Testimony for

SECONDARY-RECOVERY HEARING

HOSPAH FIELD

McKINLEY COUNTY, NEW MEXICO

BEFORE EXAMINER NUTTER
OIL CONSERVATION COMMISSION
Texaco EXHIBIT NO. 1
CASE NO. 3132

Case No. 3132

October 28, 1964

Texstar Petroleum Company

By G. M. Andreen
G. M. Andreen

Under Case No. 3131, Texstar Petroleum Company requested Commission approval for the formation of a Hospah Field Unit within which would be a Seven Lakes Sand Unit and a Hospah Sand Unit. The testimony given in Case No. 3131 is incorporated in this case by this reference.

At this hearing, Texstar, who is the operator of all the leases in the Hospah Field, is requesting permission to conduct secondary-recovery operations by injection of extraneous fluids into the Seven Lakes and the Hospah horizons underlying the Hospah Field, McKinley County, New Mexico.

The Hospah Sand is found at a depth of approximately 1,550 feet and is the only sand producing in the field. The 39 currently active wells produce 233 barrels of oil and 700 barrels of water per day. An engineering study of the Hospah Sand, prepared by the Engineering and Consulting Department of Core Laboratories, Inc., Dallas, Texas, indicates that a peripheral water-injection program for the Hospah horizon will increase the future production from this zone by 1,500,000 barrels of oil over and above that expected by continued primary operations. The proposed injection plan as indicated on Figure 1 calls for the drilling of six injection wells and the conversion of two abandoned oil wells to injection. It is anticipated that the maximum rate of injection will be 6,000 barrels per

day and that the maximum oil-producing rate will not exceed 1,000 barrels of oil per day. The life of the project is estimated at seventeen years.

All injection wells will be completed by cementing pipe through the formation and selectively perforating. All completion practices used will be such as to insure that the injected fluids will be confined to the zone under flood. The source of the extraneous water necessary to the project has not yet been determined. From old records we believe there are potential water-source sands between 600 and 1,000 feet, and if necessary, water can be obtained from the Hospah Sand on the downdip side of the fault which forms the southern boundary of the productive area. The final selection of the water source will be determined from tests to be run on the quality and quantity of water each zone contains.

The Seven Lakes Sand is found at a depth of approximately 300-350 feet. Although cores taken in this section in the early 1940's indicate oil saturation and good sand characteristics, no attempt was ever made to establish commercial production because of the viscous nature of the crude contained in the section. Engineering studies indicate this zone contains approximately 4,000,000 barrels of oil in place, and it is thought that approximately 1,000,000 barrels of this oil may be obtained by the application of one of the more exotic types of secondary recovery such as thermal, or pusher floods. The feasibility and selection of the process to

be used is contingent upon the results of special laboratory tests run on cores taken from the section. The process to be used will affect the design of the development and injection pattern, and as a consequence no specific plans in this regard can be given at this time. While the type of process to be used in attempting to establish commercial recovery from the Seven Lakes horizon is not yet known, it is recognized that the wells drilled to this zone must be completed in a manner which will confine all injected substances to the zone under flood.

Upon approval of the Hospah unitization (Case No. 3131), Texstar's plans call for the immediate consolidation of the production-handling facilities and the installation of an automatic-custody system to handle production from all leases. During the summer of 1965 it is expected that the facilities necessary to start injection into the Hospah horizon will be installed and operating. During the same period it is planned to obtain representative cores from the Seven Lakes horizon, and in the winter months of 1965-66 special tests will be run on these cores to determine the most feasible method of establishing commercial production from the zone. By the summer of 1966 Texstar hopes to be in a position to install at least the pilot phase of the secondary-recovery program for the Seven Lakes Sand.

Attached to this testimony are the following:

(1) Plat of the Hospah Field Unit.

(2) Structure map of the Hospah Sand.

(3) Gross sand isopach of the Hospah Sand.

(4) Proposed injection pattern for the Hospah Sand.

(5) Structure map of the Seven Lakes Sand.

(6) Gross sand isopach of the Seven Lakes Sand.

