

HUMBLE - MAGNOLIA WATER FLOOD PROJECT - PENROSE-SKELLY FIELD
HUMBLE - J. L. GREENWOOD LEASE
MAGNOLIA - BRUNSON-ARGO LEASE

The area being flooded on the Humble-J. L. Greenwood and Magnolia-Brunson-Argo leases, Penrose-Skelly Field, Lea County, New Mexico, comprises 480 acres in Section 9, Township 22-S, Range 37-E, as shown in Figure I. Only wells completed in the Penrose-Skelly Grayburg pay are shown, a number of deeper Brunson, Drinkard, and Paddock Field wells being omitted. Seven wells were completed on the Humble-Greenwood lease and eight wells on the Magnolia-Brunson Argo lease in the Grayburg Crystalline dolomite on a 40-acre spacing pattern during the period from May 1937 to July 1940. However, in recent years, several wells have been deepened to other pays.

Prior to initiation of the water flood, production of the Humble Greenwood lease had declined to 13 barrels per day from five producing wells. Magnolia's Brunson-Argo lease was producing 10 barrels per day from the three wells in the flood area. Total cumulative production from the seven original Humble wells to January 1, 1951, was 348,880 barrels or 1,090 barrels per lease acre. Total cumulative production from the Magnolia wells in Section 9 to January 1, 1951, was 211,810 barrels or 1,320 barrels per lease acre. There are insufficient data available from which to determine actual pay thickness. The average porosity for ten core samples at Greenwood 1 was 7.9 percent and only one had a radial permeability as high as one md.

The original reservoir pressure is estimated as 1600 pounds and a subsurface sample showed a saturation pressure of 1457 pounds and a solution ratio of 751 when flashed to 0 pounds trap pressure. The oil shrinkage factor was 0.709. The high initial ratios of the wells suggest the presence of a gas

cap and the oil was probably saturated at the original reservoir pressure.

Because of the lack of reservoir data and actual operating experience of water injection in dolomite reservoirs, the project was initiated on an experimental basis.

On January 12, 1951, injection was begun into Greenwood 3 and Brunson-Argo 8 at the rate of 240 and 300 barrels daily, respectively. Greenwood 5 had been drilled to the Drinkard pay and, when it failed to be a commercial producer, was plugged back to the Grayburg and shut in. In order to convert it to a water injection well the casing was perforated with 150 open hole jet type shots from 3640 to 3715 feet and acidized through the perforations with 3000 gallons of acid. The well then took water by gravity at the rate of 432 barrels per day. On January 25, 1951, Humble Greenwood 5 and 6 were converted to injection wells. No remedial work was required in converting Greenwood 3 and 6 and Brunson-Argo 8 to water input wells.

Injection by gravity was continued throughout 1951 at an average rate of approximately 120 barrels of water per day per injection well. Cumulative water injected to March 1, 1952 was 195,297 barrels which is 366,288 barrels less than the total cumulative oil that has been produced. There have been no changes in production attributable to the water flood project to date. Equipment is being installed to increase the injection rate, and Magnolia recently acidized Brunson-Argo 8, increasing the injection rate from 60 to 135 barrels of water per day by gravity.