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

14 September 1988

EXAMINER HEARING

IN THE MATTER OF:

Application of Murphy Operating Corporation for a unit agreement, Chaves and Roosevelt Counties, New Mexico, and Application of Murphy Operating Corporation for a waterflood project, Chaves and Roosevelt Counties, New Mexico.	CASE 9477 9478

BEFORE: David R. Catanach, Examiner

TRANSCRIPT OF HEARING

A P P E A R A N C E S

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I N D E X

E X H I B I T S

MR. CATANACH: Call the next case, 9477.

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

MR. CATANACH: Are there appearances in this case?

MR. EZZELL: Yes, sir, Calder Ezzell with the Hinkle Law Firm, representing the applicant.

I would move that we consolidate Cases 9477 and 9478.

MR. CATANACH: At this time we'll call Case 9478.

MR. STOVALL: Application of Murphy Operating Corporation for a waterflood project, Chaves and Roosevelt Counties, New Mexico.

MR. CATANACH: Are there any other appearances in these cases?

MR. EZZELL: I have two witnesses to swear.

MR. CATANACH: Okay. Will the witnesses please stand and be sworn in?

(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 Will you state your name and place of residence, please?

A Ann Murphy Ezzell, Roswell, New Mexico.

Q Who is your employer and what is your occupation?

A My employer is Murphy Operating Corporation. I'm the Chairman and Chief Executive Officer. I act as the Corporate Attorney and Petroleum Engineer.

Q And have you previously testified before the Commission and have your qualifications as an expert in the field of law and petroleum engineering been accepted as a matter of record?

A Yes, they have.

Q Are you familiar with Murphy Operating Corporation's applications in the consolidated cases 9477 and 9478?

A Yes, I am.

Q What does Murphy seek by these applications?

A We seek approval of our Haley Chaveroo San Andres Unit and authority to institute a waterflood project in that project.

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

A I personally prepared or supervised the preparation of the exhibits that were previously submitted to the OCD in connection with this hearing.

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

MR. CATANACH: They are.

MR. EZZELL: Mr. Chairman, the applications in these cases were filed in triplicate with the OCD along with four copies of all supplemental data. All of this data, as you know, is contained in Files 1 through Four, which were submitted to the Division.

In order to facilitate locating specific exhibits from which testimony will be given, we propose to introduce Files 1 through 4 as Exhibits One through Four. Then during testimony we will refer to the exhibit and divider number in reference to the specific exhibit from which testimony is being given.

Q Mrs. Ezzell, I direct your attention to Applicant's Exhibit Number One, which is the black file

folder number one, specifically referring you to One-A and One-E and ask you to identify them.

A Exhibit One-A is a map of the unit area, the proposed unit area, that delineates the unit outline and also provides tract numbers. All of the leases are state lands. There are four leases, and the unit area as proposed consists of 1840 acres.

Q Okay, and what is Exhibit One-E?

A Exhibit One-E is a map of the vicinity of the unit area. It delineates in a black outline the unit boundary; in a yellow outline a 2-mile perimeter around the unit boundary, and the area of review wells are delineated by a red circle, a half mile radius around each proposed injector.

Q Okay, what is the proposed unit area initially developed?

A The initial well in this field was drilled over 20 years ago and all the wells are about that same vintage.

Q Okay, what is the current status of production from the wells located in your proposed unit?

A The production at this time is marginally economical.

Q Would you consider that the wells that are still producing within your proposed unit would pro-

perly be classified as stripper wells?

A Yes, I would.

Q What are the unitized formations for your proposed unit?

A If I may paraphrase from the unit agreement, it is that subsurface portion of the unit area known as the San Andres formation, with a vertical limit the interval 4158 to 4470 as measured on the compensated formation density log in the Murphy Operating Corporation (unclear) Well No. 15, which was drilled March 23rd, 1966, and it's located 990 feet from the south line and 1980 feet from the east line of Section 34, Township 7 South, Range 33 East.

Q Okay, I now refer you to Exhibit One-B and ask you to identify that.

A Exhibit One-B is a schedule of ownership and unit participation factors. The exhibit lists by tract number, the lease name, and the description of the lease; of course the serial number and lease date, the lessee of record, the basic royalty and the percentage which in all cases is the State of New Mexico 12-1/2 percent.

An additional column for the overriding royalty owners and there are no overriding royalty owners, and then the working interest owners and their respective

working interest percentages together with the unit participation factors allocated to each tract.

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

A By title examinations based on abstracts and physical examination of the records in the county and also the State Land Office records, all of which was done by title examiners from the Hinkle Law Firm.

Q I now refer you to Exhibits One-C and One-D, and ask you to identify them.

A Exhibit One-C is the unit agreement for the Haley Chaveroo San Andres Unit.

