



REFINERY



ANODE



ELETRO REFINING



CATHODE

CC ROD



CASTING



ROLLING



CC ROD COIL



PROJECTS WITH ZERO INVESTMENTS:

- q Modification in Thermoshypon cooling water arrangement.
Savings : 4380 m3 : **Rs. 1.4 Lacs.**
- q Condensate Recovery of RVD for Filter Press Backwashing.
Savings : 1284 m3 : **Rs. 0.41Lacs**
- q Reuse of collected condensate water generated by anode casting cooling water.
Savings : 655 m3 : **Rs. 0.21 Lacs**



PROJECTS WITH INVESTMENTS:

q Rain water harvesting.

Savings : <u>Year</u>	-	<u>Water Savings</u>	
2005	-	4178 m3	(Rs. 1.25 Lacs)
2006	-	6225 m3	(Rs. 1.86 Lacs)
2007	-	9475 m3	(Rs. 2.84 Lacs)
2008	-	3560 m3	(Rs. 1.13 Lacs)
Total	-	23438 m3	(Rs. 7.08 Lacs)
Investment	:	Rs. 10 Lacs	
Payback Period	:	67 months	



PROJECTS WITH INVESTMENTS:

q Conversion of Gland Packing Pumps into Mechanical Seal

Savings	: 1728 m3 Water (Rs. 0.55 Lacs)
Investment	: Rs. 3.0 Lacs
Payback Period	: 65 months

q Provision of Electrolytic Cell covers in Refinery

Savings	: 3703 m3 Water (Rs. 1.18 Lacs)
Investment	: Rs. 1.0 Lacs
Payback Period	: 14 months

q Control valve provision in FO storage tank steam line

Savings	: 1501 m3 Water (Rs. 0.5 Lacs)
Investment	: Rs. 0.98 Lacs
Payback Period	: 24 months

q Installation of vacuum pump in Rotary Vacuum Drier

Savings	: 444 m3 Water (Rs. 0.41 Lacs)
Investment	: Rs. 0.48 Lac
Payback Period	: 39 months



PROJECTS WITH INVESTMENTS:

q Modification in CSM for cathode washing

Savings : 1027 m³ Water (Rs. 0.34 Lacs)
Investment : Rs. 0.49 Lacs
Payback Period : 17 months

q Special Nozzles for ASWM washing

Savings : 148 m³ Water (Rs. 0.05 Lacs)
Investment : Rs. 0.05 Lacs
Payback Period : 12 months

q Bosch tank renovation

Savings : 375 m³ Water (Rs. 0.12 Lacs)
Investment : Rs. 2.45 Lacs
Payback Period : 233 months

q Leaching process alteration for steam reduction

Savings : 555 m³ Water (Rs. 0.186 Lacs)
Investment : Rs. 0.9 Lacs
Payback Period : 58 months



WATER CONSERVATION PROJECTS - SUMMARY:

Total no of projects implemented = 13

ü Projects implemented without investments = 3

ü Projects implemented with investments = 10

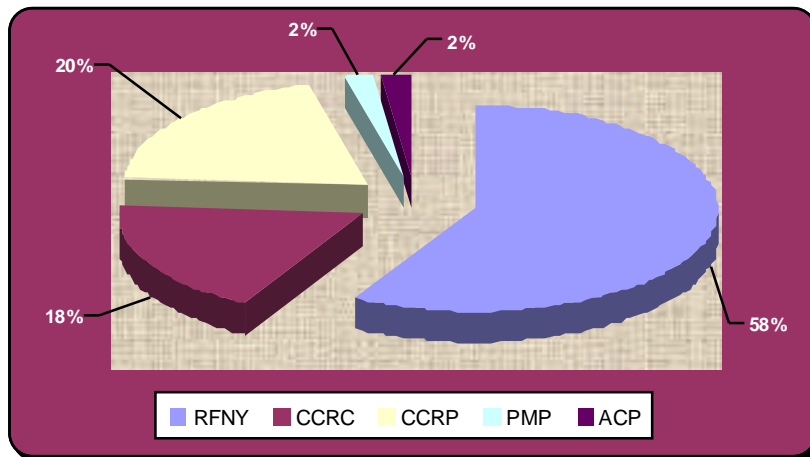
Savings : 42015 m³ Water

Total Investments made : Rs 20.85 Lacs

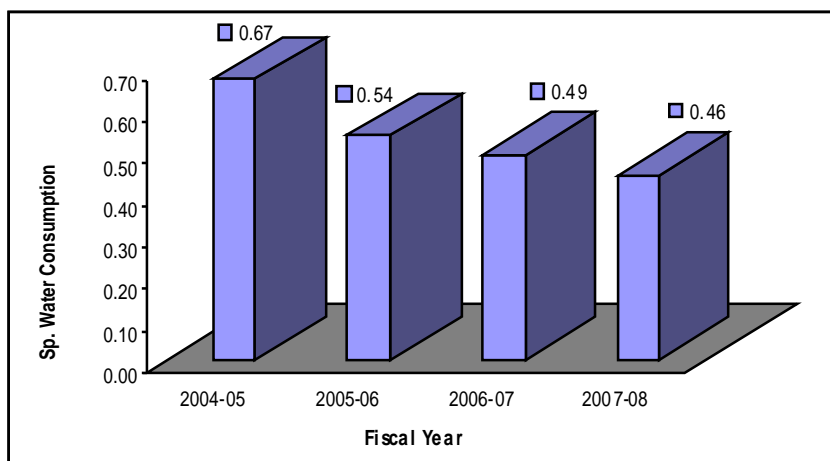
Total Savings Achieved : Rs 13.05 Lacs



WATER SHARE - SILVASSA



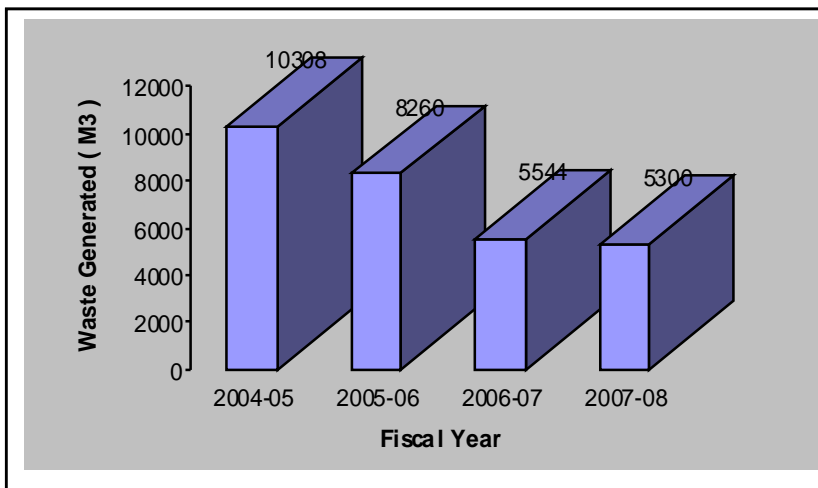
WATER CONSUMPTION (M3/MT)



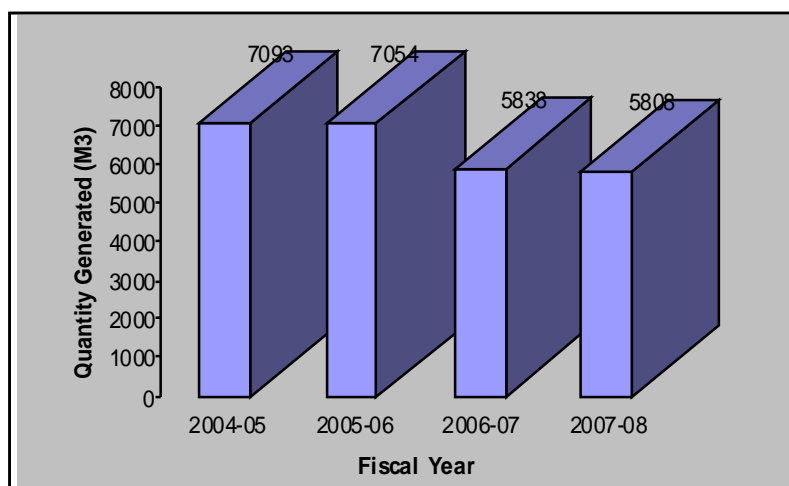
Reduction in Specific Water Consumption = 31.34 %



Waste Water Details : Industrial



Waste Water Details : Domestic





BENCHMARKING

- q Our ultimate objective of our plant is to be 0.4 m³/MT of copper cathode.
- q We are continuously committed towards natural resources conservation and water conservation is our prime focus. This we are achieving by TQM methodology, PEP and internal projects.
- q To sustain as a ZERO discharge plant in copper industry.

