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

30 April 1986

EXAMINER HEARING

IN THE MATTER OF:

Application of Mobil Producing Texas and New Mexico, Inc. for salt water disposal, Lea County, New Mexico. CASE 8884

BEFORE: Michael E. Stogner, Examiner

TRANSCRIPT OF HEARING

A P P E A R A N C E S

For the Oil Conservation Division: Jeff Taylor
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I N D E X

E X H I B I T S

MR. STOGNER: Call next Case Number 8884.

MR. TAYLOR: The application of Mobil Producing Texas and New Mexico, Incorporated, for salt water disposal, Lea County, New Mexico.

MR. STOGNER: Call for appearances in this case.

MR. CARR: May it please the Examiner, my name is William F. Carr, of the law firm Campbell & Black, P. A., of Santa Fe.

We represent Mobil Producing Texas and New Mexico, Inc., and I have one witness -- I have two witnesses.

MR. STOGNER: Are there any other appearances?

There being none, will the witnesses please stand to be sworn?

(Witnesses sworn.)

MR. STOGNER: Please continue, Mr. Carr.

WILLIAM H. HERMANCE,

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

DIRECT EXAMINATION

BY MR. CARR:

Q Will you state your full name and place of residence?

A My name is William Edwin Hermance. I live in Midland, Texas.

Q How do you spell your last name?

A H-E-R-M-A-N-C-E.

Q Mr. Hermance, by whom are you employed and in what capacity?

A I'm employed as a geologist by Mobil Producing Texas and New Mexico.

Q Have you previously testified before this Division?

A No, I have not.

Q Would you review for Mr. Stogner your educational background and then summarize your work experience?

A I received the Master's degree in geology in 1983 from Indiana State University and my Bachelor's de-

gree in geology in 1981 from the University of Rochester.

I've been employed by Mobil as a geologist since 1984.

Q Does your area of responsibility with Mobil include that portion of southeastern New Mexico which is involved in today's hearing?

A Yes, it does.

Q Are you familiar with the application filed in this case on behalf of Mobil and are you familiar with the proposed disposal well?

A Yes, I am.

MR. CARR: We tender Mr. Hermance as an expert witness in geology.

MR. STOGNER: Mr. Hermance is so qualified.

Q Would you please state what Mobil Producing Texas and New Mexico seeks with this application?

A Mobil seeks authority from the Commission to dispose of produced salt water into the Lower San Andres in the Bridges State 511, located 474 feet from the south line and 1904 feet from the east line of Section 23, Township 17 South, Range 34 East.

Q Would you refer to what has been marked for identification as Mobil Exhibit Number One and identify this, please?

A Okay, Exhibit Number One is Form C-108 for the subject well, dated April 14th, 1986, with all required attachments for the well.

Q What is the status of the proposed disposal well? Have you drilled it yet?

A The well is undrilled.

Q Would you refer to the plat which is included in Exhibit Number One -- I'm sorry, which is marked Exhibit Number Two and review that for Mr. Stogner, please?

A Exhibit Number Two is a plat map located up on the wall to your left. The map shows the location of the subject well in section -- in the southeast quarter of Section 23, and it can be seen with a red dot.

The map also shows all wells within a two mile radius of the proposed injection well.

The plat map also shows lease ownership in the area and within the area of review is shown by a one-half mile circle around the well.

Mobil currently operates a waterflood project within the yellow boundary that are just State leases.

Q And then what --

A I should point out, as well, that within Section 23 the State "VA" lease, labeled Amerada Hess, has been acquired by Mobil to the base of the San Andres.

MR. CARR: And this waterflood project, Mr. Stogner, is operated pursuant to Order R-1244.

MR. STOGNER: Thank you.

Q Mr. Hermance, would you now refer to the tabular data on all wells within the area of review which penetrate the injection zone?

A In Exhibit One you'll find the tabular data beginning on page 10/11 for all wells which penetrate the injection zone. There is also information on two other wells on page 71.

The data is tabulated giving the well number, location, well type, water injection well, whether the well is shut-in, an oil producer, or P&A'd, the depth of the well, the formation that the well is completed in, the completion interval, the date the wellw as drilled, and its current status.

