

PROPOSED  
LITTLEFIELD 'AB' FEDERAL LEASE  
WATERFLOOD PROJECT  
SHUGART POOL  
EDDY COUNTY, NEW MEXICO

CASE 4856

TUESDAY, NOVEMBER 14, 1972

BEFORE EXAMINER NUTTER OIL CONSERVATION COMMISSION	
EXHIBIT NO.	<u>9</u>
CASE NO.	<u>4872</u>
Submitted by	<u>GULF</u>
hearing Date	<u>11/14/72</u>

Operator Gulf Oil Corporation Date November 15, 1972

Project Littlefield "AB" Federal Lease Waterflood

Pool Shugart (Yates, Seven Rivers, Queen, Grayburg) County Lea

Reservoir Queen Member

I. RESERVOIR CHARACTERISTICS

A. Information on Reservoir

1. Name of Reservoir Queen Member of Shugart Pool

2. Composition Gray, fine-grained sandstone with varying amounts of dolomite as matrix.

3. Structure Gentle (78-80' per mile) southeast dip across our lease. Trapping mechanism-permeability pinch-out up dip.

B. Information on Proposed Project Area

1. Number of Productive Acres in Project Area to be Flooded Approximately 320 acres

2. Average Depth to Top of Pay 3338'

3. Estimated Average Net Thickness 12'

4. Estimated Average Effective Porosity 13.7%

II. PRIMARY PRODUCTION HISTORY AND PRESENT STATUS OF PROJECT AREA.

A. Date First Well Completed in Project Area February, 1970

B. Oil and Water Production History by Months shown as Exhibit 6.

C. Type of Depletion Solution gas drive

D. Original Reservoir Pressure None available

E. Oil Gravity 36.9°

F. Stage of Depletion of Project Area Late

G. Number of Wells in Project Area Seven (4 Producers and 3 Proposed injection wells)

H. Average Daily Oil Production Per Well at Present Time 10.4 Ebls.

I. Cumulative Oil Production as of 10-1-72 132,702 bbls.

J. Estimated Remaining Primary Reserves from 10-1-72 40,000 bbls.

### III. INJECTION INFORMATION

A. Source of Injected Water Produced lease water and purchased fresh water from Eagle Water System

B. Type of Water Shugart Pool produced water and Ogallala water from Eagle Water System

C. Treatment of Injected Water None is anticipated; however, if later in the life of the project, treatment is deemed necessary, appropriate action will be taken.

D. Pattern and Spacing Non-symmetrical 40 acre pattern

E. Estimated Injection Pressure Maximum of 1200 psi at the wellhead. Injection plant will be designed for 1500 psi maximum pressure.

F. Estimated Initial Per Well Rate of Injection Up to 500 barrels of water per day per input well

G. Additional Injection and Producing Wells to be Drilled None

H. Injection Well Geometry Water will be injected through internally plastic coated tubing below a packer located in the casing as shown on Exhibits No. 7a, 7b, and 7c

### IV. RESULTS EXPECTED

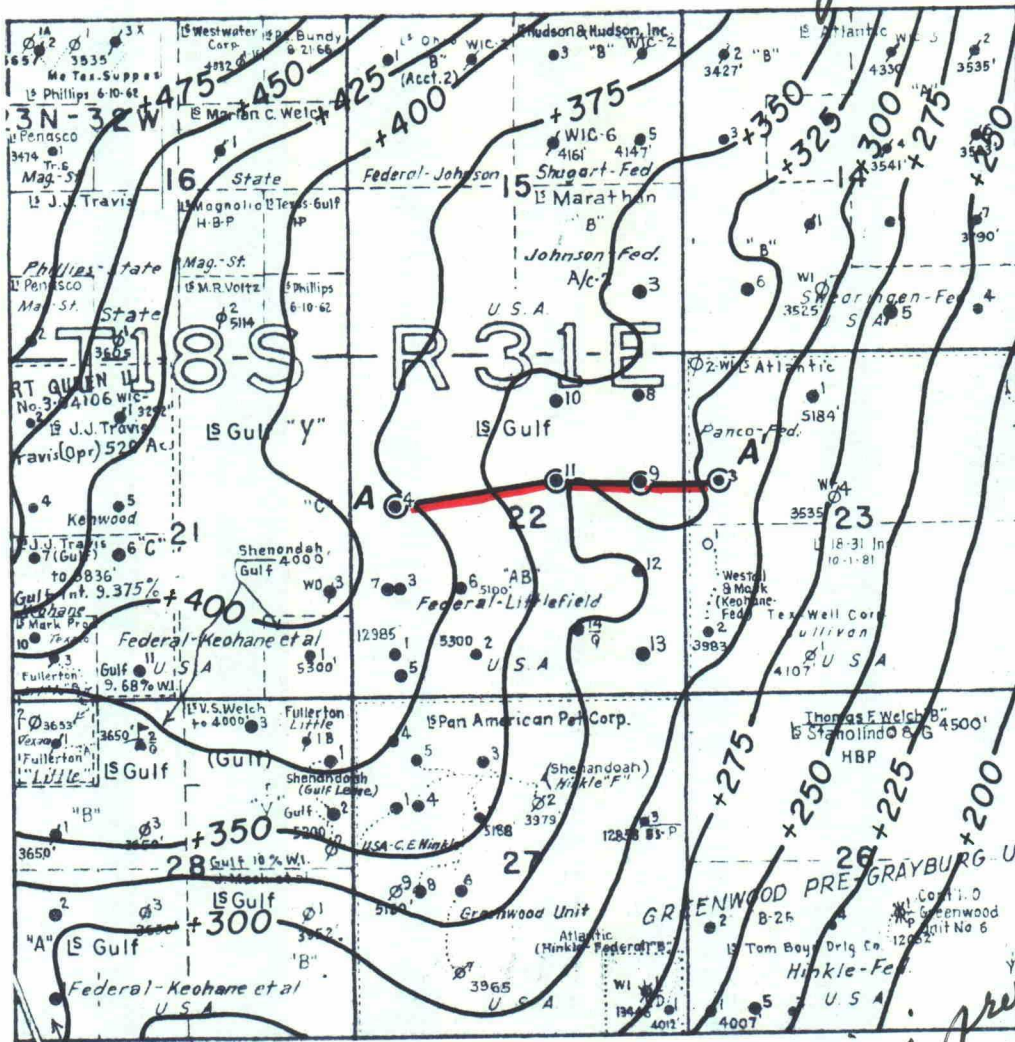
It is believed that the proposed waterflood will provide recovery of additional oil in the magnitude of 57% of the reservoir's ultimate primary recovery. In terms of barrels, the increased recovery due to waterflooding should be on the order of 100,000 barrels of oil.

