

Unit Profile

Shriram Vinyl & Chemical Industries (SVCI) established in the year 1963 is situated at Kota in state of Rajasthan, in the North - western part of India.



View ---→ Membrane based Chlor Alkali Plant at Kota

SVCI is a part of **DCM Shriram Consolidated Limited (DSCL)**, a company with turnover of **Rs. 2540 crores** and primary business interests in

Agri-Business (Urea fertilizer, Sugar, Farm inputs marketing such as DAP, Pesticides, Seeds, Agri retailing - Haryali Kisan Bazaar)

- ⇒ Plastics (PVC and PVC compounds)
 - ⇒ Chemicals (Chlor-Alkali)
 - ⇒ DSCL Building Products (Fenesta door and window profiles)
- Other businesses include Cement, Textiles and Energy Services.

Founded by Sir Shriram in 1889 (as DCM limited), today DSCL (which spun of as a separate company in 1990) is managed by Mr. Ajay S. Shriram, Chairman and Senior Managing Director and Mr. Vikram S. Shriram, Vice Chairman and Managing Director along with a highly professional executive team.

DSCL has strong brand equity reflective of credibility, ethical values and consistent high quality product image. With over 30 years of experience in managing large scale process industries with sustained high level of performance, DSCL meets the needs of a wide range of customers from farmers to industrial users, from house builders to business owners. Fostering enduring relationships is at the core of DSCL's

business philosophy - with vendors, business partners, and customers and within the organization between employees.

In year 2004-05, for improving the performance in terms of energy efficiency & environment we embarked on conversion project. In March'05 we completed the conversion & became the first Indian Plant completing the conversion of Old Mercury based plant to Energy efficient Membrane plant after CREP (Charter for corporate responsibility for Environmental protection) recommendations.

Since 22nd March'05, we are operating membrane based plant successfully.

We obtained the technology from M/s. Asahi Kasei Japan. Our Electrolysers are based on Natural Circulation. M/s. Asahi Kasei has supplied these **NCS types** of electrolysers "**First time in India**".

Natural circulation has superiority in terms of power consumption, simplicity over the conventional forced circulation electrolysers.



View---> Natural circulation **NCS type** of electrolysers

After completing conversion successfully, we have achieved capacity expansion by **installing NCH (Natural circulation with High Efficiency) type of electrolyser.**

NCH type has superiority over NCS type in terms of power consumption at higher current density operations.



View -----> NCH type of electrolyser – Next higher version of NCS type of electrolysers.

At SVCI, besides **utmost importance to implementation of EC measures, continual improvement** in quality, environment & safety is being achieved by:

- ☞ **ISO 9001 –2000**: To consistently meet customer expectations and enhance customer satisfaction. **System is in place since Feb'1997.**
- ☞ **ISO-14001**: To continue to remain an environmentally responsible entity **System is in place since Oct'2000.**
- ☞ **OHSAS 18001**: For continual improvement in Occupational Health & Safety. **System is in place since Apr'2003**
- ☞ **TPM (Total Productive Maintenance) :** to build a comprehensive productive management system for entire life span of the equipment.
- ☞ **British Safety Council - Five Star Rating :**
Latest initiative of aligning our safety management system with British Safety Council guidelines and ultimately qualify for "sword of honor".
Received "**Five Star**" rating **twice** in continuation in the **years 2005 & 2006.**