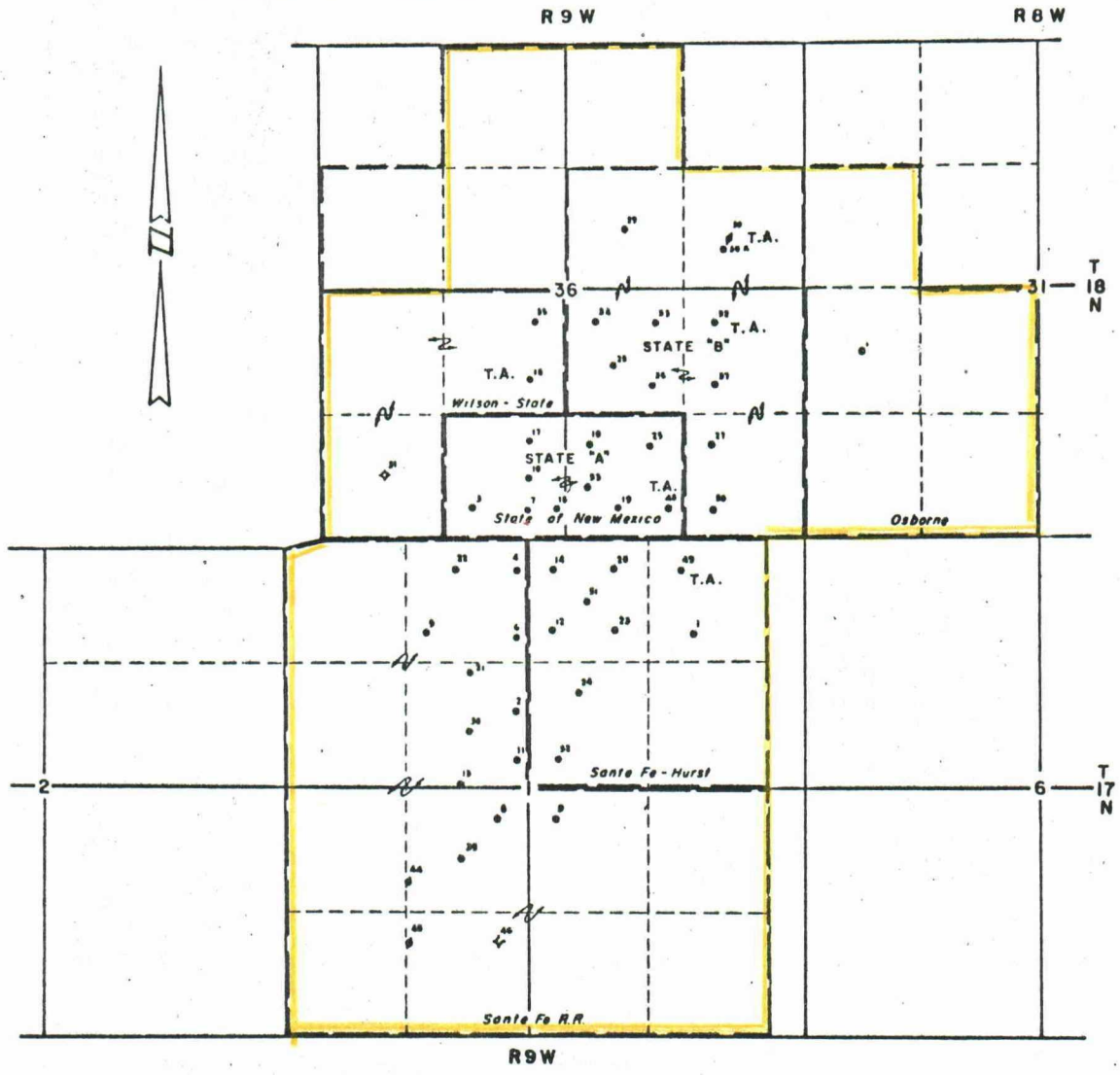
(7) Tabulation of sand characteristics of both Sands.

(8) Tabulation of past production of the Hospah Sand.

(9) Sample logs.

