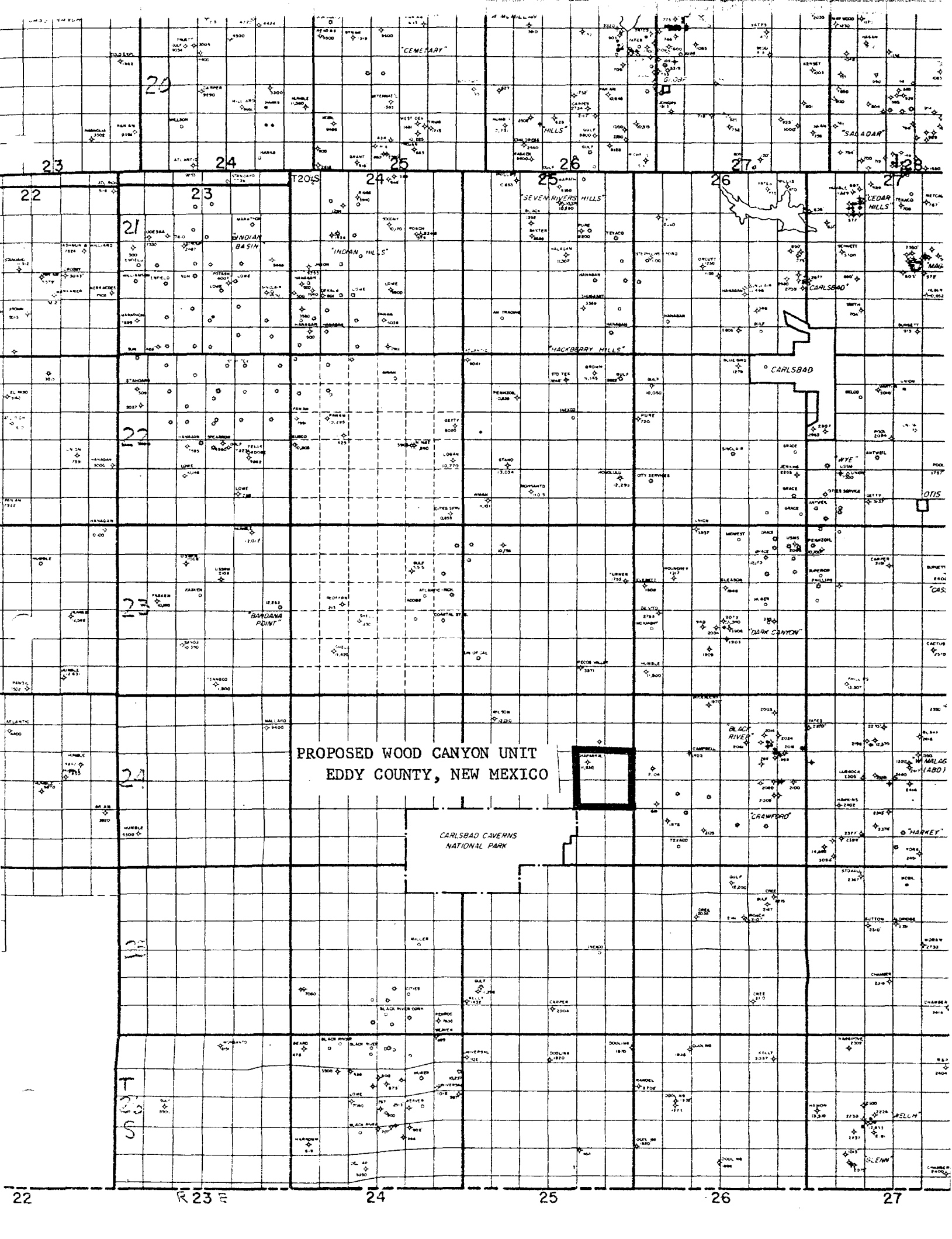
PROPOSED WOOD CANYON UNIT
T 24 S R 25 E
EDDY COUNTY, NEW MEXICO

PETROLEUM RESERVE CORP.
TULSA, OKLA.

