CASE 6652: SHELL OIL COMPANY FOR STATUTORY UNITIZATION, LEA COUNTY, NEW MEXICO

# Case No. 6652

# Large Exhibits

STATE OF NEW MEXICO
ENERGY AND MINERALS DEPARTMENT
Oil Conservation Commission
State Land Office Building
Santa Fe, New Mexico
3 October 1979

EXAMINER HEARING

| | | |
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| IN THE MATTER OF: | | |
| Application of Shell Oil Company for statutory unitization, Lea County, New Mexico, | ) | CASE 6652 |
| and | ) | |
| Application of Shell Oil Company for a pressure maintenance project, Lea County, New Mexico. | ) | CASE 6653 |

BEFORE: Commissioner Ramey
Commissioner Arnold

TRANSCRIPT OF HEARING

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MR. RAMEY: The hearing will come to order. We'll call Case Number 6652.

MR. PADILLA: Application of Shell Oil Company for statutory unitization, Lea County, New Mexico.

MR. RAMEY: Does anyone have any opinions about consolidating this case with Case 6653?

MR. ATKINSON: Mr. Commissioner, I represent Exxon Corporation, from the Modrall law firm, my name is Clifford Atkinson, and also with me is Jack Dalious. We're opposing the application of Shell Oil.

MR. RAMEY: Okay. But you have no objection to consolidating the two cases?

MR. ATKINSON: Oh, no, sir.

MR. RAMEY: All right. We'll call Case 6653.

MR. PADILLA: Application of Shell Oil Company for a pressure maintenance project, Lea County, New Mexico.

MR. RAMEY: Ask for appearances at this time, please.

MR. LOPEZ: Mr. Chairman, my name is Owen Lopez with the Montgomery law firm in Santa Fe, New Mexico, appearing on behalf of the applicant in both cases, Shell Oil Company. I have with me, and associated with me on the case, Gary Kilpatric of our law firm, and might as well put

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Clint Parsley on the record, too. He's also a new lawyer with our law firm, and Jim Lore, who's with the Office of General Counsel for Shell Oil Company, Houston, Texas.

I also have with me at counsel table Mr. Earl Buck, Project Manager of the unit, and I have four witnesses to be sworn in the cases.

I should also point out, I think, to accommodate the Commission, that we have marked our exhibits. We have at this time, propose to enter thirty-four exhibits. The first three witnesses' exhibits all pertain to the statutory unitization application and the last witness' exhibits, Mr. Phillips, all pertain to the pressure maintenance project. I have marked the exhibits accordingly.

MR. RAMEY: Thank you. What was the third man's name you mentioned, Clint --

MR. LOPEZ: Parsley, Clint Parsley.

MR. RAMEY: All right.

MR. ATKINSON: Once again I'll enter an appearance for Exxon Corporation. My name is Clifford Atkinson from Modrall law firm. Also appearing, Mr. Jack Dallous, Exxon Corporation, and at the counsel table is Mr. Bill Nolan, also with Exxon.

MR. RAMEY: Do you have any witnesses?

MR. ATKINSON: Yes, sir. Mr. Bill Nolan will be our sole witness.

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MR. RAMEY: I'll ask that all witnesses -- are there any other appearances?

I'll ask all witnesses to stand at this time and be sworn.

(Witnesses sworn.)

You may proceed, Mr. Lopez.

MR. LOPEZ: Thank you, Mr. Chairman.

Perhaps preliminarily I might mention that I have talked to the Chairman and I do understand that there are some working interest owners here who may wish to appear either on behalf or in opposition to our application, but have other commitments and may not want to sit through the whole story. The chairman said it might be possible for those persons to enter their appearances before the recess at lunch time.

Okay, I call our first witness, Mr. Campbell.

LEE CAMPBELL

being called as a witness and having been duly sworn upon his oath, testified as follows, to-wit:

DIRECT EXAMINATION

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BY MR. KILPATRIC:

MR. KILPATRIC: Mr. Chairman, I direct your attention to the prepared testimony of Mr. Campbell in the green booklet. Yes. And before we start I might point out that page nine, there are a couple of number changes. If I give them to you now I think the testimony will flow more smoothly.

MR. RAMEY: Okay.

MR. KILPATRIC: The number 70 on the first complete answer down at the middle of the page, should be 65, and the 65, I think there are three places where there is 70, that number should be changed to 65.

And at the top of page 10 at the very first line those percentages should read 92.21 instead of 92.26 and 95.34 instead of 95.44.

And I refer you back over to page 8 and ask that the first full answer there, the last line should be stricken. There are some ratifications that were received this morning. We probably will receive them this morning but we haven't received them at this time, so that would be premature.

With those corrections we'll start the testimony.

Q What is your name and where do you reside?

A Lee Campbell. I reside in Slidell,

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Louisiana.

Q By whom are you employed and in what capacity?

A. I'm employed by Shell Oil Company as a Senior Landman.

Q Have you testified previously before the Commission and had your qualifications accepted as a matter of record?

A. No, I have not.

Q Would you briefly describe your educational and employment background?

A. I graduated with a Bachelor's in Business Administration in Petroleum Land Management from the University of Texas in December, 1972, and in January, 1973, I was employed by Shell Oil Company in their Land Department in Houston.

For the past two years I have been one of those responsible for the land operations of Shell Oil Company in New Mexico and West Texas, and for the last year and a half I have almost entirely devoted my time and energies to the North Hobbs Unitization and Pressure Maintenance Project.

Q I take it then, that you are familiar with Shell Oil Company's applications in these consolidated cases, Numbers 6652 and6653?

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A. Yes, very familiar.

Q. How was it that you have become familiar with the facts concerning these two applications?

A. I was assigned the task of determining who had the working ownership interests and royalty ownership interests for each tract within the northern portion of the Hobbs Grayburg-San Andres Pool, which I will refer to as the Unit Area.

In this connection I participated in the preparation of the ownership and tract participation exhibits pertaining to the Unit Area.

MR. KILPATRIC: Are the witness' qualifications acceptable, Mr. Chairman?

MR. RANEY: He's considered qualified.

MR. KILPATRIC: Thank you.

Q. (Mr. Kilpatric continuing.) Now, Mr. Campbell, I direct your attention to what has been marked as Shell's Exhibit Number One, and I ask you to identify it.

A. This is a map of the proposed Unit Area, which is located in Lea County, New Mexico, and which contains approximately 10,649.53 acres. The Unit Area includes the following sections or portions of sections in Township 18 South, Range 37 East, NMPM: The southeast quarter and the west half of Section 13; all of Sections 14, 23, 24, and 25; the east half of the northeast quarter and the northwest

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quarter of the northeast quarter of Section 26; the east half of the northwest quarter and the east half of Section 36.

As regards Township 18 South, Range 38 East, the Unit Area includes the south half of the northwest quarter and the southwest quarter of Section 17; the northeast quarter and the south half of Section 18; all of Sections 19 and 20; the southwest quarter and the south half of the southeast quarter and the northwest quarter of the southeast quarter of Section 21; all of Sections 27, 28, 29, 30, 31, and 32; all of Section 33, except the southeast quarter of the southeast quarter; and the east half of the northwest one-quarter and the east half of Section 34.

The Unit Area consists of 88 separate tracts which were formed according to their common mineral ownership. Each tract is identified on the exhibit by a tract number, lease name, and tract operator. The tract number is denoted with a circle near the center of the tract. The lease name is at the bottom, and the tract operator is shown at the top of each designated tract.

In some instances a tract encompasses an entire lease; however, in certain leases which had diverse mineral ownership within the unitized horizon, we divided into two or more tracts.

You will note that some of the tracts have

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a designation A or B after their particular tract numbers, which, for example, you will see if you look at Tract 10 at the north central portion of the exhibit. This division was made because we discovered after we had assigned the original tract numbers additional divisions of mineral ownership within the unitized formation.

MR. KILPATRIC: Mr. Chairman, I'd like to point out that the exhibits are tabbed for the testimony and you can refer to any during the testimony by the use of tabs.

Q (Mr. Kilpatric continuing.) Now, Mr. Campbell, please define the unitized formation for the Unit Area, and in this connection I direct your attention to what has been marked for identification as Shell's Exhibit Number Two, and ask you to identify it for the Commission.

A Exhibit Number Two shows the unitized formation for the Unit Area, which is that subsurface portion of the Unit Area known as the Grayburg-San Andres formation, of Permian age, found in the interval between the stratigraphic depth of 3698 feet and the depth of 4500 feet beneath the surface, as measured on the Borehole Compensated Sonic-Gamma Ray Log run in the Shell Oil Company State A-7 Well on July the 9th, 1969.

This well is located 1930 feet from the north line and 660 feet from the east line of Section 32,

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The upper limit of the unitized formation is the top of the Grayburg-San Andres interval.

The lower limit of the unitized formation is 4500 feet beneath the surface, which is approximately 200 feet below the oil/water contact as determined by the technical committee whose function will be described by Mr. Lancaster later on.

Therefore the unitized formation has been limited to only the interval required for unit operations, which would affect the Hobbs Grayburg-San Andres Pool.

Q Mr. Campbell, I now refer you to Shell's Exhibits Numbers Three and Four, and ask you to identify them.

A. Shell's Exhibit Number Three is a copy of the Unit Agreement, covering the Unit Area.

And Exhibit Number Four is a copy of the Unit Operating Agreement, covering the Unit Area.

These are copies of the agreements that I submitted to the various royalty interest owners and working interest owners in the Unit Area for their consideration and ratification.

Q How were you able to determine who were the working interest owners and the royalty interest owners?

A. We were able to obtain the names of all

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the operators within the Unit Area from the records of the Oil and Gas Conservation Division of the State of New Mexico.

We then asked and obtained from each operator within the Unit Area a list of all the working interest owners and royalty interest owners within each of their tracts.

Q What did you do with this information?

A We compiled a list of all of the working interest owners and royalty interest owners within the Unit Area on a tract-by-tract basis, and we then contacted each working interest owner and attempted to contact all known royalty interest owners.

The Unit Agreement was submitted to the royalty interest owners and both the Unit Agreement and Unit Operating Agreement were submitted to the working interest owners, as well as to the USGS and the State of New Mexico.

It should be noted that Exhibit B contained in Shell's Exhibit Number Three, the Unit Agreement, is a list of each tract within the Unit Area, the area of land located within each tract, and the mineral ownership information for each tract.

Q I now refer you to what has been marked as Shell's Exhibit Number Five and ask you to identify it.

A. Exhibit Number Five is a computer printout on a tract-by-tract basis listing all the royalty interest

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owners within the Unit Area, their addresses, and their percentage of royalty interest in each tract.

Column One lists the tract numbers. Column Three lists the names and addresses of each royalty interest in the tract. Column Four shows the percentage of each owner's royalty interest within the tract, and Column Five indicates by an "X" that the interest owner has ratified the Unit Agreement.

Q How many royalty owners are involved in the unit Area and how were they contacted with regard to ratification of the Unit Agreement? And in this connection I direct your attention to what has been marked as Shell's Exhibit Number Six.

A As the Exhibit shows, approximately 905 royalty interest owners exist within the Unit Area, including the USGS and the State of New Mexico.

As is also shown on the exhibit, on August the 8th, 1978, the Unit Agreement and ratification forms were mailed to all known royalty interest owners. Then on October the 11th, 1978, we sent a follow-up letter to all the then known unsigned royalty interest owners advising them of sign-up status and again requesting their ratification.

During the months of December, 1978, and January and February, 1979, an intense effort was made to contact all unsigned royalty interest owners by phone.

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Then, as further shown on Exhibit Number Six, on February the 22nd, 1979, we sent even another follow-up letter to all of the unsigned royalty interest owners at that time, again advising them of sign-up status with re-quest -- respect to the Unit Agreement, and again requesting their ratification. In this letter we explained as best we could to these persons that we had attempted to contact each of them by phone but had been unable to reach some of them. We asked that they call us collect if they had any questions concerning the Unit Agreement or the project we were under-taking. Additional ratification forms were included with this letter.

Finally, on August the 6th, 1979, again as shown on the exhibit, we sent another and final letter to every known royalty interest owner, advising each of them of the status of ratification and of our plans to proceed with these applications before the Commission today, and again we requested all unsigned royalty interest owners to ratify the Unit Agreement.

Q How many of the total royalty interest owners have ratified the Unit Agreement?

A 720 of the total 905 royalty interest owners have ratified the Unit Agreement to date, and this includes the preliminary approval of the USGS and the Commission of Public Lands of the State of New Mexico.

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As Exhibit Six shows, of the 185 who have not yet ratified the Unit Agreement, 41 were unreachable, and 144 were contacted but have not yet ratified the agreement.

Q. Now, Mr. Campbell, you stated that 720 of the total number of 905 royalty interest owners have ratified the Unit Agreement. What does this figure represent as a percentage of the total royalty interests in the unit area?

A. As the exhibit shows, the percentage of sign-up is set forth in six separate percentage figures. The reason for this is twofold.

First, the percentage of ratification is dependent upon the determination of the royalty owners' interest in either the oil or the gas in the pool.

Second, the life of the water injection project has been broken down into three specific phases. The reasons for this will be discussed in later testimony of Mr. Lancaster and Mr. Buck.

Therefore, the royalty owner's interest will be dependent upon his interest during the phase in effect at a given time and whether his interest is in oil or gas.

As a result you will note that the exhibit shows a percentage sign-up ranging from 97.18 percent to 97.42 percent, which exceeds the 75 percent required for statutory unitization by more than 20 percent.

Less than 3 percent of the royalty interest ownership has not yet ratified the Unit Agreement.

Q Now I refer you to Exhibit Number Seven and ask you to identify it.

A. Exhibit Number Seven is a computer printout on a tract-by-tract basis listing all working interest owners within the Unit Area, their addresses, and their percentage of working interest in each tract.

Column One lists the tract numbers. Column Three lists the names and addresses of each working interest owner. Column Four is the percentage of each owner's working interest in each tract, and Column Five indicates by an "X" that the interest owner has ratified the unit.

MR. KILPATRIC: Mr. Chairman, I might point out here that since the time that I asked you to strike that latter sentence, it has become true and we have received some more ratifications this morning. So, in fact, we now have 73 out of the total 80 working interest owners and we'll cover that in later testimony.

Q (Mr. Kilpatric continuing.) How many working interest owners are involved within the Unit Area and how were they contacted with regard to ratification of the Unit Agreement and Unit Operating Agreement? In this connection I refer you to Shell's Exhibit Number Eight.

A. There are 80 working interest owners in the

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Unit, 25 of which are operators. As shown on this exhibit, on August the 7th, 1978, we mailed the Unit Agreement and the Unit Operating Agreement and ratification form to each of the working interest owners.

On November the 20th, 1978, we again wrote a letter to each working interest owner and again requested each unsigned owner to consider the agreements and to ratify them at their earliest convenience.

We wrote a final letter on July 13th, 1979, again to each working interest owner, advising him of the status of ratification and of Shell's plans for proceeding with statutory unitization and for the institution of a pressure maintenance project.

In this connection we made numerous telephone calls in an attempt to obtain ratification from each of the unsigned working interest owners.

Q How many of the total working interest owners have ratified the Unit Agreement and Unit Operating Agreement?

A As shown on the Exhibit Number Eight, 63 of the 80 working interest owners have ratified the Unit Agreement and the Unit Operating Agreement; however, since the exhibit was prepared we have received additional commitments to the Unit, and at this point the interest of 73 of the 80 working interest owners are committed to the Unit.

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Q Now, Mr. Campbell, can you tell the Commission what percentage of the total working interest ownership is represented by the interests of the 73 working interest owners who have committed to the unit?

A Yes. As I just stated, the interest of 73 of the 80 working interest owners have committed to the unit. This represents in excess of 92.26 percent to an excess of 95.44 percent of the working interest ownership, depending again on which of the three phases of the project is in effect at a given time and whether it involves the working interest ownership's interest in oil or gas.

This percentage of ratification again substantially exceeds the 75 percent required for statutory unitization.

Q Now I refer you to what have been marked as Shell's Exhibits Numbers 9 and 10 and ask you to identify these.

A. Exhibit Number Nine is a letter dated July 31st, 1978, from James W. Sutherland, Oil and Gas Supervisor of the United Stated Department of the Interior, advising that the USGS has no objection to the revised unit agreement form.

Exhibit Ten is a series of letters dated June 13th, June 21st, and July 6th, 1978, from Ray D. Graham, Direction of the Oil and Gas Division of the Commissioner

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of Public Lands of the State of New Mexico, approving the Unit Agreement as to form and content.

Q. Mr. Campbell, I now refer you to what has been marked as Shell's Exhibits Eleven and Twelve and ask you to identify them for the Commission.

A. Exhibit Eleven is a packet of ratification forms which have been executed by the royalty interest owners.

Exhibit Twelve is a packet of ratification forms which have been executed by the working interest owners.

Q. Were Exhibits One through Twelve prepared by you or under your supervision?

A. With the exception of Exhibits Three and Four all of these exhibits were prepared by me or under my supervision.

Regarding Exhibits Three and Four, which are the Unit Agreement and the Unit Operating Agreement, respectively, although these were actually prepared by Mr. Buck, the Project Manager, in conjunction with Shell's Legal Department, these exhibits are copies of the actual agreement that I submitted to both the working interest owners and the royalty interest owners.

MR. KILPATRIC: Mr Chairman, I now offer Exhibits One through Twelve into evidence.

If there be no objection to these exhibits, that concludes our examination.

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MR. RAMEY: These Exhibits One through Twelve will be admitted.

MR. KILPATRIC: Thank you. Pass the witness.

MR. RAMEY: Any questions of Mr. Campbell?

MR. ATKINSON: Just a couple of questions, if I may.

CROSS EXAMINATION

BY MR. ATKINSON:

Q. Mr. Campbell, the Shell Exhibit Number One defines the boundaries of the proposed North Hobbs Unit, I believe, is that not correct?

A. That's correct.

Q. But in fact the Unit itself does not entirely comprise the pool within which the Unit lies, does it?

A. Well, there's a South Hobbs Unit.

Q. And the two of them are part of the same pool, are they not?

A. I'm not the engineer.

Q. And the, if I may refer to the lower right-hand corner of the Shell Exhibit Number One, the finger that juts up into the proposed North Hobbs Unit, then, is a portion of the South Hobbs Unit?

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A. That's correct.

MR. ATKINSON: No further questions.

MR. KILPATRIC: No redirect.

MR. LOPEZ: Mr. Chairman, I might point out that I've just been informed that rather than 73 it's 77, so I would like the record to be amended or corrected to reflect that we've exceeded even our wildest expectations.

MR. RAMEY: This, I assume, is the working interest owners --

MR. KILPATRIC: Yes, sir.

MR. RAMEY: -- that have signed?

MR. KILPATRIC: Yes, sir.

MR. ATKINSON: Mr. Chairman, if possible, we'd like to reserve the right to recall him at a later time after the finish of their case.

MR. RAMEY: I would think so. I would think Mr. Campbell would want to stay around and see the whole show.

MR. ATKINSON: Okay.

MR. LOPEZ: I'd like to call Mr. Lancaster.

BILL LANCASTER

being called as a witness and having been duly sworn upon his oath, testified as follows, to-wit:

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DIRECT EXAMINATION

BY MR. LOPEZ:

Q. Would you please state your name, by whom you're employed, and in where you reside?

A. My name is Bill Lancaster. I'm employed by Shell Oil Company and I reside in Houston, Texas.

Q. Have you previously testified before the Commission and had your qualifications accepted as a matter of record?

A. No, I have not.

Q. Would you then briefly describe your educational background and employment experience?

A. I graduated from Ohio State University in 1954 with a Bachelor of Science in Petroleum Engineering. Upon graduation I spent two years, from 1954 to 1956, in the Air Force. In 1957 I received a Masters of Science in Petroleum Engineering from Texas A & M.

In August of 1957 I was employed by Shell Oil Company. From 1957 to 1968 I worked in Shell's New Orleans office as a Production and Reservoir Engineer. From 1968 until 1977 I worked as a Reservoir Engineer in Shell's Rocky Mountain Division. In 1977 I was assigned to the Reservoir Engineering Section of the Mid-Continent Division, where my responsibilities include reservoir engineering work

for fields in which Shell has an interest in West Texas and New Mexico.

Q. Mr. Lancaster, are you familiar with the history of the Hobbs Grayburg-San Andres Pool?

A. Yes, I am.

Q. How did you become familiar with this pool?

A. I am not Chairman of the Technical Committee which was formed by the Working Interest Owner Committee to investigate the feasibility of initiating a pressure maintenance project for the purpose of recovering additional oil reserves in the Hobbs Grayburg-San Andres Pool.

Q. And I take it you are familiar with the applications in Case Numbers 6652 and 6653?

A. Yes, I am.

MR. LOPEZ: Mr. Chairman, are the witness' qualifications acceptable?

MR. RAMEY: Yes.

Q. (Mr. Lopez continuing.) Mr. Lancaster, I now ask you to briefly describe the history of this pool and in that connection I ask you to refer to what has been marked as Shell Exhibit Number Thirteen.

A. Exhibit Number Thirteen is not on the wall. It is a graph showing the production history of the entire Hobbs Grayburg-San Andres Pool from its inception through 1975.

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As is shown, the pool was discovered in 1928, and by the end of 1930 was producing about one million barrels of oil per month from 135 wells. This high production rate continued until 1935, when the rate was curtailed because of the reduced demand for oil.

Although a number of wells within the pool continued to produce at maximum allowables after 1935, declines in production capacity were observed in most wells as a result of a continuing decline in these wells' bottom hole pressures.

By 1975 bottom hole pressures had declined from an initial 1,515 pounds per square inch absolute in the pool to an approximately 400 pounds per square inch absolute in what I shall refer to as the Grayburg study zones; approximately 950 pounds per square inch absolute in the San Andres study zone I; and to approximately 800 pounds per square inch in the San Andres study zones II and III.

I should mention at this time that the Technical Committee decided it would better describe the past and future performance of any complex reservoir by dividing it into six study zones. In any event, this decline in production and pressure prompted operators to consider ways of supplementing the natural reservoir drive mechanisms so as to achieve greater ultimate recovery from the reservoir.

In 1970 Amoco initiated efforts to unitize

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the entire Hobbs Grayburg-San Andres Pool.

In 1971 Morance began injecting water into the Grayburg study zones in the northern portion of the pool on the Morance-operated Rice and Hardin leases.

In 1973 Amoco abandoned its efforts to unitize the entire Hobbs Pool when working interest owners could not reach an agreement on a participation formula. Nevertheless, Amoco continued its unitization efforts and subsequently formed a volunteer unit, which comprised the southern third of the pool. This unit became effective on January 1st, 1975.

When Amoco abandoned its efforts to unitize the entire pool, Shell Oil Company was selected as unit expeditor for the remaining northern portion of the pool by the working interest owners. Shell has continued its unitization efforts to date.

Q. What were the initial unitization efforts undertaken after Shell was selected unit expeditor for the northern portion of the Hobbs Pool?

A. All operators within this northern portion of the Hobbs Pool were asked to invite the working interest owners to a meeting on July 31st, 1973. At this meeting our Technical Committee was formed by the working interest owners.

The Technical Committee was to be comprised of engineering representatives of all working interest owners.

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Q What instructions, if any, were given to the Technical Committee by the Working Interest Owners Committee, and in this connection I refer you to what has been marked as Shell's Exhibit Number Fourteen?

A As shown on this exhibit, the Technical Committee was charged by the Working Interest Owners Committee with the task of determining the feasibility and profitability of instituting a pressure maintenance project for the northern portion of the Hobbs Grayburg-San Andres Pool. In addition, our committee was charged with the responsibility of developing values, tract by tract, for the parameters set forth on this exhibit. This was done so that the Working Interest Owners Committee could develop a formula for the equitable sharing of the costs and the revenues to be derived from the pressure maintenance project.

Q Did the Technical Committee in response to this charge determine whether or not the pressure maintenance project would be feasible and profitable?

A Yes, it did.

Q What was the determination and what was the basis for that determination?

A The Technical Committee made a comprehensive study of the pool, including such parameters as the amount of oil in place, its location, and its primary recovery efficiency, that is, as you know, the expected recovery from

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the pool without the water injection program, and determined that significant volumes of oil would not be recovered under primary operations, and that be initiating a water injection program there was a potential to increase the ultimate recovery by some 55-million barrels of oil.

The committee also determined that a water injection program in this pool was feasible and that such a program would be profitable and beneficial to all the working interest owners and royalty owners.

Q. Would you describe how this Technical Committee functioned in responding to the charges you've just described, and in this connection I refer you to what has been marked for identification as Shell's Exhibits Numbers Fifteen and Sixteen?

A. Since Amoco's prior attempt was abandoned because the working interest owners could not reach an agreement on a method for allocating the unit production, based on the values assigned the parameters, and since Shell's undertaking of the unitization effort for the northern portion of the Hobbs Pool probably represented the last chance to unitize the entire northern portion of this reservoir, the Working Interest Owners Committee instructed the Technical Committee that a simple majority agreement on pertinent matters would not be sufficient and that they were to reach agreement on these matters by a substantial majority, and

that if they failed in this endeavor, the Technical Committee was to present the issue to the Working Interest Owners Committee for resolution.

To achieve these objectives our committee proceeded in a step-by-step manner so that a substantial majority agreement could be reached on each issue addressed before proceeding to the next. No decisions were reached unless there was a substantial majority concurrence.

In following these guidelines our committee met for twenty-two sessions over a three and a half year period from September, 1973, to March of 1977. Minutes of each meeting were kept and they are compiled in Shell's Exhibit Number Fifteen.

Throughout the meetings there was outstanding cooperation and attendance averaged about 83 percent of the working interest ownership.

The final outcome of this work was the acceptance by the Working Interest Owners Committee of our committee's technical report, entitled Waterflood Feasibility and Unitization Parameters of the North Hobbs Grayburg-San Andres Unit, dated April of 1977.

This technical report is Shell's Exhibit Number Sixteen.

Q Did your committee develop any information concerning the geology of the northern portion of the Hobbs

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Pool?

A Yes, we did. The entire Hobbs Grayburg-San Andres Pool is a northwest-southeast trending anticline about eight miles long and three and a half miles wide. Within this pool there exist two recognized geological strata known as the Grayburg and the San Andres. As I previously mentioned, the Technical Committee decided that breaking these strata into six study zones would facilitate the job of describing the reservoir performance.

Now, as is shown on Figure 4 of the Technical Report, this anticline has some 400 feet of structural relief from the crest of the Grayburg at 217 feet subsea, to the top of an oil/water transitional zone at 1614 feet subsea. A large gas cap above 360 feet subsea initially covered the crestal or central portion of this reservoir.

Q Would you describe for the Commission the six study zones?

A For the purposes of the technical study, the upper portion of the reservoir was divided into two study zones, referred to as the Upper and Lower Grayburg. The total thickness of these two zones varies from 80 gross feet on the southeast flank to 200 feet on the northwest and southwest flanks of the Unit Area.

Since the Grayburg is overlain by a large gas cap, most of the oil-bearing reservoir is located around

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the flanks of the structure. Maximum pay development for both of these Grayburg study zones is found on the western flank and production is from thinly interbedded sandstone, siltstone, and dolomite layers, with most of the production coming from the sandstone layers.

Again, for the purposes of the technical study, the lower portion of the reservoir was divided into four study zones, referred to as San Andres Zones I, II, III Upper, and III Lower.

San Andres Zone I is a crystalline dolomite that is separated from the overlying productive interval by 10 to 80 feet of impermeable dolomite. This zone usually consists of two to three very porous layers, some of which are reported to be cavernous. This is the only study zone known to have experienced significant edge water influx.

San Andres Zone II is a dolomite layer 50 to 90 feet thick, which is normally separated from Zone I by a thin shaley bed.

San Andres Zone III is separated from Zone II by a sandy break consisting of 10 to 20 feet of dense sandy carbonate. Zone III is generally more thin-bedded than Zones I and II, but like Zone II, is best developed on the crest of the structure. Based on core and petrophysical studies, this zone was further divided into an upper and

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lower study zone.

Q. In connection with its technical study, did the Technical Committee make any determinations with respect to the oil and gas in place within the Unit Area?

A. Yes, the Committee did.

Q. How were these determinations made?

A. Most of the wells completed in the Grayburg study zones were drilled in the 1930's and their logging surveys were not suitable for calculating porosity values; therefore, to determine the oil in place for these particular zones the Technical Committee developed net pay maps and used an average porosity value of 14 percent that had been determined from analyzing available log and core data. These oil and gas net pay maps are based on a gas/oil contact at 360 feet subsea and are included in the Technical Report as Figures 8, 9, 10, and 11.

With respect to the San Andres study zones, there did exist sufficient core and log data in the San Andres intervals to enable the Technical Committee to prepare porosity feet maps for each of the four San Andres study zones. Table 6 in the Technical Report is a summation of the petrophysical analysis used in constructing the net porosity feet maps for each of the San Andres study zones.

The resulting porosity feet maps are included in the Technical Report as Figures 23, 24, 25, and 26.

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These porosity feet maps were utilized by the Technical Committee to calculate initial oil in place on a tract-by-tract basis within the Unit Area.

Q What other kinds of data did the Technical Committee develop with respect to their study?

A The Committee developed a water-cut map for the San Andres Zone I, and gas/oil ratio maps for San Andres Zones II, III Upper, and III Lower, all of which are included in the Technical Report as Figures 27 through 30, respectively.

Q How was the data used in meeting the charge of the Working Interest Owners Committee?

A The data was used as input in determining the remaining primary and secondary reserves, and in determining the economic profitability of instituting a program of water injection in this northern portion of the Hobbs Grayburg-San Andres Pool.

This data would also provide a basis upon which the Working Interest Owners Committee could develop a fair and reasonable participation formula for all the working interest owners and royalty interest owners.

Q How did the Technical Committee finally determine an estimate of primary reserves?

A The Hobbs Grayburg-San Andres Pool is one of the last major Grayburg-San Andres reservoirs in the

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New Mexico-West Texas area to be initized. Two factors that have contributed to this delay in forming the North Hobbs Unit are the complexity of the reservoir and the influx of water into the upper portion of the San Andres, both of which made estimating primary reserves very difficult.

In forecasting the remaining primary performance of the North Hobbs Unit wells, the Technical Committee decided to determine the reserves on a well-by-well basis, separating the producers into two groups.

The first group consisted of those wells with only Grayburg production. The second group consisted of those wells with San Andres production.

Production from wells completed only in the Grayburg study zone is characterized by marginal oil rates, high gas/oil ratios, and little or no water. Since these study zones were in the latter stages of depletion, the Technical Committee determined that the remaining reserves could be estimated by extrapolating recent production trends; however, due to the complex reservoir performance observed in the San Andres study zones, production plots, such as decline curves or oil cut cumulative curves, were not suitable for forecasting the reserve potential of the San Andres wells.

After considering several proposed methods of determining primary reserves for these study zones, the

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Technical Committee elected to us a computerized reservoir simulation model because it is the most precise means of describing a complex reservoir performance of this type, and because it is able to utilize detailed well, production, reservoir, and geological data effectively.

Figure 31 of the Technical Report is a map of the North Hobbs Unit showing which of these two methods, extrapolation or computer simulation, was used in determining each well's primary reserves.

Q What was your committee's final conclusion as the remaining primary Grayburg reserves within the northern portion of the Hobbs Pool?

A At the time the Technical Report was finalized there were 78 wells completed in only the Grayburg study zones. The primary oil reserves from these wells were determined by extrapolating the 5-year production trends between January 1st, 1972, and January 1st, 1977, to an economic limit of one barrel of oil per day per well.

The well reserves were then summed by tract and the tract reserves are shown on Table 14 of the Technical Report. Using this method the total Grayburg primary oil reserves were estimated to be 1.5 million barrels of oil as of January 1st, 1977.

Q How did you calculate the remaining primary reserves with respect to the San Andres study zones?

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A. As I explained earlier, the analysis and the data necessary to make the computations with respect to the remaining primary reserves within the San Andres study zones were considerably more complex than those required for the Grayburg study zones.

Figure Number 32 of the Technical Report shows the gid overlay that was used for the computer simulation model work in describing the San Andres Zones I, II, and III.

The model consisted of three layers of 200 blocks each, with each layer describing one of the San Andres study zones. Each of the blocks within the model was assigned particular reservoir characteristics, including zonal thickness, porosity, permeability, and initial oil, gas, and water saturations. In addition, the simulation included an aquifer for the upper layer of the model to represent the water influx experienced in the San Andres Zone I.

Within the simulator program, oil, gas, and water were withdrawn from each San Andres well located within the entire Hobbs Pool, based on each well's reported production history. This, of course, included wells located in that southern portion of the pool that Amoco unitized.

The object was to construct a model so that the reservoir performance as calculated by the computer simulation would match the actual performance evidenced by the

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historical reservoir data. Once a match was obtained a prediction of future performance was made, starting in September of 1976.

The results of the simulation model study indicated the San Andres primary reserves for the North Hobbs wells would be 36.6 million barrels of oil as of January 1st, 1977.

These well reserves estimates were then summed up by study zone, by tract, and by working interest owner, and are presented in the Technical Report as Tables 16 and 23, A and B.

Q How were the recoverable secondary reserves estimated?

A Because of differences in reservoir quality the secondary potential of the Grayburg and San Andres study zones was evaluated separately. Evaluation of the Grayburg secondary recovery potential was done using another reservoir simulation model. In a depleted reservoir with a relatively low permeability, as exists in this Grayburg reservoir, the injection rates will be low, and it can take a long time to reach maximum response.

Although there are numerous technical procedures for estimating recoveries and response times, we believe the use of a simulation model, especially in this case, offers the most precise estimate performance. This

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simulation model consisted of 153 blocks on a 9x17 grid in a single layer, with wells located within the model to duplicate the results of installing an 80-acre 5-spot water injection program. The reservoir input data was based on the average reservoir characteristics typical of the Grayburg study zones on the north and west flanks of the pool.

The significant conclusions derived from this study were the following:

Number one, because of the low permeability of 5 millidarcies, more or less, injection pressures on the order of 1500 pounds per square inch will be required to inject sufficient water to obtain a successful secondary recovery operation.

Ultimate primary recovery will be 18.7 percent of the original oil in place and secondary recovery will be 14.4 percent of the original oil in place, using a symmetrical closed 80-acre 5-spot injection pattern.

Number three, an 80-acre 5-spot pattern using existing wells is economically attractive and will have a long life of approximately 36 years.

Applying the calculated secondary recovery percentage factor to the oil in place in the patterns surrounding the Grayburg injectors, as shown on Figures 35 and 36 of the Technical Report, resulted in a secondary recovery estimate of 6.6 million barrels of oil for the Grayburg study

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zones. This is equivalent to a secondary to primary recovery ratio of .57. The estimated primary and secondary oil recoveries are again listed by zone on Table 16 and by tract and working interest owner on Tables 24, A and B, of the Technical Report.

Based on the simulator results, the anticipated average water injection rates will be 260 barrels of oil per day per well into 40 injectors during fill-up, and 125 barrels of water per day per injector afterwards.

This Grayburg water injection program will require approximately 90 million barrels of injection water over a 36-year life, including 35 million barrels of makeup water, which will be obtained through contract with the City of Hobbs.

Peak Grayburg production averaging 30 barrels of oil per day per producing well, or about 1000 barrels of oil per day, will occur ten years after the water injection program begins.

Q What methods were used to evaluate the secondary potential of the San Andres study zones?

A. First, no secondary recovery potential was attributed to the San Andres Study Zone I, because the reservoir analysis of its primary performance indicated a high recovery efficiency due to the strong natural water influx.

With respect to San Andres Zones II and

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III, two methods were used to evaluate their secondary potential. These methods were, number one, to use nearby water injection projects in the same San Andres strata as an analogy to determine what could be expected from the northern portion of the Hobbs Pool. And number two, to use a third computer simulation model to forecast the results of a water injection program.

With respect to the analogy with other existing San Andres water injection programs, the performance data on eight such projects were reviewed and volumetrically averaged on the basis of the original oil in place, and this study reflected an average ultimate recovery efficiency of 35 percent with a secondary to primary recovery ratio of .85. The water injection programs included in this study were mature projects that had already recovered in excess of 60 percent of the estimated ultimate secondary oil reserve.

In analyzing these analogous water injection programs it was noted that the higher the permeability within the reservoir, the higher the anticipated secondary recovery efficiency. Only two of the project studied had average permeabilities as high as the 28 millidarcies encountered in the San Andres portion of the Hobbs Pool and their ultimate recoveries were predicted to be 39.4 and 46.4 percent of the original oil in place.

In addition to the study of these analo-

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gous projects, the secondary potential and performance of the Hobbs Grayburg-San Andres Pool was evaluated using a third reservoir simulation model. The results of this model study confirmed the floodability of the San Andres and indicated that the ultimate recovery with a water injection program would be 44 percent of the original oil in place. Consequently, based on the results of these two studies, the Technical Committee determined that the ultimate oil recovery efficiency with a water injection program for the San Andres Zones II and III would be 40 percent of the oil in place.

Q Did the Technical Committee adopt any recommendation with respect to the injection patterns for San Andres Zones II and III?

A Yes. The recommended water injection patterns for these zones was an inverted 9-spot injection pattern with approximately 160-acre spacing, as shown on pages 37 through 39 of the Technical Report. The injection wells were selected on the basis of both location and evidence of non-communication behind pipe with the San Andres Zone I.

Q Did the Technical Committee come to any conclusions with respect to the amount of secondary recovery potential based on recommended injection patterns?

A. The Technical Committee determined that by installing 160-acre inverted 9-spot patterns in the San Andres Zones II and III the recovery efficiency would be

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increased to about 24 to 40 percent and that the ultimate oil recovery would be increased by 48.6 million barrels of oil. A breakdown of the secondary recovery by study zone is listed on Table 16 and by tract and working interest owner on Tables 24, A and B, of the Technical Report.

Based on the simulation study it was determined that the San Andres production response will reach a peak of 9000 barrels of oil per day some eight years after injection begins. This constitutes an average of about 80 barrels of oil per day per producing well. This production forecast is based on an average water injection rate of 2000 barrels of water per day per well into 30 injectors during fill-up, which will take approximately 160 million barrels of water.

The total injection requirement is estimated to be 550 million barrels, of which 80 million barrels will constitute makeup volume, and again, will be obtained from the City of Hobbs. The cumulative produced water/oil ratio is expected to be 5 to 1.

Q Mr. Lancaster, did the Technical Committee estimate remaining gas reserves?

A Yes. The Technical Committee made estimates of both the volumes of the original gas cap gas in place and the remaining gas reserves. Gas cap volumetrics were calculated from the Grayburg net pay Isopach maps and

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the San Andres porosity feet maps, included in the Technical Report as Figures 8, 10, and 12.

For the Grayburg, the calculations included an average porosity of 14 percent, based on log and core data, and a water saturation of 30 percent, which was derived from analyzing the available technical data.

For the San Andres our committee used a water saturation of 22 percent, again based on the analysis of available technical data. The distribution of the calculated 54.2 billion cubic feet of gas by tract and by working interest owner, is given on Tables 21, A and B, of the Technical Report.

In estimating the remaining gas reserves for the Grayburg, our committee used the remaining Grayburg primary oil reserves for each tract as of January 1st, 1977 and multiplied that figure by the producing gas/oil ratio for each tract during the year 1976.

For the San Andres, our committee agreed to use the gas reserves as predicted by the reservoir computer simulator that predicted the San Andres primary recovery.

The well-by-well estimates of the San Andres gas reserves were then summed up on a tract-by-tract basis. The remaining gas reserves for the Grayburg and San Andres thus determined by the Technical Committee were 8.9

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and 98.3 billion cubic feet respectively. The distribution of the gas reserves by tract and by working interest owner is given on Tables 25A and 25B, respectively, in the Technical Report.

Q. Mr. Lancaster, I now refer you to what has been marked Shell's Exhibit Number Seventeen and ask you to identify it.

A. Exhibit Seventeen, as shown on the wall, is a summary of the capital requirements to install the North Hobbs Water Injection Program in the event Shell's applications are granted. This tabulation is based on Table 17 of the Technical Report, which has been revised using updated cost estimates. The exhibit is fairly self-explanatory and identifies the various capital requirements allocated to various parts of the project.

I might point out that the exhibit reflects the ultimate capital investment to be $33 million which takes into account future capital requirements that will be necessary through the life of the project.

Q. Now, Mr. Lancaster, I refer you to what has been marked as Shell's Exhibit Number Eighteen and ask you to identify it.

A. Exhibit Number Eighteen, as shown on the wall, is a production schedule for the North Hobbs Grayburg-San Andres Unit. In this exhibit there are two production

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forecasts. The lower curve represents the predicted primary production performance of the North Hobbs wells without the water injection project. The upper curve represents the unit performance that we anticipate with the water injection program.

It may be noted that the unit production is anticipated to increase to more than 10,000 barrels of oil per day. It is of interest to further note that the projected life of the unit is on the order of 44 years, or approximately 10 years more than the projected life without unitization. As I have already mentioned, we anticipate that this program of water injection would provide an additional 55 million barrels of oil over the life of the project, which would not otherwise be recovered.

Q Mr. Lancaster, I now refer you to Shell's Exhibit Number Nineteen and ask you to identify it.

A As shown on the wall, Exhibit Nineteen is a tabulation demonstrating the difference in reserves and profitability with and without unitization of the northern portion of the North -- of the Hobbs Grayburg-San Andres Pool.

The first column on the exhibit shows the reserves and profitability without unitization. The second column shows the same thing with unitization. The third column shows the difference between the first two

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columns.

You will note that the estimated remaining primary reserves as of January 1st of 1980 are 33.3 million barrels of oil. This was obtained by subtracting estimated production between January 1st, 1977, and January 1st, 1980, of 7.8 million barrels from the primary reserve estimate given in the Technical Report of 38.1 million barrels as of January 1st, 1977. The reserves of 85.5 million barrels of oil estimated to be recovered through unitized water injection operations includes the remaining primary of 30.5 million barrels plus the 55 million barrels of secondary reserves.

The next line on the exhibit shows the initial and ultimate investment requirement anticipated for the water injection project. Of the total anticipated capital investment of $33 million, $27 million is forecast to be spent during 1980 and '81 and an additional $6 million is forecast to be spent during the following 3 years to handle increasing volumes of oil and water.

The third line on this exhibit shows the difference in profitability with and without unitization. The profitability was broken down into two calculations.

The first sub-category shows profitability as undiscounted, or without any consideration for the time value of revenue.

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The second subcategory shows the profitability on a present value basis with a ten percent discount, which is a more common approach showing the effects of deferring income over an extended period of time. Consequently, as may be seen, the expected profit on an undiscounted basis for continued primary production is $405 million without unitization; $917 million with unitination; resulting in a net profit for the water injection project of $512 million.

Using this approach of calculating profitability on a discounted basis you can again see that the profit without unitization is $178 million; with unitization it's $302 million, resulting in an additional profit of $124 million, which reflects a 412 percent profit for the water injection project.

As shown on the exhibit, all profits listed do not include the payment of Federal income tax.

Q What factors were used in these calculations?

A The reserve estimates were taken from the Technical Report with the primary reserves adjusted for estimated production from January 1st, 1977 to January 1st, 1980. The income schedule for those reserves was based on the production schedule shown in Exhibit Nineteen. In addition to the $33 million capital expenditure, the operating costs of unit operations was estimated to be an additional

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$100 million more than the primary operating costs without unitization.

Revenue and expenditures were based on current unit values and no adjustments were made for future inflationary factors. In developing the profits to be derived from unit and non-unit operations, the following crude prices were used: $6.25 per barrel of oil for lower tier production; $14.98 per barrel of oil for upper tier production; and $26.00 per barrel of oil for stripper production.

Q Mr. Lancaster, realizing that the cost of operations, as well as the price of crude oil, can change, what is your opinion as to the profit values listed on Exhibit Number Nineteen?

A In my opinion the profitabilities given on Exhibit Nineteen are conservative.

Q Is it your opinion that the unitized management, operation, and development of the North Hobbs Grayburg-San Andres Unit is feasible and will result in a reasonable profit?

A. Yes, that is my opinion.

Q Why is the unitized management of the North Hobbs Grayburg-San Andres Unit necessary?

A. With the water injection program, oil is forced to move from one property to another. In view of this movement, it is necessary to unitize all interests in

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order for the owners to receive their fair share of the income from all of the oil produced within the unit. This type of arrangement benefits both the royalty and the working interest owners and protects their correlative rights, which is especially difficult to achieve in a multi-layered, heterogeneous reservoir.

In addition, the elimination of lease line barriers allows flexibility in the use of existing wells and allows variation in the injection and withdrawal rates as will be required by the reservoir's actual performance. This flexibility will result in a maximum efficiency of recovery and the elimination of waste.

Q In addition to determining the feasibility of the project and its profitability, what other charges were directed to the Technical Committee to answer?

A. The Committee was charged with developing values of certain specified parameters, or characteristics by tract, in order to permit the working interest owners to develop an equitable method for sharing of expenses and revenue from that tract.

Q. What were these parameters or characteristics which the Technical Committee was charged to develop values for?

A. The list of parameters is included on Exhibit Fourteen under the sub-heading "F". Of the ten

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parameters listed specifically, we were unable to obtain two. The first was the value of the oil and gas production and the second was the floodable net acre feet. We were unable to obtain the value for the oil production parameter with sufficient accuracy because of the wide variations of income per barrel of oil under the Federal price control regulations. We were unable to obtain the floodable net acre feet because of the poor quality of logs that exist as a result of the pool being very old; however, our committee did develop two additional parameters, which were, one, the primary gas reserves, and two, the gas cap volumetrics.

Q. Is this information located in the Technical Committee Report?

A. Yes, it is, on Tables 21 through 25. It might be noted that there are two tables for each set of parameters. On Table A the parameters are listed by tract and on Table B, listed by working interest owner. In each of these tables the parameters are listed as to the magnitude and the percent of the total for each tract and for each working interest owner.

Q. Mr. Lancaster, you have described for us how the Technical Committee was charged with certain tasks by the Working Interest Owners Committee and how your committee determined the feasibility and profitability of the pressure maintenance project. What, if anything, was to be

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done with the Technical Committee's Report?

A. As I've indicated, the Technical Committee prepared the Technical Report, dated April, 1977. In this report the Committee described the history and geology of the northern portion of the Hobbs Grayburg-San Andres Pool, calculated the primary and secondary reserves, demonstrated the feasibility and profitability of this pressure maintenance project, made recommendations as to a plan of secondary recovery, based on a water injection, and provided the working interest owners with calculated values of certain parameters as a basis upon which to negotiate an equitable formula for the sharing of the expense and income of the project.

With the data from this report the Working Interest Owners Committee would be able to determine an equitable method of sharing costs and expenses of the project and to prepare a unit agreement and unit operating agreement for ratification.

Q. Based upon your technical expertise and your knowledge of the facts concerning the two applications being heard here today, is it your opinion that the granting of the applications in these consolidated cases, Number 6652 and 6653, will result in the prevention of waste and the protection of correlative rights?

A. Yes, that is my opinion.

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Q And is it also your opinion that the granting of these applications is reasonably necessary to carry on supplemental recovery operations so as to substantially increase the ultimate recovery of oil and gas from the Hobbs Grayburg-San Andres Pool?

A Yes. That is also my opinion.

Q Were Exhibits Thirteen through Nineteen prepared by you or under your supervision?

A Yes, they were.

MR. LOPEZ: Mr. Chairman, I offer Exhibits -- Shell's Exhibits Thirteen through Nineteen into evidence.

MR. RAMEY: Shell's Exhibits Thirteen through Nineteen will be admitted.

Any questions of the witness?

MR. ATKINSON: Yes.

CROSS EXAMINATION

BY MR. ATKINSON:

Q I do have a question for you, Mr. Lancaster. In direct examination you stated that the primary reserve, that was calculated on a well-by-well basis. Was done by extrapolation, largely by extrapolation from recent production trends.

A For the Grayburg only wells.

Q And the San Andres as well, I take it.

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A No. The San Andres, in the San Andres we used the simulation, computer simulation.

Q All right. Now, the computer simulation itself was based on recent production trends, though, was it not?

A No, it was based on the complete history of each well in the total field.

Q The -- what was the effect of the recent production trends, then, on your simulation model for the San Andres?

A Well, the model used the production trend to match the history, so that what you -- and then it was agreed to in the simulation that when the simulation was done, that what it was going to forecast would be the primary reserve under the existing conditions of the field at that time.

Q All right, so that in fact the simulation model, then, was created in such a way as to match the actual performance of the well, or the life of the well, up to January 1, 1977.

A Really January -- well, really September of '76.

Q September of '76, so in fact had the actual performance of the well differed, then the simulation model would have been altered as well to fit that perfor-

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mance, is that correct?

A. It might have, depending upon the alteration.

Q. Now you mentioned something earlier about protection of correlative rights, I believe, and about protection of the unit. Shell Exhibit Number One is no longer on the wall.

MR. LOPEZ: Yes, it is. It's way in the back. We're going to fill up the room.

Q. Okay, well, that's fine. I'll ask you this, first of all, I asked your landman this question.

The San Andres -- excuse me, the North Hobbs Unit is part of the same pool then as the South Hobbs Unit, is that correct?

A. I think basically, yes.

Q. All right. Now what are the plans for protection of the South Hobbs Unit?

A. For the protection of the South Hobbs Unit?

Q. Across the lease line between the South Hobbs Unit and the North Hobbs Unit, what are the plans for the protection of that?

A. Well, there will have to be a lease line agreement drawn up.

Q. All right, now how about with regard to --

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once again it's hard to see, but do you know where the Morance waterflood project is?

A Right.

Q Now what is being done to protect the Morance?

A We'll have to have a lease line agreement there, too.

Q One more question, then. In your formula, your oil allocation formula, which is based, I believe, on -- in Phase I on 20 percent of 1976 production, 80 percent of remaining primary oil reserves, is that correct?

A That's correct.

MR. LOPEZ: Mr. Chairman, I might assist all of this. Mr. Buck is going to be our witness to explain the --

MR. ATKINSON: I see.

MR. LOPEZ: -- participation formulas. Mr. Lancaster is here just to explain what the Technical Committee did in meeting the charge from the Working Interest Owners Committee, and therefore is the reservoir engineer who is prepared to discuss the values assigned those parameters put forth on this exhibit, but Mr. Buck will be the man who is the chairman of the Working Interest Owners Committee who can discuss the participation formulas.

MR. ATKINSON: Okay.

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Q. (Mr. Atkinson continuing.) I just have a couple more questions, then.

On the -- what assumptions were made regarding the completion intervals in calculating primary reserves?

A. You mean in setting up and forecasting the simulation model?

Q. Yes.

A. It was agreed to in the Technical Committee that everybody had had sufficient time to get their zones in shape so that the zones that were open and the conditions that existed at the time the simulation model went into the forecast would be -- would be maintained.

Q. All right. Now, in determining the economic limits for a particular well, then I take it that the position of the well in the unit is a consideration also, is that not true?

A. Well, no, not necessarily. The economic limit was determined upon when your production is no longer profitable. Now, in the case of, I think, of the simulation model, it was shut off at about 2024, because frankly, it was considered the value of any barrel of oil recovered after that would be very hard to -- to equate to the formula, or equate to the recovery.

MR. ATKINSON: We have no further questions

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for the witness. We would like to reserve the right to recall Mr. Lancaster.

MR. KELLY: Okay, Mr. Lancaster also will probably be around, won't you?

Any other questions? Mr. Nutter.

CROSS EXAMINATION

BY MR. NUTTER:

Q. Mr. Lancaster, now, what patterns will you be using for the two Grayburg zones? An 80-acre 5-spot, is that it?

A. That's right, yes.

Q. And then your San Andres flooding would be on a converted 5-spot.

A. That's right.

Q. Now, you won't be flooding Zone I of the San Andres at all, is that correct?

A. We do not intend to, no.

Q. Now, what is Amoco flooding in the unit to the south of your proposed unit? Are they flooding the two zones in the Grayburg?

A. They are, yes. They have tried.

Q. Are they using the same pattern that you would be using, the 80-acre 5-spots there?

A. They don't really have very many injectors

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in the Grayburg at the present, but that is their basic pattern.

Q And how about the San Andres injection pattern?

A. They're using a 5-spot. We have a bit of a problem because a good part of the south unit was developed by Amoco and the wells are located in the center part of each tract, or each 140-acre section. But in the North Hobbs it was developed, and we have diagrams we can show later, it was developed on a competitive basis and you may have four wells in 160-acre tract, all within 660 feet of each other, literally, in the corner of each of the sections. So it's a little bit more difficult.

We intend to start off with an inverted 9-spot.

Q And is it feasible that some day you might have to go to a similar pattern of whatever Amoco would be using along that line, due to a lease line agreement, then. If they're using a 5-spot in the San Andres, you might have to go to a 5-spot rather than an inverted 9-spot along the southern border of the unit.

A. Now this is something we'd have to look at when the time came.

Q Now what is Morance drilling up in that little plug to the north there, to the Grayburg only?

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A To the Grayburg -- the Grayburg only.

Q And they are using an 80-acre 5-spot there?

A Yes.

Q And you have a compatible arrangement of injection wells to their flood?

A Yes.

Q Now you mentioned that it would take approximately ten years to assume maximum production -- to achieve maximum production from the Grayburg and eight years from the San Andres. Is that assuming that you would be placing all of the injection wells on injection more or less simultaneously?

A Yes.

Q And that it will take the -- all of the producing wells that long to have their fill-up and to achieve their maximum --

A Well, certain wells might respond earlier than others, but as a whole, this is what we've figured, that the reservoir as a whole would be slow to respond. You've got quite a bit of gas that has to be compressed, quite a bit of void space to be filled up.

Q I see. Now you also mentioned that you had studied eight analogous San Andres reservoirs to make this -- some of these predictions for this one.

Could you name those reservoirs, please?

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A. I can't have all of them right offhand, but I can get the list for you.

Q. Okay, would you --

A. Seminole was one, Jordan was another. There was, I believe -- well, I'd have to check the list.

Q. You could furnish us with that list of reservoirs, though?

A. Yes.

MR. NUTTER: Okay, I believe that's all.

A. Now, in the -- they were not included in the report because the operators did not want that information published.

Q. But we'd like to know the names of them.

A. The names we can give you.

Q. Was the Vacuum Pool included in that study?

A. I think it was.

MR. RAMEY: Any other questions of the witness? He may be excused.

MR. RAMEY: We'll take a fifteen minute recess.

(Thereupon a recess was taken.)

MR. RAMEY: The hearing will come to order. Mr. Lopez, you may proceed.

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MR. LOPEZ: Yes, sir Mr. Chairman. I'd like to correct about three little glitches in Mr. Lancaster's testimony.

When he was talking about the water recovered --- required for the Grayburg injection, I think he said oil, but it's pretty obvious that he meant water.

The second thing is, I think he talked about eleven parameters on the exhibit. He mentioned ten but there are actually eleven parameters.

And the third item is that when he was talking about the income schedule for the reserves for the profitability study, he referred to Exhibit Number Nineteen but it's pretty obvious that he should have referred to Exhibit Number Eighteen.

MR. NUTTER: As long as you're making corrections, Owen, also I think it was where some monies were involved on total income for -- or something --

MR. LOPEZ: Yeah, this 412 --

MR. NUTTER: He said $412 million and it's $421 million.

MR. LOPEZ: Or 421 percent profit --

MR. NUTTER: Rather than 412.

MR. LOPEZ: Thank you, Dan. Okay.

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W. E. BUCK

being called as a witness and having been duly sworn upon his oath, testified as follows to-wit:

DIRECT EXAMINATION

BY MR. LOPEZ:

Q. Will you please state your name and where you reside?

A. W. E. Buck. I reside in Houston, Texas.

Q. Where are you employed and in what capacity?

A. I'm employed by Shell Oil Company in Houston, Texas, as a Staff Engineer in the business coordination group.

Q. Have you previously testified before this Commission and had your qualifications accepted as a matter of record?

A. No, I have not.

Q. Would you briefly describe your educational background and employment experience?

A. I graduated from the University of Oklahoma, February of 1941, with a BS degree in Petroleum Engineering. I performed military service from March, 1941, to February of 1946, and was employed by Shell Oil Company as an exploitation engineer in February of 1946.

My assignment with Shell Oil Company has

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included various engineering and supervisory positions directly associated with the development and production of oil and gas reserves.

During the past nine years I have directed and have been responsible for Shell's efforts to unitize properties for supplemental recovery purposes. During this period I have also represented Shell and other operators' efforts to unitize properties for supplemental recovery purposes.

I have been registered as a professional engineer in the State of Texas since July 29th, 1956.

Q. Are you familiar with the applications of Shell Oil Company in Cases Numbers 6652 and 6653?

A. Yes, I am, as I have represented Shell and acted as Chairman of the Working Interest Owners Committee during the negotiations in connection with the unitization of the proposed North Hobbs Grayburg-San Andres Unit.

MR. LOPEZ: Mr. Chairman, are the witness' qualifications acceptable?

MR. RAMEY: Yes, they are.

Q. (Mr. Lopez continuing.) Mr. Buck, did the Working Interest Owners Committee hold meetings during your chairmanship?

A. Yes, they did.

Q. Were minutes taken at those meetings?

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A. Yes.

Q. Let me refer you to what has been marked as Shell's Exhibit Number Twenty and ask you to identify it?

A. Exhibit Twenty is a bound series of copies of the minutes of the Working Interest Owners Committee meetings and related correspondence. These minutes and this correspondence were prepared by me in my role as chairman of the committee.

Q. Have you reviewed these minutes?

A. Yes, I have.

Q. Do they accurately report the actions of the Working Interest Owners Committee in those respective meetings?

A. Yes, they do.

Q. How were efforts to form the North Hobbs Unit initiated and how was the program for unitization and water injection development?

A. As Mr. Lancaster previously stated, Amoco Production Company initiated an effort in 1970 to form a pool wide unit of the Hobbs Grayburg-San Andres Pool, for the purpose of supplemental recovery operations. It became apparent that agreement could not be reached on a pool wide basis because the working interest owners could not reach agreement on the method of allocating the unit production based on the values assigned the parameters.

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At a meeting held by Amoco in July -- on July the 12th, 1973, all of the working interest owners in the Hobbs Pool decided to abandon efforts to form a pool wide unit and to divide the pool into two parts for future unitization efforts. Amoco undertook a program of unitization of the south portion of the pool and was successful in forming the South Hobbs Unit on January 1, 1975.

Shell called a meeting of all operators on July 31st, 1973, to determine what interest, if any, all of them had in undertaking a program for the unitization and water injection for the northern portion of the -- part of the pool. The operators attending this meeting actually represented a major portion of the working interest in the northern portion of the pool. They agreed to proceed with a program of unitization and water injection, and to participate in an effort to form a North Hobbs Grayburg-San Andres Unit, with Shell Oil Company acting as unit expeditor and unit operator if the efforts toward unitization were successful.

As Mr. Lancaster discussed, the operators in attendance at this meeting charged the Technical Committee with the task of developing a Technical Study for the proposed North Hobbs Grayburg-San Andres Unit.

The operators instructed the Technical Committee to obtain general agreement on all items considered

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The Technical Committee was instructed to bring any matters upon which general agreement could not be reached to the Working Interest Owners Committee for direction or decision.

This Technical Committee consisted of representatives of all working interest owners who wished to participate and Shell's representative acted as chairman of the committee.

Q What actions were taken by the Working Interest Owners Committee during the time the study was being developed by the Technical Committee?

A No further meetings of the Working Interest Owners Committee was held until May 26th, 1977; however, in the meantime the Technical Committee asked our committee to act on two of its recommendations.

Our first action was to approve the recommendation of the Technical Committee to adopt a cutoff date of January 1, 1975, for all well logging data and well test information which they were going to consider in completing their charge. The need to adopt a cutoff date is fairly self-evident. As was stated in the ballot submitted to the working interest owners, a cutoff date was necessary in order to bring certain facets of the Technical Committee's work to a conclusion so that it could proceed with answering their charge. Our approval of this recommendation was arrived at by a written ballot vote on September the 26th, 1974.

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The second action our committee took was to adopt the Technical Committee's recommendation to approve a computer analysis of certain study zones using Shell's three dimensional, compressible fluid reservoir simulation program. This recommendation was approved by 88.5 percent of the working interest owners involved in the northern portion of the Hobbs Pool, again by written ballot on March 15th, 1975. The percentage approval was based on each working interest owner's respective percentage of oil production from the northern portion of the Pool during the year -- there's an error in that date and I'll have to check my minutes for that date. I apologize. That should be a portion of 1973.

MR. LOPEZ: Okay, sorry for the hitch. When did the Technical Committee complete their charge and what action was then taken by the Working Interest Owners Committee?

A. The Technical Report which has been previously introduced as Shell's Exhibit Number Sixteen, was formally submitted to the Working Interest Owners Committee at a meeting on May 26th, 1977. This Technical Report was accepted by the Working Interest Owners Committee as the completion of their charge.

76.6 percent of the working interest owners, again based on 1976 oil production, accepted the study as a

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basis for unitization negotiations.

Q Excuse me, Mr. Buck, should that also be 1973? It should not be '76?

A I'm sure that that is correct, '76 there.

Q This is '76.

A Exxon's acceptance was qualified because Exxon was not yet ready to accept the gas reserve parameters. Exxon later accepted without qualification the Technical Report as a basis for unit negotiations. Ultimately, not one working interest owner objected to the use of the Technical Report as the basis for unit negotiations.

Q Was a method developed for allocating all of the oil and gas to be produced from the Unit Area, and if so, in what manner was it developed?

A At a meeting of the Working Interest Owners Committee on July the 12th, 1977, efforts were initiated to develop a participation formula or method of allocating the oil and gas to the various tracts within the Unit Area. The meeting was attended by working interest owners representing more than 92 percent of the unit participation based on the lowest participation of any of the formulas considered at that meeting.

At this meeting a total of twelve different participation formulas were proposed by ten different working interest owners. Each proposal was considered and a roll-

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call vote was taken of the working interest owners in attendance. None of the twelve formulas received more than 58 percent approval of the working interest owners in attendance.

In the absence of agreement, the meeting of the Working Interest Owners Committee was adjourned with the intent of renewing efforts at a later date after all parties had time to review the efforts to date.

The Working Interest Owners Committee again met on September the 20th, 1977, in its continuing effort to develop an acceptable participation formula. Five additional formulas or methods of allocation were proposed at this meeting. Each new method --- formula was considered by the committee and a roll-call vote of the working interest owners present was taken on each formula.

Continental Oil Company presented the fifth formula considered at this meeting and the seventeenth proposal in all. Continental's formula received in excess of 83 percent approval of the working interest owners on a roll-call vote.

At the request of the working interest owners, a written ballot on this formula was submitted and returned by mail. This formula provided for participation by the working interest owners during three specified phases of the life of the project and based on each working interest owner's respective oil participation in each phase, the re-

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sults of the ballot were: Phase I, 92.01 percent working interest owners' approval, with only 1.46 percent disapproval. Phase II, 92.58 percent approval, with only 1.30 percent disapproval; and Phase III, 89.76 percent approval, with only 1.27 percent disapproval.

Q Would you state what is the participation formula which received the percentage approval you've just described, and also tell the Commission how it works, and in this connection I refer you to what has been marked as Shell's Exhibit Number Twenty-one.

And preliminarily, let me suggest, Mr. Chairman, the date was shown on the exhibit as 9. We've changed it to 7 on the wall exhibit and we've also corrected the Commission exhibit, but all the other exhibits that are floating around have the wrong date.

So we're clear, this Exhibit Twenty-one, the date shown in the phase allocation should read January 1, 1977, throughout. Okay.

A Actually, participation was made up of two formulas, one for oil and one for gas, each divided into three parts or phases.

As shown on the exhibit, the formula for oil allocation in Phase I participation was based on 20 percent of the ratio of the quantity of 1976 oil production from each tract to the total quantity of 1976 oil production from

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all tracts within the Unit Area, plus 80 percent of the ratio of the quantity of remaining primary oil reserves of each tract within the Unit Area as of January 1, 1977, as set forth in the Technical Report to the total quantity of remaining primary oil reserves of all tracts within the Unit Area as of the same date.

In Phase II the participation was based on 100 percent of the ratio of the quantity of remaining primary oil reserves for each tract within the Unit Area, again as of January 1, 1977, to the total quantity of remaining primary oil reserves of all tracts within the Unit Area as of the same date.

In Phase III participation was based on 100 percent of the ratio of the quantity of secondary oil reserves for each tract within the Unit Area as set forth in the Technical Report, to the total quantity of secondary oil reserves of all tracts within the Unit Area.

The gas participation formula is the same in principle as the formula for oil participation.

In Phase I participation was based on 20 percent of the ratio of the volume of 1976 gas production from each tract within the Unit Area to the total volume of 1976 gas production from all tracts within the Unit Area, plus 80 percent of the ratio of the volume of remaining primary gas reserves of each tract within the Unit Area as

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of January 1, 1977, as set forth in the Technical Report, to the total volume remaining primary gas reserves of all the tracts within the Unit Area as of the same date.

In Phase II participation was based on 100 percent of the ratio of the volume of remaining primary gas reserves for each tract within the Unit Area, again as of January, 1977, to the total volume of remaining primary gas reserves of all the tracts within the Unit Area as of the same date.

In Phase III participation was based on 100 percent of the ratio of each tract's quantity of secondary oil reserves within the Unit Area as set forth in the Technical Report, to the total quantity of secondary oil reserves of all tracts within the Unit Area.

Q. Mr. Buck, now that you've described how unit oil and gas production will be allocated to each tract during three phases, would you explain the duration of each phase?

A. With respect to the duration of each phase, Phase I is to start on the effective date of unitization and continue until the first day of the month following the month in which the total number of barrels of oil produced from all tracts within the Unit Area after the effective date of unitization equalf four million barrels.

Phase II starts at the termination of

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Phase I and continues until the first day of the month following the month in which the total number of barrels of oil produced after January 1, 1977, from all tracts within the Unit Area equals 38,071,683 barrels, which is the quantity of remaining primary oil reserves of the Unit Area, as of January 1, 1977, as set forth in the Technical Report.

Phase III begins with the termination of Phase II and continues to the remainder of the term of unitization or life of the project.

Q Is then the oil and gas that is produced from the Unit Area less that used in the conduct of unit operations or unavoidably lost, to be allocated to the separately owned tracts within the Unit Area on the basis of the participation formula just stated?

A Yes. This method of allocation is set forth in Section 13, page 9, of the Unit Agreement for the North Hobbs Grayburg-San Andres Unit, which has been introduced as Shell's Exhibit Number Three.

Q Why is there a split formula with respect to Phase I of the unit operations?

A. The relationship of a tract's production to the production of other tracts, or to the total of all tracts, at a given time, or for a relatively short period, is not necessarily the same as the relationship of the remaining primary reserves of such a tract to the total of

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all tracts; therefore, a rate of production for a fixed period was used as a parameter in Phase I to provide some adjustment. Phase I is for only a short period of time, the time it takes to produce four million barrels of oil. By the time four million barrels of oil are produced it is anticipated that the rate of production of the unit will begin to increase so that soon thereafter all tracts will be allocated oil at a rate greater than they enjoyed prior to unit operations.

Q Do you have an opinion as to whether or not the participation formula contained in the Unit Agreement allocating the produced and saved unitized hydrocarbons to the separately owned tracts in the Unit Area does so on a fair, reasonable, and equitable basis?

A. Yes, I believe it does.

As may be noted, the first two phases are based fundamentally on the remaining primary reserves of each tract as determined by the Technical Committee, a committee on which all working interest owners were invited to be represented. By using this factor as the basis for the allocation of oil and gas produced under the proposed Unit Agreement, each tract would receive first from the Unit's operation an amount of oil and an amount of gas equal to the amounts each would have received if primary operations had continued without unitization.

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Phase III, being based entirely on a given tract's secondary recovery potential, allows each tract to recover its contributed share of the added reserves. This condition is very desirable in that it places any risk of recovery upon the supplemental oil, or that additional oil that is made possible by unit operation. With the amount of oil involved in the North Hobbs Unit, royalty interest owners, working interest owners, and the State of New Mexico, can all feel quite certain that they will receive at least as much oil and gas from unit operations as they would have received from continued operations without unitization, and know they all stand to benefit from the additional oil recovered by water injection.

Placing the risk of recovery on the anticipated secondary potential is quite reasonable and fair when one considers the fact that the tracts differ in their share of primary and secondary reserves contributed to the unit. Some tracts have a smaller share of the remaining primary recovery than their share of the secondary or supplemental oil, and by the same token, some tracts have a higher share of the remaining primary than their share of the secondary reserves.

For example, two tracts might be allocated the same total amount of oil from unit operations. Assume one of these tracts receives most of its oil by reasons of

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its primary contribution and very little from its secondary contribution, and that the other tract receives its oil allocation based upon the opposite mix of its primary and secondary contribution. It is therefore reasonable that the first tract with possibly less incentive for unitization and water injection, should bear only that risk of recovery which is in proportion to its incentive or secondary potential. Conversely, the second tract which has a greater incentive for unitization and water injection by virtue of the greater secondary recovery potential, should bear the risk related to that potential benefit. The participation formula achieves this desirable and necessary result.

Q How were procedures developed for allocating unit expenses to the various separately owned tracts?

A The percentages for allocating unit expenses were developed in a manner similar to that involved in the developing of the participation formula; that is, by the working interest owners.

Unit expenses were considered as two separate items, operating expense, which is comprised of the costs associated with the actual unit operations and investment cost, which is comprised of the cost of the facilities, including the construction costs required for the water injection program.

At a metting of the Working Interest Owners

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Committee on February the 2nd, 1978, consideration was given to the methods to be used for allocating the unit expenses. Six methods were proposed and considered at the meeting. A roll-call vote was taken on each method proposed. The sixth proposal considered received in excess of 76 percent approval of the working interest owners on a roll-call vote. The working interest owners then agreed to submit by mail the sixth proposal for ballot vote.

The results of the written ballot, again based on each working interest owner's respective oil participation in each phase were: Phase I, 85.3 percent approval, with only 10.2 percent disapproval; Phase II, 85.3 percent approval, with only 9.7 percent disapproval; Phase III, 83.6 percent approval, with only 14.6 percent disapproval.

In addition, based on their initial share of the investment cost, this formula received 84.9 percent approval with only 11.7 percent disapproval.

Q What was the method developed for the sharing of unit expenses, and in this connection I refer you to Shell's Exhibit Number Twenty-two?

A The method of allocating unit expenses finally agreed upon is shown on this exhibit. The unit operating expenses, which are referred to in Article 11 of the Unit Operating Agreement, are to be shared by the working interest owners in proportion to their Phase I,

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Phase II, or Phase III, unit participation based on oil, depending on which phase is in effect at the time a particular expense is incurred.

The cost of investment items incurred prior to the Investment Readjustment Date, which is defined in Article 1.2 of the Unit Operating Agreement as the termination of Phase II, or January 1, 1991, whichever occurs first, is to be shared by working interest owners in proportion to their investment participation, which again is defined in the Unit Operating Agreement as .58 of Phase II unit participation, plus .42 of Phase III unit participation. The cost of investment items incurred after the Investment Readjustment Date will be shared by working interest owners in proportion to their Phase III unit participation.

At the time of the Investment Readjustment Date, all investment costs incurred prior to such time are to be adjusted among all the working interest owners in accordance with their respective Phase III unit participation.

Q. Is this the method stated in the Unit Operating Agreement for allocating unit expenses to the working interest owners?

A. Yes. Article 11 of the Unit Operating Agreement, which is Shell's Exhibit Four, sets forth the method of allocating the costs of unit operations, including capital investments in the manner I've just described.

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Q. Do you consider these methods of allocating unit expenses to be fair, reasonable, and equitable?

A. Yes. The proposed water injection program in conjunction with the participation formula results in the accelerated recovery of an amount of oil equivalent to each tract's remaining primary reserve, as well as allowing for the recovery of supplemental reserves. In view of the fact that benefits will result from the accelerated recovery, it is fair and reasonable that this accelerated recovery should be considered in the allocation of unit expenses. Therefore, the allocation of operating costs on the basis of the phase in effect at the time the costs are incurred, and the weighting between primary and secondary reserves in the initial allocation of investment costs, as well as the provisions for the readjustment of Phase III unit participation, allocates the expense burdens in proportion to the benefits to be derived from the project.

Q. How are credits or charges to be made for such items as wells, tanks, pumps, machinery, and equipment contributed to unit operations?

A. Consideration was given to such items by the Working Interest Owners Committee at the same time and in association with the development of a method for allocating unit expenses. As noted in Article 10 of the Unit Operating Agreement, all items contributed to unit operations

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by the working interest owners are to be inventoried and a value assigned immediately after the effective date of initization. The value of the inventoried items will be adjusted initially among the working interest owners in proportion to their investment participation, just as for investment costs.

At the Investment Readjustment Date the value of the inventoried items, less the value of any items retired, is to be readjusted among all working interest owners in accordance with their respective Phase III unit participation.

Q Does the Unit Operating Agreement provide for the situation where a working interest owner does not pay his share of the unit expense?

A Yes. Article 11.5 of the Agreement provides that in this case the unit operator shall hve a lien on the unit oil and gas owned by that working interest owner and the unit operator shall have the right to collect the proceeds from the sale of that oil and gas until the reimbursable amount owed, plus interest, has been paid.

Q Does the Unit Agreement and the Unit Operating Agreement provide for the designation and removal of the Unit Operator?

A Section 6 of the Unit Agreement and Article 6.1 of the Unit Operating Agreement designate Shell as the

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unit operator.

Article 6.2 of the Unit Operating Agreement and Sections 7 and 8 of the Unit Agreement provide a procedure for the removal of the Unit Operator and the selection of a successor.

Q. Does the Unit Operating Agreement provide a method for voting on unit matters?

A. Yes. Article 4 of the Unit Operating Agreement sets forth the voting procedures for voting on matters to be decided by the working interest owners.

Q. Does the Unit Agreement provide for putting the unit into effect and terminating it?

A. Yes. The unit is to become effective as provided by Section 39 of the Unit Agreement. The Unit Agreement may be terminated as provided in Section 24 of the Unit Agreement.

I might further add that this section of the Unit Agreement to which I have just referred provides by its own terms for its own ipso facto expiration on January 1, 1980, if the unit does not become effective by that date.

Q. Is it your opinion that the granting of these applications is in the interests of prevention of waste and protection of correlative rights?

A. Absolutely.

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Q And is it also your opinion that the granting of these applications is reasonably necessary to carry on the supplemental recovery operations so as to substantially increase the ultimate recovery of oil and gas from the Hobbs Grayburg-San Andres Pool?

A Yes, that is my opinion.

Q Mr. Buck, one final question.

Based on your very intense and extensive involvement in the unitization effort you have just described, do you have an opinion as to whether unitization would be undertaken again in the forseeable future if the application for unitization is not approved as presented?

A Naturally I hope this question will be moot, but I might comment that our efforts to date have all been to form the North Hobbs Unit, and in view of the overwhelming response we have had from the working -- from the 80 working interest owners, and the 905 royalty interest owners, it just hasn't seemed appropriate or necessary, nor was time available, to develop a "what if" program.

Nevertheless, I think that when one considers that Amoco was unable to reach agreement and form a unit in spite of the tremendous time and effort they expended in their attempts to include the northern portion of the pool in the unit; two, the complexity and history of the reservoir; three, the methods, the time, and the expense

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required to evaluate the reservoir, remembering that the Technical Committee spent nearly four years in gathering data, developing a method of evaluation and obtaining acceptance of their report by the Working Interest Owners Committee; four, that a unit expeditor is not compensated for its time, engineers, lawyers, accountants, clerks, landmen, et cetera, when a unit is not formed, but only by his share of added oil when a unit is formed; five, when I think of the number of interested parties involved, 80 working interest owners, 905 royalty interest owners, and think about what it takes to get all or most to agree on anything, much less a method of sharing over 85 million barrels of oil, of which over 55 million barrels constitute oil that would not otherwise be recovered; six, that the incentive for a water injection program decreases with time, both from a reservoir recovery standpoint and from an actual construction and operational standpoint -- for example, part of the unit area is within the city limits of Hobbs, and the growth of the city's residential areas makes it increasingly difficult to do the necessary construction and drilling work; and seven, the fact that this effort has had an excellent response, ratification or acceptance by more than 92 percent of the working interest owners and 97 percent of the royalty interest owners, and in my judgment there is little or no assurance of improving upon this level of acceptance, if unitization is not

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brought about by such an effort and response, then the risk of another attempt to unitize would be extremely high, too high, maybe.

Considering all these things, Shell, or any other operator, would have to think long and hard before again undertaking such a monumental task when there is no reason to believe that the commitment of additional time, money, and professional talent would produce a better result than we have achieved to date.

Q. Were Exhibits Twenty through Twenty-two prepared by you or under your supervision?

A. Yes, they were.

MR. LOPEZ: Mr. Chairman, I offer Shell's Exhibits Twenty through Twenty-two into evidence.

MR. RAMEY: Shell's Exhibits Twenty through Twenty-two will be accepted.

Any questions of the witness?

CROSS EXAMINATION

BY MR. ATKINSON:

Q. Mr. Buck, I just have a couple of questions for you.

How much of the $33 million capital investment will be subject to readjustment at the end of Phase II?

A. Of the $33 million?

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Q Yes, sir.

A As now estimated, as I recall, the -- the total of the $33 million, which I believe is to be the capital investment required for installation, would be adjusted to the Phase III participation at the end of Phase II.

Q The entire $33 million?

A That is correct.

Q Also now can the ipso facto termination be extended from six months by agreement of the working interest owners?

A It can be by the approval of the working interest owners who have ratified the agreement.

MR. ATKINSON: We have no further questions.

MR. RAMEY: Any other questions of the witness? He may be excused.

MR. LOPEZ: Maybe, if we could just take about a three minute break, we've got a lot of exhibits to hang up.

(Thereupon a short recess was taken.)

MR. KILPATRIC: Mr. Chairman, we're ready any time you are.

MR. RAMEY: All right, please proceed.

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R. W. PHILLIPS

being called as a witness and having been duly sworn upon his oath, testified as follows, to-wit:

DIRECT EXAMINATION

BY MR. KILPATRIC:

Q. Would you please state your name, where you reside, and by whom you are employed, and in what capacity?

A. My name is R. W. Phillips. I live in Houston, and I am employed by Shell Oil Company as a Staff Production Engineer.

Q. Have you previously testified before the Commission and had your qualifications accepted as a matter of record?

A. No, I have not.

Q. Would you briefly describe your educational background and employment experience?

A. I received a BS in Mechanical Engineering and a BS in Petroleum Engineering from Texas A & M University in 1949. I joined Shell in August of 1949. I have had production engineering type assignments for Shell in Elk City, Oklahoma; Wichita,Kansas; Ardmore, Oklahoma; Oklahoma City,

Denver, New Orleans, and Houston. I am a Registered Professional Engineer in the States of Colorado and Louisiana.

Q Do your duties as Production Engineer for Shell include responsibilities for Shell's operations in New Mexico, specifically the North Hobbs Unit under discussion today?

A Yes, they do.

Q Are you familiar with Shell Oil Company's application in Cases Numbers 6652 and 6653?

A Yes, I am.

I have been charged by Shell with the job of coordinator of engineering with responsibility for coordinating the project planning in connection with unitization efforts. In this capacity I have reviewed the wells to be included in the North Hobbs Unit Area as to their current completion and their proposed utilization in the unit operation. I also coordinated engineering efforts toward the implementation of this water injection project.

MR. KILPATRIC: Mr. Chairman, are the witness' qualifications acceptable?

MR. RAMEY: Yes, they're acceptable.

Q (Mr. Kilpatric continuing.) I refer you now to what has been marked as Shell's Exhibit Number Twenty-three and ask you to identify it.

A Exhibit Number Twenty-three is a location

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plat which shows the following:

The location of the proposed injection wells in the unit area;

The location of all other wells within a radius of two miles from the proposed injection wells;

The formation from which these wells are producing or have produced; and

The lessees within a radius of two miles from the proposed injection wells.

At the bottom of this exhibit there exists a legend which shows the status of all wells shown on the plat, for example, whether a well is a proposed injector, or is plugged and abandoned, or what have you. You will also note that on the exhibit on the wall we have outlined the Hobbs City Limits in red.

Q. Now I refer you to what has been marked as Shell's Exhibit Number Twenty-four and ask you to identify it.

A. Exhibit Number Twenty-four is the well numbering system proposed for the North Hobbs Grayburg-San Andres Unit.

This exhibit has two parts. The first part is a plat showing the method for numbering the unit wells. For example, there are no sections in the Unit that have the same number: therefore, the base unit number is the

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section's number, as shown in the enlargement of Section 28. The individual wells within the section are identified by rows and tiers which match the established 40-acre proration units in which the well or wells are located.

The enlargement identifies Well No. 28-241. The well is located in Section 28, Row 2, Tier 4, and is the only well located in this proration unit. If there was another well in the same proration unit, it would be identified as Well No. 28-242.

The second part of this exhibit is a tabulation showing the unit wells identified both by the proposed numbering system and also by the operator.

Q I now refer you to what has been marked as Shell's Exhibits Numbers Twenty-five and Twenty-six and ask you to identify them.

A Exhibit Number Twenty-five is a diagrammatic sketch of all wells to be converted to injection wells. These sketches show all casing string diameters, setting depths, quantities of cement used and tops of cemsnt, completion intervals, and total depth of each well. A tabular summary of all wells to be converted to injection is attached as part of this exhibit and shows the current operator and well number and the proposed unit well number.

Exhibit Number Twenty-six is a series of three different diagrammatic sketches which illustrate the

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three types of typical completions of producers which we anticipate converting to injectors. These sketches show tubing diameters and packer setting depths. In addition, these sketches show that these injectors will have corrosion inhibited inert fluid in the tubing-casing annulus and that the tubing will be internally lined with a non-reactive corrosion preventing coating. Provisions will be made for monitoring injection pressure and tubing-casing annulus pressures in order to detect any leaks that might occur.

Q Now I refer you to what has been marked for identification as Shell's Exhibit Number Twenty-seven and ask you to identify that.

A Exhibit Number Twenty-seven is a tabulation of wells to be drilled and their proposed location including the unit well number of each of these wells and the proposed use of these wells.

Q Now I refer you to what has been marked for identification as Shell's Exhibit Number Twenty-eight and ask you to explain it.

A Exhibit Number Twenty-eight is a series of four diagrammatic sketches showing how the newly drilled injectors and producers will be completed. In addition, these sketches show that the injectors will have non-reactive internally lined corrosion protected tubing with a packer set 100 feet above the uppermost perforation. The sketches

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further show that the tubing-casing annulus will be filled with a corrosion inhibited inert fluid and provision will be made for monitoring injection pressure and tubing-casing annulus pressure.

Both producers and injectors will have a minimum of 350 feet of surface casing and all casing strings will be cemented to the surface.

Q Were all available logs with respect to wells proposed for conversion to injection within the Unit previously given to the Commission?

A Yes, they were under the original application of August 15, 1979.

MR. KILPATRIC: At this time, Mr. Chairman, I request that the Commission take administrative notice that all these logs were submitted with Shell's application in Case Number 6653 and that the Commission make them a part of the record in these cases.

MR. RAMEY: So done.

MR. KILPATRIC: Thank you.

Q (Mr. Kilpatric continuing.) Are there any wells proposed for conversion to injection for which no logs were available and in this connection I refer you to what has been marked for identification as Shell's Exhibit Number Twenty-nine.

A Yes, there are six such wells and Exhibit

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Twenty-nine is a tabulation of these six producers proposed to be converted to injectors for which no logs are available.

Q I now refer you to what has been marked for identification as Shell's Exhibit Number Thirty and ask you to identify it.

A. Exhibit Number Thirty is a tabular summary for all wells which penetrate the injection zone and which are located within one half mile of the proposed injection wells. The tabulation consists of four parts:

Part One is a tabulation of all proposed unit wells.

Part Two is a tabulation of all active wells completed below the Grayburg-San Andres interval and within the Unit boundary.

And Part Three shows all active wells outside the Unit boundary.

And Part Four shows all plugged wells.

The tabular summary shows all casing strings, setting depths, amount of cement used, cement tops, total depth, producing interval, and well identification and location.

Q I now refer you to what has been marked for identification as Shell's Exhibit Number Thirty-one and ask you to identify it.

A. Exhibit Number Thirty-one is a series of

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diagrammatic sketches of each plugged and abandoned well which penetrates the injection zone and is located within one half mile radius of the proposed injectors.

These sketches show the position of all cement plugs placed in the wellbore during abandonment work.

Q Now I refer you to what has been marked as Shell's Exhibit Number Thirty-two and ask you to describe it.

A Exhibit Number Thirty-two is a copy of the water contract that Shell successfully negotiated with the City of Hobbs, New Mexico. The contract provides for the purchase of treated waste water which will be used for injection water in the Pressure Maintenance Project.

Our initial term contract with the City of Hobbs provides for the purchase of 50,000 barrels of water per day at a cent and a half per barrel and means an annual income to the City of Hobbs of $274,000.

Q Do you plan to use any other water source for injection in your pressure maintenance project?

A Yes. We plan to use water produced by unit operations. We will have about 20,000 barrels of water per day available from this production and therefore will plan to use a total of 70,000 barrels of water per day initially for injection.

Q I now refer you to what has been marked for

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identification as Shell's Exhibit Number Thirty-three and ask you to identify it.

A. Exhibit Number Thirty-three is a list of the proposed special rules and regulations for the North Hobbs Grayburg-San Andres Unit Pressure Maintenance Project. The proposed rules encompass the method for allowable calculations, establishing drilling well locations, completion of newly drilled and converted wells, restrictions on water injection, monitoring wells for problems, and investigation of formation isolation integrity in injection wells.

Q. It is apparent that the proposed Unit Area for the North Hobbs Grayburg-San Andres Unit does not encompass the entire Hobbs Grayburg-San Andres Pool in Lea County, New Mexico, but only a part thereof. Have there been any negotiations regarding the development of line agreements with owners or operators of other properties within the pool, but outside the proposed Unit Area?

A. Yes. There are only two water injection projects which offset the proposed Unit Area. One of them is the Moranco Rice-Hardin Waterflood Project to the north, and the other is the Amoco Operated South Hobbs Grayburg-San Andres Unit on the south. We are in the process of negotiating line agreements with both Moranco and Amoco.

In the case of Moranco -- of the Moranco Rice-Hardin Waterflood Project, we propose to convert to

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water injection the following wells in the North Hobbs Unit: Well No. 18-131 -- I'm sorry. Well No. 13-331, which is currently Shell-Rice No. 4; Well No. 18-131, the current Amerada-Hardin 3; Well No. 18-311, the current Gulf-Hardin 7; and Well No. 13-221, the current Conoco State "B4". Two of these wells are not included in our current application. We will need to obtain the unit working interest owners' approval for the conversion of these two additional wells, and upon securing that approval we will apply to the Division for administrative approval for these additional injectors.

Q. Do you have an opinion as to whether the North Hobbs Unit operations will have an adverse affect upon other portions of the Hobbs Grayburg-San Andres Pool?

A. With the completion of the North Hobbs Unit there will be three water injection programs within the Hobbs Pool, which will provide proper protection for all parties. In addition, either the Special Rules and Regulations for the North Hobbs Unit or line agreements will further assure that there will be no adverse effect upon other portions of the Hobbs Pool.

Q. I now refer you to what has been marked for identification as Shell's Exhibit Number Thirty-four and ask you to explain it.

A. Exhibit Number Thirty-four is a diagram depicting the history of the efforts that have gone into

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developing the project and the projected schedule for implementation of the project.

The top portion of the diagram depicts the work of the Technical Committee and negotiations of the working interest owners since initial efforts began in July, 1973. This top portion of the diagram also shows the time allocated for planning the unit implementation and the anticipated effective date of unitization.

The second line from the top of the diagram represents the time involved in searching, locating, negotiating, and securing a source of make-up water. As I've already indicated, the make-up water will be obained from the City of Hobbs.

The third line from the top reflects time and effort spent in the planning involved in the design of the production, injection, and water source systems, and the acquisition of sites and rights-of-way to accomodate these plans.

The bottom line of the diagram represents the planning and effort involved in developing the details of the drilling and well workover programs necessary for the implementation of the Pressure Maintenance Project.

This exhibit graphically illustrates what the testimony which you've heard today clearly shows, that the magnitude and complexity of this project have been nothing

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less than monumental.

Mr. Campbell has explained what efforts were involved in determining who had ownership interests in the proposed unit area and what efforts were involved in locating, contacting, and obtaining the consent of the incredibly numerous royalty owners and working interest owners involved.

Mr. Lancaster has described the Technical Committee's arduous four-year task of gathering the necessary technical data with accuracy, developing a method of evaluating that data, and in turn compiling that data into the Technical Report, which was accepted by all the working interest owners as a basis for their negotiations in reaching agreement as to the fair and equitable distribution of the burdens and benefits to be obtained from the production of over 55 million additional barrels of oil.

Finally, as Mr. Buck has explained, the working interest owners sat down, rolled up their sleeves, and hammered away until they were able to reach fair and equitable formulas for the sharing of these burdens and benefits.

The exhibit also shows that the efforts just described have only set the stage for the actual implementation of the project. If our efforts here today are successful, there remains much to be done to finally realize

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the very significant and important gains that the project holds.

Q. Were Exhibits Twenty-three through Thirty-four prepared by you or under your supervision?

A. Yes, all these exhibits, with the exception of the Exhibit Number Thirty-two, which -- were prepared by me or under my supervision.

With respect to Exhibit Thirty-two, this represents a copy of the actual agreement that was submitted to and executed by the City of Hobbs.

MR. KELLAHIN: Mr. Chairman, I offer Exhibits -- Shell's Exhibits Numbers Twenty-three through Thirty-four into evidence.

MR. RAMEY: Exhibits Twenty-three through Thirty-four will be accepted.

I think before we submit Mr. Phillips to cross examination, it might be wise to take statements from the other people who wish to make them.

MR. NAERT: Mr. Chairman, my name is Gilbert A. Naert, N-A-E-R-T, with Marathon Oil Company, and I'm a Senior Petroleum Engineer and I'd like to state before I read this statement that I've been directly involved in the attempted efforts to unitize the Hobbs Field since its inception in 1969 and 1970, when, as you know, we tried to unitize the entire field with PanAmerican, or Amoco, as oper-

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ator.

Marathon Oil Company is a working interest owner with leases included in the North Hobbs Grayburg-San Andres Unit in Lea County, New Mexico, and we make this statement in support of Shell Oil Company's application in Case Number 6652 and 6653 before the Oil Conservation Commission for approval of said unit.

Marathon has been participating in discussions concerning possible unitization and water flooding of these producing zones in the Hobbs Field for the past ten years. This is the first time that a substantial majority of the working interest owners in the proposed unit have been able to agree upon participation in a unitized waterflood operation.

Marathon, in executing the Unit Agreement and supporting the application believes that the proposal is essentially a fair one to all parties concerned and if adopted and implemented will result in increased production of much needed additional oil and consequently will prevent waste that might occur under continued competitive operation.

We urge approval of the unit proposal of Shell Oil Company.

Thank you.

MR. INGRAM: I'm Hugh Ingram. I'm Conservation Coordinator for Conoco, Inc., Hobbs, New Mexico.

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Conoco, Inc. is a working interest owner in the proposed North Hobbs Grayburg-San Andres Unit and supports Shell's application for statutory unitization of the proposed North Hobbs Unit. We believe that the formation of this unit is in the best interests of conservation, the prevention of waste, and the protection of correlative rights of all parties concerned.

MR. RAMEY: Anyone else?

MR. PERRY: Mr. Commissioner, my name is Boyce Perry. I'm the manager of secondary recovery for Samedan Oil Corporation.

I would like to read this statement into the record of this hearing.

Samedan Oil Corporation is a working interest owner in the North Hobbs Unit and has been involved in the proceedings of the unitization of the North Hobbs Unit since its concept: have taken on the feasibility study, compilation of the Technical Committee Report, and negotiations for participation in investment formulas.

We stand in support of all aspects of unitization efforts and believe and accept unitization of the North Hobbs Field under the proposals submitted at this hearing by Shell Oil Company.

MR. ALLEN: Mr. Chairman, I'm James Allen with Amoco Production Company, Houston, Texas. I'm a Senior

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Petroleum Engineering Supervisor.

Amoco Production Company is an operator in the proposed North Hobbs Grayburg-San Andres Unit. We have ratified both the Unit Agreement and the Unit Operating Agreement.

Amoco hereby recommends that the Commission approve the proposed unit and pressure maintenance project as proposed by Shell Oil Company in Cases Numbers 6652 and 6653.

MR. MORAN: I'm R. M. Moran, President of Morenco, Hobbs, New Mexico. I'm both the lease line operator and in the unit and Shell invited me out and wa support it all.

MR. RAMEY: Anyone else?

MR. HEFLEY: I'm Jim Hefley, Unitization Manager for Amerada Hess Corporation, Tulsa, Oklahoma.

Amerade Hess Corporation is a working operator within the unit boundary and we have ratified Shell's Unitization Agreement and support the proposal here.

MR. NUTTER: What was your last name again, please, sir?

MR. HEFLEY: Hefley, H-E-F-L-E-Y.

MR. NUTTER: Thank you.

MR. RAMEY: Any other statements? We'll recess until 1:30.

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(Thereupon the noon recess was taken.

Thereafter at the hour of 1:30 p.m. on the 3rd day of October, 1979, the hearing was again called to order and the following proceedings were had, to-wit:)

MR. RAMEY: The hearing will come to order.

Were you through with Mr. Phillips?

MR. KELLAHIN: Yes, Mr. Chairman, Shell has completed the direct examination.

MR. RAMEY: Are there any questions of this witness?

MR. ATKINSON: I have no questions, thank you.

MR. RAMEY: Mr. Stamets?

CROSS EXAMINATION

BY MR. STAMETS:

Q Mr. Phillips, Figures 35 through 39 of the Waterflood Feasibility Unitization Parameters show the injection and production patterns for the various zones to be flooded, and those are certainly some odd looking patterns

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in there. Has any consideration been given to infill drilling in this proposed mitigation project?

A. Mr. Stamets, I'm going to have to refer you to the Technical Committee people for that question because I was not involved in developing the plan, and right now we're sticking to that plan.

Q. Okay, nonetheless, I would wish you would put someone on, back on to answer the question, whoever it should be.

MR. LOPEZ: Yes, we will.

MR. KILPATRIC: We will.

MR. LOPEZ: We'll be glad to.

MR. PAMEY: Any other questions of Mr. Phillips? He may be excused.

MR. LOPEZ: Mr. Chairman, that concludes Shell's direct testimony. I would of course request to be allowed to make a closing statement at the conclusion of the evidence.

MR. PAMEY: I think that can be arranged, Mr. Lopez.

Let's see, who did you want to put back on to answer your question?

MR. LOPEZ: I'll be glad to put Mr. Lancaster on for that particular question.

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BILL LANCASTER

being recalled as a witness and being still sworn upon his oath, testified as follows, to-wit:

CROSS EXAMINATION

BY MR. STAMETS:

Q The question refers to the injection patterns that are shown on Figures, I believe, Thirty-five through Thirty-nine of the Technical Report, and my question was, has consideration been given to infill drilling within this project to make those patterns a little more uniform?

A At this point it hasn't. At this point we are -- since we haven't really gotten the unit together, and we haven't talked to the working interest owners, we more or less feel that what's in the -- what's in the Technical Report is the way we will start off. At least this is how we initially will proceed.

Now, it may be that before we go very far, we might want to make some changes.

Q Do you feel that that should be looked at?

A Yes.

Q An infill program in this project?

A Well, now when you say an infill program, I don't quite -- we've got a -- it's a 9-spot. I admit that

it's not a complete pattern across the unit, but there is in essence a 9-spot that's in there now with some drilling wells.

Now it may be that when we get together, especially after we get done on our final agreements with Amoco, that we may have a slightly different pattern, or we may have a slightly different configuration to the wells, but we have not sat down and gone through a redevelopment, no.

Q. Do you feel that this should be done within a reasonable period after the project is started?

A. After they're approved, yes.

Q. How long is a reasonable period of time?

A. I would think that within the first year when we see how things are -- how our injection is going to proceed.

And we also, as we go into this, what we will find, I think, we'll find some wells that we can't use, and moving -- then as you move one well that maybe moves another, and these are things that we can't foresee at this time.

MR. STAMETS: I believe that's all the questions I have.

MR. ATKINSON: I have another question, Mr. Chairman, as a result of this questioning of him.

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RECROSS EXAMINATION

BY MR. ATKINSON:

Q. In the event that additional infill drilling is necessary, what will that do to the projected capital investment?

A. The investment would go up slightly.

Q. Do you have any feeling at all what the additional investment would be for these?

A. Well, it depends on how many wells we're talking about, but the wells, when we talk about a well costing maybe $150,00, maybe $175,000, you could drill twenty wells and you'd go up maybe a couple million dollars, but when you talk about the profit that that offsets, you're talking about four hundred million profit and you're talking only going up about five million dollars or so on your expenditures.

So as a percentage of your profit it's really very small.

MR. ATKINSON: Okay, thank you.

RECROSS EXAMINATION

BY MR. STAMETS:

Q. I presume, Mr. Lancaster, that you would

not propose drilling any additional wells in the project unless you could say that these additional wells would recover more oil than in your current projections that you have.

A. Well, the concept is that each additional expenditure or what we did would pretty much have to stand on its own in our presentation to the working interest owners.

Q. So that would not have any effect on the overall economics of the project as you've put it forth here today.

A. Spending the additional money or -- I wouldn't think so.

Q. Thank you.

MR. NAGEY: Any other questions?

MR. PADILLA: Mr. Chairman, I have one question I think it is properly -- would be properly addressed to Mr. Buck, and I think he could answer that question from there.

Section 7 of the proposed Unit Agreement indicates that upon removal of the operator -- or the removal of the operator would be effective upon notice to the Land Commissioner. Do you have any objection to the inclusion of that notice to the Oil Conservation Division, as well?

MR. BUCK: I don't believe we'd have any objection whatsoever.

MR. LOPEZ: I might add, Ernie, that I'm

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sure no one would have any objection. That's certainly fine. It's just not in the agreement now. When you're talking about getting 700 and how many royalty owners and 77 working interest owners signed up, that takes a little bit of negotiation.

MR. PADILLA: That Section 7 just lists the procedure by which an operator may be removed.

MR. RAMEY: The witness may be excused.

Mr. Atkinson, are you ready?

MR. ATKINSON: Yes, sir. Exxon calls Mr. William Nolan.

WILLIAM E. NOLAN

being called as a witness and having been duly sworn upon his oath, testified as follows, to-wit:

DIRECT EXAMINATION

BY MR. ATKINSON:

Q. Will you please state your name and residence for the record?

A. William E. Nolan and I live in Midland, Texas.

Q. Mr. Nolan, how are you employed?

A. Employed by Exxon as a Senior Staff Engineer.

Q. Have you previously appeared before the

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Commission and had your qualifications accepted as a matter of record?

A. No, sir, not before this Commission.

Q. What is your educational background?

A. I graduated from the University of Kentucky in 1943 with a Bachelor of Science in Civil Engineering.

Q. After graduation, as an undergraduate, what was your employment experience?

A. For the first two years after I graduated I worked for Sohio Petroleum Company and during my last couple of years I was District Engineer for the West Edmond Hunton Lime Unit, which was the first large unit formed in the State of Oklahoma.

After that work experience I joined Monterey Oil Company as Chief Engineer of the Fullerton Clear Fork Unit, another large unit in West Texas.

After Exxon bought Monterey out, I went to work for Exxon in 1961. Since that period of time I've done various types of unitization work for Exxon.

Q. And what has your contact with technical committees been with regard to unitization?

A. I have attended quite a number of technical committees and I am at the present time a member of six or seven technical committees, working on unitization studies.

Q. What technical committees have you been

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involved with in New Mexico?

A. With the recently formed East Vacuum Unit I was Exxon's representative. I was also a representative for Exxon on the Double L Queen Unit, which I believe was the first statutory unit in the state. I also served on several others.

Q. Now with regard to the Technical Committee relating to Shell's applications, what has your involvement been with that, please?

A. Since 1973 I have been Exxon's technical representative on that committee.

Q. And have you had extensive involvement as a member of the Technical Committee with its workings?

A. Yes. I was trying to figure out, I think I attended every technical session of the twenty or so that was held while Mr. Swartz was the coordinator and I believe I attended them all.

MR. ATKINSON: Will the Commission accept Mr. Nolan's qualifications?

MR. RAMEY: Yes, we've heard of Mr. Nolan over the years.

Q. (Mr. Atkinson continuing.) Mr. Nolan, I refer you to what's been marked for identification as Exxon's Exhibit Number One. Could you please briefly describe what this is?

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A. Well, this is a map which Shell has also sort of presented some background data on, but this shows the whole of the Hobbs Pool, and the map was actually prepared by Amoco as an exhibit when they were working on the full field unitization effort.

It shows the boundary line between the Amoco operated South Hobbs Unit and the proposed boundary line -- proposed boundary of the North Hobbs Unit Area, along with that little peninsula that sort of sticks up there on the east side along the township between 18 South and 19 South.

Q. The dark hatched lines, I take it, outline the boundaries of the North Hobbs Unit?

A. That's correct.

Q. Now, I notice in the south portion, in the Amoco South Unit, there are two -- there's a hatch marked rectangle and a dotted rectangle. Will you explain what those are?

A. Those show two 80-acre tracts which are not a part of the Amoco South Unit, which are -- this unit, as was earlier stated, was a voluntary unit and all the tracts were not put into the unit when it was initially formed. There are a number of other tracts that did not join the unit initially on its formation in early 1975. Those, several of those, have subsequently joined the unit

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but these two, the Conoco Skelly A-9 and the Getty Mexico 4, are at the present time, or at least the last time I looked at the records in June, were not a -- were not part of the South Unit.

Q. All right. Now there are three areas overlined in yellow. Will you please explain what those are?

A. Those three areas show the tracts which Exxon owns.

Q. Thank you. I now refer you to what has been marked for identification as Exxon --

A. I might point out that that Morance Flood also is shown on here at the top of the Area.

Q. All right. I now refer you to what is marked for identification as Exxon Exhibit Two.

A. This shows again the same exhibit that Shell has presented but we'll give it a little more detail on Exxon's ownership in this unit.

On the lefthand side you see the 320-acre tract 43, which is Exxon's State "A" Lease. It has six wells on it.

Tracts 47 and 48 in the middle of the lease are the Exxon Bowers "A" Federal tracts. This is the largest Federal lease in the unit. It's 320 acres of a total of 400 acres of Federal leases in the unit.

The reason it's divided into two tracts

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is a division of royalty interest between the Tract 47 and Tract 48. It has the same base lease.

Exxon also has a 50 percent interest in the W. D. Grimes, the 40-acre tract to the right.

Q. All right, thank you.

A. I guess Exxon's total there is 660 acres out of roughly 10,000 acres in the total unit, about 6 percent, a little over 6 percent of the total surface area.

Q. I'm sorry, what ---

A. I say Exxon's total is about 6 percent of, a little over 6 percent of the total surface area of the unit.

Q. All right. I now refer you to what has been marked for identification as Exxon Exhibit Number Three.

A. Again, this exhibit is very similar to Shell's Exhibit Eighteen, excepting that when Shell plotted the production rate versus time they used a semilog plot which gives a -- quite a different character to the look of the production.

This is plotted on Cartesian -- or directly plotted such that the production rate in barrels per day plotted to the left between 2000 and 4000 and 4000 and 6000 is an equal space, and that makes the difference in the look of the graph. But in essence this is the same

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graph. You remember that -- that Shell testified the remaining primary recovery was 30.3 million barrels. That's a slight difference in estimate. Our estimate here is 30.2 million barrels, a very slight difference in estimate as to the cumulative recovery that will occur to the beginning of 1980.

That 30.2 million barrels is a direct calculation made by the Technical Committee. It started as on 1-1-77 as Mr. Buck testified, being 38.1 million barrels. Since that period of time some 7.8 or .9 million barrels would have been produced, leaving a remaining primary of 30.2 million barrels by our estimate on January the 1st of 1980.

Q How is the remaining primary exhibited on this Exhibit Number Three?

A The remaining primary is shown by the dashed line. It starts with slightly over 6000 barrels a day in January of 1980 and gradually declines across the graph, goes on off the 30-year to the year 2025, or for 45 years thereafter, and contains under that line the oil reserve,under that dashed line would accumulate to 30.2 million barrels after a production time of 45 years.

Q All right. Now, the 45-year period is when the economic limit will be reached?

A Yes. The economic limit of 3 barrels per

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day per well on quite a few of the wells will be reached in the year of 2025.

Q Would you please explain what the dark line is?

A The dark line shows the total forecast, the Unit production with waterflooding, and that would be the sum of the remaining primary plus the secondary, and you'll recall that Shell testified the secondary as being 55.2 million barrels and we agree precisely with that determination. We have no problem with that. It was what the Technical Committee determined.

And the sum, then, of the secondary being 55.2 and the primary being 30.2, gives a total recovery under the curve of 85.4 million barrels.

You'll notice, again as Shell's graph has shown, that the secondary, or bold, the black line crosses the primary line after a couple of years of production and then graudally increases on up to a rate slightly over 12,000 barrels a day, remains relatively flat for about 7 years, and then begins to decline. The reserves, by the Technical Committee, were estimated to be -- to have been produced in about 35 years from secondary recovery program, a shorter period of time than was estimated for the primary.

Also, this graph is basically, and I believe this probably was testified to by Shell, but this is a result

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of waterflooding in the Grayburg on a 5-spot pattern and in the San Andres on an inverted 9-spot pattern. Any change of that would probably change these rates.

Q. I now refer you to Exxon's Exhibit Number Four, which is in some ways very similar to the Exxon Exhibit Number Three. I notice that there are two formulas addressed in the upper lefthand corner. The first one is titled Unit Agreement Formula (Revenue Participation), and it is divided into three phases. Would you please explain that?

A. Yes. And this will be very similar to Mr. Buck's testimony.

Phase One lasts for a period of 4 million barrels. Phase Two lasts for a period of from January 1st, 1977, for 38 million barrels, and that relates down to 26.2 million barrels from the end of Phase I to the beginning of Phase III. Those are the same numbers subtracting out the cumulative production prior, and the Phase I production leaves you with 26.2 million barrels from the end of Phase I to the beginning of Phase III.

Then, of course, Phase III is 55.2 million barrels, as we've indicated with the secondary recovery for the Unit.

Q. These formulas presented here, again, are the same, are they not, as those presented by Shell this morning?

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A. Yes, as near as we can estimate.

Q. All right. Now, the second formula is entitled Unit Agreement Formula (For Payment of Investment.) Could you please explain what that is?

A. Well, for the first two phases, Phase I and Phase II investments, over the first about 10 years of production is shown by the arrows, show the extent of time we estimate the phase will last; about 2 years in Phase I and an additional 8 years in Phase II. During that period of time 58 percent of the investment would be paid on the basis of primary reserves and 42 percent on the basis of secondary reserves.

Q. Do you have an opinion as to what effect the use of these two formulas would have on a producer with higher secondary oil?

A. Yes. It causes him during the earlier phase of the Unit to invest money for something that he gets no revenue for. During Phases I and II there is no revenue dedicated for secondary production, so that if an owner owned only secondary, he would get no revenue during the first 10 years of operations and he'd pay 42 percent of the secondary oil investment.

Now, you will notice that at the end of Phase II there is a 100 percent adjustment to the Phase III investment, such that at that time whatever investment in

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secondary, secondary recovery owners have not paid, they will at that time pay in cash to those owners who have a lower secondary oil recovery. It's not a question of paying this, it's the timing under which it is paid. It would be paid under the investment adjustment, of which Mr. Buck testified that the entire 33 million barrels of secondary would be adjusted at the end of Phase II to secondary ownership, or Phase III ownership.

Q I see, you said 33 million barrels?

A I'm sorry, 33 million dollars of investment would be adjusted at that time.

Q Now, for a producer of higher secondary oil, you stated that he would be at a disadvantageous situation for several years. Approximately how long would it be?

A Around -- a little over 10 years is the way this production forecast goes before it produces the entire remaining primary of 30.2 million barrels.

Q Mr. Nolan, I now refer you to what has been marked for identification as Exxon Exhibit Number Five. Could you please explain what that is?

A Yes. This is the same type of graph that shows the production rate on Cartesian coordinates up the lefthand side, showing the production rate in barrels per day against the time. These are years after the unitization

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after the Unit starts; didn't put the years on, just put the years after starting time, which we believe a reasonable estimate might be 1-1-80.

This shows Exxon's producing rate over the period of time of the three phases of the formula.

Q This is Exxon's producing rate under the formula proposed by --

A Under the formula proposed by Shell.

During Phase I Exxon's participation is 4.688 percent, and for that first couple of years period you would multiply Exxon's 4.688 percent by the total Unit producing rate shown on the prior exhibit.

During Phase II Exxon's participation is 4.396 percent. During that period of time you would multiply the 4.396 percent times the production rate shown on the previous exhibit.

And after the end of Phase II, the secondary oil participation becomes in effect and you would multiply 7.639 percent by the production rate shown on the prior graph.

Q Those percentages you're talking about are not on this exhibit.

A They are not on that exhibit. They will be shown on a later exhibit.

Q Now, you may recall this morning Mr. Buck,

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I believe, testified that within a short period of time after Phase I, that the individual tract owners would be producing at a rate equal to or greater than what they had produced prior to unitization.

A That's right.

Q In the event that unitization is permitted. Do you have an opinion as to whether that is true in view of this exhibit?

A Well, Exxon's production rate for the first five months of 1979 averaged 535 barrels per day, as shown by the arrow on that graph.

Exxon's production allocated at 4.688 percent times the estimated Unit production rate would be in the order of 300 barrels per day compared to the actual production rate we are now achieving of 535 barrels per day for Exxon's leases.

This graph shows that as the production rate for the Unit increases, and with a constant percentage of 4.396 for Phase II, that Exxon's production rate increases from 300 barrels a day to the tenth year, where I estimated it was 545 barrels per day, which is slightly more than we are today making on those leases.

Q That would be a 10-year lag before you would achieve what you're presently --

A Before it gets back where we are today, yes,

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sir.

Q All right. Now, not only as to Exxon's working interest, but in your opinion what effect will this have on the royalty payments to royalty holders in these tracts?

A Well, of course, the main problem with this lease is that the Bowers "A" Federal Tract, and this big difference occurs on that very tract, it affects the tracts and, of course, the royalty owners in direct proportion.

Q Do you have an opinion as to the percentage production of royalties to royalty interest holders in the event that the Unit were allowed and Exxon's production was increased?

A Please state that again. Why didn't you ask me that last night?

Q Well, can you approximate what percentage of royalties the royalty owners would receive as compared to what they are receiving now?

A Yes. This lease is burdened by royalty, excess royalty payment. The Bowers "A" Federal Tract has a 12-1/2 basic royalty on a sliding scale, plus 7-1/2 percent of additional override, so it's some 20 percent of the revenue from that lease is -- goes to royalty owners.

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VOIR DIRE EXAMINATION

BY MR. DALIOUS:

Q. Mr. Nolan, according to this exhibit you show Exxon's Unit formula participation at about 300 barrels and its actual rate of production as 535 barrels.

A. That -- during the first five months of 1979 that was the actual average production, yes.

Q. Now assuming royalties are paid royalty owners on the basis of the Unit formula for the first four or five years, would the royalty owners under the Unit formula for the Exxon leases receive less royalty?

A. Yes, I believe --

Q. Than would be paid under our actual production rate?

A. We actually calculated that they would receive some 44 percent less.

Q. All right.

DIRECT EXAMINATION

BY MR. ATKINSON:

Q. Mr. Nolan, I now refer you to what has been marked for identification as Exxon Exhibit Five-A. Would you please explain for the Commission what this is?

A. Exxon Exhibit Five-A shows again a plot

of Exxon's production in the bold line. This is the actual production from January of 1976 on up through August, or to August of 1979.

It shows that Exxon's actual production started out at about 500 barrels a day in 1976 and declined in December to about a little less than 400 barrels a day, and then began to go back up and for the past two years has averaged over 500 barrels per day.

Q All right. Now, Exxon's share that is demonstrated by the dashed line, what -- what does that represent?

A. The dashed line represents Exxon's Phase I share of Unit production. You recall that during Phase I Exxon's share is 4.688 percent of the Unit total under the Agreement formula proposed here.

If you take 4.688 percent of the actual field production starting in 1977, that's what this plot shows. The field production has been relatively constant during that period of a little over 7000 barrels per day, which would then result in, had the Unit been in effect in early 1977, Exxon's share of production would have been a little over 300 barrels a day, and would have remained relatively constant during that 2-year period.

Q What is the difference between the -- or the space between the two lines, the dashed line and the

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solid line, represent?

A. Well, of course, you can see, it's about 200 barrels a day, all during that period, and the cumulative difference is shown by the bold line that goes across the curve and has an arrow on the end of it, starting at zero at the beginning of 1977. At the end of the first year it shows a 50,000 barrel difference; end of the second year, 170,000 barrel difference; and say at the end of this year we would estimate that cumulative difference at almost 200,000 barrels, which Exxon would have been paid, that they would have received 200,000 barrels less under the unitized formula than they actually produced during this period of time and the royalty owners would have been likewise treated.

Q. Now, both of these lines are based on actual production data taken from field production, is that correct?

A. That's correct. It's simply a multiplication in the case of the dashed line of the actual production of the field during that case, and an addition of Exxon's lease production during the -- for the bold line.

Q. All right. I now refer you to what has been marked for identification as Exxon Exhibit Five-B, very similar to Five-A. Could you please explain what this is?

A. This is an attempt to just show the position of some of the other operators under this formula.

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The first one we picked on was Shell. There, had the Unit formed there early in 1977, and with Shell's 24.123 percent, they would have been credited with about 1750 barrels a day of Unit production.

At that time they were producing about 1880 barrels of production. Since that time Shell's actual production has declined and today their producing rate is some -- a little less than 1700 barrels per day.

Q All right, now, if I understand you correctly, then, in the beginning of 1977 through approximately the middle of 1978, had the Unit Agreement been in effect, Shell would in essence have been reduced in the amount it could have produced, is that correct?

A Well, it would have been reduced in the amount they would receive under the formula as compared to what their leases actually would have contributed to the Unit.

Q Now what is their position now as of -- well, as of June, 1979, what was their position?

A Very close to the same line. They would have received just about, almost exactly what they are producing from their leases under the Unit formula. The dashed line and the solid line cross each other for the first four or five months of 1979, pretty closely.

Q If you will, I'd like briefly to turn you

back to Exhibit Five-A and compare it with Exhibit Five-B, then. Could you compare the difference in effect to Exxon and Shell in the event that the Unit Agreement is approved by the Commission, as to what increase or decrease in production would result to the -- to Exxon and Shell?

A. Well, of course, if the Unit formula is approved, Exxon's trend is pretty level and the Unit's production -- the field production trend is pretty level. Exxon would take a 200 and some barrel a day loss, whereas Shell, with perhaps a little deline as this bold line shows, their production rate is declining. they may have a slight gain if the Unit goes into effect.

Q. Thank you. I now refer you to Exxon Exhibit Five-C. Would you please explain what that is?

A. Well, if Exxon loses somebody else has to gain, and this shows one of those parties that gain.

Chevron's share of Phase I production is 3.125 percent. Under the Unit formula their production rate would be slightly over 200 barrels a day, or would have been had the Unit been in effect since 1977.

The bold line shows Chevron's actual production as being some 150 barrels a day less all during the period -- the last two years.

Q. So that in the event that the Unit Agreement were in effect, what would happen to Chevron's production?

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A. Chevron's production would more than double if the Unit goes into effect.

Q. Okay, now referring to what has been marked for identification as Exxon Exhibit Five-D, would you identify that, please?

A. Five-D is the performance graph for Texas Pacific Company. Their share of Unit production, Phase I, their share of Phase I, is 4.682 percent, very close to what Exxon's is.

Their actual production, shown by the bold line, held pretty close, very close, to the unitized share until February of 1978, when a rapid decline took place on their leases, and today they're producing at a rate of about 180 barrels per day, compared to their unitized share of about 340 barrels per day.

Q. Do you have an opinion as to what these four graphs indicate as to changing conditions within the proposed unit?

A. These graphs show that there have been substantial distortions since the study was made, that leases are not performing, certain leases are not performing as predicted by the Technical Study; in particular, of course, the Texas Pacific and Chevron leases. Obviously they've declined at a faster rate than the Technical Study. The Exxon leases have not declined as fast as the Technical Study

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would have shown. Shell's apparently pretty close on balance.

Q Do you have an opinion as to what may have caused those changes?

A Of course, the Technical Study had several limitations to it. As it was testified by Shell, this was an extremely complicated study because of the complicated nature of the reservoir, and we feel that at the time the study, the way it was done, was the best that could be done with the data then existing.

We took no exceptions to those decline curves, to those rates, at the time they were done.

Q Do you have an opinion now as to the viability of the data that was relied upon by Shell, or by the Technical Committee, in formulating these performance --

A Well, that data is over three years old now, and certainly, with one particular limitation that was placed on the study, and it was a necessary limitation, it was testified by Bill Lancaster, that it was necessary to assume that the producing interval of each well was not changed for the entire 45-year future primary life. Of course, to do differently would have been an impossible task. So that was agreed that we would do it that way, but it did not give a unique solution for the remaining primary, and with the reliance of the formula almost 100 percent on remaining primary, it made it an extremely important deter-

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mination using only that for the first 10 years of production, and causes Exxon this problem.

Q Now, when you talk of the reliance of the formula almost 100 percent on remaining primary, are you talking about during Phases I and II?

A During Phases I and II alone. We have no problem with Phase III.

Q And referring once again to the formula that Shell set out this morning and as set out on Exxon Exhibit Four?

A That's correct. There is some weighting of current production rate that amounts to 20 percent during the first 4 million barrels. That is only 3 percent of the total production during Phases I and II, such that 97 percent, then, relies altogether on remaining primary production for each lease.

Q All right. Mr. Nolan, I now refer you to what has been marked for identification as Exxon Exhibit Number Six, the colored graph.

A Right. Now, this graph shows the hairy details of one of the estimates made by the Technical Committee during 1976.

Q All right. Now, could you please explain what the blue line is?

A The line highlighted in blue, starting in

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1969, shows the actual production rate of Exxon's Bowers "A" Federal tract.

On the lefthand side you'll see that that rate was about 500 barrels a day for a period of four or five years and then it declined quite rapidly.

Starting at the beginning of 1964 when the Technical Study was made, the lease had declined to a producing rate of around 300 barrels per day.

Q All right. Now, we're talking, just to clarify this, we're talking about the Exxon Bowers "A" Federal which is Tract 47. That is the same tract which is identified as Tract 47 on Exxon Exhibit Two, right, is that correct?

A Correct; that is correct. It is a 7-well lease.

Q Now, taking the actual production from the tract up until the end of 1975, what did the Technical Committee do with it?

A Well, the initial simulation study was made using data up to the end of 1975. The line that is labeled "A" shows the simulation study forecast of production decline which was made with data up to the end of 1975. That matched the decline and so on, and shows a couple of changes in decline rate.

Q That is the line which lies above the blue

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line then, is that correct?

A. That's correct, yes.

Q. All right. Now, could you explain -- first of all, when was the "A" line generated by the simulator model?

A. Well, sometime in early 1976. It took a considerable amount of time to set the model up and get it going. The results were furnished to the Technical Committee members on October the 27th, 1976.

Q. All right. Now, would you please explain what the straight blue line is, which is designated as Line B?

A. Line B shows the forecast for the Bowers "A" Federal lease determined by the simulation study, starting September the 1st, 1976, and declining on out through the end of 1989. Now this line was the one which depicts the reserves which are included in the Technical Study, which are included in the formula, and which this lease is credited with.

Q. All right. Now, I notice that it is lower than Line A is, and that at the beginning of 1976 there is a pink blob there.

A. Yes.

Q. Would you please explain what the relationship with those two facts are?

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A. The pink blob shows the 8-months production which was accumulated after the 1975 one, or one B, was made. That data was introduced into the model and the reserves were recalculated, and the effective date then was September the 1st, as related by Shell. This is the final calculation which was made. This includes data through August of 1976. The addition of the little, red blob caused a reduction in the reserves assigned to this tract from a value of 1,485,868 barrels, as shown in the lower righthand side of that graph, Original Computation, (Run B).

Run B signified that 3 barrels a day economic limit was used. Another run was made using a 5 barrel a day economic limit, but Run B was decided to be the best by the Technical Committee, and that's the one we were looking at at the time, but in any case, the reserves determined under the line A were 1,485,000. The reserves determined under line B, and effective 9-1-76, where you would have to subtract the production from the beginning of the -- from 1-1-75 to 9-1-75 to make those comparable numbers, but that production rate was only 30 or 40,000 barrels. So it shows a very substantial reduction in the reserves assigned to this lease by the addition of the six months under the red blob of some 200,000 barrels.

Q. All right. Now, did you perform, or have performed for you, a computer run relating to the B line?

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A. Yes. We were not -- we could not or can not duplicate that study made by Shell with and for the Technical Committee, but by observing all of the leases, they have come pretty close to decline curves; ordinary semilog decline curves plotted against time, an exponential function.

And what we did was fit an exponential decline to the actual calculation made under this -- by this Technical Study, because we were given the starting rates and the time under the curve, and the total reserves, we could then take 1,273,139 -- that's shown on the righthand side as SR76, that is the simulator reserves determined in 1976, and that is what is used in the formula and in the report, 1,273, 139 barrels.

Q. You're referring now to the numbers -- the the first two numbers on the righthand side of the page?

A. Yes, sir, the top -- the top one of those, 1,273,139 barrels was the simulator reserve, which is in the Technical Study for this lease.

At the time this information was furnished to the Technical Committee members the rates for 1976 were also furnished. This lease, the rates shown for September 1st rate for this lease, was 316 barrels a day. That's shown in the second line of that tabulation. That's simulator 76 rate of 316 barrels per day.

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Also furnished was the rate on January 1st of 1990. Now this was done so that the Technical Committee members could view their leases and see how a visual graph would compare to the complicated calculations that none of us really understood that were made by this simulation study.

So this shows that the lease declined from 316 barrels a day in September 1st of 1976, to 206 barrels a day at the beginning of 1980, and further declined to 102 barrels a day at the beginning of 1990, and since the Technical Committee agreed that the economic limit would be 3 barrels per well per day, this lease reached its economic limit at a calculated time in the year 2012.469, as shown in the bottom part of that first group of tabulations.

The final year, the simulation study final year, SFYR, that is the year in which this lease would reach its economic limit if a decline curve match was made with the Technical Committee determined reserves.

This lease would then have three slopes to it. The decline curve would have three slopes.

Starting out, the slope would be 12.04 percent per year, and you can see that it's fairly sharp the first -- between the period of 1976 and 1980, it's fairly sharp, and it's 12 percent a year.

From the period of 1980 to 1990 the lease

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declined at 6.787684 and so on percent per year, and then it declined at 6.79206 from the period ending from 1990 to the economic limit, and that, if you use those slopes, you use those rates, you'll calculate precisely a 1,273,139 barrels under the curve.

Q. This is the reserve calculated --

A. By the Technical Committee and these calculations were made to match a decline so we could estimate what might happen under changed conditions. We couldn't duplicate the study. We tried to make as a close an estimate as possible using a conventional decline curve approach and utilizing the data calculated in the simulation study to maximum effect.

Q. And have conditions changed in the Exxon lease? Or Exxon tract?

A. Yes, and with the Exxon tract performance, which -- now this data was not available, of course, to the Technical Committee because this study was done in 1976. But starting at the beginning of 1977 this particular lease, production started to increase from 280 barrels a day at the beginning of 1977 to around 400 barrels a day, as you can see on that plot, at the end of 1977, and since that time it has been above and below 400 barrels a day, and it's fairly level at about 400 barrels a day, currently producing at about 400 barrels a day.

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It can be noted --

Q Excuse me, go ahead.

A No, you go ahead.

Q All right, I will.

Now, based on the production data since the time the Technical Committee Report was prepared, what did Exxon do with the information as to attempting to calculate reserves?

A Well, Exxon took the updated production, utilized the end point determined by the Technical Study, increasing the starting point to the average production rate occurring during the first 5 months of 1979, and declining it to the economic limit as determined under the Technical Study.

Q All right. Now, could you explain briefly how that end point was arrived at once again --

A Well, we calculated that the lease reached its economic limit in the year of 2012. The decline curve estimate here simply takes the starting rate at 409 barrels a day, the A79 is 409 barrels per day, the actual production for that lease for the first five months of 1979. It declines it in a straight semilog decline to the economic limit in the year 2012.

Q All right. Could you please explain how your ultimate reserve calculation was arrived at by the gen-

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oration of numbers in the lower righthand corner?

A. Right. Now these are the numbers which the -- which the attempt at matching generated. This shows that the -- an actual number was calculated for the producing rate first five months of 409 barrels a day.

The line slopes to the first of 19 -- for the first five months average of 19 -- pardon me. It slopes at 8.54 percent per year from the beginning of 1979 to the economic limit.

The producing rate at the beginning of 1980 is calculated to be 381 barrels per day under the curve. 226 barrels per day is what the simulation study, the 879 shows to be the producing rate at the beginning of 1980.

Q. That's where the blue line correlates right --

A. That's where the blue line is in 1980. So that means that the blue line is -- actually, it's 226 barrels per day and the -- under the yellow line the rate would be 381 barrels a day at that time.

At the end of 1990 the producing rate, calculated by the yellow line, is 156 barrels per day, and at that point you can see that the blue line is 102 barrels per day, as shown in the upper tabulation.

And they both reach the economic limit at

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the same point in time.

The reserves calculated under the yellow line from a point in 1980 are 1.472.492 barrels for this lease.

From the same point in time on the blue line, this calculation is 960,377 barrels per day, a difference of 512,000 barrels, a very substantial difference, which is what our estimate is of the increase in reserves that would be indicated by the increased producing rate of some 200 barrels per day.

Q Now by a difference, what do you mean? The difference between the formula and using the 1976 parameters and Unit formula using the updated parameters?

A No, no. This is simply the calculated reserves from a point of 1-1-80, using the yellow line ER80, a 1,472,000 barrels and using the simulation reserve, which corresponds to that same point in time of 960,377, that is the reserve calculated by the Technical Study from and after January 1st, 1980, the 963,877. So the difference between those two is the increase in reserves this lease would enjoy if the calculation is correct, of 512,000 barrels.

Q How could that be accomplished under the present Unit formula?

A Of course, we could develop this into a parameter for remaining primary and utilize the changed per-

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centages in the same formula, and that would, of course, give this lease additional participation.

Q. All right. I now refer you to Exxon Exhibit Number Seven.

A. Yeah, this is the same type of calculation for the 40-acre portion of the Bowers"A" Federal Com Tract 48. It's the upper part of the Bowers "A" Federal Lease that we think we showed on Exhibit Two. It's a single well lease, and it is the same type of calculation. The purpose of putting this in is to show the similarities between what happened with the updating, what happens with the -- adding the additional data, and that in general the slope, or pretty similar, the -- it is a two-part slope, sloping a little more drastically for the first four or five years after 1976 to the point, the beginning of 1980, and then flattening out from that point at a rate of about 6 or 7 percent per year.

The same calculations, identical calculations, were made for this lease.

The Technical Report determined a reserve of 231,139 barrels from September of 1976. That's shown by the SR76. The same type of calculation would indicate this lease reached its economic limit in the year 2027. Drawing a straight line, then, from the first five months of 1979 to that economic limit,as shown by line C, would result in a calculation of a reserve of 247,000, as shown in the ER80.

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The Shell -- the simulation reserve from that same point is 183,000 barrels, for an increase in reserve for this tract of 63,874 barrels.

Q Once again, by the increase you mean --

A The increase from and after January 1st, 1980.

Q In the event that the updated parameters were employed --

A In the event the updated parameters were employed, you would determine a minimum reserve for this lease of 247,000 barrels, and if it was put into the formula we relate that as Shell has described, to the total of all leases; take that percentage and determine the parameter that would be substituted in the formula.

Q Now, for what tracts did you perform these calculations?

A I did this for each and every tract in the Unit. As a coninicidental number, and these are given later in these tables, the reserves were fairly close. The reserve calculated by the Technical Study from and after 1-1-80, as we've previously shown, is about 30.2 million barrels.

The sum of all the leases going through this same calculation procedure, was 33 million barrels; some 10 percent change on the overall basis.

Many leases are up and many leases are down.

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The earlier exhibits show which operators are particularly affected, just a few selected ones, and we have, of course, these same graphs for each and every tract, the same calculations for each tract; if anybody wants to go through them, we'll go through them.

Q Is Exxon willing to make these available to the Commission in the event the Commission wished to view them?

A The Commission, or anyone else. Yes.

Q All right. Now I'll refer you to what has been marked for identification as Exxon Exhibit Eight. Would you tell briefly what this is, please?

A Well, this shows the comparison of the 1976 and the updated parameters as determined by Exxon, using the methods that we've tried to describe.

First off, it's pretty easy to update the production rate. We know what these leases produced for any period of time you want to talk about. We have selected, as did the operators, a full year of production, being the last full year of production, to compare to the 1976 production rate, which is utilized in the formula.

Just to start out with Exxon's share, in 1976 Exxon's oil production rate from all of its tracts was 160,433 barrels, as shown under 1976 Oil Producing Rate, and that amounted to 5.854 percent of the total production,

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which is shown down at the bottom, the Unit Total of 2,740,636. If you divide 160,433 by 2,740,636 you get 5.854 percent. That's Exxon's parameter share of production in 1976.

Now, we --

Q. To clarify that, that is the parameter which is presently employed in the proposed Unit formula in Phase I, is that correct?

A. That's correct. That's Exxon's share of the 1976 oil production rate, which weights 20 percent in Phase I of the Unit formula.

Now, if we redevelop that parameter, that same parameter, for the year of 1978, Exxon's tracts produced, coincidentally, around 180,000 barrels during 1978. The total production from all the tracts was 2,631,234, and that develops a parameter of 7.143 percent, which says that the Exxon share of unit production, based on the producing rate, was 5.854 percent in 1976, and that has now increased to 7.143 percent, demonstrating a disparity in reserve calculation and in use of a parameter that's three years old for production rate.

Q. So that in the event that the Commission were to apply the 1978 actual production data to develop the parameter, this would be the parameter that would be employed in the present formula, then, is that correct?

A. That's correct. Near as we can calculate

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it, Exxon's share would be 7.143 percent for the year of 1978.

Now, Shell's numbers, just as a comparison, we though we'd pick somebody to compare Exxon to, during 1976 Shell produced 699,966 barrels out of a total 2,740,636 for a total of 25.540 percent.

During 1978 Shell produced 638,905 barrels of the 2,731,000 produced by the Unit, for a total percentage of 24.282 percent, a reduction of about 1.3 percent where Exxon's has increased some 1.3 percent.

Q Now would you please explain what the oil reserves calculations are in part B of Exhibit Eight?

A. Right. Part B, like I say, shows the oil reserves, and for the 1976 primary oil reserves -- these numbers were taken directly from the Technical Study-- Exxon's reserves were 1,673,668 barrels out of a total reserve of 38,071,683 from a date of 1-1-77. That percentage for Exxon is 4.396 percent. And that is the parameter that is used 100 percent in Phase II of the formula.

Q And used 80 percent, I believe, in Phase I.

A. And used 80 percent in Phase I, correct.

Now, going through the decline curve method that we have described, for each and every tract in the Unit, we determined that the future oil recovery from

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a period of 1-1-80, which is perhaps close to the date this Unit may go into effect, was 33,205,631 barrels.

Going through each tract for Exxon, we determined that the reserve for Exxon is 1,875,393 barrels, for a percentage of 5.460, an increase from 4.396 to 5.468 percent.

Now, doing the same thing for Shell, Shell's 1976 primary reserve from 1-1-77, was 9,048,999 barrels out of a total 38,000,000 for a total of 23.769 percent. The redetermined reserves by Exxon, 7,776,948 out of 33.2 million for a total percentage of 23.421, a reduction of some .3 of a percent.

Q All right, now how about secondary oil reserves?

A Secondary oil reserves are just shown for reference. That is the number directly out of the Technical Report and we didn't see any reason for changing it. Exxon's share is 4,216,642 out of the 55.2 million; a total of 7.639.

Shell's is 10,419,216 out of the 55.2, a percentage of 18.875.

Q All right. Now, if we will be using many of the same numbers in what has been marked for identification as Exxon Exhibit Nine, would you please explain how that works?

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A. Well, Exxon's participation under the Agreement formula, under the formula proposed by Conoco and which is now included in the agreement, first this shows a development of Exxon's share; A, using the 1976 Parameters, and B, using the updated parameters.

Q. So A represents what will be Exxon's share in Phase I and Phase II under what is proposed by Shell presently.

A. That is correct. If you recall, the formula is composed of 20 percent 1976 oil producing rate , from the former graph, former exhibit, you see that that would amount to 20 percent of the value 5.854 percent, or 1.171 percent of the total.

Q. Now 5.584 is taken off of Exhibit Eight --

A. That's correct. Exxon's share of the parameter 1976 oil producing rate, and if you multiply that 1.171 percent, which is the rating, all that percentage in the formula, multiply that by the 4 million barrels in Phase I, you determine that that portion of the formula allocates to Exxon during Phase I, 47,000 barrels of oil. Because 1.171 percent times 4 million is 47,000, roughly.

For the remainder of -- for the other part of Phase I, you recall that the formula is 80 percent 1976 primary oil reserves. We take 80 percent of the primary oil reserves determined under the Technical Report,

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that's a percentage of 3.517. Applying that 3.517 again to the 4 million barrels, we come up with 140,000 barrels, for a total during Phase I of 4.688 percent and a share in barrels of the 4 million barrels, 197,000 barrels.

For Phase II where the oil is allocated 100 percent on primary oil reserves, using the 4.396 percent in the Technical Report, Exxon's share of the 26.2 million barrels produced during Phase II, is 1,154,000 barrels. That would give a total production during Phase I and Phase II of 1,341,000 barrels.

Q. Just to emphasize once again, this is what Exxon would be able to produce under the present --

A. This is what Exxon would be allocated under the formula. This is Exxon's allocation of the first 30.2 million barrels produced during Phase I and Phase II. It's a precise number. When the Unit produces 30.2 million barrels, Exxon's percent is going to be 4.688, or 187,000 barrels, regardless of when it's produced or how it's produced.

Q. All right. Now, what happens when you use updated parameter based on actual production data?

A. Using the updated parameters, of course, helps that some.

The 20 percent 1978 oil producing rate, as you recall from the previous exhibit, was 7.145 percent.

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Taking 20 percent of that, 1.429 percent, multiplying that by the 4 million barrels gives you 57,000 barrels, which is 10,000 more than that parameter gave the -- would give us under the '76 parameter.

The 80 percent share of primary reserves in Phase I is 5.648 percent as we've determined it. Its percentage is 4.518 weighed in the formula, multiplying that by the 4 million gives you 181,000, a total during Phase I of 238,000 barrels.

You'll notice that under the old parameters we would have gotten 187,000 barrels; under the new parameter, 238,000.

Under Phase II, using the updated parameter of 5.648 percent and multiplying that by 26,200,000 barrels gives Exxon 1,480,000 barrels for a total during Phase I and Phase II of 1,718,000 barrels, a difference of 377,000 barrels in Phase I and Phase II.

Q. Which is to say, then, that in the event the updated parameters were employed, Exxon would benefit by 377,000 barrels of oil.

A. According to our estimates, which we feel are close to what a Technical Committee would determine if that were done over on a more precise basis, we feel that's a reasonable estimate of the difference on the Exxon leases, is 377,000 barrels.

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Q How referring you to ---

VOIR DIRE EXAMINATION

BY MR. DALIOUS:

Q Mr. Nolan, you just mentioned that Exxon would receive an extra 377,000 barrels of oil if the updated parameters were used.

Would it not be true that we'd lose 377,000 barrels of oil if the proposed parameters were used as appears in the Unit Agreement?

A That's a direct corollary. If we'd get --

Q At $10 a barrel ---

A Yes, sir.

Q -- how much money would that loss represent?

A Well, at $10 a barrel, that loss would be $10,770,000. I can do that without my calculator.

DIRECT EXAMINATION

BY MR. ATKINSON:

Q I now refer you to what has been marked for identification as Exxon Exhibit Ten. Could you explain what this is?

A Now, this exhibit shows the same type of calculation using the same -- using numbers from Exhibit ---

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Q Exhibit Eight, I believe.

A It is from Exhibit Eight, thank you, for Shell's participation, doing the same thing, taking 20 percent of the 1976 oil producing rate would allocate Shell 204,000 barrels for that part of the formula; using 80 percent of the 1976 primary oil reserve would give Shell 19 percent, or 760,000 barrels for the remainder of Phase I; this being a total of 964,000 barrels.

During Phase II, applying Shell's 23.768 percent, as determined by the Technical Committee, for 100 percent of the 1976 primary oil reserve, applying that to the 26 million barrels, would give 6,227,000 barrels during Phase II.

So that the total during Phase I and Phase II is 7,191,000 barrels, which Shell will be allocated under the parameters in the Technical Report and utilizing the formula in the Technical Report.

Q All right, now what happens when you use the updated parameters with Shell?

A When you use the updated parameter, you do again the same thing, 20 percent updated 1979 producing rate paremeter is 24.282 percent. This gives 194,000 barrels compared to the 204,000 barrels, slight reduction. The 80 percent of the updated 1979 primary oil reserve, effective 1-1-80, is 23.421 percent times 8.8; 18.737 percent,

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multiplying that by your 4 million barrels gives 749,000 barrels. Under those circumstances during Phase I Shell's allocation of production from the Unit would be 943,000 barrels.

During Phase II, with the revised or updated 1979 primary oil reserve of 23.421, Shell's share would be 6,136,000 barrels. This is a total, then, for the two phases of 7,079,000 barrels.

Q. Okay, what is the difference between those two using the 1976 parameters and the parameters based on production since '76?

A. This shows a difference of 112,000 barrels.

Q. Now, what does this mean with regard to how Shell will come out if the present Unit Agreement goes through?

A. This -- this means that using the 1976 parameters, the older parameters, Shell would be allocated 112,000 barrels more oil than it would if the parameters were updated on the basis of Exxon's estimate.

Q. Now, in your opinion as an engineer, is it good engineering practice to base parameters and formula on the most up-to-date data available?

A. Certainly that's one of the things that in all the Technical Committee work we try to use all the

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updated parameters, and all of us are faced with attending these Technical Committee meetings with having to update at least two or three times during the course of a study.

As we described earlier in this study, it was updated once for -- to get an additional eight months of production included in the -- in the determination.

Q Is it your opinion that it would be appropriate and good engineering practice in view of the length of time that has elapsed since 1977, 1976, to so update the present formula?

A Yes, this is an inordinately long time to use these outdated parameters. It's over three -- about a three-year period and it would seem to me to give a better, closer, determination for each lease to redetermine the reserves based on the additional data that's now available.

Q Now you mentioned a previous update that was performed by the Technical Committee. What did that consist of?

A Well, as I said, we added the -- the production from a period January 1st of 1976 through August of 1976, and that caused the differences we looked at on Exhibits Six and Seven.

Q To the best of your knowledge, then, what was the length of time involved in rerunning the formula with the updated production parameters?

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A. That's a good point. The initial technical Committee information was furnished in October of 1976, and less than a month later the -- the updated information was furnished to the Technical Committee members, so it took Shell some several weeks to rerun that data including to include the eight months additional data.

Q. And is it your opinion that from your knowledge of what is involved in rerunning the simulator model, do you have any idea what amount of time would be involved in this case to rerun the formula?

A. No, I don't, really. I don't know what shape that's in as far as Shell's preserving the data or how long it would take to redo it. We'd have to just ask Shell what it would take if that's appropriate. I don't know.

Q. Now I refer you to what has been marked for identification as Exxon Exhibit Number Eleven, dealing with required investment of the Exxon share of the Unit Agreement formula using 1976 parameters. Would you please explain what this is and what we're doing here?

A. Well, Exxon, I guess, has objected to the payment for investments,for secondary investments during the long Phase I and Phase II period. That's what makes this one rather unique, is the long 10-year period, Exxon having a higher Phase III percentage must pay additional in-

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vestments during Phase I and Phase II over and above its revenue participation during this long period of time.

Q. Now the investment formula you're talking about, the revenue participation formula, are those set out by Shell this morning, being set forth in Exxon Exhibit Number Four, is that correct?

A. That's correct. Whereas we show down here towards the middle of this graph that in Phase I Exxon's revenue share is 4.688 percent. That's sort of along the middle line.

The investment share is 5.758 percent during that period.

Q. Now specifically how is that investment share calculated?

A. It was calculated based on 32 percent Phase III participation; 58 percent Phase II participation. That percentage -- that's the way that percentage was arrived at.

Q. I'm sorry, I think we have a little bit of confusion here. Right now you are speaking of the numbers which are sort of in the middle of the page under oil production share and investment share in thousands of dollars.

A. Yes, I am.

If we look at the top of this -- the top

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of this exhibit, we see that for an estimated range of total unit investment between $31 million and $106 million, a calculation is made as to what Exxon's cost would be on a per barrel basis during Phases I and II.

Now, $31 million is less than Shell showed would be the investment for this Unit. This was an outdated number that we used in earlier -- they've updated their number somewhat for inflation, and so on. This $106.4 million is entirely Exxon's estimate of what the investment might be in this Unit. We must admit that if that investment is made, there are going to be considerable improvements to the production performance of the Unit, and additional reserves that will be perhaps generated by the additional investment.

Q Is initial investment --

A But we strongly feel that the investment of $31 million is less than will be spent. It's been our experience in this type of unit for -- in the San Andres, and even in units operated by Shell, that these investments are much higher than the initial anticipation.

Of course, there will be benefits that will accrue, so we have just looked at what the range of investments would be and what the cost to Exxon would be, for the investment share compared to the production which would be allocated under the production side of the -- of

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the agreement.

Q All right. Now the additional investment you're talking about could come about from things such as infill drilling that has been spoken about here today --

A Yes, that's particularly what may be required as the Unit starts. It would be justified. It would certainly be justified by increased reserves, higher rates, and this and that, but nevertheless, during Phase I and Phase II Exxon's share will still be the same.

Q Now would you please explain what happens with these numbers here?

A Okay. On previous graphs we showed that Exxon's production allocated during Phase I and Phase II is 1,341,000 barrels. We're going to calculate -- we're going to show how we develop Exxon's share of investment, which in the case of $31 million total investment, would be $2.371 million dollars if the investment is $31 million.

If the investment is the higher number, $106 million, Exxon's investment would be $8.1 million.

If we divide the investment by the production, we find that under the first case Exxon's cost is $1.77 a barrel.

Under the second case, it's $6.06 a barrel, and these are just numbers to demonstrate how tough it can get on investment if they are this high, and I want to also

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compare that to some other numbers as we go through here.

Now the bottom part of this graph, repeats what Exxon's oil production share is at a 1,341,000 barrels during Phases I and II, and we've described how we got that by applying the percentage of the formula by the production in the various phases. Exxon's share of production for the first ten years is 1,341,000 barrels.

On the righthand side of the lower part, under the investment share in thousands of dollars, shows what Exxon's calculated investment share under the two investment schemes that we have established, $31 million and $106 million, we would pay -- Exxon would pay 5.758 percent and at the end of Phase II, if we just jump down to that line, Exxon would have paid $1,787,000. That's multiplying 5.758 times $31 million.

In the case of the $106 million investment, that number is $6,129,000.

Now then, this number, the next line shows the adjustment that is made at the end of Phase I. All investments at the end of Phase I are adjusted to Phase III percentage. Exxon's percentage in Phase III is 7.639 percent. So that amounts to an adjustment of 1.881 percent from Exxon's earlier share of investment to its share of investment at the beginning of Phase III. Exxon would have to pay in cash investment adjustment, 1.881 percent. In

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case of the $31 million, that's $584,000. In the case of the $106 million, that's $2 million.

Exxon would pay to others as the investment adjustment for all the investments which we made from the beginning of Phase I and through to the beginning of Phase III, for that 10-year period.

And when we add the investment adjustment and amounts paid during Phases I and II, we find that Exxon's total production -- total share of investment, in the $31 million case, is $2,371, which is shown at the top of the graph, and for the $106 million case, as shown at the top of the graph, it is $8,131,000, which includes investment paid during Phases I and II and the additional investment for the investment adjustment.

Now then, Exxon's oil production share, you'll recall, is 4.440 percent during those two phases.

If Exxon had been paying on the basis of Phase in effect, or on the same share as its revenue, its investment would be as shown here: 4.440 percent of $31 million is $1,378,000. This means that Exxon during that period paid $993,000 for an investment in excess of its revenue share of participation.

Q. This represents what Exxon actually paid under the Unit formula with the 1976 parameters.

A. That's right on the basis of the 1976 para-

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meters it would be paid in excess of its production share, $993,000 and this number would jump to $3,405,000 if the investment is as high as $100, which we feel it could get that high.

Q All right. Now referring to what has been marked for identification as Exxon Exhibit Twelve, going through the same types of calculation for Shell under the Unit Agreement formula with 1976 parameters, what do you come up with?

A Well, we showed Shell and we're not picking on Shell, we just showed it because their Phase III is lower than their Phase II, and this demonstrates what happens under this type of investment scheme where operators have big differences in primary and secondary and pay more during Phase I than they do in Phase III -- Phase I and II than they do in Phase III.

This shows that Exxon's -- or Shell's investment share for the $31 million deal at the top of the page, is $5,859,000. Shell's production during that period is $7,191,000 developed as we have on previous exhibits for a cost of $.81 a barrel. Now you recall that on the previous exhibit Exxon's cost was $1.77 a barrel during Phase I and Phase II.

Under the $100 million investment, if it does go that high, Exxon's investment -- or Shell's invest-

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ment is $20 million; Shell's production, again, is exactly the same, 7,191,000. That's a cost of $2.79 a barrel or compared to Exxon's cost of $606,000, and this results in considerable difference in the economics of this project, as to the rate of return which Shell would receive and the rate of return which Exxon would receive.

Q All right, now would you please explain to the Commission what the meaning of numbers is in the second group of calculations?

A Well, again, we calculated Shell's oil production share as being 7,191,000 barrels. This is simply multiplying their percentages times the barrels in each phase, and come on down here where their average production is 23.911 percent during Phases I and II. They've received as an oil production share 7.191,000 barrels.

Now, Shell is on the receiving side of this investment adjustment. Shell puts up more money during Phase I and Phase II, but it receives it back at the end of Phase -- some of that money back when the adjustment takes place, due to the fact that their Phase III is lower than their investment share during Phases I and II.

The percentage which they will receive, their Phase III is 18.875 percent. Their investment share is 21.713 percent. The difference between those two percentages is 2.838 percent. Multiplying that 2.838 percent

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times the investment of $31 million gives Shell a credit at the end of Phase II of $691,000. That's a little more than Exxon pays, $584.

The investment share based on the higher investment numbers, Shell would receive $3,021,000 compared to Exxon's payment of $2,002,000.

Again, Shell's oil production share, being 23. -- the bottom, second to the bottom line, now, Shell's oil production share is 23.811 percent. If that were applied to the investment, their oil production share of those investments is $7,391,000 for the $31 million investment. Their investment share is $25,344 for the $106 million investment. They have received some million and a half dollars -- or they have not received, I'm sorry. I want to rephrase that.

The investment paid by others for Shell's production share of investment is a more proper way to put it, is $1,500,000. That results because their oil production share is higher than their investment share. Others have then had to pay that difference, and in the case of the $106 million, that difference is 5.2 million dollars.

Q. Would you explain in somewhat more detail exactly what you mean by investment paid by others?

A. Well, the total investment must be paid by all parties. If Shell's oil production share is, for

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instance, $7.4 million, if they would have had to pay $7.4 million of these $31 million total investment, which is 23.8 percent. That is their -- that is their revenue share. Had they been forced to pay that, they would have had to pay a million and a half dollars more than they actually paid; therefore, other people must -- somebody had to pay that, and that is paid for by people who have a higher Phase III than Phase II.

Q One of which is Exxon?

A One of which is Exxon.

Q I refer to you what has been marked for identification as Exxon Exhibits Thirteen and Fourteen. These examine required investment under the Unit Agreement formula using the updated parameters, based on production since 1976, first for Exxon and then for Shell.

Would you please explain the results on these two exhibits?

A Well, these exhibits were prepared now instead of using the parameters that were in the Technical Study and are in the Unit Agreement. These were for using the updated 1976 oil production rate and the updated remaining primary parameters, and the same calculation procedure was used.

For instance, Exxon's share of production increases from 1,341,000 barrels, as shown on Exhibit Eleven,

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up to 1,713,000 under this type of [illegible] during Phases I and II. If the parameters are updated, Exxon's production increased.

Its investment share remains the same, exactly the same. Now that results because the investment share is really determined by your Phase III percentage. Once the investment adjustment is applied, your total investment is exactly whatever your Phase III is.

So this does not change the total investment but it increases Exxon's production, and therefore, reduces the cost per barrel from $1.77 to $1.38, and under the high investment scheme it reduces it from $6.06 per barrel to $4.73 per barrel.

It takes some of the sting out.

And again we can show that, going through this bottom part, that the amount paid by Exxon in excess of Exxon's share of production is, in the case of $31 million it's $607,000; and it's $2 million in the event that the investment is at the higher rate, and you'll see that those numbers are both lower than Exhibit Eleven, 99[illegible] compared to 607 for the $31 million case, 2 million 4 instead of 2 million 078 for the $106 million case.

Q With regard to Exhibit Fourteen, which deals with Shell, would you please compare that with Exhibit Twelve?

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A. This is the same calculation procedure, using the updated parameters in the formula proposed here, but only changing it to insert the updated parameters determined by Exxon.

It shows the effect on Shell's production, where Shell's production is reduced from 7,191,000 down to 7,079,000. Shell's share of investment is exactly the same because its Phase III doesn't change, 5,859,000. That's 83 cents a barrel where before they only paid 81 cents a barrel. Two cents a barrel.

On the $106 million scheme, a little more -- a little more of an increase. It increases their cost per barrel from $2.79 to $2.84.

And again, the investment paid by others for Shell's production share, doing it the same way, comparing the production percentage share applied to the investments, against the actual percentage paid by Shell, results in the fact of $1,307,000 is paid for by others; for the $106 million case, $4.8 million is paid for by others, during the Phase I and Phase II period.

Q. All right. Now will you -- we now come to Exhibit Fifteen. Would you explain briefly what Exhibit Fifteen presents?

A. Exhibit Fifteen shows the tract parameters for the oil production rate for three periods of time. It

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shows the 1976 oil production rate used in the Agreement formula. It shows the 1978 oil production rate which we have used to update the formula, and also shows for reference, the first -- it says 1979 oil production rate, but it's actually the first five months of 1979 oil production rate, and if you would, please, note your exhibits. That is the first five months. This is all that was available to us at the time this calculation was made from the State records.

But this just shows, then, for each lease in the Unit, there are 83 tracts, for each of those tracts it shows the value of the production during that period. It shows the fraction that each tract bears to the total, or the parameter, which is developed for 1976 oil production, 1978 oil production, and more updated, 1979. You'll notice that Exxon -- well, no, I don't show it on that.

The next part of that exhibit shows the oil reserves laid out in the same way, from the 1976 Primary Oil Reserves, as included in the Technical Study, to 1979 Primary Oil Reserves, which actually start on 1-1-80; and just for reference, the Secondary Oil Reserves, which is identical to the Technical Study and the percentages are the same as shown in Shell's Exhibit.

This is the -- each tract's percentage of the primary oil reserves for '76, as determined in 1976, the primary oil reserves as determined in 1979, and the secondary

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oil reserves as determined in 1979 -- as determined by the Technical Study.

We have also determined these parameters for the gas reserves in a manner similar for that used by the Technical Study. We did not think we wanted to burden everybody with another six tables. We have them available if anybody wants to look at them. We're not going to make any point of that, I guess.

Q No.

A The next exhibit shows the working interest owner and tract identification and the ownership of each tract. This is taken from the Unit Agreement; one correction for Exxon's tract.

This shows what each -- who owns each tract and in what proportions they own each tract.

When you apply these fractions to the tract parameters, you then determine -- and then apply that to the formula, you then determine the participation under the two formulas and the two participation schemes that we've talked about.

The next page shows Phase I, Phase II, and Phase III percentage and the investment percentage under the Agreement formula and using the 1976 parameter values for each operator in the Unit. There are 74 numbered operators. I think maybe there are only 73 operators; some number is

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missing. But in any case, the working interest owners are shown on the left, their participation during Phase I is the first column; their participation during Phase II is the second column; the third column is their participation during Phase III, and the investment participation is shown on the right.

Highlighted are Exxon's percentages, which should agree with a few more decimal points, with the numbers we've earlier presented on all exhibits; 4.867 in Phase I, 4.396 percent in Phase II, 7.629 percent in Phase III, and 5.758 percent for the investment share.

Shell's are also highlighted, since we've used their numbers. They should agree with the earlier numbers.

And last exhibit shows the same numbers for each working interest owner, using the updated parameters which Exxon has developed for 1978 oil production rate and what we call 1979 primary oil reserves.

And these show the change in percentage which occurs for each working interest owner if updated parameters are substituted into the formula proposed in the Unit Agreement presented here today.

Q. All right. Now, for what purpose is the Exhibit Fifteen being submitted to the Commission?

A. If anybody's curious about how this af-

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feets their interest and their tracts, it's information, of course, that can be used to find out, and we believe this -- should the Commission, I guess, decide that they like this updating better than the other deal, they could take these percentages and do whatever they want to with them.

MR. ATKINSON: Mr. Chairman, I'm just about at the end of my direct examination, and I wonder if we might take a short recess?

MR. RAMEY: We'll take a fifteen minute recess.

(Thereupon a recess was taken.)

MR. RAMEY: The hearing will come to order. Are there any questions of the witness?

MR. DALIOUS: Mr. Chairman, we have two or three more.

MR. RAMEY: Okay.

MR. ATKINSON: First, Mr. Chairman, we'd like to notify you of a typographic error in our Exxon Exhibit Eight. Under 1978 oil production rate, barrels, instead of 180,000 for Exxon, it should read 188,000.

MR. RAMEY: On Exhibit Eight?

MR. ATKINSON: Under 1978 oil production

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rate, barrels for Exxon should be 100,000.

MR. PAMEY: Okay.

VOIR DIRE EXAMINATION

BY MR. DALIOUS:

Q Mr. Nolan, referring back to Exxon's Five-A, Five-C, Five-D, did I understand you to say that Five-A reflected that under the proposed formula, that Exxon would lose approximately 200 barrels a day as opposed to its actual production rate?

That on Five-C Chevron, by the same process, would more than double, and that TP, by the same process, would increase substantially, perhaps 85 to 90 percent?

A Yes, sir, that was my statement.

Q Would you please state again why this would exist?

A Well, this is due to the drastic changes, rather drastic changes that have occurred in the production parameters and the remaining primary recovery parameters which are used during the early phases of the formula, since the obsolete parameters determined in 1976 were determined.

The fact that the production rate has changed on these leases and the calculated reserve would no doubt change if it were recalculated, that has resulted in this rather remarkable difference.

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Q Would you describe the 1976 production data as being current?

A No, sir, I would not.

Q If not, how would you categorize that data?

A Obsolete. Out of date.

Q In your opinion, based on such data, and applying Exhibits Five-A, C, and D, in your opinion is the old Shell formula fair and equitable and a reasonable distribution of hydrocarbons?

A Not based on what the leases are now doing, it is not.

Q I now refer you back to Exxon Eleven and Twelve. I want to be certain I understand what your testimony was with regard to both of those exhibits.

If I understood you correctly, on Exxon Number Eleven, the top line, using the total investment of $31 million, that the cost per barrel to Exxon would be $1.77.

A Yes, sir, if we take the production that is allocated to Exxon during Phases I and II, 1,341,000 barrels is the calculated oil allocated to Exxon under the formula, with a $2,371,000 investment obligation, as shown below. That results in a cost to Exxon of $1.77 per barrel.

Q All right, and on Exxon Number Twelve,

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that same number for Shell is 31 cents.

A. That's correct.

Q. Now that is a difference of 96 cents per barrel for oil, is that correct?

A. Well, that's a difference in investment cost; a cost of 96, yes, sir, 96 cents.

Q. All right. In your opinion, is that variance in investment cost under a formula using obsolete 1976 data a fair, reasonable, and equitable distribution of the payments of investment cost?

A. I think it is not. It just complicates an already bad situation.

Q. Now referring to Exxon Thirteen and Fourteen, there is a variance between Exxon's cost, investment cost of $1.30 a barrel, and Shell's of 84 cents a barrel.

A. Yes, sir.

Q. Now that difference is not so great. Did you not use the expression, the using of updated parameters would take some of the sting out of that?

A. Yes, sir, I -- it would reduce that discrepancy because it increases the oil production allocated to Exxon during Phases I and II.

Q. All right, I'll refer you back to one other question that was asked to you by Mr. Atkinson.

I believe he inquired into your opinion as

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to the length of time that it would take to recompute this data using updated parameters as opposed to 1976 parameters, and I believe you did not express your opinion at that time.

And I would like to re-ask that question in this manner: Assuming that the basic data has not been destroyed and is still available, what, in your opinion, would be the time necessary to recalculate on the basis of updated, current, 1978 or 1979 numbers?

A. Well, now on that basis, if the data is available, and could be updated as was done in 1976 when we talked about the additional eight months production, which was added, that work was done between the period of October 22nd, 1976, and November the 10th, 1976, because on October the 22nd certain decisions were made as to how these calculations would be made and Shell furnished the data then to the Technical Committee on November the 10th, a period of about three weeks.

And I don't see any reason why it would take much longer than that to recalculate, if the data is available and that stuff is still preserved.

Q. Okay. If updated parameters, in your opinion, would take some of the sting out of Exxon, as you stated, would you consider even that still somewhat inequitable?

A. Well, we --

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Q. Even that.

A. We felt that the reliance entirely on remaining primary for the long period of time, ten years, to recover the entire primary, was not equitable because this is after all a secondary recovery program. When you go into it you are willing to take some of the risk or you don't want to go. There is secondary recovery even attributable to those owners who have a high percentage of primary.

MR. ATKINSON: Mr. Chairman, at this time Exxon moves to introduce in evidence Exxon Exhibits One through Fifteen.

MR. RAMEY: Exxon's Exhibits One through Fifteen will be admitted.

MR. ATKINSON: We pass the witness.

MR. LOPEZ: Mr. Chairman, at this time on behalf of Shell Oil I'd like to request a recess until tomorrow morning, whereby we can put on our cross examination and also a brief rebuttal witness.

MR. RAMEY: Any objections to the recess?

MR. ATKINSON: No objection.

MR. RAMEY: The hearing will be recessed until 8:00 a. m. tomorrow morning at this same place.

(Thereupon the evening recess was taken.)

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(Thereafter at the hour of 8:00 o'clock a. m. on the 4th day of October, 1979, the hearing was reconvened, with the same appearances and the same Commission members in attendance, at which time the following proceedings were had, to-wit:)

MR. RAMEY: The hearing will come to order, please.

Are you ready with questions for Mr. Nolan?

MR. LOPEZ: Yes, sir, Mr. Chairman, thank you. Good morning.

MR. NOLAN: Good morning.

WILLIAM E. NOLAN

resuming the witness stand, and being previously sworn upon his oath, testified as follows, to-wit:

CROSS EXAMINATION

BY MR. LOPEZ:

Q Mr. Nolan, yesterday I believe you initially stated that you were very much involved in participating in the activities of the Technical Committee. As

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a matter of fact, I think you mentioned that you probably never missed a meeting of that Technical Committee, is that correct?

A. As I recall, yes.

Q. And would you also agree with me that there were twenty-two sessions that were fairly intense over a three and a half year period between July, 1973 and March of 1977?

A. I didn't count them but I'm sure there were that many meetings.

Q. And would you agree with me that the Technical Committee should be complimented for the excellent job performed with a very difficult situation?

A. Yes, sir, I do.

Q. Mr. Nolan, I'm going to hand you a couple letters, and I've marked an area in yellow on these letters. And first of all, I'd like you to identify the letter, if you would, for the Commission, and then I'd like you to read the language that I've marked in yellow.

A. This is a letter from Mr. J. M. Shepherd of Exxon Company to the United States Department of Interior, Geological Survey, dated June 9th, 1978.

And the highlighted area reads: "The proposed North Hobbs Grayburg-San Andres Unit Area was studied extensively for more than four years by technical

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personnel broadly representing area ownership. This study reasonably projects when and in what relative proportions remaining primary and secondary reserves will be produced under unitized waterflood operations. The graph and tabulated data developed from the study reflects this performance forecast."

Q. Thank you. Now I'd like to hand you another letter and ask you to identify it and read the same highlighted language.

A. This is a second letter from Mr. J. M. Shepherd of Exxon Company to Shell Oil Company, to the attention of Mr. W. E. Buck, dated February 16th, 1978. The highlighted area reads: "The North Hobbs Grayburg-San Andres Field was studied extensively for more than four years by technical personnel broadly representing the field ownership. This study reasonably projects when and in what relative proportions remaining primary and secondary reserves will be produced."

Q. It's essentially the same language, if not identical, to the earlier letter, is it not?

A. That is correct.

Q. And that was about six months later.

A. Yes, six.

Q. Why is it, Mr. Nolan, that not until the time of this hearing have we been advised that the values as-

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signed the parameters on the Technical Report, to which Exxon apparently agreed, are not correct values?

A. The parameter values determined at the time the study was made are the best values which could be determined at that time and with the data existing to that point.

Earlier, Exxon did not take exception to the parameter values. On re-evaluation, based on more recent data, as opposed to the obsolete data, we have come to the conclusion that this data should now be updated and proper values assigned to the -- each tract.

Q. Why should we stop now five years -- five months into 1979? Aren't these values going to constantly change? Won't they be changing by December of this year or by the end of next year?

A. I would say they will change, but there is some limiting time under which you dedicate a lease to a unit forever; some limiting period where the more updated data should be used. You cannot go back five years and ten years ago and use data developed then to unitize now.

Q. Well, wouldn't you agree with me, and it's pretty significant, that over 90 percent of the people involved in this deal have agreed to the picture taken as of January 1, 1975?

A. Certainly your -- your ownership informa-

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tion presented earlier indicates some 90 percent have signed. What their various reasons were and what their situation is, I do not know.

Q. Okay. Let's go into the reasons why you believe the parameters changed. And in that connection I would refer you to your Exhibit Two, and ask you if you wouldn't agree with me that the increased production that you have described actually comes from Tracts 47 and 48 within the Unit Area?

