BEFORE THE
OIL CONSERVATION COMMISSION
SANTA FE, NEW MEXICO

IN THE MATTER OF:

CASE 1840: Application of Pan American Petroleum Corporation for a non-standard gas unit.

TRANSCRIPT OF HEARING

JANUARY 6, 1960

as follows:

DIRECT EXAMINATION

BY: MR. BUELL:

Q Mr. Marshall, state your full name, by whom you are employed, in what capacity, and what location, please.

A My name is Charles R. Marshall, I'm employed by Pan American Petroleum Corporation as a petroleum engineer in their Farmington office.

Q Have you testified at a prior Commission hearing or hearings, Mr. Marshall?

A Yes, sir.

Q Are your qualifications as a petroleum engineer a matter of public record?

A Yes, sir.

MR. BUELL: Are they acceptable?

MR. NUTTER: Yes, sir, please proceed.

Q (By Mr. Buell) Let me direct your attention to what has been marked as Pan American's Exhibit No. 1. What is that exhibit?

A Exhibit No. 1 is a map showing a portion of Township 29 North, Range 9 West. It's the area which the western portion of the Blanco-Pictured Cliffs field covers.

Q All right, sir. Now, the purpose of this hearing, as I understand, is for approval of a non-standard unit, is that correct?

A Yes, sir.

Q Why is this unit non-standard, Mr. Marshall?

A Because of an irregularity in the public land survey in Section 6 of Township 29 North, Range 9 West.

Q Section 6 is irregular, is it?

A Yes, sir.

Q Is it short on acreage or long on acreage that makes it irregular?

A It has less than a normal 640 acres.

Q What is the total amount of acreage which we are requesting to be included in this proposed unit?

A 264 acres, which consist of the N/2 of Section 6, Township 29, Range 9.

Q How have you designated that proposed unit on Exhibit 1?

A I have shaded the proposed unit in red.

Q Would you locate the well that is presently completed on that unit, for the record, please?

A The well is located 1650 feet from the North line and 1650 feet from the East line of Section 6, Township 29. North, Range 9 West.

Q Is that orthodox or a regular location?

A Yes, sir.

Q What is the status of that well at this time?

A It is presently a dual completed well in the Mesa-

verde formation and the Pictured Cliffs formation. The Mesaverde is presently producing and the Pictured Cliffs is shut in.

Q In this proposed unit, how many separate tracts are included?

A There are four separate leases.

Q Are all of them Federal leases?

A All with the exception of one, the Jacquez lease, which consists of 120 acres in the northeast portion of Section 6, which is a fee lease.

Q Mr. Marshall, what is the significance of the contour lines as they are shown on Exhibit 1?

A These contour lines show my interpretation of the Pictured Cliffs pay development in this vicinity. They are contoured on thickness of the Pictured Cliffs pay. Each individual control point I've shown in orange. The orange figure represents the Pictured Cliffs pay thickness at the particular well.

Q What is the minimum or the smallest contour you have on this exhibit?

A The ten foot contour line, which is on the southwestern part of the map.

Q Would this indicate to you, Mr. Marshall, that all of the acreage that is in the proposed unit is productive of Pictured Cliffs gas?

A Yes, sir. My experience has been that all of the

Pictured Cliffs gas sands in the San Juan Basin trend in a north-west south-east direction. Now, I picked these pays off various other wells out around the proposed unit in order to establish control, and then projected the contour lines as you would expect the Pictured Cliffs to exist, and as proven by the other control points. This shows that the entire unit, or the entire Houck Gas unit is productive of gas from the Pictured Cliffs.

Q Have we tested that well in the Pictured Cliffs, Mr. Marshall?

A Yes, sir.

Q What was the result of that, do you have it there?

A It was tested on November the 19th from the Pictured Cliffs and it had an initial potential of 2124 MCF of gas daily.

Q How far away, Mr. Marshall, is the nearest Pictured Cliffs well to the Houck No. 1?

