



**NEW MEXICO ENERGY, MINERALS
& NATURAL RESOURCES DEPARTMENT**

OIL CONSERVATION DIVISION
2040 South Pacheco Street
Santa Fe, New Mexico 87505
(505) 827-7131

ADMINISTRATIVE ORDER NO. WFX-761

***APPLICATION OF W.A. & E.R. HUDSON, INC. TO EXPAND ITS WATERFLOOD PROJECT
IN THE MALJAMAR GRAYBURG-SAN ANDRES POOL IN EDDY COUNTY, NEW MEXICO***

**ADMINISTRATIVE ORDER
OF THE OIL CONSERVATION DIVISION**

Under the provisions of Division Order No. R-2239, W.A. & E.R. Hudson, Inc. has made application to the Division on April 7, 2000, with additional information on May 11 and 12, 2000, for permission to expand its Waterflood Project in the Maljamar Grayburg-San Andres Pool in Eddy County, New Mexico.

THE DIVISION DIRECTOR FINDS THAT:

- (1) The application has been filed in due form.
- (2) Satisfactory information has been provided that all offset operators have been duly notified of the application.
- (3) No objection has been received within the waiting period as prescribed by Rule 701(B).
- (4) The proposed injection well is eligible for conversion to injection under the terms of Rule 701.
- (5) The proposed expansion of the above referenced Waterflood Project will not cause waste nor impair correlative rights.
- (7) The application should be approved.

IT IS THEREFORE ORDERED THAT:

The applicant, W.A. & E.R. Hudson, Inc. be and the same is hereby authorized to inject water into the San Andres and Grayburg formations at approximately 3300 feet to approximately 3,899 feet through 2 3/8-inch plastic lined tubing set in a packer located within 100 feet of the uppermost injection perforations in the following described well for purposes of secondary recovery to wit:

Puckett Federal Well No. A-8
API No. 30-015-5384
1980 FSL & 660 FWL, Unit 'L'
Injection Interval (Openhole): 3,300 feet to 3,899 feet
Maximum Injection Pressure: (.2 psi/ft) 660 psig

Located in Section 24, Township 17 South, Range 31 East, Eddy County, New Mexico.

IT IS FURTHER ORDERED THAT:

The operator shall take all steps necessary to ensure that the injected water enters only the proposed injection interval and is not permitted to escape to other formations or onto the surface.

Prior to commencing injection operations into the well, the casing shall be pressure tested from the surface to the packer setting depth to assure the integrity of said casing.

The casing-tubing annulus shall be loaded with an inert fluid and equipped with a pressure gauge at the surface or left open to the atmosphere to facilitate detection of leakage in the casing, tubing or packer.

The injection well or system shall be equipped with a pressure limiting device which will limit the wellhead pressure on the injection well to .2 psi per foot of depth to the uppermost injection perforation.

The Director of the Division may authorize an increase in injection pressure upon a proper showing by the operator of said well that such higher pressure will not result in migration of the injected fluid from the Grayburg and San Andres formations. Such proper showing shall consist of a valid step-rate test run in accordance with and acceptable to this office.

The operator shall notify the supervisor of the Artesia district office of the Division of the date and time of the installation of injection equipment and of the mechanical integrity tests so that the same may be inspected and witnessed.

The operator shall immediately notify the supervisor of the Artesia district office of the Division of the failure of the tubing, casing or packer in said well and shall take such steps as may be timely and necessary to correct such failure or leakage.

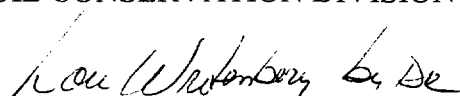
The subject well shall be governed by all provisions of Division Order No. R-2239 and Rules 702-706 of the Division Rules and Regulations not inconsistent herewith.

PROVIDED FURTHER THAT, jurisdiction is retained by the Division for the entry of such further orders as may be necessary for the prevention of waste and/or protection of correlative rights or upon failure of the operator to conduct operations (1) to protect fresh water or (2) consistent with the requirements in this order, whereupon the Division may, after notice and hearing, terminate the injection authority granted herein.

The injection authority granted herein shall terminate one year after the effective date of this order if the operator has not commenced injection operations into the subject well, provided however, the Division, upon written request by the operator, may grant an extension thereof for good cause shown.

DONE at Santa Fe, New Mexico, on this 12th day of May, 2000.

STATE OF NEW MEXICO
OIL CONSERVATION DIVISION



LORI WROTENBERY
Director

S E A L

LW/MWA/kv

cc: Oil Conservation Division - Artesia
U.S. Bureau of Land Management - Carlsbad
Case File No. 2536 /



NEW MEXICO ENERGY, MINERALS and NATURAL RESOURCES DEPARTMENT

GARY E. JOHNSON
Governor
Jennifer A. Salisbury
Cabinet Secretary

Lori Wrotenbery
Director
Oil Conservation Division

ADMINISTRATIVE ORDER NO. WFX-762

***APPLICATION OF THE WISER OIL COMPANY TO EXPAND ITS WATERFLOOD
PROJECT IN THE GRAYBURG JACKSON SEVEN RIVERS-QUEEN-GRAYBURG-SAN
ANDRES POOL IN EDDY COUNTY, NEW MEXICO***

**ADMINISTRATIVE ORDER
OF THE OIL CONSERVATION DIVISION**

Under the provisions of Division Orders No. R-2900 and R-3214, as amended, The Wiser Oil Company has made application to the Division on May 12, 2000 for permission to expand its Skelly Unit Waterflood Project in the Grayburg Jackson Seven Rivers-Queen-Grayburg-San Andres Pool in Eddy County, New Mexico.