A. Yes, sir, Tracts 47 and 48 have shown increase in production in access of that predicted by the Technical Study.

Q. I'd like for you to explain to me why this increased production has occurred. Did you go in and rework the wells or set new pumps? I'd just like to -- for you to explain to me what you did to these wells that got them to do what none of us thought they were going to do.

A. Submersible pumps were installed on two of the wells.

That increased the volume of artificial lift; increased the volume produced from the wells.

Q. Is that all you did to increase the volume?

A. Yes.

Q. And were there no pumps existing before that?

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A. There were sucker rod pumps, which did not have the capacity of the submersible pumps.

Q. How much was the capacity increased by the pumps?

A. The initial installation, the pump produced between 6 and 700 barrels of fluid a day. Prior to that time the producing rate was approximately 100-150 barrels of fluid per day. I'm guessing at that. I believe it was a very substantial increase in -- in fluid production.

Q. I see. When you talk about substantial increase in fluid production, isn't it true that after you installed these submersible pumps that you increased the volume of water about four times, too?

A. The volume of water increased about in direct proportion with the total fluid of the wells.

Q. And cannot this reflect the fact that all you are doing is accelerating your primary recovery by increasing your lift?

A. You are withdrawing at a more competitive, at a faster rate, from a given volume in the reservoir, and you will therefore produce more ultimate recovery from a well that produces at a higher rate. That's the name of the game.

Q. This is a fairly common practice in oil field management and operation, isn't it?

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A. Oil companies are quite competitive.

Q. And we're talking in this particular pool about a fairly lengthy primary life, wouldn't you agree? 35 or 40 years?

A. 45 years, yes, sir. If that volume is sustained for that period of time, there'll be a great amount of recovery made by that well as opposed to some other well on an offsetting lease.

Q. Okay. Now, I would like for you to refer to your Exhibit Five-A, and I must say that yesterday you left me with the impression that if unitization becomes a reality, Exxon would have to pay back all that additional oil production that's reflected between the solid line and the hatched line, or about 200 barrels a day, but that's not the case, is it?

A. No, sir, I did not mean to give anyone that impression. That merely represents what would have been the difference in production had the unit been formed earlier.

Q. But by increasing your lift volume, you have actually increased or accelerated your primary and those additional 200 barrels a day reflect money in the bank to Exxon even if unitization becomes a reality, isn't that so?

A. What Exxon's production has been in the past certainly is Exxon's.

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And the Feds, as well.

Q. Goes without saying.

A. Yes, sir.

Q. Now, Mr. Nolan, you'd agree with me that there has been water injection in the Amoco Unit for about four years, would you not?

A. I believe their injection started in early 1976, yes, sir.

Q. All right. And do you know whether or not the wells in that unit have responded favorably to water injection?

A. I have examined the overall production. There has been a substantial production increase. That production increase is due to several things. One is the change in allowable treatment. That has a very substantial affect. The early production increases were undoubtedly due to proration changes. There may be response. The gas/oil ratios are leveling out and perhaps going down. I believe it will be a successful flood, if that's the point.

Q. What has been your experience with the gas/oil ratio in your Tract 47?

Has it stayed the same or --

A. Gone down.

Q. -- gone down? It has gone down? Have you had an opportunity to examine any of the wells along the

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northern perimeter of the Amoco waterflood and found out whether or not they responded favorably or whether or not their gas/oil ratio has gone down?

A. No, sir, I have not. I have had the opportunity. I have not taken advantage of it.

Q. Well, would you agree with me that once a waterflood project is undertaken that it's pretty difficult at that point to go back to the drawing board and determine what the remaining primary reserves would be?

A. On the leases that will respond to waterflood it would be difficult.

Q. Mr. Nolan, yesterday I believe you explained that the unit participation formula, that was based on values assigned parameters that are no longer valid.

A. Yes, sir.

Q. And that in your analysis these could be updated fairly simply, by -- and I'm not quite sure how you came to your own calculations, but it seemed to be a combination of a decline curve analysis meshed with the computer simulation model, is that not correct?

A. That is correct, yes, sir.

Q. And this was to pertain to estimating the reserves in the San Andres formation, is that not so?

A. That is correct, yes, sir.

Q. Well, why didn't the Technical Committee

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in its deliberations agree to some kind of decline curve analysis rather than as we've discussed rely and insist upon the computer simulation model?

A. The San Andres portion of this reservoir has water influx. Decline curve analysis, straight decline curve analysis, as normally used, simply doesn't reflect what a well's reserves are. So the Committee was forced to use some method which provided for the movement of oil in the reservoir. As the water expands from the edges, it pushes the oil various areas in the reservoir. That was why we used a combined -- or I used a combination of the two methods. I have no way of doing this. This is only an approximation. It is fairly close, based on my experience, to what would happen if the simulation model were run. I do not claim, certainly, that this is an improved method. It is an approximation using only the data that we now have, and if the model were rerun, it would give results somewhat similar. The higher producing wells now would obtain greater reserves.

It was to show approximately where the oil would be produced under the updated and more recent conditions.

Q. But you would agree with me, though, that to use a decline curve analysis in a water-drive reservoir would have been laughable for -- to the Technical Committee.

A. They would not use a straight decline curve method for the San Andres, that's correct.

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Q Now, Mr. Nolan, I'd like to talk about the participation formula which has been presented to the Commission and that's contained in the Unit Agreement and Unit Operating Agreement.

You don't have any problem, do you, with Mr. Buck's explanation that it seems fairly reasonable that this kind of participation formula that allows those with primary reserves to recover those primary reserves first and put the risk of any loss or gain on those that have secondary benefits to be realized?

A Yes, I do.

Q Well, why don't you tell me what your problem is?

A Personally, it is my opinion that relying entirely on the single parameter, remaining parameter, for a period of ten years, when in fact over fifty percent of the oil produced during that period is developed because of the secondary flood, it is not an equitable way to distribute the oil production to each and every lease in the tract.

Now, that problem has been wrestled for many meetings and the majority of the owners did not agree with me and did not agree with Exxon on that point. And Exxon, in my opinion now, may defer to the majority.

Q Now let's turn to a discussion of the investment participation formula. First in this regard, I'd

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like you to explain why you think we seem to be so many miles apart. We've put up exhibits and calculations showing the initial capital investment to be $33 million, and Exxon's estimate is $100 million.

Could you explain why this big difference is there?

A. It has been our experience in San Andres waterfloods in West Texas and New Mexico that infill drilling is needed to get the maximum recovery. 40-acre spacing is not as effective. We believe that infill drilling will be required in this unit.

Now, we also believe that when we infill drill additional recovery will occur, and it certainly will be an investment that will be beneficial to all parties.

Q. Okay, but you'll have to agree with me here today, won't you, that what we've discussed with the Commission thus far does not provide for infill drilling, and what we've put before the Commission is the fact that this unitization project will be feasibly and profitable based on the data we've submitted to the Commission, and that does not include infill drilling?

A. That is correct. In that event, then all you will want to look at is our $31 million case and you would not want to look, or you would not want to believe, the $106 million case. That's your privilege.

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Q And I believe yesterday's testimony showed that if infill drilling is indicated, it's going to have to stand on its own merit above and beyond what we have here today, right?

A We have no -- no quarrel with that.

Q But let's say even assuming that I agree with your $100 million figure without infill drilling, based on what we've done, Exxon still stands to realize a pretty substantial profit from unitization, wouldn't you agree?

A Certainly, but however, we would like to also point out that the difference, the $1.71 per barrel paid by Exxon, still compares with the 84 cents per barrel paid by other companies.

Therefore their rate of return on the initial part of this thing is much higher.

That's the only point we wanted to make. It's simply that the investment formula is inconsistent with the allocation of reserves.

Q You've brought up the next point I wanted to get into. Very good.

In that connection, I'd like you to refer to your Exhibit Eleven.

A Yes, sir.

Q Pardon me for standing up, but I think if I work closely with you on this deal, we might get to the

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bottom of my problem.

A. All right, sir.

Q. First of all, we are in agreement and do understand, don't we, that the unit agreement formula for capital investments in this project will ultimately be shared on the Phase III participation, or that which is actually the secondary oil, or added oil, made possible by this unitization, is that not so?

A. Yes, sir, that is correct.

Q. Okay. Well, if you -- if you'll look at your exhibit, and I'll just -- I first point to you that your -- Exxon's share of the total investment, of the $31 million, is $2.3 million.

A. Yes, sir.

Q. Right?

A. That's correct.

Q. Okay. And that, in order to get at that cost to Exxon of $1.77 per barrel, we divided the 2.3 million by the production of 1.3 million, isn't that right?

A. That is right.

Q. Okay. Then we go down here to the percent of the total investment share, or 7.3 percent, and if we multiply that figure, 7.6, I mean.

A. Yes, sir, 7.6 percent, right.

Q. Okay, and we multiply that times the total

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estimated recovery of 55.3 million barrels, we get a total estimated secondary recovery for Exxon of 4.2 million barrels, isn't that correct?

I'll be glad to supply a calculator.

A I believe your number is approximately correct, that the future recovery after the end of Phase II, and during Phase III, when secondary operations, or secondary recovery factors become effective, after that point, Exxon's investment is -- or Exxon's recovery is some 4.2 million barrels.

Q Okay. We're in agreement.

Now, let's see what it costs Exxon to have this secondary recovery. In order to do that, then, we would go back to your 2.3 million dollar investment, right?

A Yes, sir.

Q And we would divide that by the 4.2 million that you expect to get, and I've done the calculation so I want to know if you agree with me, that comes out to 56 cents per barrel, I think.

A. I believe that that would be correct and the point you're making there is that each and every party who has secondary recovery pays then exactly the same, 56 cents per barrel.

Now, during Phase I and Phase II, the parties don't pay on the same basis. After Phase III starts

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everybody pays the same. We have no complaint about that. We're not complaining about Phase III.

Q Well, we have the readjustment date and we readjust everybody to the Phase III deal, don't we?

A. Everybody becomes whole at the beginning of Phase III.

Q Well, what's wrong with that?

A. No problem with that. The problem is during Phase I and Phase II, when we're paying twice as much.

Q Well. I can see your problem to a point but I don't think, Mr. Nolan, you're really fairly giving credit to those guys with more primary reserves who are being benefitted by this accelerated primary recovery made possible by the waterflood.

A. Of course, they're benefiting by the accelerated primary and they're paying nothing, only the interest on the money which they put up on the 58 percent during Phase I and Phase II. They're paying practically nothing to get that benefit, so they should share in some way in the cost. Which is my opinion.

They're also getting the benefit of the two-phase upper tier oil price and that type of thing, which is a benefit.

Q A few final questions, Mr. Nolan.

You know, I'm -- I'm fairly amazed at what

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I have to consider is a fairly reckless approach by Exxon.

MR. ATKINSON: Mr. Chairman, excuse me. If Mr. Lopez wants to cross examine the witness I think that is perfectly permissible, but if he's going to use this as an opportunity for argument, then we would object.

MR. RAMEY: Would you like to rephrase that question?

MR. LOPEZ: I'd be glad to rephrase that.

MR. RAMEY: It appears you may be bordering on testimony and you're not sworn.

MR. LOPEZ: And I -- that's true.

Q (Mr. Lopez continuing.) Let me refer you to your Exhibit Nine, Mr. Nolan.

A Yes, sir.

Q And I -- if I understand that exhibit, it reflects that Exxon feels that they will lose 377,000 barrels of oil, is that right?

A Yes, sir, that's correct.

Q Now, if you compare that amount of oil to the total estimated recovery of 55.2 million barrels of oil, which you agree can be recovered by secondary operations, that figure represents less than 1 percent, or .68 percent, of the oil we can get out of this project.

A Yes, sir; however, that's 100 percent of Exxon's loss.

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Q Well, I'm not so sure it is. Let me understand why you think that's so, because if I compared the same figure, 377,000 barrels of oil, to the 4.2 million additional barrels of oil that you stand to gain from the project, that seems to be less than 9 percent of what you can get, and it seems to me you're risking 11-to-1 odds to forego this 377,000 barrels of oil if the project isn't put into effect.

Q Those numbers are not mutually exclusive. We believe that the project should proceed and that the secondary recovery is a benefit to everyone. We do not believe that Exxon's position will stop the project. If we believed that, then, perhaps there would be some different approach taken.

Q Well, I don't know what else is happening here today.

No more questions.

MR. RAMEY: Any other questions?

MR. ATKINSON: Mr. Chairman, I've got a brief redirect, if I may.

MR. RAMEY: Let me ask a couple of questions first, Mr. Atkinson.

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CROSS EXAMINATION

BY MR. RAMEY:

Q. Mr. Nolan, you have, as I see on your Exhibit Fifteen, you have four leases.

A. Yes, sir.

Q. Tract 43.

A. Yes, that's the Exxon State "A" Lease.

Q. All right, what's the affect of your proposal to that lease?

A. I believe that lease drops in participation under the updated parameters, sir. It has not performed as well as predicted by the Technical Committee compared to the other leases.

Q. So if we went to the '78 production figure, that lease would not --

A. Fare as well, no, sir.

Q. -- fare as well.

And then the next two are your Bowers Leases?

A. Yes, sir, the 47, Exxon Bowers "A" Federal, Tract 48, Exxon Bowers Federal Communitized.

Q. And those two, their participation would be increased?

A. Yes, sir, their participation would increase.

Q. And then the fourth one, which is your

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Grimes Lease, what's the effect on that?

A. Well, now that is a stripper lease, and the production has dropped substantially since the Technical Report was made, and under that -- under our estimate of future production, that lease drops very substantially in participation.

Q. So Mr Grimes would suffer considerably.

A. I'm afraid so, but Mr. Grimes -- that's his -- I mean we're protecting him as best we can.

Q. So two of your leases you would get an increase in participation and two of your leases you would get a decrease in participation.

A. That's correct.

Q. And you're concerned about the Federal government.

A. We're concerned about them all, sir. We just want to give them all fair treatment.

Q. You seemed to emphasize yesterday that this was a big Federal lease and most of the Federal participation in the unit.

A. That's correct. There are a total of 400 acres Federal leases. This is 320 of them.

Q. I just made a quick addition here. I took Conoco's leases in the Unit. I think they have five leases, and under the proposed participation they would have 9.3

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percent, and under your proposal they would have 12.8 percent.

A. Yes, the Conoco leases have in general shown production much in excess of the Technical Report prediction since made in 1976.

Q. And yet they're supporting the proposed formula.

A. Conoco proposed this formula and I suppose they're proposing it. I don't know whether Conoco's looked at those numbers.

Q. But they would -- their participation would increase.

A. Very substantially, yes, sir.

Q. And still they are willing to take their knocks to get the unit together, I assume.

A. If they overlooked it, I presume they are.

MR. RAMEY: Thank you. Any other questions of Mr. Nolan? Mr. Nutter?

CROSS EXAMINATION

BY MR. NUTTER:

Q. Mr. Nolan, when you're putting a unit together that has as many interest owners as this one does, isn't it logical that at some point that you have to arrive at a cutoff point and start your circulation of the petitions

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or the circulation of the ratifications to the operators, based on information that you've had up to that time.

A Yes, Mr. Nutter, that's correct. There must be a --

Q Well now, isn't it also true, Mr. Nolan, that by the time you have circulated 905 royalty owners and 90 working interest owners, that a certain passage of time would have gone by, and by then someone will always pick up some new statistics and come up with some new parameters that would change what you just finished circulating.

A Certainly that is right. There has to be some period, some reasonable period of time, but beyond some reasonable period the updating may be needed.

Q But you always have to cut it off at some point.

A At some point, yes, sir.

Q So you'll have the numbers that you can send out to people so they can look at it and sign it.

A That is certainly -- that is certainly right.

Q Now, on your Bowers lease there, the production took a dramatic increase back in 197 --

A Yes, that's Exhibit Six.

Q In took a dramatic increase back in 1977; to what is that increase attributed, Mr. Nolan?

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A. There were two REDA pumps installed on the Bowers Lease on Well No. 2 and Well No. 3.

Q. And are those the only wells that have shown increase in production?

A. Those are the principal ones; others have shown slight increases, but those -- that is where the principal increase comes, is from those two leases which both produce from Zone 1, which is the main production interval, primary production interval, and withdrawing at the higher rate just has made this lease much more competitive.

Too bad Exxon didn't do it earlier.

Q. Now those are -- those are producing up to top allowable, I presume.

A. Yes, sir, those are both --

Q. Allowable --

A. Those are both producing up to top allowable and one of those leases is only able to produce five days a month, and it makes its allowable. It produces at a rate in excess of 500 barrels per day with the REDA pump.

Q. Well now you have also on your Exhibit Six shown the reflection of that in the production as the yellow line, and you've also shown it as an increase in reserves. Now, isn't it often true that when you put in new equipment in a well, that you have a temporary increase in production and then the production declines back to the original decline

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curve, and that you won't have the production decline curve going out there ad infinitum that high above the original decline curve?

A. Well, we can only look at what's happened in the past two years. That's a little more than just a short period of time. This lease has held -- these wells have held this production for the two-year period, from the middle of 1977 on. They show no signs of declining.

Q. And those two wells are producing from Zone 1 of the San Andres?

A. Yes, sir.

Q. So the production from those two wells is not going to affect the secondary recovery from the lease?

A. No, sir. That is not secondary recovery. All of that is primary, remaining primary oil, from the main primary zone.

Q. I see.

And you feel that you're increasing the reserves under the lease by installing these two pumps?

A. We're increasing the reserve from those two wells at the expense of some offsetting leases, yes, sir. It's just becoming more competitive. It's which wells get the oil. The reservoir production of the total reservoir will not be increased; the reserves should not be increased

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by this.

MR. HUTTER: I believe that's all. Thank you.

A. Yes, sir.

REDIRECT EXAMINATION

BY MR. ATKINSON:

Q. Mr. Nolan, I have a couple more questions on redirect.

First of all, I'd like to clarify something. Exxon is not suggesting that the decline curve method you employed to approximate the simulation model should be used by the Commission or by the Technical Committee to re-evaluate reserves, are they?

A. No, I am not. I just said it is an approximation, and I think I was very conservative, using an 8 percent decline, 8-1/2 percent decline on it. This lease is in the dead center of the reservoir; the best producing area in that reservoir. And we assigned an 8-1/2 percent decline to it when the overall production decline is 6 percent. There's no reason to believe it shouldn't decline at a rate even slower because of its central location in the reservoir.

Q. What I want to get at, though, is that Exxon is not suggesting that the simulation model is not

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correct?

A. No, the simulation model we feel would be the better method of doing it.

Q. So that what you're proposing is that the new data be input into the simulation model and see what it generates, is that correct?

A. Well that, we would certainly agree to that type of thing, but we can't force anybody to do that.

Q. Now, Mr. Lopez, sort of inferred that somehow that Exxon's installation of artificial lift in 1977 and the corresponding increase in production is some how unusual, and that wells won't change like that, ordinarily, unless you do something special.

Now do you know other wells in the proposed unit that have had -- demonstrated sharp increases over short periods of time?

A. There have been quite a number of cases through the years where there've been dramatic changes from one month to the next and then those changes were sustained for periods of -- long periods of time and this type of reservoir, where you have a large hunting ground, you have Zone 1, Zone 2, Zone 3 Upper, Zone 3 Lower, all of which will produce top allowable in some parts of the reservoir.

You have open only parts of those zones, so that you have opportunities to work over wells, get into

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new zones, put on artificial lift, stimulate wells, all those good things that oil companies are supposed to do.

Q All right. Well, now I'd like to refer you to what has been marked for identification as Exxon Exhibit Number Sixteen.

MR. ATKINSON: Mr. Chairman we only have one copy of this, so I'd like to circulate it to opposing counsel and then to the witness and the Commission, if I may.

Q (Mr. Atkinson continuing.) Mr. Nolan, looking at Exhibit Sixteen, could you please identify that and explain what that is?

A This is a data graph showing the producing history of the Shell "D" Lease, located in Section 24, Tract 29.

It shows the production rate in barrels per day versus plotted against time from a period 1960 through April, May, of 1979, and then it also shows an extrapolation made by the Technical Committee as to the future reserves on this lease.

Q Now is there anything unusual about that curve or anything that meets the eye?

A Well, there is a dramatic increase in production on this lease from a rate of about 20 barrels per day in 1973 to a rate of 120 or 30 barrels per day in 1974.

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That lease has shown a decline since that time of 16.6744 percent per year from the period -- I'll take that back. It's not that accurate. About 16 percent from 1976 to the present time.

Q Now, in your expert opinion had the Technical Committee formulated the formula that's presently proposed and put it into effect using the same parameters, current production, et cetera, in 1973 before that dramatic increase was shown, would Shell's allocation of reserves have been substantially less?

A Very substantially less, yes, sir.

Q So it's really just a question of where you end up at the time that the data is cut off then, isn't it?

A That's the unfortunate part of it, yes, sir.

Q But your feeling is that it must be cut off at some point.

A Yes, and Mr. Nutter's perfectly right. You must cut it off sometime.

Q Now, I have one other question for you regarding the investment formula.

Mr. Lopez has suggested that the 100 million dollar figure may be a little bit preposterous. Have you had any experience or knowledge at all of the Wasson Field? (sic)

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A. Yes, I have.

Q. And who is the operator?

A. Shell.

Q. And realizing that you have no exact figures in front of you, could you give us some idea of what additional costs have been incurred, investment costs, by the use of infill drilling in that field?

A. Well, as you say, I don't have the data, but as I recall, initially that waterflood was designed as a peripheral flood with a very modest investment as it started out. I'd say perhaps less than the investment that is predicted -- is estimated for this field, for this Unit.

Q. Less than $33 million?

A. Yes, I would say so, because it is peripheral with just converting the initial wells which wasn't a great deal of investment.

Now that was quite a few years ago.

Q. What has happened to the total investment to this date, to the best of your knowledge?

A. This always appears on Exxon's budget as one of our large items. Shell has drilled down to 10-acre spacing in many parts of that field, all being justified and all being profitable and all yielding additional recovery. I'd say that we've drilled 4 or 500 wells at least in that field. Investments have been in excess of $100 million.

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Q I'd also like to clarify one other point, which I believe you stated in your cross examination, but Exxon's problem with the formula, with the investment formula and the participation formula, really is not Phase III at all. It's only in Phase I and II then, is that correct?

A Yes, that's where the problem lies.

Q And also, as to the purportedly insignificant loss to Exxon of 377,000 barrels, just to clarify this once again, approximately what percentage is that of the total projected Exxon recovery?

A The total projected Exxon recovery, both primary and secondary, is 5 million barrels, so that is only 6 or 7 percent of the total projected.

Q Would you consider 377,000 barrels to be insignificant in your opinion?

A No, sir, not in my opinion. 377,000 barrels is 377,000 barrels regardless of what your total is.

MR. ATKINSON: We have no further questions, Mr. Chairman.

MR. RAMEY: Any other questions of the witness? He may be excused.

MR. NOLAN: Thank you.

MR. RAMEY: Do you have anything further, Mr. Atkinson?

MR. ATKINSON: No, sir, we don't have any

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further witnesses.

MR. RAMEY: Do you have anything further, Mr. Lopez?

MR. LOPEZ: Yes, sir, Mr. Chairman. I have a couple or three rebuttal witnesses.

I'd like to call Mr. Miller. If you could give us a second, we'd like to put up a couple of exhibits.

MR. RAMEY: Are we ready? Please proceed.

WILLIAM C. MILLER

being called as a witness and having been duly sworn upon his oath, testified as follows, to-wit:

DIRECT EXAMINATION

BY MR. LOPEZ:

Q. Would you please state your name and where you reside?

A. My name is Bill Miller and I reside in Houston, Texas.

Q. Mr. Miller, by whom are you employed and in what capacity?

A. I'm employed by Shell Oil Company as a Senior Staff Reservoir Engineer in the Mid-Continent Division.

Q. Have you previously testified before this

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Commission and had your qualifications made a matter of record?

A. No, I have not.

Q. Would then you briefly describe your educational and employment background?

A. I graduated from Stanford University in 1950 with a Bachelor of Science degree in petroleum engineering. In that year I was employed by Shell Oil Company in Los Angeles, and I worked as a Division Reservoir Engineer in Bakersfield and Farmington, New Mexico, until 1960.

I then had special assignment in Shell's Production Research Laboratory in Houston, and with Shell in the Hague in the Netherlands until 1965.

This was followed by four years Area Engineer, responsible for Shell's California Supplemental Recovery Engineering. This included thermal, miscible (sic) and waterflood projects.

During the Hobbs Primary Reserve Study, discussed in this hearing, I was the supervisor of miscible flooding and reservoir simulation research at Shell's laboratory in Houston.

In collaboration with Shell's representative on the Technical Committee my staff and I analyzed the excellent data compiled by the Committee and made the computer runs.

I attended several Committee meetings in

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Midland and Houston to explain the nature of the math model, the key factors that were bound to affect the final answer, and to inform them of our progress.

During the past two and a half years I have been responsible for Shell Oil's engineering and pilot testing of enhanced oil recovery in the huge Denver Unit in the Wasson Field, West Texas. The productive measures there are also the San Andres formation.

More recently, in cooperation with Mr. Lancaster, I've analyzed the past two and a half years production performance for the Hobbs Grayburg-San Andres Pool, and related it to the previous reservoir simulation study results.

Q. Then I take it you are fairly familiar with Shell's application in these cases, 6652 and 6653?

A. Yes, sir.

MR. LOPEZ: Mr. Chairman, are the witness' qualifications acceptable?

MR. RAMEY: He is considered qualified, Mr. Lopez.

Q. (Mr. Lopez continuing.) Mr. Miller, could you explain why you became involved in the North Hobbs Unitization Project?

A. The Technical Committee contacted me at the -- Shell's Laboratory and informed me that other methods

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to determine the important parameter of primary reserves had failed, and they wanted to know if it could be done by means of the math model.

I examined the --- all the data that the Technical Committee had compiled, thought about the nature of the problem, and concluded that indeed the math model would be suitable for this purpose.

Q Would you briefly describe what was involved in the study you did for the Technical Committee?

A Well, the complete summary is set forth in the Technical Report on pages 26 to 30; however -- which was introduced as an exhibit in this hearing.

Briefly, we represented the entire Hobbs Grayburg-San Andres Pool, north and south, with a grid system consisting of 600 distinct blocks. Based on the Technical Committee's data, we assigned properties to each one of those blocks, the thickness, the porosity, the structure that was involved, the gas/oil contacts, and the water levels.

We likewise assigned pertinent properties to each one of the individual wells in the pool, such as what zone it had been completed in, reconditioning data, and of course, the oil production.

Q And then what did the computer do?

A Well, the computer then automatically cal-

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culated the performance of each zone, the water influx, finally getting to the answer, which amounted to each well's individual pressure, its water cut, its gas/oil ratio, and its productivity.

The values I mentioned then were matched to the actual data as reported. Adjustments were made to the model to match these parameters ever more closely.

For instance, the location and strength of the water influx was an important adjustment parameter in Zone 1 production. The water drive was an important part of the performance of these wells.

When a close match was obtained, we then in the Committee felt confident in using that model for predicting the future reservoir performance.

Q And it was accepted as the method of going about it, wasn't it? At any rate --

A. Yes, indeed.

Q Did the Technical Committee establish any specifications for predicting oil and gas reserves?

A. Yes, they did, and most importantly, we decided that each well in the prediction would retain its existing completion interval. There was to be no credit given for possible future acid stimulation, for instance. There was no credit to be given for possible future completions of oil that was currently behind pipe and had never

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been opened up. There was no credit to be given to installation of high volume equipment, et cetera, a change in the productivity of the well.

In addition, we decided that to get the purely primary reserve estimate we would have to ignore the anticipated influence of the water injection of Amoco's waterflood in the south, and so indeed the primary reserves in the absence of waterflood were also calculated for all the south at the same time, in the absence of waterflood.

We recognized that there was excess capacity in the top allowable wells; that there were wells that only had to produce for a fraction of a month to make their oil production, and this was included, and the difference between those wells and the wells that were producing to capacity was recognized.

A well economic limit of 3 barrels per day was adopted or a 99 percent water cut, whichever came first, and the prediction was terminated way out in the future at the beginning of year 2025.

Q. What efforts were made to insure that the Technical Committee members fully understood the computer simulator program?

A. Very early in the game, at the January, '75 meeting of the Technical Committee in Midland, I attended and informed them of the type of model that was to be used,

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the grid system and the approach that was going to be used and the progress we had made at that time.

I met with them several times leading up to a meeting in October, 1976, in which in the call for the meeting the chairman of the Technical Committee asked especially that the people attending that meeting the representatives of the working interest owners, bring along a computer expert who could delve more deeply into the workings of the model.

We received numerous -- during all this, we received numerous suggestions, some corrections to our data, and all these were incorporated into the study, and finally, after the study was done, we specifically invited, if people wanted and still had questions, that they could come to the Belair Laboratory there in Houston and interrogate us personally and look at the output in detail.

Conoco and Skelly, now the Getty wells, took advantage of that and we met with them in our laboratory.

Q Today, looking back, what is your opinion as to the success of your computer simulation model?

A Well first, I do think we took into account all of the important factors that exist in the actual production of that big field.

More recently I compared the projection of the simulated oil production with the actual production to

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date of the many tracts in the -- in the North Hobbs Unit, and in general, the overall agreement is good.

Now these are the tracts that have San Andres production. You recall the San Andres alone was the target of the simulation study.

There were tracts where operational changes showed deviations from the simulator prediction. Now, this certainly would not have surprised anyone in the Technical Committee, because this was all discussed when we set the restrictions on the fact that, as I mentioned before, that we would use existing completions and -- and degree of stimulation in making the prediction.

So in any case where additional work was done, why indeed it would not be surprising to me or to any other member of the Technical Committee that the oil production may be above the predicted trend.

Q. Did you have the opportunity in evaluating the performance of your computer simulation to study the Exxon tracts?

A. Yes, I did.

There are four tracts involved, as we talked about just a little while ago. The first is a Grayburg Well tract, which was not involved in the simulation.

The next two are single 40-acre tracts, and indeed one is above prediction and one is below.

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The fourth tract has San Andres production from seven wells and indeed, substantially deviates from the computer prediction.

Q Was this last tract that you just mentioned Tract 47, and in that connection I refer you to Exhibit Number 35, and ask you to explain it?

A On Exhibit 35 I've plotted the barrels of oil production from Tract 47 on one axis versus the time on the other one, starting at the beginning of 1975 and with data, actual data, up till and including May of 1979.

The actual production is shown as the jagged line. The computer history match and projection and prediction of reserves of the oil rate is shown here as the smooth line.

In making the original history match Tract 47 indeed was always a problem. Back in the history match period the production, oil production decline, of this tract over two and a half years preceding, was at a rate of 25 percent per year, and indeed, looking at the other tracts in the Unit, the top allowable tracts had no decline, and the majority of the other tracts typically would have a decline that was three or four times as small as the 25 percent that was being experienced on the Exxon tract.

The productivity was declining precipitously. If someone had indeed projected that decline rate at 25

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percent, they would have driven in a line as I've shown in green here, which as you can see, would have been far below the computer projection.

The actual match of the gas/oil ratio and the oil cut at the time of the history match, actually was quite good. What was unexplained was the rapid productivity decline in that period.

Well, indeed, as brought out, Mr. Nolan suggested using 25 percent or any other decline curve for these tracts. We did it with the computer. And this was the projection that the computer gave us under the constraints that I've mentioned earlier.

Now, as you can see, starting here in the middle of 1977 the actual production has exceeded what was projected. Now, in looking at the production figure, not only of oil but also of water during this time, you find that the water production has risen from about 250 barrels a day at the time we made the history match to nearly 1000 barrels a day now. The water production from this tract has been increased nearly four times.

Now it's obvious from looking at this that the increase in oil production has by no means been the factor of four. The increase in oil production has been considerably less. This means that the oil cut of this tract is considerably less than it was, so that the rise in oil and

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the rise in water have not been proportionate. A lot more water proportionately been out than there was oil.

Q. Have you analyzed this decline in the oil cut, and in that connection I refer you to Shell's Exhibit Number 36, and ask you to explain it?

A. Exhibit 36 is a plot of Exxon's Tract Number 47. Primary reserves, as predicted by the simulator. To get a handle on this, we plotted the remaining reserves in barrels along the bottom axis here, starting as the simulator indicated for this tract, at over 1.2 million barrels for the Exxon's Tract Number 47.

On the other axis I've plotted here the percent oil cut. Now this is the percent of the total gross production that is oil, the remainder being water. I then plotted from the simulator three points: The water cut that was predicted was actually measured, on which we made our history match, in August of 1976. I plotted what the simulator predicted would be the oil cut at the first of 1980.

Q. Those points are marked on the exhibit?

A. It's marked in red. The first one is marked with a yellow square; the second with a red circle.

And finally, we have a yellow circle around what the simulator predicted would be the oil cut and the amount of oil that would be remaining as a primary reserve at the beginning of 1980.

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The dashed line then connects these three points and is the simulator's prediction back in 1976 of what the oil cut performance should be as we withdraw oil from the Tract 47.

The next thing I did was to superimpose the actual data, and in this case the yellow square which lies on top of the line is the actual oil cut that was experienced at the end of the history match, the beginning of the prediction.

At the present time there has been 475,000 barrels of oil produced out of Tract 47 in the two and a half years since the prediction, so against that point I have plotted the actual made 1979 oil cut of Tract Number 47, and outlined it in a blue square.

Now the first thing you notice is that the blue square falls on the prediction that was made by the simulator, so for this amount of remaining reserves the oil cut is just what the computer simulator would have expected.

The second thing you notice is that it, this point, May, 1979, is further from here than we thought we would be in 1980, based on the productivity of the well, as demonstrated by the actual data at the end of the history match.

So what we have here is an acceleration

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of the remaining primary reserves, which has led us down further on the oil cut, and so it's completely consistent with what the simulator had expected and predicted.

The comparable points are shown over here on this graph.

Q On Exhibit 35?

A On Exhibit 35.

Q Would you then dispute Exxon's contention that the computer simulator does not accurately project Exxon's remaining primary reserves in Tract 47?

A Yes, I would. To me, this analysis indicates that what we are looking at in the case of Tract 47 is a classic case of pure acceleration of oil reserves, and by acceleration, I mean the fact that where you are getting to the same oil reserves, but you're running faster to get there; in this case producing four times the volume of water in terms of barrels per day than we would of otherwise.

Q Finally, Mr. Miller, you have heard Mr. Nolan's testimony that in his opinion it would be possible to update the parameters by plugging in new production data. What is your opinion?

A I don't think that this would be practical or worthwhile. To be consistent with the definition of primary reserves it was agreed by the Technical Committee

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that the simulator forecast for all the San Andres wells in all the reservoirs would not include the influence of a water injection project being installed in the south by Amoco.

Under this contraint Amoco's Unit's San Andres primary reserves without the waterflood at the end of 1976 were determined by the computer to be about 9 million barrels. This was about 1/4 of the corresponding primary reserves in the northern portion. Water injection since that time by Amoco has definitely mobilized secondary recovery oil, benefiting not only the Amoco Unit producers, but also numerous wells within the proposed North Unit.

As a consequence, the oil production on Amoco-operated properties in the Hobbs Pool has steadily increased from the purely primary recovery rate of 1700 barrels a day in 1976 to nearly 5000 barrels per day by water injection now.

It's tripled.

The map labeled Exhibit 37 shows the location of the responding wells on the North Unit. Also shown is a portion of Amoco's South Unit. The tier of 40-acre tracts that lies just to the south of the North Unit. At the time that we made the history match, there were 52 oil wells in this area that were capable of making 65 barrels a day or more. Now, as expected after two-and-a-half years

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of primary production, 10 percent of those, or 21 wells, can no longer make this good oil rate, and I've indicated those and highlighted them with yellow as the minuses on the map.

This leaves 31 wells that were good oil producers that are still good oil producers, and those I have indicated by the symbol "OK". Now, I should point out that some of the "OK's" at the time of the simulator study were top allowable 80-barrel a day wells. Those, for instance, this one located here on the South Unit that juts into the North Unit is now making 300 barrels a day, due to transfer of allowable.

The next feature of the graph are 24 wells indicated by the red plus, that were not making 65 barrels a day at the time we made the projection that are making 65 barrels per day now, and over, and indeed, some of them make as much as 400 barrels a day.

Now I would point out that the concentration of these wells adjacent to the next line down here, which is the water injection, where the water injection begins in the Amoco South Unit. Now, we have previously emphasized that the clear-cut nature of the rules that were adopted 2-1/2 years ago by the Technical Committee in the simulator estimation of each well's primary reserve. Now, due to the above-mentioned response to water injection, and the high

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withdrawals in some wells adjacent to the North Unit Wells, a fresh redetermination of primary reserves in a portion of the North Unit is no longer feasible. All the portion of the North Unit affected by these, you can no longer determine primary reserve, and the portion of that North Unit that is so affected, and where you cannot determine primary reserves, is increasing every day.

In a new study it would be necessary to somehow separate many wells recent oil production into a primary fraction and a secondary recovery contraction. Then it would be necessary to obtain the Technical Committee's agreement to the admittedly arbitrary split that would be involved in each well. Furthermore, the increasing water cut would also have to be apportioned. Part of the water now could originate in the aquifer, part of it can originate from the water being injected in the South Unit, and part of it is affected by the re-adjustment of the flow lines from the aquifer due to repressuring of the South Unit.

And finally, although the field-wide and multi-zone model was well suited for estimating strictly primary recovery from the entire San Andres, it's not suitable for analyzing pattern water injection. As we testified earlier, for evaluating supplementary recovery, we made a separate simulation study, using a much more detailed grid system but covering a smaller area, only the San Andres Zone

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III Lower. This productive area covers only about three square miles.

It's evident that the 1976 time period in which primary reserves were determined and agreed upon by the Technical Committee have unique advantages. Production trends were well established and the response to water injection had not yet occurred. Any re-evaluation at this time, in my opinion, would necessarily be less definite, it would be less consistent, and it would probably be less universally acceptable to the working interest owners.

MR. LOPEZ: No further questions.

MR. RAMEY: Any questions for Mr. Miller?

MR. ATKINSON: Mr. Chairman, could we ask for a short recess to consult with my expert here?

MR. RAMEY: Certainly. We'll take a fifteen minute recess.

(Thereupon a recess was taken.)

MR. RAMEY: The hearing will come to order. Any questions?

MR. LOPEZ: Mr. Chairman, before we get into cross examination, I'd like to tender on behalf of Shell Oil Company Exhibits Thirty-five, Thirty-six, and

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Thirty-seven into evidence.

MR. BAILEY: Shell Exhibits Thirty-five through Thirty-seven will be admitted.

MR. ATKINSON: As long as we're at it, I'd also like to tender Exhibit Sixteen for Exxon.

MR. BAILEY: Exxon Exhibit Sixteen will be admitted.

Now, are there any questions for Mr. Miller?

CROSS EXAMINATION

BY MR. ATKINSON:

Q. Mr. Miller, I just have a very few questions for you.

First of all, with regard to the rules, as you called them, adopted by the Technical Committee that acidizing of wells and reworking of wells were -- that it was assumed that the completion intervals remained the same, I think is the way you put it, by the Technical Committee.

A. Yes. Yes, sir.

Q. Okay. Now, those rules were for purposes of simplifying the model, were they not?

A. No, sir. They were -- the purpose of them was to get a uniform and across-the-board fair way of -- of making extrapolations of future reserves, based on, you

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know, firm data, not on what someone might have in the back of their mind some years later.

Q But there's no prohibition against reworking wells, for example, was there?

A. No. It was recognized that there be all sorts of that going on.

Q In fact, Shell reworked some of its wells during the same period, did it not?

A. Yes, after the --- after the study period.

Q After the study period?

A. Yes.

Q There was no prohibition anywhere in the rules adopted by the Technical Committee which would have prohibited installing artificial lift on wells, either, was there?

A. No, sir. The purpose was to get a percentage that would be fair and then would be applied to whatever future acceleration or increases were made.

Q All right. Now, with regard to -- with specific regard to the Exxon Bowers Tract 47, or the Exxon Tract 47, you spoke about the waterflood in the Amoco Unit to the south. Now you're not suggesting that the increased production from the Exxon Tract 47 was as a result of a waterflood in the south, are you?

A Not yet.

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Q I'm sorry?

A No, not yet.

Q Now you also stated, I believe, -- I'm going to refer you to what has been marked for identification as Exxon Exhibits Five-B, Five-C, and Five-D. I'm sorry they're not marked. Do you have those with you?

A Yes, sir, I have.

Q Oh, okay, good. Have you reviewed these?

A Yes, sir.

Q All right. Now, you stated in your direct examination that you did not think it would be worthwhile to update the information available through the -- now available, in order to update the parameters, and the basis of your statement, I take it, is that based on the exhibits that you presented through your direct examination.

Now, in view of the great discrepancy between the performance that was forecast for Texas Pacific and for Chevron, and in view of the great discrepancy that did exist for Shell up until 1978, between what was projected and the actual production, isn't it a rather strange statement that it is not worthwhile to update the information?

A No, I don't think so. There are leases; in my review I found that are producing below prediction. As far as the other people's leases, I can only infer that this looks very typical of a case where the operators are looking

forward to unitization, where they have wells that they intend to use as key wells in the waterflood in the deeper zones, II and III, and where they do not, therefore, intend to make major investments and to jeopardize that well by doing work on it prior to the unitization; in their judgment that they're not looking to accelerate the primary reserve. The reason I infer that is that certainly has been Shell's case. With impending unitization, that we've not taken steps to try and accelerate this 45 years of dwindling reserves. We've concentrated on getting ready for the waterflood.

Q. Now, with regard to Shell, however, I notice that as far as actual production, you see Shell is essentially gearing down now in preparation for unitization, yet up until 1978 Shell's actual production was exceeding what it was to be permitted under the unitized formula.

A. We are not gearing down. I say there are opportunities for doing well work that we have not taken, and indeed, as you point out, with the long term projection of reserves, to take into account 45 years, that it's misleading to look at a few, you know, 2-1/2 years production and compare our 24.123 percent that covers the whole 45 years and compare it to what we've actually done.

Q. Now with regard to the possibility of updating, something that was not clear yesterday and is

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still not clear in my mind, at least, Shell does have the simulator program available, does it not?

A. Yes, it does, and all the data is still intact.

MR. ATKINSON: We have no further questions Mr. Chairman.

MR. RAMEY: Any other questions of Mr. Miller? He may be excused.

MR. KILPATRIC: We'd like to recall Mr. Buck to the stand. It will be very brief.

W. E. BUCK

being recalled as a witness and having been previously sworn upon his oath, testified as follows, to-wit:

REDIRECT EXAMINATION

BY MR. KILPATRIC:

Q. Mr. Buck, you have heard Exxon state that the method of allocating Investment Expenditures was not fair and reasonable, haven't you?

A. Yes.

Q. Why do you believe the allocation formula adopted in the Unit Agreement is fair and reasonable?

A. As previously stated, there exist considerable differences between the tracts and their relation-

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ship to the amount of remaining primary oil reserves and the amount of secondary oil reserves contributed to the unit. Some tracts have a high primary share and a low secondary. Others are just in the reverse, but all tracts are benefited by an acceleration and assurance of the primary reserves contributed and the recovery of secondary reserves.

To relate these benefits and to compare the benefits among parties, the actual profit to be earned by each party must be considered.

Total profit to be received is the added profit made possible by unit operations and the program of water injection. That is, if the profit a part would realize from continued primary operation without a water injection program is subtracted from the total profit to be derived from unit operations and a program of water injection, the difference would represent the added profit made possible by the unit and a program of water injection.

If the added profit should provide all parties with about the same return on their added investment, then the method of allocating costs would be in line with the benefits and would be considered fair and reasonable, in my opinion.

Such a method of relating or comparing the profit positions of the working interest owners was submitted by letter of January 24, 1978, to the working interest

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owners.

Q Would you explain the method of comparison that you just referred to, and in this connection I refer you to Shell's Exhibit Number 39?

A Most companies analyze their investment prospects and potential profits on a present value basis. That is to say that all income and expenditures are valued at their present worth, or discounted at a fixed percentage rate.

By discounting all monies, income and expenses, and expenses including capital, profit is determined on a present value basis. Now, on Exhibit 13, which has previously been submitted, we showed a discount rate of 10 percent, and that is the same discount rate we have used in this exhibit.

The first graph here of the exhibit, as presented on the wall, is a plot of the percent rate of return of all working interest owners that would have received from Unit operations had operating expenses been based on the phase-in-effect Unit participation -- that again is operating expenses -- and the capital expenses were allocated initially on the basis of their Phase II, or primary participation, and then adjusted to Phase III secondary participation at the Investment Readjustment Date. This, as I said, is a plot of their added profit. The vertical scale is the percent present

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value added profit due to the water injection project or the present value of the added profit divided by the present value of added investments.

For the purpose of this comparison all parties are assumed to receive the same price for oil sold. This may not be true as oil is priced by the Department of Energy, but it is the only way the sensitivity to the method of investment can be compared.

The horizontal scale on the exhibit is the ratio of a party's Phase II, or primary participation, to his Phase III, or secondary participation.

In order to get a reasonable scale on the bottom, this is plotted, the ratio is plotted, or expressed, I mean, as a logarithmic function, but it's still the same, being a ratio.

What the exhibit shows is that the percent profit of a party with a low Phase II primary reserve and a high Phase III reserve would be -- now this is plotted to the left of the zero line. I'm not sure you can see, the zero line runs up here. The plots I'm talking about now are here. Whereas the percent profit of a party with a high Phase II, or primary, and a low Phase III reserve is plotted to the right of zero.

As you will note, the parties to the left of zero would receive a relatively high rate of return on

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their money; whereas those parties to the right would receive a considerably lower rate.

Now, if the investments are shared completely on Phase III from the beginning, as shown here by this second overlay, this procedure has been followed, I believe. Exxon might be familiar with their Robertson Field Unit, Gage County, Texas, this procedure is that, the percent profit or rate of return reverses; that is, the parties on the left now receive a relatively low rate of return, and the parties on the right enjoy considerably higher rate of return.

The last overlay is based on the method of cost sharing as stated in the Unit Agreement. That is, the investments are based on a weight of 42 percent primary and 58 percent secondary participation. Here you will note that all parties receive about the same rate of return, not exactly the same, but within a reasonable range.

As this is a rate of return for added profit, and it takes all parties to make the added profit possible, it seems fair and reasonable that all should receive about the same rate of return from the added recovery, and the formula proposed provides such a condition.

Q Thank you, Mr. Buck. Was Shell's Exhibit Number Thirty-eight prepared by you or under your supervision?

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A. It was, yes.

Q. Thank you.

MR. KILPATRIC: Mr. Chairman, we'll offer Shell's Exhibit Thirty-eight into evidence at this time.

MR. RAMEY: Exhibit Number Thirty-eight will be admitted.

MR. KILPATRIC: Thank you. No further questions.

MR. RAMEY: Any questions of Mr. Buck?

MR. ATKINSON: We have no questions.

MR. RAMEY: He may be excused.

MR. LOPEZ: Mr. Chairman, that concludes our rebuttal.

MR. ATKINSON: Mr. Chairman I would like to -- I realize it's a bit irregular, but if possible, I would like to recall Mr. Lancaster.

BILL LANCASTER

being recalled as a witness and having been previously sworn upon his oath, testified as follows, to-wit:

RECROSS EXAMINATION

BY MR. ATKINSON:

Q. Mr. Lancaster, yesterday I believe you testified that you were and are the Chairman of the Technical

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Committee, is that correct?

A That's correct.

Q And I believe you also testified that in your opinion the Unit Agreement proposed by Shell allocates hydrocarbons to various tract owners in a fair and reasonable method or manner, also, did you not?

A I don't remember, but I agree with that.

Q All right. Now, the distribution of hydrocarbons to the various tracts as reserves on the simulation model was accomplished prior to November 17th and 18th, 1976, I think you will agree.

A Correct.

Q And the reserves that are presently allocated to the various tract owners in the simulation model are the same reserves that were allocated prior to November 17th and 18th, 1976, is that correct?

A The reserves, the primary reserves, or --

Q Yes.

A -- both?

Q Primary reserves.

A Well, they're what came out as the result of the second simulation model, the one they reran, right.

Q Now it is true, is it not, that a meeting of the Technical Committee on November 17th and 18th, the

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reserve allocation as to Skelly Oil for their Turner Wells, which had been calculated by the Shell computer run allocating 319,000 and 321,000 barrels respectively to the two Skelly Turner Wells were adjusted.

A That's correct.

Q And they were adjusted by taking the arithmetic average of three Shell wells, the Shell Sanger 2, 27 North, the Shell Turner 2, 34-E, and the Shell Turner 1, 34-G Wells, taking their production that was allocated under the computer run and arithmetically averaging that with the allocations to the Skelly Wells, is that not true?

A That's correct.

Q And this was done without a computer calculation. It was simply a decision on the part of Shell Oil to arithmetically average, is that correct?

A No, this was an agreement of the Technical Committee.

Q All right. Now, I would like to refer you, or I will ask you, whether you recall that there were seven parties in favor of this, among whom were Amerada, Amoco, Gulf, Mobil, Sun, Texas Pacific, and Shell.

Opposed to this were Cities Service, Conoco, Exxon, and Skelly.

Do you recall that?

A Well, I'm going to have to get my minutes,

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because I think you're -- we're out of -- can I get my minutes now?

Q I refer you to page two of the minutes of that Committee on November 17th and 18th, 1976.

A Okay, just a minute, though.

Well, no, that was an initial vote. There was a subsequent vote taken, and that was on March 2nd, 1977. And at that time basically the same thing, in essence, was offered, and there Exxon agreed.

If you go to your minutes for March 2nd, 1977, and go to the bottom of the page.

Q The point is that there was an adjustment, though, was there not?

A Yes.

Q And it was not a function of the computer simulation model.

A That's true.

Q All right.

MR. ATKINSON: I have no further questions.

MR. LOPEZ: Mr. Chairman, in light of this, I'd like to kind of go out of order again and call Mr. Miller back to the stand just for a brief question.

MR. RAMEY: Okay. Does anybody have any questions of Mr. Lancaster? He may be excused.

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MR. LOPEZ: Mr. Chairman, I might also mention that I don't believe Mr. Miller was ever sworn, and I would like him to be sworn and to swear that the testimony he's given today has been the truth.

(Thereupon Mr. Miller was duly sworn upon his oath.)

WILLIAM C. MILLER

being recalled as a witness, testified as follows, to-wit:

REDIRECT EXAMINATION

BY MR. LOPEZ:

Q Mr. Miller, you have just heard the questions put to Mr. Lancaster. Would you explain the reason why this adjustment was made and what Shell's role was in it?

A Yes, sir. In the Technical Report there is the -- you will see a picture of the grid system. The grid blocks in this particular case at the intersection of four of them was located a Shelly well, much like the Four Corners Monument.

In the simulator, therefore, it was possible to put that particular well into any one of the four

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blocks.

The first attempt we made, we found that indeed, what appeared to be very comparable wells in this area, three Shell wells and two Skelly wells, that at least one of the Skelly wells looked as though, indeed, its reserves were low compared to the neighbor. This was one of the changes that we made in that intervening three-week period that was spoken. We thought that by merely moving that well to another block that we could bring it into line with its neighbors.

When we did it, we actually ended up concentrating production out of that new block and the well actually made somewhat less.

At the meeting that's being referred to, this was to accept and finalize the percentages for -- I'm sorry, to finalize the oil production reserves that we had derived, and therefore, indeed, Shell suggested that rather than making additional runs and consuming additional time, that it would be fair and reasonable to start with the computer reserves for those five wells, totally 416,000 barrels on the average for each one of those five.

We then suggested that each of these wells be given that average, which meant that some wells went up some; some wells went down some. The net result was that we subtracted from the Shell wells the total of 192,000

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barrels of oil. We added to the Skelly wells 192,000 barrels of oil, and no other operator was involved in those changes.

Q Why did Shell sacrifice 192,000 barrels of oil?

A. Basically, we were determined to -- to do anything necessary to get on with the water injection project.

MR. LOPEZ: No further questions.

MR. ATKINSON: We have no questions.

MR. RAMEY: The witness may be excused. Do you have anything further, Mr. Lopez.

MR. LOPEZ: No, Mr. Chairman.

MR. RAMEY: Mr. Atkinson?

MR. ATKINSON: Only to ask Mr. Nolan, without taking the witness stand, whether Exhibits One through Sixteen were prepared by you or under your supervision?

MR. NOLAN: Yes, they were.

MR. ATKINSON: We have nothing further.

MR. RAMEY: Do you have any statement?

MR. ATKINSON: Yes, sir, we do.

Shell has come before the Commission seeking a statutory unitization. It is their burden to show, as the Commission well knows, that the Unit Agreement and unitization will protect correlative rights and that hydrocarbons will be allocated to the separately owned tracts, is statutory language,on afair, reasonable, and equitable basis.

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That is not to say some of the tracts, or most of the tracts, or Shell's tracts. It's all the tracts we're talking about.

Now, as has been brought out in our case, we do not feel that the present parameters being employed in the proposed formula, Unit formula, are fair. They are not based on production data since 1976.

I think to a certain extent the real issue has been clouded this morning. The -- Exxon is not taking issue with the effort that Shell's made to unitize this -- this North Hobbs Unit. They aren't taking issue with the accuracy of the study in 1976. They are not taking issue with anything at all as proposed by Shell, except that the parameters are simply not correct, and the reason they're not correct is because they are based on outdated, outmoded, obsolete data.

It is no more appropriate for this Commission to accept the parameters proposed by Shell in this formula with 1976 data than it would have been if Shell had brought this thing before the Commission in 1976 and suggested that 1973 data should be used.

Now I realize that it may not be an easy matter to rerun the program; however, as has been testified to this morning, the program does exist and it can be done. Exxon is more than willing to cooperate in any way to rerun

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the program as far as making their information and personnel available.

There is only one way under this present formula that the hydrocarbons can be allocated to the tract owners, the individual tract owners, all of them, on a fair and equitable basis, and that is to update the parameters. If the parameters are not updated, then Exxon's position is that, as Mr. Dalious will state in a moment, that Exxon should be left out of the Unit Agreement, and there's a precedent for this in the same pool, the Amoco -- the Amoco Unit in the south has -- I've forgotten who the operators are -- there are two windows in that pool, or in that Unit. There is also substantial precedent in view of the Moranco Waterflood Unit, which apparently can be operated by the use of lease line wells and offset wells, and as was testified to yesterday, there's no problem with projecting a finger that sticks into the proposed unit. It's certainly possible that the Exxon Tract 47 will be protected to the same extent that the peninsula that juts into the northern unit of Amoco is protected, or proposed to be protected.

So Mr. Dalious is going to set forth Exxon's official position as representative of Exxon, but I want to re-emphasize that Exxon is not quarreling with the tremendous efforts that the Technical Committee has made

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in formulating a formula that they believe to be fair and equitable, and if the parameters are revised and updated, Exxon is agreeable to proceeding with that formula and getting on with the unitization.

Thank you. Mr. Dalious will now address Exxon's formal position.

MR. DALIOUS: Mr. Chairman, in this hearing Exxon has entered its objection to approval of the proposed North Hobbs Grayburg-San Andres Unit on the basis of applicant, Shell Oil Company.

In considering the application, Exxon respectfully requests serious consideration be given to its principal objection, namely, that the proposed formula is neither fair nor equitable because of now obsolete 1976 production numbers being used for the calculation of participation percentages as they now appear in the proposed Unit and Unit Agreement.

In the instant case Exxon suggests that the passage of time since 1976 numbers has been unusually long, considerably more than is normal.

Accordingly, Exxon respectfully requests the selection of one of the following three alternatives with regard to the present application:

First of Exxon's proposed alternatives is that the Commission approve the application provided the

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applicant be required to recalculate tract participation percentages by using updated, current production and remaining primary production figures, as opposed to the 1976 figures now applied to the formula.

As a means of expediting the recalculation, the updated numbers, already available from Exxon's exhibits, could be used, and I refer to its Exhibit Number Fifteen.

With regard to authority for the issuing of an order in conformity with this alternative, Exxon submits that New Mexico Statute 70-2-6, 70-2-11, 70-7-6, and 70-7-7 contain adequate authority for such action by the Commission. Exxon suggests that the words "as prescribed" as they appear in 70-7-7 provide ample discretionary authority for the entry of an order in conformity with alternative one. Exxon submits that in so doing the applicant need not obtain a re-approval of all parties who heretofore have ratified Unit or the Unit Operating Agreement, or both. Exxon submits that if the cited articles, and in particular, 70-7-7, do not provide such authority that the word "Prescribed" is meaningless with the result that the only authority of the Commission would be either to approve or disapprove the application precisely as submitted.

Such an interpretation would appear to be contrary to the clear legislative intent in the enactment of this statute.

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Exxon further submits that if alternative number one be adopted, that applicant has ample time to effect the recomputation prior to the ipso facto termination date which is 1-1-80.

Exxon directs the attention of the Commission to a precedent for such an alternative. In the Double L Queen Unit in Eddy County, one Jack L. McClellan protested the application of Bert Royalty Company on essentially the same basis as Exxon now protests Shell's application. In that cause the Commission entered an order requiring a recalculation based on newer data. Further, we understand that no additional re-signup was required.

The second of Exxon's proposed alternatives is that the Commission approve the application subject, however, to excluding Tracts 43, 47, and 48 from the Unit Area.

Mr. Lancaster and Mr. Phillips have assured the Commission that the Unit would have no -- this would have no effect on the Unit and that these tracts could adequately be protected by the use of a cooperative agreement, and in this respect we would agree to entering into a cooperative agreement.

As a part of this alternative, Exxon would be willing to accept deletion only of its federal tracts, Numbers 47 and 48 in the proposed Unit.

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Exxon's third alternative would simply be disapproval of the Unit.

With regard to the application for field rules, Exxon has no objection to such application -- approval of such application, provided either alternative one or alternative three be selected. However, should the Commission elect to follow alternative two, respondent, Exxon herein enters its objection to Rules 1, 6, and 7, as proposed for the reason that as presently written exclusion of any tract would delete that tract from the application of the proposed rules.

These rules clearly were written as relating to the entire Unit as it was set forth in exterior boundaries and the presence of a window in the Unit would eliminate those tracts from the new rules, as proposed. We suggest that if this alternative be -- I said suggest -- we request if this alternative be selected by the Commission for its order that minor changes in the wording of the rules could be entered so that the window tracts would have the same application of the rules as they would have to the entire Unit Area.

We wish to state we appreciate the attention of the Commission and respectfully request that one of our three alternatives be entered in the order.

MR. RAMEY: Mr. Lopez?

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MR. LOPEZ: Mr. Chairman, I'm not even going to dignify the suggestion of Exxon to its second alternative by responding to it. If Exxon wanted to discuss cooperative waterflooding, the time was before now. We've had a day and a half of testimony. I would have been glad to hear it and I would have been glad to put on witnesses to respond to it as to why is just simply won't work and no one will agree to it.

Therefore, I'm not even going to respond to that.

Mr. Chairman, Mr. Commissioner, Members of the Staff, Ladies and Gentlemen.

Never in my experience before this Commission have I participated in a case more important as regards the human endeavor that has gone into it. In this connection, I want to introduce you to Hank Swartz, who was the author of the Technical Committee, and who flew directly from Cameroon to Santa Fe, New Mexico, to attend this hearing.

Mr. Hank, I want you to stand up. You did a helluve job on that Technical Report.

What we've tried to do here in the last day and a half is tell a story, and I think we've told a helluve story. I'd just like to highlight some of those events that have occurred.

Mr. Lancaster, who is now the chairman of the Technical Committee, has described to you the mammoth undertaking that the Technical Committee did to try and get one of the most important historic pools in New Mexico into a posture for secondary recovery. The magnitude of the undertaking with respect to the assembly of data, to establishing parameters, and assigning values to those parameters, to establishing a cutoff date, and the fact that they could come to a conclusion that the secondary recovery operation of this unit would be both feasible and profitable. He's described the wonderful participation of all the working interest owners in the unit and their amazing efforts to come to almost unanimous agreement on a step-by-step basis so that the working owners could find some way to allocate the production, the benefits as well as the burdens, that would be undertaken if unitization became a reality.

Mr. Buck, my good friend Mr. Buck, who was Chairman of the Working Interest Owners Committee, he has also described the relentless and unbelieveable undertaking that the working owners did in trying to achieve a fair, reasonable, and equitable formula.

He's explained, and I won't go and bore you with the details of why the participation formula with respect to the allocation of oil reserves and with respect to the allocation of investment are fair and reasonable.

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I could never say it better myself.

Third, you've heard from Mr. Campbell, who once the Unit Agreement and the Unit Operating Agreement were put into a form that could be submitted to the people involved, went out and found out who they all were. I don't what Exxon expects or how long they think it's going to take to find out where 905 royalty interest owners are, or how they're going to get 80 working owners to agree to the thing, but that's what he did. In fact, he's also testified that he couldn't even find 44 royalty interests. They're still unknown where they are; they were unreachable.

But that was a mammoth undertaking in itself.

Next, you heard from Mr. Phillips, and he's already to go with the thing, and he's told you how big a project it is and what kind of complexities are involved in trying to deal with this particular reservoir.

And finally, Mr. Chairman, today you heard from Mr. Computer Simulator himself, Mr. Miller, and he's explained the best he could how that thing worked and why everybody agreed to it.

What we've attempted to do, and if I may, and I think what the testimony reflects in a nutshell, and if I may analogize it, I think if you picture a train leaving Kansas City, and it's arrived in Albuquerque, and it's going

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to have to stop in Winslow unless everybody can get together and see that it gets to San Francisco. So all these guys on this train took a picture and agreed to take a picture in Albuquerque, that if they could take a picture and get this train together, that they wouldn't have to stop in Winslow; that they could get all the way to San Francisco.

And this is essentially what we're trying to do here today, and what Exxon would have us to do is to erase the picture we took in Albuquerque, and I suppose stop in Winslow. That's not what we want to do. We all want to get to San Francisco.

If you would just indulge me a little more, this case has been very important to me and I'd like to talk about how I feel about it and how I perceive my role.

When Mr. Buck first called me to Houston, and I went down to find out what the deal was all about, he kind of suggested to me that if I thought I was going to be able to understand the magnitude of the complexity of the project, I was biting off more than I could chew.

Well, we worked on the deal. We tried to put it together. I came home, filed an application, went back down, tried to get the testimony together, see that we were all in order, and I kind of got a little confident. I thought I was getting a pretty good handle on the deal.

Last week when I went down to Houston and

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I sat down with these gentlemen, I said to them, "You know, there's one thing. I think I've got a handle on your deal but I don't really understand the computer simulator. Would you try to explain that to me?"

And you ought to have seen the expressions on their faces. You know, they were fairly stunned, and they said, well, Owen, if we tried to describe to you the number of years, the talent involved, the amount of money that went in to developing this computer simulation program, it would take us a helluve a long time, and that's when I was humbled, Mr. Chairman. I knew, and Mr. Buck was right when he first told me, I was going to bite off more than I can chew.

You know, 55 million barrels of oil is a lot of oil, especially when you consider that only 83 million barrels of oil were produced in 1978 in New Mexico, and when you consider that we're trying to get away from our dependence on foreign oil sources, but that's not what makes this project so awesome to me. When you talk about the millions of dollars of profits, that's a lot of money, but that's not what really has gotten to me, either.

What has made my -- what has made me realize that my undertaking in trying to direct the story we've put on here in the last day and a half, what made me realize that this undertaking was fairly awesome, is when

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I finally realized the commitment of human resource to this project; the commitment of the talent, the genius, the human sacrifice, that went in to this project over the last seven years to make this thing a reality. That's when it really got to me. That's when I understood that this is a fairly awesome responsibility.

And now, Mr. Chairman, we've told our story. The curtain rang up yesterday morning at 9:00 o'clock and now it's with a great deal of relief that I am able to share with you this awesome responsibility, and I have great confidence that there will be a wise and expeditious resolution and decision to these cases and that you gentlemen up there will be able to ring down the curtain.

Thank you.

MR. RAMEY: Thank you, Mr. Lopez. Anybody else have a statement to make?

MR. ATKINSON: Mr. Chairman, I would just like to set one thing straight. Shell was not taken unawares as to Exxon's possible desire to be let out of the Unit. Exxon has talked to Shell about this previously and as recently as two months ago Shell responded and said they would not agree to that.

MR. RAMEY: The Commission will take the two cases under advisement.

MR. LAW: Mr. Chairman.

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MR. RAMEY: Yes, do you want to make a statement?

MR. LAW: My name is J. W. Law. I'm a petroleum engineer and I work for the Commissioner of Public Lands of the State of New Mexico.

The Commissioner has granted preliminary approval to the participation factor and formula set out in the proposed Unit Agreement titled the North Hobbs Grayburg-San Andres Unit, Lea County, New Mexico.

We feel at this point that if there are any changes in the participation formula or the participation percentages, it would reduce the equity of the State Land Office; that could jeopardize the preliminary approval granted.

MR. RAMEY: Thank you. Any other statements?

The Commission will take the cases under advisement.

(Hearing concluded.)

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REPORTER'S CERTIFICATE

I, SALLY W. BOYD, a Certified Shorthand Reporter, DO HEREBY CERTIFY that the foregoing and attached Transcript of Hearing before the Oil Conservation Commission was reported by me; that the said transcript is a full, true, and correct record of the hearing, prepared by me to the best of my ability from my notes taken at the time of the hearing.

Sally W. Boyd C.S.R.

Sally W. Boyd, C.S.R.

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ENERGY AND MINERALS DEPARTMENT
OIL CONSERVATION COMMISSION

IN THE MATTER OF THE HEARING CALLED BY THE OIL CONSERVATION COMMISSION FOR THE PURPOSE OF CONSIDERING:

CASE NO. 6652
Order No. R-6198

APPLICATION OF SHELL OIL COMPANY FOR STATUTORY UNITIZATION, LEA COUNTY, NEW MEXICO.

ORDER OF THE COMMISSION

BY THE COMMISSION:

This case and cause of action came on for hearing at 9:00 a.m. on October 3, 1979, at Santa Fe, New Mexico, before the Oil Conservation Commission of New Mexico, hereinafter referred to as the "Commission."

NOW, on this 30th day of November, 1979, the Commission, a quorum having been present, having considered the testimony and the record and being otherwise fully advised in the premises,

FINDS:

(1) That due public notice has been given as required by law, the Commission has jurisdiction of this case and cause of action and the subject matter hereof.

(2) That the applicant, Shell Oil Company, seeks the statutory unitization, pursuant to the "Statutory Unitization Act," Sections 70-7-1 through 70-7-21, NMSA 1978, of 10,649.53 acres, more or less, being a portion of the Hobbs Grayburg-San Andres Pool, Lea County, New Mexico, said portion to be known as the North Hobbs Grayburg-San Andres Unit Area; that applicant further seeks approval of the Unit Agreement and the Unit Operating Agreement which were submitted in evidence as applicant's Exhibits Nos. 3 and 4 in this case.

(3) That the proposed unit area should be designated the North Hobbs Grayburg-San Andres Unit Area, and the

horizontal limits of said unit area should be comprised of the following described lands:

TOWNSHIP 18 SOUTH, RANGE 37 EAST, NMPM
Section 13: SE/4 and W/2
Section 14: All
Sections 23 through 25: All
Section 26: E/2 NE/4 and NW/4 NE/4
Section 36: E/2 NW/4 and E/2

TOWNSHIP 18 SOUTH, RANGE 38 EAST, NMPM
Section 17: S/2 NW/4 and SW/4
Section 18: NE/4 and S/2
Sections 19 and 20: All
Section 21: SW/4, S/2 SE/4 and NW/4 SE/4
Sections 27 through 32: All
Section 33: W/2, NE/4, W/2 SE/4 and NE/4 SE/4
Section 34: E/2 NW/4 and E/2

(4) That the vertical limits of said North Hobbs Grayburg-San Andres Unit Area should comprise the Grayburg-San Andres formation of Permian age as found from a depth of 3,698 feet (51 feet sub-sea) to a depth of 4,500 feet (853 feet sub-sea) on the Borehole Compensated Sonic-Gamma Ray Log run July 9, 1969, in the Shell Oil Company State A Well No. 1, located 1930 feet from the North line and 660 feet from the East line of Section 32, Township 18 South, Range 38 East, NMPM, Lea County, New Mexico.

(5) That the portion of the Hobbs Grayburg-San Andres Pool proposed to be included in the aforesaid North Hobbs Grayburg-San Andres Unit Area has been reasonably defined by development.

(6) That the applicant proposes to institute a pressure maintenance project for the secondary recovery of oil, gas, gaseous substances, sulfur contained in gas, condensate, distillate and all associated and constituent liquid or liquifiable hydrocarbons within and to be produced from the proposed unit area.

(7) That the proposed supplemental recovery operations should result in the additional recovery of approximately 55 million barrels of oil.

(8) That the unitized management, operation and further development of the North Hobbs Grayburg-San Andres Unit Area, as proposed, is reasonably necessary to effectively

carry on pressure maintenance and secondary recovery operations and will substantially increase the ultimate recovery of oil and gas from the unitized portion of the pool.

(9) That the proposed unitized method of operation as applied to the North Hobbs Grayburg-San Andres Unit Area is feasible and will result with reasonable probability in the increased recovery of substantially more oil and gas from the unitized portion of the pool than would otherwise be recovered without unitization.

(10) That the estimated additional investment costs of the proposed supplemental recovery operations are $33 million which include an estimated initial capital investment of $27 million forecast to be spent in 1980 and 1981 and an additional $6 million forecast to be spent during the eight years subsequent to 1981 for construction of facilities necessary to handle the anticipated increasing volumes of oil and water.

(11) That the additional recovery to be derived from the proposed supplemental recovery operations will have a resultant net profitability over the aforesaid additional costs, on a present value basis with a ten percent discount and before federal income tax of $124 million or 421% profit.

(12) That the estimated additional costs of the proposed operations (as described in Finding No. (10) above) will not exceed the estimated value of the additional oil and gas (as described in Finding No. (11) above) plus a reasonable profit.

(13) That the applicant, the designated Unit Operator pursuant to the Unit Agreement and the Unit Operating Agreement, has made a good faith effort to secure voluntary unitization within the North Hobbs Grayburg-San Andres Unit Area.

(14) That Exxon Company, U.S.A. has declined to voluntarily join the unit and has opposed the application of Shell Oil Company in this case on the basis that the participation formula contained in the Unit Agreement fails to allocate the produced and saved unitized hydrocarbons to the separately owned tracts within the unit area on a fair, reasonable and equitable basis.

(15) That the Technical Report introduced as applicant's Exhibit No. 16 was prepared by a Technical Committee comprised of engineering representatives of all working interest owners involved in the proposed unit.

(16) That said Technical Committee met over a three and a half year period from September, 1973, to March, 1977.

(17) That Exxon Company, U.S.A. was represented at each of said meetings and its representative accepted the values assigned the unitization parameters contained in the Technical Report as well as the use of the cutoff date of January 1, 1975 for well logging data and well test information and the remaining primary oil reserve estimates as of January 1, 1977.

(18) That the values assigned the parameters appear to be based on sound engineering principles and data. Further, that there appears to exist a sound and rational basis for the adoption of the adopted cutoff dates so that a foundation could be laid for the fair allocation of remaining primary and secondary reserves to each of the tracts within the proposed unit area.

(19) That the objection of Exxon Company, U.S.A. to the application appears in large part to be based on Exxon's contention that the production performance of its Tract No. 47 since January 1, 1977, is not in conformity with the projections made by the computer simulator model used in the Technical Report.

(20) That the evidence which was presented, using the oil cutoff reserve relationship with the simulator output for Tract 47, showed that the May 1979 reserves as estimated by the simulation and the May 1979 oil cut for Tract 47 are in agreement, thus indicating that the simulation predictions are valid, and that the oil reserve estimates for Tract 47 are reasonable and fair, and are in order.

(21) That the evidence of Exxon Company, U.S.A. fails to refute the contention of the applicant that the allocations of the produced and saved hydrocarbons as set forth in the Technical Report and Unit Agreement to the separately owned tracts within the unit area are based on fair, reasonable and equitable considerations and calculations.

(22) That the participation formula contained in the unitization agreement allocates the produced and saved unitized substances to the separately owned tracts in the unit area on a fair, reasonable and equitable basis.

(23) That unitization and the adoption of the proposed unitized method of operation will benefit the working interest owners and royalty owners of the oil and gas rights within the North Hobbs Grayburg-San Andres Unit Area.

(24) That the granting of the application in this case will have no adverse effect upon other portions of the Hobbs Grayburg-San Andres Pool.

(25) That applicant's Exhibits Nos. 3 and 4 in this case, being the Unit Agreement and the Unit Operating Agreement, respectively, should be incorporated by reference into this order.

(26) That the North Hobbs Grayburg-San Andres Unit Agreement and the North Hobbs Grayburg-San Andres Unit Operating Agreement provide for unitization and unit operation of the North Hobbs Grayburg-San Andres Unit Area upon terms and conditions that are fair, reasonable and equitable and which include:

(a) an allocation to the separately owned tracts in the unit area of all oil and gas that is produced from the unit area and which is saved, being the production that is not used in the conduct of unit operations or not unavoidably lost;

(b) a provision for the credits and charges to be made in the adjustment among the owners in the unit area for their respective investments in wells, tanks, pumps, machinery, materials and equipment contributed to the unit operations;

(c) a provision governing how the costs of unit operations including capital investments shall be determined and charged to the separately owned tracts and how said costs shall be paid including a provision providing when, how, and by whom the unit production allocated to an owner who does not pay his share of the costs of unit operations shall be charged to such owner, or the interest of such owner, and how his interest may be sold and the proceeds applied to the payment of his costs;

(d) a provision for carrying any working interest owner on a limited, carried or net-profits basis, payable out of production, upon such terms and conditions which are just and reasonable, and which allow an appropriate charge for interest for such service payable out of production, upon such terms and conditions determined by the Commission to be just and reasonable, and allowing an appropriate charge for interest for such service payable out of such owner's share of production, providing that any nonconsenting working interest owner being so carried shall be deemed to have

relinquished to the Unit Operator all of his operating rights and working interests in and to the unit until his share of the costs, service charge and interest are repaid to the Unit Operator;

(e) a provision designating the Unit Operator and providing for the supervision and conduct of the unit operations, including the selection, removal or substitution of an operator from among the working interest owners to conduct the unit operations;

(f) a provision for a voting procedure for the decision of matters to be decided by the working interest owners in respect to which each working interest owner shall have a voting interest equal to his unit participation; and

(g) the time when the unit operation shall commence and the manner in which, and the circumstances under which, the operations shall terminate and for the settlement of accounts upon such termination;

(27) That the statutory unitization of the North Hobbs Grayburg-San Andres Unit Area is in conformity with the above findings, and will prevent waste and protect the correlative rights of all owners of interest within the proposed unit area, and should be approved.

IT IS THEREFORE ORDERED:

(1) That the North Hobbs Grayburg-San Andres Unit Area, comprising 10,649.53 acres, more or less, in the Hobbs Grayburg-San Andres Pool, Lea County, New Mexico, is hereby approved for statutory unitization pursuant to the Statutory Unitization Act, Sections 70-7-1 through 70-7-21 NMSA 1978.

(2) That the lands included within the North Hobbs Grayburg-San Andres Unit Area shall be comprised of:

TOWNSHIP 18 SOUTH, RANGE 37 EAST, NMPM
Section 13: SE/4 and W/2
Section 14: All
Sections 23 through 25: All
Section 26: E/2 NE/4 and NW/4 NE/4
Section 36: E/2 NW/4 and E/2

TOWNSHIP 18 SOUTH, RANGE 38 EAST, NMPM
Section 17: S/2 NW/4 and SW/4
Section 18: NE/4 and S/2
Sections 19 and 20: All
Section 21: SW/4, S/2 SE/4 and NW/4 SE/4
Sections 27 through 32: All
Section 33: W/2, NE/4, W/2 SE/4 and NE/4 SE/4
Section 34: E/2 NW/4 and E/2

and that the above described lands shall be designated as the North Hobbs Grayburg-San Andres Unit Area.

(3) That the vertical limits of said North Hobbs Grayburg-San Andres Unit Area shall comprise the Grayburg-San Andres formation of Permian age as found from a depth of 3,698 feet (51 feet sub-sea) to a depth of 4,500 feet (853 feet sub-sea) on the Borehole Compensated Sonic-Gamma Ray Log run July 9, 1969, in the Shell Oil Company State A Well No. 1, located 1930 feet from the North line and 660 feet from the East line of Section 32, Township 18 South, Range 38 East, NMPM, Lea County, New Mexico.

(4) That the applicant shall institute a pressure maintenance project for the secondary recovery of oil, gas, gaseous substances, sulfur contained in gas, condensate, distillate and all associated and constituent liquid or liquified hydrocarbons within and produced from the unit area, and said pressure maintenance project is the subject of Case No. 6653.

(5) That the North Hobbs Grayburg-San Andres Unit Agreement and the North Hobbs Grayburg-San Andres Unit Operating Agreement are approved and adopted and incorporated by reference into this Order subject to compliance with the appropriate ratification provisions of Section 70-7-8, NMSA 1978.

(6) That when the persons owning the required percentage of interest in the unit area have approved or ratified the Unit Agreement and the Unit Operating Agreement, the interests of all persons within the unit area are unitized whether or not such persons have approved the Unit Agreement or the Unit Operating Agreement in writing.

(7) That the applicant as Unit Operator shall notify in writing the Division Director of any removal or substitution of said Unit Operator by any other working interest owner within the unit area.

(8) That jurisdiction of this cause is retained for the entry of such further orders as the Division may deem necessary.

DONE at Santa Fe, New Mexico, on the day and year hereinabove designated.

STATE OF NEW MEXICO
OIL CONSERVATION COMMISSION

ALEX J. ARMIJO, Member

EMERY C. ARNOLD, Member

JOE D. RAMEY, Member & Secretary

S E A L

dr/

ENERGY AND MINERALS DEPARTMENT
OIL CONSERVATION DIVISION

CASE NO. 6652
Order No. R-6198-A

APPLICATION OF SHELL OIL COMPANY FOR STATUTORY UNITIZATION, LEA COUNTY, NEW MEXICO.

NUNC PRO TUNC ORDER

BY THE COMMISSION:

It appearing to the Commission that Order No. R-6198 dated November 30, 1979, does not correctly state the intended order of the Commission,

IT IS THEREFORE ORDERED:

(1) That Finding No. (4) on Page 2 of Order No. R-6198 be and the same is hereby corrected to read in its entirety as follows:

"(4) That the vertical limits of said North Hobbs Grayburg-San Andres Unit Area should comprise the Grayburg-San Andres formation of Permian age as found from a depth of 3,698 feet (51 feet sub-sea) to a depth of 4,500 feet (853 feet sub-sea) on the Borehole Compensated Sonic-Gamma Ray Log run July 9, 1969, in the Shell Oil Company State A Well No. 7, located 1930 feet from the North line and 660 feet from the East line of Section 32, Township 18 South, Range 38 East, NMPM, Lea County, New Mexico."

(2) That Order No. (3) on Page 7 be and the same is hereby corrected to read in its entirety as follows:

"(3) That the vertical limits of said North Hobbs Grayburg-San Andres Unit Area shall comprise the Grayburg-San Andres formation of Permian age as found from a depth of 3,698 feet (51 feet sub-sea, to a depth of 4,500 feet (853 feet sub-sea) on the Borehole Compensated Sonic-Gamma Ray Log run July 9, 1969, in the Shell Oil Company State A Well No. 7, located 1930 feet from the North line and 660 feet from the East line of Section 32, Township 18 South, Range 38 East, NMPM, Lea County, New Mexico."

(3) That the corrections set forth in this order be entered nunc pro tunc as of November 30, 1979.

DONE at Santa Fe, New Mexico, on this 30th day of January, 1980.

STATE OF NEW MEXICO
OIL CONSERVATION DIVISION

ALEX J. ARMIJO, Member

EMERY C. ARNOLD, Member

JOE D. RAMEY, Member & Secretary

S E A L

fd/

BEFORE THE OIL CONSERVATION DIVISION
OF THE STATE OF NEW MEXICO

APPLICATION OF SHELL OIL COMPANY FOR STATUTORY UNITIZATION, NORTH HOBBS (GRAYBURG-SAN ANDRES) UNIT, LEA COUNTY, NEW MEXICO.

Case No. 6652

Heard 8/15/79

APPLICATION

Shell Oil Company hereby applies to the New Mexico Oil Conservation Division for an order pursuant to the New Mexico Statutory Unitization Act (§§70-7-1 through 70-7-21 N.M.S.A. 1978) providing for the unitized management, operation and further development of the area and formation known as the North Hobbs (Grayburg-San Andres) Unit, Lea County, New Mexico, and in support of its application states:

1. Shell Oil Company (Shell) is a Delaware corporation authorized to transact business in the State of New Mexico, and is engaged in the business of, among other things, producing and selling oil and gas as defined by the New Mexico Statutory Unitization Act (§§70-7-1 through 70-7-21 N.M.S.A. 1978, hereinafter referred to as the "Act").

2. The proposed area for which application is made for unitized operations pursuant to the Act is known as the North Hobbs (Grayburg-San Andres) Unit, Lea County, New Mexico (the "Unit Area"), and consists of 10,649.53 acres, more or less, in Lea County, New Mexico, being more particularly described in Exhibit "A" attached hereto and incorporated herein by reference. A map of the Unit Area is attached hereto and incorporated herein by reference as Exhibit "B".

3. The formation for which application is made (the "Unitized Formation") is the subsurface portion of the Unit area known

as the Grayburg-San Andres formation of Permian Age, and the vertical limits thereof are found in the interval between the stratigraphic depth of 3,698 feet as measured on the Borehole Compensated Sonic-Gamma Ray Log run in the Shell Oil Company--State A-7 Well on July 9, 1969, said well being located 1,930 feet FNL and 660 feet FEL of Section 32, Township 18 South, Range 38 East, Lea County, New Mexico, and the depth of 4,500 feet beneath the surface. A copy of the Borehole Compensated Sonic Log-Gamma Ray for said well on said date is attached hereto and incorporated herein by reference as Exhibit "C". The Unitized Formation shall further include all subsurface points throughout the Unit Area correlative to the aforementioned identified depths.

4. The portion of the Unitized Formation included within the Unit Area has been reasonably defined by development.

5. Shell proposes to institute a pressure maintenance project for the secondary recovery of oil and gas from the Unitized Formation within the Unit Area.

6. The proposed plan of unitization is embodied in the Unit Agreement, a true and correct copy of which is attached hereto and incorporated herein by reference as Exhibit "D", and said plan is fair, reasonable and equitable.

7. The proposed operating plan covering the manner in which the unit will be supervised and managed and costs allocated and paid is embodied in the Unit Operating Agreement, a true and correct copy of which is attached hereto and incorporated herein by reference as Exhibit "E".

8. Shell projects that the unitized management, operation and further development of the Unitized Formation will increase production by approximately 55 million barrels of oil from 32 million to approximately 87 million barrels, will improve the producing rate, and will extend the producing life of the formation beyond the year 2000. It is therefore evident that the unitized management, operation and further development of the Unitized Formation is reasonably necessary in order to effectively carry on pressure maintenance and secondary recovery operations to substantially increase the ultimate recovery of oil and gas from the Unitized Formation within the Unit Area.

9. The method of operation which is proposed in the Unit Operating Agreement is feasible, will prevent waste and will result with reasonable probability in the increased recovery of substantially more oil and gas from the Unitized Formation than would otherwise be recovered.

10. The estimated additional costs of conducting unitized operations will not exceed the estimated value of the additional oil and gas to be recovered plus a reasonable profit.

11. The proposed unitization and adoption of the methods of operation embodied in the Unit Operating Agreement will benefit the working interest owners and royalty owners of the oil and gas rights within the Unitized Formation of the Unit Area.

12. Shell has made a good faith effort to secure voluntary unitization within the Unitized Formation of the Unit Area.

13. The participation formula contained in the Unit Agreement allocates the produced and saved unitized hydrocarbons to the separately owned tracts in the Unit Area on a fair,

reasonable and equitable basis, and protects the correlative rights of all owners of interest within the Unit Area.

14. The statutory unitization of the Unitized Formation within the Unit Area in accordance with the plan embodied in the Unit Agreement and Unit Operating Agreement will prevent waste and protect correlative rights.

WHEREFORE, Shell requests that this application be set for hearing before the Division at the earliest practicable date and that the Division enter its order approving the Unit Agreement and Unit Operating Agreement and providing for the unitized management, operation and further development of the Unitized Formation and the Unit Area in accordance with the Act.

MONTGOMERY, ANDREWS & HANNAHS, P.A.

By _____
Owen M. Lopez
P. O. Box 2307
Santa Fe, New Mexico 87501

Attorneys for Shell Oil Company

STATE OF NEW MEXICO
ENERGY AND MINERALS DEPARTMENT
OIL CONSERVATION COMMISSION

IN THE MATTER OF THE HEARING
CALLED BY THE OIL CONSERVATION
COMMISSION FOR THE PURPOSE OF
CONSIDERING:

CASE NO. 6652
Order No. R-6198

APPLICATION OF SHELL OIL
COMPANY FOR STATUTORY
UNITIZATION, LEA COUNTY,
NEW MEXICO.

ORDER OF THE COMMISSION

BY THE COMMISSION:

This case and cause of action came on for hearing at 9:00 a.m. on October 3, 1979, at Santa Fe, New Mexico, before the Oil Conservation Commission of New Mexico, hereinafter referred to as the "Commission."

NOW, on this 30th day of November, 1979, the Commission, a quorum having been present, having considered the testimony and the record and being otherwise fully advised in the premises,

FINDS:

(1) That due public notice has been given as required by law, the Commission has jurisdiction of this case and cause of action and the subject matter hereof.

(2) That the applicant, Shell Oil Company, seeks the statutory unitization, pursuant to the "Statutory Unitization Act," Sections 70-7-1 through 70-7-21, NMSA 1978, of 10,649.53 acres, more or less, being a portion of the Hobbs Grayburg-San Andres Pool, Lea County, New Mexico, said portion to be known as the North Hobbs Grayburg-San Andres Unit Area; that applicant further seeks approval of the Unit Agreement and the Unit Operating Agreement which were submitted in evidence as applicant's Exhibits Nos. 3 and 4 in this case.

(3) That the proposed unit area should be designated the North Hobbs Grayburg-San Andres Unit Area, and the

horizontal limits of said unit area should be comprised of the following described lands:

TOWNSHIP 18 SOUTH, RANGE 37 EAST, NMPM
Section 13: SE/4 and W/2
Section 14: All
Sections 23 through 25: All
Section 26: E/2 NE/4 and NW/4 NE/4
Section 36: E/2 NW/4 and E/2

TOWNSHIP 18 SOUTH, RANGE 38 EAST, NMPM
Section 17: S/2 NW/4 and SW/4
Section 18: NE/4 and S/2
Sections 19 and 20: All
Section 21: SW/4, S/2 SE/4 and NW/4 SE/4
Sections 27 through 32: All
Section 33: W/2, NE/4, W/2 SE/4 and NE/4 SE/4
Section 34: E/2 NW/4 and E/2

(4) That the vertical limits of said North Hobbs Grayburg-San Andres Unit Area should comprise the Grayburg-San Andres formation of Permian age as found from a depth of 3,698 feet (51 feet sub-sea) to a depth of 4,500 feet (853 feet sub-sea) on the Borehole Compensated Sonic-Gamma Ray Log run July 9, 1969, in the Shell Oil Company State A Well No. 1, located 1930 feet from the North line and 660 feet from the East line of Section 32, Township 18 South, Range 38 East, NMPM, Lea County, New Mexico.

(5) That the portion of the Hobbs Grayburg-San Andres Pool proposed to be included in the aforesaid North Hobbs Grayburg-San Andres Unit Area has been reasonably defined by development.

(6) That the applicant proposes to institute a pressure maintenance project for the secondary recovery of oil, gas, gaseous substances, sulfur contained in gas, condensate, distillate and all associated and constituent liquid or liquifiable hydrocarbons within and to be produced from the proposed unit area.

(7) That the proposed supplemental recovery operations should result in the additional recovery of approximately 55 million barrels of oil.

(8) That the unitized management, operation and further development of the North Hobbs Grayburg-San Andres Unit Area, as proposed, is reasonably necessary to effectively

carry on pressure maintenance and secondary recovery operations and will substantially increase the ultimate recovery of oil and gas from the unitized portion of the pool.

(9) That the proposed unitized method of operation as applied to the North Hobbs Grayburg-San Andres Unit Area is feasible and will result with reasonable probability in the increased recovery of substantially more oil and gas from the unitized portion of the pool than would otherwise be recovered without unitization.

(10) That the estimated additional investment costs of the proposed supplemental recovery operations are $33 million which include an estimated initial capital investment of $27 million forecast to be spent in 1980 and 1981 and an additional $6 million forecast to be spent during the eight years subsequent to 1981 for construction of facilities necessary to handle the anticipated increasing volumes of oil and water.

(11) That the additional recovery to be derived from the proposed supplemental recovery operations will have a resultant net profitability over the aforesaid additional costs, on a present value basis with a ten percent discount and before federal income tax of $124 million or 421% profit.

(12) That the estimated additional costs of the proposed operations (as described in Finding No. (10) above) will not exceed the estimated value of the additional oil and gas (as described in Finding No. (11) above) plus a reasonable profit.

(13) That the applicant, the designated Unit Operator pursuant to the Unit Agreement and the Unit Operating Agreement, has made a good faith effort to secure voluntary unitization within the North Hobbs Grayburg-San Andres Unit Area.

(14) That Exxon Company, U.S.A. has declined to voluntarily join the unit and has opposed the application of Shell Oil Company in this case on the basis that the participation formula contained in the Unit Agreement fails to allocate the produced and saved unitized hydrocarbons to the separately owned tracts within the unit area on a fair, reasonable and equitable basis.

(15) That the Technical Report introduced as applicant's Exhibit No. 16 was prepared by a Technical Committee comprised of engineering representatives of all working interest owners involved in the proposed unit.

(16) That said Technical Committee met over a three and a half year period from September, 1973, to March, 1977.

(17) That Exxon Company, U.S.A. was represented at each of said meetings and its representative accepted the values assigned the unitization parameters contained in the Technical Report as well as the use of the cutoff date of January 1, 1975 for well logging data and well test information and the remaining primary oil reserve estimates as of January 1, 1977.

(18) That the values assigned the parameters appear to be based on sound engineering principles and data. Further, that there appears to exist a sound and rational basis for the adoption of the adopted cutoff dates so that a foundation could be laid for the fair allocation of remaining primary and secondary reserves to each of the tracts within the proposed unit area.

(19) That the objection of Exxon Company, U.S.A. to the application appears in large part to be based on Exxon's contention that the production performance of its Tract No. 47 since January 1, 1977, is not in conformity with the projections made by the computer simulator model used in the Technical Report.

(20) That the evidence which was presented, using the oil cutoff reserve relationship with the simulator output for Tract 47, showed that the May 1979 reserves as estimated by the simulation and the May 1979 oil cut for Tract 47 are in agreement, thus indicating that the simulation predictions are valid, and that the oil reserve estimates for Tract 47 are reasonable and fair, and are in order.

(21) That the evidence of Exxon Company, U.S.A. fails to refute the contention of the applicant that the allocations of the produced and saved hydrocarbons as set forth in the Technical Report and Unit Agreement to the separately owned tracts within the unit area are based on fair, reasonable and equitable considerations and calculations.

(22) That the participation formula contained in the unitization agreement allocates the produced and saved unitized substances to the separately owned tracts in the unit area on a fair, reasonable and equitable basis.

(23) That unitization and the adoption of the proposed unitized method of operation will benefit the working interest owners and royalty owners of the oil and gas rights within the North Hobbs Grayburg-San Andres Unit Area.

(24) That the granting of the application in this case will have no adverse effect upon other portions of the Hobbs Grayburg-San Andres Pool.

(25) That applicant's Exhibits Nos. 3 and 4 in this case, being the Unit Agreement and the Unit Operating Agreement, respectively, should be incorporated by reference into this order.

(26) That the North Hobbs Grayburg-San Andres Unit Agreement and the North Hobbs Grayburg-San Andres Unit Operating Agreement provide for unitization and unit operation of the North Hobbs Grayburg-San Andres Unit Area upon terms and conditions that are fair, reasonable and equitable and which include:

(a) an allocation to the separately owned tracts in the unit area of all oil and gas that is produced from the unit area and which is saved, being the production that is not used in the conduct of unit operations or not unavoidably lost;

(b) a provision for the credits and charges to be made in the adjustment among the owners in the unit area for their respective investments in wells, tanks, pumps, machinery, materials and equipment contributed to the unit operations;

(c) a provision governing how the costs of unit operations including capital investments shall be determined and charged to the separately owned tracts and how said costs shall be paid including a provision providing when, how, and by whom the unit production allocated to an owner who does not pay his share of the costs of unit operations shall be charged to such owner, or the interest of such owner, and how his interest may be sold and the proceeds applied to the payment of his costs;

(d) a provision for carrying any working interest owner on a limited, carried or net-profits basis, payable out of production, upon such terms and conditions which are just and reasonable, and which allow an appropriate charge for interest for such service payable out of production, upon such terms and conditions determined by the Commission to be just and reasonable, and allowing an appropriate charge for interest for such service payable out of such owner's share of production, providing that any nonconsenting working interest owner being so carried shall be deemed to have

relinquished to the Unit Operator all of his operating rights and working interests in and to the unit until his share of the costs, service charge and interest are repaid to the Unit Operator;

(e) a provision designating the Unit Operator and providing for the supervision and conduct of the unit operations, including the selection, removal or substitution of an operator from among the working interest owners to conduct the unit operations;

(f) a provision for a voting procedure for the decision of matters to be decided by the working interest owners in respect to which each working interest owner shall have a voting interest equal to his unit participation; and

(g) the time when the unit operation shall commence and the manner in which, and the circumstances under which, the operations shall terminate and for the settlement of accounts upon such termination;

(27) That the statutory unitization of the North Hobbs Grayburg-San Andres Unit Area is in conformity with the above findings, and will prevent waste and protect the correlative rights of all owners of interest within the proposed unit area, and should be approved.

IT IS THEREFORE ORDERED:

(1) That the North Hobbs Grayburg-San Andres Unit Area, comprising 10,649.53 acres, more or less, in the Hobbs Grayburg-San Andres Pool, Lea County, New Mexico, is hereby approved for statutory unitization pursuant to the Statutory Unitization Act, Sections 70-7-1 through 70-7-21 NMSA 1978.

(2) That the lands included within the North Hobbs Grayburg-San Andres Unit Area shall be comprised of:

TOWNSHIP 18 SOUTH, RANGE 37 EAST, NMPM
Section 13: SE/4 and W/2
Section 14: All
Sections 23 through 25: All
Section 26: E/2 NE/4 and NW/4 NE/4
Section 36: E/2 NW/4 and E/2

TOWNSHIP 18 SOUTH, RANGE 38 EAST, NMPM
Section 17: S/2 NW/4 and SW/4
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Sections 27 through 32: All
Section 33: W/2, NE/4, W/2 SE/4 and NE/4 SE/4
Section 34: E/2 NW/4 and E/2

and that the above described lands shall be designated as the North Hobbs Grayburg-San Andres Unit Area.

(3) That the vertical limits of said North Hobbs Grayburg-San Andres Unit Area shall comprise the Grayburg-San Andres formation of Permian age as found from a depth of 3,698 feet (51 feet sub-sea) to a depth of 4,500 feet (853 feet sub-sea) on the Borehole Compensated Sonic-Gamma Ray Log run July 9, 1969, in the Shell Oil Company State A Well No. 1, located 1930 feet from the North line and 660 feet from the East line of Section 32, Township 18 South, Range 38 East, NMPM, Lea County, New Mexico.

(4) That the applicant shall institute a pressure maintenance project for the secondary recovery of oil, gas, gaseous substances, sulfur contained in gas, condensate, distillate and all associated and constituent liquid or liquified hydrocarbons within and produced from the unit area, and said pressure maintenance project is the subject of Case No. 6653.

(5) That the North Hobbs Grayburg-San Andres Unit Agreement and the North Hobbs Grayburg-San Andres Unit Operating Agreement are approved and adopted and incorporated by reference into this Order subject to compliance with the appropriate ratification provisions of Section 70-7-8, NMSA 1978.

(6) That when the persons owning the required percentage of interest in the unit area have approved or ratified the Unit Agreement and the Unit Operating Agreement, the interests of all persons within the unit area are unitized whether or not such persons have approved the Unit Agreement or the Unit Operating Agreement in writing.

(7) That the applicant as Unit Operator shall notify in writing the Division Director of any removal or substitution of said Unit Operator by any other working interest owner within the unit area.

(8) That jurisdiction of this cause is retained for the entry of such further orders as the Division may deem necessary.

DONE at Santa Fe, New Mexico, on the day and year hereinabove designated.

STATE OF NEW MEXICO
OIL CONSERVATION COMMISSION

ALEX J. ARMIJO, Member

EMERY C. ARNOLD, Member

JOE D. RAMEY, Member & Secretary

S E A L

dr/

ENERGY AND MINERALS DEPARTMENT
OIL CONSERVATION DIVISION

BRUCE KING
GOVERNOR

LARRY KEHOE
SECRETARY

POST OFFICE BOX 2088
STATE LAND OFFICE BUILDING
SANTA FE, NEW MEXICO 87501
(505) 827-2434

December 5, 1979

Re: CASE NO. 6652
ORDER NO. R-6198

Mr. Owen Lopez
Montgomery, Andrews, & Hannahs
Attorneys at Law
Post Office Box 2307
Santa Fe, New Mexico

Applicant:

Shell Oil Company

Dear Sir:

Enclosed herewith are two copies of the above-referenced Commission order recently entered in the subject case.

Yours very truly,

JOE D. RAMEY
Director

JDR/fd

Copy of order also sent to:

Hobbs OCC x
Artesia OCC x
Aztec OCC

Other J. A. Lore, Clifford Atkinson, Jack Dalious

STATE OF NEW MEXICO
ENERGY AND MINERALS DEPARTMENT
OIL CONSERVATION DIVISION

TONEY ANAYA
GOVERNOR

POST OFFICE BOX 2088
STATE LAND OFFICE BUILDING
SANTA FE, NEW MEXICO 87501
(505) 827-5800

M E M O R A N D U M

TO: DAN ARCHULETA, PERSONNEL TECHNICIAN

FROM: MICHAEL E. STOGNER, ACTING CHIEF ENGINEER MS.

SUBJECT: TRAINING COURSES OFFERED BY STATE PERSONNEL

Ms. Dorothy Butler, Clerk III, wishes to enroll in the Filing Without a Computer course scheduled for February 22, 1984. As her immediate supervisor, it is hereby approved by me.

December 20, 1983
fd/

cc: Dorothy Butler
Joe Ramey
Dick Stamets

STATE OF NEW MEXICO
ENERGY AND MINERALS DEPARTMENT
OIL CONSERVATION COMMISSION

IN THE MATTER OF THE HEARING
CALLED BY THE OIL CONSERVATION
COMMISSION FOR THE PURPOSE OF
CONSIDERING:

Case No. 6652
Order No. R-6198

APPLICATION OF SHELL OIL
COMPANY FOR STATUTORY
UNITIZATION, LEA COUNTY,
NEW MEXICO.

ORDER OF THE COMMISSION

By The Commission:

This case and cause of action came on for hearing at 9:00 a.m. on October 3, 1979, at Santa Fe, New Mexico, before the Oil Conservation Commission of New Mexico, hereinafter referred to as the Commission.

NOW, on this _____ day of November, 1979, the Commission, a quorum having been present, having considered the testimony and the record and being otherwise fully advised in the premises,

FINDS:

(1) That due public notice has been given as required by law, the Commission has jurisdiction of this case and cause of action and the subject matter hereof

(2) That the applicant, Shell Oil Company, seeks the statutory unitization, pursuant to the "Statutory Unitization Act," Sections 70-7-1 through 70-7-21, NMSA 1978, of 10,649.53 acres, more or less, being a portion of the Hobbs Grayburg-San Andres Pool, Lea County, New Mexico, said portion to be known as the North Hobbs Grayburg-San Andres Unit Area; ~~that~~ applicant further seeks approval of the Unit Agreement and the Unit Operating Agreement which were submitted in evidence as applicant's Exhibits Nos. 3 and 4 in this case.

(3) That the proposed unit area should be designated the North Hobbs Grayburg-San Andres Unit Area, and the horizontal limits of said unit area should be comprised of the following described lands:

TOWNSHIP 18 SOUTH, RANGE 37 EAST, NMPM
Section 13: SE/4 and W/2
Section 14: All
Sections 23 through 25: All
~~Section 24 All~~
~~Section 25 All~~
Section 26: E/2 NE/4 and NW/4 NE/4
Section 36: E/2 NW/4 and E/2

TOWNSHIP 18 SOUTH, RANGE 38 EAST, NMPM
Section 17: S/2 NW/4 and SW/4
Section 18: NE/4 and S/2
Sections 19 and 20: All
~~Section 20 All~~
Section 21: SW/4, ~~and~~ S/2 SE/4 and NW/4 SE/4
Sections 27 through 32: All
~~Section 28 All~~
~~Section 29 All~~
~~Section 30 All~~
~~Section 31 All~~
~~Section 32 All~~
Section 33: W/2, ~~and~~ NE/4, ~~and~~ W/2 SE/4 and NE/4 SE/4

(2)

(4) That the vertical limits of said North Hobbs Grayburg-San Andres Unit Area should comprise the Grayburg-San Andres formation of Permian age as found from ~~at~~ a depth of 3698 feet (51 feet sub-sea) to a depth of 4500 feet (853 feet subsea) on the Borehole Compensated Sonic - Gamma Ray Log run July 9, 1969, in the Shell Oil Company State A Well No. 1, located 1930 feet from the North line and 660 feet from the East line of Section 32, Township 18 South, Range 38 East, NMPM, Lea County, New Mexico.

(5) ~~(4)~~ That the portion of the Hobbs Grayburg-San Andres Pool proposed to be included in the aforesaid North Hobbs Grayburg-San Andres Unit Area has been reasonably defined by development.

(6) ~~(5)~~ That the applicant proposes to institute a pressure maintenance project for the secondary recovery of oil, gas, gaseous substances, sulfur contained in gas, condensate, distillate and all associated and constituent liquid or liquifiable hydrocarbons within and to be produced from the proposed unit area.

(7) That the proposed supplemental recovery operations should result in the additional recovery of approximately 55 million barrels of oil.

(8) ~~(6)~~ That the unitized management, operation and further development of the North Hobbs Grayburg-San Andres Unit Area, as proposed, is reasonably necessary to effectively carry on pressure maintenance and secondary recovery operations ~~to~~ and will substantially increase the ultimate recovery of oil and gas from the unitized portion of the pool.

(9) ~~(7)~~ That the proposed unitized method of operation as applied to the North Hobbs Grayburg-San Andres Unit Area is feasible and will result with reasonable probability in the increased recovery of substantially more oil and gas from the unitized portion of the pool than would otherwise be recovered without unitization.

(10) ~~(8)~~ That the estimated additional investment costs of the proposed supplemental recovery operations are $33 million which include an estimated initial capital investment of $27 million forecast to be spent in 1980 and 1981 and an additional $6 million forecast to be spent during the eight years subsequent to 1981 for construction of facilities necessary to handle the anticipated increasing volumes of oil and water.

(11) That the additional recovery to be derived ~~resulting~~ from the proposed supplemental recovery operations will have a resultant net profitability over the aforesaid additional costs, on a present value basis with a ten percent discount and before federal income tax, of $124 million or a 421% profit.

(3)

(12) That the estimated additional costs of the proposed operations (as described in Finding No. (11) above) will not exceed the estimated value of the additional oil and gas (as described in Finding No. (10) above) plus a reasonable profit.

(13) That the applicant, the designated Unit Operator pursuant to the Unit Agreement and the Unit Operating Agreement, has made a good faith effort to secure voluntary unitization within the North Hobbs Grayburg-San Andres Unit Area. ~~Nonethe-~~ in this case

(14) ~~That~~ Exxon Company, U.S.A. has declined to voluntarily join in the unit and has opposed the application of Shell Oil Company on the basis that the participation formula contained in the Unit Agreement fails to allocate the produced and saved unitized hydrocarbons to the separately owned tracts within the unit area on a fair, reasonable and equitable basis.

(15) That the Technical Report introduced as applicant's Exhibit No. 16 ~~and incorporated herein by reference~~, was prepared by a Technical Committee comprised of engineering representatives of all working interest owners involved in the proposed unit. ~~This~~

(16) That said Technical Committee met over a three and a half year period from September, 1973, to March, 1977.

(17) That said Exxon Company, U.S.A. was represented at each of ~~these~~ meetings and its representative accepted the values assigned the unitization parameters contained in the Technical Report as well as the use of the cutoff date of January 1, 1975 for well logging data and well test information and the remaining primary oil reserve estimates as of January 1, 1977.

(18) That ~~the~~ values assigned the parameters appear to be / appears to ~~are~~ based on sound engineering principles and data. Further, ~~there~~ exists a sound and rational basis for the adoption of the cutoff dates so that a foundation could be laid for the fair ~~and precise~~ allocation of remaining primary and secondary reserves to each of the tracts within the proposed unit area.

(19) That ~~the~~ objection of Exxon Company, U.S.A. to the application appears ~~is~~ in large part to be based on Exxon's contention that the production performance of its Tract No. 47 since January 1, 1977, is not in conformity with the projections made by the computer simulator model used in the Technical Report.

(20) That the evidence ~~which~~ ~~Evidence~~ was presented, using the oil cutoff reserve relationship with the simulator output for Tract 47, thus indicating ~~that~~ showed the May 1979 reserves as estimated by the simulation and the May 1979 oil cut for Tract 47 are in agreement, ~~confirming~~ that the simulation predictions are valid, and that the oil reserve estimates for Tract 47 are ~~in order~~ reasonable and fair, and are in order.

(21) That ~~the~~ evidence of Exxon Company, U.S.A. fails to refute the contention of the applicant that the allocations of the produced and saved hydrocarbons as set forth in the Technical Report and Unit Agreement to the separately owned tracts within the unit area are based on fair, reasonable and equitable considerations and calculations.

(4) (22) That the participation formula contained in the unitization agreement allocates the produced and saved unitized substances to the separately owned tracts in the unit area on a fair, reasonable and equitable basis.

(22)~~(3)~~ That unitization and the adoption of the proposed unitized method of operation will benefit the working interest owners and royalty owners of the oil and gas rights within the North Hobbs Grayburg-San Andres Unit Area.

(24) That the granting of the application in this case ~~should~~ will have no adverse effect upon other portions of the Hobbs Grayburg-San Andres Pool.

(25) That applicant's Exhibits Nos. 3 and 4 in this case, being the Unit Agreement and the Unit Operating Agreement, respectively, should be incorporated by reference into this order.

(26) That the North Hobbs Grayburg-San Andres Unit Agreement and the North Hobbs Grayburg-San Andres Unit Operating Agreement provide for unitization and unit operation of the North Hobbs Grayburg-San Andres Unit Area upon terms and conditions that are fair, reasonable and equitable and which include:

(a) an allocation to the separately owned tracts in the unit area of all oil and gas that is produced from the unit area and which is saved, being the production that is not used in the conduct of unit operations or not unavoidably lost;

(b) a provision for the credits and charges to be made in the adjustment among the owners in the unit area for their respective investments in wells, tanks, pumps, machinery, materials and equipment contributed to the unit operations;

(c) a provision governing how the costs of unit operations including capital investments shall be determined and charged to the separately owned tracts and how said costs shall be paid including a provision providing when, how, and by whom the unit production allocated to an owner who does not pay his share of the costs of unit operations shall be charged to such owner, or the interest of such owner, and how his interest may be sold and the proceeds applied to the payment of his costs;

(d) a provision for carrying any working interest owner on a limited, carried or net-profits basis, payable out of production, upon such terms and conditions which are just and reasonable, and which allow an appropriate charge for interest for such service payable out of production, upon such terms and conditions determined by the Commission ~~[illegible]~~ to be just and reasonable, and allowing an appropriate charge for interest for such service payable out of such owner's share of production, providing that any nonconsenting working interest owner being so carried shall be deemed to have relinquished to the Unit Operator all of his operating rights and working interests in and to the unit until his share of the costs, service charge and interest are repaid to the Unit Operator;

(e) a provision designating the Unit Operator and providing for the supervision and conduct of the unit operations, including the selection, removal or substitution of an operator from among the working interest owners to conduct the unit operations;

respect to which each working interest owner shall have a voting interest equal to his unit participation; and

(g) the time when the unit operation shall commence and the manner in which, and the circumstances under which, the operations shall terminate and for the settlement of accounts upon such termination;

(21) That the statutory unitization of the North Hobbs Grayburg-San Andres Unit Area is in conformity with the above findings, and will prevent waste and protect the correlative rights of all owners of interest within the proposed unit area, and should be approved.

IT IS THEREFORE ORDERED:

(1) That the North Hobbs Grayburg-San Andres Unit Area, comprising 10,649.53 acres, more or less, in the Hobbs Grayburg-San Andres Pool, Lea County, New Mexico, is hereby approved for statutory unitization pursuant to the Statutory Unitization Act, Sections 70-7-1 through 70-7-21 NMSA 1978

(2) That the lands included within the North Hobbs Grayburg-San Andres Unit Area shall be comprised of:

TOWNSHIP 18 SOUTH, RANGE 37 EAST, NMPM
Section 13: SE/4 and W/2
Section 14: All
Sections 23 through 25: All

Section 26: E/2 NE/4 and NW/4 NE/4
Section 36: E/2 NW/4 and E/2

TOWNSHIP 18 SOUTH, RANGE 38 EAST, NMPM
Section 17: S/2 NW/4 and SW/4
Section 18: NE/4 and S/2
Sections 19 and 20: All

Section 21: SW/4, and S/2 SE/4 and NW/4 SE/4
Sections 27 through 32: All

Section 33: W/2, and NE/4, and W/2 SE/4 and NE/4 SE/4
Section 34: E/2 NW/4 and E/2

and that the above described lands shall be designated as the North Hobbs Grayburg-San Andres Unit Area.

(3) That the vertical limits of said North Hobbs ~~Grayburg~~ San Andres Unit Area shall comprise the Grayburg San Andres formation of Permian age as found from ~~at~~ a depth of 3698 feet (51 feet sub-sea) to a depth of 4500 feet (853 feet subsea) on the Borehole Compensated Sonic-Gamma Ray Log run July 9, 1969, in the Shell Oil Company State A Well No. 1, located 1930 feet from the North line and 660 feet from the East line of Section 32, Township 18 South, Range 38 East, NMPM, Lea County, New Mexico.

(4) That the applicant ~~contemplates instituting~~ shall institute a pressure maintenance project for the secondary recovery of oil, gas, gaseous substances, sulfur contained in gas, condensate, distillate and all associated and constituent liquid or liquified hydrocarbons within and produced from the unit area, and said pressure maintenance project is the subject of Case No. 4653.

(5) ~~That and therefore~~ the North Hobbs Grayburg-San Andres Unit Agreement and the North Hobbs Grayburg-San Andres Unit Operating Agreement are approved, adopted and incorporated by reference into this Order subject to the appropriate ratification provisions of Section 70-7-8, NMSA 1978, ~~being complied with.~~ compliance with

(6) That when the persons owning the required percentage of interest in the unit area have approved or ratified the Unit Agreement and the Unit Operating Agreement, the interests of all persons within the unit area are unitized whether or not such persons have approved the Unit Agreement or the Unit Operating Agreement in writing.

(7) That the applicant as Unit Operator shall notify in writing the Division Director of any removal or substitution of said Unit Operator by any other working interest owner within the unit area.

(8) That jurisdiction of this cause is retained for the entry of such further orders as the Division may deem necessary.

DONE at Santa Fe, New Mexico, on the day and year hereinabove designated.

CASE 6645: Application of Depco Inc. for a unit agreement, Chaves County, New Mexico. Applicant, in the above-styled cause, seeks approval for the Apache Springs Unit Area, comprising 31,199 acres, more or less, of State, federal, and fee lands in Townships 10, 11, and 12 South, Ranges 30 and 31 East.

CASE 6646: Application of Belco Petroleum Corporation for approval of infill drilling and simultaneous dedication, Eddy County, New Mexico. Applicant, in the above-styled cause, seeks a waiver of existing well spacing requirements and a finding that the drilling of its James Ranch Unit Well No. 10 to be located in Unit H of Section 1, Township 23 South, Range 30 East, Morrow formation, is necessary to effectively and efficiently drain that portion of the proration unit which cannot be so drained by the existing well.

CASE 6638: (Continued from August 22, 1979, Examiner Hearing)

Application of Ladd Petroleum Corporation for downhole commingling, Rio Arriba County, New Mexico. Applicant, in the above-styled cause, seeks approval for the downhole commingling of Largo-Gallup and Basin-Dakota production in the wellbore of its Lindrith Well No. 24 located in Unit F of Section 4, Township 26 North, Range 7 West.

CASE 6647: Application of O. H. Berry for an unorthodox gas well location, Lea County, New Mexico. Applicant, in the above-styled cause, seeks approval for the unorthodox location of a Seven Rivers well to be located 1650 feet from the North line and 330 feet from the East line of Section 15, Township 24 South, Range 36 East, Jalmat Gas Pool, the NE/4 of said Section 15 to be dedicated to the well.

CASE 6648: Application of Morris R. Antweil for pool creation and special pool rules, Lea County, New Mexico. Applicant, in the above-styled cause, seeks the creation of a new Mississippian oil pool for its Landlady Well No. 1 located in Unit B of Section 8, Township 12 South, Range 32 East, and special rules therefor, including 160-acre oil well spacing and a 4,000 to 1 gas-oil ratio.

CASE 6649: Application of Morris R. Antweil for an unorthdox gas well location, Lea County, New Mexico. Applicant, in the above-styled cause, seeks approval for the unorthodox location of a Morrow test well to be located 660 feet from the South line and 1980 feet from the East line of Section 5, Township 12 South, Range 32 East, the E/2 of said Section 5 to be dedicated to the well.

CASE 6650: Application of Doyle Hartman for compulsory pooling, non-standard gas proration unit, and unorthodox well location, Lea County, New Mexico. Applicant, in the above-styled cause, seeks an order pooling all mineral interests in the Jalmat Gas Pool underlying the W/2 NE/4 of Section 36, Township 24 South, Range 36 East, to form an 80-acre non-standard gas proration unit to be dedicated to a well to be drilled at an unorthodox location 2310 feet from the North line and 1650 feet from the East line of said Section 36. Also to be considered will be the cost of drilling and completing said well and the allocation of the cost thereof as well as actual operating costs and charges for supervision. Also to be considered will be the designation of applicant as operator of the well and a charge for risk involved in drilling said well.

CASE 6651: Application of Alpha Twenty-One Production Company for a non-standard proration unit, unorthodox well location, and approval of infill drilling, Lea County, New Mexico. Applicant, in the above-styled cause, seeks a waiver of existing well spacing requirements and a finding that the drilling of its El Paso Plant Well No. 1 at an unorthodox location 1650 feet from the South line and 660 feet from the West line of Section 32, Township 23 South, Range 37 East, Jalmat Gas Pool, is necessary to effectively and efficiently drain that portion of the non-standard proration unit, to comprise the N/2 SW/4 of said Section 32, which cannot be so drained by the existing well.

CASE 6652: Application of Shell Oil Company for statutory unitization, Lea County, New Mexico. Applicant, in the above-styled cause, seeks an order unitizing, for the purpose of a pressure maintenance project, all mineral interests in the North Hobbs Grayburg-San Andres Unit encompassing 10,650 acres, more or less, underlying all or portions of the following lands in Lea County, New Mexico: Sections 13, 14, 23, 24, 25, 26, and 36, Township 18 South, Range 37 East; Sections 17 thru 21 and 27 thru 34, Township 18 South, Range 38 East.

The unitized interval would be the Grayburg-San Andres Formation between the depths of 3,698 feet and 4,500 feet in Shell's State A Well No. 7, located in Unit H of Section 32, Township 18 South, Range 38 East.

Among the matters to be considered at the hearing will be the necessity of unit operations; the designation of a unit operator; the determination of the horizontal and vertical limits of the unit area; the determination of a fair, reasonable, and equitable allocation of production and costs of production, including capital investment, to each of the various tracts in the unit area; the determination of credits and charges to be made among the various owners in the unit area for their investment in wells and equipment; and such other matters as may be necessary and appropriate for carrying on efficient unit operations, including, but not necessarily limited to, unit voting procedures, selection, removal, or substitution of unit operator, and time of commencement and termination of unit operations. (This case will be continued to September 19, 1979.)

Unit Name NORTH HOBBS (GRAYBURG-SAN ANDRES) UNIT (WATERFLOOD)
Operator SHELL OIL COMPANY
County LEA COUNTY, NEW MEXICO

| DATE APPROVED | OCC CASE NO. 6652 & 6653 EFFECTIVE OCC ORDER NO. R-6198 & R-6199 DATE | TOTAL ACREAGE | STATE | FEDERAL | INDIAN-FEE | SEGREGATION CLAUSE | TERM |
|---|---|---|---|---|---|---|---|
| Commissioner 12-11-79 | Commission 11-30-79 11-30-79 | 10,649.53 | 4,835.78 | 400.00 | 5,413.75 | yes | So long as |

UNIT AREA

TOWNSHIP 18 SOUTH, RANGE 37 EAST, NMPM
Section 13: SE/4 and W/2
Section 14: All
Sections 23 through 25: All
Section 26: E/2NE/4 and NW/4NE/4
Section 36: E/2NW/4 and E/2

TOWNSHIP 18 SOUTH, RANGE 38 EAST, NMPM
Section 17: S/2NW/4 and SW/4
Section 18: NE/4 and S/2
Sections 19 and 20: All
Section 21: SW/4, S/2SE/4 and NW/4SE/4
Sections 27 through 32: All
Section 33: W/2, NE/4, W/2SE/4 and NE/4SE/4
Section 34: E/2NW/4 and E/2

STATUTORY UNITIZATION-ALL ACREAGE PARTICIPATES

Unit Name NORTH HOBBS(GRAYBURG-SAN ANDRES) UNIT WATER FLOOD
Operator SHELL OIL COMPANY
County LEA

| STATE TRACT NO. | LEASE NO. | INSTI-TUTION | SEC. | TWP. | RGE. | SUBSECTION | RATIFIED DATE | ACRES | ACREAGE NOT RATIFIED | LESSEE |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | B-2330-4 | D.D & B | 14 | 18S | 37E | N/2 | 4-5-79 | 320.00 | | Getty Oil Company |
| 2 | A-1469-2 | D.D & B | 14 | 18S | 37E | N/2SW/4, SW/4SW/4, SW/4SE/4 | 12-14-78 | 160.00 | | Amerada Hess Corporation |
| 3 | E-8503 | D.D & B | 14- | 18S | 37E | SE/4SW/4 | 9-14-78 | 40.00 | | Gulf Oil Corporation |
| 4 | E-5770-2 | D.D & B | 14 | 18S | 37E | N/2SE/4 | 10-30-78 | 80.00 | | Texas Pacific Coal & Oil Co. |
| 5 | K-5218 | D.D & B | 14 | 18S | 37E | SE/4SE/4 *force pooled* | -0- | 40.00 | | Yeager & Armstrong |
| 6 | B-1535½ | D.D.& B | 13 | 18S | 37E | W/2 | 11-15-78 | 320.00 | | Continental Oil Company |
| 10A | B-2330-4 | C.P & R | 17 | 18S | 38E | SW/4NW/4 | 4-5-79 | 40.00 | | Getty Oil Company |
| 10B | B-2330-4 | C.P & R | 17 | 18S | 38E | SE/4NW/4 | 4-5-79 | 40.00 | | Getty Oil Company |
| 11 | B-2277-1 | C.P & R | 17 | 18S | 38E | N/2SW/4 | 9-5-78 | 80.00 | | Chevron U.S. A. Inc. |
| 12 | B-1327 | C.P.& R | 17 | 18S | 38E | S/2SW/4 | 4-5-79 | 80.00 | | Getty Oil Company |
| 28 | A-1543-1 | D.D.& B | 24 | 18S | 37E | NE/4 | 9-14-78 | 160.00 | | Gulf Oil Corporation |
| 29 | B-1411-1 | D.D.& B | 24 | 18S | 37E | E/2NW/4 | 7-31-78 | 80.00 | | Shell Oil Company |
| 30 | B-1461-1 | D.D.& B | 24 | 18S | 37E | W/2NW/4 | 12-14-78 | 80.00 | | Amerada Hess Corporation |
| 31 | A-1977-2 | D.D.& B | 24 | 18S | 37E | SE/4 | 10-30-78 | 160.00 | | Texas Pacific Coal & Oil Co. |
| 32 | A-1118-4 | D.D.& B | 24 | 18S | 37E | SW/4 | 7-2-79 | 160.00 | | Samedan Oil Corporation |
| 33A | B-9264-5 | D.D.& B | 23 | 18S | 37E | NE/4NE/4, SE/4NE/4 | 10-3-78 | 80.00 | | C. H. Sweet Oil Company |
| 33B | B-9264-6 | D.D.& B | 23 | 18S | 37E | NE/4SE/4 | 10-3-78 | 40.00 | | C. H. Sweet Oil Company |
| 34 | B-9264-2 | D.D.& B | 23 | 18S | 37E | W/2NE/4 | 7-31-78 | 80.00 | | Shell Oil Company |

Unit Name NORTH HOBBS (GRAYBURG-SAN ANDRES) UNIT WATERFLOOD
Operator SHELL OIL COMPANY
County LEA

| STATE TRACT NO. | LEASE NO. | INSTI-TUTION | SEC. | TWP. | RGE. | SUBSECTION | | RATIFIED DATE | RATIFIED ACRES | ACREAGE NOT RATIFIED | LESSEE |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 35 | E-5779-2 | D.D.& B | 23 | 18S | 37E | E/2NW/4, SW/4 | | 10-30-78 | 240.00 | | Texas Pacific Coal & Oil Co. |
| 37 | B-9264-10 | D.D.& B | 23 | 18S | 37E | W/2SE/4, SE/4SE/4 | | 10-18-78 | 120.00 | | Abo Petroleum Corporation |
| 38 | K-5278 | D.D.& B | 26 | 18S | 37E | NW/4NE/4 | | 10-13-78 | 40.00 | | The Wiser Oil Company |
| 39 | E-5673 | D.D.& B | 26 | 18S | 37E | E/2NE/4 | | 4-5-79 | 80.00 | | Getty Oil Company |
| 40 | B-1535½ | D.D.& B | 25 | 18S | 37E | N/2NW/4 | | 11-15-78 | 80.00 | | Continental Oil Company |
| 41 | B-1535½ | D.D.& B | 25 | 18S | 37E | S/2NW/4 | | 7-2-79 | 80.00 | | Samedan Oil Corporation |
| 42 | B-159-1 | D.D.& B | 25 | 18S | 37E | NE/4 | | 10-2-78 | 160.00 | | Texaco Inc. |
| 43 | A-1320 | D.D.& B | 25 | 18S | 37E | S/2 | FORCE POOLED | -0- | 320.00 | | Exxon Corporation |
| 46 | A-3071 | Penn | 30 | 18S | 38E | SW/4 | | 10-9-78 | 155.78 | | Marathon Oil Company |
| 49 | A-1469-2 | D.D.& B | 29 | 18S | 38E | W/2NE/4, E/2NW/4 | | 12-14-78 | 160.00 | | Amerada Hess Corporation |
| 51 | B-2657 | D.D.& B | 29 | 18S | 38E | E/2SW/4, NW/4SE/4 | | 11-15-78 | 120.00 | | Continental Oil Company |
| 53 | B-2277-1 | Penn | 29 | 18S | 38E | S/2SE/4 | | 9-5-78 | 80.00 | | Chevron U.S.A.Inc. |
| 68 | A-1118-5 | Penn | 33 | 18S | 38E | N/2NW/4 | | 7-31-78 | 80.00 | | Shell Oil Company |
| 69 | A-1573-4 | Penn | 33 | 18S | 38E | S/2NW/4 | | 9-22-79 | 80.00 | | Amoco Production Company |
| 70 | B-2656 | Penn | 33 | 18S | 38E | SW/4NE/4, W/2SE/4, SW/4 | | 11-15-78 | 280.00 | | Continental Oil Company |
| 71 | A-1469-2 | C.S. | 32 | 18S | 38E | N/2NE/4 | | 12-14-78 | 80.00 | | Amerada Hess Corporation |
| 75A | A-2747-7 | C.S. | 32 | 18S | 38E | W/2SE/4 | | 10-9-78 | 80.00 | | Marathon Oil Company |
| 75B | A-1159-9 | C.S. | 32 | 18S | 38E | E/2SE/4 | | 10-9-78 | 80.00 | | Marathon Oil Company |

Unit Name NORTH HOBBS (GRAYBURG-SAN ANDRES) UNIT WATERFLOOD
Operator SHELL OIL COMPANY
County LEA

| STATE TRACT NO. | LEASE NO. | INSTI-TUTION | SEC. | TWP. | RGE. | SUBSECTION | RATIFIED DATE | RATIFIED ACRES | ACREAGE NOT RATIFIED | LESSEE |
|---|---|---|---|---|---|---|---|---|---|---|
| 81 | A-1469-2 | C.S. | 36 | 18S | 37E | E/2NE/4, SW/4NE/4, SE/4 | 12-14-78 | 280.00 | | Amerada Hess Corporation |
| 82 | B-243-1 | C.S. | 36 | 18S | 37E | NW/4NE/4 | 9-14-78 | 40.00 | | Gulf Oil Corporation |
| 83 | B-243-1 | C.S. | 36 | 18S | 37E | E/2NW/4 | 9-14-78 | 80.00 | | Gulf Oil Corporation |

# United States Department of the Interior

GEOLOGICAL SURVEY
South Central Region
P. O. Box 26124
Albuquerque, New Mexico 87125

RECEIVED
JUN - 2 1980
OIL CONSERVATION DIVISION
SANTA FE

MAY 29 1980

#1665

Shell Oil Company
Attention: Georgiana Stanley
P. O. Box 991
Houston, Texas 77001

Gentlemen:

The revised Exhibit B to the North Hobbs Grayburg San Andres Unit, Lea County, New Mexico, submitted to this office on March 7, 1980, is accepted for record purposes.

Sincerely yours,

(ORIG. SGD.) JACK WILLOCK

FOR Floyd L. Stelzer
Acting Deputy Conservation Manager
Oil and Gas

cc:
NMOCD, Santa Fe

Unit Name NORTH HOBBS (GRAYBURG-SAN ANDRES) UNIT (WATERFLOOD)
Operator SHELL OIL COMPANY
County LEA COUNTY, NEW MEXICO

| DATE APPROVED | OCC CASE NO. 6652 & 6653 EFFECTIVE OCC ORDER NO. R-6198 & R-6199 DATE | TOTAL ACREAGE | STATE | FEDERAL | INDIAN-FEE | SEGREGATION CLAUSE | TERM |
|---|---|---|---|---|---|---|---|
| Commissioner 12-11-79 | Commission 11-30-79 11-30-79 | 10,649.53 | 4,835.78 | 400.00 | 5,413.75 | yes | So long as |

UNIT AREA

TOWNSHIP 18 SOUTH, RANGE 37 EAST, NMPM
Section 13: SE/4 and W/2
Section 14: All
Sections 23 through 25: All
Section 26: E/2NE/4 and NW/4NE/4
Section 36: E/2NW/4 and E/2

TOWNSHIP 18 SOUTH, RANGE 38 EAST, NMPM
Section 17: S/2NW/4 and SW/4
Section 18: NE/4 and S/2
Sections 19 and 20: All
Section 21: SW/4, S/2SE/4 and NW/4SE/4
Sections 27 through 32: All
Section 33: W/2, NE/4, W/2SE/4 and NE/4SE/4
Section 34: E/2NW/4 and E/2

STATUTORY UNITIZATION-ALL ACREAGE PARTICIPATES

Corrected copy. Tract 12 was omitted from our first memo.

Unit Name NORTH HOBBS(GRAYBURG-SAN ANDRES) UNIT WATER FLOOD
Operator SHELL OIL COMPANY
County LEA

| STATE TRACT NO. | LEASE NO. | INSTI-TUTION | SEC. | TWP. | RGE. | SUBSECTION | RATIFIED DATE | RATIFIED ACRES | ACREAGE NOT RATIFIED | LESSEE |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | B-2330-4 | D.D & B | 14 | 18S | 37E | N/2 | 4-5-79 | 320.00 | | Getty Oil Company |
| 2 | A-1469-2 | D.D & B | 14 | 18S | 37E | N/2SW/4, SW/4SW/4, SW/4SE/4 | 12-14-78 | 160.00 | | Amerada Hess Corporation |
| 3 | E-8503 | D.D & B | 14- | 18S | 37E | SE/4SW/4 | 9-14-78 | 40.00 | | Gulf Oil Corporation |
| 4 | E-5770-2 | D.D & B | 14 | 18S | 37E | N/2SE/4 | 10-30-78 | 80.00 | | Texas Pacific Coal & Oil Co. |
| 5 | K-5218 | D.D & B | 14 | 18S | 37E | SE/4SE/4 *force pooled* | -0- | 40.00 | | Yeager & Armstrong |
| 6 | B-1535½ | D.D.& B | 13 | 18S | 37E | W/2 | 11-15-78 | 320.00 | | Continental Oil Company |
| 10A | B-2330-4 | C.P & R | 17 | 18S | 38E | SW/4NW/4 | 4-5-79 | 40.00 | | Getty Oil Company |
| 10B | B-2330-4 | C.P & R | 17 | 18S | 38E | SE/4NW/4 | 4-5-79 | 40.00 | | Getty Oil Company |
| 11 | B-2277-1 | C.P & R | 17 | 18S | 38E | N/2SW/4 | 9-5-78 | 80.00 | | Chevron U.S. A. Inc. |
| 12 | B-1327 | C.P.& R | 17 | 18S | 38E | S/2SW/4 | 4-5-79 | 80.00 | | Getty Oil Company |
| 28 | A-1543-1 | D.D.& B | 24 | 18S | 37E | NE/4 | 9-14-78 | 160.00 | | Gulf Oil Corporation |
| 29 | B-1411-1 | D.D.& B | 24 | 18S | 37E | E/2NW/4 | 7-31-78 | 80.00 | | Shell Oil Company |
| 30 | B-1461-1 | D.D.& B | 24 | 18S | 37E | W/2NW/4 | 12-14-78 | 80.00 | | Amerada Hess Corporation |
| 31 | A-1977-2 | D.D.& B | 24 | 18S | 37E | SE/4 | 10-30-78 | 160.00 | | Texas Pacific Coal & Oil Co. |
| 32 | A-1118-4 | D.D.& B | 24 | 18S | 37E | SW/4 | 7-2-79 | 160.00 | | Samedan Oil Corporation |
| 33A | B-9264-5 | D.D.& B | 23 | 18S | 37E | NE/4NE/4, SE/4NE/4 | 10-3-78 | 80.00 | | C. H. Sweet Oil Company |
| 33B | B-9264-6 | D.D.& B | 23 | 18S | 37E | NE/4SE/4 | 10-3-78 | 40.00 | | C. H. Sweet Oil Company |
| 34 | B-9264-2 | D.D.& B | 23 | 18S | 37E | W/2NE/4 | 7-31-78 | 80.00 | | Shell Oil Company |

Unit Name NORTH HOBBS (GRAYBURG-SAN ANDRES) UNIT WATERFLOOD
Operator SHELL OIL COMPANY
County LEA

| STATE TRACT NO. | LEASE NO. | INSTI-TUTION | SEC. | TWP. | RGE. | SUBSECTION | RATIFIED DATE | RATIFIED ACRES | ACREAGE NOT RATIFIED | LESSEE |
|---|---|---|---|---|---|---|---|---|---|---|
| 35 | E-5770-2 | D.D.& B | 23 | 18S | 37E | E/2NW/4, SW/4 | 10-30-78 | 240.00 | | Texas Pacific Coal & Oil Co. |
| 37 | B-9264-10 | D.D.& B | 23 | 18S | 37E | W/2SE/4, SE/4SE/4 | 10-18-78 | 120.00 | | Abo Petroleum Corporation |
| 38 | K-5278 | D.D.& B | 26 | 18S | 37E | NW/4NE/4 | 10-13-78 | 40.00 | | The Wiser Oil Company |
| 39 | E-5673 | D.D.& B | 26 | 18S | 37E | E/2NE/4 | 4-5-79 | 80.00 | | Getty Oil Company |
| 40 | B-1535½ | D.D.& B | 25 | 18S | 37E | N/2NW/4 | 11-15-78 | 80.00 | | Continental Oil Company |
| 41 | B-1535½ | D.D.& B | 25 | 18S | 37E | S/2NW/4 | 7-2-79 | 80.00 | | Samedan Oil Corporation |
| 42 | B-159-1 | D.D.& B | 25 | 18S | 37E | NE/4 | 10-2-78 | 160.00 | | Texaco Inc. |
| 43 | A-1320 | D.D.& B | 25 | 18S | 37E | S/2 FORCE POOLED | -0- | 320.00 | | Exxon Corporation |
| 46 | A-3071 | Penn | 30 | 18S | 38E | SW/4 | 10-9-78 | 155.78 | | Marathon Oil Company |
| 49 | A-1469-2 | D.D.& B | 29 | 18S | 38E | W/2NE/4, E/2NW/4 | 12-14-78 | 160.00 | | Amerada Hess Corporation |
| 51 | B-2657 | D.D.& B | 29 | 18S | 38E | E/2SW/4, NW/4SE/4 | 11-15-78 | 120.00 | | Continental Oil Company |
| 53 | B-2277-1 | Penn | 29 | 18S | 38E | S/2SE/4 | 9-5-78 | 80.00 | | Chevron U.S.A.Inc. |
| 68 | A-1118-5 | Penn | 33 | 18S | 38E | N/2NW/4 | 7-31-78 | 80.00 | | Shell Oil Company |
| 69 | A-1573-4 | Penn | 33 | 18S | 38E | S/2NW/4 | 9-22-79 | 80.00 | | Amoco Production Company |
| 70 | B-2656 | Penn | 33 | 18S | 38E | SW/4NE/4, W/2SE/4, SW/4 | 11-15-78 | 280.00 | | Continental Oil Company |
| 71 | A-1469-2 | C.S. | 32 | 18S | 38E | N/2NE/4 | 12-14-78 | 80.00 | | Amerada Hess Corporation |
| 72 | A-1118-5 | C.S. | 32 | 18S | 38E | S/2NE/4 | 7-31-78 | 80.00 | | Shell Oil Company |
| 75A | A-2747-7 | C.S. | 32 | 18S | 38E | W/2SE/4 | 10-9-78 | 80.00 | | Marathon Oil Company |
| 75B | A-1159-9 | C.S. | 32 | 18S | 38E | E/2SE/4 | 10-9-78 | 80.00 | | Marathon Oil Company |

Unit Name NORTH HOBBS(GRAYBURG-SAN ANDRES) UNIT WATERFLOOD
Operator SHELL OIL COMPANY
County LEA

| STATE TRACT NO. | LEASE NO. | INSTI-TUTION | SEC. | TWP. | RGE. | SUBSECTION | RATIFIED DATE | RATIFIED ACRES | ACREAGE NOT RATIFIED | LESSEE |
|---|---|---|---|---|---|---|---|---|---|---|
| 81 | A-1469-2 | C.S. | 36 | 18S | 37E | E/2NE/4, SW/4NE/4, SE/4 | 12-14-78 | 280.00 | | Amerada Hess Corporation |
| 82 | B-243-1 | C.S. | 36 | 18S | 37E | NW/4NE/4 | 9-14-78 | 40.00 | | Gulf Oil Corporation |
| 83 | B-243-1 | C.S. | 36 | 18S | 37E | E/2NW/4 | 9-14-78 | 80.00 | | Gulf Oil Corporation |

State of New Mexico

6652

ALEX J. ARMIJO
COMMISSIONER

Commissioner of Public Lands

December 11, 1979

P. O. BOX 1148
SANTA FE, NEW MEXICO 87501

Shell Oil Company
P. O. Box 991
Houston, Texas 77001

Re: North Hobbs (Grayburg-San Andres) Unit
Lea County, New Mexico

ATTENTION: Georgiana Stanley

Gentlemen:

The Commissioner of Public Lands has this date given final approval to your North Hobbs (Grayburg-San Andres) Unit, Lea County, New Mexico. Our approval is subject to like approval by the United States Geological Survey.

Enclosed are Five (5) Certificates of approval.

Your filing fee in the amount of Three Hundred ($300.00) Dollars has been received.

Please notify this office when the USGS gives their approval so that we may ascertain the effective date and finish processing same.

Very truly yours,

ALEX J. ARMIJO
COMMISSIONER OF PUBLIC LANDS

BY:
RAY D. GRAHAM, Director
Oil and Gas Division
AC 505-827-2748

AJA/RDG/s
encls.
cc: OCD-Santa Fe, New Mexico
USGS-Roswell, New Mexico
USGS-Albuquerque, New Mexico

# United States Department of the Interior

GEOLOGICAL SURVEY

Conservation Division
P. O. Box 26124
Albuquerque, New Mexico 87125

DEC 28 1979

6652

Shell Oil Company
Attention: Ms. Georgiana Stanley
P. O. Box 991
Houston, Texas 77001

Gentlemen:

One approved copy of the North Hobbs (Grayburg-San Andres) Unit Agreement, Lea County, New Mexico, is enclosed. Such agreement has been assigned No. 14-08-0001-18038 and is effective as of January 1, 1980.

You are requested to furnish the State of New Mexico and other interested principals with appropriate evidence of this approval.

Sincerely yours,

(ORIG. SGD.) JACK WILLOCK

Jack Willock
for Acting Conservation Manager,
Central Region

Enclosure

cc:
BLM, Santa Fe (w/cy agr.)
NMOCD (ltr. only) ✓
Cons. of Public Lands, Santa Fe (ltr. only)

SOUTHERN UNION REFINING COMPANY
SUITE 112, 4201 WINGREN DRIVE, IRVING, TEXAS 75062

RECEIVED
JUL 28 1980
OIL CONSERVATION DIVISION
SANTA FE

July 14, 1980

6652

Mrs. Rence Cox
Arco Oil & Gas Company
Exploration and Land Department
Post Office Box 2819
Dallas, Texas 75221

Re: Shell Oil Company
North Hobbs (Grayburg-San Andres) Unit
Lea County, New Mexico

Dear Mrs. Cox:

Attached are executed oil division orders on the above subject unit. This division order will cover our purchase of State Royalty Oil barrels from state wells which we have call on that were included in this unitization.

If I can be of further assistance in any manner please give me a call.

Yours very truly,

Robert K. Stearns

Robert K. Stearns
Manager, Crude Oil Operations

RKS:bww
attach.

cc: Mr. Tony Martinez w/attach.
State of New Mexico
Energy and Minerals Department
Oil Conservation Division
P. O. Box 2088
Santa Fe, New Mexico 87501

214/659-0550 TELEX 79-2968 SURF DAL

**AtlanticRichfieldCompany** ◆ **Oil Division Order**

JUN 11 1980

RECEIVED
JUL 28 1980
OIL CONSERVATION DIVISION
SANTA FE

To Atlantic Richfield Company
P. O Box 2819 Dallas Texas 75221

May 15 1980

| Division Order Number |
|---|
| SEE PAGES 2-34 |
| Property Identification |
| SEE PAGES 2-34 |
| |
| |

Each of the undersigned hereby warrants that he is the owner of the interest set out below opposite his name in the oil produced from the SHELL OIL COMPANY-North Hobbs (Grayburg San Andres) Unit lease or unit located in the County or Parish of Lea State of New Mexico described as follows:

North Hobbs (Grayburg San Andres) Unit is comprised of 10,649.53 acres, more or less, covering production from the depths of 3698 feet to 4500 feet beneath the surface and includes various sections of land among which are those listed on attached Pages 2 through 34

and commencing February 1 1980, at 7:00 a.m. and until further written notice either from you or from us, you are authorized to receive production therefrom, purchase it and pay therefor as follows.

| Credit to | Interest | Address |
|---|---|---|

-FOR DIVISION OF INTEREST SEE PAGES 2 THROUGH 34-

Oil received and purchased hereunder shall become your property when delivered to you or your nominee or to any public or private carrier designated by you. Such oil shall be credited to the respective owners in proportion to their interests shown above at your posted price in effect on the date of delivery for the same kind and quality of oil in the field in which said lease or unit is located, or, if sold by you from the lease or unit to another purchaser, at the price received by you for such oil on the basis of the volume computations made by such purchaser, less, in both contingencies, trucking or barging expense, if any, to the point of delivery designated by the purchaser. Oil received by you in any calendar month shall be paid for (less any tax paid or payable by you for account of the undersigned with respect to such oil or the proceeds thereof, whether or not validly imposed) during the next following month by checks mailed to the above parties. If the amount accruing to the interest of any party hereto shall be less than $15.00 for any month, you are hereby authorized to accumulate the monthly accruals to such interest and to make payment when such accumulations equal or exceed $15.00. All accounts will be paid at least annually regardless of the amount.

Quantities and qualities of oil received hereunder shall be determined by the practice prevailing in the area in which the oil is produced and in accordance with rules and regulations of the governmental agency or commission having recognized jurisdiction or control of the production and handling of crude oil in such area. You or your nominee will receive only oil which, in the exclusive opinion of you or your nominee is merchantable and may require well owners to treat or steam any unmerchantable oil at well owner's expense before acceptance thereof.

You will not be responsible for any change of ownership in the absence of actual notice and satisfactory proof thereof. Each signer hereof agrees to notify you in writing of any change in his ownership and agrees that any transfer, assignment, or conveyance of any of his interest hereunder shall be made subject to this division order and effective at 7:00 a.m. on the first day of the calendar month in which notice is received. Without regard to whether any contingency is expressly stated in this division order, you are hereby relieved of any responsibility for determining when any of the interests herein shall increase, diminish, be extinguished or revert to other parties as a result of the completion or discharge of money or other payments from said interest or as a result of the expiration of any time or term limitation (either definite or indefinite), and until you receive notice in writing to the contrary, you are hereby authorized to continue to remit pursuant to the above division of interest. In the event said written notice is not received by you, you shall be held harmless for error resulting in over or under payment, or a wrong payment of any such sum or sums.

Evidence of title satisfactory to you will be furnished you as of the effective date hereof and at any time thereafter when requested by you. If such evidence of title is not furnished, or in the event of a claim or controversy, which, in your opinion, concerns title to any interest hereunder, you may hold, without interest and without any liability, the amount credited to said owner until indemnity satisfactory to you has been furnished, or until such claim or controversy is settled to your satisfaction.

Each of the undersigned agrees to protect and indemnify you and/or your nominee from and against any loss or expense which you and/or your said nominee may suffer or sustain or become liable for by reason of you and/or your nominee's purchase, pursuant hereto, of said undersigned's interest in said oil and the payment therefor to said undersigned, regardless of how the same may arise and including (not to the exclusion of any causes not herein expressly set out) the following: Any judgment rendered in an action or suit affecting the title to either the real property above described or the oil produced therefrom; all reasonable costs or expenses incurred in defending in such suit or action your position or that of your nominee receiving the oil; any claim or claims, or judgment arising therefrom, for any tax which may be asserted by any taxing authority against you or your nominee in connection with, incident or in any manner related to any sum or sums of money held in suspense by you or either of you during the existence of any claim or controversy.

