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Tissue production and tissue market – DIP in view of environmental issues

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Germany





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Overview

- Introducing WEPA
- Stock preparation
 - History of stock preparation plant
 - Hygiene paper market
 - Specks, Stickies, Ash
 - Effluent treatment
- Paper machine loops
- Power plant
- Biological treatment
- Energy recovery from Biogas





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Company data

- **WEPA – Paper mill** founded 1948
- **Family owned company** 3 brothers, active in the company
- **Production program** Industrial Tissue (Toilet paper, kitchen towels, facial tissue, DI-Pulp)
- **Plants** Arnsberg-Müschede, Marsberg- Giershagen, 225 000 ,200 000 to per year production capacity
- **Operating figures** > 1000 employees, > 250 Mio. € turnover, 18 % market share, 60 000 to per year DIP saleable capacity
- **Distribution channels** 70 % retail trade, 20 % export, 10 % specialized trade
- **Raw materials** 50 % recycled fiber, 50 % pure cellulose pulp
- **Subsidiaries** Kriepa GmbH, AFH GmbH, Wepa Polska
- **Associated companies** GC & WEPA Spain, MKG





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WEPA mills



Giershagen Mill

Production capacity: 85.000 to

Converting capacity: 100.000 to

Müschede Mill

Production capacity: 60.000 to

Converting capacity: 80.000 to



Three Mills

since 1948 in Arnsberg-Müschede

since 1961 in Marsberg-Giershagen

since 2001 in Kriebethal/Sachsen

Kriebstein Mill

Production capacity: 80.000 to

Converting capacity: 25.000 to





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Paper machines

- Müschede
 - 1983 – s-wrap, Escher Wyss (2,7 m)
 - 1996 – Crescentformer, Andritz (2,7 m)
- Kriebstein
 - 2003 – Shoe Press machine, Andritz (5,4 m)
 - 2004 – Crescentformer, Toscotec (2,7 m)
- Giershagen
 - 1989 – s-wrap, Escher Wyss (2,7 m)
 - 1991 – Crescentformer, rebuild Valmet (2,7 m)
 - 2001 – Crescentformer, rebuild Toscotec (2,7 m)

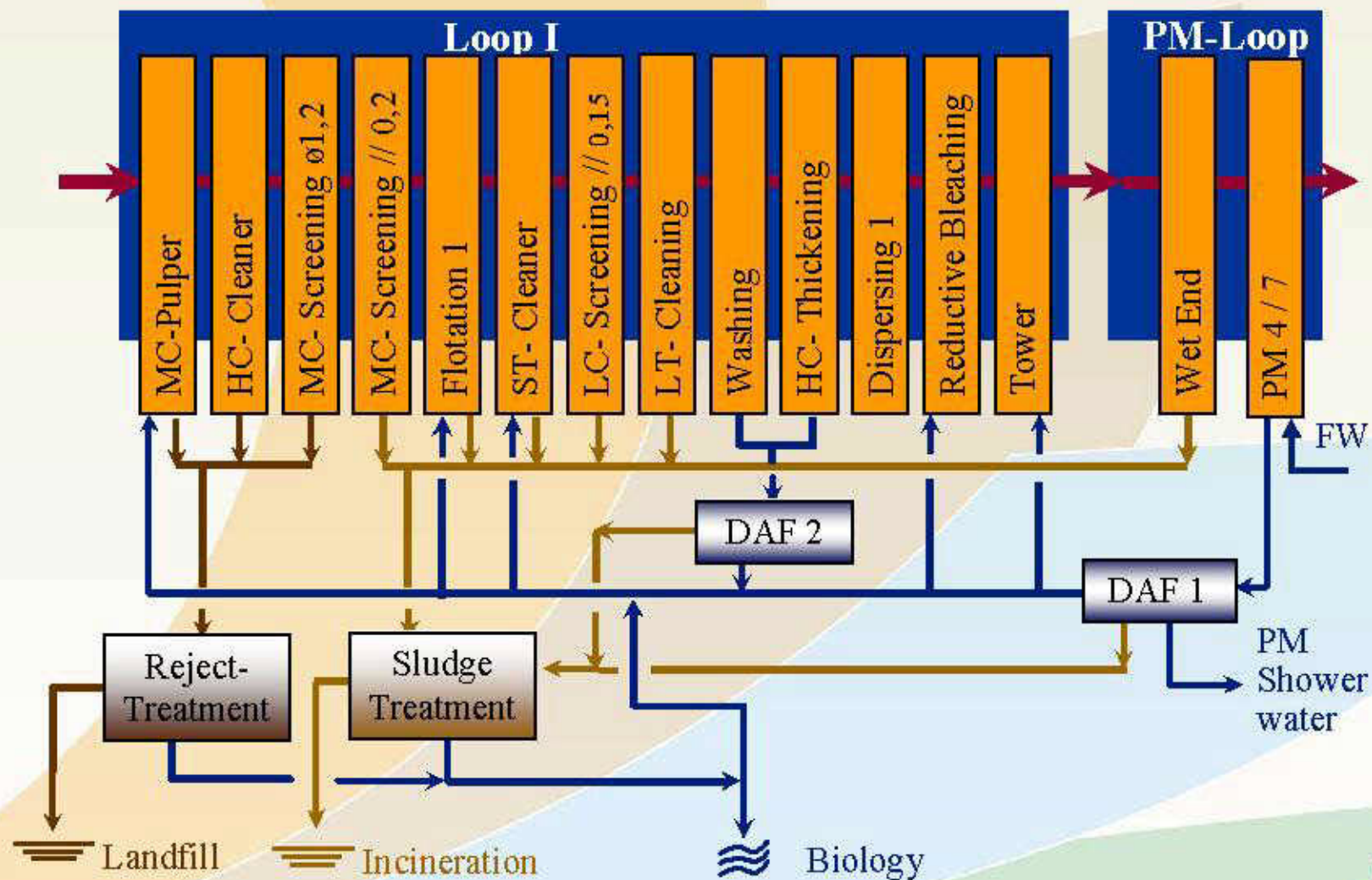




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Stock Preparation in Giershagen

