BEFORE THE
NEW MEXICO OIL CONSERVATION COMMISSION
Santa Fe, New Mexico
January 10, 1968

EXAMINER HEARING

IN THE MATTER OF:

Application of Kerr-McGee Corporation for special pool rules San Juan County, New Mexico. Case No. 3709

BEFORE: Elvis A. Utz, Examiner.

TRANSCRIPT OF HEARING

MR. UTZ: Case 3709.

MR. HATCH: Case 3709. Application of Kerr-McGee Corporation for special pool rules, San Juan County, New Mexico.

MR. MORRIS: I am Dick Morris of Montgomery, Federici, Andrews, Hannahs and Morris, Santa Fe, appearing on behalf of the applicant Kerr-McGee Corporation. We will have two witnesses, Mr. John Barwin, Mr. Ivan Geddie and ask that they both stand and be sworn at this time. We may have a third witness, Mr. Bill Stauss.

(Witness sworn.)

(Applicant's Exhibits 1 through 8 marked for identification.)

JOHN BARWIN

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

DIRECT EXAMINATION

BY MR. MORRIS:

Q Mr. Barwin, please state your name, where you reside, by whom you are employed and in what capacity?

A My name is John Barwin. I am employed by the Kerr-McGee Corporation in the capacity of senior geologist in Amarillo, Texas.

MR. UTZ: Would you spell that name for the

reporter and me?

MR. BARWIN: That's B-a-r-w-i-n.

Q (By Mr. Morris) Mr. Barwin, have you previously testified before the New Mexico Oil Conservation Commission or one of its Examiners?

A No, I have not.

Q Would you briefly state your education and your experience in the petroleum industry?

A I received a Bechelor of Science Degree with a major in Geology of Ohio State University in 1956 and a Master of Arts Degree Geology Major from the University of Wyoming in 1961. I was employed for two years by the Pan American Petroleum Corporation, one year in Casper, one year in Denver, Colorado. Following this I spent five years with Kerr-McGee in Denver, Colorado doing exploration and development work in the Rocky Mountains. This was followed by two years with Kerr-McGee in our New Oreleans, Louisiana Office and I have spent the last year and a half in our Amarillo, Texas Office doing exploration and development work in Arizona and New Mexico.

Q What is your area of responsibility in the Amarillo Office?

A My responsibility has been the greater part

of the last year and a half, the Four Corners area and the area in discussion.

Q What is your familiarity with the subject pool?

A I have worked this area, both exploration and development wise and was present during the drilling and logging of the Kerr-McGee Navajo J-1 Well which was the discovery well for the Akah Nez-Devonian Pool.

MR. MORRIS: Are the witnesses qualifications acceptable?

MR. UTZ: Yes, they are.

Q (By Mr. Morris) Mr. Barwin, if you will refer to what has been marked Exhibit Number 1 in this case and state what that is and what it shows.

A Exhibit Number 1 is a plat showing the location of the Kerr-McGee J-1 Navajo Well which is the discovery well for the Akah Nez-Devonian Pool. It is located seven hundred ninety feet from the north and east lines of Section 23 in Township 23 North, Range 20 West.

Q Let me stop you right there, Mr. Barwin. Where is this just regionally with respect to some well-known land marks in this area?

A The J-1 Well is about seven miles due east of the Arizona-New Mexico border. The community and Indian School

of Toadalena are located about two and a half miles northeast of the J-1 Well.

Q When was the discovery well completed?

A This well was completed on the fifteenth of November 1967.

Q And what is the depth of that well?

A The total depth of the well was forty-three hundred feet.

Q And what is the producing interval in the well?

A The producing interval in the well, the perforations are shown on Exhibit Number 1 from thirty-nine eighty-two to four thousand eight and four thousand eighteen to four thousand eighteen to four thousand twenty-eight and these two intervals, perforated intervals are both in the McCracken Sandstone of Devonian Age which is the pay section in the well.

