

Case No.

1094

Application, Transcript,
Small Exhibits, Etc.

CASE 1094: Barney Cockburn, Application
for permission to inject water in the
Corbin Pool.

BEFORE THE
Oil Conservation Commission
SANTA FE, NEW MEXICO
July 11, 1956

IN THE MATTER OF:

CASE NO. 1094

TRANSCRIPT OF PROCEEDINGS

DEARNLEY-MEIER AND ASSOCIATES
COURT REPORTERS
605 SIMMS BUILDING
TELEPHONE 3-6691
ALBUQUERQUE, NEW MEXICO

NEW MEXICO OIL CONSERVATION COMMISSION
 MABRY HALL - STATE CAPITOL
 SANTA FE, NEW MEXICO

REGISTER

HEARING DATE July 11, 1956 - Hobbs TIME: 9:00 a.m.

NAME:	REPRESENTING:	LOCATION
<i>Harry Winkler</i>	<i>Am oil Co.</i>	<i>Roswell</i>
<i>Arch Bales</i>	<i>- - -</i>	<i>Dallas, Tex</i>
<i>James H. Hinkle</i>	<i>Humble Oil & Refining Co</i>	<i>Roswell</i>
<i>J. W. Lyon</i>		
<i>V. T. Lyon</i>	<i>CONTINENTAL OIL CO</i>	<i>ROSWELL</i>
<i>D. H. Lacey</i>	<i>El Paso Natural Gas</i>	<i>El Paso</i>
<i>(M. Lacey)</i>	<i>C. C.</i>	<i>Hobbs</i>
<i>Al Duvey</i>	<i>Humble Oil & Refining Co</i>	<i>Midland Texas -</i>
<i>Don Harker</i>	<i>Luft. Oil Corp.</i>	<i>Ir Worth, Texas</i>

BEFORE THE
NEW MEXICO OIL CONSERVATION COMMISSION
HOBBS, NEW MEXICO
JULY 11, 1956

IN THE MATTER OF:

CASE NO. 1094: Application of Barney Cockburn in compliance with Rule 701 (a) of the Commission's Statewide Rules and Regulations for an order granting permission to inject water into the Queen horizon of the Corbin Pool, Lea County, New Mexico, and for permission to continue to produce oil from the Grayburg-San Andres formation of the Maljamar Pool. Applicant, in the above-styled cause, seeks permission to inject water in the Corbin Pool into its Wyatt-Phillips Well No. 5 located in the NE/4 NW/4 of Section 33, into their Wyatt-Phillips Well No. 6 located in the SW/4 NW/4 of Section 34, and into their Wyatt-Phillips Well No. 8 located in the NW/4 NW/4 of Section 34, all in Township 17 South, Range 33 East, Lea County, New Mexico, for the purpose of secondary recovery from the Queen formation of the Corbin Pool and further to continue to produce oil from the Grayburg-San Andres formation of the Maljamar Pool through said Wyatt-Phillips Well No. 8.

BEFORE:

Warren W. Mankin, 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. MANKIN: The next case on the docket is 1094.

MR. GURLEY: Application of Barney Cockburn in compliance with Rule 701 (a) of the Commission's Statewide Rules and Regulations for an order granting permission to inject water into the Queen horizon of the Corbin Pool, Lea County, New Mexico, and for permission to continue to produce oil from the Grayburg-San Andres formation of the Maljamar Pool.

Bring your witnesses forward to be sworn.

(Witnesses sworn.)

MR. LOSEE: Mr. Miller.

C H A R L E S P. M I L L E R,

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

DIRECT EXAMINATION

BY MR. LOSEE:

Q Would you state your name, please?

A My name is Charles P. Miller.

Q Where do you live, Mr. Miller? A Hobbs, New Mexico.

Q What is your occupation? A Petroleum geologist.

Q Mr. Miller, have you previously testified before the Oil Conservation Commission? A Yes, sir, I have.

Q Do you know when that was?

A I believe it was in July, 1952, in Santa Fe.

MR. LOSEE: Are Mr. Miller's qualifications acceptable?

MR. MANKIN: They are.

Q Have you had occasion to study the Earney Cockburn Wyatt-Phillips leases located in Sections 33 and 34, Township 17 South, Range 33 East, with reference to this water pilot project?

A I have.

Q Did you study this with any other person?

A I did.

Q Who was that person? A Mr. Buckles.

Q Where is that firm located? A Monahans, Texas.

Q Do you have, or have you prepared, a plat showing the leases

In question?

A I have, sir.

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

Q Is there anything about this map that you think should be explained to the Examiner?

MR. MANKIN: Do you have additional copies of that?

MR. LOSEE: Surely.

A I believe the map is self explanatory. The legend explains the different types of wells showing the locations of the proposed injection well, location of the presently producing Queen sand wells and the acreage to be included in the injection project. I believe the map is self explanatory.

MR. LOSEE: We will offer the map as Applicant's Exhibit A.

MR. MANKIN: Is there any objection to the introduction of Exhibit A in this case? If not, it will be so entered.

(Whereupon, Exhibit A
was admitted in evidence.

Whereupon, Exhibit B
was marked for identification.)

Q Have you and Mr. Buckles had occasion to prepare a contour map of the structures involved in this proposed area?

A We have, sir.

Q I will hand you Applicant's Exhibit B, and ask you if that is the map?

A That is the map.

Q Would you like to explain that map to the Commission?

A It is a structural contour map prepared on top of the Queen sand, contoured on an interval of one hundred feet, expresses itself

in the form of a plunging anticline or nose of a regional feature that passes through the Maljamar continuing easterly; prepared primarily to show the position of the acreage region geographically with reference to the structure.

MR. LOSSE: We will offer that map as Applicant's Exhibit B.

MR. MANKIN: Is there any objection to the introduction of Exhibit B? If there is not, it will be accepted in evidence.

(Whereupon, Exhibit B was received in evidence.)

(Whereupon, Exhibit C was marked for identification.)

Q Have you and Mr. Suckles had occasion to prepare the production history of the Wyatt-Phillips and Federal leases?

A We have.

Q I will hand you what has been marked as Applicant's Exhibit C, and ask you if this is the history you have prepared?

A Yes, sir, this is a compilation showing yearly production of individual wells in the area referred to as east Maljamar, with particular reference to Barney Cockburn leases. The tabulation includes also production from beds deeper than Queen. In other words, includes some production from Grayburg wells, but the wells are identified, and we will be able to distinguish which are Queen and which are not.

MR. LOSSE: We offer this as Applicant's Exhibit C.

MR. MANKIN: Is there any objection to the introduction of Exhibit C in this case? If not, it will be received in evidence.

(Whereupon, Exhibit C was received in evidence.)

MR. LOSEY: Will you mark this as Exhibit D?

(Whereupon, Exhibit D
was marked for identification.)

Q Have you and Mr. Buckles had occasion to prepare the other necessary data with reference to this proposed project?

A We have prepared considerable data; as to whether or not it covers the subject completely, I can't say, but we think it does.

Q I will hand you what has been marked as Exhibit D and ask you if this is a statement of the data that you and Mr. Buckles have prepared with reference to the application?

A Yes, sir.

Q Would you explain the relationship of this data to the proposed project?