### V. REASONS AND RECOMMENDATIONS

The Shugart (Queen Member) Pool underlying Gulf's Littlefield "AB" Federal lease produces by a solution gas drive mechanism and, as a result,

a considerable quantity of oil will remain unrecovered at the end of primary depletion unless some type of fluid injection project is initiated to increase the ultimate oil recovery. An engineering study indicates waterflooding would be the most economical and effective secondary recovery method to initiate. Therefore, Gulf Oil Corporation respectfully requests the Oil Conservation Commission approve the installation of the proposed waterflood facilities and grant such oil allowable as earned by the wells in the project area as provided in Rule 701 (E) Subparagraph 3, as amended, of the Commission Rules and Regulations.

*strat trap  
dip 80' / mile  
perme pinchout  
up-dip to west*



SHUGART FIELD  
EDDY COUNTY, NEW MEXICO

CASE NO. 4856

EXHIBIT NO. 2  
STRUCTURE MAP - TOP QUEEN  
CONTOUR INTERVAL 25'  
MAP SCALE: 1"=3000'  
CROSS SECTION A-A'

*well in 1 prod w/lt  
(now about 85 BPD)  
+ Opallak a w/lt from  
will inject  
500 BWD/well  
at about  
1200 psi surf  
res recy will yield  
57% of ultimate  
primary or  
about 100,000  
barrels*

