

✓
CASE 3989: Appli. of ANADARKO
PRODUCTION CO. FOR A WATERFLOOD
PROJECT, EDDY COUNTY.

Case Number

3989

Application

Transcripts.

Small Exhibits

ETC.

dearnley-meier reporting service, inc.

SPECIALIZING IN: DEPOSITIONS, HEARINGS, STATEMENTS, EXPERT TESTIMONY, DAILY COPY, CONVENTIONS

1120 SIMMS BLDG. • P. O. BOX 1092 • PHONE 243-6691 • ALBUQUERQUE, NEW MEXICO



BEFORE THE
NEW MEXICO OIL CONSERVATION COMMISSION
Santa Fe, New Mexico
December 11, 1968

EXAMINER HEARING

IN THE MATTER OF:

Application of Anadarko
Production Company for a
unit agreement, Eddy
County, New Mexico

CASE NUMBER
3988

IN THE MATTER OF:

Application of Anadarko
Production Company for a
waterflood project, Eddy
County, New Mexico.

~~CASE NUMBER~~
3989

(Consolidated)

BEFORE:

ELVIS A. UTZ, Examiner

TRANSCRIPT OF HEARING

MR. UTZ: Case 3988.

MR. HATCH: Application of Anadarko Production Company for a unit agreement, Eddy County, New Mexico.

MR. TOWNSEND: John D. Townsend, Fort Worth, Texas, appearing for the applicant, Anadarko. If it please the Examiner, I would move to consolidate for hearing purposes this case with the one following, which is Case 3989. They apply to the same basic area and formation unit, and waterflood unit.

MR. UTZ: Case 3988 is a unit agreement, and 3989 is a waterflood for that unit agreement?

MR. TOWNSEND: Yes, sir.

MR. UTZ: The two cases will be consolidated for purposes of testimony. Separate orders will be written on each case.

MR. TOWNSEND: If it please the Examiner, we have some amendments to our application in this thing. On Page 2 of the application --

MR. UTZ: Which application, 3988 or --

MR. TOWNSEND: This is the same application in both dockets.

MR. UTZ: I see.

MR. TOWNSEND: At Page 2 in Subparagraph B in the

middle of the page we stated the parties who had not yet ratified, and in B we stated that W. D. Brookover, Senior, had not ratified. He has ratified now, so we would move to strike B.

And with respect to Subparagraph C immediately below, we would add two more names of royalty owners who have not yet ratified on Tract 11. One is Robert Wadley, and the other is Jack Wadley.

Then we have some amendments on Page 4 of the application. We will go through these with our testimony, but we figured that we should formally amend them. At the top of the page, this states the wells that would be injection wells. May we strike the fourth line, which is Well 6-2, and the location described thereon, 1310 south of the north line and ten feet west of the east line of Section 16; strike that line and add a line, being Well No. 4-1, with the location 1,650 feet south of the north line and 2,310 feet east of the west line of Section 16.

Then in the sentence immediately following this, instead of saying five of the proposed injection wells, it should be four of the proposed injection wells.

Delete 6-2. In the third line on down, again delete 6-2. In Paragraph 10 below, the fourth line, delete Well

Number 6-2. This completes our proposed amendments.

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

(Whereupon, Applicant's Exhibits 1 through 8 were marked for identification.)

(Witness sworn.)

C. W. STUMHOFFER

called as a witness by the applicant, having been first duly sworn, was examined and testified as follows:

DIRECT EXAMINATION

BY MR. TOWNSEND:

Q Would you state your name and address, please?

A My name is C. W. Stumhoffer. I reside in Fort Worth, Texas.

Q By whom are you employed and in what capacity?

A I am employed by Anadarko Production Company as Superintendent of the Secondary Recovery Division.

Q Mr. Stumhoffer, what is your professional persuasion?

A I am a graduate petroleum engineer.

Q Have you previously qualified to testify before the New Mexico Oil Conservation Commission in the capacity of an expert witness in petroleum engineering?

A Yes, I have.

MR. TOWNSEND: Do you wish me to further qualify this witness?

MR. UTZ: No, he has qualified previously.

Q (By Mr. Townsend) Are you familiar with the application in these dockets 3988 and 3989?

A Yes, I am.

Q Basically, what is requested?

A In Case 3988, Anadarko has proposed a unit plat of the Far West Loco Hills Sand Unit Area, and seek approval of the unit agreement. And in Case Number 3989, we seek approval for the secondary recovery operation by waterflooding of the Zone 4 of the Grayburg of the proposed unit area. This unit area is located on the western extremity of the Loco Hills Sand Field, Eddy County, New Mexico.

Q Mr. Stumhoffer, let's define some terms here. When you say the Loco Hills Sand, what is that also known as?

A It is also known as Zone 4 of the Grayburg formation.

Q Mr. Stumhoffer, have you prepared some exhibits for use in your testimony before the Commission?

A Yes, I have.

Q Handing you what the Reporter has marked for identification as Exhibit 1, would you state what it is?

A Exhibit 1 is the unit agreement and unit operating

agreement for the Far West Loco Hills Sand Unit.

Q Mr. Stumhoffer, is this unit agreement and the unit operating agreement in the form, and does it contain the provisions that are normally used in the waterflooding formation of units, formation of the waterflooding units in New Mexico?

A The agreements have the preliminary approval of the Commissioner of Public Lands, and the USGS, and meets their requirements.

Q Have all the working interest owners underneath it involved in this area signed?

A Yes.

Q Have all of the royalty owners signed?

A All royalty owners have ratified the unit agreement except a few in Tract 11 that we have been unable to locate. In those cases we have a few that indicate they will ratify, and we have not received them, but the Tract is qualified under provisions of the unit agreement.

Q The unit agreement requires what percentage?

A Eighty-five per cent of the tract signed.

Q And the unsigned portion is far less than fifteen per cent?

A Yes.

Q Is there anything else you wish to testify with

respect to the unit agreement and the unit operating agreement?

A No.

Q Handing you what the Reporter has marked for identification as Exhibit 2, will you state what it is?

A Exhibit 2 is an engineering appraisal of the waterflood potential of Zone 4 of the Grayburg underlying the western extremity of the Loco Hills Field. This study was prepared by an engineering subcommittee appointed by the operators of the leases in this area, to study the feasibility of waterflooding the Zone 4 of the Grayburg.

Q Mr. Stumhoffer, there is a great deal of information contained in this engineering study. Would you go into it in a little more detail than you have? I would like to find out, number one, does the engineering appraisal indicate that the proposed waterflood is technically feasible from an engineering standpoint?

A The engineering subcommittee found that it was feasible to initiate a waterflood program on this area of the Loco Hills Field in Zone 4 of the Grayburg, in view of the success of the offsetting waterflood in the same zone by Newmont Oil Company under their West Loco Hills Grayburg Number 4 Sand Unit, and by the fact that this area is depleted by primary production drive.

Q Did the engineering committee find that the proposed waterflood was economically feasible?

A Yes.

Q Did the engineering committee find that the field had advanced to what is commonly known as as "stripper" stage?

A Yes, present production from the producing wells in the unit area, proposed unit area, is approximately twelve barrels of oil per day.

Q Did the engineering committee find that the use of the waterflood technique would result in the increased recovery of oil?

A Yes, we estimate additional recovery of approximately 850,000 barrels of oil.

Q From these leases alone?

A From these leases in the unit area.

Q Mr. Stumhoffer, would you just briefly explain the contents of this exhibit?

A The exhibit consists of a purpose of the report, in which we have itemized the reason for preparation of the report to meet the charges placed upon the committee, engineering committee by the operators. And we have reached a conclusion in the report that the waterflood operation in the Zone 4 of the Grayburg is feasible, and that the most efficient manner to

handle this would be on a unitized basis, and the recommendation that the area be unitized as soon as possible for secondary recovery operations. There is also a discussion of the geology of the reservoir, the production history, which is in great detail, and would be too detailed to go into at great detail.

And then we have a discussion of the reservoir characteristics of the Zone 4 of the Grayburg, and the fluid properties of the produced oil, calculation of estimated secondary reserves, and exhibits to support the discussion presented in the report. The exhibits include a map of the unit area, proposed unit area, a structural map, tabulation of the wells, and production histories, individual curves, and a supplement to the original engineering report that was prepared sometime ago to support the unitization of Zone 4 of the Grayburg only under the proposed unit area.

Q When was the supplement prepared?

A The supplement was prepared during February of 1968.

Q That commences at what page of the exhibit?

A Page 22 of the engineering report.

Q And then the remainder of the report is actual data backing up the conclusions that were presented?

A Yes.

Q Is there anything else that you wish to testify as to

with respect to this exhibit?

A The supplement report to the engineering report was prepared to show why we had prepared unitization of the Zone 4 only, in view of the fact that there are other productive zones, producing zones present under the unit area. For the following reasons, we decided to recommend that only Zone 4 be unitized:

No. 1 was lack of continuity of the other productive zones in wells located in the proposed unit area. No. 2 was the active flood to the east was only in the Loco Hills Sand or Zone 4 of the Grayburg. The formation of the proposed unit will develop Zone 4 for waterflood on a cooperative basis with the Newmont operated unit. And thirdly, the other productive zones on the west edge of the western extremity of Loco Hills will be developed for waterflood in another unit.

Q Is there anything further you have with respect to this exhibit?

A No.

Q Mr. Stumhoffer, would you direct your attention to what the reporter has marked for identification as Exhibit 3, and state what it is?

A Exhibit 3 is a completed waterflood application data sheet in which we present the reservoir and flood characteristics

of the Loco Hills Sand, the primary production history, the results to be expected from the waterflood operation on the unit, and the type of injection water that we plan to utilize in our waterflood operation. It will be fresh water to be purchased from a commercial water company. This will be covered in more detail on a later exhibit.

Q What is on the second page directly behind that?

A On the back side of Exhibit 3, we have a list of the proposed injection well completions, of the initial stage of injection wells, which will be covered in more detail. And Page 2 --

Q Before you go on to Page 2, I note that on the right-hand side of this you refer to Well Number 6-2.

A This well will be deleted from our application as previously indicated by the fact that this was a line well to be drilled between the two units, the Newmont Unit and the Anadarko Unit, and the well will be drilled on the Newmont Unit, and it was filed for approval at a previous hearing by Newmont.

Q Then there are two other pages on this exhibit.

A These two pages merely indicate the present status of the wells in the proposed unit area.

Q The information contained in Exhibit 3 was intended to fulfill the requirements of the 701-B-4, was it not?

A Yes.

Q Is there anything else you wish to testify to with respect to Exhibit 3?

A No.

Q Mr. Stumhoffer, would you direct your attention to what the Reporter has marked for identification as Exhibit 4, and state what it is?

A Exhibit 4 is a Lane Wells radio activity log of Anadarko Well Number 2, H. G. Watson, which is to be known as Far West Loco Hills Sand Unit 8-7. On this log, we have indicated the Loco Hills Sand in yellow, with a notation on the log of the unitized formation, which is to be 100 feet. The Loco Hills Sand is defined on this log from 2,482 to 2,496. The unitized formation will be 100 feet above the top of this zone, and fifty feet below the base of this zone.

Q Mr. Stumhoffer, this log then shows the stratigraphic position of the unitized formation?

A Yes.

Q Is this a typical log in this immediate area for these wells?

A Yes, it is.

Q You stated earlier that there was additional zones of production in this area. Are they above or below this?

A They are below.

Q All of them?

A All of them. There are two zones in the Grayburg Zone 5 commonly referred to as the Metex, and Zone 6 of the Grayburg commonly referred to as the Premier, that are productive in this area, but will not be unitized in this unit. They will be taken care of in another unit.

Q This exhibit was intended to fulfill the requirements of the Commission's Rule 701-B-2?

A Yes.

Q Is there anything else that you wish to testify to with respect to this exhibit?

A No.

Q Would you direct your attention to what the Reporter has marked for identification as Exhibit 5, and state what it is?

A Exhibit 5 is a diagrammatic sketch of a typical water injection well to be converted from producing status. In this we show our prepared completion program prior to producing water injection. As mentioned earlier, we will inject fresh water down plastic-coated tubing set on a packer in the bottom of the long string of casing. In the case of wells converted from producing status, the injection will be into the open-hole

under the packer.

Q In other words, this is an open-hole completion?

A This is an open-hole completion, and this will be a typical diagrammatic sketch of a well of this type to be utilized for injection.

Q Is the total depth of the well sufficient so there could be any communication with injected water into the deeper producing horizons?

A No, we will plug back, if deeper producing rights were penetrated, the wells will be plugged back to the base of the Loco Hills Sand, the unitized formation.

Q Would you direct your attention to what the Reporter has marked for identification as Exhibit 6, and state what it is?

A Exhibit 6 is also a diagrammatic sketch of a typical water injection well that is to be drilled. In this we show our proposed TD's, and casing program, and tubing program. As is the case of wells to be converted, we will inject water down two-and-three-eighths inch OD tubing that has been plastic-coated into the unitized formation through perforations.

Q Exhibits 5 and 6 are intended to fulfill the Commission's requirements of the Rule 701-B-3. Is

this correct?

A Yes.

Q Would you direct your attention to what the Reporter has marked for identification as Exhibit 7, and state what it is?

A Exhibit 7 is a map with an attachment of the proposed waterflood development of the Far West Loco Hills and Sand Unit.

Q You have only shown the Zone 4 of the Grayburg completed wells here?

A Yes. I might point out at this time that the supplement to the engineering report goes into detail as to how we determine the productive limits of the Loco Hills Sand.

Q In other words, you feel that this area that you are asking to be unitized and waterflooded is at the extreme western edge of the Zone 4 of the Grayburg?

A Yes. From the information available, there is no indicated productive sand in the area to the west of the proposed unit in Zone 4 of the Grayburg.

Q I believe you previously testified that there was an existing waterflood in this zone to the east?

A That is correct.

Q Is this reflected on this exhibit?

A Yes, it is.

Q Would you explain your proposed waterflood plan in

some detail, using this exhibit?

A We propose to initiate waterflood operation on this unit upon approval by the Commission, by the initiation of injection along the common boundary between the Newmont West Loco Hills Unit and the proposed Far West Loco Hills Sand Unit. Newmont has applied for their proposed injection wells along this boundary at a previous hearing, December 2, 1968, in their application; and Anadarko seeks approval to convert or drill injections wells to fulfill its part of the obligation of this cooperative waterflood development.

Q That is one part of what this application is for?

A Right. This will be done immediately upon effective date of this application. In this, we plan to re-enter and complete for injection Unit Well Number 1-1, located 2,310 feet south of the north line and 330 west of the east line of Section 4. We also plan to drill a well at an unorthodox location, Unit Well Number 8-8, to be located ten feet north of the south line and 2,630 feet west of the east line of Section 4. We plan to convert Unit Well Number 10-2, located 1,650 feet north of the south line and 2,310 feet east of the west line of Section 9. The fourth well of this initial waterflood development will be a well to be drilled, Number 2-3, Unit Well Number 2-3, located 330 feet south of the north line and 1,980 feet west of the east

line of Section 16.

This will comprise our initial phase of development for waterflood on this unit. We request Commission approval to initiate the second stage of --

Q Excuse me. Before you start on that. There is a dark blot down at the east side of the northeast quarter of Section 16.

A This is due to the amendment to the application, in which Well Number 6-2, that would be located on Tract 6 of the proposed unit, is to be deleted, and a well is to be drilled on the Newmont Unit twenty feet to the east of the proposed location on the Newmont Unit.

Q What you have just described is your proposed first stage of the waterflood, is that correct?

A Yes.

Q You plan to waterflood this area in two stages, is that correct?

A We plan to develop the unit for waterflood in two stages.

Q Would you describe the second stage in some detail, please?

A The second stage will consist of wells to be converted as follows: Well Number 8-1, located 2,310 feet north of the

/ south line and 1,650 feet east of the west line of Section 4, is to be a re-entry and completion for injection in the Loco Hills Sand.

Well Number 8-9 will be a new well to be drilled and completed for water injection at an unorthodox location as follows: 1,330 feet north of the south line, and 2,630 feet west of the east line of Section 4.

Well Number 9-5 will be the conversion of an existing producing well for water injection in the Loco Hills Sand. It is located 1,650 feet south of the north line, and 330 feet east of the west line of Section 9.

Well Number 10-3 is to be drilled at an unorthodox location for water injection as follows: 1,330 feet north of the south line, and ten feet east of the west line of Section 9.

Well Number 5-1 is to be a conversion of an existing producing well to water injection. Location of this well is 660 south of the north line, and 660 feet east of the west line of Section 16.

Q That was a conversion?

A That is a conversion. Well Number 4-1 will also be a conversion to injection status. Its location is 1,650 feet south of the north line, and 2,310 feet east of the west line of Section 16.

This gives us a total of ten water injection wells on the proposed unit. We propose, as originally set out, four in the initial stage, and six injection wells in the second or last stage. We would like to request that we be allowed to place the second stage on injection nine months after initiation of the first stage, without waiting on the response of offsetting producing wells as required by Rule 701.

Q Mr. Stumhoffer, I would like to explore that just a little more with you. If you can characterize your waterflood development, it would appear that your first stage is in conjunction with Newmont on the east, and will serve to push the oil generally to the west, is that correct?

A That's right.

Q And the second stage, again, if I am correct, generally the water injection wells are on the extreme westernmost edge of the field as it exists?

A Yes.

Q And should tend to push the oil to the east?

A To the west.

Q You mean to the east?

A Back into the unit area, right.

Q Back into the unit area. Why is it that you are requesting the Commission to waive their requirement that the

wells experience an increase in production before you put in the second stage?

A We are requesting a waiver of this requirement, number one, because of the fact that in the event that we did miss some productive Loco Hills Sand outside the unit area, we would want to prevent migrating from the unit area to protect correlative rights. And number two, our normal response occurs nine to twelve months after initiation of an injection and we would like to make our plans accordingly in view of this anticipated response.

Q So you feel that this would protect correlative rights by tending to prevent oil being pushed off the unit, if there were any other areas that had not been developed?

A Yes.

Q And thus would prevent the oil from being never recovered, and would also provide a more orderly development of this unit?

A Yes.

Q In this application, you are requesting the approval for the drilling of the unorthodox locations, and for the injection of water as described, is that correct?

A What was the question?

Q In this application, with respect to this waterflood,

you are requesting the approval of the drilling at unorthodox locations, and the injection of water as described, and the waiver of the Commission's requirement of experiencing a response in offsetting wells?

A That is correct.

Q And the reason for the latter part is that if you experience a response, you are afraid you may already be too late to prevent from being driven off the unit?

A Yes.

Q Is there anything else you wish to testify with respect to Exhibit 7?

A No.

Q Mr. Stumhoffer, would you direct your attention to what the Reporter has marked for identification as Exhibit 8, and state what it is?

A Exhibit 8 is a map of the proposed unit and the surrounding area covering a two-mile radius, showing offset operators and other producing wells.

I would like to point out that on this map the wells that are shown on this map to the west of the proposed unit do not produce from Zone 4 of the Grayburg.

Q Exhibit 8 was prepared to the satisfaction of the Commission's requirement of Rule 701-B-1, was it not?

A Yes.

Q Is there anything else you wish to testify to with respect to Exhibit 8?

A No.

Q Do you have any other testimony with respect to these dockets?

A I do not.

MR. TOWNSEND: We move that admission into evidence of Exhibits 1 through 8.

MR. UTZ: Without objection, Exhibits 1 through 8 will be entered into the record.

(Whereupon, Applicant's Exhibits 1 through 8 were admitted in evidence.)

MR. TOWNSEND: I have nothing further of this witness.

CROSS EXAMINATION

BY MR. UTZ:

Q Mr. Stumhoffer, let's review the wells that you want for injection. At the present time, now, your first-stage well is a new location. Your 2-3 is a first-stage well, and is a conversion?

A No, sir. It is a new well. There are two new wells we will drill in the first stage. Of the four wells in the

first stage, two will be new wells, one will be a re-entry and completion for injection, and one will be a conversion of an existing well.

The re-entry well is Number 1-1. The two new wells are 2-3 and 8-8. And the conversion of a producing well is Number 10-2.

Q Now, I think I have all the others except the 8-1. What was that?

A It is a re-entry of a plugged and abandoned well.

Q It is a standard location, however?

A Yes.

Q So you have three nonstandard locations?

A Four. In the second stage we have two nonstandard locations to be drilled, Well Number 8-9, located in the center of Tract 8, and Number 10-3, located in the southwest corner of Tract 10. We have four nonstandard water injection locations.

Q What is the second one in the first stage?

A I'm sorry, there is one, 8-8 is the only nonstandard location in the first stage, and two in the second stage.

Q Three altogether?

A Yes.

Q And the locations shown on your application are correct, to the best of your knowledge?

A Yes.

Q What do you intend to do with the annulus in these wells? Are you going to fill them with inert fluid?

A We will fill them with inert fluid, and maintain the casing heads with a valve on the outlet to check for pressure build-up.

Q The reason you submitted only two diagrammatics is that one represents your conversion wells or re-entry, and the others are your new wells?

A That's right. Exhibit 5 was for the conversion or re-entries, and Exhibit 6 is for the new wells to be drilled, as a typical example.

MR. UTZ: Any other questions of the witness?

MR. TOWNEND: Mr. Examiner, Newmont has written a letter, of which we received a copy, directed to the Commission supporting this application.

MR. HATCH: The Commission has received a letter from Newmont Oil Company in support of the application.

MR. UTZ: If there are no further questions, you may be excused.

(Witness excused.)

MR. UTZ: Any further statements in this case?

The case will be taken under advisement.

I N D E X

<u>WITNESS</u>	<u>PAGE</u>
C. W. STUMHOFFER	
Direct Examination by Mr. Townsend	4
Cross Examination by Mr. Utz	22

E X H I B I T S

<u>NUMBER</u>	<u>MARKED FOR IDENTIFICATION</u>	<u>OFFERED AND ADMITTED IN EVIDENCE</u>
Exhibits 1-8	4	22

STATE OF NEW MEXICO)
) ss
 COUNTY OF BERNALILLO)

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

Witness my Hand and Seal this 30th day of December, 1968.

Sam Mortelette
 NOTARY PUBLIC

I do hereby certify that the foregoing is
 a complete record of the proceedings in
 the hearing of Case No. 39,899
 heard by me on Dec 11, 1968.
Shirley L. [Signature], Examiner
 New Mexico Oil Conservation Commission

State of New Mexico
Oil Conservation Commission



P. O. BOX 2088
SANTA FE

Other _____

BEFORE THE OIL CONSERVATION COMMISSION
OF THE STATE OF NEW MEXICO

IN THE MATTER OF THE HEARING
CALLED BY THE OIL CONSERVATION
COMMISSION OF NEW MEXICO FOR
THE PURPOSE OF CONSIDERING:

CASE No. 3989
Order No. R-3628

APPLICATION OF ANADARKO PRODUCTION
COMPANY FOR A WATERFLOOD PROJECT,
EDDY COUNTY, NEW MEXICO.

ORDER OF THE COMMISSION

BY THE COMMISSION:

This cause came on for hearing at 9 a.m. on December 11, 1968, at Santa Fe, New Mexico, before Examiner Elvis A. Utz.

NOW, on this 16th day of December, 1968, the Commission, a quorum being present, having considered the testimony, the record, and the recommendations of the Examiner, and being fully advised in the premises,

FINDS:

(1) That due public notice having been given as required by law, the Commission has jurisdiction of this cause and the subject matter thereof.

(2) That the applicant, Anadarko Production Company, seeks permission to institute a waterflood project in its Far West Loco Hills Sand Unit Area, Loco Hills Pool, by the injection of water into the Grayburg formation through 10 injection wells in Sections 4, 9, and 16, Township 18 South, Range 29 East, NMPM, Eddy County, New Mexico.

(3) That the wells in the project area are in an advanced state of depletion and should properly be classified as "stripper" wells.

(4) That the proposed waterflood project should result in the recovery of otherwise unrecoverable oil, thereby preventing waste.

(5) That the subject application should be approved and the project should be governed by the provisions of Rules 701, 702, and 703 of the Commission Rules and Regulations.

-2-

CASE No. 3989

Order No. R-3628

IT IS THEREFORE ORDERED:

(1) That the applicant, Anadarko Production Company, is hereby authorized to institute a waterflood project in its Far West Loco Hills Sand Unit Area, Loco Hills Pool, by the injection of water into the Grayburg formation through the following-described wells in Township 18 South, Range 29 East, NMPM, Eddy County, New Mexico:

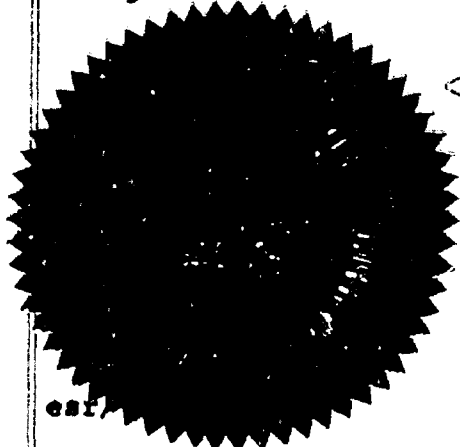
Tract 1 - Well No. 1 located 2310' FNL and 330' FEL of Section 4
Tract 8 - Well No. 1 located 2310' FSL and 1650' FWL of Section 4
Tract 8 - Well No. 9 to be drilled 1330' FSL and 2630' FEL of Section 4
Tract 8 - Well No. 8 to be drilled 10' FSL and 2630' FEL of Section 4
Tract 9 - Well No. 5 located 1650' FNL and 330' FWL of Section 9
Tract 10 - Well No. 2 located 1650' FSL and 2310' FWL of Section 9
Tract 10 - Well No. 3 to be drilled 1330' FSL and 10' FWL of Section 9
Tract 2 - Well No. 3 to be drilled 330' FNL and 1980' FEL of Section 16
Tract 5 - Well No. 1 located 660' FNL and 660' FWL of Section 16
Tract 4 - Well No. 1 located 1650' FNL and 2310' FWL of Section 16

(2) That the subject waterflood project is hereby designated the Anadarko Far West Loco Hills Waterflood Project and shall be governed by the provisions of Rules 701, 702, and 703 of the Commission Rules and Regulations.

(3) That monthly progress reports of the waterflood project herein authorized shall be submitted to the Commission in accordance with Rules 704 and 1120 of the Commission Rules and Regulations.

(4) That jurisdiction of this cause is retained for the entry of such further orders as the Commission may deem necessary.

DONE at Santa Fe, New Mexico, on the day and year hereinabove designated.



STATE OF NEW MEXICO
OIL CONSERVATION COMMISSION

DAVID F. CARGO, Chairman

GUYTON B. HAYS, Member

A. L. PORTER, Jr., Member & Secretary

OIL CONSERVATION COMMISSION

P. O. BOX 2088

SANTA FE, NEW MEXICO 87501

January 6, 1969

C
Mr. John Townsend
Anadarko Production Company
Post Office Box 9317
Fort Worth, Texas 76107

Dear Sir:

Reference is made to Commission Order No. R-3628, recently entered in Case No. 3989, approving the Anadarko Far West Loco Hills Water-flood Project.

P
Injection is to be through the ten authorized water injection wells, each of which shall be equipped with a string of plastic-coated tubing set in a packer. The packers shall be set as near to the uppermost open perforation as is practicable or in the case of open-hole completions, as near to the casing-shoe as is practicable.

V
As to allowable, our calculations indicate that when all of the authorized injection wells have been placed on active injection, the maximum allowable which this project will be eligible to receive under the provisions of Rule 701-E-3 is 938 barrels per day when the South-east New Mexico normal unit allowable is 42 barrels per day or less. This figure is based upon wells which are now on production or which are included in the program outlined on Exhibit VII for conversion of wells to water injection and the drilling and recompletion of certain wells for production.

Please report any error in this calculated maximum allowable immediately both to the Santa Fe office of the Commission and the appropriate district proration office.

In order that the allowable assigned to the project may be kept current, and in order that the operator may fully benefit from the allowable

OIL CONSERVATION COMMISSION

P. O. BOX 2088

SANTA FE, NEW MEXICO 87501

-2-

Mr. John Townsend
Anadarko Production Company
Post Office Box 9317
Fort Worth, Texas 76107

January 6, 1969

provisions of Rule 701, it behooves him to promptly notify both of the aforementioned Commission offices by letter of any change in the status of wells in the project area, i.e., when active injection commences, when additional injection or producing wells are drilled, when additional wells are acquired through purchase or unitization, when wells have received a response to water injection, etc.

Your cooperation in keeping the Commission so informed as to the status of the project and the wells therein will be appreciated.

Very truly yours,

A. L. PORTER, Jr.
Secretary-Director

ALP/DSN/lr

cc: Oil Conservation Commission
Hobbs and Artesia, New Mexico

Mr. D. E. Gray
State Engineer Office
Santa Fe, New Mexico

Case. 3889
Heard 12-11-68
Res. 12-11-68.

Grant Anadarko Prod. the
Farr West Loco Hills Sand waterflood.
Grant 10 injection well locations
as described in application.

Also grant north adox locations
for 6-2, 8-8, 8-9 + 10-3. injection
wells.

Thos A. McF.

- CASE 3989: Application of Anadarko Production Company for a waterflood project, Eddy County, New Mexico. Applicant, in the above-styled cause, seeks authority to institute a waterflood project in its Far West Loco Hills Unit Area by the injection of water into the Grayburg formation through 10 wells located in Sections 4, 9, and 16 of Township 18 South, Range 29 East, Loco Hills Pool, Eddy County, New Mexico.
- CASE 3990: Application of Roger C. Hanks, Ltd., for salt water disposal, Roosevelt County, New Mexico. Applicant, in the above-styled cause, seeks authority to dispose of produced salt water into the San Andres and Glorieta formations in the perforated and open-hole interval from approximately 4500 feet to 6600 feet in its C. O. Drew Well No. 1 located in Unit J of Section 18, Township 8 South, Range 34 East, Milnesand Field, Roosevelt County, New Mexico.
- CASE 3991: Application of Roger C. Hanks, Ltd., for salt water disposal, Lea County, New Mexico. Applicant, in the above-styled cause, seeks authority to dispose of produced salt water into the lower Devonian formation in the open-hole interval from approximately 10,835 feet to 10,965 feet in its Gulf State Well No. 1 located in Unit A of Section 11, Township 10 South, Range 32 East, Mescalero Field, Lea County, New Mexico.
- CASE 3992: Application of Roger C. Hanks, Ltd., for salt water disposal, Roosevelt County, New Mexico. Applicant, in the above-styled cause, seeks authority to dispose of produced salt water into the San Andres formation in the perforated interval from approximately 5150 feet to 5250 feet in its Mobil Federal Well No. 1 located in Unit E of Section 28, Township 8 South, Range 36 East, South Prairie Field, Roosevelt County, New Mexico.
- CASE 3973: (Readvertised)
- Application of Taylor Pruitt for salt water disposal, Roosevelt County, New Mexico. Applicant, in the above-styled cause, seeks authority to dispose of produced salt water into the San Andres formation in the perforated interval from approximately 4086 to 4455 feet in the Humble Federal Well No. 5 located in Unit B of Section 26, Township 7 South, Range 32 East, Chaveroo-San Andres Pool, Roosevelt County, New Mexico.

SM

NEWMONT OIL COMPANY

1135 CAPITAL NATIONAL BANK BUILDING

1300 MAIN • AT POLK

HOUSTON, TEXAS 77002

DEC 6 AM 8 46

Geo.
Head
Dec. 11th

Case 3988 + 3989

December 4, 1968

Mr. A. L. Porter, Jr.
Secretary-Director
Oil Conservation Commission
P. O. Box 2088
Santa Fe, New Mexico 87501

Dear Sir:

Newmont Oil Company wishes to support the Application of Anadarko Production Company for approval of the Far West Loco Hills Sand Unit and their Application to waterflood the Far West Loco Hills Sand Unit. These applications are to be heard in Cases 3988 and 3989 on December 11, 1968.

