DOYLE HARTMAN

Oil Operator

500 N. MAIN

P.O. BOX 10426

MIDLAND, TEXAS 79702

(915) 684-4011

April 12, 1991

BEFORE EXAMINER MCMILLAN

OIL CONSERVATION DIVISION

Hartman Exhibit 1

CASE NO. 10269

Marathon Oil Company
P. O. Box 552
Midland, Texas 79702-0552

Attention: Mr. David J. Loran
Engineering Manager

Re: Application of Marathon Oil Company
for Waterflood Project
McDonald State A/C #1 Lease
South Eunice Pool
Lea County, New Mexico

Gentlemen:

Hartman has received, as an offset operator, Marathon's application and NMOCD Form C-108 with attachments to initiate a waterflood project on your McDonald State A/C #1 Lease in Section 16 of T-22-S, R-36-E, Lea County, New Mexico.

Doyle Hartman agrees that it will not oppose Marathon's application to NMOCD to initiate a waterflood program on Marathon's McDonald State A/C #1 lease, in exchange for Marathon's agreement, in order to avoid potential communication with Doyle Hartman operated Jalmat gas production in Sections 20 and 21, T-22-S, R-36-E, as follows (complete descriptions of all wells referenced in this letter are shown on Attachment 1):

A. That an upper vertical limit of injection be established for Marathon's proposed injection wells #30 and #31 as follows: Top of Queen Formation (as defined in Marathon's McDonald State A/C 1 Well #8, at a depth of 3618' RKB on Apollo Perforators Inc. Dual Spaced Compensated Neutron/GR/CCL Log dated 9/19/90. See Attachment 2).

B. That maximum surface injection pressure in wells #30 and #31 be limited to 0.2 psi/ft, unless Step Rate Tests verify that any other proposed injection pressure is below breakdown.

C. That hydraulic fracture treatments be allowed for injection wells #30 and #31 only if the treatments are tagged with radioactive tracer material, and logged immediately after the fracture treatment to ensure that the fracture treatment, and subsequent water injection are contained within the Queen zone. Copies of the radioactive tracer surveys will be provided to Doyle Hartman for examination.

D. That Marathon run cement bond logs to verify integrity across the zones of interest in injection wells #30 and #31, and provide copies to Doyle Hartman for examination.

E. That Marathon run an initial injectivity Survey to verify that injection is being maintained within the defined zone intervals, and provide copies to Doyle Hartman for examination.

F. Marathon shall not commingle production in the producing wells of its McDonald State A/C #1 lease, South Eunice Oil Pool waterflood, with gas production from the Jalmat Gas Pool. The South Eunice Oil Pool is defined by NMOCD as that interval from 100' above the base of the Seven Rivers Formation down to the base of the Queen Formation. The Jalmat Gas Pool is defined as that interval from the top of the Tansill Formation down to a point 100' above the base of the Seven Rivers Formation. See Attachment 3 entitled Pool Limits.

G. If results of any surveys or tests run indicate that the limitations detailed above are not being met, Marathon shall not commence or continue injection into the well or wells involved. Provided, however, that either party may apply for a determination by the NMOCD, after proper notice to the other, whether the failure to meet the limitations will jeopardize the Hartman Jalmat wells.

H. Marathon shall make a concerted effort not to flood/water out any gas bearing zones in the upper part of the Eunice South Pool (being the lower 100' of the Seven Rivers formation), and in the event Marathon desires to flood the lower 100' of the Seven Rivers formation, sufficient data as to residual oil saturation will be gathered to make certain such interval is not predominantly gas bearing.

I. Marathon preserves the right to apply to the NMOCD at a later date for approval to inject water into the Seven Rivers formations in the two injection wells described above.

If this letter meets with your approval, please sign on the line provided below and return to me as soon as possible.

Very truly yours,

DOYLE HARTMAN

Michael Stewart
Engineer

MS/lr
555:M-WFAGMT

Agreed and accepted this 15 day of April, 1991 by David J. Shan
on behalf of Marathon Oil Company. Engineering Mgr.