THE DIVISION DIRECTOR FINDS THAT:

- (1) The application has been filed in due form.
- (2) Satisfactory information has been provided that all offset operators have been duly notified of the application.
- (3) No objection has been received within the waiting period as prescribed by Rule 701(B).
- (4) The proposed injection well is eligible for conversion to injection under the terms of Rule 701.
- (5) The proposed expansion of the above referenced Waterflood Project will not cause waste nor impair correlative rights.
- (7) The application should be approved.

IT IS THEREFORE ORDERED THAT:

The applicant, The Wiser Oil Company be and the same is hereby authorized to inject water into the Grayburg and San Andres formations at approximately 3,288 feet to approximately 3,866

feet through 2 3/8-inch plastic lined tubing set in a packer located within 100 feet of the uppermost injection perforations in the following described well for purposes of secondary recovery to wit:

Skelly Unit Well No. 70
API No. N/A
1980 FSL & 660 FEL, Unit 'I'
Injection Interval: 3,288 feet to 3,866 feet
Maximum Injection Pressure: (.2 psi/ft) 658 psig

Located in Section 23, Township 17 South, Range 31 East, Eddy County, New Mexico.

IT IS FURTHER ORDERED THAT:

The operator shall take all steps necessary to ensure that the injected water enters only the proposed injection interval and is not permitted to escape to other formations or onto the surface.

Prior to commencing injection operations into the well, the casing shall be pressure tested from the surface to the packer setting depth to assure the integrity of said casing.

The casing-tubing annulus shall be loaded with an inert fluid and equipped with a pressure gauge at the surface or left open to the atmosphere to facilitate detection of leakage in the casing, tubing or packer.

The injection well or system shall be equipped with a pressure limiting device which will limit the wellhead pressure on the injection well to .2 psi per foot of depth to the uppermost injection perforation.

The Director of the Division may authorize an increase in injection pressure upon a proper showing by the operator of said well that such higher pressure will not result in migration of the injected fluid from the Grayburg and San Andres formations. Such proper showing shall consist of a valid step-rate test run in accordance with and acceptable to this office.

The operator shall notify the supervisor of the Artesia district office of the Division of the date and time of the installation of injection equipment and of the mechanical integrity tests so that the same may be inspected and witnessed.

The operator shall immediately notify the supervisor of the Artesia district office of the Division of the failure of the tubing, casing or packer in said well and shall take such steps as may be timely and necessary to correct such failure or leakage.

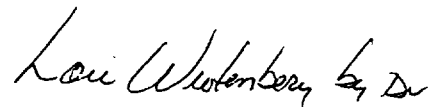
The subject well shall be governed by all provisions of Division Orders No. R-2900 and R-3214, as amended, and Rules 702-706 of the Division Rules and Regulations not inconsistent herewith.

PROVIDED FURTHER THAT, jurisdiction is retained by the Division for the entry of such further orders as may be necessary for the prevention of waste and/or protection of correlative rights or upon failure of the operator to conduct operations (1) to protect fresh water or (2) consistent with the requirements in this order, whereupon the Division may, after notice and hearing, terminate the injection authority granted herein.

The injection authority granted herein shall terminate one year after the effective date of this order if the operator has not commenced injection operations into the subject well, provided however, the Division, upon written request by the operator, may grant an extension thereof for good cause shown.

DONE at Santa Fe, New Mexico, on this 30th day of May, 2000.

STATE OF NEW MEXICO
OIL CONSERVATION DIVISION



LORI WROTENBERY
Director

S E A L

LW/MWA/kv

cc: Oil Conservation Division - Artesia
U.S. Bureau of Land Management - Carlsbad
Case File No. 3547 ✓
Bonita L.L. Jones, c/o J.O. Easley, Inc.



**NEW MEXICO ENERGY, MINERALS
& NATURAL RESOURCES DEPARTMENT**

OIL CONSERVATION DIVISION
2040 South Pacheco Street
Santa Fe, New Mexico 87505
(505) 827-7131

ADMINISTRATIVE ORDER NO. WFX-760

***APPLICATION OF CHEVRON U.S.A. PRODUCTION COMPANY TO EXPAND ITS
WATERFLOOD PROJECT IN THE ARROWHEAD-GRAYBURG POOL IN LEA
COUNTY, NEW MEXICO***

**ADMINISTRATIVE ORDER
OF THE OIL CONSERVATION DIVISION**

Under the provisions of Division Order No. R-9483, Chevron U.S.A. Production Company has made application to the Division on April 28, 2000 for permission to expand its Arrowhead Grayburg Waterflood Project in the Arrowhead Grayburg Pool in Lea County, New Mexico.

THE DIVISION DIRECTOR FINDS THAT:

- (1) The application has been filed in due form.
- (2) Satisfactory information has been provided that all offset operators have been duly notified of the application.
- (3) No objection has been received within the waiting period as prescribed by Rule 701(B).
- (4) The proposed injection wells are eligible for conversion to injection under the terms of Rule 701.
- (5) The proposed expansion of the above referenced waterflood project will not cause waste nor impair correlative rights.
- (6) The application should be approved.

IT IS THEREFORE ORDERED THAT:

The applicant, Chevron U.S.A. Production Company be and the same is hereby authorized to inject water into the Grayburg formation at approximately 3,436 feet to approximately 3,965 feet through 2 3/8-inch plastic lined tubing set in a packer located within 100 feet of the uppermost injection perforations in the following described well for purposes of secondary recovery to wit:

AGU Well No. 133

API No. 30-025-04939

1980 FSL & 660 FWL, Unit 'L'

Section 36, Township 21 South, Range 36 East, NMPM

Injection Interval: 3,755 feet to 3,800 feet

Maximum Injection Pressure: (.2 psi/ft) 751 psig

AGU Well No. 151

API No. 30-025-08738

660 FNL & 1980 FEL, Unit 'B'

Section 2, Township 22 South, Range 36 East, NMPM

Injection Interval: 3,436 feet to 3,965 feet

Maximum Injection Pressure: (.2 psi/ft) 687 psig

AGU Well No. 159

API No. 30-025-08723

1980 FNL & 1980 FWL, Unit 'F'

Section 1, Township 22 South, Range 36 East, NMPM

Injection Interval: 3,670 feet to 3,835 feet

Maximum Injection Pressure: (.2 psi/ft) 734 psig

Located in Lea County, New Mexico.

