BEFORE THE
OIL CONSERVATION COMMISSION
Santa Fe, New Mexico
May 18, 1960

IN THE MATTER OF:	
Application of Sunray Mid-Continent Oil Company for a hearing de novo before the Commission in Case No. 1904, Order No. R-1636, relating to special rules governing the Central Bisti LPG-Gas-Water Injection Project in the Bisti-Lower Gallup Oil Pool, San Juan County, New Mexico, particularly those provisions concerning the assignment of well allowables.	Case 1904

BEFORE: Mr. Murray Morgan
Mr. A. L. Porter Jr.

TRANSCRIPT OF HEARING

MR. PAYNE: Application of Sunray Mid-Continent Oil Company for a hearing de novo before the Commission in Case No. 1904, Order No. R-1636, relating to special rules governing the Central Bisti LPG-Gas-Water Injection Project in the Bisti-Lower Gallup Oil Pool, San Juan County, New Mexico, particularly those provisions concerning the assignment of well allowables.

MR. PORTER: Case 1904. The Commission will recognize Mr. White.

MR. WHITE: Charles White of Gilbert, White and Gilbert, Santa Fe, New Mexico appearing on behalf of the Applicant. I have associated with me Mr. William Loar of the Oklahoma Bar.

MR. LOAR: We will have one witness, Mr. Porter.

MR. PORTER: Will the witness stand and be sworn?

(Witness sworn.)

T. W. BRINKLEY

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

DIRECT EXAMINATION

BY MR. LOAR:

Q Will you please state your name and occupation?

A My name is T. W. Brinkley, I'm Chief Reservoir Engineer, Sunray in Tulsa.

Q Have you testified before this Commission previously as a reservoir engineer?

A Yes, I have.

Q Have you made a constant study of the Bisti Pool and even more particularly the operation of the Central Bisti Unit?

A Yes, I have.

MR. LOAR: Mr. Brinkley's qualifications are acceptable?

MR. PORTER: Yes, sir, they are.

Q Will you please refer to what has been marked as Sunray's Exhibit No. 1 and point out what that reflects?

A Exhibit No. 1 is an area map of the Central Bisti Unit. It reflects the unit area shown in heavy hashered lines. It also shows that the unit area is separated from the West Bisti Unit by

five water injection wells commonly referred to as the West Water Barrier, and those water injection wells are identified further by yellow color.

Similarly, on the East boundary we have four water injection wells which are commonly referred to as the East Water Barrier separating the unit area from production in Section 10 and 15. In addition we show colored in red 10 LPG injection wells on pattern running through the fairway of the reservoir within the unit boundary. Also we show colored in green the present gas injection wells located along the North flank and the South flank of the reservoir. We show 5 oil wells circled in orange that were drilled since unit operation began, namely CBU No. 4, No. 26, 27, 29 and 31. Those oil wells were drilled to complete the pattern for LPG flooding.

Also G.I. No. 18-L, which is an LPG injection well, was drilled after unitization to permit that South pattern.

In summary, Exhibit No. 1 reflects the plan of operation for the Central Bisti Unit, namely that we have LPG flooding through the major portion of the reservoir, we have gas injection along the North and South flanks which provide pressure as well as additional oil benefit by gas drive, and we show water flooding along the West boundary and East boundary, and lastly, we show that the southern extremity of the unit in Section 17 and 16 is subjected to a line drive by two gas injection wells, one LPG injection

well and water injection wells on the East boundary.

Q Mr. Brinkley, this pretty well conforms to the plan of operation that we all contemplated when we put this unit into effect, is that right?

A That is correct.

Q Will you please refer to Sunray's Exhibit No. 2 and review the performance of the Central Bisti Unit?

A Exhibit No. 2 is entitled "Reservoir Performance, Central Bisti Unit". You will notice the scale on the bottom of the exhibit which is a time scale covering the years 1958, 1959 and 1960. You will further notice a vertical line for the date July 1, 1959, identified as "Date of unit activated." The data to the left of the date of activiation of the unit represents past performance history and data to the right of that date represents the performance under unitized pressure maintenance type operations.

Let's consider first the daily oil production rate. That is identified as solid bar graph type lines on the lower portion of the curve with the corresponding scale on the right-hand side of the exhibit numbered from zero to 1,000, 2,000 and up to 5,000 barrels per day.

You will notice for the month of May, 1958 and for several months thereafter we had produced a little over 4,000 barrels of oil per day. And then approximately in November of 1958 we notice that the oil production rate began a decline, reaching a value of

approximately 3,000 barrels per day for the month of June just before unitization. You will notice for the months of July, August, September, October, November and December, North, 1959, representing the first six months of unitized operation the oil production rate varied from approximately 1200 to 1400 barrels per day. That represents a self-imposed restrictive allowable as a part of the plan of operation while we were injecting LPG to restore the reservoir pressure.

For the month of January, 1960, the oil production rate dropped to approximately 500 barrels per day due to the fact the unit was shut in approximately two weeks while equipment changes were made and other facilities converted to start the processing of produced gas.

Q Mr. Brinkley, by that time we had succeeded in injecting the LPG that we had planned to inject?

A That is correct.

Q Some time in December we completed the injection of that 933,000 barrels of LPG?

A That is correct. Then for the month of February we started increasing, we lifted the self-imposed restrictive allowable and started increasing the producing rate in increments for the month of February, the producing rate appears to be approximately 26, 2700 barrels per day.

Then for the month of March it was again increased to

approximately 3400 barrels per day. This oil production data reflects that we have restored the producing capacity of the Central Bisti Unit to a value greater than what was present before the date of unitization.

Now, let's take the average daily gas production. That data is reflected with a horizontal dashed bar graph and the associated scale is to the left of the graph whose numbers read zero, two, four, and in that sequence up to ten million cubic feet per day. Again the trend prior to unitization showed a consistently increasing rate of gas production reaching a value of approximately seven million cubic feet per day prior to unitization, and then after unitization we noticed that the gas production consistently decreased due to reduced gas-oil ratios as we continued unitized operation.

During the month of January that gas production reached a value of less than a million cubic feet per day and the month of February it had increased up to a value about two and a half million cubic feet per day, and for the month of March it reached almost three million cubic feet per day.

In summary, the gas production for the month of March, 1960 is materially less than the gas production immediately prior to unitization.

Q Is that one of the results that you desired to achieve by the operation of this project?

A Yes, that's one of the manifestations, shall we say, of benefits that have accrued to date by unitized operations.

Q Go ahead.

A The next curve is the average gas-oil ratio. That curve is reflected by a solid circled dots connected by dashed lines and the scale associated with that curve is found on the left-hand side of the graph near the bottom with the scales reading from zero, one, two and three MCF per barrel. It's apparent operation prior to unitization revealed a consistently increasing value of produced gas-oil ratio reaching a value of approximately 2300 cubic feet per barrel at the time of unitization, and since unitization this gas-oil ratio has consistently declined and the value for the month of March, 1960 has reached a value of approximately 800 cubic feet per barrel.

This gas-oil ratio declined since unitization as a direct benefit that we are all acquainted with, and as a result of our unitized pressure maintenance operation. The next curve of importance is near the top of the exhibit and let's consider first the volumetric average bottom hole pressure. This data is identified with open square symbols connected by dashed lines and the scale associated with this data is on the right-hand side of the exhibit near the top.