A The nearest Cliffs producer is Pan American's Jacquez Unit No. 2, located in the NW/4 of Section 5, 29, 9. That well is immediately east of the Houck, and it is 2,550 feet away. I've indicated that well in red and also the other offsetting Pictured Cliffs producer. The Heath "B" 2 located to the north of the Houck is some 2700 feet away, and it is also shown in red.

Q Now, the three wells that you have been discussing, I notice a trace on Exhibit 1. Does that reflect the trace of a cross section you prepared?

A Yes, sir.

Q That's been marked as Exhibit 2, has it not, Mr. Marshall?

A Yes, sir.

Q Would you briefly discuss Exhibit 2.

A Exhibit 2 shows the electrical logs of the three wells shown in red on Exhibit 1, and I've colored in yellow the Pictured Cliffs pay section and the way it existed in these three wells. You can see that the two end wells are the Heath "B" 2 and the Jacquez "A" 2, and have essentially the same pay thickness as would be expected, since the Heath "B" 2 is generally northwest of the Jacquez "A" 2, and on the center log, the pay is beginning to thin somewhat in that direction and still has a well-developed sand section.

Q Does the yellow interval on your Exhibit 2 reflect net or gross pay, Mr. Marshall?

A This is gross pay. As you can notice from the thickness of the yellow band on the Jacquez unit "A" 2, or the Heath "B" 2, it is somewhat thinner than the number shown on Exhibit 1 as being pay. What I did was to subtract out of the pay the shale break which occurs near the bottom of the Pictured Cliffs pay in both these wells and also to some degree in the Houck Gas Unit No. 1.

Q And the figure on Exhibit 1 as well as your contour lines reflect net pay, is that right?

A That is correct.

Q All right, sir. Let me ask you this, Mr. Marshall, are you of the opinion that the Houck No. 1 will drain the entire 264 acres which we propose to assign to it?

A Yes, sir.

Q Upon what data do you base that opinion, Mr. Marshall?

A The pressure information which was availabe from the wells in this area. The Jacquez Unit "A" No. 2 was completed in May of 1957 and had an initial shut in pressure of 1,033 pounds. I've shown this shut in pressure in brown figures on Exhibit No. 1. The Heath Gas Unit "B" No. 2 was completed in February of 1958, and it had an initial pressure of 1,013 pounds. Although the Jacquez Gas Unit "A" 2 was completed several months prior to the Heath "B" 2, no production was taken from either well until May of 1958. Production from both wells began in May of 1958, so that the 1,030 to 1,033 pounds represents the initial shut in pressure in this area. In November of 1959, at the time the Houck was dually completed in the Pictured Cliffs, the two wells, the Heath "B" 2 and the Jacquez "A" 2 had produced a cumulative of approximately 350,000 MCF. At that time the shut in pressure on the Houck Gas Unit was 867 pounds, which definitely indicates that the production from both the, either one or both of the two producing wells was being felt at the location of the Houck Gas Unit.

Q Now, you have posted these pressures by the individual

wells on Exhibit 1, have you not?

A Yes, sir.

Q All right, sir. Now, how far away did you say the nearest one of these two older producing wells --

A 550 feet. It is the Jacquez "A" 2, the nearest one, and it is 250 feet from the Houck Gas Unit.

Q From the standpoint of minimum drainage area, what would that indicate to you, based on acreage?

A Based on this radius, a minimum drainage radius that the Jacquez "A" 2 was draining would be 462 acres.

Q Directing your attention to the initial pressure on the Houck No. 1, the pressure which was taken prior to any production, how does that pressure, how does it fit in with what you would expect the pressure of that well to be with your knowledge of reserves and the production from the offsetting wells?

