APPLICATION
FOR
DESIGNATION OF UNITIZED AREA
LITTLE EDDY SEISMOGRAPH STRUCTURE
EDDY AND LEA COUNTIES
NEW MEXICO

by

SID W. RICHARDSON
AND
PERRY R. BASS

RICHARDSON AND BASS
FORT WORTH, TEXAS

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APPLICATION FOR THE DESIGNATION OF A

UNIT AREA (UNPROVEN)

LITTLE EDDY SEISMOGRAPH STRUCTURE

EDDY AND LEA COUNTIES, NEW MEXICO

An application for the designation of a unit area subject to logical development under a unit or cooperative agreement, as outlined under Unit Plan Regulations, is hereby respectfully presented by the partnership of Sid W. Richardson and Perry R. Bass in the above designated area. The area centers approximately thirty miles east and ten miles north of the town of Carlsbad, Eddy County, New Mexico, which is more particularly described as follows, to wit:

New Mexico Principal Meridian
Township 19 South, Range 32 East

Sec. 25: S-1/2
Sec. 34: SE-1/4
Secs. 35 and 36: All

Township 19 South, Range 33 East

Secs. 29, 30, 31, 32: All

Township 20 South, Range 32 East

Secs. 1, 2, 3, 4, 9, 10, 11, 12, 13, 14, 15, 16, 22, 23, 24, 25, 26: All
Sec. 27: N-1/2, N-1/2 of S-1/2
Secs. 35 and 36: All

Township 20 South, Range 33 East

Secs. 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, 31, 32: All

Township 21 South, Range 31 East

Secs. 1 and 2: All
Sec. 3: S-1/2 (320 Acs.)
Secs. 10, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 27: All
Sec. 34: E-1/2
Secs. 35 and 36: All

Township 21 South, Range 32 East

Sec. 3: Lots 1 to 16, inclusive; SW-1/4
Secs. 4, 5, 6, 7, 8, 9: All
Sec. 10: W-1/2
Sec. 15: W-1/2
Secs. 16, 17, 18, 19, 20, 21, 22, 27, 28, 29, 30, 31, 32, 33, 34: All

Township 22 South, Range 31 East

Sec. 1: N-1/2
Sec. 2: N-1/2

Township 22 South, Range 32 East

Sec. 3: N-1/2
Sec. 4: N-1/2
Sec. 5: N-1/2
Sec. 6: N-1/2

Although there has been some slight indication of structure in the area under consideration, the presence of an important deep seated structure has been obscured by the sedimentary dips and conditions of deposition associated with the Upper Permian reef building and by the location of the reef front with respect to the seismograph structure. As no drilling of sufficient depth has been done in the immediate area to indicate the presence of structure below the Delaware formation, we can only speculate as to the shallowest stratigraphic sequence which has been influenced by the uplift.

A reflection seismograph map, designated as Map No. 1 in this report, is attached. This map shows a large faulted

anticline, having a minimum closure of 500 to 1,000 feet in each individual fault segment and covering an area of some 54,000 acres. In each instance the minus values and contours indicate the minimum dips that could be taken from the seismograph profiles. We have reasons to believe that the application of logical techniques by experienced personnel, together with the presence of dips of magnitudes several times the margin of error, lends an accuracy to this seismograph mapping unusual in a difficult shooting area.

A fee ownership map, designated as Map No. 2 in this report, shows the outline of the proposed unit area, the surveyed acreage in each sectional subdivision as recorded in the United States Department of Interior Land Management Division. The purpose in presenting this map is to show accurately the number of acres in the proposed unit and the percentage of Federal, state and patented land involved.

