

CASE 1559: Sunray Mid-Continent Oil Co.
application for secondary recovery project
in San Juan Co. & for rules & reg. for said
project.

Case No.

1559

Application, Transcript,
Small Exhibits, Etc.

BEFORE THE
OIL CONSERVATION COMMISSION
DECEMBER 10, 1958

IN THE MATTER OF:

APPLICATION OF SUNRAY MID-CONTINENT OIL COMPANY, Case 1559

TRANSCRIPT OF HEARING

DEARNLEY - MEIER & ASSOCIATES
GENERAL LAW REPORTERS
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IN THE MATTER OF:

Application of Sunray Mid-Continent Oil Company for an order authorizing a secondary recovery project in San Juan County, New Mexico, and for the promulgation of special rules and regulations in connection with said project. Applicant, in the above-styled cause, seeks an order authorizing it to institute a secondary recovery project in the Bisti-Lower Gallup Oil Pool for the injection of dry gas into the Gallup formation through its Federal "C" Well No. 18, located in the SW/4 NE/4 of Section 7, Township 25 North, Range 12 West, San Juan County, New Mexico. Applicant further proposes that special rules and regulations be promulgated to govern the operation of the above-referenced project, which rules would provide among other things for the conversion of additional injection wells without notice and hearing, the transfer of allowables from injection wells to producing wells, transfer of allowables from wells which have been shut-in for observation or to increase the efficiency of the project, exemption of all leases connected with the project from gas-oil ratio limitation provided gas produced therefrom is reinjected, and such other rules and regulations the Commission may deem appropriate.

) Case 1559

BEFORE:

Daniel S. Nutter, Examiner.

TRANSCRIPT OF HEARING

MR. NUTTER: We will take the next case, case 1559.

MR. PAYNE: Case 1559, Application of Sunray Mid-Continent Oil Company for an order authorizing a secondary recovery project in San Juan County, New Mexico, and for the promulgation of special rules and regulations in connection with said project.

MR. WHITE: May the record show the same appearances as in the last case?

MR. NUTTER: The record will so show, yes, sir. Are there other appearances to be made in Case 1559?

MR. KELLAHIN: Jason Kellahin, of Kellahin & Fox, appearing on behalf of Phillips Petroleum Company.

MR. NUTTER: Will you proceed, Mr. White.

MR. WHITE: We have two witnesses, Mr. Finfrock and Mr. Hall.

(Witnesses sworn.)

LAWRENCE J. FINFROCK

the witness, having first been duly sworn, testified as follows:

DIRECT EXAMINATION

BY MR. WHITE:

Q State your full name and the name of your employer and the capacity in which you are employed?

A Lawrence J. Finfrock, employed by Sunray Mid-Continent Oil Company as research geologist in Tulsa, Oklahoma.

Q Have you previously testified before this Commission?

A Yes, I have.

Q Have you made a detailed study of the geology of the Bisti-Lower Gallup Oil Pool?

A I have.

MR. WHITE: Are the witness' qualifications acceptable?

MR. NUTTER: They are, proceed.

Q (By Mr. White) Will you refer, Mr. Finfrock, to Exhibit 1, which we would like to have marked Exhibit One, and state what it is and explain it.

(Marked Sunray Midcontinent Exhibit One for identification.)

A Exhibit One is an area map of the Bisti-Lower Gallup Oil Pool. This area map consists of portions of Townships 9 and 10, 11, 12 and 13 North, Townships 24 -- I mean 24, 25 and 26 North, Ranges 9, 10, 11, 12, 13 and 14 West in San Juan County, New Mexico. We have shown here on this exhibit indicated in yellow the project area. This project area is described as follows: The south half of Section 31, Township 26 North, Range 12 West, excepting the southwest southwest quarter, all of Section 6, 25 North, Range 12 West, excepting the northwest quarter of the northwest quarter, the north half of Section 7 in the southeast quarter of section 7 in Township 25 North, Range 12 West. We have indicated this location in the southwest quarter of the northeast quarter of Seven by a red circle. The proposed injection well for this project is a Federal "C" 18 Sunray Mid-Continent. Shown in green are the common corners of Townships 25 and 26 North, Ranges 12 and 13 West of the pilot test area of the LPG stage program which was approved by this Commission last year. Outlined by the red border are the field limits of the Bisti-Lower Gallup Oil Pool reflected in the Commission's records.

I'd like to call your attention to the northeast quarter of

Section 3 of Township 25 North, Range 12 West, shown by a dashed line. This represents this quarter section has been advertised but has not been approved in the Bisti-Lower Gallup boundary. The oil wells have been shown and located. The dark circles indicate the productive oil. The gas cap areas are shown by their different features.

(Marked Sunray Mid-Continent Exhibits 2, 3, 4 and 5 for identification.)

Q Mr. Finrock, will you refer to Exhibit 2, identify and explain it, please?

A Exhibit 2 is a copy of the portion of the electrical log of the Sunray Mid-Continent Federal "C" 18, which is the proposed injection well for the project area. This well is located in the southwest of the northeast of Section 7, 25 north, range 12 west. We have indicated on this exhibit a portion of, lower portion of the Slumberjay Log as indicated in the pink. That log lies within the Lower Gallup formation. In the Lower Gallup formation, we picked a depth of 4836 feet in this well. At the total depth of 4990 feet, that well was still in the Lower Gallup formation.

As can be seen from the study of the electrical log, the sands in the Lower Gallup formation are indicated by the SP curve.

Q Will you similarly explain what is marked as Exhibit 3?

A Exhibit 3 is a copy of a portion of the electrical log of Sunray Mid-Continent Federal 1 "C", located in the southwest of the

5

southwest of Section -- pardon me, it's located in the northwest of the northwest of Section 6, Township 25 North, Range 12 West. We have indicated the lower portion of the electrical log, have indicated in pink; the Lower Gallup Section in this log is in -- the presence of the top of the Lower Gallup formation in Exhibit 3 is picked at 4829 feet, and at the total depth of 5100 feet, this well was still in the Lower Gallup section.

As in the previous exhibit, one can see the presence of sand in the Lower Gallup section reflected by the SP curve.

Q Take your seat and refer to Exhibit 4 and explain it, please?

A Exhibit Number 4 is a northwest-southeast digrammatic cross-section extending from Section 1 in Township 25 North through to Section 17 in 25 North, Range 12 and 13 West. We have shown hereon tracings of portions of the electrical logs of the following described wells, proceeding from left to right on the cross-section: First, the British-American Marye Number 3, located on Section 21, 25 North 13 West; the British-American Marye Number 6, located in Section 1, 25 North, 13 West; the British-American Marye Number 5, also located in Section 1, 25 North, 13 West; and in Section 6 of 25 North, Range 12 West the Sunray Mid-Continent Federal "C" 5; Section 7, 25 North, Range 12 West Sunray Federal "C" 11; Section 5, 25 North, Range 12 West, Sunray Mid-Continent Federal "C" 18, which is the proposed injection well for this project.

7

Also in Section 7 of 25 North, Range 12 West Sunray Federal "C" 19; the last well is the Sunray Mid-Continent Federal "B" 4, located in Section 14, 25 North, Range 12 west. This cross-section is hung from a datum of plus 1500 feet, and the top of the Lower Gallup formation has been picked in each well and connected by a solid line. at the top of the section, which is colored in pink, tying into Exhibits 2 and 3, which have previously been described.

As can be seen from this exhibit, the dip of the beds on this section from right to left are in a northerly direction. It can be seen from this exhibit, the presence of the SP curve, the sands in the Lower Gallup section can be identified.

Q Will you likewise identify what has been marked as Exhibit 5?

A Exhibit Number 5 is a north-south cross-section of Section.. 31, 26 North, 12 West through Sections 6 and 7 in 25 North, 12 West across the project area. This section, reading from left to right, is made up of the following wells: Section 31, 26, 12, Sunray Federal "C" 7; Section 6, 25 North, 12 West, Federal "C" 4; also in Section 6, 25 North, Range 12 West, Sunray Federal "C" 10. In Section 7, 25 North, Range 12 West, Sunray Federal "C" 18, which is the injection well in this proposed program.

As in the previous exhibit, this cross-section is hung from a datum of plus 1500 feet. The top of the Lower Gallup formation

has been correlated with the solid line at the top of the section which we have indicated in pink. As in the previous exhibit, one can see from the study characteristics of the electrical log to the Lower Gallup sands are present in these four wells also.

Q Mr. Finfrock, will you state the purpose of these two exhibits, namely four and five?

A The purpose of these diagrammatic cross-sections is two-fold. One, to show the altitude for the dip of the bed in the area of the project and also to show that the Lower Gallup sands are present and continuous throughout the area.

Q Is it your opinion that the Lower Gallup formation is present throughout the project area, is continuous and connected?

A Yes, that's my opinion.

Q Were these exhibits prepared under your direction and supervision?

A Yes, they were.

MR. WHITE: We move the exhibits be admitted in evidence.

MR. NUTTER: Any objection to the admission of Sunray's Exhibits 1 through 5? If not, they will be admitted.

MR. WHITE: That's all the direct we have of this witness.

MR. NUTTER: Any questions of Mr. Finfrock?

CROSS-EXAMINATION

BY MR. PAYNE:

Q Mr. Finfrock, in the event this application is granted,

do you see any possibility of channeling?

A I feel --

Q In other words, is it a hazard in this project?

A I feel that would be a question that would be applied to the engineering witness from the study of the reservoir.

MR. PAYNE: Thank you.

EXAMINATION BY MR. NUTTER:

Q Mr. Finfrock, do you likewise feel that any questions regarding paragraph 10 of the application, that is, the promulgation of certain rules and regulations for the operation of this project should be applied to the engineering witness?

