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BEFORE THE  
OIL CONSERVATION COMMISSION  
Santa Fe, New Mexico  
May 22, 1968

EXAMINER HEARING

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IN THE MATTER OF: )

Case No. 3701 being reopened )  
at the request of Coastal States )  
Gas Producing Company to consider )  
the amendment of the special pool )  
rules for the Baum-Wolfcamp Pool, )  
Lea County, New Mexico, to provide )  
for 160-acre spacing and proration )  
units with the assignment of )  
80-acre allowables. )

Case 3701  
(Reopened)

-----  
BEFORE: Daniel S. Nutter, Examiner

TRANSCRIPT OF HEARING

MR. NUTTER: We will call Case 3701.

MR. HATCH: In the matter of Case No. 3701 being reopened at the request of Coastal States Gas Producing Company to consider the amendment of the special pool rules for the Baum-Wolfcamp Pool, Lea County, New Mexico, to provide for 160-acre spacing and proration units with the assignment of 80-acre allowables.

MR. HINKLE: Clarence Hinkle, Hinkle, Bondurant and Christy, Roswell, appearing on behalf of Coastal States. We have two witnesses and ten exhibits. I would like to have the two witnesses sworn.

(Witnesses sworn.)

(Whereupon, Exhibits Nos. 1 through 10 were marked for identification.)

ROBERT ZINKE

called as a witness, having been first duly sworn, was examined and testified as follows:

DIRECT EXAMINATION

BY MR. HINKLE:

Q State your name.

A Robert Zinke, Z-i-n-k-e.

Q By whom are you employed?

A Coastal States Gas.

Q In what capacity?

A Senior geologist in the Midland Division.

Q Have you previously testified in this Case 3701?

A Yes, I have.

Q And your qualifications as a geologist are a matter of record with the Commission?

A Yes, they are.

Q Since the original Case 3701, have you made a continuing study of this area, the Baum-Wolfcamp area?

A Yes.

Q Are you familiar with the application of Coastal States in this case?

A Yes, I am familiar.

Q What is Coastal States seeking to accomplish?

A They are seeking to amend the temporary special field rules to provide for 160-acre spacing and proration unit with 80-acre allowables.

Q Have you prepared a number of exhibits to be considered in this case?

A Yes, I have.

Q Refer to your Exhibit No. 1 and explain to the Examiner what this is.

A Exhibit No. 1 is a location plat showing the

location of the Baum field relative to the many other oil fields in Southeastern New Mexico. The red arrow points to the Baum Pool.

Q It shows the location of other pools in the area?

A That's right.

Q Now, refer to Exhibit No. 2 and explain what this shows.

A The second exhibit is a structure map of both the Baum field and the Lazy "J" field area. This map shows all of the nine producing wells in the Baum field. When I previously testified in the case in December, this field, the Champlin No. 1 Featherstone Federal and the Coastal States No. 1-6 State were the only wells or producers in the Baum field.

MR. NUTTER: What is the location of those, please?

THE WITNESS: The Champlin No. 1 Featherstone Federal is 660 from the South and East Lines of Section 6, Township 14 South, Range 33 East.

MR. NUTTER: That's the one with the subsea depth of 5537?

THE WITNESS: That's correct. The Coastal States Gas Producing No. 1-6 State is located 1980 feet from the East Line and 660 feet from the North Line of the same section.

MR. NUTTER: That's the minus 5479?

THE WITNESS: That's correct.

MR. NUTTER: Those were the only two wells in the pool at the time of the last hearing?

THE WITNESS: Yes. Previous wells drilled in the pool were the Champlin No. 1 "A" Featherstone Federal, located 2310 from the North and West Lines of Section 6, and it was an abandoned producer. It has since been re-entered and made a producer by Coastal States.

Q (By Mr. Hinkle) Were you in the process of re-entering that well at the time of the original hearing?

A That's true.

Q But it had not been completed?

A It had not been completed as a well yet.

Q Go ahead with your explanation of Exhibit No. 1.

A Currently Delaware Apache is drilling a well in the area and it's located 1980 from the North Line, 660 from the East Line of Section 30, Township 13 South, Range 33 East. There is a cross section line which is drawn through all producing wells in the field, in the Baum field, on through a dry hole, the Cabot No. 1 "P" State located 660 from the South and East, South and West, excuse me, of Section 33, Township 13 South, Range 33 East, on into the Lazy "J" Pool.

The exhibit is a structural contoured map on top of the Permo-Pennsylvanian lime. It's also designated the "B" zone member. The Baum Pool is called the Baum-Wolfcamp Pool but pay zones in this field are of Permo-Pennsylvanian age.

