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OF COUNSEL

TELEPHONE (505) 982-4285
TELEFAX (505) 982-2047

February 26, 1991

HAND DELIVERED

Mr. William J. LeMay
Oil Conservation Division
P. O. Box 2088
Santa Fe, New Mexico 87504

Re: Application of Marathon Oil Company for a Waterflood Project, including authority for unorthodox well locations and increased surface injection pressure limitation, Lea County, New Mexico.

Dear Mr. LeMay:

On behalf of Marathon Oil Company, please find enclosed our application and accompanying Division Form C-108 seeking authority to institute a waterflood operation on its McDonald State A/C 1 Lease in the South Eunice Pool, Lea County, New Mexico.

By copy of this letter and application, sent certified mail, we are notifying all interested parties of their right to appear at the hearing and participate in this case,. including the right to present evidence either in support of or in opposition to the application.

Very truly yours,

W. Thomas Kellahin

cc: Thomas C. Lowry, Esq

cc: Certified Mailing:
Notice list set forth
on Exhibit C of Application

10269

10269

STATE OF NEW MEXICO

ENERGY, MINERALS AND NATURAL RESOURCES DEPARTMENT

OIL CONSERVATION DIVISION

RECEIVED

FEB 26 1991

OIL CONSERVATION DIV.
SANTA FE

IN THE MATTER OF THE APPLICATION OF MARATHON OIL COMPANY FOR APPROVAL OF A LEASE WATERFLOOD PROJECT, INCLUDING THE DRILLING OF TWELVE INJECTION WELLS AT UNORTHODOX WELL LOCATIONS, AND INCREASE SURFACE INJECTION PRESSURE LIMITATION, LEA COUNTY, NEW MEXICO.

NO.

A P P L I C A T I O N

Comes now MARATHON OIL COMPANY, by and through its attorneys, and applies to the New Mexico Oil Conservation Division for authority to institute a leasehold waterflood project on its McDonald State A/C 1 lease consisting of 520 acres, more or less, and comprising the S/2, the NE/4, and the SE/4NW/4 of Section 16, T22S, R36E, Lea County, New Mexico by the injection of water into the South Eunice Pool (Seven Rivers-Queen), through the perforated interval from 3500 feet to 3800 feet in twelve injection wells as described in Exhibit B.

Applicant further seeks authority to inject water into each of the injection wells at a surface limitation pressure in excess of the 0.2 psi guideline (700 psi) but not in excess of 1400 psi surface pressure.

In support thereof would show:

1. Marathon Oil Company ("Marathon") is the current operator of the McDonald State A/C 1 lease located in the S/2, NE/4, SE/4NW/4 of Section 16, T22S, R36E, Lea County, New Mexico as shown on Exhibit A.

2. Marathon current operates the McDonald lease in which development began in 1930 in the Queen formation. By 1942, then Queen oil producers had been completed on the lease with the last development well drilled in 1977.

3. There is remaining secondary oil potential from the Queen formation in the South Eunice Pool under the McDonald lease which will not be recovered in the absence of waterflood operations.

4. The waterflood project plan of operations includes development on 40 acre five-spot pattern with twelve injection wells and six oil producing wells.

5. Marathon seeks approval of a leasehold waterflood project which includes the utilization of twelve injection wells, to be drilled at unorthodox well locations, as specifically identified and described on Exhibit B.

6. Marathon anticipates that the success of the waterflood project will require that the Division authorize Marathon to exceed the 0.2 psi per foot of depth Division guideline to a maximum surface injection pressure of 1400 psig.

7. Marathon requests an administrative procedure be established for the waterflood project area to allow for the amendment of the location of either injection or producing wells in the event such changes in location are deemed necessary by the operator.

8. Marathon requests that the waterflood be designated the Marathon Oil Company's McDonald State A/C 1 Lease Waterflood Project.

9. Enclosed with this application is the completed Division Form C-108 with attachments for this project.

10. In accordance with Division notice requirements, copies of the application has been sent to those parties listed on Exhibit C notifying them that the Applicant requests that this matter be set for hearing on the Division Examiner Docket now set for March 21, 1991.

Wherefore, Marathon requests that this matter be set on the Division Examiner Docket and that after hearing the application be approved as requested.

RESPECTFULLY SUBMITTED BY:

W. Thomas Kellahin
Kellahin Kellahin & Aubrey
P. O. Box 2265
Santa Fe, New Mexico 87504

and

Thomas C. Lowry
Marathon Oil Company
P. O. Box 552
Midland, Texas 79702

PROPOSED INJECTION WELL LOCATIONS

MCDONALD STATE ACCOUNT 1 LEASE

WELL NO.	LOCATION	SECTION	TOWNSHIP, RANGE
30	1,390' FSL & 1,260' FWL	16	T-22-S, R-36-E
31	1,340' FSL & 2,620' FWL	16	T-22-S, R-36-E
32	1,340' FSL & 1,260' FEL	16	T-22-S, R-36-E
33	1,340' FSL & 10' FEL	16	T-22-S, R-36-E
34	2,620' FSL & 25' FEL	16	T-22-S, R-36-E
35	2,660' FSL & 1,310' FEL	16	T-22-S, R-36-E
36	2,620' FSL & 2,650' FWL	16	T-22-S, R-36-E
37	2,620' FSL & 1,330' FWL	16	T-22-S, R-36-E
40	1,340' FNL & 25' FEL	16	T-22-S, R-36-E
41	1,340' FNL & 1,310' FEL	16	T-22-S, R-36-E
42	1,340' FNL & 2,650' FWL	16	T-22-S, R-36-E
43	1,360' FNL & 1,330' FWL	16	T-22-S, R-36-E

OFFSET OPERATORS

MCDONALD STATE ACCOUNT 1 LEASE

ARCO Oil and Gas Company
Box 1610
Midland, Texas 79702

Wiser Oil Company
700 Petroleum Bldg.
Wichita Falls, Texas 76301

Conoco
P. O. Box 1959
Midland, Texas 79702

H. J. Rasmussen
6 Desta Dr. Suite 5850
Midland, Texas 79705

Meridian Oil
21 Desta Dr.
Midland, Texas 79701

OXY USA Incorporated
P. O. Box 1919
Midland, Texas 79702

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

Headington Oil
7557 Rambler Rd. Suite 1150
Dallas, Texas 75231

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

SURFACE OWNERS AND LESSEES

MCDONALD STATE ACCOUNT 1 LEASE

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

Dasco Land Corporation
P. O. Box 2545
Hobbs, New Mexico 88240

STATE OF NEW MEXICO
ENERGY AND MINERALS DEPARTMENT

OIL CONSERVATION DIVISION
POST OFFICE BOX 2088
STATE LAND OFFICE BUILDING
SANTA FE, NEW MEXICO 87501

FORM C-108
Revised 7-1-81

APPLICATION FOR AUTHORIZATION TO INJECT

I. Purpose: [X] Secondary Recovery [ ] Pressure Maintenance [ ] Disposal [ ] Storage
Application qualifies for administrative approval? [ ] yes [X] no

II. Operator: Marathon Oil Company

Address: P.O. Box 552, Midland, TX 79702

Contact party: Engineering Manager Phone: (915)682-1626

III. Well data: Complete the data required on the reverse side of this form for each well proposed for injection. Additional sheets may be attached if necessary.

