TEXACO INC.

SKAGGS (GRAYBURG) UNIT

SKAGGS (GRAYBURG) FIELD

LEA COUNTY, NEW MEXICO

## RECOMMENDATIONS

#### Texaco Inc. requests:

- 1. A permit to unitize an area in the Skaggs (Grayburg)
  Pool to be known as the Skaggs (Grayburg) Unit which
  is to consist of the SE/4, E/2 of SW/4 and SW/4 of
  SW/4 of Section 12, the E/2 of NE/4, NW/4 of NE/4,
  NW/4 and NE/4 of SW/4 of Section 13, W/2 of SW/4 and
  SE/4 of SW/4 of Section 18 and the W/2 of NW/4, NE/4
  of NW/4 and NW/4 of NE/4 of Section 19 all in T-20-S,
  R-37-E, Lea County, New Mexico.
- 2. A permit to waterflood the Grayburg reservoir underlying the unitized area.
- 3. A permit to use 11 existing wells as injection wells as a basic 5-spot pattern flood with variations.

#### RESERVOIR DESCRIPTION

The Skaggs (Grayburg) Field was discovered March 14, 1937 by Continental Oil Company. This field produces from the Grayburg formation of Permian Age, Upper Guadalupe or Capitan series at an average depth of 3700 feet to 3950 feet.

- 1. The Physical Properties of the Reservoir Rock.
  - a. Average Porosity (Net Pay) 6 percent. (Core Data Continental Oil Company Well)
  - Average Permeability (Net Pay) 8.3 millidarcies. (Core Data Continental Oil Company Well)
  - Average Connate Water Saturation (Net Pay) -Approximately 30 percent.
     (Core Data Continental Oil Company Well)
- II. The Structural Features of the Reservoir
  - a. Oil-Water Contact Unknown.
  - b. Gas-Oil Contact Unknown.
  - c. Structure Trap is primarily structural with some stratigraphic control and dips to the Northeast at approximately 50 feet per mile. Permeability is also a controlling factor.
  - d. Average Net Effective Oil Pay Thickness -Approximately 35 feet.
- 111. Characteristics of the Reservoir Fluids
  - a. Average Oil Gravity 36.0° API.
  - b. Average Gas Gravity .855 (Air = 1.0).
  - c. Salinity of water Approximately 14,000 ppm Cl.
  - d. Oil Over saturated as indicated by high producing gas-oil ratios. No PVT analysis available.
  - IV. Pressure

- a. Original Reservoir Pressure 1550 psi.
- b. Productivity Index None Available.

#### V. Statistical Data

- a. Cumulative Oil Production Approximately 929,000 barrels as of January 1, 1966. Average per well production is 3.4 barrels of oil per day.
- b. Current Producing Gas-Oil Ratio 11,000 cubic feet.
- Average water production Approximately28 percent of the total fluid.
- d. Well status as of February I, 1965

22 Producing Wells19 Pumping Wells3 Flowing Wells

- e. Proven oil productive acreage developed on TEXACO's properties 880 acres.
- f. Well density in acres per well 40 acres.
- g. State of depletion of reservoir stripper.
- h. Current gas disposition Purchased by Warren Petroleum Corporation.
- Volumes of gas, air, or water injected into reservoir - None.

#### VI. Individual Well Problems

- a. Most wells have been completed below casing in an open hole interval. Acid treatments, Nitroglycerin, were used to stimulate production prior to potential test. Fracture treatments have been conducted on several wells during the latter years.
- b. The L.R. Kershaw Well No. 8 is a triple tubingless completion through perforations in the Skaggs (Grayburg), Weir (Blinebry) East and the Eumont formations.

## VII. General Reservoir Mechanics

- a. Gas cap expansion and solution gas drive have been the major drive mechanisms.
- Effectiveness of water drive none indicated by field performance.

### SKAGGS (GRAYBURG) FIELD Lea County, New Mexico

TEXACO Inc. requests approval to conduct waterflood operations in the Skaggs (Grayburg) Field. The project area is identified as follows:

- I. Township 20 South, Range 37 East, SW/4 SW/4, E/2 SW/4, SE/4 Section 12, NW/4, E/2 NE/4, NW/4 NE/4, NE/4 SW/4 Section 13.
- Township 20 South, Range 38 East, W/2 SW/4, SE/4 SW/4 Section 7, W/2 NW/4, NE/4 NW/4, NW/4 NE/4 Section 18.

