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BEFORE THE  
NEW MEXICO OIL CONSERVATION COMMISSION  
OIL CONSERVATION COMMISSION CONFERENCE ROOM,  
STATE LAND OFFICE BUILDING  
SANTA FE, NEW MEXICO

EXAMINER HEARING

IN THE MATTER OF:

Application of Llano, Inc. for a unit  
agreement, Lea County, New Mexico.

and

IN THE MATTER OF:

Application of Llano, Inc. for gas  
injection, Lea County, New Mexico.

Case No. 4895

Case No. 4896

BEFORE: Elvis A. Utz,  
Examiner

TRANSCRIPT OF HEARING

1 MR. UTZ: Call Case 4895.

2 MR. CARR: Case 4895, application of Llano, Inc. for  
3 a unit agreement, Lea County, New Mexico.

4 MR. COX: Louis Cox of Hinkle, Bondurant, Cox and  
5 Eaton appearing on behalf of the applicant.

6 Mr. Examiner, I move to consolidate Cases 4895 and  
7 4896, since the testimony in the two cases is overlapping and  
8 repetitious. For the purpose of hearing, we would move that  
9 the two cases be consolidated.

10 MR. UTZ: 4895 is a case for a unit agreement, and  
11 4896 is the storage area within the boundaries of this unit.

12 MR. COX: Gas injection procedures within the unit.

13 MR. UTZ: The cases will be consolidated for the  
14 purposes of testimony, separate orders will be written.

15 MR. MORRIS: I'm Richard Morris of Montgomery,  
16 Federici, Andrews, Hannahs and Morris, of Santa Fe appearing  
17 in this case, in these cases, on behalf of Southern Union  
18 Production Company and Southern Union Gas Company.

19 MR. UTZ: Are there other appearances?

20 (No response.)

21 MR. COX: I call as a witness Bob Wilson.

22 ROBERT B. WILSON,  
23 a witness, having been first duly sworn according to law, upon  
24 his oath, testified as follows:  
25

DIRECT EXAMINATION

2 BY MR. COX:

3 Q State your name, address, and place of employment.

4 A I'm Robert B. Wilson, my address is Post Office Box 1320,  
5 Hobbs, New Mexico. I work for Llano, Incorporated, in  
6 the capacity as a petroleum engineer.

7 MR. UTZ: What was the name again?

8 THE WITNESS: Robert B. Wilson.

9 Q (By Mr. Cox) Have you ever testified before the New  
10 Mexico Oil Conservation Commission, or an examiner?

11 A I have not.

12 Q What is your position with Llano?

13 A I'm a petroleum engineer.

14 Q And what is your educational background as a petroleum  
15 engineer?

16 A I'm a graduate of Texas Technological College. I received  
17 a degree in petroleum engineering in 1954. For 18 and a  
18 half years, I have practiced petroleum engineering.

19 Q You've been actively engaged in petroleum engineering for  
20 the last 18 years?

21 A That's correct.

22 MR. COX: Are there any further questions about his  
23 qualifications?

24 MR. UTZ: Other than if he is familiar with the cases  
25 he is about to testify in.

1 Q (By Mr. Cox) You are familiar with the two consolidated  
2 cases?

3 A Yes, sir. Case 4895 is an application for approval of  
4 the unit agreement for the Grama Ridge Morrow Unit and  
5 Case 4896 is an application for approval of injection of  
6 gas for secondary recovery and gas storage purposes into  
7 the Morrow formation through the State GRA No. 1 and State  
8 GRB No. 1. The approval of these applications will enable  
9 Llano to conduct storage and secondary recovery operations  
10 on the Grama Ridge Morrow reservoir.

11 Q How does the unit agreement differ from the standard State  
12 approved secondary recovery unit agreement, Mr. Wilson?

13 A Well, with the exception of the storage concept, it's  
14 essentially the same unit agreement.

15 I will point out the areas where there is a difference.  
16 In Article 11, under 11-B, it calls for an annual storage  
17 fee, or rental fee, and Article 22, it calls for  
18 renegotiation of this storage fee every five years, and  
19 Article 23 is an indemnity clause which holds harmless the  
20 Commissioner of Public Lands and of the State of New Mexico.

21 Q Now, the storage fee has not been agreed upon by the  
22 Llano and State Land Commissioner yet, is that correct?

23 A That is correct, that's still being negotiated.

24 Q Attached to the proposed form of the unit agreement which  
25 has been filed with the Commission is an exhibit. Would

1 you explain that exhibit, please, sir?

2 A Yes, sir. On the unit agreement, Exhibit A shows the  
3 wells and their locations. It shows the acreage that  
4 comprises the proposed unit and it also shows the State  
5 tracts that are involved within the unit boundary.

6 Q And that shows the ownership of the record title to the  
7 State leases in that area?

8 A Yes, sir. In this case, Shell, Gulf, and Texaco, within  
9 the parentheses, are the record owners of title of the  
10 leases as indicated.

