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

8 June 1988

EXAMINER HEARING

IN THE MATTER OF:

Application of Case No. 8834 being reopened pursuant to the provisions of Division Order No. R-8222, Lea County, New Mexico.	CASE 8834

BEFORE: David R. Catanach, 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 Bldg.
Santa Fe, New Mexico

For the Applicant:

MR. CATANACH: We'll call Case 8834.

MR. STOVALL: In the matter of Case Number 8834 being reopened pursuant to the provisions of Division Order No. R-8222, which promulgated temporary special pool rules and regulations for the Alston Ranch Upper Pennsylvanian Pool in Lea County, New Mexico, including the provision for 80-acre spacing units.

MR. CATANACH: This case was originally heard May 25th, 1988. It had to be readvertised because of a mistake in the docket.

Are there any other appearances in this case at this time?

If not, there being no appearances, no further appearances at this time, Case 8834 will be taken under advisement.

(Hearing conclude.)

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 No. 8834, heard by me on June 8 19 84.

David R. Catanach, Examiner
Oil Conservation Division

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

11 May 1988

EXAMINER HEARING

IN THE MATTER OF:

Case No. 8834 being reopened pursuant to the provisions of Division Order R-8222, Lea County, New Mexico. CASE 8334

BEFORE: David R. Catanach, Examiner

TRANSCRIPT OF HEARING

A P P E A R A N C E S

For the Division: Charles E. Roybal
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, KELLAHIN & AUBREY
P. O. Box 2265
Santa Fe, New Mexico 87504-2265

I N D E X

E X H I B I T S

MR. CATANACH: We'll call next Case 8334.

MR. ROYBAL: Case 8334. In the matter of Case Number 8334 being reopened pursuant to the provisions of Division Order R-8222, which promulgated temporary special pool rules and regulations for the Alston Ranch-Upper Pennsylvanian Pool in Lea County, New Mexico, including a provision for 160-acre spacing units.

MR. CATANACH: Are there appearances in this case?

MR. KELLAHIN: Mr. Examiner, I'm Tom Kellahin of Santa Fe, New Mexico, appearing on behalf of OXY USA Inc.

We are in support of making the special pool rules for this pool permanent. OXY USA Inc. now includes what was formerly called Cities Service Oil and Gas Company, or Corporation, I believe it was, which was the original applicant back in February of 1986 in which we presented testimony to support 80-acre spacing for this Bough C member of the Cisco formation oil pool.

That case was Case 8834 (sic) which resulted in Order R-8222. I've taken the liberty of preparing another copy of that decision, Mr. Catanach, along with a copy of the transcript and copies of the pertinent

exhibits that were used in that hearing, so that you'll have reference for them when you decide the current matter.

We have one witness to be sworn and to present testimony on this issue.

MR. CATANACH: Will the witness please stand and be sworn in.

(Witness sworn.)

MR. KELLAHIN: Mr. Catanach, our witness is Mr. Jerry Sillerud. He spells his last name S-I-L-L-E-R-U-D. And he is a petroleum engineer.

JERRY SILLERUD,

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

DIRECT EXAMINATION

BY MR. KELLAHIN:

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

A My name is Jerry Sillerud. I'm an engineer with OXY USA Inc. out of Midland, Texas.

Q Mr. Sillerud, have you testified on prior occasions before the Oil Conservation Division as a petro-

leum engineer?

A No, I have not.

Q Would you take a moment and describe when and where you obtained your engineering degree?

A I received a degree from the University of North Dakota, School of Engineering and Mines, in August of 1978.

Q Subsequent to graduation as an engineer, Mr. Sillerud, would you summarize what has been your employment experience?

A I've been with CXY, or Cities Service, since August of 1978 and I worked for approximately seven and a half years in all phases of drilling and production engineering; approximately a year as a mechanical engineer; and a year as an environmental test measurement engineer.

Q Have you been asked by your company to make a study of the engineering data available to determine whether or not you could reach on opinion concerning whether the temporary spacing of 80 acres for this special pool ought to continue or whether or not it ought to revert to 40-acre spacing?

A Yes, I have.

Q And have you reached certain opinions?

A Yes, I have.

Q In reaching your opinions have you pre-

pared as displays and documentation to support your opinions certain exhibits?

A Yes, I have.

MR. KELLAHIN: At this time, Mr. Catanach, we tender Mr. Sillerud as an expert petroleum engineer.

MR. CATANACH: He is so qualified.

Q Mr. Sillerud, let me direct your attention to Exhibit Number One. If you'll take a moment and use that structural display to first of all identify for Mr. Catanach was the initial discovery well for the pool?

