

# Recycling of Water Based Fluids with TUF Technology Oil & Gas Drilling

## TUF Filtration Technology

CRS Tough Ultra Filtration (TUF) Technology is a proprietary, highly engineered cross flow filtration system. During the cross flow filtration process the feed stream (used fluid) is filtered into a permeate stream (re-usable fluid) and a concentrate stream (contaminants). The TUF system can be configured as microfiltration, ultrafiltration or nano-filtration, dependent upon the application and the degree of filtration required.

CRS has successfully used this technology over the last 7 years to recycle many different fluid types in many industries.

## Oil & Gas Drilling

In the Oil & Gas drilling industry large quantities of water are used to hydraulically fracture new wells, as well as for water flooding of established wells. After these processes have occurred, water is returned to the surface with the oil from the well. This water is contaminated with oil and other constituents from the formation. In order for this material to be reused or even disposed of, it is necessary to remove many of these contaminants. Otherwise, the water can damage future oil wells resulting in lower oil output, or damage disposal wells resulting in lower disposal capacity. Current processes for removing these contaminants typically require numerous steps and unit operations leading to high cost and limited mobility.

When the TUF technology has been used to process these fluids it has shown the capability of removing suspended solids, free oil, as well as bacteria, all in one step. Inclusion of the TUF in a reprocessing system will allow several unit operations to be removed. This will lower service costs, waste costs as well as chemical additive costs.

### Quality:

- TSS can be reduced from up to 3% to <150ppm in a single pass
- Free oil removal from up to 10% to <0.1%
- Iron removal from up to 6000ppm to <100ppm
- Silicon removal from up to 20,000ppm to <25ppm

### Capacity:

- The TUF system will be designed based on the customer's specifications for capacity. Systems can be installed for capacities up to 100,000 bbl/day for costs of \$0.20-\$0.50/bbl.
- The systems are designed in a modular manner allowing additional modules to be brought on-site and installed without interruption to operating systems.

### Features:

- Five different defined pore sizes engineered to maximize performance based on customers' needs
- High resistance against aggressive media, high pressures or temperatures
- Proprietary self-cleaning included
- No chemicals added to the customers operating system
- No disposable filter media
- Units are designed modularly. If increased capacity is necessary, a new module is brought on-site.

### Benefits:

- Customized to generate the highest flux rate and the lowest cost of operation
- Depending on fluid composition and filtration requirements, recovery rates of up to 99% are possible
- Guaranteed recycled fluid quality
- 24/7 uptime operation

### Flexibility:

Add-Ons to the TUF will allow:

- Higher solid & free oil content in feed stream
- Hardness control
- H2S removal
- TDS removal