Q Really it's a misnomer in that respect?

A This is true. But it is designated the Baum-Wolfcamp Pool. In fact, we discussed this at the first hearing. This map shows the structural configuration of the Baum field and the fact that the Baum field is separated structurally from the Lazy "J" Pool. This structural separation is best shown by the Cabot No. 1 "P" State well.

Q Where is it located?

A It is located 660 from the South and West Lines of Section 33, Township 13 South, Range 33 East. This well is 189 feet low to the nearest abandoned Lazy "J" producer and 117 feet low to the nearest Baum producer. This low definitely separates the two structures and is quite pronounced as it is pulled back in between the two structures.

Q You referred to "B" and "C" zones in the Baum-Wolfcamp. Are those the only two zones from which the pool is producing?

A The Baum Pool produces from the "B" and the "C"

zone and the Lazy "J" Pool actually produces from designated "A" zone, which does not exist in the Baum Pool, and the "B" zone and possibly from the "C" zone.

Q Is the Lazy "J" Pool or field higher structurally than the Baum-Wolfcamp?

A Yes. It produces from elevations that range a little over 50 feet higher than the Baum-Wolfcamp Pool or Baum Pool.

Q But the so-called "A" zone is not productive in the Baum-Wolfcamp area?

A No, it is not.

Q Does this Exhibit No. 2 show the acreage ownership in the Baum-Wolfcamp Pool?

A Yes. Coastal States owns approximately 4280 acres and the other operators or ownership operators in the area are Delaware Apache, Bell Petroleum, M. W. J. Oil Company, Cabot Oil Company and Cities Service. The Lawless interest, which is indicated on the map, has been acquired by M. W. J.

Q Now refer to Exhibit 3 and explain to the Commission what this is and what it shows.

A Exhibit 3 is an electric log cross section which passes through all the nine producers in the Baum-Wolfcamp field, then through the Cabot 1 "P" State dry hole onto the

Hennigan No. 1 Depco State dry hole, into the Lazy "J" field. The cross section shows both the "B" zone member and the "C" zone member of the Permo-Penn formation. It also shows that they conform structurally very close together. The index map on this cross section is contoured on the "C" zone and it may be noted here that that structure configuration is very close to the structural configuration of the "B" zone.

The cross section shows the Baum Pool structure and the separate Lazy "J" structure. The Cabot 1 "P" State again showing the low between the two wells quite pronounced on this cross section. The Cabot 1 "P" State also tested fluid in the amount of 260 feet of free oil, 270 feet of drilling mud and 6560 feet of salt water from the "B" zone member of the Permo-Penn, being essentially a salt water test, and it only tested 50 feet of drilling mud from the top of the "C" zone member.

The Hennigan No. 1 Depco State, which is, incidentally, located 1980 from the West Line, 330 from the North Line of Section 28, Township 13 South, Range 33 East, is also a dry hole and this well tested only 400 feet of oil and gas cut drilling mud with very low members in the "B" zone and 780 feet of salt water in what we consider to be the "C" zone.



These two dry holes I feel definitely established a separation between the Baum-Wolfcamp field and the Lazy "J" field. Though it's not indicated on here, I would also like to point out again that the "A" zone exists, you can see some of the porosity in the wells in the Lazy "J" field, and that this zone does not exist in the Baum-Wolfcamp or the Baum field.

Q It's your opinion, then, that these are two separate and distinct pools?

A Yes. There's no doubt geologically that they are.

Q Definite separation?

A Definite separation.

Q Are the characteristics of the pool different?

A Yes, the next exhibit will show some of that difference in characteristics.

Q Refer to Exhibit No. 4 and tell the Examiner what it shows.

A Exhibit No. 4 is a map with the initial potentials of both the area of the Lazy "J" and the Baum Pool. This map is made to show the significant difference between the Baum Pool or field potentials and the Lazy "J" initial potentials, and if you will note, there is a line running between the two pools and the initial potential average in the Baum Pool was

59 percent salt water, and in most cases in the Lazy "J" Pool it was salt water free. There are only two wells located in Section 21 that have some percentage of salt water, but still nothing of the average of 59 percent in range.

This map definitely indicates that the fluid accumulations in the Lazy "J" field and those of the Baum field are decidedly different, with the Baum field producing and having in the fluid state salt water along with the oil whereas in substantially the largest part of the Lazy "J" field, why, it is primarily oil free.

The producing zone in the Lazy "J" field probably relative to the producing zone, the "B" zone produces in the Coastal States 1-32 located 1980 from the South Line, 660 from the West Line of Section 32; the 1-8, located 660 from the North and West Lines of Section 8 and the 1-7, located 1650 from the West Line and 330 from the North Line of Section 7. These wells all produce from the "B" zone and all produce substantial quantities of water from initial production where the "B" zone, up in the Lazy "J" Pool has not produced with initial production any quantities of water at all.