A Be glad to. We felt perhaps it would be advisable to prepare this tabulation to present for the examination of the Commission and with the Commission's permission, I will now read some of the data we wish to submit. I will not read this verbatim, but I will get the high point. We are presenting four exhibits, first, the platt showing the acreage and showing the input wells; secondly, the structure contour map, thirdly, the production history by wells by years, and fourthly, the data which I will now read. First, we discussed the reservoir and flood characteristics, namely, of the formation to be water flooded, which is the Queen sand; estimated productive area, two hundred and fifty acres, composition of the formation is sand, structure is a small plunging anticline or a nose; type of reservoir drive is solution gas plus expanding gas cap; the regional reservoir pressure has been estimated as approximately five hundred sixty pounds

per square inch; present reservoir pressure determined on offset wells recently at sub-sea depth of plus four hundred and eighteen feet, shows a maximum of four hundred and forty pounds, and a minimum of three hundred five pounds. We believe the gas cap is present in the original status of the field, and if the gas -- and that the gas cap exists at the present time; the average thickness of the effective pay is estimated to be twelve feet, average depth of the pay is approximately thirty-eight hundred and fifty feet; the average porosity which has been estimated from nearby core analysis, 14.5 per cent, average permeability estimated as the above basis, sixty millidarcies; connate water content, as estimated above, forty per cent of core, gravity of oil averages approximately thirty-five degrees A.P.I.; viscosity of oil is estimated to be four centapoises. Under our second heading, we discussed the primary performance, date first well completed, Queen, January, 1955, Cockburn Federal No. 1; the Queen wells produced no water. The stage of present depletion is estimated to be twenty-five per cent. Number of wells now producing, twelve. Present daily production per well averages eighteen barrels of oil. Present estimated oil saturation fifty-five per cent of core space. Gas repression has not been used in this area. Gas-oil ratio was estimated as originally having been less than four hundred cubic feet per barrel; gas-oil ratio at present as reported on the Commission forms C-16, is estimated to be approximately four hundred cubic feet per barrel. Initial production of each well at date of completion current production is on a tabulation and attached hereto. Under our third heading, injection data, source of water for injection, will be shallow sand at a depth of approximately 125 feet; injection

water will be fresh, injection water probably will be treated with bactericide and a corrosion inhibitor. Injection wells probably will be Phillips No. 5, 6 and 8; exact pattern will be decided later. No additional injection pressure is anticipated. The initial volume of water anticipated for injection will be two hundred barrels per well per day. The ultimate anticipated is two hundred barrels per day. The ultimate surface pressure anticipated is five hundred pounds. Under our fourth heading of results anticipated, we have entries, estimated additional water recovery as direct result of flooding, five thousand one hundred and eighteen barrels per flooded acre; estimated residual oil at abandonment is twenty-five per cent of core space. Now, in addition to the foregoing, I have a tabulation which is strictly statistical and I don't believe it is necessary to read it at this time. It has been presented as an exhibit.

Q Mr. Miller, have similar water flood projects been successfully operated in a similar structure in the producing field to your knowledge?

A Well, not within the immediate area, but in the Permian basin, yes.

Q Do you feel like this proposed project would increase the ultimate recovery from this red sand?

A We believe very definitely that it will.

Q Will the correlative rights of any of the offset operators be endangered by reason of this proposed project after it is put into operation?

A We don't feel that their rights will be endangered. Fact is, we think they will be helped by it.

Q Their ultimate recovery will be greater?

A Their ultimate recovery, we think, will be greater.

Q Now, part of this application, the applicant requests permission to, with reference to Wyatt-Phillips Well No. 8, to inject water into the red sand horizon and to continue to produce from the Grayburg-San Andres formation of the Maljamar Pools; would you just explain how that is proposed to be accomplished?

A Well, there are several methods in which it can be accomplished, I believe. In referring to the application we made to the Commission, we stated we would set tubing on a packer above our Grayburg pay and inject water into the Queen formation through perforations. I don't turn to that point right now, but --

Q Paragraph ??

A -- it is in the application, I am sure.

Q Do you feel like this method can be used successfully in injecting water into one formation and producing the other?

A It is primarily a mechanical problem. I believe it can be done.

Q You mentioned earlier in your testimony that Mr. Buckles had assisted you with the preparation of this data; did Mr. Buckles address a letter to you or Mr. Cockburn with reference to the project?

A There is a letter addressed to Mr. Cockburn. You have it. I do not have the original.

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

Q I will hand you what has been marked Applicant's Exhibit E, and ask you if that is the letter Mr. Buckles presented on his opinion?

A Yes, sir, that is the letter.

MR. LOSHE: We will offer this as Applicant's Exhibit E.

MR. MANKIN: Is there any objection to the introduction of Exhibit D and E in this case? If not, they will be introduced in evidence.

(Whereupon, Exhibits D and E were admitted in evidence.)

MR. LOSEE: Will you mark these as Exhibits F and G.

(Whereupon, Exhibits F and G were marked for identification.)

Q Mr. Miller, have the offset operators to the Wyatt-Phillips and Federal lease been notified of the proposed application?

A They have, sir.

Q I will hand you what has been marked as Exhibit F and ask you if you will state what that is?

A Exhibit F is a letter written by Mr. L. F. Fitzgerald, manager of the production department of Phillips Petroleum Company in response to my telephone conversation to him asking if Phillips would have any objection to the water flooding project. This is his reply.

Q Would you state, in general, what the reply is?

A It is a very brief answer, if you don't object, I will read it.

Q All right.

A It is a letter dated July 5, 1956, signed Mr. L. F. Fitzgerald, production manager, "Phillips Petroleum Company, in re: Barney Cockburn application to inject water in the Queen sand, parts of Sections 33 and 34, Township 17 South, Range 33 East, Lea County,

New Mexico.

"Mr. Charles P. Miller, P. O. Box 385, Hobbs, New Mexico.

"Dear Mr. Miller: This is in response to the subject application filed by Barney Cockburn for water injection into the Queen sand in the above described properties. Phillips Petroleum Company has no objections to the application or to the injection of water into the Queen sand. Very truly yours, L. M. Fitzgerald."

Q I will hand you what has been marked Applicant's Exhibit G, and ask you what that is?

A This is a letter addressed to the Oil Conservation Commission, Santa Fe, New Mexico, signed by Mr. Marshall Riley, Vice-President, Carper Drilling Company.

Q In general terms, does Carper Drilling Company object to the proposed project?

A With the Commission's permission, I will read the last paragraph. It is a very brief paragraph.

MR. MANKIN: Proceed.

A "Please be advised that as an offset operator to Barney Cockburn Wyatt-Phillips and Federal leases, we have no objection to the proposed water injection project and due completion of Wyatt No. 8."

MR. LOSEE: We will offer Applicant's Exhibits F and G.

MR. MANKIN: Is there any objection to F and G? If not, they will be so entered.

(Whereupon, Exhibits F and G were admitted in evidence.)

Q Mr. Miller, do you have anything further to add in support of this application?

A Well, I might state that is a trial run, we think it will work; we would like to be given the opportunity to try it, and if given, we will keep the Commission advised of our results, and if we find it doesn't work, I am sure we will be the first that will want to quit.

MR. LOSEE: I believe that is the applicant's case.

MR. MANKIN: All right.

BY MR. MANKIN:

Q Mr. Miller, on your Exhibit D, which is the data sheet, under primary production performance, I think it was strictly a slip of the tongue, you indicated the date the first well was completed, January, 1955. You meant January, 1951, didn't you?

A That was strictly a slip.

Q Referring back in that same Exhibit D, to reservoir and flood characteristics, you indicated the average thickness of effective pay was twelve feet. Has there been some recent completions in the Queen on the Wyatt-Phillips lease in Wells Nos. 1 and 7, that is on the Cockburn lease, Wells Nos. 1 and 7 and -- 7 and 8, where the recent completions which it was found to be separate zones in the Queen as differentiated from the original completions in Wells Nos. 1 and 2, does this twelve feet cover both zones, or was that the prior zone that has been completed before this time?

A That is the aggregate effective oil sand in the Queen formation on the east Maljamar field.

Q Which includes these two zones that have been found in the Queen as shown by Wells 1 and 7, and Wells 1 and 8 on another quarter?

A I consider it comprehensive, covering all.

Q Those would be a combining aggregate of twelve feet?

A Covering all.

Q What, in regard to produced water in this Corbin field of Queen sand, do you have any characteristics of this water as to salinity?

A Yes, let me look in the file. I believe I have here an analysis made on that. This is an analysis on the water taken from the well in the east Maljamar, depth of a hundred and twenty-five feet, made by Treat-Rite Chemical Company. Do you care to have me read the analysis?

Q I believe that is the water you intend to use?

A I believe so.

Q I meant the produced water now being produced out of the oil wells.

A At the present time, we are producing no water that I know of.

Q So therefore, as to compatability of the fresh water and the water which will be taken in a depth of approximately one hundred and twenty-five feet, there is no problem of compatability now?

A No.

Q Referring, again, to Exhibit A, which was the platt, I believe you showed two water wells which you expect to get the water from in this project; is that still the present thinking?

A If we find we need additional wells, we can get it very easily. There seems to be a very great supply of fresh water.

Q As far as the total water demand, as you now anticipate, for this project, it would amount to what amount of water per day?

A Using two injection wells, it would amount to four hundred

barrels a day.

Q However, you do anticipate three?

A Yes, we anticipate the No. 6 well will come under the influence of water, and when it does, we will use it for a water injection.

