



Presentation For National Award in



“Excellence in Water Management-2008 ”

TO



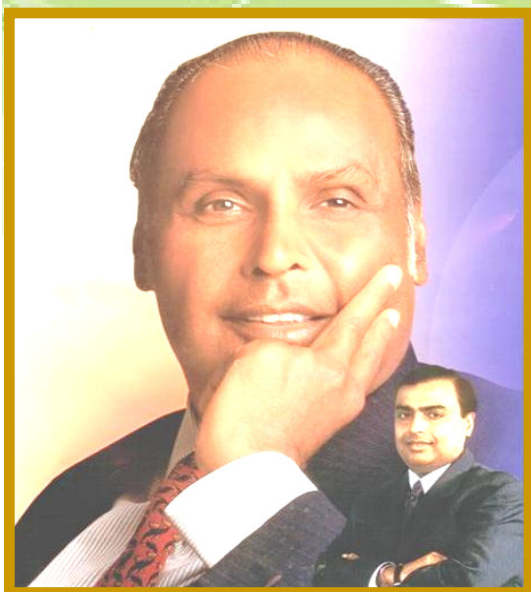
Confederation of Indian Industry
CII Sohrabji Godrej Green Business Centre

Reliance Industries Limited

Dahej Manufacturing Division

Team:

- Mr. Dipak Mehta
- Mr. Muthukumaran
- Mr. Yusuf Husain



Our Mission



To Continually offer value added and innovative petrochemicals products as raw materials for global and domestic customers, maintaining a Constant customer focus and an enduring concern for the environment and for stakeholder needs and values

Our Vision



We at RIL-DMD shall continue to contribute to Reliance Industries Limited in sustaining its market leadership position in India.

Our Value

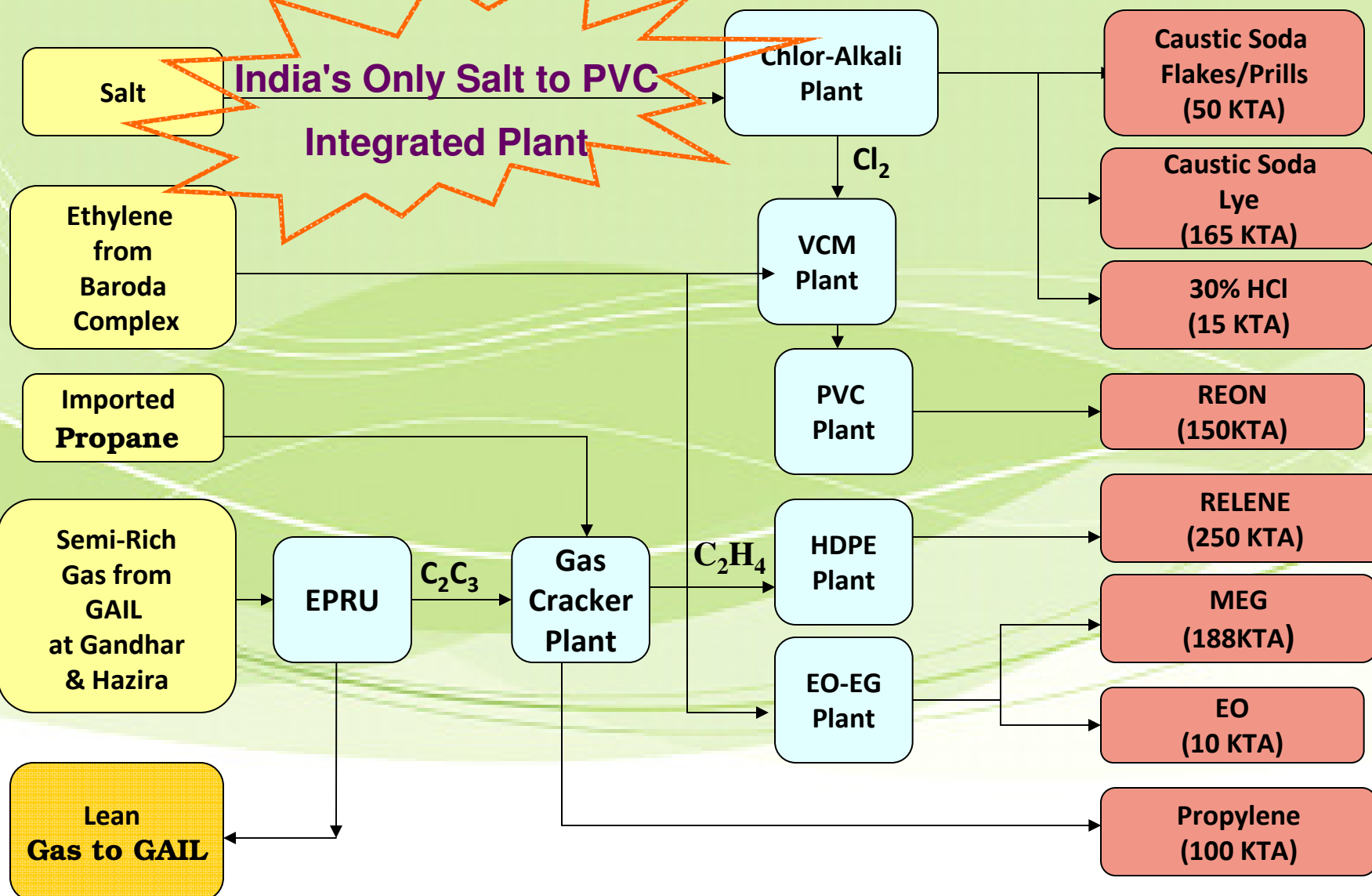
- **Visionary Leadership**
- **Customer Focus**
- **Agility**
- **Integrity**
- **Innovation**
- **Data Based Management**
- **Social Responsibility**
- **Organizational and Personal Learning**
- **Valuing Human Resources**
- **Focus on Results and Creating Values**
- **System Perspective**



Unit Profile

- ❑ Total Area of 700 hectares having 300 hectares Green belt
- ❑ Captive jetty- capacity for 6000 DWT vessel
- ❑ Manufacturing facilities of Ethylene, Propylene, EO/EG, HDPE, PVC, VCM, Caustic & Chlorine
- ❑ Only Petrochemical complex in the country where PVC manufacturing facility is backed by Captive Chlor Alkali Plant
- ❑ Captive Power generation capacity 155 MW
- ❑ Captive steam generation 540 MT/Hr
- ❑ Fuel for power and steam generation is totally gas
- ❑ 9 MGD of water pumped from River Narmada (45 KM)

Product Flow Diagram



Raw Material



Plants



Products

GROWTH IS LIFE

2008-IMC Ramakrishna Bajaj
National Quality Award Application

2008: CII Excellence in
Energy Conservation Award

2008: Excellence Award in 22nd
National Convention on Quality Circles

2007: Highest Five Star Rating of BSC Audit for
Excellence in Health, Safety & Environment

2006: CII Award of Excellence for being Energy Efficient
Unit

2006: CII Award of Excellence in Water Management

2005: Three Star Rating of BSC Audit for Excellence in
Health, Safety & Environment

2005: National Energy Conservation Award- 1st Prize in Petrochemicals

2005: IMS Certification (ISO 9001, ISO 14001 & OHSAS 18001)

2004: GAIL Award for Gas Conservation in Petrochemical Sector

2003: Gujarat Safety Council and Factory Inspectorate – Appreciation Award for
accident free 3 million operating hours.

