



UNIT PROFILE

Grasim Industries Limited, a flagship Company of Aditya Birla Group of Industries was set-up in 1947 to produce Viscose Staple Fibre. The Company was accorded ISO 9002, ISO 14001, SA8000 & OHSAS18001. Today GRASIM's core businesses is Viscose Staple Fibre and Cement with Textile, Sponge Iron and Chemical form supplementary business.

As a backward integration, Chemical Division was set up in early 1970's to manufacture Caustic Soda, Liquid Chlorine and its allied products. Initially in 1972 a 100 Tons per day Mercury Cell plant based on the technology supplied by DENORA, ITALY, was set up. Thereafter another Mercury Cell Plant was set up in 1983 and by the year 1989 the Caustic Soda production capacity of Chemical Division was enhanced to 350 Tons Per Day.

In 1994, the 1st Mercury cell Plant was converted to Membrane Cell Plant based on the finite gap technology supplied by M/s. Uhde Germany which was energy efficient. Subsequently we converted the 2nd Mercury Cell Plant this year to a further highly energy efficient Membrane Cell Plant based on worlds latest zero gap technology supplied by M/s. AKCC Japan.

Product	Installed Capacity
Caustic Soda Lye	258000 TPA
Liquid Chlorine	215000 TPA
Hydrochloric Acid	73000 TPA
Bleaching Powder (SBP)	15,000 TPA,
Poly Aluminium Chloride (PAC)	36,000 TPA
Chlorosulphonic Acid (CSA),	16,500 TPA

BRIEF WRITE UP FOR ENERGY CONSERVATION

Chemical Division of Grasim Industries Limited at Nagda is committed to conserve energy at all levels, through sustained efforts. We are highly energy conscious and continuously strive hard to conserve energy and thus contribute immensely in saving the natural resources of the planet.

Manufacture of Caustic Soda is highly power intensive. Power is our major cost driver and is in fact a raw material for us which constitute 55% of the production cost presently. We very proudly say that this figure stood at 62% of our production cost and gradually brought down to the present level of 55% of production cost through sustained energy conservation effort. We at Grasim Chemical Division were always focused towards energy conservation. The earlier cell power of **3700 KWH per ton of Caustic Soda when we commenced operations in 1972 in Mercury Cell Plant was brought down through various in-house developments to a level of 2797 KWH per ton of Caustic Soda when we finally phased out the Mercury Cell plant this year.**

In pursuit of our efforts to conserve energy further and our concern for the environment we first converted one of the Mercury Cell Plants into a 260 Tons Per Day Caustic Soda Plant based on Membrane Process with know-how from M/s. Uhde GmbH, Germany in the year 1994 and the other Mercury Cell Plant was converted into a 235 TPD Caustic Soda Plant based on latest zero gap Membrane Cell technology supplied by M/s. Asahi KASEI Chemical Corporation, Japan in 2006.

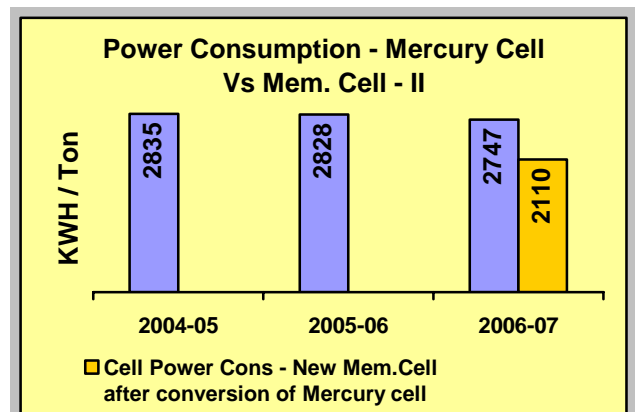
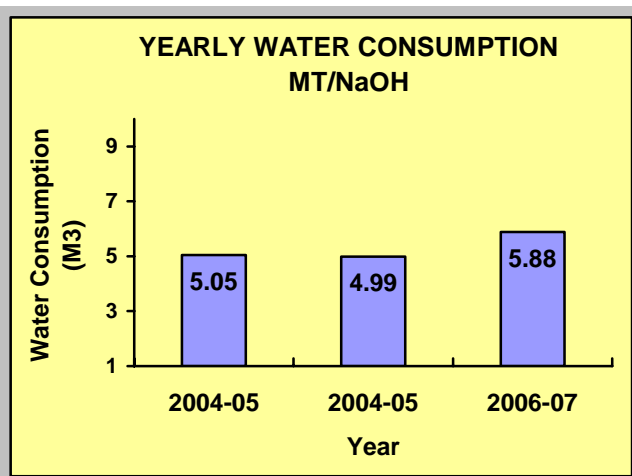
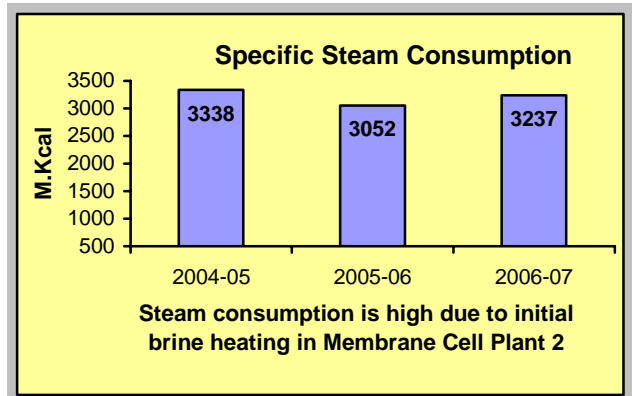
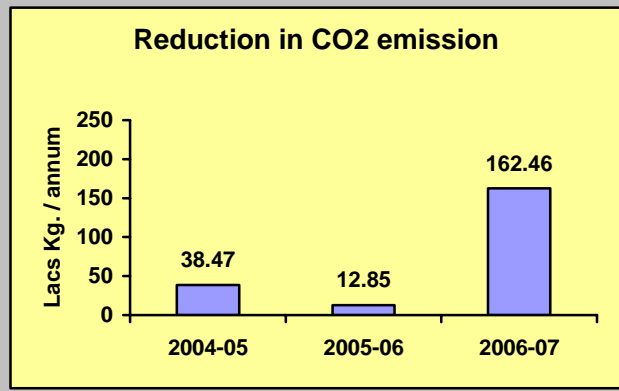
Our Group philosophy is to excel in the operational performances of the businesses we are in. Our technology supplier has rated our Membrane Cell plant as **“WORLD REFERENCE PLANT”**. This has been possible with regular interaction with the technology supplier, in-house innovations and creativity through knowledge integration programmes (K.I.P).

