

**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. 10443  
Order No. R-9503-A**

**APPLICATION OF MARATHON OIL  
COMPANY TO AMEND DIVISION ORDER  
NO. R-9503, LEA COUNTY, NEW  
MEXICO.**

**ORDER OF THE DIVISION**

**BY THE DIVISION:**

This cause came on for hearing at 8:15 a.m. on March 5, 1992 at Santa Fe, New Mexico, before Examiner David R. Catanach.

NOW, on this 7th day of April, 1992, 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) By Order No. R-9503 dated May 10, 1991, the Division authorized Marathon Oil Company to institute a waterflood project on its McDonald State A/C-1 Lease in portions of Sections 15 and 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 twelve injection wells (as more fully described in said Order No. R-9503).

(3) Order No. R-9503 further contained a provision whereby injection within the McDonald State A/C-1 Well Nos. 30, 31, 33, 34 and 40 was limited to that portion of the South Eunice Seven Rivers-Queen Pool extending from the top of the Queen formation to the top of the Grayburg formation.

(4) The vertical limits of the South Eunice Seven Rivers-Queen Pool in this area currently extend from 100 feet above the top of the Queen formation to the top of the Grayburg formation. The lower vertical limit of the Jalmat Gas Pool in this area corresponds to the top of the South Eunice Seven Rivers-Queen Pool.

(5) The injection interval within the wells described in Finding No. (3) above was limited by the Division in order to provide protection to certain offset wells currently producing from the Jalmat Gas Pool from possible "watering out" of gas reserves within the Seven Rivers formation which may occur as a result of waterflood operations.

(6) The applicant, Marathon Oil Company (Marathon), seeks an amendment to Division Order No. R-9503 to authorize an increase in the injection interval in its McDonald State A/C-1 Well Nos. 30 and 33 located in Units L and I of said Section 16 to include the lowermost 46 feet of the Seven Rivers formation.

(7) At the time of the hearing, Marathon requested that the portion of the application requesting the extension of the injection interval in its McDonald State A/C-1 Well No. 33 be dismissed.

(8) In conformance with Ordering Paragraph No. (1) Subparts (c) and (d) of said Order No. R-9503, the applicant has obtained a cement bond log and has conducted an injectivity survey on the McDonald State A/C-1 Well No. 30.

(9) The results of both the cement bond log and the injectivity survey were presented by the applicant as evidence in this case. The cement bond log indicates good cement throughout both the South Eunice Seven Rivers-Queen and Jalmat Gas Pool intervals. The results of the injectivity survey indicate, however, the presence of a channel behind the 5 1/2-inch casing which extends from the top of the Queen formation at 3606 feet upward to an approximate depth of 3575 feet.

(10) The applicant presented additional geologic and engineering evidence and testimony which indicate that:

a) the channel within the subject well does not appear to extend any higher than 3575 feet;

b) the interval from approximately 3571 feet to 3580 feet in the subject well is a sand member of the Seven Rivers formation identified by the applicant as the Lower Seven Rivers "A" Zone. This interval has good lateral continuity and, according to core data obtained from ARCO Oil and Gas Company's McDonald "WN" State Well No. 15 located in Unit L of Section 15, this interval is predominantly oil bearing;

c) the interval between the base of the Jalmat Gas Pool and the top of the Seven Rivers "A" Zone contains very little porosity or permeability;

d) the Marathon operated McDonald State A/C-1 Well Nos. 8, 9 and 10 which offset the subject injection well to the southwest, northwest and northeast, respectively, are currently open in the lower Seven Rivers interval. In addition, Marathon currently operates the McDonald State A/C-1 Well No. 6 which is located to the southeast of the subject injection well and which is currently completed in the Jalmat Gas Pool.

(11) The evidence presented indicates that injection into the Seven Rivers "A" Zone should not have any adverse affect on Jalmat Gas Pool production in this area, and any fluid injected into the Seven Rivers "A" Zone should be effectively confined to said zone.

