[Sterapore Water Treatment — Case Report 3]

Food Plant Wastewater Treatment and Recycling System

- **Name of System**
  N Food Plant Wastewater Treatment and Recycling System (Kanagawa Prefecture, Japan)
- **Start of Operation**
  March 1998
- **Outline of System**
  Food processing wastewater is treated in a membrane bioreactor, and treated water is reused.
- **Throughput**
  140 m³/day
- **Influent BOD**
  2,500 mg/L
- **Membrane Modules**
  · Product No.: UMF 8024LF × 2 tiers × 6 units (960 m²)
  · Particle cutoff: 0.1 μm
  · Membrane replacement: Membrane has not yet been replaced as of March 2000
- **Advantages of Membrane Use**
  Most suspended solids and microbes in the wastewater are removed by the membrane bioreactor. This allows the treated water to be used directly for washing and other purposes after simple sterilization. Tertiary treatment can be carried out efficiently.

System Features

Wastewater generated by food processing operations at this plant were previously discharged as sewage. However, the plant has undertaken to treat the wastewater in a membrane bioreactor and reuse the treated water for washing and cooling. In addition, some of the treated water is being RO treated and reused as boiler water. This has helped to reduce annual water service charges at the plant by about ¥12 million.

General view of facility

Activated sludge MF treated water RO treated water

Calculation of Water-related Costs and Benefits

ⓐ Water service costs prior to new system = ¥19 million/year
[¥600/m³ (city water/sewage use) × 120 m³/day × 260 days/year]

ⓑ Running costs = ¥8.4 million/year
[¥3.6 million (MF membrane replacement) + ¥0.6 million (RO membrane) + ¥1.2 million (utilities) + ¥3 million (depreciation of system)]

ⓒ Secondary benefits = ¥1.4 million/year
[¥115,000/month (reduction in boiler chemical costs) × 12 months/year

Balance:

(ⓐ − ⓑ) + ⓒ = (¥19 million − ¥8.4 million) + ¥1.4 million = ¥12 million

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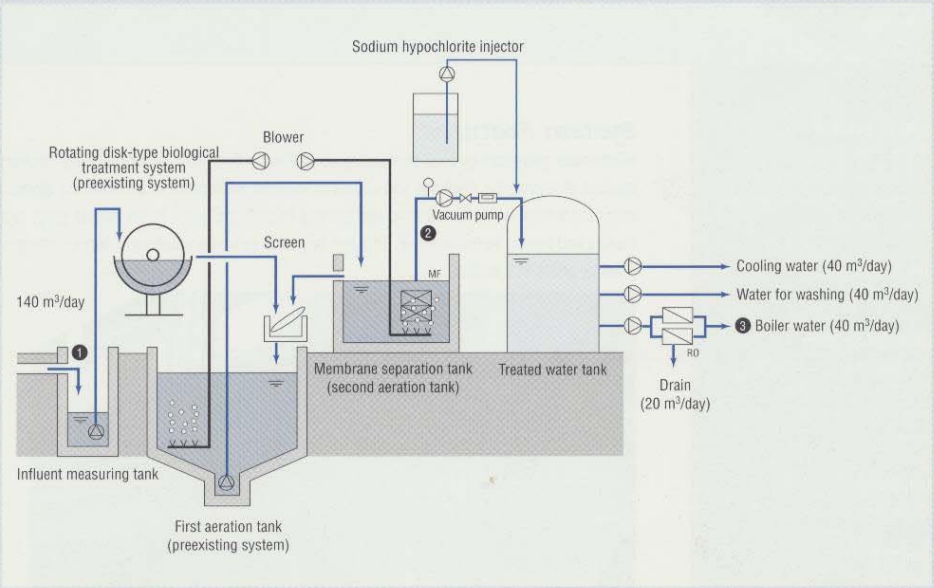
• *Flow Sheet*



• *Water Quality Analysis*

Test items	Raw water ❶	MF-treated water ❷	RO-treated water ❸
BOD (mg/L)	2,250	<1	
SS (mg/L)	1,120	<1	
n-Hexane extractable matter (mg/L)	475	<1	
Electrical counductivity (μS/cm)		2,200	<125

• *Operating Conditions (activated sludge treatment)*

HRT:	1 day
MLSS:	8,000 – 12,000 mg/L
DO:	3 mg/L
Differential pressure:	25 – 40 kPa
Chemical Wash for Membrane Modules	
Chemical:	Sodium hypochlorite (0.1%) + NaOH (4%)
Washing time:	Overnight immersion
Frequency:	Twice a year

This flow sheet presents one example of an industrial wastewater treatment system. Each system must be designed according to the water quality of the influent and the target wastewater standards.

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