

Mr. John A. Anderson  
Regional Oil & Gas Supervisor  
U. S. Geological Survey  
Box 6721  
Roswell, New Mexico

Before Examiner W. H. H. H.

Oil Conservation Commission

Re: Proposed Pilot Waterflood  
Burch "A" Lease, LC 028793(a)  
Grayburg Cooperative & Unit Area (I-Sec. No. 370)  
Grayburg-Jackson Pool  
Eddy County, New Mexico

Exhibit Case No. 1300

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Dear Mr. Anderson:

The General American Oil Company of Texas, as Unit Operator, proposes to install and operate a pilot waterflood on the subject Lease for the purpose of determining the susceptibility of the Grayburg-Jackson Zone of the Sand Andres Lime Formation to water injection. Pending the results of the original pilot operation, it is our intention to ultimately expand the waterflood to cover all portions of the Grayburg Cooperative and Unit Area that are indicated to be economically feasible to flood.

The purpose of this letter is to request your approval of our proposed pilot waterflood and to determine if our tentative pattern for ultimately expanding the flood would be acceptable to your office. We feel that the pattern proposed for the area-wide flood adequately protects the correlative rights of the varied interests concerned (U. S. Government Royalties, Overriding Royalties and General American Working Interests) without the necessity of drilling additional wells which might not be economically justified.

For your information, data relative to our proposed pilot flood are set out below:

1. ZONE TO BE FLOODED: That portion of the San Andres Formation locally referred to as the Grayburg-Jackson Zone and which occurs throughout an interval from 120' to 375' below the top of the Lovington Sand marker. This entire interval is not productive, the oil bearing portions occurring as thin breaks from a few inches to several feet in thickness scattered throughout, with an aggregate thickness estimated at 15'-16' average for the 3222 productive acres within the Cooperative and Unit Area. In wells selected for input water service in which casing has been set high (in the Grayburg Formation), it is our intention to confine the injection of water to the Grayburg-Jackson Zone by isolating this Zone with a packer assembly.

2. FLOOD PLAN: Enclosed herewith is a plat of the Grayburg Cooperative and Unit Area on which the proposed pilot flood pattern is delineated. The pattern employed in the pilot area could readily be utilized as shown in the event that the flood was expanded to cover the entire Unit and Cooperative Area. In evolving this area-wide pattern, the following factors were considered:

- (a) Minimum use of wells equipped with used casing as input wells.
- (b) Use of all lease line wells as input wells.
- (c) Although no core analysis data is available, completion and subsequent performance history indicates permeability of the Grayburg-Jackson Zone to be quite low in the West and South portions of the Cooperative and Unit Area. Accordingly, a nine-spot pattern providing three effective input wells for each producing well is tentatively scheduled for these areas. In the event that future operations so dictated, this pattern could easily be adapted to a conventional five-spot or some sort of line-drive pattern.
- (d) If flooding operations are successful within the Cooperative and Unit Area, it is possible that a field-wide flood would be feasible. This pattern easily lends itself to such an expansion in that the correlative rights of all operators involved would be protected by the staggering of input wells adjacent to common lease line boundaries.

3. INPUT WELLS: Wells currently producing which we propose to convert to water input service are as follows:

Burch A #8, 990 feet from North line and 2310 feet from West line of Sec. 19, Twp. 17 South, Rge. 30 East, NMPM.

Burch A #9, 990 feet from North and West lines of Sec. 19, Twp. 17 South, Rge. 30 East, NMPM.

Burch A #23, 2565 feet from North line and 955 feet from West line of Sec. 19, Twp. 17 South, Rge. 30 East, NMPM.

Burch A #24, 2310 feet from North line and 2615 feet from East line of Sec. 19, Twp. 17 South, Rge. 30 East, NMPM.

Burch A #14, 660 feet from South line and 1980 feet from East line of Sec. 18, Twp. 17 South, Rge. 30 East, NMPM.

