BEFORE THE
OIL CONSERVATION COMMISSION
SANTA FE, NEW MEXICO

IN THE MATTER OF:

CASE 1911 Application of Johnston and Shear for a multiple zone slim hole completion. Applicant, in the above-styled cause, seeks an order authorizing the multiple completion of its Jicarilla Well No. 1-4, located 985 feet from the North line and 805 feet from the West line of Section 4, Township 24 North, Range 5 West, Rio Arriba County, New Mexico, in such a manner as to produce gas from the South Blanco-Pictured Cliffs Pool (or Otero Chacra), gas from the Dakota Producing Interval, and oil from the Gallup formation adjacent to the Otero-Gallup Pool, each to be produced through 2 7/8-inch tubing which tubing is to be cemented in a common well bore.

BEFORE:

Elvis A. Utz, Examiner.

TRANSCRIPT OF HEARING

MR. UTZ: In order to have a little more continuity in our subject matter, we would like to take up Case 1911.

MR. FLINT: Case 1911. Application of Johnston and Shear for a multiple zone slim hole completion.

MR. ERREBO: Burns Errebo, Modrall, Seymour, Sperling, Roehl & Harris of Albuquerque, appearing on behalf of the applicant. We will have two witnesses.

(Witnesses sworn)

MORRIS JONES,

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

DIRECT EXAMINATION

BY MR. ERREBO:

Q Will you state your name, please?

A Morris Jones.

Q What is your business or occupation?

A I'm a consulting petroleum engineer.

Q Where are you located?

A Albuquerque.

Q And have you been retained by the applicant to make a study of this proposed completion?

A Yes, I have.

Q Actually, you have taken part in the design of the plan?

A Yes.

Q And are you familiar with the application which is before the Commission today?

A Yes, I am.

Q You state you are a petroleum engineer. How many years' experience have you had, and what formal education have you had?

A I have had nine years' experience as an engineer, and I graduated with a B.S. in petroleum engineering from the University of Texas.

Q Does your experience cover all phases of drilling and production engineering?

A Yes, it does.

Q You've been employed by individual companies or operators since leaving school?

A Yes. I worked for Backwood Nickel for four years, and San Juan Basin, and five years for Pacific Northwest and Northwest Production.

Q And was the latter five years also in the San Juan Basin?

A Yes.

MR. ERREBO: Are the witness' qualifications acceptable?

MR. UTZ: Yes, sir.

Q (By Mr. Errebo) What is the designation of the well that you desire to complete in the manner which you will propose today?

A This is the Johnston and Shear Jicarillo Well 1-4.

Q And have you shown the location of that well, as well as surrounding wells and acreage on an Exhibit?

A Yes, we have.

Q And that Exhibit should be designated Exhibit No. 1, is that correct?

A Yes.

Q Now, the other wells, as shown on Exhibit No. 1, are

completed in at least some of the formations which will be the subject of the completion which you will propose?

A Yes, they are.

Q Could you indicate just briefly how those other wells are completed as to formation?

A Well, the other wells shown on the Exhibit are in the Otero-Gallup Pool with completion in the Gallup, and the proposed well is in the limits of the South Blanco-Pictured Cliffs field. And, of course, the Dakota, there is no immediate Dakota production in this area, but we propose to take the well to the Dakota for possible completion there.

Q In what zones do you propose to complete this well?

A We propose to complete it in the Dakota and Gallup, and we will take in Chacra, and if the Chacra log and test warrant it, we will complete there. If not, in the Pictured Cliffs above it.

Q I would like now to refer you to your Exhibit No. 2, and ask you to identify that Exhibit.

A This is a diagrammatic sketch of the proposed triple completion for the Johnston and Shear Well No.1-4.

Q Now, I wonder if you would give the approximate depth at which these formations are found, --

A If we, starting at the bottom --

Q -- or will be found. You haven't completed this well, have you?

A No. We anticipate taking the well to 7100 feet, to the Dakota pay interval; should be from approximately 6850 to 7100. And the Gallup interval should be from approximately 5850 to 5900, and the Chacra interval between 3350 to 3450; the Pictured Cliffs interval from 2500 to 2550. These are all appxoximate depths.

Q Now, starting with, say starting with the drilling of this well and carrying your description on through the completion in these various zones, will you explain to the Examiner and to the Staff how this would be done according to your proposal?