11 Q But Llano owns the operation rights in the units form, in  
12 this agreement?

13 A That's correct.

14 Q And would you tell us about Exhibit B attached to the  
15 unit agreement?

16 A Exhibit B shows the tracts that are involved within the  
17 unit, and specifies the number of surface acres, basic  
18 royalty, the working interest, and to whom that belongs,  
19 and the percentage of surface tract participation, or the  
20 surface tract participation is based upon the total  
21 surface acre in the unit.

22 Q And what is Exhibit C attached to the unit agreement  
23 intended to reflect?

24 A Exhibit C is a time extrapolation of the remaining primary  
25 relative gas reserves, and this is the amount of gas that

1 would be produced from under the unit area if it were to  
2 remain on primary production.

3 We are proposing, of course, that we not continue  
4 to produce it under primary conditions, and this is an  
5 attempt to break it down under time extrapolation, to  
6 show what the production would have been.

7 Q And upon which to base the royalty due to the State?

8 A That's correct.

9 Q Has the Commissioner of Public Lands, or his staff,  
10 finally approved this method of determining the remaining  
11 gas reserves?

12 A The Commissioner of Public Lands has requested that we  
13 make an alternate method, which we have, based on BHP over  
14 Z, or BHP over Z versus the accumulative production. We  
15 have prepared this, we have it, and is entered into  
16 evidence later as Exhibit 3.

17 Q Has the general form and content of the proposed unit  
18 agreement, with the exception of these minor details that  
19 remain to be worked out, been generally accepted by the  
20 Land Office personnel?

21 A Yes, sir. The general form has been, more or less,  
22 tentatively approved, with the exception of Article 11 under  
23 B, but as we said, it's still being negotiated with the  
24 State Land Office.

25 MR. COX: I'll tender into evidence the exhibits which

1 are marked Exhibit 1, the little brown folder marked as Exhibit  
2 1, and there are charts which are Exhibits 1-A, 1-B, 1-C, 1-D,  
3 and 1-F: and also Exhibits 2 and 3.

4 Q (By Mr. Cox) Would you, at this time, Mr. Wilson,  
5 explain to the Examiner the purpose of the respective  
6 exhibits that are contained in Exhibit 1, beginning with  
7 Exhibit 1-A?

8 A All right, sir. Exhibit 1-A is more or less just a  
9 relative location showing Lea County and then showing the  
10 proposed unit area and then finally getting down to a  
11 detail of the respective sections of Section 34, Township  
12 21 South, Range 34 East, and Section 3, Township 22 South,  
13 Range 34 East.

14 We go to Exhibit 1-B. This is a sonic log of the  
15 State GRA No. 1 Well, and it shows the log through the  
16 recommended verticle interval of unitization, which we  
17 propose to make from the top of the Morrow Clastics to the  
18 base of the marker zone, and it shows the respective zones  
19 in this well that are producing; A, B, and D.

20 Exhibit 1-C is a map that shows the area lease  
21 ownership, and again we see the proposed unit area outlined  
22 there in dashed lines, and to the west of the proposed  
23 unit area we see two wells, the State GR4-1, and -- Pardon,  
24 that's the Federal GR4 No. 1, and the South Wilson Deep  
25 Unit wells. And, in these particular wells, while they are

1 not being proposed for the unit area, Llano owns 100 per  
2 cent of the working interest in the Federal GR4 No. 1  
3 Well, and in the South Wilson Deep Unit Well, they own  
4 99.5 per cent of the working interest, and they are  
5 negotiating with Superior on the south end of Section 10  
6 for their working interest in that particular well.

7 Exhibit 1-D is a structure map based on top of the  
8 Morrow Clastics, and while we feel this is not a  
9 structural-type reservoir, we picked it to show the  
10 structural topography, structural position of what could  
11 be the reservoir there in that area.

12 1-E is going back to Table 1 and Exhibit 1, and it  
13 more or less gives a general data for all the field wells.  
14 I would like to point out to the Examiner that the  
15 completion dates on most of the wells are fairly  
16 consistent, 65, 66; and over in Column 5, the initial  
17 potential on the wells, I think there is quite a diversity  
18 there; also, on the bottomhole pressures, seems like the  
19 South Wilson D Unit No. 2 and the Superior Government No.  
20 1 are anomalous to the other three wells. The equivalent  
21 production, it looks as if the State GRA No. 1 and the  
22 GRB No. 1 are going to produce the majority of the gas that  
23 will be produced from the area; and again, in Column 10,  
24 which is the last column on the right, the calculated flow  
25 capacity made from the four-point back pressure test,



1 indicates that the flow capacity is better on these two  
2 respective wells.