IT IS FURTHER ORDERED THAT:

The operator shall take all steps necessary to ensure that the injected water enters only the proposed injection interval and is not permitted to escape to other formations or onto the surface.

Prior to commencing injection operations into the well, the casing shall be pressure tested from the surface to the packer setting depth to assure the integrity of said casing.

The casing-tubing annulus shall be loaded with an inert fluid and equipped with a pressure gauge at the surface or left open to the atmosphere to facilitate detection of leakage in the casing, tubing or packer.

The injection well or system shall be equipped with a pressure limiting device which will limit the wellhead pressure on the injection wells to no greater than .2 psi per foot of depth to the uppermost injection perforations or casing shoe.

The Director of the Division may authorize an increase in injection pressure upon a proper showing by the operator of said well that such higher pressure will not result in migration of the injected fluid from the Grayburg formation. Such proper showing shall consist of a valid

step-rate test run in accordance with and acceptable to this office.

The operator shall notify 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 tests so that the same may be inspected and witnessed.

The operator shall immediately notify the supervisor of the Hobbs district office of the Division of the failure of the tubing, casing or packer in said wells and shall take such steps as may be timely and necessary to correct such failure or leakage.


The subject wells shall be governed by all provisions of Division Order No. R-9483 as amended and Rules 702-706 of the Division Rules and Regulations not inconsistent herewith.

PROVIDED FURTHER THAT, jurisdiction is retained by the Division for the entry of such further orders as may be necessary for the prevention of waste and/or protection of correlative rights or upon failure of the operator to conduct operations (1) to protect fresh water or (2) consistent with the requirements in this order, whereupon the Division may, after notice and hearing, terminate the injection authority granted herein.

The injection authority granted herein shall terminate one year after the effective date of this order if the operator has not commenced injection operations into the subject wells, provided however, the Division, upon written request by the operator, may grant an extension thereof for good cause shown.

DONE at Santa Fe, New Mexico, on this 15th day of May, 2000.

STATE OF NEW MEXICO
OIL CONSERVATION DIVISION



LORI WROTENBERY
Director

LW/MWA/kv

cc: Oil Conservation Division --Hobbs
Case File No. 10260 /



**Marathon
Oil Company**

P.O. Box 2490
Hobbs, New Mexico 88240
Telephone 505/393-7106

CASE # 10269
R-9503

CASE # 4616
R-4217

May 16, 2000

Mr. David Catanach
Energy and Minerals Department
Oil Conservation Division
P.O. Box 2088
Santa Fe, NM 87501-2088

Re: Drinkard Area Water Production

Dear Mr. Catanach:

Marathon Oil Company would like to inform the New Mexico Oil & Gas Division of its intent to take 128 BWPD from the leases listed below to the McDonald State A/C 1 Eunice Seven Rivers Queen Waterflood. Currently an average of 740 BWPD is injected in the waterflood. The waters tested positive for compatibility.

Leases effected: Lou Worthan, Mark Owen, L.G. Warlick, Walter Lynch, J.L. Muncy, William Turner, Dayton Hardy, Edith Butler A, Edith Butler B, & McDonald State A/C 1 Waterflood.

Producers			
Field	Zone	BWPD	BWPM
Brunson	Ellenburger	18	545
Drinkard	Abo	9	273
Drinkard	Blinebry	51	1535
Drinkard	Drinkard	15	445
Drinkard	Tubb	9	283
Eumont	Yates 7 Rivers Queen	1	15
Hare	Simpson	2	61
Penrose Skelly	Greyburg	1	15
S. Brunson Drinkard	Abo	6	172
Wantz	Abo	15	445
Wantz	Granite Wash	3	91
Total		128	3879
Injectors			
Eunice	Seven Rivers Queen	740	22422

Attached are water analyses from the batteries and water production by well. If additional information is necessary, please advise.

Sincerely,

Andrew J. Schwandt
Production Engineer
(505) 393-7106



P.O. Box 2490
Hobbs, New Mexico 88240
Telephone 505/393-7106

May 17, 2000

Mr. Chris Williams
District I Supervisor
Oil Conservation Division
P.O. Box 1980
Hobbs, NM 88240

Re: Drinkard Area Water Production

Dear Mr. Williams:

Marathon Oil Company would like to inform the New Mexico Oil & Gas Division of its intent to take 128 BWPD from the leases listed below to the McDonald State A/C 1 Eunice Seven Rivers Queen Waterflood. Currently an average of 740 BWPD is injected in the waterflood. The waters tested positive for compatibility.

Leases effected: Lou Worthan, Mark Owen, L.G. Warlick, Walter Lynch, J.L. Muncy, William Turner, Dayton Hardy, Edith Butler A, Edith Butler B, & McDonald State A/C 1 Waterflood.

Producers			
Field	Zone	BWPD	BWPM
Brunson	Ellenburger	18	545
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Penrose Skelly	Greyburg	1	15
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Wantz	Abo	15	445
Wantz	Granite Wash	3	91
Total		128	3879
Injectors			
Eunice	Seven Rivers Queen	740	22422

Attached are water analyses from the lease batteries and water production by well. If additional information is necessary, please advise.

Sincerely,

A handwritten signature in black ink, appearing to read 'Andrew J. Schwandt'.

