



have one witness.

MR. UTZ: Any other appearances in this case?

(Witness sworn.)

THOMAS 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 Thomas W. Brinkley, chief reservoir engineer Sunray at Tulsa.

Q Have you testified before this Commission previously in that capacity?

A Yes, sir.

Q Were your qualifications accepted at that time?

A Yes.

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

MR. UTZ: Yes, sir.

Q (By Mr. Loar) Mr. Brinkley, throughout the history of the Bisti Pool, have you continued to make reservoir studies of this Pool?

A Yes, I have.

Q Have you watched carefully the progress of the L.P.G. gas, water injection project in the Central Bisti unit?

A Yes, I have.

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Q Has it performed in the way you originally predicted?

A I'm pleased to say that the unit performance is excellent, and as we have expected.

Q Would you please refer to what has been marked Exhibit number 1 and discuss that briefly.

A Exhibit number 1 is entitled "1959 Reservoir Performance Data." You will notice on the bottom we have the time schedule for the year 1959, and on the vertical side, both left and right, we have various scales that correspond to the graphs on the Exhibit. You'll notice we have five graphs, two near the top and three near the bottom portion of the Exhibit. The upper graph represents the injected products per reservoir voidage ratio. Now, that, basically, is the ratio of injected reservoir volumes of gas L.P.G. and water divided by the reservoir production of gas, oil, and water, both units being on reservoir barrels. You'll notice that the first month of unit operation being July, that we had an injected production reservoir voidage reservoir ratio of approximately one, that first trial for the month of July with the scale on the right-hand side near the top. Notice for the month of August we had slightly exceeded the voidage with injected material. For the month of September and October, we approximated a replacement of reservoir voidage; however, for the month of November and December, we have exceeded the withdrawals by over-injecting material, as an example,

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the month of December. The value of this ratio is 1.65, which means we have injected 1.65 reservoir barrels of material, gas, water, or L.P.G. per barrel of reservoir voidage.

The second curve from the top represents the volumetric average reservoir pressure in pounds per square inch gauge. You'll notice the first point which is eight hundred and fifteen pounds, have to refer to the scale on the left, eight hundred fifteen pounds represents the reservoir pressure before unit operations. You'll also notice for the months of October, November, and December we have experienced increase in reservoir pressure and the value for December is approximately nine hundred pounds. You'll notice a compatibility between the upper curve and the volumetric average bottom hole pressure. In the lower portion of your Exhibit, you'll notice a heavy line representing the monthly oil production rate. You'll notice, too, that just before unitization, we were averaging approximately eighty-five thousand barrels per month, refer to the scale on the left-hand side. Now, for the months July, August, September, October, November and December, representing the first six months of unit operation, we have averaged approximately forty thousand barrels per month. This value represents a self-imposed allowable at a reduced rate to permit the injection of L.P.G. with its accompanying increase in reservoir pressure.

The next important curve is the average gas-oil ratio. It, too, is a solid line in the lower portion of the Exhibit.

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You'll notice in the month of January, we had initial ratio of approximately twelve hundred cubic feet per barrel. The scale is on your right near the base. And for each month thereafter, through the month of July, we noticed a continuously increasing trend in gas-oil ratio values reaching a maximum in July of twenty-eight hundred fifty cubic feet per barrel. Thereafter, ratios have consistently declined month after month, and the December value is just slightly over a thousand cubic feet per barrel.

The last curve is the monthly gas production, which is self-explanatory. It is sympathetic with the oil production and the gas-oil ratio.

In summary, these items, that is, rise in reservoir pressure and reduction in gas-oil ratio represent a conservation practice that has resulted in improved productivity from the unit wells and represent the expected early performance for this pressure maintenance project.

Q Now then, Mr. Brinkley, under the present Regulations and Rules now in effect for this project, is the operator required to test and establish a rate of production for each injection well prior to the transfer of allowable and use of that allowable transfer?

A That is correct.

Q What is the location of GI-18?

A The unit well GI-18 is an L.P.G. injection well, and



it is located in the Southwest of the Southwest Section 9, 25 North, and 12 West.

Q Was this well over-produced prior to its use as an injection well?

A No, it was not.

Q Why not?

A GI Number 18 was drilled for injection of L.P.G. and represents one of the ten L.P.G. injection patterns. The completion plan specified for no oil production, no fracturing, and injection was planned to start as soon as possible to maintain injection schedule for unit operations.

Q Then, you never got a test of this well which could be used for allowable transfer purposes?

A That is correct.

Q Have you checked the eight offsets to this well to determine the rate of production at the time GI-18 was completed?

A Yes, I have.

Q Would you give us the average of those eight wells at that time?