IV. Is this an expansion of an existing project? [ ] yes [XX] no
If yes, give the Division order number authorizing the project _____.

V. Attach a map that identifies all wells and leases within two miles of any proposed injection well with a one-half mile radius circle drawn around each proposed injection well. This circle identifies the well's area of review.

* VI. Attach a tabulation of data on all wells of public record within the area of review which penetrate the proposed injection zone. Such data shall include a description of each well's type, construction, date drilled, location, depth, record of completion, and a schematic of any plugged well illustrating all plugging detail.

VII. Attach data on the proposed operation, including:

1. Proposed average and maximum daily rate and volume of fluids to be injected;
2. Whether the system is open or closed;
3. Proposed average and maximum injection pressure;
4. Sources and an appropriate analysis of injection fluid and compatibility with the receiving formation if other than reinjected produced water; and
5. If injection is for disposal purposes into a zone not productive of oil or gas at or within one mile of the proposed well, attach a chemical analysis of the disposal zone formation water (may be measured or inferred from existing literature, studies, nearby wells, etc.).

*VIII. Attach appropriate geological data on the injection zone including appropriate lithologic detail, geological name, thickness, and depth. Give the geologic name, and depth to bottom of all underground sources of drinking water (aquifers containing waters with total dissolved solids concentrations of 10,000 mg/l or less) overlying the proposed injection zone as well as any such source known to be immediately underlying the injection interval.

IX. Describe the proposed stimulation program, if any.

* X. Attach appropriate logging and test data on the well. (If well logs have been filed with the Division they need not be resubmitted.)

* XI. Attach a chemical analysis of fresh water from two or more fresh water wells (if available and producing) within one mile of any injection or disposal well showing location of wells and dates samples were taken.

XII. Applicants for disposal wells must make an affirmative statement that they have examined available geologic and engineering data and find no evidence of open faults or any other hydrologic connection between the disposal zone and any underground source of drinking water.

XIII. Applicants must complete the "Proof of Notice" section on the reverse side of this form.

XIV. Certification

I hereby certify that the information submitted with this application is true and correct to the best of my knowledge and belief.

Name: Dave J. Loran Title Engineering Manager, Midland Oper.

Signature: Dave J Loran Date: 2/22/91

* If the information required under Sections VI, VIII, X, and XI above has been previously submitted, it need not be duplicated and resubmitted. Please show the date and circumstance of the earlier submittal. _____

DISTRIBUTION: Original and one copy to Santa Fe with one copy to the appropriate Division district office.

III. WELL DATA

A. The following well data must be submitted for each injection well covered by this application. The data must be both in tabular and schematic form and shall include:

(1) Lease name; Well No.; location by Section, Township, and Range; and footage location within the section.

(2) Each casing string used with its size, setting depth, sacks of cement used, hole size, top of cement, and how such top was determined.

(3) A description of the tubing to be used including its size, lining material, and setting depth.

(4) The name, model, and setting depth of the packer used or a description of any other seal system or assembly used.

Division District offices have supplies of Well Data Sheets which may be used or which may be used as models for this purpose. Applicants for several identical wells may submit a "typical data sheet" rather than submitting the data for each well.

B. The following must be submitted for each injection well covered by this application. All items must be addressed for the initial well. Responses for additional wells need be shown only when different. Information shown on schematics need not be repeated.

(1) The name of the injection formation and, if applicable, the field or pool name.

(2) The injection interval and whether it is perforated or open-hole.

(3) State if the well was drilled for injection or, if not, the original purpose of the well.

(4) Give the depths of any other perforated intervals and detail on the sacks of cement or bridge plugs used to seal off such perforations.

(5) Give the depth to and name of the next higher and next lower oil or gas zone in the area of the well, if any.

XIV. PROOF OF NOTICE

All applicants must furnish proof that a copy of the application has been furnished, by certified or registered mail, to the owner of the surface of the land on which the well is to be located and to each leasehold operator within one-half mile of the well location.

Where an application is subject to administrative approval, a proof of publication must be submitted. Such proof shall consist of a copy of the legal advertisement which was published in the county in which the well is located. The contents of such advertisement must include:

(1) The name, address, phone number, and contact party for the applicant;

(2) the intended purpose of the injection well; with the exact location of single wells or the section, township, and range location of multiple wells;

(3) the formation name and depth with expected maximum injection rates and pressures; and

(4) a notation that interested parties must file objections or requests for hearing with the Oil Conservation Division, P. O. Box 2088, Santa Fe, New Mexico 87501 within 15 days.

NO ACTION WILL BE TAKEN ON THE APPLICATION UNTIL PROPER PROOF OF NOTICE HAS BEEN SUBMITTED.

NOTICE: Surface owners or offset operators must file any objections or requests for hearing of administrative applications within 15 days from the date this application was mailed to them.

ATTACHMENT TO FORM C-108

MARATHON'S MCDONALD STATE A/C 1 LEASE

SECTION

III. Well Data: See attached well diagram sheet for proposed injection well schematic and proposed tubular data. All injection wells will be newly drilled wells, no existing wells will be converted to injection service. The next higher zone productive of hydrocarbons in the area around the injection wells is the Jalmat Zone (Jalmat Field) at approximately 3,300'. The next lower zone productive of hydrocarbons in the area is the Strawn Sand (Langley Strawn Field) at approximately 9,900'.

V. Area of Review: See attached map.

VI. Well Data in Area of Review: See attached well data sheets.

VII. 1. Proposed average daily rate 4,800 BWPD, 400 BWPD/Well.
Proposed average maximum daily rate 6,000 BWPD, 500 BWPD/Well.

2. The proposed system will be closed.

3. Proposed average surface injection pressure 1,000 psig.
Proposed maximum surface injection pressure 1,400 psig.
(Note: Applicant is requesting surface injection pressures in excess of 0.2 psi/ft.

4. Injection Water Source: Capitan Reef (Texaco's Jal Water Supply System), Produced Water
Compatibility tests (see attached water analysis)

5. Not applicable.

VIII. Geologic Data Injection Zone: The proposed injection zone will be the bottom 100 feet of the Seven Rivers formation and the entire Queen formation. The productive intervals of the Seven Rivers and Queen formations are fine-grained, well cemented sandstones, interbedded with fine to medium crystalline gray dolomite. The injection interval occurs at a depth of 3,500 to 3,800 feet from the surface.

The underground source of drinking water overlying the zone of injection is the Ogallala, the bottom of which occurs at 215' in Section 16. There are no known sources of drinking water below the zone of injection.

IX. The stimulation program for the proposed injection wells will be to acidize with approximately 5,000 gals. Hydraulic fracturing with 5,000 to 10,000 gals. carrying 1-2 ppg of sand will be considered subject to injectivity testing.