Andrew J. Schwandt
Production Engineer
(505) 393-7106

Drinkard Water Disposal

Battery/Lease	Well No.	Field	Zone	BWPD	BWPM
L.G. Warlick	5	Brunson	Ellenburger	18	545
Total		Brunson	Ellenburger	18	545
Mark Owen	4	Drinkard	Abo	9	273
Total		Drinkard	Abo	9	273
Dayton Hardy	2	Drinkard	Blinebry	2	61
Dayton Hardy	3	Drinkard	Blinebry	1	15
Edith Butler A	1	Drinkard	Blinebry	1	30
Edith Butler B	1	Drinkard	Blinebry	2	51
Edith Butler B	2	Drinkard	Blinebry	3	76
J.L. Muncy	2	Drinkard	Blinebry	1	30
J.L. Muncy	3	Drinkard	Blinebry	0	0
J.L. Muncy	4	Drinkard	Blinebry	1	30
J.L. Muncy	5	Drinkard	Blinebry	1	30
J.L. Muncy	6	Drinkard	Blinebry	1	30
J.L. Muncy	11	Drinkard	Blinebry	4	121
Lou Worthan	4	Drinkard	Blinebry	0	0
Lou Worthan	5	Drinkard	Blinebry	7	212
Lou Worthan	9	Drinkard	Blinebry	0	0
Lou Worthan	12	Drinkard	Blinebry	1	30
Lou Worthan	19	Drinkard	Blinebry	3	91
Lou Worthan	21	Drinkard	Blinebry	0	0
Mark Owen	2	Drinkard	Blinebry	1	30
Mark Owen	3	Drinkard	Blinebry	3	91
Mark Owen	4	Drinkard	Blinebry	9	273
Mark Owen	9	Drinkard	Blinebry	2	61
Walter Lynch	4	Drinkard	Blinebry	2	61
Walter Lynch	5	Drinkard	Blinebry	1	30
Walter Lynch	6	Drinkard	Blinebry	1	30
Walter Lynch	8	Drinkard	Blinebry	0	0
William Turner	4	Drinkard	Blinebry	5	152
Total		Drinkard	Blinebry	51	1535
Dayton Hardy	3	Drinkard	Drinkard	1	15
Lou Worthan	10	Drinkard	Drinkard	1	30
Lou Worthan	13	Drinkard	Drinkard	1	30
Lou Worthan	14	Drinkard	Drinkard	1	20
Lou Worthan	15	Drinkard	Drinkard	2	61
Lou Worthan	17	Drinkard	Drinkard	1	15
Mark Owen	4	Drinkard	Drinkard	9	273
Total		Drinkard	Drinkard	15	445
Dayton Hardy	2	Drinkard	Tubb	2	61
Edith Butler B	1	Drinkard	Tubb	2	51
J.L. Muncy	1	Drinkard	Tubb	1	30
J.L. Muncy	6	Drinkard	Tubb	1	30
Lou Worthan	10	Drinkard	Tubb	1	30
Lou Worthan	11	Drinkard	Tubb	0	0
Lou Worthan	14	Drinkard	Tubb	1	20
Lou Worthan	16	Drinkard	Tubb	0	0
Lou Worthan	18	Drinkard	Tubb	0	0
Mark Owen	1	Drinkard	Tubb	0	0
Walter Lynch	4	Drinkard	Tubb	2	61
Total		Drinkard	Tubb	9	283
Dayton Hardy	1	Eumont	Yates 7 Rivers Queen	1	15
Total		Eumont	Yates 7 Rivers Queen	1	15
L.G. Warlick	6	Hare	Simpson	2	61
Total		Hare	Simpson	2	61
Dayton Hardy	1	Penrose Skelly	Greyburg	1	15
Total		Penrose Skelly	Greyburg	1	15
Edith Butler B	1	S. Brunson Drinkard	Abo	2	51
Edith Butler B	2	S. Brunson Drinkard	Abo	3	76
J.L. Muncy	3	S. Brunson Drinkard	Abo	0	0
J.L. Muncy	4	S. Brunson Drinkard	Abo	1	30
Walter Lynch	7	S. Brunson Drinkard	Abo	1	15
Total		S. Brunson Drinkard	Abo	6	172
Lou Worthan	13	Wantz	Abo	1	30
Lou Worthan	14	Wantz	Abo	1	20
Lou Worthan	15	Wantz	Abo	2	61
Lou Worthan	17	Wantz	Abo	1	15
Lou Worthan	20	Wantz	Abo	3	91
Mark Owen	7	Wantz	Abo	1	15
Mark Owen	8	Wantz	Abo	0	0
Mark Owen	9	Wantz	Abo	2	61
William Turner	4	Wantz	Abo	5	152
Total		Wantz	Abo	15	445
J.L. Muncy	5	Wantz	Granite Wash	1	30
J.L. Muncy	7	Wantz	Granite Wash	1	30
Lou Worthan	18	Wantz	Granite Wash	0	0
Mark Owen	7	Wantz	Granite Wash	1	15
Mark Owen	8	Wantz	Granite Wash	0	0
Walter Lynch	7	Wantz	Granite Wash	1	15
Total		Wantz	Granite Wash	3	91



NALCO/EXXON ENERGY CHEMICALS, L.P.

12205 W. County Rd. 125
Odessa, Texas 79765
(915) 563-2125

May 12, 2000

Mr. Andy Schwandt
Marathon Oil Company
Hobbs, NM.

RE: Drinkard Water Compatibility

Dear Andy,

At your request water analyses were performed on the Drinkard Area wells and tested for compatibility with the South Eunice and McDonald A/C 1 waterfloods. The waters were manually mixed in order to visually and analytically test for compatibility. Although the South Eunice water has a tendency for sulfate scale, it has not posed a problem to this point. With the low volume ratios expected, I do not see any problem mixing the Drinkard water with either of the two waterfloods.

The water analyses are attached for your review. Please let me know if additional testing is needed.