ROAD MAP FOR THE FUTURE

- q Regular Water Audits & Identification of new projects.
- q SPC techniques in Water Monitoring.
- q Utilization of waste condensate water.
- q Conversion of all gland seal pumps into mechanical seals.
- q Exploring the possibility of Air Cooled heat exchangers in place of normal cooling towers.



TQM PROJECT 1: WATER CONSUMPTION REDUCTION

Problem Statement :

Reduction of water & steam in Cathode Stripping Machine from 10000 M³ to 7000 M³ per annum of cathode production.

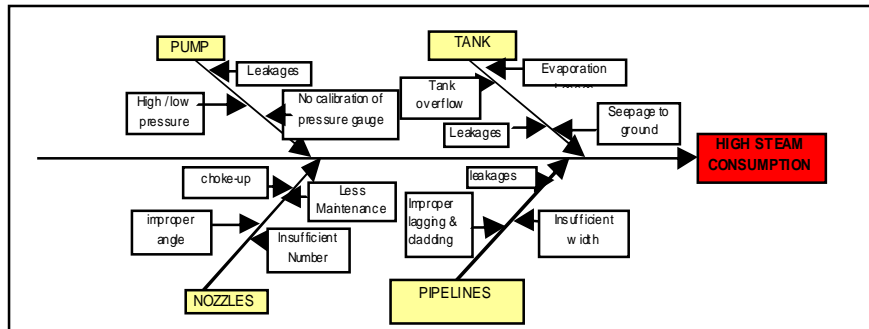
Mission Statement :

Increase in washing effectiveness in CSM & thereby conservation of water & a saving of approx Rs 1.0 Lac per year.



TQM PROJECT 1: WATER CONSUMPTION REDUCTION

Cause And Effect Diagram based on Brain Storming :



TQM PROJECT 1: WATER CONSUMPTION REDUCTION

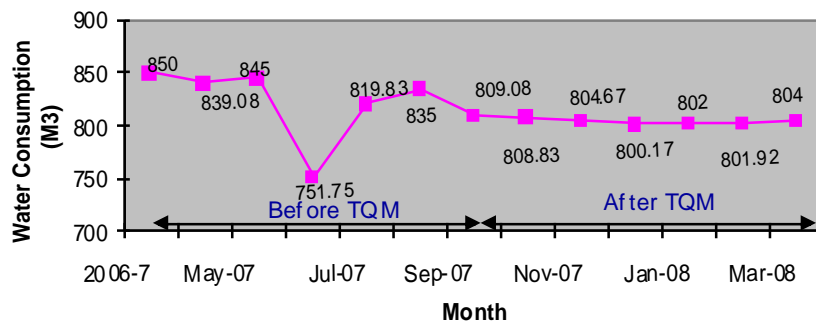
Formulation of Theories

- q Overflow and leakages of tank
- q Evaporation losses in CSM
- q Choke-up of Nozzles.
- q High or low pressure in washing line.
- q Pump & Pipeline leakages



TQM PROJECT 1: WATER CONSUMPTION REDUCTION

Results & Benefits



Reduction in Water Consumption : 4.7 % (Rs. 0.34 Lacs)



TQM PROJECT 2: WATER CONSUMPTION REDUCTION IN ACP

Control valve provision in FO storage tank steam line

Problem Statement :

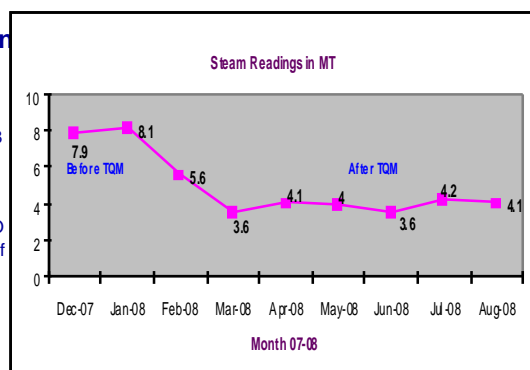
Reduction of steam for FO heating from 8 Tonnes/day to 4 Tonnes/day.