Exhibit One-D is the unit operating agreement for said unit.

Q Are you familiar with the provisions of these agreements?

A Yes, I am.

Q Who is designated as unit operator?

A Murphy Operating Corporation.

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

A There are two working interest owners, Murphy Operating Corporation and American Energy Capital

Corporation.

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

A These agreements have been executed by 100 percent of the parties, both parties.

Q Okay, so there was voluntary joinder in the unit by 100 percent of the working interest owners?

A That's correct.

Q The unit is comprised of 100 percent State of New Mexico oil and gas leases and there are no overriding royalty interests?

A Yes.

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

A Yes. Sun Operating, a limited partnership is a lessee of record.

Q Okay, a lessee of record in what has been identified as Tract 3 on the maps, although they own no rights, or no operating rights in the unitized interval, is that correct?

A That's correct.

Q Have they ratified the unit?

A Yes, they have.

Q I hand you what is marked as Exhibit Five, which is a cover letter from you with a copy of the ratification attached. That is a ratification sent to you by Sun?

A That's correct.

Q And that was forwarded by you to the State Land Office and the Oil Conservation Division?

A Yes. Three originals of this document were provided to each office.

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

A Yes, it does.

Q What is that formula?

A The formula is based upon 80 percent of primary production to be through January 1, 1988. In addition there is a 20 percent factor for usable wells within the unit area.

Q Okay. Do you feel that this formula represents a fair and equitable division of production among the royalty owners and working interest owners?

A I do.

Q Has this formula been accepted by all of the working interest owners?

A It has.

Q Does your unit agreement further contain provisions for operations, voting procedures, removal of operator, which have been agreed upon by all the the owners?

A It does.

Q Does the unit agreement and unit operating agreement contain a system for credits and charges for existing equipment?

A Yes, it does.

Q Do you feel that system is fair and equitable?

A I do.

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

A Yes, we have provided in the documentation a redesignation of well numbers consistent with guidelines provided to us by the State Land Office, whereby a well name is changed to coincide with the section number, being the first number, and then a unit number for the location of a well consistent with the A through P designations.

Q So Units A through P would be given corresponding numbers 1 through 16.

A That's correct.

Q Has the State Land Office designated

your proposed unit as a logical unit for secondary recovery and have they given preliminary approval to your unit and the unit agreement and operating agreements?

A Yes, they have.

Q I hand you what has been marked as Exhibit Six and ask you to identify that.

A This letter was prepared on August 29th, 1988, and grants preliminary approval by the State Land Office. It is signed by Floyd (unclear) as Director on behalf of W. R. Humphries, Commissioner of Public Lands.

Q This preliminary approval, is it conditioned on any occurrence?

A Yes. There were three requirements. Two have to date been fulfilled.

They asked for copies of the Exhibit B, setting out the tract participation; also a ratification from the lessee of record and working interest owners.

These items have been complied with and the final pending item is the order of the New Mexico Oil Conservation Division, and that approval awaits the outcome of this hearing.

Q Okay. To whom was notice of your application furnished?

A Notice was given to offset operators

within one-half mile of the unit boundary, in addition to also the surface owner of lands that any proposed injector is located, and all of the surface is owned by the State of New Mexico.

Q Okay. I have given you what has been marked Exhibit Seven, the first page of which is a list of all the owners whom you've identified as being offset operators within one-half mile of the unit boundary and the State Land Office for the state lands.

Have all of these individuals received the required notice?

A Yes, they have.

Q How was that notice sent to them?

A It was sent certified, return receipt requested and we received in a timely manner the return receipt.

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

A Yes.

Q And the second page to Exhibit Seven shows the xeroxed copies, second and third page, shows the xeroxed copies of each of those return receipts showing the timely delivery of the notice.

A Yes, it does.

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

A It's my opinion that it would.

Q In your opinion would the proposed unit agreement and unit operating agreement be in all respects for the best interest of the state and will the state and each beneficiary of the lands involved receive its fair share of the recoverable oil or gas in place under the land affected?

A It will.

Q In your opinion is unitized management necessary to conduct a secondary recovery operation?

A Yes.

Q Does your proposed plan have a reasonable expectation of increasing recoveries from the field?

A It does.

Q Would the granting of these applications be in the interest of conservation and the protection (sic) of waste, and the protection of the correlative rights of all parties involved?

A Yes.

Q Was Exhibit One, parts A through E, prepared by you or under your direct supervision?

A They were.

Q Were Exhibits Five, Six and Seven either prepared by you or received by you through the U. S. Mail?

A Yes.

MR. EZZELL: Mr. Chairman, I now offer Exhibits One, parts A through E, inclusive, and Exhibits Five, Six and Seven into evidence, and have no further questions of this witness.