It is planned to convert eleven of twenty-two producing wells to water injection. These wells are described as follows:

TEXACO Inc., Operator

- L.R. Kershaw Well No. 1 NE/4 NE/4 Section 13 T-20-S, R-37-E
- L.R. Kershaw Well No. 4 NE/4 NW/4 Section 13 T-20-S, R-37-E
- L.R. Kershaw Well No. 5 NE/4 SW/4 Section 13 T-20-S, R-37-E
- L.R. Kershaw Well No. 6 SW/4 NW/4 Section 13 T-20-S, R-37-E
- C.H. Weir 'A' Well No. 1 NE/4 SW/4 Section 12 T-20-S. R-37-E
- C.H. Weir 'A' Well No. 3 NE/4 SE/4 Section 12 T-20-S, R-37-E
- M.B. Weir 'B' Well No. 3 SW/4 SE/4 Section 12 T-20-S, R-37-E
- M.B. Weir 'B' Well No. 6 SW/4 SW/4 Section 12 T-20-S, R-37-E
- M.B. Weir 'B' Well No. 2 SW/4 SW/4 Section 7 T-20-S, R-38-E
- M.B. Weir 'A' Well No. 2 SW/4 NW/4 Section 18 T-20-S, R-38-E

B. L. Sweet, Operator

Trickey Well No. 2 - NW/4 NE/4 Section 18 T-20-S. R-38-E

The producing wells in the project area to be water-flooded have reached an advanced state of depletion and are properly to be classified as 'stripper' wells.

Water is to be injected in an open hole interval through plastic coated tubing below a packer. Anticipated injection rate is 500 barrels of water per day per injection well at a maximum pressure of approximately 2000 psi.

Provision for expansion by administrative approval is requested if the undeveloped acreage underlying the above leases appear prospective for economic development after flood response is observed.

It is requested that the proposed waterflood project should be authorized and should be governed by the provisions of Rule 701 of the Commission Rules and Regulations, including those provisions regarding allocation of allowables and their transfer and credits.

immediately to the South of the subject area, Oil Conservation Commission of New Mexico Order No. R-1710 authorizes Continental Oil Company to waterflood the Grayburg formation on its Southeast Monument Unit, Skaggs Pool, Lea County, New Mexico, effective June 10, 1960. The subject waterflood project will be in cooperative agreement with Continental.

As a result of TEXACO's waterflood project, it is anticipated that from 950,000 to 1,050,000 barrels of oil will be recovered over primary production. Eighty percent fillup is expected within two years after commencement of injection.

#### WATER SOURCE

Fresh water is to be used for the injection fluid which is available from a fresh water supply well located 745' FNL and 330' FEL of Section 13, T-20-S, R-37-E. This well was drilled under Texaco's water permit L-4412 approved by the State Engineer in the Lea County Shallow Underground Basin in April, 1964 and is designated as water source Well No. L-4412. The fresh water is from the Ogallala formation Pliocene epoch, Tertiary period, and consists of pinkish-gray calcareous sand usually with a thick basal gravel. It is anticipated that one more water source well will be needed upon commencement of injection and possibly another well will be required later during the life of the flood. The wells are to be positioned on a line running North-South through the existing well. The location of Water Supply Well No. L-4412-S has been filed with and approved by the State Engineer. It is to be located in the SE 1/4 of the NE 1/4 of Section 13, T-20-S, R-37-E. Upon completion, Water Source Well No. L-4412 tested for 200 gallons per minute or 6857 barrels per day.

Water requirements will be approximately 4500 barrels of water per day which is below the capacity of the existing water well, but to prevent excessive drawdown, the other well will be drilled and equipped to pump.

# STATUS OF SIGN-UP SKAGGS GRAYBURG UNIT LEA COUNTY, NEW MEXICO

Tract	Percent Working Interest (%)	Percent Royalty Interest (%)
1	100.0	95•3
2	87.5	88.4
3	100.0	0
4	100.0	61.3
5	100.0	50.0
6	100.0	66.2
7	100.0	52.3
8	100.0	92.6
9	100.0	49.7
10	100.0	83.1
Total Unit	99.6	75.0

Effective April 25, 1966

#### SKAGGS (GRAYBURG) FIELD

#### Offset Operators Mailing List

Amerada Petroleum Corporation P. O. Box 668 Hobbs, New Mexico

Cities Service P. O. Box 69 Hobbs, New Mexico

Continental Oil Company P. O. Box 427 Hobbs, New Mexico

DeKalb Petroleum Corporation 404 W. Illinois Midland, Texas

Fluor Corporation, Ltd. Midland Tower Building Midland, Texas

Gilbert, White, & Gilbert
P. O. Box 787
Santa Fe, New Mexico
Attn: Mr. L. C. White

Hissom Drilling Company 901 W. Missouri Midland, Texas

Humble Oil & Refining Company P. O. Box 2100 Hobbs, New Mexico

New Mexico Oil Conservation Comm. (2) P. O. Box 2088 Santa Fe, New Mexico New Mexico Oil Conservation Comm. P. O. Box 1980 Hobbs, New Mexico

