

BEFORE THE  
**Oil Conservation Commission**  
SANTA FE, NEW MEXICO

August 17, 1955

IN THE MATTER OF:

CASE NO. 935, 278, 889, 890,  
~~891, 926, 927~~  
Consolidated

TRANSCRIPT OF PROCEEDINGS

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BEFORE THE  
OIL CONSERVATION COMMISSION  
STATE OF NEW MEXICO

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TRANSCRIPTION OF HEARING

CASE NO. 278

10 July, 1951  
(Date)

BEFORE THE  
OIL CONSERVATION COMMISSION  
STATE OF NEW MEXICO

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Case 278: (Continued from the June 21, 1951, hearing.)

BEFORE: Hon. Ed. L. Mechem, Chairman  
Hon. R. R. Spurrier, Member

R E G I S T E R:

Dwight H. Plackard, New Mexico Miners Association,  
Albuquerque, N. M.

G. R. Griswold, Mining Engineer, Albuquerque, N. M.

Homer Dailey, Continental Oil Co., Midland, Texas.

M. A. Sherwood, Shell Oil Co., Midland, Texas.

G. E. Cameron, Humble Oil & Refining Co., Houston, Texas.

J. W. House, do. do. , Midland, Texas.

Emery Carper, Carper Drilling Co., Artesia, N. M.

W. M. Jones, Stanolind Oil & Gas Co., Lubbock, Texas.

Ralph L. Gray, Buffalo Oil Co., Artesia, N. M.

Harvey E. Yates, do. do. do. do.

H. S. Cave, Phillips Petroleum Co., Roswell, N. M.

S. B. Christy, Sun Oil Co., Roswell, N. M.

E. L. Shafer, Continental Oil Co., Hobbs, N. M.

Charles C. Lawless, Jr., New Mexico Oil & Gas Association,  
Roswell, N. M.

F. O. Davis, Potash Company of America, Carlsbad, N. M.

T. M. Cramer, U. S. Potash Co., Carlsbad, N. M.

Oliver Seth, U. S. Potash Co., Santa Fe, N. M.

G. C. Weaver, Duval Sulphur & Potash Co., Carlsbad, N.M.

W. R. Morris, do. do. do.

H. L. Gardner, International Minerals & Chemical Corp.,  
Carlsbad, N. M.

J. E. Hill, Richardson and Bass, Fort Worth, Texas.

R. H. Steinart, Southwest Potash Corporation, Carlsbad,  
N. M.

Claude E. Upchurch, Gulf Oil Corporation, Fort Worth,  
Texas.

Foster Morrell, U.S.G.S., Roswell, N. M.

R. S. Fulton, U.S.G.S., Carlsbad, N. M.

R. H. Allport, U.S.G.S., Carlsbad, N. M.

R. L. Boss, Gulf Oil Corporation, Roswell, N. M.

P. D. Grommon, Jr., The Texas Co., Fort Worth, Texas.

G.R. Brown, The Texas Co., Midland, Texas.

Harve H. Mayfield, Magnolia Petroleum Co., Midland,  
Texas.

E. E. Kinney, New Mexico Bureau of Mines, Artesia, N. M.

Glenn Staley, New Mexico Oil and Gas Engineering Com-  
mittee, Hobbs, N. M.

Justin Newman, O.C.C., Artesia, N. M.

George W. Selinger, Skelly Oil Co., Tulsa, Okla.

Jack M. Campbell, Richardson and Bass, Roswell, N.M.

L. C. White, O.C.C., Santa Fe, N. M.

George Graham, O.C.C., Santa Fe, N. M.

MR. SPURRIER: The meeting will come to order, gentlemen. This is a continuation from the last hearing of this case. And I believe that Judge Seth, or an attorney representing the potash people, were to put their case on at this time.

MR. CAMPBELL: Mr. Commissioner, it might be a little more orderly -- we have a few suggested changes in the casing program that was submitted the last time. And in order to complete our presentation, it might be proper for us to make those suggested changes at this time so that the potash people know what we have in mind. If we could just put Mr. Hill back on again, and have him get into the record those changes, and then go ahead with the potash presentation.

MR. SPURRIER: Is that agreeable with the potash people?

A VOICE: Yes.

J. E. HILL, having been sworn at the prior hearing on June 21, 1951, testified as follows:

DIRECT EXAMINATION BY MR. CAMPBELL:

MR. SPURRIER: You are reminded you have been sworn, Mr. Hill.

MR. HILL: Yes, sir.

Q (By Mr. Campbell) You are Mr. J. E. Hill? ---A. Yes, sir.

Q Employed by Richardson and Bass, Fort Worth, Texas? ---A. Yes, sir.

Q You previously testified in this hearing? ---A. Yes, sir.

Q At the time you testified previously, Mr. Hill, I believe you put into the record Exhibit A, which was a casing program suggested by a subcommittee of the New Mexico Oil and Gas Engineering Committee, is that correct? ---A. That is correct, sir.

Q And since that hearing do you have any suggestions to make as to proposed changes in that suggested casing and cementing program shown as Exhibit A in the record here? ---A. We have, sir.

Q Would you state to the Commission for the record what those changes are? ---A. In Exhibit A, par. 4 of the No. 1 section, title "Subsurface Casing String", we propose the following change to be made, and that par. 4 begin with the following sentence: "This casing string shall be tested with a hydraulic pressure of 600 lbs psi. If a drop of 100 lbs psi or more should occur within 30 minutes, corrective measures should be applied." That is our recommended 4th paragraph under Section 1. And in doing that we have deleted any reference to cable tools and the testing of a string under a cable-tool method.

Under Section 2, title "Salt Protection String", we propose that the first word of par. 1 be changed to "a", to read, "A salt protection string shall be set at least 100 ft. and not more than 200 ft. below the base of the salt section. This string may consist of new, secondhand, or reconditioned pipe. New pipe shall have received a mill test of not less than 1,000 lbs psi; secondhand and reconditioned pipe shall be retested to 1,000 lbs psi before being run." We also propose that par. 2, which is a single sentence, be changed to read as follows: "Centralizers shall be used on at least every 150 ft. of casing below the surface casing." This change was made at the instance of a telegram that was received at the last hearing which called for a definite distance between centralizers on the salt protection string. Par. 3 of Section 2 will be the same for the first sentence. The parentheses sentence and the third sentence. We propose to change the fourth sentence of that paragraph to read as follows: "If the cement fails to reach the surface, the top of the cement shall be located by a temperature or gamma ray survey; and additional cement jobs done until cement is brought to the surface."

Q Will you state the reason for that? ---A. The reason for that change was that if we did have full circulation under the previous written rule there would be no reason to run a gamma ray or temperature survey, and this just clarifies the responsibility if the cement does fail to reach the surface.

Q Isn't it true it gives the operator some option as to the method he shall use in seeing it does reach the surface? ---A. That's right.

We propose the fifth sentence be deleted from the original third paragraph to read as follows -- be deleted and this

sentence inserted, "The Oil Conservation Commission shall be furnished with proof that the salt string is cemented to the surface; either by having a Commission representative witness the job or by affidavits or logs filed with the Commission."

In par. 4 of Section 2 we propose to eliminate the first two sentences and substitute this sentence, "This casing string shall be tested with a hydraulic pressure of 1,000 lbs psi." The third sentence shall remain as written; which is, "If a drop of 100 lbs psi or more should occur within thirty minutes, corrective measures shall be applied." We propose to delete the next sentence, which begins with, "If cable tools are used ....."

Section 3, "Intermediate String." We propose to introduce the first paragraph with this portion of a sentence, "If the operator runs an intermediate string, this string may be a drilling protection string for deep drilling objectives or may be an oil string for testing medium depth zones."

This sub "a" under par. 3, the first sentence is to be left as written and the next sentence deleted, and this substitute sentence added, "The operator shall furnish proof to the Oil Conservation Commission that this cementing requirement has been fulfilled, either by having a representative of the Commission witness the job or by affidavits or logs filed with the Oil Conservation Commission." And this sentence shall be added -- these two sentences are to be added under subsection "a" of this Section 3 -- "Cement shall be allowed to stand a minimum of 12 hours under pressure, and a total of 24 hours before drilling the plug or initiating tests. Casing shall be tested with a hydraulic pressure of 1,000 lbs. psi. If a drop of 100 lbs psi or more should occur within 30 minutes, corrective measures shall be applied."

Sub-paragraph "b" under Section 3. The first sentence of "b" shall read the same; with the addition at the end of the sentence of this statement, "... and the Oil Conservation Commission satisfied that this requirement has been fulfilled either by a representative of the Commission witnessing the job or by affidavits or logs filed with the Commission. Cement time and testing rules shall apply similarly in the case of this string as is written for the above string." The last sentence of sub-par. "b" under 3 is deleted.

Sec. 4, " Oil and Production Strings (deep wells)" There

is no change in this section with the exception that the following sentence is recommended to be added: "Cement shall be allowed to stand a minimum of 12 hours under pressure and a total of 24 hours before drilling the plug or initiating tests. Hydraulic pressure tests shall be applied to this string as above."

Section 5, "Drilling Fluid for Salt Section," remains the same.

Q Mr. Hill, are these suggested changes concurred in by the members of the subcommittee who formed the original suggestions? ---A. Yes, sir.

Q And in your opinion does this proposed program with the changes that you have suggested give adequate protection to the salt section, which we are seeking here to protect? ---A. We believe it does, yes, sir.

