

CASE 2673: Application of SKELLY
for a secondary recovery project.
WEST DOLLARHIDE QUEEN POOL.

-asa//o.

2673

Application, Transcript,
and Exhibits, Etc.

Case 2672

Heard 10-24-62

Rec. 10-25-62

1. Grant Skelly's request for
the West Dollarhide Queen Land
unit.

Use the usual unit order.

Thos. A. W.

**DOLLARHIDE QUEEN POOL
COMPLETION DATA**

2.8 Wells 4 in 6 BOPD

Operator & Lease	Well No.	Location	Total Depth	PROPOSED INJECTION WELLS		Surface Casing		Intermediate Casing		Production Casing	
				Completion Interval	Size	Depth	Sx. Cement	Depth	Sx. Cement	Size	Depth
Gulbertson & Irwin	1	K-5-25S-38E	3757	3611-3757	8 5/8	275	115	None		5 1/2	3611
Texas Penny											400
L. E. Elliott	3-H	G-31-24S-38E	3748	3672-3748	9 5/8	196	150	None		5 1/2	3672
Elliott Fed.	4-H	A-31-24S-38E	3758	3655-3758	9 5/8	233	175	None		7	3655
Elliott Fed.											650
Elliott & Hall	1-S	C-31-24S-38E	3747	3656-3747	8 5/8	211	125	None		5 1/2	3656
Elliott Fed.											650
J. P. Gibbins	2	C-30-24S-38E	3785	3686-3738	8 5/8	1235	375	None		5 1/2	3785
Fowler Hair	3	E-30-24S-38E	3743	3682-3735	8 5/8	1170	395	None		5 1/2	3742
Fowler Hair											263
Gulf	17	D-4-25S-38E	3800	3579-3800	9 5/8	358	225	None		7	3579
Leonard wgn											425
Pan American	13	G-32-24S-38E	3812	3664-3812	9"	300	150	None		5 1/2	3664
State wgn	14	C-32-24S-38E	3812	3640-3812	9	302	100	None		5 1/2	3640
State wgn											300
Sinclair	3	O-30-24S-38E	3755	3630-3700	9 5/8	305	250	None		7	3755
McClure	9	I-30-24S-38E	3686	3629-3686	9 5/8	289	325	None		7	3629
McClure	12	G-30-24S-38E	3694	3629-3694	10 3/4	294	225	None		7	3629
McClure	15	O-19-24S-38E	3749	3696-3737	10 3/4	304	250	None		7	3749
State Lea 263	2	B-6-25S-38E	3755	3629-3755	13 3/8	268	200	None		7	3629
L. E. Vance	4	K-30-24S-38E	3715	3675-3715	9 5/8	291	275	None		7	3675
L. E. Vance	5	M-30-24S-38E	3732	3671-3732	9 5/8	312	300	None		7	3671
Skelly	11	N-32-24S-38E	3726	3650-3726	8 5/8	1210	400	None		5 1/2	3650
McClure	12	K-32-24S-38E	3790	3667-3790	8 5/8	1202	400	None		5 1/2	3667
McClure	18	P-32-24S-38E	3800	3670-3800	8 5/8	1195	400	None		5 1/2	3670
McClure	3	M-29-24S-38E	3752	3665-3752	8 5/8	1245	400	None		5 1/2	3665
McClure	11	E-29-24S-38E	3820	3710-3820	8 5/8	1275	400	None		5 1/2	3710
McClure	6	E-5-25S-38E	3750	3605-3750	9 5/8	1171	400	None		7	3605
McClure	9	H-5-25S-38E	3788	3620-3788	8 5/8	1218	400	None		5 1/2	3620
McClure	12	B-5-25S-38E	3750	3655-3750	8 5/8	1210	400	None		7	3655
McClure	1	H-6-25S-38E	3836PB	3620-3836	13 3/8	277	275	None		5 1/2	3620
Teraco											100
McGhee	2	P-31-24S-38E	3750	3544-3750	9 5/8	319	320	None		7	3544
McGhee	9	K-31-24S-38E	3736	3643-3736	8 5/8	1170	750	None		5 1/2	3643
Un. Royalty wgn	2	M-19-24S-38E	3694PB	3685-3693	8 5/8	1224	900	None		5 1/2	3696

2672-73



SKELLY OIL COMPANY

P. O. Box 1650
TULSA 2, OKLAHOMA

PRODUCTION DEPARTMENT

C. L. BLACKSHER, VICE PRESIDENT
W. P. WHITMORE, MGR. PRODUCTION
W. D. CARSON, MGR. TECHNICAL SERVICES
ROBERT G. HILTZ, MGR. JOINT OPERATIONS
GEORGE W. SELINGER, MGR. CONSERVATION

September 24, 1962

Re: West Dollarhide Queen Unit
Lea County, New Mexico

New Mexico Oil Conservation Commission
P. O. Box 871
Santa Fe, New Mexico

Attention: Mr. James M. Durrett, Jr., General Counsel

Gentlemen:

We are attaching an original and three copies of an application for authority to inject fluid into the Queen Sand formation in the West Dollarhide Queen Unit Area, Lea County, New Mexico. We are attaching to this application "Exhibit 'A'" which is a secondary recovery study of the West Dollarhide Queen reservoir.

At the present time we do not have logs of the injection wells available for filing, but we will, however, file such logs as are available at the hearing. We will, also, at the hearing file an exhibit describing the proposed injection wells' casing and cementing program.

We would appreciate having this matter set down for an Examiner's hearing the latter part of October, 1962.

Yours very truly,

RJJ:br
Attach.

cc-Mr. L. C. White w/ attach.
Gilbert, White and Gilbert
Bishop Building
Santa Fe, New Mexico

DOCKET MAILED

Date 10-11-62



STATE OF NEW MEXICO

STATE ENGINEER OFFICE

SANTA FE

S. E. REYNOLDS
STATE ENGINEER

October 23, 1962

ADDRESS CORRESPONDENCE TO:
STATE CAPITOL
SANTA FE, N. M.

Case 2673

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

Dear Mr. Porter:

Enclosed is a copy of a letter which I received from Mr. Jacobs of Skelly Oil Company. In view of his statement, which I accept as testimony, in the first sentence of his third paragraph "Injection of fresh water from the Santa Rosa formation will be through tubing set in a packer just above the Queen formation in each injection well," this office offers no objection to the granting of the application.

Yours very truly,

S. E. Reynolds
State Engineer

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

FEI/ma
cc-Skelly Oil Co.
F. H. Hennighausen

CARL H. GILBERT
L. C. WHITE
WILLIAM W. GILBERT
SUMNER S. KOCH
WILLIAM B. KELLY

GILBERT, WHITE AND GILBERT
ATTORNEYS AND COUNSELORS AT LAW
BISHOP BUILDING
SANTA FE, NEW MEXICO

September 26, 1962

Case 2673

New Mexico Oil Conservation Commission
P. O. Box 871
Santa Fe, New Mexico

Attention: Mr. James M. Durrett, Jr., General Counsel
Re: Skelly Oil Company

Gentlemen:

We herewith enter our formal appearance as resident counsel for Skelly Oil Company in regard to their application for authority to inject fluid into the Queen Sand formation in the West Dollarhide Queen Unit Area, Lea County, New Mexico.

Very truly yours,

LCW/ab

L. C. WHITE



SKELLY OIL COMPANY

PRODUCTION DEPARTMENT

C. L. BLACKSHER VICE PRESIDENT

W. P. WHITMORE MGR. PRODUCTION

W. D. CARSON MGR. TECHNICAL SERVICES

ROBERT G. HILTZ MGR. JOINT OPERATIONS

GEORGE W. SELINGER MGR. CONSERVATION

TULSA 2, OKLAHOMA

October 19, 1962

Re: West Dollarhide Queen Sand Unit
Lea County, New Mexico

Mr. S. E. Reynolds
State Engineer
State Capitol
Santa Fe, New Mexico

Dear Mr. Reynolds:

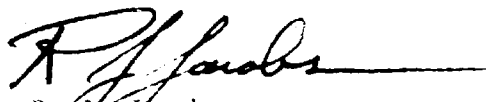
Skelly Oil Company has filed an application with the Oil Conservation Commission for permission to conduct a secondary recovery project in the West Dollarhide Queen Pool with the injection of water into the Queen formation through 28 wells located in Sections 19, 29, 30, 31, and 32, Township 24 South, Range 38 East, and Sections 4, 5, and 6, Township 25 South, Range 38 East, Lea County, New Mexico. This has been assigned Case No. 2673, and is to come on for hearing at 9 A.M. October 24, 1962.

We are attaching for your information and files two copies of an exhibit we will present at the abovementioned hearing, which gives data on the 28 wells proposed for injection. This exhibit lists the location, total depth, completion interval, and casing and cementing program for each well.

Injection of fresh water from the Santa Rosa formation will be through tubing set in a packer just above the Queen formation in each injection well. Injection rate is anticipated to be 500 barrels of water per well per day with a maximum well head pressure of 2000 psi.

We would appreciate your advising the Oil Conservation Commission that there will be no threat of contamination to the fresh waters which may occur in this area and that you have no objection to the granting of our application.

Very truly yours,


R. J. Jacobs

RJJ:db

1962 OCT 22 AM 8:24
STATE ENGINEER OFFICE
SANTA FE, N.M.

Case 2673

Shy

No. 31-62

DOCKET: EXAMINER HEARING - WEDNESDAY - OCTOBER 24, 1962

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

The following cases will be heard before Elvis A. Utz, Examiner, or Daniel S. Nutter, as alternate examiner:

CASE 2646: (Continued)

Application of Texaco Inc., for permission to dispose of salt water, Lea County, New Mexico. Applicant, in the above-styled cause, seeks permission to dispose of salt water into the Devonian formation through the Shell State of New Mexico "A" Well No. 3, located 990 feet from the South line and 660 feet from the West line of Section 2, Township 11 South, Range 37 East, Echols (Devonian) Pool, Lea County, New Mexico.

CASE 2669:

Application of Amerada Petroleum Corporation for a dual completion, Lea County, New Mexico. Applicant, in the above-styled cause, seeks approval of the dual completion (conventional) of its L. M. Lambert Well No. 8, located in Unit B, Section 6, Township 20 South, Range 37 East, Lea County, New Mexico, in such a manner as to produce oil from the Monument Paddock and Monument Blinbry Pools through parallel tapered tubing strings.