NOVEMBER 14, 1972

*estimated  
ultimate  
primary =  
about*

BEFORE EXAMINER NUTTER  
OIL CONSERVATION COMMISSION

EXHIBIT NO. 2

CASE NO. 4856

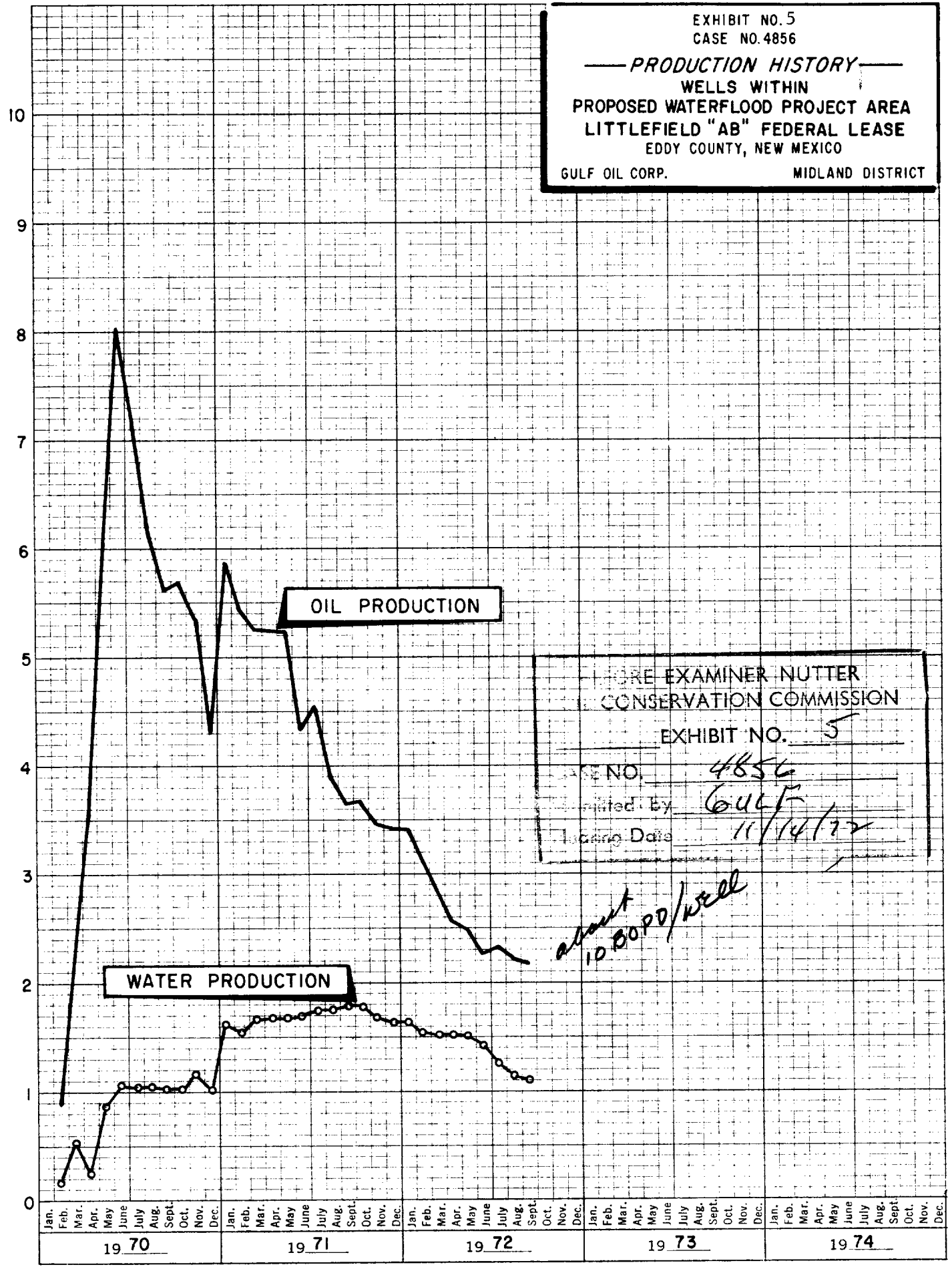
Submitted by GULF

Hearing Date 11/14/72

*Durbin Eagle & Holt CO.*

EXHIBIT NO. 5  
CASE NO. 4856  
— PRODUCTION HISTORY —  
WELLS WITHIN  
PROPOSED WATERFLOOD PROJECT AREA  
LITTLEFIELD "AB" FEDERAL LEASE  
EDDY COUNTY, NEW MEXICO  
GULF OIL CORP. MIDLAND DISTRICT

MONTHLY OIL AND WATER PRODUCTION - THOUSANDS OF BARRELS



ENGINEER EXAMINER NUTTER  
CONSERVATION COMMISSION  
EXHIBIT NO. 5  
CASE NO. 4856  
Submitted By GULF  
Filing Date 11/14/72

