BEFORE THE
OIL CONSERVATION COMMISSION
Santa Fe, New Mexico
November 20, 1962

EXAMINER HEARING

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| IN THE MATTER OF: (Consolidated) | |
| Application of Continental Oil Company for a unit agreement, Eddy County, New Mexico. Applicant, in the above-styled cause, seeks approval of the Cave Pool Unit Agreement covering 1960 acres, more or less, of State and Federal lands in Townships 16 and 17 South, Range 29 East, Eddy County, New Mexico. | CASE 2702 |
| Application of Continental Oil Company for a waterflood project and a central tank battery, Eddy County, New Mexico. Applicant, in the above-styled cause, seeks approval of a waterflood project on its proposed Cave Pool Unit, Cave Pool, Eddy County, New Mexico, by the injection of water into the Premier sand of the Grayburg formation through 26 wells located in said unit area. Applicant further seeks permission to produce all Unit wells into a central tank battery. | CASE 2703 |

BEFORE: Elvis A. Utz, Examiner.

TRANSCRIPT OF HEARING

MR. UTZ: Case 2702.

MR. KELLAHIN: Jason Kellahin, Kellahin and Fox, Santa Fe, representing the applicant. I believe that this case could well be consolidated with Case 2703 for the purposes

of making the record, since our exhibits and testimony will actually pertain to both cases.

MR. UTZ: Cases 2702 and 2703 will be consolidated for the purposes of testimony only.

MR. KELLAHIN: Of course, separate orders will be entered, as I understand.

MR. UTZ: Yes, sir.

MR. KELLAHIN: We have three witnesses. I would like to have them sworn.

MR. UTZ: Are there any other appearances in this case? You may proceed to swear the witnesses.

(Witnesses sworn.)

MR. KELLAHIN: I would like to call as the first witness Mr. Conrad R. Appledorn.

CONRAD R. APPLEDORN

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

DIRECT EXAMINATION

BY MR. KELLAHIN:

Q Would you state your name, please?

A Conrad R. Appledorn.

Q By whom are you employed and in what position?

A I am employed as Senior Production Engineer with

Continental Oil Company in Roswell, New Mexico.

Q Have you ever testified before the Oil Conservation Commission or any of its Examiners?

A No, I have not.

Q For the benefit of the Examiner, would you give a summary of your education and experience as a petroleum engineer?

A I received a degree of Bachelor mining engineering from the University of Minnesota in 1949 and followed that with a Master of Science in geology, 1954. I worked as a geologist with the United States Geological Survey and also as a teaching assistant at the University.

Q At the University of Minnesota?

A Yes, sir. In 1956 I joined Continental Oil Company and have been employed as a petroleum engineer in West Texas and New Mexico since that time. I'm also a registered professional engineer in New Mexico.

Q Are you familiar with the application of Continental Oil Company in Case 2702, which is the case pertaining to the Cave Pool Unit Agreement?

A Yes, sir.

Q Do you have a copy of that agreement?

A Yes, sir.

MR. KELLAHIN: These are all the exhibits for both

cases, three sets of them.

(Whereupon, Applicant's Exhibit No. I was marked for identification.)

Q Referring to what has been marked Exhibit No. I, would you state what that is?

A That is the Unit Agreement for the Cave Pool Unit.

Q Are you familiar with the contents of that agreement?

A Yes, I am.

Q Would you describe the unit area, please?

A The unit area includes 1959.73 acres in Township 16 and 17 South, Range 29 East, Eddy County, New Mexico. It's described in Section 2 (a) on page 3 of the Unit Agreement and is further shown in the Exhibit "A" of the agreement.

Q Have we also submitted a plat of the agreement as Exhibit II, a plat of the area involved in the agreement?

A Yes, sir. Exhibit II shows the unit area outlined by heavy line, all tracts and leases.

(Whereupon, Applicant's Exhibit No. II was marked for identification.)

Q Does the unit area include the entire Cave Pool?

A It includes all but three of the presently producing wells in the Cave Pool. All of the remaining wells are shut in or have been previously.

Q What vertical interval will be united by this agreement?



A Unitized formations will be the Premier sand of the Grayburg formation. It's defined in Section 2 (h) on page 3 of the agreement as being found between the depth of 2,374 feet and 2,405 feet in Continental's State P-4 No. 1 well. This is the equivalent interval that are shown in Exhibits III A and III B that have been handed to you, which are the logs of the State P-5 and the State U-5.