MR. CATANACH: Exhibit One, parts A through E, and Exhibits Five through Seven will be admitted as evidence.

MR. EZZELL: Call Mr. Bert Murphy.

BERT 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, residence, and occupation, please?

A I'm Bertram H. Murphy, Roswell, New Mexico. I'm an independent oil producer and a Registered

Professional Engineer, petroleum, in Texas and New Mexico.

Q Have you testified previously before this Commission on unitization and waterflood matters and had your qualifications as an expert engineer and geologist accepted as a matter of record?

A Yes, and I have also been accepted as an expert in hydrology and groundwater by the State Engineer.

Q Are you familiar with the San Andres formation and the area in Roosevelt and Chaves Counties that is the subject matter of these applications?

A Yes.

Q What does Murphy Operating Corporation seek by its applications today?

A Unitization and approval of the waterflood, the proposed Haley San Andres Unit.

Q How did you become familiar with the specifics of the proposed unit?

A I am an officer and chief engineer for the applicant, Murphy Operating Corporation, and have experience in San Andres waterfloods as a consultant for a third parties as well as for my own account.

MR. EZZELL: Mr. Chairman, are the witness' qualifications as an expert in the fields of petroleum engineering and geology acceptable?

MR. CATANACH: They are.

Q Mr. Murphy, I refer you to Exhibit Four, which is the black file number -- marked Number 4, which also contains the exhibit -- the map you see on the right on the wall.

Would you identify those exhibits? I'll get out of your way if you need to talk from them.

A This is a field map that also shows the plan of operation for the proposed unit.

We have outlined in yellow the proposed unit. We have circles, half circles around the ultimate total number of injection wells. We have the status of the existing wells to the -- to the legend here on the -- on the thing.

Our intention is to commence immediately with gravity into these four wells which are -- well, they're not marked on there, but the 34-6, 34-14, 33-8 and 33-16.

33-16 is currently a salt water disposal well. As soon as the plant is built, which we anticipate will take 60 to 90 days, we'll then convert these three wells to injection and have a double 5-spot pattern with inside producers and with the pattern affecting outside peripheral wells.

Q Okay. Mr. Murphy, could you briefly

describe the history of the Chaveroo Field in general and the proposed unit area specifically?

A The Chaveroo Field was discovered in March of '65 with the Champlin Petroleum and Warren American No. 1 Hondo State.

The field has 425 wells with cumulative production to January 1, 1988, of a little -- of almost 23-million barrels of oil; almost 34-million MCF of gas; and approximately 27-million barrels of water.

The field produces from the San Andres formation in the porous intervals of 1, 2 and 3 on the P-log, which we'll get to in a minute. Specifically the proposed Haley Chaveroo San Andres Unit has 44 wells, two of which have been permanently plugged and abandoned. These wells have produced over 3-million barrels, approximately 3,075,000 barrels of oil to January 1st, 1988. The average for the unit area is just over 73,000 barrels per well, while the field average for the entire Chaveroo Field was approximately 54,000 barrels a well.

Q So the wells in your proposed unit on an average have a -- they are a slightly better recovery rate than the average well in the field?

A In my judgement they are superior, the superior area in the field.

Q Have all of the wells in your proposed

unit area reached an advanced stage of depletion so that they could properly be classified as stripper wells?

A They have.

Q Have you done any work or an estimate on remaining underground reserves in the unit area?

A We have. We have graphed and studied the decline curves on all the wells in the -- in the area of review.

Q In your expert opinion has the primary production decreased to a point where the field is at or reaching its economic limit?

A It is.

Q You say you calculated remaining primary by the decline curve method on the existing wells?

A That's correct.

Q Do you have an estimate of potential for secondary reserves?

A We do from analogy to other San Andres waterfloods in the Northwest Shelf Area, which starts in the (not clearly understood) land area in Texas and goes clear to the Cado and beyond in the -- in New Mexico. There are many San Andres waterfloods in this area and we've made a detailed study of those floods and found that by analogy you can expect approximately one barrel recovery for each barrel of primary recovery. So we would estimate

the potential of the secondary in this unit to be something in excess of 3-million barrels.

Q Mr. Murphy, I refer you now to the File numbered Exhibit Number Three. I'd ask you to briefly explain its contents and would encourage the Examiner to interrupt with any questions they have as we go through.

A Attachment A is an engineering and geologic report prepared by me August 1st, 1988.

It briefs the history and reservoir and performance characteristics of the San Andres regional area, regional geology, stratigraphy, porous zones, structural influences, and reservoir characteristics, and it has a section on the Chaveroo Field stating when the field was discovered and giving the performance and reservoir and geologic characteristics of the field.

