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

16 January 1985

EXAMINER HEARING

IN THE MATTER OF:

Gary-Williams Oil Producer, Inc. for pool extension, amendment of Division Order No. R-7471 and for twelve non-standard oil proration units, Sandoval County, New Mexico. CASE 8448

BEFORE: Gilbert P. Quintana, Examiner

TRANSCRIPT OF HEARING

A P P E A R A N C E S

For the Oil Conservation Division: Jeff Taylor
Attorney at Law
Legal Counsel to the Division
State Land Office Bldg.
Santa Fe, New Mexico 87501

MR. QUINTANA: We'll call next Case 8448.

MR. TAYLOR: Gary Williams Oil Producer, Inc. for pool extension, amendment of Division Order R-7471, and for twelve non-standard proration units, Sandoval County, new Mexico.

I believe this case will be continued.

MR. QUINTANA: Case 8448 will be continued until January 30, 1985.

(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 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 No. 8448 heard by me on JAN. 16 1984.

Gilbert P. Quintana, Examiner
Oil Conservation Division

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

30 January 1985

EXAMINER HEARING

IN THE MATTER OF:

Gary-Williams Oil Producer, Inc. for pool extension, amendment of Division Order No. R-7471, and for twelve non-standard oil proration units, Sandoval County, New Mexico. CASE 8448

BEFORE: Michael E. Stogner, Examiner

TRANSCRIPT OF HEARING

A P P E A R A N C E S

For the Oil Conservation Division: Jeff Taylor
Attorney at Law
Legal Counsel to the Division
State Land Office Bldg.
Santa Fe, New Mexico 87501

For the Applicant: W. Thomas Kellahin
Attorney at Law
Kellahin and Kellahin
P. O. Box 2265
Santa Fe, New Mexico 87501

I N D E X

E X H I B I T S

MR. STOGNER: We'll call now Case Number 8448, which is the application of Gary-Williams Oil Producer, Incorporated, for pool extension, amendment of Division Order No. R-7471, and for twelve nonstandard oil proration units in Sandoval County, New Mexico.

Call for appearances in this matter.

MR. KELLAHIN: If the Examiner please, I'm Tom Kellahin of Santa Fe, New Mexico, appearing on behalf of the applicant, and I have two witnesses to be sworn.

MR. STOGNER: Are there any other appearances in this matter?

Will the witnesses please stand and raise your right hand.

(Witnesses sworn.)

MR. STOGNER: Continue, Mr. Kellahin.

DAVID DLOUHY,

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

DIRECT EXAMINATION

BY MR. KELLAHIN:

Q Mr. Dlouhy, for the record would you please state your name and occupation?

MR. STOGNER: And spell it, please.

A David Dlouhy, D-L-O-U-H-Y.

Q Where do you reside, Mr. Dlouhy?

A My residence is in Denver, 7417 South Lafayette Circle East.

Q And how are you employed, sir?

A I'm currently employed with Gary-Williams as an exploration geologist.

Q Would you describe for the Examiner when and where you obtained your degree in geology?

A I graduated from the University of California in 1971 with a Bachelor's degree in geology.

I obtained my Master's degree from the University of Colorado in 1980.

Q Would you describe for the Examiner what has been your employment experience as a geologist?

A After graduation with my Bachelor's degree in '71 I went to work for Marathon Oil Company in their Research Center in Denver, Colorado. I worked in their Geologic Research Group doing geologic and geochemical evaluations covering a wide variety of areas, including oil productive areas in the Rockies, the Gulf Coast, as well as

many, or a number of international objectives or projects.

Of particular note is I was responsible for a geochemical study of the fracture of Monterey in Southern California.

Q Would you describe what research and study you have done of the Rio Puerco Mancos Oil Pool Area?

A To begin with, after leaving Marathon, I worked for Mobil Oil for two years as a development geologist and worked in northwest Colorado on a fracture play and this is where I have quite a bit of experience in fracture plays, the Niobrara being very similar and time equivalent to the Gallup in the -- in the San Juan Basin.

Two years ago I took a position with Gary-Williams in their Denver office and worked initially in the Illinois area, but over the last year have been responsible for the fracture play in the San Juan Basin.

I'm the geologist responsible for the area. I've generated the maps and data associated with this project, and am currently responsible for the work, geologic work, involved with this project.

Q When you talk about fractured pay of the San Juan Basin would that include the Rio Puerco Mancos Oil?

A Correct. Our producing area produces from the Rio Puerco Mancos Pool. This is specifically a fractured sequence within the Mancos and is our primary objective in this area.

MR. KELLAHIN: We tender Mr.

Dlouhy as an expert petroleum geologist.

MR. STOGNER: He is so qualified.

Q Would you refer now to what we've marked as Exhibit A and identify for Mr. Stogner what the current pool boundary is for the Rio Puerco Mancos Oil Pool?

A The current pool boundary, which was established in February of 1984, is designated by the light dashed line and includes a 15 section area encompassing 20 North, 2 and 3 West.

Q Would you identify for him the area that's proposed for inclusion in this pool with approval of this application?

A The proposed expanded area is designated by the -- the dark, thick, cross hatched lines; covers an area that includes 20 North, 21 North, 2 and 3 West, and is again shown by the thick, cross hatched lines on Exhibit A.

Q Would you identify from the exhibit who are the major working interest owners and opertors within the area?

A Within the expanded spaced area the colors indicate the leaseholders involved in this area.

The yellow designates Gary-Williams acreage.

The blue indicates or designates the acreage held by Champlin and their associates.

