#4952 FILE

bp

200 Westlake Park Blvd.
2nd Floor - Room 243
Houston, Texas 77079

December 17, 2001

United States Department of the Interior
Bureau of Land Management
2909 W. 2nd Street
Roswell, New Mexico 88201

Attn: Mr. Edwin Roberson
Field Manager

State of New Mexico
Mr. Ray Powell
Commissioner of Public Lands
P.O. Box 1148
Santa Fe, New Mexico 87501

Attn: Mr. Jami Bailey, Director (3)
Oil and Gas Division

State of New Mexico
Department of Energy and Minerals
1220 S. St. Francis Dr.
Santa Fe, New Mexico 87505

Attn: Ms. Lori Wrotenbery (3)
Division Director

Ladies and Gentlemen:

In compliance with Section 11 of the Unit Agreement, Empire Abo Unit, Eddy County, New Mexico, ARCO Permian Inc., as Unit Operator, on behalf of itself and other participating working interest owners, hereby submits for your approval a Plan of Operation to cover the period beginning January 1, 2000, and extending through the remainder of calendar year 2002.

Yours very truly,

Gary B Smallwood

Gary B. Smallwood
Engineer

GBS
Attachments

EMPIRE ABO UNIT
2001 & 2002 Plan of Operation

SUBMITTED November 1, 2001

1. Summary of the Plan of Operation for 2001 & 2002

ARCO Permian Inc. proposes to continue operation of the Empire Abo Unit, Eddy County, New Mexico, substantially the same as in previous years. With the approval of working interest owners, gas reinjection ended in November of 1995. All available produced gas is delivered to the gasoline plants for processing and sale. Oil has been and will be produced from the most efficient wells in order to maximize recovery from the unit.

2. Project Area - Description and History

The Empire Abo Unit is located in portions of Sections 34, 35, 36, Township 17 South, Range 27 East; Sections 1, 2, 3, 4, 8, 9, 10, 11, 12, 15, 16, 17, Township 18 South, Range 27 East; Sections 25, 26, 27, 28, 31, 32, 33, 34, 35, 36, Township 17 South, Range 28 East; Sections 4, 5, 6, Township 18 South, Range 28 East; Sections 29, 30, Township 17 South, Range 29 East, Eddy County, New Mexico.

The Unit, as originally proposed, would have covered 11,399.15 acres. Certain tracts within the Unit Area did not qualify for participation as of October 1, 1973, the effective date of the Unit. These tracts are: 2, 6, 28, 41, 42, 46, 55, 56, 69, 79, 84, and 91. Total area of these tracts is 644.74 acres. The remaining 10,694.41 acres comprised the Project Area for pressure maintenance until September 1, 1975. On this date Tracts 41, 79, and 84 joined the Unit. The addition of these three tracts, which cover 120.03 acres, increased the total area of the Unit to 10,814.44 acres. Tracts 2, 6, 42, and 46 comprise the CITGO Empire Abo Unit (Riverwolf Unit), which received NMOCD approval in June 1974. The Unit Area is now disposed as follows:

	Acres
ARCO Empire Abo Unit	10,814.44
Riverwolf Unit	241.05
Non-Participating Tracts	283.66
Total Area	11,339.15

ARCO Permian Inc. operates a partial pressure maintenance project at the Empire Abo Unit. This project has involved injection of plant residue gas from Abo production back into the Abo formation and production of the most efficient wells.

3. Current Performance

In June 2001, the Unitized Project Area averaged 1,193 BOPD with a 85 percent water cut and a gas-oil ratio of 11,000 cubic feet of gas per barrel of oil. Gas injection was suspended in November of 1995 (see attached Production History Plot).

Cumulative oil production from the Project Area through June 2001 was 218.5 MMBO. This is about 59 percent of the 371 MMBO originally in place. Cumulative net gas production from the Project Area through June 2001 was 361.9 BCF. This is about 77 percent of the 468 BCF originally in place. As of June 2001, the Unit has 189 active producing wells.

4. Basic Concepts Governing Future Unit Operations

- Field production history and reservoir numeric model studies have demonstrated that oil recovery is governed by gravity drainage and secondary gas cap expansion. We will be able to maximize the beneficial effects of these recovery mechanisms by observation of well performance and producing from the most efficient wells, those with the lowest GOR's. Natural gas liquid production from individual wells will also be considered when determining the most efficient wells in the future.

5. Discussion of Past, Current, and Future Operations

a) ***Gas Injection***

Beginning in July 1974, and continuing until March of 1995 all available plant residue gas has been injected into the Abo gas cap. On November 1, 1995 all residue gas reinjection was stopped at the Empire Abo Unit.

b) ***Workovers***

An intensive workover program in previous years has been successful in maximizing low GOR production. The majority of the workovers consisted of recompleting wells lower in the reef. As a result of this program, almost all possible lower recompletions have been performed. On the eastern portion of the field where water influx is occurring, workovers consisting of recompleting wells higher in the reef have been successful. We will continue to seek out wells with recompletion potential for both oil and gas. We are also evaluating the use of horizontal wells in the field and expect to fracture wells in the less permeable parts of the field. Inactive wells are being returned to production.

c) *Continuing Field Study*

In order to maximize future reserves, we will continue to maintain an intensive field surveillance program. We will also continue to evaluate alternate and enhanced recovery techniques. Including the use of compression in the field to lower wellhead pressures and the ultimate abandonment pressure of the field.

d) *Injection of Non-Abo Gas*

All non-Abo Gas has been returned and no new non-Abo Gas is being reinjected.

e) *Withdrawals of Non-Abo Gas*

All non-Abo Gas has been withdrawn.

f) *Voidage Limit Removal*

The voidage limit was replaced with a gas production limit of 65 MMCFPD in 1984. This will allow more efficient operation of the Unit. Also, the wet gas compressors were removed and the practice of injecting unprocessed gas was discontinued.

6. Modifications to Plan

It is understood that to meet changing conditions, this plan of operation may be modified from time to time, with the approval of the Supervisor of the U.S.G.S., the Commissioner of Public Lands of the State of New Mexico, and the Department of Energy and Minerals, Oil Conservation Division, State of New Mexico.

ARCO Permian Inc., as Unit Operator, will act prudently to preserve the rights of the mineral owners, and to effectively and efficiently recover the Unit Area Reserves. This Company will meet all economical offset obligations, act to prevent waste, conserve natural resources, and protect correlative rights.

7. Effective Date and Duration of Plan

This Plan of Operation shall be effective January 1, 2001 and extend through the calendar year 2002 unless otherwise amended.

If this Plan of Operation meets with your approval, please sign on the next page and return one copy for our files.