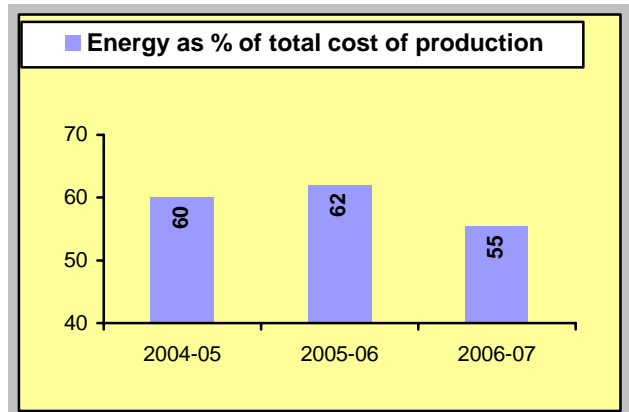
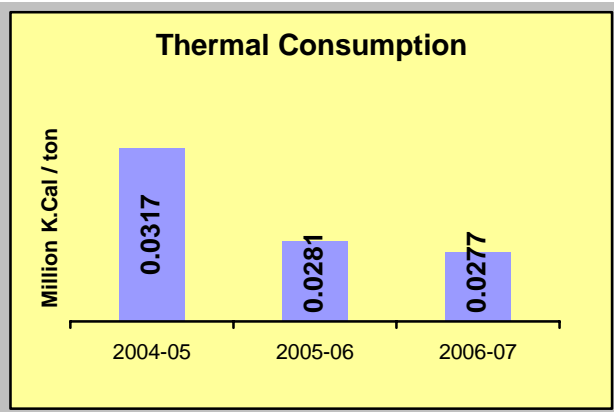
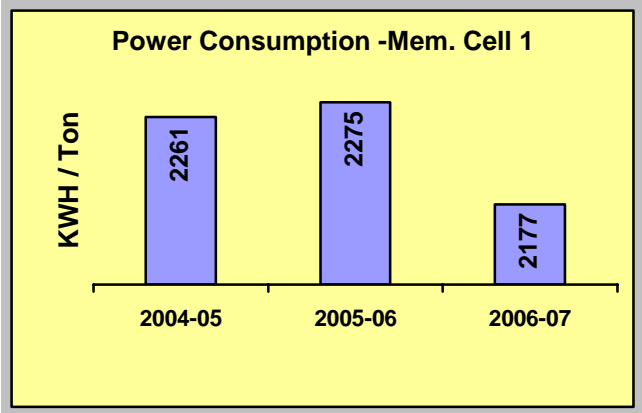
Cell Power consumption at Chemical Division’s Membrane Cell Plant has become the benchmark even for the plants operating with latest technologies of M/s. AKCC, Japan, and similar such technologies.



ii) Energy consumption

Description		Unit	2004-05	2005-06	2006-07
Electrical Energy	Mercury/ Membrane II	KWH/T	2835	2825	2797
	Membrane I		2261	2275	2177
Thermal Energy		MKCL/T	0.03172	0.02813	0.02720
Total Energy Bill		Rs. Lacs	10356.87	11644.16	12345.85
Energy as % of total cost of production		%	60%	62%	55.37%

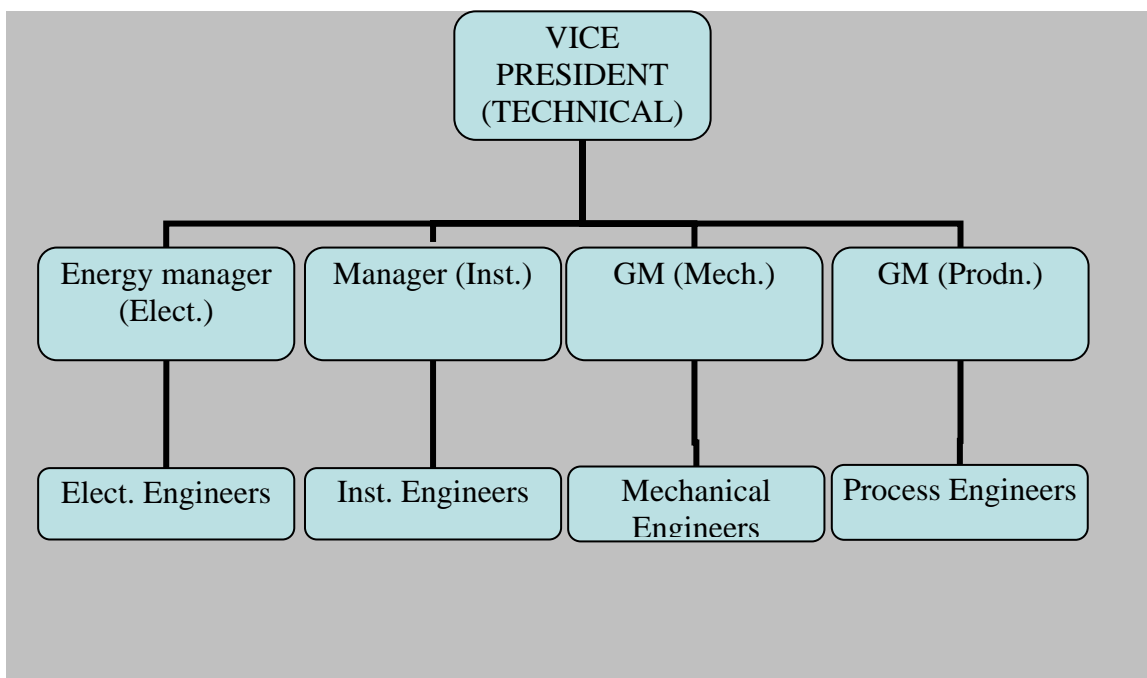




iii) Energy conservation commitment, policy, set up.

