

CASE 5668: ANADARKO PRODUCTION COMPANY  
FOR SALT WATER DISPOSAL, LEA COUNTY,  
NEW MEXICO

*any*

CASE NO.

5668

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APPLICATION,  
TRANSCRIPTS,  
SMALL EXHIBITS,

ETC.

BEFORE THE  
NEW MEXICO OIL CONSERVATION COMMISSION  
Santa Fe, New Mexico  
April 14, 1976

EXAMINER HEARING

IN THE MATTER OF:

Application of Anadarko Production  
Company for salt water disposal,  
Lea County, New Mexico.

CASE  
5668

BEFORE: Daniel S. Nutter, Examiner

TRANSCRIPT OF HEARING

A P P E A R A N C E S

For the New Mexico Oil  
Conservation Commission:

William F. Carr, Esq.  
Legal Counsel for the Commission  
State Land Office Building  
Santa Fe, New Mexico

For the Applicant:

W. Thomas Kellahin, Esq.  
KELLAHIN & FOX  
Attorneys at Law  
500 Don Gaspar  
Santa Fe, New Mexico

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General Court Reporting Service  
825 Calle Mejia, No. 122, Santa Fe, New Mexico 87501  
Phone (505) 982-9212

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DAN KERNAGHAN

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1 MR. NUTTER: We will call Case Number 5668.

2 MR. CARR: Case 5668, application of Anadarko  
3 Production Company for salt water disposal, Lea County,  
4 New Mexico.

5 MR. KELLAHIN: Tom Kellahin appearing on behalf of  
6 Anadarko Production Company. I have one witness to be sworn.

7 (THEREUPON, the witness was duly sworn.)  
8

9 DAN KERNAGHAN

10 called as a witness, having been first duly sworn, was  
11 examined and testified as follows:  
12

13 DIRECT EXAMINATION

14 BY MR. KELLAHIN:

15 Q. Would you please state your name, by whom employed  
16 and in what capacity?

17 A. My name is Dan Kernaghan, I'm employed by Anadarko  
18 Production Company as Division Evaluation Engineer.

19 Q. Mr. Kernaghan, have you previously testified before  
20 the Commission and had your qualifications as an expert  
21 accepted and made a matter of record?

22 A. Yes, I have.

23 Q. And are you familiar with the facts surrounding  
24 this particular application?

25 A. Yes, I am.

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1 MR. KELLAHIN: If the Examiner please, are the  
2 witness' qualifications acceptable?

3 MR. NUTTER: Yes, they are.

4 Q (Mr. Kellahin continuing.) Mr. Kernaghan, please  
5 refer to Exhibit Number One and identify it?

6 A Exhibit Number One shows the general area of the  
7 well that we are requesting permission to convert to salt  
8 water disposal. That well, the State "W" No. 1, is circled in  
9 red and the offsetting wells and their producing field are  
10 shown on this map.

11 Q Let's go to Exhibit Number Two which is on a little  
12 larger scale. Again, if you will identify the proposed  
13 disposal well?

14 A Anadarko's State "W" No. 1 is identified with the red  
15 arrow. It is in location "O" of Section 21, 18, 34.

16 The four wells to the south identified with red  
17 circles are the wells in which the water which we propose to  
18 dispose of is produced.

19 Q What is the total volume of water you intend to  
20 dispose of?

21 A About a hundred and twenty-five to a hundred and  
22 fifty barrels a day.

23 Outlined in green are two secondary units in the  
24 area. The one to the west is outside of a two-mile radius.  
25 It is Mobile's EK Queen Unit. The one immediately to the east

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1 northeast is Continental's East EK Queen Unit, they are both  
2 active waterflood projects in the Queen sand.

3 Q What is the history of the proposed disposal well?

4 A The proposed well was drilled and completed as a  
5 producing oil well, a marginal well. It produced some five  
6 thousand barrels of oil and then declined to an economic  
7 limit -- past it's economic limit at the present time. It  
8 was completed in the Penrose sand, we propose to inject the  
9 produced water into the same interval that it produced oil  
10 from, which is the same interval as the four wells on the  
11 south are producing from.

12 Q Would you go now to Exhibit Number Three and  
13 identify it?

14 A Exhibit Number Three is the diagrammatic sketch  
15 of our State "W" No. 1 showing the interval into which we  
16 propose to dispose the water into in the downhole equipment  
17 that we propose to use.

18 Q In your opinion will this well take the disposed  
19 water under vacuum or will you have to pump it in?

20 A We will have to use pressure to get it in.

21 Q Do you have any estimates on the kind of pressures  
22 you can anticipate?

23 A Well, it is my opinion that we can dispose of this  
24 water at less than five tenths of a pound per foot and, of  
25 course, that it will take considerably less than that. It is

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1 a small volume that we are talking about.

2 Q What is the proposed disposal interval?

3 A It is the Penrose zone of the Queen sand from  
4 forty-eight hundred and fifty-two feet to forty-eight hundred  
5 and sixty-two feet.

6 Q And what is the zone of production for the wells  
7 offsetting to the south?

8 A It is the same zone.

9 Q So you will be reinjecting into the producing zone?

10 A Yes, we are.

11 Q What kind of installations will you have on the  
12 surface of this disposal well?

13 A Well, we will have tanks to hold the water, a  
14 surge tank and a pump in which to inject it under pressure.

15 Q How will you monitor leakage?

16 A We will monitor leakage by leaving the casing tubing  
17 annulus open and watching for the appearance of water.

18 Q Have you run any injectivity tests yet?

19 A No, we have not.

20 Q Please refer to Exhibit Number Four and identify it?

21 A Exhibit Number Four is the log of the State "W" No. 1,  
22 showing the top of the overall Queen sand interval and the  
23 Penrose zone from which the well was completed and into which  
24 we propose to inject the fluid in our perforations in that  
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1 Q Please refer to the water analysis, that's the  
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3 A Exhibit Number Five is a recent water analysis.

4 Q I'm sorry, let me correct that. Exhibit Number  
5 Five is your decline curve.

6 A This is the production history of the New Mexico  
7 State "U" lease which is the four wells to the south of our  
8 proposed salt water disposal well. It shows the oil production.  
9 The increases in oil production are due to new drilling on  
10 this lease. These wells were not drilled at the same time,  
11 they were drilled over a several-year interval, approximately  
12 a ten-year interval. The oil production is declining, the  
13 water production is holding about the same, in the neighbor-  
14 hood of about four thousand barrels a month.

15 Q Would you refer to Exhibit Number Six?

16 A Exhibit Number Six is a recent water analysis from  
17 the State "U" No. 3. It is representative of the water  
18 produced from these wells. It shows the chlorides and the  
19 mineralization of this water, approximately a hundred and  
20 seventy-five thousand parts per million chloride.

21 Q Will this water be treated in any manner before  
22 it is reinjected?

23 A Other than settling, no.

24 Q Offsetting you to the east is Continental's -- is  
25 that a waterflood project?

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1 A. Yes, it is.

2 Q. Okay.

3 A. It's in the Queen sand, I don't believe it is in  
4 the Penrose zone of the Queen sand, it's in an upper interval,  
5 but it is within the field, the same vertical limits of the  
6 field.

7 Q. What are the fresh water sources in the area, if  
8 any?

9 A. If any, they would be very shallow. This is very  
10 near the edge of the Caprock, in fact, the Caprock comes a  
11 few hundred feet west of the No. 4 Well.

12 MR. NUTTER: This is on top?

13 A. It's on top. The edge comes at about the western  
14 limit of our "U" lease which is crosshatched. It is a very  
15 abrupt drop. The fresh water sands would be at a depth of  
16 three or four hundred feet.

17 Q. Will the method of completion of the disposal well  
18 insure that there will be no contamination of fresh water  
19 sources?

20 A. Well, we feel that it will, yes.

21 Q. Were Exhibits One through Six either prepared by  
22 you directly or under your direction and supervision?

23 A. Yes.

24 Q. In your opinion will approval of this application  
25 be in the best interests of conservation, the prevention of

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1 waste and the protection of correlative rights?

2 A. Yes, it will.

3 MR. KELLAHIN: If the Examiner please, we move  
 4 the introduction of Exhibits One through Six.

5 MR. NUTTER: Applicant's Exhibits One through Six  
 6 will be admitted into evidence.

7 (THEREUPON, Applicant's Exhibits One through  
 8 Six were admitted into evidence.)

9 MR. KELLAHIN: That concludes our case.

10  
 11 CROSS EXAMINATION

12 BY MR. NUTTER:

13 Q Mr. Kernaghan, you say this Continental flood over  
 14 here to the east or the northeast of your well is producing  
 15 from another portion of the Queen formation than what your  
 16 wells are producing from?

17 A. I believe so. We tested this well in an upper  
 18 section and there is a zone up above that produces in the  
 19 area. This is the porosity zone that occurs between forty-five,  
 20 fifty and forty-six hundred or forty-six ten on this log.  
 21 Now, to the best of my knowledge that is the zone that  
 22 Continental is producing from.

23 Q Okay, now, the zone that you are going to be  
 24 disposing of is down here at forty-eight, fifty approximately?

25 A. Yes.

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1 Q Now, is that the zone that is producing for your  
2 well to the south?

3 A Yes.

4 Q This Penrose section?

5 A Yes.

6 Q Do you have any plans or do you think there is any  
7 likelihood that Anadarko will conduct flooding operations on  
8 their "U" lease?

9 A I don't think so. We have no plans for it at this  
10 time and we do not anticipate this to be a waterflood.

11 Q Is this Armour Well to the east of your No. 1 Well  
12 producing?

13 A Yes.

14 Q Does it make water, do you know?

15 A It makes a little water.

16 Q What do they do with that water?

17 A They are trucking it at the present time like we are

18 Q You are trucking at the present time?

19 A Yes. It is costing us about a thousand dollars a  
20 month to truck this water. We would look favorably to picking  
21 up Armour's water, although we have no contract or agreement  
22 with them at this time.

23 Q What has been the water-producing history of your  
24 "U" lease, has it just suddenly started making a hundred and  
25 fifty or has it slowly come up?

1 A. No, it's shown on this graph and the water-oil ratio  
2 has probably come up with the completion of the three and  
3 four wells, but it has always made water.

4 Q. That is what the kick here at the end of 1972, oil  
5 production and water production then represents the completion  
6 of two new wells?

7 A. Yes, that is correct. Actually about November of  
8 '72 it was our State "U" 3 and then later on in '73 it was  
9 our state "U" 4 and it's a marginal well.

10 Q. So, water production per well has been rather  
11 uniform throughout the life of the wells?

12 A. That's correct. I think three and four make more  
13 water than the other two but earlier in the life it was  
14 making approximately eighty barrels for a thousand barrels a  
15 month oil production. I'm sorry, it was making about eight  
16 hundred per thousand, now it is making about four thousand for  
17 two thousand, fifteen hundred, so the water-oil ratio has  
18 come up overall but it hasn't been that --

19 Q. What I'm trying to get at is whether there is much  
20 possibility that this estimated disposal volume of one hundred  
21 and twenty-five to one hundred and fifty barrels per day will  
22 greatly increase?

23 A. I don't feel like it will greatly increase. The data  
24 does not indicate to me that we are going to have appreciably  
25 more than this volume of water to dispose of over the life.

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1 Q And you feel that a surface pressure equivalent to  
2 five-tenths of a pound per foot of depth to the injection zone  
3 is going to be adequate to get all of that water put away?

4 A It is my opinion that it will be adequate.

5 Q Now, on your schematic I notice that you mention  
6 that you will be using plastic-coated tubing, what about the  
7 annulus between the tubing and the casing?

8 A Well, it has been our practice to fill it with an  
9 inhibited salt water.

10 Q With a corrosion inhibited fluid?

11 A Yes.

12 Q And you would leave it open at the surface so that  
13 if it develops any pressure in there you would see the  
14 manifestation of that pressure at the surface?

