Before the

OIL CONSERVATION COMMISSION

Santa Fe, New Mexico

Date-March 20, 1957

IN THE MATTER OF:

CASE NO. 1225

TRANSCRIPT OF PROCEEDINGS

DEARNLEY - MEIER & ASSOCIATES
INCORPORATED
GENERAL LAW REPORTERS
ALBUQUERQUE - SANTE FE
3-6691 2-2211

BEFORE THE
OIL CONSERVATION COMMISSION
Santa Fe, New Mexico
March 20, 1957

IN THE MATTER OF:

Application of Moab Drilling Company for an order authorizing a pilot waterflood project in the High Lonesome Pool, Eddy County, New Mexico, in exception to Rule 701 of the New Mexico Oil Conservation Commission Statewide Rules and Regulations, and further, approval for the drilling of several unorthodox locations for injection wells in said pool. Applicant, in the above-styled cause, seeks an order authorizing a pilot waterflood project in the Queen formation of the High Lonesome Pool, said project to be effected by means of water injection through the drilling of approximately six wells in Sections 15 and 16, Township 16 South, Range 29 East, Eddy County, New Mexico. Applicant also seeks Commission approval for the drilling of these six unorthodox locations to serve as the water injection wells in the High Lonesome Pool.

Case 1225

BEFORE: Mr. Daniel S. Nutter, Examiner.

TRANSCRIPT OF HEARING

MR. NUTTER: The next case on the docket will be Case No. 1225.

MR. COOLEY: Case 1225 is the application of Moab Drilling Company for an order authorizing a pilot waterflood project in the High Lonesome Pool, Eddy County, New Mexico, in exception to Rule 701 of the New Mexico Oil Conservation Commission Statewide Rules and Regulations, and further, approval for the drilling of several unorthodox locations for water injection wells

in said pool.

MR. STEPHENSON: Mr. Examiner, I am appearing on behalf of the applicant. I am Donivan Stephenson, of the firm of Bigbee and Stephenson, Box 669, Santa Fe, New Mexico. This docket number relates to a flood project depending on the action of the Commission, and experience with the pilot flood if granted. The capacity flood may be applied for but this docket number relates only to the pilot flood. Also by way of preliminary matter, I notice on our docket sheet that it mentions that this application is in exception to Rule 701. I believe that application will show that the Commission's Rule 701 has been complied with. We are not asking any exception there.

I would like to call as my first witness Mr. T. R. Havins.

MR. COOLEY: May I clarify this Mr. Stephenson. This water injection is prohibited by Rule 701, except after notice of hearing, and that's the reason it is so advertised. You did comply with the subsequent provisions of it in your application but it, nevertheless, requires a hearing to permit water injection.

MR. NUTTER: One question. I think also that you mentioned that it is only for the pilot water flood. However, the case was advertised and we will also correct the location of certain wells on unorthodox locations.

MR. STEPHENSON: That is correct, Mr. Examiner, with respect to injecting wells.

(The witness is sworn.)

T. R. H A V I N S, J R.,

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

follows:

DIRECT EXAMINATION

BY MR. STEPHENSON:

Q Would you state your full name, please.

A T. R. Havins, Jr.

Q Where do you reside, Mr. Havins?

A Abilene, Texas.

Q By whom are you employed?

A Utex Exploration Company.

Q In what capacity?

A I'm the manager of the Land and Production Department.

Q You appear on behalf of the applicant, Moab Drilling Company? A Yes, sir.

Q What is the Moab Drilling Company?

A Moab Drilling Company is a proprietership owned by Charles A. Stein of Moab, Utah.

Q And what is the relationship, if any, between Moab Drilling Company and Utex Exploration Company, Inc.?

A Utex Exploration Company is a Corporation of which Mr. Stein is the President and chief stockholder.

Q Has Utex Exploration furnished certain personnel and services to the applicant with this pilot flood project?

A Yes, we have.

Q Mr. Havins, this application dated February 21, 1957 has been twice submitted, has it not? A Yes, sir.

Q On February 28, 1957 and on March 13, 1957?

A Yes, sir.

Q And that is with respect to the locations of the proposed injection wells.

A That is correct.

Q At whose request were those amendments made?

A After our first application of February 21 was made, we talked to the USGS people in Roswell and also to Mr. Mankin, both representatives of those agencies, and they suggested that we amend our application to show the proposed injection wells not to be exactly on the lease lines, but rather to be a few feet off the lease lines in order that they may be assigned to a forty acre proration unit.

Q With respect to the eighty acres described in your application as being within the pilot-- proposed pilot flood project, who are the owners of the leases on those two areas?

A Moab Drilling Company owns the leases on both of them.

Q Now referring, Mr. Havins, to the exhibits attached to your application relating to lease owners in the area of the proposed pilot flood area, have you received waivers or approval of this docket number from various of those lease owners listed there?

A Yes, we have. The proposed pilot flood has been discussed with a number of these lease owners and we have waivers for covering the acreage in Section 9 and Section 10 which is owned by Paul Davis and two partners of his, and we have waivers from Mr. Davis and his partners.

Q I will hand you a group of five letters stapled together which I will ask to be considered as Applicant's Exhibit Number

One and ask you if those are the waivers to which we refer?

(Marked for identification Moab's Exhibit Number One.)

A The first three are the ones to which I referred. The other two are letters from Mr. Mills Colligan and Mr. Claude Hall who have, as I understand it, some interest in some of the adjacent acreage and also have some overriding royalty interest.

Q Also, I notice on your list there, with reference to certain of these surrounding areas, Utex Exploration Company is listed as owner. You say you are employed by Utex?

A That is correct.

Q And are authorized to speak for them?

A Yes, I'm authorized to speak for Utex Exploration Company and am a partner in a lease in Section 10 and Standard Uranium Corporation.

Q And I take it that neither of those entities has any objection?

A No objection, no, sir.

Q I also notice that Mr. Charles A. Stein is listed as an adjoining or nearby lease holder.

A That is correct.

Q Are you authorized to speak for him as well?

A I am.

Q And does he have any objection to--

A He has no objection.

Q Have you been in contact with the USGS concerning this proposed application?

A Yes, sir.

Q I will hand you certain documents which I will ask to be marked as Exhibit Number Two and ask you if that is a letter to the USGS relating to this application, and applies to your application?

A Yes the first letter is a letter to the acting oil and gas supervisor at Roswell in which I set out in detail, and in which I enclosed copies of our applications to the New Mexico Oil Conservation Commission. I outlined in this letter what we had in mind, and the manner in which we were proceeding, and asked the supervisor to notify us if they had any objections to the manner in which we were proceeding, and attached to this letter is a reply to my letter signed by John A. Frost, District Engineer for the USGS in Artesia, in which he states that-- better just leave that stapled.

Q I will ask that the documents to which the witness has referred be marked as Applicant's Exhibit Two. Now you have specified in your application, have you not, that you have developed a water source for this flooding?

(Marked for identification Moab's Exhibit Number Two.)

A That is correct.

Q And that is on State acreage, is it not?

A That is on State acreage.

Q Is that water source at the same place specified in your application? I mean, the application actively stated the location, of course.

A Yes, it does.

Q Now inasmuch as a portion of this water will be used to flood a Federal lease, have you obtained a water prospecting permit? A Yes, we have.

Q I hand you what I will ask to be marked as Applicant's Exhibit Number Three, and ask you if that is a photographic copy of the water prospecting permit? A It is.

(Marked for identification Moab's Exhibit Number Three.)

Q Subsequent to the issuance of this permit you developed your water source? A That is correct.

Q Now, I notice that that is made out to Utex Exploration Company. Will all the rights obtained by that permit be made available to the applicant? A They will.

Q Is it your intention to make application for a water lease to the State Land Commissioners as soon as it may be conveniently done?

A It is our intention.

Q Mr. Havins, you have signed the application and all amendments thereto on behalf of the applicant, Moab Drilling Company. Are the statements contained in your application and all amendments therto true and correct to the best of your knowledge and belief? A They are.

Q In the event this application is approved by the Commission, will the applicant comply with all statutes of the State of New Mexico and all rules and regulations of the New Mexico Oil Conservation Commission relating to your actions under the project?

A Yes, we will comply.

MR. STEPHENSON: That completes my examination of this witness, Mr. Examiner.

MR. NUTTER: Does any one have any questions of the witness? Mr. Mankin.

CROSS EXAMINATION

BY MR. MANKIN:

Q Warren Mankin of the Oil Conservation Commission. Do you have any kind of geological report or report showing the structure of the Queen Formation in this area?

A Yes, we do. I believe that testimony will be the technical testimony and will be covered by another witness.

Q Oh, there is another witness?

A Yes, we have another expert witness who is going to cover that.

MR. MANKIN: Will this witness be concerned only with application of land?

MR. STEPHENSON: Primarily land.

MR. MANKIN: As to the unorthodox location, that will be covered by some one else.

MR. STEPHENSON: By the expert, yes.

MR. MANKIN: That unorthodox location will be covered by that same witness?

MR. STEPHENSON: Yes.

MR. NUTTER: Is that all you have, Mr. Mankin?

BY MR. MANKIN:

Q Except this might be pertinent here. Mr. Havin, it is

noted that one of the unorthodox locations falls on another State lease, other than what is being flooded, is that your intention? I'm speaking now of the Skelly State. You speak of it as Number 24 Skelly State. However, I believe the location does not place it on the Skelly State lease, it is on the State lease rather than the Skelly State Lease.

A I don't think so, Mr. Mankin.

Q Well I have your last amendment dated March 13, which states that the Number 24 Skelly shall be located 2630 from the north line and 1330 from the east line of Section 16, which would put it on, which would move the location southwest of the location that was proposed on the original application which would put it on State lease rather than the Skelly State lease. I wonder if you were aware of that?

A No, I was not. That wasn't our intentions, I believe.

Q The application says 2630 from the north line, that is an error?

