BEFORE THE
OIL CONSERVATION COMMISSION
STATE OF NEW MEXICO
Santa Fe, New Mexico
July 24, 1958

EXAMINER HEARING

TRANSCRIPT OF HEARING

Cases 1195 and 1433

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

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IN THE MATTER OF: Application of Graridge Corporation for an order amending Order No. R-972. Applicant, in the above-styled cause, seeks an order amending Order No. R-972 to approve a development pattern for the entire water flood project operated by the applicant in the Caprock-Queen Pool, Chaves and Lea Counties, New Mexico, and to permit administrative approval for the conversion of water injection wells in said project, which is within the limits of the North Caprock Queen Unit No. One authorized by Commission Order No. R-1145.	Cases 1195 & 1433

BEFORE: Mr. Elvis A. Utz, Examiner.

TRANSCRIPT OF HEARING

MR. UTZ: The next case on the docket will be Cases 1195 and 1433.

MR. PAYNE: Cases 1195 and 1433. Application of Graridge Corporation for an order amending Order No. R-972.

MR. CAMPBELL: Mr. Examiner, we are prepared to proceed, of course. I understood there was a case that was going to be continued. We have no objection to that matter being disposed of before we commence our testimony, if you desire to do it.

MR. UTZ: I certainly did overlook that. I'm sorry. We will recess Cases 1195 and 1433 for the moment.

(Recess.)

MR. UTZ: We will again take up Case 1195 and 1433.

MR. CAMPBELL: Mr. Examiner, I'm Jack M. Campbell, Campbell and Russell, Roswell, New Mexico, appearing on behalf of the applicant. I would like to make a brief statement and then we have one witness to offer some testimony.

As the Examiner is aware, this case involves the North Caprock-Queen Unit No. 1, of which Graridge Corporation, the applicant here, is the operator. A number of orders have been entered in connection with this particular project, the most recent being Order R-972-A dated May 28, 1958 in which Graridge was authorized to set up certain water injection wells defined in the order, and to activate those wells upon administrative approval by the Commission.

A few weeks ago, the Ambassador Oil Corporation, operator of the North Caprock-Queen Unit No. 2 immediately joining the one involved here, came before the Commission's Examiner to undertake to establish an administrative procedure for the activation of water injection wells in the entire project., in much the same manner as Order R-972-A provides for the limited number of wells covered by that order. This is an identical application by Graridge Corporation with regard to North Caprock-Queen Unit No. 1.

Briefly, the intent would be that the Commission approve the water injection pattern as will be submitted here, identify the

water injection wells in an order, and authorize upon such terms and conditions as the Commission sees fit the activation of those water injection wells by administrative procedure to avoid the necessity for frequent requests for emergency orders and subsequent hearings at a specific time a day or so before the emergency order expires.

The wording of the application in this case will be identical to that in the Ambassador Corporation hearing except it applies to the No. 1 rather than Unit No. 2. We have one witness, Mr. Bob Harrison, to be sworn.

MR. UTZ: May I ask if there are any more appearances in this case before we swear the witness? If not, you may proceed to swear the witness.

(Witness sworn.)

(Marked Graridge's Exhibits Nos. 1 through 3, for identification.)

MR. CAMPBELL: Mr. Examiner, I failed to mention in my opening statement that I would like to request the Examiner to take administrative notice of the testimony which has heretofore been offered in the Cases 1195 and 1433, inasmuch as at this hearing we shall simply try to bring the status of the project up to date. I assume that the Examiner is either aware or has available the transcript of testimony previously offered in connection with this particular unit.

BOBBY G. HARRISON

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

DIRECT EXAMINATION

By MR. CAMPBELL:

Q Would you state your name, please?

A Bobby G. Harrison.

Q Where do you live, Mr. Harrison?

A Breckenridge, Texas.

Q By whom are you employed?

A The Graridge Corporation and the Ibex Company.

Q In what capacity?

A As Manager of Secondary Recovery.

Q How long have you been employed by those companies?

A One year.