Attachment to Letter Agreement dated April 11, 1991

Doyle Hartman Existing Jalmat Well Locations

Hartman Boren-Greer Gas Com #1
660' FNL, 660' FWL, Section 21, T-22-S, R-36-E

Hartman Boren-Greer Gas Com #2
890' FNL, 1780' FWL, Section 21, T-22-S, R-36-E

Hartman Boren-Greer Gas Com #3
660' FNL, 940' FEL, Section 20, T-22-S, R-36-E

Marathon Proposed Water Injection Well Locations
(all in Section 16, T-22-S, R-36-E)

Marathon McDonald State A/C 1 #30 1260' FWL, 1390' FSL
Marathon McDonald State A/C 1 #31 2620' FWL, 1340' FSL

Marathon South Eunice Pool Producing Wells
(all in Section 16, T-22-S, R-36-E)

Marathon McDonald State A/C 1 #7 660' FSL, 1980' FEL
Marathon McDonald State A/C 1 #8 660' FSL, 660' FWL
Marathon McDonald State A/C 1 #47 850' FSL, 1980' FWL

APOLLO PERFORATORS INC.

DUAL SPACED COMPENSATED NEUTRON/GR/CCL

COMPANY MARATHON OIL CO
WELL MCDONALD ST A/C 1 WELL #8
FIELD SOUTH EUNICE
CNTY LEA STATE NM

COMPANY MARATHON OIL COMPANY
WELL MCDONALD STATE A/C 1 WELL #8
FIELD SOUTH EUNICE
COUNTY LEA STATE NEW MEX.

LOCATION:
660' FSL & 660' FWL
SEC. 16 TWP. 22-S RGE. 36-E

OTHER SERVICES:

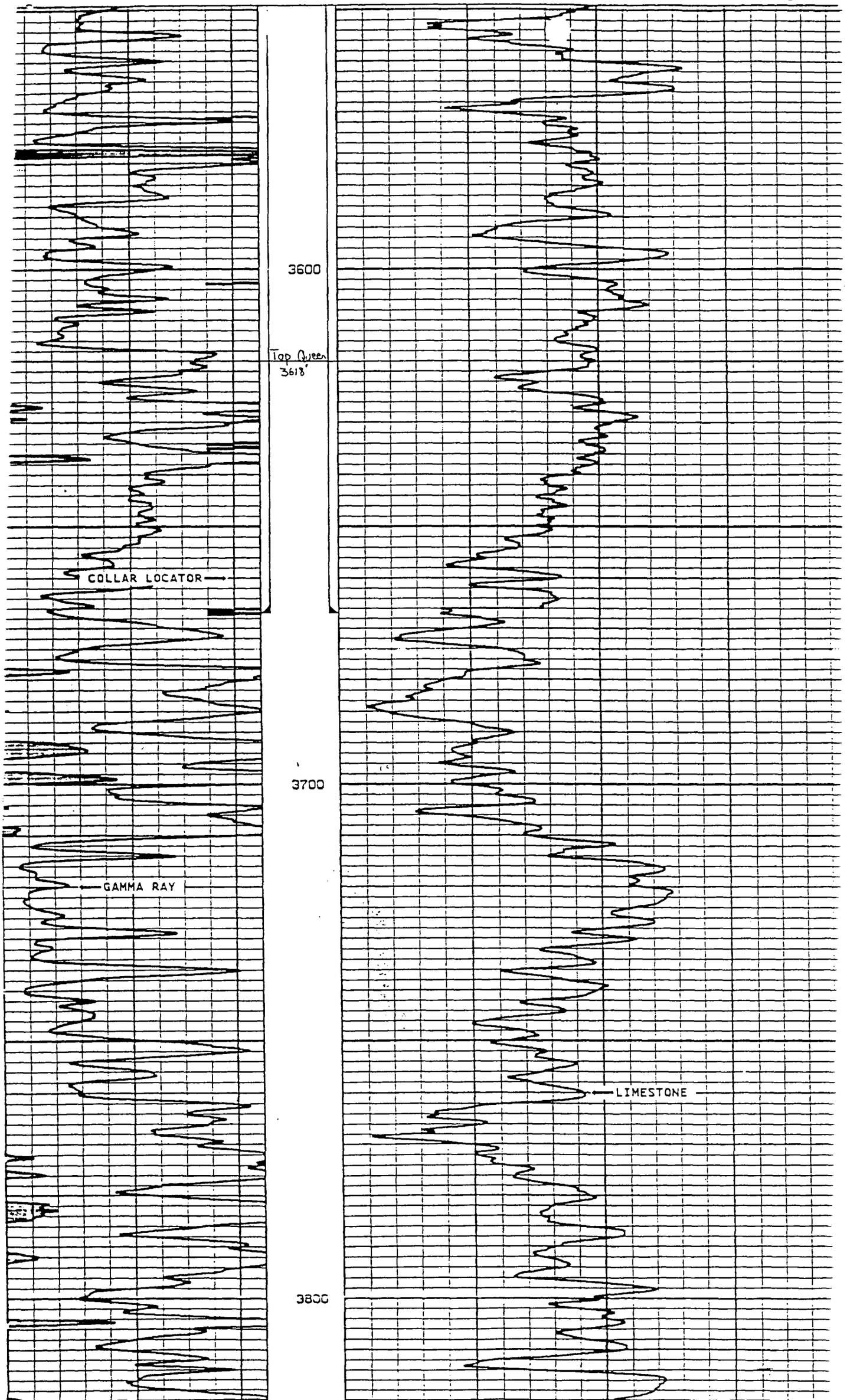
PERM. DATUM GROUND LEVEL ELEV. 3533
LOG MEASURED FROM KB 11 FT. ABOVE PERMANENT DATUM
DRILLING MEASURED FROM KB

