BEFORE THE
OIL CONSERVATION COMMISSION
SANTA FE, NEW MEXICO

IN THE MATTER OF:

CASE NO. 1452

TRANSCRIPT OF HEARING

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May 28, 1958

BEFORE THE
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IN THE MATTER OF:	
Application of Amerada Petroleum Corporation for the dual completion of a producing oil well to permit the disposal of salt water therein. Applicant, in the above-styled cause, seeks an order authorizing the dual completion of its H. C. Posey "A" No. 4 Well, located in the NW/4 NE/4 of Section 14, Township 12 South, Range 32 East, Lea County, New Mexico, in such a manner as to permit the production of oil through the tubing from the Pennsylvanian formation, adjacent to the East Caprock-Pennsylvanian Pool, and to permit the disposal of salt water through the casing tubing annulus into the Devonian formation between 11,205 feet and 11,370 feet.	CASE NO 1452

BEFORE:

Elvis A. Utz, Examiner.

TRANSCRIPT OF PROCEEDINGS

MR. UTZ: The hearing will come to order, please. The next case on the docket will be Case 1452, and the order in which the cases will be taken will be numerical, unless somebody has some urgent business.

MR. PAYNE: Case 1452. Application of Amerada Petroleum Corporation for the dual completion of a producing oil well to permit the disposal of salt water therein.

MR. KELLAHIN: If the Commission please, Jason Kellahin of Kellahin and Fox, Santa Fe, New Mexico, representing the applicant Amerada Petroleum Corporation. We have one witness, Mr. Harold Kidd. This application in Case 1452 is for permission to dually complete the Amerada H. C. Posey "A" No. 4 Well, which is a depleted oil well, in such a manner as to permit production of oil from the Pennsylvanian formation and disposal of salt water into the Devonian formation.

I would like to call as our first witness Mr. Harold Kidd.

(Witness sworn.)

HAROLD C. KIDD

called as a witness, having been first duly sworn, testified as follows:

DIRECT EXAMINATION

BY: MR. KELLAHIN:

Q Will you state your name, please?

A Harold C. Kidd.

Q By whom are you employed and in what capacity, Mr. Kidd?

A By Amerada Petroleum Corporation as district engineer at Monument, New Mexico.

Q Are you the same Mr. Kidd who testified in Case 1451 which was heard before this Commission yesterday, and qualified as an expert engineer?

A I am.

MR. KELLAHIN: Are the witness' qualifications acceptable?

MR. UTZ: They are.

Q Mr. Kidd, you are familiar with the application in Case 1452, are you not?

A Yes, sir, I am.

Q Briefly, will you describe what is proposed to be done in connection with that application?

A Yes, sir. We propose to deepen the well one hundred feet into the Devonian; set a Baker Model D packer at approximately 8800 feet, perforate the Pennsylvanian zone through the interval 8570 to 8748, set a Brown DS-3 packer at 8300 feet on 2 3/8 inch tubing, and will have a 2 1/2 inch tubing string connecting the Brown packer and Baker packer, and inject salt water down the casing-tubing annulus to the Brown packer through the 2 1/2 inch tubing to the Baker packer and down the 5 1/2 inch casing to the Devonian formation, and will produce the Pennsylvanian through 2 inch tubing.

Q Now, referring to what has been marked as Exhibit No. 1, will you state what that is?

A Exhibit No. 1 is a plat of the area showing the subject well circled in red, located in the NW/4 of the NE/4 of Section 14, Township 12 South, Range 32 East. It shows lease ownership and well locations offsetting the subject well.

Q Does that plat cover the defined limits of the East Caprock Devonian Pool?

A Yes, it does.

Q Is this plat the same plat that is attached to the application in this case?

A Yes, it is.

Q Now, referring to what has been marked as Exhibit No. 2, will you state what that is?

A Exhibit No. 2 is a structure map contoured on top of the Devonian formation with a contour interval of 100 feet. The original water-oil contact is shown on the map at minus 6910. The subject well is colored red, and there is a red north-south line representing our electric log cross section, which will be submitted as Exhibit 5.

