STATE OF NEW MEXICO
ENERGY, MINERALS AND NATURAL RESOURCES DEPARTMENT
OIL CONSERVATION DIVISION
STATE LAND OFFICE BUILDING
SANTA FE, NEW MEXICO

24 May 1989

EXAMINER HEARING

IN THE MATTER OF:

In the matter of cases called on this date and continued or dismissed without testimony presented.

CASES
9675
9109
9572
9573
9682
9683

BEFORE: David R. Catanach, Examiner

TRANSCRIPT OF HEARING

A P P E A R A N C E S

For the Division:

I N D E X

MR. CATANACH: Call this hearing to order this morning for Docket No. 16-89.

Call the continuances first this morning.

I'll call Case 9675. Application of Yates Petroleum Corporation for compulsory pooling, Chaves County, New Mexico.

This case will be continued to June 7th, 1989.

(Hearing concluded.)

MR. CATANACH: Case 9109.

In the matter of Case 9109 being reopened pursuant to the provisions of Division Orders No. R-6129-A and R-8446, whereby the Benson-Strawn Pool was redesignated as a gas pool and developed on the statewide 320-acre spacing units, Eddy County, New Mexico.

This case will be continued to June 21st, 1989.

(Hearing concluded.)

MR. CATANACH: Case 9572. The application of Dugan Production Corporation for a non-standard gas proration unit, San Juan County, New Mexico.

This case will be continued to August 23rd, 1989.

(Hearing concluded.)

MR. CATANACH: Case 9573. The application of Dugan Production Corporation for a non-standard gas proration unit, San Juan County, New Mexico.

This case will also be continued to August 23rd, 1989.

(Hearing concluded.)

MR. CATANACH: Case 9682. The application of Kerr-McGee Corporation for statutory unitization, Chaves County, New Mexico.

This case will be continued to June 7th, 1989.

(Hearing concluded.)

MR. CATANACH: Case 9683. The application of Kerr McGee Corporation for a waterflood project, Chaves County, New Mexico.

This case will be continued to June 7th, 1989.

(Hearing concluded.)

STATE OF NEW MEXICO
ENERGY, MINERALS AND NATURAL RESOURCES DEPARTMENT
OIL CONSERVATION DIVISION
STATE LAND OFFICE BUILDING
SANTA FE, NEW MEXICO

7 June 1989

EXAMINER HEARING

IN THE MATTER OF:

Application of Kerr-McGee Corporation for statutory unitization, Chaves County, New Mexico, and	CASE 9682
Application of Kerr-McGee Corporation for a waterflood project, Chaves County, New Mexico.	9683

BEFORE: Michael E. Stogner, Examiner

TRANSCRIPT OF HEARING

A P P E A R A N C E S

For the Division: Robert G. Stovall
Attorney at Law
Legal Counsel to the Division
State Land Office Building
Santa Fe, New Mexico

For Kerr-McGee Corporation: Karen Aubrey
Attorney at Law
KELLAHIN, KELLAHIN & AUBREY
P. O. Box 2265
Santa Fe, New Mexico 87504

I N D E X

E X H I B I T S

E X H I B I T S Cont'd

MR. STOGNER; We'll call next Case Number 9682.

MR. STOVALL: Application of Kerr-McGee Corporation, that's with a hyphen, for statutory unitization, Chaves County, New Mexico.

MR. STOGNER: Call for appearances.

MS. AUBREY: Karen Aubrey of the Santa Fe firm of Kellahin, Kellahin & Aubrey, appearing for the applicant.

MR. STOGNER: Are there any other appearances?

Being none, Ms. Aubrey, anything further?

MS. AUBREY: Mr. Examiner, would it be possible to consolidate Case 9682 with 9683 so that we can put the testimony on through the two witnesses together?

MR. STOGNER: No problem.

We'll call next Case Number 9683.

MR. STOVALL: Application of Kerr-McGee Corporation for a waterflood project, Chaves County, New Mexico.

MR. STOGNER: Let the record

show that Ms. Aubrey, I assume you enter an appearance in this case, also.

MS. AUBREY: Yes, Mr. Examiner, I have two witnesses to be sworn.

MR. STOGNER: It appears there are no other appearances in either of these matters, will the witnesses please stand and be sworn?

(Witnesses sworn.)

MR. STOGNER: Thank you, gentlemen.

Ms. Aubrey.

MS. AUBREY: Thank you.

DAVID CHRISTIAN,

being called as a witness and being duly sworn upon his oath, testified as follows, to-wit:

DIRECT EXAMINATION

BY MS. AUBREY:

Q Would you state your name for the record, please?

A Yes, my name is David Christian.

Q Mr. Christian, where are you employed?

A I'm employed by Kerr-McGee Corporation in Oklahoma City, Oklahoma.

Q And what do you do for Kerr-McGee?

A I am the Senior Petroleum Landman for Kerr-McGee.

Q Have you testified before the New Mexico Oil Conservation Division before, Mr. Christian?

A No.

Q Would you outline your background in petroleum land titles for the examiner?

A Yes, I have a JD degree from the University of Tulsa. I've been employed by Kerr-McGee for the last 13 years; the last 7 as the Senior Petroleum Landman/

Q And I understand, also, Mr. Christian, that you have an engineering degree, is that correct?

A Yes. I have a BS in engineering from Arizona State.

Q Are you familiar with the applications filed by Kerr-McGee Corporation in Cases 9682 and 9683 for statutory unitization and a waterflood project in Chaves County, New Mexico?

A Yes, I am.

MS. AUBREY: Mr. Examiner, are the witness' qualifications acceptable?

MR. STOGNER: They are.

Q Mr. Christian, would you tell the examiner what your participation has been in determining the identity of the working interest owners and the royalty owners in the proposed statutory unit?

A Yes. Kerr-McGee hopes to unitize for waterflood purposes two sections of land, Sections 1 and 2 of Township 8 South, Range 33 East. From the land standpoint I was asked to research who the working interest owners are and who the royalty interest owners would be plus the surface owners.

Q And what was the result of you research?

A The lands in question are all State of New Mexico mineral interest lands. They are all leased to Kerr-McGee or other parties for a 1/8th royalty.

There are three working interest owners: Kerr-McGee Corporation, Warren American Oil Company, and Bristol Resources Company.