MR. WHITE: We have Mr. Hall; he will go into detail on that.

Q (By Mr. Nutter) Mr. Finfrock, at the perforated interval that is shown, is the perforated interval on the wells for which you have the logs there the same as the pink zone?

A Yes, in this Federal "C" 18, which is the proposed injection well. I believe the perforations are from 4840.

Q I had in mind particularly Exhibits 2 and 3.

A Exhibit 2 is this Federal "C" 18, and the perforated section from the top of the sand is 4840 to 4930 in this exhibit. As I understand their program, they will use those same perforations to inject gas into the Lower Gallup formation.

Q Do you think that at the present time with the injection of gas in one well in the southwest quarter of the northeast

quarter of Section 7 and injection of gas in one well up there in the cross, at the crossroads of the townships, do you know that the complete area in between those wells can be called a project area?

A Well, I don't feel I'm qualified to answer that question. I don't know the full program of the engineering project.

MR. WHITE: Again, Mr. Nutter, I think that can be covered by Mr. Hall.

Q (By Mr. Nutter) Do you have any personal opinion, Mr. Finfrock, as to the necessity of transfer of allowable in the operation of this project on a net gas-oil ratio basis?

A No personal opinion. I'm tired of putting everything to Mr. Hall, but I feel that's his category.

MR. NUTTER: Any further questions of Mr. Finfrock? If not, he may be excused.

(Witness excused.)

MR. WHITE: Mr. Hall, you may take the stand.

DONALD E. HALL

the witness, having first been duly sworn, testified as follows:

DIRECT EXAMINATION

BY MR. WHITE:

Q Mr. Hall, state your full name for the record, please?

A Donald E. Hall.

Q By whom are you employed?

A I'm employed by Sunray Mid-Continent Oil Company.

Q In what capacity?

A I'm a petroleum engineer located in Midland, Texas, in the district office for the northwest Texas-New Mexico district.

Q Have you previously testified before the Commission?

A Yes, sir, I have.

Q Have you made a study of the Bisti-Lower Gallup Oil Pool?

A Yes, I have spent considerable time studying the Bisti-Lower Gallup Oil Pool and worked with it since Sunray commenced operations there in the early part of 1956.

MR. WHITE: Are the witness' qualifications acceptable?

MR. NUTTER: Yes, sir, they are.

Q (By Mr. White) Mr. Hall, explain in general what the proposed program will be in the event the application is granted.

A If I might refer to Exhibit One, we propose to take gas from our Federal "C" Lease, which includes the project area shaded in yellow; it was previously described in Mr. Finfrock's testimony, also, it includes the northwest quarter of Section 5, Township 25 North, 12 West and the north half of Section 8 in the same township and range, and project it into the Bisti-Lower Gallup Oil Pool underlying the project area, the area shaded in yellow.

Our injection well will be Federal "C" 18, 1980 feet out from the north and east lines of Section 7.

Q In that connection, will you refer to Exhibit 6 and explain it, please?

A Exhibit 6 is a schematic drawing of the proposed gas injection well, Sunray Mid-Continent Oil Company Federal "C" Number 18. It shows that 8 and 5/8 inch O.D. casing set at 352 feet. The 8 and 5/8 inch casing was cemented with 225 sacks of cement, cement circulated to surface. The well was drilled to a total depth of 4,990. 5 1/2 inch O.D. casing was set at 4,989 feet and cemented with 200 sacks of cement. The cement, the top of the cement behind the 5 1/2 inch O.D. casing was measured at 3650 feet by a temperature survey. The cement was drilled out inside the 5 1/2 inch casing to 4963. The well is perforated from 4842 to 4858 and 4890 to 4896, from 4910 to 4916 and 4952 to 4930. The top of the Lower Gallup sand is at 4836. We didn't penetrate the bottom of the Lower Gallup sand.

We propose to set a Baker Packer at 4830, run tubing set through the Baker Packer. Gas will be injected from the compressors down the tubing and into the perforations.

Q Is the entire project area located on a Federal Lease?

A Yes, sir.

Q And have you obtained the approval from the USGS for this project?

A Yes, sir.

Q Is that demonstrated by Exhibit 7?

A Yes, sir. Exhibit 7 is a photostatic copy of our application to the USGS, which has been approved. This application calls for injecting gas into the previously described perforations

in Federal "C" 18.

Q Now, will you refer to Exhibit 8 and explain it, please?

(Marked Sunray Mid-Continent Exhibit 8 for identification.)

A Exhibit 8 is a summary of production data from Sunray Mid-Continent Oil Company's Federal "C" Lease. It shows in columnar form, it shows the year and month, the number of wells produced each month, the oil production in barrels per month, accumulative oil production, gas production in thousand cubic feet per month, accumulative gas production, average daily oil production in barrels per day, average daily gas production in thousand cubic feet per day, and average gas-oil ratio in cubic feet per barrel.

I might point out that the last month of October, 1958, shows that the "C" Lease produced 22,006 barrels per day average, and 1,517,000 cubic feet of gas per day, and had an average gas-oil ratio of 756 cubic feet per barrel.

Q Mr. Hall, under your proposed project, what is the minimum and maximum amount of gas injection you contemplate?

A The minimum amount of gas would be calibrated from using the figure of a million and a half cubic feet per day. Of that million and a half cubic feet per day, we are injecting 650,000 cubic feet into our pilot project, that is, gas taken from Federal "C" 1 and "C" 2, and being injected into Bisti "GI" 1. We would use approximately 100,000 cubic feet per day for heater treater

gas and for compressor engines.

This could leave approximately 750,000 cubic feet of gas to be injected in "C" 18; therefore, 750,000 cubic feet per day would be the minimum amount of gas. We estimate the maximum amount to be injected in Federal "C" 18 to be approximately 2 million cubic feet.

Q And what would your minimum and maximum pressures be?

A Pressures should range from a minimum of 1500 pounds to a maximum to 22,000 pounds.

Q What is the volume of gas that will be available from your lease for injection?

A Presently it would be approximately 750,000 cubic feet per day.

Q In answer to one of the questions I asked Mr. Finfrock, in your opinion, will this project bring about any channeling?

A No, sir, we have had very little channeling in our pilot project with considerable production and the injection well being in close proximity to our producing wells.

Q Do you have any gathering system on the gas?

A Yes, we have a gathering system, a gas gathering system, of which we will take gas from -- we will have one tank battery in the north half of Section 6, another battery in the south half of Section 6, another battery in the north half of Section 7, and we will also have a gathering line coming in the tank battery of the north half of Section 8. They meet at our compressor station in

the immediate proximity of our injection well.

Q Do you anticipate that your Federal Lease gas production will increase?

A Yes, yes, sir, I do.

Q Have you designed your system to accommodate these increases?

A Our gathering system was designed to handle from 5 to 6 million cubic feet of gas. Initially, we will have compressing facilities to handle, to compress gas from 20 pounds per square inch to 2,000 pounds per square inch. That will be about a million and a half cubic feet per day for the initial compressing facilities. Other compressing facilities can be added. The gathering system, I should mention, was designed with less than five pounds of pressure drop in it.

Q Mr. Hall, were Exhibits one through six and Exhibit eight prepared under your direction and supervision?

A Exhibits 6, 7 and 8 were. Six, seven and eight were prepared under my direction. Seven was -- I had the original copy of your USGS approval copy photostated.

MR. WHITE: At this time we move the admission of Exhibits 6 through 8.

MR. NUTTER: Any objection to Sunray's Exhibits 6 through 8 as exhibits in this case? If not, they will be admitted.

Q (By Mr. White) Directing your attention in regard to perforation intervals in relation to logs on the exhibits, are you

in a position to make a statement in answer to that question?

A The perforated intervals, I should mark them on the logs, they are within the Gallup sand that Mr. Finfrock pointed out on "C" 18. He shows the top of the Gallup sand at 4836, and we didn't penetrate the bottom. The upper most perforation is at 4842; the lower most is 4930, well within the limits of the Gallup sand.

Q That's also shown on Exhibit 6, is it not?

A Yes, those perforations are shown on Exhibit 6.

Q Mr. Hall, do you have any recommendations for proposed pool regulations in regard to this project?

A Yes, sir. It is recommended that rules and regulations be adopted in the previously described project area to provide for (1) the conversion of producing wells to injection wells within the project area, upon approval of the Secretary-Director of the Oil Conservation Commission. (2) The transfer of allowable from wells which have been shut in for observation or to increase efficiency of the project to producing wells within the project area. (3) The transfer of allowable from injection wells to producing wells within the project area.

Q May I interject right there in regard to the conversion of the wells and the transfer of the allowables, what notice, if any, do you suggest be given to the offset operators to allow them an opportunity to protest?

A I would suggest that at the time the application was made

to the Conservation Commission a copy of the application was sent to all the offset operators and a ten day waiting period be made before approving the application so that the operators could object if they so desired.

Q The Commission could set the matter down for hearing upon objection?

A Yes, sir.

Q Continue with your suggestions.

A Recommend that the operation of the wells be on a net gas-oil ratio basis giving allowance for gas injection.

Q Amplify on that and explain what you mean by net gas-oil ratio?

A Net gas-oil ratio would be defined as a ratio calibrated from the net gas which would be the produced gas less the gas injected. An example would be a well producing 100 barrels per day and having a gas-oil ratio of 3,000 cubic feet per barrel would produce 300,000 cubic feet per day. If 200,000 cubic feet of this per day of this gas would be injected or returned to the reservoir, it would leave 100,000 cubic feet per day net gas taken from and not returned to the reservoir, and the net gas-oil ratio would be 100,000 divided by the oil rate of 100; therefore, it would be a net gas-oil ratio of 1,000 to 1.

Q What, in your opinion, will these proposed rules accomplish?