Q This recommendation remains that of the individual members of this subcommittee, is that correct? ---A. That is true; and also as the recommendation of Richardson and Bass as an individual operator.

Q As far as your company is concerned, you are willing to comply with this particular casing and cementing program in a critical potash area, is that correct? ---A. Yes, sir.

Q Mr. Hill, I believe you testified in the previous hearing that your company owned leases in this area, and you were prepared to drill deep tests in the general area. Can you state whether your company, whether there are any areas, which your company would not consider drilling oil wells in? ---A. We do not anticipate drilling on any of the lands presently being worked by the potash companies; specifically, in or on their mine workings areas, or in any of the areas in which they plan to explore in the future. And as a normal distance, we believe that one-half mile outside of the known or contemplated workings should be restricted.

Q And in that regard, would you be willing to give consideration to the fact that there are two new companies in that area now drilling shafts? ---A. Yes, sir.

Q And be willing to give consideration to the fact that they have not as yet undertaken any mine workings in determining

the area in which you would not drill? ---A. That is true.

MR. CAMPBELL: I believe that is all.

MR. SPURRIER: Does anyone have any question of this witness? Mr. Morrell.

MR. MORRELL: Mr. Spurrier, I would like to ask Mr. Hill one question with the thought of clarifying the record for the Commission. Section No. 3 refers to testing medium depth or medium depth zones. I think probably that should be **defined** by a depth or formation so that there will be a distinction between that and the reference to the cable tool Exhibit B to shallow.

MR. CAMPBELL: Mr. Hill, did the committee consider that at the time Section 3 was prepared? ---A. This section, of course, refers to either a drilling protection string for deep drilling objectives, or maybe an oil string for testing medium-depth zones. I would say that a medium depth zone as far as depth is concerned would be approximately a 5,000 ft. depth, or it could be 4,000 ft.

MR. MORRELL: I was merely noting that Exhibit B spoke of shallow wells above 5,000 ft.

MR. HILL: I think 5,000 ft. could be a critical depth point to clarify both jobs.

MR. MORRELL: Your medium depth zone would be below 5,000?

MR. HILL: Above 5,000.

MR. MORRELL: So, it would be synonymous to shallow?

MR. HILL: Yes, sir.

MR. MORRELL: That is all.

MR. SPURRIER: Thank you. Anyone else?

MR. SETH: May I ask one question? About the rule for plugging. Will that be considered separately or does this ~~cover that?~~

MR. HILL: The Engineering Committee did not write up

any rules for plugging or abandonment of wells. But I think they can be set up and agreed to mutually very easily. And I would suggest, as your potash companies have certain rules for abandonment, they be presented, and they statements can be made and suggestions or criticism. I would suggest that be entered into the record as part of this thing, as to the rules, or a discussion can be had on it.

MR. SETH: That is part of the picture, isn't it?

MR. HILL: Definitely, but we haven't --

MR. SETH: Have you prepared any recommendations for plugging or abandonment? ---A. No, sir, but I am prepared to approve any you might submit with reasonable good operating practice. And I would be willing to approve them or discuss them as they are presented.

MR. SETH: May we have a copy of these proposed changes? Do you have any, Jack?

MR. CAMPBELL: We have, unfortunately, only one which has been interlined. You may have it to make a copy. We do not have a full set of the changes. Mr. Hill, in connection with the plugging and abandonment matter, could you state generally insofar as your company is concerned what procedure you follow normally in the salt areas in the plugging or abandonment of wells? ---A. Under the conditions of these casing rules, there would be no effort made to recover any of the strings now; surface, salt protection string, or intermediate string or drilling protection string. Because they will have been cemented to the surface, and the drilling protection string will have been cemented from 1,000 ft. below the bottom of the salt protection string to the surface. Any known or discovered shows below a protection string would normally be cemented off by cement placed at least 100 ft below to a point at least 100 ft. above; and the normal practice would be to set a plug from 500 ft. below the protection string on up into the protection string some 2 to 300 ft. That would preclude any possible migration. And with your casing remaining intact, an upper plug of some 1,000 ft. could be set in the upper part of the hole, or it wouldn't be impractical to even put a column of cement equal to your salt section in the last, or your smallest string, left in the well.

MR. SPURRIER: The Commission would like to remind

those present that Mr. Hill is available at this time for cross-examination, and I presume he will be later.

MR. CAMPBELL: Yes. He will be here throughout the hearing for questions he can answer.

MR. SPURRIER: If you desire to cross-examine, now is the time to do it; before the potash people put on their testimony. Are there any more questions? If not, the witness may be excused.

(Witness excused.)

MR. CAMPBELL: Mr. Commissioner, that is all at this time. It may be we may want to call additional witnesses following presentation of some information by the potash industry.

MR. SPURRIER: Well, it occurs to me that the changes you have made here -- you and Mr. Hill have read into the record -- may be quite difficult to follow, and some of these people may have either comment or questions after they have been able to see exactly what those changes are.

MR. CAMPBELL: Mr. Hill will be available all day, and if they can go over the changes sometime during the course of the day, he will be available for the discussion of them.

MR. HILL: The changes are actually of no material moment. Just more for clarification and for testing some of the strings presented in the original rules. For example, one of the changes just directly places the centralizer rather than leaves it at the free joints.

MR. YATES: Mr. Commissioner, I would like to know in advance if it is clearly understood this program he is presenting is for rotary only, for deep-well zones.

MR. SPURRIER: Mr. Hill, can you answer that?

MR. HILL: That is the way that the -- I think the rules that were first introduced were for -- may I have that copy just a second? Oil and gas casing and cementing programs for oil and gas test wells in the defined areas in Eddy County, N. M. And the point brought up by Mr. Yates referring to cable tools. We purposely deleted any reference to cable-tool

methods and testing, and as a consequence the entire set of rules refers only to rotary drilling.

MR. SPURRIER: Does that answer the question?

MR. YATES: That's right.

A VOICE: Pardon me, Mr. Hill. Does that say only Eddy County? The area shown on the map goes into Lea County.

MR. HILL: It should be applied to Lea County then.

A VOICE: You removed all reference to cable-tool drilling. Why was that?

MR. HILL: It was suggested by cable-tool drillers and shallow operators, inasmuch as we were attempting to describe rules for deeper drilling, particularly on the rotary drilling, and they preferred it should be confined to that under this particular program.

A VOICE: Is it contemplated there be a separate set of regulations for cable-tool drilling?

MR. HILL: There were separate rules presented at the last meeting, marked Exhibit B and Exhibit C, which covered as I believe medium depth tests -- well, by rotary or cable tool-- and then one exclusively cable tools. And we didn't feel we could speak for every operator in the state, and we didn't feel the responsibility of attempting to secure casing and cementing programs for deeper test wells in this general area, and as a consequence we couldn't see how we, as individual operators, could force every body to drill different type wells to follow the same set of rules.

MR. MORRELL: In that connection, the heading as now printed says, "Casing and Cementing Programs for Oil and Gas Test Wells." Following your expression just now, would it clarify it to insert "rotary-drilled" before "test Wells"?

MR. HILL: That would be all right, sir.

MR. MORRELL: In the defined areas of Eddy and Lea Counties.

MR. CAMPBELL: I would like to have the record show that Exhibit A, B, and C were offered in evidence, and that the

suggested amendments were -- to Exhibit A -- were also offered in evidence.

MR. SPURRIER: Did everyone hear that? These exhibits A, B, C, and D have been offered in evidence, and without objection they will be accepted.

MR. CAMPBELL: Exhibit A is amended.

MR. SPURRIER: That includes the Exhibit A as amended this morning. Does anyone have any further question or comment before the potash people put their testimony on? If not, Mr. Seth, will you proceed?

MR. SETH: Well, Mr. Commissioner, I am here not as a spokesman for all the industry. I came for U. S. Potash. And as far as they are concerned these proposed regulations are acceptable to them for all wells drilled. This Exhibit A, as amended by the testimony of Mr. Hill this morning. I think the other companies would like to make a comment on it.

MR. DAVIS: We will concur in that, and we have no objections to the amendments to Exhibit A. And Southwestern Potash, and Potash Company of America, and the International Minerals and Chemical Corporation, and Duvall Sulphur and Potash all concur in the fact that we have no objections to the amendments proposed in Exhibit A.

MR. SPURRIER: Now, is there another company? Are there any more potash companies?

MR. DAVIS: We both represent them all. Mr. Seth spoke for U.S. Potash Co. And that represents the five companies who are involved. Mr. Cramer raises the point, Mr. Commissioner, that there are other companies who have been or are drilling in the area, and we, of course, do not speak for them. Exploratory work that may be going on or carried on by independents or others. But they are not present at this hearing.

MR. SETH: We represent all the established operators.

MR. SPURRIER: One more question. To make the record clear now; does any potash company have any testimony to present at this time on this case?

MR. SETH: As I understand the procedural situation at

this time, we will consider Exhibit A, as modified, which is limited to rotary drilling. And we stand ready to hear any proposals that may be presented for cable-tool drilling. The testimony Mr. Hill has presented this morning has split the thing into two questions now. We have the rotary regulations and we have the cable regulations. That was done by these amendments. And we stand ready to hear the proposals on the cable tools.

(Off the record discussion.)

MR. CAMPBELL: Mr. Commissioner, I believe at the last hearing a proposal was presented -- I do not represent the people that presented it -- but there is in the record a proposal for cable-tool-medium-depth well protection which was submitted at the last hearing. I presume that is the recommendation of the cable-tool operators.