A We propose to drill surface hole and set 10 3/4 casing at approximately 200 feet, and cement that to the surface. Then we'll drill 9 7/8 hole to 3500 feet. And we will reduce the hole size at that point to 8 3/4 hole, carry that size to 5900 feet. We will reduce the hole size to 6 3/4 and carry that to our total depth of 7100 feet.

Q That is actually shown on your Exhibit, is it not, No. 2?

A Except for the hole size, yes. Then we propose to run each string individually, cement these strings individually in the conventional manner with plugs.--

Q Let me ask you, there at that point, Mr. Jones, you plan to run the first string or the lower string first, is that correct?

A Right.

Q And you will cement that, and then you will move up the hole and run the next string?

A No. We propose to run all three strings, and then cement. Cement No. 1, cement No. 2 and cement No. 3 in a simultaneous operation. As soon as we are through with one, we switch to the next cement there. In our completion method we are actually working with three individual wells. We plan to perforate with a Láne Wells perforator. That's called a nuclear orientor, the same as the tool just discussed by Humble, but it works on the fracing of a mass of metal and you can turn it to a thirty degree angle on each pull of the line. On the Dakota, we have no worry there, and perforating our Gallup and our Pictured Cliffs or Chacra formation, we'll use this tool and then we'll go with the contentional frac on each formation individually.

Q Mr. Jones, now, you don't purport, do you, to be an expert on the operation and design and the technique of this tool?

A No, sir.

Q There is actually a man here, another witness who will testify in detail on that, is there not?

A Yes, sir.

Q But actually what investigation did Johnston and Shear make, to your knowledge, which resulted in the selection of this method?

A We know that this tool has been successfully used. It has been used in Texas, Pan Handle, Pampa area and West Coast,

used by Texaco and Cotter.

Q Actually, what is the source of this information?

A From Lane Well files, from actual jobs performed.

Q Now, do you anticipate it will be necessary to pump the Gallup?

A Yes, most of the wells in that field are pumping oil wells.

Q Do you know of any

A To my knowledge, there are no corrosive problems in this area.

Q Are there any other problems, and you have been an engineer in that area for nine years, are there any other problems, which you can now foresee, which would be encountered in this operation?

A Not that we know of now.

Q Now, the necessity for this hearing arises from a number of causes, does it not?

A Yes, it does.

Q Number 1, it is a triple completion?

A Right.

Q Number 2, it is a slim hole?

A Right.

Q Number 3, I believe there is one formation which is not classified?

A Right.

Q And that's the Dakota, as I recall?

A Right.

Q Now, do you feel that were the Commission to grant your application that it would result in any savings in money to Johnston and Shear?

A Yes, we think that the immediate cost would be less by a good margin, and any workover that we would have to do would be considerably less because we would be working on each individual zone just like it was a one well deal rather than three zones at once. This way there would be no possible contamination of the formation by the other formation because there would be no communication between them.

Q Actually, then, you are saving in the type of completion which you propose, separation of the zones will be more certain?

A We think it would be more permanent and more certain than with mechanical packers, over a period of time.

Q Have you considered the possibility that the directional gun might perforate another one of the strings in the hole?

A Well, if that does happen, which mechanically it is possibly improbable, but if it does, you can work inside this 2 7/8 casing just like you can inside any casing, just use smaller tools. The hole could be squeezed off or this pack off element that Otis makes could be utilized to block off that communication.

Q Do you feel that there will be money available, then, for the drilling of other wells which would otherwise be spent in drilling another hole to recover this oil or gas, is that correct, in the event only a single or dual completion is allowed?

A Right.

Q Is it your opinion, then, that the granting of this application would prevent waste?

A Yes.

Q You know of no instance where correlative rights would be violated?

A No.

Q Were these two Exhibits prepared by you or under your direction and supervision?

A Yes.

MR. ERREBO: I would like to offer these Exhibits in evidence at this time.

MR. UTZ: Without objection, they will be accepted.

MR. ERREBO: That's all we have of this witness.

CROSS EXAMINATION

BY MR. UTZ:

Q Mr. Jones, as I understand your Exhibit No. 2, you'll have a solid column of cement from 7100 feet to 2500 feet, is that correct?

A No, sir. We expect in each case to bring this cement 600 feet above the top of each pay.

Q And you'll cement the same hole. In other words, on your second string you inject at 6300, you don't plan to go down 6500?