Very truly yours,
ARCO Permian Inc.
OPERATOR

Gary B Smallwood
Gary B. Smallwood
Engineer

GBS

APPROVED BY: _____ **DATE:** _____

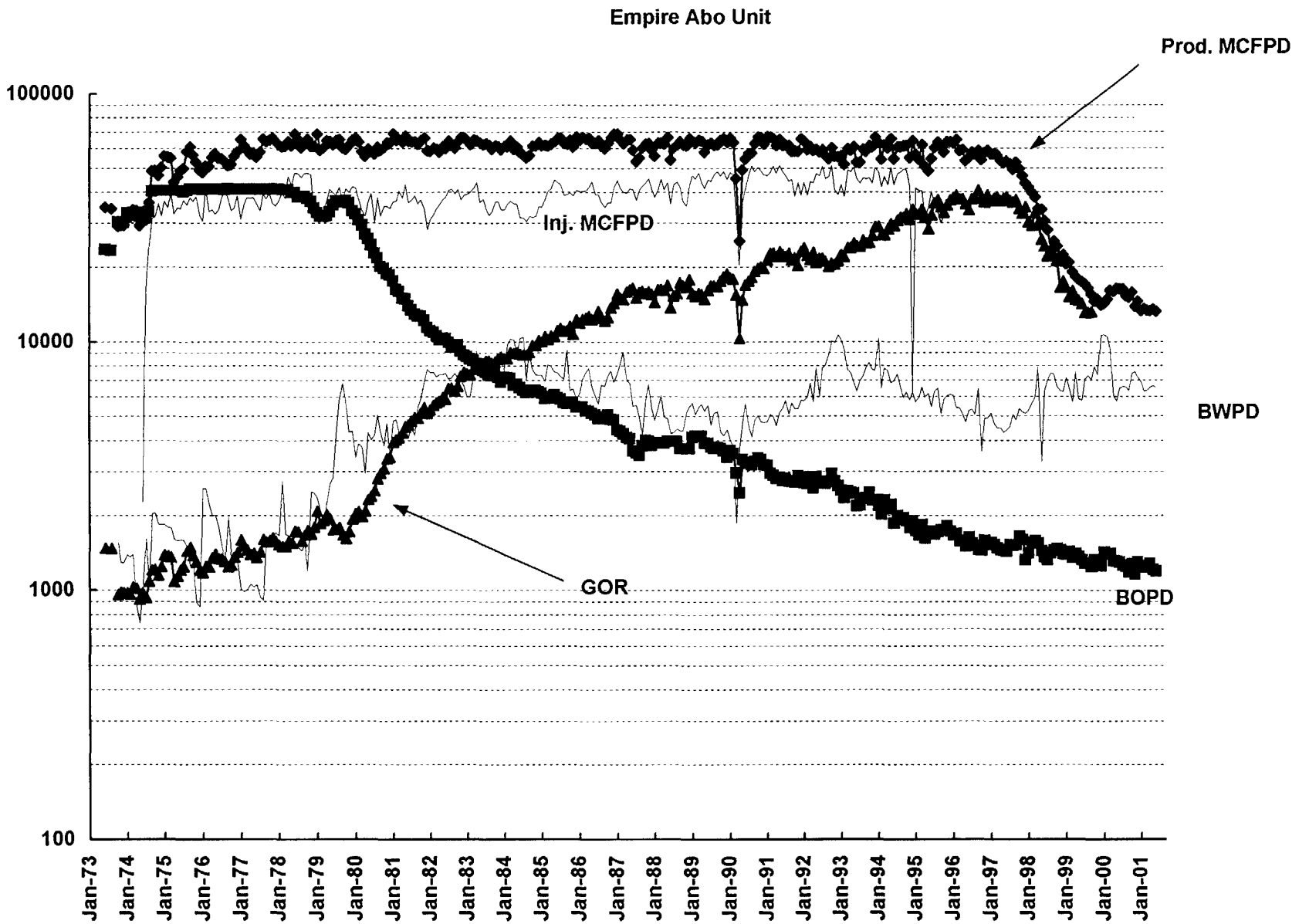
District Manager
United States Department of the Interior
Bureau of Land Management - Roswell District

APPROVED BY: _____ **DATE:** _____

Commissioner of Public Lands
State of New Mexico

APPROVED BY: _____ **DATE:** 12/27/01

Division Director
Department of Energy and Minerals
Oil Conservation Division
State of New Mexico


Empire Abo Unit
Prod. MCFPD
Inj. MCFPD
BWPD
GOR
BOPD
100000
10000
1000
100
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EMPIRE ABO UNIT
1998 PRODUCTION HISTORY

Month	BO	BW	Gross Produced MCFG	Injected MCFG	Net MCFG
January	43,595	163,462	1,296,636	0	1,296,636
February	43,257	158,192	1,112,745	0	1,112,745
March	48,842	184,660	1,184,454	0	1,184,454
April	46,300	236,922	1,025,091	0	1,025,091
May	44,610	102,178	1,054,079	0	1,054,079
June	40,855	189,722	915,698	0	915,698
July	41,030	215,403	870,962	0	870,962
August	43,645	231,236	721,859	0	721,859
September	43,313	222,011	757,616	0	757,616
October	45,295	205,263	748,724	0	748,724
November	43,390	189,679	657,183	0	657,183
December	43,316	195,270	693,680	0	693,680
Totals	**527,448**	**2,293,998**	**11,038,727**	**0**	**11,038,727**

EMPIRE ABO UNIT
1999 PRODUCTION HISTORY

Month	BO	BW	Gross Produced MCFG	Injected MCFG	Net MCFG
January	43,207	221,860	638,296	0	638,296
February	39,836	181,410	583,644	0	583,644
March	41,803	176,905	592,682	0	592,682
April	41,959	225,858	548,658	0	548,658
May	42,142	182,011	551,933	0	551,933
June	39,569	173,835	521,608	0	521,608
July	39,638	218,280	529,115	0	529,115
August	39,421	225,875	510,338	0	510,338
September	37,423	211,018	464,289	0	464,289
October	39,701	245,103	449,760	0	449,760
November	38,479	220,851	443,385	0	443,385
December	38,788	328,680	436,828	0	436,828
Totals	**481,966**	**2,611,686**	**6,270,536**	**0**	**6,270,536**

EMPIRE ABO UNIT
2000 PRODUCTION HISTORY

Month	BO	BW	Gross Produced MCFG	Injected MCFG	Net MCFG
January	43,827	329,861	442,709	0	442,709
February	38,941	292,814	415,004	0	415,004
March	43,310	286,010	497,795	0	497,795
April	39,364	179,839	478,771	0	478,771
May	40,329	178,163	508,656	0	508,656
June	38,760	195,020	488,109	0	488,109
July	39,001	204,062	506,330	0	506,330
August	38,585	203,179	474,779	0	474,779
September	36,700	197,117	468,009	0	468,009
October	38,194	223,113	473,194	0	473,194
November	35,916	234,934	430,308	0	430,308
December	38,990	215,401	435,432	0	435,432
Totals	**471,917**	**2,739,513**	**5,619,096**	**0**	**5,619,096**

EMPIRE ABO UNIT
2001 PRODUCTION HISTORY

Month	BO	BW	Gross Produced MCFG	Injected MCFG	Net MCFG
January	38,683	214,137	412,877	0	412,877
February	34,594	176,671	378,798	0	378,798
March	38,446	196,710	413,578	0	413,578
April	38,204	195,547	399,586	0	399,586
May	37,608	206,107	418,333	0	418,333
June	35,799	195,020	397,425	0	397,425
July					
August					
September					
October					
November					
December					
Totals	**223,334**	**1,184,192**	**2,420,597**	**0**	**2,420,597**

COMMISSIONER'S OFFICE
Phone (505) 827-5760
Fax (505) 827-5766

ADMINISTRATION
Phone (505) 827-5700
Fax (505) 827-5853

GENERAL COUNSEL
Phone (505) 827-5713
Fax (505) 827-4262

PUBLIC AFFAIRS
Phone (505) 827-1245
Fax (505) 827-5766

New Mexico State Land Office
Commissioner of Public Lands
Ray Powell, M.S., D.V.M.

COMMERCIAL RESOURCES
Phone (505) 827-5724
Fax (505) 827-6157

MINERAL RESOURCES
Phone (505) 827-5744
Fax (505) 827-4739

ROYALTY MANAGEMENT
Phone (505) 827-5772
Fax (505) 827-4739

SURFACE RESOURCES
Phone (505) 827-5793
Fax (505) 827-5711

January 3, 2002

BP
200 Westlake Park Blvd
Permian BU
2nd Floor – WL-4
Houston, Texas 77079

Attn: Mr. Gary Smallwood

Re: 2001-2002 Plan of Development
Empire Abo Unit
Eddy County, New Mexico

Dear Mr. Smallwood:

The Commissioner of Public Lands has, of this date, approved the above-captioned Plan of Development. Our approval is subject to like approval by all other appropriate agencies.