X. Log and test data on each proposed injection well will be forwarded to the Commission as it is obtained.

XI. See attached water analysis sheets for freshwater wells shown on area of review map.

XII. Not applicable.

XIII. Proof of Notice: See attached letter of notice to surface owners, surface lessees and offset operators sent by registered mail and return receipts.

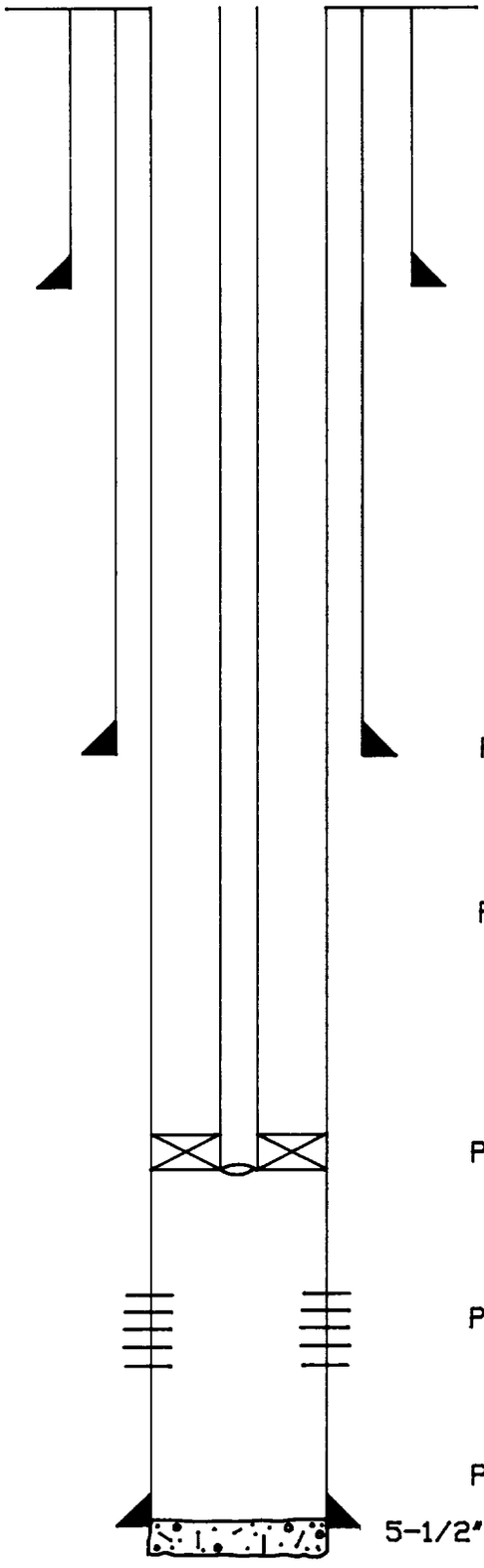
SRB/073.274/sk

TYPICAL
WELL DATA SHEET

MCDONALD STATE A/C 1
SECTION 16, T-22S, R-36E
LEA COUNTY, NEW MEXICO

MARATHON OIL COMPANY

TYPICAL PROPOSED WATER INJECTION WELL



PROPOSED CONDUCTOR CASING: 14", 42# SET @ 40'
CIRC CEMENT TO SURFACE

PROPOSED SURFACE CASING: 8-5/8",24# K-55 SET @ 450', CIRC CEMENT TO SURFACE.

PROPOSED TUBING: 2-7/8", 6.5# J-55 SET @ 3550'
PLASTIC LINED TUBING.

PROPOSED PACKER: BAKER AD-1 TENSION SET @ 3520'

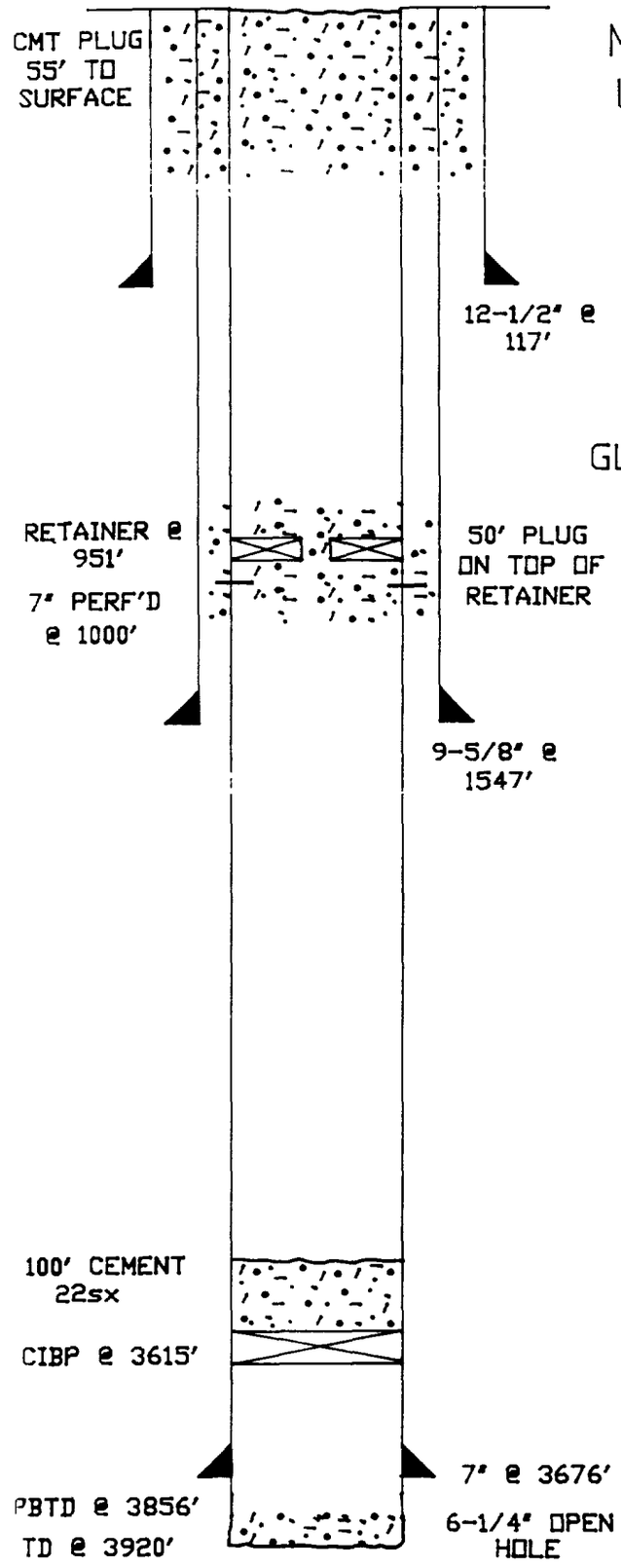
PROPOSED PERFS: 3650'-3750', 100-150 HOLES.

PROPOSED PRODUCTION CASING: 5-1/2", 15.5# K-55 SET @ 3900', CIRC. CEMENT TO SURFACE.

