BEFORE THE
OIL CONSERVATION COMMISSION
SANTA FE, NEW MEXICO

IN THE MATTER OF:

CASE 1420

TRANSCRIPT OF HEARING

JULY 15, 1959

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GENERAL LAW REPORTERS
ALBUQUERQUE, NEW MEXICO
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NEW MEXICO OIL CONSERVATION COMMISSION

Mabry Hall

Santa Fe , NEW MEXICO

REGISTER

HEARING DATE Examiner April 8, 1959 TIME: 9:00 a.m.

NAME:	REPRESENTING:	LOCATION:
Ewell N. Walsh	El Paso Natural Gas Products Co	Farmington, N.M.
Frank Gray	Caulkins Oil Co.	"
[illegible] Hubble	" " "	" "
Kellahin	Kellahin & Fox	Santa Fe, N.M.
Miller	Tidewater Oil Co.	Hobbs, N.M.
[illegible] F. HARRILL	HUMBLE OIL & REF. Co.	HOBBS, N.M.
Alvin Smith	Tidewater	Santa Fe, N.M.
Charles R Marshall	Pan American	Farmington
[illegible]	[illegible]	[illegible]
John Mason	EPNG	El Paso
[illegible]	El Paso Natural	El Paso
Kirk Newman	Pan American	Roswell

ILLEGIBLE

BEFORE THE
OIL CONSERVATION COMMISSION
SANTA FE, NEW MEXICO
JULY 15,1959

IN THE MATTER OF:

CASE 1420 (Hearing De Novo) Application of Caulkins Oil Company for a hearing de novo before the Oil Conservation Commission of New Mexico in Case No.1420. Applicant, in the above-styled cause, seeks an order authorizing it to dually complete its Well No. T-123, located 700 feet from the North line and 1800 feet from the East line of Section 7, Township 26 North, Range 6 West, Rio Arriba County, New Mexico,in such a manner as to permit the production of gas from the Dakota formation and water injection into the Tocito formation.

BEFORE:

Gov. John Burroughs
Murray Morgan
A. L. Porter

T R A N S C R I P T O F P R O C E E D I N G S

MR. PORTER: Take up next Case 1420.

MR. PAYNE: (Hearing De Novo) Application of Caulkins Oil Company for a hearing de novo before the Oil Conservation Commission of New Mexico in Case No. 1420.

MR. KELLAHIN: If the Commission please, Jason Kellahin, Kellahin & Fox, Santa Fe, New Mexico, representing the ap-

plicant, Caulkins Oil Company. We will have one witness, Mr. Frank Gray.

(Witness sworn)

MR. KELLAHIN: If the Commission please, I would like to very briefly review the situation that brought about this application on the part of Caulkins for a de novo hearing before the Commission. The application regards only that portion of Case 1420 and Order No. R-1191-A which denied the permission to make a dual completion for production from the Dakota sand with water injection in the Tolcito formation. At the time of this hearing, on April the 8th, 1959, a plan was proposed by Caulkins Oil Company which would have allowed them to drill to the Dakota sand to cement 5½ inch casing from a total depth to approximately 6828 feet; set a Baker Model D production packer in the 5½ inch casing just above the top of the Dakota production or perforations, and run 2 inch tubing and seal it into the production packer. Under that completion we would have produced gas from the Dakota through the 2 inch tubing with water injection into the Tolcito through the casing tubing annulus. Now, insofar as the provisions of Order R-1191-A are concerned, that is the only point on which we have requested a rehearing. We are perfectly satisfied with the rest of the Order which was entered pursuant to the recommendation of the Commission's Examiner.

Again, we take no quarrel with the Commission's Examiner in his recommendations as to this dual completion. Rather, we have

come up with an alternate proposal to submit to this committee which we think will satisfy the objections which were made in the findings of the Commission in the original case.

Now, in order to facilitate this hearing and save time, I would like to offer in evidence the complete record and transcript in Case 1420 heard on April the 8th, 1959.

MR. PORTER: Without objection, it will be made a part of the record of this hearing.

FRANK GRAY,

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 Frank Gray.

Q By whom are you employed and in what position, Mr.Gray?

A I am employed as field superintendent for Caulkins Oil Company.

Q Now, have you previously testified before this Commission and had your qualifications accepted by this Commission?

A Yes, sir.

