

BEFORE THE
OIL CONSERVATION COMMISSION
Santa Fe, New Mexico
September 20, 1961

EXAMINER HEARING

CASE 2377

TRANSCRIPT OF HEARING

DEARNLEY-MEIER REPORTING SERVICE, Inc.

ALBUQUERQUE, NEW MEXICO

PHONE CH 3-6691



N. R. WILLIAMSON

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

DIRECT EXAMINATION

BY MR. KELLAHIN:

Q Would you state your name, please?

A N. R. Williamson.

Q Are you the applicant in this case, Mr. Williamson?

A Yes.

Q What business are you engaged in?

A I am in the oil business.

Q Have you had practical experience in the oil business?

A Yes, sir, I have.

Q Have you testified before this Commission and stated your qualifications?

A Yes, I have.

MR. KELLAHIN: Are the qualifications of the witness acceptable?

MR. NUTTER: Yes, they are.

Q Mr. Williamson, are you familiar with the application in the case before the Commission at this time?

A Yes.

Q Briefly, what are you proposing in this application?

A Well, I am proposing to, of course, put on a waterflood on this acreage in McKinley County, which consists of three

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sections. This is an unproven area; there have been a tremendous amount of wells -- I say a tremendous amount, 30 or 40 wells -- drilled back since 1911, 1912, 13, brought up through the years, very old area, some of the first oil in New Mexico, and we want to go in and try to develop this thing into -- there is no reservoir energy in this thing, no gas drive or water drive.

Q Let's get the area identified, Mr. Williamson. Referring to what has been marked as Exhibit No. 1, is that a plat showing the area involved here?

A Yes, it is.

Q Did you purchase the wells shown on the plat?

A That's right.

Q Do you control any acreage other than that on which the wells are located?

A Yes, sir.

Q Would you describe to the Commission and Examiner what acreage you do control?

A I control Section 20, all of Section 20, all of Section 18, and the N/2 of 19, and the S/2 of 17.

Q Then you do have all of the acreage which would offset this proposed waterflood project, is that correct?

A That's right.

Q The wells shown on the exhibit, some are designated by a circle and some by a double circle. What is the difference in those wells?



A Well, your double circles are the proposed injection wells. The others are existing wells. They haven't been producing wells up to this time.

Q Were all of them drilled at the time you purchased the acreage?

A Yes.

Q Did you not drill a test well?

A I did drill a test well, which is here as Well No. 7, and that was a --

Q Was that 7 or 4?

A No. 4, I am sorry, which was the well which was drilled as an exploration well for a core analysis only.

Q Now, what is the formation involved, the producing formation which you propose to flood?

A It is the Mesaverde sand, what they call the Meniffee section of the Mesaverde.

Q What depth is it found in this area?

A Approximately 350 feet.

Q Are these wells producing?

A They haven't been producing until the last two or three weeks; I have put the wells on production at this time.

Q How did you put them on production?

A They had pump jacks, the equipment was there; I just started pumping the wells and producing them.

Q What kind of production did you achieve by pumping?



A Well, anywhere from one to three barrels a day.

Q Per well?

A Per well.

Q What are the characteristics of the fluid produced?

A Well, I get about 90 percent oil and about 10 percent water. This water, I haven't had an analysis run, but it appears to be fresh water; it doesn't have too much salt, very little in it.

Q Is it the formation, or do you think there is water encroachment?

A No, I think it is connate water.

Q Has this area ever been produced on a commercial basis?

A To my knowledge, no. I know it hasn't in the past, well, twenty or thirty years. Before that it would be hard for me to say, in 1911, 12, whether this was commercial or not. I don't know.

Q These particular wells on the tract controlled by you were not drilled at that time, were they?

A No, sir.

Q When were they drilled?

A Well, the well listed as No. 1, to my understanding was drilled in 1950; No. 2, No. 3, No. 5 and No. 6 were drilled approximately from '57 to '58, along in that period of time.

Q Do you know what kind of casing program was used in those wells?



A These wells have 4-1/2 casing. Kather, No. 2 and No. 3 and No. 5 and No. 6 have 4-1/2 casing set, supposedly, on top of the pay with an open hole completion. No. 1 has 5-1/2 casing, supposedly on top of the pay with an open hole completion.