A The eight wells directly offsetting GI Number 18, and for the month of October, 1959, the same month that GI-18 was completed, revealed production rates varying from a minimum of fifteen barrels per day to a maximum of fifty-five barrels per day. Now, within this range, two wells--number 27 and 29--represent newly drilled wells completed also in the month of



October, and their respective producing rates on completion are twenty-seven and twenty-one barrels per day. With this data for the eight direct offset wells for GI Number 18, the average, the arithmetic producing average is twenty-eight barrels per well day.

Q Do you recommend that this twenty-eight barrels per day be the amount credited to GI-18 to be available for transfer under the present Rules?

A Yes, I feel that this value of twenty-eight barrels per day well is a representative and reasonable for transfer and is recommended.

Q Now then, Mr. Brinkley, during what period of time did Sunray Mid-Continent inject L.P.G.?

A Initial injection of L.P.G. began on June the 23rd, 1959, and continued to December 15, 1959, during which time we injected nine hundred thirty-seven thousand barrels of commercial L.P.G.

MR. UTZ: What date in December?

A 15.

Q (By Mr. Loar) Now then, what volume of gas has Sunray injected into the project?

A Since unitization began, we have injected a total of five hundred and sixty-five thousand seven hundred and nine m.c.f. to the end of January, 1960.

Q And what is the approximate rate of gas injection



now?

A Currently we are injecting at the rate of approximately eight million cubic feet per day.

Q And are we also, we are also injecting water here, aren't we?

A That is correct.

Q And do you have a figure of the rate of injection on that?

A For the month of January, we were injecting at the rate of approximately thirty-five hundred barrels of water per day.

Q Now then, has all of this injection under this Lower Gallup reservoir brought about an increase in productivity?

A Yes, it has.

Q Does Sunray as unit operator have a continual testing program going on in the Central Bisti unit?

A That is correct.

Q And do we find that the productivity increases and varies between these tests?

A We have detected a continuous increase in productivity from almost every well since we started unit operation.

Q Now then, in order to make this project work, are we attempting to keep the production from each individual injection pattern in balance?

A This is very true. I would like to supplement that



with this: That voidage replacement calculations are being performed every month or oftener since start of unit operations. These calculations are necessary to maintain more than minimum admissibility pressure, as well as balances between patterns, as well as for unit total area.

Q And within area in which we notice rapid changes of productivity and changes in gas-oil ratios, these calculations are made more often than once a month, are they not?

A That is correct.

Q As productivity and gas-oil ratios change, is it necessary to change the producing rate of the wells within the injection rate and between the injection patterns?

A It is. Yes, it is necessary to adjust individual producing rates to provide operating flexibility. This is vital to operating any pressure maintenance type of operation.

Q Under the Rules which we are operating with each individual well being given a specific allowable, is it difficult to maintain the necessary flexibility and to be able to change these rates as frequently as necessary?

A It will be rather accurate and, possibly, impossible to operate with the present field Rules.

Q Do you recommend that the present Rules be changed to give the necessary operating flexibility which you desire?

A Yes, I so.

Q Would you refer to what has been marked as Exhibit



Number 2, and briefly go through the Rules, or the suggested Rules, which we are requesting for this operation?

A Exhibit Number 2 is entitled, "Special Rules and Regulations for Sunray Mid-Continent Oil Company's Central Bisti L.P.G. Gas-Water Injection Project." This Exhibit sets forth a list of nine Rules that are proposed and would be adequate, say, for proper operation of the Central Bisti unit. The proposed Rule 1 describes the unit boundary, and it is the same Rule as currently recognized as the existing Rule Number 1.

Rule Number 2. The first sentence is identical to the existing Rule 2. We have added the second sentence which gives each forty acre and eighty acre tract its current normal unit allowable.

Rule 3 is identical to the existing Rule 3.

The proposed Rule 4 is identical to the existing Rule 4, except the limitation of twice the normal allowable was deleted.

Rule 5. The proposed Rule 5 is identical to the existing Rule 5, except the first sentence was deleted because we are requesting a current normal allowable for each proration unit.

And existing Rules 6, 7 and 8 we are deleting since we propose current unit allowable for each proration unit. The proposed Rule 6 is identical to existing Rule 9, except for minor changes in words in first sentence to reflect the total unit allowable.

Proposed Rule 7 is the same as existing Rule 10, except

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it provides for unit allowable in conjunction with this proposed Rule 7.

Sunray does propose to submit an operator's monthly report for information showing results of tests such as gas-oil ratio, bottom hole pressure, and productivity of the wells.

Q At the present time, you are taking these tests, and this information is available on anywhere from monthly test to a weekly test, are they not?

A That is correct.

Q And for at least the initial stages of the project, you propose to continue to take this type of information on at least a monthly basis, do you not?

A That is correct.

Q All right, sir.

A The proposed Rule Number 8 is the same as existing Rule Number 11.

The proposed Rule Number 9, the last, is the same as existing Rule Number 12.

Q In your opinion, do the Rule changes as recommended by you in Exhibit Number 2, give the operator the necessary flexibility for an efficient operation during the pressure maintenance project?