Q Now, with reference to the subject well, what type of location is that with reference to the reservoir, Mr. Kidd?

A The structure map shows Posey "A" No. 4 to have been an edge well at completion, with the top of the Devonian at a minus 6884, while the original oil-water contact was at a minus 6910. The oil-water contact now varies from minus 6805 to minus 6886 subsea, and averages approximately minus 6869 subsea.

Q And how does the depth of the Posey "A" No. 4 compare as to the original water-oil contact?

A At the present time, the total depth of the well is approximately four feet below the original oil-water contact.

Q Now, referring to what has been marked as Exhibit No. 3, will you state what that is?

A Exhibit No. 3 is an isopach map of gross Devonian pay above water at the present time. Shows location of the original oil-water contact at a minus 6910, and the location of present oil-water contact is represented by the zero contour line. Posey "A" No. 4 is shown in red and has zero pay above water.

Q At the present time there isn't any well producing outside of this present water-oil contact, is there?

A No, sir, there isn't.

Q Are the wells inside of the zero line making water?

A Yes, sir, 15 of the 24 are inside of the zero contour line are making water.

Q Is that an active water drive pool?

A Yes, sir, it is. The main Devonian reservoir here is underlain with about six to eight hundred feet water saturated Devonian formation.

Q Now, referring to what has been marked Exhibit No. 4, will you state what that shows?

A Exhibit No. 4 is a structure map contoured on the Pennsylvanian A double marker, a correlation point approximately 35 feet below the top of the Pennsylvanian, and has a contour interval of 25 feet. Posey "A" No. 4 is again shown in red, and the red north-south line represents -- or the lines of cross section in Exhibit 5.

Q Now, in regard to that Exhibit, two wells, I believe, up in the northern portion are colored in brown. What are they?

A The wells colored brown are Wolfcamp producers which are producing from the Wolfcamp formation just above our proposed Pennsylvanian producing interval.

Q How far are they from your proposed injection well?

A Approximately a mile and a half.

Q Now, is there any well in the area producing from the Pennsylvanian zone which you propose to perforate?

A No, sir, there isn't.

Q Now, referring to what has been marked as Exhibit No. 5, would you state what that is?

A Exhibit No. 5 is a north-south electric log cross-section showing the Pennsylvanian A ~~double~~ W marker. The proposed producing interval in the Pennsylvanian in the Posey "A" No. 4. The top of the Devonian formation, the present oil-water contact of wells in the line of cross-section. The oil zone has been colored in brown, water zone in blue. The subject well is located at the far left of the exhibit, and shows the relationship to the proposed injection interval to the oil-water contact.

Q And what is that relationship, with reference to the exhibit?

A The proposed injection here shows that it will be right at the oil-water contact, and approximately a hundred and fifty feet below.

Q Well now, in your opinion, where will the major portion of the water be injected in the reservoir if the completion is

made as you are proposing?

A Well, actually, the major portion of the water to be injected will be injected in the lower portion of the proposed disposal interval and will be below the original oil-water contact of the pool. Previous history shows that we will hit zones of high permeability as we drill deeper into the Devonian.

Q Will the injection of water have any material or adverse effect upon the active water drive?

A No, sir, we anticipate no effect at all.

Q Referring to what has been marked Exhibit No. 6, will you state what that shows?

A Exhibit No. 6 is a marked electric log of Posey "A" No. 4 showing the top of the Pennsylvanian to be at 8483, at a minus 4129; shows the Pennsylvanian A ~~double~~ W marker, the proposed Pennsylvanian producing interval from 8570 to 8748, shows the top of the Devonian at 11,238, or minus 6884, and shows 5 1/2 inch casing to be set at 11,205, and present TD of the well, as shown, is 11,270 feet. The oil-water contact in the pool was at minus 6910, and it would be 11,264 on this log.

Q Does that exhibit show where you intent to perforate in the Pennsylvanian formation?

A Yes, sir, it does.

Q Was any test made of the Pennsylvanian when the well was drilled?