MR. SETH: Are they standing on that proposal?

MR. CAMPBELL: That I don't know. I presume they have representatives here.

MR. YATES: We have submitted the program. If there is any objection -- we submitted that program at the last hearing -- and if the potash companies have objections to it, we would like to hear them.

MR. SPURRIER: The way the Commission understands it, now is the time for the potash people, or anyone else, to object to the cable-tool proposal. This is the one which was signed by several operators.

MR. SETH: I believe there are two of them in the record.

MR. SPURRIER: Yes. This one was signed by the representatives of several companies.

MR. CRAMER: Weren't there two proposals submitted at the last meeting by the cable-tool operators?

MR. SPURRIER: Yes, sir, there were. I am merely trying to take one at a time. I have another one which I will bring up when we see what is going to happen to this one. We have one here that is in effect signed by Stanley Jones. But I am talking about the one that is signed by American Republics, Buffalo, and on down the list.

MR. SETH: That is Exhibit B?

MR. SPURRIER: That is Exhibit B.

MR. CRAMER: I believe the potash companies are of the opinion there was to be one set of casing and regulatory rules having to do with drilling. At this time, this division having been made, it puts the potash companies where they would have to do some talking among themselves to see where the second group would fit. It didn't occur to us there would be two sets of rules.

(Off the record discussion.)

MR. SETH: May we have a short recess and talk this over among ourselves? This was split up by the testimony of Mr. Hill.

MR. SPURRIER: You may have that time I think. Before you take that time, I would like to say these exhibits have been on file, one as long as the other. And the Commission is bound to consider all of them. And the Commission will consider all of them. What we are trying to get is the objections of the potash people to any of them.

MR. SETH: Of course, the matter started originally with recommendations of the committee, which presumably covered all casing programs, no matter how drilled and to what depth.

MR. SPURRIER: Yes.

MR. SETH: And we have devoted our attention to that. That has been amended this morning by Mr. Hill, and the situation is quite different this morning. We would like to talk it over. Maybe we can arrive at a satisfactory conclusion.

MR. CAMPBELL: When this Exhibit A was presented Mr. Hill definitely testified it was to apply to deep-test wells in a defined area. And I think that was made somewhat clear, although there were some references previously to cable tools in that Exhibit A. It is definitely in the record it was to apply only to deep-test wells.

MR. SPURRIER: Well, let's say for clarification from the Commission's point of view that we will have to issue one set of rules or regulations for drilling in this area, which will necessarily include both types of drilling, rotary or cable.

MR. CRAMER: Mr. Commissioner, speaking as a member of the committee, the casing and cementing program as it was worked out by a sub-committee made up of engineers of the oil industry was considered by the appointed committee and approved by it. Now these various things that are being done modifies the approved committee action. So that it is somewhat of a change. We had thought, in the first place, that one set of rules could cover all types of drilling. And the committee, as such, has not made recommendations on any of the modifications.

MR. SETH: To clarify the record, I believe on behalf of U.S. Potash we accepted Exhibit A, as amended, for all drilling, no matter what type or what depth. Now if I can, to review the situation a little bit, at the end of the last hearing, the potash companies were confronted by this division also in the oil industry. There are three separate and distinct proposals, and which, as originally presented, are not consistent with one another. The testimony of Mr. Hill has taken one group out of it. For that reason we are put at a little disadvantage in meeting this exhibit which was put forward as a minority report more or less.

(Off the record discussion.)

MR. SETH: There is one question involved in here. Some of these regulations as far as we are concerned are applicable to certain areas and others are not. We have that additional fact to consider. We would like before very long to read into the record a written proposal which includes the variations in methods in different areas. That might clarify the procedural situation.

(Off the record discussion.)

MR. CRAMER: Mr. Commissioner, speaking as a member of the committee and also as a representative of the Potash Company of America, there would be one very pronounced objection to Exhibit B which would have to be clarified, I am sure, before we could get together on the thing. That is what is designated as par. "b" of Exhibit B, reading as follows: That the casing and cementing program herein suggested apply only to the areas embraced in proven commercial deposits of potash. The remainder are designated potash areas to be drilled in accordance with standard existing practices. That is the end of the quotation. Up to this time all the discussion before the committee, before your Commission, and before the Land

Office has been to the effect that there would be certain acreage within a broad defined area in which drilling would be completely barred, and that the intent of any drilling regulations within that defined area is to protect the state and the potash operators in the event of any future finds of deposits of potash minerals in the delineated area. And it would appear that Exhibit B, as proposed here, would throw wide open the actual presently operating area.

(Off the record discussion.)

MR. CAMPBELL: Mr. Commissioner, in connection with this area, may I state we would be delighted to have the potash industry present whatever suggestions they have as to the areas in whatever rules the Commission promulgates will apply. Insofar as this division of rotary and cable tools, may I state our position on that? The Commission has power under the statute to issue rules and regulations for the drilling of any oil wells in any area in New Mexico, dependent upon particular conditions. There are now three suggestions; one of which applies solely to deepest rotary wells, and two of which apply to cable-tool shallow wells. I take it that the potash industry feels Exhibit A should apply to all wells, whether cable tool or rotary, deep or shallow. Of course, that is a position they are entitled to take. There is in the record, however, two suggestions by people who drill shallow wells. And if the Commission, in its order, wishes to follow the potash industry suggestion and apply Exhibit A to all wells, they can do so; but if they desire to differentiate, they can do so. It seems to me objections to Exhibit A shouldn't be offered on shallow wells. Since they were offered at the last hearing. It may be the proper thing to do would be to present the data as to areas, which would clarify some of the matters objected to in Exhibit B. I don't represent those people, but in order to keep the matter straight, there is certainly no intention to mislead as to what they have to offer based on the presentation of these two programs because they were both presented at the last hearing. And I thought it was made clear this proposal in Exhibit B was the proposal of the shallow-well people, to be incorporated in whatever the Commission puts out insofar as those particular wells are concerned.

MR. SPURRIER: Well, you have asked for a recess. Do you still want the recess?

MR. SETH: Yes. Let us discuss it among ourselves for a few minutes, and we will also present our proposal which includes

the plugging.

MR. SPURRIER: The Commission is just about prepared to give you until 1:30 or 2 o'clock to get your discussion over and be prepared to present -- to outline the area when you come back. Is there an objection to that time?

MR. SETH: One thirty would be fine.

MR. SPURRIER: Mr. Morrell?

MR. MORRELL: Mr. Commissioner, I think it might be appropriate at this point to read into the record an attempted definition of shallow and deep, since that is the procedure that is appearing to be worked out this morning. For the benefit of the Commission, I would like to read into the record an interpretation that is now currently being used by the Geological Survey. We have been called on to define what is shallow and what is deep. And we find that a depth figure alone is not entirely satisfactory, because of the differences in depths within the designated area. Possibly the potash companies would like to consider this in connection with the matters they want to take up under advisement during recess. A Survey report reads as -- to Washington from Roswell -- reads as follows:

"Definitions of shallow and deep zones are essential to the present discussion. The area is complex stratigraphically inasmuch as it extends from north to south from the shelf or back reef area across the Capitan Reef into the Delaware Basin. The permian Tansill, Yates, Seven Rivers, Queen, and Grayburg formations, comprising the White Horse group of the back reef are transitional into and equivalent in age to the Capitan limestone of the reef. The Capitan limestone is in turn transitional into the Bell Canyon formation of the Delaware Basin. The base of the shallow zone and top of the deep zone is, for practical purposes, defined as the base of the Grayburg, Capitan, or Bell Canyon formation, depending on the location. The shallow zone production includes that of the Tansill, Yates, Seven Rivers, Queen and Grayburg formations of the back reef area. And the so-called Delaware sand near the top of the Bell Canyon formation of the Delaware Basin. The Capitan limestone is untested in this area, and has so far yielded no production. The maximum depth of the shallow zone in the northern

part of the area is from 1,600 to 3,500 feet. The shallow zone in the Delaware portion of the area has not yet been found productive, and few wells have been drilled to it. The base of the shallow zone is here estimated at from 4 to 5000 feet. The deep zone so defined includes the older permian formations below those of the shallow zone and the Capitan-permian formations down to the granitic basement."

I thought it might be helpful to have that in your record.

MR. SPURRIER: Thank you, Mr. Morrell. As a matter for the record, these exhibits A and B were offered in evidence at the last hearing by Mr. Campbell and were accepted at that time. The Commission, as I said before, is bound to consider them when it promulgates the casing rules. So if the potash people find objections to Exhibit B, I suggest you offer them as such. Although I understand that by saying you accept the conditions of Exhibit A that you automatically register a protest against B.

MR. SETH: We will prepare our comments on B and C also. They were presented as alternatives. There were three alternatives presented.

MR. SPURRIER: All right, gentlemen, we will recess until 1:30.

(Noon recess.)

(Note: Full Commission present for the afternoon session.)

MR. SPURRIER: The meeting will come to order, please. Mr. Seth.

MR. SETH: We appreciate the opportunity of having the recess and we have modified our written proposal in accordance with the matters developed by Mr. Hill, and set up two separate categories. Mr. Davis will read the modified proposal into the record. And as soon as possible we will prepare complete copies, and have 25 or 30 in the hands of the Commission for distribution. The modifications were necessary by reason of the situation which developed this morning. If Mr. Davis may come forward, he will read it into the record. If the Com-

mission please, this is a statement to be read into the record. Mr. Davis, if there are questions to be asked, will be sworn and we will provide also Mr. Weaver, a geologist and engineer, to answer questions.