There are other small miscellaneous

leases throughout the area and those are identified at the bottom of the exhibit specifically by lease number.

Q Can you give us an approximate percentage of the proposed pool area that is controlled either by Gary-Williams or Champlin?

A Within the proposed expanded spaced area the acreage controlled by Gary-Williams and Champlin includes slightly over 95 percent of the acreage.

Q Would you identify for Mr. Stogner where this pool is in relation to other pools in the Basin?

A Okay. This area is in the southeast portion of the San Juan Basin in Sandoval County. Again it's included in a four township and range area that includes 20, 21 North, 2 and 3 West.

It's ten miles west of the Town of Cuba and 20 miles south-southeast of the Puerto Chiquito Field, and I'd like to make reference to the Puerto Chiquito Field at this time, because we've seen -- or what we've seen in the last year shows us that the Puerto Chiquity Field is the best analog to our producing area and we will make reference to the Puerto Chiquito Field later on in the testimony.

Q Will you describe for Mr. Stogner the general geology that you're encountering in this pool?

A Production from this area comes from the Cretaceous Mancos, specifically a 400 to 500 foot section of the Mancos that's naturally fractured.

At this point I'd like to comment on ter-

minology. Throughout this testimony I may make reference to a Gallup producing or Gallup producing sections, and this term extends from when Lewis was working in this area and they made reference to the producing interval as Gallup and they did this because they made a time correlation to the Gallup producing sands to the northwest that produces from the Bisti Field.

I'd like to stress that in making reference to the Gallup producing zone, or interval in our area, I am not indicating we have in any way a lithology that's similar to the Bisti producing sands. In fact, I'd like to stress that the lithology is distinctly different, consisting of a 400 to 500 foot sedementary sequence with no distinct or defined sands, as is the case in the Bisti Field.

Q When the pool was established and special field rules adopted back in February of '84, would you identify for the Examiner what wells were in existence at that time?

A At the time of the spacing of the initial 15-section area there were three wells in this spaced area that were producing from this Mancos fractured interval and they are identified by large circles around the wells in this area.

In addition there were three other wells in the expanded area that were drilled at the time of the spacing of this original area.

Q What were the special rules in a general

way? What were the special rules adopted and applied by the Division to the existing pool area back in February of '84? What was the spacing?

A The spacing was 320 acres that could be designated a standup or a laydown, and in addition there was no definition of spacing between wells, which is another request that we're going to make in this hearing.

Q Since the original pool rules were adopted in February of '84, would you identify on the exhibit how Mr. Stogner can locate additional wells or additional well locations?

A The black dots with no circles around them are wells that have been drilled since the 1984 original spacing hearing. This includes 13 wells in the proposed expanded area. In addition there have been 11 locations staked throughout this area and they can be identified by open dots with circles around them.

Q You've identified for us the blue shaded area and the yellow shaded area. What's the significance of the cross hatched?

A The cross hatched areas, being two of them, one in the north and one in the south area, are areas that we have been able to pool with the appropriate leaseholders and this has been done in an attempt to really allow us to explore and develop this area in a manner that we feel most prudent for this type of play, being a fracture Gallup or a fracture Mancos play.

Q Who are the principal working interest owners in those two working interest units?

A The pooled areas include primarily Gary-Williams, Champlin and their partners, which is Chorney and Norcen.

Q Would you tell Mr. Stogner what Gary-Williams seeks to accomplish with this application?

A Based on the data that we accumulated from the drilling of 13 additional wells in this expanded spaced area, as well as a refinement of our geologic interpretation in this area, and a refinement of our structural interpretation in this area, we request that the original spaced area be expanded to include the area defined on Exhibit A by the thick, cross-hatched boundaries, and we are requesting this because we believe that this best represents, or covers, a natural fracture trend, the natural fracture system or trend being the primary controlling factor for economic production in this area.

We also request that the 320-acre well spacing be maintained throughout this expanded area and request that a minimum distance of 1800 feet per well between wells be established.

Q Do the existing wells within the pool conform to a minimum distance of 1800 feet between wells?

A Some do not.

Q All right, sir, you ready to leave this one?

A Yes.

Q All right, let's go to the structure map, which is Exhibit B.

With regards to the wells that are currently subject to the pool rules, are all those wells on spacing units to which 320 acres have been dedicated?

A I believe so for the most part. There are some short sections to the north in the originally spaced area and the 320-acre designation may be an exception for some of those locations.

Q All right. Some of those locations are exceptions as a result of governmental sections that contain less than 640 acres.

A Correct.

Q With regards to the distance between wells, the minimum distance you request, does the current pool rules have a minimum distance between wells?

A I don't believe it does.

Q And what is the reason to have a minimum distance between the wells?

A The reason to establish a minimum distance between wells is because we have learned and we are observing that fracture production from a reservoir of this type is very sensitive to the spacing and really the techniques of producing the reservoir.

If there is no minimum distance, even with 320-acre spacing, this will allow effectively 40-acre

drilling, offset drilling, and effectively encourage this competitive drainage drilling by different opertors and this effectively has happened in two cases in the originally spaced area in which Champlin has attempted to offset one of our very good wells and then, likewise, we attempted to offset with a distance less than this -- less that 1800 feet with the well offsetting one of their better producing wells.

It's a case of really competitive drainage drilling and from what we are learning and seeing about the way these reservoirs should be produced, this is detrimental and we need to establish rules to provide for this.

Q Can you show us any of the existing wells on the plat within the pool that have distances between the wells of less than 1800 feet?

A The distance between the 12-4, The Gary-Williams 12-4 Well, which is in the northwest corner of Section 12, is less than that distance from the Champlin Well in Section 2, the southeast corner of Section 2.