Q You have not previously testified before the Commission or one of its Examiners in New Mexico, have you?

A No, sir.

Q Would you give the Examiner a brief statement of your educational and professional background?

A I was graduated from Texas Technology College with a B. S. in petroleum engineering in May of 1951. Following graduation I was employed by Richardson and Bass in West Texas, and placed into a training program which involved some ten months of roustabout work, followed by fifteen months of gas testing work which

involved well tests, measurement of high pressure gas and field engineering work. On completion of this work I was given a title Engineer and continued to do field engineering work and also general engineering work.

At this time I was transferred to the Water Flood Engineering Department in April of 1953 and there our duties involved planning and operation of water floods and supervision of field technical operations. After three years in the Water Flood Engineering Department with Richardson and Bass, I took a position as District Superintendent for Graridge Corporation at Camay, Texas for the Camay Districts. There we had one water flood project which was the field operations were under my direct supervision. I also assisted in planning the two prospective water flood projects for the KMA sand. In June of 1958 I was transferred to Breckenridge and given my present position.

MR. CAMPBELL: Are the witness's qualifications as an expert in the field of water flood engineering acceptable to the Examiner?

MR. UTZ: They are acceptable.

Q Mr. Harrison, have you acquainted yourself with the application of Graridge Corporation in this case?

A Yes, sir.

Q Since you have been with Graridge Corporation, have you acquainted yourself with the water flood project in New Mexico

that's known as the North Caprock-Queen Unit No. 1?

A Yes, I have.

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

A This is a plat showing the Caprock-Queen Unit No. 1 as outlined in red, and a portion of the Caprock-Queen No. 2 as outlined in green. The present producing wells are indicated along with the present injection wells which are identified in red, and the proposed injection wells which are circled producing wells.

Q Does that exhibit also show, or identify, the wells which are covered by Order R-972-A, which wells are authorized to be activated by administrative approval?

A Yes, sir. The wells identified by being a half circle colored in red, are the wells that are to be placed on injection by administrative approval.

Q Now, there are some figures appearing on the exhibit, first the figures immediately below the present water injection wells in blue and in red, will you explain what those figures represent?

A The blue figures represent the barrels per day of water injection and the pressure during the month of June, 1958, with the red figures below indicating the cumulative injection to July 1st of 1958.

Q With regard to the producing wells, you also show two sets of figures, one in red and one in blue. Will you explain what

those indicate?

A The red figure indicates the present oil production barrels per day from each producing well, with the blue figure below the red indicating the present water production barrels per day.

Q First let me ask you how recent are these production figures, Mr. Harrison?

A These tests on the producing wells were taken during the last seven days.

Q Now, I notice that your well which is designated as 6-1 on Exhibit No. 1 appears to be the well showing the largest production of oil per day at the present time being 324 barrels. May I ask you, is that the peak production from that particular well?

A I would like to correct that figure, Mr. Campbell. That is 224.

Q That is 224 barrels per day? A Yes.

Q Is that the peak figure? A No, it is not.

Q What was the peak production, if you know, from that particular well?

A The peak production was approximately 550 barrels per day.

Q When, approximately, was that peak production reached first?

A That was reached in February of 1958.

Q When, if you know, did the well commence to decline in oil production?

A Approximately one and a half months later.

Q And it has declined from approximately 500 barrels per day to 224 barrels per day? A Yes.

Q Do you antipicate that that well will continue to decline as an oil producing well? A Yes, Mr. Campbell.

Q Is that history of that particular well, in your opinion, indicative of what you may expect with regard to the period of time during which these wells in this project will maintain their peak production?

A Yes. We feel like that this well will be representative of the area.

Q Do you anticipate that all of the producing wells in the entire area will reach a peak of that nature?

A With the exception of the wells which are located in the northwestern part of the area there we have a well which is marked as a plugged well.

Q Which well, does that have any other identification?

A Not on this map. It's immediately above 31-7.

Q How do you account for your statement that the wells in the northwestern area, or portion of the unit, probably will not respond as completely as the well 6-1 to which you had reference?