Q It was indicated in your Exhibit D that there was twelve wells now producing in the area which was intended to be flooded. Does that include all wells of the Wyatt-Phillips lease and the Cockburn Phillips lease?

A Just the Queen sand wells.

Q That does not include the Maljamar wells in the Grayburg formation?

A No, and I pointed that fact out in my tabulations.

Q I was wondering what kind of pattern you call this particular flood. I cannot put my finger on the type of flood. Have you attempted to designate what type of pattern flood this would be?

A Off the record, I will say it is a trial-error. We don't know, we are going to have to try and see.

Q It is not a five-spot or a nine-spot or any particular --

A No, we asked for permission to alter our plans after we get through.

BY MR. GURLEY:

Q Now, these letters that you received and entered as your exhibits herein, they are the only two letters that you received from offset operators?

A They are the only offset operators.

Q They are the only offset operators?

A Yes.

BY MR. REEDER:

Q Mr. Miller, referring to these 1, 2, 7 and 8, and Wyatt-Phillips 6 and 11, those at one time were believed to be completed in a different horizon, but there was separation; do you now still believe that these formations are separate, or one?

A I adhere to the theory that they are more or less one.

Q That there is no separation?

A Well, now, locally, there may be, but I think from looking at it from a broad point of view in a matter of water flooding, that the ultimate effect will be as though they are one.

Q In other words, the flood will affect both of them?

A I feel very confident of that.

Q It will affect all wells?

A I feel confident of that. Insofar as, that is, the Queen sand. We are talking about the Queen sand?

Q Yes, the two members of the Queen sand. Mr. Miller, regarding your water, your injection water, is that not from the Ogallala?

A Yes, it is from the shallow sand, probably not to exceed a depth of a hundred and twenty-five to a hundred and fifty feet.

Q And, in that location that would be the Ogallala, which is the aquifer of the overlying water district. Has any effort been made on the part of Mr. Cockburn to contact the State Engineer's Office to determine their feelings relative to the use of this water?

A That is a question I am not prepared to answer. I do not know. I can't answer that question, but being as it was not assigned in the district, I presume he considered it not necessary to contact

him.

Q Is there any other deeper potential source of water in the area that is known?

A I have often considered the Santa Rosa sand as an aquifer, providing that the zone has not been contaminated with salt water as a result of improperly cased wells.

Q Does the applicant intend to make any provision for transfer of allowable or increased allowable as the flood progresses?

A We are not asking for any increase at the present time, but, here again, I wish to emphasize the fact that we will keep you informed of our progress and, if we find it is satisfactory, it may become necessary to ask for a transfer of allowables, but at the present time we don't contemplate that.

MR. REIDER: I have a statement I would like to make.

MR. MANKIN: Mr. Miller, you started to read a while ago the analysis of this water which you intend to use in these wells to flood the Queen sand. Is a copy of that available?

A I have a copy, and I believe Mr. Losee has a copy.

MR. MANKIN: Would you care to submit that as an exhibit, so we may be aware of it?

A I see no objection to it.

(Whereupon, Exhibit H was marked for identification.)

BY MR. LOSEE:

Q Mr. Miller, this is a copy of the water analysis on the two water wells, is it not, sir?

A Yes.

Q It is marked as Exhibit H?

A Yes.

MR. LOSTER: We offer this as Applicant's Exhibit H.

MR. MANKIN: Is there any objection to entering Exhibit H in evidence in this case? If not, it will be so entered.

(Whereupon, Exhibit H was admitted in evidence.)

MR. MANKIN: Mr. Miller, this was, these samples were taken from these two water wells as shown on your Exhibit A, is that correct?

A It was taken from one of them, I am not sure which.

MR. MANKIN: In other words, it is in the immediate area?

A Yes, sir, it is so marked at the head of the analysis.

MR. MANKIN: Is there any other questions of the witness in this case? Do you have any further witnesses?

MR. LOSTER: No, sir.

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

(Witness excused.)

MR. MANKIN: Is there any statements to be made or anything else to be introduced in this case?

MR. REEDER: If the Examiner please, I would like to recommend that even though the area of these water wells, these fresh water wells, may be outside the defined water basin, that water to be used is water from the Ogallala which is at present our water supply and our aquifer, and that the water situation is serious enough in southeast Lea County to warrant very serious study and considerable thought as to whether this water should or should not be used for a potential flood.

I should like to recommend that the applicant be required to

take the entire matter up with the State Engineer's Office and possibly investigate an additional source of fresh water to be used for the flood. We don't have enough water right now to waste a single barrel of it, and I think that if at all possible, the supply of water should be found from an additional source.

MR. MANKIN: I had in mind a similar request to make of counsel. If the applicant would be agreeable to merely requesting permission for this from the State Engineer's Office for the use of the quantities of water from them, and of course, I will apprise the State Engineer's Office of the problem when I return to Santa Fe, but in the interim, if the applicant could request that they be given the approval of the State Engineer's Office which has control of all the fresh water in the State of New Mexico, and such that they may give you your permission, even though it is outside the declared basin, they are thinking of extending them.

MR. LOSEE: If the Examiner please, by way of explanation we will be happy to comply with the Examiner's request, and I will contact the State Engineer's Office. The reason the applicant has not heretofore contacted the State Engineer is that he obtains his jurisdiction over the underground water only by his act in bringing them into the underground basin, and even though he were to bring this area in at a later date, the date of priority of the applicant's application of the water to beneficial use would relate back to the time in which he started to withdraw the water from the well. We will ask for their permission and ask them to advise you.

MR. MANKIN: That is true, but he still has complete control of all underground waters whether it is in a declared basin or not,

and therefore, should be apprised of the situation. And, in that same relation, you might be aware of the present possibility of salt water disposal in Lea County which the State Engineer has asked, and the subject of another case and they likewise, in this particular problem as well, even though it is not a declared basin, they want to have the fresh water properly taken care of, so I am sure that they will probably give the approval, but they would like to be apprised of the situation.

MR. LOSEE: We will be happy to advise them.

MR. MANKIN: I will acquaint them of this hearing as soon as I return to Santa Fe. Any further statements?

MR. REEDER: If the Examiner please, I would like to point out that land owners have had extreme difficulty in securing water for their stock, farms and so forth, and as a private citizen, and not as a staff member of the Commission, I would like to enter my objection to the use of the overall water as a flood water for this project.

MR. MANKIN: Any other statements in this case?

MR. LOSEE: If the Examiner please, I would like to have the application in Paragraph 7 amended to conform with the testimony of the Engineer, that part of it which relates to the input of water into Wyatt-Phillips wells Nos. 5 and 8 initially to be made at five barrels, which was undoubtedly an error, and to conform with the engineer's testimony that it is contemplated that it will be two hundred barrels per well per day.

MR. MANKIN: And, you indicate No. 5 and 8 and No. 6, of course, indicates none, but that is at the present time, but when it

is started, it will probably be at the two hundred rate also?

MR. LOSFE: Yes. May I make a resume of this?

MR. MANKIN: Proceed.

MR. LOSFE: If the Examiner please, I believe the testimony and the exhibits entered indicate that the correlative rights of the offset operators, Phillips Petroleum Company and Carper Drilling Company will not be endangered, and if anything, the ultimate recovery will be increased, and they have so filed their consent to the application. As Mr. Miller has pointed out, it is initially an experimental water flood project, and with the idea of preventing waste and promoting conservation of the oil and will enable the applicant to obtain a greater ultimate recovery of oil as he testified, about five thousand barrels per flooded acre. We believe the testimony and the exhibits support the application and respectfully ask the consideration of the Commission to the granting of the application.

MR. MANKIN: Is there any further statements? If not, we will take the case under advisement.

C E R T I F I C A T E

STATE OF NEW MEXICO)
: ss
COUNTY OF BERNALILLO)

I, THURMAN J. MOODY, 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 24th day of July, 1956, in the City of Albuquerque, County of Bernalillo, State of New Mexico.


Notary Public.

My Commission Expires:
April 3, 1960.

MAIL DIVISION 000

RECEIVED JUL 13 1956



STATE OF NEW MEXICO

STATE ENGINEER OFFICE

ROSWELL

S. E. REYNOLDS
STATE ENGINEER

July 13, 1956

ADDRESS CORRESPONDENCE TO:
P. O. BOX 810
ROSWELL, N. M.