Texaco Inc.
P. 0. Box 3109
Midland, Texas
Attn: Mr. J. S. Rowe

Texaco Inc.
P. O. Box 3109
Midland, Texas
Attn: Mr. J. M. Williams (1)
Mr. C. L. Whigham (1)

Texaco Inc.
P. O. Box 728
Hobbs, New Mexico
Attn: Mr. W. S. Bouldin

Tidewater Oil Company P. O. Box 1231 Midland, Texas

B. L. Sweet
P. O. Box 51
Hobbs, New Mexico

State Engineers Office P. O. Box 1079
Santa Fe, New Mexico

Wolfson Oil Company 504 Midland Nat'l Bank Bldg. Midland, Texas SKAGGS GRAYBURG UNIT LEA COUNTY, NEW MEXICO ROYALTY OWNERS

Eugene B. Adkins c/o Nicholson, Reyborn & Co. 1107 Phil Tower Bldg. Tulsa 3, Oklahoma

Doris M. Anderson 308 Roosevelt Topeka, Kansas 66606

Warren D. Anderson P. O. Box 136 Midland, Texas

Jane Andres
P. O. Box 307
Hagerman, New Mexico

J. M. Armstrong P. O. Box 990 Midland, Texas

Charles F. Bedford No. 7 Westover Road Ft. Worth 7, Texas

Edwin M. Bedford 964 Westchester Place Los Angeles 19, Calif.

Henry de G. Bedford P. O. Box 572 San Clemente, Calif.

Lena Mae Biel 710 Furman Ave. Corpus Christi, Texas

W. R. Biggs 110 South 23rd Muskogee, Oklahoma

Lois Birge 2708 N.W. 44th St. Oklahoma City, Okla.

Claudine Brady 1514 S. Carson St. Tulsa, Oklahoma

H. T. Brady
Route 3
Springdale, Arkansas

M. H. Brady P. O. Box 539 Midland, Texas

Randi Brekke Alkla Randi Foss Parkreien 51 Oslo, Norway

Joyce Ann Brown 909 N. Alameda Las Cruces, N. M.

Joyce C. Brown 909 N. Alameda Las Cruces, N. M. Rachel B. Brown
P. O. Box 572
San Clemente, Calif.

Dawson C. Bryan 330 W. Friar Tuck Houston, Texas

Robert E. Byers P. O. Box 4554 Austin 51, Texas

Ronald J. Byers
P. O. Box 4554
Austin, 51, Texas

Ruth Calkins c/o Bank of America La Jolla Branch La Jolla, Calif.

Ruth B. Carroon 2106 S. Cincinnati, Apt. B Tulsa, Oklahoma

Effie Carter
P. O. Box 1296
Roswell, New Mexico

Lee Carter
Portales, New Mexico

Christian Science Pleasant View Home 115 E. 83rd St. Kansas City, Mo.

B. A. Christmas, Jr. Chico Road
Rotan, N. M.

Cities Service Oil Co. Bartlesville, Oklahoma.

Josephine Orr Compton 404 Eastwood Ft. Worth, Texas

J. R. Cone Room 1706 Great Plains Life Bldg. Lubbock, Texas

Robert Maurice Cowden 2610 9th St. Wichita Falls, Texas

DeKalb Agricultural Assoc. 404 W. Illinois Midland, Texas

Caroline C. Dewey 2004 W. Golf Course Rd. Midland, Texas

Frankie T. Easley 1105 North Green Acres Hobbs, New Mexico First Nat'l Bank of Portland 6th Morrison Branch A/C James Arthur Hayes Portland, Oregon

First Nat'l Bank, Trustee Allie M. Lee Reno, Nevada

Frank E. Foulk c/o Trust Dept. Republic Nat'l. Bank P. O. Box 241 Dallas, Texas 75221

Lizzie Garwood 2222 Washington Amarillo, Texas

Eunice Cone Gibson 2514 Ahura El Paso, Texas

Charles B. Gonsales 9105 Aspen NE Albuquerque, New Mexico 87112

Sue S. Graham Drawer 2168 Roswell, N. M.

Eunice J. Gray
77 Truce Blvd.
Nyack, N. Y. 10960

Great Oaks, Inc. 115 E. 83rd St. Kansas City, Mo.