A Yes, sir. We drill stem tested two intervals, or took

two drill stem tests over the interval we propose to perforate. The first was from 8514 to 8666; gas to surface in eighteen minutes, 15,000 cubic feet per day recovered, 2000 feet of free oil, the final flowing pressure was 860 pounds, the build up pressure was 1440, and then we had a drill stem test from 8666 to 8756, had gas to surface in 3 minutes, oil in 9 minutes, flowed 106 barrels of oil in four hours, the gas volume, 546,000 cubic feet per day, which gave a GOR of 860, final flowing pressure was 1175, and the built up pressure in this test was 1580 pounds.

Q Now, referring to what has been marked as Exhibit No. 7, Mr. Kidd, what does that show?

A Exhibit No. 7 is a tabulation of production data for Posey "A" No. 4 showing monthly oil production and water production since completion.

Q Can you summarize the data for the benefit of the Examiner which appears on that exhibit?

A Yes, sir. Posey "A" No. 4 has produced 231,848 barrels of oil and 526,074 barrels of water since June, 1953. Latest test, production test, of April 14, 1958, showed the well producing 5 barrels of oil and 490 barrels of water per day.

Q Do you consider that an economic well at the present time?

A No, sir, our experience shows that approximately 15 barrels a day is the economic limits of a deep Devonian producer in this field.

Q Has any effort been made to work the well over, or attempt

made to increase the oil production?

A Yes, sir. The well produced from open hole 11,240 to 11,255, which is a minus 6886 to minus 6901, from June, 1953, to March, 1958, when the well was deepened to 11,270 feet. It is now producing from 11,240 feet to 11,270, which is a minus 6886 to a minus 6916. The well was deepened to assure that no oil pay was left below the old TD and the original water-oil contact of the pool.

Q And you found there was no oil--

A No, sir, there was no increase in oil production after deepening.

Q Now, referring to what has been marked Exhibit No. 8, will you state what that shows, Mr. Kidd?

A Exhibit No. 8 is a graph of production data for the East Caprock Devonian Pool. The graph shows monthly oil production in barrels since discovery, monthly water production is represented by the shaded area or shaded curve above the oil production curve; cumulative oil production curve; curve for the number of producing wells in the pool, and a plot of pool bottom hole pressure.

Q Now, have you any general statistics on the entire pool?

A Yes, sir. The East Caprock Devonian Pool has produced 9,415,067 barrels of oil and 8,628,241 barrels of water since discovery in August, 1951. Production currently averages 3869

barrels of oil per day, and 7055 barrels of water per day, giving you an average water cut of 64.4 per cent. The bottom hole pressure in the pool has declined only 132 pounds since discovery from an original pressure of 4419 to 4287.

Q Your information would indicate that large volumes of water are being produced in this pool. What disposition is being made of water at the present time?

A At the present time we have a permit to dispose of water into the Dewey Lake formation, and at the present time are disposing of it at approximately 2,680 barrels of water per day, which represents 38 per cent of the total water produced.

Q Is a new injection well necessary for the disposal of water?

A Yes, sir. We require additional disposal capacity to handle all of the produced water from the pool, and since the Dewey Lake formation has been found to be inadequate, we must dispose of our water into the Devonian formation, which is the only formation in the area capable of handling the necessary volume of produced water.

Q And what is the amount of water which you propose to inject into the well in the event this application is approved?

A Our gathering system and disposal system is designed to dispose of approximately ten thousand barrels of water per day.

Q And that would be the approximate amount of water you

propose to inject?

A Ultimately, yes.

Q Now, referring to what has been marked as Exhibit No. 9, will you describe that exhibit, please.

A Exhibit No. 9 is a schematic diagram showing the present completion of the well along with the proposed dual completion installation. As presently completed, the well has 13 3/8 inch casing at 299 feet; 8 5/8 inch casing at 3615; 5 1/2 inch casing at 11,205, with the top of the cement outside of the oil string at 7667, and was determined by temperature survey, and is approximately 903 feet above the proposed producing perforations in the Pennsylvanian formation. The present TD of the well is 11,270.

Q The surface string is cemented through the fresh water zones?

A Yes, it is.

Q Now, in regard to the proposed dual completion, just with reference to this exhibit, what is proposed to be done, Mr. Kidd?

