CASE 3570: Application of STOLTZ & Co. for salt water disposal, Lea County, New Mexico

CASE NO. 3570

Application,
Transcripts,
Small Exhibits
ETC.

January 8, 1968

Re: Top of the post elevations,
Lane Salt Lake,
Lea County, New Mexico

Oil Conservation Commission
P. O. Box 1980
Hobbs, New Mexico

Attn: Mr. Joe Ramey

Gentlemen:

The following elevations are furnished for your future reference in connection with our monthly reports:

1. Top of the post in the northeast part of the lake is 4155.39 feet.
2. Top of the post in the southeast part of the lake is 4154.53 feet.
3. Top of the post in the southwest part of the lake is 4155.20 feet.

Very truly yours,

BURRO PIPELINE CORPORATION

By Jack E. Brown

DHS:wt

cc: Pete Porter
Santa Fe

File

November 7, 1967

Re: Case # 3570
Order # R3238
Lane Salt Lake
Salt Water Disposal System
North Bagley Field
Lea County, New Mexico

67 NOV 8 PM 1 [illegible]

New Mexico Oil Conservation Commission
P. O. Box 1980
Hobbs, New Mexico 88240

Attn: Mr. Joe Ramey

Dear Sir:

In compliance with captioned order and as amended by Order # R-3238A, we submit the following:

1. Elevations and formation tops for the three observation wells drilled in compliance with the above orders.

2. Water sample data dated June 21, 1967 in the three observation wells prior to the disposition of water into the Lane Salt Lake.

It is our understanding the next quarterly water analysis report from the three observation wells will be due during the reporting period on or after February 1, 1968.

Very truly yours,

BURRO PIPELINE CORPORATION

By _____

DHS:wt
Encls.

cc: Mr. Pete Porter
Santa Fe, New Mexico

TEST HOLE NO. 1
Deane Stoltz
1100' FWL & 300' FSL
Sec. 7, T10S R33E
Lea County, New Mexico
6-16-67 by Abbott Bros., Hobbs, N.M.

Elevation @ Hub-Perm. Marker 4165.9'
Elevation @ well site-ground 4164.9'
Elevation @ top 3" casing 4167.08'

Time: Commenced 11:36 AM
Completed-moved off- 3:00 PM

Sample Description

0- 2	Soil, silty
2-18	100% Gray-white soft, slightly bentonitic, calcareous, sandy clay
18-20	100% d.o. inclusions sand
20-26	100% Gray-blue calcareous, sand streated clays
26-31	100% Gray-blue argillaceous quartzitic sand
31-36	100% Gray argillaceous sand with fine gravels
36-40	80% Argillaceous sand with fine gravels; 20% tan silty clay
40-45	100% Reddish brown silty-sandy clay
TD 45	@ TD bailed 15 minutes bailed down Ave.= 6 gpm

Casing: Ran 47' of 3" csg. (3" I.D.), 9 slots 1/8"X12"=44' to 24'

SWL: Top casing 17.2'

Top Triassic (grd level) 40'

40
17.2
22.8

TEST HOLE NO. 2
Deane Stoltz
1410' FEL & 600' FSL
Sec. 7, T10S R33E
Lea County, New Mexico
6-17-67 by Abbott Bros., Hobbs, N. M.

Elevation @ Perm. Marker 4174.3'
Elevation @ well site-ground 4173.3'
Elevation @ top 3" casing 4174.9'

Time: Drilled 8' on 6-16-67 - 3:55 PM to 4:30 PM
Completed-moved off- 6-17-67 - 11:30 AM

Sample Description

0- 1	Soil
1-15	100% White sandy calcareous clay
15-20	100% White very sandy calcareous clay
20-24	d.o.
24-28	100% White fine grained, quartzitic slightly argillaceous sand
28-35	100% Tan-yellow fine grained sand
35-40	100% Reddish argillaceous sand
40-43.5	100% Reddish-brown silty clay
TD 43.5	@ TD bailed 15 minutes over 75 gpm

Bailing @ 23' bailed 6 gpm

Casing: Ran 45.20' of 3" csg., slotted 9 holes 1/8"X12" from 42' to 15'

SWL: White drilling @ 25' - 24'
6-17-67 to 3" csg. 16.2'

Top Triassic: (grd level) 40'

TEST HOLE NO. 3
Deane Stoltz
2400' FSL & 1100' FEL
Sec. 7, T10S R33E
Lea County, New Mexico
6-17-67 by Abbott Bros., Hobbs, N. M.

Elevation @ Hub. Marker (60' south)	4162.2
Elevation @ well site-ground	4161.4'
Elevation @ top 3" casing	4164.2'

Sample Description

0- 1	Soil
1-16	100% White-gray calcareous, bentonitic, sandy clay
16-22	100% White argillaceous, calcareous sand
22-26	100% Gray sandy, silty clay
26-31	100% d.o.
31-33	20% Gray-red clay, 80% gray-white fine-medium argillaceous sand, trace gravel
33-35.5	100% Red-brown clay
TD 35.5	

Casing: Ran 3" csg. to 38' Perf. 34' to 14'

SWL: Top Casing 12.1'

Top Triassic: (ground) 33'

SOUTHWESTERN LABORATORIES

FORT WORTH DALLAS HOUSTON MIDLAND BEAUMONT TEXARKANA

CONSULTING, ANALYTICAL CHEMISTS
AND TESTING ENGINEERS

Midland, Texas 6-21-67 File No. C-1902-R1

Report of tests on Water

To Mr. Ed L. Reed Date Rec'd. 6-19-67

Received from Mr. Ed L. Reed

Identification Marks Lea Co., New Mexico, Deane Stoltz, #1, Observation well, Sec. 7-10S-33E, bailed 15 min. 6-16-67, sampled by Chester Skrabacz.

	Mg/L
Chloride	283
Sulfate	572

Copies: 3cc Mr. Ed L. Reed

SOUTHWESTERN LABORATORIES

Jack H. Barton

Lab. No. C-3084

SOUTHWESTERN LABORATORIES

FORT WORTH DALLAS HOUSTON MIDLAND BEAUMONT TEXARKANA

CONSULTING, ANALYTICAL CHEMISTS
AND TESTING ENGINEERS

Midland, Texas 6-21-67 File No. C-1902-R1

Report of tests on Water

To Mr. Ed L. Reed

Date Rec'd. 6-19-67

Received from Mr. Ed L. Reed

Identification Marks Lea Co., New Mexico, Deane Stoltz, #2, Observation well, bailed from 43 ft. 6-16-67, sampled by Chester Skrabacz.

	Mg/L
Chloride	184
Sulfate	577

Copies: 3cc Mr. Ed L. Reed

SOUTHWESTERN LABORATORIES

Jack H. Barton

Lab. No. C-3085

SOUTHWESTERN LABORATORIES

FORT WORTH DALLAS HOUSTON MIDLAND BEAUMONT TEXARKANA

CONSULTING, ANALYTICAL CHEMISTS
AND TESTING ENGINEERS

Midland, Texas 6-21-67 File No. C-1902-R1

Report of tests on Water

To Mr. Ed L. Reed Date Rec'd.

Received from Mr. Ed L. Reed

Identification Marks Lea Co., New Mexico, Deane Stoltz, #3, Observation well, bailed at 35½ ft., 6-17-67, sampled by Chester Skrabacz.

	Mg/L
Chloride	325
Sulfate	330

Copies: 3cc Mr. Ed L. Reed

SOUTHWESTERN LABORATORIES

Jack H. Burton

Lab. No. C-3088

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. 3570
Order No. R-3238

APPLICATION OF STOLTZ AND 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 May 17, 1967, at Santa Fe, New Mexico, before the Oil Conservation Commission of New Mexico, hereinafter referred to as the "Commission."

NOW, on this 29th day of May, 1967, the Commission, a quorum being present, having considered the testimony presented and the exhibits received at said hearing, 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 effective on certain dates, Order No. R-3221 forbids the disposal of water produced in various areas in conjunction with the production of oil or gas, or both, on the surface of the ground, or in any pit, pond, lake, depression, draw, streambed, or arroyo, or in any water course, or in any other place or in any manner which will constitute a hazard to any fresh water supplies in that area encompassed by Lea, Eddy, Chaves, and Roosevelt Counties, New Mexico.

(3) That the applicant, Stoltz and Company, seeks, as an exception to said Order No. R-3221, authority to dispose of water produced in conjunction with the production of oil or gas, or both, into a playa lake located in Sections 12 and 13, Township 10 South, Range 32 East, and in Sections 6 and 7, Township 10 South, Range 33 East, NMPM, Lea County, New Mexico.

(4) That the evidence indicates that fresh water exists in both the Ogallala and Triassic formations in the vicinity of said playa lake.

(5) That the water in the lake is not fresh water.

(6) That that portion of the Triassic red beds underlying the lake is virtually impermeable and therefore will prevent seepage from said lake into the Triassic sands which underlie said red beds and contain fresh water.

(7) That in that portion of the Ogallala formation east and southeast of the subject lake and in communication with said lake basin, the water table dips to the northwest thereby reversing the direction of the normal flow of Ogallala water and causing said water to flow into the subject lake.

(8) That the water level in the lake is normally lower in elevation than the water table in the Ogallala formation that is in communication with the lake basin.

(9) That water will not flow or seep from the subject lake into the Ogallala formation so long as the water level in the subject lake remains at a lower elevation than the water table in that portion of the Ogallala formation in communication with the lake.

(10) That the apparent high water level in the subject lake is at an elevation of 4141 feet referenced to the elevation of the Sun Oil Company State "F" Well No. 1, located near the northeast bank of said lake at a point 657.4 feet from the South line and 511.7 feet from the East line of Section 6, Township 10 South, Range 33 East, NMPM, Lea County, New Mexico, the ground elevation of said well being 4177 feet above sea level.

(11) That the applicant should be authorized to dispose of a maximum of 30,000 barrels per day of produced salt water into the subject lake provided the water level of the lake does not exceed an elevation of 4142 feet as determined by suitably placed markers.

IT IS THEREFORE ORDERED:

(1) That the applicant, Stoltz and Company, is hereby authorized, as an exception to Order No. R-3221, to utilize a playa lake known as Lane Salt Lake and located in Sections 12 and

13, Township 10 South, Range 32 East, and Sections 6 and 7, Township 10 South, Range 33 East, NMPM, Lea County, New Mexico, for the disposal of water produced in conjunction with the production of oil or gas, or both.

(2) That the water hereby authorized for disposal into said Lane Salt Lake shall be limited to a maximum of 30,000 barrels per day as determined by continuous measurement with a corrosive-resistant meter equipped with a non-reset counter.

(3) That in no event shall disposal of water into said Lane Salt Lake be permitted when the water level of said lake is 4142 feet or more above sea level as referenced to the elevation of the Sun Oil Company State "F" Well No. 1, located near the northeast bank of said lake at a point 657.4 feet from the South line and 511.7 feet from the East line of Section 6, Township 10 South, Range 33 East, NMPM, Lea County, New Mexico, the ground elevation of said well being 4177 feet above sea level.

(4) That the applicant shall drill three observation wells to the top of the red beds for the purpose of monitoring the quality of the water in the vicinity of said lake.

Said wells shall be located as follows:

TOWNSHIP 10 SOUTH, RANGE 33 EAST, NMPM
LEA COUNTY, NEW MEXICO

One well to be located approximately 400 feet from the North line and 400 feet from the West line of Section 17;

One well to be located approximately 2640 feet from the North line and 1320 feet from the East line of Section 18; and

One well to be located approximately 800 feet from the North line and 660 feet from the West line of Section 18.

That the surface elevation and depth to the top of the red beds of each observation well shall be reported to the Commission prior to use of the lake for water disposal purposes.

That water samples shall be taken from each observation well, analyses made thereof, and water levels measured by an

independent laboratory or governmental agency and filed with the Commission prior to disposal of produced water into the lake and quarterly thereafter.

(5) That the applicant shall erect permanent water level markers, graduated in feet and tenths of feet, at the following locations:

LEA COUNTY, NEW MEXICO

One marker to be located approximately in the center of the SW/4 SE/4 of Section 6, Township 10 South, Range 33 East;

One marker to be located approximately in the center of the SE/4 NW/4 of Section 7, Township 10 South, Range 33 East; and

One marker to be located in the SE/4 SE/4 of Section 12, Township 10 South, Range 32 East, and not closer than 300 feet to the high water mark in said quarter-quarter section.

(6) That Form C-120-A, Monthly Water Disposal Report, shall be filed each month in accordance with the provisions of Rule 1120 of the Commission Rules and Regulations, and such report shall also state the water level of said lake on the last day of the month.

(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

DAVID F. CARGO, Chairman

GUYTON B. HAYS, Member

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

esr/

July 11, 1967

File Case
3570

Oil Conservation Commission
P. O. Box 1980
Hobbs, New Mexico

Attention: Mr. Joe D. Ramey

Gentlemen:

In accordance with Oil Conservation Commission Order R-3238 and R-3238-A, three monitoring wells have been drilled by Stoltz & Company in Section 7, Township 10 South, Range 33 East as follows:

No. 1 Location: 1100' from West & 300' from South lines of Section 7
Date Drilled: June 16, 1967 by Abbott Bros. cable tools
Total Depth: 45 feet
Casing: 47 feet of 3" line pipe, slotted on bottom with bull plug in top. Cemented around top with 2 sacks cement.
Test: Bailed 6 gallons water per minute.

No. 2 Location: 1410' from East & 600' from South lines of Section 7
Date Drilled: June 17, 1967 by Abbott Bros. cable tools
Total Depth: 43.5 feet
Casing: 45.2 feet of 3" line pipe, slotted on bottom with bull plug in top. Cemented around top with 2 sacks cement.
Test: Bailed 75 gallons water per minute.