15 A That is correct. We prefer to do it this way.

16 MR. NUTTER: Are there further questions of  
17 Mr. Kernaghan?

18 MR. KELLAHIN: No, sir.

19 MR. NUTTER: He may be excused.

20 (THEREUPON, the witness was excused.)

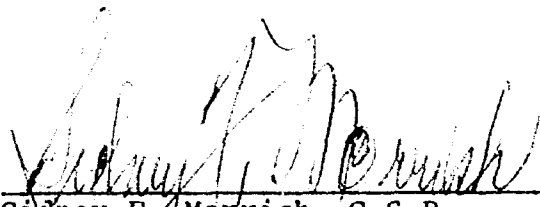
21 MR. NUTTER: Does anyone have anything they wish  
22 to offer in Case 5668? We will take the case under advisement.  
23  
24  
25

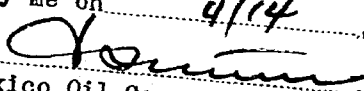
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REPORTER'S CERTIFICATE

I, SIDNEY F. MORRISH, a Certified Shorthand Reporter,  
do hereby certify that the foregoing and attached Transcript  
of Hearing before the New Mexico Oil Conservation Commission  
was reported by me, and the same is a true and correct record  
of the said proceedings to the best of my knowledge, skill and  
ability.

  
Sidney F. Morrish, C.S.R.

I do hereby certify that the foregoing is  
a complete record of the proceedings in  
the Examiner hearing of Case No. 468  
heard by me on 4/14, 1976.  
  
Examiner  
New Mexico Oil Conservation Commission

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Conservation Commission:

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23 Q And are you familiar with the facts surrounding  
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7 well that we are requesting permission to convert to salt  
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9 red and the offsetting wells and their producing field are  
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CROSS EXAMINATION

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BY MR. NUTTER:

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24 disposing of is down here at forty-eight, fifty approximately?

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sid morrish reporting service  
General Court Reporting Service  
825 Calle Mejia, No. 122, Santa Fe, New Mexico 87501  
Phone (505) 982-9212



sid morrish reporting service  
General Court Reporting Service  
825 Calle Mejia, No. 122, Santa Fe, New Mexico 87501  
Phone (505) 982-9212

1 Q Now, is that the zone that is producing for your  
2 well to the south?

3 A Yes.

4 Q This Penrose section?

5 A Yes.

6 Q Do you have any plans or do you think there is any  
7 likelihood that Anadarko will conduct flooding operations on  
8 their "U" lease?

9 A I don't think so. We have no plans for it at this  
10 time and we do not anticipate this to be a waterflood.

11 Q Is this Armour Well to the east of your No. 1 Well  
12 producing?

13 A Yes.

14 Q Does it make water, do you know?

15 A It makes a little water.

16 Q What do they do with that water?

17 A They are trucking it at the present time like we are.

18 Q You are trucking at the present time?

19 A Yes. It is costing us about a thousand dollars a  
20 month to truck this water. We would look favorably to picking  
21 up Armour's water, although we have no contract or agreement  
22 with them at this time.

23 Q What has been the water-producing history of your  
24 "U" lease, has it just suddenly started making a hundred and  
25 fifty or has it slowly come up?

sid morrish reporting service  
General Court Reporting Service  
825 Calle Mejia, No. 122, Santa Fe, New Mexico 87501  
Phone (505) 982-9212

1 A No, it's shown on this graph and the water-oil ratio  
2 has probably come up with the completion of the three and  
3 four wells, but it has always made water.

4 Q That is what the kick here at the end of 1972, oil  
5 production and water production then represents the completion  
6 of two new wells?

7 A Yes, that is correct. Actually about November of  
8 '72 it was our State "U" 3 and then later on in '73 it was  
9 our state "U" 4 and it's a marginal well.

10 Q So, water production per well has been rather  
11 uniform throughout the life of the wells?

12 A That's correct. I think three and four make more  
13 water than the other two but earlier in the life it was  
14 making approximately eighty barrels for a thousand barrels a  
15 month oil production. I'm sorry, it was making about eight  
16 hundred per thousand, now it is making about four thousand for  
17 two thousand, fifteen hundred, so the water-oil ratio has  
18 come up overall but it hasn't been that --

19 Q What I'm trying to get at is whether there is much  
20 possibility that this estimated disposal volume of one hundred  
21 and twenty-five to one hundred and fifty barrels per day will  
22 greatly increase?

23 A I don't feel like it will greatly increase. The data  
24 does not indicate to me that we are going to have appreciably  
25 more than this volume of water to dispose of over the life.

**sid morrison reporting service**

General Court Reporting Service  
825 Calle Mejia, No. 122, Santa Fe, New Mexico 87501  
Phone (505) 982-9212

1 Q And you feel that a surface pressure equivalent to  
2 five-tenths of a pound per foot of depth to the injection zone  
3 is going to be adequate to get all of that water put away?

4 A It is my opinion that it will be adequate.

5 Q Now, on your schematic I notice that you mention  
6 that you will be using plastic-coated tubing, what about the  
7 annulus between the tubing and the casing?

8 A Well, it has been our practice to fill it with an  
9 inhibited salt water.

10 Q With a corrosion inhibited fluid?

11 A Yes.

12 Q And you would leave it open at the surface so that  
13 if it develops any pressure in there you would see the  
14 manifestation of that pressure at the surface?

15 A That is correct. We prefer to do it this way.

16 MR. NUTTER: Are there further questions of  
17 Mr. Kernaghan?

18 MR. KELLAHIN: No, sir.


19 MR. NUTTER: He may be excused.

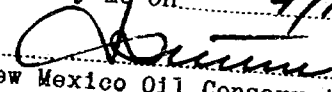
20 (THEREUPON, the witness was excused.)

21 MR. NUTTER: Does anyone have anything they wish  
22 to offer in Case 5668? We will take the case under advisement.  
23  
24  
25

REPORTER'S CERTIFICATE

I, SIDNEY F. MORRISH, a Certified Shorthand Reporter,  
do hereby certify that the foregoing and attached Transcript  
of Hearing before the New Mexico Oil Conservation Commission  
was reported by me, and the same is a true and correct record  
of the said proceedings to the best of my knowledge, skill and  
ability.

  
Sidney F. Morrish, C.S.R.

I do hereby certify that the foregoing is  
a complete record of the proceedings in  
the Examiner hearing of Case No. 568  
heard by me on 4/14, 1976  
, Examiner  
New Mexico Oil Conservation Commission

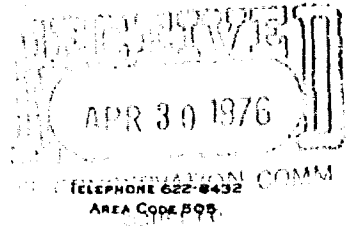
**sid morrish reporting service**  
General Court Reporting Service  
825 Calle Mejia, No. 122, Santa Fe, New Mexico 87501  
Phone (505) 982-9212

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JAMES T. JENNINGS  
SIM B. CHRISTY IV  
BRIAN W. COPPLE

ROBERT G. ARMSTRONG

LAW OFFICES OF  
JENNINGS, CHRISTY & COPPLE  
1012 SECURITY NATIONAL BANK BUILDING  
P. O. BOX 1180  
ROSWELL, NEW MEXICO 88201



April 29, 1976

Oil Conservation Commission  
P. O. Box 2088  
Santa Fe, New Mexico 87501

RE: 5668

Gentlemen:

Please forward to me a copy of the Order if and when issued in Case No. 5668 which was on the April 14, 1976 Examiner Docket.

Yours very truly,

*R-5211*  
  
JAMES T. JENNINGS

JTJ/mb

*mailed 4/30/76*



# OIL CONSERVATION COMMISSION

STATE OF NEW MEXICO

P. O. BOX 2088 - SANTA FE

87501

DIRECTOR  
JOE D. RAMEY

LAND COMMISSIONER

PHIL R. LUCERO  
April 28, 1976



STATE GEOLOGIST  
EMERY C. ARNOLD

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

Re: CASE NO. 5668  
ORDER NO. R-5211

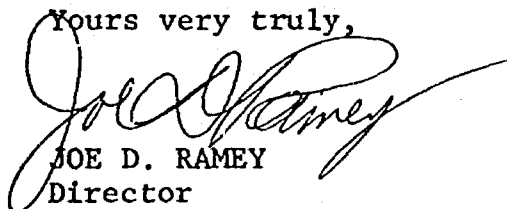
Applicant:

Anadarko Production Company

Dear Sir:

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

Yours very truly,

  
JOE D. RAMEY  
Director

JDR/fd

Copy of order also sent to:

Hobbs OCC X  
Artesia OCC \_\_\_\_\_  
Aztec OCC \_\_\_\_\_

Other \_\_\_\_\_  
\_\_\_\_\_

BEFORE THE OIL CONSERVATION COMMISSION  
OF THE STATE OF NEW MEXICO

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

CASE NO. 5668  
Order No. R-5211

APPLICATION OF ANADARKO PRODUCTION  
COMPANY FOR SALT WATER DISPOSAL,  
LEA COUNTY, NEW MEXICO.

ORDER OF THE COMMISSION

BY THE COMMISSION:

This cause came on for hearing at 9 a.m. on April 14, 1976, at Santa Fe, New Mexico, before Examiner, Daniel S. Nutter.

NOW, on this 27th day of April, 1976, 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, is the owner and operator of the New Mexico "W" State Well No. 1, located in Unit O of Section 21, Township 18 South, Range 34 East, NMPM, East E-K Queen Pool, Lea County, New Mexico.

(3) That the applicant proposes to utilize said well to dispose of produced salt water into the Queen formation, with injection into the perforated interval from approximately 4852 feet to 4862 feet.

(4) That the injection should be accomplished through 2 3/8-inch plastic lined tubing installed in a packer set at approximately 4700 feet; that the casing-tubing annulus should be filled with an inert fluid; and that a pressure gauge or approved leak detection device should be attached to the annulus or the annulus left open in order to determine leakage in the casing, tubing, or packer.

(5) That the injection well or system should be equipped with a pop-off valve or acceptable substitute which will limit the wellhead pressure on the injection well to no more than 970 psi.

-2-

Case No. 5668  
Order No. R-5211

(6) That the operator should notify the supervisor of the Hobbs district office of the Commission of the date and time of the installation of disposal equipment so that the same may be inspected.

(7) That the operator should take all steps necessary to ensure that the injected water enters only the proposed injection interval and is not permitted to escape to other formations or onto the surface.

(8) That approval of the subject application will prevent the drilling of unnecessary wells and otherwise prevent waste and protect correlative rights.

IT IS THEREFORE ORDERED:

(1) That the applicant, Anadarko Production Company, is hereby authorized to utilize its New Mexico "W" State Well No. 1 located in Unit O of Section 21, Township 18 South, Range 34 East, NMPM, East E-K Queen Pool, Lea County, New Mexico, to dispose of produced salt water into the Queen formation, injection to be accomplished through 2 3/8-inch tubing installed in a packer set at approximately 4700 feet, with injection into the perforated interval from approximately 4852 feet to 4862 feet;

PROVIDED HOWEVER, that the tubing shall be plastic-lined; that the casing-tubing annulus shall be filled with an inert fluid; and that a pressure gauge shall be attached to the annulus or the annulus shall be equipped with an approved leak detection device or the annulus left open in order to determine leakage in the casing, tubing, or packer.

(2) That the injection well or system shall be equipped with a pop-off valve or acceptable substitute which will limit the wellhead pressure on the injection well to no more than 970 psi.

(3) That the operator shall notify the supervisor of the Hobbs district office of the Commission of the date and time of the installation of disposal equipment so that the same may be inspected.