ELEV.: K.B. 3544
D.F.
G.L. 3533

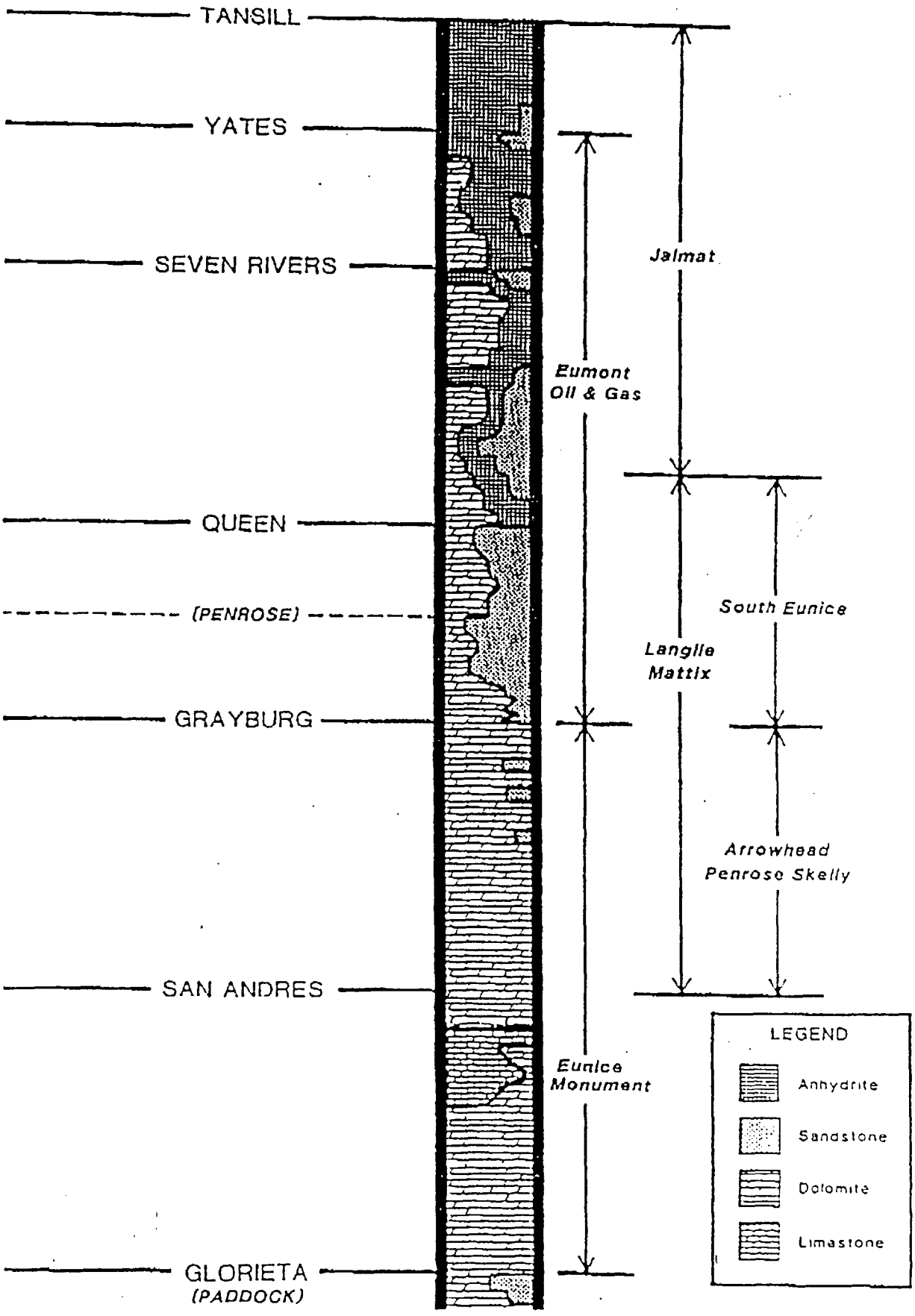
DATE	9/19/90		
RUN NO.	ONE		
DEPTH DRILLER	3860		
DEPTH LOGGER	3837		
BTM. LOG INTERVAL	3836		
TOP LOG INTERVAL	3400		
OPEN HOLE SIZE			
TYPE FLUID	WATER		
DENS. / VISC.			
MAX. REC. TEMP. °F			
EST. CEMENT TOP			
TIME WELL READY	8:00		
TIME LOGGER ON BTM.			
EQUIP. NO.	102		
LOCATION	ODESSA, TEXAS		
RECORDED BY	J KIDWELL		
WITNESSED BY	D PRICE		