No. 3 Location: 2400' from South & 1100' from East lines of Section 7
Date Drilled: June 17, 1967 by Abbott Bros. cable tools
Total Depth: 35.5 feet
Casing: 38 feet of 3" line pipe, slotted on bottom with bull plug in top. Cemented around top with 2 sacks cement.
Test: Bailed 15 gallons water per minute.

Yours very truly,

OIL REPORTS AND GAS SERVICES

W. L. Smith

W. L. Smith

DH
cc: Oil Conservation Commission
P. O. Box 2088
Santa Fe, New Mexico

bcc: Stoltz & Company
P. O. Box 1714
Midland, Texas

Oil Reports and Gas Services
P. O. BOX 763 HOBBS, NEW MEXICO

GOVERNOR
DAVID F. CARGO
CHAIRMAN

State of New Mexico
Oil Conservation Commission

LAND COMMISSIONER
GUYTON B. HAYS
MEMBER

P. O. BOX 2088
SANTA FE

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

May 29, 1967

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

Re: Case No. 3570
Order No. R-3238
Applicant:
STOLTZ AND COMPANY

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.
Secretary-Director

ALP/ir

Carbon copy of order also sent to:

DOCKET MAILED
Date 6/5/67

Hobbs OCC x
Artesia OCC
Aztec OCC
Other Mr. P. C. O'Quinn - Cabot Corporation, Midland, Texas
Mr. Frank Irby, State Engineer Office - Santa Fe,N.M.

May 17, 1967

Mr. A. L. Porter, Jr.
Secretary-Director
Oil Conservation Commission
Santa Fe, New Mexico

Dear Mr. Porter:

I have reviewed with considerable detail an exhibit to be entered in Case 3570 made on behalf of the Stoltz and Company. The exhibit is a planemetric map of T. 10 S., R. 32 and 33 E., labeled Ground-water Conditions Lane Salt Lake and Vicinity.

The contours representing the red bed structure to the southeast of the subject lake indicate a channel in this direction which is overlain with more recent deposits. I feel that there may be some transmission of the brines, which will be disposed into the lake, through this channel if the application is granted. I have no criticism of the exhibit or the conclusions which the witness, Ed Reed, will present. However, I feel that it would be wise to require the applicant to provide one or two observation wells in Section 17, or near that section, drilled to the red beds and that these wells be equipped and monitored for water quality changes. By such observations it could be readily determined if the brines from the lake are migrating southeastward into the fresh water Ogallala formation. The depth from land surface to the red beds would be approximately 50 feet.

Very truly yours,

S. E. Reynolds
State Engineer

By: Frank E. Irby
Chief
Water Rights Division

FEI:bg

CLASS OF SERVICE
This is a fast message unless its deferred character is indicated by the proper symbol.

WESTERN UNION TELEGRAM

W. P. MARSHALL, CHAIRMAN OF THE BOARD
R. W. McFALL, PRESIDENT

SYMBOLS
DL = Day Letter
NL = Night Letter
LT = International Letter Telegram

The filing time shown in the date line on domestic telegrams is LOCAL TIME at point of origin. Time of receipt is LOCAL TIME at point (391).

IN THEIR APPLICATION FOR PERMISSION TO DISPOSE OF PRODUCED SALT WATER=

CLARK OIL & REFINING CORPORATION P W TOWNSEND=

=$3570=

WU1201 (R2-65) THE COMPANY WILL APPRECIATE SUGGESTIONS FROM ITS PATRONS CONCERNING ITS SERVICE

CLASS OF SERVICE
This is a fast message unless its deferred character is indicated by the proper symbol.

WESTERN UNION TELEGRAM

W. P. MARSHALL, CHAIRMAN OF THE BOARD
R. W. McFALL, PRESIDENT

5 SYMBOLS
DL = Day Letter
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LT = International Letter Telegram

MAY 16 PM

The filing time shown in the date line on domestic telegrams is LOCAL TIME at point of origin. Time of receipt is LOCAL TIME at point of destination

LA130 NSA524

NS CZA315 NL PD=CORPUS CHRISTI TEX 16=
:OIL CONSERVATION COMM, STATE OF NEW MEXICO= MAIN OFFICE
STATE LAND OFFICE SANTA FE NMEX= '67 MAY 17 AM 8 46

ATTENTION: PETE PORTER

9 WITH REFERENCE TO CASE #3570, RELATIVE TO THE APPLICATION BY STOLTZ & COMPANY TO DISPOSE OF PRODUCED SALT WATER IN THE NORTH BAGLEY FIELD AREA OF LEA COUNTY, NEW MEXICO, PLEASE BE ADVISED THAT CLARK OIL & REFINING CORPORATION, NON-OPERATING WORKING INTEREST OWNER IN SAID NORTH BAGLEY FIELD, SUPPORTS STOLTZ & COMPANY

WU1201 (R2-65) THE COMPANY WILL APPRECIATE SUGGESTIONS FROM ITS PATRONS CONCERNING ITS SERVICE

3 suggested locations for monitor wells

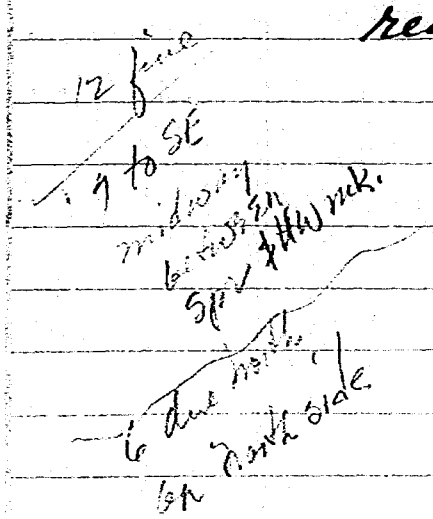
Sect. 7

ok { 1100 FWL
300 FSL } center NW of 18

ok { 1400 FEL
600 FSL } NW NW of 17

ok { 1100 FEL
2400 FSL } E of middle portion of section sceps

provide not as wide Regional cont
closer control
react



STATE OF NEW MEXICO

STATE ENGINEER OFFICE

SANTA FE

S. E. REYNOLDS
STATE ENGINEER

ADDRESS CORRESPONDENCE TO:
STATE CAPITOL
SANTA FE, NEW MEXICO 87501

May 17, 1967

Mr. A. L. Porter, Jr.
Secretary-Director
Oil Conservation Commission
Santa Fe, New Mexico

Dear Mr. Porter:

I have reviewed with considerable detail an exhibit to be entered in Case 3570 made on behalf of the Stoltz and Company. The exhibit is a planemetric map of T. 10 S., R. 32 and 33 E., labeled Groundwater Conditions Lane Salt Lake and Vicinity.

The contours representing the red bed structure to the southeast of the subject lake indicate a channel in this direction which is overlain with more recent deposits. I feel that there may be some transmission of the brines, which will be disposed into the lake, through this channel if the application is granted. I have no criticism of the exhibit or the conclusions which the witness, Ed Reed, will present. However, I feel that it would be wise to require the applicant to provide one or two observation wells in Section 17, or near that section, drilled to the red beds and that these wells be equipped and monitored for water quality changes. By such observations it could be readily determined if the brines from the lake are migrating southeastward into the fresh water Ogallala formation. The depth from land surface to the red beds would be approximately 50 feet.

Very truly yours,

S. E. Reynolds
State Engineer

By: Frank E. Irby
Frank E. Irby
Chief
Water Rights Division

FEI:bg

Docket No. 15-67

DOCKET: REGULAR HEARING - WEDNESDAY - MAY 17, 1967

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

ALLOWABLE: (1) Consideration of the oil allowable for June, 1967;

(2) Consideration of the allowable production of gas for June, 1967, from thirteen prorated pools in Lea, Eddy, and Roosevelt Counties, New Mexico, and also presentation of purchasers' nominations for said pools for the six-month period beginning July, 1967; consideration of the allowable production of gas from nine prorated pools in San Juan, Rio Arriba and Sandoval Counties, New Mexico, for June, 1967.

CASE 3570: Application of Stoltz and Company for salt water disposal, Lea County, New Mexico. Applicant, in the above-styled cause, seeks authority to dispose of produced salt water in a playa lake located in Sections 12 and 13, Township 10 South, Range 32 East, and in Sections 6 and 7, Township 10 South, Range 33 East, Lea County, New Mexico. Applicant proposes to dispose of 10,000 to 20,000 barrels of salt water per day with possible increase to 60,000 barrels per day.

CASE 3571: Southeastern New Mexico nomenclature case calling for an order for the creation of one pool and the assignment of an oil discovery allowable therein, and the creation and extension of certain other pools in Lea, Eddy, and Chaves Counties, New Mexico:

(a) Create a new pool in Lea County, New Mexico, classified as an oil pool for Abo production and designated the East Inbe-Pennsylvanian Pool, comprising the following-described acreage:

TOWNSHIP 10 SOUTH, RANGE 34 EAST, NMPM
Section 30: SW/4

Further, for the assignment of approximately 50,010 barrels of oil discovery allowable to the discovery well, Monsanto Company's Lane State Well No. 1-Y, located in Unit M of said Section 30.

(b) Create a new pool in Roosevelt County, New Mexico, classified as an oil pool for San Andres production and designated as the Northeast Chaveroo-San Andres Pool, and described as:

TOWNSHIP 7 SOUTH, RANGE 34 EAST, NMPM
Section 4: SW/4
Section 5: S/2
Section 6: SE/4

(c) Create a new pool in Eddy County, New Mexico, classified as a gas pool for Upper Pennsylvanian production and designated

as the Springs-Upper Pennsylvanian Gas Pool, and described as:

TOWNSHIP 20 SOUTH, RANGE 26 EAST,NMPM
Section 34: N/2

(d) Extend the Northeast Bagley-Wolfcamp Pool to include therein:

TOWNSHIP 11 SOUTH, RANGE 33 EAST, NMPM
Section 11: SW/4

(e) Extend the Chaveroo-San Andres Pool to include therein:

TOWNSHIP 8 SOUTH, RANGE 32 EAST, NMPM
Section 2: E/2

TOWNSHIP 8 SOUTH, RANGE 33 EAST, NMPM
Section 3: SW/4
Section 4: SE/4
Section 10: NE/4
Section 11: NE/4

(f) Extend the South Corbin-Morrow Gas Pool to include therein:

TOWNSHIP 18 SOUTH, RANGE 33 EAST, NMPM
Section 27: W/2

(g) Extend the Flying "M" San Andres Pool to include therein:

TOWNSHIP 9 SOUTH, RANGE 33 EAST, NMPM
Section 28: SE/4

(h) Extend the North Indian Hills-Morrow Gas Pool to include therein:

TOWNSHIP 21 SOUTH, RANGE 24 EAST, NMPM
Section 5: All

(i) Extend the Kemnitz-Lower Wolfcamp Pool to include therein:

TOWNSHIP 16 SOUTH, RANGE 33 EAST, NMPM
Section 23: SE/4

(j) Extend the Lazy J-Pennsylvanian Pool to include therein:

TOWNSHIP 14 SOUTH, RANGE 33 EAST, NMPM
Section 3: SW/4

(k) Extend the Leo Queen-Grayburg Pool to include therein:

TOWNSHIP 18 SOUTH, RANGE 30 EAST, NMPM
Section 21: NE/4 NW/4

(l) Extend the Lusk-Strawn Pool to include therein:

TOWNSHIP 19 SOUTH, RANGE 31 EAST, NMPM
Section 11: SW/4

(m) Extend the East Millman Queen-Grayburg Pool to include therein:

TOWNSHIP 19 SOUTH, RANGE 28 EAST, NMPM
Section 11: S/2 NE/4

(n) Extend the Nadine-Drinkard Pool to include therein:

TOWNSHIP 19 SOUTH, RANGE 38 EAST, NMPM
Section 26: NW/4

(o) Extend the Pearl-Queen Pool to include therein:

TOWNSHIP 19 SOUTH, RANGE 34 EAST, NMPM
Section 26: SW/4

(p) Extend the Vacuum-Upper Pennsylvanian Pool to include therein:

TOWNSHIP 17 SOUTH, RANGE 34 EAST, NMPM
Section 24: NW/4

Stoltz & Company
BOX 1714 - RM. 226 CENTRAL BLDG.
915 MU 2-7936 - MIDLAND, TEXAS 79701

DEANE H. STOLTZ
JACK E. BROWN
CYRIL WAGNER JR.

April 24, 1967

Case 3570

Mr. Pete Porter
Oil Conservation Commission
Santa Fe, New Mexico

Dear Sir:

It is requested that the Oil Conservation Commission hear the application of Stoltz & Company for authorization to use a playa lake for salt water disposal purposes on Wednesday, May 17, 1967.

The location of the lake in Lea County, New Mexico is as follows:

NE/4 NE/4 NW/4, SW/4 NW/4, SE/4 NW/4, NE/4 SW/4, NW/4 SW/4, SW/4 SW/4, NW/4 SE/4, of Section 7, Township 10 South, Range 33 East, N.M.P.M., Lea County, New Mexico, containing 442.07 acres, more or less.
SW/4 SE/4 of Section 6, Township 10 South, Range 33 East, 40.00 acres.
E/2 SE/4 of Section 12, Township 10 South, Range 32 East, 80.00 acres.

We will be represented at this hearing by Jason Kellahin, attorney at law, and Ed L. Reed, consulting hydrologist.

We are proposing to dispose of 10,000 to 20,000 bbls. salt water per day initially, with possible need of 60,000 bbl. per day.

We will present water analyses and other testimony in connection with this application.

Attached is certified plat of the lake in question.