Thanks,

Mike Carson
Nalco/Exxon Energy Chemicals

MITCHELL ANALYTICAL LABORATORY

2638 Faudree
Odessa, Texas 79765-8538
561-5579

Water Analysis

Company.... Nalco/Exxon Energy Chemicals
Well # M. OWEN H/T
Lease..... MARATHON
Location...
Date Run... 05/08/2000
Lab Ref #.. 00-MAY-N06457

Sample Temp... 70.0
Date Sampled.. 05/03/2000
Sampled by.... Mike Carson
Employee #
Analyzed by... DANIEL

Dissolved Gasses

		Mg/L	Eq. Wt.	MEq/L
Hydrogen Sulfide	(H ₂ S)	9.00	16.00	0.56
Carbon Dioxide	(CO ₂)	10.00	22.00	0.45
Dissolved Oxygen	(O ₂)	Not Analyzed		

Cations

Calcium	(Ca++)	7,638.00	20.10	380.00
Magnesium	(Mg++)	2,147.20	12.20	176.00
Sodium	(Na+)	33,211.05	23.00	1,443.96
Barium	(Ba++)	Not Analyzed		
Manganese	(Mn++)	Not Analyzed		

Anions

Hydroxyl	(OH-)	Not Analyzed		
Carbonate	(CO ₃ =)	0.00	30.00	0.00
Bicarbonate	(HCO ₃ -)	122.20	61.10	2.00
Sulfate	(SO ₄ =)	1,150.00	48.80	23.57
Chloride	(Cl-)	70,077.00	35.50	1,974.00

Total Iron	(Fe)	1.14	18.60	0.06
Total Dissolved Solids		114,365.59		
Total Hardness As CaCO ₃		27,898.52		
Conductivity MICROMHOS/CM		230,000		

pH 6.600 Specific Gravity 60/60 F. 1.079

CaSO₄ Solubility @ 80 F. 30.77 MEq/L, CaSO₄ scale is unlikely

CaCO₃ Scale Index

70.0	-0.067
80.0	0.023
90.0	0.253
100.0	0.253
110.0	0.503
120.0	0.503
130.0	0.813
140.0	0.813
150.0	1.153

Nalco/Exxon Energy Chemicals

MITCHELL ANALYTICAL LABORATORY

2638 Faudree
Odessa, Texas 79765-8538
561-5579

Water Analysis

Company.... Nalco/Exxon Energy Chemicals
Well # WORTHAM H/T
Lease..... MARATHON
Location...
Date Run... 05/08/2000
Lab Ref #.. 00-MAY-N06458

Sample Temp... 70.0
Date Sampled.. 05/03/2000
Sampled by.... Mike Carson
Employee # ...
Analyzed by... DANIEL

Dissolved Gasses

		Mg/L	Eq. Wt.	MEq/L
Hydrogen Sulfide	(H ₂ S)	9.00	16.00	0.56
Carbon Dioxide	(CO ₂)	8.00	22.00	0.36
Dissolved Oxygen	(O ₂)	Not Analyzed		

Cations

Calcium	(Ca++)	5,306.40	20.10	264.00
Magnesium	(Mg++)	1,073.60	12.20	88.00
Sodium	(Na+)	32,643.49	23.00	1,419.28
Barium	(Ba++)	Not Analyzed		
Manganese	(Mn++)	Not Analyzed		

Anions

Hydroxyl	(OH-)	Not Analyzed		
Carbonate	(CO ₃ =)	0.00	30.00	0.00
Bicarbonate	(HCO ₃ -)	134.42	61.10	2.20
Sulfate	(SO ₄ =)	1,000.00	48.80	20.49
Chloride	(Cl-)	62,068.20	35.50	1,748.40

Total Iron	(Fe)	3.22	18.60	0.17
Total Dissolved Solids		102,246.33		
Total Hardness As CaCO ₃		17,667.76		
Conductivity MICROMHOS/CM		210,000		

pH 6.600 Specific Gravity 60/60 F. 1.071

CaSO₄ Solubility @ 80 F. 40.80 MEq/L, CaSO₄ scale is unlikely

CaCO₃ Scale Index

70.0	-0.294
80.0	-0.184
90.0	0.026
100.0	0.026
110.0	0.266
120.0	0.266
130.0	0.616
140.0	0.616
150.0	0.956

Nalco/Exxon Energy Chemicals

MITCHELL ANALYTICAL LABORATORY

2638 Faudree
Odessa, Texas 79765-8538
561-5579

Water Analysis

Company.... Nalco/Exxon Energy Chemicals
Well # WALTER LYNCH H/T
Lease..... MARATHON
Location...
Date Run... 05/08/2000
Lab Ref #.. 00-MAY-N06459

Sample Temp... 70.0
Date Sampled.. 05/03/2000
Sampled by.... Mike Carson
Employee # ...
Analyzed by... DANIEL

Dissolved Gasses

		Mg/L	Eq. Wt.	MEq/L
Hydrogen Sulfide	(H ₂ S)	9.00	16.00	0.56
Carbon Dioxide	(CO ₂)	13.00	22.00	0.59
Dissolved Oxygen	(O ₂)	Not Analyzed		

Cations

Calcium	(Ca++)	7,879.20	20.10	392.00
Magnesium	(Mg++)	2,244.80	12.20	184.00
Sodium	(Na+)	39,893.30	23.00	1,734.49
Barium	(Ba++)	Not Analyzed		
Manganese	(Mn++)	Not Analyzed		

Anions

Hydroxyl	(OH-)	Not Analyzed		
Carbonate	(CO ₃ =)	0.00	30.00	0.00
Bicarbonate	(HCO ₃ -)	134.42	61.10	2.20
Sulfate	(SO ₄ =)	1,150.00	48.80	23.57
Chloride	(Cl-)	81,089.10	35.50	2,284.20
Total Iron	(Fe)	1.21	18.60	0.07
Total Dissolved Solids		132,414.03		
Total Hardness As CaCO ₃		28,901.68		
Conductivity MICROMHOS/CM		292,500		

pH 6.500 Specific Gravity 60/60 F. 1.092

CaSO₄ Solubility @ 80 F. 30.55 MEq/L, CaSO₄ scale is unlikely

CaCO₃ Scale Index

70.0	0.018
80.0	0.108
90.0	0.338
100.0	0.338
110.0	0.598
120.0	0.598
130.0	0.898
140.0	0.898
150.0	1.238