The Unit has Energy Conservation Cell and is headed by Vice President (Technical) assisted by the Energy manager and supported by Section Heads of other Engineering Function & Process Section. This team finds various energy saving potential in their areas, brings the proposal to Energy Cell for elaborate discussions and brainstorming sessions for finalization and implementation. The unit committed to fine tuning operations & maintenance continuously to achieve the goal, technology upgradation with energy efficient process and equipments, and motivating, training & encouraging employees to achieve a target of reducing specific energy consumption by minimizing 1% in Cell Power 5% in Aux. Power.

ENERGY CONSERVATION CELL STRUCTURE



Commitment

“Continual improvement” has been the way of life at Chemical Division with special emphasis on Energy Conservation:

- Unit ‘Energy Cell’ identifies various energy saving schemes and submit the same to Management for approval.
- Central Technical Cell was created for Aditya Birla Group of Industries for continuous monitoring, auditing and giving suggestions for various energy conservation measures.



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- Both Central Technical Cell having its Head Quarters at Baroda and Unit Technical Cell consist of highly qualified and well-experienced experts/specialists.
 - For Knowledge Integration among the employees of various Group Units of Aditya Birla Group, employees regularly exchange information through Knowledge Integration Programme (KIP) and synergy among group units.
 - To encourage involvement and commitment of the employees, a Suggestion Scheme was introduced among the employees, in which very practical Energy Saving Suggestions were also received and implemented.
 - Continual interactions with the Technology Suppliers and visits and interaction with best Chlor-Alkali plants in India and benchmarking various parameters is an on-going exercise at Chemical Division.
 - Energy Policy – company has institutionalized “Energy Conservation Policy” and strictly adheres to procure energy efficient equipments.
 - Unit has certified Energy Manager (approved by **BEE (NPC Chennai), May 2004 (Regn. No.655)**).
 - Every day energy consumption are reviewed in daily plant coordination meeting and corrective actions are taken and best achieved consumption is taken as target. (a sample sheet is given below).