Q I think it's 1800, isn't it?

A Pardon?

Q Let me look a the scale here.

A Okay, I'm sorry.

Q It's 1860.

MR. STOGNER: I'm sorry, Mr. Kellahian, please continue.

Q Let me ask you again.

MR. KELLAHIN: We checked the scale on the map, Mr. Stogner.

Q What is the distance between those two wells you've just discussed?

A It's approximately 1800 feet. I was in error in my initial assessment of the distance between those two wells.

Q So a minimum rule requiring the 1800 feet at least between wells would not impact any existing wells.

A Correct.

Q Would you go to Exhibit B for us now, which is the structure map, and first of all identify the information contained on the exhibit.

A Exhibit B is a seismic structure map that shows the detailed structure of the producing interval. Being a seismic structure map, the contour interval here is 10 milliseconds, but this equates to 50 feet. So effectively we have a detailed structure map of the producing interval with a 50-foot contour interval.

I [illegible] point out the [illegible]ence of dots which indicates the seismic lines and fairly extensive seismic network that we used to generate this structure map.

I'd also like to point out on this map the proposed expanded spaced area, or the boundary of this proposed expanded spaced area.

At this point I'd like to review our structural interpretation and the reason for emphasizing the

structure, and the reason being that an accurate definition or designation of structure is probably one of our best tools to define or indicate fracture areas or trends, natural fracture trends. And the reason for this is that -- is that a detailed structure map shows areas where a sedimentary sequence has been bent or flexed or naturally disturbed from its original normal horizontal or near horizontal bedding surface.

To illustrate this, you'll note that throughout the expanded spaced area the contour intervals change quite a bit. In fact they change from a very widely spaced contour lines, indicating areas of gentle dip, to areas of very concentrated contour lines, indicating areas of relatively much steeper dip, and then grading also into areas again of widely spaced contours, again indicating areas of gentle dip.

This change in dip is indicating areas where the sedimentary sequence has been flexed and in addition, if you follow the contour line wherever it deviates from a linament, or a straight line, we're also getting an indication of deformation of the sedimentary sequence.

This is very important for the reason that when you have a sedimentary sequence that is brittle and you bend or flex it, it will fracture. These -- these fracture systems follow the deformation and what I would like to indicate is that this -- this is the tool that we are using to indicate fracturing throughout this area.

In addition I'd like to review some of the well data within the expanded spaced area to show how the wells do confirm the fact that we have natural fracture systems throughout this area.

And I'd like to start with the well in Section 23, 21 North, 2 West. This is just to the right of the C-C' cross section.

This was a 1970s Entrada test that was cored in the Gallup and recorded fractures in the Gallup sequence, or in the Mancos sequence that is productive in this area.

I'd like to make reference to the well, the Guadalupe Well in Section 26 that's the end point of the D-D' cross section, 21 North, 3 West. This well had numerous reports of lost circulation through the Gallup system, or through the Mancos fractured system, again indicating natural fractures within the Mancos.

I'd like to make reference to the well in Section 17, 20 North, 3 West. This also was an older well, drilled, I believe, in the sixties, that reported extensive lost circulation through the fractured Mancos section, again indicating the presence of natural fracture systems in this area.

And finally the well in Section 27, 20 North, 3 West, that was cored in the Gallup and again reported vertical fractures in the Mancos fractured interval.

And then, of course, the wells that we've

drilled in the center portion of this expanded spaced area has certainly indicated natural fracture system in that three wells have intersected open fractures while drilling, as indicated by oil flow upon drilling the wells.

So effectively the structure can be used to demonstrate where we have fracture zones, fracture trends, and this is confirmed by the well data within this area.

Q Based upon the available information that you've studied, do you have a geologic opinion as to whether or not it's reasonable to now located the boundary of the proposed pool as requested by the applicant?

A I think the data that we have, both theoretical, that being the structure data, as well as the well data within this area, indicates that this encompasses an area of natural fracturing. To the best of our knowledge and our data sources, these are the boundaries we propose, although we -- we do not know how much further fracture systems may extend in the area.

This is simply defining where our information, both theoretical, as well as well data, confirms the occurrence and presence of natural fracture systems.

Q Within the proposed expanded area do you have a geologic opinion as to whether or not we're dealing with the same common source of supply?

A I believe that the entire sedimentary sequence, the 400-foot interval that is fractured and produc-

tive in this area, is also oil charged.

I believe that because of low porosity and permeability you cannot efficiently drain the matrix unless you have a natural fracture system.

So to answer the question, yes, I think it is a common source because I think the entire Gallup sequence is oil charged and the natural fracture systems facilitate the production, oil production in this area.

Q Within the proposed expanded pool area do you have a geologic opinion about the continuity of the Mancos formation through the area?

A At this time I'd like to introduce Exhibit C, and Exhibit C includes two stratigraphic cross sections that effectively cover the proposed expanded spaced area.

If I can refer quickly back to Exhibit B, which shows the location of the cross section lines, C-C' being the southwest to northeast cross section, covering essentially the entire expanded spaced area, and D-D', being a northwest to southeast cross section, again spanning nearly the entire expanded spaced interval.

The cross section is spaced on log data for the wells represented in the cross section, and for most of the wells four curves are represented for each well from left to right, a gamma ray curve followed by a resistivity curve, then a neutron porosity curve, and then a density curve.