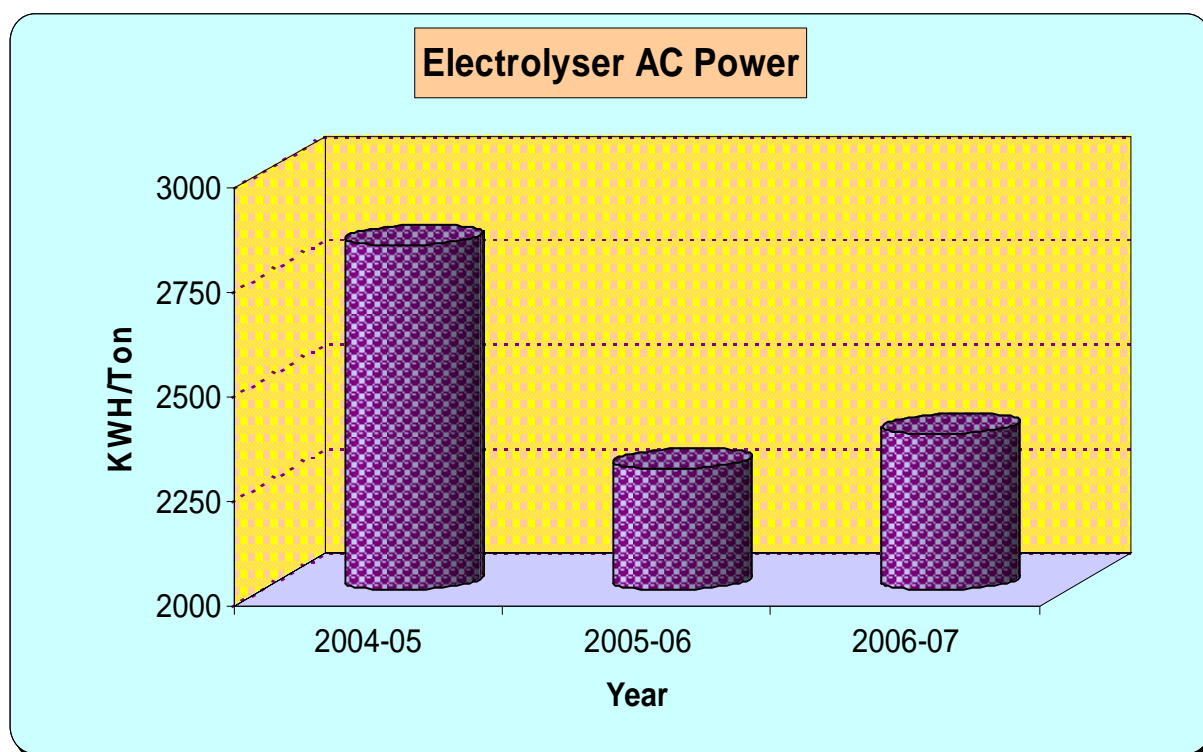
(ii) Energy Consumption

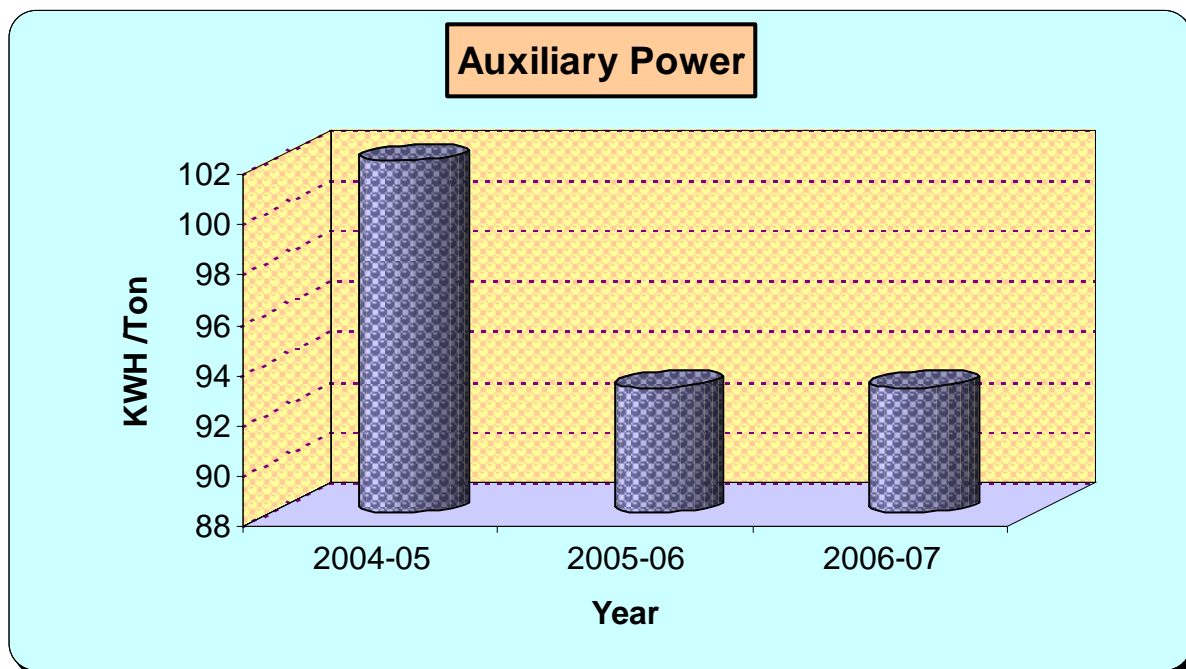
Chlor Alkali plant is an energy intensive plant. The AC Power is converted to DC power by rectifiers. DC power is used for electrolysis. During electrolysis, Caustic soda lye, Chlorine & Hydrogen are generated. Part of the main product caustic soda lye is being converted to Caustic soda flakes as per the market demand.