A It fits in well. The pore volume reserves in the Pictured Cliffs in this area are real easy to establish, to calculate. The magnitude of the pressure drop at the Houck Gas Unit No. 1 as a result of the 350,000 MCF production from that area supports the magnitude of pore volume reserves in this area. In other words, reserves calculated from this are on the same order and magnitude as reserves calculated from the pore volume. Of course, exact comparison cannot be made because we only have a point pressure and we don't know exactly how much additional area is being affected. However, the magnitude of the numbers

involved definitely support the pore volume reserves as would be calculated.

Q Then, with that view, Mr. Marshall, the data are conclusive that the Houck No. 1 will drain effectively the entire 264 acres we propose to assign, assuming the Commission approves our request?

A Yes, sir. Based on the information we've been able to gather, the well will definitely drain the minimum --

Q We are asking to assign 104 acres over and above the standard 160-acre unit, is that correct?

A Yes, sir.

Q Assume for the purpose of this question that the Commission does not approve our request and we are required to drill a well on this 104 acres, would that well, in your opinion, Mr. Marshall, ever pay out?

A No, sir. To drill and operate a well on that 104-acre tract would cost thirty-five thousand, approximately, thirty-five thousand four hundred dollars.

Q Drilling and operating?

A Drilling and operating. The gas revenues that would be expected from that well would be twenty-eight thousand two hundred dollars, or according to my estimates, it would result in a loss of seventy-two hundred dollars, if it became necessary to drill a well on the 140-acre tract.

Q In other words, Mr. Marshall, economic waste would

result if we are required to drill a well on that 104 acres?

A Yes, sir.

Q Has this 264-acre unit been unitized?

A No, sir, it has not as to the Pictured Cliffs. The unit is unitized as to the Mesaverde formation, and the royalty interest owners--Pan American owns a hundred percent of the working interest in this unit--and the royalty interest owners have been contacted in regard to the unit, and we anticipate no difficulty in forming the 260-acre unit.

Q In the event the Commission approves our request, you would expect to encounter no difficulty in the legal formation of the unit, is that correct?

A That is correct.

Q In your opinion, Mr. Marshall, if the Commission approves this application, will it serve conservation as well as protect correlative rights of all of the parties of interest?

A Yes, sir, it definitely will.

Q And in the event the application is not approved and we are required to drill on this 104 acres remaining, it would result in economic waste?

A Yes, sir, because of the economics involved, together with the fact that the pay development is thickening somewhat. Economoic waste would result if it became necessary to drill a well on that, additional well on that.

Q Do you have anything additional you would like to add,

Mr. Marshall?

A No, sir.

MR. BUELL: That's all we have at this time, Mr. Examiner, and may I formally offer Pan American's Exhibits 1 and 2.

MR. NUTTER: Pan American's Exhibits 1 and 2 will be entered in evidence. Does anyone have any questions of Mr. Marshall?

MR. FLINT: Yes, sir.

MR. NUTTER: Mr. Flint.

CROSS EXAMINATION

BY: MR. FLINT:

Q Mr. Marshall, did I understand that this Houck No. 1 well is now authorized as a dual completion in the Mesaverde and Pictured Cliffs?

A Yes, sir. I believe that the application for dual completion was made through administrative channels, and I believe that dual has been approved by the Commission.

Q At the present time the Pictured Cliffs is shut in?

A That is correct.

Q Do you propose to operate this as a dual completion?

A Yes, sir.

Q Is this proposed unit on the edge of the Pictured Cliffs pool as per the nomenclature at the present time?

A Yes, sir. This green line on Exhibit 1 shows the western limits of the Blanco-Pictured Cliffs field. Now, these limits, I didn't have the orders for the nomenclature cases which were heard at the November or December statewide hearing, however, I assume that those extensions were granted and this limit shows the field limits assuming the November and December proposed extensions were granted, and this well, the Houck, is located, of course, less than one half a mile from the field limits of the Blanco-Pictured Cliffs field.

Q And you propose no change in the completion of the well as authorized by this administrative order?

A That is correct.