I should point out that on page 10 Well No. 238 should be located in Section 24.

Q What do the symbols under well type indicate?

A WIW is water injection well; SI is shut-in; Oil is an oil producer; and P&A is a plugged and abandoned well.

Q Are there any plugged and abandoned wells within the area of review?

A There are three plugged and abandoned wells within the area of review and they can be found, the sketches on them and the tabular data are in the tables just referred to.

The sketches can be found on pages 57 and 58 for the North Vacuum Abo Unit No. 238. This well was TD'ed at 5000 feet.

Two other wells, the State "VA" and one, NK3W (sic), are found on pages 71 to 77 and are located in the southwest quarter section of Section 23. These wells also were TD'ed above 5000 feet.

Q And the data supplied provides all plugging information on the wells.

A It does.

Q Under what formation are you proposing to dispose water?

A Mobil proposes to inject in the Lower San Andres.

Q What is the thickness of this interval?

A The thickness would be approximately 600 feet, between 5050 feet and 5650 feet.

Q Has the zone been tested?

A The zone was tested and it was 100 percent wet in the Bridges State 27. This well is located, you can see on the plat, in the northeast quarter section of

Section 26.

Q Now, generally what is the nature of this formation?

A The Lower San Andres is a dolomite to sandy dolomite in this area.

Q Mr. Hermance, would you now refer to your north/south cross section, which is marked Mobil Exhibit Number Three, and perhaps you could go to the board and review the information contained on that exhibit for Mr. Stogner.

A Exhibit Four is also a cross section. This one is east, an east/west section that that will be fine and I will work back and forth with them.

Cross Section A-A' runs from Texaco's State AA Salt Water Disposal Well No. 1 in Section 10 of Township 18 South, Range 34 East, through the proposed location approximately five miles to the north and then northward into Section 14 and the northernmost well is the Vacuum Abo Unit No. 282. This is in Section 14 of 17 South, 34 East.

Briefly the cross sections show the top of the San Andres and the entire productive interval in the San Andres across the cross section from north to south. This is the base, the lower part of the yellow, of the lowermost productive San Andres.

The blue section denotes the proposed disposal zone. This is correlated from the proposed well to the south and where Texaco is currently disposing in the same zone.

The Texaco well is an open hole completion from 5100 feet to TD. This well is currently taking water on gravity.

These wells are not shown on the plat map. There is an index map on the cross section which will show you the trace of the cross section.

Cross section B-B', which would be Exhibit Four, I believe, ties to A-A' in the -- with the Bridges State No. 4. This well -- this cross section runs from Section 26, Township 17 South, 34 East, and the Mobil Bridges State 136 to the east in Section 29 of 17, 35 East, and the Shell well.

The cross section here shows essentially the same thing, the productive limits of the San Andres and the proposed disposal zone.

I think the cross sections clearly show the separation between the two farther to the east where other operators are currently producing from the San Andres. There is a 3-to-400 foot separation between the two zones, the top of the disposal zone and the base of the San Andres, and the base of the proposed disposal zone is approximately

250 or 300 feet above the Glorieta, which is the next porosity that you'll see below the disposal zone.

Q Mr. Hermance, what conclusions can you -- have you reached as a result of your study of this area?

A The conclusions that we reach are that this proposed disposal zone contains good porosity of around 12 percent. Permeability we expect to be around 25 millidarcies. There's evidence with the Texaco well to the south that the zone will take water on gravity. The well will TD some 250 to 300 feet above the Glorieta, and the disposal zone is 350 feet to 400 feet isolated from the lowermost productive San Andres. This is the only nonproductiv zone of any extent within the field. We feel that the zone will allow for safe, efficient disposal of produced water and a better recovery of reserves in these lease areas.

Q Now, Mr. Hermance, you've reviewed the available geologic data on this area.

A I have.

Q As a result of this review have you discovered any evidence of open faults or other hydrologic connections between the disposal interval and any source of underground drinking water?

A I have not.

Q In your opinion will granting this appli cation be in the best interest of conservation, the preven-

tion of waste, and the protection of correlative rights?