MR. DAVIS: In that connection, in order not to confuse the record, because this jumps around, I think it would be clearer if notes could be made and the questions not asked while the statement is being read.

This is a statement captioned, "PROPOSED REGULATIONS TO GOVERN EXPLORATION FOR AND EXTRACTION OF OIL AND GAS AND POTASH MINERALS ON NEW MEXICO STATE LANDS INCLUDED IN PROVEN OR POTENTIAL POTASH PRODUCTION AREAS." The objective of these regulations is to assure maximum conservation and economic recovery of oil, gas and potash minerals.

"I. These regulations are applicable to the area shown on the accompanying map." (Off the record.)

At the moment, we have only one copy of the map. Additional copies will be supplied at the time copies of the text is given to you.

MR. SETH: We offer that as an exhibit, if the Commission please.

MR. SPURRIER: Without objection, this may will be accepted as Exhibit A.

MR. DAVIS: ".... hereinafter referred to as the 'defined area.' The lands within this area presently fall within one of the following classifications:

"AREA A. Areas which are underlain by proven commercial potash deposits.

"AREA B. Areas under which commercial potash deposits are indicated but not delineated.

"II. The following procedures shall apply to oil and gas exploration and extraction within the defined area:

"AREA A. Drilling for oil and gas shall not be permitted within this area except upon leases where there is presently production in commercial quantities. Upon such leases, further drilling shall only be conducted pursuant to the provisions of

paragraph 2, ~~AREA~~ B herein, covering deep wells.

"Further leases may issue upon lands within the A area, but such leases shall contain the proviso that no drilling may be conducted thereon; however, the acreage included in such leases may be committed to unit agreements. Where oil and gas wells are in production within this area, no mine opening shall be driven to within less than 100 ft. of such wells so that pillar protection will be afforded.

"AREA B. Spacing of oil and gas wells in this area shall be limited to one per quarter-section. All such wells shall be located in the center of the quarter-section unless relocated by mutual agreement of the oil and gas lessee, the potash lessee, and the State Land Commissioner. All wells drilled within this area in exploration for and production of oil or gas shall be drilled, cased, and cemented according to the following procedure:

"Deep Drilling." At this point we would like to incorporate by reference the provisions covering drilling as read into the record this morning by Mr. Hill, or as amended by him, from a previous filing. This morning we agreed to Mr. Hill's setup, but it should be subject to plugging requirements, which will be brought in at a later time.

"Shallow Drilling. The suggested casing and cementing program is as follows:

"(1) Surface Casing String. In order to protect against intrusion of water, the surface casing string shall be set in the 'red bed' section of the basal Rustler formation immediately above the top of the salt section; and shall be cemented back to the ground surface or to the bottom of the cellar.

"The surface string shall consist of new, secondhand, or reconditioned pipe. New pipe shall have received a mill test of not less than 600 lbs psi; secondhand or reconditioned pipe shall be retested to 600 lbs psi before being run.

"Cement shall be allowed to stand a minimum of 12 hours under pressure and a total of 24 hours before drilling the plug or initiating tests.

"Tests of casing shall vary with drilling method. If rotary is used, the mud shall be displaced with water or with the proposed saturated water solution, and a hydraulic pressure of 600 lbs psi shall be applied. If a drop of 100 lbs psi

or more shall occur within 30 minutes, corrective measures shall be applied. If cable tools are used, the mud shall be bailed from the hole, and if the hole doesn't remain dry for a period of one hour, corrective measures shall be applied.

"(2) Salt Protection String. The salt protection string shall be set at least 100 ft. and **not** more than 200 ft. below the base of the salt section. This string may consist of new, secondhand or reconditioned pipe capable of meeting the manufacturer's test specifications.

"The string may be cemented with a normal cement volume for testing purposes only; and if commercially productive, the string must be recemented with not less than 150 per cent of the calculated volume necessary to circulate cement to the surface. The fluid used to mix with the cement shall be saturated with the salts common to the zones penetrated and with proper amounts of calcium chloride.

"Cement shall be allowed to stand a minimum of 12 hours under pressure, and a total of 24 hours before drilling the plug or initiating tests. If the cement fails to reach the top of the salt, the salt protection casing shall be perforated just above the top of the cement and additional cement jobs done until cement is brought to that point. One or more temperature or gamma ray surveys supporting complete cementation shall be filed with the Oil Conservation Commission.

"Tests of casing shall vary with the drilling method. If rotary is used, the mud shall be displaced with water and a hydraulic pressure of 1,000 lbs psi shall be applied. If a drop of 100 lbs psi or more should occur within 30 minutes, corrective measures shall be applied. If cable tools are used, the mud shall be bailed from the hole and if the hole does not remain dry for a period of one hour, corrective measures shall be applied.

"(3) Oil or Production String. This string may be set on top or through the pay zone and cemented with a volume adequate to protect the pay zone and the casing above such zone; provided however, if no salt protection casing shall have been run and commercial production obtained, that string shall be cemented to the surface as provided by (2) above or as provided by 3, a, in the deep well program.

"(4) Drilling Fluid for Salt Section. This fluid shall consist of water to which has been added sufficient salts of a

character common to the zone penetrated to completely saturate the mixture. Other admixtures may be added to the system by the operator in overcoming any specific problem."

This requirement is specifically inserted in order to prevent enlarged drill holes. Off the record for just a moment. (Off the record.)

"All holes drilled either under the deep or shallow-well programs which are abandoned shall be plugged in accordance with the following procedure:

"(a) Upon completion of production from wells which were drilled prior to the date upon which these regulations became effective, such wells shall be plugged in a manner that will provide a solid plug through the salt section and prevent liquids or gases from entering the hole above or below the salt section. Details of the plugging procedure shall be approved in advance by the Oil-Potash Committee.

"(b) Upon completion of production from wells drilled in accordance with these regulations, the wells shall be plugged by filling the casing cemented through the salt with cement.

"(c) If a well is dry or if the oil operator cannot complete a well and must abandon the hole, such well shall be plugged as provided in (a) above."

To digress for a moment here. What has just been read covers the specific casing and cementing requirements for both the deep and shallow drilling. In the main, the proposed regulations for shallow drilling are the same as those proposed by the group of operators and submitted to the Commission as Exhibit B. The balance of the material which will now be read would apply to the area restrictions and would be applicable to both deep and shallow drilling.

"III. Before drilling for oil and gas on lands within the "defined area" a map showing the location of the proposed well shall be prepared by the well operator and copies shall be sent to the State Land Commissioner and the potash lessee involved. If no objections to the location of the proposed well are made by the potash lessee in ten days, a drilling permit may be issued and the work may proceed. However, if the location of the proposed well is objected to by the potash lessee on the grounds that the location of the well is not in accordance with the foregoing regulations, the potash lessee may file

a written objection with the State Land Commissioner. If the well operator and the potash lessee cannot agree on a suitable location for the proposed well, or on any other questions which may arise in connection with the application of these regulations, then either party may demand a hearing before the State Land Commissioner, who will decide the issues in dispute. Nothing herein shall prevent either party -- strike that.

"A representative of the potash lessee may be present during drilling, cementing, casing, and plugging of all oil and gas wells on his lease to observe conformance with these regulations.

"A representative of the oil and gas lessee may inspect mine workings on his lease to observe conformance with these regulations.

"Each oil and gas lessee shall furnish to the State Land Commissioner and to the potash lessee involved certified directional surveys from the surface to a point below the lowest potash-bearing horizon for each oil and gas well drilled during the year. Each potash lessee shall advise the oil and gas lessee who is conducting drilling operations of the location of underground workings in the area adjacent to drilling locations.

"A bond of not less than \$10,000, payable to the State of New Mexico, shall be posted by the well operator, to be forfeited by him for any infraction of these regulations.

"The State Land Commissioner shall add to the "defined area" any lands which subsequently are shown to be within a new potash area or an extension of the presently classified "defined area". Lands within the "defined area" shall be reclassified by the State Land Commissioner upon proper showing by the potash lessee that further commercial ore has been proven. If any lands are transferred to the AREA A classification, the AREA A regulations, contained herein, shall automatically apply to such lands."

That, Mr. Commissioner, is the end of our proposal. In our consideration of the drilling and casing regulations, it having been stated this morning that there were three proposals before the Commission, it was our belief that the Exhibit B more probably reflected the feeling of the majority of the small operators, or those who are interested in shallow drilling. And we slightly modified that exhibit, and are suggesting it as

being proper to cover shallow drilling. That, in our opinion, would automatically bar Exhibit C as it was filed at the previous hearing.

MR. SELINGER: Mr. Davis, are you through with your statement?

MR. DAVIS: Yes.

MR. SELINGER: Back up in AREA A in which you stated no drilling in AREA A unless the lease is now on production, and then you said something about further leases may be issued. Would you mind repeating that one sentence? I didn't get it.

MR. DAVIS: "Further leases may issue upon the lands within the AREA A, but such leases shall contain the proviso that no drilling may be conducted thereon; however, the acreage embraced in such leases may be committed to unit agreements." The purpose of that is to permit any operator who is now gathering acreage together to include in such acreage the lands within the AREA A. So that any oil or gas lying thereunder may be extracted, or at least the area will be protected to the operator who is undertaking the drilling operation at that point.

MR. CAMPBELL: I have a few questions I would like to ask Mr. Davis.

MR. SETH: I believe that is all of the statement. Mr. Davis will be sworn if he is going to be a witness. That presents our proposal.

