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

6 November 1985

EXAMINER HEARING

IN THE MATTER OF:

Application of H. L. Brown, Jr. for salt water disposal, Roosevelt County, New Mexico. CASE 8743

BEFORE: David Catanach, Examiner

TRANSCRIPT OF HEARING

A P P E A R A N C E S

For the Division: Jeff Taylor
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I N D E X

DANIEL S. NUTTER

E X H I B I T S

MR. CATANACH: Call next Case 8743.

MR. TAYLOR: The application of H. L. Brown, Jr., for salt water disposal, Roosevelt County, New Mexico.

MR. PADILLA: Mr. Examiner, Ernest L. Padilla, Santa Fe, New Mexico, for the applicant in this case.

I have one witness to be sworn.

(Witness sworn.)

DANIEL S. NUTTER,

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

DIRECT EXAMINATION

BY MR. PADILLA:

Q Mr. Nutter, for the record would you please state your name and what your connection is with the applicant in this case?

A My name is Dan Nutter. I'm a consulting petroleum engineer and I've been retained by Mr. H. L. Brown, Jr., in connection with this case.

Q Have you made a study of the first injection well and familiarized yourself with certain materials supplied to you by H. L. Brown, Jr.?

A Yes, I have.

Q Have you previously testified before the Oil Conservation Division and had your credentials accepted as a matter of record?

A Yes, I have.

MR. PADILLA: Mr. Examiner, we tender Mr. Nutter as an expert petroleum engineer.

MR. CATANACH: Mr. Nutter is so qualified.

Q Mr. Nutter, --

MR. PADILLA: Mr. Examiner, before I commence, we have numbered Exhibits One through Thirteen and I'm sure that they vary from the original application as originally submitted by H. L. Brown, Jr.

We have thirteen exhibits and not necessarily in the order of the original application but for purposes of hearing and brevity we have realigned them.

Q Mr. Nutter, would you refer now to Exhibit Number One and please tell us what it is and what it contains?

A Yes. Prior to getting into Exhibit Number One, attached on the top of your packet is the Form, the

Division Form which is the application for salt water disposal, and all of the data that's required by this exhibits -- by this form is in here in one form or another, exhibit or narrative.

Okay, Exhibit Number One is an area plat which shows the location of the proposed salt water disposal well as identified by the red dot.

It also shows the wells in the area and all lease ownership.

The second page of this exhibit is the original C-101 that was filed in connection with the drilling of the Saunders "A" Well No. 1, which is located 1650 feet from the north line and 650 feet from the west line of Section 5, Township 8 South, Range 37 East, Roosevelt County, New Mexico.

This well was drilled as a Bluitt-San Andres gas well. At the time it was drilled it was proposed to take the well to 4600 feet.

The third page in the exhibit is the plat showing that the west half of Section 5 was dedicated to the well.

The fourth page is the plugging report on the well. After it was drilled in 1965 and '66 the well quit producing and was plugged in 1968.

Q Is that all you have on Exhibit One?

A Yes, it is.

Q Okay, let's go on to Exhibit Number Two, please, and tell the Examiner --

A Exhibit Number Two is a schematic diagram showing the present condition of the well. You'll notice it was spudded 11-16-65; completed 5-11-66. The well was completed with an absolute open flow from the San Andres of 820 MCF a day with a shut-in bottom hole pressure of 1297 psig.

It was connected to the pipeline initially on August the 3rd of 1966.

The well quit producing and on January 29th of 1967 there was a workover performed on the well. It was found that the well was loaded with salt. They tried to wash out the salt but they never could return the well to production, so subsequently the well was plugged.

It was plugged with ten sacks of cement at total depth of 4400 feet. The casing was shot off at 2196 feet and a 25-sack plug set at the top of the casing stub.

25 sacks was also set at the base of the surface casing pipe at 341 feet and a 10-sack surface plug set with a dry hole marker.

I believe that's all on that exhibit.

Q Would you refer now to Exhibit Number Three and tell the Examiner what that is?