Nalco/Exxon Energy Chemicals

MITCHELL ANALYTICAL LABORATORY

2638 Faudree
Odessa, Texas 79765-8538
561-5579

Water Analysis

Company.... Nalco/Exxon Energy Chemicals
Well # BUTLER B WATER TANK
Lease..... MARATHON
Location...
Date Run... 05/08/2000
Lab Ref #.. 00-MAY-N06460

Sample Temp... 70.0
Date Sampled.. 05/03/2000
Sampled by.... Mike Carson
Employee # ...
Analyzed by... DANIEL

Dissolved Gasses

		Mg/L	Eq. Wt.	MEq/L
Hydrogen Sulfide	(H ₂ S)	9.00	16.00	0.56
Carbon Dioxide	(CO ₂)	11.00	22.00	0.50
Dissolved Oxygen	(O ₂)	Not Analyzed		

Cations

Calcium	(Ca++)	6,271.20	20.10	312.00
Magnesium	(Mg++)	3,123.20	12.20	256.00
Sodium	(Na+)	48,526.47	23.00	2,109.85
Barium	(Ba++)	Not Analyzed		
Manganese	(Mn++)	Not Analyzed		

Anions

Hydroxyl	(OH-)	Not Analyzed		
Carbonate	(CO ₃ =)	0.00	30.00	0.00
Bicarbonate	(HCO ₃ -)	122.20	61.10	2.00
Sulfate	(SO ₄ =)	1,200.00	48.80	24.59
Chloride	(Cl-)	94,103.40	35.50	2,650.80
Total Iron	(Fe)	0.81	18.60	0.04
Total Dissolved Solids		153,367.28		
Total Hardness As CaCO ₃		28,483.12		
Conductivity MICROMHOS/CM		300,000		

pH 6.600 Specific Gravity 60/60 F. 1.107

CaSO₄ Solubility @ 80 F. 37.75 MEq/L, CaSO₄ scale is unlikely

CaCO₃ Scale Index

70.0	0.117
80.0	0.217
90.0	0.457
100.0	0.457
110.0	0.757
120.0	0.757
130.0	1.047
140.0	1.047
150.0	1.397

Nalco/Exxon Energy Chemicals

MITCHELL ANALYTICAL LABORATORY

2638 Faudree
Odessa, Texas 79765-8538
561-5579

Water Analysis

Company.... Nalco/Exxon Energy Chemicals
Well # BUTLER A WATER TANK
Lease..... MARATHON
Location...
Date Run... 05/08/2000
Lab Ref #... 00-MAY-N06461

Sample Temp... 70.0
Date Sampled.. 05/03/2000
Sampled by.... Mike Carson
Employee # ...
Analyzed by... DANIEL

Dissolved Gasses

		Mg/L	Eq. Wt.	MEq/L
Hydrogen Sulfide	(H ₂ S)	34.00	16.00	2.13
Carbon Dioxide	(CO ₂)	20.00	22.00	0.91
Dissovled Oxygen	(O ₂)	Not Analyzed		

Cations

Calcium	(Ca++)	6,271.20	20.10	312.00
Magnesium	(Mg++)	2,440.00	12.20	200.00
Sodium	(Na+)	51,084.75	23.00	2,221.08
Barium	(Ba++)	Not Analyzed		
Manganese	(Mn++)	Not Analyzed		

Anions

Hydroxyl	(OH-)	Not Analyzed		
Carbonate	(CO ₃ =)	0.00	30.00	0.00
Bicarbonate	(HCO ₃ -)	464.36	61.10	7.60
Sulfate	(SO ₄ =)	850.00	48.80	17.42
Chloride	(Cl-)	96,105.60	35.50	2,707.20
Total Iron	(Fe)	0.95	18.60	0.05
Total Dissolved Solids		157,270.86		
Total Hardness As CaCO ₃		25,682.00		
Conductivity MICROMHOS/CM		305,000		

pH 6.600

Specific Gravity 60/60 F. 1.109

CaSO₄ Solubility @ 80 F. 37.01 MEq/L, CaSO₄ scale is unlikely

CaCO₃ Scale Index

70.0	0.697
80.0	0.797
90.0	1.037
100.0	1.037
110.0	1.337
120.0	1.337
130.0	1.627
140.0	1.627
150.0	1.977

Nalco/Exxon Energy Chemicals

MITCHELL ANALYTICAL LABORATORY

2638 Faudree
Odessa, Texas 79765-8538
561-5579

Water Analysis

Company.... Nalco/Exxon Energy Chemicals

Well # MUNCY H/T

Lease..... MARATHON

Location...

Date Run... 05/08/2000

Lab Ref #.. 00-MAY-N06462

Sample Temp... 70.0

Date Sampled.. 05/03/2000

Sampled by.... Mike Carson

Employee # ...