A The initial discovery was the Elkin A No. 1, located in Section 25 of Township 13, Range 34.

Q When we look at the southwest quarter of Section 25 what is the 80-acre spacing unit that's dedicated to the well?

Do you recall how that was oriented?

A I do not have that.

MR. KELLAHIN: Mr. Examiner, our informatoin is that that's a west half or a stand-up 80-acre tract.

Q The east half of that 80-acre tract is the working interest of OXY USA Inc.?

A That's correct.

Q According to the display, that area identified with the stippled outline represents the area in which OXY either has a full or a partial working interest in the acreage?

A That is correct, yes.

Q After the drilling of the initial well production was obtained from what particular formation?

A We completed this well initially in the Bough C from 10,488 to 10,518 on December 24th of 1985.

Q I didn't hear you, Mr. Sillerud. It was September of '86?

A December 24th of 1985 we completed the Elkin A No. 1 initially in the Bough C formation.

Q All right. Did you recomplete that well in any of the other Bough C -- of the Bough formations?

A We reworked the well in August of 1986 and commingled the Bough B and the Bough C.

Q Of the wells shown on the display, Mr. Sillerud, what is the next well to be drilled to either the Bough C or the Bough B zones?

A OXY undertook to drill the Elkin A No. 2 and we tested this well in the Bough B. It tested wet, and we ended up completing it in the Bough A formation in September of 1986.

Q When we look to the east of the Elkin A-2

Well there is a Unical State 25 No. 1 Well in Section 25 shown as a dry hole symbol.

A That's correct.

Q Was that well in existence at the time that the Elkin A discovery well was drilled?

A Yes, it was.

Q And the Unical well has not produced from the Bough C or B?

A That's correct, that it does not produce.

Q All right. Let's go to the third well drilled in this immediate vicinity, Mr. Sillerud, and have you identify that well.

A We drilled the Yates A No. 1 in Section 26 in May of 1987 and it was a dry hole and consequently plugged.

Q Okay, was there a fourth well drilled?

A Terra Resources in March of this year, 1988, drilled the Morgan No. 1. It too was a dry hole and has been plugged.

Q What was the methodology you employed to study this reservoir to determine whether or not spacing on 40 acres ought to be appropriate or whether we ought to continue and make permanent the 80-acre spacing provisions of the special rules?

A Well, I used volumetric reserves calcula-

tions as well as decline curve analyses.

Q Let's go to Exhibit Number Two and have you identify for us the pertinent information you've utilized to commence your study.

A On Exhibit Number Two I've summarized some information that is pertinent to the Elkin A No. 1. It currently produces in the Bough C over the interval 10,488 to 10,518 and also the Bough B from 10,358 to 10,372.

It initally potentialed December 24th of 1985 in the Bough C for 135 oil, 22 water, and 189 MCF per day of gas.

It was worked over in September of '86 and -- where we perforated that Bough B interval and it was re-potentialed for 360 barrels of oil, 77 water, and 74 MCF per day of gas.

The gravity of the oil from the two formations is 39.6 degree API.

The net pay in the Bough C 26 feet; in the Bough B it is 4 feet.

The formation porosity in the Bough C is 4.5 percent; in the Bough B it is 6.0 percent.

We have a water saturation in the Bough C of 32 percent and in the Bough B of 20 percent.

Our formation volume factor is 1.35 reservoir barrels per stock tank barrel and the formation

temperature is 170 degrees Fahrenheit.

Q You got the net pay, the porosity, and the water saturation numbers from log analysis on this well?

A That is correct.

Q And the formation volume factor comes from what source?

A Knowledge.

Q The -- how does this information compare to what the original engineering witness testified to on behalf of Cities Service Oil and Gas Corporation back when this pool was created?

A They are the same.

Q Let's turn to Exhibit Number Three now, Mr. Sillerud, and have you identify and describe this exhibit.

A This is a performance curve of the Elkin A No. 1 along with a projected decline curve and also my calculation of the estimated ultimate recovery of 136,106 barrels of oil from this well at the time of its economic limit.

Q Just under the well name you have put the estimated ultimate recovery?

A That's correct, yes.

Q And you derive that number from what method?

A I used decline curve analysis.

Q And you get 136,000 barrels plus.

A That's correct.

Q Okay. Describe for us what has been the performance of the well to date?

A It, I might mention here, we've got actual figures, of course, through April of 1988, and the red dashed curve is gas production. The solid black curve is actual oil production, and then the dashed black curve is my projected decline.