Q And are those land positions shown on Exhibit One which we have over on the wall there, where is a map of the unit area?

A Yes, they are.

Q Let me have you look now at what we've marked as Exhibit Number Two, Mr. Christian, --

A Okay.

Q -- which is the unit agreement. Is that

the proposed unit agreement for this unitized area?

A Yes, it is.

Q And Exhibit Number Three is the proposed unit operating agreement, is that correct?

A That is correct.

Q Can you outline for the examiner which working interest owners have ratified the unit agreement and the unit operating agreement?

A Yes. The agreements have been ratified by Bristol Resources Company at this time in writing. We have their signed agreements.

We have verbal assurances from Warren American Oil Company that they will sign the agreements.

Q And Kerr-McGee has ratified and signed the agreements, is that correct?\

A That's correct.

Q What percentage of working interest does that represent in terms of working interest owners who have actually ratified and signed the agreement?

A Roughly 97 percent.

Q And what is the stage of your negotiations with Warren?

A Warren was given the agreements at a working interest owners meeting in April, along with Bristol We have been talking with them since then about

minor points of the agreements and finally hammered everything out and they have said they'd send the agreements back to us.

MS. AUBREY: Mr. Examiner, at this point we'd like to proceed with statutory unitization because we do not have an actual signed agreement with Warren representing the remaining 3 percent of the interest.

MR. STOGNER: Thank you, Ms. Aubrey, you may continue.

Q What percentage of royalty owners have ratified the unit agreement, Mr. Christian?

A The State of New Mexico owns 100 percent of the royalty and they have stated they will approve the agreements after approval by the Commission.

Q Let me refer you now to Exhibit Number Three-A, which is an addendum to the unit agreement. Can you describe the purpose of that addendum for the examiner?

A Yes. This addendum is in the event for any reason Warren American decides finally not to sign the agreement, that Kerr-McGee and Bristol will be allowed to pay for their share of the costs and receive their share of production plus a risk penalty.

Q And this addendum is proposed in accordance with the statutory provision that allows the

unit operator to collect a nonconsent penalty from a working interest owner who does not pay his share of the cost.

A Yes, that's correct.

Q Mr. Christian, what is the risk penalty which is provided for in Exhibit Three-A?

A 200 percent plus --

Q And is that --

A -- plus the cost of the operation.

Q And is that a statutory penalty?

A Yes, it is.

Q Are there any provisions of the unit operating agreement which were specifically negotiated with the working interest owners or which are unusual?

A Basically the agreements are the API Moel Form Agreements which are generally accepted in the industry for secondary recovery operations.

Probably the major change in this agreement is that we do not anticipate any investment adjustments for existing equipment on the -- on the leases involved.

Q Are provisions contained in the unit operating agreement for allocating the expenses and inventory and other items of tangible property?

A Yes, that's covered by the unit oper-

ating agreement.

Q Do you consider those provisions to be fair and reasonable?

A Yes. They're the same percentages that will be used to allocate the production from the various tracts.

Q Does the unit operating agreement provide for the situation where a working interest owner fails to pay his share of the unit expenses?

A Yes, it does.

Q Does the unit operating agreement -- the unit agreement and the unit operating agreement provide for the designation of (not clearly understood) for unit operating?

A Yes.

Q Do you request that Kerr-McGee be designated as the unit operator for this unit?

A Yes, I do.

Q Does the unit operating agreement provide for a method of voting on unit matters?

A It does.

Q Does the unit agreement provide for -- have provisions in it for putting the unit into effect and terminating the unit?

A Yes.

Q Mr. Christian, were Exhibits One through Three-A prepared either by you or under your supervision?

A Yes, they were.

MS. AUBREY: Mr. Examiner, I offer Exhibits One through Three-A and that concludes my examination of Mr. Christian at this time.

MR. STOGNER: Exhibits One through Three-A will be admitted into evidence at this time.

CROSS EXAMINATION

BY MR. STOVALL:

Q Let me just quickly make sure we clarify the record here.

As far as Warren, do you anticipate they will join the unit?

A Yes, but we did have to continue this from one prior time because we hadn't gotten their signature back yet.

Q Do you have any anticipation of any time frame?

A Well --

Q Have you had any discussions with them which would lead you to believe it's going to be fairly immediate?

A Well, I hope we get it by the end of this month at the very latest, but we had also hoped to have it prior to the May hearing also.

Q I understand. You will notify the Division if they do join.

A Yes, I will.

Q With respect to that, do you have participation formulas in your unit agreement and unit operating agreement?

A Yes.

Q Are you prepared to testify here or do you have another witness who will --

MS. AUBREY: Mr. Stovall, the formulas are in the agreements. The engineer will speak directly to the way that the formulas were derived. Mr. Christian is generally familiar with the formulas, however, and I believe can speak to them in a general sort of way.

MR. STOVALL: Well, I think if they're in the agreement we can determine what they say. The agreements speak for themselves. I think the examiner is probably more concerned about the manner in which they (not clearly understood).

MR. STOGNER: A little bit of both at this point. First of all, where are they, Exhibit

Two or Three?

A Exhibit B to the unit agreement, which is Exhibit Two.

MS. AUBREY: Mr. Examiner, the language regarding the tract participation is also set out on page 6 of the unit agreement, which is Exhibit Two. The actual numbers are set out in Exhibit B to the unit agreement.

Q Let's take a couple minutes here.

(Thereupon a brief recess was taken.)

MR. STOGNER: Shall we continue?

MR. STOVALL: Ms. Aubrey, let me just clarify that this witness is not the witness to testify as to the methodology that was used to develop the participation formula, is that correct?

MS. AUBREY: That's correct, Mr. Stovall, although he is familiar with it and can generally describe it for you if you would like.

MR. STOVALL: Well, I think, I think we're more interested in how -- how it was arrived at. If the engineer is more completely knowledgeable, I assume it's an engineering witness.

MS. AUBREY: It is, sir.

MR. STOVALL: Then we'll allow him to testify as to that.

MR. STOGNER: If at such time, though, we may have to recall him. We may have questions for him then.

MS. AUBREY: He will certainly be available, Mr. Stogner.

MR. STOGNER: Thank you, Ms. Aubrey. Other than that he may be excused at this time.

