

Environmentally Friendly Drilling Systems

Technology Integration Program



Case Study

Story Ranch/La Salle County, Texas

Field Trial 2

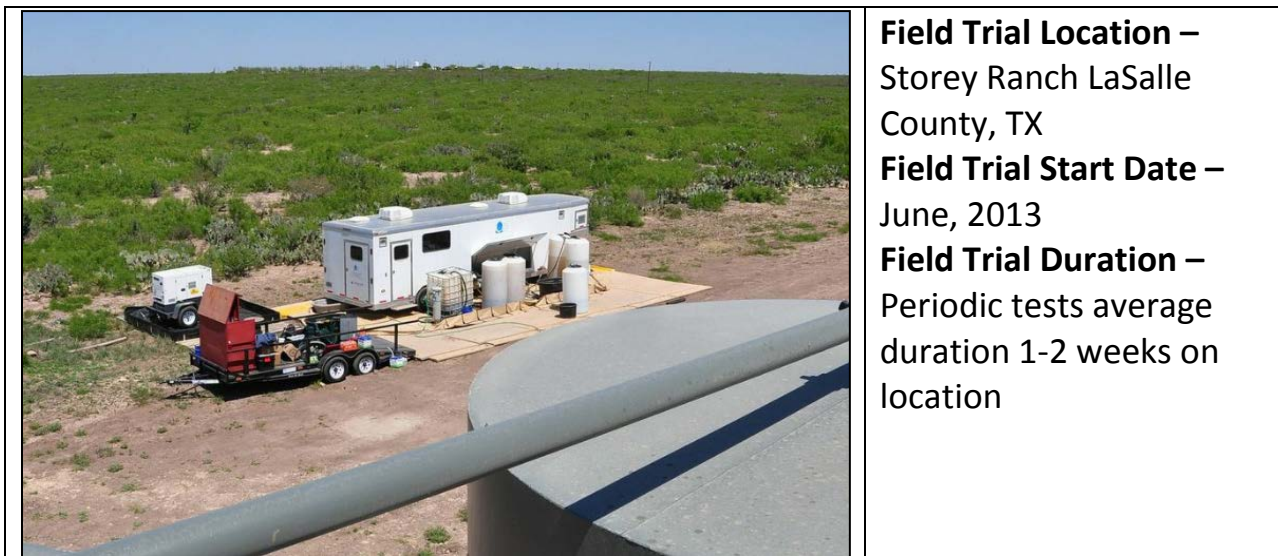
June 2013



Membrane Field Trial – Testing of appropriate membranes to remove solids, bacteria and iron from produced waters in the Eagle Ford Shale.

Team Members – Frank Platt TEES Research Engineer, Carl Vavra TEES Research Scientist, Bobby Wood Lab technician, Omar Ghannoum Student worker

Objective – To conduct continuous trials of membranes for produced water treatment in the Eagleford Shale and determine the optimum type and process for the water treated.



Discussion: This trial tested two new types of membranes for the removal of solids and reduction in turbidity for later treatment by UF or Nano filtration membranes in future trial. The goal was to remove the majority of solids, iron and bacteria from the produced water from the site.

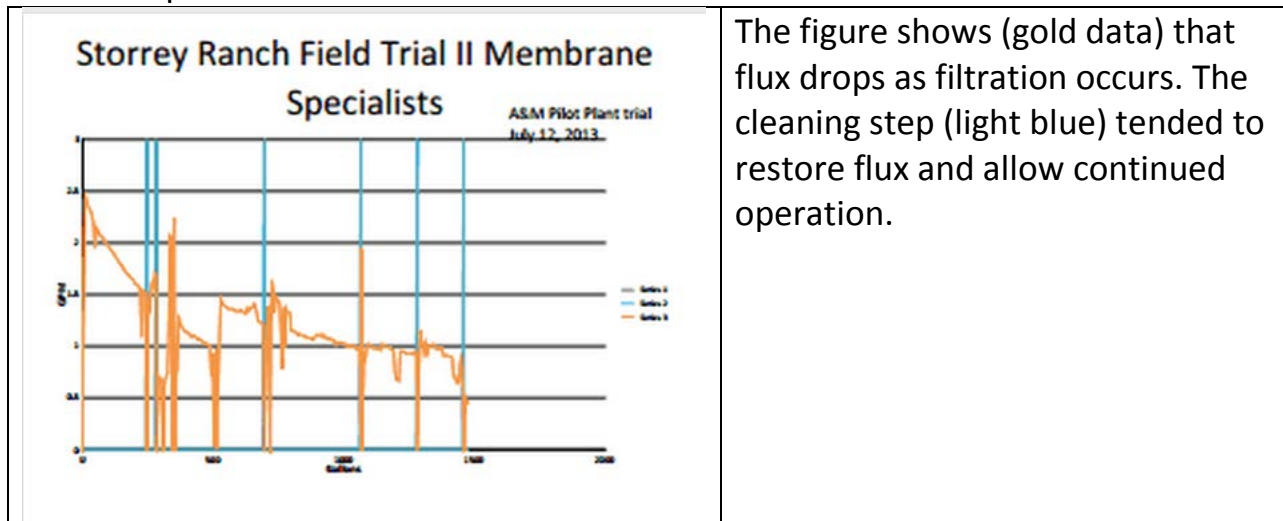
Two specific test were run with new micro-filters and ultrafilters that have been designed to obviate the need for hydrocarbon removal before filtration.

Specifics of the membrane tests can be found on the results website at:

<https://sites.google.com/site/tamueagleford/>

A self cleaning membrane was tested as a single pass, dead-end filter at an injection rate of approximately 1.25 gallon/minute. With this type of injection the permeate rate was the same as the injection rate. This was observed for the duration of the test. Indications are that crossflow methods were inadequate.

A second test was performed with a hollow tube membrane from one of GPRI's supporting sponsors. This test involved a cross-flow injection study with addition of a cleaning ball to the system to remove fouling from the membrane. As can be seen in the plots in the website the membrane produced between 1.1-1.4 gallons a minute permeate rate.



A complete report of the analytics and results of both tests will be placed on the field trial website. Further tests are called for on both membranes to determine the ultimate recovery, tendency to foul and methods to remediate that when it occurs. This should be addressed in a future trial.