

CASE 4912: Appli. of ANADARKO FOR
A WATERFLOOD, RULES, UNORTHODOX
LOCATIONS AND POOL REDELINEATION.

Change Board to
Waterflood & Pool Redelineation
Area.
When ref. to Board & Pool Redelineation
Area.
Mr. [Name] [Address] [City] [State] [Zip]
[Phone Number] [Fax Number] [E-mail Address]
[Website Address]

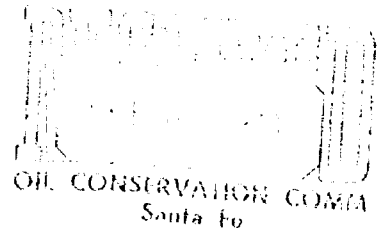
Case Number

4912

Application
Transcripts.

Small Exhibits

ETC.



BEFORE THE OIL CONSERVATION COMMISSION
OF THE STATE OF NEW MEXICO

IN THE MATTER OF THE APPLICATION OF
ANADARKO PRODUCTION COMPANY FOR
AUTHORITY TO INSTALL AND OPERATE A
WATERFLOOD PROJECT IN THE LOCO HILLS
POOL, INCLUDING THE CONVERSION TO IN-
JECTION OF TWELVE WELLS, THE DRILLING
OF ELEVEN ADDITIONAL INJECTION WELLS,
THREE OF WHICH WILL BE AT UNORTHODOX
LOCATIONS ALL WITHIN THE BOUNDARIES
OF THE BALLARD GRAYBURG SAN ANDRES UNIT
LOCATED IN SECTIONS 4, 5, 6, 7, 8, 9,
17, and 18, TOWNSHIP 18 SOUTH, RANGE 29
EAST, EDDY COUNTY, NEW MEXICO, AND FOR
THE EXTENSION OF THE LOCO-HILLS POOL
TO INCLUDE THE NW/4 OF SECTION 7, T 18 S,
R 29 E, N.M.P.M., AND TO DELETE THAT
ACREAGE FROM THE ARTESIA POOL AND FURTHER,
FOR APPROVAL OF ADMINISTRATIVE PROCEDURES FOR
EXPANSION OF SAID WATERFLOOD PROJECT.

Case 4912

A P P L I C A T I O N

COMES now ANADARKO PRODUCTION COMPANY and applies
to the Oil Conservation Commission of New Mexico for
authority to install and operate a waterflood project in
the Loco-Hills Pool by the conversion of twelve wells to
water injection, the drilling of eleven additional injection
wells, three of which will be at unorthodox locations
within the boundaries of the Ballard Grayburg-San Andres
Unit located in Sections 4, 5, 6, 7, 8, 9, 17 and 18, Town-
ship 18 South, Range 29 East, Eddy County, New Mexico; and
for revision of the Loco-Hills Pool Nomenclature to include
the NW/4 of Section 7; and for procedures for Administrative
Approval to expand said waterflood project; and in support
thereof would show:

DOCKET MAILED

Date *2/16/73*

1. Applicant is the operator of the proposed Ballard Grayburg San Andres Unit embracing lands described as:

Township 18 South, Range 29 East, N.M.P.M.

Section 4: W/2 W/2

Section 5: All

Section 6: E/2, and SE/4 SW/4

Section 7: Lots 1 & 2, E/2 NW/4, NE/4, E/2 SE/4,
and NW/4 SE/4

Section 8: All

Section 9: NW/4 NW/4

Section 17: NE/4 NE/4, W/2 NE/4, and NW/4

Section 18: NE/4 NE/4

All in Eddy County, New Mexico and containing 2580.59 acres, more or less.

2. Applicant proposes to institute a waterflood project within the boundaries of the unit area in the Loco-Hills Pool.

3. Applicant proposes to convert to water injection, twelve wells within the unit boundary as designated on the plat attached and marked Exhibit No. 1.

4. Applicant proposes to drill eight additional wells at orthodox locations for water injection within the unit boundary as designated on the plat attached and marked Exhibit No. 1.

5. Applicant proposes to drill three additional wells at unorthodox locations within the unit boundary for water injection into the Grayburg and Jackson reservoirs as follows:

(a) A well located 1320 feet from the South line and 20 feet from the East line of Section 8, Township 18 South, Range 29 East, N.M.P.M., Eddy County, New Mexico.

(b) A well located 20 feet from the North line and 1500 feet from the East line of Section 5, Township 18 South, Range 29 East, N.M.P.M., Eddy County, New Mexico.

(c) A well located 20 feet from the North line
and 1200 feet from the West line of Section
5, Township 18 South, Range 29 East, N.M.P.M.,
Eddy County, New Mexico.

6. Applicant further requests that Administrative Procedures be authorized whereby modification or expansion of the unit including the drilling of additional injection wells and/or producing wells at both orthodox and unorthodox locations may be approved without further notice and hearing.

7. Applicant further requests that the Loco-Hills Pool be extended to include the NW/4 of Section 7, Township 18 South, Range 29 East, N.M.P.M., Eddy County, New Mexico and that this same acreage be deleted from the Artesia Pool.

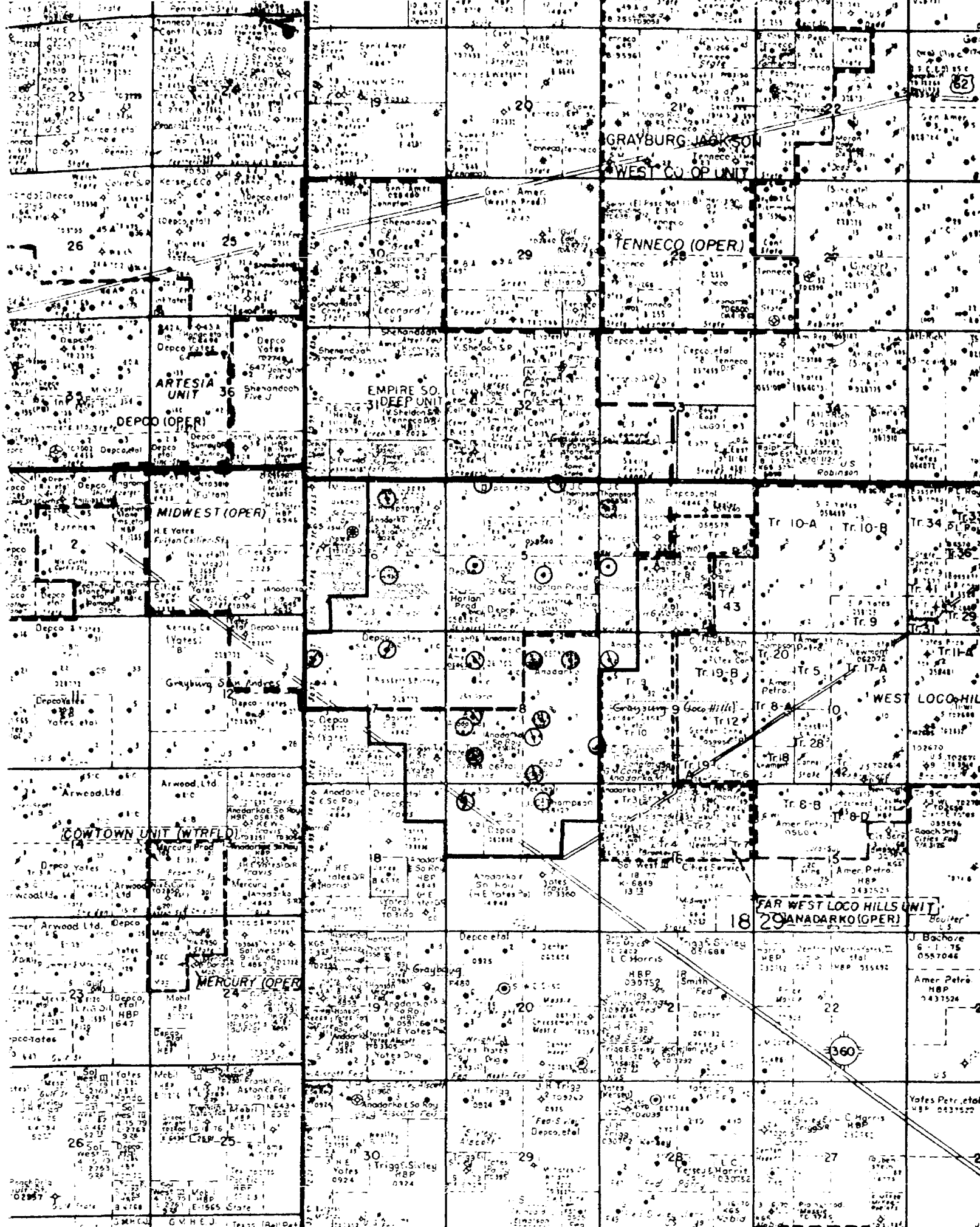
8. The granting of this application will result in the prevention of waste and the protection of correlative rights.

WHEREFORE, Applicant respectfully requests this matter be set for hearing before the Commission's duly appointed Examiner and that upon hearing, an order be entered authorizing the installation and operation of a waterflood project in the Ballard Grayburg San Andres Unit; approving the drilling of additional wells as prayed for; contracting the Artesia Pool and expanding the Loco-Hills Pool as prayed for; and establishing Administrative Procedures for expansion of the said project including the drilling of additional injection and/or producing wells at both orthodox and unorthodox locations as described above.

Respectfully Submitted,
ANADARKO PRODUCTION COMPANY

By W. F. Kellahin
KELLAHIN & FOX
P. O. Box 1769
Santa Fe, New Mexico 87501

ATTORNEYS FOR PETITIONER



Case 4912

EXHIBIT

LOCATION OF INJECTION WELLS AND OTHER WELLS WITHIN TWO MILES

APPL. CAT. OF ANADARKO PETROLEUM COMPANY TO THE NEW MEXICO OIL CONSERVATION COMMISSION FOR AUTHORITY TO INJECT WATER INTO THE GRAYBURG AND JACKSON RESERVOIRS.

BALLARD GRAYBURG SAL. AREA, GRANT COUNTY, NEW MEXICO

- GRAYBURG INJECTION
- JACKSON INJECTION
- ⊙ GRAYBURG & JACKSON INJECTION
- Wells to be converted = ⊙
- new injection wells = ○

dearnley, meier & mc cormick

209 SIMMS BLDG. • P.O. BOX 1092 • PHCNE 243-6691 • ALBUQUERQUE, NEW MEXICO 87103
1216 FIRST NATIONAL BANK BLDG. EAST • ALBUQUERQUE, NEW MEXICO 87108

BEFORE THE
NEW MEXICO OIL CONSERVATION COMMISSION
CONFERENCE ROOM, STATE LAND OFFICE BUILDING
SANTA FE, NEW MEXICO
February 28, 1973

EXAMINER HEARING

IN THE MATTER OF:

Application of Anadarko Production Company
for a Unit Agreement, Eddy County, New
Mexico;

and

Application of Anadarko Production Company
for a waterflood project, special rules,
unorthodox locations, and pool
redelineation, Eddy County, New Mexico.

Cases Nos.

4911 & 4912

BEFORE: Elvis A. Utz
Examiner

TRANSCRIPT OF HEARING

1 MR. UTZ: The Hearing will come to order, please.
2 Call Case 4911.

3 MR. CARR: Case 4911. Application of Anadarko
4 Production Company for a unit agreement, Eddy County, New
5 Mexico.

6 MR. KELLAHIN: If the Examiner please, Jason
7 Kellahin, Kellahin and Fox, Santa Fe, appearing for the
8 applicant. Also enter the appearance of Mr. Joe Keoke, a
9 member of the Oklahoma Bar.

10 In the interest of time, I would move that we
11 consolidate Case 4911 with Case 4912, the first being a unit
12 agreement and the second seeking approval of a water flood
13 project on the same unit.

14 MR. UTZ: Case 4911 and 4912 will be consolidated
15 for the purpose of testimony. Separate orders will be
16 written.

17 MR. KELLAHIN: We have one Witness I'd like to have
18 sworn.

19 (Whereupon, Mr. Paul A. Tucker was called to the
20 stand and sworn.)

21 * * * * *

22 PAUL A. TUCKER,
23 having been first duly sworn according to law, upon his oath,
24 testified as follows:
25

DIRECT EXAMINATION

BY MR. KELLAHIN

Q Would you state your name, please?

A Paul A. Tucker.

Q By whom are you employed and in what position, Mr. Tucker?

A Anadarko Production Company, Senior Petroleum Engineer.

Q Where are you located?

A Fort Worth, Texas.

Q Have you ever testified before the Oil Conservation Commission or one of its Examiners?

A No, sir.

Q For the benefit of the Examiner, would you briefly outline your education and experience as a petroleum engineer?

A I'm a graduate of the University of Oklahoma in Petroleum Engineering, have worked for Panhandle Eastern Pipeline Company or its associated company, Anadarko, since 1959, was in Panhandle's Gas Reservoir Engineering Section for about through 1968, and computer work for two years.

And then I have been with Anadarko in the evaluation in reservoir engineering for, until the present time.

Q In connection with your duties as a petroleum engineer,

1 do you handle waterflood projects, too?

2 A Yes, sir.

3 Q And do you have anything to do with the proposed
4 waterflood project which is the subject of this hearing?

5 A Yes, sir. I did most of the engineering work on this.

6 MR. KELLAHIN: Are the Witness' qualifications
7 acceptable?

8 MR. UTZ: Yes, sir. They certainly are.

9 Q (By Mr. Kellahin) Mr. Tucker, referring to what has
10 been marked as the Applicant's Exhibit Number 1, would
11 you identify that exhibit, please?

12 A This is the Unit Agreement and Unit Operating Agreement
13 of the proposed Ballard Grayburg San Andres Unit in
14 Eddy County, New Mexico.

15 Q Now, does that Unit Agreement follow generally the
16 Federal form that has been approved by this Commission
17 in the past?

18 A Yes, sir.

19 Q Has it been submitted to the U.S. Geological Survey?

20 A Yes, sir. We have preliminary approval from the
21 Geological Survey.

22 Q Now, is that your Exhibit Number 2?

23 A Yes, sir.

24 Q And that is the preliminary approval of the Unit
25 Agreement?

1 A Yes, sir.

2 Q Does the Unit Agreement contain provisions for
3 expansion at a later date, if that is deemed advisable?

4 A Yes, sir. It does, Page 7.

5 Q Yes, sir. How many acres does the proposed unit cover?

6 A 2,580.59.

7 Q Now, what percentage of that or what portion of that is
8 Federal and what is fee?

9 A The Federal acreage consists of 2,140 acres which is
10 about 83 percent of the unit area. The rest of it is
11 fee acreage, 440 acres, which is the remaining 17 percent.

12 Q Now, there is no State land involved in this unit; is
13 that correct?

14 A No, sir.

15 Q What is this unitized formation under terms of the Unit
16 Agreement?

17 A The unitized formation, the portion of the Grayburg and
18 San Andres Zone, which extends from 20 feet below the
19 base of the Loco Hill sand down to a depth of 450 feet
20 below the top of the San Andres.

21 There is a depth reference point defined to a
22 particular log in the Unit Operating Agreement or the
23 Unit Agreement.

24 The interval is between the depth of 2,388 feet and
25 3,116 feet below the surface of the land on the

1 Schlumberger Gamma Ray Neutron log of Anadarko
2 Production Company's Ballard "B" Number 4 Well, which
3 is 1,980 feet from the South line and 1,980 feet from
4 the West line of Section 8, 18 South, 29 East.

5 MR. UTZ: 18, 29?

6 THE WITNESS: Yes, sir.

7 Q (By Mr. Kellahin) What page were you reading from in
8 the Agreement there?

9 A Page 4.

10 Q Now, have all of the working interest owners within the
11 unit boundaries signed the Agreement?

12 A Yes, sir. 100 percent of the working interest owners
13 have signed.

14 Q And do you have all of the royalty ownership signed?

15 A We have a hundred percent of the royalty interest owners
16 in all tracts except Tract 26. We expect to obtain
17 this additional ratification from those royalty owners
18 prior to the time the unit is effective, and the facts
19 in the Unit Agreement assume that we will obtain this
20 additional ratification.

21 Q Now, referring to what has been marked as your Exhibit
22 Number 3, would you identify that exhibit?

23 A It is a map showing the boundary of the proposed unit
24 and the tract designations which have been signed and
25 are unified in the Unit Agreement or the Exhibit thereto.

1 Q Now, the tract also shows the working interest ownership,
2 does it not?

3 A Yes, sir.

4 Q Is Anadarko designated as the unit operator in the
5 Agreement?

6 A Yes, sir, they are.

7 Q Attached to the Exhibit Number 1, the Unit Agreement,
8 does it also contain the Unit Operating Agreement?

9 A Yes, sir.

10 Q Do you have any comments about the Operating Agreement?

11 A No, sir, other than all of the working interest owners
12 have also ratified this.

13 Q Ratified the Operating Agreement. And it is a standard
14 form of Operating Agreement, is it?

15 A Yes, sir.

16 Q Now, referring to what has been marked as Exhibit Number
17 4, would you identify that exhibit?

18 A This is a decline curve or a plot of monthly oil
19 production in barrels versus time for the leases by
20 making up the tracts within the proposed unit.

21 Q Now, the graph would appear to hold a fairly level
22 decline with some peaks along the way.

23 Could you account for those?

24 A Well, the initial development stage occurred in the
25 1939 to 1941 period. And about the first part of 1949,

1 a number of the wells were deepened to the San Andres,
2 the pay zone of the San Andres formation.

3 This accounts for the 1949 increase. In about 1956,
4 some wells were drilled, some additional development was
5 made on Anadarko's Federal II lease in the East half of
6 Section 8 of 18 South, 29 East.

7 And in 1964, there was some deepening of some wells
8 in the, mostly owned by Denco and Texas American in the
9 northern part of the proposed unit; and they deepened
10 and did some fracturing work.

11 Q Now, do you have a tabulation of the average production
12 from the wells that were in the unit boundary?

13 A Yes, sir. That's Exhibit 5 which shows the current
14 leases. It lists the number of producing wells that
15 were contained in our production reports as of September
16 1972, and a graphic determination of the barrels per
17 month production from our decline curves on those leases
18 and an approximate average production rate as of that
19 time.

