BEFORE THE
OIL CONSERVATION COMMISSION
SANTA FE, NEW MEXICO

IN THE MATTER OF:

CASE NO. 1449

TRANSCRIPT OF HEARING

May 28, 1958

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BEFORE THE
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IN THE MATTER OF:

CASE NO. 1449 Application of Graridge Corporation for an exception to Rule 309 of the Commission Rules and Regulations. Applicant, in the above-styled cause, seeks an order permitting the consolidation of tank batteries to receive the production from more than sixteen wells in the North Caprock Queen Unit No. 1 in Chaves and Lea Counties, New Mexico, which was established by Order No. R-1145. The applicant further seeks permission to install automatic custody transfer equipment on the above-referenced Unit.

BEFORE:

Elvis A. Utz, Examiner

TRANSCRIPT OF PROCEEDINGS

MR. UTZ: The hearing will come to order, and the next case is 1449.

MR. PAYNE: Application of Graridge Corporation for an exception to Rule 309 of the Commission Rules and Regulations.

MR. ELLIOTT: Mr. Examiner, R. L. Elliott, vice-president and general counsel of Graridge Coporation. Our application is two-fold: One is for the exception to Rule 309 for consolidation of more than sixteen tank batteries, and secondly, for approval of

this Commission for the installation of automatic custody transfer equipment. I have three witnesses.

MR. UTZ: Let the three witnesses stand to be sworn.

(Witnesses sworn)

THOMAS FORD,

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

DIRECT EXAMINATION

BY MR. ELLIOTT:

Q Will you state your name, address, Company and position with that company?

A I am Thomas Ford with Graridge Corporation, Breckenridge, Texas. I am manager of production.

Q Mr. Ford, will you state your -- tell the Examiner your education?

A I graduated from Texas A & M College in 1946 with a degree in petroleum engineering, and a degree in mechanical engineering.

Q What is your experience since graduation?

A I worked for ten years for an independent producer as engineer and production superintendent. During that time, I installed -- designed and installed and operated several water floods and did all types of production problems that came along. For the past two years I have been with Graridge Corporation in my present capacity, and have dealt with all types of production problems including water flood experiences in Texas and New Mexico.

Q Have you had experience with the water flood operations of Graridge in the Caprock area?

A I have.

Q And also for the Ibex Company in Eddy County?

A I have.

Q Are you familiar with the application that we have on this hearing? A I am.

MR. ELLIOTT: Mr. Examiner, would the qualifications and education as set forth by Mr. Ford qualify him as an expert before this Commission?

MR. UTZ: His qualifications are acceptable.

Q Mr. Ford, I hand you here a plat. Will you tell the Examiner what that is?

A This is a plat of the Graridge Corporation North Caprock Queen Unit in Lea and Chaves Counties, New Mexico, showing the unit area outlined in hashed marks, showing the present tank batteries, showing the present water injection plant, the proposed water injection plant, and the flow lines in the area.

Q Did you prepare this Exhibit?

A I did.

MR. ELLIOTT: Mr. Examiner, at this time I would like to introduce this Exhibit as Exhibit No. 1.

MR. UTZ: Do you have other copies of this Exhibit?

MR. ELLIOTT: Yes, sir.

Q Mr. Ford, according to this Exhibit, you have shown on here the present tank batteries existing on the North Caprock Queen Unit, is that correct? A Yes.

Q In other words, the red dots as shown there are the present tank batteries existing -- A Correct.

Q How many are there? A Twenty.

Q Now then, the lines which are connecting the batteries and wells indicate the present flow lines from the present producing wells to the tank battery? A That is correct.

Q You show a water -- a present water injection plant. Now, which one is the location of that?

A The one about the middle of Section 31.

Q Now then, you have another shown as a proposed water injection plant?

A Yes. That is in Section 7, the northeast quarter.

Q That particular plant is not in existence but one that is planned on further expansion of the unit?

A That is correct.

Q Mr. Ford, I have here Exhibit 2. Would you tell the Examiner what this is?

