East Sand Springs Atoka-Morrow Unit
Description and Geologic Justification

Yates Petroleum Corporation is requesting the formation of the East Sand Springs Atoka-Morrow unit to support the drilling of an exploratory well to be located in the NW/4 of Section 5 Township 11 South Range 35 East, in Lea County, New Mexico. The unit will include the following lands as shown on figure 1: sections 34 and 35 T10S R34E, sections 5,6,7 and 18 T11S R35E, and sections 13 and 24 T11S R34E. The primary objective of the proposed well will be gas productive Atoka-Morrow sandstones at depths between 11,600 feet and 12,300 feet measured depth. Evidence from seismic and subsurface mapping studies in the area indicates that the Morrow deposition was influenced by paleotopographic features that resulted from a period of faulting and erosion in late Mississippian and early Pennsylvanian time. The Morrow Formation was deposited on an unconformity surface which included incised valleys and fault bounded topographic highs. Seismic and subsurface evidence indicates that a thicker Morrow section, consisting of incised valley fill deposits, is present in the topographic lows that existed on this unconformity surface. These incised valleys are thought to have been the focus of depositon for coarse grained sandstone sediments which have been preserved and provide reservoirs for natural gas accumulations in the Atoka-Morrow formation.

Cross section A-A' (figure 2) shows evidence that the Morrow sands, found in the Carper McAlester State 1 well located in sec. 25 T11S R34E, were deposited in a topographic low resulting from the erosion and downcutting of a valley into the underlying Mississippian Limestone. This stratigraphic cross section is hung on the Austin Shale and indicates that the depth of the paleo-valley was on the order of 120 feet. Seismic line 2557 (figure 3) indicates the presence of a fault located on the western edge of section 7 T11S R35E. This fault interpretation indicates down to the east throw, and shows the increased thickness of the Morrow Formation on the down thrown side of this fault. The structure map (figure 4) on the top of the Mississippian illustrates the interpretation that a narrow fault bounded valley with a southwest to northeast orientation existed at the time of Morrow deposition. This valley is approximately one mile in width and extends some five miles north from the Carper McAlester well . The isopach map (figure 5) of the Morrow Formation illustrates the increased thickness of the Morrow sediments that filled the incised valley, as the overall thickness of the Morrow increases from 250 feet to over 350 feet in the center of the paleo-valley.

The proposed unit is bounded on both sides by the interpreted margins of the Morrow depositional channel. The southern boundary of the unit butts up against a lease that is productive from basal Morrow sandstones in the Carper McAlester well. The northern boundary of the unit is shown on figure 5 to be coincident with a decrease in porosity and permeability due to diagenetic cementation. Two wells immediately north of the proposed unit boundary, in sections 26 and 28 of T10S R34E, both have thick sands in the Morrow Formation but these sands appear to have low porosity on petrophysical logs and were not completed by the operators that drilled them.

BEFORE THE OIL CONSERVATION DIVISION
Santa Fe, New Mexico
Case No. 12282 Exhibit No. 8
Submitted by: Yates Petroleum Corporation
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