OCC

BEFORE EXAMINER NUTTER
OIL CONSERVATION COMMISSION
Appl. Exhibit No. 1
Case No. 5159


PROPOSED WOOD CANYON UNIT
EDDY COUNTY, NEW MEXICO
CARLSBAD CAVERNS NATIONAL PARK
CARLSBAD
"INDIAN BASIN"
"INDIAN HILLS"
"SEVEN RIVERS HILLS"
"HACKBERRY HILLS"
"CEDAR HILLS"
"SALADAR"
"CEMETARY"
"HILLS"
"BANDANA POINT"
"DARK CANYON"
"BLACK RIVER"
"CRAWFORD"
"HARKEY"
"GLENN"
"WELCH"
"WYE"
"OTIS"
T20S
T21S
T22S
R23E
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PETROLEUM RESERVE CORPORATION

(918) 584-3571

1010 FIRST NATIONAL BANK BUILDING ■ TULSA, OKLAHOMA 74103

November 14, 1973

GEOLOGIC REPORT
PROPOSED WOOD CANYON UNIT
EDDY COUNTY, NEW MEXICO

PURPOSE:

The purpose of this report is to show the geologic reason for forming a four section Federal unit to drill a 11,800 foot Lower Morrow Wildcat test in Section 24, Township 24 South, Range 25 East, Eddy County, New Mexico.

ENCLOSURES:

1. Structure Map on Lower Morrow.
2. Stratigraphic cross section of Lower Morrow.
3. Isoporosity Map of Morrow "B" Sand.
4. Isoporosity Map of Morrow "C" Sand.
5. Land Ownership Map of unit area.

DISCUSSION (GENERAL)

The Wood Canyon Unit prospect is located about fourteen miles southwest of Carlsbad and immediately northeast of White City, Eddy County, New Mexico. The Unit area covers four sections (2560 acres)

described as follows: All of Sections 13, 14, 23, and 24; Township 24 South, Range 25 East. The area is semi-arid and the topography is hilly and cut by steep sided arroyos that have as much as 400 Feet of relief.

The Carlsbad Caverns are located about five miles Southwest of the Unit well location. The Caverns are a result of solution in the Capitan Limestone formation which is a fossil barrier reef. The reef consists of a long narrow massive limestone band that stretches across Southeastern New Mexico and is at or near the surface in the local area.

The Unit area is accessible by Highway U. S. 62 from the South and East. The proposed well location in the SW/4 NE/4 of Section 24 is at an elevation of about 3850 feet and within 3/4 mile of Highway 62.

DISCUSSION (GEOLOGICAL)

The Wood Unit is located on the Northwest flank of the Delaware Basin and is underlain by about 14,000 feet of Permian, Pennsylvanian, Mississippian, Devonian, Silurian and Ordovician sediments. The subject wildcat well will penetrate and test all of the Permian and Pennsylvanian sediments at a depth of about 11,800 feet.

The basis for the subject unit outline and the drilling of a 11,800' Lower Morrow test is a recent completion by Texaco, in Section 30, T 24 S, R 26 E of a Lower Morrow gas well. This well, the Texaco #1 J. M. Gates Federal NCT-1, has a possible 28' of gross Lower Morrow gas pay and was completed in the Morrow "B" Sand from perforations 11,335-11,350 for 2340 MCFGPD. (See Cross Section.)

"B" Sand production in the Texaco well correlates to "B" Sand development in the Chaparral #1 Juniper Canyon Unit (Sec. 14-T 24 S - R 25 E) which on DST from 11,440-11,665' flowed gas at a rate of 190 MCF/day with a final SIP of 5313 P.S.I.G. A calculated estimated damage ratio of 3.26 indicated well bore damage was present and the Juniper Canyon Well may have flowed up to 600 MCFG/D. The Morrow "B" in this well indicated 8' of microlog porosity from 20' of gross clean sand. The Morrow "C" Sand was included in the Juniper Canyon's test interval and probably contributed to the gas flow on DST. The "C" Sand is also very prospective in the Unit area and logs indicate 14-18' of effective porosity in the "C" interval. The Unit outline is based on the 5' isoporosity contour of the "B" and "C" Sands.