A This is a map of the same area showing the proposed flow line and tank battery arrangement, the arrangement that we propose to put into effect if we are approved here. It shows the one central tank battery which we propose which is -- do they have copies of this? It shows the one central tank battery which we propose

as indicated by the red triangle. It shows the flow line system which we propose. It shows the present water injection plant to the north, and the one to the south indicated by the same symbol in this case. It shows all of the proposed water injection wells. It shows the free water knockout equipment placed at three different points in the flow line system to extract the water from the produced fluid and it shows the lines where the produced water will be returned to the water injection plants to be returned to the formation. These lines are indicated by the heavy blue lines. The two north free water knockouts will return the water to the north plant, and the south free water knockout will return the water to the south plant.

Q As I understand it, this particular Exhibit shows the producing wells in the North Caprock Queen Unit which has been approved by this Commission as they will be connected through the flow line shown on this plat to the central tank battery in the northeast quarter of the northeast quarter of Section 6?

A That is correct.

Q Now, this water flood project, I assume, will in the near future be producing water along with the oil,and this blue line on the Exhibit indicates a return for this water -- produced water?

A Yes, it returns it to the water injection plants where it can be reinjected into the ground.

Q You mentioned this free water knockout point here. Is that the measure taken to try to free the oil of all the water before

it gets into the central tank battery?

A Yes, that is the purpose. A free water knockout is a piece of equipment designed to separate water from oil, and rather than take all of the water to the central tank battery and then extract it, we are extracting it there and two other places as well.

Q Do you have any other observations to make about this plat? Is there anything on there that you haven't mentioned that you want to?

A No, except that the plat does show the simplicity of our collection system for our produced water, which we have only three relatively short lines to handle all of our produced water, whereas, back in Exhibit 1, if we were not allowed to consolidate tank batteries, we would have to run a produced water line from every battery back to the injection plants so this water could be reinjected.

Q In other words, the blue line that you show twice on Exhibit 2 would have to be done twenty times under the present system?

A That is correct. Of course, it would be possible that one line could be extended to take care of two or three different batteries, but every red dot would -- that would be a producing battery, would have to be connected to the injection plant.

Q Mr. Ford, how many producing wells are there in this unit?

A Roughly sixty-two. No, I believe it is fifty-six at this time. Six of them are temporarily abandoned.

Q And these fifty-six wells are now producing into 20 different tank batteries? A That is correct.

Q And under this application, it is your proposal to produce these fifty-six producing wells into one central tank battery?

A Yes. As time goes on, though, as shown on this Exhibit No. 2, certain of these wells would be converted to injection wells, and then, of course, would not be -- would not go to the battery.

Q When the unit is finally completed as to the injection wells, how many producing wells will that leave?

A Out of the original pattern there are still two tanks that are not in. I believe that leaves seventy tanks that are in. Theoretically, there would be thirty-five injection wells and thirty-five producing wells.

Q And the final outcome would be thirty-five wells tied into one central tank battery? A That is correct.

Q Mr. Ford, will you explain to the Examiner the importance of this operation in the saving of manpower and efficiency of operation?

A I estimate that this consolidation will save us ten or fifteen thousand dollars at the minimum in lines to gather produced water. I estimate that it will save us two hundred and forty man hours per month in gauging and treating oil. I believe that we will save ourselves and the State and our partners considerable money by giving -- being able to better treat our oil at one central

system. Also, in a water flood there is a great deal of water produced and considerable treating problems; by having it all at one place, we feel that we can put in an adequate treating plant too, to do a very efficient job.

Q In other words, it is your opinion that if this system is approved and set up that it will probably save waste and increase the production, which can be sold ultimately?

A That is correct.

Q Is there any way that you can see that it would reduce the amount of production that could ultimately be produced?

A No.

Q In other words, it is your opinion that it can only create more efficiency and additional production by being able to efficiently being able to handle it in this manner?

A Yes. I would say in that connection that -- something that you haven't brought in, that these wells will have to be adequately tested, and it would be possible to result in waste if you did not keep adequate control of your water flood by not knowing what the individual wells did.