(12) The completion intervals within the McDonald State A/C-1 Well Nos. 8, 9, and 10 should provide a pressure sink whereby the Seven Rivers "A" Zone will not pressure up as a result of fluid injection.

(13) The applicant has supplied copies of the bond log and injection survey run on the subject well and has notified Doyle Hartman and ARCO Oil and Gas Company of its proposal in this case. Neither Doyle Hartman nor ARCO Oil and Gas Company, both of whom operate offset Jalmat Gas wells, appeared at the hearing in opposition to the application.

(14) No other offset operator appeared at the hearing in opposition to the application.

(15) Approval of the application will afford the applicant the opportunity to effectively conduct waterflood operations, will not cause the waste of gas reserves within the Jalmat Gas Pool, and will not violate correlative rights.

(16) The applicant should be required to conduct an injectivity survey on the subject well on an annual basis in order to assure that the injected fluid is being effectively confined to the injection interval approved herein.

(17) In addition, the applicant should be required to conduct an injectivity survey on the subject well any time an injection pressure increase is sought and a step rate test is conducted.

(18) The applicant should be required to furnish copies of any injectivity surveys conducted on the subject well to Doyle Hartman, ARCO Oil and Gas Company, and to the Santa Fe office of the Division.

**IT IS THEREFORE ORDERED THAT:**

(1) The applicant, Marathon Oil Inc, is hereby authorized to expand the injection interval in its McDonald State A/C-1 Well No. 30 located 1390 feet from the South line and 1260 feet from the West line (Unit L) of Section 16, Township 22 South, Range 36 East, NMPM, Lea County, New Mexico, to include the entire interval from 3560 feet to 3850 feet.

(2) The applicant shall conduct an injectivity survey on the subject well on an annual basis in order to assure that the injected fluid is being effectively confined to the injection interval approved herein.

(3) In addition, the applicant shall conduct an injectivity survey on the subject well any time an injection pressure increase is sought and a step rate test is conducted.

(4) The applicant shall furnish copies of any injectivity surveys conducted on the subject well to Doyle Hartman, ARCO Oil and Gas Company, and to the Santa Fe office of the Division.

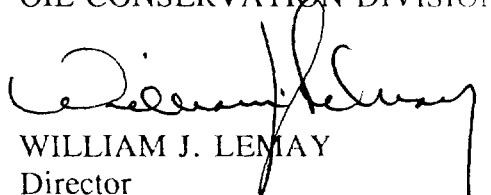
(5) All other provisions contained within Division Order No. R-9503 not inconsistent or in conflict herewith shall remain in full force and effect.

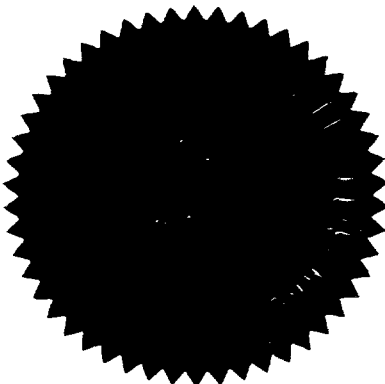
(6) The portion of the application requesting the extension of the injection interval in the McDonald State A/C-1 Well No. 33 is hereby dismissed.

(7) Jurisdiction is hereby 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



S E A L

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:

**RECEIVED**

FEB 28 1992

OIL CONSERVATION DIV.  
SANTA FE

CASE NO. 10443

APPLICATION OF MARATHON OIL COMPANY  
FOR AN AMENDMENT TO DIVISION ORDER  
R-9503, MCDONALD STATE A/C-1 LEASE  
WATERFLOOD PROJECT, LEA COUNTY,  
NEW MEXICO

**PRE-HEARING STATEMENT**

This pre-hearing statement is submitted by Marathon Oil Company as required by the Oil Conservation Division.