MR. PORTER: His qualifications are acceptable.

Q Now, Mr. Gray, are you familiar with the facts and circumstances involved in this application?

A Yes, sir.

Q Would you state briefly what is the present casing of the subject well?

A This well is presently cased with 7 inch casing to a depth of 6843 and is being operated as a Tolcito Oil Well, and produces from perforations from 6797 to 6812.

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

(Thereupon, Caulkins' Exhibit No. 1 was marked for identification.)

A Exhibit No. 1 is a plat showing the ownership of the acreage surrounding the section in which this well is located.

Q Does it likewise show the location of the subject well?

A It shows the location of the subject well also.

(Thereupon, Caulkins' Exhibit No. 2 was marked for identification.)

Q Now, referring to Exhibit No. 2, would you explain that Exhibit?

A Exhibit No. 2 is a diagramatic sketch showing the arrangement we propose to make, or that we would like to make in making a dual Dakota producer Tolcito water injection well.

Q Now, referring to the Exhibit, would you explain exactly what you propose to do?

A We propose to drill a 6¼ inch hole from 6845 to approximately 7700 feet, and cement 5 inch OD 1800 pounds N-80 seam-

less casing from approximately 7700 feet to 6833 feet, using twice the calculated amount of cement necessary to cement the liner from bottom to top. The casing proposed is designed to withstand external pressure in excess of 6582 pounds per square inch. The clearance between the 5 inch OD casing and 6¼ inch hole is 1.25 inches, making a sheath of cement .625 inches thick possible. The annular flow space would be approximately 11 square inches. The clearance between 6¼ inch hole and a 5 inch OD casing coupling is .687 inches. The annular flow space between the coupling and hole would be 6.38 square inches and would permit a sheath of cement .343 inches thick. This liner would be run on drill pipe or tubing using a Baker Oil Tools, Inc. duplex float shoe. The top of the liner would be set below the Tocito perforations to avoid possible damage to the Tocito from cement used around the liner. A loss of any appreciable amount of cement in the Tocito sand might impair its value as a water injection well. Also, by leaving the top of the liner below the Tocito perforations it would be possible to use 7 inches production packers in the completion of the well. This would be an advantage if any remedial work was ever attempted in the future with packers in place, because the bore diameter of the 7 inch packers in much larger than in 5 inch OD packers. Then forty-eight hours after cementing the liner it would be perforated at 6845 feet. This would be approximately two feet below the shoe of the 7 inch casing. A cement retainer would then be set in 7 inch casing at 6820 feet. This retainer would be run on a wire

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line for safety and accuracy of measurements.

2 3/8 inch OD EUE J-55 seamless tubing would then be run and connected to the cement retainer. Sufficient cement would be squeezed through the perforations at 6845 feet in 50 sack stages to obtain a minimum final squeeze pressure of 6,000 pounds. This would exceed the maximum injection pressure anticipated by 3000 pounds and would equal the greatest differential pressure possible under the conditions that we expect to operate.

After obtaining the desired final squeeze pressure, the retainer and cement would be drilled out to the shoe of the 5 inch OD liner. A test packer would then be run on tubing and set at 6830 feet. The casing and liner below that depth would be tested with 4000 pounds pressure. If a leak to formation is indicated, the squeezing and drilling out operation would be repeated until a satisfactory test with 4000 pounds pressure is obtained.

The Dakota zone would then be perforated and sand-water fractured.

After the fracturing operations are finished, Baker Oil Tools, Inc. permanent type production packers would be run and set on a wire line as shown on Exhibit 2. That's a Model FA Packer. On the upper part, it would be a Model FA, the lower would be a Model D. A Baker parallel flow tube would be run in the 2 inch Dakota string of 2 inch 4.70 pounds N-80 seamless tubing and would be latched into the 7 inch Model FA Packer set at 6785 to 88. The tubing string would also include six Baker tubing seal nipples spaced to

seal off in the 7 inch Model D Packer set at 6827 to 6830 feet. The portion of the barrel of this packer in which the nipples can seal is 32 inches long. The length of each nipple is 17 inches. The excessive number of seal nipples proposed is to provide assurance that a seal nipple will always be positioned in the barrel or bore of the packer at 6827 to 30 feet regardless of slight mismeasurements, expansions or contractions. The Dakota string of tubing would be set just above the top of the Dakota perforations and would be run with a seating nipple on bottom, and otherwise it would be opened.