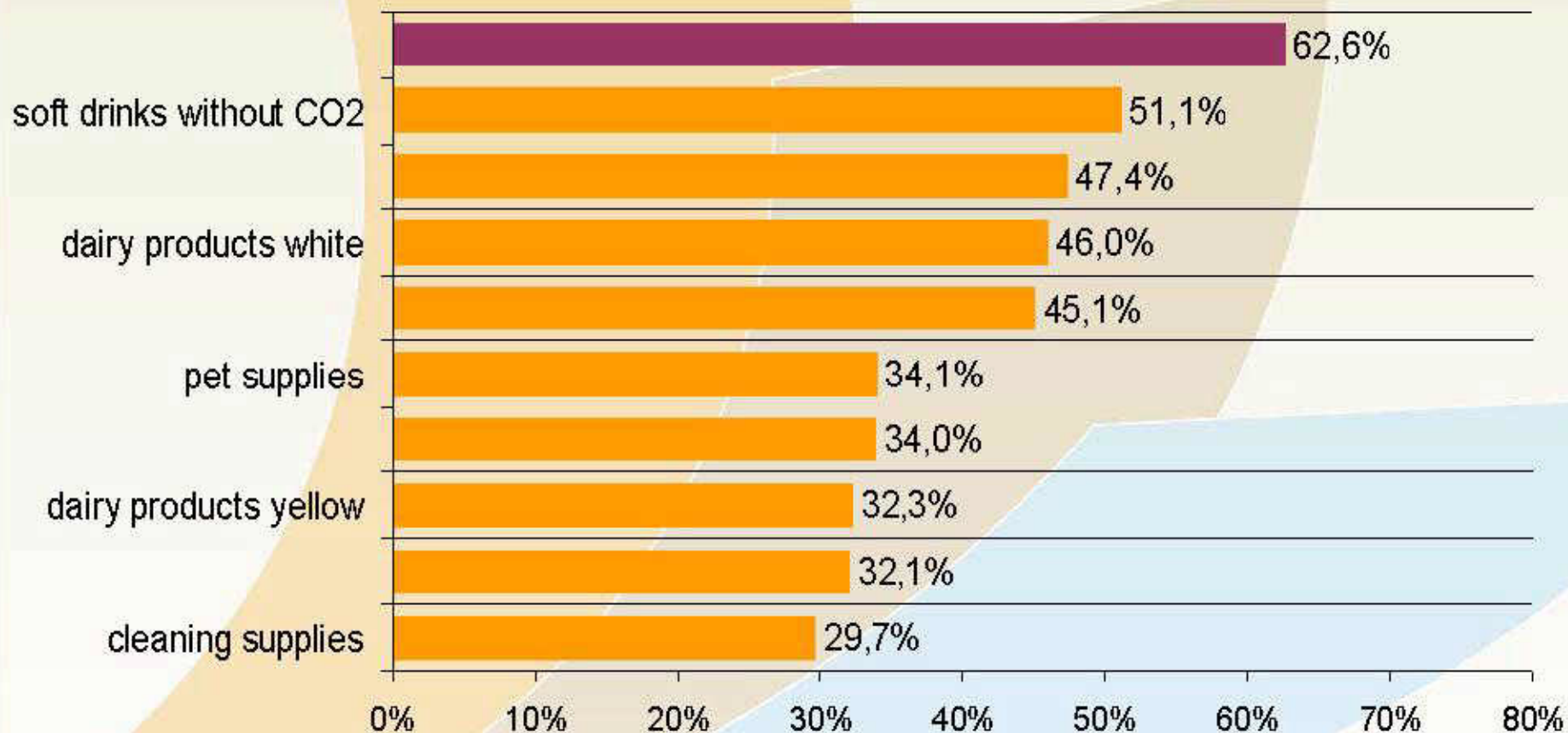




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White labels are gaining ground



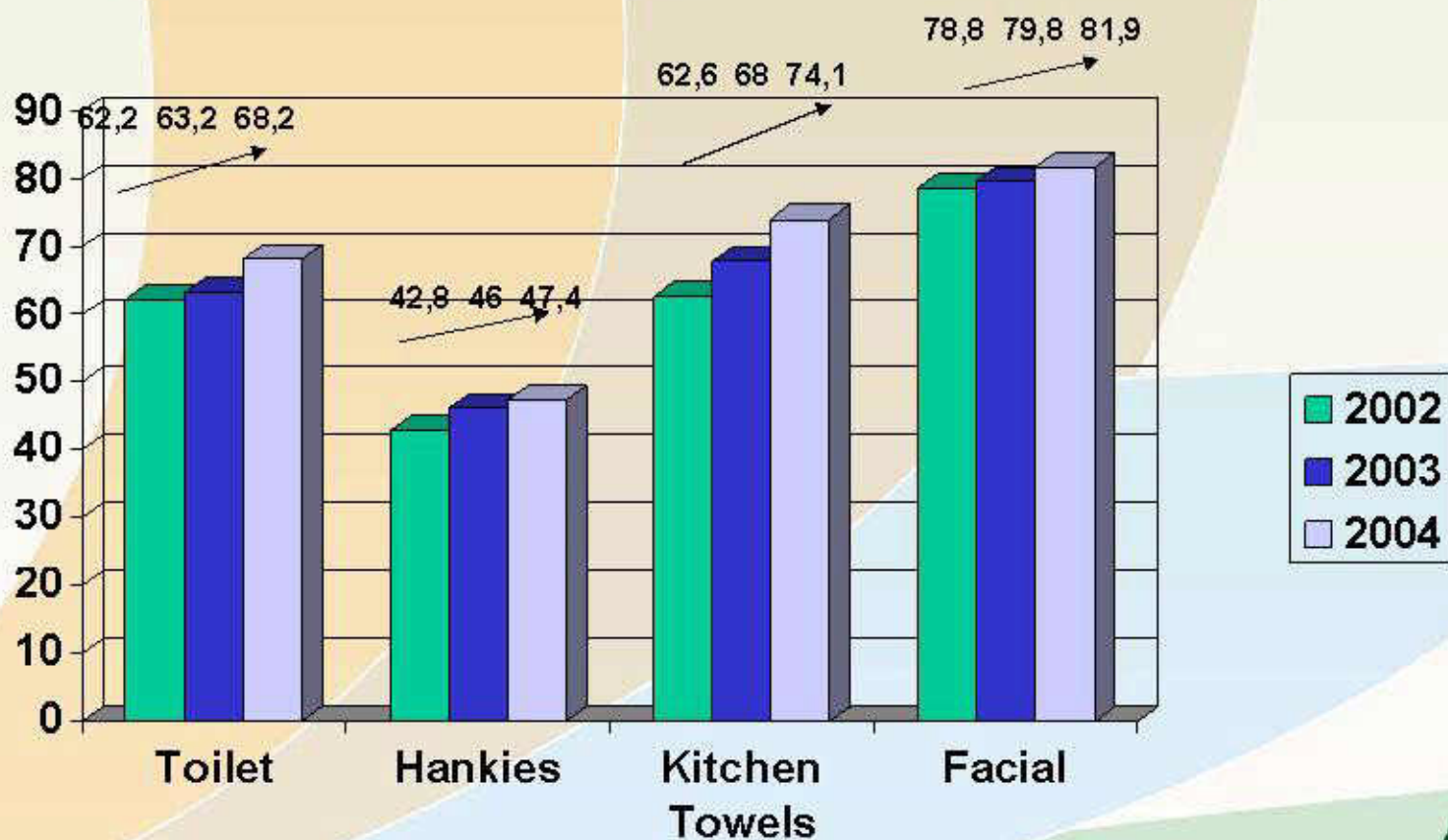


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Consumer Tissue (brands)