Since the Juniper Canyon Unit well was drilled, operators in the Carlsbad-White City area have had numerous successful completions in the Morrow by fracing wells which had DST recoveries and pressures similar to the Juniper Canyon. It is our opinion that the Juniper Canyon Well should have had a completion attempt made in the Morrow because of the DST flow and pressures. Logs indicate a possible additional 9' of microlog porosity in other Morrow Sands below the "B" and "C".

Another well, the Gulf Federal-Lee "J" No. 1 (18 - T 24 S - R 26 E), located about one mile northeast of the proposed location also indicated possible productive Morrow. A DST from 11,757-11,807 flowed gas at a rate of 500 MCF/D and had a 30 minute FSIP of 3670 P.S.I.G. Again recent completion methods would probably have made

a commercial gas producer from this dry hole. The Morrow "B" Sand was not developed; however. The Morrow "C" Sand has a possible 6' of porosity and most likely produced the gas on DST.

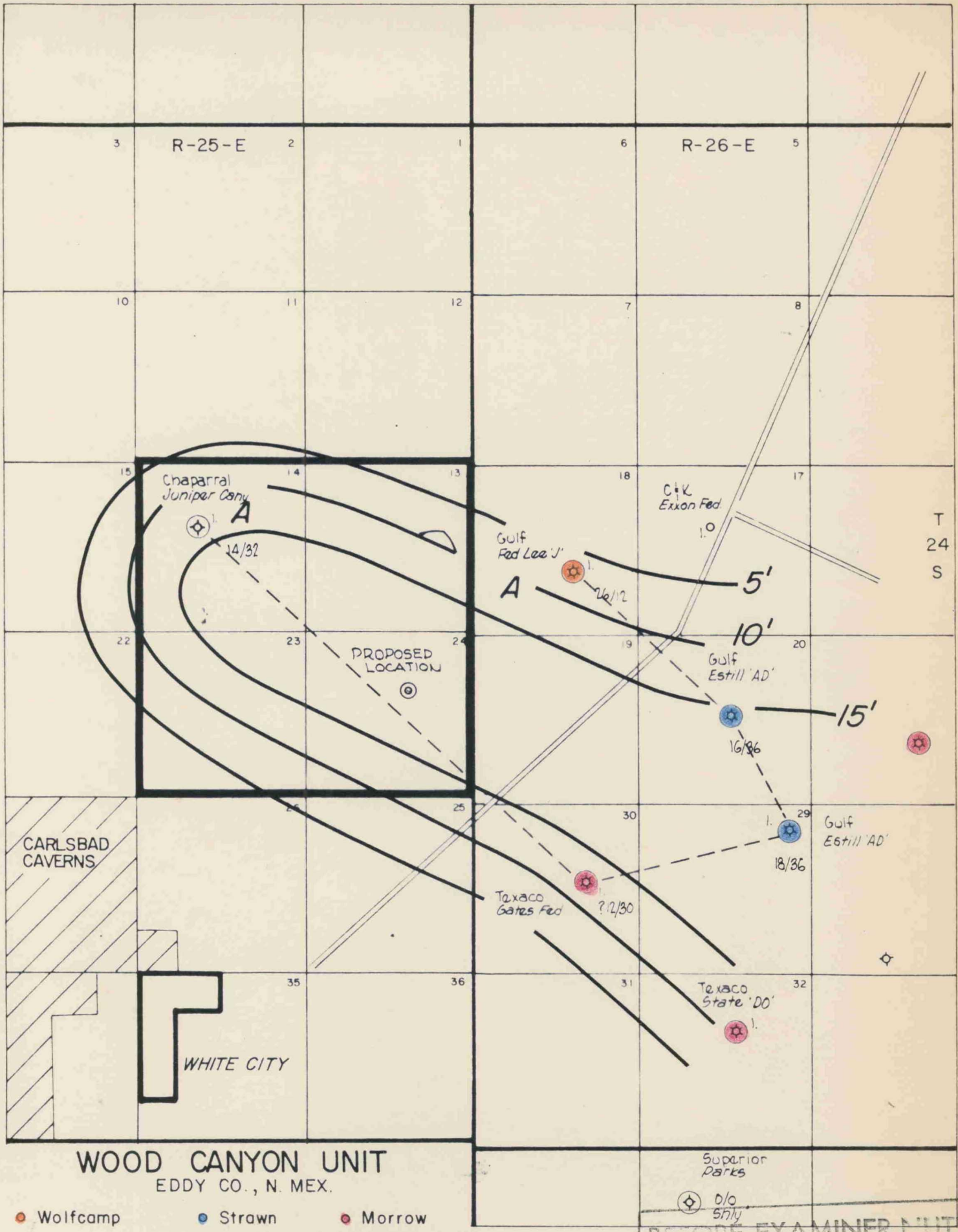
Structurally, the proposed unit location should run about 200' high to the Gulf Federal-Lee "J" and approximately 200' low to the Juniper Canyon well. The location is west of the structural low on the west edge of the White City structure. This low is the basis for the East boundary of the Unit outline. Regional structural mapping indicates an East plunging nose may be present in the Wood Canyon area. It has been demonstrated in the Carlsbad-White City area that the best sand development usually occurs in association with structures. If the nosing is present as speculated one can expect good sand development in the Wood Canyon Unit area. The Lower Morrow Structure Map is drawn on the point at 11418 in the Juniper Canyon Well and is the line of datum for the Cross Section.