CASE 2670:

Application of Elwyn C. Hale for a quadruple completion, Lea County, New Mexico. Applicant, in the above-styled cause, seeks approval of the quadruple completion (combination) of his Hale State Well No. 3, located in Unit H of Section 2, Township 25 South, Range 37 East, Lea County, New Mexico, in such a manner as to produce oil from the Devonian, McKee, Waddell and Ellenburger Pools, North Justis Field, through two strings of 2 7/8 inch casing and two strings of 3 1/2 inch casing all cemented in a common well bore.

CASE 2671:

Application of The Pure Oil Company for approval of the Red Hills Unit Agreement, Lea County, New Mexico. Applicant, in the above-styled cause, seeks approval of the Red Hills Unit Agreement covering 28,796 acres, more or less, of Federal, State and fee lands in Township 25 South, Ranges 32 and 33 East, and Township 26 South, Range 33 East, Lea County, New Mexico.

- CASE 2672: Application of Skelly Oil Company for approval of a unit agreement, Lea County, New Mexico. Applicant, in the above-styled cause, seeks approval of the West Dollarhide Queen Sand Unit Agreement comprising 2563 acres, more or less, of State, Federal and fee lands in Townships 24 and 25 South, Range 38 East, Lea County, New Mexico.
- CASE 2673: Application of Skelly Oil Company for a secondary recovery project, West Dollarhide Queen Pool, Lea County, New Mexico. Applicant, in the above-styled cause, seeks permission to institute a secondary recovery project in the West Dollarhide Queen Pool with the injection of water into the Queen formation through 28 wells located in Sections 19, 29, 30, 31, and 32, Township 24 South, Range 38 East, and Sections 4, 5, and 6, Township 25 South, Range 38 East, Lea County, New Mexico, said project to be governed by the provisions of Rule 701.
- CASE 2674: Application of Texaco Inc. for two non-standard gas proration units, Lea County, New Mexico. Applicant, in the above-styled cause, seeks approval of two 120-acre non-standard gas proration units in the Eumont Gas Pool, Lea County, New Mexico, the first to comprise the E/2 SE/4 of Section 30 and the NE/4 NE/4 of Section 31, Township 21 South, Range 36 East, to be dedicated to its J. K. Rector Well No. 2, located in Unit P of said Section 30. The second unit would comprise the W/2 SE/4 of Section 30 and the NW/4 NE/4 of Section 31, Township 21 South, Range 36 East, and would be dedicated to its J. K. Rector Well No. 3 located in Unit J of said Section 30.
- CASE 2675: Application of Shar-Alan Oil Company for an unorthodox well location, Rio Arriba County, New Mexico. Applicant, in the above-styled cause, seeks permission to drill its No. 1-A Jicarilla "F" Well No. 160 at an unorthodox well location 2310 feet from the North and East lines of Section 13, Township 23 North, Range 2 West, South Blanco-Pictured Cliffs Pool, Rio Arriba County, New Mexico.
- CASE 2676: Application of Gulf Oil Corporation for an unorthodox location, and a dual completion, Lea County, New Mexico. Applicant, in the above-styled cause, seeks approval of the dual completion (conventional) of its Lillie Well No. 3 in the Fowler-Fusselman and Fowler-Ellenburger Pools, Lea County, Mexico. Said well is presently completed in the Fowler-Fusselman Pool at an unorthodox Fowler-Ellenburger location 2310 feet from the North line and 330 feet from the West line

- CASE 2676: of Section 23, Township 24 South, Range 37 East. Applicant (Cont.) proposes to dedicate 40 acres comprising the SW/4 NW/4 of said Section 23 to the Ellenburger completion.
- CASE 2677: Application of Union Producing Company for a unit agreement, Lea County, New Mexico. Applicant, in the above-styled cause, seeks approval of the Northwest Lynch Unit Agreement embracing 3040 acres, more or less, of State and Federal lands in Township 20 South, Range 35 East, Lea County, New Mexico.
- CASE 2678: Application of Kern County Land Company for an order establishing special rules and regulations for the East Saunders Permo-Pennsylvanian Pool, Lea County, New Mexico. Applicant, in the above-styled cause, seeks an order establishing special rules and regulations for the East Saunders Permo-Pennsylvanian Pool, Lea County, New Mexico, to include provisions for 160 acre drilling and proration units therein.
- CASE 2679: In the matter of the hearing called by the Oil Conservation Commission, on its own motion, to permit R. L. Lusk, Jr., and all interested parties to appear and show cause why the Gulf State Well No. 1, located 1980 feet from the North line and 660 feet from the East line of Section 17, Township 10 South, Range 27 East, NMPM, Chaves County, New Mexico, should not be plugged in accordance with a Commission-approved plugging program.
- CASE 2680: In the matter of the hearing called by the Oil Conservation Commission, on its own motion, to permit M. G. Peters Drilling Company and all interested parties to appear and show cause why the Gulf State Well No. 1, located 1650 feet from the North line and 990 feet from the East line of Section 17, Township 10 South, Range 27 East, Chaves County, New Mexico, and the Hightower State Well No. 1, located 846 feet from the South line and 2310 feet from the East line of Section 16, Township 10 South, Range 25 East, Chaves County, New Mexico, should not be plugged in accordance with a Commission-approved plugging program.
- CASE 2681: Application of Kennedy Oil Company for a waterflood project, Eddy County, New Mexico. Applicant, in the above-styled cause, seeks authority to institute a waterflood project in the Square Lake Pool by the injection of water into the Grayburg-San Andres formations through three wells located in Section 28, Township 16 South, Range 31 East. Applicant further seeks the establishment of a capacity buffer zone allowable for the proposed project area which offsets a capacity type flood and comprises the S/2 SE/4, E/2 SW/4, and S/2 NW/4 of said Section 28.

Operator & Lease Well No. Location Total Depth Completion Interval Size Surface Casing Depth Sx. Cement Intermediate Casing Depth Sx. Cement Production Casing Depth Sx. Cement

DOLLARHIDE QUEEN POOL
COMPLETION DATA
PROPOSED INJECTION WELLS

BEFORE EXAMINER UTZ
OIL CONSERVATION COMMISSION
2672-3, EXHIBIT NO. C
CASE NO. Intermediate Casing

Culbertson & Irwin	1	K-5-25S-38E	3757	3611-3757	8 5/8	275	115	None	5 1/2	3611	400
Texas Penny											
I. E. Elliott	3-H	G-31-24S-38E	3748	3672-3748	9 5/8	196	150	None	5 1/2	3672	1050
Elliott Fed.	4-H	A-31-24S-38E	3758	3655-3758	9 5/8	233	175	None	7	3655	650
Elliott Fed.											
Elliott & Hall	1-S	C-31-24S-38E	3747	3656-3747	8 5/8	211	125	None	5 1/2	3656	650
Elliott Fed.											
J. P. Gibbins	2	C-30-24S-38E	3785	3686-3738	8 5/8	1235	375	None	5 1/2	3785	200
Fowler Hair	3	E-30-24S-38E	3743	3682-3735	8 5/8	1170	395	None	5 1/2	3742	263
Fowler Hair											
Gulf											
Leonard Wyr	17	D-4-25S-38E	3800	3579-3800	9 5/8	358	225	None	7	3579	425
Pan American											
State Wyr	13	G-32-24S-38E	3812	3664-3812	9"	300	150	None	5 1/2	3664	300
State Wyr	14	C-32-24S-38E	3812	3640-3812	9	302	100	None	5 1/2	3640	300
Stinclair											
McClure	3	O-30-24S-38E	3755	3630-3700	9 5/8	305	250	None	7	3755	1340
McClure	9	I-30-24S-38E	3686	3629-3686	9 5/8	289	325	None	7	3629	1469
McClure	12	G-30-24S-38E	3694	3629-3694	10 3/4	294	225	None	7	3629	2950
McClure	15	O-19-24S-38E	3749	3696-3737	10 3/4	304	250	None	7	3749	200
State Lea 263	2	B-6-25S-38E	3755	3629-3755	13 3/8	268	200	None	7	3629	125
L. E. Vance	4	K-30-24S-38E	3715	3675-3715	9 5/8	291	275	None	7	3675	880
L. E. Vance	5	M-30-24S-38E	3732	3671-3732	9 5/8	312	300	None	7	3671	880
Skelly											
Medco Wyr	11	K-32-24S-38E	3726	3650-3726	8 5/8	1210	400	None	5 1/2	3650	200
Medco Wyr	12	K-32-24S-38E	3790	3667-3790	8 5/8	1202	400	None	5 1/2	3667	200
Medco Wyr	18	P-32-24S-38E	3800	3670-3800	8 5/8	1195	400	None	5 1/2	3670	200
Medco Wyr	3	M-29-24S-38E	3752	3665-3752	8 5/8	1245	400	None	5 1/2	3665	400
Medco Wyr	11	E-29-24S-38E	3820	3710-3820	8 5/8	1275	400	None	5 1/2	3710	200
Medco Wyr	6	E-5-25S-38E	3750	3605-3750	9 5/8	1171	400	None	7	3605	250
Medco Wyr	9	H-5-25S-38E	3788	3620-3788	8 5/8	1218	400	None	5 1/2	3620	200
Medco Wyr	12	B-5-25S-38E	3750	3655-3750	8 5/8	1210	400	None	7	3655	200
Medco Wyr	1	H-6-25S-38E	3836FB	3620-3836	13 3/8	277	275	8 5/8	5 1/2	3620	100
Teneco											
McGhee	2	P-31-24S-38E	3750	3544-3750	9 5/8	319	320	None	7	3544	1100
McGhee	9	K-31-24S-38E	3736	3643-3736	8 5/8	1170	750	None	5 1/2	3643	450
Un. Royalty Wyr	2	M-19-24S-38E	3694FB	3685-3693	8 5/8	1224	900	None	5 1/2	3696	300

OIL CONSERVATION COMMISSION

**P. O. BOX 871
SANTA FE, NEW MEXICO**

December 3, 1962

**Mr. George W. Selinger
Skelly Oil Company
Box 1650
Tulsa 2, Oklahoma**

Dear Sir:

Reference is made to Order No. R-2356, Case No. 2673, recently entered by the Commission approving Skelly Oil Company's West Dollarhide Queen Waterflood Project, Lea County, New Mexico.

According to our calculations, when all of the authorized injection wells have been placed on active injection, the maximum allowable which this project will be eligible to receive under the provisions of Rule 701-E-3 is 2688 barrels per day.

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

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

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OIL CONSERVATION COMMISSION

P. O. BOX 871

SANTA FE, NEW MEXICO

-2-

are acquired through purchase or unitization, when wells have received a response to water injection, etc.

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

Very truly yours,

A. L. PORTER, Jr.
Secretary-Director

ALP/ir

cc: Oil Conservation Commission
Hobbs, New Mexico

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Case 2673

Heard 10-24-62

Rev. 10-25-62

1. Grant Skelly's request for a
Waterflood for their West Collierhills
unit. This unit to be operated under
Rule 701 provisions.