MS. AUBREY: Mr. Stogner, may I retain him here for one moment --

MR. STOGNER: Oh, yes.

MS. AUBREY: -- and have him identify Exhibit Number Four before he's excused and discuss that briefly with you.

A Yes, Exhibit Number Four is a photocopy of the ratification to the unit agreement and unit operating agreement by Bristol Resources Corporation.

MS. AUBREY: And was Exhibit Number Four prepared by you or under your supervision, Mr. Christian?

A Yes.

MS. AUBREY: Mr. Stogner, I'd offer Exhibit Number Four at this time.

MR. STOGNER: Exhibit Number Four will be admitted into evidence at this time, and I have no further questions still of this witness. Are there any other questions?

He may be excused at this time.

Ms. Aubrey.

BOB QUANCE,

being called as witness and being duly sworn upon his oath, testified as follows, to-wit:

DIRECT EXAMINATION

BY MS. AUBREY:

Q Would you state your name and occupation for the record, please?

A My name is Bob Quance. I'm employed by Kerr-McGee as an engineer.

Q Mr. Quance, have you testified previously before the New Mexico Oil Conservation Commission?

A No.

Q Would you outline your professional degrees and your work experience for the examiner.

A Yes. I received a Bachelor of Science degree in petroleum engineering from the University of Ok-

lahoma in 1952 and a Masters degree in the same major in 1955.

I've been employed with Stanoline and then PanAmerican, which is now called Amoco, for 11 years.

After that time I was employed by Sun Exploration and Production for 21 years, and then last August a year ago I went to work for Kerr-McGee in my current capacity as an engineer.

MS. AUBREY: Mr. Stogner, are the witness' qualifications acceptable?

MR. STOGNER: The witness is considered qualified.

Q Would you begin your testimony by briefly describing the history of the pool which you seek to unitize and in which you seek to operate the waterflood?

A Yes, I certainly will.

Chaveroo Field was discovered in March of 1965. Production is at a depth of 4250 feet. plus or minus, by a well completed for a rate of 148 barrels of oil, 2 barrels of water, 800-to-1 gas/oil ratio.

The development proceeded very quickly through the years 1965 to 1966, with most wells requiring frac treatments to become commercial producers.

This discovery well is located about 2-1/2 miles northwest of the proposed KM Chaveroo San

Andres Unit. The production is contained both in Roose=velt and Chaves Counties. This is a sour crude about 24 to 26 degree API gravity. It was developed on 40-acre spacing; has a cum production of approximately 23-million barrels of oil and 34-billion cubic feet of gas and has produced about 27-million barrels of salt water through January the 1st, 1988.

Q Mr. Quance, is the unit area proposed by Kerr-McGee located entirely within Chaves County?

A That is correct.

Q In your opinion, Mr. Quance, are the wells which are going to be involved in this project presently at an advanced stage of depletion?

A That is correct. For example, on the State F lease the wells, 11 wells, I believe, producing, they average 245 barrels of water per day.

On the Levic State Well that's owned jointly by Bristol and Warren, it's producing just over 3 barrels per day.

The State C lease, which is also Kerr-McGee, is 2.7 barrels per day.

And on the Kerr-McGee State FU lease the production is 2.3 barrels per day.

Q Let me have you take a moment and briefly describe the proposed waterflood project for the

examiner. How many wells do you propose be involved in this project?

A The proposed project consists of 19 wells of which 9 existing wells will be converted to injection.

It also includes one salt water disposal well that's currently injecting into the San Andres and will be retained for flexibility purposes. This pattern, by the way, with the wells shown on this map, in red --

MR. STOGNER: You're referring to Exhibit Number One.

A Exhibit Number One is a 5-spot pattern and was selected to conform to the (not clearly understood) Unit, which is located in Section 3, Section 33 and Section 34.

Q Mr. Quance, let me have you look now at Exhibit Number Five, which is a net pay isopach. Can you explain for the examiner what conclusions you can draw from this exhibit.

A The net pay isopach was prepared by me using a net porosity cutoff of 4 percent with the addition that pay was encountered down to a porosity of 2.5 percent where it indicated there were fractures present that would add to the producing intervals.

The contour interval on the map is 10

feet and, as you can see, in this proposed unit area, the maximum pay thickness is 69 feet in the Kerr-McGee State F No. 5. The minimum thickness is the State C No. 4 Well of 24 feet.

Q In creating your net pay isopach have you used those controls which were available to you in order to map the contours in Section 1?

A That is correct.

Q Do you have an opinion, Mr. Quance, as to whether or not the acreage contained in Section 1 will be productive in this area?

A It is my opinion that certainly a portion of Section 1 will be productive. I refer to Exhibit Number Six, which was used to prepare the Exhibit Number Five.

Q Exhibit Number Six, Mr. Quance, is on the wall next to the examiner. Would you move over there and speak up so the reporter can hear you and review the data on Exhibit Six for the examiner?

A Exhibit Six correlates from the top of the PI marker, which is a well known marker in the San Andres formation in this portion of New Mexico. It includes the wells with this F No. 1 being the northwest corner well in the unit. It goes all the way across to the salt water disposal well. It continues down sequentially and it

includes the wells along the Y that is just to the south of the boundary.

I would also direct your attention to the well F-14, which was a 20-acre infill well that was drilled in approximately 1980. In addition, on this map, Mr. Examiner, is shown the cumulative production as of the end of last year, December, 1988, and from these cumulatives plus the correlation of pay you can see that the prospects are very good for additional development, which was the basis of why I referred to this exhibit, locations that would be directly south of the FU No. 9 location.

For example, the State F-8 Well has a cumulative 93,000 barrels which should be interpreted and is not at the edge of the interval.

The FU No. 9 has a cumulative production of 64,000, and in connection with the preparation of the secondary study I felt that there would be a location at this particular location.

By a similar line of reasoning, it would be reasonable to anticipate that there could be development to the east of State F-13. F-13 has a cum of 63,000 barrels.

Q Thank you, Mr. Quance. Does Kerr-McGee have the entirety of Section 1 under lease?

A That is correct.

Q Let me have you look now at Exhibit Number Seven, which is a 4-page exhibit covering the four leases which are involved in this unit.

Would you review that for the examiner?