File: III-C

Mr. Warren W. Mankin
Oil Conservation Commission
Capitol Building
Santa Fe, New Mexico

Re: Case 1094 - Application of
Barney Cockburn to water flood
in Sec. 33 and 34, Twp. 17S, Rge. 33E

Dear Sir:

I have examined the application of Barney Cockburn to inject water into the red sand of the Corbin Pool for water flooding purposes in Sections 33 and 34, Township 17 South, Range 33 East.

This office has no objections whatsoever to the drilling or use of water wells located in Section 33 as this section is not in a declared underground water basin and is therefore, not subject to the control of the State Engineer.

The two water wells shown on exhibit A of Mr. Cockburn's application are located respectively in the NE $\frac{1}{4}$ NW $\frac{1}{4}$ and NE $\frac{1}{4}$ SE $\frac{1}{4}$ of said Section 33.

Should Mr. Cockburn desire at a later date to drill any water wells in Section 34, Township 17 South, Range 33 East, N.M.P.M., it will be necessary for him to follow the normal procedure set forth in the State Engineer's Manual of Rules and Regulations, as Section 34 is within the limits of the Lea County Underground Water Basin. At this time, I can see no apparent reason why Mr. Cockburn should not be given approval for any wells drilled in Section 34, as there is a large amount of unappropriated water still available in that area.

There are no laws or regulations which would prohibit Mr. Cockburn from importing from water outside of the declared basin for use within the declared basin.

Yours truly,

F. R. Hennighausen
F. R. Hennighausen
Acting District Supervisor

FHH*td

Copy with file 701 (u)
*Sent copy to
Docket to
Cockburn
on 6/1/42*

BEFORE THE OIL CONSERVATION COMMISSION
OF THE STATE OF NEW MEXICO

IN THE MATTER OF THE APPLICATION OF BARNEY COCKBURN
FOR PERMISSION TO INJECT WATER INTO THE RED SAND
(QUEEN) HORIZON OF THE CORBIN POOL RESERVOIR THROUGH
WYATT-PHILLIPS WELL NUMBER 5, SECTION 33, WYATT-
PHILLIPS WELLS NUMBERS 6 AND 8, SECTION 34, ALL IN
TOWNSHIP 17 SOUTH, RANGE 33 EAST, N.M.P.M., LEA
COUNTY, NEW MEXICO, AND FOR PERMISSION TO CONTINUE
TO PRODUCE OIL FROM THE GRAYBURG-SAN ANDRES FORMA-
TION OF THE MALJAMAR POOL RESERVOIR THROUGH THE SAID
WYATT-PHILLIPS WELL NUMBER 8.

No. 1094

APPLICATION

BARNEY COCKBURN, Post Office Box 105, Artesia, New Mexico,
applicant herein, respectfully shows to the Oil Conservation
Commission:

1. That applicant is the operator, and together with
Cale W. Carson, J. B. Stephenson and Don E. Woodward are the
owners and holders of Federal Oil and Gas Lease Las Cruces
Serial No. 060967, insofar as said lease covers the following
land in Lea County, New Mexico, to-wit:

NE/4 NW/4, S/2 NW/4 and SW/4 NE/4 Section 33,
NW/4 Section 34, Township 17 South, Range 33 East,
N.M.P.M., Lea County, New Mexico, and containing
320 acres, more or less, to a depth of 5500 feet
beneath the surface,

which lease is designated as the Wyatt-Phillips Lease.

2. That a total of ⁷twelve wells, two of which are aban-
doned or were dry holes, have been drilled upon the Wyatt-
Phillips Lease. That ²five of said wells are now producing 116
barrels of oil per day from the Grayburg-San Andres Horizon
of the Maljamar Pool Reservoir encountered from a depth ranging
from approximately 4285 feet to 4438 feet. That ³five of said
wells are now producing 76 barrels of oil per day from the
Red Sand (Queen) Formation of the Corbin Pool Reservoir encoun-
tered from a depth ranging from approximately 3750 feet to
3850 feet.

3. That applicant is the operator, and together with Cale W. Carson, J. B. Stephenson and Don E. Woodward are the owners and holders of Federal Oil and Gas Lease New Mexico Serial No. 04242, insofar as said lease covers the following land in Lea County, New Mexico, to-wit:

N/2 S/2 Section 33, N/2 S/2 Section 34, Township 17 South, Range 33 East, N.M.P.M., Lea County, New Mexico, and containing 320 acres, more or less,

which lease is designated as the Federal Lease.

4. That a total of eight wells have been drilled upon the Federal Lease. That one of said wells is now producing 30 barrels of oil per day from the Grayburg-San Andres Horizon of the Maljamar Pool Reservoir encountered from a depth ranging from approximately 4283 feet to 4300 feet. That seven of said wells are now producing 118 barrels of oil per day from the ~~Red Sand~~ (Queen) Formation of the Corbin Pool Reservoir encountered from a depth ranging from approximately 3800 feet to 3900 feet.

#1 7
#2 13
#3 38
#4 8
#5 30
#6 30
#7 30
#8 30
161

5. That on the plat attached hereto, marked Exhibit "A" for identification and by reference made a part hereof, is shown the Wyatt-Phillips Lease and the Federal Lease, together with all wells drilled thereon, and each offset operator. That Wyatt-Phillips Wells Numbers 5, 6 and 8 as shown on said Exhibit "A" attached hereto are the wells it is proposed to inject water into the ~~Red Sand~~ (Queen) Horizon of the Corbin Pool Reservoir. That it is applicant's belief that it would be in the interest of conservation, prevent waste and enable applicant to obtain a greater ultimate recovery of oil and hydrocarbons if water was injected into the Red Sand through Wyatt-Phillips Wells Numbers 5, 6 and 8.

6. That attached hereto are copies of logs of Wyatt-Phillips Wells Numbers 5, 6 and 8 showing the formations encountered from the surface to the total depth of each well, the description and size of casing run and set in each well and

the quantity of cement with which each string of casing is cemented.

7. That two water wells as shown on said Exhibit "A" attached hereto, will be used as the source of water for the water injection program of applicant. Applicant proposes at the beginning of this water injection program to inject each day the following volumes of water into the water injection wells as follows, respectively:

<u>INJECTION WELL NUMBER</u>	<u>VOLUME OF WATER PER DAY</u>
Wyatt-Phillips No. 5	5 barrels
Wyatt-Phillips No. 6	none
Wyatt-Phillips No. 8	5 barrels.

As the results of water injections become known and are studied the above water volumes in Wyatt-Phillips Numbers 5 and 8 will be gradually increased so that at all times the volume of water injected into said wells will be consistent with the withdrawals from offset producing oil wells. At such time as Wyatt-Phillips Well Number 6 has quit producing oil and turned to water as a result of this water injection program, applicant will commence injecting water through Wyatt-Phillips Well Number 6 in such volumes that the total volume of water injected into all of said water injection wells will be consistent with the withdrawals from offset producing oil wells.

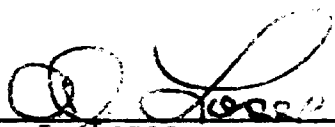
8. That Wyatt-Phillips Well Number 8 is presently producing oil from the Grayburg-San Andres Horizon of the Maljamar Pool Reservoir from a depth of 4404 feet to 4425 feet. That applicant desires to continue to produce oil from the Grayburg-San Andres Horizon through said Wyatt-Phillips Well No. 8 and to recomplete said well for the purpose of injecting water into the Red Sand-(Queen) Horizon.

9. That in producing Wyatt-Phillips Well Number 8 from the Grayburg-San Andres Horizon and in recompleting said well for the purpose of injecting water into the Red Sand Horizon,

applicant proposes to perforate the ~~Red Sand~~ ^{Queen} Horizon, run 2 inch tubing to a depth of approximately 4200 feet, set a Baker Model "D" Retainer Production Packer at approximately 3800 feet, and then produce the Grayburg-San Andres Horizon through the 2 inch tubing and inject water through the annular space between the casing and tubing into the ~~Red Sand~~ (Queen) Horizon.

10. Applicant does not now ask that the current oil allowable produced from the ~~Red Sand~~ (Queen) Horizon of the Corbin Pool Reservoir be increased by reason of the proposed water injection program.