It also has a section on propose Haley San Andres Unit and does the same same thing; in summary, a review of the technical data and proposed operational plans indicate that the unit is similar or superior to the rest of the Chaveroo San Andres Field and is typical or superior to numerous other San Andres fields in the Northwest San Andres Trend that have been waterflooded successfully. The proposed operational plan appears to be sound. Unitization and waterflooding of the unit should protect correlative rights, promote conservation and prove beneficial for the

interest owners and the county, state and federal -- county, state and federal treasuries.

The -- on the right side are the exhibits supporting this report.

Exhibit Roman Numeral VIII-A is a location map showing the location of the Chaveroo Field on the common line between Chaves and Roosevelt County.

Roman Numeral VIII-B is a copy of the Roswell Geologic Society Symposium with their attached structure map, isopach map, and a type log. This report was prepared by them in 1966 over a year after the discovery of the field.

Our studies from data developed since that time indicate that their conclusions were generally average and correct in their discussions with regard to the pay zone, the type of trap, reservoir data, completion methods, the horizontal -- deepest horizons penetrated, and the production from the field.

Exhibit Roman Numeral VIII-C is a tabulation and summary of geologic data for wells within the proposed unit area. It here shows the operator and lease as --

Q Excuse me, you need to be on VIII-C, the core data?

A Oh, core data, yes, sorry. VIII-C, we

had -- we were able to find core data on one well in the unit and on two wells in the area of review. We've included that data, which further supports the reservoir information given by the Roswell Geologic Society.

Q Okay.

A All right, now VIII-D?

Q Right.

A VIII-D is a tabular summary of geologic data for wells within the proposed unit area. It shows the operator and lease as they were carried prior to our redesignation of the wells. It shows the original well and unit and then the redesignated well number, the elevations for both ground and Kelly bushing and the tops of the P-1, P-2 and the thickness of the P-1 to the P-3.

Q Okay, at this time we have some additional data supplementing that was requested by the Oil Conservation Division. I have marked that as Exhibit Eight. Would you briefly explain what this supplemental data shows?

A This information gives in more detail the well information in the proposed Haley Unit area. It gives the unit under the new designation, the current well status, the proposed well status, the casing record, drilling date and completion date, TD, perforations, and completion.

Q And it shows (unclear) casing program, cement tops --

A That's correct. It shows the -- for both the surface pipe and the long string.

It also gives that information for the area of review.

Q So between this Exhibit VIII and Exhibit Three, Roman Numeral VIII-D, we have a tabulated summary for all wells both within the unit and outside the unit but within the area of review?

A That's correct.

Q Okay. I now refer you to Exhibit VIII-E and ask you to identify that. It is on the wall right here behind me.

A Exhibit VIII-E, or attachment VIII-E to Exhibit Three, is a structure map of the San Andres on a correlation point picked above the first porosity. It also has a marker well, or a type well, that shows a electric log -- electric log showing the first, second and third sub-sections of porosity in the San Andres formation.

Here we have a structure map prepared by us which is in addition to the map prepared by the Roswell Geologic Society but which conforms very closely with it.

It shows the influence of structure, local structure, on reserve accumulation and the perfor-

mance of the unit area and area of review.

Q You've identified as your unit interval in the marker well between the depths of 4158 and 4470. How was that interval identified?

A It was identified by a field study that indicated that in the Chaveroo Field there's production from all three of those porosity zones.

Q Known as the P-1, P-2 and P-3?

A P-3, yes.

Q Okay. What are Exhibits Three F and G, which are right here?

A These exhibits are an east/west cross section --

Q F is your isopach.

A Okay. Three, Roman Numeral VIII-F, is an isopach map. This information is a net -- is a net pay map or net porosity map based on net porosity of greater than 4 percent in the first and second porosity intervals.

The major producer of oil in here is the second porosity interval with some production from the first and a very small amount of production possibly from the third.

This map is -- conforms with the Roswell Geologic Society's work as previously submitted.

We looked at a gross pay map and found

from the study that was done our geologic section, that was insufficient difference in the gross pay to make a gross isopach map significant.

This is a north/south cross section through Section 34 and Section 3 in the unit and it demonstrates the continuity of producing intervals in the porosity intervals across the unit area, demonstrating that the injection of water should move oil from the injection wells to the producing wells.

The other cross section is a similar cross section that goes east and west across the Sections 33 and 34 and we won't hold that up unless you gentlemen just want us to for some purpose.

MR. CATANACH: I don't think that will be necessary.

Q Mr. Murphy, the structure map that we've looked at along with the porosity isopach, combined with your cross sections indicating the presence of the unitized interval, in your opinion does -- does this indicate that these -- the data we have looked at indicate that the unitized formation has a continuity over the unitized area and is essentially uniform throughout your entire unitized area?