A The McCracken Sandstone of Devonian Age is a white to very light gray, fine to coarse grained, well-rounded fractured quartzrose sandstone with a few thin shale laminae. It's a very wide spread blanket-type deposit that is found regionally throughout the Four Corners Area.

Q I see another well shown on Exhibit 1 to the northeast. Did that well penetrate this formation?

A Yes, it did. That well is the Kerr-McGee Navajo A-1 Well which was drilled almost exactly one year ago to a total depth of two thousand nine hundred twenty feet in Precambrian and we did penetrate the McCracken Sandstone of Devonian Age in that well.

Q Is it productive?

A It is not productive. There was no shales encountered. It is water bearing, it is too low structurally.

Q Where is the nearest oil production to this area?

A The nearest presently producing oil fields include Tocito Dome which is located about twenty miles northeast of the J-1 Well, the production here is from Limestone and Pennsylvanian formation. Also, about twenty miles to the northwest of the J-1, is the Dinah Bi Keyah field which produces from a tertiary shell that's been intruded into the Pennsylvanian Age sediments.

Q Does Exhibit 1 show the leasehold interest in this area?

A Yes, it does. The leasehold interest in the surrounding acreage are shown.

Q And what is the royalty ownership in this area?

A This is all Navajo Indian land.

Q Refer to Exhibit Number 2 and state what that exhibit

is what it shows.

A Exhibit Number 2 is a copy of the pertinent portion of Schlumberger induction electrical survey in the Kerr-McGee Navajo J-1 well. It's on a scale of five inches to one hundred feet and it shows, we have indicated on this Exhibit, the limits of the productive McCracken sandstone of Devonian age, the top of which is 3974, the base 4052. We have also indicated on here the previously mentioned perforated intervals from 3982 to 4008 and 4018 to 28.

Q Have you determined from this log, the effective porosity in the interval that you have perforated?

A We feel that we are dealing with about 25 feet of net pay.

Q Yes, and have you been instrumental in computing the effective porosity in this zone?

A Yes.

Q And what is that?

A The range of porosity in this zone is on the order of six to eleven percent and our average figure is about eight percent.

Q Refer next to the regional structural map, U.S. Geological Survey Map, which is marked as Exhibit 3, and point out the features of that map, please.

A The purpose of Exhibit 3, is to clarify regionally the structural position of the Kerr-McGee Navajo J-1 well. This is a reproduction of a portion of a published U.S.G.S. Map, structure contour map, that is contoured on the Dakota Sandstone. It was published in 1963 and I think, rather clearly shows the structural position of the J-1 well, as being along or near the crest of the major northwest southeast trending Toadlena anticline.

Q Now, is your structure in this particular area further shown on Exhibit 4?

A Yes, it is.

Q Point out the features of that exhibit, please?

A On Exhibit Number 4, again, we have a tract showing the area around and immediately adjacent to the discovery well of the Akah Nez Pool, and we have attempted to show on here, to the best of our current knowledge what the most likely structural configuration is, namely that we are near the crest of the Toadlena anticline.

Q At the present time there is only the one well that has been drilled in this pool, is that correct?

A That's correct.

Q Do you have sufficient information, at this time, to determine the aerial extent of the reservoir?

A It is extremely difficult at this stage, and with the

limited information we have to make a definite statement about that. We have, of course, no comparable production from the McCracken Sandstone, with which to compare the Navajo J-1 Well. I would say that at least at this stage we certainly have no indication that it's going to be extremely limited and I think ultimately it will depend almost entirely on what the actual structural configuration is in the area adjacent to the J-1.

Q Were Exhibits 1 through 4 prepared by you or under your direction?

A Yes, they were.

MR. MORRIS: We offer Exhibits 1 through 4 into evidence.

MR. UTZ: Without objection, Exhibits 1 through 4 will be entered into the record of this case.

(Whereupon Applicant's Exhibits 1 through 4 were offered and admitted in evidence.)

MR. MORRIS: Mr. Examiner, we will have another witness, with respect to the engineering aspects of the Reservoir, but that's all we have on Direct Examination of Mr. Barwin.

MR. UTZ: Are there questions of Mr. Barwin?

