

BEFORE THE  
OIL CONSERVATION COMMISSION  
Santa Fe, New Mexico  
April 24, 1963

EXAMINER HEARING

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IN THE MATTER OF:

Application of Pan American Petroleum Corpora- )  
tion for a salt water disposal dual completion, )  
San Juan County, New Mexico. Applicant, in the )  
above-styled cause, seeks authority to dually )  
complete its Navajo "C" Well No. 1, located in )  
Unit D of Section 1, Township 29 North, Range )  
17 West, San Juan County, New Mexico, to pro- )  
duce hydrocarbons from the Pennsylvanian- )  
Paradox formation and to dispose of produced )  
salt water through the intermediate casing )  
annulus into the open hole interval from 2300 )  
feet to approximately 5000 feet. )

CASE 2798

-----  
BEFORE: Elvis A. Utz, Examiner

TRANSCRIPT OF HEARING

MR. UTZ: Case 2798.

MR. DURRETT: Application of Pan American Petroleum Corporation for a salt water disposal dual completion, San Juan County, New Mexico.

MR. MALONE: May it please the Commission, Charles Malone of Roswell for the Applicant. We have one witness and six exhibits. Would our witness be sworn, please?

(Witness sworn.)

MR. UTZ: Are there other appearances in this case?  
You may proceed.

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(Whereupon, Applicant's Exhibits Nos. 1 through 6 marked for identification.)

FRANK H. HOLLINGSWORTH

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

DIRECT EXAMINATION

BY MR. MALONE:

Q Would you state your name and address, please?

A Frank H. Hollingsworth, Petroleum Engineer with Pan American Petroleum Corporation, Farmington, New Mexico.

Q What is your position in that office, please?

A Petroleum Engineer.

Q How long have you been in the Farmington office of Pan American?

A Six years.

Q Does the Farmington office have jurisdiction over the area and the well described in this application?

A Yes, sir.

Q Are you personally familiar with this application and its details?

A Yes, sir.

Q Have you previously testified before the Commission?

A No, sir.

Q Would you briefly describe your educational and experience background?

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A I have a Bachelor of Science in Petroleum Engineering from the University of Texas, and have been working for Pan American for the past eleven years, except for three-year military leave of absence. In this eleven years, the past six years have been in Farmington.

MR. MALONE: Are the qualifications of this witness satisfactory to the Commission?

MR. UTZ: Yes, sir, they are.

Q (By Mr. Malone) Briefly, what is the purpose of this application?

A Pan American desires to dispose of salt water that's produced from the Paradox interval of the Pennsylvanian formation from our Navajo "C" No. 1, which is in Unit D, Section 1, Township 29 North, Range 17 West, San Juan County, New Mexico, to dispose of this salt water into the 10-3/4, 7-5/8 casing annulus, which will put it into the Entrada, Chinle, and Cutler formations. This will enable us to continue the production of this well in an economic manner.

Q Do I understand that the water to be disposed of is the water produced from the disposal well?

A Yes, sir.

Q Would you state briefly what Exhibit No. 1 shows, please?

A I would like to refer first to our application of March 22, 1963, in which we submitted an unnumbered form to the State

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of New Mexico Oil Conservation Commission entitled "Application to Dispose of Salt Water by Injection into a Porous Formation not Productive of Oil or Gas."

Q In your application, did you set forth the information which is required under the Rule 701?

A Yes, sir.

Q Go ahead.

A Exhibit 1 is a map of San Juan County, New Mexico. It shows the location of the subject Navajo "C" No. 1 in the Northwest Quarter of Section 1, 29, 17, and it is colored red. It also shows the two wells completed in the Hogback-Pennsylvanian Field in Section 19, Township 29 North, 16 West, which are colored green.

Now a similar salt water disposal method is being used here in our Well No. 17 in the Southeast Quarter of Section 19, and this was approved by Order R-2428 of February 27, 1963.

Q That was Case No. 2762, is that correct?

A Yes, sir. It also shows the location of a dry hole in the Pan American Navajo Tribal No. 1 in the Northwest Quarter of Section 12, 29, 17, which will be referred to later.

Q That well is immediately south of the subject well, is it not?

A Yes, sir.

Q Go ahead.