Q Mr. Marshall, I note on this exhibit there are a series of rectangles and squares that are surrounded by heavy dotted lines. What do those dotted lines indicate?

A Those are existing Mesaverde units, proration units.

Q And it appears that these units cross section lines and cross half section lines and take in odd lots.

A Yes, sir. Along this west, extremewest side of Township 29, Range 9, all of the sections along there are irregular. I believe the Mesaverde units are all non-standard units up and down that side. Now, other than that row of sections and also the ones on the west side of 30 and 9, I believe the remainder are regular 320-acre units.

Q Now, in attempting to line these non-standard units

for the Mesaverde, the attempt was to form non-standard units that approached the standard size unit of 310 acres for that pool, was it not?

A I imagine that is correct. I'm not familiar with exactly the number of acres in the other units, except for the Houck, I know there are 264.

MR. BUELL: Mr. Examiner, if I may, if my memory is correct, I believe these units that we are speaking of are over the 320-acre non-standard size.

MR. NUTTER: They approach 320 however, do they not?

MR. BUELL: Yes, sir, they were in excess of 320.

EXAMINATION BY MR. NUTTER:

Q Mr. Marshall, could similar gerrymandering be done on the Pictured Cliffs in order to derive non-standard units that would approach 160 acres as the Mesaverde approaches 320 acres?

A In my opinion, not in this case, because of the development of the pay. As you can see from this isopach map, the productivity of any of the remaining non-standard units in 29, 9, in the Pictured Cliffs is highly doubtful.

Q Are these the only three Pictured Cliffs wells that are completed in the Pictured Cliffs formation, the three that you have colored in red here?

A No, sir. There are several wells all over the map. For example, in Section 8, the NW/4 and in Section 5, the SE/4.

MR. BUELL: Could we say, Mr. Marshall, that each well that you show a pick of net pay in the Pictured Cliffs is completed in the Pictured Cliffs?

A No, sir, some of the logs are Mesaverde logs which I got pay picks from which are not completed in the Pictured Cliffs.

Q (By Mr. Nutter) What about the wells in the -- well, it is that C-1 Well in the southern part of Section 6 that has 11 feet of pay.

A That is a Mesaverde.

Q It is not completed in the Pictured Cliffs?

A No, sir.

Q Was any estimate made in the Pictured Cliffs, do you know?

A Not to my knowledge.

Q Now, how many acres would be in the unit if a 160-acre standard unit were dedicated to your Houck Gas Unit Well No. 5 --

A No. 1.

Q --No. 1, the subject well today, and then the remaining portion of the N/2 of Section 6 plus the 40-acre tract which is in the NE of the NW, the 40-acre tract which is in the NE of the SW of Section 6, and the odd lot directly west of that, if they were all dedicated to a well which could be located anywhere in the W/2 of Section 6?

A That was the NE of the SW, the 40 acres?

Q Yes, sir, assuming that all of the acreage in the NW/4 of Section 6 and the acreage in the NW of the SW of Section 6, and the odd lot directly to the west of that were all dedicated to a well to be located anywhere in the W/2 of Section 6, approximately how many acres would you have dedicated to the well?

A I believe I can compute it very closely. It would be 154.

Q You would have approximately 154 acres in a non-standard unit as we've discussed?

A Yes, sir.

Q Now, would a 154-acre non-standard unit pay out if you drilled a well on that? You stated a 104-acre unit wouldn't, but would a 154-acre unit pay out?

A A 154-acre unit, other than at this location, perhaps would; however, as you can see from the isopach, a well, say, centrally located in the unit that you have just described would be expected to have ten or a few more feet, and ten feet, or a unit somewhere on the average of ten feet of Pictured Cliffs pay, the economics of development for ten feet of Pictured Cliffs pay are extremely poor. The reason that the Houck will eventually pay out, and according to my calculations, result on a return of investment of about 1.8 is because of the fact that the well is located in a better developed section of the pay

and the average pay thickness over the unit can be considered to be approximately twenty feet.