*about 10,000 PD/well*

EXHIBIT NO. 6

EXHIBIT NO. 6  
CASE NO. 4856

NOVEMBER 14, 1972

4856

601 F

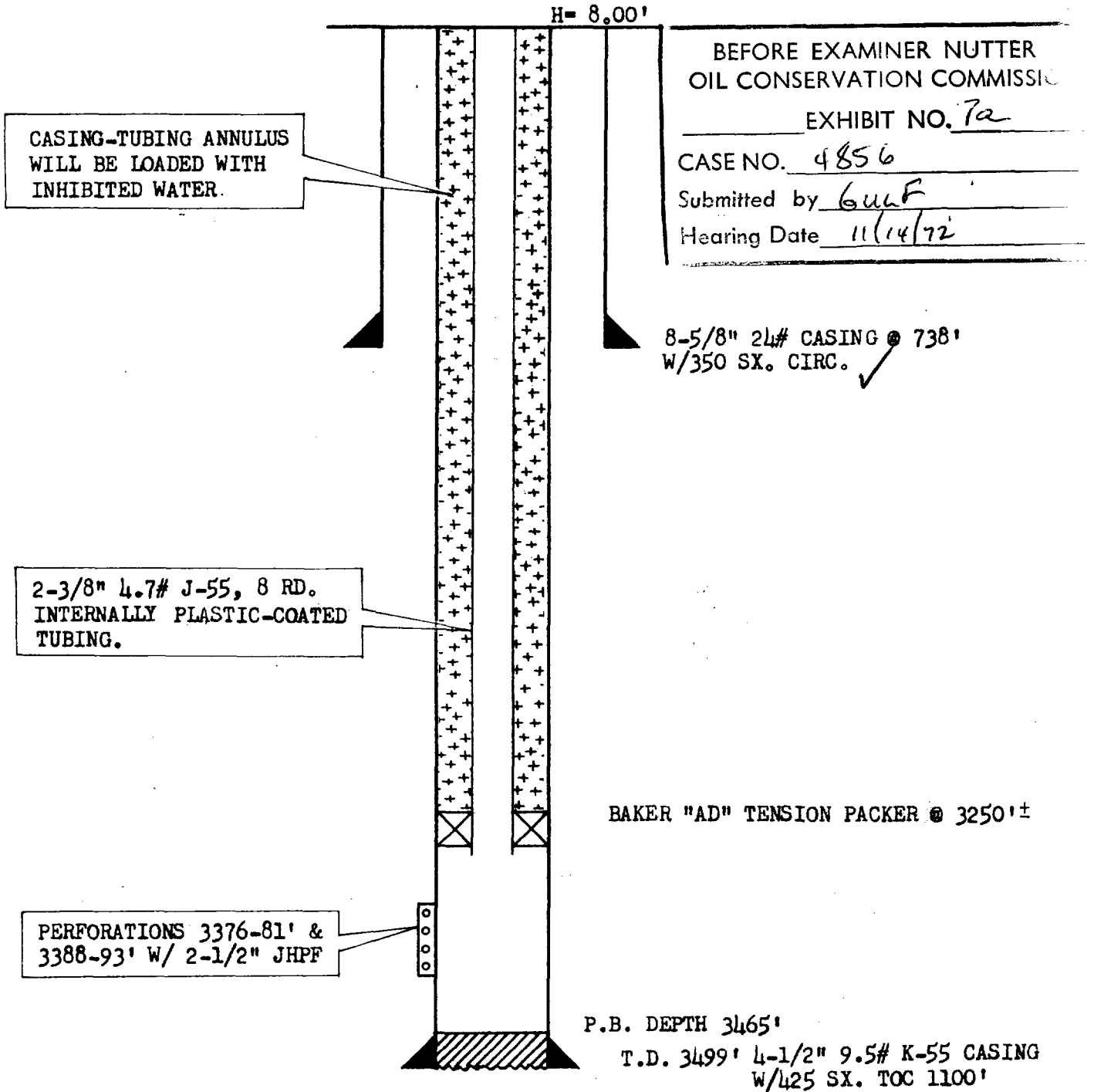
11/14/72

MONTHLY OIL, WATER AND GAS PRODUCTION  
WELLS WITHIN PROPOSED WATERFLOOD PROJECT AREA  
LITTLEFIELD "AB" FEDERAL LEASE

<u>YEAR</u> <u>MONTH</u>	<u>NO.</u> <u>WELLS</u>	<u>OIL</u> <u>BARRELS</u>	<u>WATER</u> <u>BARRELS</u>	<u>GAS</u> <u>MCF</u>
1970				
Jan.	--	--	--	-
Feb.	1	893	192	TSIM
Mar.	1	2,302	520	TSIM
Apr.	2	3,553	248	TSIM
May	5	6,081	890	TSIM
June	5	8,037	1,060	TSIM
July	5	7,126	1,040	TSIM
Aug.	5	6,186	1,040	TSIM
Sep.	5	5,610	1,015	TSIM
Oct.	5	5,697	1,025	TSIM
Nov.	5	5,383	1,180	TSIM
Dec.	5	4,301	1,020	TSIM
1971				
Jan.	6	5,874	1,620	TSIM
Feb.	6	5,430	1,560	TSIM
Mar.	6	5,260	1,670	TSIM
Apr.	6	5,244	1,670	TSIM
May	7	5,213	1,686	TSIM
June	7	4,328	1,700	TSIM
July	7	4,557	1,745	TSIM
Aug.	7	3,897	1,740	TSIM
Sep.	7	3,663	1,770	TSIM
Oct.	7	3,679	1,770	TSIM
Nov.	7	3,489	1,680	TSIM
Dec.	7	3,429	1,645	TSIM
1972				
Jan.	7	3,401	1,645	TSIM
Feb.	7	3,132	1,515	TSIM
Mar.	7	2,871	1,515	TSIM
Apr.	7	2,579	1,515	TSIM
May	7	2,498	1,515	TSIM
June	7	2,284	1,430	TSIM
July	7	2,308	1,250	TSIM
Aug.	7	2,212	1,150	TSIM
Sep.	7	2,185	1,100	TSIM

**SCHEMATIC DIAGRAM  
PROPOSED WATER INJECTION WELL**

LITTLEFIELD "AB" FEDERAL WELL # 9  
SECTION 22, T-18-S, R-31-E  
EDDY COUNTY, NEW MEXICO



BEFORE EXAMINER NUTTER  
OIL CONSERVATION COMMISSION  
EXHIBIT NO. 7a  
CASE NO. 4856  
Submitted by Gulf  
Hearing Date 11/14/72

8-5/8" 24# CASING @ 738'  
W/350 SX. CIRC. ✓

BAKER "AD" TENSION PACKER @ 3250'±

P.B. DEPTH 3465'  
T.D. 3499' 4-1/2" 9.5# K-55 CASING  
W/425 SX. TOC 1100'

NOTE: 1. WELL FRACED ON COMPLETION W/240 BBLS. 3# SPG, 20-40  
SAND ISIP 1700#, INITIAL BREAKDOWN 2500#, AIR 25.5  
BPM.

EXHIBIT NO. 7-A  
CASE NO. 4856  
NOVEMBER 14, 1972



**SCHEMATIC DIAGRAM  
PROPOSED WATER INJECTION WELL**

LITTLEFIELD "AB" FEDERAL WELL # 10  
SECTION 22, T-18-S, R-31-E  
EDDY COUNTY, NEW MEXICO

H= 9.00'

CASING-TUBING ANNULUS  
WILL BE LOADED WITH  
INHIBITED WATER

2-3/8" 4.7# J-55, 8 RD.  
INTERNALLY PLASTIC-COATED  
TUBING.

PERFORATIONS 3336-40' &  
3364-70' W/2-1/2" JHPF

BEFORE EXAMINER NUTTER OIL CONSERVATION COMMISSION	
EXHIBIT NO. <u>7-B</u>	
CASE NO.	<u>4856</u>
Submitted by	<u>Gulf</u>
Hearing Date	<u>11/14/72</u>

8-5/8" CASING @ 719'  
W/350 SX. CIRC. ✓

BAKER "AD" TENSION PACKER @ 3225' ±

P.B. DEPTH 3410'