Amount

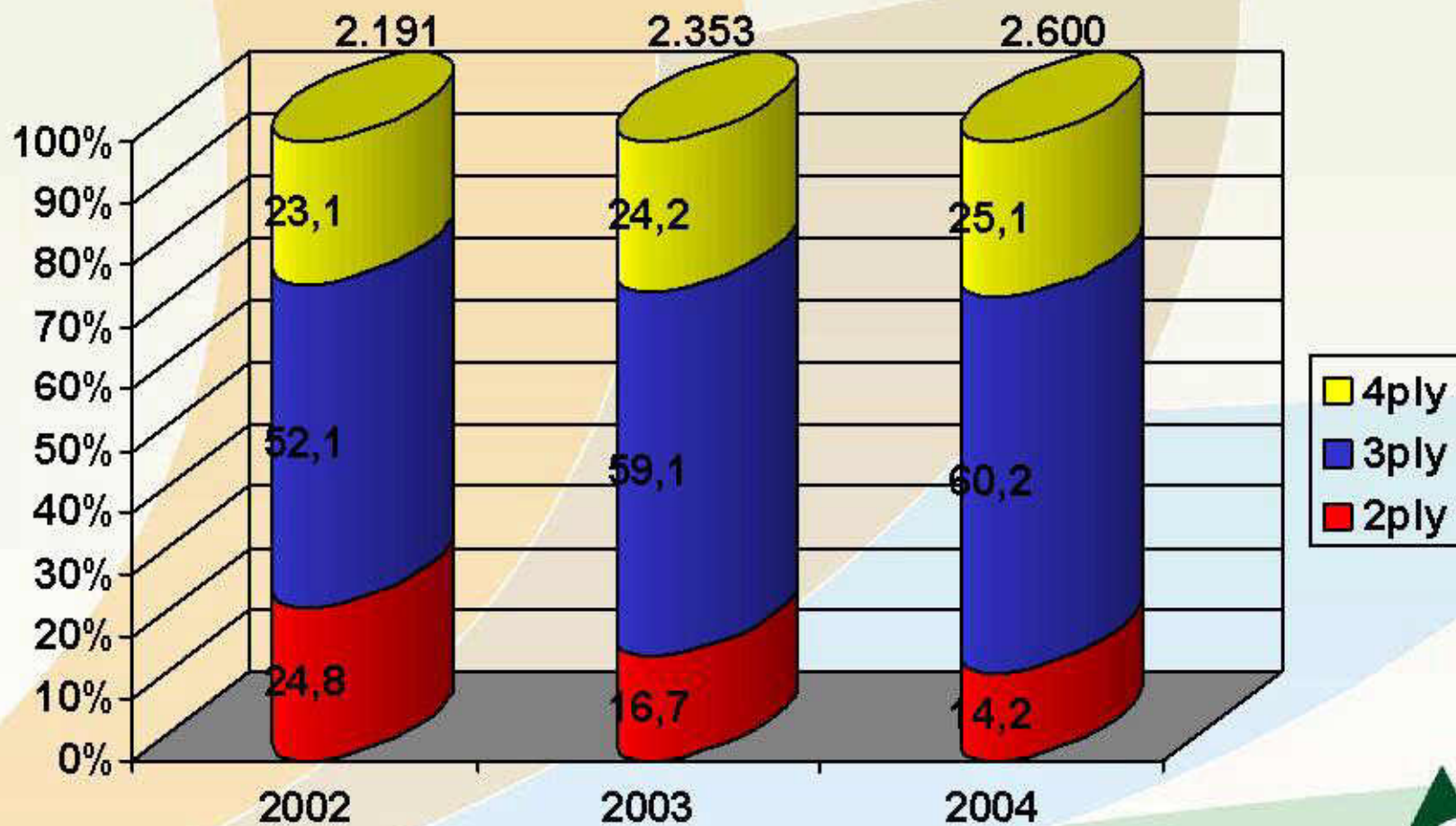




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Toilet Tissue in Plies





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Specification of quality parameters

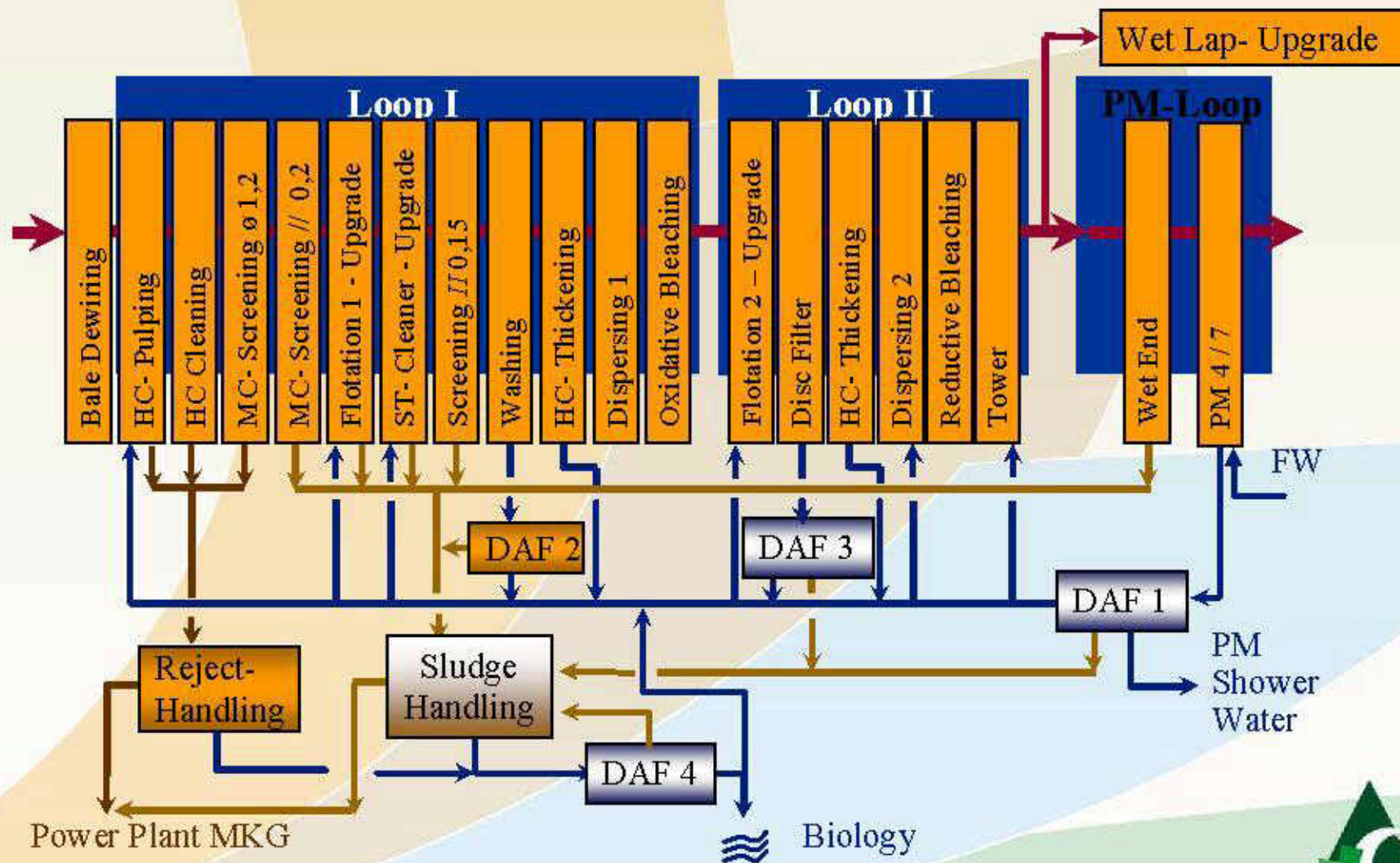
Actual condition	Required condition
Dirt specks > 300 mm ² /m ²	Dirt specks < 30 mm ² /m ²
Stickies Ø 1170 mm ² /kg	Stickies < 200 mm ² /kg
Whiteness approx. 10 % ISO increase	Whiteness Increase at least 20 % ISO
PM – runnability malfunction through Stickies	Smooth PM - runnability
	Lower priced raw materials



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Stock Preparation Giershagen