Q Does this interval embrace one common source of supply which has been designated as the Cave Pool?

A Yes, sir.

Q What is the purpose of this unitization?

A This unit is being formed to conduct waterflooding operations in the Cave Pool.

Q Who is designated as the unit operator?

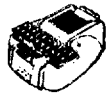
A Continental Oil Company has been elected and designated as the unit operator. This is given in Section 6 on page 7 of the Unit Agreement.

Q Is there a provision for alternate operators?

A Yes, Sections 7 and 8 on pages 7 to 9 of the agreement provide for the election of a successor if that's necessary.

Q Have all the owners of producing property in the Cave Pool been given an opportunity to join this unit?

A Yes, we have contacted all owners of producing wells



in the area. Highland Oil Corporation and General American Oil Company have declined to join. We've got copies of letters from these companies, if the Commission cares to examine them. General American has indicated they may consider lease line agreements jointly waterflooding the property.

Q Does the Unit Agreement provide for expansion of the unit area in case they elect to join?

A Yes. Section 4 on pages 5 and 6 sets out requirements for the expansion of the unit area. Section 30, pages 25 and 26 provide for subsequent joinder of working interest and royalty owners.

Q Now, on what basis do the various tracts participate in the unit?

A The participation formula is given in Section 13, pages 11 and 12. That is calculated according to ultimate primary recovery which has been determined from decline curves as 60% of the formula, net effective pay volume is 30%, and current production from October 1st, 1959 through March 31, 1960 is 10% of the formula. Section 13 on pages 12 and 13 sets out the requirements by which tracts can qualify.

Q Does the Unit Agreement create a participating area which is different from the area unitized?

A No, sir. The entire unit area will be participating

in the unit.

Q At what date does the unit become effective?

A The effective date of the unit will be 7:00 A.M. on the first day of the month following ratification of the agreement by 90% of the working interest owners' approval of the agreement by the State Land Commissioner, the Secretary of the Interior and the New Mexico Oil Conservation Commission. This is given in Section 22, pages 21 and 22. It's further provided in Section 22 (c) that this must be accomplished by July 1st, 1963.

Q What portions of the lands in the unit are federal, state and fee lands?

A Thirteen of the total of sixteen tracts are State of New Mexico lands. This is 89.8% of the unit area. Three tracts, or 10.2% of the area are federal lands, and there are no fee lands.

Q Has approval been given by the basic royalty owners, the United States Geological Survey and the State Land Commissioner?

A Yes, sir, the United States Geological Survey approved the unit area and the agreement on May 8, 1962. The State Land Commissioner approved the form and content of the agreement on October 31, and they have indicated that they will approve the agreement when submitted.

Q Has approval of the Unit Agreement been obtained from all the working interest owners?

A Yes, sir, 100% of the working interest owners have signed.

Q Are there any overriding royalties which have not signed?

A As of yesterday we have two of thirteen individuals have ratified the agreement, and none of the four major companies that own overrides have signed yet. However, we anticipate no difficulty in that regard.

Q Then have all of the royalty owners signed up?

A Yes, sir.

Q Is the Unit Agreement substantially the same as Unit Agreements that have heretofore been approved by this Commission?

A Yes, sir. The agreement is substantially the same as agreements that have been previously approved by the Commission for units with federal and state lands, and it's modeled after the Rock Queen Unit Agreement which was approved sometime ago by the Commission.

Q Did you participate in the preparation of the Unit Agreement yourself?

A Yes.

Q You are familiar with its contents throughout?

A Yes, sir.

Q Was Exhibit No. II prepared by you or under your supervision?

A Yes, sir, it was.

MR. KELLAHIN: At this time I would like to offer in evidence Exhibits I and II.

MR. UTZ: Without objection, Exhibits I and II will be entered into the record of this case.

(Whereupon, Applicant's Exhibits I and II were admitted in evidence.)

MR. KELLAHIN: That's all the questions I have of this witness.

MR. UTZ: Are there any questions of the witness? If there are no questions of the witness, you may proceed to the next witness and this witness may be excused.

(Witness excused.)

MR. KELLAHIN: I would like to call as a witness Nance G. Creager.

NANCE G. CREAGER

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

DIRECT EXAMINATION

BY MR. KELLAHIN:

Q Would you state your name, please?

A Nance G. Creager. I'm employed by Continental Oil Company as District Geologist in the Hobbs District.