In 1987 this -- the oil declined at a rate of 98 percent and I'm projecting that it will decline at a rate of 50 percent from here on until it's depleted.

Q In addition to the decline curve, Mr Sillerud, have you tabulated on a monthly basis the production from the Elkin A No. 1 Well?

A Yes, I have. That's Exhibit Number Four.

Q And this shows the current cumulative production of oil and gas and water production volumes through April of 1988 for this well?

A That's correct, yes.

Q Have you also made a tabulation of the monthly production for the other well in the pool, which is the Elkin A No. 2 Well?

A Yes, it is, and I also show the oil, gas,

and water production for this well over its producing life.

Q And that's Exhibit Number Five.

A Yes. This well, by the well, is currently temporarily abandoned and we're waiting on AFE approval to plug and abandon the well.

Q Turn now, sir, to Exhibit Number Six and have you identify and describe that exhibit.

A These are my volumetric reserves calculations for each of the two zones, the Bough B and the Bough C, and I've calculated the original oil in place for 40, 80, and 160 acre drainage areas for these two zones, using the reservoir parameters that we've previously discussed.

Q Let's go to Exhibit Seven now, Mr. Sillerud, and have you summarize what you have calculated using your volumetric analysis for the reserves in the Bough B and the Bough C for the discovery well.

A Okay. I've summarized here under B the total original oil in place of the two zones combined by the 40, 80, and 160 acre drainage area, and I've indicated recovery factors based on that ultimate recovery of 136,106 barrels of oil. That would represent a recovery factor of, well, about 60 percent for a 40-acre drainage area.

We would represent 29 -- well, about 30 percent recovery factor for an 80-acre drainage area and 15 percent recovery factor for 160-acre drainage area.

Q What type of drive mechanism do we have in this reservoir?

A This is a solution gas drive mechanism.

Q What, in your opinion, is the likely percentage recovery for a solution gas drive reservoir?

A My experience with this type of reservoir is that you can expect to recovery something on the order of 16 to 22 percent of the original oil in place with a solution gas drive reservoir.

Q Based upon that, Mr. Sillerud, what is your opinion about the appropriate spacing for the pool?

A I believe that this well is draining at least 80 acres.

Q Why have you dismissed the possibility that it is draining only 40 acres?

A For a solution gas drive reservoir I think that's too optimistic to drain 60 acre -- 60 percent of the original oil in place with a solution gas drive reservoir.

Q Based upon your decline curve analysis and your volumetric calculation, can you conclusively reach the opinion that the subject well is able to drain and develop at least 80-acre spacing units?

A Yes, I can.

Q Do you have an opinion as to whether or

not on 40-acre spacing the operator or operators within this field will be required to drill an unnecessary well?

A I think it would be unnecessary to drill on 80 acres, but --

Q On 40 acres.

A On 40 acres, excuse me.

Q Would drilling on 40 acres result in the recovery of additional hydrocarbons that would not otherwise be recovered if it was left on 80 acre spacing?

A No. No, it would not.

Q Your ultimate conclusion, then, with regard to the spacing pattern for this pool is what, sir?

A I believe it ought to remain 80 acres as permanent spacing.

Q Were these Exhibits One through Seven compiled by you or prepared under your direction and supervision.

A Yes, they were.

MR. KELLAHIN: That concludes my examination of Mr. Sillerud.

We would move the introduction of his Exhibits One through Seven.

MR. CATANACH: Mr. Kellahin, you have an Exhibit Eight here also. Do you plan on entering that?

MR. KELLAHIN: I'm sorry, perhaps we ought to do so. This was simply for informational purposes. It will show you what we believe to be the current ownership within the immediate area. Because the Division on its own motion re-docketed this case for hearing we have simply shown up as an interested party. We did not independently provide notice to anyone else that might be interested in this reservoir but this would be an exhibit taken from our land files that will show you who the parties are within the immediate pool area, and if it's of use to you, Mr. Catanach, we would incorporate it in as one of our exhibits and request that you enter it as Exhibit Number Eight.

MR. CATANACH: Exhibits One through Eight will be admitted as evidence.

CROSS EXAMINATION

BY MR. CATANACH:

Q Mr. Sillerud, there are no other operators in the pool right now, are there?

A That is correct. We have the only two wells in the pool.

Q How do you explain the low recovery rates from the Elkin A No. 2?

A Well, that's in the Bough A formation and

it, too, is a solution gas drive reservoir, and it's on a very substantial decline rate.

Q The subject pool contains all of the Bough members, is that correct?