A That is correct.

Q Were Exhibits 1 and 2 prepared by you or under your supervision?



A They were.

MR. LOAR: We move the admission of Exhibits 1, 2 and 3.

MR. UTZ: Without objection, they will be accepted.

MR. LOAR: That's all the direct testimony we have.

MR. UTZ: Any questions of the witness?

MR. NUTTER:: Yes, sir.

MR. UTZ: Mr. Nutten.

#### CROSS-EXAMINATION

BY MR. NUTTER:

Q Mr. Brinkley, your ratio on injection to production has varied considerably since July through December?

A Right.

Q From less than one to one point sixty-five?

A Right.

Q What do you consider is the ideal ratio?

A The ideal ratio, once we get the pressure in the reservoir above the minimum admissibility pressure, will be one.

Q What is the minimum admissibility pressure?

A Eleven hundred eighty pounds.

Q So, from this pressure you took in December, you still have two hundred eighty pounds to go before you reach that pressure?

A It's not that simple. This second curve on Exhibit 1 is the volumetric average reservoir pressure for the entire unit. Now, the admissibility pressure that we need to maintain



applies only within the ten five spots where we have injected L.P.G.

Q And the pressure in there is probably higher than this average of nine hundred?

A Oh, yes. Close to fourteen hundred pounds.

Q I see. So, do you believe that in some places, then, in the unit area that your injection ratio, after you've achieved these minimum admissibility pressures, your ratio of injection to voidage will be less than one, and in other places in the unit, it will still exceed one?

A It is conceivable that it will vary throughout the unit, but for a unit as a whole, it will be one, or slightly more than that.

Q Now, in order to bring this one point sixty-five to one, what do you expect to do? Reduce the amount of injection, or to increase the rate of production?

A Increase the rate of production.

Q Is that anticipated in the near future?

A Yes.

Q What will the ultimate rate of production be in order to maintain your current rate of injection, or do you intend to maintain the current rate of injection?

A I prefer to answer it this way: We anticipate producing five thousand barrels of stock tank oil per day along with its associated gas, and we will balance that voidage with



the necessary gas and water to maintain prudent operations.

Q In other words, your rate of production is fixed, and the rate of injection will be balanced against the rate of production?

A Correct.

Q To get your injection-production ratio?

A Right. I might state that in order to reach that balance, we buy extraneous gas to make up the difference between that gas that is available after processing so that we can maintain a, shall we say, a steady stabilization.

Q Well now, Mr. Brinkly, oh, first, getting to this GI Number 18 well--

A Yes.

Q --could you give me the individual offsetting wells production rates during October?

A Yes.

Q I think you stated that Number 27 had an initial rate of production during October of twenty-seven, and number twenty-nine, twenty-one barrels. What was 28?

A 28 was thirty-seven. 34 was twenty-two; 35 was twenty-eight; number 42 was eighteen; number 41 was fifteen; and number 40 was fifty-five. That's the total of two hundred twenty-three barrels per day with an arithmetic average of twenty-eight.

Q Then you suggest that twenty-eight be the allowable for GI-18?



A That would be the transfer allowable, as accepted as being reasonable and representative at the date it was completed.

Q Well, now, do your proposed Rules contemplate to receive an allowable of eighteen?

A Our proposed Rules are in effect requesting a full forty acre normal current allowable for that well.

Q So, the twenty-eight that you've recommended would be the allowable under the existing Rules as they are today?

A Under the existing Rules, correct.

Q Now, Mr. Brinkley, you said that you felt that the amendment of the existing Rules to conform with your suggested Rules here today would afford you additional flexibility in the operation of this unit?

A Correct.

Q You've omitted Rule 6, Rule 7, and Rule 8 from the existing Rules. Would you tell us how you expect to achieve additional flexibility by the omission of those three Rules?

A Well, our Rule 6, 7---The existing Rule 6, 7, and 8, as I mentioned, were deleted since we propose and request a current unit allowable, normal unit allowable, for each proration unit. And with an allowable like that, then we are in a position to assign allowables, and withdraw from the oil wells surrounding these ten L.P.G. injection wells so that we can maintain a uniform movement of L.P.G. and accomplish the displacement consis-

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tent with conservation practices for a pressure maintenance type unit such as we have here at Bisti.

Q Well now, Mr. Brinkley, Rule 6 and Rule 7 specifically apply to the manner in which the allowable is assigned to a well which is used for injection. How does the manner in which the well is used, the allowable of, and injection well affect the flexibility that you have to operate the project?

A It does not contribute to the flexibility of operation, but it does contribute to the total allowable by adding the allowable of the injection well. And, as I mentioned earlier, the five thousand barrels per day that we anticipate, we would have an allowable, if I can say that, much in excess of the five thousand barrels per day, but it does not affect flexibility, as I say, because we would have a greater allowable than we would produce.