A No, sir. Actually, we will put the cement at 5900, and the top sould be approximately 5300.

Q That's correct, 5900. You don't think that cement will drop in the hole?

A No, sir, it doesn't. When we use a D B tool in the formation, it drops a little, but not much.

Q What formations do you have between 5900 and 6500?

A We have the Greenhorn and the Grenerous which is included in this as part of the Dakota producing interval. The Greenhorn would be the only formation.

Q If you don't have cement over the Greenhorn, wouldn't that cause communication between the Greenhorn and the Gallup?

A I didn't understand you.

Q Well, let me get these depths here. Gallup is 5850 to 5900, --

A Yes, sir.

Q -- so, if you cement from 5900 up, the Greenhorn will be separated from the Gallup?

A Yes, sir.

Q There is no other formation in the open hole from 6500 to 5800 that the Greenhorn could commingle with?

A No, and actually the Greenhorn will be approximately

200 feet above the top, so it would be covered by the Dakota cement job.

Q Now, on your next stage, from 5300 to 3100, what formations will you have there?

A We have the Mesaverde formation as the main formation there.

Q That's the one you intend to complete in?

A No, sir. We intend to complete in the Gallup on that.

Q Are there any other formations in that area that the Mesaverde could commingle with?

A No, sir.

Q Now, from 2500, I believe you said the Pictured Cliffs could be from 2450, is that correct, --

A Yes, sir.

Q -- to 2500?

A Yes, sir.

Q Then, you would not necessarily cover the Pictured Cliffs with cement if you cemented 2500 --

A If we complete in the Chacra and we carry the cement column 600 feet above, it would not cover the Pictured Cliffs.

Q How about your surface casing? Do you have a depth of the Chacra in this area?

A No, sir, I don't. I know that most surface casing in that area is set at 200 feet.

Q Does the Chacra carry water in this area?

A I am not familiar with it.

Q Are you familiar with it further down?

A Yes, sir, and it carries water there.

Q You don't know whether it carries water --

A No, sir, but I know that the wells completed in this area set their surface at approximately this depth, so anything below there is not covered by cement to the top of the pay.

Q Have you drilled any wells in this area?

A Not in this immediate area. I've drilled 14 and 15 in 24, 4, which is the next range over and in the range north.

Q Did you have any water problems --

A No, sir.

Q -- in that area? Well, let's put it this way. If you have any water problem below 200 feet, would you be willing to cement above the Pictured Cliffs?

A Yes, sir, if the Commission desires, we will cover, and if we make a Chacra completion, we will cover the Pictured Cliffs with cement. Actually, there is a thousand feet difference between the Pictured Cliffs and Chacra. We plan to bring the 600 feet, the additional 400 feet would not be too much.

Q Now, will cement come up over the Chacra if you should complete in the Pictured Cliffs?

A If we set the packer in the Pictured Cliffs, no, sir, it wouldn't.

Q In order to cover the Chacra, you would have to come from your second string up to at least 3350?

A That is correct, but possibly if we could cover the Chacra, our best method costwise and resultwise would be to run the additional thousand feet of tubing on the short string and cover the Chacra and the Pictured Cliffs in one job. There would be no assurance that we could bring the cement that high in our Gallup string.

MR.UTZ: Any other questions of the witness?

QUESTIONS BY MR. FLINT:

Q How do you center your tubing when you are using three strings, or how do you propose to do this?

A Of course, your first string offers no problem. We use standard centralizers, and then centralizers that have been developed for slim hole completions can be used on each of the other strings. That holds it off an inch and a half up to two, three inches from each string to get that much cement between the strings.

Q. When you perforate the middle string, when you perforate the upper string, you still, you would have no more difficulty in a triple than you would in a dual?

A You could locate your two strings and orient your gun.

Q The upper string is the outer string?

A Yes, it might be. In the hole it would still have a

side facing the formation.

Q You wouldn't have to perforate through at a ninety degree angle from the line running through the three strings. You would have, if it is the outside string -- what do you mean when you say it might be the outside string?

A Well, of course, it depends on what you mean by outside string.

Q One of the two outside strings?

A In the hole the three strings should form a --

Q Triangle?

A Yes, so that you would have one side of each string facing the formation.

Q So you have less margin in a triangle?

A You could orient your other two strings and decide what side to face the formation.

MR. UTZ: Mr. Jones, these strings of tubing are not going to be connected together physically, are they?