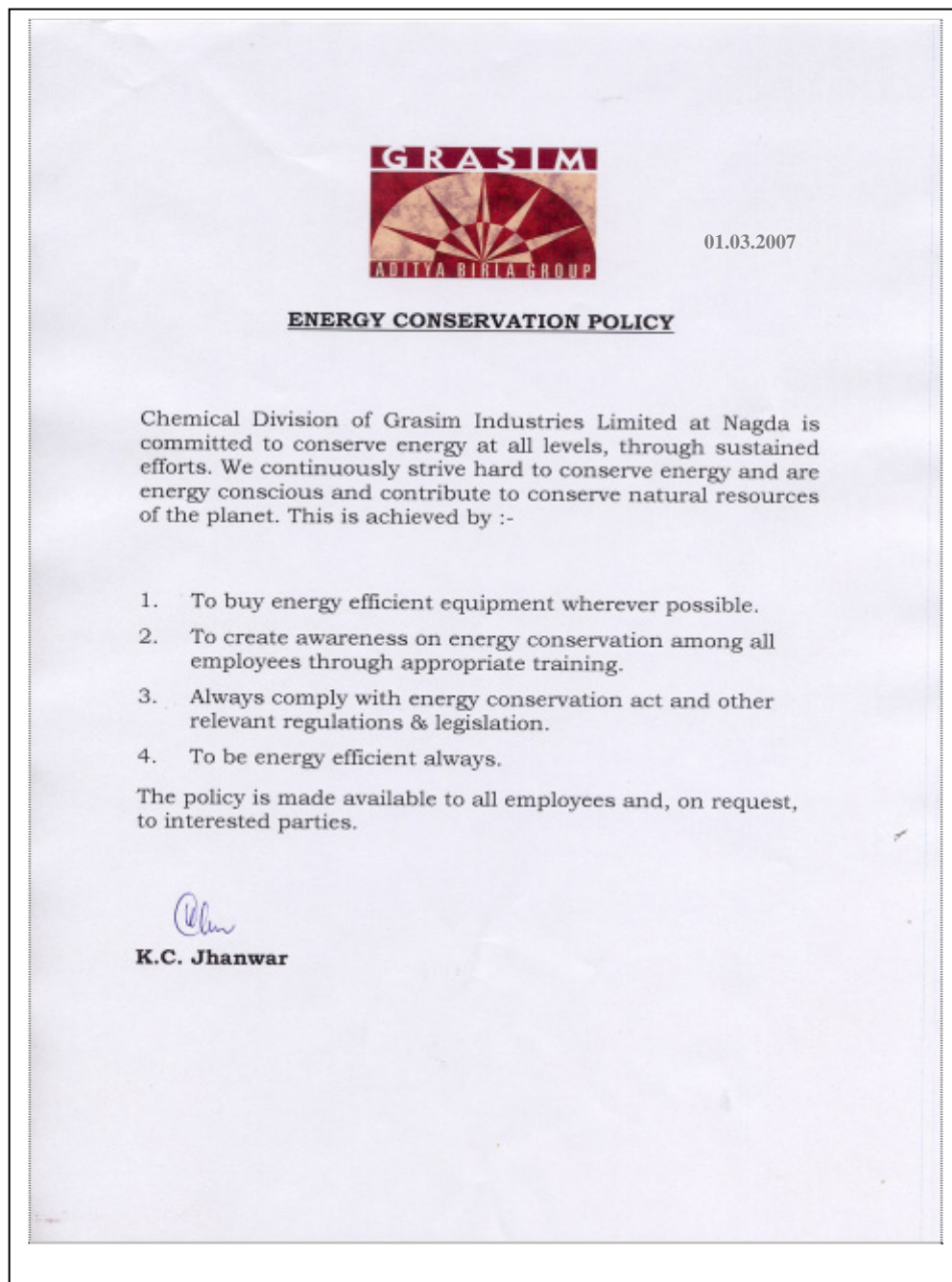


Sample Sheet

Date		15.10.07								
Plant		Production				Power				
		Unit	Target	Actual		Unit	Target	Actual		
				Yesterday	Today			Yesterday	Today	Average
Membrane Plant -1	Caustic	TPD	245	256.802	250.100	Kwh PT	2250	2223	2184	
	Chlorine	TPD	189	180.000	182.000	Kwh PT	105	110	107	
	HCl	TPD	27	50.126	41.441					
Membrane Plant -II	Caustic	TPD	311	297.730	310.710	Kwh PT	2150	2097	2126	
	Chlorine	TPD	257	235	257	Kwh PT	100	101	93	
	HCl	TPD	17	38	25					
CSF		TPD	74.5	74	74	Kwh PT	45	48	46	
Steam from H2 Boiler		TPD	192	177	198					
CSA		TPD	48	56	57	Kwh PT	26	26	25	
SBP		TPD	69	72	72	Kwh PT	125	121	115	
PAC	Liquid	TPD	190	160	160	Kwh PT	10	13	12	
	Powder	TPD	26	29	32.300	Kwh PT	180	178	162	
H2 Bottling		Nm3 Per day	20000	10024	10461	Kwh per kNm3	310	275	298	

- Benchmarking – Unit always do the benchmarking exercise for various parameters for consumptions to achieve lowest specific consumptions.
- Energy audit has been awarded to CII for the year 2006-07

ENERGY CONSERVATION POLICY





ENERGY CONSERVATION ACHIEVEMENTS

During the year 2006-07 the Unit convert Mercury cell Plant in to Membrane Cell plant

Annual saving of Rs.1769.03 lacs was archived with Investment of Rs.9567 Lacs
It has resulted percentage of reduction of 11.04 % Electrical Energy

Mercury Cell

Year	Product	KWH/Tonne	% Reduction Over 2004 - 05
2004 – 05	Caustic	3087	-
2005 – 06	Caustic	3068	0.62%
2006 – 07 up to sept-07 From Oct-07 After conversion	Caustic	3114 2360 Average 2737	11.33 %

2. Installation of Variable Frequency Drives in Primary & Secondary Brine Plant



6 Nos Variable Frequency Drives installed for brine pumps and reduced the RPM as per process requirement thereby Power consumption reduced by 2713 KWH/day

Investment : Rs. 27.5 Lacs

Savings per Annum : Rs. 42.48 Lacs

3.Optmising Cooling Water and Stopped one Booster Pump



Optimized the Cooling water Circulation system and stopped the one Booster pump thereby power consumption reduced by 1785 KWH/day

Investment : 0

Savings per Annum : Rs. 27.95 Lacs

4. Installation of Energy Efficient Screw type Freon Compressor



Installation of energy efficient screw type Freon compressor in place of reciprocating type compressor. Saving is 9 KWH / T of liquid chlorine) i.e. 7.84 lacs KWH/annum.

Investment	Rs.120 lacs
Saving	Rs.34.00 lacs per annum

5. Replacement of Low Capacity Chlorine Compressor 30 TPD with higher Capacity 65 TPD Chlorine compressor.



Replaced 2 x 20 TPD Cl₂ compressor with 65 TPD compressor and achieved the saving of 1041120 KWH/annum.

Investment : Rs 124.5 lacs

Savings : Rs 45.28 lacs per Annum

6. Installation of Energy Efficient Screw type Air Compressor with Variable Frequency Drive



**Installed one Energy Efficient Screw type Air compressor with VFD for instrument air
And stopped reciprocating compressors.**

Saving 216000 KWH/annum

Investment : Rs. 42.5 Lacs

Savings per Annum : Rs. 9.39 lacs

7.Replacement of Low Efficient Aux. Transformer with Energy Efficient Transformer



Replaced low efficiency 1000 KVA Aux. Power Transformer with 1250 KVA Energy Efficient

Aux. Transformer. and saving achieved by 105820 KWH per Annum

Investment	Rs.16.5 lacs
Saving per Annum	Rs.4.60 lacs

8. Installation of Harmonics Filter Banks to improve the suppress the harmonic level as well as to improve the power factor.



Power saving 276480 KWH annum

Investment Rs.63.5 Lacs

Saving Rs.12.44 lacs/annum



Other Major initiatives implemented for Energy Conservation during the year 2005-06

Sl. No	Title of Energy Saving project implemented	Saving in lakh KWH	Savings (Rs.in lakhs)	Invest. Made (Rs. in lakhs)
1	Replacement of old & inefficient Motors with Energy efficient Motors	0.31	1.35	4.5
2	Replacement of old & inefficient padding Air-compressor With screw type Energy Efficient Air Compressor	0.59	2.57	7.75
3	Replacement of 40 watt tube lights with E+ tube lights	0.29	1.28	0.85
4	Stopping of one 30 H.P Chilled water circulation pump	1.59	6.95	0
5	Installation of Energy Efficient Pumps	0.90	3.92	10.00
6	Replacement of inefficient Vacuum pumps with E.E.Vacuum pump	0.71	3.01	03.50
7	Replacement of convention indicating lamps with LED lamps	0.50	1.70	0.75
8.	Process optimization of RO Plant	1.08	4.67	-
9.	Reduce running time for air blower for polished brine sludge tank & from 24 to 4 hour	1.08	4.67	-
10.	By installation of temperature control of cooling water by speed variation (TPH fan direct	1.00	2.5	-
	TOTAL	8.05	32.62	27.35



Achievements

List of Certifications (ISO-9000/14000) Encon, Environment, Quality, Productivity and other Awards won during 2003 – 2006

CERTIFICATION & AWARDS/ACCOLADES

In recognition of the efforts towards maintaining greener & cleaner environment and in the field of environmental conservation, Grasim industries Limited, Chemical Division received following certificates and awards:

2006

2006 - Greentech Gold Award for Out standing Achievement in Safety Management
2006-Golden Peacock Environment management Award
2006- Indira Gandhi Memorial National Award for Best Pollution Control
2006- Greentech Gold Award for Environment management excellence award
2006- CII Energy management award runners-up
2006-National safety council, MP chapter HSE award to Membrane cell plant
2006- National safety council, MP chapter HSE award to CSA & PAC plant

2005

2005-National safety award to Membrane Cell for longest accident free years
2005-National safety award to CSA plant for lowest average frequency rate
2005-Certificate for Strong Commitment to Excel: CII - EXIM bank award for business excellence
2005-CII Energy management award runners-up
2005- Golden Peacock Eco Innovation Award
2005 – Greentech Safety gold Award
2005 - Jawaharlal Nehru Environmental & Ecological Gold Award
2005- Greentech Environmental Gold award
2005- Rajiv Ratna Best Chief Executive Gold Award
2005- Best pollution Control Implementation Gold Award from Public Sector Today

Many more awards were won by the organization in the previous years (2000-2004).



(v) **ENERGY CONSERVATION PLANS & TARGETS FOR 2007-08**

Energy Conservation Measures (Planned)	Anticipated savings in		Approx. investment (Rs.lakhs)	Project Commencement & Completion year
	Energy Value (specify units)	Rs. Lakhs		
Replacement of 110 2nd generation Elements with 5th generation Elements	28.02 Lacs KWh/Annum	122	850	2007-08
Primary Brine Unification	9.05 lacs KWh/Annum	39.36	180	2007-08
88 Element Addition in the Membrane Cell-2	79 lacs KWh/Annum	343.65	650	2007-08
TOTAL	116.07	505.01	1680	



vi) ENVIRONMENT AND SAFETY

ENVIRONMENT AND SAFETY

Steps For Environment Protection:

Grasim Chemical Division considers important to fulfill its societal responsibility by being proactive, integral and responsible towards the environment. The company is committed to the implementation of all environmental safeguards. The company policy demonstrates its commitment to the environment. Adoption of Membrane cell process with latest technology and closer of mercury cell technology plant forever is one of the examples of taking care of environment and community at large. The membrane cell process is superior in many ways to the mercury process. Membrane Cell process does not use mercury at all, mercury pollution in air, water and solid waste is totally eliminated. As a result of elimination of the main pollutant, mercury, the problems of treating wastewater and managing hazardous waste are avoided.

To ensure high standard of Safety, Health & Environment, our organization has implemented international standards i.e. OHSAS 18001, ISO 14001, ISO 9001 & SA 8000

Adoption Of Environment-Friendly & Efficient Technology And Products:

- ❖ Mercury cell plant totally discarded and to keep pace with modern technological improvements and eco-friendly movement, New Membrane Cell Caustic Soda Plant based on zero gap technology commissioned in 2007.
- ❖ This is a World Class ultra modern internationally benchmark plant in terms of pollutants, energy efficiency, and other performance parameters.
- ❖ Membrane cell process does not use mercury at all, hence mercury pollution in air, water and solid waste is totally eliminated.
- ❖ Complete process automatized by adapting the latest Distributed Control System [DCS], enabling better control over process parameters.
- ❖ Hi-tech HCl single furnace with higher capacity, the suction operation methodology minimizes HCl vapor emission to air.
- ❖ Compact sodium hypo plant for minimizing chlorine gas emission to air
- ❖ Vacuum drum filters of latest technology for maximum recovery of brine
- ❖ Up gradation of effluent treatment facility for efficient treatment.
- ❖ The products caustic, hydrogen and chlorine produced is mercury free
- ❖ Power consumption savings up to 20 to 30%.
- ❖ The sturdy and modern design of cell results into high purity of chlorine with no emissions.
- ❖ Increased use of hydrogen gas (which was earlier vented) as a fuel in boiler and other plants. Its help us in reduction of CO₂ emissions.
- ❖ Disposal site adjacent to company premises covered as per CPCB guideline.
- ❖ Salt quality parameters improved and thus reduce the quantity of brine sludge generation and improve the brine quality for electrolysis.
- ❖ Chlorine blower of higher capacity started, which helps in reduction of power consumption, better utilization of chlorine and reuse of gland cooling water.
- ❖ Modifications have been done in Chlorine-scrubbing system to eliminate chances of chlorine emissions in abnormal conditions.



Water Pollution Control:

Details of Water Pollution Control measures:

S.No	Reference	Details of E.T.P.	Capital cost	Date of commissioning
a.	For industrial effluent	Given below	183+20=203 lacs	1984(old)&2006 upgraded
b.	For domestic effluent	Given below	Approx. 6.0 lacs	1990

For industrial effluent:

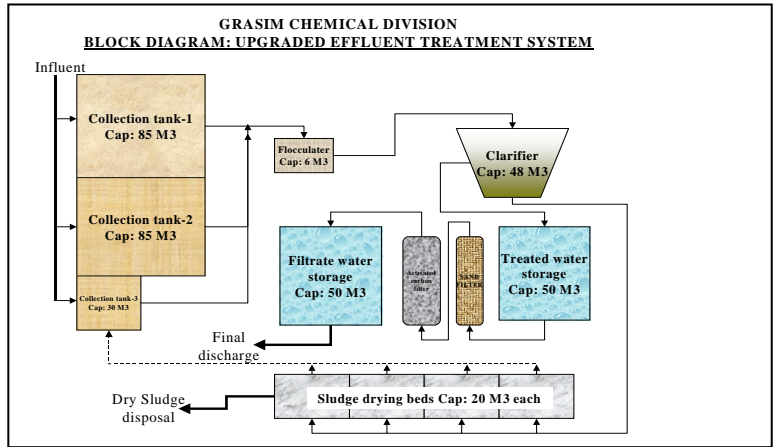
Grasim's chemical division caustic soda plant at Nagda has a lot of in-built design features, which go a long way towards pollution abatement. Following basic features have become the guiding parameters for caustic soda plant towards handling pollution abatement:

- Segregate the effluent and put back to recycle.
- Collect waste waters in specially designed pits in each section and with the use of pumps and equipment of special material of construction, recycle, reuse and send the final very small purge streams to central liquid effluent treatment system.