Other potential pays besides the Morrow in the Unit area are the Strawn and Wolfcamp formations. The Strawn is a prolific producer in two wells at White City, the Gulf Estill 1-AD (29-24S-26E) and the Gulf Estill 2-AD (29-24S-26E). Predictability of the Strawn is difficult and although it is unlikely a porous carbonate buildup occurs within the unit area the possibility is present.

The Wolfcamp has a very real possibility of production in the Unit area. Chaparral made a completion attempt in the Wolfcamp after the zone blew out during drilling. Perforations from 9727-9736 and 9784-9792 flowed gas averaging 475 MCFG/D and 15.6 bbls

of condensate with a maximum reservoir pressure of 5323 P.S.I.G. During completion operations a packer was lost and because of this mechanical problem the well was plugged and abandoned. The Gulf Federal-Lee "J" also flowed gas from this zone at a rate of 483 MCFPD.

In summary, the Wood Canyon Unit has potential of producing from three formations. The Lower Morrow presents excellent possibilities for production based upon the good shows and pressures on drill stem tests in nearby wells. The Morrow "B" and "C" Isoporosity Maps also indicate productive sands may be present in the unit outline. The Strawn, although remote, could possibly develop porosity in the area and be productive. Wolfcamp potential for gas production is good with completions in two wells in the immediate area. Additional pays could develop in the Canyon and Atoka. These two formations are productive in the S. Carlsbad area and have had shows in the White City area. In view of this, the four sections outlined appear to be properly located by geologic reasons that give cause and justification for the formation of the Wood Canyon Unit as proposed.



WOOD CANYON UNIT

EDDY CO., N. MEX.

'C' SAND ISOPOROSITY

CI = 5'