Q Have you ever testified before the New Mexico Oil Conservation Commission?

A No, sir, I have not.

Q For the benefit of the Examiner, will you give a brief summary of your educational qualification and professional experience?

A I received a BS Degree in Geological Engineering from the University of Oklahoma in 1950. I have worked since that time as an Exploration and Production Geologist in West Texas, and New Mexico.

Q By whom were you employed during this period from 1950?

A Continental Oil.

Q Through the entire period?

A Yes.

Q Have you made a study of the formations which are involved in the Unit Agreement which was testified to by the previous witness?

A Yes, sir.

Q What is the geological age and position of the unitized formation?

A The unitized formation is the Premier sand, it is a basal sand of the Grayburg formation in the Guadalupian Series of the Permian. The Premier sand is found between the base of the thick Grayburg dolomites and the top of the massive San Andres dolomite. The Premier sand appears on the Lane-Wells radioactivity log of the Continental Oil Company State P-5 No. 1 well at a subsurface interval of 2,373 feet to 2,398 feet, measured from the Kelly bushing. Exhibit No. III-A, a large scale copy of this well log, is submitted with the Premier sand zone marked on it as it is defined. We also offer Exhibit III-B, a log of the Continental Oil Company State U-5 No. 1 with Premier sand marked on it.

(Whereupon, Applicant's Exhibits III-A and III-B were marked for identification.)

Q What is the lithologic description of this formation?

A The Premier sand is a gray to brown, fine grained, well sorted sand with dolomitic cementation. The tighter sections are a pink to red dolomitic siltstone.

(Whereupon, Applicant's Exhibit IV was marked for identification.)

Q Referring to what has been marked as Exhibit No. IV, Mr. Creager, would you identify that exhibit and discuss it, please?

A This is a structure map of the Cave Pool Unit, Eddy

County, New Mexico. It is contoured on the top of the Premier sand with a contour interval of ten feet. It shows the structure in the unit to be a homocline dipping east at the rate of 75 feet per mile. There's a slight northeast dipping nose along the north side of the unit and another southeast dipping nose in the southeast part of the unit. In my opinion these structures are not responsible for the accumulation of oil in this pool. The pool is a stratigraphic type of accumulation.

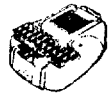
Q In your opinion the structural configuration has nothing to do with the oil accumulation?

A That is correct.

Q Would you explain the isopach map which has been marked as Exhibit No. V?

(Whereupon, Applicant's Exhibit No. V was marked for identification.)

A This is an isopach map of the Cave Pool, Eddy County, New Mexico. It has been drawn on one-foot contour interval. This map shows the thickness of the net effective pay in the Premier zone. The thicknesses used are based on core analyses, where available, and electric or radioactivity logs. The maximum thickness is seven feet, thinning to zero around the edges of the pool. Although the gross Premier interval is fairly constant over the whole unit, the net effective pay thins due to the loss of



porosity and permeability.

Q Would you describe the beds which lie above and below this Premier formation?

A The Grayburg dolomite immediately above the Premier is a light gray, pink and white, very finely crystalline changing to sandy, gray brown, finely crystalline a few feet above the Premier. The few feet of Grayburg dolomite analyzed has no measurable permability.

The San Andres dolomite below the Premier is cream, light gray and pink, very finely to finely crystalline. As indicated on Exhibits III-A and III-B, the San Andres immediately below the Premier sand is dense.

Q These two formations, in your opinion, form an effective barrier to communication above and below the Premier?

A In my opinion the Premier is segregated.

Q Are there any productive zones above the Premier?

A The Penrose sand and the Yates-Seven Rivers section are productive in nearby fields, at distances of one to two miles.

Q Is there considerable separation between the Penrose and Yates and Seven Rivers formation in the Premier sand?

A Yes, sir, it's a matter of several hundred feet.

Q Are there any potable water zones in the unitized area?

A Ground-Water Report No. 3, titled Geology and Ground-Water Resources of Eddy County, New Mexico, published by the State Bureau of Mines and Mineral Resources, reports that in this area water for stock and domestic use can be obtained from the Triassic redbeds at depths down to 300 feet. It is very erratic in occurrence. The water is of generally fair quality but may be impotable in various areas. The unitized area is not in any presently designated water basin.

Q Have you examined Exhibits III-A and III-B and the other exhibits which have been offered in connection with your testimony, IV and V?