20 Q Now, looking at the average production rate for the
21 average well, in your opinion, is this pool in that
22 advanced stage of depletion?

23 A Yes, sir. It is.

24 Q In your opinion, is it ready for secondary recovery
25 operations by waterflooding?

1 A Yes, sir.

2 Q Do you have any estimate on how much additional oil
3 might be recovered by the secondary recovery operations?

4 A We are estimating approximately 2,690,000 barrels.

5 Q Now, referring to what has been marked as Exhibit
6 Number 6, would you discuss the information shown on
7 that exhibit?

8 A This is a type log which shows the unitized interval,
9 and it shows also the zones which contain the secondary
10 oil, the zones that we plan to inject water into.

11 This particular log is not an injection well itself.
12 It was chosen because we have, it's a modern site well
13 Neutron log, and the best log we have to show the
14 porosity zones.

15 Q Now, by offering this Exhibit and showing the intervals
16 you propose to inject water into, is it your intention
17 to limit your injection to those specific zones?

18 A Not necessarily. We have marked on this exhibit two
19 primary zones into which we will definitely inject water.
20 Secondary zones are productive in certain areas of the
21 field; and as we develop the flood and obtain more
22 modern logs and information, water will be injected into
23 those and perhaps some of the additional stringers within
24 the unitized interval.

25 The Grayburg, the upper set, the large well, let's

1 see, the bracket that covers the Metex to the top of
2 the San Andres is the Grayburg interval. And then the
3 Jackson Zone porosity is located toward the lower part
4 of the diagram at about 3,000 feet.

5 Q Now, the Jackson porosity is within the vertical limits
6 of the Grayburg San Andres Pool, is it not?

7 A Yes, sir.

8 Q Now, referring to what has been marked as Exhibit
9 Number 7, would you identify that exhibit?

10 A This is a structure map of the top of the Loco Hill
11 sand. The Loco Hill sand itself is not in the unitized
12 interval, but this is the best marker bed for showing
13 the over-all structure in the area.

14 Q And does the Grayburg conform closely to this structure?

15 A Yes, sir.

16 Q Now, referring to Exhibit Number 8, would you discuss
17 that exhibit?

18 A The Jackson Zone does not cover the entire area of the
19 unit which the Grayburg Zone does. This particular
20 diagram shows what we believe to be the productive
21 limits of the Jackson Zone; and as you can see, it
22 covers most of the Section 8 of 18 South, 29 East.

23 The structure itself is schematic inasmuch as there
24 is no accurate deep control to --

25 Q That is the area you will be flooded in the Jackson;

1 is that correct?

2 A Yes, sir.

3 Q Now, referring to Exhibit Number 9, would you identify
4 that exhibit?

5 A This exhibit is our initial plan of development which
6 describes what injection wells we will drill and defines
7 approximately the timing that we are expecting.

8 Q It also gives the well locations, does it not?

9 A Yes, sir. It shows the well spot at which the different
10 injection wells will be drilled.

11 Q Now, these locations will require approval as unorthodox
12 locations in some instances?

13 A Yes, sir. There are three that are unorthodox locations.
14 The first one is located 20 feet from the North line
15 and 1,500 feet from the East line of Section 5 of 18
16 South, 29 East.

17 This second one is located 20 feet from the North
18 line and 1,200 feet from the West line of Section 5 of
19 18 South, 29 East.

20 MR. UTZ: That's Well Number 3?

21 THE WITNESS: It would be, yes, sir. Tract 13,
22 Well 3.

23 MR. UTZ: And the first one was Tract 8, Well 5?

24 THE WITNESS: Tract 8, Well 5.

25 MR. UTZ: Okay.

1 THE WITNESS: Then the third one is Tract 5, Well
2 12. It's located --

3 MR. UTZ: Tract 5, Well 12. I haven't found it yet.

4 THE WITNESS: I haven't either. Let me tell you
5 where it is located. 1,320 feet from the South line and 20
6 feet from the East line of Section 8 of 18 South, 29 East.

7 MR. UTZ: You are not sure whether that is listed
8 on your Exhibit 9 or not?

9 THE WITNESS: I think it's there. I just haven't
10 found it yet. All right. It will be on, all right. Well,
11 I've made an error. This well is Tract 5, Well 13, and it is
12 listed on the bottom of the second page of Exhibit 9.

13 MR. UTZ: Okay.

14 Q (By Mr. Kellahin) And that is in the third stage of
15 development?

16 That's not an initial well in your project, though?

17 A No, sir. I haven't explained that part of it yet, but
18 the narrative is supported by Exhibit 10 which shows
19 the first stage of development of the injection pattern.

20 It shows that well development, six wells to
21 inject into the Grayburg formation and four wells to
22 inject into the Jackson formation.

23 No, the North four wells, as shown on this exhibit
24 in Section 5, will all be newly drilled wells to the
25 Grayburg formation only.

1 The middle two wells in that set of wells are
2 replacements for existing wells. And their locations
3 will be within 330 feet of the present wells.

4 There might be a little discrepancy between Exhibit
5 Number 9 and Exhibit 10. As shown on Exhibit 9, I show
6 conversion of two existing wells two Grayburg and Jackson
7 Wells as follows under Item 3 on the initial stage of
8 development.

9 This well in Unit B of Section 8 which is the
10 Texas American Ballard "B-2", we may attempt to make
11 that a dual Jackson Well; but we are really not
12 anticipating sufficient porosity there to actually make
13 it feasible.

14 That's why it doesn't show up as a dual well on
15 Exhibit 10. The Anadarko Federal II Number 6, which is
16 1,990 feet from the North line and 2,310 feet from the
17 East line, we may go ahead and prepare that well for
18 injection into both zones, both the Grayburg and Jackson;
19 but in the initial stage, we may not actually initiate
20 Jackson injection into that well.

21 Q Now, turning to Exhibit Number 11, would you discuss
22 that exhibit?

23 A This Exhibit shows the completion of the injection
24 pattern and also identifies four new producing wells
25 which will probably or possibly be drilled.

1 This stage, Exhibit 9 on the second page, shows
2 the third stage of development. And during that third
3 stage of development, the injection would be expanded
4 as it shows in Exhibit 11 providing that performance
5 of the initial stages justifies doing that.

6 Q Now, Anadarko is the operator of the Far West Loco
7 Hills sand unit, is it not?

8 A Yes, sir.

9 Q Is that a waterflood project?

10 A Yes, sir. It is.

11 Q And that offsets to your Ballard Grayburg San Andres
12 Unit to the East?

13 A Yes, sir.

14 Q Are you fighting the same zones or formations in the
15 Far West Loco Hill Unit?

16 A No, sir. The Far West Loco Hills Unit is a waterflood
17 exclusively of the Loco Hills sands. The Ballard Unit
18 will be a waterflood of Metex and Premier intervals of
19 the Grayburg.

20 There is one well in the Northeast, Northeast of
21 Section 17, being the Thompson Travis well which is
22 getting some response from the Far West Unit.

23 Q Will the injection of water in your Ballard Grayburg
24 and San Andres Unit in any way have an adverse effect
25 on the Loco Hills Unit?

1 A No, sir.

2 Q Now, what's the situation to the North of your proposed
3 unit?

4 A This is a waterflood operated by Harold Kersey, the old
5 Loco Unit. It has been active for some years. I don't
6 have the detailed production statistics of that, but it
7 is no longer a flush unit.

8 The old Loco Unit Number 13, for example, is
9 producing about three barrels a day of oil.

10 Q Has the injection of water there had any effect on the
11 wells in your proposed unit?

12 A We haven't had any experience; but we have had two
13 effects. The Depco Bay Miller Number 2 Well in the
14 Northwest, Northwest of Section 5, 18 South, 29 East,
15 has been shut-in due to water.

16 We are getting some flattening on the production
17 on Depco's Miller lease due to water being injected in
18 the old Loco Unit immediately to the North.

19 Q Now, the old Loco Unit does affect the Grayburg and
20 San Andres formation, does it not?

21 A Yes, sir.

22 Q It is in that same formation?

23 A Yes, sir.

24 Q Is there any waterflood project of any kind in the West?

25 A Well, there is some injection in Section 12. The zones

1 are Grayburg Zones of the same, the Motox and Premier
2 which we will be flooding in the Ballard Unit.

3 Q In your opinion will the flooding of the Grayburg San
4 Andres or the Jackson Zone have any adverse effects on
5 any of the offsetting operators?

6 A No, sir.

7 Q What volumes of water do you propose to inject in these
8 wells?

9 A We will inject about 400 barrels per day per zone. And
10 for the initial phase as related back to Exhibit 10,
11 this will be about 4,000 barrels per day initially. And
12 then later on with full development, this would reach
13 about 10,000 barrels per day.

14 Q Do you have any indication what the pressure might be
15 on these injection wells?

16 A We expect that the Grayburg injection pressure may reach
17 2,200 to 2,400 pounds. This may be a fairly high value
18 for that, and we would be hoping to keep it lower than
19 that if we can get the required volumes.

20 The Jackson, we expect it will take water at a
21 lower pressure than that, maybe no more than 1,500
22 pounds. These are estimates, and it's a little difficult
23 to determine exactly what these will be.

24 Q Now, what is the source of your water?

25 A We plan to purchase water from one of the water companies

1 available in the area. There are three, the Arwood
2 Limited Water Company, the Double Eagle Water Company,
3 and the Yucca Water Company.

4 We made some informational contacts and believe
5 that we can obtain the water supply.

6 Q Now, is that fresh water?

7 A Yes, sir. The Exhibits 12 and 13 show the water analysis
8 that is taken from the Arwood and Double Eagle system.

9 Q And as the waterflood progresses, would you plan to
10 reinject produced water?

11 A Yes, sir. We would.

12 Q Now, referring to what has been marked as Exhibit
13 Number 14, would you identify that Exhibit?

14 A That's a schematic diagram referring to the type of
15 injection well that we would drill for the new Grayburg
16 Zone completions.

17 This would be, this particular sketch would apply
18 to all of the new wells to be drilled to the Grayburg
19 formation. Their locations and descriptive information
20 about them are located in the lower left-hand corner.

21 Q Now, will you use internally coated tubing?

22 A Yes, sir.

23 Q Will you inject under a packer?

24 A Yes, sir.

25 Q Do you plan to fill the casing tubing annulus with an

1 inert fluid?

2 A Yes, sir.

3 Q Will you install a packer gauge at the surface?

4 A Yes, sir.

5 Q Now, referring to Exhibits 15 through 29, what are those
6 exhibits?

7 A Those are exhibits describing individually the other
8 injection wells, schematic diagrams of the other
9 injection wells.

10 Q These are the wells that will be converted to injection?

11 A Well, there is one new well in that batch. It would
12 be Exhibit, well, really, there is an alternate exhibit.
13 So it would be Exhibit 23. And Exhibit 24 would refer
14 to the new Grayburg injection well.

15 Q Now, some of the exhibits are marked as alternate. What
16 do you mean by that?

17 A Well, for instance, Exhibit 23 and 24, one method of
18 injecting into both zones would be down a single tubing
19 string into the Jackson Zone and the Grayburg Zone.

20 The Jackson and the Grayburg would be separated by
21 a packer, and there would be a packer above the Grayburg
22 Zone. The volumes injected into the, the control of
23 the volumes injected into the two different zones would
24 be by means of a flow control. We may find this to be
25 suitable.

1 The alternate method shows dual string whereby you
2 have separate tubing strings, one for the Jackson, one
3 for the Grayburg. And we have not determined which we
4 considered to be the best type.

5 So we would like to be able to use either method
6 in that well and in another well where we have an
7 alternative exhibit.

8 Q On Exhibits 19 and 20, you have an alternate proposal
9 there, do you not?

10 A Yes, sir. 19 and 20 both refer to two methods of
11 completing the same well.

12 Q Now, you are asking for approval giving you sufficient
13 latitude to use either method; is that correct?

14 A Yes, sir.

15 Q Because you haven't determined yet which one you will
16 use?

17 A No, sir.

18 Q But in each case will you be injecting through
19 internally coated tubing and under a packer?

20 A Yes, sir.

21 Q Even under the alternate method of completion?

22 A By either method.

23 Q And you will fill the casing tubing annulus with inert
24 fluid in each case and have a pressure gauge at the
25 surface; is that correct?

1 A Yes, sir, as shown on the exhibits.

2 Q Now, Mr. Tucker, in connection with this flood, do you
3 anticipate there may be a need for additional injection
4 or producing wells at unorthodox locations?

5 A Yes, sir. This is possible.

6 Q And are you asking for an administrative procedure for
7 approval of additional wells for injection or production
8 at both orthodox and unorthodox locations?

9 A Yes, sir. We are.

10 Q Were Exhibits 2 through 29 prepared by you or under
11 your supervision?

12 A Yes, sir. They were.

13 Q And Exhibit 1 is a copy of the Unit Agreement and Unit
14 Operating Agreement as submitted; is that right?

15 A Yes, sir.

16 Q And Exhibit 2 is a copy of the letter from the
17 Department of the Interior giving preliminary approval?

18 A Yes, sir.

19 Q Now, there is one other matter in connection with this
20 application.

21 The Northwest quarter of Section 7.

22 A It would be 18 South, 29 East.

23 Q 18 South, 29 East. Is that presently in the Artesia
24 Pool?

25 A Yes, sir.

1 Q Is that the same formation that is in the Grayburg?

2 A Yes, sir.

3 Q San Andres Pool?

4 A Yes, sir.

5 Q Are you asking that that quarter-section be deleted from
6 the Artesia Pool and included in the Grayburg San Andres
7 Pool?

8 A Yes, sir. That's right.

9 MR. KELLAHIN: At this time, I'd like to offer
10 into evidence Exhibits 1 through 29 inclusive.

11 MR. UTZ: I want to get that straight. The
12 Northwest, you want this deleted from the Artesia Pool and
13 put in the Grayburg?

14 MR. KELLAHIN: The Grayburg and San Andres.

15 THE WITNESS: Well, the Loco Hills Grayburg and San
16 Andres.

17 MR. UTZ: Without objection, Exhibits 1 through 29
18 will be entered into the record of this case.

19 CROSS-EXAMINATION

20 BY MR. UTZ

21 Q Mr. Tucker, at this point, I'm a little confused about
22 the number of wells, whether they are converted wells,
23 new wells, and on non-standard locations.

24 Now, does Exhibit Number 9 list all of the wells
25 that you want to have approved?

1 A Yes, sir. They are all in there.

2 Q And I believe you have four stages of development?

3 A Yes, sir. There are two main stages, the initial and
4 the third which is the development of injection and the
5 Stage 2 and Stage 4 is well work and lease equipment to
6 maintain the production.

7 Q Now, altogether, how many wells are you asking approval
8 for at this time to convert to injection?

9 A To convert?

10 Q All right, sir. Now, let's take the converted wells
11 and then the new wells.

12 A All right. There are 12 conversions. There are 11 new
13 wells for injection. And of those 11, three are in the
14 unorthodox locations which we previously described.

15 Q Now, under the initial stage of development, we have
16 four of the 11 wells listed there; is that correct?

17 A Yes, sir.

18 Q Well, we have 11 more to find, and where are they, or
19 seven more, I mean?

20 A All right. Under the third stage of development on the
21 second page of the Exhibit 9, there are six additional
22 Grayburg Wells described.

23 Now, under Item 2 there, there is a Grayburg and
24 Jackson dual or at least into both zones. So that would
25 be the 11. Under the initial stage of development, Item

1 1, there are four Grayburg injection wells.

2 Under the third stage of development, Item 1, there
3 are six Grayburg injection wells. Under Item 2 of the
4 third stage, there is a Grayburg Jackson Well listed.

5 Now, that's the 11 injection wells to be drilled.

6 Q Well, what I need is a list of name and number of each
7 well and location of each well. And I don't believe I
8 can get it out of here.

9 A Well, we haven't got it marked as an exhibit, but --

10 Q Well, if you can furnish me that list, well, that will
11 preclude any more questioning on this exhibit.

12 MR. KELLAHIN: Would you like this marked as an
13 exhibit?

14 MR. UTZ: Sure would.

15 MR. KELLAHIN: That will be 30.

16 Q (By Mr. Utz) I assume this list includes 23 wells;
17 is that right?

18 A Yes, sir. Injection wells. That does not include the --

19 Q Okay. We have 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11 new
20 wells listed here. And Exhibit Number 9 shows your
21 non-standard locations, and I can get those from that
22 exhibit.

23 Now, this is all of the wells that you want to
24 approve at the present time, both new and conversions?

25 A Injection wells.

1 Q And you don't plan to drill any new producing wells at
2 the present time?

3 A Not in the first, not in the initial stage.

4 Q Okay.

5 MR. UTZ: Any other questions of the Witness?

6 MR. KELLAHIN: I'd like to offer into evidence
7 Exhibit Number 30.

8 MR. UTZ: Exhibit Number 30 will be entered into
9 the record in this case. The Witness may be excused.

10 Are there statements in the case?

11 The case will be taken under advisement.

12

13

14

15

16

17

18

19

20

21

22

23

24

25

1 STATE OF NEW MEXICO)
2) ss
3 COUNTY OF BERNALILLO)

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

10
11 Janet Russell
12 NOTARY PUBLIC

13 My Commission Expires:
14 November 24, 1976
15
16
17
18
19
20
21
22

23 I do hereby certify that the foregoing is
24 a complete record of the proceedings in
25 the Examiner hearing of Case No. 4911-17
Heard by me on Feb 28, 1973.
Examiner
New Mexico Oil Conservation Commission

I N D E XWITNESS

PAUL A. TUCKER

Direct Examination by Mr. Kellahin 4

Cross-Examination by Mr. Utz 22

E X H I B I T SADMITTEDOFFERED

Applicant's Exhibit Number 1 22 5

Applicant's Exhibit Number 2 22 5

Applicant's Exhibit Number 3 22 7

Applicant's Exhibit Number 4 22 8

Applicant's Exhibit Number 5 22 9

Applicant's Exhibit Number 6 22 10

Applicant's Exhibit Number 7 22 11

Applicant's Exhibit Number 8 22 11

Applicant's Exhibit Number 9 22 12

Applicant's Exhibit Number 10 22 13

Applicant's Exhibit Number 11 22 14

Applicant's Exhibit Number 12 22 18

Applicant's Exhibit Number 13 22 18

Applicant's Exhibit Number 14 22 19

Applicant's Exhibit Number 15 through 29
22 19

Applicant's Exhibit Number 30 25 24



OIL CONSERVATION COMMISSION

STATE OF NEW MEXICO

P. O. BOX 2088 - SANTA FE

87501

GOVERNOR
BRUCE KING
CHAIRMAN

**LAND COMMISSIONER
ALEX J. ARMJO
MEMBER**

**STATE GEOLOGIST
A. L. PORTER, JR.
SECRETARY - DIRECTOR**

March 27, 1973

Re: Case No. 4912

Order No. R-4493-A

Applicant:

Anadarko Production Company

Mr. Jason Kellahin
Kellahin & Fox
Attorneys at Law
Post Office Box 1769
Santa Fe, New Mexico

Dear Sir:

Enclosed herewith are two copies of the above-referenced Commission order recently entered in the subject case.