MR. DAVIS: I would like to say one more thing, Mr. Spurrier, before I go on with that. It had been the intention of the potash members of the Oil-Potash Committee that this general statement and the provisions therein be submitted as a recommendation of the full committee. Because of the way the thing came around today, it was hardly possible to do that; and this really represents the feeling or the consensus of the potash group. It is my intention following this meeting to bring this up before our complete Oil-Potash Committee for its study.

MR. SPURRIER: You have no more direct?

MR. SETH: No.

MR. F. O. DAVIS, having been first duly sworn, testified as follows:

CROSS-EXAMINATION BY MR. CAMPBELL:

Q. Mr. Davis, would you state for the record approximately the size of AREA A? ---A. May I digress just a moment again there, Mr. Campbell? I just thought of something. AREA A, as it is shaded in on this map presented to the Commission, is slightly different from the legal description which was presented to the Commission at the last hearing. At that time, you may recall, we put that in by metes and bounds. When we started putting in the actual land holdings of each company which they considered AREA A, it extended slightly outside that metes and bounds description to the northwest.

Q I don't believe you put it in in the hearing before this Commission. There may have been some evidence submitted to the Land Commissioner hearing, but to my knowledge it wasn't here. I believe this is the first presentation of an area to the Oil and Gas Conservation Commission. ---A. Then there may be no question of a conflict. The heavily bordered area on the map presented as an exhibit should govern and not the metes and bounds description, which may be kicking around the territory somewhere.

Q Is that smaller than this particular area? ---A. Only by a few hundred acres. It is just a matter of straightening out some corners. To answer the question, Mr. Campbell, the area within the AREA A, as shaded on the map, is something in the neighborhood of 80,000 acres.

Q Does that correspond generally, Mr. Davis, with the external boundaries of the area which has previously been withdrawn from oil and gas leasing on federal lands plus the leases of the two new companies that are coming into the area? ---A. Yes. Plus certain state lands which have not previously been withdrawn.

Q And how large is AREA B? ---A. I was told this morning by someone who had scaled off the entire map that it was 300,000 acres -- within the outline. So that would leave AREA B approximately 220,000 acres.

Q Now, how did you arrive at the size of AREA A generally? ---A. Generally, it represents areas of each of the companies where extensive core testing has been done and the presence of

a commercial body of potash ore determined.

Q And it includes all of the present mine workings, of course, of the various companies? ---A. It represents the present mine workings plus the proposed workings of the two new companies who are presently contemplating entry into the field.

Q Did you undertake to or did you project your future plans on any yearly basis or anything of that kind in arriving at this area A? ---A. Broadly, I would say it probably takes in our known plans for the next 6 or 8 years. It does not take in any highly speculative territory whatsoever. It is what we consider commercially proven territory.

Q And you have extensively cored all of AREA A to your knowledge? ---A. Yes, sir.

Q How dense, normally, are your cores in those areas? ---A. When we get into an area where we find what appears to be commercial ore, we will drill several core tests to a section.

Q By several do you mean one every 160 acres or one to every 30 acres? ---A. There is no general rule on it. It could be as many as 6 or 8 to a section. But the probability is it is more likely to be in the neighborhood of 3 or 4.

Q How did you arrive at AREA B? ---A. The AREA B outline was prepared by representatives of the U.S. Geological Survey in a meeting of the Oil-Potash Committee in Carlsbad a few weeks ago. And it was based upon information in the hands of Mr. Allport of the U.S.G.S.; which incorporates material received from all sources and from all companies over the years. The area, therefore, represents what I believe he called the area of great promise insofar as possible potash possibilities are concerned.

Q But you have not cored that AREA B extensively? ---A. Not extensively. It has been cored. At least four companies to my knowledge, including my own company, have put down a number of holes, and the result of those holes has been attractive enough that some of us are continuing with rather expensive programs there to see if we can delineate another body of ore in connection with AREA B.

Q It is my understanding your proposal is: any oil operator desiring to drill anywhere within that 220,000 acres must file

a map with the Land Commissioner, and potash lessee, indicating the proposed location? --- A. Yes.

Q And if the potash lessee doesn't agree or if they cannot come to terms, then it will have to be heard in hearing, and then at that time you will undertake to establish there should be no oil or gas well in that particular spot. Is that correct? ---A. Roughly, Mr. Campbell, but not exactly.

Q Wherein am I wrong? That is a very important point and I would like to know what it is. ---A. The proposed regulation there states, "If, however, the location of the proposed well is objected to by the potash lessee on the grounds that the location of the well is not in accordance with the foregoing regulations ... " Now, if through an error in the records of the Commission or through an error in surveying or something of that sort, it would be determined that the location of the well was placed in an area that is not in accordance with the regulations, we could then object. We could only object, the way this is worded, on that basis.

Q You could only object, assuming the Commission's order complying with your suggestion that there be one well in the center of each 160-acre tract. If it was elsewhere, you could object? ---A. Yes.

Q Or any other provision of the Commission's order? ---A. That's right.

Q You couldn't object just because there was potash below? ---A. That, or we couldn't object just captiously.

Q The only purpose of the provision is to satisfy you there hasn't been an erroneous survey or an improper location under the Commission's order, whatever it may be? --- A. That is correct. It is assumed if we in our future work find other areas of potash, we will apply to the Commissioner to reclassify that as A, which would undoubtedly involve rather comprehensive examination by the Commissioner before he would recognize it. The mere fact we thought there was some potash underlying a B area would not give us the right to such.

Q So far as oil and gas operators are concerned, under your suggestion, provided he complies with casing and cementing programs, suggested as Exhibit A, there will be no restriction on hill drilling in ARCA B except non-compliance with the Commission's order? --- A. That's right.

Q In other words, you are not asking the potash (?) lessee be called upon to prove the drilling of a well in AREA B? ---  
A. Not at all.

Q Now, there is one point I want to get straight about AREA A. Am I correct in my understanding that your suggestion is that the potash industry doesn't object to the leasing for oil and gas in that area, provided there is no drilling and provided it is committed to a unit plan? ---A. That was our thought in suggesting that provision.

Q May I ask if that just applies to federal as well as state lands in AREA A? ---A. I should think so. But we gave that no consideration, of course. We were here in a state hearing.

Q I realize that, but, of course, in the over-all problem we have got to consider they are contiguous. But that would be your general position as to AREA A? ---A. I should think so. As far as I could personally state. I haven't talked to the other members.

Q Then you are not in a position to state as part of your report? ---A. No, not the report.

Q That it would apply to federal areas. What was the reason, Mr. Davis, for attempting to establish a spacing program at this stage of the game, that 160-acres, one well in the center of each 160 acres? ---A. That is a follow-up on a discussion that has been carried on in every meeting held to date; whether it was the first meeting called by the Land Commissioner or the meeting held in his office subsequently or the meeting of the Oil-Potash Committee. The matter of spacing has been brought up on each occasion. And it was the consensus that the spacing should probably be a wide one. It would seem that the time to set it up is in the initial stages rather than later.

Q You don't feel, once you obtain production if you do, is the proper time, depending upon pool conditions, to determine what spacing should be? Wouldn't you be satisfied with such an arrangement as that if you had an opportunity to be heard on the spacing program? ---A. Well, we would certainly not like to contemplate the fact that we would look forward in future years to potash mining under some of the very close spacing that has been permitted in certain oil fields in the past. Not necessarily in New Mexico, but in many oil fields.

Q But you don't feel you would be satisfied with a hearing on that question at the time a discovery is made? ---A. Offhand I wouldn't like to answer the question without discussing it with the rest of the industry members.

Q You can see, can you not, that as far as the oil and gas operator is concerned that is a considerable commitment insofar as doesn't know at this time what reservoir conditions may be in a particular pool discovered. It may result in waste since he doesn't know what the condition will be until it arrives. There is a problem that bears consideration by the potash industry. ---A. Yes.

Q It is my understanding, from listening to your recommendations, that you suggest that this casing and cementing program as to the deeper wells and to the shallow wells, which you have read into the record here, shall apply both to test wells and producing wells? ---A. In the matter of the deep wells, what we have done consistently is to accept the recommendation of the oil industry itself. In the previous filing of a few weeks ago we said that was acceptable. This morning we said that the recommended program for deep drilling was as proposed by the industry itself, the oil industry itself, was acceptable.

Q I appreciate that fact, Mr. Davis, what I am asking you -- I don't believe you understand -- the casing program suggested today and one suggested previously was labeled "Test Wells and Exploratory Wells in the Area." ---A. Yes.

Q And your reading led me to believe that you intended to apply that to all wells? In other words, there would be no modification within this B area on a field rule basis once a discovery was made by an exploratory well? ---A. That's right.

Q You take the position it should apply to all wells within AREA B, exploratory or producing, is that right? ---A. Actually, the proposed program for shallow wells differentiates between a non-producer and a producer.

Q I am not referring to a non-producer or a producer. ---A. Or exploratory.

Q I am referring to a wildcat well, a test well. Exhibit A was originally intended to apply to that well with the possibility if production was obtained and a field discovered, then as is the customary procedure, field rules could be developed.

It could be the rules would need to be more stringent, perhaps less. But I would like to understand clearly what your position is on that particular phase of the matter. ---A. It is our belief that the need for the stringent casing regulations would occur if a deposit of oil or gas was found at any depth. And that the regulations that are proposed here are the minimum that should apply under any conditions.

Q To an exploratory or any other well in the area? ---A. Yes, sir.