Our interpretation of the sedimentary sequence of this producing -- of the producing Mancos in this area, and this is based on log character as well as core data that we have from two wells in the expanded spaced area, consists of essentially 400 to 500 feet of interbedded, very fine grained sandstones, siltstones, and shales. They are very finely laminated or interbedded and the interbedding is very interesting in that it's on inches to feet.

All of the sands within this producing interval are low porosity and low permeability with porosities averaging on the order of 4 to 6 percent.

Permeabilities of the sands throughout this area average less than a millidarcy.

The log character indicates that there are no reservoir sands as the Gallup sands that produce in Bisti present anywhere within the proposed expanded area.

Again we believe the entire Gallup or Mancos sequence here that is fractured and produced is oil charged, and again, becauses of the low porosity and permeability, natural fracturing is required for economic oil production.

Even with the very finely interbedded sequence throughout the entire 400 foot interval, the entire section can be very easily and accurately correlated throughout the entire expanded -- expanded area.

We've arbitrarily divided the interval into four zones, an A, B, C, and D, and all of these zones

can be traced or correlated throughout this entire section, and the point I'm trying to make is that the sedimentary sequence is very consistent and very uniform throughout the area, again consisting of this 400 foot interbedded, very fine grained sequence.

Q Do you have a geologic opinion to demonstrate a preference for either close spacing or wide spacing for this area?

A From my standpoint, from a geologic standpoint, what I see is a reservoir that's very sensitive to the way that it's developed, completed, and produced. It seems to be very sensitive to how you produce this and the reason being is what you're trying to do is drain a very tight matrix with a fracture system.

What we -- what I have seen by looking at analogous fields, particularly in the San Juan Basin, other fracture producing fields, suggests that wells drilled on close spacing can be very detrimental to the ultimate recovery from a reservoir of this nature.

My opinion in respect to what is appropriate for the spacing is on the order of 320 acres as a good point for us to properly explore and develop this type of reservoir.

What the ultimate spacing may end up to be, I'm not sure at this point. Again looking at analogies as Puerto Chiquito, you get indictions that possibly a greater spacing is necessary.

I think from a starting point, 320 acres, with the 1800 foot rule, is a good compromise in respect to setting up this area for proper development in the future.

Q Were Exhibits A, B, and C prepared by you?

A Yes, they were.

MR. KELLAHIN: We move the introduction of Exhibits A, B, and C.

MR. STOGNER: Exhibits A, B, and C will be admitted into evidence at this time.

MR. KELLAHIN: That concludes our examination of this witness.

MR. STOGNER: Mr. Kellahin, what will your next witness be testifying on?

MR. KELLAHIN: He's an engineer and he's going to talk about the producing characteristics of the pool. He's got an interference test to discuss with you.

MR. STOGNER: Okay. I may have some other questions of this witness later on but I have none at this time.

He may be excused and I may recall him. That is, unless there's some other questions of this witness at this time.

Continue, Mr. Kellahin.

JOHN NIKONCHIK,

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

DIRECT EXAMINATION

BY MR. KELLAHIN:

Q All right, sir, would you please state your name and occupation?

A My name is John Nikonchik and --

Q All right, would you spell your last name for the Examiner?

A Yes. N-I-K-O-N-C-H-I-K.

I'm currently employed as a Senior Reservoir Engineer for Gary-Williams Oil Producer.

Q Mr. Nikonchik, have you previously testified before the Division?

A No, sir, not in New Mexico.

Q Will you explain to the Examiner what your educational background is in the field of engineering?

A Yes. I graduated from Penn State University in 1976, receiving a Bachelor Science degree in petroleum and natural gas engineering.

Q Subsequent to graduation would you describe what has been your employment background in your profession?

A Okay. Immediately after college I began

work with Marathon Oil Company with which I worked for about five years.

The first three years I spent in Bridgeport, Illinois, as an operation-production engineer, responsible primarily for the mainenance and enhancements of the shallow water recovery -- or water projects that were established back there in 1950's.

From there I was transferred to the Midland District where I worked as a reservoir engineer. There I worked on primarily evaluating joint interests proposals from outside operators for drilling and development work in some 75 oilfields that we particpated in down there.

Approximately a year later I was transferred to Marathon's Research Center in Littleton, Colorado, where I worked in the Reservoir Management Group of the Applied Technology Division, and there I spent most of my time working on computer reservoir simulators, two of which being the Yates Field in Texas and the Bray Field in the North Sea.

From there I left Marathon in 1981 and worked for a couple of small independents, being their only engineer, basically evaluating development prospects and exploration prospects.

And I joined the Gary Companies in 19 -- January of 1981.

MR. KELLAHIN: If the Examiner please, we tender Mr. Nikonchik as an expert petroleum

engineer.

MR. STOGNER: He is so qualified.

Q I assume, Mr. Nikonchik, you have studied as an engineer the Rio Puerco Mancos Oil Pool and the proposed expansion area that your company seeks in this application.

A Yes, I have. I've been evaluating different parts of this project over the last year on an on and off basis.

Q Would you give Mr. Stogner an indication of the various points that you have studied in this field and what general conclusions you've made?

A Okay. First off, it's been fairly obvious to me that without fractures in a well that major production rates from this Mancos interval do not support an economic play.

We believe we have evidence that shows that this area exhibits nearly identical producing characteristics to that noted in the Puerto Chiquito East and West Fields, specifically the Mancos reserovir here in Rio Puerco exhibits a similar formation dip and degree of structural flex across the producing area.

It also contains an extensive natural fracture system, which has been identifiable by high producing rates and a pressure interference test. It contains similar undersaturated 41 degree API crude oil with compar-

able bdt properties and produces by what we believe to be a solution gas drive mechanism and the intervals of comparable depth, thickness, and rock characteristics.

