

BEFORE THE
OIL CONSERVATION COMMISSION
Santa Fe, New Mexico

September 27, 1962

EXAMINER HEARING

IN THE MATTER OF:

Application of Pan American Petroleum Corporation for a dual completion (oil production and salt water disposal), San Juan County, New Mexico. Applicant, in the above-styled cause, seeks approval of the dual completion (conventional) of its U. S. G. Section 19 Well No. 13, located 2050 feet from the North line and 1810 feet from the East line of Section 19, Township 29 North, Range 16 West, Hogback Pennsylvanian Pool, San Juan County, New Mexico, in such a manner as to dispose of salt water into a former gas producing zone (6514-6524') and to produce oil from a lower zone. (6620-6632') through the casing-tubing annulus and through tubing, respectively.

CASE NO.
2644

BEFORE: Elvis A. Utz, Examiner

TRANSCRIPT OF PROCEEDINGS

EXAMINER UTZ: Case 2644.

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

MR. MALONE: May it please the Commission, Charles

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Malone of Atwood and Malone, representing the applicant. We have one witness to be sworn, Mr. George Eaton.

(Witness sworn.)

GEORGE EATON,

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

DIRECT EXAMINATION

BY MR. MALONE:

Q Would you state your name and position for the Commission, please?

A George W. Eaton, Senior, Petroleum Engineer for Pan American Petroleum Corporation in Farmington, New Mexico.

Q Mr. Eaton, did you personally prepare the application in this case, or was it prepared under your direct supervision and control?

A The application was prepared under my supervision.

Q What is the direct reason for making this application to the Commission, Mr. Eaton?

A We had a demand from the USGS to cease making disposition of this salt water that is produced from the Hogback Pennsylvanian pool on the surface.

Q What sort of application was made?

A An administrative application was made, and then it was set for hearing.

Q Now, then, is there attached to the application a plat

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showing the wells in question?

A Yes, sir, there is.

Q And the well through which it is proposed that that salt water be disposed is called what?

A The name of that well is the Pan American Petroleum U. S. G. Section 19 Well No. 13.

Q Does the plat show Well No. 13 and any other wells in the immediate area which have been drilled to the zone at which disposal is proposed?

A Yes, sir, those wells colored in green on the plat are wells which are now producing from the Pennsylvanian Paradox.

In addition, there is a dry hole in the Northwest Quarter of Section 25, Township 29 North, Range 17 West, which was drilled to the Pennsylvanian but abandoned.

Q Would you please give us, as briefly as you can, a history of the two wells here, the No. 13 and No. 17?

A Yes, sir. The U. S. G. 19 Well No. 13 was originally drilled in 1952. It was a Morrison test; casing was set in the Morrison horizon, and the initial completion of that well was in the Mississippian.

After a very short period of production, that zone went to water. Extensive workover operations were commenced, but were unsuccessful in shutting off that water and re-establishing gas production.

In approximately 1954, a recompletion was made on the



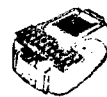
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well, at which time the well was recompleted from the Mississippian and into the Paradox. At the time of that recompletion, perforated intervals were made over approximately 600 foot intervals in various porous zones in the Paradox. These intervals were selectively tested at that time and the present producing interval in the Paradox was one which was opened then.

Although the interval that is opened now is an oil zone, there was so much gas zone also open, it wasn't known that that was an oil zone opened at the time of the original Pennsylvanian completion. At the end of a rather extensive cooperative effort between Farmington's research people and the Bureau of Mines research people, it was determined that the gas from the Pennsylvanian completion in this well was suitable for processing in the U. S. Bureau of Mines Shiprock helium plant, and accordingly, Pan American built a pipeline from that well to the U. S. Bureau of Mines Shiprock helium plant, and for about five years that plant was run from the production from the U. S. G. 19 Well No. 13.