A Yes. I believe that the vertical limits are the base of the Wolfcamp to the top of the Pennsylvanian.

Q Was the No. 2 tested in the B and C?

A It was -- it tested wet in the B and there was no porosity in the C.

Q Does --

A The vertical limits are the base of the Wolfcamp to the top of the Canyon, and not the Pennsylvanian, as I said.

Q Does OXY have any intentions of drilling any other wells at this point?

A It's under review by our geologists but we haven't made any firm plans at this time.

Q Mr. Sillerud, is economics also a factor in determining well spacing in this area?

A Yes. It costs about $600,000 to drill one of these wells to that depth, and we don't -- well, I don't have an economic analysis on a 40-acre well but I don't believe it would be economically feasible, especially when it looks like it's being drained by 80 acres.

Q Do you think basically this is just a very small, small reservoir?

A Yes, I do, and I believe that evidence of the dry holes surrounding it provide further evidence of that.

Q There hasn't been any development to the -- to the southeast or anywhere in that area, has there?

A No, sir, not to my knowledge.

Q What was the No. 2 averaging per day, do you know? Do you have that producing rate?

A At the time it was TA'd?

Q Yeah.

A It -- that -- it was making about 12 or 13 barrels a day at the time it was TA'd. It produced the first 12 days of January and was shut in.

Q And that well is going to be plugged and abandoned?

A Yes, it has collapsed casing.

MR. CATANACH: That's all I have of the witness. He may be excused.

Is there anything further in this case?

If not, it will 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 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. 8834, heard by me on May 11 1988.

David R. Catanach, Examiner
Oil Conservation Division

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

19 February 1986

EXAMINER HEARING

IN THE MATTER OF:

Application of Cities Service Oil & Gas Corporation for pool creation, special pool rules, discovery allowable, and unorthodox well location, Lea County, New Mexico. CASE 8834

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
Legal Counsel to the Division
Oil Conservation Division
State Land Office Bldg.
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For Cities Service:
W. Thomas Kellahin
Attorney at Law
KELLAHIN & 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: The hearing will come to order.

We'll call Case Number 8834, which is the application of Cities Service Oil and Gas Corporation for pool creation, special pool rules, discovery allowable, and unorthodox well location, Lea County, New Mexico.

Call for appearances.

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

MR. STOGNER: Are there any other appearances?

There being none, will the witnesses please stand and be sworn.

(Witnesses sworn.)

MR. STOGNER: Mr. Kellahin.

MR. KELLAHIN: Thank you, Mr. Examiner.

We have submitted to you a package of exhibits.

The first exhibit has two

parts. Exhibit One represents the copy of the cover letter by which, this application was filed before the Division and shows the lists of the names and addresses of those working interest owners or operators within the area.

You can locate their interest within the area by referring to Exhibit Number One-A which is a landman's ownership plat.

Pursuant to the Division notice rules, we have sent notice by regular mail to all those offset operators within the area required. In addition, you'll note that our application seeks an unorthodox well location for the discovery well. Cities proposes to dedicate an 80-acre tract consisting of the west half of the southwest quarter of 25. That makes it too close to the east boundary of that 80-acre tract. It encroaches on Cities Service interest in the east half of the southwest, so it's -- we didn't notify ourselves.

The encroachment of the unorthodox location is towards acreage totally controlled by Cities Service, so therefore, we didn't send certified notice.

MR. STOGNER: Okay, Mr. Kellahin.

MR. KELLAHIN: I'm just happy I figured all that out.

MR. STOGNER: (Not clearly understood.)

MR. KELLAHIN: We'll have an engineer that will show you the exact footage locations.

We are seeking a new pool for the production of oil. We are omitting or deleting from our application a discovery allowable because the Elkan Well, the discovery well in the Bough C, is not capable of producing in quantities sufficient enough to justify the discovery allowable.

My first witness, Mr. Examiner, is Mr. Fly, who is a geologist and will explain the geology to us.

STERLING FLY,

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

DIRECT EXAMINATION

BY MR. KELLAHIN:

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

A Sterling Fly, petroleum geologist.

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

A No.

Q Would you describe to Mr. Stogner when and where you obtained your geologic degree?

A I received a BS in 1980 and an MA in 1985 from the University of Texas at Arlington.

Q Both degrees from the same school?

A Yes.

Q Subsequent to graduation, Mr. Fly, would you summarize your professional work experience as a geologist?

A I've been with Cities Service for four years.

Q As a geologist for Cities Service, have you made a study of the geologic factors surrounding the Elkan "A" Well, located in Section 25 as described in the application?