A That is an error, and it should be from the south line of that section. I believe that's right.

MR. COOLEY: Would you like to make certain that that is the case and amend?

MR. STEPHENSON: Could I make inquiry of my expert on that and depending on the outcome I would ask leave to amend that.

MR. NUTTER: You may go off the record for consultation.

(Discussion off the record.)

MR. NUTTER: The location 2630 from the north line is ten feet within the Skelly State Lease, is that correct?

A That is correct, yes, sir.

MR. MANKIN: Mr. Havins, your amended application is correct as stated as to location and the lease to which it is located?

A It is correct, yes, sir.

MR. MANKIN: I have nothing further.

BY MR. NUTTER:

Q Mr. Havins, I would like to have something clarified, please. These various waivers that you submitted, could you tell me which acreage they cover in particular?

A I believe I can, sir.

Q Now the waiver from Mr. Paul Davis, which acreage does he have?

A He owns all of Section 9.

Q Now is he the working interest owner?

A He is the working interest owner, yes, sir. Mrs. Green and Mrs. Butcher own that acreage together. You have waivers from all three of them. He owns the working interest in the Southwest Quarter of Section 10 with the exception of the southwest forty acres of that quarter section.

Q And who owns the Southwest Quarter of Section 10?

A Moab Drilling Company.

Q Now this Mrs., Mr. Colligan what acreage does he own?

A Mr. Colligan has an overide on both the Davis Federal Lease and the Skelly State Lease and so does Mr. Hall. I'm not positive of the ownership of any leases in the acreage that are described in there now.

Q And you speak for Utex as well as for Moab, is that correct, sir?

A That is correct.

Q And you are waiving any objections from Utex for the lease in the East Half of the Southwest Quarter of Section 15?

A That is correct, yes, sir. That eighty acres is owned by Utex Exploration Company and Standard Uranium Corporation. I'm authorized to speak for the both of them.

Q Then you mentioned Mr. Stein had an adjoining lease somewhere?

A He owns the Southwest Quarter of Section 16 on the plat, that is shown on that unit. That is, Mr. Stein is the recorded owner of that lease and I'm authorized to waive any objections in his behalf.

Q Who owns the East Half of-- or the West Half of the Southwest Quarter, is that part of the Moab Lease?

A Of 15?

Q Yes, sir.

A Moab Drilling Company owns the Northwest Quarter of the Southwest Quarter of Section 15. John Trigg owns the Southwest Quarter of the Southwest Quarter of Section 15. There is a dry hole shown in that forty acres.

MR. NUTTER: Thank you. Does any one else have any questions of the witness? Mr. Cooley.

BY MR. COOLEY:

Q Mr. Havin, have you had any objection from the people you contacted surrounding this unit?

A We have had no objections from any one.

MR. NUTTER: To its formations? Every one that you have contacted has agreed to waive any objections?

A Some of the people have not been approached with that in mind because there are some of these operators with whom I have not had any recent contact. My statement was that I have not had any objections from any one. I can't tell you that everybody has approved it because I have not talked to Mr. Trigg, nor have I talked to Mr. Barhill.

Q Mr. Barhill owns the East Half of Section 15?

A With the exception of forty acres, which is cut out there, sir, as shown on our plat.

MR. COOLEY: I believe that's all, thank you.

MR. NUTTER: If there are no further questions of the witness you may be excused.

MR. COOLEY: Did you have a question, Mr. Irby?

MR. IRBY: No, my question was asked, thank you.

(Witness excused.)

P. M. B R I D G E S

Called as a witness, having first duly sworn, testified as follows:

DIRECT EXAMINATION

BY MR. STEPHENSON:

Q Would you state your full name, please?

A P. M. Bridges.

Q And where do you reside, Mr. Bridges?

A Abilene, Texas.

Q And with whom are you associated?

A Russell Engineering.

Q Of Abilene, Texas? A Of Abilene, Texas.

Q And what is your profession?

A Petroleum Engineer.

Q Where did you obtain your education, professional education, Mr. Bridges?

A I received a Bachelor of Science from Masser Institute of Technology in 1948 in engineering.

Q Since 1948 what business have you been in?

A I have been engaged continuously in the Petroleum industry since that time.

Q How long have you been with Russell Engineering?

A For the past three years.

Q In what capacity?

A As a Petroleum Engineer.

Q Are you licensed to practice as such in any state?

A I'm a registered professional engineer in the state of Texas.

Q Is that specifically with reference to petroleum engineering?

A Petroleum engineering and natural gas engineering.

Q And do you have application pending in New Mexico for that certificate?

A Yes, sir, we do.

MR. STEPHENSON: We submit the qualifications of the witness.

MR. NUTTER: They are acceptable.

Q Mr. Bridges, have you made engineering studies of this pilot flooding application which is now under consideration?

A Yes, sir, we have. We have been working on this field and particular-- This field in general and this project in particular for approximately the last eighteen months.

Q Have you, Mr. Bridges, prepared a report of your findings, conclusions, recommendations and suggestions in the course of procedure for this pilot flood now under consideration?

A Yes, sir, we have.

Q I will hand you a document which I will ask to have marked as Applicant's Exhibit Number Four. A Yes, sir.

(Marked for identification Moab's Exhibit Number Four.)

Q And ask you if that is, ask you if that is the report to which you referred? A It is.

MR. STEPHENSON: Mr. Examiner, we have several copies of this. I intended to give you these copies.

Q Was that report prepared under your supervision and control and based upon your studies of this particular pilot flood project?

A Yes, sir, it was.

Q Are the statements therein contained, true and correct to the best of your knowledge and belief? A They are.

Q And the opinions therein stated are opinions which you hold, based upon your experience and professional qualifications?

A That's correct.

Q Mr. Bridges, Mr. Havins has testified that you have

developed a water source at a point specified in the application. In your opinion, is that water source sufficient to carry out this pilot flooding project?

A We anticipate initially to inject a volume of about nine hundred barrels a day into the six proposed injection wells. Tests have been run on the water source wells indicated. The wells have a capacity in the neighborhood of fifteen hundred barrels a day, which will be well in excess of the requirement for the flood projecting.

Q Have you, Mr. Bridges, conducted any tests on this water as to its mineral contents and suitability for this operation?

A We have. The testing, which was done in our laboratory, indicates that this water source is a saturated salt solution containing approximately two hundred and eighty thousand parts per million total solids.

Q Were those tests conducted under your supervision and control? A They were.

Q With reference to the location of the six proposed injection wells, would you please state for the Examiner the considerations which you took into account in determining the locations which have been specified in the application.

A We made a study of this field to determine what, in our opinion, would be the most applicable method of injecting water. As a result of this study, we concluded that a pattern, or so-called five spot type of flood would be the most applicable to High Lonesome Pool Injection wells will surround each producer

and push the oil into the producing wells. Injection wells have been located as close to the lease line as we were able to do so, to prevent the migration of oil across lease lines. This will not make necessary unit stations of this property, since all of the oil, which is on a lease, will be recovered on that lease.

Q I noticed in your report on page 3, paragraph 4 that you make certain estimates with respect to the amount of oil which will be recoverable as a result of this project. Would you state those amounts and explain to the Examiner whether or not, in your opinion, that will be recoverable, and whether or not that amount would be recoverable if this approval were not obtained.

A We anticipate that as a direct result of water injection into the pilot flood area an additional three hundred thousand barrels of oil will be recovered from those acres, which would not be recovered under continued primary operations.

Q Would you explain a little more fully the break-down on that two hundred and eighty thousand parts per million of total solids in the water test.

A That water supply well was completed approximately three weeks ago. We got an initial sample in our laboratory which was-- we ran some preliminary tests on it, and indicated the water to be considerably saltier than we had anticipated it to be from that depth. We have withheld making complete analysis of that water until such time we were assured that the water sample that we had obtained initially was not contaminated. We have run subsequent tests on that well over the last week-end and those tests substantiate the first one, so we are now in the process of running

the complete analysis, which will be furnished to your office when it is available, but we do not as yet have a complete break-down on those total solids. The total solids will be determined by chloride determination and geoletric means. The chloride determination was one hundred seventy thousand parts per million.

MR. STEPHENSON: That concludes any examination of the witness, Mr. Examiner.

MR. NUTTER: Any one have a question? Mr. Mankin.

CROSS EXAMINATION

BY MR. MANKIN:

Q Mr. Bridges, I note from your structure map in your report that this is a very general dipping structure in the localized area. What is the general regional picture, is it there is no closure in the area at all?

A No, sir, there is not. We feel that they are individual. This is a stratographic trap with the up dip limit of the pool being a porosity pitch out.

Q Porosity pitch out? A Yes, sir.

Q Generally, referring to portion four of your report, you anticipate that at abandonment it will have produced three hundred thousand barrels of oil is that from the two wells that is within the eighty acres of the project? A That is correct.

Q However, there is wells surround this acre, oil wells surrounding this eighty acres which were not credited in that three hundred thousand. A That's correct.

Q In your original oil in place of one million three hundred and forty-thousand barrels, is that from the two wells only?

A That is from the eighty acres only.

Q Which is the Federal, Moab Drilling Company Federal Davis Number Two, and Moab Drilling Company Skelly Number Seven?

A That is correct.

Q Will not the offset wells to this five spot program, such as the Moab Drilling Company's Skelly State Number Six, Eight, Nine and Ten, and Moab Drilling Company's Federal Davis Number Three and Utex Federal Number Two all obtain some beneficial effect from this flood?

A It might be in line to give a little background on how we anticipate proceeding on this pilot flood project. There are several questions which we would like to obtain quantitative answers to before we proceed into a full field flood. That is the reason for the proposed pilot project. We expect that results from this pilot project will be obtained probably within a year's time. That quantity of oil which we have stated we expect to recover from the pilot project, will be recovered after a period probably of around fifteen years. We anticipate that should the result of this pilot project be favorable, the total field flood will then be initiated, although tere will be some partial response to offsetting wells to the pilot project, prior to the time that the full-field job is initiated, that will be to a minor extent probably.