3 Exhibit 1-F is a cross section coming from the south  
4 part of the area through the Superior Government A No. 1  
5 Well on the left side of your cross section, and then it  
6 traverses towards the north as shown on your inset map  
7 over on the right-hand side. Again, this points out how  
8 irregular the Morrow sands are through this area. We see  
9 that we have approximately five zones; there are A, B, C,  
10 D, E; and we see no continuity across the reservoir of  
11 any one particular sand. I would like to point out in  
12 particular the unitized interval again from the top of the  
13 Morrow Clastics through the base of the marker zone, and  
14 it seems like we do have pretty good correlation through  
15 those two points. Also, I think over on the left, if you  
16 will look at the Superior Government A No. 1 Well, the  
17 C zone there is productive and, as you look across the  
18 reservoir, well, it appears in only one other well, which  
19 is the South Wilson D Unit No. 2, and it was pointed out  
20 on Exhibit 1-E. These two wells had anomalously low  
21 bottomhole pressures.

22 The difference in the coloring on the map indicates  
23 the sand intervals in yellow, the gross interval in the  
24 red is the attempt to show the effective pay thickness  
25 through this gross.

1 Q Now, would you explain to the Examiner the purpose of  
2 Exhibit 2?

3 A Exhibit 2 is the plan of operation. I would like to  
4 point out in this plan of operation we referred to Phase  
5 I, Phase II, and Phase III; and I believe this might be  
6 confusing if we was not pointing out that this all takes  
7 place in Phase I of what we are referring to as the  
8 unit agreement.

9 In particular, I think we'd like to point out in  
10 Phase I what we will be doing is trying to condition our  
11 wells and get the type of equipment that would be useable  
12 for both injection and withdrawal purposes. Then, we  
13 intend to start a pilot operation in order to determine if  
14 the amount of gas we put into these wells will give us the  
15 amount of pressure rise that we expect to have from the  
16 fact that we can measure the volume of the reservoir  
17 approximately from the amount of gas that has been taken  
18 out of it.

19 After having passed this Phase I, if we do, we will go  
20 into Phase II, which will be a period of installing  
21 permanent-type compression equipment and increasing the  
22 injectivity rate, and then we will corroborate the Phase I  
23 results and if they are up to our expectations, then we will  
24 go into Phase III, which is a full stage injection, which  
25 will be effected by putting on more permanent-type

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1 compression equipment.

2 I point out that we will be monitoring the offset  
3 wells during these different phases in order to find out  
4 if we do have any gas escaping from the unit area, from  
5 the area that is not proposed as being the unit area. And  
6 if this should occur, then we will take steps to try to  
7 enlarge the unit, to try to enlarge the contiguous area  
8 into our unit.

9 I'd like to refer to the diagramatic sketches of the  
10 State GRB No. 1 and the State GRA No. 1, as attached to  
11 the plan of operation. This essentially shows the type of  
12 equipment we will have downhole for our injection and  
13 withdrawal purposes and this consists of the permanent-  
14 type packer installations with the usual off and on tools  
15 that we have in this type of application, so that we can  
16 pull the tubing in case we had a leak without having the  
17 pressure come above the packer. We could isolate the  
18 pressure from above the packer by setting the blank off  
19 tool. We will keep pickle water in our annular space,  
20 pickle water being something to keep the annular space  
21 from corroding, as well as giving us some means of  
22 protection in case we had to drop the work on the formation.  
23 In other words, it would keep the place from swelling in  
24 the formation.

25 We intend to also file the usual monthly reports that

1 are made for the units that are involved with State  
2 minerals, and we also will file six-month reports to show  
3 the progress that we've made on all the phases that we  
4 are undertaking. At the termination of our Phase III  
5 stage of operation, we will file a new plan of operation  
6 with the Commissioner in order to inform him as to how we  
7 will make injection and withdrawals after we have filled  
8 up.

9 Q To clarify just a bit, Phase I, II, and III of your plan  
10 of operation are the plans that you currently have for the  
11 period of time designations in the unit agreement as Phase  
12 I?

13 A That's correct.

14 Q And is that basically the secondary recovery operation as  
15 proposed by the unit agreement?

16 A That's correct.

17 Q And Phase II of the unit agreement, then, is what, as  
18 contemplated by the unit agreement?

19 A Phase II is the gas storage part of the unit agreement;  
20 and this will be also a period where we will be recovering  
21 additional liquids from the reservoir; and we also incur  
22 a certain amount of BTU enrichment by vaporizing the  
23 liquids that are now in the reservoir and bringing it on  
24 out with the gas on withdrawal. So, we expect to, I think,  
25 provide at least two means, another source of revenue to

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1 the State, one being the liquids and two being the BTU  
2 enrichment.

3 Q Would you briefly explain the formula for payment of  
4 royalty and revenue to the State as set forth in the unit  
5 agreement?