The conversion of the above listed wells will entail an immediate reduction in current production of approximately 16 to 18 gross bbls. of oil daily from the Burch "A" Lease as indicated by our most recent individual well checks listed as follows:

WELL NO.	DATE	OIL	WATER	GAS
BURCH "A" 8	6-30-57	0.2 BBLS.	-	-
BURCH "A" 9	6-30-57	2.5 BBLS.	-	23 MCF
BURCH "A" 14	6-30-57	0.1 BBLS.	-	-
BURCH "A" 23	6-30-57	8.0 BBLS.	-	72 MCF
BURCH "A" 24	6-30-57	7.9 BBLS.	-	37 MCF
TOTAL		18.5 BBLS.	-	132 MCF

#### 4. TAKE POINTS:

- (a) Burch "A" Input Well Nos. 8, 9, 23 and 24 together with Burch "A" No. 4 as a take point will constitute our original five-spot pilot flood area embracing an area of some 50 acres. Burch "A" No. 4 is located 1980 feet from the North and West lines of Sec. 19, Twp. 17 South, Rge. 30 East, NMFM.
- (b) By injecting water into Burch "A" No. 14 and closely observing the performance of Well No. 7, located 660 feet from the North line and 1980 feet from the East line of Sec. 19, Twp. 17 South, Rge. 30 East, NMFM, we hope to determine the tendency of injected water to channel in the reservoir. If such channeling occurs, we should have sufficient time to evaluate the effects and to possibly work out a way and means of controlling it prior to the time that we would want to expand this flood. Proposed Water Input Well Burch "A" No. 14 was formerly used as a gas injection well in connection with the gas repressuring of the Grayburg-Jackson Zone, and a direct channeling of gas was noted to occur from Well No. 14 to Well No. 7. Burch "A" No. 14 Well is currently being deepened to the Paddock Zone, and if a completion is effected in this lower horizon, it is our intention to equip this well so that water could be injected into the Grayburg-Jackson Zone through the annular space between the 7" OD casing string now in the hole and the 5" OD or 5-1/2" OD casing it would be necessary to run.

5. SOURCE OF INPUT WATER: The Unit Operator has developed a water supply adequate for commencing the pilot flood operation by recompleting the old Gulf-Grayburg Unit No. 1 Well, located 660 feet from the South line and 560 feet from the West line of Sec. 24, Twp. 17 South, Rge. 29 East, NMPM. A Pennsylvanian limestone aquifer was perforated and acidized from 9265 feet to 9299 feet. This well, completed on gas lift, flowed water for 120 hours and then was tested at 83 bbls. of water per hour for 2-1/2 hours (or at a rate of 1992 bbls. per day). Some 450 to 500 bbls. of water per day is currently being produced from the Grayburg-Keely and Grayburg-Paddock Zones within the Grayburg Cooperative and Unit Area and is readily available for injection purposes, giving us a total supply of approximately 2500 bbls. per day. Actual injectivity rates cannot be estimated at this time; however, in order to effect a fill-up of the pilot area within a reasonable length of time, we feel that an injection rate of 500 bbls. per day per well should be obtained. The water supply now available should be adequate to effect these rates.

6. CURRENT WELL STATUS, JUNE 30, 1957:

	BURCH "A"	BURCH "B"	BURCH "C"	DEXTER	KEELY "A"	KEELY "B"	KEELY "C"	COOP. & UNIT AREA TOTAL
<u>OIL WELLS</u>								
PRODUCING - FLOWING	-	-	2	-	-	6	8	16
- PUMPING	15	9	2	1	9	15	25	76
- SWABBED	3	-	-	-	-	-	1	4
TOTAL ACTIVE	18	9	4	1	9	21	34	96
TEMPORARILY ABANDONED	1	1	-	-	-	-	1	3
RECOMPLETED IN GRAYBURG-KEELY ZONE*	-	7	7	-	-	-	4	18
<u>GAS INJECTION WELLS</u> (CONVERTED FROM OIL WELLS)								
ACTIVE	-	-	-	-	1	-	-	1
INACTIVE	1	-	-	-	-	-	-	1
TOTAL WELLS WHICH HAVE PRODUCED FROM GRAYBURG- JACKSON ZONE	20	17	11	1	10	21	39	119

\*NOTE: These wells now have liners or casing set through the Grayburg-Jackson Zone; however, cement was not pumped over this Zone, and it could easily be reopened at a later date.