Q You drilled the No. 4 well?

A That's right.

Q And did you describe its completion?

A No, I didn't.

Q How was it completed?

A This was drilled as an exploration well, pipe was set on top of the pay and cement to the surface -- in fact, the pipe was set two foot from the top of the pay and set to the surface, 4-1/2 casing.

Q Do you encounter any pressure in this reservoir?

A Are you talking about bottomhole pressure?

Q Yes, sir.

A There are no bottomhole pressures of any significance in this reservoir. There is no energy at all to drive this reservoir, to the best of my knowledge.

Q In your opinion, is it practicable and economical to produce the oil there by pumping?

A No, it isn't.

Q Would it be economically feasible to do so?

A No.

Q Do you know what the gravity of the oil is?



A This oil is 32 gravity according to Rider Scott in Wichita Falls.

Q As I understand it, your proposal is to inject water in the wells designated by the double circle on the plat?

A That's right.

Q What is the nature of your proposed operation in a little more detail, Mr. Williamson?

A Well, our intentions are to go into this thing and inject water into these individual wells which you mentioned, and then, if this pilot, or if this flood is successful we intend to extend this. I would like to get permission to extend it at the rate of 160 acres per year if that would be permissible.

Q And do you ask the Commission to, in the event they see fit to approve this project, to set up an administrative procedure for expansion on that basis?

A Yes, sir, I do.

Q Without necessity for further hearing?

A That's right.

Q Unless, of course, there is objection made. What volumes of water do you propose to inject in the injection wells?

A I propose to start off with a volume of water of approximately 500 barrels per day, which there, again, will be regulated by, after this thing, or if it is effective, by the regulations with the Commission as to how much oil we can produce.

Q Are you familiar with the Commission's Rule 701?



A Yes, I am.

Q Do you understand that makes a definite provision for allowables of projects of this type?

A Yes, sir.

Q Do you think you can operate within the provision of Rule 701 on this project?

A Yes, I do.

Q Will the formation take water on gravity?

A Yes, it will take water on gravity at -- I couldn't say what rate of speed this will take, but it will take water on a hydrostatic head on gravity.

Q Do you propose to inject on a hydrostatic head?

A No, with an injection pump, which will apply a certain amount of pressure to the reservoir.

Q What pressures do you anticipate using?

A From 250 to 275 pounds, that is the calculation at this time.

Q You said you planned, initially, to inject at the rate of approximately 500 barrels per day?

A Yes.

Q What is your source of water for this purpose?

A Well, there is a flowing water well, that is in Section 20, marked on this plat, water well, which flows approximately 470 barrels of water a day and I intend to put a pump in this well to supply a sufficient amount of water to inject into this



formation.

Q You already spoke of possible expansion of this project at the rate of 160 acres per year?

A Yes.

Q Will additional volumes of water be needed for that purpose?

A That is true.

Q Do you anticipate that the well available will supply sufficient water for that purpose?

A From an engineering standpoint and calculations I would say lifting this water from a depth of two to three hundred foot of depth, which would be economical, this would produce in the neighborhood of 2,500 to 3,000 barrels of water per day.

Q Would that be sufficient for the project?

A That would be sufficient for the project I am speaking of for covering 160 acres within the first year.

Q What is the depth at which this water well is completed?

A From a thousand and fifty foot to approximately 1,150 foot.

Q What is the nature of the water, character of the water?

A The water is a fresh water, compatible with the reservoir water, compatible with the oil, no congealing of the two.

Q Then you have sufficient water in sufficient quantity, and of the proper character to carry on this project, in your opinion, is that correct?



A That is true.

Q Now, Mr. Williamson, is there any other oil development in the vicinity of this project?

A No, sir, there are not. The only oil production is, the closest oil production is in the Red Mountain in the Hospah, approximately ten, twelve miles away, at least.

Q You had no offsetting operators producing from this same formation?

A That is true.

Q What is the general nature of the terrain around this area?

A Well, it's sort of a hilly country, lots of mesas sticking up out of the ground. It is not at all flat, level-type country.

Q Is there any farming in the area?

A No, as far as I know there is not any farming within 50, 60, 70 miles of this thing.

Q On your injection wells, what kind of casing program do you propose for them?