The possibility of drainage by wells outside of the unit area and the need for further development of the unit may exist. You may be contacted at a later date regarding these possibilities.

If you have any questions or if we may be of further help, please contact Pete Martinez at (505) 827-5791.

Very truly yours,

RAY POWELL, M.S., D.V.M.
COMMISSIONER OF PUBLIC LANDS

BY:
JAMI BAILEY, Director
Oil, Gas and Minerals Division
(505) 827-5744

RP/JB/cpm
xc: Reader File OCD BLM

4952

AUG - 5 1997

COMMERCIAL RESOURCES
(505)-827-5724

SURFACE RESOURCES
(505)-827-5793

MINERAL RESOURCES
(505)-827-5744

ROYALTY
(505)-827-5772

State of New Mexico
Commissioner of Public Lands
Ray Powell, M.S., D.V.M.
310 Old Santa Fe Trail, P. O. Box 1148
Santa Fe, New Mexico 87504-1148
Phone (505)-827-5760, Fax (505)-827-5766

PUBLIC AFFAIRS
(505)-827-5765

ADMINISTRATIVE MGMT.
(505)-827-5700

LEGAL
(505)-827-5713

PLANNING
(505)-827-5752

August 1, 1997

Arco Permian
P.O. Box 1610
Midland, Texas 79702

Attn: Mr. Gary B. Smallwood

Re: 1997 Plan of Development
Empire Abo Unit
Eddy County, New Mexico

Dear Mr. Smallwood:

The Commissioner of Public Lands has, of this date, approved the above-captioned Plan of Development. Our approval is subject to like approval by all other appropriate agencies.

The possibility of drainage by wells outside of the unit area and the need for further development of the unit may exist. You may be contacted at a later date regarding these possibilities.

If you have any questions or if we may be of further help, please contact Pete Martinez at (505) 827-5791.

Very truly yours,

RAY POWELL, M.S., D.V.M.
COMMISSIONER OF PUBLIC LANDS

BY:
JAMI BAILEY, Director
Oil, Gas and Minerals Division
(505) 827-5744

RP/JB/cpm
cc: Reader File OCD

ARCO Permian
600 N Marienfeld
Midland TX 79701
Post Office Box 1610
Midland TX 79702
Telephone 915 688 5200

July 24, 1997

AUG – 7

United States Department of the Interior
Bureau of Land Management
1717 W. 2nd Street
Roswell, New Mexico 88201

Attn: Mr. Mike Menge
Asst. District Manager

State of New Mexico
Mr. Ray Powell
Commissioner of Public Lands
P.O. Box 1148
Santa Fe, New Mexico 87501

Attn: Mr. Floyd O. Prando, Director (3)
Oil and Gas Division

State of New Mexico
Department of Energy and Minerals
P.O. Box 2088
Santa Fe, New Mexico 87501

Attn: Mr. William J. LeMay (3)
Division Director

Gentlemen:

In compliance with Section 11 of the Unit Agreement, Empire Abo Unit, Eddy County, New Mexico, ARCO Permian Inc., as Unit Operator, on behalf of itself and other participating working interest owners, hereby submits for your approval a Plan of Operation to cover the period beginning January 1, 1997, and extending through the remainder of calendar year 1997.

Yours very truly,

Gary B Smallwood

Gary B. Smallwood
Engineer

GBS
Attachments

A unit of Atlantic Richfield Company

EMPIRE ABO UNIT
1997 Plan of Operation

SUBMITTED March 14, 1997

1. Summary of the Plan of Operation for 1997

ARCO Permian Inc. proposes to continue operation of the Empire Abo Unit, Eddy County, New Mexico, substantially the same as in late 1996. With the approval of working interest owners, gas reinjection ended in November of 1995. All residue gas was then sold or returned to Gas Company of New Mexico or used as fuel in 1996. By May 31, 1996 all stored gas was returned to GCNM and the associated contracts for storage expired. Oil has been and will be produced from the most efficient wells in order to maximize recovery from the unit.

2. Project Area - Description and History

The Empire Abo Unit is located in portions of Sections 34, 35, 36, Township 17 South, Range 27 East; Sections 1, 2, 3, 4, 8, 9, 10, 11, 12, 15, 16, 17, Township 18 South, Range 27 East; Sections 25, 26, 27, 28, 31, 32, 33, 34, 35, 36, Township 17 South, Range 28 East; Sections 4, 5, 6, Township 18 South, Range 28 East; Sections 29, 30, Township 17 South, Range 29 East, Eddy County, New Mexico.

The Unit, as originally proposed, would have covered 11,399.15 acres. Certain tracts within the Unit Area did not qualify for participation as of October 1, 1973, the effective date of the Unit. These tracts are: 2, 6, 28, 41, 42, 46, 55, 56, 69, 79, 84, and 91. Total area of these tracts is 644.74 acres. The remaining 10,694.41 acres comprised the Project Area for pressure maintenance until September 1, 1975. On this date Tracts 41, 79, and 84 joined the Unit. The addition of these three tracts, which cover 120.03 acres, increased the total area of the Unit to 10,814.44 acres. Tracts 2, 6, 42, and 46 comprise the CITGO Empire Abo Unit (Riverwolf Unit), which received NMOCD approval in June 1974. The Unit Area is now disposed as follows:

	Acres
ARCO Empire Abo Unit	10,814.44
Riverwolf Unit	241.05
Non-Participating Tracts	283.66
Total Area	11,339.15

ARCO Permian Inc. operates a partial pressure maintenance project at the Empire Abo Unit. This project has involved injection of plant residue gas from Abo production back into the Abo formation and production of the most efficient wells.

3. Current Performance

In December 1996, the Unitized Project Area averaged 1,518 BOPD with a 76 percent water cut and a gas-oil ratio of 39,000 cubic feet of gas per barrel of oil. Gas injection was suspended in November of 1995 (see attached Production History Plot).

Cumulative oil production from the Project Area through December 1996 was 216.2 MMBO. This is about 58 percent of the 371 MMBO originally in place. Cumulative net gas production from the Project Area through December 1995 was 317.6 BCF. This is about 68 percent of the 468 BCF originally in place. As of December 1996, the Unit has 222 active producing wells.

4. Basic Concepts Governing Future Unit Operations

- Field production history and reservoir numeric model studies have demonstrated that oil recovery is governed by gravity drainage and secondary gas cap expansion. We will be able to maximize the beneficial effects of these recovery mechanisms by observation of well performance and producing from the most efficient wells, those with the lowest GOR's. Natural gas liquid production from individual wells will also be considered when determining the most efficient wells in the future.

5. Discussion of Past, Current, and Future Operations

a) *Gas Injection*

Beginning in July 1974, and continuing until March of 1995 all available plant residue gas has been injected into the Abo gas cap. On November 1, 1995 all residue gas reinjection was stopped at the Empire Abo Unit.

b) *Workovers*

An intensive workover program in previous years has been successful in maximizing low GOR production. The majority of the workovers consisted of recompleting wells lower in the reef. As a result of this program, almost all possible lower recompletions have been performed. On the eastern portion of the field where water influx is occurring, workovers consisting of recompleting wells higher in the reef have been successful. We will continue to seek out wells with recompletion potential for both oil and gas. We are also evaluating the use of horizontal wells in the field and expect to fracture wells in the less permeable parts of the field. Inactive wells are being returned to production.

c) *Continuing Field Study*

In order to maximize future reserves, we will continue to maintain an intensive field surveillance program. We will also continue to evaluate alternate and enhanced recovery techniques. Including the use of compression in the field to lower wellhead pressures and the ultimate abandonment pressure of the field.

d) *Injection of Non-Abo Gas*

All non-Abo Gas has been returned and no new non-Abo Gas is being reinjected.

e) *Withdrawals of Non-Abo Gas*

All non-Abo Gas has been withdrawn.

f) *Voidage Limit Removal*

The voidage limit was replaced with a gas production limit of 65 MMCFPD in 1984. This will allow more efficient operation of the Unit. Also, the wet gas compressors were removed and the practice of injecting unprocessed gas was discontinued.