A Yes. These four exhibits were prepared using the Dwight's information system and as a result, Mr. Examiner, the production starts in 1970. These wells were all drilled with the exception of that 20-acre infill well, in 1966, and as you can see from that time the wells have been on somewhat of a fairly constant percentage decline, and this shows that -- two things. It shows that there has been the lack of pressure support. The declining oil production, in my opinion, represents the loss of reservoir pressure, of reservoir energy. The gas/oil ratio did increase in the early period, which is indicative of a solution gas drive reservoir. These wells produce water at this time; typically about a barrel of water per barrel of oil, which is rather typical of the San Andres. In other words, the San Andres has mixed oil and water production.

In this case the water production began a couple of years after the development and while the water production is significant, based on our studies, indicates that it will preclude a successful secondary recovery process.

Q Let me have you look at Exhibit Number

Eight, now, Mr. Quance. That's a multi-page exhibit and I'd like to ask you to address yourself to the information contained in that exhibit with regard to the determinations of the original oil in place and the information contained in the exhibit regarding capital requirements and costs.

A Yes. This exhibit was prepared by me. The purpose was to inform Bristol and Warren American as to the proposed unit. A meeting was held on April 4th, 1989 and I'd like to address your attention to Exhibit One, which was a part of this, which reflected the production for 1988 and was used to provide the cumulative production as of the end of 1988, which was used as a basis of participation so that the other two participants would have a chance to verify the cum production.

Q And this information is set out again in a later exhibit, isn't that right?

A Correct; correct. I just mentioned this in passing to say that this has been supplied to Bristol and Warren.

Q Referring to the attachment Exhibit Three, there are three projects that were of interest that were used an analogy. We noticed in particular that these projects had ultimate primary recovery ranging from 640 to 1620 barrels per acre on primary. The area that we're

talking about has a primary recovery of about 2300 barrels per acre, as you notice down below. So we're talking about an area that is better on primary production.

We also notice that from the three projects, the Fina Federal, the Coastal Flying M and the Champlin Levic State 29 N, which was a developed 5-spot in Chaveroo, that the secondary to primary or SPR ratio ranged from .86 to anticipated 1.22 for the Horton Federal, and on that basis indicate that the secondary and primary ratio would be of the order of about 1.1 for the proposed KM Unit.

In addition as to the cost, it indicates that the cost of initiating the program would be $719,000, with an additional $186,000 required for pumping unit enlargement after response would occur, with about $9.2-million for operating costs over an anticipated flood life of 20 years, for a total cost of about $10-million.

With the secondary to primary ratio of 1-to-1, one might anticipate up to 1.66-million barrels of secondary oil and using the 1/8th royalty to the State, the development cost for this project and operating costs, unescalated, is $7.00 per barrel of oil.

Q In your opinion at that cost, Mr. Quance, is this a profitable project?

A At today's prices it's our opinion that

it is.

Q Mr. Quance, in your expert opinion why is the unitized management of the Chaveroo Unit necessary?

A It's necessary basically because of the 5-spot pattern and the moving oil across lease lines.

Q In your opinion will it work to protect correlative rights and promote conservation and prevent waste?

A Yes.

Q Does the -- will the unitized management of this area permit you additional flexibility in the use of the 16 wells and allow for variations in injection rate?

A It certainly will.

Q In your opinion will unitized management result in maximum efficiency of recovery and elimination of waste of hydrocarbons?

A Yes.

Q Let me have you talk now about the participation formula which was proposed by Kerr-McGee, and which has been accepted by Bristol, and have you look at Exhibit Number Nine, which is a 2-page exhibit.

A All right, Exhibit Number Nine is the participation formula which shows the cumulative production by well and then total by lease with the tract participation based on the calculation of that tract's share of

the total cumulative production.

Q Can you explain to the Examiner why you chose that particular type of a participation formula?

A Yes, we chose this formula because based on our study of adjacent fields, projects, as I mentioned earlier, that the primary recovery we found is the best indicator of the secondary reserves that are anticipated.

Q And it's your estimation that secondary recovery would be at approximately a 1-to-1 ratio with primary recovery, is that correct?

A That is correct.

Q So the participation formula will give the working interest owners the same relative share of secondary recovery that they had of primary recovery, is that correct?

A That is correct. I would also like to add that with these wells having been developed at the same time and when we refer to the net pay map and the cross section, we're dealing with a rather massive gross interval of perhaps 150 feet, some 43 to 44 feet of net average, we're dealing with something that was rather -- fits rather well with a formula in that the wells look relatively similar and about like the cum production would be the best indicator of future anticipated secondary recovery.

Q In your opinion, Mr. Quance, are the

wells involved in this unit in approximately the same state of depletion?

A Yes.

Q Do you have an opinion, Mr. Quance, as to whether or not the participation formula which you have proposed is a fair and reasonable one?

A In my opinion, yes.

Q Let me have you look now at Exhibit Number Ten, which is the --

MR. STOGNER: Ms. Aubrey.

MS. AUBREY: Yes.

MR. STOGNER: Exhibit Number Ten, it appears to me, and the exhibits following that, primarily goes into the waterflood activity, is that correct?

MS. AUBREY: That's correct, Mr. Stogner.

MR. STOGNER: Well, can we remain on this just for a little while while we're on this frame of mind, would you permit me?

MS. AUBREY: Certainly, be glad to.

CROSS EXAMINATION

BY MR. STOGNER:

Q Mr. Quance, in Exhibit Number Nine I'd like to go into a little more detail here on your participating formula. Bear with me here.

Your formula is based the primary production and the primary production only, am I correct on that

A That is correct.

Q And the acreage for the drainage radius, that factor does not enter into this formula, is that correct?

A That is correct.

Q Okay. It's just whatever that well has produced, then therefore it is given a percentage of (not clearly understood.)

A Yes. If you may permit me to add a little bit more, I have attended the Murphy hearing on the (unclear) Unit, and they had a well factor, I believe to the extent of about 20 percent in and our case Kerr-McGee had a well drilled on 20 acres, the other party did not and we felt like since the wells were at or near the economic limit, in this particular case we're not dealing with the remaining primary equity, so we felt like that a well factor was not required.

