



White and Gilbert, Santa Fe, has heretofore filed his written appearance in this case. If the Commission please, this case and the companion case following, 2593, which seeks a unit agreement, approval of a unit agreement, covers the same area, and we move that these cases be consolidated for the purposes of taking testimony.

MR. UTZ: The request will be granted.

MR. SELINGER: We have two witnesses. We would like to have them sworn at this time.

(Witnesses sworn.)

MR. UTZ: Are there any other appearances in this case?  
You may proceed.

(Whereupon, Exhibit No. 1 in Cases  
2592 and 2593 marked for identification.)

CHARLES R. DAVIS

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

DIRECT EXAMINATION

BY MR. SELINGER:

Q Mr. Davis, will you give your name, please?

A Charles R. Davis.

Q By whom are you employed?

A Skelly Oil Company.

Q In what capacity?

A I am a Petroleum Engineer in the Joint Operation Section.



Q Where are you located?

A Tulsa, Oklahoma.

Q Have you heretofore testified before the New Mexico Oil Conservation Commission?

A I have not.

Q Will you briefly give a resume of your educational degrees and your experience to this time?

A I attended the University of Texas at Austin, Texas, years 1939 to '43, and from '46 to '48, and attained a Bachelor of Science Degree in Petroleum Geology. Subsequent to that time I had been employed by the Railroad Commission of Texas as a Gas Engineer, and ten years with Skelly Oil Company as Petroleum Engineer in various jobs from the Panhandle through Tulsa.

MR. SELINGER: We move that the witness' qualifications be accepted.

MR. UTZ: They are acceptable.

Q (By Mr. Selinger) What is your present capacity?

A My present capacity is Petroleum Engineer in the Joint Operations Section in our Tulsa, office.

Q In that capacity, you deal with what?

A We deal with unitization of secondary projects.

Q I hand you what the reporter has marked as Exhibit No. 1, and ask that you state what it is, please.

A This is a Unit Agreement for Unitization, Development, and Operation of the Lovington San Andres Unit embracing 2470 acres,



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more or less, of Federal, State and Fee lands in Townships 16 and 17 South, Ranges 36 and 37 East, Lea County, New Mexico, and more specifically set out on a map shown as Exhibit A to this Unit Agreement. The object and the purpose of this agreement is to formulate and to put into effect a secondary recovery project in order to effect a greater recovery of unitized substance and prevent waste and protect natural resources, from the area covered by the agreement, in accordance with the formula participation, regardless of the particular tract from which production is obtained or proceeds derived.

Q Does the Unit Agreement contain a definition of the interval sought to be unitized?

A It does.

Q What is that definition?

A That definition is shown as Subject (h) of Section 2, which is defined as "the San Andres Formation, same being that heretofore established underground reservoir underlying the Unit Area, the top of said reservoir being indicated to be at a depth of 4,334 feet and the base thereof at a depth of 5,240 feet on the Gamma Ray log of Amerada Petroleum Corporation's State 'LA' Lease Well No. 1, located in the NW/4 NE/4 of Section 1, Township 17 South, Range 36 East, Lea County, New Mexico."

Q Has this Unit Agreement been submitted to all the working interest owners within the unit area?

A It has.



Q Has it also been submitted to the royalty interest owners in the proposed unit area?

A It has.

Q Was this Unit Agreement attached to the application under consideration today before the Oil Conservation Commission?

A Yes, sir.

Q Is it true that we have previously submitted a list of names and addresses of all known working and royalty interest owners within the proposed unit area?

A Yes, sir, that was submitted with the application to the Conservation Commission.

Q I ask that you now go through and briefly explain Exhibits A, B, C-1 and C-2 to the Unit Agreement.

A Exhibit A is a map showing, to the extent known to us, the unit area and the boundaries and the identities of tracts and leases in said unit area.

Exhibit B is a schedule showing, to the extent known to us, the acreage comprising each tract and the percentage ownership of each working interest owner in the tract.

Exhibit C-1 is a schedule which shows in Part 1 thereof the tract participation of each tract included in the unit area, and Part 2 thereof the unit participation of each working interest owner. Exhibit C-2 is a schedule, the same as C-1.

Exhibit C-1 is for the first phase of participation in this unit, and is to be effective from and after the date of

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October the 1st, 1961. That production equals 731,378 barrels of oil as determined from the Commission's monthly report form C-52. Thereafter, until the termination of this Agreement, Exhibit C-2 or Phase II of this Agreement becomes effective.

Exhibit C-2 and C-1 is based on participations, which is as such, Phase I as shown on Exhibit C-1 is based on 70 percent actual production from 1-1-61 to 10-1-61; 20 percent remaining primary as of 10-1-61, and 10 percent adjusted ultimate primary. Phase II as shown on Exhibit C-2 of the Unit Agreement is based on 100 percent adjusted ultimate primary production.