BOREHOLE RECORD				TUBING RECORD			
RUN NO.	BIT	FROM	TO	SIZE	WGT.	FROM	TO

CASING RECORD	SIZE	WT/FT	GRADE	TYPE JOINT	TOP	BOTTOM
SURFACE STRING						
PROT. STRING						
PROD. STRING	7.00"				0	3667
LINER						
OPEN HOLE	6 1/8"				3667	3860


3600
Top Queen
3618'
COLLAR LOCATOR
3700
GAMMA RAY
LIMESTONE
3800

POOL LIMITS


TANSILL
YATES
SEVEN RIVERS
QUEEN
(PENROSE)
GRAYBURG
SAN ANDRES
GLORIETA
(PADDOCK)
Jalmat
Eumont
Oil & Gas
South Eunice
Langlie
Mattix
Arrowhead
Penrose Skelly
Eunice
Monument
LEGEND
Anhydrite
Sandstone
Dolomite
Limestone

STATE OF NEW MEXICO
ENERGY, MINERALS AND NATURAL RESOURCES DEPARTMENT
OIL CONSERVATION DIVISION

IN THE MATTER OF THE HEARING
CALLED BY THE OIL CONSERVATION
DIVISION FOR THE PURPOSE OF
CONSIDERING:

CASE NO. 10269
ORDER NO. R-9503

APPLICATION OF MARATHON OIL COMPANY FOR A WATERFLOOD PROJECT AND TWELVE UNORTHODOX INJECTION WELL LOCATIONS, LEA COUNTY, NEW MEXICO

ORDER OF THE DIVISION

BY THE DIVISION:

This cause came on for hearing at 8:15 a.m. on March 21 and April 18, 1991 at Santa Fe, New Mexico, before Examiners Michael E. Stogner and Jim H. Morrow, respectively.

NOW, on this 10th day of May, 1991, the Division Director, having considered the testimony, the record and the recommendations of the Examiner, and being fully advised in the premises,

FINDS THAT:

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

(2) The applicant, Marathon Oil, Inc., seeks authority to institute a waterflood project on its McDonald State A/C-1 Lease comprising the W/2 of Section 15 and the E/2, SE/4 NW/4, and SW/4 of Section 16, Township 22 South, Range 36 East, NMPM, Lea County, New Mexico, by the injection of water into the South Eunice Seven Rivers-Queen Pool through the perforated interval from approximately 3500 feet to 3850 feet in twelve injection wells, each to be drilled at unorthodox locations as further described in Exhibit "A" attached hereto and made a part hereof.

(3) At the March 21, 1991 hearing a representative of ARCO Oil and Gas Company entered an appearance in this matter. Further a representative of Doyle Hartman entered an appearance at the April 18, 1991 hearing. Both ARCO and Doyle Hartman have an interest in the Jalmat Gas Pool either within or immediately offsetting the proposed waterflood project area.

(4) The wells in the proposed project area are in an advanced state of depletion and should therefore be properly classified as "stripper wells."