7. PRODUCTION STATISTICS:(a) CURRENT PRODUCTION - MONTH OF JUNE 1957

LEASE	NO. ACTIVE WELLS	NO. PRODUCTIVE ACRES	OIL PRODUCTION - GROSS BBLS.			
			FOR MONTH	AVERAGE PER DAY		
			TOTAL	PER WELL	PER ACRE	
BURCH "A"	18	590	2,438	81.3	4.5	.138
BURCH "B"	9	472	1,234	41.1	4.6	.087
BURCH "C"	4	360	724	24.1	6.0	.067
DEXTER	1	40	173	5.8	5.8	.145
KEELY "A"	9	320	939	31.3	3.5	.098
KEELY "B"	21	480	1,643	54.8	2.6	.114
KEELY "C"	34	960	5,078	169.2	5.0	.176
TOTAL	96	3,222	12,229	407.6	4.2	.127

(b) CUMULATIVE PRODUCTION TO JUNE 30, 1957 (UNDER PRIMARY DEPLETION AND LIMITED GAS INJECTION)

GRAYBURG-JACKSON POOL ONLY						
LEASE	LOCATION S-T-R SUB-DIVISION	PROD. ACRES	NO. WELLS	CUMULATIVE PRODUCTION 6-30-57		
				GROSS BBLS.		
				TOTAL	PER ACRE	PER WELL
BURCH "A"	18-17S-30E S/2 S/2	117.43	3	55,026	469	18,342
	19-17S-30E N/2, N/2 S/2	472.27	17	2,713,998*	5,747	159,647
SUB-TOTAL		589.70	20	2,769,024*	4,696	138,451
BURCH "B"	19-17S-30E S/2 SW/4	77.41	3	232,625*	3,005	77,534
	30-17S-30E NW/4	154.94	7	391,153*	2,525	55,879
	23-17S-29E S/2 NE/4	80.00	2	150,805	1,885	75,403
	23-17S-29E SW/4	160.00	5	252,595	1,579	50,519
SUB-TOTAL		472.35	17	1,027,178*	2,175	60,422
BURCH "C"	19-17S-30E S/2 SE/4	80.00	2	118,048*	1,476	59,024
	30-17S-30E NW/4 NE/4	40.00	1	38,083	952	38,083
	23-17S-29E S/2 NW/4	80.00	2	120,008	1,500	60,004
	23-17S-29E SE/4	160.00	6	201,298	1,258	33,550
SUB-TOTAL		360.00	11	477,437*	1,326	43,034
DEXTER	24-17S-29E SE/4 NW/4	40.00	1	78,159	1,954	78,159
KEELY "A"	24-17S-29E NE/4 NE/4	40.00	1	116,303	2,908	116,303
	S/2 NE/4	80.00	3	462,755	5,784	154,236
	N/2 S/2	160.00	5	345,609	2,160	69,122
	SW/4 NW/4	40.00	1	78,768	1,969	78,768
SUB-TOTAL		320.00	10	1,003,435	3,136	100,344
KEELY "B"	24-17S-29E S/2 SW/4)	160.00	7	441,062	2,757	63,009
	25-17S-29E N/2 NW/4)					
	26-17S-29E E/2	320.00	14	1,028,606*	3,214	73,472
SUB-TOTAL		480.00	21	1,469,668*	3,062	69,984
KEELY "C"	24-17S-29E S/2 SE/4)					
	25-17S-29E All except)	640.00	26	2,156,986*	3,370	82,961
	N/2 NW/4)					
	26-17S-29E W/2	320.00	13	1,021,289*	3,192	78,561
SUB-TOTAL		960.00	39	3,178,275*	3,311	81,494
COOPERATIVE & UNIT AREA TOTAL		3,222.05	119	10,003,176*	3,105	84,060

\*NOTE: These cumulative production figures include a small amount of oil recovered from sand stringers in the Grayburg section which have been perforated and fracture treated recently. Total recovery to date from these Grayburg Sands is estimated to be from 65,000 to 75,000 gross bbls. for the entire Grayburg Cooperative and Unit Area.

