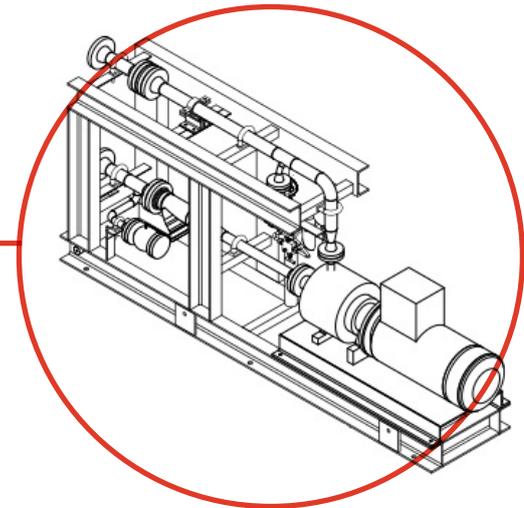


# C238 | Dana Petroleum Project

## Triton FPSO SmartMix® Systems



Project:	Dana Petroleum Project	Contractor:	Petrofac	End User:	Dana Petroleum
Product:	Triton FPSO SmartMix® Systems	Location:	North Sea (UK Offshore)	Year:	2019

### Application

This project is for the supply of three separate SmartMix® Systems for the Triton Floating Production Storage and Offloading (FPSO) vessel, which is located in block 21/30 approximately 120 miles east of Aberdeen, and produces oil and gas from the Bittern, Clapham, Pict, Saxon, Guillemot West and North West fields. The three SmartMix® Systems supplied are for the Bittern Separator, Test Separator, and Guillemot West Separator. Although similar in design and using similar equipment, the process conditions were not identical, resulting in some minor changes to each system to be incorporated to ensure satisfactory operation.

### Description

Each SmartMix® System consists of an USM Flowmeter installed in the mainline, suitable for the flow range, an Analyser Skid, complete with the required instrumentation, a Pump Skid, complete with VSD and ESD pressure protection, and a control panel complete with PLC and HMI. OGS was tasked to design each system carefully as the exact locations for analyser skid and pump skid were still to be assigned and agreed. Also the most complicated and detailed information could only be made available once the installation contractor had been assigned and had completed the required site surveys.

OGS manufactured all of the associated pipework systems and provided all instrumentation, for both the Analyser Skids and the Pump Skids, in line with the revised Triton FPSO piping and instrument diagrams. Piping materials were mainly 316/316L stainless steel, with a few mainline components being carbon steel and pipe sizes ranged from 1"-300# up to 10"-300#.

All instrumentation was supplied by OGS and these were supported on stands where applicable. Instrumentation supplied included Coriolis Mass Flow Transmitters, Pressure Transmitters, Temperature Transmitter, and a Viscosity Transmitter. All instruments were 4-20mA instruments which were cabled back to a single analogue signal junction box, which was located on the edge of the Analyser Skid. The flow control valves were air actuated, removing the need for three phase power supplies to be routed to the Analyser Skid.

The compact design of the control panel (SmartMix® Control System), which needs to be mounted in a safe area, not only housed the control system required to monitor and control the SmartMix® System, but also the I/O Cards, PSU's and Ethernet switch for site-wide communication. The overall control system consisted of a PLC, a compact PC and an HMI.

### Challenges

There were several key challenges that had to be overcome during the project implementation; the main challenge being the delivery. The order was placed at the end of 2017 and the delivery was scheduled to tie in with the planned shutdown starting at the beginning of June 2018. To make matters worse, the duration of the shutdown was reduced early on in the implementation.

The system was designed to ensure that each system was 'small' and 'similar' to ease the expected difficulties during the installation phase, as Triton FPSO topside is very congested overall. OGS was entirely reliant upon the information gathered during the installation contractor's site survey. This would provide OGS with the critical design information for each of the SmartMix® systems.

Due to the late appointment of the installation contractor and as the shutdown could not be delayed, the client decided to split the scope of activities into two separate phases; the first phase being for the mainline components (mainline pipework and Flowmeter) and the second phase for the remaining SmartMix® System components (control panel, VFD, Analyser Skid and Pump Skid).

OGS was advised to improve the delivery of Phase I components and following a concerted effort by both the OGS and OGM teams, we were pleased to deliver Phase I components early on time in July 2018. OGS continued with the design, build and testing of the Phase II components, which were less critical to the overall delivery programme. As Phase II installation activities kept being rescheduled by the client, OGS managed to deliver Phase II components comfortably and on time early April 2019.

The Triton FPSO is a very busy installation as far as process piping is concerned. One of the main benefits of the SmartMix® System is that it maintains its mixing effectiveness and efficiency in either vertical or horizontal piping and this went a long way to convince both the client and their consultant to choose SmartMix®.