Analyzed by... DANIEL

Dissolved Gasses

		Mg/L	Eq. Wt.	MEq/L
Hydrogen Sulfide	(H ₂ S)	17.00	16.00	1.06
Carbon Dioxide	(CO ₂)	16.00	22.00	0.73
Dissolved Oxygen	(O ₂)	Not Analyzed		

Cations

Calcium	(Ca++)	4,904.40	20.10	244.00
Magnesium	(Mg++)	2,342.40	12.20	192.00
Sodium	(Na+)	46,255.14	23.00	2,011.09
Barium	(Ba++)	Not Analyzed		
Manganese	(Mn++)	Not Analyzed		

Anions

Hydroxyl	(OH-)	Not Analyzed		
Carbonate	(CO ₃ =)	0.00	30.00	0.00
Bicarbonate	(HCO ₃ -)	171.08	61.10	2.80
Sulfate	(SO ₄ =)	900.00	48.80	18.44
Chloride	(Cl-)	86,094.60	35.50	2,425.20
Total Iron	(Fe)	1.43	18.60	0.08
Total Dissolved Solids		140,702.05		
Total Hardness As CaCO ₃		21,864.84		
Conductivity MICROMHOS/CM		265,000		

pH 6.800

Specific Gravity 60/60 F. 1.098

CaSO₄ Solubility @ 80 F. 45.32 MEq/L, CaSO₄ scale is unlikely

CaCO₃ Scale Index

70.0	0.217
80.0	0.307
90.0	0.537
100.0	0.537
110.0	0.797
120.0	0.797
130.0	1.097
140.0	1.097
150.0	1.437

Nalco/Exxon Energy Chemicals

MITCHELL ANALYTICAL LABORATORY

2638 Faudree
Odessa, Texas 79765-8538
561-5579

Water Analysis

Company.... Nalco/Exxon Energy Chemicals
Well # TURNER H/T
Lease..... MARATHON
Location...
Date Run... 05/08/2000
Lab Ref #.. 00-MAY-N06465

Sample Temp... 70.0
Date Sampled.. 05/03/2000
Sampled by.... Mike Carson
Employee # ...
Analyzed by... DANIEL

Dissolved Gasses

		Mg/L	Eq. Wt.	MEq/L
Hydrogen Sulfide	(H ₂ S)	41.00	16.00	2.56
Carbon Dioxide	(CO ₂)	9.00	22.00	0.41
Dissolved Oxygen	(O ₂)	Not Analyzed		

Cations

Calcium	(Ca++)	4,100.40	20.10	204.00
Magnesium	(Mg++)	1,659.20	12.20	136.00
Sodium	(Na+)	29,741.58	23.00	1,293.11
Barium	(Ba++)	Not Analyzed		
Manganese	(Mn++)	Not Analyzed		

Anions

Hydroxyl	(OH-)	Not Analyzed		
Carbonate	(CO ₃ =)	0.00	30.00	0.00
Bicarbonate	(HCO ₃ -)	391.04	61.10	6.40
Sulfate	(SO ₄ =)	2,300.00	48.80	47.13
Chloride	(Cl-)	56,061.60	35.50	1,579.20
Total Iron	(Fe)	0.52	18.60	0.03
Total Dissolved Solids		94,304.34		
Total Hardness As CaCO ₃		17,053.72		
Conductivity MICROMHOS/CM		175,000		

pH 6.800 Specific Gravity 60/60 F. 1.066

CaSO₄ Solubility @ 80 F. 52.93 MEq/L, CaSO₄ scale is unlikely

CaCO₃ Scale Index

70.0	0.258
80.0	0.368
90.0	0.578
100.0	0.578
110.0	0.818
120.0	0.818
130.0	1.168
140.0	1.168
150.0	1.508

Nalco/Exxon Energy Chemicals

MITCHELL ANALYTICAL LABORATORY

2638 Faudree
Odessa, Texas 79765-8538
561-5579

Water Analysis

Company.... Nalco/Exxon Energy Chemicals
Well # DAYTON HARDY H/T
Lease..... MARATHON
Location...
Date Run... 05/08/2000
Lab Ref #.. 00-MAY-N06466

Sample Temp... 70.0
Date Sampled.. 05/03/2000
Sampled by.... Mike Carson
Employee # ...
Analyzed by... DANIEL

Dissolved Gasses

		Mg/L	Eq. Wt.	MEq/L
Hydrogen Sulfide	(H ₂ S)	9.00	16.00	0.56
Carbon Dioxide	(CO ₂)	18.00	22.00	0.82
Dissolved Oxygen	(O ₂)	Not Analyzed		

Cations

Calcium	(Ca++)	6,753.60	20.10	336.00
Magnesium	(Mg++)	1,512.80	12.20	124.00
Sodium	(Na+)	47,308.65	23.00	2,056.90
Barium	(Ba++)	Not Analyzed		
Manganese	(Mn++)	Not Analyzed		

Anions

Hydroxyl	(OH-)	Not Analyzed		
Carbonate	(CO ₃ =)	0.00	30.00	0.00
Bicarbonate	(HCO ₃ -)	171.08	61.10	2.80
Sulfate	(SO ₄ =)	1,550.00	48.80	31.76
Chloride	(Cl-)	88,096.80	35.50	2,481.60
Total Iron	(Fe)	1.54	18.60	0.08
Total Dissolved Solids		145,421.47		
Total Hardness As CaCO ₃		23,086.48		
Conductivity MICROMHOS/CM		280,000		

pH 6.300 Specific Gravity 60/60 F. 1.101

CaSO₄ Solubility @ 80 F. 36.07 MEq/L, CaSO₄ scale is unlikely

CaCO₃ Scale Index

70.0	-0.074
80.0	0.016
90.0	0.256
100.0	0.256
110.0	0.536
120.0	0.536
130.0	0.826
140.0	0.826
150.0	1.166

Nalco/Exxon Energy Chemicals

MITCHELL ANALYTICAL LABORATORY

2638 Faudree
Odessa, Texas 79765-8538
561-5579

Water Analysis

Company.... Nalco/Exxon Energy Chemicals

Well # WARLICK C H/T

Lease..... MARATHON

Location...

Date Run... 05/08/2000

Lab Ref #.. 00-MAY-N06467

Sample Temp... 70.0

Date Sampled.. 05/03/2000

Sampled by.... Mike Carson

Employee # ...