A Yes, essentially uniform. It's very typical of the successful San Andres waterfloods in the

Northwestern Shelf Area. There's not -- in the San Andres you never have complete -- complete uniformity of -- across the various wells but you have sufficient that it's -- that they waterflood successfully.

Q Okay. I direct you back now to the file folder, I believe we're at Three, Roman Numeral VIII-H now?

A Yes, that's correct.

Q Referring you to Three, VIII-H, are you familiar with the formula for allotting of the tract participation factors?

A Yes, I am. I developed the tract participation factors based on the cumulative oil recovery to 1 January 1988, and based on 80 percent of the formula and 20 percent of the formula being usable wells.

We also looked at a number of other types of formulas and found insignificant differences in the tract participation and feel that this is the most fair and optimum formula for this unit.

Q And your reserves studies have indicated that any additional production on primary is minimal and therefor would not affect the fairness of the formula used?

A Yes, it's less than, probably, half of one percent of what's been produced in there.

Q And Exhibit Three, Roman Numeral VIII-H, shows the effect of the tract participation formula on each

tract in the -- in the proposed unit?

A That's correct.

Q Okay. And it also shows initial primary to date, to 1-1-88, for each of the -- each of the wells and each of the tracts.

A And shows usable wells.

Q Okay, and that is the formula that was approved by 100 percent of the working interest owners?

A That is correct.

Q Okay, I now refer you to Exhibit Three, Roman Numeral VIII-I, A and B, your decline curves, I believe.

A Yes, These are the decline curves for the area of review wells and they support the -- the unit formula.

Q And these were also the primary data and the decline curves from which you did your reserve calculations?

A Yes. These are the curves that I looked at to be sure that we didn't have anything significant in the way of remaining primary, or what have you, that had been put into the consideration of the unit formula.

Q Mr. Murphy, (not understood) how would the proposed waterflood be initiated? Again I might refer you to Exhibit Four, your plan of operation and the Exhibit

Four map, if you wish to use it.

Q As we pointed out before, we plan a 5-spot pattern which is the -- universally the most prominant pattern in flooding the San Andres formation.

We will start out with four initial wells which we will inject the produced water into. Those have been named in the testimony. One of them is currently a salt water disposal well. We will be producing into those, or injecting into those produced water. We will immediately start to build an injection plan and as soon as that plan is completed we will commence injection into the seven wells that will make up the initial part of this -- of this project.

Q And your injection plant location is shown on the map here?

A That's the tentative location for the plant, yes. We also show the fresh water supply lines coming in from the north there.

Q Mr. Murphy, what steps will be necessary to convert wells to injection wells on your proposed unit?

A We'll remove the present producing equipment. Plastic coat, or coat the tubing and run it back into the well; after we've checked it for total depth and clean up, clean perforations and so on, we'll run it back into the injection wells and set the packer immediate-

ly above the upper perforation in the -- in most cases in the first porosity.

We will then fill the annulus with an inert liquid and put the -- a pressure gauge or other device on the annulus wellhead so that we can monitor any possible leakage.

Q Are there any open hole completions among the wells which are scheduled for conversion to injection?

A No, sir.

Q Okay. Mr. Murphy, I refer you now to Exhibit Two, which is the black file folder numbered 2, and ask you to explain this exhibit, please, sir.

A Exhibit Two is the supplemental data required by Form C-108.

On the left we have a summary of the -- an outline of the exhibits shown on the right.

Exhibit -- Exhibit Two, Roman Numeral attachment III is well data in both tabular and schematic form for each well proposed for injection. Do you want to discuss that or shall we just go on through?

Q Go ahead. Go ahead and briefly discuss that, the schematic, at least.

A This shows the pertinent well data of perforations, completions, and so on for these wells and

has a schematic showing the proposed method of -- of re-working and completing, recompleting the injection wells.

Q Okay, on your schematic you have submitted a typical schematic rather than a schematic for each individual well. At least as far as your initial seven wells is concerned -- are concerned, is that schematic accurate with respect to each of those wells?

A With one exception. The salt water disposal well had -- which is the well in 33-16, had perforations in the fourth porosity in the San Andres, which to our knowledge or to the knowledge of the people that studied -- the other people that studies the Chaveroo Field, it does not have any hydrocarbons commercially.

Q And that fourth porosity would be outside your unitized interval --

A It would be outside our unit. The evidence in the Hobbs office of the OCC indicates that these perforations have been squeezed off and we will run an injection profile to be sure that's the case and if they have not been, then we will squeeze off those perforations so that this typical schematic, then, will apply to all of the injection wells in the unit.

Q Are you ready for (not clearly understood) I believe this is.

A Attachment 5 of Exhibit Two is an area of review map and well name redesignation chart. I think this exhibit was alluded to earlier in the testimony, and the redesignation map just changes the well numbers to conform with the guidelines of the OCC.