A We have had in that area the old abandoned well which was an air injection well, and also had some water injection during the primary production of the field, and this evidently has created some reservoir condition which has caused water to be channeled

in that area, and we have had some watering out of wells 31-7 and 31-9 as a result of this.

Also the area west of injection well 31-10 appears to be tight and the wells 31-14, which is now an injection well, and 6-3 a producing well, both had very low primary production. Probably a top production figure of some ten barrels per day.

Q Now, Mr. Harrison, I notice that on Exhibit No. 1, as you have stated, you have shown a portion of North Caprock-Queen Unit No. 2 which has a common boundary with the Unit No. 1 that is here involved. Have arrangements been made, or are they being made for proper control of the water flood projects along that common boundary?

A Yes, we plan to cooperate with Ambassador along the lease lines and steps are being made toward those agreements.

Q Are the operators and non operators on the two units in some instances the same?

A Yes, they are.

Q Mr. Harrison, is it advisable where two of these projects are adjacent to each other, in the interest of prevention of waste, to maintain some reasonable balance between the two projects?

A Yes, Mr. Campbell, it is. It is desirable in protecting correlative rights of the companies involved, and the royalty owners.

Q In the event that the Ambassador flood to the southwest

of the Unit No. 1 should commence to stimulate wells, producing wells across the boundary line into your unit, would it then be necessary for you to activate water injection wells to maintain the flood in balance?

A Yes. To avoid an unbalanced condition and to prevent water, early water breakthrough into the producing well, and loss of ultimate production, we feel that it would be necessary to activate these injection wells.

Q Mr. Harrison, I hand you what has been identified as Applicant's Exhibit No. 2 in this case and ask you to state what that is, please.

A These curves in this Exhibit No. 2 represent a portion of the primary life of the pilot flood area and the primary life of the total unit area with the oil production being projected on into the water flood, or secondary recovery portion of the production. The primary life figures are not complete, but are given here to indicate when the flood responded and to show that the project was in a state of depletion at the time water flooding was initiated.

The curves show that water injection was started in April of 1957, and that when we had an injection volume of some 210,000 barrels of water, that we received an increase in production which occurred in September of 1957. This production continued to increase and reached a peak of some 31,000 barrels per month in April of 1958. Following this we had water breakthrough into the

Well No. 6-1 and we have had declining production since that time.

The curve also shows the cumulative oil above the normal decline which has reached a figure of some 119,000 barrels at the present time.

Q Mr. Harrison, in your opinion does the delay in activating injection wells when adjacent producing wells are stimulated by water flood, result in physical waste?

A Yes, it does, Mr. Campbell.

Q Go ahead.

A In that you establish an unbalanced condition around the producing well and invite early water breakthrough from the side of initial injection and the site of the initial increase.

Q In connection with a project of this type, is it necessary in the operation of it to make future plans for reasonable expansion of this project? A Yes, it is.

Q What type of plans do you have to make with regard to activation of wells for example? What do you have to do before you prepare to actually commence water injection?

A The wells themselves have to be prepared for water injection, which involves clean-out, and in these instances, generally the setting of a liner following conditioning of a well we have the laying of injection lines into the area. We also have to make provision for ample water supply, and also in this type of operation in expanding from a pilot flood, it's necessary to expand

the plant size, installing additional pumps to take care of an adequate water supply.

Q I hand you what has been marked Applicant's Exhibit No. 3 in this case and ask you to state, if you will, what that is.

A This is a plat showing the present injection system outlined in solid lines. As can be seen from the legend, we have a rectangular solid colored block there which represents the present plant; extending from the plant we have solid lines which are the present injection system. The dashed lines represent the proposed injection system, both from the present plant and from a second plant which is to be located in the southern part of the unit area. The wells which have been circled in dashed circles represent the projected injection pattern.

Q Mr. Harrison, if you were assured that the injection pattern shown on Exhibit 1 was approved subject to administrative determination of the necessity for activating the wells, would you then be able to proceed generally with plans such as you have just outlined with regard to Exhibit No. 3?

