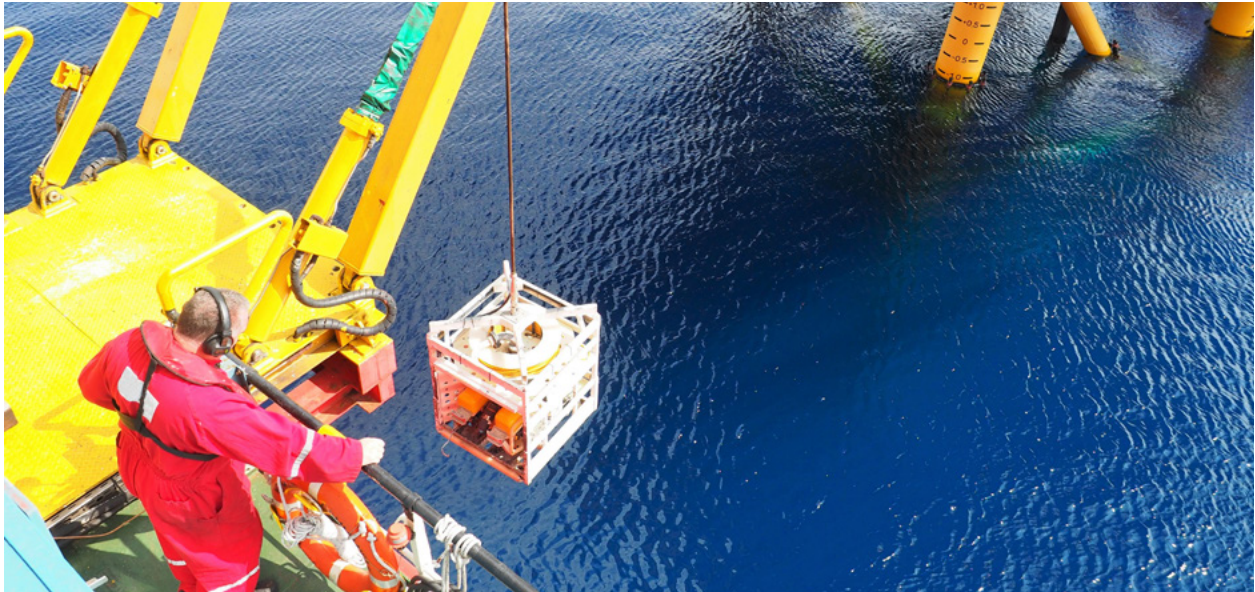


## Multi-Well Acid Stimulation Campaign: Nine flowbacks with innovative Kleen Flux technology leads to 11,462 bbls of fluid discharged in GoM, no carbon required



### BACKGROUND

As well formations age and production decreases, acid stimulations can be an effective way to revitalize a well and regain lost production. One of the waste streams that is generated during an acid stimulation is the acid flowback fluids, which can have low pH and ultimately create hard-to-treat oil/water emulsions. Chemistry alone might not break the emulsion. In many cases, this waste stream is isolated from the primary treatment system to avoid system upsets. Historically, the water was transported to shore for disposal or consumable medias—like granular activated carbon (GAC)—were used to treat the fluid for on-site discharge. Unfortunately, it's not uncommon for the traditional consumable media system to be unsuccessful at treating all of the acid flowback fluids.

### SOLUTION

Baleen Process Solutions' KLEEN FLUX™ non-consumable treatment option can tie into the platform system similar to historical GAC treatment packages are. The KLEEN FLUX™ package has the robustness to treat most—if not all—flowback fluids. The KLEEN FLUX™ treatment system allows operators to:

- Meet NPDES discharge requirements
- Significantly reduce consumable media and media disposal charges
- Decrease safety hazards of lifting GAC vessels
- Treat 100% of flowback fluid
- Perform incident free operations (IFO)
- Eliminate the use of a third party vessel for fluid capture

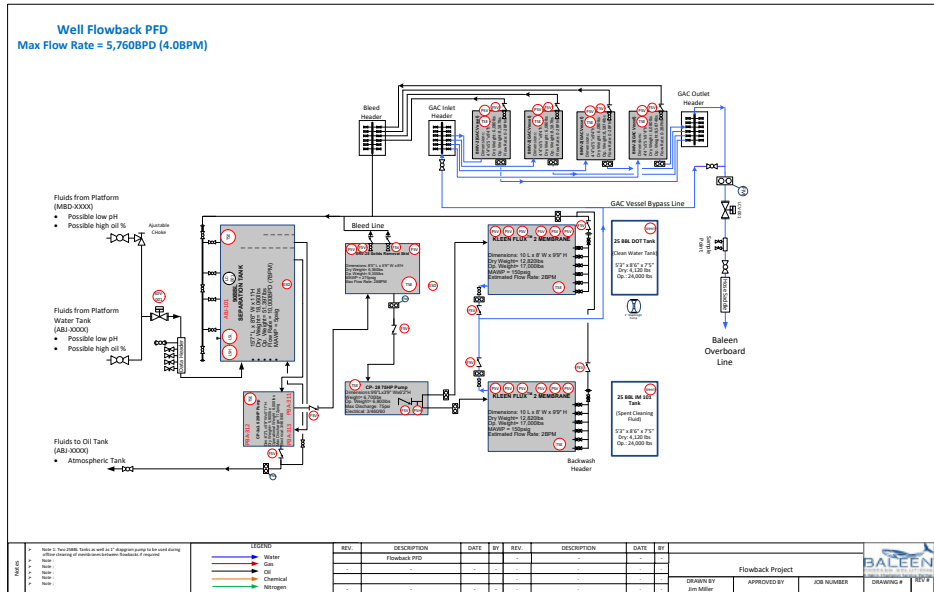


Inlet: Avg 951ppm | Outlet: Avg 11ppm

## SOLUTION

Baleen Process Solutions worked closely with platform personnel to interface the KLEEN FLUX™ package with existing platform systems as well as third-party vendor equipment assisting with the flowbacks. The KLEEN FLUX™ technology can be used to eliminate, or significantly reduce the amount of, GAC required. Reduction in the amount of GAC reduces the waste disposal charges, and hence, reduces the risk involved in the project as it decreases or eliminates the number of times GAC vessels are changed.

For this application, we incorporated four small GAC media vessels. The GAC vessels were not expected to be used but were incorporated as another layer of treatment if required. A bypass line around the GAC vessels was incorporated in the design. Baleen Process Solutions' technical personnel completed all necessary documentation (PFD, PIDs, SAFE Chart, SAFD - all reviewed by a professional engineer) that was later submitted to BSEE for MOC.



Basic process of the KLEEN FLUX™ package used during the flowbacks

## RESULTS

The Baleen Process Solutions KLEEN FLUX™ package functioned as described:

- Treated fluids met NPDES discharge permit requirements and was discharged overboard
- Reduced consumables by 90%
- Reduced lifts by 90% (no GAC vessel change outs, two GAC vessels used for flowbacks)
- Seven flowbacks, over 7,000 bbls with no flowback fluid shipped to shore for disposal
- 2,568 manhours of IFO
- No third party vessel was required
- Incoming fluid averaged an oil/grease concentration 951ppm. Oil/grease discharge from the KLEEN FLUX™ had an average of 11ppm with no sheen
- Clean up of two additional wells added 4,352 bbls for a total of 11,462 bbls from nine wells that were successfully processed on-site with compliant discharge

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