BEFORE THE
OIL CONSERVATION COMMISSION
SANTA FE, NEW MEXICO
APRIL 6, 1960

IN THE MATTER OF:

CASE 1932 Application of Great Western Drilling Company for approval of an automatic custody transfer system. Applicant, in the above-styled cause, seeks an order authorizing the installation of automatic custody transfer facilities to handle the Caprock-Queen Pool production from all wells on its Rock Queen Unit, Lea and Chaves Counties, New Mexico.

BEFORE:

Daniel S. Nutter, Examiner.

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

MR. NUTTER: Next case on the docket will be Case 1932.

MR. PAYNE: Application of Great Western Drilling Company for approval of an automatic custody transfer system.

MR. CHRISTY: Sim Christy of Hervey,Dow & Hinkle, representing the applicant. We have one witness, Mr. Examiner.

(Witness sworn)

JOHN HAMPTON,

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

DIRECT EXAMINATION

BY MR. CHRISTY:

Q Would you please state your name, address and occupation?

A John Hampton, 509 North Lorrain, Midland, Texas. Chief production engineer for Great Western Drilling Company.

Q Have you previously testified before this Commission and had your qualifications as a geologist and petroleum engineer accepted?

A Yes, sir, I have.

Q Are you famikliar with the matters contained in this application, being Case No. 1932, before the New Mexico Oil Conservation Commission?

A Yes, sir.

Q Are you familiar with the Rock Queen Unit area and the wells in the area and the history thereof?

A Yes, sir.

MR. CHRISTY: Does the Examiner have any questions concerning the --

MR. NUTTER: No, sir. Please proceed, Mr. Christy.

Q (By Mr. Christy) Mr. Hampton, would you please tell us briefly what this application seeks?

A Yes, sir. We are seeking two things in the application. First, we are seeking permission to produce more than sixteen wells into a common tank battery; and secondly, we are seeking permission to install an automatic custody transfer system within the unit area.

Q Now, Mr. Hampton, I am going to refer you to what should be marked as Exhibit 1, and ask you if you will please identify and explain this Exhibit?

A Exhibit No. 1 is a plat showing the outline of the Rock Queen Unit. It also shows each of the presently producing wells in the Unit area. By that, I have taken the six wells which are presently being used for injection, which are not depicted on the map, but I show each of the other presently producing wells. Now, it also shows the location of the central tank battery, and also shows flow lines from these wells to several gathering batteries which we propose to build. Each of the wells represented on this Exhibit by an open circle, will eventually become injection wells. And the ones that are closed circles, blue circles, blue dots, actually will remain producing wells throughout the life of the flood. All of the wells that we show, within the Unit here, are hundred percent committed to the unit agreement with the exception of twenty-three eight, twenty-three nine, and twenty-three ten. I do anticipate that these wells will probably be committed to the unit agreement at some later date. As you can see from this Exhibit, we propose to produce quite a number of wells through this ACT system. In the interest of economy and simplicity of operations, we plan to install seven gathering batteries where the oil will be gathered prior to the transfer of the oil to the central tank battery. Now, these gathering batteries will be built within the heavy blue lines inside the unit outline here. These heavy blue lines depict the area that will be produced into each of these gathering batteries. Then, also, this Exhibit shows from these gathering batteries flow lines down to our ACT system.

Q How many wells are depicted here on this Exhibit 1, Mr. Hampton, approximately?

A There are approximately a hundred and nineteen wells.

Q Now, in each of these seven areas, I notice three little circles which I assume are the tank batteries. Now, I believe Exhibit 2 is a blown up sketch of these three tank batteries in each of the seven systems; is that correct?

A Yes, sir. That's correct.

Q All right. Now, would you proceed and explain Exhibit 2 to the Examiner, please, sir?