Values reading from 800, 900, 1,000, 1100 and 1200 and represents the volumetric average bottom hole pressure for the reservoir.

You will notice immediately before unitization for the month of June we had a reservoir pressure of approximately 813 pounds. It remained rather consistent for several months and then the trend in reservoir pressure increased and that increase in pressure reached a value of approximately 1,040 pounds for the month of March, 1960. The increase in reservoir pressure, you see another manifestation of the benefits that are occurring by our present unitized operations.

The last curve on the exhibit identified as "Injected Products Per Reservoir Voidage Ratio" is identified by open circles connected by solid lines and the corresponding scale is found on the left-hand side of the exhibit near the top. Those values read from zero, one, two, three and four. Now, the units of this curve injected products per reservoir voidage means the degree in which we are replacing the reservoir voidage and all injected products are converted to reservoir volumes, that is all of the gas injected, all the water injected, all of the LPG injected is converted to reservoir volumes in barrels.

The reservoir voidage is identified as converting all of the produced stock tank oil, all the produced gas and all the produced water to reservoir barrels, thus the ratio of the injected products to the produced products is a reflection of our degree of replacement of reservoir voidage and you will notice for the months of July, August, September and October we approximated an injection

volume equivalent to that produced from the reservoir.

For the month of November, December, and the following months we have overinjected, that is we have injected more material than we have produced, and that is compatible with the increasing trend in reservoir pressure. It's interesting to note that for the month of January we injected slightly more than four times the volume that we produced. That is in part due to the fact that the withdrawals were restricted due to being shut down for approximately two months. For two weeks.

Q Two weeks during January?

A Two weeks during January. Now, the decreasing rate of injection compared to voidage will continue and we hope to stabilize at an injection rate approximately equal to the production rate.

In summary, this performance graph reveals that we have experienced a rise in reservoir pressure, we have experienced a decrease in producing gas-oil ratio, and we have restored the productivity of the reservoir to values upwards to what they were before unitization and, in fact, those values experienced early in the production history of the field.

Q Then Exhibit 2 reflects that thus far at least we have accomplished, or we are in the process of accomplishing what we set out to do at the time of unitization?

A That is exactly right.

Q Mr. Brinkley, will you please refer now to Exhibit No. 3 and point out what we are trying to reflect by this exhibit?

A Exhibit No. 3 is identical to Exhibit No. 1 except we have shown for the 10 LPG injection wells the location of the LPG, or the positions of the LPG. You will notice that the size of the pink coloring on Exhibit 3 is much larger than the pink coloring on Exhibit No. 1. You will notice further that this pink coloring in many wells is concentric to the location of the well. In other words, the position of the LPG is circular and concentric with the well.

You will notice too that in some of the other LPG injection well areas the LPG position is not circular, but eliptical, and in some cases is not concentric with the well. The object of LPG flooding in the Central Bisti Unit is to maintain the position of the LPG circular that would reflect good practices and good sweep, good displacement and maximum recovery.

When the pink coloring becomes elongated or eliptical, it is our objective then to straighten up position and make it circular to improve the sweep efficiencies and displace more oil and adhere to conservation practices.

We have been using such a plan to control our field operations by running monthly calculations, sometimes more frequent, than monthly calculations to see how these LPG fronts are growing.. If they are circular we maintain the production from the oil wells to

continue the expanding LPG front in its displacement process. When the circle becomes eliptical we attempt to straighten it out by changing the withdrawal rate or reducing the withdrawal rate, whichever the case may be, to cause an adjustment of the eliptical position to a more circular position. These circles represent the flood fronts to the date March 1, 1960.

Q Now then, Mr. Brinkley, this points up the fact that rather than setting an allowable on an individual well the operator needs the flexibility as was granted in Order No. 1636 to produce the wells in order to balance out these patterns, is that right?

A That is correct.

Q The criteria that you use in balancing out these patterns is not done on a well basis, is it?

A We have some five items that we use in order to make such an interpretation as I have explained on Exhibit No. 3. Those five items that we feel are significant are as follows: The first thing we need is the individual voidage value, that is, we need to know the quantity of oil produced, the quantity of gas and any water, if it is produced.

The second most important thing we need to know is the injection volumes of LPG and gas. The third is the well bore pressure. Fourth, pore volumes around the producing wells and injection wells, and five, the displacement efficiency around the producing wells.

Q Our method of calculating these circles is not unique with us. It's been used successfully other places and we even used it in this field in the pilot project, didn't we?

A That is correct.

Q The results of that bore out that this is a pretty good way to follow the LPG pattern?

A We think so, yes.

Q You are also making similar calculations for the gas and the water injection wells?

A That is correct.

Q In order to maintain the shape of your injection fronts, you need to produce your wells on a good engineering basis, is that right?

A That is very vital.

Q You need to fluctuate those rates from time to time, perhaps several times during a month even?

A That is correct.

Q Mr. Brinkley, there are several criteria by which the results of your injection program can be evaluated, aren't there?

A That is correct.

Q Would you please refer to Exhibit No. 4 and discuss one of these criteria?

A Exhibit No. 4 represents our method of illustrating increases in reservoir pressure in individual wells. You notice

in the legend the red circles stand for those wells that we have arrested the pressure decline and reversed it and the well has experienced an increase in well bore pressure. The green color is used to identify the wells that have continued to experience a pressure decline. The blue color represents those wells where we have arrested the pressure decline and the pressure has remained about the same as it was at the time of the unitization.

Let's consider the minority wells first. We have one well, Well No. 46 colored in green which reveals it has continued to decline, a pressure decline with unit operation. All other wells, either of a blue color where the pressure decline was arrested or a red color where the pressure was reversed and the well has experienced a pressure increase. This reflects reservoir continuity for one thing. It also reflects that 50 of the 51 oil wells have received a benefit from pressure due to the pressure maintenance operation.

Q Would you now please refer to Exhibit No. 5 which illustrates another basis on which this project can be evaluated?

A Exhibit No. 5 is a companion to Exhibit No. 4. Here we are illustrating the benefit in gas-oil ratio by unitized operation. Again, the red color reflects wells that have displayed a decrease in producing gas-oil ratios. In other words, we have reversed the previous trend of increase in gas-oil ratio and now those wells are experiencing decreasing ratios.

The green reflects the wells that have continued to experience increase in gas-oil ratios and the blue represents those wells that the ratios, the increasing trend in ratios has been arrested and have remained rather consistent with what they were at the time of unitization. Again we find two wells No. 31 and 51 whose ratios are continuing to increase. Well No. 51, although it is displaying an increasing trend in gas-oil ratios, the maximum ratio we have is approximately a thousand cubic feet per barrel. It is not serious.

Well No. 31 has continued to experience increasing gas-oil ratio trends. However, you'll notice it's offset by two gas injection wells and one LPG injection well. That data may suggest gas channeling. In any event, again we substantiate reservoir continuity and we have at least 49 wells out of the total 51 that have experienced a benefit by unitized operation.

Q Now then, Mr. Brinkley, will you please refer to Sunray's Exhibit No. 6, which illustrates still a third method for evaluating this project?