A No, sir.

Q (By Mr. Flint) They are liable to be any shape or form or wrapped around each other, for that matter?

A That is possible, but it is the same possibility when you run different size of casing.

Q So, the only possible way you would know which way you are perforating is by the use of this tool?

A Yes, sir.

Q Now, in perforating or in fracing, the Dakota zone, in your past experience, what rate of injection would be used?

A Well, of course, the Dakota varies quite a bit up here. Some Dakotas can be treated on the casing at high injection rates in the order of 35, 40 barrels, but I don't know what percentage, but quite a few of the Dakotas have had to be treated down the drill pipe because the casing would not stand the pressure of 40,025 and they have been completed with injection rates of 6, 7, 8, 9 barrels a minute.

Q What is the maximum?

A 12 is the maximum that I know of. I think you reach a friction maximum in 2 7/8 in about 12.

Q At this depth?

A Yes, sir.

Q In your opinion, is that heavy enough frac job to properly perforate, properly complete the Dakota?

A Yes, sir. Like I said, a lot of Dakotas in the basin have been completed beneath the packer or down tubing, and the wells that they've got are comparable to the others.

Q What was the attitude of your company that you previously worked for? Were they in favor or high pressure rate?

A At one time the high injection rate was all everybody strived for, but in the last two years injection rate has come down some. But one thing, it depends on whether 30 barrels does you as good as 60 barrels, or whether 10 barrels does you as

good as 60. Depends on the formation itself. Most of them still believe in high injection rates in most formations, but in the Pictured Cliffs and in the Dakota, small injections have been used and comparable wells have been obtained.

Q You say it depends on the permeability of the zone?

A That's right. Depends on the characteristics of the formation.

MR. UTZ: Any other questions?

MR. NUTTER: Yes, sir.

QUESTIONS BY MR. NUTTER:

Q What was your name, Jones?

A Jones.

Q Mr. Jones, now do I understand correctly? You expect the Pictured Cliffs at 2500 to 2550?

A That was the approximate depth.

Q Is that the top or is that the --

A That's the pay interval.

Q That's the pay interval. This well hasn't been drilled, so you don't have any logs?

A No, we have the approximate depth.

Q And you expect the Dakota to run from 3350 to 3450?

A Yes.

Q The Gallup from 5850 to 5900, and the Dakota from 5850 to 7100?

A Right.

Q Your Exhibit indicates that you have set the upper string of 2 7/8-inch at 3100. Now, is that in the event you get Pictured Cliffs, or in the event you get Chacra?

A That depth on there was put on there before we determined the exact intervals. This 31 would put us into the lowest if it was a Pictured Cliffs completion.

Q Assuming that you are going to get the Pictured Cliffs, the top of it at 2500 and the bottom at 2550, where will you set your upper string of tubing?

A We will set a hundred feet into the Louis, which would be approximately 2700 feet.

Q About 2700 feet. That's if you get Pictured Cliffs. Now, in the event that you get Chacra, where will your casing shoe on your upper string be?

A Approximately 3600 feet.

Q And your shoe in the Gallup will be at 5900, --

A Yes.

Q -- which is the bottom of the Gallup?

A Yes.

Q And you are going to set a TD of 7100 feet at the bottom of the Dakota?

A That's correct.

Q Now, your first cement, you'll run the three strings of tubing simultaneously --

A Well, actually, --

Q -- or --

A -- before they are cemented, yes, we'll run them individually.

Q Now, you stated that you could use centralizers. Do you intend to use centralizers?

A I meant to state that we will use centralizers.

Q Will you have centralizers on the lowermost string?

A Yes, sir, we have standard centralizers.

Q For the portion that will penetrate the pay?

A Right through the pay at the top and bottom.

Q And then will you have centralizers on that long string opposite the lower portion of the Gallup string?

A Yes, sir, we will have it on the slim hole, centralizers on both strings in the Gallup.

Q In the Gallup interval?

A Yes.

Q And will you have centralizers on all three strings up on, opposite the Pictured Cliffs or Chacra, whichever you happen to get?

A Right.

Q And then you'll proceed, after you have run your tubing or casing, you will proceed to start your cementing operations?

A Yes.

Q You will first cement the Dakota --

A Right.

Q -- with enough cement to come to 6500 feet, --

A Right.

Q -- which is the 350 feet above the top of the Dakota?