List 28 injection wells as shown
on Ex. C of this case.

Unit is definitely ~~in~~ in the
stripper stage. Max. producing
ability of best producer is 6 BOPD.

Frank W.

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. 2673
Order No. R-2356

APPLICATION OF SKELLY OIL COMPANY
FOR A SECONDARY RECOVERY PROJECT,
WEST DOLLARHIDE QUEEN POOL, LEA
COUNTY, NEW MEXICO.

ORDER OF THE COMMISSION

BY THE COMMISSION:

This cause came on for hearing at 9 o'clock a.m. on October 24, 1962, at Santa Fe, New Mexico, before Elvis A. Utz, Examiner duly appointed by the Oil Conservation Commission of New Mexico, hereinafter referred to as the "Commission," in accordance with Rule 1214 of the Commission Rules and Regulations.

NOW, on this 6th day of November, 1962, the Commission, a quorum being present, having considered the application, the evidence adduced, and the recommendations of the Examiner, Elvis A. Utz, and being fully advised in the premises,

FINDS:

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

(2) That the applicant, Skelly Oil Company, seeks authority to institute a waterflood project in the West Dollarhide Queen Pool in the West Dollarhide Queen Sand Unit Area comprising portions of Townships 24 and 25 South, Range 38 East, NMPN, Lea County, New Mexico, by the injection of water into the Queen formation through 28 wells located in Sections 19, 29, 30, 31, and 32, Township 24 South, Range 38 East, and Sections 4, 5, and 6, Township 25 South, Range 38 East, NMPN, Lea County, New Mexico.

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

(4) That the waterflood project should be approved and should be governed by the provisions of Rule 701.

-2-

CASE No. 2673
Order No. R-2356

IT IS THEREFORE ORDERED:

(1) That the applicant, Skelly Oil Company, is hereby authorized to institute a waterflood project in the West Dollarhide Queen Pool in the West Dollarhide Queen Sand Unit Area comprising portions of Townships 24 and 25 South, Range 38 East, NEEN, Lea County, New Mexico, by the injection of water into the Queen formation through the following-described wells:

<u>Operator & Lease</u>	<u>Well No.</u>	<u>Unit</u>	<u>L o c a t i o n</u>		
			<u>Section</u>	<u>Township</u>	<u>Range</u>
Calbertson & Irwin					
Texas Penny	1	K	5	25 South	38 East
L. E. Elliott					
Elliott Fed.	3-H	G	31	24 South	38 East
Elliott Fed.	4-H	A	31	24 South	38 East
Elliott & Hall					
Elliott Fed.	1-S	G	31	24 South	38 East
J. P. Gibbins					
Fowler Hair	2	C	30	24 South	38 East
Fowler Hair	3	E	30	24 South	38 East
Gulf					
Leonard "G"	17	D	4	25 South	38 East
Pan American					
State "Y"	13	G	32	24 South	38 East
State "Y"	14	C	32	24 South	38 East
Sinclair					
McClure	3	O	30	24 South	38 East
McClure	9	I	30	24 South	38 East
McClure	12	G	30	24 South	38 East
McClure	15	O	19	24 South	38 East
State Lea 263	2	B	6	25 South	38 East
L. E. Vance	4	K	30	24 South	38 East
L. E. Vance	5	M	30	24 South	38 East
Skelly					
Mexico "J"	11	N	32	24 South	38 East
Mexico "J"	12	K	32	24 South	38 East
Mexico "J"	18	P	32	24 South	38 East
Mexico "K"	3	M	29	24 South	38 East
Mexico "K"	11	E	29	24 South	38 East
Mexico "L"	6	E	5	25 South	38 East
Mexico "L"	9	H	5	25 South	38 East
Mexico "L"	12	B	5	25 South	38 East
Mexico "O"	1	H	6	25 South	38 East
Texaco					
McGhee	2	P	31	24 South	38 East
McGhee	9	K	31	24 South	38 East
Un. Royalty "A"	2	M	19	24 South	38 East

-3-

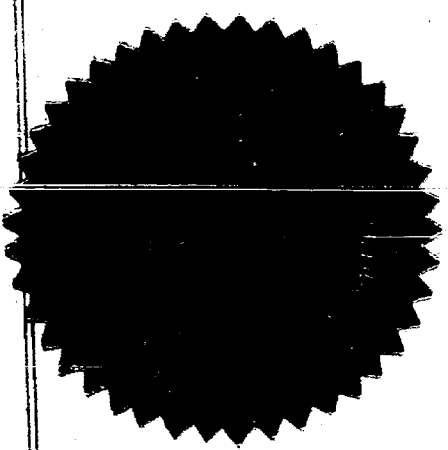
CASE No. 2673
Order No. R-2356

(2) That the subject waterflood project shall be governed by the provisions of Rule 701, including the allowable provisions thereof, and including the provisions with respect to expansion of the waterflood project.

(3) 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 herein-
above designated.

STATE OF NEW MEXICO
OIL CONSERVATION COMMISSION



E. L. McQueen

EDWIN L. MCQUEEN, Chairman

E. S. Walker

E. S. WALKER, Member

A. L. Porter, Jr.

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

esr/

GOVERNOR
EDWIN L. MECHEM
CHAIRMAN

State of New Mexico
Oil Conservation Commission

LAND COMMISSIONER
E. S. JOHNNY WALKER
MEMBER



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

P. O. BOX 871
SANTA FE

November 6, 1962

Mr. George Selinger
Skelly Oil Company
Post Office Box 1650
Tulsa 2, Oklahoma

Re: Case No. 2673
Order No. R-2356
Applicant:
Skelly Oil 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.

A. L. PORTER, Jr.
Secretary-Director

ir/

Carbon copy of order also sent to:

Hobbs OCC x

Artesia OCC

Astec OCC

OTHER Mr. Booker Kelly
Mr. Guy Buell

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BEFORE THE
OIL CONSERVATION COMMISSION
Santa Fe, New Mexico
October 24, 1962

EXAMINER HEARING

IN THE MATTER OF:

Application of Skelly Oil Company for approval of a unit agreement, Lea County, New Mexico. Applicant, in the above-styled cause, seeks approval of the West Dollarhide Queen Sand Unit Agreement comprising 2563 acres, more or less, of State, Federal and fee lands in Townships 24 and 25 South, Range 38 East, Lea County, New Mexico.

CASE 2672

IN THE MATTER OF:

Application of Skelly Oil Company for a secondary recovery project, West Dollarhide Queen Pool, Lea County, New Mexico. Applicant, in the above-styled cause, seeks permission to institute a secondary recovery project in the West Dollarhide Queen Pool with the injection of water into the Queen formation through 28 wells located in Sections 19, 29, 30, 31, and 32, Township 24 South, Range 38 East, and Sections 4, 5, and 6, Township 25 South, Range 38 East, Lea County, New Mexico, said project to be governed by the provisions of Rule 701.

CASE 2673

BEFORE: Elvis A. Utz, Examiner

TRANSCRIPT OF HEARING

MR. UTZ: Case 2672.

MR. DURRETT: Application of Skelly Oil Company for approval of a unit agreement, Lea County, New Mexico.

MR. SELINGER: George W. Selinger and Ronald Jacobs, Tulsa, Oklahoma, for the Applicant. L. C. White, Gilbert, White



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and Gilbert, resident counsel. Mr. Examiner, we ask that this case and the companion Case 2673, which is an application for authority to inject into the area covered by the proposed Unit, be consolidated for the purposes of taking testimony; and we have two witnesses and anticipate 15 or 20 minutes.

MR. BUELL: For Pan American Petroleum Corporation, Guy Buell.

MR. UTZ: Cases 2672 and 2673 will be consolidated for purposes of testimony only.

MR. JACOBS: We have two witnesses. We ask that they both be sworn.

(Witnesses sworn.)

MR. JACOBS: Our first witness, Mr. C. R. Davis.

C. R. DAVIS

called as a witness, having been first duly sworn on oath, testified as follows:

DIRECT EXAMINATION

BY MR. JACOBS:

Q Mr. Davis, will you state your full name for the record, please?

A Charles R. Davis.

Q You are employed by what company?

A Skelly Oil Company.

Q In what capacity?

A Unitization Engineer in the Joint Operation Section.



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Q In Tulsa, Oklahoma?

A Yes, sir.

Q As such, you have testified before this Commission on previous occasions, have you not?

A Yes, sir.

Q Have your qualifications as an expert in this field been recognized by the Commission?

A Yes, sir.

MR. JACOBS: We ask that his qualifications be so recognized at this time.

MR. UIZ: They will be.

Q (By Mr. Jacobs) Mr. Davis, are you familiar with the application of Skelly Oil Company in this case for approval of the Unit Agreement?

A Yes, I am.

MR. JACOBS: Attached to that application was a copy of the Unit Agreement, and it was marked as Exhibit A to the application. We ask that a copy of this now be marked for identification.

(Whereupon, Applicant's Exhibit A marked for identification.)

Q (By Mr. Jacobs) Mr. Davis, this Unit Agreement did accompany the application in this case, did it not?

A Yes, sir.

Q And you are familiar with this Agreement and its contents?



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A Yes, I am.

Q What does this cover, briefly?

A This is a Unit Agreement which provides for the development and operation of the West Dollarhide Queen Sand Unit, which comprises approximately 2563 acres, more or less, of State, Federal and fee lands in Townships 24 and 25 South, Range 38 East, Lea County, New Mexico. It is the purpose of this Agreement to enable institution and conservation of a secondary recovery operation, conserve natural resources and prevent waste and secure the other benefits obtainable through development and operation of the area subject to this Agreement under its terms, limits and agreements set forth therein.

Q I notice on the Unit Agreement we have called it the West Dollarhide Queen. In truth and fact, the Commission carries the particular wells in this Unit area as the Dollarhide Queen. Would you please explain the reason for this difference?

A This is for the simple reason that in the adjoining State of Texas there are other Dollarhide Queen reservoirs, and for ease in accounting on our part, we have named this West Dollarhide to identify it from those others.

Q This Unit Agreement is the normal type of Unit Agreement involving Federal, State, and fee lands?

A Yes, it is.

Q What is the status of the sign-up on this Unit Agreement?



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A As of this time we have approximately 81 percent of the working interest, and in excess of 89 percent of the royalty which has indicated that they will commit their interest to this Unit.

Q This Agreement has been submitted to the State Land Office and the U.S.G.S. for approval, is that correct?

A Yes, sir.

Q And preliminary approval has been obtained?