(4) That the operator shall immediately notify the supervisor of the Commission's Hobbs district office of the failure of the tubing, casing, or packer, in said well or the leakage of water from or around said well and shall take such steps as may be timely and necessary to correct such failure or leakage.

(5) That the applicant shall submit monthly reports of its disposal operations in accordance with Rules 704 and 1120 of the Commission Rules and Regulations.



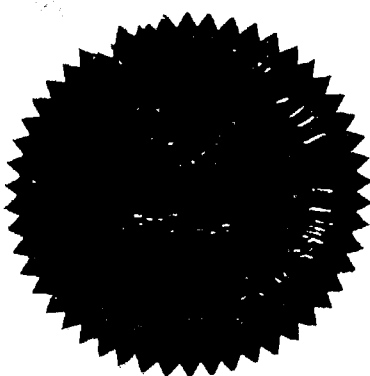
-3-

Case No. 5668  
Order No. R-5211

(6) 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



*Phil R. Lucero*  
PHIL R. LUCERO, Chairman

EMERY C. ARNOLD, Member

*Joe D. Ramey*  
JOE D. RAMEY, Member & Secretary

S E A L

dr/

CASE 5652: (Continued & Readvertised)

Application of Continental Oil Company for downhole commingling, Rio Arriba County, New Mexico. Applicant, in the above-styled cause, seeks authority to commingle Basin-Dakota gas and Otero-Gallup oil production in the wellbores of the following wells on its Northeast Haynes Lease in Township 24 North, Range 5 West, Rio Arriba County, New Mexico:

- No. 1 in Unit L of Section 9
- No. 2 in Unit D of Section 16
- No. 3 in Unit P of Section 16
- No. 4 in Unit E of Section 21
- No. 5 in Unit E of Section 22
- No. 6 in Unit D of Section 15
- No. 7 in Unit L of Section 10
- No. 8 in Unit P of Section 15

CASE 5668: Application of Anadarko Production Company for salt water disposal, Lea County, New Mexico. Applicant, in the above-styled cause, seeks authority to dispose of produced water into the Queen formation through the perforated interval from approximately 4553 to 4881 feet in its New Mexico "W" State Well No. 1, located in Unit O of Section 21, Township 18 South, Range 34 East, East E-K Queen Pool, Lea County, New Mexico.

CASE 5669: Southeastern New Mexico nomenclature case calling for an order for the creation and extension of certain pools in Chaves, Eddy, Lea, and Roosevelt Counties, New Mexico.

a) CREATE a new pool in Lea County, New Mexico, classified as an oil pool for Queen production and designated as the Eidson-Queen Pool. The discovery well is the Hanson Oil Corporation Caldonia Well No. 1, located in Unit N of Section 11, Township 16 South, Range 34 East, NMPM. Said pool would comprise:

TOWNSHIP 16 SOUTH, RANGE 34 EAST, NMPM  
Section 11: S/2  
Section 12: SW/4

b) CREATE a new pool in Eddy County, New Mexico, classified as a gas pool for Atoke production and designated as the McKittrick Hills-Atoke Gas Pool. The discovery well is the Southern Union Production Company Shelby Federal Well No. 1, located in Unit H of Section 13, Township 22 South, Range 24 East, NMPM. Said pool would comprise:

TOWNSHIP 22 SOUTH, RANGE 24 EAST, NMPM  
Section 13: N/2

c) CREATE a new pool in Eddy County, New Mexico, classified as a gas pool for Strawn production and designated as the McKittrick Hills-Strawn Gas Pool. The discovery well is the Southern Union Production Company Shelby Federal Well No. 1, located in Unit H of Section 13, Township 22 South, Range 24 East, NMPM. Said pool would comprise:

TOWNSHIP 22 SOUTH, RANGE 24 EAST, NMPM  
Section 13: N/2

d) CREATE a new pool in Eddy County, New Mexico, classified as a gas pool for Upper Pennsylvanian production and designated as the McKittrick Hills-Upper Pennsylvanian Gas Pool. The discovery well is the Southern Union Production Company Shelby Federal Well No. 2, located in Unit K of Section 12, Township 22 South, Range 24 East, NMPM. Said pool would comprise:

TOWNSHIP 22 SOUTH, RANGE 24 EAST, NMPM  
Section 12: S/2

e) CREATE a new pool in Chaves County, New Mexico, classified as a gas pool for Strawn production and designated as the South Newmill-Strawn Gas Pool. The discovery well is the Marathon Oil Company State 27 Well No. 1, located in Unit M of Section 27, Township 4 South, Range 27 East, NMPM. Said pool would comprise:

TOWNSHIP 4 SOUTH, RANGE 27 EAST, NMPM  
Section 27: W/2

f) CREATE a new pool in Roosevelt County, New Mexico, classified as an oil pool for Wolfcamp production and designated as the South Prairie-Wolfcamp Pool. The discovery well is the SNB Operating Company New Mexico Federal Well No. 1, located in Unit I of Section 20, Township 8 South, Range 36 East, NMPM. Said pool would comprise:

TOWNSHIP 8 SOUTH, RANGE 36 EAST, NMPM  
Section 20: SE/4

BEFORE THE  
OIL CONSERVATION COMMISSION OF NEW MEXICO

IN THE MATTER OF THE APPLICATION  
OF ANADARKO PRODUCTION COMPANY  
FOR SALT WATER DISPOSAL, LEA  
COUNTY, NEW MEXICO

A P P L I C A T I O N

COMES now Anadarko Production Company, by and through its attorneys, Kellahin & Fox, and hereby requests approval to inject produced water into the Queen formation through its New Mexico "W" State No. 1 Well located 660 feet from the South line and 1980 feet from the East line of Section 21, Township 18 South, Range 34 East, N.M.P.M., Lea County, New Mexico, and in support thereof would show:

1. Applicant is the operator of the New Mexico "W" State No. 1 Well.
2. Attached hereto is a copy of the subject area showing the proposed disposal well and the sources of the produced water which will be disposed of in the disposal well.
3. Applicant proposes to dispose of said water into the Queen formation through the perforated interval from approximately 4553 to 4881 feet.
4. Applicant seeks administrative provisions to make additional perforations between 4553 to 4881 feet in subject well.
5. Granting of this application will be in the best interest of conservation, prevention of waste and protection of correlative rights.

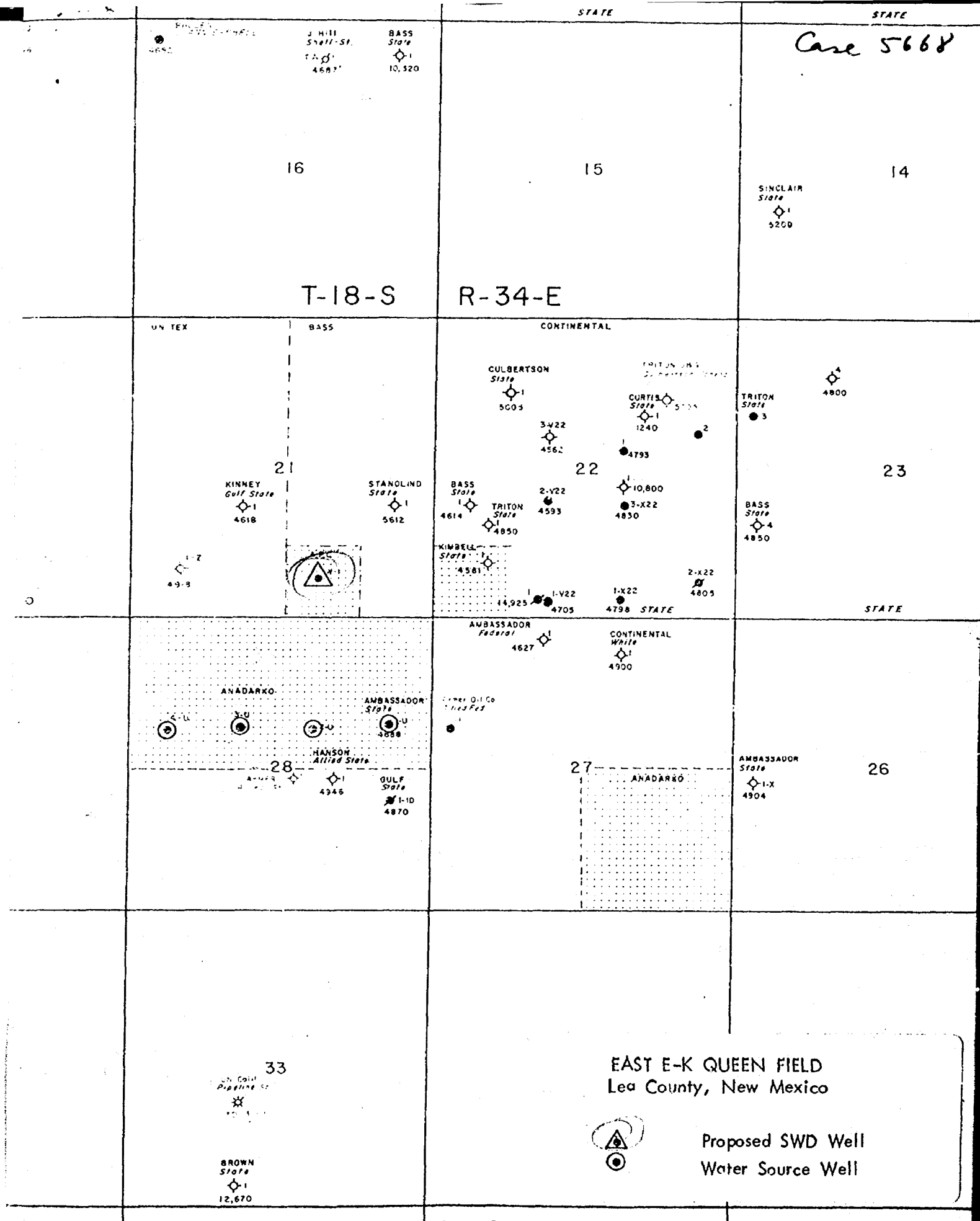
WHEREFORE, Applicant respectfully requests that this matter be set for hearing and upon hearing an order be entered authorizing the requested disposal of water as described above.

