

ON

WATER MANAGEMENT
BY

 **NAINI TISSUES**
LIMITED

NAINI TISSUES LIMITED

- An ISO 9001:2000 certified company
- ISO 14001 certification is under process
- Situated at 7th K.M. from Kashipur on Kashipur-Moradabad Road, Uttarakhand
- Started its operation in May, 2005
- Manufacturing 105 TPD writing & printing grade of paper
- Well known in market for its quality & services
- Awarded “ENVIRONMENT AWARD – 2005” by Hon’ble Chief Minister of Uttarakhand
- Achieving best process & utility parameters among the same kind of plants

PROCESS

- Eco-friendly raw material, i.e., bagasse & wheat straw (94% pulp) with 6% imported wood pulp
- Efficient wet washing system
- Continuous digester for cooking of raw material
- 4-stage brown stock washing system
- Generated black liquor treatment in Soda Recovery Plant to recover soda ash
- 4-stage bleaching sequence (C-Ep-H-H)
- On-line chemical dosing in stock preparation
- MECHANO paper machine with head box, suction couch & pickup rolls from METSO, silent drives etc.
- Full-fledged Wastewater treatment plant and achieving the prescribed norms.

FUTURE PLANS FOR ENVIRONMENT PRESERVATION

- Installation of Oxygen De-lignification (under-progress)
- Installation of TCF/ECF bleaching process
- Separate anaerobic treatment for wet washing wastewater
- Efforts towards zero discharge of wastewater by utilizing in bagasse wet bulk storage and in process wherever possible
- Installation of Rain Water Harvesting system for recharging
- Development of dense green belt
- Educating near-by community for environment protection

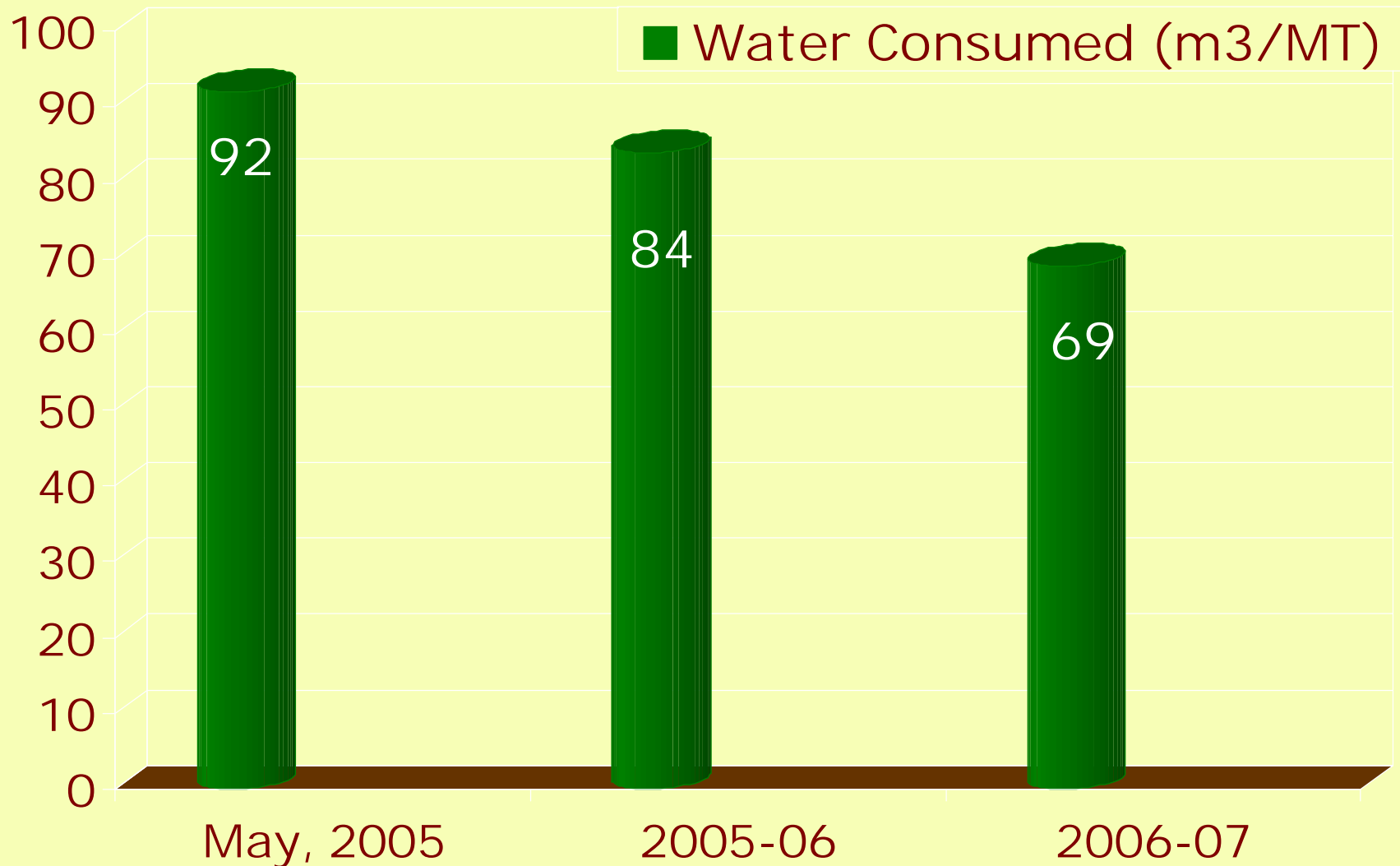
SPECIFIC WATER CONSUMPTION TREND (MAY 2005 – MARCH 2006)