5-1/2"@ 3900'

PROPOSED INJECTION FORMATION: (LOWER SEVEN RIVERS QUEEN) 3500'-3850'.

WELL DATA SHEET



MCDONALD STATE A/C 1 NO. 4
UNIT P, 660' FSL & 660' FEL
SECTION 16, T-22S, R-36E
SOUTH EUNICE FIELD
LEA COUNTY, NEW MEXICO
PLUG AND ABANDONED

GL: 3552' KB: 3563' TD: 3920' PBTD: 3856'

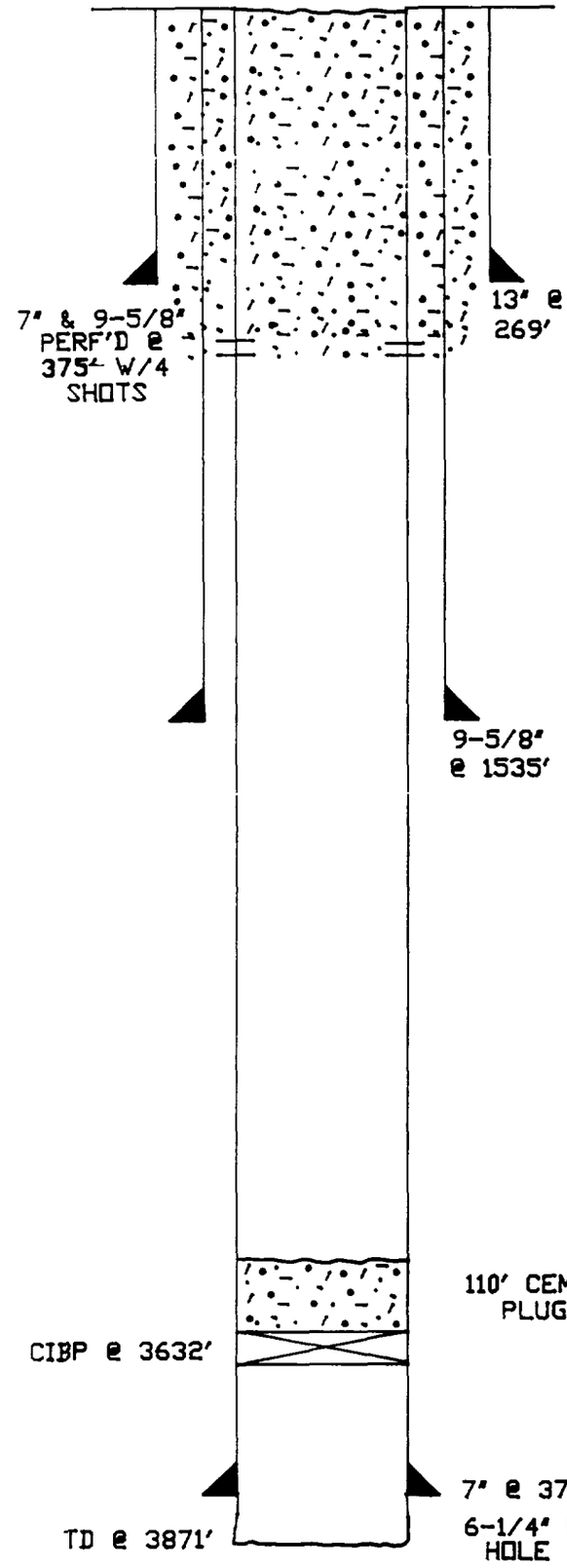
SURFACE CASING: 12-1/2",48# SET @ 117',CMT W/100sx

INTERMEDIATE: 9-5/8",40# SET @ 1547', CMT W/1200sx

PRODUCTION: 7",24# SET @ 3676', CMT W/400sx

HISTORY: THE MCDONALD STATE A/C 1 NO. 4 WAS DRILLED AND COMPLETED IN MARCH, 1936. IP 35 BOPD, 0 BWPD AND 25 MCFD. 3/38 WELL WAS PLUGGED BACK FROM 3920' TO 3856' IN OCTOBER, 1962 THIS WELL WAS P&A'D AS FOLLOWS: SET CAST IRON BRIDGE PLUG IN 7" CASING @ 3615'. SPOTTED 100' CMT PLUG FROM 3615' TO 3515' W/22sx. PERF'D 7" @ 1000'. SET CAST IRON CEMENT RETAINER @ 951'. CMT W/200sx AND HAD GOOD CEMENT RETURNS TO SURFACE, SPOTTED CEMENT PLUG FROM 55' TO SURFACE. CUT OFF 7" AND INSTALLED WELL MARKER.

WELL DATA SHEET



MCDONALD STATE A/C 1 NO. 7
UNIT O, 660' FSL & 1980' FEL
SECTION 16, T-22S, R-36E
SOUTH EUNICE FIELD
LEA COUNTY, NEW MEXICO
PLUG AND ABANDONED

GL: 3540' KB: 3551' TD: 3871'

CEMENT PLUG FROM 375' TO SURFACE, IN 7" AND 9-5/8" CASING.

SURFACE CASING: 13", 50# SET @ 269', CMT W/200sx

INTERMEDIATE: 9-5/8", 36# SET @ 1535', CMT W/500sx

PRODUCTION: 7", 24# SET @ 3710', CMT W/600sx

HISTORY: THE MCDONALD STATE A/C 1 WELL NO. 7 WAS DRILLED AND COMPLETED IN JULY 1937. IP 90 BOPD. IN OCTOBER, 1962 THIS WELL WAS P&A'D AS FOLLOWS: SET CIBP IN CSG @ 3632', SPOTTED 110' CEMENT PLUG ON TOP OF CIBP. PERF'D 7" W/4 HOLES @ 375'. APPEARED TO HAVE SHOT BOTH 7" AND 9-5/8" CSG. CIRCULATED CEMENT DOWN 7" AND GOT GOOD RETURNS THROUGH 7" AND 9-5/8" ANNULUS SPACE. CLOSED VALVE ON 9-5/8", CONTINUED CIRCULATING CEMENT AND GOT GOOD RETURNS THROUGH 9-5/8" SURFACE CSG ANNULUS SPACE. CUT OFF 7" CSG AND INSTALLED WELL MARKER.