A Yes. The ability to dispose of produced water in the Bridges State 511 will enable Mobil to operate wells in these lease areas that are currently shut-in and are uneconomic due to high water costs and the cost of trucking the water, and this will extend the productive life of these currently shut-in wellbores.

Q Will Mobil also call an engineering witness to testify in this case?

A Yes, we will.

Q Is Exhibit Number One the application that was filed with the Division in this matter?

A It is.

Q And were Exhibits Two through Four prepared by you or compiled under your direction?

A They were.

Q And can you testify as to their accuracy?

A Yes, I can.

MR. CARR: At this time, Mr. Stogner, we would offer Mobil Exhibits One through Four into evidence.

MR. STOGNER: Exhibits One through --

MR. CARR: Four.

MR. STOGNER: -- Four will be

admitted into evidence.

MR. CARR: That concludes my direct examination of this witness.

CROSS EXAMINATION

BY MR. STOGNER:

Q When we refer back to Exhibit Number Two, I believe, this is Number Two?

A Right.

Q Okay, Number Two, this is essentially setting in the center of the Mobil Bridges State leases, which I understand is a waterflood area, is that correct?

A Yes, sir, it is.

Q And what -- what type of waterflood activity is in this particular zone that you will be --

A In this zone there are no completions; it's an unproductive zone.

Q All right.

A The zone we're proposing is again some 3-to-400 feet below the lowest productive San Andres.

Q Has this zone had any production in the past?

A No, it has not. It was tested and tested 100 percent wet in the Bridges State 27, No. 27, in Section 26.

Q And where is the nearest salt water disposal well of this type in the area?

A The nearest is approximately five miles to the south. It's the Texaco State AA No. 1, which is on the cross section.

There's a small index map to the bottom left of the cross section that will show you where it is.

Q And that shows that particular well --

A And where the locations of all the others are.

Q Why can't Mobil use this water to reinject in their waterflood?

A The current waterflood will only -- can only take so much and we're proposing water from not only the San Andres will be disposed in this well. So there's more water than we can inject in the San Andres waterflood.

Q What is the major make-up of the water in the waterflood? Where is it coming from?

A I believe our engineer will go into most of that in detail.

Q Okay. Thank you, sir.

MR. STOGNER: I have no further questions of this witness at this time.

MR. CARR: At this time we call Mr. Bankson.

GLENN BANKSON,

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

DIRECT EXAMINATION

BY MR. CARR:

Q Will you state your full name and place of residence?

A Glenn Bankson. I live in Midland, Texas.

Q Mr. Bankson, by whom are you employed and in what capacity?

A I'm employed by the Mobil Oil Corporation as a reservoir engineer.

Q Have you previously testified before this Division?

A No, I haven't.

Q Would you briefly summarize for Mr. Stogner your educational background and then review your work experience, please?

A I received a Bachelor of Science degree in petroleum engineering at the Penn State University in 1955.

In 1962 I was -- I was hired by Mobil Oil Corporation and I've been working for them as an engineer

every since.

Q Does your area of responsibility for Mobil include that portion of southeastern New Mexico which is the subject of today's application?

A It does.

Q Are you familiar with the application filed in this case on behalf of Mobil?

A I am.

Q And are you familiar with the proposed disposal well?

A I am.

MR. CARR: We tender Mr. Bankson as a qualified petroleum engineer.

MR. STOGNER: Mr. Bankson is so qualified.

Q Mr. Bankson, what is the source of the water that Mobil proposes to inject or dispose of in this proposed well?

A The water that we propose to inject into the subject well is going to come primarily from the Mobil operated Abo units and from the Mobil -- Mobil's Bridges State San Andres Waterflood Project.

Q Now, Mr. Bankson, what is presently being done with this water?

A We are reinjecting as much of this water

as we can into the Bridges State San Andres Waterflood Project. Any excess water is either trucked off to a commercial water disposal wells, or we have a water disposal well in the Devonian formation which we inject some water into.

Q And what volumes are you proposing to inject in this particular well?

A We anticipate an injection rate of about 3000 barrels a day initially.

