Entered September 20, 1977

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. 6008
Order No. R-5530

APPLICATION OF TEXACO INC., FOR
A PRESSURE MAINTENANCE PROJECT,
LEA COUNTY, NEW MEXICO.

ORDER OF THE COMMISSION

BY THE COMMISSION:

This cause came on for hearing at 9 a.m. on August 17, 1977, at Santa Fe, New Mexico, before Examiner Richard L. Stamets.

NOW, on this 20th day of September, 1977, the Commission, a quorum being present, having considered the testimony, the record, and the recommendations of the Examiner, 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 by Commission Order No. R-5496 dated August 9, 1977 statutory unitization was approved for the Central Vacuum Unit Area, Lea County, New Mexico.

(3) That the applicant herein, Texaco Inc., seeks authority to institute a pressure maintenance project on the aforesaid Central Vacuum Unit Area, Vacuum Grayburg-San Andres Pool, Lea County, New Mexico, by the injection of water into the San Andres formation through the 55 wells described on Exhibit A attached to this order.

(4) That to permit an efficient injection pattern, the unorthodox locations of the 54 new injection wells as reflected on said Exhibit A should be approved.

(5) That the applicant further seeks the designation of a project area and the promulgation of special rules and regulations governing said project including special allowable provisions.

(6) That the project area should consist of those proration units within the boundary of said Central Vacuum Unit upon which is located an injection well and any directly or diagonally offsetting proration unit which contains a producing well.

(7) That the total project area allowable should be equal to the sum of the basic project area allowable plus the water injection credit allowable, and said total project area allowable should be limited to 80 barrels of oil per day times the number of developed 40-acre proration units in the project area times two.

(8) That the basic project area allowable should be equal to 80 barrels of oil per day times the number of developed 40-acre proration units in the project area.

(9) That the water injection credit allowable should be based on the following formula:

$$\text{Water Injection Credit Allowable} = \left[\frac{\text{net water injected}}{\text{basic project area allowable voidage}}\right] \times \text{basic project area allowable}$$

and should be calculated as follows:

$$\text{Water Injection Credit Allowable} = \left\{ \frac{W_i - W_p}{BPAA\left[\beta_o + \left(\frac{R_p - R_s}{1000}\right)\beta_g\right]} - 1 \right\} BPAA$$

where W_i = Average daily water injection during previous month, project area

W_p = Average daily water production during previous month, project area

BPAA = Basic Project Area Allowable = 80 x number of 40-acre tracts in project area

β_o = Oil formation volume factor, reservoir barrels per stock tank barrel, as determined from Exhibit B, for latest available project area reservoir pressure

R_p = Producing gas-oil ratio, cubic feet per barrel, during previous month, project area

R_s = Solution gas-oil ratio, cubic feet per barrel, as determined from Exhibit B, for latest available project area reservoir pressure

β_g = Gas formation volume factor, reservoir barrels per MCF, as determined from Exhibit B, for latest available project area reservoir pressure

In no event should the Water Injection Credit Allowable be less than zero.

(10) That the project area allowable should be produced from the wells within the project area in any proportion provided that any proration unit situated on the boundary of said Central Vacuum Unit which proration unit is not directly or diagonally offset by a San Andres injection well outside the unit should not be permitted to produce in excess of 80 barrels of oil per day.

(11) That each of the newly drilled injection wells in the project should be equipped with surface casing and production casing set at approximately 350 feet and 4800 feet, respectively, and cemented to the surface.

(12) That injection should be accomplished through 2 3/8-inch plastic coated tubing installed in a packer which should be set approximately 50 feet above the uppermost perforation in the case of newly drilled wells and at approximately 4376 feet in the one well to be converted to injection.

(13) That the casing-tubing annulus in each injection well should be filled with an inert fluid and that a pressure gauge or approved leak detection device should be attached to the annulus in order to determine leakage in the casing, tubing, or packer.

(14) That the injection wells or system should be equipped with a pop-off valve or acceptable substitute which will limit the surface injection pressure to no more than 0.2 pounds per foot of depth to the uppermost perforation unless the Secretary-Director of the Commission should administratively authorize a higher pressure.