Further, as to the drainage having been experiences with the San Andres for quite a long time,

putting it mildly, it's very difficult to do drainage studies or quantify net pay and as a result I think the example I've pointed up to earlier, as to the lack of development south of the FU No. 9, would appear to be a difference of opinion as to drainage, and in my view that might be potentially undrained.

The other thing I might say that is encouraging for this project was that the infill Well No. 14 on 20-acre spacing did recover slightly in excess of 15,000 barrels. Possibly some of that oil is primary, so that one can anticipate that additional wells, assuming good flood, fill up and good response could well be drilled either infill or extending out to Section 1 and as you're quite familiar, to try to assign drainage to the San Andres really hasn't been done particularly successfully.

We have instead put more emphasis on the 2300 barrels per acre foot and we feel like something on the order of maybe 1500 barrels per acre foot would be a cutoff at today's prices of what would be a (unclear) flood well.

We feel like we're much above that and therefore feel like we have an economic venture.

Q Thank you, Mr. Quance. So I can get it straight in my mind, on the far right column of Exhibit Number Nine, that's the tract participation factor. That

is the factor assigned that particular tract and those tracts being described further in the unit agreement, is that correct?

A That is correct.

Q Let's go off the record for a sec.

(Thereupon a discussion was had off the record.)

MR. STOGNER: This hearing will come to order.

Ms. Aubrey?

MS. AUBREY; Thank you, Mr. Stogner.

REDIRECT EXAMINATION

BY MS. AUBREY:

Q Mr. Quance, can you review for the examiner your expert conclusions as a petroleum engineer which lead you to conclude that the reservoir involved in this case is reasonably well defined by development?

A Yes, I can. Referring back to Exhibit Five, which is the net pay isopach, I believe this shows that it is reasonable to anticipate that approximately 1/2 of Section 1, or perhaps more, can be developed.

As I testified earlier, the project area

is at or near the economic limit and in my opinion it would not be economic to drill such wells at this time, so that it is anticipated that it will be prudent for both Kerr-McGee and the state to proceed with the flood and assuming satisfactory response to the flood, then such development would be anticipated in Section 1 and would proceed with the location south of the FU No. 9, or a location at that, a (unclear) location contemplated initially.

Furthermore, I reviewed some of the notes and information as to the pay section we're talking about and these are isolated dolomite zones of some 100-to-150 feet in gross thickness of which half to a third are productive.

The perforations, incidentally, are shown on the cross section where the isolated porosity zones have been perforated and it is anticipated then, that these zones would need further development and could be used both as injectors or producers as the flood progresses.

I would also like to point out that the State C and the FU are both 100 percent Kerr-McGee and all state leases.

Q Mr. Quance, is the salt water disposal well, which is located in the northwest of the northwest of

Section 1, a necessary component of the economics of your present proposal for unitization?

A That well, I believe, is in the northeast of the northwest and it is and the planning contemplated in the investments was based on the ability to use this salt water disposal well. We are currently producing water and it would change the economics if it were necessary to exclude that well from the unit proposal and drill a salt water disposal well for this project.

Q Mr. Quance, in order to maintain your 5-spot pattern of development, is it necessary for you to locate an injector in Section 1?

A I would anticipate, yes. Yes.

Q And does your proposal -- proposed plan of development that we're talking about here today include an injection well in Section 1?

A Yes. In -- in addition, I might further add, that based on a very thorough review of the Champlin's waterflood efforts in the Chaveroo Field, much of their flooding was an a dump flood basis and not on a developed pattern basis, so that their wells were put on injection in a random and water was injected in rather small amounts in cases and the flood response was not of sufficient volume or capability to permit the existing owners of this large field to expand the waterflood, so that would be, and it's

my technical opinion, that to the extent that it's feasible to continue the 5-spot development would provide the maximum recovery.

Q And you would be able to continue that onto the east in Section 1, is that correct?

A Correct.

Q With regard to your tract participation formula, does the inclusion of Section 1 in the unit area have any effect of diluting any working interest owner's interest in the unit?

A No.

MS. AUBREY: Mr. Stogner, I believe that that's all I have at this time.

I tender the witness for cross examination.

MR. STOGNER: I'd like to pass any questions at this time, Ms. Aubrey, so let's go ahead and hear the rest of the testimony coming up concerning the waterflood and that might answer whatever questions I might have; however, I might have some later on.

Ms. Aubrey.

Q Let me have you refer to Exhibit Number Ten, Mr. Quance, which is the Oil Commission Form C-108.

A Yes.

Q Is this signed by you, sir?

A Yes, it is.

Q In connection with the filing of the Form C-108 with the State have you prepared additional exhibits which we have here before us today?

A Yes.

Q Exhibit Number Eleven is a letter to Floyd Prondo and William J. Lemay from you involving the plan of development for the unit, is that correct?

A Yes.

Q Could you review the proposed plan of operation for the unit which is contained in Exhibit Number 11?

A Incidentally, I'd like to add to my remarks earlier that the plan of development and the inclusion of Section 1, has been discussed and I believe we have agreement from the State Land Office that it would be satisfactory to include Section 1. In addition, the contents of this letter have been reviewed with the State Land Office as to the plans.

In essence, the plan involves 1280 acres, more or less; involves the conversion of nine existing wells to injection; 10 producing wells would remain and one salt water disposal well.

The water injection stations would be

put in the northwest corner of Section 2 which is -- would be adjacent to the Kerr-McGee tank battery and would be a suitable site. We anticipate the injection of about 3000 barrels of water per day, not limited to this. Supplemental water is to be purchased. We have a contract from a Mr. Dale Brown off to the northeast. I would refer the examiner to this proposed fresh water injection line of a location of about 8 miles.

MR. STOGNER: And you're referring to Exhibit Number One and you're pointing to a -- looks like a diagonal line coming out of the unit, going to the northeast to Section 9 of 7 South, 34 East?

A That is correct.

MR. STOGNER: And that is a fresh water line?

A Yes, that would be a fresh water line.

Q Mr. Quance, in connection with that line are you or someone else in your company, in negotiation now with the State Land Office for a pipeline easement over the state lands that that line will cross?

A Yes.

Q And you have identified the source of water and have arranged for purchase of the water, is that correct?

A Yes, that's correct. We have also

tested the wells and feel like we have an adequate supply to take care of the future requirements for the project.

