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

6 September 1989

EXAMINER HEARING

IN THE MATTER OF:

Application of Murphy Operating Corporation for a unit agreement, Roosevelt County, New Mexico, and	CASE 9742
Application of Murphy Operating Corporation for a waterflood project, Roosevelt County, New Mexico.	~~CASE~~ 9743

BEFORE: Michael E. Stogner, Examiner

TRANSCRIPT OF HEARING

A P P E A R A N C E S

For the Division:	Robert G. Stovall Attorney at Law Legal Counsel to the Division State Land Office Building Santa Fe, New Mexico
For Murphy Operating Corporation:	T. Calder Ezzell, Jr. Attorney at Law HINKLE LAW FIRM P. O. Box 10 Roswell, New Mexico 88201
For Kerr McGee: Corporation:	Karen Aubrey Attorney at Law KELLAHIN, KELLAHIN & AUBREY P. O. Box 2265 Santa Fe, New Mexico 87504

I N D E X

E X H I B I T S

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MR. STOGNER; Call next Case Number 9742.

MR. STOVALL: Application of Murphy Operating Corporation for a unit agreement, Roosevelt County, New Mexico.

MR. STOGNER: Call for appearances.

MR. EZZELL: Mr. Examiner, Calder Ezzell of the Hinkle Law Firm of Roswell, representing the applicant.

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

MS. AUBREY: Yes, Mr. Examiner, Karen Aubrey of the Santa Fe firm of Kellahin, Kellahin & Aubrey.

I'm representing Kerr McGee Corporation and I have no witnesses.

MR. STOGNER: Any additional appearances?

MR. EZZELL: Mr. Examiner, I have two witnesses to swear and I would like to move to consolidate this case with the next case, 9743.

MR. STOGNER: Are there any objections? Case 9743 will be called at this time.

MR. STOVALL: Application of

Murphy Operating Corporation for a waterflood project, Roosevelt County, New Mexico.

MR. STOGNER: Call for any appearances besides Mr. Ezzell.

MS. AUBREY: Karen Aubrey from Kellahin, Kellahin & Aubrey, appearing for Kerr McGee Corporation.

MR. STOGNER: Thank you. Are there any other appearances?

Do you have any witnesses, Mr. Ezzell?

MR. EZZELL: Two witnesses to swear.

MR. STOGNER: Will the witnesses please stand and be sworn?

(Witnesses sworn.)

ANN MURPHY EZZELL,

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

DIRECT EXAMINATION

BY MR. EZZELL:

Q Would you please state your name and

residence?

A Ann Murphy Ezzell, Roswell, New Mexico.

Q By whom are you employed and in what capacity?

A I'm Chairman and Chief Executive Officer of Murphy Operating Corporation. I'm an attorney and a petroleum engineer.

Q Have you previously testified before the Commission and had your qualifications as an expert in the fields of law and petroleum engineering accepted as a matter of record?

A Yes, I have.

Q Are you familiar with Murphy Operating applications in consolidated cases 9742 and 9743?

A Yes.

Q What does Murphy seek by its application in these cases?

A Approval of a unit and authority to institute a waterflood project.

Q How did you become familiar with the facts concerning these applications?

A I've been chiefly responsible for the acquisition of the leases that we've included in the proposed unit. I've had the primary responsibility for negotiations with our other working interest owners for the

unit operating agreement and unit agreement terms.

Over all I've directed the supervision and control over the land and legal aspects of the entire unitization effort.

MR. EZZELL: Mr. Chairman, are the witness' qualifications acceptable?

MR. STOGNER: Ms. Ezzell is so qualified.

MR. EZZELL: Mr. Chairman, the applications in these cases were, as you know, filed in triplicate with the OCD, along with full copies of all exhibits.

All of this data, as we have done in the past, is in five black file folders. We propose to introduce each folder as an exhibit.

File One will be Exhibit One. File Two will be Exhibit Two, and so on. We have a couple of additional exhibits that we've received in the mail since the filing of the applications, so the easiest thing for those that wish to go along with us, is to just have the file folders in front of them.

Q Ms. Ezzell, I direct your attention to what will be marked Applicant's Exhibit One and ask you to identify it and its contents, and that would be File Folder Number One.

A Okay. Applicant's Exhibit One, File 1, contains on the inside left cover the application in this matter. On the righthand side is the index of exhibits within File One.

Exhibit 1-A is a map of the unit area, Exhibit One-A.

Exhibit 1-B is a schedule of ownership and leases.

Exhibit 1-C is a copy of the unit agreement.

Exhibit 1-D is the unit operating agreement.

And Exhibit 1-E is the area of review map.

Q Okay, behind divider A, which you've testified is your unit map, would you please describe the unit area and explain how the boundaries were determined?

A Yes. The -- as the map shows, the unit area is composed of 5147 acres. Approximately 70 percent are State leases, or 3597 acres.

1549 acres, or 30 percent, are Federal leases. The Federal leases within the proposed area are identified by cross hatch marks inside the lease line and contain the word "Federal" at the bottom of the lease.

State leases have a plain lease line and

are identified by the word "State" at the bottom of the lease.

The tract numbers are shown within a circle within each lease, and the tracts were formed according to common ownership.

The tract number and the lease and the lessee of record are also shown.

Unit boundaries were established by including each lease owned by the working interest owners upon which there is a well located completed within the proposed unit interval.

Obviously, we couldn't unitize the entire Chaveroo Field but we've included all those lands that our geologic and engineering testimony will establish which have primary production at a level which justifies inclusion within the unit, as well as certain undrilled lands which at least geologically appear to have locations which should be developed in the future for the most efficient flood pattern and full field recovery.

Q When was the proposed unit area initially developed and what is the current status of production from these wells?

A In most cases the wells are over 20 years old and are currently at or near economic limit.

Q So all of the wells within your proposed

unit would be properly classified as stripper wells?

A That's correct.

Q What is the unitized formation?

A The unitized formation is the subsurface portion of unit area known as the San Andres formation with the vertical limits being that stratigraphic interval between 4116 feet and 4424 feet as measured on the compensated formation density log run in the Murphy Operating Corporation Haas W Well No. 2 on August 18th, 1966. That well is located 330 feet from the north line and 990 feet from the east line of Section 30, Township 7 South, Range 34 East, Roosevelt County, New Mexico.