A We propose to deepen the well from 11,270 to a total depth of 11,370. We will set a Baker model D permanent packer at 8800. We will perforate the Pennsylvanian formation through the interval 8570 to 8748. We will set a Brown DS-3 packer at 8300 feet on 2 3/8 inch tubing, and we will have a 2 1/2 inch tubing string connecting the upper and lower packers to complete separation through the Pennsylvanian zone. Salt water will

injected down the casing-tubing annulus to the Brown packer through 2 1/2 inch tubing to the Baker Model D packer, and below the Baker Model D packer will be injected 5 1/2 inch casing to the proposed disposal interval of 11,205 to 11,370.

Q Now, the application in this case shows that you propose to perforate the Pennsylvanian formation at 8406 to 8748 feet, and your exhibit and testimony show you propose to perforate at 8570 to 8748. Which is correct.

A The correct perforation should be 8570 to 8748.

Q Now, Mr. Kidd, will the type of completion which is propsed here prevent the commingling of fluids in the two zones that will be opened in this well?

A Yes, sir, it will.

Q Would it adequately protect other producing zones, fresh water zones that may be encountered?

A Yes, sir, I believe it will.

Q Will it be possible for you to make any tests that may be necessary or required by the Commission in connection with the operation of this as a disposal well?

A Yes, sir, we will be able to do so.

Q Now, it wouldn't be possible for you to make a normal packer leakage test, would it?

A No, sir, it will not. We propose to run a bottom hole pressure gauge down to the two inch tubing to the Pennsylvanian producing formation, shut in the Pennsylvanian producing formation

and allow the pressure to stabilize with the salt water disposal zone also shut in. After pressure in the Pennsylvanian zone is stabilized, we propose to inject water down the casing-tubing annulus and if there is any communication, why there would be pressure change relected on our bottom hole pressure gauge, and a positive test on this, I believe, would assure that we had separation.

Q Well now, in normal production of the Pennsylvanian zone, would any leakage in that zone be reflected in your production?

A Yes, sir, it would. When we are injecting salt water, we will have approximately 800 pounds greater pressure around the Brown DS-3 Packer than the formation pressure of the Pennsylvanian formation, therefore, any leak would allow the water to communicate with the oil zone, and it would be immediately apparent to us in our production history of the well, or production tests of the well.

Q Now, in operation of this well as a salt water disposal well, would you anticipate any corrosion to occur?

A No, sir, we don't. We have not experienced any, have not suffered any corrosion in the area.

Q Would you take any precautions to assure that no corrosion would occur, or that you would learn of it promptly if it did occur?

A Yes, sir. We anticipate treating the salt water with

a corrosion inhibitor and running coupons to check on any possible corrosion. I should point out too, that all produced water that is disposed here has already been treated at the producing well for corrosion.

Q Now, what are your plans for production of the Pennsylvanian formation if it becomes necessary to put the well on artificial lift?

A Well, we anticipate that the use of Posey "A" No. 4 as a salt water disposal well can be considered temporary. Another Devonian well will be availabe in the East Caprock Pool in approximately three years, and we feel that this well will produce for a three year period.

Q The production from the Pennsylvanian, is that, in your opinion, an economic operation?

A Only as a salvage operation.

Q Is has been your experience that the productive formation is somewhat limited in this area?

A Yes, sir. A check of logs and drill stem tests in the area indicate that the Pennsylvanian formation that we propose to perforate will be productive only in this immediate area.

Q Unless you can make a dual completion of the type proposed, would it be profitable to produce the Pennsylvanian formation?

A No, sir, not to drill for it.

Q Is there any other well available at the present time for your disposal of salt water in this pool?

A No, sir, there isn't.

Q Were the exhibits which have been presented here prepared by you or under your direction and supervision, Mr. Kidd?

A Yes, sir, they were prepared by me.

MR. KELLAHIN: At this time we would like to offer in evidence Exhibits 1 through 9 inclusive.

MR. UTZ: Without objection they will be accepted.

MR. KELLAHIN: That's all the questions we have.

