BEFORE THE
OIL CONSERVATION COMMISSION
DECEMBER 10, 1958

IN THE MATTER OF:

APPLICATION OF BRITISH AMERICAN OIL PRODUCING COMPANY,

CASE 1562

TRANSCRIPT OF HEARING

DEARNLEY - MEIER & ASSOCIATES
GENERAL LAW REPORTERS
ALBUQUERQUE NEW MEXICO
Phone CHapel 3-6691

I N D E X

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IN THE MATTER OF:

Application of British American Oil Producing Company for permission to institute a secondary recovery project in San Juan County, New Mexico, and for the promulgation of special rules and regulations in connection therewith. Applicant, in the above-styled cause, seeks an order authorizing it to institute a secondary recovery project in the Bisti-Lower Gallup Oil Pool for the injection of dry gas and/or liquefied petroleum gas into the Gallup formation through four wells located in Sections 27 and 28, Township 26 North, Range 13 West, San Juan County, New Mexico. Applicant further proposes that special rules and regulations be promulgated to govern the above-described project, which would include among other things conversion of additional injection wells without notice and hearing, transfer of allowables from injection wells, transfer of allowables from wells shut-in for observation purposes or to increase the efficiency of the project, exemption of all leases connected with the project from gas-oil ratio limitation provided gas produced therefrom is reinjected, and such other rules and regulations the Commission may deem appropriate.

Case 1562

BEFORE:
Daniel S. Nutter, Examiner.

TRANSCRIPT OF HEARING

MR. NUTTER: We will take the next case, Case 1562.

MR. PAYNE: Case 1562, Application of British American Oil Producing Company for permission to institute a secondary recovery project in San Juan County, New Mexico, and for the promulgation of special rules and regulations in connection therewith.

MR. CHRISTY: Sim Christy, of Hervey, Dow & Hinkle, appearing for the Applicant, British American Oil Producing Company. Associated with us in this case is Mr. Robert Sullivan, attorney with the firm of Modesitt and Sullivan in Denver. We would appreciate the Commission hearing him and having him present the testimony.

MR. SULLIVAN: Thank you, Mr. Christy. Mr. Examiner, we would like to commence by moving for leave to amend our petition in one respect. I think it's clear from the gist of the petition that we are requesting the conversion of the Douthit "B" Five Well for injection purposes. Nevertheless, in the precise request made in our application, it does not seem to be clear that the Douthit "B" Five conversion is included. Now, you notice it did mention four wells were being requested. We have mentioned the other three which we are requesting they be approved on administrative approval. Through inadvertance or oversight on my part, what is known as the Douthit "B" Five was not included in our prayer. I would like to amend that at this time.

MR. NUTTER: You still propose to inject gas to four wells, is that correct?

MR. SULLIVAN: Yes, sir.

MR. NUTTER: The four wells are in Sections 27 and 28?

MR. SULLIVAN: There are no changes in those respects, no.

MR. NUTTER: So the amendment is not broadening the

scope of this application?

MR. SULLIVAN: No, it's in a sense a technical thing. I think the petition is clear.

MR. PAYNE: I think it is, Mr. Sullivan, in your Paragraph 2, 2-A.

MR. CHRISTY: I believe it is the prayer he refers to.

MR. SULLIVAN: I'm referring, Mr. Payne, to Paragraph 8, where we make specific request on an order. We don't request the approval of the conversion of Douthit "B" Five, which is the well we anticipate will be used initially for gas injection and which is the one we were primarily concerned with. I would like to include this Paragraph 8 and an additional sub-paragraph that the conversion of the Douthit "B" Five to an injection well be included.

MR. NUTTER: If there is no objection to the amendment of paragraph 8 to include the Douthit "B" Five, the application will be amended.

MR. SULLIVAN: We have two witnesses. The first is Mr. Nelson Williamson.

MR. PAYNE: Is your other witness here also?

MR. SULLIVAN: Yes, sir, Mr. John Stein.

(Witnesses sworn.)

MR. NUTTER: At this time, we will call for any other appearances in this case. Are there any?

MR. KELLAHIN: Jason Kellahin, of Kellahin and Fox,

appearing on behalf of Phillips Petroleum Company.

MR. NUTTER: Any others? Proceed.

MR. SULLIVAN: Take your chair, Mr. Williamson. The first order of business, we have prepared additional copies of exhibits which were attached to the application as Exhibit A and Exhibit B, One, Two, Three and Four as a perfunctory matter. I would like to enter these additional copies in evidence and so submit them.

MR. NUTTER: If there is no objection, British American's Exhibits A through B Four will be admitted.

NELSON H. WILLIAMSON

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

DIRECT EXAMINATION

BY MR. SULLIVAN:

Q State your name, please?

A Nelson H. Williamson.

Q By whom are you employed and in what capacity, Mr. Williamson?

A British American Oil Producing Company as division exploitation geologist.

Q Have you previously appeared before the New Mexico Commission?

A No, I have not.

Q Will you state then your educational and professional background as a geologist, please?

A Graduated from Tulsa University in 1948 with a BS Degree in geology and worked for Standard Oil Company of Texas in north and central Texas for three years, in west Texas for two and a half years, and for the past five years with British American Oil Producing Company in the northwestern division, which covers the Rocky Mountain area.

Q Among your duties with the British American Oil Producing Company at the present time, have you had occasion to study the Bisti-Lower Gallup Field in San Juan County, New Mexico?