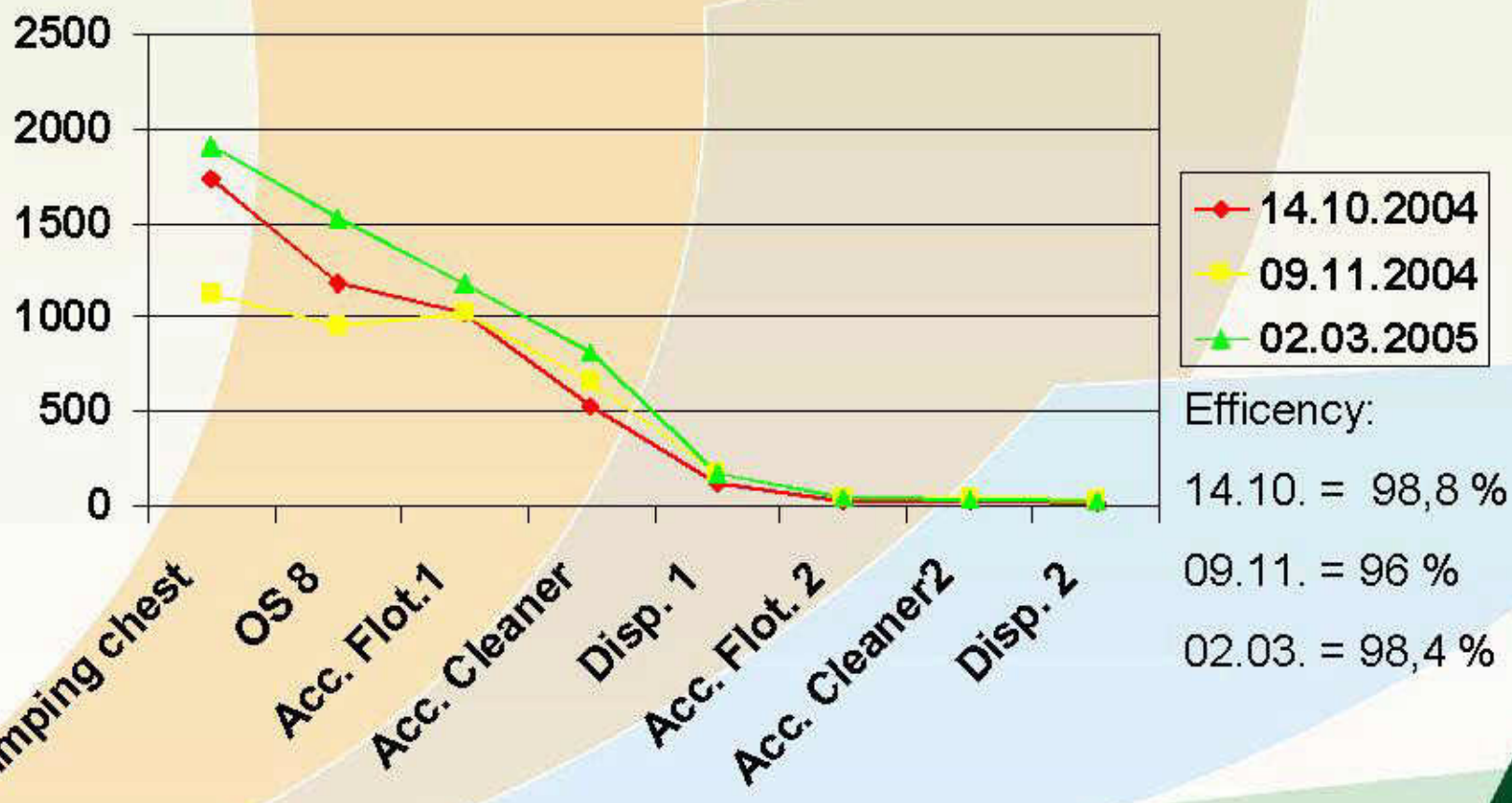




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Spots > 50 mm²/m²





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Spots > 50 mm²/m² Loop 1

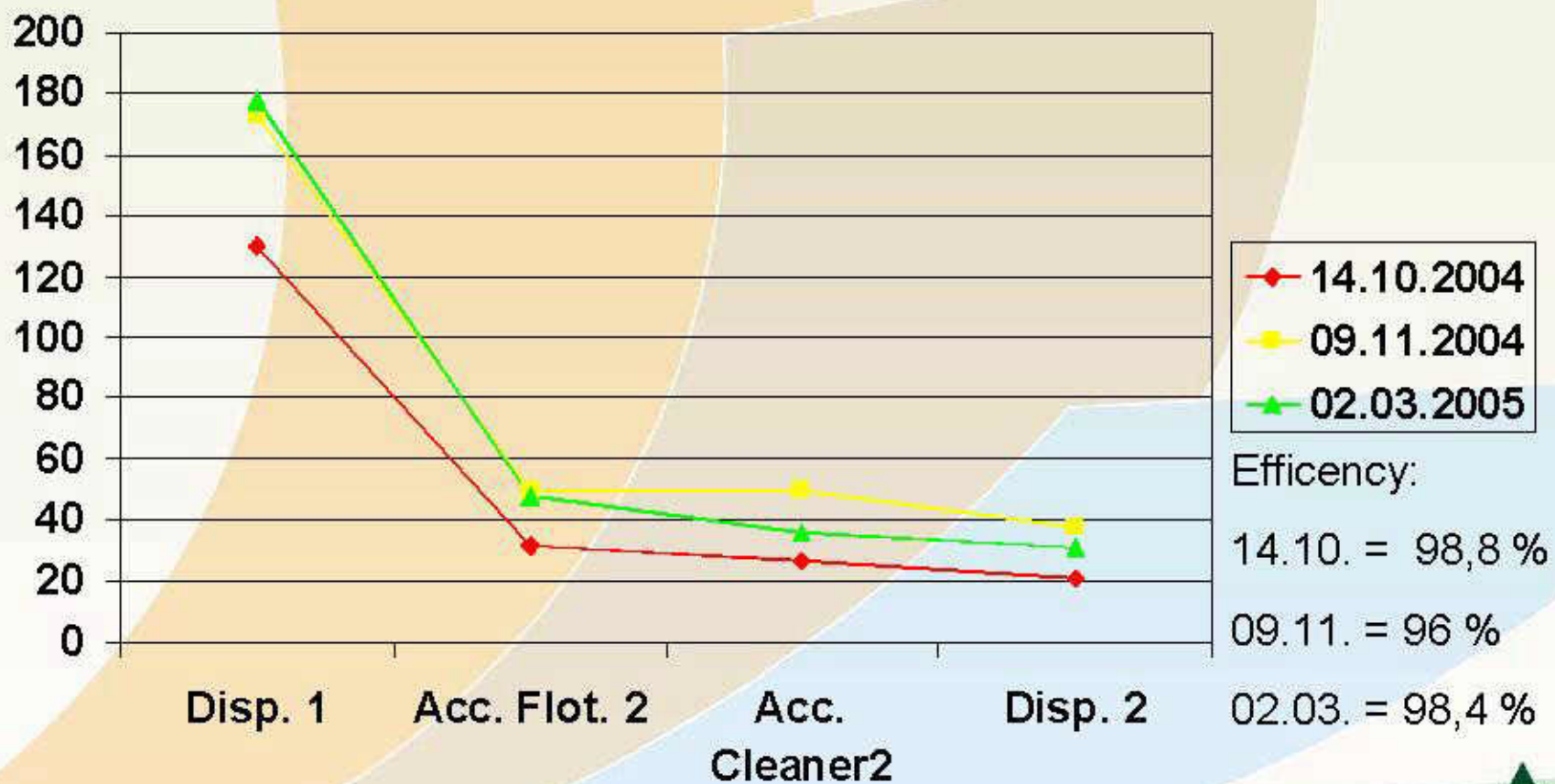




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Spots > 50 mm²/m² Loop 2

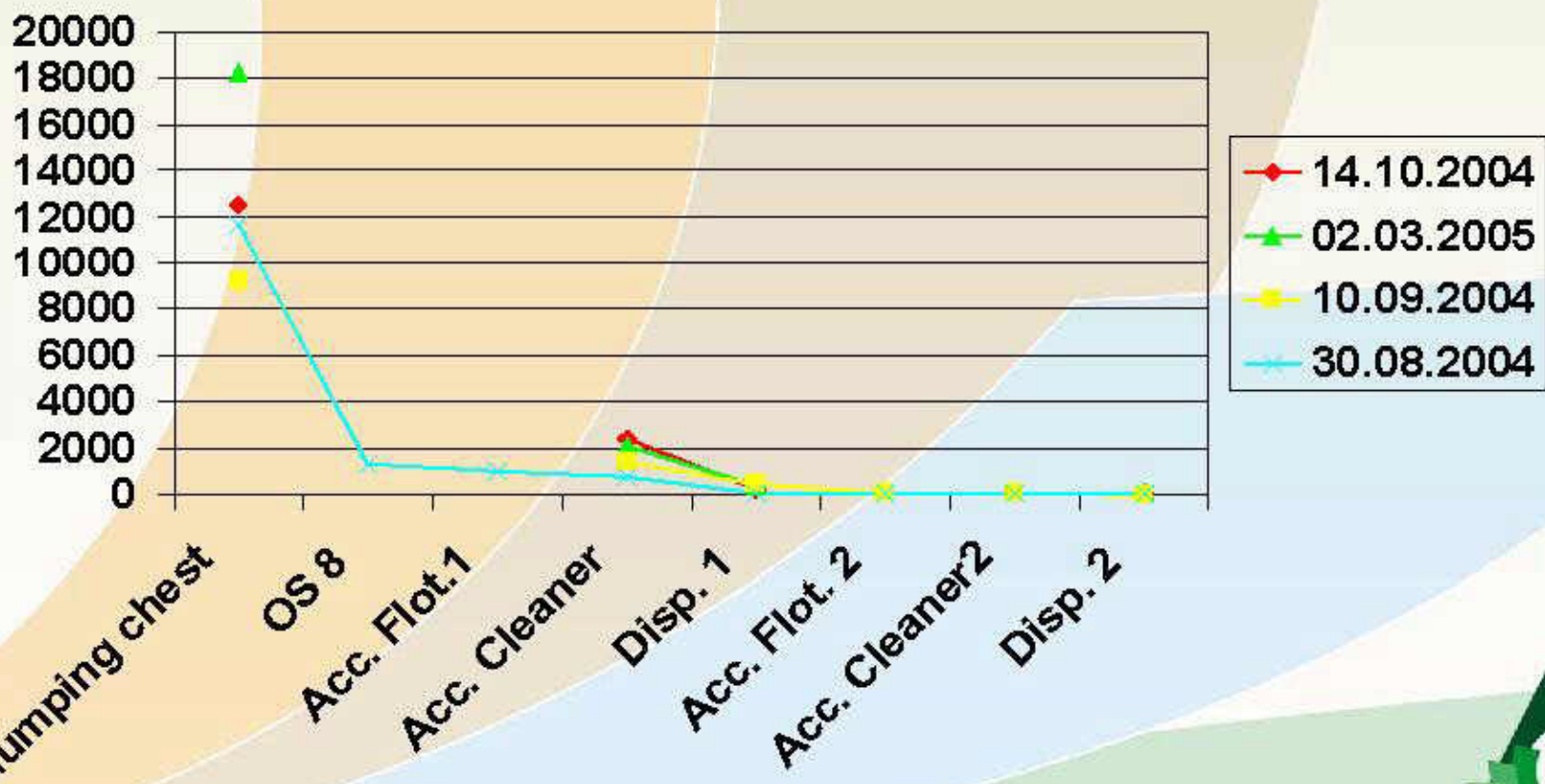




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Stickies mm²/kg

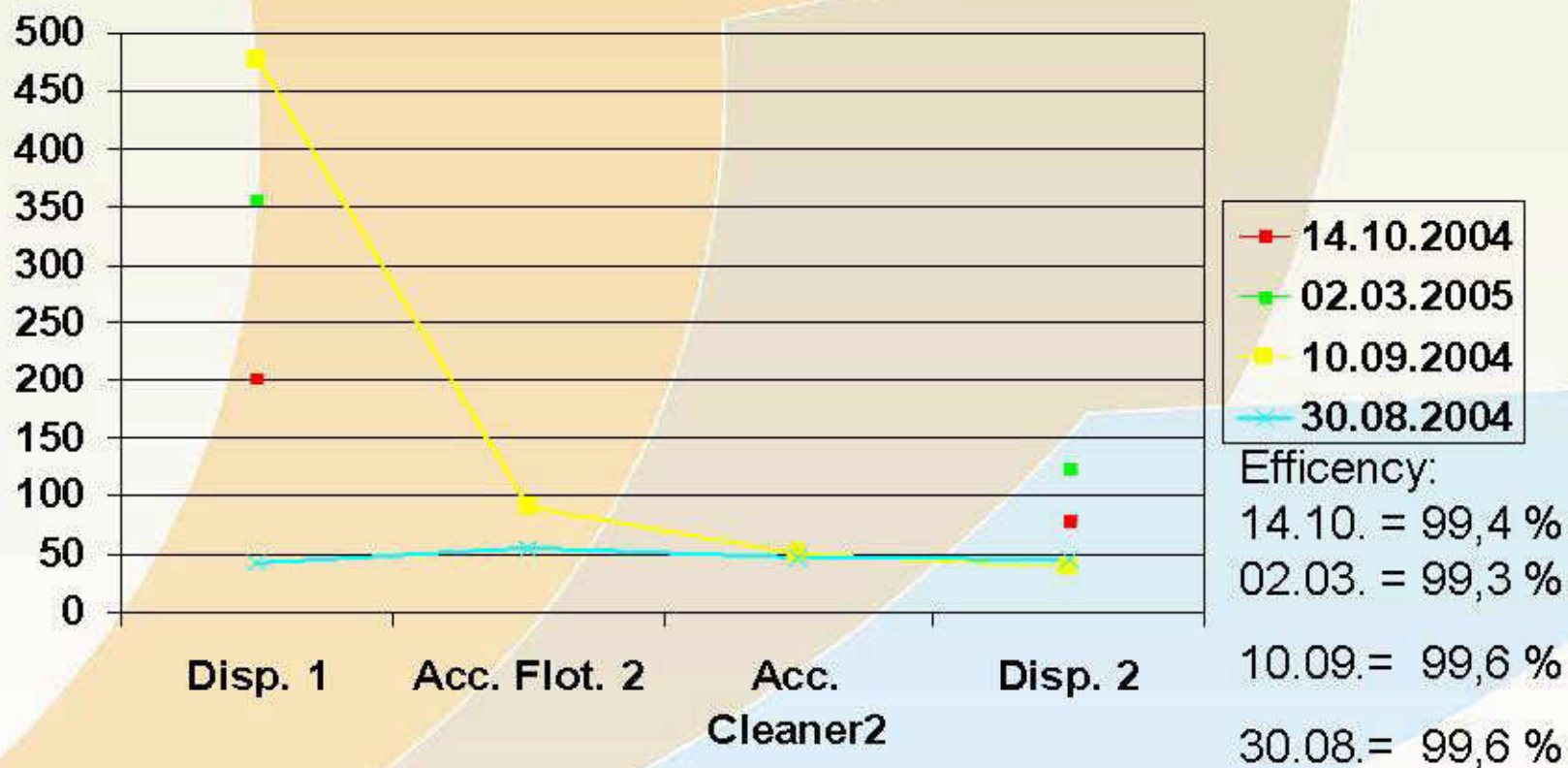




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Stickies mm^2/kg

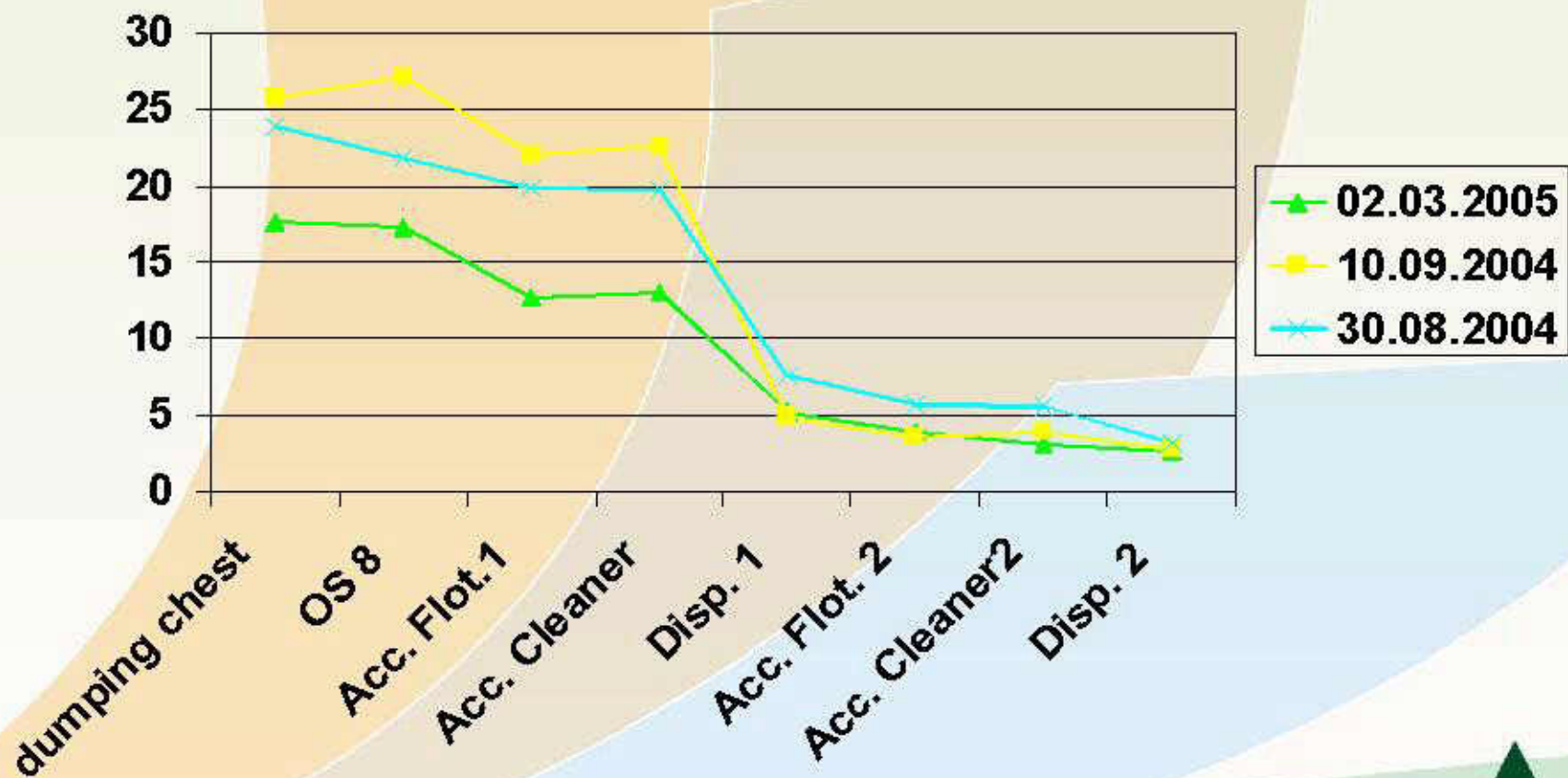




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Ash %

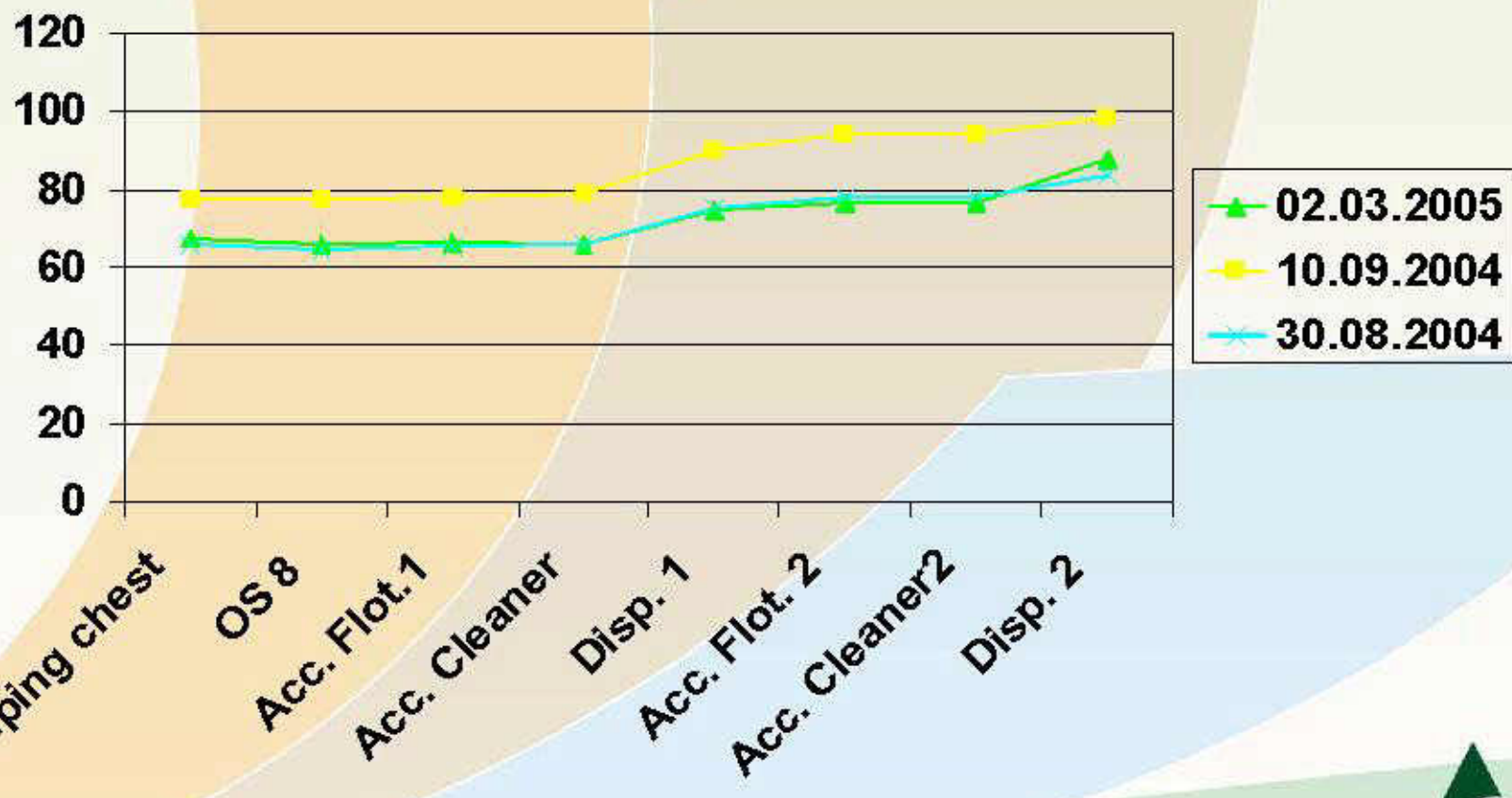




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Brightness % ISO