A There is also a dry hole to the Pennsylvanian interval

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drilled by Humble, their Navajo "K" No. 2 in the Northwest Quarter of Section 31, 30 North, 16 West; and a number of shallow dry holes in this immediate vicinity. The nearest production is the Hogback-Pennsylvanian and Hogback-Dakota Field wells approximately three miles to the south, and an undesignated Gallup Field located in Section 3, 29, 16, approximately four miles to the east.

It should also be noted that the Navajo "C" No. 1, the subject well, is located very near the San Juan River, and this is an area of intense farming by Navajo Indians. Therefore, the produced water from this well which commenced approximately in December of 1961 has been collected in a tank and hauled away by truck. This procedure has been costly and the production of the well is nearing the point where it will be uneconomic to continue this type of disposal. Therefore, that is the reason for this application, to seek a more economical means of disposing of salt water.

The producing horizons in the Hogback-Pennsylvanian and Hogback-Dakota Fields are cemented in the subject Navajo and are cemented off and are adequately protected. The Gallup formation in this undesignated Gallup Field four miles to the east is right below the surface on the subject Navajo "C" No. 1, and is cemented off by surface casing.

Q Is there anything else with respect to Exhibit No. 1?

A No, sir.



Q Briefly describe Exhibit No. 2, please.

A Exhibit No. 2 is a copy of the electric log run on the subject Navajo "C" No. 1. It has the various formation tops, casing seats, disposal interval bracketed in two red lines, producing interval, plugback depth, and total depth. On it you can see that the disposal interval is in the lower Entrada, Chinle, and Upper Cutler.

Q Do any of those formations -- or have they ever indicated any type of production of hydrocarbons?

A No, sir.

Q Please go to Exhibit No. 3 and describe it.

A Exhibit No. 3 is a diagrammatic sketch of the well conditions on the Navajo "C" No. 1, showing the various casing seats, cement volumes, cement fills and formation tops. The disposal interval and the producing interval, total depth, plugback depth. It can be seen here that the 10-3/4 inch surface casing is set at 2300, cement circulated back to surface, and that the top of the cement behind the 7-5/8 casing string is at 5,000 feet.

We propose to dispose of the Paradox salt water between the 10-3/4, 7-5/8 casing string and will go into the open hole between 2300 and 5,000 feet.

Q How have you determined the top of the cement behind the 7-5/8ths casing?

A By temperature survey.



Q Is there anything else with respect to this exhibit?

A Yes, it should be pointed out that the top of the cement behind the 7-5/8ths is approximately 1300 feet above the producing interval.

Q What is Exhibit No. 4, please?

A Exhibit No. 4 is a copy of a water analysis on the produced Paradox water from the Navajo "C" No. 1. Referring to it, you can see that the total solids into this water is in excess of 70,000 parts per million, and totally unfit for human, animal, domestic, or irrigation purposes.

Q Would you go now to Exhibit No. 5, please?

A Exhibit No. 5 is a copy of a water analysis from the dry hole, Navajo Tribal No. 1, which was referred to on Exhibit 1, being located approximately one mile south of the Navajo "C" No. 1. This water was obtained on drillstem test and as can be seen, the total solids content is in excess of 9,000 parts per million. It should also be noted in the "Remarks" column that this water was probably contaminated with the drilling fluid. As the mud was fresh water base, this would mean that the sample was contaminated with fresh water and the total solids content is probably in excess of the amount analyzed.

MR. UTZ: What was this water from, the Entrada?

A Entrada, yes, sir. The solids content of the 9,000 parts per million is unfit for human, domestic, animal, or irrigation use.

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Q What is Exhibit No. 6, please?

A Exhibit No. 6 is a copy of a letter from the State Engineer, S. E. Reynolds, dated March 29, 1963, in which he concludes that the injection with produced Paradox water into the Entrada-Chinle formations would not constitute a threat of contamination to the fresh waters in the area, and therefore he offers no objection to this application.

Q Was a copy of this application furnished to the U.S.G.S.?

A Yes, sir.

Q On what date?

A On the date of the application, which was March 22, 1963.

Q Has it furnished any objection whatsoever to Pan American with respect to this application?