A Yes, sir.

Q In your opinion do they correctly reflect the matters they purport to show?

A They do so.

MR. KELLAHIN: At this time I would like to offer in evidence Exhibits III-A, III-B and IV and V.

MR. UTZ: Without objection Exhibits III-A, III-B, IV and V will be entered into this case.

(Whereupon, Applicant's Exhibits III-A, III-B, IV and V were admitted in evidence.)

MR. KELLAHIN: That's all the questions I have on the record.



MR. UTZ: Are there questions of the witness? The witness may be excused.

(Witness excused.)

MR. KELLAHIN: Our next witness will be Dane Coltharp.

E. D. COLTHARP

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

DIRECT EXAMINATION

BY MR. KELLAHIN:

Q Will you state your name, please?

A E. D. Coltharp.

Q By whom are you employed and in what position?

A Employed by Continental Oil Company as District Engineer in the Hobbs Production District, Hobbs, New Mexico.

Q In connection with your duties as District Engineer at Hobbs, Mr. Coltharp, have you become familiar with the Cave Pool area?

A Yes, sir, on the basis of approximately four years of experience of being District Engineer over this area.

Q Does the Cave Pool lie within the area of which you are District Engineer?

A Yes, sir.

(Whereupon, Applicant's Exhibit No. VI was marked for identification.)

Q Referring to what has been marked as Exhibit No. VI, will you identify that exhibit and discuss the information shown on it?

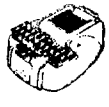
A Exhibit No. VI is the same as Exhibit No. II showing the Cave Pool Unit Area except that the outlines of the Cave Pool and other pools in the area are shown. It also shows, by appropriate colors, circles around each well, the formation from which the well produces. The color key for the producing wells is shown in the lower right-hand corner.

Q The same color key was used in outlining the pool boundaries too, was it not?

A The pool boundaries and the pool names are in a color which corresponds to each other.

Q Would you give us a brief history of the Cave Pool, Mr. Coltharp?

A Referring to the area map marked Exhibit VI here, the Kincaid and Watson Humble State 1-D, located 660 from the North line and West line of Section 8, Township 17 South, Range 29 East, was completed on April the 13th, 1956 as the discovery well in the Cave Pool. This well was drilled to a total depth of 2,427 feet and completed for an initial potential of 70 barrels of oil per day, flowing through perforations in the Premier sand at 2,268 through 2,279.



A total of 50 wells have been drilled within the Unit Area, of which three were dry holes. The development of the Cave Pool was completed by 1959.

Of the 47 producing wells in the Unit Area, 37 wells were cased through the pay and perforated. The remaining 10 wells were completed open hole by setting the production casing above the Premier sand. Completion practices include crude oil and sand treatments and we will have 5,000 to 20,000-gallon treatments, and the reported initial potentials vary from 30 barrels to 784 barrels per day.

Q What is the current daily average production for the Unit Area?

A During the month of August, 1962, the Unit Area averaged 30.6 barrels of oil per day with three barrels of water per day, 226 MCF of gas per day, for an average GOR of approximately 7400 cubic feet per barrel. This is also an average of 0.65 barrels of oil per day. The maximum daily oil production from any one well during August, 1962 was 3.1 barrels per day.

Q Well, now, in your opinion does this indicate that the reservoir is substantially depleted?

A Yes, sir, it does.

Q On primary recovery?

A Yes, it does.

Q What is the cumulative production within the Unit Area?

A Production as of September 1st, 1962 from the Unit Area totaled 797,331 barrels of oil, approximately 2,000 MMCF of gas and approximately 10,000 barrels of water.

(Whereupon, Applicant's Exhibit No. VII was marked for identification.)

Q Now, referring to what has been marked as Exhibit No. VII, will you identify the exhibit and discuss the information shown on it?

A Exhibit No. VII is the primary performance of the Cave Pool Unit Area. The rate of decline of approximately 56% per year and the low water production indicates that the Cave Pool is producing primarily by means of solution gas drive.

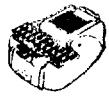
Q Do you find any indication whatever of any effective contribution to this drive with water?

A No, sir, I do not.

Q What is the API gravity of the oil produced in the Cave Pool?

A The gravity ranges from 34° to 36° API. The gravity is reported by other companies to the New Mexico Oil Conservation Commission ranges from 31° to 40° API.

Q Do you have an opinion as to what is probably the correct range?