14 — POROSITY FEET

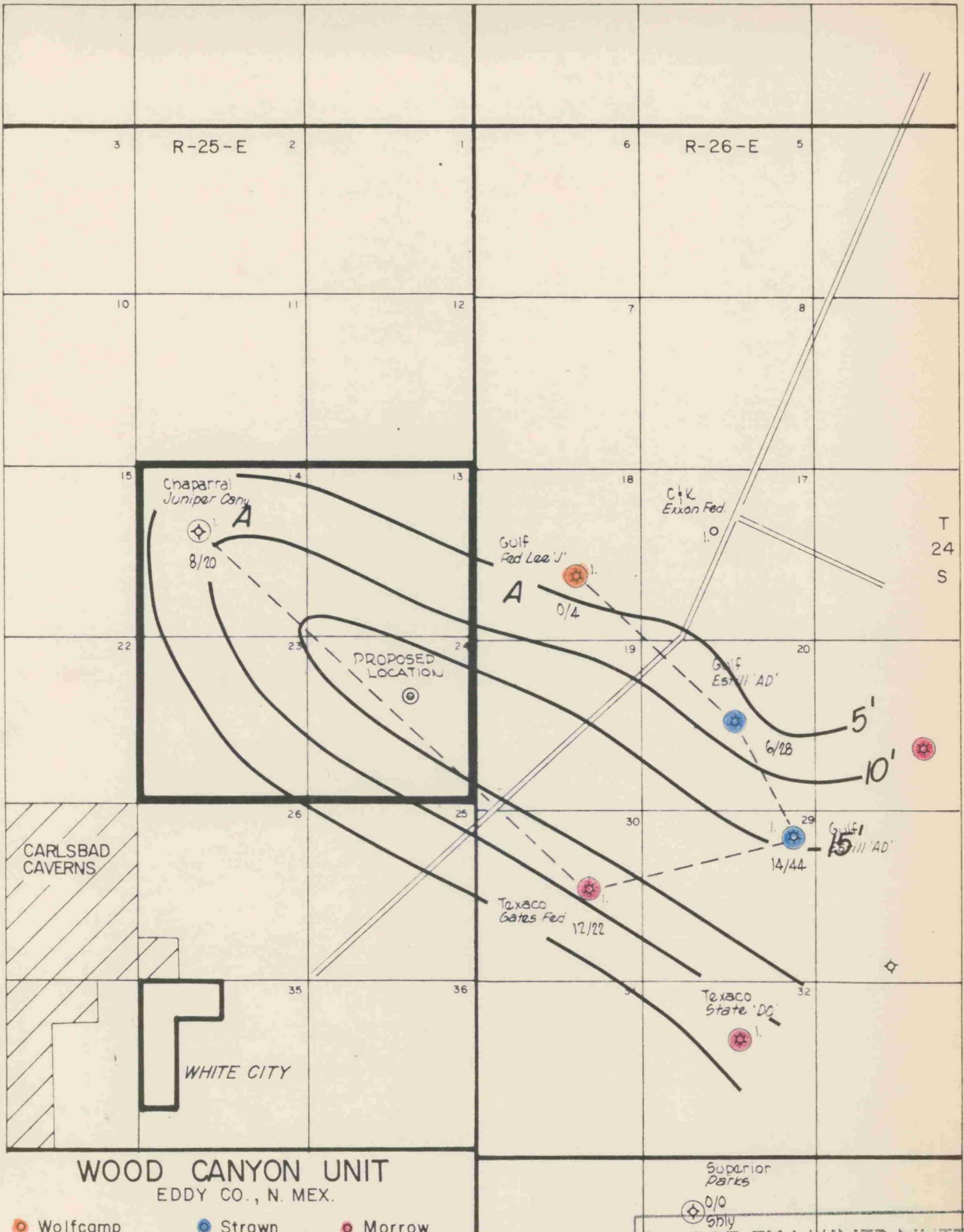
32 — GROSS CLEAN SD

BEFORE EXAMINER NUTTER