A These rules would prevent waste of natural gas and main-

tain the reservoir pressure.

Q In your opinion, will this project be in the interest of conservation and be a measure toward the prevention of waste?

A Yes, it would.

MR. WHITE: If the Examiner please, that's all the direct we have.

MR. NUTTER: Any questions of Mr. Hall?

CROSS-EXAMINATION

BY MR. PAYNE:

Q Mr. Hall, what do you advocate as a test to be used by the Secretary and Director of the Commission in determining whether administrative approval should be granted on conversion of a producing well to an injection well?

A I don't believe that it would -- to convert a producing well to an injection well?

Q Yes, sir. In your paragraph one, sub-paragraph one paragraph 10.

A Are you referring to a test to show how much allowable should be transferred from that well?

Q No. You propose the Secretary-Director approve the conversion of a producing well to an injection well. Now, I take it you have to have a reasonable standard to use in determining whether such approval should be granted. I'm wondering what you advocate as a test or standard, if any?

A I don't advocate any. We wouldn't want to inject into

any well that would damage the reservoir; but I see no instance where that would take place as long as it is within our project area.

Q I take it from your answer this is just a rubber stamp thing, so why even have administrative approval; I mean if it doesn't have to meet some kind of test?

A The only thing I could foresee would be the possibility of having several injection wells close to someone else's property and injecting too much gas into that; but that -- the other operators should be given opportunity to protest.

Q In other words, the only reason for denying such an application would be if it wouldn't protect correlative rights?

A Yes.

MR. PAYNE: Thank you.

MR. NUTTER: Any further questions?

MR. KELLAHIN: Jason Kellahin, representing Phillips Petroleum Company.

MR. NUTTER: Mr. Kellahin.

EXAMINATION BY MR. KELLAHIN:

Q As I understand your testimony, Mr. Hall, you propose application for transfer of allowables or conversion of wells to be handled by administrative approval with notice in the usual form to offset operators?

A Yes, sir, that is within the project area.

Q What would you consider as an offset operator in connection

with such notice?

A All the offset operators to the project.

Q As a whole?

A Yes.

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

MR. NUTTER: Any further questions from Mr. Hall? Mr. Stamats.

EXAMINATION BY MR. STAMATS:

Q Do you have an estimate of percent recovery in the well originally placed in the pilot area?

A I could give you an accumulative figure of that. Actually, I've worked with that, but I'm not sure I can give you a very good figure on the percent recovery. The accumulative recovery from the four producing wells in the pilot project as of November the first was 222,996 barrels of oil.

Q What percent completely would you say is flooded out the pilot area at this time?

A We don't know. We are -- that is one of the purposes of the pilot, to determine that. Actually, our gas-oil ratios are still in a fairly low range, ranging from 1,647 to 5,084 cubic feet per barrel. One purpose of the pilot is to determine how much oil we are going to get, and we are hoping to determine that.

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

MR. NUTTER: Any further questions of Mr. Hall?

MR. WHITE: That's all we have.

EXAMINATION BY MR. NUTTER:

Q Mr. Hall, did I understand you to say correctly you would gather all the gas from your Federal "C" Lease, even that portion of the northwest quarter of Section 5, which is outside the project area, and gather that gas in these section wells?

A Yes, sir.

Q All the gas from the Federal "C" Lease would be utilized?

A Yes.

Q What is the purpose of this injection program, Mr. Hall?

A Well, the purpose is to maintain our reservoir pressure and to keep from flaring gas.

Q What is the reservoir pressure at this present time in this area?

A An average reservoir pressure in 12 West, just a line drawn through Township 12 West was 1,050 pounds per square inch absolute. The original reservoir pressure in that area was 1440 pounds per square inch.

Q There has been a decline of approximately 400 pounds in the area then?

A Yes.

Q What is the bubble point on the oil in this area?

A I have that right here if I might refer to it. It was slightly over 1200 pounds, about 1215, I believe.

Q Do you think that the injection of gas from -- at a pressure of 1500 to 22,000, I believe you said, will build up the

reservoir pressures to above the bubble point again?

A No, sir, not with the oil being withdrawn too.

Q You are withdrawing it at a rapid enough rate you wouldn't have any rapid build up in your pressure?

A Yes, sir, the pressure would still decline some with the amount of gas we plan to put in, at least initially, although not as rapidly.

Q Do you think you will enhance the recovery of oil from the area by the injection of gas?

A Yes, sir, I do.

Q In what way?

A By our maintaining higher reservoir pressure than by not injecting gas, allowing gas, oil to move through the reservoir with increased pressure differential.

Q How far away from this proposed injection well that you have here today, this "C" 18, do you expect the effect of this gas injection will be felt?

A I think that it would take considerable time for it to be felt even within the range of the closest wells.

Q Is there a well to the southwest of the "C" 18?

A No, sir, there is not a well in this area here (indicating.)

Q Is there one directly west of the well?

A Yes, sir, that well would be half a mile, I believe.

Q And there is a well to the northwest?

A There is one to the northwest, one to the northeast and one to the southeast.

Q Is there one to the south of the well?

A No, sir, not directly south.

Q Do you believe that the injection of gas in the "C" 18 would ever be felt in a well more than one location removed from the "C" 18?

A I wouldn't say it would never be felt, no, sir.

Q Is it likely that the injection of gas in the "C" 18 would have effect on a well more than one location away?

A No, sir, other than it would increase the reservoir pressure, but I don't believe we would have chaneling, if that is what you meant.

Q What is your ultimate gas injection pattern that you have for this project, Mr. Hall? You propose to inject gas in more than one well ultimately, don't you?

A Possibly so. We have no pattern at this time; for the present "C" 18 is the only injection well we have planned or proposed.

Q Well, you've requested administrative approval for converting other wells to gas injection wells, though?

A To be able to, yes, sir, after notifying the offset operators.

Q Mr. Hall, do you feel that the pilot LPG project up there in the crossroads of the townships has been a success?

A Yes, sir, I definitely feel it has been a success.

Q By what percent has it increased the recovery over the normal primary recovery you would anticipate in this pool?

A I don't have the actual figures at my command. I know that is over -- we have recovered over 50%.

Q Of the original oil in place?

A Of the original oil in place. Now, I don't -- we have technical personnel that have gone into close calculations on that. I certainly haven't.

Q How much of the success of the pilot project would you say is due to the injection of the LPG and how much is due to the injection of dry gas?

A We believe that the LPG greatly assists the recovery of the, in the Bisti-Lower Gallup field.

Q Why don't you put LPG in this well, the "C" 18, then?

A At this time I understand that Sunray Mid-Continent is not economically, does not consider it economically feasible to inject gas into our own leases until such time as possibly we could have a unitized operation.

MR. LOAR: Could I interrupt and make a statement?

MR. NUTTER: Yes, sir.

MR. LOAR: Sunray Mid-Continent and the other operators west of Carson Unit or west of the Shell acreage offsetting the Carson Unit are actively negotiating a unit to be formed between that line and the township line between Ranges 12 West and 13 West.

The operators have reached agreement on the participation formula to be used in this unit and contracts are being prepared, and, at that time, it is anticipated that the operators will come to the Commission with a request to inject LPG and dry gas into such a unit.

Our purpose in requesting this application is to prevent the flaring of gas and to do what we can toward maintaining pressure in this portion of the field pending unitization in this area.

We have requested additional wells in case the gas production from this area becomes more than would be engineeringly feasible to put into "C" 18. We believe that if the Commission approves this request, it will be approving the principle of gas injection for such a purpose, and we safeguard the offset operators objecting, having a chance to object. No detriment will be occasioned to the reservoir or the offset operators.

Q (By Mr. Nutter) Mr. Hall, do you believe that the ultimate project for this field, being the injection of LPG and dry gas, as Mr. Loar stated, is the desired aim of the operators; do you think this ultimate project will be harmed in any way by the injection of gas in the "C" 18 at this time?

A No, sir, I don't. I know that the "C" 18 is not one of the wells which Sunray Mid-Continent proposes to present in their plans of unitized operations to present to the other operators. We don't believe it would be a good well to inject LPG into.

Q Mr. Hall, go through those figures again on the amount of gas you have available and how much is used for the various purposes.

A Yes, sir. In October, the average daily gas production was one, was approximately one and one half million cubic feet of gas; approximately 650,000 cubic feet of gas is being produced by "C" 1 and "C" 2, which is being reinjected into the pilot project into Bisti "GI" Number One. We estimate it will take approximately a million, I mean 100,000 cubic feet of gas to operate our pumping equipment, our heater treaters and our compressor station. That would leave, I believe, 650 -- 750 MCF to inject in the "C" 18 at the present time.

Q The one and a half million feet per day produced in October was from the entire "C" 18 Lease, is that correct?

A Yes, sir, which included our pilot project.

Q Mr. Hall, I believe you stated that you felt there would be no chaneling of gas by the injection of gas into this well. Have all the wells in the four well project reacted the same?

A No, sir.

Q Has there been a variation in the GOR of those wells?

A Yes, sir.

Q Would that indicate any chaneling up in that area?

A It would indicate some degree, yes, sir. There has been no drastic chaneling. I think I stated the range of gas-oil ratios

was from 1,647 to 5,034 cubic feet per barrel.

Actually, gas in itself is not the best means to sweep the floor space from the reservoir. That is one reason we used LPG in the pilot project, and we will have breakthroughs. One "C" pilot is fairly well depleted.. There has been considerable oil produced from the pilot.

Q Excepting the "C" 1 and "C" 2, which are the two wells on this lease in the pilot area, what is the range of GOR on the Federal "C" Lease?

A They are low. I don't believe I have the last gas-oil ratio survey. I have some tests on the lease. There is one for 467. I would say 1500 would be the approximately upper most range.