A Yes, I have.

Q Are you familiar with the application that your employer has filed in this cause?

A Yes, sir, I am.

Q In connection with your study and this application, have you prepared certain exhibits which you would like to present to the Commission in this hearing?

A Yes, sir, I have.

Q Will you proceed then to show the exhibits.

A We have extra copies here of Exhibits One and Two if you'd like to look at those.

(Marked British American Exhibits 1 and 2 for identification.)

A Exhibit One is a structure map which is contoured on top of the first bench of the Lower Gallup pay in the Bisti Gallup Field in San Juan County, New Mexico. The purpose of this exhibit

is to show the structural continuity of the field here. I further show there is no separation anywhere in this field due to structure closure.

It can be seen starting on the northwest end of the field and going southeast, the dip is in a northerly direction and represents pretty much the regional dip in the area. This particular exhibit shows primarily British American's part of the field and is designed to take in just the area of which is considered in this proposal here.

Q Is the area you refer to as British American designated by the colored portion of that exhibit?

A Yes, that's right. It's colored in yellow on the exhibit.

Q You have already marked this Exhibit Number One?

A That is right.

Q Continue.

A Exhibit Number Two, which is this exhibit here, is an isopach which is contoured on a positive microlog separation of the first bench of the Low Gallup pay in the Bisti-Lower Gallup Field or that portion of the Bisti-Lower Gallup Field which British American has and is proposing as a secondary recovery unit and shows further the continuity of this reservoir in the particular area.

The contour interval used here is five feet, and it shows again on the northwest end going southeast. There is no break in this particular reservoir due to the shaling out or pinching out

of the sands. This particular Exhibit shows British American's acreage yellow as does the Exhibit Number One.

Q And have you designated this already as Exhibit Number Two; is the exhibit so marked?

A Yes, this is marked Exhibit Two.

Q Do you have further exhibits that you wish to show the Commission?

A Yes, I do. We have several cross-sections which we wish to show.

Q How have you designated these, Mr. Williamson?

A This is a series of exhibits called Exhibit Three, and it's a series of cross-sections starting with "A" and going through "E".

Q Are they already designated as 3-A, B, C, etc.?

A Yes, sir, they are.

Q Read and explain to the Commission what these demonstrate?

A This particular cross-section and each cross-section, the line of cross-section will be shown by a red line. This particular cross-section here is Exhibit 3-A and is cross-section AA prime and goes from the Douthit "B" 3, British American Oil Producing Company Douthis "B" 3, on the west side to El Paso Sullivan "D" 3 on the east side.

Q The other wells that are represented on this cross-section are also indicated at the top of the exhibit?

A That is right. Now, I can read those off, but to dispense with, to hurry along, I think we can dispense with that if it is all right with the Commission.

MR. NUTTER: Yes, sir.

A These cross-sections are designed to show the shaving out of the reservoir in directions on the flanks, and it is an isopach or a cross-section which shows the thinning and thickening of the Lower Gallup pay section. It further substantiates the fact it is a continuous reservoir except where it shales out along the flanks. The continuity is repeated across here from the west end to the east end. There is no break in the middle. The thickness is based upon the positive microlog separation through the field.

Q I think it might be helpful if you would mention the section number through which this cross-section is drawn so the tie in between it and the area suggested in the application is clear.

A This cross-section starts at the west with Section 29, goes through Section 28, 27 and ends in Section 26.

Q Thank you. Do you wish to go to 3-B?

A Yes, if there are no questions on this.

Q (By Mr. Nutter) The western most well in this section is a dry hole, is it not?

A Yes, they are designated at the top of the cross-section here by the dry hole and the producer and the proposed

injection wells are also on there.

MR. NUTTER: Thank you.

A This is Exhibit 3-B, and is cross-section BB prime going from Section 29 again to 28 and 27. It is further north of the first cross-section, and again it is shown or is drawn on positive microlog separation and shows again the continuity of the reservoir. It again shows the shaving out on the west and on the east with the continuous reservoir through the proposed injection wells and to the flanks where it shales out.

Q Three C.

A I forgot to mention previously that the datum line which is used as a reference upon all these cross-sections is a plus 1400 and is shown a horizontal line across the top.

This is cross-section 3-C, CC prime. It is a north-south cross-section from section 21 going through 28 down to 33, and this cross-section again is drawn on the positive microlog separation of the Lower Gallup pay, the first bench. This again shows the shaling out in a north-south direction and a continuity of the reservoir in a north-south direction.

MR. NUTTER: Which is the north side there, the left side of that exhibit?

A Yes, this would be it here (indicating). This is cross-section DD prime and is Exhibit Three "D"; andagain is a north-south cross-section only farther east to again show continuity of the reservoir in a north-south direction. It shales out in

both north and south direction, and this particular cross-section is drawn on the positive microlog separation of the first bench of the lower Gallup pay.

Q One more?

A Two more. In the next cross-section, which is Exhibit 3-E, which is EE prime on the index here is a cross-section which is along the main trend of the Bisti Gallup Field and which shows the continuity of the reservoir along the main axis of the field. It is drawn on the same positive microlog separation of the Lower Gallup pay. There is no break, because of the sand conditions or structural conditions along the main trend of the field.

Q All of the sections shown on your Exhibits 3-A to E inclusive are generally dealing with the same area you pointed out as British American area on your Exhibits One and Two?