The unitized formation shall further include all subsurface points located within the unit area that are stratigraphically correlative to these depths.

Q Okay. I refer you to Exhibit 1-B and ask you to identify that.

A Exhibit 1-B is an ownership schedule showing a legal description of each of the leases within the unit area, identified by tract number and the lease name as given to it by the original operator.

The third column identifies the serial number of the lease, whether it is Federal or State, and the lease date.

The next two columns show the lessee of

record and the basic royalty rate and owner.

Next you will see any overriding royalty owners or production interest owners and their percentage of ownership.

The next column contains the names of the working interest owners relative to the unitized interval with their percentage of ownership in each tract shown at the right of their name.

The final column shows the percentage of unit participation attributable to each working interest owner on a tract by tract basis.

Q How were you able to determine who the working interest owners were and the royalty owners in your proposed unit area?

A We've obtained title opinions based on abstracts and/or title -- obtained title examinations of State, Federal and county records. These opinions were performed by the Hinkle Law Firm.

Q I refer you to 1-C and 1-D and ask you to identify them.

A Exhibit 1-C is the unit agreement. Exhibit 1-D is the unit operating agreement.

Q And are you familiar with these agreements?

A Yes. I drafted these agreements.

Q Okay, who is designated the unit operator of your proposed unit?

A Murphy Operating Corporation.

Q How many working interest owners own an interest in the proposed unit?

A There are four working interest owners, Murphy Operating Corporation, Snyder Oil Company, American Energy Capital Corporation and PAJW Corporation.

Q And how many of these working interest owners have executed or ratified the unit agreement and unit operating agreement?

A All four have executed.

Q Okay, so you have voluntary joinder by 100 percent of the working interest owners?

A That's correct.

Q Are there any owners of record of the leases within the proposed unit who are not a party to the unit agreement or unit operating agreement?

A Yes, record title owners and lessee of record that have ratified the proposed unit agreement and their names are BHP Petroleum (unclear), Inc.; ENE Resources Group, Inc.; the Wiser Oil Company; Sun Operating Partnership, and Fina Oil and Chemical Company.

Q And each one of these record title owners has ratified --

A Yes, they have.

Q -- your proposed unit. I refer you to 1-E in the back of your File 1 and ask you to identify that.

A This is a map showing the area of review as required by the OCD Form C-108.

The heavy black line identifies the unit outline and the proposed injection wells are highlighted in pink. You will see a semi-circle highlighted in blue, which are the outer boundaries of the area defined as that area within one-half mile radius around each proposed injection well, and then the broken black line which is highlighted in yellow is a 2-mile perimeter around the unit boundary.

Q Okay. Does your unit agreement use a formula for the allocation of unit production and unit cost to the various tracts?

A Yes, it does.

Q What is that formula?

A The formula is based upon 15 percent of total usable well, plus 80 percent of total primary oil recovery as of January 1st, 1989, plus 5 percent of the total surface acreage in the unit area.

Q Was this formula accepted by all of the working interest owners of the proposed units?

A Yes, it was.

Q Do you feel that this formula represents a fair and equitable allocation of costs and production with respect to the proposed unit?

A Yes.

Q Do you think that the formula represents a fair and equitable division of production among the royalty owners of the various tracts?

A Yes.

Q Speaking of the royalty owners, your exhibit indicates that there are overriding royalty owners, back to 1-B, that there are certain overriding royalty interest owners within your proposed unit. Have you notified these people of the proposed unit and have you received any response from them?

A Yes. We've received response. We've notified all of them. We've obtained ratifications of the unit agreement from all except two, who have assigned their interest in the unit to Murphy Operating Corporation.

Q And so you have voluntary joinder or approval of 100 percent of the working interest, 100 percent of the lessees of record, 100 percent of the overriding royalty interest owners?

A That's correct.

Q Okay. Does your unit agreement contain

provisions for operations and voting procedures and a procedure for the removal of operator which have agreed by all the owners?

A Yes, it does.

Q Does the unit agreement and unit operating agreement contain an equitable system of credits and charges for existing production equipment on the wells?

A Yes.

Q Do you have a well numbering system for your proposed unit?

A Yes. The well numbering system is a combination of the section number and then the location of the well which corresponds to the unit in which the well is located. That is the State of New Mexico assigns letters to 40-acre quarter quarter sections, with that letter system identifying the, say, northeast quarter northeast quarter as Unit A and the southeast quarter southeast quarter as Unit P.

We have assigned these unit areas corresponding numbers 1 through 16 so that Unit A would be number 1, Unit B would be number 2, and so on, until Unit P becomes number 16.

It is this number, 1 through 16, that identifies the unit in the section where the well is located.

As an example -- do you want some examples?

Q I don't think so.

A Okay.

Q You do have, I notice on the map, Sections 18, 19 and 30 of 7 South, 34 East, which are not regular sections?

A That's correct. The western edge of these sections are omitted so that there would be no unit letters D, E, L and M and, consequently, no 4, 5, 12 or 13.

Q Okay. You testified that the proposed unit are is entirely State and Federal oil and gas leases. Has the State Land Office designated your proposed unit as a logical unit for secondary recovery and has the unit received preliminary approval from the State Land Office?

A Yes, it has. I have a copy of a letter dated August 31st, 1989, whereby the State Land Office grants preliminary approval.

MR. EZZELL: This preliminary approval letter from the State Land Office has been marked Exhibit Six and there are three copies here.

Q Similarly, has the Bureau of Land Management designated your proposed unit as a logical unit and have you received preliminary approval from the BLM?

A Yes, we have, by letter dated August

21st, 1989, the BLM granted preliminary approval and designated the unit area as logical.

MR. EZZELL: And, Mr. Examiner, we have marked that as Applicant's Exhibit Seven.

Q To whom was notice of your application furnished?

A The owners of the surface lands for which every proposed injection well would be located and the offset operators within one-half mile of each injection well.

Because it was easier, we simply notified all the offset operators within a half mile around the proposed unit boundary. I would refer you to File Number 2, being Exhibit 2, Divider Roman Numeral XIII, which shows that the leasehold operators within a half mile are (unclear) Texas Oil & Gas Company, Milford Oil Company, Snyder Oil Company, who is one of the working interest owners, and Kerr-McGee.