A Yes.

Q And pursuant to that study, Mr. Fly, have you prepared certain exhibits?

A Yes.

MR. KELLAHIN: We tender Mr. Fly as an expert geologist.

MR. STOGNER: Mr. Fly is so qualified.

Q Let me direct your attention to Exhibit

Number Two and would you commence by simply identifying this exhibit for us?

A Exhibit Two is a map, scale one inch equal 4000 feet, in which producing wells in the southern Tatum Basin are identified. They are color coded into producing horizons.

The subject well, Cities Service Elkan "A" No. 1 is the orange well in Section 25 on the upper righthand corner. The only other orange well, which indicates Bough C production, is over in Section 32, approximately five sections to the west.

Q Have you prepared a cross section using the discovery well and tying it back into other Pennsylvanian producing wells in the immediate area to determine whether or not the discovery well constitutes a separate and distinct reservoir or source of supply from any other producing reservoir in the immediate vicinity?

A Yes.

Q Let's use Exhibit Number Two to draw the line of cross section which we're going to discuss later. Just take Exhibit Number Two and track for the examiner what wells are located on the cross section.

A Okay, the east/west cross section, which is Exhibit Three, begins in Section 25, a Union of California Well No. 1 State 25, proceeds through the orange dot,

which indicates No. 1 Elkan "A", picks up two wells in Section 33 and 34 in Circa Field, which are green, two wells in the No Nombre Field in Section 32, a blue one, which is Bough B production and an orange Bough C well, and a dry hole in Section 31.

Q If we should make an investigation going ot the east of those wells shown on Exhibit Number Two, do you find any Pennsylvanian or Permo-Penn fields as we move to the east?

A No. The Elkan "A" is the easternmost productive well in this area.

Q When we look at the pools identified in Exhibit Number Two, Mr. Fly, can you generally tell us what the spacing has been established for in each of those pools?

A Spacing for the fields represented on Exhibit Two are all 160 acres.

Q I understand that the Ranger Lake Field is spaced on 80 acres?

A Yes, that's in 12 South, 14 -- I'm sorry, excuse me -- 12 South, 34 East, just to the north of this mapped area.

Q Have you reached a conclusion concerning whether or not the discovery well has encountered Permo Penn production that is separate and distinct from the production in the adjacent pools?

A Yes. Exhibit Three shows that on this cross section the perforated intervals are indicated in red and correlation is color coded for ease.

The only well which is perforated in the same interval on this cross section, or in the whole area, is over -- the second to left well on the left side, so stratigraphic separation is effected between our Elkan "A" No. 1, the second well to the right, on the right side, is stratigraphically separate from the nearest wells, all of the wells in the Circa Field which are productive in the Bough A horizon.

Q What do you conclude as a geologist having made that study and comparison of the wells on the cross section?

A The Cities Service Elkan "A" No. 1 is -- has discovered or is a -- should be a new discovery based on the fact that it is productive in an interval which is stratigraphically and spacially separated from nearby production.

Q Let me direct your attention, Mr. Fly, to Exhibit Number Four, and have you identify that exhibit.

A Exhibit Four is a small structure map centered about the Elkan "A" No. 1, located in the southwest quarter of Section 25.

As you can see, the Union of California

No. 1 State 25 Well, was a dry hole through that same interval, so there's a limit of production between our well and the Union of California well.

Q What do you conclude from Exhibit Number Four, Mr. Fly?

A That we have a new pool discovered in the Bough C.

Q Do you have any preliminary opinions with regards to the size, shape, or extent of this new reservoir?

A Well, the structure map indicates where we feel the productive limits of the field will be, generally in a northeast/southwest orientation; generally in the south half of the west half of Section 25, and perhaps extending into Section 26, the southeast quarter.

Q For purposes of creation of a new pool, Mr. Fly, would the dedication of the west half of the southwest quarter of Section 25 be an appropriate way to commence the spacing and acreage that's subject to the pool?

A Yes.

Q Would the inclusion of a one-mile buffer zone around that spacing unit be one that would be reasonable in order to avoid the drilling of unnecessary wells?

A Yes.

Q Were Exhibits Two, Three, and Four prepared by you or compiled under your direction and supervi-

sion?

A Yes.

MR. KELLAHIN: That concludes my examination of Mr. Fly.

MR. STOGNER: Are you going to admit the exhibits at this time?

MR. KELLAHIN: Yes, sir, we'll tender Exhibits One through Four at this time.

MR. STOGNER: Okay, Exhibits One through Four will be admitted into evidence.