Q In other words, you will continue to keep a test on the individual wells periodically to know what they are making?

A That is correct. There will be a well test on every well every month.

Q In other words, you propose to set up a program after this is put into effect to test each well every month?

A Thatis correct.

MR. ELLIOTT: Mr. Examiner, inasmuch as this deals with two parts, would you like to question him before we go into the automatic custody transfer part?

MR. UTZ: You are going to question this witness with regard to automatic custody transfer too?

MR. ELLIOTT: Yes.

MR. UTZ: I think you can go ahead.

Q (By Mr. Elliott) Mr. Ford, I have here a diagram. Will you tell the Examiner what it is?

A This is a flow diagram of the proposed automatic custody transfer system to be used in this North Caprock Queen Unit.

Q I would like to introduce this as Exhibit 3. Mr. Ford, did you help prepare this or design this particular A C T unit?

A Yes, sir.

Q Will you start out with your unit and follow through the whole system and explain to the Examiner as best as you can this particular setup?

A On the top left-hand corner you have the inlet to the whole system. At this point, your produced fluid from the wells is coming into the system. First it comes into a ten-foot by twenty-foot horizontal knockout. This separates the water and allows it to go into your water disposal system. Coming out of the top of this free water knockout, the oil comes up and goes into the top of the heater treater. This is a twelve by twenty-seven and a half foot type H B natural automatic heater treater and de-

signed to have capacity to handle considerably more fluid than we'll be likely to produce. If water should get over in this and be treated out as a result of the heat treatment, it will come out the bottom of the heater treater and go to the water disposal. The oil goes from the top of the heater treater over to what we call a settling tank. It goes down through the top of the tank through a perforated down comer to the bottom of this cone bottom settling tank. This tank, in formal operation, runs -- stays full up to the bypass line, which is shown going over to the adjoining tank. Located near the bottom of this tank is a circuit of pipe on which is located a five gallon pump which circulates oil out of the tank through a regular BS and W minitor and back into the tank. This monitor determines the percentage of BS and W in the oil that is circulated past its probe. If this BS and W reaches a high content -- it will probably be set at one half of one percent -- then the monitor will activate the shut-in valve up on the bypass line to the adjoining tank; close that valve and at the same time it will activate a fifty barrel per hour pump which will take oil off of the bottom of this cone barrel tank and circulate it back through the heater treater. This oil will also -- this 50 barrels per hour pump will also be activated by a time clock once or twice a day to take the bottom off of this cone bottom settling tank. We feel that we will get very excellent treatment here and have a very minimum of waste. After the oil -- well, first, let's assume that the shut-in valve -- that the BS and W

monitor has detected bad oil and has shut the valve at the top. In this case we have bad oil in our tank, and the fluid level rises until it reaches about the nineteen foot level in this twenty foot tank, at which point it bypasses out and goes to these three overflow tanks where we store bad oil, should any be produced, should this system fail in any manner. So there is a provision for -- if the pipeline pump doesn't work, if anything goes wrong with the system, the system does go ahead and produce. Bad oil is pulled into these five hundred barrels overflow tanks. Going back to normal operation, with the shut-in valve working normally, the oil goes from the settling tank into the pipeline run tank again, down through a perforated riser, down comer, I believe it is called, and from there the oil is taken out through the normal pipeline outlet and brought down and around to the pipeline pump. At the pipeline pump, this pump will be about a hundred and fifty barrel an hour pump designed to work.--It will be a centrifugal pump -- designed to work at constant pressure; just past the pump there will be a pipeline sampler. These two items will be furnished by the pipeline and will be built to their specifications, and also to those specifications that I mentioned. From there the oil goes through a strainer, through a gas eliminator and through the positive displacement meters. These meters are S 12, I believe A. O. Smith S 12 meters, and they have a capacity of about 170 barrels per hour. The meters are arranged in tandem. Normally, one meter will be used and the other cut off, but both meters will be available for

