Visualization of Fractures in Austin Chalk - The mapping of microfractures using a non-destructive technique is a unique application of *CT* imaging. An attempt is being made to determine average fracture length, distribution of microfractures, and the relationship between interconnected and discontinuous microfractures from cores obtained from an Austin Chalk horizontal well.

Cores are prepared for scanning by placing the cores into a low vacuum core holder. The core is then subjected to evacuation at ultra-low vacuum pressures for a period of up to one week. Scanning of the subject is then initiated. Xenon gas is introduced into the core holder at low pressure (15 psig) after the initial scan of the evacuated core. The core is then rescanned using the same z axis locations.

Xenon gas has an atomic weight of 131 and the atomic weight of air is 29. Because of the difference in weights, xenon has an x-ray attenuation approximately four and a half times that of air. The xenon gas collects in the open pore spaces, i.e., fracture and vugs, and enhances the resulting *CT* images. The presence of stress relief perimeter fractures, micro-fractures and vugs were easily discernable. Example figures are not included because definition of black and white photos is limited. The actual *CT* images are projected on a color scale to emphasize these discontinuities.

Conclusions - Laboratory and imaging studies have proven the theoretical efficacy of replacing normal water with carbonated water to increase oil recovery and rate of recovery with the imbibition displacement method. *MRI* proton profiles proved that CO_2 dissolved in the water being imbibed into the rock sample did not reach the full length of the rock sample. The evidence suggests that CO_2 diffuses to the counter current flowing oil which in turn is expelled at the imbibing face.

A combination of CO_2 - enriched water imbibition and pressure depletion created a cyclic type of recovery. This method combined the beneficiating effects of CO_2 at early times, and the increase in oil production due to the localized gas drive observed after pressure depletion. The time needed to recover similar amounts of oil was reduced to nearly one third of the time required when unadulterated water imbibition was applied. This method exhibited the highest rate of recovery.

Micro-fractures present in Austin Chalk core samples were easily identified and mapped with *CT* imaging.