Accompanying this report is a columnar section, designated Plate I, showing what is believed to be the maximum stratigraphic section likely to be present on some portion of this anticline. This section has been compiled with the data from an actual well sample examination of the cuttings obtained from the Richardson and Bass No. 1 Federal-Cobb (Big Eddy Unit), located in Section 23, Township 20 South, Range 31 East, approximately seven miles west of the crest of the anticline as mapped by seismograph. In view of the magnitude of the uplift in the Little Eddy anticline area and taking into consideration the thinning of the stratigraphic section in other known and proven

areas of similar uplift, we anticipate considerable thinning, even truncation, of some segments of the formations below the top of the Lower Permian. It is known from several case histories that the greatest amount of convergence and divergence occur in the Lower Permian and throughout the Pennsylvanian formations. We anticipate considerable convergence of the Lower Permian formation over this structure with possibilities of truncation in the Pre-Permian beds. Plate II has been added to this report in support of the above assumption. This cross section is in reality a portion of the Central Basin Platform showing the deformation of Southeastern Lea County, New Mexico, a reprint from Plate I, Bulletin 23, New Mexico State Bureau of Mines and Mineral Resources. Even though there is a definite possibility of encountering shallow granite and a resulting abbreviated sedimentary section similar to that illustrated by Plate II, we have tabulated the sedimentary section below. We believe this to be the one most likely to be encountered in an area void of shallow granite.

Top Rustler Anhydrite	650'
Base Sale	2300'
Top Tansil Dolomite	2350'
Top Delaware Sand	3900'
Top Bone Spring	7500'
Top Wolfcamp	10700'
Top Pennsylvanian	11900'
Top Mississippian lime	13700'
Top Devonian	14500'

Due to the lack of reliable velocity data in the area, it is hazardous to estimate the depth or age of formations that are being mapped seismically. However, we have prepared a north - south schematic cross section, designated

as Plate III, which shows the dips as indicated by seismograph on the Pre-Permian formations encountered in our Richardson and Bass No. 1 Federal-Cobb test shown in Plate I of this report.

We propose to allocate our drilling under the following conditions. It is possible, although not probable, that a full sedimentary section as found in the Richardson and Bass No. 1 Federal-Cobb could be found at the apex of the Little Eddy structure. Due to the faulted nature of this structure, we believe it would require two test wells to a depth of 14,500 feet, or Devonian, to adequately test the faulting. However, in the event that these two wells on the apex of the structure are not in beds of Devonian age at 14,500 feet, the presence of important structure from our seismograph interpretation, within economic drilling limits, would be remote; particularly if no shows of oil or gas were encountered at shallower depths; and the feasibility of further drilling would be questionable. On the other hand, should these test wells near the apex of the structure show that known reservoir beds are not present due to the intrusion of granite, then one or more test wells located on the flank of the seismograph structure will be considered to test for production in stratigraphic traps due to truncation or thinning of the beds. The depth to which these additional or flanking tests would be drilled is dependent upon the depth of the first major unconformity, the penetration of which would disclose the greatest amount of deformation. It is anticipated that this point would be Pre-Permian in age.

In conclusion, we summarize the pertinent facts supporting this application for unitization as follows: First, it is evident that there has been presented sufficient data to outline the presence of deep seated structure; Second, that in the event of unitization, we would drill or cause to be drilled two test wells to a depth of 14,500 feet, or water in the Devonian formation, provided commercial production, granite or an impenetrable formation is not encountered at a shallower depth; and, Third, that should these test wells on the top of the structure prove up shallow granite, any possible resultant stratigraphic reservoirs which were thought to be present would require further exploration.

