# CAMP STATE UNIT

## CHAVES COUNTY, NEW MEXICO

## GEOLOGICAL REPORT

MAY 19, 1988

BEFORE EXAMINER STOGNER
OIL CONSERVATION DIVISION
EXHIBIT NO. 1
CASE NO. 9381

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CAMP STATE UNIT
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GEOLOGY

The Camp State Unit comprises a total of 5,453.34 acres in portions of Township 5 South, Ranges 22 and 23 East, Chaves County, New Mexico. The unit lies approximately 32 miles NNW of the city of Roswell, the county seat (figure 1). It is located in a sparsely-drilled area between the Pecos Slope Abo gas field to the east and the Pecos Slope Abo, West gas field.

STRUCTURE: In the vicinity of the Camp State Unit Abo beds dip eastward at a rate of about 75-feet per mile (figure 3, Map A). An eastward-plunging nose has been drawn across the southern half of the area, based mainly on the three wells lying in the southeastern quadrant of the map.

ABO SANDSTONE RESERVOIRS: In the Pecos Slope fields gas has been trapped stratigraphically in very fine-grained sandstone reservoirs of the Permian Abo formation. In the nearby wells west of the unit most of the reservoirs occur within a 300-foot interval starting at a depth of about 2900'. Cuttings and sidewall core samples indicate that the better reservoirs are very well sorted, quartzose, carbonate-cemented sandstones. They are predominantly brick-red but grade to white in the cleanest sands. The sandstones are interbedded with red, silty mudstones and together comprise the typical Abo "red bed" sequence of the southeastern New Mexico subsurface. Toward the basin, south and east of the Pecos Slope Abo fields, the sandstone and shale sequence gives way to a red shale and anhydrite facies. Farther basinward the red shales grade into evaporites of the Abo backreef facies.

In the Pecos Slope Abo, West field, log markers make it convenient to subdivide the pay interval into two groups of sands, Unit I and Unit II. The upper group, Unit I, is comprised of as many as five reservoirs and Unit II has as many as six zones in some nearby wells to the west. That same subdivision has been used in the Camp State Prospect area. In order that sandstones be considered of reservoir quality they must have shown eight percent log porosity or more and shown the typical neutron-density cross-over as an indicator of cleaner sandstones. An example of sandstones coming within those requirements can be seen on the reference log of the Transwestern No. 1 Camp State in section 25, Township 5 South, Range 22 East (figure 2). The total net feet of sandstone is indicated on the Total Net Sandstone Isopach (figure 3, Map B). Other examples of the Abo reservoirs are shown on the stratigraphic cross section A-A' (figure 4). The line of section for cross section A-A' is indicated on Map A and Map B (figure 3).

Log-derived porosity in completed Abo reservoirs ranges from eight percent to greater than 16 percent, with most zones averaging about 12 percent. All zones require fracture treatment before producing. Engineering estimates of pre-treatment permeability range from .02 to about 1.22 millidarcies. Natural