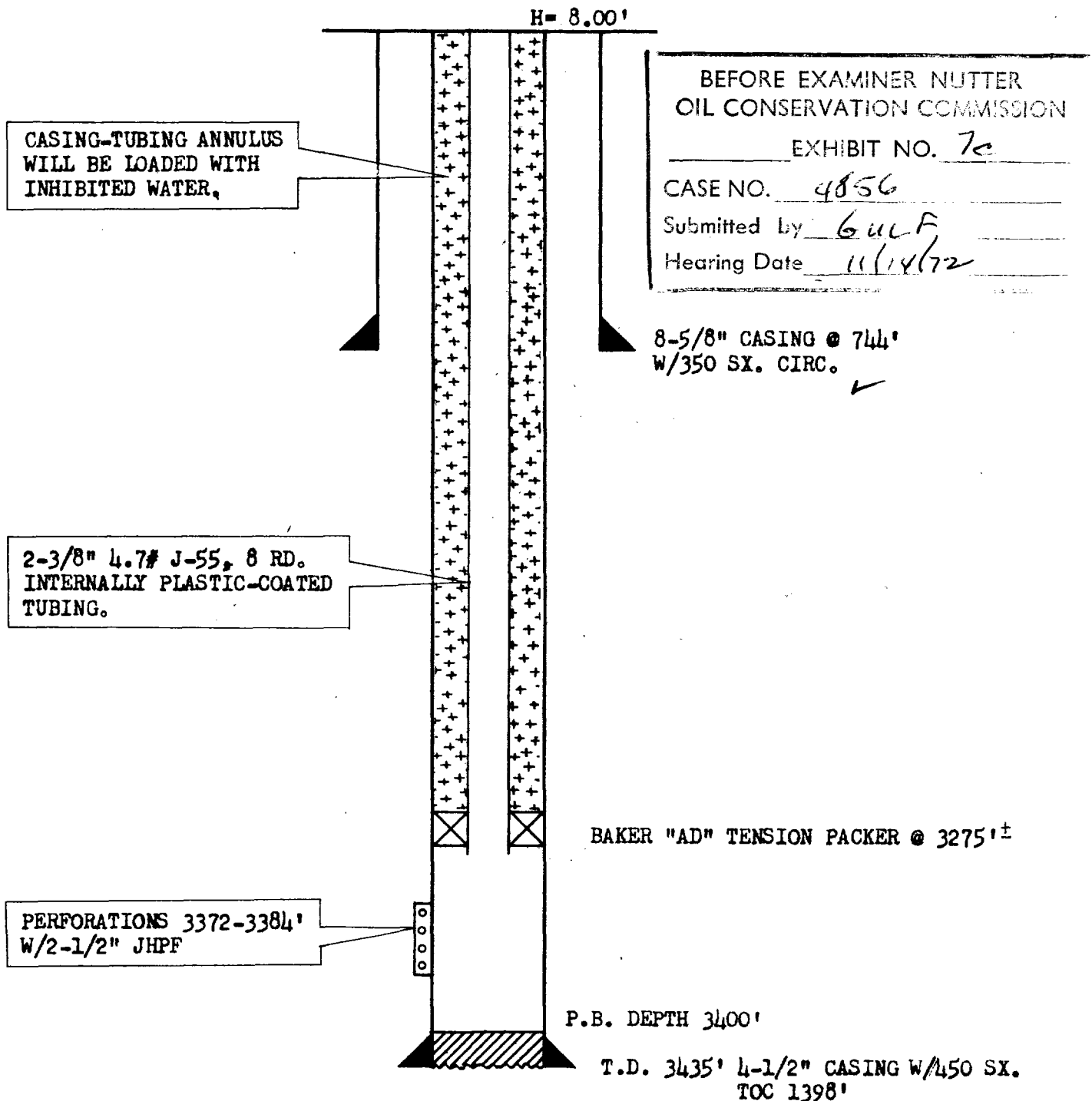
T.D. 3449' 5-1/2" CASING W/300 SX.  
TOC 1900'

NOTE: 1. WELL FRACED ON COMPLETION W/300 BBLs. 3# SPG, 20-40  
SAND ISIP 1650#, INITIAL BREAKDOWN 2050#, AIR 27.5 BPM.

EXHIBIT NO. 7-B  
CASE NO. 4856  
NOVEMBER 14, 1972

**SCHEMATIC DIAGRAM  
PROPOSED WATER INJECTION WELL**

LITTLEFIELD "AB" FEDERAL WELL # 14  
SECTION 22, T-18-S, R-31-E  
EDDY COUNTY, NEW MEXICO



NOTE: 1. WELL FRACED ON COMPLETION W/120 BBLs. 3# SPG, 20-40  
SAND ISIP 1600#, INITIAL BREAKDOWN 3000 #, AIR 25BPM.

EXHIBIT NO. 7-C  
CASE NO. 4856  
NOVEMBER 14, 1972



# United States Department of the Interior

## GEOLOGICAL SURVEY

P. O. Drawer U  
Artesia, New Mexico 88210

Gulf Oil Corporation  
Post Office Drawer 1150  
Midland, Texas 79701

Gentlemen:

Your letter of October 20, 1972, requests approval to operate a waterflood of the Queen formation on that portion of oil and gas lease New Mexico 014103 described as E $\frac{1}{2}$  sec. 22, T. 18 S., R. 31 E., N.M.P.M., Eddy County, New Mexico.

The flood pattern would be non-symmetrical, and the plan proposes to convert the following wells to water injection:

<u>Well Number</u>	<u>Location Description</u>
9-Littlefield "AB"	SE $\frac{1}{4}$ NE $\frac{1}{4}$ section 22
10-Littlefield "AB"	NW $\frac{1}{4}$ NE $\frac{1}{4}$ section 22
14-Littlefield "AB"	SW $\frac{1}{4}$ SE $\frac{1}{4}$ section 22

The plan for operating the above described waterflood project as proposed in the application is satisfactory to this office and hereby approved subject to New Mexico Oil Conservation Commission approval and the following:

1. This project will be operated in compliance with the New Mexico Oil Conservation Commission regulations governing waterflood operations.
2. Duplicate copies of a monthly progress report (N.M.O.C.C. form G-120 acceptable) are to be submitted to this office showing the volume of water injected and average pressure for the injection wells and production for the producing wells in the project area.
3. This approval does not preclude the necessity for further approval when the project is expanded to include other wells and/or leases or the necessity to submit the usual notices and reports on wells involved.