Yours truly,

Herman J. Ledbetter

Herman J. Ledbetter
Division Superintendent

HJL:ajg

cc: Anadarko Production Company
P. O. Box 9317
Fort Worth, Texas 76107
Attn: Mr. C. W. Stumhoffer

- CASE 3989: Application of Anadarko Production Company for a waterflood project, Eddy County, New Mexico. Applicant, in the above-styled cause, seeks authority to institute a waterflood project in its Far West Loco Hills Unit Area by the injection of water into the Grayburg formation through 10 wells located in Sections 4, 9, and 16 of Township 18 South, Range 29 East, Loco Hills Pool, Eddy County, New Mexico.
- CASE 3990: Application of Roger C. Hanks, Ltd., for salt water disposal, Roosevelt County, New Mexico. Applicant, in the above-styled cause, seeks authority to dispose of produced salt water into the San Andres and Glorieta formations in the perforated and open-hole interval from approximately 4500 feet to 6600 feet in its C. O. Drew Well No. 1 located in Unit J of Section 18, Township 8 South, Range 34 East, Milnesand Field, Roosevelt County, New Mexico.
- CASE 3991: Application of Roger C. Hanks, Ltd., for salt water disposal, Lea County, New Mexico. Applicant, in the above-styled cause, seeks authority to dispose of produced salt water into the lower Devonian formation in the open-hole interval from approximately 10,835 feet to 10,965 feet in its Gulf State Well No. 1 located in Unit A of Section 11, Township 10 South, Range 32 East, Mescalero Field, Lea County, New Mexico.
- CASE 3992: Application of Roger C. Hanks, Ltd., for salt water disposal, Roosevelt County, New Mexico. Applicant, in the above-styled cause, seeks authority to dispose of produced salt water into the San Andres formation in the perforated interval from approximately 5150 feet to 5250 feet in its Mobil Federal Well No. 1 located in Unit E of Section 28, Township 8 South, Range 36 East, South Prairie Field, Roosevelt County, New Mexico.
- CASE 3973: (Readvertised)
- Application of Taylor Pruitt for salt water disposal, Roosevelt County, New Mexico. Applicant, in the above-styled cause, seeks authority to dispose of produced salt water into the San Andres formation in the perforated interval from approximately 4086 to 4455 feet in the Humble Federal Well No. 5 located in Unit B of Section 26, Township 7 South, Range 32 East, Chaveroo-San Andres Pool, Roosevelt County, New Mexico.

BEFORE THE OIL CONSERVATION COMMISSION

OF THE STATE OF NEW MEXICO

APPLICATION OF ANADARKO PRODUCTION)
COMPANY FOR APPROVAL OF THE UNIT)
AGREEMENT AND UNITIZED WATERFLOOD)
OPERATIONS IN THE FAR WEST LOCO HILLS)
SAND UNIT, EDDY COUNTY, NEW MEXICO)

Case No. 3988

ENTRY OF APPEARANCE


COMES NOW the undersigned attorneys, duly licensed to practice law in the State of New Mexico, and enter their appearance in this cause in behalf of the applicant, Anadarko Production Company.

The undersigned attorneys have associated in this case with Mr. John D. Townsend, an attorney licensed to practice law in the states of Kansas and California, and request that the Commission permit Mr. Townsend to present evidence in behalf of the applicant at the hearing in this cause.

Respectfully,

HINKLE, BONDURANT & CHRISTY

By


S. B. Christy IV
as a member of the firm

Post Office Box 10
Roswell, New Mexico 88201

DOCKET MARKED

Date 11-26-68

Case 3989

**UNIT AGREEMENT
AND
UNIT OPERATING AGREEMENT
FAR WEST LOCO HILLS SAND UNIT
EDDY COUNTY, NEW MEXICO**

EXHIBIT I

UNIT AGREEMENT
FAR WEST LOCO HILLS SAND UNIT
EDDY COUNTY, NEW MEXICO

INDEX

<u>SECTION</u>		<u>PAGE</u>
1	Enabling Act and Regulations	3
2	Unit Area and Definitions	3
3	Exhibits	6
4	Expansion	6
5	Unitized Land and Unitized Substances	8
6	Unit Operator	8
7	Resignation or Removal of Unit Operator	9
8	Successor Unit Operator	10
9	Accounting Provisions and Unit Operating Agreement	11
10	Rights and Obligations of Unit Operator	11
11	Easements or Use of Surface	12
12	Plan of Operations	13
13	Tract Participation	14
14	Tracts Qualified for Unit Participation	15
15	Allocation of Unitized Substances	17
16	Royalty Settlement	21
17	Rental Settlement	23
18	Conservation	24
19	Drainage	24
20	Leases and Contracts Conformed and Extended	24
21	Mathematical Errors	26
22	Covenants Run with Land	26
23	Effective Date and Term	27
24	Rate of Prospecting, Development and Production	29
25	Nondiscrimination	29
26	Appearances	30
27	Notices	30
28	No Waiver of Certain Rights	30
29	Equipment and Facilities - Fixtures Attached to Realty	30
30	Unavoidable Delay	31
31	Loss of Title	31
32	Nonjoinder and Subsequent Joinder	32
33	Oil in Lease Tankage of Effective Date	34
34	Counterparts	35
35	Taxes	35
36	Conflict of Supervision	36
37	No Partnership	37
38	Border Agreements	37
39	Limitation of Approvals	37

EXHIBIT "A" (Map of Unit Area)

EXHIBIT "B" (Schedule of Ownership)

APPENDIX TO EXHIBIT "B" (Schedule of Ownership)

UNIT AGREEMENT
FOR THE DEVELOPMENT AND OPERATION OF THE
FAR WEST LOCO HILLS SAND UNIT
EDDY COUNTY, NEW MEXICO

NO. _____

THIS AGREEMENT, entered into as of the 1 st. day of May,
1968, by and between the parties subscribing, ratifying or consenting hereto,
and herein referred to as "parties hereto";

WITNESSETH: That,

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 of Chap. 176, Laws of 1961, Chap. 7, Art. 11, Section 39, N.M.S. 1953
anno) 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 of 1943, as
amended by Sec. 1, Chap. 162, Laws of 1951, Chap. 7, Art. 11, Sec. 41, N.M.S.
1953 Anno) to amend with the approval of the lessee, any oil and gas lease embrac-
ing 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 Commission of the State of New Mexico is authorized by law (Chap. 72, Laws of 1935, as amended by Chap. 193, Laws of 1937, Chap. 166, Laws of 1941, and Chap. 168, Laws of 1949, Chapter 65, Art. 3, Sec. 14, N.M.S., 1953 anno) to approve this Agreement, and the conservation provisions hereof; and

WHEREAS, the Mineral Leasing Act of February 25, 1920, 41 Stat. 437, as amended, 30 U.S.C. Sections 181 et seq., authorizes Federal lessees and their representatives to unite with each other, or jointly or separately with others, in collectively adopting and operating a cooperative or unit plan of development or operation of any oil or gas pool, field or like area, or any part thereof for the purpose of more properly conserving the natural resources thereof whenever determined and certified by the Secretary of the Interior to be necessary or advisable in the public interest; and

WHEREAS, the parties hereto hold sufficient interests in the Far West Loco Hills Sand Unit Area covering the land hereinafter described to give reasonably effective control of operation therein; and

WHEREAS, it is the purpose of the parties hereto, to enable institution and consummation of secondary recovery operations, conserve natural resources, 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, the mutual agreements, and the promises herein contained, the parties hereto commit to this Agreement their entire respective interests in 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, theretofore 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. The area described by tracts in Exhibit "B" and depicted on Exhibit "A" attached hereto is hereby designated and recognized as constituting the Unit Area containing 840 acres, more or less, in Eddy County, New Mexico. Said land is described as follows:

EDDY COUNTY, NEW MEXICO

T-18-S,R-29-E, NMPM

Sec. 4: S/2NE/4; W/2SE/4; E/2SW/4
Sec. 9: NE/4NW/4; S/2NW/4; SW/4
Sec.16: N/2

For the purpose of this Agreement, the following terms and expressions as used herein shall mean:

- (a) "Commissioner" is defined as the Commissioner of Public Lands of the State of New Mexico.
- (b) "Commission" is defined as the Oil Conservation Commission of the State of New Mexico.

- (c) "Director" is defined as the Director of the United States Geological Survey.
- (d) "Secretary" is defined as the Secretary of the Interior of the United States of America.
- (e) "Department" is defined as the Department of the Interior of the United States of America.
- (f) "Supervisor" is defined as the Oil and Gas Supervisor of the United States Geological Survey for the region in which the Unit Area is situated.
- (g) "Loco Hills Sand" is defined as and shall mean that heretofore established underground reservoir, a member of the Grayburg Formation of the Guadalupe Series of the Permian System and locally known as the Loco Hills Sand. This formation is found between 2482 feet and 2496 feet below the surface on the Lane Wells Radioactivity log of the Anadarko H.G. Watson Well No. 2-A located in the center of the SW/4 SE/4 Section 4, T-18S, R-29E, NMPM, Eddy County, New Mexico.
- (h) "Unitized Formation" is defined as the Loco Hills Sand shown by the log referred to in Section 2 (g) insofar as the same lies within the Unit Area together with Grayburg Sand stringers encountered at varying intervals between the depths of 100 feet above the top and 50 feet below the base of the Loco Hills Sand.
- (i) "Unitized Substances" means all oil, gas, gaseous substances, sulphur contained in gas, condensate, distillate and all associated and constituent liquid or liquefiable hydrocarbons within or produced from the Unitized Formation.
- (j) "Tract" is defined as each parcel of land described as such and given a Tract number in Exhibit "B".
- (k) "Tract Participation" is defined as that percentage of Unitized Substances produced from the Unitized Formation which is allocated to a Tract under this Agreement.
- (l) "Unit Participation" of each Working Interest Owner is defined as the sum of the percentages obtained by multiplying such Working Interest Owner's fractional Working Interest in each Tract by the Tract Participation of such Tract.

- (m) "Working Interest" is defined as 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.
- (n) "Working Interest Owner" is defined as and shall mean any party hereto owning a Working Interest, including a carried working interest owner, whether by virtue of a lease, operating agreement, fee title or otherwise, whose 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 operating thereof hereunder.
- (o) "Royalty Interest" or "Royalty" is defined as an interest other than a Working Interest in or 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, or any other payment or burden which does not carry with it the right to search for and produce Unitized Substances.
- (p) "Royalty Owner" is defined as and shall mean the owner of a Royalty Interest.
- (q) "Unit Operating Agreement" is defined as and shall mean any agreement or agreements (whether one or more) entered into (separately or collectively) by and between the Unit Operator and the Working Interest Owners as provided in Section 9 (Accounting Provisions and Unit Operating Agreement), *infra*, and shall be styled "Unit Operating Agreement, Far West Loco Hills Sand Unit, Eddy County, New Mexico."
- (r) "Paying Quantities" is defined as production of Unitized Substances in quantities sufficient to pay for the cost of producing same from wells on the unitized land.
- (s) "Tract Cumulative Oil Recovery" is defined as the number of barrels of oil produced from the unitized formation underlying a Tract of unitized land from the date of first production to January 1, 1966, as reported to the New Mexico Oil Conservation Commission.
- (t) "Unit Area Cumulative Oil Recovery" is defined as the total number of barrels of oil produced from the unitized formation underlying all Tracts of unitized land from the date of first production to January 1, 1966, as reported to the New Mexico Oil Conservation Commission.

SECTION 3. EXHIBITS. Exhibit "A" attached hereto is a map showing the Unit Area, and, to the extent known to the Unit Operator, the boundaries and identity of Tracts and Leases in said Unit Area. Exhibit "B" attached hereto is a schedule showing, to the extent known to the Unit Operator, the acreage comprising each Tract, land description, percentage ownership of each Working Interest Owner in each Tract, and the percentage of participation each Tract has in the Unit Area, together with the Royalty Interests in each Tract and the ownership thereof. 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.

Exhibits "A" and "B" shall be revised by the Unit Operator whenever changes render such revisions necessary, and at least two copies of such revision shall be filed with the Commissioner, and not less than six copies thereof shall be filed with the Supervisor.

SECTION 4. EXPANSION. The above-described Unit Area may when practicable be expanded to include therein any additional Tract or Tracts 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 a Tract or Tracts desiring to commit such Tract or Tracts hereto 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 and in the Tract or Tracts proposed to be included in the Unit, setting out the basis for admission, the proposed participation to be assigned to each such Tract, and other pertinent data. After

negotiation (at Working Interest Owner's meeting or otherwise), if 90 per cent of the Working Interest Owners (on the basis of unit participation) have agreed to such commitment of such Tract or Tracts, then Unit Operator shall, after preliminary concurrence by the Director and the Commissioner:

- (1) 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 Tract or Tracts, the Tract participation to be assigned each such Tract and the proposed effective date thereof, preferably 7:00 a.m. of the first day of a month subsequent to the date of notice; and
- (2) Furnish copies of said notice to the Commissioner, the Supervisor, each Working Interest Owner, lessee, and lessor whose interests are affected (mailing copy of such notice to the last known address of each Working Interest Owner), advising such parties that thirty (30) days will be allowed for submission to the Unit Operator of any objections to such proposed expansion; and
- (3) File, upon the expiration of said thirty (30) day period as set out in (2) immediately above, provided that objections of not more than 10 per cent of the Working Interest Owners on the basis of Unit Participation have been filed thereto, with the Commissioner, Director, and the Commission, the following:
 - (i) Evidence of mailing said notice of expansion
 - (ii) An application for such expansion in sufficient numbers for appropriate approval and distribution; and (iii) An instrument containing the appropriate joinders in compliance with the participation requirements of Section 14 (TRACTS QUALIFIED FOR PARTICIPATION) and Section 32 (NON-JOINDER AND SUBSEQUENT JOINDER), infra; and (iv) A copy of any objections received; provided, however, if a dissenting Working Interest Owner owns more than 10 per cent Unit Participation, it must be joined in such dissent by at least one other Working Interest Owner.

The expansion shall, after due consideration of all pertinent information and

upon approval by the Commissioner, the Director, and the Commission, become effective as of the date prescribed in the notice thereof or on such other appropriate date as set by the Commissioner, the Director and the Commission in the order or instrument approving such expansion. The revised Tract Participations 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 AND UNITIZED SUBSTANCES. All oil, gas, gaseous substances, sulphur contained in gas, condensate, distillate, and all associated and constituent liquid or liquifiable hydrocarbons in all the hereinabove described and subsequently admitted land effectively committed to this Agreement are herein called "Unitized Substances", insofar only as the same may be found in the Unitized Formation, together with the pertinent surface rights, are unitized under the terms of this Agreement and said land shall constitute land referred to herein as "Unitized Land" or "Land Subject to this Agreement".

SECTION 6. UNIT OPERATOR. Anadarko Production Company, a Delaware corporation, is hereby designated as Unit Operator, and, by signing this instrument as Unit Operator, it 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, and the term "Working Interest Owner" when used herein shall include or refer to Unit Operator as the owner of a Working Interest when such an interest is owned by it.

Unit Operator shall have a lien upon the interests of Working Interest Owners in the Unit Area 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, the Director and the Commissioner, and until all unit wells are placed in a condition satisfactory for suspension, abandonment, or operations, whichever is required by the Supervisor, the Commissioner, and the Commission, 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 Unit Operator may, upon default or failure in the performance of its duties or obligations hereunder, be subject to removal by 75 per cent of the committed Working Interest Owners (on the basis of unit participation) exclusive of the Working Interest owned by the Working Interest Owner who is the Unit Operator. Such removal shall be effective upon notice thereof to the Director and the Commissioner.

In all such instances of 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 becomes 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 equipment, books and records, materials, appurtenances and any other assets, used in conducting the Unit operations and owned by the Working Interest Owners (including any and all data and information which it might have gained or assembled by reason of its operation of the Unitized Land) 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 removal of any material, equipment and appurtenances needed for the preservation of any wells. Nothing herein contained shall be construed to relieve or discharge any Unit Operator who resigns or is removed hereunder for 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 by a majority vote of the Working Interest Owners (on the basis of Unit Participation):

provided no Working Interest Owner who has been removed as Unit Operator may vote for self-succession. 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 Commissioner and filed with the Supervisor. If no successor Unit Operator or Unit Manager is selected and qualified as herein provided, the Director and the Commissioner, at their election, may declare this Agreement terminated.

SECTION 9. ACCOUNTING PROVISIONS AND UNIT OPERATING 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; however, no such Unit Operating Agreement shall be deemed either to modify any of the terms and conditions of this Unit 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. Required copies of any Unit Operating Agreement executed pursuant to this Section shall be filed with the Commissioner and the Supervisor prior to approval of this Agreement.

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 are hereby delegated to and shall be exercised by the Unit Operator as herein provided. The parties hereto, to the extent they have the right to do so, grant to Unit Operator the use of brine or water, or both, from any formation in and under the Unit Area for injection into the Unitized Formation. 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. EASEMENTS OR USE OF SURFACE.

(a) The parties hereto, to the extent of their rights and interests, hereby grant to Working Interest Owners the right to use as much of the surface of the land within the Unit Area as may reasonably be necessary for Unit Operations and the removal of Unitized Substances from the Unit Area; provided that nothing herein shall be construed as leasing or otherwise conveying to Working Interest Owners a site for a water, gas injection, processing or other plant, or camp site.

(b) Working Interest Owners shall have and are hereby granted free use of water from the Unit Area for Unit Operations, except water from any well, lake, pond, or irrigation ditch of a Royalty Owner.

(c) Working Interest Owners shall pay the owner for damages to growing crops, timber, fences, improvements, and structures on the Unit Area that result from Unit Operations.

SECTION 12. 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 in paying quantities and that the object and purpose of this Agreement is to formulate and to put into effect a secondary recovery project in order to effect the greatest recovery of Unitized Substances, prevent waste and conserve natural resources consistent with good engineering practices expected of a prudent operator. 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 Supervisor, the Commission, and the Commissioner, inject into the Unitized Formation, through any well or wells completed therein, brine, water, air, gas, oil, liquid petroleum gases, and any one or more other substances or combination thereof whether produced from the Unitized Formation or not, and that the location of input wells and the rates of injection therein and the rate of production shall be governed by standards of good geologic and petroleum engineering practices and conservation methods. After commencement of secondary operations, Unit Operator shall furnish the Commission, the Commissioner and the Supervisor monthly injection and production reports for each well in the Unit. The Working Interest Owners, the Supervisor, the Commission, and the Commissioner shall be furnished periodical reports on the progress of the plan of operation and any revisions or changes thereto; provided, however, that any major revisions of the plan of operation involving a basic deviation from the initial plan of operation shall be subject to consent and approval of the Working Interest Owners, the Supervisor, the Commission, and the Commissioner.

The initial plan of operation shall be filed with the Supervisor, the Commission, and the Commissioner concurrently with the filing of this Unit Agreement for final approval. Said initial plan of operation and all revisions thereof shall be as complete and adequate as the Supervisor, the Commission, and the Commissioner may determine to be necessary for timely operation consistent herewith. 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. Reasonable diligence shall be exercised in complying with the obligations of the approved plan of operation.

Notwithstanding anything to the contrary herein contained, the Unit Operator shall commence operations for the secondary recovery of Unitized Substances from the Unit Area within six (6) months after the effective date of this Agreement, or any extension thereof approved by the Commissioner and the Supervisor. After such operations are commenced, Unit Operator shall carry on such operations as would a reasonably prudent operator under the same or similar circumstances.

SECTION 13. TRACT PARTICIPATION. In Exhibit "B" attached hereto, there are listed and numbered the various tracts within the Unit Area and set forth opposite each Tract is the Tract Participation of each Tract in the Unit Area calculated on the basis of 100 per cent Tract commitment. The Tract Participation of each Tract was determined as follows:

$$\frac{\text{Percentage Participation of Each Tract}}{\text{Tract Cumulative Oil Recovery}} = 100\% \frac{\text{Unit Area Cumulative Oil Recovery}}{\text{Unit Area Cumulative Oil Recovery}}$$

In the event less than all of the Tracts within the Unit Area are committed to this

Agreement as of the effective date hereof, Unit Operator shall promptly prepare a revised Exhibit "B" setting forth opposite each of the qualified Tracts, the revised Tract Participations which shall be calculated and determined by using the factors and formula set forth above, but applying the same only to the qualified Tracts. Unit Operator shall promptly file copies of such revised Exhibit "B" with the Supervisor and the Commissioner; and, unless such revised Exhibit "B" is disapproved by the Supervisor or the Commissioner within sixty (60) days after such filing, the revised Exhibit "B" shall be effective as of the effective date of this Agreement and shall thereafter govern the allocation of all Unitized Substances, subject, however, to any further revision or revisions of Exhibit "B" in accordance with the provisions hereof (Section 4, 31 and 32).

In any such event, the revised Tract Participations of the respective Tracts entitled to participation prior to such subsequent commitment shall remain in the same ratio one to another.

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 (as provided in Section 13 hereof) in the production of Unitized Substances therefrom shall be those Tracts more particularly described in said 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 otherwise qualify as follows (the lessee of record shall supplant the royalty interest as to Federal land for the purpose of this Section):

(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 eighty-five percent (85%) or more of the Royalty Interest created by the basic leases 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 eighty-five percent (85%) of the Royalty Interest created by the basic leases have become parties to this agreement, and as to which (1) all Working Interest Owners in such Tract have joined in a request for the acceptance of such Tract, and as to which (2) eighty percent (80%) of the combined voting interests of Working Interest Owners in all Tracts that meet the requirements of (a) have voted in favor of the acceptance of such Tract. For the purpose of this Subsection (b), the voting interest of a Working Interest Owner shall be equal to the ratio that its Unit Participation attributable to Tracts that qualify under (a) above bears to the total Unit Participation of all Working Interest Owners attributable to all Tracts that qualify under (a) above.
- (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 created by the basic leases therein that is committed hereto; and as to which (1) The Working Interest Owner who operates the Tract and all of the other Working Interest Owners in such Tract who have become parties to this agreement have joined in a request for acceptance of such Tract, and have executed and delivered an indemnity agreement indemnifying and agreeing to hold harmless the Working Interest Owners in all other Tracts that qualify under this Section 14, their successors and assigns, against all claims and demands that may be made by the owners of Working Interests in such Tract who are not parties to this agreement, and which arise out of the acceptance of the Tract; and as to which (2) eighty percent (80%) of the combined voting interest of Working Interest Owners in all Tracts that meet the requirements of (a) and (b) above have voted in favor of the acceptance of such Tract and to accept the indemnity agreement. For the purpose of this Subsection (c), the voting interest of each Working Interest Owner shall be equal to the ratio that its Unit Participation attributable to Tracts that qualify under (a) and (b)

above bears to the total Unit Participation of all Working Interest Owners attributable to all Tracts that qualify under (a) and (b) above. Upon the acceptance of such a Tract, the Unit Participation that would have been attributed to the non-subscribing owners of the 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, in proportion to their respective Working Interests in the Tract.

If, on the effective date of this Agreement, there are any Tract or Tracts in the Unit Area 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 considered as unitized land and shall not be entitled to Tract Participation hereunder. Unit Operator, shall, when submitting this Agreement for final approval by the Commissioner and the Director, file therewith a schedule of those Tracts which have been committed and made subject to this Agreement and are entitled to Tract Participation hereunder. 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 Tract 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 a part of Exhibit "B" and upon approval thereof by the Commissioner and the Director shall become a part of this Agreement and shall govern the allocation of production of Unitized Substances until a new schedule is filed and approved by the Commissioner and the Director.

SECTION 15. ALLOCATION OF UNITIZED SUBSTANCES. All Unitized Substances produced and saved (less, save and except any part of such Unitized

Substances unavoidably lost or used in conformity with good operating practices on Unitized Land for drilling, operating, camp, and other production or development purposes and for pressure maintenance) shall be apportioned among and allocated to the qualified Tracts within the Unit Area or any revision thereof in accordance with the respective Tract Participation effective hereunder during the respective periods such Unitized Substances were produced, as set forth in the then effective schedule of participation in Exhibit "B". 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 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 produced from such Tract.

The Unitized Substances allocated to each Tract shall be distributed among, or accounted for to, the parties executing, consenting to, or ratifying this Agreement 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 Tract, 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; and nothing herein contained shall be construed as requiring any retroactive adjustment for production obtained prior to the effective date of the joinder of any Tract.

If the Working Interest and the Royalty Interest in any Tract are or hereafter become divided with respect to separate parcels or portions of such Tract and owned severally by different persons, the Tract Participation assigned to such Tract 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 16 (ROYALTY SETTLEMENT) 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 for the payment of such expense.

In the event any party hereto shall fail to take in kind or separately dispose of its proportionate share of the Unitized Substances, then so long as such conditions continue, Unit Operator, for the account and at the expense of such party, and in order to avoid curtailing the operation of the Unit Area, may sell or otherwise dispose of such production to itself or others on a day-to-day

basis at not less than the prevailing market price in the area for like production; and the account of such party shall be charged therewith as having received such production. Unit Operator shall not make a sale into interstate commerce of any other party's share of gas production without first giving such other party ninety (90) days notice of such intended sale. The net proceeds, if any, of the Unitized Substances so disposed of by the Unit Operator shall be paid to the party entitled thereto.

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 on the lease or leases affected; and each such party shall hold each other party hereto harmless against all claims, demands and causes of action for the payment of such Royalty.

If, after the effective date of this Agreement, there is any Tract or Tracts subsequently committed to the Unit Area, 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 is subsequently committed hereto under the provisions of Section 32 (NON-JOINDER AND SUBSEQUENT JOINDER), or if any Tract is excluded from the Unit Area as provided for in Section 31 (LOSS OF TITLE), the Tract Participations as shown in the current Exhibit "B" shall be revised by the Unit Operator and distributed to the Working Interest Owners, the Commissioner, and the Supervisor to show the new Tract Participations of

all the then effectively committed Tracts in the Unit Area; and the revised schedules, upon approval by the Commissioner and the Director, shall govern the allocation of Unitized Substances produced from the Unitized Land from and after the effective date thereof until a new schedule is approved by the Commissioner and Director.

SECTION 16. ROYALTY SETTLEMENT. The State of New Mexico and the United States of America and all Royalty Owners who, under an existing contract, are entitled to take in kind a share of the Unitized 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 the Unit Operator shall make deliveries of such Royalty share taken in kind in conformity with the applicable contracts, laws, and regulations. Settlement for Royalty Interest 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 in accordance with the terms of this Unit Agreement.

If gas obtained from lands or formations not subject to this Agreement is introduced into the Unitized Formation for use in repressuring, stimulation of production, or increasing ultimate recovery in conformity with a plan approved pursuant to Section 12 (PLAN OF OPERATIONS), a like amount of gas, less appropriate deduction loss from any cause, may be withdrawn from the Unitized

Formation royalty free as to dry gas but not as to products extracted therefrom; provided that such withdrawal shall be at such time as may be provided in the approved plan of operations or as otherwise may be consented to by the Commissioner and the Supervisor as conforming to good petroleum engineering practices. If liquid petroleum gases obtained from lands or formations not subject to this Agreement are introduced into the Unitized Formation for the purpose and under the conditions set forth in the preceding sentence, then part or all of such liquid petroleum gases may be withdrawn royalty free pursuant to such conditions and formulas as may be prescribed or approved by the Supervisor and the Commissioner. The right of withdrawal contained in this Section shall terminate as of the effective date of termination of this Unit Agreement.

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 of Unitized Land in lieu of actual production from such Tract or Tracts.

Royalty due the United States shall be computed as provided in the operating regulations and paid in value or delivered in kind as to all Unitized Substances on the basis of the amounts thereof allocated to Unitized Federal land as provided herein at the rates specified in the respective Federal leases, or at such lower rate or rates as may be authorized by law or regulation, provided that for leases on which the royalty rate depends on the daily average production per well, said average production shall be determined in accordance with the operating regulations as though the Unitized Land were a single consolidated lease.

Royalty due the State of New Mexico shall be computed and paid as to all Unitized Substances on the basis of the amounts thereof allocated to Unitized State Land as provided herein at the rates specified in the respective State Oil and Gas Lease.

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 appears 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 thereof shall be reduced proportionately and the interest of all parties shall be adjusted accordingly.

SECTION 17. 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 rental or minimum royalty is waived, suspended, or reduced by law or by approval of the Secretary or his duly authorized representative.

SECTION 18. 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 19. 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.

SECTION 20. 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 Secretary and the Commissioner, 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 Federal and State 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 and every 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 secondary recovery operations performed hereunder upon any Tract of Unitized Land shall be accepted and deemed to be performed upon and for the benefit of each and every Tract of Unitized Land; and no lease shall be deemed to expire by reason of failure to drill or produce wells situated on land therein embraced.

(c) Suspension of drilling or producing operations on all Unitized Land pursuant to direction or consent of the Commissioner and the Supervisor or their duly authorized representatives shall be deemed to constitute such suspension pursuant to such direction or consent as to each and every Tract of Unitized Land.

(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) Termination of this Agreement shall not affect any lease which, pursuant to the terms thereof or any applicable laws, shall continue in force and effect thereafter.

(f) 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.

(g) 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 terms 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 secondary 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.

(h) The segregation of any Federal lease committed to this Agreement is governed by the following provisions in the fourth paragraph of Sec. 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 to 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 21. MATHEMATICAL ERRORS. It is hereby agreed by all parties to this Agreement that Unit Operator is empowered to correct any mathematical or clerical errors which might exist in the pertinent exhibits to this Agreement upon approval of such changes by the Commissioner and Supervisor.

SECTION 22. COVENANTS RUN WITH LAND. The covenants herein shall be construed to be covenants running with the land with respect to the interest of the parties hereto and their successors in interest until this Agreement is terminated, 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 23. 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 as of 7:00 a.m. of the first day of the month next following:

(a) The execution or ratification of this Agreement and Unit Operating Agreement by Working Interest Owners owning a combined unit participation of at least 95 per cent, and the execution or ratification of this Agreement by Royalty Owners owning a combined interest of at least 75 per cent of the Royalty Interest, in said Unit Area; and,

(b) The approval of this Agreement by the Commissioner, the Secretary or his duly authorized representatives, and the Commission; and,

(c) The filing of at least one counterpart of this Agreement for record in the office of the County Clerk of Eddy County, New Mexico, by the Unit Operator and provided, further, that if (a), (b) and (c) above are not accomplished on or before July 1, 1969, this Agreement 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 unit participation of at least ninety per cent (90%) and such Working Interest Owners have decided to extend said expiration date for a period not to exceed six (6) months (hereafter called "extended expiration date"). If said expiration date is so extended and (a), (b) and (c) are not accomplished on or before said extended expiration date, this Agreement shall ipso facto expire on said extended expiration date and thereafter be of no further force or effect. For the purpose of this Section, ownership shall be computed on the basis of unit participation as determined from Exhibit "C" attached to the Unit Operating Agreement.

(d) Unit Operator shall, within thirty (30) days after the effective date of this Agreement, file for record in the offices where a counterpart of this Agreement is recorded, a certificate to the effect that this Agreement has become effective according to its terms and stating further the effective date.

The term of this Agreement shall be for and during the time that Unitized Substances are or can be produced in paying quantities from the Unit Area

and as long thereafter as drilling, reworking or other operations (including secondary recovery operations) are prosecuted thereon without cessation of more than ninety (90) consecutive days and so long thereafter as Unitized Substances can be produced as aforesaid. Termination under this provision shall be effective as of the first day of the month after the Unit Operator and Working Interest Owners owning ninety percent (90%) of Unit Participation shall determine on confirmatory data satisfactory to the Commissioner, the Commission, and the Director, that unit operations are no longer paying.

This Agreement may be terminated at any other time and for any other reason by the Working Interest Owners owning an aggregate of ninety percent (90%) or more of Unit Participation with the approval of the Commissioner, the Commission, and the Director. Notice of any such termination shall be given by the Unit Operator to all parties hereto.

Upon termination of this Agreement, the further development and operation of the Unit Area as a Unit shall be abandoned, Unit operations shall cease, and thereafter the parties hereto shall be governed by the terms and provisions of the leases and contracts affecting the separate tracts.

Unit Operator shall within thirty (30) days after the termination date of this Agreement, file for record in the office where a counterpart of this Agreement is recorded, a certificate to the effect that this Agreement has terminated according to its terms and stating further the termination date.

If not otherwise covered by the leases unitized under this Agreement, Royalty Owners hereby grant Working Interest Owners a period of six (6) 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 24. RATE OF PROSPECTING, DEVELOPMENT AND PRODUCTION.

