BP FOINAVEN

BP installed MDPE liners produced by GPS PE Pipe Systems as part of their Foinaven water injection project off the Shetlands coast.

BP was one of the first North Sea operators to recognise that the use of PE liners in water injection applications would reduce the speed of corrosion and allow cheaper grades of steel to be specified for the host pipe, generating cost savings of more than 50% compared with conventional duplex steel options.

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The subsea design and construction was carried out by McDermott Marine Construction Ltd, who, in conjunction with BP, decided to utilise polyethylene lined carbon steel pipe. This enabled the operating company to dispense with the deoxygenating of injection water, which presented a substantial cost saving. Lined pipe also represented a much smaller capital cost than corrosion resistant alloy pipelines.

Lining of the carbon steel pipes took place at McDermott’s Ardersier facility on the North East Scottish cost. The chosen liner insertion contractor was A Hak Ltd who utilised the British Gas Swagelining
technique. An FSPO (floating production storage and offloading vessel) was the chosen topside facility, which was served by flexible risers linked to rigid subsea pipelines.

GPS PE Pipe Systems manufactured both 250mm and 200mm MDPE pipe in SDR21 and SDR26 for the project. The PE pipe liner and steel pipe were separately welded into 500m strings. The PE strings were then pulled under tension through a reducing die directly into the host steel pipe at a rate of seven metres per minute. When the winch loads - that averaged 3.2 tonnes - were eased, the liner reverted axially and radially to form a tight fit to the inside of the steel. Welding and insertion took place with no difficulties and was completed on time. The lined lengths were jointed using in-line compression joints and the assembled lines were reeled and loaded onto the reel lay vessel for offshore installation.

The operator confirmed the plastic lined pipe required no pigging during the service life. After many years in service, the plastic liner remains in as new condition and performance is acknowledged as excellent.