Specific Energy Consumptions during the period 2004-2006

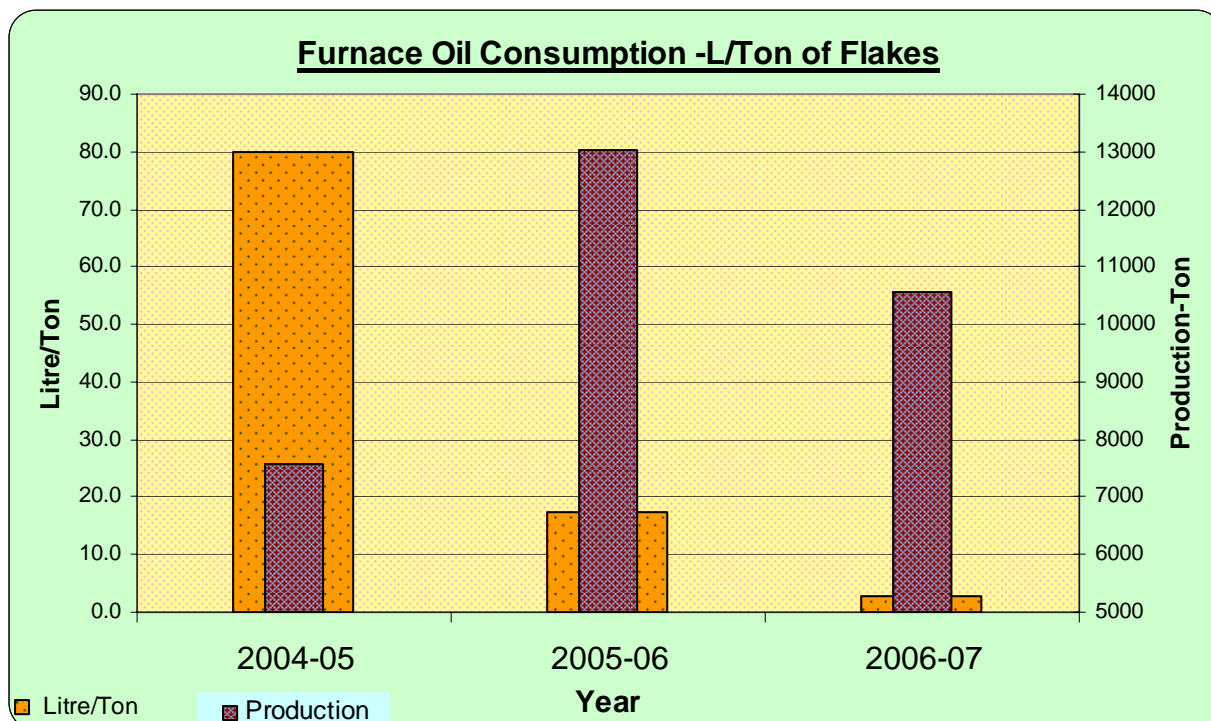
Year	No. of measures implemented	KWh / Tonne of caustic soda		Furnace oil consumption Ltr/ton of flakes
		Electrolyser AC Power	Auxiliary power	
2004-2005	1	2823	102	80.0
2005-2006	13	2288	93	17.4
2006-2007	7	2372	93	2.9

Graphical presentations of last three-year consumption are as under:





For converting the caustic soda lye into flakes, SVCI has a fusion plant of capacity 45 TPD. Combination of Furnace Oil & Hydrogen can be used for heating & converting 47.5 % of Caustic soda lye to flakes (~ 98% un-hydrous NaOH). Heating of lye is carried out in six furnaces in series with Nickel pots. Heating of pots is done by burning Hydrogen or Furnace oil.