A I propose to set 4-1/2 pipe, two foot in the pay sand, cement to surface and start injecting the water down the casing with no casing or packer.

Q You propose to inject through the casing?

A That's right.

Q Did you encounter any fresh water zone in the drilling of the No. 4 well?

A Yes, this is a fresh water zone there at approximately



80 feet.

Q Any others?

A To my knowledge, no.

Q In your opinion will the casing and cementing program you are proposing adequately protect that fresh water zone?

A Yes, I think by circulating the cement on your casing you would adequately protect the water zone.

Q In the 350 feet you drilled did you encounter any other pay formation productive of oil or gas?

A Yes, we do have a pay sand that comes in there at approximately 290 foot, but I don't think it would be adequate for waterflooding.

Q Will that be cemented off in your injection wells?

A Yes.

Q Will the cementing and casing program protect that water zone?

A Yes.

Q These are not one basic lease, are they?

A No.

Q Do you have any plans as to protection of lease lines as this waterflood expands?

A In this exhibit here -- what I anticipate doing, actually, is putting these wells down to the lease line and drill line injection wells, which will protect each and everyone as a royalty holder, and also I have discussed this with Santa Fe Railroad, as



possible going into unitization at a later date.

Q Is Santa Fe Railroad the owner of the mineral rights?

A That is true, in the N/2 of 19 and S/2 of 17.

Q Who is the owner in Section 18 and 20?

A Mr. Ferriss.

Q That is Section 18, what about Section 20?

A That is Indian leases.

Q You have the leases on all this acreage?

A That's right.

Q Have you found Santa Fe Railroad amenable to unitization of this area?

A Yes.

Q Have you taken the matter up with the Bureau of Indian Affairs?

A I have discussed it with it -- I say "with it," I have discussed it with the Department in Farmington.

Q But no steps have been taken, as yet, toward unitization?

A I have just briefly discussed with them to see what the thoughts were along that line.

Q Will the program, as you initially planned it, have any effect on those leases?

A It won't have any effect on any Indian leases at this time; rather, the pilot stage won't have any effect on any Indian leases.

Q That will afford ample time to work out a unit agreement?



A That is true.

Q Was Exhibit No. 1 prepared by you or under your supervision?

A Yes.

MR. KELLAHIN: At this time I would like to offer in evidence Exhibit No. 1.

MR. NUTTER: Applicant's Exhibit 1 will be entered in evidence.

Q Do you have anything to add to your testimony, Mr. Williamson?

A Nothing I can think up.

MR. NUTTER: Are there any questions of Mr. Williamson?

MR. MORRIS: Yes, sir.

CROSS EXAMINATION

BY MR. MORRIS:

Q Mr. Williamson, are there other wells in this immediate area drilled to the same formation, owned by other operators?

A No.

Q How far away is the nearest well that might be completed in this formation?

A To my knowledge there aren't any wells completed in this formation within, I would think I would be safe in saying ten or fifteen miles.

MR. NUTTER: That is producing wells?

A That's right.



Q So, as an operator, it is all your project?

A That's true.

Q The only people you have to keep happy are the royalty owners?

A That's right.

MR. MORRIS: That's all.

BY MR. NUTTER:

Q Have Nos. 9 and 10 been drilled yet?

A No.

Q You say when you do drill them you will put them down right on the line?

A Within five foot of the line, I think that is what is customary with the law to protect legal lines.

Q Do you have a footage location for the other wells that have been drilled?

A I do have, I don't have the plats with me, because I had all this surveyed. I couldn't tell just exactly how these oil wells were in there at the time I took the property over, and I had this survey and each well put on a plat, which I didn't bring with me, but I would be glad to supply the Commission with that information.

Q We would need the footage information.

A It is drawn to scale here, but all our big portion of these old wells are unorthodox locations.

Q Now, here in the SE/4 of Section 18, you call this the



Ferriss lease?

A Yes, sir.

Q These are the Ferriss?

A No. 2 and so on.

Q Do you anticipate the No. 4 will be put on production?

A No, that will be an injection well. No. 4, as you see there, you have No. 7 right above it, which won't be an existing well, but we will use No. 4 already drilled as an exploration well as an injection well.

Q No. 7 is out?

A Yes, No. 4 the injection well.