For the purpose of preventing waste and increasing the ultimate recovery from the field, it is requested that the Commission grant Texstar Petroleum Company permission to conduct secondary-recovery operations in both the Seven Lakes and Hospah horizons of the Hospah Field by the injection of extraneous fluids into these horizons. At such time as Texstar has determined the source of its extraneous water for injection into the

Hospah Sand and determined the nature of the secondary-recovery process to be applied to the Seven Lakes horizon, the Engineering Department of the Commission, the State Engineer's Office and the State Land Commission Office will be advised of the details of the program and their clearance obtained before actual injection operations commence. If injection into the Seven Lakes horizon, subject to the aforementioned administrative approval, cannot be granted as a result of this hearing please delete this portion of the request and injection in the Seven Lakes horizon will be the subject of a future hearing.



LEGEND

HOSPAH FIELD UNIT OUTLINE

Figure 1

LEASE PLAT

HOSPAH FIELD

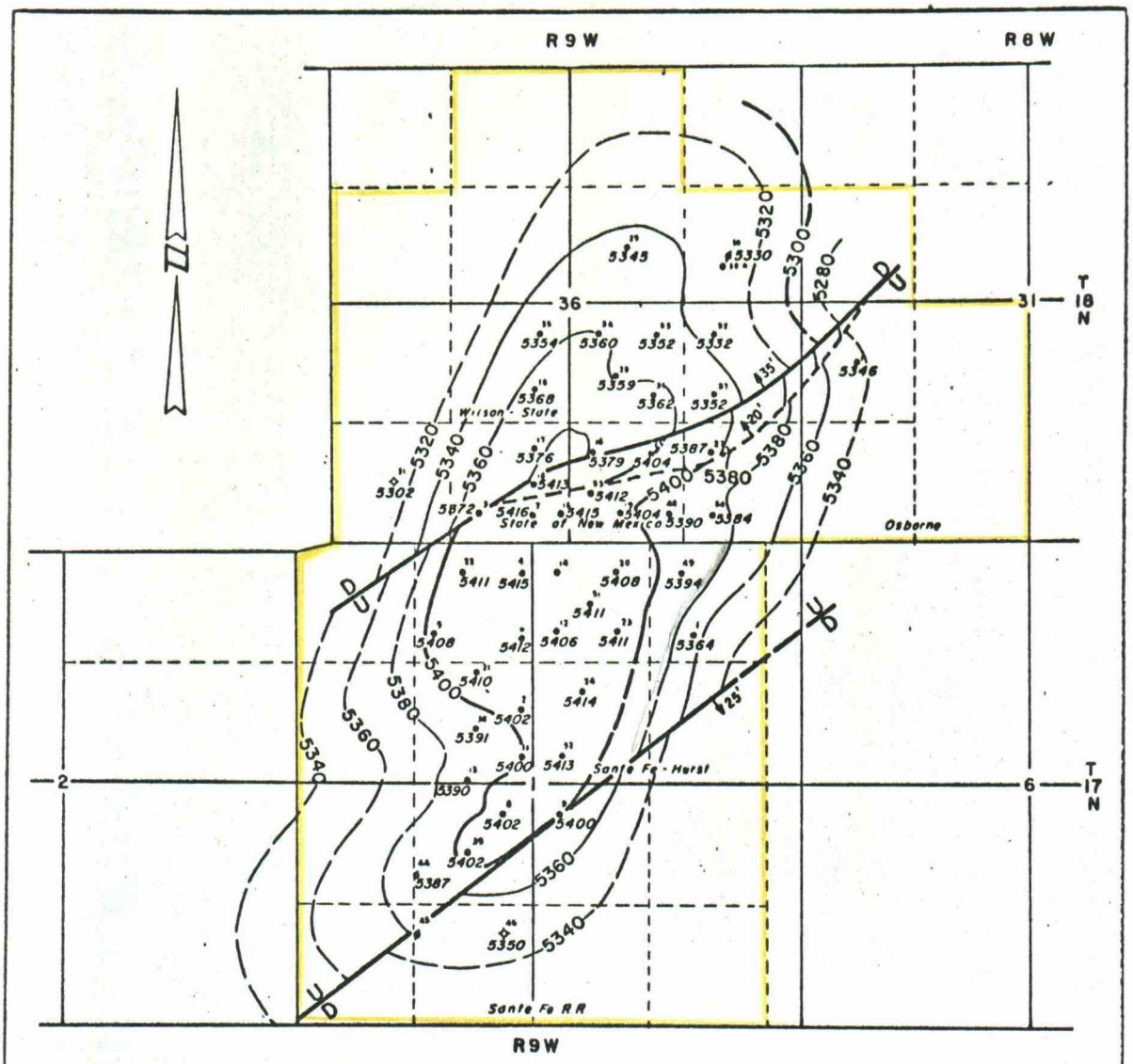
McKINLEY COUNTY, NEW MEXICO

1000' 0 1000 2000 3000 4000'

CORE LABORATORIES, INC.