Very truly yours,

STOLTZ & COMPANY

By Jason W. Kellahin

DOCKET MAILED
Date 5-4-67

DHS:wt

JASON W. KELLAHIN
P. O. Box 1769
Santa Fe, New Mexico

NEW MEXICO OIL CONSERVATION COMMISSION
P. O. BOX 2088
SANTA FE, NEW MEXICO

PRELIMINARY GAS NOMINATIONS FOR PRORATION PERIOD 7-1-67 THRU 12-31-67

SOUTHEAST POOLS

Atoka-Pennsylvanian	4,672,000 MCF
Bagley-Lower Pennsylvanian	366,500 MCF
Bagley-Upper Pennsylvanian	228,400 MCF
Blinebry	6,668,000 MCF
Crosby-Devonian	1,368,700 MCF
Eumont	25,710,700 MCF
Indian Basin-Morrow	2,847,111 MCF
Indian Basin-Upper Pennsylvanian	26,994,837 MCF
Jalmat	20,251,750 MCF
Justis	1,613,200 MCF
Monument McKee-Ellenburger	1,382,920 MCF
Todd-Lower San Andres	312,000 MCF
Tubb	8,525,800 MCF
TOTAL	100,941,918 MCF

3570

P. G. O'Quinn, Cabot Carbon [illegible]
[illegible] for Playa lake disposal.
[illegible] for [illegible] Co. & Geo.
N. Bagley Pools, 3 or more [illegible] wells. $309,000/well.
N. B. Pool [illegible] committee line field to lake # 150,000.
Devonian Res. only H_2O disposal zone
18-25 M Bbls. [illegible] 53/18000 340± BWPd.
Mult. 40 M 159 210 242

Reed
[illegible]
[illegible]
[illegible]
[illegible] = 6' BO [illegible]
Evaps. Dec. 1.94"
June 8.67"

[illegible]
X .76.9 [illegible]
17" X .8 X [illegible]
= 76.32" minus Rainfall
61.14"
15.68 [illegible]

EXHIBIT-B
Gas Allowable Hearing
May 17, 1967

NEW MEXICO OIL CONSERVATION COMMISSION
P. O. BOX 2088
SANTA FE, NEW MEXICO

GAS NOMINATIONS FOR JUNE, 1967

SOUTHEAST POOLS

Atoka-Pennsylvanian	790,000 MCF
Bagley-Lower Pennsylvanian	60,500 MCF
Bagley-Upper Pennsylvanian	38,000 MCF
Blinebry	968,079 MCF
Crosby-Devonian	223,100 MCF
Eumont	3,896,679 MCF
Indian Basin-Morrow	395,700 MCF
Indian Basin-Upper Pennsylvanian	3,753,510 MCF
Jalmat	2,869,309 MCF
Justis	222,400 MCF
Monument McKee-Ellenburger	215,500 MCF
Todd-Lower San Andres	52,000 MCF
Tubb	1,242,632 MCF
TOTAL	14,727,409 MCF

NORTHWEST POOLS

Basin-Dakota	22,155,900 MCF
Blanco-Mesaverde	15,186,100 MCF
Aztec-Pictured Cliffs	877,300 MCF
Ballard-Pictured Cliffs	811,500 MCF
Fulcher Kutz-Pictured Cliffs	315,800 MCF
South Blanco-Pictured Cliffs	3,178,000 MCF
Tapacito-Pictured Cliffs	840,700 MCF
West Kutz-Pictured Cliffs	260,800 MCF
Devils Fork-Gallup	102,700 MCF
Devils Fork-Gallup - Estimate	124,510 MCF
TOTAL	43,728,800 MCF
TOTAL ON DEVILS FORK-GALLUP - ESTIMATE	43,750,610 MCF
TOTAL ADJUSTED NOMINATIONS - BOTH AREAS	58,478,019 MCF

EXHIBIT-A
Gas Allowable Hearing
May 17, 1967

NEW MEXICO OIL CONSERVATION COMMISSION
SANTA FE OFFICE

ITEMS CHECKED OUT

CASE NO.	TRANSCRIPT	EXHIBIT NO. AND DESCRIPTION	CHECKED OUT By:	DATE CHECKED OUT	DATE CHECKED IN
3570		Ex. #3 Elevation plat (map) Ground with Gradients (map) Transcript	William J. LeMay	June 14, 61	

BEFORE THE
NEW MEXICO OIL CONSERVATION COMMISSION
Santa Fe, New Mexico
May 17, 1967

REGULAR HEARING

IN THE MATTER OF:

Application of Stoltz and Company for salt water disposal, Lea County, New Mexico. Case 3570

BEFORE: A. L. Porter, Jr., Secretary-Director
Guyton B. Hays, Land Commissioner
George M. Hatch, General Counsel

TRANSCRIPT OF HEARING

MR. PORTER: We will take up Case 3570.

MR. HATCH: Case 3570. Application of Stoltz and Company for salt water disposal, Lea County, New Mexico.

MR. PORTER: Before beginning any testimony, I would like to ask for appearances in the Case.

MR. KELLAHIN: Jason Kellahin, Kellahin and Fox of Santa Fe appearing for the applicant.

MR. PORTER: Does anyone else intend to present any sworn testimony in the Case? Any other appearances? Does anybody desire to make a statement?

MR. O'QUINN: I would like to make a statement on behalf of Cabot Corporation.

MR. PORTER: Cabot Corporation?

MR. O'QUINN: Yes, sir.

MR. PORTER: Would you identify yourself for the record, please?

MR. O'QUINN: P. C. O'Quinn.

MR. PORTER: Mr. Kellahin, you may proceed.

MR. KELLAHIN: If the Commission, please. This application was filed with the Commission on April 27th, 1967. It was filed pursuant to the general provisions contained in Section 65-3-11, Sub Section 15 which vests in the Oil Conservation Commission the authority to regulate and control the dispostion of produced water.

Subsequent to the filing of the application, the Commission entered its Order Number R-3221 in Case 3551 which, effective November the 1st, will prohibit any surface disposition of produced water from the North Bagley Pools and the other pools in that particular area.

The application which is being heard by the Commission, at this time, as the testimony will develop, affects water disposition from the North Bagley Pools and if an exception to the provisions of Order 3221 be needed, we certainly would want to incorporate that into any order entered in this case. I don't think, under the circumstances, that there is any problem in connection with the notice for advertising in this case because it is clear that we have asked for approval of surface disposition of salt water. Notice and a copy of the application was filed with the New Mexico State Engineer.

With that preface, we will have two witnesses I would like to have sworn, please.

MR. PORTER: Let's have them both sworn at this time.

MR. KELLAHIN: Mr. Jack Brown and Mr. Ed L. Reed.

(Witnesses sworn.)

MR. KELLAHIN: I would like to call as my first witness, Mr. Jack Brown.

JACK BROWN, called as a witness on behalf of the Applicant, first having been duly sworn, was examined and testified as follows:

DIRECT EXAMINATION

BY MR. KELLAHIN:

Q Would you state your name, please?

A Jack Brown.

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

A I am a partner in Stoltz and Company and serve as Petroleum Engineer for that organization.

Q Have you ever testified before the Oil Conservation Commission and made your qualifications a matter of record?

A Yes, sir.

MR. KELLAHIN: Are the witnesses' qualifications acceptable?

MR. PORTER: Yes, they are.

Q (By Mr. Kellahin) Mr. Brown, are you familiar with the application of Stoltz and Company in the case now before this Commission?

A Yes, sir.

Q Briefly, what is proposed by Stoltz and Company in this application?

A Stoltz and Company proposes to gather the produced

salt water in the North Bagley Pools to transport this water by pipeline to the Lane Salt Lake and dispose of this water in the bed of the lake by means of evaporation.

Q Now, in connection with your disposition of water from the North Bagley, have you had any meeting of the operators? Would you outline the background of this application, please?

A After the Commission spoke of a no-pit rule, we investigated the most economical means of disposing of the produced water in the North Bagley Pool which is considerable in amount and investigated the Lake as a means to dispose of the water which would be considerably more economical than the other alternatives.

Q Now, what are these other alternatives?

A All the operators in the North Bagley Pool had a meeting, on I believe, April the 27th, and formed a North Bagley Pool Operating Committee to investigate means and study means of disposing of this produced water. One company, I believe it was Felmont, had made a preliminary study of that area.

MR. PORTER: That is Felmont, F-e-l-m-o-n-t?

THE WITNESS: Felmont Oil Corporation.

MR. PORTER: F-e-l-m-o-n-t?

THE WITNESS: Yes, sir.

MR. PORTER: Thank you.

Q And their study indicated that there were not any shallow zones in this area which would take any appreciable amount of water under any reasonable pumping pressure. To dispose of water down-hole would require several deep devonian wells.

MR. PORTER: By "shallow wells" you mean --

THE WITNESS: I mean the Devonian Reservoir would be the only reservoir, the shallowest reservoir that would take any volume of water under reasonable pressures and Stoltz and Company before this meeting, discussed this investigation we had had made of the Lake and this meeting we have called here, asked for the Hearing, I mean, and the operators were of the general opinion that this would be a desirable method of disposing of the water in North Bagley Pools and by far the most economical.

We do feel, also, that of course this economics is of deep concern because that North Bagley Pool is not completely developed and disposing of water is going to be a very expensive operation by any means and it could curtail the development of the Pool and if the method of disposition of the water is too expensive, well, the ultimate recovery of the Pool will be reduced. If we can continue to dispose of the water in an economic means, we can prolong the life,

economic life of the Pool and therefore recover more oil, cumulative oil from the reservoirs.

Q (By Mr. Kellahin) In other words, are you saying that approval of this application, in effect, will result in the recovery of the oil that wouldn't be otherwise recovered?

A Yes, sir, that is --

Q That is your opinion?

A That is my opinion.

Q You made reference to the Devonian as the only reservoir which would take water under reasonable pressures. Have you had any experience at all with the disposal of water in the Devonian in the North Bagley area, Mr. Brown?

A Not directly in the North Bagley area, no sir.

Q So actually, you don't know just what the situation might be in the Devonian area, is that correct?

A Not at this time.

Q Has there been any production from the Devonian in that area?

A Not in the North Bagley Pool. The nearest Devonian production is several miles to the south in the Bagley proper.

Q In the Bagley proper?

A Yes, sir.

Q So, it would be a gamble at best, if you drilled a Devonian disposal well in the North Bagley area at this time,

is that correct?

A Yes, sir.

Q You don't know just what you might find?

A Drilling any well would be a gamble, I would say.

Q Now, where is the Lane Lake in relation to the North Bagley?

A The Lane Salt Lake is approximately four miles north of the present northern limits of the North Bagley Pool.

Q Have you had a survey made of the Lake?

A Yes, sir, we had Mr. John Sherman, the Lea County Surveyor, survey the Lake and I have a Plat here.

(Whereupon, Applicant's Exhibits 1 and 3 marked for identification.)

Q Referring to what has been marked as --

MR. PORTER: You say four miles north?

THE WITNESS: Yes, sir, four miles north of the northern limits of the Bagley Pool, North Bagley Pool.

Q (By Mr. Kellahin) Referring to what has been marked as Exhibit Number 1, is that the Plat of the Survey to which you just referred?

A Yes, sir.

Q Now, do you have control of the lake bed for the purposes of which you propose?

A Yes, sir.

Q What is the basis of this control, how did you acquire it?

A It was from the State.

Q You had business leases?

A And do you have easements over the lands' surface involved?

A Yes, sir.

Q And they are also from the State of New Mexico?

A Yes, sir.

Q What volumes of water would you anticipate you will be disposing of initially and ultimately in the Lane Lake?

A The ultimate figure is questionable. The field is still developing, but we would estimate at this time, that currently there would be in the neighborhood of 15 to 20, to 25 thousand barrels of water per day to be disposed of and, feasibly, before the field is completely developed, it will be 40 thousand barrels.

Q How, would you limit your water to be disposed of to that produced in the North Bagley, assuming that --

A That is the primary purpose and if ti appears that the Lake has more capacity than is needed by the North Bagley Pools, it is possible that other nearby pools would --

Q Also be connected?

A Also be connected to the lake.

Q In other words, you would like to use the Lake to its capacity for water disposal?

A Yes, sir.

Q Is that your statement?

A Yes.

Q Regardless of the source?

A Yes, sir.

Q Would you be willing to submit any reports or applications that may be required by the Commission before other pools are connected to the disposal system?

A Yes, sir.

MR. KELLAHIN: At this time, I would like to offer in evidence Exhibit Number 1.

MR. PORTER: What was that Exhibit?

MR. KELLAHIN: Exhibit Number 1 is a survey plat prepared by the County Surveyor of Lea County, covering the Lane Lake area. If it please the Commission, we will have another plat showing the wells and water sources in the area which we will offer with the next witness.

MR. PORTER: Are there any questions concerning this Exhibit? It will be admitted.

MR. PORTER: Are there any questions concerning

this Exhibit? It will be admitted.

(Whereupon, Applicant's Exhibit Number 1 was admitted into evidence.)

MR. KELLAHIN: That's all I have on direct examination.

CROSS EXAMINATION

BY MR. PORTER:

Q Mr. Brown, you say that if this application were approved, that at the present time there would be anywhere from 15 to 25 thousand barrels per day of salt water available to go in it?

A Yes, sir, that's the estimate.

Q Isn't this North Bagley area a rather rapidly developing area at the present time and this amount could increase pretty drastically?

A Yes, sir. It's development -- usually several wells are being drilled concurrently in the area.

Q Is there a lot of variation in the volumes of water from one well to another being produced in here?

A Yes, sir.

Q You couldn't give me an average figure per well, that is currently producing?