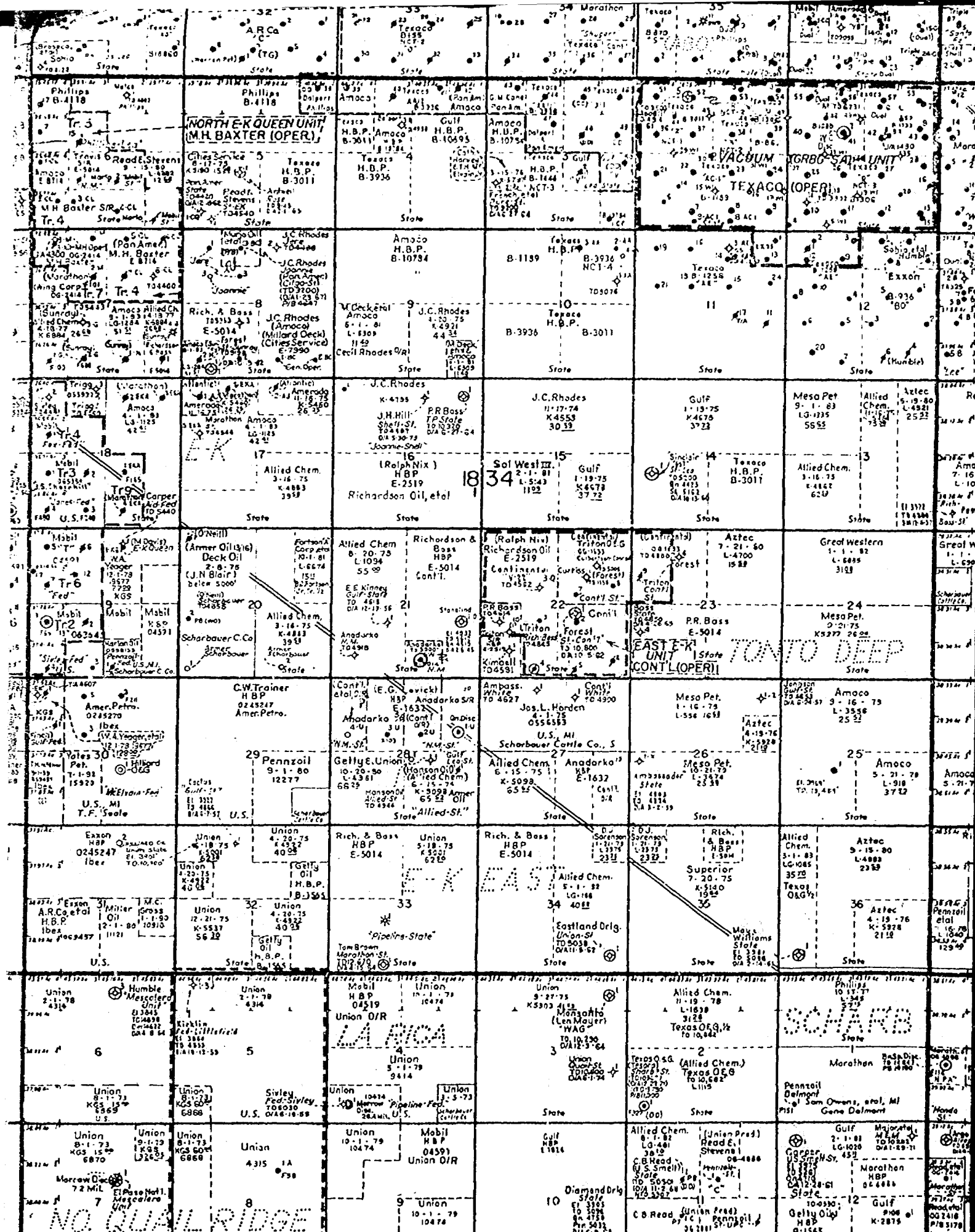
Respectfully submitted,

ANADARKO PRODUCTION COMPANY

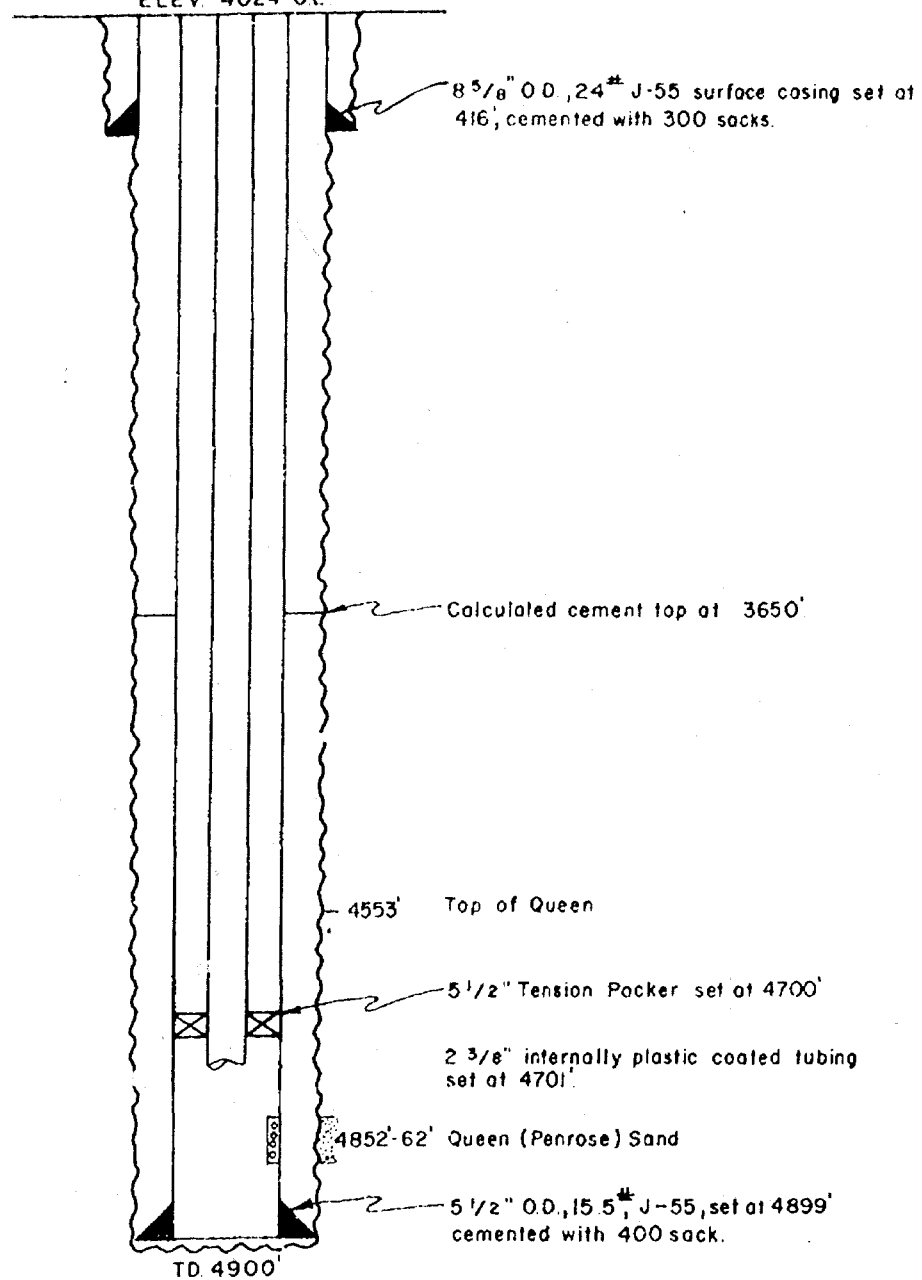
By *Robert Kellahin*  
Kellahin & Fox  
P. O. Box 1769  
Santa Fe, New Mexico 87501

ATTORNEYS FOR APPLICANT





NEW MEXICO "W" STATE, WELL NO. 1  
 660' FSL & 1980' FEL SECTION 21 T18S-R34E  
 ELEV. 4024' G.L.



BEFORE EXAMINER NUTTER

OIL CONSERVATION COMMISSION

*Anadarko* EXHIBIT NO. 3

CASE NO. 5668

ANADARKO PRODUCTION COMPANY

E.K. QUEEN EAST FIELD

EDDY COUNTY, NEW MEXICO

DIAGRAMMATIC SKETCH

FIELD: E. K. Queen, East

RESERVOIR: \_\_\_\_\_

STATE: New Mexico

LEASE/UNIT: New Mexico State "U"

PERFS: \_\_\_\_\_

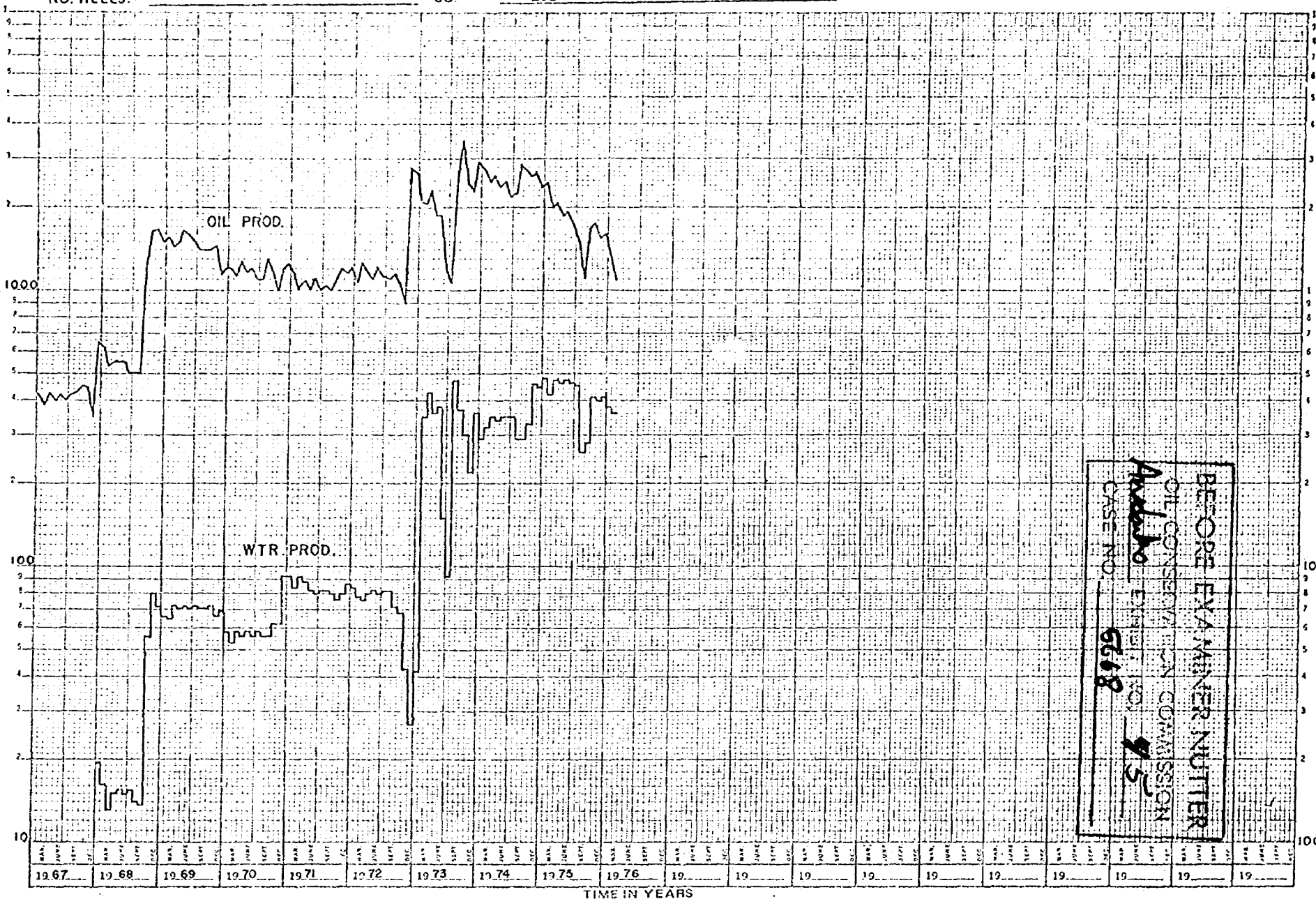
OPERATOR: Anadarko Production Co

NO. WELLS: \_\_\_\_\_

CO. Lea

LOCATION: 28--18--34

BBLs. / MO.



BBLs. / MO.

ACCT. CODE NO. \_\_\_\_\_

LEASE NAME \_\_\_\_\_

WELL NO. \_\_\_\_\_



# WATER ANALYSIS REPORT

COMPANY Anadarko Production Co. ADDRESS Loco Hills, N.M. DATE 4-6-76  
SOURCE State "U" #3 DATE SAMPLED 4-5-76 ANALYSIS NO. 11147  
Analysis Mg/L \*Meq/L

1. PH 5.5
2. H<sub>2</sub>S (Qualitative) 5.0 ppm
3. Specific Gravity 1.200
4. Dissolved Solids
5. Suspended Solids
6. Phenolphthalein Alkalinity (CaCO<sub>3</sub>)
7. Methyl Orange Alkalinity (CaCO<sub>3</sub>)
8. Bicarbonate (HCO<sub>3</sub>)
9. Chlorides (Cl)
10. Sulfates (SO<sub>4</sub>)
11. Calcium (Ca)
12. Magnesium (Mg)
13. Total Hardness (CaCO<sub>3</sub>)
14. Total Iron (Fe)
15. Barium (Qualitative)
- 16.