ENGINEERING & CONSULTING DEPT

APRIL 1, 1964



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HOSPAH FIELD UNIT OUTLINE

Figure 2

STRUCTURE MAP

TOP HOSPAH SAND

HOSPAH FIELD

McKINLEY COUNTY, NEW MEXICO

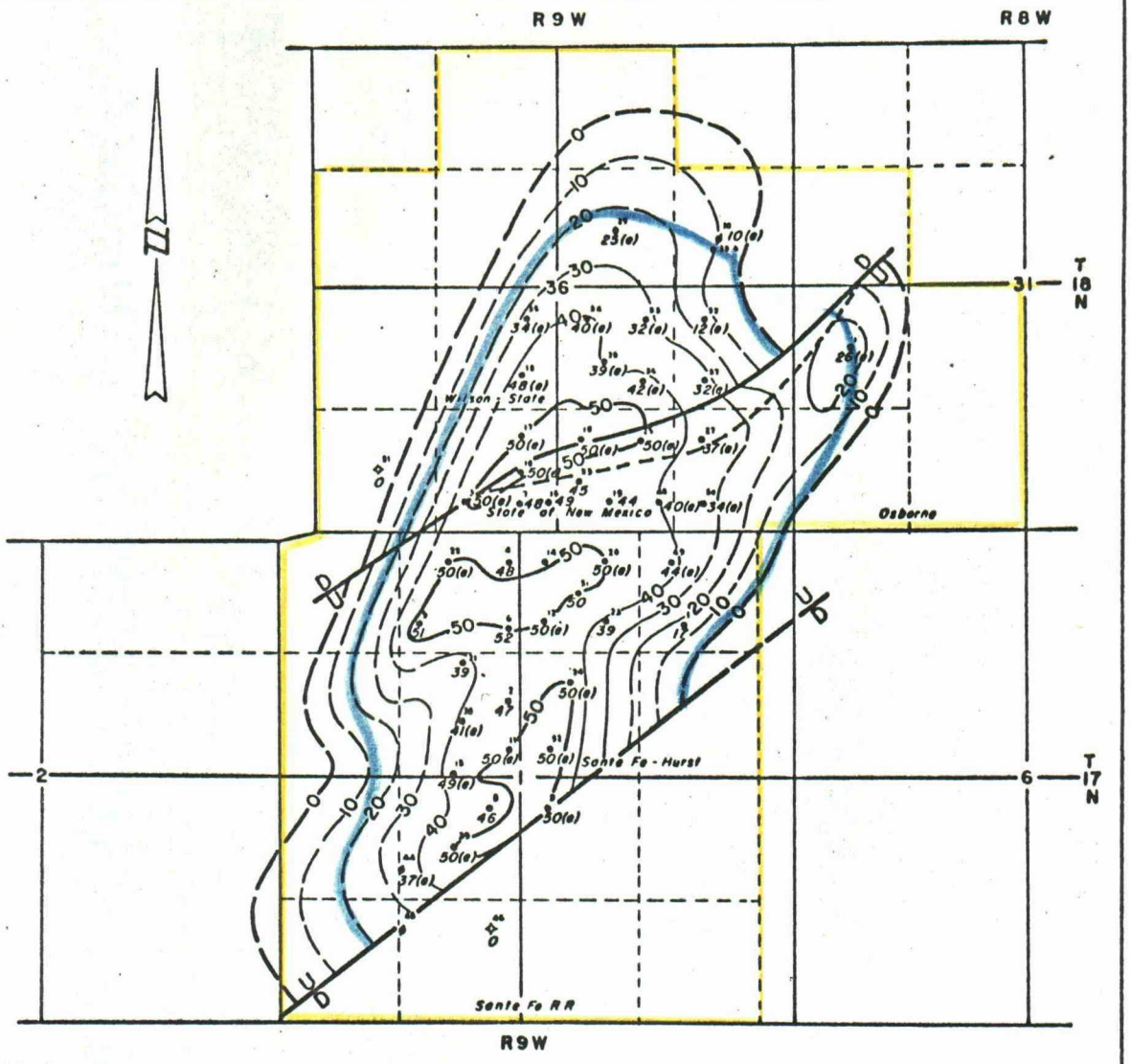
CONTOUR INTERVAL: 20 FEET

1000' 0 1000 2000 3000 4000'

CORE LABORATORIES, INC.

ENGINEERING & CONSULTING DEPT

APRIL 1, 1964



