



Client  
**Visy Pulp and Paper**

Address  
**Tumut, NSW**

Completion Date  
**May 2001**

The construction of a new pulp and paper mill at Tumut, NSW required careful management its environmental impact. Multiple waste water streams from different areas of the plant, each with their own unique characteristics required separate pre treatment before being cocktailed and fed into the main waste water treatment plant.

The effluent from the plant was initially destined to be stored for summer irrigation. The treatment process proved to be so successful that a large proportion of the treated water is now pumped back to the mill and reused, greatly reducing the mill's water consumption resulting in a substantial energy cost savings and lower usage of the external water service.

Another benefit from the process is that the wasted sludge, after extensive testing to prove its safety for reuse (by the Charles Sturt University, Wagga Wagga), is now being used to recondition degraded pasture. The crop growth in the areas is markedly improved.

## PROCESS

Wood yard run off passes through a trash rack and mud arrester before discharged to the first flush dam. 'Black Liquor' from the mill, not normally treatable by most waste water treatment systems is mixed into the first flush dam. The first flush dam contains a floating aerator that provides intermittent aeration to control odour and pre-treat this waste stream. Discharge from the first flush dam is by gravity to the cooling ponds.

Hot waste water discharge (up to 70°C) from the mill including boiler blow down and leachates containing moderate concentrations of sulfur is spread through a distribution manifold across the top of the cooling pond. This ensures maximum efficiency in cooling. It was initially intended to reduce sulfur content by chemical means, precipitating it as gypsum but this proved unnecessary.

Domestic and laboratory waste water is passed through an automatic rotary screen and discharged into the first cooling pond.



## DESIGN PARAMETERS

### After Cocktailing and Mixing

Parameter	Units	Long Term	
		Dry	Wet
<b>Flow</b>			
Average Dry	ML/day	1.5-1.7	
Peak Dry	ML/day	2	
Average Wet	ML/day	2.2	
Peak Wet	ML/day	-	2.7
Design	ML/day	2.0	2.2
<b>Waste Water Typical</b>		Low	High
BOD <sub>5</sub>	mg/L	100	251
COD	mg/L	345	683
SS	mg/L	50	135
SO <sub>4</sub>	mg/L	100	100
TDS	mg/L	500	1000
pH	-	6.5	8
Temperature	°C	50 - 55	45 - 50
<b>Load</b>			
BOD <sub>5</sub>	kg/d	200	553
COD	kg/d	300	800
SS	kg/d	100	-
SO <sub>4</sub> / COD	-	0.29	-

The design allows treatment of waste water with 4000 mg/l BOD by cocktail-ing and with good mill control has reduced discharge waste by feed back through the control system.

### Treated Effluent Parameters

Parameter	Units	Effluent Quality		
		50%ile	90%ile	95%ile
BOD <sub>5</sub>	mg/L	15	20	40
SS	mg/L	20	30	45
TP	mg/L	-	-	2
O&G	mg/L	-	-	5
pH	-	-	~7.2	~7.2

pH balancing was required. Although the waste system is "nitrogen starved" the system has developed a stable biomass.

Contaminated storm water and other cool waste streams are collected and discharged into the lower cooling ponds.

The cooling pond is a twin chambered pond with a total effective holding capacity is 2.5 ML. Highly contaminated waste such as black liquor from the mill can be diverted and stored separately in the event of a mishap and then diluted with other waste streams to produce a manageable waste stream. An automatic pH dosing system neutralizes the reactor to allow optimal treatment.

The waste water is drawn from the bottom of the cooling pond and pumped to the Factor UTB Bio Reactor. There are two feed pumps, one duty and one standby. After a six hour treatment cycle the recycled water is decanted via the Factor UTB solid excluding decant system and discharged to the 10ML holding dam.

Unsatisfactory effluent discharge, which can arise as a result of failures within the plant can be returned to the cooling pond to be re mixed and treated until satisfactory level are achieved. Two discharge dams are available.

The holding dam polishes the water as a facultative pond. The treated water can be transferred direct to irrigation, to the winter storage dam or returned to the mill for reuse as required.

Wasted sludge is removed from the Bio Reactor and deposited in a sludge holding tank. From here the sludge is then carted away to the reclamation sites as required. The sludge is used without further thickening or other

treatment and is spread as a liquid directly over pasture. Supplemental fertiliser is added to the soil as required to balance the nutrient spread.

**The system provided for the Visy Pulp and Paper Mill has a very low energy cost, low chemical usage and 95% of the water and sludge is reused.**