

PCT LTD. Catholyte Free™ Lab Study and Field Trial Improves Heavy Oil Recovery ; NewIP Potential Catholyte/ Nanobubble Technology Development Underway for Enhanced Oil Recovery

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Background:

Since February 2021, PCT Ltd. has partnered with Maverick Energy Services in Oklahoma to conduct pilot testing of ECA catholyte (Catholyte Free™ added intermittently to injection wells and producing wells to enhance sweep effectiveness as well as clean-up formation damage. The target crude is a 15 degree API oil from the Warner Sandstone (200-300 ft) formation in the Grassy Creek field located in SW Missouri, where a which prior to this pilot was either not producing or was producing at extremely low levels (< 1 or 2 BBI/Day). Several protocols were established after a basic dye tracer test to determine travel time for injection water on two 7 spot patterns. The travel time was between 12and 24 hours and communication with all or some producers was verified. It was decided to implement the injection of the 800 ppm Catholyte Free™ at between 500 and 1000 gallons per day. The first pattern showed some response, but channeling was so severe that little incremental oil was produced. The next well Pattern (L-series) has shown much greater response over the past two months with oil cuts improving intermittently as wells are pumped and shut-in to allow the catholyte to soak for 24 hour periods. The best results have occurred in two of the 6 producing wells (3-10 BOPD) from less than 2 BOPD. The water /oil ratiois still high but being managed at the field's gun barrel separator site.

Continued Testing and Validation:

In order to validate the success of Catholyte Free™ for improving the recovery of the 15 gravity Grassy Creek crude, we have conducted laboratory testing at Intertek Labs in Houston, Texas over a three month period using the Amott Cell -Core and Hele Shaw Cell methods outlined in the presentation posted on the PCT Ltd. website. The Amott Cell results using heavy oil saturated 100 md sandstone core concluded that 150 degree F., Catholyte Free™ or a blend with KCl water recovered (via countercurrent imbibition) an average of 67% and 54% of the oil respectively versus 31% using KCl water alone as the control. The actual Warner Sandstone formation has a permeability over 200 md which makes the results shown in the 100 md core considerably conservative. Hele Shaw tests which simulate an oil filled natural fracture geometry (width of 2 microns) between two one inch by 2 inch glass plates illustrated that Catholyte Free™ counter-currently imbibes significantly more oil over a shorter time period than the KCl water control as shown in the detailed study.

Additional testing is currently underway to further illustrate the efficacy of the Catholyte free™ infused with nitrogen gas nanobubbles provided by NanoGas Technologies to achieve the added surface chemistry and mechanical advantage from nanobubbles to provide a synergistic effect to improve oil recovery in a shorter timeframe and at a lower temperature. A provisional patent application is being filed regarding this development. These results will be reported in a subsequent summary by September, 2021.