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HOSPAH SAND UNIT

HOSPAH FIELD UNIT

Figure 3

GROSS SAND ISOPACH

HOSPAH RESERVOIR

ABOVE OIL – WATER CONTACT

HOSPAH FIELD

McKINLEY COUNTY, NEW MEXICO

CONTOUR INTERVAL: 10 FEET

1000' 0 1000 2000 3000 4000'

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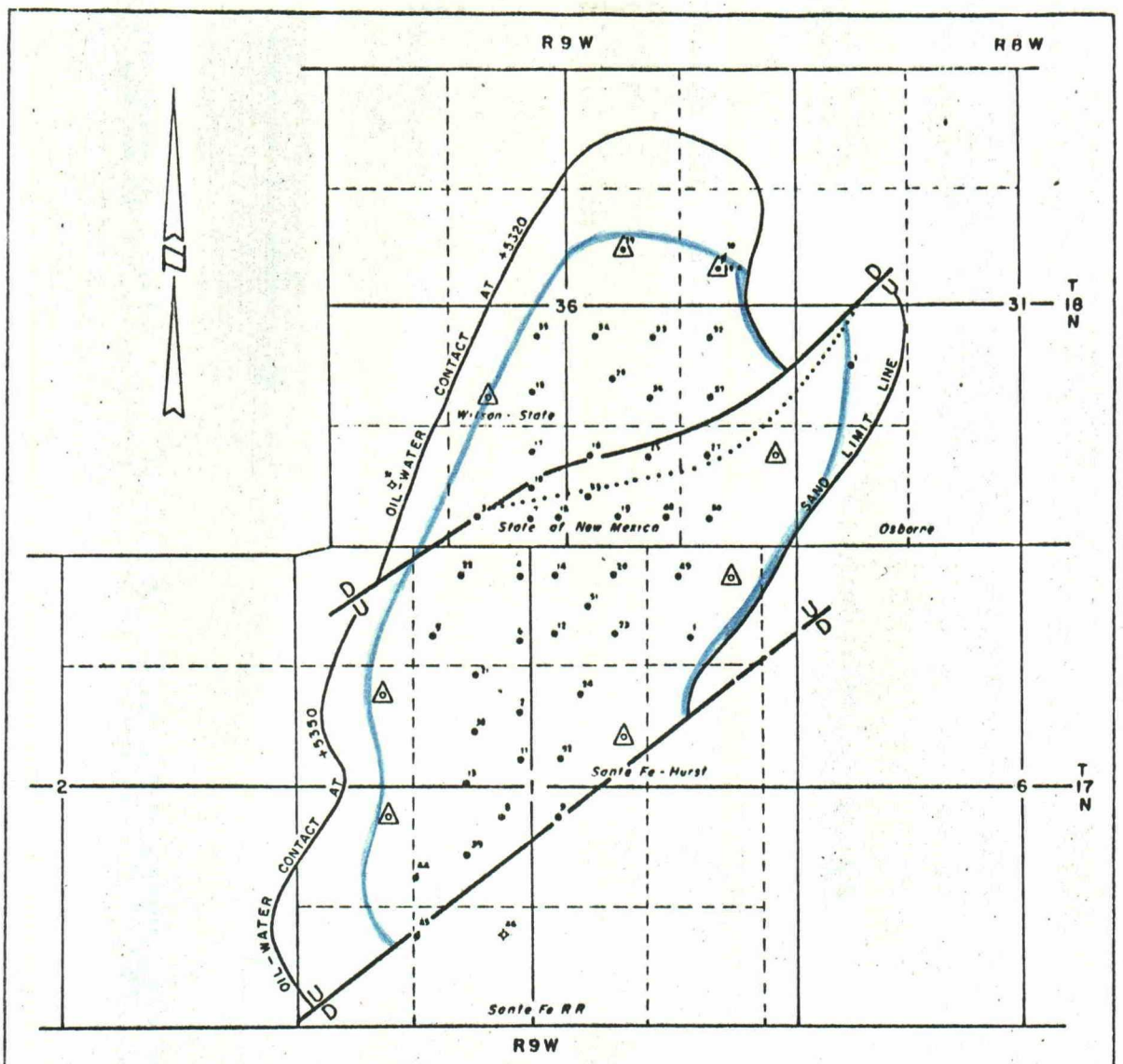
ENGINEERING & CONSULTING DEPT.