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Brightness- and Dot-measurment

- **ECO- Bright** (Brightness measurment)
 - 1.) before bleaching 1
 - 2.) after bleaching 1
 - 3.) before bleaching 2
 - 4.) after bleaching 2
 - 5.) wet lap
- **Sympatec** (dot – counter)
 - 1.) after flotation 1
 - 2.) wet lap



ABTCP

Water management for stock preparation

- Fresh water only at the paper machine
 - floated nip
 - high pressure shower
 - chemicals
- Stock preparation:
 - water from paper machine
 - dilution water for chemicals
 - sealing water for pumps and agitators



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Waterloop 1 (DP 280 – DAF 2)

mg/l

3000

2500

2000

1500

1000

500

0

Ø 2488 mg/l

Ø 293 mg/l

- 05.04.2005
- 14.03.2005
- 02.02.2005
- 17.12.2004
- 04.11.2004
- 09.07.2004

inlet

outlet





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Water Loop 2 (DP 68 – DAF 3)

mg/l

200

180

160

140

120

100

80

60

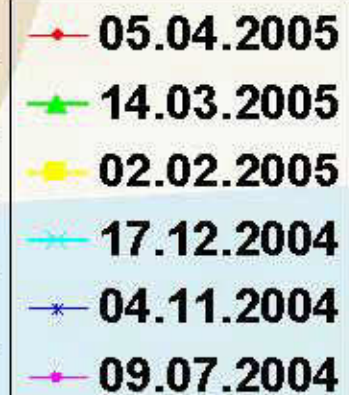
40

20

0

Ø 98 mg/l

Ø 23 mg/l



inlet

outlet





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Filtrat Presses (DP 68 – DAF 4)

mg/l

2500

2000

1500

1000

500

0

Ø 852 mg/l

Ø 23 mg/l

- 05.04.2005
- 14.03.2005
- 02.02.2005
- 17.12.2004
- 04.11.2004
- 09.07.2004

inlet

outlet





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Customer requirements

Customer	Dirt specks mm ² /m ²	Stickies mm ² /kg	Whiteness % ISO	Specialities
Tissue	➤ 50	< 200	➤ 80	Ash
Board	Not to apply	< 200	➤ 75	°SR, DIPN, Ash
Packaging	30 – 50	< 200	➤ 80	DIPN
Finepapers	< 15	< 200	85 – 95	Ash
Finepapers	< 30	< 35	84 - 88	Color