WHEREFORE, applicant prays that the Commission set a date for hearing this Application, either before the Commission or before an examiner; that upon presentation hereof applicant be granted permission to inject water into the ~~Red Sand~~ (Queen) Horizon of the Corbin Pool Reservoir through Wyatt-Phillips Wells Numbers 5, 6 and 8, as hereinabove described, and for permission to continue to produce oil from the Grayburg-San Andres Formation of the Maljamar Pool Reservoir through Wyatt-Phillips Well Number 8.


A. J. Losee
Artesia, New Mexico
Attorney for Applicant

STATE OF NEW MEXICO)
) ss.
COUNTY OF EDDY)


BARNEY COCKBURN, being first duly sworn upon his oath, states:

That he is the applicant named in the within and foregoing Application; that he has read the same and understands the contents thereof; and that the matters therein stated are true and correct according to his best information and belief.


Barney Cockburn

SUBSCRIBED AND SWORN to before me this 4th day of June, 1956.

My Commission Expires:
October 1, 1956


Notary Public

LOG OF WYATT-PHILLIPS WELL NO. 5

CASING RECORD

SIZE CASING	WEIGHT PER FOOT	AMOUNT
8-5/8"	24	1140
7"	20	1231
4-1/2"	9-1/2	4258

MUDDING AND CEMENTING RECORD

SIZE CASING	WHERE SET	NUMBER SACKS OF CEMENT	METHOD USED
8-5/8"	1140	66	Halliburton
7"	1231	50	Denton
4-1/2"	4258	100	Denton

FORMATION RECORD

FROM	TO	TOTAL FEET	FORMATION
0	116	116	Sand and Shale
116	121	5	Gravel, Water
121	788	667	Red Bed, Shale
788	906	118	Red Bed, Shale, Shell
906	1092	186	Red Bed, Shell
1092	1244	152	Anhydrite
1244	1315	71	Red Bed
1315	1480	165	Anhydrite
1480	1540	60	Anhydrite, Red Bed, Salt
1540	1740	200	Salt
1740	1860	120	Salt, Potash
1860	2005	145	Salt, Red Bed
2005	2360	355	Salt, Potash
2360	2410	50	Salt, Potash, Gypsum
2410	2515	105	Salt & Potash
2515	2750	235	Anhydrite
2750	2770	20	Red Shale
2770	2840	70	Anhydrite Broken
2840	3110	270	Anhydrite
3110	3185	75	Anhydrite, Lime
3185	3595	410	Anhydrite
3595	3630	35	Anhydrite, Lime
3630	3681	51	Anhydrite
3681	3690	9	Red Sand
3690	3695	5	Gray Lime
3695	3700	5	Sand, Lime
3700	3710	10	Anhydrite, Lime
3710	3715	5	Lime
3715	3880	165	Anhydrite
3880	3915	35	Gray Lime Broken
3915	3995	80	Anhydrite, Lime
3995	4035	40	Anhydrite
4035	4305 T.D.	270	Lime
		4305	

LOG OF WYATT-PHILLIPS WELL NO. 6

CASING RECORD

SIZE CASING	WEIGHT PER FOOT	AMOUNT
8-5/8"	24	1452
7"	20	3782

MUDDING AND CEMENTING RECORD

SIZE CASING	WHERE SET	NUMBER SACKS OF CEMENT	METHOD USED
8-5/8"	1452	50	Halliburton
7"	3782	136	Halliburton

FORMATION RECORD

FROM	TO	TOTAL FEET	FORMATION
0	80	80	Sand & caliche
80	240	160	Sand
240	745	505	Red bed, red rock
745	825	80	Gyp, shells, red rock
825	980	155	Red bed, sand
980	1160	180	Red bed
1160	1295	135	Red shale, gyp, shells
1295	1355	60	Red rock
1355	1428	73	Gyp
1428	1625	197	Anhydrite
1625	1685	60	Salt, polyhalite
1685	2505	820	Salt
2505	2570	65	Salt, potash
2570	2585	15	Salt
2585	2620	35	Anhy.
2620	2665	45	Anhy., red rock, salt
2665	2770	105	Anhydrite
2770	2820	50	Red rock, anhy.
2820	3115	295	Anhy.
3115	3135	20	Anhy. & red rock
3135	3160	25	Anhy.
3160	3185	25	Salt & red rock
3185	3560	375	Anhy.
3560	3585	25	Anhy. & gyp.
3585	3655	70	Anhy., broken
3655	3730	75	Anhydrite
3730	3750	20	Anhy. & gyp.
3750	3758	8	Sand (oil)
3758	3765	7	Red sand
3765	3775	10	Sand, anhy.
3775	3792 T.D.	17	Anhy.

LOG OF WYATT-PHILLIPS WELL NO. 8

CASING RECORD

SIZE CASING	WEIGHT PER FOOT	AMOUNT
8-5/8"	24	1470
7"	20	4424

MUDDING AND CEMENTING RECORD

SIZE CASING	WHERE SET	NUMBER SACKS OF CEMENT	METHOD USED
8-5/8"	1470	50	Halliburton
7"	4424	125	Halliburton

FORMATION RECORD

FROM	TO	TOTAL FEET	FORMATION
0	145	145	Sand & caliche
145	300	155	Sand & gravel
300	360	60	Red bed
360	1210	850	Red bed & gyp.
1210	1280	70	Red rock, gyp & shells
1280	1450	170	Red bed, gyp
1450	1575	125	Anhydrite
1575	1635	60	Red rock, salt
1635	2590	955	Salt
2590	2610	20	Anhydrite
2610	2660	50	Anhy. & red rock
2660	2840	180	Anhydrite
2840	2945	105	Anhy. & red rock
2945	3125	180	Anhydrite
3125	3134	9	Sand & shale
3134	3760	626	Anhy.
3760	3770	10	Red sand (gas, slight oil show)
3770	3780	10	White sand
3780	3869	89	Anhy.
3869	3887	18	Anhy. & lime shells
3887	3920	33	Anhy.
3920	3931	11	Anhy. & lime
3931	3950	19	Anhy.
3950	3968	18	Lime & anhy.
3968	3987	19	Lime
3987	4035	48	Lime & anhy.
4035	4187	152	Gray lime
4187	4191	4	Sand & bentonite
4191	4216	25	Lime
4216	4225	9	Sand lime
4225	4301	76	Lime
4301	4306	5	Sandy lime
4306	4353	47	Lime
4353	4368	15	Sandy lime
4368	4419	51	White lime (free oil at 4404)
4419	4424 T.D.	5	Sand

BALNEY COCKBURN

[illegible]

Wyatt-Phillips State Leases

[illegible]

Note: Wyatt-Phillips #1 was changed to Corbin Pool in 1951.

OIL CONSERVATION COMMISSION
SANTA FE, NEW MEXICO
CASE 1094 EXHIBIT No. 2

Buckles and Hostetler

OIL PRODUCTION CONSULTANTS

BOX 925

Monahans, Texas

June 4, 1956

Mr. Barney Cockburn
P. O. Box 105
Artesia, New Mexico

Dear Mr. Cockburn:

It is our understanding that you are contemplating the instigation of a water flood development in the Queen sand producing zone on your Wyatt-Phillips and Federal leases in Lea County, New Mexico. You requested a preliminary opinion as to the general flooding possibilities and a general outline as to our recommendation for procedure.

The leases are located in Sections 33 and 34, Twp. 17S., Rge. 33E. The information furnished us was a plat showing the locations of the wells and the depths at which the Queen sand occurs. Also you furnished production figures by wells from drilling date through April 1956.

The wells currently producing from the Queen sand are Wyatt-Phillips 1, 4, 6, 7 and 11; Federal wells 1, 2, 4, 5, 6, 7 and 8. The remaining wells U. S. Minerals 1 and 2; Wyatt-Phillips 5, 8, 9, 10 and 12 and Federal 3 all logged the Queen sand and could be converted to Queen sand injection or producing wells.

This production occurs in a steeply dipping structure toward the south and southeast. The wells along the north and northwest carried only gas in the Queen sand. These are U. S. Minerals 1 and 2 and Wyatt-Phillips 5, 8 and 12.