2002: United Nations Five Leaves Award for Environment Conservation

2000: Gujarat Safety Council and Factory Inspectorate – Appreciation Award for 1
million Accident Free Operating hours

1999: Commercial Production started for MEG & HDPE (Phase-II)

1996: Commercial Production started for PVC & Caustic (Phase-I)

Care For Environment




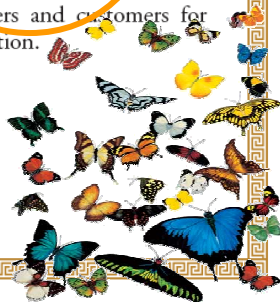
Environment Policy

Protection of environment is of prime concern and an important business objective at Reliance. With a leading role in providing competitive goods and services in the materials and energy value chains and infrastructure in India, Reliance is conscious of its responsibility towards creating, maintaining and ensuring a safe and clean environment for sustainable development.

In particular, Reliance is committed to:

- Comply with relevant laws and regulations as well as take any additional measures considered necessary.
- Follow a systematic approach to environmental management plan in order to achieve continual performance improvement.
- Prevent pollution, maximize recycle, reduce wastes, discharges and emissions.
- Conserve natural resources by their responsible and efficient use in all our operations.
- Plant trees, develop green belts and promote lush green surroundings at our manufacturing locations to be in harmony with nature.
- Emphasize every employee's responsibility in environmental performance, ensure appropriate operating practices and training.
- Promote awareness among contractors, suppliers and customers for shared responsibility towards environment protection.
- Make this policy available to the public.


Mukesh D. Ambani
2005



- *Follow a Systematic approach to Environmental Management Plan in Order to achieve continual performance improvement*
- *Prevent pollution, Maximize recycle, reduce wastes, discharges and emissions.*
- *Conserve natural resources by their responsible and efficient use in all our operations.*
- *Emphasize every employee's responsibility in environmental performance, ensure appropriate operating practices and training*
- *Promote awareness among contractors, suppliers and customers for shares responsibility towards environment protection*

MONITORING REPORTING SYSTEM

Video Conference with Corporate Office Top Management. **Site Water Balance, Monthly report, Utility Reconciliation.** Making Action Plan, Comparison with Target/ Benchmark Trend Analysis

Plant performance & Complex Water consumption report generation & review by Sr. VP (Technical Services)

Plant-wise report & monitoring for utilities
Daily Water Balance for Complex

On-line monitoring tool IP-21(ASPEN PLUS) :
Monitoring of Consumption and Distribution of Utilities



Hourly

Daily

Weekly

Monthly

Water Management Structure

STRATEGIC LEVEL

- ▲ Site President
- ▲ Sr. Vice President
- ▲ Utility Cell AVP
- ▲ Utility Managers

TACTICAL LEVEL

- ▲ Utility Coordinators
- ▲ TLS Engineers
- ▲ Operation Engineers

SUPPORTING LEVEL

- ▲ Process Technician
- ▲ Maint. Technician

Major Functions :

- ◆ Set Targets
- ◆ Provide direction
- ◆ Benchmarking & External Audits.
- ◆ Review Utility consumption trend
- ◆ Review status of Water Conservation schemes and Awareness Creation

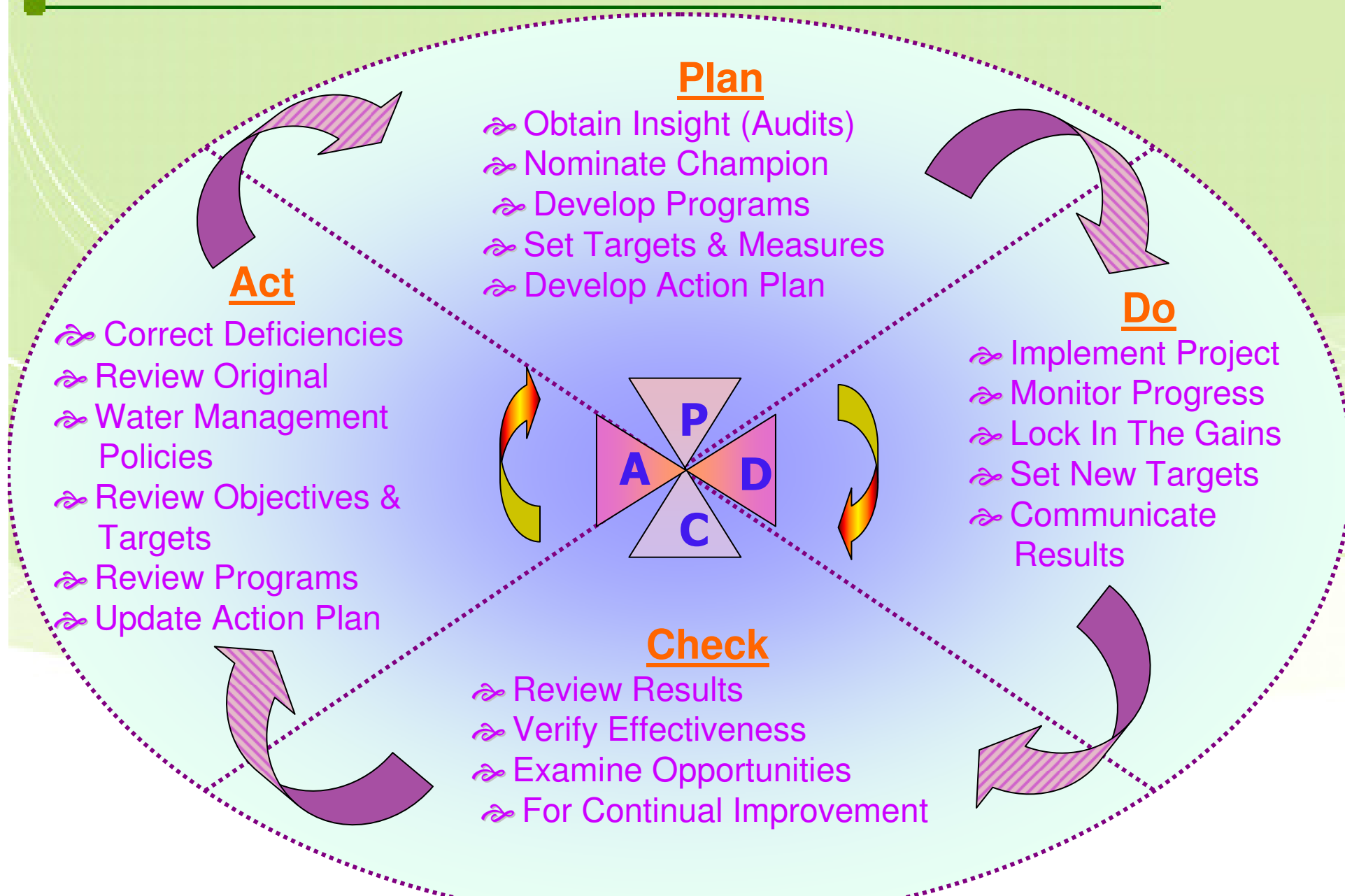
Major Functions :