A Yes, sir.

Q Would you state that, please?

A Between 34° and 36°.

Q What is the volume of the Premier sand reservoir underlying the Unit Area?

A By planimetering the isopach map marked Exhibit No. V, it was calculated at 6,771.7 acre-feet of pay, are underlying the Unit Area.

Q What is the average net reservoir thickness in the Unit Area?

A It is 3.39 feet, and this is a range from zero up to 7.2 feet of pay.

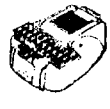
Q What's the estimated volume of stock tank oil originally in place in the Unit Area?

A There's 5,424,000 barrels of oil.

Q Now, on what do you base that estimate, Mr. Coltharp?

A The volumetric calculation, using the following data: first, the acre feet of pay, as mentioned before, of 6,771.7 from the isopach; the average porosity of 15.7, taken from the average of core analysis; the water saturation of 27% determined from electric log calculations; the initial formation volume factor of 1.11, calculated using an API 35° gravity crude.

Q Now, of that original oil in place, as you previously



testified, 797,331 barrels have been produced, is that correct?

A Yes.

Q From primary production?

A Yes.

Q What percent of the original oil in place has been produced?

A As of September 1st, 1962, approximately 14.7% of the oil in place has been produced.

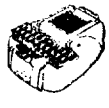
Q What's the average permeability of the Premier pay, Mr. Coltharp?

A The average permeability of the Premier reservoir sand is 25.5 millidarcies. This average was obtained from core analyses of six wells and includes only that portion of the sand with 4% or more porosity and 0.5 millidarcies or more permeability.

(Whereupon, Applicant's Exhibit No. VIII was marked for identification.)

Q Now, referring to what has been marked as Exhibit No. VIII, would you identify that exhibit and explain what it is?

A Exhibit No. VIII is a core-graph of the State P-5 No. 1 well. This is the same well shown on the log, Exhibit No. III-A. The core-graph shows the porosity, permeability, oil and water saturations as measured in the laboratory on the core



extracted from this well.

Q In your opinion is this core typical of the reservoir conditions as indicated on all core analyses available?

A Yes, sir, it is.

Q What's the present reservoir oil saturation?

A The oil saturation is presently calculated to be approximately 57% of the pore volume.

Q In your opinion is waterflooding feasible in the Cave Pool?

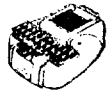
A Yes, sir. Such factors as the present oil saturation, permeability, porosity, primary performance, water saturation and depth are generally favorable for waterflooding. The Premier sand and similar sands are presently being waterflooded in other areas with very good success. In view of these factors, waterflooding in the Cave Pool should be feasible.

Q In your opinion will waterflooding tend to prevent waste and conserve natural resources?

A Yes, significant quantities of oil will be recovered by waterflooding that could not be produced economically or otherwise by primary methods.

Q Do you have any estimate as to how much oil will be recovered by flooding the Cave Pool?

A Secondary water reserves in the Unit Area are estimated



at approximately 1,000,000 barrels of oil.

Q You say "water reserves", you mean secondary waterflood reserve?

A Yes. This is approximately 1.25 times the anticipated recovery by primary means.

Q You said 1,000,000 barrels of oil?

A Yes, sir.

Q What is the predicted life of this waterflood?

A It is estimated at the present time at approximately five and one-half years.

Q What type of injection pattern do you propose to utilize?

A A modified 80-acre five spot pattern will be utilized. This is shown on Exhibit No. II with 23 producing wells, three abandoned wells, will be converted into water injection.

Q Are the wells on Exhibit II marked with a triangle to show that they are injection wells?

A Yes, sir, they are.

Q Will there be adequate protection of all ground water sources from contamination by the injection wells?

A Yes, sir. Exhibit No. IX is a tabulation of the casing program of all proposed injection wells with the exception of the Hodges No. 1 in Tract No. 5, all have both surface and production

casing which should provide adequate protection.

(Whereupon, Applicant's Exhibit No. IX was marked for identification.)

Q What do you propose to do with the Hodges No. 1?

A Prior to using the Hodges No. 1, a string of production casing will be set and cemented at approximately 2500 feet.

Q What facilities will be provided for quantity and pressure measurements on the injection wells?

A Meters are to be used to measure the quantity of water injected into each well, and pressure gauges will measure the injected pressure of each well.

Q What anticipated water injection rate will you have?

