PROJECT PROFILE SERIES #63

Waste Water Recycle System Based On HERO™ Technology for Reliance Industries

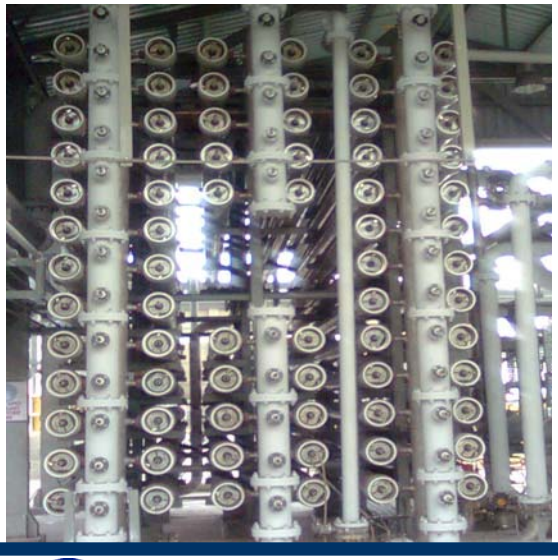
The Facility

Reliance Industries, the flagship company of the Reliance Group, is India's largest private sector company with a significant presence across the entire energy chain and a global leadership across key product segments. It is the first private sector company from India to feature in the Fortune Global 500 list of 'World's Largest Corporations'

The commissioning of this new 580,000-bpd refinery at Jamnagar (JERP) will rank it among the top ten global refineries in the world. It will catapult Reliance into the league of the largest refineries globally in terms of complex refining capacity, with a capacity to process almost two per cent of the world's crude oil. With the completion of JERP, Jamnagar has emerged as the 'Refining Hub of the World' with an aggregate refining capacity of 1.24 million barrels of oil per day in any single location in the world.

The Problem

The inlet oil & grease content in treated effluent is in the range of 5 – 10 mg/l. Treated effluent high in BOD, COD, oil & grease etc. in a Reverse Osmosis membrane system leads to frequent fouling due to biological and organic compounds, resulting in the frequent downtime and subsequent deterioration in permeate quality, quantity, reduction in overall production time and reduction in membrane life.



The Solution

For RIL, Aquatech designed a system based on HERO™ (High Efficiency Reverse Osmosis) technology. The operating environment of HERO™ system totally eliminates possibility of biological growth. It is also resistant to fouling occurring because of organics and oil & grease in the membranes, resulting in lower down time of the system for cleaning operations. Membrane system recoveries are comparatively high in the range of 90%+.

The treated effluent is collected in an equalization tank, disinfected using chlorine dosing, and then pumped into a clarification system and a filtration system for removal of suspended matter.

The two stage HERO™ Pretreatment – softeners & HRU units - is used to minimize and adjust the process parameters to operate HEROTM process in the most efficient manner. Preconditioned water is passed through cartridge filters, and then is followed by the HERO™ system. The treated water quality achievable in the RO block is in the region of 65 – 150 ppm for a temperature range of 25 – 37 deg Celsius as per the design basis. Recovery across HERO Block - 90%, Recovery across the plant - 86.4 %

Aquatech

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DESIGN WATER ANALYSIS

The system has been designed based on the composite stream as stated below:

Parameters	Input Range	Parameters	Input Range
Flow – m^3/hr	600	Al as Al – mg/l	<0.2
Temp – Deg Cel	25 - 37	Ba as Ba – mg/l	<1.2
pH	6 – 9	Sr as Sr – mg/l	<0.2
TDS – mg/l	2,500	F as CaCO3 – mg/l	<3.0
Total Suspended Solids – mg/l	200	Colloidal Silica – mg/l	0.5
Turbidity – NTU	150	Ammonical Nitrogen as NH_4 – mg/l	32
TOC – mg/l	240	TVC in nos/ml	100,000
O&G – mg/l	<18	SRB in nos/100 ml	100
Iron as Fe – mg/l	<1.5		

PROCESS FLOW DIAGRAM