Q And Two-6, A, please.

A Attachment 6-A is a tabulation of well data for wells within the unit area. This tabulation shows the tract, operating lease, the original well number and unit, the new unit well, its status, completion date, elevation datum, total depth or plugged back total depth, casing record, completion interval, initial treatment, and initial potential with remarks.

It also, in the unit area shows a cumulative oil production at January 1st, '88, and the usable wells.

Q Okay. And Exhibit 6-B shows exactly the same data for wells outside the proposed unit but within the area of review?

A With the exception of it does not have cumulative or usable wells.

Q And this data together with the data we've just submitted on Exhibit A gives the Commission and the Examiner all of the -- both the geological data and the physical data as to type of completion, where the cement

tops are, where intermediate casing or long string has been set and cemented, as well as the types of acid and frac jobs used to complete the wells?

A It does.

Q Then I refer you to Roman Numeral VI-C in File 2.

A Which is the schematic well diagram of a P & A'd well within the area of review.

On the top of that first sheet of that exhibit is a -- shows the P & A'd wells in the area of review and lists them. The following information is well by well schematic of how the wells were -- were abandoned.

Q Okay, have you done a water sample or chemical analysis of the water that you plan to inject in your flood?

A We have. We had the Permian Treating Chemical, Inc., take samples and to a compatibility test on the fresh water and the produced water. They concluded that the water could be injected separately or commingled with -- and would be very compatible.

Q And that is, that report is shown on Exhibit Roman Numeral VII-4?

A That's correct.

Q And that analysis is based upon a test of both produced water from your proposed unit and the pro-

duced water that you intend to --

A It also conforms with the experience of other operators in the San Andres and utilizing -- utilizing this fresh water source and the produced water.

Q Okay. What is Exhibit Roman Numeral X?

A Have we done -- have we done VIII?

Q Yeah, VIII was --

A Okay.

Q -- the other maps from --

A This is well logs for the proposed injection wells. It shows in most cases gamma ray neutron type of logs with the perforations or completion imposed on the -- on the log.

Q Okay. Is there any fresh water source in your proposed unit area?

A We've tried to find any significant fresh water in the unit area or the area of review. We requested that the State of New Mexico State Engineer's Office Water Division give us any information that they might have and we've included a letter from them saying that they find no water in that area.

It also is not in a declared water basin, so there's essentially no water in the -- fresh water in the -- in the area.

Q And that letter is Exhibit Two Roman

Numeral XI?

A That's correct.

Q The only other exhibit in File Two is a list of the persons to whom notice was sent, which has also been admitted definitely under the new exhibit with the return receipts, so --

You briefly hit on it earlier, but specifically what steps will be taken in the injection wells to confine the injected water to the unitized formation?

A We'll confine the injection through a coated tubing and confine it by a packer set just above the upper perforations of the -- of the injected interval, and confine it below by a plugback TD or the TD of the well.

Q In your opinion will the completion of the injection wells in the manner shown on your schematics and the exhibits submitted confine the injected water to the unitized interval?

A Yes, it will.

Q In your opinion, again, are the proposed injection wells shown on the map and that you've testified on, are they located so as to obtain the most efficient sweep and recover the greatest amount of oil that would not be recovered through primary?

A In our best judgment at this time, that

is the -- that's the optimum pattern, the 5-spot pattern; however, we'd like to request the possibility of administrative approval of a change in pattern should our initial injection indicate zones of preferential -- zones of permeability or fracture zones that would need to be handled in some different pattern.

Q You say that you will be studying the results from your initial seven wells. What -- what procedures will you specifically follow after you institute your injection process?

A Well, we will of course put all of the significant producing wells back into a good producing capability. That will be the inside producers and the surrounding producers that can be affected in any way by the injection.

We'll also run injection profiles periodically where we can determine where the injected water is going in the -- in the unitized interval and we'll run a pressure rate test or step pressure test to be sure that we're not exceeding the formation breakdown pressure.

Q Okay. Do you have any specific guidelines or specific plan as to the amount of pressure you will use on initial injection?

A We don't expect to exceed the guidelines and the regulation of the Commission, which is .2 psi per

foot of depth. If we find that it's -- that it would be to the benefit of the unit to do that, we would like to come back for administrative hearing to increase that pressure.

Q What quantity of water do you anticipate will be injected initially?

A We believe from the study of waste water disposal and other water injection in the Chaveroo Field, and based on the quality of the reservoir that we're water-flooding, that we can inject approximately 600 barrels per well per day; therefore with 7 wells we would start out with probably in a very short time 4,200 barrels a day total and we would eventually, when all of the wells were -- 24 wells were on, we'll probably get a peak injection of 13,800 barrels.

Q What is your water source, Mr. Murphy?