Q Does that mean that all the rest of the wells in the Baum-Wolfcamp have been completed only in the "C" zone?

A Primarily, yes, that is correct. The 1-32 is

producing both from the "B" and the "C" zone.

Q Is there anything else you would like to add to your testimony?

A Other than that this supports the geological structural configuration, this fluid separation.

MR. NUTTER: Mr. Zinke, going back to your cross section there, the well symbols across the bottom of the cross section of these number like your 6-1, it says B-2574, C-3118. What do those numbers represent?

THE WITNESS: Bottomhole pressures.

MR. NUTTER: In the "A", "B" and the "C" zone?

THE WITNESS: Yes, sir, these will be used in later testimony by the engineer who will testify.

MR. NUTTER: On your cross section, does that indicate that those wells are completed in those intervals if it says if you have a "C" pressure?

THE WITNESS: No, it does not. Actually, if I am correct --

MR. MCGRAW: No, not necessarily.

MR. NUTTER: No correlation between the zones?

MR. MCGRAW: No, we will make that distinct.

THE WITNESS: We have maps that will show which zones these wells are producing in.

Q (By Mr. Hinkle) Have Exhibits 1 through 4 been prepared by you or under your direction?

A Yes, they have.

MR. HINKLE: We would like to offer Exhibits 1 through 4.

MR. NUTTER: Coastal States Exhibits 1 through 4 will be admitted in evidence.

(Whereupon, Exhibits 1 through 4 were offered and admitted in evidence.)

MR. HINKLE: That's all.

CROSS EXAMINATION

BY MR. NUTTER:

Q I see from your Exhibit No. 2 and from the plat or the cross section that you do have a low for the "C" zone as well as the "B" zone?

A That's correct.

Q However, your syncline or your trough, whatever you might want to call it, extend further north as far as the "B" member is concerned, than it does here in the "C" zone? It goes clear up into Section 29, the 5575-foot line does?

A It was contoured just more or less because there isn't other control other than the Cabot well in that area.

Q But the evidence is that the trough exists in all the zones?

A Yes, it does. In fact, it is a little deeper in the "C" zone. There appears to be just a slight amount of thickening in the section between the "B" zone and the "C" zone.

Q In the State "C" No. 1 to the State "P" No. 1?

A Yes. Incidentally, the Lyon well located, this 1 "C" State located in Section 32 appears, though it was drilled and abandoned, appears to be a potential producer in the Baum-Wolfcamp Pool, if there is any question about that later.

Q When was it drilled?

A I do not have the date but it was drilled --

Q Well, I guess that's the date up there at the top of the cross section, September of '54?

A Yes. It was drilled just subsequent to the drilling of the Baum-Wolfcamp discovery wells and because of the oil and water, was abandoned.

Q After you went back into this old Coastal, or this old Champlin 1-6, you made a producer out of it, you say?

A Yes.

Q It was in the process of being recompleted when we had the last hearing?

A That's true.

Q What kind of potential did you get on that well?

A We have that on the potential map. It did not make a very good well. It was potentialled for --

Q 80 barrels of water --

A -- 80 barrels, and 610 barrels of salt water. We have not figured out why yet.

MR. NUTTER: Any other questions of Mr. Zinke?  
He may be excused.

(Witness excused.)

JACK McGRAW

called as a witness, having been first duly sworn, was examined and testified as follows:

DIRECT EXAMINATION

BY MR. HINKLE:

Q State your name, by whom you are employed, and where you reside.

A My name is Jack McGraw, I am employed by Coastal States Gas Producing Company as division petroleum engineer in Midland, Texas.

Q Did you previously testify in Case 3701?

A Yes, I did.

Q And your qualifications as petroleum engineer are a

matter of record with the Commission?

A Yes, sir.

Q Since the hearing on case, originally on 3701, have you made a continuing study of the Baum-Wolfcamp area?

A Yes, I have.

Q All the wells that have been drilled?

A Yes.

Q All the production information and all the pressure information?

A Yes, sir.

Q Have you prepared certain exhibits to be considered in this case?

A Yes, I have, Exhibits 5 through 10.

Q Refer to Exhibit 5 and explain to the Commission what this is and what it shows.

A Exhibit 5 is the graph of the production history on the Baum-Wolfcamp field back from its inception in 1955 to the present time. We have simply -- This is the same graph that was used in the last hearing. We have simply added to it the current producing rate in the field. This plat shows that the Baum field was discovered in May 1955 by Champlin Petroleum Corporation with the completion of their Featherstone Federal No. 1. That well is located in the

Southeast Quarter of the Southeast Quarter of Section 6,  
Township 14 South, Range 33 East.