This Division Order shall become valid and binding upon each and every owner above named as soon as signed by him, her or it, regardless of whether or not any of the other above named or any other owners have so signed.

| Witnesses: | Owners Sign Below | Taxpayer No. |
|---|---|---|
| | SOUTHERN UNION REFINING COMPANY A/C COMMISSIONER OF PUBLIC LANDS, STATE OF NEW MEXICO | |
| | BY: W. T. Franklin | |
| | | |
| | | |

AR3B-235-D

RC: ss

D/O No. 30-025-003534 (Covers Oil and Oil Well Gas Production)
Prop. ID 064---5466--23
GRIMES
Tract 23: SW/4 SE/4 Section 20 T-18S, R-38E

Tract Participation:

| | Oil | Gas |
|---|---|---|
| Phase 1: | .06415% | .14316% |
| Phase 2: | .05085% | .11264% |
| Phase 3: | .13035% | .13035% |

| Credit to | Interest | Address |
|---|---|---|
| Dorothy U. Wilson | .00010300 RI | 121 W. 48th Street<br>Kansas City, Mo. 64112 |
| Amalia S. Sanchez | .00005200 RI | 356 East Garcia St.<br>Santa Fe, N. M. 87501 |
| Elizabeth H. Coates, Arthur T. Stieren, Jr., Betty A. Roberts John R. Harris & Chas. V. Richter, Indep. Executors of the George H. Coates Estate | .01953200 RI | 1610 Milam Bldg.,<br>San Antonio, Texas 78205 |
| The First National Bank of Santa Fe, Trustee U/W M. A. Sanchez | .00005200 RI | c/o Trust Depart.<br>P. O. Box 609<br>Santa Fe, N. M. 87501 |
| Evelyn Brice Dowaliby | .00010400 RI | P. O. Box 1596<br>Roswell, N. M. 88201 |
| Mary Evelyn Roberts | .00003500 RI | 1111 N. Penn<br>Roswell, N. M. 88201 |
| Sabine Corporation | .03332500 RI | P. O. Box 84868<br>Dallas, Texas 75284 |
| American State Bank, Trustees of the Emma K. Bledsoe Trust | .03847600 RI | Box 1401<br>Lubbock, Texas 79408 |
| Atlantic Richfield Company | .87500000 WI | |
| Martha E. Boyle | .00020700 RI | c/o Thomas S. McCormack<br>3906 High Aire Drive<br>St. Louis, Mo. 63125 |
| John H. Budde, Jr. | .00005200 RI | 13 Village in the Woods<br>Southern Pines, N. C. 28387 |
| Dolona Roberts Cabot | .00005200 RI | 124 Kearney<br>Santa Fe, N. M. 87501 |
| Clara Cave | .00625000 RI | P. O. Box 962<br>Lovington, N.M. 88260 |
| Charles Brice Dowaliby | .00003500 RI | c/o Albuquerque National Bank<br>Savings Acct. #01-38508-7<br>P. O. Box 1344<br>Albuquerque, N. M. 87103 |

D/O No. 30-025-003534 (Covers Oil and Oil Well Gas Production)
Prop. ID 064---5466--23
GRIMES
Tract 23: (Continued)

| Credit to | Interest | Address |
|---|---|---|
| James M. Dowaliby, Jr. | .00003500 RI | 2 Church Street South, New Haven, Ct. 06519 |
| John H. Hutton, Agent | .00013300 RI | 803 Clearwater Drive Richardson, Texas 75080 |
| J. D. Langford | .00390600 RI | 7520 Hornwood, Apt. 1101 Houston, Texas 77036 |
| Elizabeth G. Orchard | .00022300 RI | 6623 Prestonshire Lane Dallas, Texas 75225 |
| Betty Raster | .00625000 RI | 249 Atkins Avenue Shreveport, La. 71104 |
| George L. Reese, Jr., District Judge | .00134400 RI | Roswell, New Mexico 88201 |
| Robert S. Roberts | .00010400 RI | 1914 Cruse Ave. Las Cruces, New Mexico 88001 |
| Joseph A. Roberts | .00005200 RI | P. O. Box 177 Santa Fe, N. M. 87501 |
| Beatrice Shepard | .00625000 RI | 9229 Shoshone Rd., NE Albuquerque, N.M. 87111 |
| Rex H. Shudde | .00061600 RI | 27105 Arriba Way Carmel, Ca. 93921 |
| Lydian Hall Woods | .00781200 RI | P. O. Box 2116 San Angelo, Texas 76901 |

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D/O No. 30-025-003964 (Covers only oil production)
Prop. ID 064---5466---7A
STATE
Tract 75A: W/2 SE/4 Section. 32, T-18S, R-38E

Tract Participation:

Phase 1: .64903%
Phase 2: .75492%
Phase 3: 2.09583%

| | | |
|---|---|---|
| Marathon Oil Company | .43750000 WI | P. O. Box 100116 Houston, Tx. 77010 |
| Atlantic Richfield Company | .43750000 WI | |
| √ Southern Union Refining Company A/C Commissioner of Public Lands, State of New Mexico | .12500000 RI | P. O. Box 980 Hobbs, New Mexico 88240 |

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D/O No. 30-025-003984 (Covers only Casinghead Gas Production)
Prop. ID 064---5466-75A
STATE SECTION 32
Tract 75A: W/2 SE/4 Section 32, T-18S, R-38E

Tract Participation:

Phase 1: 2.04432%
Phase 2: 2.40868%
Phase 3: 2.09583%

| Credit to | Interest | Address |
|---|---|---|
| Atlantic Richfield Company | .43750000 WI | |
| Commissioner of Public Lands<br>State of New Mexico | .06250000 RI | Gas Only<br>c/o Oil & Gas Acct. Comm.<br>P. O. Box 2308<br>Santa Fe, N. M. 87501 |

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D/O No. 30-025-003984 (Covers only Oil Production)
Prop. ID 064---5466--7B
STATE SECTION 32
Tract 75B: E/2 SE/4 Section 32, T-18S, R-38E

Tract Participation:

Phase 1: .95673%
Phase 2: .94712%
Phase 3: 2.00533%

| Credit to | Interest | Address |
|---|---|---|
| Marathon Oil Company | .43750000 WI | |
| Atlantic Richfield Company | .43750000 WI | |
| Southern Union Refining Company<br>a/c Commissioner of Public Lands<br>State of New Mexico | .12500000 RI | |

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D/O No. 30-025-003984 (Covers only Casinghead Gas Production)
Prop. ID 064---5466-75B
STATE SECTION 32
Tract 75B: E/2 SE/4 Section 32, T-18S, R-38E

Tract Participation:

Phase 1: .94199%
Phase 2: .84174%
Phase 3: 2.00533%

| Credit to | Interest | Address |
|---|---|---|
| Atlantic Richfield Company | .43750000 WI | |
| Commissioner of Public Lands<br>State of New Mexico | .06250000 RI | |

- - -

D/O No. 30-025-003533 (Covers Oil and Oil Well Gas Production)
Prop. ID 064---5466--54
W. D. GRIMES
Tract 54: NW/4 Section 28, T-18S, R-38E

| Tract Participation: | Oil | Gas |
|---|---|---|
| Phase 1: | 2.07685% | 1.66517% |
| Phase 2: | 2.28579% | 1.41654% |
| Phase 3: | 1.09210% | 1.09210% |

| Credit to | Interest | Address |
|---|---|---|
| Claude L. Benckenstein, Jr. | .00003550 RI | 12725 Royal Drive<br>Stafford, Texas 77477 |
| Ellis Benckenstein | .00003550 RI | P. O. Box 106<br>Sulphur, La.70663 |
| Carlton L. White | .00019532 RI | 4325 Clayton Road West<br>Fort Worth, Texas 76116 |
| Dorothy U. Wilson | .00010320 RI | 121 W. 48th St.<br>Kansas City, Mo. 64112 |
| Caron A. Hill | .00019532 RI | 6821 Charade<br>Dallas, Texas 75214 |
| Amalia S. Sanchez | .00005205 RI | 356 East Garcia St.<br>Santa Fe, N. M. 87501 |
| Conoco, Inc. | .00520830 RI | P. O. Box 84513<br>Dallas, Texas 75284 |
| Amoco Production Company | .01171860 RI | P. O. Box 84573<br>Dallas, Texas 75284 |
| Rex G. Fortenberry and Floy Baten, as Independent Executors of the Estate of Gordon D. Baten | .00000345 RI | 212 Central Caldwood Drive<br>Beaumont, Texas 77707 |
| Jennifer Dee Hill Trust #2971-01 | .00007814 RI | The Fort Worth Nat'l. Bank<br>Trust Dept.<br>P. O. Box 2050<br>Fort Worth, Tx. 76101 |
| Joe Dennis Hill Trust #2971-02 | .00007814 RI | The Fort Worth National Bank<br>Trust Dept.<br>P. O. Box 2050<br>Fort Worth, Texas 76101 |
| The First National Bank of Santa Fe, Trustee U/W M. A. Sanchez | .00005205 RI | c/o Trust Department<br>P. O. Box 609<br>Santa Fe, N. M. 87501 |
| American National Bank of Austin, Texas, Ind. Exec. of Est. of Carroll M. Sneed | .00013020 RI | c/o Trust Dept.<br>P. O. Box 2266<br>Austin, Texas 78767 |

D/O No. 30-025-003533 (Covers Oil and Oil Well Gas Production)
Prop. ID 064---5466--54
W. D. GRIMES
Tract 54: (Continued)

| Credit to | Interest | Address |
|---|---|---|
| Robert K. Black & Lorraine S. Black | .00173610 RI | 6900 N. Country Club Dr.,<br>Oklahoma City, Ok. 73116 |
| Vincent S. R. Brandt | .00065110 RI | Putney, Vt. 05346 |
| Ruth Brown | .00043400 RI | 2369 Park Place<br>Fort Worth, Texas 76110 |
| Charon Oil Group | .00260420 RI | c/o First Nat'l Bank.<br>P. O. Box 658<br>Ft. Dodge, Ia. 50501 |
| Richard T. Chapman | .00002030 RI | 625 Pierremont Rd.,<br>Shreveport, La. 71106 |
| Harold G. Chesnut | .00026040 RI | 6610 N. Hillcrest<br>Oklahoma City, Ok. 73116 |
| Evelyn Brice Dowaliby | .00010420 RI | P. O. Box 1596<br>Roswell, N. M. 88201 |
| Genevieve B. Elder | .00009118 RI | 104 Waverley Green East<br>Staunton, Va. 24401 |
| Helen Porter Estes | .00520840 RI | Box 602<br>Virginia Beach, Va. 23451 |
| David C. Harrell | .00195320 RI | 127 Yucca Drive<br>Jackson, Ms. 39211 |
| Margaret Harris Long | .00086800 RI | P. O. Box 14130<br>Oklahoma City, Oklahoma 73113 |
| Nelle Mc Ilroy | .00006510 RI | 5926 Clarewood<br>Houston, Texas 77036 |
| Elouise McLaughlin | .00021700 RI | 5303 Lasher Rd.-Hidden Hills,<br>Calabasas, Ca. 91302 |
| Ward S. Merrick, Jr. and Elizabeth Merrick Coe, as Trustees | .00260420 RI | P. O. Box 998<br>Ardmore, Oklahoma 73401 |
| Mary Evelyn Roberts | .00003470 RI | 1111 N. Penn<br>Roswell, N. M. 88201 |
| Sabine Corporation | .00230350 RI | P. O. Box 84868<br>Dallas, Texas 75284 |
| San Angelo National Bank | .00195320 RI | Attention Financial Accounting Dept.<br>P. O. Box 5291<br>San Angelo, Texas 76901 |

D/O No. 30-025-003533 (Covers Oil and Oil Well Gas Production)
Prop. ID 064---5466--54
W. D. GRIMES
Tract 54: (Continued)

| Credit to | Interest | Address |
|---|---|---|
| Mary Frances Shepherd | .00039060 RI | 555 Dalewood Lane<br>Hinsdale, Il. 60521 |
| Wilma S. Warde, Execx. of the Estate of Wilhelmine Stentzel | .00123690 RI | Box 525<br>New London, N. H. 03257 |
| American State Bank, Trustees of the Emma K. Bledsoe Trust | .00120420 RI | Box 1401<br>Lubbock, Texas 79408 |
| Fred L. Benckenstein | .00009129 RI | San Jacinto Bldg.<br>Beaumont, Tx. 77701 |
| Charles H. Benckenstein, Jr. | .00007089 RI | P. O. Box 1388<br>Beaumont, Tx. 77704 |
| Claude Leonard Benckenstein, Jr. and Charles Ellis Benckenstein, Jointly | .00002030 RI | P. O. Box 848<br>Stafford, Tx. 77477 |
| Eunice R. Benckenstein | .00016610 RI | P. O. Box 700<br>Orange, Texas 77631 |
| John H. Benckenstein | .00018238 RI | P. O. Box 551<br>Beaumont, Tx. 77704 |
| Carabel Darr | .00043400 RI | 2037 Huntington Lane<br>Fort Worth, Texas 76110 |
| Nina Feresin | .00136720 RI | 6558 Golden West<br>Arcadia, California 91006 |
| Foster Petroleum Corporation | .00694440 RI | P. O. Box 729<br>Bartlesville, Oklahoma 74003 |
| Jane Harris | .00086810 RI | 200 Nichols Hills Executive Bldg.<br>6403 NW Grand Blvd.<br>Oklahoma City, Ok. 73116 |
| William J. Harris | .00086800 RI | 200 Nichols Hillks Exeutive Bldg.<br>6403 NW Grand Blvd.<br>Oklahoma City, Ok. 73116 |
| Winifred Kellogg | .00043410 RI | 2724 Chaucer<br>Oklahoma City, Ok. 73120 |
| Mary Lou Olson | .00007240 RI | P. O. Box 668<br>Vacaville, Ca. 95688 |

D/O No. 30-025-003533 (Covers Oil and Oil Well Gas Production)
Prop. ID 064---5466--54
W. D. GRIMES
Tract 54: (Continued)

| Credit to | Interest | Address |
|---|---|---|
| G. M. Robertson | .00240840 RI | 4515 East Vermont North<br>Phoenix, Arizona 85018 |
| Morris Simms | .00021700 RI | 426 Calle De Aragon<br>Redondo Beach, Calif. 90277 |
| Wilelyn Stapper | .00007230 RI | 501 Garraty Road<br>San Antonio, Texas 78209 |
| Kathleen S. Templeman Exrx. of Est. Neil E. Templeman | .00000040 RI | 8556 S. Lewis #126<br>c/o University Village<br>Tulsa, Oklahoma 74135 |
| W. W. West | .00390620 RI | 401 North Colorado<br>Midland, Tx. 79704 |
| Lisbeth Anne Young | .00065100 RI | 790 Terraine Avenue<br>Long Beach, Ca. 90804 |
| Adobe Royalty, Inc. | .00169270 RI | 1100 Western United Life Bldg.<br>Midland, Tx. 79701 |
| Margaret Ann Annett | .00019530 RI | 123 North 14th Street<br>La Crosse, Wi. 54601 |
| Nathan Appleman Trust | .00390630 RI | c/o The Bank of New York<br>Account #45-3080<br>P. O. Box 11160<br>New York, N. Y. 10049 |
| Atlantic Richfield Company | .01562500 RI<br>.87500000 WI | |
| John H. Benckenstein, Indep. Executor of the Estate of Alfred George Benckenstein | .00004656 RI | P. O. Box 551<br>Beaumont, Tx. 77704 |
| Martha E. Boyle | .00020640 RI | c/o Thomas S. Mc Cormack<br>3906 High Aire Drive<br>St. Louis, Mo. 63125 |
| E. W. Brown III, John S. Brown, L. Slade Brown and Charles E. Brown, Independent Executors of the Estate of E. W. Brown Jr. | .00044820 RI | P. O. Box 400<br>Orange, Tx. 77630 |
| John H. Budde, Jr. | .00005160 RI | 13 Village in the Woods<br>Southern Pines, N. C. 28387 |

D/O No. 30-025-003533 (Covers Oil and Oil Well Gas Production)
Prop. ID 064---5466--54
W. D. GRIMES
Tract 54: (Continued)

| Credit to | Interest | Address |
|---|---|---|
| Dolona Roberts Cabot | .00005210 | |
| Cities Service Company | .01909720 RI | P. O. Box 3238<br>Dallas, Tx. 75285 |
| Jayne Schrader Clack | .00086800 RI | Box 91<br>Tetonia, Id. 83452 |
| The First National Bank of Shreveport, Agent, Donner Properties | .00044830 RI | P.O. Box 1116<br>Shreveport, La. 71154 |
| Charles Brice Dowaliby | .00003470 RI | |
| James M. Dowaliby, Jr. | .00003470 RI | |
| Cornelia S. Linfield Drury | .00019530 RI | 136 East 55th St.,<br>New York, N. Y. 10022 |
| John B. Gordon | .00026660 RI | 1310 Petroleum Bldg.<br>Beaumont, Tx. 77701 |
| Martin DeForest Hilshizer, Tr. U/W of Godfrey Hulshizer | .00039060 RI | 17061 Hague Lane<br>Huntington Beach, Ca. 92647 |
| John H. Hutton, Agent | .00013330 RI | |
| Munro Longyear Lyeth and Patricia D. Lyeth | .00260420 RI | First of Denver,<br>Attn: Trust Minerals<br>A/C #11033-00-8 PMR #<br>P. O. Box 5825 T A<br>Denver, Co. 80217 |
| Philo W. Grimes and Charles W. Grimes II, Trustees of the C. W. Grimes Trust | .00520830 RI | P. O. Box 7413<br>Tulsa, Oklahoma 74105 |
| Mrs. Cecil B. Moore | .00000490 RI | 907 Fourteenth Street<br>Orange, Texas 77630 |
| Babette Moore Odom | .00024940 RI | P. O. Box 458<br>Orange, Texas 77630 |

D/O No. 30-025-003533 (Covers Oil and Oil Well Gas Production)
Prop. ID 064---5466--54
W. D. GRIMES
Tract 54: (Continued)

| Credit to | Interest | Address |
|---|---|---|
| Elizabeth G. Orchard | .00022320 RI | 6623 Prestonshire Ln., Dallas, Tx. 75225 |
| Dorothy Phelps | .00130210 RI | 701 Stuckert, Rt. 3 Burleson, Tx. 76028 |
| George L. Reese, Jr., District Judge | .00134400 RI | |
| Robert S. Roberts | .00010410 RI | |
| Joseph A. Roberts | .00005210 RI | P. O. Box 177 Santa Fe, N. M. 87501 |
| Onez Norman Rooney | .00260420 RI | 2915 City National Bank Tower Oklahoma City, Ok. 73102 |
| Sabine Production Company | .00390630 RI | |
| Fort Worth Scottish Rite Association | .00023438 RI | c/o E. M. Townsen, President P. O. Box 1320 Fort Worth, Tx. 76101 |
| Rex H. Shudde | .00061560 RI | |
| La Vaughn Simms | .00043400 RI | P. O. Box 303 Weleetka, Ok. 74880 |
| Elaine Ellis Singleton | .00001950 RI | 1102 Melanie Drive Sulphur, La. 70663 |
| Bexar County National Bank, Independent Executor of the Estate of Luella Stapper | .00028940 RI | P. O. Box 300 San Antonio, Texas 78291 |
| Nelda C. Stark | .00150730 RI | P. O. Drawer 909 Orange, Texas 77630 |
| Ruby Mae Baten Taylor | .00000345 RI | 5680 Calder Rd. Beaumont, Texas 77706 |

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D/O No. 30-025-004479 (Covers only Oil Production)
Prop. ID 064---5466--64
TURNER B-1
Tract 64: NE/4 SE/4 Section 34-18S-38E

Tract Participation:

Phase 1: .34355%
Phase 2: .31251%
Phase 3: .01466%

| Credit to | Interest | Address |
|---|---|---|
| Jimmie Mc Ghee Triplett | .00003700 RI | 3614 Albans Road<br>Houston, TX 77005 |
| J. W. Triplett | .00001850 RI | P.O. Box 45<br>Amarillo, Texas 79105 |
| O. A. Triplett | .00001850 RI | 1717 Norfolk, Apt. 1280F<br>John Knox Village of W. Texas<br>Lubbock, TX 79416 |
| Valerie S. Osborn | .00004950 RI | 1015 Yosemite Blvd.<br>Turlock, CA 95380 |
| Natalie S. Huffman | .00004950 RI | 4044 Valente Court<br>Layfayette, CA 94549 |
| John A. Swenson | .00004950 RI | 1400 N. Tully Road 66<br>Turlock, CA 95380 |
| The Samuel Roberts Noble Foundation, Inc. | .00019000 RI | Route 1<br>Ardmore, OK 73401 |
| Elizabeth H. Coates, Arthur T. Stieren, Jr., Betty A. Roberts, John R. Harris & Chas V. Richter, Indep. Executors of the George H. Coates Estate | .00312500 RI | 1610 Milam Bldg.<br>San Antonio, TX 78205 |
| Mercantile National Bk at Dallas & Mary Carolyn Umpleby, Co-Trs. (3694) | .00390600 RI | C/O Trust Dept.<br>P.O. Box 225415<br>Dallas, TX 75265 |
| The First National Bank of Midland Texas and Jessie Blevins Crump Co-Trustees Trust # 1069 | .00195300 RI | P.O. Box 270<br>Midland, TX 79701 |
| Roy G. Barton | .00009900 RI | P. O. Box 968<br>Hobbs, NM 88240 |

D/O No. 30-025-004479 (Covers only Oil Production)
Prop. ID 064---5466--64
TURNER B-1
Tract 64: (Continued)

| Credit to | Interest | Address |
|---|---|---|
| The First National Bank of Midland<br>Trustee U/W of H H Watson<br>Account # 23 | .00048800 RI | P.O. Box 270<br>Midland, Tx. 79701 |
| H. Huffman & Co. | .00029700 RI | 2550 Liberty Tower<br>Oklahoma City, Ok. 73102 |
| David J. Flackman | .00009900 RI | c/o The Bank of New York<br>P.O. Box 11,200<br>New York, NY 10049 |
| Horton Aldred | .00085125 RI | R. R. 2<br>Sheridan, Indiana 46069 |
| Emma S. Anderson | .00005000 RI | 1200 Lincoln St. Space 137<br>Bellingham, Wa. 98225 |
| Robert J. Anderson | .00000429 RI | 31 Skyline Drive<br>Wellesley, Ma. 02181 |
| Harriet F. Anfenson | .00015700 RI | 3318 Don Diablo Drive<br>Carlsbad, Ca. 92008 |
| Atlantic Richfield Company | .00390600 RI | |
| Kathaleen W. Baker | .00118500 RI | 105 Tidewaters<br>Henlopen Acres, De. 19971 |
| Elizabeth T. Barry | .00000429 RI | 644 29th Street, NE<br>Cedar Rapids, Ia. 52403 |
| Mary E. Beatty | .00168300 RI | 3606-49 Vista Rey<br>Oceanside, Ca. 92054 |
| Charles Francis Bedford | .00026000 RI | 7 Westover Road<br>Fort Worth, T /6107 |
| Henry De Graffenried Bedford | .00026100 RI | 1312 North Richardson Ave.<br>Roswell, New Mexico 88201 |
| Helen Learmont Bedford | .00026100 RI | 2067-A Via Mariposa East<br>Laguna Hills, Ca, 92653 |
| Elizabeth Blosser | .00000429 RI | 1601 Fernwood Drive<br>Oakland, Ca. 94611 |
| Frances Bogart | .00013200 RI | 4822 Campbell Street<br>Kansas City, Mo. 64110 |
| George H. Bond, Jr.<br>Estate Agency No. 8478-00 | .00029700 RI | Republic National Bank of Dallas<br>Trust Oil & Gas Division<br>P.O. Box 241<br>Dallas, Tx. 75221 |

D/O No. 30-025-004479 (Covers only Oil Production)
Prop. ID 064---5466--64
TURNER B-1
Tract 64: (Continued)

| Credit to | Interest | Address |
|---|---|---|
| Rachel Bedford Bowen | .00026000 RI | P.O. Box 572<br>San Clemente, Ca. 92672 |
| The Buffalo Co. | .00601600 RI | 2550 Liberty Tower<br>Oklahoma City, Ok. 73102 |
| Irene Burgess | .00031300 RI | 444 E. Camino Real<br>Duarte, Ca. 91010 |
| June F. Burnett | .00001250 RI | 2100 Skycrest #2<br>Walnut Creek, Ca. 94595 |
| Robert W. Burnett | .00001875 RI | 6 Rosemont Avenue<br>Berkeley, Ca. 94708 |
| Ronald N. Burnett | .00001875 RI | 150 Harvard Avenue<br>Mill Valley, Ca. 94941 |
| Buttram Energies, Inc. | .01277400 RI | Suite 204<br>6421 Avondale<br>Oklahoma City, Ok. 73116 |
| Louise W. Challenger | .00118500 RI | 1050 19th St.<br>Beaumont, Tx. 77706 |
| Cities Service Company | .00781300 RI | P.O. Box 3238<br>Dallas, Tx. 75285 |
| George B. Clegg III and Wife<br>Aileen N. Clegg as Joint Tenants<br>with Right of Survivorship | .00037600 RI | 6509 Jay Miller Drive<br>Falls Church, Va. 22041 |
| Stanford Clinton, Sr. and Zylpha<br>Clinton | .00136200 RI | 6000 North Bay Road<br>Miami Beach, Florida 33140 |
| Stanford Clinton, Jr. | .00068100 RI | 2036 Skylark Drive<br>San Luis Obispo, Ca. 93401 |
| Bruce E. Clinton | .00068100 RI | The Clinton Company<br>2500 N. W. 13th Street<br>Miami, Florida 33125 |
| Wilda L. Collins | .00000198 RI | Star Route 1, Box 101<br>Union, Wa. 98592 |
| Mary Jane Mohler Corbin | .00085125 RI | 7444 S. Zephyr Court<br>Littleton, Co. 80213 |
| Patricia Ruth Cox | .00015700 RI | 922 Magnolia St.<br>Pasadena, Ca. 91106 |

D/O No. 30-025-004479 (Covers only Oil Production)
Prop. ID 064---5466--64
TURNER B-1
Tract 64: (Continued)

| Credit to | Interest | Address |
|---|---|---|
| Jessie Blevins Crump, David C. Blevins & The Fort Worth National Bank as Trustees under the Will of Jones Lester Crump | .00195300 RI | c/o Fort Worth National Bank<br>Fort Worth, Tx. 76101 |
| Iris Gerber Damson | .00002500 RI | 25 Mammaroneck Road<br>Scarsdale, NY 10583 |
| Charles E. Delaney and Wife Helen C. Delaney as Joint Tenants with Right of Survivorship | .00037600 RI | 29 Circuit Drive<br>Warwick, RI 02889 |
| Ann Dowd | .00062500 RI | P.O. Box 140<br>Account No. 4601249<br>El Paso, Tx. 79980 |
| James E. OBrien and Robert E. OBrien as Ancillary Executors of the Estate of Frank W. Doyle | .00019800 RI | 600 Scranton Life Bldg.<br>Scranton, Pa. 18503 |
| Thomas R. Dugan and Wife Barbara C. Dugan as Joint Tenants with Right of Survivorship | .00037600 RI | 47 Five Field Road<br>Madison, Ct. 06443 |
| The First National Bank of Midland, Tx., Trustee for the N. K. Ellis Trust No. 1, | .00097700 RI | Account No. 283<br>P.O. Box 270<br>Midland, Tx. 79701 |
| H. Edison Ellis, Jr. | .00029700 RI | Suite 174<br>6350 LBJ Freeway<br>Dallas, Tx. 75240 |
| Gustave Engelsman | .00010900 RI | c/o Roger Smith Hotel<br>White Plains, NY 10601 |
| Arthur O. Sherman, Executor of Estate of Walter Engelsman | .00010900 RI | Pines Bridge Road<br>Ossing, NY 10562 |
| Ralph G. Engelsman, Jr. | .00005450 RI | 2 Green Hill Road<br>Madison, NY 07940 |
| Alan D. Engelsman | .00005450 RI | 110 Brighton Way<br>Clayton, Mo. 63105 |
| Bonnie R. Etz | .01562500 RI | P.O. Box 1992<br>Roswell, NM 88201 |

D/O No. 30-025-004479 (Covers only Oil Production)
Prop. ID 064---5466--64
TURNER B-1
Tract 64: (Continued)

| Credit to | Interest | Address |
|---|---|---|
| George H. Etz, Jr. Trustee of George H. Etz Sr. Account | .01562500 RI | 2003-17th St. Lubbock, Tx. 79401 |
| The First National Bank of Midland, Texas, Trustee, Trust No. 862 | .00016200 RI | P.O. Box 270 Midland, Tx. 79701 |
| The First National Bank of Midland, Texas, Trustee, Trust No. 863 | .00016300 RI | P.O. Box 270 Midland, Tx. 79701 |
| John K. Funk | .00401000 RI | 1155 Mercantile Dallas Bldg. Dallas, Tx. 75201 |
| Edward Gerber | .00002500 RI | 2881 NE 33rd Ct. Ft. Lauderdale, Fl. 33306 |
| Eva Gousy | .00007500 RI | c/o Nazaire Gousy 884 Newport Avenue Pawtucket, RI 02861 |
| Louis H. Gousy | .00002500 RI | 8 Old River Road Manville, RI 02838 |
| Aurore Gousy | .00002400 RI | 884 Newport Avenue Pawtucket, RI 02861 |
| Estate of Mary E. Granberg | .00000429 RI | c/o Robert J. Anderson 31 Skyline Drive Wellesley, Ma. 02181 |
| Lois A. Hankamp | .00000062 RI | 5432 Shelley Way Carmichael, Ca. 95608 |
| Glenn A. Harris | .00006600 RI | 1441 Bexley Lane Brea, Ca. 92621 |
| Erna Hoffman | .00000124 RI | 1017 Minor, Apt. 702 Seattle, Wa. 98102 |
| Charlotte Jameson | .00000429 RI | 982 Ivy Avenue East St. Paul, Mn. 55106 |
| Roberth Booth Kellough & Lawrence H. Wilson Jr., Co Executors of the Est. of Robt. W. Kellough | .00013200 RI | 1601 S. Madison Tulsa, Ok. 74120 |
| Lois Anne La Mar | .00000062 RI | 230 South State Street, Apt.28 Zeeland, Mi. 49464 |
| Duncan Langdon, Jr. | .00112800 RI | R. D. 2 Stowe, Vt. 05672 |

D/O No. 30-025-004479 (Covers only Oil)
Prop. ID 064---5466--64
TURNER B-1
Tract 64: (Continued)

| Credit to | Interest | Address |
|---|---|---|
| James W. Lay | .00019800 RI | 720 Rice Street NW<br>Atlanta, Ga. 30318 |
| Rhoda P. LeCocq | .00019800 RI | Crocker Citizens National Bank<br>1 Montgomery St.<br>Savings Department<br>Book 9-24719<br>San Francisco, Ca. 94104 |
| Margaret Lewis Lidren | .00000123 RI | 1243 NE 168th Street<br>Seattle, Wa. 98155 |
| Margaret B. Luders | .00195300 RI | Box 124<br>Bearsville, NY 12409 |
| Martha Maki | .00000124 RI | 5942 46th Avenue, SW<br>Seattle, Wa. 98116 |
| Cola Maloney | .00005000 RI | Cape Vincent, N.Y. 13618 |
| Meryle Horning McFerron | .00002500 RI | 1906 Wroxton Road<br>Houston, Tx, 77005 |
| Meryle Horning McFerron, Trustee U/W/O George Irwin McFerron | .00002500 RI | |
| J. R. McGinley, Jr. | .00112900 RI | 530 Beacon Building<br>Tulsa, Ok. 74103 |
| Mary Elizabeth McMath | .00085125 RI | 403 East 4th Street<br>Sheridan, Indiana 46069 |
| Ida Miller | .00009400 RI | c/o Joan Ganz Agent<br>P.O. Box 65<br>Farmingdale, NY 11735 |
| John Mohler | .00085125 RI | 2201 E. Floyd Avenue<br>Englewood, Co. 80110 |
| South Shore National Bank Trustee Under the Gladys F. Morse Trust | .00009900 RI | 1400 Hancock Street<br>Quincy, Ma. 02169 |
| North Central Oil Corporation | .00208300 RI | P.O. Box 27491<br>Houston, Tx. 77027 |
| Mary Jane O'Hern | .00034600 RI | 1500 North Graham<br>Odessa, Tx. 79763 |
| Mary Oja | .00000198 RI | 9676 Rainier Avenue South<br>Seattle, Wa. 98118 |

D/O No. 30-025-004479 (Covers only Oil Production)
Prop. ID 064---5466--64
TURNER B-1
Tract 64: (Continued)

| Credit to | Interest | Address |
|---|---|---|
| Joan Ganz and Carl Ganz, Successor Trustees under the Last Will and Testament of Mary Duke Pearlbrook | .00084400 RI | P.O. Box 65<br>Farmingdale, NY 11735 |
| Webster Sandford & The Chase Manhattan Bank, NA, Trustees U/W of Helen D. Pearlbrook | .00093700 RI | Trust Dept.<br>1211 Avenue of the Americas<br>New York, NY 10036 |
| Robert G. Polhamus | .00000429 RI | 140 West 9th Street<br>Port Angeles, Wa. 98362 |
| Harold G. Price | .00010800 RI | 67-43 Clyde Street<br>Forest Hills, NY 11375 |
| Cora Robidoux | .00002500 RI | 8 Old River Road<br>Manville, Rhode Island 02838 |
| Sabine Production Company | .00101600 RI | |
| Samedan Oil Corporation | .00586000 RI<br>.54687500 WI | P. O. Box 84747<br>Dallas, TX 75284 |
| Estate of Hilton Sayle | .00000429 RI | c/o Harry P. Stinespring, Jr., Atty.<br>38 South Dearborn St., Suite 777<br>Chicago, Il. 60603 |
| Estate of Elizabeth Sayle | .00000429 RI | c/o Dr. Robert P. Sayle<br>Dundee, Ms. 38626 |
| Dr. Robert P. Sayle | .00000429 RI | Dundee, Ms. 38626 |
| Estate of Mona Sayle | .00000429 RI | C/O Harry P. Stinespringer, Jr., Atty.<br>38 South Dearborn St., Suite 777<br>Chicago, Il.60603 |
| Elaine N. Shepherd for Herself and as Attorney in Fact | .00097700 RI | Suite 800<br>Citizens Bank Tower<br>Oklahoma City, Ok. 73106 |
| John Shepherd | .00014100 RI | 10324 Yukon<br>Bloomington, Mn. 55438 |
| Vernon Sheldon, or Vivian Sheldon | .00195300 RI | 2830 Turnbull St.<br>Oceanside, Ca. 92054 |

D/O No. 30-025-004479 (Covers only Oil Production)
Prop. ID 064---5466--64
TURNER B-1
Tract 64: (Continued)

| Credit to | Interest | Address |
|---|---|---|
| Alice M. Smith | .00000429 RI | 637 Staub Court, NE<br>Cedar Rapids, Ia. 52402 |
| Janice Lemmon Smith | .00019800 RI | 23 Colonel Evans Drive<br>Morristown, NJ 07960 |
| Helen Joy Smith | .00016300 RI | Route 1, Box 146A<br>Newark, Ar. 72562 |
| Frances B. Spangler | .00029700 RI | 9 Covewood Dr.<br>Rowayton, Ct. 06853 |
| James E. Swenson, Custodian for Susan Lee Swenson | .00004950 RI | 1200 Cunningham<br>Dixon, Ca. 95620 |
| Louise A. Swilley | .00007400 RI | 1101 Heights Blvd.<br>Houston, Tx. 77008 |
| Hugh Thompson, Agent for the Heirs of Stanley Thompson | .00000429 RI | 4208 Ewing Ave. South<br>Minneapolis, Mn. 55410 |
| Hugh Thompson, Agent for Jean Thompson | .00000429 RI | 4208 Ewing Ave. South<br>Minneapolix, Mn. 55410 |
| William Carson Thompson | .00000429 RI | 5200 Hampshire Drive<br>Minneapolis, Mn. 55419 |
| John Thompson | .00000429 RI | 1811 Jefferson Street<br>Madison, Wi. 53711 |
| Hugh Thompson | .00000429 RI | 4208 Ewing, Avenue South<br>Minneapolis, Mn. 55410 |
| Hugh Thompson, Agent for Marie Thompson | .00000429 RI | 4208 Ewing Avenue South<br>Minneapolis, Mn. 55410 |
| Elizabeth T. Barry and Alice T. Smith, Executors of Estate of Malcolm M. Thompson | .00000429 RI | 644 29th St. NE<br>Cedar Rapids, Ia. 52403 |
| Elizabeth T. Barry and Alice T. Smith, Executors of Estate of Malcolm M. Thompson, Jr. | .00000429 RI | |
| The University of Rochester | .00601600 RI | Attn: Phillip Horsley<br>Investment Office<br>River Station<br>Rochester, NY 14627 |

D/O No. 30-025-004479 (Covers only Oil Production)
Prop. ID 064---5466--64
TURNER B-1
Tract 64: (Continued)

| Credit to | Interest | Address |
|---|---|---|
| Catherine T. Vennes | .00000429 RI | 2121 Nicholasville Rd., Apt. 709<br>Lexington, Ky. 40503 |
| Jennette Clinton Vyskocil | .00068100 RI | Box 434<br>Littleton, Co. 80160 |
| Loretta Mary Voss | .00000429 RI | 13 Belair Road<br>Wellesley, Ma. 02181 |
| Vask Warner Trust<br>UA September 29, 1956 | .00237600 RI | c/o North New York Savings Bank<br>464 Mamaroneck Ave.<br>White Plains, NY 10605 |
| Ellen Anne Wallace Williams | .00026000 RI | P.O. Box 10054<br>Glendale, Ca. 91209 |
| William J. Threadgill, Surviving Trustee for Randolph Maurice Wolff Under the Will of Frankel M. Wolff | .00037900 RI | P.O. Box 1366<br>Columbus, Ms. 39701 |
| William J. Threadgill, Surviving Trustee for Deborah Patricia Wolff, Under the Will of Frankel M. Wolff | .00038000 RI | P.O. Box 1366<br>Columbus, Ms. 39701 |
| Gustav Zellnik | .00010800 RI | c/o Hotel Olcott<br>27 W. 72 Street<br>New York, NY 10023 |

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D/O No. 30-025-004479 (Covers only Oil Production)
Prop. ID 064---5466--65
TURNER B-2
Tract 65: SE/4 SE/4 Section 34-18S-38E

Tract Participation:

Phase 1: .37764%
Phase 2: .37040%
Phase 3: .01661%

| Credit to | Interest | Address |
|---|---|---|
| Jimmie Mc Ghee Triplett | .00002900 RI | |
| J. W. Triplett | .00001450 RI | |
| O. A. Triplett | .00001450 RI | |
| Valerie S. Osborn | .00003850 RI | |
| Natalie S. Huffman | .00003850 RI | |
| John A. Swenson | .00003850 RI | |
| The Samuel Roberts Noble Foundation, Inc. | .00014700 RI | |
| Elizabeth H. Coates, Arthur T. Stieren, Jr., Betty A. Roberts, John R. Harris & Chas V. Richter, Indep. Executors of the George H. Coates Estate | .00312500 RI | |
| Mercantile National Bk at Dallas & Mary Carolyn Umpleby, Co-Trs (3694) | .00390600 RI | |
| The First National Bank of Midland Texas and Jessie Blevins Crump Co-Trustees Trust # 1069 | .00195300 RI | |
| Roy G. Barton | .00007600 RI | |
| The First National Bank of Midland Trustee U/W of H. H. Watson Account #23 | .00048800 RI | |
| H. Huffman & Co. | .00023100 RI | |
| David J. Flackman | .00007700 RI | |
| Horton Aldred | .00065975 RI | |
| Emma S. Anderson | .00003800 RI | |
| Robert J. Anderson | .00000334 RI | |
| Harriet F. Anfenson | .00012200 RI | |
| Atlantic Richfield Company | .00390600 RI | |
| Kathaleen Baker | .00118500 RI | |
| Elizabeth T. Barry | .00000334 RI | |
| Mary E. Beatty | .00130400 RI | |
| Charles Francis Bedford | .00026100 RI | |
| Henry De Graffenried Bedford | .00026000 RI | |
| Helen Learmont Bedford | .00026000 RI | |
| Elizabeth Blosser | .00000334 RI | |

D/O No. 30-025-004479 (Covers only Oil Production)
Prop. ID 064---5466--65
TURNER B-2
Tract 65: (Continued)

| Credit to | Interest | Address |
|---|---|---|
| Frances Bogart | .00010200 RI | |
| George H. Bond Jr., Estate Agency No. 8478-00 | .00023050 RI | |
| Rachel Bedford Bowen | .00026100 RI | |
| The Buffalo Co. | .00601600 RI | |
| Irene Burgess | .00024300 RI | |
| June F. Burnett | .00000950 RI | |
| Robert W. Burnett | .00001425 RI | |
| Ronald N. Burnett | .00001425 RI | |
| Buttram Energies, Inc. | .01277300 RI | |
| Louise W. Challenger | .00118500 RI | |
| Cities Service Company | .00781200 RI | |
| George B. Clegg III and Wife Aileen N. Clegg as Joint Tenants with Right of Survivorship | .00037600 RI | |
| Stanford Clinton, Sr. and Zylpha Clinton | .00105560 RI | |
| Stanford Clinton, Jr. | .00052780 RI | |
| Bruce E. Clinton | .00052780 RI | |
| Wilda L. Collins | .00000154 RI | |
| Mary Jane Mohler Corbin | .00065975 RI | |
| Patricia Ruth Cox | .00012200 RI | |
| Jessie Blevins Crump, David C. Blevins & The Fort Worth National Bank as Trustees under the Will of Jones Lester Crump | .00195300 RI | |
| Iris Gerber Damson | .00001900 RI | |
| Charles E. Delaney and Wife Helen C. Delaney as Joint Tenants with Right of Survivorship | .00037600 RI | |
| Ann Dowd | .00062500 RI | |
| James E. O'Brien and Robert E. O'Brien as Ancillary Executors of the Estate of Frank W. Doyle | .00015400 RI | |
| Thomas R. Dugan and Wife Barbara C. Dugan as Joint Tenants with Right of Survivorship | .00037600 RI | |
| The First National Bank of Midland, TX, Trustee for the N. K. Ellis Trust No. 1 Account # 283 | .00097700 RI | |

D/O No. 30-025-004479 (Covers only Oil Production)
Prop. ID 064---5466--65
TURNER B-2
Tract 65: (Continued)

| Credit to | Interest | Address |
|---|---|---|
| H. Edison Ellis, Jr. | .00023000 RI | |
| Gustave Engelsman | .00010900 RI | |
| Arthur O. Sherman, Executor of Estate of Walter Engelsman | .00010900 RI | |
| Ralph G. Engelsman, Jr. | .00005450 RI | |
| Alan D. Engelsman | .00005450 RI | |
| Bonnie R. Etz | .01562500 RI | |
| George H. Etz, Jr., Trustee of George H. Etz Sr. Trust | .01562500 RI | |
| The First National Bank of Midland, Texas, Trustee Trust No. 862 | .00016300 RI | |
| The First National Bank of Midland, Texas, Trustee Trust No. 863 | .00016200 RI | |
| John K. Funk | .00401000 RI | |
| Edward Gerber | .00001900 RI | |
| Eva Gousy | .00005700 RI | |
| Louis H. Gousy | .00001900 RI | |
| Aurore Gousy | .00002000 RI | |
| Estate of Mary E. Granberg | .00000334 RI | |
| Lois A. Hankamp | .00000048 RI | |
| Glenn A. Harris | .00005100 RI | |
| Berry Lee Hobbs | .00351400 RI | Lovington, N. M. 88260 |
| Erna Hoffman | .00000096 RI | |
| Charlotte Jameson | .00000334 RI | |
| Robert Booth Kellough & Lawrence H. Wilson Jr. Co-Executors of the Est. of Robert W. Kellough | .00010300 RI | |
| Lois Anne La Mar | .00000048 RI | |
| Duncan Langdon, Jr. | .00112800 RI | |
| James W. Lay | .00015400 RI | |
| Rhoda P. Le Cocq | .00015400 RI | |
| Margaret Lewis Lidren | .00000096 RI | |

D/O No. 30-025-004479 (Covers only Oil Production)
Prop. ID 064---5466--65
TURNER B-2
Tract 65: (Continued)

| Credit to | Interest | Address |
|---|---|---|
| Margaret B. Luders | .00195300 RI | |
| Martha Maki | .00000096 RI | |
| Cola Maloney | .00003800 RI | |
| Meryle Horning McFerron | .00001900 RI | |
| Meryle Horning McFerron, Trustee U/W/O George Irwin McFerron | .00001900 RI | |
| J. R. McGinley, Jr. | .00112900 RI | |
| Mary Elizabeth McMath | .00065975 RI | |
| Ida Miller | .00009400 RI | |
| John Mohler | .00065975 RI | |
| South Shore National Bank, Trustee under the Gladys F. Morse Trust | .00007700 RI | |
| North Central Oil Corporation | .00208300 RI | |
| Mary Jane O'Hern | .00026900 RI | |
| Mary Oja | .00000154 RI | |
| Joan Ganz and Carl Ganz, Successor Trustees under the Last Will and Testament of Mary Duke Pearlbrook | .00084300 RI | |
| Webster Sandford & The Chase Manhattan Bank NA, Trustees U/W of Helen D. Pearlbrook | .00093800 RI | |
| Robert G. Polhamus | .00000334 RI | |
| Harold G. Price | .00010800 RI | |
| Cora Robidoux | .00001900 RI | |
| Sabine Production Company | .00101600 RI | |
| Samedan Oil Corporation | .00585900 RI<br>.54687500 WI | |
| Estate of Hilton Sayle | .00000333 RI | |
| Estate of Elizabeth Sayle | .00000333 RI | |
| Dr. Robert P. Sayle | .00000333 RI | |
| Estate of Mona Sayle | .00000334 RI | |
| Elaine N. Shepherd for herself, and as Attorney-in-Fact | .00097700 RI | |
| John Shepherd | .00010900 RI | |

D/O No. 30-025-004479 (Covers only Oil Production)
Prop. ID 064---5466--65
TURNER B-2
Tract 65: (Continued)

| Credit to | Interest | Address |
|---|---|---|
| Vernon Sheldon, or Vivian Sheldon | .00195300 RI | |
| Alice M. Smith | .00000334 RI | |
| Janice Lemmon Smith | .00015400 RI | |
| Helen Joy Smith | .00016300 RI | |
| Frances B. Spangler | .00023050 RI | |
| James E. Swenson, Custodian for Susan Lee Swenson | .00003850 RI | |
| Louise A. Swilley | .00005800 RI | |
| Hugh Thompson, Agent for the Heirs of Stanley Thompson | .00000333 RI | |
| Hugh Thompson, Agent for Jean Thompson | .00000333 RI | |
| William Carson Thompson | .00000333 RI | |
| John Thompson | .00000334 RI | |
| Hugh Thompson | .00000334 RI | |
| Hugh Thompson, Agent for Marie Thompson | .00000334 RI | |
| Elizabeth T. Barry and Alice T. Smith, Executors of Estate of Malcolm M. Thompson | .00000334 RI | |
| Elizabeth T. Barry and Alice T. Smith, Executors of Estate of Malcolm M. Thompson, Jr. | .00000334 RI | |
| The University of Rochester | .00601600 RI | |
| Catherine T. Vennes | .00000334 RI | |
| Jennette Clinton Vyskocil | .00052780 RI | |
| Loretta Mary Voss | .00000334 RI | |
| Vask Warner Trust U/A September 29, 1956 | .00184300 RI | |
| Ellen Anne Wallace Williams | .00026000 RI | |

D/O No. 30-025-004479 (Covers only Oil Production)
Prop. ID 064---5466--65
TURNER B-2
Tract 65: (Continued)

| Credit to | Interest | Address |
|---|---|---|
| William J. Threadgill, Surviving Trustee for Randolph Maurice Wolff under the Will of Frankel M. Wolff | .00037900 RI | |
| William J. Threadgill, Surviving Trustee for Deborah Patricia Wolff, under the Will of Frankel M. Wolff | .00038000 RI | |
| Gustav Zellnik | .00010800 RI | |

- - -

D/O No. 30-025-004479 (Covers only Oil Production)
Prop. ID 064---5466--66
TURNER "A"
Tract 66: W/2 SE/4 Section 34-18S-38E

Tract Participation:

Phase 1: 2.28031%
Phase 2: 2.47569%
Phase 3: .37923%

| Credit to | Interest | Address |
|---|---|---|
| Jimmie McGhee Triplett | .00003700 RI | |
| J. W. Triplett | .00001850 RI | |
| O. A. Triplett | .00001850 RI | |
| Valerie S. Osborn | .00004950 RI | |
| Natalie S. Huffman | .00004950 RI | |
| John A. Swenson | .00004950 RI | |
| The Samuel Roberts Noble Foundation, Inc. | .00019000 RI | |

D/O No. 30-025-004479 (Covers only Oil Production)
Prop. ID 064---5466--66
TURNER "A"
Tract 66: (Continued)

| Credit to | Interest | Address |
|---|---|---|
| Elizabeth H. Coates, Arthur T. Stieren, Jr., Betty A. Roberts, John R. Harris & Chas. V. Richter, Indep. Executors of the George H. Coates Estate | .00312500 RI | |
| Mercantile National Bank at Dallas & Mary Carolyn Umpleby, Co-Trs. (3694) | .00390600 RI | |
| The First National Bank of Midland, Texas and Jessie Blevins Crump, Co-Trustees Trust #1069 | .00195300 RI | |
| Roy G. Barton | .00009900 RI | |
| S. E. Cone, Jr. | .00130200 RI | Route 2, Box 363<br>Lubbock, Texas 79415 |
| Tom Sealy, William Myron Keck II & Katherine Cone Keck, Trustees under Trust "C" Created by the Last Will & Testatment of S. E. Cone | .00130200 RI | |
| The First National Bank of Midland, Trustee U/W of H. H. Watson, Account #23 | .00048800 RI | |
| H. Huffman & Co. | .00029700 RI | |
| Marjorie Cone Kastman | .00130200 RI | 2420 Quaker, Suite 5<br>Lubbock, Tx. 79410 |
| David J. Flackman | .00009900 RI | |
| Horton Aldred | .00085150 RI | |
| Emma S. Anderson | .00005000 RI | |
| Robert J. Anderson | .00000429 RI | |
| Harriet F. Anfenson | .00015700 RI | |
| Atlantic Richfield Company | .00390600 RI | |
| Kathaleen W. Baker | .00118450 RI | |
| Elizabeth T. Barry | .00000429 RI | |
| Mary E. Beatty | .00168300 RI | |
| Charles Francis Bedford | .00026000 RI | |

D/O No. 30-025-004479 (Covers only Oil Production)
Prop. ID 064---5466--66
TURNER "A"
Tract 66: (Continued)

| Credit to | Interest | Address |
|---|---|---|
| Henry DeGraffenried Bedford | .00026100 RI | |
| Helen Learmont Bedford | .00026100 RI | |
| Elizabeth Blosser | .00000429 RI | |
| Frances Bogart | .00013200 RI | |
| George H. Bond, Jr., Estaté Agency No. 8478-00 | .00029700 RI | |
| Rachel Bedford Bowen | .00026000 RI | |
| The Buffalo Co. | .00601600 RI | |
| Irene Burgess | .00031300 RI | |
| June F. Burnett | .00001250 RI | |
| Robert W. Burnett | .00001875 RI | |
| Ronald N. Burnett | .00001875 RI | |
| Buttram Energies, Inc. | .01277300 RI | |
| Louise W. Challenger | .00118450 RI | |
| Cities Service Company | .00781300 RI<br>.05468800 WI | |
| George B. Clegg III and Wife, Aileen N. Clegg as Joint Tenants with Right of Survivorship | .00037600 RI | |
| Stanford Clinton, Sr. and Zilpha Clinton | .00136240 RI | |
| Stanford Clinton, Jr. | .00068120 RI | |
| Bruce E. Clinton | .00068120 RI | |
| Wilda L. Collins | .00000198 RI | |
| Fern Cone | .00390600 RI | |
| Mary Jane Mohler Corbin | .00085150 RI | |
| Patricia Ruth Cox | .00015700 RI | |

D/O No. 30-025-004479 (Covers only oil production)
Prop. ID 064---5466--66
TURNER "A"
Tract 66: (Continued)

| Credit to | Interest | Address |
|---|---|---|
| Jessie Blevins Crump, David C. Blevins & The Fort Worth National Bank as Trustees under the Will of Jones Lester Crump | .00195300 RI | |
| Iris Gerber Damson | .00002500 RI | |
| Charles E. Delaney and wife, Helen C. Delaney as Joint Tenants with Right of Survivorship | .00037600 RI | |
| Ann Dowd | .00062500 RI | |
| James E. O'Brien and Robert E. O'Brien as Ancillary Executors of the Estate of Frank W. Doyle | .00019800 RI | |
| Thomas R. Dugan and wife Barbara C. Dugan as Joint Tenants with Right of Survivorship | .00037600 RI | |
| The First National Bank of Midland, Tx. Trustee for the N. K. Ellis Trust No. 1, Account No. 283 | .00097700 RI | |
| H. Edison Ellis, Jr. | .00029700 RI | |
| Gustave Englesman | .00010900 RI | |
| Arthur O. Sherman, Executor of Estate of Walter Englesman | .00010900 RI | |
| Ralph G. Engelsman, Jr. | .00005450 RI | |
| Alan D. Engelsman | .00005450 RI | |
| Bonnie R. Etz | .00781300 RI | |
| George H. Etz Jr., Trustee of George H. Etz, Sr. Trust | .00781300 RI | |
| The First National Bank of Midland, Texas, Trustee, Trust No. 862 | .00016300 RI | |

D/O No. 30-025-004479 (Covers only oil production)
Prop. ID 064---5466--66
TURNER "A"
Tract 66: (Continued)

| Credit to | Interest | Address |
|---|---|---|
| The First National Bank of Midland Texas, Trustee Trust No. 863 | .00016300 RI | |
| John K. Funk | .00401000 RI | |
| Edward Gerber | .00002500 RI | |
| Eva Gousy | .00007500 RI | |
| Louis H. Gousy | .00002400 RI | |
| Aurore Gousy | .00002400 RI | |
| Estate of Mary E. Granberg | .00000429 RI | |
| Lois A. Hankamp | .00000062 RI | |
| Glenn A. Harris | .00006600 RI | |
| Erna Hoffman | .00000124 RI | |
| Charlote Jameson | .00000429 RI | |
| Roberth Booth Kellough & Lawrence H. Wilson, Jr., Co-Executors of the Est. of Robt. W. Kellough | .00013200 RI | |
| Lois Anne LaMar | .00000062 RI | |
| Duncan Langdon, Jr. | .00112800 RI | |
| James W. Lay | .00019800 RI | |
| Rhoda P. LeCocq | .00019800 RI | |
| Margaret Lewis Lidren | .00000123 RI | |
| Margaret B. Luders | .00195300 RI | |
| Martha Maki | .00000124 RI | |
| Cola Maloney | .00005000 RI | |
| Meryle Horning McFerron | .00002500 RI | |
| Meryle Horning McFerron, Trustee u/w/o George Irwin McFerron | .00002500 RI | |
| J. R. McGinley, Jr. | .00112900 RI | |
| Mary Elizabeth McMath | .00085150 RI | |
| Ida Miller | .00009400 RI | |
| John Mohler | .00085150 RI | |
| South Shore National Bank, Trustee under the Gladys F. Morse Trust | .00009900 RI | |
| North Central Oil Corporation | .00208300 RI | |
| Mary Jane O'Hearn | .00034600 RI | |
| Mary Oja | .00000198 RI | |

D/O No. 30-025-004479 (Covers only oil production)
Prop. ID 064---5466--66
TURNER "A"
Tract 66: (Continued)

| Credit to | Interest | Address |
|---|---|---|
| Joan Ganz and Carl Ganz, Successor Trustees under the Last Will and Testament of Mary Duke Pearlbrook | .00084300 RI | |
| Webster Sandford & The Chase Manhattan Bank NA, Trustees u/w of Helen D. Pearlbrook | .00093800 RI | |
| Robert G. Polhamus | .00000429 RI | |
| Harold G. Price | .00010800 RI | |
| Cora Robidoux | .00002400 RI | |
| Sabine Production Company | .00101600 RI | |
| Samedan Oil Corporation | .00586000 RI<br>.82031200 WI | |
| Estate of Hilton Sayle | .00000429 RI | |
| Estate of Elizabeth Sayle | .00000429 RI | |
| Dr. Robert P. Sayle | .00000429 RI | |
| Estate of Mona Sayle | .00000429 RI | |
| Elaine N. Shepherd for Herself and as Attorney-in-Fact | .00097700 RI | |
| John Shepherd | .00014100 RI | |
| Vernon Sheldon, or Vivian Sheldon | .00195300 RI | |
| Alice M. Smith | .00000429 RI | |
| Janice Lemmon Smith | .00019800 RI | |
| Helen Joy Smith | .00016200 RI | |
| Frances B. Spangler | .00029700 RI | |
| James E. Swenson, Custodian for Susan Lee Swenson | .00004950 RI | |
| Louise A. Swilley | .00007400 RI | |
| Lois Cone Tekell | .00781300 RI | 1720 Woodlawn<br>Corsicana, Texas 75110 |
| Hugh Thompson, Agent for the Heirs of Stanley Thompson | .00000429 RI | |
| Hugh Thompson, Agent for Jean Thompson | .00000429 RI | |

D/O No. 30-025-004479 (Covers only Oil Production)
Prop. ID 064---5466--66
TURNER "A"
Tract 66: (Continued)

| Credit to | Interest | Address |
|---|---|---|
| William Carson Thompson | .00000429 RI | |
| John Thompson | .00000429 RI | |
| Hugh Thompson | .00000429 RI | |
| Hugh Thompson, Agent for Marie Thompson | .00000429 RI | |
| Elizabth T. Barry and Alice T. Smith, Executors of Estate of Malcolm M. Thompson | .00000429 RI | |
| Elizabeth T. Barry and Alice T. Smith, Executors of Estate of Malcolm M. Thompson, Jr. | .00000429 RI | |
| The University of Rochester | .00601600 RI | |
| Catharine T. Vennes | .00000429 RI | |
| Jennette Clinton Vyskocil | .00068120 RI | |
| Loretta Mary Voss | .00000429 RI | |
| Vask Warner Trust, UA September 29, 1956 | .00237700 RI | |
| Ellen Anne Wallace Williams | .00026000 RI | |
| William J. Threadgill, Surviving Trustee for Randolph Maurice Wolff under the Will of Frankel M. Wolff | .00037900 RI | |
| William J. Threadgill, Surviving Trustee for Deborah Patricia Wolff, under the Will of Frankel M. Wolff | .00038000 RI | |
| Gustav Zellnik | .00010800 RI | |

- - -

D/O No. 30-025-005457 (Covers only oil production)
Prop. ID 064---5466--49
STATE "B"
Tract 49: W/2 NE/4 and E/2 NW/4 Section 29, T18S-R38E

Tract Participation:

Phase 1: 1.37425%
Phase 2: 1.32399%
Phase 3: 1.40956%

| Credit to | Interest | Address |
|---|---|---|
| Amerada Hess Corporation | .87500000 WI | |
| ✓Southern Union Refining Company a/c Commissioner of Public Lands, State of New Mexico | .12500000 RI | |

- - -

D/O No. 30-025-005454 (Covers only Oil Production)
Prop. ID 064---5466--71
STATE "A"
Tract 71: N/2 NE/4 Section 32, T-18S, R-38E

Tract Participation:

Phase 1: 1.47100%
Phase 2: 1.45514%
Phase 3: 2.04430%

| Credit to | Interest | Address |
|---|---|---|
| Amerada Hess Corporation | .87500000 WI | |
| ✓Southern Union Refining Company a/c Commissioner of Public Lands, State of New Mexico | .12500000 RI | |

- - -

D/O No. 30-025-005452 (Covers only Oil Production)
Prop. ID 064---5466--11
STATE 1-17
Tract 11: N/2 SW/4 Section 17, T-18S, R-38E

Unit Participation:

Phase 1: .00000%
Phase 2: .00000%
Phase 3: .07277%

| Credit to | Interest | Address |
|---|---|---|
| Chevron USA, Inc. | .87500000 WI | |
| ✓Southern Union Refining Company a/c Commissioner of Public Lands, State of New Mexico | .12500000 RI | |

- - -

D/O No. 30-025-005460 (Covers only Oil Production)
Prop. ID 064---5466--10A
STATE T 17
Tract 10A: SW/4 NW/4 Section 17, T-18S, R-38E

Tract Participation:

Phase 1: .04139%
Phase 2: .03640%
Phase 3: .03576%

| Credit to | Interest | Address |
|---|---|---|
| Getty Oil Company | .21875000 WI | |
| J. N. Dunlavey | .03789100 WI | P. O. Box 837<br>Roswell, N. M. 88201 |
| First Roswell Company | .07578100 WI | P. O. Box 1180<br>Roswell, N. M. 88201 |
| George P. Laflin | .03789100 WI | 815 Metrobank Bldg.<br>Denver, Co. 80202 |
| Kenneth D. McPeters | .05683500 WI | P. O. Box 1919<br>Hobbs, N. M. 88240 |
| R. M. Moran | .22734400 WI | P. O. Box 1919<br>Hobbs, N. M. 88240 |
| Moranco | .07578100 WI | P. O. Box 1860<br>Hobbs, N. M. 88240 |
| Tom Schneider | .02500000 OR | Rt. 2, Box 562<br>Eagle Pass, Texas 78852 |
| Marguerite Willis Somers | .02500000 RI | P. O. Box 1294<br>Midland, Texas 79702 |
| Howell Spear | .00947250 WI | Box 4246<br>Gulfport, Ms. 39501 |
| Ellie Sims Spear | .00947250 WI | 603 East Seco Drive<br>Hobbs, N. M. 88240 |
| Loyd Whitley | .03789100 WI | 2202 Western Drive<br>Midland, Tx. 79701 |
| A. T. Williamson | .03789100 WI | P. O. Box 1919<br>Hobbs, N. M. 88240 |

- - -

**Chevron** U.S.A. Inc.
P. O. Box 1660, Midland, TX 79702

**Production Department**
Mid-Continent Division

September 26, 1979

RECEIVED
SEP 2 3 1979
OIL CONSERVATION DIVISION
SANTA FE

Case Nos. 6652 & 6653

Oil Conservation Division
State of New Mexico
P. O. Box 2088
Santa Fe, New Mexico 87501

Gentlemen:

Chevron U.S.A. Inc. is familiar with Shell's application for Statutory Unitization and a pressure maintenance program for the North Hobbs (Grayburg-San Andres) Unit and fully endorses and supports these applications.

Yours very truly,

E. E. Hagan
Division Manager

DDA:gg

100 Years Helping to Create the Future

STATE OF NEW MEXICO
# ENERGY AND MINERALS DEPARTMENT
OIL CONSERVATION DIVISION

BRUCE KING
GOVERNOR

LARRY KEHOE
SECRETARY

POST OFFICE BOX 2088
STATE LAND OFFICE BUILDING
SANTA FE, NEW MEXICO 87501
(505) 827-2434

November 9, 1981

Case 6652

Mr. W. W. Dover
Shell Oil Company
P. O. Box 991
Houston, Texas 77001

Dear Mr. Dover:

The procedure outlined in your letter of September 25, 1981, appears satisfactory to this office.

Shell has certainly made a reasonable attempt to re-enter the Getty-Grimes No. 2 and since reservoir simulator model indicates the well will offer no threat to the shallow fresh water zones, we will permit regular injection into injection wells within one-half mile. We will require a yearly bottom hole pressure on either Well No. 29321 or Well No. 29421.

Yours very truly,

JOE D. RAMEY
Director

JDR/fd

cc: Jerry Sexton

**Shell Oil Company**

P.O. Box 991
Houston, Texas 77001

September 25, 1981

New Mexico Energy and Minerals Department
Oil Conservation Division
Attn Mr. J. D. Ramey, Director
P. O. Box 2088
Sante Fe, New Mexico 87501

Gentlemen:

ALTERNATIVE ACTION TO DRILLING A REPLACEMENT PRODUCER
FOR THE PLUGGED AND ABANDONED GETTY-GRIMES WELL NO. 2

Shell, as operator of The North Hobbs Grayburg-San Andres Waterflood Unit, shares your concern over possible contamination of the shallow aquifers through abandoned well bores. However, we believe that with the unit-wide moderate injection well pressures of 0.2 psi/ft., the average reservoir pressures in the vicinity of the subject abandoned well will be too low to cause vertical migration of injected fluids to the surface. To demonstrate the magnitude of pressures anticipated during the San Andres waterflood in the vicinity of Well No. 2, we used a reservoir simulator model as described in attachments one - three.

The results of this model work are shown in attachment four as a plot of the reservoir pressure around Well No. 2 vs. the cumulative injection, in barrels and time, in years. As illustrated, it will require some 10 years to achieve fill-up and 10 additional years to reach 1600± psi, with only moderate increases thereafter.

Some variations from the model predictions can be expected because of changing well conditions and unforeseen circumstances. Therefore, to assure that the pressure in this area does not exceed the hydrostatic head of water, or 1850± psi, bottom hole pressure surveys will be run in one of the offset producers (Nos. 29321 or 29421) as part of the annual North Hobbs bottom hole pressure schedule.

Very truly yours,

W. W. Dover
Division Production Manager
Mid-Continent Division

WRL:LRK

Attachments

cc: Mr. J. Sexton, Supervisor NMOCD - District I
P. O. Box 1980
Hobbs, New Mexico 88240

Shell Oil Company

P.O. Box 991
Houston, Texas 77001

September 25, 1981

New Mexico Energy and Minerals Department
Oil Conservation Division
Attn Mr. J. D. Ramey, Director
P. O. Box 2088
Sante Fe, New Mexico 87501

Gentlemen:

ALTERNATIVE ACTION TO DRILLING A REPLACEMENT PRODUCER
FOR THE PLUGGED AND ABANDONED GETTY-GRIMES WELL NO. 2

Shell, as operator of The North Hobbs Grayburg-San Andres Waterflood Unit, shares your concern over possible contamination of the shallow aquifers through abandoned well bores. However, we believe that with the unit-wide moderate injection well pressures of 0.2 psi/ft., the average reservoir pressures in the vicinity of the subject abandoned well will be too low to cause vertical migration of injected fluids to the surface. To demonstrate the magnitude of pressures anticipated during the San Andres waterflood in the vicinity of Well No. 2, we used a reservoir simulator model as described in attachments one - three.

The results of this model work are shown in attachment four as a plot of the reservoir pressure around Well No. 2 vs. the cumulative injection, in barrels and time, in years. As illustrated, it will require some 10 years to achieve fill-up and 10 additional years to reach 1600± psi, with only moderate increases thereafter.

Some variations from the model predictions can be expected because of changing well conditions and unforeseen circumstances. Therefore, to assure that the pressure in this area does not exceed the hydrostatic head of water, or 1850± psi, bottom hole pressure surveys will be run in one of the offset producers (Nos. 29321 or 29421) as part of the annual North Hobbs bottom hole pressure schedule.

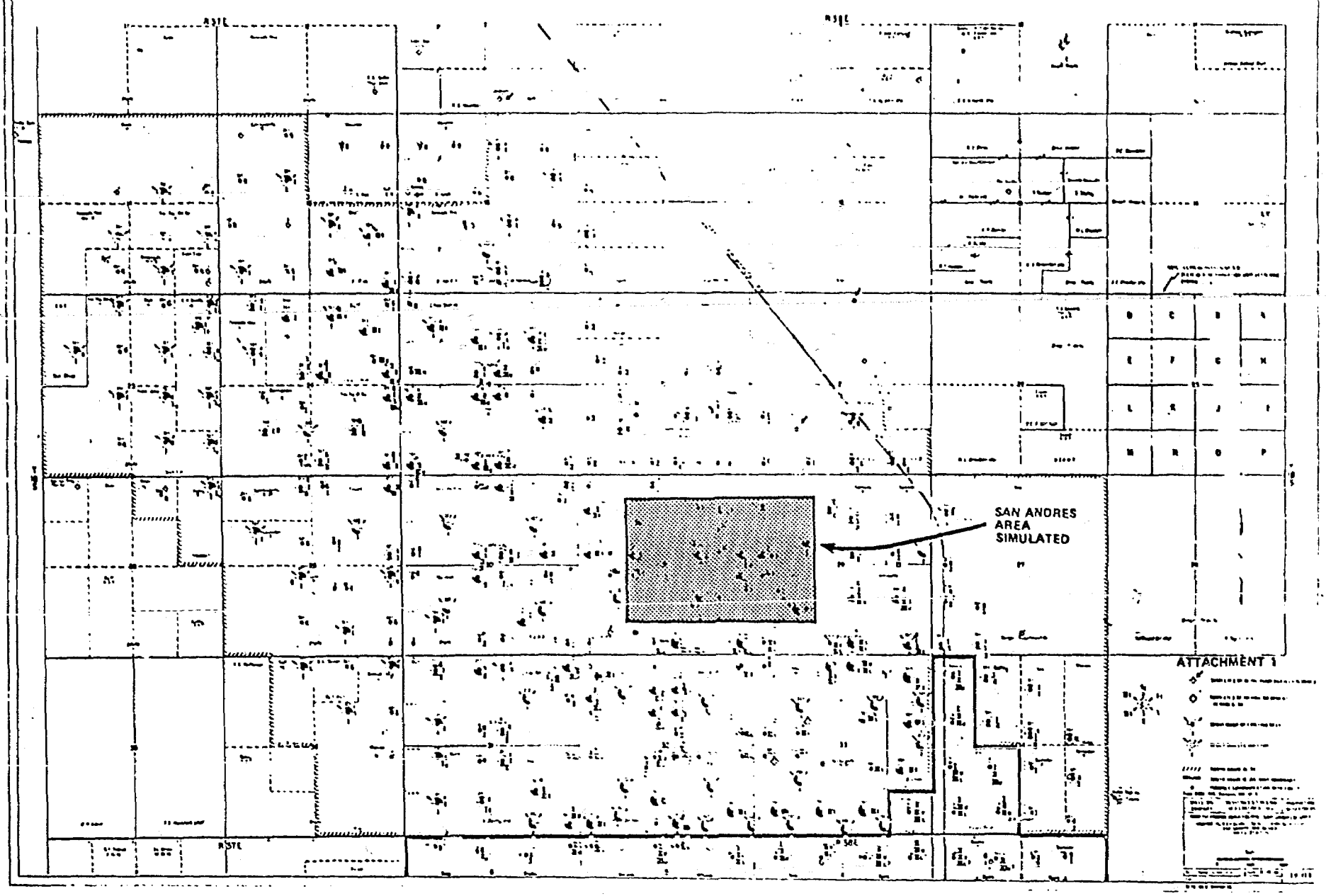
Very truly yours,

W. W. Dover
Division Production Manager
Mid-Continent Division

WRL:LRK

Attachments

cc: Mr. J. Sexton, Supervisor NMOCD - District I
P. O. Box 1980
Hobbs, New Mexico 88240




ATTACHMENT 1

# NORTH HOBBS RESERVOIR SIMULATION MODEL
# FOR SAN ANDRES ZONES II & III
# IN VICINITY OF GETTY GRIMES NO. 2

Single Layer - Constant Thickness

## Dimensions

| | | |
|---|---|---|
| 3500' | - | North-South |
| 6000' | - | East-West |
| 70' | - | Thick |

## No.Cells

| | | |
|---|---|---|
| 9 Cells | - | North-South |
| 15 Cells | - | East-West |

## Reservoir Properties

| | | |
|---|---|---|
| Porosity | - | 14% |
| Permeability | - | 10 md. |
| Saturations (initial) | | |
| Oil | - | 78% |
| Water | - | 22% |
| Gas | - | -0- |
| GØC<br>WØC | Not Included in Model | |

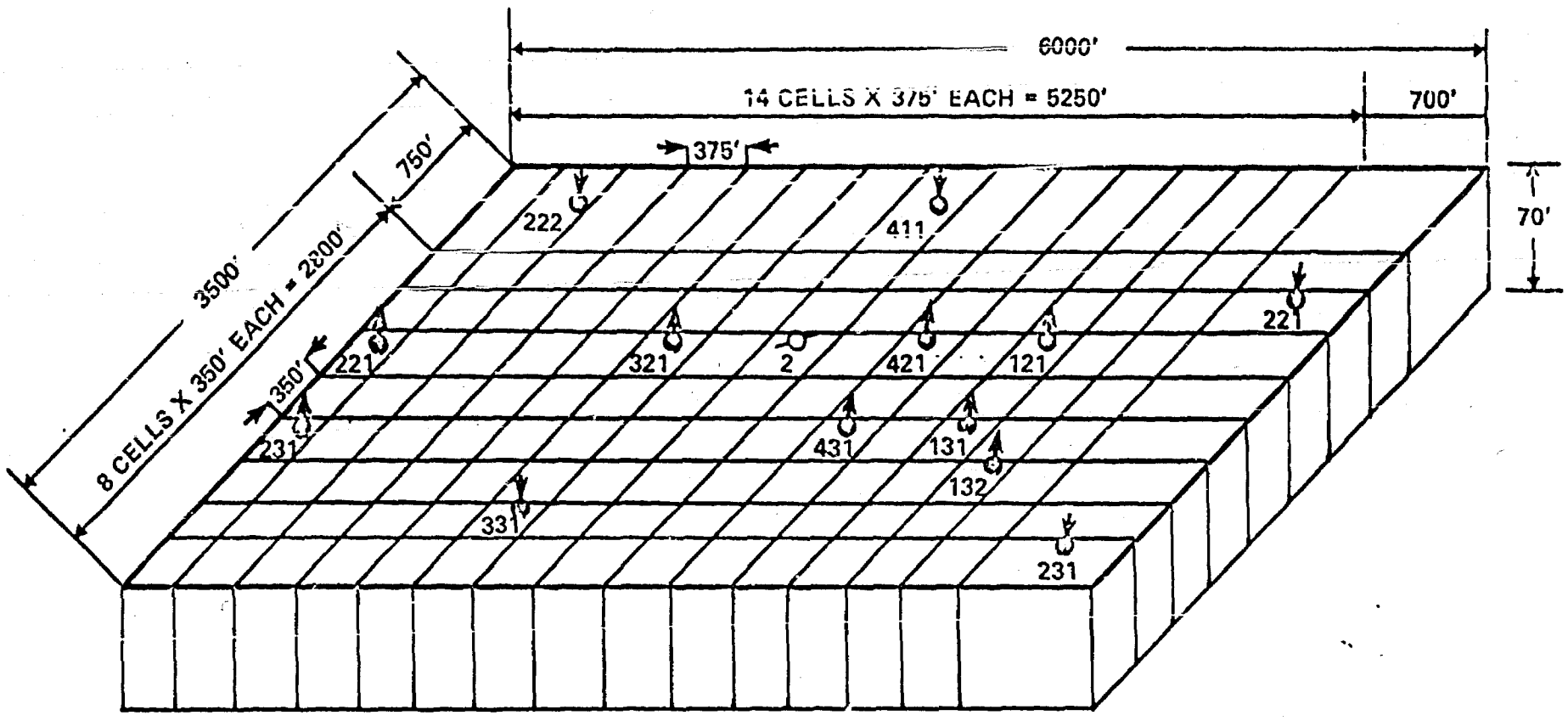
## Initial Fluids In Place

| | | |
|---|---|---|
| OOIP | - | 22,000,000 STB |
| Disolved Gas | - | 14,212 MMCF |
| Free Gas | - | -0- |
| OWIP | - | 8,126,200 STB |

## Reservoir Pressures (Average)

| | | |
|---|---|---|
| At Start Primary | - | 1550 PSI |
| At Start Waterflood | - | 710 psi |

Attachment 2




INJECTION WELL

PRODUCING WELL

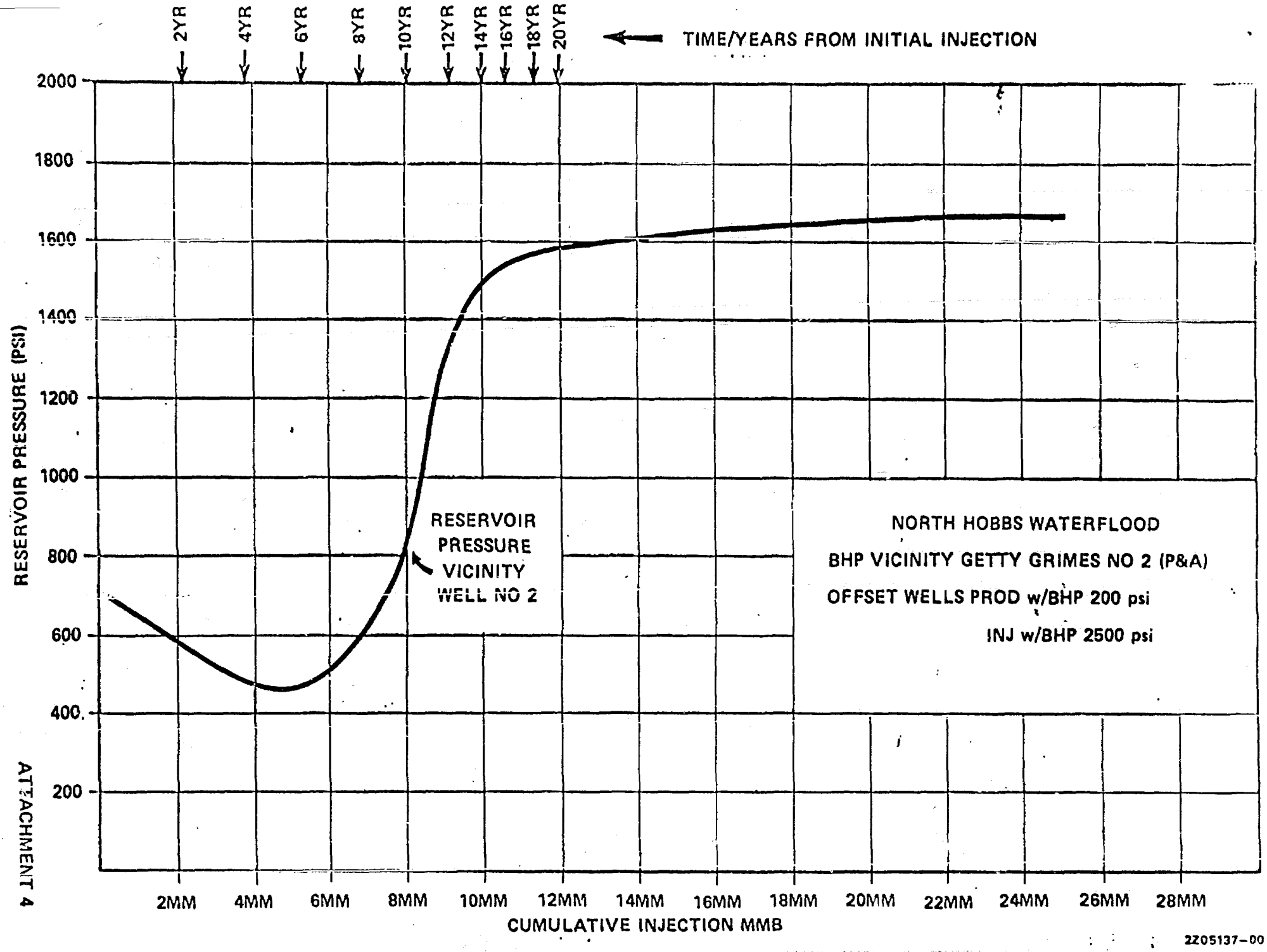
SHUT IN WELL (NO 2)

NORTH HOBBS SIMULATION MODEL
SAN ANDRES ZONES II & III
IN VICINITY GETTY GRIMES NO 2
8/81

2205136-00

ATTACHMENT 3

ATTACHMENT 4

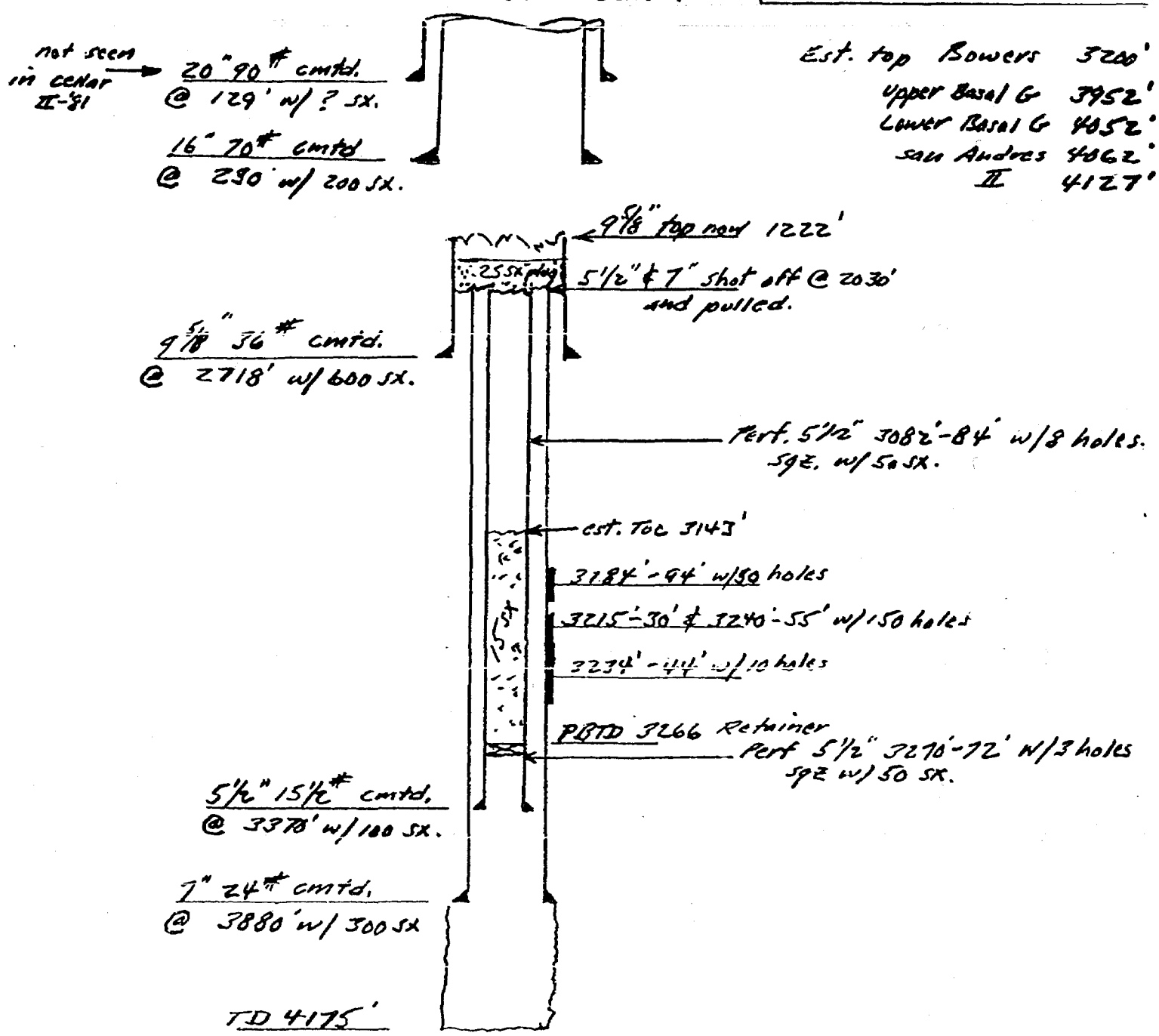



2Z05137-00

Getty - Grimes No. 2
Hobbs Field Lea County, NM
2310' FNL and 990' FEL Section 29 H
T18S - R38E

Completion Date : IX 1930 G/SA
Recompletion Date : X 1946 Bowers
P & A Date : VII 1951
Elev. 3652' Datum

Replugging Data - II, III & IX, 1981
CO to 1310' inside 9 5/8"
CO to 1361' outside 9 5/8"
Window in 9 5/8" @ 1300'




Est. top Bowers 3200'
Upper Basal G 3952'
Lower Basal G 4052'
San Andres 4062'
II 4127'

RWP IX-'81

1

PROGNOSIS
GETTY-GRIMES NO. 2
HOBBS (G/SA) POOL
990'FEL AND 2310'FNL
SEC. 29-18S-38E
LEA COUNTY, NEW MEXICO

WORK ORDER NO.: 968876 SHELL WI: 24.49%

OPERATION: Abandoned well replugging.

WELL DATA: TD 4175 10 sx cmt plug at surface
ELEV 3650'GL

CASING DATA:
20" 90# cmtd @ 129 ft w/? sx.
15 1/2" 70# cmtd @ 230' w/200 sx; 9 5/8" 36# cmtd @ 2718' w/600 sx
7" 24# cmtd @ 3880 w/300 sx; 5 1/2" 15 1/2# cmtd @ 3370' w/100 sx
NOTE: See attached well history and plugging affidavit for recompletion and history of Getty plugging operations.

PROCEDURE:
1. Dig out cellar. Remove marker. Rig up PU and reverse circulator.

2. Drill out cement in 15 1/2" csg. Clean out to 3930' ft.*

3. Spot 100' Class "C" cmt plugs @ 3930'-3830'; 3400'-3300'; 2080'-1980'; 1250'-1150'.

4. Spot Class "C" cmt plug from 400 ft.-200 ft. Spot 10 ft. cmt plug at surface.

5. Weld plate over 15 1/2" csg. Install P&A marker.

RECOMMENDED BY: K W Whitley DATE: 1/29/81

APPROVED BY: Milton A. Mann DATE: 1-29-81

* Top of salt est. 1620'. Red beds exposed from 9 5/8" csg. cut at 1200' to surface csg. Use 9.2#/gal 5 cc WL fresh water base mud for clean out.

NEW MEXICO PRODUCTION UNIT
N. HOBBS (GRAYBURG SAN ANDRES) GETTY GRIMES #2 (24.49%)
ABANDON WELL, REPLUGGING
WO #968876 - $35,166
[redacted]

2-25-81: Status: Digging out cellar w/larger backhoe trying to locate 20" conductor csg. Yesterday dig out cellar 10' square x 10' deep w/no indication of 20" conductor pipe. Set 4 dead men for rig. SDON. CC: $750.

2-26-81: Status: Prepare to install cellar boards & weld onto conductor pipe. Yesterday finished digging out cellar 10' square x 18' deep. Locate top of conductor pipe which is not 20" as prognosis states. Looks like 15 1/2". Build cellar out of 3 x 12s, 9' square x 18' high. Build fence around cellar to prevent anyone from falling in the cellar overnight. SDON. CC: $1675.

2-27-81: Status: Prep to weld joint of 16" csg inside 16" colar 16' below GL. Yesterday set 9 x 9 square x 18' high cellar boards in dug out cellar w/crane. RU rat hole drillers. Drld cmt from around 2 7/8" dry hole marker inside 16" csg. Pulled 3' stub of 2 7/8" dry hole marker out of inside 16" csg, 16' below the ground level. Re? location. SDON. CC: $4528.

2-28-81: Status: SD. Rain and mud. SD Satu & Sunday.
Yesterday - Friday - weld 16" x 16' conductor pipe inside 16" collar. 16' below ground level in cellar. Build 4 x 4 box out of 3 x 12s & place around conductor pipe, btm of cellar. Fill w/Redi-mix cmt. Removed 9 x 9 cellar board box, fill cellar w/dirt. RU DA&S unit #163. SDON. CC: $6703.

3-1-81: Status: SD for Sunday. Yesterday SD rain and mud.
CC: $7453.

3-2-81: Status: Rigging up power swivel, drlg equipment, mud tanks etc.
Yesterday Sunday SD. CC: $7453.

3-3-81: Status: Drlg on wooden plug 27' below GL w/14 3/4" bit.
Yesterday finished RU reverse circulator, drlg equipment, mud tanks, etc. Picked up 14 3/4" re-tip bit & 1 - 3 1/2" OD DC. Drld cmt out of top of jt of 16" conductor pipe 18' below GL. Drld cmt to 26' - 8'. Then drld 1' on a wooden plug to 27'. SDON. CC: $14,313.

3-4-81: Status: Running 12 1/4" retipped bit back to btm 285' to continue drlg. Yesterday drlg w/14 3/4" retipped bit from 27' below GL to 285'. DRld cmt, Red bed & wooden plug. Lost 100 bbls mud while drlg. POH. Stand back 4 - 3 1/2" DCs in derrick. LD 14 3/4" bit & PU 12 1/4" retipped bit + 2 - 4 3/4" OD DCs then Bowen 4 3/4" OD bumper sub & hydraulic jars. Ran 4 - 4 3/4" OD DCs + 1 jt tbg. Bit @221' inside 16" conductor csg @230'. SDON. CC: $20,148.

3-5-81: Status: Rigging down unit to move out of cellar area. Cellar caved in 3' overnight, unermining matting beams unit setting on.
Yesterday ran bit back to btm @283'. Had 2' of fill. Mud pump broke down. POH w/bit & DCS. SDON. CC: $22,656.

3-6-81: Status: Running 12 1/4" bit back to btm 406' to resume cleaning out.
Yesterday lay down all tbg & DCs. RD unit. Moved unit off well. Refill cellar area & build up and pack w/? dirt and rocks. Rerig unit. PU 12 1/4" bit, 6 - 4 3/4" OD DCs + 1 4 3/4" OD bumper sub & hydraulic jars. Ran back to btm 283'. Drill & clean out to 406' - 121'. Lost 200 bbls mud. Circ'd hole clean. Pulled bit up to 220' inside 16" conductor csg. SDON. CC: $34,436.

3-7-81: Status: Resume clean out.
Yesterday ran 12 1/4" bit and DCs back into hole. Tagged btm @406'. Drld out & cleaned to 468'. Mud circulation started returning in and around the collars on the outside of the csg. In 4 or 5 different places in a 2" stream. POH. LD all the DCs, hydraulic jars, bumper sub, & tbg. SDON. CC:$39,017.

CORRECT _____ APPROVED _____
EXPLOITATION ENGINEER SUPERINTENDENT

LEASE N. HOBBS (G/SA)

NEW MEXICO PRODUCTION UNIT
N. HOBBS (GRAYBURG SAN ANDRES) GETTY GRIMES #2 (24.49%)
ABANDON WELL, REPLUGGING
WO #968876 - $35,166

3-8-81: Status: Locate & plug the hole in csg. Yesterday picked up and ran a Lyons single inflatable treating pkr set @60' below the surface. Ppd fresh wtr & press'd up below pkr to 150 psi. Held OK. Came out of hole w/pkr. RU Howco cmt truck. Mixed & ppd 100 sx Class C cmt. Cmt came up several places around the csg. Cleaned up the lines. Ppd 2 bbls fresh wtr down csg. Should leave approximately 10' of clear csg from surface. SDON. CC: $41,035.

NO REPORT CALLED IN FOR 3-9-81, 3-10-81 DWN

3-11-81: Drld & circ'd hole clean to 841' w/drlg OK. Pulled bit back into surface csg. SD to clean mud pits. CC: $50,953.

3-12-81: Ran back into hole. Tagged top of 9 5/8" csg @1197'. Circ'd hole clean. Came out of hole. Picked up and ran 8 5/8" bit w/6 - 4 3/4" DCs, bumper sub & jars. Ran to 1217'. Still running on seems to be metal. Came out of hole to check bit for damage - bit looks good. SDON. CC: $65,811.

3-13-81: RIH w/6 5/8" kutrite rotary shoe to 1205'. Cut to 1207' - quit drlg. Came out of the hole, rotary shoe was badly worn. Went back in hole w/6 1/2" impression block - could not get below 1204'. Came out of hole. Ran 7 7/8" OD cone buster mill on 2 7/8" tbg, 66 - 4 3/4" DCs, bumper subs & jars. Milled to 1208'. Came out of hole. Mill showed to be running on 5 1/2" csg. SDON. CC: $82,476.

3-14-81: Ran 4 5/8" bit on 4 - 3 1/2" DCs w/2 7/8" tbg to 1208'. Drlg on iron. Came out of hole. Picked up & ran 4 1/2" cone buster mill to 1208'. Drld & milled from 1208' to 1259'. Came out of hole. Ran 4 5/8" bit from 1259' to 1268'. Circ'd hole clean. Pulled back up into surface csg. SDON. CC: $86,676.

3-15-81: SD for Sunday.

3-16-81: Coming out of hole to check bit for wear & go from there.

3-17-81: Status: Prepare to run collar locator log by SWS to help determine whether have been working inside or outside 9 5/8" csg. Yesterday ran 4 3/4" bit + 2 - 4 3/4" OD stabilizers w/10' 3 1/2" DC between. Between stabilizers & 4 - 3 1/2" DCs above. Tagged btm @1268' outside 9 5/8" csg. POH. Ran 7 5/8" flat bottom cone buster mill. Tagged top of 9 5/8" csg 1197'. Ran mill to 1206'. Milled on junk to 1210' - 4' inside 9 5/8" csg. POH. Mill worn on outside at btm. No marks in the center of mill. POH. Ran 4 3/4" cone buster mill. Tagged top of 9 5/8" csg @ 1197'. Unable to get inside 9 5/8" csg. Ran mill to 1268'. Milled to 1275' -7'. Circ'd hole clean. Mill stuck. Pulled 55,000# to free mill. POH into surface csg. SDON. CC: $93,750.

3-18-81: Status: Running 7 5/8" flat bottom cone buster mill + 6 - 4 3/4" OD DCs & 4 3/4" Bowen bumper sub & hydraulic jars. Yesterday ran 4 3/4" cone buster mill w/kick over sub, 1/4" hole above tbg collar w/tbg disc. Tagged top of 9 5/8" csg @1197'. Rotate one quarter around at a time, six complete rounds. Could not get mill inside top of 9 5/8" csg. Ran mill to 1275', outside 9 5/8" csg. Mill hangs @1270'. Requiring 55,000# of pull to free. Blew tbg disc. POH. Replaced disc & reran same mill. Attempted to get 4 3/4" mill into top of 9 5/8" csg by rotating one quarter round at a time. Attempting six complete rounds. Could not get into top of 9 5/8" csg. POH. RU SWS. Ran 1 11/16" OD collar locator. Tagged btm @1226'. Found collar @1220' & top of 9 5/8" csg @1196'. Log indicates tool outside 9 5/8" csg as depth previously reached inside 9 5/8" csg w/7 5/8" mill was 1210'. Picked up 7 5/8" cone buster mill and 6 - 4 3/4" OD DCs & 4 3/4" hydraulic Bowen bumper sub & hydraulic jars. RIH. SDON. 50 miles + per hour wind. CC: $99,967.

NEW MEXICO PRODUCTION UNIT
N. HOBBS (GRAYBURG SAN ANDRES) GETTY GRIMES #2 (24.49%)
ABANDON WELL, REPLUGGING
WO #968876 - $35,166

3-19-81: Status: POH w/6 3/4" bit, DCs & bumper sub, hydraulic jars. Yesterday finished running 7 5/8" flat btm mill. Tagged top of 9 5/8" csg @1197'. Tagged btm @1209'. Milled down to 1244' - 35'. Mill stopped. POH. Btm of mill filled w/cmt. No Red Bed. Ran new 6 3/4" Security rock bit. Drld 1244' to 1270' - 26'. Circ'd hole clean. Pulled bit up inside surface csg. SDON. CC: $106,891.

3-20-81: Status: Milling on top of 9 5/8" csg @1197' w/12 1/4" OD ? concave mill. Yesterday finished POH w/6 3/4" bit, no red beds or cmt in piece of bit. Ran 6 3/4" OD, 6 bladed cluster ? mill reamed 1240' to 1270' back to btm. Milled 1270' to 1293' - new hole. Milling on junk & iron. POH. Mill worn on btm only. SDON. CC: $111,771.

3-21-81: Status: Running redressed 12 1/4" OD concave mill. Yesterday milled over top of 9 5/8" csg w/12 1/4" OD concave mill 1197-1213' 15'. Mill torqued up & out several times. Circ'd hole clean. POH. Mill worn all over btm of mill & btmed out in center of mill. Mill had cmt above outside edges of mill. SDON. CC: $117,688.

3-22-81: Status: SD - Sunday. Yesterday finished running redressed 12 1/4" OD concave mill. Tagged top of 9 5/8" csg @1200'. Re-milled 1200' to 1212' & milled new hole 1212' to 1217' - 5'. Circ hole clean. Jarred w/80,000# @1207' to 1200' to get mill free. Hole evidently doglegged or keyseated 1200' to 1207'. Pulled mill up in surface csg. Wind to 50-60 MPH. SDON & Sunday. CC: $123,238.

3-23-81: Status: POH w/12 1/4" OD mill. Yesterday SD Sunday. CC: $123,238.

3-24-81: Status: Running 4 1/4" OD 45° angular hillside mill. Yesterday finished POH w/12 1/4" OD concave mill Mill worn all over btm and outside edges. Ran 4 5/8" flat btm mill & 3 1/2" hydraulic jars & 6 -3 1/2" OD DCs. Tagged btm @1217'. Rotate down to 1289' outside 9 5/8" csg. POH. Ran 6" off center crooked 2 7/8" x 6' tbg sub w/4 5/8" OD flat btm mill & 3 1/2" OD hydraulic jars & 6 - 3 1/2" OD DCs. Tagged btm @1217'. Rotate 24 times one-quarter turn at a time. Could not get into 9 5/8" csg. Ran mill to 1289' outside 9 5/8" csg. POH. Rebuild 45° angular 4 1/2" OD hillside mill to run in morning. SDON. CC: $128,710.

3-25-81: Status: Re-running 11 3/4" washover shoe back to btm to continue milling. Yesterday ran 4 1/4" 45° angular hillside mill on 30' crooked or bent joint of 2 7/8" tbg + 3 1/2 hydraulic jars & 6 - 3 1/2" OD DCs. Could not tag top of 9 5/8" csg @1217'. POH. Ran 2 7/8" x 6' 6" offcenter tbg sub w/same hillside mill & hydraulic jars & DCs. Tagged top of 9 5/8" @1217'. Rotate & attempt to get inside 9 5/8" csg 2 hrs - could not get inside 9 5/8" csg. Ran mill to 1289' outside 9 5/8" csg. POH. Pick up 11 3/4" OD washover shoe x 4' long w/12 1/4" OD x 10 3/8" ID kutrite inside/outside btm of mill for shoe w/flat btm dressed off mill inside washover shoe 4' above btm. Tagged btm @1197'. Original top of 9 5/8". Milled 10 hrs to 1216'. Pulled mill up inside surface csg. SDON @midnight. CC: $137,724.

3-26-81: Status: POH w/4 5/8" bit. Yesterday finished re-running 11 3/4" washover shoe & mill back to btm. Tagged fill @1214'. Milled over 9 5/8" csg to 1225'. POH. Marks on btm shoe indicate milling on 9 5/8" collar. Dressed off flat btm mill 4' up inside washover shoe slightly marked in center only. Grab wires wiped out indicating being over 9 5/8" csg. POH. Ran 4 5/8" new Walker McDonald bit & 3 1/2" hydraulic jars, 6 - 3 1/2" OD DCs. Tagged btm fill. 1223-1225'. Drld to 1226' w/slight torque. Pulled bit up into surface csg. SDON. CC: $142,924.

NEW MEXICO PRODUCTION UNIT
N. HOBBS (GRAYBURG SAN ANDRES) GETTY GRIMES #2 (24.49%)
ABANDON WELL, REPLUGGING
WO #968876 - $35,166

3-27-81: Status: Installing 8" BOP equipment. Yesterday finished pulling out of hole w/4 5/8" bit. Bit had some wire and small pieces of iron in teeth. Ran 11 3/4" washover shoe s 2' long w/12 1/4" kutrite lip guide w/kutrite on btm & outside w/10 3/4" ID w/small amt of kutrite inside mill shoe. Tagged btm @1200'. Milled 3' to 1203'. Mill free to 1225'. Milled to 1234' - 9'. Mill stuck on btm. Jarred w/65,000# to get loose. POH. Washover shoe completely full of Red Bed formation from milling in openhole outside 9 5/8" csg. SDON. CC: $149,571.

3-28-81: Status: Running 8 3/4" bit back to btm to continue drlg & condition hole. Yesterday installed 8" BOPs. Ran 8 3/4" bit & 4 3/4 hydraulic jars & bumper sub + 6 - 4 /34" OD DCs & tbg. Tagged btm @1234'. Drld 8 3/4" hole to 1276' - (42 ft). Pulled bit up into surface csg. SDON. CC: $154,959.

3-29-81: Status: SD Sunday. Yesterday (Saturday) ran 8 3/4" bit back to btm to 1268'. 8' of fill. Washed out fill to 1276'. Drill 8 3/4" hole to 1300' - 24' total. re-ream hole 1225' to 1300'. Circ hole clean. Pulled bit up into surface csg. SDON & Sunday. CC: $158,759.

3-30-81: Status: Running 8 3/4" bit back to btm to 1300' to condition hole. Yesterday SD for Sunday.
CC: $158,759.

3-31-81: Status: Running 4 7/8" tapered mill w/? on nose of mill on bent joint of 2 7/8" tbg + jars & 3 1/2" ODDCs. Yesterday ran 8 3/4" bit back to btm. Tagged btm @1289'. 11' of fill. Washed fill to btm to 1300'. Circ hole clean. POH. RU Ruthco wireline service. Ran 1 7/16" collar locator to 1303'. Locate 9 5/8" collars @1301-1273 & 1274'. Ran string junk shot 2500 grains primer cord on 20' x 1/2" rod. Jars w/4" OD x 6' long. Set off string charge @1301'. RD Ruthco. PU 4 3/4" OD tapered mill & 1 - 3 1/2" OD DCs, 1 - 6 5/8" OD string reamer, 1 - 3 1/2" OD DCs, 1 set 3 1/2" hydraulic jars, 4 - 3 1/2" OD DCs & 2 7/8" tbg. Tagged btm @1289'. Milled to 1309'. 20'. All iron. POH. Btm 4 3/4" tapered mill worn 6" up on pt. Top 6 5/8" mill barely worn. SDON. CC: $167.327.

4-1-81: Status: Running 8 3/4" OD flat btm concave type mill w/4" of heavy kutrite up sides at btm. Yesterday finished running 4 7/8" tapered mill on bent joint of 2 7/8" tbg. Tagged btm @1284'. Washed down to 1302'. Remilled to 1309'. Milled new hole to 1324' - 15'. Evidently on outside of 9 5/8" csg. POH. Mill marked on btm 6" of point as drlg on iron. Ran an 8 5/8" rock bit tagged btm @1262'. Washed to 1268' - no rotation. Then rotate 1268-1269'. Bit free to 1281'. Rotate to 1300'. Solid btm. Circ hole clean. POH. SDON. CC: $174,243.

4-2-81: Status: Running 7 7/8" bit & 4 - 3 1/2" OD DCs & 3 1/2" hydraulic jars. Yesterday ran 8 3/4" OD flat btm concave type mill w/4" heavy kutrite outside at the btm. Ran to 1300'. PU 1' to 1299'. Rotate fast 1 hr. Had small bridges @1246' & 1268' & 1281' before reaching btm of 1300'. Gradually lower mill w/fast rotation w/slight torque. Milled to 1305 1/2 - 6 1/2" w/slight torque. Milled to 1310' - 4 1/2 more feet inside 9 5/8" csg w/no torque. Recovering metal shavings & specs of cmt in mud returns. Circ hole clean. POH. Mill worn smooth on sides and btm indicating being in 9 5/8" csg. Mill also had cmt & paraffin spots on top shoulder of mill. SDON. CC:$180,483.

4-3-81: Status: Running 7 5/8" OD mill w/float basket x 4' long on 3 1/2" DCS. Yesterday ran 7 7/8" it w/2 - 3 1/2" OD DCs, 1 set of 3 1/2" OD Bowen hydraulic jars & 2 - 3 1/2" OD DCS + 2 7/8" tbg. Tagged window in 9 5/8" csg @1300'. Ran bit to 1310'. Drld to 1357' - 47'. Very little torque. POH. Bit piece 1/2 worn off indicating loose junk iron in hole, rolling around under bit. SDON. CC: $185,033.

LEASE N. Hobbs (G/SA) Unit WELL Sec. 29

NEW MEXICO PRODUCTION UNIT
N. HOBBS (GRAYBURG SAN ANDRES) GETTY GRIMES #2 (24.49%)
ABANDON WELL, REPLUGGING
WO #968876 - $35,166

4-4-81: Status: SD Saturday & Sunday. Yesterday (Friday) ran 7 5/8" mill shoe w/2 globe back & catchers w/5 1/4" ID. Tagged btm @1288'. Rotate & wash to btm to 1357'. Milled on junk 1257' to 1261-1/2' (4 1/2' total). POH. Mill hung & dragging from btm up to 1212'. Recovered 27" 5 1/4" OD dolomite formation core from outside 9 5/8" csg. SDON, Saturday & Sunday. CC: $189,483.

4-5-81: Status: SD. Sunday. Yesterday (Sat) SD.

4-6-81: Status: running 4 5/8" rock bit, 6 - 3 1/2" OD DCs & set of 3 1/2" OD hydraulic jars. Yesterday SD (Sunday). CC: $189,483.

4-7-81: Status: Rigging down to move to N. Hobbs Unit #33-211. Yesterday ran 4 5/8" bit & 3 1/2" hydraulic jars & 6 - 3 1/2" OD DCS in hole. Tagged top of 9 5/8" csg @1222'. Washed & rotated slowly to real btm of 1361 1/2. Did not get inside 9 5/8" csg. POH. LD tbg & DCs. Removed BOPS. Installed 16" female casing protector on top of 16" csg. Weld 3" plate over top of protector w/1 - 1" lug on opposite sides of plate for removal. SDON. CC: $196,142.

4-8-81: Status: Rigged down & moved to N. Hobbs Unit #33-211. Yesterday RD & clean location. Fill hole w/mud to surface. Moved to N. Hobbs Unit #33-211 & rig up. CC: $194,108.

[redacted]

CORRECT _____ APPROVED _____
EXPLOITATION ENGINEER SUPERINTENDENT

Shell Oil Company

P.O Box 991
Houston, Texas 77001

April 29, 1980

Getty Oil Company
P. O. Box 1231
Midland, Texas 79702

SUBJECT: ABANDONED WELL REPLUGGING OPERATIONS

Gentlemen:

Shell Oil Company, as Operator of the North Hobbs (G-SA) Unit, requests your approval to reenter and replug Getty-Grimes Nos. 2 and 5. Both wells are located in Unit H of Section 29-18S-38E, Lea County, New Mexico.

Exhibit "C" of Order No. R-6199 (copy attached) of the NMOCD lists eight wells that require reentering and replugging to prevent possible migration of fluids within the wellbore. These wells evidently were originally plugged in accordance with the existing rules and regulations. However, NMOCD plugging records do indicate the need for further zonal isolation.

We have attached downhole drawings of these wells showing the results of the original plugging operations. This plugging data was obtained from Oil Conservation Division records. Any additional information you may have on these wells will be appreciated.

Please furnish the name and address of your field representative to be contacted prior to the commencement of this work.

Very truly yours,

Original Signed By
K. E. ARNOLD

For: W. W. Dover
Division Production Manager
Mid-Continent Division

RWP:glw

Attachments

bc - J. T. Sexton
Supervisor
District I
New Mexico Oil Conservation Division
P. O. Box 1980
Hobbs, NM 88240

Getty Oil Company

Central Exploration and Production Division
P. O. Box 730
Hobbs, New Mexico 88240

May 22, 1980

| | |
|---|---|
| ☐ Div. Prod. Mgr. | ☐ Div. Engr. Mgr. |
| ☐ S.E.C. Mgr. | ☐ Dev. Engr. Mgr. |
| ☐ Div. Oper. Mgr. | ☐ Geol. Eng. |
| ☐ | ☐ Resv. Eng. |
| ☐ | ☐ Fac. Eng. |
| ☐ | ☐ Drilling Eng. |
| ☐ | ☐ Petro. Eng. |
| ☐ | ☐ |
| ☐ | ☐ $CO_2$ Mgr. |
| ☐ Prod. Admin. Mgr. | ☐ |
| ☐ | ☐ $CO_2$ Fac. Mgr. |
| ☐ | ☐ |
| ☐ Reg. & Perm. | ☐ |
| ☐ | ☐ Prod. Eng. I |
| ☐ Purchasing | ☐ Prod. Eng. II |
| ☐ Services | ☐ Prod. Eng. - Wasson |
| ☐ Employee Rel. | ☐ Fac. Eng. |
| ☐ File | ☐ Resv. Eng. |
| ☐ | |
| REPLY NUMBER 2 and No. 5 | DUE DATE |

Shell Oil Company
P. O. Box 991
Houston, Texas 77001

Attention: Mr. W. W. Dover

Re: Replugging Operations on Grimes No. 2 and No. 5

Gentlemen:

Looking at the downhole drawings attached to Shell's letter to Getty Oil Company dated April 29, 1980, it would appear that you have all the pertinent data which Getty might supply regarding the re-entering and replugging of the Grimes No. 2 and No. 5 well bores.

If you need any other additional specific information which Getty might supply, please call the Hobbs Area Office (505-393-4986). We will be glad to be of assistance in supplying additional information that is available.

Mr. Ed Fowler is Getty's field representative in this area. He may be contacted through the Hobbs Area Office.

Very truly yours,

GETTY OIL COMPANY

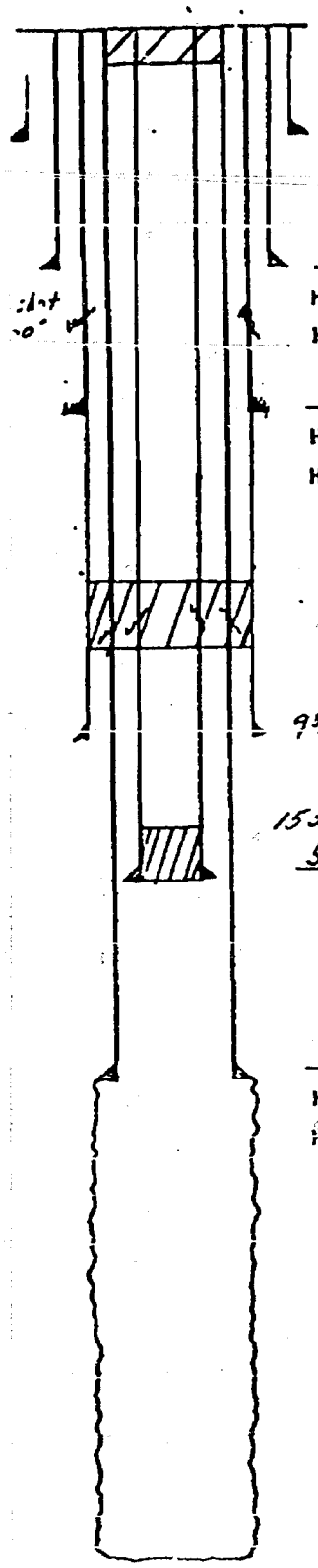
Dale R. Crockett

lws
PWS/de

cc - Mr. A. B. Cary, Midland
Mr. L. R. Hall, Midland
Mr. Welton Moore, Shell, Hobbs

W. D. Grimes | 2 | UNIT LETTER ___ 990 FEET FROM East LINE SEC. 29 T 18S R 38E

MEASUREMENT DATUM ELEV. _____ (GL–DF–KB) TOTAL DEPTH 4175 PBTD _____



10 sx. plug @ surface

20"; 90# casing cmt'd @ 129 Ft. with No record sx. cmt.

15½"-70# CASING CMT'D. @ 217 FT. WITH No record SX CMT.
HOLE SIZE No record", TOP OF CMT. OUTSIDE CASING @ No record FT.
HOW TOP OF CMT. DETERMINED _____

9 5/8"-36# CASING CMT'D. @ 2754 FT. WITH No record SX CMT.
HOLE SIZE No record", TOP OF CMT. OUTSIDE CASING @ No record FT.
HOW TOP OF CMT. DETERMINED _____

5½ + 7" csg. shot simultaneously @ 2030'. Set a 25 sx. plug @ 2030' in the 9⅝" csg.

9⅝" @ 2754'

155x. plug in bottom of 5½" csg.

5½", 15½# casing cemented @ 3370' Ft. with 100 sx. cement

7"-24# CASING CMT'D. @ 3929 FT. WITH No record SX. CMT.
HOLE SIZE No record". TOP OF CMT. OUTSIDE CASING @ No record FT.
HOW TOP OF CMT. DETERMINED _____

PERFORATED INTERVAL(S) _____
3148-3255
_____
_____

*NOW SQUEEZED

OPEN HOLE INTERVAL 3929-4175

____", ____# TBG. @ _____ FT. PKR. @ _____

Getty Oil Company

P.O. Box 1231, Midland, Texas 79702 • Telephone (915) 683-6301

May 6, 1980

- ☐ S.E.C. Mgr.
- ☐ Dev. Oper. Mgr.
- ☐ Getty Oil Company
- ☐ Audra B. Cary, District Exploration Manager, Central Exploration and Production Division
- ☐ Prod. Admin. Mgr.
- ☐ ~~DOE~~
- ☐ Reg. & Perm.
- ☐ Purchasing
- ☐ Services
- ☐ Employee Rel.
- ☐ Dev. Engr. Mgr.
- ☐ Geol. Eng.
- ☐ Resv. Eng.
- ☐ Fac. Eng.
- ☐ Drilling Eng.
- ☐ $CO_2$ Mgr.
- ☐ CO Fac. Mgr.
- ☐ I.R.F. Phillips
- ☐ Prod. Eng. Mgr.
- ☐ Prod. Eng. I
- ☐ Prod. Eng. II
- ☐ Prod. Eng. - Wasson
- ☐ Fac. Eng.
- ☐ Resv. Eng.

Shell Oil Company
P. O. Box 991
Houston, Texas 77001

cc: Mr. W. W. Dover

File: North Hobbs (G-SA) Unit
Lea County, New Mexico

Re: Re-plugging Operations on
G.O.C. Grimes No. 2 & No. 5

Gentlemen:

Getty Oil Company hereby grants to Shell Oil Company, as Operator of the North Hobbs Unit, such rights and privileges as it presently enjoys as lessor of the subject leasehold; for the express purpose of re-entering and re-plugging the said Grimes No. 2 and No. 5 wellbores in a manner, approved by the New Mexico Oil Conservation, to prevent migration of fluids within the wellbore from secondary recovery operations. It being expressly understood that this grant does not include surface damages for this operation which may accrue to the benefit of the surface owner. It will be the responsibility of the Unit Operator to negotiate and settle such damage claims with said surface owner.

By copy of this letter, the Area Superintendent is hereby requested to provide any additional information which may be available on these particular wells; and also to provide the name and address of his designated field representative which is to be contacted prior to commencement of the work.

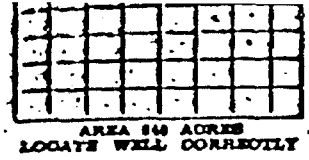
Very truly yours,

Audra B. Cary

Audra B. Cary

OVS:slw

cc: Mr. L. R. Hall
Mr. D. R. Crockett - Hobbs




# WELL RECORD

Mail to State Geologist, Santa Fe, New Mexico, not more than ten days after completion of well. Indicate questionable data by following it with (?). Submit in duplicate.

Company Tidal Oil Company Address Hobbs N.M.

Send correspondence to T.R. Wade Address Box 1067 Hobbs, N.M.

W.D. Grimes Well No. 2 in NE¼ of Sec. 29 T. 18-S

R. 38-E N. M. P. M. Hobbs Oil Field Lea County.

If State land the oil and gas lease is No. _____ Assignment No. _____

If patented land the owner is Wm. D. Grimes Address 1st Natl. Bank Seminole, Texas

The lessee is Tidal Oil Company Address Ft. Worth, Texas

If not state or patented land, give status _____

Drilling commenced July 20, 1930 19___ Drilling was completed Sept. 12, 1930 19___

Name of drilling contractor Champlin & Bass Inc. Address Holdenville, Okla.

Elevation above sea level at top of casing 3650' feet.

The information given is to be kept confidential until _____ 19___

## OIL SANDS OR ZONES

No. 1, from 3185 to 3195 No. 4, from _____ to _____

No. 2, from 4127 to 4167 No. 5, from _____ to _____

No. 3, from _____ to _____ No. 6, from _____ to _____

## IMPORTANT WATER SANDS

No. 1, from 135 to 160 No. 3, from _____ to _____

No. 2, from _____ to _____ No. 4, from _____ to _____

## CASING RECORD

| SIZE | WEIGHT PER FOOT | THREADS PER INCH | MAKE | AMOUNT | KIND OF SHOE | CUT AND PULLED FROM | PERFORATED FROM | PERFORATED TO | PURPOSE |
|---|---|---|---|---|---|---|---|---|---|
| 20" | 90# | 8 | L.W. | 128'7" | none | | | | Drill Pipe |
| 15½" | 70# | 8 | L.W. | 217'6" | T.P. | | | | Water Shut off |
| 9-5/8" | 36# | 8 | Smls | 2753'7" | Bkr. Flt. | | | | Oil String |
| | (Shoe and two bottom joints welded on) | | | | | | | | |
| 7" OD | 24# | 8 | L.W. | 2109'4" | | | | | |
| 7" OD | 24# | 8 | Smls | 1819'1" | Bkr. Flt. | | | | do |
| | (Shoe Welded on) | | | | | | | | |

## MUDDING AND CEMENTING RECORD

| SIZE | WHERE SET | NO. SACKS OF CEMENT | METHODS USED | MUD GRAVITY | AMOUNT OF MUD USED |
|---|---|---|---|---|---|

Company

Send correspondence to T.R. Wade Address Box 1057 Hobbs, N.M.

W. D. Grimes Well No. 2 in NE¼ of Sec. 29 T. 18-S

R. 38-E N. M. P. M. Hobbs Oil Field Lea County.

If State land the oil and gas lease is No. Assignment No.

If patented land the owner is Wm. D. Grimes Address 1st Natl. Bank Seminole, Texas

The lessee is Tidal Oil Company Address Ft. North, Texas

If not state or patented land, give status

Drilling commenced July 20, 1930 19 Drilling was completed Sept. 12, 1930 19

Name of drilling contractor Champlin & Bass Inc. Address Holdenville, Okla.

Elevation above sea level at top of casing 3950' feet.

The information given is to be kept confidential until 19

## OIL SANDS OR ZONES

No. 1, from 3185 to 3195 No. 4, from to

No. 2, from 4127 to 4167 No. 5, from to

No. 3, from to No. 6, from to

## IMPORTANT WATER SANDS

No. 1, from 135 to 160 No. 3, from to

No. 2, from to No. 4, from to

## CASING RECORD

| SIZE | WEIGHT PER FOOT | THREADS PER INCH | MAKE | AMOUNT | KIND OF SHOE | CUT AND PULLED FROM | PERFORATED FROM | PERFORATED TO | PURPOSE |
|---|---|---|---|---|---|---|---|---|---|
| 20" | 90# | 8 | L.W. | 128'7" | none | | | | Drill Pipe |
| 15½" | 70# | 8 | L.W. | 217'6" | T.P. | | | | Water Shut off |
| 9-5/8" | 36# | 8 | Smls | 2753'7" | Bkr. Flt. | | | | Oil String |
| | (Shoe and two bottom joints welded on) | | | | | | | | |
| 7" OD | 24# | 8 | L.W. | 2109'4" | | | | | |
| 7" OD | 24# | 8 | Smls | 1819'1" | Bkr. Flt. | | | | do |
| | (Shoe welded on) | | | | | | | | |

## MUDDING AND CEMENTING RECORD

| SIZE | WHERE SET | NO. SACKS OF CEMENT | METHODS USED | MUD GRAVITY | AMOUNT OF MUD USED |
|---|---|---|---|---|---|
| " | 230' | 200 sax cement | Halliburton | 10# | Hole Full |
| 9-5/8" | 2715' | 600 sax cement | do | 12# | do |
| 7" OD | 3550' | 300 sax cement | do | 12# | do |

## PLUGS AND ADAPTERS

## FORMATION RECORD

| FROM | TO | THICKNESS IN FEET | FORMATION |
|---|---|---|---|
| 0 | 230 | | Surface |
| 230 | 245 | | Brown Sand |
| 245 | 1000 | | Red Bed |
| 1000 | 1060 | | Shale |
| 1060 | 1105 | | Shale, lime and shells |
| 1105 | 1200 | | Shale |
| 1200 | 1305 | | Shale, Lime and Shells |
| 1305 | 1312 | | Broken Lime |
| 1312 | 1343 | | Lime Rock |
| 1343 | 1358 | | Broken Lime |
| 1358 | 1369 | | Sandy Lime |
| 1369 | 1388 | | Broken Lime |
| 1388 | 1448 | | Shale and Lime Shells |
| 1448 | 1526 | | Red Bed |
| 1526 | 1549 | | Red Bed and Lime Shells |
| 1549 | 1668 | | Anhydrite |
| 1668 | 1695 | | Red Bed and Anhydrite |
| 1695 | 1700 | | Potash |
| 1700 | 2500 | | Salt |
| 2500 | 2520 | | Salt and Anhydrite |
| 2520 | 2915 | | Anhydrite |
| 2915 | 3170 | | Anhydrite and Shale |
| 3170 | 3185 | | Anhydrite |
| 3185 | 3195 | | Sand (Show of oil at 3185') |
| 3195 | 3500 | | Anhydrite |
| 3500 | 3570 | | Anhydrite and Shale |
| 3570 | 3725 | | Anhydrite |
| 3725 | 3807 | | Lime Broken |
| 3807 | 3815 | | Sand |
| 3815 | 3835 | | Broken Lime and Shale |
| 3835 | 3880 | | Lime |
| 3880 | 3894 | | Hard Sandy Lime |
| 3894 | 4027 | | Lime |
| 4027 | 4086 | | Lime Broken (4027' top of pay) |
| 4086 | 4105 | | Hard Lime |
| 4105 | 4167 | | Broken Lime |
| 4167 | 4176 | | Hard Lime |
| ~~4176x~~ | | | |
| | | | Shallow gas and oil on above well was not cemented off and is being held by Braden Head. |

| SIZE | WHERE SET | NO. SACKS OF CEMENT | METHODS USED | MUD GRAVITY | AMOUNT OF MUD USED |
|---|---|---|---|---|---|
| 15½" | 230' | 200 sax cement | Halliburton | 10# | Hole Full |
| 9-5/8" | 2715' | 600 sax cement | do | 12# | do |
| 7" OD | 3680' | 300 sax cement | do | 12# | do |

## PLUGS AND ADAPTERS

Heaving plug—Material _____ Length _____ Depth Set _____

Adapters—Material _____ Size _____

## SHOOTING RECORD

| SIZE | SHELL USED | EXPLOSIVE USED | QUANTITY | DATE | DEPTH SHOT | DEPTH CLEANED OUT |
|---|---|---|---|---|---|---|
| | | | | | | |
| | | | | | | |
| | | | | | | |

## TOOLS USED

Rotary tools were used from 0 feet to 4176' feet, and from _____ feet to _____ feet

Cable tools were used from _____ feet to _____ feet, and from _____ feet to _____ feet

## PRODUCTION

Put to producing Sept. 15, 19 1930

The production of the first 24 hours was 1814 barrels of fluid of which 99.9 % was oil; .1 % emulsion; _____ % water; and _____ % sediment. Gravity, Be 37.1 at 70

If gas well, cu. ft. per 24 hours _____ Gallons gasoline per 1,000 cu. ft. of gas _____

Rock pressure, lbs. per sq. in. _____

## EMPLOYES

W.E. Rose, Driller _____, Driller

A.S. King, Driller _____, Driller

## FORMATION RECORD ON OTHER SIDE

I hereby swear or affirm that the information given herewith is a complete and correct record of the well and all work done on it so far as can be determined from available records.

Subscribed and sworn to before me this 22 day of September, 19 _____

Notary Public.

My commission expires June 16 1934

Name J.R. Wade

Postion Dist. Foreman

Representing TIDAL OIL COMPANY

Company or Operator

JANUARY 25TH, 1934

## FACTUAL REPORTS ON WELLS

Following is report in detail of acid treatment and its result on W.D.Grimes #2 in NE¼ 29-18-38

Grimes #2 was treated with 1000-gallons of Dowell XX acid January 9th, 1934. Previous to treating the well was tested thru open tubing for three hours. The second and third hour gauges were the same.
Oil at the rate of 777.6-bbls for 24-hrs.
Gas " " " " 3,970,000 cu.ft. for 24-hrs. } Ratio 5102 cu.ft. per bbl.

### GENERAL WELL DATA

Completed Oct 12th, 1930
7" OD-casing cemented at 3880'
Oil pays 4028' to 4086'
4105' to 4167'
Total depth 4176'
3" tubing at 4148'
Present potential 1393-bbls.

### KILLING WELL

Jan 9th, 1934

| Time | Tubing Pressure | Casing Pressure | Remarks |
|---|---|---|---|
| 10 AM | 200 | 1240 | |
| 10:45 | 0 | 1300 | Started pumping dead oil in tub at 10:00 AM |
| 11:15 | 15" Vacuum | 1300 | |
| 11:35 | 15" " | 1075 | Started bleeding casing |
| 11:40 | 25" " | 950 | |
| 12:00 | 20" " | 890 | |
| 12:10PM | 0 | 850 | |
| 12:20 | 15" " | 710 | |
| 12:40 | 25# Pressure | 730 | |
| 1:15 | 22" Vacuum | 185 | |
| 1:50 | 0 | 80 | |
| 2:25 | 0 | 0 | |
| 3:00 | 15" Vacuum | 0 | Started acid in tubing at 2:30 |
| 3:05 | 5" " | 0 | |
| 3:10 | 10" " | 0 | Started replacing acid in tubing with dead oil at 3:05 |
| 3:35 | 15" " | 120 | |
| | | 0 | Tubing had 15" vacuum and casing 0 until job was completed at 4:55 PM |

154-bbls of dead oil was used in killing well and 35-bbls was bleed from casing. 54-bbls was used in replacing acid in tubing. 208-bbls total.

### SHUT IN FOR 69 HOURS

Opened thru casing January 12th at 2:00 PM . Casing had 750# Pressure, tubing dead. After flowing casing for three hours, it was shut in and started flowing thru tubing.

### FIRST 10 DAYS PRODUCTION

January, 1934

| DATE | | CHOKE | TP | CP | OIL | GAS | RATIO |
|---|---|---|---|---|---|---|---|
| 3 | 12-hrs | 3/64 | 600 | 1240 | 21-bbls | | |
| 4 | 24-hrs | 4/64 | 150 | 1240 | 40 | | |
| 5 | | 6/64 | 225 | 1240 | 63 | | |
| 6 | | 6/64 | 200 | 1240 | 55 | | |
| 7 | | 6/64 | 225 | 1240 | 68 | 45,400 | 668 |
| 8 | | 6/64 | 215 | 1240 | 63 | | |
| 9 | | 6/65 | 215 | 1240 | 63 | | |
| 0 | | 6/64 | 215 | 1240 | 63 | | |
| 1 | | 6/64 | 205 | 1240 | 63 | | |
| 2 | | 6/64 | 195 | 1240 | 63 | | |
| 3 | | 6/64 | 200 | 1240 | 63 | | |

TESTED JANUARY 25TH, 1934

| | BBLS OIL 24 HRS | CU.FT. GAS | RATIO |
|---|---|---|---|
| cond hour thru tubing | 2,951 | 9,824,970 | 3296 |
| ird hour thru tubing &CSG | 4,082 | 14,850,864 | 3638 |
| essures before well was opened | TP 195# | CP 1215# | |
| essures at beginning of tubing gauge | TP 80# | CP 800# | |
| essures at end of tubing gauge | TP 75# | CP 740# | |
| essures during open test | TP 0 to 50 | CP 50 to 75# | |

Loyd Lamb

DUPLICATE

Santa Fe, New Mexico

# MISCELLANEOUS NOTICES

RECEIVED
AUG 16 1946
HOBBS OFFICE

Submit this notice in triplicate to the Oil Conservation Commission or its proper agent before the work described is to begin. A copy will be returned to the sender on which will be given the approval, with any modifications considered advisable, or the rejection by the Commission or agent, of the plan submitted. The plan as approved should be followed, and work should not begin until approval is obtained. See additional instructions in the Rules and Regulations of the Commission.

**Indicate nature of notice by checking below:**

| | | | |
|---|---|---|---|
| NOTICE OF INTENTION TO TEST CASING SHUT-OFF | | NOTICE OF INTENTION TO SHOOT OR CHEMICALLY TREAT WELL | |
| NOTICE OF INTENTION TO CHANGE PLANS | | NOTICE OF INTENTION TO PULL OR OTHERWISE ALTER CASING | |
| NOTICE OF INTENTION TO REPAIR WELL | | NOTICE OF INTENTION TO PLUG WELL | |
| NOTICE OF INTENTION TO DEEPEN WELL | | Notice of Intention to Recomplete Well in the Bowers Sand. | |

Houston, Texas (Place) August 12, 1946 (Date)

OIL CONSERVATION COMMISSION,
Santa Fe, New Mexico.

Gentlemen:

Following is a notice of intention to do certain work as described below at the Tide Water Associated Oil Company (Company or Operator) W. D. Grimes (Lease) Well No. 2 in NE/4 of Sec. 29, T. 18S, R. 38E, N. M. P. M., Hobbs Field, Lea County.

## FULL DETAILS OF PROPOSED PLAN OF WORK

FOLLOW INSTRUCTIONS IN THE RULES AND REGULATIONS OF THE COMMISSION

Plan to kill well with mud, set cement retainer at approximately 3250' and pump approximately 200 sacks of cement below the retainer, which should put the cement back to the San Andres formation. Gun perforate the Bowers Sand the top of which has been found on Gamma Ray and Neutron log to be at 3213'. Test well for recompletion.

Approved AUG 16 1946, 19__
except as follows:

OIL CONSERVATION COMMISSION,
By Roy A. Yarbrough
Title Oil & Gas Inspector

TIDE WATER ASSOCIATED OIL COMPANY
Company or Operator
By J. E. Springer
Position Authorized Employee
Send communications regarding well to
Name J. E. Springer
Address Tide Water Associated Oil Company,
Midland, Texas

DUPLICATE

Santa Fe, New Mexico

# MISCELLANEOUS REPORTS ON WELLS

RECEIVED
SEP 30 1946
OIL CONSERVATION COMMISSION
HOBBS, OFFICE

Sumbit this report in triplicate to the Oil Conservation Commission or its proper agent within ten days after the work specified is completed. It should be signed and sworn to before a notary public for reports on beginning drilling operations, results of shooting well, results of test of casing shut off, result of plugging of well, and other important operations, even though the work was witnessed by an agent of the Commission. Reports on minor operations need not be signed and sworn to before a notary public. See additional instructions in the Rules and Regulations of the Commission.

Indicate nature of report by checking below.

| | | | |
|---|---|---|---|
| REPORT ON BEGINNING DRILLING OPERATIONS | | REPORT ON REPAIRING WELL | |
| REPORT ON RESULT OF SHOOTING OR CHEMICAL TREATMENT OF WELL | | REPORT ON PULLING OR OTHERWISE ALTERING CASING | |
| REPORT ON RESULT OF TEST OF CASING SHUT-OFF | X | REPORT ON DEEPENING WELL | |
| REPORT ON RESULT OF PLUGGING OF WELL | | | |

September 28th, 1946, Hobbs, New Mexico
Date Place

OIL CONSERVATION COMMISSION,
SANTA FE, NEW MEXICO.
Gentlemen:

Following is a report on the work done and the results obtained under the heading noted above at the
Tide Water Associated Oil Company, W.D. Grimes Well No. 2 in the
Company or Operator Lease
NE/4 of Sec. 29, T. 18S, R. 38E, N. M. P. M.,
Hobbs Field, Lea County.

The dates of this work were as follows: September 25th and September 27th, 1946

Notice of intention to do the work was (was ~~not~~) submitted on Form C-102 on August 12, 19 46
and approval of the proposed plan was (was not) obtained. (Cross out incorrect words.)

DETAILED ACCOUNT OF WORK DONE AND RESULTS OBTAINED

In preparing this well for recompletion in the bowers sand it was found that the 7"OD oil string was in bad condition, making it necessary to run a string of 5-1/2" casing on the inside. We ran 5-1/2" OD 15.5# Seamless Steel Casing and set at 3,350' ~~XXXXXX~~ and cemented with 100 sacks. This casing was tested with 1200# pressure and let stand for 30 minutes to check for decline, held OK.

Witnessed by E.E. Hogue Tide Water Associated Oil Co. Foreman
Name Company Title

Subscribed and sworn before me this 28
day of Sept, 19 46

Wm Fichtner
Notary Public

My commission expires 12-20-47

I hereby swear or affirm that the information given above is true and correct.

Name E.E. Hogue

Position Foreman

Representing Tide Water Associated Oil Company
Company or Operator

Address Drawer KK, Hobbs, New Mexico

Remarks:

APPROVED

Date SEP 30 1946

Roy Yarbrough
Name

Dist. Gas Inspector
Title

County or Parish Lea Co. TWP 16S Range 38E

Survey ____ Block ____ Sec. 29 Twp. ____ Abst. ____

Dist. and Direction From Survey Lines of Lease or Section N 2310 E 990 S ____ W ____ Elevation ____

Offset to ____ Lease ____ Pool Hobbs

Within 3 Mile of ____ Lease ____ District ____

| LOC. MADE | DERRICK | DRILLING | COMPLETED | TOTAL DEPTH | INITIAL PRODUCTION OIL OR GAS | GRAVITY | SAND RECORD | ABANDONED |
|---|---|---|---|---|---|---|---|---|
| 9-26-46 | | | 10-31-46 | 4176' L | flwd 16 BO (sweet) in 13 hrs | | | |
| Fr. rept. | | | PB | 3266' | | 39 | TP 3148' | |

| SHOT RECORD | | | | | CASING RECORD | | ROTARY | | CABLE TOOLS | |
|---|---|---|---|---|---|---|---|---|---|---|
| DATE | NO. QTS. | FROM | TO | RESULTS | SIZE OF CASING | | FROM | TO | FROM | TO |
| | | | | | Cased | 5½" | | | | |
| | | | | | Depth | 3250' w/100 | | | | |

Sample Oil to Refinery Old TD 4176' L new work begun 9-19-46 pulled tbg., non prep. plug back 3400' and test csg., if same test O.K. operator attempt to re complete well in Powers Sand, which was topped at 3185'.

Sample Water (Fresh or Mineral)

Sample Sands & Cores

(C) OTD 4176' L PB 3266' TP 3148' 2" tbg at 3259' No pkr Comp 10-31-46 flwd 16 BO (sweet) in 13 hrs thru 13/64" TC GOR 156:1 Grav 39 Corr.

Electrical Log

REMARKS-(Chalks, Sands, Lines, Salt, Showing Oil, Gas or Water etc.)

| POSTED | | |
|---|---|---|
| | F. R. | COMPL. |
| Land Map | | |
| Geol. Map | | |
| | | |

Card

If original card is found, after transferring data

FORM C1248—MID (11-8-48)

## WELL CARD

County Lea State N.M.

Company Tidewater Assoc. Oil C. Farm W. D. Grimes Well No. 3

Field Hobbs Coord. ____ Elev. 3651

Survey ____ Blk. ____ Sec. 29 Twp. 18-S Range 38-E

Located ____ N ____ E ____ S ____ W Lines of ____

| Commenced | Completed | Top Pay | Perforations | Total Depth | Casing |
|---|---|---|---|---|---|
| | | | | | Depth |
| | | | | | Sacks |

Acid Treat. Producing Producing

Frac Treat. Interval Formation

| O.P. | Choke | CP | TP | Grav. | GOR |
|---|---|---|---|---|---|
| | | | | | |

| Electrical Log | Radioactivity Log | Sample Log | Residue Log |
|---|---|---|---|
| | | | |

0-4240.5

Drlg #2

| DATE | DEPTH | FORMATION—REMARKS |
|---|---|---|
| 10/3/46 | OTD 41 | 76' L PB 3315' Tested 7" csg four same to be full holes from 1800- 2600' cmt. Perf 5-1/2" csg 3270- 72' w/3 shots which is 20' belo Bowers sand Set Rot Sq off perf w/50 sx Perf 5#1/2" csg 3082-30 w/8 shots which is approx 100' above Powers Sand Squeezed off same w/50 sx New WOC |
| 10/10;46 | OTD 417 | 6' L PB 3266' Perf 5-1/2" csg 3 88' w/81 shots DST 3120-3260' op 95 min thru 5/8" BHC 1/4" TC on 1/2" DP Had gas to surface in 3 cc 350' or 2.55 bbls FLO & 170' 1:24 bbls salty oil wtr Reran D w/plr set at same Now prep to s |
| 10/17/46 | OTD 417 | 6' L PB 3266' before running previously reproted perf 5-1/2" fr 3184-94' w/50 shots ran 2" t on pkr set 3165' washed 500 gal acid 3184-94' pkr gave way reset same at 3135' swbd 12 bbls oil & gal slt wtr in 10 hrs perf 5-1/2 csg fr 3234-44' w/10 shots Tstd gas w/500 gal mud acid AA swbd w/all shots gas. T 1000 gal acid all perfs Testing. |
| 10/24/46 | OTD 417 | 6' L PB 3266' Perf 5-1/2" 3215- 3240-55' w/150 shots SI 12 hr SITP 700# opened flwd 26 bbls sweet oil in 67 min thru open tbg flwd 25 bbls sweet oil in hrs thru 3/16" TC Now SI |
| 10/31/46 | OTD 417 | 6' L PB 3266' SI 24 hrs opened 54 BO in 60 min thru open 2" t Set at 3269' and died GOR 175-1 |
| | | PROD. DEPT. TOPS: |
| | | Bowers Sand 3202 (+150) |

DUPLICATE

OIL CONSERVATION COMMISSION

Santa Fe, New Mexico

# MISCELLANEOUS REPORTS ON WELLS

OCT 31 1946

HOBBS OFFICE

Sumbit this report in triplicate to the Oil Conservation Commission or its proper agent within ten days after the work specified is completed. It should be signed and sworn to before a notary public for reports on beginning drilling operations, results of shooting well, results of test of casing shut off, result of plugging of well, and other important operations, even though the work was witnessed by an agent of the Commission. Reports on minor operations need not be signed and sworn to before a notary public. See additional instructions in the Rules and Regulations of the Commission.

Indicate nature of report by checking below.

| | | | |
|---|---|---|---|
| REPORT ON BEGINNING DRILLING OPERATIONS | | REPORT ON REPAIRING WELL | |
| REPORT ON RESULT OF SHOOTING OR CHEMICAL TREATMENT OF WELL | | REPORT ON PULLING OR OTHERWISE ALTERING CASING | |
| REPORT ON RESULT OF TEST OF CASING SHUT-OFF | | REPORT ON DEEPENING WELL | |
| REPORT ON RESULT OF PLUGGING OF WELL | | Notice of recompletion of well in the Bowers Sand. | X |

October 30th, 1946 — Date
Hobbs, New Mexico — Place

OIL CONSERVATION COMMISSION,
SANTA FE, NEW MEXICO.
Gentlemen:

Following is a report on the work done and the results obtained under the heading noted above at the

Tide Water Associated Oil Company (Company or Operator) W.D. Grimes (Lease) Well No. 2 in the NE/4 of Sec. 29, T. 18S, R. 38E, N. M. P. M., Hobbs Field, Lea County.

The dates of this work were as follows: September 15th to October 16th, 1946

Notice of intention to do the work was ~~was not~~ submitted on Form C-102 on August 12th, 1946

and approval of the proposed plan was ~~was not~~ obtained. (Cross out incorrect words.)

DETAILED ACCOUNT OF WORK DONE AND RESULTS OBTAINED

After setting string of 5½"OD casing at 3,350', perforated from 3,270-72' w/ 16 - 1/2" holes and squeezed w/ 50 sks. cement to shut off possible water below. Then perforated from 3,086'to 3,088' with 8 - 1/2" holes and squeezed w/ 100 sks. cement to shut off gas above. Then perforated from 3,148' to 3,255' for production. Treated formation with 2,000 gallons Dowell mud acid, and 1,000 gals. Chemical Process. Ran 2-3/8"OD Tubing set at 3,259', with tubing perforations at 3,245'to 3,249', started swabbing and testing.

Witnessed by H.G. Wesberry (Name) Tide Water Associated Oil Co. (Company) Foreman (Title)

Subscribed and sworn before me this 30th day of October, 1946

M.W. Vaughan
Notary Public

My commission expires Oct. 24, 1949

I hereby swear or affirm that the information given above is true and correct.

Name H Bwatemy

Position Foreman

Representing Tide Water Associated Oil Co.
Company or Operator

Address Drawer KK, Hobbs, New Mexico

Remarks:

Orig. & 2-cc (1 ret'd) OCC, Hobbs, N.M.
cc- Tulsa, Houston, Midland, File

APPROVED OCT 31 1946

Date

Name
Oil & Gas Inspector
Title

1

Place
Date October 30th, 1946

| | | | |
|---|---|---|---|
| D | C | B | A |
| E | F | G | H X |
| L | K | J | I |
| M | N | O | P |

Glenn Staley
Proration Office
Hobbs, New Mexico.

Designate UNIT well is located in
Unit "H"

## RECOMPLETION OF OLD WELL

E-

NOTICE OF COMPLETION OF: (Lease) E.D. Grimes Well No. 2
2,310 feet from North line: 990 feet from East line;
Section 29 Township 18S Range 38E.

DATE STARTED September 15th, 1946
DATE COMPLETED
ELEVATION 3,358' (Top of Rotary Bushing)
TOTAL DEPTH S.L.
CABLE TOOLS ROTARY TOOLS X

### CASING RECORD

| | | | | | |
|---|---|---|---|---|---|
| SIZE | 5-1/2" OD | DEPTH | 3,350' | SAX CEMENT | 100 |
| SIZE | | DEPTH | | SAX CEMENT | |
| SIZE | | DEPTH | | SAX CEMENT | |

### TUBING RECORD

SIZE 2-3/8"OD DEPTH 3,259'

### ACID RECORD

NO. GALS 2,000 - Dowell Mud Acid
NO. GALS 1,000 - Chemical Process
NO. GALS

### SHOT RECORD

NO. QTS. None
NO. QTS.
NO. QTS.

### FORMATION TOPS

Anhydrite
Top Salt
Base Salt
Red Sand
Brown Lime
White Lime
Oil or Gas Pay 3,148' - 3,255' - Bowers Sand
Water None

Initial Production Test 34.44 Pumping Flowing X
Test After Acid or Shot

Initial GAS VOLUME 11,585 cu ft, C.O. Ratio 336, Official Test

SCHEDULE NO. DATE October 28th, 1946

PIPE LINE TAKING OIL Shell Pipe Line Company

REMARKS Well Re-completed in the bowers sand.

Orig. & 2-cs to Mr. Glenn Staley
cc- Tulsa, Houston, Midland, File

COMPANY Tide Water Associated Oil Company

SIGNED BY: H Gene Lemon
Foreman

1

NEW MEXICO OIL CONSERVATION COMMISSION

SANTA FE, NEW MEXICO

DUPLICATE

JUN 25 1951

OIL CONSERVATION COMMISSION
HOBBS, NEW MEXICO

# MISCELLANEOUS NOTICES

Submit this notice in triplicate to the Oil Conservation Commission or its proper agent before operations are to begin. A copy will be returned to the sender on which will be given the approval, with any modifications considered advisable, or the rejection by the Commission or agent, of the plan submitted. The plan as approved should be followed, and work should not begin until approval is obtained. See additional instructions in the Rules and Regulations of the Commission.

Indicate nature of notice by checking below:

| | | | |
|---|---|---|---|
| NOTICE OF INTENTION TO TEST CASING SHUT-OFF | | NOTICE OF INTENTION TO SHOOT OR CHEMICALLY TREAT WELL | |
| NOTICE OF INTENTION TO CHANGE PLANS | | NOTICE OF INTENTION TO PULL OR OTHERWISE ALTER CASING | |
| NOTICE OF INTENTION TO REPAIR WELL | | NOTICE OF INTENTION TO PLUG WELL | X |
| NOTICE OF INTENTION TO DEEPEN WELL | | | |

Hobbs, New Mexico (Place) June 24, 1951 (Date)

OIL CONSERVATION COMMISSION,
Santa Fe, New Mexico.

Gentlemen:

Following is a notice of intention to do certain work as described below at the

Tide Water Associated Oil Company (Company or Operator) K.D. Grimes (Lease) Well No. 2 in SW SE NW of Sec. 29, T. 18-S, R. 32-E, N. M. P. M., Bowers Field.

Lea County.

## FULL DETAILS OF PROPOSED PLAN OF WORK

FOLLOW INSTRUCTIONS IN THE RULES AND REGULATIONS OF THE COMMISSION

We plan to circulate this well with 10#/gal. mud and spot a cement plug(200') from 3300-3100', and pull 2300' of 51/2" casing; spot another plug(25 sacks) in 9 5/8" casing from 2700-2635' after pulling 1100' of 7"OD casing. We plan to recover 750' of 9 5/8" casing after which a 20 sack cement plug will be laid in the top of the 15 1/2" casing at the surface with a 4" pipe marker according to Commission regulations.

Orig., 1cc - OCC
1cc - Tulsa
1cc - Houston
1cc - Midland
1cc - file

Approved JUN 25 1951, 19____ except as follows:

OIL CONSERVATION COMMISSION,

By [illegible]

Title Oil & Gas Inspector

Tide Water Associated Oil Company
Company or Operator

By H. D. Shackelford

Position District Foreman

Send communications regarding well to

Name H.D. Shackelford

Address Drawer EE, Hobbs, New Mexico

...instructions in the Rules and Regulations of the Commission.

Indicate nature of report by checking below.

| | | | |
|---|---|---|---|
| REPORT ON BEGINNING DRILLING OPERATIONS | | REPORT ON REPAIRING WELL | |
| REPORT ON RESULT OF SHOOTING OR CHEMICAL TREATMENT OF WELL | | REPORT ON PULLING OR OTHERWISE ALTERING CASING | |
| REPORT ON RESULT OF TEST OF CASING SHUT-OFF | | REPORT ON DEEPENING WELL | |
| REPORT ON RESULT OF PLUGGING OF WELL | X | | |

MAY 1970, STANDARD OIL COMPANY OF TEXAS IS CHANGING ITS OPERATING NAME TO CHEVRON OIL COMPANY.

July 12, 1951 (Date) Hobbs, New Mexico (Place)

GETTY

Following is a report on the work done and the results obtained under the heading noted above at the

Tide Water Associated Oil Company (Company or Operator) W.D. Grimes (Lease) Well No. 2 in the

SW SE NE of Sec. 29 T. 18-S R. 38-E N. M. P. M.

Bowers Pool Lea County

The dates of this work were as follows: June 28, 1951 - July 3, 1951

Notice of intention to do the work was ~~XXXXX~~ submitted on Form C-102 on June 26, 1951 19

and approval of the proposed plan was ~~XXXXX~~ obtained. (Cross out incorrect words.)

DETAILED ACCOUNT OF WORK DONE AND RESULTS OBTAINED

Tubing was run in this well and the hole circulated with 10#/gal mud. A cement plug(15 sacks) was spotted at the bottom in the 5 1/2" casing, and the 5 1/2" casing shot off at 2030'. The 7" casing was shot off simultaneously with the 5 1/2"casing. After recovery of the 5 1/2" and 7" casing (2030' of each), a 25 sack cement plug was spotted @ 2030' in the 9 5/8" casing and this string shot off @ 1200'. After recoveri 1200' of this string a 10 sack cement plug was then laid at the surface in the 15 1/2" casing with a 4" marker pipe rising 4' above the ground level according to Commission regulations.

Orig., 1cc = OCC
1cc - Tulsa
1cc - Houston
1cc - Midland
1cc - file

3810
2330
D

Witnessed by K.J. Hogue (Name) Tide Water Associated Oil Company (Company) Head Roustabout (Title)

APPROVED:
OIL CONSERVATION COMMISSION

Roy Yarbrough (Name)
Oil & Gas Inspector (Title)

JUL 13 1951 (Date) 19

I hereby swear or affirm that the information given above is true and correct.

Name H.P. Shackelford

Position District Foreman

Representing Tide Water Associated Oil Compa (Company or Operator)

Address Drawer KK, Hobbs, New Mexico

Getty - Grimes No. 2
Hobbs Field Lea County, NM
2310' FNL and 990' FEL Section 29 H
T18S - R38E

Completion Date : IX 1930 G/SA
Recompletion Date : X 1946 Bowers
P&A Date : VII 1951

Replugging Data - II, III & VIII, 1981
CO to 1310' inside 9 5/8"
CO to 1361' outside 9 5/8"
Window in 9 5/8" @ 1300'

Elev. 3652' Datum

not seen in cellar II-81 → 20" 90# cmtd. @ 129' w/ ? sx.

16" 70# cmtd @ 290' w/ 200 sx.

9 5/8" 36# cmtd. @ 2718' w/ 600 sx.

9 5/8" top rec 1222'

25 sx plug

5 1/2" & 7" shot off @ 2030' and pulled.

Perf. 5 1/2" 3082'-84' w/8 holes. Sqz. w/ 50 sx.

est. TOC 3143'

3184'-94' w/50 holes

3215'-30' & 3240'-55' w/150 holes

3254'-44' w/10 holes

PBTD 3266 Retainer

Perf 5 1/2" 3273'-72' w/3 holes Sqz w/ 50 sx.

5 1/2" 15 1/2# cmtd. @ 3378' w/ 100 sx.

7" 24# cmtd. @ 3880' w/ 300 sx

TD 4175'

Est. top Bowers 3200'
Upper Basal G 3952'
Lower Basal G 4052'
San Andres 4062'
II 4127'

RWP IX-81

PROGNOSIS
GETTY-GRIMES NO. 2
HOBBS (G/SA) POOL
990'FEL AND 2310'FNL
SEC. 29-18S-38E
LEA COUNTY, NEW MEXICO

WORK ORDER NO.: 968876 SHELL WI: 24.49%

OPERATION: Abandoned well replugging.

WELL DATA: TD 4175 10 sx cmt plug at surface
ELEV 3650'GL

CASING DATA:
20" 90# cmtd @ 129 ft w/? sx.
15 1/2" 70# cmtd @ 230' w/200 sx; 9 5/8" 36# cmtd @ 2718' w/600 sx
7" 24# cmtd @ 3880 w/300 sx; 5 1/2" 15 1/2# cmtd @ 3370' w/100 sx
NOTE: See attached well history and plugging affidavit for recompletion and history of Getty plugging operations.

PROCEDURE:
1. Dig out cellar. Remove marker. Rig up PU and reverse circulator.

2. Drill out cement in 15 1/2" csg. Clean out to 3930' ft.*

3. Spot 100' Class "C" cmt plugs @ 3930'-3830'; 3400'-3300'; 2080'-1980'; 1250'-1150'.

4. Spot Class "C" cmt plug from 400 ft.-200 ft. Spot 10 ft. cmt plug at surface.

5. Weld plate over 15 1/2" csg. Install P&A marker.

RECOMMENDED BY: K W Whitley DATE: 1/29/81

APPROVED BY: Walter A. Mann DATE: 1-29-81

* Top of salt est. 1620'. Red beds exposed from 9 5/8" csg. cut at 1200' to surface csg. Use 9.2#/gal 5 cc WL fresh water base mud for clean out.

NEW MEXICO PRODUCTION UNIT
N. HOBBS (GRAYBURG SAN ANDRES) GETTY GRIMES #2 (24.49%)
ABANDON WELL, REPLUGGING
WO #968876 - $35,166
[redacted]

2-25-81: Status: Digging out cellar w/larger backhoe trying to locate 20" conductor csg. Yesterday dig out cellar 10' square x 10' deep w/no indication of 20" conductor pipe. Set 4 dead men for rig. SDON. CC: $750.

2-26-81: Status: Prepare to install cellar boards & weld onto conductor pipe. Yesterday finished digging out cellar 10' square x 18' deep. Locate top of conductor pipe which is not 20" as prognosis states. Looks like 15 1/2". Build cellar out of 3 x 12s, 9' square x 18' high. Build fence around cellar to prevent anyone from falling in the cellar overnight. SDON. CC: $1675.

2-27-81: Status: Prep to weld joint of 16" csg inside 16" colar 16' below GL. Yesterday set 9 x 9 square x 18' high cellar boards in dug out cellar w/crane. RU rat hole drillers. Drld cmt from around 2 7/8" dry hole marker inside 16" csg. Pulled 3' stub of 2 7/8" dry hole marker out of inside 16" csg, 16' below the ground level. Re? location. SDON. CC: $4528.

2-28-81: Status: SD. Rain and mud. SD Satu & Sunday.
Yesterday - Friday - weld 16" x 16' conductor pipe inside 16" collar. 16' below ground level in cellar. Build 4 x 4 box out of 3 x 12s & place around conductor pipe, btm of cellar. Fill w/Redi-mix cmt. Removed 9 x 9 cellar board box, fill cellar w/dirt. RU DA&S unit #163. SDON. CC: $6703.

3-1-81: Status: SD for Sunday. Yesterday SD rain and mud.
CC: $7453.

3-2-81: Status: Rigging up power swivel, drlg equipment, mud tanks etc.
Yesterday Sunday SD. CC: $7453.

3-3-81: Status: Drlg on wooden plug 27' below GL w/14 3/4" bit.
Yesterday finished RU reverse circulator, drlg equipment, mud tanks, etc. Picked up 14 3/4" re-tip bit & 1 - 3 1/2" OD DC. Drld cmt out of top of jt of 16" conductor pipe 18' below GL. Drld cmt to 26' - 8'. Then drld 1' on a wooden plug to 27'. SDON. CC: $14,313.

3-4-81: Status: Running 12 1/4" retipped bit back to btm 285' to continue drlg.
Yesterday drlg w/14 3/4" retipped bit from 27' below GL to 285'. DRld cmt, Red bed & wooden plug. Lost 100 bbls mud while drlg. POH. Stand back 4 - 3 1/2" DCs in derrick. LD 14 3/4" bit & PU 12 1/4" retipped bit + 2 - 4 3/4" OD DCs then Bowen 4 3/4" OD bumper sub & hydraulic jars. Ran 4 - 4 3/4" OD DCs + 1 jt tbg. Bit @221' inside 16" conductor csg @230'. SDON. CC: $20,148.

3-5-81: Status: Rigging down unit to move out of cellar area. Cellar caved in 3' overnight, unermining matting beams unit setting on.
Yesterday ran bit back to btm @283'. Had 2' of fill. Mud pump broke down. POH w/bit & DCS. SDON. CC: $22,656.

3-6-81: Status: Running 12 1/4" bit back to btm 406' to resume cleaning out.
Yesterday lay down all tbg & DCs. RD unit. Moved unit off well. Refill cellar area & build up and pack w/? dirt and rocks. Rerig unit. PU 12 1/4" bit, 6 - 4 3/4" OD DCs + 1 4 3/4" OD bumper sub & hydraulic jars. Ran back to btm 283'. Drill & clean out to 406' - 121'. Lost 200 bbls mud. Circ'd hole clean. Pulled bit up to 220' inside 16" conductor csg. SDON. CC: $34,436.

3-7-81: Status: Resume clean out.
Yesterday ran 12 1/4" bit and DCs back into hole. Tagged btm @406'. Drld out & cleaned to 468'. Mud circulation started returning in and around the collars on the outside of the csg. In 4 or 5 different places in a 2" stream. POH. LD all the DCs, hydraulic jars, bumper sub, & tbg. SDON. CC:$39,017.

CORRECT _____ APPROVED _____
EXPLOITATION ENGINEER SUPERINTENDENT

LEASE N. HOBBS (GRAYBURG SAN ANDRES)

NEW MEXICO PRODUCTION UNIT
N. HOBBS (GRAYBURG SAN ANDRES) GETTY GRIMES #2 (24.49%)
ABANDON WELL, REPLUGGING
WO #968876 - $35,166

3-8-81: Status: Locate & plug the hole in csg.
Yesterday picked up and ran a Lyons single inflatable treating pkr set @60' below the surface. Ppd fresh wtr & press'd up below pkr to 150 psi. Held OK. Came out of hole w/pkr. RU Howco cmt truck. Mixed & ppd 100 sx Class C cmt. Cmt came up several places around the csg. Cleaned up the lines. Ppd 2 bbls fresh wtr down csg. Should leave approximately 10' of clear csg from surface. SDON. CC: $41,035.

NO REPORT CALLED IN FOR 3-9-81, 3-10-81 DWN

3-11-81: Drld & circ'd hole clean to 841' w/drlg OK. Pulled bit back into surface csg. SD to clean mud pits. CC: $50,953.

3-12-81: Ran back into hole. Tagged top of 9 5/8" csg @1197'. Circ'd hole clean. Came out of hole. Picked up and ran 8 5/8" bit w/6 - 4 3/4" DCs, bumper sub & jars. Ran to 1217'. Still running on seems to be metal. Came out of hole to check bit for damage - bit looks good. SDON. CC: $63,811.

3-13-81: RIH w/6 5/8" kutrite rotary shoe to 1205'. Cut to 1207' - quit drlg. Came out of the hole, rotary shoe was badly worn. Went back in hole w/6 1/2" impression block - could not get below 1204'. Came out of hole. Ran 7 7/8" OD cone buster mill on 2 7/8" tbg, 66 - 4 3/4" DCs, bumper subs & jars. Milled to 1208'. Came out of hole. Mill showed to be running on 5 1/2" csg. SDON. CC: $82,476.

3-14-81: Ran 4 5/8" bit on 4 - 3 1/2" DCs w/2 7/8" tbg to 1208'. Drlg on iron. Came out of hole. Picked up & ran 4 1/2" cone buster mill to 1208'. Drld & milled from 1208' to 1259'. Came out of hole. Ran 4 5/8" bit from 1259' to 1268'. Circ'd hole clean. Pulled back up into surface csg. SDON. CC: $86,676.

3-15-81: SD for Sunday.

3-16-81: Coming out of hole to check bit for wear & go from there.

3-17-81: Status: Prepare to run collar locator log by SWS to help determine whether have been working inside or outside 9 5/8" csg.
Yesterday ran 4 3/4" bit + 2 - 4 3/4" OD stabilizers w/10' 3 1/2" DC between. Between stabilizers & 4 - 3 1/2" DCs above. Tagged btm @1268' outside 9 5/8" csg. POH. Ran 7 5/8" flat bottom cone buster mill. Tagged top of 9 5/8" csg 1197'. Ran mill to 1206'. Milled on junk to 1210' - 4' inside 9 5/8" csg. POH. Mill worn on outside at btm. No marks in the center of mill. POH. Ran 4 3/4" cone buster mill. Tagged top of 9 5/8" csg @ 1197'. Unable to get inside 9 5/8" csg. Ran mill to 1268'. Milled to 1275' -7'. Circ'd hole clean. Mill stuck. Pulled 55,000# to free mill. POH into surface csg. SDON. CC: $93,750.

3-18-81: Status: Running 7 5/8" flat bottom cone buster mill + 6 - 4 3/4" OD DCs & 4 3/4" Bowen bumper sub & hydraulic jars. Yesterday ran 4 3/4" cone buster mill w/kick over sub, 1/4" hole above tbg collar w/tbg disc. Tagged top of 9 5/8" csg @1197'. Rotate one quarter around at a time, six complete rounds. Could not get mill inside top of 9 5/8" csg. Ran mill to 1275', outside 9 5/8" csg. Mill hangs @1270'. Requiring 55,000# of pull to free. Blew tbg disc. POH. Replaced disc & reran same mill. Attempted to get 4 3/4" mill into top of 9 5/8" csg by rotating one quarter round at a time. Attempting six complete rounds. Could not get into top of 9 5/8" csg. POH. RU SWS. Ran 1 11/16" OD collar locator. Tagged btm @1226'. Found collar @1220' & top of 9 5/8" csg @1196'. Log indicates tool outside 9 5/8" csg as depth previously reached inside 9 5/8" csg w/7 5/8" mill was 1210'. Picked up 7 5/8" cone buster mill and 6 - 4 3/4" OD DCs & 4 3/4" hydraulic Bowen bumper sub & hydraulic jars. RIH. SDON. 50 miles + per hour wind. CC: $99,967.

NEW MEXICO PRODUCTION UNIT
N. HOBBS (GRAYBURG SAN ANDRES) GETTY GRIMES #2 (24.49%)
ABANDON WELL, REPLUGGING
WO #968876 - $35,166

3-19-81: Status: POH w/6 3/4" bit, DCs & bumper sub, hydraulic jars. Yesterday finished running 7 5/8" flat btm mill. Tagged top of 9 5/8" csg @1197'. Tagged btm @1209'. Milled down to 1244' - 35'. Mill stopped. POH. Btm of mill filled w/cmt. No Red Bed. Ran new 6 3/4" Security rock bit. Drld 1244' to 1270' - 26'. Circ'd hole clean. Pulled bit up inside surface csg. SDON. CC: $106,891.

3-20-81: Status: Milling on top of 9 5/8" csg @1197' w/12 1/4" OD ? concave mill. Yesterday finished POH w/6 3/4" bit, no red beds or cmt in piece of bit. Ran 6 3/4" OD, 6 bladed cluster ? mill reamed 1240' to 1270' back to btm. Milled 1270' to 1293' - new hole. Milling on junk & iron. POH. Mill worn on btm only. SDON. CC: $111,771.

3-21-81: Status: Running redressed 12 1/4" OD concave mill. Yesterday milled over top of 9 5/8" csg w/12 1/4" OD concave mill 1197-1213' 15'. Mill torqued up & out several times. Circ'd hole clean. POH. Mill worn all over btm of mill & btmed out in center of mill. Mill had cmt above outside edges of mill. SDON. CC: $117,688.

3-22-81: Status: SD - Sunday. Yesterday finished running redressed 12 1/4" OD concave mill. Tagged top of 9 5/8" csg @1200'. Re-milled 1200' to 1212' & milled new hole 1212' to 1217' - 5'. Circ hole clean. Jarred w/80,000# @1207' to 1200' to get mill free. Hole evidently doglegged or keyseated 1200' to 1207'. Pulled mill up in surface csg. Wind to 50-60 MPH. SDON & Sunday. CC: $123,238.

3-23-81: Status: POH w/12 1/4" OD mill. Yesterday SD Sunday. CC: $123,238.

3-24-81: Status: Running 4 1/4" OD 45° angular hillside mill. Yesterday finished POH w/12 1/4" OD concave mill Mill worn all over btm and outside edges. Ran 4 5/8" flat btm mill & 3 1/2" hydraulic jars & 6 -3 1/2" OD DCs. Tagged btm @1217'. Rotate down to 1289' outside 9 5/8" csg. POH. Ran 6" off center crooked 2 7/8" x 6' tbg sub w/4 5/8" OD flat btm mill & 3 1/2" OD hydraulic jars & 6 - 3 1/2" OD DCs. Tagged btm @1217'. Rotate 24 times one-quarter turn at a time. Could not get into 9 5/8" csg. Ran mill to 1289' outside 9 5/8" csg. POH. Rebuild 45° angular 4 1/2" OD hillside mill to run in morning. SDON. CC: $128,710.

3-25-81: Status: Re-running 11 3/4" washover shoe back to btm to continue milling. Yesterday ran 4 1/4" 45° angular hillside mill on 30' crooked or bent joint of 2 7/8" tbg + 3 1/2 hydraulic jars & 6 - 3 1/2" OD DCs. Could not tag top of 9 5/8" csg @1217'. POH. Ran 2 7/8" x 6' 6" offcenter tbg sub w/same hillside mill & hydraulic jars & DCs. Tagged top of 9 5/8" @1217'. Rotate & attempt to get inside 9 5/8" csg 2 hrs - could not get inside 9 5/8" csg. Ran mill to 1289' outside 9 5/8" csg. POH. Pick up 11 3/4" OD washover shoe x 4' long w/12 1/4" OD x 10 3/8" ID kutrite inside/outside btm of mill for shoe w/flat btm dressed off mill inside washover shoe 4' above btm. Tagged btm @1197', Original top of 9 5/8". Milled 10 hrs to 1216'. Pulled mill up inside surface csg. SDON @midnight. CC: $137,724.

3-26-81: Status: POH w/4 5/8" bit. Yesterday finished re-running 11 3/4" washover shoe & mill back to btm. Tagged fill @1214'. Milled over 9 5/8" csg to 1225'. POH. Marks on btm shoe indicate milling on 9 5/8" collar. Dressed off flat btm mill 4' up inside washover shoe slightly marked in center only. Grab wires wiped out indicating being over 9 5/8" csg. POH. Ran 4 5/8" new Walker McDonald bit & 3 1/2" hydraulic jars, 6 - 3 1/2" OD DCs. Tagged btm fill. 1223-1225'. Drld to 1226' w/slight torque. Pulled bit up into surface csg. SDON. CC: $142,924.

LEASE N. HOBBS (G/SA) UNIT WELL SEC. 29

NEW MEXICO PRODUCTION UNIT
N. HOBBS (GRAYBURG SAN ANDRES) GETTY GRIMES #2 (24.49%)
ABANDON WELL, REPLUGGING
WO #968876 - $35,166

3-27-81: Status: Installing 8" BOP equipment.
Yesterday finished pulling out of hole w/4 5/8" bit. Bit had some wire and small pieces of iron in teeth. Ran 11 3/4" washover shoe s 2' long w/12 1/4" kutrite lip guide w/kutrite on btm & outside w/10 3/4" ID w/small amt of kutrite inside mill shoe. Tagged btm @1200'. Milled 3' to 1203'. Mill free to 1225'. Milled to 1234' - 9'. Mill stuck on btm. Jarred w/65,000# to get loose. POH. Washover shoe completely full of Red Bed formation from milling in openhole outside 9 5/8" csg. SDON. CC: $149,571.

3-28-81: Status: Running 8 3/4" bit back to btm to continue drlg & condition hole.
Yesterday installed 8" BOPs. Ran 8 3/4" bit & 4 3/4 hydraulic jars & bumper sub + 6 - 4 /34" OD DCs & tbg. Tagged btm @1234'. Drld 8 3/4" hole to 1276' - (42 ft). Pulled bit up into surface csg. SDON. CC: $154,959.

3-29-81: Status: SD Sunday. Yesterday (Saturday) ran 8 3/4" bit back to btm to 1268'. 8' of fill. Washed out fill to 1276'. Drill 8 3/4" hole to 1300' - 24' total. re-ream hole 1225' to 1300'. Circ hole clean. Pulled bit up into surface csg. SDON & Sunday. CC: $158,759.

3-30-81: Status: Running 8 3/4" bit back to btm to 1300' to condition hole.
Yesterday SD for Sunday.
CC: $158,759.

3-31-81: Status: Running 4 7/8" tapered mill w/? on nose of mill on bent joint of 2 7/8" tbg + jars & 3 1/2" ODDCs. Yesterday ran 8 3/4" bit back to btm. Tagged btm @1289'. 11' of fill. Washed fill to btm to 1300'. Circ hole clean. POH. RU Ruthco wireline service. Ran 1 7/16" collar locator to 1303'. Locate 9 5/8" collars @1301-1273 & 1274'. Ran string junk shot 2500 grains primer cord on 20' x 1/2" rod. Jars w/4" OD x 6' long. Set off string charge @1301'. RD Ruthco. PU 4 3/4" OD tapered mill & 1 - 3 1/2" OD DCs, 1 - 6 5/8" OD string reamer, 1 - 3 1/2" OD DCs, 1 set 3 1/2" hydraulic jars, 4 - 3 1/2" OD DCs & 2 7/8" tbg. Tagged btm @1289'. Milled to 1309'. 20'. All iron. POH. Btm 4 3/4" tapered mill worn 6" up on pt. Top 6 5/8" mill barely worn. SDON. CC: $167.327.

4-1-81: Status: Running 8 3/4" OD flat btm concave type mill w/4" of heavy kutrite up sides at btm. Yesterday finished running 4 7/8" tapered mill on bent joint of 2 7/8" tbg. Tagged btm @1284'. Washed down to 1302'. Remilled to 1309'. Milled new hole to 1324' - 15'. Evidently on outside of 9 5/8" csg. POH. Mill marked on btm 6" of point as drlg on iron. Ran an 8 5/8" rock bit tagged btm @1262'. Washed to 1268' - no rotation. Then rotate 1268-1269'. Bit free to 1281'. Rotate to 1300'. Solid btm. Circ hole clean. POH. SDON. CC: $174,243.

4-2-81: Status: Running 7 7/8" bit & 4 - 3 1/2" OD DCs & 3 1/2" hydraulic jars.
Yesterday ran 8 3/4" OD flat btm concave type mill w/4" heavy kutrite outside at the btm. Ran to 1300'. PU 1' to 1299'. Rotate fast 1 hr. Had small bridges @1246' & 1268' & 1281' before reaching btm of 1300'. Gradually lower mill w/fast rotation w/slight torque. Milled to 1305 1/2 - 6 1/2" w/slight torque. Milled to 1310' - 4 1/2 more feet inside 9 5/8" csg w/no torque. Recovering metal shavings & specs of cmt in mud returns. Circ hole clean. POH. Mill worn smooth on sides and btm indicating being in 9 5/8" csg. Mill also had cmt & paraffin spots on top shoulder of mill. SDON. CC:$180,483.

4-3-81: Status: Running 7 5/8" OD mill w/float basket x 4' long on 3 1/2" DCS.
Yesterday ran 7 7/8" it w/2 - 3 1/2" OD DCs, 1 set of 3 1/2" OD Bowen hydraulic jars & 2 - 3 1/2" OD DCS + 2 7/8" tbg. Tagged window in 9 5/8" csg @1300'. Ran bit to 1310'. Drld to 1357' - 47'. Very little torque. POH. Bit piece 1/2 worn off indicating loose junk iron in hole, rolling around under bit. SDON. CC: $185,033.

LEASE N. Hobbs (G/SA) Unit WELL Sec. 29

NEW MEXICO PRODUCTION UNIT
N. HOBBS (GRAYBURG SAN ANDRES) GETTY GRIMES #2 (24.49%)
ABANDON WELL, REPLUGGING
WO #968876 - $35,166

4-4-81: Status: SD Saturday & Sunday. Yesterday (Friday) ran 7 5/8" mill shoe w/2 globe back & catchers w/5 1/4" ID. Tagged btm @1288'. Rotate & wash to btm to 1357'. Milled on junk 1257' to 1261-1/2' (4 1/2' total). POH. Mill hung & dragging from btm up to 1212'. Recovered 27" 5 1/4" OD dolomite formation core from outside 9 5/8" csg. SDON, Saturday & Sunday. CC: $189,483.

4-5-81: Status: SD. Sunday. Yesterday (Sat) SD.

4-6-81: Status: running 4 5/8" rock bit, 6 - 3 1/2" OD DCs & set of 3 1/2" OD hydraulic jars. Yesterday SD (Sunday). CC: $189,483.

4-7-81: Status: Rigging down to move to N. Hobbs Unit #33-211. Yesterday ran 4 5/8" bit & 3 1/2" hydraulic jars & 6 - 3 1/2" OD DCS in hole. Tagged top of 9 5/8" csg @1222'. Washed & rotated slowly to real btm of 1361 1/2. Did not get inside 9 5/8" csg. POH. LD tbg & DCs. Removed BOPS. Installed 16" female casing protector on top of 16" csg. Weld 3" plate over top of protector w/1 - 1" lug on opposite sides of plate for removal. SDON. CC: $196,142.

4-8-81: Status: Rigged down & moved to N. Hobbs Unit #33-211. Yesterday RD & clean location. Fill hole w/mud to surface. Moved to N. Hobbs Unit #33-211 & rig up. CC: $194,108.

[redacted]

CORRECT _____ APPROVED _____
EXPLOITATION ENGINEER SUPERINTENDENT

Shell Oil Company

P.O. Box 991
Houston, Texas 77001

April 29, 1980

Getty Oil Company
P. O. Box 1231
Midland, Texas 79702

SUBJECT: ABANDONED WELL REPLUGGING OPERATIONS

Gentlemen:

Shell Oil Company, as Operator of the North Hobbs (G-SA) Unit, requests your approval to reenter and replug Getty-Grimes Nos. 2 and 5. Both wells are located in Unit H of Section 29-18S-38E, Lea County, New Mexico.

Exhibit "C" of Order No. R-6199 (copy attached) of the NMOCD lists eight wells that require reentering and replugging to prevent possible migration of fluids within the wellbore. These wells evidently were originally plugged in accordance with the existing rules and regulations. However, NMOCD plugging records do indicate the need for further zonal isolation.

We have attached downhole drawings of these wells showing the results of the original plugging operations. This plugging data was obtained from Oil Conservation Division records. Any additional information you may have on these wells will be appreciated.

Please furnish the name and address of your field representative to be contacted prior to the commencement of this work.

Very truly yours,

Original Signed By
K. E. ARNOLD

For: W. W. Dover
Division Production Manager
Mid-Continent Division

RWP:glw

Attachments

bc - J. T. Sexton
Supervisor
District I
New Mexico Oil Conservation Division
P. O. Box 1980
Hobbs, NM 88240

Getty Oil Company

Central Exploration and Production Division
P. O. Box 730
Hobbs, New Mexico 88240

May 22, 1980

| | |
|---|---|
| ☐ Div. Prod. Mgr. | ☐ Div. Engr. Mgr. |
| ☐ S.E.C. Mgr. | ☐ Dev. Engr. Mgr. |
| ☐ Div. Oper. Mgr. | ☐ Geol. Eng. |
| ☐ | ☐ Resv. Eng. |
| ☐ | ☐ Fac. Eng. |
| ☐ | ☐ Drilling Eng. |
| ☐ | ☐ Petro. Eng. |
| ☐ | ☐ |
| ☐ | ☐ $CO_2$ Mgr. |
| ☐ Prod. Admin. Mgr. | ☐ |
| ☐ | ☐ $CO_2$ Fac. Mgr. |
| ☐ | ☐ |
| ☐ Reg. & Perm. | ☐ [illegible] Eng. Mgr. |
| ☐ | ☐ Prod. Eng. I |
| ☐ Purchasing | ☐ Prod. Eng. II |
| ☐ Services | ☐ Prod. Eng. - Wasson |
| ☐ Employee Rel. | ☐ Fac. Eng. |
| ☐ File | ☐ Resv. Eng. |
| ☐ | |
| REPLY NUMBER | |
| | DUE DATE |

Shell Oil Company
P. O. Box 991
Houston, Texas 77001

Attention: Mr. W. W. Dover

Re: Replugging Operations on Grimes No. 2 and No. 5

Gentlemen:

Looking at the downhole drawings attached to Shell's letter to Getty Oil Company dated April 29, 1980, it would appear that you have all the pertinent data which Getty might supply regarding the re-entering and replugging of the Grimes No. 2 and No. 5 well bores.

If you need any other additional specific information which Getty might supply, please call the Hobbs Area Office (505-393-4986). We will be glad to be of assistance in supplying additional information that is available.

Mr. Ed Fowler is Getty's field representative in this area. He may be contacted through the Hobbs Area Office.

Very truly yours,

GETTY OIL COMPANY

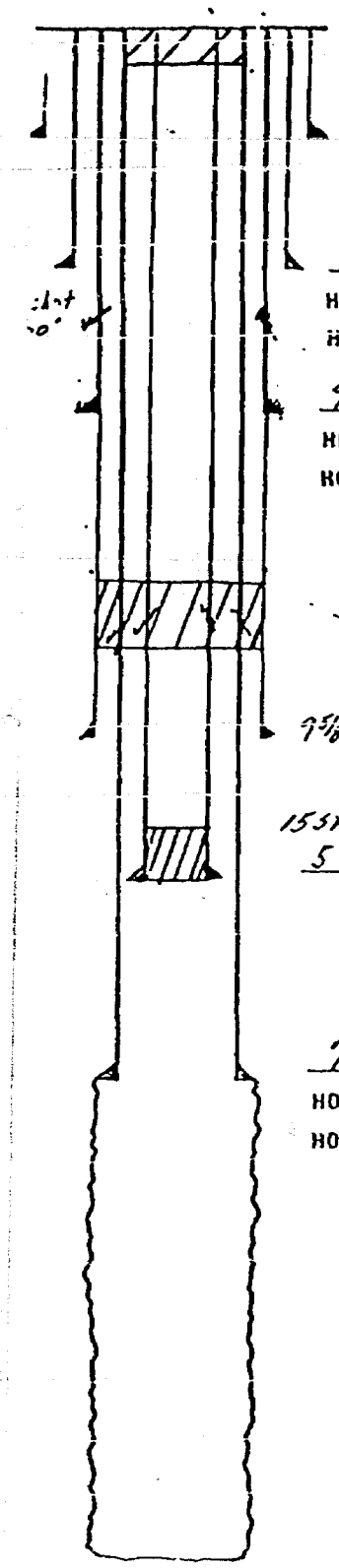
Dale R. Crockett

lws
PWS/de

cc - Mr. A. B. Cary, Midland
Mr. L. R. Hall, Midland
Mr. Welton Moore, Shell, Hobbs

W. D. Grimes | 2 | UNIT LETTER H ; 2310 FEET FROM North LINE AND 990 FEET FROM East LINE SEC. 29 T 18S R 38E

MEASUREMENT DATUM ELEV. _____ (GL–DF–KB) TOTAL DEPTH 4175 PBTD _____



10 sx. plug @ surface

20", 90# casing cmt'd @ 129 Ft. with No record sx. cmt.

15½", 70# CASING CMT'D. @ 217 FT. WITH No record SX CMT.
HOLE SIZE No record ", TOP OF CMT. OUTSIDE CASING @ No record FT.
HOW TOP OF CMT. DETERMINED _____

9⅝", 36# CASING CMT'D. @ 2754 FT. WITH No record SX CMT.
HOLE SIZE No record ", TOP OF CMT. OUTSIDE CASING @ No record FT.
HOW TOP OF CMT. DETERMINED _____

5½ + 7" csg. shot simultaneously @ 2030'. Set a 25 sx. plug @ 2030' in the 9⅝" csg.

9⅝" @ 2754'

15 sx. plug in bottom of 5½" csg.

5½", 15½# casing cemented @ 3390' Ft. with 100 sx. cement

7", 24# CASING CMT'D. @ 3929 FT. WITH No record SX. CMT.
HOLE SIZE No record ". TOP OF CMT. OUTSIDE CASING @ No record FT.
HOW TOP OF CMT. DETERMINED _____

PERFORATED INTERVAL(S) _____
3148 - 3255
_____
_____
*NOW SQUEEZED
OPEN HOLE INTERVAL 3929 - 4175
____", ____# TBG. @ _____ FT. PKR. @ _____

1

Getty Oil Company
P.O. Box 1231, Midland, Texas 79702 • Telephone (915) 682-6301

May 6, 1980

S.E.C. Mgr.
Div. Oper. Mgr.
Audra B. Cary, District Exploration Manager
Central Exploration and Production Division
Prod. Admin. Mgr.
Reg. & Perm
Purchasing
Services
Employer Rel.
File
Dev. Engr. Mgr.
Geol. Eng.
Reserv. Eng.
Eng.
Drilling Eng.
$CO_2$ Mgr.
CO Fac. Mgr.
Prod. Eng. Mgr.
Prod. Eng. I
Prod. Eng. II
Reserv. Eng.

Shell Oil Company
P. O. Box 991
Houston, Texas 77001

File: North Hobbs (G-SA) Unit
Lea County, New Mexico

Re: Re-plugging Operations on
G.O.C. Grimes No. 2 & No. 5

Gentlemen:

Getty Oil Company hereby grants to Shell Oil Company, as Operator of the North Hobbs Unit, such rights and privileges as it presently enjoys as lessor of the subject leasehold; for the express purpose of re-entering and re-plugging the said Grimes No. 2 and No. 5 wellbores in a manner, approved by the New Mexico Oil Conservation, to prevent migration of fluids within the wellbore from secondary recovery operations. It being expressly understood that this grant does not include surface damages for this operation which may accrue to the benefit of the surface owner. It will be the responsibility of the Unit Operator to negotiate and settle such damage claims with said surface owner.

By copy of this letter, the Area Superintendent is hereby requested to provide any additional information which may be available on these particular wells; and also to provide the name and address of his designated field representative which is to be contacted prior to commencement of the work.

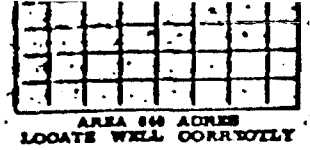
Very truly yours,

Audra B. Cary

Audra B. Cary

OVS:slw

cc: Mr. L. R. Ball
Mr. D. R. Crockett - Hobbs




# WELL RECORD

Mail to State Geologist, Santa Fe, New Mexico, not more than ten days after completion of well. Indicate questionable data by following it with (?). Submit in duplicate.

Company Tidal Oil Company Address Hobbs N.M.

Send correspondence to T.R. Wade Address Box 1057 Hobbs, N.M.

W.D. Grimes Well No. 2 in NE¼ of Sec. 29 T. 18-S

R. 38-E N. M. P. M. Hobbs Oil Field Lea County

If State land the oil and gas lease is No. _____ Assignment No. _____

If patented land the owner is Wm. D. Grimes Address 1st Natl. Bank Seminole, Texas

The lessee is Tidal Oil Company Address Ft. Worth, Texas

If not state or patented land, give status _____

Drilling commenced July 20, 1930 19__ Drilling was completed Sept. 12, 1930 19__

Name of drilling contractor Champlin & Bass Inc. Address Holdenville, Okla.

Elevation above sea level at top of casing 3650' feet.