use any time, or both meters can be run in tandem at the same time. As the fluid passes the meter, it comes to a back pressure valve. This is a constant pressure -- back pressure valve which keeps a constant pressure on the meter system at all times because the meters will act -- will operate more accurately at a standard pressure and a standard rate of through-put. From there the oil normally goes on through the pipeline. This back pressure valve is often necessary in this case because oil will drift into the pipeline if it were not for a back pressure valve. In normal operations, which is mainly what we have been covering so far, these meters are tested at regular intervals in this ten-barrel meter prover. This meter prover is a ten-barrel tank and is reduced in size at top and bottom and calibrated very carefully to hold exactly ten barrels and a hundredths of a barrel above or below. A vernier can be determined in normal operations. You prove these meters by running ten barrels through the meters, then checking it with this meter prover. These meters are temperature compensated and have ticket printers on them so that you can -- so that they actually compensate for temperature as they run. The meter prover is equipped with thermometers and everything necessary to determine the temperature so that you may accurately calibrate your meters. Normally, your meters do not read exactly ten barrels when the meter prover -- when you run ten barrels through there, the meter prover will not reflect exactly ten barrels, but very close to ten barrels and a correction factor is applied to the meters based on the results of this meter prover reading. You

will note that this sytem is also arranged so that should the meters have trouble or anything go wrong in the LACT unit, that you can continue to produce good oil and put it in all of the storage tanks and be able to run the oil as you would normally from any tank battery by opening and shutting the proper valves.

Q Mr. Ford, what are the chances of this metering system being erroneous?

A They are mechanical, and as such, are subject to failure. The principal failure that has been experienced so far has been water off the meters due to salt or some other foreign substance in the oil. It is the plan of the pipeline company and ours to test these meters into the meter prover every day until -- for possibly two weeks, until we are satisfied that they are reading correctly, and then we will probably set them up for a weekly test period for a while and eventually to a monthly reading. If the meters are showing water, there is a certain definite maximum that we would allow them to show in a month's time, and should they show more than that, then we would discontinue using that meter. The amount of variation that they can show in a month's time is one barrel in four thousand.

Q How does that compare to the margin of error in manual gauging?

A There is not any way to really say that. They have run tests and put ten good pipeline gauges out to gauge ten tanks, a bunch of tanks in a row, and they find that they get a different answer on every one of them. I would say that it is probably normal to have a

quarter of an inch error in a five-hundred-barrel tank, which would be roughly three-tenths of one percent. The maximum that we could allow this meter to vary during a month would be only a tenth of that much, or a little less than a tenth of that, or .025 percent.

Q Then, it is your opinion that this LACT unit will definitely have more accurate measurement throughout the weeks and months than it could be done by the best gauger?

A That is correct.

Q What are the safeguards against the BS and W slipping through this filtering tank you've got and into the system? Is that pretty well controlled where it is going to be treated and cannot get loose into the system?

A Yes. First, you have your BS and W monitor which is catching it there in the first tank. By the time that first tank gets half full,the BS and W which is half of one percent, the pipeline will accept up to one percent, but when the oil in that tank gets up to a half of one percent, the oil is circulated back for retreatment. So we have that first safety factor, and if that should fail, it is conceivable that that thing could fail, though it is possible to walk up to this monitor and read directly the percent of BS and W going by it at any time -- still, if that should fail,you would be building up BS and W in your settling tank. You would have a small amount of room in your pipeline run tank and then you would actually run oil on through your pipeline system and sell it to your pipeline, but again, there would be a sampler before the fluid goes through the

meters and that amount of BS and W that does get by would be reflected in your samplers.

Q The proposal is to run all the oil from this unit into one central tank battery, and this LACT system will meter the oil out of this one central tank battery?

A That is correct.

Q Mr. Ford, I have here a letter that you are supposed to have written to Service Pipeline Company that explains this system to a certain extent. Would you verify that that is the letter that you wrote?

A Yes, this is the letter that I wrote to Mr. C. E. Wilson of Service Pipeline Company.