The well was completed from the "C" zone of the Permo-Penn formation, and although it was potentialed higher, it actually produced 58 barrels of oil and 20 barrels of water per day. This well is currently producing 35 barrels of oil and 40 barrels of water per day and it has a cumulative recovery of approximately 120,000 barrels of oil and 150,000 barrels of water.

In January 1956 Champlin drilled the Featherstone Federal No. 1 "A", located in the Northeast Quarter of the Northwest Quarter of Section 7, and after drillstem testing the pay zone, the well was plugged and abandoned. Champlin later drilled and completed the Featherstone Federal No. 2, located in the Southeast Quarter of the Northwest Quarter of Section 6, and that was in August 1956. This well produced for approximately two and a half years and recovered 39,374 barrels of oil and approximately 136,000 barrels of water. It was plugged and abandoned in January of '59.

In November 1967 Coastal States drilled and completed the State 6 No. 1, which is located in the Northwest Quarter of the Northeast Quarter of Section 6, for 360 barrels of oil and 640 barrels of water per day. Following this



Coastal has drilled five additional wells and re-entered the two wells that were plugged prior to '59 and completed them as producers. As of April 1, 1968 Coastal operates eight wells in the field with a combined capacity of 1400 barrels of oil plus 4,000 barrels of water per day. Champlin operates one well, which is producing at a rate of 35 barrels of oil, 40 barrels of water. Two additional wells are in the planning stage by other operators at this time.

Q What are those wells?

A Well, the one that was testified to prior is the Apache, Delaware Apache well in Section 30 and M.W.J. plans a well in Section 5. I believe it would be in the Northwest Quarter.

MR. NUTTER: You've proved up a location for them there and also in the Southeast of 31?

A Yes, sir. In fact, they will undoubtedly drill both of those in the very near future. According to the present geology, there appears to be ten additional proven locations on 160-acre spacing. This would make a total of 19 wells for the field on 160-acre spacing. All the wells completed to date, including the two current operations, have been drilled on 160-acre spacing, although the field currently is operating under a temporary order designating 80-acre spacing.

Q (By Mr. Hinkle) Now refer to Exhibit 6 and explain that for us.

A Exhibit 6 is a plat showing the well location and pressure information. It also shows the completion interval for each well; the color code down there I believe is, I believe you can see that the blue color represents a Bough "B" completion and the yellow a Bough "C".

Q These are initial pressure completion, are they not?

A Yes.

Q Drillstem test?

A Initial drillstem test pressures in the test interval covering the "B" or the "C" zone. We took the initial shut-in pressure from the drillstem test. We feel that this is the true static reservoir pressure in the area of the well at the time the well was drilled. The initial bottomhole pressure for this area was determined to be 3495 in the Bough "C" zone and 2806 in the Bough "C" zone in the Lyon Oil Company State 31 in November of '54. This was testified to awhile ago. You'll notice the well is in Section 32 in the Southwest Quarter of the Southeast Quarter of Section 32. That is the oldest well drillstem tested in this area in 1954 and they had an immediate shut-in pressure of 3495 on the "C" zone and 2806 on the "B" zone.

Now, Champlin drillstem tested their wells in, later in '55 and '56. They only took a fifteen-minute buildup. We have evidence to prove that fifteen minutes is not long enough to get an accurate buildup pressure. We feel that fifty minutes is. In every case on ours where we have the buildup curve, fifty minutes is sufficient to get the static buildup pressure. So, therefore, our Champlin pressures were not useable from this respect. They were somewhat lower than the 3495.

We feel that the pressure in this area was at least this high when Champlin completed their Featherstone Federal No. 1. Now, assuming that this initial bottomhole pressure was 3495, and that the surrounding area contained equal pressure, then by virtue of the production of 160,000 barrels of oil and 240,000 barrels of water, the bottomhole pressure was lowered to 2282 in the nearest well, which is Coastal States State 5 No. 1.

Q How far is that?

A That's about 1700 feet Northeast of Champlin's well. Now, also the pressure was lowered to 2824 in the Featherstone Federal No. 2 or Coastal's Federal 6 No. 1, which is located approximately 3,000 feet Northwest. If you'll go to the next exhibit, we feel that this is --

Q That would be Exhibit No. 7?

