

## MEDIO FIELD, SANDOVAL COUNTY, NEW MEXICO

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Medio Field is located in secs. 14 and 15, T. 19N., R. 3W., Sandoval County, New Mexico, approximately 18 miles by road southwest of the town of Cuba. The name was taken from Medio Arroyo, three miles to the south, but the field has also been referred to as "Torreon-Entrada" and "Media."

### STRUCTURE

Surface mapping delineated an anticlinal nose plunging approximately N 30° W, with no apparent south closure. Subsequent seismograph surveying indicated closure on deeper horizons. The uniform deposition of the Entrada sandstone in the southeastern portion of the San Juan Basin would also seem to indicate a structural, rather than stratigraphic, type of reservoir.

### DEVELOPMENT

The discovery well, Magnolia Petroleum Company, Hutchinson-Federal No. 1, was spudded July 3, 1953, in sec. 14, T. 19N., R. 3W. Oil shows were encountered in the Gallup sand (Interval "K" on type log), but no free oil was recovered on drill stem tests. Drill stem tests in the upper portion of the Entrada sand recovered free oil, and analyses of cores indicated good oil saturation. After reaching a depth of 9684 feet in granite, with no further promising oil or gas shows encountered, the well was plugged back to 5231 feet and completed November 5, 1953, through perforations 5210-5215 feet in the Entrada sand. Initial potential was 78.5 barrels of 33° gravity oil per day, no water, no pump.

The Magnolia Petroleum Company, Hutchinson-Federal No. 2, in sec. 15, T. 19N., R. 3W., 1320 feet west of the discovery well, was spudded November 18, 1953. The well was drilled to a total depth of 5202 feet and completed December 17, 1953 through perforations 5200-5202 feet in the Entrada sand. The top of the Entrada sand was 35 feet low, structurally, to the discovery well. Initial potential, pumping, was 62 barrels oil per day plus 162 barrels of water. Formation water averaged approximately 4000 ppm chloride equivalents. After an unsuccessful workover to shut off the formation water, the well was temporarily abandoned April 14, 1954.

The Magnolia Petroleum Company, Harvey-Federal No. 1, 1320 feet north of the discovery well and the third and last Entrada test in the field, was spudded February 7, 1954. The Entrada was topped 39 feet low, structurally, to the Hutchinson-Federal No. 1, and the well was plugged and abandoned March 5, 1954 after drill stem tests and cores indicated water in the Entrada sand.

Production of oil from the discovery well declined and

water increased until it became uneconomical to continue producing from the Entrada sand. A workover was started January 1, 1956, and the well was plugged back to 3310 feet for recompletion in the Gallup sand. Casing was perforated from 3229 to 3254 feet (approximately center of Interval "K" on type log) in the Gallup sand, and the formation was fractured with 5,000 gallons of diesel oil and 5,000 pounds of sand. After swabbing failed to recover all of the load oil used, the formation was re-fractured using 40,000 gallons of water and 55,000 pounds of sand. Initial potential, pumping, was 13.54 barrels of 39.2° gravity oil plus 10.83 barrels of formation water from the Gallup sand, and the workover was completed March 1, 1956.

### STRATIGRAPHY

#### Cretaceous

The Hutchinson-Federal No. 1 was spudded in the Lewis shale (near base of Interval "C" on type log), approximately 100 feet stratigraphically below the base of the Pictured Cliffs sandstone. The Upper Cretaceous section, from the surface to the base of the Dakota formation, is between 4430 and 4440 feet thick.

The Pictured Cliffs sandstone (upper ½ Interval "C" on type log) forms a rather prominent ridge on the southwest and northeast flanks of the structure, and crops out in isolated patches on the north and northwest. The Lewis shale, on the outcrop, consists of gray and drab shales separated by thin gray and brown sandstones. The Lewis is approximately 500 feet thick in the Medio Field area. The Mesaverde group (lower ½ Interval "F", Interval "G", and upper ½ Interval "H" on type log) consists of 1710 to 1720 feet of very-fine- to medium-grained sandstone, gray shale and coal. The Upper Mancos shale (lower ½ Interval "H", Interval "I" and Interval "J" on type log) totals approximately 1000 to 1010 feet in thickness. The upper one half of this interval is composed of gray shale, silty and sandy in part, with thin interbedded siltstones and sandstones. The lower one half of the Upper Mancos (Interval "J" on type log) is made up of interbedded gray shales and very-fine-grained gray argillaceous sandstones. The Gallup sandstone (Interval "K" on type log), currently producing in the Hutchinson-Federal No. 1, consists of approximately 220 feet of interbedded gray sandy shale and very-fine- to fine-grained gray argillaceous and glauconitic sandstone. Porosity is low in the producing sands and permeabilities are all less than 1 millidarcy. The Lower Mancos shale (from base of Interval "K" to top Dakota sand on type log) is approximately 870 feet in thickness. The Dakota is between 230 and 240 feet thick.



**Jurassic**

The Jurassic formations, including the Morrison, Todilto and Entrada, are approximately 1105 feet thick in the Hutchinson-Federal No. 1. In this well, Morrison strata total 745 feet, the Todilto 25 feet and the Entrada 335 feet. The Todilto consists largely of dense white anhydrite with zones of finely crystalline brown limestone inclusions. The lower portion may also contain, locally, beds of finely crystalline brown limestone, fine-grained sandstone and dark-gray fissile shale. The Entrada sandstone, in its upper portion, is fine- to medium-grained, light-gray, clean and friable. In the lower one third of the formation the sandstones are pink to red in color. Average porosity of the producing interval of the Entrada was 22.8 per cent, and average permeability was 283 millidarcys.

**Triassic**

Triassic deposits (Chinle formation) consist of approximately 1130 feet of red shales, red and buff sandstones and conglomerates and thin limestones.

**Paleozoic**

Approximately 1775 feet of Permian beds and 1200 to

1205 feet of Pennsylvanian sediments were drilled in the Hutchinson-Federal No. 1. No pre-Pennsylvanian Paleozoic formations were recognized in the well. Granite was topped at 9658 feet.

**PRODUCTION**

A total of 14,196 barrels of 33° gravity crude oil was produced from the Entrada formation before abandonment. The high pour point (90° F.) of the Entrada crude oil made transportation difficult, especially in cool weather. Following is an analysis of Entrada oil from the Hutchinson-Federal No. 1:

Sulfur	0.48%	
Gasoline	4.6	(6 octane)
Kerosine	18.0	
Gas Oil	33.5	(diesel)
Neutral distillate	11.8	
Risiduum	31.9	

The Magnolia Petroleum Company, Hutchinson-Federal No. 1 has produced 2,860 barrels of oil from the Gallup sandstone as of June 30, 1957. Production during June, 1957 was 118 barrels oil plus 150 barrels formation water.