John A. Anderson

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August 14, 1957

The Unit Operator intends to conduct this pilot flood program in a workmanlike manner, undertaking all steps necessary to confine injected water to the Grayburg-Jackson Zone. Adequate facilities will be constructed and maintained to gather, treat and distribute injected water. Careful records will be kept of all injected and produced fluids. Complete records of this project will be maintained in the District Office of the Operator located at Loco Hills, New Mexico, and will be open to your inspection at all times.

Respectfully submitted

GENERAL AMERICAN OIL COMPANY OF TEXAS



R. J. Heard, District Superintendent

RJH:NWK:gk  
Enclosure (1)

BEFORE THE OIL CONSERVATION COMMISSION  
OF THE STATE OF NEW MEXICO

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

CASE NO. 1300  
Order No. R-1058-A

APPLICATION OF GENERAL AMERICAN OIL  
COMPANY OF TEXAS FOR AN ORDER AMENDING  
ORDER NO. R-1058 CONCERNING ITS PILOT  
WATER FLOOD PROJECT IN THE GRAYBURG-  
JACKSON POOL, IN EDDY 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, 1957, at Santa Fe, New Mexico, before Daniel S. Nutter, Examiner duly appointed by the New Mexico Oil Conservation Commission, hereinafter referred to as the "Commission," in accordance with Rule 1214 of the Commission Rules and Regulations.

NOW, on this 4<sup>th</sup> day of November, 1957, the Commission, a quorum being present, having considered the application, the evidence adduced and the recommendations of the Examiner, Daniel S. Nutter, 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 paragraph (2) of Order No. R-1058 authorized five water injection wells for the General American Oil Company of Texas pilot water flood project in the Grayburg-Jackson Pool in Eddy County, New Mexico, but that said order limited the input volume into each of said wells to 400 barrels of water per day.

(3) That the applicant cannot effectively operate the pilot water flood project authorized by Order No. R-1058 within the 400 barrels of water per day per well limit due to the low injectivity of certain of the injection wells.

(4) That the limitation on the volume of water to be injected into the above described water injection wells should be removed.

IT IS THEREFORE ORDERED:

That the second paragraph of Section (2) of Order No. R-1058, i. e., "Provided however, that the input volume shall not

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exceed 400 barrels of water per day into each injection well."  
be and the same is hereby deleted.

DONE at Santa Fe, New Mexico, on the day and year hereinabove  
designated.

STATE OF NEW MEXICO  
OIL CONSERVATION COMMISSION



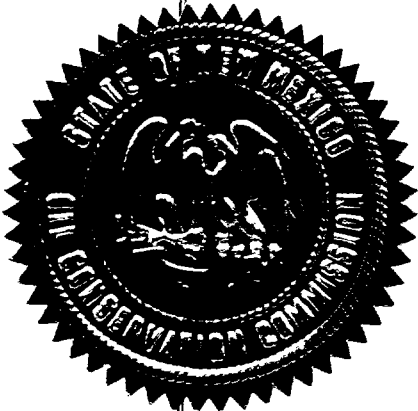
EDWIN L. MECHEM, Chairman



MURRAY E. MORGAN, Member



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



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BEFORE THE OIL CONSERVATION COMMISSION  
OF THE STATE OF NEW MEXICO

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

CASE NO. 1300  
Order No. R-1058

APPLICATION OF GENERAL AMERICAN OIL  
COMPANY OF TEXAS FOR PERMISSION TO  
INSTITUTE A PILOT WATER FLOOD PROJECT  
IN THE GRAYBURG-JACKSON POOL IN EDDY  
COUNTY, NEW MEXICO AND FOR THE ESTABLISH-  
MENT OF AN ALLOWABLE FORMULA FOR ALL WELLS  
INVOLVED IN SAID PROJECT.