In year 2006 - 2007 the unit consumed 2708 lakhs KWH of electricity. The cost of consumed electricity is 72 Rs. crores.

(iii) Energy Conservation Commitment, Policy and Organizational Set up

Continual improvement in Energy Management is a key component of our strategy to improve cost competitiveness of our products and their long-term profitability.

We have "Energy Policy" in place. We are committed for benchmarking our energy utilisation techniques with best practices, adopting modern techniques, retrofitting with high efficiency equipment and seeking cooperation from external agencies to reduce our energy consumption.

Copy of energy policy is enclosed herewith.

The plant has an energy conservation committee headed by Vice President (Chlor Alkali). This committee comprises of 9 (Nine) engineers looking after various sections. They interact on regular basis to discuss various EC steps and implement. In addition to EC, each person in the plant is well aware and actively participating for energy conservation and cost reduction.

The review of EC performance is done on regular basis.

Plant also has an attractive "SUGGESTION SCHEME" in-place to motivate employees towards betterment / improvement of the system, energy conservation, cost reduction etc. Suggestions received from workmen, supervisors, shift engineers, and are registered, evaluated & implemented subsequently.

The scheme generally covers all types of suggestions, which will benefit the organization.

More specifically scheme covers suggestion of following aspects: **Safety, Energy Conservation**, Cost reduction, Quality improvement, Work Simplification etc.

Cash rewards in kind ranging from Rs. 300/- to Rs. 20,000/- will be given to each accepted suggestion. In addition, there is a token reward to all eligible employees for filing a suggestion.

(iv) Energy Conservation achievement

Inline with our energy conservation commitment, policy & set-up, in last three, we had successfully implemented the 21 energy saving measures.

In the year 2006-07, the measures implemented **successfully** are as under:


Major Energy Conservation Projects Implemented During the year 2006-07

1. Proactive Approach for Optimization of Cooling Water Flow as per Operating Load

Its normal practice in process plants to circulate same quantity of cooling water flow irrespective of plant operating load OR weather conditions i.e. no flow reduction of cooling water is done as per weather conditions OR occasions of lower operating load of the plant.

In our plant we have started proactive control of cooling water flow as per the plant operating load & weather conditions by throttling of cooling tower pumps discharge valves OR even stoppage of one of the pump.

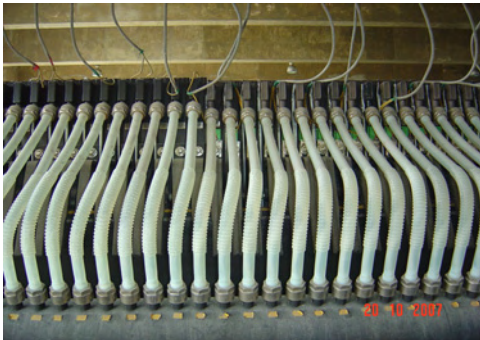
Equivalent running hrs saved	: 2500
Running load, Kw	: 85
Saving, Lacs KWH/annum	: 2.12
Amount Saved (Rs. Lacs) @2.67	: 5.67



2. Identification of Cell Units operating at higher voltage

Cell units (total – 27nos), which were running at higher voltage were identified & replaced with latest design NCH type of cell units.