BEFORE EXAMINER NUTTER

OIL CONSERVATION COMMISSION

257,904 EXHIBIT NO. 56

CASE NO. 5668

	120		
HCO <sub>3</sub>	146	÷ 61	2.4 HCO <sub>3</sub>
Cl	177,055	÷ 35.5	4,988 Cl
SO <sub>4</sub>	Trace	÷ 48	SO <sub>4</sub>
Ca	12,400	÷ 20	620 Ca
Mg	7,314	÷ 12.2	600 Mg
	61,100		
	9.0 ppm		
	Pos.		

\*Milli equivalents per liter

## PROBABLE MINERAL COMPOSITION

620	Ca	←	HCO <sub>3</sub>	2.4
600	Mg	←	SO <sub>4</sub>	Trace
3,770	Na	←	Cl	4,988

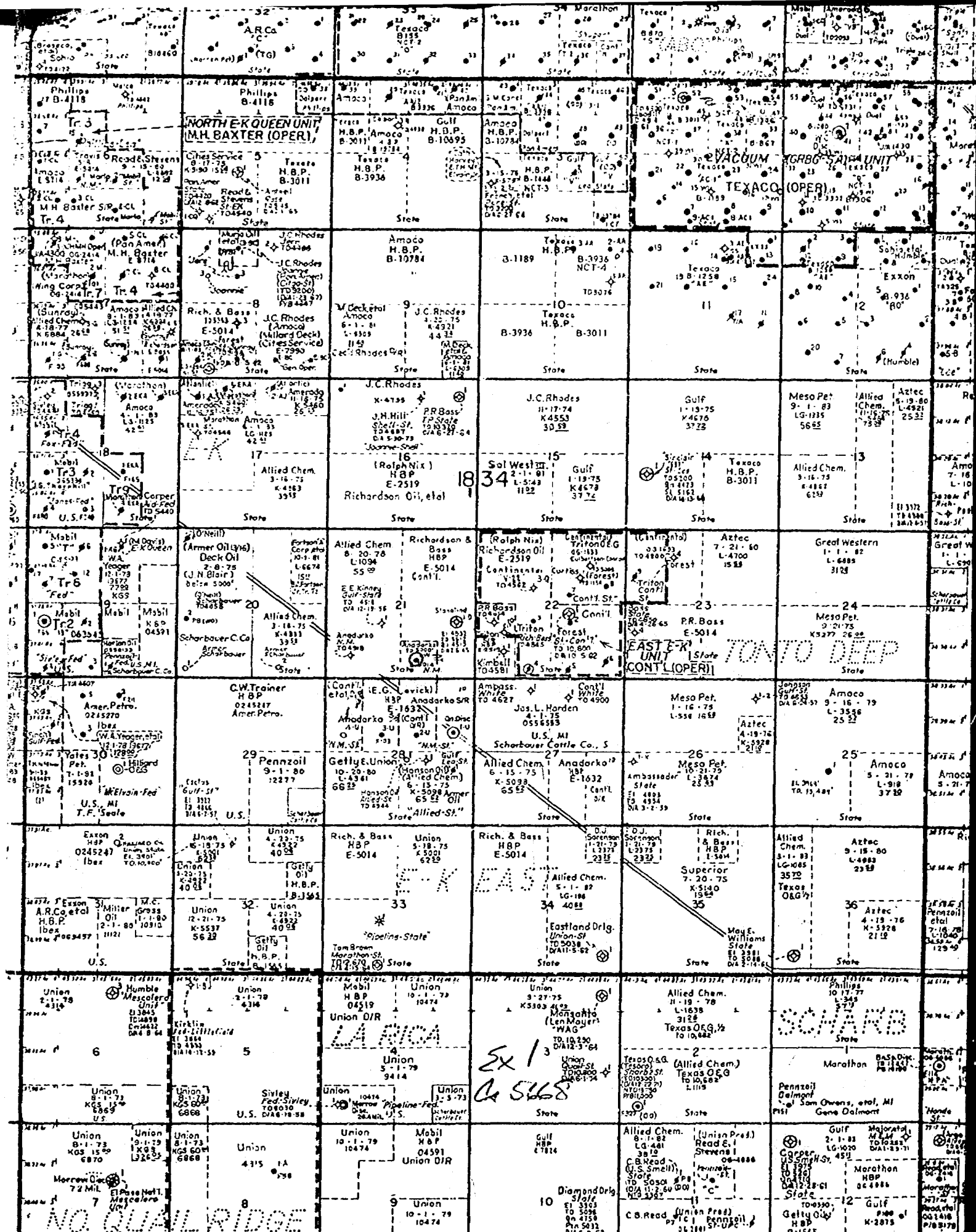
Saturation Values	Distilled Water 20°C
Ca CO <sub>3</sub>	13 Mg/L
Ca SO <sub>4</sub> • 2H <sub>2</sub> O	2,090 Mg/L
Mg CO <sub>3</sub>	103 Mg/L

Compound	Equiv. Wt.	X	Meq/L	=	Mg/L
Ca (HCO <sub>3</sub> ) <sub>2</sub>	81.04		2.4		194
Ca SO <sub>4</sub>	68.07				
Ca Cl <sub>2</sub>	55.50		618		34,300
Mg (HCO <sub>3</sub> ) <sub>2</sub>	73.17				
Mg SO <sub>4</sub>	60.19				
Mg Cl <sub>2</sub>	47.62		600		2,860
Na HCO <sub>3</sub>	84.00				
Na <sub>2</sub> SO <sub>4</sub>	71.03				
Na Cl	58.46		3,770		220,550

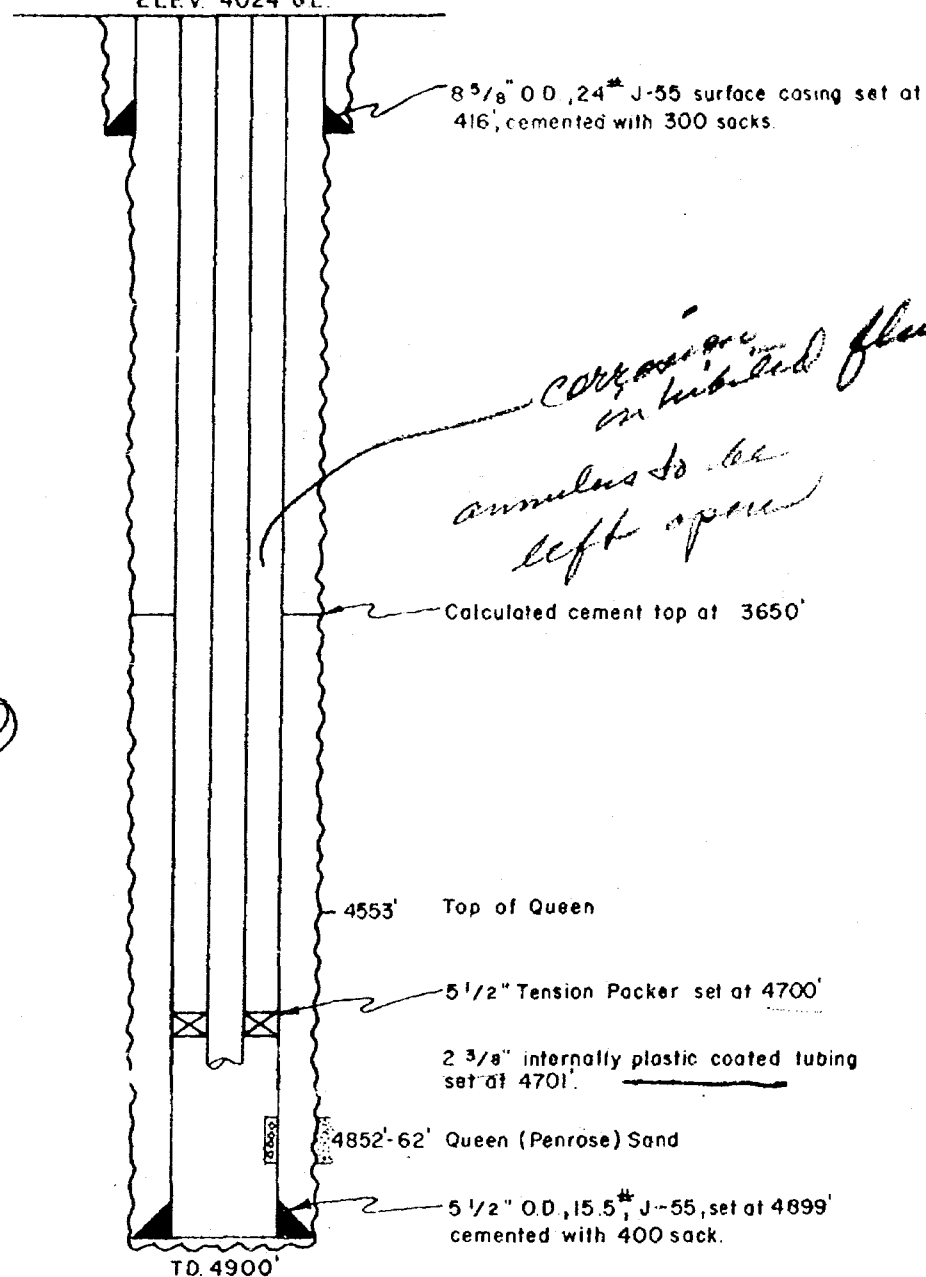
REMARKS (1) Mr. Kernagan (1) Mr. Buckles  
CC: (1) Saltzman (1) Worsham (1) Nix (1) file

Respectfully submitted  
TRETOLITE COMPANY

Ray Shaffner



NEW MEXICO "W" STATE, WELL NO. 1  
660' FSL & 1980' FEL SECTION 21 T18S-R34E  
ELEV. 4024' GL.



Disposal  
volume  
not to be  
125-150 bbls/day.  
should take this  
less than 5 lb/ft

inj pres + .5d  $\leq$  .7d  
inj pres  $\leq$  .7d - .5d  
 $\leq$  d (.7 - .5)  
 $\leq$  d (.2)  
.2(4852)  $\leq$  970 lb.  
Σ x 3  
3 5668

ANADARKO PRODUCTION COMPANY

E.K. QUEEN EAST FIELD  
EDDY COUNTY, NEW MEXICO

DIAGRAMMATIC SKETCH

FIELD: E. K. Queen, East

RESERVOIR: \_\_\_\_\_

STATE: New Mexico

LEASE/UNIT: New Mexico State "U"