- ◆ Evaluation of suggestion scheme
- ◆ Monitoring Specific Utility Consumption
- ◆ Conceive new and implement approved schemes
- ◆ Optimize utilities Consumption

Major Functions :

- ◆ Identification of scheme
- ◆ Brainstorming & implementation.
- ◆ Suggestion Scheme
- ◆ Employee Involvement
- ◆ Awareness Programmes

PDCA Cycle





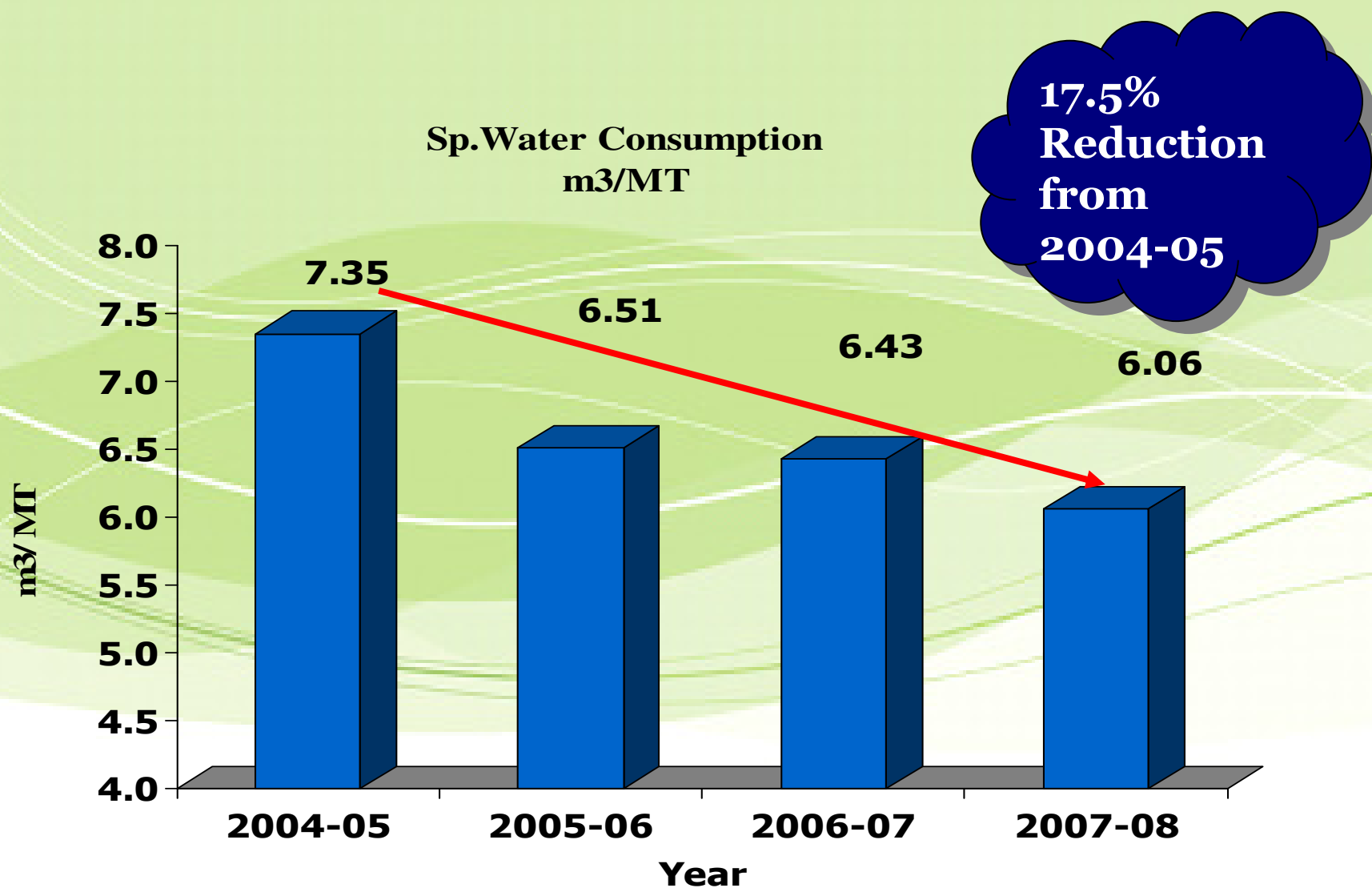
Monitoring & Reporting System

ADDRESS: R-O&U-6.3-1 DAILY REPORT							
DAILY PLANT STATUS REPORT OF O&U ON						5-Nov-08	
ABC OF SAFETY MEANS ALWAYS BE CAREFUL						REPORT PREPARATION DATE	
						6-Nov-08	
A					UTILITY SYSTEM		
1	Water withdrawal from Angareshwar	8.494		MGD			
2	Cum water withdrawal for the month	349.572		MGD			
3	RW reservoirs level	2.9	2.95/3.05		Mts		
4	Fire Water reservoir levels	4.8		Mts			
5	Drinking Water reservoir level	4.5		Mts			
6	DM Water Storage Tanks Level	9.2	9.9	0	Mts		
7	Emergency GOX Bullets Pr. (ASP)	34		Kg/cm2			
8	LIN Production	15.5		MT			
9	LIN Sale/Stock transfer	17.72		MT			
10	LIN Closing Stock	113.41		MT			
11	LIN STORAGE LEVELS(V1/V2/V12)	7800	6900	38	mm WC / mm WC / %		
B	WATER CONSUMPTION IN THE COMPLEX						
1	Water pumping from Angareshwar	38617		m3	-		
2	Firewater make up in Header	0		m3	-		
3	Filtered water to DM plant	10850		m3	-		
4	Filtered water to CT-01	5920		0	Cooling water make up		
5	Filtered water to CT-02	2081		m3	Cooling water make up		
6	Filtered water to CT-03	3354		m3	Cooling water make up		
7	Filtered water to CT-04	6852		m3	Cooling water make up		
8	Filtered water to CT-06	516		m3	Cooling water make up		
9	Drinking water to complex	992		m3	-		
10	Service water to complex	3161		m3	-		
11	DM water to CPP-I	2453		m3	DMWater consumption		
12	DM water to CPP-II	1537		m3	DMWater consumption		
13	DM water to Process plants	4690		m3	DMWater consumption		
14	DM water to regeneration	90		m3	DMWater consumption		
15	CT-02 Cir. Rate	313200		m3	-		
16	CT-03 Cir. Rate	234900		m3	-		
17	CT-04 Cir. Rate	460080		m3	-		
F	DMWP						
2	CHEMICAL STOCK	PRESENT STOCK		RECEIPT	FROM		
a	HCl (MT)	-13		35	VCM PLANT		
b	NaOH (MT)	8.5		16	CA PLANT		

Monitoring & Reporting System

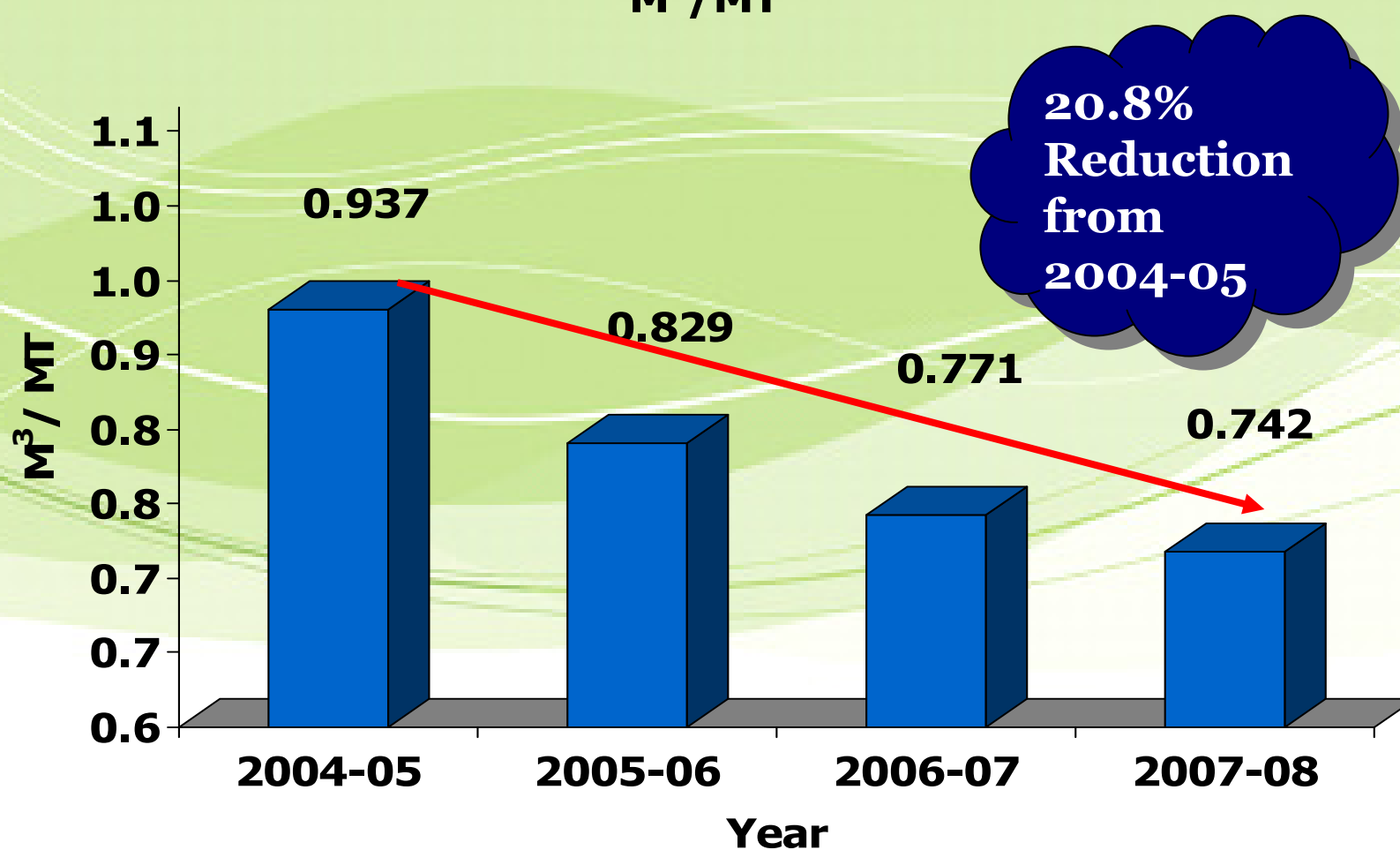
Reliance Industries Limited							
Weekly report/ Water block/54/07- 08							
TECHNOLOGY DEPARTMENT							
WEEKLY REPORT FOR WATER BLOCK							
Sr.No	Week no. WEEK ENDS ON		STD VALUE	49 11-Mar-08	50 18-Mar-08	51 25-Mar-08	52 1-Apr-08
1	RAW WATER						
	Raw Water Receipt from Reservoir to RWTP	m3/day	36160	35064.1	34795.0	33806.4	33487.7