(15) That there are 15 wells, as set out on Exhibit C to this order, which are located within or immediately adjacent to the boundaries of said Central Vacuum Unit which are completed or plugged in such a manner that will not assure that they will not serve as channels for injected water to migrate from the San Andres formation to other formations or to the surface.

(16) That to prevent migration of injected water from the San Andres formation, formation injection pressure at wells offsetting the wells identified on said Exhibit C should be limited to hydrostatic pressure until such time as the wells on said Exhibit C have been repaired or it shall otherwise be demonstrated to the satisfaction of the Secretary-Director of the Commission that the same will not serve as avenues for escape of such waters.

(17) That the wells within the project should be equipped to facilitate periodic testing of the annular space between strings of production and surface casing.

(18) That the operator should take all other steps necessary to ensure that the injected water enters only the proposed injection interval and is not permitted to escape to other formations or onto the surface from injection, producing, or plugged and abandoned wells.

(19) That approval of the subject application should result in the recovery of additional volumes of oil from the Central Vacuum Unit Area, thereby preventing waste.

(20) That the application should be approved.

IT IS THEREFORE ORDERED:

(1) That the applicant, Texaco Inc., is hereby authorized to institute a pressure maintenance project in the Central Vacuum Unit Area, Vacuum-Grayburg-San Andres Pool, Lea County, New Mexico, by the injection of water into 55 wells at orthodox and unorthodox locations as set out on Exhibit A attached to this order and by reference made a part hereof.

(2) That each of the newly drilled injection wells shall be equipped with surface casing and production casing set at approximately 350 feet and 4800 feet, respectively, and cemented to the surface.

(3) That injection shall be accomplished through 2 3/8-inch plastic coated tubing installed in a packer set approximately 50 feet above the uppermost perforation in the case of newly drilled wells and at approximately 4376 feet in the one existing well converted to injection.

(4) That the casing-tubing annulus in each injection well shall be filled with an inert fluid and a pressure gauge or approved leak detection device shall be attached to the annulus in order to determine leakage in the casing, tubing, or packer.

(5) That the injection wells or system shall be equipped with a pop-off valve or acceptable substitute which will limit the surface injection pressure to no more than 0.2 pounds per foot of depth to the uppermost perforations.

(6) That the Secretary-Director of the Commission may administratively authorize a pressure limitation in excess of that set out in Order No. (5) above upon a showing by the operator that such higher pressure will not result in fracturing of the confining strata.

(7) That the applicant shall not inject water into the formation of any well located on a 40-acre tract that has on it, or that directly or diagonally offsets a tract that has on it, one of the 15 wells identified on Exhibit C attached hereto and by reference made a part hereof, at a pressure greater than hydrostatic until such well has been repaired or it has been shown to the satisfaction of the Secretary-Director of the Commission that such well will not serve as an avenue of escape for waters injected into the San Andres formation and he has authorized a higher than hydrostatic pressure.

(8) That the wells within the project area shall be equipped with risers or in another acceptable manner such as to facilitate the periodic testing of the bradenhead for pressure or fluid production.

(9) That the operator shall immediately notify the supervisor of the Commission district office at Hobbs of the failure of the tubing or packer in any of said injection wells, the leakage of water or oil from or around any producing well, the leakage of water or oil from or around any plugged and abandoned well within the project area, or any other evidence of fluid migration from the injection zone, and shall take such timely steps as may be necessary or required to correct such failure or leakage.

(10) That the pressure maintenance project shall be designated the Texaco Inc. Central Vacuum Unit Pressure Maintenance Project.

(11) That the project area of said Central Vacuum Unit Pressure Maintenance Project shall consist of those proration units within the boundary of the Central Vacuum Unit upon which is located an injection well and any directly or diagonally offsetting proration unit which contains a producing well.

(12) That those wells within the Central Vacuum Unit Area that are not included within the project area as defined above shall be prorated in accordance with the Rules and Regulations of the Commission.

(13) That the project area shall receive a project area allowable, and said project area allowable shall be the sum of the basic project area allowable plus the water injection credit allowable, and shall be limited to 80 barrels of oil per day times the number of developed 40-acre project area times two.

