



# CLEAR SOLUTIONS for complex fluids

## H<sub>2</sub>S Elimination in Well Test Fluids



### CHALLENGE

- H<sub>2</sub>S removal from aqueous fluid returns of Well Flowback



### SOLUTION

- CETCO Energy Services (CETCO), 100 BBL Nautilus™ tank (weir box) and CrudeSorb® media with complex chemical treatment



### RESULTS

- Successful treatment of 2,600 BBLs of flowback fluids, <7ppm H<sub>2</sub>S, <20 mg/l Oil-in-Water (OIW)

# H<sub>2</sub>S Elimination in Well Test Fluids

## CHALLENGE

A North Caspian Sea operator needed a treatment package capable of Hydrogen Sulphide (H<sub>2</sub>S) removal from aqueous fluid returns from well flow back and stimulation activities. These activities were planned for new well perforation flow backs and acid stimulation in Caspian Sea off the coast of Kazakhstan. Production wells here typically produce gas with extremely high concentrations of H<sub>2</sub>S (>30%).

## CETCO SOLUTION

The operator approached CETCO to propose a treatment based on their requirements. CETCO initially designed and mobilized a temporary equipment package that consisted of a 100 BBL capacity Nautilus™ tank, also known as weir box, and a CrudeSorb® adsorption media RFV-2000 skid.

CETCO designed the treatment process and formulated a complex chemical treatment philosophy in order to satisfy client requirements. Fluid from well return was routed to the CETCO Nautilus™ tank where acidification took place in order to liberate H<sub>2</sub>S gas. Acid and H<sub>2</sub>S scavengers were injected to the process to strip off the H<sub>2</sub>S gas. Treated effluent was then either pumped to the RFV-2000 skid or recycled backed to the Nautilus™ tank while liberated H<sub>2</sub>S gas was routed to flare. NaOH was used for neutralization of the acidified water.

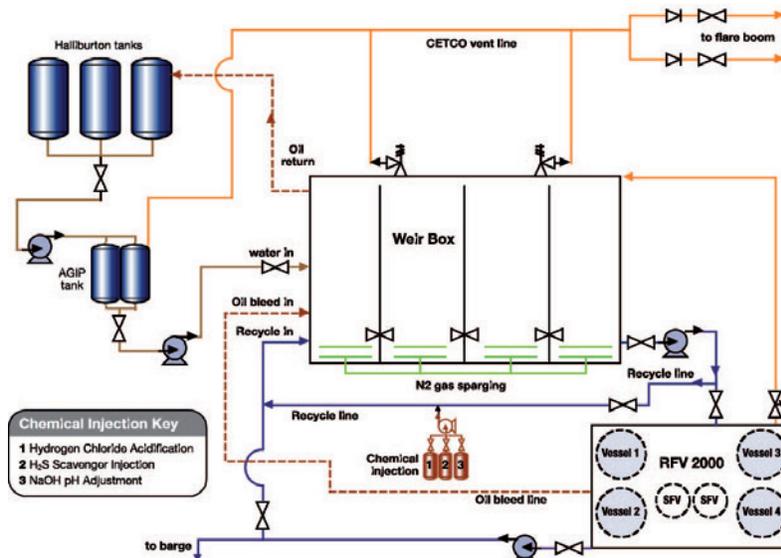
## RESULTS

Operational success was demonstrated by CETCO throughout the trials as treatment methods were adapted to changing fluid and client requirements. CETCO successfully treated approximately 2,600 BBL of flowback fluids for subsequent disposal. The water was exported by CETCO to a standby barge for transportation to an offshore disposal site. In all cases, zero H<sub>2</sub>S was detectable in the treated water.

The final specifications for the treated water were given as:

<u>Component</u>	<u>Limits</u>
H <sub>2</sub> S	< 7ppm detectable in vapor space
Oil-in-Water (OIW)	< 20 mg/l
pH Range	6 - 10
pH Stable	The fluid must not release Hydrogen Sulphide gas as a result of further pH change*

\*The solubility of Hydrogen Sulphide in solution is dependent on key factors including pH.



**Chemical Injection Key**  
 1 Hydrogen Chloride Acidification  
 2 H<sub>2</sub>S Scavenger Injection  
 3 NaOH pH Adjustment