	Fire Water Make Up	MGD	7.95	7.71	7.65	7.44	7.37
	Raw Water to Jatropha Plantation	m3/day	1644	0.0	0.0	0.0	0.0
	Raw Water to Jatropha Plantation	m3/day	1500	0.0	0.0	0.0	0.0
2	Filter water						
	Actual Raw Water Receipt (Excl.Jat.&FW)	m3/day	---	35064.1	34795.0	33806.4	33487.7
	RWTP Backwash water (FW)	m3/day	675	610.7	610.7	514.3	514.3
	Total Filter Water Available for Distribution (Excl.Backwash)	m3/day		34453.4	34184.3	33292.1	32973.4
	Raw Water Treatment Plant Capacity Utilisation	MGD		7.6	7.5	7.3	7.3
	Service water	%	50	42.9	42.5	41.3	40.9
	Drinking water	m3/day	2592	2988.0	3029.7	3004.4	2997.4
	DM Water Plant	m3/day	1022	886.6	879.9	910.1	1020.7
	Make up to cooling tower (Totaliser based)	m3/day	11463	10396.4	10325.0	10267.9	10242.9
	Make up to cooling tower (COC based)	m3/day	21364	19203.6	20323.4	18975.9	18827.3
	Total consumption	m3/day	--	18969.3	19412.5	19540.1	19303.2
	Un Accounted losses in Filter Water	m3/day	---	33474.6	34558.0	33158.3	33088.3
		MGD	--	978.9	-373.7	133.9	-114.9
				0.2	-0.1	0.0	-0.03
3	Cooling Water System						
	Make up						
	CT- 01	m3/day	7642	6855.3	6963.1	6632.9	6180.1
	CT- 02	m3/day	4200	2012.3	1950.3	1846.0	1980.7
	CT- 03	m3/day	3600	2778.1	3233.4	3129.4	3170.7
	CT- 04	m3/day	7598	6877.6	7516.7	6813.7	6905.6
	CPP-2	m3/day	559	680.3	659.9	553.9	590.1
3.1	COC of Cooling Towers						
	CT-01	P.O.	7.7	6.9	7.3	7.3	7.5
	CT-02		7.7	6.6	7.2	7.3	7.4
	CT-03		7.7	6.9	6.8	7.5	7.5
	CT-04		7.7	6.7	7.2	7.0	7.7
	CPP-2 CT		5.5	6.6	7.5	7.1	7.9
4	DM Water						
	Filter water receipt to DMWP	m3/day	11590	10396.4	10325.0	10267.9	10242.9
	Waste Water Generation	m3/day	---	646.4	735.7	742.9	700.0
	Total Production	m3/day	10800	9750.0	9589.3	9525.0	9542.9
	D.M Water Plant Capacity Utilisation	%	100-110	90.3	88.8	88.2	88.4
	Consumption						
	DM water to CPP-1	m3/day	1430	1554.7	1602.6	1740.3	1656.3
	DM water to CPP-2	m3/day	1804	2494.4	2278.6	2209.3	2423.3
	DM water to process	m3/day	5282	5138.1	5389.6	5099.1	5012.1
	DM water for regeneration	m3/day	45	57.9	57.9	60.0	57.9
5	Break up of DM Water to Process Plant						
	VCM	m3/day	318	263.7	233.5	284.9	241.7
	PVC	m3/day	2221	2207.6	2460.5	2156.2	2127.4
	CHLRO-ALKALI	m3/day	1110	1071.7	1107.7	986.3	1214.2
	C2-C3	m3/day	32	21.0	20.0	19.0	20.3
	GAS CRACKER	m3/day	487	1429.9	1104.5	1155.3	960.8
	HDPE	m3/day	20	4.0	2.1	4.5	5.6
	EO-EG	m3/day	279	216.0	195.5	246.0	228.1
6	Specific water consumption per MT of Production	m3/MT	6,320	6.72	6.71	6.71	6.70