The information given is to be kept confidential until _____ 19__

## OIL SANDS OR ZONES

No. 1, from 3185 to 3195 No. 4, from _____ to _____

No. 2, from 4127 to 4167 No. 5, from _____ to _____

No. 3, from _____ to _____ No. 6, from _____ to _____

## IMPORTANT WATER SANDS

No. 1, from 135 to 160 No. 3, from _____ to _____

No. 2, from _____ to _____ No. 4, from _____ to _____

## CASING RECORD

| SIZE | WEIGHT PER FOOT | THREADS PER INCH | MAKE | AMOUNT | KIND OF SHOE | CUT AND PULLED FROM | PERFORATED FROM | PERFORATED TO | PURPOSE |
|---|---|---|---|---|---|---|---|---|---|
| 20" | 90# | 8 | L.W. | 128'7" | none | | | | Drill Pipe |
| 15½" | 70# | 8 | L.W. | 217'6" | T.P. | | | | Water Shut off |
| 9-5/8" | 36# | 8 | Smls | 2753'7" | Bkr. Flt. | | | | Oil String |
| | (Shoe and two bottom joints welded on) | | | | | | | | |
| 7" OD | 24# | 8 | L.W. | 2109'4" | | | | | |
| 7" OD | 24# | 8 | Smls | 1619'1" | Bkr. Flt. | | | | do |
| | (Shoe Welded on) | | | | | | | | |

## MUDDING AND CEMENTING RECORD

| SIZE | WHERE SET | NO. SACKS OF CEMENT | METEODS USED | MUD GRAVITY | AMOUNT OF MUD USED |
|---|---|---|---|---|---|

Company

Send correspondence to T.R. Wade Address Box 1057 Hobbs, N.M.

W. Grimes Well No. 2 in NE¼ of Sec. 29 T. 18-S

R. 38-E N. M. P. M. Hobbs Oil Field Lea County.

If State land the oil and gas lease is No. Assignment No.

If patented land the owner is Wm. D. Grimes Address 1st Natl. Bank Seminole, Texas

The lessee is Tidal Oil Company Address Ft. Worth, Texas

If not state or patented land, give status

Drilling commenced July 20, 1930 19 Drilling was completed Sept. 12, 1930 19

Name of drilling contractor Champlin & Bass Inc. Address Holdenville, Okla.

Elevation above sea level at top of casing 3650' feet.

The information given is to be kept confidential until 19

## OIL SANDS OR ZONES

No. 1, from 3185 to 3195 No. 4, from to

No. 2, from 4127 to 4167 No. 5, from to

No. 3, from to No. 6, from to

## IMPORTANT WATER SANDS

No. 1, from 135 to 160 No. 3, from to

No. 2, from to No. 4, from to

## CASING RECORD

| SIZE | WEIGHT PER FOOT | THREADS PER INCH | MAKE | AMOUNT | KIND OF SHOE | CUT AND PULLED FROM | PERFORATED FROM | PERFORATED TO | PURPOSE |
|---|---|---|---|---|---|---|---|---|---|
| 20" | 90# | 8 | L.W. | 128'7" | none | | | | Drill Pipe |
| 15½" | 70# | 8 | L.W. | 217'6" | T.P. | | | | Water Shut off |
| 9-5/8" | 36# | 8 | Smls | 2753'7" | Bkr. Flt. | | | | Oil String |
| | (Shoe and two bottom joints welded on) | | | | | | | | |
| 7" OD | 24# | 8 | L.W. | 2109'4" | | | | | |
| 7" OD | 24# | 8 | Smls | 1819'1" | Bkr. Flt. | | | | do |
| | (Shoe Welded on) | | | | | | | | |

## MUDDING AND CEMENTING RECORD

| SIZE | WHERE SET | NO. SACKS OF CEMENT | METHODS USED | MUD GRAVITY | AMOUNT OF MUD USED |
|---|---|---|---|---|---|
| 20" | 230' | 200 sax cement | Halliburton | 10# | Hole Full |
| 9-5/8" | 2715' | 600 sax cement | do | 12# | do |
| 7" OD | 3550' | 300 sax cement | do | 12# | do |

## PLUGS AND ADAPTERS

## FORMATION RECORD

| FROM | TO | THICKNESS IN FEET | FORMATION |
|---|---|---|---|
| 0 | 230 | | Surface |
| 230 | 245 | | Brown Sand |
| 245 | 1000 | | Red Bed |
| 1000 | 1060 | | Shale |
| 1060 | 1105 | | Shale, lime and shells |
| 1105 | 1200 | | Shale |
| 1200 | 1305 | | Shale, Lime and Shells |
| 1305 | 1312 | | Broken Lime |
| 1312 | 1343 | | Lime Rock |
| 1343 | 1358 | | Broken Lime |
| 1358 | 1369 | | Sandy Lime |
| 1369 | 1388 | | Broken Lime |
| 1388 | 1448 | | Shale and Lime Shells |
| 1448 | 1526 | | Red Bed |
| 1526 | 1549 | | Red Bed and Lime Shells |
| 1549 | 1668 | | Anhydrite |
| 1668 | 1695 | | Red Bed and Anhydrite |
| 1695 | 1700 | | Potash |
| 1700 | 2500 | | Salt |
| 2500 | 2520 | | Salt and Anhydrite |
| 2520 | 2915 | | Anhydrite |
| 2915 | 3170 | | Anhydrite and Shale |
| 3170 | 3185 | | Anhydrite |
| 3185 | 3195 | | Sand (Show of oil at 3185') |
| 3195 | 3500 | | Anhydrite |
| 3500 | 3570 | | Anhydrite and Shale |
| 3570 | 3725 | | Anhydrite |
| 3725 | 3807 | | Lime Broken |
| 3807 | 3815 | | Sand |
| 3815 | 3835 | | Broken Lime and Shale |
| 3835 | 3880 | | Lime |
| 3880 | 3894 | | Hard Sandy Lime |
| 3894 | 4027 | | Lime |
| 4027 | 4086 | | Lime Broken (4027' top of pay) |
| 4086 | 4105 | | Hard Lime |
| 4105 | 4167 | | Broken Lime |
| 4167 | 4176 | | Hard Lime |
| ~~4176x~~ | | | |
| | | | Shallow gas and oil on above well was not cemented off and is being held by Braden Head. |

| SIZE | WHERE SET | NO. SACKS OF CEMENT | METHODS USED | MUD GRAVITY | AMOUNT OF MUD USED |
|---|---|---|---|---|---|
| 15½" | 230' | 200 sax cement | Halliburton | 10# | Hole Full |
| 9-5/8" | 2718' | 600 sax cement | do | 12# | do |
| 7" OD | 3880' | 300 sax cement | do | 12# | do |

## PLUGS AND ADAPTERS

Heaving plug—Material _____ Length _____ Depth Set _____

Adapters—Material _____ Size _____

## SHOOTING RECORD

| SIZE | SHELL USED | EXPLOSIVE USED | QUANTITY | DATE | DEPTH SHOT | DEPTH CLEANED OUT |
|---|---|---|---|---|---|---|
| | | | | | | |
| | | | | | | |
| | | | | | | |

## TOOLS USED

Rotary tools were used from 0 feet to 4176' feet, and from _____ feet to _____ feet

Cable tools were used from _____ feet to _____ feet, and from _____ feet to _____ feet

## PRODUCTION

Put to producing Sept. 15, 19 1930

The production of the first 24 hours was 1814 barrels of fluid of which 99.9 % was oil; .1 % emulsion; _____ % water; and _____ % sediment. Gravity, Be 37.1 at 70

If gas well, cu. ft. per 24 hours _____ Gallons gasoline per 1,000 cu. ft. of gas _____

Rock pressure, lbs. per sq. in. _____

## EMPLOYES

C.L. ROSE, Driller _____, Driller

A.C. King, Driller _____, Driller

## FORMATION RECORD ON OTHER SIDE

I hereby swear or affirm that the information given herewith is a complete and correct record of the well and all work done on it so far as can be determined from available records.

Subscribed and sworn to before me this 22 day of September 19__

Maria Jaramillo Notary Public.

My commission expires June 16 1934

Name J.R. Wade

Postion Dist. Foreman

Representing TIDAL OIL COMPANY
Company or Operator

JANUARY 25TH, 1934

## FAMOUS REPORTS ON WELLS

Following is report in detail of acid treatment and its result on W.D.Grimes #2 in NE¼ 29-18-38

Grimes #2 was treated with 1000-gallons of Dowell XX acid January 9th, 1934. Previous to treating the well was tested thru open tubing for three hours. The second and third hour gauges were the same.

Oil at the rate of 777.6-bbls for 24-hrs.
Gas " " " " 3,970,000 cu.ft. for 24-hrs. } Ratio 5102 cu.ft. per bbl.

### GENERAL WELL DATA

Completed Oct 12th, 1930 — Total depth 4176'
7" OD casing cemented at 3880' — 3" tubing at 4148'
Oil pays 4028' to 4086' — Present potential 1393-bbls.
4105' to 4167'

### KILLING WELL

Jan 9th, 1934

| Time | Tubing Pressure | Casing Pressure | Remarks |
|---|---|---|---|
| 10 AM | 200 | 1240 | Started pumping dead oil in tub at 10:00 AM |
| 10:45 | 0 | 1300 | |
| 11:15 | 15" Vacuum | 1300 | |
| 11:35 | 15" " | 1075 | Started bleeding casing |
| 11:40 | 25" " | 950 | |
| 12:00 | 20" " | 890 | |
| 12:10PM | 0 | 850 | |
| 12:20 | 15" " | 710 | |
| 12:40 | 25# Pressure | 730 | |
| 1:15 | 22" Vacuum | 185 | |
| 1:50 | 0 | 80 | |
| 2225 | 0 | 0 | Started acid in tubing at 2:30 |
| 3:00 | 15" Vacuum | 0 | |
| 3:05 | 5" " | 0 | Started replacing acid in tubing with |
| 3:10 | 10" " | 120 | dead oil at 3:05 |
| 3:35 | 15" " | 0 | Tubing had 15" vacuum and casing 0 until job was completed at 4:55 PM |

154-bbls of dead oil was used in killing well and 35-bbls was bleed from casing. 54-bbls was used in replacing acid in tubing. 208-bbls total.

### SHUT IN FOR 69 HOURS

Opened thru casing January 12th at 2:00 PM . Casing had 750# Pressure, tubing dead. After flowing casing for three hours, it was shut in and started flowing thru tubing.

### FIRST 10 DAYS PRODUCTION

January, 1934

| DATE | | CHOKE | TP | CP | OIL | GAS | RATIO |
|---|---|---|---|---|---|---|---|
| 3 | 12-hrs | 3/64 | 600 | 1240 | 21-bbls | | |
| 4 | 24-hrs | 4/64 | 150 | 1240 | 40 | | |
| 5 | | 6/64 | 225 | 1240 | 63 | | |
| 6 | | 6/64 | 200 | 1240 | 55 | | |
| 7 | | 6/64 | 225 | 1240 | 68 | 45,400 | 668 |
| 8 | | 6/64 | 215 | 1240 | 63 | | |
| 9 | | 6/65 | 215 | 1240 | 63 | | |
| 0 | | 6/64 | 215 | 1240 | 63 | | |
| 1 | | 6/64 | 205 | 1240 | 63 | | |
| 2 | | 6/64 | 195 | 1240 | 63 | | |
| 3 | | 6/64 | 200 | 1240 | 63 | | |

### TESTED JANUARY 25TH, 1934

| | BBLS OIL 24 HRS | CU.FT. GAS | RATIO |
|---|---|---|---|
| cond hour thru tubing | 2,981 | 9,824,970 | 3296 |
| ird hour thru tubing &CSG | 4,082 | 14,850,864 | 3638 |
| essures before well was opened | TP 195# | CP 1215# | |
| essures at beginning of tubing gauge | TP 80# | CP 800# | |
| essures at end of tubing gauge | TP 75# | CP 740# | |
| essures during open test | TP 0 to 50 | CP 50 to 75# | |

Loyd Lamb

DUPLICATE

Santa Fe, New Mexico

AUG 16 1946

RECEIVED

HOBBS OFFICE

# MISCELLANEOUS NOTICES

Submit this notice in triplicate to the Oil Conservation Commission or its proper agent before the work indicated is to begin. A copy will be returned to the sender on which will be given the approval, with any modifications considered advisable, or the rejection by the Commission or agent, of the plan submitted. The plan as approved should be followed, and work should not begin until approval is obtained. See additional instructions in the Rules and Regulations of the Commission.

Indicate nature of notice by checking below:

| | | | |
|---|---|---|---|
| NOTICE OF INTENTION TO TEST CASING SHUT-OFF | | NOTICE OF INTENTION TO SHOOT OR CHEMICALLY TREAT WELL | |
| NOTICE OF INTENTION TO CHANGE PLANS | | NOTICE OF INTENTION TO PULL OR OTHERWISE ALTER CASING | |
| NOTICE OF INTENTION TO REPAIR WELL | | NOTICE OF INTENTION TO PLUG WELL | |
| NOTICE OF INTENTION TO DEEPEN WELL | | Notice of Intention to Recomplete Well in the Bowers Sand. | |

Houston, Texas (Place) August 12, 1946 (Date)

OIL CONSERVATION COMMISSION,
Santa Fe, New Mexico.

Gentlemen:

Following is a notice of intention to do certain work as described below at the Tide Water Associated Oil Company (Company or Operator) W. D. Grimes (Lease) Well No. 2 in NE/4 of Sec. 29, T. 18S, R. 38E, N. M. P. M., Hobbs Field, Lea County.

## FULL DETAILS OF PROPOSED PLAN OF WORK

FOLLOW INSTRUCTIONS IN THE RULES AND REGULATIONS OF THE COMMISSION

Plan to kill well with mud, set cement retainer at approximately 3250' and pump approximately 200 sacks of cement below the retainer, which should put the cement back to the San Andres formation. Gun perforate the Bowers Sand the top of which has been found on Gamma Ray and Neutron log to be at 3213'. Test well for recompletion.

Approved AUG 16 1946, 19__ except as follows:

TIDE WATER ASSOCIATED OIL COMPANY
Company or Operator

By [signature]

Position Authorized Employee
Send communications regarding well to

OIL CONSERVATION COMMISSION,

By Roy A. Yarbrough

Title Oil & Gas Inspector

Name J. E. Springer

Address Tide Water Associated Oil Company,
Midland, Texas

1

DUPLICATE

Santa Fe, New Mexico

# MISCELLANEOUS REPORTS ON WELLS

RECEIVED
SEP 30 1946
OIL CONSERVATION COMMISSION
HOBBS, NEW MEXICO

Sumbit this report in triplicate to the Oil Conservation Commission or its proper agent within ten days after the work specified is completed. It should be signed and sworn to before a notary public for reports on beginning drilling operations, results of shooting well, results of test of casing shut off, result of plugging of well, and other important operations, even though the work was witnessed by an agent of the Commission. Reports on minor operations need not be signed and sworn to before a notary public. See additional instructions in the Rules and Regulations of the Commission.

Indicate nature of report by checking below.

| | | | |
|---|---|---|---|
| REPORT ON BEGINNING DRILLING OPERATIONS | | REPORT ON REPAIRING WELL | |
| REPORT ON RESULT OF SHOOTING OR CHEMICAL TREATMENT OF WELL | | REPORT ON PULLING OR OTHERWISE ALTERING CASING | |
| REPORT ON RESULT OF TEST OF CASING SHUT-OFF | X | REPORT ON DEEPENING WELL | |
| REPORT ON RESULT OF PLUGGING OF WELL | | | |

September 28th, 1946, Hobbs, New Mexico
Date Place

OIL CONSERVATION COMMISSION,
SANTA FE, NEW MEXICO.
Gentlemen:

Following is a report on the work done and the results obtained under the heading noted above at the
Tide Water Associated Oil Company, W.D. Grimes Well No. 2 in the
Company or Operator Lease
NE/4 of Sec. 29, T. 18S, R. 38E, N. M. P. M.,
Hobbs Field, Lea County.

The dates of this work were as follows: September 25th and September 27th, 1946

Notice of intention to do the work was (was not) submitted on Form C-102 on August 12, 19 46
and approval of the proposed plan was (was not) obtained. (Cross out incorrect words.)

DETAILED ACCOUNT OF WORK DONE AND RESULTS OBTAINED

In preparing this well for recompletion in the bowers sand it was found that the 7"OD oil string was in bad condition, making it necessary to run a string of 5-1/2" casing on the inside. We ran 5-1/2" OD 15.5# Seamless Steel Casing and set at 3,350' and cemented with 100 sacks. This casing was tested with 1200# pressure and let stand for 30 minutes to check for decline, held OK.

Witnessed by E.E. Hogue Tide Water Associated Oil Co. Foreman
Name Company Title

Subscribed and sworn before me this 28
day of Sept, 19 46
W. M. Echelberger
Notary Public

My commission expires 12-20-47

I hereby swear or affirm that the information given above is true and correct.

Name E.E. Hogue

Position Foreman

Representing Tide Water Associated Oil Company
Company or Operator

Address Drawer KK, Hobbs, New Mexico

Remarks:

APPROVED

Date SEP 30 1946

Roy Yarbrough
Name

Oil & Gas Inspector
Title

County Parish Lea Co. TWP 18S Rge. 38E Co-Ord. State (Lse.) Lse.

Survey Block Sec. 29 Twp. Abst.

Feet from Survey Lease Section Lines N 2310 E 990 S W Elevation

Offset to Lease Pool Hobbs

Within 1 Mile of Lease District

| LOC. MADE | DERRICK | DRILLING | COMPLETED | TOTAL DEPTH | INITIAL PRODUCTION OIL OR GAS | GRAVITY | SAND RECORD | ABANDONED |
|---|---|---|---|---|---|---|---|---|
| 9-26-46 | | | 10-31-46 | 4176' L | flwd 16 BO (sweet) in 13 hrs | | | |
| Fr. rept. | | | PB | 3266' | | 39 | TP 3148' | |

| SHOT RECORD | | | | | CASING RECORD | | | | | ROTARY | | CABLE TOOLS | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| DATE | NO. QTS. | FROM | TO | RESULTS | SIZE OF CASING | | | | | FROM | TO | FROM | TO |
| | | | | | Cased | 5½" | | | | | | | |
| | | | | | Depth | 3350' w/100 | | | | | | | |

Sample Oil to Refinery Old TD 4176' L new work began 9-19-46 pulled tbg., non prep. plug back 3400' and test csg., if same test O.K. operator attempt to recomplete well in Bowers Sand, which was topped at 3165'.

Sample Sands & Cores

(C) OTD 4176' L PB 3266' TP 3148' 2" tbg at 3259' No pkr Comp 10-31-46 flwd 16 BO (sweet) in 13 hrs thru 13/64" TC GOR 156:1 Grav 39 Corr.

Tests Taken of

REMARKS (Chalks, Sands, Limes, Salt, Showing Oil, Gas or Water etc.)

| POSTED | | |
|---|---|---|
| | F. R. | COMPL. |
| Land Map | | |
| Geol. Map | | |
| | | |

Last.

If no original card is found, after transferring data

FORM C1540—MID (11-8-48)

## WELL CARD

County Lea State N.M.

Company Tidewater Assoc. Oil C. Farm W. D. Grimes Well No. 3

Field Hobbs Coord. Elev. 3651

Survey Blk. Sec. 29 Twp. 18-S Range 38-E

Located N E S W Lines of

| Commenced | Completed | Top Pay | Perforations | Total Depth | Casing |
|---|---|---|---|---|---|
| | | | | | Depth |
| | | | | | Sacks |

Acid Treat. Producing Producing

Sand Treat. Interval Formation

| OIL | Choke | CP | TP | Grav. | GOR |
|---|---|---|---|---|---|
| | | | | | |

| Electrical Survey | Radioactivity Log | Sample Log | Residue Log |
|---|---|---|---|
| | | | |

O-b2bC.5

Dumb #2

| DATE | DEPTH | FORMATION—REMARKS |
|---|---|---|
| 10/3/46 | OTD 4176' | L PB 3315' Tested 7" csg four game to be full holes from 1800-2600' cmt. Perf 5-1/2" csg 3270-72' w/3 shots which is 20' belo Bowers sand Set Ret Sq off perf w/50 sx Perf 5 1/2" csg 3062-30 w/8 shots which is approx 100' above Bowers Sand Squeezed off same w/50 sx Now WOC |
| 10/10/46 | OTD 4176' | L PB 3266' Perf 5-1/2" csg 3 58' w/81 shots DST 3120-3260' op 95 min thru 5/8" BHC 1/4" TC on 1/2" DP Had gas to surface in 3 Rec 350' or 2.55 bbls FLO & 170' 1.24 bbls salty sul wtr Reran D w/plr set at same Now prep to s |
| 10/17/46 | OTD 4176' | L PB 3266' before running D previously reproted perf 5-1/2" fr 3184-94' w/50 shots ran 2" tb on pkr set 3165' washed 500 gal acid 3184-94' pkr gave way reset same at 3135' swbd 12 bbls oil-g gal slt wtr in 10 hrs perf 5-1/2 csg fr 3234-44' w/10 shots Tstd nat w/500 gal mud acid AA swbd o w/all shots gas. T 1000 gal acid all perfs Testing. |
| 10/24/46 | OTD 4176' | L PB 3266' Perf 5-1/2" 3215-3240-55' w/150 shots SI 12 hrs SITP 700# opened flwd 26 bbls sweet oil in 67 min thru open 2 tbg flwd 25 bbls sweet oil in hrs thru 5/16" TC Now SI |
| 10/31/46 | OTD 4176' | L PB 3266' SI 24 hrs opened 34 BO in 60 min thru open 2" t Set at 3269' and died GOR 175-1 |
| | | PROD. DEPT. TOPS: |
| | | Bowers Sand 3203 (Also) |

DUPLICATE

OIL CONSERVATION COMMISSION

Santa Fe, New Mexico

# MISCELLANEOUS REPORTS ON WELLS

OCT 31 1946

RECEIVED

HOBBS OFFICE

Submit this report in triplicate to the Oil Conservation Commission or its proper agent within ten days after the work specified is completed. It should be signed and sworn to before a notary public for reports on beginning drilling operations, results of shooting well, results of test of casing shut off, result of plugging of well, and other important operations, even though the work was witnessed by an agent of the Commission. Reports on minor operations need not be signed and sworn to before a notary public. See additional instructions in the Rules and Regulations of the Commission.

Indicate nature of report by checking below.

| | | | |
|---|---|---|---|
| REPORT ON BEGINNING DRILLING OPERATIONS | | REPORT ON REPAIRING WELL | |
| REPORT ON RESULT OF SHOOTING OR CHEMICAL TREATMENT OF WELL | | REPORT ON PULLING OR OTHERWISE ALTERING CASING | |
| REPORT ON RESULT OF TEST OF CASING SHUT-OFF | | REPORT ON DEEPENING WELL | |
| REPORT ON RESULT OF PLUGGING OF WELL | | Notice of recompletion of well in the Bower's Sand. | X |

October 30th, 1946 — Date
Hobbs, New Mexico — Place

OIL CONSERVATION COMMISSION,
SANTA FE, NEW MEXICO.
Gentlemen:

Following is a report on the work done and the results obtained under the heading noted above at the

Tide Water Associated Oil Company (Company or Operator) W.D. Grimes (Lease) Well No. 2 in the NE/4 of Sec. 29, T. 18S, R. 38E, N. M. P. M., Hobbs Field, Lea County.

The dates of this work were as follows: September 15th to October 16th, 1946

Notice of intention to do the work was ~~was not~~ submitted on Form C-102 on August 12th, 1946 and approval of the proposed plan was ~~was not~~ obtained. (Cross out incorrect words.)

DETAILED ACCOUNT OF WORK DONE AND RESULTS OBTAINED

After setting string of 5½"OD casing at 3,350', perforated from 3,270-72' w/ 16 - 1/2" holes and squeezed w/ 50 sks. cement to shut off possible water below. Then perforated from 3,086'to 3,088' with 8 - 1/2" holes and squeezed w/ 100 sks. cement to shut off gas above. Then perforated from 3,148' to 3,255' for production. Treated formation with 2,000 gallons Dowell mud acid, and 1,000 gals. Chemical Process. Ran 2-3/8"OD Tubing set at 3,259', with tubing perforations at 3,246'to 3,249', started swabbing and testing.

Witnessed by H.G. Kesberry (Name) Tide Water Associated Oil Co. (Company) Foreman (Title)

Subscribed and sworn before me this 30th day of October, 1946

M.M. Vaughan
Notary Public

My commission expires Oct 24, 1949

I hereby swear or affirm that the information given above is true and correct.

Name H Buckingham

Position Foreman

Representing Tide Water Associated Oil Co. (Company or Operator)

Address Drawer KK, Hobbs, New Mexico

Remarks:

Orig. & 2-cc (1 ret'd) OCC, Hobbs, N.M.
cc- Tulsa, Houston, Midland, File

APPROVED OCT 31 1946

Date

Name
Oil & Gas Inspector
Title

1

Place
Date October 30th, 1946

| | | | |
|---|---|---|---|
| D | C | B | A |
| E | F | G | H X |
| L | K | J | I |
| M | N | O | P |

Glenn Staley
Proration Office
Hobbs, New Mexico.

Designate UNIT well is located in
Unit "H"

## RECOMPLETION OF OLD WELL

H-

NOTICE OF COMPLETION OF: (Lease) T.D. Grimes Well No. 2
2,310 feet from North line: 990 feet from East line;
Section 29 Township 18S Range 38E.

DATE STARTED September 15th, 1946
DATE COMPLETED
ELEVATION 3,258' (Top of Rotary Bushing)
TOTAL DEPTH S.L.
CABLE TOOLS ROTARY TOOLS X

### CASING RECORD

SIZE 5-1/2" OD DEPTH 3,350' SAX CEMENT 100
SIZE DEPTH SAX CEMENT
SIZE DEPTH SAX CEMENT

### TUBING RECORD

SIZE 2-3/8"OD DEPTH 3,259'

### ACID RECORD

NO. GALS 2,000 - Dowell Mud Acid
NO. GALS 1,000 - Chemical Process
NO. GALS

### SHOT RECORD

NO. QTS. None
NO. QTS.
NO. QTS.

### FORMATION TOPS

Anhydrite
Top Salt
Base Salt
Red Sand
Brown Lime
White Lime
Oil or Gas Pay 3,148' - 3,255' - Bowers Sand
Water None

Initial Production Test 34.44 Pumping Flowing X
Test After Acid or Shot

Initial GAS VOLUME 11,583 cu ft, C.O. Ratio 335, Official Test

SCHEDULE NO. DATE October 28th, 1946

PIPE LINE TAKING OIL Shell Pipe Line Company

REMARKS Well Re-completed in the Bowers Sand.

Orig. & 2-cc to Mr. Glenn Staley
cc- Tulsa, Houston, Midland, File

COMPANY Tide Water Associated Oil Company

SIGNED BY: H. Gene Lemon
Foreman

NEW MEXICO OIL CONSERVATION COMMISSION

SANTA FE, NEW MEXICO

DUPLICATE

JUN 25 1951

OIL CONSERVATION COMMISSION HOBBS, NEW MEXICO

# MISCELLANEOUS NOTICES

Submit this notice in triplicate to the Oil Conservation Commission or its proper agent before operations are commenced. A copy will be returned to the sender on which will be given the approval, with any modifications considered advisable, or the rejection by the Commission or agent, of the plan submitted. The plan as approved should be followed, and work should not begin until approval is obtained. See additional instructions in the Rules and Regulations of the Commission.

Indicate nature of notice by checking below:

| | | | |
|---|---|---|---|
| NOTICE OF INTENTION TO TEST CASING SHUT-OFF | | NOTICE OF INTENTION TO SHOOT OR CHEMICALLY TREAT WELL | |
| NOTICE OF INTENTION TO CHANGE PLANS | | NOTICE OF INTENTION TO PULL OR OTHERWISE ALTER CASING | |
| NOTICE OF INTENTION TO REPAIR WELL | | NOTICE OF INTENTION TO PLUG WELL | X |
| NOTICE OF INTENTION TO DEEPEN WELL | | | |

Hobbs, New Mexico (Place) June 24, 1951 (Date)

OIL CONSERVATION COMMISSION,
Santa Fe, New Mexico.

Gentlemen:

Following is a notice of intention to do certain work as described below at the

Tide Water Associated Oil Company (Company or Operator) K.D. Grimes (Lease) Well No. 2 in SW SE NW

of Sec. 29, T. 18-S, R. 32-E, N. M. P. M., Powers Field.

Lea County.

## FULL DETAILS OF PROPOSED PLAN OF WORK

FOLLOW INSTRUCTIONS IN THE RULES AND REGULATIONS OF THE COMMISSION

We plan to circulate this well with 10#/gal. mud and spot a cement plug(200') from 3300-3100', and pull 2300' of 5 1/2" casing; spot another plug(25 sacks) in 9 5/8" casing from 2700-2635' after pulling 1100' of 7"OD casing. We plan to recover 750' of 9 5/8" casing after which a 20 sack cement plug will be laid in the top of the 15 1/2" casing at the surface with a 4" pipe marker according to Commission regulations.

Orig., lcc - OCC
lcc - Tulsa
lcc - Houston
lcc - Midland
lcc - file

Approved JUN 25 1951, 19____
except as follows:

OIL CONSERVATION COMMISSION,

By [illegible]

Title Oil & Gas Inspector

Tide Water Associated Oil Company
Company or Operator

By H.D. Shackelford E.D. Shackelford

Position District Foreman

Send communications regarding well to

Name E.D. Shackelford

Address Drawer EE, Hobbs, New Mexico

...witnessed by a ...
...requirements in the Rules and Regulations of the Commission.

Indicate nature of report by checking below.

| | | | |
|---|---|---|---|
| REPORT ON BEGINNING DRILLING OPERATIONS | | REPORT ON REPAIRING WELL | |
| REPORT ON RESULT OF SHOOTING OR CHEMICAL TREATMENT OF WELL | | REPORT ON PULLING OR OTHERWISE ALTERING CASING | MAY 1, 1950, STANDARD OIL COMPANY OF TEXAS IS CHANGING ITS OPERATING NAME TO CHEVRON OIL COMPANY. |
| REPORT ON RESULT OF TEST OF CASING SHUT-OFF | | REPORT ON DEEPENING WELL | |
| REPORT ON RESULT OF PLUGGING OF WELL | X | | |

July 12, 1951 (Date) Hobbs, New Mexico (Place)

GETTY

Following is a report on the work done and the results obtained under the heading noted above at the

Tide Water Associated Oil Company (Company or Operator) W.D. Grimes (Lease) Well No. 2 in the

SW SE NE of Sec. 29 T. 18-S R. 38-E N. M. P. M.

Bowers Pool Lea County.

The dates of this work were as follows: June 28, 1951 - July 3, 1951

Notice of intention to do the work was ~~(illegible)~~ submitted on Form C-102 on June 26, 1951, 19

and approval of the proposed plan was ~~(illegible)~~ obtained. (Cross out incorrect words.)

DETAILED ACCOUNT OF WORK DONE AND RESULTS OBTAINED

Tubing was run in this well and the hole circulated with 10#/gal mud. A cement plug(15 sacks) was spotted at the bottom in the 5 1/2" casing, and the 5 1/2" casing shot off at 2030'. The 7" casing was shot off simultaneously with the 5 1/2" casing. After recovery of the 5 1/2" and 7" casing (2030' of each), a 25 sack cement plug was spotted @ 2030' in the 9 5/8" casing and this string shot off @ 1200'. After recoveri 1200' of this string a 10 sack cement plug was then laid at the surface in the 15 1/2" casing with a 4" marker pipe rising 4' above the ground level according to Commissidn regulations.

Orig., 1cc - OCC
1cc - Tulsa
1cc - Houston
1cc - Midland
1cc - file

3810
2332
D

Witnessed by K.J. Hogue (Name) Tide Water Associated Oil Company (Company) Head Roustabout (Title)

APPROVED:
OIL CONSERVATION COMMISSION

Name

Oil & Gas Inspector
Title

JUL 13 1951
Date, 19

I hereby swear or affirm that the information given above is true and correct.

Name H.P. Shackelford

Position District Foreman

Representing Tide Water Associated Oil Compan
Company or Operator

Address Drawer KK, Hobbs, New Mexico

Getty - Grimes No. 2
Hobbs Field Lea County, NM
2310' FNL and 990' FEL Section 29 H
T18S - R38E

Completion Date : IV 1930 G/SA
Recompletion Date : X 1946 Bowers
P&A Date : VII 1951

Replugging Data - II, III & IX, 1981
Co to 1310' inside 9 5/8"
Co to 1361' outside 9 5/8"
Window in 9 5/8" @ 1300'

Elev. 3652' Datum

not seen in cellar II-81 → 20" 90# cmtd. @ 129' w/ ? sx.

16" 70# cmtd @ 290' w/ 200 sx.

9 5/8" 36# cmtd. @ 2718' w/ 600 sx.

Est. top Bowers 3200'
Upper Basal G 3952'
Lower Basal G 4052'
San Andres 4062'
II 4127'

9 5/8" top now 1222'

25 sx plug

5 1/2" & 7" shot off @ 2030' and pulled.

Perf. 5 1/2" 3082'-84' w/8 holes. Sqz. w/ 50 sx.

est. TOC 3143'

3184'-94' w/ 50 holes

3215'-30' & 3240'-55' w/ 150 holes

3234'-44' w/ 10 holes

PBTD 3266 Retainer

Perf 5 1/2" 3270'-72' w/ 3 holes Sqz w/ 50 sx.

5 1/2" 15 1/2# cmtd. @ 3378' w/ 100 sx.

7" 24# cmtd. @ 3880' w/ 300 sx

TD 4175'

RWP IX-81

PROGNOSIS
GETTY-GRIMES NO. 2
HOBBS (G/SA) POOL
990'FEL AND 2310'FNL
SEC. 29-18S-38E
LEA COUNTY, NEW MEXICO

WORK ORDER NO.: 968876 SHELL WI: 24.49%

OPERATION: Abandoned well replugging.

WELL DATA: TD 4175 10 sx cmt plug at surface
ELEV 3650'GL

CASING DATA:
20" 90# cmtd @ 129 ft w/? sx.
15 1/2" 70# cmtd @ 230' w/200 sx; 9 5/8" 36# cmtd @ 2718' w/600 sx
7" 24# cmtd @ 3880 w/300 sx; 5 1/2" 15 1/2# cmtd @ 3370' w/100 sx
NOTE: See attached well history and plugging affidavit for recompletion and history of Getty plugging operations.

PROCEDURE:
1. Dig out cellar. Remove marker. Rig up PU and reverse circulator.

2. Drill out cement in 15 1/2" csg. Clean out to 3930' ft.*

3. Spot 100' Class "C" cmt plugs @ 3930'-3830'; 3400'-3300'; 2080'-1980'; 1250'-1150'.

4. Spot Class "C" cmt plug from 400 ft.-200 ft. Spot 10 ft. cmt plug at surface.

5. Weld plate over 15 1/2" csg. Install P&A marker.

RECOMMENDED BY: K U Phillips DATE: 1/29/81

APPROVED BY: Dilton D. Mann DATE: 1-29-81

* Top of salt est. 1620'. Red beds exposed from 9 5/8" csg. cut at 1200' to surface csg. Use 9.2#/gal 5 cc WL fresh water base mud for clean out.

LEASE N. HOBBS (G/SA) UNIT WELL SEC. 29

NEW MEXICO PRODUCTION UNIT
N. HOBBS (GRAYBURG SAN ANDRES) GETTY GRIMES #2 (24.49%)
ABANDON WELL, REPLUGGING
WO #968876 - $35,166
FIRST REPORT

2-25-81: Status: Digging out cellar w/larger backhoe trying to locate 20" conductor csg. Yesterday dig out cellar 10' square x 10' deep w/no indication of 20" conductor pipe. Set 4 dead men for rig. SDON. CC: $750.

2-26-81: Status: Prepare to install cellar boards & weld onto conductor pipe. Yesterday finished digging out cellar 10' square x 18' deep. Locate top of conductor pipe which is not 20" as prognosis states. Looks like 15 1/2". Build cellar out of 3 x 12s, 9' square x 18' high. Build fence around cellar to prevent anyone from falling in the cellar overnight. SDON. CC: $1675.

2-27-81: Status: Prep to weld joint of 16" csg inside 16" colar 16' below GL. Yesterday set 9 x 9 square x 18' high cellar boards in dug out cellar w/crane. RU rat hole drillers. Drld cmt from around 2 7/8" dry hole marker inside 16" csg. Pulled 3' stub of 2 7/8" dry hole marker out of inside 16" csg, 16' below the ground level. Re? location. SDON. CC: $4528.

2-28-81: Status: SD. Rain and mud. SD Satu & Sunday.
Yesterday - Friday - weld 16" x 16' conductor pipe inside 16" collar. 16' below ground level in cellar. Build 4 x 4 box out of 3 x 12s & place around conductor pipe, btm of cellar. Fill w/Redi-mix cmt. Removed 9 x 9 cellar board box, fill cellar w/dirt. RU DA&S unit #163. SDON. CC: $6703.

3-1-81: Status: SD for Sunday. Yesterday SD rain and mud.
CC: $7453.

3-2-81: Status: Rigging up power swivel, drlg equipment, mud tanks etc.
Yesterday Sunday SD. CC: $7453.

3-3-81: Status: Drlg on wooden plug 27' below GL w/14 3/4" bit.
Yesterday finished RU reverse circulator, drlg equipment, mud tanks, etc. Picked up 14 3/4" re-tip bit & 1 - 3 1/2" OD DC. Drld cmt out of top of jt of 16" conductor pipe 18' below GL. Drld cmt to 26' - 8'. Then drld 1' on a wooden plug to 27'. SDON. CC: $14,313.

3-4-81: Status: Running 12 1/4" retipped bit back to btm 285' to continue drlg.
Yesterday drlg w/14 3/4" retipped bit from 27' below GL to 285'. DRld cmt, Red bed & wooden plug. Lost 100 bbls mud while drlg. POH. Stand back 4 - 3 1/2" DCs in derrick. LD 14 3/4" bit & PU 12 1/4" retipped bit + 2 - 4 3/4" OD DCs then Bowen 4 3/4" OD bumper sub & hydraulic jars. Ran 4 - 4 3/4" OD DCs + 1 jt tbg. Bit @221' inside 16" conductor csg @230'. SDON. CC: $20,148.

3-5-81: Status: Rigging down unit to move out of cellar area. Cellar caved in 3' overnight, unermining matting beams unit setting on.
Yesterday ran bit back to btm @283'. Had 2' of fill. Mud pump broke down. POH w/bit & DCS. SDON. CC: $22,656.

3-6-81: Status: Running 12 1/4" bit back to btm 406' to resume cleaning out.
Yesterday lay down all tbg & DCs. RD unit. Moved unit off well. Refill cellar area & build up and pack w/? dirt and rocks. Rerig unit. PU 12 1/4" bit, 6 - 4 3/4" OD DCs + 1 4 3/4" OD bumper sub & hydraulic jars. Ran back to btm 283'. Drill & clean out to 406' - 121'. Lost 200 bbls mud. Circ'd hole clean. Pulled bit up to 220' inside 16" conductor csg. SDON. CC: $34,436.

3-7-81: Status: Resume clean out.
Yesterday ran 12 1/4" bit and DCs back into hole. Tagged btm @406'. Drld out & cleaned to 468'. Mud circulation started returning in and around the collars on the outside of the csg. In 4 or 5 different places in a 2" stream. POH. LD all the DCs, hydraulic jars, bumper sub, & tbg. SDON. CC:$39,017.

CORRECT _____ APPROVED _____
EXPLOITATION ENGINEER SUPERINTENDENT

LEASE N. HOBBS (G/SA)

NEW MEXICO PRODUCTION UNIT
N. HOBBS (GRAYBURG SAN ANDRES) GETTY GRIMES #2 (24.49%)
ABANDON WELL, REPLUGGING
WO #968876 - $35,166

3-8-81: Status: Locate & plug the hole in csg.
Yesterday picked up and ran a Lyons single inflatable treating pkr set @60' below the surface. Ppd fresh wtr & press'd up below pkr to 150 psi. Held OK. Came out of hole w/pkr. RU Howco cmt truck. Mixed & ppd 100 sx Class C cmt. Cmt came up several places around the csg. Cleaned up the lines. Ppd 2 bbls fresh wtr down csg. Should leave approximately 10' of clear csg from surface. SDON. CC: $41,035.

NO REPORT CALLED IN FOR 3-9-81, 3-10-81 PWO

3-11-81: Drld & circ'd hole clean to 841' w/drlg OK. Pulled bit back into surface csg. SD to clean mud pits. CC: $50,953.

3-12-81: Ran back into hole. Tagged top of 9 5/8" csg @1197'. Circ'd hole clean. Came out of hole. Picked up and ran 8 5/8" bit w/6 - 4 3/4" DCs, bumper sub & jars. Ran to 1217'. Still running on seems to be metal. Came out of hole to check bit for damage - bit looks good. SDON. CC: $65,811.

3-13-81: RIH w/6 5/8" kutrite rotary shoe to 1205'. Cut to 1207' - quit drlg. Came out of the hole, rotary shoe was badly worn. Went back in hole w/6 1/2" impression block - could not get below 1204'. Came out of hole. Ran 7 7/8" OD cone buster mill on 2 7/8" tbg, 66 - 4 3/4" DCs, bumper subs & jars. Milled to 1208'. Came out of hole. Mill showed to be running on 5 1/2" csg. SDON. CC: $82,476.

3-14-81: Ran 4 5/8" bit on 4 - 3 1/2" DCs w/2 7/8" tbg to 1208'. Drlg on iron. Came out of hole. Picked up & ran 4 1/2" cone buster mill to 1208'. Drld & milled from 1208' to 1259'. Came out of hole. Ran 4 5/8" bit from 1259' to 1268'. Circ'd hole clean. Pulled back up into surface csg. SDON. CC: $86,676.

3-15-81: SD for Sunday.

3-16-81: Coming out of hole to check bit for wear & go from there.

3-17-81: Status: Prepare to run collar locator log by SWS to help determine whether have been working inside or outside 9 5/8" csg.
Yesterday ran 4 3/4" bit + 2 - 4 3/4" OD stabilizers w/10' 3 1/2" DC between. Between stabilizers & 4 - 3 1/2" DCs above. Tagged btm @1268' outside 9 5/8" csg. POH. Ran 7 5/8" flat bottom cone buste mill. Tagged top of 9 5/8" csg 1197'. Ran mill to 1206'. Milled on junk to 1210' - 4' inside 9 5/8" csg. POH. Mill worn on outside at btm. No marks in the center of mill. POH. Ran 4 3/4" cone buster mill. Tagged top of 9 5/8" csg @ 1197'. Unable to get inside 9 5/8" csg. Ran mill to 1268'. Milled to 1275' -7'. Circ'd hole clean. Mill stuck. Pulled 55,000# to free mill. POH into surface csg. SDON. CC: $93,750.

3-18-81: Status: Running 7 5/8" flat bottom cone buster mill + 6 - 4 3/4" OD DCs & 4 3/4" Bowen bumper sub & hydraulic jars. Yesterday ran 4 3/4" cone buster mill w/kick over sub, 1/4" hole above tbg collar w/tbg disc. Tagged top of 9 5/8" csg @1197'. Rotate one quarter around at a time, six complete rounds. Could not get mill inside top of 9 5/8" csg. Ran mill to 1275', outside 9 5/8" csg. Mill hangs @1270'. Requiring 55,000# of pull to free. Blew tbg disc. POH. Replaced disc & reran same mill. Attempted to get 4 3/4" mill into top of 9 5/8" csg by rotating one quarter round at a time. Attempting six complete rounds. Could not get into top of 9 5/8" csg. POH. RU SWS. Ran 1 11/16" OD collar locator. Tagged btm @1226'. Found collar @1220' & top of 9 5/8" csg @1196'. Log indicates tool outside 9 5/8" csg as depth previously reached inside 9 5/8" csg w/7 5/8" mill was 1210'. Picked up 7 5/8" cone buster mill and 6 - 4 3/4" OD DCs & 4 3/4" hydraulic Bowen bumper sub & hydraulic jars. RIH. SDON. 50 miles + per hour wind. CC: $99,967.

NEW MEXICO PRODUCTION UNIT
N. HOBBS (GRAYBURG SAN ANDRES) GETTY GRIMES #2 (24.49%)
ABANDON WELL, REPLUGGING
WO #968876 - $35,166

3-19-81: Status: POH w/6 3/4" bit, DCs & bumper sub, hydraulic jars. Yesterday finished running 7 5/8" flat btm mill. Tagged top of 9 5/8" csg @1197'. Tagged btm @1209'. Milled down to 1244' - 35'. Mill stopped. POH. Btm of mill filled w/cmt. No Red Bed. Ran new 6 3/4" Security rock bit. Drld 1244' to 1270' - 26'. Circ'd hole clean. Pulled bit up inside surface csg. SDON. CC: $106,891.

3-20-81: Status: Milling on top of 9 5/8" csg @1197' w/12 1/4" OD ? concave mill. Yesterday finished POH w/6 3/4" bit, no red beds or cmt in piece of bit. Ran 6 3/4" OD, 6 bladed cluster ? mill reamed 1240' to 1270' back to btm. Milled 1270' to 1293' - new hole. Milling on junk & iron. POH. Mill worn on btm only. SDON. CC: $111,771.

3-21-81: Status: Running redressed 12 1/4" OD concave mill. Yesterday milled over top of 9 5/8" csg w/12 1/4" OD concave mill 1197-1213' 15'. Mill torqued up & out several times. Circ'd hole clean. POH. Mill worn all over btm of mill & btmed out in center of mill. Mill had cmt above outside edges of mill. SDON. CC: $117,688.

3-22-81: Status: SD - Sunday. Yesterday finished running redressed 12 1/4" OD concave mill. Tagged top of 9 5/8" csg @1200'. Re-milled 1200' to 1212' & milled new hole 1212' to 1217' - 5'. Circ hole clean. Jarred w/80,000# @1207' to 1200' to get mill free. Hole evidently doglegged or keyseated 1200' to 1207'. Pulled mill up in surface csg. Wind to 50-60 MPH. SDON & Sunday. CC: $123,238.

3-23-81: Status: POH w/12 1/4" OD mill. Yesterday SD Sunday. CC: $123,238.

3-24-81: Status: Running 4 1/4" OD 45° angular hillside mill. Yesterday finished POH w/12 1/4" OD concave mill Mill worn all over btm and outside edges. Ran 4 5/8" flat btm mill & 3 1/2" hydraulic jars & 6 -3 1/2" OD DCs. Tagged btm @1217'. Rotate down to 1289' outside 9 5/8" csg. POH. Ran 6" off center crooked 2 7/8" x 6' tbg sub w/4 5/8" OD flat btm mill & 3 1/2" OD hydraulic jars & 6 - 3 1/2" OD DCs. Tagged btm @1217'. Rotate 24 times one-quarter turn at a time. Could not get into 9 5/8" csg. Ran mill to 1289' outside 9 5/8" csg. POH. Rebuild 45° angular 4 1/2" OD hillside mill to run in morning. SDON. CC: $128,710.

3-25-81: Status: Re-running 11 3/4" washover shoe back to btm to continue milling. Yesterday ran 4 1/4" 45° angular hillside mill on 30' crooked or bent joint of 2 7/8" tbg + 3 1/2 hydraulic jars & 6 - 3 1/2" OD DCs. Could not tag top of 9 5/8" csg @1217'. POH. Ran 2 7/8" x 6' 6" offcenter tbg sub w/same hillside mill & hydraulic jars & DCs. Tagged top of 9 5/8" @1217'. Rotate & attempt to get inside 9 5/8" csg 2 hrs - could not get inside 9 5/8" csg. Ran mill to 1289' outside 9 5/8" csg. POH. Pick up 11 3/4" OD washover shoe x 4' long w/12 1/4" OD x 10 3/8" ID kutrite inside/outside btm of mill for shoe w/flat btm dressed off mill inside washover shoe 4' above btm. Tagged btm @1197'. Original top of 9 5/8". Milled 10 hrs to 1216'. Pulled mill up inside surface csg. SDON @midnight. CC: $137,724.

3-26-81: Status: POH w/4 5/8" bit. Yesterday finished re-running 11 3/4" washover shoe & mill back to btm. Tagged fill @1214'. Milled over 9 5/8" csg to 1225'. POH. Marks on btm shoe indicate milling on 9 5/8" collar. Dressed off flat btm mill 4' up inside washover shoe slightly marked in center only. Grab wires wiped out indicating being over 9 5/8" csg. POH. Ran 4 5/8" new Walker McDonald bit & 3 1/2" hydraulic jars, 6 - 3 1/2" OD DCs. Tagged btm fill. 1223-1225'. Drld to 1226' w/slight torque. Pulled bit up into surface csg. SDON. CC: $142,924.

NEW MEXICO PRODUCTION UNIT
N. HOBBS (GRAYBURG SAN ANDRES) GETTY GRIMES #2 (24.49%)
ABANDON WELL, REPLUGGING
WO #968876 - $35,166

3-27-81: Status: Installing 8" BOP equipment. Yesterday finished pulling out of hole w/4 5/8" bit. Bit had some wire and small pieces of iron in teeth. Ran 11 3/4" washover shoe s 2' long w/12 1/4" kutrite lip guide w/kutrite on btm & outside w/10 3/4" ID w/small amt of kutrite inside mill shoe. Tagged btm @1200'. Milled 3' to 1203'. Mill free to 1225'. Milled to 1234' - 9'. Mill stuck on btm. Jarred w/65,000# to get loose. POH. Washover shoe completely full of Red Bed formation from milling in openhole outside 9 5/8" csg. SDON. CC: $149,571.

3-28-81: Status: Running 8 3/4" bit back to btm to continue drlg & condition hole. Yesterday installed 8" BOPs. Ran 8 3/4" bit & 4 3/4 hydraulic jars & bumper sub + 6 - 4 /34" OD DCs & tbg. Tagged btm @1234'. Drld 8 3/4" hole to 1276' - (42 ft). Pulled bit up into surface csg. SDON. CC: $154,959.

3-29-81: Status: SD Sunday. Yesterday (Saturday) ran 8 3/4" bit back to btm to 1268'. 8' of fill. Washed out fill to 1276'. Drill 8 3/4" hole to 1300' - 24' total. re-ream hole 1225' to 1300'. Circ hole clean. Pulled bit up into surface csg. SDON & Sunday. CC: $158,759.

3-30-81: Status: Running 8 3/4" bit back to btm to 1300' to condition hole. Yesterday SD for Sunday.
CC: $158,759.

3-31-81: Status: Running 4 7/8" tapered mill w/? on nose of mill on bent joint of 2 7/8" tbg + jars & 3 1/2" ODDCs. Yesterday ran 8 3/4" bit back to btm. Tagged btm @1289'. 11' of fill. Washed fill to btm to 1300'. Circ hole clean. POH. RU Ruthco wireline service. Ran 1 7/16" collar locator to 1303'. Locate 9 5/8" collars @1301-1273 & 1274'. Ran string junk shot 2500 grains primer cord on 20' x 1/2" rod. Jars w/4" OD x 6' long. Set off string charge @1301'. RD Ruthco. PU 4 3/4" OD tapered mill & 1 - 3 1/2" OD DCs, 1 - 6 5/8" OD string reamer, 1 - 3 1/2" OD DCs, 1 set 3 1/2" hydraulic jars, 4 - 3 1/2" OD DCs & 2 7/8" tbg. Tagged btm @1289'. Milled to 1309'. 20'. All iron. POH. Btm 4 3/4" tapered mill worn 6" up on pt. Top 6 5/8" mill barely worn. SDON. CC: $167.327.

4-1-81: Status: Running 8 3/4" OD flat btm concave type mill w/4" of heavy kutrite up sides at btm. Yesterday finished running 4 7/8" tapered mill on bent joint of 2 7/8" tbg. Tagged btm @1284'. Washed down to 1302'. Remilled to 1309'. Milled new hole to 1324' - 15'. Evidently on outside of 9 5/8" csg. POH. Mill marked on btm 6" of point as drlg on iron. Ran an 8 5/8" rock bit tagged btm @1262'. Washed to 1268' - no rotation. Then rotate 1268-1269'. Bit free to 1281'. Rotate to 1300'. Solid btm. Circ hole clean. POH. SDON. CC: $174,243.

4-2-81: Status: Running 7 7/8" bit & 4 - 3 1/2" OD DCs & 3 1/2" hydraulic jars. Yesterday ran 8 3/4" OD flat btm concave type mill w/4" heavy kutrite outside at the btm. Ran to 1300'. PU 1' to 1299'. Rotate fast 1 hr. Had small bridges @1246' & 1268' & 1281' before reaching btm of 1300'. Gradually lower mill w/fast rotation w/slight torque. Milled to 1305 1/2 - 6 1/2" w/slight torque. Milled to 1310' - 4 1/2 more feet inside 9 5/8" csg w/no torque. Recovering metal shavings & specs of cmt in mud returns. Circ hole clean. POH. Mill worn smooth on sides and btm indicating being in 9 5/8" csg. Mill also had cmt & paraffin spots on top shoulder of mill. SDON. CC:$180,483.

4-3-81: Status: Running 7 5/8" OD mill w/float basket x 4' long on 3 1/2" DCS. Yesterday ran 7 7/8" it w/2 - 3 1/2" OD DCs, 1 set of 3 1/2" OD Bowen hydraulic jars & 2 - 3 1/2" OD DCS + 2 7/8" tbg. Tagged window in 9 5/8" csg @1300'. Ran bit to 1310'. Drld to 1357' - 47'. Very little torque. POH. Bit piece 1/2 worn off indicating loose junk iron in hole, rolling around under bit. SDON. CC: $185,033.

LEASE N. Hobbs (GISA) Unit WELL Sec. 29

NEW MEXICO PRODUCTION UNIT
N. HOBBS (GRAYBURG SAN ANDRES) GETTY GRIMES #2 (24.49%)
ABANDON WELL, REPLUGGING
WO #968876 - $35,166

4-4-81: Status: SD Saturday & Sunday. Yesterday (Friday) ran 7 5/8" mill shoe w/2 globe back & catchers w/5 1/4" ID. Tagged btm @1288'. Rotate & wash to btm to 1357'. Milled on junk 1257' to 1261-1/2' (4 1/2' total). POH. Mill hung & dragging from btm up to 1212'. Recovered 27" 5 1/4" OD dolomite formation core from outside 9 5/8" csg. SDON, Saturday & Sunday. CC: $189,483.

4-5-81: Status: SD. Sunday. Yesterday (Sat) SD.

4-6-81: Status: running 4 5/8" rock bit, 6 - 3 1/2" OD DCs & set of 3 1/2" OD hydraulic jars. Yesterday SD (Sunday). CC: $189,483.

4-7-81: Status: Rigging down to move to N. Hobbs Unit #33-211. Yesterday ran 4 5/8" bit & 3 1/2" hydraulic jars & 6 - 3 1/2" OD DCS in hole. Tagged top of 9 5/8" csg @1222'. Washed & rotated slowly to real btm of 1361 1/2. Did not get inside 9 5/8" csg. POH. LD tbg & DCs. Removed BOPS. Installed 16" female casing protector on top of 16" csg. Weld 3" plate over top of protector w/1 - 1" lug on opposite sides of plate for removal. SDON. CC: $196,142.

4-8-81: Status: Rigged down & moved to N. Hobbs Unit #33-211. Yesterday RD & clean location. Fill hole w/mud to surface. Moved to N. Hobbs Unit #33-211 & rig up. CC: $194,108.

[redacted]

CORRECT _____ APPROVED _____
EXPLOITATION ENGINEER SUPERINTENDENT

Shell Oil Company

P.O. Box 991
Houston, Texas 77001

April 29, 1980

Getty Oil Company
P. O. Box 1231
Midland, Texas 79702

SUBJECT: ABANDONED WELL REPLUGGING OPERATIONS

Gentlemen:

Shell Oil Company, as Operator of the North Hobbs (G-SA) Unit, requests your approval to reenter and replug Getty-Grimes Nos. 2 and 5. Both wells are located in Unit H of Section 29-18S-38E, Lea County, New Mexico.

Exhibit "C" of Order No. R-6199 (copy attached) of the NMOCD lists eight wells that require reentering and replugging to prevent possible migration of fluids within the wellbore. These wells evidently were originally plugged in accordance with the existing rules and regulations. However, NMOCD plugging records do indicate the need for further zonal isolation.

We have attached downhole drawings of these wells showing the results of the original plugging operations. This plugging data was obtained from Oil Conservation Division records. Any additional information you may have on these wells will be appreciated.

Please furnish the name and address of your field representative to be contacted prior to the commencement of this work.

Very truly yours,

Original Signed By
K. E. ARNOLD

For: W. W. Dover
Division Production Manager
Mid-Continent Division

RWP:glw

Attachments

bc - J. T. Sexton
Supervisor
District 1
New Mexico Oil Conservation Division
P. O. Box 1980
Hobbs, NM 88240

Getty Oil Company

Central Exploration and Production Division
P. O. Box 730
Hobbs, New Mexico 88240

May 22, 1980

| | |
|---|---|
| ☐ Div. Prod. Mgr. | ☐ Div. Engr. Mgr. |
| ☐ S.E.C. Mgr. | ☐ Dev. Engr. Mgr. |
| ☐ Div. Oper. Mgr. | ☐ Geol. Eng. |
| ☐ | ☐ Resv. Eng. |
| ☐ | ☐ Fac. Eng. |
| ☐ | ☐ Drilling Eng. |
| ☐ | ☐ Petro. Eng. |
| ☐ | ☐ |
| ☐ | ☐ $CO_2$ Mgr. |
| ☐ Prod. Admin. Mgr. | ☐ |
| ☐ | ☐ $CO_2$ Fac. Mgr. |
| ☐ | ☐ |
| ☐ Reg. & Perm. | ☐ [illegible] |
| ☐ | ☐ Prod. Eng. I |
| ☐ Purchasing | ☐ Prod. Eng. II |
| ☐ Services | ☐ Prod. Eng. - Wasson |
| ☐ Employee Rel. | ☐ Fac. Eng. |
| ☐ File | ☐ Resv. Eng. |
| ☐ | |
| REPLY NUMBER | DUE DATE |

Shell Oil Company
P. O. Box 991
Houston, Texas 77001

Attention: Mr. W. W. Dover

Re: Replugging Operations on Grimes No. 2 and No. 5

Gentlemen:

Looking at the downhole drawings attached to Shell's letter to Getty Oil Company dated April 29, 1980, it would appear that you have all the pertinent data which Getty might supply regarding the re-entering and replugging of the Grimes No. 2 and No. 5 well bores.

If you need any other additional specific information which Getty might supply, please call the Hobbs Area Office (505-393-4986). We will be glad to be of assistance in supplying additional information that is available.

Mr. Ed Fowler is Getty's field representative in this area. He may be contacted through the Hobbs Area Office.

Very truly yours,

GETTY OIL COMPANY

Dale R. Crockett

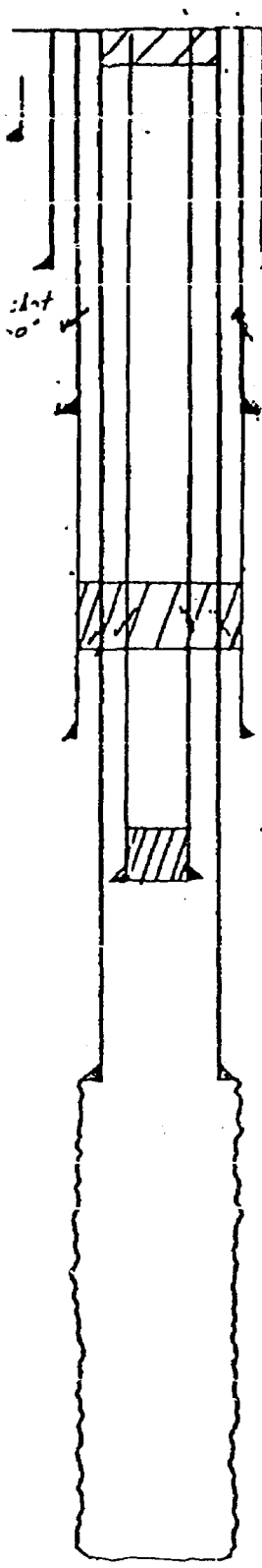
/ws
PWS/de

cc - Mr. A. B. Cary, Midland
Mr. L. R. Hall, Midland
Mr. Welton Moore, Shell, Hobbs

1

W. P. Grimes | 2 | 990 FEET FROM East LINE SEC. 27 T 18S R 38E

MEASUREMENT DATUM ELEV. _____ (GL-DF-KB) TOTAL DEPTH 4175 PBTD _____



10 sx. plug @ surface

20"; 90# casing cmt'd @ 127 Ft. with no record sx. cmt.

15½", 70# CASING CMT'D. @ 217 FT. WITH no record SX CMT.
HOLE SIZE no record ", TOP OF CMT. OUTSIDE CASING @ no record FT.
HOW TOP OF CMT. DETERMINED _____

9⅝", 36# CASING CMT'D. @ 2754 FT. WITH no record SX CMT.
HOLE SIZE no record ", TOP OF CMT. OUTSIDE CASING @ no record FT.
HOW TOP OF CMT. DETERMINED _____

5½ + 7" csg. shot simultaneously @ 2030'. Set a 25 sx. plug @ 2030' in the 9⅝" csg.

9⅝" @ 2754'

15 sx. plug in bottom of 5¼" csg.

5½", 15½# casing cemented @ 3370' Ft. with 100 sx. cement

7", 24# CASING CMT'D. @ 3929 FT. WITH no record SX. CMT.
HOLE SIZE no record ". TOP OF CMT. OUTSIDE CASING @ no record FT.
HOW TOP OF CMT. DETERMINED _____

PERFORATED INTERVAL(S) _____
3188 - 3255
_____
_____
*NOW SQUEEZED
OPEN HOLE INTERVAL 3929 - 4175'
____", ____# TBG. @ _____ FT. PKR. @ _____

Getty Oil Company
P.O. Box 1231, Midland, Texas 79702 · Telephone (915) 683-6301

May 6, 1980

S.E.C. Mgr.
Dev. Oper. Mgr.
Dev. Engr. Mgr.
Geol. Eng.
Resv. Eng.
Fac. Eng.
Drilling Eng.
Audra B. Cary, District Proration Manager
Central Exploration and Production Division
$CO_2$ Mgr.
Prod. Admin. Mgr.
WEB
CO Fac. Mgr.
J.R.F. Phillips
Reg. & Perm.
Prod. Eng. I
Prod. Eng. II
Purchasing
Services
Employee Rel.
Resv. Eng.
File

Shell Oil Company
P. O. Box 991
Houston, Texas 77001

REPLY NUMBER
DUE DATE

Attn: Mr. R. W. Dover

File: North Hobbs (G-SA) Unit
Lea County, New Mexico

Re: Re-plugging Operations on
G.O.C. Grimes No. 2 & No. 5

Gentlemen:

Getty Oil Company hereby grants to Shell Oil Company, as Operator of the North Hobbs Unit, such rights and privileges as it presently enjoys as lessor of the subject leasehold; for the express purpose of re-entering and re-plugging the said Grimes No. 2 and No. 5 wellbores in a manner, approved by the New Mexico Oil Conservation, to prevent migration of fluids within the wellbore from secondary recovery operations. It being expressly understood that this grant does not include surface damages for this operation which may accrue to the benefit of the surface owner. It will be the responsibility of the Unit Operator to negotiate and settle such damage claims with said surface owner.

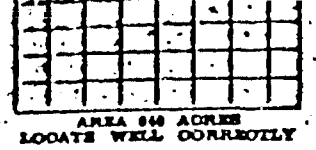
By copy of this letter, the Area Superintendent is hereby requested to provide any additional information which may be available on these particular wells; and also to provide the name and address of his designated field representative which is to be contacted prior to commencement of the work.

Very truly yours,

Audra B. Cary
Audra B. Cary

OVS:slw

cc: Mr. L. R. Hall
Mr. D. R. Crockett - Hobbs




# WELL RECORD

Mail to State Geologist, Santa Fe, New Mexico, not more than ten days after completion of well. Indicate questionable data by following it with (?). Submit in duplicate.

Company Tidal Oil Company Address Hobbs N.M.

Send correspondence to T.R. Wade Address Box 1057 Hobbs, N.M.

W.D. Grimes Well No. 2 in NE¼ of Sec. 29, T. 18-S

R 38-E, N. M. P. M., Hobbs Oil Field Lea County.

If State land the oil and gas lease is No. _____ Assignment No. _____

If patented land the owner is Wm. D. Grimes Address 1st Natl. Bank Seminole, Texas

The lessee is Tidal Oil Company Address Ft. Worth, Texas

If not state or patented land, give status _____

Drilling commenced July 20, 1930 19___ Drilling was completed Sept. 12, 1930 19___

Name of drilling contractor Champlin & Bass Inc. Address Holdenville, Okla.

Elevation above sea level at top of casing 3650' feet.

The information given is to be kept confidential until _____ 19___

## OIL SANDS OR ZONES

No. 1, from 3185 to 3195 No. 4, from _____ to _____

No. 2, from 4127 to 4167 No. 5, from _____ to _____

No. 3, from _____ to _____ No. 6, from _____ to _____

## IMPORTANT WATER SANDS

No. 1, from 135 to 160 No. 3, from _____ to _____

No. 2, from _____ to _____ No. 4, from _____ to _____

## CASING RECORD

| SIZE | WEIGHT PER FOOT | THREADS PER INCH | MAKE | AMOUNT | KIND OF SHOE | CUT AND PULLED FROM | PERFORATED FROM | PERFORATED TO | PURPOSE |
|---|---|---|---|---|---|---|---|---|---|
| 20" | 90# | 8 | L.W. | 128'7" | none | | | | Drill Pipe |
| 15½" | 70# | 8 | L.W. | 217'6" | T.P. | | | | Water Shut off |
| 9-5/8" | 36# | 8 | Smls | 2753'7" | Bkr. Flt. | | | | Oil String |
| | (Shoe and two bottom joints welded on) | | | | | | | | |
| 7" OD | 24# | 8 | L.W. | 2109'4" | | | | | |
| 7" OD | 24# | 8 | Smls | 1819'1" | Bkr. Flt. | | | | do |
| | (Shoe Welded on) | | | | | | | | |

## MUDDING AND CEMENTING RECORD

| SIZE | WHERE SET | NO. SACKS OF CEMENT | METHODS USED | MUD GRAVITY | AMOUNT OF MUD USED |
|---|---|---|---|---|---|

Company

Send correspondence to T.R. Wade Address Box 1057 Hobbs, N.M.

W. D. Grimes Well No. 2 in NE¼ of Sec. 29 T. 18-S

R. 38-E N. M. P. M. Hobbs Oil Field Lea County.

If State land the oil and gas lease is No. Assignment No.

If patented land the owner is Wm. D. Grimes Address 1st Natl. Bank Seminole, Texas

The lessee is Tidal Oil Company Address Ft. North, Texas

If not state or patented land, give status

Drilling commenced July 20, 1930 19 Drilling was completed Sept. 12, 1930 19

Name of drilling contractor Champlin & Bass Inc. Address Holdenville, Okla.

Elevation above sea level at top of casing 3650' feet.

The information given is to be kept confidential until 19

## OIL SANDS OR ZONES

No. 1, from 3185 to 3195 No. 4, from to

No. 2, from 4127 to 4167 No. 5, from to

No. 3, from to No. 6, from to

## IMPORTANT WATER SANDS

No. 1, from 135 to 160 No. 3, from to

No. 2, from to No. 4, from to

## CASING RECORD

| SIZE | WEIGHT PER FOOT | THREADS PER INCH | MAKE | AMOUNT | KIND OF SHOE | CUT AND PULLED FROM | PERFORATED FROM | PERFORATED TO | PURPOSE |
|---|---|---|---|---|---|---|---|---|---|
| 20" | 90# | 8 | L.W. | 128'7" | none | | | | Drill Pipe |
| 15½" | 70# | 8 | L.W. | 217'6" | T.P. | | | | Water Shut off |
| 9-5/8" | 36# | 8 | Smls | 2753'7" | Bkr. Flt. | | | | Oil String |
| | (Shoe and two bottom joints welded on) | | | | | | | | |
| 7" OD | 24# | 8 | L.W. | 2109'4" | | | | | |
| 7" OD | 24# | 8 | Smls | 1819'1" | Bkr. Flt. | | | | do |
| | (Shoe welded on) | | | | | | | | |

## MUDDING AND CEMENTING RECORD

| SIZE | WHERE SET | NO. SACKS OF CEMENT | METHODS USED | MUD GRAVITY | AMOUNT OF MUD USED |
|---|---|---|---|---|---|
| " | 250' | 200 sax cement | Halliburton | 10# | Hole Full |
| 9-5/8" | 2715' | 600 sax cement | do | 12# | do |
| 7" OD | 3580' | 300 sax cement | do | 12# | do |

## PLUGS AND ADAPTERS

## FORMATION RECORD

| FROM | TO | THICKNESS IN FEET | FORMATION |
|---|---|---|---|
| 0 | 230 | | Surface |
| 230 | 245 | | Brown Sand |
| 245 | 1000 | | Red Bed |
| 1000 | 1060 | | Shale |
| 1060 | 1105 | | Shale, lime and shells |
| 1105 | 1200 | | Shale |
| 1200 | 1305 | | Shale, lime and shells |
| 1305 | 1312 | | Broken Lime |
| 1312 | 1343 | | Lime Rock |
| 1343 | 1358 | | Broken Lime |
| 1358 | 1369 | | Sandy Lime |
| 1369 | 1388 | | Broken Lime |
| 1388 | 1448 | | Shale and Lime Shells |
| 1448 | 1526 | | Red Bed |
| 1526 | 1549 | | Red Bed and Lime Shells |
| 1549 | 1668 | | Anhydrite |
| 1668 | 1695 | | Red Bed and Anhydrite |
| 1695 | 1700 | | Potash |
| 1700 | 2500 | | Salt |
| 2500 | 2520 | | Salt and Anhydrite |
| 2520 | 2915 | | Anhydrite |
| 2915 | 3170 | | Anhydrite and Shale |
| 3170 | 3185 | | Anhydrite |
| 3185 | 3195 | | Sand (Show of oil at 3185') |
| 3195 | 3500 | | Anhydrite |
| 3500 | 3570 | | Anhydrite and Shale |
| 3570 | 3725 | | Anhydrite |
| 3725 | 3807 | | Lime Broken |
| 3807 | 3815 | | Sand |
| 3815 | 3835 | | Broken Lime and Shale |
| 3835 | 3880 | | Lime |
| 3880 | 3894 | | Hard Sandy Lime |
| 3894 | 4027 | | Lime |
| 4027 | 4086 | | Lime Broken (4027' top of pay) |
| 4086 | 4105 | | Hard Lime |
| 4105 | 4167 | | Broken Lime |
| 4167 | 4176 | | Hard Lime |
| 4176x | | | |
| | | | Shallow gas and oil on above well was not cemented off and is being held by Braden Head. |

| SIZE | WHERE SET | NO. SACKS OF CEMENT | METHODS USED | MUD GRAVITY | AMOUNT OF MUD USED |
|---|---|---|---|---|---|
| 15½" | 230' | 200 sax cement | Halliburton | 10# | Hole Full |
| 9-5/8" | 2715' | 600 sax cement | do | 12# | do |
| 7" OD | 3680' | 300 sax cement | do | 12# | do |

## PLUGS AND ADAPTERS

Heaving plug—Material _____ Length _____ Depth Set _____

Adapters—Material _____ Size _____

## SHOOTING RECORD

| SIZE | SHELL USED | EXPLOSIVE USED | QUANTITY | DATE | DEPTH SHOT | DEPTH CLEANED OUT |
|---|---|---|---|---|---|---|
| | | | | | | |
| | | | | | | |
| | | | | | | |

## TOOLS USED

Rotary tools were used from 0 feet to 4176' feet, and from _____ feet to _____ feet

Cable tools were used from _____ feet to _____ feet, and from _____ feet to _____ feet

## PRODUCTION

Put to producing Sept. 15, 19 1930

The production of the first 24 hours was 1614 barrels of fluid of which 99.9 % was oil; .1 % emulsion; _____ % water; and _____ % sediment. Gravity, Be 37.1 at 70

If gas well, cu. ft. per 24 hours _____ Gallons gasoline per 1,000 cu. ft. of gas _____

Rock pressure, lbs. per sq. in. _____

## EMPLOYES

W.S. ROSE, Driller _____, Driller

W.S. King, Driller _____, Driller

## FORMATION RECORD ON OTHER SIDE

I hereby swear or affirm that the information given herewith is a complete and correct record of the well and all work done on it so far as can be determined from available records.

Subscribed and sworn to before me this 22 Name J.R. Wade

day of September 19__ Postion Dist. Foreman

Notary Public. Representing TIDAL OIL COMPANY

Company or Operator

My commission expires June 6 1934

JANUARY 25TH, 1934

## ...PUS REPORTS ON WELLS

Following is report in detail of acid treatment and its result on W.D.Grimes #2 in NE¼ 29-18-38

Grimes #2 was treated with 1000-gallons of Dowell XX acid January 9th, 1934. Previous to treating the well was tested thru open tubing for three hours. The second and third hour gauges were the same.
Oil at the rate of 777.6-bbls for 24-hrs.
Gas " " " " 3,970,000 cu.ft. for 24-hrs. } Ratio 5102 cu.ft. per bbl.

### GENERAL WELL DATA

Completed Oct 12th, 1930 Total depth 4176'
7" OD casing cemented at 3880' 3" tubing at 4148'
Oil pays 4028' to 4086' Present potential 1393-bbls.
4105' to 4167'

### KILLING WELL

Jan 9th, 1934

| Time | Tubing Pressure | Casing Pressure | Remarks |
|---|---|---|---|
| 10 AM | 200 | 1240 | Started pumping dead oil in tub at 10:00 AM |
| 10:45 | 0 | 1300 | |
| 11:15 | 15" Vacuum | 1300 | Started bleeding casing |
| 11:35 | 15" " | 1075 | |
| 11:40 | 25" " | 950 | |
| 12:00 | 20" " | 890 | |
| 12:10PM | 0 | 850 | |
| 12:20 | 15" " | 710 | |
| 12:40 | 25# Pressure | 730 | |
| 1:15 | 22" Vacuum | 185 | |
| 1:50 | 0 | 60 | |
| 2:25 | 0 | 0 | Started acid in tubing at 2:30 |
| 3:00 | 15" Vacuum | 0 | |
| 3:05 | 5" " | 0 | Started replacing acid in tubing with |
| 3:10 | 10" " | 120 | dead oil at 3:05 |
| 3:35 | 15" " | 0 | Tubing had 15" vacuum and casing 0 until job was completed at 4:55 PM |

154-bbls of dead oil was used in killing well and 35-bbls was bleed from casing. 54-bbls was used in replacing acid in tubing. 208-bbls total.

### SHUT IN FOR 69 HOURS

Opened thru casing January 12th at 2:00 PM . Casing had 750# Pressure, tubing dead. After flowing casing for three hours, it was shut in and started flowing thru tubing.

### FIRST 10 DAYS PRODUCTION

January, 1934

| DATE | | CHOKE | TP | CP | OIL | GAS | RATIO |
|---|---|---|---|---|---|---|---|
| 3 | 12-hrs | 3/64 | 600 | 1240 | 21-bbls | | |
| 4 | 24-hrs | 4/64 | 150 | 1240 | 40 | | |
| 5 | | 6/64 | 225 | 1240 | 63 | | |
| 6 | | 6/64 | 200 | 1240 | 55 | | |
| 7 | | 6/64 | 225 | 1240 | 68 | 45,400 | 668 |
| 8 | | 6/64 | 215 | 1240 | 63 | | |
| 9 | | 6/65 | 215 | 1240 | 63 | | |
| 0 | | 6/64 | 215 | 1240 | 63 | | |
| 1 | | 6/64 | 205 | 1240 | 63 | | |
| 2 | | 6/64 | 195 | 1240 | 63 | | |
| 3 | | 6/64 | 200 | 1240 | 63 | | |

### TESTED JANUARY 25TH, 1934

| | BBLS OIL 24*HRS | CU.FT. GAS | RATIO |
|---|---|---|---|
| cond hour thru tubing | 2,951 | 9,824,970 | 3296 |
| ird hour thru tubing &CSG | 4,082 | 14,850,864 | 3638 |
| essures before well was opened | TP 195# | CP 1215# | |
| essures at beginning of tubing gauge | TP 80# | CP 800# | |
| essures at end of tubing gauge | TP 75# | CP 740# | |
| essures during open test | TP 0 to 50 | CP 50 to 75# | |

Loyd Lamb

DUPLICATE

Santa Fe, New Mexico

AUG 1 6 1946

RECEIVED

HOBBS OFFICE

# MISCELLANEOUS NOTICES

Submit this notice in triplicate to the Oil Conservation Commission or its proper agent before the work specified is to begin. A copy will be returned to the sender on which will be given the approval, with any modifications considered advisable, or the rejection by the Commission or agent, of the plan submitted. The plan as approved should be followed, and work should not begin until approval is obtained. See additional instructions in the Rules and Regulations of the Commission.

Indicate nature of notice by checking below:

| | | | |
|---|---|---|---|
| NOTICE OF INTENTION TO TEST CASING SHUT-OFF | | NOTICE OF INTENTION TO SHOOT OR CHEMICALLY TREAT WELL | |
| NOTICE OF INTENTION TO CHANGE PLANS | | NOTICE OF INTENTION TO PULL OR OTHERWISE ALTER CASING | |
| NOTICE OF INTENTION TO REPAIR WELL | | NOTICE OF INTENTION TO PLUG WELL | |
| NOTICE OF INTENTION TO DEEPEN WELL | | Notice of Intention to Recomplete Well in the Bowers Sand. | |

Houston, Texas (Place) August 12, 1946 (Date)

OIL CONSERVATION COMMISSION,
Santa Fe, New Mexico.

Gentlemen:

Following is a notice of intention to do certain work as described below at the Tide Water Associated Oil Company (Company or Operator) W. D. Grimes (Lease) Well No. 2 in NE/4 of Sec. 29, T. 18S, R. 38E, N. M. P. M., Hobbs Field, Lea County.

## FULL DETAILS OF PROPOSED PLAN OF WORK

FOLLOW INSTRUCTIONS IN THE RULES AND REGULATIONS OF THE COMMISSION

Plan to kill well with mud, set cement retainer at approximately 3250' and pump approximately 200 sacks of cement below the retainer, which should put the cement back to the San Andres formation. Gun perforate the Bowers Sand the top of which has been found on Gamma Ray and Neutron log to be at 3213'. Test well for recompletion.

Approved AUG 16 1946, 19__ except as follows:

TIDE WATER ASSOCIATED OIL COMPANY
Company or Operator

By J. E. Springer

Position Authorized Employee
Send communications regarding well to

OIL CONSERVATION COMMISSION,

By Roy Yarbrough

Title Oil & Gas Inspector

Name J. E. Springer

Address Tide Water Associated Oil Company,
Midland, Texas

DUPLICATE

Santa Fe, New Mexico

# MISCELLANEOUS REPORTS ON WELLS

RECEIVED
SEP 30 1946
OIL CONSERVATION COMMISSION
HOBBS, OFFICE

Sumbit this report in triplicate to the Oil Conservation Commission or its proper agent within ten days after the work specified is completed. It should be signed and sworn to before a notary public for reports on beginning drilling operations, results of shooting well, results of test of casing shut off, result of plugging of well, and other important operations, even though the work was witnessed by an agent of the Commission. Reports on minor operations need not be signed and sworn to before a notary public. See additional instructions in the Rules and Regulations of the Commission.

Indicate nature of report by checking below.

| | | | |
|---|---|---|---|
| REPORT ON BEGINNING DRILLING OPERATIONS | | REPORT ON REPAIRING WELL | |
| REPORT ON RESULT OF SHOOTING OR CHEMICAL TREATMENT OF WELL | | REPORT ON PULLING OR OTHERWISE ALTERING CASING | |
| REPORT ON RESULT OF TEST OF CASING SHUT-OFF | X | REPORT ON DEEPENING WELL | |
| REPORT ON RESULT OF PLUGGING OF WELL | | | |

September 28th, 1946, Hobbs, New Mexico
Date Place

OIL CONSERVATION COMMISSION,
SANTA FE, NEW MEXICO.
Gentlemen:

Following is a report on the work done and the results obtained under the heading noted above at the
Tide Water Associated Oil Company, W.D. Grimes Well No. 2 in the
Company or Operator Lease
NE/4 of Sec. 29, T. 18S, R. 38E, N. M. P. M.,
Hobbs Field, Lea County.

The dates of this work were as follows: September 25th and September 27th, 1946

Notice of intention to do the work was (was ~~not~~) submitted on Form C-102 on August 12, 19 46
and approval of the proposed plan was (was not) obtained. (Cross out incorrect words.)

DETAILED ACCOUNT OF WORK DONE AND RESULTS OBTAINED

In preparing this well for recompletion in the bowers sand it was fouhd that the 7"OD oil string was in bad condition, making it necessary to run a string of 5-1/2" casing on the inside. We ran 5-1/2" OD 15.5# Seamless Steel Casing and set at 3,350' ~~XXXXXX~~ and cemented with 100 sacks. This casing was tested with 1200# pressure and let stand for 30 minutes to check for decline, held OK.

Witnessed by E.E. Hogue (Name) Tide Water Associated Oil Co. (Company) Foreman (Title)

Subscribed and sworn before me this 28
day of Sept, 19 46
W. Lin Fichtner
Notary Public

My commission expires 12-20-47

I hereby swear or affirm that the information given above is true and correct.

Name E.E. Hogue
Position Foreman
Representing Tide Water Associated Oil Company
Company or Operator
Address Drawer KK, Hobbs, New Mexico

Remarks:

APPROVED
Date SEP 30 1946

Roy Yarbrough
Name
Oil & Gas Inspector
Title

County Parish Lea Co. TWP 18S Rge. 38E Co. Dist.

Survey Block Sec. 29 Twp. Abst.

Feet from Survey Lease Section Lines N 2310 E 990 S W Elevation

Dist. to Lease Pool Hobbs

Within 3 Mile of Lease District

| LOC. MADE | DERRICK | DRILLING | COMPLETED | TOTAL DEPTH | INITIAL PRODUCTION OIL OR GAS | GRAVITY | SAND RECORD | ABANDONED |
|---|---|---|---|---|---|---|---|---|
| 9-26-46 | | | 10-31-46 | 4176' L | flwd 16 BO (sweet) in 13 hrs | | | |
| Fr. rept. | | | PB | 3266' | | 39 | TP 3148' | |

| SHOT RECORD | | | | | CASING RECORD | | ROTARY | | CABLE TOOLS | |
|---|---|---|---|---|---|---|---|---|---|---|
| DATE | NO. QTS. | FROM | TO | RESULTS | | SIZE OF CASING | FROM | TO | FROM | TO |
| | | | | | Cased | 5½" w/100 | | | | |
| | | | | | Depth | 3350' | | | | |

Sample Oil to Refinery Old TD 4176' L new work began 9-19-46 pulled tbg., now prep to plug back to 3400' and test csg., if same test O.K. operator attempt to recomplete well in Bowers Sand, which was topped at 3185'.

Sample Gas to Refinery

Sample Sands & Cores

Log Record of (C) CTD 4176' L PB 3266' TP 3148' 2" tbg at 3259' No pkr Comp 10-31-46 Ir flwd 16 BO (sweet) in 13 hrs thru 13/64" TC GOR 156:1 Grav 39 Corr.

REMARKS (Chalks, Sands, Limes, Salt, Showing Oil, Gas or Water etc.)

| POSTED | | |
|---|---|---|
| | F. R. | COMPL. |
| Land Map | | |
| Geol. Map | | |
| | | |

Last.

If no original card is found, after transferring data

FORM C1940—MID (11-8-48)

## WELL CARD

County Lea State NM

Company Tidewater Assoc. Oil C. Farm W. P. Grimes Well No. 3

Field Hobbs Coord. Elev. 3651

Survey Blk. Sec. 29 Twp. 18-S Range 38-E

Located N E S W Lines of

| Commenced | Completed | Top Pay | Perforations | Total Depth | Casing |
|---|---|---|---|---|---|
| | | | | | Depth |
| | | | | | Sacks |

Acid Treat. Producing Interval Producing Formation

Sand Treat.

OPT. Choke CP TP Grav. GOR

Initial Prod. Radioactivity Log Sample Log Residue Log

0-4240.5

Lease #2

| DATE | DEPTH | FORMATION—REMARKS |
|---|---|---|
| 10/3/46 | OTD 417 | 6' L PB 3315' Tested 7" csg fou<br>same to be full holes from 1800-<br>2600' cmt. Perf 5-1/2" csg 3270<br>72' w/3 shots which is 20' belo<br>Bowers sand set Rot Sq off perf<br>w/50 sx Perf 5-1/2" csg 3082-30<br>w/8 shots which is approx 100'<br>above Bowers Sand Squeezed off<br>same w/50 sx Now WOC |
| 10/10/46 | OTD 417 | 6' L PB 3266' Perf 5-1/2" csg 3<br>58' w/81 shots DST 3120-3266' op<br>05 min thru 5/8" BHC 1/4" TC on<br>1/2" DP Had gas to surface in 5<br>:co 350' or 2.55 bbls PLO & 170'<br>:24 bbls salty oil wtr Reran D<br>w/plr set at same Now prep to s |
| 10/17/46 | OTD 417 | 6' L PB 3266' before running D<br>previously reproted perf 5-1/2"<br>fr 3184-94' w/50 shots ran 2" t<br>on pkr set 3165' washed 500 gal<br>acid 3184-94' pkr gave way reset<br>same at 3135' swbd 12 bbls oil &<br>gal slt wtr in 10 hrs perf 5-1/2<br>csg fr 3234-44' w/10 shots Tstd<br>nat w/500 gal mud acid AA swbd<br>w/all shots gas. T 1000 gal acid<br>all perfs Testing. |
| 10/24/46 | OTD 417 | 6' L PB 3266' Perf 5-1/2" 3215-<br>3240-55' w/150 shots SI 12 hrs<br>SITP 700# opened flwd 26 bbls<br>sweet oil in 67 min thru open<br>tbg flwd 25 bbls sweet oil in<br>hrs thru 5/16" TC Now SI |
| 10/31/46 | OTD 417 | 6' L PB 3266' SI 24 hrs opened<br>34 BO in 60 min thru open 2" t<br>Set at 3269' and died GOR 175-1 |
| | | PROD. DEPT. TOPS: |
| | | Bowers Sand 3202 (+450) |

DUPLICATE

Santa Fe, New Mexico

# MISCELLANEOUS REPORTS ON WELLS

OCT 31 1946

RECEIVED

HOBBS OFFICE

Sumbit this report in triplicate to the Oil Conservation Commission or its proper agent within ten days after the work specified is completed. It should be signed and sworn to before a notary public for reports on beginning drilling operations, results of shooting well, results of test of casing shut off, result of plugging of well, and other important operations, even though the work was witnessed by an agent of the Commission. Reports on minor operations need not be signed and sworn to before a notary public. See additional instructions in the Rules and Regulations of the Commission.

Indicate nature of report by checking below.

| | | | |
|---|---|---|---|
| REPORT ON BEGINNING DRILLING OPERATIONS | | REPORT ON REPAIRING WELL | |
| REPORT ON RESULT OF SHOOTING OR CHEMICAL TREATMENT OF WELL | | REPORT ON PULLING OR OTHERWISE ALTERING CASING | |
| REPORT ON RESULT OF TEST OF CASING SHUT-OFF | | REPORT ON DEEPENING WELL | |
| REPORT ON RESULT OF PLUGGING OF WELL | | Notice of recompletion of well in the Bowers Sand. | X |

October 30th, 1946 — Date
Hobbs, New Mexico — Place

OIL CONSERVATION COMMISSION,
SANTA FE, NEW MEXICO.

Gentlemen:

Following is a report on the work done and the results obtained under the heading noted above at the

Tide Water Associated Oil Company (Company or Operator) W.D. Grimes (Lease) Well No. 2 in the NE/4 of Sec. 29, T. 18S, R. 38E, N. M. P. M., Hobbs Field, Lea County.

The dates of this work were as follows: September 15th to October 16th, 1946

Notice of intention to do the work was ~~was not~~ submitted on Form C-102 on August 12th, 1946

and approval of the proposed plan was ~~was not~~ obtained. (Cross out incorrect words.)

DETAILED ACCOUNT OF WORK DONE AND RESULTS OBTAINED

After setting string of 5½"OD casing at 3,350', perforated from 3,270-72' w/ 16 - 1/2" holes and squeezed w/ 50 sks. cement to shut off possible water below. Then perforated from 3,086'to 3,088' with 8 - 1/2" holes and squeezed w/ 100 sks. cement to shut off gas above. Then perforated from 3,148' to 3,255' for production. Treated formation with 2,000 gallons Dowell mud acid, and 1,000 gals. Chemical Process. Ran 2-3/8"OD Tubing set at 3,259', with tubing perforations at 3,246'to 3,249', started swabbing and testing.

Witnessed by H.G. Wesberry (Name) Tide Water Associated Oil Co. (Company) Foreman (Title)

Subscribed and sworn before me this 30th day of October 1946

M.M. Vaughan
Notary Public

My commission expires Oct 24, 1949

I hereby swear or affirm that the information given above is true and correct.

Name R. Weakley

Position Foreman

Representing Tide Water Associated Oil Co.
Company or Operator

Address Drawer KK, Hobbs, New Mexico

Remarks:

Orig. & 2-cc (1 ret'd) OCC, Hobbs, N.M.
cc- Tulsa, Houston, Midland, File

APPROVED OCT 31 1946

Date

Name
Oil & Gas Inspector
Title

1

Place
Date October 30th, 1946

| | | | |
|---|---|---|---|
| D | C | B | A |
| E | F | G | H X |
| L | K | J | I |
| M | N | O | P |

Glenn Staley
Proration Office
Hobbs, New Mexico.

Designate UNIT well is located in
Unit "H"

## RECOMPLETION OF OLD WELL

E-

NOTICE OF COMPLETION OF: (Lease) E.D. Grimes Well No: 2
2,310 feet from North line: 990 feet from East line;
Section 29 Township 18S Range 38E.

DATE STARTED September 15th, 1946
DATE COMPLETED
ELEVATION 3,258' (Top of Rotary Bushing)
TOTAL DEPTH S.L.
CABLE TOOLS ROTARY TOOLS X

### CASING RECORD

| | | | | | |
|---|---|---|---|---|---|
| SIZE | 5-1/2" OD | DEPTH | 3,350' | SAX CEMENT | 100 |
| SIZE | | DEPTH | | SAX CEMENT | |
| SIZE | | DEPTH | | SAX CEMENT | |

### TUBING RECORD

SIZE 2-3/8"OD DEPTH 3,259'

| ACID RECORD | | SHOT RECORD | |
|---|---|---|---|
| NO. GALS | 2,000 - Dowell Mud Acid | NO. QTS. | None |
| NO. GALS | 1,000 - Chemical Process | NO. QTS. | |
| NO. GALS | | NO. QTS. | |

### FORMATION TOPS

Anhydrite
Top Salt
Base Salt
Red Sand
Brown Lime
White Lime
Oil or Gas Pay 3,148' - 3,255' - Bowers Sand
Water None

Initial Production Test 34.44 Pumping Flowing X
Test After Acid or Shot

Initial GAS VOLUME 11,583 cu ft, C.O. Ratio 336, Official Test

SCHEDULE NO. DATE October 28th, 1946

PIPE LINE TAKING OIL Shell Pipe Line Company

REMARKS Well Re-completed in the Bowers Sand.

Orig. & 2-cc to Mr. Glenn Staley
cc- Tulsa, Houston, Midland, File

COMPANY Tide Water Associated Oil Company

SIGNED BY: H. Steve Lewis
Foreman

DUPLICATE

SANTA FE, NEW MEXICO

# MISCELLANEOUS NOTICES

JUN 25 1951
OIL CONSERVATION COMMISSION
HOBBS, NEW MEXICO

Submit this notice in triplicate to the Oil Conservation Commission or its proper agent before operations are commenced. It is to begin. A copy will be returned to the sender on which will be given the approval, with any modifications considered advisable, or the rejection by the Commission or agent, of the plan submitted. The plan as approved should be followed, and work should not begin until approval is obtained. See additional instructions in the Rules and Regulations of the Commission.

Indicate nature of notice by checking below:

| | | | |
|---|---|---|---|
| NOTICE OF INTENTION TO TEST CASING SHUT-OFF | | NOTICE OF INTENTION TO SHOOT OR CHEMICALLY TREAT WELL | |
| NOTICE OF INTENTION TO CHANGE PLANS | | NOTICE OF INTENTION TO PULL OR OTHERWISE ALTER CASING | |
| NOTICE OF INTENTION TO REPAIR WELL | | NOTICE OF INTENTION TO PLUG WELL | X |
| NOTICE OF INTENTION TO DEEPEN WELL | | | |

Hobbs, New Mexico (Place) June 24, 1951 (Date)

OIL CONSERVATION COMMISSION,
Santa Fe, New Mexico.

Gentlemen:

Following is a notice of intention to do certain work as described below at the

Tide Water Associated Oil Company (Company or Operator) W.D. Grimes (Lease) Well No. 2 in SW SE NW of Sec. 29, T. 18-S, R. 38-E, N. M. P. M., Penrose Field.

Lea County.

## FULL DETAILS OF PROPOSED PLAN OF WORK

FOLLOW INSTRUCTIONS IN THE RULES AND REGULATIONS OF THE COMMISSION

We plan to circulate this well with 10#/gal. mud and spot a cement plug(200') from 3300-3100', and pull 2300' of 5 1/2" casing; spot another plug(25 sacks) in 9 5/8" casing from 2700-2635' after pulling 1100' of 7"OD casing. We plan to recover 750' of 9 5/8" casing after which a 20 sack cement plug will be laid in the top of the 15 1/2" casing at the surface with a 4" pipe marker according to Commission regulations.

Orig., 1cc - OCC
1cc - Tulsa
1cc - Houston
1cc - Midland
1cc - file

Approved JUN 25 1951, 19____
except as follows:

OIL CONSERVATION COMMISSION,

By [illegible]

Title Oil & Gas Inspector

Tide Water Associated Oil Company
Company or Operator

By H.P. Shackelford

Position District Foreman

Send communications regarding well to

Name H.P. Shackelford

Address Drawer EE, Hobbs, New Mexico

...work will witnessed by an ... instruction in the Rules and Regulations of the Commission.

Indicate nature of report by checking below.

| | | | |
|---|---|---|---|
| REPORT ON BEGINNING DRILLING OPERATIONS | | REPORT ON REPAIRING WELL | |
| REPORT ON RESULT OF SHOOTING OR CHEMICAL TREATMENT OF WELL | | REPORT ON PULLING OR OTHERWISE ALTERING CASING | |
| REPORT ON RESULT OF TEST OF CASING SHUT-OFF | | REPORT ON DEEPENING WELL | |
| REPORT ON RESULT OF PLUGGING OF WELL | X | | |

MAY 1, 1950, STANDARD OIL COMPANY OF TEXAS IS CHANGING ITS OPERATING NAME TO CHEVRON OIL COMPANY.

July 12, 1951 (Date) Hobbs, New Mexico (Place)

GETTY

Following is a report on the work done and the results obtained under the heading noted above at the

Tide Water Associated Oil Company (Company or Operator) W.D. Grimes (Lease) Well No. 2 in the

SW SE NE of Sec. 29 T. 18-S R. 38-E N. M. P. M.

Bowers Pool Lea County.

The dates of this work were as follows: June 28, 1951 - July 3, 1951

Notice of intention to do the work was ~~XXXXX~~ submitted on Form C-102 on June 26, 1951 19....

and approval of the proposed plan was ~~XXXXX~~ obtained. (Cross out incorrect words.)

DETAILED ACCOUNT OF WORK DONE AND RESULTS OBTAINED

Tubing was run in this well and the hole circulated with 10#/gal mud. A cement plug(15 sacks) was spotted at the bottom in the 5 1/2" casing, and the 5 1/2" casing shot off at 2030'. The 7" casing was shot off simultaneously with the 5 1/2"casing. After recovery of the 5 1/2" and 7" casing (2030' of each), a 25 sack cement plug was spotted @ 2030' in the 9 5/8" casing and this string shot off @ 1200'. After recoverin 1200' of this string a 10 sack cement plug was then laid at the surface in the 15 1/2" casing with a 4" marker pipe rising 4' above the ground level according to Commission regulations.

Orig., lcc - OCC
lcc - Tulsa
lcc - Houston
lcc - Midland
lcc - file

3810
2332
D

Witnessed by R.J. Hogue (Name) Tide Water Associated Oil Company (Company) Head Roustabout (Title)

APPROVED:
OIL CONSERVATION COMMISSION

Roy Yarbrough (Name)
Oil & Gas Inspector (Title)

JUL 13 1951 (Date) 19..

I hereby swear or affirm that the information given above is true and correct.

Name H.P. Shackelford

Position District Foreman

Representing Tide Water Associated Oil Compan (Company or Operator)

Address Drawer KK, Hobbs, New Mexico

Owen Lopez - Shell Oil
Gary Kilpatrick
Clint Parsley
Jim Lore
Earl Buck

4 - Witnesses

Clifford Atkinson
Jack Dollis
Bill

(1) Lee Campbell

Capture by MMBbls secondary
SA II + III 48.6 MMBbls "

Invest $30,000,000

Wm E Nolen

Bill Miller
Buck

70-2-6 - J.J. LL Queen
1. Approve with recalculation using 1978
2. Treat 43-47+48 be deleted
3. Disapproved

Rules 1, 6 + 7 objected to if alternate is accepted

| | |
|---|---|
| 0013 | 0024 |
| 0018 | 0015 |
| 0165 | 0260 |
| 0189 | 0289 |
| 0548 | 0697 |
| .0933 | .1285 |

BOX 1610
MIDLAND TX 79702

western union **Mailgram**

A-082566C274003 10/01/79 ICS IPHONCZ CCP ARCA
2 9156840168 MGM TDPN MIDLAND TX 10-01 1136A CST

NEW MEXICO OIL CONSERVATION DIVISION ATTN DEPARTMENT OF ENERGY AND MINER
ALS
BOX 2088
SANTA FE NM 875

RECEIVED
OCT 0 3
OIL CONSERVATION DIVISION
SANTA FE

THIS IS A CONFIRMATION COPY OF A PREVIOUSLY PHONE-DELIVERED TELEGRAM

RE: SHELL OIL COMPANY SOUTH HOBBS GB/SA UNIT HEARING OCTOBER 2, 1979
AS A WORKING INTEREST OWNER IN THE SOUTH HOBBS GB/SA UNIT, ARCO OIL
AND GAS COMPANY SUPPORTS SHELLS APPLICATION FOR UNITIZATION AND FOR A
PRESSURE MAINTENANCE PROGRAM FOR THE SUBJECT UNIT. WE HAVE EXECUTED
THE UNIT AND UNIT OPERATING AGREEMENTS AND BELIEVE THE UNIT WILL
RESULT IN INCREASED ULTIMATE RECOVERY.
G. DUANE AKINS, ARCO OIL AND GAS COMPANY, MIDLAND TEXAS
BOX 1610
MIDLAND TX 79702

1136 EST

MGMCOMP MGM
(

5241 (R1/78)

TO REPLY BY MAILGRAM, SEE REVERSE SIDE FOR WESTERN UNION'S TOLL - FREE PHONE NUMBERS

STATE OF NEW MEXICO
ENERGY AND MINERALS DEPARTMENT
Oil Conservation Division
State Land Office Building
Santa Fe, New Mexico
19 September 1979

EXAMINER HEARING

---

IN THE MATTER OF:

Application of Shell Oil Company for statutory unitization, Lea County, New Mexico. — CASE 6652

and

Application of Shell Oil Company for a pressure maintenance project, Lea County, New Mexico. — CASE 6653

---

BEFORE: Daniel S. Nutter

TRANSCRIPT OF HEARING

A P P E A R A N C E S

For the Oil Conservation Division: Ernest L. Padilla, Esq.
Legal Counsel for the Division
State Land Office Bldg.
Santa Fe, New Mexico 87503

SALLY WALTON BOYD
CERTIFIED SHORTHAND REPORTER
3020 Plaza Blanca (505) 471-2462
Santa Fe, New Mexico 87501

MR. NUTTER: Call next Case Number 6652.

MR. PADILLA: Application of Shell Oil Company for statutory unitization, Lea County, New Mexico.

MR. NUTTER: And we'll also call Case Number 6653.

MR. PADILLA: Application of Shell Oil Company for a pressure maintenance project in Lea County, New Mexico.

MR. NUTTER: Case Number 6652 and 6653 will be continued to the Commission Hearing scheduled to be held at this same place at 9:00 o'clock a. m. October 3rd, 1979.

(Hearing concluded.)

SALLY WALTON BOYD
CERTIFIED SHORTHAND REPORTER
3020 Plaza Blanca (505) 471-2461
Santa Fe, New Mexico 87501

SALLY WALTON BOYD
CERTIFIED SHORTHAND REPORTER
3016 Plaza Blanca (505) 471-2461
Santa Fe, New Mexico 87501

REPORTER'S CERTIFICATE

I, SALLY W. BOYD, a court reporter, DO HEREBY CERTIFY that the foregoing and attached Transcript of Hearing before the Oil Conservation Division was reported by me; that the said transcript is a full, true, and correct record of the hearing, prepared by me to the best of my ability from my notes taken at the time of the hearing.

Sally W. Boyd C.S.R.
Sally W. Boyd, C.S.R.

I do hereby certify that the foregoing is a complete record of the proceedings in the Examiner hearing of Case No. 6652-53 heard by me on 9/19 1979.

, Examiner
Oil Conservation Division

File
Case 6652

October 1, 1979

G. Tham Atkins
Arco Oil and Gas Company
Midland, Texas

Re: Shell Oil Company South Hobbs G. B-A
Unit Hearing October 2, 1979,

As a working interest owner in the South Hobbs GB-A Unit Arco Oil and Gas Company supports Shell's application for unitization and for pressure maintenance project for the subject unit . We have executed the unit and unit operating agreement and believe the unit will result in increased ultimate recovery.

G. Tham Atkins

Telegram will follow

# Gulf Oil Exploration and Production Company

J. M. Thacker
GENERAL MANAGER PRODUCTION
SOUTHWEST DISTRICT

P. O. Drawer 1150
Midland, TX 79702

RECEIVED
OCT 01 1979
CONSERVATION DIVISION
SANTA FE

September 27, 1979

New Mexico Department of Energy & Minerals
Oil Conservation Division
Post Office Box 2088
Santa Fe, New Mexico 87501

File

Attention: Mr. Joe D. Ramey

RE: Case 6652 - Statutory Unitization
Case 6653 - Pressure Maintenance Project
North Hobbs Grayburg - San Andres Unit
Lea County, New Mexico

Gentlemen:

Gulf Oil Corporation has received notice of the subject Commission Hearings set for October 3, 1979. We are a party to this proposed pressure maintenance and secondary recovery operation, and have ratified the Unit and Unit Operating Agreements.

Gulf Oil Corporation fully endorses and supports Shell Oil Company in this application.

Yours very truly,

R. H. Peacock

R. H. PEACOCK
Manager - Operations

CFK:sdn

cc: Shell Oil Company
ATTN: Mr. W. W. Dover
Post Office Box 991
Houston, Texas 77001

Gulf

A DIVISION OF GULF OIL CORPORATION

Getty

OCT 01 1979
OIL CONSERVATION DIVISION
SANTA FE

Getty Oil Company

P.O. Box 1231, Midland, Texas 79702 · Telephone (915) 683-6301

Audra B. Cary, District Production Manager
Central Exploration and Production Division

September 28, 1979

File

State of New Mexico
Oil Conservation Division
P. O. Box 2088
Santa Fe, New Mexico 87501

Attention: Mr. Joe D. Ramey, Secretary-Director

Re: Case No. 6652 and 6653
Proposed North Hobbs Unit
Hobbs Grayburg-San Andres Field
Lea, New Mexico

Gentlemen:

This is to express Getty Oil Company's support of Shell Oil Company's application for statutory unitization and for a pressure maintenance project on the subject unit. As a Working Interest Owner, which has ratified both the Unit Agreement and Unit Operating Agreement; we consider this unitized operation to be economically justified and a viable project which is engineeringly sound. This unitized operation is projected to increase recovery; and the revenue from the increase is considered sufficient to exceed the cost of obtaining this increase.

The formulae for participation and for capital allocation were derived after extensive negotiations and study by the numerous interests involved in these lengthy and strenuous unitization efforts. We consider these formulae to be equitable and a sound basis for unitization.

We, therefore, urge consideration of these applications and acceptance as presented.

Yours very truly,

GETTY OIL COMPANY

Audra B. Cary

Audra B. Cary
Dist. Prod. Manager

OVS/slw
cc: Mr. B. W. Koch
Shell Oil Co.
P. O. Box 991
Houston, Texas 77001
Attn: Mr. W. W. Dover

CASE 6682: (This case will be dismissed.)

Application of Yates Petroleum Corporation for compulsory pooling, Eddy County, New Mexico. Applicant, in the above-styled cause, seeks an order pooling all mineral interests in the Wolfcamp-Mississippian formations underlying the N/2 of Section 28, Township 18 South, Range 29 East, to be dedicated to a well to be drilled at a standard location thereon. Also to be considered will be the cost of drilling and completing said well and the allocation of the cost thereof as well as actual operating costs and charges for supervision. Also to be considered will be the designation of applicant as operator of the well and a charge for risk involved in drilling said well.

CASE 6683: Application of Read & Stevens, Inc. for an unorthodox well location and non-standard oil proration unit, Lea County, New Mexico. Applicant, in the above-styled cause, seeks approval for the unorthodox location of a Devonian test well to be located 330 feet from the North line and 100 feet from the West line of Section 6, Township 11 South, Range 37 East, Lots 5 and 6 of said Section 6 to be dedicated to the well as a non-standard 49.33-acre proration unit.

CASE 6684: Application of $CO_2$-In-Action, Inc. for creation of a new carbon dioxide gas pool and special pool rules, Harding County, New Mexico. Applicant, in the above-styled cause, seeks the creation of the North Bueyeros-Santa Rosa $CO_2$ Gas Pool and the promulgation of special pool rules therefor, including a provision for 40-acre spacing and proration units. Said pool would comprise all or parts of Sections 1 thru 4, Township 20 North, Range 30 East, and Sections 8, 9, 10, 15, 16, 17, 20, 21, 22, 27, 28, 32, 33 and 34, Township 21 North, Range 30 East.

CASE 6685: Application of ARCO Oil and Gas Company for downhole commingling, Lea County, New Mexico. Applicant, in the above-styled cause, seeks approval for the downhole commingling of Blinebry and Drinkard production in the wellbore of its J. R. Cone A Well No. 2 located in Unit L of Section 26, Township 21 South, Range 37 East.

CASE 6686: Application of Mesa Petroleum Company for an exception to Order No. R-111-A, Eddy County, New Mexico. Applicant, in the above-styled cause, seeks an exception to the casing-cementing rules of Order No. R-111-A to permit a well to be drilled in Unit F of Section 6, Township 20 South, Range 31 East, without a salt protection string and to circulate cement on the production string. Applicant also seeks the same exception for a possible future well in Unit E of said Section 6.

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Docket No. 39-79

DOCKET: COMMISSION HEARING - WEDNESDAY - OCTOBER 3, 1979

OIL CONSERVATION COMMISSION - 9 A.M. - ROOM 205
STATE LAND OFFICE BUILDING, SANTA FE, NEW MEXICO

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CASE 6652: (Continued from September 19, 1979, Examiner Hearing)

Application of Shell Oil Company for statutory unitization, Lea County, New Mexico. Applicant, in the above-styled cause, seeks an order unitizing, for the purpose of a pressure maintenance project, all mineral interests in the North Hobbs Grayburg-San Andres Unit encompassing 10,650 acres, more or less, underlying all or portions of the following lands in Lea County, New Mexico: Sections 13, 14, 23, 24, 25, 26, and 36, Township 18 South, Range 37 East; Sections 17 through 21 and 27 through 34, Township 18 South, Range 38 East.

The unitized interval would be the Grayburg-San Andres Formation between the depths of 3,698 feet and 4,500 feet in Shell's State A Well No. 7, located in Unit H of Section 32, Township 18 South, Range 38 East.

Among the matters to be considered at the hearing will be the necessity of unit operations; the designation of a unit operator; the determination of the horizontal and vertical limits of the unit area; the determination of a fair, reasonable, and equitable allocation of production and costs of production, including capital investment, to each of the various tracts in the unit area; the determination of credits and charges to be made among the various owners in the unit area for their investment in wells and equipment; and such other matters as may be necessary and appropriate for carrying on efficient unit operations, including, but not necessarily limited to, unit voting procedures, selection, removal, or substitution of unit operator, and time of commencement and termination of unit operations.

JAMES E. SPERLING
JOSEPH E. ROEHL
GEORGE T. HARRIS, JR.
DANIEL A. SISK
LELAND S. SEDBERRY, JR.
ALLEN C. DEWEY, JR.
FRANK H. ALLEN, JR.
JAMES A. PARKER
JOHN R. COONEY
KENNETH L. HARRIGAN
PETER J. ADANG
DALE W. EK
DENNIS J. FALK
JOE R. G. FULCHER
ARTHUR D. MELENDRES
JAMES P. HOUGHTON

LAW OFFICES
MODRALL, SPERLING, ROEHL, HARRIS & SISK
PUBLIC SERVICE BUILDING
P. O. BOX 2168
ALBUQUERQUE, NEW MEXICO 87103
505-243-4511

JOHN F. SIMMS (1885-1954)
J. R. MODRALL (1902-1977)
AUGUSTUS T. SEYMOUR (1907-1985)

JUDY A. FRY
PAUL M. FISH
MARK B. THOMPSON III
GEORGE J. HOPKINS
JEFFREY W. LOUBET
RUTH M. SCHIFANI
THOMAS L. JOHNSON
LYNN H. SLADE
ALAN KONRAD
ZACHARY L. McCORMICK
THURMAN W. MOORE III
CLIFFORD K. ATKINSON
DOUGLAS A. BAKER
DEBORAH J. HERZBERG
SUSAN R. STOCKSTILL

RECEIVED
SEP 06 1979
OIL CONSERVATION DIVISION
SANTA FE

September 5, 1979

Mr. Dan Nutter
Engineer
Oil Conservation Division
P.O. Box 2088
Santa Fe, New Mexico 87501

RE: Shell Oil Company's Applications No's. 6652 and 6653

Dear Mr. Nutter:

The Modrall firm is representing Exxon with regard to the Shell application for statutory unitization and pressure maintenance project, which was originally scheduled to be heard on September 5th. I have talked with Owen Lopez, who represents Shell, and we have agreed that October 3rd and 4th would be a more advantageous time for both Shell and Exxon. I therefore would like to request that the OCD continue the hearing until those dates. As I understand it, Owen has made a similar request.

Thank you for your time, and if there is some problem with the October 3rd and 4th dates, please let me know.

Sincerely yours,

Clifford K. Atkinson

Clifford K. Atkinson

CKA/sr

J. O. SETH (1883-1963)

A. K. MONTGOMERY
FRANK ANDREWS
FRED C. HANNAHS
SETH D. MONTGOMERY
FRANK ANDREWS III
OWEN M. LOPEZ
VICTOR R. ORTEGA
JEFFREY R. BRANNEN
JOHN BENNETT POUND
GARY R. KILPATRIC
THOMAS W. OLSON
WALTER J. MELENDRES
BRUCE L. HERR
MICHAEL W. BRENNAN
ROBERT B. WORCESTER
JOHN B. DRAPER
NANCY M. ANDERSON
JOHN R. SILVER
RUDOLPH B. SACKS, JR.

MONTGOMERY, ANDREWS & HANNAHS
PROFESSIONAL ASSOCIATION
ATTORNEYS AND COUNSELORS AT LAW
325 PASEO DE PERALTA
POST OFFICE BOX 2307
SANTA FE, NEW MEXICO 87501

TELEPHONE 505-982-3873
TELECOPY 505-982-4289

September 4, 1979

RECEIVED
SEP 4 1979
Oil Conservation

New Mexico Oil Conservation Division
State Land Office Building
Santa Fe, New Mexico 87501

Re: Application of Shell Oil Company for Statutory Unitization, North Hobbs (Grayburg-San Andres) Unit, Lea County, New Mexico; OCC Case No. 6652

Application of Shell Oil Company for Authority to Institute a Pressure Maintenance Project for the North Hobbs (Grayburg-San Andres) Unit, Lea County, New Mexico; OCC Case No. 6653

Gentlemen:

Please postpone the above referenced applications on behalf of our client, Shell Oil Company, until the next scheduled hearing on September 19, 1979.

Sincerely,

Owen M. Lopez

OML:ksh

STATE OF NEW MEXICO
ENERGY AND MINERALS DEPARTMENT
Oil Conservation Division
State Land Office Building
Santa Fe, New Mexico
5 September 1979

EXAMINER HEARING

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IN THE MATTER OF:

Application of Shell Oil Company for statutory unitization, Lea County, New Mexico. CASE 6652

and

Application of Shell Oil Company for a pressure maintenance project, Lea County, New Mexico. CASE 6653

---

BEFORE: Richard L. Stamets

TRANSCRIPT OF HEARING

A P P E A R A N C E S

For the Oil Conservation Division: Ernest L. Padilla, Esq.
Legal Counsel for the Division
State Land Office Bldg.
Santa Fe, New Mexico 87503

SALLY WALTON BOYD
CERTIFIED SHORTHAND REPORTER
3020 Plaza Blanca (505) 471-2462
Santa Fe, New Mexico 87501

MR. STAMETS: Call next Case 6652.

MR. PADILLA: Application of Shell Oil Company for statutory unitization, Lea County, New Mexico.

MR. STAMETS: Let's also call the companion case to that, Case 6653.

MR. PADILLA: Application of Shell Oil Company for a pressure maintenance prcject, Lea County, New Mexico.

MR. STAMETS: These cases are shown on the docket to be continued until September the 19th hearing, 1979; however, at that time they will further be continued until the Commission Hearing now scheduled for the October the 3rd, 1979.

(Hearing concluded.)

SALLY WALTON BOYD
CERTIFIED SHORTHAND REPORTER
3010 Plaza Blanca (505) 471-2462
Santa Fe, New Mexico 87501

SALLY WALTON BOYD
CERTIFIED SHORTHAND REPORTER
3010 Plaza Blanca (505) 471-2462
Santa Fe, New Mexico 87501



REPORTER'S CERTIFICATE

I, SALLY W. BOYD, a court reporter, DO HEREBY CERTIFY that the foregoing and attached Transcript of Hearing before the Oil Conservation Division was reported by me; that the said transcript is a full, true, and correct record of the hearing, prepared by me to the best of my ability, from my notes taken at the time of the hearing.

Sally W. Boyd C.S.R.
Sally W. Boyd, C.S.R.

I do hereby certify that the foregoing is a complete record of the proceedings in the Examiner hearing of Case No. 6652+6653 heard by me on 9-5 19 79.

Richard L. Stamets, Examiner
Oil Conservation Division

Dockets Nos. 38-79 and 39-79 are tentatively set for October 2 and October 17, 1979. Applications for hearing must be filed at least 22 days in advance of hearing date.

DOCKET: COMMISSION HEARING - TUESDAY - SEPTEMBER 25, 1979

9 A.M. - OIL CONSERVATION DIVISION CONFERENCE ROOM,
STATE LAND OFFICE BUILDING, SANTA FE, NEW MEXICO

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CASE 6495: (DE NOVO) (Continued from August 24, 1979, Commission Hearing)

Application of Amax Chemical Corporation for the amendment of Order No. R-111-A, Eddy County, New Mexico. Applicant, in the above-styled cause, seeks the amendment of Order No. R-111-A to extend the boundaries of the Potash-Oil Area by the inclusion of certain lands in Sections 23 and 24, Township 19 South, Range 29 East, Sections 1, 4, 5, 6, 7, 11, 12, 13, 14, 19, 20, 23, 24, and 29, Township 19 South, Range 30 East, and Sections 7, 8, 17, 18, and 19, Township 19 South, Range 31 East, all in Eddy County, New Mexico.

Upon application of Amax Chemical Corporation this case will be heard De Novo pursuant to the provisions of Rule 1220.

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Docket No. 36-79

DOCKET: EXAMINER HEARING - WEDNESDAY - SEPTEMBER 19, 1979

9 A.M. - OIL CONSERVATION DIVISION CONFERENCE ROOM,
STATE LAND OFFICE BUILDING, SANTA FE, NEW MEXICO

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The following cases will be heard before Daniel S. Nutter, Examiner, or Richard L. Stamets, Alternate Examiner:

CASE 6656: In the matter of the hearing called by the Oil Conservation Division on its own motion to permit Energy Oil & Gas Corp., The Travelers Indemnity Co., and all other interested parties to appear and show cause why the Sadler Well No. 1 located in Unit I of Section 3, Township 24 North, Range 29 East, Union County, New Mexico, should not be plugged and abandoned in accordance with a Division-approved plugging program.

CASE 6652: (Continued from September 5, 1979, Examiner Hearing)

Application of Shell Oil Company for statutory unitization, Lea County, New Mexico. Applicant, in the above-styled cause, seeks an order unitizing, for the purpose of a pressure maintenance project, all mineral interests in the North Hobbs Grayburg-San Andres Unit encompassing 10,650 acres, more or less, underlying all or portions of the following lands in Lea County, New Mexico: Sections 13, 14, 23, 24, 25, 26, and 36, Township 18 South, Range 37 East; Sections 17 through 21 and 27 through 34, Township 18 South, Range 38 East.

The unitized interval would be the Grayburg-San Andres Formation between the depths of 3,698 feet and 4,500 feet in Shell's State A Well No. 7, located in Unit H of Section 32, Township 18 South, Range 38 East.

Among the matters to be considered at the hearing will be the necessity of unit operations; the designation of a unit operator; the determination of the horizontal and vertical limits of the unit area; the determination of a fair, reasonable, and equitable allocation of production and costs of production, including capital investment, to each of the various tracts in the unit area; the determination of credits and charges to be made among the various owners in the unit area for their investment in wells and equipment; and such other matters as may be necessary and appropriate for carrying on efficient unit operations, including, but not necessarily limited to, unit voting procedures, selection, removal, or substitution of unit operator, and time of commencement and termination of unit operations. (This case will be continued to the October 3, 1979, Commission Hearing.)

CASE 6653: (Continued from September 5, 1979, Examiner Hearing)

Application of Shell Oil Company for a pressure maintenance project, Lea County, New Mexico. Applicant, in the above-styled cause, seeks authority to institute a pressure maintenance project on its North Hobbs Grayburg-San Andres Unit, by the injection of water through 70 wells into the Grayburg-San Andres formation, and the adoption of special rules governing said project. (This case will be continued to the October 3, 1979, Commission Hearing.)

CASE 6657: Application of Petroleum Development Corporation for the rescission of special pool rules, Eddy County, New Mexico. Applicant, in the above-styled cause, seeks the rescission of the special pool rules for the South Hope-Pennsylvanian Gas Pool to provide for 320-acre spacing rather than 640 acres. In the absence of objection, the pool rules will be rescinded and the pool placed on standard 320-acre spacing for Pennsylvanian gas pools rather than the present 640-acre spacing.

PROPOSED UNIT AREA
NORTH HOBBS (GRAYBURG-SAN ANDRES) UNIT
LEA COUNTY, NEW MEXICO

Township 18 South, Range 37 East, NMPM

Section 13: SE/4 and W/2
Section 14: All
Section 23: All
Section 24: All
Section 25: All
Section 26: E/2 NE/4 and NW/4 NE/4
Section 36: E/2 NW/4 and E/2

Township 18 South, Range 38 East, NMPM

Section 17: S/2 NW/4 and SW/4
Section 18: NE/4 and S/2
Section 19: All
Section 20: All
Section 21: SW/4 and S/2 SE/4 and NW/4 SE/4
Section 27: All
Section 28: All
Section 29: All
Section 30: All
Section 31: All
Section 32: All
Section 33: N/2 and SW/4 and W/2 SE/4 and NE/4 SE/4
Section 34: E/2 NW/4 and E/2

"Unitized Formation" shall mean that subsurface portion of the Unit Area Known as the Grayburg-San Andres formation of Permian Age found in the interval between the stratigraphic depth of 3698 feet as measured on the Borehole Compensated Sonic-Gamma Ray Log run in the Shell Oil Company - State A-7 well on July 9, 1969, said well being located 1930 feet FNL and 660 feet FEL of Section 32-T18S-R38E, Lea County, New Mexico, and the depth of 4500 feet beneath the surface.

STATUTORY UNITIZATION
EXHIBIT "A"

BEFORE THE OIL CONSERVATION DIVISION
OF THE STATE OF NEW MEXICO

APPLICATION OF SHELL OIL COMPANY FOR STATUTORY UNITIZATION, NORTH HOBBS (GRAYBURG-SAN ANDRES) UNIT, LEA COUNTY, NEW MEXICO.

Case No. 6652

Recd 8/15/79

APPLICATION

Shell Oil Company hereby applies to the New Mexico Oil Conservation Division for an order pursuant to the New Mexico Statutory Unitization Act (§§70-7-1 through 70-7-21 N.M.S.A. 1978) providing for the unitized management, operation and further development of the area and formation known as the North Hobbs (Grayburg-San Andres) Unit, Lea County, New Mexico, and in support of its application states:

1. Shell Oil Company (Shell) is a Delaware corporation authorized to transact business in the State of New Mexico, and is engaged in the business of, among other things, producing and selling oil and gas as defined by the New Mexico Statutory Unitization Act (§§70-7-1 through 70-7-21 N.M.S.A. 1978, hereinafter referred to as the "Act").

2. The proposed area for which application is made for unitized operations pursuant to the Act is known as the North Hobbs (Grayburg-San Andres) Unit, Lea County, New Mexico (the "Unit Area"), and consists of 10,649.53 acres, more or less, in Lea County, New Mexico, being more particularly described in Exhibit "A" attached hereto and incorporated herein by reference. A map of the Unit Area is attached hereto and incorporated herein by reference as Exhibit "B".

3. The formation for which application is made (the "Unitized Formation") is the subsurface portion of the Unit area known

as the Grayburg-San Andres formation of Permian Age, and the vertical limits thereof are found in the interval between the stratigraphic depth of 3,698 feet as measured on the Borehole Compensated Sonic-Gamma Ray Log run in the Shell Oil Company--State A-7 Well on July 9, 1969, said well being located 1,930 feet FNL and 660 feet FEL of Section 32, Township 18 South, Range 38 East, Lea County, New Mexico, and the depth of 4,500 feet beneath the surface. A copy of the Borehole Compensated Sonic Log-Gamma Ray for said well on said date is attached hereto and incorporated herein by reference as Exhibit "C". The Unitized Formation shall further include all subsurface points throughout the Unit Area correlative to the aforementioned identified depths.

4. The portion of the Unitized Formation included within the Unit Area has been reasonably defined by development.

5. Shell proposes to institute a pressure maintenance project for the secondary recovery of oil and gas from the Unitized Formation within the Unit Area.

6. The proposed plan of unitization is embodied in the Unit Agreement, a true and correct copy of which is attached hereto and incorporated herein by reference as Exhibit "D", and said plan is fair, reasonable and equitable.

7. The proposed operating plan covering the manner in which the unit will be supervised and managed and costs allocated and paid is embodied in the Unit Operating Agreement, a true and correct copy of which is attached hereto and incorporated herein by reference as Exhibit "E".

8. Shell projects that the unitized management, operation and further development of the Unitized Formation will increase production by approximately 55 million barrels of oil from 32 million to approximately 87 million barrels, will improve the producing rate, and will extend the producing life of the formation beyond the year 2000. It is therefore evident that the unitized management, operation and further development of the Unitized Formation is reasonably necessary in order to effectively carry on pressure maintenance and secondary recovery operations to substantially increase the ultimate recovery of oil and gas from the Unitized Formation within the Unit Area.

9. The method of operation which is proposed in the Unit Operating Agreement is feasible, will prevent waste and will result with reasonable probability in the increased recovery of substantially more oil and gas from the Unitized Formation than would otherwise be recovered.

10. The estimated additional costs of conducting unitized operations will not exceed the estimated value of the additional oil and gas to be recovered plus a reasonable profit.

11. The proposed unitization and adoption of the methods of operation embodied in the Unit Operating Agreement will benefit the working interest owners and royalty owners of the oil and gas rights within the Unitized Formation of the Unit Area.

12. Shell has made a good faith effort to secure voluntary unitization within the Unitized Formation of the Unit Area.

13. The participation formula contained in the Unit Agreement allocates the produced and saved unitized hydrocarbons to the separately owned tracts in the Unit Area on a fair,

reasonable and equitable basis, and protects the correlative rights of all owners of interest within the Unit Area.

14. The statutory unitization of the Unitized Formation within the Unit Area in accordance with the plan embodied in the Unit Agreement and Unit Operating Agreement will prevent waste and protect correlative rights.

WHEREFORE, Shell requests that this application be set for hearing before the Division at the earliest practicable date and that the Division enter its order approving the Unit Agreement and Unit Operating Agreement and providing for the unitized management, operation and further development of the Unitized Formation and the Unit Area in accordance with the Act.

MONTGOMERY, ANDREWS & HANNAHS, P.A.

By _____
Owen M. Lopez
P. O. Box 2307
Santa Fe, New Mexico 87501

Attorneys for Shell Oil Company

**Shell Oil Company**

P.O. Box 991
Houston, Texas 77001

March 7, 1980

Subject: Pool 1623
North Hobbs (Grayburg - San Andres) Unit
Lea County, New Mexico
Order Nos. R-6198, R-6199

6652

RECEIVED
MAR 10 1980
OIL CONSERVATION DIVISION
SANTA FE

State of New Mexico
Oil Conservation Commission
Santa Fe, New Mexico 87501

Gentlemen:

Enclosed is a copy of the revised Exhibit B to the subject Unit Agreement. Also enclosed is revised Echibit E and E Summary to the Unit Operating Agreement. Please amend your files accordingly.

Yours very truly,

Georgiana Stanley

Georgiana Stanley
Land Department
Mid-Continent Division

GS:MG

2nd Revision
2-1-80

EXHIBIT B
ATTACHED TO UNIT AGREEMENT
NORTH HOBBS (GRAYBURG-SAN ANDRES) UNIT
LEA COUNTY, NEW MEXICO



| Tract No. | Description of Land (Operator & Lease Name) | No. Acres | Serial No. & Expiration & Date of Lease | Basic Royalty Ownership and Percentage | Lessee of Record | Overriding Royalty Owner & Percentage | Working Interest Owner & Percentage |
|---|---|---|---|---|---|---|---|
| | | | | FEDERAL LAND | | | |
| 21 | T18S-R38E, Sec. 20: NW¼SE¼ (Bill Sweet-Bowers B. Fed.) | 40 | LC-032233-B HBP 06/01/60 | United States Geological Survey 12.5% | Bill L. Sweet 100% | First National Bank, Trustee for the benefit of Jessie Fay Oliver Castlem N. Trust No. 1253 0.68360%<br>Exxon Corporation 5.46875%<br>Fred F. Kotyza 2.73438%<br>First National Bank, Trustee for the benefit of Donald Cowden Oliver Trust No. 1254 0.68359%<br>Donald M. Oliver 1.36718%<br>10.9375% | Bill L. Sweet 100% |

2nd Revision
2-1-80

EXHIBIT B
ATTACHED TO UNIT AGREEMENT
NORTH HOBBS (GRAYBURG-SAN ANDRES) UNIT
LEA COUNTY, NEW MEXICO



(EXHIBIT B, CONT'D)

| Tract No. | Description of Land (Operator & Lease Name) | No. Acres | Serial No. & Expiration & Date of Lease | Basic Royalty Ownership and Percentage | Lessee of Record | Overriding Royalty Owner & Percentage | Working Interest Owner & Percentage |
|---|---|---|---|---|---|---|---|
| 22 | T18S-R38E, Sec. 20: SE¼SE¼ (Bill Sweet-Bowers B. Fed.) | 40 | LC-032233-B<br>HBP<br>06/01/60 | United States Geological Survey<br>12.5% | Bill L. Sweet<br>100% | First National Bank, Trustee for the benefit of Jessie Fay Oliver Castlem N. Trust No. 1253<br>0.68360%<br><br>Exxon Corporation<br>5.46875%<br><br>Fred F. Kotyza<br>2.73438%<br><br>First National Bank, Trustee for the benefit of Donald Cowden Oliver - Trust No. 1254<br>0.68359%<br><br>Donald M. Oliver<br>1.36718%<br>10.9375% | Bill L. Sweet<br>100% |
| 47 | T18S-R38E, Sec. 29; SW¼NW¼ & W½SW¼: Sec. 30; SE¼ (Exxon-Bowers A Federal) | 280 | LC-032233-A<br>HBP<br>02/01/50 | United States Geological Survey<br>12.5%<br>(Sliding Scale Royalty) | Exxon Corporation<br>100% | Samuel J. Caudill, Jr.<br>0.041700% | Exxon Corporation<br>100% |

EXHIBIT B
ATTACHED TO UNIT AGREEMENT
NORTH HOBBS (GRAYBURG-SAN ANDRES) UNIT
LEA COUNTY, NEW MEXICO



(EXHIBIT B, CONT'D)

| Tract No. | Description of Land (Operator & Lease Name) | No. Acres | Serial No. & Expiration & Date of Lease | Basic Royalty Ownership and Percentage | Lessee of Record | Overriding Royalty Owner & Percentage | Working Interest Owner & Percentage |
|---|---|---|---|---|---|---|---|
| Cont. 47 | | | | | | John W. Chadwick, Individually and as trustee under the wills of Glenn B. Chadwick and Grace W. Chadwick, deceased 0.125%<br><br>Charles H. Coll 0.208300%<br><br>James N. Coll 0.208300%<br><br>Jon F. Coll 0.208400%<br><br>Max W. Coll, II 0.208300%<br><br>William Myron Keck, II, Katherine Cone Keck, & Tom Sealy, trustees for Katherine Cone Keck 1971 Trust "C" 0.083334% | |

EXHIBIT B
ATTACHED TO UNIT AGREEMENT
NORTH HOBBS (GRAYBURG-SAN ANDRES) UNIT
LEA COUNTY, NEW MEXICO



(EXHIBIT B, CONT'D)

| Tract No. | Description of Land (Operator & Lease Name) | No. Acres | Serial No. & Expiration & Date of Lease | Basic Royalty Ownership and Percentage | Lessee of Record | Overriding Royalty Owner & Percentage | Working Interest Owner & Percentage |
|---|---|---|---|---|---|---|---|
| Cont. 47 | | | | | | S. E. Cone, Jr. 0.083333%<br><br>Alva N. Etz and Jean W. Etz 0.218750%<br><br>George H. Etz, Jr., Trustee of the George H. Etz, Sr., Trust 0.43750%<br><br>Robert W. Etz 0.218750%<br><br>F. J. Evans Corporation 0.041700%<br><br>The Homestake Oil & Gas Company 0.125%<br><br>The Homestake Royalty Corporation 0.25000%<br><br>Houston Oil & Minerals Corporation 0.250% | |

2nd Revision
2-1-80

EXHIBIT B
ATTACHED TO UNIT AGREEMENT
NORTH HOBBS (GRAYBURG-SAN ANDRES) UNIT
LEA COUNTY, NEW MEXICO



(EXHIBIT B, CONT'D)

| Tract No. | Description of Land (Operator & Lease Name) | No. Acres | Serial No. & Expiration & Date of Lease | Basic Royalty Ownership and Percentage | Lessee of Record | Overriding Royalty Owner & Percentage | Working Interest Owner & Percentage |
|---|---|---|---|---|---|---|---|
| Cont. 47 | | | | | | Marjorie Cone Kastman 0.083333%<br><br>Lawson Petroleum Company 0.208300%<br><br>The First National Bank of Roswell, Trustee of Allie M. Lee Trust 3.1875%<br><br>Virginia P. Selby 0.2500%<br><br>Shriners Hospitals for Crippled Children - a Colorado Corporation 1.0625%<br>7.5% | |
| 48 | T18S-R38E, Sec. 29: NW¼NW¼ (Exxon-Bowers A Fed. Com. 35) | 40 | **Communitization Agreement SW-623 Effective 10/21/71; Approved 12/23/71 | United States Geological Survey 12.5% (Sliding Scale Royalty) | Exxon Corporation 100% | Samuel J. Caudill, Jr. 0.020850%<br><br>John W. Chadwick, Individually and as trustee under the wills of Glenn B. Chadwick and Grace W. Chadwick, deceased 0.062500%<br><br>Charles H. Coll 0.104150% | Exxon Corporation 100% |
| | **Sec. 29: S½NW¼NW¼ | 20 | LC-032233-A 02/01/50 | | | | |
| | **Sec. 29: N½NW¼NW¼ | 20 | LC-032233-B 06/01/60 | | | | |

EXHIBIT B
ATTACHED TO UNIT AGREEMENT
NORTH HOBBS (GRAYBURG-SAN ANDRES) UNIT
LEA COUNTY, NEW MEXICO



(EXHIBIT B, CONT'D)

| Tract No. | Description of Land (Operator & Lease Name) | No. Acres | Serial No. & Expiration & Date of Lease | Basic Royalty Ownership and Percentage | Lessee of Record | Overriding Royalty Owner & Percentage | Working Interest Owner & Percentage |
|---|---|---|---|---|---|---|---|
| Cont. 48 | | | | | | James N. Coll 0.104150%<br><br>Jon F. Coll 0.104200%<br><br>Max W. Coll, II 0.104150%<br><br>William Myron Keck, II, Katherine Cone Keck, & Tom Sealy, trustees for Katherine Cone Keck 1971 Trust "C" .041667%<br><br>S. E. Cone, Jr. 0.041667%<br><br>Alva N. Etz and Jean W. Etz 0.109375%<br><br>George H. Etz, Jr., Trustee of the George H. Etz, Sr., Trust 0.218750% | |

EXHIBIT B
ATTACHED TO UNIT AGREEMENT
NORTH HOBBS (GRAYBURG-SAN ANDRES) UNIT
LEA COUNTY, NEW MEXICO



(EXHIBIT B, CONT'D)

| Tract No. | Description of Land (Operator & Lease Name) | No. Acres | Serial No. & Expiration & Date of Lease | Basic Royalty Ownership and Percentage | Lessee of Record | Overriding Royalty Owner & Percentage | Working Interest Owner & Percentage |
|---|---|---|---|---|---|---|---|
| Cont. 48 | | | | | | Robert W. Etz 0.109375%<br>F. J. Evans Corporation 0.020850%<br>The Homestake Oil & Gas Company 0.062500%<br>The Homestake Royalty Corporation 0.12500%<br>Houston Oil & Minerals Corporation 0.12500%<br>Marjorie Cone Kastman 0.041666%<br>Lawson Petroleum Company 0.104150%<br>The First National Bank of Roswell, Trustee of Allie M. Lee Trust 1.593750%<br>Virginia P. Selby 0.12500% | |

EXHIBIT B
ATTACHED TO UNIT AGREEMENT
NORTH HOBBS (GRAYBURG-SAN ANDRES) UNIT
LEA COUNTY, NEW MEXICO



(EXHIBIT B, CONT'D)

| Tract No. | Description of Land (Operator & Lease Name) | No. Acres | Serial No. & Expiration & Date of Lease | Basic Royalty Ownership and Percentage | Lessee of Record | Overriding Royalty Owner & Percentage | Working Interest Owner & Percentage |
|---|---|---|---|---|---|---|---|
| Cont. 48 | | | | | | Shriners Hospitals for Crippled Children - a Colorado Corporation 0.531250% 3.75% | |

Total 4 Federal Tracts ------ 400.00 acres or 3.75603% of unit (surface) area

STATE LAND

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 1 | T18S-R37E, Sec. 14: N½ (Getty-State B) | 320 | B-2330-4 HBP 12/21/33 | Commissioner of Public Lands - State of New Mexico 12.5% | Getty Oil Company 100% | None | Getty Oil Company 100% |
| 2 | T18S-R37E, Sec. 14: N½SW¼, SW¼SW¼, SW¼SE¼ (Amerada Hess-State WHB) | 160 | A-1469-2 HBP 12/18/28 | Commissioner of Public Lands - State of New Mexico 12.5% | Amerada Hess Corporation 100% | None | Amerada Hess Corporation 100% |
| 3 | T18S-R37E, Sec. 14: SE¼SW¼ (Gulf-Lea FO State) | 40 | E-8503 HBP 09/21/54 | Commissioner of Public Lands - State of New Mexico 12.5% | Gulf Oil Corporation 100% | None | Gulf Oil Corporation 100% |
| 4 | T18S-R37E, Sec. 14: N½SE¼ (Texas Pacific-State V-Act 1) | 80 | E-5770-2 HBP 11/10/51 | Commissioner of Public Lands - State of New Mexico 12.5% | Texas Pacific Coal & Oil Co. 100% | None | Texas Pacific Oil Company, Inc. 100% |

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EXHIBIT B
ATTACHED TO UNIT AGREEMENT
NORTH HOBBS (GRAYBURG-SAN ANDRES) UNIT
LEA COUNTY, NEW MEXICO



(EXHIBIT B, CONT'D)

| Tract No. | Description of Land (Operator & Lease Name) | No. Acres | Serial No. & Expiration & Date of Lease | Basic Royalty Ownership and Percentage | Lessee of Record | Overriding Royalty Owner & Percentage | Working Interest Owner & Percentage |
|---|---|---|---|---|---|---|---|
| 5 | T18S-R37E, Sec. 14: SE¼SE¼ (Estes Engineering Co. State) | 40 | K-5218 HBP 08/17/65 | Commissioner of Public Lands - State of New Mexico 12.5% | Yeager & Armstrong 100% | None | Ada A. Anderson 11.71875%<br><br>W. D. Anderson & Sons 23.43750%<br><br>Ada A. Anderson, Paul Donald Anderson & Payton V. Anderson Executors of the Estate of Warren D. Anderson 11.71875%<br><br>J. M. Armstrong 23.43750%<br><br>Russell G. Estes d/b/a Estes Engineering Company 6.25%<br><br>W. A. Yeager 23.43750%<br>100% |
| 6 | T18S-R37E, Sec. 13: W½ (Continental-State B-13) | 320 | E-1535½ HBP 12/22/32 | Commissioner of Public Lands - State of New Mexico 12.5% | Continental Oil Company 100% | None | Continental Oil Company 100% |

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EXHIBIT B
ATTACHED TO UNIT AGREEMENT
NORTH HOBBS (GRAYBURG-SAN ANDRES) UNIT
LEA COUNTY, NEW MEXICO



(EXHIBIT B, CONT'D)

| Tract No. | Description of Land (Operator & Lease Name) | No. Acres | Serial No. & Expiration & Date of Lease | Basic Royalty Ownership and Percentage | Lessee of Record | Overriding Royalty Owner & Percentage | Working Interest Owner & Percentage |
|---|---|---|---|---|---|---|---|
| 10A | T16S-R38E, Sec. 17: SW¼NW¼ (Moranco-State T-17) | 40 | B-2330-4 HBP 12/21/33 | Commissioner of Public Lands - State of New Mexico 12.5% | Getty Oil Company 100% | Marguerite W. Somers 2.5%<br><br>Tom Schneider 2.5%<br>5.0% | Howell Spear 1.17190%<br>Ellie Sims Spear 1.17190%<br>J. N. Dunlavey 4.68750%<br>First Roswell Company 9.37500%<br>Getty Oil Company 25.00000%<br>George P. Laflin 4.68750%<br>Kenneth D. McPeters 7.03130%<br>Robert Martin Moran 28.12490%<br>Moranco 9.37500% |

EXHIBIT B
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NORTH HOBBS (GRAYBURG-SAN ANDRES) UNIT
LEA COUNTY, NEW MEXICO



(EXHIBIT B, CONT'D)

| Tract No. | Description of Land (Operator & Lease Name) | No. Acres | Serial No. & Expiration & Date of Lease | Basic Royalty Ownership and Percentage | Lessee of Record | Overriding Royalty Owner & Percentage | Working Interest Owner & Percentage |
|---|---|---|---|---|---|---|---|
| Cont. 10A | | | | | | | Loyd Whitley 4.68750%<br>A. T. Williamson 4.68750%<br>100% |
| 10B | T18S-R38E, Sec. 17: SE¼NW¼ (Moranco-State T-17) | 40 | B-2330-4 HBP 12/21/33 | Commissioner of Public Lands - State of New Mexico 12.5% | Getty Oil Company 100% | None | Getty Oil Company 100% |
| 11 | T18S-R38E, Sec. 17: N½SW¼ (Chevron State 1-17) | 80 | B-2277-1 HBP 12/07/33 | Commissioner of Public Lands - State of New Mexico 12.5% | Chevron U.S.A. Inc. 100% | None | Chevron U.S.A. Inc. 100% |
| 12 | T18S-R38E, Sec. 17: S½SW¼ (Getty (Skelly)-State A) | 80 | NM-B-1327 HBP 11/16/32 | Commissioner of Public Lands - State of New Mexico 12.5% | Getty Oil Company 100% | None | Getty Oil Company 100% |
| 28 | T18S-R37E, Sec. 24: NE¼ (Gulf-Graham-State A) | 160 | A-1543-1 HBP 12/29/28 | Commissioner of Public Lands - State of New Mexico 12.5% | Gulf Oil Corporation 100% | None | Gulf Oil Corporation 100% |
| 29 | T18S-R37E, Sec. 24: E½NW¼ (Shell-State D) | 80 | B-1411-1 HBP 12/03/32 | Commissioner of Public Lands - State of New Mexico 12.5% | Shell Oil Company 100% | None | Shell Oil Company 100% |

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EXHIBIT B
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NORTH HOBBS (GRAYBURG-SAN ANDRES) UNIT
LEA COUNTY, NEW MEXICO



(EXHIBIT B, CONT'D)

| Tract No. | Description of Land (Operator & Lease Name) | No. Acres | Serial No. & Expiration & Date of Lease | Basic Royalty Ownership and Percentage | Lessee of Record | Overriding Royalty Owner & Percentage | Working Interest Owner & Percentage |
|---|---|---|---|---|---|---|---|
| 30 | T18S-R37E, Sec. 24: W½NW¼ (Amerada Hess-State E) | 80 | B-1461-1 HBP 12/14/32 | Commissioner of Public Lands - State of New Mexico 12.5% | Amerada Hess Corporation 50%<br>Getty Oil Company 50%<br>100% | None | Amerada Hess Corporation 50%<br>Getty Oil Company 50%<br>100% |
| 31 | T18S-R37E, Sec. 24: SE¼ (Texas Pacific-State G) | 160 | A-1977-2 HBP 3/11/29 | Commissioner of Public Lands - State of New Mexico 12.5% | Texas Pacific Coal & Oil Co. 100% | None | Texas Pacific Oil Company, Inc. 100% |
| 32 | T18S-R37E, Sec. 24: SW¼ (Samedan-State G) | 160 | A-1118-4 HBP 09/15/28 | Commissioner of Public Lands - State of New Mexico 12.5% | Samedan Oil Corporation 100% | Shell Companies Foundation, Inc. 12.5% | Samedan Oil Corporation 37.8%<br>First National Bank of Casper, Trustee, Tate Trusts 3.75%<br>The First National Bank of Fort Worth, Agent for William S. Spradling 0.625%<br>The First National Bank of Fort Worth Independent Executor of Estate of Verda Spradling, No. 3462 0.625% |

EXHIBIT B
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NORTH HOBBS (GRAYBURG-SAN ANDRES) UNIT
LEA COUNTY, NEW MEXICO



(EXHIBIT B, CONT'D)

| Tract No. | Description of Land (Operator & Lease Name) | No. Acres | Serial No. & Expiration & Date of Lease | Basic Royalty Ownership and Percentage | Lessee of Record | Overriding Royalty Owner & Percentage | Working Interest Owner & Percentage |
|---|---|---|---|---|---|---|---|
| Cont. 32 | | | | | | | C. C. Forbes 1.9%<br>Ilamae Forbes 1.85%<br>Samuel Roberts Noble Foundation, Inc. 28.75%<br>G. D. Morris Estate 1.25%<br>Richard L. Noble 15.2%<br>Portales National Bank, Executor of Estate of Myrtle A. Moore 1.875%<br>Donald R. Lisle and Hal A. Treadwell, Co-Executors of Estate of John Roring, Deceased 3.75%<br>SEA Properties, Ltd 0.75%<br>E. C. Sullivan 1.875%<br>100% |

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EXHIBIT B
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NORTH HOBBS (GRAYBURG-SAN ANDRES) UNIT
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(EXHIBIT B, CONT'D)

| Tract No. | Description of Land (Operator & Lease Name) | No. Acres | Serial No. & Expiration & Date of Lease | Basic Royalty Ownership and Percentage | Lessee of Record | Overriding Royalty Owner & Percentage | Working Interest Owner & Percentage |
|---|---|---|---|---|---|---|---|
| 33A | T18S-R37E, Sec. 23: NE¼NE¼, SE¼NE¼, (Est. of C. H. Sweet-State F) | 80 | B-9264-5 HBP 08/11/41 | Commissioner of Public Lands - State of New Mexico 12.5% | C. H. Sweet Oil Company 100% | Shell Companies Foundation, Inc. Gas - 12.5% Oil - Fluctuating Overriding Royalty Interest per 4/9/51 Agreement | First National Bank of Lea County, Trustee for Cecil H. Sweet and Imo Emmetta Sweet Trust 100% |
| 33B | T18S-R37E, Sec. 23: NE¼SE¼ (Est. of C. H. Sweet-State F) | 40 | B-9264-6 HBP 08/11/41 | Commissioner of Public Lands - State of New Mexico 12.5% | C. H. Sweet Oil Company 100% | Shell Companies Foundation, Inc. Gas - 12.5% Oil - Fluctuating Overriding Royalty Interest per 1/2/53 Agreement | First National Bank of Lea County, Trustee for Cecil H. Sweet and Imo Emmetta Sweet Trust 100% |
| 34 | T18S-R37E, Sec. 23: W½NE¼ (Shell-State F) | 80 | B-9264-2 HBP 08/11/41 | Commissioner of Public Lands - State of New Mexico 12.5% | Shell Oil Company 100% | None | Shell Oil Company 100% |
| 35 | T18S-R37E, Sec. 23: E½NW¼ & SW¼ (Texas Pacific-State V-A/C 2) | 240 | E-5770-2 HBP 11/10/51 | Commissioner of Public Lands - State of New Mexico 12.5% | Texas Pacific Coal & Oil Co. 100% | None | Texas Pacific Oil Company, Inc. 100% |

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LEA COUNTY, NEW MEXICO



(EXHIBIT B, CONT'D)

| Tract No. | Description of Land (Operator & Lease Name) | No. Acres | Serial No. & Expiration & Date of Lease | Basic Royalty Ownership and Percentage | Lessee of Record | Overriding Royalty Owner & Percentage | Working Interest Owner & Percentage |
|---|---|---|---|---|---|---|---|
| 37 | T18S-R37E, Sec. 23: W½SE¼ & SE¼SE¼ (John A. Yates-Shell State F) | 120 | B-9264-10 HBP 08/11/41 | Commissioner of Public Lands - State of New Mexico 12.5% | Abo Petroleum Corporation 100% | Shell Companies Foundation, Inc. Gas - 12.5% Oil - Fluctuating Overriding Royalty Interest per 10/14/55 Agreement | Abo Petroleum Corporation 52.5%<br>Ward Investment Corporation 10%<br>Yates Petroleum Corporation 25%<br>S. P. Yates 12.5%<br>100% |
| 38 | T18S-R37E, Sec. 26: NW¼NE¼ (Wiser-State L) | 40 | K-5278 HBP 09/21/65 | Commissioner of Public Lands - State of New Mexico 12.5% | The Wiser Oil Company 100% | None | The Wiser Oil Company 100% |
| 39 | T18S-R37E, Sec. 26: E½NE¼ (Getty (Skelly)-Hobbs E) | 80 | E-5673 HBP 10/10/51 | Commissioner of Public Lands - State of New Mexico 12.5% | Getty Oil Company 100% | None | Getty Oil Company 100% |
| 40 | T18S-R37E, Sec. 25: N½NW¼ (Continental-State B-25) | 80 | B-1535½ HBP 12/22/32 | Commissioner of Public Lands - State of New Mexico 12.5% | Continental Oil Company 100% | None | Continental Oil Company 100% |

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(EXHIBIT B, CONT'D)

| Tract No. | Description of Land (Operator & Lease Name) | No. Acres | Serial No. & Expiration & Date of Lease | Basic Royalty Ownership and Percentage | Lessee of Record | Overriding Royalty Owner & Percentage | Working Interest Owner & Percentage |
|---|---|---|---|---|---|---|---|
| 41 | T18S-R37E, Sec. 25: S½NW¼ (Samedan-State B) | 80 | B-1535½-1 HBP 12/22/32 | Commissioner of Public Lands - State of New Mexico 12.5% | Samedan Oil Corporation 100% | Continental Oil Company 6.25% | Samedan Oil Corporation 100% |
| 42 | T18S-R37E, Sec. 25: NE¼ (Texaco-N.M. C State) | 160 | B-159-1 HBP 08/14/31 | Commissioner of Public Lands - State of New Mexico 12.5% | Texaco Inc. 100% | None | Texaco Inc. 100% |
| 43 | T18S-R37E, Sec. 25: S½ (Exxon-N.M. State A) | 320 | A-1320 HBP 11/22/28 | Commissioner of Public Lands - State of New Mexico 12.5% | Exxon Corporation 100% | None | Exxon Corporation 100% |
| 46 | T18S-R38E, Sec. 30: SW¼ (Marathon-State Sec. 30) | 155.78 | A-3071 HBP 01/09/30 | Commissioner of Public Lands - State of New Mexico 12.5% | Marathon Oil Company 100% | None | Marathon Oil Company 100% |
| 49 | T18S-R38E, Sec. 29, W½NE¼ & E½NW¼ (Amerada State B) | 160 | A-1469-2 HBP 12/18/28 | Commissioner of Public Lands - State of New Mexico 12.5% | Amerada Hess Corporation 100% | None | Amerada Hess Corporation 100% |
| 51 | T18S-R38E, Sec. 29: E½SW¼ & NW¼SE¼ (Continental-State A 29) | 120 | B-2657 HBP 09/23/33 | Commissioner of Public Lands - State of New Mexico 12.5% | Continental Oil Company 100% | None | Continental Oil Company 100% |

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NORTH HOBBS (GRAYBURG-SAN ANDRES) UNIT
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(EXHIBIT B, CONT'D)

| Tract No. | Description of Land (Operator & Lease Name) | No. Acres | Serial No. & Expiration & Date of Lease | Basic Royalty Ownership and Percentage | Lessee of Record | Overriding Royalty Owner & Percentage | Working Interest Owner & Percentage |
|---|---|---|---|---|---|---|---|
| 53 | T18S-R38E, Sec. 29: S½SE¼ (Chevron-State 1-29) | 80 | B-2277-1 HBP 12/07/33 | Commissioner of Public Lands - State of New Mexico 12.5% | Chevron U.S.A. Inc. 100% | None | Chevron U.S.A. Inc. 100% |
| 68 | T18S-R38E, Sec. 33: NE¼NE¼ (Shell-State B) | 80 | A-1118-5 HBP 09/15/28 | Commissioner of Public Lands - State of New Mexico 12.5% | Shell Oil Company 100% | None | Shell Oil Company 100% |
| 69 | T18S-R38E, Sec. 33: S½NW¼ (Amoco-State G) | 80 | A-1573-4 HBP 01/03/29 | Commissioner of Public Lands - State of New Mexico 12.5% | Amoco Production Company 100% | None | Amoco Production Company 75.43501%<br>Landreth Interests 24.56499%<br>100% |
| 70 | T18S-R38E, Sec. 33: SW¼NE¼, W½SE¼ & SW¼ (Continental-State A-33) | 280 | B-2656 HBP 09/23/33 | Commissioner of Public Lands - State of New Mexico 12.5% | Continental Oil Company 100% | None | Continental Oil Company 100% |
| 71 | T18S-R38E, Sec. 32: N½NE¼ (Amerada Hess-State A) | 80 | A-1469-2 HBP 12/18/28 | Commissioner of Public Lands - State of New Mexico 12.5% | Amerada Hess Corporation 100% | None | Amerada Hess Corporation 100% |
| 72 | T18S-R38E, Sec. 32: S½NE¼ (Shell-State A) | 80 | A-1118-5 HBP 09/15/28 | Commissioner of Public Lands - State of New Mexico 12.5% | Shell Oil Company 100% | None | Shell Oil Company 100% |

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NORTH HOBBS (GRAYBURG-SAN ANDRES) UNIT
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(EXHIBIT B, CONT'D)

| Tract No. | Description of Land (Operator & Lease Name) | No. Acres | Serial No. & Expiration & Date of Lease | Basic Royalty Ownership and Percentage | Lessee of Record | Overriding Royalty Owner & Percentage | Working Interest Owner & Percentage |
|---|---|---|---|---|---|---|---|
| 75A | T18S-R38E, Sec. 32: W½SE¼ (Marathon-State Sec. 32) | 80 | A-2747-7 HBP 08/22/29 | Commissioner of Public Lands - State of New Mexico 12.5% | Marathon Oil Company 50%<br>Atlantic Richfield 50%<br>100% | None | Marathon Oil Company 50%<br>Atlantic Richfield Company 50%<br>100% |
| 75B | T18S-R38E, Sec. 32: E½SE¼ (Marathon-State Sec. 32) | 80 | A-1159-9 HBP 10/01/28 | Commissioner of Public Lands - State of New Mexico 12.5% | Marathon Oil Company 100% | None | Marathon Oil Company 50%<br>Atlantic Richfield Company 50%<br>100% |
| 81 | T18S-R37E, Sec. 36: E½NE¼, SW¼NE¼, SE¼ (Amerada Hess-State C) | 280 | A-1469-2 HBP 12/18/28 | Commissioner of Public Lands - State of New Mexico 12.5% | Amerada Hess Corporation 100% | None | Amerada Hess Corporation 100% |
| 82 | T18S-R37E, Sec. 36: NW¼NE¼ (Byrom-J. R. Holt State) | 40 | B-243-1 HBP 09/10/31 | Commissioner of Public Lands - State of New Mexico 12.5% | Gulf Oil Corporation 100% | Gulf Oil Corporation 5.46875% | W. K. Byrom 62.5%<br>Margaret M. McPheron 18.75%<br>R. L. McPheron 9.375%<br>Coleen Grady McPheron Wallace 9.375%<br>100% |

EXHIBIT B
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(EXHIBIT B, CONT'D)

| Tract No. | Description of Land (Operator & Lease Name) | No. Acres | Serial No. & Expiration & Date of Lease | Basic Royalty Ownership and Percentage | Lessee of Record | Overriding Royalty Owner & Percentage | Working Interest Owner & Percentage |
|---|---|---|---|---|---|---|---|
| 83 | T18S-R37E, Sec. 36: E½NW¼ (Gulf J. R. Holt-NCT D) | 80 | B-243-1 HBP 09/10/31 | Commissioner of Public Lands - State of New Mexico 12.5% | Gulf Oil Corporation 100% | None | Gulf Oil Corporation 100% |

Total 40 State Tracts ------ 4835.78 acres or 45.40839% of unit (surface) area

FEE LAND

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 7 | T18S-R37E, Sec. 13: SE¼ (Shell-Rice) | 160 | Fee HBP 05/21/28 | Amoco Production Company, et al* 12.5% | Shell Oil Company 100% | None | Shell Oil Company 100% |
| 8 | T18S-R38E, Sec. 18: SW¼ (Amerada Hess-B. Hardin) | 155.21 | Fee HBP 03/24/28 | Exxon Corporation, et al* 12.5% | Amerada Hess Corporation 100% | None | Amerada Hess Corporation 100% |
| 9 | T18S-R38E, Sec. 18: E½ (Gulf-Dan W. Hardin) | 320 | Fee HBP 04/27/27 | Gulf Oil Corporation, et al* 12.5% | Gulf Oil Corporation 100% | None | Gulf Oil Corporation 100% |
| 13 | T18S-R38E, Sec. 21: NW¼SE¼ (Antweil-Hobbs-Cone Townsite) | 40 | Fee HBP 06/28/26 | Jack Robinson, et al* 12.5% | Del-Lea, Inc. 100% | Fern Cone 1.56250% | Del-Lea, Inc. 100% |

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EXHIBIT B
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NORTH HOBBS (GRAYBURG-SAN ANDRES) UNIT
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(EXHIBIT B, CONT'D)

| Tract No. | Description of Land (Operator & Lease Name) | No. Acres | Serial No. & Expiration & Date of Lease | Basic Royalty Ownership and Percentage | Lessee of Record | Overriding Royalty Owner & Percentage | Working Interest Owner & Percentage |
|---|---|---|---|---|---|---|---|
| Cont. 13 | | | | | | Cathie Auvenshine .729166%<br>Clifford Cone .729166%<br>Douglas L. Cone .729166%<br>Kathleen Cone 3.64583%<br>Kenneth G. Cone .729166%<br>Thomas R. Cone .729166%<br>Del-Lea, Inc. 0.26042%<br>Robert B. Holt 1.69271%<br>A. G. Kaspar 1.69271%<br>12.5% | |
| 14 | T18S-R38E, Sec. 21: SE¼SE¼ (Wiser-Morris B) | 40 | Fee HBP 05/17/37<br>Fee HBP 05/27/37 | Jack Robinson, et al* 12.5% | Kenneth Noel Headley 12.5%<br>Two States Oil Company 37.5% | None | Kenneth Noel Headley 12.5%<br>Two States Oil Company 37.5% |

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(EXHIBIT B, CONT'D)

| Tract No. | Description of Land (Operator & Lease Name) | No. Acres | Serial No. & Expiration & Date of Lease | Basic Royalty Ownership and Percentage | Lessee of Record | Overriding Royalty Owner & Percentage | Working Interest Owner & Percentage |
|---|---|---|---|---|---|---|---|
| Cont. 14 | | | Fee<br>HBP<br>05/31/37<br>Fee<br>HBP<br>06/07/37<br>Fee<br>HBP<br>06/12/37<br>Fee<br>HBP<br>06/23/37<br>Fee<br>HBP<br>09/10/37<br>Fee<br>HBP<br>09/24/37<br>Fee<br>HBP<br>01/19/38 | | The Wiser Oil Company<br>50%<br>100% | | The Wiser Oil Company<br>50%<br>100% |
| 15 | T18S-R38E, Sec. 21: SW¼SE¼ (Wiser-Morris A) | 40 | Fee<br>HBP<br>06/28/26 | Jack Robinson, et al*<br>12.5% | Mary Daniel Conrad<br>6.25%<br><br>E. Bernard Johnston Trustee of Herman R. Crile, Sr. Revocable Trust<br>9.37500%<br><br>Kenneth Noel Headley<br>9.375% | None | Mary Daniel Conrad<br>6.25%<br><br>E. Bernard Johnston Trustee of Herman R. Crile, Sr. Revocable Trust<br>9.37500%<br><br>Kenneth Noel Headley<br>9.375% |

EXHIBIT B
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(EXHIBIT B, CONT'D)

| Tract No. | Description of Land (Operator & Lease Name) | No. Acres | Serial No. & Expiration & Date of Lease | Basic Royalty Ownership and Percentage | Lessee Of Record | Overriding Royalty Owner & Percentage | Working Interest Owner & Percentage |
|---|---|---|---|---|---|---|---|
| Cont. 15 | | | | | Peter Hurd 6.25% | | Peter Hurd 6.25% |
| | | | | | Ruby Wanda Conrad Judson 1.25% | | Ruby Wanda Conrad Judson 1.25% |
| | | | | | Kathryn Louise Conrad McCarthy 1.25% | | Kathryn Louise Conrad McCarthy 1.25% |
| | | | | | Nathlyn Ione Conrad Murdoch 1.25% | | Nathlyn Ione Conrad Murdoch 1.25% |
| | | | | | Frances I. Conrad Rose 1.25% | | Frances I. Conrad Rose 1.25% |
| | | | | | Bettye Conrad Treadaway 1.25% | | Bettye Conrad Treadaway 1.25% |
| | | | | | The Wiser Oil Company 50% | | The Wiser Oil Company 50% |
| | | | | | Henry Yeager, Jr. 4.06746% | | Henry Yeager, Jr. 4.06746% |

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(EXHIBIT B, CONT'D)

| Tract No. | Description of Land (Operator & Lease Name) | No. Acres | Serial No. & Expiration & Date of Lease | Basic Royalty Ownership and Percentage | Leasee of Record | Overriding Royalty Owner & Percentage | Working Interest Owner & Percentage |
|---|---|---|---|---|---|---|---|
| cont. 15 | | | | | Ruth Anne Yeager 3.02580%<br><br>Ruth Peeler Yeager, Henry Yeager, Jr., & First National Bank in Dallas, Joint Trustees of Ruth Anne Yeager Trust No. 2 1.04167%<br><br>Mrs. Ruth Peeler Yeager 4.36507%<br>100% | | Ruth Anne Yeager 3.02580%<br><br>Ruth Peeler Yeager, Henry Yeager, Jr., & First National Bank in Dallas, Joint Trustees of Ruth Anne Yeager Trust No. 2 1.04167%<br><br>Mrs. Ruth Peeler Yeager 4.36507%<br>100% |
| 16 | T18S-R38E, Sec. 21: SW¼ (Gulf-W. D. Grimes, NCT C) | 160 | Fee HBP 04/29/26 | Union Oil Company of California, et al* 12.5% | Gulf Oil Corporation 100% | None | Gulf Oil Corporation 100% |
| 17 | T18S-R38E, Sec. 20: NE¼ (Est. of C. H. Sweet-McKinley B) | 160 | Fee HBP 06/21/26 | W. C. McBride-Silurian Oil Company, et al* 12.5% | C. H. Sweet Oil Company 100% | Shell Oil Company 10.93750% | First National Bank of Lea County, Trustee for the Cecil H. Sweet and Imo Emmetta Sweet Trust 100% |

EXHIBIT B
ATTACHED TO UNIT AGREEMENT
NORTH KOBBS (GRAYBURG-SAN ANDRES) UNIT
LEA COUNTY, NEW MEXICO



(EXHIBIT B, CONT'D)

| Tract No. | Description of Land (Operator & Lease Name) | No. Acres | Serial No. & Expiration & Date of Lease | Basic Royalty Ownership and Percentage | Lessee of Record | Overriding Royalty Owner & Percentage | Working Interest Owner & Percentage |
|---|---|---|---|---|---|---|---|
| 18 | T18S-R38E, Sec. 20: N½NW¼ (Getty (Skelly)-H. D. McKinley) | 80 | Fee<br>HBP<br>06/21/26 | W. C. McBride - Silurian Oil Company et al*<br>12.5% | Getty Oil Company<br>100% | None | Getty Oil Company<br>100% |
| 19 | T18S-R38E, Sec. 20: S½NW¼ (Chevron-H. D. McKinley) | 80 | Fee<br>HBP<br>06/21/26 | W. C. McBride - Silurian Oil Company et al*<br>12.5% | Chevron U.S.A., Inc.<br>100% | None | Chevron U.S.A. Inc.<br>100% |
| 20 | T18S-R38E, Sec. 20: NE¼SE¼ (Est. of C. H. Sweet-Grimes) | 40 | Fee<br>HBP<br>03/10/28 | Mary Evelyn Maddox, et al<br>12.5% | C. H. Sweet Oil Company<br>100% | Verna Lee Brown<br>5.46875%<br><br>Alice Patricia Gray<br>0.05127%<br><br>Emmett D. White<br>0.05127%<br>5.57129% | First National Bank of Lea County, Trustee for Cecil H. Sweet and Imo Emmetta Sweet Trust<br>100% |
| 23 | T18S-R38E, Sec. 20: SW¼SE¼ (Atlantic Richfield-Grimes) | 40 | Fee<br>HBP<br>06/23/28 | Mrs. Emma Bledsoe, Individually and as Independent Executrix of the Estate of W. H. Bledsoe, et al*<br>12.5% | Atlantic Oil Producing Co.<br>100% | None | Atlantic Richfield Company<br>100% |

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EXHIBIT B
ATTACHED TO UNIT AGREEMENT
NORTH HOBBS (GRAYBURG SAN ANDRES) UNIT
LEA COUNTY, NEW MEXICO



(EXHIBIT B, CONT'D)

| Tract No. | Description of Land (Operator & Lease Name) | No. Acres | Serial No. & Expiration & Date of Lease | Basic Royalty Ownership and Percentage | Lessee of Record | Overriding Royalty Owner & Percentage | Working Interest Owner & Percentage |
|---|---|---|---|---|---|---|---|
| 24 | T18S-R38E, Sec. 20: SW¼ (Shell-H. D. McKinley B) | 160 | Fee HBP 06/21/26 | Cities Service Company, et al* 12.5% | Shell Oil Company 100% | None | Shell Oil Company 100% |
| 25 | T18S-R38E, Sec. 19: NE¼ (Getty-Boon Hardin) | 160 | Fee HBP 03/24/28 | Amoco Production Company, et al* 12.5% | Getty Oil Co. (Tidal) 100% | None | Getty Oil Company 100% |
| 26 | T18S-R38E, Sec. 19: NW¼ (Cities Service-Boon Hardin) | 155.30 | Fee HBP 03/24/28 | Exxon Corporation, et al* 12.5% | Cities Service Company 100% | None | Cities Service Company 100% |
| 27 | T18S-R38E, Sec. 19: S½ (Shell-McKinley A) | 315.50 | Fee HBP 06/21/26 | Amoco Production Company, et al* 12.5% | Shell Oil Company 100% | None | Shell Oil Company 100% |
| 36 | T18S-R37E, Sec. 23: W½NW¼ (C&C Operating Corp.-Shipp A) | 80 | Fee (2) HBP 01/26/56 Fee (3) HBP 08/31/59 | Robert H. Huston, Jr. Exec. of Estate of Leona Huston, et al 12.5% | C&C Operating Corporation 100% | Elbert D. Shipp a/k/a Daymon Shipp Pers. Rep. of Estate of Burton E. Shipp a/k/a Bunk Shipp. Deceased .68360% Homer Shipp .68359% Robert H. Huston, Jr., Exec. of Estate of Leona Huston .68360% | C&C Operating Corporation 100% |

EXHIBIT B
ATTACHED TO UNIT AGREEMENT
NORTH HOBBS (GRAYBURG-SAN ANDRES) UNIT
LEA COUNTY, NEW MEXICO



(EXHIBIT B, CONT'D)

| Tract No. | Description of Land (Operator & Lease Name) | No. Acres | Serial No. & Expiration & Date of Lease | Basic Royalty Ownership and Percentage | Lessee of Record | Overriding Royalty Owner & Percentage | Working Interest Owner & Percentage |
|---|---|---|---|---|---|---|---|
| | | | | | | Mary A. H. Stephenson .14242%<br>Robert Lee McPherson .14241%<br>Coleen Grady McPheron Wallace .14241%<br>2.47803% | |
| 44 | T18S-R38E, Sec. 30: NW¼ (Amerada-H. D. McKinley) | 155.66 | Fee<br>HBP<br>06/21/26 | W. C. McBride-Silurian Oil Company et al*<br>12.5% | Amerada Hess Corporation<br>100% | None | Amerada Hess Corporation<br>100% |
| 45 | T18S-R38E, Sec. 30: NE¼ (Getty-H. D. McKinley) | 160 | Fee<br>HBP<br>06/21/26 | W. C. McBride - Silurian Oil Company, et al*<br>12.5% | Getty Oil Company<br>100% | Cities Service Company<br>1.17187% | Getty Oil Company<br>100% |
| 50 | T18S-R38E, Sec. 29: NE¼NE¼ (Exxon-W. D. Grimes) | 40 | Fee<br>HBP<br>06/23/28 | Exxon Corporation, et al*<br>12.5% | Exxon Corporation<br>75%<br>Cities Service Company<br>25%<br>100% | Continental Oil Company (net profit interest)<br>25% | Exxon Corporation<br>75%<br>Cities Service Company<br>25%<br>100% |
| 52 | T18S-R38E, Sec. 29: SE¼NE¼ & NE¼SE¼ (Getty-W. D. Grimes) | 80 | Fee<br>HBP<br>03/10/28 | Lillian Milyko, et al*<br>12.5% | H. V. Craig<br>100% | None | Getty Oil Company<br>100% |

EXHIBIT B
ATTACHED TO UNIT AGREEMENT
NORTH HOBBS (GRAYBURG-SAN ANDRES) UNIT
LEA COUNTY, NEW MEXICO



(EXHIBIT B, CONT'D)

| Tract No. | Description of Land (Operator & Lease Name) | No. Acres | Serial No. & Expiration & Date of Lease | Basic Royalty Ownership and Percentage | Lessee of Record | Overriding Royalty Owner & Percentage | Working Interest Owner & Percentage |
|---|---|---|---|---|---|---|---|
| 54 | T18S-R38E, Sec. 28: NW¼ (Atlantic-W. D. Grimes SOC) | 160 | Fee<br>HBP<br>06/10/26 | Cities Service Company, et al*<br>12.5% | Sinclair Oil & Gas Company<br>100% | None | Atlantic Richfield Company<br>100% |
| 55 | T18S-R38E, Sec. 28: W½NE¼ (Samedan-Moon A) | 80 | Fee (7)<br>HBP<br>10/03/34 | George H. Etz, Jr, Trustee of the George H. Etz, Sr. Trust, et al*<br>12.5% | Samedan Oil Corporation<br>100% | None | John P. Cusack, Jr.<br>25% |
| | | | Fee (2)<br>HBP<br>10/08/34 | | | | Michael F. Cusack<br>25% |
| | | | Fee (2)<br>HBP<br>11/13/34 | | | | Samedan Oil Corporation<br>48.5%<br>SEA Properties, Ltd.<br>1.5%<br>100% |
| 56 | T18S-R38E, Sec. 28: E½NE¼ (Samedan-Moon B) | 80 | Fee (1)<br>HBP<br>04/01/35<br>Fee (2)<br>HBP<br>10/03/34<br>Fee (3)<br>HBP<br>10/05/34<br>Fee (2)<br>HBP<br>10/08/34<br>Fee (1) | Samedan Oil Corporation, et al*<br>12.5% | Samedan Oil Corporation<br>100% | None | John P. Cusack, Jr.<br>25%<br>Michael F. Cusack<br>25%<br>Samedan Oil Corporation<br>48.5%<br>SEA Properties, Ltd.<br>1.5%<br>100% |

EXHIBIT B
ATTACHED TO UNIT AGREEMENT
NORTH HOBBS (GRAYBURG-SAN ANDRES) UNIT
LEA COUNTY, NEW MEXICO



(EXHIBIT B, CONT'D)

| Tract No. | Description of Land (Operator & Lease Name) | No. Acres | Serial No. & Expiration & Date of Lease | Basic Royalty Ownership and Percentage | Lessee of Record | Overriding Royalty Owner & Percentage | Working Interest Owner & Percentage |
|---|---|---|---|---|---|---|---|
| | | | HBP<br>11/08/34<br>Fee (1)<br>HBP<br>11/13/34<br>Fee (1)<br>HBP<br>11/17/34 | | | | |
| 57 | T18S-R38E, Sec. 28: SW¼<br>(Shell-W. D. Grimes) | 160 | Fee<br>HBP<br>06/10/26 | Cities Service Company, et al*<br>12.5% | Shell Oil Company<br>100% | None | Shell Oil Company<br>100% |
| 58 | T18S-R38E, Sec. 28: SE¼<br>(Continental - W. D. Grimes) | 160 | Fee<br>HBP<br>04/02/27 | Atlantic Richfield Company, et al*<br>12.5% | Continental Oil Company<br>100% | None | Continental Oil Company<br>100% |
| 59 | T18S-R38E, Sec. 27: All<br>(Shell-Sanger Inv. Co.) | 640 | Fee<br>HBP<br>04/19/28 | Sanger Investment Company, Agency 7, et al*<br>12.5% | Shell Oil Company<br>100% | None | Shell Oil Company<br>100% |
| 60A | T18S-R38E, Sec. 34: NE¼NE¼<br>(Moranco-Hobbs) | 40 | Fee (1)<br>HBP<br>08/17/61<br>Fee (1)<br>HBP<br>09/05/61<br>Fee (1)<br>HBP<br>09/17/61<br>Fee (1)<br>HBP<br>09/18/61 | Buttram Engineers, Inc. et al*<br>15.09306 | Shell Oil Company<br>100% | George B. Clegg, III<br>0.05642%<br>Charles E. Delaney<br>0.05643%<br>Thomas R. and B. C. Dugan<br>0.05642%<br>0.16927% | Shell Oil Company<br>87.5%<br>Marshall & Winston, Inc.<br>12.5%<br>100% |

EXHIBIT B
ATTACHED TO UNIT AGREEMENT
NORTH HOBBS (GRAYBURG-SAN ANDRES) UNIT
LEA COUNTY, NEW MEXICO



(EXHIBIT B, CONT'D)

| Tract No. | Description of Land (Operator & Lease Name) | No. Acres | Serial No. & Expiration & Date of Lease | Basic Royalty Ownership and Percentage | Lessee of Record | Overriding Royalty Owner & Percentage | Working Interest Owner & Percentage |
|---|---|---|---|---|---|---|---|
| cont. 60A | | | Fee (3)<br>HBP<br>5/15/61<br>Fee (33)<br>HBP<br>05/17/61<br>Fee (1)<br>HBP<br>10/17/61<br>Fee (1)<br>HBP<br>10/20/61<br>Fee (1)<br>HBP<br>10/24/61<br>Fee (1)<br>HBP<br>11/02/61<br>Fee (1)<br>HBP<br>11/17/61<br>Fee (1)<br>HBP<br>01/10/62<br>Fee (1)<br>HBP<br>10/11/62<br>Fee (1)<br>HBP<br>11/27/62 | | | | |

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EXHIBIT B
ATTACHED TO UNIT AGREEMENT
NORTH HOBBS (GRAYBURG-SAN ANDRES) UNIT
LEA COUNTY, NEW MEXICO



(EXHIBIT B, CONT'D)

| Tract No. | Description of Land (Operator & Lease Name) | No. Acres | Serial No. & Expiration & Date of Lease | Basic Royalty Ownership and Percentage | Lessee of Record | Overriding Royalty Owner & Percentage | Working Interest Owner & Percentage |
|---|---|---|---|---|---|---|---|
| 60B | T18S-R38E, Sec. 34: SE¼NE¼ (Moranco-Hobbs) | 40 | Fee (1)<br>HBP<br>08/17/61<br>Fee (1)<br>HBP<br>09/05/61<br>Fee (1)<br>HBP<br>09/17/61<br>Fee (1)<br>HBP<br>09/18/61<br>Fee (3)<br>HBP<br>05/15/61<br>Fee (33)<br>HBP<br>05/17/61<br>Fee (1)<br>HBP<br>10/17/61<br>Fee (1)<br>HBP<br>10/20/61<br>Fee (1)<br>HBP<br>10/24/61<br>Fee (1)<br>HBP<br>11/02/61 | Buttram Energies Inc., et al* 15.48369% | Shell Oil Company 100% | George B. Clegg, III 0.05642%<br><br>Charles E. Delaney 0.05643%<br><br>Thomas R. and B. C. Dugan 0.05642%<br>0.16927% | Shell Oil Company 100% |

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EXHIBIT B
ATTACHED TO UNIT AGREEMENT
NORTH HOBBS (GRAYBURG-SAN ANDRES) UNIT
LEA COUNTY, NEW MEXICO



(EXHIBIT B, CONT'D)

| Tract No. | Description of Land (Operator & Lease Name) | No. Acres | Serial No. & Expiration & Date of Lease | Basic Royalty Ownership and Percentage | Lessee of Record | Overriding Royalty Owner & Percentage | Working Interest Owner & Percentage |
|---|---|---|---|---|---|---|---|
| Cont. 60B | | | Fee (1)<br>HBP<br>11/17/61<br>Fee (1)<br>HBP<br>01/10/62<br>Fee (1)<br>HBP<br>10/11/62<br>Fee (1)<br>HBP<br>11/27/62 | | | | |
| 61A | T18S-R38E, Sec. 34: SW¼NE¼ (Shell-Turner, Well 1) | 40 | Fee<br>HBP<br>04/07/26 | Buttram Energies, Inc. et al*<br>12.5% | Shell Oil Company<br>100% | None | Shell Oil Company<br>100% |
| 61B | T18S-R38E, Sec. 34: NW¼NE¼ (Shell-Turner, Well 2) | 40 | Fee<br>HBP<br>04/07/26 | Marshall & Winston, Inc, et al*<br>12.5% | Shell Oil Company<br>100% | None | Shell Oil Company<br>100% |
| 62 | T18S-R38E, Sec. 34: NE¼NW¼ (Getty (Skelly) B. H. Turner-Batt 2) | 40 | Fee<br>HBP<br>04/07/26 | Marshall & Winston, Inc. et al<br>12.5% | Getty Oil Company<br>100% | None | Getty Oil Company<br>100% |
| 63 | T18S-R38E, Sec. 34: SE¼NW¼ (Getty (Skelly) B. H. Turner-Batt 1) | 40 | Fee<br>HBP<br>04/07/26 | Atlantic Richfield Company, et al*<br>12.5% | Getty Oil Company<br>100% | None | Getty Oil Company<br>100% |

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EXHIBIT B
ATTACHED TO UNIT AGREEMENT
NORTH HOBBS (GRAYBURG-SAN ANDRES) UNIT
LEA COUNTY, NEW MEXICO



(EXHIBIT B, CONT'D)

| Tract No. | Description of Land (Operator & Lease Name) | No. Acres | Serial No. & Expiration & Date of Lease | Basic Royalty Ownership and Percentage | Lessee of Record | Overriding Royalty Owner & Percentage | Working Interest Owner & Percentage |
|---|---|---|---|---|---|---|---|
| 64 | T18S-R38E, Sec. 34: NE/4SE/4 (Samedan-Turner B) | 40 | Fee (35)<br>HBP<br>08/10/37<br>Fee (1)<br>HBP<br>12/31/37<br>Fee (1)<br>HBP<br>01/20/38<br>Fee (2)<br>HBP<br>02/05/38<br>Fee (1)<br>HBP<br>12/12/38<br>Fee (1)<br>HBP<br>02/11/44<br>Fee (1)<br>HBP<br>08/07/34 | Bonnie R. Etz, and George H. Etz, Jr., Trustee of George H. Etz, Sr. Trust, et al*<br>12.5% | Samedan Oil Corporation<br>100% | None | Samedan Oil Corporation<br>62.5%<br><br>Mary Frances Cusack<br>18.75%<br><br>John Patrick Cusack Jr., Trustee under the John Patrick Cusack Testamentary Trust<br>4.6875%<br><br>John Patrick Cusack, Jr.<br>7.03125%<br><br>Michael F. Cusack<br>7.03125%<br>100% |

EXHIBIT B
ATTACHED TO UNIT AGREEMENT
NORTH HOBBS (GRAYBURG-SAN ANDRES) UNIT
LEA COUNTY, NEW MEXICO



(EXHIBIT B, CONT'D)

| Tract No. | Description of Land (Operator & Lease Name) | No. Acres | Serial No. & Expiration & Date of Lease | Basic Royalty Ownership and Percentage | Lessee of Record | Overriding Royalty Owner & Percentage | Working Interest Owner & Percentage |
|---|---|---|---|---|---|---|---|
| 65 | T18S-R38E, Sec. 34: SE¼SE¼ (Samedan-Turner B-Batt 2) | 40 | Fee (35)<br>HBP<br>08/10/37<br>Fee (1)<br>HBP<br>12/31/37<br>Fee (1)<br>HBP<br>01/20/38<br>Fee (2)<br>HBP<br>02/05/38<br>Fee (1)<br>HBP<br>12/12/38<br>Fee (3)<br>HBP<br>02/11/44<br>Fee (1)<br>HBP<br>08/01/44<br>Fee (1)<br>HBP<br>08/02/44<br>Fee (1)<br>HBP<br>08/07/34 | Bonnie R. Etz, and George H. Etz, Jr., Trustee of George H. Etz, Sr. Trust, et al*<br>12.5% | Samedan Oil Corporation<br>62.5%<br><br>Mary Frances Cusack<br>18.75%<br><br>John Patrick Cusack, Jr., Trustee under the John Patrick Cusack Testamentary Trust<br>4.6875%<br><br>John Patrick Cusack, Jr.<br>7.03125%<br><br>Michael F. Cusack<br>7.03125%<br>100% | None | Samedan Oil Corporation<br>62.5%<br><br>Mary Frances Cusack<br>18.75%<br><br>John Patrick Cusack, Jr., Trustee under the John Patrick Cusack Testamentary Trust<br>4.6875%<br><br>John Patrick Cusack, Jr.<br>7.03125%<br><br>Michael F. Cusack<br>7.03125%<br>100% |

EXHIBIT B
ATTACHED TO UNIT AGREEMENT
NORTH HOBBS (GRAYBURG-SAN ANDRES) UNIT
LEA COUNTY, NEW MEXICO



(EXHIBIT B, CONT'D)

| Tract No. | Description of Land (Operator & Lease Name) | No. Acres | Serial No. & Expiration & Date of Lease | Basic Royalty Ownership and Percentage | Lessee of Record | Overriding Royalty Owner & Percentage | Working Interest Owner & Percentage |
|---|---|---|---|---|---|---|---|
| 66 | T18S-R38E, Sec. 34: W½SE¼ (Samedan-Turner A) | 80 | Fee (17)<br>HBP<br>08/07/34<br>Fee (1)<br>HBP<br>12/07/34<br>Fee (1)<br>HBP<br>12/10/34<br>Fee (1)<br>HBP<br>12/12/34 | Buttram Energies, Inc. et al*<br>12.5% | Samedan Oil Corporation<br>87.891%<br><br>Hattie C. Williams<br>5.859%<br><br>Cities Service Company<br>6.25%<br>100% | None | Samedan Oil Corporation<br>87.89100%<br><br>Hattie C. Williams<br>5.859%<br><br>Cities Service Company<br>6.25%<br>100% |
| 67 | T18S-R38E, Sec. 33: N½NE¼ & SE¼NE¼ & NE¼SE¼ (Gulf-W. D. Grimes, NCT-A) | 160 | Fee<br>HBP<br>04/29/26 | Union Oil Company of California, et al*<br>12.5% | Gulf Oil Corporation<br>100% | None | Gulf Oil Corporation<br>100% |
| 73 | T18S-R38E, Sec. 32: NW¼ (Gulf-W. D. Grimes NCT-A/2) | 160 | Fee<br>HBP<br>04/29/26 | Union Oil Company of California, et al*<br>12.5% | Gulf Oil Corporation<br>100% | None | Gulf Oil Corporation<br>100% |
| 74 | T18S-R38E, Sec. 32: SW¼ (Gulf-Grimes NCT-A Batt 2) | 160 | Fee<br>HBP<br>04/29/26 | Union Oil Company of California, et al*<br>12.5% | Gulf Oil Corporation<br>100% | None | Gulf Oil Corporation<br>100% |

EXHIBIT B
ATTACHED TO UNIT AGREEMENT
NORTH HOBBS (GRAYBURG-SAN ANDRES) UNIT
LEA COUNTY, NEW MEXICO



(EXHIBIT B, CONT'D)

| Tract No. | Description of Land (Operator & Lease Name) | No. Acres | Serial No. & Expiration & Date of Lease | Basic Royalty Ownership and Percentage | Lessee of Record | Overriding Royalty Owner & Percentage | Working Interest Owner & Percentage |
|---|---|---|---|---|---|---|---|
| 76 | T18S-R38E, Sec. 31: NE¼ (Cities Service-Clara Fowler) | 160 | Fee HBP 03/08/28 | Marshall & Winston, Inc., et al* 12.5% | Cities Service Company 100% | None | Cities Service Company 100% |
| 77 | T18S-R38E, Sec. 31: E½NW¼ (Getty (Skelly)-Clara Fowler) | 80 | Fee HBP 03/08/28 | Atlantic Richfield Company, et al* 12.5% | Getty Oil Company 100% | None | Getty Oil Company 100% |
| 78 | T18S-R38E, Sec. 31: W½NW¼ (Sun-Clara Fowler) | 75.94 | Fee HBP 03/08/28 | Atlantic Richfield Company, et al* 12.5% | Shell Oil Company 100% | None | Shell Oil Company 100% |
| 79 | T18S-R38E, Sec. 31: SE¼ (Shell-N. Berry) | 160 | Fee HBP 03/07/28 | The First of Denver for the account of Munro L. and Patricia D. Lyeth #11033-00-8 and Onez Norman Rooney, et al* 12.5% | Shell Oil Company 100% | None | Shell Oil Company 100% |
| 80 | T18S-R38E, Sec. 31: SW¼ (Mobil-Nora Berry) | 156.14 | Fee HBP 04/07/28 | The First of Denver for the account of Munro L. and Patricia D. Lyeth #11033-00-8 and Onez Norman Rooney, et al* 12.5% | Mobil Oil Corporation 100% | None | Mobil Oil Corporation 100% |

EXHIBIT B
ATTACHED TO UNIT AGREEMENT
NORTH HOBBS (GRAYBURG-SAN ANDRES) UNIT
LEA COUNTY, NEW MEXICO



(EXHIBIT B, CONT'D)

| Tract No. | Description of Land (Operator & Lease Name) | No. Acres | Serial No. & Expiration & Date of Lease | Basic Royalty Ownership and Percentage | Lessee of Record | Overriding Royalty Owner & Percentage | Working Interest Owner & Percentage |
|---|---|---|---|---|---|---|---|

Total 44 Tracts ------ 5413.75 acres or 50.83558% of unit (surface) area

RECAPITULATION OF NUMBER OF ACRES

| | | |
|---|---|---|
| Federal Lands | 400.00 acres | 3.75603 percent |
| State Lands | 4835.78 acres | 45.40839 percent |
| Fee Lands | 5413.75 acres | 50.83558 percent |
| | 10,649.53 acres | 100.00 percent |

* Largest Royalty Interest Owner only is named.
Complete royalty ownership will be furnished upon request.