A That is right.

MR. SULLIVAN: That's all the questions I have, Mr. Examiner, of this witness with the exception of the question whether or not these were prepared by you? All of these Exhibits were prepared by you?

A That is right.

MR. NUTTER: Mr. Williamson, I note your Exhibits One and Two in the legend indicate that four of these wells will be water injection wells. You didn't intend to mean water injection, did you?

A No, that wouldn't be right.

MR. SULLIVAN: I think that error has been corrected so that on the actual Exhibit it only reads "injection wells". Correct me on that if I'm wrong.

A Yes.

MR. SULLIVAN: That was a draftsman's error on your small copies. We didn't bother to take it off because it had been produced; on the actual exhibit, the proper designation does appear. That's an error I will admit to.

MR. NUTTER: Mr. Williamson, one contour practice your cross-section shows one thing regardless of how far you go you can run out of the pool?

A I wouldn't say that. I'm not qualified to say how far the pool would go.

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

(Witness excused.)

MR. SULLIVAN: Thank you, Mr. Williamson. Mr. Stein, take the stand, please.

JOHN STEIN

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

DIRECT EXAMINATION

BY MR. SULLIVAN:

Q State your full name, please?

A I'm John Stein.

Q By whom are you employed, and what position do you

occupy with that employer?

A I'm employed by British American Oil Producing Company as district engineer for the entire Rocky Mountain area.

Q Have you previously testified before this Commission, Mr. Stein --

A Yes, I have.

Q -- as an expert engineering witness?

A Yes.

MR. SULLIVAN: May he so testify at this hearing, Mr. Examiner?

MR. NUTTER: Yes, sir.

Q (By Mr. Sullivan) Mr. Stein, are you familiar with the application that British American has filed with regard to gas injection in this section of the Bisti-Lower Gallup Field?

A Yes, sir, I am familiar with the application.

Q Let's commence with your exhibits, Mr. Stein. Have you prepared certain Exhibits in connection with this application that you'd like to present?

A Yes, I have.

Q What is the first of those?

A Exhibit Number Four is the first one that I have to discuss. Exhibit Number Four is a map showing the area covered by our application, which is all that area enclosed within the red lines. It also shows the locations of all the producing wells in the immediate vicinity and the four wells proposed for injection. It

further demonstrates --

Q Would you mind just pointing out those four wells?

A The four wells which we have proposed for injection purposes are Douthit "B" 5, which is located in the southwest of the northeast of Section 28; the Douthit "B" No. 7, which is in the southwest of the northeast of 27; the Douthit "B" --

Q Just a moment -- what is the description?

A Southwest of the northwest.

Q Thank you.

A The Douthit "B" 12, which is in the southwest southwest of Section 27; and the Douthit "B" 13, which is located in the southwest of the southeast of 28.

Q Now, at this point just, would you point out the confines of the Douthit "B" Lease?

A The Douthit "B" Lease is all of Sections 27, 28, 29 and the west half of Section 32.

Q Do you know who is the lessor in that?

A British American is the lessor.

Q No, British American is not the lessor; it is the lessee. Who is the lessor?

A The United States; the Federal Government.

Q Thank you. Proceed.

A This exhibit also demonstrates the area of influence around, the maximum area of influence we expect around each of these injection wells ultimately. That is the area shown by the heavy

green line. You will note this area of influence is contained wholly within British American's properties.

As gas is injected into each of the injection wells, the gas bubble will be formed, and as gas is continued to be injected, the bubble will continue to grow and, of course, ultimately, sometime away on down the line will reach these approximate proportions.

You will also note that the location of the injection well is such that the area of influence will never be of such magnitude as to invade other properties. It will have no influence on offset properties. Now, information compiled from our pilot LPG injection projects indicate we will not expect any trouble injecting gas into any of these wells.

"GI" Number 1 is taking up to 1600 MCF without any trouble. The reservoir properties in the rest of the pilot project are very similar to the reservoir properties in the area of our proposed gas injection project.

We plan to gather ultimately all the gas from our leases in this area to put into this injection project. However, if initially in the interest of time, and incidentally there is not much left in 1958, our initial gathering system will consist of a system to gather gas only from Sections 27, 28 and Section 34. A compressor station will be built in the vicinity of Douthit "B" No. 9 Well. Of course, the gas gathered from these three Sections will be injected into the Douthit "B" 5, initially.

Now, the other three wells, Douthit "B" 7, 12 and 13 will be converted to gas injection wells when the produced gas volume becomes sufficiently high to warrant their conversion. Of course, they will not be converted until administrative approval is obtained from the Commission.

At the present time, the wells located in Sections 27, 28 and 34 produce about 18,500 MCF a month. Of this amount, 2500 MCFs a month is required for lease operation use. That leaves us about 16,000 MCFs to inject into the Douthit "B" 5 initially, which would be 530 MCF per day. That's about all I have to say on Exhibit Number Four.

Q Is each of those proposed injection wells which you have mentioned presently producing oil from the Lower Gallup?

A Yes, they are. All produce oil from the first bench of the Lower Gallup.

Q In the application you may recall that we described the Lower Gallup as the stratographic section in the first bench of the Gallup sand at, encountered near the Douthit "B" 5 between a depth of 2966 and 5,000 feet. Is that the formation to which you are referring as being presently productive, into which you hope to inject gas?

A That is the formation I'm referring to.

Q Are you ready to proceed to your next exhibit, Number Five?