A No, sir. Referring back to Order R-2438, Case 2762, we do have a letter from the U.S.G.S. in which they did not object to this disposal of salt water into similar formation on our U.S.G.S. Section 19 No. 17. This was Exhibit No. 5 on this case.

Q As a matter of fact, the testimony in the former Case 2762 reflected the fact that it was the U.S.G.S. which suggested to Pan American that salt water disposal rights be obtained in the former application, is that not correct?

A Yes, sir. And in this case, the U.S.G.S. had no opinion



on the disposal of salt water, since it was being tanked and trucked away and not a threat to any surface.

Q Do you have any comment to make with respect to the subject application as to prevention of waste?

A Yes, sir. If we're not able to dispose of this salt water in the method requested, we will be forced to abandon the well prematurely, which will result in the waste of hydrocarbons and helium gas. This well has been producing gas to the Navajo Helium Plant in Shiprock, New Mexico, for approximately four years. It contains helium content of 5.4 percent.

Q What about economic waste and the difference in expense between trucking the salt water and disposal of it in the manner described in the application?

A Well, trucking the salt water is costing us approximately 30 cents per barrel, and disposal of the water into the casing annulus, it will be somewhat less than this. I don't know the amount.

Q Do you have anything further to offer with respect to the application?

A No, sir.

Q Were Exhibits No. 2 and 3 prepared by you or under your direction, and Exhibit No. 1 prepared by the Land Department of your company?

A That's right.

MR. MALONE: We offer Exhibits 1 through 6.

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MR. UTZ: Exhibits 1 through 6 will be entered into the record of this case.

(Whereupon, Applicant's Exhibits Nos. 1 through 6 entered in evidence.)

MR. MALONE: That concludes our presentation of evidence.

CROSS EXAMINATION

BY MR. UTZ:

Q Mr. Hollingsworth, how much water and how much oil is this well producing at the present time?

A It's producing between 70 and 90 barrels of salt water per day, approximately 15 barrels of condensate and 750 mcf of gas.

Q Is this hydrocarbon gas, all except the five percent helium?

A Yes, sir. But it is a very low BTU gas and it has approximately 40 percent nitrogen in it.

Q And you feel that this formation is capable of taking in excess of seven barrels of water per day?

A Yes, sir.

Q The only water samples that you had in the Entrada was from the well to the south?

A Yes, sir.

Q You never took any out of this well?

A Well, we did not run a drillstem test on the Navajo "C" No. 1, since this Navajo Tribal No. 1 was downdip from the



well and it was concluded to be water-bearing, also. Also the logs conducted on the Navajo "C" No. 1 showed it to be water-bearing.

Q Do you intend to treat this water--

A No, sir.

Q -- before injection? Do you think it's corrosive enough to do any damage to your 7-5/8ths casing?

A No, sir.

Q In producing this water, you have never experienced any corrosive problems?

A No, sir.

MR. UTZ: Are there other questions of the witness?

MR. DURRETT: Yes, sir, I have a question.

MR. UTZ: Mr. Durrett.

BY MR. DURRETT:

Q Mr. Hollingsworth, I understood your testimony on direct examination that approval of this application would prevent economic waste, as you stated it would be cheaper to inject the water rather than haul it off?

A Yes, sir.

Q However, I did not understand your testimony as to how approval of the application would prevent premature abandonment of the well. Would you go into that a little bit?

A Well, if we have to continue to haul this water away from the well to dispose of it, we cannot continue to operate

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this well economically so it will result in this abandonment of this well.

Q You mean you would have to abandon it right away, at this date?

A Yes, sir.

Q What is the estimated difference in cost, do you have that?

A No, sir. Like I stated, it's costing us approximately 30 cents a barrel to haul this water away, and we don't know how much it will cost us to dispose of it by pumping it into the annulus, but I would venture a guess at five cents or less per barrel.

Q You feel it would be substantially cheaper, at any rate?

A Yes, sir.

MR. DURRETT: Thank you.

MR. MALONE: Mr. Examiner, I neglected to ask the witness the age of the casing in the well. Could I ask that at this time?

MR. UTZ: Yes, sir.

A It's four years old.

MR. MALONE: That's all we have.

MR. UTZ: Are there other questions? The witness may be excused.

(Witness excused.)

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