Effluent treatment system treats the effluent to achieve standard set by the M.P. pollution control board for prevention and control of water pollution. The salient features of upgraded liquid effluent treatment consist of Collection and Equalization, pH correction, Aeration, Flocculation, Clarification, 2-stage filtration and ETP sludge collection drying beds.

Domestic effluent: The domestic effluent is aerated and used for gardening purpose. Development efforts to minimize the generation or to recycle / reuse the effluent are a continuous process at Grasim Chemical Division.

KEY FEATURES OF EFFLUENT TREATMENT FACILITY



Incoming effluent



Chemical dosing system



Aeration



Flocculation



Clarification



Top view of clarifier

Bottom sludge



Filtration – 2 stage



Sludge drying



Top view of sludge drying beds

















Final discharge



Resource Conservation Recycling of Water at Grasim Chemical Division

Re-utilization measures and its percentage use in industry

STEPS FOR REUSE / RECYCLE OF WASTE

-  Use of D.M. plant rejects water in place of filter water (100%)
-  Recycle of effluent in respective section (MCP unit I & II 85%)
-  Use of D.M. plant reject in D.M. plant II (100%)
-  Throttling of water valves at various places in plant.
-  Restricted blow down of cooling towers (80-85%)
-  Reuse of steam condensate (60%)
-  Check & immediate repair of leakages if any (100%)
-  C.S.F. effluents recycle in scrubbers (100%)
-  Operation of cooling water system in a 100% closed loop.
-  Recycling of hot water rejection of HCL furnace (100%)
-  Segregation, recycle, reuse of the waste water generated in various sections of the plant(90%)
-  Disposal of brine mud sludge in cake form in place of slurry (100%)
-  Reuse of HCL gas scrubbing water in process (100%)
-  Recycle of condensate from Chlorine and Hydrogen pipeline (100%)
-  Use of treated domestic water for plantation within premises (100%)
-  Recycle of pump gland cooling water (100%)

Air Pollution Control:

Details of air pollution control measure:

Membrane cell plant: Unit-1

Sn	Name of the Scrubber	No. of units	Control system	End use	Waste generated
1	Alkali Scrubbers	2	Absorption of unreacted Chlorine to produce bleach liquor	Bleach liquor, which is a product, is used for bleaching.	No waste is generated.
2	Water Scrubbers	6	Absorption of HCl vapours in water.	HCl thus produced is a product.	No waste is generated.

Membrane cell plant: Unit-2

Sn	Name of the Scrubber	No. of units	Control system	End use	Waste generated
1	Alkali Scrubbers	2	Absorption of unreacted Chlorine to produce bleach liquor	Bleach liquor, which is a product, is used for bleaching.	No waste is generated.
2	Water Scrubbers	6	Absorption of HCl vapours in water.	HCl thus produced is a product.	No waste is generated.

Stable Bleaching Powder plant:

Sn	Name of the Scrubber	No. of units	Control system	End use	Waste generated
1	Alkali Scrubbers	2	Absorption of chlorine	Bleach liquor thus produced is recycled in plant process.	No waste is generated.
2.	Bag filters	10	For control of SPM	Not applicable	Not applicable

Poly Aluminium chloride plant

Sn	Name of the Scrubber	No. of units	Control system	End use	Waste generated
1	Water Scrubbers	3	Absorption of unreacted HCl vapours in water.	HCl and Al ₂ O ₃ enriched water produced, is used in making PAC.	No waste is generated.

Chlorosulphonic acid plant

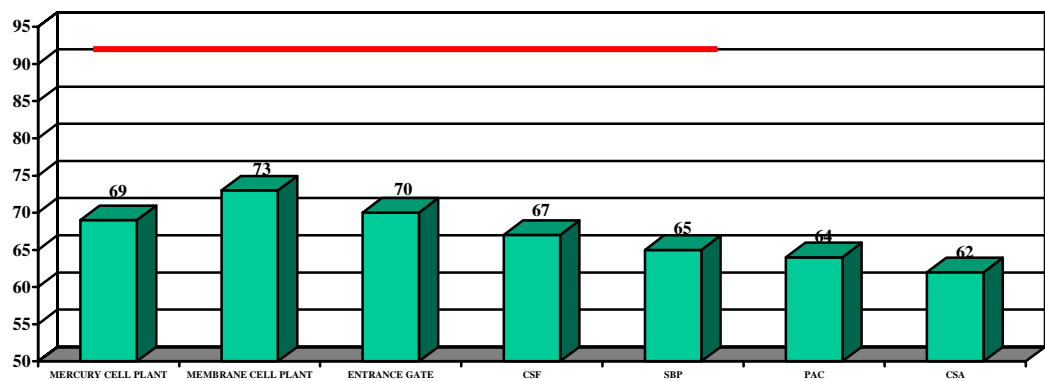
Sn	Name of the Scrubber	No. of units	Control system	End use	Waste generated
1	Water Scrubbers	1	Absorption of HCl vapours in water.	HCl thus produced is recycled in plant	No waste is generated.

				process.	
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Noise Pollution Control:

The ambient as well as industrial source noise levels are well within the critical noise exposure limit for 8 hour.

AVERAGE NOISE LEVEL IN THE PLANT AREA



Solid Waste:

The brine sludge is stored in the HDPE film lined Secured land fill facility

The Brine Sludge, is allowed to settle in RCC pits, which have chemical resistant brick lining. After settling in the pits the brine is decanted and recycled to process. The thick sludge thus obtained in RCC pits, is dewatered by Vacuum Drum Filter. The brine sludge contains impurities of salt in the precipitated form e.g. BaSO₄, CaCO₃, Mg (OH)₂, NaCl, SiO₂, Fe (OH)₂.