6. Modifications to Plan

It is understood that to meet changing conditions, this plan of operation may be modified from time to time, with the approval of the Supervisor of the U.S.G.S., the Commissioner of Public Lands of the State of New Mexico, and the Department of Energy and Minerals, Oil Conservation Division, State of New Mexico.

ARCO Permian Inc., as Unit Operator, will act prudently to preserve the rights of the mineral owners, and to effectively and efficiently recover the Unit Area Reserves. This Company will meet all economical offset obligations, act to prevent waste, conserve natural resources, and protect correlative rights.

7. Effective Date and Duration of Plan

This Plan of Operation shall be effective January 1, 1997 and extend through the calendar year unless otherwise amended.

If this Plan of Operation meets with your approval, please sign on the next page and return one copy for our files.

Very truly yours,
ARCO Permian Inc.
OPERATOR

Gary B Smallwood

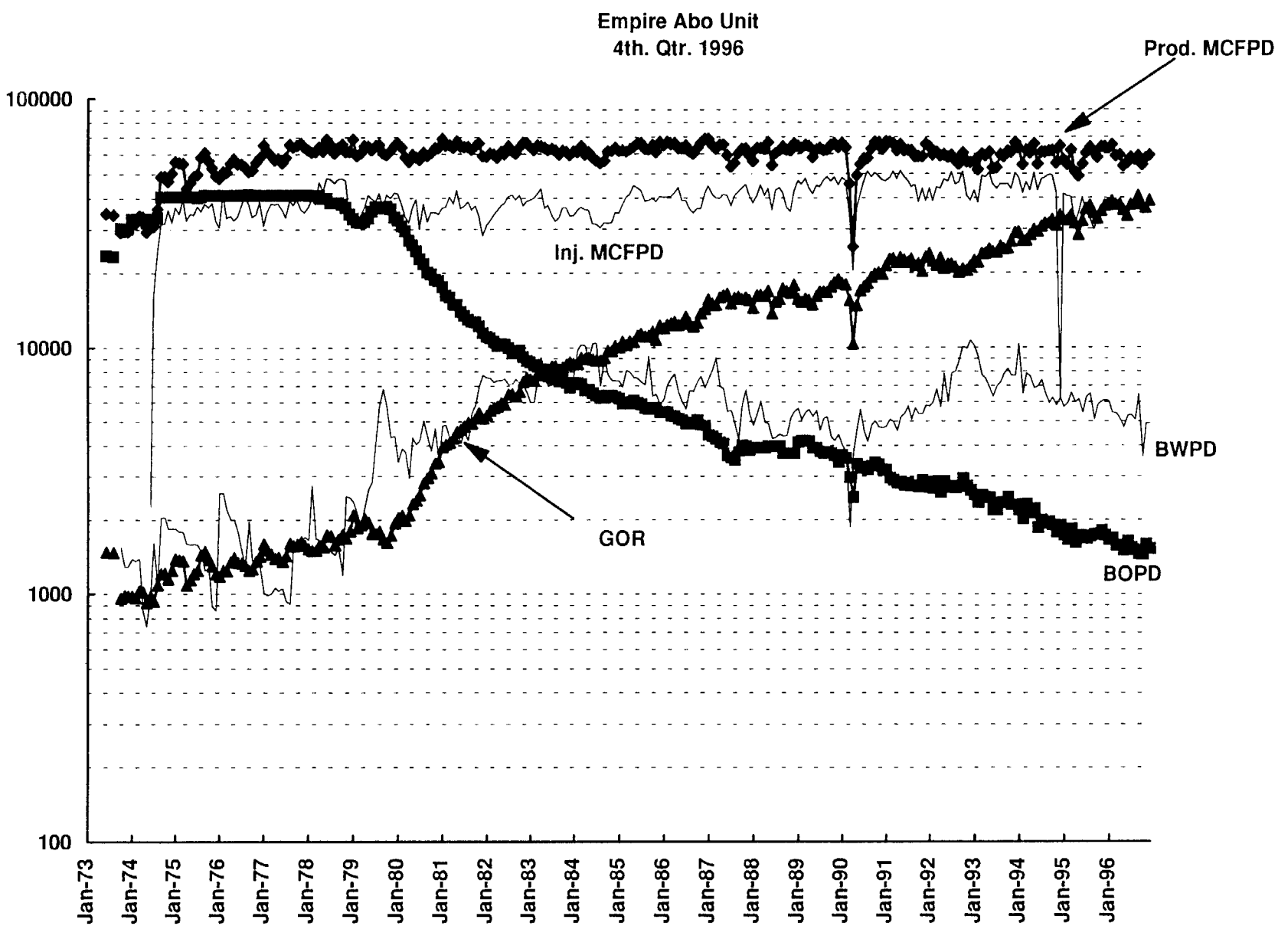
Gary B. Smallwood
Engineer

GBS

APPROVED BY: _____ **DATE:** _____
District Manager
United States Department of the Interior
Bureau of Land Management - Roswell District

APPROVED BY: _____ **DATE:** _____
Commissioner of Public Lands
State of New Mexico

APPROVED BY: _____ **DATE:** 8/7/97
Division Director
Department of Energy and Minerals
Oil Conservation Division
State of New Mexico


Empire Abo Unit
4th. Qtr. 1996
Prod. MCFPD
Inj. MCFPD
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EMPIRE ABO UNIT
1996 PRODUCTION HISTORY

Month	BO	BW	Gross Produced MCFG	Injected MCFG	Net MCFG
January	51,453	187,911	1,949,908	0	1,949,908
February	47,005	151,480	1,824,755	0	1,824,755
March	48,547	166,901	1,819,656	0	1,819,656
April	47,290	152,907	1,776,853	0	1,776,853
May	46,340	146,876	1,661,487	0	1,661,487
June	48,852	158,302	1,652,295	0	1,652,295
July	47,752	165,271	1,792,407	0	1,792,407
August	46,641	157,624	1,760,284	0	1,760,284
September	43,435	193,648	1,760,379	0	1,760,379
October	44,660	111,961	1,679,076	0	1,679,076
November	47,480	147,238	1,729,136	0	1,729,136
December	47,068	152,205	1,828,429	0	1,828,429
Totals	**566,523**	**1,892,324**	**21,234,665**	**0**	**21,234,665**

PLAN OF OPERATIONS FOR 1997
EMPIRE ABO UNIT
EDDY COUNTY, NEW MEXICO

B A L L O T

If you approve of this Plan of Operation for the calendar year of 1997, please advise ARCO Permian, Inc.. Correspondence should be directed to:

ARCO Permian, Inc.
Attention: Gary B. Smallwood -- MIO 633-23
P.O. Box 1610
Midland, Texas 79702

APPROVED BY:_____**DATE:**_____

DISAPPROVED BY:_____**DATE:**_____

REPRESENTING:_____

4952

RAY POWELL, M.S., D.V.M.
COMMISSIONER

State of New Mexico
Commissioner of Public Lands
310 OLD SANTA FE TRAIL P.O. BOX 1148
SANTA FE, NEW MEXICO 87504-1148

(505) 827-5760
FAX (505) 827-5766

June 14, 1996

Arco Permian
Post Office Box 1610
Midland, Texas 79702

Attn: Mr. Gary B. Smallwood

Re: 1996 Plan of Development
Empire Abo Unit
Eddy County, New Mexico

Dear Mr. Smallwood:

The Commissioner of Public Lands has this date approved the above-captioned Plan of Development. Our approval is subject to like approval by all other appropriate agencies.