A From both, yes.

MR. JACOBS: I believe that's all we have of this witness. We ask that the application and the corresponding Exhibit A attached thereto be admitted into evidence and made a part of the record.

MR. UTZ: Without objection it will be entered into the record.

(Whereupon, Applicant's Exhibit No. A admitted in evidence.)

MR. JACOBS: You may cross examine Mr. Davis.

MR. UTZ: Any questions of the witness? The witness may be excused.

(Witness excused.)

CHARLES J. LOVE

called as a witness, having been first duly sworn on oath, testified as follows:

DIRECT EXAMINATION

BY MR. JACOBS:



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Q Will you state your name for the record, please?

A Charles J. Love.

Q Mr. Love, by whom are you employed?

A Skelly Oil Company.

Q In what capacity?

A District Petroleum Engineer located in Hobbs, New Mexico.

Q Mr. Love, have you testified before the Oil Conservation Commission as an expert?

A Yes, sir, I have.

Q Were your qualifications accepted at that time?

A Yes, sir.

MR. JACOBS: We ask that his qualifications be recognized.

MR. UTZ: Yes, sir, he has previously qualified.

Q (By Mr. Jacobs) Mr. Love, are you familiar with the application in Case No. 2673?

A Yes, sir, I am.

Q And marked and attached to the application was an Exhibit A, was it not?

A Yes, sir.

Q What is that exhibit?

A It is a study, a secondary recovery study proposed by the West Dollarhide Engineering Subcommittee to study the feasibility of secondary recovery operations in the Dollarhide Queen



reservoir.

(Whereupon, Applicant's Exhibit No. B marked for identification.)

Q (By Mr. Jacobs) This exhibit now has been marked for identification as Exhibit B. Just briefly, without going into detail, what was the general outline of this exhibit?

A Well, the object of this report was to determine the feasibility of conducting secondary recovery operations in the Queen reservoir. This study concluded that it was feasible, that additional oil could be recovered by injecting water into the Queen sand. The report recommends that injection operations begin. The report further contains a history of the Dollarhide Queen Field, gives the recovery by primary operations and the expected or anticipated recovery by secondary.

It also contains the appropriate maps and the predicted, charts or graphs showing the predicted performance by primary and by secondary recovery.

Q What type of an injection program is anticipated?

A We will inject water into the Queen reservoir through 28 injection wells. They will be converted for injection purposes. We will inject water under a packer into the Queen sand.

Q The source of this water initially will be what?

A Will be Santa Rosa Water.

Q The volume you anticipate into each well?

A The Engineering Subcommittee felt that the initial injection rates would be 500 barrels per day per injection well, or

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a total of about 14,000 barrels of water through the 28 wells that will be converted.

Q What is the anticipated maximum pressure at the wellhead?

A The Engineering Subcommittee in their initial design work carried the design of their equipment to a maximum pressure of 2,000 pounds after reservoir fill-up.

Q Are the proposed injection wells indicated on a map contained in this report?

A Yes, sir, they are.

Q That is Figure --

A Figure 8.

Q -- Figure 8 of Exhibit B, is that correct?

A Yes, sir.

Q You have also prepared another exhibit which lists the proposed wells and their casing cementing program, et cetera?

A Yes, sir.

MR. JACOBS: We ask that be marked for identification as Exhibit C.

(Whereupon, Applicant's Exhibit C marked for identification.)

Q (By Mr. Jacobs) Does this exhibit list the 28 wells that are proposed for injection?

A Yes, sir, it does.

Q It gives the location of each well?

A Yes, sir. The total depth, the completion interval, the size and depth of surface casing that was set, the sacks of

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cement. Then it shows the intermediate strings and the production casing, the size, the depth, and the sacks of cement used.

Q Most of the wells proposed are open hole type completion, is that correct?

A Yes, sir, most of them are, 23 of those wells listed are open hole. There are five that will be injecting through perforations.

Q You anticipate setting a packer above the Queen sand and injecting the water through tubing into the Queen formation?

A Yes, sir.

Q You feel that this will protect all the fresh water sands or any other sands that may be present in the area?

A Yes, sir, we do.

Q Will you run coupon tests and/or coat the tubing if necessary?

A Yes, sir, we will. We will either internally line or plasti-coat the tubing or run coupon checks and check them weekly or as often as is deemed necessary from the results of the initial analysis from the coupon tests.

MR. JACOBS: I have now what we request be marked as Exhibit D. It has eleven parts to it.

(Whereupon, Applicant's Exhibit No. D marked for identification.)

Q (By Mr. Jacobs) These are the eleven wells in which we have logs available, is that correct?

A Yes, sir. There were eleven wells upon which we did



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have logs. Eleven of the injection wells.

Q For the record, will you please list or name those wells on which we have the logs?

A Yes, sir. L. E. Elliott, Operator, their Elliott Federal No. 3-H; Elliott and Hall, Operator, Elliott Federal Well No. 3-S; J. P. Gibbon, Operator, the Fowler Hare Well No. 2; Gulf Oil Corporation, their Leonard G. Well No. 17; Pan American, their State "Y" Well 13 and State "Y" 14; Skelly Oil Company, Mexico "J" 11, Mexico "K" 3, Mexico "L" 6, Mexico "O" 1; Texaco, their McGee Well No. 2.

(Whereupon, Applicant's Exhibit No. E marked for identification.)

Q I hand you what has been marked for identification as Skelly Exhibit E and ask that you state what it is, please.

A Our Exhibit E is a map of the West Dollarhide Queen Sand Unit area, the Unit area being outlined with a hashed line. The Unit is located in a portion of Township 24 South and 25 South, Ranges 37 and 38 East. Also shown on the map, to the best of our knowledge, are all known Queen wells in this area.

Q Does this map also show the lessees --

A Yes, sir, it does.

Q -- within a two-mile radius of all proposed injection wells?

A Yes, sir.

Q I notice that there are wells indicated to the north primarily in Section 19, I believe, it looks like one in Section



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18.

A Yes.

Q It's not within the Unit area. Are these wells in the Dollarhide Queen formation?

A They are in the Dollarhide Queen Pool. It is my understanding that the operators of those wells did not want them included within this Unit; and in my opinion, I don't think their exclusion from the Unit will in any way harm our proposed operations for the West Dollarhide Queen Unit.

Q In fact, most of these wells are dually completed in some other sand, are they not?

A Yes, sir, they are.

Q What is the average production of the wells within the proposed Unit area?

A The average daily production for the month of August from the wells within the Unit area was 2.8 barrels per well.

Q What is the range, that is, the highest and the lowest?

A There is one well producing six barrels a day, and the lowest range, a half barrel a day.

Q Mr. Love, it is your opinion, is it not, that this is in the nature of a salvage type operation?

A Yes, sir, it is.

Q And you are requesting a permit to waterflood, and under the provisions of Rule 701 of the Commission?

A Yes, sir.



MR. JACOBS: I believe that's all we have of this witness. We ask that Exhibits B through E inclusive be admitted into evidence, and the application be made a part of the record.

MR. UTZ: Without objection, Exhibits B through E will be included as a part of this record.

(Whereupon, Applicant's Exhibits B through E, inclusive, admitted in evidence.)

CROSS EXAMINATION

BY MR. UTZ:

Q All the wells listed on Exhibit C will be proposed injection wells?

A Yes, sir.

Q All such wells will have injection through tubing with packer set above the Queen?

A Yes, sir.

Q Is this proposed to be a waterflood or a secondary recovery project?

A Secondary recovery project.

Q Therefore each well's allowable will stand on its own?

A Y

MR. UTZ: Are there any other questions of the witness?
The witness may be excused.

(Witness excused.)

MR. UTZ: Any statements in this case?

MR. BUELL: Guy Buell, for Pan American Petroleum

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Corporation. It is our opinion that this is a significant conservation effort, and for that reason we would urge that the Commission approve the two Skelly applications that Skelly has requested.

MR. UTZ: Any other statements?

MR. SELINGER: I believe the Applicant asked that the allowables be fixed in accordance with Rule 701.

MR. UTZ: I don't understand that. If it is a secondary recovery project, it wouldn't be true. There is a distinction as to waterfloods and secondary recovery.

MR. SELINGER: In view of the fact that all of the wells are sub-marginal wells and not capable of making the top, it is naturally assumed by the operator that all wells will be permitted to have a maximum allowable of the top unit, whatever it might be for that current period. Is that correct?

MR. UTZ: Under Rule 701, you mean?

MR. SELINGER: Under any normal situation.

MR. UTZ: Certainly the secondary recovery project is to receive the normal unit allowable.

MR. SELINGER: Even under a waterflood project, would not the transfer of allowable from the injection wells be permitted, to the producing wells?

MR. UTZ: Yes. As a waterflood, it would.

MR. SELINGER: As a waterflood?

MR. UTZ: Yes.



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MR. SELINGER: Each well would be entitled to produce up to the maximum top allowable?

MR. UTZ: Yes. The 42 barrels a day, as a waterflood.

MR. JACOBS: May I call Mr. Love back to the stand to clarify this?

MR. UTZ: Yes.

CHARLES J. LOVE

recalled as a witness, testified further as follows:

REDIRECT EXAMINATION

BY MR. JACOBS:

Q These wells are a stripper type operation?

A Yes.

Q When you said secondary recovery, you used the term secondary recovery and waterflood synonymously, didn't you?

A Yes, I did.

Q In your opinion, is this in truth and fact a waterflood type operation?

A Under the 701, it would be.

Q And you are requesting that a project area under Rule 701 be established, 42 barrels times the number of units within the project area with the rest of the rules provided for in Rule 701.

A Yes.

MR. UTZ: In your opinion, the producing capability of these wells would qualify them as a waterflood or stripper stage?



A Yes. The average production is 2.8 or less than three barrels per well.

MR. UTZ: Any other questions? The witness may be excused again.

(Witness excused.)

MR. UTZ: Any other statements in this case? The case will be taken under advisement. The hearing is adjourned until 1:30.

(Whereupon, the hearing was recessed until 1:30 o'clock P.M.)

* * * * *

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STATE OF NEW MEXICO)
COUNTY OF BERNALILLO) ss

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

WITNESS my Hand and Seal this 23rd day of November, 1962, in the City of Albuquerque, County of Bernalillo, State of New Mexico.

Ada Dearnley
NOTARY PUBLIC

My Commission Expires:

June 19, 1963.

