

PROVIDING HIGH FLOW RATE, VARIABLE INLET OIL IN WATER REMOVAL FROM MULTIPLE PIG RUNS WITHOUT RELYING ON CONSUMABLE MEDIA – (UPTO 281M3 P/H) AND 10000PPM OIW (OIL IN WATER) INLET.

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CETCO was tasked with the treatment of all aqueous fluid displaced from the pigging operation of a pipeline between 2 North Sea assets to enable it to be reinstated.

The project required a Fluid treatment package designed to degas the fluid as well as remove any solids or hydrocarbons and waxes.

It was also critical to ensure any fluids returned from pigging can be discharged overboard within acceptable parameters, i/e Sub 30ppm. The focus internally was to utilise non consumable oil removal technologies to minimise waste streams, negate breaking containment and simplify logistical challenges, while still facing the challenge of providing inspec fluids for discharge from variable inlet qualities at upto 350m³ p/h

Project Management Is Key.

CETCO engaged with the client to establish a clear scope of work for the offshore campaign. The Project Team worked closely with the client in the planning process to develop a suitable schedule for the work.

The Project Engineer/Operations Team attended kick-off meetings with the Client project team to confirm initial requirements, where the following key elements of the work were discussed:

- Review the operational requirements in detail, both scope and schedule.
- Installation of the equipment and split of responsibilities during the installation.
- Confirm equipment to be supplied by CETCO for the works, inc all utilities and interface considerations.
- Confirm personnel manning level for the on and offshore work scopes.
- Mutually agree mobilisation dates.

As with any offshore mobilisation track record, deckspace, manpower and cost were all key considerations. A package, manpower and schedule were quickly confirmed with the client.

CETCO proposed and mobilised a Smart Tank for degassing and bulk separation purposes, a solids filtration unit (Pleated Filter Unit (PFU800-20)) and oil in water coalescence units, Hi-Flow® (IFV4000/IFV5000). Adsorption technology, CrudeSorb® (2 x RFV4000) was proposed to be used initially on the first pigging operation to further reduce residual hydrocarbon content from the Hi-Flow® unit.

The fluids were to be directed to the CETCO treatment package via a temporary pig receiver and discharged to the environment below the agreed/regulated 30mg/l.

CETCO Package laid out on the asset Pipe Deck.



After the first sample was taken, the fluids were deemed of a quality that could bypass the RFV4000 Absorbent media units and increase the flow rate up to the maximum pumping rate of 260 m³/hr and overboard directly from the Hi-Flow™ oil in water coalescers.

The crude from this pipeline had a high wax probability, this was evident due to both the frequency of the filter change out and the physical presence within the filter unit when changing out filters.

What issues are still outstanding and could be improved/investigated further

Main issues encountered were foaming, high solids and waxy fluids.



Smart Tank Foaming

Heavy and unexpected stable foam building up in the Smart Tank registering on the High-level sensor and in turn activating the ESDV (emergency shutdown valve). More information about

the chemical content of the pipeline fluid would have given the option of engineering chemical injection at a suitable point to add a defoaming chemical.

Solids removal

Pleated filters were used to their full capacity of 8kg of solids, the filters removed around 5,440kg of solids material. A significant volume but all managed under one mobilisation. Filtration is down to 10 micron which enables the coalescing elements to be protected and allow them to still provide effective oil in water removal duties.

Future technologies being developed to provide non-consumable and backwashable solids filtration solutions.

Key Highlights -

- Total overboard 21,420 m³
- Average overboard OIW 1.5mg/l
- Average flow rate during treatment 155m³/h
- 5 tonnes of solids removed

Highest Inlet sample recorded:	744 mg/l (0.1mg/l overboard)
Highest Overboard sample recorded:	24.91mg/l
Lowest Overboard sample recorded:	<0.1mg/l