A Exhibit No. 6 is the third companion exhibit that reflects benefit by pressure maintenance operation. Here the red colors identify those wells that have experienced a production capacity increase. Green identifies those wells that have continued to display decreasing production capacities, and blue represents those wells whose capacity decline has been arrested and remain

approximately the same as of the time of unitization.

Again, taking the most inferior wells, we find three wells that have continued to display a decline in production capacity, Well No. 45, Well No. 3 and Well No. 5, You will notice that Well No. 45 is a diagonal offset to one of our water injection wells. We have also detected water breakthrough and we feel suggests the reason for the continued decline into No. 45. Well No. 5 is also a diagonal offset to the present water injection well and that No. 5 well is one of the old oil wells in the old LPG pilot area. We feel that it has continued to decline because we haven't restored that well to its maximum benefit by virtue of the water flooding in that area.

Well No. 3 we feel is truly a well that has not benefited by production capacity increase and has followed the decreasing trend in production capacity. Here again reflects continuity of reservoir and we have at least 48 out of the 51 wells that have shown benefit due to our pressure maintenance type operation.

Q Mr. Brinkley, the well labeled Val R. Reese and Associates, Hickman, is shown as a gas injection well. That's in the Section 32. Is that still on production at this time?

A That well is still on production.

Q It is scheduled for gas injection?

A Yes, we have completed the necessary arrangements to convert the well and it will be converted to a gas injection well

some time in the near future.

Q Mr. Brinkley, Well No. 3 is offset on, you might say each side, by wells which have either increased the production capacity or they are, the production capacity has been maintained, is that right?

A That is correct.

Q What is the story on the Hickman well?

A The Hickman No. 1 well, which is an offset to the Well No. 3 which has continued its private decline, the Hickman well has shown an increase in productivity.

Q A slight increase?

A A slight increase in productivity.

Q Essentially then by all three of the criteria that we have illustrated here, essentially all of our wells have been affected by one way or the other?

A That is correct.

Q Thus far would you say that we have pretty much of a text book example of how one of these projects should operate?

A I think so.

Q Mr. Brinkley, would you now refer to Exhibit No.7 and point out what we're trying to illustrate by that?

A Exhibit No. 7 is entitled "Well Tests In Effect At Time of Unitization, Central Bisti Unit". You'll notice we have identified in two columns the well numbers and we have also

identified the oil production based on these tests and expressed in barrels per day and the total is 2389 barrels per day.

Q Mr. Brinkley, these tests were based on what we took off the oil proration schedule in July of 1959, are they not?

A That is correct.

Q They do not reflect the wells which were converted for injection service?

A That is correct.

Q Would you refer to Exhibit No. 2 and state what the production was for June and July of '59?

A For the month of June, Exhibit 2 reflects a production just slightly less than 3,000 barrels per day and for the month of July, 1959, it was approximately 1200 barrels a day.

Q This exhibit is merely an attempt to illustrate approximately what the productivity was at the time of unitization?

A That is correct.

Q Would you now refer to Exhibit No. 8 and discuss that briefly?

A Exhibit No. 8 is entitled "December, 1959 Capacity Well Tests, Central Bisti Unit". Again, we have identified the well numbers and the capacity test for December, '59 in barrels per day. From these tests the total is 4,943 barrels per day.

Q Indicating an increase over the previous tests in July, or whenever that test had been made, on the proration schedule?

A That is correct.

Q Now, then, Mr. Brinkley, will you refer to Sunray's Exhibit No. 9 and state what that reflects?

A Exhibit No. 9 is entitled "Current Capacity Well Tests, Central Bisti Unit". Again, we have shown the individual well numbers and the current test production in barrels per day, which reflects a total productivity of 7981 barrels per day.

Q Mr. Brinkley, based on the information you have, do you believe that the productivity of this unit will continue to increase?

A We expect it to increase.

Q Would you now refer to Exhibit No. 10 and point out by the major categories what this reflects?

A Exhibit No. 10 is entitled "Gross Expenditure Analyses for the Central Bisti Unit", and at the bottom of the exhibit we show a total gross expenditure of $3,334,240. Now, this total is made up of three major categories and each of these categories represent expenditures necessary for unitized operations that would not be necessary for continued natural depletion competitive type operations.

In the first category is identified as LPG and gas injection. The second category are the water barriers. The last category is oil gathering and lease facilities.

Q You have attempted in this schedule to eliminate things

which would not have been, or work, which would not have been done if it had not been unitized?

A That is correct.

Q You will admit that there are some of them here that people can question whether they should have been included or not and possibly some eliminated that should have been included, is that right?

A That is right.

MR. PORTER: The hearing will recess until one-thirty.

(Whereupon a recess was taken.)

AFTERNOON SESSION

DIRECT EXAMINATION of
MR. BRINKLEY Continued.

MR. PORTER: The hearing will come to order, please. Mr. Loar, will you continue with your direct examination, please?

MR. LOAR: I have already put a copy of the Exhibit 11 on the Commission's desk.

Q (By Mr. Loar) Mr. Brinkley, would you please refer to Exhibit No. 11 and very briefly point out what we're trying to illustrate there?

A Exhibit No. 11 is entitled "Operating Expense Analysis, First Six Months, 1959, Sunray Wells Before Unitization Versus Central Bisti Unit Area After July 1, 1959". You will notice the exhibit is broken into two parts, the upper portion and the lower portion. The upper portion includes the first six months for 1959

representing Sunray Mid-Continent operating expense analysis for their two leases consisting of 24 oil wells in the Central Bisti Unit Area, and it reflects an operating cost per well month to vary from minimum of $195.00 to a maximum of $397.00, and this same data, based on a barrel of oil basis reflects a minimum of eight cents per barrel and a maximum of sixteen cents per barrel. We contract this data with the lower portion of the exhibit, namely from July 1, 1959 through March, 1960.

Q July 1 being the date we started the secondary recovery.

A It's the activation of the unit where we started our pressure maintenance operations.

Q Mr. Brinkley, at this point, the first portion, January through June of 1959, Sunray was injecting produced gas on their leases, were they not?

A That is correct.

Q They were also participating in the LPG pilot project, were they not?

A That is correct.

Q Are all the costs tieable to that removed from the first six months of '59?

A That is true.

Q All right.

A From the data for July 1, 1959 to March, 1960, representing the unitized operations, reflects that the operating cost on a

well month basis varies from a minimum of $353.00 to a maximum of $1875.00 per month. On a barrel of oil basis the minimum is forty-three cents per barrel and a maximum of $2.82 per barrel.

In summary, it reflects that unit operations are more expensive than the competitive operations from the two leases as shown on this exhibit.

Q By that you mean unit operations with the type of project we are conducting here?

A That is correct.

Q Now, Mr. Brinkley, as our production increases we would anticipate that this per barrel cost will decline?

A We think so.

Q Is that right? A Yes, sir.

Q Now then, Mr. Brinkley, in August of 1957, several of the operators started the LPG pilot project in the Northwest corner of the unit, is that right?

A That is correct.

Q In December of 1958 Sunray started injecting the produced gas on its Federal C Lease into which well?

A At that time the well that we were returning gas to was the Federal C-18, which is No. GI16 on our current exhibits.

Q Now then, what type of rule did the Commission issue for that operation?

A This rule consisted of several parts, the significant

parts might be summarized as follows: The area was restricted to our C Lease.

Q We had not undertaken any unitization at that time?