The possibility of drainage by wells outside of the Unit Area and the need for further development of the unit may exist. You may be contacted at a later date regarding these possibilities.

If you have any questions, or if we may be of further help, please contact Pete Martinez at (505) 827-5791.

Very truly yours,

RAY POWELL, M.S., D.V.M.
COMMISSIONER OF PUBLIC LANDS

BY:
LARRY KEHOE, Director
Oil, Gas and Minerals Division
(505) 827-5744

RP/LK/cpm

cc: Reader File OCD BLM

ARCO Permian
600 N. Marienfeld
Midland TX 79701
Post Office Box 1610
Midland TX 79702
Telephone 915 688 5200

June 6, 1996

United States Department of the Interior
Bureau of Land Management
1717 W. 2nd Street
Roswell, New Mexico 88201

Attn: Mr. Mike Menge
Asst. District Manager

State of New Mexico
Department of Energy and Minerals
P. O. Box 2088
Santa Fe, New Mexico 87501

Attn: Mr. William J. LeMay (3)
Division Director

State of New Mexico
Mr. Ray Powell
Commissioner of Public Lands
P. O. Box 1148
Santa Fe, New Mexico 87501

Attn: Mr. Floyd O. Prando, Director (3)
Oil and Gas Division

Working Interest Owners
Empire Abo Unit
Eddy County, New Mexico

Gentlemen:

In compliance with Section 11 of the Unit Agreement, Empire Abo Unit, Eddy County, New Mexico, ARCO Permian Inc., as Unit Operator, on behalf of itself and other participating working interest owners, hereby submits for your approval a Plan of Operation to cover the period beginning January 1, 1996, and extending through the remainder of calendar year 1996.

Yours very truly,

Gary B Smallwood

Gary B. Smallwood
Engineer

GBS:elt
senm/gary/96cvrlt.doc

Attachments

A unit of Atlantic Richfield Company

EMPIRE ABO UNIT
1996 Plan of Operation

SUBMITTED May 24, 1996

1. Summary of the Plan of Operation for 1996

ARCO Permian Inc. proposes to continue operation of the Empire Abo Unit, Eddy County, New Mexico, substantially the same as in late 1995. Residue gas sales were started in the Empire Abo Unit in March of 1995 at the rate of 5 MMCFPD. Sales rates were increased to 13 MMCFPD in July. With the approval of working interest owners gas reinjection ended in November of 1995. All residue gas was then sold or returned to Gas Company of New Mexico or used as fuel. A table is attached indicating Gas Company of New Mexico's balance. Oil has been and will be produced from the most efficient wells in order to maximize recovery from the unit.

2. Project Area - Description and History

The Empire Abo Unit is located in portions of Sections 34, 35, 36, Township 17 South, Range 27 East; Sections 1, 2, 3, 4, 8, 9, 10, 11, 12, 15, 16, 17, Township 18 South, Range 27 East; Sections 25, 26, 27, 28, 31, 32, 33, 34, 35, 36, Township 17 South, Range 28 East; Sections 4, 5, 6, Township 18 South, Range 28 East; Sections 29, 30, Township 17 South, Range 29 East, Eddy County, New Mexico.

The Unit, as originally proposed, would have covered 11,399.15 acres. Certain tracts within the Unit Area did not qualify for participation as of October 1, 1973, the effective date of the Unit. These tracts are: 2, 6, 28, 41, 42, 46, 55, 56, 69, 79, 84, and 91. Total area of these tracts is 644.74 acres. The remaining 10,694.41 acres comprised the Project Area for pressure maintenance until September 1, 1975. On this date Tracts 41, 79, and 84 joined the Unit. The addition of these three tracts, which cover 120.03 acres, increased the total area of the Unit to 10,814.44 acres. Tracts 2, 6, 42, and 46 comprise the CITGO Empire Abo Unit (Riverwolf Unit), which received NMOCD approval in June 1974. The Unit Area is now disposed as follows:

	Acres
ARCO Empire Abo Unit	10,814.44
Riverwolf Unit	241.05
Non-Participating Tracts	283.66
Total Area	11,339.15

ARCO Permian Inc. operates a partial pressure maintenance project at the Empire Abo Unit. This project has involved injection of plant residue gas from Abo production back into the Abo formation and production of the most efficient wells.

3. Current Performance

In December 1995, the Unitized Project Area averaged 1,717 BOPD with a 78 percent water cut and a gas-oil ratio of 37,000 cubic feet of gas per barrel of oil. Gas injection was suspended in November (see attached Production History Plot).

Cumulative oil production from the Project Area through December 1995 was 215.7 MMBO. This is about 58 percent of the 371 MMBO originally in place. Cumulative net gas production from the Project Area through December 1995 was 296 BCF. This is about 63 percent of the 468 BCF originally in place. As of December 1995, the Unit has 191 active producing wells.

4. Basic Concepts Governing Future Unit Operations

- Field production history and reservoir numeric model studies have demonstrated that oil recovery is governed by gravity drainage and secondary gas cap expansion. We will be able to maximize the beneficial effects of these recovery mechanisms by observation of well performance and producing from the most efficient wells, those with the lowest GOR's. Natural gas liquid production from individual wells will also be considered when determining the most efficient wells in the future.

5. Discussion of Past, Current, and Future Operations

a) ***Gas Injection***

Fifteen gas injection wells along the north edge of the field and 15 new injection wells on the south edge handle all of the Empire Abo Unit injected gas. Table I lists these wells. Beginning in July 1974, and continuing until March of 1995 all available plant residue gas has been injected into the Abo gas cap. On November 1, 1995 all residue gas reinjection was stopped at the Empire Abo Unit.

b) ***Workovers***

An intensive workover program in previous years has been successful in maximizing low GOR production. The majority of the workovers consisted of recompleting wells lower in the reef. As a result of this program, almost all possible lower recompletions have been performed. On the eastern portion of the field where water influx is occurring, workovers consisting of recompleting wells higher in the reef have been successful. We will continue to seek out wells with recompletion potential. We are also evaluating the use of horizontal wells in the field and expect to fracture wells in the less permeable parts of the field. Inactive wells are being returned to production.

c) *Continuing Field Study*

In order to maximize future reserves, we will continue to maintain an intensive field surveillance program. We will also continue to evaluate alternate and enhanced recovery techniques.

d) *Injection of Non-Abo Gas*

Gas from non-Abo sources was delivered from the Gas Company of New Mexico (formerly Southern Union Gas Company) to the Empire Abo Unit. This began on June 18, 1976. The amount of gas stored in the Empire Abo Unit under the 1976 agreement through February 1989 is 3,753 MMMBTU or 3,854 MMCF. A table is attached indicating Gas Company of New Mexico's withdrawals and returns for 1995.

e) *Withdrawals of Non-Abo Gas*

With the start of blowdown at Empire Abo Gas Company has been withdrawing and not returning stored gas. Gas Company is expected to have all stored gas removed by mid 1996.

f) *Voidage Limit Removal*

The voidage limit was replaced with a gas production limit of 65 MMCFPD in 1984. This will allow more efficient operation of the Unit. Also, the wet gas compressors were removed and the practice of injecting unprocessed gas was discontinued.

6. Modifications to Plan

It is understood that to meet changing conditions, this plan of operation may be modified from time to time, with the approval of the Supervisor of the U.S.G.S., the Commissioner of Public Lands of the State of New Mexico, and the Department of Energy and Minerals, Oil Conservation Division, State of New Mexico.