WELL DATA

AREA OF REVIEW: MCDONALD STATE A/C 1 LEASE

OPERATOR-WELL NAME LOCATION	COMPLETION DATE	TD	PBTD	CASING SIZE	CASING DEPTH	CEMENT SACKS/TOP	PRODUCING INTERVAL	STIMULATION	CURRENT STATUS	REMARKS
Marathon McDonald State A/C 1 No. 3	6/35	3,819'	3,748'	13-3/8"	287'	300/Circ	3,581'-3,666'	A 2,000 gal	SI OW	
1,980' FSL and 1,980' FEL				9-5/8"	1,575'	400/732'Cal	3,686'-3,748' OH	A 4,900 gal		
Section 16, T-22-S, R-36-E				7"	3,686'	600/Circ				
Marathon McDonald State A/C 1 No. 4	4/36	3,920'	P&A	13-3/8"	117'	85/Circ	3,676'-3,920' OH	A 3,000 gal	P&A	Well Plugged in 1962
660' FSL and 660' FEL				9-5/8"	1,547'	1,200/Circ		A 3,000 gal		
Section 16, T-22-S, R-36-E				7"	3,676'	400/1944'Cal				
Marathon McDonald State A/C 1 No. 5	12/36	6,202'	3,605'	13-3/8"	270'	800/Circ	3,125'-3,460'	A 6,000 gal	SI GW	
1,980' FNL and 1,980' FWL				9-5/8"	1,453'	400/610'Cal	3,700'-3,813' OH	A 2,000 gal		
Section 16, T-22-S, R-36-E				7"	3,700'	400/1944'Cal		F 45,600 gal., 152,000#		
Marathon McDonald State A/C 1 No. 6	5/37	3,848'	3,635'	13-3/8"	260'	250/Circ	3,058'-3,530'	A 1,000 gal	GW	
660' FSL and 1,980' FWL				9-5/8"	1,619'	500/565' Cal		F 10,000 gal. oil, 10,000#		
Section 16, T-22-S, R-36-E				7"	3,657'	400/1901' Cal				
Marathon McDonald State A/C 1 No. 7	7/37	3,871'	P&A	13"	269'	200/Circ	3,710'-3,871' OH	A 3,000 gal	P&A	Well Plugged in 1962
660' FSL and 1,980' FEL				9-5/8"	1,535'	500/Circ		A 5,000 gal		
Section 16, T-22-S, R-36-E				7"	3,710'	600/Circ		A 8,000 gal		
Marathon McDonald State A/C 1 No. 8	9/37	3,850'	3,756'	13-3/8"	216'	200/Circ	3,526'-3,648'	A 1,000 gal	SI OW	
660' FSL and 660' FWL				9-5/8"	1,545'	600/Circ	3,667'-3,756'	A 6,500 gal		
Section 16, T-22-S, R-36-E				7"	3,667'	600/Circ				
Marathon McDonadl State A/C 1 No. 9	10/37	3,856'	3,856'	13-3/8"	208'	200/Circ	3,566'-3,634'	A 3,000 gal	OW	
1,980' FSL and 660' FWL				9-5/8"	1,513'	500/Circ	3,662'-3,856' OH	A 7,500 gal		
Section 16, T-22-S, R-36-E				7"	3,662'	300/2,345'Cal				

SRB/068.274/kp

WELL DATA

AREA OF REVIEW: MCDONALD STATE A/C 1 LEASE

OPERATOR-WELL NAME LOCATION	COMPLETION DATE	TD	PBTD	CASING SIZE	CASING DEPTH	CEMENT SACKS/TOP	PRODUCING INTERVAL	STIMULATION	CURRENT STATUS	REMARKS
Marathon McDonald State A/C 1 No. 10 1,980' FSL and 1,980' FWL Section 16, T-22-S, R-36-E	4/38	3,850'	3,768'	13-3/8" 9-5/8" 7" 5-1/2" (liner)	255' 1,509' 3,655' 3,597'- 3,846'	200/Circ 200/1088' Cal 500/Circ 68/3597'	3,682'-3,767'	F 10,000 gal oil, 7,500#	SI OW	
Marathon McDonald State A/C 1 No. 29 1,980 FSL and 660' FEL Section 16, T-22-S, R-36-E	4/77	3,997'	3,810'	8-5/8" 4-1/2"	349' 3,997'	410/Circ. 1,450'/Circ.	3,634'-3,806'	A 2,000 gal A 6,000 gal	OW	
Marathon McDonald A/C 1 No. 25 1,980' FNL and 660' FEL Section 16, T-22-S, R-36-E	1/42	3,953	3,654'	12-1/2" 8-5/8" 4-1/2"	191' 1,468' 3,712'	200/Circ 400/Circ 90/3,451' Cal	3,272'-3,422'	A 7,000 gal A 1,500 gal F 45,312 gal, (152,000#)	GW	4-1/2" casing cement squeezed in 19 pumping 325 sacks down 4-1/2"-8-5/8 annulus using tubing. Circulated.
Marathon McDonald State A/C 1-A No. 1 660- FSL and 990' FWL Section 15, T-22-S, R-36-E	5/55	3,910'	3,872'	10-3/4" 5-1/2"	362 3,909	200/Circ. 1,750/Circ	3,728'-3,836'	A 1,500 gal F 10,000 gal, 10,000#	OW	
Marathon McDonald State A/C 1-A No. 2 1,980' FSL and 1,980' FWL Section 15, T-22-S, R-36-E	6/55	3,920'	3,919'	9-5/8" 7"	390 3,919	200/Circ. 1,750/Circ.	3,795'-3,911'	A 750 gal F 7,500 gals, 7,500# A 2,200 gal F 36,000 gal, 49,500#	OW	
Marathon McDonald State A/C 1-A No. 3 1,980' FNL and 66' FWL Section 15, T-22-S, R-36-E	8/55	3,905'	3,856'	9-5/8" 7"	394 3,905'	250/Circ. 190/2,950'	3,787'-3,854'	A 500 gals F 7,500 gals, 7,500# F 40,000 gals, 60,000#	OW	