J. W. Greening 1117 W. 4th Winston Salem, N. C.

Mrs. Dora Haley Route 1, Box 280 Sheridan, Ark. 72150

Mrs. B. B. Harris 800 Claton St. Orlando, Florida

Martha W. Harris 100 S. Highway 79 Henderson, Texas

Frank Haynes, Guardian James R. Haynes Grantville, Kansas

Edna H. Healy 917 Locust, Apt. 331 Des Moines, Iowa

W. C. Hentzler 2714 Kansas Ave. Topeka, Kansas

W. J. Hoene 1101 E. Kerbey Ave El Paso, Texas

# SKAGGS GRAYBURG UNIT LEA COUNTY, NEW MEXICO ROYALTY OWNERS

Clarence W. Hoit 4474 Yosemite Way Los Angeles 41, Calif.

Jessie A. Hutchison 6007 Ridgeway Houston, Texas

Mattie H. James 1506 Congress Ave. Austin, Texas

Nelson H. James 5 West Rivercrest Houston 27, Texas

Edna Mae Johnson 3441 Clayton Road East Ft. Worth, Texas

Frances G. Johnson
P. O. Box 1557
Roswell, N. M.

Lloyd W. Johnson 2809 E. 39th St. Tulsa 5, Oklahoma

S. P. Johnson, Jr., Executor Estate of S. P. Johnson P. O. Box 1713 Roswell, N. M.

Vicki Anderson Jones P. O. Box 1884 Midland, Texas

Roberta Kelly 112 E. Sanger Hobbs, New Mexico

L. R. Kershaw 505 W. Broadway Muskogee, Oklahoma

E. W. Kimball 5400 Valerie St. Bellaire, Texas

Marjorie Cone Kustman
Estate of S. E. Cone
2806 34th St.
Lubbock, Texas

Bess Adkins Lacy 2407 - 27th Place Tulsa, Oklahoma

Lois R. Linam
P. O. Box 1898
Hobbs, New Mexico

Thelma A. Linam P. O. Box 743 Hobbs, New Mexico Birdie Loyd 1508 W. Imoore Dr. Albuquerque, N. M.

J. F. Maddox P. O. Box 2317 Hobbs, New Mexico

Kataryn Gregory May, Executrix Estate of C. L. Gregory 162 Anita Circle El Paso, Texas

B. L. McGee 112 E. Andres Drive, NW Atlanta, Georgia

Fannie M. McIntire c/o Lillard, Eidson, Lewis & Porter New England Bldg. Topeka, Kansas

Arni J. Maki
P. O. Box 1202
Denver 1, Colo.

Mercantile Nat'l. Bank, Trustee P. H. Stanford Trust TA/2481 Dallas 22, Texas

Me-Tex Supply Co. Hobbs, New Mexico

Charles P. Miller P. O. Box 385 Hobbs, New Mexico

Mrs. Clyde W. Miller 222 S. Justin Dallas, Texas

Mr. & Mrs. E. B. Miller 902 N. Shipp Hobbs, New Mexico

Irma Mills
Pearsall, Texas

J. Hiram Moore
201 Wall Bldg. Suite 517
Midland, Texas

A. E. Neudauer, Jr. 4003 North Peunte Baldwin Park, Calif.

New Mexico Bank & Trust Co. Trustee of Carlin Trust Hobbs, New Mexico

New Mexico Bank & Trust Co. Trustee of Klein Trust Hobbs, New Mexico Mary Margaret Parr c/o A. S. Parr 1501 Gage Blvd. Topeka, Kansas

Elyse S. Patterson 6444 Indian Lane Shawnee Mission, Kansas

Effie H. B. Phillips P. O. Box 4
Bent, New Mexico

J. E. Pinney 854 Lewis Salina, Kansas

Lee Roberts
Route 2
Garfield, Ark.

H. Dillard Schenick
P. O. Box 1225
Lovington, New Mexico

Sixth Church of Christ Scientist 401 W. 66th Terr. Kansas City, Mo.

June D. Speight
P. O. Drawer 1687
Lovington, New Mexico

Glen Staley 12170 Stanaway Loop Rd. Tacoma, Washington

Tenie Stoll
RFD #1
Topeka, Kansas

Tenneco Oil Co. Wilco Bldg. Midland, Texas

Don R. Sturgeon 724 N. Ave. B Canton, Ill.

The Home Stalse Oil & Gas Co. 507 Phil Tower Bldg. Tulsa 3, Oklahoma

The Home Stalse Royalty Corp. 507 Phil Tower Bldg. Tulsa 3, Oklahoma

The Mother Church
The First Church of Christ
Scientist
c/o R. G. Watson, Treasurer
107 Falmouth St.
Boston, 15, Mass.

SKAGGS GRAYBURG UNIT LEA COUNTY, NEW MEXICO ROYALTY OWNERS

Astri Udness Thomk Halvdan Srartes GT 2-A Oslo, Norway

Tidewater Oil Co. P. O. Box 1404 Houston, Texas

Sally S. Toles P. O. Box 1300 Roswell, N. M.