APRIL 1, 1964



LEGEND

PROPOSED INJECTION WELL

HOSPAH SAND UNIT

Figure 4

PROPOSED INJECTION PROGRAM

HOSPAH SAND

HOSPAH FIELD

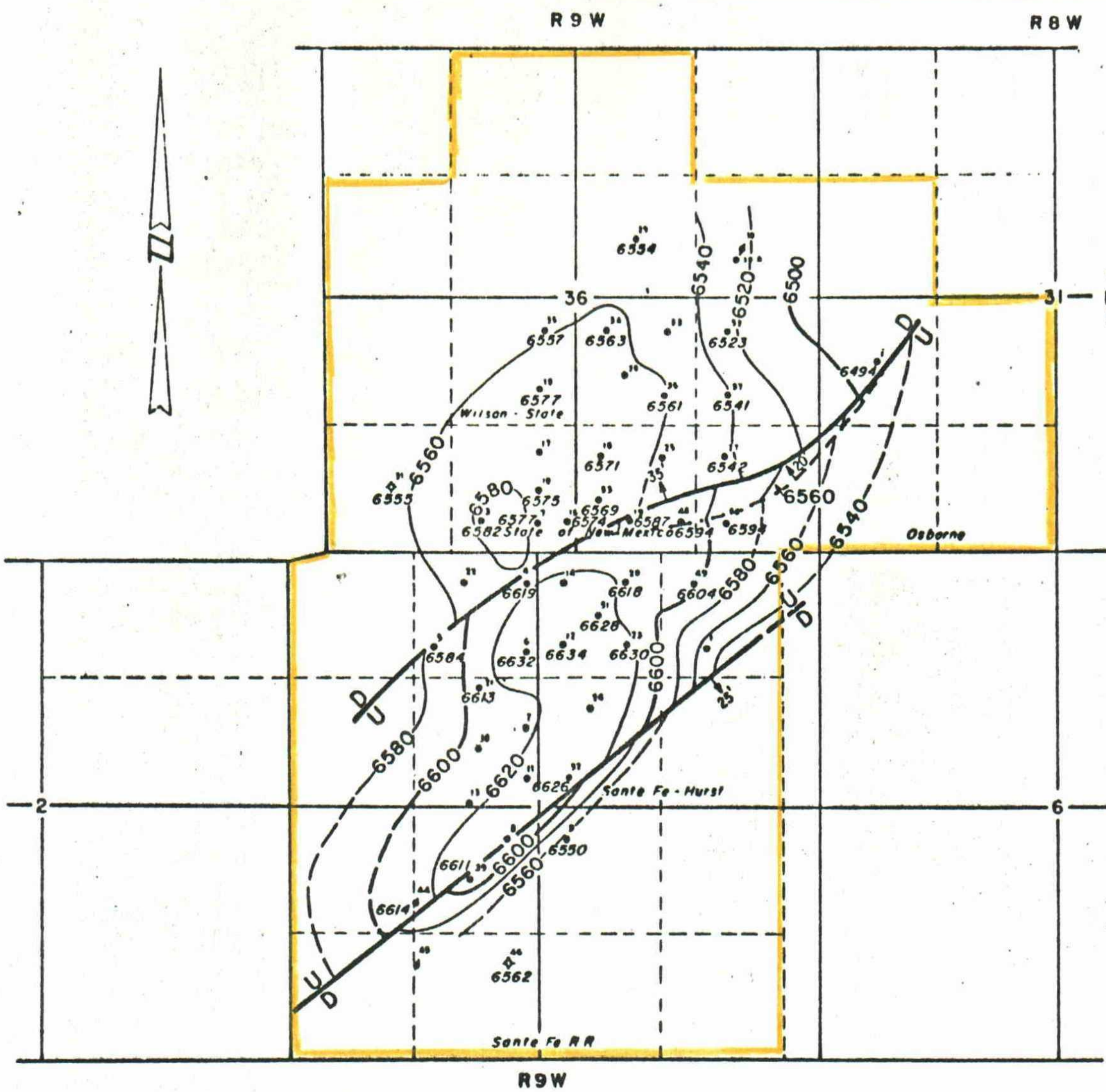
McKINLEY COUNTY, NEW MEXICO

1000' 0 1000 2000 3000 4000'

CORE LABORATORIES, INC.