Exhibit No. 8

Case No. 4856  
November 14, 1972

Sincerely yours,

Robert L. Beekman  
Assistant District Engineer

October 25, 1972  
BEFORE EXAMINER NUTTER  
OIL CONSERVATION COMMISSION  
EXHIBIT NO. 8  
CASE NO. 4856  
Submitted by GULF  
Hearing Date 11/14/72



# United States Department of the Interior

## GEOLOGICAL SURVEY

P. O. Drawer U  
Artesia, New Mexico 88210

October 25, 1972

Gulf Oil Corporation  
Post Office Drawer 1150  
Midland, Texas 79701

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3. This approval does not preclude the necessity for further approval when the project is expanded to include other wells and/or leases or the necessity to submit the usual notices and reports on wells involved.

Sincerely yours,

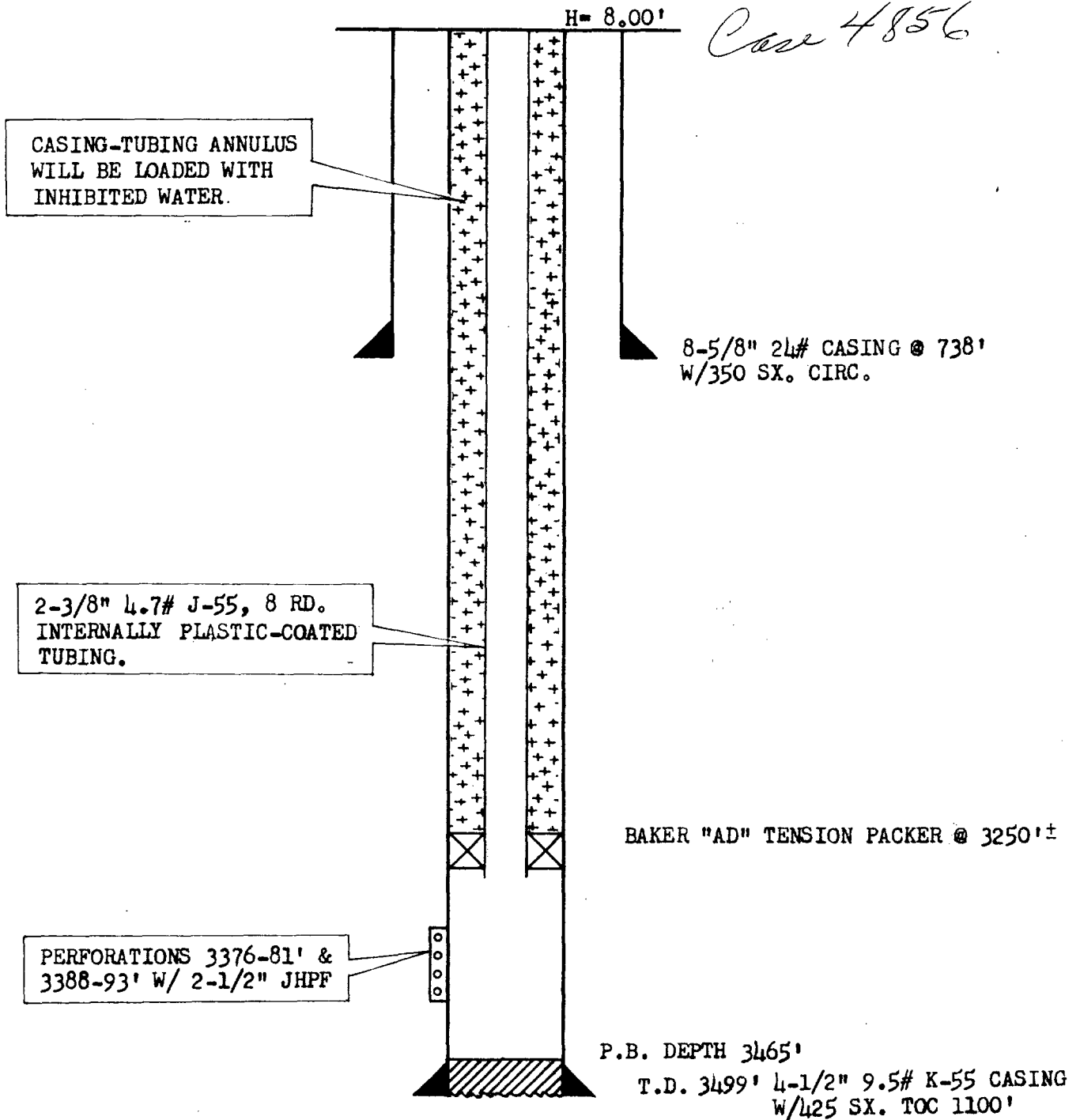
Robert L. Beekman  
Assistant District Engineer