CROSS EXAMINATION

BY MR. ARNOLD:

Q Mr. Barwin, there are a couple of gas wells completed in the same general area in this Zone also, aren't there? If so,

where are they located?

A We do have a shut in Helium Bearing Gas Well, that is located three and, oh, a quarter mile northwest of the J-1 Well, that is correct.

Q Is it on the same structure?

A It is on the same structural feature along the Toadlena anticline, that is correct. The specific relationship between that well and this J-1 Well, is not immediately clear at this time.

Q You don't know whether there is a relationship between the gas production and the oil production?

A Well, as usually occurs in the development of such a rank wildcat area as this, we have discovered with each succeeding well that we have drilled out here, that the problem becomes considerably more complicated, and it appeared previously -- at the present time I would say that it would appear that we have more structural relief along the crest of this thing than we initially thought, and that quite possibly the presence of several local domes and saddles along the crest of the anticline would seem to be very likely.

Q Is there any helium gas present in this oil well, at all?

A The small amount of gas that is produced with the well does have a helium content, it is lower than the helium content

~~it is lower than the helium content~~ in the well to the north.

MR. UTZ: What percentage helium is it?

A I think it is slightly over four percent.

Q (By Mr. Arnold) Did you mention a permeability figure in this well?

MR. MORRIS: Our other witness will testify with respect to the permeability.

Q One other thing, I notice a couple of pronunciations on the name of this field. Why don't we all get it straightened out, to begin with, who is the expert on Navajo?

MR. POHLMANN: I am no expert, but Akah Nez, is pronunciation, just plain --

MR. ARNOLD: That's all the questions I have.

MR. UTZ: Other questions? Witness may be excused.

(Witness Excused.)

IVAN D. GEDDIE

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

DIRECT EXAMINATION

BY MR. MORRIS:

Q Mr. Geddie, will you please state your name, where you reside, by whom you are employed and in what capacity?

A My name is Ivan D. Geddie, that's spelled G-E-D-D-I-E, I am employed by the Kerr-McGee Corporation, I live in Oklahoma City, and I am a professional petroleum engineer.

Q Have you previously testified before the New Mexico Oil Conservation Commission or one of its Examiners?

A I have not.

Q Would you briefly state your education and experience in the petroleum industry?

A I graduated from Louisiana Polytechnic Institute in 1954, immediately upon graduation I was employed by the Mobile Oil Corporation and worked for Mobile approximately twelve years, I held a position of field exploitation engineer, reservoir engineer and unitization and conservation engineer, in Oklahoma and in West Texas and since the last two years I have worked for the Kerr-McGee Corporation, and the title of my position is conservation and unitization engineer with Kerr-McGee.

Q What is your familiarity with the subject Pool, Mr. Geddy?

A Well, I have made a study of the history of drilling the J-1 Well, the economics, the cost of drilling that well, estimated the recoverys from eighty acre tracts and forty acre spacing in the field and economics of drilling wells, in general in the Akah Nez Field.

MR. MORRIS: Are the witness's qualifications acceptible?

MR. UTZ: Yes, they are.

Q (By Mr. Morris) Mr. Geddie, please refer to Exhibit Number 5, entitled Reservoir Data Sheets and point out the features as shown on this Exhibit.

A Exhibit Number 5 is a Reservoir Data Sheet showing the information that we have available on the McCracken Sandstone of Devonian Age in the Akah Nez Field. The top of the sand in the J-1 Well, is plus five thousand one hundred six feet sub-sea. The net sand thickness in this well is approximately twenty five feet. The porosity as determined from log calculations is eight percent. The average permeability calculated by Darcys Radial Flow Calculations is one hundred sixty three point five millidarcies. The bottom hole pressure was measured at seven hundred sixty six PSIG, this is a shut in bottom hole pressure. The gravity of the oil has been measured at forty-seven point forty five degrees. On initial tests, the initial test data or test data on the was as shown on the bottom of this exhibit, the well was completed on November 15, 1967, and our initial test was on November the 19th. The well pumped one hundred sixty barrels of oil on this test, and sixty-two barrels of water with GOR of 109 cubic feet per barrel of oil. We tested the well again on November 25, 1967, and it pumped two hundred two barrels of oil and sixty-four barrels of water per day. On December 3rd, we again tested the well, and it pumped two hundred thirty-two barrels of oil and forty-four barrels of water per day.

