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

18 December 1985

EXAMINER HEARING

IN THE MATTER OF:

The application of Eastland Oil Company for a unit agreement, Eddy County, New Mexico; and
The application of Eastland Oil Company for a waterflood project, Eddy County, New Mexico.

CASE 8786 & 8787

BEFORE: Michael E. Stogner, Examiner

TRANSCRIPT OF HEARING

A P P E A R A N C E S

For the Division: Jeff Taylor
Attorney at Law
Legal Counsel to the Division
Energy and Minerals Dept.
Santa Fe, New Mexico 87501

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

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GEORGE NEAL

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MR. STOGNER: We'll call next Case 8786.

MR. TAYLOR: The application of The Eastland Company for a unit agreement, Eddy County, New Mexico.

MR. KELLAHIN: If the Examiner please, for purposes of taking testimony today we would request that you consolidate Case 8786 with Case 8787.

MR. STOGNER: Are there any objections?

There being none, we'll call next Case 8787.

MR. TAYLOR: The application of The Eastland Oil Company for a waterflood project, Eddy County, New Mexico.

MR. STOGNER: 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 one witness to be sworn.

MR. STOGNER: Are there any other appearances in either one of these cases?

Will the witness please stand

and be sworn at this time?

(Witness sworn.)

GEORGE NEAL,

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

DIRECT EXAMINATION

BY MR. KELLAHIN:

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

A George Neal. I'm Vice President of Eastland Oil Company.

Q Mr. Neal, have you previously testified before the Oil Conservation Division?

A I have.

Q And have you so testified in your capacity as an engineer?

A I have.

Q Pursuant to your employment by your company, Mr. Neal, have you made a study of the facts surrounding Eastland's application for approval of a waterflood project and a unit agreement in Eddy County, New Mexico?

A Yes, I have.

MR. KELLAHIN: If the Examiner pleae, we tender Mr. Neal as an expert engineer.

MR. STOGNER: Mr. Neal is so qualified.

Q Mr. Neal, let me direct you to what is marked as Exhibit Number One, and to orient the Examiner as to what your company seeks to accomplih with this application, would you first of all identify for us how you've indicated the outer boundary of the proposed unit on Exhibit Number One?

A The limits of the boundaries of the so-called Power Grayburg Unit have been determined by salt water determination on the electric logs as being 50 percent average salt water saturation. It's been drawn through the contour map and the proration units within this 50 percent average salt water saturation limits have been designated in a unit.

Q The outer boundary of the unit is indicated by the dashed black line?

A That's correct.

Q And what type of acreage is involved in this unit, Mr. Neal?

A It is all Federal acreage.

Q In terms of the formation to be the subject of the unit and the waterflood, is this the Grayburg

section of the Powers Grayburg-San Andres Pool?

A That is correct. It's only the Grayburg sands.

Q Is there any San Andres production within the unit?

A There is none.

Q All right. So that the examiner will know what your basic application involves, Mr. Neal, would you identify for him on Exhibit One how you have indicated the proposed injection well?

A The injection wells are surrounded by a triangle and they have been colored, I believe, on all the exhibits in yellow.

Q How many injection wells do you propose?

A There are four injection wells within the unit limits.

Q And how many producing wells will produce for the unit?

A There will be five producing wells.

Q And how are those indicated?

A The circles around the producing wells.

Q I notice in the northwest corner of Section 6, in the southeast of the northwest there is a 40-acre tract just outside the unit and there is a well symbol on that tract. It says the Kenwood Federal No. 4?

A That is presently a producing -- did produce from the deeper formation and it is now a salt water disposal well used to dispose of salt water produced in the Power Grayburg-San Andres Pool.

Q Let me direct your attention now to Exhibit Number Two, Mr. Neal, and have you describe for us generally what has been the primary production history for the Grayburg wells in the proposed unit.

A The cumulative production through January the 1st, 1985, has been 452,000 barrels and these last stages of primary production is estimated an additional 37,000 barrels to be produced by primary production.

Presently the wells are making on the average about three barrels per day per well.