Specific Water Consumption



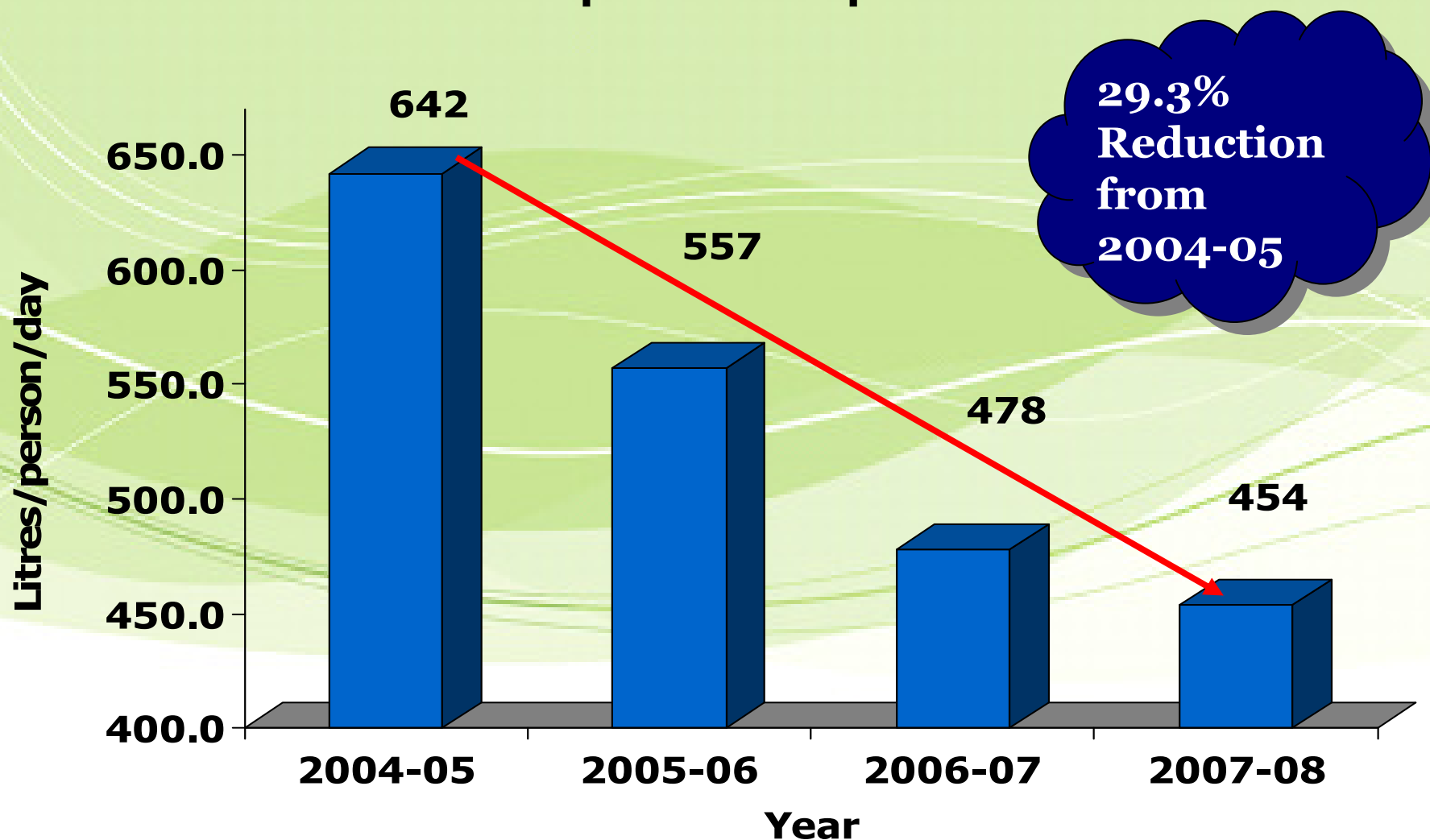
Specific Waste Water Discharge

Sp. Waste Water Discharge
 M^3 / MT

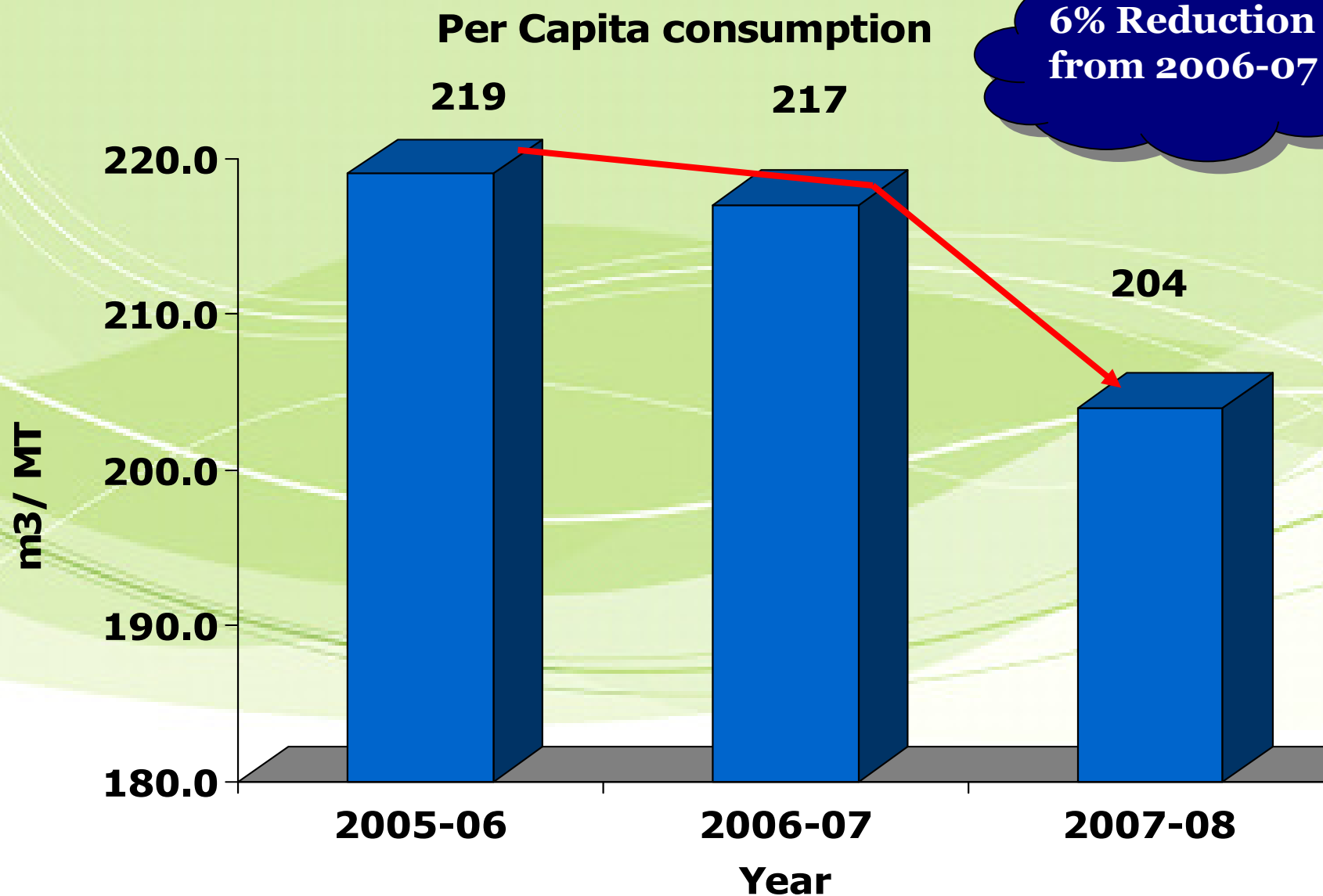


Per Capita Consumption (Industrial)

Per Capita Consumption



Per Capita consumption (Colony)



Water Conservation Measures

Project Implemented	Year	Water Saving km ³ / annum	Saving Rs. (Lacs)
Increase in cycle of concentration in all Cooling towers from 5 COC to 7.5 COC	2004-05	130 (RW)	10.5
Cooling Tower Blow down of CT-04 used as make up in Cooling Tower -02 & 03. (Cascading system)	2004-05	30(RW)	2.25
CPP-Continuous blow down from boiler drum, recycled back to Cooling water return header.	2004-05	20.2(RW)	1.5
Cooling Water Supply pump bearing oil-cooling water recycled to return header.	2004-05	14.4 (RW)	0.93

Water Conservation Measures

Project Implemented	Year	Water Saving km ³ / annum	Saving Rs x10 ⁶
CPP - Steam turbine generator bearing cooling water diverted back to Cooling water return header.	2004-05	5.02 (RW)	0.35
Gas Cracker Unit: Silica sample cooler water recycled to cooling water return header.	2004-05	26.4 (DM)	1.98
In house Steam trap and steam leak survey for entire complex done, leakages and faulty steam traps found and attended.	2004-05	17.5 (DM)	4.02
HDPE: Use of waste flash steam in VAR machine.	2004-05	2.47 (DM)	0.57



Water Conservation Measures

Project Implemented	Year	Water Saving km ³ / annum	Saving Rs x10 ⁶
Firewater network: Cooling Tower Blow down water used as a make up resulted in reduction in fresh make-up water.	2005-06	108.0 (RW)	9.32
Raw water Plant: Filter bed backwash frequency increased from 20 hrs to 32 hrs.	2005-06	60.7 (RW)	5.24
100 nos. push back type valve provision in Toilets	2005-06	12.5 (RW)	1.08
40 nos. Toilet photo sensors installed.	2005-06	8.7 (RW)	0.75