Q Under the existing Rules, including Rules 6 and 7, what is the calculated allowable for this current month for this unit, assuming that we were to assign twenty-eight barrels to GI-18?

A Assuming that we have a forty acre proration unit allowable of sixty barrels, and hundred and twenty barrels per day for an eighty acre proration unit, we would have a total of sixty-five hundred and eleven barrels per day adding the transferred allowable.

MR. LOAR: Mr. Brinkley, I think there was some misunder-

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standing. Are you asking under the existing Rules or proposed Rules?

MR. NUTTER: Under existing Rules, assuming a forty acre allowable of sixty barrels, and an injection allowable equal to the ability of the well to produce at the time of conversion.

MR. LOAR: I think Mr. Brinkley's answer is based on the proposed Rule rather than the existing Rule?

A This number sixty-five eleven would give us an allowable of sixty-five hundred and eleven, if we achieve the total proration unit allowable for each of the forty and eighty acre proration units. Now, let's see if I have a number for the existing Rules. I don't have that, Bill.

MR. PORTER: Mr. Brinkley, as I understand it, this sixty-five hundred and eleven would be under your proposed Rules?

A It would be under the proposed Rules with this exception, that we are taking credit for a transfer allowable under the existing rules.

MR. PORTER: I see.

Q (By Mr. Nuttér:) What do you mean there, Mr. Brinkley?

A The total unit allowable that I mentioned of sixty-five hundred eleven barrels per day is incorporating the proposed Rules allocating a full normal allowable for each proration unit, and adding to that the transfer allowable from the injection wells with the existing Rules.



Q I see. In other words, you are assuming a normal unit allowable for each producing tract?

A Right.

Q And, you are adding the injection wells' allowable which is computed under the existing Rule?

A Exactly.

Q And that comes to sixty-five hundred?

A Right.

Q Now, are you assuming twenty-eight barrels for the GI-18 in that, or did you assign any allowable for 18?

A I didn't assign anything for GI-18.

Q So it would be a total of sixty-five thirty-nine?

A That is correct.

Q Now, under your proposed Rules, how much allowable would you have assigned to the project, assuming your proposal that the injection well would receive a current normal unit allowable if located upon a normal eighty acre tract?

A Seventy-three hundred twenty barrels per day.

Q Which would appear to be considerably in excess of the desired rate of production for the unit at any time?

A It is in excess of our current thinking as far as the five thousand barrels per day is concerned, yes.

Q Mr. Brinkley, do you think that the existing Rule which provides that an injection well would receive its rate of production at the time it was converted over is an incentive to



an operator to convert a well early in its life more than to wait until the well is depleted and has a lesser allowable which could be transferred?

A No. I think that is a rather impracticable approach in my opinion. I say that using Bisti as an example. I see no opportunity of any prudent operator taking faster steps in developing field procedures leading to unitization than we have done in Bisti, and the record reflects that our injection wells that we have picked, very few of them are top allowable transfers and a great majority of them are only on fraction of the top allowable, and I think it is rather impracticable and unreasonable to expect an operator encouraged with such an argument.

Q You say you see no opportunity for an operator to take faster action; there is an opportunity for an operator to take slower action?

A Right.

Q Then, if the operator takes slower action and waits for a year or two years from now to institute a pressure maintenance in the Bisti Field, were to receive the same allowable as you would receive, then there is no incentive for you to proceed on a faster scale than he would, is there?

A Other than the fact that L.P.G. flooding requires fast action, and it was not the transfer of allowable per day that we were after, but the opportunity to apply an L.P.G. flood and adhere to the conservation practices. If we had waited

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another year, we wouldn't have a project under my conditions.

Q For L.P.G.?

A For L.P.G, yes, and that's what is our driving force, to get an L.P.G. going here. If we waited another year, we wouldn't have an opportunity with any kind of an allowable on an input well.

Q Another year wouldn't be too late to institute the water pressure maintenance program?

A Right. Another year, two years, five years, that is correct.

Q Well, your proposal here is actually based on the premise that an injection tract would receive top unit allowable for the pool regardless of the ability of that tract to produce at any time during its life as a producing tract, is that correct? Even though the tract had been developed originally with a marginal well, if the marginal well were converted to injection later on in the life of the field, it would receive top unit allowable?

A That is correct.

Q Despite the fact that perhaps it never could produce top allowable?

A That is correct.

Q Mr. Brinkley, Rule 7 of the existing Rules provides that a well shall receive an allowable, this referring to transfer wells, a well shall receive an allowable equal to its ability

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to produce on a specified test, but that in no event would the well receive an allowable greater than its ability to produce, or greater than top unit allowable for the pool at the time the test was conducted, or greater than the current top unit allowable for the pool during the month of transfer. Could the elimination of any one of those three items afford you greater opportunity to operate your pressure maintenance project?