VACUUM DRUM FILTER



SECURED LANDFILL FACILITY



The dewatered sludge in cake form is transported by our own Tractor Trolleys to the double HDPE film lined secured landfill [SLF] site for disposal, which is located within plant premises. The site is maintained under lock & key round the clock and no unauthorized entry is permitted. The cake is dumped in the HDPE film lined SLF and is further leveled, covered with soil cover and compacted. The brine sludge is stored in SLF as per conditions of authorization and the site is developed as per the latest CPCB guidelines.

Noise, Effluent & Pollution Hazards:

Chemical Division has initiated various environmental friendly processes to reduce pollution hazards.

Health Risk:

Company has taken various initiatives to address health risk in its operations. Following measures are taken to avoid health risk to the employees / nearby communities-

- Follows safe practices recommended by safety council.
- Carrying out analysis for on-site and off-site risk.
- Ensured public liability insurance.
- Created emergency response cell, conducting mock drill etc.
- Conducted environment and safety audit.
- Maintains first aid room within factory premises.

Organisations Occupational Health Services Set Up And Achievements

A very well equipped 123 bed hospital named 'Indubhai Parekh Memorial Hospital' is run by our organization for all the employees (contractor worker, workers & staff) and the general public for treatment of any type of diseases / occupational health check-up.

The Doctors working in Hospital are well qualified and experienced. At least 1-2 doctor along with full staff of nurses & assistants is present round the clock in the hospital to take care of any emergency.

The company has given credit facility to the employees and his family members for medical treatment and purchase of medicine.

Following facilities are available at 'Indubhai Parekh Memorial Hospital':

S.No.	Facility	Nos.
1	Intensive care unit 'ICU'	9 beds
2	Male ward	7 beds
3	Female ward	40 beds



4	Maternity ward	10 beds
5	General ward	57 beds
6	Eye ward	1 no.
7	Operation theater	1 no.
8	Labour room	1 no.
9	X-ray deptt.	1 no.
10	ECG deptt.	1 no.
11	Sonography deptt.	1 no.
12	Pathological lab with blood bank	1 no.
13	Separate dressing room	1 no.
14	Car	1 no.
15	Ambulance	2 no.

The routine medical examination of all the employees is carried out once in a year. Health register in the form no. 21 of M.P. factories rules, 1962 is being maintained at our organization.

Apart from above facilities our organization also has strong set up of first aid treatment. First Aid Centre manned with two first aid attendants.

Our first aid center is having two rooms and provided with necessary medicines and equipments:

First aid room
Dressing room
Beds
Oxygen cylinders
Stretches
First aid medicines
Sterility facilities
Qualified first aid attendants
First aid boxes

At least one watchman trained in first aid is present in 2nd and 3rd shift. About 30 employees are trained in first aid. One jeep is always available in the factory for any emergency. If any accident occurred in the factory, the injured employee is given first aid and sent to ESIC hospital / Indubhai Parekh Memorial Hospital.

Other Indices For Effectiveness On Environment Protection:

In addition to the above indices for measuring effectiveness on environmental protection, Chemical Division has been obtaining the various other requirements through-

- The 'Environment Impact assessment (EIA) study
- Nearby community requirements
- Requirements received from other different bodies
- Yearly environment audit. Environment statement is submitted to MPPCB every year.



All these also form the basis of formulating plan for environmental / community care activities. The environmental cell derives annual action plan defining goals, responsibilities. A budget for environmental care and community initiatives is drawn up.

Measures Taken For Ecological Balance:

Company has taken various measures to protect ecological imbalance. The organization has been able to balance the various ecology parameters successfully through following initiatives.

Pollution control: Water , air & solid waste	Set up effluent treatment plant and solid waste disposal arrangement.
Environment Management System implementation	ISO 14001 environmental Management System implemented
Plantation	Number of trees planted.
Resource conservation, waste recycling	Refer preservation of resources
Noise reduction	Well within limit in all area.

Number Of Environmental Incident / Accident : None

Green Belt Development

Grasim Chemical Division has carried out extensive plantation all around the Grasim plant located at Birlagram, Nagda in the state of Madhya Pradesh. The lush greenery all around Grasim, complex is result of extensive plantation and horticultural activities carried out over the years.

Steps taken to protect plantation:

1. Survey of soil and site for survival of appropriate species.
2. Sapling preparation in nursery.
3. Plant staking and tree guards.
4. Periodic watering.
5. Manure and fertilizer addition.
6. Spray of pesticides, fungicides and plant hormone at fixed interval

Survival rate of plantation is 100% as we have replaced the plants in case of any mortality.

Following varieties of Plants / spices have been planted in and around Grasim Complex

S.NO.	SPECIES	S.NO.	SPECIES
1	EUCALYPTUS HYBRID	13	THUJA COMPACTA
2	THESPESIA POPULNEA	14	BOUGAINVILLEA
3	CALISTEMON LENSOLETUS	15	POLYALTHIA PENDULA
4	ACACIA AURICULAEFORMIS	16	IXORA
5	AZADIRACHTA INDICA	17	MANGOLIA GRANDIFLORA



6	BOUHINIA BLACKEANA	18	FICUS ELASTICA
7	THEVETIA NERIFOLIA	19	HIBISCUS ROSA SINENSIS
8	FICUS BENJAMINA	20	BOTTLE PALM
9	CAESALPENIA	21	MANGOES
10	NERIDIUM ODORUM	22	PEACHES
11	TABERNAE MONTANA CORONERIA	23	GRAPES
12	GARDENIA FLORIDA	24	COCONUT

TOTAL NOS. OF TREES IN AND AROUND GRASIM COMPLEX IS AROUND 1.95 LACS .

Cost Benefit

Cost Of Environmental Protection :

Company makes conscious effort toward environment protection and various control measures. Separate cost of environment protection and in turn benefits cannot be very accurately measured, however the company investment in environment protection is as follows:

Investment On Environment Protection & Effective Implementation

Capital Investments on Industry: Rs. 308.61 crores

Capital Invested for Pollution: Rs. Approx 1.50 Crores (For chlorine scrubbing system, effluent collection pits, new Hcl furnace, capping etc.)

