**BACKGROUND**

Reverse Osmosis (RO) is used as a water treatment method by separating dissolved constituents (i.e., salts) from water. Constituents can build up over time on the membrane preventing effective water treatment. To make RO a more effective method of water treatment, the turbulence of the feed water at the membrane surface can be increased.

The system for testing has now been improved so water stays within the system and temperature remains as constant as possible given heat transfer from the booster pump. Performance was compared between a Sterlitech Feed Spacer and two 3D printed feed spacers to see if different geometric spacer configurations and materials allow more turbulence at the membrane surface.

**METHODS**

After the system was redesigned with no leakage, three different feed spacers were tested. DI water was used throughout the system first with a new DOW BW30 membrane to ensure that the system was running properly. Each feed spacer was then tested with 7 gallons of DI water and 10g/L of Instant Ocean at approximately 450 psi. After each testing period (~36 hours) the solution was drained and cleaned with a NaOH solution before testing a new spacer.

**RESULTS AND CONCLUSIONS**

The feed flow remained steady at 2.09 liters per minute and temperature stayed at an average of 69.35 °F. Feed Total dissolved solids (TDS) was highest in the factory feed spacer, followed by the plastic, then carbon fiber feed spacer. The factory feed spacer performed better than the other two feed spacers because the trendline crossed the y-axis at the lowest permeate TDS value. This does not necessarily show a difference in the performance of the materials, because each material had a different geometry, so that could have caused this result instead.

**REFERENCES**