A Yes, I am.

Q Your exhibits are already marked and designated by number?

A Yes, they are. I have here copies of all these exhibits which I neglected to pass out. Exhibit Number 5 is actually four exhibits which I have elected to number 5-A, 5-B, 5-C and 5-D. Exhibit 5-A is an electric log of the Douthit "B" No. 5 Well, showing the present condition of the well and the proposed completion for gas injection. Douthit "B" 5 has 5½ inch casing set at 5201 KB cemented with with 100 sacks of regular cement, perforated to completion over the interval 5028 to 5048 feet with four jets per foot. We propose to complete it for gas injection as follows: Run 2 inch EUE tubing equipped with a retrievable packer set at 5010 feet, the annulus filled with oil and pressure casing tested with 2,000 psi for 30 minutes. If there are no leaks, we will complete the well for gas injection through the interval 5028 to 48, which is the first bench of the Lower Gallup sand.

Exhibit 5-B is the electric log section of the Douthit "B" 7 Well. The well has 5½ inch casing set at 5164 feet KB, cemented with 100 sacks of cement. Initially it was perforated from 5016 feet with four jets block squeezed with 70 sacks of cement. After the cement was drilled out, the well was perforated in the third bench of the Gallup Sand at 5024 to 5034 feet, four jets per foot in the first bench, 4970 to 4990 in the first bench of the Gallup.

We propose to complete the well for gas injection purposes

as follows: We will set a cast iron bridge plug at 5,000 feet KB. This will isolate the first bench from the third bench of the Gallup sand. Tubing will be run and connected to a packer, a retrievable packer and set at 4960 KB. The annulus will be filled with oil and tested at 2,000 psi for thirty minutes. If no leaks are indicated, we will complete the well for gas injection through the interval 4970 to 4490 in the first bench of the Gallup.

Douthit Exhibit 5-C is an electric log of the Douthit "B" 12 Well, which is another one of the wells. We propose to complete the injection through 5½ inch casing set at 5097 feet KB, cemented with 100 sacks of regular cement, perforated on initial completion at 4976 to 4995 with four jets a foot. We propose to complete it for gas injection purposes as follows: Run 2 inch tubing equipped with a retrievable packer set at 4960 feet. The annulus will be filled with oil and pressure tested for 30 minutes at 2,000 psi. If no leaks are indicated, it will be completed for gas injection through the interval 4976 to 4995, which is the first bench of the Gallup sand.

Exhibit 5-D is an electric log of the Douthit "B" 13 Well. The well has 5½ inch casing set at 5122 KB, cemented with 100 sacks of regular cement, completed through perforations from 5052 to 5066 and from 5040 to 5044, then it was perforated in the second bench of the Gallup sand from 5026 to 5034 and 5040 to 5044, and then the first bench of the Gallup was perforated from 4994 to 5008 feet.

We propose to complete it for gas injection purposes by

setting a cast iron bridge plug at 5016 feet KB, which will completely isolate the first bench of the Gallup sand from the other two benches.

Again 2 inch tubing will be equipped with a retrievable packer set at 4980 feet. The annulus will be filled with oil and the casing pressure tested with 2,000 psi for 30 minutes. If no leaks are indicated, we will complete the well for gas injection through intervals from 4994 to 5008 feet KB.

Q These are the proposed completion plans which you will pursue, assuming that subsequent to the granting of the first well, we will assume administrative approval of the Secretary-Director of the commission were granted for the conversion of these additional wells?

A That is correct.

Q You don't propose to do this work in the three wells represented by your exhibits 5-C, D and E immediately?

A No, that is on down the line.

Q Which well are you referring to and which you wish immediate approval to convert?

A The Douthit "B" 5 Well for gas injection purposes.

Q Do you have an additional exhibit?

A Yes, I do have. Exhibit No.66 is a graph of the reservoir performance history of the British American properties in the Bisti Gallup Field. The upper curve is a curve of bottom hole pressure, that is average bottom hole pressure, since completion

of our Marye Number One Well to the present time versus time. You will note that the pressure has dropped from initially about 1516 psi to around 1,000 psi as of August of 1958.

The middle curve is a plot of monthly production versus time. Prior to May of 1958, the production rate was very erratic due to the pipe line approrpiation. However, since the pipe line was completed to the west coast, the production has been fairly constant due to the allowable which has been set by the Commission and has been producing from 80,000 to 85,000 barrels per month.

The lower curve underlined by the green coloring is a curve of average gas-oil ratio versus time. It, too, was very erratic prior to May, mostly due to up and down production of the field. Now that we do have a fairly stabalized oil producing rate, we can see the gas-oil ratios are beginning to decline. At the present time, the average gas-oil ratio for all of British American Wells in this particular area is about 500 to one. The solution gas oil-ratio initially was 389 cubic feet per barrel. I might point out here according to our fluid sample taken on Marye No. 1, we had a bubble point of 4811 psi. The pressure now, as of August, was 140 psi below the bubble point.

Q What is your estimated daily injection of gas going to be initially if your petition to inject and convert the Douthit "B" 5 is granted by the Commission, Mr. Stein?

A It will be about 530 MCF a day.

Q And where did you indicate that gas would come from in

the initial stages?

A From the wells in Sections 27, 28 and 34.

Q Then if you gather gas from the remaining injection wells in your application, as your gathering system is extended, what do you anticipate your daily injection rate would be, at least under presently known circumstances?