Q Do you have an opinion as an engineer, Mr. Neal, as to whether this proposed unit is a viable candidate for a waterflood project?

A We have examined the unit and surrounding areas and it appears that this Grayburg Sand will flood.

Q In making your calculations, Mr. Neal, do you have an estimate of the additional recovery of oil that you project for the waterflood project?

A Yes. We figure an additional 358,000 barrels would be recovered by the waterflood, which will represent approximately 8 percent of the oil in place.

Q What is the source of the water to be utilized for the waterflood project?

A We plan to contact, or we have contacted the City of Carlsbad and they have a waterline approximately four miles from this area and they will sell water to the unit.

Q Is this fresh water?

A It is fresh water.

Q Let's to Exhibit Number Threed, Mr. Neal, and talk about the geology of the unit.

What is Exhibit Number Three?

A Exhibit Number Three is a structure map. It's drawn on top of the -- it's called the Loco Hills Sand in the Grayburg formation, and it also defines the structure, structural position of the Power Grayburg Pool within the area surrounding the pool approximately two miles each direct.

Q What significance do you draw from the structure map in terms of your unit?

A That the Power Grayburg Pool is a separate reservoir and it is this long, east/west axis, very narrow, north and south, approximately one location wide.

Q Do you have an opinion, Mr. Neal, as to whether the proposed unit boundary for the unit is one that has a reasonable geologic justification?

A Yes. As has been defined, the area within the unit has been defined by dry holes in all directions.

Q All right, sir, would you take a moment and define for the examiner the dry holes that dictate the orientation of the unit?

A To the north in Section 31 we have drilled a so-called Allied Federal "A" No. 1. It was dry on drilling and was not completed.

In Section 32 to the north and slightly to the east is the Allied State No. 1 that was a small producer and was plugged after making approximately 5000 barrels of oil.

On the east we have drilled the ARCO Federal No. 3, which was dry at the time it was drilled but has since, it's debatable whether or not the salt water saturations in that well might be approaching those at 50 percent. We had hoped to use that well for an injection well.

Q And in fact that is one of the wells shown as a proposed injection well?

A That is correct.

Q All right, sir, what other wells define the --

A The Allied Federal No. 2 is a dry hole to the north -- to the southeast and the Kenwood Federal No. 4

is also dry to the south.

And the extreme west is the Bennett Hondo State in the Section 2, which is a dry hole.

Q Would you use this exhibit, Mr. Neal, and explain to the examiner approximately where in Eddy County this unit is?

A It's -- the unit's southeast of Loco Hills approximately 75 -- 7 miles, about 45 miles from Carlsbad.

Q Are there any other Grayburg floods in the immediate vicinity?

A The Jackson Grayburg two miles north is -- has been flooded for several years; it's quite a large flood in the Grayburg.

Q Are there any other Grayburg or San Andres waterfloods in the immediate area?

A No, there's not strictly in the Grayburg. There are some floods in the Shugart to the south, approximately two miles south.

Q All right, sir, let's turn to Exhibit Number Four, which is your east/west cross section. Would you identify the exhibit and explain to the examiner what wells are depicted on the cross section?

A Yes. The cross section designated as A-A' goes from the east to west through the east/west center

of the Power Grayburg Unit.

The sands that are producing or present in these wells is depicted in yellow on the cross section.

Q Would you take any of the logs that you want and identify for the examiner what has occurred in each of those zones and what you propose to do in terms of flooding those zones?

A The well -- the sands that are producing, that we have produced in the Power Grayburg are designated as the C, D, and E Sands, the lower three sand sections.

The Loco Hills Sand and two other sands designated as A and B are not continuous and in cases that we have tested those sands, they've either had gas or high water saturations, so the three lower sands are the ones that seem ideally suited for our flooding because they're continuous over the entire reservoir.

Q All right, sir, let's turn now to Exhibit Number Five, which is the north/south cross section.

All right, sir, would you identify Exhibit Number Five?

A Exhibit Five shows two cross sections, D-D' and C-C', that are north/south on the east end of the structure and on the -- approximately through the center, the thickest part of the structure.