Q Is No. 8 drilled yet, Mr. Williamson?

A No. 8 is an existing well which was drilled, and I can't tell you when, but it is an existing well with pipe in it. The conditions of that well I can't tell you just what it is until we log it and come up with that information.

Q 2, 3, 5, 6 and 4 are all drilled?

A No. 2, 3, 5 and 6, yes, and 1, existing wells which are producing at this time.

Q So the only ones that you show here on this exhibit that haven't been drilled yet are the injection wells No. 9 and 10, is that right?

A That is true.

Q And No. 7 up there which won't be drilled?

A No. 7 won't be drilled.



Q Mr. Williamson, is this more or less the same type of reservoir, and do you expect the same kind of conditions as Chaco Oil has in their waterflood in Red Mountain?

A Yes, something similar to that, that is true. I think this is producing from the same sands and same positions that they would be producing.

Q What procedure would you want to set up for expanding the flood at the rate of 160 acres per year?

A I would like to be able to go ahead and put this pilot flood on and see if it is going to be effective, and extend it to 160 acres within 12 months, because I do have that kind of obligation: of course, it also depends on what the Commission says.

Q You would like some sort of procedure whereby you could write a letter to the Commission and ask to add another 160 acre tract to the project area?

A That's right. It might not be on this exact ten-acre spacing, because this is close spacing. The reservoir characteristics, if they carry through we might want to put it on a wider spacing. It is according -- I will leave that strictly up to the engineers.

Q On the plat that was attached to the exhibit, there are some wells here in the NE/4 of Section 19, two injection wells and a producer: you anticipate drilling those in the near future? It shows the 9 and 10 on the line, and then two wells directly south of them.



A This is the plat prepared by my engineers. Yes, I do, I anticipate drilling the shown wells in the NE of 19 to protect Santa Fe Railroad.

Q That will give you a total of six injection wells?

A Yes, sir, that's right.

Q When you furnish us with the location of these other wells could you furnish us with the location of those two wells as well as the two that will be close to the line?

A Yes, I can. They have been surveyed already.

MR. NUTTER: Any further questions of Mr. Williamson?

REDIRECT EXAMINATION

BY MR. KELLAHIN:

Q The wells in Section 19, will they be a part of the initial pilot project?

A Yes, they will, due to the fact that we do have to protect this property line. This will be in the initial.

Q You would want to include in the information you have already given in regard to Exhibit 1?

A That's right.

MR. NUTTER: Any further questions of Mr. Williamson?

MR. IRBY: Mr. Irby, State Engineer's Office.

BY MR. IRBY:

Q Mr. Williamson, I believe you said the depth of this water well was 900 to 11?

A No, sir, 1,050 to about 1,150 feet.



Q Do you know anything about the casing in that well?

A The casing in that well is approximately a 945-foot, in depth. That is where the pipe is cemented and supposedly cemented to the surface. See, I just acquired this property and I can't say it was because I wasn't there when it happened, or didn't have a representative there.

Q What size casing?

A Four and a half casing.

Q And it flows constantly, has no valve on it?

A That is true. We do have a valve, yes, sir, we have a valve on it, but at the present time it is flowing for stock purposes on this ranch there. Mr. Brock asked me to leave it flowing, and for cattle purposes on that ranch I did.

MR. IRBY: That is all I have. Thank you.

MR. NUTTER: Any further questions? Witness may be excused.

MR. KELLAHIN: Call Mr. Morden as a witness, please.

AUDLEY DEAN MORDEN

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 Audley Dean Morden.

Q What business are you engaged in, Mr. Morden?



A Oil and gas exploration and evaluation of oil properties.

Q Are you an independent consultant?

A Yes, sir.

Q Have you previously testified before this Commission as a geologist and engineer?

A Yes, sir.

Q And had your qualifications accepted as a matter of record?

A Yes, sir.

MR. KELLAHIN: Are the witness's qualifications acceptable?

MR. NUTTER: Yes.

Q In connection with your business as a consulting engineer and geologist were you employed by Mr. Williamson to make an analysis of the project which is now the subject of this hearing?

A Yes, sir, I was.

Q Did you make such an analysis?

A I did.

Q Would you state briefly what type of investigation you made in connection with this project?