Q Does Exhibit A to the Unit Agreement show the various ownerships as to State lands, Federal lands, and Fee lands within the proposed unit area?

A It does, sir, and they are so designated in the left-hand corner of the map under the legend.

Q In your opinion, is the Unit Agreement fair and equitable, and does it afford each interest owner within the proposed unit area his fair and equitable share of the reservoir's content?

A It does.

Q What is the situation as to sign-up at this time?

A As of this date, 86.6 percent of the working interest has been committed. This was based on percentage acreage-wise. 11.57 percent of the royalty interest has been committed, and the State of New Mexico, which owns 85 percent of this royalty in this unit, to our knowledge, will execute this Agreement, which would give



us something in the neighborhood of 96 percent royalty committed.

Q This agreement then has been submitted to the State of New Mexico and to the Federal Government?

A Yes, it has.

Q And no objections, other than requiring approval of the Oil Conservation Commission, have been received that you know of?

A Not to my knowledge, no, sir. I might say that working interest, an additional eight percent has expressed willingness to commit their interest at such times as the proper parties are available for execution of these agreements.

MR. SELINGER: I believe that's all the questions I have of this witness. If you would like to cross examine or wait until we have the other one. The other one will be engineering, as to the waterflood project itself.

MR. UTZ: Are there questions of the witness?

MR. MORRIS: Yes, sir.

CROSS EXAMINATION

BY MR. MORRIS:

Q I didn't get your name, sir.

A Charles R. Davis.

Q Mr. Davis, of the working interest that has not yet joined your unit, could you identify the tracts of land that they own within the unit area here shown on Exhibit A?

A Yes, sir. Tract No. 10, the Rodman-Noel Tract; Tract No. 6, the Turner Tract; and Tract No. 23, shown as the Moran-Union



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Supply Tract; Tidewater Oil Company, Tract No. 7. Those are the four tracts.

Q You said an eight percent interest which had not yet signed had indicated its willingness to sign. Which one was that?

A Tract 7 and Tract 23.

Q Have you received any indication from the owners of Tracts 6 or 10 that they would not join the unit?

A We have some indication that there's a possibility that they will not join. Tract 10, there's a possibility that arrangements can be made to have this included in the unit area.

Q In your opinion, will the exclusion of the acreage shown as Tract 6 or Tract 10 adversely affect the operation of the unit area?

A No, sir, it will not.

MR. MORRIS: That's all I have of this witness.

MR. UTZ: Are there other questions? The witness may be excused.

(Witness excused.)

MR. SELINGER: We call as our next witness Mr. Charles Love.

CHARLES J. LOVE

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

DIRECT EXAMINATION

BY MR. SELINGER:



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Q Mr. Love, will you state your full name for the record, please?

A Charles J. Love.

Q And you are employed by what company?

A Skelly Oil Company.

Q In what capacity?

A District Petroleum Engineer.

Q You are located where?

A In Hobbs, New Mexico.

Q Have you heretofore testified before the Oil Conservation Commission of New Mexico?

A No, sir, I have not.

Q Will you briefly give a resume of your education and degrees and your experience since obtaining those degrees?

A I was graduated from Louisiana State University in 1950 with a B. S. Degree in Petroleum Engineering; two years in the service, and I have been employed by Skelly Oil Company since 1953 in various petroleum engineering capacities in Shreveport, Louisiana, Tulsa, Oklahoma, and presently now in Hobbs.

MR. SELINGER: We ask that his qualifications as an expert be accepted.

MR. UTZ: They are acceptable.

(Whereupon, Applicant's Exhibit No. 2 marked for identification.)

Q (By Mr. Selinger) I hand you what has been marked by the reporter as Skelly Exhibit No. 2. Will you explain that, please?



A Exhibit 2 is a plat showing the proposed Lovington San Andres Unit in Townships 16 and 17 South, Ranges 36 and 37 East in Lea County, New Mexico. This proposed unit area is located approximately six miles south of the City of Lovington, New Mexico.

Q Is this unit outline the same unit outline that is shown on Exhibit A to the Unit Agreement which has been identified as Exhibit 1 in this hearing?

A Yes, it is.

Q Does Exhibit 2 have indicated thereon all the producing or plugged wells in the San Andres formation?

A Yes, sir, to the best of our knowledge, this shows all of the existing San Andres producing wells within a radius of two, two and a half miles of our unit area; and to the best of our knowledge, all plugged and abandoned wells.

Q This is indicated by a symbol in the lower left-hand corner of this exhibit, is that right?

A That's right.

