BEFORE THE
OIL CONSERVATION COMMISSION
HOBBS, NEW MEXICO

IN THE MATTER OF:

Case No. 1636

TRANSCRIPT OF HEARING

APRIL 15, 1959

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BEFORE THE
OIL CONSERVATION COMMISSION
HOBBS, NEW MEXICO

IN THE MATTER OF:

Case 1636 Application of the Atlantic Refining Company for an amendment of Rule 115 of the Commission Rules and Regulations. Applicant, in the above-styled cause, seeks an order amending Rule 115 of the Commission Rules and Regulations insofar as said rule is related to required pressure rating of wellhead equipment.

Hobbs Auditorium
Hobbs, New Mexico
April 15, 1959

BEFORE:

A. L. Porter, Jr.
Murray Morgan
Governor John Burroughs

TRANSCRIPT OF HEARING

MR. PORTER: The next case to be considered will be Case 1636.

MR. PAYNE: Case 1636, "Application of the Atlantic Refining Company for an amendment of Rule 115 of the Commission Rules and Regulations."

MR. HINKLE: If the Commission please, in Case 1636 we have one witness which I would like to have sworn.

MR. PORTER: Will the witness stand, please?

(Witness sworn in.)

MR. HINKLE: For the information of the Commission, this is the application of Atlantic to amend Rule 115. I want to read

the rule as it now stands and the proposed amendment of Atlantic. This is Rule 115, Well and Lease Equipment: "Christmas tree fittings or wellhead connections with a working pressure equivalent to at least 150 per cent of the calculated or known pressure in the reservoir from which production is expected shall be installed and maintained in first class condition so that on flowing wells, gas-oil ratio, static bottomhole or other pressure tests may be easily made. Valves shall be installed and maintained in good working order to permit pressures to be obtained on both casing and tubing. Each flowing well shall be equipped to control properly the flowing of each well, and in case of an oil well, shall be produced into an oil and gas separator of a type generally used in the industry."

Here is the proposed amendment of Atlantic's: The heading would be the same. "Christmas tree fittings or wellhead connections shall be installed and maintained in first class condition so that on flowing wells, gas-oil ratio, static bottomhole or other pressure tests may be easily made. For oil wells, the christmas tree shall have a test pressure rating at least equivalent to the calculated or known pressure in the reservoir from which production is expected." Now, that's instead of 150 per cent. "And for gas wells, the christmas tree shall have a test pressure equivalent to at least 150 per cent of the calculated or known pressure in the reservoir from which production is expected. Valves shall be installed and maintained in good working order to permit pressures

to be obtained on both casing and tubing. Each flowing well shall be equipped to control properly the flowing of each well, and in the case of an oil well, shall be produced into an oil and gas separator of a type generally used in the industry."

We have several exhibits, copies of which each of you have, including the staff, and these exhibits are enlarged and will be referred to by the witness.

HENRY W. NIPPERT

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

DIRECT EXAMINATION

BY MR. HINKLE:

Q State your name, please?

A Henry W. Nippert.

Q By whom are you employed?

A Atlantic Refining Company, Dallas, Texas.

Q In what capacity?

A As a production engineer in the remedial and completions group with the Dallas staff.

Q Are you a graduate engineer?

A Yes sir, I am.

Q From what school?

A I received a BS degree in petroleum engineering from the Texas Technological College in 1940.

Q Have you practiced your profession since that time?

A Yes sir, I have.

Q State briefly to the Commission your experience, practical experience that you have had?

A Immediately after graduation from college in 1940, I accepted a position with Beckman, Incorporated, out of Odessa, Texas as a roughneck. I roughnecked approximately fifteen months, at which time I entered the U. S. Air Force. After I served four and a half years in the U. S. Air Force, I went to work for the Texas Company at Pampa, Texas as a roustabout. My experience with the Texas Company, in working for the Texas Company, rather, I progressed from a roustabout to a petroleum engineer trainee to a junior petroleum engineer,petroleum engineer, field engineer, area engineer, assistant district engineer and finally district engineer. My last position with the Texas Company was district petroleum engineer at Midland, Texas. During that time, I frequently made trips to New Mexico as that was under the jurisdiction of the Midland office. After leaving the Texas Company, I accepted a position of assistant production superintendent with the Ann Lee Company out of Dallas, Texas, but I was stationed in Midland; I worked for the Ann Lee Company approximately a year and a half and then accepted this present job with Atlantic Refining Company in Dallas.

Q In connection with this proposed amendment of Rule 115, have you made any study or survey of well conditions in New Mexico, in Southeastern and Northwestern New Mexico?

A Yes sir, I have.

Q What was the nature of the study that you made?