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Bales from wet lap





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Transportation wet lap





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Power plant for the incineration of rejects design data

- **Combustion of rejects**

22,5 MW firing thermal capacity

25 t/h steam generation

10 t/h getter from stock preparation (50 % organic,
50 % anorganic)

2,5 t/h wood

1,1 t/h rejects

- **Gas turbine engine with waste-heat boiler**

4,5 MW electric power GT

15 MW firing thermal capacity gas turbine

8 MW firing thermal capacity surface burner

- **Steam turbine**

6,3 MW electric power

36 t/h max. loading capacity

with two steam extractions

one at 19 bar

15 t/h

one at 3,5 bar

5 t/h

23,5 t/h max. condensation capacity

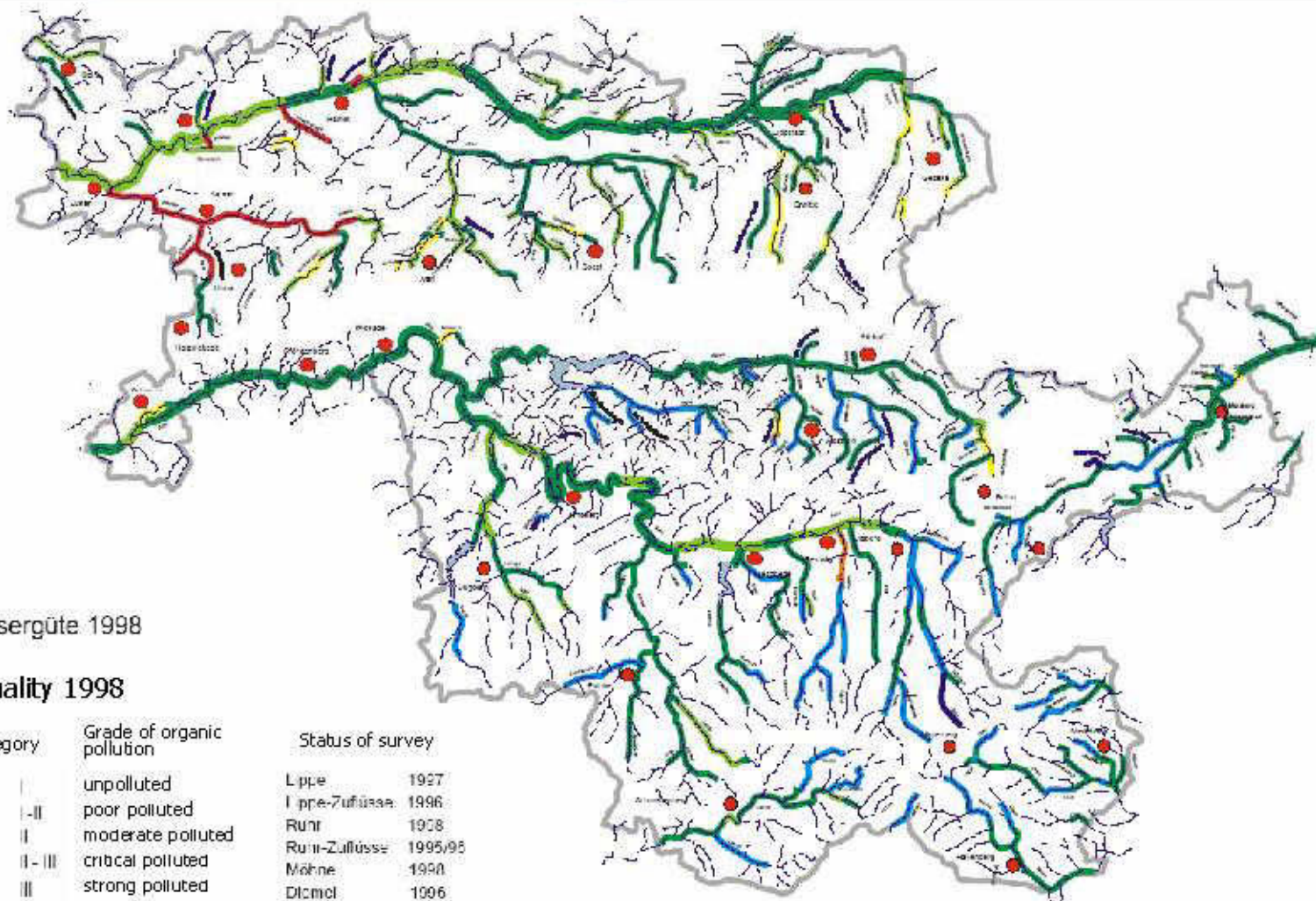




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Federal Environmental Agency Lippstadt