Q GOR range from 400 to 1500 on the rest of the lease?

A Yes, sir.

Q Mr. Hall, How much allowable would you transfer from a well if the well were shut in for observation or to increase the efficiency of the project or to convert it to an injection well?

A We feel like we should transfer the top allowable if the well was so capable of making that top allowable.

Q Supposing the well were not capable of making top allowable?

A We feel like the capacity of the well should be transferred.

Q On the basis of a test or on the basis of previous 90 days' production?

A On the basis of the test.

Q What length of test would you propose?

A We believe that the wells should be tested in accordance with the instructions on the Gas-Oil Ratio Form C-116. I believe they provide for a well to be produced normally over a 24-hour period before the well is tested, and tested for a 24-hour period. We believe that also the other operators should be notified as to the date of that test.

Q What is the necessity, Mr. Hall, for the net GOR rule you propose?

A We do not believe an operator can afford to convert wells to injection wells or to shut in wells unless the allowable of those wells is transferred to other wells.

Q That's your explanation for transfer of allowable, but what is your explanation for net GOR?

A Net GOR would conserve gas and being allowed to shut wells in that had high GORs you would conserve gas. Also, in being able to have a net GOR you can inject that gas and maintain a fair share of oil rates and replace the gas going into the reservoir when a well would have a high gas-oil ratio.

Q You gave a hypothetical 3,000 to one on a well that produced 300,000 cubic feet per day?

A Yes, sir.

Q You said if 200,000 of this gas is reinjected, how much would you now, how much of that gas in an individual well was

being injected?

A We would have to proportion that to the wells on the lease. Actually, we intend to inject all the gas capable of injection, except what is used on the lease for lease use or compressor fuel.

Q What is your "GI" Number One presently taking in MCF per day?

A Approximately a million six hundred thousand, I believe. Well, during the month of October, 43,931,000 cubic feet of gas were injected into it; a million and a half, I believe.

Q Do you think this "C" 18 will be capable of taking as much gas as the "GI" One?

A No, sir, I do not at the pressure that is going on "GI" One. It does not have as good permeability, although our "GI" Number One was not fracked and "C" 18 was fracked. We still do not believe it is as capable as "GI" One.

Q Is the rate of gas production in this area increasing at the present time, Mr. Hall?

A Yes, sir, it is increasing. Not -- it is very gradual. We expect it to be a gradual increase.

MR. NUTTER: Any other questions of Mr. Hall?

MR. CHRISTY: S. B. Christy, of Hervey, Dow & Hinkle, representing Humble Oil Company.

MR. NUTTER: Mr. Christy.

EXAMINATION BY MR. CHRISTY:

Q Does the project encompass the entire lease?

A No, it does not.

Q When you spoke of the net GOR formula, do you propose that for each of the wells in the project or for the entire lease?

A Only the project area.

Q Do you have such a rule you have prepared written out, the type of rule you propose on this net GOR?

A No, sir.

Q It doesn't seem to be encompassed hereon in the application in any particular language. Do you happen to have that?

A No.

Q You have no particular language?

A No.

Q One other question on your transfer of allowables. Do you propose any limit to that? For example, no one well to receive more than three allowables, or is it unlimited?

A Well, we hadn't planned to do that, no, sir; but the way we have stated it is there will be no limit, although the offset operators would be able to object to that.

Q Now, sir, again, can you visage any situation there in which you would be transferring say more than three allowable to any one well?

A No, sir.

Q You can't?

A I don't believe that we would transfer a full allowable

from -- the top allowable -- from one well to just one other well.

MR. CHRISTY: Thank you.

MR. NUTTER: Mr. White.

REDIRECT EXAMINATION

BY MR. WHITE:

Q Mr. Hall, you said that you found some chaneling in your pilot area. Is the degree of this chaneling greater than what you anticipated?

A No, sir, I would rather say rather than chaneling it's more of a depletion rather than chaneling.

MR. WHITE: That's all.

MR. NUTTER: Any questions from Mr. Hall? If not, he may be excused.

(witness excused.)

MR. NUTTER: Does anyone else have anything further they wish to offer in case 1559?

MR. KELLAHIN: Jason Kellahin representing Phillips Petroleum Company. Phillips Petroleum Company is the operator of properties in this pool, including properties which directly offset the proposed project area as is shown by Applicant's Exhibit Three. Phillips is in general support of the application and particularly with the provisions which have been suggested as to administrative approval after notice and opportunity to protest has been given to offset operators in regard to the transfer of allowables, conversion of wells from producing wells

to injection wells and the procedure for testing wells prior to the transfer of the allowable from that well. With that provision, Phillips is in support of the application.

MR. NUTTER: Did you wish the Phillips telegram to be read in the record?

MR. KELLAHIN: I believe it is covered in my statement. However, I'll present the telegram to the Commission.

MR. NUTTER: Anything further in Case 1559? If not, we will take the case under advisement.

STATE OF NEW MEXICO)
) ss
 COUNTY OF BERNALILLO)

I, John Calvin Bevell, Notary Public in and for the County of Bernalillo, State of New Mexico, do hereby certify that the foregoing and attached Transcript of Hearing before the New Mexico Oil Conservation Commission was reported by me in stenotype and reduced to typewritten transcript by me; that the same is a true and correct record, to the best of my knowledge, skill and ability.

WITNESS my Hand and Seal this 15th day of December, 1958, in the City of Albuquerque, County of Bernalillo, State of New Mexico.

John Calvin Bevell

My Commission Expires:

January 24, 1962

I do hereby certify that the foregoing is a complete record of the proceedings in the Examiner hearing of Case No. 1559 heard by me on 12-10, 1958.

[Signature], Examiner
 New Mexico Oil Conservation Commission

CLASS OF SERVICE

This is a fast message unless its deferred character is indicated by the proper symbol.

WESTERN UNION

TELEGRAM

W. P. MARSHALL, PRESIDENT

SYMBOLS

DL=Day Letter
NL=Night Letter
LT=International Letter Telegram

The filing time shown in the date line on domestic telegrams is STANDARD TIME at point of origin. Time of receipt is STANDARD TIME at point of destination.

LA 153 KB301

1958 DEC 8 PM 3 05

K BRA 193 PD=BARTLESVILLE OKLA 8 342PMC

=NEW MEXICO OIL CONSERVATION COMMISSION, ATTN A L PORTER
JR= SANTA FE NMEX

=IN RE: CASE NO CD-1559 AN APPLICATION BY SUNRAY
MID-CONTINENT OIL COMPANY SEEKING AUTHORIZATION TO
INSTITUTE A SECONDARY RECOVERY PROJECT IN THE BISTILLOWER
GALLUP OIL POOL. PHILLIPS PETROLEUM COMPANY AS AN
OPERATOR OF PRODUCING PROPERTIES IN THIS FIELD, SOME OF
WHICH DIRECTLY OFFSET THE AREA INVOLVED IN THE
APPLICATION, APPROVES IN GENERAL THE PROPOSED
APPLICATION. IT IS REQUESTED, HOWEVER, THAT ADMINISTRATIVE

THE COMPANY WILL APPRECIATE SUGGESTIONS FROM ITS PATRONS CONCERNING ITS SERVICE

CLASS OF SERVICE

This is a fast message unless its deferred character is indicated by the proper symbol.

WESTERN UNION

TELEGRAM

W. P. MARSHALL, PRESIDENT

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K BRA 193/2

1958 DEC 8 PM 3 09

APPROVAL BE REQUIRED FOR ANY INJECTION WELL CONVERSION
OR ALLOWABLE TRANSFER WHICH WILL INVOLVE WELLS
OFFSETTING LEASES NOT INCLUDED IN THE PROJECT AREA=
L E FITZJARRALD, MGR OF PRODUCTION PHILLIPS
PETROLEUM CO=

THE COMPANY WILL APPRECIATE SUGGESTIONS FROM ITS PATRONS CONCERNING ITS SERVICE

SUNRAY MID-CONTINENT OIL COMPANY

P. O. BOX 2039

TULSA 2, OKLAHOMA

R. E. FOSS, VICE PRESIDENT

A. W. GRIFFITH, ASST. TO THE VICE PRESIDENT

M. S. PATTON, JR., MANAGER
ENGINEERING DIVISION

PRODUCTION DEPARTMENT

July 2, 1957

C. J. KERWIN, SUPERINTENDENT
PRODUCTION DIVISION

L. G. RODGERS, GENERAL MANAGER
GAS DIVISION

J. H. DOUMA, MANAGER
JOINT OPERATIONS DIVISION

New Mexico Oil Conservation Commission
125 Mabry Hall, Capitol Building
Santa Fe, New Mexico

Attention: Mr. W. W. Mankin

Re: Case No. 1280 - Application
of Sunray Mid-Continent Oil Company
for an Order Authorizing a Pilot
Secondary Recovery Project Bisti-
Lower Gallup Oil Pool, San Juan Co.,
New Mexico

Gentlemen:

Attached are three copies of Exhibit A which is a plat showing the
pilot area involved in the subject application.

This application was filed with the Commission on June 26, 1957 by
Mr. L. C. White, Attorney of Santa Fe.

Very truly yours,

SUNRAY MID-CONTINENT OIL COMPANY



Burns H. Errebo

BHE:at
Attachment

cc: Mr. L. C. White, Attorney
P. O. Box 787
Santa Fe, New Mexico



SUNRAY OIL COMPANY IS A WHOLLY-OWNED REFINING & MARKETING SUBSIDIARY

OIL CONSERVATION COMMISSION

P. O. BOX 871

SANTA FE, NEW MEXICO

P.O. Box 871
Santa Fe, New Mexico
January 7, 1959

C
Mr. L. C. White
Gilbert, White & Gilbert
P.O. Box 787
Santa Fe, New Mexico

O
Dear Mr. White:

Enclosed herewith please find Order No. R-1315, entered by the Commission in Case No. 1559 December 31, 1958.