PERFS: \_\_\_\_\_

OPERATOR: Anadarko Production Co

NO. WELLS: \_\_\_\_\_

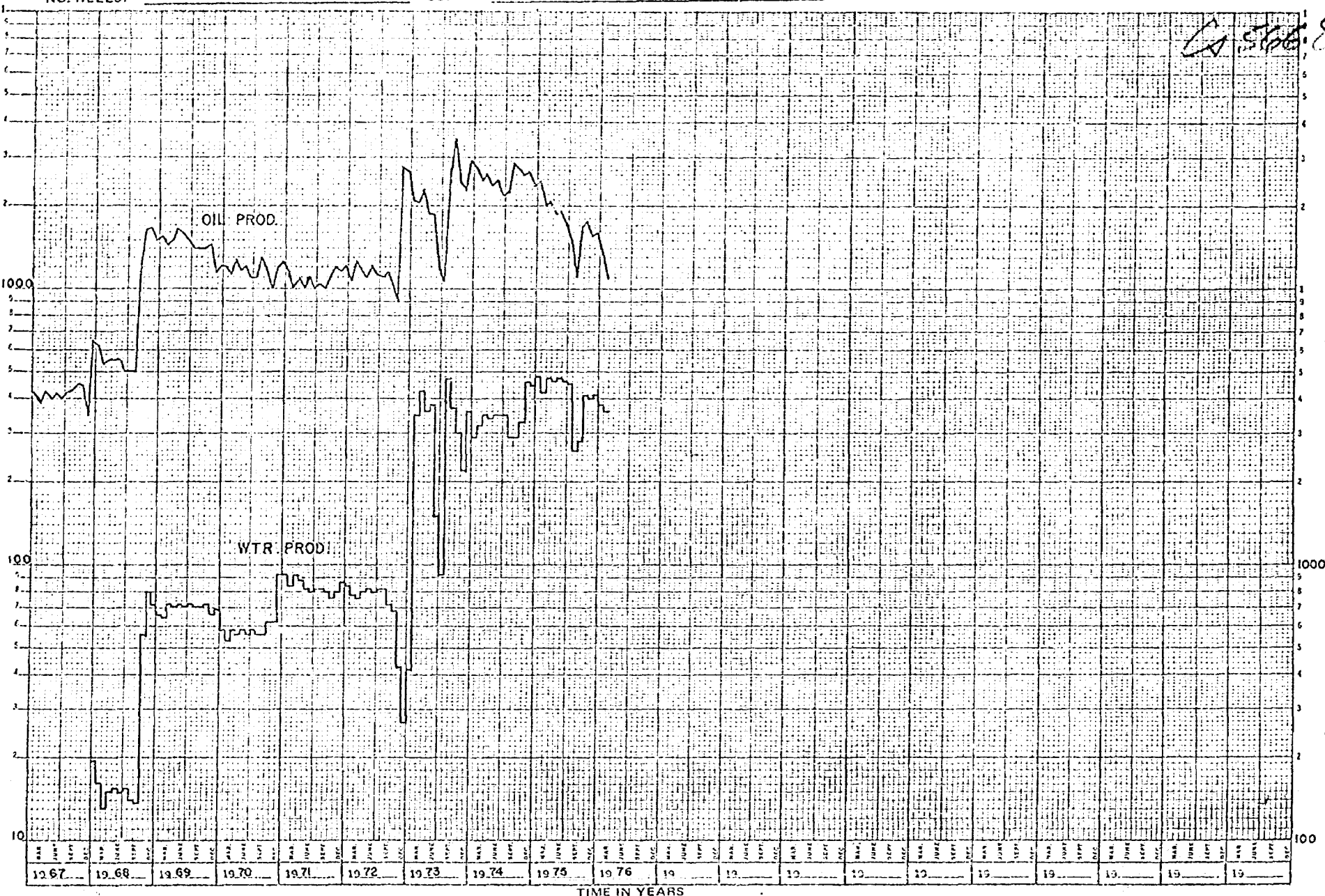
CO. Leo

LOCATION: 28-18-34

5

CA 500.8

BBL. / MO.



BBL. / MO.

ACCT. CODE NO. \_\_\_\_\_

LEASE NAME \_\_\_\_\_

WELL NO. \_\_\_\_\_



## TRETOLITE DIVISION

369 Marshall Avenue / Saint Louis, Missouri 63119  
(314) WO 1-3500/TWX 910-760-1660/Telex 44-2417

## WATER ANALYSIS REPORT

COMPANY Anadarko Production Co. ADDRESS LocoHills, N.M. DATE: 4-6-76  
SOURCE State "U" #3 DATE SAMPLED 4-5-76 ANALYSIS NO. 11147  
Analysis Mg/L \*Meq/L

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2. H <sub>2</sub> S (Qualitative)	5.0 ppm			
3. Specific Gravity	1.200			
4. Dissolved Solids		257,904		
5. Suspended Solids				
6. Phenolphthalein Alkalinity (CaCO <sub>3</sub> )				
7. Methyl Orange Alkalinity (CaCO <sub>3</sub> )		120		
8. Bicarbonate (HCO <sub>3</sub> )		146	÷ 61	2.4 HCO <sub>3</sub>
9. Chlorides (Cl)		177,055	÷ 35.5	4,988 Cl
10. Sulfates (SO <sub>4</sub> )		Trace	÷ 48	SO <sub>4</sub>
11. Calcium (Ca)		12,400	÷ 20	620 Ca
12. Magnesium (Mg)		7,314	÷ 12.2	600 Mg
13. Total Hardness (CaCO <sub>3</sub> )		61,100		
14. Total Iron (Fe)		9.0 ppm		
15. Barium (Qualitative)		Pos.		

16.  
\*Milli equivalents per liter

## PROBABLE MINERAL COMPOSITION

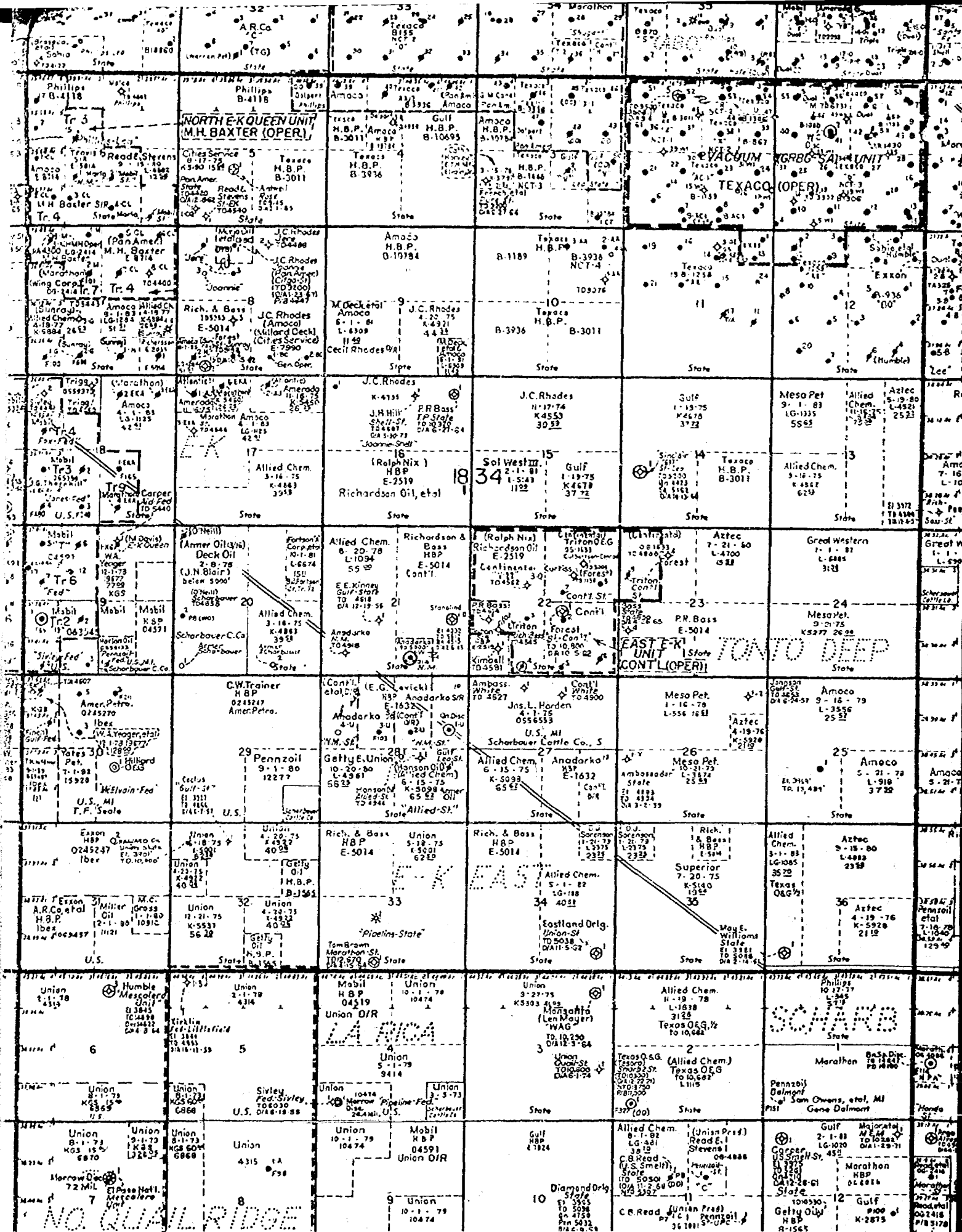
	Compound	Equiv. Wt.	X	Meq/L	=	Mg/L
620	Ca			2.4		194
600	Mg			Trace		
3,770	Na			4,988		
	Ca (HCO <sub>3</sub> ) <sub>2</sub>	81.04				
	Ca SO <sub>4</sub>	68.07				
	Ca Cl <sub>2</sub>	55.50		618		34,300
	Mg (HCO <sub>3</sub> ) <sub>2</sub>	73.17				
	Mg SO <sub>4</sub>	60.19				
	Mg Cl <sub>2</sub>	47.62		600		2,860
	Na HCO <sub>3</sub>	84.00				
	Na <sub>2</sub> SO <sub>4</sub>	71.03				
	Na Cl	58.46		3,770		220,550

Saturation Values Distilled Water 20°C  
Ca CO<sub>3</sub> 13 Mg/L  
Ca SO<sub>4</sub> • 2H<sub>2</sub>O 2,090 Mg/L  
Mg CO<sub>3</sub> 103 Mg/L

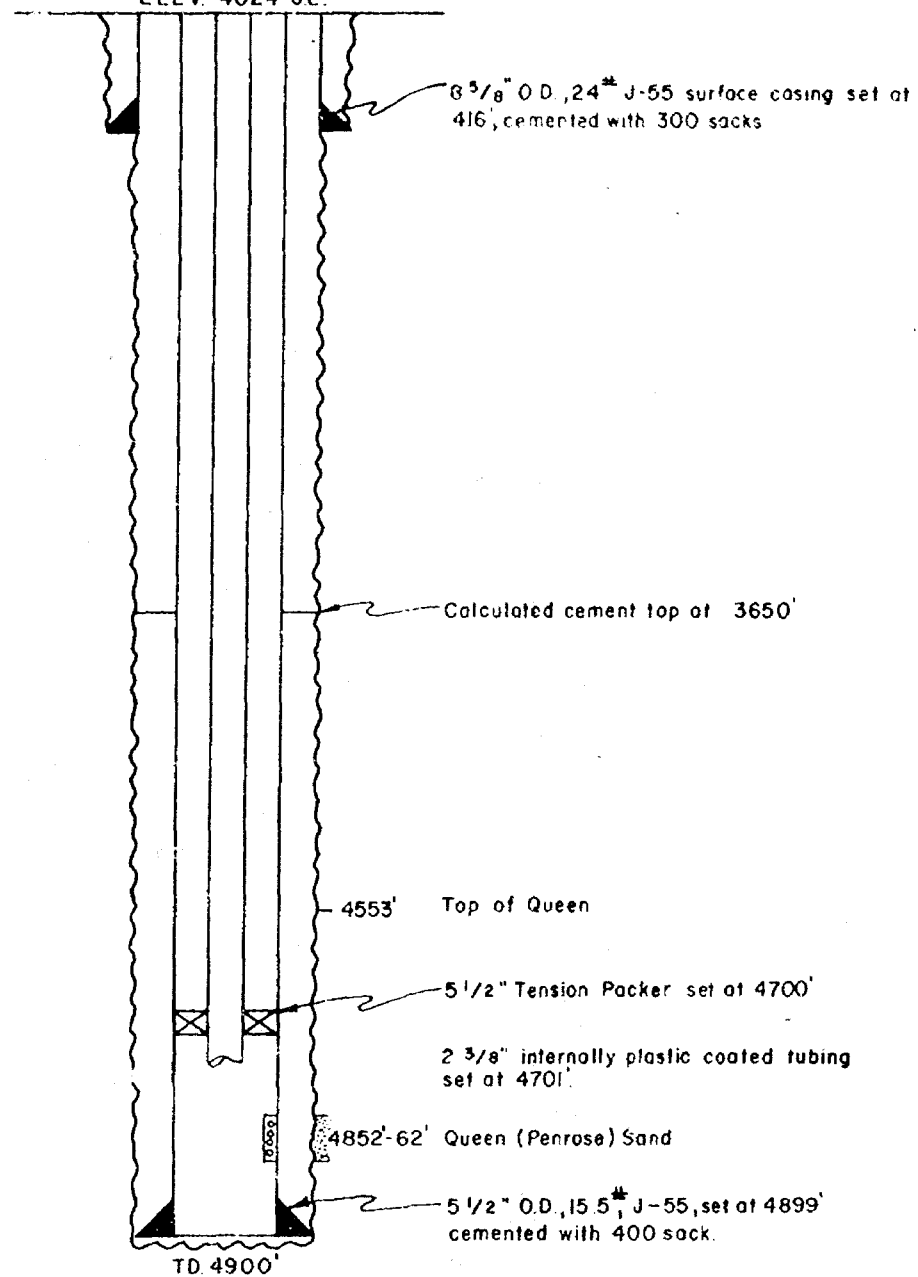
REMARKS (1) Mr. Kernagan (1) Mr. Buckles  
CC: (1) Saltzman (1) Worsham (1) Nix (1) file