The production from the Queen wells is as follows:

BEFORE THE
OIL CONSERVATION COMMISSION
SANTA FE, NEW MEXICO
Carburn EXHIBIT No. *E*
CASE 1094

<u>Well</u>	<u>First Production</u>	<u>April 1956 Barrels</u>	<u>Accumulated Barrels Through April 1956</u>
Fed. 1	Jan. 1951	594	61,824
Fed. 2	April 1951	390	53,648
Fed. 4	Oct. 1953	1200	34,607
Fed. 5	Jan. 1954	240	16,101
Fed. 6	May 1955	900	10,159
Fed. 7	Mar. 1956	594	1,230
Fed. 8	Mar. 1956	186	1,217
W-P 1	Feb. 1951	189	40,239
W-P 4	Dec. 1952	313	28,209
W-P 6-11	Feb. 1954	1199	18,893
W-P 7	Apr. 1954	658	18,545

The above production history indicates sufficient sand thickness, porosity and permeability to enable this formation to respond readily to a water flood development. The Queen sand is being successfully flooded in other parts of the Permian Basin. It is responding to flood operation in the Key-stone Colby and Weiner Colby fields in Winkler County, Texas and in the Clara Couch field in Crockett County, Texas.

Since there is a definite gas cap in the Queen sand in this field we would recommend injecting water into the gas cap first to block this zone off and preventing oil being migrated into it. This procedure has been very successful in other fields having a gas cap. In general it results in forcing the gas down dip into the oil zone where it comes in contact with the oil, lowering its viscosity and increasing the gravity. No loss is evident in this procedure as would be the case if oil were migrated into the gas zone. Wells then such as Wyatt-Phillips 5, 8 and 9 could be opened into the Queen zone and water injection started as soon as possible.

Later on we would recommend the flood put on as much of an enclosed pattern as possible. This could be accomplished when evidence of production increase is first noticed in the first line of wells down dip from the injection wells.

An additional procedure could be instigated at once to evaluate the flood performance in the oil zone. Federal well #8 is centrally located in the oil bearing zone and this would be a good well to be used as a test injection well. It is offset in three directions by Queen zone producing wells. As soon as definite results are accomplished a regular flood pattern could be established.

Page 3 - Mr. Barney Cockburn

It is our understanding an excellent water supply is available and tests are being conducted in the laboratory now. Preliminary analyses show the water to be very low in mineral content with a turbidity of zero and a Ph of 7.4. This water would not even have to be filtered and the only treatment indicated is a bactericide.

Results from flooding the Queen sand in the Permian Basin on a regular 5-spot pattern indicate that flooding will recover from 1 1/2 to two times primary production after primary is produced to economic limit.

The only hazard in flood performance on this property would be possibly fractured formation indicated by the steep dip toward the south and south-east. This possible condition might tend to by-pass the oil containing pore spaces. If this condition exists, these fractures could be successfully plugged in our opinion, and normal flooding operations resumed.

Yours very truly,


G. L. Buckles

GLB:ph

PHILLIPS PETROLEUM COMPANY

BARTLESVILLE, OKLAHOMA

PRODUCTION DEPARTMENT
L. E. FITZJARRALD
MANAGER

July 5, 1956

EARL GRIFFIN
GENERAL SUPERINTENDENT
JACK TARNER
TECHNICAL ADVISER TO MGR
H. S. KELLY
CHIEF ENGINEER

In re: Barney Cockburn Application to Inject Water Into
the Queens Sand - Corbin Pool - Parts of Sections 33
and 34, Township 17 South, Range 33 East, Lea County,
New Mexico

Mr. Charles Miller
P. O. Box 385
Hobbs, New Mexico

Dear Mr. Miller:

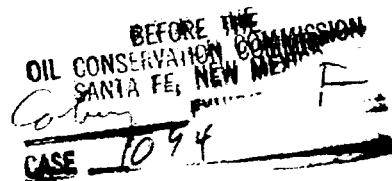
This is in response to the subject application filed
by Barney Cockburn for water injection into the Queens Sand in
the above described properties.

Phillips Petroleum Company has no objections to the
application or to the injection of water into the Queens Sand.

Very truly yours,

L. E. Fitzjarrald
L. E. Fitzjarrald

LEF:ZZH:dr



It's Performance That Counts
FLITE-FUEL — TROP-ARTIC

CARPER
MAIN OFFICE, OCC

O I L P R O D U C T I O N A N D D R I L L I N G
1956 JUL 17 PM 1:17

EMERY CARPER, PRESIDENT
STANLEY CARPER, EXEC. VICE-PRES. & TREAS.
MARSHALL ROWLEY, VICE-PRES.
NELLE BOOKER, SECRETARY

ARTESIA, NEW MEXICO
CARPER BUILDING
TELEPHONE 147 L. D. 837

7 July 1956

Case #1094

Oil Conservation Commission
Capital Building
Santa Fe, New Mexico

Re: Oil Conservation Commission
Case No. 1094

Gentlemen:

We have received a copy of the Application of Barney Cockburn for permission to inject water into the Red Sand (Queen) horizon of the Corbin Pool Reservoir through Wyatt-Phillips Well No. 5, Section 33, Wyatt-Phillips Wells No. 6 and 8, Section 34, all in Township 17 South, Range 33 East, N.M.P.M., Lea County, New Mexico, and for permission to continue to produce oil from the Grayburg-San Andres formation of the Maljamar Pool reservoir through the said Wyatt-Phillips Well No. 8.

Please be advised that as a offset operator to Barney Cockburns' Wyatt-Phillips and Federal Leases we have no objection to the proposed water flood project and dual completion of Wyatt-Phillips Well No. 8.

Very truly yours,

CARPER DRILLING COMPANY

By:

Marshall Rowley
Vice President

C.C. United States Geological Survey
Post Office Box 6721
Roswell, New Mexico

BEFORE THE
OIL CONSERVATION COMMISSION
SANTA FE, NEW MEXICO
Carlin EXHIBIT No. *1*
CASE 1094

TREAT-RITE CHEMICAL CO.

INCORPORATED

MONAHANS, TEXAS

RESULT OF WATER ANALYSES

TO: Mr. Barney Cookburn LABORATORY NO. M6562
Box 105, Artesia, New Mexico SAMPLE RECEIVED 6-4-56
 RESULTS REPORTED 6-6-56

COMPANY Barney Cookburn LEASE Federal
 FIELD OR POOL E. Maljamar Township: 18 S, 33 E
 SECTION BLOCK SURVEY COUNTY Lea STATE N. Mex.
 SOURCE OF SAMPLE, AND DATE TAKEN:
 NO. 1 Raw water-taken from well E. Maljamar At 125' depth.
 NO. 2
 NO. 3
 NO. 4

REMARKS:

CHEMICAL AND PHYSICAL PROPERTIES

	NO. 1	NO. 2	NO. 3	NO. 4
SPECIFIC GRAVITY AT 60--60° F	1.000			
PH WHEN SAMPLED				
PH WHEN RECEIVED	7.4			
TOTAL ALKALINITY AS CaCO ₃	124			
SATURATED VAPOR PRESSURE AS CaCO ₃	-			
UNDERSATURATION AS CaCO ₃	30			
TOTAL HARDNESS AS CaCO ₃	112			
CALCIUM AS CaCO ₃	57			
MAGNESIUM AS CaCO ₃	55			
SODIUM AND/OR POTASSIUM	91			
SULFATE AS SO ₄	19			
CHLORIDE <u>1444</u> as Cl	12			
SILICA AS SiO ₂	12.4			
IRON AS Fe	none			
MANGANESE AS Mn	none			
BARIUM AS Ba	none			
TURBIDITY ELECTRIC	none			
COLOR AS Pt	none			
DISSOLVED SOLIDS AT 103 °C.	246			
TOTAL SOLIDS AT 103 °C.	246			
TEMPERATURE °F				
CARBON DIOXIDE CALCULATED	10			
DISSOLVED OXYGEN WINKLER				
HYDROGEN SULPHIDE	none			
RESIDUAL CHLORINE	none			
Chlorides as NaCl	20			

BEFORE THE
 OIL CONSERVATION COMMISSION
 SANTA FE, NEW MEXICO
 EXHIBIT No. 4
 CASE 1057

NOTE: ND-Not Determined. All Results Reported as Parts Per Million. Divide by 17.1 to Convert Grains Per Gallon

Additional Determinations and Remarks

Letter of recommendations attached.

cc: Buckles & Hostetler

By Waylan C. Martin, M.A.

TREAT-RITE CHEMICAL CO., INC.