A Well, there are approximately 53 or 4 wells in the area now, and I would estimate the average to be between,

oh, 350 and 500 barrels per day per well.

Q Three hundred and fifty to five hundred barrels of salt water per day, per well?

A Yes, sir.

Q And how many wells did you say were in there?

A There are 53 or 4.

Q These are all in the North Bagley Pool?

A Yes, sir.

Q What is the production formation?

A The Pennsylvanian, we have upper, lower and middle Pennsylvanian Pools and there are also a few wells in the Wolfcamp.

MR. PORTER: Does anyone have a question of Mr. Brown? You may be excused.

*****

(Witness excused.)

MR. KELLAHIN: We will call as our next witness Mr. Reed, please,

MR. PORTER: How do you spell your name? R double e d?

MR. REED: Yes, sir.

*****

ED L. REED, called as a witness on behalf of the Applicant, first having been duly sworn, was examined and

testified as follows:

DIRECT EXAMINATION

BY MR. KELLAHIN:

Q Would you state your name, please?

A My name is Ed L. Reed.

Q What business are you engaged in, Mr. Reed?

A I am a Consulting Hydrologist.

Q Where are you located?

A Midland, Texas.

Q Mr. Reed, have you had any special training in the field of Hydrology?

A Yes, sir.

Q Would you outline for the Commission your education and experience as a Hydrologist?

A I have a Bachelo or Science degree from Texas Tech in Geological Engineering in 1939. I did graduate work at Tech in 1949 and 1950 in fields realted to Hydrology. I worked for major oil companies from 1939 to 1952. Ten years with Pan American as Geologist and District Geologist and Consulting Geologist. I have been in Consulting Hydrology since 1952. I am a member of the Fellow of the Geological Society of America, I am a member of the Society of Civil Engineers. That's all.

Q Have you done any work in the State of New Mexico as a Hydrologist?

A Yes, sir.

Q And in connection with the application before the Commission did you make an investigation for Stoltz and Company?

A Yes, sir, I did.

Q Now, what did you do in connection with that investigation, Mr. Reed?

A I examined the published literature on the North Lea County area. I examined the Lake itself, it's borders on the ground. I examined the outcrops of bedrock that exist along the margins of the Lake. We have measured the depth to water in the wells, the water wells in the area. We have had the surveyor, Mr. Sherman, run elevations to the measuring point of the water wells in the area and also prepare a limited topograhic map of the Lake and the margins of the Lake which has been submitted, and the elevation of the springs or seeps that discharge into the Lake.

We have examined seismic shot-hole drillers' logs in the area covered by the map and from this study we have prepared a topographic map of the top of the triassic redbed surface. We have contoured the water table of the Ogallala portion of this area. We have taken samples of water from

all of the wells from three points within the Lake and from three springs discharging intermittently into the Lake, have examined the chemical analyses data which is prepared in Exhibit form and have posted the data upon the map and we have prepared the exhibit which is now upon the board.

Q Did you make any study of the surface flow of water into the Lake area?

A We made a very preliminary examination of the watershed area of the Lake and of the inlets into the Lake of which there are two principal ones.

Q Did you examine the rainfall records for the vicinity?

A We examined the rainfall records for the Tatum Station. We examined the Class A Land Pan evaporation records for Portales, Bitter Lake and Lake Avalon and made determinations of monthly evaporation from this data.

Q On that basis did you prepare any calculations to show the effect of discharge of water into the Lake at varying rates?

A Yes, sir, I did.

Q Now, turning to what has been marked as Exhibit Number 2, a twenty-five page exhibit, would you identify that, please.

A These are original copies of chemical analysis

sheets prepared by Southwestern Laboratories in their Midland office of water samples taken during this investigation. All of these being normal water samples with one exception. A sample of the lakebed material in one part of the Lake was sampled and a one-to-one extract prepared and a chemical analysis made of that extract material.

Q And that is the data which is posted on the plat that is on the board?

A That's correct, yes sir.

MR. PORTER: Mr. Reed, may I ask you, you mentioned that you had ten years experience with Pan American, I believe, and possibly some other major oil company experiences. Where were you located when you had this?

THE WITNESS: I was with Atlantic in Midland and Pan American in Midland, ten years, except for two years in Wichita Falls.

MR. PORTER: Some of your experience was in Southeast New Mexico then as an engineer, geological engineer?

THE WITNESS: About seven years in Southeastern New Mexico as an area geologist and Southeast New Mexico and Northwest New Mexico, and there years as District Geologist including Southeast, New Mexico, yes, sir.

MR. PORTER: Thank you.

MR. HAYS: These springs that you examined, is

that sweet water or salt water?

THE WITNESS: Well, we can get into that in a description of this Exhibit, if you wish. I think I can lay the background for this and perhaps explain that question to you.

Q (By Mr. Kellahin) Now, Mr. Reed, turning to what has been marked as Exhibit Number 3, would you first identify that exhibit, Please?

A Yes, sir. Exhibit Number 3 is a map of Township 10, South Range 33 East and a few sections bordering to the north and to the west. This map has been prepared by me. It shows upon the map the position of Lane Lake occupying a portion of Section 6 and 7 of 10 South 33, a portion of 12 and 13 in 10 South 32.

On this map I have shown the locations of the existing water wells, all that we know or can find. I have shown the chloride concentration in milligrams per liter or parts per million in the pressure samples, the salt lake concentration of the waters from these water wells. I have shown the sea level elevation of the water table as determined from measured depths to water and elevations determined by the surveyor.

I have shown the quality of the water in the Lake at two points and in the soil at one point, the quality

of spring water, seep water in three areas. On this large map, the yellow dotted lines represent the topography of the triassic surface. The heavy dashed lines represent the attitude of the water table.

Now, on the map on the wall, I have indicated three of the wells in the northeast part of the area as water being derived from the triassic. These are the only three wells that we can identify that are not producing from the Ogallala.

Basically, Lane Lake is a closed basin. It is a water table lake in that the surface of the lake is at the water table and is maintained at the water table by wind action blowing the sediment out and creating a mound ridge of alluvium deposits on the eastern side of the Lake.

Surface water going from the watershed area to the northwest which is rather extensive, but much of which is non-contributory I believe, surface water comes into the lake in a ravine at the northeast corner where the triassic is at the surface, in a ravine in the southwest side of the Lake in the east, along the east quarter corner of Section 12 where the Ogallala is exposed in lesser amounts in smaller gullies on the west and southwest side of the Lake.

The Lake is completely enclosed topographically so the water cannot flow out of the Lake, surface water can not flow out of the Lake.

Bedrock is exposed along the northeast and north-northwest margins of the Lake, in this case being triassic redbed material. Cretacious, I have examined exposed in the bluffs in two places on the west side of the Lake, Section 7 and the northwest corner of Section 13, a thin section of bright yellow, yellowish-orange sandy clay. Ogallala is exposed in one patch, the east side of Section 12 in the bluffs and the base of which cannot be determined on the ground. In this case, the upper part is a gravelly, clichy, underlain by sands and gravelly sand and silty clays, light colored, gray to buck.

On the east side of the lake there are no exposures that I can find in examining that carefully. The bluffs on the east side are composed of wind-blown material. Largely gypsum crystals and sand grains blown out ot the Lake from the nearby sandy areas on the west side.

On the west side in the sand dune area there are many places that I have seen blow outs in the sand dune with residual Ogallala gravel, indicating that in portions of this area, the Ogallala has also been removed.

Looking at the quality of water in Lane Lake and in the vicinity we will look first at the wells. Ogallala water generally in the area covered by this map, is of good quaiity. The chlorides are low to moderate in concentration

forty parts per million, forty-two parts per million, for example, in a well in Section 20. A maximum, other than some consideration, that I am not sure of, 322 in the southwest corner of Section 12, there are two exceptions, there are two wells, one in Section 16 and one in Section 7 in the Township to the East which have high chloride concentrations. The one in section 7 I have no explanation for because I didn't study that area and I am of the opinion that this is not related to any of the hydrolic system involving Lane Lake. The well in Section 16 could possibly represent seepage water from the triassic, from a brackish water-sand in the triassic, since this well is very near the northern limits of Ogallala deposition.

Q Which well is that you're pointing to?

A In Section 16, Northeast corner of Section 16, 10 South 33 East.

MR. PORTER: What are the parts per million in that well?

THE WITNESS: Chlorides are 666 and sulphates are 746. This is a brackish water, the true source of which I cannot tell you because we don't have enough data. The triassic water, where it has been developed, is of good quality and completely unlike this --

MR. PORTER: Is that water being use for anything?

THE WITNESS: Stock purposes, I believe, yes, sir.

Going to the Lake itself, a sample of water from the Lake in the northern part of the Lake in Section 6 has a chloride concentration of a 120, 696 and a sulphate concentration of 43, 909. In the southwest corner of Lane Lake, in the southeast Section of 12, a surface sample of water, the chloride concentration is 157,883, the sulphate concentration is 99,748. The highest sulphate concentration I have encountered.

MR. PORTER: Are these different pockets of water?

THE WITNESS: Yes, sir.

MR. PORTER: They are not connected on the Lake?

THE WITNESS: No, sir, there are dried areas in between, these are residual pockets of water.

MR. PORTER: Low places?

THE WITNESS: Yes, sir, I believe, they are not permanent pockets of water, they may come or go in response to the humidity and wind action.

MR. PORTER: You mean, they rise and fall?

THE WITNESS: They rise and fall --

MR. PORTER: The surface level of the water goes up and down?

THE WITNESS: Yes, sir. This is true all over the

Lake in response to the rate of evaporation, the inflow is a fairly constant figure, I believe, and the amount of discharge from the Lake is a function of humidity and wind.

MR. PORTER: And that inflow is from seepage of these springs that you were talking about?

THE WITNESS: Yes, sir, and probably some seepage from other areas under the surface of the lake that we can't see, but there is other seepage.

MR. PORTER: Thank you.

A A one-to-one extract of soil in the central part of the Lake, this would be about a one-to-one dilution since the saturation of the soil was about 50 percent as to its water content. The chloride concentration was 33,283, sulphate concentration 16,458. The sample three seepage areas, two in the northeast corner of Section 7 with chlorides 15,000, suphates 16,000 in one sample, chlorides 12,788 and sulphates of over 19,000 in the other sample.

The third seep flowing sufficiently in volume to carry the water in the defined channel out into the Lake, perhaps a hundred or so feet. Chlorides, 12,262 and sulphates 6842. By comparison, the brines, two samples of brines which are proposed to be put into the lake, are represented by analyses shown to the right of the Lake, and labeled "Brines". Chlorides of 28,904, sulphates 517 in one sample,

chlorides 31,707 and sulphates 452 in another sample.

Going, now unless there are questions at this point, going now to the other --

Q (By Mr. Kellahin) Mr. Reed, at this point, you mentioned these seeps in response to the question that was asked by Mr. Hays. Can you state what the source of this salt water is that is going into the Lake at the present time?

A Yes, sir. Going to the question of the water table and this is fundamental, I think, in answering your question of the source of this water, we have contoured the water table elevation as determined in the well and in the springs. Generally, we find the water is very near the western limits of the Ogallala as it is disposed into the escarpment, which would be just a few miles to the west.

MR. PORTER: That is what is referred to as the Caprock?

THE WITNESS: Yes, sir. As a matter of fact, a State map shows a large valley coming in from the west called a sand gap and indicates that there is no Ogallala in this area? This is, I think, not quite true, there is a large valley coming in at a re-entrant into the Caprock, so the edge of the Ogallala is closer to Lane Lake in this position than it would be to the north and south, but we are near the outcrop, near the edge of the Ogallala, the water

table is quite, dipping quite seeply to the east, toward the Lake.

MR. HAYS: This is dipping toward the east?

THE WITNESS: Yes, sir. The regional dip is to the southeast and in this particular area, I think in response to the Lake, the dip is to the east. The regional grade is to the south, all across Lea County.

The water level is at ~~4559~~ 4259, approximately in this well and this is plus or minus a few feet because this is not a tide elevation.

MR. PORTER: This well, would you identify that by number?

THE WITNESS: Yes, sir. In the northwest corner of Section 14, 10 South 33.

MR. PORTER: Thank you.

A The water level is higher than 4189 and a well in the southeast part of Section 36 right on the township line, 36, between 32 and 33 East, this is a pumping level. The water level is 4257 in the well in the center of the southwest quarter of Section 25, 10 South, 32.

By comparison with these relatively high water table elevations, the water table up through the balance of this township with the exception of the Lake, is fairly flat, ranging from 4163 to 4164, 4170, 68, 66, 65, 58, a questionable

figure here, 60 and 65, 4165.

MR. PORTER: This township you are referring to 10, 33?

THE WITNESS: 10, 33.

MR. PORTER: Thank you.

A The water level in the triassic wells is substantially deeper as we normally find than the water level in the Ogallala.

Of interest and of importance in examining the hydrolic system made up by Lane Lake is the fact that there is reversal in the hydrolic gradient between a well in the northeast corner of Section 19, 10 south 33, two wells in the southwest corner of Section 18 of the same township and the elevation of the spring on the east side of the Lake, in Section 7.

The water table is 4170 in this water well; in 19, 4164, 4163 in 18; 4142.5 on the east side of the Lake, so there is northwest dip at least in this area, northwest dip of the water table into the lake with a difference in elevation of approximately 28 feet from the well in Section 19 to the water level on the east side of the Lake, and this water level is about one and a half feet higher than the average level of the lake bed itself. The spring is up on a little bench at the base of a break in the escarpment and

about one and a half feet above the elevation of the Lake itself. We do not have lake bed elevation because at this time we could not get in there. It was too muddy.

