

Clair Project Offshore

**ABLE APPLIES UNIQUE OMEGA TUBE CORIOLIS
METERING TO CRUCIAL OIL FLOW MEASUREMENT**



The Clair reservoir, located 75 kilometres West of Shetland Islands and in water depths of up to 150 meters, was first discovered in 1977. It is the largest known, as yet undeveloped, hydrocarbon resource on the UK continental shelf, extending over an area of some 220km².

Development of the field is a major undertaking, due to the highly fractured reservoir, casting uncertainty in terms of reserves and the ability to commercially produce the field. The field comprises of an extensively layered and fractured sandstone reservoir with significant open fractures and variable matrix quality. The successful commercial development of the field is dependant on understanding the productivity of the fractured reservoir, covering static reservoir description, reservoir performance prediction and the drilling and well engineering.

The Clair development has recoverable reserves of around 250 million barrels of 22-23oAPI oil. The Clair licensees; BP, ConocoPhillips, ChevronTexaco,

Shell and Amerada Hess have agreed to pool their resources and jointly develop the field, with BP, being the major stakeholder and appointed Operator and Programme Co-ordinator. The cost of the development is £650 million.

The platform topside, comprising of 3 decks, was shipped out in June 2004 and was the biggest lift ever performed on the UK continental shelf. It includes additional processing facilities for offshore power generation, water injection, produced water and cuttings re-injection, surplus gas disposal and flare gas recovery. Hook up and commissioning is underway with first oil planned shortly.

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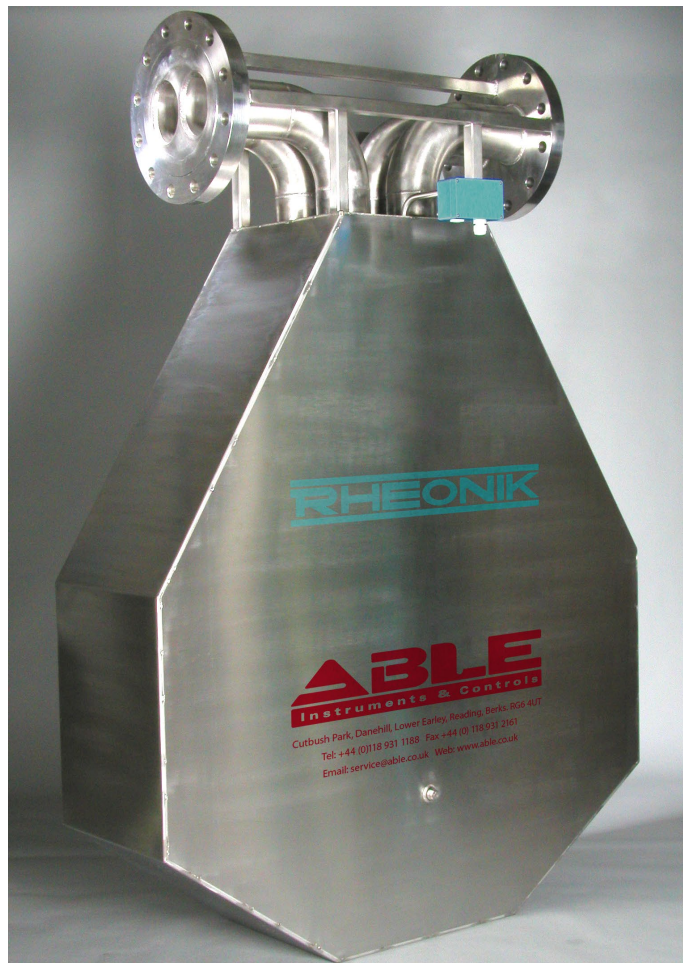


Clair Onshore Facilities Project.

The Clair Onshore Facilities at the Sullom Voe Oil Terminal on Shetland Islands is concerned with the reception of oil to storage with AMEC as the principal designer of these facilities.

Oil reception from the platform is via an emergency shutdown valve skid, then on to a pig reception skid. The oil is then routed to two large storage tankers. Whilst one storage tank acts as the oil reception tank, the other is used for tanker loading. Once the reception tank is filled, the tank duties are switched.

ABLE Instruments has been working with AMEC on the supply, installation and commissioning of a 12" diameter Rheonik Coriolis meter, the largest available worldwide. The Rheonik Coriolis range is characterised by its unique and patented omega tube element, which allows the most challenging of applications to be solved. The omega tube has a torsional or swinging movement, rather than the bending motion traditionally associated with coriolis, this allows increased tube wall thickness, which means exceptional resistance to abrasion, operation under high pressures, plus it eliminates the requirement for the secondary containment associated with other element designs.



The Coriolis meter also monitors the sampling oil coming in to the terminal. A Jiskoot System is used to sample oil on the main line to the skid, with the Coriolis meter controlling the sample rate, ensuring the measurement is of oil and not water.

ABLE has also supplied non-intrusive ultrasonic flow metering equipment to the project, as well as hands on training for both the flowmeters and the Coriolis meter on site at Sullom Voe by their own fully trained service team.

A typical example of a Rheonik Coriolis meter as supplied to the BP Clair Development

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The Coriolis meter has been installed on the onshore pig reception skid to monitor the supply of oil to the storage tank, thereby, crucially monitoring the oil flow received from the platform. The Coriolis flow signal is also employed in the pipeline integrity monitoring system tied to the offshore platform, ensuring there is no loss of inventory between offshore supply and onshore reception. Due to the substantial investment involved in developing this field and the difficult conditions of the reservoirs, it is imperative that oil monitoring is accurate.