ENGINEERING & CONSULTING DEPT

APRIL 1, 1964



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HOSPAH FIELD UNIT

Figure 5

STRUCTURE MAP

TOP SEVEN LAKES SAND

HOSPAH FIELD

McKINLEY COUNTY, NEW MEXICO

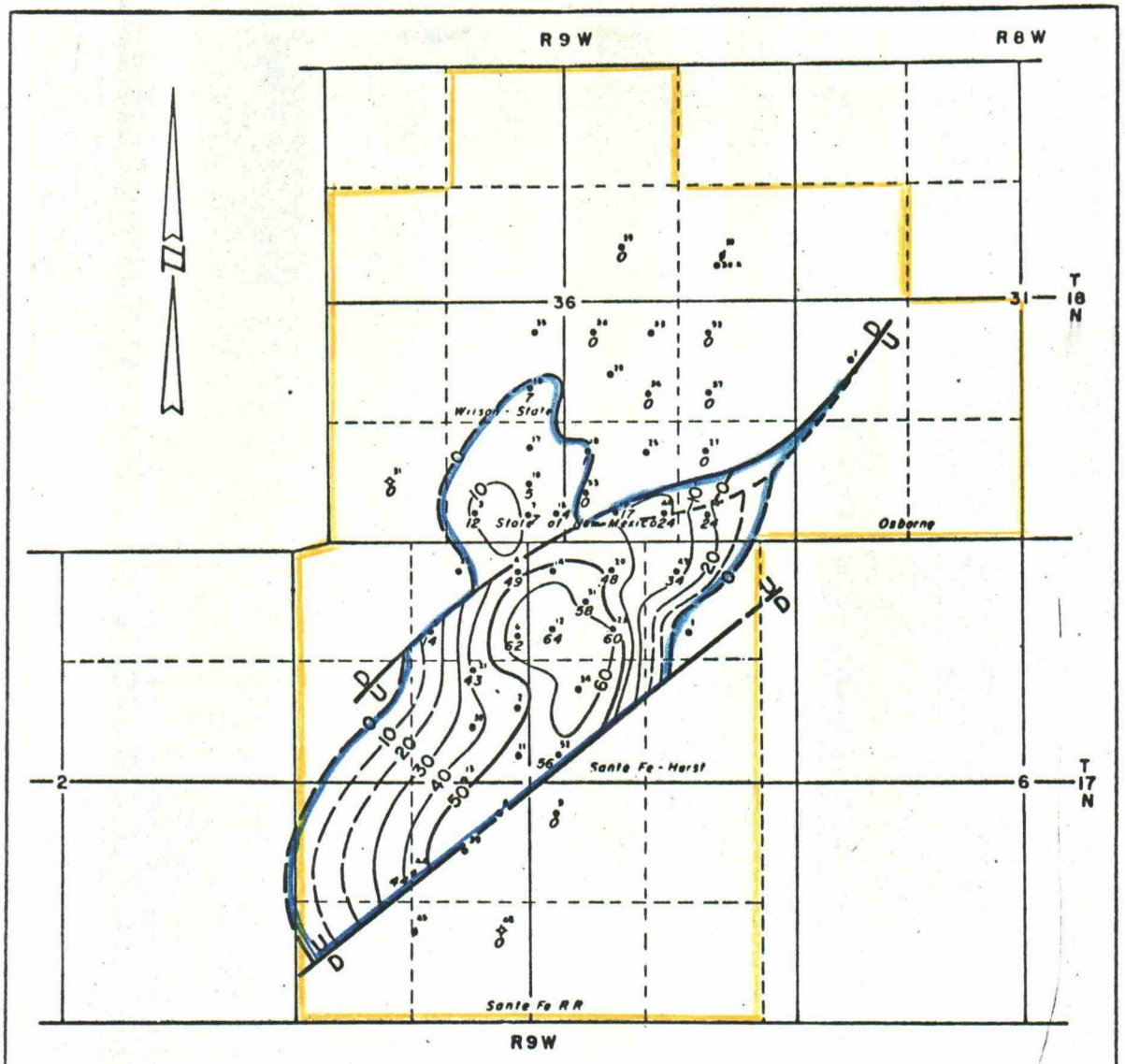
CONTOUR INTERVAL: 20 FEET

1000' 0 1000 2000 3000 4000'

CORE LABORATORIES, INC.

ENGINEERING & CONSULTING DEPT

APRIL 1, 1964



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HOSPAH FIELD UNIT

SEVEN LAKES SAND UNIT

Figure 6

GROSS SAND ISOPACH

SEVEN LAKES RESERVOIR

ABOVE OIL – WATER CONTACT

HOSPAH FIELD

McKINLEY COUNTY, NEW MEXICO

CONTOUR INTERVAL: 10 FEET

1000' 0 1000 2000 3000 4000'

CORE LABORATORIES, INC.

ENGINEERING & CONSULTING DEPT.

APRIL 1, 1964

Figure 7

SUMMARY OF FORMATION AND FLUID DATA

HOSPAH FIELD
McKinley County, New Mexico

April 1, 1964

Hospah Sand

Stock-Tank Oil Gravity, ° API	30
Pour Point, ° F	20
Estimated Initial Solution GOR, SCF/Bbl.	50
Estimated Initial Formation Volume Factor, v/v	1.03
Estimated Present Formation Volume Factor, v/v	1.00
Estimated Saturation Pressure, psi	300-400
Estimated Original Reservoir Pressure, psi	300-400
Average Permeability, md.	1061
Average Porosity, per cent	25.7
Average Connate Water Saturation, per cent	33.0
Original Oil-Water Contact, North Block, datum sea level	-5,320'
Original Oil-Water Contact, South Block, datum sea level	-5,350'
Unit Stock-Tank Oil Initially in Place, Bbl./Ac.-Ft.	1,297
Gross Reservoir Volume Above Original Oil-Water Contact, acre-feet	21,059
Net Reservoir Volume Above Original Oil-Water Contact, acre-feet	15,794
Total Stock-Tank Oil Initially in Place, barrels	20,485,000

Seven Lakes Sand

Average Permeability, md.	319
Average Porosity, per cent	28.2
Average Connate Water Saturation, per cent	67.0
Oil-Water Contact, datum sea level	-6,570'
Unit Stock-Tank Oil Initially in Place, Bbl./Ac.-Ft.	722
Gross Reservoir Volume Above Oil-Water Contact, acre-feet	9,128
Net Reservoir Volume Above Oil-Water Contact, acre-feet	6,390
Total Stock-Tank Oil Initially in Place, barrels	4,614,000