We can also show that a well than has encountered a natural fracture system is capable of draining in the vicinity of 300 acres, and so it follows that 320-acre spacing is appropriate and that wells drilled on closer spacing would probably be unnecessary.

Now in light of the similarities to Puerto Chiquito, we believe this area deserves the same consideration as the Puerto Chiquito West Field, which the State allowed to be developed on a wide spacing and through the benefits of a gas injection and pressure maintenance program, Puerto Chiquito West has been an outstanding example, I believe, of the highly efficient production of a fractured reservoir, and that I think that's a fact that the operator and the State ought to be pretty proud of.

Q Mr. Nikonchik, have you studied the transcripts, the engineering data, and the records developed by Mr. Greer in those West Puerto Chiquito Mancos hearings?

A Yes, I have.

Q Let me direct your attention now to Exhibit D and have you give us some of the specifics upon which you have made your conclusions.

A Okay. Exhibit D is the first exhibit in the package of engineering exhibits identified as Exhibits D through J.

This is a production decline curve on a well we feel to represent a well that has encountered only matrix production and has not encountered production that comes from an open contributing fracture system.

This specific well example is the San Isidro Well 18-8. It is located on your -- if you refer back to Exhibit A, most likely is the best one, it's the farthest western well from the bottom of the page, and this is just about a mile and a half outside of our currently spaced area.

Now, as indicated on that map, it was completed in the Gallup A, B, C, and D zone, and after some workovers in mid-1984 to increase pump efficiency and clear up some paraffin problems, the well was IP'ed for 27 barrels of oil per day in November of 1984.

The recent weeks of production decline have indicated that the well will decline as we projected and will only recover 4000 barrels before reaching an economic limit.

Now the economic impact of drilling for a well like this is noted on the next exhibit, which is Exhibit E. This is titled Economics for Drilling a Typical Mancos Shale Well Encountering Matrix Only and in a Non-fractured Reservoir.

Using the analogy of the 18-8, we've assigned a typical tight decline curve starting at approximately 1000 barrels a month, which is approximately 33 bar-

rels per day. This declines over 18 months to approximately 3 barrels per day and with a gross production of 5300 barrels of [illegible] fairly obvious point. The bottom line indicates, that this well results in a net loss of $356,000 under the present economic conditions that exist today.

Now --

Q All right, sir, are you ready to go to Exhibit F?

A Yes. Now in contrast to this, what we're really after down here is to encounter the fracture system.

Exhibit F, which is the next exhibit, is the typical decline curve, or which is an example of a production decline curve of a well that has encountered an extensive fracture system.

This particular example is the San Isidro Well 11-16. You can find this well on Exhibit A in the center of the currently spaced area, 15 section area. It's in the southeast corner of Section 11.

This well was in existence at the time of the last hearing.

Throughout 1984 the production has been allowed to increase up to approximately 10,000 barrels a month, which is 330-some barrels a day, and the recent decline, as shown, has been projected to an economic limit yielding 175,000 barrels of ultimate reserves.

Now, it's interesting that during the drilling of this well with an air mist, the well actually

encountered the open fracture system and had blown out; was eventually completed open hole; has never been stimulated, and the initial flow potentials of this well were on the order of 30 barrels per hour during the first weeks of testing.

Now, to give you some accepted Basin average recovery factors that have been testified to in previous hearings by Mr. Greer, et al.

An average recovery for the fractured Mancos Shale interval is approximately 500 to 700 barrels per acre.

Now if we use this kind of recovery factor, our 175,000 gross barrels of production represents a range of drained acreage in the range of 250 to 350 acres, or approximately a 300-acre average drainage for this particular well.

Now the economic impact of drilling wells like this is shown on the next exhibit. Again the same format as the other economic example, where we've shown a typical decline curve based on the analogy to the 11-16, with an initial production of 320 barrels per day with a life of 15-1/2 years to an economic limit, and as you can see, this well will return a profit of $2-1/2-million for its $425,000 investment.

Now the evidence of the fractured system and the wide drainage is indicated on Exhibit H, which is the next exhibit.

This is pressure interference data that was acquired during March of 1984.

The test -- the observation well was the 1-16 Well, as influenced from the 11-16 Well, the 11-16 being the same well we just referred to on the map.

The 1-16 Well is 7500 feet, approximately, due northeast in Section 1. At the time of the interference test the wells in Section 12 were not present.

The bottom hole pressure as recorded on the vertical axis shows that during the first half of the interference test up through the first 60 hours, the11 -- or the 1-16 had stabilized at a static bottom hole pressure of approximately 1312 pounds.

The 11-16 had been shut-in up to approximately 30 hours into the pressure recording. At 11 -- or at 6:30 p.m. on March 15th the well was opened at an average rate of 500 barrels per day through the test and some 25 hours later the first effects of the interference test were noted and it's fairly obvious that we were starting to deplete the pressure in the 1-16 well at that distance of 7500 feet.

Now the magnitude of this pressure drop is only on the order of 2/3rds of a pound per day, which on its own merit is not that great; however, the significance of this can be seen on our next exhibit, Exhibit I, and this shows data showing the magnitude of the pressure interference tests at Puerto Chiquito, taken in 1965.

Now this data was first entered as evidence before the New Mexico Oil Conservation Commission in Case 3455 on November 16th, 1966, by Mr. Al Greer, and that was in the matter of their application for division of the Puerto Chiquito Fied into the east and west fields.

These interference tests were run in at that time four phases. The first phase I did not indicate on here, but this is a time when the involved wells were completely shut-in.