I do hereby certify that the foregoing is a complete record of the proceedings in the Examiner hearing of Case No. 262282673 heard by me on *Oct. 24*, 1962.
Shirley H. [Signature] Examiner
New Mexico Oil Conservation Commission



Dollarhide Queen

Secondary Recovery Study

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- II. Conclusions
- III. Recommendations
- IV. Discussion
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 - B. General Reservoir and Fluid Properties
 - C. Primary Recovery
 - D. Secondary Recovery
 - 1. Waterflooding
 - 2. Unitization and Participation
 - 3. Plan of Waterflood
- V. Maps, Reports, and Graphical Data

Dollarhide Queen

I. Object:

This study was made by the Dollarhide Queen Engineering Sub-Committee for the following purposes:

1. To determine the feasibility of a waterflood project in the subject pool.
2. To outline a program for secondary recovery by waterflooding.
3. To determine participation parameters applicable to the proposed unit.
4. To design a waterflood project for the proposed unit.

II. Conclusions

1. The subject pool is a feasible waterflood project, and a full scale flood is indicated as soon as possible.
2. Ultimate primary depletion will recover 3.14 million barrels of oil.
3. Secondary recovery resulting from water injection will yield an additional 1.6 million barrels of oil.
4. The flood program as outlined is expected to result in top allowable unit oil production of 42 barrels per day per unitized well, or 2688 barrels per day.
5. The participation formula herein described is presented as the most equitable method of allocating secondary production from the unitized reservoir. The proposed formula was agreed upon, after extensive investigation of a variety of types and combinations of parameters. It is believed to be the most reasonable division of interests for a reservoir with the characteristics and performance history of the Dollarhide Queen. The participation formula, which includes 72% cumulative to 1-1-60; 23% ~~productive~~ acres; and 5% gross pay, has been approved by the working interest owners.

III. Recommendations:

1. The subject area should be unitized to promote effective secondary recovery of oil from the Queen reservoir.
2. A full-scale water injection program as proposed should be instituted at the earliest possible date.

IV. Discussion:

A. History

Initial discovery of the Dollarhide Queen pool was the completion of Skelly Oil Company's Mexico "0" Well No. 1 in Sec. 6, T-25-S, R-38-E, Lea County, New Mexico. Subsequent development of the field has been effected by various operators. The following are presently operating leases within the proposed unit:

Culbertson & Irwin
Elliott & Hall
J. P. Gibbins
Gulf Oil Corp.
Pan American Petroleum Corp.
Sinclair Oil & Gas Co.
Skelly Oil Co.
Texaco, Inc.

Within the horizontal limits of the proposed unit area, a total of 64 Queen producers on regular 40-acre spacings have been completed. Of this number, 58 wells continue to produce a limited amount of oil from the depleted reservoir. The proposed unit with the Queen completions enclosed by its boundaries is outlined on the accompanying Unit Area Map, Figure 1.

B. General Reservoir and Fluid Properties

The Dollarhide Queen reservoir, as shown on the structure map, Figure 2, is represented as an elongated northwest-southeast trending anticline. Structural dip on the south and west sides is 300 feet per mile, and on the north is 150 feet per mile. The Queen formation, a member of the Whitehorse Group, Permian Age, is found at an average depth of 3600 feet in the Dollarhide area. A typical section of the Queen formation is illustrated by the included log of Skelly's Mexico L #24, Figure 3.

Productive limits of the Queen reservoir in this area are defined by a water-oil contact at 585 feet, subsea elevation, on the north and west and by insufficient porosity on the south and east.

The water-oil contact is shown by the core analysis of Skelly's Mexico "J" Well No. 4, Fig. 4. Determination of the water-oil contact at -585 feet is further supported by the water locator log run on Texaco's McGhee No. 5, Fig. 5. An additional indication of the presence of a water-oil contact at -585 is the performance of Texaco's United Royalty Well No. 1. Originally completed at a PBTD of 3715 feet (a subsea elevation of -546'; TD was 3717'), the well's initial potential was 132 barrels oil and no water. After three years, oil production had declined and a slight amount of water was being produced. The well was deepened to approximately one foot above the water-oil contact, resulting in a marked

increase in water production.

Absence of porosity is evidenced by the low capacity wells and dry holes on the south and east flanks of the reservoir, and is illustrated on the Gross Isopach map, Fig. 6, and on logs of the Pan American's State "I" wells numbered 13, 15, and 1 on cross-section A-A', Fig. 7. The porosity limit was established on the basis of well surveys and results of drill stem tests.

C. Primary Recovery

The oil originally in place was determined volumetrically, applying a core determined net to gross factor as shown in the attached calculations. Assuming a recovery efficiency of 15 per cent, ultimate primary recovery was estimated at 3.14 million barrels. This estimate is in accord with extrapolated decline curves, and is equivalent to a per well primary ultimate of 49,000 barrels.

D. Secondary Recovery

1. Waterflooding

The geometry of the reservoir is such that no single flood pattern will affect a maximum portion of the reservoir in a reasonable period of time without additional drilling. The engineering committee has agreed upon use of a combination of two patterns; the 30-acre five-spot and peripheral. This combination will make possible the utilization of existing wells, and is expected to fulfill flooding requirements for the Queen reservoir. The injection pattern is illustrated on Fig. 8. Employment of this pattern is believed the most effective approach toward secondary recovery from this reservoir, and should afford adequate protection against drainage by non-unitized properties.

Based upon an injection rate of 500 barrels/day/well, a response is expected approximately 14.5 months after the proposed flood is initiated.

Secondary recovery was calculated by the Stiles method to be 1.6 million barrels, employing a water-oil ratio of 50:1 as the economic limit. Secondary production will bring to 4.74 million barrels the estimated ultimate recovery.

Primary performance and the projected secondary performance are shown on Figures 9a, 9b, and 9c.

2. Unitization and Participation

Secondary development of an area having the size and conformation of the proposed Dollarhide Queen Unit is generally considered most practical and economical if undertaken by a single operator. Skelly Oil Company has been named operator for the proposed unit.

Participation parameters were developed on the following basis:

- A. Primary Participation Formula. Each tract's percentage of the total production from Unit Area during the year 1959.
- B. Secondary Participation Formula. 72% each tract's percentage of the total Unit Area's Cumulative Production as of January 1, 1960,

Plus

23% of each tract's percentage of total ^{Developed} ~~Production~~
Acres in the Unit Area,

Plus

5% of each tract's percentage of Gross Pay under the Unit Area.

The primary participation parameter will be used as the basis for allocating production among working interest owners up to the time when all primary oil has been produced. Primary oil is described as that portion of the estimated primary (3.14 million barrels) remaining after deducting therefrom all oil produced from said Queen formation and run to the pipeline (as determined by Working Interest Owners from the Commissions monthly reports, Form C-115) from the beginning of production to the effective date of the Unit.

When ultimate primary recovery is complete, the secondary participation parameter will become the basis of allocation.

The cost of installation will be distributed among the working interest owners on the basis of the secondary participation percentage of each.

3. Plan of Waterflood

Thirty-six producing wells and twenty-eight injection wells employed in a combination 5-spot and peripheral pattern as shown on Figure 8, are planned for the secondary recovery project. An injection rate of 500 barrels/day/well is intended. The nine Santa Rosa water wells proposed on Figure 10 will be used as the injection water source.

A water test drilled through the Santa Rosa on Skelly's Mexico "O" lease produced 1200 barrels water per day from the interval between 590 feet and 766 feet. Nine wells should adequately supply the 14,000 barrels water per day required to sustain the injection rate. Water rights have been obtained in the pool and an analysis of the water is attached, Fig. 11. Santa Rosa water is being used successfully in a Drinkard and Devonian flood a few miles east in Texas. No treating problems are anticipated.

On Figure 12 is shown the flow of injection water from supply well to injection well. Installation of a filtering system will be determined by filter tests of water from the Santa Rosa formation.

Injection wells will be equipped with retrievable packers to isolate the casing-tubing annulus, and for control of the media injected.

Although Ellenburger and Fusselman waters are present in the Queen area the supply is limited, and availability as a primary injection source cannot be assured due to instability of supply from these oil-producing formations. The cost of treating the produced water for injection would be high, and due to the expected marginal flood is not recommended for use.

A single injection plant, shown in the distribution system on Figure 13, will be constructed in Unit L Sec. 32-T24S-R38E. The system, including 4½" O.D., 3½" O.D., and 2-3/8" O.D., injection lines, will be installed for implementation of full scale secondary recovery operations when unitization becomes effective.

Initial installation of 200 hydraulic horsepower is planned to implement the flood at the proposed injection rate. Ultimate power requirements of 600 hydraulic horsepower is anticipated to sustain the injection rate at an expected peak well-head pressure requirement of 2,000 psi. Power requirements will be determined by the injection rate, and additions or deletions of power will be governed by pressure and volumetric conditions as observed when the flood is instituted.

Dollarhide Queen
Volumetric Calculations

$$\text{Volumetric formula: } N = \frac{7758 \times A \times H \times \phi \times S_o}{B_o}$$

Where:

N = Oil originally in place, Bbls.

7758 = Conversion factor, Bbls./acre - feet

A = area included, acres

H = Thickness of formation, feet

ϕ = Porosity

S_o = Oil saturation

B_o = Oil formation volume factor

Factors used to determine Primary Oil:

Ah = 222,796.3 gross acre-feet (from gross pay isopach map)

Aheffective = $\frac{222,796.3}{5} = 44,559.26$ acre-feet (employing a net-to-gross factor of 1:5, estimated from logs and cores)

ϕ = 14% (estimated using logs and cores)

$S_o = (1 - S_w)$; $S_w = 48\%$ (estimated using cores)

$B_o = 1.2$ RBO/STBO (estimated, based on area)

Primary recovery efficiency = 15% (estimated, based on area)

$$N_{\text{primary}} = \frac{44,559.26 \times 7758 \times .14 \times 0.52 \times 0.15}{1.2}$$

$$N_{\text{primary}} = 3.14 \times 10^6 \text{ Bbls.}$$

$$\frac{\text{Acres-Foot} \times \text{Bbls/acre-foot}}{\text{Bbls/bbl.}} = \text{Bbls.}$$

V. Maps, Reports and Graphical Data

- Figure 1 - Unit Area
- Figure 2 - Structure Map
- Figure 3 - Typical Section
- Figure 4 - Core Analysis
- Figure 5 - Water Locator Log
- Figure 6 - Gross Isopach Map
- Figure 7 - Cross-Section A-A'
- Figure 8 - Injection Pattern
- Figures 9a, 9b, 9c - Performance Curves
- Figure 10 - Distribution System
- Figure 11 - Analysis of Santa Rosa Water
- Figure 12 - Schematic Diagram of Water Injection

R-38-E

Sinclair
320 Ac.

Gulf

Gulf

708 Ac.

20

21

(NCT-D)
1280 Ac.