Attached you will see the letters which were sent certified and the return receipts.

With respect to the surface owners, we sent notices to the State of New Mexico, Mr. Thomas Tucker, the Portales National Bank, who is Mr. Tucker's mortgagee, Mr. Dale Brown, the District Manager of the BLM, and Ms. Louise Metzger.

Again, copies of these are contained in File Number 2, Divider XIII, and stamped return receipts are also included.

Q In each case was the notice received by the person to whom it was addressed at least 20 days prior to the date of this hearing?

A Yes. As shown by the return receipts, with the exception of Mr. Tommy Tucker. The letter is in his post office box and we have not received a signed receipt back, although we talked to him regularly and he just hasn't gotten around to getting it out of his box, but his banker has it and his attorney, also.

Q And Mr. Tucker is a surface owner of lands where proposed injection wells will be located?

A Yes. I left several messages at the Alsups, the store in Elida that takes his messages and he did call me back and he does have it. He has notice but he just hasn't gone over there.

Q So he has actual notice of the hearing and had it 20 days prior to the hearing.

A Yes, sir.

Q Ms. Ezzell, in your opinion would the approval of the application in these cases promote the conservation of oil or gas and the better utilization of reservoir energy?

A Yes, it will.

Q Are the proposed unit agreement and unit operating agreements in all respects for the best interest of the State and will the State and each beneficiary of the lands involved receive it's fair share of recoverable oil or gas in place?

A They will.

Q Is unitized management necessary to conduct a secondary recovery operation?

A Yes, it's necessary.

Q Do you -- does your proposed plan have a reasonable expectation of increasing recovery from the field?

A Yes, it does.

Q And would the granting of these applications be in the interest of conservation, the prevention of waste, and the protection of correlative rights of all parties?

A Yes.

Q Was Exhibit 1, sub parts A through E, which is entire File Number 1, prepared by you or under your direct supervision?

A Yes.

Q Were Exhibits Six and Seven and the return receipts that were attached to Exhibit 2, Roman Numer-

al XIII received by you through the United States mail?

A Yes.

MR. EZZELL: Mr. Chairman, I'll offer Exhibits -- Exhibit 1, parts A through E, and Exhibits Six, Seven, and 2-XIII into evidence, and I have --

MR. STOGNER: They are submitted into evidence.

MR. EZZELL: And I have no more questions of this witness.

CROSS EXAMINATION

BY MR. STOGNER:

Q Ms. Ezzell, I'm sorry, I have a couple of questions here.

The -- you said in your testimony that two overriding interests have not --

A We bought two overriding royalty interests because they did not want to join the unit.

Q I see.

A And there are copies, I have copies of the assignment and copies of the ratifications with me.

Q Okay, and are those part of the record that we have gone over earlier?

A You have copies of the signature pages

for all the working interest owners and I can submit to you copies of all the others that you would like.

Q I don't think we need to do that at this time. Perhaps subsequent to the hearing we can make that a part of the record.

MR. EZZELL: For your reference, Exhibit 1-B has the names and the percentage ownership of each of the overriding royalty interest owners and the witness has testified that --

MR. STOGNER: 100 --

MR. EZZELL: -- 100 percent have either been bought by Murphy Operating Corporation or have ratified the unit.

MR. STOGNER: Okay, and let's see, is Mr. Tucker one of those?

MR. EZZELL: No, he's a surface owner.

A Mr. Tucker is a surface owner.

Q And he was notified pursuant to the waterflood portion of the application, is that correct?

A Yes, sir. When I could see the time running on the notice, I got him on the phone and I said please go and pick up the package, and he said, "Oh, I'll get around to it," and then I called him several times and he's traveling and just not -- he just doesn't care.

Q And this is in Elida, New Mexico, which is a population of what, 800 or so?

MR. EZZELL: This room is bigger.

A I would say probably about -- it's pretty small.

Q Well, I'm from a town of 800 and believe me, this type of notification is definitely acceptable.

MR. STOVALL: Did you leave a copy of it at the Allsup's?

A Mr. Examiner, he has a -- his property is mortgaged and we're required to provide his banker and his attorney with copies and they did pick their packages up and we do have return receipts. So a responsible party that has an authorization got that letter.

Q Okay, and that was made part of that packet of the notices.

A Yes.

MR. EZZELL: That's right.

MR. STOGNER: Okay, are there any other questions of Ms. Ezzell?

If not, you may be excused.

A Thank you.

MR. STOGNER: Thank you.

Mr. Ezzell?

MR. EZZELL: My next witness is Bertram H. Murphy.

MR. MURPHY: Good morning.

MR. STOGNER: Good morning.

BERTRAM H. MURPHY,

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

DIRECT EXAMINATION

BY MR. EZZELL:

Q Would you state your name and residence and occupation, please?

A I am Bertram H. Murphy, Roswell, New Mexico. I'm Vice President and Chief Engineer of Murphy Operating Corporation and a registered professional engineer in Texas and New Mexico.

Q Do you specialize or spend a significant amount of your time working with secondary recovery projects?

A Yes, sir, I do.

Q Have you previously testified before the Oil Conservation Division on unitization and waterflood matters and had your qualifications as an expert in the fields of engineering and geology accepted as a matter of

record?

A Yes, I have, since about 1962.

Q Have you been the engineer in charge of numerous waterfloods in your career?

A I have.

Q About how many?

A In excess of 60.

Q About how many of that number have been in the State of New Mexico?

A Approximately one-third.

Q Are you familiar with the San Andres formation and the Chaveroo Field, which is the subject of these applications?

A I am.

Q What does Murphy Operating Corporation seek by its application?

A We seek unitization and approval to waterflood the proposed Jennifer Chaveroo San Andres Unit.

Q And you were --

A Proposed unit.

Q And you were the chief engineer, or engineer in charge of this project?

A Yes, sir.

MR. EZZELL: Mr. Chairman, are the witness' qualifications as an expert in the fields of

engineering and geology acceptable?

MR. STOGNER; Mr. Murphy is so qualified.

MR. EZZELL: Thank you.