(5) The proposed waterflood project is estimated to have the potential to recover 1.44 million barrels of additional oil which might not otherwise be recovered in the absence of a waterflood project; therefore said project should result in the recovery of otherwise unrecoverable oil, thereby preventing waste.

(6) While the applicant applied for authority to inject water under pressure in excess of the Division's guideline of 0.2 psi per foot of depth, at the hearing the applicant withdrew that request.

(7) The injection wells are to be newly drilled wells at unorthodox well locations approximately equal distances from offsetting producing wells in order to develop an effective and efficient well pattern. In order to accomplish this pattern, it is necessary to approve the unorthodox location of these injection wells as described on Exhibit "A" of this order.

(8) Prior to commencing the injection of water into the proposed Well Nos. 37 or 43, the operator shall obtain a lease line injection agreement with the offset operators for the W/2 NW/4 of said Section 16 and submit a copy of said agreement to the Division.

(9) The proposed waterflood injection interval for said project is proposed to be the South Eunice Seven Rivers-Queen Pool, the vertical limits of which extend from 100 feet above the top of the Queen to the top of the Grayburg formation; however, the applicant has requested that proposed water injection well Nos. 30, 31, 33, 34 and 40 be limited to injection into the Seven Rivers formation of said pool at this time due to their proximity to nearby Jalmat Gas wells.

(10) The McDonald State "WN" Well Nos. 15 and 23, currently operated by ARCO, are producing Jalmat Gas wells located in Unit L and Unit C, respectively, of Section 15, Township 22 South, Range 36 East, NMPM, Lea County, New Mexico.

(11) In addition, Doyle Hartman currently oversees three temporarily abandoned Jalmat Gas wells: the Boren-Greer Gas Com Wells Nos. 1, 2, and 3 in Unit D and C of Section 21 and in Unit A of Section 20, both in Township 22 South, Range 36 East, NMPM, Lea County, New Mexico, respectively.

(12) The base of the Jalmat Gas Pool in this area corresponds to the top of the South Eunice Seven Rivers-Queen Pool.

(13) To help ensure that water injection from the proposed waterflood project does not adversely affect the Jalmat Gas Pool in the areas described in Finding Paragraph Nos. (10) and (11) above the applicant hereby requests that the proposed injection Well Nos. 30, 31, 33, 34 and 40 be subject to the following special provisions:

(a) the upper vertical limit of injection shall be the top of the Queen formation, as defined in the Marathon McDonald A/C-1 Well No. 29, located in Unit I of said Section 16, at a depth of 3695 feet RKB on the Dresser Atlas Compensated Neutron/Densilog dated March 27, 1977 and as defined in the Marathon McDonald A/C-1 Well No. 8, located in Unit M of said Section 16, at a depth of 3618 feet RKB on the Apollo Perforators Inc. Dual Spaced Compensated Neutron/GR/CCl Log dated September 19, 1990;

(b) any hydraulic fracture treatment for these wells shall be tagged with radioactive tracer material and logged immediately after the fracture treatment to ensure that the fracture treatment and subsequent water injection are contained in the Queen formation;

(c) the operator shall obtain cement bond logs to verify the integrity across the Jalmat, Queen and Seven Rivers formations in these injection wells;

(d) the operator shall obtain initial injectivity surveys for these wells to verify that injection is being maintained within the top of the Queen formation;

(e) the potential pay zones in the Seven Rivers and Queen formations in the Marathon producing McDonald State A/C-1 Well Nos. 4, 29 and 46 in Section 16, and Well Nos. 3 and 4 in Section 15 shall be opened to help prevent injection water reaching the ARCO McDonald State "WN" Well Nos. 15 and 23 Jalmat Gas producing interval;

(f) Marathon shall make a concerted effort not to flood/water out any gas bearing zones in the lower 100 feet of the Seven Rivers formation of the Eunice South Pool and in the event Marathon desires to flood the lower 100 feet of the Seven Rivers formation, sufficient data as to residual oil saturation should be gathered to make certain such interval is not predominantly gas bearing;

(14) If the results of any survey or test performed on these injection wells show that the limitations of items 13(a) through 13(f) are not being met, Marathon may not commence or continue injection into the well or wells involved pending a determination by the Division Director whether the failure to meet the limitation will jeopardize either of the existing ARCO Jalmat Gas wells or any of the potentially active Hartman Jalmat Gas wells described above.