cc: N.M.O.C.C., Santa Fe ✓  
Roswell - Accounts - Files

**SCHEMATIC DIAGRAM  
PROPOSED WATER INJECTION WELL**

LITTLEFIELD "AB" FEDERAL WELL # 9  
SECTION 22, T-18-S, R-31-E  
EDDY COUNTY, NEW MEXICO

*Case 4856*

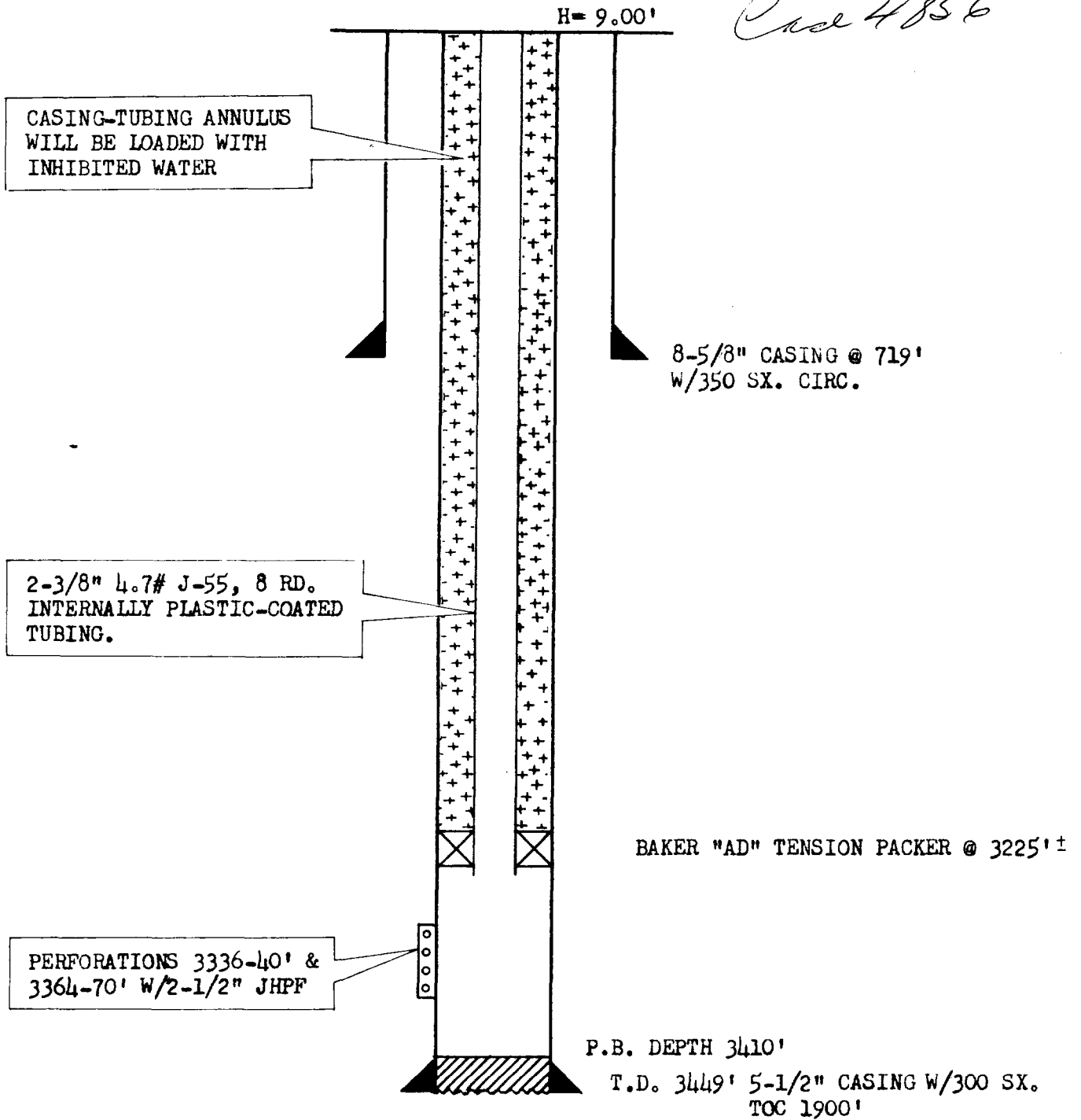


NOTE: 1. WELL FRACED ON COMPLETION W/240 BBLs. 3# SPG, 20-40 SAND ISIP 1700#, INITIAL BREAKDOWN 2500#, AIR 25.5 BPM.