The P-11 Well was brought on stream first, affecting three observation wells at the distances shown. Interference time was in 24 hours in all cases. The magnitude of their interference, again, on the same order of the one-third to three-quarters of a psi per day presure drop, and as indicated by phase 3 and phase 4, these same magnitudes of pressure drop were noted there, and we're all familiar with the significance of the fracture system over there, and it therefore seems to me that we have at least as good a fracture system in our area as was noted in Puerto Chiquito.

And then moving on to Exhibit J, I'd like to show some more comparisons of some parameters between our pool area and the Puerto Chiquito West Mancos Field.

In both cases the lithology is fractured shale.

Our depth at Rio Puerco is on the order of 3300 to 4800 feet, where Puerto Chiquito West was slight-

ly deeper at 4500 to 6500 feet.

Gross thicknesses are comparable in both cases. Porosity, matrix porosity is less than 6 percent, although this is probably insignificant, far outweighed by the fracture porosity, which has been estimated to be on the order of one percent of the bulk volume.

Matrix permeabilities are less than a millidarcy in both cases, more on the order of a tenth to a hundredth of a millidarcy, as per core analysis.

The gravities of the crude are very -- very similar, and the PBT properties shown on the last core, solution GOR bubble point pressure and viscosities, which are basically a function of depth, followed pretty straightforwardly, as you would expect, and we therefore believe we have a very similar situation as to what Puerto Chiquito had.

Q Do you have an engineering opinion with regards to the request for a minimum distance between wells of 1800 feet?

A Yes. Coupled with the -- the 320-acre spacing that we're requesting, I believe the minimum distance of 1800 feet allows enough latitude in well placement to significantly explore and develop and identify the fracture system.

It also places wells far enough apart as to be useful in a later pressure maintenance gas injection project, and this is probably necessary. If wells

are closer than that we would expect premature breakthrough of gas and therefore having to shut certain wells in much sooner than we would hope to, therefore rendering their usefulness, or actually rendering them useless early in the life of a project like that.

Q Do you have an engineering opinion as to why it's necessary to expand the pool as proposed by the applicant rather than allow the pool to be expanded on a well by well step out from the existing pool?

A I believe that, and our exploration philosophy here is that this is a fairly significant play of a pretty wide area, and to adequately define the extent of the fracture system in a reasonable amount of time, with the hopes of getting to a pressure maintenance project at a sooner date, we would like to be able to drill outside of the mile buffer around the current area and still be protected from 40-acre competitive offset in the event that we are fortunate enough to encounter the major fracture system, and we know that if we do encounter that fracture system, we're probably able to drain at least 300 acres, if not more, and that wells drilled on direct 40-acre competitive offsets would be draining essentially the same oil out of two wells, and really those wells are useless.

Q Were Exhibits D through J prepared by you?

A Yes, sir, all of them.

MR. KELLAHIN: Move the intro-

duction of Exhibits D through J.

MR. STOGNER: Exhibits D through A will be admitted --

MR. KELLAHIN: J. J.

MR. STOGNER: Did I say "A"?

MR. KELLAHIN: Yes, sir.

MR. STOGNER: Oh, D through J will be admitted into evidence at this time.

Call for questions.

Mr. Frank Chavez, of our Aztec District Office.

QUESTIONS BY MR. FRANK CHAVEZ:

Q Mr. Nanochek (sic), is the production from the San Isidro Well 18 -- No. 18-A restricted because of gas venting?

A No, sir, I don't believe it is.

Q Is the production from the No. 11-16 restricted because of gas venting?

A Yes, it is.

Q So therefore these production figures show a restricted production which might actually be higher than what you've projected.

A That's correct.

Q Are you using the Puerto Chiquito West Field as an analogy to the Rio Puerco Mancos when you're looking at recovery per acre?

A In the way of -- we have not made any ultimate recovery projections from the area at this point, no.

As far as using the 500 to 700 barrels per acre recovery factor to determine the 300-acre drainage, in that instance, yes.

Q In your Exhibit J you show a gross thickness comparison to the Rio Puerco Mancos and the West Puerto Chiquito Mancos with a difference of about 150 feet. Would you take that into account in comparing your recoveries per acre if you make it analagous and other factors?

A That -- that's actually, I suppose, a kind of a misleading number. Gross thickness is the entire Mancos interval. To determine the actual extent of the fracture system that's contributing, it's much smaller than that, and Puerto Chiquito West, from what I remember reading in the -- in the journal books, the fracture thickness is on the order of anywhere from 25 to 50 or 75 feet, somewhere in that range, and from what we've seen, we, I believe, have fracture zones that are comparable to that, in that magnitude.

Q So your thickness of the actual fracture zone or what we call pay zone is more similar than the 400 -- 250 feet interval?

A I would believe so, yes.

Q Would you feel a change in the Rio Puerco Mancos rules to include a two mile buffer rather than a one mile buffer would offer the protection that you might need

rather than expanding the area as you requested?

A I hadn't thought about that. I don't know if I can answer that question.

(Thereupon a discussion was had off the record and a recess was taken at this time.)

MR. STOGNER: The hearing will resume to order.

MR. KELLAHIN: Mr. Chavez has a question pending.

A I believe I was asked whether or not a two mile buffer area would be acceptable in exchange for the requested spacing.

I would at this point have to say no. The -- putting a two mile buffer around the currently spaced area creates an artificial boundary, It presupposes that the reservoir goes in the direction that our geologic interpretation goes in a direction that our geologic interpretation says it doesn't, and it would end up excluding areas of the reservoir that we believe geologically should be part of the entire fracture system and it would include areas that we at this time feel probably are not part of the fracture system.

