CETCO
ENERGY SERVICES

FPSO SLOPS CLEANUP

WATER TREATMENT - UK

BENEFITS

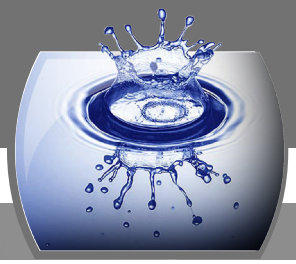
- Consistently achieved combined oil removal efficiency of >80%
- Successfully treated produced water
- Removed hydrocarbons to an average OIW discharge concentration of <20 mg/L

CHALLENGES

- Slops water oil content limits and accumulation
- Preciptation of suspended solids and contaminants

SOLUTION

- Conducted FPOS
- Enabled the asset to achieve slops water limits
- Mobilzed two-stage filtration and coalescer package which accepted feed from storage tank stripping pumps at a maximum rate of 12,600 bwpd
- Diluted online produced water effluent with treated slops water



Maersk Oil UK was experiencing difficulties with slops water oil content on the Gryphon FPSO. Therefore, the FPSO was forced to route the off spec produced water into the FPSO's storage cells for later treatment using the existing equipment.

Once within the storage cells, the slops water became even harder to treat due to precipitation of suspended solids and addition of other contaminants. As a result, the volume of slops water stored on the FPSO was steadily accumulating.

CETCO Energy Services initially conducted a Fluid Process and Optimisation Study (FPOS) on the installation which determined the fluid characteristics; oil and solids particle size; chemical injection programme; and process performance.

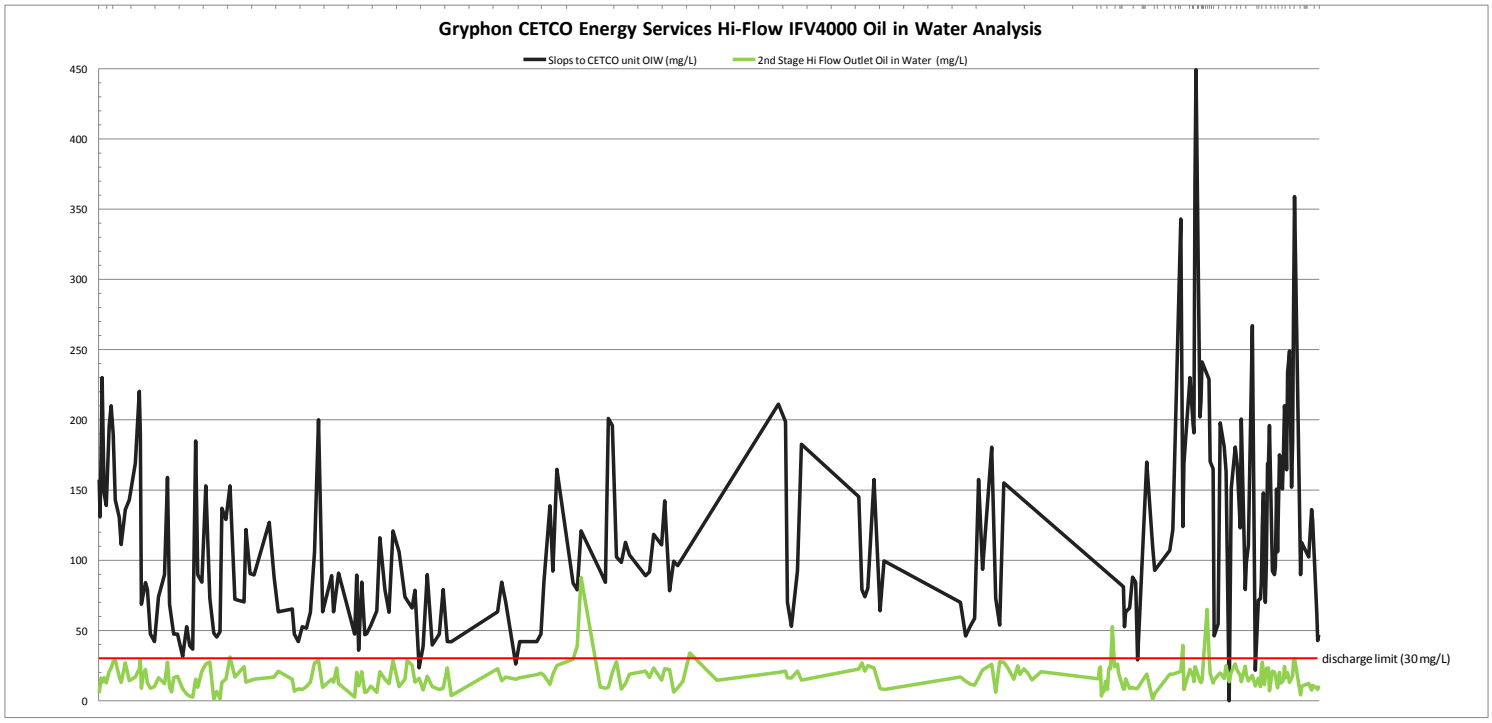
After this information was established, CETCO Energy Services selected best available technology (BAT) to separate oil in water (OIW) and to enable the asset to achieve the discharge limit.

CETCO Energy Services mobilized a two-stage filtration and coalescer package consisting of a PFU600 pleated filter unit and the IFV4000, which is CETCO Energy Services' proprietary Hi-Flow Coalescer. This treatment package accepted feed from the storage tank stripping pumps at a maximum rate of 12,600 bwpd.

FPSO SLOPS CLEANUP CONT.

Once on site, the PFU600 and IFV4000 rental units were installed in series configuration, at an identified and suitable point at the discharge of the storage tank stripping pumps. After the unit's installation, all fluids discharged from the rental package were routed to the Downstream Enhancement Vessel (DEV) of the water plant; this had the effect of diluting the online produced water effluent with treated slops water.

The advanced capabilities of CETCO Energy Services' Hi-Flow with prefiltration consistently achieved a combined oil removal efficiency of >80%. For the duration of the rental from 26/08/2013 until 14/12/2013, CETCO Energy Services successfully treated the produced water and removed hydrocarbons on the Gryphon FPSO to an average OIW discharge concentration of < 20 mg/L.



CETCO ENERGY SERVICES

cetcoenergyservices.com