Sustainable Production: Treatment to Avoid Water Contamination by the Paper Mill in Uruguay

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Introduction

- The new United Paper Mills (UPM) plant is a leading Finnish company in the forest and forest products industry. Founded in 1996, it is dedicated to the production of pulp, paper, and related products.

Sustainable Development Goals

Problem description

- UPM's mill is designed to produce pulp from eucalyptus wood and is estimated to produce up to 2.1 million tons per year
- The clearance of large forested areas is necessary to support its operations.
- The mill generates various types of waste and emits pollutants.
- Effluents from the mill flow into the Rio Negro and eventually into the Rio Uruguay, affecting the fishing area of Entre Ríos in Costa Uruguay Sur.

Problem Approach

In one year of production, will generate approximately 6,100-6,500 tons per day. In this table, we can see the different contaminants.

Compound	Unit	Mean Value	Group
T. Sulfur	Kg/day	33,211.1	Group A
AOX	Kg/day	147.5	
Phenolic S. (as Phenol)	Kg/day	0.1	
Total P	Kg/day	45.8	
Total N	Kg/day	109.7	
Ca	Kg/day	10,973.1	
Chlorate	Kg/day	42.6	
Oils and fats	Kg/day	299.7	
As	Kg/day	0.159	Group B
Cd	Kg/day	0.008	
Cu	Kg/day	0.269	
T. Cr	Kg/day	0.901	
Hg	Kg/day	0.002	
Ni	Kg/day	2.829	
Pb	Kg/day	0.032	
Zn	Kg/day	0.520	
Al	Kg/day	15.730	
Mn	Kg/day	12.023	
TCDD	µg/day	48.4	Group C
TEQ TCDF	µg/day	7.1	
PeCDD	µg/day	108.5	
HxCDD	µg/day	90.4	
HpCDD	µg/day	153.7	
OCDD	µg/day	268.7	
PeCDF	µg/day	96.7	
HxCDF	µg/day	127.5	
HpCDF	µg/day	142.8	
OCDF	µg/day	188.6	

Group A: Process Compounds. AOX and Phenolic are typical of Bleaching. Total N, NH3 and total P, mainly originated in Secondary Treatment, but partly in Digestion and Chemical Recovery. Sulfur, Sulfides and Ca come from Washing and Chemical Recovery. Chlorates come from Chemical Preparation Area. Oils and fats come from every place in the mill, but some from dissolved wood.

Group B: Main Heavy Metals. Most of them come as traces with the chemical supply, although some metals are part of the dissolved wood. All are persistent and bio-cumulative

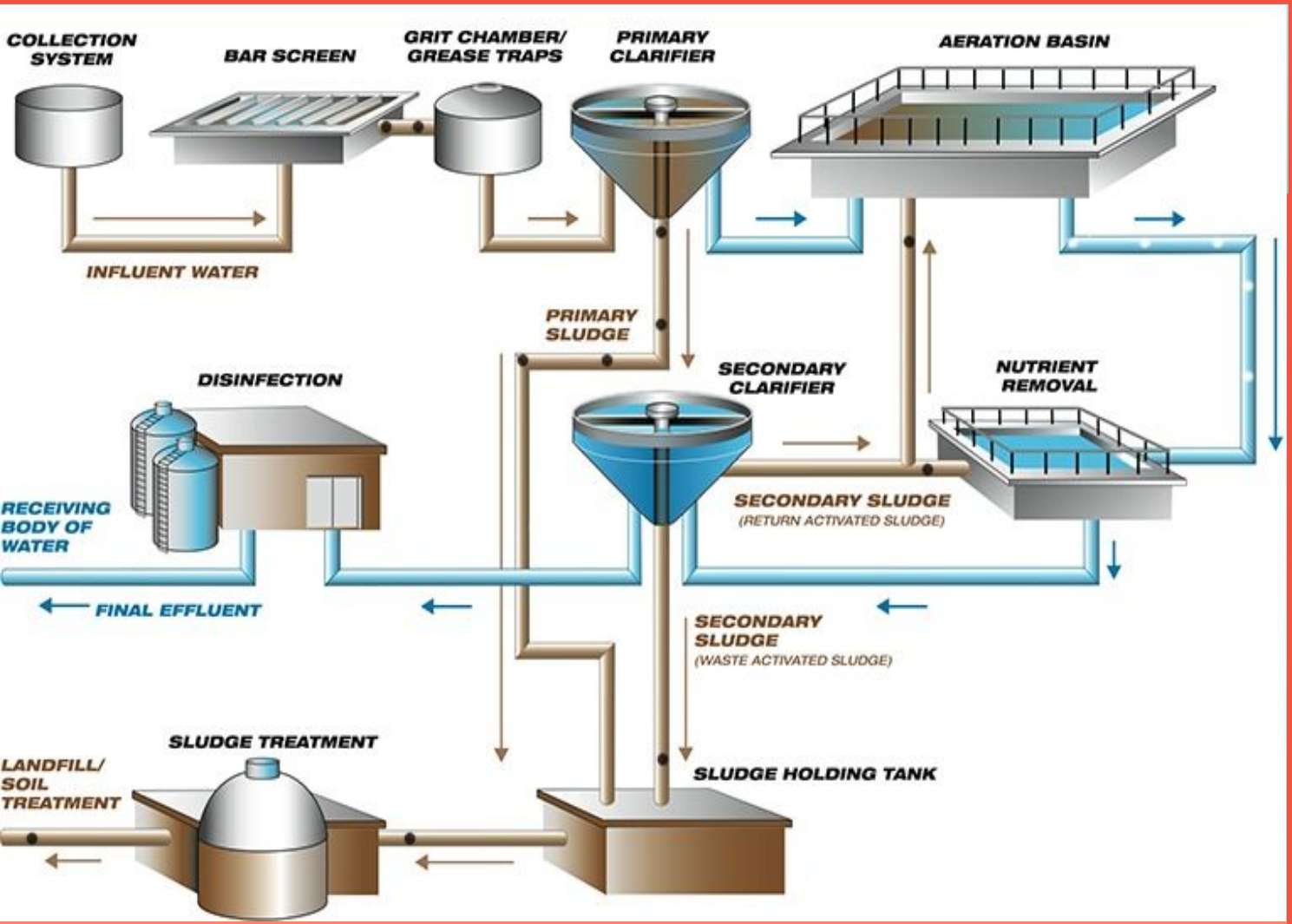
Group C: Dioxins, Furans and Dioxins-like compounds of very high toxicity. In this particular case, all compounds of this Table set are originated in Bleaching.

Total Group A	Kg/day	44,830
Total Group B	Kg/day	32
Total Group A+B	Kg/day	44,862
	t/year	15,926
Total Group C	µg/day	1,232
	µg/year	437,489

These factories generate a high level of organometallic contaminants during the wood digestion and pulp manufacturing process. Mutagenic, endocrine disrupting and carcinogenic properties were observed in some of the detected contaminants.

Water recycling process

To carry out this process, it is necessary to complete the following steps:



1. Water collection and storage process
2. Recycled Water Treatment
3. Mixture with Fresh Water
4. Reuse Process
5. Control and Monitoring

Advantages and Disadvantages

Advantages	Disadvantages
Environmental Protection	Operating Costs
Regulatory Compliance	Sludge Waste
Water Recycling:	Maintenance Requirements
Odor and Waste Reduction	Energy Consumption
Sustainability:	Impact on Production

Conclusion

Wastewater treatment in paper mills is essential to protect the environment and maintain the long-term viability of the industry.

Water recycling reduces the demand for fresh water and minimizes the discharge of contaminated effluent into the environment.

¡THANK YOU!

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