6 A In Phase I or Phase II?

7 Q Both phases.

8 A In Phase I, it would be allocated on whichever plan the  
9 Commissioner accepts. As we pointed out in Exhibit C of  
10 the unit agreement, or that was the time extrapolation,  
11 the BHP over Z to be introduced, we will pay royalty in  
12 Phase I, or a predetermined amount of liquids that would  
13 be fair, that would be in an equitable manner based upon  
14 what we and also the State of New Mexico thinks would be  
15 fair for remaining primary reserves.

16 Phase II would be based upon the amount of liquid  
17 that we would recover from the formation. We would pay  
18 again, one-eighth of the royalty there; and on the BTU  
19 content or enrichment, we would pay one-eighth royalty  
20 there; and we propose to measure the amount of gas going  
21 into the reservoir and also measure the amount of gas  
22 that's withdrawn. We will make tests on the withdrawal  
23 amount and also on the injection amount and take an average  
24 to see if we are actually taking any BTU from the reservoir;  
25 and on this basis, we will make the payment for BTU

1 enrichment.

2 Q Now, would you tell us what Exhibit 3 is?

3 A Exhibit 3 is the result of the composite royalty production,  
4 and it shows the amount of BHP over Z method, and it shows  
5 the amount of the equivalent BTU that would be allocated  
6 to the GRA No. 1 and the GRB No. 1 Wells over their  
7 economic lives, under remaining primary reserve conditions.

8 MR. UTZ: Now, is this BTU or Mcf?

9 THE WITNESS: These are Mcf, should be total Mcf on  
10 the column there, Mr. Utz. It would be equivalent Mcf since  
11 we inverted any liquid that might be coming out on the basis  
12 of 3,500 cubic feet for one barrel of liquid.

13 MR. UTZ: 3,500 cubic feet per one barrel?

14 THE WITNESS: Yes, sir. This conversion factor is  
15 referred to in Exhibit 1.

16 Q (By Mr. Cox) The diagramatic sketch that you submitted  
17 as part of the plan of operation, does that reflect the  
18 procedure that you propose to use for a gas-injection  
19 well, as well as your withdrawal wells?

20 A Yes, sir, they are one and the same. It would take no  
21 special equipment for withdrawal or injection. We can use  
22 the same facilities right along.

23 Q If the unit agreement and the application for approval,  
24 application for approval of the unit agreement, and the  
25 application for injection of the gas into the storage area

1 into the secondary recovery, ultimately the storage area,  
 2 is approved, is it your opinion that this will tend to  
 3 prevent waste and promote conservation?

4 A Yes, sir.

5 MR. COX: I have no further questions.

6 MR. UTZ: Are there further questions of the witness?

7 MR. MORRIS: Yes, sir.

8 MR. UTZ: You may proceed.

9 CROSS-EXAMINATION

10 BY MR. MORRIS:

11 Q Mr. Wilson, which of these zones are you proposing to  
 12 inject gas into, all of them?

13 A Well, in the case of GRA and GRB, if you will refer to  
 14 your cross section, you can see the GRA No. 1 is completed  
 15 in the A Zone and D Zone, the GRB No. 1 is completed in  
 16 the B Zone and the D Zone and the E Zone; and, again, we  
 17 feel that, this is just more or less from my volumetric  
 18 interpretations, that is in the GRB No. 1 Well, only the  
 19 B and D Zones are affected. So, therefore, we only  
 20 propose, in this particular unit area, that we will be  
 21 putting gas into those respective zones.

22 Q What criterion have you used in showing the portion of  
 23 these zones marked in red on your Exhibit 1-F?

24 A We tried to relate it to volumetrics, going with the  
 25 average porosity and water saturation in using the proration

1 acreage of 640, putting this much gas back underground  
2 within the respective wells, according to the ultimate  
3 production that they would make.

4 Q Maybe I didn't make myself clear. In showing the portions  
5 of these zones colored in red on Exhibit 1-F, have you  
6 used any porosity cut-off prameter?

7 A As far as average pay on the logs?

8 Q Yes.

9 A We felt that we couldn't use a porosity cut-off because  
10 we were looking at gross intervals over the log that were  
11 not representative of the amount of gas that was being  
12 produced from a particular well.

13 Our gross interval, or what would be net log pay,  
14 was really larger than what we were actually able to  
15 produce on, I think, performance; and on this basis, we  
16 felt that we could come up with a representative cut-off  
17 porosity.

18 Q On either side of your cross section, you have a  
19 designation, "0 Pay from Isopachous Map."

20 Now, do you have an Isopachous Map presented here as  
21 part of your exhibits?

22 A No, sir, I do not. I have an Isopachous Map that I think  
23 I could introduce into evidence. It's more or less just a  
24 general effective pay over the area, entire area.

25 This is the only one I have (indicating).



1 MR. MORRIS: Could we have this marked as an exhibit?

2 (Whereupon, Llano's Exhibit No. 4 was marked into  
3 evidence.)