A Exhibit Number Three is the Commission's or the Division's injection well data sheet, and it states that 8-5/8ths inch casing was set with 150 sacks of cement with the cement circulated to the surface and an 11-inch hole.

The long string is 4-1/2 inch pipe and it was originally cemented with 350 sacks of cement, the top of which came just below the point where the casing was shot off and there will be a squeeze job performed on it and some additional cement employed in tying back onto this casing stub.

So the total cement on the long string will be 825 sacks; 350 sacks on the original job; 475 sacks on the second stage cementing; and the well will be perforated from 4035 to 45 -- 4030 to 4535 feet and 2-7/8ths inch internally plastic-coated tubing will be run.

We'll get into that in more detail later.

Q Go on now to Exhibit Number Four, Mr. Nutter.

A Exhibit Number Four is a schematic diagram of the well as it will be completed.

Here we see that the surface pipe is at 281 feet. We see that the DV tool and the casing patch is at 2196 feet. This where the new 4-1/2 inch casing will be tied onto the stub of the old 4-1/2 inch casing.

We see the new perforations from 4030 tc 4535, with a packer set at 3950 feet. The top of the cement on that long string is at 3084 feet, so we've got 951 feet of cement above the uppermost perforation to the top of the cement.

The schematic also shows that internally plastics-coated tubing will be set in the packer at 3950. There will be an internally plastic-coated 4-1/2 inch by 2-3/8ths inch injection packer. The annulus behind the 2-3/8ths inch tubing will be filled with fresh water containing 2 percent corrosion inhibitor and bacteriacide plus an oxygen scavenger.

Pressure gauges will be installed on two annuluses; on the 4-1/2 by 2-3/8ths inch tubing/casing annulus and also on the 4-1/2 inch by 8-5/8ths inch long string surface pipe annulus.

The next one, two, three, the next four pages of this exhibit are the detailed procedures that will be followed in recompleting the well as a salt water disposal well.

To drill out the surface plug; drill down to and clean out to the top of the 4-1/2 inch casing stub; to run a dressing tool, dress off the top of the 4-1/2 inch casing stub; run a Bowen casing patch and lead seal packoff; latch onto the 4-1/2 inch tool with a 4-1/2 inch stub and

run the DV tool on the new casing string; cement the 4-1/2 inch casing through the DV tool and on that second page of that procedure, on the third line down, Mr. Examiner, it says cement the 4-1/2 inch casing through the DV tool with 75 sacks, there's a "4" missing there. That should be 475 sacks.

Then the DV tool will be clased. It will be pressure checked and shut in to allow the cement to harden.

Later on the hole will be circulated clean and 500 gallons of acid will be spotted in the bottom of the casing.

Then a wireline plug -- casing perforation tool will be run. The casing will be perforated from 4035 to 45 -- 4030 to 4535 with a total of 175 -- 176 shots.

The procedure on the next page goes through running the packer, pressure testing, acidizing, swabbing the well, running injection tests, and completing it for converting to salt water disposal.

Q Okay, let's go -- is that all on Exhibit Number Four?

A Yes, sir.

Q Okay, now let's go on to Exhibit Number Five and have you identify that for the examiner.

A Exhibit Number Five is another plat.

This time we have shown the proposed salt water disposal well with the red dot in the middle of the two circles.

Also circled by red is the only dry hole or the only well which has been plugged and abandoned within the one-half mile area of interest, as required by the Division.

There's also a two-mile circle on here, which is the area that's prescribed by the Division to find out if there's any production from the -- from the same formation that we're proposing disposal in.

There's only one well within this two-mile circle which is producing from the San Andres and that would be the well that's shown as a gas well in the northeast quarter of the northeast quarter of Section 8 there, up in Unit A, Mr. Examiner, of Section 8, in the section immediately above the proposed injection section, that gas well in Unit A is producing from the San Andres.

There have been some other San Andres wells in here but they have been plugged and abandoned, but the only one that's currently producing is that well in Section 8.