Q Mr. Murphy, would you briefly describe the history of the Chaveroo Field in general and your proposed unit area specifically?

A Yes, sir. This is described in detail in an engineering and geologic report which is part of Exhibit Three, File Number 3, Roman Numeral VIII.

Basically, the Chaveroo Field is the largest San Andres Field in the Northwest Shelf Area, which extends from west Texas into New Mexico. It's produced since -- up to January 1st of 1989 -- 23-million barrels of oil, 34-million barrels -- I'm sorry, MCF of gas, and 28-million barrels of water. The average, there are 419 wells in the field and they produce from three porous zones in the San Andres formation and they have produced an average of approximately 50,000 barrels.

The unit area itself has produce an average of approximately 70,000 barrels and is an area relative to production and reservoir formation characteristics.

There are 71 usable wells; total production has been 5-million barrels, of which -- making an

average of approximately the 70,000 barrels per well.

Q And your proposed unit is called the Jennier Chaveroo San Andres Unit?

A That's correct.

Q Mr. Murphy, what is the current production from your proposed unit area?

A The current production is 30 to 50 barrels per day.

Q And for the total of the wells.

A The total of the unit area.

Q So these wells have reached an advanced state of depletion to the point that you would classify them as stripper wells?

A Yes.

Q Do you have an estimate on remaining primary reserves from your unit area?

A The remaining primary is insignificant when compared to the production to date, and it is very small. The -- the unit area has reached stripper and near primary depletion.

Q So in your opinion the primary production from the proposed unit area has reached its economic limit?

A It's approaching it.

Q Okay. Do you have any estimate on po-

tential secondary reserves?

A Yes. We made a detailed study of the San Andres waterfloods in the Northwest Shelf area going into the Texas area and into New Mexico, and we found a good correlation by analogy of approximately one barrel of secondary oil for each barrel of primary produced, so we're estimating the secondary potential at 5-million barrels.

Q Okay, I refer you now to Exhibit Number 4, which is File No. 4, which is -- the Hearing Examiner's copy also has the map that's on the wall behind me, so you won't have to unfold it, the field map. There's one under the clock.

Would you identify Exhibit 4 and explain its contents?

A Exhibit 4 is the plan of operation for 1989 and 1990 for the proposed unit. It's identified in the map on the wall there, the one to the far right, and it shows the proposed injection plant location centered in Section 26, I believe that is, 25 --

MS. EZZELL: 25.

A -- 25, uh-huh, and it shows the proposed main trunk injection line going diagonally southwest to northeast through the field with individual injection lines going to the proposed injection wells.

Also on the map is the -- is the loca-

tion of the water source. The fresh water source is located approximately nine miles north and west of the -- of the unit area. It currently is serving the Haley Unit, which is another Murphy-operated unit, and it is projected to serve the Jennifer Unit.

Q Okay, all of your proposed injection wells are identified by the semi-circle around the well location?

A Yes, sir, those circles aren't closed because they are not on injection at this time but they're the proposed injections.

Q Okay, and in Section 35 I see that there are six proposed injection locations that are highlighted in blue. Would you explain those, please?

A Yes, sir. We plan to initiate the project immediately by injecting into four of those wells. That would be 35-02, 35-04, 35-10 and 35-12, while we're building the plant. When the plant is complete, we will then go ahead and convert 35-6 and 35-8. That will make two enclosed 5-spots, because we will have the benefit of the injection from the Haley Unit Well No. 34-8.

Q That is --

A On a line cooperative basis.

Q Okay.

A Yes.

Q And you also are the operator of the Haley Unit, which is --

A We are.

Q -- abuts your unit in Sections 34 and 35?

A Yes, sir.

Q On the completion of the injection plant you've -- your plan of operation is divided into three phases, is it not?

A That's correct. Phase One is gravity injection into the four initial wells.

Phase Two would be the completion and the -- of the plant and the pressure injection into those four wells plus the two other wells in blue, and then almost immediately thereafter we plan to go to full unit injection.

Q And you will be, after the initial six wells are converted to injection and water is being injected, you will then study the results from the Section 35 wells prior to --

A Yes, sir, that's the purpose --

Q -- converting the rest of the wells?

A -- of initiating the -- what we term a -- it's a 369-spot pattern with the four wells. It will give us some experience in the injectivity and the way the

reservoir performs with initial injection.

Q Okay, I now refer you to File Folders Numbers 2 and 3, which are Exhibits 2 and 3. As we've stated, this is the supplemental C-108 data, and items in these files are marked to correspond to the questions on the C-108 to which they apply.

MR. STOGNER: Mr. Ezzell, I have one here marked Roman Numeral II. Is that also a file?

MR. EZZELL: Roman Numeral II?

MR. STOGNER: Well, it looks like a II, either two ones or eleven.

MR. EZZELL: That's package Number 11.

MR. STOGNER: Okay, so I need to go to a File Number 2.

MR. EZZELL: Yeah, it's File 2.

MR. STOGNER: Okay.

Q Okay, with File Number 2 would you briefly hit the high spots on its contents; very briefly.

A File Number 2 is supplemental data required by Form C-108. It includes Exhibit III, Exhibit Roman Numeral III, which is well data in both tabular and schematic form and the schematic form is a typical data

sheet for each proposed injection well.

It shows the operator, unit well number, well type, casing record, date drilled and completion, total depth, perforations open hole, completion information, proposed injection downhole equipment and the proposed injection rate, or both rate and pressure, an average and a maximum.

Q And this data is provided in tabular form for each of the 44 proposed injection wells throughout the entire unit area.

A Yes, sir, it is.

Q And the second to the last page in that divider shows a schematic diagram. Would you identify that, please?

A Yes, that's a diagram of the -- of the method of injection well completion. It shows that all of the proposed injection wells have been cased through and perforated in the producing intervals. The -- it shows that we will set a packer within 100 feet of the top perforations and inject through coated tubing from the surface, which will also be packed off.

In the annulus between the tubing and the casing will be an inert packer fluid that will be pressure tested to 300 psi and held for 30 minutes.

Q Okay, and turning the page there is one

more chart.

A This is the well data for the proposed injectors and it shows the proposed unit well number, the original well number, location, total depth, plugged back total depth and remarks that the wells need to be reentered or redrilled.