Voltage before	: 3.36 Volt
Voltage Now	: 3.22 Volt
Load	: 12.5 KA
Power Reduction	: $27 * 12.5 * 0.14$
	: 47.25 Kw
Saving, Lacs KWH/annum	: $47.25 * 24 * 355$
	: 4.03
Amount Saved (Rs. Lacs) @2.67	: 10.75



3. Reduction in RPM of Brine Reactor (A-022) by using VFD

During energy audit it was observed that the power factor of the Reactor-1 agitator motor was low, also the operating load was less. Hence it was decided to improve the power factor & reduce the RPM by installing VFD. We have successfully installed the VFD and reduced the RPM from 1450 rpm to 860 rpm. This has improved the power factor and energy is saved.


Before VFD -	
Running KW	: 7.9
After installation of VFD –	
Running KW	: 2.1
Saving, Lacs KWh/annum	: 0.49
Amount Saved (Rs. Lacs) @2.67	: 1.31



4. Auto control of Cooling Tower ID Fan with Temperature

During winter, cooling water temperature is low hence there is no need to operate the ID Fan of cooling tower. A temperature auto cut off switch is installed for ID fan. It is set at 18°C i.e. when the cooling water temperature is above 18°C ID Fan runs and below 18°C it switch off the fan.

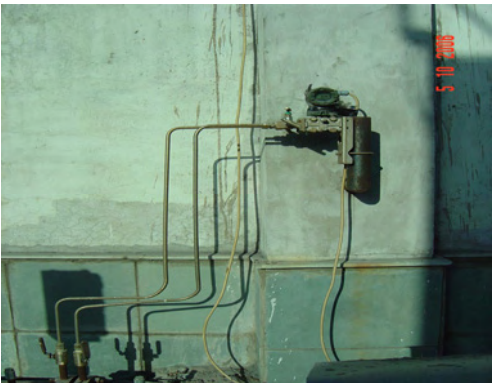
Motor Running load	: 28 Kw
Appox. Running hr Saved (for 3 months i.e. 1080 hrs.)	: 12 hrs
Saving, Lacs KWh/annum	: 0.30
Amount Saved (Rs. Lacs) @2.67	: 0.80



5. Reduction in Furnace Oil Consumption


In our flaking plant, hydrogen OR furnace oil can be used for conversion of caustic soda lye to caustic soda flakes. Conversion is essentially an evaporation process.

In year 2006-07, furnace oil consumption was reduced **to 3 Ltr/ton** (from target consumption of 15 lit/ton) by better hydrogen utilization.

Target Consumption, L/ton	: 15	
Actual Consumption, L/ton	: 3	
Net Saving, L/ton	: 12	
Production, Tons/Year	: 10566	
Net Saving, KL/Year	: 126.79	
Net Energy Saving, MKcal	: 1.20	
(@ 10000 Kcal/Kg = 9500 Kcal/ltr)		
Amount Saved (Rs. Lacs)	: 24.59	
(@19.40 Rs/Lit.)		

6. Reduction in Impeller Diameter of Cooling Tower Pump in HCL area

Cooling tower Pump performance of HCL plant area was reviewed during internal energy audit. Possibility of reduction in impeller diameter was observed. Pump characteristics with flow requirements studied. Power saving has been achieved after reduction in Impeller diameter.


<u>Earlier (Original Design) -</u>		
Running KW	: 86.25	
<u>After Modification -</u>		
Running KW	: 66.13	
Saving, Lacs KWh/annum	: 1.71	
Amount Saved (Rs. Lacs) @2.67	: 4.58	

7. Reduction in Operating Hours of Filter Back Wash Pump (P-141)

Body feed solution needs to be prepared by mixing brine & alpha cellulose. Earlier for preparation of body feed solution, pump was used for transferring brine solution from adjacent brine tank.

Practice of using pump has now been changed. Brine is being transferred to body feed tank by gravity, **instead of pump.**

<u>Earlier</u>	
Pump running hrs, Minutes/Day	: 10
Operating Power, KW	: 15Kw
<u>Now</u>	
Pump running hrs	: Nil
Saving, KWh/annum	: 15*59
	: 887
Amount Saved (Rs. Lacs) @2.67	: 0.02



(v) Energy Conservation Plans and Targets

We are committed for continual improvements in energy consumption & efficiency.