Q Now, for just a moment on your abandonment program. I believe you stated you have drilled a considerable number of core holes in this A and some in the B area? ---A. Yes.

Q Is it your feeling that the abandoned core holes should be treated in the same manner by way of plugging regulations as an abandoned oil well, Mr. Davis? ---A. Mr. Weaver, who I think will follow me here, has had personal contact with the plugging of dozens or perhaps hundreds of our core tests, and I think he is much more competent to pass on matters there than I am.

Q Now, one other question, Mr. Davis. In connection with this request for a bond, are you acquainted with the bonds that are presently required under state leases in New Mexico? ---A. Not particularly, no.

Q Was your recommendation on the assumption that there is none, or do you feel there should be additional bond? As a matter of fact, I believe there is a \$5,000 per well and a \$10,000 blanket bond on state leases already. ---A. It was my understanding there was a plugging bond.

Q What is your recommendation? ---A. This would be a separate and distinct bond requiring compliance with the regulations and which would be forfeitable --

Q If it were true that the bond presently required in the amount of \$5,000 per well and \$10,000 for the -- \$10,000 state-wide blanket bond --- applied to all violations of any regulation of the State of New Mexico, would that change your views in connection with the bond? ---A. That would suffice, in our opinion, although we think possibly the penalty should be greater than \$5,000. In that connection I would like to state it isn't our thought that there should be anything punitive here insofar as the potash companies are concerned. To us



MR. YATES: I wonder if I could have Mr. Davis read that back about drilling on presently existing oil and gas leases in A area.

MR. DAVIS: Drilling for oil and gas shall not be permitted within this area -- the A AREA -- except upon leases where there is presently production in commercial quantities. Upon such leases further drilling shall only be conducted pursuant to the provisions of paragraph 2, AREA B, contained herein, for deep wells. The thought there is that ~~where~~ drilling is continued in AREA A under existing leases, that the casing requirements for deep drilling should be required for shallow holes also in the A AREA.

MR. YATES: That doesn't sound like what you read. Will you read it again.

(Whereupon Mr. Davis read the language again.)

MR. YATES: What is your proposal on existing oil and gas leases on which there isn't commercial drilling?

MR. DAVIS: There is no provision for drilling them.

MR. YATES: Don't you think that is kind of in conflict with the existing oil and gas leases? Wherein the operator is given a specific right there?

MR. DAVIS: I will let you answer that, Mr. Seth.

MR. SETH: That is really a legal question for the Land Commissioner to decide. I don't know the answer myself.

A VOICE: Mr. Davis, did I understand correctly A AREA is about 800,000 acres?

MR. DAVIS: I didn't get your question.

A VOICE: Did I understand correctly that A AREA is about 800,000 acres?

MR. DAVIS: No, about 80,000 acres.

A VOICE: About 80,000 acres?

MR. DAVIS: Yes. I haven't scaled that off. I just roughly counted the sections here at noon. But it is in that

neighborhood.

A VOICE: And you also stated, I believe, that your company and others involved there would probably mine that area in 6 to 8 years?

MR. DAVIS: No, I didn't say that. Mr. Campbell's question in that connection was as to what determined our selection of that area. And I stated that it covered the area that we reasonably expect to get into within the next 6 to 8 years. We certainly hope we don't have it all mined out in 6 or 8 years because we will be disappointed in our reserves.

BY MR. MARTIN YATES III:

Q (By Mr. Yates) You say there is 80,000 acres in this AREA A. How long do you think it will take you to mine out the 80,000 acres? ---A. That is a rather difficult question to answer. But it will be several decades.

Q That is what I thought. Well, I for one would like to go on record protesting your proposal whereby you do not permit any drilling in the A AREA, whether it is under an existing oil and gas lease that has production or is without production. I think that that is confiscation. I certainly object. ---A. I would like to make a little explanation, it having been brought up once before when Mr. Campbell tried to show 500 years around here. When you say it takes several decades to completely deplete a mining property, that doesn't mean that you may not be in every section of your mine within 5 or 6 years. Your natural program of mining is to drift out, very often to the extreme outline of your deposits, and to do your working from there; so that this is an area we reasonably expect we will be operating in to some degree within this coming decade.

Q Here is the difference between your lease and ours. Once you establish commercial production, you can perpetuate your lease, but our lease, where we don't have production, is only for 5 years; and so long thereafter as oil and gas is produced. If we are not permitted to drill on our leases in the A AREA, we will lose those leases. We don't have a chance to ever perpetuate by production. ---A. That same requirement is in the potash lease. That only perpetrates in the event you continue operating in commercial production.

Q But under your proposal we are not permitted to operate ours.

I don't believe that is right. I think that the potash company has a right, and I think the oil company has a right. Both are sale leases, and I don't believe one should be precluded from operating their oil and gas lease while the other is permitted to operate potash.

MR. HARVEY YATES: I would like to register my disapproval. I am opposed to confiscation whether in the United States or Russia.

MR. WHITE: What proportion does your present mine operation bear to the total 80,000 acres?

MR. DAVIS: I can speak only for my own company, Mr. White. I would say that presently we have an area that extends approximately 4 miles north and south by something in the neighborhood of 3 miles east and west; which, if you squared it off, is 12 square miles, or 12 sections. Our immediate plans for the next two years contemplate the entry into about 4 more sections to the south. Our total holdings under both state and federal leases within this area that is covered here is something in the neighborhood of 20,000 acres on the part of our company. So that our present workings would be roughly in the neighborhood of one-half of the A AREA set down on the map by our company.

MR. CAMPBELL: You include in your description of areas you now mine or contemplate mining areas that might be -- where you might be having to drift out to a new mining area?

MR. DAVIS: That is correct.

MR. CAMPBELL: And you include those within those 80,000 acres?

MR. DAVIS: Yes.

MR. CAMPBELL: Where there is a possibility it drifts out to take in a deposit?

MR. DAVIS: Yes.

MR. YATES: I wonder if we could see that map, please, Exhibit A?

MR. SPURRIER: Does anyone have a question of this witness?

BY MR. MORRELL:

Q Mr. Davis, I would like to ask one or two questions for clarification of the presentation you have made on the proposed regulations. Following them, Mr. Davis, they appear to be based on the ones previously prepared by the potash operators. ---A. Primarily so; modified slightly in the light of the discussion this morning.

Q As I recall your presentation, you refer to the water to be mixed with the cement, that it shall be saturated with salts common to the zone penetrated with proper amounts of calcium chloride added. I have heard it informally discussed and I was wondering if it wouldn't be informative to ask of the other parties present at this hearing if they have any suggestions as to what the proper amount of calcium chloride additive should be? ---A. A bit earlier I suggested anything having to do with plugging could be better covered by Mr. Weaver.

Q It merely referred to proper amounts, and I wanted to get your idea. ---A. I believe in the neighborhood of three per cent, but Mr. Weaver can tell you definitely.

Q He will enlarge on that. That is three per cent of the volume and weight of cement? ---A. Yes.

Q We would like to have that clarified. The next point I have; you referred to a map to be prepared by the well operator. I was wondering if you would be willing to have a slight modification of that to provide for a map or plat of survey of the well location? ---A. I would think that would be all we meant by that.

Q The oil operators are now furnishing that to the Commission. ---A. That is all we require, is the location.

Q Is a survey of the location? ---A. Yes.

Q With respect to the point Mr. Campbell raised on your suggestion that exploratory wells be drilled in the center of each quarter-section, I would like to raise a little objection to that specific wording, inasmuch as within your defined area there are state lands that do not comprise an entire quarter-section. I gathered that your intention is you would like to limit exploratory development to rate or number of one per quarter-section? ---A. Yes. And for the reason the location

is, if you will notice, isn't inflexible in here. So that future plans of development could be worked out by the potash operators in the event that additional potash ore was found in that area and they wouldn't have to workscrew around a bunch of holes placed hit or miss over an entire district.

Q That same result could be accomplished by merely stating exploratory wells would be limited to one well per quarter-section without specifying the location. I mention that because we do not approve wells in the center of a quarter-section on federal acreage, and present regulations of the Oil Conservation Commission do not. ---A. As a non-operating official, I wouldn't think it would occasion any difficulty as long as we reasonably in advance knew where it was. We can skirt any known hole if we know it far enough in advance, which we would do.

Q My thought was to take out the specific reference to a particular location to avoid that complication. ---A. I don't think it would cause any difficulty at all.

BY MR. CAMPBELL:

Q Did I understand you before as to this well in the center of 160 acres, that it applies only to exploratory wells? I didn't understand it that way. ---A. I don't think it stated that. I believe Mr. Morrell --

Q That is a considerable difference, of course. The original exploratory well, the spacing and location, is all different than it is in a developing well. ---A. That really isn't our proposal.

Q You thought it should apply to all wells? ---A. Yes.

Q That is the basis on which I questioned you. ---A. Yes, sir.

MR. SPURNIER: Do you also intend that this applies only to state land?

MR. DAVIS: In connection with the original purpose of the hearings and the establishment of a group to study this, it was our thought that very probably this would continue on to cover both federal and state lands. And as you know, there have been representatives of the federal government here at all discussions.

Q (By Mr. Campbell) You understand, don't you, Mr. Davis, that the Oil Conservation Commission issues rules and regulations which govern both state and federal lands within New Mexico? ---A. That is my understanding, regardless of the ownership --

Q They have the right to issue operating rules? ---A. Yes.

BY MR. GROMMON:

Q Mr. Davis, I believe you stated that in AREA A you recommended no development whatsoever. ---A. Yes.