(14) That the basic project area allowable shall be equal to 80 barrels of oil per day times the number of developed 40-acre proration units in the project area.

(15) That the water injection credit allowable shall be based on the following formula:

$$\text{Water Injection Credit Allowable} = \left[\frac{\text{net water injected}}{\text{basic project area allowable voidage}}\right] \times \text{basic project area allowable}$$

and should be calculated as follows:

$$\text{Water Injection Credit Allowable} = \left\{\frac{W_i - W_p}{\text{BPAA}\left[\beta_o + \left(\frac{R_p - R_s}{1000}\right)\beta_g\right]} - 1\right\} \text{BPAA}$$

where:
- W_i = Average daily water injection during previous month, barrels per day, project area only
- W_p = Average daily water produced during previous month, barrels per day, project area only
- BPAA = Basic Project Area Allowable = 80 x number of 40-acre tracts in project area
- β_o = Oil formation volume factor, reservoir barrels per stock tank barrel, as determined from Exhibit B (attached hereto and by reference made a part hereof), for the latest available project area reservoir pressure
- R_p = Producing gas-oil ratio, cubic feet per barrel, for previous month, project area only
- R_s = Solution gas-oil ratio, cubic feet per barrel, as determined from Exhibit B, for the latest available project area reservoir pressure
- β_g = Gas formation volume factor, reservoir barrels per MCF, as determined from Exhibit B, for latest available project area reservoir pressure

In no event shall the Water Injection Credit Allowable be less than zero, i.e., negative numbers derived from application of the above formula shall be ignored.

(13) That the average project area reservoir pressure shall be determined prior to the commencement of injection of water into the reservoir and at least annually thereafter. The average project area pressure shall be the average of the pressures in at least ten representative wells selected by the operator of the unit and the Supervisor of the Hobbs District Office of the Commission at an agreed upon datum.

(14) That the project area allowable may be produced from any well within the project area in any proportion provided, however, that any proration unit situated on the boundary of the Central Vacuum Unit which proration unit is not directly or diagonally offset by a San Andres injection well outside said Central Vacuum Unit shall not be permitted to produce in excess of 80 barrels of oil per day.

(15) That each month the project operator shall submit to the Commission a Pressure Maintenance Project Operator's Report, on a form prescribed by the Commission, outlining thereon the data required, and requesting allowables for each of the several wells in the Project as well as the total project area allowable. The aforesaid Pressure Maintenance Project Operator's Report shall be filed in lieu of Form C-120 for the Project.

(16) That the Commission shall, upon review of the report and after any adjustments deemed necessary, calculate the allowable for the wells in the Project for the next succeeding month in accordance with these rules. The sum of the allowables so calculated shall be assigned to the Project and, except as provided under Order (14) above, may be produced from the wells in the Project in any proportion.

(17) That jurisdiction of this cause is retained for the entry of such further orders as the Commission may deem necessary.

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

STATE OF NEW MEXICO
OIL CONSERVATION COMMISSION

PHIL R. LUCERO, Chairman

EMERY C. ARNOLD, Member

JOE D. RAMEY, Member & Secretary

S E A L

dr/

CENTRAL VACUUM UNIT
Authorized Injection Wells

54 new wells to be drilled at the following locations:

WELL NO.	LOCATION	SECTION	TOWNSHIP SOUTH	RANGE EAST
5	1310' FNL & 1310' FWL	30	17	35
6	1310' FNL & 2630' FWL	30	17	35
7	1310' FNL & 1330' FEL	30	17	35
13	2630' FNL & 10' FEL	25	17	34
14	2630' FNL & 1310' FWL	30	17	35
15	2630' FNL & 2630' FWL	30	17	35
16	2630' FNL & 1330' FEL	30	17	35
25	1330' FSL & 1310' FWL	25	17	34
26	1330' FSL & 2630' FWL	25	17	34
27	1330' FSL & 1330' FEL	25	17	34
28	1330' FSL & 10' FEL	25	17	34
29	1330' FSL & 1310' FWL	30	17	35
30	1330' FSL & 2630' FWL	30	17	35
31	1330' FSL & 1330' FEL	30	17	35
40	10' FSL & 1310' FWL	25	17	34
41	10' FSL & 2630' FWL	25	17	34
42	10' FSL & 1330' FEL	25	17	34
43	10' FSL & 10' FEL	25	17	34
44	10' FSL & 1310' FWL	30	17	35
45	10' FSL & 2630' FWL	30	17	35
46	10' FSL & 1330' FEL	30	17	35
55	1310' FNL & 1310' FWL	36	17	34
56	1310' FNL & 2630' FWL	36	17	34
57	1310' FNL & 1330' FEL	36	17	34
58	1310' FNL & 10' FEL	36	17	34
59	1310' FNL & 1310' FWL	31	17	35
60	1310' FNL & 2630' FWL	31	17	35
61	1310' FNL & 1330' FEL	31	17	35
70	2630' FNL & 1310' FWL	36	17	34
71	2630' FNL & 2630' FWL	36	17	34
72	2630' FNL & 1330' FEL	36	17	34
73	2630' FNL & 10' FEL	36	17	34
74	2630' FNL & 1310' FWL	31	17	35
81	1330' FSL & 1310' FWL	36	17	34
82	1330' FSL & 2630' FWL	36	17	34
83	1330' FSL & 1330' FEL	36	17	34
84	1330' FSL & 10' FEL	36	17	34
85	1330' FSL & 1310' FWL	31	17	35
93	10' FSL & 1310' FWL	31	17	35
94	10' FSL & 2630' FWL	31	17	35
99	1310' FNL & 1310' FWL	6	18	35
100	1310' FNL & 2630' FWL	6	18	35
101	1310' FNL & 1330' FEL	6	18	35
106	2520' FNL & 1040' FWL	6	18	35

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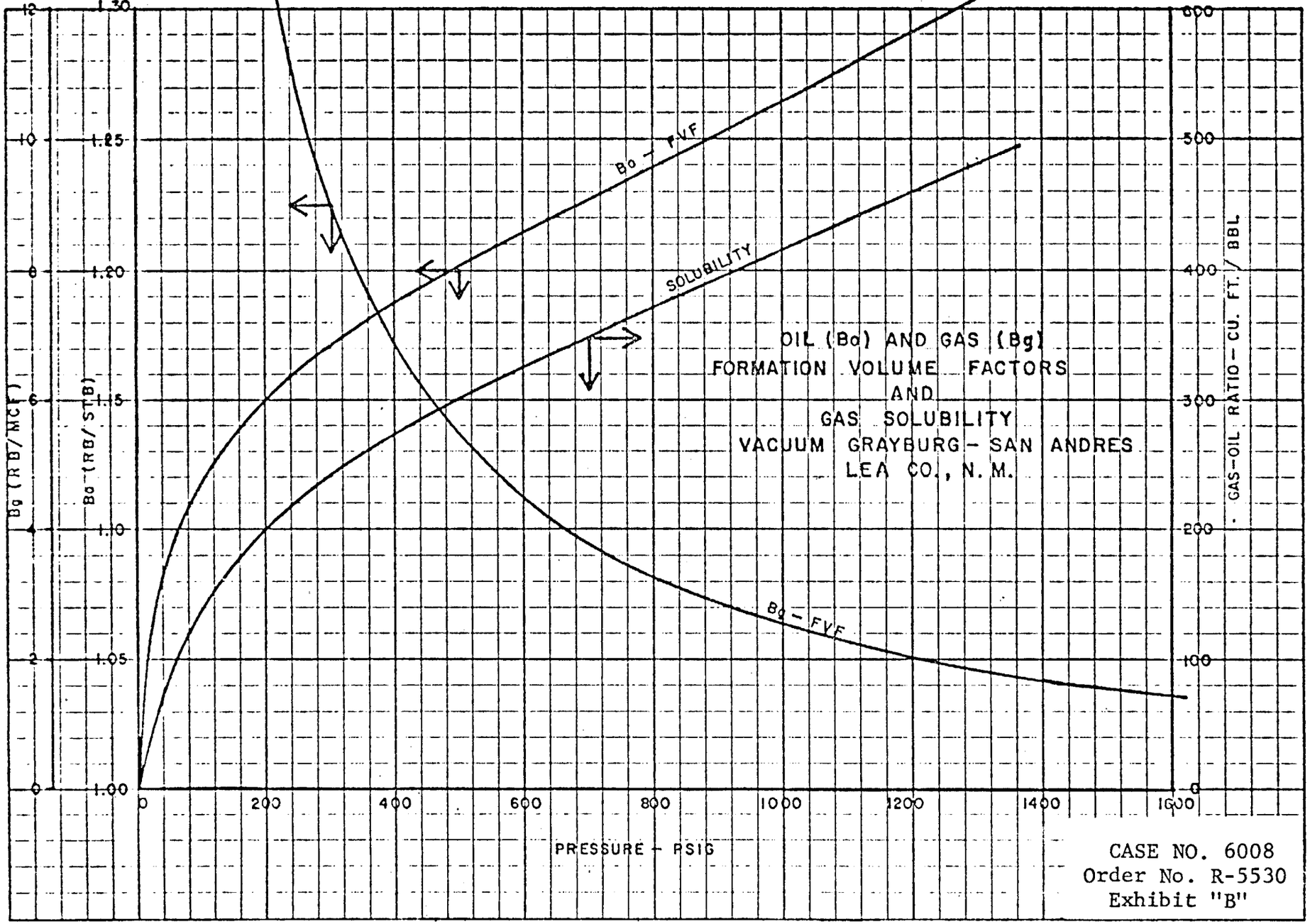
Exhibit "A"