**APPEARANCE OF PARTIES**

**APPLICANT**

Marathon Oil Company  
ATTN: Thomas Lowry, Esq.  
Post Office Box 552  
Midland, Texas 79702  
(915) 687-8148

**ATTORNEY**

W. Thomas Kellahin  
KELLAHIN, KELLAHIN & AUBREY  
P.O. Box 2265  
Santa Fe, New Mexico 87504  
(505) 982-4285

**OPPOSITION OR OTHER PARTY**

ARCO Oil and Gas

**ATTORNEY**

William F. Carr  
CAMPBELL, CARR, BERGE ET AL  
P.O. Box 2208  
Santa Fe, New Mexico 87504  
(505) 988-4421

Pre-Hearing Statement  
Case No. 10443  
Page 2

## **STATEMENT OF CASE**

### **APPLICANT**

Marathon Oil Company seeks to increase by 40 feet the vertical limits of the authorized injection interval in its injection well No. 30 as set forth in Division Order R-9503.

Marathon Oil Company has obtained data including injectivity surveys which demonstrate that the injection interval of the subject well can be increased to allow Marathon the opportunity to recover additional oil in its project.

Approval of the increase will still provide adequate separation between the project and the Jalmat gas pool.

### **OPPOSITION OR OTHER PARTY**

N/A

**PROPOSED EVIDENCE**

APPLICANT

WITNESSES	EST. TIME	EXHIBITS
Eric Carlson Geologist	30 Minutes	Estimated 10 Exhibits in all
Don Price Petroleum Engineer	45 Minutes	

OPPOSITION

WITNESSES	EST. TIME	EXHIBITS
SEE OPPOSITION FILING, IF ANY		

**PROCEDURAL MATTERS**

Applicant hereby amends its original application to dismiss without prejudice the Injection Well #33 from the subject application.

KELLAHIN, KELLAHIN & AUBREY

By: 

W. Thomas Kellahin  
P.O. Box 2265  
Santa Fe, New Mexico 87504  
(505) 982-4285  
ATTORNEYS FOR APPLICANT

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:

**RECEIVED**

FEB 28 1992

OIL CONSERVATION DIV.  
SANTA FE

CASE NO. 10443

APPLICATION OF MARATHON OIL COMPANY  
FOR AN AMENDMENT TO DIVISION ORDER  
R-9503, MCDONALD STATE A/C-1 LEASE  
WATERFLOOD PROJECT, LEA COUNTY,  
NEW MEXICO

PRE-HEARING STATEMENT

This pre-hearing statement is submitted by Marathon Oil  
Company as required by the Oil Conservation Division.

**APPEARANCE OF PARTIES**

**APPLICANT**

Marathon Oil Company  
ATTN: Thomas Lowry, Esq.  
Post Office Box 552  
Midland, Texas 79702  
(915) 687-8148

**ATTORNEY**

W. Thomas Kellahin  
KELLAHIN, KELLAHIN & AUBREY  
P.O. Box 2265  
Santa Fe, New Mexico 87504  
(505) 982-4285

**OPPOSITION OR OTHER PARTY**

ARCO Oil and Gas

**ATTORNEY**

William F. Carr  
CAMPBELL, CARR, BERGE ET AL  
P.O. Box 2208  
Santa Fe, New Mexico 87504  
(505) 988-4421



Pre-Hearing Statement  
Case No. 10443  
Page 2

## STATEMENT OF CASE

### APPLICANT

Marathon Oil Company seeks to increase by 40 feet the vertical limits of the authorized injection interval in its injection well No. 30 as set forth in Division Order R-9503.

Marathon Oil Company has obtained data including injectivity surveys which demonstrate that the injection interval of the subject well can be increased to allow Marathon the opportunity to recover additional oil in its project.

Approval of the increase will still provide adequate separation between the project and the Jalmat gas pool.