713 Ac.

717 Ac.

722 Ac.

Clure - Federal

18

3

William A. Ramsay
State

William A. Ramsay
State

Sinclair
320 Ac.

Skelly
640 Ac.

Gulf
320 Ac.

724 Ac.

16

14

15

12

13

14

29

(NCT-D)

28

Gulf Featherstone
Unit 4 722 Ac.

722 Ac.

722 Ac.

722 Ac.

722 Ac.

722 Ac.

722 Ac.

722 Ac.

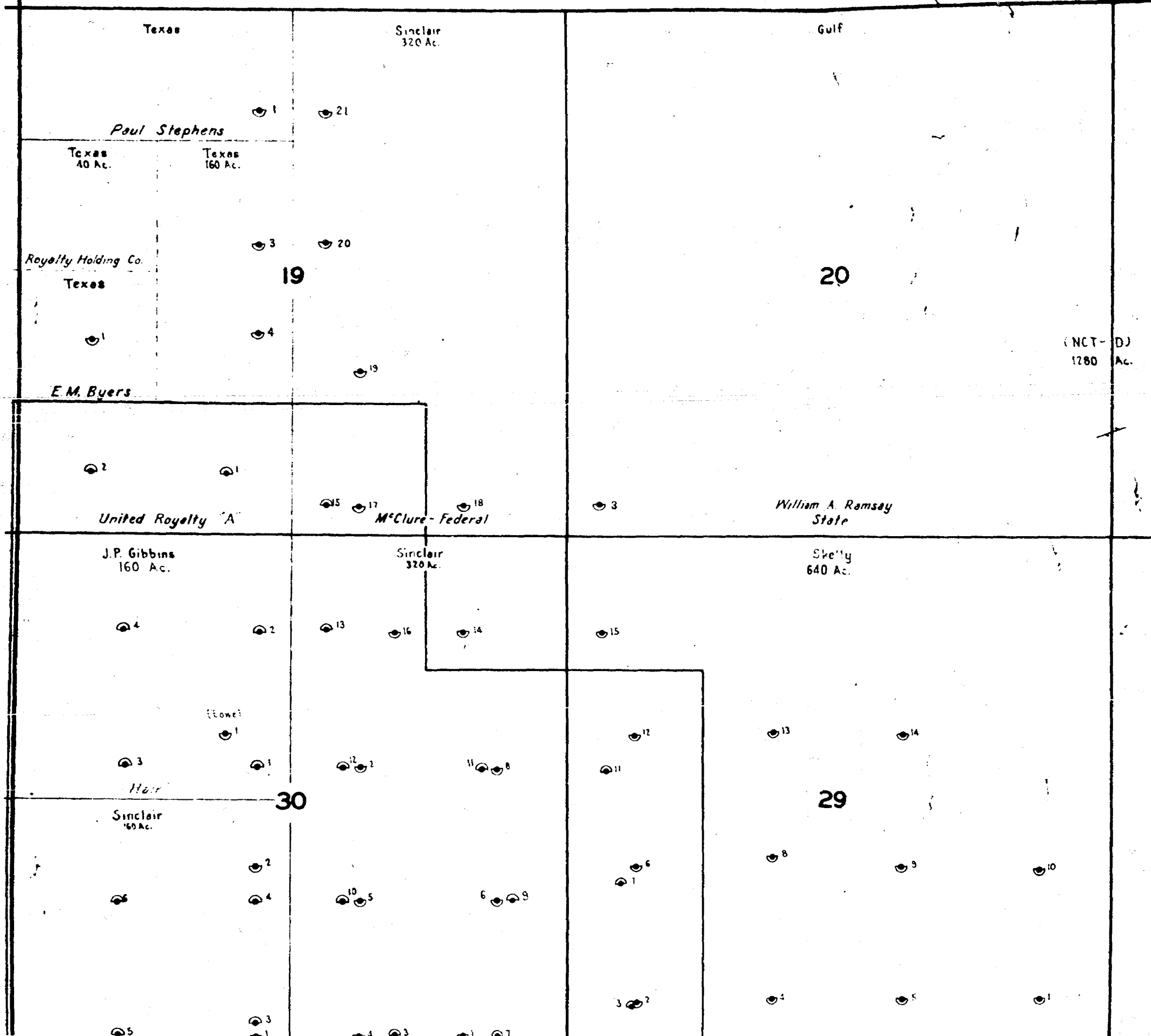
720 Ac.

Gulf-Featherstone
Unit No 2
(NCT-D)
40 Ac.

William A. Ramsay

T
24
S

R-38-E



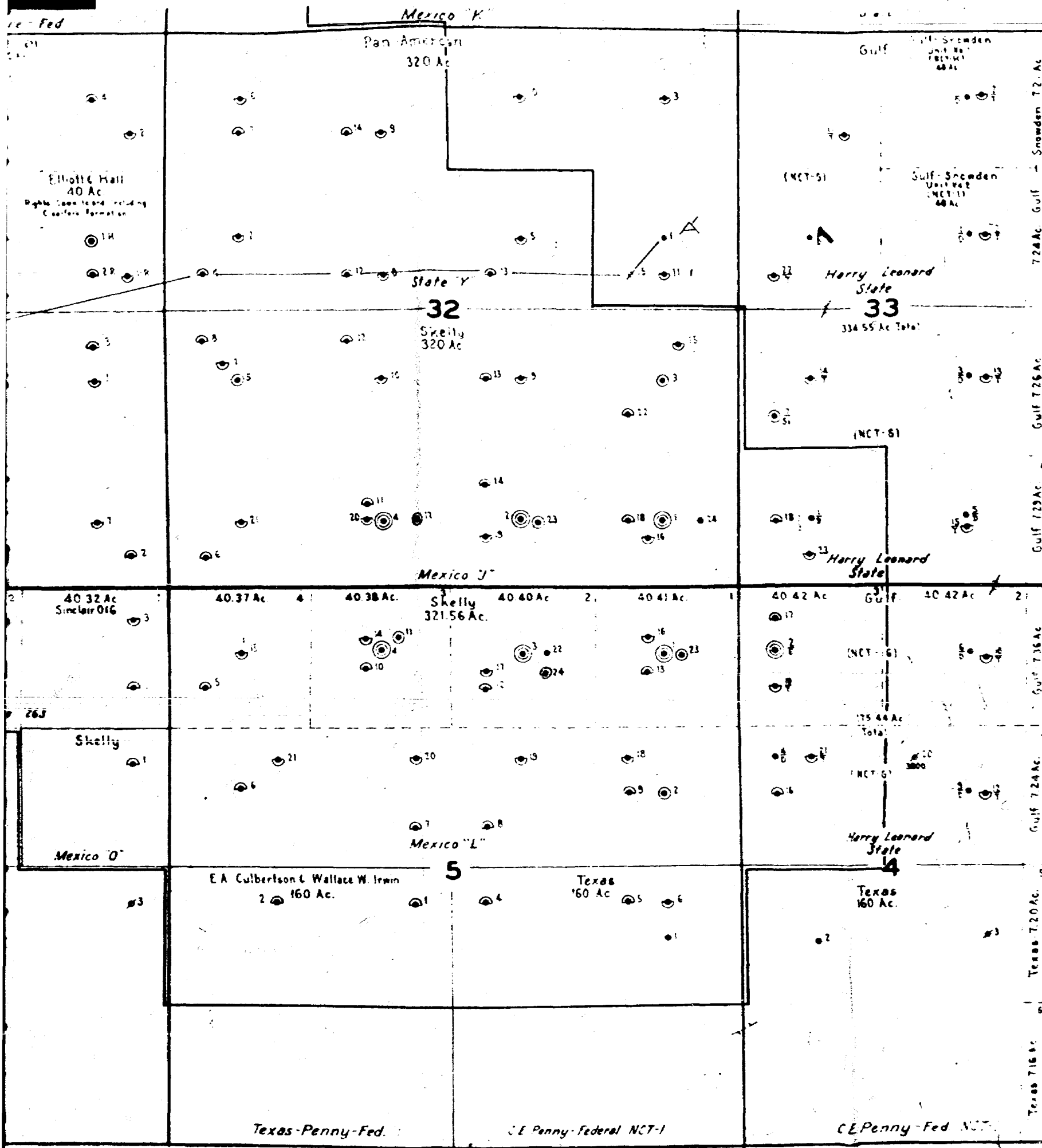
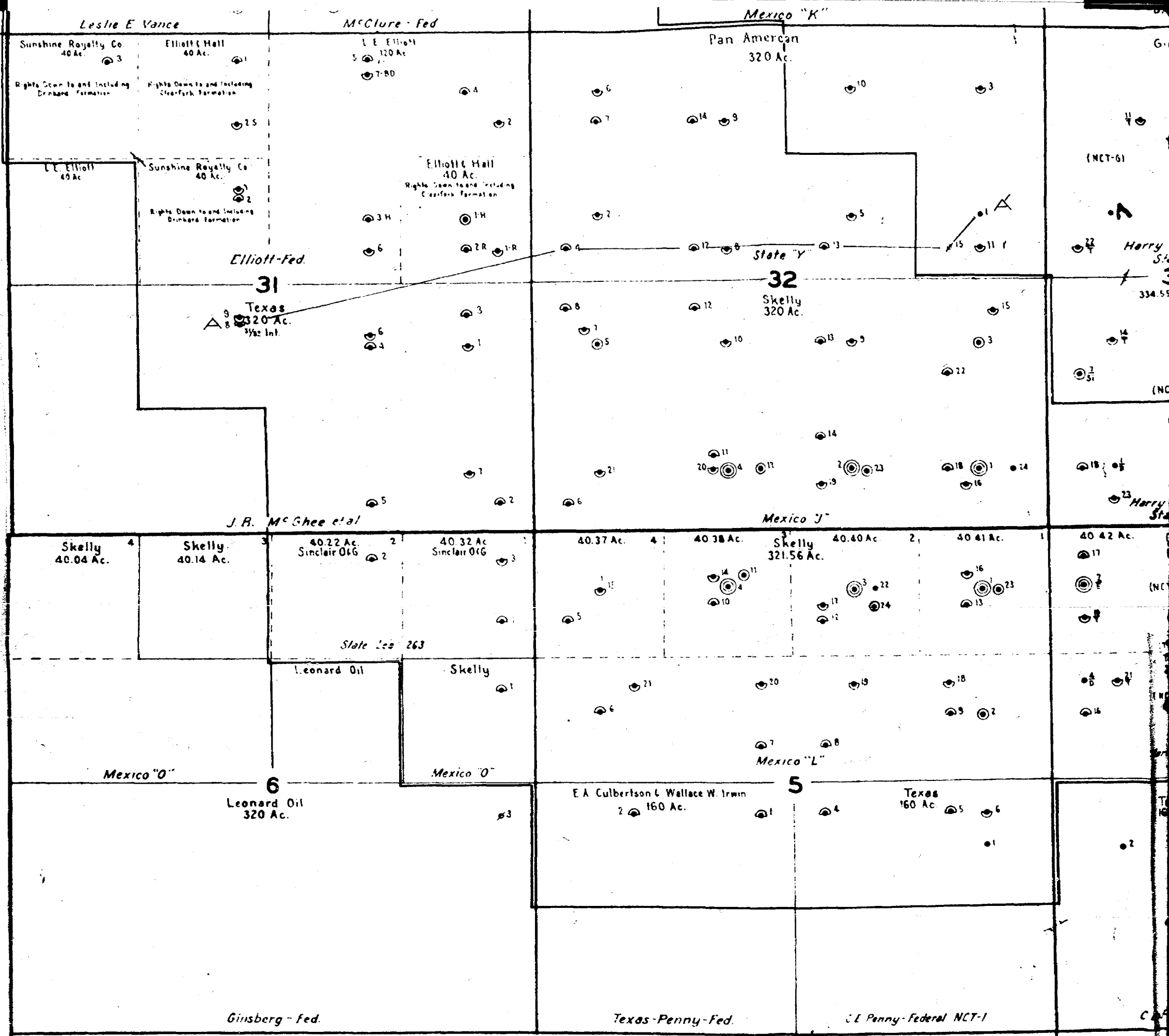