P
You will note that the order authorizes Sunray Mid-Continent Oil Company to institute a gas injection project in the Bisti-Lower Gallup Oil Pool and to convert a producing oil well to gas injection, effective immediately. You will also note that the order defines a project area for the gas injection project and promulgates special rules for the operation of said project, effective February 1, 1959.

Y
We are also enclosing a copy of the Gas Injection Project Operator's Monthly Report, required to be filed monthly under the terms of the subject order. A supply of these forms will be available for your use within a few days.

The above report is to be filed each month within three days after the normal unit allowable for Northwest New Mexico has been established. Its purpose is primarily to ascertain the amount of allowable which is to be assigned each well in the project area during the following month based on the project's performance during the preceding month. For example, the report which is filed in February will be to assign the allowable for March and will contain production data for January.

It will be necessary to take gas-oil ratio tests on each producing well in the project each month with the results of said tests included in the data submitted on the monthly report. The gas-oil ratios need not be filed on the regular gas-oil ratio test report (Form C-116) except during the normal testing period prescribed by the Commission for the Bisti Pool. No tests will be required on wells which are shut-in or have been converted to gas injection.

Mr. L. C. White
Santa Fe, New Mexico

January 7, 1959

Inasmuch as the monthly report embodies substantially all of the data normally reported on Form C-120 for injection projects, this latter form will not be required. You are, therefore, exempt from that portion of Rule 704 which pertains to Form C-120.

Very truly yours,

A. L. Porter, Jr.
Secretary - Director

ALP/DSN:bp
Encls.

CC-Emery Arnold, OCC, Aztec

BEFORE THE OIL CONSERVATION COMMISSION OF THE STATE OF NEW MEXICO

IN THE MATTER OF THE APPLICATION OF SUNRAY
MID-CONTINENT OIL COMPANY FOR AN ORDER
AUTHORIZING A GAS INJECTION PROJECT IN THE
BISTI-LOWER GALLUP OIL POOL IN SAN JUAN
COUNTY, NEW MEXICO, PURSUANT TO RULE 701 OF
THE COMMISSION'S RULES AND REGULATIONS, AND
FOR AN ORDER ESTABLISHING RULES AND REGULATIONS
IN THE AREA OF SAID PROJECT.

CASE NO. 1557

A P P L I C A T I O N

TO THE HONORABLE OIL CONSERVATION COMMISSION OF THE STATE OF NEW MEXICO:

COMES NOW the Applicant, Sunray Mid-Continent Oil Company, and respectfully
alleges and states as follows:

1. That it is the owner and operator of leases and wells within the limits
of the Bisti-Lower Gallup Oil Pool, San Juan County, New Mexico.

2. That it is desired to inject gas, pursuant to Rule 701 of the Commission's
Rules and Regulations, into the Bisti-Lower Gallup Oil Pool underlying the following
described acreage:

The South Half (S/2) of Section 31, Township 26
North, Range 12 West, except the Southwest
Quarter of the Southwest Quarter (SW/4 SW/4)
of said Section 31, N.M.P.M.

All of Section 6, Township 25 North, Range 12
West, except the Northwest Quarter of the North-
west Quarter (NW/4 NW/4) of said Section 6,
N.M.P.M.

The Northwest Quarter (NW/4) and the East Half
(E/2) of Section 7, Township 25 North, Range 12
West, N.M.P.M.

All in San Juan County, New Mexico.

3. That the wells in the Bisti-Lower Gallup Oil Pool are produced from the
Lower Gallup Oil Sand which is found at the approximate depth of 4829 feet in Sunray
Mid-Continent Oil Company's Federal "C" Well No. 1 located in the Northwest Quarter of
the Northwest Quarter (NW/4 NW/4) of Section 6, Township 25 North, Range 12 West, N.M.P.M.,
San Juan County, New Mexico.

4. That it is proposed to inject gas into Sunray Mid-Continent Oil Company's
Federal "C" Well No. 18, located in the Southwest Quarter of the Northeast Quarter (SW/4
NE/4) of Section 7, Township 25 North, Range 12 West, N.M.P.M., San Juan County, New
Mexico.

5. That casing has been set and cemented in the proposed injection well as
follows:

(a) Sunray's Federal "C" No. 18:

8-5/8" casing set at 352' with 225 sacks of cement.
5-1/2" casing set at 4989' with 200 sacks of cement.

(b) The casing in the injection well will be tested
in accordance with such rules and methods hereto-
fore approved by the Commission or as may be
prescribed by it prior to use as an injection
well.

6. That it is estimated that between 900,000 and 1,900,000 cubic feet of gas per day will be injected into the injection well, however, at a later date it is estimated that the volume of gas injected may increase; that the gas will consist of produced casinghead gas from the Lower Gallup Oil Formation with needed make-up gas to be purchased from outside sources.

7. That the Commission by its Order No. R-1027 dated August 7, 1957, has heretofore granted to Sunray Mid-Continent Oil Company permission to inject liquefied petroleum gas followed by gas into the Bisti-Lower Gallup Oil Pool for the purposes of secondary recovery.

8. That attached hereto, marked Exhibit "A", and made a part hereof by this reference, is a plat showing the location of the proposed intake well; the location of all oil and gas wells, including drilling wells and dry holes, and the names of lessees within one-half mile of the proposed intake well; and the name of each offset operator.

9. That the operator of this project is Sunray Mid-Continent Oil Company, P. O. Box 2039, Tulsa 2, Oklahoma.

10. That in the interest of conservation, the prevention of waste, and to more effectively and efficiently operate the gas injection project, it is recommended to the Commission that rules and regulations be adopted to accomplish the following in the portion of the Bisti-Lower Gallup Oil Pool as described above:

- ad.*
offset operator - to the project
notice
(copy to all offset operators)
10 day
10 working days
- (1). The conversion of producing wells to injection wells upon approval of the Secretary-Director of the Commission.
 - (2). The transfer of the allowables from injection wells to producing wells within the project area.
 - (3). The transfer of allowable from wells which have been shut-in for observation or to increase the efficiency of the project to producing wells within the project area.
 - (4). The operation of wells on a net gas-oil ratio basis giving allowance for gas injected. *net gas - gas injected. Amt. allowed to recover minus amt. produced.*
 - (5). Such other rules and regulations which the Commission deems to be necessary.

WHEREFORE Applicant prays that this application be set for hearing, that notice be given as required by law and that upon the evidence adduced at such hearing, the Commission issue an order granting to Applicant permission to inject gas into the Bisti-Lower Gallup Oil Pool, and an order establishing rules and regulations in that portion of the Bisti-Lower Gallup Oil Pool, San Juan County, New Mexico, described in this application, as more fully set out in this application.

Dated this 14 day of November, 1958.

SUNRAY MID-CONTINENT OIL COMPANY


By William R. Loar
William R. Loar, Attorney
P. O. Box 2039
Tulsa 2, Oklahoma

By L. C. White
L. C. White, Attorney
P. O. Box 787
Santa Fe, New Mexico

Proposed:
Notice to all offset operators
10 day
10 working days

650,000 cu ft per day
100,000 gal water needed etc.
700,000 cu ft

[illegible]

PRODUCING FORMATION		SUNRAY MID-CONTINENT OIL COMPANY	PRODUCING LEASES
NAME	AVERAGE DEPTH	FIELD: BISTI LOWER GALLUP DISTRICT: N.&W. TEXAS COUNTY: SAN JUAN STATE: N. MEXICO	NEW MEXICO FED. 'B' NEW MEXICO FED. 'C'
		SCALE 4000 2000 0 2000 4000 8000  FEET	

BEFORE THE OIL CONSERVATION COMMISSION
OF THE STATE OF NEW MEXICO

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

CASE NO. 1559
Order No. R-1315

APPLICATION OF SUNRAY MID-CONTINENT
OIL COMPANY FOR AN ORDER AUTHORIZING
A GAS INJECTION PROJECT IN THE BISTI-
LOWER GALLUP OIL POOL IN SAN JUAN
COUNTY, NEW MEXICO, AND FOR THE
PROMULGATION OF SPECIAL RULES AND
REGULATIONS GOVERNING SAID PROJECT.

ORDER OF THE COMMISSION

BY THE COMMISSION:

This cause came on for hearing at 9 o'clock a.m. on December 10, 1958, at Santa Fe, New Mexico, before Daniel S. Nutter, Examiner duly appointed by the Oil Conservation Commission of New Mexico, hereinafter referred to as the "Commission," in accordance with Rule 1214 of the Commission Rules and Regulations.

NOW, on this 3rd day of December, 1958, the Commission, a quorum being present, having considered the application, the evidence adduced and the recommendations of the Examiner, Daniel S. Nutter, and being fully advised in the premises,

FINDS:

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

(2) That the applicant, Sunray Mid-Continent Oil Company, is the operator of the Federal "C" Lease in the Bisti-Lower Gallup Oil Pool including the following-described acreage:

TOWNSHIP 25 NORTH, RANGE 12 WEST, NMPM
Section 6: NE/4 NW/4, S/2 NW/4, NE/4 and the S/2
Section 7: N/2 and the SE/4

TOWNSHIP 26 NORTH, RANGE 12 WEST, NMPM
Section 31: N/2 SW/4, SE/4 SW/4 and the SE/4

all in San Juan County, New Mexico.

-2-

Case No. 1559
Order No. R-1315

(3) That the applicant proposes to institute a gas injection project on said Federal "C" Lease by the injection of gas into the Gallup formation through its Federal "C" Well No. 18, located in the SW/4 NE/4 of said Section 7.