Respectfully submitted  
TRETOLITE COMPANY  
Ray Shaffner

EX 6  
CV 5668



NEW MEXICO "W" STATE, WELL NO. 1  
 660' FSL & 1980' FEL SECTION 21 T18S-R34E  
 ELEV. 4024' GL.



Case 5668  
 Exhibit 3

ANADARKO PRODUCTION COMPANY
E.K. QUEEN EAST FIELD EDDY COUNTY, NEW MEXICO
DIAGRAMMATIC SKETCH

FIELD: E K Queen, East

RESERVOIR: \_\_\_\_\_

STATE: New Mexico

LEASE/UNIT: New Mexico State "U"

PERFS: \_\_\_\_\_

OPERATOR: Anadarko Production Co

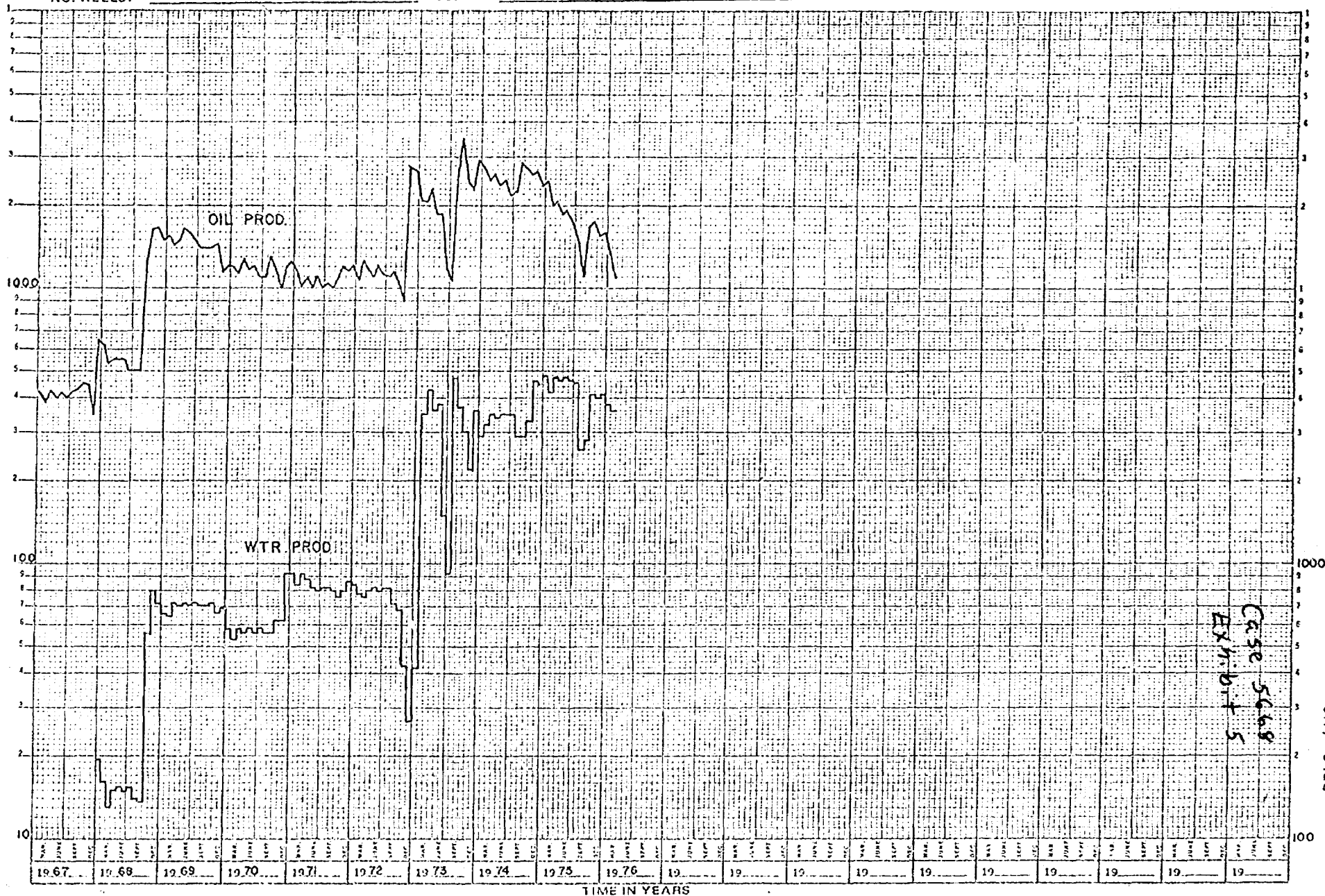
NO. WELLS: \_\_\_\_\_

CO. \_\_\_\_\_

1.00

LOCATION: 28-18-34

BBLs. / MO.



Case 5668  
Exhibit 5

BBLs. / MO.

ACCT. CODE NO \_\_\_\_\_

LEASE NAME \_\_\_\_\_

WELL NO. \_\_\_\_\_



# WATER ANALYSIS REPORT

COMPANY Anadarko Production Co. ADDRESS Loco Hills, N.M. DATE: 4-6-76  
SOURCE State "U" #3 DATE SAMPLED 4-5-76 ANALYSIS NO. 11147  
Analysis Mg/L \*Meq/L

1. PH	5.5			
2. H <sub>2</sub> S (Qualitative)	5.0 ppm			
3. Specific Gravity	1.200			
4. Dissolved Solids		257,904		
5. Suspended Solids				
6. Phenolphthalein Alkalinity (CaCO <sub>3</sub> )				
7. Methyl Orange Alkalinity (CaCO <sub>3</sub> )		120		
8. Bicarbonate (HCO <sub>3</sub> )		146	÷ 61	2.4 HCO <sub>3</sub>
9. Chlorides (Cl)		177,055	÷ 35.5	4,988 Cl
10. Sulfates (SO <sub>4</sub> )		Trace	÷ 48	SO <sub>4</sub>
11. Calcium (Ca)		12,400	÷ 20	620 Ca
12. Magnesium (Mg)		7,314	÷ 12.2	600 Mg
13. Total Hardness (CaCO <sub>3</sub> )		61,100		
14. Total Iron (Fe)		9.0 ppm		
15. Barium (Qualitative)		Pos.		
16.				

\*Milli equivalents per liter

## PROBABLE MINERAL COMPOSITION

	Compound	Equiv. Wt.	X	Meq/L	=	Mg/L
620	Ca			2.4		194
600	Mg					
3,770	Na			618		34,300
	Ca (HCO <sub>3</sub> ) <sub>2</sub>	81.04				
	Ca SO <sub>4</sub>	68.07				
	Ca Cl <sub>2</sub>	55.50				
	Mg (HCO <sub>3</sub> ) <sub>2</sub>	73.17				
	Mg SO <sub>4</sub>	60.19				
	Mg Cl <sub>2</sub>	47.62		600		2,860
	Na HCO <sub>3</sub>	84.00				
	Na <sub>2</sub> SO <sub>4</sub>	71.03				
	Na Cl	58.46		3,770		220,550

Saturation Values	Distilled Water 20°C
Ca CO <sub>3</sub>	13 Mg/L
Ca SO <sub>4</sub> • 2H <sub>2</sub> O	2,090 Mg/L
Mg CO <sub>3</sub>	103 Mg/L

REMARKS (1) Mr. Kernagan (1) Mr. Buckles  
CC: (1) Saltzman (1) Worsham (1) Nix (1) file

Respectfully submitted  
TRETOLITE COMPANY  
Ray Shaffner

KELLAHIN AND FOX  
ATTORNEYS AT LAW  
800 DON GASPAR AVENUE  
POST OFFICE BOX 1789  
SANTA FE, NEW MEXICO 87501

JASON W. KELLAHIN  
ROBERT E. FOX  
W. THOMAS KELLAHIN

TELEPHONE 982-4315  
AREA CODE 505

March 18, 1976

Mr. Bill Carr  
Oil Conservation Commission  
P. O. Box 2008  
Santa Fe, New Mexico 87501

Re: Anadarko's application for  
Salt Water Disposal, Lea County

Dear Bill:

Please file the enclosed application on behalf of  
Anadarko Production Company for hearing on April 14,  
1976.

Anadarko is requesting permission to dispose of  
salt water in its New Mexico "W" State No. 1 well  
located in Section 21, T18S, R34E, Lea County, New Mexico.

Very truly yours,

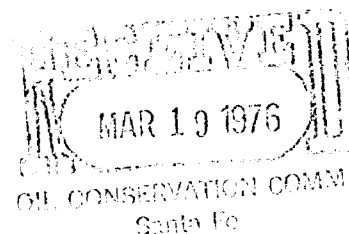


W. Thomas Kellahin

CC: Mr. Dan Kernaghan

WTK:kjf

Enclosure



BEFORE THE  
OIL CONSERVATION COMMISSION OF NEW MEXICO

IN THE MATTER OF THE APPLICATION  
OF ANADARKO PRODUCTION COMPANY  
FOR SALT WATER DISPOSAL, LEA  
COUNTY, NEW MEXICO

A P P L I C A T I O N

COMES now Anadarko Production Company, by and through its attorneys, Kellahin & Fox, and hereby requests approval to inject produced water into the Queen formation through its New Mexico "W" State No. 1 Well located 660 feet from the South line and 1980 feet from the East line of Section 21, Township 18 South, Range 34 East, N.M.P.M., Lea County, New Mexico, and in support thereof would show:

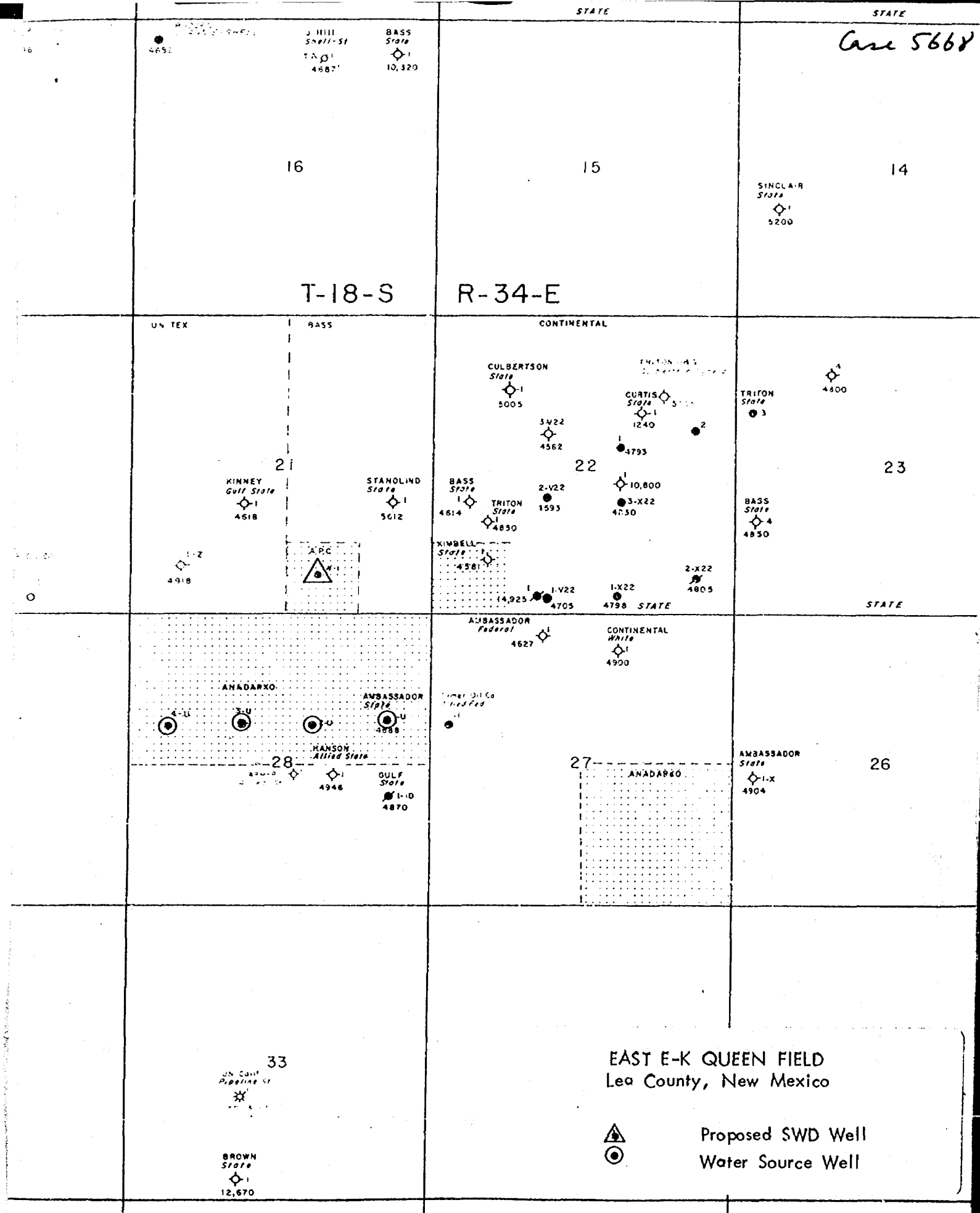
1. Applicant is the operator of the New Mexico "W" State No. 1 Well.
2. Attached hereto is a copy of the subject area showing the proposed disposal well and the sources of the produced water which will be disposed of in the disposal well.
3. Applicant proposes to dispose of said water into the Queen formation through the perforated interval from approximately 4553 to 4881 feet.
4. Applicant seeks administrative provisions to make additional perforations between 4553 to 4881 feet in subject well.
5. Granting of this application will be in the best interest of conservation, prevention of waste and protection of correlative rights.

WHEREFORE, Applicant respectfully requests that this matter be set for hearing and upon hearing an order be entered authorizing the requested disposal of water as described above.

Respectfully submitted,  
ANADARKO PRODUCTION COMPANY

By \_\_\_\_\_  
Kellahin & Fox  
P. O. Box 1769  
Santa Fe, New Mexico 87501

ATTORNEYS FOR APPLICANT



BEFORE THE  
OIL CONSERVATION COMMISSION OF NEW MEXICO

IN THE MATTER OF THE APPLICATION  
OF ANADARKO PRODUCTION COMPANY  
FOR SALT WATER DISPOSAL, LEA  
COUNTY, NEW MEXICO

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5. Granting of this application will be in the best interest of conservation, prevention of waste and protection of correlative rights.

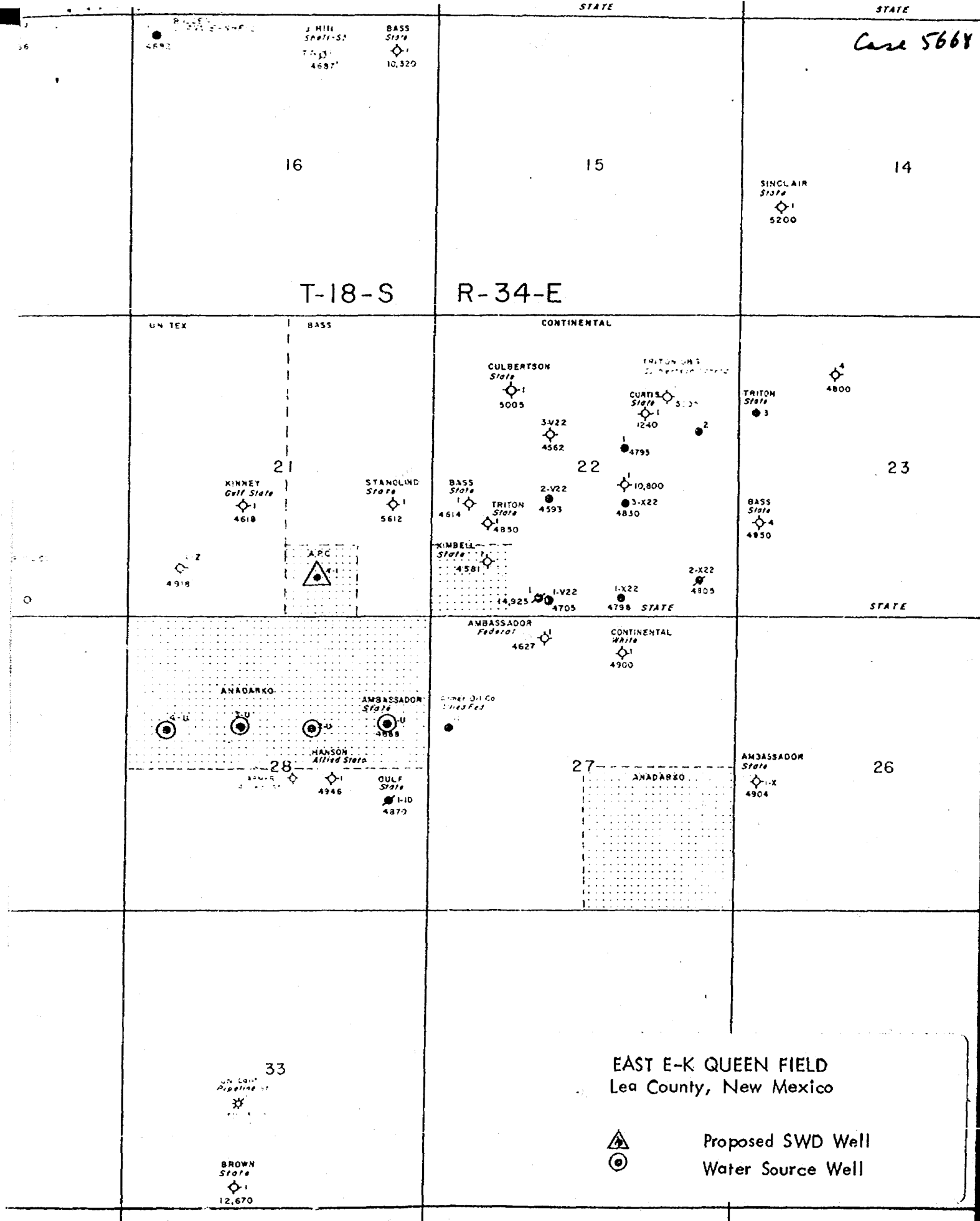
Case  
5668

WHEREFORE, Applicant respectfully requests that this matter be set for hearing and upon hearing an order be entered authorizing the requested disposal of water as described above.

Respectfully submitted,  
ANADARKO PRODUCTION COMPANY

By \_\_\_\_\_  
Kellahin & Fox  
P. O. Box 1769  
Santa Fe, New Mexico 87501

ATTORNEYS FOR APPLICANT





DRAFT

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. 5668

Order No. R- 5211

APPLICATION OF ANADARKO PRODUCTION  
COMPANY FOR SALT WATER DISPOSAL,  
LEA COUNTY, NEW MEXICO.

ORDER OF THE COMMISSION

BY THE COMMISSION:

This cause came on for hearing at 9 a.m. on April 14, 1976  
at Santa Fe, New Mexico, before Examiner, Daniel S. Nutter.

NOW, on this        day of April, 1976, 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,  
is the owner and operator of the New Mexico "W" State Well No. 1,  
located in Unit 0 of Section 21, Township 18 South,  
Range 34 East, NMPM, East E-K Queen Pool,  
Lea County, New Mexico.

(3) That the applicant proposes to utilize said well to  
dispose of produced salt water into the Queen  
formation, with injection into the perforated interval  
from approximately 4553 feet to 4881 feet.

(4) That the injection should be accomplished through 2 3/8-inch plastic lined tubing installed in a packer  
set at approximately 4700 feet; that the casing-tubing annulus  
should be filled with an inert fluid; and that a pressure gauge  
or ~~approved leak~~ OK detection device should be attached to the

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*or the annulus left open*  
annulus in order to determine leakage in the casing, tubing,  
or packer.

(4) That the injection well or system should be equipped with a pop-off valve or acceptable substitute which will limit the wellhead pressure on the injection well to no more than ~~400~~<sup>970</sup> psi.

(5) That the operator should notify the supervisor of the Hobbs district office of the Commission of the date and time of the installation of disposal equipment so that the same may be inspected.

(6) That the operator should take all steps necessary to ensure that the injected water enters only the proposed injection interval and is not permitted to escape to other formations or onto the surface.

(7) That approval of the subject application will prevent the drilling of unnecessary wells and otherwise prevent waste and protect correlative rights.

IT IS THEREFORE ORDERED:

(1) That the applicant, Anadarko Production Company, is hereby authorized to utilize its New Mexico "W" State Well No. 1 located in Unit 0 of Section 21, Township 18 South, Range 34 East, NMPM, East E-K Queen Pool, Lea County, New Mexico, to dispose of produced salt water into the Queen formation, injection to be accomplished through 2 3/8-inch tubing installed in a packer set at approximately 4700 feet, with injection into the perforated interval from approximately ~~4553~~<sup>4852</sup> feet to ~~4881~~<sup>4862</sup> feet;

PROVIDED HOWEVER, that the tubing shall be plastic-lined; that the casing-tubing annulus shall be filled with an inert fluid; and that a pressure gauge shall be attached to the annulus or the annulus shall be equipped with an approved leak detection device *or the annulus left open* in order to determine leakage in the casing, tubing, or packer.

CASE NO. \_\_\_\_\_

(2) That the injection well or system shall be equipped with a pop-off valve or acceptable substitute which will limit the wellhead pressure on the injection well to no more than <sup>970</sup>~~700~~ psi.

(3) That the operator shall notify the supervisor of the Hobbs district office of the Commission of the date and time of the installation of disposal equipment so that the same may be inspected.

(4) That the operator shall immediately notify the supervisor of the Commission's Hobbs district office of the failure of the tubing, casing, or packer, in said well or the leakage of water from or around said well and shall take such steps as may be timely and necessary to correct such failure or leakage.

(5) That the applicant shall submit monthly reports of its disposal operations in accordance with Rules 704 and 1120 of the Commission Rules and Regulations.

(6) 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.