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. The Director is hereby vested with authority to alter or modify from time to time, in his discretion, the rate of prospecting and development and within the limits made or fixed by the Commission to alter or modify the quantity and rate of production under this Agreement, such authority being hereby limited to alteration or modification in the public interest, the purpose thereof and the public interest to be served thereby to be stated in the order of alteration or modification; provided, further, that no such alteration or modification shall be effective as to any land of the State of New Mexico as to the rate of prospecting and development in the absence of the specific written approval thereof by the Commissioner and as to any lands of the State of New Mexico or privately owned lands subject to this Agreement as to the quantity and rate of production in the absence of specific written approval thereof by the Commission.

Powers in this Section vested in the Director, the Commission, and Commissioner shall only be exercised after notice to Unit Operator and opportunity for hearing to be held not less than fifteen (15) days from notice.

SECTION 25. NON-DISCRIMINATION. In connection with the performance of work under this Agreement, the Unit Operator agrees to comply with all of the provisions of Section 202 (1) to (7) inclusive, of Executive Order 11246, (30 F.R. 12319), which are hereby incorporated by reference in this Agreement.

SECTION 26. APPEARANCES. Unit Operator shall have the right to appear for or on behalf of any and all interests affected hereby before the Commissioner, the Department, and the Commission, and to appeal from any order issued under the rules and regulations of the Department, the Commissioner, or the Commission, or to apply for relief from any of said rules and regulations or in any proceedings relative to operations before the Department, the Commission, or the Commissioner, 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 27. 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 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 28. 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 rules or regulations issued thereunder in any way affecting such party, or as a waiver by such party of any right beyond his or its authority to waive.

SECTION 29. EQUIPMENT AND FACILITIES-FIXTURES ATTACHED TO REALTY. Each Working Interest Owner has hereto 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 Unit Area as now or hereafter constituted. Therefore, for all purposes of this Agreement, any and all such equipment shall be considered to be personal property and not fixtures attached to realty. Accordingly, said well and lease equipment and personal property is hereby severed from the mineral estates affected by this Agreement, and it is agreed that any and all such equipment and personal property shall be and remain personal property for all purposes.

SECTION 30. UNAVOIDABLE DELAY. All obligations under this Agreement requiring the Unit Operator to commence or continue secondary 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, fire, war, Civil disturbances, acts of God, Federal, State or municipal law or agency, unavoidable accident, uncontrollable delays in transportation, inability to obtain necessary material in open market, or other matters beyond the reasonable control of the Unit Operator, whether similar to matters herein enumerated or not.

SECTION 31. 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 Unit Agreement, such Tract shall be automatically regarded as not committed hereto effective as of 7:00 a.m. on the first day after such title failure 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 thereto, 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 States of America shall be withheld, but such funds shall be deposited as directed by the Supervisor or the Commissioner (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 defect or failure of any title hereunder.

SECTION 32. NONJOINDER AND SUBSEQUENT JOINDER. If the owner of any substantial interest in a tract within the Unit Area fails or refuses to subscribe, ratify, or consent in writing to this Agreement, the Working Interest Owner in that Tract who has executed or ratified this Agreement may withdraw said Tract from this Agreement by written notice to the Director, the Commissioner, and Unit Operator prior to the effective date of this Agreement. 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 the Unit 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 Unit Agreement.

Any oil or gas interest in Unitized Substances not committed hereto prior to submission of this Agreement to the Director and the 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 and for a period of and including six (6) months thereafter, 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, however, after final approval of this Agreement by the Commissioner, any commitment of State land must be approved by the Commissioner.

It is understood and agreed, however, that from and after six (6) months from 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 as may be agreed upon by ninety percent (90%) of the Working Interest Owners (based on Unit Participation), subject to approval by the Commissioner and Director. Such 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 land is involved, such joinder

must be approved by the Commissioner. Such joinder by a proposed Royalty Owner at any time 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 joinders to this Agreement shall be effective at 7:00 a.m. as of the first day of the month following the filing with the Supervisor and the 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 Director or the Commissioner is duly made within sixty (60) days after such filing. Notwithstanding any of the provisions to the contrary, all commitment of State of New Mexico land must be approved by the Commissioner.

SECTION 33. OIL IN LEASE TANKAGE ON EFFECTIVE DATE. Unit Operator shall make a proper and timely gauge of all lease and other tanks on Unitized land in order to ascertain the amount of merchantable oil or other liquid hydrocarbons above the pipeline connection in such tanks as of 7:00 a.m. on the effective date hereof. Any of such production which has been produced legally as part of the prior allowable of the well or wells from which produced shall be and remain the property of the Working Interest Owner entitled thereto the same as if the Unit had not been formed; and such Working Interest Owner shall promptly remove said oil from Unitized Land. Any such oil not promptly removed shall be sold by Unit Operator for the

account of such Working Interest Owner who shall pay all royalty, overriding royalties, production payments, and all other payments under the terms and provisions of the applicable lease or leases and other contracts. All such oil as is in excess of the prior allowable of the well or wells from which the same was produced shall be regarded and treated the same as Unitized Substances produced after the effective date hereof. If, as of the effective date hereof, any Tract is overproduced with respect to the allowable of the well or wells on that Tract and the amount of such overproduction has been sold or otherwise disposed of, such overproduction shall be regarded and included as a part of the Unitized Substances produced after the effective date hereof.

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 lands within the above-described Unit Area.

SECTION 35. 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 such 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 36. CONFLICT OF SUPERVISION. Neither the Unit Operator nor the Working Interest Owners, nor any of them, shall be subject to any forfeiture, termination or expiration of any rights hereunder or under any leases or contracts subject hereto, or to any penalty or liability on account of delay or failure in whole or in part to comply with any applicable provisions thereof to the extent that the said Unit Operator or the Working Interest Owners, or any of them, are hindered, delayed or prevented from complying therewith by reason of failure of the Unit Operator to obtain, in the exercise of due diligence, the concurrence of proper representatives of the United States and of the State of New Mexico in and about any matters or things concerning which it is required herein that such concurrence be obtained. The parties hereto, including the Commission, agree that all powers and authority vested in the Commission in and by any provisions of this Agreement are vested in the Commission and shall be exercised by it pursuant to the provisions of the laws of the State of New Mexico and subject in any case to appeal or judicial review as may now or hereafter be provided by the laws of the State of New Mexico.

SECTION 37. NO PARTNERSHIP. It is expressly agreed that the relation of the parties hereto is that of independent contractors and nothing in this Agreement contained, expressed or implied, or any operations conducted hereunder, shall create or be deemed to have created a partnership or association between the parties hereto or any of them.

SECTION 38. BORDER AGREEMENTS. Subject to the approval of the Commissioner and the Supervisor, the Unit Operator with concurrence of 70% of the Working Interest Owners (based on Unit Participation), may enter into a border-protection agreement or agreements with the Working Interest Owners of adjacent lands along the exterior boundary of the Unit Area with respect to the operations in the border area for the maximum ultimate recovery, conservation purposes and proper protection of the parties and interests.

SECTION 39. LIMITATION OF APPROVALS. Notwithstanding anything herein contained to the contrary, if no Federal lands are committed to this Agreement, then no consents or approvals provided herein shall be required of the Department, the Secretary, the Director, or the Supervisor; and it shall not be necessary to file any instrument hereunder with said officers or agencies unless and until Federal Lands are so committed to this Agreement; likewise, if no State lands are committed to this Agreement, then no consents or approvals provided herein shall be required of the Commissioner, and it shall not be necessary to file any instrument hereunder with said officer unless and until State lands are so committed to this Agreement.

IN WITNESS WHEREOF, the parties hereto have caused this Agreement to be executed and have set opposite their respective names the date of execution.

ANADARKO PRODUCTION COMPANY

BY _____

Its _____

UNIT OPERATOR AND WORKING
INTEREST OWNER

ATTEST:

DATE: _____

CITIES SERVICE OIL COMPANY

ATTEST:

BY _____

Its _____

DATE: _____

DEPCO, INC.

ATTEST:

BY _____

Its _____

DATE: _____

HUSKY OIL COMPANY

ATTEST:

BY _____

Its _____

DATE: _____

LGM COMPANY

ATTEST:

BY _____

Its _____

DATE: _____

NEWMONT OIL COMPANY

ATTEST:

BY _____

Its _____

DATE: _____

DATE: _____

DATE: _____

DATE: _____

DATE: _____

DATE: _____

J.U. CONE, TRUSTEE, for the Douglas
Cone Trust, Clifford Cone Trust, Thomas
Cone Trust, Cathie Cone Trust, and
Kenneth Cone Trust.

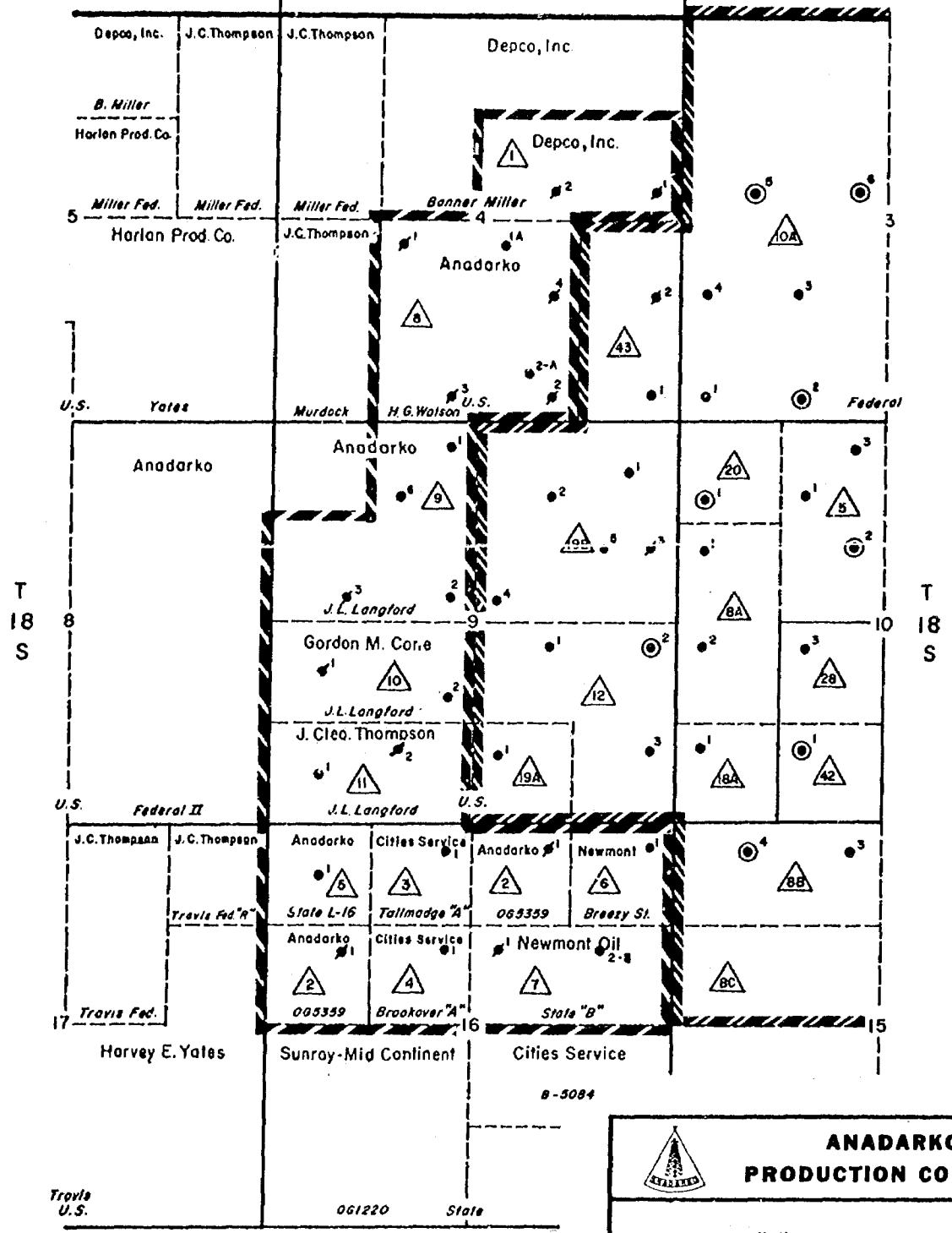
GORDON M. CONE

R.D. COLLIER

J. CLEO THOMPSON, SR.

JAMES CLEO THOMPSON, JR.

R - 29 - E



LEGEND

- | | |
|----------------------------------|---|
| ● OIL WELL | △ TRACT NUMBER |
| ★ GAS WELL | —— UNIT BOUNDARY - ANADARKO OPERATED |
| ◇ DRY HOLE | —— UNIT BOUNDARY - NEWMONT OPERATED |
| ⊙ WATER INJECTION WELL | NOTE: Plot shows wells that have produced oil from zone 4 of Grayburg |
| ⊗ ABANDONED OIL WELL | |
| ⊙ TEMPORARILY ABANDONED OIL WELL | |



**ANADARKO
PRODUCTION COMPANY**

EXHIBIT "A" TO UNIT AGREEMENT
FAR WEST LOCO HILLS SAND UNIT
LOCO HILLS FIELD

EDDY COUNTY, NEW MEXICO



DATE 5-1-68 SCALE FEET

EXHIBIT "B" TO UNIT AGREEMENT
FAR WEST LOCO HILLS SAND UNIT
Eddy County, New Mexico

SCHEDULE OF OWNERSHIP

TRACT NO.	DESCRIPTION OF LAND	NUMBER OF ACRES	SERIAL NUMBER AND EXPIRATION DATE	BASIC ROYALTY AND PERCENTAGE	RECORD LESSEE	OVERRIDING ROYALTY OWNERSHIP	WORKING INTEREST OWNER AND PERCENTAGE	PERCENTAGE TRACT PARTICIPATION
<u>FEDERAL LANDS</u>								
1	S/2NE/4 Section 4 T18S, R29E	80	LC 058579 HBP	U.S.A. 12.5% to 32.0%-oil 12.5% to 16 2/3% - gas	Depco, Inc. - $\frac{1}{2}$ and Husky Oil Company - $\frac{1}{2}$		Depco, Inc. (Operator) - 50% Husky Oil Company - 50%	2.248337
<u>STATE LANDS</u>								
2	NW/4NE/4 and SW/4 NW/4 Section 16 T18S, R29E	80	OG-5359-1 4-21-69	State of New Mexico 12.5%	T.J. Sivley and John H. Trigg	Lonnie Kemper et ux 1/16 of 8/8 on oil increasing to 1/8 of 8/8 after 25,000 barrels produced. 1/8 of 8/8 of gas.	Anadarko Production Company (Surface to 4000')	-100% 6.106849

EXHIBIT "B" TO UNIT AGREEMENT (Continued)
 FAR WEST LOCO HILLS SAND UNIT
 Eddy County, New Mexico

SCHEDULE OF OWNERSHIP

TRACT NO.	DESCRIPTION OF LAND	NUMBER OF ACRES	SERIAL NUMBER AND EXPIRATION DATE	BASIC ROYALTY AND PERCENTAGE	RECORD LESSEE	OVERRIDING ROYALTY OWNERSHIP	WORKING INTEREST OWNER AND PERCENTAGE	PERCENTAGE TRACT PARTICIPATION
3	NE/4NW/4 Section 16 T18S, R29E	40	B-4918-49 HBP	State of New Mexico 12.5%	Carper Drilling Company	David Carmody and David Chaves, Jr. 3% of 8/8	Cities Service Oil Company (Operator) R.D. Collier Anadarko Production Company - 50% - 25% - 25%	10.813586
4	SE/4NW/4 Section 16 T18S, R29E	40	B-4918-97 HBP	State of New Mexico 12.5%	Cities Service Oil Company		Cities Service Oil Company -100%	2.183512
5	NW/4NW/4 Section 16 T18S, R29E	40	B-6058-15 HBP	State of New Mexico 12.5%	Continental Oil Company	Donnell Drilling Company 1/16 of 8/8	Anadarko Production Company (Surface to 3500') -100%	4.131993
6	NE/4NE/4 Section 16 T18S, R29E	40	E-3136 HBP	State of New Mexico 12.5%	Ralph Nix	Ralph Nix and Jerry Curtis 1/8 of 7/8	Newmont Oil Company (Surface to 350' below Top of San Andres) -100%	0.467134

EXHIBIT "B" TO UNIT AGREEMENT (Continued)
 FAR WEST LOCO HILLS SAND UNIT
 Eddy County, New Mexico

SCHEDULE OF OWNERSHIP

TRACT NO.	DESCRIPTION OF LAND	NUMBER OF ACRES	SERIAL NUMBER AND EXPIRATION DATE	BASIC ROYALTY AND PERCENTAGE	RECORD LESSEE	OVERRIDING ROYALTY OWNERSHIP	WORKING INTEREST OWNER AND PERCENTAGE	PERCENTAGE TRACT PARTICIPATION
7	S/2NE/4 Section 16 T18S, R29E	80	B-6570-28 HBP	State of New Mexico 12.5%	R.L. Tayloe	R.L. Tayloe 1/8 of 7/8	Newmont Oil Company (Surface to 3400')	-100% 4.521291
<u>FEE LANDS</u>								
8	W/2SE/4; E/2SW/4 Section 4 T18S, R29E	160	Fee Land HBP	Appendix Note 1	Anadarko Production Company	Appendix Note 2	Anadarko Production Company (Surface to 3220')	-100% 21.695396
9	S/2NW/4; NE/4NW/4 Section 9 T18S, R29E	120	Fee Land HBP	J.L. Langford 10.9375% C.R. Baldwin 1.5625%	Anadarko Production Company	Appendix Note 3	Anadarko Production Company (Surface to 3150')	-100% 19.702019
10	N/2SW/4 Section 9 T18S, R29E	80	Fee Land HBP	J.L. Langford 10.9375% C.R. Baldwin 1.5625%	Gordon M. Cone and J.U. Cone, Trustee for Douglas, Clifford, Thomas, Cathie and Kenneth Cone Trusts		Gordon M. Cone - 50% J.U. Cone, Trustee for Douglas, Clifford, Thomas, Cathie and Kenneth Cone Trusts - 50%	13.080327

EXHIBIT "B" TO UNIT AGREEMENT (Continued)
 FAR WEST LOCO HILLS SAND UNIT
 Eddy County, New Mexico

SCHEDULE OF OWNERSHIP

TRACT NO.	DESCRIPTION OF LAND	NUMBER OF ACRES	SERIAL NUMBER AND EXPIRATION DATE	BASIC ROYALTY AND PERCENTAGE	RECORD LESSEE	OVERRIDING ROYALTY OWNERSHIP	WORKING INTEREST OWNER AND PERCENTAGE	PERCENTAGE TRACT PARTICIPATION
11	S/2SW/4 Section 9 T18S, R29E	80	Fee Land HBP	J.L. Langford 10.9375% C.R. Baldwin 1.5625%	J. Cleo Thompson, Sr. and James Cleo Thompson, Jr.	Appendix Note 4	J. Cleo Thompson, Sr. and James Cleo Thompson, Jr. IGM Company	-66 2/3% -33 1/3%
UNIT TOTAL								15.049556 100.000000

TOTALS

1 Federal Tract	80 acres	9.52% of Unit Area
6 State of New Mexico Tracts	320 acres	38.10% of Unit Area
4 Fee Tracts	440 acres	52.38% of Unit Area
11 Tracts	840 acres	100.00% of Unit Area

APPENDIX TO EXHIBIT "B" TO UNIT AGREEMENT
FAR WEST LOCO HILLS SAND UNIT
Eddy County, New Mexico

NOTE 1 - BASIC ROYALTY OWNERS UNDER TRACT 8

A.L. Cone	1.82292%
J.R. Cone	1.09375
Katherine Drake	0.20833
Vera H. Herren	1.56250
George L. Reese, Jr.	0.78125
Oliver H. Smith, Jr.	3.12500
Leona L. Stagner	0.78125
H.G. Watson	<u>3.12500</u>
	12.50000%

NOTE 2 - OVERRIDING ROYALTY AND PRODUCTION PAYMENT OWNERSHIP UNDER TRACT 8

W.D. Brookover et ux and W.D. Brookover, Jr. et ux	1/16 of 7/8 reduced to 1/32 of 7/8 when average production less than 10 BOPD per well.
--	--

\$136,320.00 production payment from this tract
and other leases outside of Unit Area to V.S.
Welch out of 3% of gross oil produced.

\$200,000.00 production payment from this tract
and other leases outside of Unit Area to Cima
Capitan, Inc. (2/3) and Harold C. Porter (1/3)
out of one-third (1/3) of net working interest
oil produced. After payout Cima Capitan, Inc.
and Harold C. Porter will receive 1/64 of net
working interest override.

APPENDIX TO EXHIBIT "B" TO UNIT AGREEMENT (Cont.)
 FAR WEST LOCO HILLS SAND UNIT
Eddy County, New Mexico

NOTE 3 - OVERRIDING ROYALTY AND PRODUCTION PAYMENT OWNERSHIP UNDER TRACT 9

Harvey E. Yates	1.000%
Martin Yates III	1.000
S.P. Yates	1.000
John A. Yates	1.000

\$136,320.00 production payment from this tract and other leases outside of Unit Area to V.S. Welch out of 3% of gross oil produced.

\$200,000.00 production payment from this tract and other leases outside of Unit Area to Cima Capitan, Inc. (2/3) and Harold C. Porter (1/3) out of one-third (1/3) of net working interest oil produced. After payout Cima Capitan, Inc. and Harold C. Porter will receive 1/64 of net working interest override.

NOTE 4 - OVERRIDING ROYALTY OWNERSHIP UNDER TRACT 11

SW/4SW/4 Section 9 SE/4SW/4 Section 9

Roy G. Barton	2½% of 8/8ths
Georgia Mae Cocke	1% of 8/8ths
Sally Ruth Dean	1% of 8/8ths
Alex S. Emmons	1/2% of 8/8ths
W.E. Flint	5% of 8/8ths
LGM Company	1/3% of 8/8ths 1% of 8/8ths
E.H. Lumpkin	1% of 8/8ths
James D. Lumpkin	1% of 8/8ths
Mrs. J.W. Peery	3% of 8/8ths 3% of 8/8ths
H. Dillard Schenck	4% of 8/8ths 5% of 8/8ths

APPENDIX TO EXHIBIT "B" TO UNIT AGREEMENT (Cont.)
 FAR WEST LOCO HILLS SAND UNIT
Eddy County, New Mexico

NOTE 4 - OVERRIDING ROYALTY OWNERSHIP UNDER TRACT 11 (Continued)

	<u>SW/4SW/4 Section 9</u>	<u>SE/4SW/4 Section 9</u>
Taylor Holdings, Ltd.	1/2% of 8/8ths	1/2% of 8/8ths
J. Cleo Thompson, Sr. and James Cleo Thompson, Jr.	2/3% of 8/8ths	2% of 8/8ths
George S. Todd	1/2% of 8/8ths	1/2% of 8/8ths
Helen Claire Wadley		1% of 8/8ths
H.G. Watson	3% of 8/8ths	3% of 8/8ths
Hollis G. Watson	5% of 8/8ths	
Avis I Watson		5% of 8/8ths

UNIT OPERATING AGREEMENT
FAR WEST LOCO HILLS SAND UNIT
Eddy County, New Mexico

INDEX

<u>ARTICLE</u>		<u>PAGE</u>
1	CONFIRMATION OF UNIT AGREEMENT	1
1.1	Confirmation of Unit Agreement	1
2	EXHIBITS	2
2.1	Exhibits	2
2.1.1	Exhibits A and B	2
2.1.2	Exhibit C	2
2.1.3	Exhibit D	2
2.1.4	Exhibit E	2
2.2	Revision of Exhibits	2
3	SUPERVISION OF OPERATIONS BY WORKING INTEREST OWNERS	2
3.1	Overall Supervision	2
3.2	Particular Powers and Duties	3
3.2.1	Method of Operation	3
3.2.2	Drilling of Wells	3
3.2.3	Well Workovers and Change of Status	3
3.2.4	Expenditures	3
3.2.5	Disposition of Surplus Facilities	4
3.2.6	Appearance Before a Court or Regulatory Body	4
3.2.7	Audits	5
3.2.8	Inventories	5
3.2.9	Technical Services	5
3.2.10	Appointment of Committees	6
3.2.11	Removal of Unit Operator	6
3.2.12	Enlargement of Unit Area	6
3.2.13	Adjustment and Readjustment of Investments	6
3.2.14	Termination of Unit Agreement	6
4	MANNER OF EXERCISING SUPERVISION	6
4.1	Designation of Representatives	6
4.2	Meetings	6
4.3	Voting Procedure	7
4.3.1	Voting Interest	7
4.3.2	Vote Required	7
4.3.3	Vote at Meetings by Nonattending Working Interest Owner	8
4.3.4	Poll Votes	8
5	INDIVIDUAL RIGHTS AND PRIVILEGES OF WORKING INTEREST OWNERS	9
5.1	Reservation of Rights	9

UNIT OPERATING AGREEMENT
FAR WEST LOCO HILLS SAND UNIT

INDEX

<u>ARTICLE</u>		<u>PAGE</u>
5.2	Specific Rights	9
5.2.1	Access to Unit Area	9
5.2.2	Reports by Request	9
5.3	Undrilled Locations	10
6	UNIT OPERATOR	10
6.1	Initial Unit Operator	10
6.2	Resignation or Removal and Selection of Successor	10
7	POWERS AND DUTIES OF UNIT OPERATOR	10
7.1	Exclusive Right to Operate Unit	10
7.2	Workmanlike Conduct	10
7.3	Liens and Encumbrances	11
7.4	Employees	11
7.5	Records	11
7.6	Reports to Working Interest Owners	11
7.7	Reports to Governmental Authorities	11
7.8	Engineering and Geological Information	11
7.9	Expenditures	12
7.10	Settlements	12
7.11	Nondiscrimination	12
7.12	Mathematical Errors	12
8	TAXES	13
8.1	Ad Valorem Taxes	13
8.2	Other Taxes	13
9	INSURANCE	14
9.1	Insurance	14
9.1.1	Insurance	14
10	ADJUSTMENT OF INVESTMENTS	14
10.1	Personal Property Taken Over	14
10.1.1	Wells and Casing	14
10.1.2	Well and Lease Equipment	14
10.1.3	Records	14
10.2	Inventory and Evaluation of Personal Property	15
10.3	Investment Adjustment	15
10.4	General Facilities	16
10.5	Ownership of Personal Property and Facilities	16
11	DEVELOPMENT AND OPERATING COSTS	17
11.1	Basis of Charge to Working Interest Owners	17
11.2	Budgets	17
11.3	Advance Billing	18

UNIT OPERATING AGREEMENT
FAR WEST LOCO HILLS SAND UNIT

INDEX

<u>ARTICLE</u>		<u>PAGE</u>
11.4	Commingling of Funds	18
11.5	Lien of Unit Operator	18
11.6	Unpaid Unit Expense	19
11.7	Wells Drilled by Unit Operator	19
11.8	Uncommitted Royalty	20
11.8.1	Burden of 1/8th Royalty	20
11.8.2	Burden of Excess Royalty and Other Interests	21
12	OIL IN LEASE TANKAGE ON EFFECTIVE DATE	21
12.1	Gauge of Merchantable Oil	21
13	OPERATION OF NON-UNITIZED FORMATIONS	22
13.1	Right to Operate in Non-Unitized Formation	22
14	TITLES	22
14.1	Warranty and Indemnity	22
14.2	Failure Because of Unit Operations	23
15	LIABILITY, CLAIMS AND SUITS	23
15.1	Individual Liability	23
15.2	Settlements	24
16	INTERNAL REVENUE PROVISION	24
16.1	Internal Revenue Provision	24
17	NOTICES	25
17.1	Notices	25
18	WITHDRAWAL OF WORKING INTEREST OWNER AND CREATION OF NEW INTEREST	26
18.1	Withdrawal	26
18.2	Creation of a New Interest	27
19	ABANDONMENT OF WELLS	27
19.1	Rights of Former Owners	27
19.2	Plugging	28
20	EFFECTIVE DATE AND TERM	28
20.1	Effective Date	28
20.2	Term	29
21	TERMINATION OF UNIT AGREEMENT	29
21.1	Termination	29
21.1.1	Oil and Gas Rights	29
21.1.2	Right to Operate	29
21.1.3	Salvaging Wells	30
21.1.4	Cost of Salvaging	30

UNIT OPERATING AGREEMENT
FAR WEST LOCO HILLS SAND UNIT

INDEX

<u>ARTICLE</u>		<u>PAGE</u>
22	COUNTERPART EXECUTION	30
22.1	Execution by Separate Counterparts or Ratifications	30
23	SUCCESSORS AND ASSIGNS	31
23.1	Successors and Assigns	31

EXHIBIT "C" (Summary of Ownership by Working Interest Owner)

EXHIBIT "D" (Accounting Procedure)

EXHIBIT "E" (Insurance Provisions)

UNIT OPERATING AGREEMENT
FAR WEST LOCO HILLS SAND UNIT
Eddy County, New Mexico

THIS AGREEMENT, entered into as of the ____ day of _____,
19 ____, by and between the parties who execute or ratify this Agreement;

WITNESSETH

THAT, WHEREAS, the parties hereto as Working Interest Owners have executed as of the date hereof, that certain Unit Agreement for the development and operation of the Far West Loco Hills Sand Unit, Eddy County, New Mexico, hereinafter referred to as "Unit Agreement", and which, among other things, provides for a separate agreement to be made and entered into by and between Working Interest Owners pertaining to the development and operation of the Unit Area 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 incorporated herein by reference and made a part of this Agreement. The definitions in the Unit Agreement are adopted for all purposes of this Agreement. In the event that there is any conflict between the Unit Agreement and this Agreement, the Unit Agreement shall prevail.

ARTICLE 2

EXHIBITS

2.1 Exhibits. The following exhibits are incorporated herein by reference:

2.1.1 Exhibits A and B of the Unit Agreement.

2.1.2 Exhibit C attached hereto, is a schedule showing the total Unit Participation of each Working Interest Owner.

2.1.3 Exhibit D, attached hereto, is the Accounting Procedure applicable to development and operation of the Unit Area. In the event of conflict between this Agreement and Exhibit D, this Agreement shall prevail.

2.1.4 Exhibit E, attached hereto, contains insurance provisions applicable to the development and operation of the Unit Area.

2.2 Revision of Exhibits. Whenever Exhibits "A" and "B" are revised, Exhibit "C" shall be revised accordingly, such revision to be effective as of the effective date of revised Exhibits "A" and "B".

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 the development and operations of the Unit Area pursuant to this Agreement and the Unit

Agreement. In the exercise of such power 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 Particular Powers and Duties. The matters to be passed upon and decided by Working Interest Owners shall include, but not be limited to, the following:

3.2.1 Method of Operation. The kind, character and method of operation, including any type of pressure maintenance or secondary recovery program to be employed.

3.2.2 Drilling of Wells. The drilling of any wells within the Unit Area either for production of Unitized Substances, for use as an injection well, or for other purposes.

3.2.3 Well Workovers and Change of Status. The workover, recompletion, repair, abandonment, or change of status of any well in the Unit Area or use of any such well for injection or other purposes. The Unit Operator shall be responsible for performing such work and such work shall be done at Unit expense.

3.2.4 Expenditures. Making of any expenditure in excess of Five thousand dollars (\$5,000.00); provided that approval by Working Interest Owners

of the drilling, reworking, drilling deeper, or plugging back of any well shall include approval of all necessary expenditures required therefor and for completing, testing, and equipping the same, including necessary flow lines, separators and lease tankage; provided, however, that in case of blowout, explosion, fire, flood or other sudden emergencies, Unit Operator may take steps and incur such expenses as in its opinion are required to deal with the emergency and to safeguard life or property, but that Unit Operator shall, as promptly as possible, report the emergency to the Working Interest Owners.

3.2.5 Disposition of Surplus Facilities. Selling or otherwise disposing of any major item of surplus material or equipment, the current list price of new equipment similar thereto being Two thousand dollars (\$2,000.00) or more.

3.2.6 Appearance Before a Court or Regulatory Body. The designation of a representative to appear before any court or regulatory body in all matters pertaining to Unit operations; provided, however, such designation by Working Interest Owners

shall not prevent any Working Interest Owner from appearing in person at its own expense or from designating another representative in its own behalf.