4 MR. MORRIS: Mr. Cox, is it satisfactory with you,  
5 if this is offered as an exhibit?

6 MR. COX: This is the information from which you  
7 prepared that map?

8 THE WITNESS: That's correct.

9 MR. COX: We have no objection.

10 Q (By Mr. Morris) Mr. Wilson, I'm not too good at reading  
11 Isopachous maps, will you tell us what this shows, please?

12 A This gives the average pay that would be under the area  
13 of these five wells over the entire area, or the Grama  
14 Ridge Morrow Field; and, it's based on, again, volumetrics  
15 and trying to put the gas that they produce back into the  
16 ground and coming up with a number of acre of feet that  
17 would be required for that purpose.

18 Q All right. Now, is the outermost contour there a 0 contour?

19 A That's correct.

20 Q And then what is the contour interval?

21 A 0, 5, 10, 15, so forth.

22 Q Now, what control did you have in preparing this map in  
23 the southwesterly direction?

24 A Southwesterly direction, we had the GR4 No. 1 and then the  
25 Superior Government Well. This gave us the only control

1 we had in this area. It was an interpretation made from  
2 the study of these two wells, the GR4 No. 1 and the  
3 Government.

4 Q Now, I notice on this exhibit that you put a cross mark  
5 across Section 8, which is the Southern Union Production  
6 Company acreage. Does that have any significance?

7 A Well, no, sir, not really. I don't think it did at the  
8 time, I think we one time thought about using that as a  
9 unit area, and then it was just blocked out, was the  
10 reason for it.

11 Q Does your control in this area definitely dictate against  
12 that acreage being productive of gas, or being in  
13 communication with the unit area as you are proposing it  
14 in this hearing at this time?

15 A I'd say definitely we don't think we are trying to say it's  
16 non-productive. The only thing we are trying to point out  
17 from our Isopach Map would be that we think that these  
18 sands are rather limited, they are irregular; and, again,  
19 looking at the cross section, you can take any particular  
20 sand and I think if you go across the area, they are very  
21 irregular.

22 So, we feel that they certainly could come in again on  
23 your particular Section 8 and while this would be  
24 geologically the same sand, we feel that historically it  
25 would not be connected. So, therefore, we are not -- We

1 are looking at the combined volume under the area that we  
2 propose to pick as a gas storage unit.

3 Q Before you can definitely say whether the acreage in  
4 Section 8 is or is not productive and is or is not  
5 connected with the proposed unit acreage, you'd really  
6 have to have some additional development, would you not?

7 A We wouldn't mind if you drilled a well down there, if we  
8 had a storage area, if you want to spend the money.

9 Q Now, is the accumulation here in your unit area, is it  
10 controlled structurally or stratigraphically?

11 A Stratigraphically. We feel structure has no importance  
12 whatsoever on the accumulation of the hydrocarbons. It's  
13 more of a porosity-permeability feature within the  
14 individual sands.

15 Q Now, your Exhibit 1-D, is that a structured map?

16 A That's correct.

17 Q If structure has no bearing in this hearing, I was just  
18 wondering what the significance of the structure map was  
19 as an exhibit here.

20 A It was merely to point out the structural configuration of  
21 the reservoir in this area. We are not trying to place  
22 any importance on it as a producing mechanism, we feel  
23 it's strictly stratigraphic.

24 Q Your plan of operation, Phase I, calls for compatability  
25 testing.

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1 Is the gas that you are going to be putting in here,  
2 is it Morrow gas?

3 A I feel that it would be a mixture of gases. In all  
4 probability, some of it would be Morrow, but it would be  
5 a mixture of gases that have been put into the Llano  
6 transmission lines.

7 Q Do you know at this time what the source of gas is that you  
8 would propose to store in this reservoir?

9 A I don't feel that I could answer that question. I think,  
10 Mr. Morris, possibly we have someone here that could.

11 Q You don't know?

12 A I do not know.

13 Q Do you propose to make these compatability tests available  
14 to the Commission before you proceed to Phase II or III of  
15 your program?

16 A Well, we will furnish the Commissioner with a report every  
17 six months in order to give him the progress of the Phase  
18 I, Phase II, and Phase III and certainly it would be no  
19 trouble at all to inform the Commissioner at the end of  
20 any particular phase if he so desires.

21 Q I wasn't referring to the Commissioner of Public Lands, I  
22 was referring to the Oil Conservation Commission, as to  
23 whether you are proposing to make reports to them and gain  
24 further approval from this Commission before you proceeded  
25 into your storage project.

1 A I don't think that's our intention. Our intention is to  
2 go ahead and file this with the Commissioner and then  
3 we'll go with our reports to him every six months and  
4 furnish him monthly reports of any injection, withdrawal,  
5 or liquid production. This will be furnished to the  
6 State, of course, and they will be in turn furnished a  
7 copy of it.

8 Q In other words, you don't propose to have any further  
9 hearings before the Oil Conservation Commission itself  
10 when you go from a pilot project into a full-scale storage  
11 project?