(4) That the applicant further proposes that special rules and regulations be promulgated to govern the operation of said project, which rules would provide for:

(a) the conversion of additional injection wells without notice and hearing, subject to administrative approval by the Commission.

(b) the transfer of allowables from injection wells to producing wells within the project area.

(c) the transfer of allowables from wells which have been shut-in for observation or to increase the efficiency of the project, to other wells within the project area.

(d) operation of the wells in the project on a net gas-oil ratio basis giving allowance for gas injected.

(e) such other rules and regulations as are deemed appropriate by the Commission.

(5) That the applicant has established by a preponderance of the evidence that approval of the subject application will prevent waste and result in greater ultimate recovery of oil from the Bisti-Lower Gallup Oil Pool.

(6) That the application to convert the said Federal "C" Well No. 18 to gas injection should be authorized.

(7) That special rules and regulations governing the applicant's gas injection project in the Bisti-Lower Gallup Oil Pool should be established.

IT IS THEREFORE ORDERED:

(1) That the applicant, Sunray Mid-Continent Oil Company, be and the same is hereby authorized to operate a gas-injection project on its Federal "C" Lease, Bisti-Lower Gallup Oil Pool, San Juan County, New Mexico, subject to the special rules and regulations for said gas injection project as hereinafter set forth.

(2) That the applicant be and the same is hereby authorized to convert its Federal "C" Well No. 18, located in the SW/4 NE/4 of Section 7, Township 25 North, Range 12 West, NMPM, San Juan County, New Mexico, to a gas injection well, with injection of gas through perforations in the interval between 4842 feet and 4930 feet.

-3-

Case No. 1559
Order No. R-1315

(3) That special rules and regulations governing the operation of the above-described gas injection project on applicants Federal "C" Lease be and the same are hereby promulgated as follows, effective February 1, 1959:

**SPECIAL RULES AND REGULATIONS FOR THE
SUNRAY MID-CONTINENT OIL COMPANY FEDERAL "C" GAS
INJECTION PROJECT**

RULE 1. The project area of the Sunray Mid-Continent Oil Company Federal "C" Gas Injection Project, hereinafter referred to as the "Project," shall comprise that area described as follows:

TOWNSHIP 25 NORTH, RANGE 12 WEST, NMPM

Section 6: NE/4 NW/4, S/2 NW/4,
NE/4, and S/2

Section 7: N/2 and SE/4

TOWNSHIP 26 NORTH, RANGE 12 WEST, NMPM

Section 31: N/2 SW/4, SE/4 SW/4, and SE/4

RULE 2. The allowable for the Project shall be the sum of the allowables of the several wells within the project area, including those wells which are shut-in or are used as gas injection wells.

RULE 3. Allowables for gas injection wells may be transferred to producing wells within the project area, as may the allowables for producing wells which, in the interest of more efficient operation of the Project, are shut-in or curtailed because of high gas-oil ratio or shut-in for pressure regulation, control of pattern or sweep efficiencies, to observe changes in pressures or changes in characteristics of reservoir liquids, or progress of sweep.

RULE 4. The project allowable may be produced from any well or wells in the project area in any proportion, subject to the limitations set forth in Rule 8, provided that the rate of production is consistent with the efficient operation of the Project and provided further that no well shall produce in excess of two times the top unit allowable for the Bisti-Lower Gallup Oil Pool, or 200 barrels per day, whichever is greater.

RULE 5. The allowable assigned to any gas injection well, which allowable is to be transferred to any well or wells in the project area for production, shall in no event exceed the producing capacity of the well prior to conversion to gas injection, as determined by the testing procedure prescribed by Rule 7.

Conversion of producing wells to gas injection, or the drilling of additional wells for gas injection, shall be done only after approval of same by the Secretary-Director of the Commission. To obtain such approval, the Project operator shall file proper application with the Commission, which application shall include the following:

- (1) A plat showing location of proposed injection well, all wells within the project area and offset operators, locating their off-setting wells to the project area.
- (2) A schematic drawing of the proposed injection well which fully describes the casing, tubing, perforated interval, and depths and showing that injection of gas will be confined into the Bisti-Lower Gallup formation.
- (3) A letter stating that all interested parties, including offset operators to the project area have been furnished a complete copy of the application and the date of the notification.

The Secretary-Director may approve the proposed gas injection well if, within 20 days after receiving the application, no objection to the proposal is received. The Secretary-Director may grant immediate approval provided waivers of objection are received from all interested parties.

RULE 6. The allowable assigned to any well which is shut-in or is curtailed in accordance with the provisions of Rule 3, which allowable is to be transferred to any well or wells in the project area for production, shall in no event exceed the producing capacity of the well prior to such shut-in or curtailment as determined by the testing procedure prescribed by Rule 7.

RULE 7. The allowable assigned to any well which is used for the purpose of gas injection, or which is shut-in or curtailed in accordance with Rule 3, shall be determined by a 24-hour test at a stabilized rate of production, which shall be the final 24-hour period of a 72-hour test throughout which the well shall be produced in the same manner and at a constant rate. In no event shall a well receive an allowable greater than its ability to produce, or greater than top unit allowable for the pool multiplied by the well's acreage factor, whichever is applicable. The project operator shall notify all operators offsetting the Project, as

-5-

Case No. 1559
Order No. R-1315

well as the Commission, of the exact time such tests are to be conducted. Tests may be witnessed by representatives of the offsetting operators and the Commission, if they so desire.

RULE 8. No well in the project area shall be assigned any allowable transferred from any other well or wells in the project area unless and until said well has been approved by the Commission as a duly authorized "Transfer Well." To receive approval for any such Transfer Well, the Project operator shall file application with the Secretary-Director of the Commission for permission to transfer allowable to the well, setting forth therein the well's current allowable and the maximum allowable which will be assigned to the well. Copies of the application shall be provided to all operators owning acreage offsetting the proration unit on which the transfer well is located. The Secretary-Director may designate the well as a Transfer Well subject to the maximum expected allowable for the well if, within 20 days after receiving the application, no objection to the designation is received. The Secretary-Director may grant immediate designation as a Transfer Well provided waivers of objection are received from all such offset operators.

RULE 9. The allowable assigned to any well in the Project shall be based upon the ability of the well to produce and shall be subject to the limiting gas-oil ratio (2,000 to 1) for the Bisti-Lower Gallup Oil Pool, except that any well or wells within the project area producing with a gas-oil ratio in excess of 2,000 cubic feet of gas per barrel of oil may be produced on a "net" gas-oil ratio basis, which net gas-oil ratio shall be determined by applying credit for daily average gas injected into the Bisti-Lower Gallup Oil Pool within the project area to such high gas-oil ratio well. The daily adjusted oil allowable for any such well receiving gas injection credit shall be determined in accordance with the following formula:

$$A_{adj} = \frac{TUA \times F_a \times 2,000}{\frac{P_g - I_g}{P_o}}$$

where:

A_{adj} = the well's daily adjusted allowable
 TUA = top unit allowable for pool
 F_a = the well's acreage factor

-6-
Case No. 1559
Order No. R-1315

P_g = average daily volume of gas produced by the well during the preceding month, cubic feet

I_g = the well's allocated share of the daily average gas injected during the preceding month, cubic feet.

P_o = average daily volume of oil produced by the well during the preceding month, barrels

In no event shall the amount of injected gas being credited to a well be such as to cause the net gas-oil ratio, $\frac{P_g - I_g}{P_o}$, to be less than 2,000 cubic feet of gas per barrel of oil produced.

RULE 10. Each month the project operator shall, within three days after the normal unit allowable for Northwest New Mexico has been established, submit to the Commission a Gas Injection Project Operator's Report, on a form prescribed by the Commission, outlining thereon the data required, and requesting allowables for each of the several wells in the Project.

RULE 11. The Commission shall, upon review of the report and after any adjustments deemed necessary, assign allowables to each well in the Project for the next succeeding month in accordance with these rules.

RULE 12. The Special Rules and Regulations for the operation of the subject Project shall prevail against the Statewide Rules and also against the Special Rules and Regulations for the Bisti-Lower Gallup Oil Pool, if in conflict therewith.

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

STATE OF NEW MEXICO
OIL CONSERVATION COMMISSION

E. L. Mechem
EDWIN L. MECHEM, Chairman

Murray E. Morgan
MURRAY E. MORGAN, Member

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



ir/

CASE 1562: (con't)

special rules and regulations be promulgated to govern the above-described project, which would include among other things conversion of additional injection wells without notice and hearing, transfer of allowables from injection wells, transfer of allowables from wells shut-in for observation purposes or to increase the efficiency of the project, exemption of all leases connected with the project from gas-oil ratio limitation provided gas produced therefrom is reinjected, and such other rules and regulations the Commission may deem appropriate.

CASE 1563:

Application of Caulkins Oil Company for a dual completion. Applicant, in the above-styled cause, seeks an order authorizing it to dually complete its Breech "A" Well No. D-204, located in the SE/4 SE/4 of Section 9, Township 26 North, Range 6 West, Rio Arriba County, New Mexico, in such a manner as to permit the production of oil from the South Blanco-Tocito Oil Pool and the production of gas from the South Blanco-Dakota Gas Pool through parallel strings of tubing.

CASE 1564:

Application of Great Western Drilling Company for approval of a unit agreement and a pilot water flood project. Applicant, in the above-styled cause, seeks an order approving its proposed North Central Caprock Queen Unit Agreement embracing 2,040 acres, more or less, of state and federal lands in Sections 13, 14, 15, and 24, of Township 13 South, Range 31 East, and Sections 17, 18, and 19, of Township 13 South, Range 32 East, Caprock-Queen Pool, Chaves and Lea Counties, New Mexico, and for authority to institute a pilot water flood project in the Queen formation underlying said unit area.