3.2.7 Audits. The making of proper audits of the accounts of Unit Operator pertaining to operations hereunder; provided that such audits shall:

- (a) not be conducted more than once each year except upon the resignation or removal of Unit Operator;
- (b) be made at the expense of all Working Interest Owners other than the Working Interest Owner designated as Unit Operator, unless such audit is conducted at the specific instance and request of Unit Operator, in which latter event the same shall be made at the expense of all Working Interest Owners including the Working Interest Owner designated as Unit Operator; and
- (c) be 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 "D".

3.2.9 Technical Services. Any direct charges to the joint account for services by consultants or Unit Operator's technical personnel not covered by the overhead charges provided by Exhibit "D".

- 3.2.10 Appointment of Committees. The appointment or designation of committees or subcommittees necessary for the study of any problem in connection with Unit operations.
- 3.2.11 The removal of Unit Operator and the selection of a successor in accordance with Article 6.2 hereof.
- 3.2.12 The enlargement of the Unit Area.
- 3.2.13 The adjustment and readjustment of investments as required.
- 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 advise Unit Operator in writing the names and addresses of its representative and alternate representative authorized to represent and bind it in respect to any matter pertaining to the development and operation of the Unit Area. Such representative or alternate representative may be changed from time to time by written notice to Unit Operator.

4.2 Meetings. All meetings of Working Interest Owners for the purpose of considering and acting upon any matter pertaining to the development and operation of the Unit Area shall be called by the Unit

Operator upon its own motion or at the request of two (2) or more Working Interest Owners. No meeting shall be called on less than fourteen (14) days' advance written notice, with agenda for the meeting attached. In the absence of protest by any qualified member of the meeting, the Working Interest Owners attending such meeting shall not be prevented from amending items included in the agenda or from deciding on such amended item or from deciding other items presented at such meeting. The representative of Unit Operator shall be chairman of each meeting.

4.3 Voting Procedure. Working Interest Owners shall act upon and determine all matters coming before them as follows:

4.3.1 Voting Interest. In voting on any matter each Working Interest Owner shall have a voting interest equal to its then percentage in Unit Participation, as shown in Exhibit "C", and such revisions thereof as may hereafter be made in accordance with the terms of this Agreement.

4.3.2 Vote Required. Unless otherwise provided herein or in the Unit Agreement, Working Interest Owners shall act upon and determine all matters coming before them by the affirmative vote of seventy-five percent (75%) or more voting interest; provided that, should any one

Working Interest Owner own more than twenty-five percent (25%) voting interest, its vote must be supported by the vote of one or more Working Interest Owners having a combined voting interest of at least five percent (5%).

4.3.3 Vote at Meetings by Nonattending Working Interest Owner. Any Working Interest Owner not represented at a meeting may vote on any item included in the agenda of the meeting by letter or telegram addressed to the chairman of the meeting, provided such vote is received prior to the submission of such item to vote.

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 fourteen (14) days after the proposal is sent to Working Interest Owners. Unit Operator will give prompt notice

of the results of such voting to all Working Interest Owners.

ARTICLE 5

INDIVIDUAL RIGHTS AND PRIVILEGES
OF WORKING INTEREST OWNERS

5.1 Reservation of Rights. Working Interest Owners severally reserve to themselves all their rights, power, authority and privileges, except as provided expressly in this Agreement and the Unit Agreement.

5.2 Specific Rights. Each Working Interest Owner shall have among others, the following specific rights and privileges:

5.2.1 Access to Unit Area. Access to the Unit Area at all reasonable times to inspect the operation hereunder and all wells and records and data pertaining thereto.

5.2.2 Reports by Request: 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 data not ordinarily furnished by Unit Operator to all

Working Interest Owners; the cost of preparing copies of said reports shall be charged solely to the Working Interest Owner requesting the same.

5.3 Undrilled Locations. Undrilled locations on tracts committed to the Unit Area shall be drilled by the Unit Operator at Unit expense.

ARTICLE 6

UNIT OPERATOR

6.1 Initial Unit Operator. Anadarko Production Company, a Delaware corporation, is hereby designated as initial 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

POWERS AND DUTIES OF UNIT OPERATOR

7.1 Exclusive Right to Operate Unit. Subject to the provisions of this Agreement and to the orders, directions and limitations rightfully given or imposed by Working Interest Owners, Unit Operator shall have the exclusive right and duty to develop and operate the Unit Area for the production of Unitized Substances.

7.2 Workmanlike Conduct. Unit Operator shall conduct all operations hereunder in a good and workmanlike manner, and, in the absence of specific instructions from Working Interest Owners, shall have the right and duty to conduct such operations in the same manner as would

a prudent operator under the same or similar circumstances. Unit Operator shall freely consult with Working Interest Owners and keep them advised of all matters arising in connection with such operations which Unit Operator, in the exercise of its best judgement, considers important. Unit Operator shall not be liable for damages unless such damages result from the gross negligence or willful misconduct of Unit Operator.

7.3 Liens and Encumbrances. Unit Operator shall keep the lands and leases in the Unit Area free from all liens and encumbrances occasioned by its operations hereunder, except the lien of Unit Operator granted hereunder.

7.4 Employees. The number of employees used by Unit Operator in conducting operations hereunder, the selection of such employees, the hours of labor, and the compensation for services to be paid any and all such employees shall be determined by Unit Operator. Such employees shall be the employees of Unit Operator.

7.5 Records. Unit Operator shall keep true and correct books, accounts, and records of its operation hereunder.

7.6 Reports to Working Interest Owners. Unit Operator shall furnish to each Working Interest Owner monthly, injection and production reports for each well in the Unit, as well as periodic reports of the development and operation of the Unit Area.

7.7 Reports to Governmental Authorities. Unit Operator shall make all necessary reports to governmental authorities.

7.8 Engineering and Geological Information. Unit Operator

shall furnish to each Working Interest Owner, upon written request, a copy of the log of, and copies of engineering and geological data pertaining to, wells drilled by Unit Operator.

7.9 Expenditures. Unit Operator is authorized to make single expenditures not in excess of Five thousand dollars (\$5,000.00) without prior approval of Working Interest Owners; provided, however, that nothing in this Article (nor in Article 3.2.4) shall be deemed to prevent Unit Operator from making an expenditure in excess of said amount if such expenditure becomes necessary because of a sudden emergency which may otherwise cause loss of life, title or extensive damage to property. Unit Operator shall report to Working Interest Owners, as promptly as possible, the nature of the emergency and the action taken.

7.10 Settlements. Unit Operator may settle any single damage claim not involving an expenditure in excess of Two thousand dollars (\$2,000.00) provided such payment is a complete settlement of such claim. All claims in excess of \$2,000.00 must be approved by Working Interest Owners.

7.11 Nondiscrimination. In connection with the performance of work under this Agreement, the Unit Operator agrees to comply with all provisions of Section 202 (1) to (7) inclusive, of Executive Order 11246 (30 F.R. 12319), which are hereby incorporated by reference in this Agreement.

7.12 Mathematical Errors. It is hereby agreed by all parties to this Agreement that Unit Operator is empowered to correct any

mathematical errors which might exist in the pertinent exhibits to this Agreement upon approval of the Commissioner and the Director.

ARTICLE 8

TAXES

8.1 Ad Valorem Taxes. Beginning with the first of the calendar year after the effective date hereof, Unit Operator after consulting with Working Interest Owners, shall make and file for ad valorem tax purposes all necessary renditions and returns with the proper taxing authorities or governmental subdivisions covering all property of each Working Interest Owner within the Unit Area and used in connection with the development and operation of the Unit Area. Any Working Interest Owner dissatisfied with any proposed rendition or assessment of its interest in property shall have the right, at its own expense, to protest and resist the same. All such ad valorem taxes due and payable on account of real and personal property of each Working Interest Owner located within the Unit Area and used in connection with Unit operations shall be paid by the Unit Operator for the joint account in the same manner as other costs and expenses of Unit operations; provided that, 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 1/8 royalty, such Working Interest Owner 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 direct

taxes and assessments imposed upon or on account of the production or handling of its share of Unitized Substances.

ARTICLE 9

INSURANCE

9.1 Insurance. Unit Operator shall carry, with respect to Unit operations subject to this Agreement:

9.1.1 Insurance as set forth in Exhibit "E".

ARTICLE 10

ADJUSTMENT OF INVESTMENTS

10.1 Personal Property Taken Over. Upon the effective date hereof, Working Interest Owners shall deliver to Unit Operator possession of:

10.1.1 Wells and Casing. All wells completed in the Unitized Formation, together with the casing therein;

10.1.2 Well and Lease Equipment. The tubing and rods in each such well, together with the wellhead connections thereon, and all other lease and operating equipment used in the operation of such wells which Working Interest Owners determine is necessary or desirable for conducting Unit operations; and

10.1.3 Records. A copy of all production and well records pertaining to such wells.

10.2 Inventory and Evaluation of Personal Property. Working Interest Owners shall (at the expense of the joint account, and as of the effective date) inventory all well and lease equipment delivered to the Unit Operator as provided in Article 10.1.1 and 10.1.2, except that casing shall be given no value. The inventory will include all tangible property classified as controllable equipment. For the purpose of inventory and adjustment of investment, sucker rods and tubing under 2 inches in the wells will also be considered as controllable but will not be considered controllable in future accounting. Non-controllable equipment except items listed above will not be included on the inventory but may nevertheless be taken over by the Unit if in use on the property. The distinction between controllable and non-controllable equipment will be based on the latest material classification manual published by the Council of Petroleum Accountants Society of North America. The condition of the equipment will be indicated on the inventory and priced in accordance with the basis prescribed in Section IV of Exhibit "D" attached. The inventory and evaluation will be presented to the Working Interest Owners within ninety (90) days after the taking of the inventory. Upon approval by the Working Interest Owners of the inventory and evaluation of the equipment and personal property, the Unit Operator will furnish each Working Interest Owner a copy thereof showing only those items which it has been decided to retain and the value of each item.

10.3 Investment Adjustment. Upon approval of such

inventory and evaluation by Working Interest Owners, each Working Interest Owner shall be credited with the value of its interest in all personal property so taken over by Unit Operator under Article 10.1.2 and charged with an amount equal to that obtained by multiplying the total value of all such personal property so taken over by Unit Operator under Article 10.1.2 by such Working Interest Owner's Unit Participation as shown in Exhibit "C". 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. Pricing of inventory will be in accordance with Section IV of Exhibit "D" hereof.

10.4 General Facilities. The acquisition of warehouses, warehouse stocks, lease houses, camps, facility systems, and office buildings necessary for operations hereunder shall be by negotiation by and between the owners thereof and Unit Operator, subject to the approval of Working Interest Owners.

10.5 Ownership of Personal Property and Facilities. 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 in an amount equal to its Unit Participation shown on Exhibit "C".

ARTICLE 11

DEVELOPMENT AND OPERATING COSTS

11.1 Basis of Charge to Working Interest Owners. Unit Operator initially shall pay and discharge all costs and expenses incurred in the development and operation of the Unit Area. Working Interest Owners shall reimburse Unit Operator for all such costs and expenses, in proportion to their respective Unit Participation, shown on Exhibit "C". All charges, credits and accounting for costs and expenses shall be in accordance with Exhibit "D".

11.2 Budgets. Before or as soon as practical after the effective date hereof, Unit Operator shall prepare a budget of estimated costs and expenses for the remainder of the calendar year, and on or before the first day of each November thereafter shall prepare a budget of estimated costs and expenses for the ensuing calendar year. Such budgets shall set forth the estimated costs and expenses by quarterly periods. Unless otherwise specified in the budget, it shall be presumed for the purpose of advance billings that the estimated costs and expenses for each month of a quarterly period shall be one-third (1/3) of the estimate for the quarterly period. Budgets so prepared shall be estimates only and shall be subject to adjustment and correction by Working Interest Owners and Unit Operator from time to time wherever it shall appear that an adjustment or correction is proper. A copy of

each such budget and adjusted budget shall be promptly furnished each Working Interest Owner.

11.3 Advance Billing. Unit Operator shall have the right at its option to require Working Interest Owners to advance their respective proportion of such costs and expenses by submitting to Working Interest Owners, on or before the 15th day of any month, an itemized estimate of such costs and expenses 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 proportionate part of such estimate. Adjustment between estimates and the actual costs shall be made by Unit Operator at the close of each calendar month, and the accounts of the Working Interest Owners shall be adjusted accordingly.

11.4 Commingling of Funds. No funds received by Unit Operator under this Agreement need be segregated by Unit Operator or maintained by it as a joint fund, but may be commingled with its own funds.

11.5 Lien of Unit Operator. Each Working Interest Owner grants to Unit Operator a lien upon its Oil and Gas Rights in each Tract, its share of Unitized Substances when produced, and its interest in all Unit equipment, as security for payment of its share of Unit expense, together with interest thereon at the rate of eight per-cent (8%) per annum. Unit Operator shall have the right to bring suit to enforce collection of such indebtedness with or without seeking foreclosure of the lien. In addition, upon default by any Working

Interest Owner in payment of its share of Unit expense, Unit Operator shall have the right 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. Oil and Gas Rights, as used herein, means 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 hereof.

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 agrees, upon request by Unit Operator, to pay its proportionate part of the unpaid share of Unit expense of the defaulting Working Interest Owner. The Working Interest Owners that pay the share of Unit expense of a defaulting 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 the defaulting Working Interest Owner. Any Working Interest Owner so paying a defaulting Working Interest Owner's share of Unit expenses shall be subrogated to the lien and rights herein granted Unit Operator.

11.7 Wells Drilled by Unit Operator. All wells drilled by Unit Operator shall be drilled on a competitive basis at the usual rates

prevailing in the area. Unit Operator may employ its own tools and equipment in the drilling of wells, but in such event, the charge therefor shall not exceed the prevailing rate in the area, and such work shall be performed by Unit Operator under the same terms and conditions as are customary and usual in the area in contracts of independent contractors doing work of a similar nature.

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 to the extent provided below, the difference shall be borne by or inure to the benefit of Working Interest Owners, in proportion to their respective Unit Participation.

11.8.1 Burden of 1/8th Royalty. 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 adjust-

ments shall be made by charges
and credits to the joint account.

11.8.2 Burden of Excess Royalty and Other
Interests. Any uncommitted Royalty
Interest in excess of one-eighth
(1/8) shall be borne solely by
the Working Interest Owner contribut-
ing such interest.

ARTICLE 12

OIL IN LEASE TANKAGE ON EFFECTIVE DATE

12.1 Gauge of Merchantable Oil. Unit Operator shall
make a proper and timely gauge of all lease and other tanks within
the Unit Area in order to ascertain the amount of merchantable oil above
the pipe line connection in such tanks as of 7:00 a.m. on the effective
date hereof. All such oil which has then been produced legally shall
be and remain the property of the Working Interest Owner entitled
thereto the same as if the Unit had not been formed; and such Working
Interest Owner shall promptly remove said oil from the Unit Area. Any
such oil not removed shall be sold by Unit Operator for the account of
such Working Interest Owner, subject to the payment of all Royalty to
Royalty Owners under the terms and provisions of the Unit Agreement
and any applicable lease or leases and other contracts.

ARTICLE 13

OPERATION OF NON-UNITIZED FORMATION

13.1 Right to Operate in Non-Unitized Formations. Any Working Interest Owner now having, or hereafter acquiring, the right to drill for and produce oil, gas or other minerals, other than Unitized Substances, within the Unit Area shall have the full right to do so notwithstanding this Agreement. In exercising said right, however, such Working Interest Owner shall exercise every reasonable precaution to prevent unreasonable interference with operations hereunder. No Working Interest Owner, other than Unit Operator, shall produce Unitized Substances through any well drilled or operated by it. If any such other Working Interest Owner drills any well into or through the Unitized Formation, the Unitized Formation shall be cased or otherwise protected in such a manner that the Unitized Formation and the production of Unitized Substances will not be adversely affected. No dual completions in the Unitized Formation and some other formation shall be permitted.

ARTICLE 14

TITLES

14.1 Warranty and Indemnity. Each Working Interest Owner represents and warrants that it is the owner of the respective Working Interest set forth opposite its name in Exhibit "B" of the Unit Agreement and hereby agrees to indemnify and hold harmless the other Working Interest Owners from any loss and liability for damages due

to failure (in whole or in part) of its title to any such interests, except failure of title arising out of operations hereunder; provided that such warranty and indemnity shall be limited to an amount equal to the net value that has been received from the sale of Unitized Substances attributed to the interest as to which title failed. In the event of such title failure, the interest of the parties hereto shall be revised to reflect the true Unit participation. Each failure of title shall be effective, insofar as this Agreement is concerned, as of 7:00 a.m. on the first day after such title failure is determined and there shall be no retroactive adjustment of development and operating expenses, Unitized Substances or the proceeds therefrom, as a result of title failure.

14.2 Failure Because of Unit Operations. The failure of title to any Working Interest in any Tract by reason 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 15

LIABILITY, CLAIMS AND SUITS

15.1 Individual Liability. The duties, obligations, and liabilities of Working Interest Owners shall be several and not joint or collective; and nothing contained herein shall ever be construed

as creating a partnership of any kind, joint venture, or an association or trust between or among Working Interest Owners.

15.2 Settlements. In the event claim is made against a Working Interest Owner, or any Working Interest Owner is sued on account of any matter or thing arising from the development and operation of the Unit Area, and over which such Working Interest Owner individually has no control because of the rights, powers and duties granted by this Agreement and the Unit Agreement, said Working Interest Owner shall immediately notify the Unit Operator of such claim or suit. Unit Operator shall assume and take over the further handling of such claim or suit and all costs and expenses of handling, settling or otherwise discharging such claim or suit shall be borne by Working Interest Owners as any other cost or expense of operating the Unit Area. Unit Operator may settle any single damage claim or suit involving Unit operations but not involving an expenditure of more than two thousand dollars (\$2,000.00), provided the payment is in complete settlement of such claim or suit.

ARTICLE 16

INTERNAL REVENUE PROVISION

16.1 Internal Revenue Provision. Each party hereto hereby irrevocably elects that it and the operations covered by this Agreement be excluded from the application of Subchapter K of Chapter 1 of Subtitle A of the Internal Revenue Code of 1954 as

permitted and authorized by Section 761 of said Code and the regulations promulgated thereunder,, Unit Operator is hereby irrevocably authorized and directed to execute on behalf of each party hereto such additional or further evidence of said election as may be required by the Secretary of the Treasury of the United States or the Federal Internal Revenue Service and regulations issued under said Subchapter K, including all of the returns, statements and data required, and Unit Operator shall furnish each party hereto a copy thereof. Should said regulations require each party to execute such further evidence, each party hereto irrevocably agrees to execute or join in the execution thereof. Each party hereto irrevocably agrees not to give any notices or take any action inconsistent with the elections hereby made and each hereby states that the income derived by it from the operations under this Agreement can be adequately determined without the computation of partnership taxable income.

ARTICLE 17

NOTICES

17.1 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 hereof.

ARTICLE 18

WITHDRAWAL OF WORKING INTEREST OWNER

AND CREATION OF NEW INTEREST

18.1 Withdrawal. If any Working Interest Owner so desires, it may withdraw from this Agreement by conveying, assigning and transferring, without warranty of title (either expressed or implied) to the other Working Interest Owners who do not desire to withdraw herefrom, all of the former's rights, title and interest in and to its lease or leases, or other operating rights in the Unit Area, insofar as said lease, leases or rights pertain to the Unitized Formation, together with the withdrawing Working Interest Owner's interest in all wells, pipe lines, casing, injection equipment facilities and other personal property used in conjunction with the development and operation of the Unit Area; provided, that such transfer, assignment or conveyance shall not relieve said Working Interest Owner from any obligation or liability incurred prior to the date of the execution and delivery thereof. The interest so transferred, assigned and conveyed shall be taken and owned by the other Working Interest Owners in proportion to their respective Unit Participations, and the Unit Operator shall recompute the percentage of participation to include this change and furnish the remaining Working Interest Owners with a corrected interest sheet. After the execution and delivery of such transfer, assignment or conveyance, the withdrawing Working Interest Owner shall be relieved from all further

obligations and liability hereunder and under said Unit Agreement; and the right of such Working Interest Owner to any benefits subsequently accruing hereunder and under said Unit Agreement shall cease; provided, that upon delivery of said transfer, assignment or conveyance, the assignees, in the ratio of the respective interests so acquired, shall pay to the assignor for its interest in all jointly-owned equipment, casing and other personal property, the fair salvage value thereof, as estimated and fixed by the remaining Working Interest Owners.

18.2 Creation of a New Interest. If any Working Interest Owner shall, after executing this Agreement, create any overriding royalty, production payment or other similar interest, hereafter referred to as "New Interest", out of its interest subject to this Agreement, such new interest shall be subject to all the terms and provisions of this Agreement and the Unit Agreement.

ARTICLE 19

ABANDONMENT OF WELLS

19.1 Rights of Former Owners. If Working Interest Owners decide to permanently abandon any well within the Unit Area prior to termination of the Unit Agreement, Unit Operator shall give written notice of such fact to the former Working Interest Owner of the Tract on which such well is located, together with the amount (as estimated and fixed by the Working Interest Owners) to be the net salvage value of the equipment in and on said well contributed by Working Interest

Owners under Article 10.1.1. Said former Working Interest Owner shall have the right and option for a period of ninety (90) days after receipt of such notice to notify Unit Operator of its election to take over and own said well and to deepen or plug back said well to a formation other than the Unitized Formation. Within ten (10) days after said former Working Interest Owner of the Tract has so notified Unit Operator of its desire to take over such well, it shall pay to Unit Operator, for credit to the joint account of the Working Interest Owners, the amount of the net salvage value above described. At the same time the former Working Interest Owner taking over the well shall agree, by letter addressed to Unit Operator, to effectively seal off and protect the Unitized Formation and (at such time as well is ready for abandonment) to plug and abandon well in a workmanlike manner in accordance with applicable laws and regulations.

19.2 Plugging. In the event the former Working Interest Owner of a Tract does not elect to take over a well located thereon which is proposed for abandonment, Unit Operator shall plug and abandon the well in accordance with applicable laws and regulations.

ARTICLE 20

EFFECTIVE DATE AND TERM

20.1 Effective Date. This Agreement shall become effective on the date and at the time the Unit Agreement becomes effective.

20.2 Term. This Agreement shall continue in full force and effect so long as the Unit Agreement remains in force and effect and thereafter until all Unit wells have been plugged and abandoned or turned over to Working Interest Owners in accordance with Article 21 hereof, and all personal and real property acquired for the joint account of Working Interest Owners has been disposed of by Unit Operator in accordance with instructions of Working Interest Owners and there shall have been a final accounting.

ARTICLE 21

TERMINATION OF UNIT AGREEMENT

21.1 Termination. Upon termination of the Unit Agreement the following shall occur:

21.1.1 Oil and Gas Rights. Possession of all oil and gas rights in and to the several separate tracts shall revert to the Working Interest Owners thereof.

21.1.2 Right to Operate. Working Interest Owners of any such Tract desiring to take over and continue to operate a well or wells located thereon may do so by paying Unit Operator, for the credit of the joint account, the net salvage value of the equipment in and on the well, contributed by such Working Interest Owners under Article 10.1.1 and

agreeing in writing to properly
plug the well at such time as it
is abandoned.

21.1.3 Salvaging Wells. With respect to all
wells not taken over by the Working
Interest Owners, Unit Operator shall,
at the joint expense of Working Interest
Owners, salvage as much of the casing
and equipment in or on such wells as can
economically and reasonably be salvaged,
and shall cause such wells to be properly
plugged and abandoned.

21.1.4 Cost of Salvaging. Working Interest
Owners shall share the cost of salvaging,
liquidation or other distribution of assets
and properties used in the development and
operation of the Unit Area in proportion to
their respective Unit Participation, as
shown on Exhibit "C".

ARTICLE 22

COUNTERPART EXECUTION

22.1 Execution by Separate Counterparts or Ratifications.

This Agreement may be executed in any number of counterparts and each
counterpart so executed shall have the same force and effect as an

original instrument and as if all of the parties to the aggregate counterparts had signed the same instrument; or may be ratified by a separate instrument in writing referring to this Agreement. Each such ratification shall have the force and effect of an executed counterpart and of adopting by reference all of the provisions hereof.

ARTICLE 23

SUCCESSORS AND ASSIGNS

23.1 Successors and Assigns. The terms and provisions hereof shall be covenants running with the lands and unitized leases covered hereby and shall be binding upon and inure to the benefit of the respective heirs, successors and assigns of the parties hereto.

No party hereto shall assign or convey less than his entire interest in any Tract committed hereto unless such leased interest, if any, is an undivided interest in such entire tract; and, should any interest committed hereto be or become owned by three (3) or more parties, then all of such parties shall be obligated to appoint a single agent to represent such interest for the purpose of accepting billings and receiving payments, if any, arising hereunder, or under the Unit Agreement, and for voting upon any matter which is the subject of determination by the Working Interest Owners.

IN WITNESS WHEREOF, the parties hereto have

executed this Agreement upon the respective dates indicated opposite
their respective signatures.

ANADARKO PRODUCTION COMPANY

BY _____

Its _____

ATTEST:

BY _____

UNIT OPERATOR AND WORKING
INTEREST OWNER

DATE _____

CITIES SERVICE OIL COMPANY

BY _____

Its _____

ATTEST:

DATE: _____

DEPCO, INC.

BY _____

Its _____

ATTEST:

DATE: _____

HUSKY OIL COMPANY

ATTEST:

BY _____

Its _____

DATE: _____

LGM COMPANY

ATTEST:

BY _____

Its _____

DATE: _____

NEWMONT OIL COMPANY

ATTEST:

BY _____

Its _____

DATE: _____

J. U. CONE, TRUSTEE for the Douglas Cone Trust, Clifford Cone Trust, Thomas Cone Trust, Cathie Cone Trust, and Kenneth Cone Trust

DATE: _____

GORDON M. CONE

DATE: _____

R. D. COLLIER

DATE: _____

DATE: _____

J. CLEO THOMPSON, SR.

DATE: _____

JAMES CLEO THOMPSON, JR.

EXHIBIT "C"
FAR WEST LOCO HILLS SAND UNIT
Eddy County, New Mexico

SUMMARY OF OWNERSHIP BY WORKING INTEREST OWNER

ANADARKO PRODUCTION COMPANY

Tract 2	6.106849
Tract 3	2.703396
Tract 5	4.131993
Tract 8	21.695396
Tract 9	<u>19.702019</u>

TOTAL ANADARKO	54.339653
----------------	-----------

CITIES SERVICE OIL COMPANY

Tract 3	5.406793
Tract 4	<u>2.183512</u>

TOTAL CITIES SERVICE	7.590305
----------------------	----------

R.D. COLLIER

Tract 3	<u>2.703397</u>
---------	-----------------

TOTAL R.D. COLLIER	2.703397
--------------------	----------

GORDON M. CONE

Tract 10	<u>6.540164</u>
----------	-----------------

TOTAL GORDON M. CONE	6.540164
----------------------	----------

J.U. CONE, TRUSTEE FOR DOUGLAS, CLIFFORD,
THOMAS, CATHIE, AND KENNETH CONE TRUSTS

Tract 10	<u>6.540163</u>
----------	-----------------

TOTAL J.U. CONE, TRUSTEE	6.540163
--------------------------	----------

EXHIBIT "C" (Continued)
FAR WEST LOCO HILLS SAND UNIT
Eddy County, New Mexico

SUMMARY OF OWNERSHIP BY WORKING INTEREST OWNER

DEPCO, INC.

Tract 1	<u>1.124169</u>
---------	-----------------

TOTAL DEPCO, INC.	1.124169
-------------------	----------

HUSKY OIL COMPANY

Tract 1	<u>1.124168</u>
---------	-----------------

TOTAL HUSKY OIL COMPANY	1.124168
-------------------------	----------

LGM COMPANY

Tract 11	<u>5.016518</u>
----------	-----------------

TOTAL LGM COMPANY	5.016518
-------------------	----------

NEWMONT OIL COMPANY

Tract 6	0.467134
---------	----------

Tract 7	<u>4.521291</u>
---------	-----------------

TOTAL NEWMONT OIL COMPANY	4.988425
---------------------------	----------

J. CLEO THOMPSON, SR. AND JAMES CLEO THOMPSON, JR.

Tract 11	<u>10.033038</u>
----------	------------------

TOTAL J. CLEO THOMPSON ET AL	10.033038
------------------------------	-----------

UNIT TOTAL	100.000000
------------	------------

EXHIBIT " D "

Attached to and made a part of Unit Operating Agreement
dated May 1, 1968, covering the Far West Loco Hills
Sand Unit, Eddy 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.

"Operator" shall mean the party designated to conduct the Joint Operations.

"Non-Operators" shall mean the nonoperating parties, whether one or more.

"Joint Account" shall mean the account showing the charges and credits accruing because of the Joint Operations and which are to be shared by the Parties.

"Parties" shall mean Operator and Non-Operators.

"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. Conflict with Agreement

In the event of a conflict between the provisions of this Accounting Procedure and the provisions of the agreement to which this Accounting Procedure is attached, the provisions of the agreement shall control.

3. Collective Action by Non-Operators

Where an agreement or other action of Non-Operators is expressly required under this Accounting Procedure and if the agreement to which this Accounting Procedure is attached contains no contrary provisions in regard thereto, the agreement or action of a majority in interest of the Non-Operators shall be controlling on all Non-Operators.

4. Statements and Billings

Operator shall bill Non-Operators on or before the last day of each month for their proportionate share of costs and expenses, for the preceding month. Such bills will be accompanied by statements reflecting the total charges and credits as set forth under Subparagraph "C" below:

A. Statement in detail of all charges and credits to the Joint Account.

B. Statement of all charges and credits to the Joint Account, summarized by appropriate classifications indicative of the nature thereof.

C. Statement of all charges and credits to the Joint Account summarized by appropriate classifications indicative of the nature thereof, except that items of Controllable Material and unusual charges and credits shall be detailed.

5. Payment and Advances by Non-Operators

Each Non-Operator shall pay its proportion of all such bills within fifteen (15) days after receipt thereof. If payment is not made within such time, the unpaid balance shall bear interest at the rate of ~~XXX~~ per cent (~~8%~~) per annum until paid.

eight 8%

6. Adjustments

Payment of any such bills shall not prejudice the right of any Non-Operators 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 the Joint Property as provided for in Section VII.

7. 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 accounting hereunder 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 adjustment of accounts as provided for in Paragraph 6 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.

II. DIRECT CHARGES

Subject to limitations hereinafter prescribed, Operator shall charge the Joint Account with the following items:

1. **Rentals and Royalties**
Delay or other rentals and royalties when such rentals and royalties are paid by Operator for the Joint Account of the Parties.
2. **Labor**
 - A. Salaries and wages of Operator's employees directly engaged on the Joint Property in the conduct of the Joint Operations, and salaries or wages of technical employees who are temporarily assigned to and directly employed on the Joint Property.
 - B. Operator's cost of holiday, vacation, sickness and disability benefits and other customary allowances paid to the employees whose salaries and wages are chargeable to the Joint Account under Paragraph 2A of this Section II and Paragraph 1 of Section III; except that in the case of those employees only a pro rata portion of whose salaries and wages are chargeable to the Joint Account under Paragraph 1 of Section III, not more than the same pro rata portion of the benefits and allowances herein provided for shall be charged to the Joint Account. Cost 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 and Paragraph 1 of Section III. 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 labor cost of salaries and wages chargeable to the Joint Account under Paragraphs 2A and 2B of this Section II and Paragraph 1 of Section III.
 - D. Reasonable personal expenses of those employees whose salaries and wages are chargeable to the Joint Account under Paragraph 2A of this Section II and for which expenses the employees are reimbursed under Operator's usual practice.
3. **Employee Benefits**
Operator's current cost 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; provided however, the total of such charges shall not exceed ten percent (10%) of Operator's labor costs chargeable to the Joint Account under Paragraphs 2A and 2B of this Section II and Paragraph 1 of Section III.
4. **Material**
Material purchased or furnished by Operator for use on the Joint Property. So far as it is reasonably practical and consistent with efficient and economical operation, only such Material shall be purchased for or transferred to the Joint Property as may be required for immediate use; and 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 or railway receiving point where like material is available, except by agreement with Non-Operators.
 - 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 or railway receiving point, except by agreement with Non-Operators. No charge shall be made to Joint Account for moving Material to other properties belonging to Operator, except by agreement with Non-Operators.
 - C. In the application of subparagraphs A and B above, there shall be no equalization of actual gross trucking costs of \$100 or less.
6. **Services**
 - A. The cost of contract services and utilities procured from outside sources other than services covered by Paragraph 8 of this Section II and Paragraph 2 of Section III.
 - B. Use and service of equipment and facilities furnished by Operator as provided in Paragraph 5 of Section IV.
7. **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 any other cause, except to the extent that the damage or loss could have been avoided through the exercise of reasonable diligence on the part of Operator. Operator shall furnish Non-Operators written notice of damages or losses incurred as soon as practicable after a report thereof has been received by Operator.
8. **Legal Expense**
All costs and expenses of handling, investigating and settling litigation or claims arising by reason of the Joint Operations or necessary to protect or recover the Joint Property, including, but not limited to, attorneys' fees, court costs, cost of investigation or procuring evidence and amounts paid in settlement or satisfaction of any such litigation or claims; provided, (a) no charge shall be made for the services of Operator's legal staff or other regularly employed personnel (such services being considered to be Administrative Overhead under Section III), except by agreement with Non-Operators, and (b) no charge shall be made for the fees and expenses of outside attorneys unless the employment of such attorneys is agreed to by Operator and Non-Operators.
9. **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.
10. **Insurance Premiums**
Premiums paid for insurance required to be carried on the Joint Property for the protection of the Parties.
11. **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 for the necessary and proper conduct of the Joint Operations.