A That is correct. And the allowable was the summation of the individual well allowables, including the shut in wells. There was a provision for transfer of allowable and allowables may be produced from any well as long as that well that received the transfer did not produce at a rate greater than twice the top allowable.

Q Now, Mr. Brinkley, was that provision put in in order to protect the correlative rights of the operators offsetting this project?

A That is my understanding, yes.

Q All right.

A Of course, for a well to qualify we needed the test production capacity and that feature required certain testing procedure and we had a limiting gas-oil ratio of 2,000 to 1 permitting a net gas-oil ratio type operation, and we provided certain monthly reports to the Conservation Commission for their records.

Q Was that a good rule for the project that Sunray Mid-Continent was operating at that time?

A It was a good rule for that project, yes.

Q Was the project we were conducting relatively inexpensive?

A Yes, sir.

Q Would you say that it was accomplishing the same measure of conservation that we are accomplishing about our present project?

A No, sir.

Q Now then, Mr. Brinkley, your Exhibits 4, 5, 6 and 7, 8 and 9, demonstrated, or we hoped they demonstrated, that throughout the unit area we have affected the productivity, the ratios and the reservoir as a whole within the unit area, have we not?

A That was the intent of the exhibit, yes, sir.

Q Are you familiar with the water flood rule of the State of New Mexico?

A Yes, sir.

Q And that's a state-wide rule, is that right?

A Yes, sir.

Q Well, there is a provision in 2-E which I would like to read one sentence, if I may. "If, after notice and hearing, it has been established that desirable units referring to normal proration units that are not directly or diagonally offset of wells completed thereon which have experienced a substantial response to water injection, the Commission may consider them for the water flood allowable".

Do you believe that all 72 wells in this project have received some measure of stimulation or been affected in some way by this project?

A Yes, sir.

Q If that's true, what allowable would this project be entitled to?

A Well, utilizing the present water flood rules, if we were operating under water flood rules where each normal unit allowable would be 52 barrels per day, and transfer privileges from the injection wells, et cetera, we would have a total unit allowable of 6240 barrels per day.

Q Mr. Brinkley, would that, in view of the fact that the 52 barrels is a fixed amount, would that allowable be subject to market demand?

A No, sir.

Q In your opinion will the present operation which we are conducting in the Central Bisti Unit afford a greater recovery and a greater conservation measure than stripper water flooding?

A Yes, sir.

Q Mr. Brinkley, would you refer to Exhibit No. 12 and point out what that reflects?

A Exhibit No. 12 is entitled "Calculated Unit Allowable, Central Bisti Unit". This exhibit consists of two pages, first page lists the well numbers and the acres in the proration unit and the normal unit well allowable based on March, April and May well tests expressed in barrels of oil per day. The second page lists the injection wells, their acres, and the allowable available to transfer based on well tests. The summation of the first page

reveals that the oil wells have a producing well allowable of 2,865 barrels per day.

Q Mr. Brinkley, I would like to interrupt at that point. Now, that includes also GI 13 and GI 12, does it not?

A That is correct. Those two wells are listed in the first column of the first page. The transfer allowable is 1484 barrels per day for a total unit allowable of 4349 barrels per day.

Q Now, the 1484 is the 1604 on page 2 less what GI 12 and 13 have available?

A That is correct.

Q Also, Mr. Brinkley, in all of these allowable calculations have you included the Val Reese well?

A No, sir.

Q So in that case you would have a total of 73 wells and whatever that well would test at the time of conversion?

A That is correct.

Q Under the present rules is the project allowable tied to individual well tests?

A Yes.

Q And as the project progresses the productivity on the overall picture for the immediate future, the productivity of the wells in the unit will increase, will it not?

A Right.

Q Then as the project further progresses, well, the

productivity of some of the wells will decline?

A That is correct.

Q Now, this is particularly true as the LPG and the gas and the water fronts reach the producing wells, is it not?

A That is true.

Q Under the present rules where the individual well tests currently determine the allowable in order to maintain sufficient allowable to economically operate this project, will it be necessary to consider at what point the affected well should be shut in in order to maintain allowable?

A Yes, it absolutely will.

Q Will these wells that are shut in, would they still have some producible hydrocarbons?

A Yes.

Q Could the effect of trying to apply this rule in order to receive the largest allowable affect the sweep pattern inversely?

A Yes, sir, it sure will.

Q Then the operator, by the operation of the type of rule that we now have, would have to consider the alternatives of economics versus waste in order to determine whether or not to shut a well in?

A That is very true.

Q Is that one of the reasons in your request that you will

ask for a unit allowable tied to something other than individual well tests?

A That is true.

Q Now then, Mr. Brinkley, prior to June and July of 1959, was the plan of operation presented to the Oil Conservation Commission, the Land Commission and the U.S.G.S. and the working interest owners in this unit?

A Yes, it was.

Q In that plan of operation did the operators outline the wells to be converted, the wells to be drilled, the type of project, the economics and the production from this unit?

A That is very true.

Q Were all of these based on a 5,000 barrel per day figure?

A Yes, sir.

Q Was this plan an operation approved by all parties concerned as part of an approving of the unit itself?

A Yes, sir.

Q Is Sunray Mid-Continent and the other operators, other working interest owners in this unit, prepared to operate under a fixed allowable of 5,000 barrels per day?

A Yes, sir.

Q We have stated that in our past hearings, have we not?

A That is true.

Q Based on a premise that the Commission desires to tie

units such as this to market demand, have you prepared some rules?

A Yes, I have.

Q This is an attempt to take the existing rules of the State of New Mexico and subject this unit to the market demand fluctuations that might occur?

A Yes, sir.

Q Would you briefly summarize what has been handed to you as Exhibit No. 13?

A Exhibit No. 13 is entitled "Special Rules and Regulations for Sunray Mid-Continent Oil Company's Central Bisti LPG-Gas-Water Injection Project". These rules consist of ten in toto. The first rule defines the project area of the Central Bisti Unit. Rule No. 2 defines the project allowable. Rule No. 3 provides --

Q Rule No. 2 is tied to what the Commission will establish as the normal unit allowable in Northwest New Mexico, is it not?

A That is correct.

Q And also reflects the 80-acre proration units of which this unit has several?

A That is correct. Rule No. 3 provides for transfer of allowable from injection wells. Rule No. 4 states the project allowable may be produced from any well or wells in the project area in any proportion.

Q Now then, Mr. Brinkley, I believe you've testified that on the East side and the West side of this area we have established

what we hope is an effective water barrier between our operation and other operators in the pool, have we not?

A That is correct.

Q And everything within the unit area is unitized so that all parties participate?

A That is correct.

Q With this in mind, would there be any correlative rights problem within the unit area or any of the boundaries?

A No, sir.

Q Then there's no need to have the limitation which was back in the original gas injection rules for this unit, is there?

A That is correct.

Q And that was removed by the Commission in their Order 1636, was it not?

A That is correct.

Q All right, please proceed.

A Rule No. 5 provides a procedure for converting producing wells and drilling additional wells. Rule No. 6 --

Q Mr. Brinkley, I'll have to interrupt one more time. The Commission, in Rule 1636, granted a provision that if an injection well was drilled and completed and never produced provided a method for determining the allowable, did it not?

A That is correct.

Q I have neglected to put that in Rule 5, haven't I?