A Yes, we would, Mr. Campbell, in that we can approximate when wells, producing wells will receive an increase in production, and thus we can project a plan for cleaning out and preparing the proposed injection wells and the laying of the injection system.

Q In this particular project is it necessary in almost all instances of injection wells to install liners?

A Yes, it is. The reason being to confine the water to the Queen sand, and in some cases it is necessary in order to prepare the well for water injection that it have collapsed pipe.

Q If you are able to obtain authority to initiate injection wells by administrative approval, in your opinion will it help you to more efficiently run this project? A Yes, it would.

Q Would it result in greater recovery of oil as a result of the water flood effort?

A Yes, sir, in that it would prevent some delay in activating injection wells.

MR. CAMPBELL: I would like to offer Applicant's Exhibits 1, 2 and 3 in this case, Mr. Examiner.

MR. UTZ: Is there objection to the introduction of Applicant's Exhibits 1, 2 and 3? If not, they will be so admitted.

MR. CAMPBELL: I have no further questions at this time.

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

CROSS EXAMINATION

By MR. NUTTER:

Q Mr. Harrison, I believe you stated that a delay in the conversion of a well to water injection after such well has received a response from the water flood, or is offset by a well that has received a response to the water flood, would result in waste, is that correct? A Yes.

Q What do you regard as the length of time that such delay which would result in waste would constitute?

A Mr. Nutter, it depends on the area and on the response involved. I doubt that I could place a definite figure of time in this case.

Q Do you have any idea what a general figure for an area such as this would be?

A I should think that if an offset injection well could be activated within thirty days following the increase in production of the producing well, that the situation would be amply taken care of.

Q Thirty days? A Yes.

Q Mr. Harrison, your company, on May the 6th, 1958, appeared before an Examiner of this Commission and requested approval for the converting of your 31-2 and your 31-8 and your 32-12 and 32-14 immediately, and for your other injection at a near future date. The order authorizing the conversion of those four wells was signed May 28, and as I recall, permission was actually granted to Graridge Company to convert those four wells to water injection prior to the time that the order was actually signed. I notice here on this Exhibit No. 1 of yours that the wells went on injection July 22. What was the reason for the delay there from May until July to get the wells on injection?

A The delay was caused primarily by delay in field operations

in laying the injection lines and obtaining the equipment for the plant. The equipment had all been ordered and was in, but the electric system which had to be installed caused most of the delay.

Q Do you think that waste to this reservoir resulted as a result of this two month delay?

A I doubt that any real waste has been involved here. It is possible, but it would be at this time difficult to evaluate. It could be evaluated in later figures that will come from this project.

Q When was the response to your 31-7, 31-9, 32-13 and 5-3 first noted, Mr. Harrison?

A These increases were noted in September of 1957.

Q So there has been a delay to actual offsetting these increases from additional injection wells from September of '57 to July of '58, is that correct?

A Yes. That would be correct.

Q But you don't believe that you can tell that any waste has occurred at this time?

A No. We feel that the water breakthrough which has been established in 31-7 and 31-9 was a result of the air injection program which had been carried on previous to water injection, rather than by unbalanced injection.

Q Do you anticipate that in the future it will be impossible to put wells on injection in a period of time less than the time it took to put the four wells on injection?

A Yes, we do.

Q Will an effort be made to do so?

A Yes, sir.

Q Mr. Harrison, I also notice that at the hearing in May, the testimony indicated that you were attempting a frack job on your 31-15 well due to the failure of that well to respond substuantially to the water injection program. Has that well been fracked recently?

A No, it has not. The situation there involves two things, the well 31-10 is known to be the well that is definitely effecting the water production in 31-7 and 31-9, and also this well 31-10 has shown no pressure, which also was a result of water breaking through, probably as a result of the original air injection. Also Well No. 31-14 has been a low injection well, but it is known to be in a tight area and this would be a condition of low permeability, and we hope that with the new equipment we have installed in the plant which will enable us to go to higher pressures, that we will be able to substantially increase that injection rate.