A Not as far as flexibility is concerned; only an increased allowable.

Q Flexibility, in other words, is not a consideration here?

A No, sir.

Q Well, increased-- The question of increased allowable becomes mute, does it not, when you plan to produce five thousand barrels and your allowable, as calculated under this Rule, would come to seventy-five thirty-nine?

A That is true with the current situation that we have. We have no idea what the future situation might be. We also experience changes, and what not, and if the production demand for this part of the country increases, why, it would afford us an equitable position in the demand picture.

Q Production demand wouldn't have to increase for you to have a fair share of the existing market, would it, Mr. Brinkley?

A Not necessarily.



Q Under your proposed rate of production?

A That's right. That was one example that I gave you. Also, there are benefits, but they are not greater, spend as much money as we have at Bisti, that if proper and equitable credit is not given to an injection well, why, that minimizes, or tends to detract in the operator's eyes the advantages of spending this money toward secondary application. In other words, if the allowable is not given to an input well, the normal proration unit allowable is not given to an input well, and we have to adhere to the present Rules, which we can transfer consistent with its producing rate, then that injection well is penalized as the benefits occur.

Q This participation in total production is not penalized?

A It is penalized if the injection well is always depressed to a low producing capacity and it is never given an opportunity to be upgraded as the benefits accrue to pressure maintenance type operations. We have pointed out the increase in productivity of numerous oil wells, yet there is no benefit accruing by virtue of the injection wells.

Q Well now, in the participation formula for this unit, you don't consider what the allowable of an injection well is for the operator to share in the production from the unit, do you?

A We do to the extent that it fixes the top allowable.

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Q In other words, it is the rate of return that affects various operators?

A That's right.

Q But the total production from the unit isn't affected, is it?

A The ultimate recovery isn't affected, but certainly the rate of recovery and the rate at which we pay out our investment and achieve an earning capacity on that investment is certainly affected by the unit allowable.

MR. UTZ: That is the reason you say that an injection well is penalized?

A Right.

MR. UTZ: It is not penalized from the fact that you change?

A It is not penalized in a change in ultimate recovery, but it is penalized in earning capacity.

Q (By Mr. Nutter:) The earning capacity does not come from the injection well, from the producing well?

A The injection well is affected by the producing well.

Q Only by rate?

A Only by rate.

MR. NUTTER: That's all, Mr. Brinkley.

BY MR. UTZ:

Q Mr. Brinkley, under your proposed Rule, what do you



figure would be the maximum rate of production from any well?

A I don't know. I can't answer that at this time. I might state this: We are in the process of calculating optimum producing rates from each well making up a ten five spots where the L.P.G. flood is so that we can maintain uniform advancement of L.P.G. slug at all times, and maintain a balance between adjacent five spot patters. I will admit I have not answered your question. I don't know what that answer is yet, and I wouldn't know until we complete these calculations, and the calculations have not been needed until we increase the producing rate, and in the past we have maintained this self-imposed restricted rate and have not needed that information, but all this while, we are gaining more and more test data and continuing our calculations, and that data will be available at some time in the future.

Q What is the normal eighty acre allowable for this present month in the Bisti? One hundred twenty barrels?

A I've used one hundred twenty barrels per eighty acre proration unit.

MR. LOAR: That's the March figure.

Q (By Mr. Utz) Do you anticipate it will be necessary for you to produce at two hundred forty barrels from any well?

A That might be a very good figure. I would hesitate to be tied down to it at this time. I do know some of the wells will be producing less than the normal allowable, and some will



be producing more in respect of two hundred. Two hundred forty barrels might ultimately be a pretty good figure, but I will leave that open until we complete our calculation.

Q Let's assume it would be two hundred forty barrels that you would want to transfer to some wells on the edge of the unit. How would that affect--well, let's look at Sections 12 and 15, and I can't see the Section number on the Section in the middle. What would it be?

A Section 12.

MR. LOAR: 10 is the Section north of Section 15.

Q (By Mr. Utz) Yes, 10. Looking at that area specifically, if you were to transfer as much as two hundred forty barrels to some of those edge wells, how would the correlative rights be protected from your offset to the east?

A I'm not sure that I follow what area you are talking about.

Q Well, if you were to transfer and produce-- Well, let's pick out a well in Section 12. I believe it is your Well Number 2 in the Northeast.

A That's Well Number 12.

MR. LOAR: That's Section 12.

A In Section 12.

Q Section 3.

A Section 3, I beg your pardon.

Q If you were to transfer as much as two hundred and



forty barrels to Well Number 12, how would that affect the Murchison Well Number 3 insofar as recovering its reserve?

A Well, our transfer of allowable does not include using unit Well Number 12. If we could produce unit 12 at two hundred forty barrels a day, it would upset the correlative rights, of course.

Q But, your Rule gives you that opportunity, your proposed Rule, does not it?

A Right.