Q In this 220,000 acres, AREA B, the proposal A that was submitted by the committee, engineer committee, was for test wells, exploratory wells, and it was my thought, as a representative of the operators, that that casing program was very rigid and should be reviewed if a discovery was found, and the field rules set up for the new field. I think that should apply to the spacing rule as well. In other words, this casing program presented today, which you and the other potash people presented this morning, should apply to exploratory wells and new wells; and if an oil field is discovered, the Commission should hold a hearing to consider proper spacing for the development of the field and a proper casing program. In all probability, in my opinion, the proper casing program would include the two strings of pipe above and below the salt. But for proper development of an oil field, it might be advisable to alternate any casing program below that. It should be considered in view of the information and knowledge of the oil field at that time. ---A. Well, that is the first time I have heard any distinction made between exploratory wells and subsequently developing wells, let us say. Again, to reiterate, the casing and drilling program as stated to be acceptable to us was developed by the oil industry itself. I believe that, without change, the potash industry at the last hearing stated that the sub-committee's recommendation for a drilling and casing program was acceptable to the potash companies. This morning, as you know, we stated that the modifications as proposed by Mr. Hill were acceptable. So we have felt that right along it was the oil industry's own idea of what it took to properly protect its own wells and the potash deposits. And until Mr. Campbell started asking questions about exploratory wells, I didn't know there was any distinction.

MR. SETH: May I make a comment on that point? I think a hearing of this nature is all we can do now. Is do the best we can, knowing the circumstances. The Commission is always

open to anyone to come in at a later date and seek a modification of orders. We can't anticipate everything at this point. All we can do is to do the best we can on what we know of the situation. If something develops during the program, and might at a later date, any person that has sufficient interest can come in and seek a modification upon the basis of the facts as they are then known. That would certainly be true in this case, wouldn't it, Mr. Spurrier?

MR. SPURRIER: Certainly.

MR. GROMMON: I believe it would be impossible for the Commission at this time to write proper regulations for oil development in a field that they wouldn't know whether it was 5, 7 or 10 thousand feet deep and about a spacing and casing program below a salt development.

MR. SETH: To think of spacing in connection with reservoir conditions and drainage. But you have here an agency in between those wells that has to guard its underground workings and has to leave pillars or a certain size. You have to take into consideration this new and additional factor in spacing. It isn't spacing only for drainage of the oil, it is spacing to conserve the potash reserve also there. If you get oil wells too close together in the section, there won't be any room for anybody else to work underground. You have to consider someone else in there.

MR. GROMMON: Of course, we have never had what we consider real close spacing in New Mexico. 40 acres. You would have no objection to a rehearing if a discovery was made to consider proper regulations for the field?

MR. SETH: I don't think there is any question about it.

MR. GROMMON: Very well, that is all I have.

(Recess.)

MR. SPURRIER: Does anyone have any further question of Mr. Davis?

BY MR. YATES:

Q Mr. Chairman, I would like to ask Mr. Davis about this 80,000 acres in the A district. Just how many acres have you mined by the various potash companies in the last 25 years?

Can you answer that? ---A. I don't believe you could answer the question directly, Mr. Yates. It has very little bearing on what determines the outline of the 80,000 acres. As I stated previously, the amount of acreage that you have actually mined out doesn't determine the area of your mine workings. You may have mine workings under 10 square miles and have mined out only one square mile completely.

Q Wasn't it previously testified at one of these hearings there has been approximately 10,000 acres mined in the last 25 years by the various potash companies? ---A. I don't recall that. But for one thing your American potash industry today is about 10 times as big as it was 12 or 14 years ago. The first potash operation I think got into -- got going commercially -- in 1929. The second operation didn't get in there until 1935. The third operation didn't get started until 1940; and each one of them started on a fraction of the basis it now operates under. So, anything that occurred in the past would be no criteria as to what might come in the future. Past performance on the removal of ore has nothing really to do with the case.

Q I kind of think it might have something to do with it. It looks to me, just from a layman's viewpoint, to that 80,000 acres I believe it will take anywhere from 150 to 200 years to mine out the rest of the potash ore. I think that is an unreasonable length of time. ---A. Unfortunately, Mr. Yates, you are not familiar with the potash properties or potash authorities or potash reserves. I can state unequivocally right now insofar as any known potash reserves occur down there there is nothing like 150 years of ore. Or insofar as I know today no one can positively state that at the present rate of production there is 50 years of ore supply.

Q All right. Now, isn't it likely -- as I understand it, the potash companies are continuing to core and they are prospecting from time to time -- isn't it likely they will make more discoveries? ---A. We certainly hope so.

Q Then I think in view, in the light of that, it is unreasonable for the potash companies to try and set aside an area that large and expect the oilman not to drill wells in those areas. This thing will keep growing and growing. ---A. Relatively, the area is infinitesimal, as I think you will agree when you spot it down on a map of the state or county, as the case may be. And it is the only place known in New Mexico where potash occurs, and it is something of vital importance to the state and to the nation.

Q I agree it is vital to the state and the nation, and I think the potash companies should be permitted to mine; but at the same time, I think the oil companies could protect the potash beds, and I think both could work in cooperation in the same areas at the same time. ---A. In the event now you speak of the entire defined area, in the event you should find oil deposits in the B AREA and develop the B AREA, it wouldn't make any difference what the potash companies found in the next 10 to 20 years. It would still be concurrent production of oil and potash.

Q But you set one area aside and don't permit any drilling, and permit drilling in B. Suppose a man has a lease in the B and A AREAS, which we have. All right. Then we have some neighbors that have offset leases that offset our lease in the A AREA. We couldn't protect ourselves from drainage where a man drills an offset to our 80 acres. We would have to wait, if your proposal went through, and have the oil go out from under us even though we could perpetrate our lease in the A and B AREA through production on the B AREA. That would certainly be an unjust case. (No response from the witness.)

MR. YATES: Mr. Chairman, I would like to register a complaint against the proposal made here just a minute ago, and that is on the spacing of 160 acres. As I understand it, their proposal is on the B AREA. It has been established by precedent, generally speaking, that the spacing in New Mexico has been one well to 40 acres. And I don't think one to 160 acres is just and right. I don't believe it is to the interest of the state or the federal government either.

MR. SPURRIER: Does anyone have a question of Mr. Davis? Or a comment? If not, the witness may be excused.

(Witness excused.)

MR. SPURRIER: Do you have another witness?

G. C. WEAVER, having been first duly sworn, testified as follows:

DIRECT EXAMINATION BY MR. SETH:

Q Will you state your name, please? ---A. G. C. Weaver.

Q With which company are you associated, Mr. Weaver, and in what capacity? ---A. I am a consultant for Duval Sulphur and

Potash.

Q Would you state briefly your qualifications? ---A. I graduated from Colorado School of Mines in 1926. I have been in the mining game ever since. I have had eight years with the Potash Company of America, four with International Minerals and Chemical, and I have done consulting work for the last five years.

Q Have you examined and considered the proposed regulations as presented to the Commission by Mr. Davis? ---A. I have.

Q Would you wish to make any comments on them, generally, or anything specific for the benefit of the Commission? ---A. I think the major point to be considered in any approach that we take to this problem is conservation; conservation of both oil and gas and potash.

Q As far as the casing requirements are concerned, both for the deep wells and shallow wells, what comments do you have to make on those?---A. Well, these regulations that are set forth now I don't believe should be construed as final. If there is an oil and gas discovery made, the casing program will have to be worked out after the pool has been discovered. These regulations that we have here are a starting point. But it is provided for in these regulations to alternate the programs after due consideration has been given by the Commission and others concerned.

Q Now, as far as specific questions are concerned, I believe Mr. Foster Morrell asked about the fluid to be mixed with the cement, as to the proportion of calcium chloride. What do you recommend? ---A. The normal practice is to use three per cent calcium chloride, three per cent of the weight of the cement used.

Q You believe that would be a reasonable requirement in this connection? ---A. Yes. There has been considerable research work done on that.

Q The question was also asked as to the method of plugging core holes drilled by the potash companies in their exploratory work. What recommendation for closing core holes do you have? ---A. The practice followed in plugging core holes is to cement through the salt section with Portland cement and three per cent calcium chloride and mixed with saturated sodium chloride and potassium chloride brine. It is a continuous plug all

through the salt section.

Q That would be comparable to the plugging requirement recommended in this proposal? ---A. Yes.

Q There has been some discussion about the spacing as proposed in these recommendations? What comments would you have to make on the spacing as an initial proposal, knowing what we know about reservoir conditions at the present time? ---A. I don't think it was the purpose or intent to insist that wells be drilled in the center of each quarter. The thing in mind there was to limit the number of holes per section so that too many pillars wouldn't have to be left upon the extraction of potash.

Q These proposals contemplate that no workings will be driven to within a distance of less than 100 ft. from any such wells. That would mean you would have to leave a pillar with a radius of 100 ft. around each well? ---A. That, or adequate support, yes.

Q As the density of the wells increased in the section, it would mean substantial reduction in the recoverable potash in the area? ---A. Yes, that's right.

Q In your opinion, is that a reasonable requirement as recommended for a starting place, at least? ---A. Yes. There again, I believe it takes into consideration and is set up in this proposal where that spacing can be changed.

Q Is there anything else of general comment on technical matters you would like to bring out? ---A. I may say this. I can appreciate the position of the operator in wanting to recover all casing possible. And it would be my opinion that the potash companies would not object to recovering all that casing in case of a dry hole.