Water Conservation Measures

Project Implemented	Year	Water Saving km³ / annum	Saving Rs x10⁶
Ground Water Recharging In Saraswati Township.	2005-06	Quality improvement.	--
PVC: Utilization of Waste steam of CPP-2 in VAR (Vapor absorption) of PVC plant.	2005-06	78.0 (DM)	17.9
EOEG Plant: Installation of wastewater recovery unit (PK-610) for recovery of wastewater for utilization in Process.	2005-06	42.0 (DM)	9.66
EPRU Plant: Steam consumption reduction in amine stripper by optimizing CO₂ to steam ratio. (six-sigma project).	2005-06	5.8 (DM)	1.33

Water Conservation Measures

Project Implemented	Year	Water Saving km ³ / annum	Saving Rs x10 ⁶
CA Plant: Seal water from 4 pumps in Secondary brine area is rerouted to lean brine return line	2005-06	2.3 (DM)	0.43
HDPE Plant: DM water consumption reduction by improvement in transport water system of Extruder.	2005-06	73 (DM)	1.65
VCM plant: Condensate recovered from Exchangers of Oxy reactors & returned to VCM DM tank	2005-06	0.5 (Condensate)	0.33
EOEG Plant: Increase in Cycle time of Ion exchange resins By improvement in Influent quality	2006-07	46(DM)	10.5



Water Conservation Measures

Project Implemented	Year	Water Saving km ³ / annum	Saving Rs x10 ⁶
PVC Plant: Cent rate water utilization in place of DMW for K-6701 Grade PVC in Line-1&2 Wet scrubbers.	2007-08	12.42 (DM)	2.84
VCM Plant: Cooling water pH analyzer return diverted to cooling water return header	2007-08	1.69 (RW)	15.3
HDPE Plant: Modification in Wax Collection system for improved recovery of DM water.	2007-08	2.3 (DM)	0.43
Total		699.9	98.86



RIL-DMD

PROJECT 1: Utilization of Backwash water for developing Jatropha plantations



Original Scheme:
Raw Water Treatment plant generates wastewater from Filter bed Backwash and clarifloculator drains was diverted to the Natural pond.



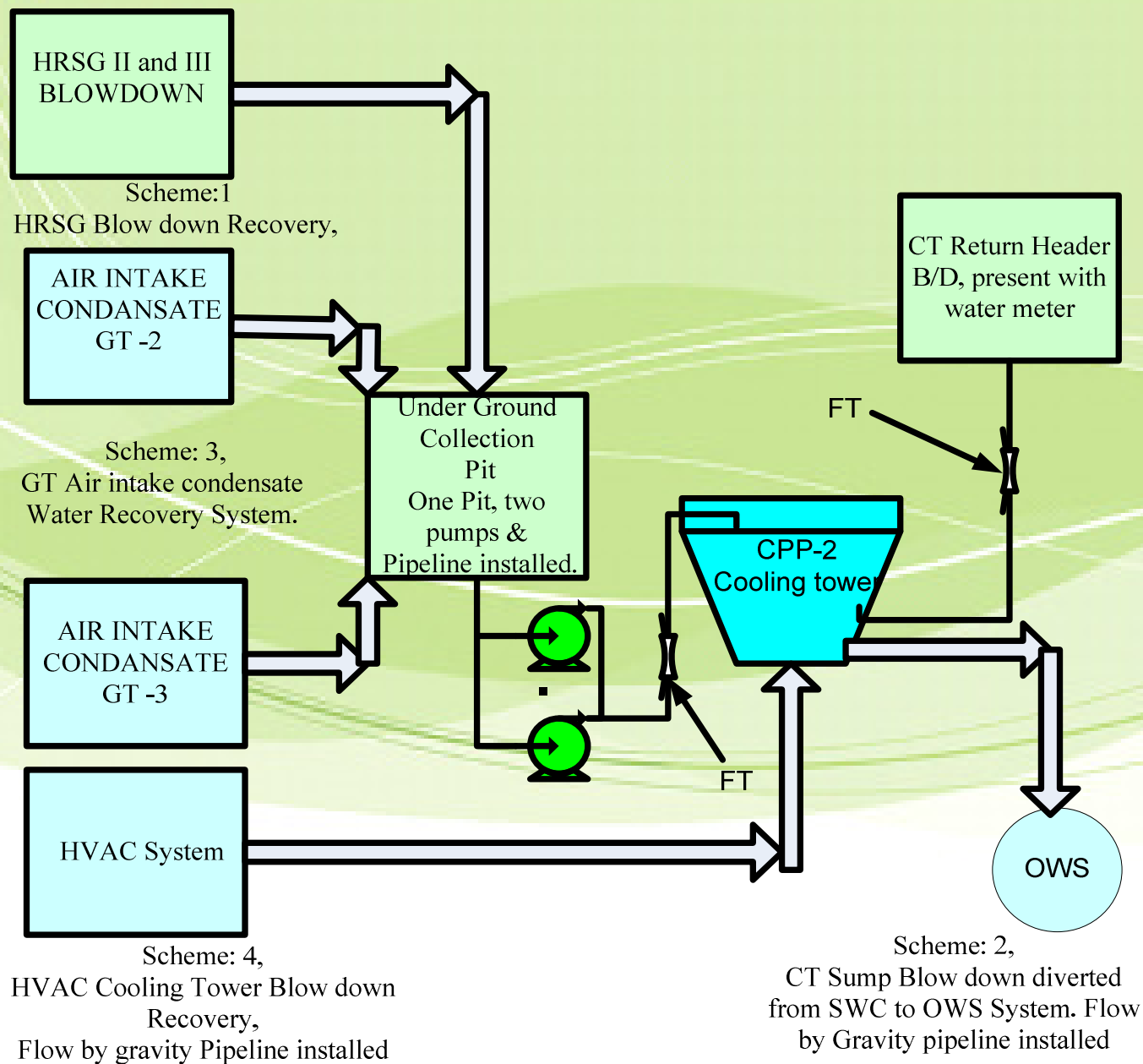
Modification:

This year we utilized a major part of the Backwash water in our Jatropha plantations. During October 2007 Jatropha plantations was done in 56 acres. The plantation required 20 m³ per hectare of water. Installing a rerouting line in the Backwash water line provides this water



This resulted in a saving of 246.0Km³ of raw water that accounted to Rs.31.0 lacs savings per Annum. This was done at an investment of Rs.10lacs with a Simple payback period of 8 Months.