Q Mr. Geddie, in the completion of this well, how was the well treated?

A We did fracture treat the well, in the completions operations. We set five and a half inch casing and cemented and then perforated and fracked.

Q And was this a water frack?

A It was not. It was an oil frack.

Q It was an oil frack?

A Yes.

Q From this information, do you have any opinion concerning the effectiveness of one well in this pool to drain a given area that would be established by the Commission as a proration unit for the Pool?

A Well, in my opinion, and based upon my calculations, Darcys Radial Flow Calculations and based upon my knowledge of petroleum reservoirs, in general, it is my opinion that one well will drain in access of eighty acres.

Q Have you made some calculations, Mr. Geddie, that are not shown as exhibits here, as to the reserves in place in this field, and have you computed those for forty and eighty acre units?

A Yes, sir, I have. I calculated reserves for this field, based upon the eight percent porosity, which was previously given in the testimony of our geologist, and with a water

saturation of thirty percent, which calculated from logs, and from this calculation that a formation volume factor estimated at one point zero five, which is necessary for us to estimate, because we have no data available to us. We determined the reserves for eighty acres to be one hundred fifty five thousand barrels of oil, and the reserves for forty acres to be seventy-eight thousand barrels of oil, this is the recoverable reserves and assuming an eighteen percent recovery of the original oil in place.

MR. UTZ: How much for eighty?

A One hundred fity-five thousand barrels and seventy-eight thousand for forty.

Q (By Mr. Morris) Now what was the cost of your discovery well?

A Our discovery well cost one hundred fifty thousand dollars. We feel that we can drill subsequent wells for something less than that we estimate the cost of the average well in the field to be on the order of one hundred twenty-five thousand dollars.

Q Now, comparing the cost with your reserve calculations and taking into account other matters of economics, do you arrive at any conclusions with respect to the development of this Pool on forty acres versus eighty acres proration units?

A Yes. The oil is being sold for two dollars eighty cents a barrel out there, and we have to pay forty-two cents

a barrel trucking charge. My economics using the two dollars eighty cents and the forty-two cents trucking charge plus fifty cents a barrel operating cost, which is rather high operating cost, but is factual for this area, because of the terrain and and the difficulties in operation, and the snow, the weather and what have you, result in a well on eighty acres yielding a net profit, before income tax and before other tax deduction, of one hundred five thousand dollars. A well on forty acres will yield a net loss before these same items of nine thousand dollars. I might go on to say that the one hundred five thousand dollar return for one hundred twenty-five thousand dollars investment makes this a, let's say a marginally attractive investment, and even at that it's certainly not a highly attractive investment.

Q Is this discovery well on pump?

A The discovery well is on pump, yes sir.

Q And do you anticipate that additional development wells in the pools will also have to be put on pump from the very beginning?

A Yes.

Q Do you have any anticipation that the area will be served by pipeline in the near future?

A No, of course, if we are able to develop a large field here, then I assume we would be able to either build a pipeline or interest someone else into coming in, but this is on down the

line a year or so, at least, I would assume, before we are able to determine the aerial extent of the field and the productive capacity, and so forth.

Q Even if pipeline were developed for this area, would that significantly change your recovery and your economic picture in this pool?

A If we are able to get a pipeline into the field the forty acre drilling still would not be economically attractive it would make eighty acre drilling more attractive and would yield a break even proposition something on this order, for forty acre drilling.

Q Do you have any proposal to make to the commission for the adoption of special rules and regulations for this Pool?

