NOON MEETING—APRIL 30, 1980

C. KIPP FERNS—Biographical Sketch

Kipp Ferns is Southeast District Production Geologist with American Natural Gas Production Co. in the Jackson, Mississippi office. He received his B S Degree from the University of Missouri at Rolla in 1952. He joined Cities Service Co. in 1953 and has worked in Texas, Montana, and Oklahoma offices before moving to Jackson in 1963. He had worked in the South Arkansas-North Louisiana "State Line" Jurassic Trend for Cities before joining American Natural in February 1980.

MARK E. YORK—Biographical Sketch

Mark E. York is an exploration geologist with Cities Service Company, Jackson, Mississippi. He received his BS and MS Degrees from Tulsa University in 1968 and 1975. From 1968 through 1977, he worked as a research assistant and geologist for Cities Service Company in the fields of paleontology, palynology, and carbonate research. During this time, he also helped conduct carbonate sediment seminars in Belize, Florida, and the Bahamas. Since 1978, Mark has worked as an exploration geologist in the South Arkansas-North Louisiana "State Line" Jurassic Trend concentrating mainly on the Smackover Formation.

BAYOU MIDDLE FORK FIELD (SMACKOVER), CLAIBORNE PARISH, LOUISIANA—A CASE HISTORY: DISCOVERY TO WATERFLOOD (Abstract)

Bayou Middle Fork Field, Claiborne Parish, Louisiana is located in north-central Louisiana near the Arkansas-Louisiana border in an area known as the "State Line Trend" of the Upper Jurassic Smackover Formation. Smackover production in the area is associated with a complex fault system masked by approximately 10,000 feet of younger sediments. A geophysical program combined with geological studies indicated a faulted deep seated east-west trending anticline. Based on this evidence, Cities Service Company drilled a test well on the structure resulting in the discovery of the Smackover reservoirs at Bayou Middle Fork Field in March, 1975.

Core and sample studies made as the field developed showed the Smackover Formation at Bayou Middle Fork Field to be a limestone composed mainly of oolites, hardened pellets, pisolites, oncolites, and micrite. This limestone has been divided into three units, designated as the Smackover "A", "B", and "C". The general environmental setting that produced these sediments varied from low to high energy conditions over a broad, shallow, gradually south sloping marine shelf. This environmental setting underwent continual minor sea level fluctuations and structural changes which produced an interfingering and mixing of the various carbonate sediments. One major change occurred as sea level completely receded. The shelf was exposed to supratidal conditions which resulted in the deposition of evaporitic and continental sediments. This regression ended Smackover "C" deposition and produced the Buckner "B" member of the stratigraphic section. This was followed by a partial transgression and subsequent regression resulting in the Smackover "B" and "A" being deposited in an off-lap sequence. This second withdrawal of the sea ended Smackover deposition and again produced conditions for accumulation of supratidal and continental sediments.

Porosity preserved within these oolitic rocks is primary intergranular which has been enhanced by leaching of the oolites. Effective porosity varies from a low of 8% to a high of 23.7% while permeability ranges from less than 1 md to 270 md. During early development of the field, the porosity and water values from log analysis indicated the possibility of substantial water production; however, as wells were completed no water was produced. This can be explained by the presence of microporosity containing irreducible water, as noted by scanning electron microscopy and petrographic examination.

Smackover production at Bayou Middle Fork Field is from three separate reservoirs, the Smackover "C", and upper and lower "A". the lower Smackover "A" reservoir is the largest of the three. This reservoir contains volatile oil, and the mechanism for primary production would be solution gas drive, recovering only 20% of the oil in place. It was determined that a pressure maintenance system would be necessary to recover the maximum amount of hydrocarbons. A water drive system was chosen as the most favorable means to accomplish pressure maintenance. It is estimated that an additional 20% of the oil in place will be produced by this water flood program.