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

(16) Applicant submitted data on the proposed injection wells, water wells in the area, and all wells (including plugged wells) which penetrate the zone of interest within 1/2 mile of each of the proposed injection wells. This data shows that wells in the area are cased and plugged so as to protect fresh water and prevent fluid migration from the injection zone, and includes testimony indicating no evidence of open faults or any other hydrologic connection between the injection zone and the fresh water resources in the area.

(17) With the adoption of the special provisions of Paragraph (13) above, the proposed waterflood injection interval shows to be adequately isolated from any hydrocarbon productive formation above or below that interval and is further isolated from any potential fresh water sources.

(18) The injection wells or injection pressurization system for each well should be so equipped as to limit injection pressure at the wellhead to no more than 700 psi.

(19) Injection should be accomplished through 2 7/8-inch plastic-lined tubing installed in a packer set at approximately 100 feet above the uppermost perforated interval; the casing-tubing annulus should be filled with an inert fluid; and a pressure gauge or approved leak-detection device should be attached to the annulus in order to determine leaks in the casing, tubing or packer.

(20) Prior to commencing injection operations, the casing in each of the subject wells should be pressure-tested throughout the interval, from the surface down to the proposed packer-setting depth, to assure integrity of such casing.

(21) The Director of the Division should be authorized to administratively approve an increase in the injection pressure upon a proper showing by the operator that such higher pressure will not result in migration of the injected waters from its authorized injection interval.

(22) The operator should give advance notification to the supervisor of the Hobbs District Office of the Division of the date and time of the installation of injection equipment and of the mechanical integrity pressure-test in order that the same may be witnessed.

(23) The subject application should be approved and the project should be governed by the provisions of Rules 702 through 708 of the Division Rules and Regulations.

IT IS THEREFORE ORDERED THAT:

(1) The applicant, Marathon Oil Company, is hereby authorized to institute a waterflood project on its McDonald State A/C-1 Lease, comprising the E/2, SE/4 NW/4 and SW/4 of Section 16 and W/2 of Section 15, Township 22 South, Range 36 East, NMPM, Lea County, New Mexico by the injection of water into the South Eunice Seven Rivers-Queen Pool, through the perforated interval from approximately 3500 feet to 3850 feet in each of the injection wells shown on Exhibit "A" attached hereto and made a part hereof, EXCEPT that the water injected into the McDonald State A/C-1 Well Nos. 30, 31, 33, 34 and 40 shall be confined to not exceed the top of the Queen formation pending further order of the Division.

PROVIDED HOWEVER THAT, prior to commencing injection operations in injection wells Nos. 30, 31, 33, 34, or 40, the following special provisions shall apply:

(a) the upper vertical limit of injection shall be the top of the Queen formation, as defined in the Marathon McDonald State A/C-1 Well No. 29, located in Unit I, Section 16, at a depth of 3695 feet RKB on the Dresser Atlas Compensated Neutron/Densilog dated March 27, 1977 and as defined in the Marathon McDonald State A/C-1 Well No. 8, located in Unit M of said Section 16, at a depth of 3618 feet RKB on Apollo Perforators Inc. Dual Spaced Compensated Neutron/GR/CCL Log dated September 19, 1990;

(b) any hydraulic fracture treatments shall be allowed for these five injection wells only if the treatments are tagged with radioactive tracer material and the wells logged immediately after the fracture treatment to ensure that the fracture treatment and subsequent water injection are contained in the Queen formation;

(c) the operator shall obtain cement bond logs to verify the integrity across the Jalmat, Queen and Seven Rivers formations in these injection wells;

(d) the operator shall obtain initial injectivity surveys for these wells to verify that injection is being maintained within the top of the Queen formation;

(e) the potential pay zones in the Seven Rivers and Queen formations in the Marathon producing McDonald State A/C-1 Well Nos. 4, 29 and 46 in Section 16 and Well Nos. 3 and 4 in Section 15 shall be opened to help prevent injection water reaching the ARCO McDonald State "WN" Well Nos. 13 and 23 Jalmat Gas producing interval;

(f) Marathon shall make a concerted effort not to flood/water out any gas bearing zones in the lower 100 feet of the Seven Rivers formation of the South Eunice Oil Pool and in the event Marathon desires to flood the lower 100 feet of the Seven Rivers formation, sufficient data as to residual oil saturation will be gathered to make certain such interval is not predominantly gas bearing;

(2) If the results of any survey or test performed on these injection wells show that the limitations of ordering Paragraphs 1(a) through 1(f) are not being met, Marathon shall not commence or continue injection into the well or wells involved pending a determination by the Division, after notice and hearing, whether the failure to meet the limitation will jeopardize any of the Hartman or ARCO Jalmat Gas wells.

