

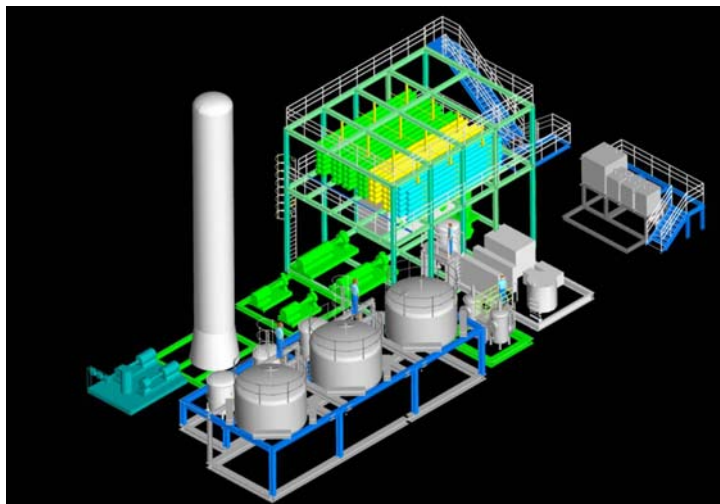
FPSO Gimboa (60,000 BWPD)

Process: **Sulphate Removal**
Client: **Saipem SA, France**
Country: **Offshore Angola – Block 4/05**
Contract Description: **Water Injection System – Module 42 SRP**
Contract Date: **September 2005**
Contract Completion Date: **October 2007**

Capacity: **60,000 BPD (9,540 m³/day)**
Sea Water Conversion: **75%**
Sea Water Feed Quality: **35,000 mg/l (TDS)**
Product Water Output Quality: **≤ 40 mg/l sulphate**

Project Description:

The Project is for the design, supply of a water injection plant sized for 60,000 BPD (9,540 m³/day) of low sulphate water for the FPSO Gimboa, which will operate in the Block 4/05 Field, deepwater offshore Angola. A Fresh Water RO System is also provided, sized for 4,529 BPD. The Project scope consists of a Water Injection Plant in a single lift module arrangement comprising: Seawater Coarse Strainers, Chlorination Unit, Dual Media Fine Filtration, Guard Cartridge Filters, HP Feed Pumps, Sulphate Removal Membrane System, Fresh Water Membrane System, Vacuum Deaerator, Water Injection Pumps, Chemical Cleaning System, Chemical Dosing Systems, Control Valves and Instrumentation, Fresh Water Distribution Systems and Module Lighting, Fire & Gas Detection and Fire Fighting Systems.



Process Description:

Course filtration is provided by a set of automatic backwashable coarse strainers rated at 100µm. Fine filtration is then achieved by a set of dual media fine filters, complete with air scour, followed by a set of guard cartridge filters to provide fine filtration down to 15µm prior to membrane trains. The set of fine filters supplies feed water for one (1) SRP train and two (2) SWRO trains.

The conditioned water, boosted to the required feed pressure, enters the Sulphate removal trains. Each membrane train is fitted with pressure vessels containing SR90-440i nanofiltration elements. A recovery of 75% is achieved by a 2:1 brine staged configuration. Brine reject from the process is discharged overboard, while the low Sulphate permeate is routed to a vacuum deaerator and onward to the water injection pumps for injection to the wells at the required pressure. A dedicated clean in place (CIP) package, consisting of cleaning tank, pump, heater and cartridge filter vessel is provided for membrane cleaning purposes. A SWRO package plant, complete with distribution system, is provided to supply fresh water for the vessel.