A We are actually able to draw an isobaric map showing a pressure sink in the vicinity of this Champlin well where by far the majority of this production has come from. All these pressures now are initial pressures and they are taken from over a period of time November through April with mostly -- if you'll look at the dates on this map, the completion date is the little number to the upper right of the well, most of these were in the latter part of November, December and January. And so we have a given time that we can draw a static pressure for the reservoir and it definitely indicates a sink, a pressure sink in the vicinity of the Champlin's well. We feel that this shows definite indications that the pressure has been influenced over, well, practically a thousand acres in here by the production of this fluid.

Q Is this pretty conclusive evidence that one well will effectively and efficiently drain as much as a thousand acres?

A This is conclusive evidence that it will affect the pressure over this area. We feel that it also definitely proves that one well will effectively drain in excess of 160 acres. It could, of course, influence the pressure without effectively draining the oil over the other area.

Q Do you consider this as good evidence of the drainage factor?

A Yes, we consider this as being conclusive evidence of interference between wells on 160-acre or greater spacing.

Q And about the best evidence you can obtain?

A Yes, sir, it is. In fact, it's the type of information you would receive if you run an interference test and actually shut a well in, in fact, you couldn't possibly run one for the period of time that we have been able to observe here. You wouldn't get anywhere near this grade of pressure variation.

Q Now, refer to Exhibit No. 8 and explain what this shows.

A Exhibit No. 8 shows the initial bottomhole pressure in the "B" zone in many of these same wells. You'll note that the pressure is quite uniform all across the field at approximately 2550 pounds and has not been influenced locally by the previous mentioned production from the "C" zone. This, we think, supports the previous map and our statement that says that the low pressures were a direct influence of the production from that zone.

MR. NUTTER: That Champlin well is producing from the "C" zone only?

THE WITNESS: "C" zone only.

MR. NUTTER: This would indicate there was no vertical communication between the zones?

THE WITNESS: That is true. Vertical communication between the zones in the field area. I'll have to point out that this 2550 average pressure for the "B" zone is some 300 pounds less than what it was found to be in '54. It was 2806 in '54.

MR. NUTTER: Any Lyon well?

THE WITNESS: Any Lyon well. We feel this indicates a regional migration of oil. It wasn't from the production in this field.

Q (By Mr. Hinkle) Refer to Exhibit No. 9 and explain what this shows.

A Exhibit No. 9 is an isobaric map of subsequent bottomhole pressures obtained in April 1968 on five of the producing wells. This map has the same general shape as the initial bottomhole pressure map, indicating that the bottomhole pressure is declining uniformly across the field. Although the current well density is more on the order of 320 acres than 160 at this time.

Q Is this indicative of wide drainage?

A Yes, it is; if you didn't have good pressure communication you would expect some of the poorer wells to have

much higher pressures due to the fact that they have recovered smaller volumes of oil and total fluid.

Q Is there anything else you would like to say about the Exhibit No. 9?

A We have taken extensive bottomhole pressures as we have indicated, and the permeability has been calculated from this drillstem test information on six separate test intervals on four separate wells. The average permeability over the pay zone ranged from 52 millidarcies to 407 millidarcies, with the average for all test intervals being 160 millidarcies.

I would expect the permeability distribution on a given well to range from several hundred millidarcies down to a tenth of a millidarcy in order for the total interval to have an average of 160. Therefore, we must have some several feet in the wells that have high permeability in order for the average to be 160. This indicates that the wells would be capable of producing large volumes of fluid and should be able to recover this fluid from an area with a drainage radius in excess of 1320 feet, which, of course, is a drainage for a well developed in a field on 160-acre spacing.

Production history to date has verified this conclusion that the wells would be capable of producing large

volumes of fluid and pressure observation has indicated interference between wells over much greater distance than 1320 feet.

It is our conclusion that one well can effectively and efficiently drain in excess of 160 acres in this reservoir.

Q Have you made the study of the economics involved in developing this area on 40, 80 and 160-acre spacing?

A Yes, we have, and Exhibit 10 shows the economics and it's the same as we presented in the last hearing. We have no information to date to indicate that we will recover in excess of the 151,000 barrels per 160 acres that we had testified to at our previous hearing. In fact, our subsequent pressure information indicates that it might be somewhat less. So we saw no reason to recalculate the economics, they're the same as we used before.

We have obtained a gas sales contract, and as testified to before, we still believe that it will require about the same amount of cost to dispose of water that the gas will bring, so that does not enter into the economics, and we also have a pipeline connection now for the field, or we have signed an agreement, and they will be hooking that up and that will improve the economics very slightly.

Q What is your ratio of income to investment?



A The ratio of income to investment on 160 acres is 1.63, which is fair economics considering that the wells in this field do come in at high producing rates and you do get a fairly fast payback and it makes favorable economics.