MONTH	FINISHED PRODUCTION (MT)	SPECIFIC WATER CONSUMPTION (m³)	WATER CONSUMPTION (m³/MT OF PAPER PRODUCTION)
May-05	431.88	39740	92.0
Jun-05	1209.87	101470	83.9
Jul-05	1756	149260	85.0
Aug-05	2123	199990	94.2
Sep-05	1809.2	164640	91.0
Oct-05	2626	215330	82.0
Nov-05	2224.7	214490	96.4
Dec-05	2525	212730	84.2
Jan-06	2600	203630	78.3
Feb-06	2283.5	176560	77.3
Mar-06	2854	204980	71.8
Total	22443.15	1882820	84

SPECIFIC WATER CONSUMPTION TREND (APRIL 2006 – MARCH 2007)

MONTH	FINISHED PRODUCTION	SPECIFIC WATER CONSUMPTION (m ³)	WATER CONSUMPTION (m ³ /MT OF PAPER PRODUCTION)
Apr-06	2882.00	200300	69.5
May-06	2863.80	200350	70.0
Jun-06	2597.60	186500	71.8
Jul-06	2662.90	193790	72.8
Aug-06	3014.80	198910	66.0
Sep-06	2548.45	179970	70.6
Oct-06	2973.39	188590	63.4
Nov-06	2902.00	194950	67.2
Dec-06	2698.00	182610	67.7
Jan-07	2129.20	159560	74.9
Feb-07	2734.00	188400	68.9
Mar-07	3258.09	217780	66.8
Total	33264.23	2291710	69

COMPARISON OF SPECIFIC WATER CONSUMPTION (Industrial)



Present water consumption is 64 m³/MT of paper

NATIONAL NORMS FOR WATER CONSUPTION IN AGRO-BASED PULP & PAPER MILLS

- CREP by CPCB in 2002 –
 - § Less than 140 cum/tonne of paper within 2 years
 - § Less than 100 cum/tonne of paper in 4 years for mills installed after 1992
- A detailed study by CPCB of different mills of similar kind shows –
 - § Large Scale Agro-based paper mills: 67 m³/MT
 - § Medium Scale Agro-based paper mills: 80 m³/MT
 - § Small Scale Agro-based paper mills: 110 m³/MT

GLOBAL NORMS FOR WATER CONSUPTION IN WOOD-BASED* PULP & PAPER MILLS

S. N.	Country	Av. Water Conspⁿ. (m3/MT of paper)	Source
1	USA	64	Appendix "W" of Report on status of Pulp & Paper in US by Michiel P.H. Brongers and Aaron J. Mierzwa
2	Europe	40	APIC Public Eco-efficiency Report 2003
3	Canada	67	APIC Public Eco-efficiency Report 2003
4	Finland	40	Pulp Fact - Environmental Implecations of Paper Cycle" by Nigel Dudley, Sue Stolton and Jean-Paul Jeanrenaud WWF International 1996

*Water consumption norms of Agro-Based paper mills are not available

REDUCTION IN SPECIFIC WATER CONSⁿ. (2005-06)

S. No.	Project	Utilization area	Water requirement	Water saved (m ³ /annum)	Cost of water saved (Rs./annum)	Investment (Lacs)	Payback Period (Months)
1	Installation of Mark Saveall for P. M/C B/W clarification	MSBP washer's washing showers	65 m ³ /hr.	1430 X	463320 X	12.00	9.3
				324	3.33		
				463320	1542855		
2	Utilization of chlorinated B/W	For unbleached pulp dilution	58 m ³ /MT of pulp	1597320	5319000	Included in Project Cost (No extra investment)	
3	Utilization of paper machine warm water	P.M/c HP Shower	15 m ³ /hr	116640	388410	2.00	6.1
4	Caustic dilution with black liquor	In digester for bath ratio	10.9 m ³ /hr	70632	235200	1.00	5.2