OIL CONSERVATION COMMISSION

EXHIBIT NO. 2

5159



WOOD CANYON UNIT

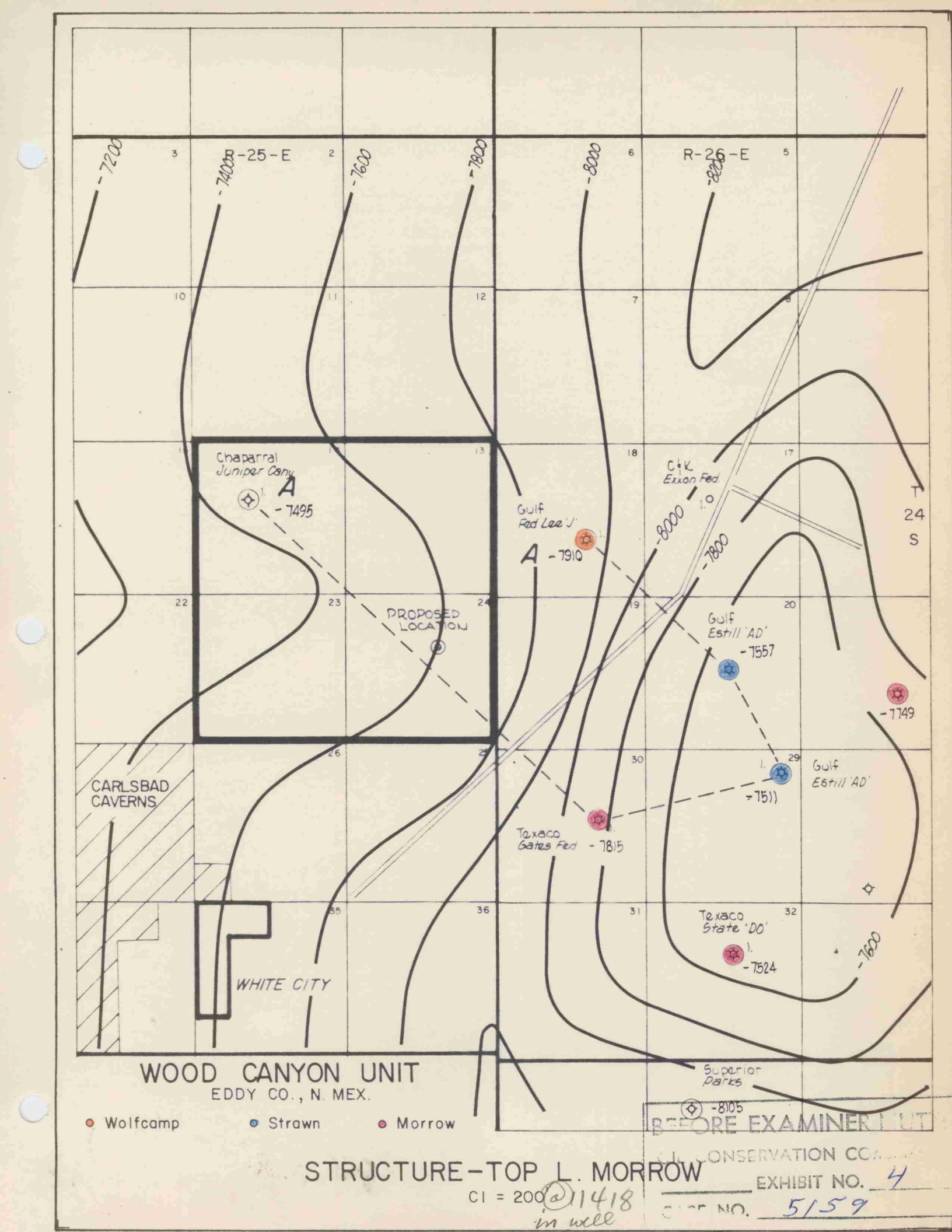
EDDY CO., N. MEX.

