



Concept Selection and Design Considerations for Compression Facilities for FPSO Glas Dowl

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Abstract:

As part of the modification of the Floating Production Storage and Offloading Unit (FPSO) Glas Dowl for operation on the Sable Field (offshore South Africa), a new gas compression system was installed. Associated gas is compressed for use as lift gas and re-injection back into the reservoir for pressure maintenance and optimizing liquid recovery.

Concept selection of the compression facilities was based on technical and commercial criteria in combination with the specific requirements of the Sable field. Large variations in gas molecular weight, compressor efficiency and overall system availability favored the use of reciprocating compressors, despite space constraints and potential vibration problems. A configuration based on 4 x 33% MP/HP reciprocating compressors which includes a spare compressor, was selected.

During the design, specific attention was given to pulsation and vibration control as this was considered crucial for the success of the project. A dynamic analysis of the compression system according API 618 Design Approach 3 was included in the scope of the compressor Original Equipment Manufacturer (OEM). In addition an independent verification study was awarded to TNO, acting as 3rd party.

The required modifications to the piping system resulting from the analysis were implemented as far as practically possible. An extensive field measurement program during the operational phase was conducted which showed vibration levels well within the allowable range.

The application of multiple large reciprocating compressors on the FPSO Glas Dowl showed to be a success. Compressor and piping system vibrations were controlled successfully which resulted in vibration levels well within allowable limits. The stringent space restrictions and high system availability requirements were met in full.