At about that time, the well commenced producing water and water production increased to the extent that it became apparent that we could not continue to supply the plant with sufficient gas for it to operate. Rather than shut the plant down completely while workover operations were in progress on Well No. 13, Pan American elected to drill a second well to keep the plant in operation during the time we were trying to restore



production to Well No. 13.

Q Is this second well the other well shown in green in the plat as No. 17?

A Yes, sir, that is the well. This occurred in late 1957 and early 1958, I believe. Strangely enough, during the testing operations of the Pennsylvanian, during the completion attempt on Well No. 17, we also found that the Pennsylvanian contained water throughout at this location, even though it is slightly higher structurally than Well No. 13.

But as there was enough gas also produced along with this water, it did enable the plant to continue in operation. Shortly after that, an elaborate and extensive workover program was carried out on Well No. 13, during which program each of the various porous intervals in the Pennsylvanian was selectively tested and subsequently squeezed off, with the exception of the interval we are now applying to use for a salt water disposal zone and the present oil productive interval.

We picked this interval, 6514-24, which is the subject of our application for the salt water disposal zone, as a gas productive interval which would furnish a little bit of gas to the helium plant while producing less water in these other intervals that were once gas productive from the Pennsylvanian. At that time, we didn't expect a long-life zone, so the well was equipped then with a Baker Model D packer set between -- I will call it the watered-out gas zone and the oil-productive zone which produced

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no water.

Q You are speaking of Well No. 13, which would be this exhibit? (Indicating)

A Yes, sir, so that when the gas producer from the upper zone finally reached a point so the plant could no longer operate and the well would have to be converted to an oil well, all that would have to be done was to set a side door blank check to shut off the upper perforations and permit the upper perforations to produce.

The point is, the well is equipped for dual completion. No additional work will have to be done in order to equip it for this. The annulus will be in 2 3/8-inch tubing and 5 1/2-inch casing and has this set of perforations open to it. The tubing is set off with this blank side door check arrangement.

Q Did you state whether or not the gas producing zone is now producing?

A No, sir, the gas producing zone is not now producing. The two wells, producing wells No. 13 and No. 17, produced gas for another six or seven months to run that Bureau of Mines helium plant. The water production had increased in both the wells, and that gas production had decreased to the point the plant could no longer operate on this small total.

Q In about what year was this, that the water so increased that gas could no longer be produced?

A The year 1958. Thereupon, the helium plant was shut



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down and the pipeline which Pan American had built from the Hogback Pennsylvanian pool to the plant was picked up and used elsewhere and the plant was shut down. Then for approximately one year, at some time in early 1959, Pan American drilled a discovery well on another little Pennsylvanian structure. That has resulted in the completion of what is known as the Navajo C-1 Well, which is that green well on the plat already referred to, in the Northwest Quarter of Section 1, Township 29 North, Range 17 West.

Q Is that well producing from the same stratigraphic interval as Wells 13 and 17?

A No, sir, that is a different reservoir. I will also refer you to the well in the Northwest Quarter of Section 19 of Township 29 North, Range 17 West, which is a well known as the Pan American Navajo Tribal No. 1. That well is a dry hole in the Pennsylvania formation, and I believe it effectively shows separation between the Hogback Pennsylvanian pool and the undesignated Pennsylvanian pool from which this Navajo C-1 is producing.

To continue about that well, it was completed early in 1959 and was found to have a gas that contained approximately five percent helium and although with a great deal of qualms on my part with regard to again building a pipeline system from that well to the U. S. B. M. Helium plant and letting one well again run that plant, that is what was done and at the present time the Navajo C-1 is furnishing the gas to run the U. S. B. M. helium plant.



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I might add, with regard to that, that I am assuming the same production characteristics as the U. S. G. 19 and 13 and 17. In the past six or eight months, it has started producing water, and water production on the well is increasing and gas production is decreasing, and I don't know just how much longer we will be able to sustain that helium plant operation.

Q What are you doing with the salt water from that well, please?

A The well being so close to the San Juan River, it's not possible to store that water in pits at all, so water is collected in stock tanks, regular oil stock tanks on the lease, and approximately two or three times a week, it is actually hauled away in tank trucks.