MR. PORTER: What does the existing Rule give you? How much allowable would it give you for that well?

A Let's see--

MR. LOAR: Rule 4, Mr. Brinkley.

A Gives it two times the normal allowable.

MR. PORTER: That would be the maximum?

A That would be the maximum, yes.

Q (By Mr. Utz) I don't believe that you ever did answer Mr. Nutter's question as to what the March current allowable would be for this unit, unit allowable?

A March current-- No, that was not answered.

Q Do you know what February's was?

A No, I don't.

MR. LOAR: We have not needed it, Mr. Utz, since we have been in January, twelve hundred fifty barrels, February we went to twenty-five hundred, and March we propose to go to thirty-

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seven fifty, but we have not needed to calculate the top because we have not gotten, approached to check it.

MR. PORTER: Mr. Brinkley, at one time in considering this, in a discussion, I believe, a figure was mentioned that approximated sixty-five hundred barrels with a fifty-three barrel allowable. Would you know whether or not that is approximately correct?

MR. UTZ: Are there any other questions of the witness?

MR. NUTTER: Yes, sir.

MR. PORTER: He is working on an answer, Mr. Utz.

MR. LOAR: Mr. Brinkley, it has to be done well by well. It can't be done.

A I appreciate that.

MR. PORTER: It won't be necessary to answer my question. I just thought you might have it in mind, Mr. Brinkley.

A Yes, I think as far as I can tell that is the order of magnitude.

MR. PORTER: Thank you.

MR. UTZ: Any other questions?

BY MR. FLINT:

Q Mr. Brinkley, do you have any knowledge as to the agreement of the pipeline company serving this unit to taking the oil under your proposed Rule where there is no per well top? Would there be any problem as to their ascertaining whether they were taking--



A I'm not acquainted with that contract.

MR. LOAR: I've investigated that.

MR. FLINT: It might be good to have something in the record.

MR. LOAR: We have checked with our pipeline company, excuse me, purchaser that is taking oil from this unit. We have only one purchaser taking oil from this unit, and they have advised that they will be able, that this will create no problem. Does that answer your question?

MR. FLINT: Mr. Loar, in this unit you are operating an L.A.C.T. system, are you not?

MR. LOAR: Yes, since approximately the middle of January. There is one tank battery for the entire unit.

MR. FLINT: Do you feel that there will be any problem if this were not the case?

MR. LOAR: No, sir. As a matter of fact, from checking back, we do not believe that there will be any problem if there are more than one purchaser. We operate a number of units, in fact, we participate in a number of units, and some of them have four and five purchasers and pipe line company operating out of two, three and four tank batteries, and the unit operator assumes the responsibility of seeing that the unit allowable is not exceeded, and it is worked very satisfactorily in every instance in which we have had any connection.

MR. FLINT: Would you feel, assuming that there were

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more than one purchaser, the problems would be the same under the present Rules as they would be under your proposed Rules with one purchaser?

MR. LOAR: Yes, sir, because somebody would have to allocate to the individual pipeline company the amount of oil that they were entitled to take under the present month's allowable, and each month would be a different figure, depending on the commitments that the pipeline company had for the individual oil.

Q (By Mr. Flint) Mr. Brinkley, there wouldn't be any possibility under the proposed Rule for an allowable getting assigned to undrilled acreage, would there?

A No, sir.

Q Back to a line of questions that Mr. Nutter proposed to you earlier, as to the incentive to initiate pressure maintenance early in the life of the pool, is it your opinion that the engineering requirements on a pressure maintenance project of this type would require an early start regarding less of transfer of allowable?

A It does not require early start, but certainly encourages it.

Q I think you stated that there is a point when it would be too late to initiate this type of project?

A That is correct.

Q And this diminishes the importance to have--transferring the normal unit allowable rather than the actual ability



to produce?

A Right.

Q Your answer to that question would be true in case of water flood?

A To this extent: Water flood recovery is enhanced with early flooding, early in the life of the project as compared to waiting until you are in the final stages of the completion. It is a matter of degree, if I can make myself clear.

Q In other words, probably the only instance in which transferring normal unit allowable rather than the actual ability to produce would result in loss of ultimate recovery would be in the instance where an imprudent operator was operating in the field and was willing to delay initiating such a project?

A Are you speaking of water flooding?

Q No, I was thinking more in terms of the pressure maintenance project of the type that you are conducting.

A There would be no loss in ultimate recovery, but it would unfairly deprive the operation of the benefits that you would be entitled to by assigning a normal current allowable for the proration unit.

Q And under the proposed Rule, the unit, total unit allowable is tied to the current allowable at all times?

A Correct.

Q And, this would to some extent, compensate for the transferring of normal unit allowable rather than the actual



ability to produce?

A Correct.

MR. FLINT: That's all.

MR. UTZ: Mr. Brinkley, under the present Rules, you have all the unit allowable you need for this unit, do you not? Supposing that your desire was to produce five thousand barrels a day from the unit?