Now, of course, the ratio to investment on 40 and 80 acres are negative. It will not pay out.

Q They are .41 on 40 acres and .81 on 80 acres?

A Yes, sir, that's true.

Q I believe you testified that if this field is fully developed insofar as the limits of it are now known, it would require the drilling of some ten additional wells which would be about nineteen wells total, is that right?

A Yes, sir, we think that's what it will be.

Q If it were developed on 80-acre spacing, how many wells would have to be drilled?

A It would require 38 wells to produce the same amount of oil.

Q And how much would it cost to drill those additional nineteen wells?

A Well, at \$180,000 per well, this, of course, would require some \$3,400,000 of additional drilling money.

Q According to the figures you have just given us, it would never pay out?

A No, sir, it would not pay out on that basis.

Q In other words, it would be complete economic loss of the three million four hundred thousand?

A Yes, sir.

Q Have the other lease owners in this area indicated whether or not they approve of this application?

A Yes, sir. We have contacted all the other lease owners in the area and all of them have indicated by phone to us that they support us in this. We have received two letters from operators and we understand that they have mailed some letters in to the Commission.

MR. HINKLE: Our letters are from Cabot Corporation and M.W.J.

MR. HATCH: The Commission has received those letters.

MR. HINKLE: You have received them?

MR. HATCH: Yes.

Q (By Mr. Hinkle) What about Apache?

A Apache told us they would support us in the hearing and said they would mail the letter in.

MR. NUTTER: Here is a letter from Apache, too.

Q (By Mr. Hinkle) In your opinion, will the amendment of the temporary special field rules in this case to provide

for 160-acre spacing and 80-acre allowable be in the interest of conservation and prevention of waste?

A Yes, sir.

Q Would it also tend to protect correlative rights?

A Yes, sir. We feel that it will.

Q Does Coastal States have any particular development program planned for this area?

A Yes, sir. We have a development program planned. It is temporarily halted, though, while we're considering the bottomhole pressures that we just run and we are waiting to run additional bottomhole pressures in the last of May. We're somewhat alarmed at this rapid pressure decline and although we recognize that generally the first subsequent pressures run after initial cause alarm and generally it will flatten after this. We're hoping this will be the case but we're not planning to drill any more until we do determine the pressure performance on one additional test.

Q If pressure performance is along the lines that you anticipate, would you then plan on developing it on 160 acres, that is, drilling the additional wells necessary to drill it up on 160-acre spacing?

A Yes, sir. We would continue to develop the field on one, if this order is amended, on 160-acre spacing; however,

if this pressure performance does continue to decline at the same rate we probably would not drill it on 160.

Q Under the same conditions, if it doesn't decline as much as it might, would Coastal States continue to develop this field on an 80-acre basis?

A No, sir, we would not.

Q It would just be economically impossible?

A We could not justify a well on 80 acres.

Q Do you have anything else you would like to mention?

A Well, only that we are, of course, requesting field rules similar to those granted for the Vada-Penn Pool. The rules should include a provision for 160-acre spacing with a 160-acre proportional factor of 4.77 for allowable purposes. This is the normal proportional factor for 80-acre spacing as published by the New Mexico Oil Conservation Commission, and the present allowable for the field. We are not asking for these in allowable since we only have one well in the field now. Well, we have two that do make more than, I believe this would be 277 barrels of oil per day. Our latest test indicates that two wells, two of our wells would be capable of producing in excess of this.

Q You have testified that Coastal States would probably not develop this area on 80 acres. Do you know what the

attitude of the other operators in the area might be?

A No, sir, I don't. Possibly some of these 80-acre tracts could be farmed out and some of them might be drilled.

Q There might be one or two of them drilled?

A Yes, sir.

MR. HINKLE: We would like to offer in evidence Exhibits 5 through 10.

MR. NUTTER: Coastal States Exhibits 5 through 10 will be admitted in evidence.

(Whereupon, Exhibits 5 through 10 were offered and admitted in evidence.)

MR. HINKLE: I believe that's all.

CROSS EXAMINATION

BY MR. NUTTER:

Q Turning first to your Exhibit No. 5 and tracing the history of the production of this pool, we can see that after that first well was completed, that the production declined until about August of 1956 when the second well was brought in and then production for the pool went up again.

A Yes.

Q Then the production declined again and then it raised just a little bit here in late 1958, but not much. What was the cause for the production to jump up in 1966?

A It is our understanding that in 1966 Champlin was experimenting with a Kobe pump or a high voltage pump, and they put it on and you can see that it actually did increase the production considerably, in fact, it more than doubled it, almost tripled it, and increased the water proportionately, but for some reason they were not successful or not able to keep this pump operating properly, and so they took it off and went back to their **Beam** pumping unit and still the production stayed above what it was.

