
MEMORANDUM

TO: US BUREAU OF RECLAMATION SCIENCE AND TECHNOLOGY PROGRAM
FROM: KATIE BENKO
SUBJECT: PRODUCED WATER PROJECT UPDATE
DATE: JULY 27, 2006
CC: MICHELLE CHAPMAN, BENNY FREEMAN

FY06 PROJECT REPORT

Task 1: Coordination with University of Texas at Austin and Area Offices

On February 10, 2005, Michelle Chapman and I met with Benny Freeman and his students in Austin. We talked about coordination of efforts between Dr. Freeman's research group and our work through the S&T program. While visit UTA, we saw the work Dr. Freeman's research group was doing. They had already begun modifying ultrafiltration membrane surfaces. They were coating these membranes and testing the integrity of the coated surfaces.

Following this meeting, a memorandum was composed that contained more specific information on the coordination of efforts and task description for the use of the Science and Technology program funding.

Task 2: Evaluation of Produced Water Samples

I found a USGS database on produced water on-line and was able to access this database. This database was used to obtain a general understanding of produced water variability. USGS has water quality data for over 14,000 wells in Texas, alone. Not only is there extreme variability in water quality across the state, but also within each basin. From the water quality data available from the Texas wells, a number of graphs were constructed. The purpose of graphing this data was to determine the variability of each of the ionic constituents in the water. Data was available for the total dissolved solids concentration and the following ions: calcium, magnesium, sulfate, and chloride.

Sodium and chloride make up the majority of the ions in the produced water samples included in this database. The high sodium and chloride concentrations indicate that reverse osmosis would be a favorable technology for treating produced water.

Since the variability of produced water quality is so great, it was deemed necessary to focus on water from one specific well. We chose to look do a complete water quality analysis on one oil well and one natural gas well.

We decided to put a contract in place with BC Technologies in order to locate an oil and gas producer who would grant us access to their wells and allow us to perform water quality analyses on the their produced water. BC Technologies was selected because of their expertise in the produced water field. They have also developed an extensive database on produced water and have experience in treating produced water.

A contract for \$7000 was put into place with BC Technologies. The following tasks were completed:

Subtask 1: Locate source of produced water in New Mexico or Texas that has an interest in using membrane treatment technology. This task also includes obtaining permission from the producer to collect one natural gas water sample and one oil produced water sample from a producing basin in New Mexico and Texas

Subtask 2: Obtain water samples as described above.

Subtask 3: Characterize the chemical quality of each produced water sample collected by conducting detailed chemical analyses.

The water quality analyses includes the following: major ions, organics, bacteria counts, total suspended solids, pH and temperature.

Task 3: Evaluation of Performance and Fouling of Commercial Membrane with Produced Water and Surrogate

We did not test membranes during this 1 year study due to a lack of understanding of relevant water quality and the difficulty of testing these types of waters in a laboratory setting.

Task 4: Publication of a peer reviewed paper

A peer reviewed publication was written documenting the findings of the produced water quality analysis. This paper is uploaded as a research product.