A The water source is a fresh water source for the Chaveroo Field which we believe to be a -- a buried stream bed connected to the Ogallala formation further to the east. These wells have been acquired by -- by contract and by other appropriate legal means from the surface owners in the area and they have been tested and used -- utilized in agriculture for many years and indicate a open -- a daily rate and quantity of water sufficient to water-flood the unit and other units, for that matter.

Q Do you contemplate injecting produced

water, as well?

A We do. We will inject any produced -- any water produced on the unit will be reinjected.

Q Will your waterflood be an open or closed system?

A It will be a closed system. We'll also provide for individual wellhead filters to take out any -- any solids that might affect the injectivity.

Q Are you requesting a project allowable for your project?

A We're requesting the capacity allowable under Rule 701.

Q So that the allowable will be based on the ability of the wells to produce rather than the depth bracket allowable?

A Yes.

Q Okay. In your opinion is unitized management necessary to conduct secondary recovery operations?

A It is. The location of the wells and the reservoir conditions dictate that to do all of the things that you wish to do in a secondary recovery project, that you need to unitize this area.

Q And your plan, therefore, has an expectation of increased ultimate recoveries, producing oil that could not be produced through conventional primary means?

A It does. As outlined before, we would expect to produce perhaps as much as an additional 3-million barrels of oil from the unit area that would not have been produced otherwise.

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 land involved receive its fair share of the recoverable oil and gas in place?

A They will and it will.

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

A Yes.

Q Were the exhibits in File folders Two, Three and Four, as well as Exhibit Eight, prepared by you or under your direct supervision?

A They were.

MR. EZZELL: I'd like to offer Exhibits Two, Three and Four in their entirety and Exhibit Eight into evidence, please.

MR. CATANACH: Exhibits Two, Three and Four and Exhibit Number Eight will be admitted into evidence.

MR. EZZELL: I have nothing

further from this witness.

CROSS EXAMINATION

BY MR. CATANACH:

Q I just have a few questions.

Mr. Murphy, as I understand it, you're initially requesting approval for four injection wells, is that correct?

A No, sir, we're requesting approval for -- for all of the injection wells, for all of the --

Q How many?

A I believe there's 24, 23?

Q 23?

A 23.

Q As I understand it, your initially just going to use 4?

A This is -- we planned this in a progressive way. We can start immediately to inject the produced water into 4 of the wells while we're building a plant, which will take 60 to 90 days, and then we will immediately go ahead and recomplete 3 more wells which will give us a 5-spot. As soon as we're sure there's not going to be any bypassing through fractures or something, we'll expand out into a full injection over the entire unit.

Q The proposed injection Well 33-16,

that's a disposal well at this time?

A That's correct.

Q Do you know by what authorization that is -- that was approved for disposal?

A No, sir, I don't.

Q We're going to have to reclassify that well, probably, If you could maybe find that for me.

MR. EZZELL: I'll be able to do that quicker, that was an old Chevron well.

MR. CATANACH: Texaco well.

MR. EZZELL: I mean Texaco well.

Q And your Exhibit Number Four -- no, sorry, Exhibit Number Two, the area of review wells --

A Yes, sir.

Q -- inside and outside the unit area, do those wells represent all the wells that exist within a one-half mile radius of all your proposed injection wells?

A To the best of our ability, they do, sir, and the additional fact, we have a few in there which probably technically don't fall in the area of review. What we did was just -- we took a half mile from the unit line and took all of the wells that -- all of the data that we could find on the wells from that area.

Q In Exhibit Number Eight, the supplement-

al information, what is that exactly, Mr. Murphy?

A That was information that I believe was requested by -- was it by the Land Office or by the OCC?

MR. EZZELL: By the Commission.

A By the Commission. I think the reason for that, probably, primarily, was that they wanted additional information on the casing records because we had not originally included the information on the surface pipe and so --

Q Now, do these, the surface pipe and the tops of cement on the long string, what do you mean?

A Well, that was -- the main reason for that was the top of the cement on the long string and the -- and the condition and information on the surface pipe.

Q Okay, do the wells on Exhibit Number Eight represent all the wells within the area of review?

A It only -- it only has the initial 7.

Q The initial 7.

MR. EZZELL: That would be these initial 7 injection wells.

Q I see.

A It looks like it has --

MR. EZZELL: Prior to converting any other --

A There's more than 7 here --

MR. EZZELL: No, within a half mile --

A Within a half mile --

MR. STOVALL: Gentlemen, whoa, whoa, whoa, let's go off the record if you would like to discuss it amongst yourselves first.

(Thereupon a discussion was had off the record.)

Q Mr. Murphy, you've got some water analyses, Exhibit Number 7-4, or whatever it is?

A Uh-huh, that's in File Folder Number Two?