Q Has 31-14 been fracked as an injection well?

A No. There was an original attempt to frack this well in the early stages. However, it was found that the liner had collapsed and there was quite a lot of remedial work that was done.

Q However, fracking the well would increase the permeability, would it not?

A Yes, it's possible that it would, but it also might invite

water breakthrough into the adjacent producing wells.

Q Are you still contemplating fracking 31-15?

A We have the unusual situation here. That well had shown some increase and then at the time the water breakthrough occurred in 31-7 and 31-9 the well showed some decrease in production, and we feel that this was a result of water, the oil bank being built up ahead of the water being somewhat relieved as a result of this water breakthrough.

Q Do you think that possibly 31-16 and 6-2 would have an effect on 31-15?

A Yes. They would be the two wells that would appear to be affecting it at the present time.

Q Are you still contemplating fracking 31-15?

A I was unaware of the situation that a frack job had been contemplated here. I would have to give some more thought to that. However, in view of the situation we have in 31-10, I doubt that we would want to frack it immediately.

Q You would hesitate to frack 31-14 too, is that correct, to increase the water injectivity?

A We would do so if the increased pressure does not increase the injection rate to a desired volume.

Q Even though doing so might require running an additional liner in the well?

A Well, that well, the remedial work has been done to the well.

Q It has? A Yes.

MR. NUTTER: I believe that's all. Thank you.

MR. UTZ: Does anyone have any further questions of the witness? Mr. Lamp.

MR. LAMP: Raymond Lamb with Wilson Oil Company.

MR. UTZ: Mr. Lamb, would you come forward, please, so that the reporter can understand you more clearly?

By MR. LAMB:

Q I haven't been able to follow your input well as to how frequently they have been put on. How many of your input wells approved by the Commission are not now being used as input wells?

A There are four wells which have been approved as injection wells but which can not be activated unless we have administrative approval.

Q Do you have any that have the complete approval that have not been put on? A No.

Q They are all on that have been approved?

A Yes.

Q As I understand this project, as far as the production and the input status is concerned, it has moved from a pilot status into a permanent status?

A We have activated four injection wells outside of the pilot flood, the original six injection wells in the pilot flood.

Q Do you now consider the pilot project or a permanent full-

fledged project?

A No, we would consider it a full-fledged project in that the pilot has indicated that the water flooding would be profitable in this area.

Q You have then expanded the input wells over the pilot project? A Yes.

Q Have you any plan for extending the allowable system beyond that same status? I realize it is not a point of this particular case, it is not within the call. I was asking Mr. Harrison if he has any plans to extend the present allowable system beyond.

A Well, we feel that it would be necessary to have allowables which would take care of the increases in production to avoid waste.

Q But you haven't and, not here, you do not have any immediate plans for the expansion of the allowable system?

A This hearing would not concern that question, no.

MR. LAMB: That's all.

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

MR. NUTTER: One question.

By MR. NUTTER:

Q You put those four wells on injection 7-22-58. What are the rates of injection at the present time?

A The rate will approximate 300 barrels per day per well till such time as we can complete a water well which we have received

approval for a replacement well, and the well should be drilling within the next three to four days.

Q Have tests been run on the wells establishing that they can take 300 barrels per day?

A No. We have done no testing there since they were just placed on injection, and I believe only one well has indicated that it is going to pressure up immediately.

Q How much has actually been injected, to your knowledge, to the present time?

A It would approximate some 900 to 1,000 barrels of water per well.

Q For each of those four wells? A Yes.

MR. NUTTER: Thank you.

By MR. UTZ:

Q Mr. Harrison, which well was it that indicated a pressure immediately? A The Well No. 32-12.

Q What do you attribute that to?

A This well had actually shown some increase in oil production prior to being worked over as an injection well. This area has thusly been pressured up somewhat, and is thus creating some back pressure.

Q Interference from your other injection?

A Yes, it would result from water having been injected in 31-10 in all probability.

