Technical Assistance Request

Team Trident proposes integrating solar-thermal energy with a non-membrane-based desalination technique, Temperature Swing Solvent Extraction (TSSE) to reduce the volume of produced water from oil and gas operations. The team's objectives involve creating a fit for purpose water that can be reused in subsequent drilling operations. As a secondary objective, we will closely evaluate the product water quality and determine if a more aggressive fit for reuse objective (ie agriculture) is not possible.

Our team consists of experts in the fields of commercialization, desalination, engineering, and solar systems analysis. Our anticipated host site is at the Brackish Groundwater National Desalination Research Facility where we will take delivery of produced water provided by the New Mexico Produced Water Research Consortium.

In order to round out our project, we are seeking assistance to optimize our system for the most efficient use of thermal energy. Trident is a desalination company and seeks a partner with solar experience. With our relatively low thermal input requirements, we want to evaluate various options for solar-thermal optimization, particularly heat exchangers and thermal storage. However, we first need to establish clear parameters for our prototype's solar thermal integration and optimization in our design phase.

A partner that can assist us in evaluating state-of-the-art heat exchangers and thermal energy storage devices would be highly appreciated. We anticipate the lab will work closely alongside our engineering team members in order to assist in sizing and cost efficiency analysis. This knowledge will further refine our techno-economic decision making and play a key component in finalizing our integrated process schematic. It is also our preference that a solar facility be available on site or nearby so that we can assess on-sun test designs. To that end, we would require assistance modeling data to evaluate thermal efficiency over a range of flux, flow-rate, and process temperatures (+/- 100°C).

In addition to solar energy dynamics, Team Trident is interested in connecting with any group that has expertise in Liquid-Liquid Extraction expertise. Our system operates using solvent extraction principals, and we enjoy connecting with any solvent driven systems and thermal desalination professionals. We are particularly interested in of testing different solvents against select produced water samples.

Operationally, we would be particularly interested in mobility and transport options as we prepare to scale out the system. Our preferred method of delivery would be via a trailer as it is in line with industry expectations. Finally, we could use assistance identifying select vendors with advanced sensor/density technologies. Maximizing our solvent recovery rate rests at the heart of our process and improving our efficiency is a key performance indicator.