Very truly yours,

A. L. Porter, Jr.

A. L. PORTER, Jr.

Secretary-Director *4*

ALP/ir

Copy of order also sent to:

Hobbs OCC x

Artesia OCC **X**

Aztec OCC

Other _____

BEFORE THE OIL CONSERVATION COMMISSION
OF THE STATE OF NEW MEXICO

CASE NO. 4912
Order No. R-4493-A

NOMENCLATURE

APPLICATION OF ANADARKO PRODUCTION
COMPANY FOR A WATERFLOOD PROJECT,
SPECIAL RULES, UNORTHODOX LOCATIONS,
AND POOL REDELINEATION, EDDY COUNTY,
NEW MEXICO.

NUNC PRO TUNC

BY THE COMMISSION:

It appearing to the Commission that Order No. R-4493, dated March 16, 1973, does not correctly state the intended order of the Commission.

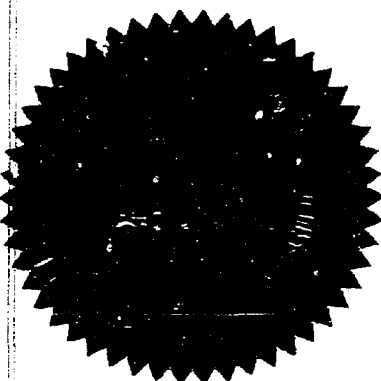
IT IS THEREFORE ORDERED:

(1) That wherever in Findings Nos. (8) and (9), and in Orders Nos. (1) and (6), the phrase "Ballard Grayburg Jackson Unit Area" may occur, that said phrase be stricken, and the phrase "Ballard Grayburg San Andres Unit Area" be substituted therefor.

(2) That this order shall be effective nunc pro tunc as of March 16, 1973.

DONE at Santa Fe, New Mexico, this 27th day of March, 1973.

STATE OF NEW MEXICO
OIL CONSERVATION COMMISSION


BRUCE KING, Chairman

ALEX J. ARMIJO, Member

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

S E A L

dr/

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. 4912
Order No. R-4493

Nomenclature

APPLICATION OF ANADARKO PRODUCTION
COMPANY FOR A WATERFLOOD PROJECT,
SPECIAL RULES, UNORTHODOX LOCATIONS,
AND POOL REDELINEATION, EDDY COUNTY,
NEW MEXICO.

ORDER OF THE COMMISSION

BY THE COMMISSION:

This cause came on for hearing at 9 a.m. on February 28, 1973, at Santa Fe, New Mexico, before Examiner Elvis A. Utz.

NOW, on this 16th day of March, 1973, 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 authority to institute a waterflood project by the injection of water into the Grayburg and San Andres formations underlying its Ballard Grayburg San Andres Unit Area in Sections 4, 5, 6, 7, 8, 9, 17, and 18, Township 18 South, Range 29 East, NMPM, Loco Hills Pool, Eddy County, New Mexico.

(3) That said injection would be accomplished through 23 wells at orthodox and unorthodox locations, with 15 wells serving as injection wells into the Grayburg formation, five wells serving as injection wells into the San Andres formation, and three wells serving as dual injection wells into the Grayburg and San Andres formations.

(4) That the applicant also seeks the deletion of the NW/4 of Section 7, Township 18 South, Range 29 East, NMPM, from the Artesia Pool and the extension of the Loco Hills Pool to include said lands therein.

Case No. 4912
Order No. R-4493

(5) Applicant further seeks approval of a procedure for the administrative approval of additional injection and producing wells at orthodox and unorthodox locations without notice and hearing.

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

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

x (8) That to include all of the proposed waterflood project and the Ballard Grayburg [Jackson] Unit Area within the horizontal limits of one pool as designated by the Commission, the Artesia Pool should be contracted and the Loco Hills Pool extended as described in Finding No. (4) above.

x (9) That approval of the requested administrative procedure will afford the applicant the opportunity to produce its just and equitable share of the oil in the Loco Hills Pool, provided the wells are drilled no closer than 330 feet to the outer boundary of the Ballard Grayburg [Jackson] Unit Area nor closer than ten feet to any quarter-quarter section or subdivision inner boundary.

(10) 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:

x (1) That the applicant, Anadarko Production Company, is hereby authorized to institute a waterflood project in the Ballard Grayburg-[Jackson] Unit Area, Loco Hills Pool, by the injection of water into the Grayburg and San Andres formations through the following-described wells in Township 18 South, Range 29 East, NMEN, Eddy County, New Mexico:

Tract No.	Well No.	Footage Description	Se- ion
8	5	20' from North line, 1500' from East line	5
13	3	20' from North line, 1200' from West line	5
23	1	Within 330' of well located 2310' from South line, 990' from West line	5

-3-
Case No. 4912
Order No. R-4493

Tract No.	Well No.	Footage Description	Section
25	3	Within 330' of well located 1980' from South line, 1980' from East line	5
5	3	330' from South line, 2310' from East line	8
5	8	2310' from South line, 1980' from East line	8
14	3	990' from South line, 990' from West line	8
21	1	2310' from South line, 990' from West line	8
5	6	990' from North line, 2310' from East line	8
12	2	990' from North line, 990' from West line	8
6	18	1980' from South line, 1980' from East line	6
7	3	660' from North line, 1980' from East line	17
10	2	Within 330' of well located 990' from North line, 380' from West line	4
20	12	660' from North line, 660' from West line	17
21	2	1980' from South line, 660' from West line	8
26	1	Within 330' of well located 2310' from South line, 330' from West line	4
5	13	1310' from South line, 20' from East line	8
1	6	990' from North line, 330' from West line	7
2	3	660' from North line, 1980' from East line	7
5	4	1650' from South line, 2310' from East line	8
17	3	660' from North line, 1980' from East line	6
22	4	990' from North line, 330' from West line	9
5	10	990' from North line, 990' from East line	8

PROVIDED HOWEVER, injection into each of the aforesaid wells shall be through plastic-lined tubing set in a packer located as close as is practicable to the uppermost perforation or the casing shoe, whichever is applicable, and provided further, that the casing-tubing annulus of each well shall be loaded with an inert fluid and equipped with a pressure gauge at the surface.

-4-

Case No. 4912
Order No. R-4493

(2) That the subject waterflood project is hereby designated the Anadarko Ballard GSA Unit 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.

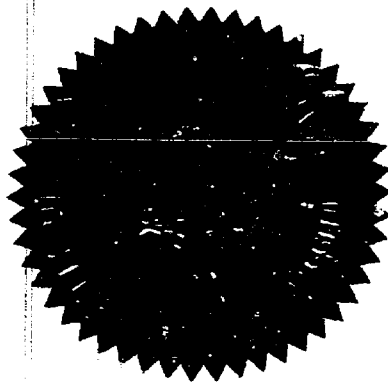
(4) That the Artesia Pool, as heretofore classified, defined, and described, is hereby contracted by the deletion of the NW/4 of Section 7, Township 18 South, Range 29 East, NMPM.

(5) That the Loco Hills Pool, as heretofore classified, defined, and described, is hereby extended to include therein the NW/4 of Section 7, Township 18 South, Range 29 East, NMPM.

(6) That the Secretary-Director of the Commission may approve additional producing and injection wells at orthodox and unorthodox locations within the Ballard Grayburg Jackson Unit Area as may be necessary to complete an efficient production and injection pattern; provided said wells shall be drilled no closer than 330 feet to the outer boundary of the Ballard Grayburg Jackson Unit Area nor closer than ten feet to any quarter-quarter section or subdivision inner boundary, and provided the application therefor has been filed in accordance with Rule 701 B of the Commission Rules and Regulations.

(7) 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

Bruce King
BRUCE KING, Chairman

Alex J. Armijo
ALEX J. ARMISO, Member

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

S E A L

dr/

none
P 10
June
R 4493

IT IS THEREFORE ORDERED:

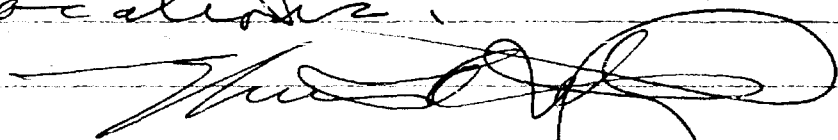
That wherever in Findings Nos. (8) and (9),
and in Orders Nos. (1) and (6), the
phrase "Ballard Grayburg Jackson
Unit Area" may occur, that said
phrase be stricken, and the
phrase "Ballard Grayburg San Andres
Unit Area" be substituted therefor.

Case. 4912
Hear. 2-28-73
Rec. 3-2-73

Grant. Canadiana permission
to establish their Ballard
Hydro. S.A. Hydro flood by converting
12 wells and drilling 11 new wells
for Hydro injection.
Of the 11 new wells **3** are
NSL's.

See Et. 30 for list of wells

Also grant a dim. approval
procedure for new injection
and producing wells at old
or NS locations.



All injection shall be thru
Int. coated tubing under a
packer. The Annulus to be filled
with inert fluid w/ a pressure
gauge at the surface.



DOCKET: EXAMINER HEARING - WEDNESDAY - FEBRUARY 28, 1973

9 A. M. - OIL CONSERVATION COMMISSION CONFERENCE ROOM,
STATE LAND OFFICE BUILDING - SANTA FE, NEW MEXICO

The following cases will be heard before Elvis A. Utz, Examiner, or Richard L. Stamets, Alternate Examiner:

- CASE 4907: Application of Eastern Petroleum Company for water disposal, San Juan County, New Mexico. Applicant, in the above-styled cause, seeks authority to dispose of produced water into the Dakota formation through its Navajo Well No. 21 located in Unit C of Section 3, Township 27 North, Range 17 West, Table Mesa-Dakota Oil Pool, San Juan County, New Mexico.
- CASE 4908: Application of El Paso Natural Gas Company for a dual completion, Rio Arriba County, New Mexico. Applicant, in the above-styled cause, seeks authority to dually complete its Vaughn Well No. 22 located in Unit G of Section 29, Township 26 North, Range 6 West, Rio Arriba County, New Mexico, in such a manner as to permit the production of gas from the South Blanco-Pictured Cliffs Pool and the Otero Chacra Pool through parallel strings of tubing cemented in a common wellbore.
- CASE 4909: Application of Continental Oil Company for a non-standard unit, Lea County, New Mexico. Applicant, in the above-styled cause, seeks approval for a 160-acre non-standard gas proration unit comprising the N/2 SW/4, SE/4 SW/4, and NW/4 SE/4 of Section 9, Township 21 South, Range 37 East, Blinebry Gas Pool, Lea County, New Mexico, said unit to be simultaneously dedicated to its Hawk B-1 Wells Nos. 2 and 4 located in Units J and L, respectively, of said Section 9.
- CASE 4910: Application of Continental Oil Company for downhole commingling, Lea County, New Mexico. Applicant, in the above-styled cause, seeks authority to commingle Blinebry and Drinkard production in its wellbore of its Lockhart B-1 Well No. 7 located in Unit G of Section 1, Township 22 South, Range 36 East, Blinebry and Drinkard Oil Pools, Lea County, New Mexico.
- CASE 4911: Application of Anadarko Production Company for a unit agreement, Eddy County, New Mexico. Applicant, in the above-styled cause, seeks approval of the Ballard Grayburg-San Andres Unit Area, comprising 2581 acres, more or less, of Federal and fee lands in Township 18 South, Range 29 East, Eddy County, New Mexico.
- CASE 4912: Application of Anadarko Production Company for a waterflood project, special rules, unorthodox locations, and pool redelineation, Eddy County, New Mexico. Applicant, in the above-styled cause, seeks authority to institute a waterflood project by the injection of water into the Grayburg-San Andres formation through 23 injection wells, some at unorthodox locations, in its Ballard Grayburg-San Andres Unit in Sections 4, 5, 6, 7, 8, and 17, Township 18 South, Range 29 East, Loco Hills Pool, Eddy County, New Mexico. Applicant

(Case 4912 continued from page 1)

also seeks an administrative procedure for approval of additional injection wells at orthodox and unorthodox locations without notice and hearing. Applicant further seeks the deletion of the NW/4 of the aforesaid Section 7 from the Artesia Pool and the concurrent extension of the Loco Hills Pool to include said lands.

CASE 4913: Application of Lone Star Industries, Inc. for compulsory pooling, Rio Arriba County, New Mexico. Applicant, in the above-styled cause, seeks an order pooling all mineral interests underlying the N/2 of Section 12, Township 30 North, Range 5 West, to be dedicated to a well to be drilled at a standard location to the Basin-Dakota Pool.

Also to be considered will be the costs of drilling said well, a charge for the risk involved, a provision for the allocation of actual operating costs, and the establishment of charges for supervision of said well.

CASE 4901: (Continued and Readvertised)

Application of Belco Petroleum Corporation for a dual completion, Eddy County, New Mexico. Applicant, in the above-styled cause, seeks approval for the dual completion of its Union Mead Com Well No. 2 located in Unit N of Section 4, Township 22 South, Range 27 East, Eddy County, New Mexico, to produce gas from undesignated Wolfcamp and Morrow gas pools through the tubing and the casing-tubing annulus, respectively, by means of a crossover assembly.

CASE 4914: Southeastern New Mexico nomenclature case calling for an order for the creation and extension of certain pools in Lea, Eddy and Roosevelt Counties, New Mexico.

(a) Create a new pool in Eddy County, New Mexico, classified as a gas pool for Morrow production and designated as the Burton Flat-Morrow Gas Pool. The discovery well is the Monsanto Company Burton Flat Deep Unit No. 1 located in Unit O of Section 3, Township 21 South, Range 27 East, NMPM. Said pool would comprise:

TOWNSHIP 21 SOUTH, RANGE 27 EAST, NMPM
Section 3: Lots 9 through 16

(b) Create a new pool in Lea County, New Mexico, classified as an oil pool for San Andres production and designated as the Lea-San Andres Pool. The discovery well is the Superior Oil Company Government "E" No. 2 located in Unit A of Section 25, Township 19 South, Range 34 East, NMPM. Said pool would comprise:

TOWNSHIP 19 SOUTH, RANGE 34 EAST, NMPM
Section 25: NE/4

DEWELL DIVISION OF THE DOW CHEMICAL COMPANY

WATER ANALYSIS REPORT

TO: ANADARKO PRODUCTION COMPANY
P.O. BOX 67
LOCO HILLS, NEW MEXICO 88355

LABORATORY NO.: HEWBS
DATE: 12-13-72

WELL NAME + NO.: ARWOOD LTD DEPTH: 0 FT
FIELD: SO. LAKE FORMATION: FRESH
COUNTY: EDDY STATE: NEW MEXICO
SAMPLE PT.: PLANT SAMPLE ID: FRESH WATER

DISSOLVED SOLIDS

OTHER PROPERTIES

CATIONS	MG/L	MEQ/L	
SODIUM, NA	156	6	PH = 7.50
CALCIUM, CA	80	3	SP GR = 1.000
MAGNESIUM, MG	48	4	RESISTIVITY = 0.0000

ANIONS

CHLORIDES, CL	263	7
SULFATES, SO4	830	4
BICARBONATES, HCO3	122	1

THE CALCIUM CARBONATE STABILITY INDEX = 1.31305

THE CALCIUM SULFATE STABILITY INDEX IS -32.80

A NEGATIVE NUMBER INDICATES THE SCALE IN SOLUTION DOES NOT EXCEED THE SATURATION VALUE AND SHOULD NOT PRECIPITATE.

REMARKS AND RECOMMENDATIONS:

JACK SAMP

BEFORE EXAMINER UTZ	
OIL CONSERVATION COMMISSION	
Anadarko EXHIBIT NO. 12	
CASE NO. 4911-4912	
Submitted by Paul Tucker	
Hearing Date 2-28-73	

EXHIBIT 12

WATER ANALYSIS - ARWOOD, LTD.

APPLICATION OF ANADARKO PRODUCTION COMPANY TO NEW MEXICO OIL CONSERVATION COMMISSION
FOR AUTHORITY TO INJECT WATER INTO THE GRAYBURG AND JACKSON RESERVOIRS.

BALLARD GRAYBURG SAN ANDRES UNIT, LOCO HILLS FIELD, EDDY COUNTY, NEW MEXICO

DOUGLASS DIVISION OF THE DOW CHEMICAL COMPANY

WATER ANALYSIS REPORT

TO: ANADARKO PRODUCTION COMPANY
P.O. BOX 67
LOCO HILLS, NEW MEXICO 88255

LABORATORY NO.: HIBBS
DATE: 12-13-72

WELL NAME + NO.: DOUBLE EAGLE DEPTH: 0 FT
FIELD: SQ. LAKE FORMATION: FRESH
COUNTY: EDDY STATE: NEW MEXICO
SAMPLE PT.: PLANT SAMPLE ID: FRESH WATER

DISSOLVED SOLIDS

OTHER PROPERTIES

CATIONS	MG/L	MEQ/L		
SODIUM, NA	72	3	PH =	7.85
CALCIUM, CA	100	4	SP GR =	1.000
MAGNESIUM, MG	36	3	RESISTIVITY =	.0000

ANIONS

CHLORIDES, CL	177	4
SULFATES, SO4	200	4
BICARBONATES, HC23	122	1

THE CALCIUM CARBONATE STABILITY INDEX = 1.63109

THE CALCIUM SULFATE STABILITY INDEX IS -21.39

A NEGATIVE NUMBER INDICATES THE SCALE IN SOLUTION DOES
NOT EXCEED THE SATURATION VALUE AND SHOULD NOT PRECIPITATE.