### OPPOSITION OR OTHER PARTY

N/A

**PROPOSED EVIDENCE**

APPLICANT

WITNESSES	EST. TIME	EXHIBITS
Eric Carlson Geologist	30 Minutes	Estimated 10 Exhibits in all
Don Price Petroleum Engineer	45 Minutes	


OPPOSITION

WITNESSES	EST. TIME	EXHIBITS
SEE OPPOSITION FILING, IF ANY		

**PROCEDURAL MATTERS**

Applicant hereby amends its original application to dismiss without prejudice the Injection Well #33 from the subject application.

KELLAHIN, KELLAHIN & AUBREY

By:   
W. Thomas Kellahin  
P.O. Box 2265  
Santa Fe, New Mexico 87504  
(505) 982-4285  
ATTORNEYS FOR APPLICANT

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

**RECEIVED**

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

FEB 28 1992

OIL CONSERVATION DIV.  
SANTA FE

CASE NO. 10443

APPLICATION OF MARATHON OIL COMPANY  
FOR AN AMENDMENT TO DIVISION ORDER  
R-9503, MCDONALD STATE A/C-1 LEASE  
WATERFLOOD PROJECT, LEA COUNTY,  
NEW MEXICO

PRE-HEARING STATEMENT

This pre-hearing statement is submitted by Marathon Oil  
Company as required by the Oil Conservation Division.

**APPEARANCE OF PARTIES**

**APPLICANT**

Marathon Oil Company  
ATTN: Thomas Lowry, Esq.  
Post Office Box 552  
Midland, Texas 79702  
(915) 687-8148

**ATTORNEY**

W. Thomas Kellahin  
KELLAHIN, KELLAHIN & AUBREY  
P.O. Box 2265  
Santa Fe, New Mexico 87504  
(505) 982-4285

**OPPOSITION OR OTHER PARTY**

ARCO Oil and Gas

**ATTORNEY**

William F. Carr  
CAMPBELL, CARR, BERGE ET AL  
P.O. Box 2208  
Santa Fe, New Mexico 87504  
(505) 988-4421

Pre-Hearing Statement  
Case No. 10443  
Page 2

## STATEMENT OF CASE

### APPLICANT

Marathon Oil Company seeks to increase by 40 feet the vertical limits of the authorized injection interval in its injection well No. 30 as set forth in Division Order R-9503.

Marathon Oil Company has obtained data including injectivity surveys which demonstrate that the injection interval of the subject well can be increased to allow Marathon the opportunity to recover additional oil in its project.

Approval of the increase will still provide adequate separation between the project and the Jalmat gas pool.

### OPPOSITION OR OTHER PARTY

N/A

**PROPOSED EVIDENCE**

APPLICANT

WITNESSES	EST. TIME	EXHIBITS
Eric Carlson Geologist	30 Minutes	Estimated 10 Exhibits in all
Don Price Petroleum Engineer	45 Minutes	

OPPOSITION

WITNESSES	EST. TIME	EXHIBITS
SEE OPPOSITION FILING, IF ANY		

**PROCEDURAL MATTERS**

Applicant hereby amends its original application to dismiss without prejudice the Injection Well #33 from the subject application.

KELLAHIN, KELLAHIN & AUBREY

By: 

W. Thomas Kellahin  
P.O. Box 2265  
Santa Fe, New Mexico 87504  
(505) 982-4285  
ATTORNEYS FOR APPLICANT

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/CCI 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.

Case No. 10269  
Order No. R-9503  
Page No. 8

(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.

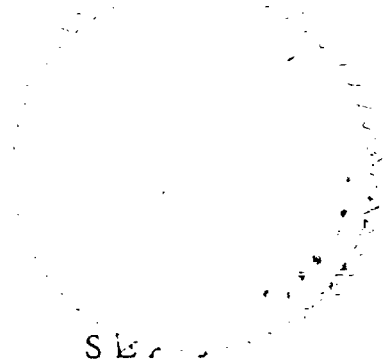
(11) The subject waterflood project is hereby designated the McDonald State A/C-1 Lease Waterflood Project and shall be governed by the provisions of Rules 701 through 708 of the Division Rules and Regulations.

