

## **Plant Highlights**

Plant operational up until 24 months ago and now in long term storage/pickled.

Patented process capable of processing up to 2.5 million gallons/day for frac recycle and up to 462,000 gallons/day for water discharge. Capacity dependent on pretreatment, type of feed water, and type of membranes utilized.

There are 4 “separate” RO skids. 2 of the skids are 2 stage ROs. 10 vessels on the first stage and 7 on the second stage with 5 membranes per vessel; totaling 85 membranes per skid. The other 2 ROs are single stage; One has 12 Vessels, with 7 membranes per vessel, totaling 84 membranes on that skid. The last one has 8 vessels, with 6 membranes on the skid, totaling 48 membranes on the skid.

Plant complete with exception of a missing cartridge filter housing. The lab is being redeployed internally so not included with the plant.

Operations began in 2006.

In 2009 plant expanded recycling process to discharge quality water into the New Fork River.



## **Questions/Answers**

Has the system been checked for NORM from processing produced water?

No

Was a long-term storage process or system flush implemented prior to shut down, or was the system left with produced water?

The plant was drained at intersection points but not purged with fresh water. Pumps were winterized by pulling plugs and flange points. The Ultra Filtration unit was left water full to best protect the membranes.

Can the plant handle polymers, emulsions?

The upstream process to the plant was a series of settling ponds intended to drop suspended solids. The final pond was inoculated with aerobic bacteria intended to remove MEOH and hydrocarbons.

Are any chemical additives required for the process, or is it mechanical only?

Coagulants and polymers were used to remove solids in the clarifying unit. Clarifying unit is upstream of the MPB (main process building).

What is the maximum OWR (oil water ratio) it can handle?

Suspended oil was removed utilizing a inlet separator. A large portion was removed by the separator and the inlet separation pond. Pit C would register GRO in the 60 mg/l

What is the min/max daily feed rate for efficiency?

The plant is broken down into 2 trains (Frac train, and MPB train). Frac train utilized coagulants and polymers to drop solids in the clarifying units. Volume through the frac train could handle 62,000 bpd. Peak volume through the MPB train (fresh water to river) was 11,000 bpd.

What is the minimum number of operators required to run plant per SOP?

3 plant operators

How much storage (pretreatment) is required to maintain maximum continuous daily operation?

Pond storage was 3.7 MMbbls for 3 pits. The three pits allowed for efficient processing of fluids. Pit storage was required to handle varying inlet volumes.

Is the waste stream brine or dry salt or a mixture of both?

The waste stream is a high salinity brine.