Q Right. You've got some fresh water analyses. Where exactly did that fresh water analysis come from, or fresh water come from?

A It came from the fresh water supply wells that are located at the end of that pipeline, which is several miles north of the Chaveroo Field and the location is given on the analysis, and in this case they're called the Moore, because Moore is the surface owner there and the one with which we contracted for the water.

Q Do you know what depth those fresh water wells are producing from ?

A Yes, they're shallow. They're probably none of them are any deeper than 4-or-500 feet. They're probably Ogallala, although there's no studies in the area and there's no declared basin in here just because it is an area of very, very sparse water reserves.

Q Okay, and you actually have contacted the State Engineer and he has determined that there is no Ogallala water in -- within the unit area?

A Yes, sir. He has none in his records and there is no surface evidence of anything but minor windmill water.

Q So there may be some present but not in substantial quantities.

A That's correct. There's probably, anywhere out there you could get a few gallons a minute anywhere up on the Llano Estacado there.

Q Do you have listed somewhere the proposed perforations in all your proposed injection wells?

A We have listed the -- the existing perforations in the schematics and in the tabular information that we've submitted.

We have not yet determined, and will probably not determine until we get it back into the wells, whether we will open up additional intervals in the unitized interval. I would expect we would open some of those

intervals as we study the wells and as we run, maybe, supplemental electric logs, and so on in our recompletions and workovers.

Q Okay, but for right now you plan on using the current perforations that are open?

A We do unless there's evidence that develops during the recompletion or workover that indicates it would improve the flood to open additional zones.

What we were -- what we are looking at is the best judgment of the people that originally drilled and completed the wells, which is probably very good. We probably won't -- we will probably not open the very much, but we could if in running a log or looking at the later injection profiles, we could find that we need to perforate additional sub-intervals in the -- in the interval of the unitization there.

Q I see. You've identified three zones within the San Andres, the P-1, P-2 and P-3. Are those all about equally productive?

A No, sir, the second porosity is by far the most prolific. The upper zone carries, usually, some oil and perhaps more gas than the second porosity, and the third porosity normally does not produce in many parts of the field but it does in certain areas produce a small amount of oil.

Q But you do plan to waterflood all three zones.

A Yes, sir. We feel that we need to do that because it will not be economic to come back, leave one and come back and get it later, so anything, in our judgment and from the records and from the information we can develop as we -- as we redevelop the unit, indicates that it has recoverable commercial reserves, we'll open up.

MR. CATANACH: That's all the questions we have of this witness at this time. He may be excused.

Mr. Ezzell, could you submit a rough draft order on the waterflood?

MR. EZZELL: Be happy to.

MR. CATANACH: That way we can get everything straight and you're going to submit additional information --

MR. EZZELL: We'll work that up for you for all wells.

MR. CATANACH: Okay. Okay, do we have anything further in this -- in these two cases?

If not, they will be taken under advisement, and we'll leave the record open until we receive the additional information.

(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. 9477, 9478 heard by me on September 14 1988.

David R. Catanach, Examiner
Oil Conservation Division

NEW MEXICO OIL CONSERVATION COMMISSION

EXAMINER HEARING

SANTA FE, NEW MEXICO

Hearing Date SEPTEMBER 14, 1988 **Time:** 8:15 A.M.

NAME	REPRESENTING	LOCATION
W.T. Kellahin	Kellahin & Kellahin	Santa Fe
Lloyd Dickerson	Dickerson, Fed & Wardlaw	Artesia
Greg Nelson	TXO Prod. Corp	Midland TX
John P. Gallant	TXO Prod. Corp.	Midland, TX
RJ Quance	Kerr-McGee Corp	Oklahoma City
Vijinder K. Bangia	Union Texas Petroleum	Houston, TX
E.R. Manning	El Paso Natural Gas.	El Paso, TX
Calder Ezzell	Hinkle Law Firm	Roswell
Ann Murphy Ezzell	Murphy Operating Corp	"
Bert H Murphy	" " "	"
Mark B. Murphy	" " "	"
Reilly Sullivan	American Energy Corp. Corp	Houston, TX.
Richard Corcoran	Dugan Production Corp.	Farmington, NM
John Roe	" " "	" "
Ben Stone	Bogram	Santa Fe
Victor Lyon	OCD	Santa Fe
Ron Bartel	BLM	Santa Fe
Patrick Tower	Santa Fe Energy	Midland
Curt Anderson	"	"

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NAME	REPRESENTING	LOCATION
William F. Carr	Campbell Black	Santa Fe
Brie Sietzer	Amerind Oil Co	Midland Tx
Robert C. Leibrock	Amerind Oil Co.	Midland, TX.
Carlos Hoffman	Hinkle Law Firm	Santa Fe
Edsel Neff	Robert Enfield	Roswell