12 A One is not contemplated.

13 Q What are the total amounts of the gas that you propose to  
14 store in this unit area?

15 A After we get past Phase I, we will design our permanent  
16 compression equipment for a maximum of 2,500 PSI surface  
17 pressure, which in turn will enable us, under the volume  
18 pressure concept we have of the reservoir, to inject  
19 something close to 8,000,000 cubic feet.

20 If we should desire to go to any higher pressures,  
21 we would have to modify our equipment and, there again,  
22 we would come back to the Commission for approval of a  
23 plan of operation in order to surface the 2,500 PSI surface  
24 pressure.

25 Q Now, here again, are you talking about coming back to the

1 Commissioner of Public Lands, or back to the Oil  
2 Commission?

3 A To the Commission of Public Lands, Commissioner of Public  
4 Lands.

5 Q In your Direct testimony, I think you stated that after you  
6 made your test to determine limits of the Morrow  
7 reservoir, that you might have to take steps to enlarge  
8 the unit, and that your unit agreement so provides.

9 A We have talked this over with the State Land Office and  
10 they were of the opinion that if it had to be enlarged,  
11 that we certainly would have to negate this unit agreement  
12 and start from scratch and have another one.

13 MR. MORRIS: Mr. Cox, I did not receive a copy of the  
14 unit agreement itself. Do you have one I could look at?

15 MR. COX: I have an office copy.

16 Q (By Mr. Morris) The unit agreement that you have proposed  
17 for approval by the Commission, has it be tentatively  
18 agreed upon between your company and the Commissioner of  
19 Public Lands as to form?

20 A As to form, I think we are in some agreement. We are, as  
21 I said before, still negotiating under Article 11, under  
22 11-B.

23 MR. MORRIS: I think that's all the questions I have.

24 Thank you.

25

CROSS-EXAMINATION

BY MR. UTZ:

Q Mr. Wilson, your testimony was that your maximum pressure at this time for injection purposes would be 2,500 surface?

A Yes, sir.

Q The original pressure of this pool is something like 7,000-pound surface, or was that bottomhole?

A Referring again to Exhibit 1-E, the pressures were 7,500 on three of the wells, and I think one of them was 58 and the other was 69. This is well below the original bottomhole pressures.

Q How are you closed on this structure, is it water, permeability pinch out?

A Permeability pinch out, Mr. Utz.

Q Do you feel that your Isopachous Map, showing a 0 pay, is the pinch out? Does it seal there, or is it further away?

A We feel that we are within limits. As I said before, we worked this up on a volumetric basis and it's the best way that we can do from the information available without going to the additional expense of development.

We feel there is no pressure anomalies shown on the surface that we can see that would call for further development. So, that's one of the bases that makes it

1 the depleted reservoir, that it will go for gas storage.

2 Q Referring to your Exhibit 1-D, which is your structure  
3 map, can you state which of those contours you feel is  
4 the limit of your reservoir?

5 A Well, sir, as I said before, I don't think structure is  
6 significant in this particular case because these are  
7 sands that I think are stratigraphic in nature; and I  
8 think if you went up structure or down structure, you  
9 would come into an entirely different area of permeability  
10 and porosity, where you could have hydrocarbons; and  
11 structure has no bearing whatsoever on the ability of  
12 these sands to produce.

13 Q May I see your Isopach Map? Do you still have that with  
14 you?

15 A Yes, sir.

16 Q Do you feel that Sections 3 and 34 include the entire  
17 structure in which you will store gas?

18 A Sections 3 and 34 include the entire structure, no, sir,  
19 I don't consider that they do.

20 Q You don't?

21 A No, sir, I don't.

22 Q Are we just unitizing Sections 3 and 34, rather than 33  
23 and 4, the other sections?

24 A We feel that the individual sands within the wells are  
25 limited, and while we will be storing gas into Sections 3



1 and 34, we will be able to, as the work interest operator,  
2 as I said before, we have 100 per cent of GR4-1 and 99.5  
3 per cent of the South Wilson D Unit No. 2 Wells. We  
4 feel that we can monitor these offset wells and if we do  
5 have a show of gas over to these respective sections, 33  
6 and 4, we can then take enlargement measures.

7 Q Does Llano own the leases on Section 33 and Section 4?

8 A They are not the lessee of the record.

9 Q Do you have an agreement with them of any nature in regard  
10 to this storage area?

11 A In regard to this Section 34 and 3?

12 Q No, Sections 33 and 4, the sections immediately to the  
13 west.

14 A Well, as working interest operator, we could effect an  
15 agreement should it be shown that communication exists.

16 MR. COX: I believe he testified that they own 99.5  
17 per cent of Section 33 and 100 per cent of Section 4, the  
18 operating rights in this zone.