They show the same sands and also indi-

cate the fast drop-off of the structure, especially on the south, indicating that it is a separate structure.

Q Would you tell the Examiner what opinions and reasons you have for selecting the four injection wells as injection wells, and why you have determined that it is not feasible to construct a typical 5-spot injection pattern for the unit?

A The wells we've selected are, of course, have been named, and they are the four wells that join or offset producers in every case. They are across the center of the structure, thickest part of the structure, and it is impossible to have a 5-spot in this type of -- this because it's only one proration unit wide across the north/south.

We have found that even at drilling lease line wells is not economical because of the amount of additional oil recovered would not be sufficient to pay for an additional well drilled.

Q Would you give the examiner a brief summary of your economics in terms of how you've shown that even lease line wells would not be profitable?

A Yes. The cost of a well in this area is approximately $220,000 completed and based on the recovery that we've estimated from the flood of 750 barrels per acre, a lease line well, we feel, would contribute maybe an additional 20 acres at the maximum to a 5-spot; times 750 would

be an additional 15,000 barrels of oil.

We estimate a profit from this waterflood of, after discount, of $10.70 a barrel, so we feel that additional oil recovered by a lease line well would be $161,000 as opposed to the cost of the well of $220,000.

Q Let me turn your attention now, Mr. Neal, to Exhibit Number Six and let's talk about the requirements of the Division in terms of the C-108 form.

Have you made a review, Mr. Neal, of the requirements of the Division as outlined on Form C-108 and have you prepared the exhibits attached to that form?

A Yes, I have.

Q Is Exhibit Number Six the form that you have executed on behalf of your company?

A That's correct.

Q All right, sir, let's turn to Number Seven, then.

Would you identify Exhibit Number Seven and show us what you have done with this exhibit?

A Exhibit Seven is the map that represents the area under question, with the Power Grayburg Pool outlined in the center, approximately three miles in each direction of this pool.

We have drawn a circle around each injection well, of course they overlap, of one-half mile radius

to represent the area of review of the -- each injection well.

There's also a circle around the entire unit, 2-mile radius, which is to represent the area we're looking at here.

Q Within the 2-mile area, Mr. Neal, have you made an investigation to determine whether there are any fresh water wells?

A Yes, we have.

Q And have you found any?

A No, there's no fresh water.

Q Within the half mile radius area of review, have you made a tabulation of all the plugged and abandoned wells and the producing wells that penetrate the Grayburg interval?

A Yes, we have.

Q All right, sir. Let's turn now to Exhibit Eight, which is marked Eight-A, B, C, and D, and have you identify what Exhibit Eight-A is, sir.

A Eight-A is the schematic of the ARCO Federal No. 3 with the information completed on the schematic as well as on the answers to the questions asked on the form.

Q Have you prepared a similar schematic for each of the four injection wells?

A That is correct, four wells.

Q Are each of the four proposed injection wells formerly producing wells in the Grayburg?

A With the exception of the ARCO Federal No. 3. It was completed as a dry hole and we propose to re-enter that well and set casing using it as an injection well.

Q Upon recompletion of each of the four wells for injection purposes, Mr. Neal, in your opinion as an engineer will each of those wellbores be recompleted so that water injected into the Grayburg would not migrate up above and out of the Grayburg formation?

A Yes, they are protected by casing and cement.

Packers will be used on top of the perforated interval, tension packers, and coated tubing with inhibited packer fluid.

Q Do you propose to put some gauge on the surface to monitor the annular space between the tubing and the casing?

A That's correct. We would check that.

Q Do you have an opinion as to whether each of these proposed injection wells conforms to the requirements of the Oil Conservation Division for injection wells?

A It's my opinion that they do, yes.

Q Let's turn now to Exhibit Number Nine, Mr. Neal. Would you identify Number Nine for us?

A Exhibit Nine is a detail of all the wells that are completed in the area of review with their present status, size casing set, sacks of cement, top of cement, either calculated or measured, and completion interval of the wells.

Q Have you also listed on the tabulation those wells that are plugged and abandoned?