III. INDIRECT CHARGES

Operator may charge the Joint Account for indirect costs either by use of an allocation of district expense items plus a fixed rate for administrative overhead, and plus the warehousing charges, all as provided for in Paragraphs 1, 2, and 3 of this Section III OR by combining all three of said items under the fixed rate provided for in Paragraph 4 of this Section III, as indicated next below:

OPERATOR SHALL CHARGE THE JOINT ACCOUNT UNDER THE TERMS OF:

- ☐ Paragraphs 1, 2 and 3. (Allocation of district expense plus fixed rate for administrative overhead plus warehousing.)
☒ Paragraph 4. (Combined fixed rate)

1. District Expense

Operator shall charge the Joint Account with a pro rata portion of the salaries, wages and expenses of Operator's production superintendent and other employees serving the Joint Property and other properties of the Operator in the same operating area, whose time is not allocated directly to the properties, and a pro rata portion of the cost of maintaining and operating a production office known as Operator's office located at or near (or a comparable office if location changed), and necessary sub-offices (if any), maintained for the convenience of the above-described office, and all necessary camps, including housing facilities for employees if required, used in connection with the operations of the Joint Property and other properties in the same operating area. The expense of, less any revenue from, such facilities may, at the option of Operator, include depreciation of investment or a fair monthly rental in lieu of depreciation. Such charges shall be apportioned to all properties served on some equitable basis consistent with Operator's accounting practice.

2. Administrative Overhead

Operator shall charge administrative overhead to the Joint Account at the following rates, which charge shall be in lieu of the cost and expense of all offices of the Operator not covered by Paragraph 1 of this Section III, including salaries, wages and expenses of personnel assigned to such offices. Such charges shall be in addition to the salaries, wages and expenses of employees of Operator authorized to be charged as direct charges as provided in Paragraphs 2 and 8 of Section II.

WELL BASIS (RATE PER WELL PER MONTH)

Well Depth	DRILLING WELL RATE (Use Total Depth)	PRODUCING WELL RATE (Use Current Producing Depth)		
	Each Well	First Five	Next Five	All Wells Over Ten
.....
.....
.....
.....

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 this Paragraph 2 of Section III, unless such cost and expense are agreed upon between Operator and Non-Operators as a direct charge to the Joint Account.

3. Operator's Fully Owned Warehouse Operating and Maintenance Expense (Describe fully the agreed procedure to be followed by the Operator.)

NONE

4. Combined Fixed Rates

Operator shall charge the Joint Account for the services covered by Paragraph 1, 2 and 3 of this Section III, the following fixed per well rates:

WELL BASIS (RATE PER WELL PER MONTH)

Well Depth	DRILLING WELL RATE (Use Total Depth)	PRODUCING WELL RATE (Use Current Producing Depth)		
	Each Well	First Five	Next Five	All Wells Over Ten
Unitized Formation	500	70	65	55
.....
.....

Said fixed rate (shall) ~~(XXXXXX)~~ include salaries and expenses of production foremen.

5. Application of Administrative Overhead or Combined Fixed Rates

The following limitations, instructions and charges shall apply in the application of the per well rates as provided under either Paragraph 2 or Paragraph 4 of this Section III:

- A. Charges for drilling wells shall begin on the date each 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 the suspension of drilling operations for fifteen (15) or more consecutive days.
 - B. The status of wells shall be as follows:
 - (1) Producing gas wells, injection wells for recovery operations, water supply wells utilized for water flooding operations and salt water disposal wells shall be considered the same as producing wells.
 - (2) Wells permanently shut down but on which plugging operations are deferred shall be dropped from the well schedule at the time the shutdown is effected. When such a well is plugged a charge shall be made at the producing well rates.
 - (3) Wells being plugged back, drilled deeper, converted to a source or input well, or which are undergoing any type of workover that requires the use of a drilling or workover rig shall be considered the same as drilling wells.
 - (4) Temporarily shut-down wells, which are not produced or worked upon for a period of a full calendar month, shall not be included in the well schedule, provided however, wells shut in by governmental regulatory body shall be included in the well schedule only in the event the allowable production is transferred to some other well or wells on the Joint Property. In the event of a unit allowable, all wells capable of producing will be counted in determining the charge.
 - (5) Gas wells shall be included in the well schedule if directly connected to a permanent sales outlet even though temporarily shut in due to overproduction or failure of purchaser to take the allowed production.
 - (6) Wells completed in multiple horizons, in which the production is not commingled down hole, shall be considered as a producing well for each separately producing horizon.
 - C. The well rates shall apply to the total number of wells being drilled or operated under the agreement to which this Accounting Procedure is attached, irrespective of individual leases.
 - D. The well rates shall be adjusted on the first day of April of 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 preceding calendar year as shown by "The Index of Average Weekly Earnings of Crude Petroleum and Gas Production Workers" as published by the United States Department of Labor, Bureau of Labor Statistics. The adjusted rates shall be the rates currently in use, plus or minus the computed adjustment.
6. For the construction of compressor plants, water stations, secondary recovery systems, salt water disposal facilities, and other such projects, as distinguished from the more usual drilling and producing operations, Operator in addition to the Administrative Overhead or Combined Fixed Rates provided for in Paragraph 2 and 4 of this Section III, shall charge the Joint Account with an additional overhead charge as follows:
- A. Total cost less than \$25,000, no charge.
 - B. Total cost more than \$25,000 but less than \$100,000, 3 % of total cost.
 - C. Total cost of \$100,000 or more, 3 % of the first \$100,000 plus 2 % of all over \$100,000 of total cost.
- Total cost shall mean the total 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 wells shall be excluded.
7. The specific rates provided for in this Section III may be amended from time to time by mutual agreement between the Parties hereto if, in practice, the rates are found to be insufficient or excessive.

IV. BASIS OF CHARGES TO JOINT ACCOUNT

Subject to the further provisions of this Section IV, Operator will procure all Material and services for the Joint Property. At the Operator's option, Non-Operator may supply Material or services for the Joint Property.

1. Purchases

Material purchased and service procured shall be charged at the price paid by Operator after deduction of all discounts actually received.

2. Material furnished from Operator's Warehouse or Other Properties

A. New Material (Condition "A")

- (1) Tubular goods, two inch (2") and over, shall be priced on Eastern Mill base (i. e. Youngstown, Ohio; Lorain, Ohio; and Indiana Harbor, Indiana) on a minimum carload basis effective at date of movement and f. o. b. railway receiving point nearest the Joint Property, regardless of quantity. In equalized hauling charges, Operator is permitted to include ten cents (10c) per hundred-weight on all tubular goods furnished from his stocks in lieu of loading and unloading costs sustained.
- (2) Other Material shall be priced at the current replacement cost of the same kind of Material, effective at date of movement and f. o. b. the supply store or railway receiving point nearest the Joint Property where Material of the same kind is available.
- (3) The Joint Account shall not be credited with cash discounts applicable to prices provided for in this Paragraph 2 of Section IV.

B. Used Material (Condition "B" and "C")

- (1) Material in sound and serviceable condition and suitable for reuse without reconditioning, shall be classified as Condition "B" and priced at seventy-five per cent (75%) of the current price of new Material.
- (2) Material which cannot be classified as Condition "B" but which,
 - (a) After reconditioning will be further serviceable for original function as good secondhand Material (Condition "B"), or
 - (b) Is serviceable for original function but substantially not suitable for reconditioning, shall be classified as Condition "C" and priced at fifty per cent (50%) of current new price.
- (3) Obsolete Material or Material which cannot be classified as Condition "B" or Condition "C" shall be priced at a value commensurate with its use. 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.

- (4) 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 prices specified in Paragraphs 1 and 2 of this Section IV 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 procuring such Material, in making it suitable for use, and in moving it to the Joint Property, provided, that 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 10 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.

5. Equipment and Facilities Furnished by Operator

A. Operator shall charge the Joint Account for use of equipment and facilities at rates commensurate with cost of ownership and operation. Such rates shall include cost of maintenance, repairs, other operating expense, insurance, taxes, depreciation and interest on investment not to exceed six per cent (6%) per annum, provided such rates shall not exceed those currently prevailing in the immediate area within which the Joint Property is located. Rates for automotive equipment shall generally be in line with the schedule of rates adopted by the Petroleum Motor Transport Association, or some other recognized organization, as recommended uniform charges against Joint Property operations. Rates for laboratory services shall not exceed those currently prevailing if performed by outside service laboratories. Rates for trucks, tractors and well service units may include wages and expenses of operator.

B. Whenever requested, Operator shall inform Non-Operators in advance of the rates it proposes to charge.

C. Rates shall be revised and adjusted from time to time when found to be either excessive or insufficient.

V. DISPOSAL OF MATERIAL

The Operator may purchase, but shall be under no obligation to purchase, interest of Non-Operators in surplus Condition "A" or "B" Material. The disposition of surplus Controllable Material, not purchased by Operator, shall be subject to agreement between Operator and Non-Operators, provided Operator shall dispose of normal accumulations of junk and scrap Material either by transfer or sale from the Joint Property.

1. Material Purchased by the Operator or Non-Operators

Material purchased by either the Operator or Non-Operators shall be credited by the Operator to the Joint Account for the month in which the Material is removed by the purchaser.

2. Division in Kind

Division of Material in kind, if made between Operator and Non-Operators, shall be in proportion to the respective interests in such Material. The Parties will thereupon be charged individually with the value of the Material received or receivable. Proper credits shall be made by the Operator in the monthly statement of operations.

3. Sales to Outsiders

Sales to outsiders of Material from the Joint Property shall be credited by Operator to the Joint Account at the net amount collected by Operator from vendee. Any claim by vendee related to such sale shall be charged back to the Joint Account if and when paid by Operator.

VI. BASIS OF PRICING MATERIAL TRANSFERRED FROM JOINT ACCOUNT

Material purchased by either Operator or Non-Operators or divided in kind, unless otherwise agreed to between Operator and Non-Operators shall be priced on the following basis:

1. New Price Defined

New price as used in this Section VI shall be the price specified for New Material in Section IV.

2. New Material

New Material (Condition "A"), being new Material procured for the Joint Property but never used, at one hundred per cent (100%) of current new price (plus sales tax if any).

3. Good Used Material

Good used Material (Condition "B"), being used Material in sound and serviceable condition, suitable for reuse without reconditioning:

A. At seventy-five per cent (75%) of current new price if Material was charged to Joint Account as new, or

B. At sixty-five per cent (65%) of current new price if Material was originally charged to the Joint Account as secondhand at seventy-five percent (75%) of new price.

4. Other Used Material

Used Material (Condition "C"), at fifty per cent (50%) of current new price, being used Material which:

A. Is not in sound and serviceable condition but suitable for reuse after reconditioning, or

B. Is serviceable for original function but not suitable for reconditioning.

5. Bad-Order Material

Material (Condition "D"), no longer suitable for its original purpose without excessive repair cost but usable for some other purpose at a price comparable with that of items normally used for such other purpose.

6. Junk Material

Junk Material (Condition "E"), being obsolete and scrap Material, at prevailing prices.

7. Temporarily Used Material

When the use of Material is temporary and its service to the Joint Property does not justify the reduction in price as provided for in Paragraph 3 B of this Section VI, such Material shall be priced on a basis that will leave a net charge to the Joint Account consistent with the value of the service rendered.

VII. INVENTORIES

The Operator shall maintain detailed records of Material generally considered controllable by the Industry.

1. Periodic Inventories, Notice and Representation

At reasonable intervals, inventories shall be taken by Operator of the Joint Account Material, which shall include all such Material as is ordinarily considered controllable. 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, who shall in that event furnish Non-Operators with a copy thereof.

2. Reconciliation and Adjustment of Inventories

Reconciliation of inventory with charges to the Joint Account shall be made, and a list of overages and shortages shall be jointly determined by Operator and Non-Operators. Inventory adjustments shall be made by Operator with the Joint Account for overages and shortages, but Operator shall be held accountable to Non-Operator 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.

EXHIBIT E

INSURANCE PROVISIONS
FAR WEST LOCO HILLS SAND UNIT
EDDY COUNTY, NEW MEXICO

With respect to producing operations conducted hereunder, Unit Operator shall at all times purchase or provide for the protection and benefit of the parties hereto, protection comparable to that afforded under standard form policies of insurance for:

- (a) Workmen's compensation insurance to comply with the applicable Federal and State workmen's compensation laws to be billed to the Joint Account under the provisions of Paragraph 2C of Section II - Direct Charges, COPAS 1962 Accounting Procedure.
- (b) General public liability insurance with bodily injury limits of \$100,000.00 any one person, \$300,000.00 any one accident. The Joint Account will not be charged for this coverage.
- (c) General public liability property damage insurance with limits of \$100,000.00 for each accident. The Joint Account will not be charged for this coverage.
- (d) Automobile public liability insurance with bodily injury limits of \$100,000.00 any one person, \$300,000.00 any one accident, and property damage limit of \$100,000.00 any one accident. The cost of this coverage is included in the transportation rate applicable to vehicle use under Paragraph 3 above.

All losses not covered by standard form policies of insurance for the hazards set out above shall be borne by the parties hereto as their interests appear at the time of any loss.

5-1-68

Case
3989

ENGINEERING APPRAISAL
OF
WATERFLOOD POTENTIAL
OF
ZONE 4 OF THE GRAYBURY

PREPARED BY
ENGINEERING SUB-COMMITTEE
FAR WEST LOCO HILLS SAND UNIT

C. W. STUMHOFFER
ANADARKO PRODUCTION COMPANY
CHAIRMAN

EXHIBIT II

ENGINEERING APPRAISAL
OF
WATERFLOOD POTENTIAL
OF
ZONE 4 OF THE GRAYBURG

PREPARED BY
ENGINEERING SUB-COMMITTEE
FAR WEST LOCO HILLS SAND UNIT

C. W. STUMHOFFER
ANADARKO PRODUCTION COMPANY
CHAIRMAN

SUPPLEMENTED FEBRUARY 9, 1968
UPDATED NOVEMBER 10, 1968

EXHIBIT II

TABLE OF CONTENTS

	<u>PAGE NUMBER</u>
PURPOSE OF REPORT	1
CONCLUSIONS	3
RECOMMENDATIONS	7
DISCUSSION	9
Geology	9
Production History	10
Reservoir Characteristics	12
Fluid Properties	14
Primary Reserves	15
Estimated Secondary Recovery Reserves	15
Participation Parameters	19
Water Supply and Injection Facilities	20
Production Equipment	20
Plugged and Abandoned Wells	21
Supplement	22

PURPOSE OF REPORT

The purpose of this report is to present the findings of the Engineering Sub-Committee formed to study the feasibility of forming a unit for secondary recovery operations in Zone 4 of the Grayburg formation, referred to locally as the Loco Hills Sand, on the west end of the Loco Hills Field, Eddy County, New Mexico. The proposed Unit area will be referred to as the Far West Loco Hills Sand Unit.

At an Operators' Committee meeting on May 24, 1966, the following charges were made to the Engineering Sub-Committee:

1. Prepare base map.
2. Establish areal and vertical extent of productive Loco Hills Sand and recommend boundaries of proposed Unit.
3. Prepare all geologic maps with intent to prepare structure, isopach, and cross sections, if possible.
4. Accumulate, check out, and tabulate production data from wells that produced from the Loco Hills Sand.

5. Prepare respective lease production curves from above data. Economic limit of three barrels of oil per well per day to be used in determining remaining primary reserves.
6. Prepare a basic parameter data sheet on a working interest by lease basis to include cumulative recovery to 1-1-66, acre-feet if possible, usable wells, productive acres if possible, gross acres, and remaining primary reserve if above economic limit.
7. Engineering economic feasibility study of a waterflood effort on the proposed Unit area including a study of water supply source and cooperative effort with Newmont's West Loco Hills Grayburg Sand No. 4 Unit.
8. Present completed engineering study to Operators' Committee.

CONCLUSIONS

As a result of the Engineering Study made of Zone 4 of the Grayburg underlying that portion of the Loco Hills Field not included in Newmont Oil Company's West Loco Hills Grayburg Sand No. 4 Unit, Eddy County, New Mexico, the following conclusions are presented:

1. Zone 4 of the Grayburg, known locally as the Loco Hills Sand is being successfully water flooded to the east of the area under consideration on Newmont's West Loco Hills Grayburg Sand No. 4 Unit. Refer to Figure 1 for location of Zone 4 of the Grayburg in the geologic column in this area.
2. Sufficient data is available to define the productive limits, areally and vertically, of Zone 4 of the Grayburg. Refer to Figure 4 for productive limits of Zone 4 of the Grayburg and Table 1 for individual well data to support these productive limits.
3. To conduct an efficient waterflood operation in the proposed Unit area, it will be necessary to unitize all royalty and working interests within the proposed area.

4. Insufficient geologic and well log data eliminated any possibility of constructing an isopach map for use in reservoir calculations.

Wells with Gamma Ray - Neutron logs were not strategically located to construct a cross section to tie the productive Zone 4 Grayburg under the proposed Far West Loco Hills Sand Unit into the Zone 4 Grayburg being water flooded on Newmont's West Loco Hills Grayburg No. 4 Sand Unit. However, utilizing Driller's logs and available data, there is no question that the productive zones on these two Units are correlative.

5. Of the twenty-four (24) wells that have produced or are producing Loco Hills Sand oil in the proposed Unit area, twelve (12) are presently on production with a total average monthly production for the first six months of 1968 of 286 barrels of oil or 9.4 barrels of oil per day from all twelve (12) wells. This production rate is below the established economic limit of three barrels of oil per well per day, and therefore no remaining primary reserves have been assigned. Refer to lease production curves, Figures 7 thru 17, and Tables 1 and 2 for individual well and lease production history.

6. A basic parameter sheet, Table 3, has been prepared, and the conclusion has been reached by the Engineering Sub-Committee that cumulative recovery as of 1-1-66 is the most reliable parameter to be utilized in establishing a Unit participation formula. However, in view of the large number of plugged and abandoned wells within the proposed Unit area, some allowance should be made for a usable well parameter in the participation formula.

A third parameter, gross productive acreage, has been presented in the basic parameter table. This parameter is presented largely because it is listed in the charges to the Engineering Sub-Committee. It is recommended that since the usable well and gross productive acreage parameters tend to neutralize each other, that very little, if any, emphasis be given to the gross productive acreage parameter in the Unit participation formula.

7. The proposed Unit area is comprised of 840 acres on which twenty-four (24) wells have produced or are producing from Zone 4 of the Grayburg. After detailed study, it was determined that seventeen (17) of these wells have produced only from Zone 4 of the Grayburg. Each of the remaining seven (7) wells were analyzed individually, and an estimate of recoveries by zones

was made. Cumulative oil recovery from Zone 4 of the Grayburg through 12-31-65, one of the recommended unitization parameters is 851,987 barrels and cumulative recovery to 9-1-68 is 862,986 barrels.

8. Waterflooding of Zone 4 of the Grayburg within the proposed Unit area will result in the recovery of an estimated 853,000 barrels of secondary oil over a six year period.
9. Commence water injection along boundary between proposed Unit area and Newmont's West Loco Hills Grayburg Sand No. 4 Unit as first stage of development of proposed Unit for waterflood operation. A second stage or row of water injection wells is proposed for the west side of the proposed Unit area. However, since the Loco Hills Sand loses its porosity and permeability in this area, and to stay within the allowable restrictions of Rule 701, consideration may be given to eliminating this second stage of water injection. This decision will have to be based on performance of the first stage.

RECOMMENDATIONS

In view of these conclusions, it is recommended that:

1. Zone 4 of the Grayburg formation under the area shown in Figure 2 be unitized as soon as possible for waterflood operations. Efforts should be made to initiate water injection in the first stage by 4-1-69, or sooner if possible. Figure 5 shows proposed tract and well designations for the proposed Far West Loco Hills Sand Unit.
2. A Unit participation formula acceptable to all interests be adopted as soon as possible utilizing the data in attached Table 3.
3. Approval of all governmental agencies, specifically the United States Geological Survey and New Mexico Bureau of Land, as to the general form of the proposed Unit, be obtained before circulating documents for signature.
4. Hearing before the New Mexico Oil Conservation Commission be scheduled to obtain approval to initiate waterflood operations as planned.

5. Negotiations for a cooperative water injection program between the West Loco Hills Grayburg Sand No. 4 Unit operated by Newmont Oil Company and the proposed Far West Loco Hills Sand Unit be pursued to an acceptable agreement.
6. A decision be reached on water supply source so that a supply system may be installed to the proposed Unit area. Yucca Water Company and Double Eagle Water Company will be contacted to submit proposals for furnishing of water to proposed Unit.

DISCUSSION

Geology

Geologically, the Loco Hills Field,
on the west end of which the proposed

Unit area is located, falls in the southwestern portion of the Artesia-Vacuum Trend of Southeastern New Mexico. This trend extends eastward from the town of Artesia into Lea County and structurally has the aspects of an eastward plunging anticline with the most westerly updip wells approximately 500 feet higher than the easterly down structure wells.

The principal producing zones in the Loco Hills Field are found in the Grayburg formation of the Permian system with a small percentage of the wells on the western edge of the field completed in the San Andres formation of the Permian system. Generally, there are three sand bodies that are productive in the Grayburg formation with the uppermost zone, Zone No. 4 which is known locally as the "Loco Hills" Sand, the most prolific. It is estimated that over eighty per cent (80%) of the field's 31,756,000 barrels of oil produced to 1-1-68 has been recovered from the "Loco Hills" Sand.

The purpose of the proposed Far West Loco Hills Sand Unit is to unitize for secondary recovery operations, the Zone 4 productive area on the west end of

the Loco Hills Field that was not included in Newmont's West Loco Hills Grayburg Sand No. 4 Unit. This productive area is confined to a one-half mile strip on the west end of the Newmont-operated unit as shown on Figure 4.

The productive Zone 4 of the Grayburg in the Loco Hills Field thins from east to west and becomes thin and limey without porosity and hydrocarbon saturations on the west boundary of the proposed Unit area. The pay zone is characterized by a gray, fine-grained sandstone with a calcareous matrix. Under the proposed Unit area, the top of the Zone 4 pay is found at approximately 2400 feet. Figure 3 is a structure map on the base of the Loco Hills Sand.

Production History

The discovery well, Yates et al, Yates No. 1, Section 6-T18S-R30E, in the Loco Hills Field, was completed during January of 1939. Development of the field after this discovery progressed rapidly and upon full development, the field covered a surface area of approximately 9,920 acres and contained 275 producing wells.

Of the twenty-four (24) wells in the proposed Unit area that produced Loco Hills Sand oil, twenty (20) were completed during 1939 and 1940. Newmont's

Breezy State No. 1, although drilled during 1940, was not completed until 1957; Anadarko's H. G. Watson Well Nos. 1-A and 2-A were completed during 1959, and Anadarko's Langford Well No. 6 during 1957. To September 1, 1968 cumulative recovery from Zone 4 of the Grayburg under these wells was 862,986 barrels. Based on a productive area within the proposed Unit of 840 acres and an estimate average net pay thickness of 8 feet, 128 barrels of oil have been produced per acre feet.

From individual analysis of each well utilizing available logs, sample logs, production data, deepening history, etc., it was determined that seventeen (17) wells produced only Loco Hills Sand oil. Of the remaining seven (7) wells that produced from other zones in addition to the Loco Hills Sand, an estimate of recoveries by zones was made. The basis for these estimates on an individual well basis is presented in Table 1, Well Completion and History Data, Zone 4 Grayburg (Loco Hills Sand) Wells under proposed Far West Loco Hills Sand Unit.

Most of the drilling was performed with cable tools with a few of the more recent holes drilled by rotary tools utilizing compressed air. Normal completion was to set 5-1/2" O.D., 6-5/8" O.D., or 7" O.D. casing in the Upper Grayburg Dolomite, drill in with cable tools, and shoot open hole with nitroglycerin. The four wells drilled during the latter 1950's were completed through perforations.

opposite the pay zone.

During 1940, the Loco Hills Pressure Maintenance Association was formed to collect produced gas throughout the field and to re-inject it through selected input wells to maintain the reservoir pressure in the hopes that it would increase the ultimate primary recovery. One well in the proposed Unit area, Gordon Cone's Langford Well No. 1, was utilized as an input well.

No increased production was noted due to this gas injection program. Insufficient injection capacity and economic factors that made it more desirable to sell the produced gas resulted in a sharply curtailed gas injection program during 1946.

Reservoir Characteristics

A study of the geologic characteristics of the Loco Hills Sand (Zone 4 of the Grayburg) indicates it to be a stratigraphic trap limited by porosity and permeability pinchouts on the north, west, and south with static edgewater as the eastern limit. The proposed Unit area lies on the western extremity of this reservoir in an area where the pay zone has split into two stringers just before losing porosity and permeability.

Examination of driller's logs and the few available Gamma Ray-Neutron Logs indicates good continuity of sand development in Zone 4 of the Grayburg on the proposed Unit area that correlates with the zone being water flooded under Newmont's West Loco Hills Grayburg Sand No. 4 Unit. Utilizing driller's and available Gamma Ray-Neutron Logs, net pay thickness is estimated to be 8 feet under the proposed Unit area.

Since no core analyses were made on the wells within the proposed Unit area, reservoir properties will have to be assumed to be comparable to core data of the Loco Hills Sand analyzed from Newmont's West Loco Hills Grayburg Sand No. 4 Unit Well No. 8D-5 located in the NW/4 NE/4 Section 15-T18S-R29E. Eight feet of Loco Hills Sand from this well had the following average characteristics:

Permeability - Millidaries-----	5.4
Porosity - per cent-----	16.4
Water Saturation - per cent-----	18.5
Residual Oil Saturation - per cent-----	10.0

In estimating waterflood reserves, the following sand characteristics were utilized:

Permeability ----- 5.4 md
 Porosity-----16.4%
 Connate Water Saturation-----25.0%
 Residual Oil Saturation-----20.0%

Fluid Properties

The characteristics of reservoir fluid were obtained from the Engineering Report on the Loco Hills Field, dated February 1, 1944, and prepared by the Loco Hills Pressure Maintenance Association, Inc. This information is as follows:

Type Crude	Paraffin base, relatively sweet
Gravity	35 to 37 degrees API
Color	Brownish green
Viscosity (original)	1.5 cp
Original Formation Volume Factor	1.27 reservoir barrels per stock tank barrel
Solution Gas-Oil Ratio	420 cubic feet per barrel
Saturation Pressure	898 psig
Reservoir Temperature	82° F
Original Reservoir Pressure	1000 psig (estimated)
Drive Mechanism	Solution gas

The above data resulted from a bottom hole sample taken and analyzed during 1943 from the Canfield No. 3 well located in Section 7-T18S-R30E. The sample was taken at a depth of 2750 feet with a bottom hole pressure of 903 psig existing at the time.

Current conditions existing in the reservoir are estimated to be:

Reservoir Pressure	100 psig
Formation Volume Factor	1.05 reservoir barrel per stock tank barrel
Viscosity of Reservoir Oil	2.0 cp

Primary Reserves

There are no wells producing at or above the established economic limit of three (3) barrels per day per well. Therefore, no remaining primary reserves for the Loco Hills Sand are existent under the proposed Unit area.

Estimated Secondary Recovery Reserves

The waterflooding of Zone 4 of the Grayburg under the proposed Unit area will be an extension of a successful waterflood program to the east,

Newmont's West Loco Hills Grayburg No. 4 Sand Unit. The proposed Unit area was not taken into the Newmont Unit originally because of the existence of other productive horizons open in the well bore in some wells located in the proposed Far West Loco Hills Sand Unit.

The study that has been made by this Engineering Sub-Committee has determined that approximately 91% of the oil produced from the wells within the proposed Far West Loco Hills Sand Unit is Zone 4 of the Grayburg oil. Therefore, it is being proposed that the remaining Zone 4 productive area of the Loco Hills Field be unitized for waterflood operations.

To accomplish this, it is proposed to establish a cooperative agreement between Newmont's unit and the proposed Unit. This will be accomplished by a line of injection wells along the boundary between these two units as shown in Figure 4. The proposed Far West Loco Hills Sand Unit will convert or drill the following injection wells under this proposal:

1. Drill line water input well on Anadarko's H. G. Watson Lease 10' NSL, 2630' WEL of Section 4-T18S-R29E.
2. Drill a water input well on Anadarko's State 0-16 Lease 330' SNL, 1980' WEL of Section 16-T18S-R29E.

3. Re-enter and complete as water input well Depco's Banner Miller Well No. 1.

4. Convert Gordon M. Cone's J. L. Langford Well No. 2 to water input.

Newmont's West Loco Hills Grayburg No. 4 Sand Unit would convert or drill the following injection wells under this proposal:

1. Drill line water input well on Tract 43, 1650' NSL, 1310' WEL Section 4-T18S-R29E.
2. Drill line water input well on Tract 19B, 10' SNL, 1330' WEL Section 9-T18S-R29E.
3. Convert West Loco Hills Grayburg No. 4 Sand Unit Well No. 19B-4 to water input.

A line water input well to be shared jointly by the two units is recommended for drilling on Newmont's ^{WEST LOCO HILLS Grayburg NO. 4 Sand UNIT} ~~Breezy State Lease~~ 1310' SNL, 10' ^{WEL} ~~SNL~~ Section ¹⁶⁻ ~~15~~ T18S-R29E. Newmont's West Loco Hills Grayburg No. 4 Sand Unit now has on injection Well Nos. 10A-5 and 8B-4 that will have an effect on the response time on the proposed Far West Loco Hills Sand Unit.

A second line of injection wells has been scheduled for water injection on the proposed Far West Loco Hills Sand Unit nine (9) months after commencement of water injection in the first line of injection wells. These wells are (See Figure 4):

1. Re-entry and conversion to input Anadarko's H. G. Watson Well No. 1.
2. Conversion to input, Cities Service's Brookover Well No. 1.
3. Conversion to input Anadarko's State L-16 Well No. 1 and Anadarko's J. L. Langford Well No. 5.
4. Drill two water input wells - one 1330' NSL, 2630' WEL Section 4, T-18S, R-29E (Anadarko's H. G. Watson Lease) and the second 1330' NSL and 10' EWL Section 9, T-18S, R-29E (Gordon M. Cone's J. L. Langford Lease).

The initiation of water injection into all or even part of this second stage of water injection wells will be dependent upon the allowable situation under Rule 701. However, this work has been provided for in the economic calculations.

In addition to the injection wells to be drilled and converted to develop the proposed Unit area for waterflood, four (4) plugged and abandoned wells will be

re-entered and completed for production, one temporarily abandoned gas input well is to be re-conditioned for production, and four new wells will be drilled for production.