William R. Tomlinson P. O. Box 66 Lovington, New Mexico

Flora Dupree Trickory 4310 NE 22nd Ave. Lighthouse Point Pompano Beach, Florida

Charles R. Turner P. O. Box 2016 Hobbs, New Mexico

Craig H. Walker 1109 Granada Casper, Wyoming

Myrtis D. Watkins 322 East St. Henderson, Texas

Charles H. Weir P. O. Box 1617 Hobbs, New Mexico

George W. Weir P. O. Box 1794 Hobbs, New Mexico

Mary B. Weir P. O. Box 1023 Pecos, Texas

Sofie Helene Wigert
Hans Jorgen Huitfeldt
Alexandria Helena Huitfeldt
Wells Fargo Bank
464 California St.
Acct. 01-312933
San Francisco 4, Calif.

Margaret Wiggins 1510 Missouri No. 2 Houston, Texas

Ellen Ann W. Williams c/o Hawaiian Airlines Inc. 10420 Burbank Blvd. North Hollywood, Calif.

Hattie Cone Williams Room 1706 Great Plains Life Bldg. Lubbock, Texas

Johnie Windsor P. O. Box 71 Aspermont, Texas Verna D. Wirtjes 1202 East Ovid Des Moines, Iowa

Louisa Orr Wise c/o W. F. Weeks 812 Fair Foundation Bldg. Tyler, Texas

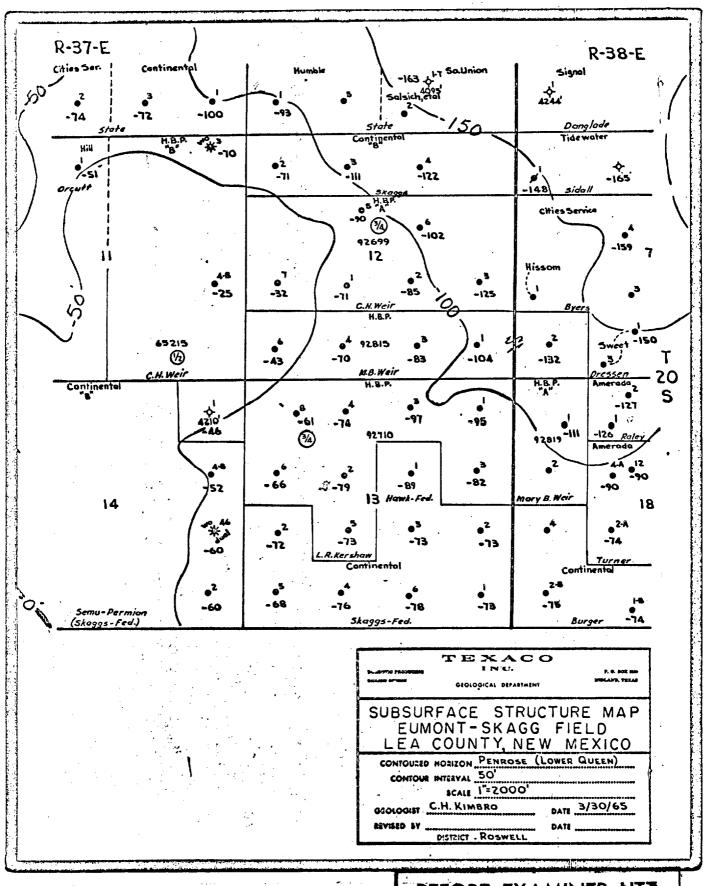
J. L. Wood 233 N. Riverside Ave. Rialto, Calif.

Mary Beth Wood P. O. Box 272 Lovington, N. M.