PROJECT 2: Waste Water Recovery Scheme in CPP-II



- ✚ Project Cost Rs 13,00,000
- ✚ Average Water Recovered- 200 m³/Day
- ✚ Savings Realized Rs 2800/ Day
- ✚ Annual Savings Rs 10,00,000
- ✚ Project Started Date
- ✚ Target Completion Date
- ✚ Actual Completion Date

Certification & Benchmarking

Standard.			Certification Date	System
ISO 9001 - 2000			23 rd May 2006	Quality Management System
ISO 14001 - 2004			23 rd May 2006	Environment Management System
OHSAS 18001 - 1999			23 rd May 2006	Occupational Health and Safety Assessment Series
Plant	Year	Benchmarking done by	Level	Remarks
GCU	2008	Solomon, USA	Global	Ranked 3 rd Quartile amongst the 30 participating plants
CPP	2007	Internal	Group sites	Ranked 2nd in Internal Benchmarking of RIL Group Sites
MEG	2007	PDC Netherlands	Global	Ranked 9th amongst MEG industries in the world.
PVC	2007	PDC Netherlands	Global	Ranked 4th position based on energy consumption in world


GPCB norms of discharge water for our complex is 15730 m³ /day, as against existing discharge rate of only 4990 m³ /day

Future plans 2008 - 09

Scheme	Plant	Potential Water Saving km ³ / annum	Annual Savings (Rs. Lacs)	Investment (Rs. Lacs)	Target Date
Performance Testing of Cooling Water Towers	All CT s	-	-	-	Mar 2009
Replacement of existing GRP fans to FRP fans in balance cooling tower	All CT s	-	67	90	Aug 2009
Replacement of inefficient CT 04 CW pumps (6 nos)	CT 04	-	250	164	May 2009

Future plans 2008 - 09

Scheme	Plant	Potential Water Saving km ³ / annum	Annual Savings Rs. Lacs	Investment Rs. Lacs	Target Date
Reduce DM water consumption by improving DI unit / Aldehyde removal unit operation, and reducing regeneration	MEG	227.27	50	-	Under Study
Reduction in Water to Monomer ratio	PVC	3.21	0.7	-	Dec 2008
Zero Make up of Raw Water in Fire Water	Complex	-	4.38	-	Under Study

Community Awareness



- ❖ Providing Awareness on Importance of Conserving Water on Environment Celebration Day
- ❖ Introduction of Green School Project
- ❖ Installation of Dedicated Water Supply line to reduce the Water Wastage during transportation thru Road Tankers.
- ❖ Conducted Science fare at district level to motivate young students to think innovative for Natural resource conservation

Fight Global Warming

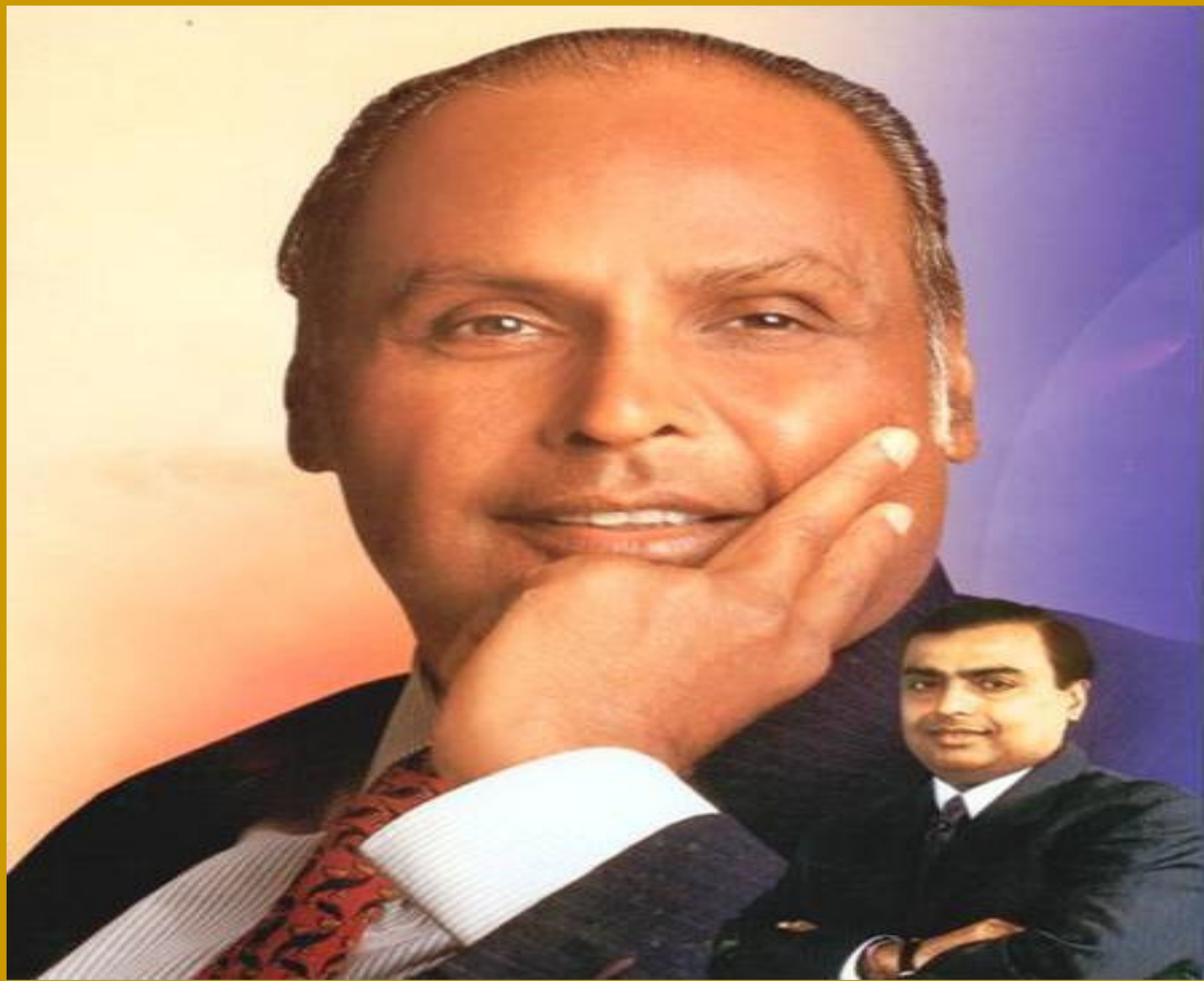
- Each one of us can make a difference !





RIL-DMD

Enriching
Lives
and
Empowering
People



THANKS

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