



Frac Water Treatment

Oil & Gas Client

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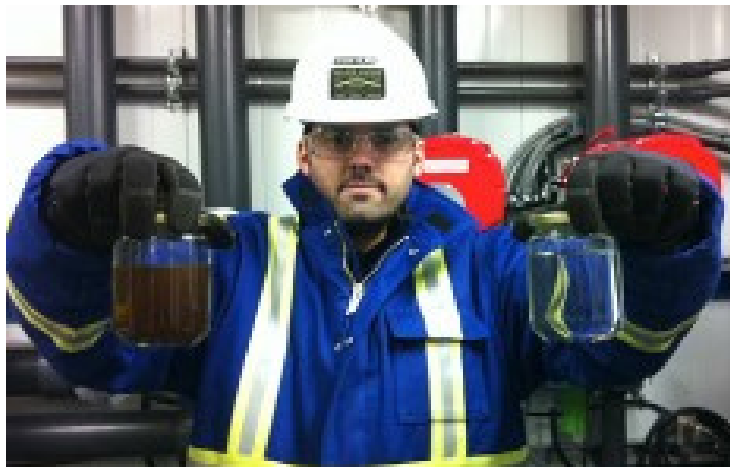
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BACKGROUND:

ClearBakk was approached by an Oil & Gas service disposal major player in Alberta Market to help in treating their produced and frac water that they receive from multiple Oil & Gas producers to a level that extended the life of their deep disposal wells.



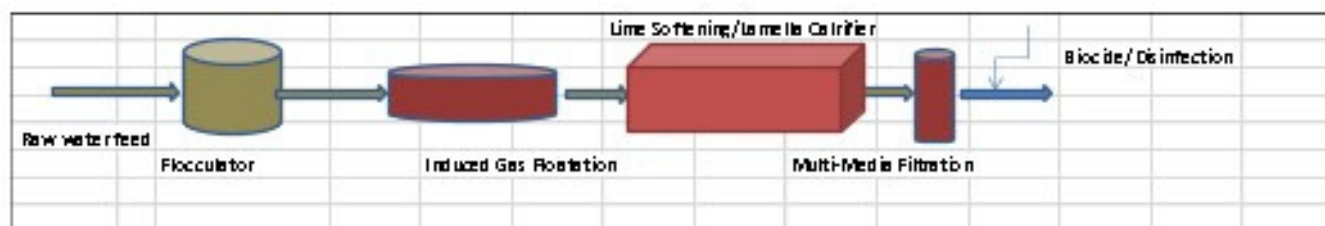
ClearBakk has received their water analysis and a sample of the harshest waste stream the client receives and completed bench testing and FEED engineering to design a water treatment system that could handle multiple waste streams and adequate for high spikes in various constituents.



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CHALLENGE:

Client challenge was: High suspended solids, high iron content, and high TOC. All these constituents potentially affect the injection disposal well by clogging it and increasing the bacteria formation which will impact disposal cost and affect the life span of the injection wells.



Below are the highlighted constituents that exceeds water quality targets for reuse or disposal for frac needs.

Other heavy metals were reduced to a non-detectable levels in the effluent of the treatment systems.

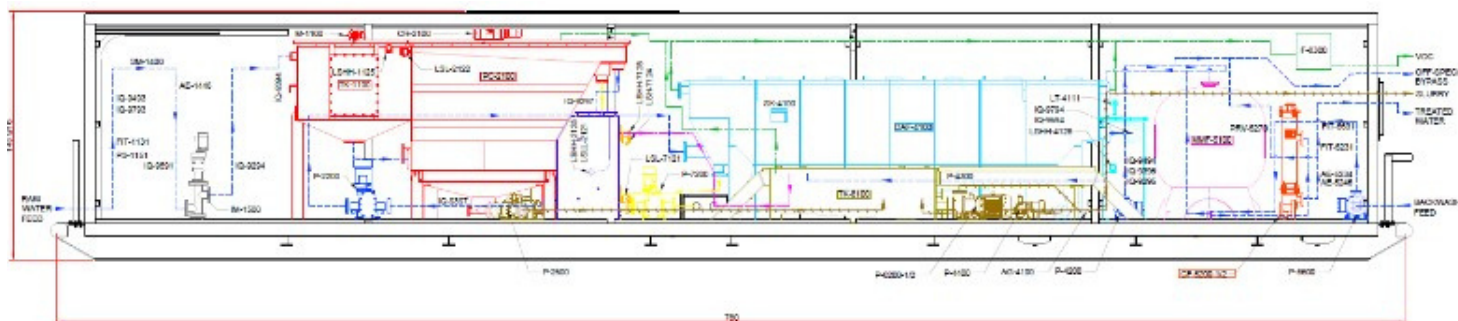
Constituent (Average)	unit	Reported	Frac Reuse Targets (Slick Water)	CWS Reported Results
Total Dissolved Solids (TDS)	PPM	148,500	200,000 (TYP. N/R)	135,000
Total Suspended Solids (TSS)	PPM	750	150 (TYP. <50)	6
Hardness (as CaCO ₃)	PPM	5,000	3,000 (TYP. <50)	130
Total Iron	PPM	50	NA (TYP. <50)	<0.1
Total Organic Carbon (TOC)	PPM	6,500	NA	<10

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SYSTEM OVERVIEW:

A Full scale system was designed with the following criteria:

- Inlet Flow Rate: **800 m3/day**
- Effluent Flow Rate: **700 m3/day**
- Overall system recovery: **88%**
- Building Size: **1 x 53' ISO container.**



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SUMMARY:

Waste stream characteristics from each sites:

- Up to 15% TDS with the majority of ions as monovalent ions.
- Moderate to High TOC, Hardness, Iron, TSS and O&G
- Water Temperature between 25 – 40 degrees C.
- TDS reduction is not a requirement as chemical additives for reuse is adjusted to fit in high salinity to reuse the produced water in Frac water applications

TREATMENT ACHIEVED:

CWS met or exceeded quality guidelines provided by the client for re-using produced water and multiple disposal streams in Frac water application.

Scaling Components:

Parameter	Influent	DAF Outlet	Final Effluent
Barium, mg/L	203	12.4	0.11
Calcium, mg/L	1520	2480	122
Iron, mg/L	28.3	17.7	0.1
Magnesium, mg/L	166	157	45.8
Manganese, mg/L	1.9	4.2	0.02
Strontium, mg/L	138	26.8	0.5