UTE INDIANS "A" #26
GEOLOGIC/GEOPHYSICAL SUMMARY

PARADOX FORMATION

The Ute Indians "A" #26 is a proposed 8800 ft. Pennsylvanian Paradox Formation test to be located at a surface location of 570' FSL and 1045' FEL of Section 2-T31N-R14W, San Juan County, New Mexico. The proposed bottom hole location is approximately 850' FSL and 1450' FEL of Section 2. There is currently one active Paradox well in Section 2, the Ute Indian "A' #7 drilled by Pan American in 1955. Cross Timbers intends to shut-in the existing well upon successful completion of the proposed well in the Paradox Formation.

The Paradox Formation at Ute Dome is approximately 700 ft. thick and composed mostly of algal and fossiliferous carbonates deposited in a shallow water, shelf environment. The Paradox has been subdivided into 5 members, which are, in ascending order, the Alkali Gulch, Barker Creek, Akah, Desert Creek and Ismay. All of these members are productive at Ute Dome. It is implied by Neil Whitehead (1993) that there is no natural vertical communication between the various members of the Paradox, as each appear to have their own unique gas/water contact.

The Ute Dome feature is a structural high formed at the crest of an asymmetrical, northeast plunging anticline. Steeper dips are found on the southern and eastern sides of the anticline, which forms the edge of the present day San Juan Basin. The attached seismic structure map on the top of the Akah Member was interpreted from a vibroseis 3-D seismic survey shot by Amoco in 1995, and reprocessed by Cross Timbers in 1998.

The Ute Indian "A" #7 well in the NW¼, Section 2 was completed in 1955 and had produced 9.58 BCFG through 1983 when the average production rate fell from an average of 600 MCFGPD to 40 MCFGPD. Several workovers were performed through the years in an attempt to get the rate back up to where it should be according to its previous decline rate, but all were unsuccessful. The well is currently averaging around 20-30 MCFGPD. It is estimated that the well lost 1.67 BCF of gas due to mechanical difficulties. In addition, it has been estimated by Cross Timbers' engineers that 1.87 BCF of unique reserves remain in Section 2 which will not be recovered by the existing well.

Geologic and engineering analysis indicate the best area for drilling a replacement well is in the SE¼ of the section for the following reasons:

1) The proposed location is on the flexure point between the relatively flat crest of the structure and the steeply dipping south flank. This flexure point should lie in the area of most intense fracturing, which is a necessary component to the productivity of these wells.

2) The Ute Mountain Gas Com "M" #1 well in Section 11 encountered a 75 ft. thick porous carbonate buildup in the basal Ismay which is not present in any offsetting wells. One depositional model suggests that this buildup would trend in a NE-SW direction, possibly into the SE¼ of Section 2.

3) Given that the existing well in Section 2 has produced over 9.6 BCFG, a replacement well should be located outside of the drainage radius of that well. The proposed location in the SE¼ satisfies that requirement.

4) In the event the Paradox is uneconomic at the proposed location, the location is situated ideally for the testing of a fault-bounded structural closure at the Dakota level.

DAKOTA FORMATION

The Ute Indians "A" #26 is designed to test the Dakota/Morrison Sandstones should the Paradox Fm. prove uneconomic. There is currently one active Dakota well in the SE¼, Section 2, the Ute Indians "A" #20. That well is producing only around 30 MCFGPD and has a cumulative production to date of 132 MMCFG.

The Ute Dome Dakota Field is located on a broad semi-circular structure on the edge of the Four Corners Platform. On the southeast side of the structure, the entire stratigraphic section dips steeply to the southeast into the San Juan Basin. The southern portion of this structure is bisected at the Dakota level by several WNW-ESE trending normal faults. Vertical displacement along the faults can range up to 250 ft. The faults commonly form four-way structural closures which trap hydrocarbons migrating upward from mature source rocks in the basin.

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The attached seismic structure map on the top of the Dakota Formation was interpreted from a vibroseis 3-D seismic survey shot by Amoco in 1995 and reprocessed by Cross Timbers in 1998. The proposed Ute Indians "A' #26 is located on the crest of a four-way structural closure bounded on the north by a down-to-the-north normal fault. The structure extends eastward into the SW corner of Section 1 where Cross Timbers is proposing to test the eastern end of the structure with the Ute Mountain Tribal "J" #6. This fault block has not been tested to date, but similar fault blocks in the area have proven productive from lower Dakota and Morrison Sandstones which are typically wet off of these localized structures. The faults act as permeability barriers, particularly in the Upper Dakota Sandstones by juxtaposing the permeable productive sandstone of the upthrown block against non-porous and impermeable Graneros shales of the downthrown block.

The placement of the proposed well is based on a combination of defining the highest structural point at the Dakota level from the seismic data and finding a topographically suitable spot where a location can be built relatively inexpensively and without unnecessary damage to the environment. In the case of the proposed Ute Indians "A" #26 well, the desired bottom-hole location fell on a topographically undrillable spot. Therefore, although the bottom hole location is at a legal distance from the unit boundary, the surface location is not.

The reason for the request for a simultaneous well dedication is due to fault separation between the proposed well and the existing Ute Indians "A" #20 which prevents reserves south of the fault from being accessed by the existing well.

Larry K. Bissett
Nov. 16, 1998

Reference: Whitehead, Neil H. III, 1993, New Mexico Bureau of Mines and Mineral Resources, Atlas of Major Rocky Mountain Gas Reservoirs, SJ-6, pp. 136-137.