ORDER OF THE COMMISSION

BY THE COMMISSION:

This cause came on for hearing at 1 o'clock p.m. on August 28, 1957, at Hobbs, New Mexico, before Daniel S. Nutter, Examiner duly appointed by the Oil Conservation Commission, hereinafter referred to as the "Commission," in accordance with Rule 1214 of the Commission Rules and Regulations.

NOW, on this 30<sup>th</sup> day of September, 1957, the Commission, a quorum being present, having considered the application, the evidence adduced, and the recommendations of the Examiner, Daniel S. Nutter, 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, General American Oil Company of Texas, proposes to institute a pilot water flood project in the Grayburg Jackson Pool in Eddy County, New Mexico, in a pilot area consisting of the S/2 SW/4 and SW/4 SE/4 of Section 18, and the N/2 and N/2 S/2 of Section 19, all in Township 17 South, Range 30 East, NMPM, Eddy County, New Mexico, with input volumes limited to 400 barrels of water per day into each injection well.

(3) That the applicant further requests that an allowable formula be established for the wells in the above-described pilot area.

(4) That the said pilot area comprises a portion of one of the unitized tracts in the Grayburg Cooperative and Unit Area established by Order 802 dated November 19, 1948, and identified therein as the Grayburg Oil Company of New Mexico Unit G-1.

(5) That the allowable formula established by Order 802 for the units created thereby provides that the "Applicants are hereby authorized to produce from each unitized tract, hereinabove described, the total allowable production, as fixed by the Commission for the total number of developed 40-acre proration units comprising such unitized tract...", provided however, "that no well located upon any unitized tract shall be permitted to produce at a rate in excess of the top allowable as fixed by the Commission."

(6) That the total allowable for Unit G-1 should continue to be calculated and assigned in accordance with the above quoted provisions of Order 802 but that all producing wells in the above-described pilot area should be excepted from that portion of the order which prohibits the production of said wells at a rate in excess of the top allowable as fixed by the Commission.

(7) That the proposed pilot water flood project will not adversely affect the interests of any other operator in the Grayburg Jackson Pool.

(8) That the proposed pilot water flood project will promote conservation and will tend to prevent waste through the production of oil which might not otherwise be recovered.

(9) That periodic reports should be submitted to the Commission by the applicant disclosing the progress of the secondary recovery program.

IT IS THEREFORE ORDERED:

(1) That the applicant, General American Oil Company of Texas, be and the same hereby is authorized to initiate a pilot water flood project in the Grayburg Jackson Pool on the S/2 SW/4 and SW/4 SE/4 of Section 18, and the N/2 and N/2 S/2 of Section 19, all in Township 17 South, Range 30 East, NMPM, Eddy County, New Mexico.

(2) That the following wells be and the same are hereby authorized as water injection wells for the above-described pilot water flood project:

			<u>Sec. Twp. Rge.</u>		
Burch "A"	14	SW/4 SE/4	18	17	30
Burch "	8	NE/4 NW/4	19	17	30
Burch "	9	NW/4 NW/4	"	"	"
Burch "	23	SW/4 NW/4	"	"	"
Burch "	24	SW/4 NE/4	"	"	"

all in Eddy County, New Mexico.

Provided however, that the input volume shall not exceed 400 barrels of water per day into each injection well.

(3) That the total allowable for the Grayburg Oil Company of New Mexico Unit G-1 established by Order 802 dated November 19, 1948, shall continue to be calculated and assigned in accordance

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Order No. R-1058

with the provisions of said Order 802, provided however, that all producing wells in the above-described pilot water flood area are hereby excepted from that portion of Order 802 which provides "that no well located upon any unitized tract shall be permitted to produce at a rate in excess of the top allowable as fixed by the Commission."

(4) That monthly progress reports on the pilot water flood project shall be submitted to the Commission in accordance with Rule 704 and Rule 1119 of the Commission Rules and Regulations.

DONE at Santa Fe, New Mexico, on the day and year hereinabove designated.

STATE OF NEW MEXICO  
OIL CONSERVATION COMMISSION



EDWIN L. MECHEM, Chairman



MURRAY E. MORGAN, Member



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



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