ARCO Permian Inc., as Unit Operator, will act prudently to preserve the rights of the mineral owners, and to effectively and efficiently recover the Unit Area Reserves. This Company will meet all economical offset obligations, act to prevent waste, conserve natural resources, and protect correlative rights.

7. Effective Date and Duration of Plan

This Plan of Operation shall be effective January 1, 1996 and extend through the calendar year unless otherwise amended.

If this Plan of Operation meets with your approval, please sign on the next page and return one copy for our files.

Very truly yours,
ARCO Permian Inc.
OPERATOR

Gary B Smallwood
Gary B. Smallwood
Engineer

GBS

APPROVED BY: _____ **DATE:** _____
District Manager
United States Department of the Interior
Bureau of Land Management - Roswell District

APPROVED BY: _____ **DATE:** _____
Commissioner of Public Lands
State of New Mexico

APPROVED BY: _____ **DATE:** 6/24/96
Division Director
Department of Energy and Minerals
Oil Conservation Division
State of New Mexico

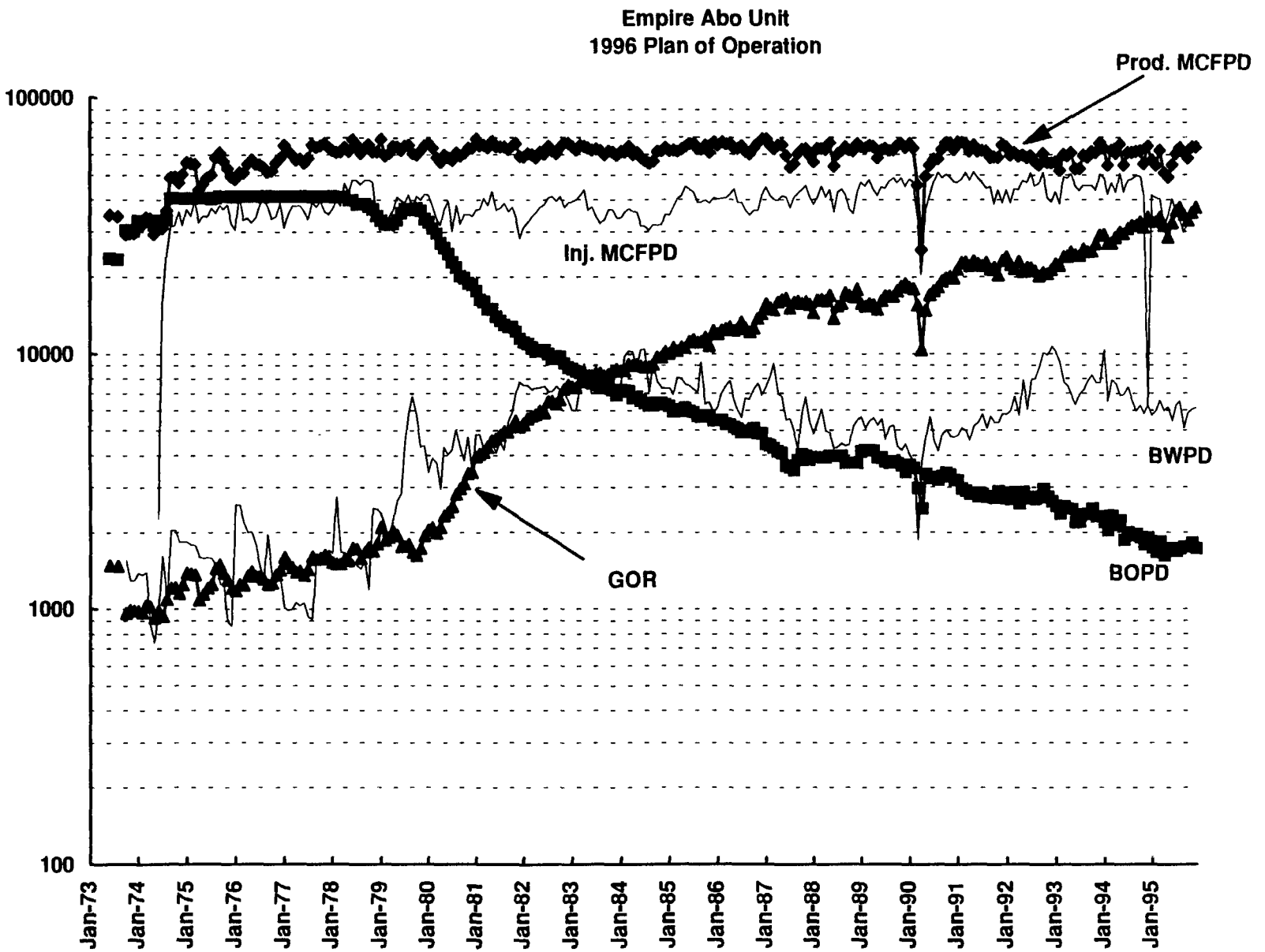
TABLE I

EMPIRE ABO UNIT
Gas Injection Wells

Previous Operator/ Lease and Well	Unit Well Designation	Location	Sec	Twp	Rng
Hondo/State "A" No. 24	C-39	NW/4 SE/4	26	17	28
Hondo/State "A" No. 16	D-37	SW/4 SW/4	26	17	28
Amoco/State "BV" No. 1	F-25	SW/4 NW/4	32	17	28
Hondo/State "A" No. 35	F-27	SW/4 NE/4	32	17	28
ARCO/M. Yates B (ARC) No. 8	F-31	SW/4 NE/4	33	17	28
Amoco/State "BM" No. 1	G-22	NE/4 SW/4	31	17	28
Hondo/State "A" No. 9	G-24	NE/4 SE/4	31	17	28
Gulf/NCT "C" No. 1	H-19	SW/4 SE/4	36	17	27
Amoco/State "BE" No. 1	H-21	SW/4 SW/4	31	17	28
Amoco/Malco "H" Fed. No. 9	I-10	NE/4 NW/4	3	18	27
Amoco/State "F" No. 8	I-18	NE/4 NW/4	1	18	27
Amoco/Malco "H" Fed. No. 2	J-12	SE/4 NE/4	3	18	27
Amoco/Windfohr Fed. No. 4	K-7	NW/4 SE/4	4	18	27
Exxon/CBDU "A" No. 8	M-6	SE/4 NW/4	9	18	27
Cities Service/Hudson A #1	J-10	SE/4 NW/4	3	18	27
Exxon/CBDU No. 13	R-5	1980' FNL & 660' FWL	16	18	27
Exxon/CBDU "A" No. 7	P-5	330' FSL & 990' FWL	9	18	27
N/A	M-901	1300' FNL & 1220' FWL	10	18	27
N/A	L-111	2485' FEL & 20' FSL	3	18	27
N/A	L-131	100' FSL & 100' FWL	2	18	27
N/A	L-141	1360' FWL & 1050' FSL	2	18	27
N/A	K-182	2370' FWL & 1533' FSL	1	18	27
N/A	J-202	2490' FNL & 1299' FEL	1	18	27
N/A	J-223	2630' FNL & 1930' FWL	6	18	28
N/A	I-23	470' FNL & 2170' FEL	6	18	28
N/A	H-261	150' FSL & 1400' FWL	32	17	28
N/A	I-283	175' FNL & 300' FEL	5	18	28
N/A	H-302	1250' FSL & 1925' FWL	33	17	28
N/A	G-321	1520' FSL & 250' FEL	33	17	28
N/A	F-343	2300' FNL & 1675' FWL	34	17	28