Q You indicated that it would be approximately a year before you will be able to get any beneficial results from this flood?

A No, we hope within a year to have enough results from the

flood to be able to evaluate it.

Q Well then, in a period of less then a year you would expect to have some results which will either prove or disprove the project.

A We hope to, yes, sir.

Q Do you feel that you have-- what portions of fill-up do you expect to have before you get any beneficial results?

A The preliminary production from this field has been exceptionally low, so that the fill-up volume is relatively small. These wells in this particular area have all been drilled within the last two years, and we expect to reach fill-up in this area in a period of probably of about six months.

Q The two producing wells within this water flood area, approximately how much pay sections do you have in those wells? That is, net pay?

A It is approximately twenty-five feet, and those two wells, as best we can estimate, produced accumulative production of about twenty-five thousand barrels.

Q The injection wells, in what portion of the Queen Formation do you anticipate completing those?

A They will be completed in the entire pay section.

Q The entire pay section will be open hole?

A That is a point that has not been completely resolved yet. We anticipate-- on these injection wells we feel that probably our biggest problem will be getting high enough injection rates, and we anticipate in the pilot project of doing some evaluating to see which one gives us the best time completion.

Q This twenty-five feet that you speak of, is it fairly clean sand or is it such that you might have to selectively inject into the formation?

A We are not anticipating any selective injections, no, sir, it is twenty-five foot section and probably about thirty-five or forty foot cross section. The remainder of it being low-porosity sand with occasionally anhydride streamers. Incidentially, there is no water in the Queen Sand in this area.

Q At the end of this pilot flood, if it is successful, what plans would you have at that time for additional water or additional development? Do you have anything that you could present at this time?

A Well, there, in addition to evaluating the injectivity of the sand during the course of pilot project, we will also be evaluating the productivity of our water source. We know that water from wells has been drilled in the area; that this water sand is quite extensive throughout this area, and we will probably have enough information at that time to make a pretty good estimate of how much additional water supply wells we will need.

Q So your present plans would be that you would develop further the shallow source for water?

A That is correct.

Q As the project would be developed in scale?

A That is correct.

Q The water source has not been limited in any way by the State Engineers Office has it?

A No, sir, it has not.

Q Because of the high content of the salt?

A Well this is outside any water-- any of the water basins, and I'm sure from the salinity that we got on this test, that they will probably not want to include it in one. We are not limited in any way by the State Engineers Office to the use of this water at the present time.

MR. MANKIN: I believe that's all.

BY MR. NUTTER:

Q Is the water compatable with the reservoir, or will it have to be treated?

A We do not believe that any treatment of the water from a compatable standpoint will be necessary. We do intend to treat it for control of corrosion and also for control of bacteria.

MR. NUTTER: Does any one else have any further questions of the witness?

BY MR. COOLEY:

Q Mr. Bridges, would the injection into each of the six wells be approximately equalled?

A Yes, sir, it would be.

Q Could you estimate for me, Mr. Bridges, what the radial area affected in front of the well would be? What the radius of the affected area would be?

A That depends on how long you are injecting water into it. We anticipate eventually to effect the whole area of the reservoirs by injecting water.

Q With these six wells? A No.

Q I mean, from a well. Take a particular well and inject one sixth of nine hundred barrels per day into it, could you estimate for me what the radial effect would be.

A I would guess-- I have not made figures, I have not made calculations along those lines, but I would guess by the time we have evaluated the pilot project, which we are anticipating will be approximately a year's time, injecting at the rate of one hundred fifty barrels a day, that we probably will have not swept out more than about six per cent of the total area within the reservoirs. That is based on our anticipated life of fourteen years.

Q You misunderstand my question, Mr. Bridges. I'm trying to determine how many feet from the injection well.

A Well if you will pardon me for a minute while I get out my slide rule I can give you a number. Approximately one hundred and fifty feet.

Q By any stretch of the imagination it couldn't reach thirteen hundred and ten feet? It couldn't effect a well thirteen hundred and ten feet away, or a lease?

A No, we don't believe it will.

MR. NUTTER: I think what Mr. Cooley is driving at, Mr. Bridges, is the possibility of a lease from which you have not secured a waiver of objection or which Moab or it's affiliates does not control, any of those leases that aren't either waived or controlled would not be effected by this pilot waterflood before the date that you had a chance to evaluate the flood and determine whether you want to expand it or not.

A I would like to point out that this was one of the considerations. In the location of this pilot project, you will notice that it is completely surrounded by producing well in the acreage involved, Moab and Utex and so on, and it is probably pretty much of a practical impossibility that any effect would not be noted on it. I assume that you are speaking of this acreage in Section 15. It is practically impossible that any of that, any well on that acreage would be effected prior to noticing an effect on our offsetting wells, which is an operated by Moab or Utex, so that if for any reason, any peculiar reservoir characteristics which we do not forsee at this time, if the water should start to channel we will be able to catch it, catch that effect on our producing wells prior to the time that it may affect any offsetting acreage.

MR. COOLEY: You mean that the Moab Number Five and Six and the Utex Number Two would detect any effect to the east, any influence to the east before it could reach the Barhill acreage?

A That is correct.

MR. COOLEY: I believe that's all.

MR. NUTTER: Any further questions of the witness?

BY MR. MANKIN:

Q Mr. Bridges, to go further in that, you indicated that there would be no effect. Did you not mean that there would be, not be any detrimental effect? In other words, there is likely to be beneficial effect but not detrimental effect from this flood in this year's time.

A Well, that's correct.

MR. NUTTER: He also stated if by some quirk of nature, channelling occurred that they would notice it in their own wells before the other fellow felt it.

MR. MANKIN: But likewise, from a structural standpoint, it isn't likely that there wouldn't be any detrimental effect to the lease on the southeast in this short period of time, is that not true? A That's true.

MR. NUTTER: Any one else have any questions of Mr. Bridges?

MR. STEPHENSON: One more question. Mr. Bridges, based upon all the information available to you and your professional opinion, in your opinion, are these six injection wells, at the location described in the application, located at such points as to constitute the most practical method of flooding this field, this pilotflood, and also to effect note a maximum recovery?

A Yes, sir, they are.

MR. STEPHENSON: I believe that's all.

MR. NUTTER: If there are no further questions of the witness, you may be excused.

(Witness excused.)

MR. STEPHENSON: Mr. Examiner, we respectfully request that the various exhibits which we have had marked, which I believe constitute Applicant's One through Four, inclusive be admitted into the record and credited-- be admitted into evidence and credited as part of the record in this proceeding.

MR. NUTTER: Is there any objections to the introduction of Moab's Exhibits One through Four in Case 1225? If not, they

will be admitted.

MR. STEPHENSON: Mr. Examiner, we respectfully submit that the application should be granted and that the recovery of this reserve, which would otherwise not be recoverable, is to the best interest to the State of New Mexico. If it is granted we will undertake to comply with all the statutes, rules, and regulations of the Oil Conservation Commission.

MR. NUTTER: Thank you. Does any one else have anything further in this case?

MR. COOLEY: I take it, Mr. Stephenson, that the basis for your application for the six unorthodox locations is that these locations will best facilitate the introduction of water into the reservoir, and for the pilotflood?

MR. STEPHENSON: Mr. Cooley, not being an expert I would say generally that our primary contention in that behalf is that the locations, as specified in the application as amended, are the most practical, based upon the expert testimony, and will result in the greatest recovery of otherwise unrecoverable reserves, and further I should like to invite your attention to the testimony to the effect that there will be no lateral movement of oil across lease lines so are as we can determine, and that is one of the considerations for such a location.

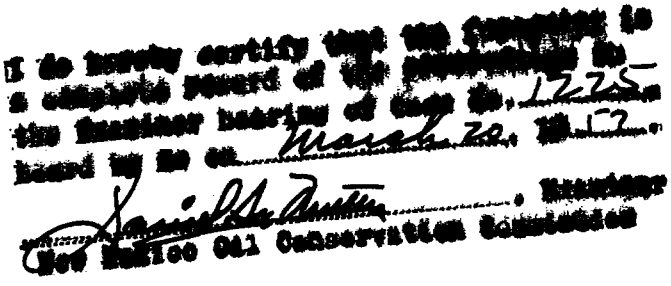
MR. COOLEY: Thank you.

MR. NUTTER: Now, if there is nothing further in this case, we will take the case under advisement and proceed to case Number 1226.

STATE OF NEW MEXICO)
: ss.
COUNTY OF BERNALILLO)

I, J. A. Trujillo, 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 28th day of March, 1957.



J. A. Trujillo
Notary Public, Court Reporter

My Commission Expires:

October 5, 1960

OIL CONSERVATION COMMISSION
P. O. BOX 871
SANTA FE, NEW MEXICO

June 23, 1958

COPY

Mr. Jack Campbell
Campbell & Russell
P.O. Box 721
Roswell, New Mexico

Dear Mr. Campbell:

On behalf of your clients, Moab Drilling Company and Utex Exploration Company, we enclose two copies of Order R-975-A issued June 18, 1958, by the Oil Conservation Commission in Case 1225, which was heard on May 28th at Santa Fe before an examiner.

Very truly yours,

A. L. Porter, Jr.
Secretary - Director

bp
Encls.

Utex Exploration Company
PETROLEUM DIVISION
ROOM 25, BACON BUILDING
P. O. BOX 628
ABILENE, TEXAS

T. R. HAVINS, JR.
MGR. LAND AND PRODUCTION DEPARTMENTS

CHARLES A. STEEN
PRESIDENT
CHIEF GEOLOGIST

J. C. ASHBY
GENERAL MANAGER

Exam Hearing

August 25, 1958

New Mexico Oil Conservation Commission
P. O. Box 871
Santa Fe, New Mexico

In Re: Pilot Waterflood Project,
High Lonesome Pool,
Sections 15 & 16, T16S, R29E,
Eddy County, New Mexico.