Q What would be the approximate thickness of the pay in the NE of the NW of Section 6?

A NE of the NW?

Q Yes, sir.

A I would say that would average over that 40-acre tract about fourteen feet, fifteen feet.

Q Is that enough gas pay to pay out a Pictured Cliffs --

A Well, sir, it is getting along the border edge as far as paying out. Now, resulting in a return, it would not be, the return would not be very high, however. We said fifteen feet?

Q Yes, sir.

A According to my estimates, the total revenue from a, if I assume that the unit would have 160 acres, the total revenue from that at that pay would be somewhere in the neighborhood of thirty to thirty-five thousand dollars, and a new well cost in there is about twenty-five to twenty-six thousand dollars, so that you would realize a pay out, however, the margin of profit would be extremely low when you consider the investment and the life of these gas wells in this area.

MR. BUELL: Did you ignore operating costs in that estimate that you just gave the Examiner?

A Yes, sir.

Q (By Mr. Nutter) That was the completion cost?

A Completion cost.

Q The Pictured Cliffs test on this well of 2124, was that a calculated open flow or was that through choke?

A It was a three-quarter inch choke, three hour test.

Q And the 867 pounds was what, the seven-day shut in pressure?

A Initial pressure.

Q Or the initial pressure, or what?

A Let's see, the shut in time is seven days. I don't have that information. I believe it was eleven days.

Q How about the other two wells with which you compared this pressure along with the shut in --

A The Houck Gas Unit "A" No. 2 was shut in for twenty-six days, the Heath Gas Unit "B" No. 2 was shut in for sixteen days.

MR. NUTTER: Any further questions of Mr. Marshall.

MR. UTZ: Yes.

MR. NUTTER: Mr. Utz.

EXAMINATION BY MR. UTZ:

Q Was the Pictured Cliffs formation tested in the well in Section 7, Mr. Marshall, that has a net pay of thirteen feet?

A Not to my knowledge, no, sir. I'm almost sure it wasn't. The practice of development in there is to drill to and

through the Pictured Cliffs with mud and below that with gas, which would preclude a test.

MR. FLINT: Mr. Marshall, is Pan American the operator of the S/2 of Section 6?

A Yes, sir.

Q (By Mr. Utz) These yellow figures are microlog pay or --

A No, sir, pay development is taken from the electric log. Pay development is the resistivity measurement.

MR. UTZ: That's all.

A Mr. Examiner, I would like to correct myself. I finally got the shut in period of the Houck No. 1. It is fifteen days, the 867.

MR. NUTTER: Instead of eleven days?

A No, I was looking at the Mesaverde. I was right the first time, it is eleven days, excuse me.

MR. NUTTER: Any further questions of Mr. Marshall? You may be excused.

(Witness excused.)

MR. NUTTER: Do you have anything further, Mr. Buell?

MR. BUELL: No, sir, Mr. Examiner, that's all we have.

MR. NUTTER: Does anyone have anything further in this case? We will take this case under advisement.

STATE OF NEW MEXICO)
)
COUNTY OF BERNALILLO)

I, J.A. Trujillo, Notary Public in and for the County of Bernalillo, State of New Mexico, do hereby certify that the foregoing and attached Transcript of Proceedings before the New Mexico Oil Conservation Commission was reported by me in Stenotype and reduced to typewritten transcript by me, and that the same is a true and correct record to the best of my knowledge, skill and ability.

WITNESS my Hand and Seal this, the 2d day of January, 1960, in the City of Albuquerque, County of Bernalillo, State of New Mexico.

NOTARY PUBLIC

My Commission Expires:

October 5, 1960

I do hereby certify that the foregoing is a complete record of the proceedings in the Examiner hearing of Case No. 1840, heard by me on 1-6, 1960.

, Examiner
New Mexico Oil Conservation Commission