A Yes, they're all --

Q In addition to listing the plugged and abandoned wells, Mr. Neal, have you also prepared schematics of the wellbores for each of those plugged and abandoned wells?

A Yes. Each well that has been plugged in the area of review, a schematic has been prepared and is presented as part of that exhibit.

Q For each of the producing wells within the area of review, Mr. Neal, do you find any of them that are defective insofar as they lack cement between the casing and the formation as it penetrates through the Grayburg section?

A No, there was none apparent and they're all protected through the Grayburg section.

Q Let's look now, sir, at the schematics of

the plugged and abandoned wells. I believe we've marked those as Exhibits Ten through Seventeen?

A Exhibits Ten through Seventeen, correct, yes, sir.

Q Excluding for a moment Exhibit Number Seventeen, Mr. Neal, with regards to Exhibits Ten through Sixteen, do you have an opinion as to whether each of those wells has been properly plugged and abandoned?

A On examination of the records available, as depicted here on these schematics, yes, all those wells have been properly plugged.

Q Let's turn to Exhibit Number Seventeen now. Would you identify for Mr. Stogner where this well-bore, the Stagner No. 9 Well, where is that well located?

A Stagner No. 1 Well, it's located in Section 31, approximately 1980 feet from the south and 1980 feet from the east line. It would be approximately one-half mile from the nearest injection well, our Allied Federal No. 2.

Q In relation to that plugged and abandoned well, can you describe for Mr. Stogner any other wells in the immediate area that penetrated the Grayburg section? I'm looking at, in particular, in Section 32.

A Yes, most recently the Harvey Yates Power Deep was completed in April of '85. It is producing from

the Bone Springs. It penetrated the Grayburg section.

It's 6 -- 660, I believe, from the west line, 1980, approximately, from the south line in Section 32.

Q All right, let's look at the schematic for this plugged and abandoned well, Mr. Neal, and have you describe for us the history of this well and approximately when and how it was plugged?

A The well was plugged and abandoned in October of 1940 and the information that we found first was very sketchy on the plugging data on this well that was filed with the Oil Conservation Division; however, after we did go to Santa Fe and found that the -- we had some information from the USGS, Department of Interior, that showed a plugging record that was filed by English and Harmon on this well.

It was drilled to a total depth of 4252. Incidentally, on this -- there's an error on this Exhibit Nine, the date the well was drilled on the Stagner No. 1. That was actually a date that the well was reworked, 12-19-56.

It was drilled in 2-29-39 and plugged, 2-28 -- 10-28-40.

The second entry on that well on page three is a re-entry that has those same dates.

This had surface pipe set at 670 feet. The surface pipe was cemented with 50 sacks. The well's at total depth of 4252 feet; apparently was dry after setting 5-1/2 inch casing at 4108 and they shot the 5-1/2 -- they set a -- set a cement plug in the bottom of the 5-1/2 with 30 sacks and they show the 5-1/2 casing at 2460 and pulled it and the plugging record states that they plugged the hole inside of the 5-1/2 casing with rock, lead, wool, and steel cuttings from 2460 to 4108, and they set a cement plug from 1578 to 1650, 25 sacks, and filled the hole with mud and set a surface plug, set a plug from 172 feet to 200 feet with 10 sacks, and a surface plug with 2 sacks.

And in 1965 Ernest Hanson attempted to re-enter this well and he drilled to 295 feet, he encountered junk and spent approximately ten days trying to re-enter the well, couldn't, he filled the hole with mud and put a 40-foot plug on top of the surface with 15 sacks.

Q In your opinion, Mr. Neal, can Eastland re-enter this well to replug it in any way?

A Not from the information that we have from Ernest Lee Hanson that this well -- they worked on it with a cable tool rig for approximately ten days trying to re-enter the surface pipe.

Q Is there any fresh water in the immediate area surrounding this plugged and abandoned well?

A There is no fresh water. The surface water that's used for stock is hauled.

Q When the well in 32, I believe it was -- was that the Yates well that was drilled?

A Correct.

Q When the Yates well was drilled in '85, did they encounter any wate flows in any of the shallower zones from the surface down to the Grayburg?