CROSS EXAMINATION

BY MR. STOGNER:

Q Mr. Fly, let's get Exhibit One out of the way first.

Help me out a little bit on this. You sent carbon copies to -- of this application of January 20th, 1986, to several people in your own party and Durham Corporation.

Walk me through this. How is Durham Corporation -- why did they -- why did you send notice to them for?

A This shows the --

Q He's the fourth one down on the carbon copy.

A Okay. They, well, they -- we show that they have ownership in one of the three sections immediately to the east of ours. I'm not sure which one it was right offhand.

Q But the -- it appears to be the northwest quarter of Section 35, to the southwest?

A Yeah, that's it.

Q Okay. How about Yates Petroleum Corporation?

A Okay, they have the east half of Section 25 and southeast quarter of 35, plus the south half of the northeast quarter of Section 35.

Q Exxon Corporation.

A Okay, they are in the east half of Section 24.

Q F. H. Miles, or Mills? Is he the owner over there in Section 30 to the township?

A Yes, sir, south half of 30.

Q Okay. Ralph Way? He seems to have a half interest in it.

A Same, in that same area.

Q R. O. Cannon?

A Northwest -- northwest of northwest of 30.

Q Okay. And Monsanto, of course, being to the south.

A To the south.

Q HNG, or Houston Natural Gas?

A North half of 31.

Q And, as Mr. Kellahin stated awhile ago, you are offsetting yourself on all sides except to the south, but since the proration unit -- since you're offsetting the people to the north and to the east of you, Cities was the only one to be notified, is that correct?

A Yes, sir.

Q Thank you for walking through that with me.

Are you familiar with the Circa Upper Pennsylvanian Pool in this area?

A Yes, sir.

Q Do you know the pool boundaries of that pool?

A Well, they're outlined on the -- well, actually, the Commission boundaries are outlined on the large land plat, Exhibit One-A, highlighted in yellow, of which three green wells are within a two-mile radius of our well.

Q And the vertical limits of that pool, do you know what those are?

A They -- it's Upper Penn --

Q Do they include all the Bough C intervals,

A, B, C, and D?

A That -- that just includes the Bough A. As -- as -- on Exhibit Two, several wells are included in the Circa in the Lower Wolfcamp. Most of them are in the Bough A and to the far south end, some in the Bough B.

Q But you don't know the vertical limits of the Circa?

A Well, --

Q In the (not clearly understood) pool.

A Well, it says here in the Superior Oil Company State "B" No. 1, Section 4, 14 South, 34 East, an interval 10,397 to 10,422.

Q What are you reading that off of?

A Off --

MR. KELLAHIN: This is the Commission Order setting up the Circa Upper Penn Pool, Mr. Stogner, if you'd like to have this copy.

MR. STOGNER: Okay, that would be fine. I'll take administrative notice and that appears to be Order No. R-3452, as amended.

According to this the vertical limits are fairly well limited, aren't they?

Thanks for this.

Q Let's go to your Exhibit Number Three and could you explain to me what you used as the markers for the

Bough C formation? Let's start with the top of the Bough C.

A Okay, there's a distinctive kick on the sonic log on most of these. The curve kicks way to the right and that carries through most of these wells fairly well, fairly persistently and consistently, through the wells that are penetrating in the -- in the Bough C interval.

Q Is that kick caused by shale or --

A Well, you're going from a shale into a limestone right there, so I guess sort of boundary phenomenon.

Q How about the base?

A Well, the base is the top of where we correlate the Cisco, a limestone marker which comes in. It's only shown in three or actually in four wells on this cross section, but it's a correlation, you know, lay down the logs and correlate the best you can marker.

Q Have you been in contact with Mr. Paul Kautz in our Hobbs District Office concerning the boundaries and the vertical limits of this pool?

A I have not.

MR. KELLAHIN: I believe Cities, other Cities personnel have, Mr. Stogner, and he's approved or concurred in establishment of the new pool as to vertical limits.

MR. STOGNER: All righty, I will be in contact with Mr. Kautz to verify that.

Thank you, sir. I have no further questions of Mr. Fly.

Are there any other questions of this witness?

MR. KELLAHIN: No, sir.

MR. STOGNER: If not, he may be excused.

Mr. Kellahin, did you enter Exhibits One through Four or One through Five?

MR. KELLAHIN: One through Four. The fifth one starts the engineering testimony.

MR. STOGNER: Thank you, sir.

TERRY LINDQUIST,

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

DIRECT EXAMINATION

BY MR. KELLAHIN:

A Mr. Lindquist, for the record would you state your name and occupation?