Annual recurring expenditure for pollution control measures: Rs. 0.66 crores

Key Practices, Activities, Risks And Measures Related To Legal And Regulatory Norms

Grasim Industries Limited Chemical Division considers the fulfilling of its societal responsibility as an opportunity to serve society and for going well beyond the mere compliance of regulatory and legal norms. Some of the norms that are required to be complied with are shown below. Grasim Chemical Division meets its obligations completely and goes beyond statutory requirements year after year.

Key practices	Legislation / regulation	Area/ Coverage	Activities	Risk associated	Achieved 2004-05	Target 2005-06
Environment monitoring	Air act 1981	Works /town	Stack emission monitoring Work area environment Ambient air quality	Air pollution	8 milli gms cl2 /m3 of air	7 milli gm/m3 of air
Environment monitoring	Water act – 1974	Works outlet drain	Measurement and analysis of effluent water	Water pollution	0.18 m3 /t NaOH	0.15 m3 / t NaOH



Waste utilization/disposal	Environment protection act 1986	Works / town	Solid waste disposal	Land / water pollution	100% in own secured land fill area with in organization campus	100%
Resource conser-vation	Environment protection act 1986	Works	Reduction of specific raw material consumption Water consumption Energy consumption	Depletion of natural resources, cost overrun, env. pollution	5.63 m3/t NaOH	5.0-5.50 m3/t NaOH
Legal compliance	Income/wealth/sales/excise tax act	Corporate/suppliers/imports/assets	Filling of returns & assess Payment of custom duties Issue of declaration	Legal action	100% compliance	100% compliance
Legal compliance	P fund	Employees	Rec. deposit & returns	Legal action	100% compliance	100% compliance

Impact On Society:

Number of general complaints: None

Number of general infringement : None

Number of safety related accident : No major accident occurred.

List Of Major Safety Appliances, Equipment & Devices

S.No.	Safety Appliances	Safety Equipment	Safety Devices
1	Safety Belt	Scaffolding	High / Low Level Alarm For Tanks
2	Safety Helmet	Net	
3	Safety Goggle	Crawling Board	Overflow Alarms For Tanks
4	Face Shield	Portable Ladder-Rope And Aluminium Ladder	Emergency Trip Switches At Cell House
5	Hand Gloves	Siren / Hooter	Exhaust System
6	Suit / Apron	Chlorine Emergency Kit	Interlocking Of Equipment Tripping With Power



7	Life Jacket / Suit	Portable Electrical Appliances / Tools	Isolating Valves At Strategic Points
8	Gas Masks	Safety Tools	Electrical Earthing Of Equipments, Pipelines, Machine, Vessels Etc.
9	Breathing Appratus	Portable Public Address System	Scrubbing System
10	Gum Boots	Electric Discharge Rod	System To Avoid Any Reverse Flow Of Liquid And Gases
11	Chlorine Emergency Kit	Bund Wall / Dyke	Pipeline, Valve, Flange Joints And Instruments As Per P & I Diagram

SPECIAL FEATURES OF ENVIRONMENT MANAGEMENT

Grasim Chemical Division considers important to fulfill its societal responsibility by being proactive, integral and responsible towards the environment. The company is committed to the implementation of all environmental safeguards. The company's environmental policy demonstrates its commitment to the environment **“Continual Improvement”** has been the way of life at Chemical Division with special emphasis on Environmental Improvement.

Following Features Makes Our Organization Strong Candidate For The Award

- ❖ Unit has ISO 14001 certification since Apr. 2002 and have certified internal auditors team for carrying out six monthly environmental audit.
- ❖ Our CEO is a member of the executive committee, Alkali Manufacturers Association of India and has a key role in study of critical equipments of the Chlor Alkali industry.
- ❖ CREP- Corporate Responsibility on Environment Protection, CREP is an understanding between industry & regulatory authorities. GRCD has proactively participated in AMAI meetings and all requirements are being met with as per targets. Action plan with status is enclosed.



- ❖ Water conservation measures over last two years have reduced water consumption considerably.
- ❖ Second largest Chlor-Alkali plant in the India.
- ❖ Adoption of World Class Manufacturing (WCM) concepts in all areas of industrial activities. WCM encompasses TPM & TQM systems also. We have won gold medal for manufacturing excellence (02-03).
- ❖ Energy conservation measures adopted and saving of Rs. 823 lakhs achieved.
- ❖ 4% improvement in productivity as compared to last year.
- ❖ Most modern effluent treatment plants for industrial and domestic effluents. 100% effluent confirms excellent quality of treated wastewater.
- ❖ Many water conservation, energy conservation & waste reduction initiatives are taken.
- ❖ There is continuous reduction in waste loads and inputs are very near to stoichiometry.
- ❖ Senior management involves in all environmental & pollution related matters and meets all shop floor staff every week to deliberate on problems & initiatives.
- ❖ Every day environmental related issues are discussed in daily plant coordination meeting and corrective actions are taken, if any.
- ❖ Unit 'Environmental Cell' identifies various environmental improvement schemes and submits the same to management for approval.
- ❖ Environmental and Safety task force was created for Aditya Birla Chemical business units for continuous monitoring, auditing and giving suggestions for various environmental protection / improvement measures.
- ❖ Environmental & safety task force consist highly qualified and well-experienced experts on environment & safety from each unit.
- ❖ For Knowledge Integration among the employees of various Group Units of Aditya Birla Group, employees regularly exchange information through Knowledge Integration Programme (KIP) on environmental issues.
- ❖ To encourage involvement and commitment of the employees, a Suggestion Scheme was introduced among the employees, in which very practical Environmental improvement Suggestions were also received and implemented.
- ❖ Continuous interactions with the Technology Suppliers and visits and interaction with best Chlor-Alkali plants in India and benchmarking various environmental parameters is an on-going exercise at Chemical Division.
- ❖ Environmental Policy – company has institutionalized “Environmental Policy” and strictly adheres to comply with all points of policy



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- ❖ Benchmarking – Unit always do the benchmarking exercise for various environmental monitoring parameters by setting its own target much below the specified target.