The only plugged well within the half mile area of interest, as I mentioned, is the well that's in the southwest quarter of the northwest quarter of Section 5, a diagonal offset to the proposed injection well.

Q Mr. Nutter, let's go on now to Exhibit Number Six and have you identify that for the Examiner.

A I mentioned that there was one P&Aed well within the half mile area of interest. Exhibit Number Six is the schematic diagram of that plugged and abandoned well; also the tabular description of the plugs that are in the well.

You'll see that this well was originally drilled to a total depth of 9565 feet. It was a deep test and was dry on completion and plugged at the time of drilling.

There is some junk in the bottom of the hole.

The first plug is from 9565 to 9490; second plug from 9255 to 9180; third plug 8275-8210; fourth plug from 7215 to 7130; fifth plug, 6605-6530; the sixth plug 5235 to 5160; and the seventh plug was from 4065 to 3990.

The 8-5/8ths inch intermediate casing was free at 1513 feet. It was shot off at that point and pulled, so there's a 25-sack plug set across the top of the stub at that 8-5/8ths inch intermediate pipe from 1525 to 1500; plug number eight was -- plug number nine was from 225 feet to 200 feet across the shoe of the 13-3/8ths inch surface pipe; a 10-sack plug was set at the surface and dry

hole marker installed.

So I believe that this one well which is within a half a mile of the proposed disposal well has been adequately plugged. It looks like it's a pretty good plugging job to me.

Q Let's go on to Exhibit Number Seven, please.

A Exhibit Number Seven is the geological and lithological data that's required by Item Number Eight of the application for disposal form. It indicates that the San Andres formation is the injection formation; the top of that formation is at 3720 feet. It's a tan to gray dolomite, microcrystalline interbedded with thin layers of anhydrite.

The thickness and depth of the formation is from 4030 to 4535 for the injection zone.

Now the Lower Ogallala in this area contains water that is pretty nasty. It's got approximately 5000 parts per million of chlorides in it, which is rather unusual for the Ogallala.

But the Upper Ogallala in this particular area produces such little water that there are no Upper Ogallala wells here.

Now we will get into the water wells that are completed in the Lower Ogallala that produced this 5000

ppm chloride water.

There's no known water sands at all below the disposal formation.

Q Is that water fit for human consumption?

A No, that water is not fit for human consumption but it is used for watering cattle in the area.

Q Let's go on to Exhibit Number Eight. Tell us what that is.

A Exhibit Number Eight is the affirmative statement required by Item Number Twelve on the application for salt water disposal.

It's a statement that the -- that an examination has been made of all available geological and engineering data and no evidence of open faults or other hydrologic connection between the disposal zone and any underground source of water was observed.

Q Okay, let's go on to Exhibit Number Nine.

A Exhibit Number Nine is a large plat which shows the water wells, the fresh water wells which are within one mile of the proposed disposal well.

The proposed disposal well is the well that's colored in red in the northwest quarter of Section 5.

There are four water wells in this section, all of which are producing from the Lower Ogallala, as I stated.

There's one in the extreme southwest quarter, which is identified by a square.

There's one in the central south part identified by a square.

There's another well on the extreme south line of the section in the southeast portion of the section, and another one which is adjacent to the Shell Saunders Federal dry hole in the northeast quarter of the southeast quarter of Section 5.

All the water wells are identified by red squares and the proposed disposal well is identified by the red dot.

These are all active water wells. You'll notice that each one of them is connected an electric power line for pumping -- electricity for pumping the water.

Q Is that all you have on that exhibit?

A Yes, sir.

Q Let's go on to Exhibit Number Ten and tell the Examiner what that is?

A Exhibit Number Ten is a multi-page exhibit.

The first page in this exhibit is a plat showing the proposed injection well circled in red.

Then there are some solid dots which I numbered. These are the water wells which are producing

fresh water from the Ogallala and also the proposed -- I mean the one San Andres well that's producing in the area.