A That figure we searched for a minute ago.

MR. UTZ: Isn't this figure you gave us sixty-five thirty-nine calculated in accordance with the present Rules?

A No, sir, that's assigning a normal allowable for each proration unit, plus the transfer allowable from each injection well consistent with the present Rules. Now, the allowable on many of our wells is less than normal, so the sixty-five eleven that I gave you was assuming that each well had its normal allowable for each proration unit.

MR. NUTTER: I think I see what you mean, now, you were assigning top unit allowable to each producing well?

A For each proration well.

Q And assigning the allowable as calculated by the existing Rules for the transfer well?

A That's right.

Q And taking the sum of those two and come up with sixty-five thirty-nine?

A Right.

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Q You don't have the sum of the producing well and the transfer allowable for the existing wells?

A Not with me, and apparently have destroyed that sheet or lost it.

MR. LOAR: I can calculate it in about fifteen minutes. I can sit down and calculate it.

A We can calculate it.

MR. LOAR: Mr. Brinkley, these calculations and one additional reason is that as each well increases in productivity, under the present Rules, does your allowable increase? Is my question confusing to you?

A No, if I understand the Rules properly, we would have to go back and re-test each well and apply for an allowable and get a benefit in allowable, but each well has to sustain or demonstrate its ability to produce in order to accrue that allowable, and that prevents the very thing we are trying to achieve which is the flexibility of operation which you need in order to achieve the conservation ideals that are set up.

MR. LOAR: Mr. Nutter, didn't we select four or five wells at random which would demonstrate this increase in productivity over approximately two months period?

MR. NUTTER: Yes.

MR. LOAR: That might help the Examiner, too, one of the reasons we have not bothered to calculate this figure.

A Yes. I think you want the record to reflect



that you asked me and not Mr. Nutter the question.

MR. LOAR: Did I ask Mr. Nutter the question?

MR. PORTER: Maybe you should let him answer it.

MR. NUTTER: I don't recall calculating

A Let's take Well 35. Now, Well 35 is one of the direct offsets to GI-18.

MR. LOAR: Would you give the location on the map?

A The Southeast of the Southwest, Section 9, 25 North, and 12 West. In October, '59, that well had a productivity of twenty-eight barrels per day, the same well in December, two months later, had a productivity of sixty-five barrels per day. And in January, the productivity, January of 1960, had a productivity of one hundred fifty-two barrels per day.

Let's take Well Number 1 which is in the Southwest Southwest Section 31, 26 North, 12 West. In July, 1959, it had a productivity of twenty-nine barrels per day. In December of 1959, the productivity continued to decline, reaching twenty-three barrels per day, and in January, 1960, the productivity improved, reaching forty-three barrels per day.

Well Number 9, located in the Northeast of the Southeast of Section 5, 25 North, 12 West, in June, 1959, had a productivity of seventy-five barrels per day, and in December of '59, the productivity improved to ninety-eight barrels a day, and then, in February, 1960, the productivity reached one hundred eleven barrels per day. This does not mean that we have reached the top

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capacity of that well by any means.

MR. LOAR: You are getting credit for that volume of production under the present Rules, are you not?

A Yes, as long as it does not exceed the top allowable.

Well Number 26, which is located in the Northeast of the Southeast Section 9, 25 North, 12 West, in December had a productivity of twenty-three hundred seventy-six barrels per day, and in January, 1960, had a productivity of three hundred and forty-eight barrels per day.

Well Number 3, which is the last well that I have listed, which is Northeast Northeast Section 6, 25 North, and 12 West, in July of '59 had a productivity of twenty-eight barrels per day. In December, '59, productivity increased to thirty-two barrels per day, and in February, 1960, it had increased to forty-nine barrels per day.

But these figures that I have given you are, do not represent the balanced withdrawal figures that we need to produce from the wells to maintain uniform advancement of the L.P.G. slug achieving high displacement efficiency and adhering to our plan of operation and conversation practice. Each oil well will have to be produced at its own unique rate to maintain uniform advancement of the L.P.G. slug, otherwise, we will get bypassing in the reservoir and the slug will never sweep part of the pattern. So it is critical that we are permitted to have flexibility in producing the wells at a definite rate to control the

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advancement of L.P.G.

MR. NUTTER: In other words, your Rule 4 as proposed here would provide that, would it not?

A Exactly.

MR. NUTTER: So the deletion of the limitation that is included in the present Rule 4 would eliminate that problem?

A Exactly. That is the most important part of our field rules.

Q Now, the well that came up from, I think it was the Number 3 well that came up from twenty-eight barrels in July to thirty-two barrels in December, and forty-nine barrels in February, you want to produce it more than forty-nine barrels anyway, wouldn't you?

A It might be that we don't want to produce that but twenty barrels a day. It depends on its location and what we want to accomplish in the area that this one well affects that area.