A Well, it would be in the neighborhood of a million a day.

Q Is it natural to assume there will be increasing quantities of gas throughout your leasehold areas which will be available for injection as time goes on?

A Yes, it certainly is.

Q In British American's application in this matter, Mr. Stein, there was an indication that your company was conducting and making a study of the economic feasibility of LPG in this area. What has that study revealed up to this point?

A Well, it revealed that LPG is a good method for secondary recovery. However, we have not yet concluded as to the economics of its use.

Q In this presentation, you are not suggesting or proposing to the Commission any LPG be injected into the project area which has been outlined here in your testimony?

A No, I am not.

Q Do you have any further remarks you would like to make with regard to recommendations you made in your application to the

Commission with regard to field rules? Let us take specifically your request that field rules include the right to transfer allowables from converted wells. Would you like to give us a discourse on that, and, if so, what is that discourse?

A Yes, we have requested the Commission's approval to transfer allowables from one well to another on a field basis for several reasons, mostly because of economic reasons. Since wells must be converted to injection wells, transfer of allowable will enable us to continue producing the same daily quantity of oil even though good producing wells must be sacrificed for injection purposes.

In a gas injection project, certain wells will become extremely high GO producers, ratio producers and consequently are gassed out in the latter life of the project. Thus, to enable us to continue producing the field in the most efficient manner, it becomes necessary to transfer allowable of the wells to more efficient wells. Now, to evaluate the results of any secondary recovery program, it is often necessary to shut wells in for observation purposes, to run bottom hole pressures and what have you. However, if we are allowed to transfer allowables, we could continue to produce the field at a maximum efficient rate, and, of course, our daily revenue would not be impaired.

Q You've mentioned two or three different types of situations in which you are suggesting you should have the right to transfer allowables. Let's confine our remarks to the request

to transfer allowables from those wells which are converted. All of the arguments that you have made for that right would apply equally to wells which have been converted to injection wells, would they not?

A Yes, sir, they certainly would.

Q What is the area within which you have recommended to the Commission this right be permitted?

A Well, I think the area should consist of that area which you are gathering gas from and any wells that you are taking gas from or any well that has to be converted to an injection well, we should be allowed to transfer that allowable to any other wells on that particular property or in that particular area.

Q Do I misunderstand you -- you are not suggesting that you be permitted to transfer allowalbles from a well just because gas from that well is being injected?

A Oh, no, that is just one of the reasons.

Q That is what I wanted to make clear. Would you restate what your recommendation is with regard to transfer of allowables of wells which are converted to injection wells, to what area do you believe that right should be extended?

A To that area from which gas is being gathered.

Q For injection purposes?

A For injection purposes, certainly.

Q And why do you recommend that that area be the area to which this privilege is extended, Mr. Stein?

A Well, that is the area that will be most likely effected by this injection program. It will be the area under study at all times, and it will be the one in which it will be a necessity to shut wells down and, well, we feel that it's the practical thing do do. We are going to spend a lot of money to put this injection project in, and we are going to sacrifice some good oil producing wells in order to do so.

Q Do you have any estimates as to the benefits of this gas injection program, Mr. Stein? Would you like to comment on the possible benefits generally or specifically?

A Yes, it's already been proven by development and reservoir studies that the Bisti Gallup field is a closed reservoir and has a solution depletion type recovery mechanism. With this type of recovery mechanism, from our special course studies, we can expect to recover 15 percent of the original oil in place. By injecting produce gas back into the reservoir, I believe that we can increase the ultimate recovery in the area in which we are injecting gas by at least 10 percent additionally of the original oil in place. With the rate of bottom pressure decline and conservation of bottom hole pressure, it will permit efficient operation, it will reduce lifting cost and it will help us to maintain stabilized producing rates for a much longer period of time.

Last but not least, it will prevent surface and sub-surface waste.

Q In connection with your application, Mr. Stein, there

is a request in there that the field orders include what has previously been referred to and is referred to in the application as net gas-oil ratio?

A Yes.

Q What do you mean by that in connectinn with your application?

A Well, what we are asking for is approval to continue producing that well at its maximum assigned allowable after the gas-oil ratio has increased over the 2,000 to 1 which has been set by the State Regulations.

Q You mean the oil allowable be permitted, to be permitted to produce its maximum legal oil allowable?

A Yes, after its maximum gas-oil ratio has passed or increased over the two thousand to one ratio set by State Regulations.

Q Only if what is occurring, however, in connection with that gas?

A Well, as long as we are gathering it and injecting it back into the ground.

Q Thank you.

A We believe a net gas oil ratio would permit more efficient operation of the field as a whole. It would allow us to produce the well at economical rates for a longer period of time; and I believe it would increase the ultimate recovery from the area by being able to produce the well down to economic limits.

MR. SULLIVAN: I think that concludes my questioning, Mr. Nutter.

MR. NUTTER: I think we will recess the hearing until 1:15.

(Recess.)

AFTERNOON SESSION

MR. NUTTER: The hearing will come to order. Does anyone have any questions of Mr. Stein?

MR. KELLAHIN: Yes.

MR. NUTTER: Mr. Kellahin.

CROSS EXAMINATION

BY MR. KELLAHIN:

Q Mr. Stein, as I understand your application, you don't set up anything which would be termed as a project area, anything of that nature, do you?