FIGURE 1

DOLLARHIDE-QUEEN LEA COUNTY NEW MEXICO

— UNIT AREA
— CROSS SECTION A-A



LEGEND

- DEVONIAN PRODUCER
- ◐ QUEENS PRODUCER
- ◑ DRINKARD PRODUCER
- ◒ FUSSELMAN PRODUCER
- ◓ ELLENBURGER PRODUCER
- ◔ DRY & ABANDONED

FIGURE 1

DOLLARHIDE
LEA COUNTY

UNIT AREA
CROSS SECTION

R 38 E

SINCLAIR

GULF

GULF

20

21

URE - FED.

SINCLAIR

WM. A. RAMSAY - STATE
SKELLY

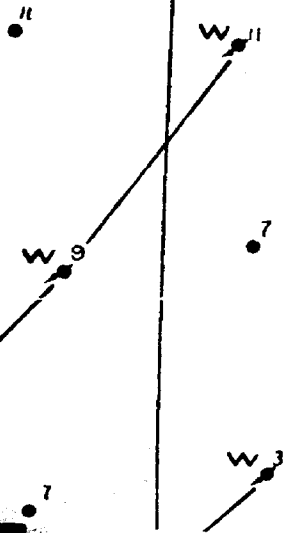
WM. A. RAMSAY STATE
GULF

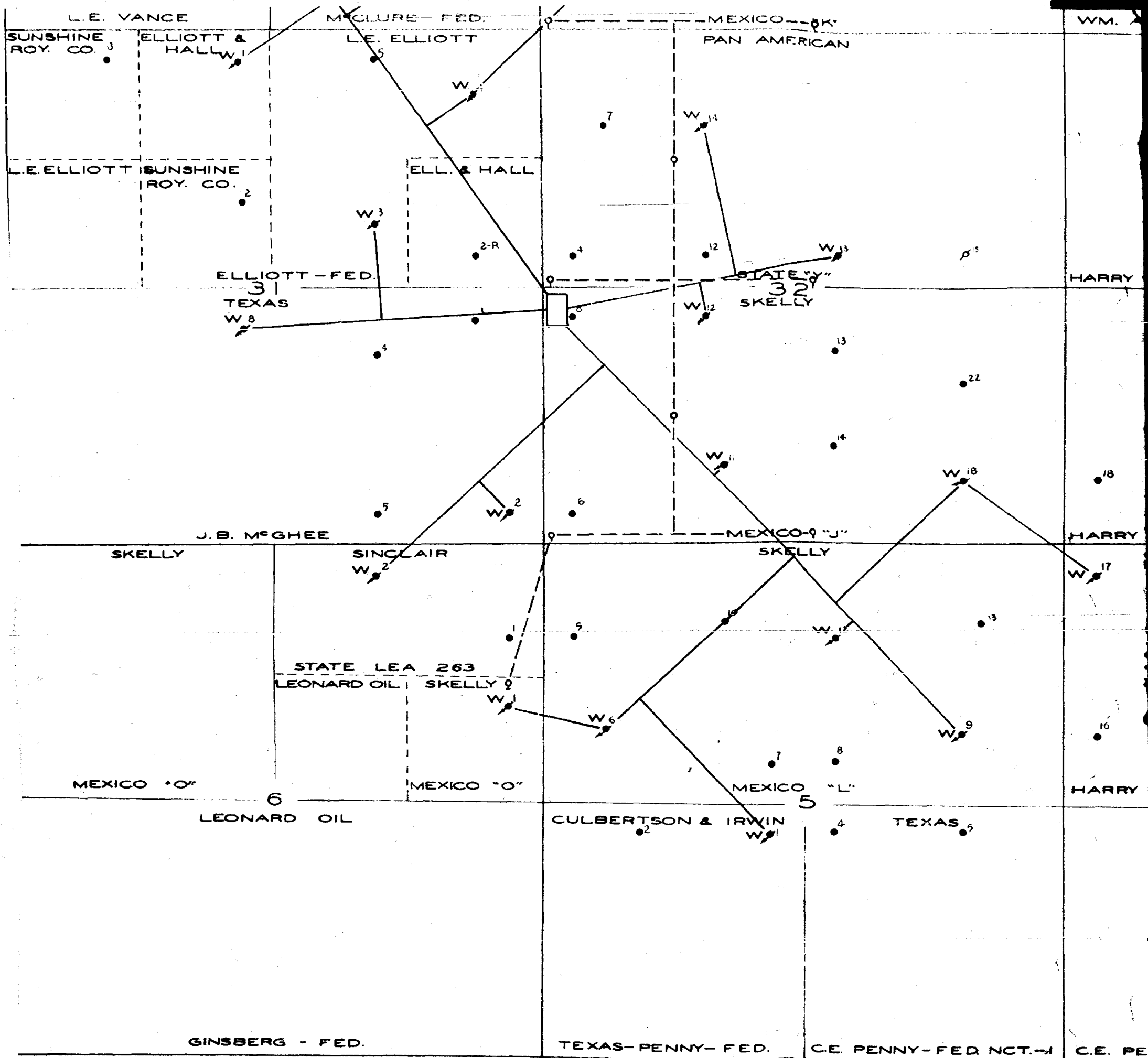
T
24
S

29

28

2





- QUEEN PRODUCER
- ✕ QUEEN INJECTION WELL
- Q SANTA ROSA WATER WELL
- ✕ DRY & ABANDONED
- Q PROPOSED SANTA ROSA WATER WELL

FIGURE 10

----- PROPOSED WATER SUPPLY
 ————— PROPOSED INJECTION

DOLLARHIDE - QUEEN
 LEA COUNTY NE
 PROPOSED WATER SUPPLY
 PROPOSED INJECTION

TREAT-RITE WATER LABORATORIES

INCORPORATED

BOX 548 - MONAHANS, TEXAS

RESULT OF WATER ANALYSES

TO: Mr. J. N. Danlaver LABORATORY NO: 11-11-58
P. O. Box 35, Hobbs, New Mexico SAMPLE RECEIVED 11-11-58
 RESULTS REPORTED 11-15-58

COMPANY Skelly Oil Co. LEASE Dollarhide Queen Waterflood
 FIELD OR POOL Dollarhide Queen
 SECTION BLOCK SURVEY COUNTY Lea STATE NM
 SOURCE OF SAMPLE AND DATE TAKEN:
 NO. 1 Raw water - taken from source water well.
 NO. 2 Produced water - taken from heater-treater.
 NO. 3
 NO. 4

REMARKS

CHEMICAL AND PHYSICAL PROPERTIES

	NO. 1	NO. 2	NO. 3	NO. 4
SPECIFIC GRAVITY AT 60°F.	1.0014	1.1390		
PH WHEN SAMPLED				
PH WHEN RECEIVED	9.0	10.2		
TOTAL ALKALINITY AS CaCO ₃	106	132		
SATURATED ALKALINITY AS CaCO ₃	9	37		
UNDERSATURATION AS CaCO ₃				
TOTAL HARDNESS AS CaCO ₃	32	50.18		
CALCIUM AS CaCO ₃	20	27.20		
MAGNESIUM AS CaCO ₃	12	22.98		
SODIUM AND/OR POTASSIUM	650	12,916		
SULFATE AS SO ₄	980	1,770		
CHLORIDE AS CL AS CL	256	100,957		
SILICA AS SiO ₂	0.9	1.2		
IRON AS FE	45.4	204		
MANGANESE AS MN	0	0.12		
BARIUM AS BA	none	none		
TURBIDITY ELECTRIC	1.3	0.4		
COLOR AS Pt	0.75	3.2		
DISSOLVED SOLIDS AT 103°C	1,000	211,850		
TOTAL SOLIDS AT 103°C	1,150	211,774		
TEMPERATURE °F.				
CARBON DIOXIDE CALCULATED	none	340		
DISSOLVED OXYGEN WINKLER				
HYDROGEN SULPHIDE	1.000	none		
RESIDUAL CHLORINE				
RESISTIVITY OHMS/CC	4.2	12.1		
Chlorides, as NaCl	2,023	140,322		
Phenolphthalein Alkalinity	30			

NOTE: All Results Reported as Parts Per Million. Divide by 17.1 to Convert to Grains Per Gallon.

Additional Determinations and Remarks	Actual Turbidity	Theoretical Compatibility
<u>Mixture of waters</u>	<u>1.7</u>	<u>1.7</u>
<u>Source water & produced waters</u>	<u>55.0</u>	<u>52.7</u>

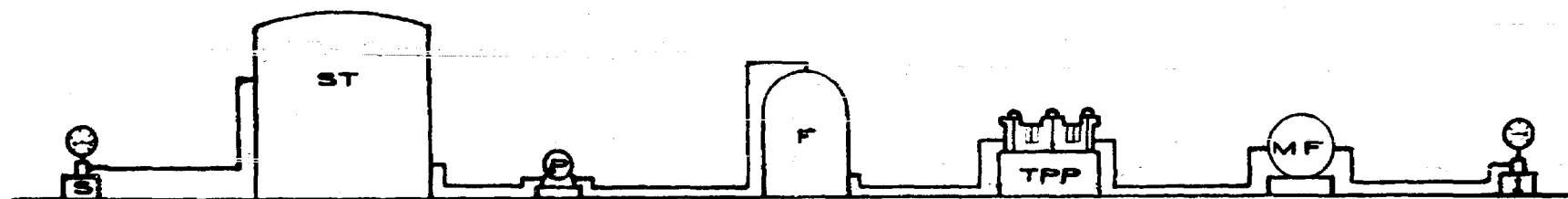
Letter of recommendation attached.