A Well, to bring it to six hundred and -- we plan to bring cement to 6500 feet, and --

Q That would be 600 above the top of the Dakota, it would be 600 below the bottom?

A The top that I gave you is the Dakota instead of pay interval. The pay interval is in the bottom. In each case we plan to bring it about 600 feet above our uppermost perforation.

Q All right, assuming that you have cemented your Dakota with sufficient cement to bring the 600 feet above the uppermost perforations, then the top is going to be somewhere in the neighborhood of 6450 to 6500?

A Right.

Q And then you'll cement your middle string?

A Yes, sir.

Q But you don't expect that the cement from the middle string will fall to the top of the other cement?

A No, sir.

Q Are you using any particular accelerator or additive to the cement to hasten the setting time of the cement, heavy mixtures?

A We will use a jell cement, but we don't plan to add any accelerator in it at these depths because we are afraid it will

set too fast on us.

Q You just feel that the consistency of the cement will keep it from falling to the bottom?

A We will have heavy mud in the hole that will not be too much different in weight from the cement, so the difference is not too great.

Q Well, now, where do you expect the bottom of the cement on the middle string to be?

A Well, now, from the past experience of covering the Pictured Cliffs on a long string is by using the D V tool. It drops in this area about a hundred feet to where the bottom of it drops a hundred feet.

Q So you might expect cement at 6000 feet?

A In effect; we would put in enough cement to cover a 740 interval, which would give you 600 feet.

Q Now, in the upper string, would you expect the cement to drop an additional hundred feet below that casing shoe?

A Yes, sir.

Q If you get the Pictured Cliffs, it would put it approximately at 2800?

A Yes, sir.

Q And if you got Chacra to about 3700?

A Yes.

Q Now, why don't you use enough cement on each string as you cement it to cause the cement to come up to that 100-foot

level so that you would have a continuous cement job?

A Well, we don't know that that will accomplish anything, and if we've got too high a cement column, especially in this interval from the bottom, the Gallup to the Pictured Cliffs, we could possibly lose cement to the formation because of the height of that cement column.

Q So, you are afraid if you use adequate cement, you will cement off the formation, adequate cement to come up to it --

A Yes, sir.

Q Is there any indication at this time whether you are going to get a Pictured Cliffs or a Chacra well?

A We think that we will have a Chacra well because this is not far from the Chacra Pool.

MR. UTZ: What happens if both --

A If that is the case, the Pictured Cliffs will be developed later.

Q (By Mr. Nutter) What system will be used to determine that you have adequate separation on any of these three zones from any other?

A Well, I assume that the State would require that these wells be tested annually, just like the packer communication, and you could have, or all three zones shut in like the standard test; flow one zone for a week, take your shut-in pressures on the other two, and then alternate this, and if any commingling is there at all, it will be indicated.

Q You feel that this type of multiple completion should be subject to the standard packer leakage test procedure?

A We feel that it should.

Q Are there any known formations in this area, Mr. Jones, which have a tendency to cause any undue outside pressures on the casings which would collapse the casings?

A No, sir.

Q Have you, in your experience in this area, encountered any casing failures or collapses?

A Not in this area, no, sir.

MR. NUTTER: I believe that's all. Thank you.

QUESTIONS BY MR. UTZ:

Q Mr. Jones, did the Mancos give you any trouble?

A In this particular area, the Jicarilla area, we have never had any trouble with collapse at all. North of there, we had had some trouble from the Louis, but if we had good pipe, we never had any trouble.

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

(Witness excused)

MR. UTZ: Is there a Bill Sanders in the room?

EDWIN ADCOCK,

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

DIRECT EXAMINATION

BY MR. ERREBO:

Q Will you state your name, please?

A Edwin Adcock.

Q What was the last name?

A Adcock.

Q Mr. Adcock, by whom are you employed?

A Lane Wells Company.

Q And where are you located?

A Farmington, New Mexico.

Q In what capacity are you employed?

A I am district sales engineer.

Q How much experience have you had in well work, Mr. Adcock?

A My well work started in 1953 in Farmington, New Mexico.

Q Have you been there since that time?

A I was absent from there and operated in the Panhandle of Texas for approximately a year.

Q Were you with the Lane Wells Company at that time?

A Yes, sir.

Q Are you familiar, Mr. Adcock, with the method of completion which has been proposed by a previous witness on the well which is the subject of this application?