A Not to my knowledge.

Q Okay. Are there any water flows on the surface around that plugged and abandoned well?

A Not that I know of.

Q Are there other injection wells in the immediate area?

A Yes. The closest injection well would be in the Grayburg Jackson to the north. It would be approximately one-half mile, three-quarters of a mile.

Q Do you have an opinion, Mr. Neal, as to whether this wellbore in its current state poses any type of risk by which water disposed of by your operations in the Grayburg can migrate up through this wellbore into any shallower zones?

A I don't see any risk at all. It's -- the distance, such a distance away from the well that I don't think there would be any problem.

Q All right, Mr. Neal, let's turn to Exhibit Number Eighteen and talk about the specific details of your proposed waterflood project.

Would you describe for the examiner your proposed average daily rates for injection of water into your injection wells and what you propose as a pressure limitation for that injection?

A We would initially propose an injection rate of 500 barrels per day per injection well, or 2000, for a total of 2000 barrels a day during the initial fill-up.

We would anticipate a total volume of 2,700,000 barrels of make-up water and, of course, and equal volume of produced water will be re-injected, and the average injection rates of 375 barrels per day has been planned.

We would anticipate an average injection pressure of 600 to 800 but in some cases it's been noted that the injection pressures as high -- have gone as high as 1000 psi.

The Eastland Kenwood Federal 4, which is an injection well and had perforations in the Grayburg Sands, injects water at a maximum of 875 pounds at 360 barrels per day. We have a limitation on that well of 1000 psi.

Q If the Commission applies its .2 psi per foot of depth guideline to this project, what, using that

guideline, would be the surface limitation pressure?

A Approximately 680 pounds.

Q What are you requesting as a surface limitation pressure?

A 1000 pounds.

Q Let's turn to Exhibit Number Nineteen, Mr. Neal, and have you describe for us what the current authorized limitation pressure is for your disposal well, the No. 4 Well?

A Yes. We have an authorization of 1000 psi surface pressure for that well, which was issued by the Oil Conservation Division July the 17th, 1980, and the attached page is a listing of all of the fracture treatments made on the producing wells in the Power Grayburg with their immediate shutdown pressures after the fracture treatment, and these shutdown pressures average 1081 pounds, which should be the fracture, fracture pressure of the reservoir.

We would stay under the limits of fracture pressures.

Q Let's talk about the disposal well No. 4. You've indicated to us that approximately 360 barrels a day, you have surface pressures of 875?

A Yes.

Q Okay. Would you describe for us what the relationship is of the injection limitation on the disposal

well to the four injection wells and how you can draw a comparison between the fracture treatment pressures that were used to justify the surface limitation pressure for the No. 4 disposal well, how that's reasonable to apply to the other four wells?

A We're injecting into the same formation on a disposal well as we plan to produce and inject in the proposed secondary recovery unit. It's the Grayburg Sands of the same -- they're deeper sands because this well was -- had higher water saturations and was water productive.

The fracture pressure should -- should represent the initial shutdown pressures on these wells. Treatment pressures should be representative of the fracture pressures of the formation.

Q And if the injection wells use an average daily injection rate of 375 barrels a day, that would be below the 1000 pound limitation?

A Yes.

Q Let's turn now, sir, to Exhibit Number Twenty and have you identify that for us.

A Exhibit Twenty is an application to the Bureau of Land Management for a secondary recovery logical acreage designation and we met with the BLM on two occasions to consider this acreage designation on the Power Grayburg, and the letter on top of the exhibit is from the District

Manager of the BLM authorizing the 427.44 acres included in the Power Grayburg Unit as a logical -- logically subject to operation under the Unitized Provisions of the Minerals Leasing Act.

Q Let's turn to Exhibit Number Twenty-one, which is your unit agreement, Mr. Neal.

Yes, sir. The unit agreement, is that a unit agreement the Examiner has before him, is that a unit agreement that's on a form that has been accepted and approved by the Bureau of Land Management?

A Yes, that was submitted to the BLM and they did so approved in this letter, authorization.

Q What is the method of participation of the owners in the unit?