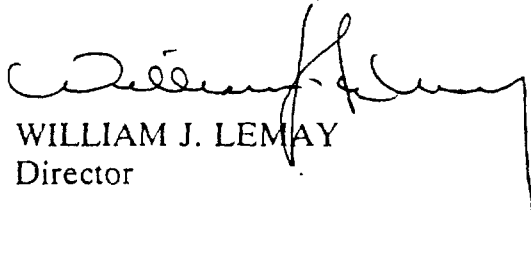
(12) Monthly progress reports of the waterflood project herein authorized shall be submitted to the Division in accordance with Rules 706 and 1115 of the Division Rules and Regulations.

(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, NM17M, 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

**EXHIBIT "C"**

**Offset Operators - McDonald State Account 1 Lease:**

ARCO Oil and Gas Company  
P.O. Box 1610  
Midland, Texas 79702

Conoco, Inc.  
P.O. Box 1959  
Midland, Texas 79702

Meridian Oil Inc.  
21 Desta Drive  
Midland, Texas 79701

Doyle Hartman  
P.O. Box 10426  
Midland, Texas 79701

Headington Oil  
7557 Rambler Road, Suite 1150  
Dallas, Texas 75231

Dallas McCasland  
P.O. Box 206  
Eunice, New Mexico 88231

**Surface Owners and Lessees:**

State of New Mexico  
c/o Commissioner of Public Lands  
P.O. Box 1148  
Santa Fe, New Mexico 87504

Dasco Land Corporation  
P.O. Box 2454  
Hobbs, New Mexico 88240

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. 10443  
Order No. R-9503-A

APPLICATION OF MARATHON OIL  
COMPANY TO AMEND DIVISION ORDER  
NO. R-9503, LEA COUNTY, NEW  
MEXICO.

ORDER OF THE DIVISION

BY THE DIVISION:

This cause came on for hearing at 8:15 a.m. on March 5, 1992 at Santa Fe, New Mexico, before Examiner David R. Catanach.

NOW, on this \_\_\_\_\_ day of April, 1992, 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) By Order No. R-9503 dated May 10, 1991, the Division authorized Marathon Oil Company to institute a waterflood project on its McDonald State A/C-1 Lease in portions of Sections 15 and 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 twelve injection wells (as more fully described in said Order No. R-9503).

(3) Order No. R-9503 further contained a provision whereby injection within the McDonald State A/C-1 Well Nos. 30, 31, 33, 34 and 40 was limited to that portion of the South Eunice Seven Rivers-Queen Pool extending from the top of the Queen formation to the top of the Grayburg formation.

(4) The vertical limits of the South Eunice Seven Rivers-Queen Pool in this area currently extend from 100 feet above the



top of the Queen formation to the top of the Grayburg formation. The lower vertical limit of the Jalmat Gas Pool in this area corresponds to the top of the South Eunice Seven Rivers-Queen Pool.

(5) The injection interval within the wells described in Finding No. (3) above was limited by the Division in order to provide protection to certain offset wells currently producing from the Jalmat Gas Pool from possible "watering out" of gas reserves within the Seven Rivers formation which may occur as a result of waterflood operations.

(6) The applicant, Marathon Oil Company (Marathon), seeks an amendment to Division Order No. R-9503 to authorize an increase in the injection interval in its McDonald State A/C-1 Well Nos. 30 and 33 located in Units L and I of said Section 16 to include the lowermost 46 feet of the Seven Rivers formation.

(7) At the time of the hearing, Marathon requested that the portion of the application requesting the extension of the injection interval in its McDonald State A/C-1 Well No. 33 be dismissed.

(8) In conformance with Ordering Paragraph No. (1) Subparts (c) and (d) of said Order No. R-9503, the applicant has obtained a cement bond log and has conducted an injectivity survey on the McDonald State A/C-1 Well No. 30.