A Yes, sir.

Q Have you conferred with him pertaining to this problem?

A Yes, sir.

Q Will you state to the Commission the name or the description of the tool which you propose to use to perforate the casing at each of these zones?

A We will use a nuclear orientor to orient a size winder tubing perforator.

Q Is that a tube which is used by your company as a part of its service?

A Yes, sir.

Q When was that particular tool developed and made available for use in the field?

A The first publicity that was put out on the tool was, I believe, in November of 1959.

Q And tell the Examiner and the Staff to what extent you have been exposed to and have had the opportunity to make a study of this tool.

A In our area in Farmington, I think, is the first triple or even dual completion with a 2 7/8 tubing.

Q Is that in this area or is it in the experience of your company?

A This area only that I am referring to, in the San Juan Basin.

Q Are you saying, then, that your company has had experience with the use of this tool in other areas?

A Yes, sir.

Q Now, how does your company make you, as a district sales engineer, is that correct, --

A Yes.

Q -- acquainted with the use and operation of this tool or the people under your supervision?

A We have, of course, communications on all new systems developed. The full information is used. Well histories in other areas are distributed through the mail to us, and when new tools are brought into an area, of course, a qualified engineer is brought in with the tools.

Q Now, a qualified engineer is a man who has made a special study and who has used it in another area, I assume?

A That is correct.

Q Would you propose to use such an engineer in such an installation?

A Yes, sir, we will bring an engineer in. A young man in Pampa, Texas, at the present time, has done -- I know of two jobs. I have those well histories here, and he will bring the tool from Pampa, Texas into this area and operate the tool himself.

Q Do you know who he did those jobs for? What was the name of the operator?

A Yes, sir, he did one for Texaco and one for Carter Oil Company.

Q Now, you are speaking from hearsay, but do you have what you consider reliable and full information as to the success

or the results of that operation on those other two wells?

A Yes, sir, I have complete job reports on both wells. Here is the Texaco, Incorporated well that was completed in Pampa, Texas. It's a two string tubing, 2 7/8. The perforating depths are also listed here, if you would like to look at that.

Q Do you propose to introduce those in evidence, or are you mkaing them available at this time for the examination of the Examiner?

A I would like to make these available.

Q You don't want to hold on to them, in other words?

A Yes, I would appreciate that. This is an actual log, this is a field print and actual log that was run.

Q Now, what do those really show, simply and briefly?

A Essentially, the log shows that they will log the other metal or other string of tubing in the well bore so that we can orient the gun away from the string of tubing into the formation.

Q Now, will you explain exactly upon what theory or what physical circumstances this tool operates?

A As Humble mentioned a while ago, it has a mechanical ratch on the top, and with each upstroke of the tool, the orientor is moved thirty degrees so that we will locate the casing and continue around showing that the gun is away from the tubing. The nuclear device used is a radioactive source which bombards the formation and the tubing. The other metal in the hole will form a

shielding effect and give you a radioactive, we call it a shift.

Q That is reflected upon instruments on the surface, is that right?

A Yes, sir, this is all surface recorded.

Q In other words, you can see it as it happens, is that right?

A That is correct.

Q Now, proceed then.

A The mechanical section of it, on the surface we have a Speedomax which records the pin actions. The instrument is being bombarded, so that when the deflection or the neutron bombardment is cut sown to the tool or shielded, then you get a small sensitivity or a shift when you have an increase in the radiation returning to the instrument. Then, the radiation has to come from the formation because it would be shielded through the tubing and other cement.

Q What is the accuracy of the location of the other casing in the hole which you are trying to locate in terms, say, of degrees? Would you express it in that manner or how?

A Well, we will rotate the instrument the full circumference of the well bore, and with each thirty degrees, if you'll note on the log that I have in front of you there, you can see each shift that occurs. For instance, it was ratched at this point so that it is now pointing. You can see the shift begin here. It did not get completely away or completely to it, and here, of

course, is another rachet for another shift, and here is the next one, so that you can see each ratchet as it is moved around the casing. You require complete shift, thirty degrees, will not take you completely away from the casing or completely away from the formation.

QUESTIONS BY MR. UTZ:

Q Which would these indications on here show, that it is pointed toward the tubing?