A Exhibit 2 is a schematic diagram of one of these gathering batteries that we will have seven of them in the system, and they will all be patterned after this battery. Now, on the extreme right of Exhibit No. 2, I show a production header. The oil comes from the individual wells into this production header. Then, by opening and closing the proper valves, the production can be directed either into the tank battery for transfer to the centraltank battery or it can be directed into the tank on the extreme left of the diagram, which is a test tank. The well on test will be directed into this test tank, and after the test is finished, the results of the test will be manually gauged by the gauger or by the pumper. To follow a well or production into the tank battery, production comes in from the production header, through the separator, and this is a two-phase separator. It separates the gas from the liquid. The gas is then used to fire the heater treater, and the separator

passes the fluid into the heater treater. Now, this heater is just a--as the name implies, it heats the fluid which passes into it. Then after the fluid is heated, it passes into the next tank, B, depicted on the left, which is called a wash tank on this diagram. That's a wash tank or gun barrel, whichever you prefer. Now, this gun barrel will have water in the bottom of it at all times. This will afford the oil and water a chance to come into the gun barrel. Then the oil will pass through the water, and it affords the free water a chance to fall out. And, also, it has a very good treating action on the oil as it passes through the water. Now, the water which is collected in this tank will be transferred out of the tank into our salt water recycling system by flood level controls. When the salt water is at the low level in here, the automatic valve shown directly in front of the tank depicted with a cross-section and a circle, closes, and the pump shuts down. And, of course, then water is allowed to come later in the tank up to the high level. When the water reaches the high level, the valve is opened and the pump is actuated and salt water is transferred into our salt water recycling system. Now, the top part of this gun barrel will accumulate the oil production. When the oil in the tank reaches the level of the over-flow lines shown here, oil is allowed then to flow over into the production tank. And oil will be transferred from this production tank to the central tank battery. We expect this treating system here will knock out all of the free water, and the only thing

that will be transferred to the central tank battery will be mostly free oil and some oil and water in emulsion.

Now, the transfer of the oil from this production tank to the tank battery is also automatic. These tank batteries are strategically located so that oil will gravity out of them through most of the months of the year to the central tank battery. That will be done automatically by this automatic valve shown in front of the tank battery. That valve will open when a certain hydrostatic head is reached, and it will close when the hydrostatic head is lessened or close to zero. Now, at times when this oil will not gravity to the central tank battery, the oil transfer pump will be kicked in by the float level controls in the tank. When oil is at the low level, the pump will be shut down. When oil is at the high level, the pump will be activated and transfer oil to the central tank battery. There is one other time that this pump might be used, and that would be in the case that production was of a greater amount than would gravity to the central tank battery. Then the float level controls would kick the transfer pump in. I think about the only item-- Oh, yes, there is, in conjunction with this oil transfer pump, there is a pressure kill switch. When pressure is built up in this line through an automatic valve at the valve--

MR. NUTTER: Which line?

A In the line to the central tank battery. The pressure kill switch will kill this pump and will not allow any more oil to

go to the central tank battery. One other item about the test tank, before the pumper leaves his lease each night, he will pump this tank out. When you pump the tank out, you pump it back through the treater into the gun barrel and into the production tank. He will do this in order that the test tank, which is a five-hundred barrel tank, may be used for storage during the night. Thus, we have provided about a thousand barrels of storage at each of these gathering batteries.

Q Mr. Hampton, referring back to Exhibit 1, I believe you mentioned the central gathering system where the ACT would be,--

A Yes, sir. It would be located just northwest of Well 36-3.

Q Now, I believe Exhibit 3 is a blownup version of that central tank battery; is that correct?

A Yes, sir, that's correct.

Q Would you please identify and explain Exhibit 3 to the Examiner?

A Exhibit No. 3 is a schematic diagram of our proposed central tank battery. This battery is essentially the same as we have had approved by the Commission previously. On this diagram we show a heater treater, a sales tank, two five-hundred-barrel storage tanks, and, of course, the ACT Unit. Now, oil is normally run to the pipeline at the levels of two and three, shown on the five hundred barrel sales tank. Also, in conjunction with this tank, we have other level controls. The level No. 1 is a high level alarm, which activates an alarm and notifies the pumper that a high