A Yes, I have prepared an exhibit and I believe it is Exhibit Number 6, that shows the Field Rules that I propose for the Akah Nez Devonian Pool, I will briefly go through these, they are rather standard rules. Rule Number 1, makes the field rules to be adopted here applicable to the Pool limits of the Akah Nez Devonian Pool, in an area of one mile around this oil pool. Rule Number 2, establishes eighty acre spacing. Rule Number 3, is a standard unorthodox size or shape rule, where you have unorthodox tracts in the public land survey.

Rule 4, provides that each well shall be located no closer than three hundred thirty feet to a governmental quarter quarter Section. Rule 5, is a standard exception rule, that permits administrative granting of location exceptions due to topographic reasons after notification of off-setting operators has been given, twenty days after notice of the off-set operators has been given, and no objections received. Rule 6, provides for a proportional factor of two point zero for a standard proration unit, and consisting of seventy-nine through eighty-one acres.

Q All right. Mr. Geddie, with respect to that allowable factor of two under current unit allowables that would yield what allowable for the subject well, for the discovery well?

A For the discery well, we will have one hundred forty barrels a day allowable plus twenty-four barrels a day discovery allowable yielding, one hundred sixty-four barrels a day, total allowable for the well.

Q And is the well capable of producing that allowable?

A It is.

Q Now, your Rule 4 provides a flexible well location pattern, do you have another exhibit prepared showing the permissible locations in the pool as presently defined by Commission Order?

A Yes, I do. This is Exhibit Number 7, and Exhibit Number 7 shows the pool limits as presently established, which is the

northeast quarter of Section 23, Township 23, north twenty west, as you can see the J-1 Well is spotted in the northeast quarter of that quarter section. The area shown hatched on the plat is the permitted well location for each quarter quarter Section.

Q Now, further with respect to the Well locations, is there any particular reason why you have prepared a flexible rather than a fixed well location pattern?

A Yes, this is very rough country, mountainous country, rugged terrain, and it is our belief that the operators should be allowed to drill the well within three hundred thirty feet of the quarter section line, quarter quarter section line of any quarter section, and that they, of course, be allowed to drill additional wells in each eighty acre tract. Now, my next exhibit, Exhibit Number 8, shows the terrain in this area, and this is prepared from a preliminary topographic survey made by the U.S.G.S. and shows the terrain in the area of the Navajo J-1. These locations in here are very expensive to make and even with this liberal location with this location tolerance that we are asking for here, we will undoubtedly have some locations in subsequent development in this field that will have to be brought in as exceptions, but it costs us about fifteen thousand dollars to make location on one of these wells.

MR. UTZ: Those contour lines being close together that means it is pretty steep doesn't it?

A Yes, sir, that's pretty steep. Those are forty foot contour intervals not ten, they are forty foot contour lines,

Q (By Mr. Morris) Mr. Geddie, do you have an opinion concerning the effect of the proposed rules and regulations to prevent waste and protect correlative rights?

A In my opinion the proposed rules will prevent waste and protect correlative rights.

Q Are you proposing temporary or permanent rules?

A Temporary rules.

Q Were Exhibits 5 through 8, prepared by you or under your direction?

A Yes.

MR. MORRIS: We offer Applicant's Exhibits 5 through 8 into evidence.

MR. UTZ: Without objection, Exhibits 5 through 8 will be entered into the record of this case.

(Whereupon, Applicant's Exhibits 5 through 8 were offered and admitted in evidence.)

MR. MORRIS: That's all under Direct Examination.

MR. UTZ: Other questions of the witness?

CROSS EXAMINATION

BY MR. ARNOLD:

Q Has a survey been made, which fixes the acreage in

all the sub-divisions out there? Or you speak of Standard and Non-Standard prolation units, I was wondering what you are using for acreage?

A Well, we have a requirement to make a survey, which we inherited, more or less, when we leased this area, and it will be and is being surveyed by a contract surveyor in that area, and he will fix Standard Governmental Section Units, and so forth in the area.

Q There isn't any reason to expect that there will be a lot of non-standard units there, then?

A No, sir. As I understand it he plans to grid this with a Standard Township and Range Grid, and of course, there will be the normal correction line work, at the Township, and Section line, where you have a correction line, odd-ball section, that correction line, but other than that, it should be a Standard Section grid, one mile square grid.