EXHIBIT E
ATTACHED TO UNIT OPERATING AGREEMENT
NORTH HOBBS (GRAYBURG-SAN ANDRES) UNIT
LEA COUNTY, NEW MEXICO

UNIT PARTICIPATION AND INVESTMENT PARTICIPATION

| Tract No. | Working Interest Owner | Working Interest In Tract | Unit Participation (By Tracts) Phase I | Phase II | Phase III | Investment Participation* (By Tracts) |
|---|---|---|---|---|---|---|
| 1 | Getty Oil Company | 100.00000 | 0.04166 | 0.03449 | 0.13978 | 0.07871 |
| 2 | Amerada Hess Corporation | 100.00000 | 0.04372 | 0.03496 | 0.20696 | 0.10720 |
| 3 | Gulf Oil Corporation | 100.00000 | 0.03122 | 0.02643 | 0.08361 | 0.05045 |
| 4 | Texas Pacific Oil Co., Inc. | 100.00000 | 0.11473 | 0.10166 | 0.29162 | 0.18144 |
| 5 | Ada A. Anderson | 11.71875 | 0.00629 | 0.00396 | 0.02317 | 0.01203 |
| | W. D. Anderson & Sons | 23.43750 | 0.01257 | 0.00793 | 0.04633 | 0.02405 |
| | Ada A. Anderson, Paul Donald Anderson & Payton V. Anderson, Executors of the Estate of Warren D. Anderson | 11.71875 | 0.00629 | 0.00396 | 0.02317 | 0.01203 |
| | J. M. Armstrong | 23.43750 | 0.01257 | 0.00793 | 0.04633 | 0.02406 |
| | Russell G. Estes d/b/a Estes Engineering Company | 6.25000 | 0.00335 | 0.00211 | 0.01236 | 0.00641 |
| | W. A. Yeager | 23.43750 | 0.01257 | 0.00793 | 0.04633 | 0.02406 |
| | | 100.00000 | 0.05364 | 0.03382 | 0.19769 | 0.10264 |
| 6 | Continental Oil Company | 100.00000 | 0.05157 | 0.03087 | 1.35192 | 0.58571 |
| 7 | Shell Oil Company | 100.00000 | 0.33855 | 0.28554 | 2.37454 | 1.16292 |
| 8 | Amerada Hess Corporation | 100.00000 | 0.00000 | 0.00000 | 2.11560 | 0.88855 |

EXHIBIT E (CONT'D)

2nd Revision 2-1-80

| Tract No. | Working Interest Owner | Working Interest Tract | Unit Participation (By Tracts) Phase I | Phase II | Phase III | Investment Participation* (By Tracts) |
|---|---|---|---|---|---|---|
| 9 | Gulf Oil Corporation | 100.00000 | 0.26552 | 0.20781 | 1.29435 | 0.66416 |
| 10A | Howell Spear | 1.17190 | 0.00049 | 0.00042 | 0.00042 | 0.00043 |
| | Ellie Sims Spear | 1.17190 | 0.00049 | 0.00042 | 0.00042 | 0.00043 |
| | J. N. Dunlavey | 4.68750 | 0.00194 | 0.00171 | 0.00168 | 0.00169 |
| | First Roswell Company | 9.37500 | 0.00388 | 0.00341 | 0.00335 | 0.00339 |
| | Getty Oil Company | 25.00000 | 0.01034 | 0.00910 | 0.00894 | 0.00903 |
| | George P. Laflin | 4.68750 | 0.00194 | 0.00171 | 0.00168 | 0.00169 |
| | Kenneth D. McPeters | 7.03130 | 0.00291 | 0.00256 | 0.00251 | 0.00254 |
| | Robert Martin Moran | 28.12490 | 0.01164 | 0.01024 | 0.01005 | 0.01016 |
| | Moranco | 9.37500 | 0.00388 | 0.00341 | 0.00335 | 0.00339 |
| | Loyd Whitley | 4.68750 | 0.00194 | 0.00171 | 0.00168 | 0.00169 |
| | A. T. Williamson | 4.68750 | 0.00194 | 0.00171 | 0.00168 | 0.00169 |
| | | 100.00000 | 0.04139 | 0.03640 | 0.03576 | 0.03613 |
| 10B | Getty Oil Company | 100.00000 | 0.00000 | 0.00000 | 0.00504 | 0.00212 |
| 11 | Chevron U.S.A. Inc. | 100.00000 | 0.00000 | 0.00000 | 0.07277 | 0.03056 |
| 12 | Getty Oil Company | 100.00000 | 0.02525 | 0.02093 | 0.10735 | 0.05723 |
| 13 | Del-Lea, Inc. | 100.00000 | 0.08746 | 0.08048 | 0.03529 | 0.06150 |
| 14 | Kenneth Noel Headley | 12.50000 | 0.02166 | 0.02216 | 0.00227 | 0.01381 |
| | Two States Oil Company | 37.50000 | 0.06498 | 0.06649 | 0.00682 | 0.04143 |
| | The Wiser Oil Company | 50.00000 | 0.08663 | 0.08865 | 0.00910 | 0.05523 |
| | | 100.00000 | 0.17327 | 0.17730 | 0.01819 | 0.11047 |
| 15 | Mary Daniel Conrad | 6.25000 | 0.02408 | 0.02508 | 0.00196 | 0.01537 |
| | E. Bernard Johnston, Trustee of Herman R. Crile, Sr. Revocable Trust | 9.37500 | 0.03613 | 0.03762 | 0.00294 | 0.02305 |
| | Kenneth Noel Headley | 9.37500 | 0.03612 | 0.03761 | 0.00294 | 0.02306 |
| | Peter Hurd | 6.25000 | 0.02408 | 0.02508 | 0.00196 | 0.01537 |
| | Ruby Wanda Conrad Judson | 1.25000 | 0.00482 | 0.00502 | 0.00039 | 0.00307 |
| | Kathryn Louise Conrad McCarthy | 1.25000 | 0.00482 | 0.00502 | 0.00039 | 0.00307 |
| | Nathlyn Ione Conrad Murdoch | 1.25000 | 0.00482 | 0.00502 | 0.00039 | 0.00307 |

| Tract No. | Working Interest Owner | Working Interest In Tract | Unit Participation (By Tracts) Phase I | Phase II | Phase III | Investment Participation* (By Tracts) |
|---|---|---|---|---|---|---|
| 15 | Frances I. Conrad Rose | 1.25000 | 0.00482 | 0.00502 | 0.00039 | 0.00307 |
| | Bettye Conrad Treadaway | 1.25000 | 0.00482 | 0.00502 | 0.00039 | 0.00307 |
| | The Wiser Oil Company | 50.00000 | 0.19267 | 0.20062 | 0.01567 | 0.12295 |
| | Henry Yeager, Jr. | 4.06746 | 0.01567 | 0.01632 | 0.00127 | 0.01000 |
| | Ruth Anne Yeager | 3.02580 | 0.01166 | 0.01214 | 0.00095 | 0.00744 |
| | Ruth Peeler Yeager, Henry Yeager, Jr., & First National Bank in Dallas, Joint Trustees of Ruth Anne Yeager Trust No. 2 | 1.04167 | 0.00401 | 0.00418 | 0.00033 | 0.00256 |
| | Mrs. Ruth Peeler Yeager | 4.36507 | 0.01682 | 0.01751 | 0.00137 | 0.01074 |
| | | 100.00000 | 0.38534 | 0.40126 | 0.03134 | 0.24589 |
| 16 | Gulf Oil Corporation | 100.00000 | 0.17539 | 0.16097 | 0.17130 | 0.16531 |
| 17 | First National Bank of Lea County, Trustee for the Cecil H. Sweet and Imo Emmetta Sweet Trust | 100.00000 | 0.02662 | 0.02300 | 0.13047 | 0.06814 |
| 18 | Getty Oil Company | 100.00000 | 0.00853 | 0.00013 | 0.19617 | 0.08247 |
| 19 | Chevron U.S.A. Inc. | 100.00000 | 0.46388 | 0.44274 | 0.39268 | 0.42171 |
| 20 | First National Bank of Lea County, Trustee Cecil H. Sweet and Imo Emmetta Sweet Trust | 100.00000 | 0.00082 | 0.00000 | 0.04338 | 0.01822 |
| 21 | Bill L. Sweet | 100.00000 | 0.02651 | 0.02300 | 0.08569 | 0.04933 |
| 22 | Bill L. Sweet | 100.00000 | 0.00000 | 0.00000 | 0.09207 | 0.03867 |
| 23 | Atlantic Richfield Company | 100.00000 | 0.06415 | 0.05085 | 0.13035 | 0.08424 |

| Tract No. | Working Interest Owner | Working Interest In Tract | Unit Participation (By Tracts) Phase I | Phase II | Phase III | Investment Participation* (By Tracts) |
|---|---|---|---|---|---|---|
| 24 | Shell Oil Company | 100.00000 | 2.13208 | 2.18100 | 0.93009 | 1.65562 |
| 25 | Getty Oil Company | 100.00000 | 0.38428 | 0.34282 | 1.37055 | 0.77447 |
| 26 | Cities Service Company | 100.00000 | 0.73038 | 0.65783 | 2.93591 | 1.61462 |
| 27 | Shell Oil Company | 100.00000 | 4.99981 | 4.72987 | 3.68081 | 4.28926 |
| 28 | Gulf Oil Corporation | 100.00000 | 1.55912 | 1.44073 | 2.98865 | 2.09086 |
| 29 | Shell Oil Company | 100.00000 | 0.71513 | 0.61650 | 1.11779 | 0.82704 |
| 30 | Amerada Hess Corporation | 50.00000 | 0.16818 | 0.16350 | 0.35766 | 0.24504 |
| | Getty Oil Company | 50.00000 | 0.16818 | 0.16349 | 0.35766 | 0.24505 |
| | | 100.00000 | 0.33636 | 0.32699 | 0.71532 | 0.49009 |
| 31 | Texas Pacific Oil Company, Inc. | 100.00000 | 4.47471 | 4.52936 | 2.18451 | 3.54452 |
| 32 | Samedan Oil Corporation | 37.80000 | 1.20719 | 1.12526 | 0.52622 | 0.87367 |
| | First National Bank of Casper, Trustee, Tate Trusts | 3.75000 | 0.11976 | 0.11163 | 0.05221 | 0.08667 |
| | The First National Bank of Fort Worth, Agent for William S. Spradling | 0.62500 | 0.01996 | 0.01861 | 0.00870 | 0.01445 |
| | The First National Bank of Fort Worth, Independent Executor of Estate of Verda Spradling, Account No. 3462 | 0.62500 | 0.01996 | 0.01861 | 0.00870 | 0.01445 |
| | C. C. Forbes | 1.90000 | 0.06068 | 0.05656 | 0.02645 | 0.04391 |
| | Ilamae Forbes | 1.85000 | 0.05908 | 0.05507 | 0.02575 | 0.04276 |
| | Samuel Roberts Noble Foundation, Inc. | 28.75000 | 0.91817 | 0.85585 | 0.40024 | 0.66449 |
| | G. D. Morris Estate | 1.25000 | 0.03992 | 0.03721 | 0.01740 | 0.02889 |

| Tract No. | Working Interest Owner | Working Interest In Tract | Unit Participation (By Tracts) Phase I | Phase II | Phase III | Investment Participation* (By Tracts) |
|---|---|---|---|---|---|---|
| 32 | Richard L. Noble | 15.20000 | 0.48543 | 0.45249 | 0.21160 | 0.35132 |
| | Portales National Bank Executor of Estate of Myrtle A. Moore | 1.87500 | 0.05988 | 0.05582 | 0.02610 | 0.04334 |
| | Donald R. Lisle and Hal A. Treadwell, Co-Executors of Estate of John Roring, Deceased | 3.75000 | 0.11976 | 0.11163 | 0.05221 | 0.08667 |
| | SEA Properties, Ltd. | 0.75000 | 0.02396 | 0.02233 | 0.01044 | 0.01733 |
| | E. C. Sullivan | 1.87500 | 0.05988 | 0.05582 | 0.02610 | 0.04334 |
| | | 100.00000 | 3.19363 | 2.97689 | 1.39212 | 2.31129 |
| 33A | First National Bank of Lea County, Trustee for Cecil H. Sweet and Imo Emmetta Sweet Trust | 100.00000 | 0.14618 | 0.13607 | 0.45033 | 0.20806 |
| 33B | First National Bank of Lea County, Trustee for Cecil H. Sweet and Imo Emmetta Sweet Trust | 100.00000 | 0.09081 | 0.08239 | 0.16981 | 0.11911 |
| 34 | Shell Oil Company | 100.00000 | 0.02065 | 0.00990 | 0.23908 | 0.10616 |
| 35 | Texas Pacific Oil Company, Inc. | 100.00000 | 0.09228 | 0.07279 | 0.34319 | 0.18636 |
| 36 | C&C Operating Corporation | 100.00000 | 0.01133 | 0.00688 | 0.03147 | 0.01721 |
| 37 | Abo Petroleum Corporation | 52.50000 | 0.06818 | 0.05615 | 0.20376 | 0.11815 |
| | Ward Investment Corporation | 10.00000 | 0.01299 | 0.01069 | 0.03881 | 0.02250 |
| | Yates Petroleum Corporation | 25.00000 | 0.03246 | 0.02674 | 0.09703 | 0.05626 |
| | S. P. Yates | 12.50000 | 0.01623 | 0.01337 | 0.04851 | 0.02813 |
| | | 100.00000 | 0.12986 | 0.10695 | 0.38811 | 0.22504 |
| 38 | The Wiser Oil Company | 100.00000 | 0.00209 | 0.00000 | 0.08529 | 0.03582 |
| 39 | Getty Oil Company | 100.00000 | 0.03247 | 0.02415 | 0.17221 | 0.08633 |

EXHIBIT B (CONT'D)

| Tract No. | Working Interest Owner | Working Interest In Tract | Unit Participation (By Tracts) Phase I | Phase II | Phase III | Investment Participation* (By Tracts) |
|---|---|---|---|---|---|---|
| 40 | Continental Oil Company | 100.00000 | 0.29448 | 0.32197 | 0.44016 | 0.37161 |
| 41 | Samedan Oil Corporation | 100.00000 | 0.07122 | 0.06099 | 0.26713 | 0.14757 |
| 42 | Texaco Inc. | 100.00000 | 3.15134 | 3.09110 | 1.16515 | 2.28220 |
| 43 | Exxon Corporation | 100.00000 | 0.66554 | 0.49553 | 0.98320 | 0.70035 |
| 44 | Amerada Hess Corporation | 100.00000 | 3.36952 | 3.41061 | 1.86735 | 2.76244 |
| 45 | Getty Oil Company | 100.00000 | 3.64803 | 3.75614 | 2.83435 | 3.36899 |
| 46 | Marathon Oil Company | 100.00000 | 1.83355 | 1.86777 | 1.98935 | 1.91883 |
| 47 | Exxon Corporation | 100.00000 | 3.37645 | 3.25911 | 6.10957 | 4.45630 |
| 48 | Exxon Corporation | 100.00000 | 0.59298 | 0.59347 | 0.42645 | 0.52332 |
| 49 | Amerada Hess Corporation | 100.00000 | 1.37425 | 1.32399 | 1.40956 | 1.35993 |
| 50 | Exxon Corporation | 75.00000 | 0.07896 | 0.07199 | 0.17944 | 0.11711 |
| | Cities Service Company | 25.00000 | 0.02632 | 0.02399 | 0.05981 | 0.03904 |
| | | 100.00000 | 0.10528 | 0.09598 | 0.23925 | 0.15615 |
| 51 | Continental Oil Company | 100.00000 | 2.01126 | 2.10178 | 2.84880 | 2.41553 |
| 52 | Getty Oil Company | 100.00000 | 0.87710 | 0.86847 | 1.23597 | 1.02282 |
| 53 | Chevron U.S.A. Inc. | 100.00000 | 2.75083 | 2.95624 | 2.50776 | 2.76788 |
| 54 | Atlantic Richfield Company | 100.00000 | 2.07685 | 2.28579 | 1.09210 | 1.78444 |
| 55 | John P. Cusack, Jr. | 25.00000 | 0.56276 | 0.60802 | 0.06241 | 0.37886 |
| | Michael F. Cusack | 25.00000 | 0.56276 | 0.60802 | 0.06241 | 0.37886 |
| | Samedan Oil Corporation | 48.50000 | 1.09176 | 1.17956 | 0.12107 | 0.73500 |
| | SEA Properties, Ltd. | 1.50000 | 0.03377 | 0.03648 | 0.00374 | 0.02273 |
| | | 100.00000 | 2.25105 | 2.43208 | 0.24963 | 1.51545 |

| Tract No. | Working Interest Owner | Working Interest In Tract | Unit Participation (By Tracts) Phase I | Phase II | Phase III | Investment Participation* (By Tracts) |
|---|---|---|---|---|---|---|
| 56 | John P. Cusack, Jr. | 25.00000 | 0.57333 | 0.63029 | 0.02671 | 0.37679 |
| | Michael F. Cusack | 25.00000 | 0.57333 | 0.63029 | 0.02671 | 0.37678 |
| | Samedan Oil Corporation | 48.50000 | 1.11227 | 1.22276 | 0.05182 | 0.73096 |
| | SEA Properties, Ltd. | 1.50000 | 0.03440 | 0.03781 | 0.00161 | 0.02261 |
| | | 100.00000 | 2.29333 | 2.52115 | 0.10685 | 1.50714 |
| 57 | Shell Oil Company | 100.00000 | 2.91562 | 2.97071 | 3.07756 | 3.01559 |
| 58 | Continental Oil Company | 100.00000 | 4.16481 | 4.73239 | 1.68555 | 3.45272 |
| 59 | Shell Oil Company | 100.00000 | 6.45317 | 6.70337 | 0.33242 | 4.02757 |
| 60A | Shell Oil Company | 87.50000 | 0.00000 | 0.00000 | 0.00019 | 0.00008 |
| | Marshall & Winston, Inc. | 12.50000 | 0.00000 | 0.00000 | 0.00003 | 0.00001 |
| | | 100.00000 | 0.00000 | 0.00000 | 0.00022 | 0.00009 |
| 60B | Shell Oil Company | 100.00000 | 0.12511 | 0.10695 | 0.00636 | 0.06470 |
| 61A | Shell Oil Company | 100.00000 | 1.19303 | 1.22347 | 0.09076 | 0.74773 |
| 61B | Shell Oil Company | 100.00000 | 1.06871 | 1.06806 | 0.01963 | 0.62772 |
| 62 | Getty Oil Company | 100.00000 | 1.15101 | 1.17464 | 0.11411 | 0.72922 |
| 63 | Getty Oil Company | 100.00000 | 1.15287 | 1.17515 | 0.31108 | 0.81224 |
| 64 | Samedan Oil Corporation | 62.50000 | 0.21472 | 0.19532 | 0.00916 | 0.11713 |
| | Mary Frances Cusack | 18.75000 | 0.06441 | 0.05860 | 0.00275 | 0.03514 |
| | John Patrick Cusack, Jr., Trustee under the John Patrick Cusack Testamentary Trust | 4.68750 | 0.01610 | 0.01465 | 0.00069 | 0.00878 |
| | John Patrick Cusack, Jr. | 7.03125 | 0.02416 | 0.02197 | 0.00103 | 0.01318 |
| | Michael F. Cusack | 7.03125 | 0.02416 | 0.02197 | 0.00103 | 0.01318 |
| | | 100.00000 | 0.34355 | 0.31251 | 0.01466 | 0.18741 |

| Tract No. | Working Interest Owner | Working Interest In Tract | Unit Participation (By Tracts) Phase I | Phase II | Phase III | Investment Participation* (By Tracts) |
|---|---|---|---|---|---|---|
| 65 | Samedan Oil Corporation | 62.50000 | 0.23603 | 0.23150 | 0.01038 | 0.13863 |
| | Mary Frances Cusack | 18.75000 | 0.07081 | 0.06945 | 0.00311 | 0.04159 |
| | John Patrick Cusack, Jr., Trustee under the John Patrick Cusack Testamentary Trust | 4.68750 | 0.01770 | 0.01736 | 0.00078 | 0.01039 |
| | John Patrick Cusack, Jr. | 7.03125 | 0.02655 | 0.02605 | 0.00117 | 0.01560 |
| | Michael F. Cusack | 7.03125 | 0.02655 | 0.02604 | 0.00117 | 0.01560 |
| | | 100.00000 | 0.37764 | 0.37040 | 0.01661 | 0.22181 |
| 66 | Samedan Oil Corporation | 87.89100 | 2.00419 | 2.17591 | 0.33331 | 1.40202 |
| | Hattie C. Williams | 5.85900 | 0.13360 | 0.14505 | 0.02222 | 0.09346 |
| | Cities Service Company | 6.25000 | 0.14252 | 0.15473 | 0.02370 | 0.09970 |
| | | 100.00000 | 2.28031 | 2.47569 | 0.37923 | 1.59518 |
| 67 | Gulf Oil Corporation | 100.00000 | 2.17917 | 2.11608 | 3.40765 | 2.65854 |
| 68 | Shell Oil Company | 100.00000 | 0.96616 | 0.84228 | 2.48452 | 1.53202 |
| 69 | Amoco Production Company | 75.43501 | 1.38898 | 1.35806 | 1.87841 | 1.57661 |
| | Landreth Interests | 24.56499 | 0.45231 | 0.44224 | 0.61170 | 0.51341 |
| | | 100.00000 | 1.84129 | 1.80030 | 2.49011 | 2.09002 |
| 70 | Continental Oil Company | 100.00000 | 4.69790 | 4.50257 | 7.98097 | 5.96350 |
| 71 | Amerada Hess Corporation | 100.00000 | 1.47100 | 1.45514 | 2.04430 | 1.70259 |
| 72 | Shell Oil Company | 100.00000 | 0.91041 | 0.83110 | 2.56349 | 1.55870 |
| 73 | Gulf Oil Corporation | 100.00000 | 2.09767 | 1.86731 | 3.47646 | 2.54315 |
| 74 | Gulf Oil Corporation | 100.00000 | 3.40184 | 3.62040 | 3.75733 | 3.67791 |
| 75A | Marathon Oil Company | 50.00000 | 0.32452 | 0.37746 | 1.04791 | 0.65905 |
| | Atlantic Richfield Company | 50.00000 | 0.32451 | 0.37746 | 1.04792 | 0.65905 |
| | | 100.00000 | 0.64903 | 0.75492 | 2.09583 | 1.31810 |

EXHIBIT E (CONT'D)

| Tract No. | Working Interest Owner | Working Interest In Tract | Unit Participation (By Tracts) Phase I | Phase II | Phase III | Investment Participation* (By Tracts) |
|---|---|---|---|---|---|---|
| 75B | Marathon Oil Company | 50.00000 | 0.47836 | 0.47356 | 1.00267 | 0.69578 |
| | Atlantic Richfield Company | 50.00000 | 0.47837 | 0.47356 | 1.00266 | 0.69579 |
| | | 100.00000 | 0.95673 | 0.94712 | 2.00533 | 1.39157 |
| 76 | Cities Service Company | 100.00000 | 2.34959 | 2.36589 | 2.52494 | 2.43269 |
| 77 | Getty Oil Company | 100.00000 | 1.22093 | 1.17282 | 0.70944 | 0.97820 |
| 78 | Shell Oil Company | 100.00000 | 0.22719 | 0.19658 | 0.43429 | 0.29642 |
| 79 | Shell Oil Company | 100.00000 | 2.40938 | 2.30652 | 1.96469 | 2.16295 |
| 80 | Mobil Oil Corporation | 100.00000 | 0.92642 | 0.82805 | 0.67264 | 0.76278 |
| 81 | Amerada Hess Corporation | 100.00000 | 0.14029 | 0.11442 | 0.60098 | 0.31878 |
| 82 | W. K. Byrom | 62.50000 | 0.07232 | 0.06827 | 0.07468 | 0.07096 |
| | Margaret M. McPheron | 18.75000 | 0.02170 | 0.02048 | 0.02241 | 0.02128 |
| | R. L. McPheron | 9.37500 | 0.01085 | 0.01024 | 0.01120 | 0.01065 |
| | Colleen Crady McPheron Wallace | 9.37500 | 0.01085 | 0.01024 | 0.01120 | 0.01065 |
| | | 100.00000 | 0.11572 | 0.10923 | 0.11949 | 0.11354 |
| 83 | Gulf Oil Corporation | 100.00000 | 0.00000 | 0.00000 | 0.04756 | 0.01998 |
| | | | 100.00000 | 100.00000 | 100.00000 | 100.00000 |

EXHIBIT E (CONT'D) SUMMARY

| Working Interest Owner | Tract Nos. | Unit Participation Phase I | Phase II | Phase III | Investment Participation* |
|---|---|---|---|---|---|
| Abo Petroleum Corporation | 37 | 0.06818 | 0.05615 | 0.20376 | 0.11815 |
| Amerada Hess Corporation | 2 | 0.04372 | 0.03496 | 0.20696 | 0.10720 |
| | 8 | 0.00000 | 0.00000 | 2.11560 | 0.88855 |
| | 30 | 0.16818 | 0.16350 | 0.35766 | 0.24504 |
| | 44 | 3.36952 | 3.41061 | 1.86735 | 2.76244 |
| | 49 | 1.37425 | 1.32399 | 1.40956 | 1.35993 |
| | 71 | 1.47100 | 1.45514 | 2.04430 | 1.70259 |
| | 81 | 0.14029 | 0.11442 | 0.60098 | 0.31878 |
| | | 6.56696 | 6.50262 | 8.60241 | 7.38453 |
| Amoco Production Company | 69 | 1.38898 | 1.35806 | 1.87841 | 1.57661 |
| Ada A. Anderson | 5 | 0.00629 | 0.00396 | 0.02317 | 0.01203 |
| Ada A. Anderson, Paul Donald Anderson & Payton V. Anderson, Executors of the Estate of Warren D. Anderson | 5 | 0.00629 | 0.00396 | 0.02317 | 0.01203 |
| W. D. Anderson & Sons | 5 | 0.01257 | 0.00793 | 0.04633 | 0.02405 |
| J. M. Armstrong | 5 | 0.01257 | 0.00793 | 0.04633 | 0.02406 |
| Atlantic Richfield Company | 23 | 0.06415 | 0.05085 | 0.13035 | 0.08424 |
| | 54 | 2.07685 | 2.28579 | 1.09210 | 1.78444 |
| | 75A | 0.32451 | 0.37746 | 1.04792 | 0.65905 |
| | 75B | 0.47837 | 0.47356 | 1.00266 | 0.69579 |
| | | 2.94388 | 3.18766 | 3.27303 | 3.22352 |
| W. K. Byrom | 82 | 0.07232 | 0.06827 | 0.07468 | 0.07096 |
| C&C Operating Corporation | 36 | 0.01133 | 0.00688 | 0.03147 | 0.01721 |

EXHIBIT E (CONT'D)

| Working Interest Owner | Tract Nos. | Unit Participation Phase I | Phase II | Phase III | Investment Participation* |
|---|---|---|---|---|---|
| Chevron U.S.A. Inc. | 11 | 0.00000 | 0.00000 | 0.07277 | 0.03056 |
| | 19 | 0.46388 | 0.44274 | 0.39268 | 0.42171 |
| | 53 | 2.75083 | 2.95624 | 2.50776 | 2.76788 |
| | | 3.21471 | 3.39898 | 2.97321 | 3.22015 |
| Cities Service Company | 26 | 0.73038 | 0.65783 | 2.93591 | 1.61462 |
| | 50 | 0.02632 | 0.02399 | 0.05981 | 0.03904 |
| | 66 | 0.14252 | 0.15473 | 0.02370 | 0.09970 |
| | 76 | 2.34959 | 2.36589 | 2.52494 | 2.43269 |
| | | 3.24881 | 3.20244 | 5.54436 | 4.18605 |
| Mary Daniel Conrad | 15 | 0.02408 | 0.02508 | 0.00196 | 0.01537 |
| Continental Oil Company | 6 | 0.05157 | 0.03087 | 1.35192 | 0.58571 |
| | 40 | 0.29448 | 0.32197 | 0.44016 | 0.37161 |
| | 51 | 2.01126 | 2.10178 | 2.84880 | 2.41553 |
| | 58 | 4.16481 | 4.73239 | 1.68555 | 3.45272 |
| | 70 | 4.69790 | 4.50257 | 7.98097 | 5.96350 |
| | | 11.22002 | 11.68958 | 14.30740 | 12.78907 |
| E. Bernard Johnston, Trustee of Herman R. Crile, Sr. Revocable Trust | 15 | 0.03613 | 0.03762 | 0.00294 | 0.02305 |
| John P. Cusack, Jr. | 55 | 0.56276 | 0.60802 | 0.06241 | 0.37886 |
| | 56 | 0.57333 | 0.63029 | 0.02671 | 0.37679 |
| | 64 | 0.02416 | 0.02197 | 0.00103 | 0.01318 |
| | 65 | 0.02655 | 0.02605 | 0.00117 | 0.01560 |
| | | 1.18680 | 1.28633 | 0.09132 | 0.78443 |
| John Patrick Cusack, Jr., Trustee under John Patrick Cusack Testamentary Trust | 64 | 0.01610 | 0.01465 | 0.00069 | 0.00878 |
| | 65 | 0.01770 | 0.01736 | 0.00078 | 0.01039 |
| | | 0.03380 | 0.03201 | 0.00147 | 0.01917 |

EXHIBIT E (CONT'D)

| Working Interest Owner | Tract Nos. | Unit Participation Phase I | Phase II | Phase III | Investment Participation* |
|---|---|---|---|---|---|
| Mary Frances Cusack | 64 | 0.06441 | 0.05860 | 0.00275 | 0.03514 |
| | 65 | 0.07081 | 0.06945 | 0.00311 | 0.04159 |
| | | 0.13522 | 0.12805 | 0.00586 | 0.07673 |
| Michael F. Cusack | 55 | 0.56276 | 0.60802 | 0.06241 | 0.37886 |
| | 56 | 0.57333 | 0.63029 | 0.02671 | 0.37678 |
| | 64 | 0.02416 | 0.02197 | 0.00103 | 0.01318 |
| | 65 | 0.02655 | 0.02604 | 0.00117 | 0.01560 |
| | | 1.18680 | 1.28632 | 0.09132 | 0.78442 |
| Del-Lea, Inc. | 13 | 0.08746 | 0.08048 | 0.03529 | 0.06150 |
| J. N. Dunlavey | 10A | 0.00194 | 0.00171 | 0.00168 | 0.00169 |
| Russell G. Estes d/b/a Estes Engineering Company | 5 | 0.00335 | 0.00211 | 0.01236 | 0.00641 |
| Exxon Corporation | 43 | 0.66554 | 0.49553 | 0.98320 | 0.70035 |
| | 47 | 3.37645 | 3.25911 | 6.10957 | 4.45630 |
| | 48 | 0.59298 | 0.59347 | 0.42645 | 0.52332 |
| | 50 | 0.07896 | 0.07199 | 0.17944 | 0.11711 |
| | | 4.71393 | 4.42010 | 7.69866 | 5.79708 |
| First National Bank of Casper, Trustee, Tate Trusts | 32 | 0.11976 | 0.11163 | 0.05221 | 0.08667 |
| The First National Bank of Fort Worth, Agent for William S. Spradling | 32 | 0.01996 | 0.01861 | 0.00870 | 0.01445 |
| The First National Bank of Fort Worth, Independent Executor of Estate of Verda Spradling, Account No. 3462 | 32 | 0.01996 | 0.01861 | 0.00870 | 0.01445 |

EXHIBIT B (CONT'D)

| Working Interest Owner | Tract Nos. | Unit Participation Phase I | Phase II | Phase III | Investment Participation* |
|---|---|---|---|---|---|
| First National Bank of Lea County, Trustee for Cecil H. Sweet and Imo Emmetta Sweet Trust | 17 | 0.02662 | 0.02300 | 0.13047 | 0.06814 |
| | 20 | 0.00082 | 0.00000 | 0.04338 | 0.01822 |
| | 33A | 0.14618 | 0.13607 | 0.45033 | 0.26806 |
| | 33B | 0.09081 | 0.08239 | 0.16981 | 0.11911 |
| | | 0.26443 | 0.24146 | 0.79399 | 0.47353 |
| First Roswell Company | 10A | 0.00388 | 0.00341 | 0.00335 | 0.00339 |
| C. C. Forbes | 32 | 0.06068 | 0.05656 | 0.02645 | 0.04391 |
| Ilamae Forbes | 32 | 0.05908 | 0.05507 | 0.02575 | 0.04276 |
| Getty Oil Company | 1 | 0.04166 | 0.03449 | 0.13978 | 0.07871 |
| | 10A | 0.01034 | 0.00910 | 0.00894 | 0.00903 |
| | 10B | 0.00000 | 0.00000 | 0.00504 | 0.00212 |
| | 12 | 0.02525 | 0.02093 | 0.10735 | 0.05723 |
| | 18 | 0.00853 | 0.00013 | 0.19617 | 0.08247 |
| | 25 | 0.38428 | 0.34282 | 1.37055 | 0.77447 |
| | 30 | 0.16818 | 0.16349 | 0.35766 | 0.24505 |
| | 39 | 0.03247 | 0.02415 | 0.17221 | 0.08633 |
| | 45 | 3.64803 | 3.75614 | 2.83435 | 3.36899 |
| | 52 | 0.87710 | 0.86847 | 1.23597 | 1.02282 |
| | 62 | 1.15101 | 1.17464 | 0.11411 | 0.72922 |
| | 63 | 1.15287 | 1.17515 | 0.31108 | 0.81224 |
| | 77 | 1.22093 | 1.17282 | 0.70944 | 0.97820 |
| | | 8.72065 | 8.74233 | 7.56265 | 8.24688 |
| Gulf Oil Corporation | 3 | 0.03122 | 0.02643 | 0.08361 | 0.05045 |
| | 9 | 0.26552 | 0.20781 | 1.29435 | 0.66416 |
| | 16 | 0.17539 | 0.16097 | 0.17130 | 0.16531 |
| | 28 | 1.55912 | 1.44073 | 2.98865 | 2.09086 |
| | 67 | 2.17917 | 2.11608 | 3.40765 | 2.65854 |
| | 73 | 2.09767 | 1.86731 | 3.47646 | 2.54315 |
| | 74 | 3.40184 | 3.62040 | 3.75733 | 3.67791 |
| | 83 | 0.00000 | 0.00000 | 0.04756 | 0.01998 |
| | | 9.70993 | 9.43973 | 15.22691 | 11.87036 |

EXHIBIT E (CONT'D)

| Working Interest Owner | Tract Nos. | Unit Participation Phase I | Phase II | Phase III | Investment Participation* |
|---|---|---|---|---|---|
| Kenneth Noel Headley | 14 | 0.02166 | 0.02216 | 0.00227 | 0.01381 |
| | 15 | 0.03612 | 0.03761 | 0.00294 | 0.02306 |
| | | 0.05778 | 0.05977 | 0.00521 | 0.03687 |
| Peter Hurd | 15 | 0.02408 | 0.02508 | 0.00196 | 0.01537 |
| Ruby Wanda Conrad Judson | 15 | 0.00482 | 0.00502 | 0.00039 | 0.00307 |
| Landreth Interests | 69 | 0.45231 | 0.44224 | 0.61170 | 0.51341 |
| George P. Laflin | 10A | 0.00194 | 0.00171 | 0.00168 | 0.00169 |
| Marathon Oil Company | 46 | 1.83355 | 1.86777 | 1.98935 | 1.91883 |
| | 75A | 0.32452 | 0.37746 | 1.04791 | 0.65905 |
| | 75B | 0.47836 | 0.47356 | 1.00267 | 0.69578 |
| | | 2.63643 | 2.71879 | 4.03993 | 3.27366 |
| Marshall & Winston, Inc. | 60A | 0.00000 | 0.00000 | 0.00003 | 0.00001 |
| Kathryn Louise Conrad McCarthy | 15 | 0.00482 | 0.00502 | 0.00039 | 0.00307 |
| Kenneth D. McPeters | 10A | 0.00291 | 0.00256 | 0.00251 | 0.00254 |
| Margaret M. McPheron | 82 | 0.02170 | 0.02048 | 0.02241 | 0.02128 |
| R. L. McPheron | 82 | 0.01085 | 0.01024 | 0.01120 | 0.01065 |
| Mobil Oil Corporation | 80 | 0.92642 | 0.82805 | 0.67264 | 0.76278 |

EXHIBIT E (CONT'D)

| Working Interest Owner | Tract Nos. | Unit Participation Phase I | Phase II | Phase III | Investment Participation* |
|---|---|---|---|---|---|
| Moranco | 10A | 0.00388 | 0.00341 | 0.00335 | 0.00339 |
| Robert Martin Moran | 10A | 0.01164 | 0.01024 | 0.01005 | 0.01016 |
| G. D. Morris Estate | 32 | 0.03992 | 0.03721 | 0.01740 | 0.02889 |
| Nathlyn Ione Conrad Murdoch | 15 | 0.00482 | 0.00502 | 0.00039 | 0.00307 |
| Richard L. Noble | 32 | 0.48543 | 0.45249 | 0.21160 | 0.35132 |
| Samuel Roberts Noble Foundation, Inc. | 32 | 0.91817 | 0.85585 | 0.40024 | 0.66449 |
| Portales National Bank, Executor of Estate of Myrtle A. Moore | 32 | 0.05988 | 0.05582 | 0.02610 | 0.04334 |
| Donald R. Lisle and Hal A. Treadwell, Co-Executors of the Estate of John Roring, Deceased | 32 | 0.11976 | 0.11163 | 0.05221 | 0.08667 |
| Frances I. Conrad Rose | 15 | 0.00482 | 0.00502 | 0.00039 | 0.00307 |
| Samedan Oil Corporation | 32 | 1.20719 | 1.12526 | 0.52622 | 0.87367 |
| | 41 | 0.07122 | 0.06099 | 0.26713 | 0.14757 |
| | 55 | 1.09176 | 1.17956 | 0.12107 | 0.73500 |
| | 56 | 1.11227 | 1.22276 | 0.05182 | 0.73096 |
| | 64 | 0.21472 | 0.19532 | 0.00916 | 0.11713 |
| | 65 | 0.23603 | 0.23150 | 0.01038 | 0.13863 |
| | 66 | 2.00419 | 2.17591 | 0.33331 | 1.40202 |
| | | 5.93738 | 6.19130 | 1.31909 | 4.14498 |
| SEA Properties, Ltd. | 32 | 0.02396 | 0.02233 | 0.01044 | 0.01733 |
| | 55 | 0.03377 | 0.03648 | 0.00374 | 0.02273 |
| | 56 | 0.03440 | 0.03781 | 0.00161 | 0.02261 |
| | | 0.09213 | 0.09662 | 0.01579 | 0.06267 |

EXHIBIT E (CONT'D)

| Working Interest Owner | Tract Nos. | Unit Participation Phase I | Phase II | Phase III | Investment Participation* |
|---|---|---|---|---|---|
| Shell Oil Company | 7 | 0.33855 | 0.28554 | 2.37454 | 1.16292 |
| | 24 | 2.13208 | 2.18100 | 0.93009 | 1.65562 |
| | 27 | 4.99981 | 4.72987 | 3.68081 | 4.28926 |
| | 29 | 0.71513 | 0.61650 | 1.11779 | 0.82704 |
| | 34 | 0.02065 | 0.00990 | 0.23908 | 0.10616 |
| | 57 | 2.91562 | 2.97071 | 3.07756 | 3.01559 |
| | 59 | 6.45317 | 6.70337 | 0.33242 | 4.02757 |
| | 60A | 0.00000 | 0.00000 | 0.00019 | 0.00008 |
| | 60B | 0.12511 | 0.10695 | 0.00636 | 0.06470 |
| | 61A | 1.19303 | 1.22347 | 0.09076 | 0.74773 |
| | 61B | 1.06871 | 1.06806 | 0.01963 | 0.62772 |
| | 68 | 0.96616 | 0.84228 | 2.48452 | 1.53202 |
| | 72 | 0.91041 | 0.83110 | 2.56349 | 1.55870 |
| | 78 | 0.22719 | 0.19658 | 0.43429 | 0.29642 |
| | 79 | 2.40938 | 2.30652 | 1.96469 | 2.16295 |
| | | 24.47500 | 24.07185 | 19.31622 | 22.07448 |
| Howell Spear | 10A | 0.00049 | 0.00042 | 0.00042 | 0.00043 |
| Ellie Sims Spear | 10A | 0.00049 | 0.00042 | 0.00042 | 0.00043 |
| E. C. Sullivan | 32 | 0.05988 | 0.05582 | 0.02610 | 0.04334 |
| Bill L. Sweet | 21 | 0.02651 | 0.02300 | 0.08569 | 0.04933 |
| | 22 | 0.00000 | 0.00000 | 0.09207 | 0.03867 |
| | | 0.02651 | 0.02300 | 0.17776 | 0.08800 |
| Texaco Inc. | 42 | 3.15134 | 3.09110 | 1.16515 | 2.28220 |
| Texas Pacific Oil Company, Inc. | 4 | 0.11473 | 0.10166 | 0.29162 | 0.18144 |
| | 31 | 4.47471 | 4.52936 | 2.18451 | 3.54452 |
| | 35 | 0.09228 | 0.07279 | 0.34319 | 0.18636 |
| | | 4.68172 | 4.70381 | 2.81932 | 3.91232 |

EXHIBIT E (CONT'D)

| Working Interest Owner | Tract Nos. | Unit Participation Phase I | Phase II | Phase III | Investment Participation* |
|---|---|---|---|---|---|
| Bettye Conrad Treadaway | 15 | 0.00482 | 0.00502 | 0.00039 | 0.00307 |
| Two States Oil Company | 14 | 0.06498 | 0.06649 | 0.00682 | 0.04143 |
| Colleen Grady McPheron Wallace | 82 | 0.01065 | 0.01024 | 0.01120 | 0.01065 |
| Ward Investment Corporation | 37 | 0.01299 | 0.01069 | 0.03881 | 0.02250 |
| Loyd Whitley | 10A | 0.00194 | 0.00171 | 0.00168 | 0.00169 |
| Hattie C. Williams | 66 | 0.13360 | 0.14505 | 0.02222 | 0.09346 |
| A. T. Williamson | 10A | 0.00194 | 0.00171 | 0.00168 | 0.00169 |
| The Wiser Oil Company | 14 | 0.08663 | 0.08865 | 0.00910 | 0.05523 |
| | 15 | 0.19267 | 0.20062 | 0.01567 | 0.12295 |
| | 38 | 0.00209 | 0.00000 | 0.08529 | 0.03582 |
| | | 0.28139 | 0.28927 | 0.11006 | 0.21400 |
| Yates Petroleum Corporation | 37 | 0.03246 | 0.02674 | 0.09703 | 0.05626 |
| S. P. Yates | 37 | 0.01623 | 0.01337 | 0.04851 | 0.02813 |
| Henry Yeager, Jr. | 15 | 0.01567 | 0.01632 | 0.00127 | 0.01000 |
| Ruth Anne Yeager | 15 | 0.01166 | 0.01214 | 0.00095 | 0.00744 |
| Ruth Peeler Yeager, Henry Yeager, Jr., & First National Bank in Dallas, Joint Trustees of Ruth Anne Yeager Trust No. 2 | 15 | 0.00401 | 0.00418 | 0.00033 | 0.00256 |
| Mrs. Ruth Peeler Yeager | 15 | 0.01682 | 0.01751 | 0.00137 | 0.01074 |
| W. A. Yeager | 5 | 0.01257 | 0.00793 | 0.04633 | 0.02406 |
| | | 100.00000 | 100.00000 | 100.00000 | 100.00000 |

* Applicable only to investment costs incurred prior to the Investment Readjustment Date

# UNIT OPERATING AGREEMENT
# NORTH HOBBS (GRAYBURG-SAN ANDRES) UNIT
# LEA COUNTY, NEW MEXICO

UNIT OPERATING AGREEMENT
NORTH HOBBS (GRAYBURG-SAN ANDRES) UNIT
LEA COUNTY, NEW MEXICO

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UNIT OPERATING AGREEMENT
NORTH HOBBS (GRAYBURG-SAN ANDRES) UNIT
LEA COUNTY, NEW MEXICO

THIS AGREEMENT, entered into as of the 1st day of July, 1978, by the parties who have signed the original of this instrument, a counterpart thereof, or other instrument agreeing to be bound by the provisions hereof;

WITNESSETH:

WHEREAS, the parties hereto as Working Interest Owners have executed, as of the date hereof, an agreement entitled "Unit Agreement, North Hobbs (Grayburg-San Andres) Unit, Lea County, New Mexico", herein referred to as "Unit Agreement", which among other things, provides for a separate agreement to be entered into by Working Interest Owners to provide for the development and operation of the Unit Area as therein defined;

NOW, THEREFORE, in consideration of the mutual agreements herein set forth, it is agreed as follows:

ARTICLE 1
CONFIRMATION OF UNIT AGREEMENT

1.1 Confirmation of Unit Agreement. The Unit Agreement is hereby confirmed and by reference made a part of this agreement. The definitions in the Unit Agreement are adopted for all purposes of this agreement. If there is any conflict between the Unit Agreement and this agreement, the Unit Agreement shall govern.

1.2 Additional Definitions. For the purpose of this agreement, the following terms and expressions as used herein shall mean:

(a) "Investment Participation" shall mean the sum of .58 Phase II Unit Participation and .42 Phase III Unit Participation.

(b) "Investment Readjustment Date" shall mean the date of termination of Phase II or January 1, 1991, whichever is the earlier date."

ARTICLE 2
EXHIBITS

2.1 Exhibits. The following exhibits are incorporated herein by reference:

2.1.1 Exhibits A, B, C and D of the Unit Agreement.

2.1.2 Exhibit E, attached hereto, is a schedule showing the Tract Participation, the Unit Participation, and the Investment Participation of each Working Interest Owner. Exhibit E, or a revision thereof, shall not be conclusive as to the information therein, except it may be used as showing the Unit Participations of Working Interest Owners for purposes of this agreement until shown to be in error or revised as herein authorized.

2.1.3 Exhibit F, attached hereto, is the Accounting Procedure applicable to Unit Operations. If there is any conflict between this agreement and Exhibit F, this agreement shall govern.

2.1.4 Exhibit G, attached hereto, contains insurance provisions applicable to Unit Operations.

2.1.5 Exhibit H, attached hereto, is a form of Indemnity Agreement required under the provisions of Section 14(c) of the Unit Agreement.

2.2 Revision of Exhibits. Whenever Exhibits A, B or C are revised, Exhibit E shall be revised accordingly and be effective as of the same date. Unit Operator shall also revise Exhibit E from time to time as required to conform to changes in ownership of which Unit Operator has been notified as provided in the Unit Agreement.

2.3 Reference to Exhibits. When reference is made herein to an exhibit, it is to the exhibit as originally attached, or, if revised, to the last revision.

## ARTICLE 3
## SUPERVISION OF OPERATIONS BY WORKING INTEREST OWNERS

3.1 Overall Supervision. Working Interest Owners shall exercise overall supervision and control of all matters pertaining to Unit Operations pursuant to this agreement and the Unit Agreement. In the exercise of such authority, each Working Interest Owner shall act solely in its own behalf in the capacity of an individual owner and not on behalf of the owners as an entirety.

3.2 Specific Authorities and Duties. The matters with respect to which the Working Interest Owners shall decide and take action shall include, but not be limited to, the following:

3.2.1 Method of Operation. The method of operation, including any type of pressure maintenance, enhanced recovery, or other recovery program to be employed.

3.2.2 Drilling of Wells. The drilling of any well whether for production of Unitized Substances, for use as an injection well, or for other purposes.

3.2.3 Abandonment and Change of Status of Wells. The abandonment of any well or change of status of any well by converting such well for use as an injector or for any purpose other than production of Unitized Substances.

3.2.4. Expenditures. The making of any single expenditure in excess of twenty-five thousand dollars ($25,000); provided that, approval by Working Interest Owners of the drilling, reworking, deepening, or plugging back of any well shall include approval of all necessary expenditures required therefor, and for completing, testing, and equipping the well, including necessary flow lines, separators, and lease tankage.

3.2.5 Disposition of Unit Equipment. The selling or otherwise disposing of any major item of surplus Unit Equipment, if the list price of new equipment similar thereto is seven thousand five hundred dollars ($7,500) or more.

3.2.6. Appearance Before a Court or Regulatory Agency. The designating of a representative to appear before any court or regulatory agency in matters pertaining to Unit Operations; provided, however, that Unit Operator shall act as such representative in the absence of the designation of a different representative by Working Interest Owners, and provided, further, that such designation shall not prevent any Working Interest Owner from appearing in person or from designating another representative in its own behalf.

3.2.7 Audits. The auditing of the accounts of Unit Operator pertaining to Unit Operations hereunder; however, the audits shall

(a) not be conducted more than once each year except upon the resignation or removal of Unit Operator, and

(b) be made upon approval of the owner or owners of a majority of Working Interest other than that of Unit Operator, at the expense of all Working Interest Owners other than Unit Operator, or

(c) be made at the expense of those Working Interest Owners requesting such audit, if owners of less than a majority of Working Interest, other than that of Unit Operator, request such an audit, and

(d) be made upon not less than thirty (30) days' written notice to Unit Operator.

3.2.8 Inventories. The taking of periodic inventories under the terms of Exhibit F.

3.2.9 Technical Services. The authorizing of charges to the joint account for services by consultants or Unit Operator's technical personnel not covered by the overhead charges provided by Exhibit F.

3.2.10 Assignments to Committees. The appointment of committees to study any problems in connection with Unit Operations.

3.2.11 The removal of Unit Operator and the selection of a successor.

3.2.12 The enlargement of the Unit Area.

3.2.13 The adjustment and readjustment of investments.

3.2.14 The termination of the Unit Agreement.

## ARTICLE 4
## MANNER OF EXERCISING SUPERVISION

4.1 Designation of Representatives. Each Working Interest Owner shall inform Unit Operator in writing of the names and addresses of the representative and alternate who are authorized to represent and bind such Working Interest Owner with respect to Unit Operations. The representative or alternate may be changed from time to time by written notice to Unit Operator.

4.2 Meetings. All meetings of Working Interest Owners shall be called by Unit Operator upon its own motion or at the request of two (2) or more Working Interest Owners having a total voting interest of not less than ten percent (10%). No meeting shall be called on less than fourteen (14) days' advance written notice, with agenda for the meeting attached. Working Interest Owners who attend the meeting may amend items included in the agenda and may act upon an amended item or other items presented at the meeting; provided, however, that no expenditure or commitment for expenditure may be authorized unless it is included in the agenda attached to the notice of the meeting. The representative of Unit Operator shall be chairman of each meeting. The parties hereto may reduce the notice requirement to not less than three (3) days and may waive the requirement for an attached agenda by consent of Working Interest Owners having a combined voting interest not less than that required for an affirmative vote under the provision of Section 4.3.2.

4.3 Voting Procedure. Working Interest Owners shall decide all matters coming before them as follows:

4.3.1 Voting Interest. Each Working Interest Owner shall have a voting interest equal to its Phase II Unit Participation during Phase I and Phase II and equal to its Phase III Unit Participation during Phase III, depending upon which phase is in effect at the time the vote is taken.

4.3.2 Vote Required. Unless otherwise provided herein or in the Unit Agreement, Working Interest Owners shall determine all matters by the affirmative vote of Working Interest Owners have a combined voting interest of at least sixty-five percent (65%); however, should any one Working Interest Owner have more than thirty-five percent (35%) voting interest, its negative vote or failure to vote shall not defeat a motion, and such motion shall pass if approved by Working Interest Owners having a majority voting interest, unless one or more Working Interest Owners having a combined voting interest of at least five percent (5%) likewise vote against the motion or fail to vote.

4.3.3 Vote at Meeting by Nonattending Working Interest Owner. Any Working Interest Owner who is not represented at a meeting may vote by letter or telegram addressed to the representative of the Unit Operator if its vote is received prior to the vote on the item.

4.3.4 Poll Votes. Working Interest Owners may vote on and decide, by letter or telegram, any matter submitted in writing to Working Interest Owners. If no meeting is requested, as provided in Section 4.2, within seven (7) days after a written proposal is sent to Working Interest Owners, the vote taken by letter or telegram shall become final. Unit Operator will give prompt noice of the results of such voting to all Working Interest Owners.

## ARTICLE 5
## INDIVIDUAL RIGHTS OF WORKING INTEREST OWNERS

5.1 Reservation of Rights. Working Interest Owners severally reserve to themselves all their rights, except as otherwise provided in this agreement and the Unit Agreement.

5.2 Specific Rights. Each Working Interest Owner shall have, among others, the following specific rights:

5.2.1 Access to Unit Area. Access to the Unit Area at all reasonable times to inspect Unit Operations, all wells, and the records and data pertaining thereto.

5.2.2 Reports. The right to receive from Unit Operator, upon written request, copies of all reports to any governmental agency, reports of crude oil runs and stocks, inventory reports, and all other information pertaining to Unit Operations. The cost of gathering and furnishing information not ordinarily furnished by Unit Operator to all Working Interest Owners shall be charged to the Working Interest Owner that requires the information.

7.9 Expenditures. Unit Operator is authorized to make single expenditures not in excess of twenty-five thousand dollars ($25,000) without prior approval of Working Interest Owners; provided that any capital expenditure in excess of five thousand dollars ($5,000) will be described in an informational authority for expenditure furnished to Working Interest Owners, except individual Working Interest Owners declining to receive such information. If an emergency occurs, Unit Operator may immediately make or incur such expenditures as in its opinion are required to deal with the emergency. Unit Operator shall report to Working Interest Owners, as promptly as possible, the nature of the emergency and the action taken.

7.10 Wells Drilled by Unit Operator. All wells drilled by Unit Operator shall be on a competitive bid basis. Unit Operator may employ its own tools and equipment under terms and conditions approved by Working Interest Owners.

7.11 Border Agreements. Unit Operator may, after approval by Working Interest Owners, enter into border agreements with respect to lands adjacent to the Unit Area for the purpose of coordinating operations.

## ARTICLE 8
## TAXES

8.1 Ad Valorem Taxes. Beginning with the first calendar year commencing after the Effective Date hereof, Unit Operator shall make and file all necessary ad valorem tax renditions and returns with the proper taxing authorities with respect to all property of each Working Interest Owner used or held by Unit Operator for Unit Operations. Unit Operator shall settle assessments arising therefrom. All such ad valorem taxes shall be paid by Unit Operator and charged to the joint account; however, if the interest of a Working Interest Owner is subject to a separately assessed overriding royalty interest, production payment, or other interest in excess of a one-eighth (1/8) royalty, such Working Interest Owner shall notify Unit Operator of such interest prior to the rendition date and shall be given credit for the reduction in taxes paid resulting therefrom.

8.2 Other Taxes. Each Working Interest Owner shall pay or cause to be paid all production, severance, gathering, and other taxes imposed upon or with respect to the production or handling of its share of Unitized Substances.

## ARTICLE 9
## INSURANCE

9.1 Insurance. Unit Operator, with respect to Unit Operations, shall:

9.1.1 Comply with the Workmen's Compensation Law of the State of New Mexico.

9.1.2 Provide employers' liability insurance with a limit of $100,000.

9.1.3. Provide other insurance as set forth in Exhibit G.

## ARTICLE 10
## ADJUSTMENT OF INVESTMENTS

10.1 Personal Property Taken Over. Upon the Effective Date hereof, Working Interest Owners shall deliver to Unit Operator the following:

10.1.1 Wells and Casing. All wells completed in the Unitized Formation, together with all casing therein.

10.1.2 Well and Lease Equipment. The tubing in each such well, the wellhead connections thereon, and all other well, lease and operating equipment used in the operation of such wells which Working Interest Owners determine is necessary or desirable for conducting Unit Operations. Working Interest Owners shall make such determination as soon as practicable after the Effective Date hereof, and all of such property that is determined to be surplus shall be returned as promptly as possible to the Working Interest Owners who delivered same to Unit Operator. Property determined by Working Interest Owners to be surplus shall not be considered to have been taken over under this agreement.

10.1.3 Condition of Wells. All wells, including the casing therein, shall be delivered to Unit Operator in reasonably good physical condition capable of being used for Unit Operations. If within one hundred and eighty (180) days after the Effective Date hereof (a) any such well is determined by the Working Interest Owners not to have been in reasonably good physical condition on said Effective Date, or (b) any casing failure or leak is discovered by Unit Operator in any such well, whether such casing failure or leak developed before or after the Effective Date hereof, the Working Interest Owner who contributed such well shall be liable to the other Working Interest Owners for liquidated damages in an amount, measured by the cost to Working Interest Owners of repairing such well or drilling a replacement well, not to exceed fifty thousand dollars ($50,000), provided that any amount in excess of fifty thousand dollars ($50,000) shall be treated as any other item of Unit Expense and charged to the joint account.

10.1.4 Records. A copy of all production and well records that pertain to such wells.

10.2 Inventory and Evaluation of Personal Property. Working Interest Owners shall at Unit Expense inventory and evaluate the personal property taken over under Section 10.1.2, except flowlines, and shall inventory the

casing taken over under Section 10.1.1, but casing shall be given no value. Such inventories shall include and be limited to those items of equipment indicated to be controllable in the most recent edition of the "Materials Classification Manual" prepared by the Council of Petroleum Accountants Societies of North America, except that, upon determination of Working Interest Owners, items considered noncontrollable may be included in the inventory in order to insure a more equitable adjustment of investment. All noncontrollable items of well and lease equipment installed within the Unit Area that are required in Unit Operations, although excluded from the inventories, shall nevertheless be taken over by the Unit Operator. Immediately following completion of such inventory, the material and equipment taken over under Section 10.1.2 shall be priced at a realistic value as determined by the Working Interest Owners, which pricing shall be performed under the supervision of, by the personnel of, and in the offices of the Unit Operator, with other Working Interest Owners furnishing such additional pricing help as may be available and necessary.

10.3 Investment Adjustment. Upon approval by Working Interest Owners of the inventory and evaluation, investments shall be adjusted as follows:

10.3.1 Initial Adjustment of Investments. Each Working Interest Owner shall be credited with the value, as determined in accordance with Section 10.2 above, of its interest in all personal property taken over by Unit Operator under Section 10.1.2 and charged with an amount equal to that obtained by multiplying the total value of all such personal property taken over by Unit Operator under Section 10.1.2 by such Working Interest Owner's Investment Participation, as shown on Exhibit E. If the charge against any Working Interest Owner is greater than the amount credited to such Working Interest Owner, the resulting net charge shall be paid and in all other respects be treated as any other item of Unit Expense chargeable against such Working Interest Owner. If the credit to any Working Interest Owner is greater than the amount charged against such Working Interest Owner, the resulting net credit shall be paid to such Working Interest Owner by Unit Operator out of funds received by it in settlement of the net charges described above.

10.3.2 Readjustments of Investments. Effective as of the Investment Readjustment Date, the investment account of the Working Interest Owners hereunder shall be readjusted on the basis of their respective Phase III Unit Participations, as shown on Exhibit E. For the purposes of such readjustment, each Working Interest Owner shall be (1) credited for its interest in the adjusted value of all personal property and facilities taken over or otherwise acquired by the Unit Operator pursuant to this agreement prior to the Investment Readjustment Date, and (2) charged with an amount equal to that obtained by multiplying the same adjusted value of personal property and facilities by such Working Interest Owner's Phase III Unit Participation. The adjusted value of all personal property and facilities for the purposes of this Section 10.3.2 shall be determined as follows:

(a) Value personal property and facilities initially taken over by Unit Operator on the same basis as that used when such personal property and facilities were taken over.

(b) Value all other investment items (controllable and noncontrollable materials and construction costs) acquired prior to the Investment Readjustment Date, including well casing subsequently purchased and installed, injection well conversion costs, and tank battery consolidation costs, on the basis of cost to the joint account.

(c) Add (a) and (b) together and deduct the value of all items of investment retired prior to the Investment Readjustment Date on the same basis that such items were originally charged.

Each Working Interest Owner shall be charged or credited with the net cash amount necessary to effect such readjustment of the investment account, and such charges and credits shall be settled in the same manner as the charges and credits referred to in Section 10.3.1.

10.4 General Facilities and Abandoned Installations. The acquisition of warehouses, warehouse stocks, lease houses, camps, facility systems, and office buildings necessary for Unit Operations shall be by negotiation by the owners thereof and Unit Operator, subject to the approval of Working Interest Owners. There shall be no adjustment for lease roads or appurtenances thereto.

10.5 Exchange of Interest in and Ownership of Personal Property and Facilities. Each Working Interest Owner hereby exchanges, and agrees to exchange, its interest in all of the personal property and facilities described in Section 10.1.2 above for its proportionate interest, as shown for Investment Participation on Exhibit E during the time prior to the Investment Readjustment Date and as shown for Phase III Unit Participation on Exhibit E from and after the Investment Readjustment Date in all such personal property and facilities described in Section 10.1.2. Each Working Interest Owner, individually, shall by virtue hereof own an undivided interest in all personal property and facilities taken over or otherwise acquired by Unit Operator pursuant to this agreement.

## ARTICLE 11
## UNIT EXPENSE

11.1 Basis of Charge to Working Interest Owners. Unit Operator initially shall pay all Unit Expense. Each Working Interest Owner shall reimburse Unit Operator for its share of Unit Expense on the basis provided in Sections 11.1.1 and 11.1.2 below. All charges, credits, and accounting for Unit Expense shall be in accordance with Exhibit F.

11.1.1. Operating Expense. Operating expense shall be shared and borne by Working Interest Owners in proportion to Phase I, Phase II or Phase III Unit Participation, whichever phase is in effect at the time such expense was incurred.

11.1.2. Investment Cost. The cost of investment items (as described in Section 10.3.2 (b) above) incurred prior to the Investment Readjustment Date shall be shared and borne by Working Interest Owners in proportion to Investment Participation. The cost of such investment items incurred after the Investment Readjustment Date shall be shared and borne by Working Interest Owners in proportion to Phase III Unit Participation.

11.2 Budgets. Before or as soon as practical after the Effective Date hereof, Unit Operator shall prepare a budget of estimated Unit Expense for the remainder of the calendar year, and, on or before the first day of each August thereafter, shall prepare such a budget for the ensuing calendar year. A budget shall set forth the estimated Unit Expense by quarterly periods. Budgets shall be estimates only, and shall be adjusted or corrected by Working Interest Owners and Unit Operator whenever an adjustment or correction is proper. A copy of each budget and adjusted budget shall promptly be furnished to each Working Interest Owner.

11.3 Advance Billings. Unit Operator shall have the right, without prejudice to other rights or remedies, to require Working Interest Owners to advance their respective shares of estimated Unit Expense by submitting to Working Interest Owners, on or before the 15th day of any month, an itemized estimate thereof for the succeeding month, with a request for payment in advance. Within fifteen (15) days thereafter, each Working Interest Owner shall pay to Unit Operator its share of such estimate. Adjustments between estimated and actual Unit Expense shall be made by Unit Operator at the close of each calendar month, and the accounts of Working Interest Owners shall be adjusted accordingly.

11.4 Commingling of Funds. Funds received by Unit Operator under this agreement need not be segregated or maintained by it as a separate fund, but may be commingled with its own funds.

11.5 Liens and Security Interest of Unit Operator. Each Working Interest Owner grants to Unit Operator and Unit Operator shall have as to each Working Interest Owner a lien upon its Oil and Gas Rights in each Tract, and a security interest in its share of Unitized Substances when extracted, and its interest in all Unit Equipment, to secure payment of its share of Unit Expense, together with interest thereon at the rate of twelve percent (12%) per annum or the maximum contract rate permitted by applicable usury laws, whichever is the lesser; provided, however, that notwithstanding anything in this agreement to the contrary, said lien shall not be enforceable by foreclosure and sale of the Oil and Gas Rights of any Working Interest Owner which is not a signatory party to this agreement.

To the extent that Unit Operator has a security interest under the Uniform Commercial Code of the State of New Mexico, Unit Operator shall be entitled to exercise the rights and remedies of a secured party under the Code. The bringing of a suit and the obtaining of judgment by Unit Operator for the secured indebtedness shall not be deemed an election of remedies or otherwise affect the lien rights or security interest as security for the payment thereof. In addition, upon default by any Working Interest Owner in the payment of its share of Unit Expense, Unit Operator shall have the right, without prejudice to other rights or remedies, to collect from the purchaser the proceeds from the sale of such Working Interest Owner's share of Unitized Substances until the amount owed by such Working Interest Owner, plus interest as aforesaid, has been paid. Each purchaser shall be entitled to rely upon Unit Operator's written statement concerning the amount of any default. Unit Operator hereby grants to the other Working Interest Owners a similar lien upon all of Unit Operator's right, title and interest as a Working Interest Owner hereunder as security for payment of any and all amounts that may become due and owing hereunder by Unit Operator to any of such other Working Interest Owners.

11.6 Unpaid Unit Expense. If any Working Interest Owner fails to pay its share of Unit Expense within sixty (60) days after rendition of a statement therefor by Unit Operator, each Working Interest Owner which is a signatory party to this agreement shall, upon request by Unit Operator, pay its proportionate part of the unpaid share of Unit Expense of the non-paying Working Interest Owner. Working Interest Owners that pay the share of Unit Expense of a non-paying Working Interest Owner shall be reimbursed by the Unit Operator for the amount so paid, plus any interest collected thereon, upon receipt by Unit Operator of any past due amount collected from or otherwise received for the account of the non-paying Working Interest Owner. Each Working Interest Owner so paying a non-paying Working Interest Owner's share of Unit Expense shall be subrogated to the lien and other rights herein granted Unit Operator, and each such Working Interest Owner, in proportion to the amounts so paid and not reimbursed, shall have and be entitled to exercise the voting interest of the non-paying Working Interest Owner.

11.7 Carved-out Interest. If any Working Interest Owner shall, after becoming bound by this agreement, create an overriding royalty, production payment, net proceeds interest, carried interest, or any other interest out of its Working Interest, such carved-out interest shall be subject to the terms and provisions of this agreement, specifically including, but without limitation, Section 11.5 hereof entitled "Lien and Security Interest of Unit Operator". If the Working Interest Owner creating such carved-out interest (a) fails to pay any Unit Expense chargeable to such Working Interest Owner under this agreement, and the production of Unitized Substances accruing to the credit of such Working Interest Owner is insufficient for that purpose, or (b) withdraws from this agreement under the terms and provisions of Article 17 hereof, the carved-out interest

shall be chargeable with a pro rata portion of all Unit Expense incurred hereunder, the same as though such carved-out interest were a Working Interest, and Unit Operator shall have the right to enforce against such carved-out interest the lien and all other rights granted in Section 11.5 for the purpose of collecting the Unit Expense chargeable to the carved-out interest.

11.8 Uncommitted Royalty. Should an owner of a Royalty Interest in any Tract fail to become a party to the Unit Agreement, and, as a result thereof, the actual Royalty Interest payments with respect to such Tract are more or less than the Royalty Interest payments computed on the basis of the Unitized Substances that are allocated to such Tract under the Unit Agreement, the difference shall be borne by or inure to the benefit of Working Interest Owners, in proportion to their respective Unit Participations at the time the Unitized Substances were produced; however, the difference to be borne by or inure to the benefit of Working Interest Owners shall not exceed an amount computed on the basis of one-eighth (1/8) of the difference between the Unitized Substances allocated to the Tract and the Unitized Substances produced from the Tract. Such adjustments shall be made by charges and credits to the joint account.

11.9 Rentals. The Working Interest Owners in each Tract shall pay and bear all rentals, minimum royalty, advance rentals or delay rentals due under the lease thereon and shall concurrently submit to the Unit Operator evidence of payment.

## ARTICLE 12
## NONUNITIZED FORMATIONS

12.1 Right to Operate. Any Working Interest Owner that now has or hereafter acquires the right to drill for and produce oil, gas, or other minerals, from a formation underlying the Unit Area other than the Unitized Formation, shall have the right to do so notwithstanding this agreement or the Unit Agreement. In exercising the right, however, the Working Interest Owner shall exercise care to prevent unreasonable interference with Unit Operations. No Working Interest Owner shall produce Unitized Substances through any well drilled or operated by it. If any Working Interest Owner drills any well into or through the Unitized Formation, the Unitized Formation shall be protected in a manner satisfactory to Working Interest Owners so that production of Unitized Substances will not be adversely affected.

12.2 Multiple Completions. No well now or hereafter completed in the Unitized Formation shall ever be completed as a multiple completion with the Unitized Formation and any other formation unless such multiple completion and the subsequent handling of the multiple completion is approved by Working Interest Owners in accordance with the voting procedure set out in Section 4.3.2 of this agreement.

## ARTICLE 13
## TITLES

13.1 Warranty and Indemnity. Each Working Interest Owner represents and warrants that it is the owner of the respective Working Interests set forth opposite its name in Exhibit B, and agrees to indemnify and hold harmless the other Working Interest Owners from any loss due to failure, in whole or in part, of its title to any such interest, except failure of title arising because of Unit Operations; however, such indemnity and any liability for breach of warranty shall be limited to an amount equal to the net value that has been received from the sale or receipt of Unitized Substances attributed to the interest as to which title failed. Each failure of title will be deemed to be effective, insofar as this agreement is concerned, as of 7:00 a.m. on the first day of the calendar month in which such failure is finally determined, and there shall be no retroactive adjustment of Unit Expense, or retroactive allocation of Unitized Substances or the proceeds therefrom, as a result of a title failure.

13.2 Failure Because of Unit Operations. The failure of title to any Working Interest in any Tract because of Unit Operations, including non-production from such Tract, shall not change the Unit Participation of the Working Interest Owner whose title failed in relation to the Unit Participation of the other Working Interest Owners at the time of the title failure.

## ARTICLE 14
## LIABILITY, CLAIMS, AND SUITS

14.1 Individual Liability. The duties, obligations, and liabilities of Working Interest Owners shall be several and not joint or collective; and nothing herein contained shall ever be construed as creating a partnership of any kind, joint venture, association, or trust among Working Interest Owners.

14.2 Settlements. Unit Operator may settle any single damage claim or suit involving Unit Operations if the expenditure does not exceed seven thousand five hundred dollars ($7,500.00) and if the payment is in complete settlement of such claim or suit. If the amount required for settlement exceeds the above specified amount, Working Interest Owners shall assume and take over the further handling of the claim or suit unless such authority is expressly delegated to Unit Operator. All costs and expense of handling, settling, or otherwise discharging such claim or suit shall be an item of Unit Expense. If a claim is made against any Working Interest Owner or if any Working Interest Owner is sued on account of any matter arising from Unit Operations over which such Working Interest Owner individually has no control because of the rights given Working Interest Owners and Unit Operator by this agreement and the Unit Agreement, the Working Interest Owner shall immediately notify the Unit Operator, and the claim or suit shall be treated as any other claim or suit involving Unit Operations.

## ARTICLE 15
## INTERNAL REVENUE PROVISION

15.1 Internal Revenue Provision. Notwithstanding any provisions herein that the rights and liabilities of the parties hereunder are several and not joint or collective, or that this agreement and operations hereunder shall not constitute a partnership, if for Federal income tax purposes this agreement and the operations hereunder are regarded as a partnership, then each of the parties hereto elects to be excluded from the application of all of the provisions of Subchapter K, Chapter 1, Subtitle A, of the Internal Revenue Code of 1954, as permitted and authorized by Section 761 of the Code and the regulations promulgated hereunder. Each party hereto agrees not to give any notices or take any other action inconsistent with the election made hereby. If any present or future income tax laws of the state or states in which the Unit Area is located, or any future income tax law of the United States, contain provisions similar to those in Subchapter K, Chapter 1, Subtitle A, of the Internal Revenue Code of 1954, under which an election similar to that provided by Section 761 of the Code is permitted, each of the parties agree to make such election as may be permitted or required by such laws. In making this election, each of the parties states that the income derived by such party from the operations under this agreement can be adequately determined without the computation of partnership taxable income.

## ARTICLE 16
## NOTICES

16.1 Notices. All notices required hereunder shall be in writing and shall be deemed to have been properly served when sent by mail or telegram to the address of the representative of each Working Interest Owner as furnished to Unit Operator in accordance with Article 4.

## ARTICLE 17
## WITHDRAWAL OF WORKING INTEREST OWNER

17.1 Withdrawal. A Working Interest Owner may withdraw from this Agreement by transferring, without warranty of title either express or implied, to the Working Interest Owners who do not desire to withdraw all its Oil and Gas Rights, exclusive of Royalty Interests, together with its interest in all Unit Equipment and in all wells used in Unit Operations, provided that such transfer shall not relieve such Working Interest Owner from any obligation or liability incurred prior to the first day of the month following receipt by Unit Operator of such transfer, and further provided that each of the non-transferring Working Interest Owners shall have the option to acquire a transferred interest and shall indicate such election by notifying the Unit Operator in writing within thirty (30) days of notice of withdrawal. The delivery of the transfer shall be made to Unit Operator for the transferees. The transferred interest shall be owned by the transferees in proportion to their respective Unit Participations. The

transferees, in proportion to the respective interests so acquired, shall pay the transferor for its interest in Unit Equipment, the salvage value thereof less its share of the estimated cost of salvaging same and of plugging and abandoning all wells then being used or held for Unit Operations, as determined by Working Interest Owners. In the event such withdrawing owner's interest in the aforesaid salvage value is less than such owner's share of such estimated costs, the withdrawing owner, as a condition precedent to withdrawal, shall pay the Unit Operator, for the benefit of Working Interest Owners succeeding to its interest, a sum equal to the deficiency. Within sixty (60) days after receiving delivery of the transfer, Unit Operator shall render a final statement to the withdrawing owner for its share of Unit Expense, including any deficiency in salvage value as determined by Working Interest Owners, incurred as of the first day of the month following the date of receipt of the transfer. Provided all Unit Expense, including any deficiency hereunder, due from the withdrawing owner has been paid in full within thirty (30) days after the rendering of such final statement by the Unit Operator, withdrawing owner shall be relieved from all further obligations and liabilities hereunder and under the Unit Agreement, and the rights of the withdrawing Working Interest Owner hereunder and under the Unit Agreement shall cease insofar as they existed by virtue of the interest transferred.

17.2 Limitation on Withdrawal. Notwithstanding anything set forth in Section 17.1, Working Interest Owners may refuse to permit the withdrawal of a Working Interest Owner if its Working Interest is burdened by any royalties, overriding royalties, production payments, net proceeds interest, carried interest, or any other interest created out of the Working Interest in excess of one-eighth (1/8) lessor's royalty, unless other Working Interest Owners willing to accept the assignment agree to accept the Working Interest subject to such burdens.

## ARTICLE 18
## ABANDONMENT OF WELLS

18.1 Rights of Former Owners. If Working Interest Owners decide to abandon permanently any well within the Unit Area prior to termination of the Unit Agreement, Unit Operator shall give written notice thereof to the Working Interest Owners of the Tract on which the well is located, and they shall have the option for a period of ninety (90) days after the sending of such notice to notify Unit Operator in writing of their election to take over and own the well. Within thirty (30) days after the Working Interest Owners of the Tract have notified Unit Operator of their election to take over the well, they shall pay Unit Operator, for credit to the joint account, the amount estimated by Working Interest Owners to be the net salvage value, as determined by Working Interest Owners, of the casing and equipment in and on the well up to and including the wellhead equipment, except the casing therein if contributed by such Working Interest Owners under Section 10.1.1. The Working Interest Owners of the Tract, by taking

over the well, agree to seal off effectively and protect the Unitized Formation, and upon abandonment to plug the well in compliance with applicable laws and regulations.

18.2 Plugging. If the Working Interest Owners of a Tract do not elect to take over a well located within the Unit Area that is proposed for abandonment, Unit Operator shall at Unit Expense plug and abandon the well in compliance with applicable laws and regulations.

## ARTICLE 19
## EFFECTIVE DATE AND TERM

19.1 Effective Date. This agreement shall become effective when the Unit Agreement becomes effective.

19.2 Term. This agreement shall continue in effect so long as the Unit Agreement remains in effect, and thereafter until (a) all unit wells have been plugged and abandoned or turned over to Working Interest Owners in accordance with Article 20, (b) all Unit Equipment and real property acquired for the joint account have been disposed of by Unit Operator in accordance with instructions of Working Interest Owners, and (c) there has been a final accounting.

## ARTICLE 20
## ABANDONMENT OF OPERATIONS

20.1 Termination. Upon termination of the Unit Agreement, the following will occur:

20.1.1 Oil and Gas Rights. Oil and Gas Rights in and to each separate Tract shall no longer be affected by this agreement, and thereafter the parties shall be governed by the terms and provisions of the leases, contracts, and other instruments affecting the separate Tracts.

20.1.2 Right to Operate. Working Interest Owners of any Tract that desire to take over and continue to operate wells located thereon may do so by paying Unit Operator, for credit to the joint account, the amount estimated by Working Interest Owners to be the net salvage value, as determined by Working Interest Owners, of the casing and equipment up to and including the wellhead equipment in and on the wells taken over, except the casing therein if contributed by such Working Interest Owners under Section 10.1.1, and by agreeing to plug properly each well at such time as it is abandoned.

20.1.3 Salvaging Wells: Unit Operator shall salvage as much of the casing and equipment in or on wells not taken over by Working

Interest Owners of separate Tracts as can economically and reasonably be salvaged, and shall cause the wells to be plugged and abandoned in compliance with applicable laws and regulations.

20.1.4 Cost of Abandonment. The cost of abandonment of Unit Operations shall be Unit Expense.

20.1.5 Distribution of Assets. Working Interest Owners shall share in the distribution of Unit Equipment, or the proceeds thereof, in the same proportion as then applicable to the sharing of investment costs.

## ARTICLE 21
## EXECUTION

21.1 Original, Counterpart, or Other Instrument. An owner of a Working Interest may become a party to this agreement by signing the original of this instrument, a counterpart thereof, or other instrument agreeing to be bound by the provisions hereof. The signing of any such instrument shall have the same effect as if all the parties had signed the same instrument.

## ARTICLE 22
## SUCCESSORS AND ASSIGNS

22.1 Successors and Assigns. This agreement shall extend to, be binding upon, and inure to the benefit of the parties hereto and their respective heirs, devisees, legal representatives, successors, and assigns, and shall constitute a covenant running with the lands, leases, and interests covered hereby.

IN WITNESS WHEREOF, the parties hereto have executed this agreement on the dates opposite their respective signatures.

SHELL OIL COMPANY
Unit Operator and Working Interest Owner

Date: July 31, 1978

By: Robert L. Avary
Attorney in Fact
ROBERT L. AVARY
P. O. Box 991
Houston, Texas 77001

STATE OF TEXAS )
)
COUNTY OF HARRIS )

The foregoing instrument was acknowledged before me this 31st day of July, 1978, by ROBERT I. AVARY, Attorney in Fact for SHELL OIL COMPANY, a Delaware corporation, on behalf of said corporation.

My Commission expires:

BELINDA ROEBER
Notary Public in and for Harris County, Texas
My Commission Expires July 21, 1979

Belinda Roeber
Notary Public in and for
Harris County, Texas

EXHIBIT E
ATTACHED TO UNIT OPERATING AGREEMENT
NORTH HOBBS (GRAYBURG-SAN ANDRES) UNIT
LEA COUNTY, NEW MEXICO

UNIT PARTICIPATION AND INVESTMENT PARTICIPATION

| Tract No. | Working Interest Owner | Working Interest In Tract | Unit Participation (By Tracts) Phase I | Phase II | Phase III | Investment Participation* (By Tracts) |
|---|---|---|---|---|---|---|
| 1 | Getty Oil Company | 100.00000 | 0.04166 | 0.03449 | 0.13978 | 0.07871 |
| 2 | Amerada Hess Corporation | 100.00000 | 0.04372 | 0.03496 | 0.20696 | 0.10720 |
| 3 | Gulf Oil Corporation | 100.00000 | 0.03122 | 0.02643 | 0.08361 | 0.05045 |
| 4 | Texas Pacific Oil Co., Inc. | 100.00000 | 0.11473 | 0.10166 | 0.29162 | 0.18144 |
| 5 | Ada A. Anderson | 11.71875 | 0.00629 | 0.00396 | 0.02317 | 0.01203 |
| | W. D. Anderson & Sons | 23.43750 | 0.01257 | 0.00793 | 0.04633 | 0.02405 |
| | Ada A. Anderson, Paul Donald Anderson & Payton V. Anderson, Executors of the Estate of Warren D. Anderson | 11.71875 | 0.00629 | 0.00396 | 0.02317 | 0.01203 |
| | J. M. Armstrong | 23.43750 | 0.01257 | 0.00793 | 0.04633 | 0.02406 |
| | Russell G. Estes d/b/a Estes Engineering Co. | 6.25000 | 0.00335 | 0.00211 | 0.01236 | 0.00641 |
| | W. A. Yeager | 23.43750 | 0.01257 | 0.00793 | 0.04633 | 0.02406 |
| | | 100.00000 | 0.05364 | 0.03382 | 0.19769 | 0.10264 |
| 6 | Continental Oil Company | 100.00000 | 0.05157 | 0.03087 | 1.35192 | 0.58571 |
| 7 | Shell Oil Company | 100.00000 | 0.33855 | 0.28554 | 2.37454 | 1.16292 |
| 8 | Amerada Hess Corporation | 100.00000 | 0.00000 | 0.00000 | 2.11560 | 0.88855 |

EXHIBIT E (CONT'D)

| Tract No. | Working Interest Owner | Working Interest Tract | Unit Participation (By Tracts) Phase I | Phase II | Phase III | Investment Participation* (By Tracts) |
|---|---|---|---|---|---|---|
| 9 | Gulf Oil Corporation | 100.00000 | 0.26552 | 0.20781 | 1.29435 | 0.66416 |
| 10A | Howell Spear | 1.17190 | 0.00049 | 0.00042 | 0.00042 | 0.00043 |
| | Ellie Sims Spear | 1.17190 | 0.00049 | 0.00042 | 0.00042 | 0.00043 |
| | J. N. Dunlavey | 4.68750 | 0.00194 | 0.00171 | 0.00168 | 0.00169 |
| | First Roswell Company | 9.37500 | 0.00388 | 0.00341 | 0.00335 | 0.00339 |
| | Getty Oil Company | 25.00000 | 0.01034 | 0.00910 | 0.00894 | 0.00903 |
| | George P. Laflin | 4.68750 | 0.00194 | 0.00171 | 0.00168 | 0.00169 |
| | Kenneth D. McPeters | 7.03130 | 0.00291 | 0.00256 | 0.00251 | 0.00254 |
| | Robert Martin Moran | 28.12490 | 0.01164 | 0.01024 | 0.01005 | 0.01016 |
| | Moranco | 9.37500 | 0.00388 | 0.00341 | 0.00335 | 0.00339 |
| | Loyd Whitley | 4.68750 | 0.00194 | 0.00171 | 0.00168 | 0.00169 |
| | A. T. Williamson | 4.68750 | 0.00194 | 0.00171 | 0.00168 | 0.00169 |
| | | 100.00000 | 0.04139 | 0.03640 | 0.03576 | 0.03613 |
| 10B | Getty Oil Company | 100.00000 | 0.00000 | 0.00000 | 0.00504 | 0.00212 |
| 11 | Chevron U.S.A., Inc. | 100.00000 | 0.00000 | 0.00000 | 0.07277 | 0.03056 |
| 12 | Getty Oil Company | 100.00000 | 0.02525 | 0.02093 | 0.10735 | 0.05723 |
| 13 | Del-Lea, Inc. | 100.00000 | 0.08746 | 0.08048 | 0.03529 | 0.06150 |
| 14 | Kenneth Noel Headley | 12.50000 | 0.02166 | 0.02216 | 0.00227 | 0.01381 |
| | Two States Oil Company | 37.50000 | 0.06498 | 0.06649 | 0.00682 | 0.04143 |
| | The Wiser Oil Company | 50.00000 | 0.08663 | 0.08865 | 0.00910 | 0.05523 |
| | | 100.00000 | 0.17327 | 0.17730 | 0.01819 | 0.11047 |
| 15 | Mary Daniel Conrad | 6.25000 | 0.02408 | 0.02508 | 0.00196 | 0.01537 |
| | Herman R. Crile, Sr., Trustee of Herman R. Crile, Sr. | 9.37500 | 0.03613 | 0.03762 | 0.00294 | 0.02305 |
| | Kenneth Noel Headley | 9.37500 | 0.03612 | 0.03761 | 0.00294 | 0.02306 |
| | Peter Hurd | 6.25000 | 0.02408 | 0.02508 | 0.00196 | 0.01537 |
| | Ruby Wanda Conrad Judson | 1.25000 | 0.00482 | 0.00502 | 0.00039 | 0.00307 |
| | Kathryn Louise Conrad McCarthy | 1.25000 | 0.00482 | 0.00502 | 0.00039 | 0.00307 |
| | Nathlyn Ione Conrad Murdoch | 1.25000 | 0.00482 | 0.00502 | 0.00039 | 0.00307 |

EXHIBIT E (CONT'D)

| Tract No. | Working Interest Owner | Working Interest In Tract | Unit Participation (By Tracts) Phase I | Phase II | Phase III | Investment Participation* (By Tracts) |
|---|---|---|---|---|---|---|
| 15 | Frances I. Conrad Rose | 1.25000 | 0.00482 | 0.00502 | 0.00039 | 0.00307 |
| | Bettye Conrad Treadaway | 1.25000 | 0.00482 | 0.00502 | 0.00039 | 0.00307 |
| | The Wiser Oil Company | 50.00000 | 0.19267 | 0.20062 | 0.01567 | 0.12295 |
| | Dr. Henry Yeager, Jr., in care of Trust Oil Department Trust Services, First National Bank in Dallas | 4.06746 | 0.01567 | 0.01632 | 0.00127 | 0.01000 |
| | Ruth Anne Yeager | 3.02580 | 0.01166 | 0.01214 | 0.00095 | 0.00744 |
| | Ruth Peeler Yeager, Henry Yeager, Jr., & First National Bank in Dallas, Joint Trustees of Ruth Anne Yeager Trust No. 2 | 1.04167 | 0.00401 | 0.00418 | 0.00033 | 0.00256 |
| | Mrs. Ruth Peeler Yeager in care of Trust Oil Department Trust Services, First National Bank in Dallas | 4.36507 | 0.01682 | 0.01751 | 0.00137 | 0.01074 |
| | | 100.00000 | 0.38534 | 0.40126 | 0.03134 | 0.24589 |
| 16 | Gulf Oil Corporation | 100.00000 | 0.17539 | 0.16097 | 0.17130 | 0.16531 |
| 17 | First National Bank of Lea County, Trustee for the Cecil H. Sweet and Imo Emmetta Sweet Trust | 100.00000 | 0.02662 | 0.02300 | 0.13047 | 0.06814 |
| 18 | Getty Oil Company | 100.00000 | 0.00853 | 0.00013 | 0.19617 | 0.08247 |
| 19 | Chevron U.S.A., Inc. | 100.00000 | 0.46388 | 0.44274 | 0.39268 | 0.42171 |
| 20 | First National Bank of Lea County, Trustee Cecil H. Sweet and Imo Emmetta Sweet Trust | 100.00000 | 0.00082 | 0.00000 | 0.04338 | 0.01822 |
| 21 | Bill Sweet | 100.00000 | 0.02651 | 0.02300 | 0.08569 | 0.04933 |

EXHIBIT E (CONT'D)

| Tract No. | Working Interest Owner | Working Interest In Tract | Unit Participation (By Tracts) Phase I | Phase II | Phase III | Investment Participation* (By Tracts) |
|---|---|---|---|---|---|---|
| 22 | Bill Sweet | 100.00000 | 0.00000 | 0.00000 | 0.09207 | 0.03867 |
| 23 | Atlantic Richfield Company | 100.00000 | 0.06415 | 0.05085 | 0.13035 | 0.08424 |
| 24 | Shell Oil Company | 100.00000 | 2.13208 | 2.18100 | 0.93009 | 1.65562 |
| 25 | Getty Oil Company | 100.00000 | 0.38428 | 0.34282 | 1.37055 | 0.77447 |
| 26 | Cities Service Company | 100.00000 | 0.73038 | 0.65783 | 2.93591 | 1.61462 |
| 27 | Shell Oil Company | 100.00000 | 4.99981 | 4.72987 | 3.68081 | 4.28926 |
| 28 | Gulf Oil Corporation | 100.00000 | 1.55912 | 1.44073 | 2.98865 | 2.09086 |
| 29 | Shell Oil Company | 100.00000 | 0.71513 | 0.61650 | 1.11779 | 0.82704 |
| 30 | Amerada Hess Corporation | 50.00000 | 0.16818 | 0.16350 | 0.35760 | 0.24504 |
| | Getty Oil Company | 50.00000 | 0.16818 | 0.16349 | 0.35766 | 0.24505 |
| | | 100.00000 | 0.33636 | 0.32699 | 0.71532 | 0.49009 |
| 31 | Texas Pacific Oil Company, Inc. | 100.00000 | 4.47471 | 4.52936 | 2.18451 | 3.54452 |
| 32 | Samedan Oil Corporation | 37.80000 | 1.20719 | 1.12526 | 0.52622 | 0.87367 |
| | First National Bank of Casper, Trustee, Tate Trusts | 3.75000 | 0.11976 | 0.11163 | 0.05221 | 0.08667 |
| | The First National Bank of Fort Worth, Agent for William S. Spradling | 0.62500 | 0.01996 | 0.01861 | 0.00870 | 0.01445 |
| | The First National Bank of Fort Worth, Trustee for Verda Spradling, Account No. 3211 | 0.62500 | 0.01996 | 0.01861 | 0.00870 | 0.01445 |
| | C. C. Forbes | 1.90000 | 0.06068 | 0.05656 | 0.02645 | 0.04391 |
| | Ilamae Forbes | 1.85000 | 0.05908 | 0.05507 | 0.02575 | 0.04276 |

EXHIBIT E (CONT'D)

| Tract No. | Working Interest Owner | Working Interest In Tract | Unit Participation (By Tracts) Phase I | Phase II | Phase III | Investment Participation* (By Tracts) |
|---|---|---|---|---|---|---|
| 32 | Samuel Roberts Noble Foundation, Inc. | 28.75000 | 0.91817 | 0.85585 | 0.40024 | 0.66449 |
| | G. D. Morris | 1.25000 | 0.03992 | 0.03721 | 0.01740 | 0.02889 |
| | Richard L. Noble | 15.20000 | 0.48543 | 0.45249 | 0.21160 | 0.35132 |
| | Portales National Bank | 1.87500 | 0.05988 | 0.05582 | 0.02610 | 0.04334 |
| | John Roring | 3.75000 | 0.11976 | 0.11163 | 0.05221 | 0.08667 |
| | SEA Properties, Ltd. | 0.75000 | 0.02396 | 0.02233 | 0.01044 | 0.01733 |
| | E. C. Sullivan | 1.87500 | 0.05988 | 0.05582 | 0.02610 | 0.04334 |
| | | 100.00000 | 3.19363 | 2.97689 | 1.39212 | 2.31129 |
| 33A | First National Bank of Lea County, Trustee for Cecil H. Sweet and Imo Sweet Trust | 100.00000 | 0.14618 | 0.13607 | 0.45033 | 0.26806 |
| 33B | First National Bank of Lea County, Trustee for Cecil H. Sweet and Imo Sweet Trust | 100.00000 | 0.09081 | 0.08239 | 0.16981 | 0.11911 |
| 34 | Shell Oil Company | 100.00000 | 0.02065 | 0.00990 | 0.23908 | 0.10616 |
| 35 | Texas Pacific Oil Company, Inc. | 100.00000 | 0.09228 | 0.07279 | 0.34319 | 0.18636 |
| 36 | C&C Operating Corporation | 100.00000 | 0.01133 | 0.00688 | 0.03147 | 0.01721 |
| 37 | Abo Petroleum Corporation | 52.50000 | 0.06818 | 0.05615 | 0.20376 | 0.11815 |
| | Ward Investment Corporation | 10.00000 | 0.01299 | 0.01069 | 0.03881 | 0.02250 |
| | Yates Petroleum Corporation | 25.00000 | 0.03246 | 0.02674 | 0.09703 | 0.05626 |
| | S. P. Yates | 12.50000 | 0.01623 | 0.01337 | 0.04851 | 0.02813 |
| | | 100.00000 | 0.12986 | 0.10695 | 0.38811 | 0.22504 |
| 38 | The Wiser Oil Company | 100.00000 | 0.00209 | 0.00000 | 0.08529 | 0.03582 |
| 39 | Getty Oil Company | 100.00000 | 0.03247 | 0.02415 | 0.17221 | 0.08633 |
| 40 | Continental Oil Company | 100.00000 | 0.29448 | 0.32197 | 0.44016 | 0.37161 |
| 41 | Samedan Oil Corporation | 100.00000 | 0.07122 | 0.06099 | 0.26713 | 0.14757 |

EXHIBIT E (CONT'D)

| Tract No. | Working Interest Owner | Working Interest In Tract | Unit Participation (By Tracts) Phase I | Phase II | Phase III | Investment Participation* (By Tracts) |
|---|---|---|---|---|---|---|
| 42 | Texaco, Inc. | 100.00000 | 3.15134 | 3.09110 | 1.16515 | 2.28220 |
| 43 | Exxon Corporation | 100.00000 | 0.66554 | 0.49553 | 0.98320 | 0.70035 |
| 44 | Amerada Hess Corporation | 100.00000 | 3.36952 | 3.41061 | 1.86735 | 2.76244 |
| 45 | Getty Oil Company | 100.00000 | 3.64803 | 3.75614 | 2.83485 | 3.36899 |
| 46 | Marathon Oil Company | 100.00000 | 1.83355 | 1.86777 | 1.98935 | 1.91883 |
| 47 | Exxon Corporation | 100.00000 | 3.37645 | 3.25911 | 6.10957 | 4.45630 |
| 48 | Exxon Corporation | 100.00000 | 0.59298 | 0.59347 | 0.42645 | 0.52332 |
| 49 | Amerada Hess Corporation | 100.00000 | 1.37425 | 1.32399 | 1.40956 | 1.35993 |
| 50 | Exxon Corporation | 75.00000 | 0.07896 | 0.07199 | 0.17944 | 0.11711 |
| | Cities Service Company | 25.00000 | 0.02632 | 0.02399 | 0.05981 | 0.03904 |
| | | 100.00000 | 0.10528 | 0.09598 | 0.23925 | 0.15615 |
| 51 | Continental Oil Company | 100.00000 | 2.01126 | 2.10178 | 2.84880 | 2.41553 |
| 52 | Getty Oil Company | 100.00000 | 0.87710 | 0.86847 | 1.23597 | 1.02282 |
| 53 | Chevron U.S.A., Inc. | 100.00000 | 2.75083 | 2.95624 | 2.50776 | 2.76788 |
| 54 | Atlantic Richfield Company | 100.00000 | 2.07685 | 2.28579 | 1.09210 | 1.78444 |
| 55 | John P. Cusack, Jr. | 25.00000 | 0.56276 | 0.60802 | 0.06241 | 0.37886 |
| | Michael F. Cusack | 25.00000 | 0.56276 | 0.60802 | 0.06241 | 0.37886 |
| | Samedan Oil Corporation | 48.50000 | 1.09176 | 1.17956 | 0.12107 | 0.73500 |
| | SEA Properties, Ltd. | 1.50000 | 0.03377 | 0.03648 | 0.00374 | 0.02273 |
| | | 100.00000 | 2.25105 | 2.43208 | 0.24963 | 1.51545 |

EXHIBIT E (CONT'D)

| Tract No. | Working Interest Owner | Working Interest In Tract | Unit Participation (By Tracts) Phase I | Phase II | Phase III | Investment Participation* (By Tracts) |
|---|---|---|---|---|---|---|
| 56 | John P. Cusack, Jr. | 25.00000 | 0.57333 | 0.63029 | 0.02671 | 0.37679 |
| | Michael F. Cusack | 25.00000 | 0.57333 | 0.63029 | 0.02671 | 0.37678 |
| | Samedan Oil Corporation | 48.50000 | 1.11227 | 1.22276 | 0.05182 | 0.73096 |
| | SEA Properties, Ltd. | 1.50000 | 0.03440 | 0.03781 | 0.00161 | 0.02261 |
| | | 100.00000 | 2.29333 | 2.52115 | 0.10685 | 1.50714 |
| 57 | Shell Oil Company | 100.00000 | 2.91562 | 2.97071 | 3.07756 | 3.01559 |
| 58 | Continental Oil Company | 100.00000 | 4.16481 | 4.73239 | 1.68555 | 3.45272 |
| 59 | Shell Oil Company | 100.00000 | 6.45317 | 6.70337 | 0.33242 | 4.02757 |
| 60A | Del-Lea, Inc. | 16.40625 | 0.00000 | 0.00000 | 0.00003 | 0.00001 |
| | M. Ralph Lowe, Inc. | 21.87500 | 0.00000 | 0.00000 | 0.00005 | 0.00002 |
| | Kenneth D. McPeters | 4.09500 | 0.00000 | 0.00000 | 0.00001 | 0.00001 |
| | Robert Martin Moran | 16.40625 | 0.00000 | 0.00000 | 0.00004 | 0.00001 |
| | Moranco | 20.51000 | 0.00000 | 0.00000 | 0.00004 | 0.00002 |
| | Linda B. Parrish and Linda Ann Parrish Richardson, Co-Trustees under the will of M. C. Parrish, Jr. | 8.20750 | 0.00000 | 0.00000 | 0.00002 | 0.00001 |
| | Marshall & Winston, Inc. | 12.50000 | 0.00000 | 0.00000 | 0.00003 | 0.00001 |
| | | 100.00000 | 0.00000 | 0.00000 | 0.00022 | 0.00009 |
| 60B | Del-Lea, Inc. | 18.75000 | 0.02346 | 0.02005 | 0.00119 | 0.01213 |
| | M. Ralph Lowe, Inc. | 25.00000 | 0.03128 | 0.02674 | 0.00159 | 0.01617 |
| | Kenneth D. McPeters | 4.68 00 | 0.00585 | 0.00501 | 0.00030 | 0.00303 |
| | Robert Martin Moran | 18.75000 | 0.02346 | 0.02005 | 0.00119 | 0.01213 |
| | Moranco | 23.44000 | 0.02933 | 0.02507 | 0.00149 | 0.01517 |
| | Linda B. Parrish and Linda Ann Parrish Richardson, Co-Trustees under the will of M. C. Parrish, Jr. | 9.38000 | 0.01173 | 0.01003 | 0.00060 | 0.00607 |
| | | 100.00000 | 0.12511 | 0.10695 | 0.00636 | 0.06470 |

EXHIBIT E (CONT'D)

| Tract No. | Working Interest Owner | Working Interest In Tract | Unit Participation (By Tracts) Phase I | Phase II | Phase III | Investment Participation* (By Tracts) |
|---|---|---|---|---|---|---|
| 61A | Shell Oil Company | 100.00000 | 1.19303 | 1.22347 | 0.09076 | 0.74773 |
| 61B | Shell Oil Company | 100.00000 | 1.06871 | 1.06806 | 0.01963 | 0.62772 |
| 62 | Getty Oil Company | 100.00000 | 1.15101 | 1.17464 | 0.11411 | 0.72922 |
| 63 | Getty Oil Company | 100.00000 | 1.15287 | 1.17515 | 0.31108 | 0.81224 |
| 64 | Samedan Oil Corporation | 62.50000 | 0.21472 | 0.19532 | 0.00916 | 0.11713 |
| | Mary Frances Cusack | 18.75000 | 0.06441 | 0.05860 | 0.00275 | 0.03514 |
| | John Patrick Cusack, Jr., Trustee under the John Patrick Cusack Testamentary Trust | 4.68750 | 0.01610 | 0.01465 | 0.00069 | 0.00878 |
| | John Patrick Cusack, Jr. | 7.03125 | 0.02416 | 0.02197 | 0.00103 | 0.01318 |
| | Michael F. Cusack | 7.03125 | 0.02416 | 0.02197 | 0.00103 | 0.01318 |
| | | 100.00000 | 0.34355 | 0.31251 | 0.01466 | 0.18741 |
| 65 | Samedan Oil Corporation | 62.50000 | 0.23603 | 0.23150 | 0.01038 | 0.13863 |
| | Mary Frances Cusack | 18.75000 | 0.07081 | 0.06945 | 0.00311 | 0.04159 |
| | John Patrick Cusack, Jr., Trustee under the John Patrick Cusack Testamentary Trust | 4.68750 | 0.01770 | 0.01736 | 0.00078 | 0.01039 |
| | John Patrick Cusack, Jr. | 7.03125 | 0.02655 | 0.02605 | 0.00117 | 0.01560 |
| | Michael F. Cusack | 7.03125 | 0.02655 | 0.02604 | 0.00117 | 0.01560 |
| | | 100.00000 | 0.37764 | 0.37040 | 0.01661 | 0.22181 |
| 66 | Samedan Oil Corporation | 87.89100 | 2.00419 | 2.17591 | 0.33331 | 1.40202 |
| | Hattie C. Williams | 5.85900 | 0.13360 | 0.14505 | 0.02222 | 0.09346 |
| | Cities Service Company | 6.25000 | 0.14252 | 0.15473 | 0.02370 | 0.09970 |
| | | 100.00000 | 2.28031 | 2.47569 | 0.37923 | 1.59518 |
| 67 | Gulf Oil Corporation | 100.00000 | 2.17917 | 2.11608 | 3.40765 | 2.65854 |
| | Shell Oil Company | 100.00000 | 0.96616 | 0.84228 | 2.48452 | 1.53202 |

EXHIBIT E (CONT'D)

| Tract No. | Working Interest Owner | Working Interest In Tract | Unit Participation (By Tracts) Phase I | Phase II | Phase III | Investment Participation* (By Tracts) |
|---|---|---|---|---|---|---|
| 69 | Amoco Production Company | 75.43501 | 1.38898 | 1.35806 | 1.87841 | 1.57661 |
| | Landreth Interests | 24.56499 | 0.45231 | 0.44224 | 0.61170 | 0.51341 |
| | | 100.00000 | 1.84129 | 1.80030 | 2.49011 | 2.09002 |
| 70 | Continental Oil Company | 100.00000 | 4.69790 | 4.50257 | 7.98097 | 5.96350 |
| 71 | Amerada Hess Corporation | 100.00000 | 1.47100 | 1.45514 | 2.04430 | 1.70259 |
| 72 | Shell Oil Company | 100.00000 | 0.91041 | 0.83110 | 2.56349 | 1.55870 |
| 73 | Gulf Oil Corporation | 100.00000 | 2.09767 | 1.86731 | 3.47646 | 2.54315 |
| 74 | Gulf Oil Corporation | 100.00000 | 3.40184 | 3.62040 | 3.75733 | 3.67791 |
| 75A | Marathon Oil Company | 50.00000 | 0.32452 | 0.37746 | 1.04791 | 0.65905 |
| | Atlantic Richfield Company | 50.00000 | 0.32451 | 0.37746 | 1.04792 | 0.65905 |
| | | 100.00000 | 0.64903 | 0.75492 | 2.09583 | 1.31810 |
| 75B | Marathon Oil Company | 50.00000 | 0.47836 | 0.47356 | 1.00267 | 0.69578 |
| | Atlantic Richfield Company | 50.00000 | 0.47837 | 0.47356 | 1.00266 | 0.69579 |
| | | 100.00000 | 0.95673 | 0.94712 | 2.00533 | 1.39157 |
| 76 | Cities Service Company | 100.00000 | 2.34959 | 2.36589 | 2.52494 | 2.43269 |
| 77 | Getty Oil Company | 100.00000 | 1.22093 | 1.17282 | 0.70944 | 0.97820 |
| 78 | Sun Oil Company | 100.00000 | 0.22719 | 0.19658 | 0.43429 | 0.29642 |
| 79 | Shell Oil Company | 100.00000 | 2.40938 | 2.30652 | 1.96469 | 2.16295 |
| 80 | Mobil Oil Corporation | 100.00000 | 0.92642 | 0.82805 | 0.67264 | 0.76278 |
| 81 | Amerada Hess Corporation | 100.00000 | 0.14029 | 0.11442 | 0.60098 | 0.31878 |

EXHIBIT E (CONT'D)

| Tract No. | Working Interest Owner | Working Interest In Tract | Unit Participation (By Tracts) Phase I | Phase II | Phase III | Investment Participation* (By Tracts) |
|---|---|---|---|---|---|---|
| 82 | W. K. Byrom | 62.50000 | 0.07232 | 0.06827 | 0.07468 | 0.07096 |
| | Robert G. McPherson | 37.50000 | 0.04340 | 0.04096 | 0.04481 | 0.04258 |
| | | 100.00000 | 0.11572 | 0.10923 | 0.11949 | 0.11354 |
| 83 | Gulf Oil Corporation | 100.00000 | 0.00000 | 0.00000 | 0.04756 | 0.01998 |
| | | | 100.00000 | 100.00000 | 100.00000 | 100.00000 |

EXHIBIT E (CONT'D) SUMMARY

| Working Interest Owner | Tract Nos. | Unit Participation Phase I | Phase II | Phase III | Investment Participation* |
|---|---|---|---|---|---|
| Abo Petroleum Corporation | 37 | 0.06818 | 0.05615 | 0.20376 | 0.11815 |
| Amerada Hess Corporation | 2 | 0.04372 | 0.03496 | 0.20696 | 0.10720 |
| | 8 | 0.00000 | 0.00000 | 2.11560 | 0.99855 |
| | 30 | 0.16813 | 0.16350 | 0.35766 | 0.24504 |
| | 44 | 3.36952 | 3.41061 | 1.86735 | 2.76244 |
| | 49 | 1.37425 | 1.32399 | 1.40956 | 1.35993 |
| | 71 | 1.47100 | 1.45514 | 2.04430 | 1.70259 |
| | 81 | 0.14029 | 0.11442 | 0.60098 | 0.31878 |
| | | 6.56696 | 6.50262 | 8.60241 | 7.38453 |
| Amoco Production Company | 69 | 1.38898 | 1.35806 | 1.87841 | 1.57661 |
| Ada A. Anderson | 5 | 0.00629 | 0.00396 | 0.02317 | 0.01203 |
| Ada A. Anderson, Paul Donald Anderson & Payton V. Anderson, Executors of the Estate of Warren D. Anderson | 5 | 0.00629 | 0.00396 | 0.02317 | 0.01203 |
| W. D. Anderson & Sons | 5 | 0.01257 | 0.00793 | 0.04633 | 0.02405 |
| J. M. Armstrong | 5 | 0.01257 | 0.00793 | 0.04633 | 0.02406 |
| Atlantic Richfield Company | 23 | 0.06415 | 0.05085 | 0.13035 | 0.08424 |
| | 54 | 2.07685 | 2.28579 | 1.09210 | 1.78444 |
| | 75A | 0.32451 | 0.37746 | 1.04792 | 0.65905 |
| | 75B | 0.47837 | 0.47356 | 1.00266 | 0.69579 |
| | | 2.94388 | 3.18766 | 3.27303 | 3.22352 |
| W. K. Byrom | 82 | 0.07232 | 0.06827 | 0.07468 | 0.07096 |
| C&C Operating Corporation | 36 | 0.01133 | 0.00688 | 0.03147 | 0.01721 |

EXHIBIT B (CONT'D)

| Working Interest Owner | Tract Nos. | Unit Participation Phase I | Phase II | Phase III | Investment Participation* |
|---|---|---|---|---|---|
| Chevron U.S.A., Inc. | 11 | 0.00000 | 0.00000 | 0.07277 | 0.03056 |
| | 19 | 0.46388 | 0.44274 | 0.39268 | 0.42171 |
| | 53 | 2.75083 | 2.95624 | 2.50776 | 2.76788 |
| | | 3.21471 | 3.39898 | 2.97321 | 3.22015 |
| Cities Service Company | 26 | 0.73038 | 0.65783 | 2.93591 | 1.61462 |
| | 50 | 0.02632 | 0.02399 | 0.05981 | 0.03904 |
| | 66 | 0.14252 | 0.15473 | 0.02370 | 0.09970 |
| | 76 | 2.34959 | 2.36589 | 2.52494 | 2.43269 |
| | | 3.24881 | 3.20244 | 5.54436 | 4.18605 |
| Mary Daniel Conrad | 15 | 0.02408 | 0.02508 | 0.00196 | 0.01537 |
| Continental Oil Company | 6 | 0.05157 | 0.03087 | 1.35192 | 0.58571 |
| | 40 | 0.29448 | 0.32197 | 0.44016 | 0.37161 |
| | 51 | 2.01126 | 2.10178 | 2.84880 | 2.41553 |
| | 58 | 4.16481 | 4.73239 | 1.68555 | 3.45272 |
| | 70 | 4.69790 | 4.50257 | 7.98097 | 5.96350 |
| | | 11.22002 | 11.68958 | 14.30740 | 12.78907 |
| Herman R. Crile, Sr., Trustee of Herman R. Crile, Sr. | 15 | 0.03613 | 0.03762 | 0.00294 | 0.02305 |
| John P. Cusack, Jr. | 55 | 0.56276 | 0.60802 | 0.06241 | 0.37886 |
| | 56 | 0.57333 | 0.63029 | 0.02671 | 0.37679 |
| | 64 | 0.02416 | 0.02197 | 0.00103 | 0.01318 |
| | 65 | 0.02655 | 0.02605 | 0.00117 | 0.01560 |
| | | 1.18680 | 1.28633 | 0.09132 | 0.78443 |
| John Patrick Cusack, Jr., Trustee under John Patrick Cusack Testamentary Trust | 64 | 0.01610 | 0.01465 | 0.00069 | 0.00878 |
| | 65 | 0.01770 | 0.01736 | 0.00078 | 0.01039 |
| | | 0.03380 | 0.03201 | 0.00147 | 0.01917 |

EXHIBIT E (CONT'D)

| Working Interest Owner | Tract Nos. | Unit Participation Phase I | Phase II | Phase III | Investment Participation* |
|---|---|---|---|---|---|
| Mary Frances Cusack | 64 | 0.06441 | 0.05860 | 0.00275 | 0.03514 |
| | 65 | 0.07081 | 0.06945 | 0.00311 | 0.04159 |
| | | 0.13522 | 0.12805 | 0.00586 | 0.07673 |
| Michael F. Cusack | 55 | 0.56276 | 0.60802 | 0.06241 | 0.37886 |
| | 56 | 0.57333 | 0.63029 | 0.02671 | 0.37678 |
| | 64 | 0.02416 | 0.02197 | 0.00103 | 0.01318 |
| | 65 | 0.02655 | 0.02604 | 0.00117 | 0.01560 |
| | | 1.18680 | 1.28632 | 0.09132 | 0.78442 |
| Del-Lea, Inc. | 13 | 0.08746 | 0.08048 | 0.03529 | 0.06150 |
| | 60A | 0.00000 | 0.00000 | 0.00003 | 0.00001 |
| | 60B | 0.02346 | 0.02005 | 0.00119 | 0.01213 |
| | | 0.11092 | 0.10053 | 0.03651 | 0.07364 |
| J. N. Dunlavey | 10A | 0.00194 | 0.00171 | 0.00168 | 0.00169 |
| Russell G. Estes d/b/a Estes Engineering Co. | 5 | 0.00335 | 0.00211 | 0.01236 | 0.00641 |
| Exxon Corporation | 43 | 0.66554 | 0.49553 | 0.98320 | 0.70035 |
| | 47 | 3.37645 | 3.25911 | 6.10957 | 4.45630 |
| | 48 | 0.59298 | 0.59347 | 0.42645 | 0.52332 |
| | 50 | 0.07896 | 0.07199 | 0.17944 | 0.11711 |
| | | 4.71393 | 4.42010 | 7.69866 | 5.79708 |
| First National Bank of Casper, Trustee, Tate Trusts | 32 | 0.11976 | 0.11163 | 0.05221 | 0.08667 |
| The First National Bank of Fort Worth, Agent for William S. Spradling | 32 | 0.01996 | 0.01861 | 0.00870 | 0.01445 |
| The First National Bank of Fort Worth, Trustee for Verda Spradling, Account No. 3211 | 32 | 0.01996 | 0.01861 | 0.00870 | 0.01445 |

EXHIBIT E (CONT'D)

| Working Interest Owner | Tract Nos. | Unit Participation Phase I | Phase II | Phase III | Investment Participation* |
|---|---|---|---|---|---|
| First National Bank of Lea County, Trustee for Cecil H. Sweet and Imo Sweet Trust | 17 | 0.02662 | 0.02300 | 0.13047 | 0.06814 |
| | 20 | 0.00082 | 0.00000 | 0.04338 | 0.01822 |
| | 33A | 0.14618 | 0.13607 | 0.45033 | 0.26806 |
| | 33B | 0.09081 | 0.08239 | 0.16981 | 0.11911 |
| | | 0.26443 | 0.24146 | 0.79399 | 0.47353 |
| First Roswell Company | 10A | 0.00388 | 0.00341 | 0.00335 | 0.00339 |
| C. C. Forbes | 32 | 0.06068 | 0.05656 | 0.02645 | 0.04391 |
| Ilamae Forbes | 32 | 0.05908 | 0.05507 | 0.02575 | 0.04276 |
| Getty Oil Company | 1 | 0.04166 | 0.03449 | 0.13978 | 0.07871 |
| | 10A | 0.01034 | 0.00910 | 0.00894 | 0.00903 |
| | 10B | 0.00000 | 0.00000 | 0.00504 | 0.00212 |
| | 12 | 0.02525 | 0.02093 | 0.10735 | 0.05723 |
| | 18 | 0.00853 | 0.00013 | 0.19617 | 0.08247 |
| | 25 | 0.38428 | 0.34282 | 1.37055 | 0.77447 |
| | 30 | 0.16818 | 0.16349 | 0.35766 | 0.24505 |
| | 39 | 0.03247 | 0.02415 | 0.17221 | 0.08633 |
| | 45 | 3.64803 | 3.75614 | 2.83435 | 3.36899 |
| | 52 | 0.87710 | 0.86847 | 1.23597 | 1.02282 |
| | 62 | 1.15101 | 1.17464 | 0.11411 | 0.72922 |
| | 63 | 1.15287 | 1.17515 | 0.31108 | 0.81224 |
| | 77 | 1.22093 | 1.17282 | 0.70944 | 0.97820 |
| | | 8.72065 | 8.74233 | 7.56265 | 8.24688 |
| Gulf Oil Corporation | 3 | 0.03122 | 0.02643 | 0.08361 | 0.05045 |
| | 9 | 0.26552 | 0.20781 | 1.29435 | 0.66416 |
| | 16 | 0.17539 | 0.16097 | 0.17130 | 0.16531 |
| | 28 | 1.55912 | 1.44073 | 2.98865 | 2.09086 |
| | 67 | 2.17917 | 2.11608 | 3.40765 | 2.65854 |
| | 73 | 2.09767 | 1.86731 | 3.47646 | 2.54315 |
| | 74 | 3.40184 | 3.62040 | 3.75733 | 3.67791 |
| | 83 | 0.00000 | 0.00000 | 0.04756 | 0.01998 |
| | | 9.70993 | 9.43973 | 15.22691 | 11.87036 |

EXHIBIT E (CONT'D)

| Working Interest Owner | Tract Nos. | Unit Participation Phase I | Phase II | Phase III | Investment Participation* |
|---|---|---|---|---|---|
| Kenneth Noel Headley | 14 | 0.02166 | 0.02216 | 0.00227 | 0.01381 |
| | 15 | 0.03612 | 0.03761 | 0.00294 | 0.02306 |
| | | 0.05778 | 0.05977 | 0.00521 | 0.03687 |
| Peter Hurd | 15 | 0.02408 | 0.02508 | 0.00196 | 0.01537 |
| Ruby Wanda Conrad Judson | 15 | 0.00482 | 0.00502 | 0.00039 | 0.00307 |
| Landreth Interests | 69 | 0.45231 | 0.44224 | 0.61170 | 0.51341 |
| George P. Laflin | 10A | 0.00194 | 0.00171 | 0.00168 | 0.00169 |
| M. Ralph Lowe, Inc. | 60A | 0.00000 | 0.00000 | 0.00005 | 0.00002 |
| | 60B | 0.03128 | 0.02674 | 0.00159 | 0.01617 |
| | | 0.03128 | 0.02674 | 0.00164 | 0.01619 |
| Marathon Oil Company | 46 | 1.83355 | 1.86777 | 1.98935 | 1.91883 |
| | 75A | 0.32452 | 0.37746 | 1.04791 | 0.65905 |
| | 75B | 0.47836 | 0.47356 | 1.00267 | 0.69578 |
| | | 2.63643 | 2.71879 | 4.03993 | 3.27366 |
| Marshall & Winston, Inc. | 60A | 0.00000 | 0.00000 | 0.00003 | 0.00001 |
| Kathryn Louise Conrad McCarthy | 15 | 0.00482 | 0.00502 | 0.00039 | 0.00307 |
| Kenneth D. McPeters | 10A | 0.00291 | 0.00256 | 0.00251 | 0.00254 |
| | 60A | 0.00000 | 0.00000 | 0.00001 | 0.00001 |
| | 60B | 0.00585 | 0.00501 | 0.00030 | 0.00303 |
| | | 0.00876 | 0.00757 | 0.00282 | 0.00558 |
| Robert G. McPherson | 82 | 0.04340 | 0.04096 | 0.04481 | 0.04258 |
| Mobil Oil Corporation | 80 | 0.92642 | 0.82805 | 0.67264 | 0.76278 |
| Moranco | 10A | 0.00388 | 0.00341 | 0.00335 | 0.00339 |
| | 60A | 0.00000 | 0.00000 | 0.00004 | 0.00002 |
| | 60B | 0.02933 | 0.02507 | 0.00149 | 0.01517 |
| | | 0.03321 | 0.02848 | 0.00488 | 0.01858 |

EXHIBIT E (CONT'D)

| Working Interest Owner | Tract Nos. | Unit Participation Phase I | Phase II | Phase III | Investment Participation* |
|---|---|---|---|---|---|
| Robert Martin Moran | 10A | 0.01164 | 0.01024 | 0.01005 | 0.01016 |
| | 60A | 0.00000 | 0.00000 | 0.00004 | 0.00001 |
| | 60B | 0.02346 | 0.02005 | 0.00119 | 0.01213 |
| | | 0.03510 | 0.03029 | 0.01128 | 0.02230 |
| G. D. Morris | 32 | 0.03992 | 0.03721 | 0.01740 | 0.02889 |
| Nathlyn Ione Conrad Murdoch | 15 | 0.00482 | 0.00502 | 0.00039 | 0.00307 |
| Richard L. Noble | 32 | 0.48543 | 0.45249 | 0.21160 | 0.35132 |
| Samuel Roberts Noble Foundation, Inc. | 32 | 0.91817 | 0.85585 | 0.40024 | 0.66449 |
| Linda B. Parrish and Linda Ann Parrish Richardson, Co-Trustees under the will of M. C. Parrish, Jr. | 60A | 0.00000 | 0.00000 | 0.00002 | 0.00001 |
| | 60B | 0.01173 | 0.01003 | 0.00060 | 0.00607 |
| | | 0.01173 | 0.01003 | 0.00062 | 0.00608 |
| Portales National Bank | 32 | 0.05988 | 0.05582 | 0.02610 | 0.04334 |
| John Roring | 32 | 0.11976 | 0.11163 | 0.05221 | 0.08667 |
| Frances I. Conrad Rose | 15 | 0.00482 | 0.00502 | 0.00039 | 0.00307 |
| Samedan Oil Corporation | 32 | 1.20719 | 1.12526 | 0.52622 | 0.87367 |
| | 41 | 0.07122 | 0.06099 | 0.26713 | 0.14757 |
| | 55 | 1.09176 | 1.17956 | 0.12107 | 0.73500 |
| | 56 | 1.11227 | 1.22276 | 0.05182 | 0.73096 |
| | 64 | 0.21472 | 0.19532 | 0.00916 | 0.11713 |
| | 65 | 0.23603 | 0.23150 | 0.01038 | 0.13863 |
| | 66 | 2.00419 | 2.17591 | 0.33331 | 1.40202 |
| | | 5.93738 | 6.19130 | 1.31909 | 4.14498 |
| SEA Properties, Ltd. | 32 | 0.02396 | 0.02233 | 0.01044 | 0.01733 |
| | 55 | 0.03377 | 0.03648 | 0.00374 | 0.02273 |
| | 56 | 0.03440 | 0.03781 | 0.00161 | 0.02261 |
| | | 0.09213 | 0.09662 | 0.01579 | 0.06267 |

EXHIBIT E (CONT'D)

| Working Interest Owner | Tract Nos. | Unit Participation Phase I | Phase II | Phase III | Investment Participation* |
|---|---|---|---|---|---|
| Shell Oil Company | 7 | 0.33855 | 0.28554 | 2.37454 | 1.16292 |
| | 24 | 2.13208 | 2.18100 | 0.93009 | 1.65562 |
| | 27 | 4.99981 | 4.72987 | 3.68081 | 4.28926 |
| | 29 | 0.71513 | 0.61650 | 1.11779 | 0.82704 |
| | 34 | 0.02065 | 0.00990 | 0.23908 | 0.10616 |
| | 57 | 2.91562 | 2.97071 | 3.07756 | 3.01559 |
| | 59 | 6.45317 | 6.70337 | 0.33242 | 4.02757 |
| | 61A | 1.19303 | 1.22347 | 0.09076 | 0.74773 |
| | 61B | 1.06871 | 1.06806 | 0.01963 | 0.62772 |
| | 68 | 0.96616 | 0.84228 | 2.48452 | 1.53202 |
| | 72 | 0.91041 | 0.83110 | 2.56349 | 1.55870 |
| | 79 | 2.40938 | 2.30652 | 1.96469 | 2.16295 |
| | | 24.12270 | 23.76832 | 18.87538 | 21.71328 |
| Howell Spear | 10A | 0.00049 | 0.00042 | 0.00042 | 0.00043 |
| Ellie Sims Spear | 10A | 0.00049 | 0.00042 | 0.00042 | 0.00043 |
| E. C. Sullivan | 32 | 0.05988 | 0.05582 | 0.02610 | 0.04334 |
| Sun Oil Company | 78 | 0.22719 | 0.19658 | 0.43429 | 0.29642 |
| Bill Sweet | 21 | 0.02651 | 0.02300 | 0.08569 | 0.04933 |
| | 22 | 0.00000 | 0.00000 | 0.09207 | 0.03867 |
| | | 0.02651 | 0.02300 | 0.17776 | 0.08800 |
| Texaco, Inc. | 42 | 3.15134 | 3.09110 | 1.16515 | 2.28220 |
| Texas Pacific Oil Company, Inc. | 4 | 0.11473 | 0.10166 | 0.29162 | 0.18144 |
| | 31 | 4.47471 | 4.52936 | 2.18451 | 3.54452 |
| | 35 | 0.09228 | 0.07279 | 0.34319 | 0.18636 |
| | | 4.68172 | 4.70381 | 2.81932 | 3.91232 |

EXHIBIT E (CONT'D)

| Working Interest Owner | Tract Nos. | Unit Participation Phase I | Phase II | Phase III | Investment Participation* |
|---|---|---|---|---|---|
| Bettye Conrad Treadaway | 15 | 0.00482 | 0.00502 | 0.00039 | 0.00307 |
| Two States Oil Company | 14 | 0.06498 | 0.06649 | 0.00682 | 0.04143 |
| Ward Investment Corporation | 37 | 0.01299 | 0.01069 | 0.03881 | 0.02250 |
| Loyd Whitley | 10A | 0.00194 | 0.00171 | 0.00168 | 0.00169 |
| Hattie C. Williams | 66 | 0.13360 | 0.14505 | 0.02222 | 0.09346 |
| A. T. Williamson | 10A | 0.00194 | 0.00171 | 0.00168 | 0.00169 |
| The Wiser Oil Company | 14 | 0.08663 | 0.08865 | 0.00910 | 0.05523 |
| | 15 | 0.19267 | 0.20062 | 0.01567 | 0.12295 |
| | 38 | 0.00209 | 0.00000 | 0.08529 | 0.03582 |
| | | 0.28139 | 0.28927 | 0.11006 | 0.21400 |
| Yates Petroleum Corporation | 37 | 0.03246 | 0.02674 | 0.09703 | 0.05626 |
| S. P. Yates | 37 | 0.01623 | 0.01337 | 0.04851 | 0.02813 |
| Dr. Henry Yeager, Jr. in care of Trust Oil Department Trust Services, First National Bank in Dallas | 15 | 0.01567 | 0.01632 | 0.00127 | 0.01000 |
| Ruth Anne Yeager | 15 | 0.01166 | 0.01214 | 0.00095 | 0.00744 |
| Ruth Peeler Yeager, Henry Yeager, Jr., & First National Bank in Dallas, Joint Trustees of Ruth Anne Yeager Trust No. 2 | 15 | 0.00401 | 0.00418 | 0.00033 | 0.00256 |

EXHIBIT E (CONT'D)

| Working Interest Owner | Tract No. | Unit Participation Phase I | Unit Participation Phase II | Unit Participation Phase III | Investment Participation* |
|---|---|---|---|---|---|
| Mrs. Ruth Peeler Yeager in care of Trust Oil Department Trust Services, First National Bank in Dallas | 15 | 0.01682 | 0.01751 | 0.00137 | 0.01074 |
| W. A. Yeager | 5 | 0.01257 | 0.00793 | 0.04633 | 0.02406 |
| | | 100.00000 | 100.00000 | 100.00000 | 100.00000 |

* Applicable only to investment costs incurred prior to the Investment Readjustment Date

EXHIBIT F

Attached to and made a part of UNIT OPERATING AGREEMENT
North Hobbs (Grayburg-San Andres) Unit
Lea County, New Mexico

# ACCOUNTING PROCEDURE
# JOINT OPERATIONS

## I. GENERAL PROVISIONS

**1. Definitions**

"Joint Property" shall mean the real and personal property subject to the agreement to which this Accounting Procedure is attached.

"Joint Operations" shall mean all operations necessary or proper for the development, operation, protection and maintenance of the Joint Property.

"Joint Account" shall mean the account showing the charges paid and credits received in the conduct of the Joint Operations and which are to be shared by the Parties.

"Operator" shall mean the party designated to conduct the Joint Operations.

"Non-Operators" shall mean the parties to this agreement other than the Operator.

"Parties" shall mean Operator and Non-Operators.

"First Level Supervisors" shall mean those employees whose primary function in Joint Operations is the direct supervision of other employees and/or contract labor directly employed on the Joint Property in a field operating capacity.

"Technical Employees" shall mean those employees having special and specific engineering, geological or other professional skills, and whose primary function in Joint Operations is the handling of specific operating conditions and problems for the benefit of the Joint Property.

"Personal Expenses" shall mean travel and other reasonable reimbursable expenses of Operator's employees.

"Material" shall mean personal property, equipment or supplies acquired or held for use on the Joint Property.

"Controllable Material" shall mean Material which at the time is so classified in the Material Classification Manual as most recently recommended by the Council of Petroleum Accountants Societies of North America.

**2. Statement and Billings**

Operator shall bill Non-Operators on or before the last day of each month for their proportionate share of the Joint Account for the preceding month. Such bills will be accompanied by statements which identify the authority for expenditure, lease or facility, and all charges and credits, summarized by appropriate classifications of investment and expense except that items of Controllable Material and unusual charges and credits shall be separately identified and fully described in detail.

**3. Advances and Payments by Non-Operators**

Unless otherwise provided for in the agreement, the Operator may require the Non-Operators to advance their share of estimated cash outlay for the succeeding month's operation. Operator shall adjust each monthly billing to reflect advances received from the Non-Operators.

Each Non-Operator shall pay its proportion of all bills within fifteen (15) days after receipt. If payment is not made within such time, the unpaid balance shall bear interest monthly at the rate of twelve percent (12%) per annum or the maximum contract rate permitted by the applicable usury laws in the state in which the Joint Property is located, whichever is the lesser, plus attorney's fees, court costs, and other costs in connection with the collection of unpaid amounts.

**4. Adjustments**

Payment of any such bills shall not prejudice the right of any Non-Operator to protest or question the correctness thereof; provided, however, all bills and statements rendered to Non-Operators by Operator during any calendar year shall conclusively be presumed to be true and correct after twenty-four (24) months following the end of any such calendar year, unless within the said twenty-four (24) month period a Non-Operator takes written exception thereto and makes claim on Operator for adjustment. No adjustment favorable to Operator shall be made unless it is made within the same prescribed period. The provisions of this paragraph shall not prevent adjustments resulting from a physical inventory of Controllable Material as provided for in Section V.

**5. Audits**

A. Non-Operator, upon notice in writing to Operator and all other Non-Operators, shall have the right to audit Operator's accounts and records relating to the Joint Account for any calendar year within the twenty-four (24) month period following the end of such calendar year; provided, however, the making of an audit shall not extend the time for the taking of written exception to and the adjustments of accounts as provided for in Paragraph 4 of this Section I. Where there are two or more Non-Operators, the Non-Operators shall make every reasonable effort to conduct joint or simultaneous audits in a manner which will result in a minimum of inconvenience to the Operator. Operator shall bear no portion of the Non-Operators' audit cost incurred under this paragraph unless agreed to by the Operator.

**6. Approval by Non-Operators**

Where an approval or other agreement of the Parties or Non-Operators is expressly required under other sections of this Accounting Procedure and if the agreement to which this Accounting Procedure is attached contains no contrary provisions in regard thereto, Operator shall notify all Non-Operators of the Operator's proposal, and the agreement or approval of a majority in interest of the Non-Operators shall be controlling on all Non-Operators.

## II. DIRECT CHARGES

Operator shall charge the Joint Account with the following items:

1. **Rentals and Royalties**

   Lease rentals and royalties paid by Operator for the Joint Operations.

2. **Labor**

   A. (1) Salaries and wages of Operator's field employees directly employed on the Joint Property in the conduct of Joint Operations and related expenses

   (2) Salaries of First Level Supervisors in the field.

   (3) Salaries and wages of Technical Employees directly employed on the Joint Property if such charges are excluded from the Overhead rates.

   B. Operator's cost of holiday, vacation, sickness and disability benefits and other customary allowances paid to employees whose salaries and wages are chargeable to the Joint Account under Paragraph 2A of this Section II. Such costs under this Paragraph 2B may be charged on a "when and as paid basis" or by "percentage assessment" on the amount of salaries and wages chargeable to the Joint Account under Paragraph 2A of this Section II. If percentage assessment is used, the rate shall be based on the Operator's cost experience.

   C. Expenditures or contributions made pursuant to assessments imposed by governmental authority which are applicable to Operator's costs chargeable to the Joint Account under Paragraphs 2A and 2B of this Section II.

   D. Personal Expenses of those employees whose salaries and wages are chargeable to the Joint Account under Paragraph 2A of this Section II.

3. **Employee Benefits**

   Operator's current costs of established plans for employees' group life insurance, hospitalization, pension, retirement, stock purchase, thrift, bonus, and other benefit plans of a like nature, applicable to Operator's labor cost chargeable to the Joint Account under Paragraphs 2A and 2B of this Section II shall be Operator's actual cost not to exceed twenty per cent (20%), or percent most recently recommended by the Council of Petroleum Accountants Societies of North America.

4. **Material**

   Material purchased or furnished by Operator for use on the Joint Property as provided under Section IV. Only such Material shall be purchased for or transferred to the Joint Property as may be required for immediate use and is reasonably practical and consistent with efficient and economical operations. The accumulation of surplus stocks shall be avoided.

5. **Transportation**

   Transportation of employees and Material necessary for the Joint Operations but subject to the following limitations:

   A. If Material is moved to the Joint Property from the Operator's warehouse or other properties, no charge shall be made to the Joint Account for a distance greater than the distance from the nearest reliable supply store, recognized barge terminal, or railway receiving point where like material is normally available, unless agreed to by the Parties.

   B. If surplus Material is moved to Operator's warehouse or other storage point, no charge shall be made to the Joint Account for a distance greater than the distance to the nearest reliable supply store, recognized barge terminal, or railway receiving point unless agreed to by the Parties. No charge shall be made to the Joint Account for moving Material to other properties belonging to Operator, unless agreed to by the Parties.

   C. In the application of Subparagraphs A and B above, there shall be no equalization of actual gross trucking cost of $200 or less excluding accessorial charges.

6. **Services**

   The cost of contract services, equipment and utilities provided by outside sources, except services excluded by Paragraph 9 of Section II and Paragraph 1. ii of Section III. The cost of professional consultant services and contract services of technical personnel directly engaged on the Joint Property if such charges are excluded from the Overhead rates. The cost of professional consultant services or contract services of technical personnel not directly engaged on the Joint Property shall not be charged to the Joint Account unless previously agreed to by the Parties.

7. **Equipment and Facilities Furnished by Operator**

   A. Operator shall charge the Joint Account for use of Operator owned equipment and facilities at rates commensurate with costs of ownership and operation. Such rates shall include costs of maintenance, repairs, other operating expense, insurance, taxes, depreciation, and interest on investment not to exceed eight per cent (8%) per annum. Such rates shall not exceed average commercial rates currently prevailing in the immediate area of the Joint Property.

   B. In lieu of charges in Paragraph 7A above, Operator may elect to use average commercial rates prevailing in the immediate area of the Joint Property less 20%. For automotive equipment, Operator may elect to use rates published by the Petroleum Motor Transport Association.

8. **Damages and Losses to Joint Property**

   All costs or expenses necessary for the repair or replacement of Joint Property made necessary because of damages or losses incurred by fire, flood, storm, theft, accident, or other cause, except those resulting from Operator's gross negligence or willful misconduct. Operator shall furnish Non-Operator written notice of damages or losses incurred as soon as practicable after a report thereof has been received by Operator.

9. **Legal Expense**

   Expense of handling, investigating and settling litigation or claims, discharging of liens, payment of judgments and amounts paid for settlement of claims incurred in or resulting from operations under the agreement or necessary to protect or recover the Joint Property, except that no charge for services of Operator's legal staff or fees or expense of outside attorneys shall be made unless previously agreed to by the Parties. All other legal expense is considered to be covered by the overhead provisions of Section III unless otherwise agreed to by the Parties, except as provided in Section I. Paragraph 3.

10. Taxes

All taxes of every kind and nature assessed or levied upon or in connection with the Joint Property, the operation thereof, or the production therefrom, and which taxes have been paid by the Operator for the benefit of the Parties.

11. Insurance

Net premiums paid for insurance required to be carried for the Joint Operations for the protection of the Parties. In the event Joint Operations are conducted in a state in which Operator may act as self-insurer for Workmen's Compensation and/or Employers Liability under the respective state's laws, Operator may, at its election, include the risk under its self-insurance program and in that event, Operator shall include a charge at Operator's cost not to exceed manual rates.

12. Other Expenditures

Any other expenditure not covered or dealt with in the foregoing provisions of this Section II, or in Section III, and which is incurred by the Operator in the necessary and proper conduct of the Joint Operations.

## III. OVERHEAD

1. Overhead - Drilling and Producing Operations

i. As compensation for administrative, supervision, office services and warehousing costs, Operator shall charge drilling and producing operations on either:

( X ) Fixed Rate Basis, Paragraph 1A, or
( ) Percentage Basis, Paragraph 1B.

Unless otherwise agreed to by the Parties, such charge shall be in lieu of costs and expenses of all offices and salaries or wages plus applicable burdens and expenses of all personnel, except those directly chargeable under Paragraph 2A, Section II. The cost and expense of services from outside sources in connection with matters of taxation, traffic, accounting or matters before or involving governmental agencies shall be considered as included in the Overhead rates provided for in the above selected Paragraph of this Section III unless such cost and expense are agreed to by the Parties as a direct charge to the Joint Account.

ii. The salaries, wages and Personal Expenses of Technical Employees and/or the cost of professional consultant services and contract services of technical personnel directly employed on the Joint Property shall ( X) shall not ( ) be covered by the Overhead rates.

A. Overhead - Fixed Rate Basis

(1) Operator shall charge the Joint Account at the following rates per well per month:

Drilling Well Rate $ 2311
Producing Well Rate $ 165

(2) Application of Overhead - Fixed Rate Basis shall be as follows:

(a) Drilling Well Rate

[1] Charges for onshore drilling wells shall begin on the date the well is spudded and terminate on the date the drilling or completion rig is released, whichever is later, except that no charge shall be made during suspension of drilling operations for fifteen (15) or more consecutive days.

[2] Charges for offshore drilling wells shall begin on the date when drilling or completion equipment arrives on location and terminate on the date the drilling or completion equipment moves off location or rig is released, whichever occurs first, except that no charge shall be made during suspension of drilling operations for fifteen (15) or more consecutive days

[3] Charges for wells undergoing any type of workover or recompletion for a period of five (5) consecutive days or more shall be made at the drilling well rate. Such charges shall be applied for the period from date workover operations, with rig, commence through date of rig release, except that no charge shall be made during suspension of operations for fifteen (15) or more consecutive days.

(b) Producing Well Rates

[1] An active well either produced or injected into for any portion of the month shall be considered as a one-well charge for the entire month.

[2] Each active completion in a multi-completed well in which production is not commingled down hole shall be considered as a one-well charge providing each completion is considered a separate well by the governing regulatory authority.

[3] An inactive gas well shut in because of overproduction or failure of purchaser to take the production shall be considered as a one-well charge providing the gas well is directly connected to a permanent sales outlet.

[4] A one-well charge may be made for the month in which plugging and abandonment operations are completed on any well.

[5] All other inactive wells (including but not limited to inactive wells covered by unit allowable, lease allowable, transferred allowable, etc.) shall not qualify for an overhead charge.

(3) The well rates shall be adjusted as of the first day of April* ~~each year following the effective date of the agreement to which this Accounting Procedure is attached~~. The adjustment shall be computed by multiplying the rate currently in use by the percentage increase or decrease in the average weekly earnings of Crude Petroleum and Gas Production Workers for the last calendar year compared to the calendar year preceding as shown by the index of average weekly earnings of Crude Petroleum and Gas Fields Production Workers as published by the United States Department of Labor, Bureau of Labor Statistics, or the equivalent Canadian index as published by Statistics Canada, as applicable. The adjusted rates shall be the rates currently in use, plus or minus the computed adjustment.

* of the year 1978 and each year thereafter.

B. Overhead - Percentage Basis

(1) Operator shall charge the Joint Account at the following rates:

(a) Development

_____ Percent ( %) of the cost of Development of the Joint Property exclusive of costs provided under Paragraph 9 of Section II and all salvage credits.

(b) Operating

_____ Percent ( %) of the cost of Operating the Joint Property exclusive of costs provided under Paragraphs 1 and 9 of Section II, all salvage credits, the value of injected substances purchased for secondary recovery and all taxes and assessments which are levied, assessed and paid upon the mineral interest in and to the Joint Property.

(2) Application of Overhead - Percentage Basis shall be as follows:
For the purpose of determining charges on a percentage basis under Paragraph 1B of this Section III, development shall include all costs in connection with drilling, redrilling, deepening or any remedial operations on any or all wells involving the use of drilling crew and equipment; also, preliminary expenditures necessary in preparation for drilling and expenditures incurred in abandoning when the well is not completed as a producer, and original cost of construction or installation of fixed assets, the expansion of fixed assets and any other project clearly discernible as a fixed asset, except Major Construction as defined in Paragraph 2 of this Section III. All other costs shall be considered as Operating.