A That is correct.

Q You would like to have that provision incorporated in these rules, would you not?

A Yes, that would be a necessary part of Rule 5. Rule No. 6 describes the net gas-oil ratio feature and includes the Commission formula for calculating the daily adjusted oil allowable.

Q This is the same net gas-oil ratio rule that's been used throughout this several series of rules affecting this pool, is it not?

A Exactly. Rule 7 provides credit for daily average net water injected.

Q And Rule 7 is a direct take from the Rule 1336 which was issued in March for this project?

A That is correct. Rules 8, 9 and 10 briefly permit admission of the previous parts of the rule.

Q Now then, Mr. Brinkley, these rules would provide that the Commission would continue to be furnished individual well tests, individual well information so they can follow it on an individual well basis, would they not?

A That is correct.

Q Now, the $64,000 question, what allowable would these rules provide under the present 60 barrel, we didn't amend it to include 61, the normal unit allowable for the month of May.

A I'm assuming that you are permitted to transfer the full

normal unit allowable for each injection well.

Q Based on the rules you are presenting here.

A That would give a normal unit allowable of 7,200 barrels per day.

Q Would 4920 barrels of this be attributed to the producing wells?

A Yes, sir.

Q And 2280 barrels would be attributable to the injection wells?

A That is correct.

Q Mr. Brinkley, in view of the type of operation here and the fact that this is a unitized project, will there be any adverse effect on correlative rights?

A No, sir.

Q Do you believe that this type of rule, which provides a fixed yardstick for all wells in the project, and will prevent waste and permit the efficient operation of this project?

A Yes, sir.

MR. LOAR: That's all the direct we have of Mr. Brinkley.

MR. PORTER: Anyone have a question of Mr. Brinkley?

MR. PAYNE: Yes, sir.

MR. PORTER: Mr. Payne.

CROSS EXAMINATION

BY MR. PAYNE:

Q Mr. Brinkley, how much additional oil do you anticipate recovering from this pool due to your pressure maintenance project?

A We think that the best oil will be approximately the same as we would have achieved by natural depletion. In other words, we will get a hundred percent more oil.

Q Will the value of that oil amount to as much as or more than $3,334,000?

A Yes, sir.

Q But I take it that your position is that pressure maintenance people need more incentive in order to expend large sums of money in order to go into such a project as this?

A Well, incentive is one facet to the problem. Certainly that is an important part, but I think probably of more importance, or equal importance I should say, is the, oh, the simplicity of admission, shall we say, and the ability to define the unit allowable rather than the method that we presently have.

Q As I understand it, the rules that you propose here today are identical with the rules that you proposed at the previous hearing?

A Yes.

Q And the crux of it is that the injection well and the producing well should both be assigned top unit allowable?

A Yes, sir.

Q If the Commission decided to assign either injection

wells or producing wells to that unit allowable regardless of the producing wells' ability to produce or the injection wells' ability to produce prior to conversion, if you had your choice between one or the other of those two being assigned top unit allowable, which would you take?

A I may have missed a fine point on your question.

Q Well, right now neither one of them get top unit allowable unless they are capable of making it or were capable of making it at the time of conversion.

A That is correct.

Q You want top unit allowable for both?

A Yes.

Q Assuming the Commission decided to give you top unit allowable for one or the other, either the producing wells or the injection wells, which do you think would be the most feasible and the most equitable?

A Well, that has many facets. If I have to give a choice right now without running through the various ramifications and combinations, I would choose the oil wells.

Q The producing wells? A Yes.

Q Isn't it true, though, Mr. Brinkley, that in many cases an operator will institute what is called a pressure maintenance project which embraces a large extent of acreage and yet he may only have three or four injection wells?

A That has been done in the past, yes.

Q And so that such an alternative as you are taking here would allow all the producing wells to get top unit allowable regardless of their producing ability even though they might be far removed from an injection well?

A Right.

Q So if we're looking at this case as a matter of precedent, wouldn't it seem to be more feasible and equitable to assign the injection well top unit allowable?

A Well, that is a very interesting point. I deeply appreciate your position on that. It's one of the many facets of defining the unit allowable. Maybe I can help by suggesting one item. Although we can define a top unit allowable for the Central Bisti Unit or any other unit and that value might be a high figure, and in order to tie it to a market demand you would want to modify that figure, well, then, there's no reason why the top unit allowable couldn't be multiplied by some factor.

Q Well, now, Mr. Brinkley, if each one of your injection wells was assigned top unit allowable and the producing wells were only assigned the allowable based on the ability to produce up to top unit allowable, what project allowable would you come up with here? Would it be 5145 barrels?

A I wonder --

MR. LOAR: For my benefit would you mind restating that

so I can also figure it?

Q If all injection wells were assigned top unit allowable, as of the present time 60 barrels, the allowable assigned to the producing wells remained the same as it is under the existing rules, what would the allowable for the project be?

MR. LOAR: Mr. Porter, in the interest of time may I suggest a couple of points here to Mr. Brinkley that might get this answer?

MR. PORTER: Sure, go ahead.

REDIRECT EXAMINATION

BY MR. LOAR:

Q Referring to your calculations as to what the present rules would give you, don't you have 21 injection wells at the present time with a 2280 allowable based on normal unit allowable?

A That is correct.

Q And then referring to Exhibit No. 12, you show 2865 as your normal unit allowable, I'm sorry, four producing wells restricted to capacity or normal unit allowable, whichever is the lesser?

A No, sir, that should be 2745 because you included two injection wells.

Q You have taken the step that I have taken next. Would the additional figures give you the answer, Mr. Payne is looking for?

A That's what I have, I'm waiting on him.

MR. LOAR: Go ahead, and he's waiting on you.

MR. PORTER: Did you say 21 injection wells?

(Whereupon a discussion was held off the record.)

A I have these figures.

RECROSS EXAMINATION

BY MR. PAYNE:

Q All right.

A Considering that each of the injection wells receive their top unit allowable, which amounts to 2280 barrels per day, and considering that the oil wells produce under test capacities, which amounts to 2745 barrels per day, gives a total unit allowable of 5,025 barrels per day.

Q All right, now, as I understand your testimony, it is that your project here is tied or proposed to be tied and operated on a 5,000 a day basis?

A That is correct.

Q So that in the absence of any decline in normal unit allowables in Northwest New Mexico, this would be sufficient allowable?

A If we experience no declines, yes, sir.

Q Isn't it also true, Mr. Brinkley, that the producing wells will rise in their producing ability as they receive the response from the injection?

A They will fluctuate, yes, sir.

Q But generally speaking, until you reach the peak they are going to be going up, aren't they?

A As you recall, we have several displacement processes going on in the reservoir. We have gas injection, water injection and LPG injection and the correlation, shall we say, or coordination of rising and peaking out and declining, we will find during parts of this history that some of the wells will be declining while others continue to increase. So it is rather awkward to say that we will continually receive a rise and then peak out because of this relative distribution, shall I say.

Q But thus far at least every well I believe you testified has received some benefit from your injection project?

A Right.

Q I assume that that benefit means that the producing ability of them has either increased or has not declined?

A Well, I think we pointed out --

Q Except for two or three wells?

A Yes, that is correct.

Q Now, under your proposed rule, the unit allowable would be 7,200 barrels?

A That is correct.