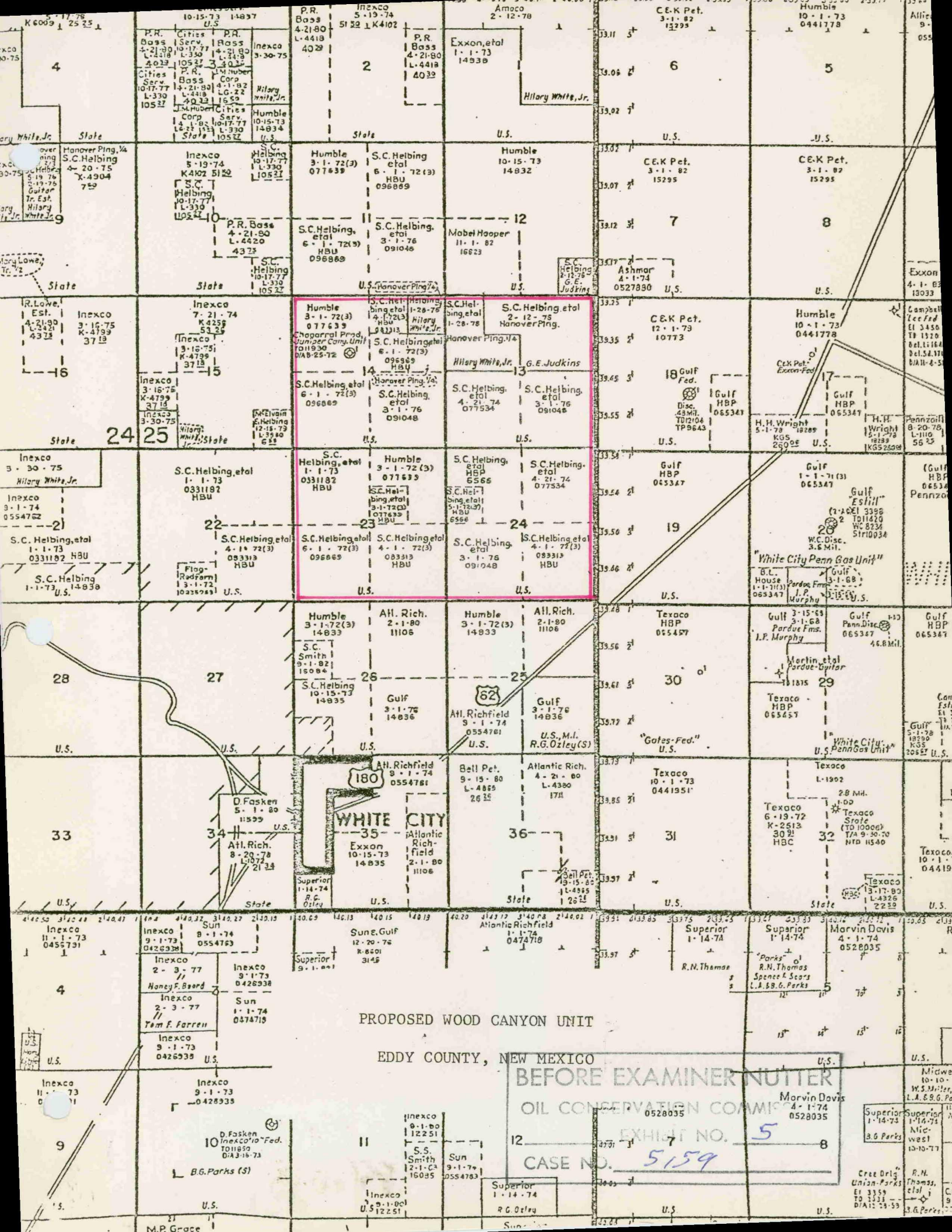
Wolfcamp Strawn Morrow

'B' SAND ISOPOROSITY

CI = 5'

BEFORE EXAMINER NUTTER
OIL CONSERVATION COMMISSION
EXHIBIT NO. 3
NO. 5159


R-25-E
R-26-E
T 24 S
-7200
-7400
-7600
-7800
-8000
-8200
Chaparral Juniper Cany. A -7495
Gulf Fed Lee 'J' A -7910
C-K Exxon Fed 1-O
Gulf Estill 'AD' -7557
-7749
Gulf Estill 'AD' -7511
Texaco Gates Fed -7815
Texaco State 'DO' -7524
Superior Parks -8105
PROPOSED LOCATION
CARLSBAD CAVERNS
WHITE CITY
WOOD CANYON UNIT
EDDY CO., N. MEX.
Wolfcamp
Strawn
Morrow
STRUCTURE-TOP L. MORROW
CI = 200
BEFORE EXAMINER
OIL CONSERVATION COMM.
EXHIBIT NO. 4
CASE NO. 5159


PROPOSED WOOD CANYON UNIT
EDDY COUNTY, NEW MEXICO
WHITE CITY
BEFORE EXAMINER NUTTER
OIL CONSERVATION COMMISSION
EXHIBIT NO. 5
CASE NO. 5159