The triangles are the Wolfcamp wells which will be furnishing the water that will be disposed of in this proposed injection well.

What H. L. Brown has done, he's putting in a gathering system and a compression system to gather the gas from eleven Wolfcamp gas wells. These wells produce a small amount of water and the water will be gathered at the compression station and will be disposed of into the proposed well.

Now, the solid dots, as I mentioned, are the fresh water analyses and we get into the analyses on the following pages in this Exhibit Number Ten.

On the next page is the analysis of the water well which is adjacent to that Shell Saunders well, which is the well in the southeast quarter of Section 10, approximately 1980 feet from the south line and about 660 feet, probably, from the east line of the section.

You'll see here that --

Q Mr. Nutter, is that Section 10 or is that Section --

A Section 5, I'm sorry, Section 5.

You'll see that the chlorides are the 5000 parts per million; biocarbonates 240; magnesium and

calcium are 300 parts per million and 500 parts per million, respectively.

The next page of this exhibit, the first well -- incidentally, the numbers at the bottom of these analyses correspond with the numbers that were marked on the first page of the exhibit, so you can identify where they are.

The number two on the second page of the exhibit, which is the first well, identified with the number two, is the No. 2 well on the little plat. This is the Breck San Andres Gas Well, located in Unit A of Section 8. You'll see that the San Andres from this well is producing water that has chlorides of 180,000 parts per million, so the San Andres water is really very salty.

The next two wells on this exhibit, being identified as Numbers Three and Four, are fresh water wells located in Unit M and Unit P of Section 5. So those would be the two southernmost wells on Exhibit Number Nine, with the exception of the well which is in the extreme southwest corner.

That well is the next well on the next page. That's the well identified as Well Number Five. Again, 5000 parts per million from the Lower Ogallala.

There are two other wells, one in Unit E of Section 3 and one in Unit F of Section 6, which are also

producing from the Lower Ogallala and they also produce with 5000 parts per million.

The following wells are -- the following analyses are analyses of water produced from the 11 Wolfcamp wells that will be going into the disposal system. The chlorides in these wells range from a low of 80,000 to a high of 125,000, so we see that the disposal water is substantially less in chlorides than the San Andres water which will be the -- which is the native formation water that we're going into.

Q Are you done with this Exhibit Ten?

A Yes, sir.

Q Let's go on to Exhibit Number Eleven.

A Exhibit Number Eleven is a packet of exhibits, being the waivers from all of the offset operators. If we start on -- if we to one of our original plats, and we start at the --

Q Which plat are you referring to, Mr. Nutter?

A We should have a plat that has a half mile circle on it.

Q That's Exhibit Number One?

A No, that doesn't have a half mile circle.

Exhibit Five has a half mile circle. Thank you, Mrs. Boyd.

If we start the -- if we go to the southwest of the proposed injection well, the first offset operator within a half mile of the proposed injection well is Santa Fe Energy Company. Santa Fe Energy Company has a waiver.

If we go clockwise, then, the northeast quarter of Section 6 is Felmont. We have a waiver from Felmont.

The lease in Section 31 is owned by Threshold. We have a notice from Threshold here that they no longer have a -- the lease has expired. They no longer have an interest in the area.

Going straight -- continuing clockwise, we have Section 32 owned by West Texas Gas Company. West Texas Gas Exploration; we have a waiver from that operator.

Continuing clockwise we see that the north half of the northeast quarter of Section 5 is shown as being leased to H. A. Lasik. This is an error on the map because it's -- it's actually not an error on the map, but he is not the operator of this. Mr. Lasik has contributed his acreage to the project of Mr. Brown, so he's a partner in the whole operation, so he's not considered to be an offset operator; he's a partner.

Then we have a waiver from -- the rest of the northeast quarter of Section 5 is owned by H. L. Brown.

The southeast quarter of Section 5 is Shell. The next waiver in the package is from Shell.

