Project Case Study

Total F15-A5

Client: Total Nederland

End User: Total Nederland

Capacity: 15 m³/d

Contract Value: circa £1.1M

Scope: Design, manufacture & commission

Contract Completion: December 2012 to February 2014

General

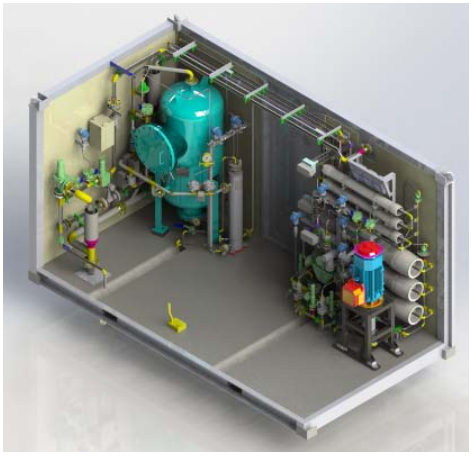
Following a competitive tendering process, Salt Separation Services were awarded a contract from Total E&P Nederland for a containerised water purification package for installation on the F15-A platform in the Southern North Sea.

The F15-A5 well of Total E&P Nederland, produces gas from Volpriehausen sandstone. The peak initial gas production of F15-A5 is 350 kNm^3/d. Performance of the well has been reduced by salt deposition. Salt accumulates in the well riser and limits into gas flow. Seawater is to be treated and injected to the well riser to dissolve the salt.

Seawater contains suspended solids, bacteria, dissolved salts and dissolved oxygen, all of which can have an adverse effect on the injection system as well as on the well. Therefore, their quality in the injection water is to be reduced to an acceptable level to prevent any corrosion and plugging.

Project Details

Due to the fact that the platform is unmanned, the usage of chemicals have been limited as far as possible. As the platform may be permanently unmanned in the near future, the unit has been designed to operate automatically.



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The innovative solution includes:

- Oversized pre-filtration to improve filtration efficiency and reduce the frequency of disposable filter changes.
- Two pass RO system with only one high pressure pump to reduce package footprint and weight, whilst also simplifying the process and controls.
- Recycling of second pass RO concentrate back into first pass RO feed to dilute the influent seawater and increase the net overall recovery.
- Reduced first pass RO recovery to remove the requirement for antiscalant dosing.
- RO arrays designed at low flux rates to reduce potential fouling.
- No CIP system – thereby reducing package footprint, weight, complexity and cost. Due to the relatively low number of RO membrane elements (3 x 8" and 3 x 4") a cost-benefit exercise identified that RO membrane replacement instead of RO membrane cleaning would be the most cost-effective solution.

The ATEX Zone 2 rated package is installed in a 15' DNV2.7-1 container. The container is insulated and is fitted with a personnel door, escape hatch, heating, lighting, ventilation and smoke detection.

As well as designing and manufacturing the containerised RO package, Salt Separation Services also supplied a deaerator tower and storage tank to deaerate the treated water using fuel gas as the scrubbing medium.

Prior to despatch, the package was subject to a comprehensive client witnessed Factory Acceptance Test at our Rochdale works.

The package was designed, manufactured and tested at our Rochdale works, including all Carbon Steel, Stainless Steel and Super Duplex Stainless Steel fabrications.

Extensive use of 3D modelling software (SolidWorks) was used for package design.

Process Flow