Q And each of the -- each of the wells in your proposed unit area were originally drilled as oil and/or gas producers?

A That's correct.

Q Okay. The C-108 requires information as to any underlying or overlying productive zones. Do you have any information as to zones uphole or downhole?

A The -- the closest known production that is not in the San Andres is in the Pennsylvania Bough C formation at a productive depth of 9050 feet in the Tobac, I believe that's typographical error on Tobac, which is 3 to 4 miles south of the proposed Jennifer Unit.

Q Okay. Mr. Murphy, is this an expansion of an existing project?

A No, sir, there are, I believe, two old, single well waterflood units approved in that area, but this is a new proposed waterflood.

Q All right.

MR. EZZELL: Mr. Examiner, for

the record, our research indicated that there were two old approved waterfloods, one well waterfloods. They would have been created by -- in Case Number 943 -- excuse me -- 8423, which is Order R-7809, and the other is Case 3904, which was Order R-3544. One of those was in 1968; the other one is in 1985.

Q Mr. Murphy, I refer you to Roman Numeral V in File 2 and ask you to identify that.

A Five, Roman Numeral V is a map identifying all wells and leases within two miles of each of the proposed injection wells, a two-mile boundary highlighted in yellow, and a half mile radius circle drawn in blue around each proposed injection well identifies the well's area of review.

Q Okay, and behind the map there is tabular data?

A Behind the map is -- is tabular data, which is a redesignation of the well names for the proposed unit and it shows the original well name, description of the lands, number of acres and status, redesignation of well name, serial number and lease date, leases of record, basic royalty and percentage, San Andres production working interest ownership, the working interest percent ownership, and the percent unit participation proposed.

Q Okay, and now we move to Roman Numeral

VI-A and VI-B. Would you briefly explain those?

A VI-A and VI-B are the tabulation of data, VI-A for all wells of public record within the proposed unit, and VI-B is for all of the wells of public record outside the proposed unit area, but within the area of review.

Q And what information do those tables show?

A Both show essentially the same information. They show the tract number, operator and lease, well number, unit -- the new unit well number, the status, completion date, datum, elevation in feet, TD or plugback TD, the casing record, the completion interval, the initial treatment, the initial potential, remarks, the cumulative oil produced to January 1st, 1989, and the usable wells.

In the case of -- of B, since they're outside the unit, the last two pieces of information are omitted.

Q Okay, and then Roman Numeral VI-C?

A This is a schematic that illustrates all plugging details of each plugged and abandoned well within the area of review, on top of the actual -- this actual map that shows these plugged wells in blue, and then below the map is the individual schematics for each of the wells in the area of review that are plugged.

Q So that's a plugging diagram for every plugged and abandoned well within the area of review?

A Yes, it is.

Q Mr. Murphy, what quantity of water do you anticipate will be initially injected?

A We anticipate that we will inject approximately 600 barrels per well per day into each of the injection wells.

Q Okay, so that would initially be 3600 barrels per day for the first six wells in Section 35 that are a part of your Phases 1 and 2?

A That's correct.

Q What is the ultimate amount to be injected?

A Approximately 30,000 barrels a day.

Q Is your injection system open or closed?

A It's a closed system.

Q What procedures will you follow in your injection process?

A We will run a pressure rate test and we will -- we will run periodic tests for the -- to -- to determine the formation breakdown pressure. We do not plan to exceed the .2 psi per foot of depth that the formation phase is under the rules of the OCD.

Q For your injection pressure?

A For our injection pressure, without approval of the OCD and after submitting evidence that we can exceed it, if that should occur.

Q What is your water source for the proposed waterflood project?

A Our water source is -- for our make-up water, is fresh water, shallow fresh water sands approximately nine miles north of the unit area, an undeclared water basin.

Q To be transported to the unit how?

A By pipeline as indicated on the map.

Q And this is the same water source -- I think you share the line with the Haley Unit?

A That's correct.

Q That's already been approved. Do you intend to inject produced water?

A We do.

Q Have you done a water compatibility analysis?

A Yes, we have.

Q And I refer you to File Folder 2, Exhibit Number VII.4, those are your water compatibility results?

A Yes, they are.

Q Do these reports indicate compatibility

with the fresh water and the produced water in the area?

A They do.

Q Okay, referring you to File Number Three, would you identify it and tell us what it contains?

A File Number 3 is additional supplemental data required by Form C-108.

On the left side of the file is the engineering and geological report, dated July 15th, 1989, on the proposed unit area and the San Andres, generally, in this region.

On the right side corresponding exhibits to the requirements of -- of the C-108.

Q Okay. Behind divider Roman Numeral VIII-A, what is that?

A That's a general location map. It's in essence a road map that shows the location of the unit.

Q And VIII-B?

A VIII-B is a report dated November, '66, prepared by the Roswell Geologic Society Symposium with an attached structure map and (unclear) map and a type log.

Q And that report is on the Chaveroo Field in general?

A Yes.

Q Okay, VIII-C?

A Eight-C is the core data, completion core graphs for the wells located within the area unit and a completion core graph for State "AZ" Well No. 2, located in the proximity of the unit in Section 33, 7 South, 33 East.

Q And to your knowledge, those are all of the wells that have been cored within the proposed unit that -- where that information was available?

A That's correct.

Q Okay. Roman Numeral VIII-D?

A VIII-D is the tabulated summary of geologic data and shows the operator and lease, the original well number, the new unit well number, the elevation, both at ground level and the datum which is in most cases a Kelly bushing, the top of the first porosity, or P-1, measured and the top of the P-2 given as a subsurface measurement, and the thickness of the P-1 to the P-3.

Q Okay, and does this data indicate that the unitized formation has a continuity and is substantially uniform over the entire unit area?

A That's correct.

Q I now refer you to Roman Numeral VIII-E and ask you to identify that.

A This is a structure map which is -- a copy of which is the center exhibit on the wall, and it

delineates the San Andres structure and the correlation point in a typical well.

Q Mr. Murphy, what is the unitized interval for your proposed unit?

A The unitized interval is as stated previously, previous testimony, in a type well, and it is from 4116 to 4424, as measured on the compensated formation density log of Hobbs W Well No. 2, or as the proposed new unit No. 30-01.