Elizabeth Woolworth 403 Avenue D San Angelo, Texas

May Woolworth 403 Avenue D San Angelo, Texas

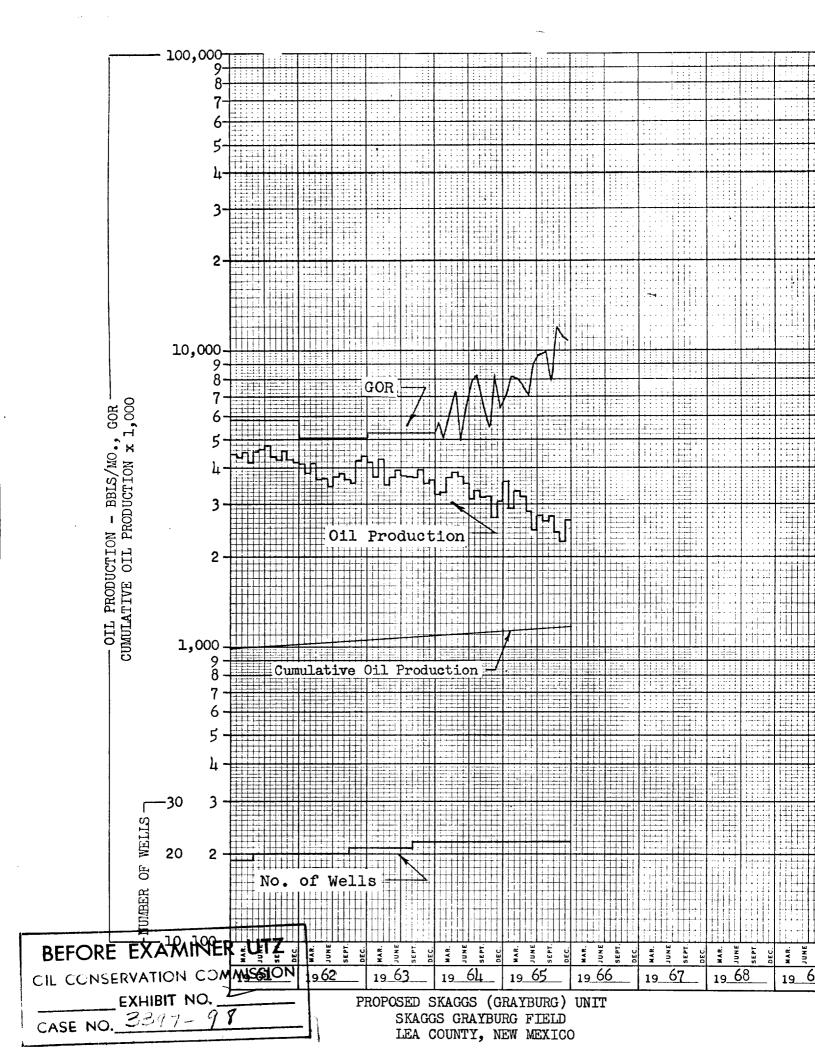
W. A. Yeager P. O. Box 990 Midland, Texas