Then in the north -- in the west half of the southwest quarter of Section 5, you'll notice that it shows that this 80-acre tract is owned by NRM Petroleum Corporation. We attempted to obtain a waiver from NRM. They notified us that they no longer have this lease so the landowner, who is Ainsworth, as you can see on that 80-acre tract in the west half of the southwest of 5, he was -- the landowner was contacted and Ainsworth did provide us with a waiver to the disposal of salt water.

So we have waivers from all offset operators within a half a mile of the proposed injection well.

Q Is there any operator within the half mile circle that has San Andres rights?

A Yes, there's the one operator then that has the San Andres well in the south -- in the northeast quarter of the northeast quarter of Section 8.

Q Is a waiver necessary from that person?

A No, a waiver was not necessary. Exhibit Number Twelve, by the way, then, is the notice to the newspapers; is the complete packet in which we sent a copy of the application or the notice to the Portales News Tribune and the affidavit of publication that this was published on September the 17th, 1985 in the Portales newspaper giving

notice of H. L. Brown's intent to convert this well to salt water disposal.

And Exhibit Number Thirteen, I believe, may be the most important exhibit in the whole flock. We notified Breck Operating Corporation who operates the one San Andres well within two miles of our intent to convert the Saunders "A" Well No. 1 to salt water disposal. We received a waiver from Breck Operating Corporation stating they had no objection to the disposal of salt water in the San Andres formation in our proposal.

Q Mr. Nutter, what is the proposed injection pressure into the proposed injection interval?

A We propose to inject at the rate -- it's really not known, because the wells have not -- the compression system and the gathering system has not been put in operation yet, so it's really not known how much water will be produced; however, it's anticipated that the total volume of water when the compressor facilities are installed and in operation, the total volume of water from the eleven wells that will be connected to this disposal well will be in the neighborhood of 140 to 150 barrels a day, so it's not a great deal of water.

We don't know what the injection pressures will be; however, I believe that the maximum pressure authorized by the Commission under its rule of thumb of .2

of a pound per square inch for each foot of depth to the uppermost perforation would result in a maximum pressure of about 807, I believe it is, psi, and we are confident we will be able to live within that maximum pressure.

Q Would H. L. Brown -- well, should the pressure have to increase from time to time, would H. L. Brown want to have the authority to ask the appropriate position in the District Office for approval to increase that pressure?

A Yes, we would prefer that the order approving the project contain the standard phraseology that permits administrative expansion to increase in the injection pressure, if that becomes necessary and can be shown to be within limits of step rate tests.

Q Mr. Nutter, would this application be in the best interest of the prevention of waste and the protection of correlative rights?

A It will definitely prevent waste in that it will permit the wells to be produced in an efficient manner by installing this one large gathering system and the installation of compression facilities and the production of the gas.

Also there's no impairment of correlative rights at all in this. It's not anticipated this disposal would affect the one remaining San Andres producing well at

all.

Q Mr. Nutter, do you have anything further to add to your testimony concerning this application?

A No, I haven't.

MR. PADILLA: Mr. Examiner, we pass the witness and tender the exhibits, or move the introduction of Exhibits One through Thirteen.

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

QUESTIONS BY MR. CHAVEZ:

Q Mr. Nutter, on Exhibit Number Four you have a procedure that would be used to re-enter the well. On page two of that exhibit you stated you'll use a Bowen casing patch with lead seal packoff.

What is the internal diameter of that tool?

A The packoff, the internal diameter would be 4-1/2 inch so it would just fit over the top of the stub after it's been milled off, and then the lead is compressed o that to form the seal.

Then on the upper portion of the next page you'll notice that that is pressure tested to be sure that there is an adequate seal achieved.

Q Okay, so there's no possibility, then,

that the 3-7/8ths mill tooth bit that will be used to clean out the well would damage that casing packer.

A That's right. That's right. They have to drill on, after this is installed, they have to drill on down and clean out the well clear down to the old casing shoe and the bit that will be used is 3-7/8ths inch, so that does clear through that casing patch.