Q Mr. Harrison, I believe you stated that you were in a position, or had the agreement, I believe you stated, to cooperate with Ambassador in regard to putting injection wells on along the boundaries, the common boundaries of your two units. Is that in the form of an oral agreement or written agreement, and if so, how do you intend to perform this cooperation?

A The extent of this at the present time is that the injection pattern along boundary lines has been approved by both companies, and oral agreements have been reached as to which wells would be injection wells, but no formal written agreements have been drawn up. They are being drawn up at the present time.

Q How do you expect that these injection wells on another side of the common boundary will be put into operation, that is simultaneously or when you have response from a producing well, or just how in order to protect your unit rights?

A In order to protect our unit rights and to maintain a balanced situation, the most desirable thing would be to activate injection wells along lease lines at relatively the same time. However, the Ambassador pilot flood does extend near our boundary line, and probably in this situation the increase in production would indicate when we should activate these wells in the pilot flood area there.

Q You have reference to their injection well 12-2?

A Yes.

Q Has that shown any response on your 6-13 yet?

A No, it has not.

Q If it did, what would be your action?

A We would feel that it would be necessary to give this well back up from injection wells, proposed injection wells 6-12 and 6-14, and this we would propose to be done by administrative approval from the Commission.

Q If you had administrative approval today on those wells to make injection wells of the 6-12 and 6-14, how long would it take you to inject water?

A In all probability it would be some three weeks, three to four weeks before those wells could be completed as injection wells, and the injection system extended. It would depend mostly upon the time required to condition the wells.

Q Then it's your proposal then in this agreement to the best of your ability to attempt to put injection wells on simultaneously on either side of the common boundary, is my understanding correct?

A Yes, that would be the most desirable situation.

Q Well, do you propose to do that?

A Well, with the permission of the Commission we would do that, yes.

MR. UTZ: Does anyone have any further questions of the witness? If not, the witness may be excused.

(Witness excused.)

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

MR. UTZ: Are there any other statements to be made 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)
:
COUNTY OF BERNALILLO)

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

IN WITNESS WHEREOF I have affixed my hand and notarial seal this 6th day of Aug, 1958.

Ada Dearnley
Notary Public-Court Reporter

My commission expires:

June 19, 1959.

I do hereby certify that the foregoing is a complete record of the proceedings in the Examiner hearing of Case No. 1195 & 1233 heard by me on July 24, 1958.

New Mexico Oil Conservation Commission

NEW MEXICO OIL CONSERVATION COMMISSION

Mabry Hall

Santa Fe, NEW MEXICO

REGISTER

HEARING DATE Examiner July 24, 1958 TIME: 9:00 a.m.

NAME:	REPRESENTING:	LOCATION:
Jack M Campbell	Campbell & Russell	Roswell, N. M.
B. A. Harrison	Grandge Corp	Breckenridge, Texas
[illegible]	Western Nat'l Gas Co.	Midland Tex
Charles Sapp	" " " "	Houston, Texas
Warren W Mankin	Amoco O & G Co	Dallas, Tex.
Rudell Cook	Western Nat'l Gas Co.	Midland, Tex.
Tom [illegible]	Ohio Oil Co.	Midland, Tex
P. T. McGrath	U. S. G. S.	Farmington
Ray C. Jotter	Western Natural Gas Co	Midland, Texas
E. N. FISCHER	OCC	Santa Fe
JJ Savage	Gulf Oil Corp	Roswell
William V. Kastler	" "	Roswell
Don. Walker	" " "	Fort Worth, Texas
Vance M Hendricks	" " "	Roswell
AL DUVALL	SHELL OIL COMPANY	ROSWELL
[illegible]	NM State Land Office	Santa Fe

NEW MEXICO OIL CONSERVATION COMMISSION

Mabry Hall

Santa Fe, NEW MEXICO

REGISTER

HEARING DATE Examiner July 24, 1958 TIME: 9:00 a.m.

NAME:	REPRESENTING:	LOCATION:
Lee W Kelly	El Paso Natural Gas Products	Farmington
J Derrell Couch	The Ohio Oil Co	Houston