MR. ELLIOTT: I would like to introduce this as Exhibit 4 for your personal information, and also I should like to enter in evidence a reply and approval by Service Pipeline Company to that letter as Exhibit 5.

Do you have any further statements to make?

A No. I believe that's all we have.

MR. UTZ: Is there any question of the witness?

CROSS EXAMINATION

BY MR. UTZ:

Q Mr. Ford, what type of tests do you anticipate making for the individual wells?

A I propose a trailer mounted portable test unit that will have individual meters on it and will individually measure your oil

and your water.

Q And how often will you test these wells?

A At least once a month.

Q Once a month. Is this entire area unitized?

A You are referring to this Exhibit 1?

Q Yes, sir.

A Yes, that within the hashed marks, and you will note, though, that this one on the left hand side, this Ambassador State "N" is not in the unit as of this date. And the Texas Company up here in the, I believe it is the northwest of the northwest of 32, is not in the unit as of this date.

Q Do you anticipate the Ambassador 40-acres will become a part of this unit?

A We anticipated that, to begin with. I don't know the status of that well at this time.

Q You are not making application at this time to include that well in this application, are you, automatic custody transfer and --

A No, we are not. It will be water injection well if it does come into the unit.

MR. UTZ: Does anyone else have any other questions of the witness?

MR. ELLIOTT: I would like to get one more question in there.

REDIRECT EXAMINATION

BY MR. ELLIOTT:

Q Mr. Ford, when do you propose to start the installation of this central type battery and this automatic custody equipment?

A As soon as approval is obtained and equipment can be obtained. The approximate -- it will take approximately a month to get some of the equipment on hand.

MR. ELLIOTT: That's all.

A I might say that some of the wells in the south part of this flood will probably not be put on into the central tank battery until such time as the water flood progresses down that way. It wouldn't be an instantaneous thing.

MR. UTZ: The witness may be excused.

(Witness excused)

W. R. WILLIS,

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

DIRECT EXAMINATION

BY MR. ELLIOTT:

Q Mr. Willis, will you state your name, address, company and position?

A W. R. Willis with the National Automatic Tank Company, Wichita Falls, Texas, as district manager.

Q Mr. Willis, have you have considerable experience with this automatic custody transfer equipment in the last few years?

A Yes, sir. I have been with National Tank Company twenty years, and for the last eighteen months I have been interested in

LACT operations in the central Texas area.

Q Have you personally followed the installation of one or more of these units in areas in Texas, New Mexico or Oklahoma?

A Yes, sir. We have done design work for Shell, and The Texas Company at the present time.

Q Did you assist in designing this particular LACT unit?

A Yes, sir, I did.

Q Was this diagram drawn at your instance and request?

A Yes, sir. Sketches were sent in to our drafting department to prepare this paper.

Q From your experience and the experience and recommendations of your engineers, do you feel that this system will work on the Caprock unit?

A Yes, sir, we do.

MR. ELLIOTT: That's all. Do you have any questions?

MR. UTZ: Perhaps he can answer one question.

CROSS EXAMINATION

BY MR. UTZ:

Q Let's see, is the water knockout after the tank battery or before?

A Prior to the entrance to the treating unit, sir.

Q Is the treating unit before --

A Yes, sir, the treating unit is ahead of the settling tank. The horizontal free water knockout comes in the stream prior to the entrance of the oil to the heat treater unit, and then the clean

oil leaves the heat treater unit and goes into the six hundred barrels settling tank.

MR. UTZ: Are there any other questions? If there are no other questions, the witness may be excused.

(Witness excused)

J. C. DODSON,

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

DIRECT EXAMINATION

BY MR. ELLIOTT:

Q Mr. Dodson, will you please state your name, address, company and position with that company?

A J. C. Dodson, district superintendent of the Lovington district for Service Pipeline Company.

Q Mr. Dodson, are you familiar with the diagram of the LACT unit that we have been discussing here in this hearing?

A Yes, sir.

Q Have you and your company had an opportunity to approve or disapprove the installation of this unit on the North Caprock Queen Unit?