A Well, first of all, so that I might have an accurate determination of the bottomhole pressures, I made an analysis of the drill stem tests conducted on the Atlantic wells, bottomhole pressure surveys conducted on the Atlantic wells, and I also referred to the annual publication of the New Mexico Oil and Gas Conservation Commission Engineering Committee.

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

MR. PORTER: Yes sir, they are.

(Thereupon, the document was marked as Atlantic's Exhibit Number One for identification.)

Q (By Mr. Hinkle) Now, Mr. Nippert, if you will refer to Exhibit One on the board here and explain to the Commission what it is and what it shows?

A Exhibit One of the Atlantic Refining Company is simply a chart that shows the pressure ratings of the wellhead that are available under API specifications. The main purpose of this exhibit is to show the large steps or pressure differential that exists between some of the higher pressures. For example, you'll note that the working pressure goes in steps from 3,000 to 5,000 to 10,000. And we hope to show by this exhibit that we don't have much choice in the actual selection of the christmas

tree, that it is pretty much decided for us by custom and by the manufacturers. So therefore, if we have a well that should require a 6,000 pound christmas tree by a 6,000 pound working pressure, we would have no choice, since there isn't a 6,000 pound christmas tree, we would have to step up to the 10,000 pound. These are all --

Q These are all of the sizes established by the manufacturers?

A Yes, by the manufacturers.

Q Manufacturers of the equipment?

A Yes, sir.

(Thereupon, the document was marked as Atlantic's Exhibit Number Two for identification.)

Q (By Mr. Hinkle) I'll refer you to Exhibit Number Two; will you explain to the Commission what that is?

A You will note that Exhibit Two of the Atlantic Refining Company shows approximate cost of christmas trees. You will note that we have used the word approximate, even though actual dollars and cents are used on the table. The reason for this is Atlantic buys their christmas trees from four major manufacturers and these figures that I have used here represent an average cost of the four manufacturers. You'll note that I have broken it into two parts, the single string completion and the dual parallel string completion, and this simply shows the comparison in the

cost between the single and the dual, and the various pressure ratings. One thing perhaps I should elaborate on here, you'll note that there are two 3,000 pound working pressures on the 6,000 pound test on the dual parallel string. The reason for that is, this first type is a cheaper type, the one used with the single master valves, and the second used is the old interval block master valve, which would be more appropriate for heavier duty or off-shore type locations.

(Thereupon, the document was marked as Atlantic's Exhibit Number Three for identification.)

Q (By Mr. Hinkle) Now, refer to Exhibit Number Three and explain to the Commission what that is and what it shows?

A Exhibit Three of the Atlantic Refining Company is the effect of the proposed rule change on christmas trees for oil wells. The first column on the left indicates the depth of the well in feet; the second column, the approximate bottomhole pressure of the well for the given depth; the third column, the weight of the oil column for that given well with the bottomhole pressure that we are using, and the fourth column represents the tubing pressure at the surface, which would be actually the pressure exerted at the wellhead at the time.

Now, I would like to point out to the Commission at this time that in arriving at this bottomhole pressure, I used the figure of .4 pounds per foot. The tubing, the oil column is

based on what we think is a typical or average well in New Mexico, of 2500 pounds per foot.

(Thereupon, the document was marked at Atlantic's Exhibit Number Four for identification.)

Q (By Mr. Hinkle) Now, refer to Exhibit Four and explain to the Commission what that is?

A I haven't finished.

Q Excuse me, go ahead.

A In the fifth column, I have depicted the type of tree that would be required on these specific examples, wells, by the present Rule 115; and in the last column on the right, I have shown what working pressure would be required should the Commission find out suggestion acceptable.

Q Now, refer to Exhibit Four and explain what that exhibit is to the Commission?

A Exhibit Four of the Atlantic Refining Company shows the effect of the proposed rule change on christmas trees for gas wells. The tables or the columns you will note are quite similar to the ones that we have seen on Exhibit Number Three with the exception of the fact that here we have a gas column weight and a gas tubing pressure due to the weight of the gas column. Now, in this particular case, our assumption is the bottomhole pressure is still the same, of course, but due to the fact that we can be more specific with gas and we don't have so many

unknown factors to throw in, and by assuming that this is strictly a dry gas area as such, we can actually calculate what these pressures would be, and this is the basis for the pressures shown in the gas column. It is a dry gas on a methane basis.

Q Now, one of the purposes, I take it, of this suggested amendment is to affect economy by reason of the fact that the present rule requires the use of more expensive equipment than is necessary, is that right?

A Yes sir, that's correct.

Q Can you point out by taking for instance, referring to Exhibit Three, the equipment which is necessary under the present rules say at a depth of 10,000 feet --

A Yes, sir.

Q --and compare it with the cost of equipment which would be required under the amended rule to see what the saving would be?

