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GEOLOGICAL EXPLANATION OF THE PROPOSED PAN AM PARDUE "ALZ" FED. COM. #1, EDDY COUNTY, NEW MEXICO

The proposed Pan Am Pardue "ALZ" Fed. Com. #1 is an unorthodox location 1140' FSL & 1350' FWL of section 27 of Township 21 South - Range 24 East. The test location is on the east edge of the Indian Basin Upper Penn Pool. The test well will be a re-entry of the Pan American Pardue Gas Unit #1 which originally had a total depth in the Upper Penn Formation at 8038 feet. Yates Petroleum plans to re-enter the well and deepen it to a depth of 10,350 feet to test the hydrocarbon potential of the Upper Penn (Canyon) and the Morrow Formations.

The primary objective of the well is to test the Morrow sands, these sands are thought to be fluvial-deltaic deposits. The other objective is the dolomite of the Upper Penn (Canyon). The dolomite reservoir, which is the east edge of the Indian Basin Upper Penn Pool, consists of a lens of porous and permeable dolomite pinching out into tight limestone.

Cross-section A-A' is a north-south stratigraphic cross-section with the top section showing the relationship of the Canyon dolomite to the Canyon limestone and the bottom section showing the Morrow sands. The Canyon dolomite is colored blue and the limestone is uncolored. The dolomite thickens from north to south proceeding into section 27. Both wells present in section 27, the Pardue #1 and the Anadarko Pardue Farms #1, recovered oil during drill stem tests in the Canyon dolomite. The Morrow sands are highlighted in yellow in the bottom section, with drill stem tested and perforated intervals marked. The Ralph Lowe Staple #1 should have been completed in the Morrow, the sand from 9566'-9609' produced a good amount of gas on a drill stem test. The Anadarko Pardue Farms #1 and the Santa Fe Energy Righthand Canyon Fed. "34" #1 have a "wet" sand in the Morrow Clastics "A" Section. The Santa Fe Energy well produced gas along with water from the sand. A Morrow completion was not attempted in the Anadarko well, because the sand calculates "wet".

The Canyon structure map, with the top of the Canyon carbonate as a datum, shows structural dip to the east. The proposed Yates re-entry and the Anadarko Pardue Farms #1 have shows of oil produced from drill stem tests. The Canyon dolomite, in both wells, should be structurally high enough to produce oil.

The isolith map represents the Canyon dolomite and shows its limits and thickness. Values with a plus sign (+) beside them indicate that the dolomite was not fully penetrated and the true thickness is unknown. Triangles around well symbols indicate oil shows in the dolomite. Most locations in section 27 should have suffient thickness of dolomite for potential oil production.

The Morrow structure map, with the top of the Lower Morrow as a datum, shows a structural dip to the east. Both the Yates re-entry and the Santa Fe Energy location should be updip of the Anadarko and Righthand Canyon wells which had a "wet" Morrow sand. The two proposed locations are structurally similar.

The Morrow isolith map represents sands of the Morrow Clastics section and shows the limits of sand deposition. The isolith is a "clean sand" map with a gamma ray cutoff of 50 API units or less. This map shows a sand thick trending through the area of the proposed locations. The map shows that wells located within the 50 foot contour interval have a better chance for encountering reservoir quality sands. The Staple #1 (section 22) should have been a Morrow completion. The Anadarko Pardue Farms #1 (N/2 section 27) had one quality sand that was "wet", but the other sands had very low porosity values. The Righthand Canyon #1 (NW/4 section 34) had two sands, one "wet" and the other tight, but both have suffient thickness. The Yates re-entry should have 55 feet of sand present giving it a better chance of encountering quality sands as opposed to the proposed Santa Fe Energy location which will have 45 feet of sand.

The Santa Fe Energy location exhibit shows the different Santa Fe Energy locations through the course of negotiations. The source of this information was verbal communication from the Santa Fe Energy geologist (Gene Davis) through phone conversations during the week of October 26 through 30, 1992. The first location was 660' FSL & 1980' FWL of section 27, an orthodox location for a lay-down 320 acre Morrow spacing unit. This location was then moved because of topography problems to 1300' FSL & 1350' FWL, two hundred feet from the proposed Yates re-entry. During a later phone conversation with the Santa Fe Energy geologist, he stated that the location was then moved to 500' FSL & 660' FWL because he had remapped the area. It appears that Santa Fe Energy is geologically comfortable with any location in the S/2 of the SW/4 of section 27.