Based upon this reversal in the hydrolic grading and further based upon a ridge on the red bed surface which comes up through the southwest part of the area studied, can be identified into Section 19. Another ridge coming through the central part of the study area from the north and coming southwesterly at least into Section 8 and 17 of 10 South, 33. There being no control in this particular area to connect these two ridges, it seems most probable to me that there is a regional ridge, northeast and southwest trending ridge on the red bed surface, in about, diagonally, about the central part of the mapped area. We have good control for all of this northern part of the triassic surface and good control for this part. No control in the center.

MR. PORTER: Good control for the southwest part?

THE WITNESS: For the southwest part, yes, sir. A combination then of a ridge on the base of the aquafer, low permeability of the Ogalla as indicated by a 19 foot decline in the water level in a well in Section 19, 10 South, 33, as between the static level and the pumping level of a windmill which is pumping relatively small quantities

of water, probably under 5 gallons per minute, would suggest that the discharge of this lake, acting as a pump, as a large pump covering 340 acres, has created a continuous depression in the water table surface of some magnitude measured in feet, The exact amount, we can't testify to because there is no oontrol on the southeast side of the Lake except for these three wells immediately south, but it would appear that since there is no spring discharge on this side observable, there is spring discharge on the southeast side observable, there is a depression in the water table surface of a permanent nature which we have indicated to have a relief of some 19 feet.

The water then from the springs would represent the movement of what we think is Ogallala water in a northwesterly direction satisfying the demand of this Lake for discharge of some magnitude. The springs then are derived from probable Ogallala settlements in response to this reversal in the hydrolic gradient and the quality probable is determined by the amount of evaporate material that has blown up historically over many thousands of years from the lake bed itself, depositing both sodium chloride, calcium chloride, magnesium sulphate and other salts in this illuvial ridge, water moving through that ridge over a substantial distance couldn't have this quality.

I have shown a water table divided somewhere near

I have shown a water table divided somewhere near the central part of the map with a 4160 contour on the elevation, on the water table in Section 18. A similar 4160 contour in Section 28, 22 and so forth in the southeast part of the map, a flat area in the central part of the map and a postulated 4150 without control. It has to be here somewhere because beyond this divide there is regional hydrolic gradiant to the Ogallala water table.

MR. PORTER: May I ask you, at this point, you have indicated that the seepage at this point is salt water. Do you have any information as to whether these were ever fresh water springs?

THE WITNESS: I have no information that these were ever fresh water springs. I have been told that some years ago the fresh water did seep into the southwest side of the lake. I can see how this patch of Ogallala could well have been a source of --

MR. PORTER: There is no seepage in the Ogallala?

THE WITNESS: No. There is no seepage of water in the Ogallala at this time and I see no evidence that it has been there in the recent past.

MR. PORTER: You also referred to the three wells south of the lake here. I see the chloride content in one there at 154 and one at 182.

THE WITNESS: Yes, sir.

MR. PORTER: Do you have any history of the chloride content of the wells, other than the present samples that have been taken?

THE WITNESS: No, sir, I have none and the survey, USGS, when they made their study of this area, did not collect any samples in this particular area.

MR. PORTER: What is that water used for?

THE WITNESS: Stock and domestic. These aren't domestic wells they are stock wells.

MR. PORTER: Ranch house supply?

THE WITNESS: Yes, sir, in the northeast corner of 19.

MR. HAYS: Do you think there is any connection between the lake and those wells?

THE WITNESS: No, sir, in this respect, this particular lake is substantially different from other salt lakes that we have examined.

MR. HAYS: How do you explain that draw-down in that one well then?

THE WITNESS: In the Ranch well?

MR. HAYS: You have one well there, didn't you say there was a draw-down right in here?

THE WITNESS: Yes, sir, 19, northeast, corner of 19.

MR. HAYS: How do you explain that draw-down?

THE WITNESS: Low permeability.

MR. HAYS: Did you examine it just as a turn well and then you saw that the draw-down went down 19 feet?

THE WITNESS: No, sir, I measured, when it was pumping and my field man measured later after it had been shut-in. The difference, one of the differences in this lake and other salt lakes that I have examined, is this question of material reversal of hydrolic gradient on the southeast side. In other lakes that we have examined in Texas, we have found that the lakes do, under natural conditions, periodically discharge water from the lake into the ground water zone, into the Ogallala in response to run-off into the lake, rising depth of water in the lake, overcoming the reversal in the hydrolic gradient and discharge of poor quality water into the Ogallala, which has had the result of the creation of wide areas down the hydrolic gradient of brackish water, in some cases, extending for a good many miles. But I would add that these lakes are in areas where the Ogallala has a high permeability and is substantially thick. This is an area of relatively thin Ogallala. The maximum depth perhaps 60 or 70 feet in the above areas, may be a hundred feet in the lower parts, but in the areas, we have examined on the order of 5 to 30 feet in thickness and obviously low permeability. So it

seems to me, and it is my opinion that this is a closed hydrolic system in which both surface water and ground water is discharging into the lake and, or flowing into the lake, I should say, and all of the discharge from the lake is by evaporation.

MR. HAYS: If you flow the amount of water into this, brackish water into this lake, like you are wanting to do, how much of it will raise the level of the lake into the area that you are figuring on?

THE WITNESS: We have made a number of calculations based upon the average evaporation, net evaporation in the area which amounts to 61.14 inches according to our calculations. This is --

Q (By Mr. Kellahin) That's per year?

A Per year. This is lake evaporation, less rainfall.

MR. HAYS: Go over that once more for me.

THE WITNESS: We have calculated the net evaporation under average conditions to be 61.14 inches per year.

MR. HAYS: 61 --

THE WITNESS: The gross evaporation amounts to 76.82 inches, based upon pan co-effecients and correcting the evaporation for an evaporation rate of 50,000 parts per million brine. The rainfall is 15.68 inches average, so the net evaporation would be 61.14 inches. We have examined the

performance of this lake under --

MR. PORTER: By way of explanation here, Mr. Reed, you have testified that the net evaporation here, I believe, would be 61.14 inches, per year?

THE WITNESS: Yes, sir.

MR. PORTER: In other words, if you had this lake filled to a depth of 61.14 inches, in twelve months it would dry up?

THE WITNESS: It isn't quite like that because you are not adding any rainfall back to that.

MR. PORTER: I mean, assuming there is no recharge or anything.

THE WITNESS: Assuming no rainfall, the gross evaporation is 76.82 inches.

MR. PORTER: Oh, I see.

THE WITNESS: But I have taken the rainfall from this.

MR. PORTER: If you add in rainfall, or no change of conditions, it would evaporate up to 76 inches then?

THE WITNESS: This is correct, yes. The average pan evaporation is 99 inches. We made corrections for the co-efficient to the pan evaporation and the co-efficient for brine at 5,000 parts per million.

MR. PORTER: Mr. Kellahin, I'm not quite sure who

is conducting the direct examination?

MR. KELLAHIN: You are doing fine.

MR. HAYS: That is kind of rapid evaporation for fresh water?

THE WITNESS: Salt water. We have reduced the pan evaporation by a point of 97 to yield evaporation of 50,000 parts per million brine. Now the more concentrated, the more reduction would have to be applied.

MR. HAYS: Do you ever run tests on this kind of stuff and actually evaporate that much water?

THE WITNESS: I will quote to you the Bureau of Reclamation figures in a few minutes. Yes, it will.

MR. HAYS: That is sure a lot of water.

THE WITNESS: That's a lot of water. Based upon these figures we have made calculations of performance of this reservoir starting with the water year of October, because this is the beginning of the low evaporation period of a year. We have assumed average conditions. We have assumed a lake to be dry at the time of beginning the input of water. From this data and assuming an input of 30,000 barrels per day, which amounts to about 4 and a quarter inches per month, depending upon the number of days and beginning in October, the first of October, with a dry lake, the depth to water at the end of February, would amount to 6.95 inches.

MR. PORTER: You say 30,000 barrels per day would raise the water level 4 and a quarter inches per month?

THE WITNESS: Would put that much into the lake. Let me back up a little bit. We have prelimetered Mr. Sherman's map of the closing contour of the maximum depth to water that has been observed in recent months and this amounts to three hundred and forty surface acres. 30,000 barrels per day amounts to 3.87 acre feet per day and on a monthly basis, this would amount to about 4 and a quarter inches or a little less per month. Evaporation rates range from a low of 1.94 in December to a high of 8.67 in June, so going through an input discharge balance calculation or reservoir performance calculation, we have come up with a maximum depth to water by the end of February of 6.95 inches.

MR. PORTER: Excuse me, just a moment, Mr. Reed. Would you give me that December and June figure again?

THE WITNESS: Yes, sir. The evaporation?

MR. PORTER: Evaporation.

THE WITNESS: December would be 1.94, the June figure would be 8.67. Those are the extremeties.

MR. PORTER: Thank you.

THE WITNESS: Yes, sir. Beginning in March, the evaporation rate, now exceeds the input rate by a gradually increasing amount, not taking into consideration surface inflow

at all at the present time, by the end of April, the lake is now dry, and by the end of April, we have accumulated an amount equal to 319 acre feet, that would be available for future evaporation of the inflow water into the lake. Both surface inflow and ground water discharge which will continue to come in concurrently with the input of brine, we now have an amount equal to 319 acre feet, which in my opinion is adequate to take care of the total inflow both of ground water and surface water into this lake. So that at the rate of 30,000 barrels per day there is no accumulation and in an average year, from year to year of water in the lake. Similar calculations at 35,000 barrels per day, indicate defficiency or a net value totaling 89 acre feet for inflow of surface water and ground water discharge. Under these conditions, there could be a carryover of some magnitude in an average year.

Q (By Mr. Kellahin) In other words, if you raised the input to 35,000 barrels a day, evaporation would not keep up with it, is that what you are saying?

A Would not keep up with the inflow itself. It would keep up with the amount being put into the lake, but not with the inflow.

Q Now, under the circumstances you have outlined, if for example a total of 30,000 barrels per day were discharged into the lake, would that have any effect on the

hydrolic system and reverse the flow of water as you have outlined previously, where you say the water is flowing into the lake rather than out of it?

A In my opinion, it would not.

Q Under those circumstances then, Mr. Reed, in your opinion would there be any possibility of contamination of fresh water supplies in the vicinity of Lane Lake, in the event this volume of water is put into it?

A In my opinion, there would not be any possibility of contamination of ground water because I don't believe that this amount of water would begin to balance the amount of reversal of hydrolic gradient into the lake.

Q Now, you outlined some details of the situation as to the Ogallala water. Does the same situation prevail as to triassic water in the northern portion of the plat shown as Exhibit 3?

A I think not.

Q What is the situation as to the triassic, how would it be protected from any inflow of water?

A The triassic water occurs in sand at considerable greater depths than the Ogallala. The overlying material is generally considered to be an impermeable red silty clay, the fact that there is a difference presently in the water table of the triassic and of the Ogallala and of the lake,

would indicate there is no leakage from the Ogallala into the triassic. In this respect the conditions agree with other areas for which other detailed studies have been made, where we find no hydrolic communication between the Ogallala and the triassic. In only very limited areas do we find this to occur. We have substantial differences in depth to water. As a matter of fact, the triassic water in the northeast corner of Section 3, 10 South, 33 East, is of better quality than any of the other wells we have examined.

It is my judgment that the base of Lane Lake underneath the evaporate of which are unknown at the present time, but which could be of substantial thickness, is upon the triassic and it is my personal opinion that this has an impermeable bottom brine of the fact that the triassic is still of good quality adjacent to the Lake. Had there been hydrolic communication between the two, we would have had substantial different quality at this time in the wells adjoining the lake and it is my judgment that if the hydrolic system is not materially modified by the disposal of water into the lake, there will be no deterioration in the quality of water, only by completely upsetting this hydrolic system by high of the grade into the lake can we cause damage.

MR. HAYS: Mr. Reed, if you flow this amount of water into this Lake, which you are anticipating, how long

would it take for communication between this lake and the wells? How long would it take, if it is going to contaminate them, would it take for it to show up, in your opinion?

THE WITNESS: We have not run any real pumping tests of the aquafer in this area and I don't know what the permeability is, but based upon the little data that we do have, the permeability appears to be quite low and would expect the rate of movement under normal conditions at 10 or so feet to the mile of hydrolic gradient, to be less than one hundred feet per year. Now, I can't give you a figure that has any real meaning because we don't have the data to make the calculation, but I think it would be of this order of magnitude of less than a hundred feet per year. Of course, in order to do this, we don't know precisely the amount of total reversal into this Lake. We do know that it is substantial, but to the degree that the water does not rise above the depth of the Ogallala in the adjacent area, there could be no contamination, in my opinion.

Q (By Mr. Kellahin) Now, as I understand your testimony, if you put 30,000 barrels a day in that Lake, the level will not rise above the Ogallala?

A This is my opinion, yes, sir. Above the point at which it is now escaping into the Lake, above the spring elevation.

Q The spring elevations are actually somewhat above the lake bed?

A One and a half feet.

Q One and a half feet?

A Yes, sir.

Q In your opinion then, would it be a safe procedure to use the Lane Lake for disposal of salt water as proposed by Stoltz and Company?

A Yes, sir, within some limitations, yes, sir, I believe it would be.

Q Now, what limitations are you talking about, Mr. Reed?

A In my opinion, at this time, and with what we know of conditions, I think 30,000 barrels a day would be a safe figure. The amount to which this could be increased depends upon data that we do not now have and further, it would depend upon the reaction of this Lake under these conditions and confirmation of the data, and I can't say how much more can be put in. Some more probably could be put into the Lake without raising the water level to the point where pumping wells, existing pumping wells could intercept this water surface. This may be a matter of one, two, three or four feet, I can't answer the question at this time.