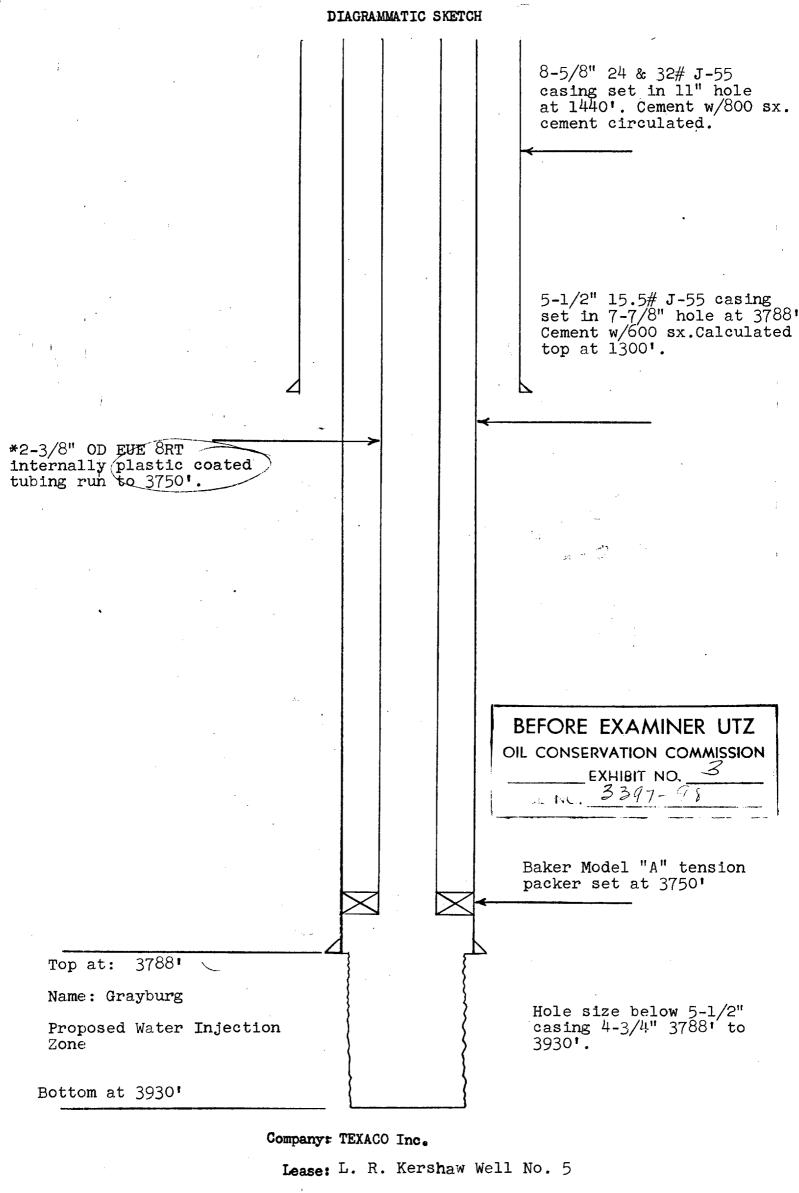


BEFORE EXAMINER UTZ

CIL CONSERVATION COMMISSION

3397-98

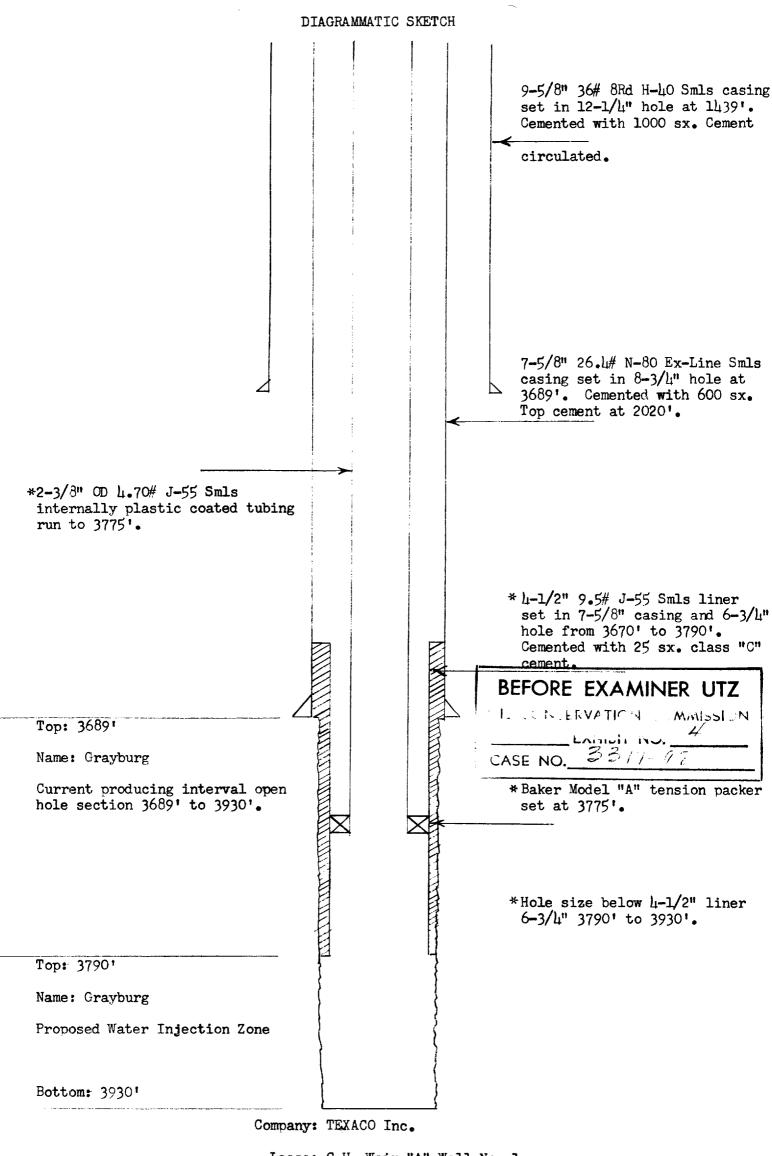




Field: Skaggs

County: Lea County, New Mexico

\*NOTE: This well is currently completed in an open hole interval as shown. The diagrammatic sketch indicates a packer to be installed when converting the well to injection; therefore, packer depth and setting depth of tubing are approximate