Respectfully submitted,

PARTNERSHIP OF RICHARDSON & BASS

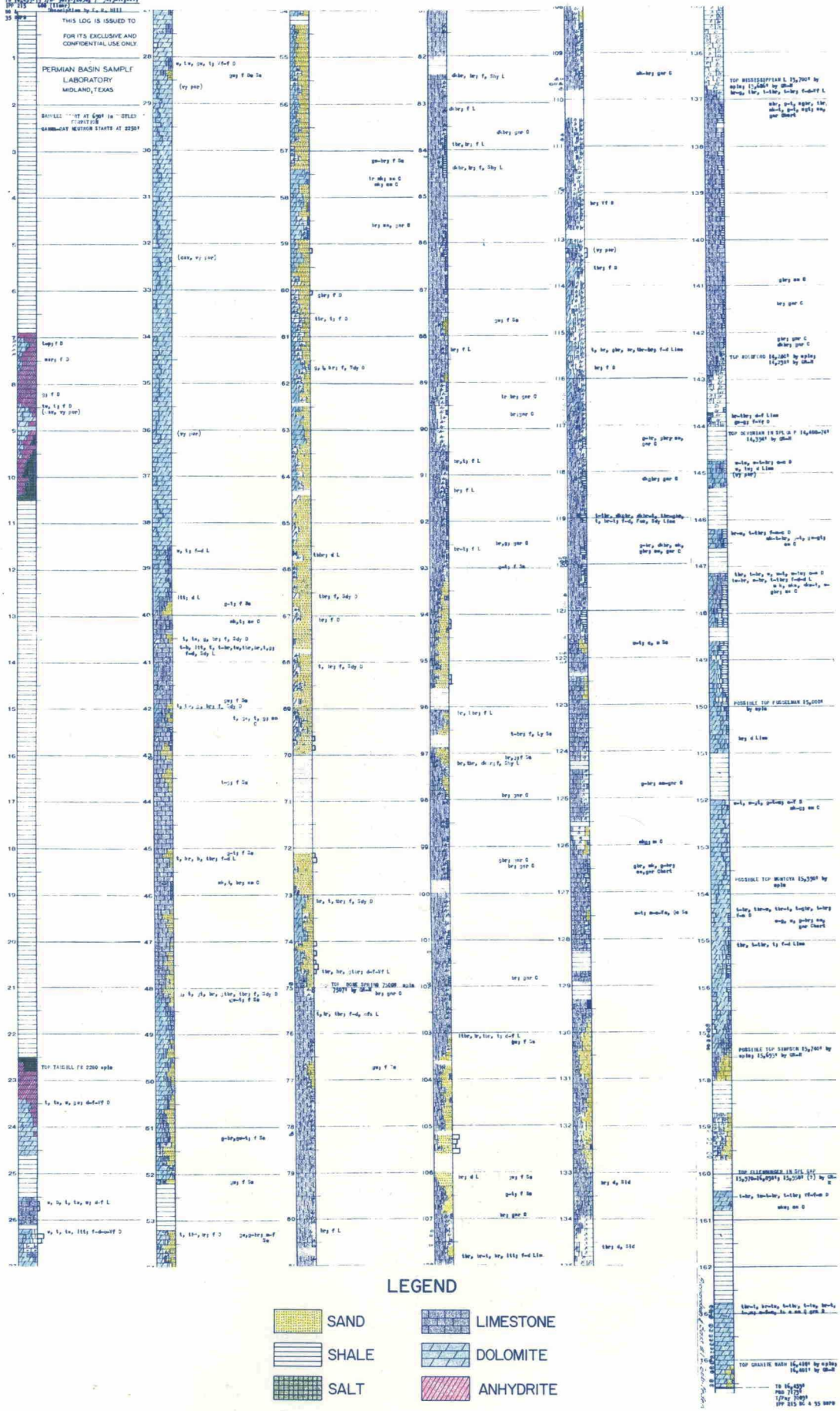
By _____
PERRY R. BASS, PARTNER

Fort Worth, Texas
August 1, 1956

TYPE COLUMNAR SECTION

SHOWING SECTION ANTICIPATED NEAR LITTLE EDDY STRUCTURE

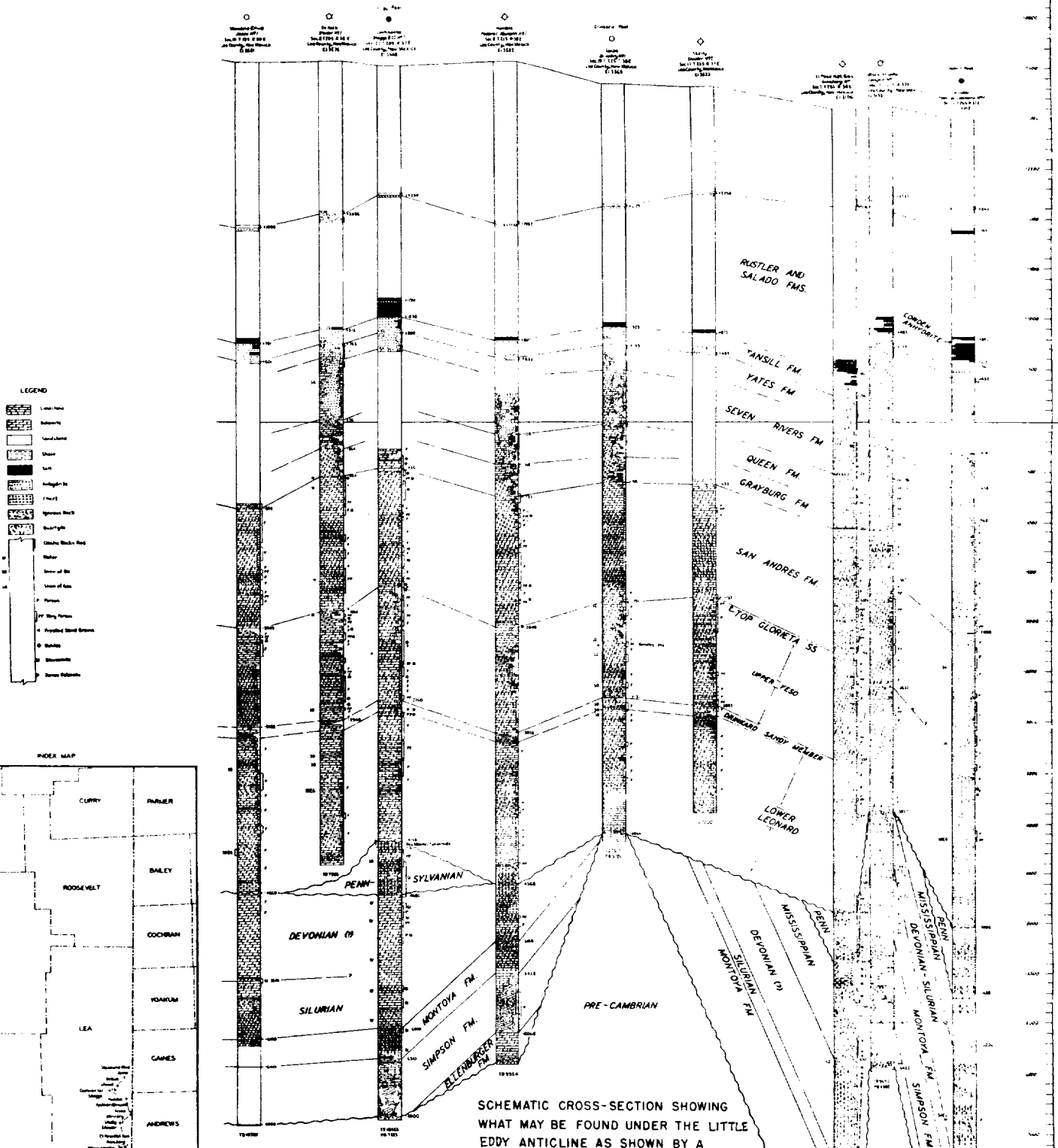
PLATE NO. 1



LEGEND

SAND
SHALE
SALT
LIMESTONE
DOLOMITE
ANHYDRITE

PLATE NO. 1



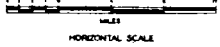
LEGEND

INDEX MAP

SCHEMATIC CROSS-SECTION SHOWING WHAT MAY BE FOUND UNDER THE LITTLE EDDY ANTICLINE AS SHOWN BY A PORTION OF PLATE I, BULLETIN 23, N.M. STATE BUREAU OF MINES AND MINERAL RESOURCES.

PLATE I

CROSS SECTION
FROM SOUTHERN ROOSEVELT COUNTY
TO SOUTHEAST CORNER OF LEA COUNTY



SOUTH

NORTH

DELAWARE MOUNTAIN GROUP

BONESPRING

WOLFCAMP

PENNSYLVANIAN

MISSISSIPPIAN

DEVONIAN

PENN.

MISS.

DEV.

8000

9000

10000

11000

12000

13000

14000

15000

16000

Feet 1500 1000 500 0

0 1 2 3 Miles

SCALE

PLATE NO. III

LITTLE EDDY STRUCTURE

NORTH-SOUTH SCHEMATIC CROSS SECTION

DIPS ON PRE-PENNSYLVANIAN HORIZONS
AS INDICATED BY SEISMOGRAPH SURVEY