Q All right, and that unitized interval, you have a log, a typical well log on this one exhibit. Would that interval include what is shown on this typical well log as the P-1, P-2 and P-3 Zones?

A Yes, sir.

Q Okay. What is Exhibit 3 VIII-F?

A This is the isocum base map with the proposed unit area delineated. It's contoured on the cumulative oil recovery to 01 January, 1989.

The -- it shows an estimated zero line in yellow, a 50,000 barrel recovery line in blue, and a 100,000 barrel recovery line in green.

Q Previous testimony indicated that there was a certain amount of undrilled acreage in your proposed unit, which is easily seen in the -- in the unit map that's on the -- the field map that's on the wall. Tell us what

your thoughts are as far as the inclusion of those undrilled tracts within the unit?

A Our reservoir studies of the individual well logs, cross sections, and of the recovery performance, particularly analogy to other areas of the field between the -- for example, the 50,000 barrel recovery line and the zero line, where we can determine that accurately -- indicate to us that there is commercial reserves in the undrilled areas that are included in the proposed unit, and we feel that this exhibit supports that by -- by projection of the zero line based on analogy to other cases in the field.

Q Okay, what are Exhibits 3 VIII-G, and that's G-1 through G-7, one of which we have put on the wall?

A Yes, sir, we put F, I believe, on the wall, and these are cross sections, northwest/southeast, west/east, north/south, and through various portions of the unit, to support continuity and to support the acreage that is not developed.

Q And the unitized formation was determined by the correlation of the logs of the marker well and the logs of the typical well and the cross sections of the logs of the wells in the --

A Yes, the type log is the center well in

Exhibit F, and that was used for correlation throughout the entire unit area.

Q Mr. Murphy, are you familiar with a formula used for arriving at the tract participation factors?

A I am.

Q And would you -- did you calculate that formula?

A I did.

Q And what is that formula?

A It's 5 percent for the undeveloped acreage, 15 percent for usable wells, and 80 percent for cumulative production from the wells to -- and tracts -- to 01 January 1989.

Q And Roman Numeral VIII-H in Exhibit Three shows what?

A The chart of deviation of tract participation factors.

Q Okay, so that is just tabular data showing the percent usable wells, percentage of primary recovery, and the percentage of acreage on a tract by tract basis?

A That's correct.

Q From which the tract participation factors were derived? Okay. And this formula was approved by

100 percent of the working interest owners in the unit.

A That's correct.

Q The next divider is VIII-I and I'll ask you to identify that.

A These are the production decline curves for the wells within the unit area in VIII-I-1, and VIII-I-2 is the decline curves of wells outside the unit area but within the area of review.

Q Okay, and this data establishes that the field is approaching its economic limit?

A It does.

Q Mr. Murphy, what steps will be necessary to convert your 44 wells to injectors?

A We will remove the existing equipment, check the total depth to be sure that the wells are open to below the producing interval.

We may need to do some remedial work, re-perforate, perhaps do a light stimulation with -- with acid or by other means, and once that's done we will set a packer within 100 feet of the top producing perforations, and fill the annulus with an inert packer fluid, which we'll test at 300 pounds for 30 minutes after packing the wells off at the surface. The injection casing will be coated for protection from corrosion.

Q Are there any open hole completions

among the wells which are scheduled to be converted to injection?

A No, sir.

Q I refer to you File Number 5 and Divider Roman Numeral X -- 10, that's an X, I guess -- and ask you to identify that.

A This is additional supplemental data required by Form 108.

Q Are these copies of logs from each of the 44 wells that are scheduled to be converted to injection within the unit?

A Yes, they are.

Q Okay.

A There is a schedule on top showing those wells.

Q And returning to File Folder No. 2 and divider Roman Numeral XI, would you identify that?

A This is a map showing the location of four fresh water sources, together with copies of the results of chemical analysis of the fresh water and these are the ones in the area of review.

Q And what -- what did your investigation reveal about those four fresh water wells?

A Well, it revealed that there was a very -- a very small amount of water; it's mainly windmill stock

water. In some cases the wells aren't active.

The chemical test indicated a -- a medium quality potable -- potable water, usable for stock.

Q What steps will be taken to confine your injection water into the unit in the unitized interval?

A Well, as indicated before, in addition to a surface pipe which goes through the shallow fresh water intervals, such as they are in this area, the reason we had to go nine miles north was because of the lack of water in the -- in the unit area.

We also have a long string, a producing string, set through the producing interval. It's been perforated and confining fluids in or out of that to the producing interval, and it will be further protected by a packer above those perforations with -- with the previously describe methods to the surface.

Q In your opinion will the completion of the injection wells in this manner confine the injected water to the unitized interval?

A They will.

Q Are the propose injection wells shown on your maps located so as to obtain the most efficient sweep and recovery the greatest amount of secondary oil which would not have been recovered otherwise?

A Yeah, they are.

Q In your opinion would it be helpful if the order approving the waterflood project provided for an administrative procedure for the approval of any changes which might prove necessary in the location of injection wells?

A It would be most helpful.

Q Mr. Murphy, are you requesting a project allowable?

A We are. We're requesting an allowable that is the capacity of the producing wells.

Q And that would be a Rule 701 project allowable?

A That's correct.

Q Why is unitized management necessary, in your opinion?

A It's necessary in that it's generally the most effective manner of waterflooding an area that has agreeable ownership. It's -- we find that we can commingle production where we wish to. We can generally have a better management of injection and producing practices.

The alternative to that, which is also effective, is line cooperation, which we will have with the Haley Unit to the west and the Kerr McGee Unit to the south.

Q In your opinion will the proposed unit

agreement and unit operating agreement be in the best interest of the State and will each beneficiary of the lands involved receive its fair share of recoverable oil?

A Yes, they will.

Q Will the granting of these applications prevent waste and be in the interest of conservation and the protection of correlative rights?

A It will.

Q And were Exhibits 2, 3, 4 and 5 prepared by you or under your direct supervision?

A They were.

MR. EZZELL: I'd like to offer these exhibits into evidence and I have no further questions of this witness.

MR. STOGNER: All of the exhibits you referred to will be admitted into evidence.