Q What kind of monitoring plans does Kerr-McGee have for the injection wells once the waterflood begins?

A We plan to follow the state requirements and to test the wells and after approximately 90 to 120 days we'd run a tracer survey and look for the incidence of channeling and if channeling would occur we'd take remedial steps to handle that situation.

Q When does Kerr-McGee intend to commence waterflooding?

A We anticipate commencing in the latter half of 1989.

Q Let me have you refer now just to Exhibit Number Twelve, which is a tabular and schematic data sheet for the injection wells in the proposed project.

A I have proposed here, we have proposed under my direction, exhibits which show the surface casing, the log string, the sacks of cement, top of the cement, and referring to the reverse side of Exhibit -- first page of Exhibit Twelve, is the standard that reviews the existing tubing after it's been inspected with plastic coating and with a packer set at approximately 100 feet above the top perforation.

Q And is this representative of the proposed completion as an injector for each of the injection wells?

A Yes. In addition, I might further testify and add that shown here on each of these well schematics is the perforated interval and in my opinion the pay in this area has been all, essentially all, perforated and did not require remedial work to open up additional pay to maximize the ultimate recovery.

Q And you have tendered for the examiner a schematic of each of the wells that will be used as injection wells, is that correct?

A That's correct.

Q Let me have you look at now at what has been identified as Exhibit Thirteen and review that briefly for the examiner.

A Okay, Exhibit Thirteen is a tabulation of well data for the wells within the proposed unit area. It shows the leases, the tract numbering system that's proposed, the existing well number, the propose new unit well number, which I have understood from discussion with the state that it would be easiest to number the wells sequentially and that is the proposed numbering system. The well status is indicated, completion date is shown, and other information as required.

In addition you will notice that the pay in essentially all the cases has been acidized and fraced and this indicates the low permeability, extremely low permeability of the pay that we're talking about. You do notice that the wells came on at a very high initial potential which was, I think, an indication of a fairly successful completion job.

And the well status is indicated and it in addition shows the cum and the useable well.

Q Now Exhibit Number Fourteen is a tabulation of the well data for the wells within the proposed unit area, is that right?

A Yes, that's correct. It also shows the type of log which refers to the cross section --

Q Which is Exhibit Six.

A It also shows the hole size, the casing record, sacks of cement, and the depth of the surface casing, and where there were not records on the scout tickets or we did not operate the wells, I have made calculations that would indicate that the cement would have circulated to the surface on the surface casing, and therefore I believe that the program would use wells that have cemented surface pipe.

Q Based on your calculations and your examination of the record, is it your opinion that all the

wells involved here are sufficiently cemented in order to protect fresh water sources?

A I would think so and in addition, on the wells that we operated, our history was extraordinarily detailed. There was no indication of any problems or remedial work having to be done as to assure there's no (not clearly understood).

Q Let me have you look now at Exhibit Number Fifteen.

A Which is a tabulation of wells outside the proposed unit but within the half mile radius of each proposed injection well, and this refers to the surface casing.

Q And for those wells which -- which are listed here, you've determined the top of cement, is that right?

A Yes.

Q Did you do that calculation yourself, Mr. Quance?

A Yes.

Q Let me have you look now at Exhibit Number Sixteen.

A That is a tabulation of the wells outside the proposed unit area but within the half mile of each proposed injection well. It follows along the line of

the data for the unit wells in terms of completion date and other data required for the C-108.

Q Exhibit Number Seventeen consists of tabular and schematic data on the three plugged and abandoned wells in the area, is that correct?

A That is correct.

Q And have you identified tops of cement for each of those?

A Yes, we have the top of the cement both in the long string and the surface casing.

Q And for each of the wells have you included a copy of the New Mexico Oil Conservation Commission Form C-103 showing the plugging procedure?

A Yes.

Q Exhibit Number Eighteen, Mr. Quance, is a multi-page exhibit which refers to water analysis, both of the injection water and fresh water in the area, is that correct?

A Yes, that is correct.

Q Did you prepare the information on this exhibit?

A Yes, or had it prepared.

Q What conclusion did you draw from the analyses of the waters?

A Referring to the second page, we found

that the water supply wells, two drilled by Kerr-McGee, and the windmill water of Dale Brown, which is representative of his water that comes from supply wells used for irrigation, is fresh and would be suitable for flood.

Also Oil Lab has provided an analysis and they have mixed the F lease produced water with the fresh water from Dale Brown and reported no precipitants were formed when this water was mixed and therefore conclude the two appear to be compatible.

Also from a review of where fresh water has been used for waterfloods in this area of New Mexico, find that it has been a suitable water to mix with San Andres for injection purposes.

Q In your research for this project, Mr. Quance, have you examined the data and found no evidence of open faults or any other hydrological connection between the disposal zone and any sources of fresh water?

A That's correct.

Q Let me have you look now at Exhibit Number Nineteen.

A Exhibit Nineteen, recognizing the lack of a water supply in this area, and the cost of obtaining water from the drilled wells in Section 1 and Section 2, as a fresh water supply source, in particular a good supply well was obtained, water supply well, FU No. 1, which is

tested at 86 gallons a minute and might be used to augment the water from Dale Brown. It is our conclusion, though, given the results, that this would be an insufficient supply to use for this waterflood.

Q And is this exhibit being provided in order to assist the State Land Commissioner in the identification of water supply sources?

A That's correct.

Q Let me have you look now at Exhibit Twenty-one -- let me have you look now at Exhibit Number Twenty, Mr. Quance, and review that briefly for the examiner.

A Exhibit Twenty gives a general review of the Chaveroo Field. It also provides a general description of the pay zone we're talking about. The pay zone, more particularly, is defined as the P-1 and the P-2 formation, which is the zones that are productive in the proposed unit. It describes in more detail as to the -- why we think this is a good flood project and why we think the unitization and waterflooding should protect rights, promote conservation, and prove beneficial to the interest of all parties involved.

Q Let me have you look now at Exhibit Number Twenty-one. Would you review that for the examiner?

A Exhibit Twenty-one shows the -- the

proposed new unit well number, the completion date and the legal description of the wells. It also shows the production for these wells for December, 1988, and more particularly will show and demonstrate that these are stripper wells at or near the economic limit.

Q Now is this -- is this cumulative production through December of '88 or is this simply December of '88 production?