Gentlemen:

Moab Drilling Company is now operating properties in a pilot waterflood in the above described areas, as approved in Case 1225, by Orders R-975 and R-975-B.

Our engineers feel that this pilot waterflood area should include a water injection well in the vicinity of the southwest corner of the Northeast quarter Northwest quarter (SW/corner NE/4 NW/4) Section 15, T16S, R29E. This thinking is primarily based on the fact that the Moab Drilling Company No. 5 Davis Federal located in the center of the Southeast quarter Northwest quarter (SE/4 NW/4) Section 15, has had considerable increase in production since the pilot waterflood has been in operation. It is felt that this well should be backed up with another water injection well.

It is our plan, if this application is approved, to drill our No. 11-W Davis Federal injection well at a point 1310' from the north line and 2630' from the west line of Section 15.

If it is necessary for a hearing to be conducted on this matter, we shall appreciate your setting a hearing at your earliest convenience either before an examiner in Santa Fe or Hobbs, or before a full commission, whichever you prefer.

Should you need any additional information in this matter, please feel free to call on us.

Yours very truly,

T R Havins Jr

T. R. Havins, Jr., For
MOAB DRILLING COMPANY

TRH/fh

BEFORE THE
OIL CONSERVATION COMMISSION
SANTA FE, NEW MEXICO
December 6, 1957

TRANSCRIPT OF HEARING
Case No. 1225

DEARNLEY - MEIER & ASSOCIATES
INCORPORATED
GENERAL LAW REPORTERS
ALBUQUERQUE, NEW MEXICO
3-6691 5-9546

NEW MEXICO OIL CONSERVATION COMMISSION

Oil Conservation Commission Office

Santa Fe, NEW MEXICO

REGISTER

HEARING DATE Examiner December 6, 1957 TIME: 9:00 a.m.

NAME:	REPRESENTING:	LOCATION:
Jack M Campbell	Campbell + Russell	Roswell N.M.
P M Bridges	Russell Engineering	Abilene, Texas
Julian C Atty	Vlen Exploration Co.	Abilene, Texas
Nancy Boyd	N.M. Interstate Pipeline Servi	
Frank E Irby	State Engr	Santa Fe

BEFORE THE
OIL CONSERVATION COMMISSION
SANTA FE, NEW MEXICO
December 6, 1957

IN THE MATTER OF: Application of Moab Drilling Company and Utex Exploration Company, Inc. for an order authorizing capacity production for the pilot water flood project in the High Lonesome Pool, Eddy County, New Mexico.	CASE NO. 1225

BEFORE:

Mr. Al. L. Porter, Jr., Examiner.

TRANSCRIPT OF HEARING

MR. PORTER: The meeting will come to order, please. Case 1350 was called for hearing originally on November 20 before Mr. Elvis Utz, at that time counsel for the applicant moved for a continuance until the next examiner hearing, the case was continued by Mr. Utz. In the meantime I have a letter from Mr. S. B. Christie, of Hervey, Dow and Hinkle, counsel for the applicant, requesting that this case be continued to December 23rd at 10 o'clock. There's no objection, the case will be continued to that date.

We will hear the next case, 1225.

MR. COOLEY: Case 1225. Moab and Utex Exploration Company, Inc. for an order authorizing capacity production for the pilot water flood project in the High Lonesome Pool, Eddy County, New

Mexico.

MR. CAMPBELL: Mr. Examiner, I'm Jack M. Campbell. Campbell & Russell, Roswell, New Mexico, appearing on behalf of the applicants, Moab Drilling Company and Utex Exploration Company, Inc. This case, as the Examiner is aware, was originally heard some months ago and a pilot program was authorized by you, Commission Order R-975, dated April 12, 1957. The project has reached a stage where some relief is needed in connection with restriction or production, and on application the Commission on November 25, 1957, issued it's emergency order E-5, authorizing the transfer of allowable from Donohue No. 3N Well to Donohue No 2K Well. This order, of course, will expire by reason of the Statutes fifteen days after it's issuance, and this hearing was requested for the purpose of obtaining a permanent order in so far as this area is concerned.

The application sets out the wells for which this authority is sought, and these are all of the wells which are offsetting directly or diagonally any of the water input wells authorized by the original order.

I have one witness here, Mr. P. M. Bridges, who should be sworn.

MR PORTER: Will your witness stand and be sworn, please?

(Witness sworn.)

MR. PORTER: Just a moment, Jack, since the witness will

have to be referring to his notes, I wonder if it would be all right to let him set over here at the end of the table and let you sit over there?

MR. CAMPBELL: Surely.

P. M. BRIDGES

a witness, of lawful age, having been first duly sworn on oath, testified as follows:

DIRECT EXAMINATION

BY MR. CAMPBELL:

Q Will you state your name, please?

A P. M. Bridges.

Q And where do you live, Mr. Bridges?

A Abilene, Texas.

Q What is your profession?

A Consulting Petroleum Engineer with Russell Engineering of Abilene, Texas.

Q Have you testified previously before this Commission?

A Yes, I have.

Q Did you testify in the original hearing in this case, which was the original application for a pilot water flood program?

A Yes, I did.

MR. CAMPBELL:

I would like to call to the Examiner's attention the fact that this is a continuation in effect of the original case and ask

that the Examiner in the interest of saving time consider the testimony in evidence offered in the original case 1225, of which this analysis which I am handing you is a part and is an exhibit in that original case.

Q Mr. Bridges, since the pilot water flood program was started in the High Lonesome Field has your organization observed and determined the results of the program to date?

A Yes, we have.

Q I hand you what has been identified as first, as applicant's Exhibit No. 3A and ask you if you will please state what that is?

A Exhibit 3A is a map of the area of the High Lonesome Pool in which the pilot water flood project is located. It shows the location of the injection wells as well as the location of the wells which we are requesting capacity allowables for.

Q Those wells for which you are seeking capacity allowables are circled with a large circle?

A Yes, they are.

Q And are those wells wells which are offsetting the red diagonally, the water input wells?

A Yes, they are.

Q Now, I refer you to what has been identified as applicant's Exhibit No. 1A and ask you to state what that is and describe to the Examiner what it reflects?

A Exhibit 1A is the results of well tests that have been

taken on the wells in the vicinity of the pilot project area since the inception of water injection. And it, we have in addition to the estimates of producing rates which have been turned into the Commission, we also have some late well tests in November, which were taken during the last part of November to show as nearly as possible the current status of the wells in the area.

Q Does that exhibit indicate that, that there had been some of the producing wells which have shown some stimulation by virtue of the water injection?

A Yes, it does. The most pronounced effect has been the Utex Exploration, Inc. Donohue-Federal No. 2.

Q Where is that situated referring then to Exhibit 3A?

A It is a southeast offset to injection well Davis-Federal 22-W, it's the closest producer to any injection well in the field.

Q What has been the result with regard to that particular well?

A Well, we anticipated that we would, should start expecting some response from this well after injections of about 5,000 barrels of water into 22-W. If I could refer to Exhibit 2A?

Q I will ask you to refer to what has been identified as Exhibit 2A and state what it is at this time?

A It is a record of volumes of water injected into all of the six injection wells in the pilot project area.

Q Did you or your company compile this data on Exhibit 2A.

and Exhibit 2A?

Q We did from records supplied to us by Moab Drilling Company and Utex.

Q Referring to those exhibits go ahead with your explanation.

A As I stated we had anticipated that upon injection of about 5,000 barrels of water into 22-W that we should start to expect some increase from the Donohue-Federal No 2. It will be noted from Exhibit 2A, 5,000 barrels of water has been injected into 22-W by the end of September. And referring back to Exhibit 1A it will be noted that in the month of October, Davis, excuse me, Donohue-Federal No 2 did start to show an increase. Latest well test on this well, taken on the 25th of November, show it was capable of producing at the present time approximately 57 barrels of oil which is an increase of about 40 barrels above what it was capable of producing prior to the start of water injection.

Q Mr. Bridges, if the other wells in the area respond accordingly with the injection of that equivalent amount of water and considering their distance from the water input wells, do you anticipate that in the near future there may be some increase above the normal unit allowable in some of the other producing wells.

A Yes, we do.

Q Have there been any other wells to date which have responded to the extent where they are either in excess of or approaching excess of normal unit allowable?

A The Davis-Federal No. 5 Well test on the 26th of November was capable of producing approximately 44 barrels of oil, which is slightly in excess of the unit allowable.

Q Now, is it correct that in this particular project you have actually drilled all of the water input wells?

A Yes, we have.

Q You have not used existing wells?

A No.

Q So what type of flood do you have with regard to spacing and units?

A We have had forty acre five spots.

Q Will you state what you have found with regard to the possible rate of water injection in this pilot program since you have instituted it?

A Our original application stated that we anticipated being able to inject approximately a hundred and fifty barrels of water at a surface pressure of approximately fifteen hundred pounds. At the present time we are unable to apply a surface pressure in excess of a thousand to eleven hundred pounds without causing fracturing of the formation and water break through at the producing wells, so our injection rate at the present time is something a little bit less than a hundred barrels per day per well.

Q That is the maximum rate of injection that you have been able to obtain before break through, is that correct?

A That is correct.

Q And you have actually had some experience in connection with determining that rate relative to the break through point, have you not?

A That is correct. You will note on Exhibit 1A some of those wells made water, particularly Skelly-State 9 during the month of October, and Davis-Federal 2 during the month of August and a little bit in September, and this was caused by exceeding the breakdown pressure in these wells.

Q And based upon that fact of a relatively slow injection rate have you made any general calculations to estimate the possible peak production from these wells in the pilot area?