CHEMICAL AND BACTERIAL ANALYSIS OF WATER

WATER CONSULTANTS

P. O. BOX 848

PHONE 486

MONAHANS, TEXAS

June 6, 1956

Mr. Barney Cockburn
Box 105
Artesia, New Mexico

Subject: Recommendations relative to analysis No. M6562 (6-4-56),
Federal Lease.

Dear Mr. Cockburn,

This analysis is limited due to the lack of field analyses. However, the very low solids content will undoubtedly leave the water relatively corrosive. This is due to the fact that water (without some solids) naturally wants something, due to the salt deficiency. The presence or absence of oxygen is a significant factor. Its presence will render the water considerably more corrosive. Consequently, it is suggested that protective coatings be used (cement lining would be preferable.).

The analysis indicates that filtration is not essential. However, it should be taken into consideration that occasional impurities will undoubtedly give rise to some insoluble materials. If observations indicate that impurities are very uncommon, it is recommended that filtration not be included. The sample showed no sand, but a sand trap should be used as a safeguard.

The nature of the water makes it probable that it will not readily support bacterial growth. This is not definite however, and should be checked after about three or four weeks of operation.

As to whether the system should be open or closed will depend entirely on the oxygen content of the water.

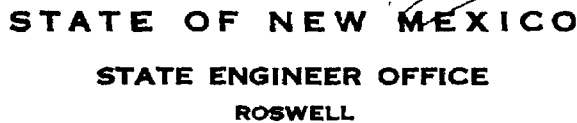
Please contact me for any further information or discussion.

Yours very truly,

Waylan C. Martin
Texas Div. Mgr.

WCM/gt

cc: Buckles & Hostetler



ADDRESS CORRESPONDENCE TO:
P. O. BOX 810
ROSWELL, N. M.

It may well be that the statement in my letter of July 13th, as follows, "This office has no objections whatsoever to the drilling or use of water wells located in Section 33, as this section is not in a declared underground water basin, and is therefore not subject to the control of the State Engineer." is somewhat misleading. Correctly stated I should have pointed out that the policies of the State of New Mexico is that which is declared by the legislature. The pertinent provisions of the statutes regarding drilling in undeclared basins is found in Sec. 75-11-19, Sec. 75-11-21 and Sec. 75-11-22, NMSA 1953. Sec. 75-11-21 reads: "No permit and license to appropriate underground water shall be required except in basins declared by the State Engineer to have reasonably ascertainable boundaries." Since the State Engineer is governed by this provision, I should have merely stated that no permit and license is required to drill wells in Section 33.

Mr. A. J. Losee


-2-

July 13, 1956

In order to complete a valid appropriation of underground water in New Mexico, whether it be from declared or undeclared basin, the water must be placed for beneficial use therefore my previous letter should not be construed as a decision by the State Engineer as to whether water flooding is or is not beneficial use.

It may well be that there is no difference for your purpose between this letter and the previous one written on July 13th but the State Engineer is anxious to avoid any statements which could be construed as going beyond the policy as pronounced by the legislature.

Very truly yours,


F. H. Hennighausen
Acting District Supervisor

FHH:mr

cc: State Engineer
Santa Fe, New Mexico

Warren Mankin
Capitol Building
Santa Fe, New Mexico

MAIN OFFICE GOC

103 AUG 3 PM 1:13

A. J. LOSEE
ATTORNEY AT LAW
CARPER BUILDING - P. O. BOX 644
ARTESIA, NEW MEXICO
2 August 1956

Mr. Warren W. Mankin
Oil Conservation Commission
P. O. Box 871
Santa Fe, New Mexico

Re: Commission Case 1094
Barney Cockburn-Applicant

Dear Mr. Mankin:

In accordance with our telephone conversation of yesterday, I enclose original and one copy of proposed order approving the application of Barney Cockburn to water flood the Red Sand Formation of the Corbin Pool reservoir.

Thank you in advance for your attention to this matter.

Very truly yours,



A. J. Losee

AJL:NW
Enclosure

OIL CONSERVATION COMMISSION

P. O. BOX 871

SANTA FE, NEW MEXICO

August 23, 1956

C
O
P
Y

Mr. A. J. Losee
Attorney-At-Law
P.O. Box 644
Artesia, New Mexico

Dear Sir:

On behalf of your client, Barney Cockburn, we enclose two copies of Order R-856 issued August 16, 1956, by the Oil Conservation Commission in Case 1094, which was heard on July 11th at Hobbs.

Very truly yours,

A. L. Porter, Jr.
Secretary - Director

brp
Encls.

BEFORE THE OIL CONSERVATION COMMISSION
OF THE STATE OF NEW MEXICO

IN THE MATTER OF THE HEARING
CALLED BY THE OIL CONSERVATION
COMMISSION OF THE STATE OF NEW
MEXICO FOR THE PURPOSE OF
CONSIDERING:

CASE NO. 1094
Order No. R-856

THE APPLICATION OF BARNEY
COCKBURN IN COMPLIANCE WITH
RULE 701 (a) OF THE NEW MEXICO
OIL CONSERVATION COMMISSION
RULES AND REGULATIONS FOR AN
ORDER GRANTING PERMISSION TO
INJECT WATER INTO THE QUEEN
FORMATION OF THE CORBIN POOL AND
FOR PERMISSION TO CONTINUE TO
PRODUCE OIL FROM THEIR WYATT-
PHILLIPS NO. 8 THE GRAYBURG-
SAN ANDRES FORMATION OF THE
MALJAMAR POOL, THROUGH
APPLICANTS WYATT-PHILLIPS WELL
NO. 8, LEA COUNTY, NEW MEXICO.

ORDER OF THE COMMISSION

BY THE COMMISSION:

This cause came on for hearing at 9:00 o'clock a.m. on July 11, 1956, at Hobbs, New Mexico, before Warren W. Mankin, Examiner, duly appointed by the Oil Conservation Commission of New Mexico, herein-after referred to as the "Commission", in accordance with Rule 1214 of the Commission's Statewide Rules and Regulations.

NOW, on this 16th day of August, 1956, the Commission, a quorum being present, having considered the application, the evidence adduced, and the recommendations of the Examiner, Warren W. Mankin, and being fully advised in the premises,

FINDS:

(1) That due notice having been given as required by law, the Commission has jurisdiction of this cause and the subject matter thereof;

(2) That the application filed herein complies in all respects with the provisions of Rule 701 of the Commission's Rules and Regulations;

(3) That the applicant, Barney Cockburn is the operator together with Carl W. Carson, J. B. Stevenson and Don E. Woodward owns the federal oil and gas lease upon which has been drilled the Wyatt-Phillips Well No. 5, located in the NE/4 NW/4 of Section 33, the Wyatt-Phillips Well No. 6, located in the SW/4 NW/4 of Section 34, and the Wyatt-Phillips Well No. 8, located in the NW/4 NW/4 of Section 34, all in Township 17 South, Range 33 East, NMPM, Lea County, New Mexico, through which wells the applicant proposes to inject water into the Queen formation of the Corbin Pool.

(4) That the proposed program will not adversely affect the interests of any other operators.

(5) That no objection has been entered to the granting of this application.

(6) That the proposed program will promote conservation and will tend to prevent waste through the production of oil which might not otherwise have been recovered.

(7) That periodic reports should be submitted to the Commission by the applicant disclosing the progress of the secondary recovery program.

(8) That continued production from the Grayburg-San Andres formation in the Maljamar Pool is not inconsistent with the proposed program and that such continued production will prevent waste and protect correlative rights.

IT IS THEREFORE ORDERED:

(1) That the application of Barney Cockburn for permission to inject water into the Queen formation of the Corbin Pool in Lea County, New Mexico, for the purpose of secondary recovery of oil therefrom, be and the same is hereby approved.

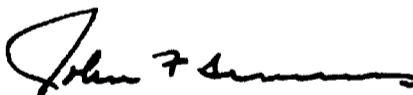
(2) That the injection shall be made through the tubing of the Wyatt-Phillips Well No. 5, located in the NE/4 NW/4 of Section 33, the Wyatt-Phillips Well No. 6, located in the SW/4 NW/4 of Section 34, and recompleat and inject water through the casing-tubing annulus of the Wyatt-Phillips Well No. 8, located in the NW/4 NW/4 of Section 34, all in Township 17 South, Range 33 East, NMPM, Lea County, New Mexico.

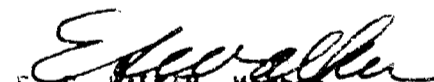
(3) That monthly progress reports on the water flood project shall be submitted to the Commission in accordance with Rule 1119 of the Commission's Rules and Regulations.