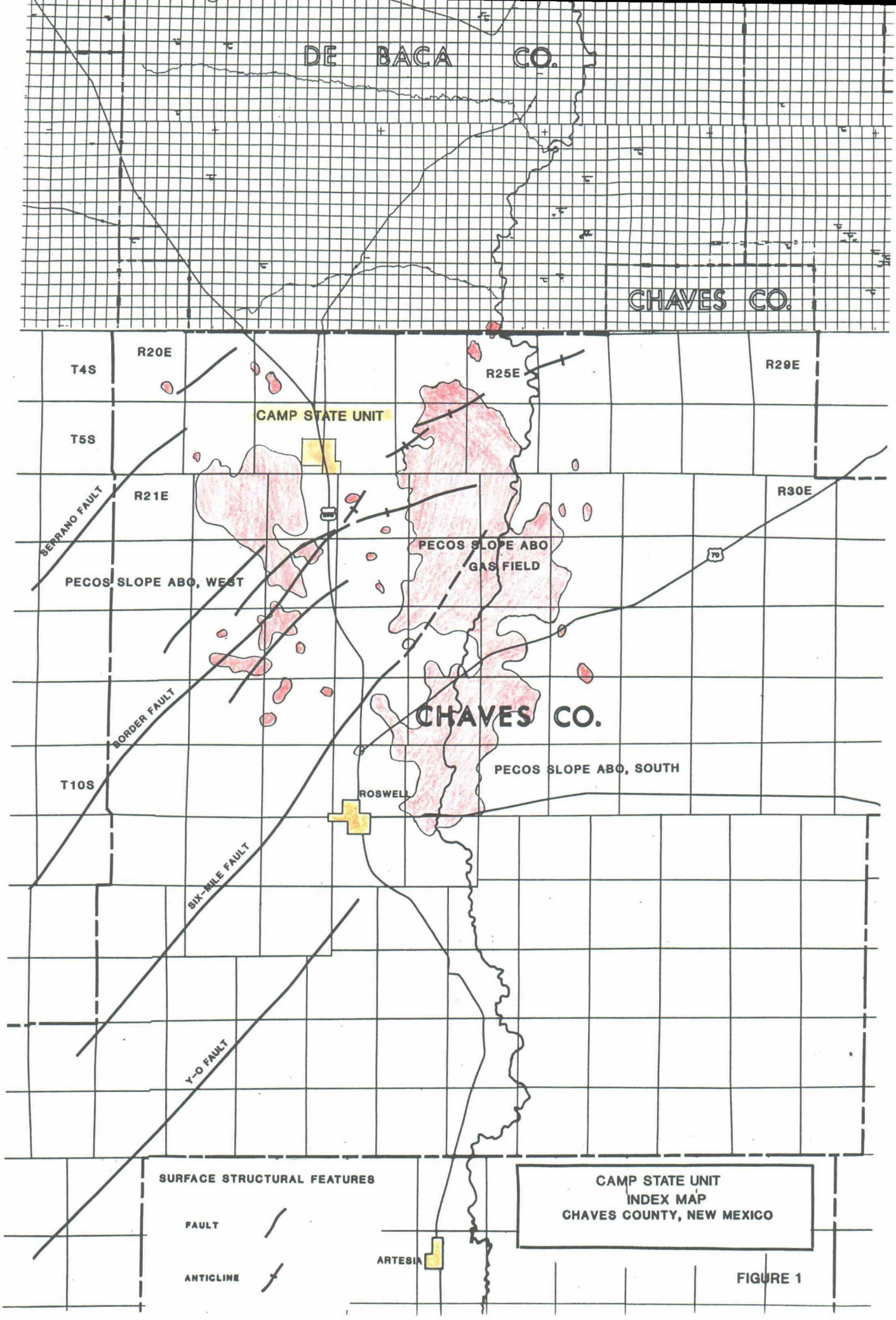
fracturing, which is evident at the surface, probably enhances permeability in and between some wells.

CAMP STATE PROSPECT: Net sandstone isopach mapping to the reference well from the west, east and south suggest that it is located in a local sandstone "thick". The map interpretation shows it as an isolated pod or delta lobe nearly cut off from the thicker sandstone body to the west (figure 3, Map B).

Log-derived sandstone porosity in the reference well ranges from eight to about 14 percent. Calculated water saturations average 50%. These fall within the range for producing reservoirs in the Pecos Slope Abo, West field. The microresistivity log suggests that permeability in these sandstones is generally low (figure 2, bottom of log), and for this reason this poses the biggest risk to the success of the proposed reentry and completion attempt.

The map of the Prospect and Unit Boundary (figure 3, Map C) is a summary representation of our basis for the unit area.

George R. Reddy
Roswell, New Mexico


DE BACA CO.
CHAVES CO.
T4S
T5S
T10S
R20E
R21E
R25E
R29E
R30E
CAMP STATE UNIT
SERRANO FAULT
BORDER FAULT
SIX-MILE FAULT
Y-O FAULT
PECOS SLOPE ABO, WEST
PECOS SLOPE ABO GAS FIELD
PECOS SLOPE ABO, SOUTH
CHAVES CO.
ROSWELL
ARTESIA
70
SURFACE STRUCTURAL FEATURES
FAULT
ANTICLINE
CAMP STATE UNIT
INDEX MAP
CHAVES COUNTY, NEW MEXICO
FIGURE 1