A Yes, we have. We anticipate that the peak production from the wells in the pilot area will probably not be in excess of three to three hundred fifty barrels a day.

Q What was --

A Based on our present injection rates of about six hundred barrels a day.

Q What was the original, approximately, production from this area from these wells prior to the time you commenced your water flood?

A It was about a hundred barrels, a hundred to a hundred-twenty barrels a day.

Q Now, have you for the companies here involved made any

plans with regard to the possible future development of this area beyond the pilot water flood area that you are now operating?

A Yes, we have. These plans, of course, are still very tentative, we are awaiting further data from the pilot area, itself, If it continues to respond as favorably as it has up to the present time we will probably be ready to go ahead with expanse of the flood to encompass the eastern area of the field sometime around the middle of next year.

Q How much of an increase in the size of the area will that involve and the number of wells, can you give us an idea on that?

A Actually involve the drilling of a good many more injection wells but it will be enclosing the five spots on the wells presently outside the pilot flood area and involve, ultimately thirteen producing wells.

Q What with regard to the western portion of the area?

A The western or older portion of the High Lonesome Pool has been developed on a somewhat erratic spacing, it is our present intention to go into the western area and redrill it completely, both producing and injection wells. We anticipate if, that the western area will probably encompass about seventeen producing wells.

Q That development beyond the pilot stage and then the development between the eastern portion and the western portion will be of necessity then in stages of development?

A That is correct.

Q Have you any estimates at all that you could give to the Examiner with regard to the possible ultimate peak production from the pool if assuming you decide to put it all under water flood at some time?

A We anticipate a peak production in the neighborhood of a thousand barrels per day.

Q What was the production at the time you started, approximately?

A It was approximately a hundred wells as of September, 1957, which was the month prior to the month when we got any response from any of our producing wells, the production from the field averaged about a hundred and fifty barrels a day.

Q Now, in the light of the fact, in order to accomplish that, you have to drill a number of producing wells as well as injection wells and operate in stages of development, would that peak production come at one time or would it be in a period of peaks and particular areas in the field?

A Well, of course, we will have a different area of the field peaking at different times. However, with the low rates of injection that we have we do not expect any high sharp peaks from any of our producing wells.

Q Do you have any estimates based upon your present rate of injection, and assuming that that rate of injection is continued,

as to approximately what the maximum production might be from any producing well in this particular field in the light of your relatively low rate of injection?

A I doubt that any particular well in the field will exceed a hundred barrels a day at peak. I think that the average peak on these wells is probably going to be placed in the neighborhood of fifty or sixty.

Q Mr. Bridges, you testified, did you not, in connection with the application of Grayridge Corporation of capacity water flood in the Caprock Queen Pool in New Mexico?

A Yes, I did.

Q At that time did you express an opinion as to whether you felt that restricted production in the project of this type would restul in physical waste?

A I made a statement to that effect, yes, sir.

Q What is your opinion with regard to this particular project here, what is your opinion relative to the possibility of waste in the event there is a restriction in production permitted from these wells?

A Well, I feel that any curtailment of rates will cause a loss of ultimate recovery in the project.

MR. CAMPBELL: I would like at this time to request that the Examiner consider the testimony in evidence which is a part of the records of the Commission in the case of Grayridge Corporation, Case No. 1324.

MR. CAMPBELL: I have no further questions of this witness.

MR. PORTER: That portion of the testimony in the case to which you refer that has pertinence to this case will be considered. Anyone have a question of the witness? Mr. Nutter.

BY MR. NUTTER:

Q Mr. Bridges, I think you stated that the western part of this field would involve another seventeen wells which would be included in the water flood, the ultimate development of the flood, is that correct?

A That is correct. We expect ultimately to have approximately thirty producing wells in the field.

Q Now, what did you mean when you said that, now you said that the production during the month of September, 1957, was approximately a hundred fifty barrels a day?

A That is right.

Q That's from all thirty of the wells in the pool?

A No, that's from the twenty-two wells presently producing from the field. However, we expect to plug out some of the present producers and redrill in the western part.

Q New producing wells would be drilled?

A In that western portion of the field.

Q I see. And you would have thirty producing wells when the field is completely developed on water flood?

A Yes.

Q You estimate the peak production would be a thousand barrels a day at that time?

A We expect it will be some place in that neighborhood, yes, sir.

Q That would be a sustained peak, there would be wells that would have passed their zenith and declined and other wells just appraaching their peak, but the average peak production would be a thousand barrels a day?

A Yes.

Q So the increase has gone from a hundred fifty to a thousand barrels a day sustained production while the water flood is in its stage of completion but before the depletion has set in?

A That is correct.

Q How long do you estimate that thousand barrels a day would last?

A We are not in a position yet to make an estimate on that, Mr. Nutter. We hope to be able to by the time that we get the other six months and we get some more additional layout of the pilot project area.

Q I note from Exhibits 1A and 2A that Skelly-State Wells No. 6 and 8 showed a trace of water during the months of August and September, as well as the Davis-Federal Wells No. 2 and 5 showed a trace of water in August and September on the well tests that were

taken in November which are also shown on these exhibits, no water is indicated as being produced. Was any water produced on those tests?

A I believe that Skelly-State 9 is still producing a trace of water. The rest of the wells are not producing any water at the present time.

Q The wells that previously showed a trace are not producing water and the well that produced considerable percentage of the total production is now producing at the rate of just a trace?

A That is correct.

Q Do you attribute that decline in water production, particularly in the Skelly-State No 9, to the decrease in the amount of water injected--

A Well, it's --

Q --in the two adjoining water injection wells?

A It's attributable to the well head injection pressure apparently caused a fracturing of the formation.

Q Do you think that fracturing resulted in any permanent damage---

A No, sir.

Q --to the water flood?

A When we backed off on our injection pressure the water production in fact stopped, and there was no effect on the oil production at all.

Q So that this, the high injection rates and high injection

pressure which were used at the beginning on the wells, but which have been reduced have not resulted in any damage to the --

A No, sir.

Q -- any permanent damage to the water flood?

A No.

Q Will the increase of the production rate from a hundred fifty barrels a day to a sustained rate of a thousand barrels a day have, in your opinion, any adverse effect upon the demand for oil from the State of New Mexico or the demand for oil from primary recovery projects?

A No.

MR. NUTTER: That's all.

MR. PORTER: Anyone else have a question? Mr. Campbell.

REDIRECT EXAMINATION

BY MR. CAMPBELL:

Q I want to clear up one matter if I may.

MR. PORTER: All right.

Q Mr. Bridges, when you refer to high injection rates or low injection rates do you refer to them in relation to the break down point in any particular reservoir? In other words, do you when you say a rate of injection, high rate, do you mean the rate, the maximum rate short of the break down?

A Yes, I do.

Q In a particular reservoir?

A Particular reservoir.

MR. CAMPBELL: That's all.

BY MR. NUTTER:

Q In other words, Mr. Bridges, a high injection rate in one reservoir may not be a high injection rate in another?

A That is correct. It would depend on characteristics of the reservoir.

Q If you get break down and break through that is a high injection rate, is it not?

A Yes.

BY MR. COOLEY:

Q Mr. Bridges, are you familiar with the ownership of the operating rights in the High Lonesome Pool?

A Yes, I believe I am.

Q Can you tell me what other companies other than the two applicants in this case own operating rights in that pool?

A I believe that this matter was gone into at the original hearing for application of the pilot project. The three companies which are presently operating in the High Lonesome Pool, Charles A. Steen and Associates, Moab Drilling Company and Utex Exploration Company are, as was brought out in the testimony by one of Utex officials at the previous hearing, are inter-related companies having to a large extent common ownership. Actually the only outside operator in the field at the present time in the area which we are considering is Barnhill, who is presently producing one well on the eastern

side of the field and has one shut in gas well.

MR. PORTER: Then I take it, Mr. Bridges, that the well that is shown as belonging to Garr Oil Company is outside the area---

A Yes, sir.

MR. PORTER: --that we are talking about, and would not be affected by this project?

A No.

BY MR. COOLEY:

Q Would the Garr Well be affected by either of the proposed extensions to the present pilot area to which you refer in your direct testimony?

A No, it would not. The western area of the field which I have referred to encompasses Sections 17 and 20. It's the south half of 17 and the north half of 20.

Q And what, did you more specifically explain what you meant by the eastern portion of the field?

A The eastern portion of the field would include Sections 5 and 6.

Q Entire sections?

A Well, actually it will be the western half of Sections, I'm sorry, 15 and 16. It would be the western half of Section 15, and practically all of Section 16.

Q And that's Township 16 South, Range 29 East?

A Yes.

Q The western half of 15 is already in the flood?

A Well, that is right, but there would be additional injection wells to be drilled in there.

Q But the present general area then is what you referred to as the eastern portion of the field?

A That is correct.

MR. COOLEY: I see. Thank you.

MR. CAMPBELL: I'm sure the Examiner is aware that any extensions will have to be on a new hearing so that anybody who may be affected as the project is enlarged, if it is, will have an opportunity to be heard.

MR. PORTER: But your present application applies to the area as outlined in Order R-975?

A That is correct.

MR. CAMPBELL: It applies to the well specified in the application.

MR. PORTER: But the area though, and I believe that's all covered by R-975.

MR. COOLEY: Sections 15 and 16 of Township 16 South, Range 29 East.

MR. CAMPBELL: That is correct.

MR. PORTER: Anyone else have a question of the witness?

BY MR. COOLEY:

Q Mr. Bridges, I would like to clear up this thousand barrels per day peak. If all the wells or all the pool is flooded, I believe that's what you said, if the entire pool is put under water flood you feel that the combined production at any given time would not exceed one thousand barrels per day?

A Well, of course, that is necessarily at this time a pretty rough estimate for two reasons. First of all, we really haven't got sufficient data from the pilot project area yet to be able to make accurate predictions of just what we can expect and the peak production rate will depend also on the speed with which the rest of the field is developed for water flood; if our plans are not changed from what they are at the present time.