2. Overhead - Major Construction

To compensate Operator for overhead costs incurred in the construction and installation of fixed assets, the expansion of fixed assets, and any other project clearly discernible as a fixed asset required for the development and operation of the Joint Property, Operator shall either negotiate a rate prior to the beginning of construction, or shall charge the Joint Account for Overhead based on the following rates for any Major Construction project in excess of $ 25,000 :

A. 3 % of total costs if such costs are more than $ 25,000 but less than $ 100,000 ; plus

B. 3 % of total costs in excess of $ 100,000 but less than $1,000,000; plus

C. 2 % of total costs in excess of $1,000,000.

Total cost shall mean the gross cost of any one project. For the purpose of this paragraph, the component parts of a single project shall not be treated separately and the cost of drilling and workover wells shall be excluded.

3. Amendment of Rates

The Overhead rates provided for in this Section III may be amended from time to time only by mutual agreement between the Parties hereto if, in practice, the rates are found to be insufficient or excessive.

## IV. PRICING OF JOINT ACCOUNT MATERIAL PURCHASES, TRANSFERS AND DISPOSITIONS

Operator is responsible for Joint Account Material and shall make proper and timely charges and credits for all material movements affecting the Joint Property. Operator shall provide all Material for use on the Joint Property; however, at Operator's option, such Material may be supplied by the Non-Operator. Operator shall make timely disposition of idle and/or surplus Material, such disposal being made either through sale to Operator or Non-Operator, division in kind, or sale to outsiders. Operator may purchase, but shall be under no obligation to purchase, interest of Non-Operators in surplus condition A or B Material. The disposal of surplus Controllable Material not purchased by the Operator shall be agreed to by the Parties.

1. Purchases

Material purchased shall be charged at the price paid by Operator after deduction of all discounts received. In case of Material found to be defective or returned to vendor for any other reason, credit shall be passed to the Joint Account when adjustment has been received by the Operator.

2. Transfers and Dispositions

Material furnished to the Joint Property and Material transferred from the Joint Property or disposed of by the Operator, unless otherwise agreed to by the Parties, shall be priced on the following bases exclusive of cash discounts:

A. New Material (Condition A)

(1) Tubular goods, except line pipe, shall be priced at the current new price in effect on date of movement on a maximum carload or barge load weight basis, regardless of quantity transferred, equalized to the lowest published price f.o.b. railway receiving point or recognized barge terminal nearest the Joint Property where such Material is normally available.

(2) Line Pipe

(a) Movement of less than 30,000 pounds shall be priced at the current new price, in effect at date of movement, as listed by a reliable supply store nearest the Joint Property where such Material is normally available.

(b) Movement of 30,000 pounds or more shall be priced under provisions of tubular goods pricing in Paragraph 2A (1) of this Section IV.

(3) Other Material shall be priced at the current new price, in effect at date of movement, as listed by a reliable supply store or f.o.b. railway receiving point nearest the Joint Property where such Material is normally available.

B. Good Used Material (Condition B)

Material in sound and serviceable condition and suitable for reuse without reconditioning:

(1) Material moved to the Joint Property

(a) At seventy-five percent (75%) of current new price, as determined by Paragraph 2A of this Section IV.

(2) Material moved from the Joint Property

(a) At seventy-five percent (75%) of current new price, as determined by Paragraph 2A of this Section IV, if Material was originally charged to the Joint Account as new Material, or

(b) at sixty-five percent (65%) of current new price, as determined by Paragraph 2A of this Section IV, if Material was originally charged to the Joint Account as good used Material at seventy-five percent (75%) of current new price.

The cost of reconditioning, if any, shall be absorbed by the transferring property.

C. Other Used Material (Condition C and D)

(1) Condition C

Material which is not in sound and serviceable condition and not suitable for its original function until after reconditioning shall be priced at fifty percent (50%) of current new price as determined by Paragraph 2A of this Section IV. The cost of reconditioning shall be charged to the receiving property, provided Condition C value plus cost of reconditioning does not exceed Condition B value.

(2) Condition D

All other Material, including junk, shall be priced at a value commensurate with its use or at prevailing prices. Material no longer suitable for its original purpose but usable for some other purpose, shall be priced on a basis comparable with that of items normally used for such other purpose. Operator may dispose of Condition D Material under procedures normally utilized by the Operator without prior approval of Non-Operators.

D. Obsolete Material

Material which is serviceable and usable for its original function but condition and/or value of such Material is not equivalent to that which would justify a price as provided above may be specially priced as agreed to by the Parties. Such price should result in the Joint Account being charged with the value of the service rendered by such Material.

E. Pricing Conditions

(1) Loading and unloading costs may be charged to the Joint Account at the rate of fifteen cents (15¢) per hundred weight on all tubular goods movements, in lieu of loading and unloading costs sustained, when actual hauling cost of such tubular goods are equalized under provisions of Paragraph 5 of Section II.

(2) Material involving erection costs shall be charged at applicable percentage of the current knocked-down price of new Material.

3. Premium Prices

Whenever Material is not readily obtainable at published or listed prices because of national emergencies, strikes or other unusual causes over which the Operator has no control, the Operator may charge the Joint Account for the required Material at the Operator's actual cost incurred in providing such Material, in making it suitable for use, and in moving it to the Joint Property; provided notice in writing is furnished to Non-Operators of the proposed charge prior to billing Non-Operators for such Material. Each Non-Operator shall have the right, by so electing and notifying Operator within ten days after receiving notice from Operator, to furnish in kind all or part of his share of such Material suitable for use and acceptable to Operator.

4. Warranty of Material Furnished by Operator

Operator does not warrant the Material furnished. In case of defective Material, credit shall not be passed to the Joint Account until adjustment has been received by Operator from the manufacturers or their agents.

## V. INVENTORIES

The Operator shall maintain detailed records of Controllable Material.

1. Periodic Inventories, Notice and Representation

At reasonable intervals, Inventories shall be taken by Operator of the Joint Account Controllable Material. Written notice of intention to take inventory shall be given by Operator at least thirty (30) days before any inventory is to begin so that Non-Operators may be represented when any inventory is taken. Failure of Non-Operators to be represented at an inventory shall bind Non-Operators to accept the inventory taken by Operator.

2. Reconciliation and Adjustment of Inventories

Reconciliation of a physical inventory with the Joint Account shall be made, and a list of overages and shortages shall be furnished to the Non-Operators within six months following the taking of the inventory. Inventory adjustments shall be made by Operator with the Joint Account for overages and shortages, but Operator shall be held accountable only for shortages due to lack of reasonable diligence.

3. Special Inventories

Special Inventories may be taken whenever there is any sale or change of interest in the Joint Property. It shall be the duty of the party selling to notify all other Parties as quickly as possible after the transfer of interest takes place. In such cases, both the seller and the purchaser shall be governed by such inventory.

4. Expense of Conducting Periodic Inventories

The expense of conducting periodic Inventories shall not be charged to the Joint Account unless agreed to by the Parties.

EXHIBIT G
ATTACHED TO UNIT OPERATING AGREEMENT
NORTH HOBBS (GRAYBURG-SAN ANDRES) UNIT
LEA COUNTY, NEW MEXICO

## INSURANCE PROVISIONS

Unit Operator shall carry the following insurance with respect to Unit Operations:

(1) Public liability and property damage insurance with limits of $100,000.00 for injuries to or death of one person and $300,000.00 for injuries or deaths in one accident, and $100,000.00 for property damage in one accident.

(2) Automobile public liability and property damage insurance with limits of $100,000.00 for injuries to or death of one person and $300,000.00 for injuries or deaths in one accident, and $100,000.00 for property damage in one accident.

All insurance coverage required hereby shall be carried at the joint expense and for the benefit of the Working Interest Owners. Premiums for automobile public liability and property damage insurance on Unit Operator's fully owned equipment shall not be charged directly to the joint account, but will be covered by the flat rate charge assessed for the use of such equipment. Unit Operator will not carry fire, windstorm or explosion insurance covering Unit Operations or Unit Equipment.

Contractors and sub-contractors will be required to carry insurance of the same types as hereinabove specified and in such amounts as deemed necessary by Unit Operator.

If under the laws of the State in which operations are conducted Operator is authorized to be a self-insurer as to workmen's compensation and/or employers' liability, Operator may elect to be a self-insurer under such laws and in such event Operator shall charge to the joint account, in lieu of any premiums for such insurance, a premium equivalent limited to amounts determined by applying manual insurance rates to the payroll.

If the parties hereto or any of them shall insure their respective risks beyond the specific limits of insurance required hereunder to be carried by the Unit Operator, the benefits of such insurance shall inure to the parties procuring and maintaining the same, respectively, and the cost of such insurance shall be borne by such parties, respectively, without reimbursement one from the other and without entering into any accounting hereunder.

EXHIBIT H

ATTACHED TO UNIT OPERATING AGREEMENT
NORTH HOBBS (GRAYBURG-SAN ANDRES) UNIT
LEA COUNTY, NEW MEXICO

INDEMNITY AGREEMENT

WHEREAS, Section 14(c) of an agreement entitled "Unit Agreement, North Hobbs (Grayburg-San Andres) Unit, Lea County, New Mexico," dated July 1, 1978, provides that under certain circumstances and conditions therein stated a Tract that fails to qualify under Section 14(a) or Section 14(b) may be qualified under said Section 14(c) if the requisite Working Interest Owners in the Tract as specified in said Section 14(c) request the qualification of the Tract and execute and deliver, or obligate themselves to execute and deliver, an indemnity agreement; and

WHEREAS, Tract _____, described in the Unit Agreement is such a Tract; and

WHEREAS, the undersigned are owners of Working Interest in such Tract and have become parties to the Unit Agreement and the Unit Operating Agreement and desire the qualification of the Tract under said Section 14(c):

NOW THEREFORE, in consideration of and conditioned upon said Tract meeting the other requirements of said Section 14(c) of the Unit Agreement and its being qualified under said Section 14(c), the undersigned hereby request the qualification of said Tract under said Section 14(c) and agree, together with other owners of Working Interest in the Tract who execute and deliver, or who obligate themselves to execute and deliver, like indemnity agreements, to indemnify and hold harmless all other Working Interest Owners in the Unit Area against all claims and demands required by said Section 14(c) to be the subject of such indemnity. Any liability arising hereunder shall be borne by the undersigned and other Working Interest Owners in the Tract who are committed to like indemnity agreements in the proportion that the Working Interest of each in the Tract bears to the total Working Interest therein of all the owners of Working Interest in the Tract committed to such indemnity agreement.

This indemnity shall become void with respect to all claims and demands based upon occurrences subsequent to any time that conditions are such that said Tract would be qualified under the provisions of said Unit Agreement without this indemnity.

This agreement shall be binding upon and inure to the benefit of the heirs, devisees, legal representatives, successors, and assigns of the respective parties initially bound or benefited by the provisions hereof.

IN WITNESS WHEREOF, each of the undersigned has executed this instrument on the date opposite its signature.

_____ _____

_____ _____

# UNIT AGREEMENT
# NORTH HOBBS (GRAYBURG-SAN ANDRES) UNIT
# LEA COUNTY, NEW MEXICO

UNIT AGREEMENT
NORTH HOBBS (GRAYBURG-SAN ANDRES) UNIT
LEA COUNTY, NEW MEXICO


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UNIT AGREEMENT
NORTH HOBBS (GRAYBURGSAN ANDRES) UNIT
LEA COUNTY, NEW MEXICO

THIS AGREEMENT, entered into as of the 1st day of July, 1978, by and between the parties subscribing, ratifying or consenting hereto, and herein referred to as "parties hereto";

WITNESSETH:

WHEREAS, the parties hereto are the owners of working, royalty or other oil or gas interests in the Unit Area subject to this Agreement; and

WHEREAS, the Commissioner of Public Lands of the State of New Mexico is authorized by an Act of the Legislature (Sec. 1, Chap. 88, Laws 1943 as amended by Sec. 1, Chap. 176, Laws 1961; Chap. 7, Art. 11, Sec. 39, N.M.S. 1953 Ann.) to consent to or approve this agreement on behalf of the State of New Mexico, insofar as it covers and includes lands and mineral interests of the State of New Mexico; and

WHEREAS, the Commissioner of Public Lands of the State of New Mexico is authorized by an Act of the Legislature (Sec. 3, Chap. 88, Laws 1943 as amended by Sec. 1, Chap. 162, Laws 1951; Chap. 7, Art. 11, Sec. 41, N.M.S. 1953 Ann.) to amend with the approval of the lessee, any oil and gas lease embracing State lands so that the length of the term of said lease may coincide with the term of such unitized development and operation of State lands; and

WHEREAS, the Oil Conservation Division of the Energy and Minerals Department of the State of New Mexico is authorized by law (Chap. 65, Art. 3 and Art. 14, N.M.S. 1953 Ann.) to approve this agreement and the conservation provisions hereof; and

WHEREAS, the parties hereto hold sufficient interests in the North Hobbs (Grayburg-San Andres) Unit covering the land hereinafter described to give reasonably effective control of operations therein; and

WHEREAS, it is the purpose of the parties hereto to conserve natural resources, to prevent waste and secure the other benefits obtainable through development and operation of the area subject to this Agreement under the terms, conditions and limitations herein set forth.

NOW, THEREFORE, in consideration of the premises and the promises herein contained, the parties hereto commit to this Agreement their respective interests in the unitized formation of the below defined Unit Area, and agree severally among themselves as follows:

SECTION 1. ENABLING ACT AND REGULATIONS. The Mineral Leasing Act of February 25, 1920, as amended, supra, and all valid pertinent regulations, including operating and unit plan regulations, heretofore issued thereunder and valid, pertinent and reasonable regulations hereafter issued thereunder are accepted and made a part of this Agreement as to Federal lands, provided such regulations are not inconsistent with the terms of this Agreement; and as to non-Federal lands, the oil and gas operating regulations in effect as of the effective date hereof governing drilling and producing operations, not inconsistent with the terms hereof or the laws of the State in which the non-Federal land is located, are hereby accepted and made a part of this Agreement.

SECTION 2. UNIT AREA AND DEFINITIONS. For the purpose of this Agreement, the following terms and expressions as used herein shall mean:

(a) "Unit Area" is defined as those lands described in Exhibit B and depicted on Exhibit A hereof, and such land is hereby designated and recognized as constituting the Unit Area, containing 10,649.53 acres, more or less, in Lea County, New Mexico.

(b) "Land Commissioner" is defined as the Commissioner of Public Lands of the State of New Mexico.

(c) "Division" is defined as the Oil Conservation Division of the Energy and Minerals Department of the State of New Mexico.

(d) "Unitized Formation" shall mean that subsurface portion of the Unit Area known as the Grayburg-San Andres formation of Permian Age found in the interval between the stratigraphic depth of 3698 feet as measured on the Borehole Compensated Sonic-Gamma Ray Log run in the Shell Oil Company - State A-7 well on July 9, 1969, said well being located 1930 feet FNL and 660 feet FEL of Section 32-T18S-R38E, Lea County, New Mexico, and the depth of 4500 feet beneath the surface.

(e) "Unitized Substances" are all oil, gas, gaseous substances, sulphur contained in gas, condensate, distillate and all associated and constituent liquid or liquefiable hydrocarbons within and produced from the Unitized Formation of the Unitized Land.

(f) "Tract" is each parcel of land described as such and given a Tract number in Exhibit B.

(g) "Tract Participation" is defined as the percentage of participation shown on Exhibit C for allocating Unitized Substances to a Tract under this Agreement, such percentages or participation being shown separately as to oil and as to gas.

(h) "Unit Participation" is the sum of the percentages obtained by multiplying the Working Interest of a Working Interest Owner in each Tract by the Tract Participation of such Tract as to oil.

(i) "Working Interest" is the right to search for, produce and acquire Unitized Substances whether held as an incident of ownership of mineral fee simple title, under an oil and gas lease, or otherwise held, which interest is chargeable with and obligated to pay or bear, either in cash or out of production, or otherwise, all or a portion of the cost of drilling, developing and producing the Unitized Substances from the Unitized Formation and operations thereof hereunder. Provided that any Royalty Interest created out of a Working Interest subsequent to the execution of this Agreement by the owner of the working interest shall continue to be subject to such Working Interest burdens and obligations.

(j) "Working Interest Owner" is any party hereto owning a Working Interest, including a carried working interest owner, holding an interest in Unitized Substances by virtue of a lease, operating agreement, fee title or otherwise. The owner of Oil and Gas Rights that are free of lease or other instrument creating a Working Interest in another shall be regarded as a Working Interest Owner to the extent of seven-eighths (7/8) of his interest in Unitized Substances, and as a Royalty Owner with respect to his remaining one-eighth (1/8) interest therein.

(k) "Royalty Interest" or "Royalty" is an interest, other than a Working Interest, having the right to receive a portion of the Unitized Substances or the proceeds thereof and includes the royalty interest reserved by the lessor by an oil and gas lease and any overriding royalty interest, oil payment interest, net profit contract, or any other payment or burden which does not carry with it the right to search for and produce Unitized Substances.

(l) "Royalty Owner" is the owner of a Royalty Interest.

(m) "Unit Operating Agreement" is the agreement entered into by and between the Unit Operator and the Working Interest Owners as provided in Section 9, infra, and shall be styled "Unit Operating Agreement, North Hobbs (Grayburg-San Andres) Unit, Lea County, New Mexico".

(n) "Oil and Gas Rights" is the right to explore, develop and operate lands within the Unit Area for the production of Unitized Substances, or to share in the production so obtained or the proceeds thereof.

(o) "Outside Substances" are any substances obtained from any source other than the Unitized Formation and injected into the Unitized Formation.

(p) "Unit Manager" is any person or corporation appointed by Working Interest Owners to perform the duties of Unit Operator until the selection and qualification of a successor Unit Operator as provided for in Section 7 hereof.

(q) "Unit Operator" is the party designated by Working Interest Owners under the Unit Operating Agreement to conduct Unit Operations.

(r) "Unit Operations" are any operations conducted pursuant to this Agreement and the Unit Operating Agreement.

(s) "Unit Equipment" is all personal property, lease and well equipment, plants, and other facilities and equipment taken over or otherwise acquired for the joint account for use in Unit Operations.

(t) "Unit Expense" is all cost, expense, or indebtedness incurred pursuant to this Agreement and the Unit Operating Agreement for or on account of Unit Operations.

(u) "Effective Date" is the date this Agreement becomes effective as provided in Section 24.

SECTION 3. EXHIBITS. Exhibit A attached hereto is a map showing the Unit Area and the boundaries and identity of tracts and leases in said Unit Area to the extent known to the Unit Operator. Exhibit B attached hereto is a schedule showing, to the extent known to the Unit Operator, the acreage comprising each Tract, percentages and kind of ownership of oil and gas interests in all land in the Unit Area. Exhibit C attached hereto shows the Tract Participation of each Tract in the Unit Area. However, nothing herein or in said schedule or map shall be construed as a representation by any party hereto as to the ownership of any interest other than such interest or interests as are shown in said map or schedule as owned by such party. Exhibit D attached hereto is an appendix setting out certain federal contract provisions. Exhibits, A, B, and C shall be revised by the Unit Operator whenever changes in the Unit Area render such revision necessary and copies of such revision shall be filed with the Land Commissioner.

SECTION 4. EXPANSION. The above described Unit Area may when practicable be expanded to include therein any additional lands regarded as reasonably necessary or advisable for the purposes of this Agreement. Such expansion shall be effected in the following manner:

(a) The working interest owner or owners of lands desiring to bring such lands into this unit, shall file an application therefor with Unit Operator requesting such admission.

(b) Unit Operator shall circulate a notice of the proposed expansion to each Working Interest Owner in the Unit Area and to each working interest owner in the lands proposed to be included in the unit, setting out the basis for admission, the Tract Participation to be assigned to each Tract in the enlarged Unit Area and other pertinent data. After negotiation (at Working Interest Owner's meeting or through correspondence) if at least three Working Interest Owners having in the aggregate seventy-five percent (75%) Unit Participation then in effect have agreed to inclusion of such lands in the Unit Area, the Unit Operator shall:

(1) After obtaining preliminary concurrence by the Land Commissioner and the Division, prepare a notice of proposed expansion describing the contemplated changes in the boundaries of the Unit Area, the reason therefor, the basis for admission of the additional lands, the Tract Participation to be assigned thereto and the proposed effective date thereof; and

(2) Mail or deliver copies of said notice to the Land Commissioner, each Working Interest Owner and Royalty Owner, and to the lessee and lessor whose interests are affected, advising such parties that thirty (30) days will be allowed for submission to the Unit Operator of any objection to such proposed expansion; and

(3) File, upon the expiration of said thirty (30) day period as set out in (2) immediately above, with the Land Commissioner: (a) Evidence of mailing or delivering copies of said notice of expansion; (b) An application for approval of such expansion; (c) An instrument containing the appropriate joinders in compliance with the participation requirements of Section 14, and Section 33, infra; and (d) A copy of all objections received along with the Unit Operator's response thereto.

The expansion shall, after due consideration of all pertinent information and approval by the Land Commissioner, become effective as of the date prescribed in the notice thereof, preferably as of 7:00 a.m. of the first day of a month subsequent to the date of notice. The revised Tract Participation of the respective Tracts included within the Unit Area prior to such enlargement shall remain in the same ratio one to another.

SECTION 5. UNITIZED LAND. All land committed to this Agreement as to the Unitized Formation shall constitute land referred to herein as "Unitized Land" or "Land subject to this Agreement". Nothing herein shall be construed to unitize, pool, or in any way affect the oil, gas and other minerals contained in or that may be produced from any formation other than the Unitized Formation as defined in Section 2 (d) of this Agreement.

SECTION 6. UNIT OPERATOR. Shell Oil Company is hereby designated the Unit Operator, and by signing this instrument as Unit Operator agrees and consents to accept the duties and obligations of Unit Operator for the operation, development and production of Unitized Substances as herein provided. Whenever reference is made herein to the Unit Operator, such reference means the Unit Operator acting in that capacity and not as an owner of interests in Unitized Substances, when such interests are owned by it, and the term "Working Interest Owner" when used herein shall include or refer to the Unit Operator as the owner of a Working Interest when such an interest is owned by it.

The interests of Working Interest Owners and the Unit Operator in the Unit Area shall be subject to a reciprocal lien and security interest to the extent provided in the Unit Operating Agreement.

SECTION 7. RESIGNATION OR REMOVAL OF UNIT OPERATOR. Unit Operator shall have the right to resign at any time, but such resignation shall not become effective so as to release Unit Operator from the duties and obligations of Unit Operator and terminate Unit Operator's rights as such for a period of six (6) months after written notice of intention to resign has been given by Unit Operator to all Working Interest Owners and the Land Commissioner unless a new Unit Operator shall have taken over and assumed the duties and obligations of Unit Operator prior to the expiration of said period. The resignation or removal of Unit Operator shall not release Unit Operator from any liability for any default by it hereunder occurring prior to the effective date of its resignation or removal.

The Unit Operator shall be subject to removal by Working Interest Owners having in the aggregate eighty percent (80%) or more Unit Participation then in effect exclusive of the Working Interest Owner who is the Unit Operator. Such removal shall be effective upon notice thereof to the Land Commissioner.

In all such instances of effective resignation or removal, until a successor to Unit Operator is selected and approved as hereinafter provided, the Working Interest Owners shall be jointly responsible for the performance of the duties of the Unit Operator and shall, not later than thirty (30) days before such resignation or removal become effective, appoint a Unit Manager to represent them in any action to be taken hereunder.

The resignation or removal of Unit Operator under this Agreement shall not terminate its right, title or interest as the owner of a Working Interest or other interest in Unitized Substances, but upon the resignation or removal of Unit Operator becoming effective, such Unit Operator shall deliver possession of all wells, equipment, books and records, materials, appurtenances and any other assets used in connection with the Unit Operations

and owned by the Working Interest Owners to the new duly qualified successor Unit Operator or to the Unit Manager if no such new Unit Operator is elected, to be used for the purpose of conducting Unit Operations hereunder. Nothing herein shall be construed as authorizing the removal of any material, equipment or appurtenances needed for the preservation of any wells. Nothing herein contained shall be construed to relieve or discharge any Unit Operator or Unit Manager who resigns or is removed hereunder from any liability or duties accruing or performable by it prior to the effective date of such resignation or removal.

SECTION 8. SUCCESSOR UNIT OPERATOR. Whenever the Unit Operator shall tender its resignation as Unit Operator or shall be removed as hereinabove provided, the Working Interest Owners shall select a successor Unit Operator as herein provided. Such selection shall not become effective until (a) a Unit Operator so selected shall accept in writing the duties and responsibilities of Unit Operator, and (b) the selection shall have been approved by the Land Commissioner. If no successor Unit Operator or Unit Manager is selected and qualified as herein provided, the Land Commissioner, at his election, may declare this Agreement terminated.

In selecting a successor Unit Operator the affirmative vote of three or more Working Interest Owners having a total of sixty-five percent (65%) or more of the total Unit Participation then in effect shall prevail; provided that if any one Working Interest Owner has a Unit Participation of more than thirty-five percent (35%), its negative vote or failure to vote shall not be regarded as sufficient unless supported by the vote of one or more other Working Interest Owners having a total Unit Participation of at least five percent (5%). If the Unit Operator who is removed votes only to succeed itself or fails to vote, the successor Unit Operator may be selected by the affirmative vote of the owners of at least seventy-five percent (75%) of the Unit Participation remaining after excluding the Unit Participation of Unit Operator so removed.

SECTION 9. ACCOUNTING PROVISIONS AND UNIT AGREEMENT. Costs and expenses incurred by Unit Operator in conducting Unit Operations hereunder shall be paid, apportioned among and borne by the Working Interest Owners in accordance with the Unit Operating Agreement. Such Unit Operating Agreement shall also provide the manner in which the Working Interest Owners shall be entitled to receive their respective proportionate and allocated share of the benefits accruing hereto in conformity with their underlying operating agreements, leases or other contracts and such other rights and obligations as between Unit Operator and the Working Interest Owners as may be agreed upon by the Unit Operator and the Working Interest Owners; however, no such Unit Operating Agreement shall be deemed either to modify any of the terms and conditions of this Agreement or to relieve the

Unit Operator of any right or obligation established under this Agreement, and in case of any inconsistency or conflict between this Agreement and the Unit Operating Agreement, this Agreement shall prevail. Copies of any Unit Operating Agreement executed pursuant to this Section shall be filed with the Land Commissioner.

SECTION 10. RIGHTS AND OBLIGATIONS OF UNIT OPERATOR. Except as otherwise specifically provided herein the exclusive right, privilege and duty of exercising any and all rights of the parties hereto which are necessary or convenient for prospecting for, producing, storing, allocating and distributing the Unitized Substances or for conducting other Unit Operations are hereby delegated to and shall be exercised by the Unit Operator as herein provided. Upon request, acceptable evidence of title to said rights shall be deposited with said Unit Operator, and together with this Agreement, shall constitute and define the rights, privileges and obligations of Unit Operator. Nothing herein, however, shall be construed to transfer title to any land or to any lease or operating agreement, it being understood that under this Agreement the Unit Operator, in its capacity as Unit Operator, shall exercise the rights of possession and use vested in the parties hereto only for the purposes herein specified.

SECTION 11. PLAN OF OPERATIONS. It is recognized and agreed by the parties hereto that all of the land subject to this Agreement is reasonably proved to be productive of Unitized Substances and that the object and purpose of this Agreement is to formulate and to put into effect an enhanced recovery project in order to effect additional recovery of Unitized Substances, prevent waste and conserve natural resources. The parties hereto agree that the Unit Operator may, subject to the consent and approval of a Plan of Operation by the Working Interest Owners, the Land Commissioner and the Division, inject into the Unitized Formation, through any well or wells completed therein, brine, water, air, gas, oil, liquefied petroleum gases and any one or more other substances or combination of substances whether produced from the Unitized Land or not, and that the location of input wells and the rates of injection therein shall be governed by standards of good geologic and petroleum engineering practices and conservation methods. Subject to like approval the Plan of Operation may be revised as conditions may warrant.

The initial Plan of Operation shall be filed with the Land Commissioner and the Division concurrently with the filing of this Agreement for final approval. Said initial Plan of Operation and all revisions thereof shall be as complete and adequate as the Land Commissioner and the Division may determine to be necessary for timely operation consistent herewith. Upon approval of this Agreement and the initial plan by the Land Commissioner, said plan, and all subsequently approved plans shall constitute

the operating obligations of the Unit Operator under this Agreement for the period specified therein. Thereafter, from time to time before the expiration of any existing plan, the Unit Operator shall submit for like approval a plan for an additional specified period of operation. After such operations are commenced, reasonable diligence shall be exercised by the Unit Operator in complying with the obligations of the approved Plan of Operation.

Notwithstanding anything to the contrary herein contained, should the Unit Operator fail to commence operation of an enhanced recovery project incorporating the injection of water within eighteen (18) months after the Effective Date of this Agreement, or any extension thereof approved by the Land Commissioner, this Agreement shall terminate automatically as of the date of default.

SECTION 12. USE OF SURFACE AND USE OF WATER. The parties, to the extent of their rights and interests, hereby grant to Unit Operator the right to use as much of the surface of the Unitized Land as may reasonably be necessary for Unit Operations; provided that nothing herein shall be construed as leasing or otherwise conveying to the Unit Operator a site for water injection plants, gas injection plants or other plants or camp site.

Unit Operator shall have free use of water or brine or both from the Unitized Land for Unit Operations, except water from any well, lake, pond or irrigation ditch of a surface owner, unless approval for such use is granted by the surface owner.

Unit Operator shall pay the party or parties entitled thereto for damages to growing crops, timber, fences, improvements and structures on the Unitized Land that result from Unit Operations.

SECTION 13. TRACT PARTICIPATION. In Exhibit C attached hereto there are listed and numbered the various Tracts within the Unit Area, and set forth opposite each Tract are figures which represent the Tract Participation, shown separately as to oil and as to gas, during Phase I, Phase II and Phase III of Unit Operations if all Tracts in the Unit Area qualify as provided herein. The Phase I, Phase II and Phase III Tract Participations of each Tract as shown in Exhibit C were determined in accordance with the following formulas, using data heretofore approved by Working Interest Owners:

TRACT PARTICIPATION:

| | | |
|---|---|---|
| During Phase I: | As to oil: | 20% A + 80% B |
| | As to gas: | 20% C + 80% D |

| | | |
|---|---|---|
| During Phase II: | As to oil: | 100% B |
| | As to gas: | 100% D |
| During Phase III: | As to oil: | 100% E |
| | As to gas: | 100% E |

Where: A = Ratio of the quantity of 1976 oil production from each Tract to the total quantity of 1976 oil production from all Tracts within the Unit Area.

B = Ratio of the quantity of remaining primary oil reserves (as of 1/1/77) of each Tract to the total quantity of remaining primary oil reserves (as of 1/1/77) of all Tracts within the Unit Area.

C = Ratio of the volume of 1976 gas production from each Tract to the total volume of 1976 gas production from all Tracts within the Unit Area.

D = Ratio of the volume of remaining primary gas reserves (as of 1/1/77) of each Tract to the total volume of remaining primary gas reserves (as of 1/1/77) of all Tracts within the Unit Area.

E = Ratio of the quantity of secondary oil reserves of each Tract to the total quantity of secondary oil reserves of all Tracts within the Unit Area.

Phase I shall begin on the Effective Date of this Agreement and continue until the first day of the calendar month next following the date on which the total number of barrels of oil produced after said Effective Date from the Unitized Formation underlying all Tracts described in the original Exhibit B hereof equals 4,000,000 barrels as determined from the official production reports (currently known as C-115 reports) filed with the New Mexico Oil Conservation Commission or its successor. Phase II shall begin with the termination of Phase I and continue until the first day of the calendar month next following the date on which the total number of barrels of oil produced after January 1, 1977, from the Unitized Formation underlying all Tracts described in the original Exhibit B hereof equals 38,071,683 barrels determined in the same manner as aforesaid. Phase III shall begin with the termination of Phase II and continue for the remainder of the term of this Agreement. Unit Operator shall notify the Land Commissioner and all Working Interest Owners as to the date each phase change occurs.

In the event less than all Tracts are qualified on the Effective Date hereof, the Tract Participations shall be calculated on the basis of all such qualified Tracts rather than all Tracts in the Unit Area. The total

number of barrels of oil that shall determine the duration of Phase I shall remain at 4,000,000 barrels, and the total number of barrels of oil that shall determine the duration of Phase II shall remain at 38,071,683 barrels; however, oil produced from all Tracts within the Unit Area, non-qualified Tracts as well as qualified Tracts, shall be counted for purposes of determining the production of said totals of 4,000,000 barrels as to Phase I and 38,071,683 barrels as to Phase II.

SECTION 14. TRACTS QUALIFIED FOR PARTICIPATION. On and after the Effective Date hereof the Tracts within the Unit Area which shall be entitled to participation in the production of Unitized Substances shall be those Tracts more particularly described in Exhibit B that corner or have a common boundary (Tracts separated only by a public highway or a railroad right of way shall be considered to have a common boundary), and that otherwise qualify as follows:

(a) Each Tract as to which Working Interest Owners owning one hundred percent (100%) of the Working Interest have become parties to this Agreement, and as to which Royalty Owners owning seventy-five percent (75%) or more of the Royalty Interest have become parties to this Agreement.

(b) Each Tract as to which Working Interest Owners owning one hundred percent (100%) of the Working Interest have become parties to this Agreement, and as to which Royalty Owners owning less than seventy-five percent (75%) of the Royalty Interest have become parties to this Agreement, and as to which (1) Working Interest Owners, including the Working Interest Owner who operates the Tract, owning a total of seventy-five percent (75%) or more of the Working Interest in such Tract that is committed to this agreement have joined in a request for qualification of such Tract, and as to which (2) Working Interest Owners having seventy-five percent (75%) or more of the combined Phase III Unit Participation in all Tracts that meet the requirements of Section 14 (a) above have voted in favor of the qualification of such Tract.

(c) Each Tract as to which Working Interest Owners owning less than one hundred percent (100%) of the Working Interest have become parties to this Agreement, regardless of the percentage of Royalty Interest therein that is committed hereto; and as to which (1) one or more of the Working Interest Owners in such Tract who have become parties to this Agreement, one of which must be the operator of such Tract, have joined in a request for qualification of such Tract, and have executed and delivered, or obligated themselves to execute and deliver, an indemnity agreement identical in form to the agreement attached to the Unit Operating Agreement as Exhibit H indemnifying and agreeing to hold harmless the other Working Interest Owners in the Unit Area, their successors and assigns, against all claims and demands that may be made by the owners of Working Interest in such

Tract who are not parties to this Agreement, and which arise out of the qualification of such Tract; and as to which (2) Working Interest Owners having seventy-five percent (75%) or more of the Phase III Unit Participation in all Tracts that meet the requirements of Section 14 (a) and 14(b) have voted in favor of the qualification of such Tract and to accept the indemnity agreement. Upon the qualification of such a Tract, the Tract Participations which would have been attributed to the non-subscribing owners of Working Interest in such Tract, had they become parties to this Agreement and the Unit Operating Agreement, shall be attributed to the Working Interest Owners in such Tract who have become parties to such agreements, and joined in the indemnity agreement, in proportion to their respective Working Interests in the Tract.

If on the Effective Date of this Agreement there is any Tract or Tracts which have not been effectively committed to or made subject to this Agreement by qualifying as above provided, then such Tract or Tracts shall not be entitled to participate hereunder. Unit Operator shall, when submitting this Agreement for final approval by the Land Commissioner, file therewith a schedule of those Tracts which have been committed and made subject to this Agreement and are entitled to participate in Unitized Substances. Said schedule shall set forth opposite each such committed Tract the lease number or assignment number, the owner of record of the lease, and the percentage participation of such Tract which shall be computed according to the participation formula set out in Section 13 (Tract Participation) above. This schedule of participation shall be Revised Exhibit C and upon approval thereof by the Land Commissioner shall become a part of this Agreement and shall govern the allocation of production of Unitized Substances until a new schedule is approved by the Land Commissioner.

SECTION 15. ALLOCATION OF UNITIZED SUBSTANCES. All Unitized Substances produced and saved (less, save and except any part of such Unitized Substances used in conformity with good operating practices on Unitized Land for drilling, operating, camp and other production or development purposes and for injection or unavoidable loss in accordance with a Plan of Operation approved by the Land Commissioner) shall be apportioned among and allocated to the qualified Tracts in accordance with the respective Tract Participations effective hereunder during the respective periods such Unitized Substances were produced, as set forth in the schedule of participation in Exhibit C. The amount of Unitized Substances so allocated to each Tract, and only that amount, (regardless of whether it be more or less than the amount of the actual production of Unitized Substances from the well or wells, if any, on such Tract) shall, for all intents, uses and purposes, be deemed to have been produced from such Tract.

The Unitized Substances allocated to each Tract shall be distributed among, or accounted for, to the parties entitled to share in the production from such Tract in the same manner, in the same proportions, and

upon the same conditions, as they would have participated and shared in the production from such Tracts, or in the proceeds thereof, had this Agreement not been entered into; and with the same legal force and effect.

No Tract committed to this Agreement and qualified for participation as above provided shall be subsequently excluded from participation hereunder on account of depletion of Unitized Substances.

If the Working Interest and/or the Royalty Interest in any Tract are divided with respect to separate parcels or portions of such Tract and owned now or hereafter in severalty by different persons, the Tract Participation during Phase I, Phase II and Phase III shall, in the absence of a recordable instrument executed by all owners and furnished to Unit Operator fixing the divisions of ownership, be divided among such parcels or portions in proportion to the number of surface acres in each.

The Unitized Substances allocated to each Tract shall be delivered in kind to the respective Working Interest Owners and parties entitled thereto by virtue of the ownership of Oil and Gas Rights therein. Each Working Interest Owner and the parties entitled thereto shall have the continuing right to receive such production in kind at a common point within the Unit Area and to sell or dispose of the same as it sees fit. Each such party shall have the right to construct, maintain and operate all necessary facilities for that purpose on Unitized Land, provided the same are so constructed, maintained and operated as not to interfere with operations carried on pursuant hereto. Subject to Section 18 hereof, any extra expenditure incurred by Unit Operator by reason of the delivery in kind of any portion of the Unitized Substances shall be borne by the party responsible therefor under the controlling lease or contract. In the event any Working Interest Owner shall fail to take or otherwise adequately dispose of its proportionate share of the production from the Unitized Formation currently as and when produced, then so long as such condition continues, Unit Operator, for the account and at the expense of the Working Interest Owner of the Tract or Tracts concerned, and in order to avoid curtailing the operation of the Unit Area, may, but shall not be required to, sell or otherwise dispose of such production to itself or to others on a day-to-day basis, provided that all contracts of sale by the Unit Operator of any other party's share of Unitized Substances shall be only for such reasonable periods of time as are consistent with the minimum needs of the industry under the circumstances, but in no event shall any such contract be for a period in excess of one year, and at not less than the prevailing market price in the area for like production, and the account of such Working Interest Owner shall be charged therewith as having received such production. The net proceeds, if any, of the Unitized Substances so disposed of by Unit Operator shall be paid to the Working Interest Owner of the Tract or Tracts concerned. Notwithstanding the foregoing, Unit Operator shall not make a sale into interstate commerce of any Working Interest Owner's share of gas production without first giving such Working Interest Owner sixty (60) days notice of such intended sale.

Any Working Interest Owner receiving in kind or separately disposing of all or any part of the Unitized Substances allocated to any Tract, or receiving the proceeds therefrom if the same is sold or purchased by Unit Operator, shall be responsible for the payment of all Royalty, overriding royalty and production payments due thereon, and each such party shall hold each other Working Interest Owner harmless against all claims, demands and causes of action by owners of such Royalty, overriding royalty and production payments.

If, after the Effective Date of this Agreement, there is any Tract or Tracts that are subsequently committed hereto, as provided in Section 4 (Expansion) hereof, or any Tract or Tracts within the Unit Area not committed hereto as of the Effective Date hereof but which are subsequently committed hereto under the provisions of Section 14 (Tracts Qualified for Participation) and Section 33 (Nonjoinder and Subsequent Joinder), or if any Tract is excluded from this Agreement as provided for in Section 32 (Loss of Title), the schedule of participation as shown in Exhibit C, shall be revised by the Unit Operator; and the revised Exhibit C, upon approval by the Land Commissioner, shall govern the allocation of production on and after the effective date thereof until a revised schedule is approved as hereinabove provided. In any such revised Exhibit C, pursuant to this paragraph, the Tract Participation of the previously qualified Tracts shall remain in the same ratio one to the other.

SECTION 16. FEA PRICING. It is anticipated that at the Effective Date hereof, crude oil produced, saved and sold from the North Hobbs (Grayburg-San Andres) Unit will be subject to the rules and regulations of the Federal Energy Administration or its successor, herein referred to as "FEA". Such rules and regulations provide for the classification of crude oil for pricing purposes as (a) Stripper Well Crude Oil, (b) Old Oil, and (c) Upper Tier Crude Oil. It is further anticipated that Unit Operator will, in compliance with applicable FEA rules and regulations, prepare a unit-wide certification covering monthly crude oil production from the unit, in which event it will be necessary for Unit Operator to implement a method for the allocation of the unit certification among the Tracts comprising the unit. It is the intention of the parties to this agreement that the interest owners in each Tract shall retain the regulatory benefits attributable to that Tract to the extent that the unit is legally permitted to retain such benefits. Under the FEA rules and regulations as of October 1976, a unit certification is allowed each month to include in the Upper Tier Crude Oil portion thereof, a constant number of barrels described by FEA rules and regulations as Imputed Upper Tier Crude Oil. The unit certification is further allowed each month to include in the Stripper Well Crude Oil portion thereof, a constant number of barrels described by FEA rules and regulations as Imputed Stripper Well Crude Oil. In view of the foregoing, and notwithstanding the provisions of Section 15 hereof, crude oil produced, saved and sold from the unit shall be allocated as follows:

(a) Imputed Stripper Well Crude Oil. The first oil produced, saved and sold each month up to a quantity equal to the unit's Imputed Stripper Well Crude Oil shall be allocated to Tracts contributing Imputed Stripper Well Crude Oil to the unit certification in proportion to their contributions of such Imputed Stripper Well Crude Oil. Should any Tract in any month be allocated out of unit production in accordance with its Tract Participation as set forth in this agreement, a total number of barrels of oil that is less than the Imputed Stripper Well Crude Oil that such Tract has contributed to the unit certification, then such Tract's allocation of Imputed Stripper Well Crude Oil shall be reduced by the amount that the Imputed Stripper Crude Oil exceeds the amount of oil to be allocated in accordance with its Tract Participation. The amount in excess of its Tract Participation shall be termed Excess Imputed Stripper Well Crude Oil. The total Excess Imputed Stripper Well Crude Oil of all Tracts shall be allocated to all Tracts, including Tracts which have not contributed Imputed Stripper Well Crude Oil to the unit certification, in proportion to the quantities that the unit production allocated to a Tract by its Tract Participation exceeds the quantity of Imputed Stripper Well Crude Oil allocated to such Tract.

(b) Imputed Upper Tier Crude Oil. Oil produced, saved, and sold each month from the unit after a quantity of oil equal to the Imputed Stripper Well Crude Oil is produced, saved and sold, up to a quantity equal to the Imputed Upper Tier Crude Oil, shall be allocated to those Tracts contributing Imputed Upper Tier Crude Oil to the unit certification in proportion to their contributions of such Imputed Upper Tier Crude Oil. Should any Tract in any month be allocated out of unit production in accordance with its Tract Participation as set forth in this agreement, a total number of barrels of oil that is less than the sum of its Imputed Stripper Well Crude Oil, its Excess Imputed Stripper Well Crude Oil as provided in subparagraph (a) above, and its allocated Imputed Upper Tier Crude Oil, then such Tract's allocation of Imputed Upper Tier Crude Oil shall be reduced by the quantity that the sum of the Tract's Imputed Stripper Well Crude Oil, its Excess Imputed Stripper Crude Oil and its allocated Imputed Upper Tier Crude Oil exceeds the total quantity of oil to be allocated in accordance with its Tract Participation. The amount in excess of its Tract Participation shall be termed Excess Imputed Upper Tier Crude Oil. The total Excess Imputed Upper Tier Crude Oil of all Tracts shall be allocated to all Tracts, including Tracts which have not contributed Imputed Stripper Well Crude Oil and/or Imputed Upper Tier Crude Oil to the unit certification, in proportion to the quantities that the unit production allocated to a Tract by its Tract Participation exceeds the sum of the Imputed Stripper Well Crude, Excess Imputed Stripper Well Crude Oil and Imputed Upper Tier Crude Oil allocated to such Tract.

(c) Upper Tier Crude Oil and Old Oil shall each be allocated to each Tract in proportion to the quantities that the unit production allocated

to a Tract by its Tract Participaton exceeds the sum of the allocated Imputed Stripper Well Crude Oil, Excess Imputed Stripper Well Crude Oil, Imputed Upper Tier Crude Oil and Excess Imputed Upper Tier Crude Oil allocated to such Tract.

The provisions of this Section 16 shall remain in effect only so long as necessary for the unit to comply with applicable laws, rules and regulations of appropriate governmental authorities. Should such laws, rules, and regulations hereafter change substantially so as to alter the basis for a certification of unit production as set forth above, then in such event a method of allocating the certification among the Tracts comprising the unit shall be implemented by Unit Operator which as nearly as possible achieves the above-stated intention hereof. In any event the provisions of this Section 16 shall automatically terminate in their entirety upon the production of 23,000,000 barrels of oil after the Effective Date from the Unitized Formation underlying all Tracts described in the original Exhibit B hereof; thereafter all oil produced, saved and sold from the unit shall, as to each and every category into which such production may then or thereafter be classified for pricing or other purposes, be allocated to all qualified Tracts in proportion to Tract Participation in accordance with the provisions of Section 15. The provisions of this section shall be deemed supplementary to the other provisions of this Agreement and the provisions of the Unit Operating Agreement so that nothing contained herein shall alter the terms of such agreements, including but not limited to the portions thereof dealing with Tract Participation, allocation of unit production, and allocation of investment and operating costs.

SECTION 17. OUTSIDE SUBSTANCES. If gas obtained from any source other than the Unitized Formation is introduced into the Unitized Formation for use in repressuring, stimulating of production or increasing ultimate recovery, which shall be in conformity with a Plan of Operation first approved by the Land Commissioner and the Division, a like amount of gas with appropriate deduction for loss or depletion from any cause may be withdrawn from unit wells completed in the Unitized Formation royalty free as to dry gas, but not royalty free as to the products extracted therefrom; provided that such withdrawal shall be at such time as may be provided in the approved Plan of Operation or as otherwise may be consented to or prescribed by the Land Commissioner and the Division as conforming to good petroleum engineering practices and provided further that such right of withdrawal shall terminate on the termination date of this Agreement.

SECTION 18. ROYALTY SETTLEMENT. Any and all Royalty Owners who, under an existing contract, are entitled to take in kind a share of the substances produced from any Tract unitized hereunder, shall continue to be entitled to such right to take in kind their share of the Unitized Substances

allocated to such Tract, and Unit Operator shall make deliveries of such Royalty share taken in kind in conformity with the applicable contracts, laws and regulations. Settlement for Royalty not taken in kind shall be made by Working Interest Owners responsible therefor under existing contracts, laws and regulations on or before the last day of each month for Unitized Substances produced during the preceding calendar month; provided, however, that nothing herein contained shall operate to relieve the lessees of any land from their respective lease obligations for the payment of any Royalty due under their leases, except that such Royalty shall be computed on Unitized Substances as allocated to each Tract in accordance with the terms of this Agreement. With respect to Federal leases committed hereto on which the royalty rate depends upon the daily average production per well, such average production shall be determined in accordance with the operating regulations pertaining to Federal leases as though the committed Tracts were included in a single consolidated lease.

If the amount of production or the proceeds thereof accruing to any Royalty Owner (except the United States of America) in a Tract depends upon the average production per well or the average pipeline runs per well from such Tract during any period of time, then such production shall be determined from and after the Effective Date hereof by dividing the quantity of Unitized Substances allocated hereunder to such Tract during such period of time by the number of wells located thereon completed in the Unitized Formation as of the Effective Date hereof, provided that any Tract not having any well completed in the Unitized Formation on the Effective Date hereof shall be considered as having one such well for the purpose of this provision.

All Royalty due the State of New Mexico and the United States of America and the other Royalty Owners hereunder shall be computed and paid on the basis of all Unitized Substances allocated to the respective Tract or Tracts committed hereto, in lieu of actual production from such Tract or Tracts.

Each Royalty Owner (other than the State of New Mexico and the United States of America) that executes this Agreement represents and warrants that it is the owner of a Royalty Interest in a Tract or Tracts within the Unit Area as its interest is indicated in Exhibit B attached hereto. If any Royalty Interest in a Tract or Tracts should be lost by title failure or otherwise in whole or in part, during the term of this Agreement, then the Royalty Interest of the party representing himself to be the owner hereof shall be reduced proportionately and the interests of all parties shall be adjusted accordingly.

SECTION 19. RENTAL SETTLEMENT. Rentals or minimum Royalties due on leases committed hereto shall be paid by Working Interest Owners responsible therefor under existing contracts, laws and regulations provided that

nothing herein contained shall operate to relieve the lessees of any land from their respective lease obligations for the payment of any rental or minimum Royalty in lieu thereof, due under their leases. Rental for lands of the State of New Mexico subject to this Agreement shall be paid at the rate specified in the respective leases from the State of New Mexico. Rental or minimum Royalty for lands of the United States of America subject to this Agreement shall be paid at the rate specified in the respective leases from the United States of America, unless such rental or minimum Royalty is waived, suspended or reduced by law or by approval of the Secretary or his duly authorized representative.

SECTION 20. CONSERVATION. Operations hereunder and production of Unitized Substances shall be conducted to provide for the most economical and efficient recovery of said substances without waste, as defined by or pursuant to Federal and State laws and regulations.

SECTION 21. DRAINAGE. The Unit Operator shall take appropriate and adequate measures to prevent drainage of Unitized Substances from Unitized Land by wells on land not subject to this Agreement.

The Unit Operator, upon approval by the Working Interest Owners and the Land Commissioner, is hereby empowered to enter into a border line agreement or agreements with working interest owners of adjoining lands not subject to this Agreement with respect to operation in the border area for the maximum economic recovery, conservation purposes and proper protection of the parties and interest affected.

SECTION 22. LEASES AND CONTRACTS CONFORMED AND EXTENDED. The terms, conditions and provisions of all leases, subleases and other contracts relating to exploration, drilling, development or operation for oil or gas on lands committed to this Agreement are hereby expressly modified and amended to the extent necessary to make the same conform to the provisions hereof, but otherwise to remain in full force and effect, and the parties hereto hereby consent that the Land Commissioner and the Secretary of the Interior of the United States of America (hereinafter referred to as "Secretary"), respectively, shall and by their approval hereof, or by the approval hereof by their duly authorized representatives, do hereby establish, alter, change or revoke the drilling, producing, rental, minimum Royalty and Royalty requirements of State and Federal leases committed hereto and the regulations in respect thereto to conform said requirements to the provisions of this Agreement.

Without limiting the generality of the foregoing, all leases, subleases and contracts are particularly modified in accordance with the following:

(a) The development and operation of lands subject to this Agreement under the terms hereof shall be deemed full performance of all

obligations for development and operation with respect to each part or separately owned Tract subject to this Agreement, regardless of whether there is any development of any particular part or Tract of the Unit Area, notwithstanding anything to the contrary in any lease, operating agreement or other contract by and between the parties hereto, or their respective predecessors in interest, or any of them.

(b) Drilling, producing or enhanced recovery operations performed hereunder shall be deemed to be performed upon and for the benefit of each Tract, and no lease shall be deemed to expire by reason of failure to drill or produce wells situated on the land therein embraced.

(c) Suspension of drilling or producing operations on all unitized lands pursuant to direction or consent of the Land Commissioner and the Secretary, or their duly authorized representatives, shall be deemed to constitute such suspension pursuant to such direction or consent as to each Tract of Unitized Lands.

(d) Each lease, sublease, or contract relating to the exploration, drilling, development or operation for oil and gas which by its terms might expire prior to the termination of this Agreement, is hereby extended beyond any such term so provided therein, so that it shall be continued in full force and effect for and during the term of this Agreement.

(e) Any lease embracing lands of the State of New Mexico which is made subject to this Agreement shall continue in force beyond the term provided therein as to the lands committed hereto until the termination hereof.

(f) Any lease embracing lands of the State of New Mexico having only a portion of its land committed hereto shall be segregated as to that portion committed and that not committed, and the terms of such lease shall apply separately to such segregated portions commencing as of the Effective Date hereof. Provided, however, that notwithstanding any of the provisions of this Agreement to the contrary, such lease shall continue in full force and effect beyond the term provided therein as to all lands embraced in such lease if oil or gas is, or has heretofore been discovered in paying quantities on some part of the lands embraced in such lease committed to this Agreement or, so long as a portion of the Unitized Substances produced from the Unit Area is, under the terms of this Agreement, allocated to the portion of the lands covered by such lease committed to this Agreement, or, at any time during the term hereof, as to any lease that is then valid and subsisting and upon which the lessee or the Unit Operator is then engaged in bona fide drilling, reworking, or improved recovery operations on any part of the lands embraced in such lease, then the same as to all lands embraced therein shall remain in full force and effect so long as such operations are diligently prosecuted, and if they result in the production

of oil or gas, said lease shall continue in full force and effect as to all of the lands embraced therein, so long thereafter as oil or gas in paying quantities is being produced from any portion of said lands.

(g) The segregation of any Federal lease committed to this Agreement is governed by the following provision in the fourth paragraph of Section 17 (j) of the Mineral Leasing Act, as amended by the Act of September 2, 1960, (74 Stat. 781-784): "Any (Federal) lease heretofore or hereafter committed to any such (unit) plan embracing lands that are in part within and in part outside of the area covered by any such plan shall be segregated into separate leases as to the lands committed and the lands not committed as of the effective date of unitization; provided, however, that any such lease as to the non-unitized portion shall continue in force and effect for the term thereof but for not less than two years from the date of such segregation and so long thereafter as oil or gas is produced in paying quantities."

SECTION 23. COVENANTS RUN WITH LAND. The covenants herein shall be construed to be covenants running with the land with respect to the interests of the parties hereto and their successors in interest until this Agreement terminates, and any grant, transfer or conveyance of interest in land or leases subject hereto shall be and hereby is conditioned upon the assumption of all privileges and obligations hereunder by the grantee, transferee or other successor in interest. No assignment or transfer of any Working Interest subject hereto shall be binding upon Unit Operator until the first day of the calendar month after Unit Operator is furnished with the original, or acceptable photostatic or certified copy of the recorded instrument of transfer; and no assignment or transfer of any Royalty Interest subject hereto shall be binding upon the Working Interest Owner responsible therefor until the first day of the calendar month after said Working Interest Owner is furnished with the original or acceptable photostatic or certified copy of the recorded instrument of transfer.

SECTION 24. EFFECTIVE DATE AND TERM. This Agreement shall become binding upon each party who executes or ratifies it as of the date of execution or ratification by such party and shall become effective on the first day of the calendar month next following the approval of this Agreement by the Land Commissioner and the Division, and the filing by Unit Operator of this Agreement or notice thereof for record in the office of the County Clerk of Lea County, New Mexico. Unit Operator shall not file this Agreement or notice thereof for record, and hence this Agreement shall not become effective, unless such filing is approved by Working Interest Owners owning a combined Phase III Unit Participation of at least eighty percent (80%) as to all Tracts then qualified under the provisions of Section 14.

If this Agreement does not become effective on or before January 1, 1980, it shall ipso facto expire on said date (hereinafter called "expiration

date") and thereafter be of no further force or effect, unless prior thereto this Agreement has been executed or ratified by Working Interest Owners owning a combined Phase III Unit Participation of at least seventy-five percent (75%), and the owners of at least seventy-five percent (75%) of such Working Interest committed to this Agreement have decided to extend said expiration date for a period not to exceed one year (hereinafter called "extended expiration date"). If said expiration date is so extended and this Agreement does not become effective on or before said extended expiration date, it shall ipso facto expire on said extended expiration date and thereafter be of no further force or effect.

Unit Operator shall, within thirty (30) days after the Effective Date of this Agreement, file for record in the office of the County Clerk of Lea County, New Mexico, a certificate to the effect that this Agreement has become effective in accordance with its terms and stating the Effective Date.

The term of this Agreement shall be for and during the time that Unitized Substances are produced from the Unitized Land and so long thereafter as drilling, reworking or other operations (including enhanced recovery operations) are prosecuted thereon without cessation of more than ninety (90) consecutive days unless sooner terminated as herein provided.

This Agreement may be terminated with the approval of the Land Commissioner by Working Interest Owners owning eighty percent (80%) or more of the Unit Participation then in effect whenever such Working Interest Owners determine that Unit Operations are no longer profitable or in the interest of conservation. Upon approval, such termination shall be effective as of the first day of the month after said Working Interest Owners' determination. Notice of any such termination shall be filed by Unit Operator in the office of the County Clerk of Lea County, New Mexico, within thirty (30) days of the effective date of termination.

Upon termination of this Agreement, the parties hereto shall be governed by the terms and provisions of the leases and contracts affecting the separate Tracts just as if this Agreement had never been entered into.

If not otherwise provided by the leases unitized under this Agreement, Royalty Owners hereby grant Working Interest Owners a period of six months after termination of this Agreement in which to salvage, sell, distribute or otherwise dispose of the personal property and facilities used in connection with Unit Operations.

SECTION 25. RATE OF PRODUCTION AND DISPOSAL THEREOF. All production and the disposal thereof shall be in conformity with allocations and quotas made or fixed by any duly authorized person or regulatory body under any Federal or State statute.

SECTION 26. NONDISCRIMINATION. Unit Operator in connection with the performance of work under this Agreement relating to leases of the United States agrees to comply with the provisions of Exhibit D attached hereto and made a part hereof.

SECTION 27. APPEARANCES. Unless a different representative is designated by Working Interest Owners, Unit Operator shall have the right to appear for or on behalf of any interests affected hereby before the Land Commissioner, the Department of the Interior of the United States of America, and the Division, and to appeal from any order issued under the rules and regulations of the Land Commissioner, the Department or the Division, or to apply for relief from any of said rules and regulations or in any proceedings relative to operations before the Land Commissioner, the Department or the Division or any other legally constituted authority; provided, however, that any other interested party shall also have the right at his or its own expense to be heard in any such proceeding.

SECTION 28. NOTICES. All notices, demands, objections or statements required hereunder to be given or rendered to the parties hereto shall be deemed fully given if made in writing and personally delivered to the party or parties or sent by postpaid certified or registered mail, addressed to such party or parties at their respective addresses set forth in connection with the signatures hereto or to the ratification or consent hereof or to such other address as any such party or parties may have furnished in writing to the party sending the notice, demand or statement.

SECTION 29. NO WAIVER OF CERTAIN RIGHTS. Nothing in this Agreement contained shall be construed as a waiver by any party hereto of the right to assert any legal or constitutional right or defense as to the validity or invalidity of any law of the State wherein said Unitized Lands are located, or regulations issued thereunder in any way affecting such party, or as a waiver by any such party of any right beyond his or its authority to waive; provided, however, each party hereto covenants that it will not resort to any action to partition the Unitized Land or the Unit Equipment.

SECTION 30. EQUIPMENT AND FACILITIES NOT FIXTURES ATTACHED TO REALTY. Each Working Interest Owner has heretofore placed and used on its Tract or Tracts committed to this Agreement various well and lease equipment and other property, equipment and facilities. It is also recognized that additional equipment and facilities may hereafter be placed and used upon the Unitized Land as now or hereafter constituted. Therefore, for all purposes of this Agreement all such equipment shall be considered to be personal property and not fixtures attached to realty. Accordingly, all such well and lease equipment and personal property is hereby severed from the mineral estates affected by this Agreement, and it is agreed that all

such equipment and personal property shall be and remain personal property of the Working Interest Owners for all purposes and the rights and interests therein as among Working Interest Owners shall be as set forth in the Unit Operating Agreement.

SECTION 31. UNAVOIDABLE DELAY. All obligations under this Agreement requiring the Unit Operator to commence or continue enhanced recovery operations or to operate on or produce Unitized Substances from any of the lands covered by this Agreement shall be suspended while, but only so long as, the Unit Operator, despite the exercise of due care and diligence, is prevented from complying with such obligations, in whole or in part, by strikes, acts of God, Federal, State or municipal law or agency, unavoidable accident, uncontrollable delays in transportation, inability to obtain necessary materials in open market, or other matters beyond the reasonable control of the Unit Operator whether similar to matters herein enumerated or not.

SECTION 32. LOSS OF TITLE. In the event title to any Tract of Unitized Land shall fail so as to render the Tract inoperable under this Agreement and the true owner cannot be induced to join this Agreement, such Tract shall be automatically regarded as not committed hereto as of the first day of the calendar month in which the failure of title is determined and there shall be such readjustment of future costs and benefits as may be required on account of the loss of such title. In the event of a dispute as to title as to any Royalty, Working Interest or other interest subject hereto, payment or delivery on account thereof may be withheld without liability or interest until the dispute is finally settled; provided, that as to State or Federal land or leases, no payments of funds due the State of New Mexico or the United Sates of America shall be withheld, but such funds shall be deposited as directed by the Land Commissioner and/or the Oil and Gas Supervisor of the United States Geological Survey (hereinafter referred to as "Supervisor"), as the case may be, to be held as unearned money pending final settlement of the title dispute, and then applied as earned or returned in accordance with such final settlement.

Unit Operator as such is relieved from any responsibility for any defeat or failure of any title hereunder.

SECTION 33. NONJOINDER AND SUBSEQUENT JOINDER. Joinder by any Royalty Owner, at any time, must be accompanied by appropriate joinder of the corresponding Working Interest Owner in order for the interest of such Royalty Owner to be regarded as effectively committed. Joinder to this Agreement by a Working Interest Owner, at any time, must be accompanied by appropriate joinder to the Unit Operating Agreement in order for such interest to be regarded as effectively committed to this Agreement.

Any oil or gas interest in the Unitized Formation not committed hereto prior to submission of this Agreement to the Land Commissioner for

final approval may thereafter be committed hereto upon compliance with the applicable provisions of this Section and of Section 14 (Tracts Qualified for Participation) hereof, at any time up to the Effective Date hereof on the same basis of participation as provided in said Section 14, by the owner or owners thereof subscribing, ratifying, or consenting in writing to this Agreement and, if the interest is a Working Interest, by the owner of such interest subscribing also to the Unit Operating Agreement.

It is understood and agreed, however, that from and after the Effective Date hereof the right of subsequent joinder as provided in this Section shall be subject to such requirements or approvals and on such basis and effective as of such date as may be agreed upon by Working Interest Owners owning not less than sixty-five percent (65%) of the Unit Participation then in effect, and approved by the Land Commissioner. Such subsequent joinder by a proposed Working Interest Owner must be evidenced by his execution or ratification of this Agreement and the Unit Operating Agreement and, where State or Federal land is involved, such joinder must be approved by the Land Commissioner or Supervisor. Such joinder by a proposed Royalty Owner must be evidenced by his execution, ratification or consent of this Agreement and must be consented to in writing by the Working Interest Owner responsible for the payment of any benefits that may accrue hereunder in behalf of such proposed Royalty Owner. Except as may be otherwise herein provided, subsequent joinder to this Agreement shall be effective as of the first day of the month following the filing with the Land Commissioner of duly executed counterparts of any and all documents necessary to establish effective commitment of any Tract or interest to this Agreement, unless objection to such joinder by the Land Commissioner is duly made within sixty (60) days after such filing.

SECTION 34. COUNTERPARTS. This Agreement may be executed in any number of counterparts, no one of which needs to be executed by all parties and may be ratified or consented to by separate instrument in writing, specifically referring hereto, and shall be binding upon all those parties who have executed such a counterpart, ratification or consent hereto with the same force and effect as if all parties had signed the same document, and regardless of whether or not it is executed by all other parties owning or claiming an interest in the land within the above described Unit Area.

SECTION 35. JOINDER IN DUAL CAPACITY. Execution as herein provided by any party as either a Working Interest Owner or a Royalty Owner shall commit all interests owned or controlled by such party; provided, that if the party is the owner of a Working Interest, he must also execute the Unit Operating Agreement.

SECTION 36. TAXES. Each party hereto shall, for its own account, render and pay its share of any taxes levied against or measured by the amount or value of the Unitized Substances produced from the Unitized Land;

provided, however, that if it is required or if it be determined that the Unit Operator or the several Working Interest Owners must pay or advance said taxes for the account of the parties hereto, it is hereby expressly agreed that the parties so paying or advancing said taxes shall be reimbursed therefor by the parties hereto, including Royalty Owners, who may be responsible for the taxes on their respective allocated share of said Unitized Substances. No taxes shall be charged to the United States or to the State of New Mexico, nor to any lessor who has a contract with a lessee which requires his lessee to pay such taxes.

SECTION 37. NO PARTNERSHIP. The duties, obligations and liabilities of the parties hereto are intended to be several and not joint or collective. This Agreement is not intended to create, and shall not be construed to create, an association or trust, or to impose a partnership duty, obligation or liability with regard to any one or more of the parties hereto. Each party hereto shall be individually responsible for its own obligations as herein provided.

SECTION 38. PRODUCTION AS OF THE EFFECTIVE DATE. Unit Operator shall make a proper and timely gauge of all lease storage tanks (excluding separation and treating equipment) within the Unitized Area in order to ascertain the amount of merchantable oil above the pipe line connection in such tanks as of the Effective Date hereof. All such oil which has then been produced in accordance with established allowables shall be and remain the property of the Working Interest Owner entitled thereto, the same as if the unit had not been formed; and the responsible Working Interest Owner shall promptly remove said oil from the Unitized Land. Any such oil not so removed shall be sold by Unit Operator for the account of such Working Interest Owners, subject to the payment of all Royalty to Royalty Owners under the terms hereof. The oil that is in excess of the prior allowable of the wells from which it was produced shall be regarded as Unitized Substances produced after Effective Date hereof.

If, as of the Effective Date hereof, any Tract is overproduced with respect to the allowable of the wells on that Tract and the amount of over-production has been sold or otherwise disposed of, such over-production shall be regarded as a part of the Unitized Substances produced after the Effective Date hereof and shall be charged to such Tract as having been delivered to the parties entitled to Unitized Substances allocated to such Tract.

SECTION 39. STATUTORY UNITIZATION. If and when Working Interest Owners owning at least seventy-five percent (75%) of the Phase I, Phase II and Phase III Unit Participation and Royalty Owners owning at least seventy-five percent (75%) of the Phase I, Phase II and Phase III Royalty Interest have become parties to this Agreement or have approved this Agreement in

writing and such Working Interest Owners have also become parties to the Unit Operating Agreement, Unit Operator may make application to the Division for statutory unitization of the uncommitted interests pursuant to the Statutory Unitization Act (Chap. 65, Art. 14, N.M.S. 1953 Ann.). If such application is made and statutory unitization is approved by the Division, then effective as of the date of the Division's order approving statutory unitization, this Agreement and/or the Unit Operating Agreement shall automatically be revised and/or amended in accordance with the following:

(1) Section 14 of this Agreement shall be revised by substituting for the entire said section the following:

"SECTION 14. TRACTS QUALIFIED FOR PARTICIPATION. On and after the Effective Date hereof, all Tracts within the Unit Area shall be entitled to participation in the production of Unitized Substances."

(2) Section 24 of this Agreement shall be revised by substituting for the first three paragraphs of said section the following:

"SECTION 24. EFFECTIVE DATE AND TERM. This Agreement shall become effective on the first day of the calendar month next following the effective date of the Division's order approving statutory unitization upon the terms and conditions of this Agreement, as amended (if any amendment is necessary) to conform to the Division's order; approval of this Agreement, as so amended, by the Land Commissioner; and the filing by Unit Operator of this Agreement or notice thereof for record in the office of the County Clerk of Lea County, New Mexico. Unit Operator shall not file this Agreement or notice thereof for record, and hence this Agreement shall not become effective, unless within ninety (90) days after the date all other prerequisites for effectiveness of this Agreement have been satisfied, such filing is approved by Working Interest Owners owning a combined Phase III Unit Participation of at least sixty-five percent (65%) as to all Tracts within the Unit Area.

"Unit Operator shall, within thirty (30) days after the Effective Date of this Agreement, file for record in the office of the County Clerk of Lea County, New Mexico, a certificate to the effect that this Agreement has become effective in accordance with its terms, therein identifying the Division's order approving statutory unitization and stating the Effective Date."

(3) This Agreement and/or the Unit Operating Agreement shall be amended in any and all respects necessary to conform to the Division's order approving statutory unitization.

Any and all amendments of this Agreement and/or the Unit Operating Agreement that are necessary to conform said agreements to the Division's

order approving statutory unitization shall be deemed to be hereby approved in writing by the parties hereto without any necessity for further approval by said parties, except as follows:

(a) If any amendment of this Agreement has the effect of reducing any Royalty Owner's participation in the production of Unitized Substances, such Royalty Owner shall not be deemed to have hereby approved the amended agreement without the necessity of further approval in writing by said Royalty Owner; and

(b) If any amendment of this Agreement and/or the Unit Operating Agreement has the effect of reducing any Working Interest Owner's participation in the production of Unitized Substances or increasing such Working Interest Owner's share of Unit Expense, such Working Interest Owner shall not be deemed to have hereby approved the amended agreements without the necessity of further approval in writing by said Working Interest Owner.

IN WITNESS WHEREOF, the parties hereto have caused this Agreement to be executed and have set opposite their respective names the date of execution.

SHELL OIL COMPANY
Unit Operator and Working Interest Owner

Date: July 31, 1978

By: Robert L. Avary
Attorney in Fact
ROBERT L. AVARY
P. O. Box 991
Houston, Texas 77001

STATE OF TEXAS )
)
COUNTY OF HARRIS )

The foregoing instrument was acknowledged before me this 31st day of July, 1978, by ROBERT L. AVARY, Attorney in Fact for SHELL OIL COMPANY, a Delaware corporation, on behalf of said corporation.

My Commission expires:
BELINDA ROEBER
Notary Public in and for Harris County, Texas
My Commission Expires July 21, 1979

Belinda Roeber
Notary Public in and for
Harris County, Texas

# EXHIBIT A
## NORTH HOBBS (GRAYBURG – SAN ANDRES) UNIT
Lea County, New Mexico

2Z00199

R 37 E | R 38 E

**LEGEND**

- WELLS COMPLETED IN UNITIZED FORMATION
- UNIT BOUNDARY
- (61) TRACT NUMBER

T 18 S

T 19 S

R 38 E

EXHIBIT B
ATTACHED TO UNIT AGREEMENT
NORTH HOBBS (GRAYBURG-SAN ANDRES) UNIT
LEA COUNTY, NEW MEXICO



| Tract No. | Description of Land (Operator & Lease Name) | No. Acres | Serial No. & Expiration & Date of Lease | Basic Royalty Ownership and Percentage | Lessee of Record | Overriding Royalty Owner & Percentage | Working Interest Owner & Percentage |
|---|---|---|---|---|---|---|---|
| | | | | FEDERAL LAND | | | |
| 21 | T18S-R38E, Sec. 20: NW/4SE/4 (Bill Sweet-Bowers B. Fed.) | 40 | LC-032233-B HBP 06/01/60 | United States Geological Survey 12.5% | Bill L. Sweet 100% | First National Bank and Ida Elizabeth Oliver, Co-Trustees for the benefit of Jessie Fay Oliver Castlen N. Trust No. 1253 0.68360%<br><br>Exxon Corporation 5.46875%<br><br>Fred F. Kotyza 2.73438%<br><br>First National Bank and Ida Elizabeth Oliver, Co-Trustees for the benefit of Donald Cowden Oliver Trust No. 1254 0.68359%<br><br>Donald M. Oliver 1.36718%<br>10.9375% | Bill Sweet 100% |

EXHIBIT B
ATTACHED TO UNIT AGREEMENT
NORTH HOBBS (GRAYBURG-SAN ANDRES) UNIT
LEA COUNTY, NEW MEXICO



(EXHIBIT B, CONT'D)

| Tract No. | Description of Land (Operator & Lease Name) | No. Acres | Serial No. & Expiration & Date of Lease | Basic Royalty Ownership and Percentage | Lessee of Record | Overriding Royalty Owner & Percentage | Working Interest Owner & Percentage |
|---|---|---|---|---|---|---|---|
| 22 | T18S-R38E, Sec. 20: SE¼SE¼ (Bill Sweet-Bowers B. Fed.) | 40 | LC-032233-B HBP 06/01/60 | United States Geological Survey 12.5% | Bill L. Sweet 100% | First National Bank and Ida Elizabeth Oliver, Co-Trustees for the benefit of Jessie Fay Oliver Castlen M. Trust No. 1253 0.68360%<br><br>Exxon Corporation 5.46875%<br><br>Fred P. Kotyza 2.73438%<br><br>First National Bank and Ida Elizabeth Oliver, Co-Trustees for the benefit of Donald Cowden Oliver - Trust No. 1254 0.68359%<br><br>Donald M. Oliver 1.36718%<br>10.9375% | Bill Sweet 100% |
| 47 | T18S-R38E, Sec. 29; SW¼NW¼ & W½SW¼; Sec. 30; SE¼ (Exxon-Bowers A Federal) | 280 | LC-032233-A HBP 02/01/50 | United States Geological Survey 12.5% (Sliding Scale Royalty) | Exxon Corporation 100% | Samuel J. Caudill, Jr. 0.041700% | Exxon Corporation 100% |

EXHIBIT B
ATTACHED TO UNIT AGREEMENT
NORTH HOBBS (GRAYBURG-SAN ANDRES) UNIT
LEA COUNTY, NEW MEXICO



(EXHIBIT B, CONT'D)

| Tract No. | Description of Land (Operator & Lease Name) | No. Acres | Serial No. & Expiration & Date of Lease | Basic Royalty Ownership and Percentage | Lessee of Record | Overriding Royalty Owner & Percentage | Working Interest Owner & Percentage |
|---|---|---|---|---|---|---|---|
| Cont. 47 | | | | | | John W. Chadwick, Individually and as trustee under the wills of Glenn B. Chadwick and Grace E. Chadwick, deceased 0.125%<br><br>Charles H. Coll 0.208300%<br><br>James H. Coll 0.208300%<br><br>Jon F. Coll 0.208400%<br><br>Lillian Hinkle Coll for the account of Max W. Coll, II 0.208300%<br><br>William M. Keck, II, Tom Scully and Katherine Cone Keck as Trustees of the Katherine Cone Keck Trust C under the will of S. E. Cone, deceased 0.083334% | |

EXHIBIT B
ATTACHED TO UNIT AGREEMENT
NORTH HOBBS (GRAYBURG-SAN ANDRES) UNIT
LEA COUNTY, NEW MEXICO



(EXHIBIT B, CONT'D)

| Tract No. | Description of Land (Operator & Lease Name) | No. Acres | Serial No. & Expiration & Date of Lease | Basic Royalty Ownership and Percentage | Lessee of Record | Overriding Royalty Owner & Percentage | Working Interest Owner & Percentage |
|---|---|---|---|---|---|---|---|
| Cont. 47 | | | | | | S. E. Cone, Jr. 0.083333%<br><br>Alva M. Etz and Jean W. Etz 0.218750%<br><br>George H. Etz, Jr., Trustee of the George H. Etz, Sr., Trust 0.43750%<br><br>Robert W. Etz 0.218750%<br><br>F. J. Evans Corporation 0.041700%<br><br>The Homestake Oil & Gas Company 0.125%<br><br>The Homestake Royalty Corporation 0.25000%<br><br>Houston Oil & Minerals Corporation 0.250% | |

EXHIBIT B
ATTACHED TO UNIT AGREEMENT
NORTH HOBBS (GRAYBURG-SAN ANDRES) UNIT
LEA COUNTY, NEW MEXICO



(EXHIBIT B, CONT'D)

| Tract No. | Description of Land (Operator & Lease Name) | No. Acres | Serial No. & Expiration & Date of Lease | Basic Royalty Ownership and Percentage | Lessee of Record | Overriding Royalty Owner & Percentage | Working Interest Owner & Percentage |
|---|---|---|---|---|---|---|---|
| Cont. 47 | | | | | | Marjorie Cone Kastman 0.083333%<br>Lawson Petroleum Company 0.208300%<br>The First National Bank of Roswell, Trustee of Allie M. Lee Trust 3.1875%<br>Virginia P. Selby 0.2500%<br>Shriners Hospitals for Crippled Children - a Colorado Corporation 1.0625%<br>7.5% | |
| 48 | T18S-R38E, Sec. 29: NW¼NW¼ (Exxon-Bowers A Fed. Com. 35) | 40 | **Communitization Agreement SW-623 Effective 10/21/71; Approved 12/23/71 | United States Geological Survey 12.5% (Sliding Scale Royalty) | Exxon Corporation 100% | Samuel J. Caudill, Jr. 0.020850%<br>John W. Chadwick, Individually and as trustee under the wills of Glenn B. Chadwick and Grace W. Chadwick, deceased 0.062500%<br>Charles H. Coll 0.104150% | Exxon Corporation 100% |
| | **Sec. 29: S½NW¼NW¼ | 20 | LC-032233-A 02/01/50 | | | | |
| | **Sec. 29: N½NW¼NW¼ | 20 | LC-032233-B 06/01/60 | | | | |

EXHIBIT B
ATTACHED TO UNIT AGREEMENT
NORTH HOBBS (GRAYBURG-SAN ANDRES) UNIT
LEA COUNTY, NEW MEXICO



(EXHIBIT B, CONT'D)

| Tract No. | Description of Land (Operator & Lease Name) | No. Acres | Serial No. & Expiration & Date of Lease | Basic Royalty Ownership and Percentage | Lessee of Record | Overriding Royalty Owner & Percentage | Working Interest Owner & Percentage |
|---|---|---|---|---|---|---|---|
| Cont. 48 | | | | | | James M. Coll 0.104150%<br><br>Jon F. Coll 0.104200%<br><br>Lillian Hinkle Coll for the account of Max W. Coll, II 0.104150%<br><br>William M. Keck, II, Tom Sealy and Katherine Cone Keck as Trustees of the Katherine Cone Keck Trust C under the will of S. E. Cone, deceased 0.041667%<br><br>S. E. Cone, Jr. 0.041667%<br><br>Alva N. Etz and Jean W. Etz 0.109375%<br><br>George H. Etz, Jr., Trustee of the George H. Etz, Sr., Trust 0.218750% | |

EXHIBIT B
ATTACHED TO UNIT AGREEMENT
NORTH HOBBS (GRAYBURG-SAN ANDRES) UNIT
LEA COUNTY, NEW MEXICO



(EXHIBIT B, CONT'D)

| Tract No. | Description of Land (Operator & Lease Name) | No. Acres | Serial No. & Expiration & Date of Lease | Basic Royalty Ownership and Percentage | Lessee of Record | Overriding Royalty Owner & Percentage | Working Interest Owner & Percentage |
|---|---|---|---|---|---|---|---|
| Cont. 48 | | | | | | Robert W. Etz 0.109375%<br><br>F. J. Evans Corporation 0.020850%<br><br>The Homestake Oil & Gas Company 0.062500%<br><br>The Homestake Royalty Corporation 0.12500%<br><br>Houston Oil & Minerals Corporation 0.12500%<br><br>Marjorie Cone Kastman 0.041666%<br><br>Lawson Petroleum Company 0.104150%<br><br>The First National Bank of Roswell, Trustee of Allie M. Lee Trust 1.593750%<br><br>Virginia P. Selby 0.12500% | |

EXHIBIT B
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NORTH HOBBS (GRAYBURG-SAN ANDRES) UNIT
LEA COUNTY, NEW MEXICO



(EXHIBIT B, CONT'D)

| Tract No. | Description of Land (Operator & Lease Name) | No. Acres | Serial No. & Expiration & Date of Lease | Basic Royalty Ownership and Percentage | Lessee of Record | Overriding Royalty Owner & Percentage | Working Interest Owner & Percentage |
|---|---|---|---|---|---|---|---|
| Cont. 48 | | | | | | Shriners Hospitals for Crippled Children - a Colorado Corporation 0.531250% 3.75% | |
| Total 4 Federal Tracts ------- 400.00 acres or 3.75603% of unit (surface) area | | | | | | | |
| | STATE LAND | | | | | | |
| 1 | T18S-R37E, Sec. 14: N½ (Getty-State B) | 320 | B-2330-4 HBP 12/21/33 | Commissioner of Public Lands - State of New Mexico 12.5% | Getty Oil Company 100% | None | Getty Oil Company 100% |
| 2 | T18S-R37E, Sec. 14: N½SW¼, SW¼SW¼, SW¼SE¼ (Amerada Hess-State WHB) | 160 | A-1469-2 HBP 12/15/28 | Commissioner of Public Lands - State of New Mexico 12.5% | Amerada Hess Corporation 100% | None | Amerada Hess Corporation 100% |
| 3 | T18S-R37E, Sec. 14: SE¼SW¼ (Gulf-Lea FO State) | 40 | E-8503 HBP 09/21/54 | Commissioner of Public Lands - State of New Mexico 12.5% | Gulf Oil Corporation 100% | None | Gulf Oil Corporation 100% |
| 4 | T18S-R37E, Sec. 14: N½SE¼ (Texas Pacific-State V-Act 1) | 80 | E-5770-2 HBP 11/10/51 | Commissioner of Public Lands - State of New Mexico 12.5% | Texas Pacific Coal & Oil Co. 100% | None | Texas Pacific Oil Company, Inc. 100% |

EXHIBIT B
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NORTH HOBBS (GRAYBURG-SAN ANDRES) UNIT
LEA COUNTY, NEW MEXICO



(EXHIBIT B, CONT'D)

| Tract No. | Description of Land (Operator & Lease Name) | No. Acres | Serial No. & Expiration & Date of Lease | Basic Royalty Ownership and Percentage | Lessee of Record | Overriding Royalty Owner & Percentage | Working Interest Owner & Percentage |
|---|---|---|---|---|---|---|---|
| 5 | T18S-R37E, Sec. 14: SE¼SE¼ (Estes Engineering Co. State) | 40 | K-5218 HBP 08/17/65 | Commissioner of Public Lands - State of New Mexico 12.5% | Yeager & Armstrong 100% | None | Ada A. Anderson 11.71875%<br>W. D. Anderson & Sons 23.43750%<br>Ada A. Anderson, Paul Donald Anderson & Payton V. Anderson Executors of the Estate of Warren D. Anderson 11.71875%<br>J. H. Armstrong 23.43750%<br>Russell G. Estes d/b/a Estes Engineering Co. 6.25%<br>W. A. Yeager 23.43750%<br>100% |
| 6 | T18S-R37E, Sec. 13: W½ (Continental-State B-13) | 320 | B-1535-1 HBP 12/22/32 | Commissioner of Public Lands - State of New Mexico 12.5% | Continental Oil Company 100% | None | Continental Oil Company 100% |

EXHIBIT B
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NORTH HOBBS (GRAYBURG-SAN ANDRES) UNIT
LEA COUNTY, NEW MEXICO



(EXHIBIT B, CONT'D)

| Tract No. | Description of Land (Operator & Lease Name) | No. Acres | Serial No. & Expiration & Date of Lease | Basic Royalty Ownership and Percentage | Lessee of Record | Overriding Royalty Owner & Percentage | Working Interest Owner & Percentage |
|---|---|---|---|---|---|---|---|
| 10A | T18S-R38E, Sec. 17: SW¼NW¼ (Moranco-State T-17) | 40 | B-2330-4 HBP 12/21/33 | Commissioner of Public Lands - State of New Mexico 12.5% | Getty Oil Company 100% | The First National Bank of Midland Texas, for account of Clifford T. Somers 2.5%<br>Tom Schneider 2.5%<br>5.0% | Howell Spear 1.17190%<br>Ellie Sims Spear 1.17190%<br>J. N. Dunlavey 4.68750%<br>First Roswell Company 9.37500%<br>Getty Oil Company 25.00000%<br>George P. Laflin 4.68750%<br>Kenneth D. McPeters 7.03130%<br>Robert Martin Moran 28.12490%<br>Moranco 9.37500% |

EXHIBIT B
ATTACHED TO UNIT AGREEMENT
NORTH HOBBS (GRAYBURG-SAN ANDRES) UNIT
LEA COUNTY, NEW MEXICO



(EXHIBIT B, CONT'D)

| Tract No. | Description of Land (Operator & Lease Name) | No. Acres | Serial No. & Expiration & Date of Lease | Basic Royalty Ownership and Percentage | Lessee of Record | Overriding Royalty Owner & Percentage | Working Interest Owner & Percentage |
|---|---|---|---|---|---|---|---|
| Cont. 10A | | | | | | | Loyd Whitley 4.68750%<br>A. T. Williamson 4.68750%<br>100% |
| 10B | T18S-R38E, Sec. 17: SE¼NW¼ (Moranco-State T-17) | 40 | B-2330-4 HBP 12/21/33 | Commissioner of Public Lands - State of New Mexico 12.5% | Getty Oil Company 100% | None | Getty Oil Company 100% |
| 11 | T18S-R38E, Sec. 17: N½SW¼ (Chevron State 1-17) | 80 | B-2277-1 HBP 12/07/33 | Commissioner of Public Lands - State of New Mexico 12.5% | Chevron U.S.A., Inc. 100% | None | Chevron U.S.A., Inc. 100% |
| 12 | T18S-R38E, Sec. 17: S½SW¼ (Getty (Skelly)-State A) | 80 | NM-B-1327 HBP 11/16/32 | Commissioner of Public Lands - State of New Mexico 12.5% | Getty Oil Company 100% | None | Getty Oil Company 100% |
| 28 | T18S-R37E, Sec. 24: NE¼ (Gulf-Graham-State A) | 160 | A-1543-1 HBP 12/29/28 | Commissioner of Public Lands - State of New Mexico 12.5% | Gulf Oil Corporation 100% | None | Gulf Oil Corporation 100% |
| 29 | T18S-R37E, Sec. 24: E½NW¼ (Shell-State D) | 80 | B-1411-1 HBP 12/03/32 | Commissioner of Public Lands - State of New Mexico 12.5% | Shell Oil Company 100% | None | Shell Oil Company 100% |

EXHIBIT B
ATTACHED TO UNIT AGREEMENT
NORTH HOBBS (GRAYBURG-SAN ANDRES) UNIT
LEA COUNTY, NEW MEXICO



(EXHIBIT B, CONT'D)

| Tract No. | Description of Land (Operator & Lease Name) | No. Acres | Serial No. & Expiration & Date of Lease | Basic Royalty Ownership and Percentage | Lessee of Record | Overriding Royalty Owner & Percentage | Working Interest Owner & Percentage |
|---|---|---|---|---|---|---|---|
| 30 | T18S-R37E, Sec. 24: W½NW¼ (Amerada Hess-State E) | 80 | B-1461-1 HBP 12/14/32 | Commissioner of Public Lands - State of New Mexico 12.5% | Amerada Hess Corporation 50%<br>Getty Oil Company 50%<br>100% | None | Amerada Hess Corporation 50%<br>Getty Oil Company 50%<br>100% |
| 31 | T18S-R37E, Sec. 24: SE¼ (Texas Pacific-State G) | 160 | A-1977-2 HBP 3/11/29 | Commissioner of Public Lands - State of New Mexico 12.5% | Texas Pacific Coal & Oil Co. 100% | None | Texas Pacific Oil Company, Inc. 100% |
| 32 | T18S-R37E, Sec. 24: SW¼ (Samedan-State C) | 160 | A-1118-4 HBP 09/15/28 | Commissioner of Public Lands - State of New Mexico 12.5% | Samedan Oil Corporation 100% | Shell Companies Foundation, Inc. 12.5% | Samedan Oil Corporation 37.8%<br>First National Bank of Casper, Trustee, Tate Trusts 3.75%<br>The First National Bank of Fort Worth, Agent for William S. Spradling 0.625%<br>The First National Bank of Fort Worth Trustee for Verda Spradling, No. 3211 0.625% |

EXHIBIT B
ATTACHED TO UNIT AGREEMENT
NORTH HOBBS (GRAYBURG-SAN ANDRES) UNIT
LEA COUNTY, NEW MEXICO



(EXHIBIT B, CONT'D)

| Tract No. | Description of Land (Operator & Lease Name) | No. Acres | Serial No. & Expiration & Date of Lease | Basic Royalty Ownership and Percentage | Lessee of Record | Overriding Royalty Owner & Percentage | Working Interest Owner & Percentage |
|---|---|---|---|---|---|---|---|
| Cont. 32 | | | | | | | C. C. Forbes 1.9%<br><br>Ilamae Forbes 1.85%<br><br>Samuel Roberts Noble Foundation, Inc. 28.75%<br><br>G. D. Morris 1.25%<br><br>Richard L. Noble 15.2%<br><br>Portales National Bank 1.875%<br><br>John Roring 3.75%<br><br>SEA Properties, Ltd. 0.75%<br><br>E. C. Sullivan 1.875%<br>100% |

EXHIBIT B
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LEA COUNTY, NEW MEXICO



(EXHIBIT B, CONT'D)

| Tract No. | Description of Land (Operator & Lease Name) | No. Acres | Serial No. & Expiration & Date of Lease | Basic Royalty Ownership and Percentage | Lessee of Record | Overriding Royalty Owner & Percentage | Working Interest Owner & Percentage |
|---|---|---|---|---|---|---|---|
| 33A | T18S-R37E, Sec. 23: NE¼NE¼, SE¼NE¼, (Est. of C. H. Sweet-State F) | 80 | B-9264-5 HBP 08/11/41 | Commissioner of Public Lands - State of New Mexico 12.5% | C. H. Sweet Oil Company 100% | Shell Companies Foundation, Inc. Gas - 12.5% Oil - Fluctuating Overriding Royalty Interest per 4/9/51 Agreement | First National Bank of Lea County, Trustee for Cecil H. Sweet and Imo Sweet Trust. 100% |
| 33B | T18S-R37E, Sec. 23: NE¼SE¼ (Est. of C. H. Sweet-State F) | 40 | B-9264-6 HBP 08/11/41 | Commissioner of Public Lands - State of New Mexico 12.5% | C. H. Sweet Oil Company 100% | Shell Companies Foundation, Inc. Gas - 12.5% Oil - Fluctuating Overriding Royalty Interest per 1/2/53 Agreement | First National Bank of Lea County, Trustee for Cecil H. Sweet and Imo Sweet Trust. 100% |
| 34 | T18S-R37E, Sec. 23: N½NE¼ (Shell-State F) | 80 | B-9264-2 HBP 08/11/41 | Commissioner of Public Lands - State of New Mexico 12.5% | Shell Oil Company 100% | None | Shell Oil Company 100% |
| 35 | T18S-R37E, Sec. 23: E½NW¼ & SW¼ (Texas Pacific-State V-A/C 2) | 240 | E-5770-2 HBP 11/10/51 | Commissioner of Public Lands - State of New Mexico 12.5% | Texas Pacific Coal & Oil Co. 100% | None | Texas Pacific Oil Company, Inc. 100% |

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(EXHIBIT B, CONT'D)

| Tract No. | Description of Land (Operator & Lease Name) | No. Acres | Serial No. & Expiration & Date of Lease | Basic Royalty Ownership and Percentage | Lessee of Record | Overriding Royalty Owner & Percentage | Working Interest Owner & Percentage |
|---|---|---|---|---|---|---|---|
| 37 | T18S-R37E, Sec. 23: W½SE¼ & SE¼SE¼ (John A. Yates-Shell State F) | 120 | B-9264-10 HBP 08/11/41 | Commissioner of Public Lands - State of New Mexico 12.5% | Abo Petroleum Corporation 100% | Shell Companies Foundation, Inc. Gas - 12.5% Oil - Fluctuating Overriding Royalty Interest per 10/14/55 Agreement | Abo Petroleum Corporation 52.5%<br>Ward Investment Corporation 10%<br>Yates Petroleum Corporation 25%<br>S. P. Yates 12.5%<br>100% |
| 38 | T18S-R37E, Sec. 26: NW¼NE¼ (Wiser-State L) | 40 | K-5278 HBP 09/21/65 | Commissioner of Public Lands - State of New Mexico 12.5% | The Wiser Oil Company 100% | None | The Wiser Oil Company 100% |
| 39 | T18S-R37E, Sec. 26: E½NE¼ (Getty (Skelly)-Hobbs E) | 80 | E-5673 HBP 10/10/51 | Commissioner of Public Lands - State of New Mexico 12.5% | Getty Oil Company 100% | None | Getty Oil Company 100% |
| 40 | T18S-R37E, Sec. 25: N½NW¼ (Continental-State B-25) | 80 | B-1535½ HBP 12/22/32 | Commissioner of Public Lands - State of New Mexico 12.5% | Continental Oil Company 100% | None | Continental Oil Company 100% |

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(EXHIBIT B, CONT'D)

| Tract No. | Description of Land (Operator & Lease Name) | No. Acres | Serial No. & Expiration & Date of Lease | Basic Royalty Ownership and Percentage | Lessee of Record | Overriding Royalty Owner & Percentage | Working Interest Owner & Percentage |
|---|---|---|---|---|---|---|---|
| 41 | T18S-R37E, Sec. 25: S½NW¼ (Samedan-State B) | 80 | B-1535½-1 HBP 12/22/32 | Commissioner of Public Lands - State of New Mexico 12.5% | Samedan Oil Corporation 100% | Continental Oil Company 6.25% | Samedan Oil Corporation 100% |
| 42 | T18S-R37E, Sec. 25: NE¼ (Texaco-N.M. C State) | 160 | B-159-1 HBP 08/14/31 | Commissioner of Public Lands - State of New Mexico 12.5% | Texaco Inc. 100% | None | Texaco Inc. 100% |
| 43 | T18S-R37E, Sec. 25: S½ (Exxon-N.M. State A) | 320 | A-1320 HBP 11/22/28 | Commissioner of Public Lands - State of New Mexico 12.5% | Exxon Corporation 100% | None | Exxon Corporation 100% |
| 46 | T18S-R38E, Sec. 30: SW¼ (Marathon-State Sec. 30) | 155.78 | A-3071 HBP 01/09/30 | Commissioner of Public Lands - State of New Mexico 12.5% | Marathon Oil Company 100% | None | Marathon Oil Company 100% |
| 49 | T18S-R38E, Sec. 29, W½NE¼ & E½NW¼ (Amerada State B) | 160 | A-1469-2 HBP 12/18/28 | Commissioner of Public Lands - State of New Mexico 12.5% | Amerada Hess Corporation 100% | None | Amerada Hess Corporation 100% |
| 51 | T16S-R38E, Sec. 29: E½SW¼ & NW¼SE¼ (Continental-State A 29) | 120 | B-2657 HBP 09/23/33 | Commissioner of Public Lands - State of New Mexico 12.5% | Continental Oil Company 100% | None | Continental Oil Company 100% |

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(EXHIBIT B, CONT'D)

| Tract No. | Description of Land (Operator & Lease Name) | No. Acres | Serial No. & Expiration & Date of Lease | Basic Royalty Ownership and Percentage | Lessee of Record | Overriding Royalty Owner & Percentage | Working Interest Owner & Percentage |
|---|---|---|---|---|---|---|---|
| 53 | T18S-R38E, Sec. 29: S½SE¼ (Chevron-State 1-29) | 80 | B-2277-1 HBP 12/07/33 | Commissioner of Public Lands - State of New Mexico 12.5% | Chevron U.S.A. Inc. 100% | None | Chevron U.S.A. Inc. 100% |
| 68 | T18S-R38E, Sec. 33: N½NW¼ (Shell-State B) | 80 | A-1118-5 HBP 09/15/28 | Commissioner of Public Lands - State of New Mexico 12.5% | Shell Oil Company 100% | None | Shell Oil Company 100% |
| 69 | T18S-R38E, Sec. 33: S½NW¼ (Amoco-State G) | 80 | A-1573-4 HBP 01/03/29 | Commissioner of Public Lands - State of New Mexico 12.5% | Amoco Production Company 100% | None | Amoco Production Company 75.43501%<br>Landreth Interests 24.56499%<br>100% |
| 70 | T18S-R38E, Sec. 33: SW¼NE¼, W½SE¼ & SW¼ (Continental-State A-33) | 280 | B-2656 HBP 09/23/33 | Commissioner of Public Lands - State of New Mexico 12.5% | Continental Oil Company 100% | None | Continental Oil Company 100% |
| 71 | T18S-R38E, Sec. 32: N½NE¼ (Amerada Hess-State A) | 80 | A-1469-2 HBP 12/18/28 | Commissioner of Public Lands - State of New Mexico 12.5% | Amerada Hess Corporation 100% | None | Amerada Hess Corporation 100% |
| 72 | T18S-R38E, Sec. 32: S½NE¼ (Shell-State A) | 80 | A-1118-5 HBP 09/15/28 | Commissioner of Public Lands - State of New Mexico 12.5% | Shell Oil Company 100% | None | Shell Oil Company 100% |

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(EXHIBIT B, CONT'D)

| Tract No. | Description of Land (Operator & Lease Name) | No. Acres | Serial No. & Expiration & Date of Lease | Basic Royalty Ownership and Percentage | Lessee of Record | Overriding Royalty Owner & Percentage | Working Interest Owner & Percentage |
|---|---|---|---|---|---|---|---|
| 75A | T18S-R38E, Sec. 32: W½SE¼ (Marathon-State Sec. 32) | 80 | A-2747-7 HBP 08/22/29 | Commissioner of Public Lands - State of New Mexico 12.5% | Marathon Oil Company 50%<br>Atlantic Richfield 50%<br>100% | None | Marathon Oil Company 50%<br>Atlantic Richfield Company 50%<br>100% |
| 75B | T18S-R38E, Sec. 32: E½SE¼ (Marathon-State Sec. 32) | 80 | A-1159-9 HBP 10/01/28 | Commissioner of Public Lands - State of New Mexico 12.5% | Marathon Oil Company 100% | None | Marathon Oil Company 50%<br>Atlantic Richfield Company 50%<br>100% |
| 81 | T18S-R37E, Sec. 36: E½NE¼, SW¼NE¼, SE¼ (Amerada Hess-State C) | 280 | A-1469-2 HBP 12/18/28 | Commissioner of Public Lands - State of New Mexico 12.5% | Amerada Hess Corporation 100% | None | Amerada Hess Corporation 100% |
| 82 | T18S-R37E, Sec. 36: NW¼NE¼ (Byrom-J. R. Holt State) | 40 | B-243-1 HBP 09/10/31 | Commissioner of Public Lands - State of New Mexico 12.5% | Gulf Oil Corporation 100% | Gulf Oil Corporation 5.46875% | W. K. Byrom 62.5%<br>Robert G. McPherson 37.5%<br>100% |

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(EXHIBIT B, CONT'D)

| Tract No. | Description of Land (Operator & Lease Name) | No. Acres | Serial No. & Expiration & Date of Lease | Basic Royalty Ownership and Percentage | Leases of Record | Overriding Royalty Owner & Percentage | Working Interest Owner & Percentage |
|---|---|---|---|---|---|---|---|
| 83 | T18S-R37E, Sec. 36: E½NW¼ (Gulf J. R. Holt-NCT D) | 80 | B-243-1 HBP 09/10/31 | Commissioner of Public Lands - State of New Mexico 12.5% | Gulf Oil Corporation 100% | None | Gulf Oil Corporation 100% |

Total 40 State Tracts ------- 4835.78 acres or 45.40839% of unit (surface) area

FEE LAND

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 7 | T18S-R37E, Sec. 13: SE¼ (Shell-Rice) | 160 | Fee HBP 05/21/28 | Amoco Production Company, et al* 12.5% | Shell Oil Company 100% | None | Shell Oil Company 100% |
| 8 | T18S-R38E, Sec. 18: SW¼ (Amerada Hess-B. Hardin) | 155.21 | Fee HBP 03/24/28 | Exxon Corporation, et al* 12.5% | Amerada Hess Corporation 100% | None | Amerada Hess Corporation 100% |
| 9 | T18S-R38E, Sec. 18: E½ (Gulf-Dan W. Hardin) | 320 | Fee HBP 04/27/27 | Gulf Oil Corporation, et al* 12.5% | Gulf Oil Corporation 100% | None | Gulf Oil Corporation 100% |
| 13 | T18S-R38E, Sec. 21: NW¼SE¼ (Antwell-Hobbs-Cone Townsite) | 40 | Fee HBP 06/28/26 | Jack Robinson, et al* 12.5% | Del-Lea, Inc. 100% | Fern Cone 1.56250% | Del-Lea, Inc. 100% |

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(EXHIBIT B, CONT'D)

| Tract No. | Description of Land (Operator & Lease Name) | No. Acres | Serial No. & Expiration & Date of Lease | Basic Royalty Ownership and Percentage | Lessee of Record | Overriding Royalty Owner & Percentage | Working Interest Owner & Percentage |
|---|---|---|---|---|---|---|---|
| Cont. 13 | | | | | | Kathleen Cone, Individually and as Co-executor, & Eunice Gibson & James H. Milan, Co-executors of Estate of Gordon M. Cone 7.29166%<br>Del-Lea, Inc. 0.26042%<br>Robert B. Holt 1.69271%<br>A. G. Kaspar 1.69271%<br>12.5% | |
| 14 | T18S-R38E, Sec. 21: SE¼SE¼ (Wiser-Morris B) | 40 | Fee HBP 05/17/37<br>Fee HBP 05/27/37 | Jack Robinson, et al* 12.5% | Kenneth Noel Headley 12.5%<br>Two States Oil Company 37.5% | None | Kenneth Noel Headley 12.5%<br>Two States Oil Company 37.5% |

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(EXHIBIT B, CONT'D)

| Tract No. | Description of Land (Operator & Lease Name) | No. Acres | Serial No. & Expiration & Date of Lease | Basic Royalty Ownership and Percentage | Leases of Record | Overriding Royalty Owner & Percentage | Working Interest Owner & Percentage |
|---|---|---|---|---|---|---|---|
| Cont. 14 | | | Fee<br>HBP<br>05/31/37<br>Fee<br>HBP<br>06/07/37<br>Fee<br>HBP<br>06/12/37<br>Fee<br>HBP<br>06/23/37<br>Fee<br>HBP<br>09/10/37<br>Fee<br>HBP<br>09/24/37<br>Fee<br>HBP<br>01/19/38 | | The Wiser Oil Company<br>50%<br>100% | | The Wiser Oil Company<br>50%<br>100% |
| 15 | T18S-R38E, Sec. 21: SW¼SE¼ (Wiser-Morris A) | 40 | Fee<br>HBP<br>06/28/26 | Jack Robinson, et al*<br>12.5% | Mary Daniel Conrad<br>6.25%<br><br>Herman R. Crile, Sr. Trustee of Herman R. Crile, Sr.<br>9.37500%<br><br>Kenneth Noel Headley<br>9.375% | None | Mary Daniel Conrad<br>6.25%<br><br>Herman R. Crile, Sr. Trustee of Herman R. Crile, Sr.<br>9.37500%<br><br>Kenneth Noel Headley<br>9.375% |

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| Tract No. | Description of Land (Operator & Lease Name) | No. Acres | Serial No. & Expiration & Date of Lease | Basic Royalty Ownership and Percentage | Lessee Of Record | Overriding Royalty Owner & Percentage | Working Interest Owner & Percentage |
|---|---|---|---|---|---|---|---|
| Cont. 15 | | | | | Peter Hurd 6.25% | | Peter Hurd 6.25% |
| | | | | | Ruby Wanda Conrad Judson 1.25% | | Ruby Wanda Conrad Judson 1.25% |
| | | | | | Kathryn Louise Conrad McCarthy 1.25% | | Kathryn Louise Conrad McCarthy 1.25% |
| | | | | | Nathlyn Ione Conrad Murdoch 1.25% | | Nathlyn Ione Conrad Murdoch 1.25% |
| | | | | | Frances I. Conrad Rose 1.25% | | Frances I. Conrad Rose 1.25% |
| | | | | | Bettye Conrad Treadaway 1.25% | | Bettye Conrad Treadaway 1.25% |
| | | | | | The Wiser Oil Company 50% | | The Wiser Oil Company 50% |
| | | | | | Dr. Henry Yeager, Jr. in care of Trust Oil Department Trust Services, First National Bank in Dallas 4.06746% | | Dr. Henry Yeager, Jr. in care of Trust Oil Department Trust Services, First National Bank in Dallas 4.06746% |

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|---|---|---|---|---|---|---|---|
| cont. 15 | | | | | Ruth Anne Yeager 3.02580%<br><br>Ruth Peeler Yeager, Henry Yeager, Jr., & First National Bank in Dallas, Joint Trustees of Ruth Anne Yeager Trust No. 2 1.04167%<br><br>Mrs. Ruth Peeler Yeager in care of Trust Oil Department Trust Services, First National Bank in Dallas 4.36507%<br>100% | | Ruth Anne Yeager 3.02580%<br><br>Ruth Peeler Yeager, Henry Yeager, Jr., & First National Bank in Dallas, Joint Trustees of Ruth Anne Yeager Trust No. 2 1.04167%<br><br>Mrs. Ruth Peeler Yeager in care of Trust Oil Department Trust Services, First National Bank in Dallas 4.36507%<br>100% |
| 16 | T18S-R38E, Sec. 21: SW¼ (Gulf-W. D. Grimes, NCT C) | 160 | Fee HBP 04/29/26 | Union Oil Company of California, et al* 12.5% | Gulf Oil Corporation 100% | None | Gulf Oil Corporation 100% |
| 17 | T18S-R38E, Sec. 20: NE¼ (Est. of C. H. Sweet-McKinley B) | 160 | Fee HBP 06/21/26 | W. C. McBride-Silurian Oil Company, et al* 12.5% | C. H. Sweet Oil Company 100% | Sun Oil Company 10.93750% | First National Bank of Lea County, Trustee for the Cecil H. Sweet and Imo Emmetta Sweet Trust 100% |

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|---|---|---|---|---|---|---|---|
| 18 | T18S-R38E, Sec. 20: N½NW¼ (Getty (Skelly)-H. D. McKinley) | 80 | Fee HBP 06/21/26 | W. C. McBride - Silurian Oil Company et al* 12.5% | Getty Oil Company 100% | None | Getty Oil Company 100% |
| 19 | T18S-R38E, Sec. 20: S½NW¼ (Chevron-H. D. McKinley) | 80 | Fee HBP 06/21/26 | W. C. McBride - Silurian Oil Company et al* 12.5% | Chevron U.S.A., Inc. 100% | None | Chevron U.S.A., Inc. 100% |
| 20 | T18S-R38E, Sec. 20: NE¼SE¼ (Est. of C. H. Sweet-Grimes) | 40 | Fee HBP 03/10/28 | Mary Evelyn Maddox, et al* 12.5% | C. H. Sweet Oil Company 100% | Verna Lee Brown 5.46875%<br>Alice Patricia Gray 0.05127%<br>Emmett D. White 0.05127%<br>5.57129% | First National Bank of Lea County, Trustee for Cecil H. Sweet and Imo Emmetta Sweet Trust 100% |
| 23 | T18S-R38E, Sec. 20: SW¼SE¼ (Atlantic Richfield-Grimes) | 40 | Fee HBP 06/23/28 | Mrs. Emma Bledsoe, Individually and as Independent Executrix of the Estate of W. H. Bledsoe, et al* 12.5% | Atlantic Oil Producing Co. 100% | None | Atlantic Richfield Company 100% |

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(EXHIBIT B, CONT'D)

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|---|---|---|---|---|---|---|---|
| 24 | T18S-R38E, Sec. 20: SW¼ (Shell-H. D. McKinley B) | 160 | Fee HBP 06/21/26 | Cities Service Company, et al* 12.5% | Shell Oil Company 100% | None | Shell Oil Company 100% |
| 25 | T18S-R38E, Sec. 19: NE¼ (Getty-Boon Hardin) | 160 | Fee HBP 03/24/28 | Amoco Production Company, et al* 12.5% | Getty Oil Co. (Tidal) 100% | None | Getty Oil Company 100% |
| 26 | T18S-R38E, Sec. 19: NW¼ (Cities Service-Boon Hardin) | 155.30 | Fee HBP 03/24/28 | Exxon Corporation, et al* 12.5% | Cities Service Company 100% | None | Cities Service Company 100% |
| 27 | T18S-R38E, Sec. 19: S½ (Shell-McKinley A) | 315.50 | Fee HBP 06/21/26 | Amoco Production Company, et al* 12.5% | Shell Oil Company 100% | None | Shell Oil Company 100% |
| 36 | T18S-R37E, Sec. 23: W½NW¼ (C&C Operating Corp.-Shipp A) | 80 | Fee (2) HBP 01/26/56 Fee (3) HBP 08/31/59 | Estate of Burton E. Shipp, et al* 12.5% | C&C Operating Corporation 100% | Elbert Shipp .25635% Homer Shipp .25635% Estate of Burton Shipp 1.70898% Leona Houston .25635% 2.47803% | C&C Operating Corporation 100% |
| 44 | T18S-R38E, Sec. 30: NW¼ (Amerada-H. D. McKinley) | 155.66 | Fee HBP 06/21/26 | W. C. McBride-Silurian Oil Company, et al* 12.5% | Amerada Hess Corporation 100% | None | Amerada Hess Corporation 100% |

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(EXHIBIT B, CONT'D)

| Tract No. | Description of Land (Operator & Lease Name) | No. Acres | Serial No. & Expiration & Date of Lease | Basic Royalty Ownership and Percentage | Lessee of Record | Overriding Royalty Owner & Percentage | Working Interest Owner & Percentage |
|---|---|---|---|---|---|---|---|
| 45 | T18S-R38E, Sec. 30: NE¼ (Getty-H. D. McKinley) | 160 | Fee<br>HBP<br>06/21/26 | W. C. McBride - Silurian Oil Company, et al*<br>12.5% | Getty Oil Company<br>100% | Cities Service Company<br>1.17187% | Getty Oil Company<br>100% |
| 50 | T18S-R38E, Sec. 29: NE¼NE¼ (Exxon-W. D. Grimes) | 40 | Fee<br>HBP<br>06/23/28 | Exxon Corporation, et al*<br>12.5% | Exxon Corporation<br>75%<br><br>Cities Service Company<br>25%<br>100% | Continental Oil Company (net profit interest)<br>25% | Exxon Corporation<br>75%<br><br>Cities Service Company<br>25%<br>100% |
| 52 | T18S-R38E, Sec. 29: SE¼NE¼ & NE¼SE¼ (Getty-W. D. Grimes) | 80 | Fee<br>HBP<br>03/10/28 | Lillian Milyko, et al*<br>12.5% | H. V. Craig<br>100% | None | Getty Oil Company<br>100% |
| 54 | T18S-R38E, Sec. 28: NW¼ (Atlantic-W. D. Grimes SOC) | 160 | Fee<br>HBP<br>06/10/26 | Cities Service Company, et al*<br>12.5% | Sinclair Oil & Gas Company<br>100% | None | Atlantic Richfield Company<br>100% |
| 55 | T18S-R38E, Sec. 28: W½NE¼ (Samedan-Moon A) | 80 | Fee (7)<br>HBP<br>10/03/34 | George H. Etz, Jr., Trustee of the George H. Etz, Sr. Trust, et al*<br>12.5% | Samedan Oil Corporation<br>100% | None | John P. Cusack, Jr.<br>25% |

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(EXHIBIT B, CONT'D)

| Tract No. | Description of Land (Operator & lease Name) | No. Acres | Serial No. & Expiration & Date of Lease | Basic Royalty Ownership and Percentage | Lessee of Record | Overriding Royalty Owner & Percentage | Working Interest Owner & Percentage |
|---|---|---|---|---|---|---|---|
| Cont. 55 | | | Fee (2) HBP 10/08/34<br><br>Fee (2) HBP 11/13/34 | | | | Michael F. Cusack 25%<br><br>Samedan Oil Corporation 48.5%<br><br>SEA Properties, Ltd. 1.5%<br>100% |
| 56 | T18S-R38E, Sec. 28: E½NE¼ (Samedan-Hoon B) | 80 | Fee (1) HBP 04/01/35<br>Fee (2) HBP 10/03/34<br>Fee (3) HBP 10/05/34<br>Fee (2) HBP 10/08/34<br>Fee (1) HBP 11/08/34<br>Fee (1) HBP 11/13/34<br>Fee (1) HBP 11/17/34 | Samedan Oil Corporation, et al* 12.5% | Samedan Oil Corporation 100% | None | John P. Cusack, Jr. 25%<br><br>Michael F. Cusack 25%<br><br>Samedan Oil Corporation 48.5%<br><br>SEA Properties, Ltd. 1.5%<br>100% |

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| Tract No. | Description of Land (Operator & Lease Name) | No. Acres | Serial No. & Expiration & Date of Lease | Basic Royalty Ownership and Percentage | Lessee of Record | Overriding Royalty Owner & Percentage | Working Interest Owner & Percentage |
|---|---|---|---|---|---|---|---|
| 57 | T18S-R38E, Sec. 28: SW¼ (Shell-W. D. Grimes) | 160 | Fee<br>HBP<br>06/10/26 | Atlantic Richfield Company, et al*<br>12.5% | Shell Oil Company<br>100% | None | Shell Oil Company<br>100% |
| 58 | T18S-R38E, Sec. 28: SE¼ (Continental - W. D. Grimes) | 160 | Fee<br>HBP<br>04/02/27 | Atlantic Richfield Company, et al*<br>12.5% | Continental Oil Company<br>100% | None | Continental Oil Company<br>100% |
| 59 | T18S-R38E, Sec. 27: All (Shell-Sanger Inv. Co.) | 640 | Fee<br>HBP<br>04/19/28 | Sanger Investment Company, Agency 7, et al*<br>12.5% | Shell Oil Company<br>100% | None | Shell Oil Company<br>100% |
| 60A | T18S-R38E, Sec. 34: NE¼NE¼ (Moranco-Hobbs) | 40 | Fee (1)<br>HBP<br>08/17/61<br>Fee (1)<br>HBP<br>09/05/61<br>Fee (1)<br>HBP<br>09/17/61<br>Fee (1)<br>HBP<br>09/18/61<br>Fee (3)<br>HBP<br>05/15/61 | Buttram Texhoma Company, et al*<br>15.48369% | C. W. Trainer<br>100% | George B. Clegg, III<br>0.05642%<br><br>Charles E. Delaney<br>0.05643%<br><br>Thomas R. and B. C. Dugan<br>0.05642%<br>0.16927% | Del-Lea, Inc.<br>16.40625%<br><br>M. Ralph Lowe, Inc.<br>21.875%<br><br>Kenneth D. McPeters<br>4.095%<br><br>Robert Martin Moran<br>16.40625%<br><br>Moranco<br>20.51% |

EXHIBIT B
ATTACHED TO UNIT AGREEMENT
NORTH HOBBS (GRAYBURG-SAN ANDRES) UNIT
LEA COUNTY, NEW MEXICO



(EXHIBIT B, CONT'D)

| Tract No. | Description of Land (Operator & Lease Name) | No. Acres | Serial No. & Expiration & Date of Lease | Basic Royalty Ownership and Percentage | Lessee of Record | Overriding Royalty Owner & Percentage | Working Interest Owner & Percentage |
|---|---|---|---|---|---|---|---|
| cont. 60A | | | Fee (33) HBP 05/17/61 Fee (1) HBP 10/17/61 Fee (1) HBP 10/20/61 Fee (1) HBP 10/24/61 Fee (1) HBP 11/02/61 Fee (1) HBP 11/17/61 Fee (1) HBP 01/10/62 Fee (1) HBP 10/11/62 Fee (1) HBP 11/27/62 | | | | Marshall & Winston, Inc. 12.5%<br>Linda B. Parrish and Linda Ann Parrish Richardson-Co-trustees under the will of M. C. Parrish, Jr. 8.2075%<br>100% |

EXHIBIT B
ATTACHED TO UNIT AGREEMENT
NORTH HOBBS (GRAYBURG-SAN ANDRES) UNIT
LEA COUNTY, NEW MEXICO



(EXHIBIT B, CONT'D)

| Tract No. | Description of Land (Operator & Lease Name) | No. Acres | Serial No. & Expiration & Date of Lease | Basic Royalty Ownership and Percentage | Lessee of Record | Overriding Royalty Owner & Percentage | Working Interest Owner & Percentage |
|---|---|---|---|---|---|---|---|
| 60B | T18S-R38E, Sec. 34: SE¼NE¼ (Moranco-Hobbs) | 40 | Fee (1)<br>HBP<br>08/17/61<br>Fee (1)<br>HBP<br>09/05/61<br>Fee (1)<br>HBP<br>09/17/61<br>Fee (1)<br>HBP<br>09/18/61<br>Fee (3)<br>HBP<br>05/15/61<br>Fee (33)<br>HBP<br>05/17/61<br>Fee (1)<br>HBP<br>10/17/61<br>Fee (1)<br>HBP<br>10/20/61<br>Fee (1)<br>HBP<br>10/24/61<br>Fee (1)<br>HBP<br>11/02/61 | Buttram Texhoma Company, et al*<br>15.48369% | C. W. Trainer<br>100% | George B. Clegg, III<br>0.05642%<br><br>Charles E. Delaney<br>0.05643%<br><br>Thomas R. and B. C. Dugan<br>0.05642%<br>0.16927% | Del-Lea, Inc.<br>18.75%<br><br>M. Ralph Lowe, Inc.<br>25%<br><br>Kenneth D. McPeters<br>4.68%<br><br>Robert Martin Moran<br>18.75%<br><br>Moranco<br>23.44%<br><br>Linda B. Parrish and Linda Ann Parrish Richardson-Co-trustees under the will of M. C. Parrish, Jr.<br>9.38%<br>100% |

EXHIBIT B
ATTACHED TO UNIT AGREEMENT
NORTH HOBBS (GRAYBURG-SAN ANDRES) UNIT
LEA COUNTY, NEW MEXICO



(EXHIBIT B, CONT'D)

| Tract No. | Description of Land (Operator & Lease Name) | No. Acres | Serial No. & Expiration & Date of Lease | Basic Royalty Ownership and Percentage | Lessee of Record | Overriding Royalty Owner & Percentage | Working Interest Owner & Percentage |
|---|---|---|---|---|---|---|---|
| Cont. 60B | | | Fee (1) HBP 11/17/61 Fee (1) HBP 01/10/62 Fee (1) HBP 10/11/62 Fee (1) HBP 11/27/62 | | | | |
| 61A | T18S-R38E, Sec. 34: SW¼NE¼ (Shell-Turner, Well 1) | 40 | Fee HBP 04/07/26 | Buttram Texhoma Company, et al* 12.5% | Shell Oil Company 100% | None | Shell Oil Company 100% |
| 61B | T18S-R38E, Sec. 34: NW¼NE¼ (Shell-Turner, Well 2) | 40 | Fee HBP 04/07/26 | Marshall & Winston, Inc, et al* 12.5% | Shell Oil Company 100% | None | Shell Oil Company 100% |
| 62 | T18S-R38E, Sec. 34: NE¼NW¼ (Getty (Skelly) B. H. Turner-Batt 2) | 40 | Fee HBP 04/07/26 | Marshall & Winston, Inc. et al* 12.5% | Getty Oil Company 100% | None | Getty Oil Company 100% |
| 63 | T18S-R38E, Sec. 34: SE¼NW¼ (Getty (Skelly) B. H. Turner-Batt 1) | 40 | Fee HBP 04/07/26 | Atlantic Richfield Company, et al* 12.5% | Getty Oil Company 100% | None | Getty Oil Company 100% |

EXHIBIT B
ATTACHED TO UNIT AGREEMENT
NORTH HOBBS (GRAYBURG-SAN ANDRES) UNIT
LEA COUNTY, NEW MEXICO



(EXHIBIT B, CONT'D)

| Tract No. | Description of Land (Operator & Lease Name) | No. Acres | Serial No. & Expiration & Date of Lease | Basic Royalty Ownership and Percentage | Lessee of Record | Overriding Royalty Owner & Percentage | Working Interest Owner & Percentage |
|---|---|---|---|---|---|---|---|
| 64 | T18S-R38E, Sec. 34: NE¼SE¼ (Samedan-Turner B) | 40 | Fee (35)<br>HBP<br>08/10/37<br>Fee (1)<br>HBP<br>12/31/37<br>Fee (1)<br>HBP<br>01/20/38<br>Fee (2)<br>HBP<br>02/05/38<br>Fee (1)<br>HBP<br>12/12/38<br>Fee (1)<br>HBP<br>02/11/44<br>Fee (1)<br>HBP<br>08/07/34 | Bonnie R. Etz, and George H. Etz, Jr., Trustee of George H. Etz, Sr. Trust, et al*<br>12.5% | Samedan Oil Corporation<br>100% | None | Samedan Oil Corporation<br>62.5%<br><br>Mary Frances Cusack<br>18.75%<br><br>John Patrick Cusack Jr., Trustee under the John Patrick Cusack Testamentary Trust<br>4.6875%<br><br>John Patrick Cusack, Jr.<br>7.03125%<br><br>Michael P. Cusack<br>7.03125%<br>100% |

EXHIBIT B
ATTACHED TO UNIT AGREEMENT
NORTH HOBBS (GRAYBURG-SAN ANDRES) UNIT
LEA COUNTY, NEW MEXICO



(EXHIBIT B, CONT'D)

| Tract No. | Description of Land (Operator & Lease Name) | No. Acres | Serial No. & Expiration & Date of Lease | Basic Royalty Ownership and Percentage | Lessee of Record | Overriding Royalty Owner & Percentage | Working Interest Owner & Percentage |
|---|---|---|---|---|---|---|---|
| 65 | T18S-R38E, Sec. 34: SE¼SE¼ (Samedan-Turner B-Batt 2) | 40 | Fee (35)<br>HBP<br>08/10/37<br>Fee (1)<br>HBP<br>12/31/37<br>Fee (1)<br>HBP<br>01/20/38<br>Fee (2)<br>HBP<br>02/05/38<br>Fee (1)<br>HBP<br>12/12/38<br>Fee (3)<br>HBP<br>02/11/44<br>Fee (1)<br>HBP<br>08/01/44<br>Fee (1)<br>HBP<br>08/02/44<br>Fee (1)<br>HBP<br>08/07/34 | Bonnie R. Etz, and George H. Etz, Jr., Trustee of George H. Etz, Sr. Trust, et al* 12.5% | Samedan Oil Corporation 62.5%<br><br>Mary Frances Cusack 18.75%<br><br>John Patrick Cusack, Jr., Trustee under the John Patrick Cusack Testamentary Trust 4.6875%<br><br>John Patrick Cusack, Jr. 7.03125%<br><br>Michael F. Cusack 7.03125%<br>100% | None | Samedan Oil Corporation 62.5%<br><br>Mary Frances Cusack 18.75%<br><br>John Patrick Cusack, Jr., Trustee under the John Patrick Cusack Testamentary Trust 4.6875%<br><br>John Patrick Cusack, Jr. 7.03125%<br><br>Michael F. Cusack 7.03125%<br>100% |

EXHIBIT B
ATTACHED TO UNIT AGREEMENT
NORTH HOBBS (GRAYBURG-SAN ANDRES) UNIT
LEA COUNTY, NEW MEXICO



(EXHIBIT B, CONT'D)

| Tract No. | Description of Land (Operator & Lease Name) | No. Acres | Serial No. & Expiration & Date of Lease | Basic Royalty Ownership and Percentage | Lessee of Record | Overriding Royalty Owner & Percentage | Working Interest Owner & Percentage |
|---|---|---|---|---|---|---|---|
| 66 | T18S-R38E, Sec. 34: W½SE¼ (Samedan-Turner A) | 80 | Fee (17)<br>HBP<br>08/07/34<br>Fee (1)<br>HBP<br>12/07/34<br>Fee (1)<br>HBP<br>12/10/34<br>Fee (1)<br>HBP<br>12/12/34 | Buttram Texhoma Company, et al*<br>12.5% | Samedan Oil Corporation<br>87.891%<br><br>Hattie C. Williams<br>5.859%<br><br>Cities Service Company<br>6.25%<br>100% | None | Samedan Oil Corporation<br>87.89100%<br><br>Hattie C. Williams<br>5.859%<br><br>Cities Service Company<br>6.25%<br>100% |
| 67 | T18S-R38E, Sec. 33: N½NE¼ & SE¼NE¼ & NE¼SE¼ (Gulf-W. D. Grimes, NCT-A) | 160 | Fee<br>HBP<br>04/29/26 | Union Oil Company of California, et al*<br>12.5% | Gulf Oil Corporation<br>100% | None | Gulf Oil Corporation<br>100% |
| 73 | T18S-R38E, Sec. 32: NW¼ (Gulf-W. D. Grimes NCT-A/2) | 160 | Fee<br>HBP<br>04/29/26 | Union Oil Company of California, et al*<br>12.5% | Gulf Oil Corporation<br>100% | None | Gulf Oil Corporation<br>100% |
| 74 | T18S-R38E, Sec. 32: SW¼ (Gulf-Grimes NCT-A Batt 2) | 160 | Fee<br>HBP<br>04/29/26 | Union Oil Company of California, et al*<br>12.5% | Gulf Oil Corporation<br>100% | None | Gulf Oil Corporation<br>100% |

EXHIBIT B
ATTACHED TO UNIT AGREEMENT
NORTH HOBBS (GRAYBURG-SAN ANDRES) UNIT
LEA COUNTY, NEW MEXICO



(EXHIBIT B, CONT'D)

| Tract No. | Description of Land (Operator & Lease Name) | No. Acres | Serial No. & Expiration & Date of Lease | Basic Royalty Ownership and Percentage | Lessee of Record | Overriding Royalty Owner & Percentage | Working Interest Owner & Percentage |
|---|---|---|---|---|---|---|---|
| 76 | T18S-R38E, Sec. 31: NE¼ (Cities Service-Clara Fowler) | 160 | Fee HBP 03/08/28 | Marshall & Winston, Inc., et al* 12.5% | Cities Service Company 100% | None | Cities Service Company 100% |
| 77 | T18S-R38E, Sec. 31: E½NW¼ (Getty (Skelly)-Clara Fowler) | 80 | Fee HBP 03/08/28 | Atlantic Richfield Company, et al* 12.5% | Getty Oil Company 100% | None | Getty Oil Company 100% |
| 78 | T18S-R38E, Sec. 31: W½NW¼ (Sun-Clara Fowler) | 75.94 | Fee HBP 03/08/28 | Atlantic Richfield Company, et al* 12.5% | Sunray Mid-Continent Oil Company 100% | None | Sun Oil Company 100% |
| 79 | T18S-R38E, Sec. 31: SE¼ (Shell-N. Berry) | 160 | Fee HBP 03/07/28 | The First of Denver for the account of Munro L. and Patricia D. Lyeth #11033-00-8 and Onez Norman Rooney, et al* 12.5% | Shell Oil Company 100% | None | Shell Oil Company 100% |
| 80 | T18S-R38E, Sec. 31: SW¼ (Mobil-Nora Berry) | 156.14 | Fee HBP 04/07/28 | The First of Denver for the account of Munro L. and Patricia D. Lyeth #11033-00-8 and Onez Norman Rooney, et al* 12.5% | Mobil Oil Corporation 100% | None | Mobil Oil Corporation 100% |

(EXHIBIT B, CONT'D)

| Tract No. | Description of Land (Operator & Lease Name) | No. Acres | Serial No. & Expiration & Date of Lease | Basic Royalty Ownership and Percentage | Lessee of Record | Overriding Royalty Owner & Percentage | Working Interest Owner & Percentage |
|---|---|---|---|---|---|---|---|

Total 44 Tracts ------ 5413.75 acres or 50.83558% of unit (surface) area

RECAPITULATION OF NUMBER OF ACRES

| | | |
|---|---|---|
| Federal Lands | 400.00 acres | 3.75603 percent |
| State Lands | 4835.78 acres | 45.40839 percent |
| Fee Lands | 5413.75 acres | 50.83558 percent |
| | 10,649.53 acres | 100.00 percent |

* Largest Royalty Interest Owner only is named.
Complete royalty ownership will be furnished upon request.

EXHIBIT C
ATTACHED TO UNIT AGREEMENT
NORTH HOBBS (GRAYBURG-SAN ANDRES) UNIT
LEA COUNTY, NEW MEXICO

## TRACT PARTICIPATION

| Tract No. | Tract Participation | | | | | |
|---|---|---|---|---|---|---|
| | Phase I | | Phase II | | Phase III | |
| | Oil | Gas | Oil | Gas | Oil | Gas |
| 1 | 0.04166 | 0.00929 | 0.03449 | 0.00764 | 0.13978 | 0.13978 |
| 2 | 0.04372 | 0.08878 | 0.03496 | 0.07047 | 0.20696 | 0.20696 |
| 3 | 0.03122 | 0.03430 | 0.02643 | 0.02884 | 0.08361 | 0.08361 |
| 4 | 0.11473 | 0.35014 | 0.10166 | 0.30838 | 0.29162 | 0.29162 |
| 5 | 0.05364 | 0.16616 | 0.03382 | 0.10370 | 0.19769 | 0.19769 |
| 6 | 0.05157 | 0.04476 | 0.03087 | 0.02715 | 1.35192 | 1.35192 |
| 7 | 0.33855 | 0.86416 | 0.28554 | 0.74135 | 2.37454 | 2.37454 |
| 8 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 2.11560 | 2.11560 |
| 9 | 0.26552 | 0.85119 | 0.20781 | 0.63155 | 1.29435 | 1.29435 |
| 10A | 0.04139 | 0.02411 | 0.03640 | 0.02107 | 0.03576 | 0.03576 |
| 10B | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00504 | 0.00504 |
| 11 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.07277 | 0.07277 |
| 12 | 0.02525 | 0.01680 | 0.02093 | 0.01383 | 0.10735 | 0.10735 |
| 13 | 0.08746 | 0.42917 | 0.08048 | 0.39277 | 0.03529 | 0.03529 |
| 14 | 0.17327 | 0.14273 | 0.17730 | 0.01745 | 0.01819 | 0.01819 |
| 15 | 0.38534 | 0.10378 | 0.40126 | 0.06477 | 0.03134 | 0.03134 |
| 16 | 0.17539 | 0.20016 | 0.16097 | 0.18270 | 0.17130 | 0.17130 |
| 17 | 0.02662 | 0.21697 | 0.02300 | 0.[illegible]628 | 0.13047 | 0.13047 |
| 18 | 0.00853 | 0.01565 | 0.00013 | 0.00140 | 0.19617 | 0.19617 |
| 19 | 0.46388 | 0.84657 | 0.44274 | 0.97367 | 0.39268 | 0.39268 |
| 20 | 0.00082 | 0.00000 | 0.00000 | 0.00000 | 0.04338 | 0.04338 |
| 21 | 0.02651 | 0.02649 | 0.02300 | 0.02283 | 0.08569 | 0.08569 |
| 22 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.09207 | 0.09207 |
| 23 | 0.06415 | 0.14318 | 0.05085 | 0.11264 | 0.13035 | 0.13035 |
| 24 | 2.13208 | 2.55190 | 2.18100 | 2.79399 | 0.93009 | 0.93009 |
| 25 | 0.38428 | 0.49151 | 0.34282 | 0.39731 | 1.37055 | 1.37055 |
| 26 | 0.73038 | 1.66052 | 0.65783 | 1.95237 | 2.93591 | 2.93591 |
| 27 | 4.99981 | 6.08021 | 4.72987 | 6.64223 | 3.68081 | 3.68081 |
| 28 | 1.55912 | 3.04417 | 1.44073 | 3.44263 | 2.98865 | 2.98865 |
| 29 | 0.71513 | 0.53634 | 0.61650 | 0.37304 | 1.11779 | 1.11779 |
| 30 | 0.33636 | 0.22798 | 0.32699 | 0.17396 | 0.71532 | 0.71532 |
| 31 | 4.47471 | 1.84752 | 4.52936 | 1.85495 | 2.18451 | 2.18451 |
| 32 | 3.19363 | 0.95292 | 2.97689 | 0.68503 | 1.39212 | 1.39212 |
| 33A | 0.14618 | 0.74487 | 0.13607 | 0.68822 | 0.45033 | 0.45033 |
| 33B | 0.09081 | 0.36334 | 0.08239 | 0.32777 | 0.16981 | 0.16981 |
| 34 | 0.02065 | 0.08343 | 0.00990 | 0.03948 | 0.23908 | 0.23908 |
| 35 | 0.09228 | 0.10744 | 0.07279 | 0.08411 | 0.34319 | 0.34319 |
| 36 | 0.01133 | 0.00022 | 0.00688 | 0.00013 | 0.03147 | 0.03147 |
| 37 | 0.12986 | 0.22612 | 0.10695 | 0.18492 | 0.38811 | 0.38811 |
| 38 | 0.00209 | 0.00000 | 0.00000 | 0.00000 | 0.08529 | 0.08529 |
| 39 | 0.03247 | 0.03270 | 0.02415 | 0.02412 | 0.17221 | 0.17221 |
| 40 | 0.29448 | 0.19819 | 0.32197 | 0.19398 | 0.44016 | 0.44016 |

EXHIBIT C (CONT'D)

| Tract No. | Tract Participation | | | | | |
|---|---|---|---|---|---|---|
| | Phase I | | Phase II | | Phase III | |
| | Oil | Gas | Oil | Gas | Oil | Gas |
| 41 | 0.07122 | 0.10996 | 0.06099 | 0.09355 | 0.26713 | 0.26713 |
| 42 | 3.15134 | 1.54441 | 3.09110 | 0.98477 | 1.16515 | 1.16515 |
| 43 | 0.66554 | 2.24437 | 0.49553 | 1.65710 | 0.98320 | 0.98320 |
| 44 | 3.36952 | 2.34840 | 3.41061 | 2.43179 | 1.86735 | 1.86735 |
| 45 | 3.64803 | 5.02853 | 3.75614 | 5.47228 | 2.83435 | 2.83435 |
| 46 | 1.83355 | 1.44175 | 1.86777 | 1.44663 | 1.98935 | 1.98935 |
| 47 | 3.37645 | 2.81163 | 3.25911 | 2.40472 | 6.10957 | 6.10957 |
| 48 | 0.59298 | 0.67176 | 0.59347 | 0.77563 | 0.42645 | 0.42645 |
| 49 | 1.37425 | 2.13844 | 1.32399 | 2.01128 | 1.40956 | 1.40956 |
| 50 | 0.10528 | 0.20806 | 0.09598 | 0.15187 | 0.23925 | 0.23925 |
| 51 | 2.01126 | 3.66274 | 2.10178 | 4.19663 | 2.84880 | 2.84880 |
| 52 | 0.87710 | 1.36727 | 0.86847 | 1.15993 | 1.23597 | 1.23597 |
| 53 | 2.75083 | 0.69483 | 2.95624 | 0.79733 | 2.50776 | 2.50776 |
| 54 | 2.07685 | 1.66517 | 2.28579 | 1.41654 | 1.09210 | 1.09210 |
| 55 | 2.25105 | 0.82559 | 2.43208 | 0.68204 | 0.24963 | 0.24963 |
| 56 | 2.29333 | 0.86934 | 2.52115 | 0.78810 | 0.10685 | 0.10685 |
| 57 | 2.91562 | 1.58446 | 2.97071 | 1.46117 | 3.07756 | 3.07756 |
| 58 | 4.16481 | 3.27379 | 4.73239 | 3.32535 | 1.68555 | 1.68555 |
| 59 | 6.45317 | 2.42299 | 6.70337 | 1.71870 | 0.33242 | 0.33242 |
| 60A | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00022 | 0.00022 |
| 60B | 0.12511 | 0.20973 | 0.10695 | 0.17812 | 0.00636 | 0.00636 |
| 61A | 1.19303 | 0.63995 | 1.22347 | 0.69663 | 0.09076 | 0.09076 |
| 61B | 1.06871 | 0.35937 | 1.06806 | 0.34590 | 0.01963 | 0.01963 |
| 62 | 1.15101 | 0.54376 | 1.17464 | 0.58368 | 0.11411 | 0.11411 |
| 63 | 1.15287 | 0.73483 | 1.17515 | 0.57763 | 0.31108 | 0.31108 |
| 64 | 0.34355 | 0.18078 | 0.31251 | 0.04725 | 0.01466 | 0.01466 |
| 65 | 0.37764 | 0.10272 | 0.37040 | 0.05957 | 0.01661 | 0.01661 |
| 66 | 2.28031 | 0.55014 | 2.47569 | 0.56246 | 0.37923 | 0.37923 |
| 67 | 2.17917 | 4.86684 | 2.11608 | 5.31231 | 3.40765 | 3.40765 |
| 68 | 0.96616 | 1.17272 | 0.84228 | 1.04205 | 2.48452 | 2.48452 |
| 69 | 1.84129 | 3.13857 | 1.80030 | 3.72411 | 2.49011 | 2.49011 |
| 70 | 4.69790 | 10.71660 | 4.50257 | 12.36430 | 7.98097 | 7.98097 |
| 71 | 1.47100 | 2.42416 | 1.45514 | 2.76787 | 2.04430 | 2.04430 |
| 72 | 0.91041 | 1.42477 | 0.83110 | 1.54778 | 2.56349 | 2.56349 |
| 73 | 2.09767 | 3.87053 | 1.86731 | 4.01469 | 3.47646 | 3.47646 |
| 74 | 3.40184 | 2.08463 | 3.62040 | 1.60923 | 3.75733 | 3.75733 |
| 75A | 0.64903 | 2.04432 | 0.75492 | 2.40868 | 2.09583 | 2.09583 |
| 75B | 0.95673 | 0.94199 | 0.94712 | 0.84174 | 2.00533 | 2.00533 |
| 76 | 2.34959 | 0.78709 | 2.36589 | 0.87467 | 2.52494 | 2.52494 |
| 77 | 1.22093 | 0.44131 | 1.17282 | 0.38108 | 0.70944 | 0.70944 |
| 78 | 0.22719 | 0.32052 | 0.19658 | 0.18989 | 0.43429 | 0.43429 |
| 79 | 2.40938 | 2.20153 | 2.30652 | 1.71149 | 1.96469 | 1.96469 |
| 80 | 0.92642 | 1.33618 | 0.82805 | 1.18726 | 0.67264 | 0.67264 |
| 81 | 0.14029 | 0.18401 | 0.11442 | 0.14900 | 0.60098 | 0.60098 |
| 82 | 0.11572 | 0.08569 | 0.10923 | 0.08047 | 0.11949 | 0.11949 |
| 83 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.04756 | 0.04756 |
| | 100.00000 | 100.00000 | 100.00000 | 100.00000 | 100.00000 | 100.00000 |

# EXHIBIT D

## APPENDIX

### "FEDERAL CONTRACT PROVISIONS"

The following provisions are incorporated in the agreement to which this Appendix is attached and shall be applicable to the parties thereunder if and to the extent such agreement is a subcontract or purchase order under a federal contract and inclusion of such provisions is required under applicable Executive Orders or Government Procurement Regulations:

### EQUAL OPPORTUNITY CLAUSE

(Executive Order 11246)

(A) Contractor is aware of and is fully informed of Contractor's responsibilities under Executive Order 11246 and shall file compliance reports as required by Section 203 of Executive Order 11246 and otherwise comply with the requirements of such order.

(B) Contractor shall be bound by and agrees to the following provisions as contained in Section 202 of Executive Order 11246, to wit:

"(1) The Contractor will not discriminate against any employee or applicant for employment because of race, color, religion, sex or national origin. The Contractor will take affirmative action to ensure that applicants are employed, and that employees are treated during employment, without regard to their race, color, religion, sex or national origin. Such action shall include, but not be limited to the following: employment, upgrading, demotion, or transfer, recruitment or recruitment advertising, layoff or termination, rates of pay or other forms of compensation, and selection for training, including apprenticeship. The Contractor agrees to post in conspicuous places, available to employees and applicants for employment, notices to be provided by the contracting officer setting forth the provisions of this nondiscrimination clause.

"(2) The Contractor will, in all solicitations or advertisements for employees placed by or on behalf of the Contractor, state that all qualified applicants will receive consideration for employment without regard to race, color, religion, sex, or national origin.

"(3) The Contractor will send to each labor union or representative of workers with which he has a collective bargaining agreement or other contract or understanding, a notice, to be provided by the agency contracting officer, advising the labor union or workers' representative of the Contractor's commitments under Section 202 of Executive Order 11246 of September 24, 1965, and shall post copies of the notice in conspicuous places available to employees and applicants for employment.

"(4) The Contractor will comply with all provisions of Executive Order No. 11246 of September 24, 1965, and of the rules, regulations, and relevant orders of the Secretary of Labor.

"(5) The Contractor will furnish all information and reports required by Executive Order No. 11246 of September 24, 1965, and by the rules, regulations, and orders of the Secretary of Labor, or pursuant thereto, and will permit access to his books, records, and accounts by the contracting agency and the Secretary of Labor for purposes of investigation to ascertain compliance with such rules, regulations, and orders.

"(6) In the event of the Contractor's noncompliance with the nondiscrimination clauses of this contract or with any of such rules, regulations, or orders, this contract may be cancelled, terminated, or suspended in whole or in part and the Contractor may be declared ineligible for further Government contracts in accordance with procedures authorized in Executive Order No. 11246 of September 24, 1965, and such other sanctions may be imposed and remedies invoked as provided in Executive Order No. 11246 of September 24, 1965, or by rule, regulations, or order of the Secretary of Labor, or as otherwise provided by law.

"(7) The Contractor will include the provisions of Paragraphs (1) through (7) in every subcontract or purchase order unless exempted by rules, regulations or orders of the Secretary of Labor issued pursuant to Section 204 of Executive Order No. 11246 of September 24, 1965, so that such provisions will be binding upon each subcontractor or vendor. The Contractor will take action with respect to any subcontract or purchase order as the contracting agency may direct as a means of enforcing such provisions including sanctions for noncompliance; provided, however, that in the event the Contractor becomes involved in, or is threatened with, litigation with a subcontractor or vendor as a result of such direction by the contracting agency, the Contractor may request the United States to enter into such litigation to protect the interests of the United States."

(C) Contractor certifies that segregated facilities are not and will not be maintained or provided for Contractor's employees at any of Contractor's establishments; that such employees are not and will not be permitted to perform their services at any location under Contractor's control where segregated facilities are maintained, and, that Contractor is aware of and understands that any breach of the foregoing is a violation of the Equal Opportunity Clause of Executive Order 11246, as included above in paragraph (B). "Segregated facilities" as used herein means any waiting rooms, work areas, rest rooms and washrooms, restaurants and other eating areas, time clocks, locker rooms and other storage or dressing areas, parking lots, drinking fountains, recreation or entertainment areas, transportation and housing facilities provided for employees which are segregated by explicit directive or are in fact segregated on the basis of race, creed, color, or national origin, because of habit, local custom or otherwise.

### UTILIZATION OF MINORITY BUSINESS ENTERPRISES

(41 CFR 1–1.13)

(A) It is the policy of the government that minority business enterprises shall have the maximum practicable opportunity to participate in the performance of government contracts.

(B) The Contractor agrees to use his best efforts to carry out this policy in the award of his subcontracts to the fullest extent consistent with the efficient performance of this contract. As used in this contract, the term "Minority Business Enterprise" means a business, at least 50 percent of which is owned by minority group members or, in case of publicly owned businesses, at least 51 percent of the stock of which is owned by minority group members. For the purposes of this definition, minority group members are Negroes, Spanish-speaking American persons, American-Orientals, American-Indians, American-Eskimos, and American-Aleuts. Contractors may rely on written representations by subcontractors regarding their status as minority business enterprises in lieu of an independent investigation.

### MINORITY BUSINESS ENTERPRISES SUBCONTRACTING PROGRAM

(41CFR 1–1.13) (Applicable to contracts which may exceed $500,000 in value)

(A) The Contractor agrees to establish and conduct a program which will enable minority business enterprises (as defined in the clause entitled "Utilization of Minority Business Enterprises") to be considered fairly as subcontractors and suppliers under this contract. In this connection, the Contractor shall –

(1) Designate a liaison officer who will administer the Contractor's minority business enterprises program.

(2) Provide adequate and timely consideration of the potentialities of known minority business enterprises in all "make-or-buy" decisions.

(3) Assure that known minority business enterprises will have an equitable opportunity to compete for subcontracts, particularly by arranging solicitations, time for the preparation of bids, quantities, specifications, and delivery schedules so as to facilitate the participation of minority business enterprises.

(4) Maintain records showing (i) procedures which have been adopted to comply with the policies set forth in this clause, including the establishment of a source list of minority business enterprises, (ii) awards to minority business enterprises on the source list, and (iii) specific efforts to identify and award contracts to minority business enterprises.

(5) Include the Utilization of Minority Business Enterprises clause in subcontracts which offer substantial minority business enterprises subcontracting opportunities.

(6) Cooperate with the Contracting Officer in any studies and surveys of the Contractor's minority business enterprises procedures and practices that the Contracting Officer may from time to time conduct.

(7) Submit periodic reports of subcontracting to known minority business enterprises with respect to the records referred to in subparagraph (4), above, in such form and manner and at such time (not more often than quarterly) as the Contracting Officer may prescribe.

(B) The Contractor further agrees to insert, in any subcontract hereunder which may exceed $500,000, provisions which shall conform substantially to the language of this clause, including this paragraph (B), and to notify the Contracting Officer of the names of such subcontractors.

## LISTING OF EMPLOYMENT OPENINGS

(41 CFR 50-250)

(A) The contractor, to provide special emphasis to the employment of qualified disabled veterans and veterans of the Vietnam era, agrees that all suitable employment openings of the contractor which exist at the time of the execution of this contract and those which occur during the performance of this contract, including those not generated by this contract and including those occurring at an establishment of the contractor other than the one wherein the contract is being performed but excluding those of independently operated corporate affiliates, shall be offered for listing at an appropriate local office of the State employment service system wherein the opening occurs and to provide such reports to such local office regarding employment openings and hires as may be required: Provided, that if the contract is for less than $10,000 or if it is with a State or local government the reports set forth in paragraphs (C) and (D) of this clause are not required.

(B) Listing of employment openings with the employment service system pursuant to this clause shall be made at least concurrently with the use of any other recruitment service or effort and shall involve the normal obligations which attach to the placing of a bona fide job offer, including the acceptance of referrals of veterans and non-veterans. The listing of employment openings does not require the hiring of any particular job applicant or from any particular group of job applicants, and nothing herein is intended to relieve the Contractor from any requirements in any Executive Orders or regulations regarding nondiscrimination in employment.

(C) The reports required by paragraph (A) of this clause shall include, but not be limited to, periodic reports which shall be filed at least quarterly with the appropriate local office or, where the contractor has more than one establishment in a State, with the central office of that State employment service. Such reports shall indicate for each establishment (1) the number of individuals who were hired during the reporting period, (2) the number of those hired who were disabled veterans, and (3) the number who were nondisabled veterans of the Vietnam era. The contractor shall submit a report within 30 days after the end of each reporting period wherein any performance is made on this contract. The contractor shall maintain copies of the reports submitted until the expiration of 1 year after final payment under the contract, during which time they shall be made available, upon request, for examination by any authorized representatives of the contracting officer or of the Secretary of Labor.

(D) Whenever the contractor becomes contractually bound to the listing provisions of this clause, he shall advise the employment service system in each State wherein he has establishments of the name and location of each such establishment in the State. As long as the contractor is contractually bound to these provisions and has so advised the State system there is no need to advise the State system of subsequent contracts. The contractor may advise the State systems when it is no longer bound by this contract clause.

(E) This clause does not apply to the listing of employment openings which occur and are filled outside of the 50 States, the District of Columbia, Puerto Rico, Guam, and the Virgin Islands.

(F) This clause does not apply to openings which the contractor proposes to fill from within his own organization or to fill pursuant to a customary and traditional employer-union hiring arrangement. This exclusion does not apply to a particular opening once an employer decides to consider applicants outside of his own organization or employer-union arrangement for that opening.

(G) As used in this clause:

(1) "All suitable employment openings" includes, but is not limited to, openings which occur in the following job categories: Production and nonproduction; plant and office; laborers and mechanics; supervisory and nonsupervisory; technical; and executive, administrative, and professional openings which are compensated on a salary basis of less than $18,000 per year. This term includes full-time employment, temporary employment of more than 3 days' duration, and part-time employment. It does not include openings which the contractor proposes to fill from within his own organization or to fill pursuant to a customary and traditional employer-union hiring arrangement. Under the most compelling circumstances an employment opening may not be suitable for listing, including such situations where the needs of the Government cannot reasonably be otherwise supplied, where listing would be contrary to national security, or where the requirement of listing would otherwise not be for the best interest of the Government.

(2) "Appropriate office of the State employment service system" means the local office of the Federal-State national system of public employment offices with assigned responsibility for serving the area where the employment opening is to be filled, including the District of Columbia, Guam, Puerto Rico, and the Virgin Islands.

(3) "Openings which the contractor proposes to fill from within his own organization" means employment openings for which no consideration will be given to persons outside the contractor's organization (including any affiliates, subsidiaries, and the parent companies) and includes any openings which the contractor proposes to fill from regularly established "recall" or "rehire" lists.

(4) "Openings which the contractor proposes * * * * to fill pursuant to a customary and traditional employer-union hiring arrangement" means employment openings for which no consideration will be given to persons outside of a special hiring arrangement, including openings which the contractor proposes to fill from union halls, which is part of the customary and traditional hiring relationship which exists between the contractor and representatives of his employees.

(5) "Disabled veteran" means a person entitled to disability compensation under laws administered by the Veterans' Administration for disability rated at 30 per centum or more, or a person whose discharge or release from active duty was for a disability incurred or aggravated in line of duty.

(6) "Veteran of the Vietnam era" means a person (1) who (i) served on active duty for a period of more than 180 days, any part of which occurred after August 5, 1964, and was discharged or released therefrom with other than a dishonorable discharge, or (ii) was discharged or released from active duty for service-connected disability if any part of such duty was performed after August 5, 1964, and (2) who was so discharged or released within the 48 months preceding his application for employment covered under this part.

PROPOSED UNIT AREA
NORTH HOBBS (GRAYBURG-SAN ANDRES) UNIT
LEA COUNTY, NEW MEXICO

Township 18 South, Range 37 East, NMPM

Section 13: SE/4 and W/2
Section 14: All
Section 23: All
Section 24: All
Section 25: All
Section 26: E/2 NE/4 and NW/4 NE/4
Section 36: E/2 NW/4 and E/2

Township 18 South, Range 38 East, NMPM

Section 17: S/2 NW/4 and SW/4
Section 18: NE/4 and S/2
Section 19: All
Section 20: All
Section 21: SW/4 and S/2 SE/4 and NW/4 SE/4
Section 27: All
Section 28: All
Section 29: All
Section 30: All
Section 31: All
Section 32: All
Section 33: N/2 and SW/4 and W/2 SE/4 and NE/4 SE/4
Section 34: E/2 NW/4 and E/2

"Unitized Formation" shall mean that subsurface portion of the Unit Area Known as the Grayburg-San Andres formation of Permian Age found in the interval between the stratigraphic depth of 3698 feet as measured on the Borehole Compensated Sonic-Gamma Ray Log run in the Shell Oil Company - State A-7 well on July 9, 1969, said well being located 1930 feet FNL and 660 feet FEL of Section 32-T18S-R38E, Lea County, New Mexico, and the depth of 4500 feet beneath the surface.

STATUTORY UNITIZATION
EXHIBIT "A"

# UNIT OPERATING AGREEMENT
# NORTH HOBBS (GRAYBURG-SAN ANDRES) UNIT
# LEA COUNTY, NEW MEXICO

UNIT OPERATING AGREEMENT
NORTH HOBBS (GRAYBURG-SAN ANDRES) UNIT
LEA COUNTY, NEW MEXICO

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UNIT OPERATING AGREEMENT
NORTH HOBBS (GRAYBURG-SAN ANDRES) UNIT
LEA COUNTY, NEW MEXICO

THIS AGREEMENT, entered into as of the 1st day of July, 1978, by the parties who have signed the original of this instrument, a counterpart thereof, or other instrument agreeing to be bound by the provisions hereof;

WITNESSETH:

WHEREAS, the parties hereto as Working Interest Owners have executed, as of the date hereof, an agreement entitled "Unit Agreement, North Hobbs (Grayburg-San Andres) Unit, Lea County, New Mexico", herein referred to as "Unit Agreement", which among other things, provides for a separate agreement to be entered into by Working Interest Owners to provide for the development and operation of the Unit Area as therein defined;

NOW, THEREFORE, in consideration of the mutual agreements herein set forth, it is agreed as follows:

ARTICLE 1
CONFIRMATION OF UNIT AGREEMENT

1.1 Confirmation of Unit Agreement. The Unit Agreement is hereby confirmed and by reference made a part of this agreement. The definitions in the Unit Agreement are adopted for all purposes of this agreement. If there is any conflict between the Unit Agreement and this agreement, the Unit Agreement shall govern.

1.2 Additional Definitions. For the purpose of this agreement, the following terms and expressions as used herein shall mean:

(a) "Investment Participation" shall mean the sum of .58 Phase II Unit Participation and .42 Phase III Unit Participation.

(b) "Investment Readjustment Date" shall mean the date of termination of Phase II or January 1, 1991, whichever is the earlier date."

ARTICLE 2
EXHIBITS

2.1 Exhibits. The following exhibits are incorporated herein by reference:

2.1.1 Exhibits A, B, C and D of the Unit Agreement.

2.1.2 Exhibit E, attached hereto, is a schedule showing the Tract Participation, the Unit Participation, and the Investment Participation of each Working Interest Owner. Exhibit E, or a revision thereof, shall not be conclusive as to the information therein, except it may be used as showing the Unit Participations of Working Interest Owners for purposes of this agreement until shown to be in error or revised as herein authorized.

2.1.3 Exhibit F, attached hereto, is the Accounting Procedure applicable to Unit Operations. If there is any conflict between this agreement and Exhibit F, this agreement shall govern.

2.1.4 Exhibit G, attached hereto, contains insurance provisions applicable to Unit Operations.

2.1.5 Exhibit H, attached hereto, is a form of Indemnity Agreement required under the provisions of Section 14(c) of the Unit Agreement.

2.2 Revision of Exhibits. Whenever Exhibits A, B or C are revised, Exhibit E shall be revised accordingly and be effective as of the same date. Unit Operator shall also revise Exhibit E from time to time as required to conform to changes in ownership of which Unit Operator has been notified as provided in the Unit Agreement.

2.3 Reference to Exhibits. When reference is made herein to an exhibit, it is to the exhibit as originally attached, or, if revised, to the last revision.

## ARTICLE 3
## SUPERVISION OF OPERATIONS BY WORKING INTEREST OWNERS

3.1 Overall Supervision. Working Interest Owners shall exercise overall supervision and control of all matters pertaining to Unit Operations pursuant to this agreement and the Unit Agreement. In the exercise of such authority, each Working Interest Owner shall act solely in its own behalf in the capacity of an individual owner and not on behalf of the owners as an entirety.

3.2 Specific Authorities and Duties. The matters with respect to which the Working Interest Owners shall decide and take action shall include, but not be limited to, the following:

3.2.1 Method of Operation. The method of operation, including any type of pressure maintenance, enhanced recovery, or other recovery program to be employed.

3.2.2 Drilling of Wells. The drilling of any well whether for production of Unitized Substances, for use as an injection well, or for other purposes.

3.2.3 Abandonment and Change of Status of Wells. The abandonment of any well or change of status of any well by converting such well for use as an injector or for any purpose other than production of Unitized Substances.

3.2.4. Expenditures. The making of any single expenditure in excess of twenty-five thousand dollars ($25,000); provided that, approval by Working Interest Owners of the drilling, reworking, deepening, or plugging back of any well shall include approval of all necessary expenditures required therefor, and for completing, testing, and equipping the well, including necessary flow lines, separators, and lease tankage.

3.2.5 Disposition of Unit Equipment. The selling or otherwise disposing of any major item of surplus Unit Equipment, if the list price of new equipment similar thereto is seven thousand five hundred dollars ($7,500) or more.

3.2.6. Appearance Before a Court or Regulatory Agency. The designating of a representative to appear before any court or regulatory agency in matters pertaining to Unit Operations; provided, however, that Unit Operator shall act as such representative in the absence of the designation of a different representative by Working Interest Owners, and provided, further, that such designation shall not prevent any Working Interest Owner from appearing in person or from designating another representative in its own behalf.

3.2.7 Audits. The auditing of the accounts of Unit Operator pertaining to Unit Operations hereunder; however, the audits shall

(a) not be conducted more than once each year except upon the resignation or removal of Unit Operator, and

(b) be made upon approval of the owner or owners of a majority of Working Interest other than that of Unit Operator, at the expense of all Working Interest Owners other than Unit Operator, or

(c) be made at the expense of those Working Interest Owners requesting such audit, if owners of less than a majority of Working Interest, other than that of Unit Operator, request such an audit, and

(d) be made upon not less than thirty (30) days' written notice to Unit Operator.

3.2.8 Inventories. The taking of periodic inventories under the terms of Exhibit F.

3.2.9 Technical Services. The authorizing of charges to the joint account for services by consultants or Unit Operator's technical personnel not covered by the overhead charges provided by Exhibit F.

3.2.10 Assignments to Committees. The appointment of committees to study any problems in connection with Unit Operations.

3.2.11 The removal of Unit Operator and the selection of a successor.

3.2.12 The enlargement of the Unit Area.

3.2.13 The adjustment and readjustment of investments.

3.2.14 The termination of the Unit Agreement.

## ARTICLE 4
## MANNER OF EXERCISING SUPERVISION

4.1 Designation of Representatives. Each Working Interest Owner shall inform Unit Operator in writing of the names and addresses of the representative and alternate who are authorized to represent and bind such Working Interest Owner with respect to Unit Operations. The representative or alternate may be changed from time to time by written notice to Unit Operator.

4.2 Meetings. All meetings of Working Interest Owners shall be called by Unit Operator upon its own motion or at the request of two (2) or more Working Interest Owners having a total voting interest of not less than ten percent (10%). No meeting shall be called on less than fourteen (14) days' advance written notice, with agenda for the meeting attached. Working Interest Owners who attend the meeting may amend items included in the agenda and may act upon an amended item or other items presented at the meeting; provided, however, that no expenditure or commitment for expenditure may be authorized unless it is included in the agenda attached to the notice of the meeting. The representative of Unit Operator shall be chairman of each meeting. The parties hereto may reduce the notice requirement to not less than three (3) days and may waive the requirement for an attached agenda by consent of Working Interest Owners having a combined voting interest not less than that required for an affirmative vote under the provision of Section 4.3.2.

4.3 Voting Procedure. Working Interest Owners shall decide all matters coming before them as follows:

4.3.1 Voting Interest. Each Working Interest Owner shall have a voting interest equal to its Phase II Unit Participation during Phase I and Phase II and equal to its Phase III Unit Participation during Phase III, depending upon which phase is in effect at the time the vote is taken.

4.3.2 Vote Required. Unless otherwise provided herein or in the Unit Agreement, Working Interest Owners shall determine all matters by the affirmative vote of Working Interest Owners have a combined voting interest of at least sixty-five percent (65%); however, should any one Working Interest Owner have more than thirty-five percent (35%) voting interest, its negative vote or failure to vote shall not defeat a motion, and such motion shall pass if approved by Working Interest Owners having a majority voting interest, unless one or more Working Interest Owners having a combined voting interest of at least five percent (5%) likewise vote against the motion or fail to vote.

4.3.3 Vote at Meeting by Nonattending Working Interest Owner. Any Working Interest Owner who is not represented at a meeting may vote by letter or telegram addressed to the representative of the Unit Operator if its vote is received prior to the vote on the item.

4.3.4 Poll Votes. Working Interest Owners may vote on and decide, by letter or telegram, any matter submitted in writing to Working Interest Owners. If no meeting is requested, as provided in Section 4.2, within seven (7) days after a written proposal is sent to Working Interest Owners, the vote taken by letter or telegram shall become final. Unit Operator will give prompt noice of the results of such voting to all Working Interest Owners.

## ARTICLE 5
## INDIVIDUAL RIGHTS OF WORKING INTEREST OWNERS

5.1 Reservation of Rights. Working Interest Owners severally reserve to themselves all their rights, except as otherwise provided in this agreement and the Unit Agreement.

5.2 Specific Rights. Each Working Interest Owner shall have, among others, the following specific rights:

5.2.1 Access to Unit Area. Access to the Unit Area at all reasonable times to inspect Unit Operations, all wells, and the records and data pertaining thereto.

5.2.2 Reports. The right to receive from Unit Operator, upon written request, copies of all reports to any governmental agency, reports of crude oil runs and stocks, inventory reports, and all other information pertaining to Unit Operations. The cost of gathering and furnishing information not ordinarily furnished by Unit Operator to all Working Interest Owners shall be charged to the Working Interest Owner that requires the information.

## ARTICLE 6
## UNIT OPERATOR

6.1 Unit Operator. Shell Oil Company is hereby designated as the Unit Operator.

6.2 Resignation or Removal and Selection of Successor. The resignation or removal of Unit Operator and the selection of a successor shall be governed by the provisions of the Unit Agreement.

## ARTICLE 7
## AUTHORITIES AND DUTIES OF UNIT OPERATOR

7.1 Exclusive Right to Operate Unit. Subject to the provisions of this agreement and to instructions from Working Interest Owners, Unit Operator shall have the exclusive right and be obligated to conduct Unit Operations.

7.2 Workmanlike Conduct. Unit Operator shall conduct Unit Operations in a good and workmanlike manner as would a prudent operator under the same or similar circumstances. Unit Operator shall freely consult with Working Interest Owners and keep them informed of all matters which Unit Operator, in the exercise of its best judgment, considers important. Unit Operator shall not be liable to Working Interest Owners for damages, unless such damages result from its gross negligence or willful misconduct.

7.3 Liens and Encumbrances. Unit Operator shall endeavor to keep the lands, leases and Unit Equipment in the Unit Area free from all liens and encumbrances occasioned by Unit Operations, except the lien and security interest of Unit Operator granted hereunder.

7.4 Employees. The number of employees used by Unit Operator in conducting Unit Operations, their selection, hours of labor, and compensation shall be determined by Unit Operator. Such employees shall be the employees of Unit Operator.

7.5 Records. Unit Operator shall keep correct books, accounts, and records of Unit Operations.

7.6 Reports to Working Interest Owners. Unit Operator shall furnish to Working Interest Owners quarterly reports of Unit Operations or reports at such less-frequent intervals as may be approved by Working Interest Owners.

7.7 Reports to Governmental Authorities. Unit Operator shall make all reports to governmental authorities that it has the duty to make as Unit Operator.

7.8 Engineering and Geological Information. Unit Operator shall furnish to a Working Interest Owner, upon written request, a copy of all logs and other engineering and geological data pertaining to wells drilled for Unit Operations.

7.9 Expenditures. Unit Operator is authorized to make single expenditures not in excess of twenty-five thousand dollars ($25,000) without prior approval of Working Interest Owners; provided that any capital expenditure in excess of five thousand dollars ($5,000) will be described in an informational authority for expenditure furnished to Working Interest Owners, except individual Working Interest Owners declining to receive such information. If an emergency occurs, Unit Operator may immediately make or incur such expenditures as in its opinion are required to deal with the emergency. Unit Operator shall report to Working Interest Owners, as promptly as possible, the nature of the emergency and the action taken.