MR. UTZ: You think you want to produce the well that was capable of producing three hundred forty-eight barrels that much?

A No, sir. I might say that some wells are capable of producing one thousand barrels a day, but that does not mean that we want to produce one thousand barrels a day. We want to control the production rate so that we can maintain uniform advancement of the slug to insure the gravity sweep of that



slug and not bypass any of the oil.

MR. NUTTER: Now, the big problem that appears is the lack of flexibility in producing these wells?

A Exactly.

MR. NUTTER: If the wells are receiving credit for their ability to produce, then you can produce the total productivity of the unit in any manner that you see fit from any wells that you see fit. You have flexibility, have you not?

A Right.

MR. NUTTER: Now, do the present Rules as they are written affect your injection flexibility?

A They do not affect the injection flexibility.

MR. NUTTER: But they do affect your producing flexibility?

A Affect both the withdrawal and producing flexibility.

MR. NUTTER: Now, what does it require to produce the wells in a flexible manner as you would desire?

A It would require our Rule Number 4 as we have proposed also, I think it is Rule 2.

MR. NUTTER: I mean, under the existing Rules, Mr. Brinkley, you have the flexibility-- What do you have to do under the existing Rules?

A I would recommend we incorporate our Rule Number 2 and Rule Number 4, and we'll have what we need.

MR. NUTTER: Well, under the existing Rule, when you



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desire flexibility in producing rates and you have an allowable assigned to the well for the month, what does it require? Application for a supplemental allowable to change the allowable for the well?

A There is a great deal of detailed reporting and time factor, too, and detailed tests that may not be convenient or fit in with our schedule that makes it rather awkward and to a considerable extent impractical in order to preserve what we have started here. It is a simplification, shall we say, of the operator as well as the Commission that we accomplish both at once with these proposed Rules.

MR. UTZ: Are you saying that this project is so sensitive that you have to change your producing rates within the thirty days period?

A It is more sensitive than that, yes, sir. We are setting on top of this every day.

MR. UTZ: Is it necessary to change them every few days?

A Yes, sir. Could be.

MR. NUTTER: And the frequency with which you desire to change the **rate** of production from a given well is such that it entails an undue burden upon yourself as well as the Commission to apply for and receive supplement?

A It would be impossible for the operator, and I think it would be unduly burdening to the Commission to receive the voluminous amount of paper work that would be required. If I can



present to you the idea of ten gas bubbles, each separator with a bank of oil under high pressure, and associate it with pressure differential between the gas bubbles, you can see how little control we have on gas movement of the entire bubble if it is not properly balanced, and once those gas bubbles get out of control, why, we may never recoup our former position, and, hence, a loss of recovery would result.

MR. PORTER: Are you saying, Mr. Brinkley, that if you are not granted this flexibility as proposed in Rule 4, that waste--there is a probability of waste of oil?

A Yes.

MR. PORTER: It will be left in the reservoir?

A Yes, sir.

MR. UTZ: Any other questions?

MR. LOAR: I would like to clear up one or two other points. It may not be confusing, but they are to me. Mr. Brinkley, Rule 2 as proposed ties the project to the market demand for the area, does it not?

A It does.

Q In other words, whatever fluctuation in allowable takes place in Northwest New Mexico, this project would be subject to, then?

A Right.

Q Your difficulty is not in total unit allowable, at least at the present time, but individual allowables within the



total allowable, is that right?

A Right.

Q And, you are seeking by Rule 4 and some of these other Rules, to receive a total unit allowable?

A That is the objective, yes.

Q And then, the operator can allocate that to individual wells within the project?

A Exactly. Right.

Q The reason for limiting production to two times the normal unit allowable would be to protect correlative rights, wouldn't it?

A That was the intent of the existing Rules.

Q Is there any need for such a Rule within the interior of the project?

A No, none whatsoever.

Q Now then, as to the five thousand barrel a day figure, is the equipment, the injection lines, compression facilities, and associated equipment, sized for a five thousand barrel a day allowable?

A It was designed for five thousand barrels a day.

Q Now then, we could increase the equipment out there and handle a larger volume, is that right?

A That is correct.

Q If we were, and as our Rules advocate, being subject to market demand, we could also have an allowable reduced to

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below five thousand barrels a day, could we not?

A That is correct.

Q This may be argumentative, but isn't it fair if we were to be cut less than our optimum producing rate at the present time to also have the privilege to increase our producing rate above that?

A That is my belief. Maintain equity.

MR. LOAR: I guess that's all.

MR. UTZ: Any other questions? If there are none, the witness may be excused.

(Witness excused.)

MR. UTZ: Did you enter your Exhibits?

MR. LOAR: Yes, sir. I did at the conclusion of his testimony.

MR. UTZ: Any other statements to be made in this case?

The case will be taken under advisement.

We will recess until one-fifteen.

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