Utilizing this waterflood development program as a guide, reservoir and secondary recovery calculations have been made and are presented in Tables 4 and 5. These calculations show that of the oil in place at pressure depletion, 4,193,000 stock tank barrels, the recovery due to waterflooding should be 853,000 stock tank barrels of oil when consideration is given to pattern configuration, efficiencies, and economics. This calculates to be 158 barrels per acre foot in the sweep area or very near one times primary recovery.

Participation Parameters

A basic parameter sheet, Table 3, has been prepared by the Engineering Sub-Committee, and it is presented for consideration to determine a Unit participation formula.

With the meager well and reservoir data available, it is the conclusion of the Engineering Sub-Committee that cumulative oil recovery as of January 1, 1966 is the most reliable parameter to be utilized in establishing a Unit participation formula. In view of the large number of plugged and abandoned wells within the proposed Unit area, it is felt that some allowance should be made for a usable well parameter in the participation formula.

A third parameter, gross productive acreage, has also been presented in the basic parameter table. This parameter is presented largely because it is listed in the charges to the Engineering Sub-Committee.

Water Supply and Injection Facilities

Water supply for this proposed Unit will be fresh water to be purchased from one of the two commercial water companies in the area. Yucca Water Company and Double Eagle Water Company will be contacted for bids to furnish this water.

One water injection plant with two triplex pumps driven by gas engines will be utilized to furnish pressured water to the proposed water injection wells. Pressured water will be transported to the various injection wells through an injection system protectively coated against corrosion.

Produced water will be re-cycled when volumes justify installation of disposal facilities.

Production Equipment

Larger pumping equipment will be installed as needed. Provisions have been made in the development costs for this larger capacity equipment. It is anticipated that peak total fluid production will be in the range of 250-300 barrels per day per well.

The proposed Unit tank batteries will be consolidated into one central battery and LACT equipment will be utilized.

Plugged and Abandoned Wells

Past experience of other operators

in this area indicates that plugged and abandoned wells require no additional work to prevent loss of injection fluids. Therefore, no provisions have been made for the re-entry and re-plugging of these wells.

SUPPLEMENT
TO
ENGINEERING APPRAISAL
OF
WATERFLOOD POTENTIAL
OF
ZONE 4 OF THE GRAYBURG
WESTERN PORTION LOCO HILLS FIELD
EDDY COUNTY, NEW MEXICO

Prepared by
ENGINEERING SUB-COMMITTEE
FAR WEST LOCO HILLS SAND UNIT

C. W. Stumhoffer
ANADARKO PRODUCTION COMPANY
Chairman
February 9, 1968

GENERAL

On July 25, 1967, there was submitted to the U.S. Geological Survey for their consideration and approval a proposal to unitize for waterflood Zone 4 of the Grayburg, hereinafter referred to as Loco Hills Sand, under certain leases located in Sections 4, 9, and 16 - T18S-R29E, Loco Hills Field, Eddy County, New Mexico. The proposed Unit Area is referred to as the Far West Loco Hills Sand Unit for which a preliminary Unit Agreement and Unit Operating Agreement have been prepared and approved by the Operators of tracts in the proposed Unit Area. Copies of the proposed Unit documents and an Engineering Appraisal prepared by the Engineering Sub-Committee for the proposed Unit were provided to the U.S.G.S. to assist them in their evaluation of the proposed Unit.

The U.S.G.S. in their evaluation of the proposed Unit, has requested additional data and explanation of certain points in the Engineering Appraisal. Particularly requested was (1) data to support productive limits of the Loco Hills sand on the west end of the Loco Hills Field, (2) the basis for using sixty (60) percent Loco Hills sand - forty (40) percent other zones to determine cumulative primary recoveries by zones for wells within the Unit Area that produced from other zones along with the Loco Hills sand and (3) the reason or reasons for only unitizing the Loco Hills sand under the proposed Unit area. Each of these points will be discussed individually as follows:

PRODUCTIVE LIMITS OF LOCO HILLS SAND

Newmont Oil Company is the Operator of the West Loco Hills Grayburg Sand No. 4 Unit that offsets the proposed Far West Loco Hills Sand Unit to the east.

The Newmont-operated Unit, which covers a large portion of the productive Loco Hills sand in the Loco Hills Field, is conducting a very successful water-flood operation in the Loco Hills sand.

At the time that the Newmont-operated Unit was formed during 1963, all productive Loco Hills sand on the west end of the Loco Hills Field was not included in the Unit Area for several reasons. One reason was the lack of adequate, clear-cut well and reservoir data to define the productive limits of the Loco Hills sand.

Since there exists a need to initiate a secondary recovery program in the depleted Loco Hills sand reservoir on the west end of the Loco Hills Field under leases outside of the Newmont-operated Unit, the Operators of the leases in this area undertook a study of the most practical method of developing these leases for waterflood. An Engineering Sub-Committee was appointed by the Operators to perform this feasibility study. Among the charges to this Engineering Sub-Committee was the establishment of the productive limits of the Loco Hills sand on the west end of the Loco Hills Field.

To establish these productive limits as definitively as possible, the Engineering Sub-Committee met in the offices of the New Mexico Oil Conservation Commission in Artesia, New Mexico in order to have access to well and production data. With careful study of the meager data available, it was determined that twenty-four (24) wells on the west end of the Loco Hills Field outside of the Newmont-operated Unit produce or have produced oil from the Loco Hills sand. These twenty-four (24) wells are tabulated in Table I of the Engineering Appraisal

and a Unit boundary was drawn around these twenty-four (24) wells as shown on attached Figure 1 that shows wells that have produced oil from the Loco Hills sand (Exhibit A to the proposed Unit Agreement). Loco Hills sand production from seven (7) of these wells was commingled with production from other zones as indicated on Figure 1.

Figure 2 is a map of the proposed Unit Area and offsetting leases showing all producing wells. The producing zones open to the well bore during the producing life of these wells are shown on this map. This map is presented to support the western boundary of the proposed Unit to include only the productive Loco Hills sand on the west end of the Loco Hills Field.

CUMULATIVE PRIMARY RECOVERIES FROM LOCO
HILLS SAND IN PROPOSED UNIT AREA

In the area of the proposed Unit, production from the Loco Hills sand has been commingled with production from other zones in the lower Grayburg and San Andres in seven (7) wells. This commingling of production from several zones along with the Loco Hills sand production was another factor in leaving this area of the Loco Hills Field out of the Newmont-operated Unit. The Newmont-operated Unit, also limited to the Loco Hills sand, was unitized with a participation formula based on cumulative primary recovery from the Loco Hills sand.

Cumulative primary oil recovery from the Loco Hills sand remains the most reliable parameter for unitization in this area of the Loco Hills Field. With this fact in mind, a detailed study by the Engineering Sub-Committee was made of the production history of the producing wells that produced from the

Loco Hills sand to ascertain primary oil recoveries from the Loco Hills sand if at all possible.

By using production decline curves, well deepening histories and results, well stimulation histories and results, sample logs, and other available data, it was determined that of the twenty-four (24) wells in the proposed Unit Area that produced Loco Hills sand oil, seventeen (17) produced from the Loco Hills sand only. As of 1-1-66, these seventeen (17) wells have produced 78+ percent of the cumulative primary oil recovered by the twenty-four (24) wells in the proposed Unit Area.

The remaining seven (7) wells produce or produced from the lower Grayburg sands and/or the San Andres formation in addition to the Loco Hills sand. After lengthy research by the Engineering Sub-Committee and much discussion by the Operators of tracts in the proposed Unit Area, it was agreed to prorate the cumulative primary recovery from these seven wells on the basis of sixty (60) percent Loco Hills sand and forty (40) percent other zones.

On the attached Table 1, oil production from these seven wells is prorated by zones. Under the remarks column of this Table, data that was available to use as a guide in determining the 60-40 basis for proration of recoveries by zones is presented. Only three of these wells, Anadarko's H.G. Watson #1 and #1-A and State L-16 #1, have sufficient data available to support proration of recoveries by zones. Utilizing this data, the 60-40 basis for proration of recoveries by zones was negotiated by the Operators of tracts in the proposed Unit Area.

LIMITATION OF PROPOSED UNITIZED
FORMATION TO LOCO HILLS SAND

The Unitized Formation of the proposed Unit has been limited to the Loco Hills sand for several reasons. These reasons are

1. Lack of continuity of the other productive zones in wells located within the proposed Unit Area.
2. Newmont's West Loco Hills Grayburg Sand No. 4 Unit is limited to the Loco Hills sand. The proposed Unit joins the Newmont-operated Unit on the west and a cooperative waterflood program will be initiated along the common boundary between these two units in the Loco Hills sand.
3. Other productive zones in wells located within the proposed Unit Area will be developed for waterflood in conjunction with future secondary recovery operations on leases to the west of the proposed Unit Area.

TABLE 1
PROPOSED FAR WEST LOCO HILLS SAND UNIT
LOCO HILLS FIELD

Cumulative Primary Recovery by Zones

Seven Wells

Productive from Loco Hills Sand and Other Zones

Name and Location of Well	Cumulative Recovery as of 1-1-66, Barrels	Cumulative Recovery by Zones as of 1-1-66, Barrels *			Remarks
		Loco Hills	Metex	San Andres	
<u>Depco, Inc.</u> Banner Miller #2	10,196	6,118	4,078	-	Well drilled to San Andres. Productive zones Loco Hills sand 2510'-15' not stimulated and Metex 2633'-45' stimulated w/nitro. No tests of individual zones to prorate recoveries.
<u>Anadarko</u> H.G. Watson #1	53,665	32,199	21,466	-	Well drilled into Metex sands of Grayburg. Productive zones Loco Hills sand 2478'-83' and Metex 2555'-62' stimulated w/nitro. No tests of individual zones to prorate recoveries. Diagonal offset to northwest, J. Cleo Thompson Miller #3, produced 20,785 barrels of oil from Metex only. Assuming comparable recovery from Metex in H.G. Watson #1, Loco Hills sand produced 32,880 barrels of oil. On this basis production prorated by zones would be 61% Loco Hills - 39% other zones.

2-9-68

TABLE 1
Page 1

TABLE 1 (Continued)

Cumulative Recovery by Zones
as of 1-1-66, Barrels *

Name and Location of Well	Cumulative Recovery as of 1-1-66, Barrels	Loco Hills	Metex	San Andres	Remarks
<u>Anadarko</u> H.G. Watson #1-A	13,526	8,116	-	5,410	Well drilled through San Andres. Productive zones Loco Hills sand that tested 4 gallons of oil per hour natural and San Andres that tested 2 gallons of oil per hour natural. Both zones completed through perforations after fracture treatment. On this basis, production prorated by zones would be 67% Loco Hills - 33% other zones.
<u>Anadarko</u> Langford #3	32,838	19,703	13,135	-	Well drilled through Metex sands of Grayburg. Productive zones Loco Hills sand 2422'-40' stimulated w/nitro and Metex 2646'-53' stimulated w/nitro. No tests of individual zones to prorate recoveries.
<u>Anadarko</u> Langford #6	4,904	2,942	1,962	-	Well drilled into San Andres. Productive zones Loco Hills sand 2466'-76' stimulated by fracture treatment, Metex 2550'-56' stimulated by fracture treatment, and San Andres 2813'-2950' stimulated by fracture treatment. San Andres non-productive. No tests of Loco Hills or Metex individually to prorate recoveries.
<u>Anadarko</u> State L-16 #1	58,748	35,249	23,499	-	Well drilled into Metex sands of Grayburg. Productive zones Loco Hills sand 2454'-59' and Metex 2562'-85' stimulated

2-9-68

TABLE 1

Page 2

TABLE 1 (Continued)

Cumulative Recovery by Zones
as of 1-1-66, Barrels *

Name and Location of Well	Cumulative Recovery as of 1-1-66, Barrels	Loco Hills	Metex	San Andres	Remarks
<u>Anadarko</u> State L-16 #1 (continued)					w/nitro. No tests of individual zones to prorate recoveries. Offset to west, J. Cleo Thompson's Travis "R" Federal #1, produced 31,537 barrels of oil from Metex only. Assuming comparable recovery from Metex in State L-16 #1, Loco Hills sand produced 27,211 barrels of oil. On this basis, production prorated by zones would be 46% Loco Hills - 54% other zones.
<u>Cities Service Oil Company</u> Brookover #1	31,045	18,627	12,418	-	Well drilled into Metex sands of Grayburg. Productive zones at 2530' Loco Hills sand and 2638' Metex sand all stimulated w/nitro. No tests of individual zones to prorate recoveries.

* Based on 60% Loco Hills sand and 40% other zones.

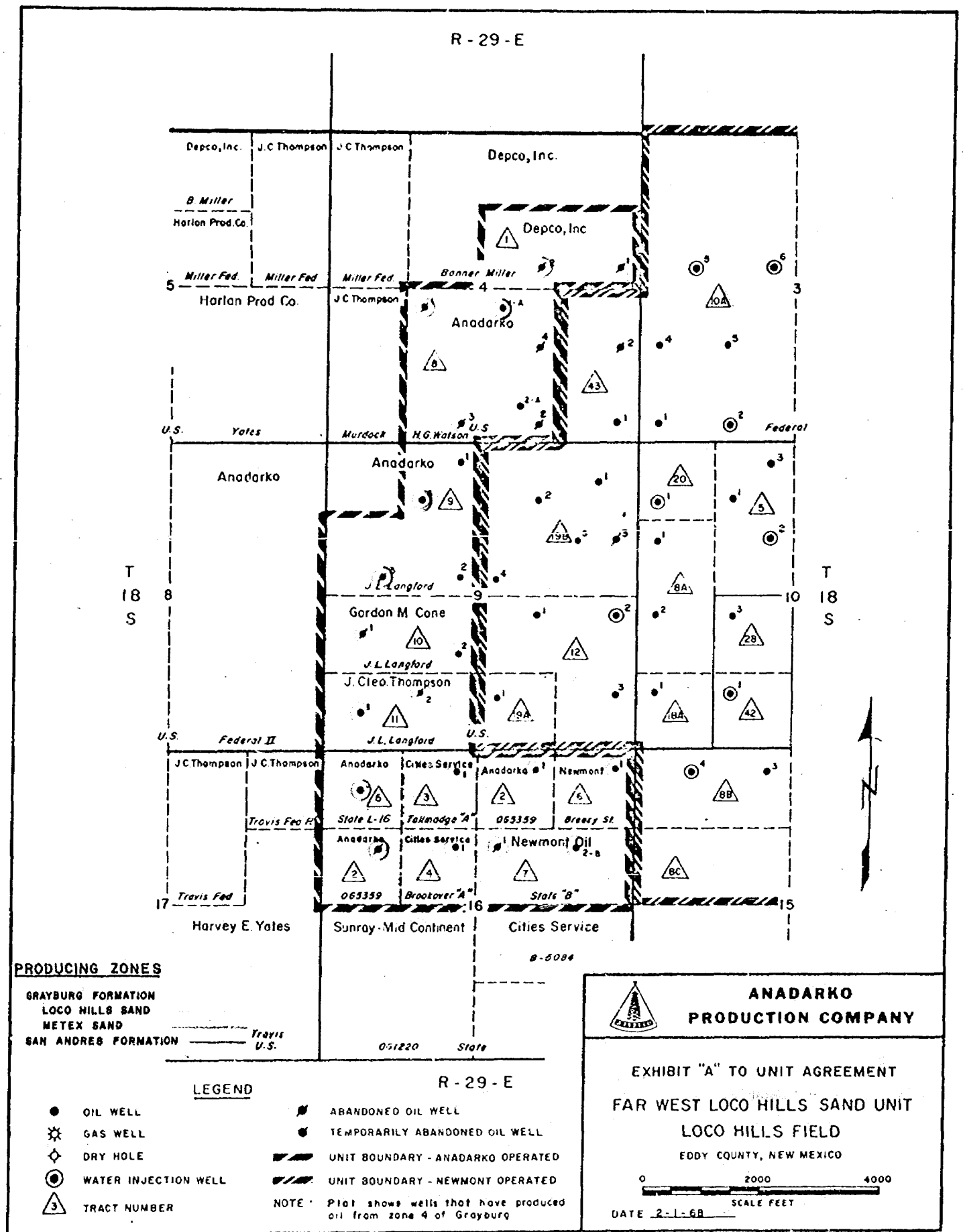


FIGURE 1

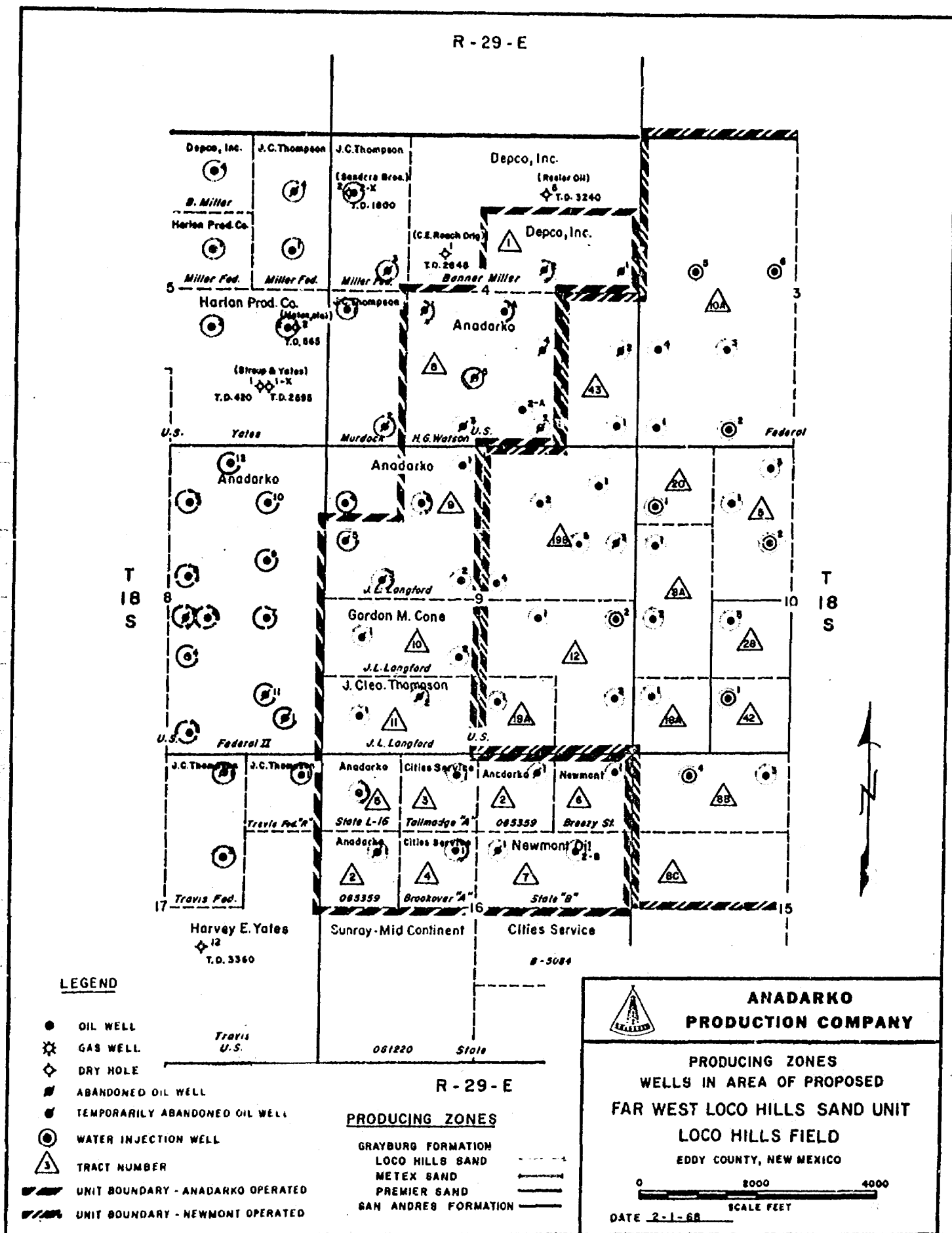


FIGURE 2

LIST OF TABLES

<u>Table No.</u>	<u>Title</u>
1	Well Completion and History Data, Far West Loco Hills Sand Unit, Zone 4 Grayburg (Loco Hills Sand) Wells, Loco Hills Field, Eddy County, New Mexico.
2	Production History, Far West Loco Hills Sand Unit, Zone 4 Grayburg (Loco Hills Sand) Wells, Loco Hills Field, Eddy County, New Mexico.
3	Possible Unitization Parameters, Far West Loco Hills Sand Unit, Zone 4 Grayburg (Loco Hills Sand) Wells, Loco Hills Field, Eddy County, New Mexico.
4	Reservoir Calculations, Far West Loco Hills Sand Unit, Zone 4 Grayburg (Loco Hills Sand) Wells, Loco Hills Field, Eddy County, New Mexico.
5	Secondary Recovery Calculations, Far West Loco Hills Sand Unit, Zone 4 Grayburg (Loco Hills Sand) Wells, Loco Hills Field, Eddy County, New Mexico.
6	Development Program for Waterflood Operations, Far West Loco Hills Sand Unit, Zone 4 Grayburg (Loco Hills Sand) Wells, Loco Hills Field, Eddy County, New Mexico.

TABLE 3
FAR WEST LOCO HILLS SAND UNIT
POSSIBLE UTILIZATION PARAMETERS
ZONE 4 GRAYBURG (LOCO HILLS SAND)
LOCO HILLS FIELD
KNOT COUNTY, NEW MEXICO

Lease	Well No.	Location	Cumulative Recovery Parameter		Usable Well Parameter			Gross Productive Activity Parameter	
			Cum. Recovery From Loco Hills Sand 1-1-66	Percent of Cumulative Recovery 1-1-66	Number Wells In Unit Area	Usable Wells In Unit Area	Percent of Usable Wells	Gross Productive Acreage	Percent of Gross Productive Acreage
Anadarko Production Company									
State C-16	1	NW/4 NE/4 Sec. 16 T-185, R-29E	51,844	6.053864	1	0	0.000000	40	4.761905
Hamper State	1	SW/4 NW/4 Sec. 16 T-185, R-29E	452	0.052984	1	0	0.000000	40	4.761905
H. G. Watson	1	NE/4 SW/4 Sec. 4 T-185, R-29E	32,199	3.774463	1	0	0.000000	40	4.761905
H. G. Watson	2	SW/4 SE/4 Sec. 4 T-185, R-29E	50,401	5.908156	1	0	0.000000	20	2.380952
H. G. Watson	3	SE/4 SW/4 Sec. 4 T-185, R-29E	43,602	5.111157	1	0	0.000000	40	4.761905
H. G. Watson	4	NW/4 SE/4 Sec. 4 T-185, R-29E	41,281	4.879083	1	0	0.000000	20	2.380952
H. G. Watson	1-A	NW/4 SE/4 Sec. 4 T-185, R-29E	8,116	0.951381	1	1	7.692307	20	2.380952
H. G. Watson	2-A	SW/4 SE/4 Sec. 4 T-185, R-29E	9,479	1.111157	1	1	7.692308	20	2.380952
Langford	1	NE/4 NW/4 Sec. 9 T-185, R-29E	75,172	8.823609	1	1	7.692308	20	2.380952
Langford	2	SE/4 NW/4 Sec. 9 T-185, R-29E	70,156	8.223896	1	1	7.692308	40	4.761905
Langford	3	SW/4 NW/4 Sec. 9 T-185, R-29E	19,703	2.309445	1	0	0.000000	40	4.761905
Langford	6	NW/4 NW/4 Sec. 9 T-185, R-29E	2,942	0.344870	1	1	7.692308	20	2.380952
State L-16	1	NW/4 NW/4 Sec. 16 T-185, R-29E	35,249	4.131993	1	1	7.692308	40	4.761905
Total Anadarko Production Company			440,496	51.636258	13	6	46.153847	400	47.619047
Cities Service Oil Company									
Tallmadge	1	NE/4 NW/4 Sec. 16 T-185, R-29E	92,248	10.813586	1	1	7.692307	40	4.761905
Seaboard	2	NE/4 NW/4 Sec. 16 T-185, R-29E	18,627	2.183512	1	1	7.692308	40	4.761904
Total Cities Service Oil Co.			110,875	12.997098	2	2	15.384615	80	9.523809
Gordon M. Come									
Langford	1	NW/4 SW/4 Sec. 9 T-185, R-29E	34,154	4.003634	1	1	7.692308	40	4.761905
Langford	2	NE/4 SW/4 Sec. 9 T-185, R-29E	77,671	9.076694	1	1	7.692307	40	4.761905
Total Gordon M. Come			111,825	13.080328	2	2	15.384615	80	9.523810
Dapco, Inc.									
Banner Miller	1	SE/4 NE/4 Sec. 4 T-185, R-29E	13,062	1.531166	1	0	0.000000	40	4.761905
Banner Miller	2	SW/4 NE/4 Sec. 4 T-185, R-29E	6,118	0.717170	1	0	0.000000	40	4.761905
Total Dapco, Inc.			19,180	2.248336	2	0	0.000000	80	9.523810
Moynont Oil Company									
Breezy State	1	NE/4 NE/4 Sec. 16 T-185, R-29E	3,985	0.467133	1	1	7.692308	40	4.761905
State "a"	1	SW/4 NE/4 Sec. 16 T-185, R-29E	22,754	2.667292	1	0	0.000000	40	4.761905
State "a"	2	SE/4 NE/4 Sec. 16 T-185, R-29E	15,816	1.853998	1	1	7.692307	40	4.761904
Total Moynont Oil Co.			42,555	4.988423	3	2	15.384615	120	14.285714
J. Cleo Thompson									
Langford	1	SW/4 SW/4 Sec. 16 T-185, R-29E	65,542	7.683030	1	1	7.692308	40	4.761905
Langford	2	SE/4 SW/4 Sec. 16 T-185, R-29E	62,842	7.366527	1	0	0.000000	40	4.761905
Total J. Cleo Thompson			128,384	15.049557	2	1	7.692308	80	9.523810
Total Far West Loco Hills Unit			853,075	100.000000	24	13	100.000000	840	100.000000

TABLE 4
FAR WEST LOCO HILLS SAND UNIT
ZONE 4 GRAYBURG (LOCO HILLS SAND)
LOCO HILLS FIELD
EDDY COUNTY, NEW MEXICO

RESERVOIR CALCULATIONS

Original Oil in Place

$$OIP = \frac{7758 \times \phi \times (1-SW)}{Boi}$$

$$OIP = \frac{7758 \times 0.164 \times (1-0.25)}{1.27}$$

$$OIP = 751 \text{ BBls./Acre-Foot}$$

$$OIP = 751 \text{ BBls./Acre-Foot} \times 6,720 \text{ Acre-Feet} *$$

$$OIP = 5,049,000 \text{ STB}$$

$$\begin{aligned} \text{Percent Primary Recovery} &= \frac{N_p}{N} = \frac{851,987}{5,049,000} \times 100\% \\ &= 16.9\% \text{ of Original Oil in Place} \end{aligned}$$

Present Reservoir Oil Saturation

$$S_o = (1 - \frac{N_p}{N}) (\frac{Bo_i}{Bo}) (1 - SW)$$

$$S_o = (1 - \frac{851,987}{5,049,000}) (\frac{1.05}{1.27}) (1 - 0.25)$$

$$S_o = (0.831) (0.827) (0.75) (100)$$

$$S_o = 51.5\%$$

Remaining Oil in Place

$$NR = \frac{7758 \times \phi \times S_o}{Bo}$$

$$NR = \frac{7758 \times 0.164 \times 0.515}{1.05}$$

$$NR = 624 \text{ BBls./Acre-Foot}$$

$$NR = 624 \text{ BBls./Acre-Foot} \times 6,720 \text{ Acre-Feet}$$

$$NR = 4,193,000 \text{ STB}$$

Table 4
Reservoir Calculations
Page 2

Where: ϕ = Porosity, %

SW = Connate Water Saturation, %

Boi - Initial Formation Volume Factor

Bo = Present Formation Volume Factor

N or OIP = Original Oil in Place, STB.

NP = Cumulative Oil Production, STB.

NR = Remaining Oil in Place, STB.

So = Present Oil Saturation, %

6,720 Acre-Feet*- Based on Assumed Average Net Pay
Thickness of 8' Based on Driller's Logs
and Available GRN Logs.

TABLE 5.
FAR WEST LOCO HILLS SAND UNIT
ZONE 4 GRAYBURG (LOCO HILLS SAND)
LOCO HILLS FIELD
EDDY COUNTY, NEW MEXICO

SECONDARY RECOVERY CALCULATIONS

Water Flood Reserves

$$N_r = \frac{7758 \times \phi (S_o - S_{or}) \times B_{wf}}{B_o}$$

$$N_r = \frac{7758 \times 0.164 (0.515 - 0.200) \times 1.15}{1.05}$$

$$N_r = 439 \text{ BBls./Acre-Foot}$$

$$N_{pf} = N_r \times E \times C \times A_{Fe}$$

$$N_{pf} = 439 \times 0.60 \times 0.60 \times 5400$$

$$N_{pf} = 853,000 \text{ STB}$$

Where: N_r = Water Flood Reserves in Place, BBls/Acre-Foot.

N_{pf} = Predicted Recoverable Secondary Reserves, STB.

ϕ = Porosity, %

S_o = Present Oil Saturation, %.

S_{or} = Residual Oil Saturation After Water Flood, %

B_o = Present Formation Volume Factor

B_{wf} = Formation Volume Factor When Fill-up Effected.

E = Sweep Efficiency for Contained Five-Spot.

C = Percent Pattern Containment.

A_{Fe} = Effective Acre-Feet in Injection Pattern.

Reservoir Fill-Up Time

$$S_g = 1 - S_w - S_o$$

$$S_g = 1.000 - 0.250 - 0.515$$

$$S_g = 0.235 = 23.5\%$$

$$V_f = 7758 \times AF \times \phi \times S_g$$

$$V_f = 7758 \times 6720 \times 0.164 \times 0.235$$

$$V_f = 2,009,000 \text{ STB}$$

$$T_f = \frac{V_f - V}{I_r}$$

$$T_f = \frac{2,009,000 - 115,000}{I_r *}$$

$$T_f = \underline{677 \text{ Days or } 22.3 \text{ Months}}$$

Where: S_g = Present Gas Saturation, %

S_w = Connate Water Saturation, %

S_o = Present Oil Saturation, %

V_f = Present Reservoir Voidage or Fill-Up Volume, BBls.

AF = Primary Acre-Feet in Unit Area

ϕ = Porosity, %

T_f = Time to Fill-Up

V = Effective Water Injection by Offset Operator to Time
Injection Commenced on Far West Loco Hills Sand Unit, BBls.

* I_r = Effective Injection Rate, BBls./Day
273 Days at 1900 BWP, 404 Days at 3400 BWP.

Note: Assume eight water input wells along line between Newmont's West Loco Hills Grayburg No. 4 Sand Unit with average injection rate of 400 barrels of water per well per day - effective to Far West Loco Hills Sand Unit 50% or 1,600 BWP for first nine months. Second stage of injection wells placed in operation nine months after first stage at injection rates of 300 barrels of water per well per day into five wells, 1,500 BWP.

Table 5
Secondary Recovery Calculations
Page 3

Note - continued

Effective injection rate into Unit Area during first nine months of operation 1,900 BWPB including 300 BWPB injected into two input wells on Newmont's West Loco Hills Grayburg No. 4 Sand Unit, 10A-5 and 8B-4. These two wells will have contributed 115,000 barrels of injection water to the Far West Loco Hills Sand Unit on 1-1-67.

Effective injection rate into Unit Area after first nine months 3,400 BWPB.

Reservoir Flood-Out Time

$$V_d = N_{pf} \times 6$$

$$V_d = 853,000 \times 6$$

$$V_d = \underline{5,118,000 \text{ Barrels of Water}}$$

$$V_t = V_f - V_l + V_d$$

$$V_t = 2,009,000 - 115,000 + 5,118,000$$

$$V_t = \underline{7,012,000 \text{ Barrels}}$$

$$T_t = \frac{7,012,000}{I_r \star}$$

$$T_t = \underline{2,183 \text{ Days or } 5.98 \text{ Years}}$$

Where: V_d = Displacement Volume which is estimated to be six times Secondary Recovery based on performance of other water floods in field, barrels.