Q You perhaps misunderstood the direction that I was leading with that question.

By using the two mile buffer that would indicate that a well that was drilled within two miles, or any well drilled within two miles of the existing pool could be included within the pool but does not mandate that it would be in the final -- in the final judgment of the Division, but upon drilling it would be drilled and spaced according to the pool rules if it was within two miles of the boundary.

Does that clarify what we would interpret that two mile buffer zone to be?

A I think I understand what you -- what you mean, but I don't know what significance it has. I'm not sure I understand what --

Q You mentioned that you thought you needed protection from 40-acre drilling offsetting wells within the pool within a one mile distance.

A That's right.

Q Would there be difficulty if that was done within two miles of the pool boundary offsetting existing wells?

A Does that mean that a well drilled within two miles would then have a two mile protection itself?

Q Yes, that would extend --

A Let's take for instance --

Q Okay.

A -- if we go on the C-C' cross section on the geologic structure map, just below the C' we have the

28-15 Well, which is within two miles of the existing spaced area.

Would that supply two mile protection around that entire well?

Q Yes, it would. It would indicate that a well that was drilled within two miles of that well or within, let's say, within two miles of the proration unit or the pool boundary that would cover that well, will be spaced and drilled on the pool requirements, the pool rules?

For example, off --

A Then just the northeast of 22-13 could be subject to 40-acre competitive offsets, then, because it is outside the two mile boundary, and that at this point is not satisfactory.

Q Under the application of a two mile limit, what we would do is cover, for example, 22-13 well with a two mile bugger itself.

As the wells are permitted to be drilled within an area, we extend the limits artificially within our own organization to cover the (not understood) for the well.

So, for example, if the order of the wells being drilled was this, let's say we've got your existing pool boundary that ends on the east sides of Section 6, 7, and 18.

A Okay.

Q The No. 4-14 would fall within the two mile limit of the pool and would therefore be included in

the pool.

Immediately following that, the No. 28-15 were drilled within this two mile limit, it would fall also within the rules of that pool. Consequently, the 22-13 would then also fall within the rules of this pool, although the time limit, there may be some time for formally expanding the pool to include that. The requirements of the Division are such that the wells would be required to be spaced and drilled under those pool rules.

And we would also have, then, the extent of the pool by proven production.

MR. KELLAHIN: What sections are not covered or protected if you go to a two mile buffer versus expanding pursuant to the application?

Within the expanded area that we propose, looking at the exhibit, which, if any, of the sections are not protected by the two mile buffer that would be protected if it were included in our application?

MR. CHAVEZ: Perhaps part of Section 19, 21, 2.

A Is that the only one? I think that it's --

MR. CHAVEZ: No, what I'm saying is that the pool formally would not be expanded to include the acreage that you have, or the acreage that you've requested, but should the rules change, the pool would be expanded to cover the proration unit covered by the

well, and with a two mile bugger limit any well drilled within two miles of that pool expansion would have to fall -- be drilled and produced in accordance with the rules.

MR. KELLAHIN: I'm sorry, we're missing the point, Mr. Chavez.

MR. CHAVEZ: Let's go off the record a minute and let me do a little sketching on the exhibit.

MR. KELLAHIN: Yeah. Yeah.

MR. STOGNER: Off the record.

(Thereupon more discussion was had off the record.)

MR. STOGNER: Okay, who had what awhile ago?

Q Mr. Nikonchik, do you understand the implications to some extent of amending the pool rules to include a two mile buffer rather than a one mile buffer at this time?

A Yes, I do.

MR. KELLAHIN: Mr. Examiner, we would request an opportunity to respond to you after the hearing with regards to Mr. Chavez' suggestion.

MR. STOGNER: Do you have a time frame that you would like to --

MR. KELLAHIN: I would think within ten days of the hearing date, Mr. Examiner.

MR. TAYLOR: Mr. Examiner, for the record I'd like to --

MR. STOGNER: Let's get this witness out of the way.

MR. KELLAHIN: I'm going to recall the geologist for one question.

MR. STOGNER: Okay. Okay. Let's go ahead and do that and if I have any more questions I'll recall either one of them.

MR. KELLAHIN: Okay.

MR. STOGNER: Okay.

DAVID DLOUHY,

being recalled and being still sworn upon his oath, testified as follows, to-wit:

REDIRECT EXAMINATION

BY MR. KELLAHIN:

Q Mr. Chavez has suggested another procedure that might accomplish the same result for us.

The procedure would be to use a two mile buffer area around wells that are shown productive in this reservoir.

You've given us some of your opinions with regards to certain of the wells that you've examined

the logs of. I would like to, specifically like to, direct your attention to the well that is marked "D" on the cross section. It's the Guadalupe Exploration Well on the Taylor Ranch Government No. 1?

A Okay.

Q Would you describe for us the geology; tell us whether or not you have an opinion as to whether that well has encountered fractured matrix porosity?

A The Guadalupe Well in Section 26 is the first well in the cross section, and as I mentioned before, it is very similar to the lithology throughout the -- the area that we've been discussing.

The geological report on that well indicated numerous instances of lost mud through the Gallup -- through the producing Mancos interval, indicating it definitely intersected natural fracture systems.

In addition, it intersected fractures below the interval that we're normally producing and the well was actually completed in this -- in the lower portion of the Mancos.

The well was completed with an IP of 54 barrels a day. It's currently plugged but it was a producing well from a natural fracture system in the Mancos.