A December, 1988, production. Incidentally, it does show the salt water disposal well and the interval that is being injected and that is down dip but it is injected into the San Andres formation.

Q Let me have you review Exhibit Number 22 for the Examiner.

A Yes. This is provided by Mr. Scott from the Roswell Geological Society, and I think provides quite an interesting and informative discussion of the Chaveroo Field and you notice in particular the rapid development of the field that took place in 1966.

This is a fairly blanket reservoir and I think rather typical. In addition, I direct your attention to the fact that although the Bough C did produce in the discovery well, there is no production above or below the San Andres in this Chaveroo Field or the unit area.

Q Let me have you look now at Exhibit

Number Twenty-three, which is a letter from Steve Reynolds, State Engineer's Office, to you regarding the location of declared underground water basins.

A Yes. This area is not located in the declared underground water basin in the San Andres.

Q And Exhibit Number Twenty-five, Mr. Quance, is a set of mailing certificates which are provided to the Examiner in compliance with --

A Twenty-four.

Q I'm sorry, Twenty-four, in compliance with the requirements of New Mexico Oil Conservation Commission Rule Number 1207, confirming the mailing by certified mail to all affected parties of both the application for the waterflood and the application for statutory unitization, is that correct?

A Yes.

Q And finally Exhibit Number Twenty-five, Mr. Quance, can you tell the examiner what that is?

A This is a notice that we have given to Texaco relative to the hearing and they are an offset operator.

Q And it reflects Texaco's waiver of any objection --

A That is correct.

Q -- to the application.

A That is correct.

Q Mr. Quance, were Exhibits Five through Twenty-three prepared by you or under your supervision and direction?

A Yes.

MR. AUBREY: Mr. Stogner, I offer Exhibits Five through Twenty-three at this time --

MR. STOGNER: Exhibits -- I'm sorry.

MS. AUBREY: -- sponsored by Mr. Quance and the last two exhibits also, even though they were not prepared by him. Twenty-four is from our own office.

And I have no more questions of the witness.

MR. STOGNER: Exhibits Five through Twenty-five will be admitted into evidence at this time.

RECROSS EXAMINATION

BY MR. STOGNER:

Q Mr. Quance, when I look at Exhibit Number Ten, that's a tabulation of well data for wells outside the proposed unit area but within one-half mile. You're re- ferring to the circle or the outer boundary of

several circles that are put together on Exhibit Number One, are you not?

A That's correct.

Q Okay. Did you make a calculation on the top of the cement behind the production string on those wells?

MS. AUBREY: Excuse me, Mr. Stogner, I'm confused about which exhibit you're referring to.

MR. STOGNER: I'm -- I'm looking at Exhibit Ten, or is there another exhibit which shows me --

A There's an Exhibit Sixteen --

Q Sixteen, okay.

A -- tabulation of well data for wells outside proposed unit area but within a half mile of each proposed injection well.

Q Okay, that is Sixteen, I'm sorry, it looked like Ten on this.

A Okay.

Q Okay, yeah, that's what I'm referring to, the Exhibit Sixteen.

Now you show the sacks of cement but as far as the tops, they are not listed; however, all of these wells that you have listed here are presently producing

from the San Andres formation or that zone in which you're planning to inject, is that correct?

A Yes, that is correct.

Q Do you have an opinion whether the sacks of cement used or shown for each of these wells, that that was adequate enough to give, say, a 500-foot level or -- or amount of cement above the upper perforation of each of these perfs shown?

A Yes. My information comes from two sources. The first one is the information provided by Murphy for the Halley Unit which testified that they had adequate cement protection.

And the lack of any problems of lost circulation zones and the size of cement and the casing sizes that are used in this area are common; therefore this would provide adequate protection above the San Andres to isolate the zone.

And, incidentally, we have reviewed, I have reviewed the logs and the wells to the north of the proposed unit area and there is nothing in those records that would indicate any particular problems of protecting the producing interval with this cement job.

Q Now none of the wells in the area, either within the half mile radius or in the unit area, went below a total depth of about 4500, is that correct?

Or did you find any?

A No, I didn't.

Q And your Exhibit Number Seventeen shows the plugged and abandoned wells.

A Yes.

Q And do they -- I have a bunch of exhibits in front of me so I haven't been able to correlate some of the maps with some of these.

A Yeah, those three wells are the Enfield Hale No. 1, the McClellan (unclear) State No. 1, and the Glenn C. H. Hale No. 1.

Q Now the wells that you just told me, those are the only P&A'd wells within the half mile radius of review?

A Yes.

Q Give me a little bit of time to mark it.

Okay, I'm referring to any of these maps and my particular one, I'm referring to Exhibit Number Five. I find that to be a very easy one for me to mark with as I'm going here.

There's a plugged and abandoned well in Section 1.

A Yes.

Q Now what is your -- what is your proposed plan for that well, and for the record, that well is

in Unit C of Section 5.

A Okay, this is the C No. 5 Well, I believe.

Q Do you plan to put that back on production?

A No.

Q No.

A That well, on initial completion did not produce any oil and was subsequently converted to salt water disposal.

You're referring now to the well marked Number 5 --

Q Yes, I am.

A -- with 2 feet of pay indicated.

Q But that well is presently plugged and abandoned but you're going to turn it into injection.

A No, it is currently a salt water disposal well, yes.

Q Oh, okay. My exhibit shows that to be P&A'd. I'm sorry.

A Uh-huh.

Q Let me refer to Exhibit Number Eighteen. This is your injection water. You're planning to use fresh water from the Ogallala formation, is that correct?

A Yes.

Q Will there be any recirculating of produced waters --

A Yes.

Q -- for injection purposes?

A Yes, sir.

Q And that will be put into the injection wells.

A Yes. If you want further particulars on that, I think I could add a little bit of information.

Q Okay, feel free.

A Referring to Exhibit Eight.

Q Exhibit Eight.

A Table 1.

Q Table 1.

A Are you there?

Q Yes.

A Okay, about 1, 2, 3, 4, 5 columns over shows the percent water purchased, starting at 100 percent, going down to zero percent and then the next column over shows the amount of water that's anticipated to be purchased.

Q Okay.

A And that, I believe, goes to your question as to the amount of water that's anticipated to be purchased and then recycled water.