Q I notice that also on this exhibit there are some wells with the normal well symbol with an arrow through it and with the letter "W" above it. What does that indicate?

A Those are the proposed water injection wells that will be converted to inject water into the San Andres formation.

Q Are these proposed injection wells outlined on our application in this hearing?

A Yes, sir, they are.



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Q To the best of your knowledge, are the **leases** and lessees of the various leases in the area covered by this plat shown and indicated?

A Yes, sir.

(Whereupon, Applicant's Exhibit 3 marked for identification.)

Q I hand you what the reporter has marked for identification as Exhibit No. 3, and I ask that you state what it is, please.

A Exhibit 3 is a report prepared by the Engineering Subcommittee entitled "The Secondary **Recovery** Study of the Lovington San Andres Reservoir, Lea County, New Mexico."

Q Has this engineering report previously been furnished to the Oil Conservation Commission?

A Yes, sir, it has.

Q Will you briefly describe what this report contains, please?

A It was the purpose of this report to make **the** study to determine the feasibility of waterflooding of the San Andres Reservoir. This report concludes that it is feasible, that additional oil will be recovered, and it makes the recommendation that the reservoir should be waterflooded.

It gives a **brief** discussion as to the history, some of the general reservoir fluid properties and characteristics of the reservoir, primary performance of the Lovington San Andres Field, the secondary recovery prospects, and our proposed plans of operation



under this unitized project.

I would like to call your attention on the fourth existing page of this report, Paragraph D, 2 (a) under "Primary Participation," the dates given there, there exists a typographical error, it should be 1-1-61, instead of '60, to 10-1-61.

Q I notice that this report also contains certain maps and graphical data. Will you briefly go through those figures and explain what they are?

A Figure 1 attached to this report is a map of the unit area outlined, showing our proposed injection wells and our injection pattern. Figure 2 is a structure map drawn on top of the San Andres formation. Figure 3 is an east-west cross section of the San Andres Field. Figure 4 is a north-south cross section of the Field; and Figure 5 is our graph or plot of the primary performance of this reservoir. Figure 6 is our projected secondary recovery performance; and Figure 7 is a plat showing our proposed distribution system, the location of our injection plant within the unit area; and Figure 8 is a copy of a water analysis, and Figure 8-A is the compatibility tests on these water analyses.

(Whereupon, Applicant's Exhibit No. 4 marked for identification.)

Q I hand you what the reporter has marked for identification as Exhibit No. 4, and ask that you state what it is, please.

A Exhibit 4 is prepared to show our injection well completion data for the proposed injection wells in the San Andres, Lovington San Andres Unit. There are 17 proposed injection wells

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listed by operator and lease, well number, location, showing the total depth, the completion interval, the size of the surface casing, the depth it was set, and sacks of cement used. It also shows the production casing, the size, the depth, and the sacks of cement there, and then an indication whether it was logged or not.

Q What is your anticipated source of water to be injected into these proposed wells?

A We propose to obtain injection water from the Ogallala formation. It occurs at a depth of approximately 150 to 200 feet.

Q And what is your estimated daily injection rate?

A We plan or propose to inject at a rate of 500 barrels a day per injection well, or at a rate of 8500 barrels for the unit.

Q Do you anticipate any treatment of this water?

A According to the tests that we have available to us, the fresh water is compatible with the San Andres water, and we anticipate no treatment and we will use a closed system.

(Whereupon, Applicant's Exhibit No. 5 marked for identification.)

Q I hand you what the reporter has marked for identification as Exhibit No. 5, and ask you to state what it is, please.

A Exhibit No. 5 is the log of one of the proposed injection wells. It is located in Section 5, 17 South, 37 East. It's the only log that we have available on our injection wells.

Q What is the present name of this well?

A It's shown on our map as the Moran-Union Supply State



"A" No. 1.

Q Could you identify on this log the San Andres formation?

A It would be shown on the small scale; the top of the San Andres formation is at 4687 feet.

Q And the approximate bottom?

A 4896, approximately.

Q Will you give the top again, please?

A 4687. That will have to be on the small log scale there.

Q And the base again?

A 4896.

Q Is it true that this log is the only log we have available of the 17 proposed injection wells?

A Yes, sir.

Q In your opinion, Mr. Love, is this proposed secondary recovery plan feasible?

A Yes, sir, it is.

Q What is the present condition of the producing wells, are they what could be defined as toward the economic limit, or stripper wells, or what?

A Yes, sir, they are. The Field is averaging, or the wells in the field producing at an average of seven barrels of oil per day.

Q Is there any gas-oil ratio problems?

A No, sir.

Q Any water problems?



A No, sir.