level has been reached in the sales tank. Level No. 4 is a low level kill switch which kills the pipeline pump in front of the ACT unit. That's merely to protect the pump here. And Level No. 5 is a high level shut-in switch. Now, this Level No. 5, which when oil reaches Level No. 1, the alarm is activated; however, the system is not shut-in as yet. It allows oil to flow out of the sales tank into these two five-hundred barrel storage tanks. Now, when those storage tanks are full and all oil builds up one more foot in the sales tank, then the Level No. 5 closes in a valve in front of the heater treater, which is marked with an "M" inside the circle on this schematic diagram, closes that valve in. When this valve is closed in, then, of course, it will allow no more oil to be transferred to the central tank battery. And, also, this is the switch which when it's closed, and the transfer pump builds up a slight pressure in the blow lines from the gathering batteries, the pressure kill switch will kill those pumps at the gathering battery, and, of course, will allow no more oil to come to the central gathering battery, but will allow a thousand barrels of oil to accumulate at each of the central tank batteries.

Q How much storage will you have in the Rock Queen area when this installation is completed?

A Well, at each gathering battery we will have about a thousand barrels of storage plus some storage in the gun barrel. However, we will say we have a thousand barrels at each gas gathering battery. Then, we have about two hundred fifty barrels of additional

storage in the sales tank above the level of two, and, of course, we have the two five-hundred barrel storage tanks for about twelve hundred and fifty barrels here at the central tank battery. So, we have about eight thousand two hundred fifty barrels of storage in the unit area.

Q Do you consider that sufficient storage, Mr. Hampton?

A Yes, sir, I do. As the Commission knows, this unit will be operated under the revised Rule 701, and we anticipate that our peak production will be approximately five thousand barrels per day. Therefore, I believe we have more than sufficient storage.

Q I notice in the lower portion of Exhibit 3 there is an installation marked ACT unit. I believe Exhibit 4 is a blown up version of that; is that correct, Mr. Hampton?

A Yes, sir, that's correct.

Q Would you please further identify and explain Exhibit 4 to the Examiner?

A Exhibit No. 4 is a schematic diagram of our proposed automatic custody transfer unit. The first item on the far left of the Exhibit is the charge pump, which merely serves to keep the lines full and keep the oil moving through the system. Then, in the next item, shown are two samplers. This is unique as far as Great Western ACT systems go. The sampler at the bottom is a sampler which serves only the pipeline. That sampler will be sealed at all times and will not be accessible to us except when they take the sample out of it.

Q Excuse me. As I understand it, Texas-New Mexico Pipeline purchases substantially all of the oil from this unit?

A Substantially all of it, yes, sir.

Q The sampler--

A The sampler, then, at the top is a sampler which has been accessible to Great Western at all times. This means was devised to keep a check on the quality of the oil that we are selling to the pipeline at all times, since the pipeline does not require, and actually they prefer not to have a monitor in the system. They feel that is just another accessory to go wrong, and we intend to go along with them. So instead of that, we have put a second sampler in the system, and experience will tell us how often we should sample this oil. But we will sample it often enough to keep from ever having bad oil go through the pipeline or a mixture of oil and water go to the pipeline. Of course, we feel that we have a very efficient treating system, and they agreed with us. And they feel that in our system there was really not a great deal of need for the monitor, and with this system, the other sampler, they felt that we had a very efficient system.

The next item shown here is a three inch Smith D aerator which merely serves to remove free air or gas that might accidentally get into the system.

The next item shown is a three inch AO Smith strainer, which merely serves to take any foreign particles out before the oil

passes through the meters. Then, we show a plug valve, which is merely to isolate the meter in case it needs to be worked on or repaired or anything.

The next item is a two and one half inch AO Smith Model S 24 meter, which is a positive displacement type meter. It is equipped with an automatic temperature compensator to correct all measurements to a basis of sixty degrees Fehrenheit. Meter also has a device which records manual reset that shuts it down and shuts the system down in case the meter stops functioning properly.

The next item--I might say here about the meters, that we believe the meter is probably accurate to a greater degree than one-tenth of one percent, and in order to prove this meter, it must repeat a measurement within five hundredths of one percent. Then the oil passes from the meter through a motor-operated valve here. This valve is actually the heart of the ACT system. It opens and closes and allows oil to pass through the system. This valve would close in several cases. It can be closed manually, if need be, but if the meter stops functioning properly, the valve would close, or when a predetermined amount of oil has passed through the system, the valve will close.