Q If this were water flood it would get 6240?

A That is correct.

Q Now, do you believe, Mr. Brinkley, that a pressure maintenance project should be assigned a greater allowable than a water flood project, and if so, why?

A Well, I'm not saying that it should get a greater allowable than water flood projects because the process of operation, the reservoir mechanics is the same, essentially the same, we will displace oil by another fluid, a modification as to what goes on in the reservoir, but the physical mechanism and so forth is the same.

Q Generally speaking, would you say that it's true that there's more risk involved in initiating a water flood project than in a pressure maintenance project?

A In past history there is more risk in LPG flooding than there is in water flooding due to the general acceptance in industry and water flooding you might say has proven itself whereas the LPG flooding is still in the development stage, shall we say, and there is a high risk factor in LPG flooding.

Q Of course, in this LPG flood you operated a very small pilot until you had established to your satisfaction it would be successful, didn't you?

A That is correct.

Q I take it Sunray would have no opposition to a rule which provided that the project would be assigned 5,000 barrels a day regardless of allowable in the Northwest?

A Are you referring to a unit allowable?

Q Yes.

A A flat unit allowable, of 5,000 barrels a day?

Q Yes, sir. A No objection.

Q So even if you have a unit allowable of 7,200 barrels per day, you only propose to produce 5,000?

A Will you repeat your question?

Q So that even if this project should receive a unit allowable in the amount of 7,200 barrels per day, nonetheless you would produce it at 5,000 barrels a day, or thereabouts?

A No. No. We suggested that the allowable be tied to market demand.

Q Yes, but you don't want your production to go under 5,000 do you?

A Well, if we tie to market demand and if the market demand requires that the allowable be reduced below the 5,000, we will abide by it.

Q But we're going up now? A Yes.

Q We'll say your allowable is considerably more than 5,000, what are you going to produce then?

A We will produce the allowable.

Q You will produce the 7,200 barrels?

A We can make modifications with our present equipment and enlarge facilities to provide for that.

Q So that while this is tied to 5,000 barrels now, should you receive a considerably higher allowable than that, you will manage to change your equipment in such a way as to produce it?

A We will consider that alternative, yes, sir.

MR. PAYNE: Thank you.

MR. PORTER: As I understand your testimony is that you don't plan to produce above 5,000 barrels a day, but you would like to have the opportunity in case you do?

A Yes, sir.

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

BY MR. NUTTER:

Q Mr. Brinkley, I notice in your direct testimony that you placed rather heavy emphasis on the necessity to change the producing rates of the various wells from time to time during the month?

A Yes.

Q In order to control the shape of the LPG sweep?

A Yes.

Q And other reasons? A Yes, sir.

Q The present existing rule does afford you that opportunity, doesn't it?

A The present rules do afford us that opportunity.

Q You also mentioned that in the event you had a well that on account of high gas-oil ratio or for some other reason should be

shut in, the operator would have to make a choice between economics and possible waste by having to produce the well?

A That is correct.

Q Do the rules that are presently in effect afford you the opportunity to make a wise decision there?

A No, sir.

Q Rule No. 3 of the present rules provides that allowables for 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 are shut in for any of the following reasons: Pressure regulation, control of pattern or sweep efficiencies or to observe changes in pressures or changes in the characteristics of reservoir liquids or progress of sweep?

A Right.

Q Why can't you make a decision to shut a well in and transfer your allowable under that rule?

A Well, what you say is very very true, but I wonder if we did that, wouldn't an operator be prone to shut a well in while the capacity was high to take advantage of the allowable?

Q Well, I think it would be wise to if he could foresee that some damage was going to occur in the reservoir if he didn't shut it in.

A That is very true. I would like to make this one statement, however, and that is an operator would be faced with a choice of maintaining his allowable or improving the oil recovery. Now, in order to maintain the allowable at a high value, the present field rules would encourage an operator to shut in remote wells while their capacities are high. Now, if those remote wells, or any well, is shut in while the capacity is high, that will prevent the completion of the sweep efficiency in that area. We will gain the increased allowable at the expense of continuing the displacement in that area, and those hydrocarbons will be not produced until blowdown occurs and hence we feel that waste will occur.

Q Well now, Mr. Brinkley, if you foresaw that waste was going to occur by producing a well from top allowable down to a marginal status so that you could, or if you saw that waste was going to occur as a result of producing the well too long, wouldn't you go ahead and shut the well in while it's still a top allowable well?

A Well, the waste doesn't occur if we continue the well and displacing the oil, but if we did that --

Q How is waste going to occur if you don't produce the oil but would occur if you did produce the oil?

A I'm sorry, I was thinking about something else.

MR. PORTER: I don't believe you have allowed the witness to complete his answer.

A This is a pretty important point, I believe with the present field rules we are tied to the well capacity tests. Now, in order to maintain our allowables high, a company would favor shutting in wells while their capacities are high in order to gain the advantage of the higher allowable. Now, when those wells are shut in, that means the displacement process around those wells ceases and hence the oil is not produced and will not be produced until we start blowdown operations, which would permit a lesser efficient recovery.

Now, if we take the other extreme that we continue producing each oil well at its capacity and continue recovering the higher oil, prevent the waste, then we are handicapped by declining allowables which materially affect the economics of LPG flooding. We must make a decision on economics versus waste.

Q Well now, Mr. Brinkley, on your Exhibit No. 3 you show the eliptical pattern of the LPG --

A Yes.

Q -- sweep. Now, for instance, it appears that GI 6-L has an eliptical pattern in a Southwesterly direction towards that No. 19 well. Now, it's in the interest of obtaining a round pattern for the sweep to curtail the production of No. 19, is it not?

A Well, that would be one approach to the problem. We have an alternate choice. We could also increase the withdrawal from No. 8 and also from No. 7 and No. 18 to go the other way and

still end up with a circular position of the LPG.

Q Yes, sir, but now it appears that this pattern at the present time is moving in a Southwesterly direction.

A This I recollect.

Q Now, the allowable for No. 19 well at the present time is probably high, is it not?

A I will have to look for my records if you want me to do that.

Q No. 19 does carry a top allowable of 120 barrels at this present time according to Exhibit 12. If you curtailed No. 19 well or shut it in at the present time you would be transferring a high allowable to another well, wouldn't you?

A That is correct, right.

Q Which would be in accordance with the provisions of Rule No. 3 of the present rules. You would get full benefit for curtailing production of that well?

A That is right.

Q I notice that some of the wells, particularly in the Southern part of the project andalong the Southwest flank of the pool, carry marginal allowables at this present time.

A That's right.

Q Were any of those wells marginal wells upon initial completion, do you know?

A Many of those wells were inferior compared to the Fairway

wells. As a matter of fact, I think we have testified earlier that the wells on the isopack map of less than 10 feet were all inferior compared to the wells completed in isopack thickness greater than ten feet.

Q So some of these wells weren't capable of making top allowable for the pool even when they were originally completed, is that true?

A That is possible.

Q But your proposal would assign top allowable to those wells?

A Right.

Q Which have never been capable of making it?

A That is correct.

Q Mr. Brinkley, I think in your direct testimony you stated that the unit at the present time is producing more oil than it was at the time the unit was first formed, is that correct?

A That is correct.

Q It's also producing considerable amount of oil in excess of what the normal decline would have been to this present time, is it not?