A parallel string of 2 inch tubing would be run and latched into the parallel flow tube at 6785 feet using a parallel anchor seal nipple. With the equipment in the well arranged in this manner, Dakota production would be confined to one string of 2 inch tubing and Tocito injection water would be confined to a companion string of 2 inch tubing. The Baker packers proposed for this installation are recommended by the manufacturer for use in wells having up to 10,000 pound pressure. The N-80 tubing or 2 inch N-80 tubing proposed for the Dakota string is recommended for use in external pressure of less than 7200 pounds.

Q Now, with that type of compression, Mr. Gray, how would you conduct a packer leakage test?

A With Dakota gas and distillate production and Tocito injection water each confined to separate strings of 2 inch tubing, the operation of the well for production and injection could be

carried on with the tubing head valves wide open. If the upper packer or the water injection string of tubing should ever begin to leak, the leak would be immediately indicated by the return of water through the tubing head. If there should be a leak of injection water by the lower packer, or around the 7 inch casing and liner, the leak would be immediately apparent because water reaching the Dakota zone would either kill the flow of gas or would be brought to the surface by the gas.

If a leak should start in the Dakota string of tubing above the depth of balance between the fluid in the 7 inch casing and gas pressure inside the tubing, the production of gas through the open tubing head valves would be immediately apparent.

To summarize the packer leakage test possibilities, we could say first, that both strings of tubing and both packers would actually be on a leakage test continuously because a leak at any point would be immediately apparent. Further, by injecting water through a string of tubing instead of through the casing-tubing annulus as was proposed during the April 8 hearing, the possibility of losing injection water in sands above the Tocito through casing leaks would also be eliminated. Facilities would also be in place to permit the immediate protection of the Dakota zone from any injection water that might reach it from any source.

Q Now, in the event a leak did occur, what remedial steps would you take to prevent any damage?

A The first operation in the event of a leak of water

from any source would be to discontinue immediately the injection of water. Now, we would also install a high-low shutoff valve on a water injection line to accomplish this shutting down of the water injection automatically, and by this, I mean it wouldn't be necessary for anyone to go to it.If we had a leak, a break in the water line down hill or a packer gave way or anything like that, it would automatically shut off and water injection would be stopped then.

Q Now, what other steps could you take to prevent damage to the formation?

A Well, a leak in either string of tubing could be stopped by setting a retrievable bridge plug below the leak. Equipment for this purpose is available twenty-four hours a day in the San Juan Basin. If there should be a leak of injection water by the lower packer or around the 7 inch casing and liner, the Dakota sand could be adequately protected by pumping temporary plugging materials into the Dakota zone through the 2 inch tubing strings. Now, there are several types of plugging material available in the area on short notice, two of which are described in our Exhibits 3 and 4.

Q Are Exhibits 3 and 4 industry information on plugging materials and its uses?

A Yes, it is, and it was furnished upon request. One -- Exhibit 3 is a letter from Dowell about their temporary plugging material, and Exhibit 4 is a letter with some attachment from Halli-

burton Oil Well Cementing Company.

Q Now, what type of water are you using in this injection program, Mr. Gray?

A We are using the same, or rather we are using fresh water, approximately 3500 barrels or 3300 barrels of fresh water with about 200 barrels of produced water, which is fresh water that has been pumped in to -- or rather, recovered, producing the wells in the water flood operation.

Q Have you had any experience with that water and its effect on the Dakota formation?

A We have used this water in the fracing of Dakota wells in this immediate area, and we have obtained excellent stimulations where this water was used. We have used other fresh waters with the same results, but there appears to be no difference in the results. It is our completion practice to water-frac these Dakota wells, and we have done so, using this water as well as other waters without any harm at all.

Q Have you ever had occasion to use this water to kill a well?

A Yes, it was necessary to use water to do some repair work on our dual Tocito producer No. "D" 204. We had a leak in a permanent type packer; it was necessary to pull the tubing, and we ran a second packer and set it immediately above the one that was already in the hole, but it was necessary to keep water going into the well continuously to keep it dead so that we could work

on it. This particular operation required the use of parallel string of tubing planted together, and we couldn't run it with strip rubbers.

Q What volumes of water did you inject and for how long?

A We had approximately 500 barrels a day going into the well for about a week.