A Well, not exactly, not in so many words; however, we have stated initially we will commence to gather gas from Sections 27, 28 and 34.

Q That is with your injection gas?

A We will inject it back into the Douthit 5; that may be considered as a project area.

Q Now, in connection with your transfer of allowable, as I undersand it, you propose to transfer allowables from wells which are converted to injection wells and from wells that are shut in for reasons of economic and engineering purposes for the operation

of the project?

A That is correct.

Q I don't quite understand what you mean in regard to transfer of those allowables to area from which gas is being gathered for injection purposes?

A For instance, initially if the Commission approves our request, the area involved, of course, primarily will be Sections 27, 28 and 34. We feel that's not unreasonable to ask. We can transfer allowable anywhere in that area. That's where the gas will be taken initially. Now, we will pursue with due diligence to gather the rest of the gas as soon as possible. Of course, when we start gathering gas from other areas, we should have the benefit of transferring allowables if it becomes necessary.

Q That would be, however, transferring allowables beyond the area of influence of the injection program?

A The direct influence, yes.

Q With that in mind, Mr. Stein, would you have any objection for a procedure which would require administrative approval by the Commission for the transfer of allowables after notice to all of the off set operators?

A No, I wouldn't have any particular objection to it, no. We would rather, if it were possible, to go ahead and transfer allowables whenever necessary and when needed. We could live with it if we had to to get administrative approval before transferring allowable.

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

MR. NUTTER: Any further questions?

EXAMINATION BY MR. PAYNE:

Q Mr. Stein, along this same line of questioning, I notice on your application you propose to convert "B" 7, "B" 12 and "B" 13 Wells upon application to and approval of the Secretary-Director of the Commission. Do you propose to notify offset operators and have a waiting period of some ten or 15 days before the Commission will grant approval?

A I don't think we propose that. I don't believe that would be unreasonable.

Q Is that the only limitation you would have on granting administrative approval, as long as nobody objected you would propose, if the Commission granted approval to? Is that right?

A I can't see any reason to have any objection. There are all inside wells from outside operators within British American properties. None of them offset any operator. As far as I can see, I can't imagine anybody opposing it.

Q There is one thing that kind of bothers me a little -- why didn't you ask for all four wells instead of asking for one administrative approval, which in all probability would be granted in the absence of an objection; why didn't you ask for all four wells now?

A At the present time we don't have any more gas available. I mean, we don't have enough gas available to justify

converting all four of those wells to injection wells right at this minute; and there would be no need to. We just don't need them at the present time. We foresee in the future, as gas volumes increase, they will be required, become entirely practical and feasible to convert those wells as needed to injection wells. At the present time, we can continue to produce oil from them along with one injection well.

Q One further objection to granting administrative approval would be whether they would be needed for injection gas?

A Perhaps the Commission would have to take that into consideration. Certainly we would not ask for it if it were not needed.

Q As I understand your application as amended so to speak by the testimony you propose only to inject dry gas or casing head gas?

A Yes, sir.

Q No LPG at this time?

A No, sir.

MR. PAYNE: Thank you; that's all the questions I have.

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

EXAMINATION BY MR. STAMATS:

Q Mr. Stein --

A Yes, sir.

Q -- in the event that LPG injection might be started, would these same four injection wells be used?

A It's conceivable they could be used.

Q Injection of gas at this time would in no way diminish their desireability?

A You would have to do a few things to the wells to condition them. You would have to inject oil to build up an oil bank to get rid of--before you injected the LPG they could be used if the operator so desired.

MR. STAMATS: That's all.

EXAMINATION BY MR. NUTTER:

Q Have you ruled out LPG in this immediate area for the present time?

A For Douthit "B" 5 we have for the time being.

Q Mr. Stein, what is this area on Exhibit No. 4 that is outlined in red?

A That is supposed to be the area covered by this particular application.

Q But you don't call this the project area?

A Well, we haven't designated a project area, so to speak, unless you want to consider the fact we intend to gather gas initially from Sections 27, 28 and 34 an initial project area.

Q But is this area outlined in red the area you will eventually gather the gas for the injection program?

A Yes, we will produce that will all diligence. We will commence to construct facilities to gather this gas in Sections 27, 28 and 34 as soon as possible; therefore, we will go ahead with

our plans to gather the rest of the gas.

Q Is British American the 100 percent working interest owner in all three of the leases included in this area?

A Yes, sir, they are.

Q Any variation of royalty interest?

A There is overrides in there I understand, one percent, two percent.

Q Are these overrides common throughout the acreage here?

A I don't believe so.

Q Before you could start transferring allowables from one place to another, you would possibly have to communitize or unitize all the interest in there?

A I don't believe so. There are some small overrides in there. As I say, I don't know they are over the entire area, I can't answer that question truthfully.

Q Well, right now you are talking about Sections 27 and 28 which are on the Douthit Lease and 34 which is the Dalgy Lease?

A That's right.

Q Do you know whether the ownership royalty interest, working interest and overriding royalty interest is 100 percent common throughout the two leases?

A Douthit and Dalgy? I don't know they are 100 percent over the field. I think probably they are not.

Q Mr. Stein, would you furnish the Commission with the details as to the ownership of the working interest, the royalty interest and the overriding royalty interest on the three leases that comprise this area outlined in red?

A We could; we could do that by letter if that is satisfactory.

MR. NUTTER: That is satisfactory.