We, as I stated, do not expect to start expansion of the field, of the project, probably before the middle of next year, and we anticipate at that time that we will complete the development of the eastern half and then following that will go into developing the western half of the project. But it is hard to say at this time just how long, over how long a period of time that development will be spread out. And that will, of course, control, be a controlling factor on the peak completion rate from the field.

Q And assuming, Mr. Bridges, that curtailment of production from any well under flood would cause waste, you still may control the total production from a pilot water flood project or water flood project in any given pool by controlling the rate of development,

can you not?

A Within limits.

Q Now, would you please explain that answer?

A Well, taking the average case, it wouldn't be possible. We could not recommend this pilot project be produced for the next five years without drilling the injection wells to enclose the five spots offsetting the pilot project because to do so would cause flooding out of the producing wells from one side only. And so the amount that you can stage your development is dependent in part upon the rate of water injection you are using. At a slow injection rate you anticipate a flood which will take our present estimates of the flood life here, some place in the order of ten to twelve years-- and so we would not-- at the maximum injection rates that we can sustain in the field--so we would not flood out these producing wells as quickly as you would in a field where it was necessary to go to higher injection rates and a shorter life.

Q And assuming that this pool is developed or flooded over a period of from ten to twelve years it could be accomplished in such a manner that the peaks in productions for the various areas could be staged where they would not coincide, is that not true? You have now a pilot area involving I believe it's eleven, isn't it, producing wells?

A Yes.

Q The development of this field could be so staged as that

so as to prevent the peak production which will come from these eleven wells from coinciding with the peak production from say the western half of the field which you say your company anticipates developing at some later date.

A That is a hard question to answer because we do not know yet how long the peak production from these wells is going to last. One of the unknown factors in this flood and the reason that we recommend and that Moab Drilling Company installed this pilot that this has an erratic permeability distribution which would lead to early, fairly high water cuts. Now, if that occurs then the peak in these may be low and long drawn out. On the other hand if we get, if this erratic permeability distribution that we have in the field does not give us early high water cuts it may be that our estimate of the life of the project is too conservative, the life will be something shorter than the ten to twelve years we are anticipating. So I can't say now whether it would be possible to stage the development so the peak would not, one portion of the field would be on the decline before the other portion reached it's peak.

Q In the event of the eventuality that you did have these early water cuts, the peaks would not be nearly so high on these wells?

A Well, our estimates of peak take that into account, our anticipated early high water cuts. It is possible the life of the field, if these early high water cuts do not develop, this peak

would be, as I said it is a rough estimate, as high as possibly 1500 barrels a day rather than a 1,000.

Q Well, in pools generally which are water flooded where you do not have this erratic effect of permeability, it is the nature of water flood to peak rather early in the life of the flood, is it not, and decline steadily thereafter?

A Yes, it is.

Q And that peak is not of very long duration?

A That is correct.

MR. COOLEY: That's all the questions I have.

RE-DIRECT EXAMINATION

BY MR. CAMPBELL:

Q It is true, is it not, as a general proposition subject to the limitations you indicated and possible economic limitations, that the stage to the development or rate of development can be a factor in controlling the peak production situations in a particular are, can it not?

A It can be providing proper engineering consideration is taken of the reservoir factors.

Q Yes, I understand within the limitations that you referred to that is a factor that can have some bearing upon that particular phase of secondary recovery, can it not?

A That is correct.

MR. PORTER: Are there any further questions? Mr. Irby.

MR. IRBY: Is there anything in the record that states the zone of injection?

MR. CAMPBELL: I'm sure there is in the original record.

A We are injecting into the Queen sand.

MR. COOLEY: In Order R-795, the original order, water project authorizing water injection in the Queen sand underlying Sections 15 and 16.

MR. PORTER: Anyone else have a question. The witness may be excused, Mr. Campbell.

(Witness excused.)

MR. CAMPBELL: I would like to offer in evidence applicants Exhibits 1A and 2A and 3A.

MR. PORTER: Without objection they will be admitted.

MR. PORTER: Mr. Campbell, I believe you said this is the only witness you have.

MR. CAMPBELL: Yes, sir.

MR. PORTER: Anyone else have testimony to present in this case? Any further statements? If not, we will take the case under advisement and adjourn the hearing.

STATE OF NEW MEXICO)
: SS
COUNTY OF BERNALILLO)

I, MARIANNA MEIER, Notary Public in and for the County of Bernalillo, State of New Mexico, do hereby certify that the foregoing and attached Transcript of Hearing 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; that same is a true and correct record to the best of my knowledge, skill and ability.

WITNESS my Hand and Seal, this, the 26 day of December, 1957, in the City of Albuquerque, County of Bernalillo, State of New Mexico.

Marianna Meier
NOTARY PUBLIC

My Commission Expires:

April 8, 1960.

I do hereby certify that the foregoing is a complete record of the proceedings in the Examiner hearing of Case No. 1225 heard by me on Dec. 6, 1957

A. L. Porter
New Mexico Oil Conservation Commission

BEFORE THE
OIL CONSERVATION COMMISSION
SANTA FE, NEW MEXICO
May 28, 1958

CASE NO. 1225

DEARNLEY - MEIER & ASSOCIATES
INCORPORATED
GENERAL LAW REPORTERS
ALBUQUERQUE, NEW MEXICO
3-6691 5-9546

BEFORE THE
OIL CONSERVATION COMMISSION
SANTA FE, NEW MEXICO
MAY 28, 1958

IN THE MATTER OF:

CASE NO. 1225: Application of Moab Drilling Company and Utex Exploration Company for an order amending Order No. R-975. Applicant, in the above-styled cause, seeks an order amending Order No.R-975: to permit the conversion to a water injection well of the Utex Exploration: Company Donohue-Federal No. 3 Well, located in the SE/4 SW/4 of Section 15, Township 16 South, Range 29 East, Eddy County, New Mexico.

BEFORE:

Elvis A. Utz, 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. UTZ: The hearing will come to order, please. The first case on the docket will be Case 1225.

MR. PAYNE: Application of Moab Drilling Company and Utex Exploration Company for an order amending Order No. R-975.

MR. CAMPBELL: Mr. Examiner, I am Jack M. Campbell, Campbell & Russell, Roswell, New Mexico, appearing on behalf of the application. I have one witness, Mr. Speir, to be sworn.

(Witness sworn)

MR. UTZ: Are there any other appearances to be made in this case? If not, you may proceed.

A. M. SPEIR,

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

DIRECT EXAMINATION

BY MR. CAMPBELL:

Q Will you state your name, please?

A Archie Speir.

Q Where do you live, Mr. Speir?

A Artesia, New Mexico.

Q By whom are you employed?

A Utex Exploration Company.

Q How long have you been employed by that company?

A Two years.

Q Will you give the Examiner a brief summary of your professional and educational background, please?

A I am a graduate of **Ohio University, 1949, petroleum engineering. Worked three years for a drilling contractor, two years for Magnolia Petroleum Company, one year for H. L. Brown as a petroleum engineer, and two years with Utex.**

Q What is your present job with Utex?

A It is production engineer.

Q Are you acquainted with the High-Linesome water flood project operated by Utex?

A Yes, sir, I am.

Q Do you have some current information, Mr. Speir, on the water injection and oil production from wells that are involved in that particular project?

A Yes, sir, we do.

Q I hand you what has been identified as Moab's Exhibit No. 1 in this case, and ask you to state what that is, please.

MR. UTZ: The witness' qualifications are acceptable.

Q Will you state what that is, please?

A Table 1, the barrels injected into six pilot injection wells in the High-Lonesome Field, with cumulative injection of each well.

Q Does that carry the water injection per well through the month of April, including the month of April?

A Yes. The cumulative figure shows the April injection.

Q I hand you what has been identified as Moab's Exhibit No. 2, and ask you to state what that is, please.

A Table No. 2 is a production history of Davis-Federal lease. This is a complete production history from the initial completions of these wells through April, 1958. Two wells on the lease, No. 2 and the No. 3 Well.

Q Is that the lease which is affected by this particular application?

A Yes, sir, it is.

Q I now hand you what has been identified as Moab's Exhibit No. 3, and ask you to state what that is, please.

A Table No. 3 is a production history of Moab Drilling Company Donohue-Federal lease for the past twelve months showing the monthly production and the total production for the twelve-month period.

Q Now, I hand you what has been identified as Moab's Exhibit No. 4 and ask you to state what that is, please.

A Table No. 4 is the production history of Moab Drilling Company Skelley State lease that includes the six wells involved in the pilot -- excuse me, -- the five wells in the pilot flood area, showing the monthly production for the last twelve months with the total production through that period of time.

Q Do Exhibits 1, 2, 3 and 4 reflect the entire information on the water injection and the oil production on all of the leases that are involved in the **High-Lonesome water flood project?**

A Yes, sir, it does.

Q Now, are you acquainted with the application that has been filed for an amendment to the basic order in this water flood project?

A Yes, sir.

Q Mr. Speir, I hand you what has been identified as Moab's Exhibit No. 5, and ask you first to state what that is?

A Exhibit No. 5 is a plat of the field that encompasses the pilot flood area, and on this there are two outstanding identifications including three wells that are circled in blue that have received a kick or an increase in production due to the water flooding.

The one well that is circled in red is the well that is proposed to be converted from a producing to an injection well.

Q Now, that well that is circled in red, which I believe is your Donohue-Federal No. 3, what has been the recent oil production history of that well as reflected in the Exhibits that we have previously offered here?

MR. UTZ: Mr. Campbell, do you have another set of Exhibits that Mr. Nutter could have?

A The production history on Utex Exploration Donohue-Federal No. 3 Well has always been a marginal producing well, and in the past few months it has not been productive at all.

Q Has an effort been made in the past to improve the production from that well?

A Yes, sir.

Q Primary production?