Q At what cost?

A I estimated that the present cost per barrel is running about thirty cents per barrel to dispose of water by way of the lease collection and the tank truck hauling.

Q Now, do I understand that only the wells designated as No. 13 and 17 are producing oil at this time?

A That is correct.

Q What is the approximate production?

A The combined production is approximately fifty barrels per day from the two wells. In order to obtain that fifty barrels of oil per day, the two wells combined produce approximately a thousand barrels of salt water per day.



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Q Now, then, what is the desire of Pan American as expressed in this application with respect to disposing of this salt water production with the fifty barrels of oil per day?

A It's the desire of Pan American to use the watered-out former gas producing zone in the Pennsylvanian as a disposal zone.

Q And that is, the gas having ceased production in 1958?

A Yes, sir, it is.

Q Are there any other wells nearby which are producing gas from the proposed disposal zone?

A No, sir, there are not.

Q How close would the nearest well be?

A My memory is that the nearest well that produces from this same correlative interval is in the Table Mesa area approximately nine miles away.

Q Now, then, on the basis of the facts that Pan American has at hand at this time, does Pan American have any other possible solution in mind for this water disposal problem which you have in Wells 13 and 17, other than the method described in this application?

A No, sir, I don't believe so. The economics would not justify the drilling of a disposal well and a hauling cost, if we elected to take that route to haul the water as is done in the case of the Navajo C-1, thirty cents a barrel would run \$30.00 per day, which is in excess of the value of the oil.

Q The combined oil production is fifty barrels per day.



you said, approximately?

A Yes. We have this request from the USGS to cease disposition on the surface. This appears to be the solution.

Q What would Pan American be required to do with respect to the oil production from Wells No. 13 and 17 if this application should be denied? Could these wells continue to be produced?

A No, sir.

Q They would have to be abandoned?

A Yes, sir.

Q Would the correlative rights of any other owner be affected by the granting of an application for disposal of salt water in this former gas zone?

A No, sir, they would not. The only well in the vicinity, anywhere in the vicinity, is a Pan American well.

Q You have stated that it is in a different stratigraphic interval?

A Yes, sir.

Q With respect to the correlative rights of Pan American, would they be protected in the granting of this application?

A Yes, sir, they would, in that production could be continued from the two wells until it became no longer economical to operate the two wells.

Q Do you have any other statements to make, Mr. Eaton?

A No, sir, I don't believe so.

MR. MALONE: Would the Examiner care to have the

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application marked as an exhibit or the plat marked as an exhibit in the case? Would it be of any assistance to the Commission?

A As a historical note, those brown wells on this plat are completed under the Dakota formation in the Hogback Pennsylvanian pool, and I believe that they are the first wells completed in the state of New Mexico. The little pool was discovered in 1922 and that makes it pretty old.

EXAMINER UTZ: That 160 acres has been pretty good to Pan American?

A Yes, sir, it has. Evidently, based on the performance of the wells, this Pennsylvanian reservoir is an area that must be one of the most powerful water drives in the world. Those Pennsylvanian wells will flow a hundred percent, too, and based on the actual production from the two Pennsylvanian wells there, they are practically flowing a hundred percent now with twenty to thirty barrels of oil and five barrels of water per day each.

EXAMINER UTZ; The Examiner would request that the plat be marked as Exhibit 1 in this case.

(Whereupon Applicant's Exhibit No. 1 marked for identification.)

Q (by Mr. Malone) It was prepared under your supervision and control, is that correct?

A That is correct.

MR. MALONE: We move the admission.

EXAMINER UTZ: It will be accepted.

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(Whereupon Applicant's Exhibit No. 1 was admitted in evidence.)

EXAMINER UTZ: Are you completed?

MR. MALONE: Yes.

CROSS EXAMINATION

BY EXAMINER UTZ:

Q Mr. Eaton, in your opinion, is there adequate separation between your abandoned gas zone and the lower oil zone?