Mission Statement :

Effective utilisation of Steam for FO heating and there by a saving of Rs.50,000 per annum.

Methodology of Implementation :

- § Analytical study of Steam requirement.
- § Installation of Steam Control Valve.
- § Continuous monitoring of the system and data analysis.





Employee & Community Involvement

APPROACH

TOP DOWN APPROACH

BOTTOM UP APPROACH

CSR Activities



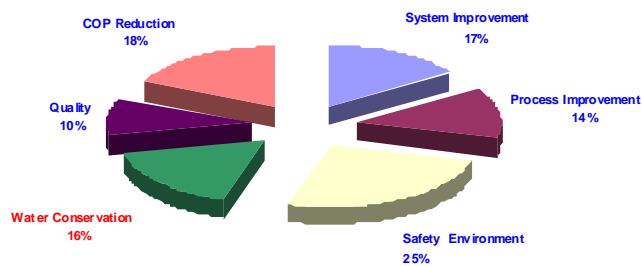
Policy Deployment
Continuous Improvement
Daily Management



PEP Mechanism
Water Month
CSR Activities



SUGGESTION CATEGORY





Water Month Celebration

- q Celebrated Water Month on March 2008.
- q Celebrated World Water Day on March 22nd 2008.
- q Each year carries a particular theme on WWD like...

2008	: Theme 2008: Sanitation
2007	: coping with water scarcity challenge of the twenty-first century
2006	: Water and Culture
2005	: Water for Life
2004	: Water and Disasters
2003	: Water for the future etc....



- q Organized various events related to water awareness.



WATER MONITORING & REPORTING SYSTEMS:

- q Whole Plant is divided into 5 areas and Water Consumption for each plant is monitored and action plans taking according to it.
- q Water norms are fixed for all the equipments & any variation is alerted by DCS.
- q Water audits being done internally by water champions and remedial actions immediately taken.
- q Water report is getting prepared by the Water Manager and is getting reviewed by the Head Operations in presence of Sectional Heads.
- q The Water report consists of Water Share, Specific Consumption, Trend analysis, Internal & External Benchmarking, Concerns and Action plan for the next month.



LIST OF MAJOR ENVIRONMENT IMPROVEMENTS

- q Rain water harvesting in the plant. (10 Lacs)
- q Zero Discharge Plant.
- q Reduction in air pollution by introducing scrubbers. (3.5 Lacs)
- q Installed Sewage Water Treatment facility. Treated water is being used for gardening purpose. (2.5 Lacs)
- q Installed air pre heater in the boiler to reduce fuel consumption. (5.5 Lacs)
- q Installed Acetylene Soot Collection System installed in CCR to improve working Environment. (5.6 Lacs)
- q Soil Correction Carried out in Refinery. (2.62 Lacs)
- q Installation of Air Ventilators in Refinery & CCR. (3.23 Lacs)
- q Conversion of FO fired boiler into Biomass fuel fired furnace. (11.4 Lacs)



AWARDS & CERTIFICATION

- q ISO 9001, ISO 14001 and OHSAS 18001 Certified by DNV
- q IEI Safety award by Gujarat State – 2007
- q CII – Excellent Water Efficient Unit Award – 2007
- q CII – Excellent Energy Efficient Unit Award – 2007
- q IMEA-Platinum award for Metal Category by M/s Frost and Sullivan
- q RBNQA- Commendation Certificate
- q Qualtech Innovation award – “Recovery of Nickel from Electrolyte Stream”
- q Corporate award “ Creative Workplace ”- Sept 2008
- q First prize for best Suggestor Award @INSSAN- July 2007
- q Second prize for best Suggestor Award @INSSAN- July 2007
- q Unique employee involvement practices – INSSAN May 2007
- q Golden Peacock National Training award for 2007