Q And then what will the maximum rate be?

A We anticipate that the maximum rate will be about 11,000 barrels a day.

Q Is this going to be an open or a closed system?

A It will be closed system. The -- the water is all gathered and transported across the lease in lined pipe and it's held temporarily in tanks and Mobil has a gas (not clearly understood) on top of these tanks, so we -- we consider it a closed system.

Q Now, Mr. Bankson, I believe page four of Exhibit One indicates that the system will be open. Is that incorrect?

A That is correct. That -- that is an error that should be corrected.

MR. STOGNER: I'm sorry, where is that?

A It's on --

MR. CARR: It's numbered page -- at the bottom of the page, Roman Numeral VII, numbered paragraph 2. It says, "System will be open".

That should be "closed".

Q Mr. Bankson, does Mobil propose to inject under pressure or by gravity?

A We anticipate injecting under gravity.

Q If, in fact, pressure needs to be applied to this well during disposal operations, would a pressure limitation of .2 pound per foot of depth to the top of the disposal interval be satisfactory for Mobil's purposes?

A We believe that it would, yes.

Q Would you now refer to the schematic drawing of the proposed injection well in Exhibit Number One and review the completion or proposed completion of that well for Mr. Stogner?

A Yeah. The schematic of the proposed well's on page number six.

There is a written write-up of this completion that we propose on page 79, but I'll go over the schematic here.

What we propose to do is have a conductor pipe, 13-3/8ths inch conductor pipe set a 40 feet and then we will circulate cement on it.

Then we will come down with the surface pipe to 1700 feet, it will be a 9-5/8ths inch pipe, and we'll circulate cement on it.

Then we'll come down to the total -- total depth of approximately 5650 feet and we'll set 7-inch casing at that depth and we'll circulate cement on it.

Then we'll come in and perforate in the -- this is an approximate zone, and we'll have to define exactly once we get some logs in here. We'll go ahead and perforate. Then we'll come up and set a packer about 100 feet above the perforations. We'll anchor down the tubing. The tubing is going to be 2-and-7-inch dual line tubing (sic) and it will be tied into, anchored into the packer, which will be, like I say, about 100 feet above the perforations.

Q Will the annular space be filled with an inert fluid?

A Yes, the -- yes, it will, and we will, in addition to that, have the presure gauges on the annulus so that we can monitor the pressure changes in that, the annulus.

Q And you'll be able to run all tests required by the Federal Underground Injection Control Program.

A We will.

Q Mr. Bankson, do you anticipate any com-

patibility problems resulting from the proposed disposal?

A We have not -- we don't have any compatibility tests for the water we're going to put in there and the zone, water in the zone that we're talking about; however, we have been injecting the Abo water since about 1978 into the -- into the upper productive areas, intervals of the San Andres reservoir and we have not seen any evidence of any kind of a problem with compatibility or plugging of that nature, or anything of that nature.

Therefore we think that we will not have any compatibility problems with the disposal zone.

Q Are there fresh water zones in the area?

A There are. The fresh water zone is the Ogallala which overlies this area at approximately 300 feet.

Q Now, are there any fresh water wells within one mile of the proposed injection well?

A There are two of them and we have them -- on page 82 we have a plat which shows the two fresh water wells.

For lack of a better name we've labeled them X and Y.

X is in the southwest corner of the south -- southwest quarter of the southeast quarter of Section 23 and Y is in the northeast quarter of the northwest quarter of Section 25.

On the previous page, page 81, we have a water analysis report on these two wells that was taken on April 7th, 1986.

Q Mr. Bankson, will a log of this well be filed with the Division as required by Division rules?

A It will.

Q Who operates all the offsetting properties in this area?

A Mobil, Mobil operates all the properties around here for the half mile interval of interest that we're talking about.

Q And who is the surface owner?

A The surface owner is the State of New Mexico.

Q Are you aware of similar applications that have been granted for injection of waters in the same general area?

A The, of course, the Texaco well which Bill Hermance talked about, which is on the bottom -- on the south end of the cross section that he has, and Rice Engineering has a commercial disposal well, or zone, or well in the same zone off to the east of this property.

