

**GEOLOGICAL CONDITION FOR UNORTHODOX LOCATION
OF THE YATES PETROLEUM CORPORATION
HANLAD "AKZ" STATE #2
1225 FWL & 330 FSL
Section 13-T5S-R27E**

Case 10489: Unorthodox gas location, Chaves County, NM
June 11, 1992

Yates Petroleum Corporation respectfully requests approval for the unorthodox location of its proposed Hanlad "AKZ" State #2 to be drilled 330 feet from the south line and 1225 feet from the west line of Section 13, Township 8 South, Range 27 East, Chaves County, New Mexico. The projected total depth of approximately 6900' will penetrate Precambrian basement with the primary objective being Siluro-Ordovician dolomite. The S/2 of said Section 13 is to be dedicated to said well forming a standard 320 acre gas spacing and proration unit.

The necessity for this unorthodox location is based upon geological conditions.

Introduction: Substantial geological testimony and numerous geological interpretations have already been presented to the commission as evidence in the original unorthodox application for the BHP Puffer State #1, the discovery gas well of the subject undesignated gas pool, and in the application of Collins & Ware for an unorthodox gas location in Case 10344. Many elements of the different interpretations are very compatible and other points have been very contradictory. It is believed that the source of the contradiction is the over simplification of the tectonic style that led to the entrapment of hydrocarbons in the Siluro-Ordovician in this area, as well as, other similar fields in Chaves County. Data available for interpretation consist of seismic data, from BHP, Collins & Ware, Stevens Oil, joint BHP-Yates seismic data and proprietary seismic data solely owned by Yates Petroleum. All extant well data was utilized also to provide a fully integrated geological-geophysical interpretation.

Exhibit #4 is a structure map constructed on the Pre-Penn unconformity. The contour interval is 50 ft. Black contours illustrate the top of Pre-Penn unconformity that is also the top of the Mississippian formation. Red contours are representative of or very near the top of the Siluro-Ordovician as the Mississippian is very thin (30'-40') or absent over the upthrown block due to erosion. Mississippian subsea elevations are shown in blue and Siluro-Ordovician elevations are in red. Purple circles represent seismic shot points and values in purple are subsea values derived from seismic.

The map also shows three distinctive styles of faulting, the blue indicates normal faulting, the green shows strike-slip (wrench) faulting and the red defines high angle reverse faulting. The very distinctive nature of this faulting provides the conclusive evidence of the tectonic nature that resulted in the substantial accumulation of gas reserves.

The normal faults represent the oldest active faulting in this area. Trending north-south more or less this fault represents early extensional tectonics as the proto-basin began its subsidence. Compressional forces were activated at or very near the end of Mississippian or very early Pennsylvanian. Uplift to the west in the ancestral rockies led to the folding of the beds on the upthrown side of the normal fault. As lateral compression continued movement became evident as strike-slip faults developed along ancient shear zones. The movement is dextral (right) lateral in nature. As these faults either began converging or began to step, a bulge was formed at the structural juncture where compressional forces were most intense. Eventually the stress resulted in a complete rupture and the block moved upward relative to its surroundings. As the material reached the surface and the lateral pressure was reduced, the rock in the fault zone expanded to produce a typical curved fault pattern of the upthrust. The nature of the fault is high angle reverse that flattens into the Pre-Penn unconformity. Mississippian sediments were then eroded from the upthrust. The trap is defined by the outline of the uplifted block with the Penn Clastics and Mississippian formations on the downthrown side providing the seal. It is evident that substantial gas reserves do not exist outside of this block.

Exhibit #5 is a structural map on the Wolfcamp shale that represents earliest Permian. As the pedernal uplift (ancestral rockies) pulsed positive again in earliest Permian or latest Pennsylvanian, compressional forces were initiated that re-activated movement along the wrench zone. Other similar en'echelon faults that exhibit the same relative movement became evident. These new faults tie into the original wrench faults. Note that the area of structural closure has shifted slightly west as compared to the Pre-Penn structure.

Exhibit #6 reflects the structure at the top of the San Andres formation. Post San Andres movement occurred again resulting in additional right lateral wrench faults. Again these all tie into the bounding root faults at depth. The overall structural grain has been altered to east-west, northeast, southwest as en'echelon folding is now the dominant structural feature. The area of closure has also migrated further west of the original trend.

Conclusion: It is evident that the tectonic history in this area is complicated. By using seismic data and existing well control it has been possible to form a geological interpretation that explains the accumulation of gas reserves in this pool within reasonable doubt. Yates Petroleum has sufficient reserves on

the leasehold to warrant the drilling of a well to capture and produce the reserves under the lease. It is unfortunate that the conventional governmental lease survey does not conform to the geology in this instance, and four different operators have been forced to make applications for four different unorthodox locations. The overall end result is that Yates Petroleum Corporation is compelled by the state lease form to protect the correlative rights of said lease by drilling for the reserves under the lease rather than let them be drained by an offset well or be required to pay compensatory royalties. Upon failure of the lessee to comply, the lessor, the State of New Mexico, is authorized to cancel the lease.

Therefore it is asked that the Commission grant this unorthodox location with a reasonable penalty (15-35%) that would allow them the protection of their correlative rights.