N_{pf} = Predicted Recoverable Secondary Reserves, STB.

V_t = Total Water Requirement, barrels.

V_f = Present Reservoir voidage or fill-up volume, barrels.

V_l = Effective water injection by offset operator to time injection commenced on Far West Loco Hills Sand Unit, barrels.

T_t = Total Flood out time.

I_r = Effective Injection Rate, 273 Days at 1900 BWPB, balance (1,910 Days) at 3,400 BWPB.

TABLE 6
 FAR WEST LOCO HILLS SAND UNIT
 DEVELOPMENT PROGRAM
 PROPOSED WATERFLOOD OPERATIONS
 ZONE 4 GRAYBURG (LOCO HILLS SAND)
 LOCO HILLS FIELD
 EDDY COUNTY, NEW MEXICO

I. First Quarter 1969

- A. Drill line water input well (8-8) on Anadarko's H. G. Watson lease 10' NSL 2630' WEL of Section 4, T-18S, R-29E.
- B. Drill water input well (2-3) on Anadarko's State 0-16 lease 330' SNL 1980' WEL of Section 16, T-18S, R-29E.
- C. Re-enter and complete as water input well Depco's Banner Miller Well No. 1 (1-1).
- D. Drill line water input well (6-2) on Newmont's *WEST LOCO HILLS GRAYBURG NO. 4 Sand Unit*
~~Breezy State~~ lease 1310' SNL 10' ~~WEL~~ EWL
 Section ~~16~~¹⁵, T-18S, R-29E (50% Newmont Unit - 50% Anadarko Unit).
- E. Convert Gordon M. Cone's J. L. Langford Well No. 2 (10-2) to water input.
- F. Construct water injection plant to serve five (5) water input wells - one injection pump and engine to give 3,000 BHPD capacity at 1200 psi.
- G. Install water injection system to five (5) water input wells.
- H. Plug back Anadarko's H. G. Watson Well No. 1-A (8-6) and 2-A (8-7), J. L. Langford Well No. 6 (9-6) and State L-16 Well No. 1 (5-1) and Cities Service's Tallmadge Well No. 1 (3-1) and Brookover Well No. 1 (4-1).

II. Second Quarter 1969

- A. Re-enter and complete for production Depco's Banner Miller Well No. 2 (1-2) including production equipment.
- B. Re-enter and complete for production J. Cleo Thompson's J. L. Langford Well No. 2 (11-2) including production equipment.

TABLE 6
Page #2

- C. Recondition Anadarko's J. L. Langford Well No. 1 (9-1) and J. L. Langford Well No. 2 (9-2) for production.
- D. Recondition Cities Service Tallmadge "A" No. 1 (3-1) Well for production.
- E. Recondition Newmont's Breezy State No. 1 (6-1) Well, and State "B" No. 2 (6-2) Well for production.

III. Third Quarter 1969

- A. Re-enter and recondition Gordon M. Cone's J. L. Langford No. 1 (10-1) Well for production.
- B. Drill water input well (8-9) on Anadarko's H. G. Watson lease approximately 1330' NSL and 2630' WEL Section 4, T-18S, R-29E.

IV. Fourth Quarter 1969

- A. Drill water input well (10-3) on Gordon M. Cone's J. L. Langford Lease approximately 10' EWL and 1330' NSL Section 9, T-18S, R-29E.
- B. Convert to input Cities Service's Brookover "A" No. 1 (4-1) Well.
- C. Re-enter and condition for injection Anadarko's H. G. Watson No. 1 (8-1) Well.
- D. Consolidate tank battery and gathering system.
- E. Expand injection system and plant.
- F. Larger pumping equipment for Newmont's Breezy State No. 1 (6-1).
- G. Convert Anadarko's State L-16 No. 1 (5-1) Well to injection.
- H. Convert Anadarko's J. L. Langford No. 5 (9-5) Well to injection.

V. First Quarter 1970

- A. Drill producing well (7-3) on Newmont's State "B" Lease approximately 1650' SNL and 1650' WEL of Section 16, T-18S, R-29E.
- B. Larger pumping equipment for Anadarko's J. L. Langford No. 2 (9-2) Well and H. G. Watson's No. 1-A (8-6) Well.

TABLE 6
Page 3

- C. Drill producing Well (9-7) on Anadarko's J. L. Langford Lease approximately 2310 SNL and 1650 EWL of Section 9, T-18S, R-29E.

VI. Second Quarter 1970

- A. Drill producing well (8-10) on Anadarko's H. G. Watson Lease approximately 660' NSL and 1980' EWL of Section 4, T-18S, R-29E.
- B. Drill producing well (11-3) on J. Cleo Thompson's Lease approximately 1650' EWL and 330' NSL of Section 9, T-18S, R-29E.

LIST OF FIGURES

<u>FIGURE NO.</u>	<u>TITLE</u>
1	Gamma Ray - Neutron Log Anadarko Production Company's H. G. Watson Well No. 2-A showing location of Zone 4 Grayburg (Loco Hills Sand), Far West Loco Hills Sand Unit, Loco Hills Field, Eddy County, New Mexico.
2	Map of Proposed Far West Loco Hills Sand Unit Area, Loco Hills Field, Eddy County, New Mexico.
3	Structure Map Base of Zone 4 Grayburg (Loco Hills Sand), Far West Loco Hills Sand Unit Area, Loco Hills Field, Eddy County, New Mexico.
4	Map Proposed Water Flood Development and Present Productive Area of Zone 4 Grayburg (Loco Hills Sand), Far West Loco Hills Sand Unit, Loco Hills Field, Eddy County, New Mexico.
5	Map Proposed Tract and Well Designations, Far West Loco Hills Sand Unit, Loco Hills Field, Eddy County, New Mexico.
6	Projected Production Curve for Water Flood Operations, Zone 4 Grayburg (Loco Hills Sand), Far West Loco Hills Sand Unit, Loco Hills Field, Eddy County, New Mexico.
7	Lease Production Curve Depco's Banner Miller Lease, Far West Loco Hills Sand Unit, Loco Hills Field, Eddy County, New Mexico.
8	Lease Production Curve Anadarko's State G-16 Lease, Far West Loco Hills Sand Unit, Loco Hills Field, Eddy County, New Mexico.
9	Lease Production Curve Cities Service's Tallmadge Lease, Far West Loco Hills Sand Unit, Loco Hills Field, Eddy County, New Mexico.

LIST OF FIGURES
(Continued)

<u>FIGURE NO.</u>	<u>TITLE</u>
10	Lease Production Curve Cities Service's Brookover Lease, Far West Loco Hills Sand Unit, Loco Hills Field, Eddy County, New Mexico.
11	Lease Production Curve Anadarko's State L-16 Lease, Far West Loco Hills Sand Unit, Loco Hills Field, Eddy County, New Mexico.
12	Lease Production Curve Newmont's Breezy State Lease, Far West Loco Hills Sand Unit, Loco Hills Field, Eddy County, New Mexico.
13	Lease Production Curve Newmont's State "B" Lease, Far West Loco Hills Sand Unit, Loco Hills Field, Eddy County, New Mexico.
14	Lease Production Curve Anadarko's H. G. Watson Lease, Far West Loco Hills Sand Unit, Loco Hills Field, Eddy County, New Mexico.
15	Lease Production Curve Anadarko's J. L. Langford Lease, Far West Loco Hills Sand Unit, Loco Hills Field, Eddy County, New Mexico.
16	Lease Production Curve Gordon Cone's J. L. Langford Lease, Far West Loco Hills Sand Unit, Loco Hills Field, Eddy County, New Mexico.
17	Lease Production Curve J. Cleo Thompson's J. L. Langford Lease, Far West Loco Hills Sand Unit, Loco Hills Field, Eddy County, New Mexico.

ANADARKO PRODUCTION COMPANY

N. O. WATSON NO. 2-A

EDDY COUNTY, NEW MEXICO

SECTION 10, T20N, R2E

SIC 4-100-245

ELAN 2010

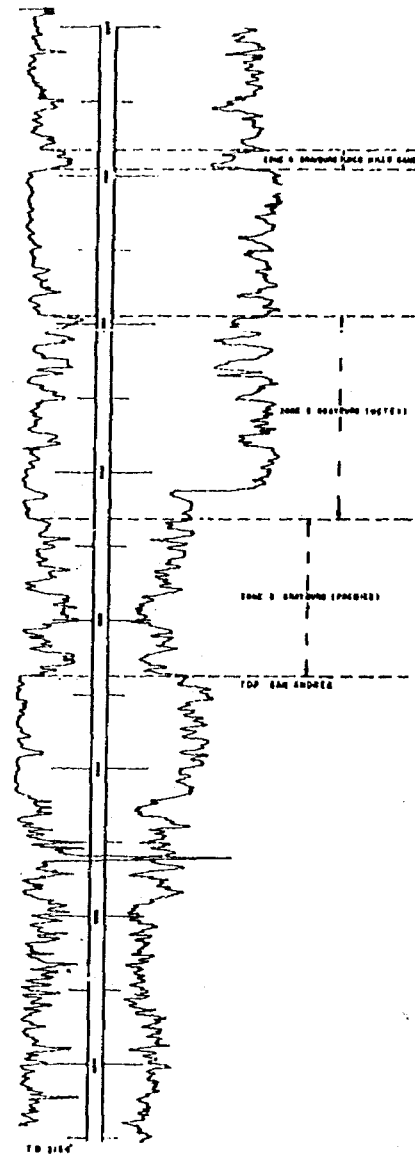


FIGURE 1

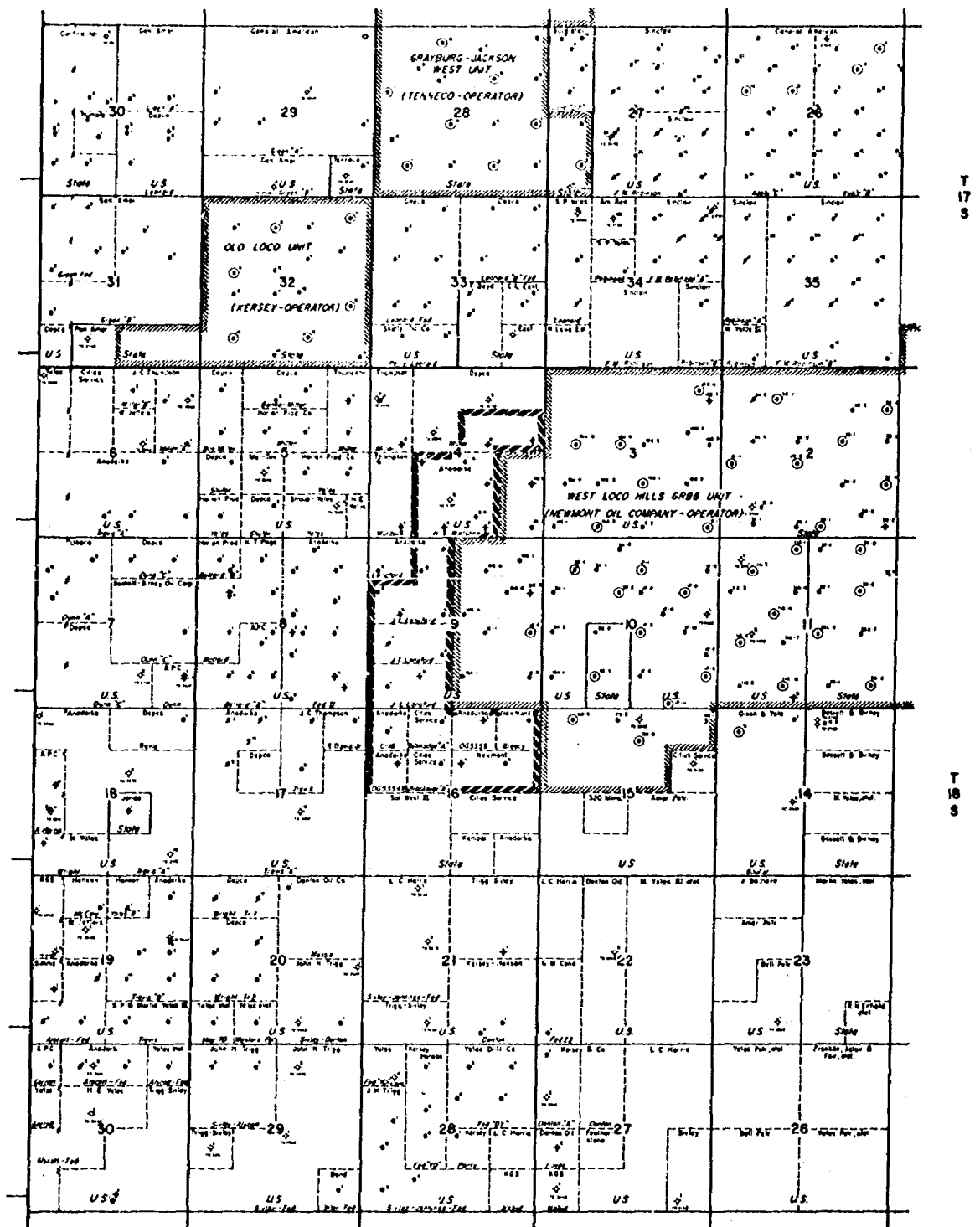
LOCATION ZONE 4 GRAYBURN (LOCO HILLS SAND)

GEOLOGIC COLUMN

FAR WEST LOCO HILLS SAND UNIT

LOCO HILLS FIELD

EDDY COUNTY, NEW MEXICO



LEGEND

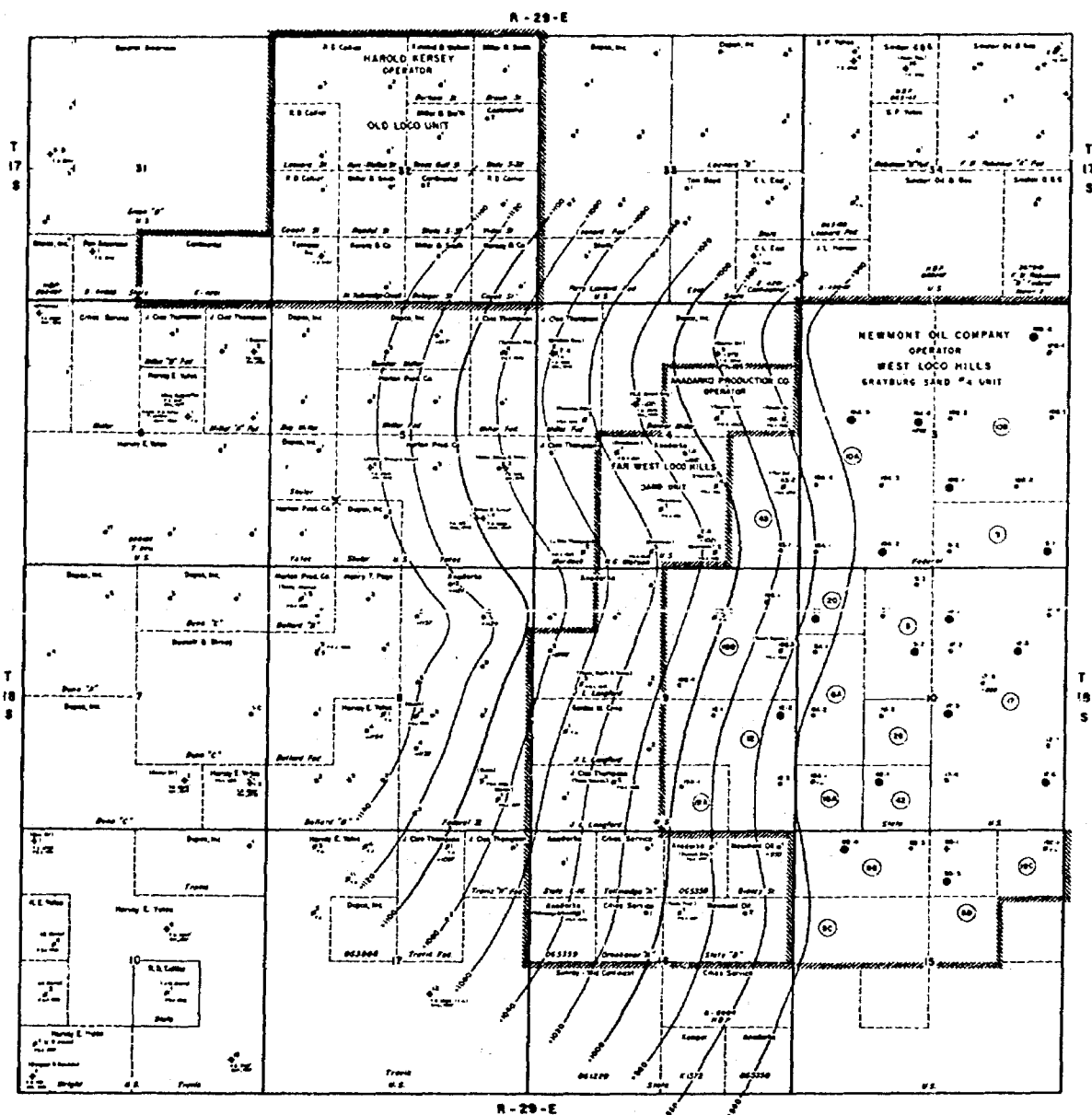
- Oil Well
- ⊕ Plugged & Abandoned
- ⊖ Temporarily Abandoned
- ⊙ Dry & Abandoned
- ⊗ Water Injection Well
- ▭ GRB Unit Outcrop
- ▨ Far West Loco Hills Sand Unit



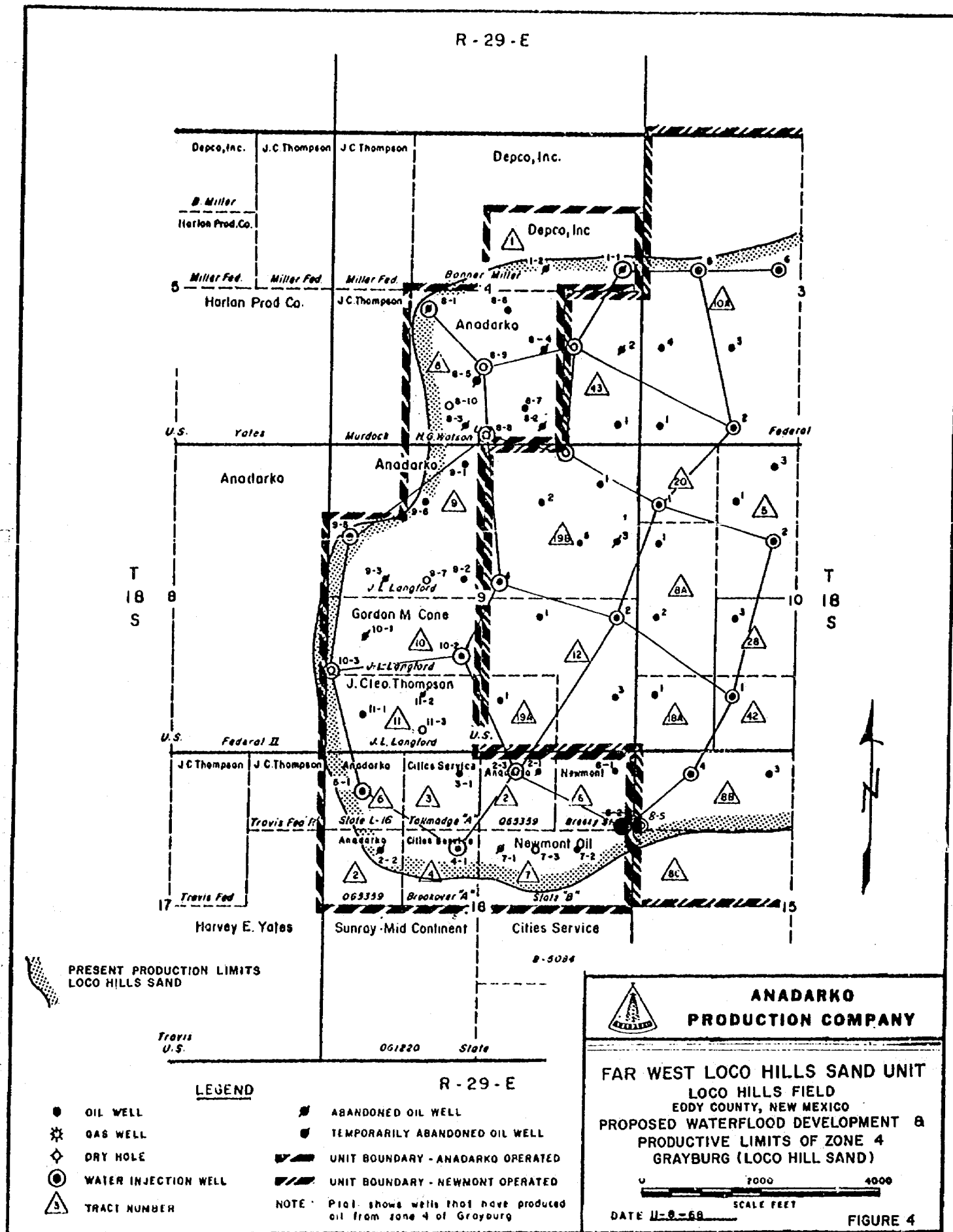
**ANADARKO
PRODUCTION COMPANY**

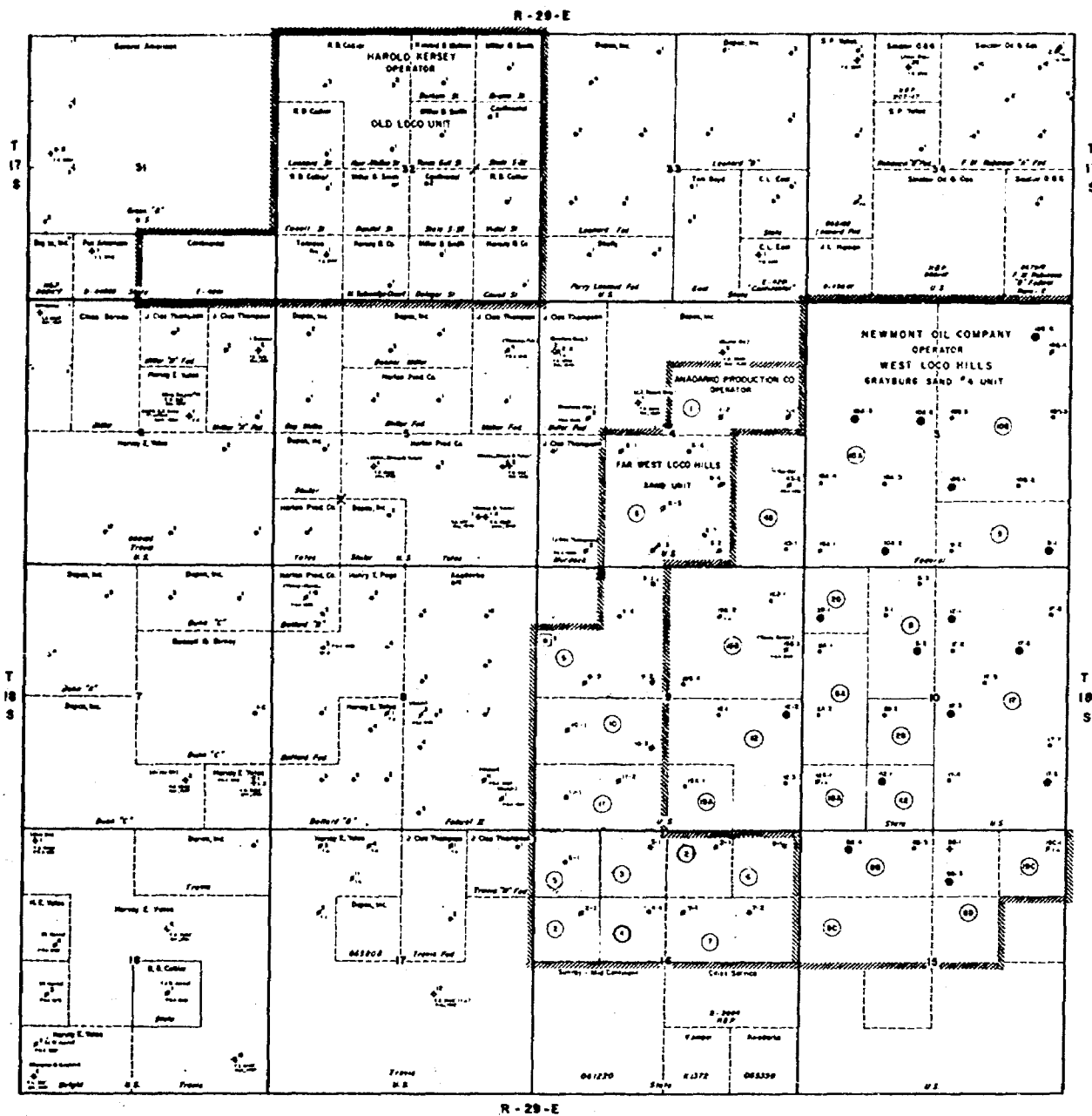
FIGURE 2
FAR WEST LOCO HILLS SAND UNIT
LOCO HILLS FIELD
EDDY COUNTY, NEW MEXICO

0 100 200 300 400 500
SCALE: 1"=1000'



R - 29 - E





- LEGEND
- OIL WELL
 - GAS WELL
 - DRY HOLE
 - ⊕ ABANDONED OIL WELL
 - ⊖ TEMPORARILY ABANDONED OIL WELL
 - ⊙ WATER INJECTION WELL
 - UNIT BOUNDARY
 - ⊞ WELLS IN UNIT AREA PRODUCING FROM FORM OTHER THAN UTILIZED FORMATION

**ANADARKO
PRODUCTION COMPANY**

**FIGURE 5
FAR WEST LOCO HILLS SAND UNIT
LOCO HILLS FIELD
EDDY COUNTY, NEW MEXICO**

RECOMMENDED TRACT AND WELL DESIGNATION

0 1000 2000 3000 4000
SCALE FEET

Case 3989

EXHIBIT III

NEW MEXICO OIL AND GAS COMMISSION
WATERFLOOD APPLICATION DATA

FIELD Loco Hills COUNTY Eddy
OPERATOR Anadarko Production Company DATE 11-11-68
LEASE Far West Loco Hills Sand Unit
RESERVOIR Zone (4) Grayburg (Loco Hills Sand) DISCOVERY DATE January, 1939

1. RESERVOIR AND FLUID CHARACTERISTICS

A. Information on entire reservoir

1. Name of Formation Loco Hills Sand (Zone 4 Grayburg)
2. Estimated productive area of entire reservoir 9920 Acres
3. Composition (Sand, Limestone, Dolomite, etc.) Sand
4. Type of structure Monocline
(include cross-section and structure maps)
5. Type drive during primary production Solution Gas
6. Original reservoir pressure 1900 PSIG (Estimated)
7. Was gas cap present originally? NO At present NO

B. Information on proposed project area

(Include plat of lease (s) to be flooded, showing producing wells, proposed injection wells, and offset wells).

1. Number of productive acres in lease (s) to be flooded 840
2. Average depth to top of pay (feet) 2400
3. Average effective pay thickness (feet) 8
4. Average porosity (%) 16.4% (Estimated)
5. Average horizontal permeability (mds.) 5.4 (est.) Range Unknown
6. Connate water content (% of pore space) 25% (Estimated)
7. Gravity of oil (API) 36° API Viscosity 2.0 cp (Estimated)

II. PRIMARY PRODUCTION HISTORY

1. Date first well completed on lease (s) Table I, Engineering Appraisal Attached.
2. Oil, gas, water production by months since discovery. (Graphically as well as in tabular form.) Table 2 & figures 6 thru 17 attached Engineering appraisal
3. Stage of depletion of project area Stripper-All wells below economic limit.
4. Number of producing wells on each lease in project area See attached list.
5. Average daily oil production per well at present time 1 BOPD / Producing well.
6. Cumulative oil production to date from lease (s) 862,986 barrels as of 9-1-68.