19 Q (By Mr. Utz) Well, that's what I was trying to ask you,  
20 we just didn't communicate too well.

21 A I'm sorry.

22 Q Well, what are you going to do with those wells, keep them  
23 shut in?

24 A No, sir, we will continue to produce them and we will be  
25 able to find anomalies, I believe, from our rate-time

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1 extrapolation, and also by BHP over Z extrapolation; and  
2 we can tell if there is any communication between these  
3 wells that should be depleting from the gas that's been  
4 injected to build up the pressure on Section 34 and Section  
5 3.

6 Q Okay. Now, you are going to use GRB 1 and GRA 1 for  
7 injection. Can you produce those wells if you so desire?

8 A Yes, sir, we can.

9 Q Now, in regard to your Exhibit Number 2, I guess there  
10 are two parts to it, aren't there?

11 A Plan of operation and the diagramatic sketches, yes, sir.

12 Q Is this the manner in which these wells are now completed?

13 A Yes, sir, it is. I say "now completed." This is the way  
14 we propose to complete it in regard to the tubing, but  
15 there are production packers in the well, and the GRB No.  
16 1 is not exactly as depicted, but this is the way that we  
17 propose to put the tubing string in order to produce and  
18 inject the gas.

19 Q You are going to load the annulus with inert fluid, I  
20 believe you said.

21 A Yes, sir.

22 Q How are you going to monitor the annulus, with a gauge or  
23 leave it open?

24 A We will have gauges on the annulus in order to observe any  
25 pressure increase.

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

2 MR. STAMETS: Just a couple.

3 CROSS-EXAMINATION

4 BY MR. STAMETS:

5 Q The gas will be processed before storage to knock out  
6 the liquids?

7 A The gas will be coming from the transmission lines and it  
8 will have been processed before it gets to the storage  
9 area.

10 Q Through a gasoline plant?

11 A Well, whatever way they do that, I wouldn't tell you for  
12 sure I know.

13 Q I don't believe that the Commission has a gas storage  
14 project form. I assume Llano would work with the  
15 Commission to come up with an acceptable form for our  
16 use, something we might use in cooperation with the State  
17 Land Office?

18 A We would be happy to.

19 Q One other thing that may be a problem would be the liquids  
20 produced with any gas coming back up. I'm sure that you  
21 would not report your storage gas to us on a Form C-115,  
22 but I would think that the liquids produced would have to  
23 be reported on a C-115.

24 A Right.

25 MR. STAMETS: That's all.

CROSS-EXAMINATION

BY MR. UTZ:

Q Mr. Wilson, do you feel that there is any communication between Section 8 and your storage area?

A Between Section 8. From the calculations I've made on the volume, I feel it unlikely. I feel there is communication geologically, I think, between these two areas; but historically, I don't see that there is any apparent.

Q All right, sir. Referring to your two methods at arriving at future reserves, is there a considerable difference by using the BHP method and the production-time method?

A There is an approximate difference of 2,200, or probably 22,000 Mcf, which would be royalty. This was 34 on the original and I think it comes out to approximately 56,000 on the BHP over Z extrapolation.

Q Is that just for one well, or for both wells?

A That's for both wells.

Q What's this 50,260 I see at the bottom of the GRA Well?

A That's the GRB, that's just from the date 1/1/73 through the entire operation of what would be the remaining primary. In February of 1970, there is cumulative of 50,260 Mcf, which when added back with the production that would come from the GRA, 6,210 Mcf, that would total up to 56,470 Mcf.

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

1 MR. MORRIS: Mr. Examiner, I have one more that was  
2 prompted by your question.

3 CROSS-EXAMINATION

4 BY MR. MORRIS:

5 Q Mr. Wilson, Mr. Utz asked your opinion concerning the  
6 probability of communication between Section 8 and the  
7 unit area. Would the pressure analyses that you undertake  
8 during the pilot test put you in a position to answer that  
9 question more definitively?

10 A I think our answer now would be on what we have observed  
11 from performance and from history, is that the area that  
12 would have to be allocated under this unit area in the  
13 direction of your well would have to be enlarged in so  
14 large a manner that we don't feel it could be probable  
15 that you have communication in Section 8. All that we  
16 hope to get from our tests, as we start our injection, is  
17 the answer that will confirm the volumetrics that we have  
18 come up with from our past history.

19 In other words, it's just a situation of taking  
20 pressure and volume measurements and then trying to put  
21 them up as a different pressure and then you can come up  
22 with a volume that you expect to get at a point after so  
23 much gas has been injected; and if your pressure comes up  
24 to the point that you expected it would have under the  
25 volume of sums that you have made, then you feel that your

1 calculations are correct.

2 Q And if it does not?

3 A Then, that means that it is leaving us and it's going in  
4 the direction of, I think, these other wells.

5 Q It could be going in the direction of Section 8.

6 A Well, I would not say Section 8 so much as Section 33 and  
7 Section 4, and, say, Section 10.

8 Q I see. But it is an objective of your pilot test to  
9 determine by pressure analysis the limits of the Morrow  
10 reservoir?