Q Why can't you go ahead and start initially with produced water from the San Andres?

A Well, at this time the produced water is a very small amount, on the order of 100 barrels of water a day.

Q And there is no other produced water in the vicinity.

A That's correct, and after we drilled several wells, we found that there's not a lot of water in this vicinity and this may in fact be one of the reasons that there was a lack of sustained and coordinated injection in this area.

These projects that I referred to earlier, particularly done by Champlin, which is now (unclear) Resources, was really on a dump truck, produced water basis.

Q Are you saying that as water became available it was utilized?

A Yes, uh-huh.

Q What is your maximum injection pressure which you're proposing, Mr. Quance?

A I believe we are proposing 800 pounds pressure.

Q Does that meet with our policy of the .2 psi per foot?

A Yes.

Q Okay.

A And if we went to a higher pressure, step rate tests or other information would be provided to the department.

Q Mr. Quance, I'm going to -- I hate to belittle (sic) this issue but I'm going to bring it up.

Your initial plan of development appears to be pretty much wrapped up in Exhibit Number One.

A That is correct.

Q With some injection wells being converted from producing wells. After this is done, will there be any plan on developing the far west side of Section 1 to capture production that may be moved because of your No. 3 and Nos. 13 injection wells in Section 2?

A Yes.

Q Then I assume it all depends on how those wells react and what kind of geological parameters are found through the log and actual drilling of the well whether development further to the east would take any kind of steps to do that.

A Yes. In addition, Mr. Examiner, I'd like to point out that there's the Yates well in the northeast of the northeast of Section 10 that has been on production since 1984 and has cumed in excess of 30,000 barrels; per-

haps 40,000 barrels of oil, currently producing around 24 barrels of oil per day, and this was an area that had been essentially abandoned and given up prior to that time, so we are very much aware that with the best well in the field, the only well that I know of that's above 10 barrels per day, but there could be some interesting pluses to this project, and so that was a very important data point for us in the conduct and the management.

I might also add that the studies that we have done in this area of New Mexico, plus (unclear) field costs would be far in excess of $100,000, so we have extensively reviewed Chaveroo plus these adjacent fields, and others that I haven't referred to in these exhibits.

Incidentally, that Yates well in Section Ten does have all the water that's being produced reinjected and it's on the order of 150 barrels of water per day and it is showing a very good oil production increase prior to injection, which could well be primary oil, and since Yates had to get a waiver from Kerr-McGee for the injection and operation there, we have received from Yates monthly reports on that and I can assure you that that appears to be from any reasonable interpretation primary oil. And I suspect that the reinjection of produced water, which is in large quantities, has helped sustain the production but we are very much aware and want to do what we can to

develop this property as expeditiously as possible.

We have also found that it will take perhaps two years or more to get response and for that reason we don't see it as being appropriate at this time to drill any wells (unclear).

So it's a staged program with the big increase in reserves anticipated, as I testified earlier, with this barrel for barrel, and we'd anticipate much more waterflood reserves in Section 2 than in Section 1 at this time.

Q When do you propose to start the unit operations provided that an order is issued in the next two weeks?

A In the latter half of 1989.

Q When's your first lease due to expire? Or I'll submit that question to you, Mr. Christian?

MR. CHRISTIAN: Within the unit, Mr. Examiner, our leases are held by production.

MR. STOGNER: Okay, so -- I was trying to establish a timetable, something a little more specific than the last half of 1989.

MR. CHRISTIAN: As I understand, we'll immediately start pipeline work. We still have to work out a lease line injection agreement with Murphy Operating Company with their two units, so we can

coordinate the injection wells.

MR. STOGNER: I have no further questions of either one of these witnesses at this time, Ms. Aubrey.

Is there any other questions of either of these witnesses?

MS. AUBREY: Just a point of clarification, Mr. Stogner.

REDIRECT EXAMINATION

BY MS. AUBREY:

Q Mr. Quance, we have asked the Examiner for an expedited order in this matter so that the unit can begin operating as of July 1, is that correct?

A Yes, that's correct and we plan, reinforcing what Mr. Christian said, to start immediately on the program. I'm a little -- as to the actually date of initiation, it kind of depends. We had hoped actually previous -- months ahead of this application to approve it all the way, and it just takes -- these things take a little bit longer, but it's really a matter of the time to get things done rather than our lack of plans to proceed with -- as diligently with the program as I could.

MR. STOGNER: Anything else, Ms. Aubrey?

MS. AUBREY: No, Mr. Stogner.

MR. STOGNER: Does anybody else have anything further to add in either Case 9682 or 9683?

Ms. Aubrey, are you prepared to submit me a rough draft order?

MS. AUBREY: I don't have it with me today, Mr. Stogner, but I'll have it to you by the end of the week.

MR. STOGNER: I'd also like to ask for something else.

MS. AUBREY: Certainly.

MR. STOGNER: It's a legal brief concerning that portion of the Statutory Unitization Act, specifically Section 70-7-5B, and any other portions of the statute to help me with the question of the unit area and development.

MS. AUBREY: That would be a definition by development, is that correct?

MR. STOGNER: That and how it relates to this case, a statement of development and setting up the unit outline in this particular case pursuant to what the Statutory Unitization Act allows or doesn't allow, and I think it all ties back into this particular subsection.

MS. AUBREY: And when would you like that brief, Mr. Stogner?

MR. STOGNER: I will leave that up to you. Would you have any preference?

MS. AUBREY: Well, I would say within the next week to ten days I'd be happy to.

MR. STOGNER: I will accept that. You will submit that simultaneously with your rough draft, I would assume.

Okay, I appreciate it.

Does anybody else have anything further in either of these cases?

The cases will then be taken under advisement.

(Hearing concluded.)

C E R T I F I C A T E

I, SALLY W. BOYD, C. S. R. DO HEREBY CERTIFY that the foregoing Transcript of Hearing before the Oil Conservation Division (Commission) was reported by me; that the said transcript is a full, true and correct record of the hearing, prepared by me to the best of my ability.

Sally W. Boyd CSR

I do hereby certify that the foregoing is a complete record of the proceedings in the Examiner hearing of Case Nos. 9682 and 9683 heard by me on July 19 89.

Examiner
Oil Conservation Division