EMPIRE ABO UNIT
1995 PRODUCTION HISTORY

Month	BO	BW	Gross Produced MCFG	Injected MCFG	Net MCFG
January	51,983	172,066	1,704,733	1,244,573	460,160
February	49,843	178,370	1,625,963	1,218,460	407,503
March	54,880	196,370	1,865,234	1,209,493	655,741
April	48,326	179,032	1,528,504	946,447	582,057
May	51,515	185,264	1,462,495	1,037,932	424,563
June	50,682	208,217	1,637,197	1,207,964	429,233
July	50,127	163,752	1,814,553	1,062,190	752,363
August	51,316	194,834	1,910,376	988,493	921,883
September	52,114	153,344	1,816,052	895,123	920,929
October	54,192	180,599	1,797,483	1,009,056	788,427
November	54,070	181,024	1,916,674	0	1,916,674
December	53,239	189,875	1,979,550	0	1,979,550
Totals	**622,287**	**2,182,747**	**21,058,814**	**10,819,731**	**10,239,083**


Empire Abo Unit
1996 Plan of Operation
Prod. MCFPD
Inj. MCFPD
BWPD
GOR
BOPD
100000
10000
1000
100
Jan-73
Jan-74
Jan-75
Jan-76
Jan-77
Jan-78
Jan-79
Jan-80
Jan-81
Jan-82
Jan-83
Jan-84
Jan-85
Jan-86
Jan-87
Jan-88
Jan-89
Jan-90
Jan-91
Jan-92
Jan-93
Jan-94
Jan-95

Empire Abo Unit
Gas Company of New Mexico
Stored Gas Balance Statement

Month/Yr	MMBTU Withdrawn by GCNM	Rem. MMBTU Due GCNM
Jul-95	0	3,704,822
Aug-95	78,899	3,625,923
Sep-95	102,412	3,523,511
Oct-95	527,951	2,995,560
Nov-95	512,060	2,483,500
Dec-95	496,760	1,986,740

ARCO Permian
600 N Marienfeld
Midland TX 79701
Post Office Box 1610
Midland TX 79702
Telephone 915 688 5200

#4952

February 9, 1995

United States Department of the Interior
Bureau of Land Management
P.O. Drawer 1397
Roswell, New Mexico 88201

Attn: Mr. Tony L. Ferguson
Asst. District Manager

State of New Mexico
Mr. Jim Baca
Commissioner of Public Lands
P.O. Box 1148
Santa Fe, New Mexico 87501

Attn: Mr. Floyd O. Prando, Director (3)
Oil and Gas Division

State of New Mexico
Department of Energy and Minerals
P.O. Box 2088
Santa Fe, New Mexico 87501

Attn: Mr. William J. LeMay (3) ✓
Division Director

Working Interest Owners
Empire Abo Unit
Eddy County, New Mexico

Gentlemen:

In compliance with Section 11 of the Unit Agreement, Empire Abo Unit, Eddy County, New Mexico, ARCO Oil and Gas Company, as Unit Operator, on behalf of itself and other participating working interest owners, hereby submits for your approval a Plan of Operation to cover the period beginning January 1, 1995, and extending through the remainder of calendar year 1995.

Yours very truly,

Gary B Smallwood

Gary B. Smallwood
Engineer

GBS:keg
Attachments

EMPIRE ABO UNIT
1995 Plan of Operation

SUBMITTED December 22, 1994

1. Summary of the Plan of Operation for 1995

ARCO Oil and Gas Company proposes to continue operation of the Empire Abo Unit, Eddy County, New Mexico, substantially the same as in recent years. We will continue to reinject residue gas from the GPM extraction plant and the Amoco extraction plant. During the third quarter of 1994, we reinjected 80% of all produced gas. Reinjection volumes will be less as we will start partial gas sales. We expect to reinject 70% of the produced gas during the first and second quarters of 1995 and 60% during the third and fourth quarters. Our estimate of the subsequent gas sales is 6.5 MMCFPD in the first half of 1995 and 13 MMCFPD in the second half of 1995. Oil will be produced from the most efficient wells in order to maximize recovery. Gas Company of New Mexico will be allowed to make emergency withdrawals of extraneous gas during the winter. The withdrawal will be replaced by Gas Company of New Mexico in the summer. A table is attached indicating Gas Company of New Mexico's takes and withdrawals and balance.

2. Project Area - Description and History

The Empire Abo Unit is located in portions of Sections 34, 35, 36, Township 17 South, Range 27 East; Sections 1, 2, 3, 4, 8, 9, 10, 11, 12, 15, 16, 17, Township 18 South, Range 27 East; Sections 25, 26, 27, 28, 31, 32, 33, 34, 35, 36, Township 17 South, Range 28 East; Sections 4, 5, 6, Township 18 South, Range 28 East; Sections 29, 30, Township 17 South, Range 29 East, Eddy County, New Mexico.

The Unit, as originally proposed, would have covered 11,399.15 acres. Certain tracts within the Unit Area did not qualify for participation as of October 1, 1973, the effective date of the Unit. These tracts are: 2, 6, 28, 41, 42, 46, 55, 56, 69, 79, 84, and 91. Total area of these tracts is 644.74 acres. The remaining 10,694.41 acres comprised the Project Area for pressure maintenance until September 1, 1975. On this date Tracts 41, 79, and 84 joined the Unit. The addition of these three tracts, which cover 120.03 acres, increased the total area of the Unit to 10,814.44 acres. Tracts 2, 6, 42, and 46 comprise the CITGO Empire Abo Unit (Riverwolf Unit), which received NMOCD approval in June 1974. The Unit Area is now disposed as follows:

	Acres
ARCO Empire Abo Unit	10,814.44
Riverwolf Unit	241.05
Non-Participating Tracts	283.66
Total Area	11,339.15

ARCO Oil and Gas Company operates a pressure maintenance project at the Empire Abo Unit. This project involves injection of plant residue gas from Abo production back into the Abo formation.

3. Current Performance

In October 1994, the Unitized Project Area averaged 2,017 BOPD with a 78 percent water cut and a gas-oil ratio of 29,628 cubic feet of gas per barrel of oil. Gas injection averaged 46,124 MCFPD (see attached Production History Plot).

Cumulative oil production from the Project Area through October 1994 was 214.7 MMBO. This is about 57.9 percent of the 371 MMBO originally in place. Cumulative net gas production from the Project Area through October 1994 was 322.9 BCF. This is about 68.9 percent of the 468 BCF originally in place. As of October 1994, the Unit has 191 active producing wells.

4. Basic Concepts Governing Future Unit Operations

- Field production history and reservoir numeric model studies have demonstrated that oil recovery is governed by gravity drainage and secondary gas cap expansion. We will be able to maximize the beneficial effects of these recovery mechanisms by observation of well performance and producing from the most efficient wells, those with the lowest GOR's. Natural gas liquid production from individual wells will also be considered when determining the most efficient wells in the future.
- Gas injection will help maintain reservoir pressure and control expansion of the secondary gas cap.

5. Discussion of Past, Current, and Future Operations

a) ***Gas Injection***

Fifteen gas injection wells along the north edge of the field and 15 new injection wells on the south edge handle all of the Empire Abo Unit injected gas. Table I lists these wells. Beginning in July 1974, and continuing through the latest month for which data is available (October 1994), all available plant residue gas has been injected into the Abo gas cap. The Unit receives plant residue gas at about 700 psi and compresses it to 2000 psi for injection. Superhydration facilities at the extraction plants reduce hydrogen sulfide content to minimize possible corrosion. A rigorous corrosion treatment program is maintained. As soon as the New Mexico Environmental Department of Air Pollution Control Bureau grants a permit, the gas injection machines at the Empire Abo Unit gas injection plant will be replaced with clean burn rental machines. The rental machines will reduce operating costs and reduce emissions below Title V requirements.