CROSS EXAMINATION

BY MR. STOGNER:

Q Mr. Murphy, I'd like to go to Folder Number 2, Exhibit Number Three was a list of all the proposed injection wells, and in it you list a maximum pressure at a perforated or open hole interval, which you testified there are no open hole intervals, is that correct?

A Those -- those are through -- through perforations --

Q Okay.

A -- in every case.

Q And we have a -- here at the OCD we have a policy of .2 psi per foot maximum injection pressure.

Does your maximum injection pressure also correspond with the proposed perforations?

A It does.

Q Okay. Let's go over to the tabulation of well data within the unit area and outside the unit area.

If I look at the casing record, well, first let me go back, the TD of the plugback total depth, are any of these wells below the -- were any of these wells drilled below the San Andres formation of 4500 feet? Does any of them penetrate on down any deeper?

A Not to my knowledge. If they were, they've been plugged back to the third -- third porosity interval, or the P-3 interval of the San Andres.

Q You have an extensive cementing record on your proposed injection wells. Do you have a record of the cementing record -- do you have any record of the cement behind the pipes on the wells in these two sections?

A We do in our well files. I assumed we'd included that, did we not? Let me ask -- yeah, in Exhibit Three, in the casing record, we've indicated where the -- the number of sacks, or where the cement was circulated to the surface.

Q Now that is in the proposed injection wells, is that right?

A Well, it's in -- it's in both -- it was done in both the injection wells and the producers, but it's shown for the injection wells as required under the C-108.

Q I'm sorry, I'm having a hard time finding that record on the wells within the proposed unit area and outside of the unit area but within the area of review.

A That's Exhibit IV-A and IV-B in File 2, or Exhibit Two.

The -- also, in Exhibit 3 is the one that gives your cement record, if that's what you're interested in. It's the first exhibit in File 2.

Q Yeah.

A Under Casing Record, for example, in the Well 25-02, we show the surface pipe went to 378; 8-5/8ths, 24 pound in an 11-inch hole with 200 sacks which were circulated to surface.

Q Okay, but these in Exhibit Number Three

are all your proposed injection wells, the 44 injection wells, right?

A Yes, sir, that's correct.

Q Okay, do you have that cement record for the wells, all of the wells, within the area of review?

A We have them -- we have them under IV-A -- yeah, I'm sorry, VI-A and VI-B.

Q VI-A, okay, no wonder I couldn't find them.

A I'm sorry, I was reading that Roman Numeral backwards, like King Henry the I-I-I.

Q Okay, I show the casing record and the cement record is where?

A We show it with the number of sacks. For example, under Casing Record, we --

Q Okay, I --

A -- have 4-1/2 inch with -- that's with 80 sacks is the way that should read -- I'm sorry, 800 sacks.

Q Okay, so that gives the sacks of cement that was in that interval.

A Yes, sir.

Q Okay. Now did all of these wells have surface pipe, in your recollection?

A Yes.

Q And were those cemented back to the surface?

A Yes.

Q Okay. Now in your testimony you -- or in your testimony sometime during that time, you mentioned two other previous orders in this particular area: Order Number R-7809 and 3544?

A That is correct.

Q Are those active?

MR. EZZELL: I will identify or locate them when I --

MR. STOGNER: Are they overlying this area? Are they outside of the area?

MR. EZZELL: No, they're in the area and we now own them.

MR. STOGNER: Are they -- were they ever active?

MR. EZZELL: As a waterflood, they were both -- they were both one well floods, I assume, for disposal purposes.

MR. STOGNER: Okay, I will take administrative notice of both of these cases and if anything needs to be done subsequent, it will either be handled in the order or we'll be in touch for any additional supplemental data concerning these two orders.

MR. EZZELL: One of them is the State DB Well No. 6, which is located in the southwest southwest corner of 5, and it will be converted to a producer under the plan.

A Uh-huh.

MR. EZZELL The other well indicated on the map is an injection well. The other is the Hobbs W No. 9, which is in the southeast of the northwest of Section 29 and it will be maintained as an injector under the plan.

That was southwest southwest of 25 and the second was southeast northwest of 29.

MR. STOVALL: I'm not sure the Examiner's seeing what I'm seeing on this, Mr. Ezzell, if I may ask you, there appear to be some other injectors on the -- on this exhibit -- which exhibit I'm looking at here, your map -- in Section 36; another injector, at least identified by the symbol in 25, do you know what those are?

MR. EZZELL: Those, my research was limited to previous approved waterflood projects. I am assuming that in numerous situations operators converted those Chaveroo wells to injection and filed their --

A Disposal.

MR. EZZELL: -- I mean dis-

posal and filed their C-108's and got approval.

MR. STOVALL: Maybe it would be more appropriate to direct that to your witness. Perhaps he has the information, I would think.

Mr. Murphy?

A I think that's a correct answer, to my knowledge, what the counselor said. There -- we did -- we did find in looking at the State Engineering Committee's records of production and we followed up with getting the data out of the records in Hobbs on the disposal into some of these wells. This -- this map here does show where you have a "W" --

MR. STOGNER: What map are you referring to, Mr. Murphy?

A I'm referring to the isocum recovery map. Does that have an exhibit number?

MR. EZZELL: Yeah, that's A-VIII.

Go ahead with what you were saying on that.

A Well, all we can say is that there are several of the wells that were used as -- either under a waterflood order or as disposal wells and they are -- those wells are indicated in the -- in the State engineering -- Engineer's monthly reports. Where we identified them, we

went back and got the water record of injection from the records in Hobbs and we don't see that they -- they don't pose any operational, waterflood operational problem to us. We're fortunate that most of them fall on proposed injection locations, and there are only -- do you have any idea, Mark, there are? Yeah, just a few.

MR. STOVALL: Mr. Murphy, let me ask you, you -- you turned and asked somebody else a question. Can you -- can you answer that of your own knowledge, either looking at an exhibit or -- just to make the record accurate?

A Yes, I believe I can. Let me see if I can find our plan of operation here.

MR. STOVALL: Well, let me say just by reference to, again, the waterflood study field map, I don't know what the exhibit number is on it, it would appear that there are probably half a dozen wells marked with the injector symbol.