Q And did that have any adverse effect on the producing characteristics of the Dakota formation?

A Not at all. Just as soon as the tubing was landed in the packer, the tubing head valves were installed. About thirty minutes after,the well kicked off and started flowing. The production is both gas and distillate, and since the well has cleaned up, it is approximately the same as it was since we worked on it.

Q In your opinion, would the leakage of water into the Dakota formation cause any damage to that formation?

A The amount of water that would get into the Dakota from a leak,before we could get temporary plugging material pumped into the well would not harm it.

Q Now, with this type of completion or any work, are any workovers possible or other remedial work?

A The -- you mean --

Q What work can you do on the well with this type of completion?

A The tubing can be pulled out of the well at any time. The Dakota would have to be pulled first. Either or both can be

pulled -- I mean both can be pulled. By pulling the Tolcito string first, these packers can be removed and replaced, if that should become necessary, and it is also possible to do a limited number of remedial operations through the tubing without removing the packers. For instance, if we used this temporary plugging material Dowell or Halliburton advertize. It might be too viscose and thick to flow out under its own steam. We could go in with tubing through those packers and wash that out.

Q Now, what is the reason for Caulkins Oil Company seeking this type of completion?

A Well, it's -- of course, we want to have the advantage of increased production by reason of water injection. As far as the Tolcito is concerned, and the deepening to the Dakota zone is a matter of economics. The cost of doing the work that we propose to do would be returned in less than two years if we were successful in obtaining an average Dakota well for this area, while if a new Dakota well were drilled, the cost of drilling a well would be returned in approximately four years.

Q Now, do you consider an additional Dakota well necessary to get the production from that formation?

A No. I think that we can produce it as a dual Dakota, gas distillate producer and water injection well, and give the Dakota sand full protection from any leaks of water that might develop at any time.

Q Now, you said that you can give the Dakota formation

complete protection. Will, in your opinion, all of the other formations which may underly the lands involved in this application be adequately protected by this completion?

A I think that with the separate string of tubing for the Tolcito that we would be giving complete protection to any sands above the Tolcito, because if the tubing should spring a leak at any time, the water will start running out the tubing head, and it is going to be apparent to anybody that goes by the well, and those wells are visited at least once a day, so the leak cannot continue for more than twenty-four hours without being detected.

Q In your opinion, is this type of completion in the interest of conservation and the prevention of waste?

A Yes, sir, I think so.

Q Were Exhibits 1 and 2 prepared by you or under your direction and supervision?

A They were prepared under my direction.

Q And Exhibits 3 and 4 are reports submitted to you?

A Yes, sir.

MR. KELLAHIN: At this time we would like to offer Exhibits 1 through 4, inclusive.

MR. PORTER: Without objection, the Exhibits will be admitted.

(Whereupon, Caulkins Exhibits 1 through 4 were received in evidence.)

MR. PORTER: Anyone have a question of Mr. Gray?

MR. NUTTER: Yes.

MR. PORTER: Mr. Nutter.

CROSS EXAMINATION

BY MR. NUTTER:

Q Mr. Gray, when you drilled this well, what size of hole did you drill down to the shoe of this 7 inch casing?

A We didn't drill the shoe out.

Q What size of a hole is that pipe setting?

A I believe it is 8 3/4 inch hole.

Q What is the top of the cement on that string?

A It is approximately 5,000 feet. I believe it is shown on the sketch here, I'm not certain of that. No, it isn't. It is approximately 5,000 feet.

Q Were centralizers used in that casing?

A I'm not certain whether they were or not, but I'm almost sure they were, because that has been more or less a standard completion practice.

Q You feel sure, then, that you have a cement sheath around that 7 inch pipe with uniform thickness?

A The purpose of making the perforations at 6845 is to make certain that there is no communication between the Tocito sand and the lower formations. In carrying on the operation, water would be pumped through those perforations at 6845 to break down the formation at that depth before pumping. In any event, if a return of water is obtained, a channel from the shoe of the 7 inch

to the perforations from 6797 to 6812 would be indicated. Now, if such a condition is encountered, the channel would be cemented and the cement retainer drilled out, and any cement remaining in the 5½ inch OD liner about 6845 would be also drilled out, and we would -- the 5 inch liner would be perforated again and another cement retainer set at 6820, and then those perforations would be squeezed with enough cement in 50 sack stages to get this 6,000 pounds minimum pound squeeze pressure that we propose.