REMARKS AND RECOMMENDATIONS:

JACK SARFF

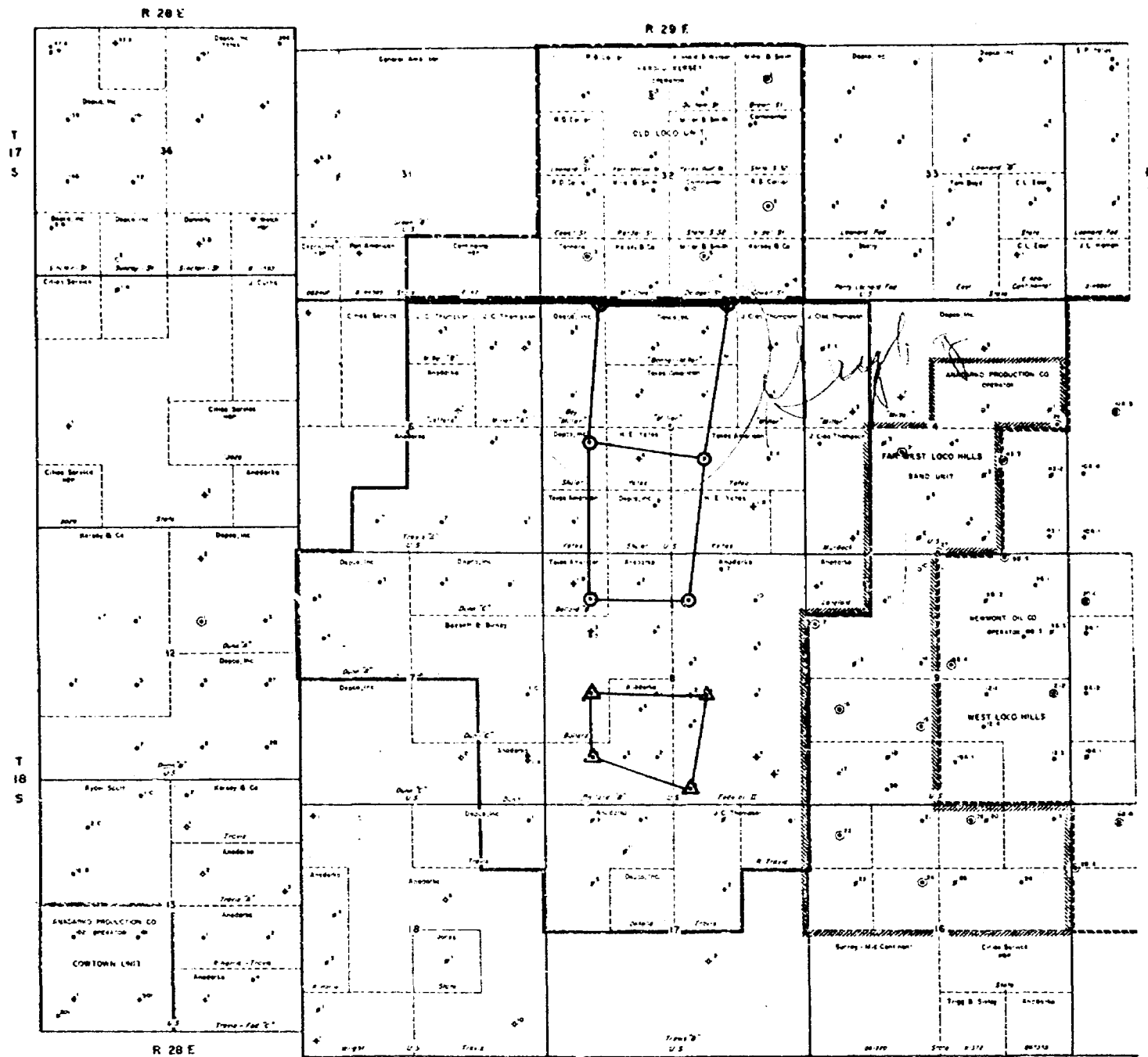
BEFORE EXAMINER UTZ
OIL CONSERVATION COMMISSION
Anadarko EXHIBIT NO. 13
CASE NO. 4911-4912
Submitted by *Paul J. J. J.*
Hearing Date 2-28-73

EXHIBIT 13

WATER ANALYSIS - DOUBLE EAGLE WATER COMPANY

APPLICATION OF ANADARKO PRODUCTION COMPANY TO NEW MEXICO OIL CONSERVATION COMMISSION
FOR AUTHORITY TO INJECT WATER INTO THE GRAYBURG AND JACKSON RESERVOIRS.

BALLARD GRAYBURG SAN ANDRES UNIT, LOCO HILLS FIELD, EDDY COUNTY, NEW MEXICO



LEGEND

- Oil Well
- ◆ Plugged & Abandoned
- Temporarily Abandoned
- Dry & Abandoned
- ⊙ Water Injection Well
- Anderson Operated - Eastown Waterfield Unit
- Anderson Operated - Far West Loco Hills
- Newman Operated - West Loco Hills
- Bailey, Connors - Old Loco Unit
- Proposed Unit Boundary - Ballard Grayburg-San Andres Unit
- Anderson Production Co. Acreage

⊙ - GRAYBURG INJECTION WELL
 ▲ - JACKSON INJECTION WELL

PROPOSED BALLARD GRAYBURG-SAN ANDRES UNIT
 LOCO HILLS FIELD
 EDDY COUNTY, NEW MEXICO
 INJECTION PATTERN
 INITIAL PHASE

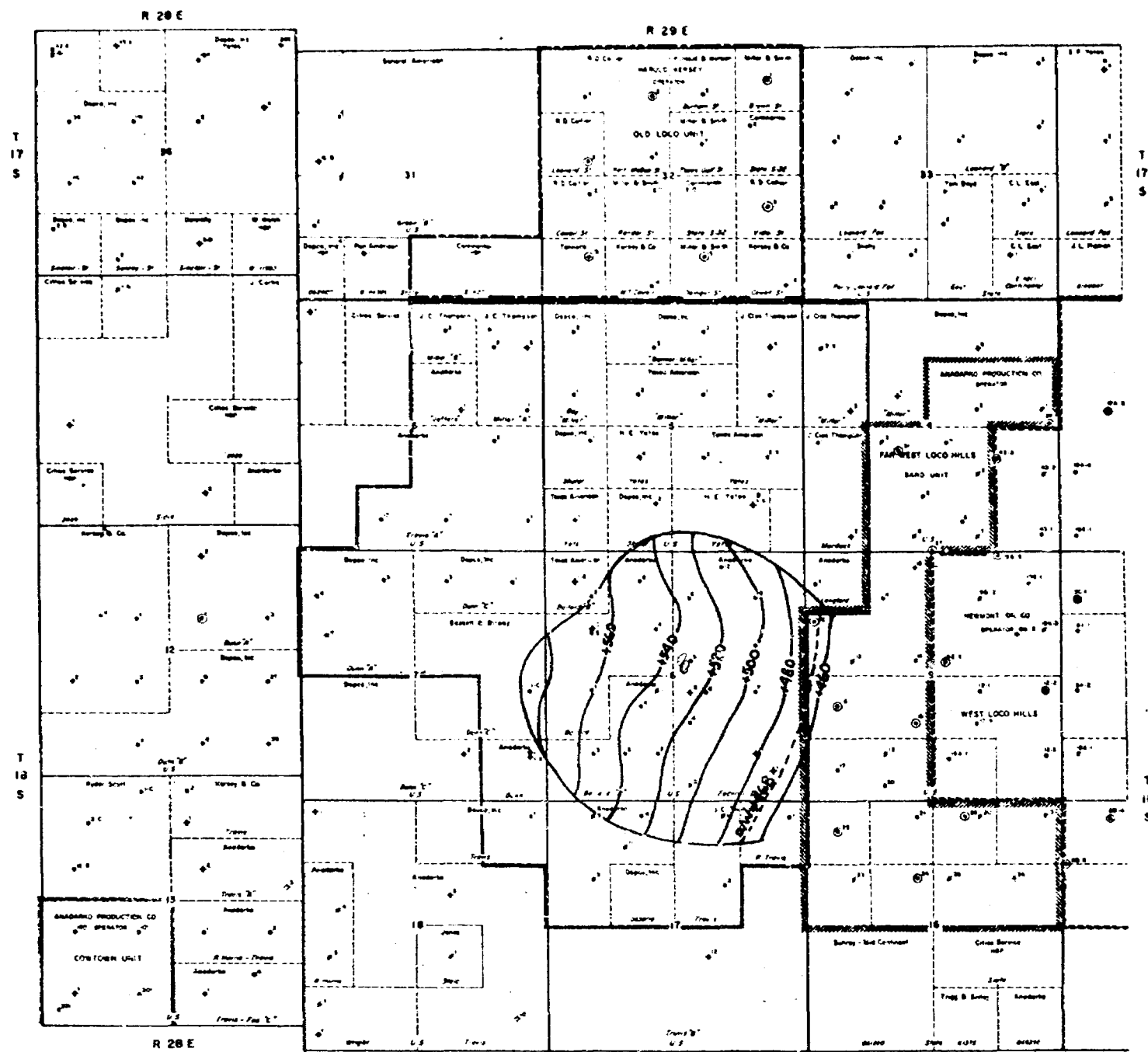
BEFORE EXAMINER UTZ
 OIL CONSERVATION COMMISSION
 ANDERSON EXHIBIT NO. 10
 CASE NO. 4911-4912
 Submitted by Paul Tucker
 Hearing Date 2-28-77

EXHIBIT 10

INJECTION PATTERN - INITIAL PHASE

APPLICATION OF ANADARKO PRODUCTION COMPANY TO NEW MEXICO OIL CONSERVATION COMMISSION
 FOR A GRANT TO INJECT WATER INTO THE GRAYBURG AND JACKSON RESERVOIRS.

BALLARD GRAYBURG-SAN ANDRES UNIT, LOCO HILLS FIELD, EDDY COUNTY, NEW MEXICO



- LEGEND**
- Oil Well
 - ◆ Plugged & Abandoned
 - ⊙ Temporarily Abandoned
 - Dry & Abandoned
 - ⊗ Water Injection Well
 - Anadarko Operated - Cotton Waterflood Unit
 - Anadarko Operated - Far West Loco Hills
 - Anadarko Operated - West Loco Hills
 - Anadarko Operated - Old Loco Unit
 - Proposed Unit Boundary - Ballard Grayburg - San Andres Unit
 - Anadarko Production Co. Accepage

PROPOSED BALLARD GRAYBURG - SAN ANDRES UNIT
 LOCO HILLS FIELD
 EDDY COUNTY, NEW MEXICO
SCHEMATIC STRUCTURE MAP
JACKSON ZONE

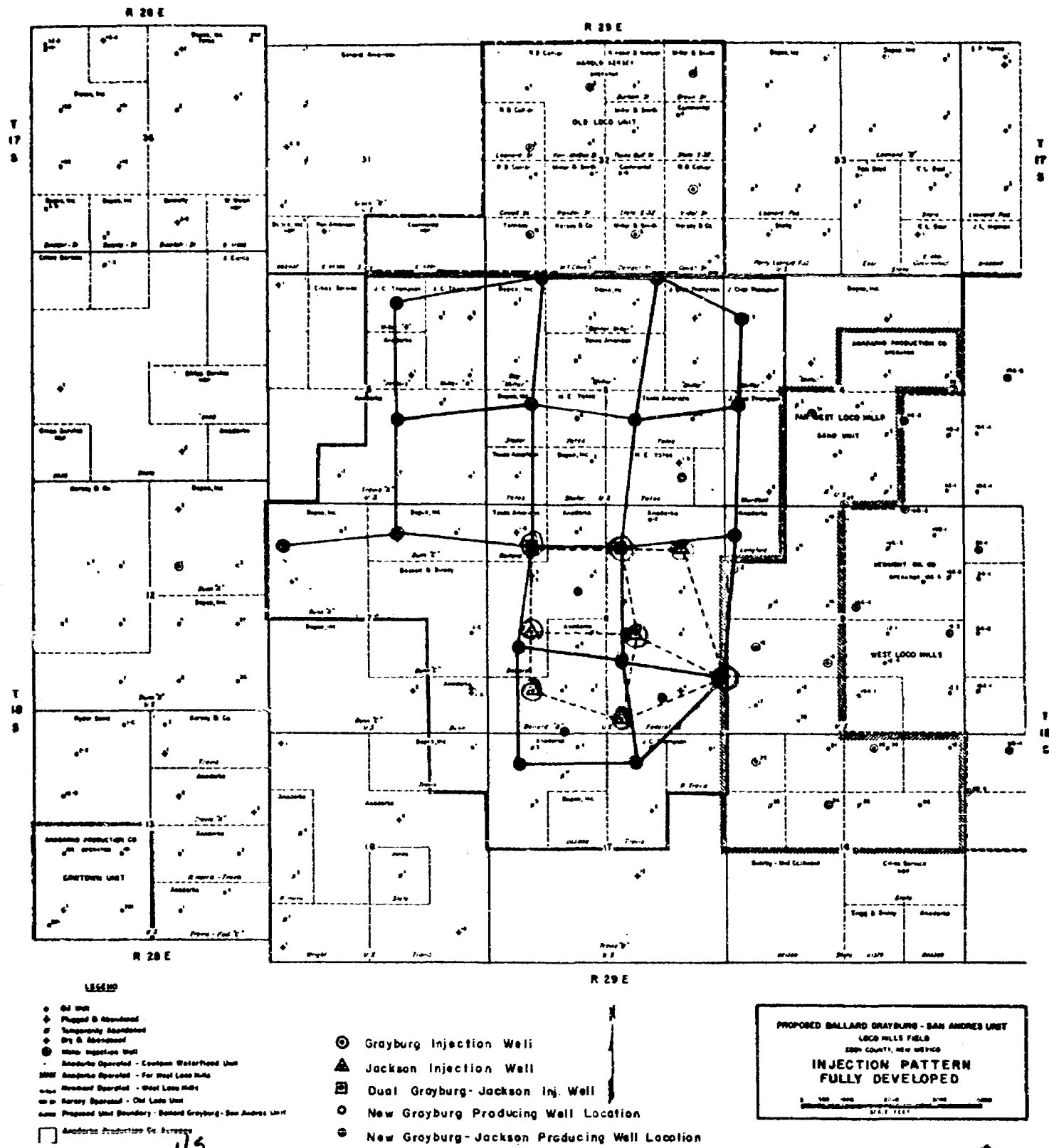
BEFORE EXAMINER UTZ
 OIL CONSERVATION COMMISSION
Anadarko EXHIBIT NO. 8
 CASE NO. 4911-4912
 Submitted by Paul Tucker
 Hearing Date 2-28-73

EXHIBIT 8

JACKSON ZONE - PRODUCTIVE LIMITS AND SCHEMATIC STRUCTURE

APPLICATION OF ANADARKO PRODUCTION COMPANY TO NEW MEXICO OIL CONSERVATION COMMISSION
 FOR AUTHORITY TO INJECT WATER INTO THE GRAYBURG AND JACKSON RESERVOIRS.

BALLARD GRAYBURG SAN ANDRES UNIT, LOCO HILLS FIELD, EDDY COUNTY, NEW MEXICO



18 GB inj wells
5 Jackson
20 total inj wells
3 dual GB/Jackson wells

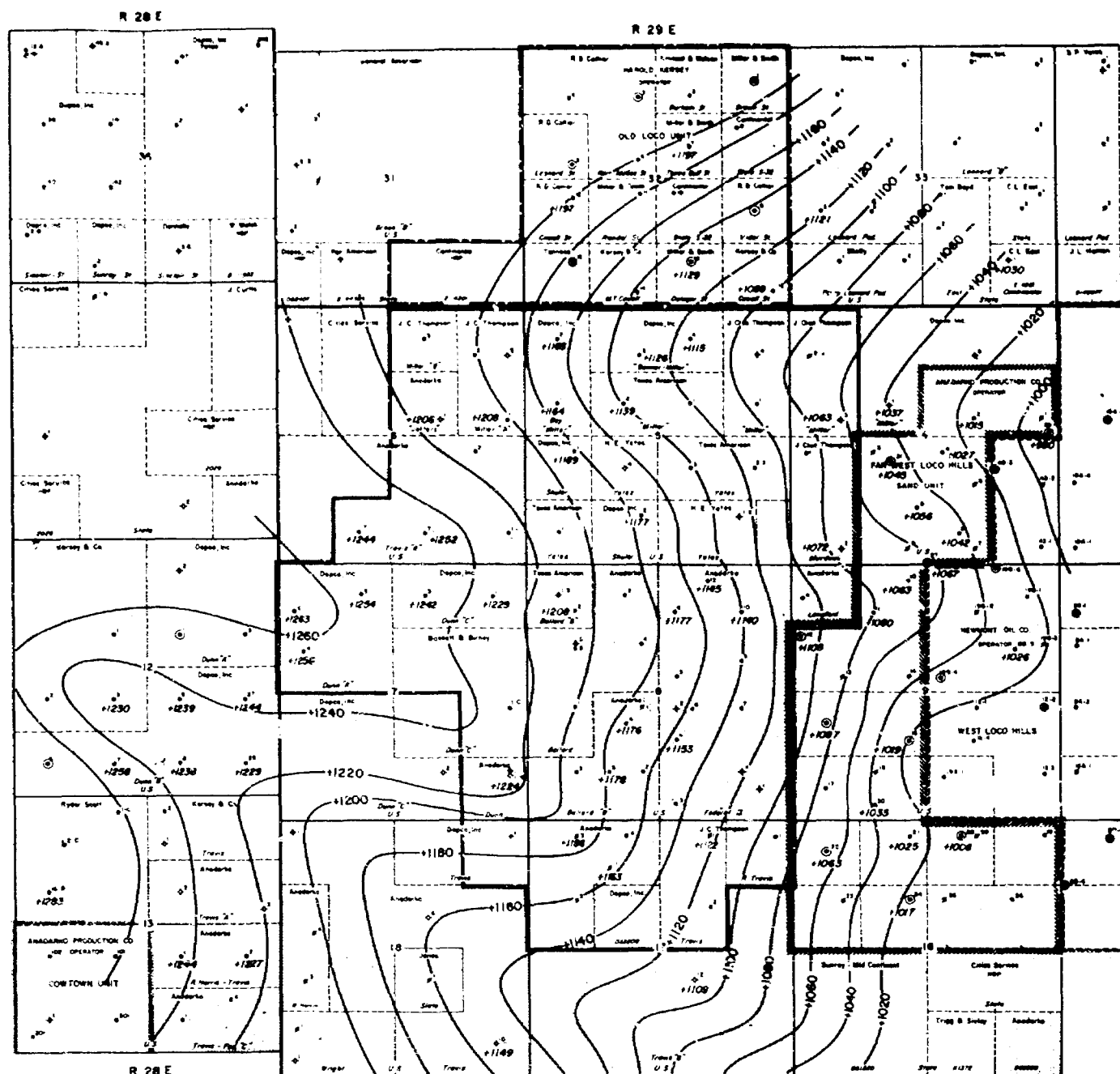
BEFORE EXAMINER UTZ
OIL CONSERVATION COMMISSION
anadarko EXHIBIT NO. 11
CASE NO. 4911-4912
Submitted by Paul Tucker
Hearing Date 2-28-73

EXHIBIT 11

INJECTION PATTERN - FULL DEVELOPMENT

APPLICATION OF ANADARKO PRODUCTION COMPANY TO NEW MEXICO OIL CONSERVATION COMMISSION FOR AUTHORITY TO INJECT WATER INTO THE GRAYBURG AND JACKSON RESERVOIRS.