REDUCTION IN SPECIFIC WATER CONSⁿ. (2006-07)

S.No.	Project	Utilization Area	Water Requirement	Water Saved (m ³ /Annum)	Cost of water saved (Rs./annum)	Investment (Lacs)	Payback Period (Months)
1	Floor cleaning with back water	In Different sections	20 m ³ /d	6480	21578	0.20	11
2	Utilization of ETP treated wastewater	Raw Material washing	50 m ³ /hr	356400	1337000	3.00	2.7
3	Utilization of foul condensate	Unbleached Pulp Washing	21.9 m ³ /hr	191625	638000	3.00	5.6

INNOVATIVE PROJECTS TO REDUCE FRESH WATER CONSUMPTION

PROJECT NO. 1

- Utilization of chlorinated backwater
 - § Wastewater generated from chlorination stage is used for dilution of unbleached pulp
 - § Earlier, fresh water was used for dilution
- Advantages –
 - § Reduction in fresh water consumption by 58 m³/MT of pulp
 - § Reduction in chlorine consumption by 0.5%
 - § Reduction in pollution load on ETP

PROJECT NO. 2

- Installation of Mark Saveall
 - § The surplus back water from paper machine is feeded into Mark Saveall
 - § Fibre allowed to settle by gravity
 - § Clarified overflow used in washing showers of bleaching plant washers
- Advantages –
 - § Saving of huge quantity of fresh water
 - § Re-use of fiber & filler
 - § Saving in power, chemicals & manpower as compared to Krofta, CAF or DAF system
 - § Reduction in pollution load at ETP inlet



PROJECT NO. 3

- Utilization of Foul Condensate

- § Foul condensate from Evaporator section of Chemical Recovery Plant is used in washing shower of final BSW



- Advantages –

- § Saving of huge quantity of fresh water
- § Scaling problem reduced considerably
- § Reduction in pollution load at ETP inlet

ROADMAP TO ACHIEVE GLOBAL BENCHMARK

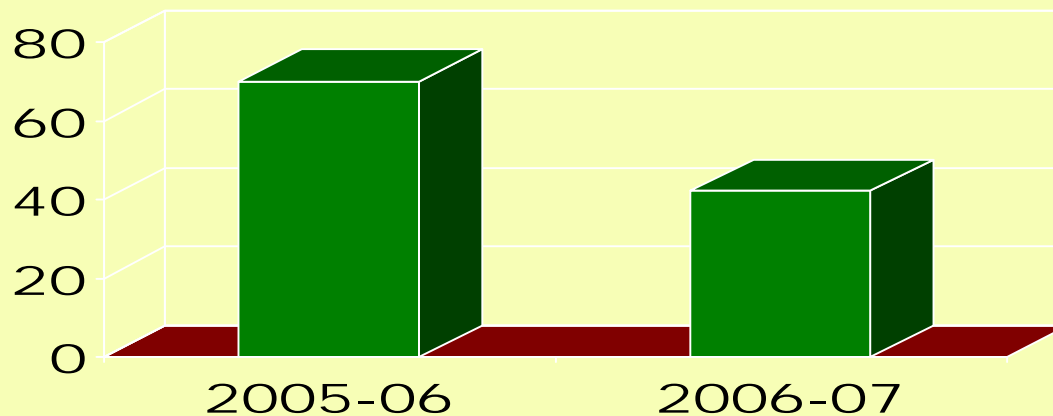
S. N.	Scheme	Reduction in Water Consumption	Time Frame
1	Replacement of P. M/c LP fresh water shower by its Back Water	3.8 m ³ /MT	2007-08
2	Replacement of Alk-Washer cover shower fresh water by its filtrate	2.7 m ³ /MT	2007-08
3	Replacement of final BSW washing shower (1 no.) fresh water by P.M/c micro-filtered back water	3.4 m ³ /MT	2007-08
4	Replacement of make-up (fresh) water for pulp washing in MSBP by TCF/ECF filtrate	3.1 m ³ /MT	2008-09
5	Fresh water savings on account of bleach liquor preparation by introducing TCF/ECF bleaching process	1.4 m ³ /MT	2008-09
	Total Saving of fresh water	14.4 m³/MT	

FRESH WATER CONSUMPTION (Domestic)

- Total Employees = 250 + 100
= 350
- Total Consumption = 10000 ltr/day
- Consumption Per Capita = 28.5 Ltr/person/day
(per capita consumption includes washing, drinking, toilets, cooking and horticultural purposes)
- No residential complex within the plant premises.