CASE 1565:

Application of Continental Oil Company for a dual completion. Applicant, in the above-styled cause, seeks an order authorizing it to dually complete its Warren Unit Well No. 9 located in the SW/4 NW/4 of Section 27, Township 20 South, Range 38 East, Lea County, New Mexico, in such a manner as to permit the production of gas from the Warren-Tubb Gas Pool and oil from the Warren-Drinkard Oil Pool through parallel strings of tubing.

CASE 1566:

Application of Pan American Petroleum Corporation for approval of a unit agreement. Applicant, in the above-styled cause, seeks an order approving its East Saunders Unit Agreement embracing approximately 2,320 acres of state acreage in Township 14 South, Range 34 East, Lea County, New Mexico.

CASE 1567:

Application of Olsen Oils, Inc., for a non-standard gas proration unit. Applicant, in the above-styled cause, seeks an order establishing a 160-acre non-standard gas proration unit in the Tubb Gas Pool consisting of the N/2 NW/4, SN/4 NW/4 and the NW/4 SW/4 of Section 25, Township 22 South, Range 37 East, Lea County, New Mexico; or in the alternative for a compulsory pooling order pooling all interests within the vertical limits of the Tubb Gas Pool in the NW/4 of said Section 25 as one Tubb Gas Unit and a like order pooling all interests within the vertical limits of the Tubb Gas Pool in the SN/4 of said Section 25 as another Tubb Gas Unit.

DOCKET: EXAMINER HEARING DECEMBER 10, 1958

OIL CONSERVATION COMMISSION 9 a.m., Mabry Hall, State Capitol, Santa Fe, New Mexico

The following cases will be heard before Daniel S. Nutter, Examiner:

CASE 1558:

Application of Sunray Mid-Continent Oil Company for permission to commingle the production from two separate oil pools. Applicant, in the above-styled cause, seeks an order authorizing it to commingle the production from the Blinebry Oil Pool and Drinkard Pool on its State Land "15" Lease comprising the S/2 S/2 of Section 16, Township 21 South, Range 37 East, Lea County, New Mexico. Applicant proposes to meter the production from the Blinebry Oil Pool prior to being commingled and to determine Drinkard Pool production by subtracting the metered volume on the total gauged production in the common tank battery.

CASE 1559:

Application of Sunray Mid-Continent Oil Company for an order authorizing a secondary recovery project in San Juan County, New Mexico, and for the promulgation of special rules and regulations in connection with said project. Applicant, in the above-styled cause, seeks an order authorizing it to institute a secondary recovery project in the Bisti-Lower Gallup Oil Pool for the injection of dry gas into the Gallup formation through its Federal "C" Well No. 18, located in the SW/4 NE/4 of Section 7, Township 25 North, Range 12 West, San Juan County, New Mexico. Applicant further proposes that special rules and regulations be promulgated to govern the operation of the above-referenced project, which rules would provide among other things for the conversion of additional injection wells without notice and hearing, the transfer of allowables from injection wells to producing wells, transfer of allowables from wells which have been shut-in for observation or to increase the efficiency of the project, exemption of all leases connected with the project from gas-oil ratio limitation provided gas produced therefrom is reinjected, and such other rules and regulations the Commission may deem appropriate.

CASE 1560:

Application of El Paso Natural Gas Company for a dual completion. Applicant, in the above-styled cause, seeks an order authorizing it to dually complete its Huerfano Unit Well No. 92 (DG) located in the SW/4 NW/4 of Section 7, Township 26 North, Range 9 West, San Juan County, New Mexico, in such a manner as to permit the production of gas from an undesignated Gallup gas pool and gas from an undesignated Dakota gas pool.

CASE 1561:

Application of Tidewater Oil Company for a dual completion. Applicant, in the above-styled cause, seeks an order authorizing it to dually complete its A. B. Coates "C" Well No. 17, located in the SE/4 NE/4 of Section 24, Township 25 South, Range 37 East, Lea County, New Mexico, in such a manner as to permit the production of oil from the Justis-McKee Pool and oil from the Justis-Ellenburger Pool through parallel strings of tubing.

CASE 1562:

Application of British American Oil Producing Company for permission to institute a secondary recovery project in San Juan County, New Mexico, and for the promulgation of special rules and regulations in connection therewith. Applicant, in the above-styled cause, seeks an order authorizing it to institute a secondary recovery project in the Bisti-Lower Gallup Oil Pool for the injection of dry gas and/or liquefied petroleum gas into the Gallup formation through four wells located in Sections 27 and 28, Township 26 North, Range 13 West, San Juan County, New Mexico. Applicant further proposes that

PROPOSED SPECIAL RULES AND REGULATIONS
FOR THE GAS INJECTION PROJECT AREA
IN THE BISTI LOWER GALLUP FIELD
SAN JUAN COUNTY, NEW MEXICO

RULE 1: Any well may be converted to and used as a gas injection well in accordance with the following conditions:

(a) Prior to the conversion of any well into a gas injection well the operator of the well shall request in writing permission of the Secretary-Director of the Commission to convert the well into a gas injection well. A copy of such request shall be furnished all operators of properties offsetting the project area. This request shall include the following:

Bisti Lower Gallup Field
Page -2-

RULE 3: The tests for gas oil ratios shall be made according to requirements set out in the Oil Conservation Commission's Statewide Rule No. 301. This requirement for the taking of gas oil ratio tests shall not apply to injection wells. Wells shut in for observation and tests may be exempt from the gas oil ratio testing requirements upon request to and approval from the Secretary-Director.

RULE 4 (a) All or part of the allowable of wells in the project area which are:

- (1) Shut in because of high gas oil ratio or
- (2) Shut in for pressure regulation, control of pattern or sweep efficiencies, to observe changes in pressures or changes in characteristics in reservoir liquids, progress of sweep, or otherwise to achieve secondary recovery operations may be transferred or retransferred from time to time to other wells in the same reservoir located in the project area.

(b) An oil well in the project area which is converted to a gas injection well may have transferred or retransferred to any other well in the same reservoir located in the project area all or any part of its allowable. Allowable of injection wells may be transferred or retransferred so long as such wells continue to be used for injection.

(c) Before an allowable may be transferred to any well or wells, the operator must file a request for such transfer with the Secretary-Director. Such request must contain the following:

- (1) A plat showing the location of all wells in the project area and designating thereon the proposed well from which the allowable will be transferred and the well or wells from which the transferred allowable will be produced. The plat should also show the offset operators and their offsetting wells to the project area.
- (2) A schedule showing the well or wells to which the allowable is to be transferred and the amount of such transferred allowable to be produced by each well.
- (3) A test of the well whose allowable is requested to be transferred, taken within 30 days of the date the request is mailed to the Secretary-Director, reported on the Commission's Form C-116 and tested in accordance with the instructions on Form C-116. The well should be produced at its normal producing rate for at least 24 hours prior to beginning the test.
- (4) A letter stating that all offset operators to the project area have been furnished a copy of the request to transfer allowables and the date of this notification.

(d) The Secretary-Director upon receiving a request for allowable transfer shall wait ten days before granting such allowable transfer. Should the Secretary-Director or any offset operator object to such allowable transfer, permission will be granted only after notice and hearing.

(e) Any producing well whose allowable is transferred under the above provisions may have up to its top unpenalized allowable transferred provided that sufficient amounts of gas are injected to remove the gas oil ratio penalty.

(b) The Secretary-Director upon receiving this request shall wait ten days before granting permission to convert such well into an injection well. Should the Secretary-Director or any offset operator object to the use of such well for injection purposes, permission for such use will be granted only after notice and hearing.