(9) The results of both the cement bond log and the injectivity survey were presented by the applicant as evidence in this case. The cement bond log indicates good cement throughout both the South Eunice Seven Rivers-Queen and Jalmat Gas Pool intervals. The results of the injectivity survey indicate, however, the presence of a channel behind the 5 1/2-inch casing which extends from the top of the Queen formation at 3606 feet upward to an approximate depth of 3575 feet.

(10) The applicant presented additional geologic and engineering evidence and testimony which indicates that:

a) the channel within the subject well does not appear to extend any higher than 3575 feet;

b) the interval from approximately 3571 feet to 3580 feet in the subject well is a sand member of the Seven Rivers formation identified by the applicant as the Lower Seven Rivers "A" Zone. This interval has good lateral continuity and, according to core data obtained from ARCO Oil & Gas Company's McDonald "WN" State Well No. 15 located in Unit L of Section 15, this interval is predominantly oil bearing;

c) the interval between the base of the Jalmat Gas Pool and the top of the Seven Rivers "A" Zone contains very little porosity or permeability;

d) the Marathon operated McDonald State A/C-1 Well Nos. 8, 9 and 10 which offset the subject injection well to the southwest, northwest and northeast, respectively, are currently open in the lower Seven Rivers interval. In addition, Marathon currently operates the McDonald State A/C-1 Well No. 6 which is located to the southeast of the subject injection well and which is currently completed in the Jalmat Gas Pool.

(11) The evidence presented indicates that injection into the Seven Rivers "A" Zone should not have any adverse affect on Jalmat Gas Pool production in this area, and, any fluid injected into the Seven Rivers "A" Zone should be effectively confined to said zone.

(12) The completion intervals within the McDonald State A/C-1 Well Nos. 8, 9 and 10 should provide a pressure sink whereby the Seven Rivers "A" Zone will not pressure up as a result of fluid injection.

(13) The applicant has supplied copies of the bond log and injection survey run on the subject well and has notified Doyle Hartman and ARCO Oil & Gas Company of its proposal in this case. Neither Doyle Hartman nor ARCO Oil & Gas Company, both of whom operate offset Jalmat Gas wells, appeared at the hearing in opposition to the application.

(14) No other offset operator appeared at the hearing in opposition to the application.

(15) Approval of the application will afford the applicant the opportunity to effectively conduct waterflood operations, will not cause the waste of gas reserves within the Jalmat Gas Pool, and will not violate correlative rights.

(16) The applicant should be required to conduct an injectivity survey on the subject well on an annual basis in order to assure that the injected fluid is being effectively confined to the injection interval approved herein.

(17) In addition, the applicant should be required to conduct an injectivity survey on the subject well any time an injection pressure increase is sought and a step rate test is conducted.

(18) The applicant should be required to furnish copies of any injectivity surveys conducted on the subject well to Doyle Hartman, ARCO Oil & Gas Company, and to the Santa Fe office of the Division.

IT IS THEREFORE ORDERED THAT:

(1) The applicant, Marathon Oil Inc, is hereby authorized to expand the injection interval in its McDonald State A/C-1 Well No. 30 located 1390 feet from the South line and 1260 feet from the West line (Unit L) of Section 16, Township 22 South, Range 36 East, NMPM, Lea County, New Mexico, to include the entire interval from

3560 feet to 3850 feet.

(2) The applicant shall conduct an injectivity survey on the subject well on an annual basis in order to assure that the injected fluid is being effectively confined to the injection interval approved herein.

(3) In addition, the applicant shall conduct an injectivity survey on the subject well any time an injection pressure increase is sought and a step rate test is conducted.

(4) The applicant shall furnish copies of any injectivity surveys conducted on the subject well to Doyle Hartman, ARCO Oil & Gas Company, and to the Santa Fe office of the Division. *and*

(5) All other provisions contained within Division Order No. R-9503 not inconsistent or in conflict herewith shall remain in full force and effect.

(6) The portion of the application requesting the extension of the injection interval in the McDonald State A/C-1 Well No. 33 is hereby dismissed.

(7) Jurisdiction is hereby 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

S E A L