A Well, I don't know the meaning of the word considerably in excess, but it is producing more than had we stroplated the normal decline and compared that value today with what the unit is producing today.

Q Would it be unreasonable on Exhibit No. 2 to project a decline to approximately 2500 barrels at this present time had no pressure maintenance project been instituted?

A No, that is not unreasonable.

Q And it is producing 3500 at the present time?

A Yes.

Q So a thousand barrels a day more than it would have been making?

A That is correct.

Q Your Exhibits 4, 5 and 6-- A Yes, sir.

Q --give us some comparisons of the pressures, the gas-oil ratios, and production capacity and some of them it has increased, some decreased and some stayed about the same. What interval of time do the exhibits cover?

A From the date of unitization to the present time.

Q That would be from July to the present?

A Yes.

Q Mr. Brinkley, on Exhibit No. 10, in which you have itemized the gross expenditures for the operation of the project, the sum total here is about three and one-third million dollars. A large percentage of that three and one-third million dollars is for the purchase of LPG, is that correct?

A Almost two-thirds of it.

Q Well, now, you will recover this LPG we presume, do you

agree?

A We hope so.

Q You anticipate that you will?

A We anticipate recovering LPG, the precise amount we are not sure since this is a new recovery method, and we have no field history to compare with.

Q You are not injecting LPG at this present time in any wells, are you?

A No, sir.

Q All of the wells on the various exhibits shown as LPG wells are now gas injection wells?

A That is correct.

Q Now, on Exhibit No. 11, Mr. Brinkley, I note that the average operating cost of a well in June of 1959 was $397.00 and then in July it jumped up to $1875?

A Yes, sir.

Q When the unit was formed? A Yes, sir.

Q Is that increase of $1500 entirely attributable to the fact that it was a well in a unit?

A Well, I might state this, I went through our accounting records and to the best of my ability lifted out the operating costs consistent with what I testified to, and there is a normal lead or lag in these items and there might be some adjustment in here that would modify these values a little bit, but it does

reflect that the total amount of money that we allocated for operating expenses for the month of July for the 65 wells amounted to $1875 per well a month, yes, sir.

Q Your heading here says these are operating costs less the injection expenses?

A Right.

Q Do they include such expenses as converting wells to injection?

A Yes.

Q And drilling new wells. Are any new wells amortized in this?

A Wait a minute, let me get my list out. There seems to be a conflict internally.

Q Exhibit No. 11 is the one I'm referring to.

A Yes. These values do not include the costs of drilling and completing. It does include the remedial work. Now, many of these wells were opened up into the second and third bench where before they were completed only in the first bench, but to specifically answer your question, it does not include the drilling and completing but it does include the remedial work.

Q I see.

A I have some, oh, fifteen or twenty items that we in our accounting procedure allocate to operating expenses, and they are separate and divorced from the Exhibit 10 items which are commonly

more in the investment.

Q Then the items in Exhibits 10 and 11 in some ways reflect the same information. One is not operating costs and the other one the cost of developing the unit for pressure maintenance.

A I believe you can refer to operating costs or listing costs, lease operating cost and the other more in the investment items possibly.

Q Exhibit 11, while it is operating costs, does include some investment in the wells, however, such as perforating and opening up new benches and so forth?

A Those aren't investment items, those are expense. At least we carry them in the expense analysis.

Q We can't exactly take Exhibit 11 and say this is the cost of operating a unit?

A Yes, that's exactly what it is. That's what it's costing us to operate. These figures were taken directly from our lease operating expense book. I'll be happy to read these items off.

Q No, I don't think it's necessary. However, the point I'm trying to make, this isn't all unit overhead, it includes remedial work, it includes opening up new zones in wells which have never been opened previously and items such as that?

A It's the normal operating expense items and does not include overhead. I don't have any figures for district overhead,

or Tulsa overhead or division overhead. It's only the lease operating expense analysis. What it costs us to lift the oil out of the ground.

Q And these costs would be high if this work was being done whether it was in a unit or not?

A Yes.

Q Is that correct? A Yes.

MR. NUTTER: I believe that's all, Mr. Brinkley, thank you.

MR. PORTER: Mr. Payne.

BY MR. PAYNE:

Q Mr. Brinkley, what Sunray is proposing here is identical to what two operators proposed in the water flood hearing and the Commission in the case of water floods at least felt that was too high. Do you have any particular reason why you feel this type of allowable should be assigned to a pressure maintenance project when it was felt that it was too high in a water flood project?

A I'm assuming you are thinking of the 7200 barrels per day allowable.

Q Well, actually, what you have proposed is that all wells producing and injection receive top unit allowable even though they aren't on a tract directly offsetting an injection well?

A Right.

Q Since they have received some kind of response?

A Right.

Q What I'm saying is that identical rule was proposed by two companies in a water flood hearing. Presumably the Commission felt it was too high so they came out with another rule. Now, I'm wondering if you have any reason that you could give me why you think it's not too high in a pressure maintenance project.

A Well, as I have stated before, we are prepared to produce at 5,000 barrel per day and we are also want to be tied to market demand and we will have to make a decision whether the additional investment to move the allowable up or cut it back as the market demand might dictate.

Q Well, would you prefer, Mr. Brinkley, to produce this project at 5,000 barrels, period?

A We will be happy at 5,000 barrels per day unit allowable.

Q However, if the allowable goes up you might also go up with your production over 5,000?

A We would have to consider the alternatives, the economics of additional expenditure for equipment, et cetera, and as we do in all of our operations.

MR. PAYNE: Thank you.

BY MR. PORTER:

Q You figure your ultimate recovery would be as great with a 5,000 barrel a day allowable as it would if you were allowed the 72 or exercised the option in case you were giving it at,

producing at 7200?

A We think it would be the same.

Q Would be the same? A Yes, sir.

MR. PORTER: Mr. Nutter.

BY MR. NUTTER:

Q Mr. Brinkley, assuming that you had the allowable at 7200 barrels and also assuming that there are 51 producing wells, an average producing well allowable is 141 barrels per day would be somewhere in the ball park, would it not?

A Right.

Q Is Sunray operating any pressure maintenance project anywhere at an equivalent depth of this one where the average allowable for the producing wells is 141 barrels per day?

MR. PAYNE: In a prorated state?

Q In a prorated state.

A Well, the answer to your question is yes.

Q What is the number of wells on the project?

A Well, now, I don't have that detailed information with me, but I'll be happy to assemble it and send it back to you. I might mention this, that our Cycle G projects fall in that category and many of them are deeper than this and I'm satisfied and confident that we can provide you with the information.

Q I meant wells as shallow as this, not deeper.

A As shallow as this, I am satisfied that we do.

Q Yes. A Yes, sir.

Q Under the current rules you have an allowable of 4349 barrels, is that correct?

A Yes, sir.

Q And at the present time your desired rate of operation is 5,000 barrels. Now, you do have some wells that are continuing to increase in their producing capability, have you not?

A Right.

Q Do you think that this project area within a period of 90 days will be capable of being assigned an allowable of 5,000 barrels per day under this existing rule?

A I'm satisfied that that is very true. Our suggestion is that the present rules are not satisfactory for future operation because of this waste or the decision that we will have to make of economics continuing a high allowable, but shutting wells in early or continuing displacement and then suffering the component decision of cutting back on our allowable.