A 90 percent cumulative production of January the 1st, 1985, 10 percent acreage.

Q Is that a unit agreement and a participation formula that's been agreed to by the working interest owners in the unit?

A That's correct, the working interests have agreed to that formula.

Q You have 100 percent?

A We have 100 percent, yes.

Q All right, sir.

A Eastland does not have 100 percent of the

working interest, no.

Q 100 percent of the working interest owners have agreed to the unit?

A Yes, correct.

Q All right, sir. Let me ask you to turn to Exhibit Number Twenty-two, which is your tabulation of the surface owner and the offsetting operators. Is that true, sir?

A Yes, that's right.

Q Have you caused the offset operators to be sent notification of your application to the Division for the waterflood project?

A We have.

Q Have you received notification of any objection from any of these other operators to your project?

A We have received none, no.

Q Were Exhibits One through Twenty-two, with the exclusion of the BLM letter, Mr. Neal, were those exhibits that were either prepared by you or compiled under your direction and supervision?

A They were.

Q And have you reviewed those documents an satisfied yourself that they are true and accurate to the best of your knowledge, information and belief?

A I have.

Q In your opinion, Mr. Neal, will approval of these two applications for unit approval and for the waterflood project be in the best interests of conservation, the prevention of waste, and the protection of correlative rights?

A It's our opinion, yes.

MR. KELLAHIN: That concludes our examination of Mr. Neal. We move the introduction of Exhibits One through Twenty-two.

MR. STOGNER: Exhibits One through Twenty-two will be admitted into evidence.

CROSS EXAMINATION

BY MR. STOGNER:

Q Mr. Neal, you stated that the source water will be from the City of Carlsbad, which is fresh water. Is treated water out of the sewage system or is that fresh drinking water out of the city system?

A That's out of the city system from the Caprock system, yes, sir. I believe they call that Double Eagle system.

Q First, let's go back to Exhibit Four, and what you have basically in here is several different sand members within the Grayburg.

Do you plan to inject into the Loco Hills

Sand which you show as being one of the thicker sand members in the Grayburg?

A No, sir. We have had three different completions in the Loco Hills Sand and we've found it contains either gas -- going on the structurally high wells it contains gas and on the other wells we've found that the water saturations are very high in the Loco Hills sand.

Q What -- I'm sorry.

A We do not plan to use the Loco Hills (not clearly audible.)

Q This Loco Hills Sand, does it extend up to the north?

A To the north?

Q Uh-huh.

A Yes. That's shown on the cross sections C and D, the north/south cross section.

Q Okay, does that particular sand extend further north than what is shown on the Exhibit Number Five?

A That is correct. This cross section, structure map is drawn on the -- it is not drawn on the Loco Hills Sand; no, it's on the base of the C Sand, so it does extend into the north, yes.

Q Are there any wells producing from the sand member to the north?

A I'm not sure. I think there are, yes.

Q In the records of the Stagner, and that's Stagner with an "A", no relation, are there any records showing that this particular sand member was encountered in that well?

A I have the records in front of me. No, they -- they just say it was dry; was not productive; but they don't define sand members.

Q Okay. So there's no record of an old well that was drilled back in 1939-40, encountered that zone, and that there was any gas show?

A That's correct.

Q That Stagner No. 1, when it was drilled in 1939 was it cable tool drilled or rotary drilled?

A It was cable tool drilled.

Q From surface to TD.

A That's right.

Q So if sand would have been -- I mean if gas would have been encountered in that Loco Hills sand they would have known about it, wouldn't they?

A Yes, uh-huh. Looking at the record, they show their first oil as 6-1/2 barrels at 3800 feet on the Stagner well.

That's below the (not clearly understood.)

Q Where are you getting this information

from? I notice you have a document there.

A Yes, this was obtained from the BLM in Santa Fe. We couldn't find it and just most recently have found this information.

MR. STOGNER: Mr. Kellahin, I'd like to have that information to supplement the Exhibit Number Seventeen, if I might.

MR. KELLAHIN: We'll mark this subsequent to the hearing as Exhibit Twenty-three, Mr. Examiner, and submit a copy to you.