BALLARD GRAYBURG-SAN ANDRES UNIT, LOCO HILLS FIELD, EDDY COUNTY, NEW MEXICO



LEGEND

- Oil Well
 - ◆ Plugged & Abandoned
 - ◆ Temporarily Abandoned
 - ◆ Dry & Abandoned
 - ② Water Injection Well
- Amderlin Operated - Custom Waterflood Unit
- Amderlin Operated - For West Lake Hole
- Amderlin Operated - West Lake Hole
- Karori Operated - Old Lake Unit
- Proposed West Country - Boland Grayling - San Andres Unit
- Amderlin Production Co. Acroge

PROPOSED BALLARD GRAYBURG - SAN ANDRES UNIT
LOCO HILLS FIELD
EDDY COUNTY, NEW MEXICO

STRUCTURE MAP
TOP OF LOCO HILLS ZONE

Age Group	Percentage of Respondents
18-29	85%
30-49	80%
50-69	75%
70-89	70%
90+	65%

BEFORE EXAMINER UTZ
OIL CONSERVATION COMMISSION

ANODARK EXHIBIT NO. 7

CASE NO. 4911-4912

Submitted by Paul Zucker

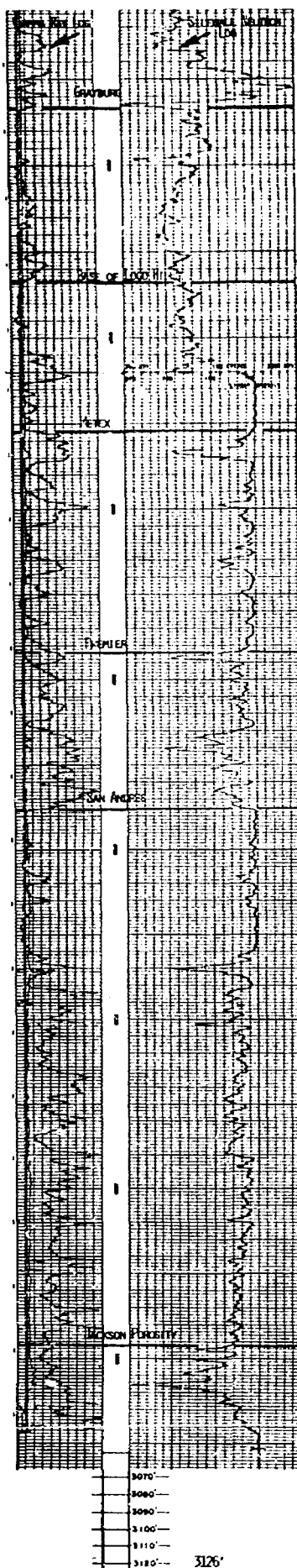
Hearing Date 2-28-73

EXHIBIT 7

STRUCTURE MAP - TOP OF LOCO HILLS SAND

APPLICATION OF ANADARKO PRODUCTION COMPANY TO NEW MEXICO OIL CONSERVATION COMMISSION
FOR AUTHORITY TO INJECT WATER INTO THE GRAYBURG AND JACKSON RESERVOIRS.

BALLARD GRAYBURG SAN ANDRES UNIT, LOCO HILLS FIELD, EDDY COUNTY, NEW MEXICO



2380' (20' BELOW THE BASE OF THE LOCO HILLS SAND)

PRIMARY ZONE

SECONDARY ZONE

OVERALL GRAYBURG INJECTION INTERVAL (SEE NOTE)
WATER WILL BE INJECTED AT THE RATE OF 350-400
BARRELS PER DAY AT AN ESTIMATED PRESSURE OF
2200-2400 PSI.

SECONDARY ZONE

PRIMARY ZONE

UNITIZED INTERVAL

*Well is Anadarko Ballard 05 (Tract 14, Well 5) which
will not be an actual injection well. Used for
illustration only.

JACKSON
POROSITY

Water will be
injected at the
rate of 350-400 barrels
per day. May take
water on a vacuum initially
and eventually increase to
1500 psi.

(400' BELOW THE TOP OF THE SAN ANTONIO)

BEFORE EXAMINER UTZ
OIL CONSERVATION COMMISSION

Case No. 4911-11912

Submitted by Paul J. J. J.

Hearing Date 2-28-73

NOTE:

PERMISSION IS REQUESTED TO INJECT WATER INTO
ANY GRAYBURG ZONE IN THE OVERALL INJECTION
INTERVAL. ALTHOUGH THE ZONES INDICATED AS
PRIMARY AND SECONDARY ZONES ARE THE MAIN
INTERVALS OF INTEREST, OTHER ZONES MAY BE
OPEN OR LOCALLY PRODUCTIVE WITHIN THE UNIT.

ANADARKO PRODUCTION COMPANY

BALLARD GRAYBURG SAN ANTONIO UNIT

LOCO HILLS FIELD
Ector County, New Mexico

EXHIBIT 6

TYPE LOG ILLUSTRATING WATER
INJECTION INTERVALS

Application of Anadarko Production Company to
New Mexico Oil Conservation Commission for
authority to inject water into the Grayburg
and Jackson reservoirs.

P.T. PT. NORTH, TEXAS JAN., 1973

Conservation
Grayburg
NSL

EXHIBIT 9
INITIAL PLAN OF DEVELOPMENT
 APPLICATION OF ANADARKO PRODUCTION COMPANY TO THE
 NEW MEXICO OIL CONSERVATION COMMISSION FOR AUTHORITY
 TO INJECT WATER INTO THE GRAYBURG AND JACKSON RESERVOIRS
 PROPOSED BALLARD GSA UNIT
 LOCO HILLS GSA FIELD
 EDDY COUNTY, NEW MEXICO

BEFORE EXAMINER UTZ
OIL CONSERVATION COMMISSION
 ANADARKO EXHIBIT NO. 9
 CASE NO. 4911-4912
 Submitted by Paul Tuckey
 Hearing Date 2-28-73

INITIAL STAGE OF DEVELOPMENT

1. DRILL AND COMPLETE 4 NEW GRAYBURG INJECTION WELLS AS FOLLOWS:

TRACT	WELL	LOCATION	S-T-R	REMARKS
8	NSL	20' FNL & 1500' FEL	5-18S-29E	REPLACEMENT WELL FOR DEPCO SCHULER #1, WHICH WILL BE PLUGGED.
13	NSL	20' FNL & 1200' FEL	5-18S-29E	
23	1	WITHIN 330' OF EXISTING WELL LOCATED	5-18S-29E	
25	3	2310' FSL & 990' FWL	5-18S-29E	REPLACEMENT WELL FOR TEXAS AMERICAN YATES #3, WHICH WILL BE PLUGGED.
		WITHIN 330' OF EXISTING WELL LOCATED		
		1980' FSL & 1980' FEL		

2. CONVERT 4 EXISTING WELLS TO JACKSON WATER INJECTION WELLS AS FOLLOWS:

TRACT	WELL	LOCATION	S-T-R	REMARKS
5	3	330' FSL & 2310' FEL	8-18S-29E	PREVIOUSLY ANADARKO FEDERAL #1 #3. PREVIOUSLY ANADARKO FEDERAL #1 #8. PREVIOUSLY ANADARKO BALLARD "B" #3. PREVIOUSLY ANADARKO BALLARD "C" #1.
14	3	2310' FSL & 1980' FEL	8-18S-29E	
		990' FSL & 990' FWL	8-18S-29E	
21	1	2310' FSL & 990' FWL	8-18S-29E	

3. CONVERT 2 EXISTING WELLS TO GRAYBURG AND JACKSON INJECTION WELLS AS FOLLOWS:

TRACT	WELL	LOCATION	S-T-R	REMARKS
5	6	990' FNL & 2310' FEL	8-18S-29E	PREVIOUSLY ANADARKO FEDERAL #1 #6. (JACKSON INJECTION WILL PROBABLY NOT BE ACTIVE INITIALLY.) PREVIOUSLY TEXAS AMERICAN BALLARD "B" #2. (JACKSON INJECTION WILL PROBABLY NOT PROVE FEASIBLE.)
12	2	990' FNL & 990' FWL	8-18S-29E	

4. WORKOVER ANADARKO BALLARD #2 (TRACT 15, WELL 2) FOR PRODUCTION.

5. PLUG ANADARKO BALLARD "B" #1 (TRACT 14, WELL 1) WHICH IS NOT REQUIRED, AND TWO REPLACED WELLS - DEPCO SCHULER #1 AND TEXAS AMERICAN YATES #3.

6. INSTALL INJECTION PLANT AND A WATER INJECTION SYSTEM TO PROVIDE 400 BWPD TO EACH OF 10 ZONES, OR A TOTAL INITIAL RATE OF 4,000 BWPD.

SECOND STAGE OF DEVELOPMENT (13 TO 20 MONTHS AFTER INITIAL INJECTION) 1/

1. DRILL NEW GRAYBURG-JACKSON WELL (TRACT 15, WELL 6) AT APPROXIMATELY 1980' FNL & 1980' FWL OF SECTION 8-18S-29E AND COMPLETE FOR PRODUCTION.
2. WORKOVER 2 PRODUCING WELLS AND SIDETRACK AROUND JUNK IN HOLE - TEXAS AMERICAN MILLER #2 (TRACT 9, WELL 2) AND ANADARKO TRAVIS "A" #1 (TRACT 6, WELL 1). PLACE BACK ON PRODUCTION.
3. FRACTURE 2 PRODUCING WELLS - THOMPSON MILLER "A" #1 (TRACT 11, WELL 1) AND TEXAS AMERICAN YATES #1 (TRACT 25, WELL 1).
4. MAKE ADDITIONAL PERFORATIONS IN 2 PRODUCING WELLS - BEPCO DUNN "C" #1 (TRACT 2, WELL 1) AND BEPCO SCHULER #2 (TRACT 23, WELL 2).
5. MAKE ADDITIONAL PERFORATIONS AND FRACTURE 1 PRODUCING WELL - ANADARKO FEDERAL 11 #12 (TRACT 5, WELL 12).
6. CLEAN OUT AND DO MINOR WORK ON 13 PRODUCING WELLS.
7. CONSOLIDATE TANK BATTERIES, AND GATHERING LINES, INSTALL LACT UNIT.
8. INSTALL LARGER PUMPING EQUIPMENT AS REQUIRED.

THIRD STAGE OF DEVELOPMENT - EXPANSION OF INJECTION (19 - 26 MONTHS AFTER INITIAL INJECTION STAGE)

1. DRILL AND COMPLETE 6 NEW GRAYBURG INJECTION WELLS AS FOLLOWS:

TRACT	WELL	LOCATION	S-T-R	REMARKS
6	18	1980' FSL & 1980' FEL	6-18S-29E	
7	3	660' FNL & 1980' FEL	17-18S-29E	REPLACEMENT WELL FOR THOMPSON MILLER #2-X.
10	2	WITHIN 330' OF EXISTING WELL LOCATED	4-18S-29E	
20	12	990' FNL & 380' FWL	17-18S-29E	LOCATION APPROXIMATE DUE TO NEARBY HIGHWAY.
21	2	660' FNL & 660' FWL	8-18S-29E	
26	1	1980' FSL & 660' FWL	4-18S-29E	REPLACEMENT WELL FOR THOMPSON MURDOCK #1.
		WITHIN 330' OF EXISTING WELL LOCATED		
		2310' FSL & 330' FWL		

2. DRILL NEW GRAYBURG & JACKSON INJECTION WELL (TRACT 5, WELL 13) LOCATED 1320' FSL & 20' FEL, SECTION 8-18S-29E.



NSL

3. CONVERT 5 EXISTING WELLS TO GRAYBURG INJECTION AS FOLLOWS:

TRACT	WELL	LOCATION	S-T-R	REMARKS
1	6	990' FNL & 330' FWL	7-18S-29E	PREVIOUSLY DEP CO DUNN "A" #6.
2	3	660' FNL & 1980' FEL	7-18S-29E	PREVIOUSLY DEP CO DUNN "C" #3.
5	4	1650' FSL & 2310' FEL	8-18S-29E	PREVIOUSLY ANADARKO FEDERAL 11 #4.
17	3	660' FNL & 1980' FEL	6-18S-29E	PREVIOUSLY THOMPSON MILLER "B" #3.
22	4	990' FNL & 330' FWL	9-18S-29E	PREVIOUSLY ANADARKO LANGFORD #4. WELL WILL BE DEEPENED TO PREMIER.

4. CONVERT 1 EXISTING WELL TO JACKSON INJECTION - ANADARKO FEDERAL 11 #10 (TRACT 5, WELL 10) LOCATED 990' FNL & 990' FWL, SECTION 8-18S-29E.
5. PLUG WELLS REPLACED BY NEW WELLS - THOMPSON MILLER #2-X AND THOMPSON MURDOCK #1.
6. ENLARGE WATER PLANT AND FACILITIES TO PROVIDE 400 BWPD TO EACH OF 25 ZONES, OR A TOTAL OF 10,000 BWPD.

FOURTH STAGE OF DEVELOPMENT (30 - 40 MONTHS AFTER INITIAL INJECTION) 1/

1. DRILL 2 NEW GRAYBURG & JACKSON WELLS AND COMPLETE FOR PRODUCTION AS FOLLOWS:

TRACT	WELL	LOCATION	S-T-R	REMARKS
5	14	APPROXIMATELY 800' FSL & 1400' FEL	8-18S-29E	THIS WELL MAY NOT BE REQUIRED.
14	6	20' FSL & 1650' FWL	8-18S-29E	

2. DRILL 1 NEW GRAYBURG WELL AND COMPLETE FOR PRODUCTION - TRACT 24 WELL 1, LOCATED 660' FSL & 990' FEL, SECTION 5-18S-29E.
3. MAKE ADDITIONAL GRAYBURG PERFORATIONS AND FRAC 3 WELLS - THOMPSON MILLER "A" #2 (TRACT 11, WELL 2), ANADARKO FEDERAL 11 #7 (TRACT 5, WELL 7) AND THE ANADARKO FEDERAL 11 #9 (TRACT 5, WELL 9).
4. RECOMPLETE AND FRACTURE 1 JACKSON PRODUCING WELL IN GRAYBURG & JACKSON (COMMINGLED) - BASSETT & BIRNEY DUNN #1 (TRACT 19, WELL 1).
5. DEEPEN 2 GRAYBURG PRODUCING WELLS THROUGH THE PREMIER FORMATION AND FRACTURE - THOMPSON TRAVIS #2 (TRACT 7, WELL 2) AND THOMPSON R. TRAVIS #1 (TRACT 7A, WELL 1).
6. RESTORE 2 TEMPORARILY ABANDONED GRAYBURG WELLS TO PRODUCTION AND FRAC IF REQUIRED - ANADARKO TRAVIS "B" #3 (TRACT 14, WELL 3) AND THOMPSON TRAVIS #1 (TRACT 7, WELL 1).
7. CLEAN OUT AND MINOR WORK ON 8 PRODUCERS.
8. ADD LARGER PUMPING EQUIPMENT AS REQUIRED.

1/ PRODUCING WELL WORK SUBJECT TO REVISION AS DICTATED BY FLOOD PERFORMANCE AND ADDITIONAL DATA OBTAINED DURING DEVELOPMENT.

