

A HYBRID TREATMENT PROCESS FOR HIGH TDS OIL-FIELD PRODUCED WATER

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South Eastern New Mexico (SENM) produces in the range of 400 million barrels of produced water per year, with total dissolve solids (TDS) in the range of ~ 200,000 ppm. Most often, disposal is done by transporting the water long distance to disposal-ponds, costing around ~\$1.2 billion /year using an estimated 0.3 million barrels of transportation fuel. The objective of this current project is to design, develop and demonstrate the best possible technology economically achievable to desalinate produced water and make the same suitable for a number of applications.

Reverse Osmosis (RO) is quite effective for desalination of water with TDS < 30,000 ppm (i.e. sea water). As the amount of TDS increases, there is a disproportionate increase in the requirement of pressure for the RO process, making the process very expensive. In this context a hybrid process based on forward osmosis (FO) is under development using draw solutions that can induce high osmotic pressure at no applied external pressure. Current presentation compiles issues and opportunities associated with this hybrid technique. A number of pretreatments, including ones suggested by Late Prof. Robert Bowman, were investigated to reduce fouling and scaling potential of the membranes. Feasibility of using this hybrid process to economically treat produced water will be analyzed and discussed.

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