A This can be done in two ways. I would like to make this statement. You may orient the gun at one hundred eighty degrees away from the location of the tubing or with your orientor looking away. On this well it was oriented in such a fashion that we located the casing and with the charges pointing one hundred eighty degrees away from the casing, the gun was fired. So you have two methods that may be used, which can be done at the discretion, I guess, of the engineer or the company man.

Q Which case on here shows that your firing jets are pointed toward the other casing?

A You have a decrease in sensitivity hereon so that it is away from the casing at this point.

QUESTIONS BY MR..NUTTER:

Q Sensitivity is increasing to the right?

A Decreasing to the right.

Q Decreasing to the right or left?

A Here he is looking at the casing, he is getting less

of his bombardment. Return here, he is getting greater on this well. It was one hundred eighty degrees out, so he wanted to locate the casing before he fired the gun, he wanted to point it at the casing or the other string of tubing.

Q (By Mr. Errebo) Are the shots fired in a fan-shaped direction, horizontally speaking, or are they fired in a fan-shape direction out from the gun or pretty much straight ahead?

A They are fired straight ahead from the gun.

Q In other words, there is one row of shots in the gun, is that correct?

A That's right.

Q And they all fire in the same direction?

A Same direction.

MR. ERREBO: Does the Commission desire to have copies of this information which it has before it now?

MR. UTZ: Yes, I think in this particular case we should have copies.

Q (By Mr. Errebo) Can you make copies of that and furnish it to them --

A I certainly can.

Q -- through the mail?

A Yes, sir. I have here -- I failed to bring it up -- this brochure laying on your desk there.

Q I would like for you to identify that.

A This is put out by Lane Wells Company, which is, as you can see, advertised on it, and this would be the case if the point would be perforating, with the thing oriented with the charges, so it is perforated away from the casing. As you see, here is this other string of tubing, and each ratch is here.

MR. ERREBO: We would like to have that designated as our Exhibit No. 3.

MR. UTZ: Actually, this -- it wouldn't be necessary to send us a copy of this log, just this one here.

A All right. That's fine.

MR. ERREBO: Do you desire to have a copy, to have the printed information which is before Mr. Nutter?

MR. UTZ: I think we should have copies of that, yes, sir.

MR. ERREBO: We will introduce that, then, as Exhibit No. 4 and ask that we be allowed to withdraw it and make a copy, and submit the copy to you.

MR. UTZ: You can get it to us right away?

MR. ERREBO: Sure can.

A If you would like to have this letter on this particular job, I'll leave it with you.

MR. ERREBO: Would you care to identify those various sheets as Exhibits?

MR. UTZ: It is immaterial to me.

Q (By Mr. Errebo) Do you have anything further that

you care to offer to the Commission?

A No.

Q Your purpose, of course, in being here is to explain to them something which is relatively new, at least insofar as this tool is concerned. I believe you heard the previous witness and the questions which were asked him, and you were present, I believe, during the preceding case --

A Yes.

Q -- and are familiar, then, with the matter which does concern the Commission in the application of these techniques?

A The only thing I would like to make clear is the point that we will bring in a qualified engineer who has run this tool in prior wells successfully to do this work.

MR. ERREBO: I believe that's all we have on direct.

CROSS EXAMINATION

BY MR. UTZ: Mr. Adcock, is the source of radiation the formation in this area that this tool measures, or do you inject the source?

A It will have a source on the tool which will bombard the formation.

Q It measures it in return?

A Yes.

Q Therefore, the tubing will shield the return of the radiation bombardment?

A That is correct.

MR. UTZ: Any other questions --

MR. NUTTER: Yes, sir.

MR. ERREBO: I have no further questions. I would like to offer the Exhibits which have been admitted in evidence following the first two Exhibits in evidence.

Q (By Mr. Errebo) Actually, these are Exhibits which are either prepared by your company, company literature, or they are information which is furnished you, is that correct?

A Yes, sir.

MR. ERREBO: I believe the Exhibits speak for themselves as to the source of preparation.

MR. UTZ: Without objection, they will be accepted.

QUESTIONS BY MR. NUTTER:

Q Mr. Adcock, in response to a question by Mr. Errebo that when this thing first became available for use, and you stated that in November of 1959 the first publicity --

A Yes, sir.

Q -- on the tool was released, how long has the tool actually been in use?

A It was on field test prior to that, and I don't have the exact date. All of our tools before they are put in publicity are field tested. Sometimes those field tests require six months or maybe a year.

Q Well, now, by saying the first publicity, you mean that's when it was first available to the industry?