Q In your opinion is that the same formation that is the subject of the current pool in the Rio Puerco Mancos Pool?

A The same formation is definitely shown in

the Guadalupe Well, or represented in the Guadalupe Well, and it is definitely fractured.

The production interval is in the Mancos but generally below the area that we have normally completed our wells in the area discussed.

Q Do you have an opinion as to whether that well is in the same common source of supply as the wells in the current pool?

A My opinion, it is definitely in the same common source. Again, I believe that the data indicates the entire Mancos section is oil saturated but tight, low porosity, low permeability, and that fractures, natural fractures will allow production from this oil saturated Mancos section.

Q All right.

MR. STOGNER: Are there any other questions of this witness?

I don't know which witness to ask this particular question concerning the nonstandard proration units. That's in Section 3, 4, and 5 of 20 North, 2 West, and Sections 19, 30, and 31, in 21 North, 2 West.

Has there been -- has there been any proposal on what particular 320 acres will be dedicated to each proration unit? Will this be standup or laydown?

MR. KELLAHIN: No, sir. Mr. Chavez has advised us during the break that there's an ad-

ministrative procedure to handle approval of those nonstandard proration units without notice of hearing.

MR. STOGNER: Do you wish then --

MR. KELLAHIN: If that statement is correct, then we have no objection to -- if -- if my memory is correct as to what Mr. Chavez has told us, then I see no reason to concern ourselves in this hearing with approval of those nonstandard proration units.

MR. STOGNER: All right. Now then, for the record and to make sure I've got everything clear in my mind, the proposed rule changes in the Puerco Rio -- yeah, Rio Puerco is essentially that there be a minimum of 1800 feet between producing wells in the Rio Puerco Mancos Pool, is that correct?

MR. KELLAHIN: That's true.

MR. STOGNER: That's true. Is there any other proposed rule changes that --

MR. KELLAHIN: Yes.

MR. STOGNER: -- I might have missed?

MR. KELLAHIN: Yes.

MR. STOGNER: Okay.

MR. KELLAHIN: Instead of expanding the pool as the applicant has requested, Mr. Chavez has proposed to us changing Rule One. If you'll see in Rule One, it says "within one mile of its boundary".

That "one" is deleted and the number "two" is written there. The question is whether that accomplishes the same result as the applicant has sought.

So that potentially there are two rule changes.

MR. STOGNER: What is Gary-Williams Oil Producers proposal stand now as -- as far as extending the proration units to include all the lands described on your Exhibit A?

MR. KELLAHIN: I do not understand the question. I'm sorry.

MR. STOGNER: What do you want to do with that, the extension?

MR. KELLAHIN: The extension of the pool boundary?

MR. STOGNER: Yes, sir.

MR. KELLAHIN: The applicant seeks the extension of the pool boundary to those limits as defined on the exhibit and we suggest that you could enter an order approving the expansion in that way.

Mr. Chavez has suggested an alternative procedure by changing Rule One to say "two" miles, that coupled with his administrative processing of those wells within that area will result in substantially all of the same acreage being included by expansion in the pool.

In other words, there are sufficient wells outside the existing pool, if you use a two

mile buffer, that he can administratively expand the pool as he would do normally with a pool, and thereby include or place under protection with the two mile buffer all that area that Gary-Williams seeks to protect.

And because we are uncertain of what the other working interest owners want, we would like to have the opportunity within ten days of the hearing to submit to both you and Mr. Chavez either our concurrence, or if there's an objection, the reasons why working interest owners might object to this proposed method to implement a way to control the area.

MR. STOGNER: So correct me if I'm wrong, you wish a fifteen day time to get some feedback on the two mile proposal?

MR. KELLAHIN: I think we can do it in ten days but fifteen days would do just as well.

MR. STOGNER: Well, let's just cut it in half and say twelve.

At which time, also, I would like to receive from you a proposed rough on this particular application.

I have no further questions for either one of these witnesses.

Are there any other questions of these witnesses?

If not, they may be excused.

Mr. Taylor, I believe we have

some things you need to read into the record.

MR. KELLAHIN: Well, if it might help you, sir, --

MR. TAYLOR: I just have copies of them.

MR. KELLAHIN: -- we have received copies of all the letters from various working interest owners supporting the application and I have placed them all together.

MR. TAYLOR: Okay, we also have one in opposition that just came in today.

MR. STOGNER: Let's put that one in the record, then.

MR. TAYLOR: Mr. Kellahin, has this been designated as an exhibit or would you --

MR. KELLAHIN: It has not been. I'll be happy to do that.

MR. TAYLOR: Why don't we label it as an exhibit, Exhibit K?

MR. STOGNER: Mr. Kellahin, on Exhibit K I count seventeen -- seventeen correspondence from various operators giving their approval of the proposed expansion, is that right?

And with one objection being from -- do you want a copy of that?

MR. KELLAHIN: Yeah.

MR. STOGNER: And this will al-

so be made part of Exhibit K in opposition to the proposed extension from Bell K. Hatch. B-E-L-L H-A-T-C-H.

MR. KELLAHIN: Yes.

MR. STOGNER: Is there anything further in this Case Number 8448?

Anybody? Mr. Kellahin?

MR. KELLAHIN: Sir?

MR. STOGNER: Do you have anything further in this case?

MR. KELLAHIN: No, sir.

MR. STOGNER: Does anybody else have anything further?

If not, this case will be taken under advisement pending the twelve days limit that I have given to Mr. Kellahin to get back.

(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 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 No. 8448, heard by me on 30 January 1985.

Michael E. Stogner, Examiner
Oil Conservation Division