Q These regulations, do they not contemplate on the shallow wells that the salt protection string be recovered if the well isn't a producing well? ---A. That's right.

Q Is there anything else you would like to comment on? ---A. No, I believe not.

MR. SETH: That is all the direct questioning.

## CROSS-EXAMINATION BY MR. CAMPBELL:

Q Mr. Weaver, I believe you stated that you felt the primary consideration of everybody in this matter was conservation. I presume by that you mean the production of these resources under proper conservation practices? ---A. Yes, sir.

Q We are all concerned with producing both oil and gas and potash? ---A. That is correct.

Q And making it available. I have one question to ask you about the spacing matter. Do you have a particular objection to presenting your views with regard to spacing of these wells before this Commission at such time as a discovery is made? And your advice would be the same then, and the Commission's consideration of those views be better balanced at that time than it would be at this time? ---A. Yes, I think you are correct. No one knows where a discovery is going to be made.

Q That's right. ---A. And I don't think there is anyone here that can foresee where a large salt horse would enter in. And I think that if that could be handled on its own merits, it would be very satisfactory that way.

Q There is one other thing that has come up in our discussions with reference to your proposal about the use of the various brines in the plug. ---A. Yes.

Q I believe your proposal, which I think is taken from the one suggested by the sub-committee of the engineering committee of the oil and gas operators ... ? ---A. Yes.

Q Uses the terms "salts common to the area." ---A. Yes, sir.

Q Would the suggestion you made with reference to your three per cent solution there plus the other ingredients eliminate the necessity of that provision? In other words, some of the operators raise the question as to whether you might in all cases be able to determine with accuracy the salt common to that particular area. Would that be a particular problem so far as you are concerned? ---A. No. I am sure in plugging any of those wells that the potash companies would cooperate fully in furnishing a saturated brine for the mixing.

Q It would be to their advantage to do it? ---A. Yes, certainly.

Q If they had it available? ---A. Yes, certainly.

MR. CAMPBELL: That is all.

MR. SPURRIER: Does anyone have a question of this witness? If not, the witness may be excused.

(Witness excused.)

MR. CAMPBELL: If the Commission please, I would like to call one witness for a very brief presentation, and I would like to explain the reason for the presentation of this evidence. It isn't to minimize the understanding of most of the oil operators. The necessity of using every effort to have a proper program of casing and cementing in this area, but to make clear to the Commission the background of oil and gas drilling in this area so that they may evaluate the problem involved in connection with this casing and cementing. And I would like to call for that purpose Mr. H. S. Cave.

H. S. CAVE, having been first duly sworn, testified as follows:

DIRECT EXAMINATION BY MR. CAMPBELL:

- Q State your name, please. ---A. H. S. Cave.
- Q By whom are you employed? ---A. Phillips Petroleum Co.
- Q Where are you stationed? ---A. Roswell, N. M.
- Q In what capacity are you employed? ---A. Well, just senior geologist.
- Q Will you state for the Commission very briefly your professional background? ---A. I did undergraduate work in geology at the University of Missouri; one year of postgraduate work in geology at the University of Missouri; and two years postgraduate work at Harvard University; two field seasons with the U.S. Geological Survey; a year and a half with the Geological Survey of Georgia; subsequent to that time, with the exception of time in the service, I have been engaged in geological work for oil companies and industries.
- Q Mr. Cave, when did you first become acquainted with the geological situation in the area that is here under discussion? ---A. That was very late in 1926 or early in 1927, at which time I was employed by the Bisbee Oil Co., at which time said company acquired state leases for potash exploration in

the amount of approximately 49,000 acres.

Q What was your connection with that -- in exploratory work?

---A. Subsequent to that, in order to validate those leases and to see what we might have gotten, we drilled four core holes, and at that time it was my duty to check such cores and describe them, and that was done in conjunction with Walter Lang of the U. S. Geological Survey, who was in charge of potash investigation for the Survey and hence for the Department of the Interior in New Mexico.

Q You, yourself, assisted in the analysis of those cores?

---A. Yes, sir.

Q Mr. Cave, through the course of the years since that time have you had occasion to obtain records concerning the drilling of oil wells in this particular area? ---A. Yes, sir, I have.

Q And have you recently made a study of wells which were drilled and have been drilled in that area since the initial discovery of oil? ---A. I have made a compilation of the data pertaining to those wells.

Q What area does the compilation cover? ---A. It primarily covers Township 19S, Range 29 and 30E; Township 20S, Range 29 and 30E; Township 21S, Range 29 and 30E; and Township 22S, Range 29E.

Q That is six townships, is that correct? ---A. Yes, sir. Seven townships.

Q Seven townships in the immediate area under consideration here? ---A. Yes, sir.

Q And what did your compilation show as to the number of oil and gas wells which have already been drilled in that area?

---A. These records were taken from the status sheets of the Geological Survey and set forth in T. 19S, 29E to have been a total of 45 test holes drilled. In total depths these ranged from 503 ft. to 3,096 ft. Through their range in years for this drilling they range from 1925 into the year 1951. In T. 19S, R. 30E, as of approximately one month ago, 22 tests had been drilled, with a range in total depth with a minimum of 1,722 ft. to a maximum of 4,022 ft. In years, range from 1929 up until a period of about one month ago in the current year 1951. In T. 20S, R. 29E during the same dates there have been drilled a total of 30 wells that range in total depth

from a minimum of 505 ft. to a maximum of 6,683 ft. In years, they range from 1925 to 1948. In T. 20S, R. 30E, a total of 47 wells, with ranges in total depth from 1,250ft. to 3,500 ft. In years, the range covers from 1925 to 1948. That gave in those four townships, for which we were supposedly reaching, a total of 144 tests. In T. 21S, R. 29E there have been drilled 2 tests, one to 430 ft. in the year '41 and one to a total depth of 3,334 ft. in the year 1950. In T. 21S, R. 30E there have been a total of 5 holes drilled. They range in total depth from 503 ft. to a maximum depth of 1,934 ft. They were drilled between the years 1925 to 1934. In T. 22S, R. 29E 2 tests have been drilled. One to a total depth of 3,322 ft. The other to a total depth of 3,260 ft. The former was drilled in 1937 and the latter in the year 1926. It gives within the general area under discussion a total of 153 tests of one class or another that have been drilled.

Q And these records you obtained from the reports of the U.S. Geological Survey? ---A. Yes.

Q And those are available, as to location, and all the information is available at that source? ---A. Yes, they are. I might add, on this current geological survey the accurate location is shown, and I merely tabulated this to give more concrete figures.

Q To your knowledge, within that area where those 153 wells between 1925 to date have been drilled, do you know of any instances in that particular area where there have been complaints as to leakage and so forth? ---A. Personally, I do not. But I have no record what damage the potash people might have suffered, if any.

Q But this area we are referring to isn't virgin country so far as oil and gas holes are concerned? ---A. By no means. It is one of the oldest areas for prospecting in the state as far as southeastern New Mexico is concerned.

MR. CAMPBELL: That is all.

MR. SPURRIER: Does anyone have a question of this witness?

MR. SETH: We have no questions.

MR. CAMPBELL: That is all we have.

MR. SPURRIER: Do you have any other witnesses, Mr. Seth?

MR. SETH: We, we have no further testimony.

MR. SPURRIER: Do you have anything further, Mr. Campbell?

MR. CAMPBELL: Mr. Commissioner, just this. I think this hearing today has brought the problem here into focus more than any we have previously had, and so far as Richardson and Bass, whom I represent, are concerned, we wish to state we appreciate the information furnished by the potash companies and we feel, based on the information that has been furnished and their recommendations and our recommendations that, speaking for that company, we feel that the matter can definitely be worked out to our satisfaction, and we hope to the satisfaction of the potash companies.

MR. SETH: On behalf of the potash companies, I would just like to express our appreciation for this additional hearing that was had after the recess this noon. We feel that the matter is one of some substantial importance to the state and it should be decided on the basis of the interest of the state itself. The potash deposits, as has been testified several times during these previous hearings, are probably the only ones in the western hemisphere. The state should look at the proposition with a long-range view. The potash beds can be developed in the immediate future, and they should be. It is just a matter of time. The oil will be there when the potash is mined out. And I believe the matter, as the witness has stated, is one of conservation. It not only means production and realization of these resources, but it means protection of the adjoining ones. If the oil can be produced in a manner to protect the potash beds, that is all we are interested in. The state, in the potash, has a unique resource that is in need of protection and is in considerable danger of damage, and I think the matter as presented during the several hearings has brought that out much better than I can state it. It transcends any interest of any individual or any individual company. In a situation of this nature, just as in these condemnation cases on the bombing range and other things that have happened in the state, someone is bound to get hurt. It happens when the state takes into consideration an action like this. A decision has to be made which will insure to the state the best realization of this resource. We will be very happy to furnish any additional maps or information that the Commission may wish at any time.

MR. SPURRIER: Thank you. The meeting is adjourned, gentlemen.

STATE OF NEW MEXICO

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COUNTY OF BERNALILLO

I HEREBY CERTIFY That the foregoing transcript of hearing before the Oil Conservation Commission in Santa Fe on July 10, 1951, is a true record of the same to the best of my knowledge, skill, and ability.

DONE at Albuquerque, N. M., this \_\_\_\_\_ day of July, 1951.

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E. E. Greeson  
Notary Public - Court Reporter

My Commission Expires: 8-4-52

Mailed:  
July 20, 1951