EXHIBIT 5
 RECENT AVERAGE PRODUCTION RATES
 APPLICATION OF ANADARKO PRODUCTION COMPANY TO THE
 NEW MEXICO OIL CONSERVATION COMMISSION FOR AUTHORITY
 TO INJECT WATER INTO THE GRAYBURG AND JACKSON RESERVOIRS

OPERATOR	LEASE		TRACT	NUMBER OF PRODUCING WELLS AS OF 9/72	APPROXIMATE CURRENT PRODUCTION (BBL/MO.) 1/	APPROXIMATE AVG. WELL PROD. RATE (BOPD)
ANADARKO	BALLARD	8-18-29	15 & 21	4	320	2.7
ANADARKO	BALLARD "B"	8-18-29	14	3	530	5.9
ANADARKO	DUNN	7-18-29	4	0	0	0.0
ANADARKO	FEDERAL II	8-18-29	5	7	700	3.3
ANADARKO	LANGFORD	9-18-29	22	0	0	0.0
ANADARKO	JEFFERS	6-18-29	18	0	0	0.0
ANADARKO	TRAVIS "A"	6-18-29	6	3	165	1.8
ANADARKO	TRAVIS "D"	17-18-29	20	1	40	1.3
BASSETT-BIRNEY	DUNN "C"	7-18-29	3 & 19	1	63	2.1
DEPCO	DUNN "A"	7-18-29	1	3	135	1.5
DEPCO	DUNN "C"	7-18-29	2	2	140	2.3
DEPCO	BANNER MILLER	5-18-29	8	2	380	6.3
DEPCO	BAY MILLER	5-18-29	13	1	90	3.0
DEPCO	SCHULER	5-18-29	23	2	120	2.0
DEPCO	TRAVIS	18-18-29	16A	1	25	0.8
DEPCO	063808	17-18-29	16	0	0	0.0
TEXAS AMERICAN	BALLARD "F"	8-18-29	12	1	55	1.8
TEXAS AMERICAN	MILLER-FEDERAL	5-18-29	9	1	110	3.7
TEXAS AMERICAN	YATES	5-18-29	25	3	175	1.9
TEXAS AMERICAN	YATES (S/2 SE)	5-18-29	24 & 24A	0	0	0.0
TEXAS AMERICAN	YATES (NE SW)	5-18-29	24	0	0	0.0
THOMPSON	MILLER	4&5-18-29	10	1	100	3.3
THOMPSON	MILLER "A"	6-18-29	11	2	70	1.2
THOMPSON	MILLER "B"	6-18-29	17	1	22	0.7
THOMPSON	MURDOCK	4-18-29	26	1	11	0.4
THOMPSON	TRAVIS-FEDERAL	17-18-29	7	1	17	0.6
THOMPSON	R. TRAVIS	17-18-29	7A	1	520	17.3
TOTAL				42	3,788	3.0

1/ GRAPHICALLY FROM DECLINE CURVE



UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY
WASHINGTON, D.C. 20242

Anadarko Production Company
2 Greenway Plaza East
Suite 410
Houston, Texas 77046

JUL 24 1972

Attention: Mr. C. W. Stumhoffer

Gentlemen:

Your application of June 6 filed with the Area Oil and Gas Supervisor, Roswell, New Mexico, requests the designation of the Ballard Grayburg San Andres unit area embracing 2,580.59 acres, more or less, of Federal and fee lands in Eddy County, New Mexico, as logically subject to operation under the unitization provisions of the Mineral Leasing Act, as amended.

Unitization is for the purpose of conducting secondary recovery operations by waterflooding and will be limited to the stratigraphic interval in the Grayburg and San Andres formations as defined by section 2(f) of the unit agreement. You estimate that secondary recovery operations will result in the additional recovery of 2,693,000 barrels of oil.

The proposed unit area has been developed by 64 wells that have been completed in the formations to be unitized. Participation in unitized substances for each qualified tract will be in one phase as defined by section 13 of the proposed unit agreement.

The land outlined on your plat marked "Exhibit A to Unit Agreement, Ballard Grayburg San Andres Unit, Loco Hills Grayburg San Andres Field, Eddy County, New Mexico," is acceptable as a logical unit area for secondary recovery operations. We hereby concur in the Supervisor's recommendation that the proposed basis for allocating unitized production be accepted. Your proposed form of unit agreement, which modifies the standard form to the extent necessary to cover conditions incidental to secondary recovery operations in a producing unit, will be acceptable if further modified in accordance with the marked form returned herewith. The remaining copies of the proposed form of unit agreement are being retained for distribution to the appropriate offices of the Geological Survey.

BEFORE EXAMINER UTZ OIL CONSERVATION COMMISSION <u>Anadarko</u> EXHIBIT NO. <u>2</u> CASE NO. <u>H 911 - 4912</u> Submitted by <u>Paul Tucker</u> Hearing Date <u>2-28-73</u>
--

EXHIBIT 2

U.S.G.S. PRELIMINARY APPROVAL
(PAGE 1, PAGE 2)

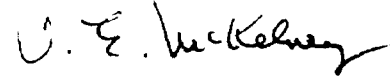
APPLICATION OF ANADARKO PRODUCTION COMPANY TO NEW MEXICO OIL CONSERVATION COMMISSION
FOR AUTHORITY TO INJECT WATER INTO THE GRAYBURG AND JACKSON RESERVOIRS.

BALLARD GRAYBURG SAN ANDRES UNIT, LOCO HILLS FIELD, EDDY COUNTY, NEW MEXICO

In the absence of any type of land requiring special provisions or any objections not now apparent, a duly executed agreement conformed to the marked copy will be approved if submitted in approvable status within a reasonable period of time. However, the right is reserved to deny approval of any executed agreement that, in our opinion, does not have the full commitment of sufficient lands to afford effective control of secondary recovery operations.

Please include the latest status of all acreage when the executed agreement is submitted for final approval. The format of the sample exhibits attached to the 1968 reprint of the standard form should be followed closely in the preparation of exhibits A and B.

Sincerely yours,

A handwritten signature in dark ink, appearing to read "J. E. McKelvey". The signature is written in a cursive style with a long, sweeping underline.

Director

Pressure gauge to monitor packer condition.

NEW GRAYBURG INJECTION WELL

Estimated cement top 0 - 50 feet. Sufficient cement will be used to circulate to surface.

Top of salt section approximately 315 - 400 feet, depending on location. 8 5/8" J-55 24# casing cemented with 250 sacks.

Water with corrosion inhibitor in tubing - casing annulus.

Estimated top of cement 800 - 900 feet.

2 3/8" O.D. internally coated tubing.

"Shorty" type tension packer set approximately 20 to 30 feet above uppermost perforations. Actual depth will range from 2420 to 2540 feet, depending on the depth formation encountered at the particular location.

Grayburg perforations to be made in selected Metex and Premier zones in the overall interval corresponding to a depth of 2454 - 2676 feet in well 5 of Tract 14. (Formerly the Anadarko Ballard B5 well)

Top of San Andres ranging from about 2690 to 2750 feet, depending on location. Set 4 1/2" K-55 IO.5# and cement with 400 - 450 sacks.

WELLS TO WHICH SKETCH APPLIES

TRACT	WELL	LOCATION	S - T - R	REMARKS
6	18	1980' FSL & 1980' FEL	6-18S-29E	
7	3	660' FNL & 1980' FEL	17-18S-29E	
8	5	20' FNL & 1500' FEL	5-18S-29E	UNORTHDOX LOCATION
10	2	WITHIN 330' OF EXISTING WELL LOCATED 990' FNL & 350' FWL	4-18S-29E	REPLACEMENT WELL FOR J.C. THOMPSON MILLER 2X
13	3	20' FNL & 1200' FWL	5-18S-29E	UNORTHDOX LOCATION
20	12	APPROXIMATELY 660' FNL & 660' FWL	17-18S-29E	LOCATION APPROXIMATE DUE TO NEARBY HIGHWAY
21	2	1980' FSL & 660' FWL	8-18S-29E	
23	1	WITHIN 330' OF EXISTING WELL LOCATED 2310' FSL & 990' FWL	5-18S-29E	REPLACEMENT WELL FOR D.M. SCHULER NO. 1
25	3	WITHIN 330' OF EXISTING WELL LOCATED 1980' FSL & 1980' FEL	5-18S-29E	REPLACEMENT WELL FOR TEXAS AMERICAN YATES'S
26	1	WITHIN 330' OF EXISTING WELL LOCATED 2310' FSL & 350' FWL	4-18S-29E	REPLACEMENT WELL FOR THOMPSON MURDOCK #1

ANADARKO PRODUCTION COMPANY

BALLARD GRAYBURG SAN ANDRES UNIT
LOCO HILLS FIELD
EDDY COUNTY, NEW MEXICO

EXHIBIT 14

DIAGRAMMATIC SKETCH OF INJECTION WELL

TYPICAL NEW GRAYBURG ZONE INJECTION WELL (SEE LIST OF WELLS TO WHICH SKETCH APPLIES AT LEFT)

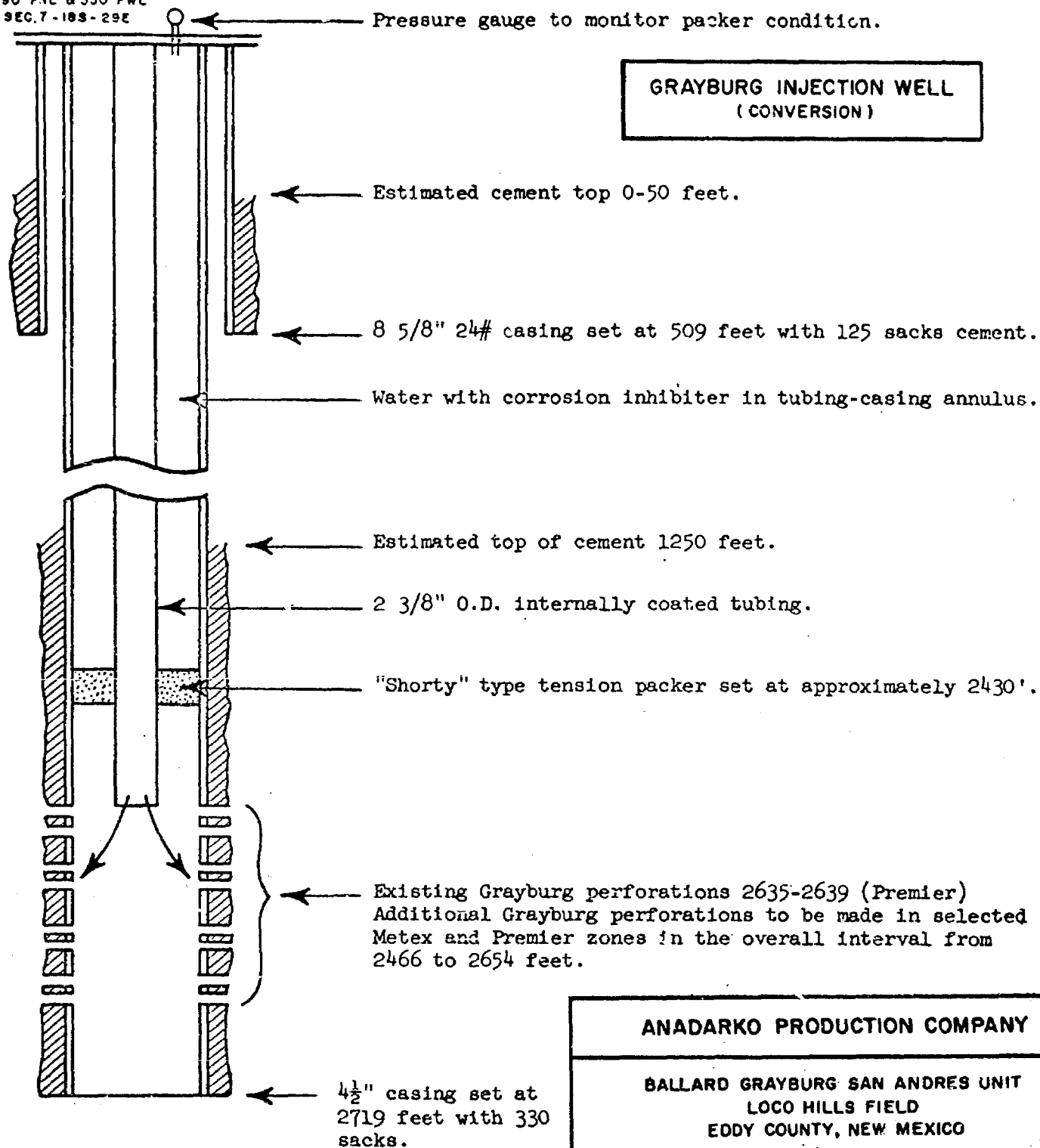
Application of Anadarko Production Company to New Mexico Oil Conservation Commission for authority to inject water into the Grayburg and Jackson reservoirs.

P. T.

FT. WORTH, TEXAS

JAN., 1973

990' FNL & 330' FWL
SEC. 7-10S-29E



**GRAYBURG INJECTION WELL
(CONVERSION)**

ANADARKO PRODUCTION COMPANY

**BALLARD GRAYBURG SAN ANDRES UNIT
LOCO HILLS FIELD
EDDY COUNTY, NEW MEXICO**

**EXHIBIT 15
DIAGRAMMATIC SKETCH OF INJECTION WELL**

**TRACT 1 WELL 6
(FORMERLY DEPCO, DUNN-A6)**

Application of Anadarko Production Company to
New Mexico Oil Conservation Commission for
authority to inject water into the Grayburg
and Jackson reservoirs.

P. T.

FT. WORTH, TEXAS

JAN., 1973

Note: Well is officially classified to be in the
Artesia Field.

660' FNL & 1980' FEL
SEC. 7 - 183 - 29E

Pressure gauge to monitor packer condition.

**GRAYBURG INJECTION WELL
(CONVERSION)**

Estimated cement top 0-50 feet.

8 5/8" O.D. 22# casing set at 375' with 75 sacks cement.

Water with corrosion inhibitor in tubing-casing annulus.

Estimated top of cement 2000 feet.

2 3/8" O.D. internally coated tubing.

"Shorty" type tension packer set at approximately 2410 feet.

Existing Grayburg perforations 2512, 2517, 2569, 2571, 2604, 2612, 2618, and 2626. Additional Grayburg perforations will be made in selected Matex and Premier zones in the overall interval from 2442 to 2634.

4 1/2" O. D. 11.6# casing set at 2567 feet with 150 sacks cement.

ANADARKO PRODUCTION COMPANY

**BALLARD GRAYBURG SAN ANDRES UNIT
LOCO HILLS FIELD
EDDY COUNTY, NEW MEXICO**

EXHIBIT 16

DIAGRAMMATIC SKETCH OF INJECTION WELL

**TRACT 2 WELL 3
(FORMERLY DEPCO, DUNN-03)**

Application of Anadarko Production Company to
New Mexico Oil Conservation Commission for
authority to inject water into the Grayburg
and Jackson reservoirs.

P. T.

FT. WORTH, TEXAS

JAN., 1973

330' FSL & 2310' FEL
SEC. 8 - 185 - 29E

Pressure gauge to monitor packer condition.

**GRAYBURG INJECTION WELL
(CONVERSION)**

Estimated top of cement 175 feet or higher.

8 1/4" casing set at 360 feet with 50 sacks.

Water with corrosion inhibitor in tubing-5" casing annulus.

Estimated top of cement 1000 feet.

2 3/8" O.D. internally coated tubing.

7" casing set at 2275 feet with 100 sacks.

5" casing is presently backed off at 2470 feet. Will tie back into this string to surface.

Grayburg shot holes 2486-2516 and 2671-2719. Existing Grayburg perforations at 2490 & 2675 will be squeezed.

Top of cement unknown. Probably in shot holes but may be higher.

"Shorty" type tension packer set at approximately 2850 feet.

5" casing set at 2872 feet with 50 sacks.

Jackson reservoir.

Well possibly is plugged back to 3000 feet.

T.D. 3040

ANADARKO PRODUCTION COMPANY

**BALLARD GRAYBURG SAN ANDRES UNIT
LOCO HILLS FIELD
EDDY COUNTY, NEW MEXICO**

EXHIBIT 17

DIAGRAMMATIC SKETCH OF INJECTION WELL

TRACT 5 WELL 3

(FORMERLY ANADARKO, FEDERAL II 3)

Application of Anadarko Production Company to New Mexico Oil Conservation Commission for authority to inject water into the Grayburg and Jackson reservoirs.

P. T.

FT. WORTH, TEXAS

JAN., 1973

1650' FSL & 2310' FEL
SEC. 8 - 18S - 29E

Pressure gauge to monitor packer condition.

**GRAYBURG INJECTION WELL
(CONVERSION)**

Estimated cement top 100 feet.

8" (I.D.) casing set at 380 feet with 50 sacks.

Water with corrosion inhibitor in tubing-casing annulus.

Estimated top of cement 1500 feet.

2 3/8" O.D. internally coated tubing.

"Shorty" type tension packer at approximately 2440 feet.

Existing Grayburg perforations 2485-2489, 2516-2520, 2654-2666. Grayburg perforations to be made in selected Metex and Premier zones in the overall interval from 2474 to 2700.

Plug back to approximately 2730' with permanent cast iron bridge plug.

7" casing set at 2776' with 100 sacks.

Jackson zone presently open

Present T.D. 3032

ANADARKO PRODUCTION COMPANY

**BALLARD GRAYBURG SAN ANDRES UNIT
LOCO HILLS FIELD
EDDY COUNTY, NEW MEXICO**

**EXHIBIT 18
DIAGRAMMATIC SKETCH OF INJECTION WELL**

**TRACT 5 WELL 4
(FORMERLY ANADARKO, FEDERAL II 4)**

Application of Anadarko Production Company to New Mexico Oil Conservation Commission for authority to inject water into the Grayburg and Jackson reservoirs.

P. T.

FT. WORTH, TEXAS

JAN., 1973

990' FNL & 2310' FEL
SEC. 3 - 108 - 29 E

Pressure gauge to monitor packer condition.

**GRAYBURG & JACKSON INJECTION
WELL USING DOWNHOLE FLOW
REGULATORS (CONVERSION)**

Estimated cement top 100 feet.

8" casing set at 345' with 50 sacks cement.

Water with corrosion inhibitor in tubing-casing annulus.

Cement top estimated to be about 1900 feet.

2 3/8" O.D. internally coated tubing

Tension set packer at approximately 2430 feet

Existing Grayburg perforations 2564 - 2574 and 2640 - 2650.
Grayburg perforations to be made in selected Metex and Premier zones
in the overall interval from 2452 to 2674 feet.