11 A It is.

12 Q That's what you have stated here in the plan of operation.

13 A The purpose of our Phase I, in other words, we have said  
14 in Phase I, in order to determine by pressure analysis the  
15 limits of the Morrow reservoir and the compatibility for  
16 gas storage of the well, we have a limit of the Morrow  
17 reservoir now in mind and if we can establish this limit  
18 again by fill-up operation, we feel that what we have come  
19 up with, as far as our calculations from history, we feel  
20 that we have corroborated our case and we have a good  
21 storage reservoir. We have a tight jug.

22 MR. MORRIS: That's all.

23 MR. UTZ: Other questions?

24 MR. COX: Mr. Utz, I would like to offer Exhibits 1  
25 through 4, inclusive, now, in evidence. Exhibit 1, including

1 A, B, C, D, E, and F.

2 MR. UTZ: They will be accepted in evidence.

3 Are there statements in the case?

4 MR. MORRIS: I have just a very brief statement, Mr.  
5 Examiner.

6 I think it's apparent from the plan of operation and  
7 Mr. Wilson's testimony here today that the applicant is not  
8 certain of the limits of the Morrow reservoir. It has a  
9 tentative conclusion in that direction, but this is one of the  
10 avowed purposes of the pilot test, is to determine whether  
11 those tentative conclusions are valid.

12 We would recommend to the Examiner that the Commission  
13 retain jurisdiction of this matter and make provision in any  
14 order approving this unit agreement and project for reopening  
15 of this matter and further hearing concerning this matter before  
16 the plan of operation proceeds from Phase I into the permanent  
17 phase of the project.

18 Certainly, there is adequate precedent in Commission  
19 practice for this type of provision. It's been common in the  
20 Commission's practice as far as water injection is concerned,  
21 in making the transition from pilot project to full scale water  
22 project, that the matter be reviewed by the Commission so that  
23 all interested parties can be apprised of the information that  
24 is available at that time; and make a determination as to  
25 whether, Number 1, continuation of the project would cause waste,

1 or Number 2, whether the correlative rights of any interest  
2 owner in the area can be adversely affected.

3 We would recommend that the Commission enter an  
4 order in this matter, as it sees fit, otherwise, to approve  
5 the agreement and the project, that would make definite  
6 provision for reopening the case at the time Phase I of the  
7 plan of operation is completed.

8 MR. COX: I'd like to just say in closing, Mr. Utz,  
9 that this, I believe, the proposal contained in this  
10 application, is probably a first for all of us. I don't think  
11 there is anything like it in the State Land Office; the State  
12 Land Office certainly hasn't had anything like this.

13 This is explicitly an experimental project. The  
14 applicant is making an effort to find a way to utilize New  
15 Mexico gas in New Mexico, and the objective is one that has been  
16 a considerable matter. They are willing to spend a pretty good  
17 hunk of change to see whether it will work or not, and it is  
18 going to be an expensive operation, one which will be most  
19 beneficial if their projected hopes are realized.

20 For those reasons, we feel definitely that the  
21 application should be granted and the unit agreement approved  
22 and the method of injection approved. The Commission, of  
23 course, does have jurisdiction to reopen these matters, and I  
24 don't think that we want to be coming back up here every year  
25 on this project if it can be avoided; but, certainly, it would



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1 be amenable to discussing the matter and coming to a hearing  
2 before the Commission, or the Examiner, at such time as there  
3 is a need for it, at such time as the Commission deems it  
4 necessary.

5 MR. UTZ: Would Llano object to coming in at the  
6 end of Phase I with a full-scale report on it?

7 THE WITNESS: No, sir. We would be happy to.

8 MR. UTZ: Does anyone have anything further in this  
9 case?

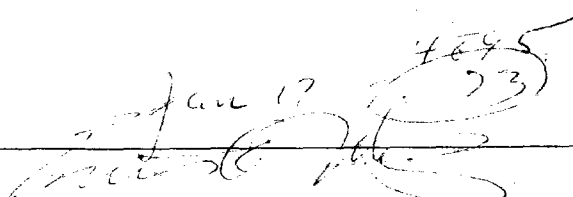
10 (No response.)

11 MR. UTZ: The case will be taken under advisement.

12 STATE OF NEW MEXICO )  
13 ) ss  
14 COUNTY OF BERNALILLO )

15 I, JOHN DE LA ROSA, a Court Reporter, in and for the  
16 County of Bernalillo, State of New Mexico, do hereby certify  
17 that the foregoing and attached Transcript of Hearing before  
18 the New Mexico Oil Conservation Commission was reported by  
19 me; and that the same is a true and correct record of the said  
20 proceedings to the best of my knowledge, skill and ability.

21   
22 COURT REPORTER

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24  
25  


I N D E XWITNESSPAGE

ROBERT B. WILSON

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