A Yes, sir. Let me elaborate on that point just a little bit. During extensive and elaborate repair operations done on U. S. G. 19-13 Well in 1958, each of those zones that had been perforated was selectively tested and then each one was again re-tested; and although some of them were fairly close together or are fairly close together, there was never in the entire operation any evidence that there was any communication between any of them. And I feel that the same conditions prevail with regard to the proposed disposal zone and the oil zone for this reason.

At the time that that black check was run in this well back in 1958 to block off that gas zone, the well was making a lot of water; but once that check was in place, water production ceased until here just fairly recently, in modern times, you might say, and it has gradually increased. I believe that is definite evidence that the two zones are entirely separate.

Q Does the oil zone produce water?



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A Yes, sir.

Q Is it also salt water?

A Yes, sir.

Q Does it produce gas?

A Gas-oil ratio I believe in the range of approximately 1300 to 1400 cubic feet per barrel.

Q Is this oil zone gas, does it have any helium in it comparable to the type of gas there?

A To answer the question, yes. And then I will elaborate on that. It differs from the top zone gas in that the helium content is principally hydrocarbon content, the solution gas in this oil will burn. The gas that was once used as a supply source to the helium plant would not burn. It is principally nitrogen, but the solution gas in the oil zone is principally hydrocarbon.

Q It also contains nitrogen?

A Very little, very little, mostly hydrocarbon and the small helium content.

Q How about pressures in the two zones?

A Approximately equal, to the best of our knowledge, and our history on that well. Since it's been recompleted in the oil zone, I don't believe we have any bottomhole pressure data since that time; and with the powerful water drive that the reservoir seems to be supplying, it would be my opinion it is at original pressure today or very close to it.

With regard to the gas zone, particularly, we had a



chance to take bottomhole pressures in the gas zone when the helium plant would be down for turn-around or repair or something, and the bottomhole pressure history was very encouraging, because it did not decline; but unfortunately, it wasn't due to the tremendous gas reserves. It was due to pressure by the water drive, which we did not expect.

Q The gas zone never did produce any oil?

A It produced condensate.

Q But not all of the type at the oil zone?

A No, sir. Let me qualify that, too. At the time that it was producing as a gas well, this oil zone was also open, so chances are there were some small amounts of that oil being produced at this time. We never really got a good estimate of the condensate in the fluid. The gravity of the condensate was in the range of 5540 to 5558 degrees.

Q What is the gravity of pure oil?

A It's about 37.

EXAMINER UTZ: Are there any other questions?

MR. GRAY: Mr. Examiner, I would like to ask three questions. Mr. Gray, State Engineer's Office.

CROSS EXAMINATION

BY MR. GRAY:

Q Mr. Eaton, does the 5 1/2-inch casing extend from the surface?

A Yes, sir, it does.



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Q And the injection of the salt water will be down the 5 1/2-inch casing?

A Yes, sir.

Q Will the Morrison formation be protected by two strings of casing?

A Yes, sir. And I want to qualify that again. Part of it will be protected by three strings, that is, strings of 13 3/8-inch set at 1250 feet, which is into the Morrison.

MR. GRAY: That is all, Mr. Examiner.

EXAMINER UTZ: Are there other questions?

The witness may be excused.

(Witness excused.)

Just a minute. Mr. McGrath.

MR. McGRATH: I am P. T. McGrath of the USGS in Farmington. This well is all on Navajo land and insofar as that is concerned, we recommend the Commission approve this application.

EXAMINER UTZ: Are there other statements?

The case will be taken under advisement.

We will have a ten-minute recess.

(Whereupon these proceedings were recessed at 10:30 o'clock A.M.)

* * *



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PHONE 243-6691

Michael Kue
NOTARY PUBLIC

May 11, 1966

I do hereby certify that the foregoing is a complete record of the proceedings in the Elmer hearing of Case No. 2644, heard by me on Oct. 27, 1962.

....., Examiner
New Mexico Oil Conservation Commission