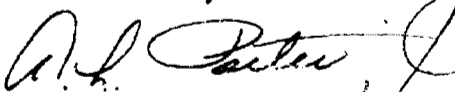
(4) That the applicant is permitted to produce through the tubing of the said Wyatt-Phillips Well No. 8 from the Grayburg-San Andres formation of the Maljamar Pool, Lea County, New Mexico.

DONE at Santa Fe, New Mexico, on the day and year hereinabove designated.

STATE OF NEW MEXICO
OIL CONSERVATION COMMISSION


JOHN F. SIMMS, Chairman


E. S. WALKER, Member


A. L. PORTER, Jr., Secretary & Member



WATER FLOOD DATA FOR HEARING
Before
NEW MEXICO OIL CONSERVATION COMMISSION

July 11, 1956
Hobbs, New Mexico.

OPERATOR: Barney Cockburn

NAME OF FIELD: East Maljamar

NAME & LOCATION OF LEASES:

Wyatt-Phillips

NE $\frac{1}{4}$ NW $\frac{1}{4}$; S $\frac{1}{4}$ NW $\frac{1}{4}$; SW $\frac{1}{4}$ NE $\frac{1}{4}$ section 33; NW $\frac{1}{4}$ section 34 all in township 17 South, range 33 East, Lea County, New Mexico, containing 320 acres, more or less.

Cockburn-Federal

N $\frac{1}{2}$ S $\frac{1}{2}$ section 33; N $\frac{1}{2}$ S $\frac{1}{2}$ section 34 all in township 17 South, range 33 East, Lea County, New Mexico; containing 320 acres, more or less.

EXHIBITS:

1. Plat (colored) showing leases
2. Structure contour map drawn on top of Queen Sand
3. Production history by wells, by years
4. Tabulated data. (follows in this paper)

RESERVOIR AND FLUID CHARACTERISTICS:

1. Name of formation to be water flooded is Queen Sand
2. Estimated productive area is 520 acres
3. Composition of formation is Sand
4. Structure is small plunging anticline, or nose
5. Type of reservoir drive is solution gas plus expanding gas cap
6. Original reservoir pressure has been estimated as approximately 560 pounds per square inch.
7. Present reservoir pressure determined on offset wells recently, at subsea depth of plus 418 feet show a maximum of 440 pounds and a minimum of 305 pounds
8. Gas cap was present in original status of field
9. Gas cap exists at present time
10. Average thickness of effective pay is estimated to be 12 feet
11. Average depth to pay is approximately 3850 feet
12. Average porosity (estimated from nearby core analysis) 14.5%
13. Average permeability (estimated as above) 60 millidarcies
14. Connate water content (estimated as above) is 40% of pore space
15. Gravity of oil averages approximately 35 degrees API
16. Viscosity of oil is estimated to be 4 centipoises.

PRIMARY PRODUCTION PERFORMANCE:

1. Date first well completed was January 1951 (#1 Federal)
2. Wells produce no water
3. Stage of present depletion is estimated to be 25%
4. Number of wells now producing is 12
5. Present daily production per well averages 18 barrels oil
6. Present estimated oil saturation is 55% of pore space
7. Gas repressuring has not been used in this area
8. Gas oil ratio was estimated as originally having been less than 400 cubic feet per barrel
9. Gas oil ratio at present (as reported on Commission Form C-116) is estimated to be approximately 400 cubic feet per barrel.

Primary Production Performance -cont'd.

10. Initial production of each well; date of completion, and current production on tabulation attached hereto.

INJECTION DATA:

1. Source of water for injection will be shallow sand at depth of approximately 125 feet
2. Injection water will be fresh
3. Injection water probably will be treated with Bactericide and a corrosion inhibitor
4. Injection wells will probably be Wyatt-Phillips No. 5, 6 and 8. Exact pattern will be decided later
5. No initial injection pressure is anticipated
6. The initial volume of water anticipated for injection will be 200 barrels per well per day
7. The ultimate injection volume anticipated is 200 barrels per well per day
8. The ultimate surface pressure anticipated is 500 pounds

RESULTS ANTICIPATED:

1. Estimated additional oil recovery as direct result of flooding is 5,118 barrels per flooded acre
2. Estimated residual oil at abandonment is 25% of pore space.

TABULATION OF ITEM 10 ABOVE (Primary Production Performance)

Barney Cockburn

Federal Leases & wells

<u>Location</u>	<u>Completion Date</u>	<u>I. P.</u>	<u>Present Prod.</u>
#1 1650' fr. SL 330' fr. EL Sec. 33-17S-33E	1-23-51	P 120/Day	P 25/Day
#2 1650 fr. SL 330' fr. WL Sec. 34-17S-33E	4-20-51	P 130/Day	P 20/Day
#3 2310 fr. SL 1650 fr. EL Sec. 33-17S-33E	6-8-51	F 65/Day	Grayburg
#4 1650 fr. SL 1650 fr. WL Sec. 34-17S-33E	8-29-53	F 120/Day	F 37/Day
#5 2310 fr SL 330 fr WL Sec. 33-17S-33E	1-7-54	F 72/Day	F 6/Day
#6 2310 fr SL 2310 fr EL Sec. 34-17S-33E	4-12-55	F 180/Day	F 40/Day
#7 2310 fr SL 330 fr EL Sec. 33-17S-33E	11-3-55	P 53/Day	P 27/Day
#8 2310 fr SL 330 fr WL Sec. 34-17S-33E	1-3-56	P 63/Day	P 20/Day

Phillips-Wyatt lease & wells

#1 1980 fr NL 660 fr WL Sec 33-17S-33E	8-26-47	F 70/Day	9/Day
#3 1650 fr NL 330 fr WL Sec. 33-17S-33E	6-18-52	F 35/Day	Grayburg
#4 1650 fr,NL 1650 fr WL Sec 33-17S-33E	12-21-52	F 35/Day	F 10/Day
#5 990 fr NL 1650 fr WL Sec. 33-17S-33E	1-26-55	P 40/Day	Grayburg
#6 2310 fr NL 330 fr WL Sec 34-17S-33E	2-17-54	F 130/day	F 10/Day

Tabulation of Item 10 Above (Primary Production Performance) cont'd.

Phillips-Wyatt lease & wells

#7	2310 fr NL 1650 fr WL				
	Sec 34-17S-33E	4-15-54	F 35/Day	F 30/Day	
#8	990 fr NL 330 fr WL				
	Sec 34-17S-33E	5-15-54	P 45/Day	Grayburg	
#9	990 fr NL 1650 fr WL				
	Sec 34-17S-33E	2-18-55	P 34/Day	Grayburg	
#10	1650 fr NL 1650 fr EL				
	Sec 33-17S-33E	3-28-55	P 35/Day	Grayburg	
#11	1980 fr NL 1650 fr EL				
	Sec 34-17S-33E	1-31-56	P 34/Day	P 35/Day	
#12	660 fr NL 1980 fr WL				
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Hobbs, New Mexico.

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NAME OF FIELD: East Maljamar

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Barney Cockburn

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#7 2310 fr SL 330 fr EL Sec. 33-178-33E	11-3-55	P 53/Day	P 27/Day
#8 2310 fr SL 330 fr WL Sec. 34-178-33E	1-3-56	P 63/Day	P 20/Day

Phillips-Wyatt lease & wells

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#4 1650 fr WL 1650 fr WL Sec 33-178-33E	12-21-52	F 35/Day	F 10/Day
#5 990 fr WL 1650 fr WL Sec. 33-178-33E	1-26-55	P 40/Day	Grayburg
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Phillips-Wyatt lease & wells

#7	2310 fr NL 1650 fr WL				
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#8	990 fr NL 330 fr WL				F 30/Day
	See 34-178-33E	5-15-54	P	45/Day	
#9	990 fr NL 1650 fr WL				Grayburg
	See 34-178-33E	2-18-55	P	34/Day	
#10	1650 fr NL 1650 fr EL				Grayburg
	See 33-178-33E	3-28-55	P	35/Day	
#11	1980 fr NL 1650 fr EL				Grayburg
	See 34-178-33E	1-31-56	P	34/Day	
#12	660 fr NL 1980 fr WL				P 35/Day
	See 33-178-33E	1-14-56	P	37/Day	Grayburg