3.3 - Field Test and Transfer of Technology

Edco Producing Company has expressed an interest in conducting a trial, carbonated water frac treatment on their Wilson-Dunn Unit No. 1 well. The well has been scheduled for treatment in the 3rd quarter of 1992

The following characteristics of the fractured reservoir system and fluid properties were derived from the previously discussed studies:

- Outcrop studies indicate that the following geometry could represent an Austin Chalk reservoir: Matrix blocks of about 4 X 4 X 4 ft and a system of macro-fractures 0.8 mm wide. The micro-fractures are 0.1 mm wide
- The producing interval was assumed to be 80 ft thick.
- The movable oil saturation in the matrix blocks after primary recovery is 45%. Laboratory experiments have shown an additional oil recovery due to carbonated water imbibition of 15% of *OOIP*.
- A gaseous phase is present in the fracture system. Dissolved gas drive is assumed to be the primary production mechanism.
- The average depth of the reservoir, in the area of interest, is 5,500 ft with a *BHT* of 170 ^{o}F.
- Representative reservoir matrix rock, fluid characteristics, and laboratory rock and fluid properties are shown in the following table. Laboratory characteristics were needed to scale the obtained results to reservoir scale.

Several considerations have to be done in order to duplicate the beneficial effects of a carbonated water imbibition flooding seen in repeated laboratory experiments using Austin Chalk crude.

Water imbibition is directly proportional to the contact area between the rock and water. The surface area contacted by the carbonated water must be as large as possible. This consideration suggests that the largest possible volume of carbonated water be injected.

Laboratory experiments have shown that oil recovery is proportional to the amount of CO_2 dissolved into the imbibed water. Fig. 38 shows the solubility of CO_2 in water is a direct function of pressure and is greatest at low pressures. At high pressure values the solubility becomes approximately a linear function of pressure. Carbon dioxide solubility in water is also a function of temperature and salinity. Increases in temperature will