A Yes, sir. There was a large number -- quite a bit of open hole below the pay zone that has been water flooded. This hole was plugged back, and this well was refraced in order to stimulate production.

Q Now, why is it, Mr. Speir, that you contemplate an injection well, water injection well at that particular location?

A We have had a breakthrough of water into our Donohue-Federal No. 2 Well, and we intend to -- we are trying to back up the No. 2 Well to prevent any further migration of the oil past the No. 2 Well.

Q Are you in charge of the operation of this project for your company?

A Yes, sir, I am.

Q Is it your opinion that it is necessary to inject water at that location in order to increase the ultimate recovery of oil in regard to the secondary recovery program?

A Yes, sir, we do. We feel like there is between ten and fifteen thousand barrels of oil -- secondary recovery oil, that we will be able to recover by the injection of water into the No. 3 Well.

Q Now, that well is situated on a Federal lease, is it not?

A Yes, sir, it is.

Q Have you discussed this matter with the United States Geological Survey?

A Yes, sir, I have.

Q I hand you what has been identified as Moab's Exhibit No. 6, and ask you to state what that is, please?

A Exhibit No. 6 is a letter we received or Utex Exploration received from the United States Geological Survey stating that they do not object to converting the No. 3 Well to a water injection well.

Q Have you contacted the owner of the lease in the SE/4 of the SW/4 of Section 15, which offsets this proposed injection well to the west?

A Yes, sir, we have.

Q I hand you what has been identified as Moab's Exhibit No. 7, and ask you to state what that is, please?

A Exhibit No. 7 is a letter from Mr. John H. Trigg, the owner of said unit, said acreage, stating that he does not object to converting said well into an injection well.

Q Now, Mr. Speir, have you notified the owners of overriding royalty or oil payment under the Federal lease of this application?

A Yes, sir, we have.

Q I hand you what has been identified as Moab's Exhibit 8 and ask you to state what that is?

A Exhibit No. 8 is a letter to Mr. Edward C. Donohue, the overriding royalty owner, of the Donohue-Federal acreage on which the proposed injection well is located.

Q That is, in fact, an oil payment rather than an overriding royalty, is it not, Mr. Speir?

A Yes, sir, it is.

Q Was that,a letter of that type sent to all of the owners of record of overriding or oil payment under the Donohue-Federal lease?

A Yes, sir, to all known existing overriding royalty owners.

Q Was that letter sent to Mr. Donohue, certified?

A Yes, sir. It was a certified letter.

Q I hand you what has been identified as Moab's Exhibit 8-A, and ask you to state what that is?

A This is a Return Receipt for the certified mail that was mailed to Mr. Donohue.

Q Now, are there any other overriding royalty owners on that tract, to your knowledge?

A Yes.

Q I hand you what has been identified as Moab's Exhibit 8-B, and ask you to state what that is, please?

A Exhibit 8-B is a Return Receipt from Mrs. George Amolin, owner of overriding royalty under the Donohue lease.

MR. CAMPBELL: Now, Mr. Examiner, for the record, we also notified all overriding royalty owners under the State lease, Skelley State lease to the west, and we have here -- and I would like to offer in evidence Return Receipts from Skelley Oil Company, Art B. Gibson, B. B. Smithing, as applicants, Exhibits 8-C, D and E. I would also -- this should be Moab's Exhibits 8-C, D and E. I would also like to offer in evidence a letter dated May 23, 1958 from B. B. Smithing owner of overriding royalty under the Skelley State lease waiving any objection to this application. And I would like for the record to show that the applicant states that these overriding royalty owners' Return Receipts, which are offered in evidence are the only overriding royalty owners of record under the Skelley State lease except employees of the applicant who own overriding royalty under that particular State lease.

I believe that's all I have of this witness at this time.

MR. UTZ: Any questions of the witness?

CROSS EXAMINATION

BY MR. NUTTER:

Q Mr. Speir, your Donohue-Federal No. 2 did experience an increase in production after the injection of water was started, did it not?

A Yes.

Q And since then, the production has declined?

A That's right.

Q What is the reason that it has declined, on account of the water breaking through?

A Yes, sir, we feel that is the reason, the water breakthrough, and we have experienced quite a bit of damage to this well; at the present time we haven't been able to cure or to eliminate.--

Q What is the present percentage of oil and water being produced?

A I think our last test on that was six barrels of oil and five barrels of oil per day producing rate.

Q Has the No. 4 Well there experienced any increase in production?

A No. 4 Well is temporarily an abandoned well.

Q Do you anticipate that the injection of water into Well No. 3 will cause a reversal of this breakthrough and cause No. 2 Well to produce again with a higher percentage of oil?

A That is something that I can't answer definitely; it is

something we are hoping for. We are not exactly anticipating a higher production rate, but only a longer producing life.

Q Do you have any plans for converting the Well No. 4 to production?

A No, sir.

MR. NUTTER: I believe that's all.

MR. UTZ: Any other questions of the witness?

QUESTIONS BY MR. UTZ:

Q Mr. Speir, I didn't quite follow whether or not you had received a reply from the royalty interest or other interests in the west half of the southeast quarter of Section 15.

A That is the Burnhill-McCallister lease?

Q Yes, sir.

A We have written them, we have not received an answer from them.

Q You haven't received a return registered receipt?

A Not at the time we left the office on our way here. We think it might be over there by now.

Q Mr. Speir, does Moab own any of the northeast quarter of Section 15?

A No, sir, they don't. The east half of Section 15 is owned by William G. Burnhill, the McCallister Federal lease, with the exception of one 40-acre tract on the east side.

Q Do you have any plans to back up Wells 5 and 6?

A Well, yes, we do.

Q Where would you drill the injection wells?

A From the original planning, if and when we drill an injection well will be, oh, in approximately the same location of the corner of the unit that all of our other pilot injection wells are drilled.

Q It would be in the northwest quarter of --

A Yes, sir. I think those are ten feet north and ten feet west of the corner of each unit.

Q And you have not received any response from Well No. 10 as yet, Donohue-Federal No. 10?

A The Skelley State.--

Q That's the Skelley State, okay?

A -- No. 10, no, sir, we haven't.

MR. UTZ: Are there any other questions of the witness? If not, the witness may be excused.

MR. CAMPBELL: May I do this first, please? I neglected to ask you if, to your knowledge, Exhibits 1, 3 and 4 were prepared from the production records of your company?

A Yes, sir, they were.

MR. CAMPBELL: I would like to offer in evidence Applicant's Exhibits, Moab's Exhibits 1 through 8-E, whatever the last designation is there.

MR. UTZ: Is there objection to the entrance of Exhibits 1 through 8-E? If not, they will be accepted.

MR. CAMPBELL: We have nothing further, Mr. Examiner.

MR. UTZ: The witness may be excused.

(Witness excused)

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

If not, 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 12th day of June, 1958, in the City of Albuquerque, County of Bernalillo, State of New Mexico.

Joseph A. Trujillo
Notary Public

My commission expires:
October 5, 1960.

I do hereby certify that the foregoing is a complete record of the proceedings in the Examiner hearing of Case No. 1225, heard by me on May 28, 1958.

....., Examiner
New Mexico Oil Conservation Commission

BEFORE THE
OIL CONSERVATION COMMISSION
SANTA FE, NEW MEXICO

IN THE MATTER OF:

CASE 1225

TRANSCRIPT OF HEARING

OCTOBER 2, 1958

DEARNLEY - MEIER & ASSOCIATES
GENERAL LAW REPORTERS
ALBUQUERQUE NEW MEXICO
Phone CHapel 3-6691

BEFORE THE
OIL CONSERVATION COMMISSION
SANTA FE, NEW MEXICO

IN THE MATTER OF:

CASE 1225 Application of Moab Drilling Company for authority to expand its water flood project in the High Lonesome Pool, Eddy County, New Mexico, and for approval of certain unorthodox well locations therein. Applicant, in the above-styled cause, seeks an order authorizing the expansion of its water flood project in the High Lonesome Pool, Eddy County, New Mexico, to include its Davis-Federal Well No. 11-W, a proposed water injection well to be drilled on an unorthodox location 1310 feet from the North line and 2630 feet from the West line of Section 15, Township 16 South, Range 29 East. Applicant further seeks an administrative procedure for the future expansion of said water flood project to include the following proposed water injection wells to be drilled on unorthodox locations:

Davis-Federal No.1-W; 10 feet from the North line and 2630 feet from the West line of Section 15.

Davis-Federal No.2-W; 10 feet from the North line and 1310 feet from the West line of Section 15.

Skelly-State No.15-W; 1310 feet from the North line and 2630 feet from the West line of Section 16.

Skelly-State No.25-W; 2630 feet from the North line and 2630 feet from the West line of Section 16.

All in Township 16 South, Range 29 East.

BEFORE:

Mr. Elvis A. Utz, 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. UTZ: Next case on the docket will be Case 1225.

MR. PAYNE: Case 1225. Application of Moab Drilling Company for authority to expand its water flood project in the High Lonesome Pool, Eddy County, New Mexico, and for approval of certain unorthodox well locations therein.

MR. UTZ: Are there any appearances to be made in this case?

MR. CAMPBELL: Mr. Examiner, I am Jack M. Campbell of Campbell & Russell, Roswell, New Mexico, appearing on behalf of the applicant. I have one witness to be sworn.

MR. UTZ: Is there any other appearance to be made in this case? If not, you may proceed, Mr. Campbell.

(Witness sworn)

ARCHIE SPEIR,

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

DIRECT EXAMINATION

BY MR. CAMPBELL:

Q Will you state your name, please?

A Archie Speir.

Q Where do you live, Mr. Speir?

A Artesia, New Mexico.

Q By whom are you employed?

A Utex Exploration Company.

Q Speak up a little louder, please. In what capacity?

A Production engineer.

Q Have you testified previously before this Commission or its Examiners?