SRB/068.274/kp

WELL DATA

AREA OF REVIEW: MCDONALD STATE A/C 1 LEASE

OPERATOR-WELL NAME LOCATION	COMPLETION DATE	TD	PBTD	CASING SIZE	CASING DEPTH	CEMENT SACKS/TOP	PRODUCING INTERVAL	STIMULATION	CURRENT STATUS	REMARKS
Marathon McDonald State A/C 1-A No. 4 660' FNL and 660' FWL Section 15, T-22-S, R-36-E	1/56	3,907'	3,868'	9-5/8" 7"	422' 3,906'	300/Circ. 200/3,205'	3,727'-3,830' 3,727'-3,830'	A 500 gal F 10,000 gal, 10,000# F 10,000 gal, 15,000#	OW	
Marathon Maxwell State No. 1 660' FNL and 1,980' FWL Section 16, T-22-S, R-36-E	9/35	3,926'	3,926'	16" 8-5/8" 7"	120' 1,521' 3,709'	105/Circ 1,000/Circ 600/Circ	3,709'-3,926' OH	A 1,000 gal A 3,000 gal	SI OW	
ARCO McDonald State "WN" No. 23 660' FNL and 1,980' FWL Section 15, T-22-S, R-36-E	5/74	3,710'	3,695'	7-5/8" 4-1/2"	429' 3,710'	250/Surf Cal 500/1320' Cal	3,320'-3,667'	A 2,000 gal F 45,000 gal, 32,000#	GW	
ARCO McDonald State "WN" No. 15 1,650' FSL and 330' FWL Section 15, T-22-S, R-36-E	12/30	3,900'	3,493'	20" 16" 10" 8-5/8" 6-5/8"	255' 542' 1,570' 3009' 3813'	25/230' Cal 75/361' Cal 150/1449' Cal 275/1570' Cal 25/3646' Cal	3,400'-3,493'		GW	Originally Marathon's McD No. 1
Wiser Oil Co. Shell "A" State No. 1 660' FNL and 660 FWL Section 16, T-22-S, R-36-E	5/37	3,872'	3,872'	13-3/8" 9-5/8" 7"	243' 1,467' 3,675'	100/148' Cal 450/519' Cal 250/2577' Cal	3,553'-3,628' 3,675'-3,872' OH	A 1,000 gal F 10,000 gal, 15,000#	OW	
Conoco State "E" No. 9 1,980 FNL and 660' FWL Section 16, T-22-S, R-36-E	8/37	3,868'	3,845'	10-3/4" 7-5/8" 5-1/2"	240' 1,531' 3,663'	175/Surf Cal 425/225' Cal 425/304' Cal	3,663'-3,845' OH	A 1,500 gal A 1,500 gal A 5,000 gal A 5,000 gal	OW	
H. J. Rasmussen State "A" A/C 1 No. 70 1,295 FSL and 1,295' FEL Section 8, T-22-S, R-36-E	11/83	3,900'	3,900'	8-5/8" 5-1/2"	573' 3,900'	375/Surf Cal 950/281' Cal	3,752'-3,889'	A 2,300 gal A 2,000 gal A 2,300 gal A 1,600 gal	SI WIW	
H. J. Rasmussen State "A" A/C 2 No. 55 660' FSL and 660' FEL Section 8, T-22-S, R-36-E	4/61	3,850'	3,840'	8-5/8" 5-1/2"	322' 3,850'	300/Surf Cal 250/2898' Cal	3,774'-3,835'	F 20,000 Gal, 20,000#	SI OW	

WELL DATA

AREA OF REVIEW: MCDONALD STATE A/C 1 LEASE

OPERATOR-WELL NAME LOCATION	COMPLETION DATE	TD	PBTD	CASING SIZE	CASING DEPTH	CEMENT SACKS/TOP	PRODUCING INTERVAL	STIMULATION	CURRENT STATUS	REMARKS
H. J. Rasmussen State "A" A/C 2 No. 72 1,410' FSL and 1,440' FWL Section 9, T-22-S, R-36-E	3/84	3,900'	3,670'	8-5/8" 5-1/2"	598' 3,900'	375/Surf Cal. 950/281' Cal.	3,135'-3,359'	A 1,500 gal F 42,000 gal, 65,000#	GW	
H. J. Rasmussen State "A" A/C 2 No. 4 660' FSL and 660' FWL Section 9, T-22-S, R-36-E	7/37	3,878'	3,878'	13-3/8" 8-5/8" 7"	245' 1,505' 3,640'	200/55' Cal. 600/546' Cal. 150/3069'Cal.	3,640'-3,878' OH		OW	
H. J. Rasmussen State "A" A/C 2 No. 71 1,295' FSL and 25' FWL Section 9, T-22-S, R-36-E	9/83	3,900'	3,890'	8-5/8" 5-1/2"	588' 3,900'	375/Surf Cal. 950/281' Cal.	3,763'-3,877'	A 1,800 gal A 3,000 gal	SI WIW	
H. J. Rasmussen State "A" A/C 2 No. 1 660' FSL and 1,974' FWL Section 9, T-22-S, R-36-E	7/35	3,835'	3,835'	13-3/8" 9-5/8" 7"	249' 1,498' 3,698'	200/59' Cal. 800/Surf Cal. 600/1064' Cal.	3,698'-3,835' OH	A 3,000 gals	TA OW	
ARCO State 157 "A" No. 1 660' FSL and 1,980' FEL Section 9, T-22-S, R-36-E	10/36	4,000'	3,700'	13-3/8" 8-5/8" 5-1/2"	224' 1,443' 3,731'	NA 400/803'Cal. 275/2683' Cal.	3,638'-3,673'	A 1,000 gal. F 20,000 gal, 30,000#	OW	
ARCO State 157 "A" No. 3 660' FSL and 660' FEL Section 9, T-22-S, R-36-E	5/58	3,850'	3,845'	8-5/8" 5-1/2"	330' 3,850'	250/Surf Cal. 200/3088' Cal.	3,656'-3,782'	F 20,000 gals, 20,000# A 1,000 gals F 18,000 gals, 30,000#	OW	
ARCO H.S. Record "WN" No. 2 560' FSL and 660' FWL Section 10, T-22-S, R-36-E	3/58	3,797'	3,796'	8-5/8" 5-1/2"	1,493' 3,796'	500/Surf Cal. 500/2044' Cal.	3,667'-3,795'	A 1,000 gals A 15,000 gals, 15,000# A 1,500 gals F 25,000 gals, 43,000#	OW	

SRB/068.274/kp

WELL DATA

AREA OF REVIEW: MCDONALD STATE A/C 1 LEASE

OPERATOR-WELL NAME LOCATION	COMPLETION DATE	TD	PBTD	CASING SIZE	CASING DEPTH	CEMENT SACKS/TOP	PRODUCING INTERVAL	STIMULATION	CURRENT STATUS	REMARKS
ARCO H. S. Record "WN" No. 5 860' FSL and 1,980' FWL Section 10, T-22-S, R-36-E	3/81	3,921'	3,880'	8-5/8" 5-1/2"	1,100' 3,921'	800/Surf Cal. 1,350'/Surf Cal.	3,690'-3,865'	A 1,000 gals F 38,250 gals, 87,000#	OW	
Meridian Oil, Inc. Citgo "SE" State No. 2 990' FNL and 330' FEL Section 17, T-22-S, R-36-E	7/77	3,900'	3,875'	8-5/8" 4-1/2"	442' 3,900'	300/Surf Cal. 950/1148' Cal.	3,645'-3,805'	A 5,000 gals F 53,000 gals, 90,000#	GW	
Oxy USA, State "H" No. 1 660' FNL and 660' FEL Section 17, T-22-S, R-36-E	10/37	3,914'	3,914'	13" 9-5/8" 7"	234' 1,471' 3,680'	25/28 Cal. 450/523 Cal. 200/2802' Cal.	3,680'-3,914' OH	A 4,000 gals	SI OW	
Meridian Oil Citgo "SE" State No. 1 2,310' FNL and 480' FEL Section 17, T-22-S, R-36-E	3/77	3,850'	3,810'	8-5/8" 4-1/2"	423' 3,850	225/Surf Cal. 1,550/Surf. Cal.	3,637'-3,791'	A 50,000 gals F 55,000 gals, 95,000#	GW	
Oxy USA State "H" No. 2 1,980' FNL and 660' FEL Section 17, T-22-S, R-36-E	10/55	3,815'	3,815'	8-5/8" 5-1/2"	1,427' 3,691	600/Surf Cal. 250/2739' Cal	3,470'-3,585' 3,691'-3,815' OH	A 500 gals F 6,000 gals, 6,000# A 500 gals F 15,000 gals, 15,000#	SI OW	
Conoco State "E" No. 2 1,980' FSL and 660' FEL Section 17, T-22-S, R-36-E	12/37	3,858'	3,858'	10-3/4" 7-5/8" 5-1/2"	291' 1,476' 3,714'	225/73' Cal. 450/93' Cal. 425/355' Cal.	3,672'-3,712' 3,714'-3,858' OH	A 1,000 gls A 3,780 Gals	OW	
Conoco State "E" No. 14 330' FSL and 660' FEL Section 17, T-22-S, R-36-E	3/89	9,700'		13-3/8" 8-5/8" 5-1/2"	1,365' 6,415' 6080'-9700' (Line)	1,300/130'Cal. 1,800/3537'Cal. 900/6271' Cal.	9,066'-9,530'	A 5,000 gals	OW	