Locked set packer at
approximately 2950 feet

Jackson perforations
2988 - 3000 feet

5 1/2" 14# casing set
at 3033 feet with 180 sacks

ANADARKO PRODUCTION COMPANY

**BALLARD GRAYBURG SAN ANDRES UNIT
LOCO HILLS FIELD
EDDY COUNTY, NEW MEXICO**

EXHIBIT 19

DIAGRAMMATIC SKETCH OF INJECTION WELL

**TRACT 3 WELL 6
(FORMERLY ANADARKO, FEDERAL II 6)**

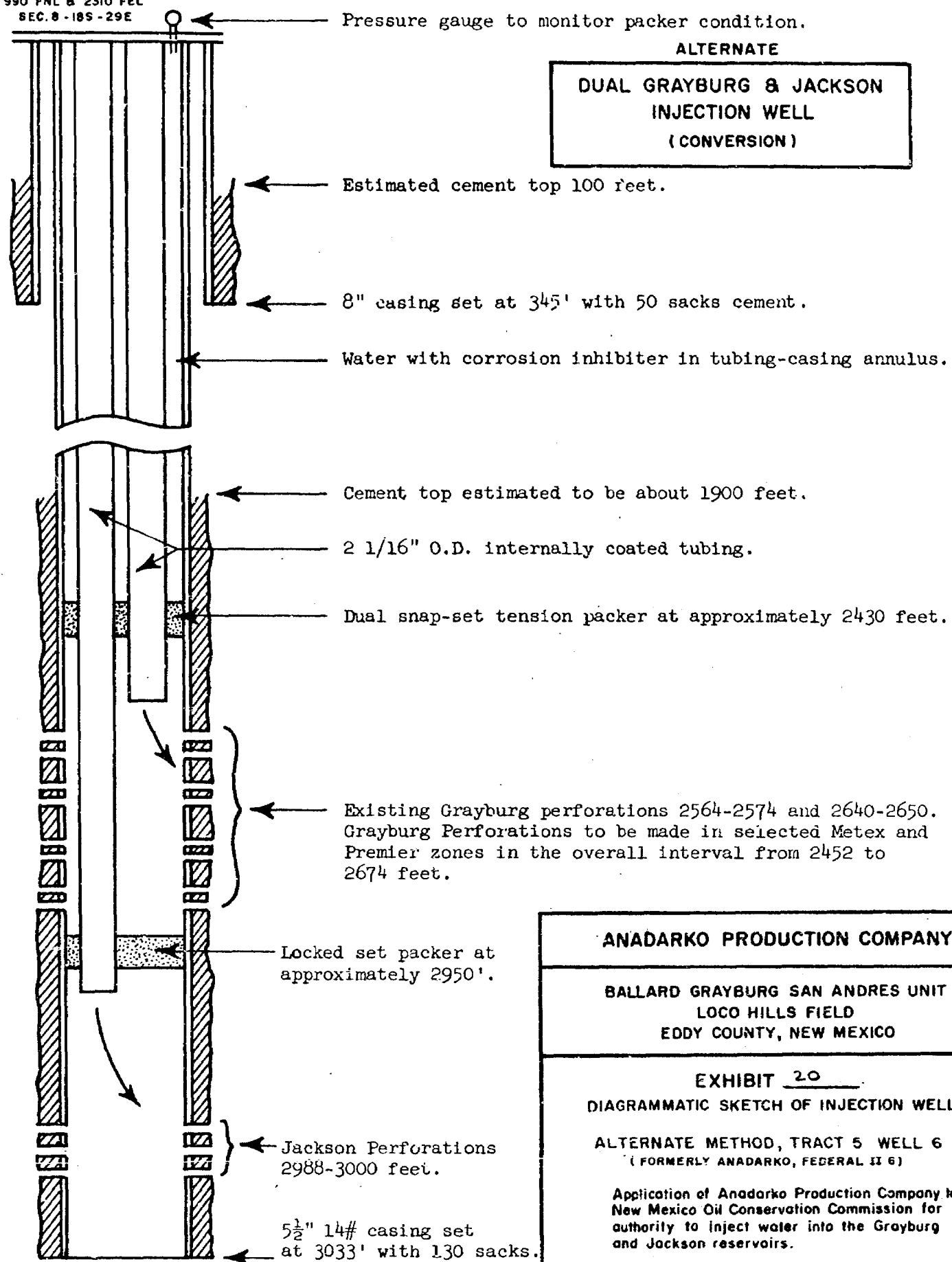
Application of Anadarko Production Company to
New Mexico Oil Conservation Commission for
authority to inject water into the Grayburg
and Jackson reservoirs.

P. T.

FT. WORTH, TEXAS

JAN., 1973

990' FNL & 2310' FEL
SEC. 8 - 18S - 29E



ANADARKO PRODUCTION COMPANY

BALLARD GRAYBURG SAN ANDRES UNIT
LOCO HILLS FIELD
EDDY COUNTY, NEW MEXICO

EXHIBIT 20

DIAGRAMMATIC SKETCH OF INJECTION WELL

ALTERNATE METHOD, TRACT 5 WELL 6
(FORMERLY ANADARKO, FEDERAL II 6)

Application of Anadarko Production Company to
New Mexico Oil Conservation Commission for
authority to inject water into the Grayburg
and Jackson reservoirs.

P. T.

FT. WORTH, TEXAS

JAN., 1973

2310' FSL & 1980' FEL
SEC. 8 - 18S - 29 E

Pressure gauge to monitor packer condition.

**JACKSON INJECTION WELL
(CONVERSION)**

Estimated top of cement 100 feet.

8" casing set at 368 feet with 50 sacks cement.

Water with corrosion inhibitor in tubing - casing annulus.

Estimated top of cement 2450 feet.

2 3/8" O.D. internally coated tubing.

Grayburg (Metex and Premier) perforations at
2580 - 2590 and 2645 - 2675 are presently open.
These will be squeezed.

"Shorty" type tension packer at approximately 2975 feet.

Jackson zone perforations
at 3003 - 3025 feet.

5 1/2" casing set at
3032 feet with 100 sacks.

ANADARKO PRODUCTION COMPANY

**BALLARD GRAYBURG SAN ANDRES UNIT
LOCO HILLS FIELD
EDDY COUNTY, NEW MEXICO**

**EXHIBIT 21
DIAGRAMMATIC SKETCH OF INJECTION WELL**

**TRACT 5 WELL 8
(FORMERLY ANADARKO, FEDERAL II 8)**

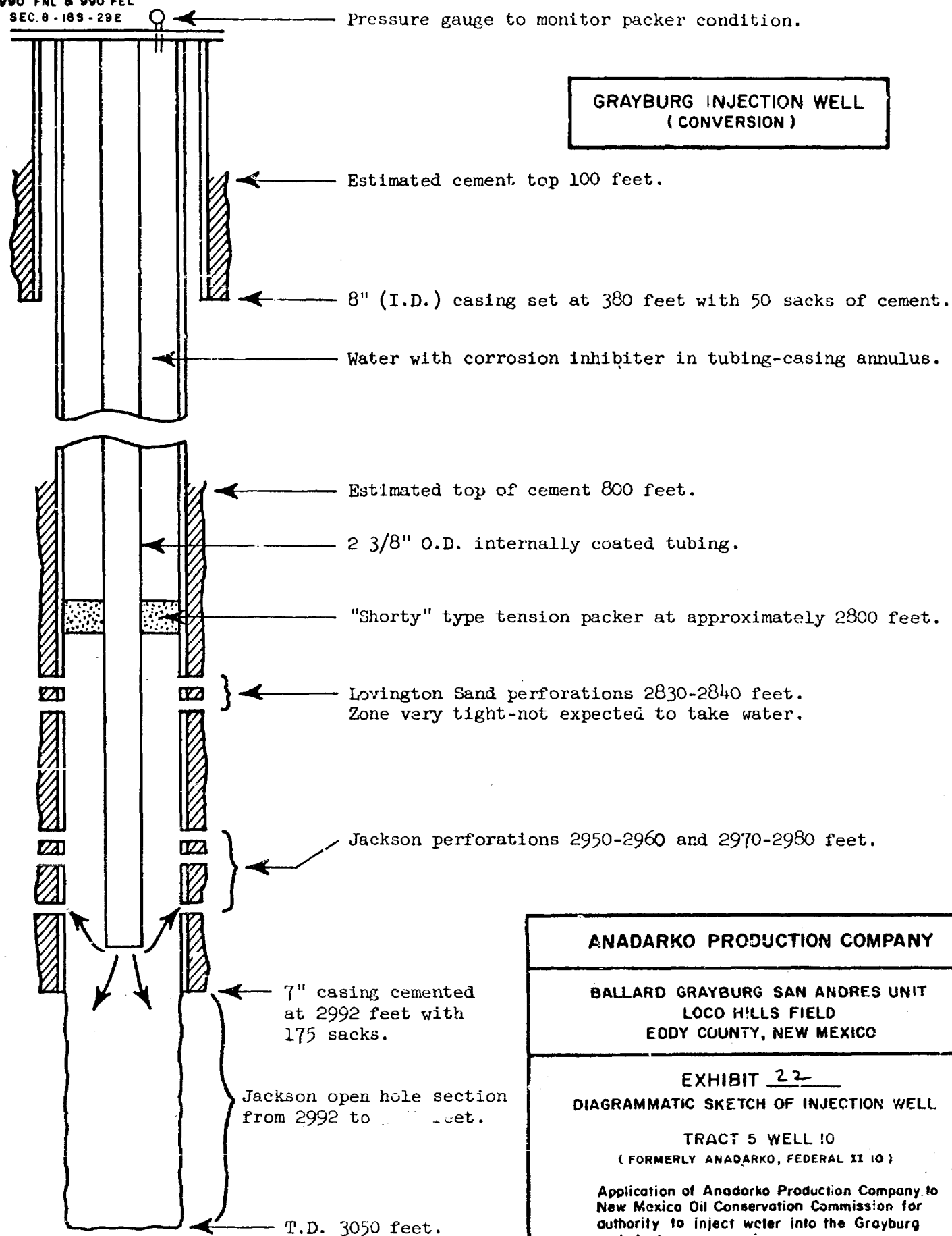
Application of Anadarko Production Company to
New Mexico Oil Conservation Commission for
authority to inject water into the Grayburg
and Jackson reservoirs.

P. I.

FT. WORTH, TEXAS

JAN., 1973

990' FNL & 990' FEL
SEC. 8 - 189 - 29E



GRAYBURG INJECTION WELL
(CONVERSION)

ANADARKO PRODUCTION COMPANY

BALLARD GRAYBURG SAN ANDRES UNIT
LOCO HILLS FIELD
EDDY COUNTY, NEW MEXICO

EXHIBIT 22
DIAGRAMMATIC SKETCH OF INJECTION WELL

TRACT 5 WELL 10
(FORMERLY ANADARKO, FEDERAL II 10)

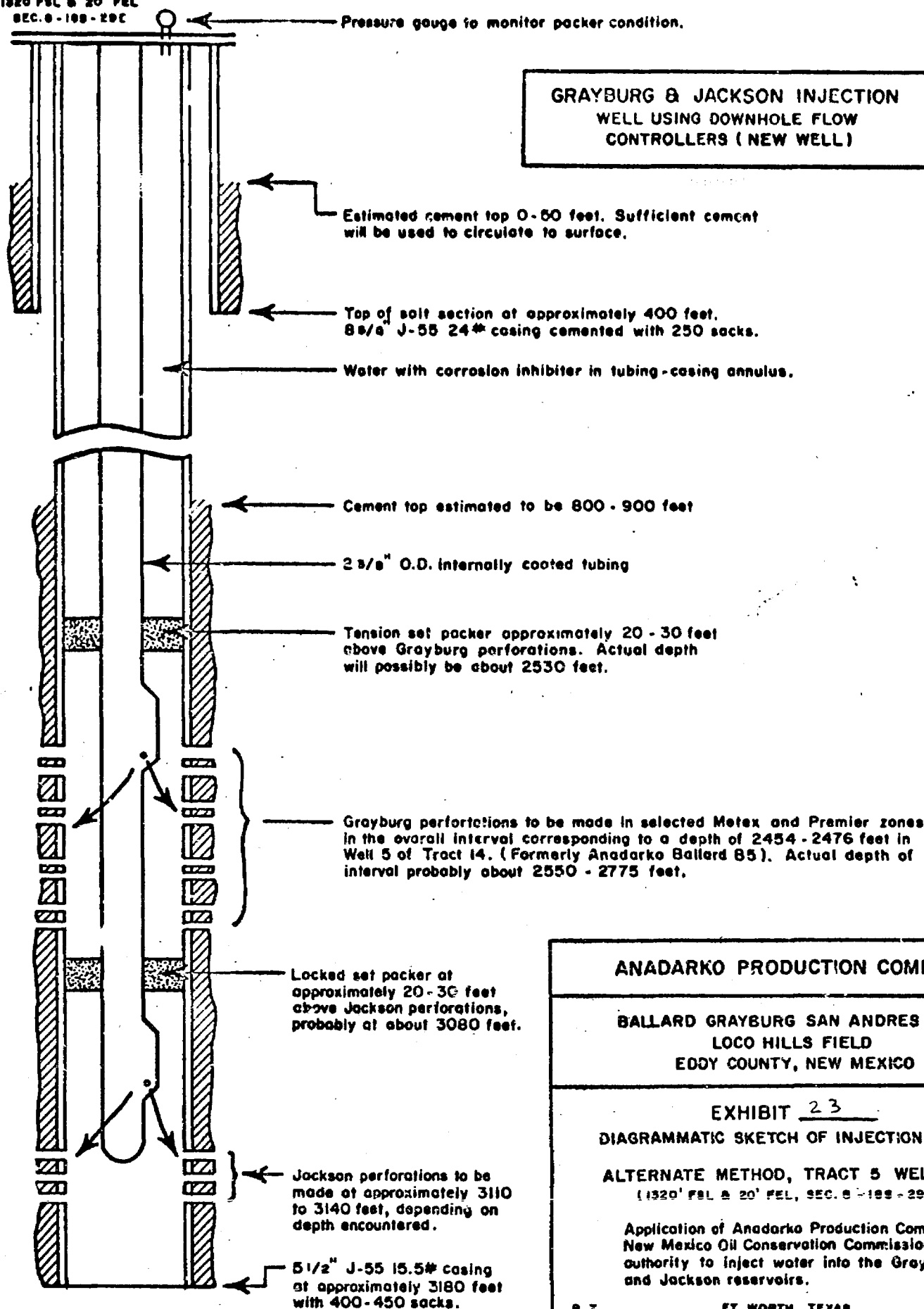
Application of Anadarko Production Company to
New Mexico Oil Conservation Commission for
authority to inject water into the Grayburg
and Jackson reservoirs.

P. T.

FT. WORTH, TEXAS

JAN., 1973

1320' FSL & 20' FEL
SEC. 8 - 100 - 29E



**GRAYBURG & JACKSON INJECTION
WELL USING DOWNHOLE FLOW
CONTROLLERS (NEW WELL)**

ANADARKO PRODUCTION COMPANY

**BALLARD GRAYBURG SAN ANDRES UNIT
LOCO HILLS FIELD
EDDY COUNTY, NEW MEXICO**

EXHIBIT 23

DIAGRAMMATIC SKETCH OF INJECTION WELL

**ALTERNATE METHOD, TRACT 5 WELL 13
(1320' FSL & 20' FEL, SEC. 8 - 100 - 29E)**

Application of Anadarko Production Company to
New Mexico Oil Conservation Commission for
authority to inject water into the Grayburg
and Jackson reservoirs.

P. T.

FT. WORTH, TEXAS

JAN., 1973

1320' FSL & 20' FEL
SEC. 8 - 18S - 29E

Pressure gauge to monitor packer condition.

ALTERNATE

NEW DUAL GRAYBURG & JACKSON
INJECTION WELL

Estimated cement top 0-50 feet. Sufficient cement will be used to circulate to surface.

Top of salt section at approximately 400 feet. 8 5/8" J-55 24# casing cemented with 250 sacks.

Water with corrosion inhibitor in tubing-casing annulus.

Estimated top of cement 800-900 feet.

2 1/16" O. D. internally coated tubing.

Dual snap-set tension packer approximately 20-30 feet above Grayburg perforations. Actual depth will possibly be about 2530 feet.

Grayburg Perforations to be made in selected Metex and Premier zones in the overall interval corresponding to a depth of 2454 to 2676 feet in well 5 of tract 14. (Formerly the Anadarko Ballard B5). Actual depth of interval probably about 2550-2775 feet.

Locked set packer at approximately 20-30' above Jackson perforations, probably at about 3080 feet.

Jackson perforations to be made at approximately 3110 to 3140 feet, depending on depth encountered.

5 1/2" J-55 15.5# casing at approximately 3180' with 400-450 sacks.

ANADARKO PRODUCTION COMPANY

BALLARD GRAYBURG SAN ANDRES UNIT
LOCO HILLS FIELD
EDDY COUNTY, NEW MEXICO

EXHIBIT 24

DIAGRAMMATIC SKETCH OF INJECTION WELL

ALTERNATE METHOD, TRACT 5 WELL 13
(1320' FSL & 20' FEL, SEC. 8 - 18S - 29E)

Application of Anadarko Production Company to
New Mexico Oil Conservation Commission for
authority to inject water into the Grayburg
and Jackson reservoirs.

P. T.

FT. WORTH, TEXAS

JAN., 1973

990' FNL & 990' FWL
SEC. 8 - 18S - 29E

Pressure gauge to monitor packer condition.

**GRAYBURG INJECTION WELL
(CONVERSION)**

Estimated cement top 0-50 feet.

8 5/8" casing set at 365 feet with 50 sacks cement.

Water with corrosion inhibitor in tubing-casing annulus.

Estimated cement top about 2200 feet.

2 3/8" O.D. internally coated tubing.

"Shorty" type tension packer at approximately 2420 feet.

Present Grayburg perforations 2453-2455, 2463-2465, 2479-2481, 2492-2494, 2554-2558, 2576-2589, 2618-2632 and 2649-2657. New Grayburg perforations will be made in selected Metex & Premier zones within the overall interval between 2450 and 2664 feet.