A Terry Lindquist; reservoir engineer.

Q Mr. Lindquist, have you previously testi-

fied before the Division?

A No, I have not.

Q Describe to the examiner when and where you obtained your degree.

A I obtained a Bachelor of Science in petroleum engineering from the New Mexico Institute of Mining and Technology; graduation date was December of 1980.

Q Subsequent to graduation have you been employed as a petroleum engineer?

A Yes.

Q Describe your professional experience.

A I have five years with the Reservoir Engineering Department of Cities Service.

Q As a reservoir engineer have you made a study of the facts surrounding Cities Service's application for the create of a new Bough C Pool, as set forth in its application?

A Yes, I have.

Q Pursuant to that study, Mr. Lindquist, have you prepared certain engineering exhibits?

A Yes.

MR. KELLAHIN: We tender Mr. Lindquist as an expert petroleum engineer.

MR. STAMETS: That was the class of '80 from New Mexico Mines?

A December of '80.

MR. STOGNER: Good class; he's so qualified.

Q Mr. Lindquist, let me begin by asking you some preliminary questions about the proposed new pool.

Do you have a recommendation to the examiner as to what the spacing for this pool ought to be?

A Yes. 80 acres.

Q In addition do you have a recommendation to the examiner as to where you would propose to locate wells under the special rules?

A Yes.

Q All right. The Commission generally adopts for pools of this type well locations that require wells to be drilled within 150 feet of the center of a quarter quarter section.

Is that a practice that would be consistent, in your opinion, for wells to be drilled in this new pool?

A Yes.

Q Do you have a recommendation to the Examiner with regards to how long the temporary rules should be placed in effect before there is a hearing to determine whether those rules ought to be made permanent?

A Yes, sir.

Q What is that period of time?
A 180 days.
Q I'm sorry, let's go for 18 months.
A Okay. I'm sorry.
Q Is that all right?
A Yeah.
Q That's what you meant to say, isn't it?
A Yes, I'm sorry.
Q A temporary period for eighteen months would give Cities Service an opportunity to drill additional wells in the pool and to obtain production from those wells from which to determine what the ultimate spacing ought to be.
A Yes.
Q And you couldn't do that in 180 days, could you?
A Sorry, yeah.
Q All right. Do you have a recommmendation to the examiner with regards to possible pool names for the new pool?
A Yes.
Q All right. Would you give us your list of preferences and we'll rely on the examiner to pick a name?
A Kachina.

MR. STOGNER: Oh, how do you spell that?

A K-A-C-H-I-N-A. Alston Ranch, A-L-S-T-O-N.

Q What's the last one?

A North Hillburn, H-I-L-L-B-U-R-N.

Q All right. Let me direct your attention, Mr. Lindquist, to Exhibit Number Five and have you describe for us what studies that you have made to determine, first of all, what the appropriate spacing ought to be for the pool,

Could you lead us through your Exhibit Number Five and show us what the pertinent reservoir parameters were that you have determined to exist for the discovery well?

A Pertinent information is that we are producing from the Bough C formation over a producing interval of 10,488 feet to 10,518 feet.

The initial potential, the well pumped 135 barrels of oil per day, 22 barrels of water per day, and 189 MCF per day.

Gravity of the oil is 39.8 degree API.

Formation net feet of pay, 26 feet.

Formation porosity, calculated from log data, 4-1/2 percent.

Formation water saturation, also calcu-

from log data is 32 percent.

Formation volume factor, 1.35 reservoir barrels per stock tank barrel.

Formation temperature of 170 degrees Fahrenheit.

Q Having determined that information from the discovery well, have you made a calculation of what you estimate to be the recovery from the discovery well?

A Yes, I have.

Q All right, let me direct your attention to Exhibit Number Six and have you identify and explain that exhibit.

A Exhibit Number Six is my recovery calculations.

The estimated recovery for the discovery well, the Elkan "A" No. 1, 83,180 stock tank barrels.

A volumetric reserve estimation was then conducted for the Bough C formation, where a varying drainage area from 40 to 160 acres, and an original oil in place was calculated for 40, 80, and 160-acre drainage area.

Then knowing the estimated recovery I could then determine the percent of original oil in place recovered for each one of those drainage areas.

For this instance, the 40-acre came up with a recovery of 45-1/2 percent original oil in place; 80

acre calculation recovered approximately 22.7 percent original oil in place; and for 160 acres recovery totals 11.4 percent original oil in place.

Q Have you additional calculations with regards to the recovery potential?

A Yes, I have.