Q Mr. Nutter, on that exhibit you show there's going to be 500 feet of perforations that will be shot in through casing and in combination with Exhibit Six you show that -- how the closest P&A well will be plugged.

Will the perforations in the proposed disposal well be across zones that may not have cement plugs across them in the P&Aed well?

A They may. However, there is 950 -- 951 feet of cement above the perforations in this well, so we don't anticipate that there would be any migration of water into any other zone.

The two wells would have an equivalent area if we can compare Exhibit Number Four, which is this well after re-entry, and Exhibit Number --

MR. PADILLA: Six.

A -- and Exhibit Number Six. The intermediate string, which is the deepest string in the Saunders Estate No. 1, which is the P&A Devonian well, that 8-5/8ths

is set at 4010. The top of the cement on the proposed disposal well is 3084. So this is the interval that you're talking about. So the top of the cement in the one well is opposed -- is 1000 feet above the shoe on the well that's been plugged and abandoned, because the shoe on the well that's been plugged and abandoned is at 4010.

The top of the cement on the long string in the disposal well is at 3084, so you have that interval which is cemented in the disposal well from 3084 down to the shoe on the other well, so I don't see how water could enter into the other well at all.

And then of course the other well has numerous plugs in it; even if the water should enter that well, it has numerous plugs in it to keep it from going anywhere in the well.

Q On this first page of your Exhibit Number Four you show the -- in the schematic you show the top perforation at 4035.

A That should have been corrected. That's supposed to be 4030.

Q Okay.

A It's corrected on mine. I may not have corrected it on that one, or called your attention to it. That should be 4-0-3-0.

Q Thank you. That's all I have to discuss.

CROSS EXAMINATION

BY MR. CATANACH:

Q I have a couple of questions, Mr. Nutter.

A Yes, sir.

Q Do you know who currently holds the lease in Section 31?

A I don't believe it's leased.

Q It's not leased?

A No. There's another -- a plat in here which is an older plat that shows that that was originally leased -- I don't remember which one of those plats, there are two sets of these ownership plats that were used in these exhibits.

And one of those showed that there's another company had that lease and it was good for -- until 1978, or '79, and apparently that lease expired.

Then Threshold took it over and the expiration date on it was 6-25-85 at that time and they've left the lease go, so apparently there's very little interest. There's been two operators in the last ten years have held that lease up there in Section 31 and there's never been any drilling done on it.

So I don't know if the State Land Office has released it or not. It's not a State Land Office lease.

It's a fee lease, and I don't know if that's been leased or not.

We did not attempt to get the waiver from the landowner in that particular case because you'll notice that the half inch circle just barely ticks the corner of that particular lease, so a waiver was not obtained from that particular landowner.

Q Okay, that's fine. Mr. Nutter, has there been any compatibility tests run on the San Andres and the Wolfcamp formations?

A There haven't. There haven't, but the San Andres and the Wolfcamp waters are commingled in numerous other areas in north Lea County and possibly also in south Roosevelt County, I'm not sure about that.

But I do know that Wolfcamp water is disposed of in the San Andres formation in a number of instances and there's never been any demonstrated problems that couldn't be resolved by treatment of water.

Q One more question, Mr. Nutter. Does H. L. Brown plan to load the casing with PVC water or --

A Yes. That is shown on Exhibit Number Four that the annulus behind the 2-3/8ths inch tubing will be filled with fresh water containing a corrosion inhibitor, bacteriacide, and oxygen scavenger to keep the annulus clean and free of corrosion.

MR. CATANACH: I have no further questions of the witness.

He may be excused.

MR. PADILLA: Mr. Examiner, I have nothing further.

MR. CATANACH: Is there anything further in Case 8743?

If not, it will be taken under advisement.

(Hearing concluded.)

C E R T I F I C A T E

I, SALLY W. BOYD, C.S.R., DO HEREBY CERTIFY 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. 8703 heard by me on November 6, 1985.

David Catanach, Examiner
Oil Conservation Division