MR. UTZ: Will this conform to the N.M.P.M. as the land office uses?

A Now, you are going past my knowledge of Survey work out here. We, of course, as I said, we have this contract surveyor out there, what is the gentleman's name, Mr. Ecklehawk, and I assume that he was going to tie it in with existing surveys to the best of his ability.

MR. UTZ: Do you know about that?

MR. POHLMAN: Yes, he will. And I can't testify that this is the absolute truth, but I am sure that's what he is doing.

MR. WILLIAMS: I am C. D. Williams, with Kerr-McGee, and each lease is surveyed and the survey plat is filed with the U.S.G.S. before permit to drill is approved by the U.S.G.S.

MR. UTZ: Thank you.

MR. ARNOLD: Will these surveys be accepted by the General Land Office then, as a final survey on that area?

MR. McGRATH: No, they just don't do it, unless they have a man out there that checks the notes, and then they will, and they normally do it on Indian Lands, however, we have had some, but these are not G.L.O. Surveys.

MR. UTZ: Then to boil it down, it will be a Navajo Survey, but they will try to conform with the Land Office Township Lines.

MR. McGRATH: The Land Office does put out what they call, protraction diagrams, which if, this land were ever so surveyed, this is the way it would be and they try to follow those.

MR. UTZ: Does that answer your question, Mr. Arnold?

MR. ARNOLD: I was just trying to prevent getting into a situation where we had to have a Hearing eventually, for every Unit, which varied more than two acres, if the General Land Office comes in and re-calculates all the acreages what we are

already having on a lot of gas units in the San Juan Basin, and of course, the rules have now been re-written to say that if the variation is not more than twenty-five percent of the Standard Unit, in either direction that the District Office can approve the non-standard location, without the necessity of a hearing, of course, I believe you do say, without notice of hearing?

A Yes, we do, I was trying to remember exactly how it was worded, let's see exactly what we say here: May grant exception without notice of hearing when an application has been filed, for a non-standard unit comprising the governmental quarter section lot or the unorthodox size or shape of the Tract as due to variation of the legal sub-division of the Public Lands Survey, so it can be granted by administrative action.

Q (By Mr. Arnold) You wouldn't object to that being written like the gas wells order, or that if it doesn't exceed twenty-five percent of a Unit, either direction, that it can be approved in the District Office?

A No, sir, I wouldn't have any objection to that.

MR. UTZ: Are there other questions? Witness may be excused.

(Whereupon, Witness excused.)

MR. GEDDIE: Mr. Utz, I might make one remark.

Mr. Arnold asked me if it would satisfy us to include the twenty-five percent provision in the field rules as opposed to that twenty-five percent variation, from a Standard Unit Provision in the field rules, and I told him, that it was satisfactory, as far as Kerr-McGee is concerned, so if you all want to re-write the rules there to permit District Office approval of unorthodox size units up to twenty-five percent, that's all right.

MR. UTZ: All right, sir. Do you have another witness?

MR. MORRIS: No, that's all we have.

MR. UTZ: Statements in the case.

MR. HATCH: I have a telegram from Anadarko Production Company, supporting the application.

MR. UTZ: Case will be taken under Advisement.

STATE OF NEW MEXICO)
) ss
COUNTY OF BERNALILLO)

I, KAY EMBREE, Notary Public in and for the County of Bernalillo, State of New Mexico, do hereby certify that the foregoing and attached Transcript of Hearing before the New Mexico Oil Conservation Commission was reported by me; and that the same is a true and correct record of the said proceedings, to the best of my knowledge, skill and ability.

Witness my Hand and Seal this 30th day of January, 1968.

Kay Embree
NOTARY PUBLIC

My Commission Expires:

November 19, 1971

I do hereby certify that the foregoing is a complete record of the proceedings in the Examiner hearing of Case No. 3209, heard by me on 1-10, 1968.

Examiner
New Mexico Oil Conservation Commission