And then we show next a flow rate controller, which is merely to keep a small back pressure on the system and keep the lines full to accurately gauge the oil. And from there the oil passes into the pipeline. Then we show mounted directly on the skid here a five barrel, five prover tank. Now, this prover tank will be used to

prove the meter as often as is necessary, and will be mounted directly on the skid.

Q I assume from your testimony a moment ago, Mr. Hampton, that is, that the pipeline company has examined this proposed installation and has approved it?

A Yes, sir, they have.

Q Are there other ACT systems similar to this one in operation in New Mexico?

A Yes, sir. It's essentially the same system that has operated several places in New Mexico, and essentially the same system as operating in several places in the Caprock area.

Q Mr. Hampton, what benefits do you believe would be derived from the granting of this application with respect to this ACT system?

A Well, there are several benefits that would be realized, but I think the most important of which is metering eliminates the exposure of oil to air throughout the system, and thus retaining the lighter fraction in it, and enhancing its volume, gravity, and price, both to the working interest owners and to the royalty owners. The system would also be a savings to the operator in saving his own storage and treating facilities which we won't have to have with this system. Safety to our personnel would be increased. And, in addition, there wouldn't be as much oil lost through a natural disaster in the area since there won't be as much oil in storage as there might be by having storage on each lease or tract

in the unit. And, of course, some oil will be conserved by circulating the tank back through the treating systems. And last, we feel that positive displacement meters are probably more accurate than hand gauges.

Q Mr. Hampton, do you feel that the granting of this application would be in the interest of conservation and the protection of waste and the prevention of the violation of rights of the various interested parties in this area?

A Yes, sir.

Q Were Exhibits 1, 2, 3 and 4 prepared by you or under your direct supervision?

A Yes, sir.

Q Do you have anything further that you think would be of interest or advice to the Examiner?

A I don't believe so.

MR. CHRISTY: That's all.

MR. NUTTER: Any questions from the witness?

CROSS-EXAMINATION

BY MR. PAYNE:

Q Mr. Hampton, is this a prorated water flood?

A Yes, sir.

Q Now, Mr. Hampton, on April 4th the Commission entered an Order in Case 1898, which requires the separate measurement of primary wells producing into common facilities with wells inside a prorated water flood project area. Is your system set up so that

you would be able to comply with that?

A Yes, sir.

MR. NUTTER: Does that Order require separate measurement or facility to make separate tests?

MR. PAYNE: It requires separate tests every month,--

A Yes, sir.

MR. PAYNE: --unless you get an exception, which is also provided for administratively. That's all.

QUESTIONS BY MR. NUTTER:

Q Mr. Hampton, now, your central battery is located at the three tanks directly north of Well No. 36-4 and 36-3; is that correct?

A That's correct, yes, sir.

Q And the other tank batteries are the gathering batteries; is that correct?

A Yes, sir.

Q Now, what is the level that the oil will normally work in these gathering batteries? We have several dotted lines drawn on here.

A The high level would be eight feet, and the low level would be at the bottom.

Q I see. And you figure you have how much storage in each one of these gathering batteries?

A We have approximately a thousand barrels.

Q The test tank is normally empty; is that correct?

A Yes, sir.

And this is the tank that you said the pumper would empty before he left the lease in the evening?

A Yes, sir.

Q Now, you provide for a production separator and production treater, but I don't see any separator or treater for the test oil to go through.

A No, sir. We want all of the water and the oil to go into this test tank so we will know how much oil and how much water the well is making.

Q And the production from the wells, when it goes into the test tank, will not be separated; it would be water plus oil?

A Yes, sir.

Q Then how will you determine how much water and how much oil the well made? By gauging this tank?

A Yes, sir. There will be a gauge taken of the tank and a shake-out of the water. We feel it's very important.

Q How about separation of gas?

A It will just come off the vent line of the tank.

Q Now, what system are you going to use to prove the meter on this automatic custody transfer?

A This five-barrel grouping tank.