A Water injection rate of approximately 124,000 barrels per month, or 160 barrels of water per day per injection well is planned.

Q What pressures do you anticipate will be encountered in getting this water into the formation?

A We're currently estimating a maximum of 1500 pounds pressure.

Q Will the wells you propose to use handle this kind of pressure, Mr. Coltharp?

A Yes, sir, they will.

Q What's the source of your injection water?

A The unit will purchase water from a commercial source. Also, produced water will be gathered and reinjected.

Q As I understand it, produced water will be used to supplement the purchased water for injection in the reservoir once the flood gets into operation?

A Yes, sir, it will.

Q This water will then just be recircled, isn't that correct?

A Yes, sir.

Q Because you don't produce any great volumes of water from the reservoir now?

A That is correct.

Q What is the total water injection requirement for this flood?

A An extimated 2,800,000 barrels of make-up water, or purchased water, will be injected, and an additional 4,700,000 barrels of produced water will also be injected.

Q This is over the life of the project?

A Yes, sir.

Q How many tank batteries are presently in use in the Cave Pool?

A Seventeen tank batteries.

Q Is this a necessary operation?

A No. One central battery for the entire unit would be more efficient. A total of 24 producing wells, 23 proration units will be producing into one central tank battery.

Q Continental Oil Company has in this case asked for permission to produce more than 16 wells in the one tank battery, have they not?

A Yes, sir.

Q That is what you recommend?

A Yes, sir.

Q Would any inequities arise from the installation and use of a central tank battery?

A No, since each lease within the unit shares in the total unit production on the basis of the set participating percentages of the Unit Agreement none would arise.

Q Are you familiar with the requirements of the Oil Conservation Commission in regard to testing facilities for a central tank battery installation?

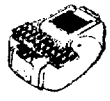
A Yes. Facilities to periodically test individual wells will be provided for.

Q And they will be in accordance with the Commission's rules, is that correct?

A Yes.

Q Incidentally, do you propose to operate this waterflood





project under the provisions of Rule 701?

A Yes, sir.

Q Under that rule what would the maximum daily allowable be for the unit?

A There are 49 proration units within the Unit Area. 48 of these proration units have one well on each, one has two wells. This would calculate to be a 2,072 barrel of oil per day as a maximum allowable.

Q Were Exhibits VI through IX prepared by you or under your supervision?

A Yes, sir, they were.

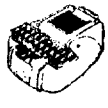
MR. KELLAHIN: I would like to offer in evidence Exhibits VI through IX.

MR. UTZ: Exhibits VI through IX will be entered into the record in this case.

(Whereupon, Applicant's Exhibits VI through IX were admitted in evidence.)

MR. KELLAHIN: That completes the examination of this witness. If the Commission please, I do have a statement to make which I probably should make before cross examination, because it might raise some questions in that connection. We have discussed this installation with Mr. Frank Irby of the State Engineer's Office and I think Mr. Irby is present. Do you want to make your





own statement?

MR. IRBY: Go ahead.

MR. KELLAHIN: I have the opportunity of representing Mr. Irby.

MR. UTZ: That's unique, but go ahead.

MR. KELLAHIN: We have agreed that the Hodges No. 5 well will have tubing installed which will be cemented into the surface casing, and all of the casing in all of the wells to be used for injection will be pressure tested before utilized for that purpose, and if necessary, will be squeezed and cemented, or tubing will be installed, or both, if it appears necessary.

As to the Humble State No. 1 well and the Atlantic State No. 4 well, both of these wells on the list show an 8-5/8" surface string set at 311 feet and 366 feet respectively, and set with jell. On those wells which will be used for injection, tubing will be installed and a packer installed in the well. On that basis it's my understanding that Mr. Irby has no other objection to the proposed waterflood project.

MR. UTZ: Well, that's going to be a point of questioning. I believe you got ahead of me.

CROSS EXAMINATION

BY MR. UTZ:

Q What wells was it you were going to set liners in?

A The Hodges 5 No. 1 well. It's listed at the bottom of Continental Oil Company's listing of wells there.

Q That's Pan American well?

A Yes, sir.

Q You want to set a liner through the Premier?

A To approximately 2500 feet, yes, sir.

Q Was that one of the open holes that you were going to set a liner in?

A That did not have production casing set in that well at all. We will set a full set of pipe.

Q You have seven other open hole completions here?

A Yes, sir.

Q Is your injection program for this?