Q Are you asking here for approval to inject into the San Andres formation and to convert additional wells to injection administratively without the necessity of hearing?

A Yes, sir.

Q Your exhibit seems to indicate that additional well or wells may have to be drilled?

A Yes, sir. It is proposed to drill a well in Section 36, which will be the Northwest Quarter of the Southeast Quarter. It will be an injection well; and a second well proposed to be drilled in the Northwest Quarter of the Southwest Quarter of Section 36.

Q And these two wells are included in the 17 wells that are listed on Exhibit No. 4?

A Yes.

Q Will these wells to be drilled, will they be regular locations?

A Yes, sir, they will be regular locations.

Q Are you asking for a project area in conformation with Rule 701?

A Yes, sir.

MR. SELINGER: That's all we have of this witness. We offer Exhibits 1 through 5, inclusive, and ask that the application be made a part of the record.

MR. UTZ: Without objection, the Exhibits 1 through 5



will be, as well as the application in this case, will be made a part of the record.

(Whereupon, Applicant's Exhibits Nos. 1 through 5 admitted in evidence.)

CROSS EXAMINATION

BY MR. UTZ:

Q Mr. Love, I haven't had time to study your injection well record here too well. How old is most of the casing in these wells?

A Well, this Field was discovered in 1939 and it was developed shortly, I mean in a short period of time after that, but our plans are to inject through the tubing under a packer into the San Andres formation.

Q The packer being set at the top of the San Andres?

A Yes, sir.

Q Do you intend to inject through new tubing or the present tubing?

A It will be, we will have the tubing inspected and if we have to replace the tubing, we will, and it will be coated.

Q Will the annular space between the tubing and the casing be filled with any type of fluid?

A We're not definite on our plans of that as yet. If need be, we will put fluid behind our packer or between the annulus.

Q In which case, if you do, you could readily detect leakage?



A Yes, sir.

Q Has the State Engineer been contacted in regard to this project?

A With regard to the water.

Q Has he been advised of this project, other than through Commission records?

A To my knowledge, I don't know.

Q I'm not sure, is the Ogalala formation within the water basin in this Lea County area?

A Yes, sir. Now he has been contacted with regards to this Ogalala water.

Q You have permission from him to use it?

A We are in the process of filling out the permit to change the usage of this water, but this has been discussed with him. There are water rights available within the unit area.

Q Would you furnish the State Engineer a copy of Exhibit No. 4 and request that he furnish the Commission a letter as to his approval or disapproval of the casing which would protect the fresh waters?

A Yes, sir.

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

MR. MORRIS: Yes, sir.

BY MR. MORRIS:

Q Mr. Love, you testified that the average production from wells in this area was about seven barrels a day. At the

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extremes of the production figures that you've averaged to come up with seven barrels a day, what do the wells on the high end produce per day?

A There are no top allowable wells in the Field.

Q I see.

A Looking at these figures, there is one well that had a monthly production of 780 barrels, so I would say around 25 barrels a day would be the top production.

Q Do you have many wells in this area that produce at that rate?

A No, sir.

Q Would you say that seven barrels a day might represent the mean production as well as the average?

A Yes, sir.

Q Mr. Davis in his testimony stated that there was a possibility -- now I'm referring to Exhibit A of the Unit Agreement -- that Tracts 6 and 10, as well as possibly 7 and 23, might not come into the unit area. In your engineering opinion, if those tracts did not come into the unit area, would that pose serious difficulties to the operation of the secondary recovery project?

A I don't think there would be serious difficulties. I do think that our injection pattern as we have proposed here may have to be revised to protect the unit, and also the unsigned tracts.

MR. MORRIS: That's all I have.

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MR. UTZ: You are requesting this project be classified as a waterflood rather than a secondary recovery project, aren't you?

A Yes, sir.

MR. SELINGER: Under Rule 701.

MR. UTZ: Are there any other questions of the witness?  
The witness may be excused.

(Witness excused.)

MR. UTZ: Any other statements in this case?

MR. SELINGER: I believe the Commission files should reflect that the following working interest owners have indicated their approval and urged the unit: Glenn B. Chadwick, Amerada --

MR. MORRIS: I could save time by stating what we have.

MR. SELINGER: Good.

MR. MORRIS: If the Examiner please, the Commission has received correspondence from Amerada Petroleum Corporation, Mobil Oil Company, Shell Oil Company, United Producing Company, Inc., Sunray, D-X Oil Company, Pan American Petroleum Corporation, stating their concurrence in one or both of these applications and urging the Commission's approval.

MR. SELINGER: Do you have a letter from Mr. Glenn B. Chadwick?

MR. MORRIS: Not that I find in our records.

MR. SELINGER: We'll be glad to furnish you with our copy of it.