Lease: C.H. Weir "A" Well No. 1

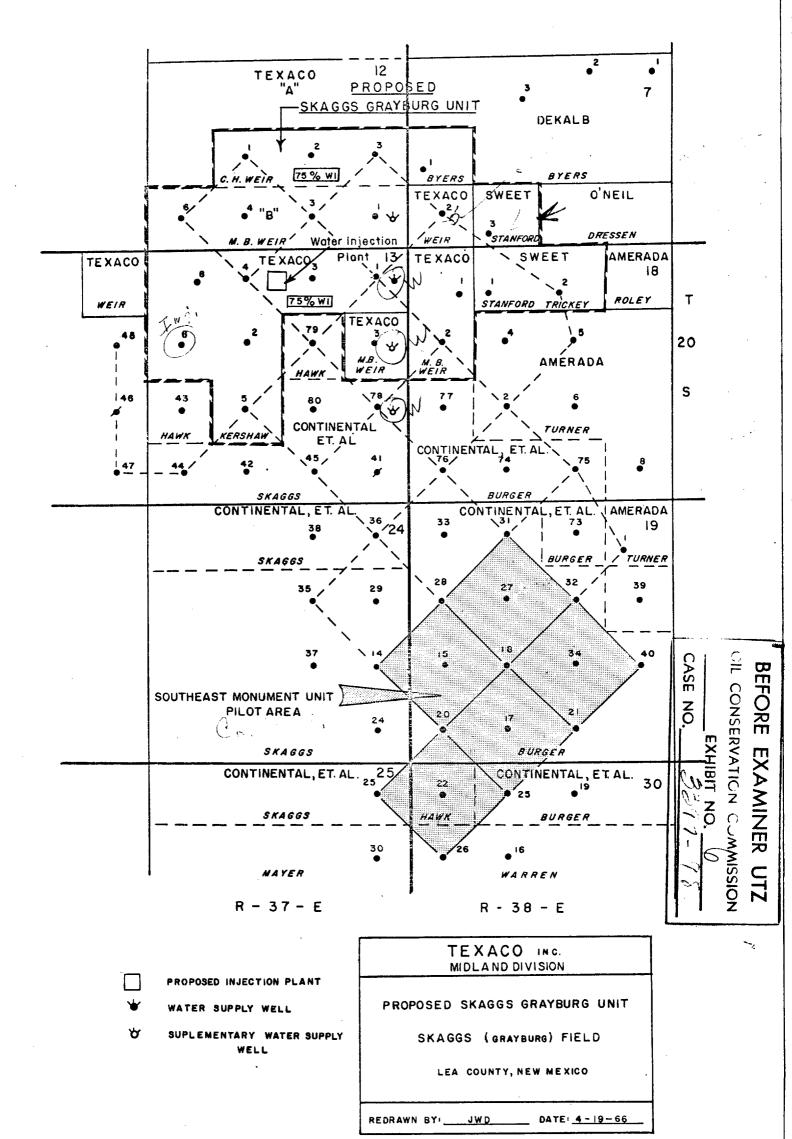
Field: Skaggs

County: Lea County, New Mexico

\*Note: This well is currently completed in an open hole interval from 3689' to 3930'. The diagrammatic sketch indicates a liner and packer to be installed when converting the well to injection; therefore, liner top and bottom, packer depth and setting depth of tubing are approximate.

EXHIBIT NO 5	LIST OF INJECTION WELLS
OIL CONSERVATION COMMISSI N	
PROPOSED SKAGGS GRAYBURG UNIT BEFORE EXAMINER UTZ	PROPOSED SKAGGS GRAYBURG UNI

M. B. Weir "B" M. B. Weir "A" C. H. Weir "A" M. B. Weir "B" C. H. Weir "A" L. R. Kershaw Trickey L. R. Kershaw L. R. Kershaw B. Weir "B" R. Kershaw Lease We I J 2 σ 8-5/8" 8-5/8" 8-5/8" 8-5/8" 8-5/8" 8-5/8" 8-5/8" 9-5/8" 9-5/8" 8-5/8" 8-5/8" Size Surface Casing 1439 1446 Depth 1450 1445 1440 1494 1426 1430 1450 1447 2551 000 000 1000 800 Sks 800 800 800 850 150 700 800 Cement Circ dol 5-1/2" 5-1/2" 5-1/2" 5-1/2" 5-1/2" 7-5/8" 5-1/2" 7-5/8" 5-1/2" 5-1/2" 5-1/2" Size Production Casing 37371 3788 37781 3780 3770 37601 37591 3785 37691 Depth 36891 3800 1600 1200 250 600 600 Sks 650 600 600 600 600 600 Cement 1501 1302 2160 2020 1300 1166 2335 1605 1506 Unk Sk l op EXHIBIT NO. 3397- 98 4-1/2" Size 36701 <del>1</del>00 Liner 37901 Bottom 6-3/4" 4-3/4" 4-3/4" 4-3/4" 4-3/4" 6-3/4" 4-3/4" 4-3/4" 4-3/4" 4-3/4" Open Hole Size 39401 39401 39301 3930 39301 39201 3930 39301 39401 3940 39361 Total Depth 37371 3788 3778 37801 37601 37851 37901 37701 37591 38001 37691 Injection
Interval
Top Bottom 3940 39301 39401 39301 39401 39401 39301 39201 39301 3930' 3936



SCALE: |" = 2000