~~Phillips~~
NWPL S.J. Unit 32-7 #6
A-17-31N-7W
Comp 8-24-53

Qualification of witness

Opening Statement of the Committee

In the fall of 1986, the Aztec office of the NMOCD saw that Fruitland Coal Gas development was increasing and that because of the unique nature of the resource existing rules might not be adequate. We contacted Mr. Bill Smith of Colorado Oil and Gas Commission, and asked if they would like to join with us in calling together an industry committee to advise us on what type of regulation would be necessary to allow for the best development of this resource which extends into both states. We held our first meeting in November of 1986 and today we are presenting the results of the 1 1/2 years of work by this committee. We want to thank the members of the committee for their excellent cooperation. We have included a list of names of the people who helped so much to make this committee work fruitful.

Question: What is the purpose of Case 9420 and Case 9421?

The purpose of these cases is to recognize the Fruitland Coal as a separate reservoir from other formations in the

San Juan Basin by declaring it a separate pool and to inact special rules that will address the unique character of this resource. Part A of Exhibit 1 is a map showing the proposed pool boundary. This boundary follows the Fruitland Coal outcrop around the San Juan Basin. The 2nd page of Part A is a log referred to in the proposed order which follows as Part B of Exhibit 1 is a copy of a draft order proposed by the Fruitland Coalbed Methane Committee. Members of the Committee will testify to different portions of these rules. The Committee was set up to recognize that individual operators could vote on the rules but also come into this hearing and testify to modify or oppose portions of the rules. CASE 9721 - APPLICATION TO CONTRACT THE

Question - Will you please describe the geologic history of the Fruitland Coal?

The Fruitland Coal formation was deposited during the late Cretaceous period approximately 75 million years ago. Part C of Exhibit 1 is a map showing how the area we now call the

San Juan Basin probably existed at the edge of a large sea during this period of time.

On the lower two thirds of Part D, we have a sketch showing how the southwestern shoreline of this sea transgressed and regressed creating and covering coastal swamps. At the top of this exhibit is a stratigraphic cross-section from southwest to northeast across the mid- section of the San Juan Basin showing the resultant Fruitland Coal beds and the underlying Pictured Cliffs Sandstone. Part E shows how tectonic movement during the laramide diastrophism created the current San Juan Basin structure. The Fruitland Coal has been mined along its outcrop for many years and is fuel for electrical generating stations just a few miles west of here.

Question: Please describe the lithologic nature of the Fruitland formation and particularly the coal seams?

The Fruitland formation is a coastal plain deposit of paludal carbonaceous shales, siltstones, sandstones, and coals. It ranges in thickness from less than 100 to greater

than 600 feet. Part F is a typical lithologic column combined with an induction electric log showing how the Fruitland Formation is underlain by the Pictured Cliffs formation, a regressive coastal barrier sandstone, and overlain by the lower member of the Kirtland Shale formation. The depositional and preservational environments for the individual coal beds varied and therefore correlating individual lenticirclar beds is difficult over large distances. However, the major coal beds have an areal extent of several square miles and therefore it is necessary to include all coals as a common source. The coal is generally considered ~~sub-~~Bituminous.

Question: Why can the Fruitland Coal be considered a source of supply as a gas pool? NGPA 107 APPLICATIONS BY Amoco

The history of coal mining is filled with stories of problems caused by methane gas. One month ago a West German mine suffered a disaster which killed ~~over one hundred~~ MANY men because of a gas explosion. Part G is a paper by Mr. J. R. Levine describing how coal quality influences the generation

of methane gas during coalification. I ~~am not a coal expert~~ and cannot fully explain the complex chemical processes described in this paper but I do want to point out that this paper shows that methane, carbon dioxide, and water are the results of coalification. This means that the coal itself becomes a source bed for natural gas. Note, that throughout the narrative and in the attached tables there is no reference to heavier hydrocarbons than methane. We have yet to find heavier hydrocarbons within coal beds.

Question: Do the coals act as source "rock" for other producing horizons?

No, at one time it was generally accepted that these coals were the source rock for gas found in the Pictured Cliffs formation. This idea is now being less accepted for several reasons. First, in the area of better P.C. production, the ~~S.W.~~ S.W. PART OF THE BASIN S.W. of the Frt. Coals and the P.C. formation are greatly separated. Second, in the area where they are the closest, to the North, there is little P.C. production. Finally, and, most obvious, given the geometry of these formations,

it is difficult to imagine downward movement of large amounts of gas.

Question: How, then, do you differentiate the coal gas production from the sandstone production in the area?

We can show separation by gas analysis produced water analysis, and pressure. Part H shows typical gas analyses for coal gas and sandstone gas production . The coal gas shows significant carbon dioxide and low BTU as compared to Pictured Cliffs gas. Part I is a diagram of produced water analyses from P.C. and Frt. coal wells. This shows that the bicarbonate and chloride levels can be used to differentiate producing intervals. Finally, it has long been known that drillers in the San Juan Basin have had to take precautions when drilling through the Fruitland Coal because of the danger of blowouts from overpressured coals. Part J is a paper written by A.D. Decker describing his analysis of this over pressure situation. I will quote from the second paragraph from what is marked at the bottom as P. 55. (Read). If you will refer again to Part F this becomes

clearer. Not all of the Fruitland Coal is overpressured but this overpressure is excellent to show separation.

Question; Would you please summarize your geologic conclusions?

The Fruitland Coals extend throughout the area of this application. Although they are lenticular, the individual coal beds are large enough to extend over several miles each. The coalification process has produced gas which is confined within the coals and can be produced through wells drilled to the coal beds. Therefore, the Fruitland Coals should be designated a common source of supply apart from the sandstone intervals within the Fruitland formation and apart from the Pictured Cliffs formation.

Question: Why is it important that the coals be a separate pool?

There are two reasons. First, the production of coal gas requires a different technology and science than conventional oil and gas production. Because of that it

needs to be regulated differently to assure the efficient and orderly development of the resource, to prevent waste, and to protect correlative rights. Secondly, we are now beginning to realize the value of this resource. Park K is a paper written by Mr. Bruce Kelso. I will quote from the 3rd paragraph of what is marked as page 119. (Read)

Further on in the paper Mr. Kelso does qualify this number, but I would note that historically this type of estimate has proved to be low. Given that, we have a potential for a gas resource greater than Prudhoe Bay which has estimates of only approximately 29 TCF gas in place. Declaring the coal a separate pool is a recognition of the facts.