Q They kept it up over a thousand barrels a month, anyway?

A Yes, sir. It might have helped the well just to relieve some of this water from it temporarily.

Q Then the next spurt is when you started drilling your wells?

A Yes. As you can see, our April production is shown at 27,500 barrels. Now, that's down because we were shutting in in April, taking those bottomhole pressures. Our May production will be over 42,000 barrels.

Q That will be way up here?

A Yes, sir, it will be right on up.

MR. HINKLE: What is your average production per day now?

THE WITNESS: We average 14,000 barrels per day and about 4,000 barrels of water.

MR. HINKLE: How is the water being handled, by submergible pump?

THE WITNESS: We are producing the water with Kobe pumps, hydraulic pumps.

Q (By Mr. Nutter) If we turn to Exhibit No. 7, Mr. McGraw, your first isobaric map, I presume that all of the wells that are colored blue are producing from the Bough "B" zone, the ones that are colored yellow are producing from the Bough "C", and there's a couple of wells that are blue and yellow both, they are completed in both intervals?

A That's true.

Q The pressures that you have on your subsequent isobaric map, Exhibit No. 9, would be "B" and "C" zone only combined for those two wells that are producing from both zones?

A Yes, sir.

Q And then they would be "B" or "C" for the others?

A They're just "C" on the others. The two "B" zone wells, the two in the south, have no pressures. They weren't even completed in April. These having two zones open in the field in the well bore, as you can see, distorted this map

somewhat. We really thought it would distort it more than this, but it didn't have a great effect on it.

Q The Champlin well in the Southeast, Southeast of 6 was the first well completed, that was back in May of '55?

A Yes, sir.

Q It has produced how much, about a half a million barrels?

A Well, it has produced 120,000 barrels of oil and 150,000 barrels of water.

Q I don't know where I got the half million.

A The other well, of course, the combined total was about 400,000 barrels that was removed from this area, but the other well was shut-in back in '59, we feel like the pressure has stabilized in that area.

Q Then the well over here, the 1-7 in Section 7, was the second well completed, it was brought in in --

A That one was drilled. That was the second well drilled.

Q It didn't have any producing history until you re-entered it?

A That's right. They plugged it without even running pipe.

Q And you recompleted it when, Mr. McGraw?



A I believe the date shows on that, April '68.

Q It was drilled back in '55?

A Yes, sir.

Q Then they drilled their third well up here in  
Section 6?

A Yes.

Q And when did they abandon it, in 1959?

A Yes, sir. They abandoned it in, oh, about December  
of '59. Excuse me, that's December of '58.

Q December of '58?

A Yes.

Q Then you recompleted that well?

A Yes, sir.

Q When did you put it back on production?

A In December of '67.

Q All the rest of the production in here is from new  
wells that have been drilled since that time?

A Yes, sir, that is true.

Q How are the wells holding up as far as productivity,  
Mr. McGraw?

A Well, they're holding up real well, we feel like.  
I have the latest test here that you might get that plat that  
shows the initial potential, and I will read you off the

latest tests on those. The Coastal States Federal 6 No. 1, which is in the Southeast Quarter of the Northwest Quarter of Section 6, the current test on that is 40 barrels of oil and 645 barrels of water. The State 5 No. 1, that is the one in the Southwest Quarter, 288 barrels of oil, 60 barrels of water. The 5, 2 is 139 barrels of oil, 533 barrels of water. The State 6, 1 in the Northeast Quarter, 318 barrels of oil, 790 barrels of water. The State 7, 1, 70 barrels of oil, 30 barrels of water. The State 31, 1, 165 barrels of oil, 1,018 barrels of water.

Q My next question is, where is all this water going?

A The State 32, 1 is 220 barrels of oil, and 480 barrels of water. The State 8 No. 1, 175 barrels of oil, 168 barrels of water.

Q Now, where is all this water going?

A At the present time we're still storing it in the drilling pits. We are, of course, going to have to have a disposal well, we had been hoping, not really hoping, but watching if we got a dry hole, the first dry hole we got was going to be a disposal well. We have not drilled a dry hole to date. We have approached Lyon on their well, we would like to have had it. The Cabot well. We have checked every dry hole in the area, now we are all the way in Section 20

working on this dry hole that shows up there.

Q The old Trigg State well of Ohio?

A That's the closest one, and if we don't get a dry hole in the next couple of months or three we'll have to go to there.

Q You mentioned earlier that the Lyon State might have a possibility of being recompleted?

A That's true.

Q But this Cabot State, it is down in the trough?