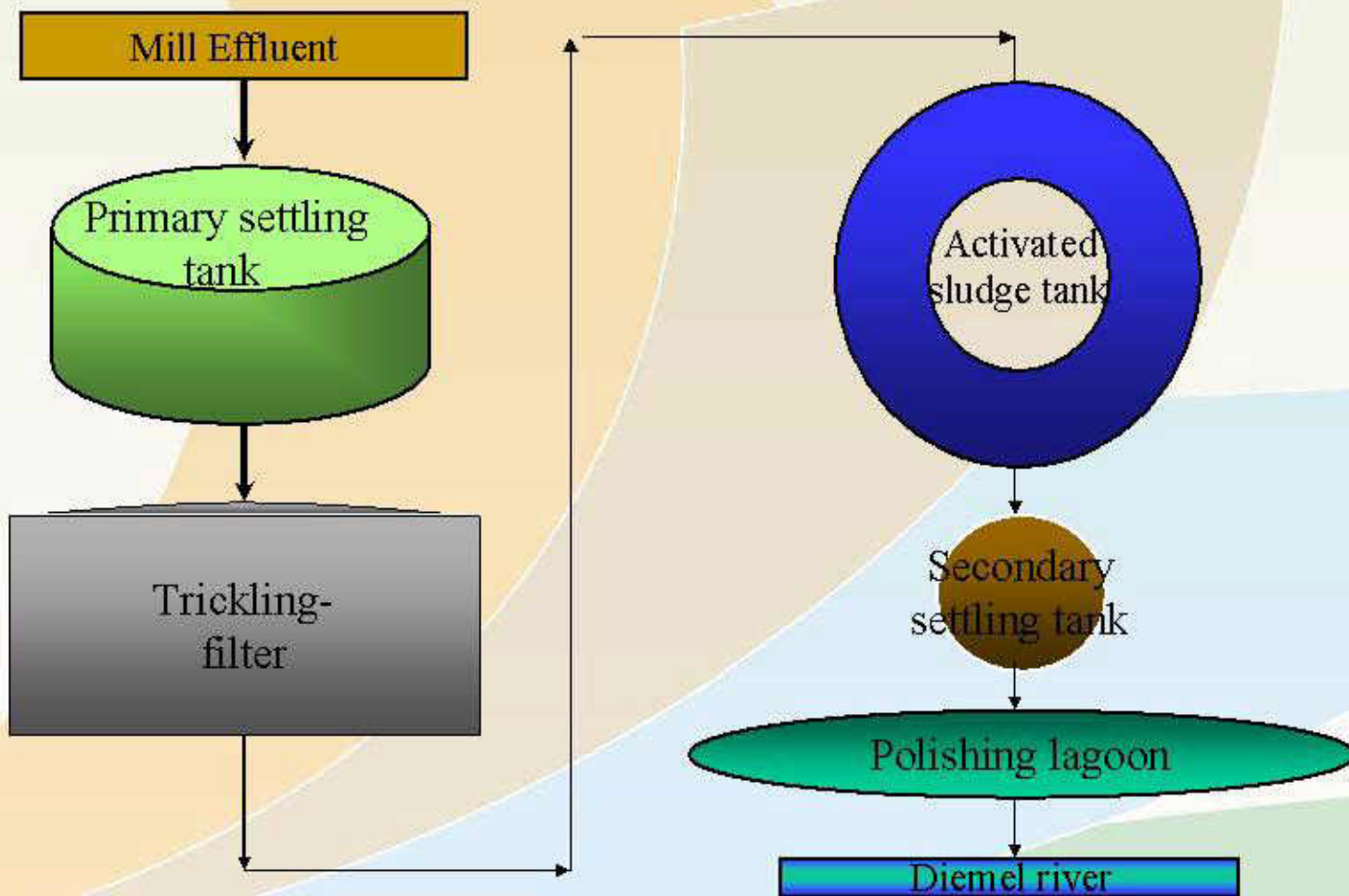


Gewässergüte 1998

Water quality 1998

Quality category	Grade of organic pollution	Status of survey
	I unpolluted	Lippe 1997
	I-II poor polluted	Lippe-Zufüsse 1996
	II moderate polluted	Ruhr 1998
	II-III critical polluted	Ruhr-Zufüsse 1995/96
	III strong polluted	Möhne 1990
	III-IV highly polluted	Dümel 1996
	IV excessively polluted	Anse 1997/98
		Lenne 1997
		Eder-Zufüsse 1997

Effluent Treatment Plant Giershagen, Block Diagram 1989-1998





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Effluent treatment plant in Giershagen

Design- and admissible values

Design 1989

COD	7500 kg/d (3000 mg/l)
BOD	4500 kg/d (1800 mg/l)

Admissible values (still valid)

COD	200 mg/l from August 2004 on temporary 270 mg/l
BOD ₅	20 mg/l
AOX	0,6 mg/l
Total phosphorus	2 mg/l
Total inorg. Nitrogen	10 mg/l
Epichlorohydrin	0,0025 mg/l
Non ionic tensides	1 mg/l
Anionic tensides	1 mg/l



Effluent Treatment Plant Giershagen

current feed- and discharge data

	Feed Tricking Filter	Discharge
• Flow	max. 2880 m ³ /d	2400 m ³ /d max.
COD mg/l	1200 – 1800	60 – 100
COD kg/d	3000 – 4500	app. 240
BOD ₅ mg/l	600 – 900	app. 5
• Efficiency :		
– Tricking Filter (COD/BOD)		app. 35 %
– Total efficiency COD		95 %
– Total efficiency BOD		99,6 %



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IC – Reactor – Design Data

	Average	Maximum
Volume (m ³ /d)	2520	4000
COD – Feed (mg/l)	2830	3770
COD (kg/d)	7132	12000
Ratio BOD/COD	0,5	0,42
Temperature (°C)		



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General data of the IC - Reactor

- Volume 500 m³
- Dimensioning 7,5 t COD/d (Max. up to 12 t COD/d)
- Actual load 7 – 8 t COD/d (in peaks up to 12 t)
20 – 23 kg COD/m³ x d
- Amount of gas 2000 – 2500 m³/d
- Composition of gas app. 80 % methane, 16 % CO₂, 2 % H₂S
- COD-Removal app. 75 %
- BOD-Removal app. 80 %
- pellet content 15 – 25 t
- Organic fraction app. 85 %
- Inorganic fraction app. 15 %





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Trouble after the rebuild Temperature

Before rebuild		After rebuild	
Feed Trickling filter	33 – 39 °C	feed ICR	> 40 °C
Feed activated sludge tank	30 – 33 °C		partial 35 – 39 °C
Cooling capacity Trickling Filter	2 – 5 °C	Cooling capacity ICR	none
Impact		deflocculating, max. compressor power	high COD - values



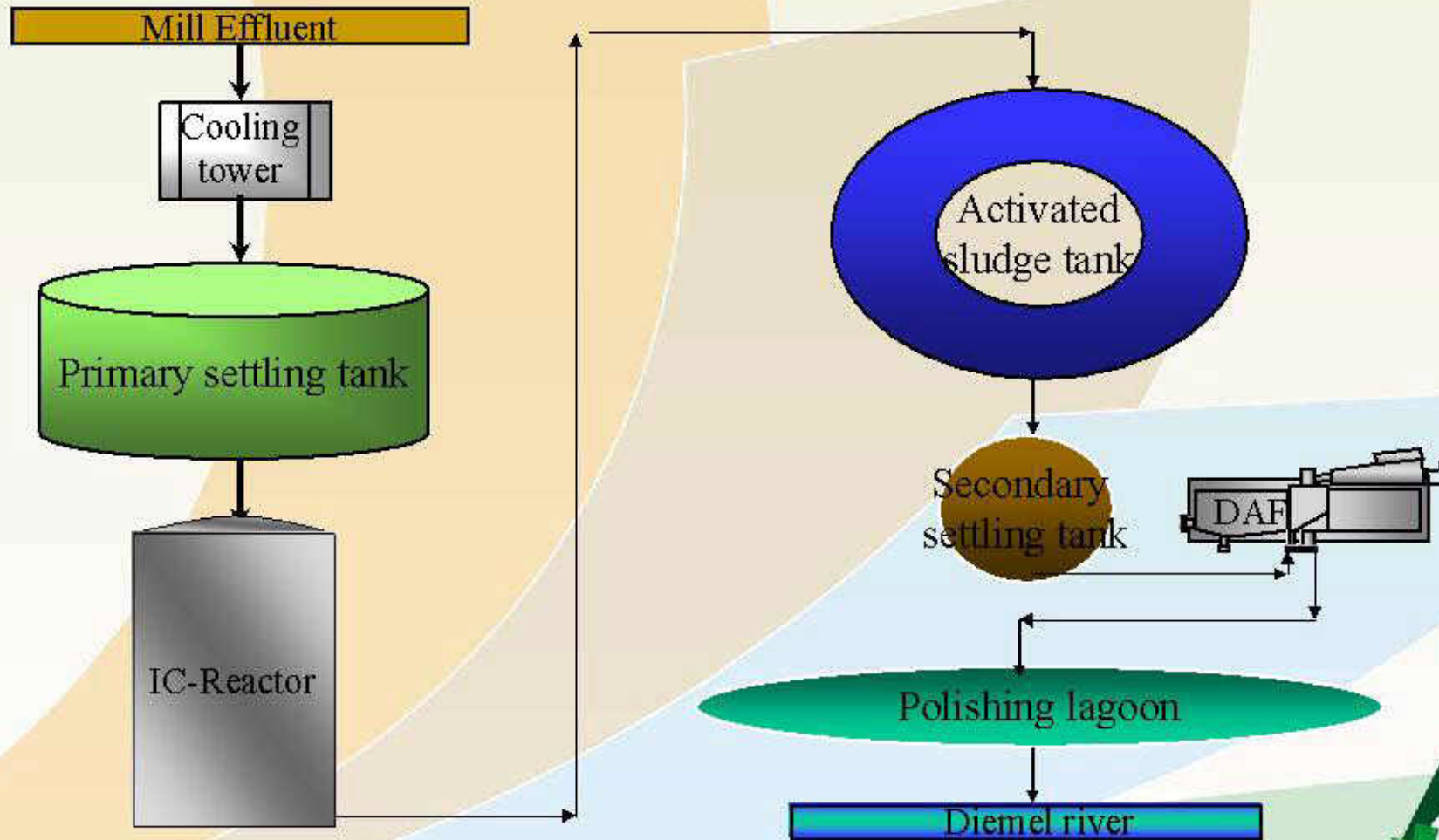
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Solutions

Temperature	Installation of a cooling tower (2000) cooling capacity 5 – 10 ° C
pellets loss	Utilization of a screening drum with 0,5 mm slots (2001)
Rest - COD	a.) Mikroflotation – precipitation (2001) b.) Trials with ozonization - Membrane technology (2005)

Effluent Treatment Plant Giershagen, Block Diagram 2004 incl. Upgrades





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Thank You