A I studied the cores and the core analysis, and compared this property with existing floods, and advised Mr. Williamson what I thought the property would do, and how to do it.

Q Could we have the core analysis marked as Exhibit No. 2, please? Referring to what has been marked as Exhibit No. 2, Mr. Morden, is that the core analysis which you used?

A Yes, sir.



Q Prepared by Rider and Scott Company?

A That's right, sir.

Q In your opinion are they competent engineers?

A Very much so.

Q Have you checked the information contained in that core analysis?

A Yes, I have.

Q Do you believe it to be correct?

A Yes, sir.

Q On the basis of your examination of the core analysis would you give the Examiner your summary of the characteristics of this reservoir as you have found it to be?

A It is a very, very porous sand, with very good permeabilities, and it would appear to me that it would be ideal for a shallow flood. It seems to fit the picture of shallow floods that are already in existence.

Q Of course, the analysis speaks for itself, but, roughly, would you tell us what the permeabilities of the formation are?

A The average porosity is in the range of 28 percent, and permeabilities, roughly 400.

Q And you consider that excellent for the purposes proposed by Mr. Williamson.

A I do.

Q Have you made any analysis of the oil reserves in this area?



A Yes, sir, I have; from the core analysis, you have, roughly, from 55 to 65,000 barrels per ten-acre location.

Q Under the waterflood, as proposed by Mr. Williamson, would you be in a position to estimate what your recoveries might be on this project?

A I would estimate that probably somewhere between 70 and 90 percent of total recovery on a flood of this type.

Q Would that oil be otherwise recovered?

A As Mr. Williamson stated, at the rate of one to three barrels per day, which is certainly not commercial.

Q In your opinion, as an engineer, would that be a feasible method of production?

A No, sir, it certainly wouldn't be economical.

Q In your opinion as an engineer is a waterflood a feasible method of production for this area?

A Yes, it is.

Q Are you familiar with the source of water to which Mr. Williamson testified?

A Yes, sir, I am.

Q Do you know the characteristics of this water?

A The fresh water, we have a preliminary analysis which indicates 314 parts per million of chloride and 1680 parts per million of sulfate, SO_4 .

Q That is fresh water?

A Yes, sir, it is.



Q Is it compatible to the fluid found in the reservoir?

A It is, sir.

Q In connection with your recommendations to Mr. Williamson, what type of project did you recommend to him?

A Just exactly what Mr. Williamson has presented.

Q Did you recommend the initial injection of approximately 500 barrels per day?

A Yes, sir, I believe, from studying the porosity and permeabilities that that should be the optimum amount of fluid to inject in the reservoir.

Q I believe Mr. Williamson testified that the gravity of this oil is 32, is that correct?

A Yes, sir.

Q Do you think, with the injection program as outlined by Mr. Williamson, there is any danger of channelling of water?

A Not at the pressures Mr. Williamson has indicated he is going to use.

Q Which would be approximately 250 pounds?

A Yes.

Q Would you advocate use of any different pressure than that?

A No, sir, from what we know now that should be the best.

Q Are you familiar with the provisions of the Commission's Rule 701?

A Yes, sir, I am.



Q In your opinion can this project be operated within the scope of those provisions?

A I believe it can.

MR. KELLAHIN: At this time we would like to offer in evidence Exhibit No. 2 which is a core analysis prepared by an independent engineering company.

MR. NUTTER: Applicant's Exhibit No. 2 will be admitted into evidence.

MR. KELLAHIN: That is all the questions I have of the witness.

MR. NUTTER: Any questions of Mr. Morden?

CROSS EXAMINATION

BY MR. NUTTER:

Q What is the average number of net feet of pay?

A Nineteen.

Q And, as the core analysis shows, you have 10 percent residual oil saturation and a porosity of 28.1?

A Yes, sir.

Q That calculates 58 to 60,000 barrels per ten-acre tract?

A Yes, sir, going on the core analysis that is right.

MR. NUTTER: Any further questions of Mr. Morden? He may be excused. Do you have anything further, Mr. Kellahin?

MR. KELLAHIN: That is all, Mr. Nutter.

MR. NUTTER: Does anyone have anything they wish to offer in Case No. 2377? Take the case under advisement and the hearing is adjourned.



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