Analyzed by... DANIEL

Dissolved Gasses

		Mg/L	Eq. Wt.	MEq/L
Hydrogen Sulfide	(H ₂ S)	9.00	16.00	0.56
Carbon Dioxide	(CO ₂)	9.00	22.00	0.41
Dissolved Oxygen	(O ₂)	Not Analyzed		

Cations

Calcium	(Ca++)	8,200.80	20.10	408.00
Magnesium	(Mg++)	2,049.60	12.20	168.00
Sodium	(Na+)	36,330.58	23.00	1,579.59
Barium	(Ba++)	Not Analyzed		
Manganese	(Mn++)	Not Analyzed		

Anions

Hydroxyl	(OH-)	Not Analyzed		
Carbonate	(CO ₃ =)	0.00	30.00	0.00
Bicarbonate	(HCO ₃ -)	171.08	61.10	2.80
Sulfate	(SO ₄ =)	450.00	48.80	9.22
Chloride	(Cl-)	76,083.60	35.50	2,143.20

Total Iron	(Fe)	0.74	18.60	0.04
Total Dissolved Solids		123,304.41		
Total Hardness As CaCO ₃		28,905.36		
Conductivity MICROMHOS/CM		245,000		

pH 6.700 Specific Gravity 60/60 F. 1.086

CaSO₄ Solubility @ 80 F. 28.52 MEq/L, CaSO₄ scale is unlikely

CaCO₃ Scale Index

70.0	0.260
80.0	0.380
90.0	0.580
100.0	0.580
110.0	0.850
120.0	0.850
130.0	1.160
140.0	1.160
150.0	1.490

Nalco/Exxon Energy Chemicals

MITCHELL ANALYTICAL LABORATORY

2638 Faudree
Odessa, Texas 79765-8538
561-5579

Water Analysis

Company.... Nalco/Exxon Energy Chemicals
Well # MCDONALD A/C 1 IPD
Lease..... MARATHON
Location...
Date Run... 05/08/2000
Lab Ref #.. 00-MAY-N06464

Sample Temp... 70.0
Date Sampled.. 05/03/2000
Sampled by.... Mike Carson
Employee # ...
Analyzed by... DANIEL

Dissolved Gasses

		Mg/L	Eq. Wt.	MEq/L
Hydrogen Sulfide	(H ₂ S)	117.00	16.00	7.31
Carbon Dioxide	(CO ₂)	16.00	22.00	0.73
Dissolved Oxygen	(O ₂)	Not Analyzed		

Cations

Calcium	(Ca++)	442.20	20.10	22.00
Magnesium	(Mg++)	658.80	12.20	54.00
Sodium	(Na+)	7,153.91	23.00	311.04
Barium	(Ba++)	Not Analyzed		
Manganese	(Mn++)	Not Analyzed		

Anions

Hydroxyl	(OH-)	Not Analyzed		
Carbonate	(CO ₃ =)	0.00	30.00	0.00
Bicarbonate	(HCO ₃ -)	1,613.04	61.10	26.40
Sulfate	(SO ₄ =)	1,050.00	48.80	21.52
Chloride	(Cl-)	12,013.20	35.50	338.40

Total Iron	(Fe)	0.08	18.60	0.00
Total Dissolved Solids		23,064.23		
Total Hardness As CaCO ₃		3,806.58		
Conductivity MICROMHOS/CM		45,000		

pH 6.800 Specific Gravity 60/60 F. 1.016

CaSO₄ Solubility @ 80 F. 64.67 MEq/L, CaSO₄ scale is unlikely

CaCO₃ Scale Index

70.0	0.166
80.0	0.286
90.0	0.506
100.0	0.506
110.0	0.766
120.0	0.766
130.0	1.066
140.0	1.066
150.0	1.346

Nalco/Exxon Energy Chemicals

MITCHELL ANALYTICAL LABORATORY

2638 Faudree
Odessa, Texas 79765-8538
561-5579

Water Analysis

Company.... Nalco/Exxon Energy Chemicals
Well # 90% MCDONALD/10% DRINKARD
Lease..... MARATHON
Location....
Date Run... 05/08/2000
Lab Ref #.. 00-MAY-N06469

Sample Temp... 70.0
Date Sampled.. 05/03/2000
Sampled by.... Mike Carson
Employee # ...
Analyzed by... DANIEL

Dissolved Gasses

		Mg/L	Eq. Wt.	MEq/L
Hydrogen Sulfide	(H ₂ S)	107.00	16.00	6.69
Carbon Dioxide	(CO ₂)	16.00	22.00	0.73
Dissolved Oxygen	(O ₂)	Not Analyzed		

Cations

Calcium	(Ca++)	1,045.20	20.10	52.00
Magnesium	(Mg++)	805.20	12.20	66.00
Sodium	(Na+)	10,683.01	23.00	464.48
Barium	(Ba++)	Not Analyzed		
Manganese	(Mn++)	Not Analyzed		

Anions

Hydroxyl	(OH-)	Not Analyzed		
Carbonate	(CO ₃ =)	0.00	30.00	0.00
Bicarbonate	(HCO ₃ -)	1,478.62	61.10	24.20
Sulfate	(SO ₄ =)	1,062.00	48.80	21.76
Chloride	(Cl-)	19,020.90	35.50	535.80

Total Iron	(Fe)	0.20	18.60	0.01
Total Dissolved Solids		34,218.13		
Total Hardness As CaCO ₃		5,914.32		
Conductivity MICROMHOS/CM		66,083		

pH 6.800 Specific Gravity 60/60 F. 1.024

CaSO₄ Solubility @ 80 F. 62.29 MEq/L, CaSO₄ scale is unlikely

CaCO₃ Scale Index

70.0	0.222
80.0	0.352
90.0	0.562
100.0	0.562
110.0	0.822
120.0	0.822
130.0	1.162
140.0	1.162
150.0	1.482

Nalco/Exxon Energy Chemicals