7.10 Wells Drilled by Unit Operator. All wells drilled by Unit Operator shall be on a competitive bid basis. Unit Operator may employ its own tools and equipment under terms and conditions approved by Working Interest Owners.

7.11 Border Agreements. Unit Operator may, after approval by Working Interest Owners, enter into border agreements with respect to lands adjacent to the Unit Area for the purpose of coordinating operations.

ARTICLE 8
TAXES

8.1 Ad Valorem Taxes. Beginning with the first calendar year commencing after the Effective Date hereof, Unit Operator shall make and file all necessary ad valorem tax renditions and returns with the proper taxing authorities with respect to all property of each Working Interest Owner used or held by Unit Operator for Unit Operations. Unit Operator shall settle assessments arising therefrom. All such ad valorem taxes shall be paid by Unit Operator and charged to the joint account; however, if the interest of a Working Interest Owner is subject to a separately assessed overriding royalty interest, production payment, or other interest in excess of a one-eighth (1/8) royalty, such Working Interest Owner shall notify Unit Operator of such interest prior to the rendition date and shall be given credit for the reduction in taxes paid resulting therefrom.

8.2 Other Taxes. Each Working Interest Owner shall pay or cause to be paid all production, severance, gathering, and other taxes imposed upon or with respect to the production or handling of its share of Unitized Substances.

ARTICLE 9
INSURANCE

9.1 Insurance. Unit Operator, with respect to Unit Operations, shall:

9.1.1 Comply with the Workmen's Compensation Law of the State of New Mexico.

9.1.2 Provide employers' liability insurance with a limit of $100,000.

9.1.3. Provide other insurance as set forth in Exhibit G.

## ARTICLE 10
## ADJUSTMENT OF INVESTMENTS

10.1 Personal Property Taken Over. Upon the Effective Date hereof, Working Interest Owners shall deliver to Unit Operator the following:

10.1.1 Wells and Casing. All wells completed in the Unitized Formation, together with all casing therein.

10.1.2 Well and Lease Equipment. The tubing in each such well, the wellhead connections thereon, and all other well, lease and operating equipment used in the operation of such wells which Working Interest Owners determine is necessary or desirable for conducting Unit Operations. Working Interest Owners shall make such determination as soon as practicable after the Effective Date hereof, and all of such property that is determined to be surplus shall be returned as promptly as possible to the Working Interest Owners who delivered same to Unit Operator. Property determined by Working Interest Owners to be surplus shall not be considered to have been taken over under this agreement.

10.1.3 Condition of Wells. All wells, including the casing therein, shall be delivered to Unit Operator in reasonably good physical condition capable of being used for Unit Operations. If within one hundred and eighty (180) days after the Effective Date hereof (a) any such well is determined by the Working Interest Owners not to have been in reasonably good physical condition on said Effective Date, or (b) any casing failure or leak is discovered by Unit Operator in any such well, whether such casing failure or leak developed before or after the Effective Date hereof, the Working Interest Owner who contributed such well shall be liable to the other Working Interest Owners for liquidated damages in an amount, measured by the cost to Working Interest Owners of repairing such well or drilling a replacement well, not to exceed fifty thousand dollars ($50,000), provided that any amount in excess of fifty thousand dollars ($50,000) shall be treated as any other item of Unit Expense and charged to the joint account.

10.1.4 Records. A copy of all production and well records that pertain to such wells.

10.2 Inventory and Evaluation of Personal Property. Working Interest Owners shall at Unit Expense inventory and evaluate the personal property taken over under Section 10.1.2, except flowlines, and shall inventory the

casing taken over under Section 10.1.1, but casing shall be given no value. Such inventories shall include and be limited to those items of equipment indicated to be controllable in the most recent edition of the "Materials Classification Manual" prepared by the Council of Petroleum Accountants Societies of North America, except that, upon determination of Working Interest Owners, items considered noncontrollable may be included in the inventory in order to insure a more equitable adjustment of investment. All noncontrollable items of well and lease equipment installed within the Unit Area that are required in Unit Operations, although excluded from the inventories, shall nevertheless be taken over by the Unit Operator. Immediately following completion of such inventory, the material and equipment taken over under Section 10.1.2 shall be priced at a realistic value as determined by the Working Interest Owners, which pricing shall be performed under the supervision of, by the personnel of, and in the offices of the Unit Operator, with other Working Interest Owners furnishing such additional pricing help as may be available and necessary.

10.3 Investment Adjustment. Upon approval by Working Interest Owners of the inventory and evaluation, investments shall be adjusted as follows:

10.3.1 Initial Adjustment of Investments. Each Working Interest Owner shall be credited with the value, as determined in accordance with Section 10.2 above, of its interest in all personal property taken over by Unit Operator under Section 10.1.2 and charged with an amount equal to that obtained by multiplying the total value of all such personal property taken over by Unit Operator under Section 10.1.2 by such Working Interest Owner's Investment Participation, as shown on Exhibit E. If the charge against any Working Interest Owner is greater than the amount credited to such Working Interest Owner, the resulting net charge shall be paid and in all other respects be treated as any other item of Unit Expense chargeable against such Working Interest Owner. If the credit to any Working Interest Owner is greater than the amount charged against such Working Interest Owner, the resulting net credit shall be paid to such Working Interest Owner by Unit Operator out of funds received by it in settlement of the net charges described above.

10.3.2 Readjustments of Investments. Effective as of the Investment Readjustment Date, the investment account of the Working Interest Owners hereunder shall be readjusted on the basis of their respective Phase III Unit Participations, as shown on Exhibit E. For the purposes of such readjustment, each Working Interest Owner shall be (1) credited for its interest in the adjusted value of all personal property and facilities taken over or otherwise acquired by the Unit Operator pursuant to this agreement prior to the Investment Readjustment Date, and (2) charged with an amount equal to that obtained by multiplying the same adjusted value of personal property and facilities by such Working Interest Owner's Phase III Unit Participation. The adjusted value of all personal property and facilities for the purposes of this Section 10.3.2 shall be determined as follows:

(a) Value personal property and facilities initially taken over by Unit Operator on the same basis as that used when such personal property and facilities were taken over.

(b) Value all other investment items (controllable and noncontrollable materials and construction costs) acquired prior to the Investment Readjustment Date, including well casing subsequently purchased and installed, injection well conversion costs, and tank battery consolidation costs, on the basis of cost to the joint account.

(c) Add (a) and (b) together and deduct the value of all items of investment retired prior to the Investment Readjustment Date on the same basis that such items were originally charged.

Each Working Interest Owner shall be charged or credited with the net cash amount necessary to effect such readjustment of the investment account, and such charges and credits shall be settled in the same manner as the charges and credits referred to in Section 10.3.1.

10.4 General Facilities and Abandoned Installations. The acquisition of warehouses, warehouse stocks, lease houses, camps, facility systems, and office buildings necessary for Unit Operations shall be by negotiation by the owners thereof and Unit Operator, subject to the approval of Working Interest Owners. There shall be no adjustment for lease roads or appurtenances thereto.

10.5 Exchange of Interest in and Ownership of Personal Property and Facilities. Each Working Interest Owner hereby exchanges, and agrees to exchange, its interest in all of the personal property and facilities described in Section 10.1.2 above for its proportionate interest, as shown for Investment Participation on Exhibit E during the time prior to the Investment Readjustment Date and as shown for Phase III Unit Participation on Exhibit E from and after the Investment Readjustment Date in all such personal property and facilities described in Section 10.1.2. Each Working Interest Owner, individually, shall by virtue hereof own an undivided interest in all personal property and facilities taken over or otherwise acquired by Unit Operator pursuant to this agreement.

## ARTICLE 11
## UNIT EXPENSE

11.1 Basis of Charge to Working Interest Owners. Unit Operator initially shall pay all Unit Expense. Each Working Interest Owner shall reimburse Unit Operator for its share of Unit Expense on the basis provided in Sections 11.1.1 and 11.1.2 below. All charges, credits, and accounting for Unit Expense shall be in accordance with Exhibit F.

11.1.1. Operating Expense. Operating expense shall be shared and borne by Working Interest Owners in proportion to Phase I, Phase II or Phase III Unit Participation, whichever phase is in effect at the time such expense was incurred.

11.1.2. Investment Cost. The cost of investment items (as described in Section 10.3.2 (b) above) incurred prior to the Investment Readjustment Date shall be shared and borne by Working Interest Owners in proportion to Investment Participation. The cost of such investment items incurred after the Investment Readjustment Date shall be shared and borne by Working Interest Owners in proportion to Phase III Unit Participation.

11.2 Budgets. Before or as soon as practical after the Effective Date hereof, Unit Operator shall prepare a budget of estimated Unit Expense for the remainder of the calendar year, and, on or before the first day of each August thereafter, shall prepare such a budget for the ensuing calendar year. A budget shall set forth the estimated Unit Expense by quarterly periods. Budgets shall be estimates only, and shall be adjusted or corrected by Working Interest Owners and Unit Operator whenever an adjustment or correction is proper. A copy of each budget and adjusted budget shall promptly be furnished to each Working Interest Owner.

11.3 Advance Billings. Unit Operator shall have the right, without prejudice to other rights or remedies, to require Working Interest Owners to advance their respective shares of estimated Unit Expense by submitting to Working Interest Owners, on or before the 15th day of any month, an itemized estimate thereof for the succeeding month, with a request for payment in advance. Within fifteen (15) days thereafter, each Working Interest Owner shall pay to Unit Operator its share of such estimate. Adjustments between estimated and actual Unit Expense shall be made by Unit Operator at the close of each calendar month, and the accounts of Working Interest Owners shall be adjusted accordingly.

11.4 Commingling of Funds. Funds received by Unit Operator under this agreement need not be segregated or maintained by it as a separate fund, but may be commingled with its own funds.

11.5 Liens and Security Interest of Unit Operator. Each Working Interest Owner grants to Unit Operator and Unit Operator shall have as to each Working Interest Owner a lien upon its Oil and Gas Rights in each Tract, and a security interest in its share of Unitized Substances when extracted, and its interest in all Unit Equipment, to secure payment of its share of Unit Expense, together with interest thereon at the rate of twelve percent (12%) per annum or the maximum contract rate permitted by applicable usury laws, whichever is the lesser; provided, however, that notwithstanding anything in this agreement to the contrary, said lien shall not be enforceable by foreclosure and sale of the Oil and Gas Rights of any Working Interest Owner which is not a signatory party to this agreement.

To the extent that Unit Operator has a security interest under the Uniform Commercial Code of the State of New Mexico, Unit Operator shall be entitled to exercise the rights and remedies of a secured party under the Code. The bringing of a suit and the obtaining of judgment by Unit Operator for the secured indebtedness shall not be deemed an election of remedies or otherwise affect the lien rights or security interest as security for the payment thereof. In addition, upon default by any Working Interest Owner in the payment of its share of Unit Expense, Unit Operator shall have the right, without prejudice to other rights or remedies, to collect from the purchaser the proceeds from the sale of such Working Interest Owner's share of Unitized Substances until the amount owed by such Working Interest Owner, plus interest as aforesaid, has been paid. Each purchaser shall be entitled to rely upon Unit Operator's written statement concerning the amount of any default. Unit Operator hereby grants to the other Working Interest Owners a similar lien upon all of Unit Operator's right, title and interest as a Working Interest Owner hereunder as security for payment of any and all amounts that may become due and owing hereunder by Unit Operator to any of such other Working Interest Owners.

11.6 Unpaid Unit Expense. If any Working Interest Owner fails to pay its share of Unit Expense within sixty (60) days after rendition of a statement therefor by Unit Operator, each Working Interest Owner which is a signatory party to this agreement shall, upon request by Unit Operator, pay its proportionate part of the unpaid share of Unit Expense of the non-paying Working Interest Owner. Working Interest Owners that pay the share of Unit Expense of a non-paying Working Interest Owner shall be reimbursed by the Unit Operator for the amount so paid, plus any interest collected thereon, upon receipt by Unit Operator of any past due amount collected from or otherwise received for the account of the non-paying Working Interest Owner. Each Working Interest Owner so paying a non-paying Working Interest Owner's share of Unit Expense shall be subrogated to the lien and other rights herein granted Unit Operator, and each such Working Interest Owner, in proportion to the amounts so paid and not reimbursed, shall have and be entitled to exercise the voting interest of the non-paying Working Interest Owner.

11.7 Carved-out Interest. If any Working Interest Owner shall, after becoming bound by this agreement, create an overriding royalty, production payment, net proceeds interest, carried interest, or any other interest out of its Working Interest, such carved-out interest shall be subject to the terms and provisions of this agreement, specifically including, but without limitation, Section 11.5 hereof entitled "Lien and Security Interest of Unit Operator". If the Working Interest Owner creating such carved-out interest (a) fails to pay any Unit Expense chargeable to such Working Interest Owner under this agreement, and the production of Unitized Substances accruing to the credit of such Working Interest Owner is insufficient for that purpose, or (b) withdraws from this agreement under the terms and provisions of Article 17 hereof, the carved-out interest

shall be chargeable with a pro rata portion of all Unit Expense incurred hereunder, the same as though such carved-out interest were a Working Interest, and Unit Operator shall have the right to enforce against such carved-out interest the lien and all other rights granted in Section 11.5 for the purpose of collecting the Unit Expense chargeable to the carved-out interest.

11.8 Uncommitted Royalty. Should an owner of a Royalty Interest in any Tract fail to become a party to the Unit Agreement, and, as a result thereof, the actual Royalty Interest payments with respect to such Tract are more or less than the Royalty Interest payments computed on the basis of the Unitized Substances that are allocated to such Tract under the Unit Agreement, the difference shall be borne by or inure to the benefit of Working Interest Owners, in proportion to their respective Unit Participations at the time the Unitized Substances were produced; however, the difference to be borne by or inure to the benefit of Working Interest Owners shall not exceed an amount computed on the basis of one-eighth (1/8) of the difference between the Unitized Substances allocated to the Tract and the Unitized Substances produced from the Tract. Such adjustments shall be made by charges and credits to the joint account.

11.9 Rentals. The Working Interest Owners in each Tract shall pay and bear all rentals, minimum royalty, advance rentals or delay rentals due under the lease thereon and shall concurrently submit to the Unit Operator evidence of payment.

## ARTICLE 12
## NONUNITIZED FORMATIONS

12.1 Right to Operate. Any Working Interest Owner that now has or hereafter acquires the right to drill for and produce oil, gas, or other minerals, from a formation underlying the Unit Area other than the Unitized Formation, shall have the right to do so notwithstanding this agreement or the Unit Agreement. In exercising the right, however, the Working Interest Owner shall exercise care to prevent unreasonable interference with Unit Operations. No Working Interest Owner shall produce Unitized Substances through any well drilled or operated by it. If any Working Interest Owner drills any well into or through the Unitized Formation, the Unitized Formation shall be protected in a manner satisfactory to Working Interest Owners so that production of Unitized Substances will not be adversely affected.

12.2 Multiple Completions. No well now or hereafter completed in the Unitized Formation shall ever be completed as a multiple completion with the Unitized Formation and any other formation unless such multiple completion and the subsequent handling of the multiple completion is approved by Working Interest Owners in accordance with the voting procedure set out in Section 4.3.2 of this agreement.

## ARTICLE 13
## TITLES

13.1 Warranty and Indemnity. Each Working Interest Owner represents and warrants that it is the owner of the respective Working Interests set forth opposite its name in Exhibit B, and agrees to indemnify and hold harmless the other Working Interest Owners from any loss due to failure, in whole or in part, of its title to any such interest, except failure of title arising because of Unit Operations; however, such indemnity and any liability for breach of warranty shall be limited to an amount equal to the net value that has been received from the sale or receipt of Unitized Substances attributed to the interest as to which title failed. Each failure of title will be deemed to be effective, insofar as this agreement is concerned, as of 7:00 a.m. on the first day of the calendar month in which such failure is finally determined, and there shall be no retroactive adjustment of Unit Expense, or retroactive allocation of Unitized Substances or the proceeds therefrom, as a result of a title failure.

13.2 Failure Because of Unit Operations. The failure of title to any Working Interest in any Tract because of Unit Operations, including non-production from such Tract, shall not change the Unit Participation of the Working Interest Owner whose title failed in relation to the Unit Participation of the other Working Interest Owners at the time of the title failure.

## ARTICLE 14
## LIABILITY, CLAIMS, AND SUITS

14.1 Individual Liability. The duties, obligations, and liabilities of Working Interest Owners shall be several and not joint or collective; and nothing herein contained shall ever be construed as creating a partnership of any kind, joint venture, association, or trust among Working Interest Owners.

14.2 Settlements. Unit Operator may settle any single damage claim or suit involving Unit Operations if the expenditure does not exceed seven thousand five hundred dollars ($7,500.00) and if the payment is in complete settlement of such claim or suit. If the amount required for settlement exceeds the above specified amount, Working Interest Owners shall assume and take over the further handling of the claim or suit unless such authority is expressly delegated to Unit Operator. All costs and expense of handling, settling, or otherwise discharging such claim or suit shall be an item of Unit Expense. If a claim is made against any Working Interest Owner or if any Working Interest Owner is sued on account of any matter arising from Unit Operations over which such Working Interest Owner individually has no control because of the rights given Working Interest Owners and Unit Operator by this agreement and the Unit Agreement, the Working Interest Owner shall immediately notify the Unit Operator, and the claim or suit shall be treated as any other claim or suit involving Unit Operations.

## ARTICLE 15
## INTERNAL REVENUE PROVISION

15.1 Internal Revenue Provision. Notwithstanding any provisions herein that the rights and liabilities of the parties hereunder are several and not joint or collective, or that this agreement and operations hereunder shall not constitute a partnership, if for Federal income tax purposes this agreement and the operations hereunder are regarded as a partnership, then each of the parties hereto elects to be excluded from the application of all of the provisions of Subchapter K, Chapter 1, Subtitle A, of the Internal Revenue Code of 1954, as permitted and authorized by Section 761 of the Code and the regulations promulgated hereunder. Each party hereto agrees not to give any notices or take any other action inconsistent with the election made hereby. If any present or future income tax laws of the state or states in which the Unit Area is located, or any future income tax law of the United States, contain provisions similar to those in Subchapter K, Chapter 1, Subtitle A, of the Internal Revenue Code of 1954, under which an election similar to that provided by Section 761 of the Code is permitted, each of the parties agree to make such election as may be permitted or required by such laws. In making this election, each of the parties states that the income derived by such party from the operations under this agreement can be adequately determined without the computation of partnership taxable income.

## ARTICLE 16
## NOTICES

16.1 Notices. All notices required hereunder shall be in writing and shall be deemed to have been properly served when sent by mail or telegram to the address of the representative of each Working Interest Owner as furnished to Unit Operator in accordance with Article 4.

## ARTICLE 17
## WITHDRAWAL OF WORKING INTEREST OWNER

17.1 Withdrawal. A Working Interest Owner may withdraw from this Agreement by transferring, without warranty of title either express or implied, to the Working Interest Owners who do not desire to withdraw all its Oil and Gas Rights, exclusive of Royalty Interests, together with its interest in all Unit Equipment and in all wells used in Unit Operations, provided that such transfer shall not relieve such Working Interest Owner from any obligation or liability incurred prior to the first day of the month following receipt by Unit Operator of such transfer, and further provided that each of the non-transferring Working Interest Owners shall have the option to acquire a transferred interest and shall indicate such election by notifying the Unit Operator in writing within thirty (30) days of notice of withdrawal. The delivery of the transfer shall be made to Unit Operator for the transferees. The transferred interest shall be owned by the transferees in proportion to their respective Unit Participations. The

transferees, in proportion to the respective interests so acquired, shall pay the transferor for its interest in Unit Equipment, the salvage value thereof less its share of the estimated cost of salvaging same and of plugging and abandoning all wells then being used or held for Unit Operations, as determined by Working Interest Owners. In the event such withdrawing owner's interest in the aforesaid salvage value is less than such owner's share of such estimated costs, the withdrawing owner, as a condition precedent to withdrawal, shall pay the Unit Operator, for the benefit of Working Interest Owners succeeding to its interest, a sum equal to the deficiency. Within sixty (60) days after receiving delivery of the transfer, Unit Operator shall render a final statement to the withdrawing owner for its share of Unit Expense, including any deficiency in salvage value as determined by Working Interest Owners, incurred as of the first day of the month following the date of receipt of the transfer. Provided all Unit Expense, including any deficiency hereunder, due from the withdrawing owner has been paid in full within thirty (30) days after the rendering of such final statement by the Unit Operator, withdrawing owner shall be relieved from all further obligations and liabilities hereunder and under the Unit Agreement, and the rights of the withdrawing Working Interest Owner hereunder and under the Unit Agreement shall cease insofar as they existed by virtue of the interest transferred.

17.2 Limitation on Withdrawal. Notwithstanding anything set forth in Section 17.1, Working Interest Owners may refuse to permit the withdrawal of a Working Interest Owner if its Working Interest is burdened by any royalties, overriding royalties, production payments, net proceeds interest, carried interest, or any other interest created out of the Working Interest in excess of one-eighth (1/8) lessor's royalty, unless other Working Interest Owners willing to accept the assignment agree to accept the Working Interest subject to such burdens.

## ARTICLE 18
## ABANDONMENT OF WELLS

18.1 Rights of Former Owners. If Working Interest Owners decide to abandon permanently any well within the Unit Area prior to termination of the Unit Agreement, Unit Operator shall give written notice thereof to the Working Interest Owners of the Tract on which the well is located, and they shall have the option for a period of ninety (90) days after the sending of such notice to notify Unit Operator in writing of their election to take over and own the well. Within thirty (30) days after the Working Interest Owners of the Tract have notified Unit Operator of their election to take over the well, they shall pay Unit Operator, for credit to the joint account, the amount estimated by Working Interest Owners to be the net salvage value, as determined by Working Interest Owners, of the casing and equipment in and on the well up to and including the wellhead equipment, except the casing therein if contributed by such Working Interest Owners under Section 10.1.1. The Working Interest Owners of the Tract, by taking

over the well, agree to seal off effectively and protect the Unitized Formation, and upon abandonment to plug the well in compliance with applicable laws and regulations.

18.2 Plugging. If the Working Interest Owners of a Tract do not elect to take over a well located within the Unit Area that is proposed for abandonment, Unit Operator shall at Unit Expense plug and abandon the well in compliance with applicable laws and regulations.

## ARTICLE 19
## EFFECTIVE DATE AND TERM

19.1 Effective Date. This agreement shall become effective when the Unit Agreement becomes effective.

19.2 Term. This agreement shall continue in effect so long as the Unit Agreement remains in effect, and thereafter until (a) all unit wells have been plugged and abandoned or turned over to Working Interest Owners in accordance with Article 20, (b) all Unit Equipment and real property acquired for the joint account have been disposed of by Unit Operator in accordance with instructions of Working Interest Owners, and (c) there has been a final accounting.

## ARTICLE 20
## ABANDONMENT OF OPERATIONS

20.1 Termination. Upon termination of the Unit Agreement, the following will occur:

20.1.1 Oil and Gas Rights. Oil and Gas Rights in and to each separate Tract shall no longer be affected by this agreement, and thereafter the parties shall be governed by the terms and provisions of the leases, contracts, and other instruments affecting the separate Tracts.

20.1.2 Right to Operate. Working Interest Owners of any Tract that desire to take over and continue to operate wells located thereon may do so by paying Unit Operator, for credit to the joint account, the amount estimated by Working Interest Owners to be the net salvage value, as determined by Working Interest Owners, of the casing and equipment up to and including the wellhead equipment in and on the wells taken over, except the casing therein if contributed by such Working Interest Owners under Section 10.1.1, and by agreeing to plug properly each well at such time as it is abandoned.

20.1.3 Salvaging Wells: Unit Operator shall salvage as much of the casing and equipment in or on wells not taken over by Working

Interest Owners of separate Tracts as can economically and reasonably be salvaged, and shall cause the wells to be plugged and abandoned in compliance with applicable laws and regulations.

20.1.4 Cost of Abandonment. The cost of abandonment of Unit Operations shall be Unit Expense.

20.1.5 Distribution of Assets. Working Interest Owners shall share in the distribution of Unit Equipment, or the proceeds thereof, in the same proportion as then applicable to the sharing of investment costs.

## ARTICLE 21
## EXECUTION

21.1 Original, Counterpart, or Other Instrument. An owner of a Working Interest may become a party to this agreement by signing the original of this instrument, a counterpart thereof, or other instrument agreeing to be bound by the provisions hereof. The signing of any such instrument shall have the same effect as if all the parties had signed the same instrument.

## ARTICLE 22
## SUCCESSORS AND ASSIGNS

22.1 Successors and Assigns. This agreement shall extend to, be binding upon, and inure to the benefit of the parties hereto and their respective heirs, devisees, legal representatives, successors, and assigns, and shall constitute a covenant running with the lands, leases, and interests covered hereby.

IN WITNESS WHEREOF, the parties hereto have executed this agreement on the dates opposite their respective signatures.

SHELL OIL COMPANY
Unit Operator and Working Interest Owner

Date: July 31, 1978

By: Robert L. Avary
Attorney in Fact
ROBERT L. AVARY
P. O. Box 991
Houston, Texas 77001

STATE OF TEXAS )
)
COUNTY OF HARRIS )

The foregoing instrument was acknowledged before me this 31st day of July, 1978, by ROBERT L. AVARY, Attorney in Fact for SHELL OIL COMPANY, a Delaware corporation, on behalf of said corporation.

My Commission expires:

BELINDA ROEBER
Notary Public in and for Harris County, Texas
My Commission Expires July 21, 1979

Belinda Roeber
Notary Public in and for
Harris County, Texas

EXHIBIT B
ATTACHED TO UNIT OPERATING AGREEMENT
NORTH HOBBS (GRAYBURG-SAN ANDRES) UNIT
LEA COUNTY, NEW MEXICO

## UNIT PARTICIPATION AND INVESTMENT PARTICIPATION

| Tract No. | Working Interest Owner | Working Interest In Tract | Unit Participation (By Tracts) Phase I | Phase II | Phase III | Investment Participation* (By Tracts) |
|---|---|---|---|---|---|---|
| 1 | Getty Oil Company | 100.00000 | 0.04166 | 0.03449 | 0.13978 | 0.07871 |
| 2 | Amerada Hess Corporation | 100.00000 | 0.04372 | 0.03496 | 0.20696 | 0.10720 |
| 3 | Gulf Oil Corporation | 100.00000 | 0.03122 | 0.02643 | 0.08361 | 0.05045 |
| 4 | Texas Pacific Oil Co., Inc. | 100.00000 | 0.11473 | 0.10166 | 0.29162 | 0.18144 |
| 5 | Ada A. Anderson | 11.71875 | 0.00629 | 0.00396 | 0.02317 | 0.01203 |
| | W. D. Anderson & Sons | 23.43750 | 0.01257 | 0.00793 | 0.04633 | 0.02405 |
| | Ada A. Anderson, Paul Donald Anderson & Payton V. Anderson, Executors of the Estate of Warren D. Anderson | 11.71875 | 0.00629 | 0.00396 | 0.02317 | 0.01203 |
| | J. M. Armstrong | 23.43750 | 0.01257 | 0.00793 | 0.04633 | 0.02406 |
| | Russell G. Estes d/b/a Estes Engineering Co. | 6.25000 | 0.00335 | 0.00211 | 0.01236 | 0.00641 |
| | W. A. Yeager | 23.43750 | 0.01257 | 0.00793 | 0.04633 | 0.02406 |
| | | 100.00000 | 0.05364 | 0.03382 | 0.19769 | 0.10264 |
| 6 | Continental Oil Company | 100.00000 | 0.05157 | 0.03087 | 1.35192 | 0.58571 |
| 7 | Shell Oil Company | 100.00000 | 0.33855 | 0.28554 | 2.37454 | 1.16292 |
| 8 | Amerada Hess Corporation | 100.00000 | 0.00000 | 0.00000 | 2.11560 | 0.88855 |

EXHIBIT E (CONT'D)

| Tract No. | Working Interest Owner | Working Interest Tract | Unit Participation (By Tracts) Phase I | Phase II | Phase III | Investment Participation* (By Tracts) |
|---|---|---|---|---|---|---|
| 9 | Gulf Oil Corporation | 100.00000 | 0.26552 | 0.20781 | 1.29435 | 0.66416 |
| 10A | Howell Spear | 1.17190 | 0.00049 | 0.00042 | 0.00042 | 0.00043 |
| | Ellie Sims Spear | 1.17190 | 0.00049 | 0.00042 | 0.00042 | 0.00043 |
| | J. N. Dunlavey | 4.68750 | 0.00194 | 0.00171 | 0.00168 | 0.00169 |
| | First Roswell Company | 9.37500 | 0.00388 | 0.00341 | 0.00335 | 0.00339 |
| | Getty Oil Company | 25.00000 | 0.01034 | 0.00910 | 0.00894 | 0.00903 |
| | George P. Laflin | 4.68750 | 0.00194 | 0.00171 | 0.00168 | 0.00169 |
| | Kenneth D. McPeters | 7.03130 | 0.00291 | 0.00256 | 0.00251 | 0.00254 |
| | Robert Martin Moran | 28.12490 | 0.01164 | 0.01024 | 0.01005 | 0.01016 |
| | Moranco | 9.37500 | 0.00388 | 0.00341 | 0.00335 | 0.00339 |
| | Loyd Whitley | 4.68750 | 0.00194 | 0.00171 | 0.00168 | 0.00169 |
| | A. T. Williamson | 4.68750 | 0.00194 | 0.00171 | 0.00168 | 0.00169 |
| | | 100.00000 | 0.04139 | 0.03640 | 0.03576 | 0.03613 |
| 10B | Getty Oil Company | 100.00000 | 0.00000 | 0.00000 | 0.00504 | 0.00212 |
| 11 | Chevron U.S.A., Inc. | 100.00000 | 0.00000 | 0.00000 | 0.07277 | 0.03056 |
| 12 | Getty Oil Company | 100.00000 | 0.02525 | 0.02093 | 0.10735 | 0.05723 |
| 13 | Del-Lea, Inc. | 100.00000 | 0.08746 | 0.08048 | 0.03529 | 0.06150 |
| 14 | Kenneth Noel Headley | 12.50000 | 0.02166 | 0.02216 | 0.00227 | 0.01381 |
| | Two States Oil Company | 37.50000 | 0.06498 | 0.06649 | 0.00682 | 0.04143 |
| | The Wiser Oil Company | 50.00000 | 0.08663 | 0.08865 | 0.00910 | 0.05523 |
| | | 100.00000 | 0.17327 | 0.17730 | 0.01819 | 0.11047 |
| 15 | Mary Daniel Conrad | 6.25000 | 0.02408 | 0.02508 | 0.00196 | 0.01537 |
| | Herman R. Crile, Sr., Trustee of Herman R. Crile, Sr. | 9.37500 | 0.03613 | 0.03762 | 0.00294 | 0.02305 |
| | Kenneth Noel Headley | 9.37500 | 0.03612 | 0.03761 | 0.00294 | 0.02306 |
| | Peter Hurd | 6.25000 | 0.02408 | 0.02508 | 0.00196 | 0.01537 |
| | Ruby Wanda Conrad Judson | 1.25000 | 0.00482 | 0.00502 | 0.00039 | 0.00307 |
| | Kathryn Louise Conrad McCarthy | 1.25000 | 0.00482 | 0.00502 | 0.00039 | 0.00307 |
| | Nathlyn Ione Conrad Murdoch | 1.25000 | 0.00482 | 0.00502 | 0.00039 | 0.00307 |

EXHIBIT E (CONT'D)

| Tract No. | Working Interest Owner | Working Interest In Tract | Unit Participation (By Tracts) Phase I | Phase II | Phase III | Investment Participation* (By Tracts) |
|---|---|---|---|---|---|---|
| 15 | Frances I. Conrad Rose | 1.25000 | 0.00482 | 0.00502 | 0.00039 | 0.00307 |
| | Bettye Conrad Treadaway | 1.25000 | 0.00482 | 0.00502 | 0.00039 | 0.00307 |
| | The Wiser Oil Company | 50.00000 | 0.19267 | 0.20062 | 0.01567 | 0.12295 |
| | Dr. Henry Yeager, Jr., in care of Trust Oil Department Trust Services, First National Bank in Dallas | 4.06746 | 0.01567 | 0.01632 | 0.00127 | 0.01000 |
| | Ruth Anne Yeager | 3.02580 | 0.01166 | 0.01214 | 0.00095 | 0.00744 |
| | Ruth Peeler Yeager, Henry Yeager, Jr., & First National Bank in Dallas, Joint Trustees of Ruth Anne Yeager Trust No. 2 | 1.04167 | 0.00401 | 0.00418 | 0.00033 | 0.00256 |
| | Mrs. Ruth Peeler Yeager in care of Trust Oil Department Trust Services, First National Bank in Dallas | 4.36507 | 0.01682 | 0.01751 | 0.00137 | 0.01074 |
| | | 100.00000 | 0.38534 | 0.40126 | 0.03134 | 0.24589 |
| 16 | Gulf Oil Corporation | 100.00000 | 0.17539 | 0.16097 | 0.17130 | 0.16531 |
| 17 | First National Bank of Lea County, Trustee for the Cecil H. Sweet and Imo Emmetta Sweet Trust | 100.00000 | 0.02662 | 0.02300 | 0.13047 | 0.06814 |
| 18 | Getty Oil Company | 100.00000 | 0.00853 | 0.00013 | 0.19617 | 0.08247 |
| 19 | Chevron U.S.A., Inc. | 100.00000 | 0.46388 | 0.44274 | 0.39268 | 0.42171 |
| 20 | First National Bank of Lea County, Trustee Cecil H. Sweet and Imo Emmetta Sweet Trust | 100.00000 | 0.00082 | 0.00000 | 0.04338 | 0.01822 |
| 21 | Bill Sweet | 100.00000 | 0.02651 | 0.02300 | 0.08569 | 0.04933 |

EXHIBIT E (CONT'D)

| Tract No. | Working Interest Owner | Working Interest In Tract | Unit Participation (By Tracts) Phase I | Phase II | Phase III | Investment Participation* (By Tracts) |
|---|---|---|---|---|---|---|
| 22 | Bill Sweet | 100.00000 | 0.00000 | 0.00000 | 0.09207 | 0.03867 |
| 23 | Atlantic Richfield Company | 100.00000 | 0.06415 | 0.05085 | 0.13035 | 0.08424 |
| 24 | Shell Oil Company | 100.00000 | 2.13208 | 2.18100 | 0.93009 | 1.65562 |
| 25 | Getty Oil Company | 100.00000 | 0.38428 | 0.34282 | 1.37055 | 0.77447 |
| 26 | Cities Service Company | 100.00000 | 0.73038 | 0.65783 | 2.93591 | 1.61462 |
| 27 | Shell Oil Company | 100.00000 | 4.99981 | 4.72987 | 3.68081 | 4.28926 |
| 28 | Gulf Oil Corporation | 100.00000 | 1.55912 | 1.44073 | 2.98865 | 2.09086 |
| 29 | Shell Oil Company | 100.00000 | 0.71513 | 0.61650 | 1.11779 | 0.82704 |
| 30 | Amerada Hess Corporation | 50.00000 | 0.16818 | 0.16350 | 0.35766 | 0.24504 |
| | Getty Oil Company | 50.00000 | 0.16818 | 0.16349 | 0.35766 | 0.24505 |
| | | 100.00000 | 0.33636 | 0.32699 | 0.71532 | 0.49009 |
| 31 | Texas Pacific Oil Company, Inc. | 100.00000 | 4.47471 | 4.52936 | 2.18451 | 3.54452 |
| 32 | Samedan Oil Corporation | 37.80000 | 1.20719 | 1.12526 | 0.52622 | 0.87367 |
| | First National Bank of Casper, Trustee, Tate Trusts | 3.75000 | 0.11976 | 0.11163 | 0.05221 | 0.08667 |
| | The First National Bank of Fort Worth, Agent for William S. Spradling | 0.62500 | 0.01996 | 0.01861 | 0.00870 | 0.01445 |
| | The First National Bank of Fort Worth, Trustee for Verda Spradling, Account No. 3211 | 0.62500 | 0.01996 | 0.01861 | 0.00870 | 0.01445 |
| | C. C. Forbes | 1.90000 | 0.06068 | 0.05656 | 0.02645 | 0.04391 |
| | Ilamae Forbes | 1.85000 | 0.05908 | 0.05507 | 0.02575 | 0.04276 |

EXHIBIT E (CONT'D)

| Tract No. | Working Interest Owner | Working Interest In Tract | Unit Participation (By Tracts) Phase I | Phase II | Phase III | Investment Participation* (By Tracts) |
|---|---|---|---|---|---|---|
| 32 | Samuel Roberts Noble Foundation, Inc. | 28.75000 | 0.91817 | 0.85585 | 0.40024 | 0.66449 |
| | G. D. Morris | 1.25000 | 0.03992 | 0.03721 | 0.01740 | 0.02889 |
| | Richard L. Noble | 15.20000 | 0.48543 | 0.45249 | 0.21160 | 0.35132 |
| | Portales National Bank | 1.87500 | 0.05988 | 0.05582 | 0.02610 | 0.04334 |
| | John Roring | 3.75000 | 0.11976 | 0.11163 | 0.05221 | 0.08667 |
| | SEA Properties, Ltd. | 0.75000 | 0.02396 | 0.02233 | 0.01044 | 0.01733 |
| | E. C. Sullivan | 1.87500 | 0.05988 | 0.05582 | 0.02610 | 0.04334 |
| | | 100.00000 | 3.19363 | 2.97689 | 1.39212 | 2.31129 |
| 33A | First National Bank of Lea County, Trustee for Cecil H. Sweet and Imo Sweet Trust | 100.00000 | 0.14618 | 0.13607 | 0.45033 | 0.26806 |
| 33B | First National Bank of Lea County, Trustee for Cecil H. Sweet and Imo Sweet Trust | 100.00000 | 0.09081 | 0.08239 | 0.16981 | 0.11911 |
| 34 | Shell Oil Company | 100.00000 | 0.02065 | 0.00990 | 0.23908 | 0.10616 |
| 35 | Texas Pacific Oil Company, Inc. | 100.00000 | 0.09228 | 0.07279 | 0.34319 | 0.18636 |
| 36 | C&C Operating Corporation | 100.00000 | 0.01133 | 0.00688 | 0.03147 | 0.01721 |
| 37 | Abo Petroleum Corporation | 52.50000 | 0.06818 | 0.05615 | 0.20376 | 0.11815 |
| | Ward Investment Corporation | 10.00000 | 0.01299 | 0.01069 | 0.03881 | 0.02250 |
| | Yates Petroleum Corporation | 25.00000 | 0.03246 | 0.02674 | 0.09703 | 0.05626 |
| | S. P. Yates | 12.50000 | 0.01623 | 0.01337 | 0.04851 | 0.02813 |
| | | 100.00000 | 0.12986 | 0.10695 | 0.38811 | 0.22504 |
| 38 | The Wiser Oil Company | 100.00000 | 0.00209 | 0.00000 | 0.08529 | 0.03582 |
| 39 | Getty Oil Company | 100.00000 | 0.03247 | 0.02415 | 0.17221 | 0.08633 |
| 40 | Continental Oil Company | 100.00000 | 0.29448 | 0.32197 | 0.44016 | 0.37161 |
| 41 | Samedan Oil Corporation | 100.00000 | 0.07122 | 0.06099 | 0.26713 | 0.14757 |

EXHIBIT E (CONT'D)

| Tract No. | Working Interest Owner | Working Interest In Tract | Unit Participation (By Tracts) Phase I | Phase II | Phase III | Investment Participation* (By Tracts) |
|---|---|---|---|---|---|---|
| 42 | Texaco, Inc. | 100.00000 | 3.15134 | 3.09110 | 1.16515 | 2.28220 |
| 43 | Exxon Corporation | 100.00000 | 0.66554 | 0.49553 | 0.98320 | 0.70035 |
| 44 | Amerada Hess Corporation | 100.00000 | 3.36952 | 3.41061 | 1.86735 | 2.76244 |
| 45 | Getty Oil Company | 100.00000 | 3.64803 | 3.75614 | 2.83435 | 3.36899 |
| 46 | Marathon Oil Company | 100.00000 | 1.83355 | 1.86777 | 1.98935 | 1.91883 |
| 47 | Exxon Corporation | 100.00000 | 3.37645 | 3.25911 | 6.10957 | 4.45630 |
| 48 | Exxon Corporation | 100.00000 | 0.59298 | 0.59347 | 0.42645 | 0.52332 |
| 49 | Amerada Hess Corporation | 100.00000 | 1.37425 | 1.32399 | 1.40956 | 1.35993 |
| 50 | Exxon Corporation | 75.00000 | 0.07896 | 0.07199 | 0.17944 | 0.11711 |
| | Cities Service Company | 25.00000 | 0.02632 | 0.02399 | 0.05981 | 0.03904 |
| | | 100.00000 | 0.10528 | 0.09598 | 0.23925 | 0.15615 |
| 51 | Continental Oil Company | 100.00000 | 2.01126 | 2.10178 | 2.84880 | 2.41553 |
| 52 | Getty Oil Company | 100.00000 | 0.87710 | 0.86847 | 1.23597 | 1.02282 |
| 53 | Chevron U.S.A., Inc. | 100.00000 | 2.75083 | 2.95624 | 2.50776 | 2.76788 |
| 54 | Atlantic Richfield Company | 100.00000 | 2.07685 | 2.28579 | 1.09210 | 1.78444 |
| 55 | John P. Cusack, Jr. | 25.00000 | 0.56276 | 0.60802 | 0.06241 | 0.37886 |
| | Michael F. Cusack | 25.00000 | 0.56276 | 0.60802 | 0.06241 | 0.37886 |
| | Samedan Oil Corporation | 48.50000 | 1.09176 | 1.17956 | 0.12107 | 0.73500 |
| | SEA Properties, Ltd. | 1.50000 | 0.03377 | 0.03648 | 0.00374 | 0.02273 |
| | | 100.00000 | 2.25105 | 2.43208 | 0.24963 | 1.51545 |

EXHIBIT E (CONT'D)

| Tract No. | Working Interest Owner | Working Interest In Tract | Unit Participation (By Tracts) Phase I | Phase II | Phase III | Investment Participation* (By Tracts) |
|---|---|---|---|---|---|---|
| 56 | John P. Cusack, Jr. | 25.00000 | 0.57333 | 0.63029 | 0.02671 | 0.37679 |
| | Michael F. Cusack | 25.00000 | 0.57333 | 0.63029 | 0.02671 | 0.37678 |
| | Samedan Oil Corporation | 48.50000 | 1.11227 | 1.22276 | 0.05182 | 0.73096 |
| | SEA Properties, Ltd. | 1.50000 | 0.03440 | 0.03781 | 0.00161 | 0.02261 |
| | | 100.00000 | 2.29333 | 2.52115 | 0.10685 | 1.50714 |
| 57 | Shell Oil Company | 100.00000 | 2.91562 | 2.97071 | 3.07756 | 3.01559 |
| 58 | Continental Oil Company | 100.00000 | 4.16481 | 4.73239 | 1.68555 | 3.45272 |
| 59 | Shell Oil Company | 100.00000 | 6.45317 | 6.70337 | 0.33242 | 4.02757 |
| 60A | Del-Lea, Inc. | 16.40625 | 0.00000 | 0.00000 | 0.00003 | 0.00001 |
| | M. Ralph Lowe, Inc. | 21.87500 | 0.00000 | 0.00000 | 0.00005 | 0.00002 |
| | Kenneth D. McPeters | 4.09500 | 0.00000 | 0.00000 | 0.00001 | 0.00001 |
| | Robert Martin Moran | 16.40625 | 0.00000 | 0.00000 | 0.00004 | 0.00001 |
| | Moranco | 20.51000 | 0.00000 | 0.00000 | 0.00004 | 0.00002 |
| | Linda B. Parrish and Linda Ann Parrish Richardson, Co-Trustees under the will of M. C. Parrish, Jr. | 8.20750 | 0.00000 | 0.00000 | 0.00002 | 0.00001 |
| | Marshall & Winston, Inc. | 12.50000 | 0.00000 | 0.00000 | 0.00003 | 0.00001 |
| | | 100.00000 | 0.00000 | 0.00000 | 0.00022 | 0.00009 |
| 60B | Del-Lea, Inc. | 18.75000 | 0.02346 | 0.02005 | 0.00119 | 0.01213 |
| | M. Ralph Lowe, Inc. | 25.00000 | 0.03128 | 0.02674 | 0.00159 | 0.01617 |
| | Kenneth D. McPeters | 4.68000 | 0.00585 | 0.00501 | 0.00030 | 0.00303 |
| | Robert Martin Moran | 18.75000 | 0.02346 | 0.02005 | 0.00119 | 0.01213 |
| | Moranco | 23.44000 | 0.02933 | 0.02507 | 0.00149 | 0.01517 |
| | Linda B. Parrish and Linda Ann Parrish Richardson, Co-Trustees under the will of M. C. Parrish, Jr. | 9.38000 | 0.01173 | 0.01003 | 0.00060 | 0.00607 |
| | | 100.00000 | 0.12511 | 0.10695 | 0.00636 | 0.06470 |

EXHIBIT E (CONT'D)

| Tract No. | Working Interest Owner | Working Interest In Tract | Unit Participation (By Tracts) Phase I | Phase II | Phase III | Investment Participation* (By Tracts) |
|---|---|---|---|---|---|---|
| 61A | Shell Oil Company | 100.00000 | 1.19303 | 1.22347 | 0.09076 | 0.74773 |
| 61B | Shell Oil Company | 100.00000 | 1.06871 | 1.06806 | 0.01963 | 0.62772 |
| 62 | Cetty Oil Company | 100.00000 | 1.15101 | 1.17464 | 0.11411 | 0.72922 |
| 63 | Getty Oil Company | 100.00000 | 1.15287 | 1.17515 | 0.31108 | 0.81224 |
| 64 | Samedan Oil Corporation | 62.50000 | 0.21472 | 0.19532 | 0.00916 | 0.11713 |
| | Mary Frances Cusack | 18.75000 | 0.06441 | 0.05860 | 0.00275 | 0.03514 |
| | John Patrick Cusack, Jr., Trustee under the John Patrick Cusack Testamentary Trust | 4.68750 | 0.01610 | 0.01465 | 0.00069 | 0.00878 |
| | John Patrick Cusack, Jr. | 7.03125 | 0.02416 | 0.02197 | 0.00103 | 0.01318 |
| | Michael F. Cusack | 7.03125 | 0.02416 | 0.02197 | 0.00103 | 0.01318 |
| | | 100.00000 | 0.34355 | 0.31251 | 0.01466 | 0.18741 |
| 65 | Samedan Oil Corporation | 62.50000 | 0.23603 | 0.23150 | 0.01038 | 0.13863 |
| | Mary Frances Cusack | 18.75000 | 0.07081 | 0.06945 | 0.00311 | 0.04159 |
| | John Patrick Cusack, Jr., Trustee under the John Patrick Cusack Testamentary Trust | 4.68750 | 0.01770 | 0.01736 | 0.00078 | 0.01039 |
| | John Patrick Cusack, Jr. | 7.03125 | 0.02655 | 0.02605 | 0.00117 | 0.01560 |
| | Michael F. Cusack | 7.03125 | 0.02655 | 0.02604 | 0.00117 | 0.01560 |
| | | 100.00000 | 0.37764 | 0.37040 | 0.01661 | 0.22181 |
| 66 | Samedan Oil Corporation | 87.89100 | 2.00419 | 2.17591 | 0.33331 | 1.40202 |
| | Hattie C. Williams | 5.85900 | 0.13360 | 0.14505 | 0.02222 | 0.09346 |
| | Cities Service Company | 6.25000 | 0.14252 | 0.15473 | 0.02370 | 0.09970 |
| | | 100.00000 | 2.28031 | 2.47569 | 0.37923 | 1.59518 |
| 67 | Gulf Oil Corporation | 100.00000 | 2.17917 | 2.11608 | 3.40765 | 2.65854 |
| 68 | Shell Oil Company | 100.00000 | 0.96616 | 0.84228 | 2.48452 | 1.53202 |

EXHIBIT E (CONT'D)

| Tract No. | Working Interest Owner | Working Interest In Tract | Unit Participation (By Tracts) Phase I | Phase II | Phase III | Investment Participation* (By Tracts) |
|---|---|---|---|---|---|---|
| 69 | Amoco Production Company | 75.43501 | 1.38898 | 1.35806 | 1.87841 | 1.57661 |
| | Landreth Interests | 24.56499 | 0.45231 | 0.44224 | 0.61170 | 0.51341 |
| | | 100.00000 | 1.84129 | 1.80030 | 2.49011 | 2.09002 |
| 70 | Continental Oil Company | 100.00000 | 4.69790 | 4.50257 | 7.98097 | 5.96350 |
| 71 | Amerada Hess Corporation | 100.00000 | 1.47100 | 1.45514 | 2.04430 | 1.70259 |
| 72 | Shell Oil Company | 100.00000 | 0.91041 | 0.83110 | 2.56349 | 1.55870 |
| 73 | Gulf Oil Corporation | 100.00000 | 2.09767 | 1.86731 | 3.47646 | 2.54315 |
| 74 | Gulf Oil Corporation | 100.00000 | 3.40184 | 3.62040 | 3.75733 | 3.67791 |
| 75A | Marathon Oil Company | 50.00000 | 0.32452 | 0.37746 | 1.04791 | 0.65905 |
| | Atlantic Richfield Company | 50.00000 | 0.32451 | 0.37746 | 1.04792 | 0.65905 |
| | | 100.00000 | 0.64903 | 0.75492 | 2.09583 | 1.31810 |
| 75B | Marathon Oil Company | 50.00000 | 0.47836 | 0.47356 | 1.00267 | 0.69578 |
| | Atlantic Richfield Company | 50.00000 | 0.47837 | 0.47356 | 1.00266 | 0.69579 |
| | | 100.00000 | 0.95673 | 0.94712 | 2.00533 | 1.39157 |
| 76 | Cities Service Company | 100.00000 | 2.34959 | 2.36589 | 2.52494 | 2.43269 |
| 77 | Getty Oil Company | 100.00000 | 1.22093 | 1.17282 | 0.70944 | 0.97820 |
| 78 | Sun Oil Company | 100.00000 | 0.22719 | 0.19658 | 0.43429 | 0.29642 |
| 79 | Shell Oil Company | 100.00000 | 2.40938 | 2.30652 | 1.96469 | 2.16295 |
| 80 | Mobil Oil Corporation | 100.00000 | 0.92642 | 0.82805 | 0.67264 | 0.76278 |
| 81 | Amerada Hess Corporation | 100.00000 | 0.14029 | 0.11442 | 0.60098 | 0.31878 |

EXHIBIT E (CONT'D)

| Tract No. | Working Interest Owner | Working Interest In Tract | Unit Participation (By Tracts) Phase I | Phase II | Phase III | Investment Participation* (By Tracts) |
|---|---|---|---|---|---|---|
| 82 | W. K. Byrom | 62.50000 | 0.07232 | 0.06827 | 0.07468 | 0.07096 |
| | Robert G. McPherson | 37.50000 | 0.04340 | 0.04096 | 0.04481 | 0.04258 |
| | | 100.00000 | 0.11572 | 0.10923 | 0.11949 | 0.11354 |
| 83 | Gulf Oil Corporation | 100.00000 | 0.00000 | 0.00000 | 0.04756 | 0.01998 |
| | | | 100.00000 | 100.00000 | 100.00000 | 100.00000 |

EXHIBIT E (CONT'D)

SUMMARY

| Working Interest Owner | Tract Nos. | Unit Participation Phase I | Phase II | Phase III | Investment Participation* |
|---|---|---|---|---|---|
| Abo Petroleum Corporation | 37 | 0.06818 | 0.05615 | 0.20376 | 0.11815 |
| Amerada Hess Corporation | 2 | 0.04372 | 0.03496 | 0.20696 | 0.10720 |
| | 8 | 0.00000 | 0.00000 | 2.11560 | 0.88855 |
| | 30 | 0.16818 | 0.16350 | 0.35766 | 0.24504 |
| | 44 | 3.36952 | 3.41061 | 1.86735 | 2.76244 |
| | 49 | 1.37425 | 1.32399 | 1.40956 | 1.35993 |
| | 71 | 1.47100 | 1.45514 | 2.04430 | 1.70259 |
| | 81 | 0.14029 | 0.11442 | 0.60098 | 0.31878 |
| | | 6.56696 | 6.50262 | 8.60241 | 7.38453 |
| Amoco Production Company | 69 | 1.38898 | 1.35806 | 1.87841 | 1.57661 |
| Ada A. Anderson | 5 | 0.00629 | 0.00396 | 0.02317 | 0.01203 |
| Ada A. Anderson, Paul Donald Anderson & Payton V. Anderson, Executors of the Estate of Warren D. Anderson | 5 | 0.00629 | 0.00396 | 0.02317 | 0.01203 |
| W. D. Anderson & Sons | 5 | 0.01257 | 0.00793 | 0.04633 | 0.02405 |
| J. M. Armstrong | 5 | 0.01257 | 0.00793 | 0.04633 | 0.02406 |
| Atlantic Richfield Company | 23 | 0.06415 | 0.05085 | 0.13035 | 0.08424 |
| | 54 | 2.07685 | 2.28579 | 1.09210 | 1.78444 |
| | 75A | 0.32451 | 0.37746 | 1.04792 | 0.65905 |
| | 75B | 0.47837 | 0.47356 | 1.00266 | 0.69579 |
| | | 2.94388 | 3.18766 | 3.27303 | 3.22352 |
| W. K. Byrom | 82 | 0.07232 | 0.06827 | 0.07468 | 0.07096 |
| C&C Operating Corporation | 36 | 0.01133 | 0.00688 | 0.03147 | 0.01721 |

EXHIBIT E (CONT'D)

| Working Interest Owner | Tract Nos. | Unit Participation Phase I | Phase II | Phase III | Investment Participation* |
|---|---|---|---|---|---|
| Chevron U.S.A., Inc. | 11 | 0.00000 | 0.00000 | 0.07277 | 0.03056 |
| | 19 | 0.46388 | 0.44274 | 0.39268 | 0.42171 |
| | 53 | 2.75083 | 2.95624 | 2.50776 | 2.76788 |
| | | 3.21471 | 3.39898 | 2.97321 | 3.22015 |
| Cities Service Company | 26 | 0.73038 | 0.65783 | 2.93591 | 1.61462 |
| | 50 | 0.02632 | 0.02399 | 0.05981 | 0.03904 |
| | 66 | 0.14252 | 0.15473 | 0.02370 | 0.09970 |
| | 76 | 2.34959 | 2.36589 | 2.52494 | 2.43269 |
| | | 3.24881 | 3.20244 | 5.54436 | 4.18605 |
| Mary Daniel Conrad | 15 | 0.02408 | 0.02508 | 0.00196 | 0.01537 |
| Continental Oil Company | 6 | 0.05157 | 0.03087 | 1.35192 | 0.58571 |
| | 40 | 0.29448 | 0.32197 | 0.44016 | 0.37161 |
| | 51 | 2.01126 | 2.10178 | 2.84880 | 2.41553 |
| | 58 | 4.16481 | 4.73239 | 1.68555 | 3.45272 |
| | 70 | 4.69790 | 4.50257 | 7.98097 | 5.96350 |
| | | 11.22002 | 11.68958 | 14.30740 | 12.78907 |
| Herman R. Crile, Sr., Trustee of Herman R. Crile, Sr. | 15 | 0.03613 | 0.03762 | 0.00294 | 0.02305 |
| John P. Cusack, Jr. | 55 | 0.56276 | 0.60802 | 0.06241 | 0.37886 |
| | 56 | 0.57333 | 0.63029 | 0.02671 | 0.37679 |
| | 64 | 0.02416 | 0.02197 | 0.00103 | 0.01318 |
| | 65 | 0.02655 | 0.02605 | 0.00117 | 0.01560 |
| | | 1.18680 | 1.28633 | 0.09132 | 0.78443 |
| John Patrick Cusack, Jr., Trustee under John Patrick Cusack Testamentary Trust | 64 | 0.01610 | 0.01465 | 0.00069 | 0.00878 |
| | 65 | 0.01770 | 0.01736 | 0.00078 | 0.01039 |
| | | 0.03380 | 0.03201 | 0.00147 | 0.01917 |

EXHIBIT E (CONT'D)

| Working Interest Owner | Tract Nos. | Unit Participation Phase I | Phase II | Phase III | Investment Participation* |
|---|---|---|---|---|---|
| Mary Frances Cusack | 64 | 0.06441 | 0.05860 | 0.00275 | 0.03514 |
| | 65 | 0.07081 | 0.06945 | 0.00311 | 0.04159 |
| | | 0.13522 | 0.12805 | 0.00586 | 0.07673 |
| Michael F. Cusack | 55 | 0.56276 | 0.60802 | 0.06241 | 0.37886 |
| | 56 | 0.57333 | 0.63029 | 0.02671 | 0.37678 |
| | 64 | 0.02416 | 0.02197 | 0.00103 | 0.01318 |
| | 65 | 0.02655 | 0.02604 | 0.00117 | 0.01560 |
| | | 1.18680 | 1.28632 | 0.09132 | 0.78442 |
| Del-Lea, Inc. | 13 | 0.08746 | 0.08048 | 0.03529 | 0.06150 |
| | 60A | 0.00000 | 0.00000 | 0.00003 | 0.00001 |
| | 60B | 0.02346 | 0.02005 | 0.00119 | 0.01213 |
| | | 0.11092 | 0.10053 | 0.03651 | 0.07364 |
| J. N. Dunlavey | 10A | 0.00194 | 0.00171 | 0.00168 | 0.00169 |
| Russell G. Estes d/b/a Estes Engineering Co. | 5 | 0.00335 | 0.00211 | 0.01236 | 0.00641 |
| Exxon Corporation | 43 | 0.66554 | 0.49553 | 0.98320 | 0.70035 |
| | 47 | 3.37645 | 3.25911 | 6.10957 | 4.45630 |
| | 48 | 0.59298 | 0.59347 | 0.42645 | 0.52332 |
| | 50 | 0.07896 | 0.07199 | 0.17944 | 0.11711 |
| | | 4.71393 | 4.42010 | 7.69866 | 5.79708 |
| First National Bank of Casper, Trustee, Tate Trusts | 32 | 0.11976 | 0.11163 | 0.05221 | 0.08667 |
| The First National Bank of Fort Worth, Agent for William S. Spradling | 32 | 0.01996 | 0.01861 | 0.00870 | 0.01445 |
| The First National Bank of Fort Worth, Trustee for Verda Spradling, Account No. 3211 | 32 | 0.01996 | 0.01861 | 0.00870 | 0.01445 |

EXHIBIT E (CONT'D)

| Working Interest Owner | Tract Nos. | Unit Participation Phase I | Unit Participation Phase II | Unit Participation Phase III | Investment Participation* |
|---|---|---|---|---|---|
| First National Bank of Lea County, Trustee for Cecil H. Sweet and Imo Sweet Trust | 17 | 0.02662 | 0.02300 | 0.13047 | 0.06814 |
| | 20 | 0.00082 | 0.00000 | 0.04338 | 0.01822 |
| | 33A | 0.14618 | 0.13607 | 0.45033 | 0.26806 |
| | 33B | 0.09081 | 0.08239 | 0.16981 | 0.11911 |
| | | 0.26443 | 0.24146 | 0.79399 | 0.47353 |
| First Roswell Company | 10A | 0.00388 | 0.00341 | 0.00335 | 0.00339 |
| C. C. Forbes | 32 | 0.06068 | 0.05656 | 0.02645 | 0.04391 |
| Ilamae Forbes | 32 | 0.05908 | 0.05507 | 0.02575 | 0.04276 |
| Getty Oil Company | 1 | 0.04166 | 0.03449 | 0.13978 | 0.07871 |
| | 10A | 0.01034 | 0.00910 | 0.00894 | 0.00903 |
| | 10B | 0.00000 | 0.00000 | 0.00504 | 0.00212 |
| | 12 | 0.02525 | 0.02093 | 0.10735 | 0.05723 |
| | 18 | 0.00853 | 0.00013 | 0.19617 | 0.08247 |
| | 25 | 0.38428 | 0.34282 | 1.37055 | 0.77447 |
| | 30 | 0.16818 | 0.16349 | 0.35766 | 0.24505 |
| | 39 | 0.03247 | 0.02415 | 0.17221 | 0.08633 |
| | 45 | 3.64803 | 3.75614 | 2.83435 | 3.36899 |
| | 52 | 0.87710 | 0.86847 | 1.23597 | 1.02282 |
| | 62 | 1.15101 | 1.17464 | 0.11411 | 0.72922 |
| | 63 | 1.15287 | 1.17515 | 0.31108 | 0.81224 |
| | 77 | 1.22093 | 1.17282 | 0.70944 | 0.97820 |
| | | 8.72065 | 8.74233 | 7.56265 | 8.24688 |
| Gulf Oil Corporation | 3 | 0.03122 | 0.02643 | 0.08361 | 0.05045 |
| | 9 | 0.26552 | 0.20781 | 1.29435 | 0.66416 |
| | 16 | 0.17539 | 0.16097 | 0.17130 | 0.16531 |
| | 28 | 1.55912 | 1.44073 | 2.98865 | 2.09086 |
| | 67 | 2.17917 | 2.11608 | 3.40765 | 2.65854 |
| | 73 | 2.09767 | 1.86731 | 3.47646 | 2.54315 |
| | 74 | 3.40184 | 3.62040 | 3.75733 | 3.67791 |
| | 83 | 0.00000 | 0.00000 | 0.04756 | 0.01998 |
| | | 9.70993 | 9.43973 | 15.22691 | 11.87036 |

EXHIBIT E (CONT'D)

| Working Interest Owner | Tract Nos. | Unit Participation Phase I | Phase II | Phase III | Investment Participation* |
|---|---|---|---|---|---|
| Kenneth Noel Headley | 14 | 0.02166 | 0.02216 | 0.00227 | 0.01381 |
| | 15 | 0.03612 | 0.03761 | 0.00294 | 0.02306 |
| | | 0.05778 | 0.05977 | 0.00521 | 0.03687 |
| Peter Hurd | 15 | 0.02408 | 0.02508 | 0.00196 | 0.01537 |
| Ruby Wanda Conrad Judson | 15 | 0.00482 | 0.00502 | 0.00039 | 0.00307 |
| Landreth Interests | 69 | 0.45231 | 0.44224 | 0.61170 | 0.51341 |
| George P. Laflin | 10A | 0.00194 | 0.00171 | 0.00168 | 0.00169 |
| M. Ralph Lowe, Inc. | 60A | 0.00000 | 0.00000 | 0.00005 | 0.00002 |
| | 60B | 0.03128 | 0.02674 | 0.00159 | 0.01617 |
| | | 0.03128 | 0.02674 | 0.00164 | 0.01619 |
| Marathon Oil Company | 46 | 1.83355 | 1.86777 | 1.98935 | 1.91883 |
| | 75A | 0.32452 | 0.37746 | 1.04791 | 0.65905 |
| | 75B | 0.47836 | 0.47356 | 1.00267 | 0.69578 |
| | | 2.63643 | 2.71879 | 4.03993 | 3.27366 |
| Marshall & Winston, Inc. | 60A | 0.00000 | 0.00000 | 0.00003 | 0.00001 |
| Kathryn Louise Conrad McCarthy | 15 | 0.00482 | 0.00502 | 0.00039 | 0.00307 |
| Kenneth D. McPeters | 10A | 0.00291 | 0.00256 | 0.00251 | 0.00254 |
| | 60A | 0.00000 | 0.00000 | 0.00001 | 0.00001 |
| | 60B | 0.00585 | 0.00501 | 0.00030 | 0.00303 |
| | | 0.00876 | 0.00757 | 0.00282 | 0.00558 |
| Robert G. McPherson | 82 | 0.04340 | 0.04096 | 0.04481 | 0.04258 |
| Mobil Oil Corporation | 80 | 0.92642 | 0.82805 | 0.67264 | 0.76278 |
| Moranco | 10A | 0.00388 | 0.00341 | 0.00335 | 0.00339 |
| | 60A | 0.00000 | 0.00000 | 0.00004 | 0.00002 |
| | 60B | 0.02933 | 0.02507 | 0.00149 | 0.01517 |
| | | 0.03321 | 0.02848 | 0.00488 | 0.01858 |

EXHIBIT E (CONT'D)

| Working Interest Owner | Tract Nos. | Unit Participation Phase I | Phase II | Phase III | Investment Participation* |
|---|---|---|---|---|---|
| Robert Martin Moran | 10A | 0.01164 | 0.01024 | 0.01005 | 0.01016 |
| | 60A | 0.00000 | 0.00000 | 0.00004 | 0.00001 |
| | 60B | 0.02346 | 0.02005 | 0.00119 | 0.01213 |
| | | 0.03510 | 0.03029 | 0.01128 | 0.02230 |
| G. D. Morris | 32 | 0.03992 | 0.03721 | 0.01740 | 0.02889 |
| Nathlyn Ione Conrad Murdoch | 15 | 0.00482 | 0.00502 | 0.00039 | 0.00307 |
| Richard L. Noble | 32 | 0.48543 | 0.45249 | 0.21160 | 0.35132 |
| Samuel Roberts Noble Foundation, Inc. | 32 | 0.91817 | 0.85585 | 0.40024 | 0.66449 |
| Linda B. Parrish and Linda Ann Parrish Richardson, Co-Trustees under the will of M. C. Parrish, Jr. | 60A | 0.00000 | 0.00000 | 0.00002 | 0.00001 |
| | 60B | 0.01173 | 0.01003 | 0.00060 | 0.00607 |
| | | 0.01173 | 0.01003 | 0.00062 | 0.00608 |
| Portales National Bank | 32 | 0.05988 | 0.05582 | 0.02610 | 0.04334 |
| John Roring | 32 | 0.11976 | 0.11163 | 0.05221 | 0.08667 |
| Frances I. Conrad Rose | 15 | 0.00482 | 0.00502 | 0.00039 | 0.00307 |
| Samedan Oil Corporation | 32 | 1.20719 | 1.12526 | 0.52622 | 0.87367 |
| | 41 | 0.07122 | 0.06099 | 0.26713 | 0.14757 |
| | 55 | 1.09176 | 1.17956 | 0.12107 | 0.73500 |
| | 56 | 1.11227 | 1.22276 | 0.05182 | 0.73096 |
| | 64 | 0.21472 | 0.19532 | 0.00916 | 0.11713 |
| | 65 | 0.23603 | 0.23150 | 0.01038 | 0.13863 |
| | 66 | 2.00419 | 2.17591 | 0.33331 | 1.40202 |
| | | 5.93738 | 6.19130 | 1.31909 | 4.14498 |
| SEA Properties, Ltd. | 32 | 0.02396 | 0.02233 | 0.01044 | 0.01731 |
| | 55 | 0.03377 | 0.03648 | 0.00374 | 0.02273 |
| | 56 | 0.03440 | 0.03781 | 0.00161 | 0.02261 |
| | | 0.09213 | 0.09662 | 0.01579 | 0.06267 |

EXHIBIT E (CONT'D)

| Working Interest Owner | Tract Nos. | Unit Participation Phase I | Phase II | Phase III | Investment Participation* |
|---|---|---|---|---|---|
| Shell Oil Company | 7 | 0.33855 | 0.28554 | 2.37454 | 1.16292 |
| | 24 | 2.13208 | 2.18100 | 0.93009 | 1.65562 |
| | 27 | 4.99981 | 4.72987 | 3.68081 | 4.28926 |
| | 29 | 0.71513 | 0.61650 | 1.11779 | 0.82704 |
| | 34 | 0.02065 | 0.00990 | 0.23908 | 0.10616 |
| | 57 | 2.91562 | 2.97071 | 3.07756 | 3.01559 |
| | 59 | 6.45317 | 6.70337 | 0.33242 | 4.02757 |
| | 61A | 1.19303 | 1.22347 | 0.09076 | 0.74773 |
| | 61B | 1.06871 | 1.06806 | 0.01963 | 0.62772 |
| | 68 | 0.96616 | 0.84228 | 2.48452 | 1.53202 |
| | 72 | 0.91041 | 0.83110 | 2.56349 | 1.55870 |
| | 79 | 2.40938 | 2.30652 | 1.96469 | 2.16295 |
| | | 24.12270 | 23.76832 | 18.87538 | 21.71328 |
| Howell Spear | 10A | 0.00049 | 0.00042 | 0.00042 | 0.00043 |
| Ellie Sims Spear | 10A | 0.00049 | 0.00042 | 0.00042 | 0.00043 |
| E. C. Sullivan | 32 | 0.05988 | 0.05582 | 0.02610 | 0.04334 |
| Sun Oil Company | 78 | 0.22719 | 0.19658 | 0.43429 | 0.29642 |
| Bill Sweet | 21 | 0.02651 | 0.02300 | 0.08569 | 0.04933 |
| | 22 | 0.00000 | 0.00000 | 0.09207 | 0.03867 |
| | | 0.02651 | 0.02300 | 0.17776 | 0.08800 |
| Texaco, Inc. | 42 | 3.15134 | 3.09110 | 1.16515 | 2.28220 |
| Texas Pacific Oil Company, Inc. | 4 | 0.11473 | 0.10166 | 0.29162 | 0.18144 |
| | 31 | 4.47471 | 4.52936 | 2.18451 | 3.54452 |
| | 35 | 0.09228 | 0.07279 | 0.34319 | 0.18636 |
| | | 4.68172 | 4.70381 | 2.81932 | 3.91232 |

EXHIBIT E (CONT'D)

| Working Interest Owner | Tract Nos. | Unit Participation Phase I | Phase II | Phase III | Investment Participation* |
|---|---|---|---|---|---|
| Bettye Conrad Treadaway | 15 | 0.00482 | 0.00502 | 0.00039 | 0.00307 |
| Two States Oil Company | 14 | 0.06498 | 0.06649 | 0.00682 | 0.04143 |
| Ward Investment Corporation | 37 | 0.01299 | 0.01069 | 0.03881 | 0.02250 |
| Loyd Whitley | 10A | 0.00194 | 0.00171 | 0.00168 | 0.00169 |
| Hattie C. Williams | 66 | 0.13360 | 0.14505 | 0.02222 | 0.09346 |
| A. T. Williamson | 10A | 0.00194 | 0.00171 | 0.00168 | 0.00169 |
| The Wiser Oil Company | 14 | 0.08663 | 0.08865 | 0.00910 | 0.05523 |
| | 15 | 0.19267 | 0.20062 | 0.01567 | 0.12295 |
| | 38 | 0.00209 | 0.00000 | 0.08529 | 0.03582 |
| | | 0.28139 | 0.28927 | 0.11006 | 0.21400 |
| Yates Petroleum Corporation | 37 | 0.03246 | 0.02674 | 0.09703 | 0.05626 |
| S. P. Yates | 37 | 0.01623 | 0.01337 | 0.04851 | 0.02813 |
| Dr. Henry Yeager, Jr. in care of Trust Oil Department Trust Services, First National Bank in Dallas | 15 | 0.01567 | 0.01632 | 0.00127 | 0.01000 |
| Ruth Anne Yeager | 15 | 0.01166 | 0.01214 | 0.00095 | 0.00744 |
| Ruth Peeler Yeager, Henry Yeager, Jr., & First National Bank in Dallas, Joint Trustees of Ruth Anne Yeager Trust No. 2 | 15 | 0.00401 | 0.00418 | 0.00033 | 0.00256 |

EXHIBIT E (CONT'D)

| Working Interest Owner | Tract Nos. | Unit Participation Phase I | Unit Participation Phase II | Unit Participation Phase III | Investment Participation* |
|---|---|---|---|---|---|
| Mrs. Ruth Peeler Yeager in care of Trust Oil Department Trust Services, First National Bank in Dallas | 15 | 0.01682 | 0.01751 | 0.00137 | 0.01074 |
| W. A. Yeager | 5 | 0.01257 | 0.00793 | 0.04633 | 0.02406 |
| | | 100.00000 | 100.00000 | 100.00000 | 100.00000 |

* Applicable only to investment costs incurred prior to the Investment Readjustment Date

COPAS — 1974
Recommended by the Council of Petroleum Accountants Societies of North America

EXHIBIT F

Attached to and made a part of UNIT OPERATING AGREEMENT
North Hobbs (Grayburg-San Andres) Unit
Lea County, New Mexico

# ACCOUNTING PROCEDURE
# JOINT OPERATIONS

## I. GENERAL PROVISIONS

**1. Definitions**

"Joint Property" shall mean the real and personal property subject to the agreement to which this Accounting Procedure is attached.

"Joint Operations" shall mean all operations necessary or proper for the development, operation, protection and maintenance of the Joint Property.

"Joint Account" shall mean the account showing the charges paid and credits received in the conduct of the Joint Operations and which are to be shared by the Parties.

"Operator" shall mean the party designated to conduct the Joint Operations.

"Non-Operators" shall mean the parties to this agreement other than the Operator.

"Parties" shall mean Operator and Non-Operators.

"First Level Supervisors" shall mean those employees whose primary function in Joint Operations is the direct supervision of other employees and/or contract labor directly employed on the Joint Property in a field operating capacity.

"Technical Employees" shall mean those employees having special and specific engineering, geological or other professional skills, and whose primary function in Joint Operations is the handling of specific operating conditions and problems for the benefit of the Joint Property.

"Personal Expenses" shall mean travel and other reasonable reimbursable expenses of Operator's employees.

"Material" shall mean personal property, equipment or supplies acquired or held for use on the Joint Property.

"Controllable Material" shall mean Material which at the time is so classified in the Material Classification Manual as most recently recommended by the Council of Petroleum Accountants Societies of North America.

**2. Statement and Billings**

Operator shall bill Non-Operators on or before the last day of each month for their proportionate share of the Joint Account for the preceding month. Such bills will be accompanied by statements which identify the authority for expenditure, lease or facility, and all charges and credits, summarized by appropriate classifications of investment and expense except that items of Controllable Material and unusual charges and credits shall be separately identified and fully described in detail.

**3. Advances and Payments by Non-Operators**

Unless otherwise provided for in the agreement, the Operator may require the Non-Operators to advance their share of estimated cash outlay for the succeeding month's operation. Operator shall adjust each monthly billing to reflect advances received from the Non-Operators.

Each Non-Operator shall pay its proportion of all bills within fifteen (15) days after receipt. If payment is not made within such time, the unpaid balance shall bear interest monthly at the rate of twelve percent (12%) per annum or the maximum contract rate permitted by the applicable usury laws in the state in which the Joint Property is located, whichever is the lesser, plus attorney's fees, court costs, and other costs in connection with the collection of unpaid amounts.

**4. Adjustments**

Payment of any such bills shall not prejudice the right of any Non-Operator to protest or question the correctness thereof; provided, however, all bills and statements rendered to Non-Operators by Operator during any calendar year shall conclusively be presumed to be true and correct after twenty-four (24) months following the end of any such calendar year, unless within the said twenty-four (24) month period a Non-Operator takes written exception thereto and makes claim on Operator for adjustment. No adjustment favorable to Operator shall be made unless it is made within the same prescribed period. The provisions of this paragraph shall not prevent adjustments resulting from a physical inventory of Controllable Material as provided for in Section V.

**5. Audits**

A. Non-Operator, upon notice in writing to Operator and all other Non-Operators, shall have the right to audit Operator's accounts and records relating to the Joint Account for any calendar year within the twenty-four (24) month period following the end of such calendar year; provided, however, the making of an audit shall not extend the time for the taking of written exception to and the adjustments of accounts as provided for in Paragraph 4 of this Section I. Where there are two or more Non-Operators, the Non-Operators shall make every reasonable effort to conduct joint or simultaneous audits in a manner which will result in a minimum of inconvenience to the Operator. Operator shall bear no portion of the Non-Operators' audit cost incurred under this paragraph unless agreed to by the Operator.

**6. Approval by Non-Operators**

Where an approval or other agreement of the Parties or Non-Operators is expressly required under other sections of this Accounting Procedure and if the agreement to which this Accounting Procedure is attached contains no contrary provisions in regard thereto, Operator shall notify all Non-Operators of the Operator's proposal, and the agreement or approval of a majority in interest of the Non-Operators shall be controlling on all Non-Operators.

## II. DIRECT CHARGES

Operator shall charge the Joint Account with the following items:

1. **Rentals and Royalties**

   Lease rentals and royalties paid by Operator for the Joint Operations.

2. **Labor**

   A. (1) Salaries and wages of Operator's field employees directly employed on the Joint Property in the conduct of Joint Operations, and related expenses

   (2) Salaries of First Level Supervisors in the field.

   (3) Salaries and wages of Technical Employees directly employed on the Joint Property if such charges are excluded from the Overhead rates.

   B. Operator's cost of holiday, vacation, sickness and disability benefits and other customary allowances paid to employees whose salaries and wages are chargeable to the Joint Account under Paragraph 2A of this Section II. Such costs under this Paragraph 2B may be charged on a "when and as paid basis" or by "percentage assessment" on the amount of salaries and wages chargeable to the Joint Account under Paragraph 2A of this Section II. If percentage assessment is used, the rate shall be based on the Operator's cost experience.

   C. Expenditures or contributions made pursuant to assessments imposed by governmental authority which are applicable to Operator's costs chargeable to the Joint Account under Paragraphs 2A and 2B of this Section II.

   D. Personal Expenses of those employees whose salaries and wages are chargeable to the Joint Account under Paragraph 2A of this Section II.

3. **Employee Benefits**

   Operator's current costs of established plans for employees' group life insurance, hospitalization, pension, retirement, stock purchase, thrift, bonus, and other benefit plans of a like nature, applicable to Operator's labor cost chargeable to the Joint Account under Paragraphs 2A and 2B of this Section II shall be Operator's actual cost not to exceed twenty per cent (20%), or percent most recently recommended by the Council of Petroleum Accountants Societies of North America.

4. **Material**

   Material purchased or furnished by Operator for use on the Joint Property as provided under Section IV. Only such Material shall be purchased for or transferred to the Joint Property as may be required for immediate use and is reasonably practical and consistent with efficient and economical operations. The accumulation of surplus stocks shall be avoided.

5. **Transportation**

   Transportation of employees and Material necessary for the Joint Operations but subject to the following limitations:

   A. If Material is moved to the Joint Property from the Operator's warehouse or other properties, no charge shall be made to the Joint Account for a distance greater than the distance from the nearest reliable supply store, recognized barge terminal, or railway receiving point where like material is normally available, unless agreed to by the Parties.

   B. If surplus Material is moved to Operator's warehouse or other storage point, no charge shall be made to the Joint Account for a distance greater than the distance to the nearest reliable supply store, recognized barge terminal, or railway receiving point unless agreed to by the Parties. No charge shall be made to the Joint Account for moving Material to other properties belonging to Operator, unless agreed to by the Parties.

   C. In the application of Subparagraphs A and B above, there shall be no equalization of actual gross trucking cost of $200 or less excluding accessorial charges.

6. **Services**

   The cost of contract services, equipment and utilities provided by outside sources, except services excluded by Paragraph 9 of Section II and Paragraph 1. ii of Section III. The cost of professional consultant services and contract services of technical personnel directly engaged on the Joint Property if such charges are excluded from the Overhead rates. The cost of professional consultant services or contract services of technical personnel not directly engaged on the Joint Property shall not be charged to the Joint Account unless previously agreed to by the Parties.

7. **Equipment and Facilities Furnished by Operator**

   A. Operator shall charge the Joint Account for use of Operator owned equipment and facilities at rates commensurate with costs of ownership and operation. Such rates shall include costs of maintenance, repairs, other operating expense, insurance, taxes, depreciation, and interest on investment not to exceed eight per cent (8%) per annum. Such rates shall not exceed average commercial rates currently prevailing in the immediate area of the Joint Property.

   B. In lieu of charges in Paragraph 7A above, Operator may elect to use average commercial rates prevailing in the immediate area of the Joint Property less 20%. For automotive equipment, Operator may elect to use rates published by the Petroleum Motor Transport Association.

8. **Damages and Losses to Joint Property**

   All costs or expenses necessary for the repair or replacement of Joint Property made necessary because of damages or losses incurred by fire, flood, storm, theft, accident, or other cause, except those resulting from Operator's gross negligence or willful misconduct. Operator shall furnish Non-Operator written notice of damages or losses incurred as soon as practicable after a report thereof has been received by Operator.

9. **Legal Expense**

   Expense of handling, investigating and settling litigation or claims, discharging of liens, payment of judgments and amounts paid for settlement of claims incurred in or resulting from operations under the agreement or necessary to protect or recover the Joint Property, except that no charge for services of Operator's legal staff or fees or expense of outside attorneys shall be made unless previously agreed to by the Parties. All other legal expense is considered to be covered by the overhead provisions of Section III unless otherwise agreed to by the Parties, except as provided in Section I, Paragraph 3.

10. Taxes

All taxes of every kind and nature assessed or levied upon or in connection with the Joint Property, the operation thereof, or the production therefrom, and which taxes have been paid by the Operator for the benefit of the Parties.

11. Insurance

Net premiums paid for insurance required to be carried for the Joint Operations for the protection of the Parties. In the event Joint Operations are conducted in a state in which Operator may act as self-insurer for Workmen's Compensation and/or Employers Liability under the respective state's laws, Operator may, at its election, include the risk under its self-insurance program and in that event, Operator shall include a charge at Operator's cost not to exceed manual rates.

12. Other Expenditures

Any other expenditure not covered or dealt with in the foregoing provisions of this Section II, or in Section III, and which is incurred by the Operator in the necessary and proper conduct of the Joint Operations.

## III. OVERHEAD

1. Overhead - Drilling and Producing Operations

i. As compensation for administrative, supervision, office services and warehousing costs, Operator shall charge drilling and producing operations on either:

( X ) Fixed Rate Basis, Paragraph 1A, or

( ) Percentage Basis, Paragraph 1B.

Unless otherwise agreed to by the Parties, such charge shall be in lieu of costs and expenses of all offices and salaries or wages plus applicable burdens and expenses of all personnel, except those directly chargeable under Paragraph 2A, Section II. The cost and expense of services from outside sources in connection with matters of taxation, traffic, accounting or matters before or involving governmental agencies shall be considered as included in the Overhead rates provided for in the above selected Paragraph of this Section III unless such cost and expense are agreed to by the Parties as a direct charge to the Joint Account.

ii. The salaries, wages and Personal Expenses of Technical Employees and/or the cost of professional consultant services and contract services of technical personnel directly employed on the Joint Property shall ( X) shall not ( ) be covered by the Overhead rates.

A. Overhead - Fixed Rate Basis

(1) Operator shall charge the Joint Account at the following rates per well per month:

Drilling Well Rate $ 2311

Producing Well Rate $ 165

(2) Application of Overhead - Fixed Rate Basis shall be as follows:

(a) Drilling Well Rate

[1] Charges for onshore drilling wells shall begin on the date the well is spudded and terminate on the date the drilling or completion rig is released, whichever is later, except that no charge shall be made during suspension of drilling operations for fifteen (15) or more consecutive days.

[2] Charges for offshore drilling wells shall begin on the date when drilling or completion equipment arrives on location and terminate on the date the drilling or completion equipment moves off location or rig is released, whichever occurs first, except that no charge shall be made during suspension of drilling operations for fifteen (15) or more consecutive days

[3] Charges for wells undergoing any type of workover or recompletion for a period of five (5) consecutive days or more shall be made at the drilling well rate. Such charges shall be applied for the period from date workover operations with rig commence through date of rig release, except that no charge shall be made during suspension of operations for fifteen (15) or more consecutive days.

(b) Producing Well Rates

[1] An active well either produced or injected into for any portion of the month shall be considered as a one-well charge for the entire month.

[2] Each active completion in a multi-completed well in which production is not commingled downhole shall be considered as a one-well charge providing each completion is considered a separate well by the governing regulatory authority.

[3] An inactive gas well shut in because of overproduction or failure of purchaser to take the production shall be considered as a one-well charge providing the gas well is directly connected to a permanent sales outlet.

[4] A one-well charge may be made for the month in which plugging and abandonment operations are completed on any well.

[5] All other inactive wells (including but not limited to inactive wells covered by unit allowable, lease allowable, transferred allowable, etc.) shall not qualify for an overhead charge.

(3) The well rates shall be adjusted as of the first day of April* ~~each year following the effective date of the agreement to which this Accounting Procedure is attached~~. The adjustment shall be computed by multiplying the rate currently in use by the percentage increase or decrease in the average weekly earnings of Crude Petroleum and Gas Production Workers for the last calendar year compared to the calendar year preceding as shown by the index of average weekly earnings of Crude Petroleum and Gas Fields Production Workers as published by the United States Department of Labor, Bureau of Labor Statistics, or the equivalent Canadian index as published by Statistics Canada, as applicable. The adjusted rates shall be the rates currently in use, plus or minus the computed adjustment.

* of the year 1978 and each year thereafter.

B. Overhead - Percentage Basis

(1) Operator shall charge the Joint Account at the following rates:

(a) Development

_____ Percent ( %) of the cost of Development of the Joint Property exclusive of costs provided under Paragraph 9 of Section II and all salvage credits.

(b) Operating

_____ Percent ( %) of the cost of Operating the Joint Property exclusive of costs provided under Paragraphs 1 and 9 of Section II, all salvage credits, the value of injected substances purchased for secondary recovery and all taxes and assessments which are levied, assessed and paid upon the mineral interest in and to the Joint Property.

(2) Application of Overhead - Percentage Basis shall be as follows:
For the purpose of determining charges on a percentage basis under Paragraph 1B of this Section III, development shall include all costs in connection with drilling, redrilling, deepening or any remedial operations on any or all wells involving the use of drilling crew and equipment; also, preliminary expenditures necessary in preparation for drilling and expenditures incurred in abandoning when the well is not completed as a producer, and original cost of construction or installation of fixed assets, the expansion of fixed assets and any other project clearly discernible as a fixed asset, except Major Construction as defined in Paragraph 2 of this Section III. All other costs shall be considered as Operating.

2. Overhead - Major Construction

To compensate Operator for overhead costs incurred in the construction and installation of fixed assets, the expansion of fixed assets, and any other project clearly discernible as a fixed asset required for the development and operation of the Joint Property, Operator shall either negotiate a rate prior to the beginning of construction, or shall charge the Joint Account for Overhead based on the following rates for any Major Construction project in excess of $ 25,000 :

A. 3 % of total costs if such costs are more than $ 25,000 but less than $ 100,000 ; plus

B. 3 % of total costs in excess of $ 100,000 but less than $1,000,000; plus

C. 2 % of total costs in excess of $1,000,000.

Total cost shall mean the gross cost of any one project. For the purpose of this paragraph, the component parts of a single project shall not be treated separately and the cost of drilling and workover wells shall be excluded.

3. Amendment of Rates

The Overhead rates provided for in this Section III may be amended from time to time only by mutual agreement between the Parties hereto if, in practice, the rates are found to be insufficient or excessive.

## IV. PRICING OF JOINT ACCOUNT MATERIAL PURCHASES, TRANSFERS AND DISPOSITIONS

Operator is responsible for Joint Account Material and shall make proper and timely charges and credits for all material movements affecting the Joint Property. Operator shall provide all Material for use on the Joint Property; however, at Operator's option, such Material may be supplied by the Non-Operator. Operator shall make timely disposition of idle and/or surplus Material, such disposal being made either through sale to Operator or Non-Operator, division in kind, or sale to outsiders. Operator may purchase, but shall be under no obligation to purchase, interest of Non-Operators in surplus condition A or B Material. The disposal of surplus Controllable Material not purchased by the Operator shall be agreed to by the Parties.

1. Purchases

Material purchased shall be charged at the price paid by Operator after deduction of all discounts received. In case of Material found to be defective or returned to vendor for any other reason, credit shall be passed to the Joint Account when adjustment has been received by the Operator.

2. Transfers and Dispositions

Material furnished to the Joint Property and Material transferred from the Joint Property or disposed of by the Operator, unless otherwise agreed to by the Parties, shall be priced on the following bases exclusive of cash discounts:

A. New Material (Condition A)

(1) Tubular goods, except line pipe, shall be priced at the current new price in effect on date of movement on a maximum carload or barge load weight basis, regardless of quantity transferred, equalized to the lowest published price f.o.b. railway receiving point or recognized barge terminal nearest the Joint Property where such Material is normally available.

(2) Line Pipe

(a) Movement of less than 30,000 pounds shall be priced at the current new price, in effect at date of movement, as listed by a reliable supply store nearest the Joint Property where such Material is normally available.

(b) Movement of 30,000 pounds or more shall be priced under provisions of tubular goods pricing in Paragraph 2A (1) of this Section IV.

(3) Other Material shall be priced at the current new price, in effect at date of movement, as listed by a reliable supply store or f.o.b. railway receiving point nearest the Joint Property where such Material is normally available.

B. Good Used Material (Condition B)

Material in sound and serviceable condition and suitable for reuse without reconditioning:

(1) Material moved to the Joint Property

(a) At seventy-five percent (75%) of current new price, as determined by Paragraph 2A of this Section IV.

(2) Material moved from the Joint Property

(a) At seventy-five percent (75%) of current new price, as determined by Paragraph 2A of this Section IV, if Material was originally charged to the Joint Account as new Material, or

(b) at sixty-five percent (65%) of current new price, as determined by Paragraph 2A of this Section IV, if Material was originally charged to the Joint Account as good used Material at seventy-five percent (75%) of current new price.

The cost of reconditioning, if any, shall be absorbed by the transferring property.

C. Other Used Material (Condition C and D)

(1) Condition C

Material which is not in sound and serviceable condition and not suitable for its original function until after reconditioning shall be priced at fifty percent (50%) of current new price as determined by Paragraph 2A of this Section IV. The cost of reconditioning shall be charged to the receiving property, provided Condition C value plus cost of reconditioning does not exceed Condition B value.

(2) Condition D

All other Material, including junk, shall be priced at a value commensurate with its use or at prevailing prices. Material no longer suitable for its original purpose but usable for some other purpose, shall be priced on a basis comparable with that of items normally used for such other purpose. Operator may dispose of Condition D Material under procedures normally utilized by the Operator without prior approval of Non-Operators.

D. Obsolete Material

Material which is serviceable and usable for its original function but condition and/or value of such Material is not equivalent to that which would justify a price as provided above may be specially priced as agreed to by the Parties. Such price should result in the Joint Account being charged with the value of the service rendered by such Material.

E. Pricing Conditions

(1) Loading and unloading costs may be charged to the Joint Account at the rate of fifteen cents (15¢) per hundred weight on all tubular goods movements, in lieu of loading and unloading costs sustained, when actual hauling cost of such tubular goods are equalized under provisions of Paragraph 5 of Section II.

(2) Material involving erection costs shall be charged at applicable percentage of the current knocked-down price of new Material.

3. Premium Prices

Whenever Material is not readily obtainable at published or listed prices because of national emergencies, strikes or other unusual causes over which the Operator has no control, the Operator may charge the Joint Account for the required Material at the Operator's actual cost incurred in providing such Material, in making it suitable for use, and in moving it to the Joint Property; provided notice in writing is furnished to Non-Operators of the proposed charge prior to billing Non-Operators for such Material. Each Non-Operator shall have the right, by so electing and notifying Operator within ten days after receiving notice from Operator, to furnish in kind all or part of his share of such Material suitable for use and acceptable to Operator.

4. Warranty of Material Furnished by Operator

Operator does not warrant the Material furnished. In case of defective Material, credit shall not be passed to the Joint Account until adjustment has been received by Operator from the manufacturers or their agents.

## V. INVENTORIES

The Operator shall maintain detailed records of Controllable Material.

1. Periodic Inventories, Notice and Representation

At reasonable intervals, Inventories shall be taken by Operator of the Joint Account Controllable Material. Written notice of intention to take inventory shall be given by Operator at least thirty (30) days before any inventory is to begin so that Non-Operators may be represented when any inventory is taken. Failure of Non-Operators to be represented at an inventory shall bind Non-Operators to accept the inventory taken by Operator.

2. Reconciliation and Adjustment of Inventories

Reconciliation of a physical inventory with the Joint Account shall be made, and a list of overages and shortages shall be furnished to the Non-Operators within six months following the taking of the inventory. Inventory adjustments shall be made by Operator with the Joint Account for overages and shortages, but Operator shall be held accountable only for shortages due to lack of reasonable diligence.

3. Special Inventories

Special Inventories may be taken whenever there is any sale or change of interest in the Joint Property. It shall be the duty of the party selling to notify all other Parties as quickly as possible after the transfer of interest takes place. In such cases, both the seller and the purchaser shall be governed by such inventory.

4. Expense of Conducting Periodic Inventories

The expense of conducting periodic Inventories shall not be charged to the Joint Account unless agreed to by the Parties.

EXHIBIT C
ATTACHED TO UNIT OPERATING AGREEMENT
NORTH HOBBS (GRAYBURG-SAN ANDRES) UNIT
LEA COUNTY, NEW MEXICO

## INSURANCE PROVISIONS

Unit Operator shall carry the following insurance with respect to Unit Operations:

(1) Public liability and property damage insurance with limits of $100,000.00 for injuries to or death of one person and $300,000.00 for injuries or deaths in one accident, and $100,000.00 for property damage in one accident.

(2) Automobile public liability and property damage insurance with limits of $100,000.00 for injuries to or death of one person and $300,000.00 for injuries or deaths in one accident, and $100,000.00 for property damage in one accident.

All insurance coverage required hereby shall be carried at the joint expense and for the benefit of the Working Interest Owners. Premiums for automobile public liability and property damage insurance on Unit Operator's fully owned equipment shall not be charged directly to the joint account, but will be covered by the flat rate charge assessed for the use of such equipment. Unit Operator will not carry fire, windstorm or explosion insurance covering Unit Operations or Unit Equipment.

Contractors and sub-contractors will be required to carry insurance of the same types as hereinabove specified and in such amounts as deemed necessary by Unit Operator.

If under the laws of the State in which operations are conducted Operator is authorized to be a self-insurer as to workmen's compensation and/or employers' liability, Operator may elect to be a self-insurer under such laws and in such event Operator shall charge to the joint account, in lieu of any premiums for such insurance, a premium equivalent limited to amounts determined by applying manual insurance rates to the payroll.

If the parties hereto or any of them shall insure their respective risks beyond the specific limits of insurance required hereunder to be carried by the Unit Operator, the benefits of such insurance shall inure to the parties procuring and maintaining the same, respectively, and the cost of such insurance shall be borne by such parties, respectively, without reimbursement one from the other and without entering into any accounting hereunder.

EXHIBIT H

ATTACHED TO UNIT OPERATING AGREEMENT
NORTH HOBBS (GRAYBURG-SAN ANDRES) UNIT
LEA COUNTY, NEW MEXICO

# INDEMNITY AGREEMENT

WHEREAS, Section 14(c) of an agreement entitled "Unit Agreement, North Hobbs (Grayburg-San Andres) Unit, Lea County, New Mexico," dated July 1, 1978, provides that under certain circumstances and conditions therein stated a Tract that fails to qualify under Section 14(a) or Section 14(b) may be qualified under said Section 14(c) if the requisite Working Interest Owners in the Tract as specified in said Section 14(c) request the qualification of the Tract and execute and deliver, or obligate themselves to execute and deliver, an indemnity agreement; and

WHEREAS, Tract _____, described in the Unit Agreement is such a Tract; and

WHEREAS, the undersigned are owners of Working Interest in such Tract and have become parties to the Unit Agreement and the Unit Operating Agreement and desire the qualification of the Tract under said Section 14(c):

NOW THEREFORE, in consideration of and conditioned upon said Tract meeting the other requirements of said Section 14(c) of the Unit Agreement and its being qualified under said Section 14(c), the undersigned hereby request the qualification of said Tract under said Section 14(c) and agree, together with other owners of Working Interest in the Tract who execute and deliver, or who obligate themselves to execute and deliver, like indemnity agreements, to indemnify and hold harmless all other Working Interest Owners in the Unit Area against all claims and demands required by said Section 14(c) to be the subject of such indemnity. Any liability arising hereunder shall be borne by the undersigned and other Working Interest Owners in the Tract who are committed to like indemnity agreements in the proportion that the Working Interest of each in the Tract bears to the total Working Interest therein of all the owners of Working Interest in the Tract committed to such indemnity agreement.

This indemnity shall become void with respect to all claims and demands based upon occurrences subsequent to any time that conditions are such that said Tract would be qualified under the provisions of said Unit Agreement without this indemnity.

This agreement shall be binding upon and inure to the benefit of the heirs, devisees, legal representatives, successors, and assigns of the respective parties initially bound or benefited by the provisions hereof.

IN WITNESS WHEREOF, each of the undersigned has executed this instrument on the date opposite its signature.

_____ _____

_____ _____

STATE OF NEW MEXICO
ENERGY AND MINERALS DEPARTMENT
Oil Conservation Commission
State Land Office Building
Santa Fe, New Mexico
3 October 1979

EXAMINER HEARING

| | | |
|---|---|---|
| IN THE MATTER OF: | | |
| Application of Shell Oil Company for statutory unitization, Lea County, New Mexico, | ) | CASE 6652 |
| and | ) | |
| Application of Shell Oil Company for a pressure maintenance project, Lea County, New Mexico. | ) | CASE 6653 |

BEFORE: Commissioner Ramey
Commissioner Arnold

TRANSCRIPT OF HEARING

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MR. RAMEY: The hearing will come to order. We'll call Case Number 6652.

MR. PADILLA: Application of Shell Oil Company for statutory unitization, Lea County, New Mexico.

MR. RAMEY: Does anyone have any opinions about consolidating this case with Case 6653?

MR. ATKINSON: Mr. Commissioner, I represent Exxon Corporation, from the Modrall law firm, my name is Clifford Atkinson, and also with me is Jack Dalious. We're opposing the application of Shell Oil.

MR. RAMEY: Okay. But you have no objection to consolidating the two cases?

MR. ATKINSON: Oh, no, sir.

MR. RAMEY: All right. We'll call Case 6653.

MR. PADILLA: Application of Shell Oil Company for a pressure maintenance project, Lea County, New Mexico.

MR. RAMEY: Ask for appearances at this time, please.

MR. LOPEZ: Mr. Chairman, my name is Owen Lopez with the Montgomery law firm in Santa Fe, New Mexico, appearing on behalf of the applicant in both cases, Shell Oil Company. I have with me, and associated with me on the case, Gary Kilpatric of our law firm, and might as well put

Clint Parsley on the record, too. He's also a new lawyer with our law firm, and Jim Lore, who's with the Office of General Counsel for Shell Oil Company, Houston, Texas.

I also have with me at counsel table Mr. Earl Buck, Project Manager of the unit, and I have four witnesses to be sworn in the cases.

I should also point out, I think, to accommodate the Commission, that we have marked our exhibits. We have at this time, propose to enter thirty-four exhibits. The first three witnesses' exhibits all pertain to the statutory unitization application and the last witness' exhibits, Mr. Phillips, all pertain to the pressure maintenance project. I have marked the exhibits accordingly.

MR. RAMEY: Thank you. What was the third man's name you mentioned, Clint --

MR. LOPEZ: Parsley, Clint Parsley.

MR. RAMEY: All right.

MR. ATKINSON: Once again I'll enter an appearance for Exxon Corporation. My name is Clifford Atkinson from Modrall law firm. Also appearing, Mr. Jack Dalious, Exxon Corporation, and at the counsel table is Mr. Bill Nolan, also with Exxon.

MR. RAMEY: Do you have any witnesses?

MR. ATKINSON: Yes, sir. Mr. Bill Nolan will be our sole witness.

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MR. RAMEY: I'll ask that all witnesses are there any other appearances?

I'll ask all witnesses to stand at this time and be sworn.

(Witnesses sworn.)

You may proceed, Mr. Lopez.

MR. LOPEZ: Thank you, Mr. Chairman.

Perhaps preliminarily I might mention that I have talked to the Chairman and I do understand that there are some working interest owners here who may wish to appear either on behalf or in opposition to our application, but have other commitments and may not want to sit through the whole story. The chairman said it might be possible for those persons to enter their appearances before the recess at lunch time.

Okay, I call our first witness, Mr. Campbell.

LEE CAMPBELL

being called as a witness and having been duly sworn upon his oath, testified as follows, to-wit:

DIRECT EXAMINATION

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BY MR. KILPATRIC:

MR. KILPATRIC: Mr. Chairman, I direct your attention to the prepared testimony of Mr. Campbell in the green booklet. Yes. And before we start I might point out that page nine, there are a couple of number changes. If I give them to you now I think the testimony will flow more smoothly.

MR. RAMEY: Okay.

MR. KILPATRIC: The number 70 on the first complete answer down at the middle of the page, should be 65, and the 65, I think there are three places where there is 70, that number should be changed to 65.

And at the top of page 10 at the very first line those percentages should read 92.21 instead of 92.26 and 95.34 instead of 95.44.

And I refer you back over to page 9 and ask that the first full answer there, the last line should be stricken. There are some ratifications that were received this morning. We probably will receive them this morning but we haven't received them at this time, so that would be premature.

With those corrections we'll start the testimony.

Q What is your name and where do you reside?

A Lee Campbell. I reside in Slidell,

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Louisiana.

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

A. I'm employed by Shell Oil Company as a Senior Landman.

Q. Have you testified previously before the Commission and had your qualifications accepted as a matter of record?

A. No, I have not.

Q. Would you briefly describe your educational and employment background?

A. I graduated with a Bachelor's in Business Administration in Petroleum Land Management from the University of Texas in December, 1972, and in January, 1973, I was employed by Shell Oil Company in their Land Department in Houston.

For the past two years I have been one of those responsible for the land operations of Shell Oil Company in New Mexico and West Texas, and for the last year and a half I have almost entirely devoted my time and energies to the North Hobbs Unitization and Pressure Maintenance Project.

Q. I take it then, that you are familiar with Shell Oil Company's applications in these consolidated cases, Numbers 6652 and6653?

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A. Yes, very familiar.

Q. How was it that you have become familiar with the facts concerning these two applications?

A. I was assigned the task of determining who had the working ownership interests and royalty ownership interests for each tract within the northern portion of the Hobbs Grayburg-San Andres Pool, which I will refer to as the Unit Area.

In this connection I participated in the preparation of the ownership and tract participation exhibits pertaining to the Unit Area.

MR. KILPATRIC: Are the witness' qualifications acceptable, Mr. Chairman?

MR. RAMEY: He's considered qualified.

MR. KILPATRIC: Thank you.

Q. (Mr. Kilpatric continuing.) Now, Mr. Campbell, I direct your attention to what has been marked as Shell's Exhibit Number One, and I ask you to identify it.

A. This is a map of the proposed Unit Area, which is located in Lea County, New Mexico, and which contains approximately 10,649.53 acres. The Unit Area includes the following sections or portions of sections in Township 18 South, Range 37 East, NMPM: The southeast quarter and the west half of Section 13; all of Sections 14, 23, 24, and 25; the east half of the northeast quarter and the northwest

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quarter of the northeast quarter of Section 26; the east half of the northwest quarter and the east half of Section 36.

As regards Township 18 South, Range 38 East, the Unit Area includes the south half of the northwest quarter and the southwest quarter of Section 17; the northeast quarter and the south half of Section 18; all of Sections 19 and 20; the southwest quarter and the south half of the southeast quarter and the northwest quarter of the southeast quarter of Section 21; all of Sections 27, 28, 29, 30, 31, and 32; all of Section 33, except the southeast quarter of the southeast quarter; and the east half of the northwest one-quarter and the east half of Section 34.

The Unit Area consists of 88 separate tracts which were formed according to their common mineral ownership. Each tract is identified on the exhibit by a tract number, lease name, and tract operator. The tract number is denoted with a circle near the center of the tract. The lease name is at the bottom, and the tract operator is shown at the top of each designated tract.

In some instances a tract encompasses an entire lease; however, in certain leases which had diverse mineral ownership within the unitized horizon, we divided into two or more tracts.

You will note that some of the tracts have

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a designation A or B after their particular tract numbers, which, for example, you will see if you look at Tract 10 at the north central portion of the exhibit. This division was made because we discovered after we had assigned the original tract numbers additional divisions of mineral ownership within the unitized formation.

MR. KILPATRIC: Mr. Chairman, I'd like to point out that the exhibits are tabbed for the testimony and you can refer to any during the testimony by the use of tabs.

Q (Mr. Kilpatric continuing.) Now, Mr. Campbell, please define the unitized formation for the Unit Area, and in this connection I direct your attention to what has been marked for identification as Shell's Exhibit Number Two, and ask you to identify it for the Commission.

A. Exhibit Number Two shows the unitized formation for the Unit Area, which is that subsurface portion of the Unit Area known as the Grayburg-San Andres formation, of Permian age, found in the interval between the stratigraphic depth of 3698 feet and the depth of 4500 feet beneath the surface, as measured on the Borehole Compensated Sonic-Gamma Ray Log run in the Shell Oil Company State A-7 Well on July the 9th, 1969.

This well is located 1930 feet from the north line and 660 feet from the east line of Section 32,

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Township 18 South, Range 38 East, Lea County, New Mexico.

The upper limit of the unitized formation is the top of the Grayburg-San Andres interval.

The lower limit of the unitized formation is 4500 feet beneath the surface, which is approximately 200 feet below the oil/water contact as determined by the technical committee whose function will be described by Mr. Lancaster later on.

Therefore the unitized formation has been limited to only the interval required for unit operations, which would affect the Hobbs Grayburg-San Andres Pool.

Q Mr. Campbell, I now refer you to Shell's Exhibits Numbers Three and Four, and ask you to identify them.

A Shell's Exhibit Number Three is a copy of the Unit Agreement, covering the Unit Area.

And Exhibit Number Four is a copy of the Unit Operating Agreement, covering the Unit Area.

These are copies of the agreements that I submitted to the various royalty interest owners and working interest owners in the Unit Area for their consideration and ratification.

Q How were you able to determine who were the working interest owners and the royalty interest owners?

A We were able to obtain the names of all

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the operators within the Unit Area from the records of the Oil and Gas Conservation Division of the State of New Mexico.

We then asked and obtained from each operator within the Unit Area a list of all the working interest owners and royalty interest owners within each of their tracts.

Q. What did you do with this information?

A. We compiled a list of all of the working interest owners and royalty interest owners within the Unit Area on a tract-by-tract basis, and we then contacted each working interest owner and attempted to contact all known royalty interest owners.

The Unit Agreement was submitted to the royalty interest owners and both the Unit Agreement and Unit Operating Agreement were submitted to the working interest owners, as well as to the USGS and the State of New Mexico.

It should be noted that Exhibit B contained in Shell's Exhibit Number Three, the Unit Agreement, is a list of each tract within the Unit Area, the area of land located within each tract, and the mineral ownership information for each tract.

Q. I now refer you to what has been marked as Shell's Exhibit Number Five and ask you to identify it.

A. Exhibit Number Five is a computer printout on a tract-by-tract basis listing all the royalty interest

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owners within the Unit Area, their addresses, and their percentage of royalty interest in each tract.

Column One lists the tract numbers. Column Three lists the names and addresses of each royalty interest in the tract. Column Four shows the percentage of each owner's royalty interest within the tract, and Column Five indicates by an "X" that the interest owner has ratified the Unit Agreement.

Q. How many royalty owners are involved in the unit Area and how were they contacted with regard to ratification of the Unit Agreement? And in this connection I direct your attention to what has been marked as Shell's Exhibit Number Six.

A. As the Exhibit shows, approximately 905 royalty interest owners exist within the Unit Area, including the USGS and the State of New Mexico.

As is also shown on the exhibit, on August the 8th, 1978, the Unit Agreement and ratification forms were mailed to all known royalty interest owners. Then on October the 11th, 1978, we sent a follow-up letter to all the then known unsigned royalty interest owners advising them of sign-up status and again requesting their ratification.

During the months of December, 1978, and January and February, 1979, an intense effort was made to contact all unsigned royalty interest owners by phone.

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Then, as further shown on Exhibit Number Six, on February the 22nd, 1979, we sent even another follow-up letter to all of the unsigned royalty interest owners at that time, again advising them of sign-up status with respect -- respect to the Unit Agreement, and again requesting their ratification. In this letter we explained as best we could to these persons that we had attempted to contact each of them by phone but had been unable to reach some of them. We asked that they call us collect if they had any questions concerning the Unit Agreement or the project we were undertaking. Additional ratification forms were included with this letter.

Finally, on August the 6th, 1979, again as shown on the exhibit, we sent another and final letter to every known royalty interest owner, advising each of them of the status of ratification and of our plans to proceed with these applications before the Commission today, and again we requested all unsigned royalty interest owners to ratify the Unit Agreement.

Q. How many of the total royalty interest owners have ratified the Unit Agreement?

A. 720 of the total 905 royalty interest owners have ratified the Unit Agreement to date, and this includes the preliminary approval of the USGS and the Commission of Public Lands of the State of New Mexico.

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As Exhibit Six shows, of the 185 who have not yet ratified the Unit Agreement, 41 were unreachable, and 144 were contacted but have not yet ratified the agreement.

Q Now, Mr. Campbell, you stated that 720 of the total number of 905 royalty interest owners have ratified the Unit Agreement. What does this figure represent as a percentage of the total royalty interests in the unit area?

A As the exhibit shows, the percentage of sign-up is set forth in six separate percentage figures. The reason for this is twofold.

First, the percentage of ratification is dependent upon the determination of the royalty owners' interest in either the oil or the gas in the pool.

Second, the life of the water injection project has been broken down into three specific phases. The reasons for this will be discussed in later testimony of Mr. Lancaster and Mr. Buck.

Therefore, the royalty owner's interest will be dependent upon his interest during the phase in effect at a given time and whether his interest is in oil or gas.

As a result you will note that the exhibit shows a percentage sign-up ranging from 97.18 percent to 97.42 percent, which exceeds the 75 percent required for statutory unitization by more than 20 percent.

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Less than 3 percent of the royalty interest ownership has not yet ratified the Unit Agreement.

Q Now I refer you to Exhibit Number Seven and ask you to identify it.

A Exhibit Number Seven is a computer printout on a tract-by-tract basis listing all working interest owners within the Unit Area, their addresses, and their percentage of working interest in each tract.

Column One lists the tract numbers. Column Three lists the names and addresses of each working interest owner. Column Four is the percentage of each owner's working interest in each tract, and Column Five indicates by an "X" that the interest owner has ratified the unit.

MR. KILPATRIC: Mr. Chairman, I might point out here that since the time that I asked you to strike that latter sentence, it has become true and we have received some more ratifications this morning. So, in fact, we now have 73 out of the total 80 working interest owners and we'll cover that in later testimony.

Q (Mr. Kilpatric continuing.) How many working interest owners are involved within the Unit Area and how were they contacted with regard to ratification of the Unit Agreement and Unit Operating Agreement? In this connection I refer you to Shell's Exhibit Number Eight.

A. There are 80 working interest owners in the

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Unit, 25 of which are operators. As shown on this exhibit, on August the 7th, 1978, we mailed the Unit Agreement and the Unit Operating Agreement and ratification form to each of the working interest owners.

On November the 20th, 1978, we again wrote a letter to each working interest owner and again requested each unsigned owner to consider the agreements and to ratify them at their earliest convenience..

We wrote a final letter on July 13th, 1979, again to each working interest owner, advising him of the status of ratification and of Shell's plans for proceeding with statutory unitization and for the institution of a pressure maintenance project.

In this connection we made numerous telephone calls in an attempt to obtain ratification from each of the unsigned working interest owners.

Q How many of the total working interest owners have ratified the Unit Agreement and Unit Operating Agreement?

A. As shown on the Exhibit Number Eight, 63 of the 80 working interest owners have ratified the Unit Agreement and the Unit Operating Agreement; however, since the exhibit was prepared we have received additional commitments to the Unit, and at this point the interest of 73 of the 80 working interest owners are committed to the Unit.

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Q Now, Mr. Campbell, can you tell the Commission what percentage of the total working interest ownership is represented by the interests of the 73 working interest owners who have committed to the unit?

A Yes. As I just stated, the interest of 73 of the 80 working interest owners have committed to the unit. This represents in excess of 92.26 percent to an excess of 95.44 percent of the working interest ownership, depending again on which of the three phases of the project is in effect at a given time and whether it involves the working interest ownership's interest in oil or gas.

This percentage of ratification again substantially exceeds the 75 percent required for statutory unitization.

Q Now I refer you to what have been marked as Shell's Exhibits Numbers 9 and 10 and ask you to identify these.

A Exhibit Number Nine is a letter dated July 31st, 1978, from James W. Sutherland, Oil and Gas Supervisor of the United Stated Department of the Interior, advising that the USGS has no objection to the revised unit agreement form.

Exhibit Ten is a series of letters dated June 13th, June 21st, and July 6th, 1978, from Ray D. Graham, Direction of the Oil and Gas Division of the Commissioner

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of Public Lands of the State of New Mexico, approving the Unit Agreement as to form and content.

Q. Mr. Campbell, I now refer you to what has been marked as Shell's Exhibits Eleven and Twelve and ask you to identify them for the Commission.

A. Exhibit Eleven is a packet of ratification forms which have been executed by the royalty interest owners.

Exhibit Twelve is a packet of ratification forms which have been executed by the working interest owners.

Q. Were Exhibits One through Twelve prepared by you or under your supervision?

A. With the exception of Exhibits Three and Four all of these exhibits were prepared by me or under my supervision.

Regarding Exhibits Three and Four, which are the Unit Agreement and the Unit Operating Agreement, respectively, although these were actually prepared by Mr. Buck, the Project Manager, in conjunction with Shell's Legal Department, these exhibits are copies of the actual agreement that I submitted to both the working interest owners and the royalty interest owners.

MR. KILPATRIC: Mr Chairman, I now offer Exhibits One through Twelve into evidence.

If there be no objection to these exhibits, that concludes our examination.

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MR. RAMEY: Those Exhibits One through Twelve will be admitted.

MR. KILPATRIC: Thank you. Pass the witness.

MR. RAMEY: Any questions of Mr. Campbell?

MR. ATKINSON: Just a couple of questions, if I may.

CROSS EXAMINATION

BY MR. ATKINSON:

Q. Mr. Campbell, the Shell Exhibit Number One defines the boundaries of the proposed North Hobbs Unit, I believe, is that not correct?

A. That's correct.

Q. But in fact the Unit itself does not entirely comprise the pool within which the Unit lies, does it?

A. Well, there's a South Hobbs Unit.

Q. And the two of them are part of the same pool, are they not?

A. I'm not the engineer.

Q. And the, if I may refer to the lower right-hand corner of the Shell Exhibit Number One, the finger that juts up into the proposed North Hobbs Unit, then, is a portion of the South Hobbs Unit?

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A. That's correct.

MR. ATKINSON: No further questions.

MR. KILPATRIC: No redirect.

MR. LOPEZ: Mr. Chairman, I might point out that I've just been informed that rather than 73 it's 77, so I would like the record to be amended or corrected to reflect that we've exceeded even our wildest expectations.

MR. RAMEY: This, I assume, is the working interest owners --

MR. KILPATRIC: Yes, sir.

MR. RAMEY: -- that have signed?

MR. KILPATRIC: Yes, sir.

MR. ATKINSON: Mr. Chairman, if possible, we'd like to reserve the right to recall him at a later time after the finish of their case.

MR. RAMEY: I would think so. I would think Mr. Campbell would want to stay around and see the whole show.

MR. ATKINSON: Okay.

MR. LOPEZ: I'd like to call Mr. Lancaster.

BILL LANCASTER

being called as a witness and having been duly sworn upon his oath, testified as follows, to-wit:

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DIRECT EXAMINATION

BY MR. LOPEZ:

Q. Would you please state your name, by whom you're employed, and in where you reside?

A. My name is Bill Lancaster. I'm employed by Shell Oil Company and I reside in Houston, Texas.

Q. Have you previosly testified before the Commission and had your qualifications accepted as a matter of record?

A. No, I have not.

Q. Would you then briefly describe your educational background and employment experience?

A. I graduated from Ohio State University in 1954 with a Bachelor of Science in Petroleum Engineering. Upon graduation I spent two years, from 1954 to 1956, in the Air Force. In 1957 I received a Masters of Science in Petroleum Engineering from Texas A & M.

In August of 1957 I was employed by Shell Oil Company. From 1957 to 1968 I worked in Shell's New Orleans office as a Production and Reservoir Engineer. From 1968 until 1977 I worked as a Reservoir Engineer in Shell's Rocky Mountain Division. In 1977 I was assigned to the Reservoir Engineering Section of the Mid-Continent Division, where my responsibilities include reservoir engineering work

for fields in which Shell has an interest in West Texas and New Mexico.

Q. Mr. Lancaster, are you familiar with the history of the Hobbs Grayburg-San Andres Pool?

A. Yes, I am.

Q. How did you become familiar with this pool?

A. I am not Chairman of the Technical Committee which was formed by the Working Interest Owner Committee to investigate the feasibility of initiating a pressure maintenance project for the purpose of recovering additional oil reserves in the Hobbs Grayburg-San Andres Pool.

Q. And I take it you are familiar with the applications in Case Numbers 6652 and 6653?

A. Yes, I am.

MR. LOPEZ: Mr. Chairman, are the witness' qualifications acceptable?

MR. RAMEY: Yes.

Q. (Mr. Lopez continuing.) Mr. Lancaster, I now ask you to briefly describe the history of this pool and in that connection I ask you to refer to what has been marked as Shell Exhibit Number Thirteen.

A. Exhibit Number Thirteen is not on the wall. It is a graph showing the production history of the entire Hobbs Grayburg-San Andres Pool From its inception through 1975.

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As is shown, the pool was discovered in 1928, and by the end of 1930 was producing about one million barrels of oil per month from 125 wells. This high production rate continued until 1935, when the rate was curtailed because of the reduced demand for oil.

Although a number of wells within the pool continued to produce at maximum allowables after 1935, declines in production capacity were observed in most wells as a result of a continuing decline in these wells' bottom hole pressures.

By 1975 bottom hole pressures had declined from an initial 1,515 pounds per square inch absolute in the pool to an approximately 400 pounds per square inch absolute in what I shall refer to as the Grayburg study zones; approximately 950 pounds per square inch absolute in the San Andres study zone I; and to approximately 800 pounds per square inch in the San Andres study zones II and III.

I should mention at this time that the Technical Committee decided it would better describe the past and future performance of any complex reservoir by dividing it into six study zones. In any event, this decline in production and pressure prompted operators to consider ways of supplementing the natural reservoir drive mechanisms so as to achieve greater ultimate recovery from the reservoir.

In 1970 Amoco initiated efforts to unitize

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the entire Hobbs Grayburg-San Andres Pool.

In 1971 Moranco began injecting water into the Grayburg study zones in the northern portion of the pool on the Moranco-operated Rice and Hardin leases.

In 1973 Amoco abandoned its efforts to unitize the entire Hobbs Pool when working interest owners could not reach an agreement on a participation formula. Nevertheless, Amoco continued its unitization efforts and subsequently formed a volunteer unit, which comprised the southern third of the pool. This unit became effective on January 1st, 1975.

When Amoco abandoned its efforts to unitize the entire pool, Shell Oil Company was selected as unit expeditor for the remaining northern portion of the pool by the working interest owners. Shell has continued its unitization efforts to date.

Q. What were the initial unitization efforts undertaken after Shell was selected unit expeditor for the northern portion of the Hobbs Pool?

A. All operators within this northern portion of the Hobbs Pool were asked to invite the working interest owners to a meeting on July 31st, 1973. At this meeting our Technical Committee was formed by the working interest owners.

The Technical Committee was to be comprised of engineering representatives of all working interest owners.

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Q. What instructions, if any, were given to the Technical Committee by the Working Interest Owners Committee, and in this connection I refer you to what has been marked as Shell's Exhibit Number Fourteen?

A. As shown on this exhibit, the Technical Committee was charged by the Working Interest Owners Committee with the task of determining the feasibility and profitability of instituting a pressure maintenance project for the northern portion of the Hobbs Grayburg-San Andres Pool. In addition, our committee was charged with the responsibility of developing values, tract by tract, for the parameters set forth on this exhibit. This was done so that the Working Interest Owners Committee could develop a formula for the equitable sharing of the costs and the revenues to be derived from the pressure maintenance project.

Q. Did the Technical Committee in response to this charge determine whether or not the pressure maintenance project would be feasible and profitable?

A. Yes, it did.

Q. What was the determination and what was the basis for that determination?

A. The Technical Committee made a comprehensive study of the pool, including such parameters as the amount of oil in place, its location, and its primary recovery efficiency, that is, as you know, the expected recovery from

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the pool without the water injection program, and determined that significant volumes of oil would not be recovered under primary operations, and that be initiating a water injection program there was a potential to increase the ultimate recovery by some 55-million barrels of oil.

The committee also determined that a water injection program in this pool was feasible and that such a program would be profitable and beneficial to all the working interest owners and royalty owners.

Q. Would you describe how this Technical Committee functioned in responding to the charges you've just described, and in this connection I refer you to what has been marked for identification as Shell's Exhibits Numbers Fifteen and Sixteen?

A. Since Amoco's prior attempt was abandoned because the working interest owners could not reach an agreement on a method for allocating the unit production, based on the values assigned the parameters, and since Shell's undertaking of the unitization effort for the northern portion of the Hobbs Pool probably represented the last chance to unitize the entire northern portion of this reservoir, the Working Interest Owners Committee instructed the Technical Committee that a simple majority agreement on pertinent matters would not be sufficient and that they were to reach agreement on these matters by a substantial majority, and

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that if they failed in this endeavor, the Technical Committee was to present the issue to the Working Interest Owners Committee for resolution.

To achieve these objectives our committee proceeded in a step-by-step manner so that a substantial majority agreement could be reached on each issue addressed before proceeding to the next. No decisions were reached unless there was a substantial majority concurrence.

In following these guidelines our committee met for twenty-two sessions over a three and a half year period from September, 1973, to March of 1977. Minutes of each meeting were kept and they are compiled in Shell's Exhibit Number Fifteen.

Throughout the meetings there was outstanding cooperation and attendance averaged about 83 percent of the working interest ownership.

The final outcome of this work was the acceptance by the Working Interest Owners Committee of our committee's technical report, entitled Waterflood Feasibility and Unitization Parameters of the North Hobbs Grayburg-San Andres Unit, dated April of 1977.

This technical report is Shell's Exhibit Number Sixteen.

Q Did your committee develop any information concerning the geology of the northern portion of the Hobbs

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Pool?

A. Yes, we did. The entire Hobbs Grayburg-San Andres Pool is a northwest-southeast trending anticline about eight miles long and three and a half miles wide. Within this pool there exist two recognized geological strata known as the Grayburg and the San Andres. As I previously mentioned, the Technical Committee decided that breaking these strata into six study zones would facilitate the job of describing the reservoir performance.

Now, as is shown on Figure 4 of the Technical Report, this anticline has some 400 feet of structural relief from the crest of the Grayburg at 217 feet subsea, to the top of an oil/water transitional zone at 1614 feet subsea. A large gas cap above 360 feet subsea initially covered the crestal or central portion of this reservoir.

Q. Would you describe for the Commission the six study zones?

A. For the purposes of the technical study, the upper portion of the reservoir was divided into two study zones, referred to as the Upper and Lower Grayburg. The total thickness of these two zones varies from 80 gross feet on the southeast flank to 200 feet on the northwest and southwest flanks of the Unit Area.

Since the Grayburg is overlain by a large gas cap, most of the oil-bearing reservoir is located around

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the flanks of the structure. Maximum pay development for both of these Grayburg study zones is found on the western flank and production is from thinly interbedded sandstone, siltstone, and dolomite layers, with most of the production coming from the sandstone layers.

Again, for the purposes of the technical study, the lower portion of the reservoir was divided into four study zones, referred to as San Andres Zones I, II, III Upper, and III Lower.

San Andres Zone I is a crystalline dolomite that is separated from the overlying productive interval by 10 to 80 feet of impermeable dolomite. This zone usually consists of two to three very porous layers, some of which are reported to be cavernous. This is the only study zone known to have experienced significant edge water influx.

San Andres Zone II is a dolomite layer 50 to 90 feet thick, which is normally separated from Zone I by a thin shaley bed.

San Andres Zone III is separated from Zone II by a sandy break consisting of 10 to 20 feet of dense sandy carbonate. Zone III is generally more thin-bedded than Zones I and II, but like Zone II, is best developed on the crest of the structure. Based on core and petrophysical studies, this zone was further divided into an upper and

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lower study zone.

Q. In connection with its technical study, did the Technical Committee make any determinations with respect to the oil and gas in place within the Unit Area?

A. Yes, the Committee did.

Q. How were these determinations made?

A. Most of the wells completed in the Grayburg study zones were drilled in the 1930's and their logging surveys were not suitable for calculating porosity values; therefore, to determine the oil in place for these particular zones the Technical Committee developed net pay maps and used an average porosity value of 14 percent that had been determined from analyzing available log and core data. These oil and gas net pay maps are based on a gas/oil contact at 360 feet subsea and are included in the Technical Report as Figures 8, 9, 10, and 11.

With respect to the San Andres study zones, there did exist sufficient core and log data in the San Andres intervals to enable the Technical Committee to prepare porosity feet maps for each of the four San Andres study zones. Table 6 in the Technical Report is a summation of the petrophysical analysis used in constructing the net porosity feet maps for each of the San Andres study zones.

The resulting porosity feet maps are included in the Technical Report as Figures 23, 24, 25, and 26.

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These porosity feet maps were utilized by the Technical Committee to calculate initial oil in place on a tract-by-tract basis within the Unit Area.

Q. What other kinds of data did the Technical Committee develop with respect to their study?

A. The Committee developed a water-cut map for the San Andres Zone I, and gas/oil ratio maps for San Andres Zones II, III Upper, and III Lower, all of which are included in the Technical Report as Figures 27 through 30, respectively.

Q. How was the data used in meeting the charge of the Working Interest Owners Committee?

A. The data was used as input in determining the remaining primary and secondary reserves, and in determining the economic profitability of instituting a program of water injection in this northern portion of the Hobbs Grayburg-San Andres Pool.

This data would also provide a basis upon which the Working Interest Owners Committee could develop a fair and reasonable participation formula for all the working interest owners and royalty interest owners.

Q. How did the Technical Committee finally determine an estimate of primary reserves?

A. The Hobbs Grayburg-San Andres Pool is one of the last major Grayburg-San Andres reservoirs in the

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New Mexico-West Texas area to be unitized. Two factors that have contributed to this delay in forming the North Hobbs Unit are the complexity of the reservoir and the influx of water into the upper portion of the San Andres, both of which made estimating primary reserves very difficult.

In forecasting the remaining primary performance of the North Hobbs Unit wells, the Technical Committee decided to determine the reserves on a well-by-well basis, separating the producers into two groups.

The first group consisted of those wells with only Grayburg production. The second group consisted of those wells with San Andres production.

Production from wells completed only in the Grayburg study zone is characterized by marginal oil rates, high gas/oil ratios, and little or no water. Since these study zones were in the latter stages of depletion, the Technical Committee determined that the remaining reserves could be estimated by extrapolating recent production trends; however, due to the complex reservoir performance observed in the San Andres study zones, production plots, such as decline curves or oil cut cumulative curves, were not suitable for forecasting the reserve potential of the San Andres wells.

After considering several proposed methods of determining primary reserves for these study zones, the

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Technical Committee elected to us a computerized reservoir simulation model because it is the most precise means of describing a complex reservoir performance of this type, and because it is able to utilize detailed well, production, reservoir, and geological data effectively.

Figure 31 of the Technical Report is a map of the North Hobbs Unit showing which of these two methods, extrapolation or computer simulation, was used in determining each well's primary reserves.

Q. What was your committee's final conclusion as the remaining primary Grayburg reserves within the northern portion of the Hobbs Pool?

A. At the time the Technical Report was finalized there were 78 wells completed in only the Grayburg study zones. The primary oil reserves from these wells were determined by extrapolating the 5-year production trends between January 1st, 1972, and January 1st, 1977, to an economic limit of one barrel of oil per day per well.

The well reserves were then summed by tract and the tract reserves are shown on Table 14 of the Technical Report. Using this method the total Grayburg primary oil reserves were estimated to be 1.5 million barrels of oil as of January 1st, 1977.

Q. How did you calculate the remaining primary reserves with respect to the San Andres study zones?

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A As I explained earlier, the analysis and the data necessary to make the computations with respect to the remaining primary reserves within the San Andres study zones were considerably more complex than those required for the Grayburg study zones.

Figure Number 32 of the Technical Report shows the gid overlay that was used for the computer simulation model work in describing the San Andres Zones I, II, and III.

The model consisted of three layers of 200 blocks each, with each layer describing one of the San Andres study zones. Each of the blocks within the model was assigned particular reservoir characteristics, including zonal thickness, porosity, permeability, and initial oil, gas, and water saturations. In addition, the simulation included an aquifer for the upper layer of the model to represent the water influx experienced in the San Andres Zone I.

Within the simulator program, oil, gas, and water were withdrawn from each San Andres well located within the entire Hobbs Pool, based on each well's reported production history. This, of course, included wells located in that southern portion of the pool that Amoco unitized.

The object was to construct a model so that the reservoir performance as calculated by the computer simulation would match the actual performance evidenced by the

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historical reservoir data. Once a match was obtained a prediction of future performance was made, starting in September of 1976.

The results of the simulation model study indicated the San Andres primary reserves for the North Hobbs wells would be 36.6 million barrels of oil as of January 1st, 1977.

These well reserves estimates were then summed up by study zone, by tract, and by working interest owner, and are presented in the Technical Report as Tables 16 and 23, A and B.

Q. How were the recoverable secondary reserves estimated?

A. Because of differences in reservoir quality, the secondary potential of the Grayburg and San Andres study zones was evaluated separately. Evaluation of the Grayburg secondary recovery potential was done using another reservoir simulation model. In a depleted reservoir with a relatively low permeability, as exists in this Grayburg reservoir, the injection rates will be low, and it can take a long time to reach maximum response.

Although there are numerous technical procedures for estimating recoveries and response times, we believe the use of a simulation model, especially in this case, offers the most precise estimate performance. This

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simulation model consisted of 153 blocks on a 9x17 grid in a single layer, with wells located within the model to duplicate the results of installing an 80-acre 5-spot water injection program. The reservoir input data was based on the average reservoir characteristics typical of the Grayburg study zones on the north and west flanks of the pool.

The significant conclusions derived from this study were the following:

Number one, because of the low permeability of 5 millidarcies, more or less, injection pressures on the order of 1500 pounds per square inch will be required to inject sufficient water to obtain a successful secondary recovery operation.

Ultimate primary recovery will be 18.7 percent of the original oil in place and secondary recovery will be 14.4 percent of the original oil in place, using a symmetrical closed 80-acre 5-spot injection pattern.

Number three, an 80-acre 5-spot pattern using existing wells is economically attractive and will have a long life of approximately 36 years.

Applying the calculated secondary recovery percentage factor to the oil in place in the patterns surrounding the Grayburg injectors, as shown on Figures 35 and 36 of the Technical Report, resulted in a secondary recovery estimate of 6.6 million barrels of oil for the Grayburg study

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zones. This is equivalent to a secondary to primary recovery ratio of .57. The estimated primary and secondary oil recoveries are again listed by zone on Table 16 and by tract and working interest owner on Tables 24, A and B, of the Technical Report.

Based on the simulator results, the anticipated average water injection rates will be 260 barrels of oil per day per well into 40 injectors during fill-up, and 125 barrels of water per day per injector afterwards.

This Grayburg water injection program will require approximately 90 million barrels of injection water over a 36-year life, including 35 million barrels of makeup water, which will be obtained through contract with the City of Hobbs.

Peak Grayburg production averaging 30 barrels of oil per day per producing well, or about 1000 barrels of oil per day, will occur ten years after the water injection program begins.

Q. What methods were used to evaluate the secondary potential of the San Andres study zones?

A. First, no secondary recovery potential was attributed to the San Andres Study Zone I, because the reservoir analysis of its primary performance indicated a high recovery efficiency due to the strong natural water influx.

With respect to San Andres Zones II and

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III, two methods were used to evaluate their secondary potential. These methods were, number one, to use nearby water injection projects in the same San Andres strata as an analogy to determine what could be expected from the northern portion of the Hobbs Pool. And number two, to use a third computer simulation model to forecast the results of a water injection program.

With respect to the analogy with other existing San Andres water injection programs, the performance data on eight such projects were reviewed and volumetrically averaged on the basis of the original oil in place, and this study reflected an average ultimate recovery efficiency of 35 percent with a secondary to primary recovery ratio of .85. The water injection programs included in this study were mature projects that had already recovered in excess of 60 percent of the estimated ultimate secondary oil reserve.

In analyzing these analogous water injection programs it was noted that the higher the permeability within the reservoir, the higher the anticipated secondary recovery efficiency. Only two of the project studied had average permeabilities as high as the 28 millidarcies encountered in the San Andres portion of the HObbs Pool and their ultimate recoveries were predicted to be 39.4 and 46.4 percent of the original oil in place.

In addition to the study of these analo-

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gous projects, the secondary potential and performance of the Hobbs Grayburg-San Andres Pool was evaluated using a third reservoir simulation model. The results of this model study confirmed the floodability of the San Andres and indicated that the ultimate recovery with a water injection program would be 44 percent of the original oil in place. Consequently, based on the results of these two studies, the Technical Committee determined that the ultimate oil recovery efficiency with a water injection program for the San Andres Zones II and III would be 40 percent of the oil in place.

Q Did the Technical Committee adopt any recommendation with respect to the injection patterns for San Andres Zones II and III?

A Yes. The recommended water injection patterns for these zones was an inverted 9-spot injection pattern with approximately 160-acre spacing, as shown on pages 37 through 39 of the Technical Report. The injection wells were selected on the basis of both location and evidence of non-communication behind pipe with the San Andres Zone I.

Q Did the Technical Committee come to any conclusions with respect to the amount of secondary recovery potential based on recommended injection patterns?

A The Technical Committee determined that by installing 160-acre inverted 9-spot patterns in the San Andres Zones II and III the recovery efficiency would be

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increased to about 24 to 40 percent and that the ultimate oil recovery would be increased by 48.6 million barrels of oil. A breakdown of the secondary recovery by study zone is listed on Table 16 and by tract and working interest owner on Tables 24, A and B, of the Technical Report.

Based on the simulation study it was determined that the San Andres production response will reach a peak of 9000 barrels of oil per day some eight years after injection begins. This constitutes an average of about 80 barrels of oil per day per producing well. This production forecast is based on an average water injection rate of 2000 barrels of water per day per well into 30 injectors during fill-up, which will take approximately 160 million barrels of water.

The total injection requirement is estimated to be 550 million barrels, of which 80 million barrels will constitute makeup volume, and again, will be obtained from the City of Hobbs. The cumulative produced water/oil ratio is expected to be 5 to 1.

Q. Mr. Lancaster, did the Technical Committee estimate remaining gas reserves?

A. Yes. The Technical Committee made estimates of both the volumes of the original gas cap gas in place and the remaining gas reserves. Gas cap volumetrics were calculated from the Grayburg net pay Isopach maps and

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the San Andres porosity feet maps, included in the Technical Report as Figures 8, 10, and 12.

For the Grayburg, the calculations included an average porosity of 14 percent, based on log and core data, and a water saturation of 30 percent, which was derived from analyzing the available technical data.

For the San Andres our committee used a water saturation of 22 percent, again based on the analysis of available technical data. The distribution of the calculated 54.2 billion cubic feet of gas by tract and by working interest owner, is given on Tables 21, A and B, of the Technical Report.

In estimating the remaining gas reserves for the Grayburg, our committee used the remaining Grayburg primary oil reserves for each tract as of January 1st, 1977 and multiplied that figure by the producing gas/oil ratio for each tract during the year 1976.

For the San Andres, our committee agreed to use the gas reserves as predicted by the reservoir computer simulator that predicted the San Andres primary recovery.

The well-by-well estimates of the San Andres gas reserves were then summed up on a tract-by-tract basis. The remaining gas reserves for the Grayburg and San Andres thus determined by the Technical Committee were 8.9

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and 98.3 billion cubic feet respectively. The distribution of the gas reserves by tract and by working interest owner is given on Tables 25A and 25B, respectively, in the Technical Report.

Q. Mr. Lancaster, I now refer you to what has been marked Shell's Exhibit Number Seventeen and ask you to identify it.

A. Exhibit Seventeen, as shown on the wall, is a summary of the capital requirements to install the North Hobbs Water Injection Program in the event Shell's applications are granted. This tabulation is based on Table 17 of the Technical Report, which has been revised using updated cost estimates. The exhibit is fairly self-explanatory and identifies the various capital requirements allocated to various parts of the project.

I might point out that the exhibit reflects the ultimate capital investment to be $33 million which takes into account future capital requirements that will be necessary through the life of the project.

Q. Now, Mr. Lancaster, I refer you to what has been marked as Shell's Exhibit Number Eighteen and ask you to identify it.

A. Exhibit Number Eighteen, as shown on the wall, is a production schedule for the North Hobbs Grayburg-San Andres Unit. In this exhibit there are two production

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forecasts. The lower curve represents the predicted primary production performance of the North Hobbs wells without the water injection project. The upper curve represents the unit performance that we anticipate with the water injection program.

It may be noted that the unit production is anticipated to increase to more than 10,000 barrels of oil per day. It is of interest to further note that the projected life of the unit is on the order of 44 years, or approximately 10 years more than the projected life without unitization. As I have already mentioned, we anticipate that this program of water injection would provide an additional 55 million barrels of oil over the life of the project, which would not otherwise be recovered.

Q. Mr. Lancaster, I now refer you to Shell's Exhibit Number Nineteen and ask you to identify it.

A. As shown on the wall, Exhibit Nineteen is a tabulation demonstrating the difference in reserves and profitability with and without unitization of the northern portion of the North --- of the Hobbs Grayburg-San Andres Pool.

The first column on the exhibit shows the reserves and profitability without unitization. The second column shows the same thing with unitization. The third column shows the difference between the first two

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columns.

You will note that the estimated remaining primary reserves as of January 1st of 1980 are 33.3 million barrels of oil. This was obtained by subtracting estimated production between January 1st, 1977, and January 1st, 1980, of 7.8 million barrels from the primary reserve estimate given in the Technical Report of 38.1 million barrels as of January 1st, 1977. The reserves of 85.5 million barrels of oil estimated to be recovered through unitized water injection operations includes the remaining primary of 30.3 million barrels plus the 55 million barrels of secondary reserves.

The next line on the exhibit shows the initial and ultimate investment requirement anticipated for the water injection project. Of the total anticipated capital investment of $33 million, $27 million is forecast to be spent during 1980 and '81 and an additional $6 million is forecast to be spent during the following 8 years to handle increasing volumes of oil and water.

The third line on this exhibit shows the difference in profitability with and without unitization. The profitability was broken down into two calculations.

The first sub-category shows profitability as undiscounted, or without any consideration for the time value of revenue.

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The second sub-category shows the profitability on a present value basis with a ten percent discount, which is a more common approach showing the effects of deferring income over an extended period of time. Consequently, as may be seen, the expected profit on an undiscounted basis for continued primary production is $405 million without unitization; $917 million with unitization; resulting in a net profit for the water injection project of $512 million.

Using this approach of calculating profitability on a discounted basis you can again see that the profit without unitization is $178 million; with unitization it's $302 million, resulting in an additional profit of $124 million, which reflects a 412 percent profit for the water injection project.

As shown on the exhibit, all profits listed do not include the payment of Federal income tax.

Q What factors were used in these calculations?

A The reserve estimates were taken from the Technical Report with the primary reserves adjusted for estimated production from January 1st, 1977 to January 1st, 1980. The income schedule for these reserves was based on the production schedule shown in Exhibit Nineteen. In addition to the $33 million capital expenditure, the operating costs of unit operations was estimated to be an additional

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$100 million more than the primary operating costs without unitization.

Revenue and expenditures were based on current unit values and no adjustments were made for future inflationary factors. In developing the profits to be derived from unit and non-unit operations, the following crude prices were used: $6.25 per barrel of oil for lower tier production; $14.98 per barrel of oil for upper tier production; and $26.00 per barrel of oil for stripper production.

Q. Mr. Lancaster, realizing that the cost of operations, as well as the price of crude oil, can change, what is your opinion as to the profit values listed on Exhibit Number Nineteen?

A. In my opinion the profitabilities given on Exhibit Nineteen are conservative.

Q. Is it your opinion that the unitized management, operation, and development of the North Hobbs Grayburg-San Andres Unit is feasible and will result in a reasonable profit?

A. Yes, that is my opinion.

Q. Why is the unitized management of the North Hobbs Grayburg-San Andres Unit necessary?

A. With the water injection program, oil is forced to move from one property to another. In view of this movement, it is necessary to unitize all interests in

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order for the owners to receive their fair share of the income from all of the oil produced within the unit. This type of arrangement benefits both the royalty and the working interest owners and protects their correlative rights, which is especially difficult to achieve in a multi-layered, heterogeneous reservoir.

In addition, the elimination of lease line barriers allows flexibility in the use of existing wells and allows variation in the injection and withdrawal rates as will be required by the reservoir's actual performance. This flexibility will result in a maximum efficiency of recovery and the elimination of waste.

Q. In addition to determining the feasibility of the project and its profitability, what other charges were directed to the Technical Committee to answer?

A. The Committee was charged with developing values of certain specified parameters, or characteristics by tract, in order to permit the working interest owners to develop an equitable method for sharing of expenses and revenue from that tract.

Q. What were these parameters or characteristics which the Technical Committee was charged to develop values for?

A. The list of parameters is included on Exhibit Fourteen under the sub-heading "F". Of the ten

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parameters listed specifically, we were unable to obtain two. The first was the value of the oil and gas production and the second was the floodable net acre feet. We were unable to obtain the value for the oil production parameter with sufficient accuracy because of the wide variations of income per barrel of oil under the Federal price control regulations. We were unable to obtain the floodable net acre feet because of the poor quality of logs that exist as a result of the pool being very old; however, our committee did develop two additional parameters, which were, one, the primary gas reserves, and two, the gas cap volumetrics.

Q. Is this information located in the Technical Committee Report?

A. Yes, it is, on Tables 21 through 25. It might be noted that there are two tables for each set of parameters. On Table A the parameters are listed by tract and on Table B, listed by working interest owner. In each of these tables the parameters are listed as to the magnitude and the percent of the total for each tract and for each working interest owner.

Q. Mr. Lancaster, you have described for us how the Technical Committee was charged with certain tasks by the Working Interest Owners Committee and how your committee determined the feasibility and profitability of the pressure maintenance project. What, if anything, was to be

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done with the Technical Committee's Report?

A. As I've indicated, the Technical Committee prepared the Technical Report, dated April, 1977. In this report the Committee described the history and geology of the northern portion of the Hobbs Grayburg-San Andres Pool, calculated the primary and secondary reserves, demonstrated the feasibility and profitability of this pressure maintenance project, made recommendations as to a plan of secondary recovery, based on a water injection, and provided the working interest owners with calculated values of certain parameters as a basis upon which to negotiate an equitable formula for the sharing of the expense and income of the project.

With the data from this report the Working Interest Owners Committee would be able to determine an equitable method of sharing costs and expenses of the project and to prepare a unit agreement and unit operating agreement for ratification.

Q. Based upon your technical expertise and your knowledge of the facts concerning the two applications being heard here today, is it your opinion that the granting of the applications in these consolidated cases, Number 6652 and 6653, will result in the prevention of waste and the protection of correlative rights?

A. Yes, that is my opinion.

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Q. And is it also your opinion that the granting of these applications is reasonably necessary to carry on supplemental recovery operations so as to substantially increase the ultimate recovery of oil and gas from the Hobbs Grayburg-San Andres Pool?

A. Yes. That is also my opinion.

Q. Were Exhibits Thirteen through Nineteen prepared by you or under your supervision?

A. Yes, they were.

MR. LOPEZ: Mr. Chairman, I offer Exhibits -- Shell's Exhibits Thirteen through Nineteen into evidence.

MR. RAMEY: Shell's Exhibits Thirteen through Nineteen will be admitted.

Any questions of the witness?

MR. ATKINSON: Yes.

CROSS EXAMINATION

BY MR. ATKINSON:

Q. I do have a question for you, Mr. Lancaster. In direct examination you stated that the primary reserve, that was calculated on a well-by-well basis. Was done by extrapolation, largely by extrapolation from recent production trends.

A. For the Grayburg only wells.

Q. And the San Andres as well, I take it.

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A. No. The San Andres, in the San Andres we used the simulation, computer simulation.

Q. All right. Now, the computer simulation itself was based on recent production trends, though, was it not?

A. No, it was based on the complete history of each well in the total field.

Q. The -- what was the effect of the recent production trends, then, on your simulation model for the San Andres?

A. Well, the model used the production trend to match the history, so that what you -- and then it was agreed to in the simulation that when the simulation was done, that what it was going to forecast would be the primary reserve under the existing conditions of the field at that time.

Q. All right, so that in fact the simulation model, then, was created in such a way as to match the actual performance of the well, or the life of the well, up to January 1, 1977.

A. Really January -- well, really September of '76.

Q. September of '76, so in fact had the actual performance of the well differed, then the simulation model would have been altered as well to fit that perfor-

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mance, is that correct?

A. It might have, depending upon the alteration.

Q. Now you mentioned something earlier about protection of correlative rights, I believe, and about protection of the unit. Shell Exhibit Number One is no longer on the wall.

MR. LOPEZ: Yes, it is. It's way in the back. We're going to fill up the room.

Q. Okay, well, that's fine. I'll ask you this, first of all, I asked your landman this question.

The San Andres -- excuse me, the North Hobbs Unit is part of the same pool then as the South Hobbs Unit, is that correct?

A. I think basically, yes.

Q. All right. Now what are the plans for protection of the South Hobbs Unit?

A. For the protection of the South Hobbs Unit?

Q. Across the lease line between the South Hobbs Unit and the North Hobbs Unit, what are the plans for the protection of that?

A. Well, there will have to be a lease line agreement drawn up.

Q. All right, now how about with regard to --

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once again it's hard to see, but do you know where the Moranco waterflood project is?

A. Right.

Q. Now what is being done to protect the Moranco?

A. We'll have to have a lease line agreement there, too.

Q. One more question, then. In your formula, your oil allocation formula, which is based, I believe, on -- in Phase I on 20 percent of 1976 production, 80 percent of remaining primary oil reserves, is that correct?

A. That's correct.

MR. LOPEZ: Mr. Chairman, I might assist all of this. Mr. Buck is going to be our witness to explain the --

MR. ATKINSON: I see.

MR. LOPEZ: -- participation formulas. Mr. Lancaster is here just to explain what the Technical Committee did in meeting the charge from the Working Interest Owners Committee, and therefore is the reservoir engineer who is prepared to discuss the values assigned those parameters put forth on this exhibit, but Mr. Buck will be the man who is the chairman of the Working Interest Owners Committee who can discuss the participation formulas.

MR. ATKINSON: Okay.

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Q (Mr. Atkinson continuing.) I just have a couple more questions, then.

On the -- what assumptions were made regarding the completion intervals in calculating primary reserves?

A. You mean in setting up and forecasting the simulation model?

Q. Yes.

A. It was agreed to in the Technical Committee that everybody had had sufficient time to get their zones in shape so that the zones that were open and the conditions that existed at the time the simulation model went into the forecast would be -- would be maintained.

Q. All right. Now, in determining the economic limits for a particular well, then I take it that the position of the well in the unit is a consideration also, is that not true?

A. Well, no, not necessarily. The economic limit was determined upon when your production is no longer profitable. Now, in the case of, I think, of the simulation model, it was shut off at about 2024, because frankly, it was considered the value of any barrel of oil recovered after that would be very hard to -- to equate to the formula, or equate to the recovery.

MR. ATKINSON: We have no further questions

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for the witness. We would like to reserve the right to recall Mr. Lancaster.

MR. RAMEY: Okay, Mr. Lancaster also will probably be around, won't you?

Any other questions? Mr. Nutter.

CROSS EXAMINATION

BY MR. NUTTER:

Q. Mr. Lancaster, now, what patterns will you be using for the two Grayburg zones? An 80-acre 5-spot, is that it?

A. That's right, yes.

Q. And then your San Andres flooding would be on a converted 9-spot.

A. That's right.

Q. Now, you won't be flooding Zone I of the San Andres at all, is that correct?

A. We do not intend to, no.

Q. Now, what is Amoco flooding in the unit to the south of your proposed unit? Are they flooding the two zones in the Grayburg?

A. They are, yes. They have tried.

Q. Are they using the same pattern that you would be using, the 80-acre 5-spots there?

A. They don't really have very many injectors

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in the Grayburg at the present, but that is their basic pattern.

Q And how about the San Andres injection pattern?

A They're using a 5-spot. We have a bit of a problem because a good part of the south unit was developed by Amoco and the wells are located in the center part of each tract, or each 140-acre section. But in the North Hobbs it was developed, and we have diagrams we can show later, it was developed on a competitive basis and you may have four wells in 160-acre tract, all within 660 feet of each other, literally, in the corner of each of the sections. So it's a little bit more difficult.

We intend to start off with an inverted 9-spot.

Q And is it feasible that some day you might have to go to a similar pattern of whatever Amoco would be using along that line, due to a lease line agreement, then. If they're using a 5-spot in the San Andres, you might have to go to a 5-spot rather than an inverted 9-spot along the southern border of the unit.

A Now this is something we'd have to look at when the time came.

Q Now what is Morance drilling up in that little plug to the north there, to the Grayburg only?

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A. To the Grayburg; to the Grayburg only.

Q. And they are using an 80-acre 5-spot there?

A. Yes.

Q. And you have a compatible arrangement of injection wells to their flood?

A. Yes.

Q. Now you mentioned that it would take approximately ten years to assume maximum production --- to achieve maximum production from the Grayburg and eight years from the San Andres. Is that assuming that you would be placing all of the injection wells on injection more or less simultaneously?

A. Yes.

Q. And that it will take the -- all of the producing wells that long to have their fill-up and to achieve their maximum ---

A. Well, certain wells might respond earlier than others, but as a whole, this is what we've figured, that the reservoir as a whole would be slow to respond. You've got quite a bit of gas that has to be compressed, quite a bit of void space to be filled up.

Q. I see. Now you also mentioned that you had studied eight analogous San Andres reservoirs to make this --- some of these predictions for this one.

Could you name those reservoirs, please?

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A. I can't name all of them right offhand, but I can get the list for you.

Q. Okay, would you --

A. Seminole was one, Jordan was another. There was, I believe -- well, I'd have to check the list.

Q. You could furnish us with that list of reservoirs, though?

A. Yes.

MR. NUTTER: Okay, I believe that's all.

A. Now, in the -- they were not included in the report because the operators did not want that information published.

Q. But we'd like to know the names of them.

A. The names we can give you.

Q. Was the Vacuum Pool included in that study?

A. I think it was.

MR. RAMEY: Any other questions of the witness? He may be excused.

MR. RAMEY: We'll take a fifteen minute recess.

(Thereupon a recess was taken.)

MR. RAMEY: The hearing will come to order. Mr. Lopez, you may proceed.

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MR. LOPEZ: Yes, sir, Mr. Chairman. I'd like to correct about three little gliches in Mr. Lancaster's testimony.

When he was talking about the water recovered --- required for the Grayburg injection, I think he said oil, but it's pretty obvious that he meant water.

The second thing is, I think he talked about eleven parameters on the exhibit. He mentioned ten but there are actually eleven parameters.

And the third item is that when he was talking about the income schedule for the reserves for the profitability study, he referred to Exhibit Number Nineteen but it's pretty obvious that he should have referred to Exhibit Number Eighteen.

MR. NUTTER: As long as you're making corrections, Owen, also I think it was where some monies were involved on total income for -- or something ---

MR. LOPEZ: Yeah, this 412 --

MR. NUTTER: He said $412 million and it's $421 million.

MR. LOPEZ: Or 421 percent profit ---

MR. NUTTER: Rather than 412.

MR. LOPEZ: Thank you, Dan. Okay.

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W. E. BUCK

being called as a witness and having been duly sworn upon his oath, testified as follows to-wit:

DIRECT EXAMINATION

BY MR. LOPEZ:

Q. Will you please state your name and where you reside?

A. W. E. Buck. I reside in Houston, Texas.

Q. Where are you employed and in what capacity?

A. I'm employed by Shell Oil Company in Houston, Texas, as a Staff Engineer in the business coordination group.

Q. Have you previously testified before this Commission and had your qualifications accepted as a matter of record?

A. No, I have not.

Q. Would you briefly describe your educational background and employment experience?

A. I graduated from the University of Oklahoma, February of 1941, with a BS degree in Petroleum Engineering. I performed military service from March, 1941, to February of 1946, and was employed by Shell Oil Company as an exploitation engineer in February of 1946.

My assignment with Shell Oil Company has

included various engineering and supervisory postions directly associated with the development and production of oil and gas reserves.

During the past nine years I have directed and have been responsible for Shell's efforts to unitize properties for supplemental recovery purposes. During this period I have also represented Shell and other operators' efforts to unitize properties for supplemental recovery purposes.

I have been registered as a professional engineer in the State of Texas since July 29th, 1958.

Q. Are you familiar with the applications of Shell Oil Company in Cases Numbers 6652 and 6653?

A. Yes, I am, as I have represented Shell and acted as Chairman of the Working Interest Owners Committee during the negotiations in connection with the unitization of the proposed North Hobbs Grayburg-San Andres Unit.

MR. LOPEZ: Mr. Chairman, are the witness' qualifications acceptable?

MR. RAMEY: Yes, they are.

Q. (Mr. Lopez continuing.) Mr. Buck, did the Working Interest Owners Committee hold meetings during your chairmanship?

A. Yes, they did.

Q. Were minutes taken at those meetings?

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A. Yes.

Q. Let me refer you to what has been marked as Shell's Exhibit Number Twenty and ask you to identify it?

A. Exhibit Twenty is a bound series of copies of the minutes of the Working Interest Owners Committee meetings and related correspondence. These minutes and this correspondence were prepared by me in my role as chairman of the committee.

Q. Have you reviewed these minutes?

A. Yes, I have.

Q. Do they accurately report the actions of the Working Interest Owners Committee in those respective meetings?

A. Yes, they do.

Q. How were efforts to form the North Hobbs Unit initiated and how was the program for unitization and water injection development?

A. As Mr. Lancaster previously stated, Amoco Production Company initiated an effort in 1970 to form a pool wide unit of the Hobbs Grayburg-San Andres Pool, for the purpose of supplemental recovery operations. It became apparent that agreement could not be reached on a pool wide basis because the working interest owners could not reach agreement on the method of allocating the unit production based on the values assigned the parameters.

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At a meeting held by Amoco in July -- on July the 12th, 1973, all of the working interest owners in the Hobbs Pool decided to abandon efforts to form a pool wide unit and to divide the pool into two parts for future unitization efforts. Amoco undertook a program of unitization of the south portion of the pool and was successful in forming the South Hobbs Unit on January 1, 1975.

Shell called a meeting of all operators on July 31st, 1973, to determine what interest, if any, all of them had in undertaking a program for the unitization and water injection for the northern portion of the -- part of the pool. The operators attending this meeting actually represented a major portion of the working interest in the northern portion of the pool. They agreed to proceed with a program of unitization and water injection, and to participate in an effort to form a North Hobbs Grayburg-San Andres Unit, with Shell Oil Company acting as unit expeditor and unit operator if the efforts toward unitization were successful.

As Mr. Lancaster discussed, the operators in attendance at this meeting charged the Technical Committee with the task of developing a Technical Study for the proposed North Hobbs Grayburg-San Andres Unit.

The operators instructed the Technical Committee to obtain general agreement on all items considered.

The Technical Committee was instructed to bring any matters upon which general agreement could not be reached to the Working Interest Owners Committee for direction or decision.

This Technical Committee consisted of representatives of all working interest owners who wished to participate and Shell's representative acted as chairman of the committee.

Q What actions were taken by the Working Interest Owners Committee during the time the study was being developed by the Technical Committee?

A No further meetings of the Working Interest Owners Committee was held until May 26th, 1977; however, in the meantime the Technical Committee asked our committee to act on two of its recommendations.

Our first action was to approve the recommendation of the Technical Committee to adopt a cutoff date of January 1, 1975, for all well logging data and well test information which they were going to consider in completing their charge. The need to adopt a cutoff date is fairly self-evident. As was stated in the ballot submitted to the working interest owners, a cutoff date was necessary in order to bring certain facets of the Technical Committee's work to a conclusion so that it could proceed with answering their charge. Our approval of this recommendation was arrived at by a written ballot vote on September the 26th, 1974.

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The second action our committee took was to adopt the Technical Committee's recommendation to approve a computer analysis of certain study zones using Shell's three dimensional, compressible fluid reservoir simulation program. This recommendation was approved by 88.5 percent of the working interest owners involved in the northern portion of the Hobbs Pool, again by written ballot on March 15th, 1975. The percentage approval was based on each working [illegible] owner's respective percentage of oil production from the northern portion of the Pool during the year -- there's an error in that date and I'll have to check my minutes for that date. I apologize. That should be a portion of 1973.

MR. LOPEZ: Okay, sorry for the hitch. When did the Technical Committee complete their charge and what action was then taken by the Working Interest Owners Committee?

A. The Technical Report which has been previously introduced as Shell's Exhibit Number Sixteen, was formally submitted to the Working Interest Owners Committee at a meeting on May 26th, 1977. This Technical Report was accepted by the Working Interest Owners Committee as the completion of their charge.

76.6 percent of the working interest owners, again based on 1976 oil production, accepted the study as a

basis for unitization negotiations.

Q Excuse me, Mr. Buck, should that also be 1973? It should not be '76?

A I'm sure that that is correct, '76 there.

Q This is '76.

A Exxon's acceptance was qualified because Exxon was not yet ready to accept the gas reserve parameters. Exxon later accepted without qualification the Technical Report as a basis for unit negotiations. Ultimately, not one working interest owner objected to the use of the Technical Report as the basis for unit negotiations.

Q Was a method developed for allocating all of the oil and gas to be produced from the Unit Area, and if so, in what manner was it developed?

A At a meeting of the Working Interest Owners Committee on July the 12th, 1977, efforts were initiated to develop a participation formula or method of allocating the oil and gas to the various tracts within the Unit Area. The meeting was attended by working interest owners representing more than 92 percent of the unit participation based on the lowest participation of any of the formulas considered at that meeting.

At this meeting a total of twelve different participation formulas were proposed by ten different working interest owners. Each proposal was considered and a roll-

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call vote was taken of the working interest owners in attendance. None of the twelve formulas received more than 58 percent approval of the working interest owners in attendance.

In the absence of agreement, the meeting of the Working Interest Owners Committee was adjourned with the intent of renewing efforts at a later date after all parties had time to review the efforts to date.

The Working Interest Owners Committee again met on September the 20th, 1977, in its continuing effort to develop an acceptable participation formula. Five additional formulas or methods of allocation were proposed at this meeting. Each new method -- formula was considered by the committee and a roll-call vote of the working interest owners present was taken on each formula.

Continental Oil Company presented the fifth formula considered at this meeting and the seventeenth proposal in all. Continental's formula received in excess of 83 percent approval of the working interest owners on a roll-call vote.

At the request of the working interest owners, a written ballot on this formula was submitted and retu_ned by mail. This formula provided for participation by the working interest owners during three specified phases of the life of the project and based on each working interest owner's respective oil participation in each phase, the re-

sults of the ballot were: Phase I, 92.01 percent working interest owners' approval, with only 1.46 percent disapproval; Phase II, 92.58 percent approval, with only 1.30 percent disapproval; and Phase III, 89.76 percent approval, with only 1.27 percent disapproval.

Q. Would you state what is the participation formula which received the percentage approval you've just described, and also tell the Commission how it works, and in this connection I refer you to what has been marked as Shell's Exhibit Number Twenty-one.

And preliminarily, let me suggest, Mr. Chairman, the date was shown on the exhibit as 9. We've changed it to 7 on the wall exhibit and we've also corrected the Commission exhibit, but all the other exhibits that are floating around have the wrong date.

So we're clear, this Exhibit Twenty-one, the date shown in the phase allocation should read January 1, 1977, throughout. Okay.

A. Actually, participation was made up of two formulas, one for oil and one for gas, each divided into three parts or phases.

As shown on the exhibit, the formula for oil allocation in Phase I participation was based on 20 percent of the ratio of the quantity of 1976 oil production from each tract to the total quantity of 1976 oil production from

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all tracts within the Unit Area, plus 80 percent of the ratio of the quantity of remaining primary oil reserves of each tract within the Unit Area as of January 1, 1977, as set forth in the Technical Report to the total quantity of remaining primary oil reserves of all tracts within the Unit Area as of the same date.

In Phase II the participation was based on 100 percent of the ratio of the quantity of remaining primary oil reserves for each tract within the Unit Area, again as of January 1, 1977, to the total quantity of remaining primary oil reserves of all tracts within the Unit Area as of the same date.

In Phase III participation was based on 100 percent of the ratio of the quantity of secondary oil reserves for each tract within the Unit Area as set forth in the Technical Report, to the total quantity of secondary oil reserves of all tracts within the Unit Area.

The gas participation formula is the same in principle as the formula for oil participation.

In Phase I participation was based on 20 percent of the ratio of the volume of 1976 gas production from each tract within the Unit Area to the total volume of 1976 gas production from all tracts within the Unit Area, plus 80 percent of the ratio of the volume of remaining primary gas reserves of each tract within the Unit Area as

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of January 1, 1977, as set forth in the Technical Report, to the total volume remaining primary gas reserves of all the tracts within the Unit Area as of the same date.

In Phase II participation was based on 100 percent of the ratio of the volume of remaining primary gas reserves for each tract within the Unit Area, again as of January, 1977, to the total volume of remaining primary gas reserves of all the tracts within the Unit Area as of the same date.

In Phase III participation was based on 100 percent of the ratio of each tract's quantity of secondary oil reserves within the Unit Area as set forth in the Technical Report, to the total quantity of secondary oil reserves of all tracts within the Unit Area.

Q Mr. Buck, now that you've described how unit oil and gas production will be allocated to each tract during three phases, would you explain the duration of each phase?

A With respect to the duration of each phase, Phase I is to start on the effective date of unitization and continue until the first day of the month following the month in which the total number of barrels of oil produced from all tracts within the Unit Area after the effective date of unitization equalf four million barrels.

Phase II starts at the termination of

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Phase I and continues until the first day of the month following the month in which the total number of barrels of oil produced after January 1, 1977, from all tracts within the Unit Area equals 38,071,683 barrels, which is the quantity of remaining primary oil reserves of the Unit Area, as of January 1, 1977, as set forth in the Technical Report.

Phase III begins with the termination of Phase II and continues to the remainder of the term of unitization or life of the project.