54 new wells to be drilled at the following locations continued

WELL NO.	LOCATION	SECTION	TOWNSHIP SOUTH	RANGE EAST
107	2450' FNL & 2630' FWL	6	18	35
108	2630' FNL & 1480' FEL	6	18	35
113	1620' FSL & 1100' FWL	6	18	35
114	1460' FSL & 2100' FWL	6	18	35
115	1600' FSL & 1500' FEL	6	18	35
120	60' FNL & 1100' FWL	7	18	35
121	400' FSL & 2380' FWL	6	18	35
122	350' FSL & 1560' FEL	6	18	35
128	1310' FNL & 200' FEL	12	18	34
129	1310' FNL & 2630' FWL	7	18	35

One existing well, Sun Oil Company Lea State "B" No. 7 located as follows:

131	2119' FNL & 918' FWL	7	18	35


Bg (RB/MCF)
Bo (RB/STB)
GAS-OIL RATIO - CU. FT. / BBL
Bo - FVF
SOLUBILITY
Bg - FVF
OIL (Bo) AND GAS (Bg)
FORMATION VOLUME FACTORS
AND
GAS SOLUBILITY
VACUUM GRAYBURG - SAN ANDRES
LEA CO., N. M.
PRESSURE - PSIG
0
200
400
600
800
1000
1200
1400
1600
1.00
1.05
1.10
1.15
1.20
1.25
1.30
0
2
4
6
8
10
12
0
100
200
300
400
500
600
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OPERATOR	LEASE	WELL NO.	UT.	SEC.	TWP.	RGE.
Continental Oil Co.	State H 35	9	H	35	17S	34E
Getty Oil Company	State AN	8	P	7	18S	35E
Getty Oil Company	State AN	9	I	7	18S	35E
Getty Oil Company	State BA	6	D	36	17S	34E
Marathon Oil Co.	Warn State A/c 2	6	K	6	18S	35E
Marathon Oil Co.	Warn State A/c 2	10	K	6	18S	35E
Mobil Oil Corp.	Bridges State	11	F	25	17S	34E
Mobil Oil Corp.	State DD	1	D	31	17S	35E
Phillips Petroleum Co.	Santa Fe	87	L	31	17S	35E
Texaco Inc.	New Mexico "AB" State	5	J	6	18S	35E
Texaco Inc.	New Mexico "AE" State	4	F	12	18S	34E
Texaco Inc.	New Mexico "O" State NCT-1	14	J	36	17S	34E
Texaco Inc.	New Mexico "O" State NCT-1	18	H	36	17S	34E
Texaco Inc.	New Mexico "P" State	1	J	7	18S	35E
Texaco Inc.	New Mexico "Q" State	4	P	25	17S	34E

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Exhibit "C"