APPLICATION FOR THE DESIGNATION OF A UNIT AREA (UNPROVEN) JAMES RANCH SEISMOGRAPH STRUCTURE EDDY COUNTY, 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 is more particularly described as centering 21 miles east of the town of Carlsbad, Eddy County, New Mexico, and falling in Townships 22 and 23 South, Ranges 30 and 31 East.

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 beds in this part of the Delaware Basin. As no drilling of sufficient depth has been done in the 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 anticline having a minimum closure of 700 feet and covering an area of some 20,000 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 the seismograph mapping unusual in a difficult shooting area. The proposed unit area is shown enclosed by the orange and blue lines.

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 section, and 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 there 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 Humble Oil and Refining Company's No. 1 Federal-Wiggs, Section 31, Township 24 South, Range 27 East, Eddy County, New Mexico, and located 24 miles southwest of the crest of the anticline as mapped by seismograph. In view of the magnitude of the uplift in the James Ranch 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 forma-

tions below the top of the Lower Permian. It can be shown from several case histories that the greatest amounts of convergence and divergence occur in the Lower Permian and throughout the Pennsylvanian formations. We anticipate considerable convergence of the Pennsylvanian and Lower Permian formations over this structure with possibilities of truncation in the Pre-Permian beds. The apparent large range of possibilities with regard to the thickness of sediments to be penetrated leads us to offer a maximum and a minimum stratigraphic section to be penetrated. The maximum thickness of sedimentary beds penetrated in a flank well would be similar to that encountered in the Humble well mentioned above. A tabulation of the formations and the depths at which they would be encountered follows:

Formation	Depth	Thickness
Base Salt	3130'	——
Top Delaware Mountain	3500'	3600'
Top Bone Spring (Leonard)	7100'	2750'
Top Wolfcamp	9850'	670'
Top Pennsylvanian	10520'	1680'
Top Mississippian	12200'	600'
Top Devonian	12800'	900'
Top Montoya	13700'	200'
Top Simpson	13900'	300'
Top Ellenburger	14200'	——

Deep drilling in the West Texas Permian Basin area has disclosed that certain Pre-Permian beds are more likely to be missing on the crest of major uplifts than are others. The following tabulation shows the age of beds most likely to be present on top of the structure without truncation, in the order of the highest probability of their presence:

1. Ellenburger (Ordovician)
2. Simpson (Ordovician)
3. Silure-Devonian
4. Pennsylvanian
5. Mississippian

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 west - east schematic cross section, designated as Plate II, which shows the dips as indicated by seismograph on the Pre-Permian formations encountered (with the exception of the Pre-Cambrian granite) in the Humble Oil and Refining Company's No. 1 Federal-Higgs test referred to above. We consider the possibility of Lower Permian beds resting on Pre-Cambrian granite on top of the structure to be good and it can not be ruled out by the data available. If the Pre-Permian beds are present on top of the Pre-Cambrian granite uplift, it is highly probable that a gas cap of considerable proportions will be present as illustrated in the Cross Section of the Keystone Field, Winkler County, Texas, shown here as Plate III. To complete the case history of the Keystone Field we enclose a subsurface structural map, Plate IV, contoured on the top of the Ellenburger dolomite. Plate V, for the purpose of this report, is a schematic cross section showing Lower Permian resting on Pre-Cambrian granite. The 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 V, we have tabulated the sedimentary section shown below. We believe this to be the one most likely to be encountered in a productive area outside of a gas cap. In the event of shallow granite, most of the exploratory drilling for flank production would take place in a flank area having an average sedimentary section as indicated below.

Minimum Section

Formation	Depth	Thickness
Base Salt	3130'	----
Top Delaware	3300'	3600'
Top Bone Springs (Leonard)	7100'	2750'
Top Devonian	9850'	900'
Top Montoya	10750'	200'
Top Simpson	10950'	300'
Top Ellenburger	11250'	----

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 Humble Oil and Refining Company's No. 1 Federal-Wiggs dry hole could be found at the apex of the James Ranch Structure. In the event that a well on the apex of the structure is not in beds of Devonian Age at 13,000 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

a test well 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, thinning of the beds or faulting. 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 approaching a large anticline in size; Second, that in the event of unitization, we would drill a test well to a depth of 13,000 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 a test well 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 AND BASS

By_____

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Fort Worth, Texas
November 4, 1952