

Treatment Process for Reusing and Recycling Produced Water

For This project, me and six other Chemical Engineering Undergraduates worked together to develop a treatment train for the reuse and recycling of waste water produced from hydraulic fracturing operations. To achieve this goal, we used a combination of lab research, article research, industry outreach, and economic analysis to come to our conclusion of using coagulation/flocculation followed by dissolved air flotation to treat 20,000 bbls/day of produced water for it to be reused for additional hydraulic fracturing operations. Reusing produced water is more ideal than the alternative, which is disposing of it in deep-wells where it is permanently lost, can induce seismic activity, and possibly contaminate drinking water.

To begin our project, we did hours of article research to get an understanding of our task and to determine which technologies to begin perusing. We researched several technologies to treat the produced water and narrowed them down on the basis of economic feasibility, safety, ease-of-operation, and ability to treat a myriad of specifications. We also reached out to Winkler Services, a midstream company that treats produced water, to get their opinions on our approach, and they liked it.

When the technologies were chosen to research, we developed experimental plans to test the technologies on a synthetic produced water solution and measured the parameters that needed to be met before and after treatment. We tested a sand filter as well as coagulation/flocculation with dissolved air flotation and the latter proved to be more sufficient at treating the produced water.

We did an economic analysis on the coagulation/flocculation with dissolved air flotation process and it proved to be economically feasible. Therefore, it was deemed that this process was viable for treating the waste water produced from hydraulic fracturing operation.