A Yes sir, I can take a depth of 10,000 feet. We would expect to have a bottomhole pressure of 4,000 pounds and an oil tubing pressure of approximately 1500 pounds. Now, according to our present Rule 115, it would be necessary for us to install a 10,000 pound working pressure tree on this well since the rule requires the working pressure of the tree to be one and a half times the bottomhole pressure, or 6,000 pounds. Under our suggested change to the rule, we believe that a 2,000 pound working pressure tree would be adequate for that well, and I'll

show what the actual savings would amount to. As we have noted that a 10,000 pound pressure tree would be necessary, in which case with the single it would cost $7,043.60, whereas we feel that a 2,000 pound tree would be adequate, in which case it would cost $1,823.67. Now, should that well be a dual, the savings will be even more spectacular. For a 10,000 pound working pressure, the cost would be $13,521.36 as compared to $3,301.40.

Q The first instance you mentioned there, there would be a saving of a little over $5,000.00, would there not?

A Yes, sir.

Q Now, would comparable savings be made in practically all instances and be considerably greater as you get deeper?

A Yes sir, they would be made in practically all cases, and as you pointed out, they would become more appreciable with increased depth.

Q Can you state to the Commission whether or not your proposed rule will afford just as much safety in operation as the present rule?

A Well, obviously we can't say that this rule will afford as much safety because we don't have as much actual safety factors, so to speak, to rely on, but we do feel that the rule will be adequate for all conditions of oil and gas production.

Q The present rule in some cases requires equipment which is all out of reason as far as the safety factor and the economics are concerned?

A Yes sir, that's quite right. We have recently completed a dual well which was required by Rule 115 to have a 5,000 pound working pressure tree on it; the deepest tubing string in the well has a tubing pressure of approximately 1200 pounds and the shallowest tubing string has a pressure of approximately 800 pounds.

MR. HINKLE: That's all the questions we have of the witness.

MR. PORTER: Anyone else have a question of Mr. Nippert?

CROSS EXAMINATION

BY MR. NUTTER:

Q Mr. Nippert, I believe API specifications require that each tree actually be tested to this working pressure, do they not, or is it required to be tested to the test pressure?

A Yes sir, a test pressure, Mr. Nutter. The procedure for doing that is that the manufacturer, when he assembles a tree, he fills it with cold water and he brings it up to test pressure and holds it for three minutes, then he releases that pressure to zero and again brings it up to test pressure.

Q So every tree that we have in the field is rated at a 10,000 pound test, we know has actually sustained the 10,000 pound testline?

A Yes sir, definitely.

Q Now, what about, is there any evidence that as these trees are in place on a well for a long period of time, that they

may deteriorate with age, that the steel may become more brittle or affected by pressure?

A Well sir, there's several things that would enter into that, of course, up in some of our northern states, I have not heard of any occasions here where they become affected by what we call hydrogen embrittlement, and as you pointed out, as the tree becomes older, it loses some of its strength due to that; however, as I say, I don't know of any case in New Mexico. Another thing that would tend to weaken it tree would be corrosion.

Q As a general rule, does it take quite a long while for this to occur, the corrosion, the corrosive element and the hydrogen embrittlement?

A Well, the hydrogen embrittlement can occur fairly rapidly, and of course the degree of severity of the corrosion would govern how long it would take to endanger the tree. Actually, as far as practical purposes, I have seen trees whose thickness has been reduced by 30 or 40 per cent by corrosion and yet we've still had them in use.

Q I suppose that as a general rule if it takes a period of time for these conditions to occur, the bottomhole pressure in the reservoir is going down, anyway?

A Yes sir, and usually you'll have some indication by your pulling jobs, you will find corrosion in the tubing, and when that shows up, of course you immediately start doing something about it, perhaps injecting an inhibitor down the tubing and tree,

so perhaps you'll arrest the corrosion right at that point.

Q In the calculation that you made here on Exhibit Four for the gas column that would be in the well, and then to offset the high pressure at the bottom of the hole, you have used the more severe conditions of completely dry gas in that calculation?

A That's correct, I have used methane, which is the most severe condition. So actually, you would never have a pressure that high on the well, that is, I would say 99 per cent of the time. I don't know of any well that's making pure methane gas.

Q As I understand your proposed rule, you are still throwing in a safety factor on those gas wells?

A Yes sir, there is. There is a safety factor that's not publicized by wellhead manufacturers themselves, in that the actual capacity, so to speak, of this head is perhaps four times the working pressure shown.

Q You can't depend on that, though, can you?

A No; as I say, that isn't the literature, but it actually exists. I think that's brought out many times now due to the present day fracturing practices where many operators go up to and exceed the test pressure in fracturing wells.