Q. Is then the oil and gas that is produced from the Unit Area less that used in the conduct of unit operations or unavoidably lost, to be allocated to the separately owned tracts within the Unit Area on the basis of the participation formula just stated?

A. Yes. This method of allocation is set forth in Section 13, page 9, of the Unit Agreement for the North Hobbs Grayburg-San Andres Unit, which has been introduced as Shell's Exhibit Number Three.

Q. Why is there a split formula with respect to Phase I of the unit operations?

A. The relationship of a tract's production to the production of other tracts, or to the total of all tracts, at a given time, or for a relatively short period, is not necessarily the same as the relationship of the remaining primary reserves of such a tract to the total of

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all tracts; therefore, a rate of production for a fixed period was used as a parameter in Phase I to provide some adjustment. Phase I is for only a short period of time, the time it takes to produce four million barrels of oil. By the time four million barrels of oil are produced it is anticipated that the rate of production of the unit will begin to increase so that soon thereafter all tracts will be allocated oil at a rate greater than they enjoyed prior to unit operations.

Q. Do you have an opinion as to whether or not the participation formula contained in the Unit Agreement allocating the produced and saved unitized hydrocarbons to the separately owned tracts in the Unit Area does so on a fair, reasonable, and equitable basis?

A. Yes, I believe it does.

As may be noted, the first two phases are based fundamentally on the remaining primary reserves of each tract as determined by the Technical Committee, a committee on which all working interest owners were invited to be represented. By using this factor as the basis for the allocation of oil and gas produced under the proposed Unit Agreement, each tract would receive first from the Unit's operation an amount of oil and an amount of gas equal to the amounts each would have received if primary operations had continued without unitization.

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Phase III, being based entirely on a given tract's secondary recovery potential, allows each tract to recover its contributed share of the added reserves. This condition is very desirable in that it places any risk of recovery upon the supplemental oil, or that additional oil that is made possible by unit operation. With the amount of oil involved in the North Hobbs Unit, royalty interest owners, working interest owners, and the State of New Mexico, can all feel quite certain that they will receive at least as much oil and gas from unit operations as they would have received from continued operations without unitization, and know they all stand to benefit from the additional oil recovered by water injection.

Placing the risk of recovery on the anticipated secondary potential is quite reasonable and fair when one considers the fact that the tracts differ in their share of primary and secondary reserves contributed to the unit. Some tracts have a smaller share of the remaining primary recovery than their share of the secondary or supplemental oil, and by the same token, some tracts have a higher share of the remaining primary than their share of the secondary reserves.

For example, two tracts might be allocated the same total amount of oil from unit operations. Assume one of these tracts receives most of its oil by reasons of

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its primary contribution and very little from its secondary contribution, and that the other tract receives its oil allocation based upon the opposite mix of its primary and secondary contribution. It is therefore reasonable that the first tract with possibly less incentive for unitization and water injection, should bear only that risk of recovery which is in proportion to its incentive or secondary potential. Conversely, the second tract which has a greater incentive for unitization and water injection by virtue of the greater secondary recovery potential, should bear the risk related to that potential benefit. The participation formula achieves this desirable and necessary result.

Q How were procedures developed for allocating unit expenses to the various separately owned tracts?

A. The percentages for allocating unit expenses were developed in a manner similar to that involved in the developing of the participation formula; that is, by the working interest owners.

Unit expenses were considered as two separate items, operating expense, which is comprised of the costs associated with the actual unit operations and investment cost, which is comprised of the cost of the facilities, including the construction costs required for the water injection program.

At a metting of the Working Interest Owners

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Committee on February the 2nd, 1978, consideration was given to the methods to be used for allocating the unit expenses. Six methods were proposed and considered at the meeting. A roll-call vote was taken on each method proposed. The sixth proposal considered received in excess of 76 percent approval of the working interest owners on a roll-call vote. The working interest owners then agreed to submit by mail the sixth proposal for ballot vote.

The results of the written ballot, again based on each working interest owner's respective oil participation in each phase were: Phase I, 85.3 percent approval, with only 10.2 percent disapproval; Phase II, 85.8 percent approval, with only 9.7 percent disapproval; Phase III, 83.6 percent approval, with only 14.6 percent disapproval.

In addition, based on their initial share of the investment cost, this formula received 84.9 percent approval with only 11.7 percent disapproval.

Q What was the method developed for the sharing of unit expenses, and in this connection I refer you to Shell's Exhibit Number Twenty-two?

A. The method of allocating unit expenses finally agreed upon is shown on this exhibit. The unit operating expenses, which are referred to in Article 11 of the Unit Operating Agreement, are to be shared by the working interest owners in proportion to their Phase I,

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Phase II, or Phase III, unit participation based on oil, depending on which phase is in effect at the time a particular expense is incurred.

The cost of investment items incurred prior to the Investment Readjustment Date, which is defined in Article 1.2 of the Unit Operating Agreement as the termination of Phase II, or January 1, 1991, whichever occurs first, is to be shared by working interest owners in proportion to their investment participation, which again is defined in the Unit Operating Agreement as .58 of Phase II unit participation, plus .42 of Phase III unit participation. The cost of investment items incurred after the Investment Readjustment Date will be shared by working interest owners in proportion to their Phase III unit participation.

At the time of the Investment Readjustment Date, all investment costs incurred prior to such time are to be adjusted among all the working interest owners in accordance with their respective Phase III unit participation.

Q Is this the method stated in the Unit Operating Agreement for allocating unit expenses to the working interest owners?

A Yes. Article 11 of the Unit Operating Agreement, which is Shell's Exhibit Four, sets forth the method of allocating the costs of unit operations, including capital investments in the manner I've just described.

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Q Do you consider these methods of allocating unit expenses to be fair, reasonable, and equitable?

A Yes. The proposed water injection program in conjunction with the participation formula results in the accelerated recovery of an amount of oil equivalent to each tract's remaining primary reserve, as well as allowing for the recovery of supplemental reserves. In view of the fact that benefits will result from the accelerated recovery, it is fair and reasonable that this accelerated recovery should be considered in the allocation of unit expenses. Therefore, the allocation of operating costs on the basis of the phase in effect at the time the costs are incurred, and the weighting between primary and secondary reserves in the initial allocation of investment costs, as well as the provisions for the readjustment of Phase III unit participation, allocates the expense burdens in proportion to the benefits to be derived from the project.

Q How are credits or charges to be made for such items as wells, tanks, pumps, machinery, and equipment contributed to unit operations?

A Consideration was given to such items by the Working Interest Owners Committee at the same time and in association with the development of a method for allocating unit expenses. As noted in Article 10 of the Unit Operating Agreement, all items contributed to unit operations

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by the working interest owners are to be inventoried and a value assigned immediately after the effective date of initization. The value of the inventoried items will be adjusted initially among the working interest owners in proportion to their investment participation, just as for investment costs.

At the Investment Readjustment Date the value of the inventoried items, less the value of any items retired, is to be readjusted among all working interest owners in accordance with their respective Phase III unit participation.

Q. Does the Unit Operating Agreement provide for the situation where a working interest owner does not pay his share of the unit expense?

A. Yes. Article 11.5 of the Agreement provides that in this case the unit operator shall hve a lien on the unit oil and gas owned by that working interest owner and the unit operator shall have the right to collect the proceeds from the sale of that oil and gas until the reimbursable amount owed, plus interest, has been paid.

Q. Does the Unit Agreement and the Unit Operating Agreement provide for the designation and removal of the Unit Operator?

A. Section 6 of the Unit Agreement and Article 6.1 of the Unit Operating Agreement designate Shell as the

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unit operator.

Article 6.2 of the Unit Operating Agreement and Sections 7 and 8 of the Unit Agreement provide a procedure for the removal of the Unit Operator and the selection of a successor.

Q. Does the Unit Operating Agreement provide a method for voting on unit matters?

A. Yes. Article 4 of the Unit Operating Agreement sets forth the voting procedures for voting on matters to be decided by the working interest owners.

Q. Does the Unit Agreement provide for putting the unit into effect and terminating it?

A. Yes. The unit is to become effective as provided by Section 39 of the Unit Agreement. The Unit Agreement may be terminated as provided in Section 24 of the Unit Agreement.

I might further add that this section of the Unit Agreement to which I have just referred provides by its own terms for its own ipso facto expiration on January 1, 1980, if the unit does not become effective by that date.

Q. Is it your opinion that the granting of these applications is in the interests of prevention of waste and protection of correlative rights?

A. Absolutely.

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Q And is it also your opinion that the granting of these applications is reasonably necessary to carry on the supplemental recovery operations so as to substantially increase the ultimate recovery of oil and gas from the Hobbs Grayburg-San Andres Pool?

A Yes, that is my opinion.

Q Mr. Buck, one final question.

Based on your very intense and extensive involvement in the unitization effort you have just described, do you have an opinion as to whether unitization would be undertaken again in the forseeable future if the application for unitization is not approved as presented?

A Naturally I hope this question will be moot, but I might comment that our efforts to date have all been to form the North Hobbs Unit, and in view of the overwhelming response we have had from the working -- from the 80 working interest owners, and the 905 royalty interest owners, it just hasn't seemed appropriate or necessary, nor was time available, to develop a "what if" program.

Nevertheless, I think that when one considers that Amoco was unable to reach agreement and form a unit in spite of the tremendous time and effort they expended in their attempts to include the northern portion of the pool in the unit; two, the complexity and history of the reservoir; three, the methods, the time, and the expense

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required to evaluate the reservoir, remembering that the Technical Committee spent nearly four years in gathering data, developing a method of evaluation and obtaining acceptance of their report by the Working Interest Owners Committee; four, that a unit expeditor is not compensated for its time, engineers, lawyers, accountants, clerks, landmen, et cetera, when a unit is not formed, but only by his share of added oil when a unit is formed; five, when I think of the number of interested parties involved, 80 working interest owners, 905 royalty interest owners, and think about what it takes to get all or most to agree on anything, much less a method of sharing over 85 million barrels of oil, of which over 55 million barrels constitute oil that would not otherwise be recovered; six, that the incentive for a water injection program decreases with time, both from a reservoir recovery standpoint and from an actual construction and operational standpoint -- for example, part of the unit area is within the city limits of Hobbs, and the growth of the city's residential areas makes it increasingly difficult to do the necessary construction and drilling work; and seven, the fact that this effort has had an excellent response, ratification or acceptance by more than 92 percent of the working interest owners and 97 percent of the royalty interest owners, and in my judgment there is little or no assurance of improving upon this level of acceptance, if unitization is not

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brought about by such an effort and response, then the risk of another attempt to unitize would be extremely high, too high, maybe.

Considering all these things, Shell, or any other operator, would have to think long and hard before again undertaking such a monumental task when there is no reason to believe that the commitment of additional time, money, and professional talent would produce a better result than we have achieved to date.

Q. Were Exhibits Twenty through Twenty-two prepared by you or under your supervision?

A. Yes, they were.

MR. LOPEZ: Mr. Chairman, I offer Shell's Exhibits Twenty through Twenty-two into evidence.

MR. RAMEY: Shell's Exhibits Twenty through Twenty-two will be accepted.

Any questions of the witness?

CROSS EXAMINATION

BY MR. ATKINSON:

Q. Mr. Buck, I just have a couple of questions for you.

How much of the $33 million capital investment will be subject to readjustment at the end of Phase II?

A. Of the $33 million?

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Q Yes, sir.

A As now estimated, as I recall, the -- the total of the $33 million, which I believe is to be the capital investment required for installation, would be adjusted to the Phase III participation at the end of Phase II.

Q The entire $33 million?

A That is correct.

Q Also now can the ipso facto termination be extended from six months by agreement of the working interest owners?

A It can be by the approval of the working interest owners who have ratified the agreement.

MR. ATKINSON: We have no further questions.

MR. RAMEY: Any other questions of the witness? He may be excused.

MR. LOPEZ: Maybe, if we could just take about a three minute break, we've got a lot of exhibits to hang up.

(Thereupon a short recess was taken.)

MR. KILPATRIC: Mr. Chairman, we're ready any time you are.

MR. RAMEY: All right, please proceed.

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R. W. PHILLIPS

being called as a witness and having been duly sworn upon his oath, testified as follows, to-wit:

DIRECT EXAMINATION

BY MR. KILPATRIC:

Q. Would you please state your name, where you reside, and by whom you are employed, and in what capacity?

A. My name is R. W. Phillips. I live in Houston, and I am employed by Shell Oil Company as a Staff Production Engineer.

Q. Have you previously testified before the Commission and had your qualifications accepted as a matter of record?

A. No, I have not.

Q. Would you briefly describe your educational background and employment experience?

A. I received a BS in Mechanical Engineering and a BS in Petroleum Engineering from Texas A & M University in 1949. I joined Shell in August of 1949. I have had production engineering type assignments for Shell in Elk City, Oklahoma; Wichita,Kansas; Ardmore, Oklahoma; Oklahoma City,

Denver, New Orleans, and Houston. I am a Registered Professional Engineer in the States of Colorado and Louisiana.

Q. Do your duties as Production Engineer for Shell include responsibilities for Shell's operations in New Mexico, specifically the North Hobbs Unit under discussion today?

A. Yes, they do.

Q. Are you familiar with Shell Oil Company's application in Cases Numbers 6652 and 6653?

A. Yes, I am.

I have been charged by Shell with the job of coordinator of engineering with responsibility for coordinating the project planning in connection with unitization efforts. In this capacity I have reviewed the wells to be included in the North Hobbs Unit Area as to their current completion and their proposed utilization in the unit operation. I also coordinated engineering efforts toward the implementation of this water injection project.

MR. KILPATRIC: Mr. Chairman, are the witness' qualifications acceptable?

MR. RAMEY: Yes, they're acceptable.

Q. (Mr. Kilpatric continuing.) I refer you now to what has been marked as Shell's Exhibit Number Twenty-three and ask you to identify it.

A. Exhibit Number Twenty-three is a location

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plat which shows the following:

The location of the proposed injection wells in the unit area;

The location of all other wells within a radius of two miles from the proposed injection wells;

The formation from which these wells are producing or have produced; and

The lessees within a radius of two miles from the proposed injection wells.

At the botton of this exhibit there exists a legend which shows the status of all wells shown on the plat, for example, whether a well is a proposed injector, or is plugged and abandoned, or what have you. You will also note that on the exhibit on the wall we have outlined the Hobbs City Limits in red.

Q. Now I refer you to what has been marked as Shell's Exhibit Number Twenty-four and ask you to identify it.

A. Exhibit Number Twenty-four is the well numbering system proposed for the North Hobbs Grayburg-San Andres Unit.

This exhibit has two parts. The first part is a plat showing the method for numbering the unit wells. For example, there are no sections in the Unit that have the same number; therefore, the base unit number is the

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section's number, as shown in the enlargement of Section 28. The individual wells within the section are identified by rows and tiers which match the established 40-acre proration units in which the well or wells are located.

The enlargement identifies Well No. 28-241. The well is located in Section 28, Row 2, Tier 4, and is the only well located in this proration unit. If there was another well in the same proration unit, it would be identified as Well No. 28-242.

The second part of this exhibit is a tabulation showing the unit wells identified both by the proposed numbering system and also by the operator.

Q. I now refer you to what has been marked as Shell's Exhibits Numbers Twenty-five and Twenty-six and ask you to identify them.

A. Exhibit Number Twenty-five is a diagrammatic sketch of all wells to be converted to injection wells. These sketches show all casing string diameters, setting depths, quantities of cement used and tops of cement, completion intervals, and total depth of each well. A tabular summary of all wells to be converted to injection is attached as part of this exhibit and shows the current operator and well number and the proposed unit well number.

Exhibit Number Twenty-six is a series of three different diagrammatic sketches which illustrate the

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three types of typical completions of producers which we anticipate converting to injectors. These sketches show tubing diameters and packer setting depths. In addition, these sketches show that these injectors will have corrosion inhibited inert fluid in the tubing-casing annulus and that the tubing will be internally lined with a non-reactive corrosion preventing coating. Provisions will be made for monitoring injection pressure and tubing-casing annulus pressures in order to detect any leaks that might occur.

Q. Now I refer you to what has been marked for identification as Shell's Exhibit Number Twenty-seven and ask you to identify that.

A. Exhibit Number Twenty-seven is a tabulation of wells to be drilled and their proposed location including the unit well number of each of these wells and the proposed use of these wells.

Q. Now I refer you to what has been marked for identification as Shell's Exhibit Number Twenty-eight and ask you to explain it.

A. Exhibit Number Twenty-eight is a series of four diagrammatic sketches showing how the newly drilled injectors and producers will be completed. In addition, these sketches show that the injectors will have non-reactive internally lined corrosion protected tubing with a packer set 100 feet above the uppermost perforation. The sketches

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further show that the tubing-casing annulus will be filled with a corrosion inhibited inert fluid and provision will be made for monitoring injection pressure and tubing casing annulus pressure.

Both producers and injectors will have a minimum of 350 feet of surface casing and all casing strings will be cemented to the surface.

Q. Were all available logs with respect to wells proposed for conversion to injection within the Unit previously given to the Commission?

A. Yes, they were under the original application of August 15, 1979.

MR. KILPATRIC: At this time, Mr. Chairman, I request that the Commission take administrative notice that all these logs were submitted with Shell's application in Case Number 6653 and that the Commission make them a part of the record in these cases.

MR. RAMEY: So done.

MR. KILPATRIC: Thank you.

Q. (Mr. Kilpatric continuing.) Are there any wells proposed for conversion to injection for which no logs were available and in this connection I refer you to what has been marked for identification as Shell's Exhibit Number Twenty-nine.

A. Yes, there are six such wells and Exhibit

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Twenty-nine is a tabulation of those six producers proposed to be converted to injectors for which no logs are available.

Q. I now refer you to what has been marked for identification as Shell's Exhibit Number Thirty and ask you to identify it.

A. Exhibit Number Thirty is a tabular summary for all wells which penetrate the injection zone and which are located within one half mile of the proposed injection wells. The tabulation consists of four parts:

Part One is a tabulation of all proposed unit wells.

Part Two is a tabulation of all active wells completed below the Grayburg-San Andres interval and within the Unit boundary.

And Part Three shows all active wells outside the Unit boundary.

And Part Four shows all plugged wells.

The tabular summary shows all casing strings, setting depths, amount of cement used, cement tops, total depth, producing interval, and well identification and location.

Q. I now refer you to what has been marked for identification as Shell's Exhibit Number Thirty-one and ask you to identify it.

A. Exhibit Number Thirty-one is a series of

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diagrammatic sketches of each plugged and abandoned well which penetrates the injection zone and is located within one half mile radius of the proposed injectors.

These sketches show the position of all cement plugs placed in the wellbore during abandonment work.

Q. Now I refer you to what has been marked as Shell's Exhibit Number Thirty-two and ask you to describe it.

A. Exhibit Number Thirty-two is a copy of the water contract that Shell successfully negotiated with the City of Hobbs, New Mexico. The contract provides for the purchase of treated waste water which will be used for injection water in the Pressure Maintenance Project.

Our initial term contract with the City of Hobbs provides for the purchase of 50,000 barrels of water per day at a cent and a half per barrel and means an annual income to the City of Hobbs of $274,000.

Q. Do you plan to use any other water source for injection in your pressure maintenance project?

A. Yes. We plan to use water produced by unit operations. We will have about 20,000 barrels of water per day available from this production and therefore will plan to use a total of 70,000 barrels of water per day initially for injection.

Q. I now refer you to what has been marked for

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identification as Shell's Exhibit Number Thirty-three and ask you to identify it.

A. Exhibit Number Thirty-three is a list of the proposed special rules and regulations for the North Hobbs Grayburg-San Andres Unit Pressure Maintenance Project. The proposed rules encompass the method for allowable calculations, establishing drilling well locations, completion of newly drilled and converted wells, restrictions on water injection, monitoring wells for problems, and investigation of formation isolation integrity in injection wells.

Q. It is apparent that the proposed Unit Area for the North Hobbs Grayburg-San Andres Unit does not encompass the entire Hobbs Grayburg-San Andres Pool in Lea County, New Mexico, but only a part thereof. Have there been any negotiations regarding the development of line agreements with owners or operators of other properties within the pool, but outside the proposed Unit Area?

A. Yes. There are only two water injection projects which offset the proposed Unit Area. One of them is the Moranco Rice-Hardin Waterflood Project to the north, and the other is the Amoco Operated South Hobbs Grayburg-San Andres Unit on the south. We are in the process of negotiating line agreements with both Moranco and Amoco.

In the case of Moranco --- of the Moranco Rice-Hardin Waterflood Project, we propose to convert to

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water injection the following wells in the North Hobbs Unit: Well No. 13-131 -- I'm sorry. Well No. 13-231, which is currently Shell-Rice No. 4; Well No. 18-131, the current Amerada-Hardin 3; Well No. 18-311, the current Gulf-Hardin 7; and Well No. 13-221, the current Conoco State "B4". Two of these wells are not included in our current application. We will need to obtain the unit working interest owners' approval for the conversion of these two additional wells, and upon securing that approval we will apply to the Division for administrative approval for these additional injectors.

Q. Do you have an opinion as to whether the North Hobbs Unit operations will have an adverse affect upon other portions of the Hobbs Grayburg-San Andres Pool?

A. With the completion of the North Hobbs Unit there will be three water injection programs within the Hobbs Pool, which will provide proper protection for all parties. In addition, either the Special Rules and Regulations for the North Hobbs Unit or line agreements will further assure that there will be no adverse effect upon other portions of the Hobbs Pool.

Q. I now refer you to what has been marked for identification as Shell's Exhibit Number Thirty-four and ask you to explain it.

A. Exhibit Number Thirty-four is a diagram depicting the history of the efforts that have gone into

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developing the project and the projected schedule for implementation of the project.

The top portion of the diagram depicts the work of the Technical Committee and negotiations of the working interest owners since initial efforts began in July, 1973. This top portion of the diagram also shows the time allocated for planning the unit implementation and the anticipated effective date of unitization.

The second line from the top of the diagram represents the time involved in searching, locating, negotiating, and securing a source of make-up water. As I've already indicated, the make-up water will be obained from the City of Hobbs.

The third line from the top reflects time and effort spent in the planning involved in the design of the production, injection, and water source systems, and the acquisition of sites and rights-of-way to accomodate these plans.

The bottom line of the diagram represents the planning and effort involved in developing the details of the drilling and well workover programs necessary for the implementation of the Pressure Maintenance Project.

This exhibit graphically illustrates what the testimony which you've heard today clearly shows, that the magnitude and complexity of this project have been nothing

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loss than monumental.

Mr. Campbell has explained what efforts were involved in determining who had ownership interests in the proposed unit area and what efforts were involved in locating, contacting, and obtaining the consent of the incredibly numerous royalty owners and working interest owners involved.

Mr. Lancaster has described the Technical Committee's arduous four-year task of gathering the necessary technical data with accuracy, developing a method of evaluating that data, and in turn compiling that data into the Technical Report, which was accepted by all the working interest owners as a basis for their negotiations in reaching agreement as to the fair and equitable distribution of the burdens and benefits to be obtained from the production of over 55 million additional barrels of oil.

Finally, as Mr. Buck has explained, the working interest owners sat down, rolled up their sleeves, and hammered away until they were able to reach fair and equitable formulas for the sharing of these burdens and benefits.

The exhibit also shows that the efforts just described have only set the stage for the actual implementation of the project. If our efforts here today are successful, there remains much to be done to finally realize

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the very significant and important gains that the project holds.

Q. Were Exhibits Twenty-three through Thirty-four prepared by you or under your supervision?

A. Yes, all these exhibits, with the exception of the Exhibit Number Thirty-two, which -- were prepared by me or under my supervision.

With respect to Exhibit Thirty-two, this represents a copy of the actual agreement that was submitted to and executed by the City of Hobbs.

MR. KILPATRIC: Mr. Chairman, I offer Exhibits -- Shell's Exhibits Numbers Twenty-three through Thirty-four into evidence.

MR. RAMEY: Exhibits Twenty-three through Thirty-four will be accepted.

I think before we submit Mr. Phillips to cross examination, it might be wise to take statements from the other people who wish to make them.

MR. NAERT: Mr. Chairman, my name is Gilbert A. Naert, N-A-E-R-T, with Marathon Oil Company, and I'm a Senior Petroleum Engineer and I'd like to state before I read this statement that I've been directly involved in the attempted efforts to unitize the Hobbs Field since its inception in 1969 and 1970, when, as you know, we tried to unitize the entire field with PanAmerican, or Amoco, as oper-

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ator.

Marathon Oil Company is a working interest owner with leases included in the North Hobbs Grayburg-San Andres Unit in Lea County, New Mexico, and we make this statement in support of Shell Oil Company's application in Case Number 6652 and 6653 before the Oil Conservation Commission for approval of said unit.

Marathon has been participating in discussions concerning possible unitization and water flooding of these producing zones in the Hobbs Field for the past ten years. This is the first time that a substantial majority of the working interest owners in the proposed unit have been able to agree upon participation in a unitized waterflood operation.

Marathon, in executing the Unit Agreement and supporting the application believes that the proposal is essentially a fair one to all parties concerned and if adopted and implemented will result in increased production of much needed additional oil and consequently will prevent waste that might occur under continued competitive operation.

We urge approval of the unit proposal of Shell Oil Company.

Thank you.

MR. INGRAM: I'm Hugh Ingram. I'm Conservation Coordinator for Conoco, Inc., Hobbs, New Mexico.

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Conoco, Inc. is a working interest owner in the proposed North Hobbs Grayburg San Andres Unit and supports Shell's application for statutory unitization of the proposed North Hobbs Unit. We believe that the formation of this unit is in the best interests of conservation, the prevention of waste, and the protection of correlative rights of all parties concerned.

MR. RAMEY: Anyone else?

MR. PERRY: Mr. Commissioner, my name is Boyce Perry. I'm the manager of secondary recovery for Samedan Oil Corporation.

I would like to read this statement into the record of this hearing.

Samedan Oil Corporation is a working interest owner in the North Hobbs Unit and has been involved in the proceedings of the unitization of the North Hobbs Unit since its concept; have taken on the feasibility study, compilation of the Technical Committee Report, and negotiations for participation in investment formulas.

We stand in support of all aspects of unitization efforts and believe and accept unitization of the North Hobbs Field under the proposals submitted at this hearing by Shell Oil Company.

MR. ALLEN: Mr. Chairman, I'm James Allen with Amoco Production Company, Houston, Texas. I'm a Senior

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Petroleum Engineering Supervisor.

Amoco Production Company is an operator in the proposed North Hobbs Grayburg-San Andres Unit. We have ratified both the Unit Agreement and the Unit Operating Agreement.

Amoco hereby recommends that the Commission approve the proposed unit and pressure maintenance project as proposed by Shell Oil Company in Cases Numbers 6652 and 6653.

MR. MORAN: I'm R. M. Moran, President of Moranco, Hobbs, New Mexico. I'm both the lease line operator and in the unit and Shell invited me out and we support it all.

MR. RAMEY: Anyone else?

MR. HEFLEY: I'm Jim Hefley, Unitization Manager for Amerada Hess Corporation, Tulsa, Oklahoma.

Amerade Hess Corporation is a working operator within the unit boundary and we have ratified Shell's Unitization Agreement and support the proposal here.

MR. NUTTER: What was your last name again, please, sir?

MR. HEFLEY: Hefley, H-E-F-L-E-Y.

MR. NUTTER: Thank you.

MR. RAMEY: Any other statements? We'll recess until 1:30.

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(Thereupon the noon recess was taken.

Thereafter at the hour of 1:30 p.m. on the 3rd day of October, 1979, the hearing was again called to order and the following proceedings were had, to-wit:)

MR. RAMEY: The hearing will come to order.

Were you through with Mr. Phullips?

MR. KILPATRIC: Yes, Mr. Chairman, Shell has completed the direct examination.

MR. RAMEY: Are there any questions of this witness?

MR. ATKINSON: I have no questions, thank you.

MR. RAMEY: Mr. Stamets?

CROSS EXAMINATION

BY MR. STAMETS:

Q Mr. Phillips, Figures 38 through 39 of the Waterflood Feasibility Unitization Parameters show the injection and production patterns for the various zones to be flooded, and those are certainly some odd looking patterns

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in there. Has any consideration been given to infill drilling in this proposed unitization project?

A Mr. Stancis, I'm going to have to refer you to the Technical Committee people for that question because I was not involved in developing the plan, and right now we're sticking to that plan.

Q Okay, nonetheless, I would wish you would put someone on, back on to answer the question, whoever it should be.

MR. LOPEZ: Yes, we will.

MR. KILPATRIC: We will.

MR. LOPEZ: We'll be glad to.

MR. RAMEY: Any other questions of Mr. Phillips? He may be excused.

MR. LOPEZ: Mr. Chairman, that concludes Shell's direct testimony. I would of course request to be allowed to make a closing statement at the conclusion of the evidence.

MR. RAMEY: I think that can be arranged, Mr. Lopez.

Let's see, who did you want to put back on to answer your question?

MR. LOPEZ: I'll be glad to put Mr. Lancaster on for that particular question.

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WILL LANCASTER

being recalled as a witness and being still sworn upon his oath, testified as follows, to-wit:

CROSS EXAMINATION

BY MR. STAMETS:

Q The question refers to the injection patterns that are shown on Figures, I believe, Thirty-five through Thirty-nine of the Technical Report, and my question was, has consideration been given to infill drilling within this project to make those patterns a little more uniform?

A At this point it hasn't. At this point we are --- since we haven't really gotten the unit together, and we haven't talked to the working interest owners, we more or less feel that what's in the --- what's in the Technical Report is the way we will start off. At least this is how we initially will proceed.

Now, it may be that before we go very far, we might want to make some changes.

Q Do you feel that that should be looked at?

A Yes.

Q An infill program in this project?

A Well, now when you say an infill program, I don't quite --- we've got a --- it's a 9-spot. I admit that

it's not a complete pattern across the unit, but there is in essence a 9-spot that's in there now with some drilling wells.

Now it may be that when we get together, especially after we get done on our final agreements with Amoco, that we may have a slightly different pattern, or we may have a slightly different configuration to the wells, but we have not sat down and gone through a redevelopment, no.

Q. Do you feel that this should be done within a reasonable period after the project is started?

A. After they're approved, yes.

Q. How long is a reasonable period of time?

A. I would think that within the first year when we see how things are -- how our injection is going to proceed.

And we also, as we go into this, what we will find, I think, we'll find some wells that we can't use, and moving -- then as you move one well that maybe moves another, and these are things that we can't foresee at this time.

MR. STAMETS: I believe that's all the questions I have.

MR. ATKINSON: I have another question, Mr. Chairman, as a result of this questioning of him.

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RECROSS EXAMINATION

BY MR. ATKINSON:

Q. In the event that additional infill drilling is necessary, what will that do to the projected capital investment?

A. The investment would go up slightly.

Q. Do you have any feeling at all what the additional investment would be for these?

A. Well, it depends on how many wells we're talking about, but the wells, when we talk about a well costing maybe $150,00, maybe $175,000, you could drill twenty wells and you'd go up maybe a couple million dollars, but when you talk about the profit that that offsets, you're talking about four hundred million profit and you're talking only going up about five million dollars or so on your expenditures.

So as a percentage of your profit it's really very small.

MR. ATKINSON: Okay, thank you.

RECROSS EXAMINATION

BY MR. STAMETS:

Q. I presume, Mr. Lancaster, that you would

not propose drilling any additional wells in the project unless you could see that those additional wells would recover more oil than in your current projections that you have.

A. Well, the concept is that each additional expenditure or what we did would pretty much have to stand on its own in our presentation to the working interest owners.

Q. So that would not have any effect on the overall economics of the project as you've put it forth here today.

A. Spending the additional money or -- I wouldn't think so.

Q. Thank you.

MR. RAMEY: Any other questions?

MR. PADILLA: Mr. Chairman, I have one question I think it is properly -- would be properly addressed to Mr. Buck, and I think he could answer that question from there.

Section 7 of the proposed Unit Agreement indicates that upon removal of the operator -- or the removal of the operator would be effective upon notice to the Land Commissioner. Do you have any objection to the inclusion of that notice to the Oil Conservation Division, as well?

MR. BUCK: I don't believe we'd have any objection whatsoever.

MR. LOPEZ: I might add, Ernie, that I'm

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sure no one would have any objection. That's certainly fine. It's just not in the agreement now. When you're talking about getting 709 and how many royalty owners and 77 working interest owners signed up, that takes a little bit of negotiation.

MR. PADILLA: That Section 7 just lists the procedure by which an operator may be removed.

MR. RAMEY: The witness may be excused.

Mr. Atkinson, are you ready?

MR. ATKINSON; Yes, sir. Exxon calls Mr. William Nolan.

WILLIAM E. NOLAN

being called as a witness and having been duly sworn upon his oath, testified as follows, to-wit:

DIRECT EXAMINATION

BY MR. ATKINSON:

Q. Will you please state your name and residence for the record?

A. William E. Nolan and I live in Midland, Texas.

Q. Mr. Nolan, how are you employed?

A. Employed by Exxon as a Senior Staff Engineer.

Q. Have you previously appeared before the

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Commission and had your qualifications accepted as a matter of record?

A. No, sir, not before this Commission.

Q. What is your educational background?

A. I graduated from the University of Kentucky in 1943 with a Bachelor of Science in Civil Engineering.

Q. After graduation, as an undergraduate, what was your employment experience?

A. For the first two years after I graduated I worked for Sohio Petroleum Company and during my last couple of years I was District Engineer for the West Edmond Hunton Lime Unit, which was the first large unit formed in the State of Oklahoma.

After that work experience I joined Monterey Oil Company as Chief Engineer of the Fullerton Clear Fork Unit, another large unit in West Texas.

After Exxon bought Monterey out, I went to work for Exxon in 1961. Since that period of time I've done various types of unitization work for Exxon.

Q. And what has your contact with technical committees been with regard to unitization?

A. I have attended quite a number of technical committees and I am at the present time a member of six or seven technical committees, working on unitization studies.

Q. What technical committees have you been

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involved with in New Mexico?

A. With the recently formed East Vacuum Unit I was Exxon's representative. I was also a representative for Exxon on the Double L Queen Unit, which I believe was the first statutory unit in the state. I also served on several others.

Q. Now with regard to the Technical Committee relating to Shell's applications, what has your involvement been with that, please?

A. Since 1973 I have been Exxon's technical representative on that committee.

Q. And have you had extensive involvement as a member of the Technical Committee with its workings?

A. Yes. I was trying to figure out, I think I attended every technical session of the twenty or so that was held while Mr. Swartz was the coordinator and I believe I attended them all.

MR. ATKINSON: Will the Commission accept Mr. Nolan's qualifications?

MR. RAMEY: Yes, we've heard of Mr. Nolan over the years.

Q. (Mr. Atkinson continuing.) Mr. Nolan, I refer you to what's been marked for identification as Exxon's Exhibit Number One. Could you please briefly describe what this is?

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A. Well, this is a map which Shell has also sort of presented some background data on, but this shows the whole of the Hobbs Pool, and the map was actually prepared by Amoco as an exhibit when they were working on the full field unitization effort.

It shows the boundary line between the Amoco operated South Hobbs Unit and the proposed boundary line -- proposed boundary of the North Hobbs Unit Area, along with that little peninsula that sort of sticks up there on the east side along the township between 18 South and 19 South.

Q. The dark hatched lines, I take it, outline the boundaries of the North Hobbs Unit?

A. That's correct.

Q. Now, I notice in the south portion, in the Amoco South Unit, there are two -- there's a hatch marked rectangle and a dotted rectangle. Will you explain what those are?

A. Those show two 80-acre tracts which are not a part of the Amoco South Unit, which are -- this unit, as was earlier stated, was a voluntary unit and all the tracts were not put into the unit when it was initially formed. There are a number of other tracts that did not join the unit initially on its formation in early 1975. Those, several of those, have subsequently joined the unit

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but those two, the Conoco State A-5 and the Getty Monico 4, are at the present time, or at least the last time I looked at the records in June, were not a -- were not part of the South Unit.

Q. All right. Now there are three areas over-lined in yellow. Will you please explain what those are?

A. Those three areas show the tracts which Exxon owns.

Q. Thank you. I now refer you to what has been marked for identification as Exxon --

A. I might point out that that Moranco Flood also is shown on here at the top of the Area.

Q. All right. I now refer you to what is marked for identification as Exxon Exhibit Two.

A. This shows again the same exhibit that Shell has presented but we'll give it a little more detail on Exxon's ownership in this unit.

On the lefthand side you see the 320-acre tract 43, which is Exxon's State "A" Lease. It has six wells on it.

Tracts 47 and 48 in the middle of the lease are the Exxon Bowers "A" Federal tracts. This is the largest Federal lease in the unit. It's 320 acres of a total of 400 acres of Federal leases in the unit.

The reason it's divided into two tracts

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is a division of royalty interest between the Tract 47 and Tract 48. It has the same base lease.

Exxon also has a 50 percent interest in the W. D. Grimes, the 40-acre tract to the right.

Q. All right, thank you.

A. I guess Exxon's total there is 660 acres out of roughly 10,000 acres in the total unit, about 6 percent, a little over 6 percent of the total surface area.

Q. I'm sorry, what --

A. I say Exxon's total is about 6 percent of, a little over 6 percent of the total surface area of the unit.

Q. All right. I now refer you to what has been marked for identification as Exxon Exhibit Number Three.

A. Again, this exhibit is very similar to Shell's Exhibit Eighteen, excepting that when Shell plotted the production rate versus time they used a semilog plot which gives a -- quite a different character to the look of the production.

This is plotted on Cartesian -- or directly plotted such that the production rate in barrels per day plotted to the left between 2000 and 4000 and 4000 and 6000 is an equal space, and that makes the difference in the look of the graph. But in essence this is the same

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graph. You remember that -- that Shell testified the remaining primary recovery was 30.3 million barrels. That's a slight difference in estimate. Our estimate here is 30.2 million barrels, a very slight difference in estimate as to the cumulative recovery that will occur to the beginning of 1980.

That 30.2 million barrels is a direct calculation made by the Technical Committee. It started as on 1-1-77 as Mr. Buck testified, being 38.1 million barrels. Since that period of time some 7.8 or .9 million barrels would have been produced, leaving a remaining primary of 30.2 million barrels by our estimate on January the 1st of 1980.

Q How is the remaining primary exhibited on this Exhibit Number Three?

A. The remaining primary is shown by the dashed line. It starts with slightly over 6000 barrels a day in January of 1980 and gradually declines across the graph, goes on off the 30-year to the year 2025, or for 45 years thereafter, and contains under that line the oil reserve,under that dashed line would accumulate to 30.2 million barrels after a production time of 45 years.

Q All right. Now, the 45-year period is when the economic limit will be reached?

A. Yes. The economic limit of 3 barrels per

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day per well on quite a few of the wells will be reached in the year of 2025.

Q Would you please explain what the dark line is?

A The dark line shows the total forecast, the Unit production with waterflooding, and that would be the sum of the remaining primary plus the secondary, and you'll recall that Shell testified the secondary as being 55.2 million barrels and we agree precisely with that determination. We have no problem with that. It was what the Technical Committee determined.

And the sum, then, of the secondary being 55.2 and the primary being 30.2, gives a total recovery under the curve of 85.4 million barrels.

You'll notice, again as Shell's graph has shown, that the secondary, or bold, the black line crosses the primary line after a couple of years of production and then graudally increases on up to a rate slightly over 12,000 barrels a day, remains relatively flat for about 7 years, and then begins to decline. The reserves, by the Technical Committee, were estimated to be -- to have been produced in about 35 years from secondary recovery program, a shorter period of time than was estimated for the primary.

Also, this graph is basically, and I believe this probably was testified to by Shell, but this is a result

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of waterflooding in the Grayburg on a 5-spot pattern and in the San Andres on an inverted 9-spot pattern. Any change of that would probably change these rates.

Q. I now refer you to Exxon's Exhibit Number Four, which is in some ways very similar to the Exxon Exhibit Number Three. I notice that there are two formulas addressed in the upper lefthand corner. The first one is titled Unit Agreement Formula (Revenue Participation), and it is divided into three phases. Would you please explain that?

A. Yes. And this will be very similar to Mr. Buck's testimony.

Phase One lasts for a period of 4 million barrels. Phase Two lasts for a period of from January 1st, 1977, for 38 million barrels, and that relates down to 26.2 million barrels from the end of Phase I to the beginning of Phase III. Those are the same numbers subtracting out the cumulative production prior, and the Phase I production leaves you with 26.2 million barrels from the end of Phase I to the beginning of Phase III.

Then, of course, Phase III is 55.2 million barrels, as we've indicated with the secondary recovery for the Unit.

Q. These formulas presented here, again, are the same, are they not, as those presented by Shell this morning?

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A. Yes, as near as we can estimate.

Q. All right. Now, the second formula is entitled Unit Agreement Formula (For Payment of Investment.) Could you please explain what that is?

A. Well, for the first two phases, Phase I and Phase II investments, over the first about 10 years of production is shown by the arrows, show the extent of time we estimate the phase will last; about 2 years in Phase I and an additional 8 years in Phase II. During that period of time 58 percent of the investment would be paid on the basis of primary reserves and 42 percent on the basis of secondary reserves.

Q. Do you have an opinion as to what effect the use of these two formulas would have on a producer with higher secondary oil?

A. Yes. It causes him during the earlier phase of the Unit to invest money for something that he gets no revenue for. During Phases I and II there is no revenue dedicated for secondary production, so that if an owner owned only secondary, he would get no revenue during the first 10 years of operations and he'd pay 42 percent of the secondary oil investment.

Now, you will notice that at the end of Phase II there is a 100 percent adjustment to the Phase III investment, such that at that time whatever investment in

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secondary, secondary recovery owners have not paid, they will at that time pay in cash to those owners who have a lower secondary oil recovery. It's not a question of paying this, it's the timing under which it is paid. It would be paid under the investment adjustment, of which Mr. Buck testified that the entire 33 million barrels of secondary would be adjusted at the end of Phase II to secondary ownership, or Phase III ownership.

Q. I see, you said 33 million barrels?

A. I'm sorry, 33 million dollars of investment would be adjusted at that time.

Q. Now, for a producer of higher secondary oil, you stated that he would be at a disadvantageous situation for several years. Approximately how long would it be?

A. Around -- a little over 10 years is the way this production forecast goes before it produces the entire remaining primary of 30.2 million barrels.

Q. Mr. Nolan, I now refer you to what has been marked for identification as Exxon Exhibit Number Five. Could you please explain what that is?

A. Yes. This is the same type of graph that shows the production rate on Cartesian coordinates up the lefthand side, showing the production rate in barrels per day against the time. These are years after the unitization,

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after the Unit starts; didn't put the years on, just put the years after starting time, which we believe a reasonable estimate might be 1-1-80.

This shows Exxon's producing rate over the period of time of the three phases of the formula.

Q. This is Exxon's producing rate under the formula proposed by --

A. Under the formula proposed by Shell.

During Phase I Exxon's participation is 4.688 percent, and for that first couple of years period you would multiply Exxon's 4.688 percent by the total Unit producing rate shown on the prior exhibit.

During Phase II Exxon's participation is 4.396 percent. During that period of time you would multiply the 4.396 percent times the production rate shown on the previous exhibit.

And after the end of Phase II, the secondary oil participation becomes in effect and you would multiply 7.639 percent by the production rate shown on the prior graph.

Q. Those percentages you're talking about are not on this exhibit.

A. They are not on that exhibit. They will be shown on a later exhibit.

Q. Now, you may recall this morning Mr. Buck,

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I believe, testified that within a short period of time after Phase I, that the individual tract owners would be producing at a rate equal to or greater than what they had produced prior to unitization.

A. That's right.

Q. In the event that unitization is permitted. Do you have an opinion as to whether that is true in view of this exhibit?

A. Well, Exxon's production rate for the first five months of 1979 averaged 535 barrels per day, as shown by the arrow on that graph.

Exxon's production allocated at 4.688 percent times the estimated Unit production rate would be in the order of 300 barrels per day compared to the actual production rate we are now achieving of 535 barrels per day for Exxon's leases.

This graph shows that as the production rate for the Unit increases, and with a constant percentage of 4.396 for Phase II, that Exxon's production rate increases from 300 barrels a day to the tenth year, where I estimated it was 545 barrels per day, which is slightly more than we are today making on those leases.

Q. That would be a 10-year lag before you would achieve what you're presently --

A. Before it gets back where we are today, yes

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sir.

Q. All right. Now, not only as to Exxon's working interest, but in your opinion what effect will this have on the royalty payments to royalty holders in these tracts?

A. Well, of course, the main problem with this lease is that the Bowers "A" Federal Tract, and this big difference occurs on that very tract, it affects the tracts and, of course, the royalty owners in direct proportion.

Q. Do you have an opinion as to the percentage production of royalties to royalty interest holders in the event that the Unit were allowed and Exxon's production was increased?

A. Please state that again. Why didn't you ask me that last night?

Q. Well, can you approximate what percentage of royalties the royalty owners would receive as compared to what they are receiving now?

A. Yes. This lease is burdened by royalty, excess royalty payment. The Bowers "A" Federal Tract has a 12-1/2 basic royalty on a sliding scale, plus 7-1/2 percent of additional override, so it's some 20 percent of the revenue from that lease is -- goes to royalty owners.

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VOIR DIRE EXAMINATION

BY MR. DALIOUS:

Q. Mr. Nolan, according to this exhibit you show Exxon's Unit formula participation at about 300 barrels and its actual rate of production as 535 barrels.

A. That -- during the first five months of 1979 that was the actual average production, yes.

Q. Now assuming royalties are paid royalty owners on the basis of the Unit formula for the first four or five years, would the royalty owners under the Unit formula for the Exxon leases receive less royalty?

A. Yes, I believe --

Q. Than would be paid under our actual production rate?

A. We actually calculated that they would receive some 44 percent less.

Q. All right.

DIRECT EXAMINATION

BY MR. ATKINSON:

Q. Mr. Nolan, I now refer you to what has been marked for identification as Exxon Exhibit Five-A. Would you please explain for the Commission what this is?

A. Exxon Exhibit Five-A shows again a plot

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of Exxon's production in the bold line. This is the actual production from January of 1976 on up through August, or to August of 1979.

It shows that Exxon's actual production started out at about 500 barrels a day in 1976 and declined in December to about a little less than 400 barrels a day, and then began to go back up and for the past two years has averaged over 500 barrels per day.

Q All right. Now, Exxon's share that is demonstrated by the dashed line, what -- what does that represent?

A. The dashed line represents Exxon's Phase I share of Unit production. You recall that during Phase I Exxon's share is 4.688 percent of the Unit total under the Agreement formula proposed here.

If you take 4.688 percent of the actual field production starting in 1977, that's what this plot shows. The field production has been relatively constant during that period of a little over 7000 barrels per day, which would then result in, had the Unit been in effect in early 1977, Exxon's share of production would have been a little over 300 barrels a day, and would have remained relatively constant during that 2-year period.

Q What is the difference between the -- or the space between the two lines, the dashed line and the

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solid line, represent?

A. Well, of course, you can see, it's about 200 barrels a day, all during that period, and the cumulative difference is shown by the bold line that goes across the curve and has an arrow on the end of it, starting at zero at the beginning of 1977. At the end of the first year it shows a 50,000 barrel difference; end of the second year, 170,000 barrel difference; and say at the end of this year we would estimate that cumulative difference at almost 200,000 barrels, which Exxon would have been paid, that they would have received 200,000 barrels less under the unitized formula than they actually produced during this period of time and the royalty owners would have been likewise treated.

Q. Now, both of these lines are based on actual production data taken from field production, is that correct?

A. That's correct. It's simply a multiplication in the case of the dashed line of the actual production of the field during that case, and an addition of Exxon's lease production during the -- for the bold line.

Q. All right. I now refer you to what has been marked for identification as Exxon Exhibit Five-B, very similar to Five-A. Could you please explain what this is?

A. This is an attempt to just show the position of some of the other operators under this formula.

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The first one we picked on was Shell. There, had the Unit formed there early in 1977, and with Shell's 24.123 percent, they would have been credited with about 1750 barrels a day of Unit production.

At that time they were producing about 1880 barrels of production. Since that time Shell's actual production has declined and today their producing rate is some -- a little less than 1700 barrels per day.

Q. All right, now, if I understand you correctly, then, in the beginning of 1977 through approximately the middle of 1978, had the Unit Agreement been in effect, Shell would in essence have been reduced in the amount it could have produced, is that correct?

A. Well, it would have been reduced in the amount they would receive under the formula as compared to what their leases actually would have contributed to the Unit.

Q. Now what is their position now as of -- well, as of June, 1979, what was their position?

A. Very close to the same line. They would have received just about, almost exactly what they are producing from their leases under the Unit formula. The dashed line and the solid line cross each other for the first four or five months of 1979, pretty closely.

Q. If you will, I'd like briefly to turn you

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back to Exhibit Five-A and compare it with Exhibit Five-B, then. Could you compare the difference in effect to Exxon and Shell in the event that the Unit Agreement is approved by the Commission, as to what increase or decrease in production would result to the -- to Exxon and Shell?

A. Well, of course, if the Unit formula is approved, Exxon's trend is pretty level and the Unit's production -- the field production trend is pretty level. Exxon would take a 200 and some barrel a day loss, whereas Shell, with perhaps a little deline as this bold line shows, their production rate is declining, they may have a slight gain if the Unit goes into effect.

Q. Thank you. I now refer you to Exxon Exhibit Five-C. Would you please explain what that is?

A. Well, if Exxon loses somebody else has to gain, and this shows one of those parties that gain.

Chevron's share of Phase I production is 3.125 percent. Under the Unit formula their production rate would be slightly over 200 barrels a day, or would have been had the Unit been in effect since 1977.

The bold line shows Chevron's actual production as being some 150 barrels a day less all during the period -- the last two years.

Q. So that in the event that the Unit Agreement were in effect, what would happen to Chevron's production?

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A. Chevron's production would more than double if the Unit goes into effect.

Q. Okay, now referring to what has been marked for identification as Exxon Exhibit Five-D, would you identify that, please?

A. Five-D is the performance graph for Texas Pacific Company. Their share of Unit production, Phase I, their share of Phase I, is 4.682 percent, very close to what Exxon's is.

Their actual production, shown by the bold line, held pretty close, very close, to the unitized share until February of 1978, when a rapid decline took place on their leases, and today they're producing at a rate of about 180 barrels per day, compared to their unitized share of about 340 barrels per day.

Q. Do you have an opinion as to what these four graphs indicate as to changing conditions within the proposed unit?

A. These graphs show that there have been substantial distortions since the study was made, that leases are not performing, certain leases are not performing as predicted by the Technical Study; in particular, of course, the Texas Pacific and Chevron leases. Obviously they've declined at a faster rate than the Technical Study. The Exxon leases have not declined as fast as the Technical Study

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would have shown. Shell's apparently pretty close on balance.

Q. Do you have an opinion as to what may have caused these changes?

A. Of course, the Technical Study had several limitations to it. As it was testified by Shell, this was an extremely complicated study because of the complicated nature of the reservoir, and we feel that at the time the study, the way it was done, was the best that could be done with the data then existing.

We took no exceptions to those decline curves, to those rates, at the time they were done.

Q. Do you have an opinion now as to the viability of the data that was relied upon by Shell, or by the Technical Committee, in formulating these performance --

A. Well, that data is over three years old now, and certainly, with one particular limitation that was placed on the study, and it was a necessary limitation, it was testified by Bill Lancaster, that it was necessary to assume that the producing interval of each well was not changed for the entire 45-year future primary life. Of course, to do differently would have been an impossible task. So that was agreed that we would do it that way, but it did not give a unique solution for the remaining primary, and with the reliance of the formula almost 100 percent on remaining primary, it made it an extremely important deter-

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mination using only that for the first 10 years of production and causes Exxon this problem.

Q. Now, when you talk of the reliance of the formula almost 100 percent on remaining primary, are you talking about during Phases I and II?

A. During Phases I and II alone. We have no problem with Phase III.

Q. And referring once again to the formula that Shell set out this morning and as set out on Exxon Exhibit Four?

A. That's correct. There is some weighting of current production rate that amounts to 20 percent during the first 4 million barrels. That is only 3 percent of the total production during Phases I and II, such that 97 percent, then, relies altogether on remaining primary production for each lease.

Q. All right. Mr. Nolan, I now refer you to what has been marked for identification as Exxon Exhibit Number Six, the colored graph.

A. Right. Now, this graph shows the hairy details of one of the estimates made by the Technical Committee during 1976.

Q. All right. Now, could you please explain what the blue line is?

A. The line highlighted in blue, starting in

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1969, shows the actual production rate of Exxon's Bowers "A" Federal tract.

On the lefthand side you'll see that that rate was about 500 barrels a day for a period of four or five years and then it declined quite rapidly.

Starting at the beginning of 1964 when the Technical Study was made, the lease had declined to a producing rate of around 300 barrels per day.

Q. All right. Now, we're talking, just to clarify this, we're talking about the Exxon Bowers "A" Federal which is Tract 47. That is the same tract which is identified as Tract 47 on Exxon Exhibit Two, right, is that correct?

A. Correct; that is correct. It is a 7-well lease.

Q. Now, taking the actual production from the tract up until the end of 1975, what did the Technical Committee do with it?

A. Well, the initial simulation study was made using data up to the end of 1975. The line that is labeled "A" shows the simulation study forecast of production decline which was made with data up to the end of 1975. That matched the decline and so on, and shows a couple of changes in decline rate.

Q. That is the line which lies above the blue

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line then, is that correct?

A. That's correct, yes.

Q. All right. Now, could you explain -- first of all, when was the "A" line generated by the simulator model?

A. Well, sometime in early 1976. It took a considerable amount of time to set the model up and get it going. The results were furnished to the Technical Committee members on October the 27th, 1976.

Q. All right. Now, would you please explain what the straight blue line is, which is designated as Line B?

A. Line B shows the forecast for the Bowers "A" Federal lease determined by the simulation study, starting September the 1st, 1976, and declining on out through the end of 1989. Now this line was the one which depicts the reserves which are included in the Technical Study, which are included in the formula, and which this lease is credited with.

Q. All right. Now, I notice that it is lower than Line A is, and that at the beginning of 1976 there is a pink blob there.

A. Yes.

Q. Would you please explain what the relationship with those two facts are?

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A. The pink blob shows the 8-months production which was accumulated after the 1975 one, or one A, was made. That data was introduced into the model and the reserves were recalculated, and the effective date then was September the 1st, as related by Shell. This is the final calculation which was made. This includes data through August of 1976. The addition of the little, red blob caused a reduction in the reserves assigned to this tract from a value of 1,485,868 barrels, as shown in the lower righthand side of that graph, Original Computation, (Run B).

Run B signified that 3 barrels a day economic limit was used. Another run was made using a 5 barrel a day economic limit, but Run B was decided to be the best by the Technical Committee, and that's the one we were looking at at the time, but in any case, the reserves determined under the line A were 1,485,000. The reserves determined under line B, and effective 9-1-76, where you would have to subtract the production from the beginning of the -- from 1-1-75 to 9-1-75 to make those comparable numbers, but that production rate was only 30 or 40,000 barrels. So it shows a very substantial reduction in the reserves assigned to this lease by the addition of the six months under the red blob of some 200,000 barrels.

Q. All right. Now, did you perform, or have performed for you, a computer run relating to the B line?

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A. Yes. We were not -- we could not or can not duplicate that study made by Shell with and for the Technical Committee, but by observing all of the leases, they have come pretty close to decline curves; ordinary semilog decline curves plotted against time, an exponential function.

And what we did was fit an exponential decline to the actual calculation made under this -- by this Technical Study, because we were given the starting rates and the time under the curve, and the total reserves, we could then take 1,273,139 -- that's shown on the righthand side as SR76, that is the simulator reserves determined in 1976, and that is what is used in the formula and in the report, 1,273, 139 barrels.

Q. You're referring now to the numbers in the the first two numbers on the righthand side of the page?

A. Yes, sir, the top -- the top one of those. 1,273,139 barrels was the simulator reserve, which is in the Technical Study for this lease.

At the time this information was furnished to the Technical Committee members the rates for 1976 were also furnished. This lease, the rates shown for September 1st rate for this lease, was 316 barrels a day. That's shown in the second line of that tabulation. That's simulator 76 rate of 316 barrels per day.

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Also furnished was the rate on January 1st of 1980. Now this was done so that the Technical Committee members could view their leases and see how a visual graph would compare to the complicated calculations that none of us really understood that were made by this simulation study.

So this shows that the lease declined from 316 barrels a day in September 1st of 1976, to 206 barrels a day at the beginning of 1980, and further declined to 102 barrels a day at the beginning of 1990, and since the Technical Committee agreed that the economic limit would be 3 barrels per well per day, this lease reached its economic limit at a calculated time in the year 2012.469, as shown in the bottom part of that first group of tabulations.

The final year, the simulation study final year, SFYR, that is the year in which this lease would reach its economic limit if a decline curve match was made with the Technical Committee determined reserves.

This lease would then have three slopes to it. The decline curve would have three slopes.

Starting out, the slope would be 12.04 percent per year, and you can see that it's fairly sharp the first -- between the period of 1976 and 1980, it's fairly sharp, and it's 12 percent a year.

From the period of 1980 to 1990 the lease

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declined at 6.787684 and so on percent per year, and then it declined at 6.79206 from the period ending from 1990 to the economic limit, and that, if you use those slopes, you use those rates, you'll calculate precisely a 1,273,139 barrels under the curve.

Q. This is the reserve calculated --

A. By the Technical Committee and these calculations were made to match a decline so we could estimate what might happen under changed conditions. We couldn't duplicate the study. We tried to make as a close an estimate as possible using a conventional decline curve approach and utilizing the data calculated in the simulation study to maximum effect.

Q. And have conditions changed in the Exxon lease? Or Exxon tract?

A. Yes, and with the Exxon tract performance, which -- now this data was not available, of course, to the Technical Committee because this study was done in 1976. But starting at the beginning of 1977 this particular lease, production started to increase from 280 barrels a day at the beginning of 1977 to around 400 barrels a day, as you can see on that plot, at the end of 1977, and since that time it has been above and below 400 barrels a day, and it's fairly level at about 400 barrels a day, currently producing at about 400 barrels a day.

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It can be noted --

Q Excuse me, go ahead.

A. No, you go ahead.

Q All right, I will.

Now, based on the production data since the time the Technical Committee Report was prepared, what did Exxon do with the information as to attempting to calculate reserves?

A. Well, Exxon took the updated production, utilized the end point determined by the Technical Study, increasing the starting point to the average production rate occurring during the first 5 months of 1979, and declining it to the economic limit as determined under the Technical Study.

Q All right. Now, could you explain briefly how that end point was arrived at once again --

A. Well, we calculated that the lease reached its economic limit in the year of 2012. The decline curve estimate here simply takes the starting rate at 409 barrels a day, the A79 is 409 barrels per day, the actual production for that lease for the first five months of 1979. It declines it in a straight semilog decline to the economic limit in the year 2012.

Q All right. Could you please explain how your ultimate reserve calculation was arrived at by the gen-

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eration of numbers in the lower righthand corner?

A. Right. Now these are the numbers which the -- which the attempt at matching generated. This shows that the -- an actual number was calculated for the producing rate first five months of 409 barrels a day.

The line slopes to the first of 19 -- for the first five months average of 19 -- pardon me. It slopes at 8.54 percent per year from the beginning of 1979 to the economic limit.

The producing rate at the beginning of 1980 is calculated to be 381 barrels per day under the curve. 226 barrels per day is what the simulation study, the S79 shows to be the producing rate at the beginning of 1980.

Q. That's where the blue line correlates right --

A. That's where the blue line is in 1980. So that means that the blue line is -- actually, it's 226 barrels per day and the -- under the yellow line the rate would be 381 barrels a day at that time.

At the end of 1990 the producing rate, calculated by the yellow line, is 156 barrels per day, and at that point you can see that the blue line is 102 barrels per day, as shown in the upper tabulation.

And they both reach the economic limit at

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the same point in time.

The reserves calculated under the yellow line from a point in 1980 are 1,472,492 barrels for this lease.

From the same point in time on the blue line, this calculation is 960.377 barrels per day, a difference of 512,000 barrels, a very substantial difference, which is what our estimate is of the increase in reserves that would be indicated by the increased producing rate of some 200 barrels per day.

Q Now by a difference, what do you mean? The difference between the formula and using the 1976 parameters and Unit formula using the updated parameters?

A. No, no. This is simply the calculated reserves from a point of 1-1-80, using the yellow line ER80, a 1,472,000 barrels and using the simulation reserve, which corresponds to that same point in time of 960,377, that is the reserve calculated by the Technical Study from and after January 1st, 1980, the 963,877. So the difference between those two is the increase in reserves this lease would enjoy if the calculation is correct, of 512,000 barrels.

Q. How could that be accomplished under the present Unit formula?

A. Of course, we could develop this into a parameter for remaining primary and utilize the changed per-

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centages in the same formula, and that would, of course, give this lease additional participation.

Q All right. I now refer you to Exxon Exhibit Number Seven.

A Yeah, this is the same type of calculation for the 40-acre portion of the Bowers"A" Federal Com Tract 48. It's the upper part of the Bowers "A" Federal Lease that we think we showed on Exhibit Two. It's a single well lease, and it is the same type of calculation. The purpose of putting this in is to show the similarities between what happened with the updating, what happens with the -- adding the additional data, and that in general the slope, or pretty similar, the -- it is a two-part slope, sloping a little more drastically for the first four or five years after 1976 to the point, the beginning of 1980, and then flattening out from that point at a rate of about 6 or 7 percent per year.

The same calculations, identical calculations, were made for this lease.

The Technical Report determined a reserve of 231,139 barrels from September of 1976. That's shown by the SR76. The same type of calculation would indicate this lease reached its economic limit in the year 2027. Drawing a straight line, then, from the first five months of 1979 to that economic limit,as shown by line C, would result in a calculation of a reserve of 247,000, as shown in the ER80.

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The Shell -- the simulation reserve from that same point is 183,000 barrels, for an increase in reserve for this tract of 63,874 barrels.

Q. Once again, by the increase you mean --

A. The increase from and after January 1st, 1980.

Q. In the event that the updated parameters were employed --

A. In the event the updated parameters were employed, you would determine a minimum reserve for this lease of 247,000 barrels, and if it was put into the formula, we relate that as Shell has described, to the total of all leases; take that percentage and determine the parameter that would be substituted in the formula.

Q. Now, for what tracts did you perform these calculations?

A. I did this for each and every tract in the Unit. As a conincidental number, and these are given later in these tables, the reserves were fairly close. The reserve calculated by the Technical Study from and after 1-1-80, as we've previously shown, is about 30.2 million barrels.

The sum of all the leases going through this same calculation procedure, was 33 million barrels; some 10 percent change on the overall basis.

Many leases are up and many leases are down.

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The earlier exhibits show which operators are particularly affected, just a few selected ones, and we have, of course, these same graphs for each and every tract, the same calculations for each tract; if anybody wants to go through them, we'll go through them.

Q Is Exxon willing to make these available to the Commission in the event the Commission wished to view them?

A The Commission, or anyone else. Yes.

Q All right. Now I'll refer you to what has been marked for identification as Exxon Exhibit Eight. Would you tell briefly what this is, please?

A Well, this shows the comparison of the 1976 and the updated parameters as determined by Exxon, using the methods that we've tried to describe.

First off, it's pretty easy to update the production rate. We know what these leases produced for any period of time you want to talk about. We have selected, as did the operators, a full year of production, being the last full year of production, to compare to the 1976 production rate, which is utilized in the formula.

Just to start out with Exxon's share, in 1976 Exxon's oil production rate from all of its tracts was 160,433 barrels, as shown under 1976 Oil Producing Rate, and that amounted to 5.854 percent of the total production,

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which is shown down at the bottom, the Unit Total of 2,740,636. If you divide 160,433 by 2,740,636 you get 5.854 percent. That's Exxon's parameter share of production in 1976.

Now, we --

Q. To clarify that, that is the parameter which is presently employed in the proposed Unit formula in Phase I, is that correct?

A. That's correct. That's Exxon's share of the 1976 oil production rate, which weights 20 percent in Phase I of the Unit formula.

Now, if we redevelop that parameter, that same parameter, for the year of 1978, Exxon's tracts produced, coincidentally, around 180,000 barrels during 1978. The total production from all the tracts was 2,631,234, and that develops a parameter of 7.143 percent, which says that the Exxon share of unit production, based on the producing rate, was 5.854 percent in 1976, and that has now increased to 7.143 percent, demonstrating a disparity in reserve calculation and in use of a parameter that's three years old for production rate.

Q. So that in the event that the Commission were to apply the 1978 actual production data to develop the parameter, this would be the parameter that would be employed in the present formula, then, is that correct?

A. That's correct. Near as we can calculate

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it, Exxon's share would be 7.143 percent for the year of 1978.

Now, Shell's numbers, just as a comparison, we though we'd pick somebody to compare Exxon to, during 1976 Shell produced 699,966 barrels out of a total 2,740,636 for a total of 25.540 percent.

During 1978 Shell produced 638,905 barrels of the 2,731,000 produced by the Unit, for a total percentage of 24.282 percent, a reduction of about 1.3 percent where Exxon's has increased some 1.3 percent.

Q. Now would you please explain what the oil reserves calculations are in part B of Exhibit Eight?

A. Right. Part B, like I say, shows the oil reserves, and for the 1976 primary oil reserves -- these numbers were taken directly from the Technical Study-- Exxon's reserves were 1,673,668 barrels out of a total reserve of 38,071,683 from a date of 1-1-77. That percentage for Exxon is 4.396 percent. And that is the parameter that is used 100 percent in Phase II of the formula.

Q. And used 80 percent, I believe, in Phase I.

A. And used 80 percent in Phase I, correct.

Now, going through the decline curve method that we have described, for each and every tract in the Unit, we determined that the future oil recovery from

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a period of 1-1-80, which is perhaps close to the date this Unit may go into effect, was 33,205,631 barrels.

Going through each tract for Exxon, we determined that the reserve for Exxon is 1,875,393 barrels, for a percentage of 5.468, an increase from 4.396 to 5.468 percent.

Now, doing the same thing for Shell, Shell's 1976 primary reserve from 1-1-77, was 9,048,999 barrels out of a total 38,000,000 for a total of 23.769 percent. The redetermined reserves by Exxon, 7,776,948 out of 33.2 million for a total percentage of 23.421, a reduction of some .3 of a percent.

Q All right, now how about secondary oil reserves?

A Secondary oil reserves are just shown for reference. That is the number directly out of the Technical Report and we didn't see any reason for changing it. Exxon's share is 4,216,642 out of the 55.2 million; a total of 7.639.

Shell's is 10,419,216 out of the 55.2, a percentage of 18.875.

Q All right. Now, if we will be using many of the same numbers in what has been marked for identification as Exxon Exhibit Nine, would you please explain how that works?

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A. Well, Exxon's participation under the Agreement formula, under the formula proposed by Conoco and which is now included in the Agreement, first this shows a development of Exxon's share; A, using the 1976 Parameters, and B, using the updated parameters.

Q. So A represents what will be Exxon's share in Phase I and Phase II under what is proposed by Shell presently.

A. That is correct. If you recall, the formula is composed of 20 percent 1976 oil producing rate , from the former graph, former exhibit, you see that that would amount to 20 percent of the value 5.854 percent, or 1.171 percent of the total.

Q. Now 5.584 is taken off of Exhibit Eight --

A. That's correct. Exxon's share of the parameter 1976 oil producing rate, and if you multiply that 1.171 percent, which is the rating, all that percentage in the formula, multiply that by the 4 million barrels in Phase I, you determine that that portion of the formula allocates to Exxon during Phase I, 47,000 barrels of oil. Because 1.171 percent times 4 million is 47,000, roughly.

For the remainder of -- for the other part of Phase I, you recall that the formula is 80 percent 1976 primary oil reserves. We take 80 percent of the primary oil reserves determined under the Technical Report,

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that's a percentage of 3.517. Applying that 3.517 again to the 4 million barrels, we come up with 140,000 barrels, for a total during Phase I of 4.688 percent and a share in barrels of the 4 million barrels, 187,000 barrels.

For Phase II where the oil is allocated 100 percent on primary oil reserves, using the 4.396 percent in the Technical Report, Exxon's share of the 26.2 million barrels produced during Phase II, is 1,154,000 barrels. That would give a total production during Phase I and Phase II of 1,341,000 barrels.

Q. Just to emphasize once again, this is what Exxon would be able to produce under the present --

A. This is what Exxon would be allocated under the formula. This is Exxon's allocation of the first 30.2 million barrels produced during Phase I and Phase II. It's a precise number. When the Unit produces 30.2 million barrels, Exxon's percent is going to be 4.688, or 187,000 barrels, regardless of when it's produced or how it's produced.

Q. All right. Now, what happens when you use updated parameter based on actual production data?

A. Using the updated parameters, of course, helps that some.

The 20 percent 1978 oil producing rate, as you recall from the previous exhibit, was 7.145 percent.

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Taking 20 percent of that, 1.429 percent, multiplying that by the 4 million barrels gives you 57,000 barrels, which is 10,000 more than that parameter gave the -- would give us under the '76 parameter.

The 80 percent share of primary reserves in Phase I is 5.648 percent as we've determined it. Its percentage is 4.518 weighed in the formula, multiplying that by the 4 million gives you 181,000, a total during Phase I of 238,000 barrels.

You'll notice that under the old parameters we would have gotten 187,000 barrels; under the new parameter, 238,000.

Under Phase II, using the updated parameter of 5.648 percent and multiplying that by 26,200,000 barrels gives Exxon 1,480,000 barrels for a total during Phase I and Phase II of 1,718,000 barrels, a difference of 377,000 barrels in Phase I and Phase II.

Q. Which is to say, then, that in the event the updated parameters were employed, Exxon would benefit by 377,000 barrels of oil.

A. According to our estimates, which we feel are close to what a Technical Committee would determine if that were done over on a more precise basis, we feel that's a reasonable estimate of the difference on the Exxon leases, is 377,000 barrels.

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Q. Now referring you to --

VOIR DIRE EXAMINATION

BY MR. DALIOUS:

Q. Mr. Nolan, you just mentioned that Exxon would receive an extra 377,000 barrels of oil if the updated parameters were used.

Would it not be true that we'd lose 377,000 barrels of oil if the proposed parameters were used as appears in the Unit Agreement?

A. That's a direct corollary. If we'd get --

Q. At $10 a barrel --

A. Yes, sir.

Q. -- how much money would that loss represent?

A. Well, at $10 a barrel, that loss would be $10,770,000. I can do that without my calculator.

DIRECT EXAMINATION

BY MR. ATKINSON:

Q. I now refer you to what has been marked for identification as Exxon Exhibit Ten. Could you explain what this is?

A. Now, this exhibit shows the same type of calculation using the same -- using numbers from Exhibit --

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Q. Exhibit Eight, I believe.

A. It is from Exhibit Eight, thank you, for Shell's participation, doing the same thing, taking 20 percent of the 1976 oil producing rate would allocate Shell 204,000 barrels for that part of the formula; using 80 percent of the 1976 primary oil reserve would give Shell 19 percent, or 760,000 barrels for the remainder of Phase I; this being a total of 964,000 barrels.

During Phase II, applying Shell's 23.768 percent, as determined by the Technical Committee, for 100 percent of the 1976 primary oil reserve, applying that to the 26 million barrels, would give 6,227,000 barrels during Phase II.

So that the total during Phase I and Phase II is 7,191,000 barrels, which Shell will be allocated under the parameters in the Technical Report and utilizing the formula in the Technical Report.

Q. All right, now what happens when you use the updated parameters with Shell?

A. When you use the updated parameter, you do again the same thing, 20 percent updated 1978 producing rate parameter is 24.282 percent. This gives 194,000 barrels compared to the 204,000 barrels, slight reduction. The 80 percent of the updated 1979 primary oil reserve, effective 1-1-80, is 23.421 percent times 8.8; 18.737 percent,

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multiplying that by your 4 million barrels gives 749,000 barrels. Under those circumstances during Phase I Shell's allocation of production from the Unit would be 943,000 barrels.

During Phase II, with the revised or updated 1979 primary oil reserve of 23.421, Shell's share would be 6,136,000 barrels. This is a total, then, for the two phases of 7,079,000 barrels.

Q Okay, what is the difference between those two using the 1976 parameters and the parameters based on production since '76?

A This shows a difference of 112,000 barrels.

Q Now, what does this mean with regard to how Shell will come out if the present Unit Agreement goes through?

A This -- this means that using the 1976 parameters, the older parameters, Shell would be allocated 112,000 barrels more oil than it would if the parameters were updated on the basis of Exxon's estimate.

Q Now, in your opinion as an engineer, is it good engineering practice to base parameters and formula on the most up-to-date data available?

A Certainly that's one of the things that in all the Technical Committee work we try to use all the

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updated parameters, and all of us are faced with attending these Technical Committee meetings with having to update at least two or three times during the course of a study.

As we described earlier in this study, it was updated once for -- to get an additional eight months of production included in the -- in the determination.

Q Is it your opinion that it would be appropriate and good engineering practice in view of the length of time that has elapsed since 1977, 1976, to so update the present formula?

A. Yes, this is an inordinately long time to use these outdated parameters. It's over three -- about a three-year period and it would seem to me to give a better, closer, determination for each lease to redetermine the reserves based on the additional data that's now available.

Q. Now you mentioned a previous update that was performed by the Technical Committee. What did that consist of?

A. Well, as I said, we added the -- the production from a period January 1st of 1976 through August of 1976, and that caused the differences we looked at on Exhibits Six and Seven.

Q. To the best of your knowledge, then, what was the length of time involved in rerunning the formula with the updated production parameters?

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A. That's a good point. The initial Technical Committee information was furnished in October of 1976, and less than a month later the -- the updated information was furnished to the Technical Committee members, so it took Shell some several weeks to rerun that data including to include the eight months additional data.

Q. And is it your opinion that from your knowledge of what is involved in rerunning the simulator model, do you have any idea what amount of time would be involved in this case to rerun the formula?

A. No, I don't, really. I don't know what shape that's in as far as Shell's preserving the data or how long it would take to redo it. We'd have to just ask Shell what it would take if that's appropriate. I don't know.

Q. Now I refer you to what has been marked for identification as Exxon Exhibit Number Eleven, dealing with required investment of the Exxon share of the Unit Agreement formula using 1976 parameters. Would you please explain what this is and what we're doing here?

A. Well, Exxon, I guess, has objected to the payment for investments,for secondary investments during the long Phase I and Phase II period. That's what makes this one rather unique, is the long 10-year period, Exxon having a higher Phase III percentage must pay additional in-

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vestments during Phase I and Phase II over and above its revenue participation during this long period of time.

Q Now the investment formula you're talking about, the revenue participation formula, are those set out by Shell this morning, being set forth in Exxon Exhibit Number Four. is that correct?

A That's correct. Whereas we show down here towards the middle of this graph that in Phase I Exxon's revenue share is 4.688 percent. That's sort of along the middle line.

The investment share is 5.758 percent during that period.

Q Now specifically how is that investment share calculated?

A It was calculated based on 32 percent Phase III participation; 58 percent Phase II participation. That percentage -- that's the way that percentage was arrived at.

Q I'm sorry, I think we have a little bit of confusion here. Right now you are speaking of the numbers which are sort of in the middle of the page under oil production share and investment share in thousands of dollars.

A Yes, I am.

If we look at the top of this -- the top

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of this exhibit, we see that for an estimated range of total unit investment between $31 million and $106 million, a calculation is made as to what Exxon's cost would be on a per barrel basis during Phases I and II.

Now, $31 million is less than Shell showed would be the investment for this Unit. This was an outdated number that we used in earlier --- they've updated their number somewhat for inflation, and so on. This $106.4 million is entirely Exxon's estimate of what the investment might be in this Unit. We must admit that if that investment is made, there are going to be considerable improvements to the production performance of the Unit, and additional reserves that will be perhaps generated by the additional investment.

Q. Is initial investment ---

A. But we strongly feel that the investment of $31 million is less than will be spent. It's been our experience in this type of unit for --- in the San Andres, and even in units operated by Shell, that these investments are much higher than the initial anticipation.

Of course, there will be benefits that will accrue, so we have just looked at what the range of investments would be and what the cost to Exxon would be, for the investment share compared to the production which would be allocated under the production side of the --- of

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the agreement.

Q. All right. Now the additional investment you're talking about could come about from things such as infill drilling that has been spoken about here today --

A. Yes, that's particularly what may be required as the Unit starts. It would be justified. It would certainly be justified by increased reserves, higher rates, and this and that, but nevertheless, during Phase I and Phase II Exxon's share will still be the same.

Q. Now would you please explain what happens with these numbers here?

A. Okay. On previous graphs we showed that Exxon's production allocated during Phase I and Phase II is 1,341,000 barrels. We're going to calculate -- we're going to show how we develop Exxon's share of investment, which in the case of $31 million total investment, would be $2.371 million dollars if the investment is $31 million.

If the investment is the higher number, $106 million, Exxon's investment would be $8.1 million.

If we divide the investment by the production, we find that under the first case Exxon's cost is $1.77 a barrel.

Under the second case, it's $6.06 a barrel, and these are just numbers to demonstrate how tough it can get on investment if they are this high, and I want to also

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compare that to some other numbers as we go through here.

Now the bottom part of this graph, repeats what Exxon's oil production share is at a 1,341,000 barrels during Phases I and II, and we've described how we got that by applying the percentage of the formula by the production in the various phases. Exxon's share of production for the first ten years is 1,341,000 barrels.

On the righthand side of the lower part, under the investment share in thousands of dollars, shows what Exxon's calculated investment share under the two investment schemes that we have established, $31 million and $106 million, we would pay -- Exxon would pay 5.758 percent and at the end of Phase II, if we just jump down to that line, Exxon would have paid $1,787,000. That's multiplying 5.758 times $31 million.

In the case of the $106 million investment, that number is $6,129,000.

Now then, this number, the next line shows the adjustment that is made at the end of Phase I. All investments at the end of Phase I are adjusted to Phase III percentage. Exxon's percentage in Phase III is 7.639 percent. So that amounts to an adjustment of 1.881 percent from Exxon's earlier share of investment to its share of investment at the beginning of Phase III. Exxon would have to pay in cash investment adjustment, 1.881 percent. In

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case of the $31 million, that's $584,000. In the case of the $106 million, that's $2 million.

Exxon would pay to others as the investment adjustment for all the investments which we made from the beginning of Phase I and through to the beginning of Phase III, for that 10-year period.

And when we add the investment adjustment and amounts paid during Phases I and II, we find that Exxon's total production -- total share of investment, in the $31 million case, is $2,371, which is shown at the top of the graph, and for the $106 million case, as shown at the top of the graph, it is $8,131,000, which includes investment paid during Phases I and II and the additional investment for the investment adjustment.

Now then, Exxon's oil production share, you'll recall, is 4.440 percent during those two phases.

If Exxon had been paying on the basis of Phase in effect, or on the same share as its revenue, its investment would be as shown here: 4.440 percent of $31 million is $1,378,000. This means that Exxon during that period paid $993,000 for an investment in excess of its revenue share of participation.

Q. This represents what Exxon actually paid under the Unit formula with the 1976 parameters.

A. That's right on the basis of the 1976 para-

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meters it would be paid in excess of its production share, $993,000 and this number would jump to $3,405,000 if the investment is as high as $106, which we feel it could get that high.

Q All right. Now referring to what has been marked for identification as Exxon Exhibit Twelve, going through the same types of calculation for Shell under the Unit Agreement formula with 1976 parameters, what do you come up with?

A Well, we showed Shell and we're not picking on Shell, we just showed it because their Phase III is lower than their Phase II, and this demonstrates what happens under this type of investment scheme where operators have big differences in primary and secondary and pay more during Phase I than they do in Phase III -- Phase I and II than they do in Phase III.

This shows that Exxon's -- or Shell's investment share for the $31 million deal at the top of the page, is $5,859,000. Shell's production during that period is $7,191,000 developed as we have on previous exhibits for a cost of $.81 a barrel. Now you recall that on the previous exhibit Exxon's cost was $1.77 a barrel during Phase I and Phase II.

Under the $100 million investment, if it does go that high, Exxon's investment -- or Shell's invest-

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ment is $20 million; Shell's production, again, is exactly the same, 7,191,000. That's a cost of $2.79 a barrel or compared to Exxon's cost of $606,000, and this results in considerable difference in the economics of this project, as to the rate of return which Shell would receive and the rate of return which Exxon would receive.

Q. All right, now would you please explain to the Commission what the meaning of numbers is in the second group of calculations?

A. Well, again, we calculated Shell's oil production share as being 7,191,000 barrels. This is simply multiplying their percentages times the barrels in each phase, and come on down here where their average production is 23.811 percent during Phases I and II. They've received as an oil production share 7.191,000 barrels.

Now, Shell is on the receiving side of this investment adjustment. Shell puts up more money during Phase I and Phase II, but it receives it back at the end of Phase -- some of that money back when the adjustment takes place, due to the fact that their Phase III is lower than their investment share during Phases I and II.

The percentage which they will receive, their Phase III is 18.875 percent. Their investment share is 21.713 percent. The difference between those two percentages is 2.838 percent. Multiplying that 2.838 percent

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times the investment of $31 million gives Shell a credit at the end of Phase II of $831,000. That's a little more than Exxon pays, $584.

The investment share based on the higher investment numbers, Shell would receive $3,021,000 compared to Exxon's payment of $2,002,000.

Again, Shell's oil production share, being 23. -- the bottom, second to the bottom line, now, Shell's oil production share is 23.811 percent. If that were applied to the investment, their oil production share of those investments is $7,391,000 for the $31 million investment. Their investment share is $25,344 for the $106 million investment. They have received some million and a half dollars -- or they have not received, I'm sorry. I want to rephrase that.

The investment paid by others for Shell's production share of investment is a more proper way to put it, is $1,500,000. That results because their oil production share is higher than their investment share. Others have then had to pay that difference, and in the case of the $106 million, that difference is 5.2 million dollars.

Q. Would you explain in somewhat more detail exactly what you mean by investment paid by others?

A. Well, the total investment must be paid by all parties. If Shell's oil production share is, for

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instance, $7.4 million, if they would have had to pay $7.4 million of these $31 million total investment, which is 23.8 percent. That is their -- that is their revenue share. Had they been forced to pay that, they would have had to pay a million and a half dollars more than they actually paid; therefore, other people must -- somebody had to pay that, and that is paid for by people who have a higher Phase III than Phase II.

Q One of which is Exxon?

A. One of which is Exxon.

Q I refer to you what has been marked for identification as Exxon Exhibits Thirteen and Fourteen. These examine required investment under the Unit Agreement formula using the updated parameters, based on production since 1976, first for Exxon and then for Shell.

Would you please explain the results on these two exhibits?

A. Well, these exhibits were prepared now instead of using the parameters that were in the Technical Study and are in the Unit Agreement. These were for using the updated 1978 oil production rate and the updated remaining primary parameters, and the same calculation procedure was used.

For instance, Exxon's share of production increases from 1,341,000 barrels, as shown on Exhibit Eleven,

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up to 1,718,000 under this type of [illegible] during Phases I and II. If the parameters are updated, Exxon's production increased.

Its investment share remains the same, exactly the same. Now that results because the investment share is really determined by your Phase III percentage. Once the investment adjustment is applied, your total investment is exactly whatever your Phase III is.

So this does not change the total investment but it increases Exxon's production, and therefore, reduces the cost per barrel from $1.77 to $1.38, and under the high investment scheme it reduces it from $6.06 per barrel to $4.73 per barrel.

It takes some of the sting out.

And again we can show that, going through this bottom part, that the amount paid by Exxon in excess of Exxon's share of production is, in the case of $31 million, it's $607,000; and it's $2 million in the event that the investment is at the higher rate, and you'll see that those numbers are both lower than Exhibit Eleven, 993 compared to 607 for the $31 million case, 2 million 4 instead of 2 million 878 for the $106 million case.

Q With regard to Exhibit Fourteen, which deals with Shell, would you please compare that with Exhibit Twelve?

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A. This is the same calculation procedure, using the updated parameters in the formula proposed here, but only changing it to insert the updated parameters determined by Exxon.

It shows the effect on Shell's production, where Shell's production is reduced from 7,191,000 down to 7,079,000. Shell's share of investment is exactly the same because its Phase III doesn't change, 5,859,000. That's 83 cents a barrel where before they only paid 81 cents a barrel. Two cents a barrel.

On the $106 million scheme, a little more -- a little more of an increase. It increases their cost per barrel from $2.79 to $2.84.

And again, the investment paid by others for Shell's production share, doing it the same way, comparing the production percentage share applied to the investments, against the actual percentage paid by Shell, results in the fact of $1,307,000 is paid for by others; for the $106 million case, $4.8 million is paid for by others, during the Phase I and Phase II period.

Q. All right. Now will you -- we now come to Exhibit Fifteen. Would you explain briefly what Exhibit Fifteen presents?

A. Exhibit Fifteen shows the tract parameters for the oil production rate for three periods of time. It

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shows the 1976 oil production rate used in the Agreement formula. It shows the 1978 oil production rate which we have used to update the formula, and also shows for reference the first -- it says 1979 oil production rate, but it's actually the first five months of 1979 oil production rate, and if you would, please, note your exhibits. That is the first five months. This is all that was available to us at the time this calculation was made from the State records.

But this just shows, then, for each lease in the Unit, there are 83 tracts, for each of those tracts it shows the value of the production during that period. It shows the fraction that each tract bears to the total, or the parameter, which is developed for 1976 oil production, 1978 oil production, and more updated, 1979. You'll notice that Exxon -- well, no, I don't show it on that.

The next part of that exhibit shows the oil reserves laid out in the same way, from the 1976 Primary Oil Reserves, as included in the Technical Study, to 1979 Primary Oil Reserves, which actually start on 1-1-80; and just for reference, the Secondary Oil Reserves, which is identical to the Technical Study and the percentages are the same as shown in Shell's Exhibit.

This is the -- each tract's percentage of the primary oil reserves for '76, as determined in 1976, the primary oil reserves as determined in 1979, and the secondary

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oil reserves as determined in 1979 -- as determined by the Technical Study.

We have also determined these parameters for the gas reserves in a manner similar for that used by the Technical Study. We did not think we wanted to burden everybody with another six tables. We have them available if anybody wants to look at them. We're not going to make any point of that, I guess.

Q. No.

A. The next exhibit shows the working interest owner and tract identification and the ownership of each tract. This is taken from the Unit Agreement; one correction for Exxon's tract.

This shows what each -- who owns each tract and in what proportions they own each tract.

When you apply these fractions to the tract parameters, you then determine -- and then apply that to the formula, you then determine the participation under the two formulas and the two participation schemes that we've talked about.

The next page shows Phase I, Phase II, and Phase III percentage and the investment percentage under the Agreement formula and using the 1976 parameter values for each operator in the Unit. There are 74 numbered operators. I think maybe there are only 73 operators; some number is

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missing. But in any case, the working interest owners are shown on the left; their participation during Phase I is the first column; their participation during Phase II is the second column; the third column is their participation during Phase III, and the investment participation is shown on the right.

Highlighted are Exxon's percentages, which should agree with a few more decimal points, with the numbers we've earlier presented on all exhibits; 4.867 in Phase I, 4.396 percent in Phase II, 7.629 percent in Phase III, and 5.758 percent for the investment share.

Shell's are also highlighted, since we've used their numbers. They should agree with the earlier numbers.

And last exhibit shows the same numbers for each working interest owner, using the updated parameters which Exxon has developed for 1978 oil production rate and what we call 1979 primary oil reserves.

And these show the change in percentage which occurs for each working interest owner if updated parameters are substituted into the formula proposed in the Unit Agreement presented here today.

Q. All right. Now, for what purpose is the Exhibit Fifteen being submitted to the Commission?

A. If anybody's curious about how this af-

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feels their interest and their tracts, it's information, of course, that can be used to find out, and we believe this -- should the Commission, I guess, decide that they like this updating better than the other deal, they could take these percentages and do whatever they want to with them.

MR. ATKINSON: Mr. Chairman, I'm just about at the end of my direct examination, and I wonder if we might take a short recess?

MR. RAMEY: We'll take a fifteen minute recess.

(Thereupon a recess was taken.)

MR. RAMEY: The hearing will come to order. Are there any questions of the witness?

MR. DALIOUS: Mr. Chairman, we have two or three more.

MR. RAMEY: Okay.

MR. ATKINSON: First, Mr. Chairman, we'd like to notify you of a typographic error in our Exxon Exhibit Eight. Under 1978 oil production rate, barrels, instead of 180,000 for Exxon, it should read 188,000.

MR. RAMEY: On Exhibit Eight?

MR. ATKINSON: Under 1978 oil production

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rate, barrels for Exxon should be 133,000.

MR. RAMEY: Okay.

VOIR DIRE EXAMINATION

BY MR. DALTON:

Q. Mr. Nolan, referring back to Exxon's Five-A, Five-C, Five-D, did I understand you to say that Five-A reflected that under the proposed formula, that Exxon would lose approximately 200 barrels a day as opposed to its actual production rate?

That on Five-C Chevron, by the same process, would more than double, and that TP, by the same process, would increase substantially, perhaps 85 to 90 percent?

A. Yes, sir, that was my statement.

Q. Would you please state again why this would exist?

A. Well, this is due to the drastic changes, rather drastic changes that have occurred in the production parameters and the remaining primary recovery parameters which are used during the early phases of the formula, since the obsolete parameters determined in 1976 were determined.

The fact that the production rate has changed on these leases and the calculated reserve would no doubt change if it were recalculated, that has resulted in this rather remarkable difference.

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Q. Would you describe the 1976 production data as being current?

A. No, sir, I would not.

Q. If not, how would you categorize that data?

A. Obsolete. Out of date.

Q. In your opinion, based on such data, and applying Exhibits Five-A, C, and D, in your opinion is the old Shell formula fair and equitable and a reasonable distribution of hydrocarbons?

A. Not based on what the leases are now doing, it is not.

Q. I now refer you back to Exxon Eleven and Twelve. I want to be certain I understand what your testimony was with regard to both of those exhibits.

If I understood you correctly, on Exxon Number Eleven, the top line, using the total investment of $31 million, that the cost per barrel to Exxon would be $1.77.

A. Yes, sir, if we take the production that is allocated to Exxon during Phases I and II, 1,341,000 barrels is the calculated oil allocated to Exxon under the formula, with a $2,371,000 investment obligation, as shown below. That results in a cost to Exxon of $1.77 per barrel.

Q. All right, and on Exxon Number Twelve,

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that same number for Shell is 81 cents.

A. That's correct.

Q. Now that is a difference of 96 cents per barrel for oil, is that correct?

A. Well, that's a difference in investment cost; a cost of 96, yes, sir, 96 cents.

Q. All right. In your opinion, is that variance in investment cost under a formula using obsolete 1976 data a fair, reasonable, and equitable distribution of the payments of investment cost?

A. I think it is not. It just complicates an already bad situation.

Q. Now referring to Exxon Thirteen and Fourteen, there is a variance between Exxon's cost, investment cost of $1.38 a barrel, and Shell's of 84 cents a barrel.

A. Yes, sir.

Q. Now that difference is not so great. Did you not use the expression, the using of updated parameters would take some of the sting out of that?

A. Yes, sir, I -- it would reduce that discrepancy because it increases the oil production allocated to Exxon during Phases I and II.

Q. All right, I'll refer you back to one other question that was asked to you by Mr. Atkinson.

I believe he inquired into your opinion as

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to the length of time that it would take to recompute this data using updated parameters as opposed to 1976 parameters, and I believe you did not express your opinion at that time.

And I would like to re-ask that question in this manner: Assuming that the basic data has not been destroyed and is still available, what, in your opinion, would be the time necessary to recalculate on the basis of updated, current, 1978 or 1979 numbers?

A. Well, now on that basis, if the data is available, and could be updated as was done in 1976 when we talked about the additional eight months production, which was added, that work was done between the period of October 22nd, 1976, and November the 10th, 1976, because on October the 22nd certain decisions were made as to how those calculations would be made and Shell furnished the data then to the Technical Committee on November the 19th, a period of about three weeks.

And I don't see any reason why it would take much longer than that to recalculate, if the data is available and that stuff is still preserved.

Q. Okay. If updated parameters, in your opinion, would take some of the sting out of Exxon, as you stated, would you consider even that still somewhat inequitable?

A. Well, we --

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Even that.

We felt that the reliance entirely on remaining primary for the long period of time, ten years, to recover the entire primary, was not equitable because this is after all a secondary recovery program. When you go into it you are willing to take some of the risk or you don't want to go. There is secondary recovery even attributable to those owners who have a high percentage of primary.

MR. ATKINSON: Mr. Chairman, at this time Exxon moves to introduce in evidence Exxon Exhibits One through Fifteen.

MR. RAMEY: Exxon's Exhibits One through Fifteen will be admitted.

MR. ATKINSON: We pass the witness.

MR. LOPEZ: Mr. Chairman, at this time on behalf of Shell Oil I'd like to request a recess until tomorrow morning, whereby we can put on our cross examination and also a brief rebuttal witness.

MR. RAMEY: Any objections to the recess?

MR. ATKINSON: No objection.

MR. RAMEY: The hearing will be recessed until 8:00 a. m. tomorrow morning at this same place.

(Thereupon the evening recess was taken.)

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(Thereafter at the hour of 8:00 o'clock a. m. on the 4th day of October, 1979, the hearing was reconvened, with the same appearances and the same Commission members in attendance, at which time the following proceedings were had, to-wit:)

MR. RAMEY: The hearing will come to order, please.

Are you ready with questions for Mr. Nolan?

MR. LOPEZ: Yes, sir, Mr. Chairman, thank you. Good morning.

MR. NOLAN: Good morning.

WILLIAM E. NOLAN

resuming the witness stand, and being previously sworn upon his oath, testified as follows, to-wit:

CROSS EXAMINATION

BY MR. LOPEZ:

Q. Mr. Nolan, yesterday I believe you initially stated that you were very much involved in participating in the activities of the Technical Committee. As

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a matter of fact, I think you mentioned that you probably never missed a meeting of that Technical Committee, is that correct?

A. As I recall, yes.

Q. And would you also agree with me that there were twenty-two sessions that were fairly intense over a three and a half year period between July, 1973 and March of 1977?

A. I didn't count them but I'm sure there were that many meetings.

Q. And would you agree with me that the Technical Committee should be complimented for the excellent job performed with a very difficult situation?

A. Yes, sir, I do.

Q. Mr. Nolan, I'm going to hand you a couple letters, and I've marked an area in yellow on these letters. And first of all, I'd like you to identify the letter, if you would, for the Commission, and then I'd like you to read the language that I've marked in yellow.

A. This is a letter from Mr. J. M. Shepherd of Exxon Company to the United States Department of Interior, Geological Survey, dated June 9th, 1978.

And the highlighted area reads: "The proposed North Hobbs Grayburg-San Andres Unit Area was studied extensively for more than four years by technical

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personnel broadly representing area ownership. This study reasonably projects when and in what relative proportions remaining primary and secondary reserves will be produced under unitized waterflood operations. The graph and tabulated data developed from the study reflects this performance forecast."

Q. Thank you. Now I'd like to hand you another letter and ask you to identify it and read the same highlighted language.

A. This is a second letter from Mr. J. M. Shepherd of Exxon Company to Shell Oil Company, to the attention of Mr. W. E. Buck, dated February 16th, 1978. The highlighted area reads: "The North Hobbs Grayburg-San Andres Field was studied extensively for more than four years by technical personnel broadly representing the field ownership. This study reasonably projects when and in what relative proportions remaining primary and secondary reserves will be produced."

Q. It's essentially the same language, if not identical, to the earlier letter, is it not?

A. That is correct.

Q. And that was about six months later.

A. Yes, sir.

Q. Why is it, Mr. Nolan, that not until the time of this hearing have we been advised that the values as-

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signed the parameters on the Technical Report, to which Exxon apparently agreed, are not correct values?

A. The parameter values determined at the time the study was made are the best values which could be determined at that time and with the data existing to that point.

Earlier, Exxon did not take exception to the parameter values. On re-evaluation, based on more recent data, as opposed to the obsolete data, we have come to the conclusion that this data should now be updated and proper values assigned to the -- each tract.

Q. Why should we stop now five years -- five months into 1979? Aren't these values going to constantly change? Won't they be changing by December of this year or by the end of next year?

A. I would say they will change, but there is some limiting time under which you dedicate a lease to a unit forever; some limiting period where the more updated data should be used. You cannot go back five years and ten years ago and use data developed then to unitize now.

Q. Well, wouldn't you agree with me, and it's pretty significant, that over 90 percent of the people involved in this deal have agreed to the picture taken as of January 1, 1975?

A. Certainly your -- your ownership informa-

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tion presented earlier indicates some 90 percent have signed. What their various reasons were and what their situation is, I do not know.

Q. Okay. Let's go into the reasons why you believe the parameters changed. And in that connection I would refer you to your Exhibit Two, and ask you if you wouldn't agree with me that the increased production that you have described actually comes from Tracts 47 and 48 within the Unit Area?

A. Yes, sir, Tracts 47 and 48 have shown increase in production in access of that predicted by the Technical Study.

Q. I'd like for you to explain to me why this increased production has occurred. Did you go in and rework the wells or set new pumps? I'd just like to -- for you to explain to me what you did to these wells that got them to do what none of us thought they were going to do.

A. Submersible pumps were installed on two of the wells.

That increased the volume of artificial lift; increased the volume produced from the wells.

Q. Is that all you did to increase the volume?

A. Yes.

Q. And were there no pumps existing before that?

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A. There were sucker rod pumps, which did not have the capacity of the submersible pumps.

Q. How much was the capacity increased by the pumps?

A. The initial installation, the pump produced between 6 and 700 barrels of fluid a day. Prior to that time the producing rate was approximately 100-150 barrels of fluid per day. I'm guessing at that. I believe it was a very substantial increase in -- in fluid production.

Q I see. When you talk about substantial increase in fluid production, isn't it true that after you installed these submersible pumps that you increased the volume of water about four times, too?

A. The volume of water increased about in direct proportion with the total fluid of the wells.

Q And cannot this reflect the fact that all you are doing is accelerating your primary recovery by increasing your lift?

A. You are withdrawing at a more competitive, at a faster rate, from a given volume in the reservoir, and you will therefore produce more ultimate recovery from a well that produces at a higher rate. That's the name of the game.

Q. This is a fairly common practice in oil field management and operation, isn't it?

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A. Oil companies are quite competitive.

Q. And we're talking in this particular pool about a fairly lengthy primary life, wouldn't you agree? 35 or 40 years?

A. 45 years, yes, sir. If that volume is sustained for that period of time, there'll be a great amount of recovery made by that well as opposed to some other well on an offsetting lease.

Q. Okay. Now, I would like for you to refer to your Exhibit Five-A, and I must say that yesterday you left me with the impression that if unitization becomes a reality, Exxon would have to pay back all that additional oil production that's reflected between the solid line and the hatched line, or about 200 barrels a day, but that's not the case, is it?

A. No, sir, I did not mean to give anyone that impression. That merely represents what would have been the difference in production had the unit been formed earlier.

Q. But by increasing your lift volume, you have actually increased or accelerated your primary and those additional 200 barrels a day reflect money in the bank to Exxon even if unitization becomes a reality, isn't that so?

A. What Exxon's production has been in the past certainly is Exxon's.

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And the Feds, as well.

Q. Goes without saying.

A. Yes, sir.

Q. Now, Mr. Nolan, you'd agree with me that there has been water injection in the Amoco Unit for about four years, would you not?

A. I believe their injection started in early 1976, yes, sir.

Q. All right. And do you know whether or not the wells in that unit have responded favorably to water injection?

A. I have examined the overall production. There has been a substantial production increase. That production increase is due to several things. One is the change in allowable treatment. That has a very substantial affect. The early production increases were undoubtedly due to proration changes. There may be response. The gas/oil ratios are leveling out and perhaps going down. I believe it will be a successful flood, if that's the point.

Q. What has been your experience with the gas/oil ratio in your Tract 47?

Has it stayed the same or --

A. Gone down.

Q. -- gone down? It has gone down? Have you had an opportunity to examine any of the wells along the

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northern perimeter of the Amoco waterflood and found out whether or not they responded favorably or whether or not their gas/oil ratio has gone down?

A. No, sir, I have not. I have had the opportunity. I have not taken advantage of it.

Q. Well, would you agree with me that once a waterflood project is undertaken that it's pretty difficult at that point to go back to the drawing board and determine what the remaining primary reserves would be?

A. On the leases that will respond to waterflood it would be difficult.

Q. Mr. Nolan, yesterday I believe you explained that the unit participation formula, that was based on values assigned parameters that are no longer valid.

A. Yes, sir.

Q. And that in your analysis these could be updated fairly simply, by -- and I'm not quite sure how you came to your own calculations, but it seemed to be a combination of a decline curve analysis meshed with the computer simulation model, is that not correct?

A. That is correct, yes, sir.

Q. And this was to pertain to estimating the reserves in the San Andres formation, is that not so?

A. That is correct, yes, sir.

Q. Well, why didn't the Technical Committee

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in its deliberations agree to some kind of decline curve analysis rather than as we've discussed rely and insist upon the computer simulation model?

A. The San Andres portion of this reservoir has water influx. Decline curve analysis, straight decline curve analysis, as normally used, simply doesn't reflect what a well's reserves are. So the Committee was forced to use some method which provided for the movement of oil in the reservoir. As the water expands from the edges, it pushes the oil various areas in the reservoir. That was why we used a combined -- or I used a combination of the two methods. I have no way of doing this. This is only an approximation. It is fairly close, based on my experience, to what would happen if the simulation model were run. I do not claim, certainly, that this is an improved method. It is an approximation using only the data that we now have, and if the model were rerun, it would give results somewhat similar. The higher producing wells now would obtain greater reserves.

It was to show approximately where the oil would be produced under the updated and more recent conditions.

Q. But you would agree with me, though, that to use a decline curve analysis in a water-drive reservoir would have been laughable for -- to the Technical Committee.

A. They would not use a straight decline curve method for the San Andres, that's correct.

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Q Now, Mr. Nolan, I'd like to talk about the participation formula which has been presented to the Commission and that's contained in the Unit Agreement and Unit Operating Agreement.

You don't have any problem, do you, with Mr. Buck's explanation that it seems fairly reasonable that this kind of participation formula that allows those with primary reserves to recover those primary reserves first and put the risk of any loss or gain on those that have secondary benefits to be realized?

A. Yes, I do.

Q. Well, why don't you tell me what your problem is?

A. Personally, it is my opinion that relying entirely on the single parameter, remaining parameter, for a period of ten years, when in fact over fifty percent of the oil produced during that period is developed because of the secondary flood, it is not an equitable way to distribute the oil production to each and every lease in the tract.

Now, that problem has been wrestled for many meetings and the majority of the owners did not agree with me and did not agree with Exxon on that point. And Exxon, in my opinion now, may defer to the majority.

Q. Now let's turn to a discussion of the investment participation formula. First in this regard, I'd

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like you to explain why you think we seem to be so many miles apart. We've put up exhibits and calculations showing the initial capital investment to be $33 million, and Exxon's estimate is $100 million.

Could you explain why this big difference is there?

A. It has been our experience in San Andres waterfloods in West Texas and New Mexico that infill drilling is needed to get the maximum recovery. 40-acre spacing is not as effective. We believe that infill drilling will be required in this unit.

Now, we also believe that when we infill drill additional recovery will occur, and it certainly will be an investment that will be beneficial to all parties.

Q. Okay, but you'll have to agree with me here today, won't you, that what we've discussed with the Commission thus far does not provide for infill drilling, and what we've put before the Commission is the fact that this unitization project will be feasibly and profitable based on the data we've submitted to the Commission, and that does not include infill drilling?

A. That is correct. In that event, then all you will want to look at is our $31 million case and you would not want to look, or you would not want to believe, the $106 million case. That's your privilege.

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Q. And I believe yesterday's testimony showed that if infill drilling is indicated, it's going to have to stand on its own merit above and beyond what we have here today, right?

A. We have no -- no quarrel with that.

Q. But let's say even assuming that I agree with your $100 million figure without infill drilling, based on what we've done, Exxon still stands to realize a pretty substantial profit from unitization, wouldn't you agree?

A. Certainly, but however, we would like to also point out that the difference, the $1.71 per barrel paid by Exxon, still compares with the 84 cents per barrel paid by other companies.

Therefore their rate of return on the initial part of this thing is much higher.

That's the only point we wanted to make. It's simply that the investment formula is inconsistent with the allocation of reserves.

Q. You've brought up the next point I wanted to get into. Very good.

In that connection, I'd like you to refer to your Exhibit Eleven.

A. Yes, sir.

Q. Pardon me for standing up, but I think if I work closely with you on this deal, we might get to the

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bottom of my problem.

A. All right, sir.

Q. First of all, we are in agreement and do understand, don't we, that the unit agreement formula for capital investments in this project will ultimately be shared on the Phase III participation, or that which is actually the secondary oil, or added oil, made possible by this unitization, is that not so?

A. Yes, sir, that is correct.

Q. Okay. Well, if you -- if you'll look at your exhibit, and I'll just -- I first point to you that your -- Exxon's share of the total investment, of the $31 million, is $2.3 million.

A. Yes, sir.

Q. Right?

A. That's correct.

Q. Okay. And that, in order to get at that cost to Exxon of $1.77 per barrel, we divided the 2.3 million by the production of 1.3 million, isn't that right?

A. That is right.

Q. Okay. Then we go down here to the percent of the total investment share, or 7.3 percent, and if we multiply that figure, 7.6, I mean.

A. Yes, sir, 7.6 percent, right.

Q. Okay, and we multiply that times the total

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estimated recovery of 55.2 million barrels, we get a total estimated secondary recovery for Exxon of 4.2 million barrels, isn't that correct?

I'll be glad to supply a calculator.

A. I believe your number is approximately correct, that the future recovery after the end of Phase II, and during Phase III, when secondary operations, or secondary recovery factors become effective, after that point, Exxon's investment is -- or Exxon's recovery is some 4.2 million barrels.

Q. Okay. We're in agreement.

Now, let's see what it costs Exxon to have this secondary recovery. In order to do that, then, we would go back to your 2.3 million dollar investment, right?

A. Yes, sir.

Q. And we would divide that by the 4.2 million that you expect to get, and I've done the calculation so I want to know if you agree with me, that comes out to 56 cents per barrel, I think.

A. I believe that that would be correct and the point you're making there is that each and every party who has secondary recovery pays then exactly the same, 56 cents per barrel.

Now, during Phase I and Phase II, the parties don't pay on the same basis. After Phase III starts

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everybody pays the same. We have no complaint about that. We're not complaining about Phase III.

Q. Well, we have the readjustment date and we readjust everybody to the Phase III deal, don't we?

A. Everybody becomes whole at the beginning of Phase III.

Q. Well, what's wrong with that?

A. No problem with that. The problem is during Phase I and Phase II, when we're paying twice as much.

Q. Well. I can see your problem to a point but I don't think, Mr. Nolan, you're really fairly giving credit to those guys with more primary reserves who are being benefitted by this accelerated primary recovery made possible by the waterflood.

A. Of course, they're benefiting by the accelerated primary and they're paying nothing, only the interest on the money which they put up on the 58 percent during Phase I and Phase II. They're paying practically nothing to get that benefit, so they should share in some way in the cost. Which is my opinion.

They're also getting the benefit of the two-phase upper tier oil price and that type of thing, which is a benefit.

Q. A few final questions, Mr. Nolan.

You know, I'm -- I'm fairly amazed at what

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I have to consider is a fairly reckless approach by Exxon.

MR. ATKINSON: Mr. Chairman, excuse me. If Mr. Lopez wants to cross examine the witness I think that is perfectly permissible, but if he's going to use this as an opportunity for argument, then we would object.

MR. RAMEY: Would you like to rephrase that question?

MR. LOPEZ: I'd be glad to rephrase that.

MR. RAMEY: It appears you may be bordering on testimony and you're not sworn.

MR. LOPEZ: And I -- that's true.

Q. (Mr. Lopez continuing.) Let me refer you to your Exhibit Nine, Mr. Nolan.

A. Yes, sir.

Q. And I -- if I understand that exhibit, it reflects that Exxon feels that they will lose 377,000 barrels of oil, is that right?

A. Yes, sir, that's correct.

Q. Now, if you compare that amount of oil to the total estimated recovery of 55.2 million barrels of oil, which you agree can be recovered by secondary operations, that figure represents less than 1 percent, or .68 percent, of the oil we can get out of this project.

A. Yes, sir; however, that's 100 percent of Exxon's loss.

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Q Well, I'm not so sure it is. Let me understand why you think that's so, because if I compared the same figure, 377,000 barrels of oil, to the 4.2 million additional barrels of oil that you stand to gain from the project, that seems to be less than 9 percent of what you can get, and it seems to me you're risking 11-to-1 odds to forego this 377,000 barrels of oil if the project isn't put into effect.

Q Those numbers are not mutually exclusive. We believe that the project should proceed and that the secondary recovery is a benefit to everyone. We do not believe that Exxon's position will stop the project. If we believed that, then, perhaps there would be some different approach taken.

Q Well, I don't know what else is happening here today.

No more questions.

MR. RAMEY: Any other questions?

MR. ATKINSON: Mr. Chairman, I've got a brief redirect, if I may.

MR. RAMEY: Let me ask a couple of questions first, Mr. Atkinson.

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CROSS EXAMINATION

BY MR. RAMEY:

Q. Mr. Nolan, you have, as I see on your Exhibit Fifteen, you have four leases.

A. Yes, sir.

Q. Tract 43.

A. Yes, that's the Exxon State "A" Lease.

Q. All right, what's the affect of your proposal to that lease?

A. I believe that lease drops in participation under the updated parameters, sir. It has not performed as well as predicted by the Technical Committee compared to the other leases.

Q. So if we went to the '78 production figure, that lease would not --

A. Fare as well, no, sir.

Q. fare as well.

And then the next two are your Bowers Leases?

A. Yes, sir, the 47, Exxon Bowers "A" Federal, Tract 48, Exxon Bowers Federal Communitized.

Q. And those two, their participation would be increased?

A. Yes, sir, their participation would increase.

Q. And then the fourth one, which is your

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Grimes Lease, what's the effect on that?

A. Well, now that is a stripper lease, and the production has dropped substantially since the Technical Report was made, and under that -- under our estimate of future production, that lease drops very substantially in participation.

Q. So Mr Grimes would suffer considerably.

A. I'm afraid so, but Mr. Grimes -- that's his -- I mean we're protecting him as best we can.

Q. So two of your leases you would get an increase in participation and two of your leases you would get a decrease in participation.

A. That's correct.

Q. And you're concerned about the Federal government.

A. We're concerned about them all, sir. We just want to give them all fair treatment.

Q. You seemed to emphasize yesterday that this was a big Federal lease and most of the Federal participation in the unit.

A. That's correct. There are a total of 400 acres Federal leases. This is 320 of them.

Q. I just made a quick addition here. I took Conoco's leases in the Unit. I think they have five leases, and under the proposed participation they would have 9.3

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percent, and under your proposal they would have 12.8 percent.

A. Yes, the Conoco leases have in general shown production much in excess of the Technical Report prediction since made in 1976.

Q. And yet they're supporting the proposed formula.

A. Conoco proposed this formula and I suppose they're proposing it. I don't know whether Conoco's looked at those numbers.

Q. But they would -- their participation would increase.

A. Very substantially, yes, sir.

Q. And still they are willing to take their knocks to get the unit together, I assume.

A. If they overlooked it, I presume they are.

MR. RAMEY: Thank you. Any other questions of Mr. Nolan? Mr. Nutter?

CROSS EXAMINATION

BY MR. NUTTER:

Q. Mr. Nolan, when you're putting a unit together that has as many interest owners as this one does, isn't it logical that at some point that you have to arrive at a cutoff point and start your circulation of the petitions,

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or the circulation of the ratifications to the operators, based on information that you've had up to that time.

A. Yes, Mr. Nutter, that's correct. There must be a --

Q. Well now, isn't it also true, Mr. Nolan, that by the time you have circulated 905 royalty owners and 90 working interest owners, that a certain passage of time would have gone by, and by then someone will always pick up some new statistics and come up with some new parameters that would change what you just finished circulating.

A. Certainly that is right. There has to be some period, some reasonable period of time, but beyond some reasonable period the updating may be needed.

Q. But you always have to cut it off at some point.

A. At some point, yes, sir.

Q. So you'll have the numbers that you can send out to people so they can look at it and sign it.

A. That is certainly -- that is certainly right.

Q. Now, on your Bowers lease there, the production took a dramatic increase back in 197 --

A. Yes, that's Exhibit Six.

Q. It took a dramatic increase back in 1977; to what is that increase attributed, Mr. Nolan?

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A. There were two REDA pumps installed on the Bowers Lease on Well No. 2 and Well No. 3.

Q. And are those the only wells that have shown increase in production?

A. Those are the principal ones; others have shown slight increases, but those -- that is where the principal increase comes, is from those two leases which both produce from Zone 1, which is the main production interval, primary production interval, and withdrawing at the higher rate just has made this lease much more competitive.

Too bad Exxon didn't do it earlier.

Q. Now those are -- those are producing up to top allowable, I presume.

A. Yes, sir, those are both --

Q. Allowable --

A. Those are both producing up to top allowable and one of those leases is only able to produce five days a month, and it makes its allowable. It produces at a rate in excess of 500 barrels per day with the REDA pump.

Q. Well now you have also on your Exhibit Six shown the reflection of that in the production as the yellow line, and you've also shown it as an increase in reserves. Now, isn't it often true that when you put in new equipment in a well, that you have a temporary increase in production and then the production declines back to the original decline

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curve, and that you won't have the production decline curve going out there ad infinitum that high above the original decline curve?

A. Well, we can only look at what's happened in the past two years. That's a little more than just a short period of time. This lease has held -- these wells have held this production for the two-year period, from the middle of 1977 on. They show no signs of declining.

Q. And those two wells are producing from Zone 1 of the San Andres?

A. Yes, sir.

Q. So the production from those two wells is not going to affect the secondary recovery from the lease?

A. No, sir. That is not secondary recovery. All of that is primary, remaining primary oil, from the main primary zone.

Q. I see.

And you feel that you're increasing the reserves under the lease by installing these two pumps?

A. We're increasing the reserve from those two wells at the expense of some offsetting leases, yes, sir. It's just becoming more competitive. It's which wells get the oil. The reservoir production of the total reservoir will not be increased; the reserves should not be increased

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by this.

MR. HUTTER: I believe that's all. Thank you.

A. Yes, sir.

REDIRECT EXAMINATION

BY MR. ATKINSON:

Q. Mr. Nolan, I have a couple more questions on redirect.

First of all, I'd like to clarify something. Exxon is not suggesting that the decline curve method you employed to approximate the simulation model should be used by the Commission or by the Technical Committee to re-evaluate reserves, are they?

A. No, I am not. I just said it is an approximation, and I think I was very conservative, using an 8 percent decline, 8-1/2 percent decline on it. This lease is in the dead center of the reservoir; the best producing area in that reservoir. And we assigned an 8-1/2 percent decline to it when the overall production decline is 6 percent. There's no reason to believe it shouldn't decline at a rate even slower because of its central location in the reservoir.

Q. What I want to get at, though, is that Exxon is not suggesting that the simulation model is not

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correct?

A. No, the simulation model we feel would be the better method of doing it.

Q. So that what you're proposing is that the new data be input into the simulation model and see what it generates, is that correct?

A. Well that, we would certainly agree to that type of thing, but we can't force anybody to do that.

Q. Now, Mr. Lopez, sort of inferred that somehow that Exxon's installation of artificial lift in 1977 and the corresponding increase in production is some how unusual, and that wells won't change like that, ordinarily, unless you do something special.

Now do you know other wells in the proposed unit that have had -- demonstrated sharp increases over short periods of time?

A. There have been quite a number of cases through the years where there've been dramatic changes from one month to the next and then those changes were sustained for periods of -- long periods of time and this type of reservoir, where you have a large hunting ground, you have Zone 1, Zone 2, Zone 3 Upper, Zone 3 Lower, all of which will produce top allowable in some parts of the reservoir.

You have open only parts of those zones, so that you have opportunities to work over wells, get into

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new zones, put on artificial lift, stimulate wells, all those good things that oil companies are supposed to do.

Q. All right. Well, now I'd like to refer you to what has been marked for identification as Exxon Exhibit Number Sixteen.

MR. ATKINSON: Mr. Chairman we only have one copy of this, so I'd like to circulate it to opposing counsel and then to the witness and the Commission, if I may.

Q. (Mr. Atkinson continuing.) Mr. Nolan, looking at Exhibit Sixteen, could you please identify that and explain what that is?

A. This is a data graph showing the producing history of the Shell "D" Lease, located in Section 24, Tract 29.

It shows the production rate in barrels per day versus plotted against time from a period 1960 through April, May, of 1979, and then it also shows an extrapolation made by the Technical Committee as to the future reserves on this lease.

Q. Now is there anything unusual about that curve or anything that meets the eye?

A. Well, there is a dramatic increase in production on this lease from a rate of about 20 barrels per day in 1973 to a rate of 120 or 30 barrels per day in 1974.

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That lease has shown a decline since that time of 16.6744 percent per year from the period -- I'll take that back. It's not that accurate. About 16 percent from 1976 to the present time.

Q. Now, in your expert opinion had the Technical Committee formulated the formula that's presently proposed and put it into effect using the same parameters, current production, et cetera, in 1973 before that dramatic increase was shown, would Shell's allocation of reserves have been substantially less?

A. Very substantially less, yes, sir.

Q. So it's really just a question of where you end up at the time that the data is cut off then, isn't it?

A. That's the unfortunate part of it, yes, sir.

Q. But your feeling is that it must be cut off at some point.

A. Yes, and Mr. Nutter's perfectly right. You must cut it off sometime.

Q. Now, I have one other question for you regarding the investment formula.

Mr. Lopez has suggested that the 100 million dollar figure may be a little bit preposterous. Have you had any experience or knowledge at all of the Wasson Field? (sic

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A. Yes, I have.

Q. And who is the operator?

A. Shell.

Q. And realizing that you have no exact figures in front of you, could you give us some idea of what additional costs have been incurred, investment costs, by the use of infill drilling in that field?

A. Well, as you say, I don't have the data, but as I recall, initially that waterflood was designed as a peripheral flood with a very modest investment as it started out. I'd say perhaps less than the investment that is predicted -- is estimated for this field, for this Unit.

Q. Less than $33 million?

A. Yes, I would say so, because it is peripheral with just converting the initial wells which wasn't a great deal of investment.

Now that was quite a few years ago.

Q. What has happened to the total investment to this date, to the best of your knowledge?

A. This always appears on Exxon's budget as one of our large items. Shell has drilled down to 10-acre spacing in many parts of that field, all being justified and all being profitable and all yielding additional recovery. I'd say that we've drilled 4 or 500 wells at least in that field. Investments have been in excess of $100 million.

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Q. I'd also like to clarify one other point, which I believe you stated in your cross examination, but Exxon's problem with the formula, with the investment formula and the participation formula, really is not Phase III at all. It's only in Phase I and II then, is that correct?

A. Yes, that's where the problem lies.

Q. And also, as to the purportedly insignificant loss to Exxon of 377,000 barrels, just to clarify this once again, approximately what percentage is that of the total projected Exxon recovery?

A. The total projected Exxon recovery, both primary and secondary, is 5 million barrels, so that is only 6 or 7 percent of the total projected.

Q. Would you consider 377,000 barrels to be insignificant in your opinion?

A. No, sir, not in my opinion. 377,000 barrels is 377,000 barrels regardless of what your total is.

MR. ATKINSON: We have no further questions Mr. Chairman.

MR. RAMEY: Any other questions of the witness? He may be excused.

MR. NOLAN: Thank you.

MR. RAMEY: Do you have anything further, Mr. Atkinson?

MR. ATKINSON: No, sir, we don't have any

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further witnesses.

MR. RAMEY: Do you have anything further, Mr. Lopez?

MR. LOPEZ: Yes, sir, Mr. Chairman. I have a couple or three rebuttal witnesses.

I'd like to call Mr. Miller. If you could give us a second, we'd like to put up a couple of exhibits.

MR. RAMEY: Are we ready? Please proceed.

WILLIAM C. MILLER

being called as a witness and having been duly sworn upon his oath, testified as follows, to-wit:

DIRECT EXAMINATION

BY MR. LOPEZ:

Q. Would you please state your name and where you reside?

A. My name is Bill Miller and I reside in Houston, Texas.

Q. Mr. Miller, by whom are you employed and in what capacity?

A. I'm employed by Shell Oil Company as a Senior Staff Reservoir Engineer in the Mid-Continent Division.

Q. Have you previously testified before this

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Commission and had your qualifications made a matter of record?

A. No, I have not.

Q. Would then you briefly describe your educational and employment background?

A. I graduated from Stanford University in 1950 with a Bachelor of Science degree in petroleum engineering. In that year I was employed by Shell Oil Company in Los Angeles, and I worked as a Division Reservoir Engineer in Bakersfield and Farmington, New Mexico, until 1960.

I then had special assignment in Shell's Production Research Laboratory in Houston, and with Shell in the Hague in the Netherlands until 1965.

This was followed by four years Area Engineer, responsible for Shell's California Supplemental Recovery Engineering. This included thermal, miscible (sic) and waterflood projects.

During the Hobbs Primary Reserve Study, discussed in this hearing, I was the supervisor of miscible flooding and reservoir simulation research at Shell's laboratory in Houston.

In collaboration with Shell's representative on the Technical Committee my staff and I analyzed the excellent data compiled by the Committee and made the computer runs.

I attended several Committee meetings in

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Midland and Houston to explain the nature of the math model, the key factors that were bound to affect the final answer, and to inform them of our progress.

During the past two and a half years I have been responsible for Shell Oil's engineering and pilot testing of enhanced oil recovery in the huge Denver Unit in the Wasson Field, West Texas. The productive measures there are also the San Andres formation.

More recently, in cooperation with Mr. Lancaster, I've analyzed the past two and a half years production performance for the Hobbs Grayburg-San Andres Pool, and related it to the previous reservoir simulation study results.

Q. Then I take it you are fairly familiar with Shell's application in these cases, 6652 and 6653?

A. Yes, sir.

MR. LOPEZ: Mr. Chairman, are the witness' qualifications acceptable?

MR. RAMEY: He is considered qualified, Mr. Lopez.

Q. (Mr. Lopez continuing.) Mr. Miller, could you explain why you became involved in the North Hobbs Unitization Project?

A. The Technical Committee contacted me at the --- Shell's Laboratory and informed me that other methods

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to determine the important parameter of primary reserves had failed, and they wanted to know if it could be done by means of the math model.

I examined the -- all the data that the Technical Committee had compiled, thought about the nature of the problem, and concluded that indeed the math model would be suitable for this purpose.

Q Would you briefly describe what was involved in the study you did for the Technical Committee?

A Well, the complete summary is set forth in the Technical Report on pages 26 to 30; however -- which was introduced as an exhibit in this hearing.

Briefly, we represented the entire Hobbs Grayburg-San Andres Pool, north and south, with a grid system consisting of 600 distinct blocks. Based on the Technical Committee's data, we assigned properties to each one of those blocks, the thickness, the porosity, the structure that was involved, the gas/oil contacts, and the water levels.

We likewise assigned pertinent properties to each one of the individual wells in the pool, such as what zone it had been completed in, reconditioning data, and of course, the oil production.

Q And then what did the computer do?

A Well, the computer then automatically cal-

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culated the performance of each zone, the water influx, finally getting to the answer, which amounted to each well's individual pressure, its water cut, its gas/oil ratio, and its productivity.

The values I mentioned then were matched to the actual data as reported. Adjustments were made to the model to match these parameters ever more closely.

For instance, the location and strength of the water influx was an important adjustment parameter in Zone 1 production. The water drive was an important part of the performance of those wells.

When a close match was obtained, we then in the Committee felt confident in using that model for predicting the future reservoir performance.

Q. And it was accepted as the method of going about it, wasn't it? At any rate --

A. Yes, indeed.

Q. Did the Technical Committee establish any specifications for predicting oil and gas reserves?

A. Yes, they did, and most importantly, we decided that each well in the prediction would retain its existing completion interval. There was to be no credit given for possible future acid stimulation, for instance. There was no credit to be given for possible future completions of oil that was currently behind pipe and had never

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been opened up. There was no credit to be given to installation of high volume equipment, et cetera, a change in the productivity of the well.

In addition, we decided that to get the purely primary reserve estimate we would have to ignore the anticipated influence of the water injection of Amoco's waterflood in the south, and so indeed the primary reserves in the absence of waterflood were also calculated for all the south at the same time, in the absence of waterflood.

We recognized that there was excess capacity in the top allowable wells; that there were wells that only had to produce for a fraction of a month to make their oil production, and this was included, and the difference between those wells and the wells that were producing to capacity was recognized.

A well economic limit of 3 barrels per day was adopted or a 99 percent water cut, whichever came first, and the prediction was terminated way out in the future at the beginning of year 2025.

Q. What efforts were made to insure that the Technical Committee members fully understood the computer simulator program?

A. Very early in the game, at the January, '75 meeting of the Technical Committee in Midland, I attended and informed them of the type of model that was to be used,

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the grid system and the approach that was going to be used and the progress we had made at that time.

I met with them several times leading up to a meeting in October, 1976, in which in the call for the meeting the chairman of the Technical Committee asked especially that the people attending that meeting the representatives of the working interest owners, bring along a computer expert who could delve more deeply into the workings of the model.

We received numerous -- during all this, we received numerous suggestions, some corrections to our data, and all these were incorporated into the study, and finally, after the study was done, we specifically invited, if people wanted and still had questions, that they could come to the Belair Laboratory there in Houston and interrogate us personally and look at the output in detail.

Conoco and Skelly, now the Getty wells, took advantage of that and we met with them in our laboratory.

Q Today, looking back, what is your opinion as to the success of your computer simulation model?

A Well first, I do think we took into account all of the important factors that exist in the actual production of that big field.

More recently I compared the projection of the simulated oil production with the actual production to

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date of the many tracts in the -- in the North Hobbs Unit, and in general, the overall agreement is good.

Now these are the tracts that have San Andres production. You recall the San Andres alone was the target of the simulation study.

There were tracts where operational changes showed deviations from the simulator prediction. Now, this certainly would not have surprised anyone in the Technical Committee, because this was all discussed when we set the restrictions on the fact that, as I mentioned before, that we would use existing completions and -- and degree of stimulation in making the prediction.

So in any case where additional work was done, why indeed it would not be surprising to me or to any other member of the Technical Committee that the oil production may be above the predicted trend.

Q. Did you have the opportunity in evaluating the performance of your computer simulation to study the Exxon tracts?

A. Yes, I did.

There are four tracts involved, as we talked about just a little while ago. The first is a Grayburg Well tract, which was not involved in the simulation.

The next two are single 40-acre tracts, and indeed one is above prediction and one is below.

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The fourth tract has San Andres production from seven wells and indeed, substantially deviates from the computer prediction.

Q Was this last tract that you just mentioned Tract 47, and in that connection I refer you to Exhibit Number 35, and ask you to explain it?

A. On Exhibit 35 I've plotted the barrels of oil production from Tract 47 on one axis versus the time on the other one, starting at the beginning of 1975 and with data, actual data, up till and including May of 1979.

The actual production is shown as the jagged line. The computer history match and projection and prediction of reserves of the oil rate is shown here as the smooth line.

In making the original history match Tract 47 indeed was always a problem. Back in the history match period the production, oil production decline, of this tract over two and a half years preceding, was at a rate of 25 percent per year, and indeed, looking at the other tracts in the Unit, the top allowable tracts had no decline, and the majority of the other tracts typically would have a decline that was three or four times as small as the 25 percent that was being experienced on the Exxon tract.

The productivity was declining precipitously. If someone had indeed projected that decline rate at 25

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percent, they would have shown in a line as I've shown in green here, which as you can see, would have been far below the computer projection.

The actual match of the gas/oil ratio and the oil cut at the time of the history match, actually was quite good. What was unexplained was the rapid productivity decline in that period.

Well, indeed, as brought out, Mr. Nolan suggested using 25 percent or any other decline curve for these tracts. We did it with the computer. And this was the projection that the computer gave us under the constraints that I've mentioned earlier.

Now, as you can see, starting here in the middle of 1977 the actual production has exceeded what was projected. Now, in looking at the production figure, not only of oil but also of water during this time, you find that the water production has risen from about 250 barrels a day at the time we made the history match to nearly 1000 barrels a day now. The water production from this tract has been increased nearly four times.

Now it's obvious from looking at this that the increase in oil production has by no means been the factor of four. The increase in oil production has been considerably less. This means that the oil cut of this tract is considerably less than it was, so that the rise in oil and

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the rise in water have not been proportionate. A lot more water proportionately taken out than there was oil.

Q. Have you analyzed this decline in the oil cut, and in that connection I refer you to Shell's Exhibit Number 36, and ask you to explain it?

A. Exhibit 36 is a plot of Exxon's Tract Number 47. Primary reserves, as predicted by the simulator. To get a handle on this, we plotted the remaining reserves in barrels along the bottom axis here, starting as the simulator indicated for this tract, at over 1.2 million barrels for the Exxon's Tract Number 47.

On the other axis I've plotted here the percent oil cut. Now this is the percent of the total gross production that is oil, the remainder being water. I then plotted from the simulator three points: The water cut that was predicted was actually measured, on which we made our history match, in August of 1976. I plotted what the simulator predicted would be the oil cut at the first of 1980.

Q. Those points are marked on the exhibit?

A. It's marked in red. The first one is marked with a yellow square; the second with a red circle.

And finally, we have a yellow circle around what the simulator predicted would be the oil cut and the amount of oil that would be remaining as a primary reserve at the beginning of 1990.

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The dashed line then connects these three points and is the simulator's prediction back in 1976 of what the oil cut performance should be as we withdraw oil from the Tract 47.

The next thing I did was to superimpose the actual data, and in this case the yellow square which lies on top of the line is the actual oil cut that was experienced at the end of the history match, the beginning of the prediction.

At the present time there has been 475,000 barrels of oil produced out of Tract 47 in the two and a half years since the prediction, so against that point I have plotted the actual made 1979 oil cut of Tract Number 47, and outlined it in a blue square.

Now the first thing you notice is that the blue square falls on the prediction that was made by the simulator, so for this amount of remaining reserves the oil cut is just what the computer simulator would have expected.

The second thing you notice is that it, this point, May, 1979, is further from here than we thought we would be in 1980, based on the productivity of the well, as demonstrated by the actual data at the end of the history match.

So what we have here is an acceleration

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of the remaining primary reserves, which has led us down further on the oil cut, and so it's completely consistent with what the simulator had expected and predicted.

The comparable points are shown over here on this graph.

Q. On Exhibit 35?

A. On Exhibit 35.

Q. Would you then dispute Exxon's contention that the computer simulator does not accurately project Exxon's remaining primary reserves in Tract 47?

A. Yes, I would. To me, this analysis indicates that what we are looking at in the case of Tract 47 is a classic case of pure acceleration of oil reserves, and by acceleration, I mean the fact that where you are getting to the same oil reserves, but you're running faster to get there; in this case producing four times the volume of water in terms of barrels per day than we would of otherwise.

Q. Finally, Mr. Miller, you have heard Mr. Nolan's testimony that in his opinion it would be possible to update the parameters by plugging in new production data. What is your opinion?

A. I don't think that this would be practical or worthwhile. To be consistent with the definition of primary reserves it was agreed by the Technical Committee

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that the simulator forecast for all the San Andres wells in all the reservoirs would not include the influence of a water injection project being installed in the south by Amoco.

Under this contraint Amoco's Unit's San Andres primary reserves without the waterflood at the end of 1976 were determined by the computer to be about 9 million barrels. This was about 1/4 of the corresponding primary reserves in the northern portion. Water injection since that time by Amoco has definitely mobilized secondary recovery oil, benefiting not only the Amoco Unit producers, but also numerous wells within the proposed North Unit.

As a consequence, the oil production on Amoco-operated properties in the Hobbs Pool has steadily increased from the purely primary recovery rate of 1700 barrels a day in 1976 to nearly 5000 barrels per day by water injection now.

It's tripled.

The map labeled Exhibit 37 shows the location of the responding wells on the North Unit. Also shown is a portion of Amoco's South Unit. The tier of 40-acre tracts that lies just to the south of the North Unit. At the time that we made the history match, there were 52 oil wells in this area that were capable of making 65 barrels a day or more. Now, as expected after two-and-a-half years

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of primary production, 40 percent of those, or 21 wells, can no longer make this good oil rate, and I've indicated those and highlighted them with yellow as the minuses on the map.

This leaves 31 wells that were good oil producers that are still good oil producers, and those I have indicated by the symbol "OK". Now, I should point out that some of the "OK's" at the time of the simulator study were top allowable 80-barrel a day wells. Those, for instance, this one located here on the South Unit that juts into the North Unit is now making 300 barrels a day, due to transfer of allowable.

The next feature of the graph are 24 wells indicated by the red plus, that were not making 65 barrels a day at the time we made the projection that are making 65 barrels per day now, and over, and indeed, some of them make as much as 400 barrels a day.

Now I would point out that the concentration of these wells adjacent to the next line down here, which is the water injection, where the water injection begins in the Amoco South Unit. Now, we have previously emphasized that the clear-cut nature of the rules that were adopted 2-1/2 years ago by the Technical Committee in the simulator estimation of each well's primary reserve. Now, due to the above-mentioned response to water injection, and the high

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withdrawals in some wells adjacent to the North Unit Wells, a fresh redetermination of primary reserves in a portion of the North Unit is no longer feasible. All the portion of the North Unit affected by these, you can no longer determine primary reserve, and the portion of that North Unit that is so affected, and where you cannot determine primary reserves, is increasing every day.

In a new study it would be necessary to somehow separate many wells recent oil production into a primary fraction and a secondary recovery contraction. Then it would be necessary to obtain the Technical Committee's agreement to the admittedly arbitrary split that would be involved in each well. Furthermore, the increasing water cut would also have to be apportioned. Part of the water now could originate in the aquifer, part of it can originate from the water being injected in the South Unit, and part of it is affected by the re-adjustment of the flow lines from the aquifer due to repressuring of the South Unit.

And finally, although the field-wide and multi-zone model was well suited for estimating strictly primary recovery from the entire San Andres, it's not suitable for analyzing pattern water injection. As we testified earlier, for evaluating supplementary recovery, we made a separate simulation study, using a much more detailed grid system but covering a smaller area, only the San Andres Zone

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III Lower. This productive area covers only about three square miles.

It's evident that the 1976 time period in which primary reserves were determined and agreed upon by the Technical Committee have unique advantages. Production trends were well established and the response to water injection had not yet occurred. Any re-evaluation at this time, in my opinion, would necessarily be less definite, it would be less consistent, and it would probably be less universally acceptable to the working interest owners.

MR. LOPEZ: No further questions.

MR. RAMEY: Any questions for Mr. Miller?

MR. ATKINSON: Mr. Chairman, could we ask for a short recess to consult with my expert here?

MR. RAMEY: Certainly. We'll take a fifteen minute recess.

(Thereupon a recess was taken.)

MR. RAMEY: The hearing will come to order. Any questions?

MR. LOPEZ: Mr. Chairman, before we get into cross examination, I'd like to tender on behalf of Shell Oil Company Exhibits Thirty-five, Thirty-six, and

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Thirty-seven into evidence.

MR. RAMEY: Chalk Exhibits Thirty-five through Thirty-seven will be admitted.

MR. ATKINSON: As long as we're at it, I'd also like to tender Exhibit Sixteen for Exxon.

MR. RAMEY: Exxon Exhibit Sixteen will be admitted.

Now, are there any questions for Mr. Miller?

CROSS EXAMINATION

BY MR. ATKINSON:

Q. Mr. Miller, I just have a very few questions for you.

First of all, with regard to the rules, as you called them, adopted by the Technical Committee that acidizing of wells and reworking of wells were -- that it was assumed that the completion intervals remained the same, I think is the way you put it, by the Technical Committee.

A. Yes. Yes, sir.

Q. Okay. Now, those rules were for purposes of simplifying the model, were they not?

A. No, sir. They were -- the purpose of them was to get a uniform and across-the-board fair way of -- of making extrapolations of future reserves, based on, you

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know, firm data, not on what persons might have in the back of their mind some years later.

Q But there's no prohibition against reworking wells, for example, was there?

A. No. It was recognized that there be all sorts of that going on.

Q In fact, Shell reworked some of its wells during the same period, did it not?

A. Yes, after the -- after the study period.

Q After the study period?

A. Yes.

Q There was no prohibition anywhere in the rules adopted by the Technical Committee which would have prohibited installing artificial lift on wells, either, was there?

A. No, sir. The purpose was to get a percentage that would be fair and then would be applied to whatever future acceleration or increases were made.

Q All right. Now, with regard to -- with specific regard to the Exxon Bowers Tract 47, or the Exxon Tract 47, you spoke about the waterflood in the Amoco Unit to the south. Now you're not suggesting that the increased production from the Exxon Tract 47 was as a result of a waterflood in the south, are you?

A. Not yet.

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Q. I'm sorry?

A. No, not yet.

Q. Now you also stated, I believe, -- I'm going to refer you to what has been marked for identification as Exxon Exhibits Five-B, Five-C, and Five-D. I'm sorry they're not marked. Do you have those with you?

A. Yes, sir, I have.

Q. Oh, okay, good. Have you reviewed these?

A. Yes, sir.

Q. All right. Now, you stated in your direct examination that you did not think it would be worthwhile to update the information available through the -- now available, in order to update the parameters, and the basis of your statement, I take it, is that based on the exhibits that you presented through your direct examination.

Now, in view of the great discrepancy between the performance that was forecast for Texas Pacific and for Chevron, and in view of the great discrepancy that did exist for Shell up until 1978, between what was projected and the actual production, isn't it a rather strange statement that it is not worthwhile to update the information?

A. No, I don't think so. There are leases; in my review I found that are producing below prediction. As far as the other people's leases, I can only infer that this looks very typical of a case where the operators are looking

forward to unitization, where they have wells that they intend to use as key wells in the waterflood in the deeper zones, II and III, and where they do not, therefore, intend to make major investments and to jeopardize that well by doing work on it prior to the unitization; in their judgment that they're not looking to accelerate the primary reserve. The reason I infer that is that certainly has been Shell's case. With impending unitization, that we've not taken steps to try and accelerate this 45 years of dwindling reserves. We've concentrated on getting ready for the waterflood.

Q. Now, with regard to Shell, however, I notice that as far as actual production, you see Shell is essentially gearing down now in preparation for unitization, yet up until 1978 Shell's actual production was exceeding what it was to be permitted under the unitized formula.

A. We are not gearing down. I say there are opportunities for doing well work that we have not taken, and indeed, as you point out, with the long term projection of reserves, to take into account 45 years, that it's misleading to look at a few, you know, 2-1/2 years productio and compare our 24.123 percent that covers the whole 45 years and compare it to what we've actually done.

Q. Now with regard to the possibility of updating, something that was not clear yesterday and is

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still not clear in my mind, at least, Shell does have the simulator program available, does it not?

A. Yes, it does, and all the data is still intact.

MR. ATKINSON: We have no further questions, Mr. Chairman.

MR. RAMEY: Any other questions of Mr. Miller? He may be excused.

MR. KILPATRIC: We'd like to recall Mr. Buck to the stand. It will be very brief.

W. E. BUCK

being recalled as a witness and having been previously sworn upon his oath, testified as follows, to-wit:

REDIRECT EXAMINATION

BY MR. KILPATRIC:

Q. Mr. Buck, you have heard Exxon state that the method of allocating Investment Expenditures was not fair and reasonable, haven't you?

A. Yes.

Q. Why do you believe the allocation formula adopted in the Unit Agreement is fair and reasonable?

A. As previously stated, there exist considerable differences between the tracts and their relation-

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ship to the amount of remaining primary oil reserves and the amount of secondary oil reserves contributed to the unit. Some tracts have a high primary share and a low secondary. Others are just in the reverse, but all tracts are benefited by an acceleration and assurance of the primary reserves contributed and the recovery of secondary reserves.

To relate these benefits and to compare the benefits among parties, the actual profit to be earned by each party must be considered.

Total profit to be received is the added profit made possible by unit operations and the program of water injection. That is, if the profit a part would realize from continued primary operation without a water injection program is subtracted from the total profit to be derived from unit operations and a program of water injection, the difference would represent the added profit made possible by the unit and a program of water injection.

If the added profit should provide all parties with about the same return on their added investment, then the method of allocating costs would be in line with the benefits and would be considered fair and reasonable, in my opinion.

Such a method of relating or comparing the profit positions of the working interest owners was submitted by letter of January 24, 1978, to the working interest

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owners.

Q. Would you explain the method of comparison that you just referred to, and in this connection I refer you to Shell's Exhibit Number 38?

A. Most companies analyze their investment prospects and potential profits on a present value basis. That is to say that all income and expenditures are valued at their present worth, or discounted at a fixed percentage rate.

By discounting all monies, income and expenses, and expenses including capital, profit is determined on a present value basis. Now, on Exhibit 19, which has previously been submitted, we showed a discount rate of 10 percent, and that is the same discount rate we have used in this exhibit.

The first graph here of the exhibit, as presented on the wall, is a plot of the percent rate of return of all working interest owners that would have received from Unit operations had operating expenses been based on the phase-in-effect Unit participation -- that again is operating expenses -- and the capital expenses were allocated initially on the basis of their Phase II, or primary participation, and then adjusted to Phase III secondary participation at the Investment Readjustment Date. This, as I said, is a plot of their added profit. The vertical scale is the percent present

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value added profit due to the water injection project or the present value of the added profit divided by the present value of added investments.

For the purpose of this comparison all parties are assumed to receive the same price for oil sold. This may not be true as oil is priced by the Department of Energy, but it is the only way the sensitivity to the method of investment can be compared.

The horizontal scale on the exhibit is the ratio of a party's Phase II, or primary participation, to his Phase III, or secondary participation.

In order to get a reasonable scale on the bottom, this is plotted, the ratio is plotted, or expressed, I mean, as a logarithmic function, but it's still the same, being a ratio.

What the exhibit shows is that the percent profit of a party with a low Phase II primary reserve and a high Phase III reserve would be -- now this is plotted to the left of the zero line. I'm not sure you can see, the zero line runs up here. The plots I'm talking about now are here. Whereas the percent profit of a party with a high Phase II, or primary, and a low Phase III reserve is plotted to the right of zero.

As you will note, the parties to the left of zero would receive a relatively high rate of return on

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their money; whereas those parties to the right would receive a considerably lower rate.

Now, if the investments are shared completely on Phase III from the beginning, as shown here by this second overlay, this procedure has been followed, I believe, Exxon might be familiar with their Robertson Field Unit, Gage County, Texas, this procedure is that, the percent profit or rate of return reverses; that is, the parties on the left now receive a relatively low rate of return, and the parties on the right enjoy considerably higher rate of return.

The last overlay is based on the method of cost sharing as stated in the Unit Agreement. That is, the investments are based on a weight of 42 percent primary and 58 percent secondary participation. Here you will note that all parties receive about the same rate of return, not exactly the same, but within a reasonable range.

As this is a rate of return for added profit, and it takes all parties to make the added profit possible, it seems fair and reasonable that all should receive about the same rate of return from the added recovery, and the formula proposed provides such a condition.

Q Thank you, Mr. Buck. Was Shell's Exhibit Number Thirty-eight prepared by you or under your supervision?

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A. It was, yes.

Q. Thank you.

MR. KILPATRIC: Mr. Chairman, we'll offer Shell's Exhibit Thirty-eight into evidence at this time.

MR. RAMEY: Exhibit Number Thirty-eight will be admitted.

MR. KILPATRIC: Thank you. No further questions.

MR. RAMEY: Any questions of Mr. Buck?

MR. ATKINSON: We have no questions.

MR. RAMEY: He may be excused.

MR. LOPEZ: Mr. Chairman, that concludes our rebuttal.

MR. ATKINSON: Mr. Chairman I would like to -- I realize it's a bit irregular, but if possible, I would like to recall Mr. Lancaster.

BILL LANCASTER

being recalled as a witness and having been previously sworn upon his oath, testified as follows, to-wit:

RECROSS EXAMINATION

BY MR. ATKINSON:

Q. Mr. Lancaster, yesterday I believe you testified that you were and are the Chairman of the Technical

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Committee, is that correct?

A. That's correct.

Q. And I believe you also testified that in your opinion the Unit Agreement proposed by Shell allocates hydrocarbons to various tract owners in a fair and reasonable method or manner, also, did you not?

A. I don't remember, but I agree with that.

Q. All right. Now, the distribution of hydrocarbons to the various tracts as reserves on the simulation model was accomplished prior to November 17th and 18th, 1976, I think you will agree.

A. Correct.

Q. And the reserves that are presently allocated to the various tract owners in the simulation model are the same reserves that were allocated prior to November 17th and 18th, 1976, is that correct?

A. The reserves, the primary reserves, or --

Q. Yes.

A. -- both?

Q. Primary reserves.

A. Well, they're what came out as the result of the second simulation model, the one they reran, right.

Q. Now it is true, is it not, that a meeting of the Technical Committee on November 17th and 18th, the

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reserve allocation is to Skelly Oil for their Turner Wells, which had been calculated by the Shell computer run allocating 319,000 and 321,000 barrels respectively to the two Skelly Turner Wells were adjusted.

A. That's correct.

Q. And they were adjusted by taking the arithmetic average of three Shell wells, the Shell Sanger 2, 27 North, the Shell Turner 2, 34-B, and the Shell Turner 1, 34-G Wells, taking their production that was allocated under the computer run and arithmetically averaging that with the allocations to the Skelly Wells, is that not true?

A. That's correct.

Q. And this was done without a computer calculation. It was simply a decision on the part of Shell Oil to arithmetically average, is that correct?

A. No, this was an agreement of the Technical Committee.

Q. All right. Now, I would like to refer you, or I will ask you, whether you recall that there were seven parties in favor of this, among whom were Amerada, Amoco, Gulf, Mobil, Sun, Texas Pacific, and Shell.

Opposed to this were Cities Service, Conoco, Exxon, and Skelly.

Do you recall that?

A. Well, I'm going to have to get my minutes,

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because I think you're -- we're out of -- can I get my minutes now?

Q I refer you to page two of the minutes of that Committee on November 17th and 18th, 1976.

A Okay, just a minute, though.

Well, no, that was an initial vote. There was a subsequent vote taken, and that was on March 2nd, 1977. And at that time basically the same thing, in essence, was offered, and there Exxon agreed.

If you go to your minutes for March 2nd, 1977, and go to the bottom of the page.

Q The point is that there was an adjustment, though, was there not?

A Yes.

Q And it was not a function of the computer simulation model.

A That's true.

Q All right.

MR. ATKINSON: I have no further questions.

MR. LOPEZ: Mr. Chairman, in light of this, I'd like to kind of go out of order again and call Mr. Miller back to the stand just for a brief question.

MR. RAMEY: Okay. Does anybody have any questions of Mr. Lancaster? He may be excused.

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MR. LOPEZ: Mr. Catron, I might also mention that I don't believe Mr. Miller was ever sworn, and I would like him to be sworn and to swear that the testimony he's given today has been the truth.

(Thereupon Mr. Miller was duly sworn upon his oath.)

WILLIAM C. MILLER

being recalled as a witness, testified as follows, to-wit:

REDIRECT EXAMINATION

BY MR. LOPEZ:

Q. Mr. Miller, you have just heard the questions put to Mr. Lancaster. Would you explain the reason why this adjustment was made and what Shell's role was in it?

A. Yes, sir. In the Technical Report there is the -- you will see a picture of the grid system. The grid blocks in this particular case at the intersection of four of them was located a Skelly well, much like the Four Corners Monument.

In the simulator, therefore, it was possible to put that particular well into any one of the four

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blocks.

The first attempt we made, we found that indeed, what appeared to be very comparable wells in this area, three Shell wells and two Skelly wells, that at least one of the Skelly wells looked as though, indeed, its reserves were low compared to the neighbor. This was one of the changes that we made in that intervening three-week period that was spoken. We thought that by merely moving that well to another block that we could bring it into line with its neighbors.

When we did it, we actually ended up concentrating production out of that new block and the well actually made somewhat less.

At the meeting that's being referred to, this was to accept and finalize the percentages for -- I'm sorry, to finalize the oil production reserves that we had derived, and therefore, indeed, Shell suggested that rather than making additional runs and consuming additional time, that it would be fair and reasonable to start with the computer reserves for those five wells, totally 416,000 barrels on the average for each one of those five.

We then suggested that each of these wells be given that average, which meant that some wells went up some; some wells went down some. The net result was that we subtracted from the Shell wells the total of 192,000

barrels of oil. We added to the Skelly wells 192,000 barrels of oil, and no other operator was involved in these changes.

Q. Why did Shell sacrifice 192,000 barrels of oil?

A. Basically, we were determined to -- to do anything necessary to get on with the water injection project.

MR. LOPEZ: No further questions.

MR. ATKINSON: We have no questions.

MR. RAMEY: The witness may be excused. Do you have anything further, Mr. Lopez.

MR. LOPEZ: No, Mr. Chairman.

MR. RAMEY: Mr. Atkinson?

MR. ATKINSON: Only to ask Mr. Nolan, without taking the witness stand, whether Exhibits One through Sixteen were prepared by you or under your supervision?

MR. NOLAN: Yes, they were.

MR. ATKINSON: We have nothing further.

MR. RAMEY: Do you have any statement?

MR. ATKINSON: Yes, sir, we do.

Shell has come before the Commission seeking a statutory unitization. It is their burden to show, as the Commission well knows, that the Unit Agreement and unitization will protect correlative rights and that hydrocarbons will be allocated to the separately owned tracts, is statutory language, on a fair, reasonable, and equitable basis.

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That is not to say some of the tracts, or most of the tracts, or Shell's tracts. It's all the tracts we're talking about.

Now, as has been brought out in our case, we do not feel that the present parameters being employed in the proposed formula. Unit formula, are fair. They are not based on production data since 1976.

I think to a certain extent the real issue has been clouded this morning. The -- Exxon is not taking issue with the effort that Shell's made to unitize this -- this North Hobbs Unit. They aren't taking issue with the accuracy of the study in 1976. They are not taking issue with anything at all as proposed by Shell, except that the parameters are simply not correct, and the reason they're not correct is because they are based on outdated, outmoded, obsolete data.

It is no more appropriate for this Commission to accept the parameters proposed by Shell in this formula with 1976 data than it would have been if Shell had brought this thing before the Commission in 1976 and suggested that 1973 data should be used.

Now I realize that it may not be an easy matter to rerun the program; however, as has been testified to this morning, the program does exist and it can be done. Exxon is more than willing to cooperate in any way to rerun

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the program as far as making their information and personnel available.

There is only one way under this present formula that the hydrocarbons can be allocated to the tract owners, the individual tract owners, all of them, on a fair and equitable basis, and that is to update the parameters. If the parameters are not updated, then Exxon's position is that, as Mr. Dalious will state in a moment, that Exxon should be left out of the Unit Agreement, and there's a precedent for this in the same pool, the Amoco -- the Amoco Unit in the south has -- I've forgotten who the operators are -- there are two windows in that pool, or in that Unit. There is also substantial precedent in view of the Moranco Waterflood Unit, which apparently can be operated by the use of lease line wells and offset wells, and as was testified to yesterday, there's no problem with projecting a finger that sticks into the proposed unit. It's certainly possible that the Exxon Tract 47 will be protected to the same extent that the peninsula that juts into the northern unit of Amoco is protected, or proposed to be protected.

So Mr. Dalious is going to set forth Exxon's official position as representative of Exxon, but I want to re-emphasize that Exxon is not quarreling with the tremendous efforts that the Technical Committee has made

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in formulating a formula that they believe to be fair and equitable, and if the parameters are revised and updated, Exxon is agreeable to proceeding with that formula and getting on with the unitization.

Thank you. Mr. Dalious will now address Exxon's formal position.

MR. DALIOUS: Mr. Chairman, in this hearing Exxon has entered its objection to approval of the proposed North Hobbs Grayburg-San Andres Unit on the basis of applicant, Shell Oil Company.

In considering the application, Exxon respectfully requests serious consideration be given to its principal objection, namely, that the proposed formula is neither fair nor equitable because of now obsolete 1976 production numbers being used for the calculation of participation percentages as they now appear in the proposed Unit and Unit Agreement.

In the instant case Exxon suggests that the passage of time since 1976 numbers has been unusually long, considerably more than is normal.

Accordingly, Exxon respectfully requests the selection of one of the following three alternatives with regard to the present application:

First of Exxon's proposed alternatives is that the Commission approve the application provided the

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applicant be required to recalculate tract participation percentages by using updated, current production and remaining primary production figures, as opposed to the 1976 figures now applied to the formula.

As a means of expediting the recalculation, the updated numbers, already available from Exxon's exhibits, could be used, and I refer to its Exhibit Number Fifteen.

With regard to authority for the issuing of an order in conformity with this alternative, Exxon submits that New Mexico Statute 70-2-6, 70-2-11, 70-7-6, and 70-7-7 contain adequate authority for such action by the Commission. Exxon suggests that the words "as prescribed" as they appear in 70-7-7 provide ample discretionary authority for the entry of an order in conformity with alternative one. Exxon submits that in so doing the applicant need not obtain a re-approval of all parties who heretofore have ratified Unit or the Unit Operating Agreement, or both. Exxon submits that if the cited articles, and in particular, 70-7-7, do not provide such authority that the word "Prescribed" is meaningless with the result that the only authority of the Commission would be either to approve or disapprove the application precisely as submitted.

Such an interpretation would appear to be contrary to the clear legislative intent in the enactment of this statute.

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Exxon further submits that if alternative number one be adopted, that applicant has ample time to effect the recomputation prior to the ipso facto termination date which is 1-1-80.

Exxon directs the attention of the Commission to a precedent for such an alternative. In the Double L Queen Unit in Eddy County, one Jack L. McClellan protested the application of Bert Royalty Company on essentially the same basis as Exxon now protests Shell's application. In that cause the Commission entered an order requiring a recalculation based on newer data. Further, we understand that no additional re-signup was required.

The second of Exxon's proposed alternatives is that the Commission approve the application subject, however, to excluding Tracts 43, 47, and 48 from the Unit Area.

Mr. Lancaster and Mr. Phillips have assured the Commission that the Unit would have no -- this would have no effect on the Unit and that these tracts could adequately be protected by the use of a cooperative agreement, and in this respect we would agree to entering into a cooperative agreement.

As a part of this alternative, Exxon would be willing to accept deletion only of its federal tracts, Numbers 47 and 48 in the proposed Unit.

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Exxon's third alternative would simply be disapproval of the Unit.

With regard to the application for field rules, Exxon has no objection to such application -- approval of such application, provided either alternative one or alternative three be selected. HOwever, should the Commission elect to follow alternative two, respondent, Exxon herein enters its objection to Rules 1, 6, and 7, as proposed for the reason that as presently written exclusion of any tract would delete that tract from the application of the proposed rules.

These rules clearly were written as relating to the entire Unit as it was set forth in exterior boundaries and the presence of a window in the Unit would eliminate those tracts from the new rules, as proposed. We suggest that if this alternative be -- I said suggest -- we request if this alternative be selected by the Commission for its order that minor changes in the wording of the rules could be entered so that the window tracts would have the same application of the rules as they would have to the entire Unit Area.

We wish to state we appreciate the attention of the Commission and respectfully request that one of our three alternatives be entered in the order.

MR. RAMEY: Mr. Lopez?

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MR. LOPEZ: Mr. Chairman, I'm not even going to dignify the suggestion of Exxon to its second alternative by responding to it. If Exxon wanted to discuss cooperative waterflooding, the time was before now. We've had a day and a half of testimony. I would have been glad to hear it and I would have been glad to put on witnesses to respond to it as to why is just simply won't work and no one will agree to it.

Therefore, I'm not even going to respond to that.

Mr. Chairman, Mr. Commissioner, Members of the Staff, Ladies and Gentlemen.

Never in my experience before this Commission have I participated in a case more important as regards the human endeavor that has gone into it. In this connection, I want to introduce you to Hank Swartz, who was the author of the Technical Committee, and who flew directly from Cameroon to Santa Fe, New Mexico, to attend this hearing.

Mr. Hank, I want you to stand up. You did a helluve job on that Technical Report.

What we've tried to do here in the last day and a half is tell a story, and I think we've told a helluve story. I'd just like to highlight some of those events that have occurred.

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Mr. Lancaster, who is now the chairman of the Technical Committee, has described to you the mammoth undertaking that the Technical Committee did to try and get one of the most important historic pools in New Mexico into a posture for secondary recovery. The magnitude of the undertaking with respect to the assembly of data, to establishing parameters, and assigning values to those parameters, to establishing a cutoff date, and the fact that they could come to a conclusion that the secondary recovery operation of this unit would be both feasible and profitable. He's described the wonderful participation of all the working interest owners in the unit and their amazing efforts to come to almost unanimous agreement on a step-by-step basis so that the working owners could find some way to allocate the production, the benefits as well as the burdens, that would be undertaken if unitization became a reality.

Mr. Buck, my good friend Mr. Buck, who was Chairman of the Working Interest Owners Committee, he has also described the relentless and unbelieveable undertaking that the working owners did in trying to achieve a fair, reasonable, and equitable formula.

He's explained, and I won't go and bore you with the details of why the participation formula with respect to the allocation of oil reserves and with respect to the allocation of investment are fair and reasonable.

I could never say it better myself.

Third, you've heard from Mr. Campbell, who once the Unit Agreement and the Unit Operating Agreement were put into a form that could be submitted to the people involved, went out and found out who they all were. I don't what Exxon expects or how long they think it's going to take to find out where 905 royalty interest owners are, or how they're going to get 80 working owners to agree to the thing, but that's what he did. In fact, he's also testified that he couldn't even find 44 royalty interests. They're still unknown where they are; they were unreachable.

But that was a mammoth undertaking in itself.

Next, you heard from Mr. Phillips, and he's already to go with the thing, and he's told you how big a project it is and what kind of complexities are involved in trying to deal with this particular reservoir.

And finally, Mr. Chairman, today you heard from Mr. Computer Simulator himself, Mr. Miller, and he's explained the best he could how that thing worked and why everybody agreed to it.

What we've attempted to do, and if I may, and I think what the testimony reflects in a nutshell, and if I may analogize it, I think if you picture a train leaving Kansas City, and it's arrived in Albuquerque, and it's going

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to have to stop in Winslow unless everybody can get together and see that it gets to San Francisco. So all these guys on this train took a picture and agreed to take a picture in Albuquerque, that if they could take a picture and get this train together, that they wouldn't have to stop in Winslow; that they could get all the way to San Francisco.

And this is essentially what we're trying to do here today, and what Exxon would have us to do is to erase the picture we took in Albuquerque, and I suppose stop in Winslow. That's not what we want to do. We all want to get to San Francisco.

If you would just indulge me a little more, this case has been very important to me and I'd like to talk about how I feel about it and how I perceive my role.

When Mr. Buck first called me to Houston, and I went down to find out what the deal was all about, he kind of suggested to me that if I thought I was going to be able to understand the magnitude of the complexity of the project, I was biting off more than I could chew.

Well, we worked on the deal. We tried to put it together. I came home, filed an application, went back down, tried to get the testimony together, see that we were all in order, and I kind of got a little confident. I thought I was getting a pretty good handle on the deal.

Last week when I went down to Houston and

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I sat down with these gentlemen, I said to them, "You know, there's one thing. I think I've got a handle on your deal but I don't really understand the computer simulator. Would you try to explain that to me?"

And you ought to have seen the expressions on their faces. You know, they were fairly stunned, and they said, well, Owen, if we tried to describe to you the number of years, the talent involved, the amount of money that went in to developing this computer simulation program, it would take us a helluve a long time, and that's when I was humbled, Mr. Chairman. I knew, and Mr. Buck was right when he first told me, I was going to bite off more than I can chew.

You know, 55 million barrels of oil is a lot of oil, especially when you consider that only 83 million barrels of oil were produced in 1978 in New Mexico, and when you consider that we're trying to get away from our dependence on foreign oil sources, but that's not what makes this project so awesome to me. When you talk about the millions of dollars of profits, that's a lot of money, but that's not what really has gotten to me, either.

What has made my -- what has made me realize that my undertaking in trying to direct the story we've put on here in the last day and a half, what made me realize that this undertaking was fairly awesome, is when

I finally realized the commitment of human resource to this project; the commitment of the talent, the genius, the human sacrifice, that went in to this project over the last seven years to make this thing a reality. That's when it really got to me. That's when I understood that this is a fairly awesome responsibility.

And now, Mr. Chairman, we've told our story. The curtain rang up yesterday morning at 9:00 o'clock and now it's with a great deal of relief that I am able to share with you this awesome responsibility, and I have great confidence that there will be a wise and expeditious resolution and decision to these cases and that you gentlemen up there will be able to ring down the curtain.

Thank you.

MR. RAMEY: Thank you, Mr. Lopez. Anybody else have a statement to make?

MR. ATKINSON: Mr. Chairman, I would just like to set one thing straight. Shell was not taken unawares as to Exxon's possible desire to be let out of the Unit. Exxon has talked to Shell about this previously and as recently as two months ago Shell responded and said they would not agree to that.

MR. RAMEY: The Commission will take the two cases under advisement.

MR. LAW: Mr. Chairman.

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MR. RAMEY: Yes, do you want to make a statement?

MR. LAW: My name is J. W. Law. I'm a petroleum engineer and I work for the Commissioner of Public Lands of the State of New Mexico.

The Commissioner has granted preliminary approval to the participation factor and formula set out in the proposed Unit Agreement titled the North Hobbs Grayburg-San Andres Unit, Lea County, New Mexico.

We feel at this point that if there are any changes in the participation formula or the participation percentages, it would reduce the equity of the State Land Office; that could jeopardize the preliminary approval granted.

MR. RAMEY: Thank you. Any other statements?

The Commission will take the cases under advisement.

(Hearing concluded.)

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REPORTER'S CERTIFICATE

I, SALLY W. BOYD, a Certified Shorthand Reporter, DO HEREBY CERTIFY that the foregoing and attached Transcript of Hearing before the Oil Conservation Commission was reported by me; that the said transcript is a full, true, and correct record of the hearing, prepared by me to the best of my ability from my notes taken at the time of the hearing.

Sally W. Boyd C.S.R.
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CASE 6633: SHELL OIL COMPANY FOR A PRESSURE MAINTENANCE PROJECT, LEA COUNTY

APPLICATION OF SHELL OIL COMPANY
— PRESSURE MAINTENANCE PROJECT —
LEA COUNTY, NEW MEXICO

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