III. RESULTS - EXPECTED

1. Estimated original oil in place (bbls.) 5,049,000
2. Estimated saturation at present time (% of pore space) 51.5%
3. Estimated residual oil saturation at abandonment 20.0%
4. Estimated ultimate additional oil that will be recovered as a direct result of injection (bbls.) 853,000 barrels

IV. INJECTION

1. Source of injected water (formation, depths) Commercial Water Company
2. Fresh or salt water Fresh
3. Flood pattern and spacing Modified 5 spot
4. Initial injection pressure to be used (psi) 1300 PSI
5. Estimated initial per well rate of injection (bbls.) 300
6. List complete injection well data on reverse side of this sheet

INJECTION WELL DATA

		FWLHSU		Banner - Miller No. 1	Gordon Cone J.L. Langford No. 2	FWLHSU
WELL NO.		FWLHSU 8-8 (To be drilled)	2-3 (To be drilled)	FWLHSU 1-1 (Re-entry P & A Well)	FWLHSU 10-2 (Conversion)	6-2 (To be drilled)
Sur. csg.	Size	8 5/8"	8 5/8"	Unknown	Unknown	8 5/8"
	Length	250'	250'			250'
	Sxs. Cement	150 sx	150			150
Prod. csg.	Size	4 1/2"	4 1/2"	7"	7"	4 1/2"
	Length	2550'	2550'	2397'	2338'	2550'
	Sxs. Cement	200	200	100	100	200
Tubing	Length	2240 (Est.)	2240 (Est.)	2240 (Est.)	2240 (Est.)	2240 (Est.)
	Packer Depth	2240 (Est.)	2240 (Est.)	2240 (Est.)	2240 (Est.)	2240 (Est.)
Inj.	Depth	2480-2500 Est.	2450-2470 (Est.)	2525-2555	2457-2473	2465-2480 (Est.)
	Thru casing. or tubing?	Tubing	Tubing	Tubing	Tubing	Tubing

FAR WEST LOCO HILLS SAND UNIT

LOCO HILLS FIELD

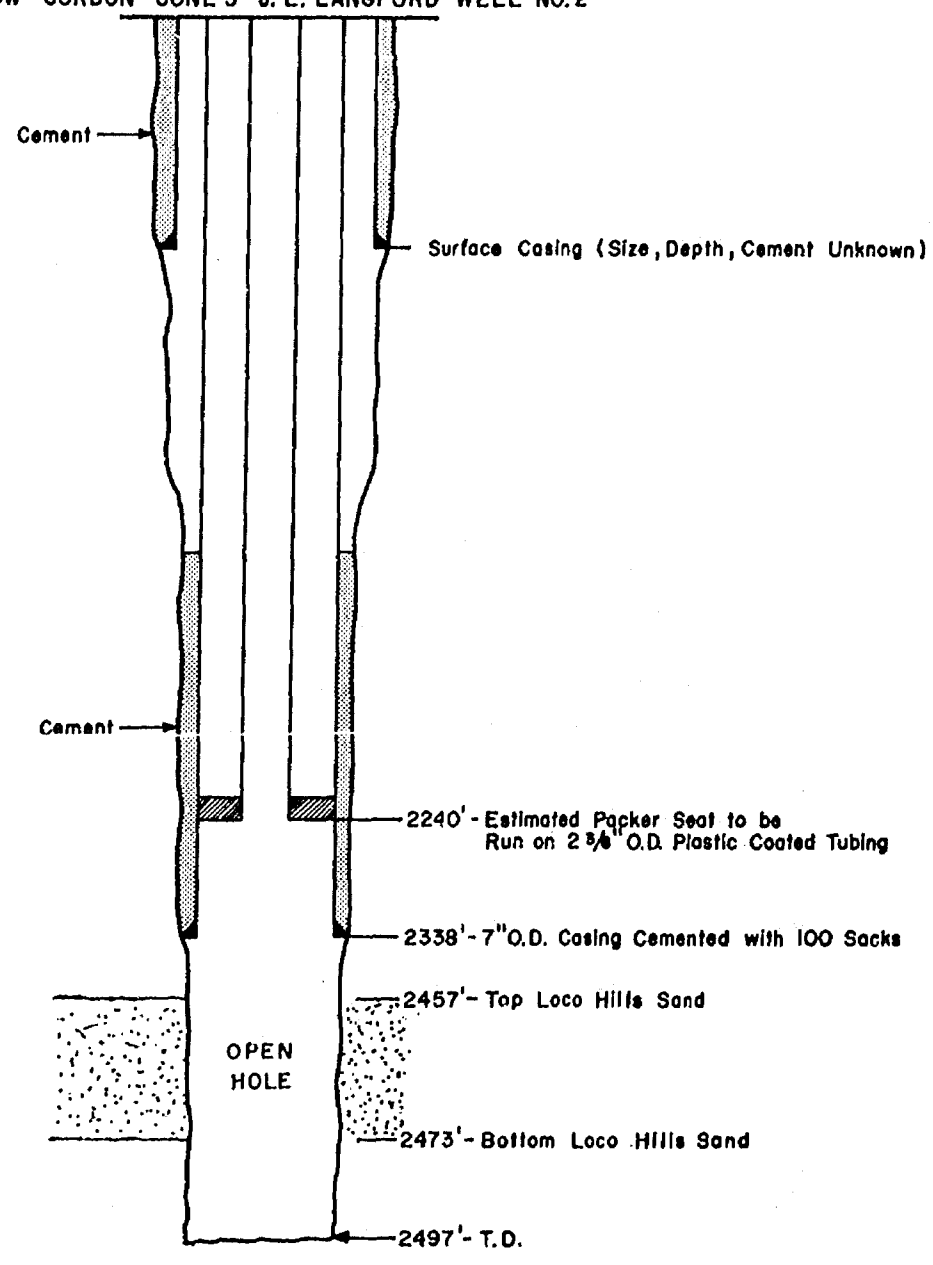
EDDY COUNTY, NEW MEXICO

PRODUCING WELL TABULATION

<u>Company</u>	<u>Lease</u>	<u>Well No.</u>	<u>Producing</u>	<u>Inactive</u>
Anadarko Production Co.	H.G. Watson 4-185-29E Tract 8	1	NO	YES
		2	NO	YES
		3	NO	YES
		4	NO	YES
		5	NO	YES
		1-A	YES	NO
		2-A	YES	NO
	J.L. Langford 9-185-29E Tract 9	1	YES	NO
		2	YES	NO
		3	NO	YES
		5	NO	YES
		6	YES	NO
	State L-16 16-185-29E Tract 5	1	YES	NO
	State 0-16 16-185-29E Tract 2	1	NO	YES
	Kemper State 16-185-29E Tract 2	1	NO	YES
Depco, Inc.	Banner-Miller 4-185-29E Tract 1	1	NO	YES
		2	NO	YES
Gordon M. Cone	J.L. Langford 9-185-29E Tract 10	1	NO	YES
		2	YES	NO
J. Cleo Thompson	J.L. Langford 9-185-29E Tract 11	1	YES	NO
		2	NO	YES
Cities Service Oil Co.	Tallmadge "A" 16-185-29E Tract 3	1	YES	NO
	Brookover "A" 16-185-29E Tract 4	1	YES	NO

<u>Company</u>	<u>Lease</u>	<u>Well No.,</u>	<u>Producing</u>	<u>Inactive</u>
Newmont Oil Corp.	Breezy State	1	YES	NO
	16-185-29E			
	Tract 6			
	State B	1	NO	YES
	16-185-29E	2	YES	NO
	Tract 7			
			<hr/>	<hr/>
TOTAL			12	14

PROPOSED
FAR WEST LOCO HILLS SAND UNIT
WELL NUMBER 10-2
NOW GORDON CONE'S J. L. LANGFORD WELL NO. 2

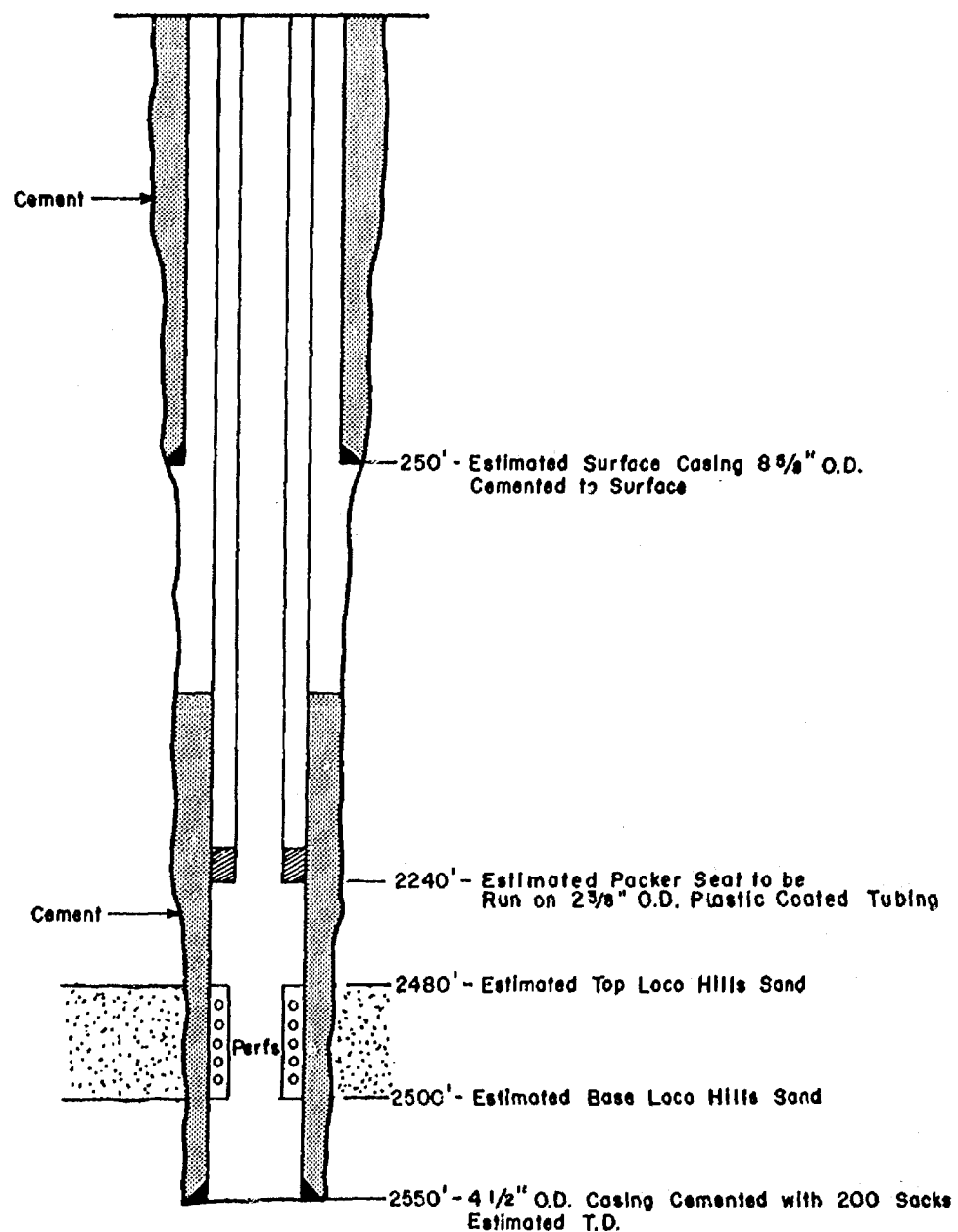


**ANADARKO
PRODUCTION COMPANY**

FAR WEST LOCO HILLS SAND UNIT
LOCO HILLS FIELD
EDDY COUNTY, NEW MEXICO
DIAGRAMMATIC SKETCH
OF
PROPOSED COMPLETION
OF
TYPICAL WATER INJECTION WELL
TO BE CONVERTED FROM PRODUCING
STATUS EXHIBIT V

Case 3988

PROPOSED
FAR WEST LOCO HILLS SAND UNIT
WELL NUMBER 8-8



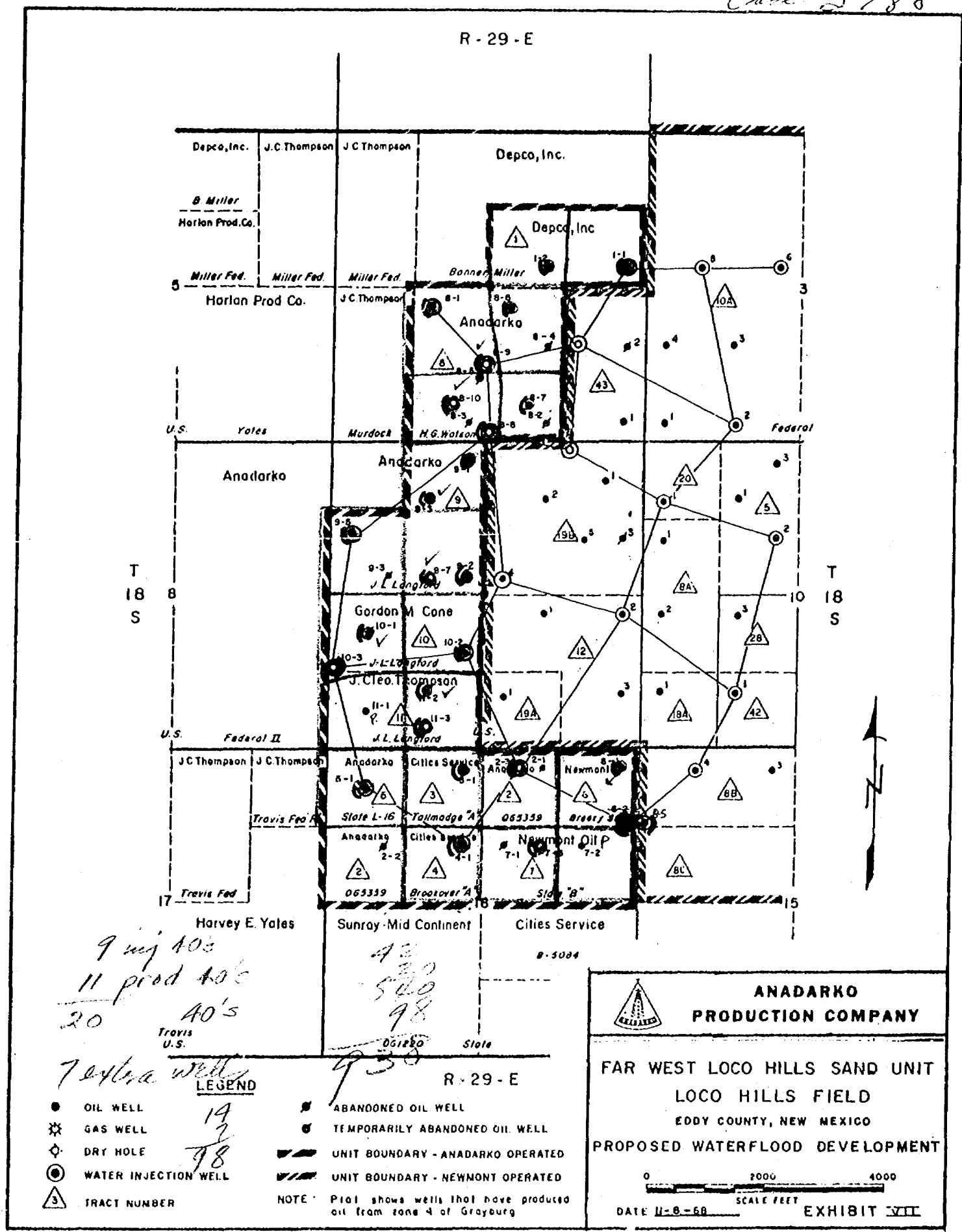
**ANADARKO
PRODUCTION COMPANY**

FAR WEST LOCO HILLS SAND UNIT
LOCO HILLS FIELD
EDDY COUNTY, NEW MEXICO
DIAGRAMMATIC SKETCH
OF
PROPOSED COMPLETION
OF
TYPICAL WATER INJECTION WELL
TO BE DRILLED

EXHIBIT VI

Case 3988

R - 29 - E



FAR WEST LOCO HILLS SAND UNIT
DEVELOPMENT PROGRAM
PROPOSED WATERFLOOD OPERATIONS
ZONE 4 GRAYBURG (LOCO HILLS SAND)
LOCO HILLS FIELD
EDDY COUNTY, NEW MEXICO

I. First Quarter 1969

- A. Drill line water input well (8-8) on Anadarko's H. G. Watson lease 10' NSL 2630' WEL of Section 4, T-18S, R-29E.
- B. Drill water input well (2-3) on Anadarko's State 0-16 lease 330' SNL 1980' WEL of Section 16, T-18S, R-29E.
- C. Re-enter and complete as water input well Depco's Banner Miller Well No. 1 (1-1).
- D. Drill line water input well ⁸⁻⁵(6-2) on Newmont's ~~Breezy State~~ ^{WEST LOCO HILLS GRAYBURG NO. 4 SAND UNIT} lease 1310' SNL 10' ~~WEL~~ ^{EWL} Section ~~16~~¹⁵, T-18S, R-29E (50% Newmont Unit - 50% Anadarko Unit).
- E. Convert Gordon M. Cone's J. L. Langford Well No. 2 (10-2) to water input.
- F. Construct water injection plant to serve five (5) water input wells - one injection pump and engine to give 3,000 BWPD capacity at 1200 psi.
- G. Install water injection system to five (5) water input wells.
- H. Plug back Anadarko's H. G. Watson Well No. 1-A (8-6) and 2-A (8-7), J. L. Langford Well No. 6 (9-6) and State L-16 Well No. 1 (5-1) and Cities Service's Tallmadge Well No. 1 (3-1) and Brookover Well No. 1 (4-1).

II. Second Quarter 1969

- A. Re-enter and complete for production Depco's Banner Miller Well No. 2 (1-2) including production equipment.
- B. Re-enter and complete for production J. Cleo Thompson's J. L. Langford Well No. 2 (11-2) including production equipment.

EXHIBIT VII

- C. Recondition Anadarko's J. L. Langford Well No. 1 (9-1) and J. L. Langford Well No. 2 (9-2) for production.
- D. Recondition Cities Service Tallmadge "A" No. 1 (3-1) Well for production.
- E. Recondition Newmont's Breezy State No. 1 (6-1) Well, and State "B" No. 2 (6-2) Well for production.

III. Third Quarter 1969

- A. Re-enter and recondition Gordon M. Cone's J. L. Langford No. 1 (10-1) Well for production.
- B. Drill water input well (8-9) on Anadarko's H. G. Watson lease approximately 1330' NSL and 2630' WEL Section 4, T-18S, R-29E.

IV. Fourth Quarter 1969

- A. Drill water input well (10-3) on Gordon M. Cone's J. L. Langford Lease approximately 10' EWL and 1330' NSL Section 9, T-18S, R-29E.
- B. Convert to input Cities Service's Brookover "A" No. 1 (4-1) Well.
- C. Re-enter and condition for injection Anadarko's H. G. Watson No. 1 (8-1) Well.
- D. Consolidate tank battery and gathering system.
- E. Expand injection system and plant.
- F. Larger pumping equipment for Newmont's Breezy State No. 1 (6-1).
- G. Convert Anadarko's State L-16 No. 1 (5-1) Well to injection.
- H. Convert Anadarko's J. L. Langford No. 5 (9-5) Well to injection.

V. First Quarter 1970

- A. Drill producing well (7-3) on Newmont's State "B" Lease approximately 1650' SNL and 1650' WEL of Section 16, T-18S, R-29E.
- B. Larger pumping equipment for Anadarko's J. L. Langford No. 2 (9-2) Well and H. G. Watson's No. 1-A (8-6) Well.

- C. Drill producing Well (9-7) on Anadarko's J. L. Langford Lease approximately 2310 SNL and 1650 EWL of Section 9, T-18S, R-29E.

VI. Second Quarter 1970

- A. Drill producing well (8-10) on Anadarko's H. G. Watson Lease approximately 660' NSL and 1980' EWL of Section 4, T-18S, R-29E.
- B. Drill producing well (11-3) on J. Cleo Thompson's Lease approximately 1650' EWL and 330' NSL of Section 9, T-18S, R-29E.

FAR WEST LOCO HILLS SAND UNIT
TRACT AND WELL DESIGNATION
LOCO HILLS FIELD
EDDY COUNTY, NEW MEXICO

Company	Old Designation		New Designation	
	Lease	Well No.	Tract No.	Well No.
Depco, Inc.	Banner Miller	1	1	1-1
Depco, Inc.	Banner Miller	2	1	1-2
Anadarko Production Co.	State 0-16	1	2	2-1
Anadarko Production Co.	Kemper State	1	2	2-2
Cities Service Oil Co.	Tallmadge "A"	1	3	3-1
Cities Service Oil Co.	Brookover "A"	1	4	4-1
Anadarko Production Co.	State L-16	1	5	5-1
Newmont Oil Company	Breezy State	1	6	6-1
Newmont Oil Company	State "B"	1	7	7-1
Newmont Oil Company	State "B"	2	7	7-2
Anadarko Production Co.	H. G. Watson	1	8	8-1
Anadarko Production Co.	H. G. Watson	2	8	8-2
Anadarko Production Co.	H. G. Watson	3	8	8-3
Anadarko Production Co.	H. G. Watson	4	8	8-4
Anadarko Production Co.	H. G. Watson	5	8	8-5
Anadarko Production Co.	H. G. Watson	1-A	8	8-6
Anadarko Production Co.	H. G. Watson	2-A	8	8-7
Anadarko Production Co.	J. L. Langford	1	9	9-1
Anadarko Production Co.	J. L. Langford	2	9	9-2
Anadarko Production Co.	J. L. Langford	3	9	9-3
Anadarko Production Co.	J. L. Langford	5	9	9-5
Anadarko Production Co.	J. L. Langford	6	9	9-6
Gordon M. Cone	J. L. Langford	1	10	10-1
Gordon M. Cone	J. L. Langford	2	10	10-2
J. Cleo Thompson	J. L. Langford	1	11	11-1
J. Cleo Thompson	J. L. Langford	2	11	11-2

BEFORE THE OIL CONSERVATION COMMISSION

OF THE STATE OF NEW MEXICO

Case No. 3988

APPLICATION OF ANADARKO PRODUCTION)
COMPANY FOR APPROVAL OF THE UNIT)
AGREEMENT AND UNITIZED WATERFLOOD)
OPERATIONS IN THE FAR WEST LOCO HILLS)
SAND UNIT, EDDY COUNTY, NEW MEXICO)

A P P L I C A T I O N

COMES NOW Anadarko Production Company, hereinafter referred to as "Applicant," and in support of this Application states:

1. Applicant is a corporation, duly organized and existing under the laws of the State of Delaware, and authorized to do business in the State of New Mexico. Applicant's principal office and post office address is Post Office Box 9317, Fort Worth, Texas.

2. Applicant and others have entered into a Unit Agreement and Unit Operating Agreement for the Far West Loco Hills Sand Unit, Eddy County, New Mexico, a copy of which is attached to this Application as Exhibit I. The purpose of such agreements is to provide for unitized waterflood operations in the Loco Hills Sand, which is a member of the Grayburg formation of the Guadalupe series of the Permian system, which formation is approximately 2480 feet below the surface in the Unit Area. The Unitized Formation is also known as the Grayburg No. 4 Sand.

3. The Unit Area covers the following described land, all in T18S, R29E, Eddy County, New Mexico:

Tract 1	S/2 NE/4 Section 4
Tract 2	NW/4 NE/4 and SW/4 NW/4 Section 16
Tract 3	NE/4 NW/4 Section 16
Tract 4	SE/4 NW/4 Section 16
Tract 5	NW/4 NW/4 Section 16
Tract 6	NE/4 NE/4 Section 16
Tract 7	S/2 NE/4 Section 16
Tract 8	W/2 SE/4 and E/2 SW/4 Section 4
Tract 9	S/2 NW/4 and NE/4 NW/4 Section 9
Tract 10	N/2 SW/4 Section 9
Tract 11	S/2 SW/4 Section 9

All working interest owners under all tracts have signed the Unit Agreement and Unit Operating Agreement. Basic lease, royalty and working interest owner information, together with individual tract participation, are all contained in Exhibit "B" to the Unit Agreement attached as Exhibit I and reference is hereby made thereto. As shown therein, the Federal Government owns the fee title to Tract No. 1. The fee title to Tracts 2, 3, 4, 5, 6, and 7 is in the State of New Mexico. Tracts 8, 9, 10, and 11 are owned by individuals. Ratifications of the Unit Agreement by all royalty interest, overriding royalty and oil payment interest owners have been obtained with the exception of the following:

a) Preliminary approval has been obtained from the Commissioner of Public Lands of the State of New Mexico and from the United States Geological Survey. Application for final approval will be made upon receipt of the orders requested herein.

W.D. Brookover, Sr.
b) W. D. Brookover, Sr. has not ratified with respect to his overriding royalty on Tract 8.

c) The following overriding royalty owners have not ratified with respect to Tract 11:

Alex S. Emmons
James D. Lumpkin
Taylor Holdings, Ltd.
George S. Todd.

P.H. Wadley
James Wadley

From the foregoing, it appears that a sufficient percentage of the working, royalty, and overriding royalty interests have approved the Unit Agreement for it to become effective by its terms, once final approval is obtained from the State Commissioner of Public Lands and the United States Geological Survey.

4. Applicant is designated as the Unit Operator in the Unit Operating Agreement and, as such, is given the authority to develop and operate the Unit Area for the production of Unitized Substances.

5. The Unit Agreement is in substantially the same form as unit agreements heretofore approved by the Commissioner of Public Lands, the New Mexico Oil Conservation Commission, and the United States Geological Survey. Applicant believes, and therefore alleges, that secondary recovery operations can be more economically and efficiently conducted under the terms of the Unit Agreement, and that such operations will be in the interest of conservation of oil and the prevention of waste.

6. Oil production from the Unit Area has declined to the point that the wells are in an advanced stage of depletion and are regarded as what is commonly referred to as "stripper" wells. Approval of a unit agreement for the area immediately adjacent to the east of the Unit Area was previously granted by Order No. R-2166 of this Commission. Waterflood operations of such immediately adjacent area were authorized and implemented by Order Nos. R-2178, R-2178-B, R-2178-C, R-2829, R-2933, R-3204, and R-3375.

7. An engineering appraisal of the waterflood potential for the Unit Area has been prepared and is attached hereto as Exhibit II. This study indicates both the need and economic feasibility for a secondary recovery waterflood operation in the Unit Area.

8. Applicant desires to initiate a waterflood project to inject fresh and produced water into the following described wells at the following described locations within the Unit Area.

Well Number	Location
-------------	----------

8-8

/ 10' NSL and 2630' WEL, Section 4 new 10' NSL

2-3

/ 330' SNL and 1980' WEL, Section 16 512

1-1

/ 2310' SNL and 330' WEL, Section 4 10' NSL

6-2

/ 1310' SNL and 10' WEL, Section 4 10' NSL

10-2

/ 1650' NSL and 2310' EWL, Section 9 10' NSL

8-9

/ 1330' NSL and 2630' WEL, Section 4 10' NSL

10-3

/ 1330' NSL and 10' EWL, Section 9 10' NSL

8-1

/ 2310' NSL and 1650' EWL, Section 4 10' NSL

5-1

/ 660' SNL and 660' EWL, Section 16 10' NSL

9-5

/ 1650' SNL and 330' EWL, Section 9 10' NSL

Five of the proposed injection wells (2-3, 6-2, 8-8, 8-9, and 10-3)

are not presently in existence and must be drilled with the proposed locations of wells 6-2, 8-8, 8-9, and 10-3 unorthodox or non-standard. Approval of the locations and authority to drill are requested herein on the basis that the plan is the most economical and efficient method of operation of the waterflood and necessary to complete an efficient water injection and oil production pattern.

9. Applicant and Newmont Oil Company, as operator of the West Loco Hills Grayburg No. 4 Sand Unit, have tentatively agreed upon a cooperative lease line development agreement between the units. Applicant understands Newmont will make a separate application with respect to its obligations and proposed operations completing its waterflood development.

10. Applicant plans to initiate waterflooding in two stages. The first stage, which will commence as soon as possible after the effective date of the formation of the Unit, will involve injection into the following unit wells: 1-1, 2-3, 6-2, 8-8, and 10-2. The second stage of water injection, which is proposed to commence approximately nine months after the first stage, will involve injection into the remaining wells set out in paragraph 8. Authority is therefore requested for establishment of an administrative procedure whereby wells may be converted to or drilled for injection by stages, rather than after experiencing substantial response to water injection as required by Rule 701 E 5.

11. Exhibit III attached hereto is a data sheet giving pertinent information with respect to the proposed waterflood project as required by Rule 701 B 4. Exhibit IV attached hereto is a Gamma Ray-Neutron log of the Anadarko Production Company H. G. Watson Well No. 2, to be known as Unit Well No. 8-7, located in the SW/4 SE/4, Section 4-T18S-R29E, showing the stratigraphic position of the Unitized Formation, as required by Rule 701 B 2.

12. Exhibit V attached hereto is a diagramatic sketch of the proposed completion of a typical water injection well to be converted from producing status, and Exhibit VI attached hereto is a diagramatic sketch of the proposed completion of a typical water injection well to be drilled, as required by Rule 701 B 3.

13. Attached hereto as Exhibit VII is a map of the Unit Area showing the proposed waterflood development of the Unitized Formation and Exhibit VIII attached hereto is a map of the Unit Area and surrounding area within a two-mile radius, as required by Rule 701 B 1.

14. Applicant alleges that the proposed waterflood operation will prevent the premature abandonment of wells, will result in increased ultimate recovery of oil, and thus will prevent waste.

15. Applicant requests that all producing wells in the Unit Area be operated and produced in accordance with the allowable provisions of Rule 701 E of the Commission's Rules and Regulations.

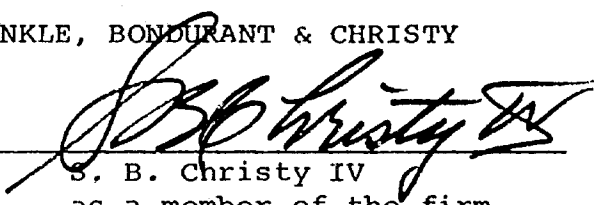
WHEREFORE, Applicant requests that the necessary notice be given and this matter be set for hearing, and that following such hearing the Commission approve the Unit Agreement and unitized waterflood operations in the Far West Loco Hills Sand Unit, Eddy County,

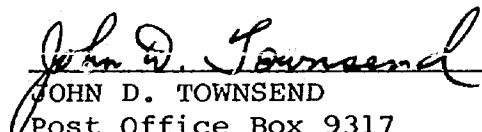
New Mexico, as herein requested, and for such other and further relief
as may seem just and equitable in the premises.

Respectfully submitted,

HINKLE, BONDURANT & CHRISTY

By


S. B. Christy IV
as a member of the firm
Post Office Box 10
Roswell, New Mexico 88201


JOHN D. TOWNSEND
Post Office Box 9317
Fort Worth, Texas 76107

Attorneys for Applicant
ANADARKO PRODUCTION COMPANY

DRAFT

GMH/esr

BEFORE THE OIL CONSERVATION COMMISSION
OF THE STATE OF NEW MEXICO

IN THE MATTER OF THE HEARING
CALLED BY THE OIL CONSERVATION
COMMISSION OF NEW MEXICO FOR
THE PURPOSE OF CONSIDERING:

Jda
Special
Order
12-1-68
CASE No. 3989

Order No. R-3628

GMH
APPLICATION OF ANADARKO PRODUCTION COMPANY
FOR A WATERFLOOD PROJECT, EDDY COUNTY,
NEW MEXICO.

Jda
ORDER OF THE COMMISSION

BY THE COMMISSION:

This cause came on for hearing at 9 a.m. on December 11, 1968,
at Santa Fe, New Mexico, before Examiner Elvis A. Utz.

NOW, on this day of December, 1968, the Commission, a
quorum being present, having considered the testimony, the record,
and the recommendations of the Examiner, and being fully advised
in the premises,

FINDS:

(1) That due public notice having been given as required by
law, the Commission has jurisdiction of this cause and the subject
matter thereof.

(2) That the applicant, Anadarko Production Company,
seeks permission to institute a waterflood project in the/ its
Far West Loco Hills Sand Unit Area, Loco Hills Pool, by
the injection of water into the Grayburg formation
through 10 injection wells in Sections 4, 9, and 16,
Township 18 ~~NORTH~~ South, Range 29 ~~WEST~~ East, NMPM,
Eddy County, New Mexico.

(3) That the wells in the project area are in an advanced
state of depletion and should properly be classified as "stripper"
wells.

(4) That the proposed waterflood project should result in
the recovery of otherwise unrecoverable oil, thereby preventing
waste.

(5) That the subject application should be approved and the project should be governed by the provisions of Rules 701, 702, and 703 of the Commission Rules and Regulations.

IT IS THEREFORE ORDERED:

(1) That the applicant, Anadarko Production Company, is hereby authorized to institute a waterflood project in ~~the~~ its Far West Loco Hills Sand Unit Area, Loco Hills Pool, by the injection of water into the Grayburg formation through the following-described wells in Township 18 ~~North~~ South, Range 29 ~~West~~ East, NMPM, Eddy County, New Mexico:

Tract 1 - Well No. 1 located 2310 FNL and 330 FEL of Section 4 -
Tract 8 - Well No. 1 located 2310 FSL and 1650 FWL of Section 4 -
Tract 8 - Well No. 9 to be drilled 1330 FSL and 2630 FEL of Section 4 -
Tract 8 - Well No. 8 to be drilled 10 FSL and 2630 FEL of Section 4 -
Tract 9 - Well No. 5 located 1650 FNL and 330 FWL of Section 9 -
Tract 10 - Well No. 2 located 1650 FSL and 2310 FWL of Section 9 -
Tract 10 - Well No. 3 to be drilled 1330 FSL and 10 FWL of Section 9 -
Tract 2 - Well No. 3 to be drilled 330 FNL and 1980 FEL of Section 16 -
Tract 5 - Well No. 1 located 660 FNL and 660 FWL of Section 16 -
Tract 4 - Well No. 1 located 1650 FNL and 2310 FWL of Section 16 -

(2) That the subject waterflood project is hereby designated the Anadarko Far West Loco Hills Waterflood Project and shall be governed by the provisions of Rules 701, 702, and 703 of the Commission Rules and Regulations.

(3) That monthly progress reports of the waterflood project herein authorized shall be submitted to the Commission in accordance with Rules 704 and 1120 of the Commission Rules and Regulations.

(4) That jurisdiction of this cause is retained for the entry of such further orders as the Commission may deem necessary.

DONE at Santa Fe, New Mexico, on the day and year hereinabove designated.

Mr. John Townsend
Anadarko Production Company
Post Office Box 9317
Fort Worth, Texas 76107

Dear Sir:

Reference is made to Commission Order No. R-3628, *recently* entered in Case No. 3989, approving the *Anadarko Far West Loco Hills* Waterflood Project.

Injection is to be through the ten authorized water injection wells, each of which shall be equipped with a string of tubing set in a packer. The packers shall be set as near to the uppermost open perforation as is practicable or in the case of open-hole completions, as near to the casing shoe as is practicable.

As to allowable, our calculations indicate that when all of the authorized injection wells have been placed on active injection, the maximum allowable which this project will be eligible to receive under the provisions of Rule 701-E-3 is 958 barrels per day when the Southeast New Mexico normal unit allowable is 42 barrels per day or less. *This figure is*

Please report any error in this calculated maximum allowable immediately, both to the Santa Fe office of the Commission and the appropriate district proration office.

In order that the allowable assigned to the project may be kept current, and in order that the operator may fully benefit from the allowable provisions of Rule 701, it behooves him to promptly notify both of the aforementioned Commission offices by letter of any change in the status of wells in the project area, i.e., when active injection commences, when additional injection or producing wells are drilled, when additional wells are acquired through purchase or unitization, when wells have received a response to water injection, etc.

Your cooperation in keeping the Commission so informed as to the status of the project and the wells therein will be appreciated.

Very truly yours,

A. L. PORTER, Jr.
Secretary-Director

cc: OCC: Hobbs X
Artesia X
Aztec

USGS

~~Mr. Frank T. By~~, State Engineer Office, Santa Fe, New Mexico

Mr. D. E. Gray

(wells which are now on production or which are included in the program outlined in Exhibit VII for conversion of wells to water injection and the drilling and recompletion of certain wells for production.)