SRB/068.274/kp

WELL DATA

AREA OF REVIEW: MCDONALD STATE A/C 1 LEASE

OPERATOR-WELL NAME LOCATION	COMPLETION DATE	TD	PBTD	CASING SIZE	CASING DEPTH	CEMENT SACKS/TOP	PERFORATED INTERVAL	STIMULATION	CURRENT STATUS	REMARKS
Conoco State "E" No. 1	9/37	3,842'	3,842'	10-3/4"	379'	285/64' Cal.	3,663'-3,842' OH	A 1,000 gals	OW	
660' FSL and 660 FEL				7-5/8"	1,495'	700/Surf. Cal.		A 2,000 gals		
Section 17, T-22-S, R-36-E				5-1/2"	3,663'	425/304'Cal.		A 5,000 gals		
ARCO Langley Boren No. 2	11/88	10,100	9,531'	13-3/8"	1,400'	1,175/284' Cal.	9,062'-9,612'	A 11,354 gals	OW	
330' FNL and 660' FEL				8-5/8"	6,405'	1,835/3471' Cal.				
Section 20, T-22-S, R-36-E				5-1/2"	6189'-10100' (Line)	975'/6386' Cal.				
Conoco SRQU No. 1	4/37	3,830'	3,830'	13-3/8"	211'	250/Surf Cal.	3,687'-3,830' OH	A 2,000 gals	WIW	
660' FNL and 660' FEL				9-5/8"	1,490'	400/647' Cal		A 4,000 gals		
Section 20, T-22-S, R-36-E				7"	3,687'	300/2370' Cal.		A 2,000 gals		
Doyle Hartman Boren & Greer Gas Com No. 3		3,600'		8-5/8"	457'	275/Surf Cal.	2,978'-2,986'	A 1,000 gals	TA GW	
660' FNL and 940' FEL	6/82			5-1/2"	3,600'	830/438' Cal.		F 6,000 gals, 34,000#		
Section 20, T-22-S, R-36-E										
Conoco SRQU No. 4	5/36	3,884'	3,884'	13-3/8"	203'	150/60' Cal.	3,689'-3,884' OH	A 4,000 gals.	WIW	
660' FNL and 660' FEL				9-5/8"	1,502'	450/554'Cal.				
Section 21, T-22-S, R-36-E				7"	3,688'	225/2700' Cal.				
Dallas McCasland Devonian Christmas #2	6/37	3,855'	3,360'	13-3/8"	192'	150/49' Cal.	3,120'-3,370'	A 5,000 gals	GW	
660' FNL and 1,980' FEL				9-5/8"	1,531'	375/741' Cal.				
Section 21, T-22-S, R-36-E				7"	3,688'	225/2700' Cal.				
Conoco SRQU No. 3	1/56	3,842	3,806'	8-5/8"	299'	300/Surf Cal.	3,768'-3,800'	F 10,000 gals, 10,000#	OW	
330' FNL and 1,650' FEL				5-1/2"	3,841'	750/984' Cal.				
Section 21, T-22-S, R-36-E										

SRB/068.274/kp

WELL DATA

AREA OF REVIEW: MCDONALD STATE A/C 1 LEASE

OPERATOR-WELL NAME LOCATION	COMPLETION DATE	TD	PBTD	CASING SIZE	CASING DEPTH	CEMENT SACKS/TOP	PERFORATED INTERVAL	STIMULATION	CURRENT STATUS	REMARKS
Conoco SRQU No. 2 660' FNL and 1,980' FWL Section 21, T-22-S, R-36-E	2/37	3,794'	3,794'	13-3/8" 9-5/8" 7"	202' 1,522' 3,693'	25/178' Cal. 450/574' Cal. 325/2226' Cal.	3,693'-3,794' OH	A 6,000 gals	WIW	
Doyle Hartman Boren & Greer No. 2 890' FNL and 1,780' FWL Section 21, T-22-S, R-36-E	6/78	3,800'	3,410'	8-5/8" 5-1/2"	450' 3,800'	280/Surf Cal. 450/2086' Cal.	3,178'-3,380'	F 43,840 gals, 43,500#	TA GW	
Doyle Hartman Boren & Greer Gas Com #1 660' FNL and 660' FWL Section 21, T-22-S, R-36-E	6/37	3,830'		13-3/8" 9-5/8" 7" 5"	214' 1,537' 2,923' 3,678'	200/24' Cal. 800/Surf Cal. 400/1167' Cal. 100/2904' Cal.			SI GW	
ARCO Langley Greer No. 2 890' FNL and 330' FWL Section 21, T-22-S, R-36-E	5/90	9,800'	9,350'	13-3/8" 8-5/8" 5-1/2"	394' 4,007' 9,800'	420/Surf Cal. 2,200/487' Cal. 1,415/4410' Cal.	9,006'-9,160'	A 2,250 gals	OW	
Conoco SRQU No. 66 330' FNL and 660' FWL Section 21, T-22-S, R-36-E	4/75	3,900'	3,884'	8-5/8" 5-1/2"	510' 3,900'	275/Surf Cal. 150/3329' Cal.	3,604'-3,815'	A 300 gals F 15,000 gals, 30,000#	OW	
Headington Oil Peerless, et al Com #1 660' FNL and 1,980' FWL Section 22, T-22-S, R-36-E	1/54	3,492'		9-5/8" 7"	1,600' 3,492'	750/19' Cal. 708/384' Cal.	3,350'-3,478'		GW	
Conoco SRQU No. 5 660' FNL and 660' FWL Section 22, T-22-S, R-36-E	10/35	3,844'	3,844'	13-3/8 9-5/8 7"	157' 1,560' 3,664'	NA 1,000/Surf Cal. 450/1688' Cal.	3,664'-3,844' OH	A 3,000 gals	OW	

SRB/068.274/kp

P O BOX 1468
MONAHANS, TEXAS 79756
PH 943-3234 OR 563-1040

Martin Water Laboratories, Inc.

709 W INDIANA
MIDLAND TEXAS 79701
PHONE 683-4521

RESULT OF WATER ANALYSES

LABORATORY NO. 191128

TO: Mr. Jim Keil
P. O. Box 552, Midland, TX 79702

SAMPLE RECEIVED 1-18-91

RESULTS REPORTED 1-18-91

COMPANY Marathon Oil Company LEASE McDonald Acct.