A It's too low and it would be the ideal well.

Q Who owns the well, now?

A Cabot does, and so far they have not responded to our offer to buy it from them.

Q Now, in determining your reserves, Mr. McGraw, on your economic sheet here, I wonder if you could give me the factors that you used in arriving at your estimated recovery. Give me your average net feet of pay.

A The figures were calculated from our State 6 No. 1, from the logs on our State 6 No. 1.

Q Is it an average well?

A It's the best one.

Q It is?

A It's the best one.

Q Is it in both zones?

A No, sir, it's only in the "C" zone right now.

Q So these factors here, these economic factors might not include the "B" zone, then?

A This is true, but the wells that do produce from both zones don't make as much oil as this well and don't have as high a pressure. I thought about going back and average this but everything would tend to decrease it from this amount that we have no indication that we'll recover any more oil out of any well than this State 6, 1.

MR. HINKLE: This gives the most favorable aspect?

THE WITNESS: This is the most favorable. This is the one we used to sell our management.

Q (By Mr. Nutter) Net pay?

A Nine feet.

Q Water saturation?

A 38 percent.

Q Porosity?

A Nine percent.

Q Formation volume factor?

A 1.45.

Q And recovery factor?

A 35 percent.

Q That's optimistic, too, isn't it?

A Yes, sir.

Q And using those factors, you arrived at these estimated recoveries?

A Yes. That will calculate 299 barrels per acre foot and 135 barrels of acre feet recovery, nine feet of pay gives you 945 per acre. On 160 acres, that's 115,000 barrels. We feel, looking at the optimistic side, that this is what we can hope to recover it and we would like to develop it on that basis.

MR. NUTTER: Any other questions of Mr. McGraw?

REDIRECT EXAMINATION

BY MR. HINKLE:

Q In connection with your last testimony there, are all of these wells, when you penetrated the "B" zone and completed in the "C" zone, did you have any indication of production in all of them in the "B" zone?

A Not all of them, but I would say, well, if you look at the cross section you can see this, we do have other zones that we can open.

MR. NUTTER: In other words, you have drillstem tests in the "B" zone?

THE WITNESS: That's true.

MR. NUTTER: You tested it in every well?

MR. HINKLE: But it was not productive in every well.

THE WITNESS: Not in every case. The "B" zone is more erratic. In fact, our greatest production decline is on the wells in Sections 7 and 8 that are completed only in the "B" zone.

MR. HINKLE: The "C" zone seems to be the most uniform productive zone of the three.

THE WITNESS: That's true. It's the best reservoir.

MR. NUTTER: I would like to get the nomenclature straight in my mind if possible. Is the "B" zone Lower Wolfcamp, Mr. Zinke?

MR. ZINKE: I believe the "B" zone is actually what you call the Pennsylvanian in the Lazy "J". It's right below the Wolfcamp.

MR. NUTTER: Well, Wolfcamp is Permian, how could the proper name for this be Permo-Penn, then?

MR. ZINKE: It's in a transition zone. Remember, we mentioned the "A" zone that does not exist in the Baum but does exist in the Lazy "J"?

MR. NUTTER: Is the "A" Lower Permian?

MR. ZINKE: "A" could very well be Lower Permian.

It's difficult to draw an exact line between the Wolfcamp or Permian and Pennsylvanian here. It appears to be that the top of the "B" zone could be considered the top of the Pennsylvanian because it definitely is a good correlative marker across the country and used by many people to map on.

MR. NUTTER: The proper name for this would be Baum-Pennsylvanian?

THE WITNESS: This is true. We did point this out in our testimony today. We did also when the case came up originally. It should be changed.

MR. NUTTER: The first time I thought there was some Lower Permian production here but evidently not, no Permian production at all.

MR. ZINKE: Not in my opinion, there isn't.

MR. NUTTER: It's below the transition zone even?

MR. ZINKE: In my opinion it's below the transition zone. The "A" zone is probably in the transition zone.

MR. NUTTER: Any other questions of Mr. McGraw? He may be excused.

(Witness excused.)

MR. HINKLE: I just want to point out that in my experience before the Commission I think if there is ever a case that justifies wide spacing for oil field development,

this is one. It meets all of the qualifications of the factors which are involved in the rules and law, the conservation law, in that it has been clearly proven that one well will effectively and economically drain more than 160 acres, and it's been clearly shown here that the development on 160-acre basis will prevent the expending of some \$3,400,000 for the drilling of non-essential wells which can never be recovered.

MR. NUTTER: Thank you. Is there anything else to be offered in Case 3701 (reopened)? If not, we will take the case under advisement, and the hearing is adjourned.



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