MR. SULLIVAN: As a matter of fact, you know the working interest is common in all those areas; that is 100 percent British American, is it not?

A It is.

Q (By Mr. Nutter) It is all United States Government owned land?

A That is right.

MR. SULLIVAN: The question is the overriding royalty?

MR. NUTTER: Will be the overriding royalty.

MR. SULLIVAN: If you'd like to have that information, if it is relevant to the problem, we can furnish it to you.

MR. NUTTER: I believe it is, Mr. Sullivan, because the Commission has never to my knowledge authorized any transfer of allowables across lease lines unless this area was unitized where there was variation whatsoever in ownership of the acreage.

MR. SULLIVAN: That is your prerogative whether or not it is necessary. I think it is open to some question.

MR. NUTTER: Perhaps so.

MR. SULLIVAN: But we will furnish that information if it is deemed pertinent by you. Of course, you can take it into consideration.

A I might add we are taking necessary steps to unitize that whole area. Of course that takes time.

Q (By Mr. Nutter) Mr. Stein, do you think any sort of system inequities could occur where you shut in wells or converted them to injection wells in the interior of the lease and transfer the allowable of those wells to a well that is closer to the exterior boundary of that lease?

A Yes, I think there could be inequities. I don't think that would be the case here. From the location of most of the oil wells, most of the allowables that would be transferred would be wells within the interior of the lease. There is one offset; that is down here on in the future time. There is a direct offset here to Phillips' well. I don't think we even propose to transfer say four allowables to that well. We might of necessity have to transfer a portion of the wells' allowable to that particular well. I don't think that would result in any great inequities. I think we should be permitted to transfer allowables. We are going to a lot of expense; we are sacrificing producing wells for the benefit of the reservoir and for the benefit of everybody concerned. It it is done on a reasonable basis, I don't believe there will be any inequities existing.

Q But you do agree it would be probable?

A Certainly, if you transferred four allowables to one you would be taking more than your share. A proportionate allowable, I don't think would be too inequitable.

Q Have you suggested any maximum allowable any well would be permitted to have?

A No, sir, I have not. I thought I'd leave that up to the Commission.

Q Mr. Stein, I noticed that the Douthit "B" 7 and the Douthit "B" 13 have both been perforated at an interval other than the first bench of the Gallup sandstone?

A That is correct.

Q Are these intervals that have been perforated depleted at the present time?

A No, sir.

Q Would they be depleted by the time you --

A No, we isolated them from the rest of the reservoir. We have proposed to set a cast iron bridge plug between them. We are only anticipating injection and recovery from the first bench for the time being. They will be there for future use.

Q You could remove that bridge plug and produce the wells at a later date?

A That is right, or you could take the production out of some other well for instance.

Q Mr. Stein, have you suggested any formula or could you suggest a formula by which the amount of gas that is removed

from a well and measured presumably I believe at a low pressure could be converted into a high pressure, you could inject into another well so you would be allowed to figure this net gas-oil ratio?

A I don't feel you need a formula. I think one could be contemplated. I don't think you need it. All the gas is measured, of course, at your regular 15 pounds or 15½ which is taken out of the ground at low pressure at 60 degrees. Of course, it's put back in the reservoir at a higher pressure; it's still the same volume going in.

Q I see, you use volume for volume?

A Yes.

Q MCF for MCF?

A Yes.

Q All at 15 pounds?

A Yes, that's the way it will be metered at the time it goes into the ground. It will be taken off of the leases; each lease will be metered as it is taken to the compressor. Of course, there will be one large master meter going into the ground. It could be converted back to the 15 pounds pressure.

Q What do you suggest is the criteria to determine how much allowable a well should have transferred away from it if it is converted or shut in?

A I would say the legal allowable for that particular well would be the allowable we would be allowed to transfer.

Q At the time it was converted or shut down?

A That is right.

Q Would you continue to give this well credit for top allowable if it were a top allowable well at the time it was converted?

A Yes, sir.

Q And four or five years on down the road when there would not be a top allowable well in the pool, this well would still be receiving top allowable credit?

A Of course, you'd have to be able to produce that from the other wells in order to have it.further on down the line. You see, wells would get to the point where they could not make the allowable. Then you'd be reduced to the capacity of the wells. Until such time, that well's top allowable would be given to the other wells which are capable of producing their own allowable plus its allowable. I think it more or less corrects itself as you go on down the line. Wells will decline and eventually none will be a top allowable well, then you haven't got anything to transfer.

Q Are these four wells the subject of this hearing today top allowable wells at the present time?

A Yes, sir.

MR. NUTTER: Does anyone else have any questions?

EXAMINATION BY MR. STAMATS:

Q Mr. Stein, would your company be objectionable to a

provision in any order written approving this plan to limiting transfer of allowables to be within the lease? In other words, you could not transfer an allowable from one lease to another until such time these leases were communitized?

A We could live with it.

MR. STAMATS: That's all.

EXAMINATION BY MR. NUTTER:

Q I think you went into the explanation of where the tank batteries were, didn't you?

A No, I did not. I'd be glad to do so.

Q Point out where the batteries are. I was wondering whether it would be feasible to get to the gas from these other leases here?

A All of our batteries, with the exception of one, to the best of my knowlege are located in the center of the half section. For instance, Section 27 would have the battery located thusly (indicating); and in the south half, it would be, of course, in the center. It's -- in every case that happens to be the condition so on down the line. The only battery not in the center is Marye Number One battery here. It's situated about in the center of the quarter. Of course, this one is over here (indicating).