Plug back to approximately 2675 feet.

5 1/2" casing at 2697 feet cemented with 75 sacks.

Jackson zone presently open but not considered productive.

Present T.D. 3086'.

ANADARKO PRODUCTION COMPANY

**BALLARD GRAYBURG SAN ANDRES UNIT
LOCC HILLS FIELD
EDDY COUNTY, NEW MEXICO**

EXHIBIT 25

DIAGRAMMATIC SKETCH OF INJECTION WELL

TRACT 12 WELL 2

(FORMERLY TEXAS AMERICAN, BALLARD 82)

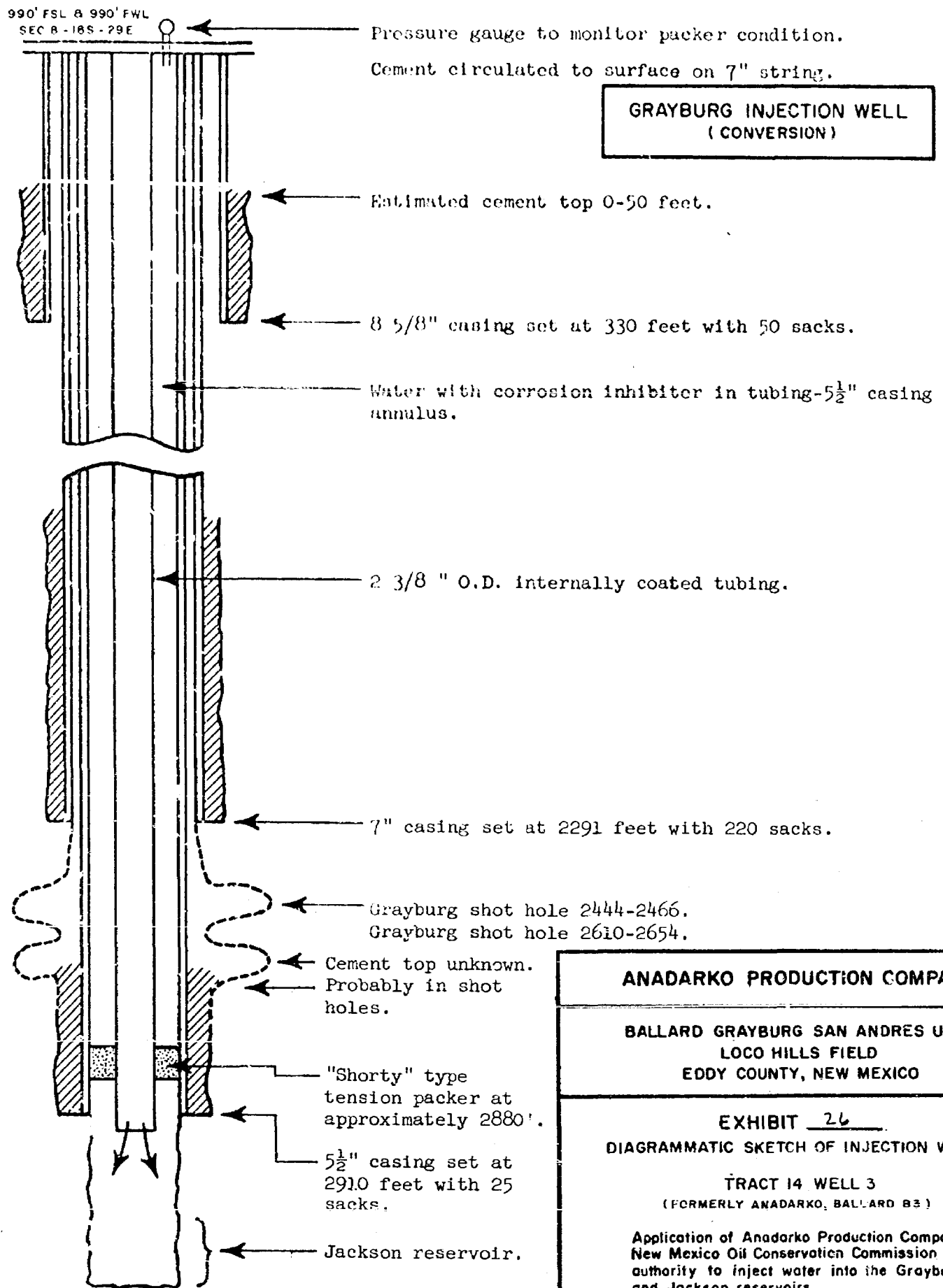
Application of Anadarko Production Company to New Mexico Oil Conservation Commission for authority to inject water into the Grayburg and Jackson reservoirs.

P. T.

FT. WORTH, TEXAS

JAN., 1973

990' FSL & 990' FWL
SEC 8 - 18S - 29E



ANADARKO PRODUCTION COMPANY

**BALLARD GRAYBURG SAN ANDRES UNIT
LOCO HILLS FIELD
EDDY COUNTY, NEW MEXICO**

EXHIBIT 26

DIAGRAMMATIC SKETCH OF INJECTION WELL

TRACT 14 WELL 3

(FORMERLY ANADARKO, BALLARD B3)

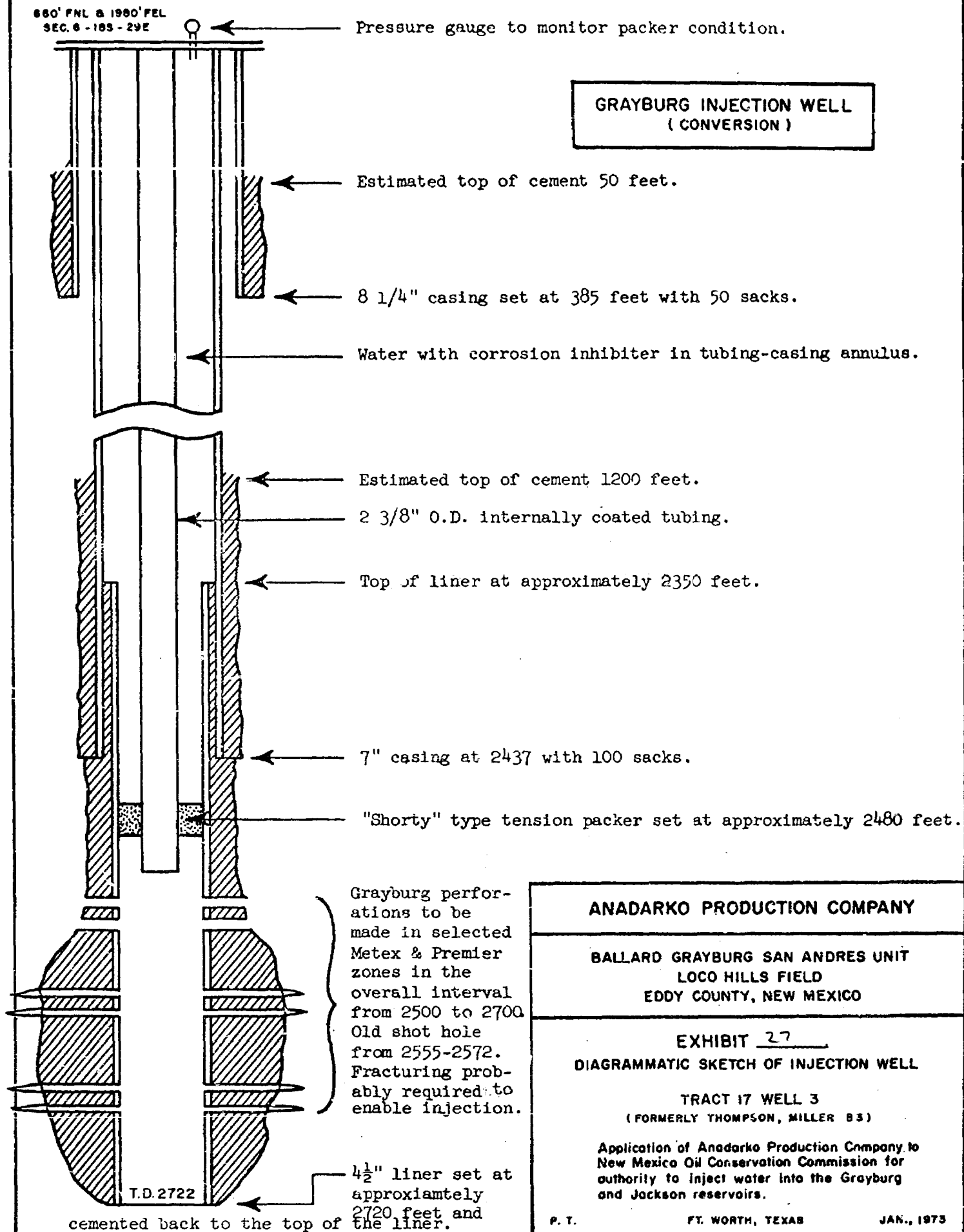
Application of Anadarko Production Company to
New Mexico Oil Conservation Commission for
authority to inject water into the Grayburg
and Jackson reservoirs.

P. T.

FT. WORTH, TEXAS

JAN., 1973

660' FNL & 1990' FEL
SEC. 6 - 185 - 29E



ANADARKO PRODUCTION COMPANY

BALLARD GRAYBURG SAN ANDRES UNIT
LOCO HILLS FIELD
EDDY COUNTY, NEW MEXICO

EXHIBIT 27 DIAGRAMMATIC SKETCH OF INJECTION WELL

TRACT 17 WELL 3
(FORMERLY THOMPSON, MILLER B3)

Application of Anadarko Production Company to
New Mexico Oil Conservation Commission for
authority to inject water into the Grayburg
and Jackson reservoirs.

P. T.

FT. WORTH, TEXAS

JAN., 1973

2310' FSL & 990' FWL
SEC. 8 - 183 - 29E

Pressure gauge to monitor packer condition.

**GRAYBURG INJECTION WELL
(CONVERSION)**

Estimated cement top 50 feet.

8 3/8" casing set at 345 feet with 50 sacks cement.

Water with corrosion inhibitor in tubing-casing annulus.

Estimated cement top 1000 feet.

2 3/8" O.D. internally coated tubing.

Top of liner not available. Probably no cement behind liner down to some point in the shot hole.

7" casing set at 2302 feet with 100 sacks.

Grayburg shot hole 2430 to 2460 feet.

Cement top unknown -
probably in shot hole
somewhere.

"Shorty" type
tension packer set
at approximately
2820 feet.

5 1/2" liner set at
2850' with 35 sacks.

Jackson reservoir.

T.D. 3040

ANADARKO PRODUCTION COMPANY

**BALLARD GRAYBURG SAN ANDRES UNIT
LOCO HILLS FIELD
EDDY COUNTY, NEW MEXICO**

EXHIBIT 28

DIAGRAMMATIC SKETCH OF INJECTION WELL

TRACT 21 WELL 1

(FORMERLY ANADARKO, BALLARD C1)

Application of Anadarko Production Company to
New Mexico Oil Conservation Commission for
authority to inject water into the Grayburg
and Jackson reservoirs.

P. T.

FT. WORTH, TEXAS

JAN., 1973

990' FNL & 330' FWL
SEC. 9 - 183 - 29E

Pressure gauge to monitor packer condition.

**GRAYBURG INJECTION WELL
DEEPENING & CONVERSION**

Estimated top of cement 150 feet.

8" casing set at 400 feet with 50 sacks.

Water with corrosion inhibitor in tubing-casing annulus.

Estimated cement top 2000 feet.

2 3/8" O.D. internally coated tubing.

"Shorty" type tension packer at approximately 2500 feet.

Present Grayburg (Metex) perforations 2534-2548 and 2559-2565.

Top of liner at approximately 2580 feet.

5 1/2" casing at 2596' with 100 sacks. (Present depth)

Additional Grayburg (Premier) perforations to be made in selected zones in the overall interval from 2565 to 2760 feet.

Deepen to the top of San Andres at approximately 2760 ft. Set 4" Hydril liner and cement back up to the top of the liner.

ANADARKO PRODUCTION COMPANY

**BALLARD GRAYBURG SAN ANDRES UNIT
LOCO HILLS FIELD
EDDY COUNTY, NEW MEXICO**

EXHIBIT 29

DIAGRAMMATIC SKETCH OF INJECTION WELL

TRACT 22 WELL 4

(FORMERLY ANADARKO, J. L. LANGFORD #)

Application of Anadarko Production Company to New Mexico Oil Conservation Commission for authority to inject water into the Grayburg and Jackson reservoirs.

P. T.

FT. WORTH, TEXAS

JAN., 1973

BEFORE THE OIL CONSERVATION COMMISSION
OF THE STATE OF NEW MEXICO

CASE NO. 4912
Order No. R-4493-A

APPLICATION OF ANADARKO PRODUCTION
COMPANY FOR A WATERFLOOD PROJECT,
SPECIAL RULES, UNORTHODOX LOCATIONS,
AND POOL REDELINEATION, EDDY COUNTY,
NEW MEXICO.

NOMENCLATURE

NUNC PRO TUNC

BY THE COMMISSION:

It appearing to the Commission that Order No. R-4493, dated March 16, 1973, does not correctly state the intended order of the Commission,

IT IS THEREFORE ORDERED:

(1) That wherever in Findings Nos. (8) and (9), and in Orders Nos. (1) and (6), the phrase "Ballard Grayburg Jackson Unit Area" may occur, that said phrase be stricken, and the phrase "Ballard Grayburg San Andres Unit Area" be substituted therefor.

(2) That this order shall be effective nunc pro tunc as of March 16, 1973.

DONE at Santa Fe, New Mexico, this _____ day of March, 1973.

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:

APPLICATION OF ANADARKO PRODUCTION
COMPANY FOR A WATERFLOOD PROJECT,
SPECIAL RULES, UNORTHODOX LOCATIONS,
AND POOL REDELINEATION, EDDY COUNTY,
NEW MEXICO.

CASE NO. 4912

Order No. R-4493

Nomenclature

ORDER OF THE COMMISSION

BY THE COMMISSION:

This cause came on for hearing at 9 a.m. on February 28, 1973
at Santa Fe, New Mexico, before Examiner Elvis R. Utz.

NOW, on this day of March, 19 , 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 authority to institute a waterflood project by the
injection of water into the Grayburg and San Andres formations
underlying its Ballard Grayburg San Andres Unit Area in Sections
4, 5, 6, 7, 8, 9, 17, and 18, Township 18 South, Range 29 East, Loco
Hills Pool, Eddy County, New Mexico

(3) That said injection would be accomplished through
23 wells at orthodox and unorthodox locations, with ~~15~~ 15
wells serving as injection wells into the Grayburg formation, five
wells serving as injection wells into the San Andres formation,
and three wells serving as dual injection wells into the
Grayburg and San Andres formations.

(4) That the applicant also seeks the deletion of the NW 1/4
of Section 7, Township 18 South, Range 29 East, NMPM, from the
Artesia Pool and the extension of the Loco Hills Pool to include
said lands therein.

(5) Applicant further seeks approval of ~~an~~ a ~~administrative~~ procedure for the administrative approval of additional injection and producing wells ^{orthodox and} at ~~unorthodox~~ locations without notice and hearing.

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

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

(8) That to include ~~of~~ all of the proposed waterflood project and the Ballard Grayburg Jackson Unit Area within the horizontal limits of one pool as designated by the Commission, the Artesia Pool should be contracted and the Loco Hills Pool ~~expand~~ extended as described in Finding No (4) above.

(9) That approval of the requested administrative procedure will afford the applicant the opportunity to produce its just and equitable share of the oil in the Loco Hills Pool, provided the wells are ~~not~~ drilled no closer than 330 feet to the outer boundary of the Ballard Grayburg Jackson Unit Area nor closer than ten feet to any quarter-quarter section or subdivision inner boundary.

(10) That the subject application should be approved and the project should be ^{governed} ~~approved~~ 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
Ballard Grayburg Jackson Unit Area, Loco Hills Pool,
 by the injection of water into the Grayburg and San Andres formations
 through the following-described wells in Township 24 18
~~North~~ South, Range 29 ~~West~~ East, NMPM, Eddy County,
Oklahoma, New Mexico:

Phase I			
Tract No.	Well No.	Footage Description	Section
8	5	20' from north line, 1500' from east line	5
13	3	20' from north line, 1200' from west line	5
23	1	within 330' of well located	
		2310' from south line, 990' from west line	5
25	3	within 330' of well located	
		1980' from south line, 1980' from east line	5
5	3	330' from south line, 2310' from east line	8
5	8	2310' from south line, 1980' from east line	8
14	3	990' from south line, 990' from west line	8
21	1	2310' from south line, 990' from west line	8
5	6	990' from north line, 2310' from east line	8
12	2	990' from north line, 990' from west line	8
6	18	1980' from south line, 1980' from east line	6
7	3	660' from north line, 1980' from east line	17
10	2	within 330' of well located	
		990' from north line, 380' from west line	4
20	12	660' from north line, 660' from west line	17
21	2	1980' from south line, 660' from west line	8

(4) That the subject waterflood project is hereby designated the Anadarko Ballard ^{Unit} GSA 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 the Artesia Pool, as heretofore classified, defined, and described, is hereby contracted by the deletion of the NW¹/₄ of Section 7, Township 18 South, Range 29 East, NMPM.

(5) That the Loco Hills Pool, as heretofore classified, defined, and described, is hereby extended to include therein the NW¹/₄ of Section 7, Township 18 South, Range 29 East, NMPM.

(6) That the Secretary-Director of the Commission may approve additional producing and injection wells at orthodox and unorthodox locations within the Ballard Grayburg Jackson Unit Area as may be necessary to complete an efficient production and injection pattern; provided said wells shall be drilled no closer than 330 feet to the outer boundary of the Ballard Grayburg Jackson Unit Area nor closer than ten feet to any ~~outer~~ ~~least~~ quarter-quarter section ~~line~~ or subdivision inner boundary, and provided the application therefor has been filed in accordance with Rule 701 B of the Commission Rules and Regulations.

~~(7) That monthly progress reports of the subject waterflood projects shall~~

(7) 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.