Q Yes. Right now at 4345 you are 651 barrels away from the desired 5,000, correct?

A Yes.

Q And your proposal would permit an allowable of 7200 barrels?

A Yes.

Q Which comes closer to the desired 5,000, the 7200 or

the 4349?

A The former, the 4349.

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

BY MR. UTZ:

Q Mr. Brinkley, I note that you have very few injection wells in the Southeast part of this unit. Do you intend to drill any more injection wells in that area?

A I prefer to answer it this way, we don't want to leave it a closed door that we won't drill injection wells down there because we learn things from month to month and year to year and Bisti being of unusual nature, shall we say, why there's a possibility that we may want to modify this plan of operation.

Q If you don't drill any injection wells in say Section 16, do you think you'll recover more oil than you would from primary?

A With our present method of operation?

Q Yes. A Yes, sir.

Q Do you feel that the injection wells that are considerable distance away will help to produce oil out of that area?

A Yes, yes, sir.

Q Referring to your Exhibit 10 again, besides the LPG which Mr. Nutter inquired about, is there other items on that list that you will be able to recover certain amounts of value from such as the gas injected or the salvage value of equipment?

A Of course, Exhibit No. 10 does not include gas purchase. That's at the top of the exhibit.

Q I see, okay, well any other items?

A Yes, we do have salvageable value for many of these items. Of course, when we abandon the reservoir some time why we will salvage some of the casing and the other equipment that's attached to the well, of course, our injection lines will be salvageable and we've discussed the LPG purchase, separators will be salvageable, some of this test equipment might have some salvageable value, actually the salvageable value on most of the physical property will be rather small.

Q Then actually your net expenditure will be substantially less than the 3.3 million dollars?

A It will be less than that. I don't know how much.

Q Referring to your Exhibit No. 11, particularly your cost per barrel column, from July '59 through March, '60, that was a period when you on your own volition reduced your takes from this unit, was it not?

A Yes, sir.

Q So that would account to a great extent to the high cost per barrel, wouldn't it?

A I'll put it this way, if we had produced twice as much barrels as we had here with no additional expense, thence the lifting costs dollars per barrel would be half what this exhibit

reflects.

Q Yes. And your production during that period ranged anywhere from 500 barrels up to 3500, is that about right?

A Correct, yes, sir.

Q I note in July your cost per barrel was $282 and you produced approximately 1200 barrels and in December it was $119 and you produced approximately 1200 barrels. The additional cost in July could be attributed to workovers and things of that nature?

A It's due to the heavy activity we had during that month to get the unit into operation, whereas in December all that work had been done and hence although we had a reduction in, and of course not as much work done in December, the lifting cost was approximately half that for July.

MR. UTZ: I believe that's all.

MR. PORTER: Anyone else have a question of Mr. Brinkley? Do you have any more, Mr. Loar?

REDIRECT EXAMINATION

BY MR. LOAR:

Q Mr. Brinkley, in response to Mr. Payne's first question I believe it was we have modified these rules to include a Rule 7 which was not presented at the Examiner Hearing of February 25, haven't we? You said these were identical, they do include that additional rule?

A Oh, yes, that is true.

Q Now, Mr. Payne proposed a hypothetical question of two or three injection wells on an area this size and what the allowables would be. Actually the Commission has a chance to regulate these projects and determine the validity of this type of project, do they not?

A That is correct.

Q Our big problem, or one of our big problems is not during the time of increasing productivity is it, Mr. Brinkley?

A That is correct.

Q Isn't our big problem going to come in admission of this as some of the wells, as the LPG front hits them or the water front or the gas injection begins to hit them?

A That's correct.

Q Now, I believe Mr. Nutter referred to Exhibit No. 3 and he discussed shutting in 19, rather than perhaps some method of operation you had been conducting, in order to stabilize your LPG circle. Don't you have to consider the injection into GI 16, GI 15, the injection into the LPG GI 5-L and all of those factors?

A Oh, yes.

Q Isn't that the reason you requested the flexibility that we now partially have?

A That is true, very true.

Q Now, then, if you shut in GI 19, I am sorry, if you shut in producing well 19 as was suggested, aren't you back to the

problem of perhaps distorting your sweep and perhaps having an inefficient operation in that area?

A Precisely.

Q In referring to your Exhibits No. 10 and 11, the investment costs and the operating costs, aren't Sunray's books pretty well scrutinized by Internal Revenue Service and must not these be kept in accordance with current practices?

A Yes, sir.

MR. LOAR: I believe that's all.

MR. PORTER: Anyone else have a question? The witness may be excused.

(Witness excused.)

MR. PORTER: You didn't offer your exhibits.

MR. LOAR: No, at this time if no objection, we would like to offer Sunray's Exhibits 1 through 13.

MR. PORTER: Without objection the exhibits will be admitted. Does anyone have any further testimony to offer in this case?

MR. MEECH: Thomas Meech, appearing on behalf of Amerada Petroleum Corporation, in association with Jason Kellahin. Amerada supports this application, and as one of the owners of the working interest in the unit, we request that the application be granted.

MR. PORTER: Anyone else have a statement? Mr. Spann.

MR. SPANN: Charles C. Spann of Grantham, Spann and

Sanchez, Albuquerque, New Mexico. First, I would like to enter an appearance for El Paso Natural Gas Products Company who concur in the application, and we urge that it be granted, and secondly I would like to enter an appearance for Phillips Petroleum Company and Mr. Pete Nicola of that company has a statement to make for Phillips.

MR. NICOLA: Phillips Petroleum Company is a part owner of the unit under discussion today. We recognize the Commission has adopted a water flood rule which restricts water flood allowables to wells offsetting input wells. We also recognize that the Commission by its action on the prior hearing in this matter is seeking to restrict pressure maintenance operations through the allowables which would accrue to the same wells as if no injection were being carried on. Phillips Petroleum Company believes that both actions are unduly and unnecessarily restrictive.

Unless the Commission grants somewhat more liberal allowables, operators will have little incentive to undertake other projects of similar character in the State of New Mexico. It is noted that oil production in Northwest New Mexico is being held below demand to reduce waste of gas. The Central Bisti-Lower Gallup Sand Unit is not wasting gas, but rather is an operation of experimental character which seeks to produce oil in a most efficient manner and to recover a greater percent of the oil in place. The operation

is costly. It may show the way for large future increases in New Mexico oil production.

The Commission should therefore do everything reasonable to help this project to be an economic success. Phillips Petroleum Company strongly urges that the application of Sunray Mid-Continent for increased allowable be approved.

MR. PORTER: Mr. Selinger.

MR. SELINGER: If the Commission please, George W. Selinger, representing Skelly Oil Company. We have no interest in the Central Bisti Unit. We have interest in units being formed now, secondary recovery in the Bisti Field itself. We urge the Commission's approval of the application on file here and as presented by Sunray Mid-Continent.

MR. PORTER: Does anyone else have a statement to make in this case? The Commission will take the case under advisement and take up next Case 1893.

STATE OF NEW MEXICO)
: SS
COUNTY OF BERNALILLO)

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

IN WITNESS WHEREOF I have affixed my hand and notarial seal this 25th day of May, 1960.

Ada Dearnley
Notary Public - Court Reporter

My commission expires:

June 19, 1963.