A Yes, sir. At the present time there are five tools,

I believe, that our company has available.

Q Do you know how many actual jobs these tools have been used on?

A Not the total number, no, sir.

Q Have any of the tools been used on a job which involved three strings of casing in the hole?

A To my knowledge, I'm not aware of three strings; only the dual completions.

Q By having three strings, there is more opportunity of shooting another string of tubing than there is with only two strings in the hole, is there not?

A I don't think that that would have any bearing on the nuclear locator because it would be affected equally by both strings of tubing.

Q It would have more area which would be shielded?

A That is correct.

Q And a smaller area in which it could be shot without damaging another string of casing?

A If the three strings of tubing are in a triangular position, it would have approximately the same area as it would in the other; not quite, but almost.

Q Well, now, Mr. Adcock, I note on these two job reports that you have here --

A Yes.

Q -- on the Texaco well, the remark is made here, the

number of rotations to obtain three hundred sixty degrees, it says it made only ten steps, and on the other well, the number of rotations to obtain three hundred sixty degrees, it says fourteen on the first run. Now, there is considerable difference there, assuming that it would rotate thirty degrees for each step.

A All right, sir.

Q It should take twelve. One took two more and one two less. How reliable is this tool?

A If I may use that letter that I submitted over there that goes with that job report on the -- this report, the first problem that they ran into, which is strictly a mechanical problem in the ratching on your gun, and no gun will be fired unless certainty of being away from the other string of tubing. If there is any trouble, we certainly wouldn't fire it since this is only a mechanical situation whereby you lift up to ratch the gun. He made the remark here that a different cam rack was also used in the second run since the timing adjustment was knocked out of position on the first run, so it apparently damaged the timing position on the first run; so it is more or less a mechanical situation there. There is nothing involved in detonating the gun with it, and certainly if that particular mechanical function fails, we will withdraw the gun and replace it before we do any perforating.

Q Now, in each instance, the tool was run in the hole and ratched around three hundred sixty degrees to get the point where you have the maximum reading, and then returned to that point;

in other words, rotation of more than three hundred sixty degrees made?

A I think it would depend on where you started in your casing. In other words, if you had it oriented such as it was when the changes were oriented with your orientor and you were looking away from the casing, then you would go the full three hundred sixty degrees to locate, to be positive that you are back looking away from the casing. If you started out in such a fashion, that you were just off of the casing, and located the casing and came on around, it may not be necessary to make the full three hundred sixty. That would be up to the discretion -- if the customer would request the full three hundred sixty, we will be happy to do it.

Q It would seem you would be assured that you made a three hundred sixty rotation and find the maximum reading and then return to it, would it not?

A It would. To my knowledge, that has been done on every well in which we had the tool run. If they requested, it was done

Q You don't know the number of jobs it has been used on two strings of casing?

A Not to the total number. The company did not furnish me with the total number of jobs. I requested information for the hearing, and since these were in the area where the tool had been used, they submitted those.

Q Do you know of any jobs in which the tool has been used and another string of casing was perforated?

A No, sir, I certainly do not. If there is any uncertainty as to the direction of the gun, it would be wise to retrieve the tool and start over again and check it. That is one of the things about the nuclear logging tool; it is surface recorded. If we are not getting a pictorial graph of the direction of the gun, then the tool would be withdrawn from the well bore and corrected.

MR. NUTTER: I believe that's all. Thank you.

MR. UTZ: Any other questions?

REDIRECT EXAMINATION

BY MR. ERREBO:

Q Mr. Adcock, you don't know how many times this was tested or over what period of time before it was brought on the market in November?

A No, I don't know the exact time.

Q Do you have any estimate or anything which would give the Commission an idea of how long or how extensively this thing was tested before it was put on the market?

A The majority of the tools that Lane Well has manufactured and put on the open market have been tested from six months to a year and given a thorough test before being put on the market.

MR. ERREBO: That's all.

MR. UTZ: Any other questions? If not, the witness may be excused.

(Witness excused)

MR. UTZ: Do you have anything further?

MR. ERREBO: That's all we have.

MR. UTZ: Any other statements to be made in this case? 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 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 15th day of March, 1960, in the City of Albuquerque, County of Bernalillo, State of New Mexico.

Joseph A. 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. 1911, heard by me on Feb. 25, 1960.

New Mexico Oil Conservation Commission, Examiner