Q What size of hole do you propose to drill for your 5 inch line?

A Six and a quarter. That is 26 pound casing, and there may be some question about the use of a six and a quarter bit in 7 inch 26 pound pressure, but from experience it will be --

Q Experience of this particular well?

A I couldn't say. We didn't -- I don't believe we had a bit in that. I think we just braced that plug in with water and didn't drill it down, but in other casing strings where we have had 26 pound casing, we have used six and a quarter bits.

Q Now, what is the next smaller size?

A Six and an eighth.

Q What would be your cement sheaths under the two bits?

A It would be a sixteenth of an inch less.

Q Now, this 3,000 pounds anticipated injection pressure, what is that surface pressure?

A That is surface pressure.

Q What would be the pressure down here on the top of this lower packer then?

A Roughly 6,000 pounds.

Q What is the pressure of the Dakota?

A Bottom hole pressure at this time on it would range between 2800 and 2900 pounds.

Q Now, is this 3,000 pound surface pressure or 6,000 injection pressure, is that a pressure that you are having to acquire in the other injection wells in that pool?

A No, we were not. The highest injection pressure we have at this time is a little over 2,000 pounds, and that is in a well that was a tight well to begin with, and one in which some three million barrels of water has been injected.

Q What do you expect will be the initial injection pressure here?

A I think that probably for a day or two it might even go in on vacuum, but we have another well that was not quite -- that did not have quite as great an initial flow as this well that we are using for injection purposes, and at the present time we are injecting a thousand barrels a day in it, and the pressure is about 600 pounds.

Q Well, now, if you had pressures in the range of vacuum to 600 or 700 pounds in your Tocito and you had a failure of that lower packer or of tubing leak between the two packers, the Dakota

gas would go into the Tocito formation, then, wouldn't it?

A No, sir, the weight of your fluid column at 6800 feet would be about 3,000 pounds, and that alone would be greater than the pressure in the Dakota zone.

Q You will always have more pressure in that interval between the packer than you would from the Dakota?

A Unless it went in on a vacuum. The present pressure in the Tocito is approximately 1800, 1900 pounds in that well, so it is not likely to drop below that. So that I think that we could say that we would always have more pressure on the outside of the Dakota string than inside.

MR. NUTTER: I believe that's all. Thank you. Oh, yes, one more question, Mr. Gray.

Q (By Mr. Nutter) What is this proposed Dakota perforation interval?

A It would be -- oh, it would be over a vertical area of about 300 feet.

Q What is the interval that you are proposing for the Dakota?

A For the Dakota?

Q Yes, sir.

A Well, it would be approximately 7400 to 7700.

MR. NUTTER: Thank you.

MR. PORTER: Does anyone else have a question of Mr. Gray? The witness may be excused.

(Witness excused)

MR. PORTER: Anyone have anything further to offer in this case?

MR. KELLAHIN: I would like to make a very brief statement. If the Commission please, I believe that our presentation has shown that adequate protection has been afforded by this proposed completion to all of the zones which could be affected by the proposal to inject water through a dual completion of this type. In addition to that, I think the safety features which are proposed here, which would include automatic cutoff in the event of a packer leak and the remedial work which could be done in the event of such a leak, plus the fact that experience has shown that this type of water is suitable for fracturing and for killing a well with no adverse effect on the Dakota formation, clearly shows that the proposal is feasible,and we urge the Commission's approval of it.

MR. PORTER: Anyone else have anything further in the case? Take the case under advisement.

We are going to recess the hearing at this time until 8:30 in the morning, at which time we will reopen the oil allowable case briefly. Mr. Nutter indicated this morning that he would have additional information concerning the allowables for Northwest New Mexico, that should take a few minutes.

The next case to be considered in the morning will be Case 1722, following the allowable case. The hearing is recessed until 8:30 tomorrow morning.

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 Proceedings before the New Mexico Oil Conservation Commission was reported by me in Stenotype and reduced to typewritten transcript by me, and that the same is a true and correct record to the best of my knowledge, skill and ability.

WITNESS my Hand and Seal this, the 29th day of July, 1959, in the City of Albuquerque, County of Bernalillo, State of New Mexico.

NOTARY PUBLIC

My Commission Expires:

October 5, 1960