Q Would you be able to answer that question after

some experience with water disposal in the lake?

A And with additional data, yes, sir.

Q Would you recommend, then, to this Commission that some Administrative procedure be set up whereby the amount of water that may be disposed of in Lane Lake, could be increased at a future date in the event the Lake would take it?

A Yes, sir, I believe this would be practical.

Q And just basically, in summary, what type of data would be required to support such an application?

A Continued and periodic measurements of water levels to determine the range which they might have from month to month a nd from year to year, examination of input evaporation rate data into the lake, continued observance of springs and continued observance of the quality of water, perhaps some additional water table data would be desirable.

Q Mr. Reed, Exhibit Number 2, the twenty-five page exhibit composed of water analyses, were furnished to you by a laboratory, is that correct?

A That's correct.

Q And Exhibit Number 3 was prepared by you, is that correct, or under your supervision?

A That's correct, yes.

MR. KELLAHIN: At this point, I would like to offer in evidence, Exhibits 2 and 3.

MR. PORTER: If there are no objections, the Exhibits will be admitted.

(Whereupon, Applicant's Exhibits 2 and 3 were admitted into evidence.)

Q (By Mr. Kellahin) Do you have anything to add to your testimony, Mr. Reed, at this time?

A I believe not.

MR. KELLAHIN: That completes my direct examination. Have you completed yours?

MR. PORTER: We will take a ten minute recess.

(Whereupon, a short recess was taken.)

MR. PORTER: The hearing will come to order. Mr. Kellahin has indicated he either has another question on direct or he wants to begin the cross examination.

Q (By Mr. Kellahin) Mr. Reed, in your direct testimony, you made mention of "pan evaporation? as being the basis of your computations on evaporation from this lake. Would you give us a little more information on just how this calculation was arrived at?

A Yes, sir. The Westher Bureau has maintained what is called a "Class A Land Pan" which is a standard method of determining evaporation in three locatities in this general area. One at Portales, one at Bitter Lake and one at Lake Avalon. There are carefully controlled water surfaces from

which total evaporation rates are determined. It is customary to apply a co-efficient to the pan evaporation records ranging from seven tenths of the actual record in a large lake, to nine tenths in a small lake, which more nearly duplicates the conditions of the pan. In large lakes we customarily use seven tenths.

In the studies by the U.S.G.S. Cox and Haven's report, at Malaga Bend in the salt water diversion project on the Pecos River, they have used nine tenths because this is a small lake covering fifty-two acres of land and shallow water.

In this case with a little larger lake, but with probably shallower water, I have used a co-efficient of eight tenths of the actual pan record. The average annual evaporation from the pan of these three stations is ninety-nine inches. To that ninety-nine inches we have applied a factor. Eight tenths to correct for fresh water and .97 to correct for the lower evaporation rates of a brine of the concentration which we are here considering. This yield, a co-efficient of .776 applied to the gross evaporation from the pan records. This yields an evaporation of 76.82 inches. From this we have subtracted the rainfall to derive a net evaporation height under average conditions of 61.14 inches as the vertical height of water that would under average conditions be evaporated from a

relatively small shallow lake.

To compare this tabulation, we went to the U.S.G.S. report by Cox and Havens, their analysis of the performance of the storage area in the so-called northeast depression at Malaga Bend which has now been in operation since July of 1963. Eliminating the question of leakage from the lake, which is of some question and examining only their calculations of the net evaporation from the 52.8 acres in the northeast depression for twelve months and applying this -- I believe eleven months -- applying this on the basis of evaporation, in acre feet, per acre of surface covered to Lane Lake, we have come up with 35,609 barrels per day as representing the same degree of evaporation from Lane Lake with it's three hundred and forty acre surface, compared to the northeast depression with it's 52.8, which is very close to the fires that we derived at 35,000 barrels a day showing an availability of 89 acre feet for inflow and surface runoff.

Q As I understand, then, your figures from Malaga Bend are based on actual experience?

A Yes, they had their weather data at the site and made what I feel, are accurate calculations of the actual evaporation from the Lake.

Q And in making your calculations, you have assumed it will rain again?

A Yes, sir. I have.

MR. HAYS: Have you ever been in this Lake when it was dry?

THE WITNESS: Yes, sir, I have.

MR. HAYS: And you could walk across it?

THE WITNESS: Well, I couldn't quite walk -- I didn't think I could walk across it. I didn't try it. It was a humid day and water was right at the surface of the lake, Mr. Hays.

MR. HAYS: And the information you have given us, you have got that sixty-one inches of water on this surface, that is over four feet of water and that much water would evaporate, right?

THE WITNESS: If it were available, yes. Now the evaporation rate of the Lake under its present conditions will be substantially less than 61 inches, for the reason that during much of the year the water that is evaporated from the lake must move up by capillary action and be evaporated from the surface. We do not have a free water surface much of the year.

MR. HAYS: With all these figures and everything you have been using, and everything, four feet of water will evaporate off of that Lake in a year?

THE WITNESS: A little more than that, about five

feet.

MR. HAYS: Off the record.

(Whereupon, an off-the-record discussion was held.)

MR. PORTER: Back on the record.

Q (By Mr. Kellahin) Mr. Reed, if the 30,000 barrel figure is used and that amount of water is put on the lake, at any time, would the depth of the water be four feet?

A No, sir.

Q The evaporation would be continuous, actually it would be considerably less than that, wouldn't it?

A In my opinion, it would, yes, sir.

A Have you made a study of the red beds in this area of this lake?

Q Yes, sir.

A Do you have a map showing that?

Q Yes, sir, I do. It is a work map, I bring this only to show the amount of detail that was available for the preparation of the triassic red bed map. It is not in form to be submitted as an Exhibit but does show the density of control and the absence of control in those areas for which there is no data, but it is available to me. That is only for information purposes. We have examined the driller's logs and the elevation of each of the shot-holes for which the data was

available.

MR. KELLAHIN: That's all I have of the witness.

MR. PORTER: Mr. Reed, I am sure there will be some other questions, but at this point I would like for Mr. Hatch, our attorney, to read a letter which we have received from the office of the State Engineer and I want to ask you your opinion concerning this letter. Would you read that letter, Mr. Hatch?

MR. HATCH: It is a letter from the State Engineer's office dated May 17th, 1967. Addressed to the Secretary-Director of the Oil Conservation Commission. "I have reviewed with considerable detail an exhibit to be entered in Case 3570 made on behalf of Stoltz and Company. The exhibit is a planametric map of Township 10 South, Range 32 and 33 East, labeled "Ground Water Conditions, Lane Salt Lake and Vicinity."

"The contours representing the red bed structure to the southeast of the subject lake, indicate a channel in this direction which is overlain with more recent deposits. I feel that there may be some transmission of the brines, which will be disposed into the Lake through this channel if the application is granted. I have no criticism of the exhibit or the conclusions which the witness Ed Reed will present. However, I feel that it would be wise to require the applicant to provide one or two observation wells in Section 17, or near

that Section, drilled to the red beds and that these wells be equipped and monitored for water quality changes. By such observations, it could be readily determined if the brines from the lake are migrating southeastward into the fresh water Ogallala formation. The depth of land surface to the red beds would be approximately fifty feet. Very truly yours, S. E. Reynolds, State Engineer, by Frank E. Irby, Chief of the Water Rights Division."

CROSS EXAMINATION

BY MR. PORTER:

Q Mr. Reed, the question I wanted to ask you, what is your opinion as to the desirability of a couple of wells which will be used for the purpose of monitoring the chloride content?

A I think it would be desirable.

Q You think it would be desirable?

A Yes, sir.

MR. PORTER: How deep did he indicate those wells to be? Fifty feet or --

MR. HATCH: Well, he said the depth from the land surface to the red beds would be approximately fifty feet. I assume he means in this Section 17, that he is speaking of, but that I don't know.

MR. PORTER: Does anyone else have a question now

of Mr. Reed? Mr. Nutter?

CROSS EXAMINATION

BY MR. NUTTER:

Q Mr. Reed, how many of these water wells that are shown on this map are triassic water wells?

A Three.

Q Now, the one in the northeast corner of Section 3, you mentioned was, what are the other two, please?

A One in the southeast quarter of Section 34 and one in the east central part of Section 5 of 10 South, 33.

Q The one that has the water level of 4093?

A Yes, sir.

Q And all the rest of them are Ogallala water wells?

A I believe so, yes, sir. there is some possible question about the well in Section 16, but I believe from its water level, it is an Ogallala water well.

Q Well now, you mentioned a difference in water elevation of some 19 feet from an Ogallala water well to the water level of the seep on the southeast side of the Lake?

A Yes, sir.

Q What would that 19 feet be? Between the seep and

which well?

A I'm sorry, it would be 28 feet. I was subtracting in my head.

Q I see.

A It would be 28 feet, Mr. Nutter.

Q It would be the well in Section 19?

A 19, yes, sir. That happens to have the highest water level of any wells we measured in the area southeast of the Lake.

Q And according to this then, the water table in the Ogallala would probably be dipping to the northwest?

A That's correct, yes, sir.

Q Now, what is holding the level of the lake bed at its present level, is it the existence of water just below the surface?

A I believe it is side inflow from the --

Q No, I mean what is holding the level of the lake bed?

MR. PORTER: You mean the water level in the lake bed?

A The physical surface of the lake bed?

Q What is holding the sand on the bottom, in other words? Is it moisture coming up from the bottom?

A In part, yes, sir. The fact that there is a

balance -- well, there is really not a balance, I believe the lake bed is probably declining.

Q As the general area declines, the lake bed would decline, would it not?

A Yes, sir, under periods when evaporation exceeds the discharge into the lake, and the top two or three inches is dry and we have windy weather, I believe there is some reudtion of the surface of the lake elevation.

Q Now, you said that there was one area on the west side where the Ogallala formation is exposed and there is a couple of cretacious sections and one triassic section shown on your map. You mentioned also, that the east side of the lake was covered with wind-blown debris, so how can you tell that seep on the southeast side of the lake would be coming from the Ogallala?

A Only by inference. The Ogallala is present southeast of the lake at some position. The water in the triassic is deeper in this position and it is either water in the surficial alluvial material of creternia age or Ogallala and I rather suspect it is Ogallala.

Q Do you suspect the Ogallala formation is presently under the surface of the lake?

A I don't believe it is, no, sir.

Q But it has all been erroded off and that triassic

rocks would underlie the alluvial sand?

A Yes, sir, I believe the cretacious has probably been removed underneath the lake, also.

Q Now, when you were calculating your evaporative rate at being approximately four inches -- when you were calculating that if you put 30,000 barrels per day in, this would be approximately four inches per month and would be covered by the evaporation. What area of evaporation were you considering, three hundred forty acres?

A Three hundred and forty acres, yes, sir.

Q Is the lake bed uniform enough on the surface that three hundred and forty acres of the area would be covered by water discharging in there at an average of four inches per month?

A There seems to be less than a foot of relief between the contour that Mr. Sherman drew on the ground and the average level out in the lake. It may be a little more, but I have assumed, to be conservative, that there was less than a foot of relief, so that there would be uniform thickness of water. This may not be quite true, it may be a foot and a half in the lowest spot which would take some of the water. It would then mean, of course, a smaller surface area exposed, but it also would mean that the same volume of water would not cover the same number of surface acres.

Q But there is less than a foot of relief throughout the lake bed?

A I think so, and Mr. Sherman has expressed the same opinion to me.

Q How thick is the sand in the lake bed?

A I don't know, it has not been tested. I suspect, based upon thicknesses we have determined in other lakes of about the same age and with the same geological conditions, that it would be measured at several feet, perhaps several tens of feet, but I can't answer the question.

Q And below this sand would be impermeable red beds?

A This is my opinion, yes, sir.

Q Now, the nearest Ogallala water well to the southeast would be this one, with the water level at 3163, that is the top of the water in the Ogallala, isn't it?

A Yes, sir.

Q Do you know what the depth of the Ogallala or the thickness of the Ogallala is there?

A Yes, sir. The base of the well -- let me see, I believe we measured the depth of that well as being 46.2 feet. The water level was 19 feet, so that would mean --

MR. PORTER: You mean a hundred and something, don't you?

A Depths to water, I am speaking about now. Twenty-

five feet of water.

Q Twenty-five feet of water?

A I believe this is correct.

Q So, the bottom of the water then would still be higher than the lake bed?

A This is correct, yes, sir. We have taken this into consideration.

MR. PORTER: I see, thank you.

THE WITNESS: Yes, sir.

CROSS EXAMINATION

BY MR. PORTER:

Q Mr. Reed, you have testified that in your opinion, after your study, that both the surface and the ground water flows to the lake?

A Yes, sir.

Q And that the only discharge is through evaporation?

A Yes, sir.

Q Now, this would be true, I believe you state, in your opinion up to a volume of 30,000 barrels per day being put into the lake?

A Yes, sir.

Q But that something substantially above 30,000 might upset this situation?

A I don't know what the upper limit will be because

we don't have that type of data to determine.

Q But in the event the Commission should consider the granting of the application, you would recommend the exercising of caution in going above this volume of 30,000?

A Yes, sir.

MR. PORTER: Does anyone else have a question? The witness may be excused.

(Whereupon, the witness was excused.)

MR. PORTER: Mr. Nutter, were you through?

MR. NUTTER: I believe so.

MR. KELLAHIN: I would like to recall Mr. Brown briefly, if I may.

MR. PORTER: Yes, I have a question of Mr. Brown too. Would you take the stand, Mr. Brown?

J. G. BROWN, recalled as a witness on behalf of the applicant, first previously having been duly sworn, was examined and testified as follows:

Q You are the same Mr. Brown that previously testified in this Case?