PROVIDED FURTHER THAT:

(3) If the results of any survey or test performed on these injection wells show that the limitations of ordering Paragraph 1(a) through 1(f) are not being met, Marathon shall not commence or continue injection into the well or wells involved pending a determination by the Division Director whether the failure to meet the limitation will jeopardize either of the ARCO Jalmat Gas wells.

(4) The injection wells herein authorized and/or injection pressurization system shall be so equipped as to limit injection pressure at the wellhead to no more than 700 psi.

(5) The unorthodox injection well locations are approved as described on Exhibit "A" of this order.

(6) Injection into said injection wells shall be through 2-7/8 inch internally plastic coated tubing, set in a packer which shall be located within 100 feet of the top perforations, and the casing-tubing annulus shall be loaded with an inert fluid and equipped with an approved pressure gauge or attention attracting leak detection device.

(7) Prior to commencing injection operations, the casing in the subject well shall be pressure-tested to assure the integrity of such casing in a manner that is satisfactory to the supervisor of the Division's Hobbs District Office.

(8) The Director of the Division may authorize an increase in injection pressure upon a proper showing by the operator that such higher pressure will not result in migration of the injected fluid from its authorized injection interval.

(9) The operator shall notify the supervisor of the Hobbs District Office of the Division in advance of the date and time of the installation of injection equipment and of the mechanical integrity pressure-test in order that the same may be witnessed.

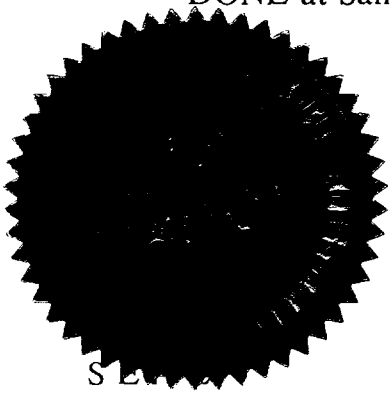
(10) The operator shall immediately notify the supervisor of the Division's Hobbs District Office of the failure of the tubing, casing or packer, in said well or the leakage of water from or around said well and shall take such steps as may be timely and necessary to correct such failure or leakage.

(11) The subject waterflood project is hereby designated the McDonald State A/C-1 Lease Waterflood Project and shall be governed by the provisions of Rules 701 through 708 of the Division Rules and Regulations.

(12) Monthly progress reports of the waterflood project herein authorized shall be submitted to the Division in accordance with Rules 706 and 1115 of the Division Rules and Regulations.

(13) Jurisdiction of this cause is retained for the entry of such further orders as the Division may deem necessary.

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



STATE OF NEW MEXICO
OIL CONSERVATION DIVISION

WILLIAM J. LEMAY
Director

CASE NO. 10269
ORDER NO. R-9503
MARATHON OIL, INC.
PROPOSED INJECTION WELL LOCATIONS
MCDONALD STATE A/C-1 LEASE
ALL IN SECTION 16, TOWNSHIP 22 SOUTH, RANGE 36 EAST, NMPM, LEA COUNTY, NEW MEXICO
EXHIBIT "A"

WELL NUMBER	*FOOTAGE LOCATION*	*UNIT LETTER*	*INJECTION INTERVAL*
30	1390' FSL - 1260' FWL	L	Queen
31	1340' FSL - 2620' FWL	K	Queen
32	1340' FSL - 1260' FEL	I	Seven Rivers-Queen
33	1340' FSL - 10' FEL	I	Queen
34	2620' FSL - 25' FEL	I	Queen
35	2620' FNL - 1310' FEL	H	Seven Rivers-Queen
36	2620' FSL - 2630' FEL	J	Seven Rivers-Queen
37*	2620' FSL - 1330' FWL	K	Seven Rivers-Queen
40	1340' FNL - 25' FEL	H	Queen
41	1340' FNL - 1310' FEL	H	Seven Rivers-Queen
42*	1340' FNL - 2630' FEL	G	Seven Rivers-Queen
43*	1360' FNL - 1330' FWL	F	Seven Rivers-Queen

** Denotes Lease Line Injection Wells*