A Yes, sir.

Q Have you testified before the Commission or its Examiners previously in connection with Case 1225, which is the High Lonesome water flood project?

A Yes, sir.

Q When was this project commenced, Mr. Speir?

A We actually started injection in May, 1957.

Q I am going to hand you what has been identified as Applicant's Exhibit No. 1-A, Moab's Exhibit No. 1-A, in this case and ask you to state what that is, please?

A This is a plat of the High Lonesome Field, including the pilot water flood area. The wells circled, colored in red, are the ones that have shown an increase in oil production since the start of the water injection. The wells circled in yellow -- colored in yellow, are the proposed injection wells covered by this application.

Q Now, I hand you what has been identified as Moab's Exhibit No. 2-A, and ask you to please state what that is?

A These are tabulations of water injected in our injection wells,and monthly production,and totals of production from our producing wells in the pilot water flood area.

Q Now, referring to Exhibit 2, which contains Table Roman numeral I through Table V, will you briefly state to the Examiner what those various Tables reflect, first, referring to Table I, what does that show?

A Table I is the barrels of water injected through our injection wells during the month of August, and the cumulative water injected into each of these respective wells.

Q What is total water through August?

A 17,916 barrels.

Q And what does that average for August, what does the injection pressure average?

A Average injection pressure is 1,028 pounds. The August total production was 14,131 barrels.

Q Now, do the remaining Tables, II through V, show the oil and water production from the wells in the pilot area by leases?

A Yes, sir, they do. They show it by wells.

Q I note on Table Roman numeral II the Davis-Federal lease Well No. 2 appears to be the only one of all of the wells in the area which has shown any substantial increase in oil production, is that right?

A May I correct you that it is Well No. 5.

Q Well No. 5, Davis Well No. 5. Is that the only one that has shown a substantial increase?

A Yes, it is.

Q What is the present producing rate of that particular well?

A Present rate during the month of August was 2,662 barrels with a hundred and fifty barrels of water.

Q So it is producing something less than 100 barrels per day at the present time, is that correct?

A Yes.

Q Have there been any wells in the area that have peaked out and then declined since the flood went into operation?

A Yes. That is covered in Roman numeral No. V, which is Utex Exploration's Donahue Federal No. 2; 1,226 barrels during the month of November, 1957. It declined in the month of August, 1958 to ten barrels of oil, and 1510 barrels of water.

Q Now, the well that we refer to as the Davis Well No. 5, is it maintaining a fairly level rate of production since it attained the 2,400 barrels a month in April of 1958?

A Yes, sir, it has.

Q Now, what is it, Mr. Speir, that you are seeking from the Commission in this particular application? What do you want to do?

A We are seeking approval to drill the unorthodox well designated as the Davis-Federal No. 11-W.

Q Is the location of that proposed injection well shown on Exhibit 1-A?

A Yes, it is.

Q Is that Well to be situated on the quarter section line of Section 15?

A Yes, sir, it is. It is on a lease boundary line on the corner of the "C" Unit, southeast corner of the "C" Unit.

Q Now, Mr. Speir, why is it that you are seeking immediate approval of that injection well?

A Well, for two reasons. We need to back up our Davis-Federal No. 5 due to its increase in production, and to protect all respective owners as to their correlative rights under the two

leases, the Davis-Federal and McCallister-Federal.

Q The McCallister-Federal lease is not a part of this project, is it?

A No, it is not.

Q Are the owners of the McCallister-Federal lease aware of your application in this case?

A Yes, sir, they are. They have been notified.

Q Have you received replies from them?

A We have received waivers. They do not object to this application.

Q I hand you what has been identified as Moab's Exhibit 3-A, and ask you to state what that is, please?

A This is a letter written by Moab Drilling Company to Mrs. Blanche McCallister asking for a waiver on this application, and has been signed by Mrs. McCallister and returned to us.

Q The signature indicates that they waive any objection to the plan of action set out in your letter, is that correct?

A Yes, sir. "The undersigned waives any and all objections to the drilling of these wells."

Q Now, I hand you what has been identified as Moab's Exhibit 4-A, and ask you to state what that is, please?

A This is an identical letter to Mrs. Blanche McCallister written to Mr. William Barnhill, who is the operator of the McCallister-Federal lease. He also waives any objections to the above described plan of action of the drilling of the David-Federal

Well.

Q Now, with regard to the other proposed injection wells, 1-W, 2-W, 15-W, and 25-W, what is the situation with regard to those wells? Do you need immediate approval of those?

A No, sir, we do not. We are asking that, for administrative approval subject to the Oil Commission, and we feel that it is necessary to be drilled.

Q Is the administrative approval, which has heretofore been adopted by the Commission relative to the addition of injection wells, satisfactory to you?

A Yes, it is.

Q You understand that by that you are required to satisfy the Commission that the offset wells have sustained substantial increase in production due to water flooding before you can obtain a permit for the new injection well?

A Yes, sir, that is our understanding, and when these other wells show substantial increase in production, then we will ask for permission to drill the remaining injection wells.

Q Now, in this particular project, you are drilling new wells for injection wells, are you not?

A Yes, sir, that is right.

Q What is the approximate cost of the drilling of an injection well in this area, Mr. Speir?

A Approximately, it is about $20,000.00.

Q Now, if you drill this well 11-W as an injection well,

how will you complete that mechanically?

A Mechanically, those are all cored, and the core analysis on the pay zone we set through cement to the surface, perforate through the pay zone in the field. Ordinarily, we have to frac or hydrofrac the well before we can start injection. However, some of the wells will take a small amount of water prior to frac. We have one well -- we might state the 22-W is our best injection well where we can put the highest rate of water through, that it has never been fraced.

Q Do you believe, Mr. Speir, that if you are permitted to utilize this location for drilling Well 11-W as a water injection well, that it will increase the ultimate recovery of oil in this project?

A Yes, I do.

Q Do you believe that by drilling that well and injecting water, you will protect the rights of the owners of your property and the adjacent property under the McCallister-Federal lease?

A Yes, sir, we do.

MR. CAMPBELL: I believe that's all at this time, Mr. Examiner. I would like to offer in evidence Moab's Exhibits 1-A through 4-A inclusive.

MR. UTZ: Is there objection to the offering of Exhibits 1-A through 4-A inclusive? If not, they will be accepted. Are there any questions of the witness?

MR. CAMPBELL: Mr. Examiner, I might make one observation

or request. I am not quite clear on what is required for approval of locations for water injection wells. I know of no Rule that sets up location requirements for water injection wells as distinguished from potential oil or gas wells, but whatever is required, we include in this application, of course, this request, whatever authority is necessary to drill these water injection wells at the location shown on Exhibit No. 1.

MR. COOLEY: Well, Mr. Campbell, in that regard, Rule 701 requires that permission be obtained before any well may be utilized as an injection well; water or any other foreign matter that might be injected into the reservoir, and the approval of the well as an injection well would carry approval of the location. It would be taken into consideration in approving it.

MR. UTZ: Any questions of the witness?

MR. COOLEY: I have one question.

MR. UTZ: Go ahead.

CROSS EXAMINATION

BY MR. COOLEY:

Q Mr. Speir, I notice in your direct testimony you testified that it has been your practice in this particular project to fracture your injection wells to increase the receptivity, I suppose. Could you tell me what your experience has been with using fracturing of different sorts with injection wells, especially with regard to the possibility of channeling?

A Well, in that respect, we try to hold our volume of frac

treatment as low as possible to eliminate the possibility of a fracture, or an extensive fracture. I might state in the history of these wells that the three approved on the original pilot flood would not take any water, or I would say, less than three barrels per day rate previous to fracturing. In order to inject any water at all, that would make the flood economical, it was necessary to frac regardless of the danger we might have in channeling across. We do not feel like the fracture treatment at all has channeled or fractured water to the production well. We have experienced water in wells, but we do not feel that the total blame is to the fracture treatment.

Q Your indication was that it was not exactly the same type of fracture that you would use if you intended to use a completed well?

A It is identical.

Q It is identical?

A Yes. The volumes were about the same. However, we do treat the producing wells with small volume on the field.

Q And you feel fracturing in this particular area is a calculated risk the operators must take in order to get any water in the formation?

A Yes, it is necessary to fracture in order to inject, regardless of the evils.

MR. COOLEY: That's all the questions I have.

MR. UTZ: Does anyone else have a question of the witness?

QUESTIONS BY MR. STAMETS:

Q Mr. Speir, do you have an opinion on why the No. 2 Well kicks out at a comparatively lower well than the No. 5 Well now producing?

A Yes. It has a smaller oil reserve in the No. 5. That is a very thin pay section. You are referring to the Utex Donahue-Federal No. 2?

Q Yes, sir, that's the one.

A We have a small reserve, and it didn't take long for that to develop.

MR. STAMETS: That's all the questions I have.

QUESTIONS BY MR. UTZ:

Q Mr. Speir, on your Exhibit No. 2-A, does that Exhibit show the total production for the month of August if you were to total the figures as shown on the oil production Tables of this Exhibit? In other words, does this show all the wells in the pilot water flood area?

A Yes, sir. There are eleven wells encompassed in the area, and they are all included in Exhibit 2-A.

Q You don't know offhand what that production figure was, do you?

A Not exactly. In the neighborhood of 6,000 barrels.

Q It is all on this Exhibit?

A Yes, sir.

MR. UTZ: Does anyone else have a question of the witness?

If not, the witness may be excused.

MR. CAMPBELL: That's all we have.

MR. UTZ: 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 9th day of October, 1958, in the City of Albuquerque, County of Bernalillo, State of New Mexico.

J. A. Trujillo
Notary Public

My Commission Expires:
October 5, 1960

I do hereby certify that the foregoing is a complete record of the proceedings in the Examiner hearing of Case No. 1225, heard by me on 10-2, 1958.

, Examiner
New Mexico Oil Conservation Commission