Energy Conservation Plans ----->

Energy Conservation Measures (planned)	Anticipated savings in		Approx. Investment (Rs. Lakhs)	Project commencement and completion year
	Energy Value (Lakhs KWh/Annum)	Rs. Lakhs		
Reducing the unloading hours of utility compressors by Reducing RPM of the compressors.	0.13	0.34	0.20	Commencement : Dec'07 Completion : Jan'08
Phase wise replacement of ordinary light fittings with energy efficient luminaries.	0.07	0.20	0.30	Commencement : Nov'07 Completion : Mar'08
Load sharing optimisation of chlorine compressors by installing an available bigger compressor.	6.48	22.0	15.0	Commencement : Sep'07 Completion : Oct'07
Examining the possibility of reduction in RPM of Cl2 Compressor through VFD	1.70	4.54	5.00	Commencement : Dec'07 Completion : Feb'08

Energy conservation targets ----->

Year	Electrical* KWh/Tonne	Thermal Ltr of F.O. /tonne of flakes	Reduction over the year 2006-07	
			Electrical %	Thermal %
2006-07 (Base Year)	2421	15	-	-
2007-08	2461	14	-	6.7
2008-09	2501	13	-	13.3

*: As per membrane technology norm annual increase of 40 Kwh/ton of power is expected due to deposition of Ca/mg on the membranes & ageing of cell units. Target has been set accordingly.

(vi) Environment and Safety

Being an **ISO-14001 & OHSAS 18001** certified company; **adoption of cleaner technology has always received strong emphasis at our complex.** Our all process effluents are being reused/recycled. **No discharge of any process effluent.**

In year 2005-06 to strengthen safety of work place, Health and safety management, complex was aligned to the requirements of **British Safety Councils Safety management System.**

This programme took continuous efforts on all fronts including rigorous training and change in mind sets of the people. The result of which, we have achieved the **"5 Star" rating for 3rd year of succession.**

In year 2006-07, our complex was awarded with **"Sword of Honour"**.

21. Whether any dispute pertaining to statutory requirements of safety, and pollution control is pending with any Government Agency. If yes, give details:

- Nil
- All the statutory requirements are met & compliance reports are also being submitted regularly.

**NATIONAL ENERGY CONSERVATION AWARD-2007
SUMMARY SHEET**

Unit Name: Shriram Vinyl & Chemical Industries

Sub-Sector: Chlor Alkali

1. Implementation of energy conservation measures & investment (S.No. 16, S.No. 9.3(i))

a. No. of measures implemented ,investment made & saving achieved.

Year	No. of measures implemented (i)	Investment made (Rs.lakhs) (ii)	Savings achieved (Rs.lakhs/yr.) (iii)	Energy cost (Rs.lakhs/yr.) (iv)	%Savings (savings achieved / Energy Cost of previous year) (iii/iv x100)
2004-2005	1	8900	-	3508	-
2005-2006	13	32	223	5427	6.35
2006-2007	7	33	48	7230	0.88

Remarks (if any): In year 2004-05, we have executed membrane conversion project. Reduction in energy achieved in year 2005-06 however investment was made in year 2004-05. Reduction achieved can be seen on page # 24.

2. Energy savings (S.No. 16, S.No.9.1C(a), Page -5,No. 10 R(k))

a. Absolute savings

Year	Elect. Saving (Lakh Kwh) (i)	Thermal (Fuel) saving (Mkcal) (ii)	Elect. Consumption (Lakh kWh) (iii)	Thermal* (Fuel) Consumption (Mkcal) (iv)	% Elect. Saving (savings achieved / Electricity consumption of previous year (i)/(iii) x100)	% Thermal (fuel) Saving (savings achieved / thermal energy consumption of previous year (ii)/(iv) x100)
2004-2005	-	-	1349.33	5759	-	-
2005-2006	36.82	150.81	2032.42	2148	2.72	2.62
2006-2007	8.66	1.20	2707.98	288	0.43	0.06

Remarks (if any) :

* Furnace oil is being used for flaking plant, for converting part of caustic soda lye to caustic flakes.