MR. NUTTER: Any further questions?

QUESTIONS BY MR. UTZ:

Q Mr. Hampton, I am a little bit confused on how this salt

water tank is going to operate. How will the water be disposed of from the wash tank? Is that on flood level wells, too?

A Yes, sir.

Q Actuate the salt water pump?

A Yes, sir. And, of course, this water will be transferred to the injection plant and reinjected back into the formation.

Q All the production will go into this tank after it goes through the heater treater?

A That's correct.

Q How does the oil get over into your production tank?

A The oil floats on the water, and flows out of the gun barrel and on this overflow line shown between the two tanks.

Q How does your flood level pump know whether it's turned on for oil or what?

A Due to the different resistivity of oil and water. Through electrical current.

Q Now, there are no automatic valves on the production header. Are they all manual?

A Yes, sir.

Q Are all of these wells pumping wells?

A Yes, sir.

Q In the event your production tank and test tank become full, then oil would flow into your test tank?

A Yes, sir.

Q And the only thing that would keep it from becoming full

would be your high level float switch which would turn on your pump? Can you set the tank battery?

A Yes, sir; either that or a sufficient gravity.

Q Now, if that float level should fail, what would prevent oil from overflowing?

A Well, if the float level should fail, of course, this valve can still open and oil can gravity out.

Q Well, what would open the valve?

A Hydrostatic pressure.

Q In other words, when the tank became full at a pre-determined level, then the hydrostatic pressure would open the valve?

A Yes, sir.

Q Is that pretty full proof?

A Yes, sir.

Q And you feel that it is so arranged that there would be no possibility of oil overflowing from this gathering tank battery?

A That's correct.

Q On your valve tank battery, you do have that safety high level shut-off?

A Yes, sir.

Q In the event the high level, referring to Exhibit 3, now, in the event your high level switch, which I belive is No. 1; is that correct?

A No, sir. That's the high level alarm.

Q I see. And which is your high level?

A 5.

Q No. 5. What is No. 2?

A No. 2 is the high working level, where oil is normally sold to the pipeline.

Q But that doesn't turn on the transfer pump?

A It activates the ACT unit.

Q Well, that's what I was getting at.

A Yes, sir, 2.

Q Yes. In the event that switch fails, No.2, when your oil reaches No. 1, you turn on the alarm?

A Yes, sir.

Q And if that doesn't wake anybody up, then No. 5 will shut in the system?

A Yes, sir.

Q That is shut in at valve M?

A Yes, sir.

MR. UTZ: I believe that's all I have.

QUESTIONS BY MR. NUTTER:

Q Mr. Hampton, just what would be the procedure to test these wells to determine how much production comes from each well?

A The well will be pumped into the test tank and manually gauged.

Q That's the--

A Any well that you require test on will be pumped into that.

Q That's the tank in Exhibit No. 2, labeled "Test tank?"

A Yes, sir.

Q But there will be no separation of gas from the oil and the water with the production will go into that tank also?

A That is correct.

MR. NUTTER: Thank you. Any further questions from Mr. Hampton? You may be excused.

(Witness excused)

MR. CHRISTY: We would like to offer in evidence Exhibits 1 through 4 inclusive.

MR. NUTTER: Great Western's Exhibits 1 through 4 will be admitted.

MR. CHRISTY: That's all we have for the applicant.

MR. NUTTER: Does anyone have anything further with Case 1932? The case will be taken under advisement, and we will take the next case, 1933.

STATE OF NEW MEXICO)
) ss
COUNTY OF BERNALILLO)

I, THOMAS T. TOMKO, Court Reporter, 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 machine shorthand 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 16th day of April, 1960, in the City of Albuquerque, County of Bernalillo, State of New Mexico.

Thomas T. Tomko
NOTARY PUBLIC

My Commission Expires:

Jan 7 1964

BEFORE EXAMINER NUTTER
OIL CONSERVATION COMMISSION
EXHIBIT NO.
CASE NO.

I certify that the foregoing is a correct record of the proceedings in the hearing of Case No. 1932 heard by me on Apr 6, 1960.

Examiner
New Mexico Oil Conservation Commission