MR. CARR: Mr. Stogner, the order approving the Texaco disposal well was entered in Case 5874, and that is Order R-5391.

The approval of the Rice disposal well was by Orders R-5384 and 5384-A. They were entered in Case 5953.

Q Mr. Bankson, have you reviewed the engineering data which is available on this subject area?

A Yes.

Q As a result of that review have you discovered any evidence of faulting or other hydrologic connections between the disposal interval and fresh water zone?

A I have not.

Q In your opinion will granting this application be in the best interest of conservation, the prevention of waste, and the protection of correlative rights?

A I believe it will.

Q If in fact Mobil ever needs to increase the pressure on this well to a figure in excess of the .2 pound per foot to the top of the injection interval, Mobil would come back to the Division and present evidence on the structure at that time?

A That's right. We'd run tests and determine what the (not clearly understood.)

MR. CARR: I have no further questions of Mr. Bankson.

MR. STOGNER: Thank you, Mr. Carr.

CROSS EXAMINATION

BY MR. STOGNER:

Q Mr. Banks.

A Yes, sir.

Q I'll repeat my question earlier. What is the source water for the Mobil Bridges State lease waterflood project?

A The source water is the produced Abo formation water and also the water produced out of the San Andres zone.

Q Now this is for the water utilized in the Mobil Waterflood Project?

A That's right.

Q Is there any fresh water from the Ogallala being utilized out there?

A Yes, sir. We use the fresh water from the Ogallala to waterflood the Abo formation in the Abo units.

Q But not the Bridges -- okay.

A Not the Bridges State lease.

Q Not the -- not the Grayburg --

A San Andres.

Q -- San Andres, just the Abo.

A Yes, sir.

Q Why can't this water be reinjected and utilized in the waterflood project?

A The -- the Abo formation is a very tight formation. The average permeability in the Abo is less than one millidarcy.

We currently inject an average of about 200 barrels a day, or to 225 barrels a day per inection well and our -- and this is fresh water, and the surface pressure -- the surface injection pressure is about 4000 pounds.

Now we've had CORE Laboratories do a study for us that included measuring the particulate size, the size of the particulate matter entrained in the Abo water and also the throat pore -- pore throat size of the -- of the interconnecting (not clearly understood) you know, between the porosity, the interconnecting channels. And as a result of their study we found that -- that the Abo produced water contains an awful -- very large amount of particulate matter entrained in it. It is approximately of one micron size, and we are not able to filter that this -- we are not able to filter out this size, this small size of particulate matter.

The CORE Laboratories work on the throat, pore throat sizes indicated approximately 60 percent of the reservoir had pore throat sizes also in the one micron size, and we are very much afraid that if we did inject the -- the

Abo produced water, we would plug up a large proportion of the -- of the Abo reservoir and we would not be able to put as much water into the ground for fear of having to run our injection pressure up higher and we think that we would end up bypassing quite a bit of the reserves in the Abo formation.

Q Have you reviewed, Mr. Banks, all the wells within the half mile radius?

A Yes, sir.

Q Okay, have -- have you checked the cement behind the pipe for both producing and injection wells in there?

A The injection wells and producing wells that penetrate through this zone that we are talking about are primarily wells that get down into the Abo formation. Of course the San Andres are all completed above this particular zone.

The Abo, normally when we complete a well in the Abo we run the surface string down to 5000 pounds, I mean 5000 feet, and then we run the production string on down to the 8400 feet for the Abo. In each case the cement is circulated behind the pipe and so that we feel that the -- that the part of the Abo wells that goes through this disposal zone will be adequately protected by cement around the casing.

Q Thank you, Mr. Banks.

MR. STOGNER: I have no further questions of this witness.

Are there any further questions of Mr. Bankson?

If not, he may be excused.

Mr. Carr, is there anything further in 8884?

MR. CARR: Nothing further, Mr. Stogner.

MR. STOGNER: Does anybody else have anything further in Case Number 8884 at this time?

If not, this case will be taken under advisement and this hearing is hereby adjourned.

(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. 8884, heard by me on 30 April 1986.

Examiner
Oil Conservation Division