Q What is this .4 pounds per foot pressure rating that you used based on, Mr. Nippert?

A Well sir, that's based on the results of drill stem tests, bottomhole pressure surveys and also, as I mentioned earlier, Mr. Nutter, it is based on actual figures that appear

in the annual report of the New Mexico Oil and Gas Engineering Committee.

Q That appears to be an established gradient that is in existence here in New Mexico?

A Yes sir, it sure it.

Q How about this .25 pounds for the oil column, what is that based on?

A Well, that's based on our experience with Atlantic wells, that it would be a typical flowing pressure of an average well here in New Mexico.

Q I see. And I didn't get that gradient that you used for your dry gas, what was that, sir?

A Well, sir, I didn't give any specific figure since it is a variable--actually, as I recall from memory, it varies from .008 to about .157 at 25,000 feet, but that was arrived at those exact figures by using the general gas equation for each 1,000 foot interval.

Q Mr. Nippert, does your proposed rule provide that these wells shall have a tree on oil wells with a test pressure equal to the bottomhole pressure?

A Yes sir, that's correct.

Q And on the gas wells, a test pressure equal to 150 per cent of the bottomhole pressure?

A Yes, sir.

Q That's test pressure in both cases?

A Yes, sir.

MR. NUTTER: Thank you, that's all.

MR. PORTER: Anyone else have a question of Mr. Nippert? You may --

MR. HINKLE: I have one or two other questions.

REDIRECT EXAMINATION

BY MR. HINKLE:

Q Referring to the questions by Mr. Nutter, Mr. Nippert, in regard to the deterioration of the equipment with time, isn't it true in connection particularly with oil wells, that during the life of the well the pressure goes down and the equipment doesn't have to be of the same strength?

A Yes sir, that's true.

Q One would kind of offset the other?

A That's correct.

Q Are any more stringent rules than you propose here required in Texas or any of the other States?

A No sir, there are not; in fact, they are less stringent in Texas than actually required here.

MR. HINKLE: That's all.

RECROSS EXAMINATION

BY MR. NUTTER:

Q You mean they are less stringent in Texas than the rule you have proposed or less stringent than the existing rule?

A Well, sir, in both cases. Actually, the requirement

in Texas is that the test pressure of the tree be equal to the bottomhole pressure, that's test pressure of the tree, be equal to the bottomhole pressure. That applies to both oil and gas wells.

Q So in other words, your rule is identical with the Texas rule except that you throw in a 150 per cent safety factor for gas wells?

A Yes sir, that's right.

MR. NUTTER: Thank you, that's all.

MR. PORTER: Anyone else have a question?

REDIRECT EXAMINATION

BY MR. HINKLE:

Q Did you prepare all of these exhibits or were they prepared under your direction?

A I made the actual calculations and the Drafting Department prepared them under my --

Q Under your direction?

A Yes.

MR. HINKLE: I would like to offer in evidence Atlantic's Exhibits One through Four inclusive.

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

The witness may be excused.

A Thank you, sir.

(Witness excused.)

MR. PORTER: Anyone else have a statement to make, any comments on Case 1636?

MR. ANDERSON: R. N. Anderson, Sinclair Oil and Gas Company. We concur with Atlantic on their modified State-wide Rule 115.

MR. KASTLER: Bill Kastler appearing for Gulf Oil Corporation. Gulf also concurs with Atlantic's application in this case.

MR. PORTER: Any further comments on the case?

MR. PAYNE: Here is a statement that Pan American Petroleum Corporation has asked to be entered in the record: "Pan American has had an opportunity to study Atlantic's proposed revision of Rule 115. It is our opinion that Atlantic's revision is an improvement of the present rule and Pan American urges that the Atlantic's request be approved."

We have also received a statement of "None opposition" from the Texas Company.

MR. PORTER: Is there a difference between support and none opposition?

MR. PAYNE: In my mind, there certainly is.

MR. PORTER: If there's nothing further in this case, we'll take the case under advisement. Since the Commission will not have time to conclude any of the other cases, except possibly the nomenclature cases this afternoon, we will recess the hearing until nine o'clock tomorrow morning. (Hearing recessed.)

STATE OF NEW MEXICO)
: ss
COUNTY OF BERNALILLO)

I, JERRY MARTINEZ, Notary Public in and for the County of Bernalillo, State of New Mexico, do hereby certify that the foregoing and attached Transcript of Hearing were reported by me in Stenotype, and that the same was reduced to typewritten transcript by me and contains a true and correct record of said proceedings, to the best of my knowledge, skill and ability.

DATED this 16th day of May, 1959, in the City of Albuquerque, County of Bernalillo, State of New Mexico.

Notary Public

My Commission Expires:

January 24, 1962