FIGURE II

By Wayne C. Martin, P. E.

SKELLY OIL COMPANY

DOLLARHIDE QUEEN SCHEMATIC DIAGRAM OF WATER INJECTION



- S..... WATER SUPPLY WELL
- ST..... WATER STORAGE
- P..... TRANSFER PUMP
- F..... FILTER (IF APPLICABLE)
- TPP..... TRIPLEX POWER PUMP
- MF..... METERING FACILITIES
- I..... WATER INJECTION WELL

FIGURE 12

BEFORE THE NEW MEXICO OIL CONSERVATION COMMISSION

IN THE MATTER OF THE APPLICATION OF)
SKELLY OIL COMPANY FOR AUTHORITY TO)
INJECT FLUID INTO THE QUEEN SAND)
FORMATION IN THE WEST DOLLARHIDE)
QUEEN FIELD, LEA COUNTY, NEW MEXICO.)

CASE 2673
FILED _____
HEARING _____

APPLICATION

Comes now Skelly Oil Company on behalf of itself and others and respectfully states as follows:

1. That it is an owner and operator of oil and gas wells in the West Dollarhide Queen Field, Lea County, New Mexico.
2. That it desires to conduct secondary recovery operations in this field by injecting fluids into the Queen Sand formation, which formation shall be described and construed to mean the formation and reservoir encountered in the drilling by Skelly Oil Company's Mexico "L" Lease Well No. 24 between the depths of 3580 feet and 3760 feet as shown by the electric log of said well, which well is located in the NW/4 of the NE/4 of Section 5, Township 25 South, Range 38 East, Lea County, New Mexico.
3. That applicant proposes to conduct secondary recovery operations by injection of fluids into the Queen Sand formation, above described, in an area known as the West Dollarhide Queen Sand Unit, which unit consists of portions of Sections 19, 29, 30, 31, 32 and 33, Township 24 South, Range 38 East, and Sections 4, 5 and 6, Township 25 South, Range 38 East, Lea County, New Mexico, containing an area of 2,562.52 acres, more or less, which area is more specifically set out on a map entitled "Figure 1 of Exhibit 'A'" attached hereto and made a part hereof by reference.
4. That initially applicant proposes to inject fluid into 28 wells as follows:

<u>Well</u>	<u>Location</u>
Texaco - United Royalty "A" #2	Unit M, Sec. 19-24S-38E-
Sinclair - McClure-Fed. #15	Unit O, Sec. 19-24S-38E-
Sinclair - McClure-Fed. #3	Unit O, Sec. 30-24S-38E-
Sinclair - McClure-Fed. #12	Unit G, Sec. 30-24S-38E-
Sinclair - McClure-Fed. #9	Unit I, Sec. 30-24S-38E-
J. P. Gibbins - Fowler Hair #2	Unit C, Sec. 30-24S-38E-
J. P. Gibbins - Fowler Hair #3	Unit E, Sec. 30-24S-38E-
Sinclair - L. E. Vance #4	Unit K, Sec. 30-24S-38E-
Sinclair - L. E. Vance #5	Unit M, Sec. 30-24S-38E-
Skelly - Mexico "K" #3	Unit M, Sec. 29-24S-38E-
Skelly - Mexico "K" #11	Unit E, Sec. 29-24S-38E-
Pan American - State "Y" #13	Unit G, Sec. 32-24S-38E-
Pan American - State "Y" #14	Unit C, Sec. 32-24S-38E-
Elliott, Inc. - Elliott "H" #3	Unit G, Sec. 31-24S-38E-
Elliott, Inc. - Elliott "H" #4	Unit A, Sec. 31-24S-38E-
Elliott and Hall - Elliott "R" #1	Unit C, Sec. 31-24S-38E-
Texaco - J. B. McGhee #2	Unit P, Sec. 31-24S-38E-
Texaco - J. B. McGhee #9	Unit K, Sec. 31-24S-38E-
Skelly - Mexico "J" #11	Unit N, Sec. 32-24S-38E
Skelly - Mexico "J" #12	Unit K, Sec. 32-24S-38E
Skelly - Mexico "J" #18	Unit P, Sec. 32-24S-38E
Skelly - Mexico "L" #6	Unit E, Sec. 5-25S-38E
Skelly - Mexico "L" #9	Unit H, Sec. 5-25S-38E
Skelly - Mexico "L" #12	Unit B, Sec. 5-25S-38E
Sinclair - State Lea 263 #2	Unit B, Sec. 6-25S-38E
Skelly - Mexico "O" #1	Unit H, Sec. 6-25S-38E
Gulf - Leonard State #7	Unit D, Sec. 4-25S-38E
Culbertson & Irwin - Texas Penny Fed. #1	Unit K, Sec. 5-25S-38E

Lea County, New Mexico. These wells are shown on a map marked "Figure 8 of Exhibit 'A'" above referred to, and further applicant may in the future desire to expand the secondary recovery project to include other wells within the unit area.

5. That attached hereto is a map marked "Figure 8 of Exhibit 'A'" which shows the proposed injection wells and the location of all wells and lessees within the limits of the field or a two-mile radius of said proposed injection wells.

6. That applicant proposes to use as a primary source of injection fluids fresh water from the Santa Rosa formation present in the area, supplementing said water with produced water from the Queen Sand formation as the flood progresses. Applicant proposes to inject initially between 13,000 barrels and 15,000 barrels of water per day.

WHEREFORE, PREMISES CONSIDERED, applicant prays that this Commission, after the giving of notice as required by law, set this application down for hearing and that at the conclusion of said hearing based on the evidence produced, that it issue an order authorizing applicant to inject fluid and conduct secondary recovery operations within the West Dollarhide Queen Sand Unit by authorizing the injection of water into 28 wells in the unit area, provide for the expansion of the secondary recovery project without the necessity of further hearings, and other rules and regulations, and orders as may be necessary in the premises.

Respectfully submitted,

SKELLY OIL COMPANY

By


George W. Selinger

By


Ronald J. Jacobs
Its Attorney

Of Counsel
L. C. White
Gilbert, White & Gilbert
Santa Fe, New Mexico

Handwritten: need Special Ltr of Transmittal 2688 BOPD

DRAFT

Handwritten: JMD/esr
October 30, 1962

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. 2673

Order No. R-2356

APPLICATION OF SKELLY OIL COMPANY
FOR A SECONDARY RECOVERY PROJECT,
WEST DOLLARHIDE QUEEN POOL, LEA
COUNTY, NEW MEXICO.

Handwritten signature: J. J. P.

ORDER OF THE COMMISSION

BY THE COMMISSION:

This cause came on for hearing at 9 o'clock a.m. on
October 24, 1962, at Santa Fe, New Mexico, before Elvis A. Utz,
Examiner duly appointed by the Oil Conservation Commission of New
Mexico, hereinafter referred to as the "Commission," in accordance
with Rule 1214 of the Commission Rules and Regulations.

NOW, on this Nov day of Nov, 1962, the Commission,
a quorum being present, having considered the application, the
evidence adduced, and the recommendations of the Examiner,
Elvis A. Utz, and being fully advised in the premises,

FINDS:

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

(2) That the applicant, Skelly Oil Company, seeks authority
to institute a waterflood project in the West Dollarhide Queen Pool
in the West Dollarhide Queen Sand Unit Area comprising portions of
Townships 24 and 25 South, Range 38 East, NMPM, Lea County, New
Mexico, by the injection of water into the Queen ~~sand~~ formation
through 28 wells located in Sections 19, 29, 30, 31, and 32,
Township 24 South, Range 38 East, and Sections 4, 5, and 6, Town-
ship 25 South, Range 38 East, NMPM, Lea County, New Mexico.

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

(4) That the waterflood project should be approved and
should be governed by the provisions of Rule 701.

CASE No. 2673

IT IS THEREFORE ORDERED:

(1) That the applicant, Skelly Oil Company, is hereby authorized to institute a waterflood project in the West Dollarhide Queen Pool in the West Dollarhide Queen Sand Unit Area comprising portions of Townships 24 and 25 South, Range 38 East, NMPM, Lea County, New Mexico, by the injection of water into the Queen formation through the following-described wells:

<u>Operator & Lease</u>	<u>Well No.</u>	<u>Unit</u>	<u>L o c a t i o n</u>		
			<u>Section</u>	<u>Township</u>	<u>Range</u>
Culbertson & Irwin					
Texas Penny	1	K	5	25 South	38 East
L. E. Elliott					
Elliott Fed.	3-H	G	31	24 South	38 East
Elliott Fed.	4-H	A	31	24 South	38 East
Elliott & Hall					
Elliott Fed.	1-S	C	31	24 South	38 East
J. P. Gibbins					
Fowler Hair	2	C	30	24 South	38 East
Fowler Hair	3	E	30	24 South	38 East
Gulf					
Leonard "G"	17	D	4	25 South	38 East
Pan American					
State "Y"	13	G	32	24 South	38 East
State "Y"	14	C	32	24 South	38 East
Sinclair					
McClure	3	O	30	24 South	38 East
McClure	9	I	30	24 South	38 East
McClure	12	G	30	24 South	38 East
McClure	15	O	19	24 South	38 East
State Lea 263	2	B	6	25 South	38 East
L. E. Vance	4	K	30	24 South	38 East
L. E. Vance	5	M	30	24 South	38 East
Skelly					
Mexico "J"	11	N	32	24 South	38 East
Mexico "J"	12	K	32	24 South	38 East
Mexico "J"	18	P	32	24 South	38 East
Mexico "K"	3	M	29	24 South	38 East
Mexico "K"	11	E	29	24 South	38 East
Mexico "L"	6	E	5	25 South	38 East
Mexico "L"	9	H	5	25 South	38 East
Mexico "L"	12	B	5	25 South	38 East
Mexico "O"	1	H	6	25 South	38 East
Texaco					
McGhee	2	P	31	24 South	38 East
McGhee	9	K	31	24 South	38 East
Un. Royalty "A"	2	M	19	24 South	38 East

(2) That the subject waterflood project shall be governed by the provisions of Rule 701, including the allowable provisions thereof, and including the provisions with respect to expansion of the waterflood project.

(3) 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.