2.b. Specific Energy Consumption (SEC) reduction during the period 2004-2006 (S.No.11)							
Year	Product	KWh / Tonne		% reduction over 2004-2005		MKCal / Tonne	% Reduction Over 2004-2005
		Electrolyser AC Power	Auxiliary power	Electrolyser AC Power	Auxiliary power		
2004-2005	Caustic Soda	2823	102	-	-	-	-
2005-2006	Caustic Soda	2288	93	18.95	8.82	-	-
Remarks (if any) :							

2.c. Specific Energy Consumption (SEC) reduction during the period 2005-2007 (S.No.11)							
Year	Product	KWh / Tonne		% reduction over 2005-2006		MKCal / Tonne	% Reduction Over 2005-2006
		Electrolyser AC Power	Auxiliary power	Electrolyser AC Power	Auxiliary power		
2005-2006	Caustic soda	2288	93	-	-	-	-
2006-2007	Caustic soda	2372*	93	-3.67	0.00	-	-
Remarks (if any) : * Higher power consumption due to membrane contamination with Iodine.							

2.d. Specific Energy Consumption Comparison with National & International Best (S.no. 12)			
Unit's values		National / International BEST	
Product	Figures for the current Year (2006-2007)	National*	International**
Caustic Soda	Electrolysis AC power : 2372 Kwh/ton.	-	-
	Aux. Power: 93 Kwh/ton.		-
Remarks (if any) :			
<p>*: Electrolysis power varies with the operating current density. Higher the current density higher will be the power consumption & therefore for making apple-to-apple comparison of power consumption it is essential to <u>compare the operating current density as well</u>. Operating current density in our case is 4.62 KA/m² for NCS type of electrolysers & 6 KA/m² for NCH type of electrolyser.</p> <p>We do not have the data for operating current density of the other plants & hence comparison of power consumption will not present the true picture.</p>			

3. Annual Energy Savings and Annual sales Turnover (Ref. S. No. 17)			
Year	Annual energy savings achieved in (Rs. Lakh) (i)	Annual sales turnover (Rs. Lakhs) (ii)	Annual savings achieved / annual sales turnover of previous year (in %) (i/ii) x100
2004-2005	-	8147	-
2005-2006	222.94	17202	2.73
2006-2007	47.72	22274	0.28

4. Specific energy Consumption Target as Achieved During 2006-2007 [Ref. S.No. 19(a)]						
Specific Energy consumption or use actual units						
Planned target for 2006-2007 (a)		Actually achieved in 2006-2007 (b)		% Reduction (+) or increase (-) (a-b)/b x100		Money saved during 2006-07
kWh/Tonne	Ltr of F.O. /ton of flakes	kWh/Tonne	Ltr of F.O. /ton of flakes	Electrical	Thermal	Rs. Lakhs
2421	15	2465**	2.78	-1.78**	+439.56	47.72
* use appropriate units						

** Higher power consumption due to membrane contamination with Iodine.

5. Planned Specific Energy Consumption Target for the year 2007-08 & 2008-09 (Ref S. No. 19 (b))

Year	Electrical* KWh/Tonne	Thermal Ltr of F.O. /tonne of flakes	Reduction over the year 2005-06	
			Electrical %	Thermal %
2006-07 (Base Year)	2421	15	-	-
2007-08	2461	14	-	6.7
2008-09	2501	13	-	13.3

* :As per membrane technology norm annual increase of 40 Kwh/ton of power is expected due to deposition of Ca/mg on the membranes & ageing of cell units. Target has been set accordingly.

23. DOCUMENTS ATTACHED:

- I. Copies of Certificates (With year wise marking) pertaining to statutory requirements such as safety & pollution control for the period 2005-07 are enclosed.
- II. One copy each of the audited annual report for the years 2005-06, 2006-07 & 2007-08 are enclosed.
- III. A brief write up of the unit as mentioned at S.no. 22 along with photographs depicting equipments/locations where energy efficiency activities have been undertaken and a Floppy Diskette in Word are enclosed.

Date : 22.10.2007
Place : KOTA

S.C.KHANDELWAL
VICE PRESIDENT- (CHLOR ALKALI)