A Yes, sir.

Q Mr. Brown, you testified as to the alternatives to use of Lane Lake for a water disposal as consisting of the drilling of Devonian wells for water disposal. Are there any

Devonian wells available at this time that could be used for that purpose in the North Bagley area?

A No, sir, it was determined that Devonian wells would have to be drilled from top to bottom.

Q Now, assuming you are going to make disposition of something like 30,000 barrels of water per day, how many Devonian wells would be required in your opinion, to handle that volume?

A In the opinion of the North Bagley operators, at this meeting we had, it is an unknown factor, but they say it could take as many as three or more Devonian wells to handle the volume of water required.

Q Are you familiar with the cost of drilling wells in this area?

A It is also the opinion of the operators present, it was a rough estimate at the time, but it cost in the neighborhood of $300,000 to drill and equip each Devonian well as a water disposal well.

Q Now, have you made any estimate of the cost of laying the lines and utilizing Lane Lake for water disposal?

A The laying of the gathering system would be common to both, or any system that you used. Additional line to go from the North Bagley field to the Lake would cost in the neighborhood of a hundred to a hundred and fifty thousand

dollars.

Q That would be for all practical purposes. The total cost of a water disposal system in Lane Lake as compared to the Devonian Lake, would be a hundred and fifty thousand dollars as against three hundred thousand for each well you would have to drill, is that your testimony?

A Yes, sir.

Q And a minimum of nine hundred thousand, roughly, or more for Devonian wells?

A Yes, sir.

MR. KELLAHIN: That's all I have.

BY MR. PORTER:

Q Mr. Brown, do you know what is, roughly, the total volume of water now being produced by Stoltz per day?

A No, sir, it varies, in the neighborhood of 8,000 barrels a day I believe, current wells.

Q In the event the Commission should authorize disposal here, there would be considerable space available for other producers in the pool?

A Yes, sir. That was our intention to make it available to the other operators in the pool and the 30,000 barrel figure or 35,000 would be adequate for the present wells and some additional development in the field.

Q The present production, I believe, you testified,

is in the neighborhood of 15 to 20,000?

A Yes, sir.

Q In the Pool?

A Yes, sir.

Q Do you expect the water production to increase? I'm talking about the existing wells.

A Experience hasn't been for any individual zone for the water to increase, as a matter of fact, quite often it does decrease, but there are several reservoirs in the field as you change from one reservoir to another, it might, where you might have a hundred barrels a day, if you change reservoirs, as one zone becomes non-commercial, why you are liable to increase from 100 barrels a day to 500 barrels a day by changing different reservoirs.

Q The water-oil ratio increases in your own existing well, I am sure, the water-oil ratio?

A It hasn't been the past experience for it to increase. It does over short periods, and we have had some wells that have decreased considerably. Most of the wells in this field aren't too old, most of them have been drilled within the last year, so we haven't got any long range knowledge of what might happen to the ratios.

Q What size line were you anticipating here, Mr. Brown?

A it would be in the neighborhood of ten and three quarters to twelve and three quarters for the main line going to the lake.

Q And it is about how many, about four miles?

A About four miles from the north end of the Field, yes, sir.

CROSS EXAMINATION

BY MR. HAYS:

Q Is it going to be a gravity flow?

A It will probably have to be a combination. There is some gravity toward the lake, I believe it is in the neighborhood of 75 feet from the north end of the field to the lake.

CROSS EXAMINATION

BY MR. PORTER:

Q Will that line be treated with anything, plastic-coated or anything?

A Yes, sir, it will have to be a special line to accommodate corrosive of water. It will not be steel line, it will be either cement or plastic-coated or some special treatment.

CROSS EXAMINATION

BY MR. RAMEY:

Q Mr. Brown, do you anticipate setting up some kind

of water and oil separation equipment?

A Yes, sir, that will be necessary to keep any oil that might carry over from going to the Lake.

MR. PORTER: You mean separation before it goes into the line, Mr. Ramey?

THE WITNESS: At some point on the line before it reaches the Lake, you will have to have some separation system in case some small fraction of oil should be carried over with the water from the producing regions.

MR. RAMEY: The film of oil on top of the water in the lake would reduce the evaporation down considerably.

MR. PORTER: And there is an accumulation of oil usually at the injection point on your existing disposal system?

MR. RAMEY: Yes, sir.

MR. PORTER: Any further questions? You may be excused.

(Witness was excused.)

MR. KELLAHIN: That's all we have on our presentation, Mr. Porter and Mr. Hays. In connection with the letter from the State Engineer, as I understand, his only comment was he thought it was advisable that observation wells be drilled to determine whether there was any encroachment of water in the triassic. It has been recommended by Mr. Reed, as his

testimony shows, in his recommendation to Stoltz and Company, that certain observation wells be drilled in order to evaluate this project for their own protection and for the protection of the fresh water zones and for the protection of the ranchers in the area. Certainly, Stoltz and Company plans to drill such wells and will drill any observation well that may be required.

MR. PORTER: Does anyone else have any statement or comment on this application?

MR. O'QUINN: I am speaking on behalf of Cabot Corporation. Cabot feels that the evidence presented here today bears out the applicant's contention that no additional contamination of fresh water would --

MR. PORTER: Will you speak a little louder, please?

MR. O'QUINN: Cabot Corporation feels that the evidence presented here today, bears out the applicant's contention that no additional contamination of fresh water would result from granting this application and we urge the Commission to act favorably upon it.

MR. PORTER: Mr. Johnson, I believe you live in the vicinity of this Lake, do you have any comment on this application?

MR. JOHNSON: I would just like to say before anybody did anything, they better be sure about this fresh

water because we all know how little we have of it and how short it is getting. If something happened to it, why it would put me out of business pretty quick.

MR. PORTER: How far are your wells that you are using out of, from the Lake?

MR. JOHNSON: I have got, the closest one is a mile, just about a mile and then the house mill is about a mile and a half from the Lake, from the south end of the Lake and I have got another one in the triassic that is about a mile and a half, I believe, roughly a mile and a half on the northeast side of the Lake.

MR. PORTER: Thank you.

MR. JOHNSON: I just want to say, to give it a lot of thought. I have.

MR. PORTER: I am sure that's right. If there are no further statements to be made, the Commission will take the Case under advisement.

MR. HATCH: I have a telegram.

MR. PORTER: Oh, excuse me. You have a telegram? Mr. Hatch has a telegram.

MR. HATCH: I have a telegram that is dated May the 16th, 1967, addressed to the Oil Conservation Commission. "With reference to Case 3570, relative to the application of Stoltz and Company disposing of produced salt water in the North

Bagley field area of Lea Connty, New Mexico, please be advised that Clark Oil and Refining Corporation, a non-operating working interest owner in the said North Bagley field, supports Stoltz and Company in their application to Commission for an order to dispose of produced salt water. Signed Clark Oil and Refinery Corporation, by P. W. Townsend."

MR. PORTER: Is there anything further?

MR. HATCH: That's all.

MR. PORTER: The Commission will take the Case under advisement and the Hearing is adjourned.

(Whereupon, the Hearing was concluded.)

STATE OF NEW MEXICO)
) SS.
COUNTY OF BERNALILLO)

I, JERRY POTTS, Court Reporter, do hereby certify that the foregoing and attached transcript of proceedings before the New Mexico Oil Conservation Commission Examiner at Santa Fe, New Mexico, is a true and correct record to the best of my knowledge, skill and ability.

IN WITNESS WHEREOF I have affixed my hand and notarial seal this 29th day of May, 1967.

Jerry Potts
Notary Public - Court Reporter

My Commission Expires:

July 10, 1970

SOUTHWESTERN LABORATORIES

FORT WORTH DALLAS HOUSTON MIDLAND BEAUMONT TEXARKANA

CONSULTING, ANALYTICAL CHEMISTS
AND TESTING ENGINEERS

Midland, Texas 4-22-67 File No. C-1902-R1

Report of tests on Water

To Mr. Ed L. Reed Date Rec'd. 4-20-67

Received from Mr. Ed L. Reed

Identification Marks Lea County, New Mexico, Deane Stoltz, West side of Lake (50 ft. in from shore) Section 7-10S-33E

	Mg/L
Chloride 1:1 extract	33283
Sulfate 1:1 extract	16458

BEFORE THE
OIL CONSERVATION COMMISSION
Santa Fe, New Mexico
Appl. Exhibit No. 9
Case No. 3570

Copies: 3cc Mr. Ed L. Reed

SOUTHWESTERN LABORATORIES
Jack H Boulton

Lab. No. C-2594

SOUTHWESTERN LABORATORIES

FORT WORTH DALLAS HOUSTON MIDLAND BEAUMONT TEXARKANA

CONSULTING, ANALYTICAL CHEMISTS
AND TESTING ENGINEERS

Midland, Texas 4-28-67 File No. C-1902-R1

Report of tests on Water

To Mr. Ed L. Reed Date Rec'd. 4-24-67

Received from Mr. Ed L. Reed

Identification Marks Deane Stoltz, Seep East side of lake 900 ft. South of sun dry hole, middle S.E./4, S.E./4 Section 6-10S-33E.

	Mg/L
Chloride	12,788
Sulfate	19,265
Total dissolved solids (evap.)	48,290

Copies: 3cc Mr. Ed L. Reed

SOUTHWESTERN LABORATORIES
Jack H Barton

Lab. No. C-2617

SOUTHWESTERN LABORATORIES

FORT WORTH DALLAS HOUSTON MIDLAND BEAUMONT TEXARKANA

CONSULTING, ANALYTICAL CHEMISTS
AND TESTING ENGINEERS

Midland, Texas 4-28-67 File No. C-1902-R1

Report of tests on Water

To Mr. Ed L. Reed Date Rec'd. 4-24-67

Received from Mr. Ed L. Reed

Identification Marks Deane Stoltz, Seep East side of lake 730 ft. South of sun dry hole middle S.E./4, S.E./4 Section 6-10S-33E

	Mg/L
Chloride	15,240
Sulfate	16,232
Total dissolved solids (evap.)	48,860

Copies: 3cc Mr. Ed L. Reed

SOUTHWESTERN LABORATORIES

Jack H Barton

Lab. No. C-2619

SOUTHWESTERN LABORATORIES

FORT WORTH DALLAS HOUSTON MIDLAND BEAUMONT TEXARKANA

CONSULTING, ANALYTICAL CHEMISTS
AND TESTING ENGINEERS

Midland, Texas 4-28-67 File No. C-1902-R1

Report of tests on Water

To Mr. Ed L. Reed Date Rec'd. 4-24-67

Received from Mr. Ed L. Reed

Identification Marks Deane Stoltz, Pond below dry seeps, south end of lake S.W./4 Section 7-10S-33E.

	Mg/L
Ions of:	
Calcium	116
Magnesium	23716
Sodium (calc.)	105757
Bicarbonate	1446
Sulfate	99748
Chloride	157833
Total	388616

Hypothetically combined as:

Calcium bicarbonate	469.0
Magnesium bicarbonate	1312.7
Magnesium sulfate	116189.2
Sodium sulfate	10441.5
Sodium chloride	260203.5
Total dissolved solids (evap.)	399620

Copies: 3cc Mr. Ed L. Reed

SOUTHWESTERN LABORATORIES

Lab. No. C-2618

Jack H Boulton

SOUTHWESTERN LABORATORIES

FORT WORTH DALLAS HOUSTON MIDLAND BEAUMONT TEXARKANA

CONSULTING, ANALYTICAL CHEMISTS
AND TESTING ENGINEERS

Midland, Texas 4-28-67 File No. C-1902-R1

Report of tests on Water

To Mr. Ed L. Reed Date Rec'd. 4-24-67

Received from Mr. Ed L. Reed

Identification Marks Deane Stoltz, Lake water

Mg/L

Ions of:

Calcium	384
Magnesium	9923
Sodium (calc.)	80195
Bicarbonate	181
Sulfate	43907
Chloride	120696
Total	255286

Hypothetically combined as:

Calcium bicarbonate	240.5
Calcium sulfate	1102.5
Magnesium sulfate	49069.2
Sodium sulfate	5894.5
Sodium chloride	198979.4
Total dissolved solids (evap.)	260140

Copies: 3cc Mr. Ed L. Reed

SOUTHWESTERN LABORATORIES

Jack H Barton

Lab. No. C-2616

SOUTHWESTERN LABORATORIES

FORT WORTH DALLAS HOUSTON MIDLAND BEAUMONT TEXARKANA

CONSULTING, ANALYTICAL CHEMISTS
AND TESTING ENGINEERS

Midland, Texas 4-29-67 File No. C-1902-R1

Report of tests on Water

To Mr. Ed L. Reed Date Rec'd. 4-20-67

Received from Mr. Ed L. Reed

Identification Marks Lea County, New Mexico, Deane Stoltz, Stoltz Sinclair Pit

	Mg/L		M. Eq./L
Chloride	31707		894.14
Sulfate	452		9.40
Bicarbonate	503		8.25
Sodium (calc.)	18009		783.35
Hardness (vers.)	6423		128.44

Total dissolved solids (evap.) ------ 53430

Copies: 3cc Mr. Ed L. Reed

SOUTHWESTERN LABORATORIES

Jack H Barton

Lab. No. C-2593

SOUTHWESTERN LABORATORIES

FORT WORTH DALLAS HOUSTON MIDLAND BEAUMONT TEXARKANA

CONSULTING, ANALYTICAL CHEMISTS
AND TESTING ENGINEERS

Midland, Texas 4-29-67 File No. C-1902-R1

Report of tests on Water

To Mr. Ed L. Reed

Date Rec'd. 4-20-67

Received from Mr. Ed L. Reed

Identification Marks Lea County, New Mexico, Deane Stoltz, Bell pit, Flow line

	Mg/L
Chloride	28,904
Sulfate	517
Total dissolved solids (evap.)	48,910

Copies: 3cc Mr. Ed L. Reed

SOUTHWESTERN LABORATORIES
Jack H Barton

Lab. No. C-2595

SOUTHWESTERN LABORATORIES

FORT WORTH DALLAS HOUSTON MIDLAND BEAUMONT TEXARKANA

CONSULTING, ANALYTICAL CHEMISTS
AND TESTING ENGINEERS

Midland, Texas 4-28-67 File No. C-1902-R1

Report of tests on Water

To Mr. Ed L. Reed Date Rec'd. 4-24-67

Received from Mr. Ed L. Reed

Identification Marks Deane Stoltz, water well hydrant at house, S.W./4 Section 31-9S-33E.