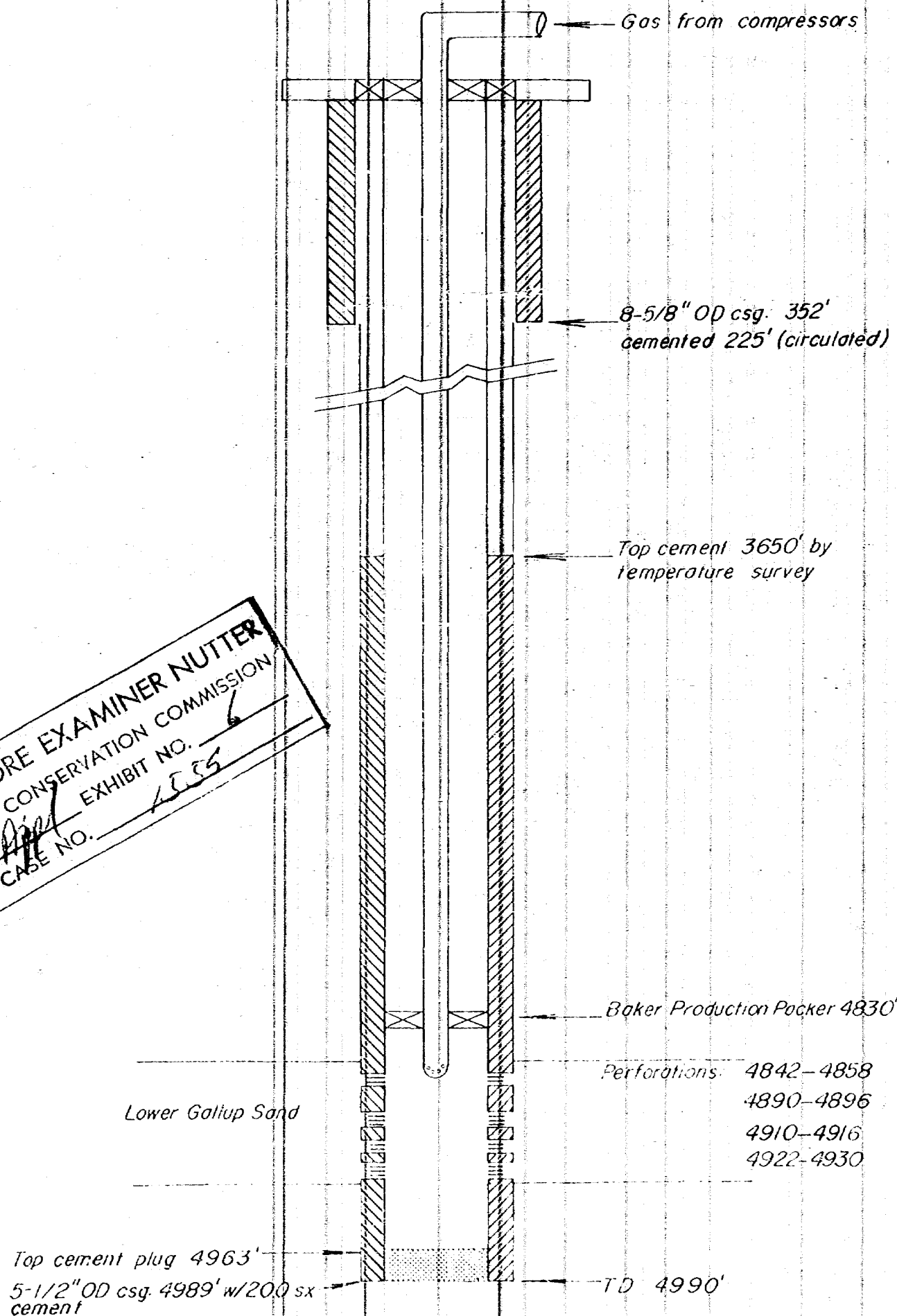
RULE 2 (a): The permitted gas oil ratio for all wells shall be two thousand (2000) cubic feet of gas per barrel of oil produced. Any well producing with a gas oil ratio in excess of two thousand (2000) cubic feet of gas per barrel of oil produced shall be allowed to produce daily only that volume of gas obtained by multiplying its daily oil allowable as determined by the applicable rules of the Commission by two thousand (2000) provided that an operator may produce an oil well under a net gas oil ratio. The net gas oil ratio as used herein shall be determined by subtracting from the total volume of gas produced from said well during any interval prescribed by the Commission that volume of gas that was during the same interval injected into the producing reservoir and by dividing the net volume of gas thus remaining by the oil produced during the same interval. If during any interval the said well has a net gas oil ratio in excess of two thousand (2000) cubic feet of gas per barrel of oil produced, its daily oil allowable shall be determined and assigned by multiplying by two thousand (2000) that oil allowable which said well would be assigned under the Commission's rules were its net ratio two thousand (2000) cubic feet of gas per barrel of oil, or less, and by dividing the product thus obtained by the net gas oil ratio of said well as determined as hereinabove set out.

(b) Each operator injecting gas shall submit to the Commission on or before the 25th of each month, a tabulation showing the following for the preceding month:

- (1) The total gas produced from said well.
- (2) The total oil produced from said well.
- (3) The amount of such total volume of gas produced from said well that was during the month returned to the reservoir from which it was produced or utilized for plant fuel and shrinkage.
- (4) The amount of such total volume of gas produced from said well that was during the month not returned to the reservoir from which it was produced or utilized for plant fuel and shrinkage.
- (5) The net gas oil ratio of said well.

SCHEMATIC DRAWING
 PROPOSED GAS INJECTION WELL
 SUNRAY MID-CONTINENT OIL COMPANY
 FEDERAL "C" NO 18
 BISTI-LOWER GALLUP POOL
 SAN JUAN COUNTY NEW MEXICO

BEFORE EXAMINER NUTTER
 OIL CONSERVATION COMMISSION
 CASE NO. 4835
 EXHIBIT NO. 1



SUNRAY MID-CONTINENT OIL COMPANY
 EXHIBIT NO. 1 CASE NO. 4835

Form 9-551a
(Feb. 1951)

Budget Bureau No. 42-2388-1
Approval expires 12-31-59.

(SUBMIT IN TRIPLICATE)

Land Office Santa Fe

Lease No. 078056 USA

Unit Q

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

RECEIVED

NOV 20 1958

SUNDRY NOTICES AND REPORTS ON WELLS GEOLOGICAL SURVEY
WASHINGTON NEW MEXICO

NOTICE OF INTENTION TO DRILL.....	SUBSEQUENT REPORT OF WATER SHUT-OFF.....
NOTICE OF INTENTION TO CHANGE PLANS.....	SUBSEQUENT REPORT OF SHOOTING OR ACIDIZING.....
NOTICE OF INTENTION TO TEST WATER SHUT-OFF.....	SUBSEQUENT REPORT OF ALTERING CASING.....
NOTICE OF INTENTION TO RE-DRILL OR REPAIR WELL.....	SUBSEQUENT REPORT OF RE-DRILLING OR REPAIR.....
NOTICE OF INTENTION TO SHOOT OR ACIDIZE.....	SUBSEQUENT REPORT OF ABANDONMENT.....
NOTICE OF INTENTION TO PULL OR ALTER CASING.....	SUPPLEMENTARY WELL HISTORY.....
NOTICE OF INTENTION TO ABANDON WELL.....	
Other <u>X</u>	

(INDICATE ABOVE BY CHECK MARK NATURE OF REPORT, NOTICE, OR OTHER DATA)

November 18, 1958

N.M. Federal "G"
Well No. 18 is located 1900 ft. from [N] line and 1900 ft. from [E] line of sec. 7

NE 1/4 Sec 7 25N 12W MUPM
(Of Sec. and Sub. No.) (Twp.) (Range) (Meridian)
Santa Fe San Juan New Mexico
(City) (County or Subdivision) (State or Territory)

The elevation of the derrick floor above sea level is 6280 ft.

DETAILS OF WORK

(State names of and expected depths to objective sands; show sizes, weights, and lengths of proposed casings; indicate mudlogging jobs, cementing points, and all other important proposed work.)

We propose to take this well off production and convert it to a gas injection well. Injection will be into present production perforations 4890-96', 4910-16', 4922-30', 4842-58'. This well's allowable will be transferred to other wells on this lease.

BEFORE EXAMINER NUTTER

OIL CONSERVATION COMMISSION

EXHIBIT NO. 7
CASE NO. 1559

SUNRAY MID-CONTINENT OIL COMPANY

EXHIBIT NO. 7 CASE NO. 1559

I understand that this plan of work must receive approval in writing by the Geological Survey before operations may be commenced.

Company Sunray Mid-Continent Oil Company

Address Box 128

Hobbs, New Mexico

By K. S. Statten

Title Engineer

BEFORE EXAMINER NUTTER
OIL CONSERVATION COMMISSION
Final EXHIBIT NO. 8
CASE NO. 1557

PRODUCTION DATA
SUNRAY MID-CONTINENT OIL COMPANY-FEDERAL "C" LEASE
BISTI (LOWER GALLUP) OIL POOL
SAN JUAN COUNTY, NEW MEXICO

SUNRAY MID-CONTINENT OIL COMPANY
EXHIBIT NO. 8 CASE NO. 1557

Year & Month	Number of Wells Produced	Oil Prod. Bbls./mo.	Cum. Oil Prod. Bbls.	Gas Prod. MCF/Mo.	Cum. Gas Prod. MCF	Avg. Daily Oil Prod. Bbls./Day	Avg. Daily Gas Prod. MCF/Day	Avg. For Ft. 3 Per Bbl.
1956								
Apr.	1	542	542	271	271	54	27	500
May	3	2,751	3,293	2,315	2,586	87	75	862
June	6	8,166	11,459	3,745	6,331	272	125	460
July	11	17,473	28,932	6,468	12,799	564	209	371
Aug.	15	17,796	46,728	6,661	19,460	574	215	375
Sept.	9	12,618	59,346	5,361	24,821	421	179	425
Oct.	8	14,648	73,994	5,581	30,402	473	180	381
Nov.	8	8,502	82,496	3,592	33,994	283	120	424
Dec.	8	7,992	90,488	2,881	36,875	258	93	360
1957								
Jan.	8	9,212	99,700	4,392	41,267	297	142	478
Feb.	7	19,863	119,563	9,333	50,600	709	333	470
Mar.	10	26,662	146,225	12,434	63,034	860	401	466
Apr.	10	20,029	166,254	9,633	72,667	668	321	481
May	6	9,654	175,908	3,860	76,527	311	125	402
June	6	10,270	186,178	3,964	80,491	342	132	386
July	6	8,701	194,879	3,359	83,850	281	108	384
Aug.	2	3,521	198,400	1,359	85,209	114	44	386
Sept.	4	3,313	201,713	1,775	86,984	110	59	536
Oct.	7	12,220	213,933	5,849	92,833	394	189	480
Nov.	3	8,512	222,445	4,480	97,313	284	149	525
Dec.	7	11,025	233,470	5,669	102,982	356	183	514
1958								
Jan.	18	14,211	247,681	8,035	111,017	458	259	566
Feb.	19	12,921	260,602	9,663	120,680	461	345	748
Mar.	19	17,060	277,662	13,837	134,517	550	446	811
Apr.	19	20,349	298,011	23,454	157,971	678	782	1153
May	19	59,125	357,136	41,701	199,672	1907	1345	705
June	19	55,382	412,518	38,925	238,597	1846	1298	703
July	20	62,499	475,017	48,460	287,057	2016	1563	775
Aug.	21	59,065	534,082	45,486	332,543	1905	1467	770
Sept.	21	56,632	590,714	45,217	377,760	1888	1507	798
Oct.	21	62,190	652,904	47,013	424,773	2006	1517	756