Q How long do you believe it will be until you are in a position to gather the gas on the Marye Lease in 35, in Section 1?

A Possibly early in 1959, sometime in 1959. It will take

some time to build this section of the line, and we will pursue it as diligently as possible. It will be probably sometime in the early part of 1959.

Q Do you believe the Number 5 well would be able to handle more that 530 MCF?

A Yes, sir, I believe it would handle as much as the "GI" Well which has had 1600 a day and would take more than that if you wanted to increase the pressure. However, we have our facilities designed for 1500 pounds pressure.

Q Well, now, this 18,500 MCF you mentioned being produced was only from Sections 27, 28 and 34?

A Yes, sir.

Q What is the total amount of gas produced in the area that is outlined in red on your Exhibit Two?

A The total amount there would be exclusive of Marye Number One, 34,000 MCF a month. This is taken from October. We use about 3200 for lease use, so that would give you roughly 30,800 left over per month. The Marye Number One itself produces around 12,000 MCF a month, all of which is injected into the "GI" One well.

Q Do you believe the Douthit "B" 5 would handle this 30,000 a month that you have available on these three leases?

A Yes, sir, I believe it would.

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

MR. SULLIVAN: Mr. Nutter, I have two which I would like

to ask for purposes of clarifying answers which he's given in response to a question you asked and one your other engineer asked.

MR. NUTTER: All right.

REDIRECT EXAMINATION

BY MR. SULLIVAN:

Q You suggested in response to the question by Mr. Nutter you felt on transfer of allowables a well should be given it's legal allowable at the time it was shut in. Do you mean to imply by that it would be a constant allowable that would be transferred without regard to changing allowable elsewhere in the field?

A No, I did not.

Q Did you on the contrary mean that you felt that well's legal allowable month by month as it might change should be transferable?

A That's what I meant. I might not have left that impression, the legal allowable from month to month.

Q Not necessarily as of a constant figure as it was shut in?

A No. If I have left that impression, I'm sorry.

Q In response to a question asked you by the gentleman on my extreme left here, you indicated that you could live with a situation whereby you would be permitted to transfer your allowables within the same lease. Would you point out, for instance, what the situation would be currently with regard to, for instance,

to the transfer of allowables from the Douthit "B" 5 if your were confined to the Douthit Lease, keeping in mind the ability of the wells to make the current allowable or to make more than the current allowable, et cetera?

A Within the Douthit "B" Lease, we would have all of these wells in here. I don't recall -- some of the wells, of course, can't even make an allowable now -- Number 18 can't make it.

Q It wouldn't be practical to transfer any additional allowables to those wells?

A No, sir, it certainly would not. It has to be transferred to a well that is actually capable of making it plus its own allowable.

Q Then there would be certain limitations if these limitation of allowables within leases were imposed it would impose restrictions on you that would make it more difficult, let's say if not perhaps impossible, to maintain your current rate of production from all of your leases?

A That is correct.

MR. SULLIVAN: That's all, Mr. Nutter; thank you.

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

(Witness excused.)

MR. SULLIVAN: I'd like to submit for admission into evidence British American's Exhibits One through Six with the sub-

lettered exhibits under Three and Five thereunder.

MR. NUTTER: Is there objection to the admission of British American's One through Six? If not, they will be received in evidence.

Does anyone have anything further they wish to offer in Case 1562?

MR. KELLAHIN: Phillips Petroleum Company is in general agreement with the application as submitted by British American in this case. We would, however, like to see a provision in the order requiring administrative approval after notice to offset operators before there is any transfer of allowables, before any wells are converted to injection wells or wells shut in for engineering reasons in the operation of the project.

We feel it is particularly necessary in this case in that it is proposed that the transfer of allowables be to areas in which gas is being gathered, which in some instances could be remote from the area subject to the influence of this injection program and receiving the benefit of the pressure maintenance program.

We don't want to be opposed to the transfer of allowables. We feel any company setting up a project of this type is entitled to some consideration in that respect.

As offset operators and owner of properties in this pool, Phillips feels notice to these offset operators is essential.

MR. NUTTER: Anything further?

MR. SULLIVAN: I think that's a reasonable suggestion by Phillips, and I would like to suggest it's not unreasonable to say that if the order contains such a provision that it should apply only to those instances where it is proposed to transfer allowables to lease line offsets. This is a sizeable lease acreage. It seems to me for their protection those wells which are immediately offset to the lease lines are the ones they are interested in for administrative ease and opinion. Myself, the paper work on the part of the operator there seems to be good reason to limit the restriction of notice to offset operators where it is proposed to transfer allowable only to those wells which lie immediately adjacent to a lease line. Interior wells, I should not think the same justification would exist.

MR. NUTTER: If there is nothing further in Case 1562, we will take this case under advisement and take Case 1563.

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STATE OF NEW MEXICO)
) ss
COUNTY OF BERNALILLO)

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

WITNESS MY HAND AND SEAL this 17th day of December, 1958, in the City of Albuquerque, County of Bernalillo, State of New Mexico.

John Calvin Bevell
NOTARY PUBLIC

My Commission Expires:

January 24, 1962

I do hereby certify that the foregoing is a complete record of the proceedings in the Examiner hearing of Case No. 1562, heard by me on 12-10, 1958.

Examiner
New Mexico Oil Conservation Commission