SCHEMATIC DIAGRAM  
PROPOSED WATER INJECTION WELL

LITTLEFIELD "AB" FEDERAL WELL # 10  
SECTION 22, T-18-S, R-31-E  
EDDY COUNTY, NEW MEXICO

*Card 4856*

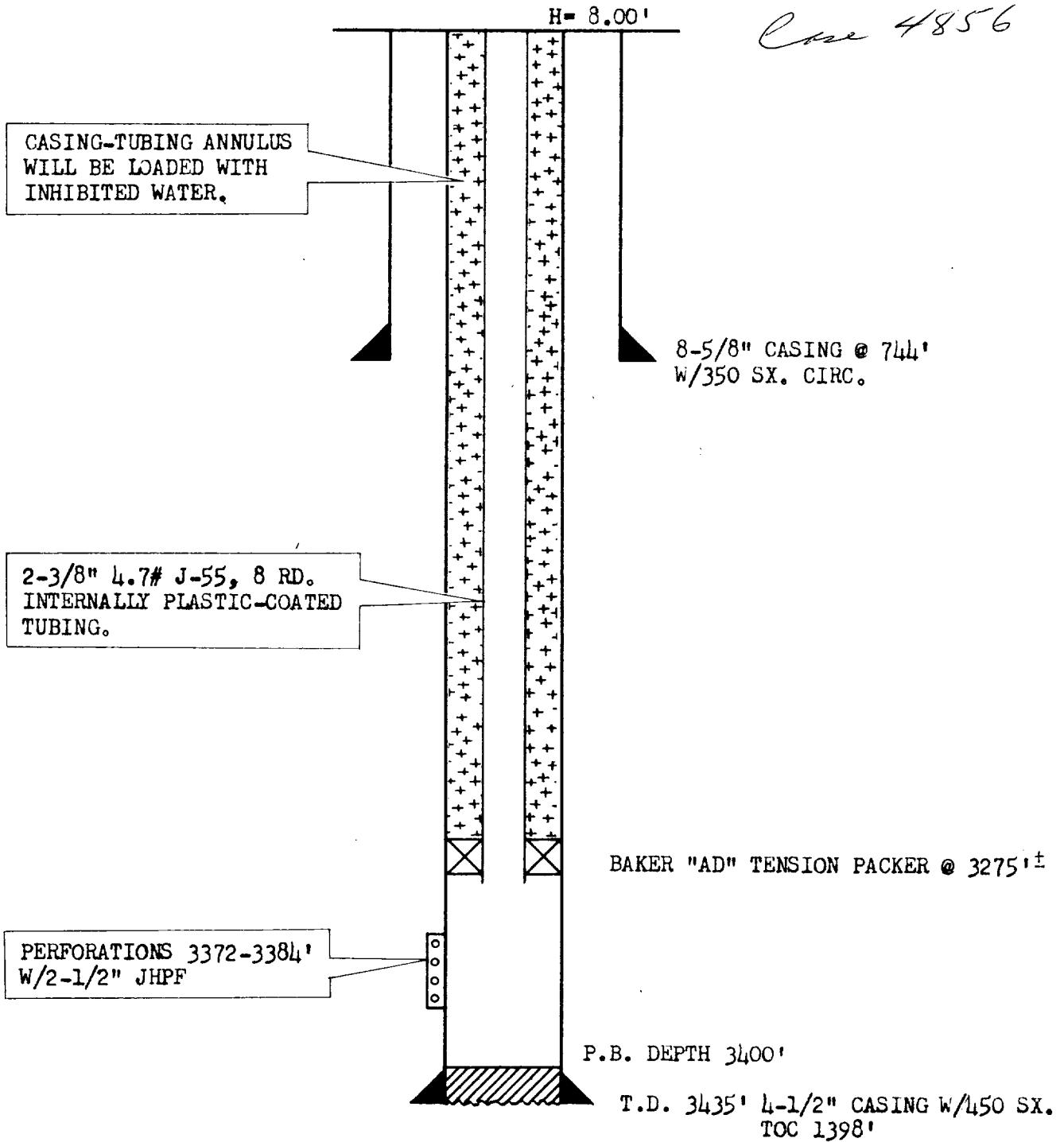


NOTE: 1. WELL FRACED ON COMPLETION W/300 BBLs. 3# SPG, 20-40  
SAND ISIP 1650#, INITIAL BREAKDOWN 2050#, AIR 27.5 BPM.

SCHEMATIC DIAGRAM  
PROPOSED WATER INJECTION WELL

LITTLEFIELD "AB" FEDERAL WELL # 14  
SECTION 22, T-18-S, R-31-E  
EDDY COUNTY, NEW MEXICO

*Case 4856*



NOTE: 1. WELL FRACED ON COMPLETION W/120 BBLs. 3# SPG, 20-40  
SAND ISIP 1600#, INITIAL BREAKDOWN 3000 #, AIR 25BPM.

# Gulf Oil Company - U.S.

EXPLORATION AND PRODUCTION DEPARTMENT  
MIDLAND DISTRICT

W. B. Hopkins  
DISTRICT MANAGER  
J. A. Hord  
DISTRICT EXPLORATION  
MANAGER  
J. L. Pike  
DISTRICT PRODUCTION  
MANAGER  
M. B. Moseley  
DISTRICT SERVICES MANAGER

P. O. Drawer 1150  
Midland, Texas 79701

October 20, 1972

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

Attention: Mr. George Hatch

Re: Application of Gulf Oil Corporation  
to Initiate a Waterflood Project in  
the Shugart (Y.SR.Q.G.) Pool,  
Eddy County, New Mexico

Dear Mr. Hatch:

Gulf filed the captioned application with the Commission on October 16, 1972. It has come to our attention that Paragraph (4) has been incorrectly stated. We have enclosed three corrected copies of Page 2 of the application. We would certainly appreciate it if you would replace Page 2 of our application with the corrected page.

Yours very truly,

*R. O. BOBO*

R. O. BOBO  
District Proration Engineer

ROB:jmc  
Attachment

cc: New Mexico Oil Conservation Commission  
P. O. Drawer "DD"  
Artesia, New Mexico 88210

James A. Knauf  
United States Geological Survey  
Drawer "U"  
Artesia, New Mexico 88210



Case 485-6  
11-2-72





# OIL CONSERVATION COMMISSION

STATE OF NEW MEXICO  
P. O. BOX 2088 - SANTA FE  
87501

GOVERNOR  
BRUCE KING  
CHAIRMAN

LAND COMMISSIONER  
ALEX J. ARMIJO  
MEMBER

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

November 17, 1972

Mr. Bill Kastler  
Gulf Oil Corporation  
Post Office Drawer 1150  
Midland, Texas 79701

Re: Case No. 4856  
Order No. R-4438  
Applicant:  
Gulf Oil Corporation

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

Copy of order also sent to:

Hobbs OCC       x      

Artesia OCC       x      

Aztec OCC                   

Other State Engineer Office