MR. STOGNER: You will mark that as Exhibit Twenty-three?

MR. KELLAHIN: Yes, sir, and then we will give you this set and make a copy for ourselves.

MR. STOGNER: You're more than welcome to use our machine and after the hearing just lay that on my desk.

MR. KELLAHIN: All right, sir.

MR. STOGNER: Would you wish to enter that into evidence?

MR. KELLAHIN: Yes, if you please.

MR. STOGNER: Exhibit Number Twenty-three will be admitted into evidence at this time.

Q Let's turn our attention now to the south, the Kenwood Well No. 4, which is, as I understand it, presently a salt water disposal well.

A Correct.

Q Disposing water as your Exhibit Number Nineteen shows in the perforated interval from 3506 to 3598, is that correct?

A That's correct.

Q Is that a producing sand or --

A Yes.

Q What particular sand is that noted in? I do not show that particular zone on your cross section, being Exhibit Number --

A No, I don't believe that well is on the cross section, but it is -- this includes the Grayburg Sands of, I believe it's C through E.

Q But I don't show E being down that deep in this particular area, at least in the cross section of Exhibit 4. I show E basically hovering around 3500 feet, but it does extend --

A That well is off structure.

Q Okay, so it is in sand then, a sand member.

A Yes, it's approximately 200 feet low to the producing wells.

Q This E Sand, is it a homogeneous type?

A Seems to be; it's a very thin sand however, but it is --

Q And how does this E Sand compare to the C and D Sands in make-up and --

A Its porosity?

Q Yes, sir.

A In most cases, of course they vary from well to well, but in most cases porosity is close to the same but it's much thinner; it's a much thinner sand.

C and D is the principal producing sands.

Q Do you think that sands C and D would have the same frac pressure as the sand E?

A Yes, they're all fractured together in all the wells that I know. No one sand was fractured individually. I can't say that positively but I would get the -- I would anticipate that they're the same, yes.

Q Let's go back up and talk about the Loco Hills Sand again.

A Okay.

Q The perfs that are present in the Loco Hills Sand in your -- within your unit area, what will happen to those perforations?

A We plan to set a packer. I believe it's shown on our well sketch on two wells that have these sands

open, and set a tension packer between those perforations; shut those off.

Q So you don't plan to produce those at this time.

A No, I do not.

Q On your four injection wells, will Eastland run a mechanical integrity test pursuant to any requirements that the Artesia District Office may have?

A Yes.

Q To assure that there will not be any leakage?

A Right. We have in the past on those well, on that one well that has required it.

Q Okay, let's go back to Exhibit One. Now you show some wells with blue circles and some wells with yellow triangles. How many of these wells overall are presently producing in your proposed waterflood zone?

A There are nine producing wells.

Q Okay. Of those nine producing wells, what is the average rate of production on those wells to date?

A 2.7 barrels per day.

Q So they are classified as stripper.

A Yes.

Q Are there any formations above the Gray

burg in this area that is capable of producing or has produced?

A No. We tested, in the ARCO Federal No. 3 we tested clear up through the Queen and found no -- no production.

Q Are there any water wells or windmills within this general area of the unit?

A Not within two miles, no.

Q What is the closest water well or windmill?

A It's in Cedar Lake Draw. I guess it would be about maybe three, three and a half miles.

Q In what direction?

A That would be north, toward Loco Hills, within the Grayburg Jackson area.

Q And that Grayburg Jackson is presently under waterflood, is that correct?

A Yes, correct.

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

Are there any other questions of this witness?

MR. KELLAHIN: No, sir.

MR. STOGNER: Does anybody else have any questions?

If not, Mr. Neal may be excused.

Is there anything further in either one of these cases at this time, Mr. Kellahin?

MR. KELLAHIN: No, nothing else.

MR. STOGNER: Does anybody else have anything further in Cases Numbers 8786 or 8787?

If not, both these cases 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 Nos. 8786 and 8787 heard by me on 18 December 19 85.

Michael E. Stogner, Examiner
Oil Conservation Division