A It would be to go ahead and test the injectivity of the wells prior to setting any liners, or anything like that.

Q If the test is all right, will you inject through the tubing?

A Inject through the casing if met with the requirement as set forth, otherwise we will set tubing and packer.

Q The packer above the formation?

A Yes, sir.

Q It's your intention to test all injection wells, is that correct?

A Yes.

Q You are going to test at 2,000 pounds?

A 2,000 pounds would probably, it would be at least 500 pounds above the injection pressure we anticipate in that area.

Q The injection pressure was 1500 pounds maximum?

A That's our maximum anticipated, yes, sir.

Q All these wells that don't meet the pressure test, you intend to inject through the tubing?

A Yes, sir.

Q I don't know whether you gave the range of GOR's in the pool or not. If you did I missed it. Do you have that figure?

A The range is from almost too small to measure in some wells up to approximately 15,000 to 1 GOR. However, that is not very much gas considering they're only making .8 of a barrel, or one barrel or two barrels of oil per day.

Q The average would be around 6,500 to 1?

A Approximately 7,400 to 1.

Q Seventy-four?

A Yes, sir.

Q On your Exhibit No. VII you show water production going down to 10 barrels from about March of '60 to December of 1961.

Does that mean that the water production was something below 10 barrels during those months?

A Sir, that is the reported production, and it was from one well that was shut in at the time and then they started producing the well again and the water production primarily there is from one well.

Q What well is that? Do you have that down?

A No, sir, I do not.

Q How much additional recovery do you estimate that this waterflood will give?

A One million additional barrels.

Q One million barrels?

A Yes, sir.

Q In addition to the 797,331 that you now have?

A Yes, sir.

MR. UTZ: Are there other questions of the witness?

MR. DURRETT: Yes, sir, I have a question or two.

BY MR. DURRETT:

Q Mr. Coltharp, which well did you say was the discovery well in this pool?

A It's the Kincaid and Watson Humble State 1-D. That well is located in the Northwest of the Northwest of Section 8. The map in here says Kincaid and Watson A Humble.

Q Where would you propose to locate your central tank battery, did you state that?

A No, sir, I did not. The central tank battery is proposed to be located in the Southeast corner of the Northwest Quarter of the Southeast Quarter.

MR. UTZ: What section?

A Of Section 5.

Q What section?

A Township 17 South, Range 9 East.

Q Would that be in the Southeast, Southeast, of the Northwest?

A Let's go Southeast corner of the Northwest of the Southeast. Approximately thirteen, fourteen hundred feet from the South and East lines of Section 5.

MR. UTZ: That would be on the E-4200 lease?

A Yes, sir.

MR. DURRETT: That's all I have. Thank you.

MR. KELLAHIN: If the Commission please, we have a plat showing the location of the tank battery which I would like to have marked as Exhibit X and offer as an exhibit at this time. I think it might be helpful to the Commission.

(Whereupon, Applicant's Exhibit No. X was marked for identification.)



MR. UTZ: What type of testing facilities is it your intention to install?

A Currently we're planning to install three sleeve manifolds out in the field, one would be located at the central battery, two satellite manifolds. At those satellites we would have metering heater treaters so that the production from the individual wells could be periodically tested. This is shown on Exhibit X.

MR. UTZ: Exhibit X will be entered into the record of this case.

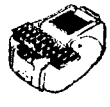
(Whereupon, Applicant's Exhibit No. X was admitted in evidence.)

MR. UTZ: Are there other questions of the witness? The witness may be excused.

(Witness excused.)

MR. UTZ: Is there anything further in either of these two cases? The case will be taken under advisement. We'll take a ten-minute break.





STATE OF NEW MEXICO )
) ss
COUNTY OF BERNALILLO )

I, ADA DEARNLEY, Court Reporter, do hereby certify that the foregoing and attached transcript of proceedings before the New Mexico Oil Conservation Commission at Santa Fe, New Mexico, is a true and correct record to the best of my knowledge, skill and ability.

IN WITNESS WHEREOF I have affixed my hand and notarial seal this 17th day of December, 1962.

Ada Dearnley
Notary Public-Court Reporter

My commission expires:

June 19, 1963.

I do hereby certify that the foregoing is a complete record of the proceedings in the Examiner hearing of Case No. 2702, 2703 heard by me on Nov. 20, 1962.

, Examiner
New Mexico Oil Conservation Commission