A Yes, sir. At a joint meeting of our district and division management, along with the engineers, we did study the equipment and arrangement and approved it.

Q Your company has approved the installation of this equipment?

A Yes, sir.

Q There was some discussion by Mr. Ford about checking this unit for a period of time to determine its accuracy. What is your proposal, if the approval is given for this installation and it is made, in the way of checking this to determine accuracy?

A Yes, sir, we plan to check it until such time as we know that it is accurate; that it is measuring quality and quantity accurately.

Q And your company is willing to accept this metering device as being accurate for oil purchased by you from these properties?

A Yes, sir. At the end of the test period, if it proves that it does determine quality and quantity, then Service Pipeline Company will accept it.

Q Do you have any further statements you would like to make in connection with this?

A I believe not.

MR. ELLIOTT: That's all.

MR. UTZ: Are there questions of the witness? If there are none, the witness may be excused.

MR. ELLIOTT: Mr. Utz, I would like at this time to offer in evidence the five Exhibits which I have given you and ask that they be accepted.

MR. UTZ: Is there objection to the entrance of the five Exhibits in this case? If not, they will be accepted.

I would like to recall Mr. Ford for one question which I

neglected to clear up. You can just sit right there.

THOMAS FORD,

recalled as a witness, having been previously duly sworn, testified as follows:

RECROSS EXAMINATION

BY MR. UTZ:

Q In regard to the overflow tank, that is a 1500 barrel capacity, is it?

A Yes.

Q Will this station be manned at all times, or if not, how often?

A This station will only be manned once a day, but there will be installed a signal light on the highest structure there, which seems to be the heater treatment, and any time the BS and W monitor shuts off, the valve in the top there which stops oil going into the pipeline, then the flash red light will be activated. It is contemplated that even should that -- should the system fail after night and no one see it until in themorning, that there would be no oil lost. Fifteen hundred barrels should hold it.

Q That should take care of it?

A Yes, sir.

MR. UTZ: That's all I had.

MR. ELLIOTT: There is one other thing that wasn't brought out that you might like to know.

REDIRECT EXAMINATION

BY MR. ELLIOTT:

Q Mr. Ford, would you tell Mr. Examiner how this meter works in stamping the recording of the -- so that you can measure from day to day how this ticket works in the meter?

A The meter has a gauge on it which will read in barrels, and these barrels are temperature compensated. There is a ticket printer on the meter so that you can walk up to it at any time, insert the ticket, press the handle and get a reading of the amount of oil as of that time. We contemplate each morning taking a reading from the meter plus a reading from our pipeline run tank and use that as our daily production. In other words, the change in the pipeline run tank will affect the amount that has gone through the meters, as far as what has been produced in the one day. We will have that further check should anything go completely wrong with everything. We will have a daily production figure each day which will give us a further check on the accuracy of the installation.

MR. UTZ: Anyone else have a question of the witness? The witness may be excused again.

(Witness excused)

MR. UTZ: Are there any other statements in this case?

MR. BUELL: May it please the Examiner, Guy Buell, Pan American Petroleum Corporation. Pan American is a firm believer in the principal of automatic custody transfer. Our experience with them, we found them reliable and efficient. They also prevent waste and certainly offer an opportunity to save substantial amount of money,

which is important to all of us. Pan American would like to see this Commission approve such units wherever practical and feasible.

MR. UTZ: Any other statements?

MR. KASTLER: Bill Kastler, Counsel for Gulf Oil Corporation. Gulf Oil Corporation has a working interest in this unit and is also a firm believer in automatic custody transfer methods, and we urge the approval of this case.

MR. UTZ: Any other statements? If there are no nother statements, the case will be taken under advisement.

C E R T I F I C A T E

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/or under my personal supervision, 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 26th day of June, 1958, in the City of Albuquerque, County of Bernalillo, State of New Mexico.

Joseph G. 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. 1459, heard by me on May 28, 1958.

Examiner
New Mexico Oil Conservation Commission