



Project: Shah Deniz Phase II

Contractor: KBR

End User: BP Exploration

Product: Turbo Expander Compressor

Location: Azerbaijan

Year: 2013

Application

The Shah Deniz Phase II turbo expander compressor package comprises two trains on separate skid bases and includes all the auxiliary systems necessary to run the turbo machines. Each turbo machine designed and supplied by Atlas Copco Mafi Trench Company (ACMTC) produces an equivalent 4.58MW of power via a radial expansion turbine and reuses this energy to recompress the process gas offering the end user BP Exploration significant savings over a traditional pressure reduction station.

Description

OGS' extensive design, packaging and manufacturing expertise and experience were required on this high specification project to ensure a successful delivery. This multi-company endeavour included the turbo machine OEM, ACMTC from California, engineering contractor was located in the UK, and end user BP Exploration in Azerbaijan. The auxiliary systems packaged on the skid include a self-contained, recirculating pressurised lubrication oil system and a seal gas system, along with extensive instrumentation arranged in a user friendly gauge board. The auxiliary systems were fully flushed and functionally tested with lubrication oil and a 'dummy' control system at the OGS workshop in Gorseinon, UK prior to the shipment.

Challenges

As with all projects there were a number of challenges to meet whilst executing this contract. Keeping the package as compact as possible was important to the end user as the skid was to be enclosed in a steel building. The challenge was to minimise footprint whilst retaining all the necessary operational access. Thoughtful positioning of equipment and working closely with equipment vendors to orientate connections enabled the majority of the equipment to be easily accessed from the skid perimeter with only a minimal number of walkways on skid. Each self-contained skid measured 4m wide x 10m long x 3.5m high and weighed in at 40 tonnes.

Prefabricating all the pipe spools to a high tolerance was key to maintain the schedule during the manufacturing phase as the delivery date would not allow for the equipment and machine deliveries prior to pipework fabrication activities. This effort was started during the design phase with accurate 3D modelling of all components and yielded precise pipework isometric drawings. These drawing gave OGS welders and pipe fitters all the information to accurately prefabricate all pipework prior to the equipment arrival. The trial assembly culminated in a black build inspection with only a minor punch list and no pipework modifications which enabled a swift transition into the finishing and final assembly phase.

The functional testing was the culmination of the engineering and manufacturing activities - and the major focus for the end user. The dynamic response of the lube oil system provided an unexpected challenge which was managed promptly by OGS with the mobilised onsite support from a well known valve OEM. The problem was openly shared with the inspector and end user, recorded via data logger and this experience, along with the data, was distributed across the multi company team. This openness was appreciated by the end user and the functional testing was signed off in July 2015.