	Mg/L
Chloride	133
Sulfate	239
Total dissolved solids (evap.)	720

Copies: 3cc Mr. Ed L. Reed

SOUTHWESTERN LABORATORIES
Jack H Barton

Lab. No. C-2620

SOUTHWESTERN LABORATORIES

FORT WORTH DALLAS HOUSTON MIDLAND BEAUMONT TEXARKANA

CONSULTING, ANALYTICAL CHEMISTS
AND TESTING ENGINEERS

Midland, Texas 5-11-67 File No. C-1902-R1

Report of tests on Water

To Mr. Ed L. Reed Date Rec'd. 5-9-67

Received from Mr. Ed L. Reed

Identification Marks Lea County, New Mexico, Deane Stoltz, NE/SE/4 Sec. 34, T9S, R33E, Stock windmill, McGuffin, 5-8-67, sampled by Chester Skrabacz

	Mg/L
Chloride	112
Sulfate	132

Copies: 3cc Mr. Ed L. Reed

SOUTHWESTERN LABORATORIES

Jack H Barton

Lab. No. C-2700

SOUTHWESTERN LABORATORIES

FORT WORTH DALLAS HOUSTON MIDLAND BEAUMONT TEXARKANA

CONSULTING, ANALYTICAL CHEMISTS
AND TESTING ENGINEERS

Midland, Texas 5-11-67 File No. C-1902-R1

Report of tests on Water

To Mr. Ed L. Reed Date Rec'd. 5-9-67

Received from Mr. Ed L. Reed

Identification Marks Lea County, New Mexico, Deane Stoltz, NW/4/NW/4 Sec. 14 T10S, R32E, Stock tank, 5-8-67, sampled by Chester Skrabacz.

	Mg/L
Chloride	21
Sulfate	74

Copies: 3cc Mr. Ed L. Reed

SOUTHWESTERN LABORATORIES

Jack H Benton

Lab. No. C-2697

SOUTHWESTERN LABORATORIES

FORT WORTH DALLAS HOUSTON MIDLAND BEAUMONT TEXARKANA

CONSULTING, ANALYTICAL CHEMISTS
AND TESTING ENGINEERS

Midland, Texas 5-11-67 File No. C-1902-R1

Report of tests on Water Date Rec'd. 5-9-67

To Mr. Ed L. Reed

Received from Mr. Ed L. Reed

Identification Marks Lea County, New Mexico, Deane Stoltz, Sec. 25, T10S, R32E, Stock windmill, 5-8-67, sampled by Chester Skrabacz.

	Mg/L
Chloride	112
Sulfate	158

Copies: 3cc Mr. Ed L. Reed

SOUTHWESTERN LABORATORIES

Jack H Barton

Lab. No. C-2703

SOUTHWESTERN LABORATORIES

FORT WORTH DALLAS HOUSTON MIDLAND BEAUMONT TEXARKANA

CONSULTING, ANALYTICAL CHEMISTS AND TESTING ENGINEERS

Midland, Texas 5-11-67 File No. C-1902-R1

Report of tests on Water

To Mr. Ed L. Reed

Date Rec'd. 5-9-67

Received from Mr. Ed L. Reed

Identification Marks Lea County, New Mexico, Deane Stoltz, NE/NE/4 Sec. 3 T10S, R33E, Stock windmill, 5-8-67, sampled by Chester Skrabacz.

	Mg/L
Chloride	28
Sulfate	83

Copies: 3cc Mr. Ed L. Reed

SOUTHWESTERN LABORATORIES

Jack H Barton

Lab. No. C-2699

SOUTHWESTERN LABORATORIES

FORT WORTH DALLAS HOUSTON MIDLAND BEAUMONT TEXARKANA

CONSULTING, ANALYTICAL CHEMISTS
AND TESTING ENGINEERS

Midland, Texas 5-11-67 File No. C-1902-R1

Report of tests on Water

To Mr. Ed L. Reed Date Rec'd. 5-9-67

Received from Mr. Ed L. Reed

Identification Marks Lea County, New Mexico, Deane Stoltz, SE/NE/4 Sec. 5 T10S, R33E, Stock windmill, 5-8-67, sampled by Chester Skrabacz.

	Mg/L
Chloride	49
Sulfate	83

Copies: 3cc Mr. Ed L. Reed

SOUTHWESTERN LABORATORIES
Jack H Barton

Lab. No. C-2704

SOUTHWESTERN LABORATORIES

FORT WORTH DALLAS HOUSTON MIDLAND BEAUMONT TEXARKANA

CONSULTING, ANALYTICAL CHEMISTS
AND TESTING ENGINEERS

Midland, Texas 5-11-67 File No. C-1902-R1

Report of tests on Water Date Rec'd. 5-9-67

To Mr. Ed L. Reed

Received from Mr. Ed L. Reed

Identification Marks Lea County, New Mexico, Deane Stoltz, NE/SW/4 Sec. 7, T10S, R33E, Seep, 5-8-67, sampled by Chester Skrabacz

	Mg/L
Chloride	12262
Sulfate	6842

Copies: 3cc Mr. Ed L. Reed

SOUTHWESTERN LABORATORIES
Jack H Barton

Lab. No. C-2695

SOUTHWESTERN LABORATORIES

FORT WORTH DALLAS HOUSTON MIDLAND BEAUMONT TEXARKANA

CONSULTING, ANALYTICAL CHEMISTS
AND TESTING ENGINEERS

Midland, Texas 5-11-67 File No. C-1902-R1

Report of tests on Water

To Mr. Ed L. Reed Date Rec'd. 5-9-67

Received from Mr. Ed L. Reed

Identification Marks Lea County, New Mexico, Deane Stoltz, SW/4/SW/4 Sec. 12 T10S, R33E, Stock windmill, 5-8-67, sampled by Chester Skrabacz.

	Mg/L
Chloride	322
Sulfate	419

Copies: 3cc Mr. Ed L. Reed

SOUTHWESTERN LABORATORIES
Jack H Barton

Lab. No. C-2698

SOUTHWESTERN LABORATORIES

FORT WORTH DALLAS HOUSTON MIDLAND BEAUMONT TEXARKANA

CONSULTING, ANALYTICAL CHEMISTS AND TESTING ENGINEERS

Midland, Texas 4-22-67 File No. C-1902-R1

Report of tests on Water

To Mr. Ed L. Reed

Received from Mr. Ed L. Reed

Identification Marks Lea County, New Mexico, Deane Stoltz, Water well tank, NE/corner, Sec. 16-10S-33E

Date Rec'd. 4-20-67

	Mg/L
Chloride	666
Sulfate	746

Copies: 3cc Mr. Ed L. Reed

SOUTHWESTERN LABORATORIES

Jack H Barton

Lab. No. C-2596

SOUTHWESTERN LABORATORIES

FORT WORTH DALLAS HOUSTON MIDLAND BEAUMONT TEXARKANA

CONSULTING, ANALYTICAL CHEMISTS
AND TESTING ENGINEERS

Midland, Texas 4-22-67 File No. C-1902-R1

Report of tests on Water

Date Rec'd. 4-20-67

To Mr. Ed L. Reed

Received from Mr. Ed L. Reed

Identification Marks Lea County, New Mexico, Deane Stoltz, Water well tank, SW/corner, Section 18-10S-33E

	Mg/L
Chloride	154
Sulfate	371

Copies: 3cc Mr. Ed L. Reed

SOUTHWESTERN LABORATORIES

Jack H Barton

Lab. No. C-2598

SOUTEWESTERN LABORATORIES

FORT WORTH DALLAS HOUSTON MIDLAND BEAUMONT TEXARKANA

CONSULTING, ANALYTICAL CHEMISTS
AND TESTING ENGINEERS

Midland, Texas 4-22-67 File No. C-1902-R1

Report of tests on Water

To Mr. Ed L. Reed Date Rec'd. 4-20-67

Received from Mr. Ed L. Reed

Identification Marks Lea County, New Mexico, Deane Stoltz, Water well flow line, Ranch house, NE/corner, Section 19-10S-33E

	Mg/L
Chloride	182
Sulfate	394

Copies: 3cc Mr. Ed L. Reed

SOUTHWESTERN LABORATORIES

Lab. No. C-2599

Jack H Barton

SOUTHWESTERN LABORATORIES

FORT WORTH DALLAS HOUSTON MIDLAND BEAUMONT TEXARKANA

CONSULTING, ANALYTICAL CHEMISTS
AND TESTING ENGINEERS

Midland, Texas 5-11-67 File No. C-1902-R1

Report of tests on Water

To Mr. Ed L. Reed Date Rec'd. 5-9-67

Received from Mr. Ed L. Reed

Identification Marks Lea County, New Mexico, Deane Stoltz, SE/SE Sec. 20, T10S, R33E, Stock tank, 5-8-67, sampled by Chester Skrabacz.

	Mg/L
Chloride	42
Sulfate	162

Copies: 3cc Mr. Ed L. Reed

SOUTHWESTERN LABORATORIES

Jack H Burton

Lab. No. C-2705

SOUTHWESTERN LABORATORIES

FORT WORTH DALLAS HOUSTON MIDLAND BEAUMONT TEXARKANA

CONSULTING, ANALYTICAL CHEMISTS
AND TESTING ENGINEERS

Midland, Texas 5-11-67 File No. C-1902-R1

Report of tests on Water

To Mr. Ed L. Reed Date Rec'd 5-9-67

Received from Mr. Ed L. Reed

Identification Marks Lea County, New Mexico, Deane Stoltz, Center of section, Sec. 22, T10S, R33E, Stock tank, 5-8-67, sampled by Chester Skrabacz.

	Mg/L
Chloride --------	196
Sulfate ---------	439

Copies: 3cc Mr. Ed L. Reed

SOUTHWESTERN LABORATORIES

Jack H Boulton

Lab. No. C-2696

SOUTHWESTERN LABORATORIES

FORT WORTH DALLAS HOUSTON MIDLAND BEAUMONT TEXARKANA

CONSULTING, ANALYTICAL CHEMISTS
AND TESTING ENGINEERS

Midland, Texas 5-11-67 File No. C-1902-R1

Report of tests on Water

To Mr. Ed L. Reed Date Rec'd. 5-9-67

Received from Mr. Ed L. Reed

Identification Marks Lea County, New Mexico, Deane Stoltz, Sec. 23, T10S, R33E, Windmill, 5-8-67, Sampled by Chester Skrabacz.

	Mg/L
Chloride	210
Sulfate	523

Copies: 3cc Mr. Ed L. Reed

SOUTHWESTERN LABORATORIES

Jack H Bouton

Lab. No. C-2702

SOUTHWESTERN LABORATORIES

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CONSULTING, ANALYTICAL CHEMISTS
AND TESTING ENGINEERS

Midland, Texas 4-22-67 File No. C-1902-R1

Report of tests on Water

To Mr. Ed L. Reed

Date Rec'd. 4-20-67

Received from Mr. Ed L. Reed

Identification Marks Lea County, New Mexico, Deane Stoltz, Water well tank, center, Section 28-10S-33E

	Mg/L
Chloride	154
Sulfate	291

Copies: 3cc Mr. Ed L. Reed

SOUTHWESTERN LABORATORIES

Jack H Burton

Lab. No. C-2597

Copies: 3cc Mr. Ed L. Reed

SOUTHWESTERN LABORATORIES

FORT WORTH DALLAS HOUSTON MIDLAND BEAUMONT TEXARKANA

CONSULTING, ANALYTICAL CHEMISTS
AND TESTING ENGINEERS

Midland Texas 5-11-67 File No. C-1902-R1

Report of tests on Water

To Mr. Ed L. Reed Date Rec'd. 5-9-67

Received from Mr. Ed L. Reed

Identification Marks Lea County, New Mexico, Deane Stoltz, Sec. 33, T10S, R33E, Windmill, 5-8-67, sampled by Chester Skrabacz.

	Mg/L
Chloride	140
Sulfate	262

Copies: 3cc Mr. Ed L. Reed

SOUTHWESTERN LABORATORIES

Jack H Barton

Lab. No. C-2707

SOUTHWESTERN LABORATORIES

FORT WORTH DALLAS HOUSTON MIDLAND BEAUMONT TEXARKANA

CONSULTING, ANALYTICAL CHEMISTS
AND TESTING ENGINEERS

Midland, Texas 5-11-67 File No. C-1902-R1

Report of tests on Water

To Mr. Ed L. Reed Date Rec'd.

Received from Mr. Ed L. Reed

Identification Marks Lea County, New Mexico, Deane Stoltz, NW/SW/4 Sec. 7 T10S, R34E, 5-8-67, sampled by Chester Skrabacz

	Mg/L
Chloride	1654
Sulfate	3091

Copies: 3cc Mr. Ed L. Reed

SOUTHWESTERN LABORATORIES

Jack H Burton

Lab. No. C-2701