FIELD OR POOL

SECTION ___ BLOCK ___ SURVEY ___ COUNTY Lea STATE NM

SOURCE OF SAMPLE AND DATE TAKEN:

NO. 1 Produced water - taken from heater-treater @ #1-A. 1-18-91

NO. 2 Raw water - taken from Texaco Supply Line. 1-18-91

NO. 3

NO. 4

REMARKS:

CHEMICAL AND PHYSICAL PROPERTIES

	NO. 1	NO. 2	NO. 3	NO. 4
Specific Gravity at 60° F.	1.0265	1.0075		
pH When Sampled	6.8	6.8		
pH When Received	6.98	6.79		
Bicarbonate as HCO_3	1,781	1,098		
Supersaturation as $CaCO_3$	0	0		
Undersaturation as $CaCO_3$	--	--		
Total Hardness as $CaCO_3$	8,100	2,700		
Calcium as Ca	940	660		
Magnesium as Mg	1,397	255		
Sodium and/or Potassium	10,819	2,186		
Sulfate as SO_4	2,038	1,388		
Chloride as Cl	19,885	3,622		
Iron as Fe	0.04	0.08		
Barium as Ba	0	0		
Turbidity, Electric	38	261		
Color as Pt	25	20		
Total Solids, Calculated	36,861	9,209		
Temperature °F.	65	60		
Carbon Dioxide, Calculated	463	285		
Dissolved Oxygen,	0.000	*		
Hydrogen Sulfide	159	477		
Resistivity, ohms/m at 77° F.	0.220	0.750		
Suspended Oil	27	500		
Filtrable Solids as mg/l	22.3	71.4		
Volume Filtered, ml	750	650		

Results Reported As Milligrams Per Liter

Additional Determinations And Remarks *Unable to determine due to high oil content.

It is apparent in the turbidity readings of the mixtures that due to the substantial amount of oil in the supply water, they do not reflect what would be expected from any influence from compatibility but rather reflect oil separation at different rates. A careful examination of the analytical results has revealed no evidence of any potential incompatibility between these waters, therefore clearly indicating that no scaling potential or precipitation would be expected to result from combining these waters. We do note that the supply water has a rather high level of

- CONTINUED ON PAGE 2 -

Form No. 3

By ___

P O BOX 1468
MONAHANS, TEXAS 79756
PH 943-3234 OR 563-1040

Martin Water Laboratories, Inc.

709 W. INDIANA
MIDLAND, TEXAS 79701
PHONE 683-4521

RESULT OF WATER ANALYSES

LABORATORY NO. 191128 (Page 2)

TO: Mr. Jim Keil
P. O. Box 552, Midland, TX 79702

SAMPLE RECEIVED 1-18-91
RESULTS REPORTED 1-18-91

COMPANY Marathon Oil Company LEASE McDonald Acct.

FIELD OR POOL

SECTION ___ BLOCK ___ SURVEY ___ COUNTY Lea STATE NM

SOURCE OF SAMPLE AND DATE TAKEN:

NO. 1 Mixture of 25% Produced Water and 75% Supply Water.

NO. 2 Mixture of 50% Produced Water and 50% Supply Water.

NO. 3 Mixture of 75% Produced Water and 25% Supply Water.

NO. 4

REMARKS:

CHEMICAL AND PHYSICAL PROPERTIES	NO. 1	NO. 2	NO. 3	NO. 4
Specific Gravity at 60° F.				
pH When Sampled				
pH When Received				
Bicarbonate as HCO_3				
Supersaturation as $CaCO_3$				
Undersaturation as $CaCO_3$				
Total Hardness as $CaCO_3$				
Calcium as Ca				
Magnesium as Mg				
Sodium and/or Potassium				
Sulfate as SO_4				
Chloride as Cl				
Iron as Fe				
Barium as Ba				
Turbidity, Electric - actual	175	153	59	
Color as Pt				
Total Solids, Calculated				
Temperature °F.				
Carbon Dioxide, Calculated				
Dissolved Oxygen,				
Hydrogen Sulfide				
Resistivity, ohms/m at 77° F.				
Suspended Oil				
Filtrable Solids as mg/l				
Volume Filtered, ml				
Theoretical Compatible Turbidity	205	150	94	

Results Reported As Milligrams Per Liter

Additional Determinations And Remarks suspended oil, but we suspect this is at least partially the result of the sample point. However, some oil would be expected to be present in this supply water. We note in our microscopic examination of the suspended solids that the particles were all extremely fine material associated with the suspended oil. Therefore, the level of the filtrable solids is of questionable significance in regard to injection quality.

Form No. 3

By W. C. Martin

Waylan C. Martin, M.A.

P O BOX 1468
MONAHANS, TEXAS 79756
PH. 943-3234 OR 563-1040

Martin Water Laboratories, Inc.

709 W INDIANA
MIDLAND, TEXAS 79701
PHONE 683-4521

RESULT OF WATER ANALYSES

LABORATORY NO. 191127

TO: Mr. Jim Keil
P. O. Box 552, Midland, TX 79702

SAMPLE RECEIVED 1-15-91
RESULTS REPORTED 1-18-91

COMPANY Marathon Oil Company LEASE McDonald Acct. #1

FIELD OR POOL

SECTION ___ BLOCK ___ SURVEY ___ COUNTY Lea STATE NM

SOURCE OF SAMPLE AND DATE TAKEN:

NO. 1 Raw water - taken from North Ranch water well. 1-15-91

NO. 2 Raw water - bailed from South Ranch water well. 1-15-91

NO. 3

NO. 4

REMARKS: Samples taken by Tom Elrod, Martin Water Laboratories, Inc.

CHEMICAL AND PHYSICAL PROPERTIES

	NO. 1	NO. 2	NO. 3	NO. 4
Specific Gravity at 60° F.	1.0019	1.0023		
pH When Sampled				
pH When Received	7.50	7.39		
Bicarbonate as HCO_3	249	57		
Supersaturation as $CaCO_3$				
Undersaturation as $CaCO_3$				
Total Hardness as $CaCO_3$	300	485		
Calcium as Ca	80	102		
Magnesium as Mg	24	56		
Sodium and/or Potassium	96	150		
Sulfate as SO_4	92	3		
Chloride as Cl	148	540		
Iron as Fe	0.22	40.0		
Barium as Ba				
Turbidity, Electric				
Color as Pt				
Total Solids, Calculated	689	908		
Temperature °F.				
Carbon Dioxide, Calculated				
Dissolved Oxygen,				
Hydrogen Sulfide	0.0	0.0		
Resistivity, ohms/m at 77° F.	10.44	5.24		
Suspended Oil				
Filtrable Solids as mg/l				
Volume Filtered, ml				
Nitrate, as N	0.5	0.7		

Results Reported As Milligrams Per Liter

Additional Determinations And Remarks: The undersigned certifies the above to be true and correct to the best of his knowledge and belief.

Form No. 3

By W. C. Martin

Waylan C. Martin, M.A.