A I didn't believe there were that many. I'm sorry I didn't -- I apologize to the Examiner for not getting into this issue more, but --

MR. STOVALL: I stand corrected.

MR. EZZELL: Two of them were the approved waterfloods.

MR. STOVALL: Correct, but these are already injectors, is this correct? In Section 36 --

A They are or have been. They are or have been used as disposal wells, the ones that are not in the approved waterfloods.

MR. EZZELL: That's in a flood and that one is in a flood, and that leaves two other disposal wells.

MR. STOVALL: Okay, the approved floods are the ones you've referred to previously.

MR. STOGNER: Gentlemen, this is not going to get on the record --

MR. STOVALL: Yeah, let's get back to -- let me just go with Mr. Murphy on this. I think we've identified -- and I'll use some numbers here that, if you -- you may want to be where you can see where I'm talking about, Mr. Murphy.

A All right.

MR. STOVALL: In Section 25 you have previously testified the well in the southwest of the southwest as being an approved injector for waterflood, excuse me.

A Waterflood, yes.

MR. STOVALL: In the north-

east of the southeast I see a well on -- on this large exhibit marked 1-DF that appears to have the injector symbol. Is that a disposal well? Can you --

A Is that in 25?

MR. STOVALL: You and I are referring to two different exhibits, so I don't know if we're --

A Well, I'm -- I'm taking it off of here because it's --

MR. STOVALL: Okay.

MR. EZZELL: If I could, gentlemen, refer everyone to File 4, which is Exhibit Four, page 3 shows a comparison of current proposed well status and it shows the well status for every well in the -- in the field, whether it is S for shut-in, P for producing, I for injection, SWD for salt water disposal, and it shows that there are two salt water disposal wells in the field.

MR. STOVALL: Okay. I think that answers the question.

MR. EZZELL: And that has been submitted into evidence.

MR. STOVALL: Okay.

Q (Mr. Stogner continuing) What does that designation of well status "A" mean in that File Number 4, Mr. Murphy?

A It means abandoned.

Q I'm sorry, abandoned?

A Yes.

MR. EZZELL; You will note that those are the ones, the six wells that are indicated in the remarks as being "RE" or "RD", indicating that they would have to be re-entered or redrilled pursuant to the plan of operation.

MR. STOGNER: I've got it straight. I've got -- so far I've come up with 2, 3 injection wells and 2 salt water disposal wells at the present time, making a total of 5 wells with some sort of injection, is that correct?

A That's correct.

Q Okay. And then to the right the proposed well status is what you plan in this particular order or project will either convert them or keep them as injection.

A That's correct.

Q Mr. Murphy, I'm a little vague, or we went over it pretty quick, about the initial injection wells on your first phase of your project. What were those wells again?

A Those wells are -- they're located in Section 35 and they're the proposed unit designations will

be 35-02, 35-04, 35-10 and 35-12. They're -- they're shown in blue on the field map on the wall here.

Q Okay, so when I would look in Section 35 of the large map, plan of operation, I have 6 proposed injection wells initially.

A Well, the 4 will be started by gravity of produced field water into them while we're constructing the plant. As soon as the plant is constructed, which will take 90 to, probably, 120 days, we'll immediately, then, convert the other two wells shown in blue there, which is 35-6 and 35-8, and shortly thereafter we'll go to full field injection.

Q I'm somewhat confused because your numbering system does not correspond with this map.

A Maybe I'm telling you wrong.

MR. EZZELL: No, these are the original numbers, and the numbers at this time would be Well Number 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16 (not clearly heard by the reporter).

MR. STOVALL: Mr. Ezzell, what you're explaining to the Examiner is what Mrs. Ezzell testified to as to the numbering system?

MR. EZZELL: That is -- that is the numbering system which has been testified to today. Exactly.

Q Okay, let me repeat this. The initial wells will be Numbers 2, 4, 11 and 10 in Section 35. I'm sorry, 2, 4, 10 and 12 in Section 35, the initial injection wells.

A That's correct.

Q As soon as your injection plant or system is put on line, the next two then will be Numbers 6 and 8.

A That's correct.

Q Okay.

MR. STOVALL: Mr. Murphy, you are requesting a project allowable, excuse me, for this project under Rule 701, as the producability of the wells.

A That's right.

MR. STOVALL: So am I safe in -- in assuming, or perhaps I will ask you, the initial project area, as defined in Rule 701, includes those proration units with the injector wells on them and offsetting tracts with producing wells on them.

Are there any additional wells which you would want in the additional -- in the project area under the provisions of Rule 701?

A No.

MR. STOVALL: That could be administratively expanded, understand, and --

A Yes. No, that -- that would -- would be what we would request for the initial part of the project.

MR. EZZELL: Mr. Examiner, we are seeking approval of the entire 44-well injection and waterflood project. As the plan of development says, Phase 1 and Phase 2 will be used to study waterflood response and for that reason we would be asking that the order include an administrative procedure for a change in the injection pattern if the first -- the initial response indicates water channeling fractures that would dictate the change from the standard 5-spot pattern that is proposed.

MR. STOVALL: I understand that, Mr. Ezzell, but as far as granting the -- the allowable under Rule 701, that allowable can only apply to wells within the project area.

MR. EZZELL: Right.

MR. STOVALL: And the project area includes those initially on injection and as you expand the injection, the project area is expanded to bring additional wells within that --

MR. EZZELL: With additional allowable, right.

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

Are there any other questions

of this witness?

A Thank you very much.

MR. STOGNER: You may be excused.

Is there anything further in either Case Number 9742 or 9743 at this time?

MR. EZZELL: Briefly summarizing, we're seeking an order approving the unit as proposed and the waterflood project that the evidence related to.

We would seek an effective date of October 1, 1989.

As we just stated, we are seeking approval of all 44 injection locations and have provided the necessary C-108 data.

We would also ask that Orders R-7809 and R-3544 be rescinded by the orders granting our application.

We are asking, as you know, for a project allowable and an administrative procedure contained in the order for the expansion or change of injection patterns as that may be dictated by field response.

And that is all, gentlemen.

MR. STOGNER: Anybody else have anything in either of these cases?

Case 9742 and 9743 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. 9742 & 9743 heard by me on 6 September 1987.

Examiner
Oil Conservation Division