REDUCTION IN SPECIFIC WASTEWATER DISCHARGE

Year (April- March)	Treated Waste- water from final outlet of ETP (m ³)	Treated Waste-water Recycled for R. M. washing		Treated Waste- water Discharged from Final outlet of ETP		Waste water discharge / Ton of Paper
		(m ³)	%	(m ³)	%	
2005-06	1576267	0	-	1576267	100	70.23
2006-07	1840866	438000	23.8	1402866	76.4	42.17



Reduction = 40%

■ Wastewater Discharge

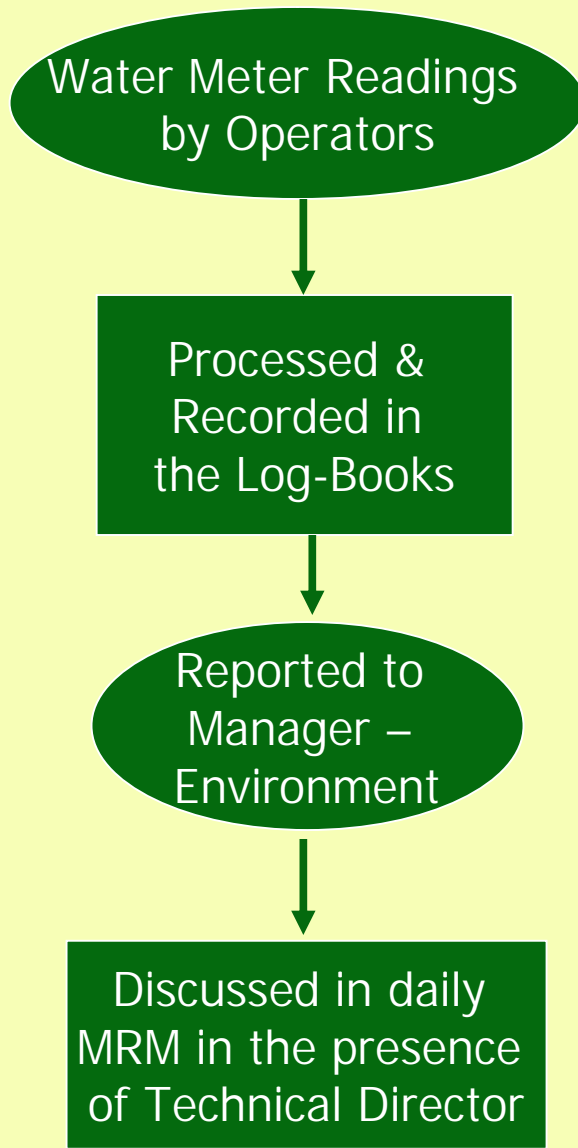
INNOVATIVE PROJECT TO REDUCE WASTEWATER DISCHARGE

- UTILIZATION IN RAW MATERIAL WASHING
 - § A need was identified
 - § Source, quality & supply was identified
 - § Total investment & payback period was calculated
 - § Detailed proposal was submitted to management for necessary budgetary approvals
 - § Project implemented within one month from the date of approval
 - § A review of the same was submitted to the management after one month for fresh water saving
- Using of treated wastewater for bagasse wet bulk storage in coming season for further reduction in final discharge



- Total Water Required = $50 \text{ m}^3/\text{hr} = 1100 \text{ m}^3/\text{day}$
- Total Fresh Washer Saving per annum = 356400 m^3
- Cost of fresh water (including cess, power, pumping & treatment) = Rs. 3.33 per m^3
- Savings per annum = Rs. 1337000
- Investment = Rs. 3.00 Lacs
- Payback period = 2.7 months

MONITORING & REPORTING



- Installation of water meters
 - § on each borewell delivery
 - § on fresh water line in each section
- Installation of V-notch at final discharge of ETP
- Consumption target for each section and review in MRM
- Water committee meeting on monthly basis to review water consumption & selection of water conservation project

EMPLOYEE & COMMUNITY AWARENESS

- Involvement of shop-floor workers
- Competition among workers on "WORLD ENVIRONMENT DAY"
- Display of slogans all over the plant, poems, essay, stories etc. on notice boards
- Monthly Reward scheme for maintaining water consumption within limits to each section
- Open suggestion scheme for water conservation with reward
- Maintaining excellent housekeeping.
- Encouraging nearby farmers to use treated wastewater for irrigation of crops to save ground water
- Distribution of pumpsets to nearby farmers for this purpose