Q All right, let's turn to Exhibit Number Seven, then, Mr. Lindquist, and have you describe your additional calculations.

A These calculations were conducted by setting up a two-well drainage system, figured the amount of interference, which would be noticed for a 40, 80, or 160-acre system.

Of course for the 160-acre system there would be no drainage. That is the ultimate production the well could produce; however for the 40-acre per well designation only 71,000 stock tank barrels could be recovered versus an 80-acre recovery of 82,000 stock tank barrels.

Therefore I went back through the original oil in place calculations and determined that for a 40-acre recovery drainage area, we're looking for a recovery from the Bough C of 38.8 percent; 80-acre was again 22.4 percent; and for 160-acre it's only 11.6 percent.

Q Based upon your calculations of recoveries to be expected, do you have a recommendation to the exa

miner for temporary spacing?

A Yes.

Q And what acreage would you use for the temporary spacing?

A 80-acre units.

Q Mr. Fly has told us that the closest Permo-Penn Field to the west is the Circ Field and that's spaced on 160 acres.

Can you draw any comparisons or dissimilarities to demonstrate why the Elkan new pool ought to be on a 160 acres or 80?

A Well, for one, you're looking at two different reservoirs. We are in the Bough C, whereas the Circa is in the Bough A, and again, the only basis we have to go by is the Bough C completions in the No Nombre Field, this completion was on 160-acre proration unit; however, this well initial -- potentialed for 310 barrels of oil per day and it was a far superior well in terms of potential compared to our Elkan A.

Q How does that potential compare to the Elkan A?

A 310 barrels of oil per day for the State "FO" No. 3, which is four miles east of the Elkan "A", or four miles west of the Elkan "A", compared to 135 barrels of oil per day for our discovery; decreased by a third.

Q In your opinion, then, spacing for the new pool on 160 acres would not provide for a sufficient number of wells to properly develop the pool.

A No, it would not.

Q All right, let's look at the other way. What is your opinion with regards to the selection of 80 over 40-acre spacing?

A For 40-acre spacing there will be too much interference, would hamper our economics.

Q In drilling of 40 acres, then, is it your opinion that that would result in the drilling of unncessary wells?

A Yes, it would.

Q Let's turn to the economics, then, Mr. Lindquist. I direct your attention to Exhibit Number Eight and have you identify and describe that exhibit.

A In Exhibit Eight I've conducted two economic analyses. The first considers 40-acre spacing; the second considers 80-acre spacing.

For the 40-acre spacing case the return on investment and the discounted net cash production does not meet our corporate hurdle (sic) rate.

Whereas, for the 80-acre spacing both the discounted net cash production and the the return on investment does satisfy our corporate need.

It's been proposed that the initial spacing unit for the discovery well be the west half of the southwest quarter. Would that constitute an unorthodox well location if the spacing, well spacing rules that we have proposed are adopted by the examiner?

A Yes.

Q All right. Describe exactly in what way it would be unorthodox.

A The Elkan "A" No. 1 would be 180 feet east of the proposed permissible -- or permissible location.

Q And that would be moving towards the Cities Service -- Cities Service acreage in the east half of the southwest quarter.

A Yes, it would.

Q All right. Were Exhibits Five through Eight prepared by you?

A Yes, they were.

Q And in your opinion, Mr. Lindquist will approval of this application be in the best interest of conservation, the prevention of waste, and the protection of correlative rights?

A Yes, it would.

MR. KELLAHIN: We move the introduction of Exhibits Five through Eight.

MR. STOGNER: Exhibits Five through Eight will be admitted into evidence at this time.

CROSS EXAMINATION

BY MR. STOGNER:

Q Mr. Lindquist, let's go over these names here.

It's been the policy and procedure set up that the pool names correspond to geographical featurs, geological features in the area.

So I can better understand these, where did the name Alston Ranch, what is that based on?

A These field designations were proposed by our geological exploration people and I do not know how those names were arrived at.

Q Okay. Is it Cities Service Oil and Gas Company's intent to limit the vertical limits of this pool just to the Bough C?

A Yes.

MR. STOGNER: I have no further questions of Mr. Lindquist.

Are there any other questions of this witness?

MR. KELLAHIN: No, sir.

MR. STOGNER: If not, he may be excused.

Anything further in this case,

Mr. Kellahin?

MR. KELLAHIN: No, sir.

MR. STOGNER: Does anybody else have anything further in Case Number 8834?

If not, this case will 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 No. _____, heard by me on _____ 19____.

_____, Examiner
Oil Conservation Division