CROSS EXAMINATION

BY: MR. UTZ:

Q Mr. Kidd, why did you propose, or why do you propose to use this type of a dual completion rather than a two string dual?

A We'd have to use two and one-sixteenth inch tubing, and our pressure -- the pressure drop through that, the tubing -- To inject the volume that we propose to inject would be so great that we would exceed the design of any of our present disposal system. You would be getting up to fifteen, sixteen hundred pressure minimum.

Q The Brown DS-3 Packer is a retrievable packer?

A Yes, sir, it is.

Q I believe you stated that you intend to treat the salt water. It is salt water, is it not?

A Yes, sir.

Q With inhibitor to prevent corrosion?

A Yes, sir.

Q Has that been successful?

A Well, I would say it has. We have wells that are producing say two thousand barrels of salt water a day while we are injecting chemicals down the casing, which mix with the water. Actually, this will be a much better operation and we will be able to uniformly mix our chemical with the water on the surface and distribute it equally through it, and I believe it will provide complete protection, if there is any need for protection.

Q Have you used this inhibitor process very long?

A Yes, sir.

Q How many years?

A We have been treating our wells in the East Caprock since completion, or since they were first making water.

Q How many years would that be?

A 1951.

Q And you had no corrosion problem?

A No, sir. This is a close system, I would like to point out, and we found that you have very little corrosion difficulty with the closed system.

Q Would you explain again in little more detail how you intend to check for corrosion periodically?

A Well, we will have, of course, coupons in the line to assure that our corrosion - -

Q Will you explain what coupons are?

A They are just metal samples that we can attach into the disposal line and they periodically check those to see what rate they have corroded, and any severe corrosion would be immediately known and would change our chemical treatment until we could cut down the rate of oorrosion, and any leak anywhere into the Pennsylvanian will, of course, be apparent in our production test or production of the well.

Q And you think that this formation -- Has this well been completed?

A No, sir.

Q Do you believe that this formation will take ultimately ten thousand barrels a day?

A Yes, sir, we do. We have some PI tests in the field which have an infinite PI.

MR. UTZ: Any other questions of the witness? If there are no other questions, the witness may be excused.

(Witness excused.)

MR. UTZ: Are there any other statements to be made in this case?

MR. KELLAHIN: That completes our presentation, Mr. Utz. In connection with the application, I would like to point out that what is involved here is really in no sense different than other cases which have heretofore been approved by the Commission, except perhaps on the proposition of dual completion in the Pennsylvanian zone. The Commission has on numerous occasions

approved the use of wells for salt water disposal. In some cases it was indicated that tubing could be used for injection of salt water, and apparently salt water is being injected into the casing.

I would like to call the Commission's attention to these cases. I have a long list here, but I will only mention a few. There is Case 764, 1142, 1121, 869, 310, 1109, and 1137. The record in those cases would show that injection is being done directly through the--I wouldn't say in all those cases, but as I recall in most of them, the injection of salt water is directly through the casing. The only other problem involved here is the dual completion of the Pennsylvanian zone, and as shown by Mr. Kidd's testimony, if anything went wrong with the injection program which did result in leakage at that point, it would become immediately apparent, and we would immediately take steps to correct it.

MR. UTZ: Is there anything further in this case? If not, the case will be taken under advisement.

STATE OF NEW MEXICO)
) ss
COUNTY OF BERNALILLO)

I, J. A. Trujillo, Notary Public in and for the County of Bernalillo, State of New Mexico, do hereby certify that the foregoing and attached Transcript of Hearing before the New Mexico Oil Conservation Commission was reported by me in Stenotype and reduced to typewritten transcript, and that same is a true and correct record to the best of my knowledge, skill and ability.

WITNESS my Hand and Seal, this, the 9th, day of June, 1958, in the City of Albuquerque, County of Bernalillo, State of New Mexico.

Joseph G. Trujillo
NOTARY PUBLIC

My Commission Expires:

October 5, 1960

I do hereby certify that the foregoing is a complete record of the proceedings in the Examiner hearing of Case No. 1452, heard by me on May 26, 1958.

..., Examiner
New Mexico Oil Conservation Commission