We believe the injection facilities meet the requirements of the United States Geological Survey and the State of New Mexico.

b) *Workovers*

An intensive workover program in previous years has been successful in maximizing low GOR production. The majority of the workovers consisted of recompleting wells lower in the reef. As a result of this program, almost all possible lower recompletions have been performed. On the eastern portion of the field where water influx is occurring, workovers consisting of recompleting wells higher in the reef have been successful. We will continue to seek out wells with recompletion potential. We are also evaluating the use of horizontal wells in the field and expect to fracture wells in the less permeable parts of the field.

c) ***Continuing Field Study***

In order to maximize future reserves, we will continue to maintain an intensive field surveillance program. We will also continue to evaluate alternate and enhanced recovery techniques.

d) ***Injection of Non-Abo Gas***

Gas from non-Abo sources was delivered from the Gas Company of New Mexico (formerly Southern Union Gas Company) to the Empire Abo Unit. This began on June 18, 1976. The amount of gas stored in the Empire Abo Unit under the 1976 agreement through February 1989 is 3,753 MMMBTU or 3,854 MMCF. A table is attached indicating Gas Company of New Mexico's withdrawals and returns for 1994.

e) ***Withdrawals of Non-Abo Gas***

Gas Company of New Mexico will be permitted to withdraw up to 300 MMCF of the extraneous stored gas for emergency use during the winter period, November 1 - March 31. The withdrawn gas will be replaced by Gas Company of New Mexico during the next summer season, April 1 - October 31.

f) ***Voidage Limit Removal***

The voidage limit was replaced with a gas production limit of 65 MMCFPD in 1984. This will allow more efficient operation of the Unit. Also, the wet gas compressors were removed and the practice of injecting unprocessed gas was discontinued.

6. Modifications to Plan

It is understood that to meet changing conditions, this plan of operation may be modified from time to time, with the approval of the Supervisor of the U.S.G.S., the Commissioner of Public Lands of the State of New Mexico, and the Department of Energy and Minerals, Oil Conservation Division, State of New Mexico.

ARCO Oil and Gas Company, as Unit Operator, will act prudently to preserve the rights of the mineral owners, and to effectively and efficiently recover the Unit Area Reserves. This Company will meet all economical offset obligations, act to prevent waste, conserve natural resources, and protect correlative rights.

7. Effective Date and Duration of Plan

This Plan of Operation shall be effective January 1, 1995 and extend through the calendar year unless otherwise amended.

If this Plan of Operation meets with your approval, please sign on the next page and return one copy for our files.

Very truly yours,
ARCO Oil and Gas Company
OPERATOR

Gary B. Smallwood
Engineer

GBS:keg

APPROVED BY: _____ **DATE:** _____

District Manager
United States Department of the Interior
Bureau of Land Management - Roswell District

APPROVED BY: _____ **DATE:** _____

Commissioner of Public Lands
State of New Mexico

APPROVED BY: _____ **DATE:** 3-6-95

For Division Director
Department of Energy and Minerals
Oil Conservation Division
State of New Mexico

TABLE I

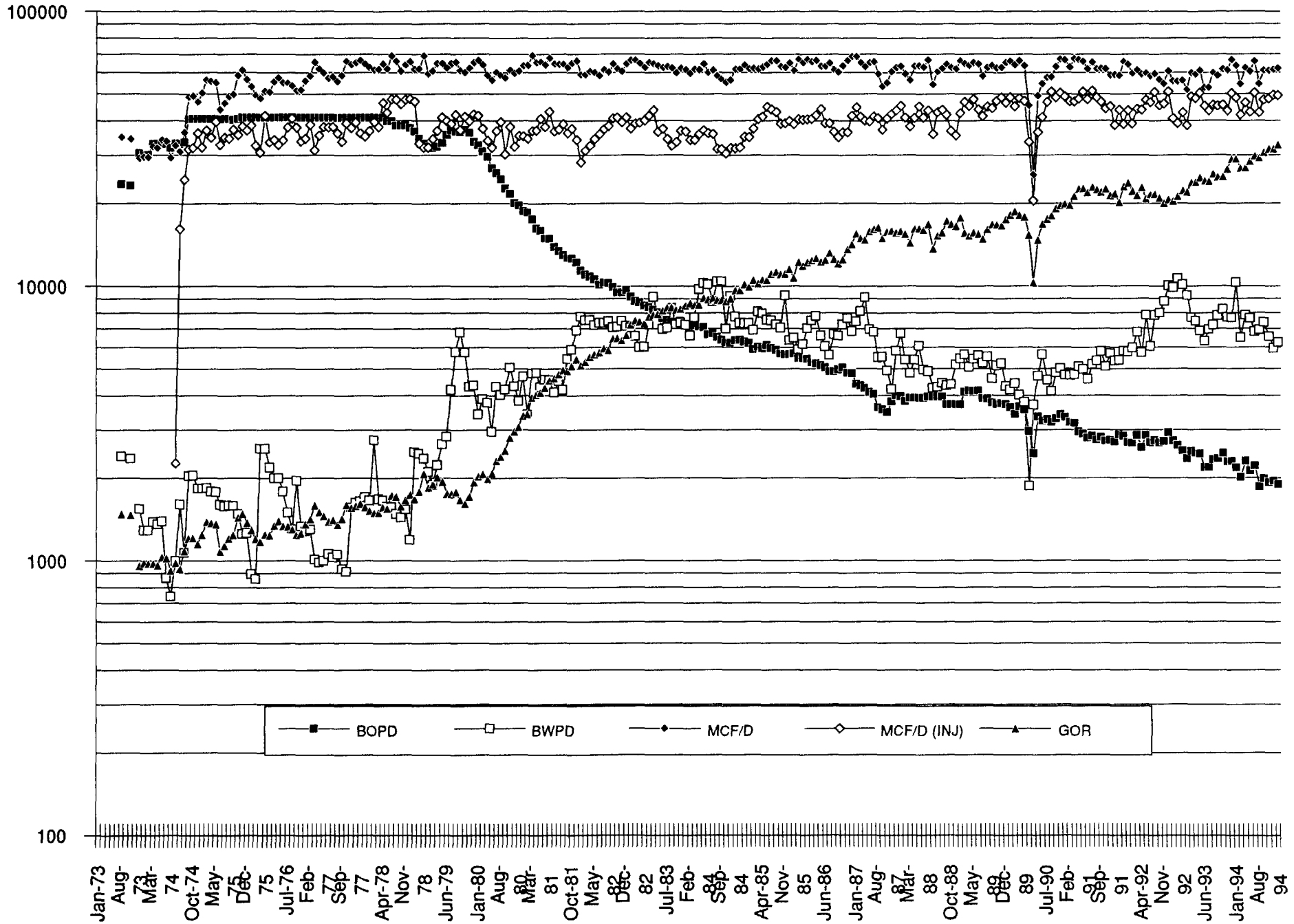
EMPIRE ABO UNIT
Gas Injection Wells

Previous Operator/ Lease and Well	Unit Well Designation	Location	Sec	Twp	Rng
Hondo/State "A" No. 24	C-39	NW/4 SE/4	26	17	28
Hondo/State "A" No. 16	D-37	SW/4 SW/4	26	17	28
Amoco/State "BV" No. 1	F-25	SW/4 NW/4	32	17	28
Hondo/State "A" No. 35	F-27	SW/4 NE/4	32	17	28
ARCO/M. Yates B (ARC) No. 8	F-31	SW/4 NE/4	33	17	28
Amoco/State "BM" No. 1	G-22	NE/4 SW/4	31	17	28
Hondo/State "A" No. 9	G-24	NE/4 SE/4	31	17	28
Gulf/NCT "C" No. 1	H-19	SW/4 SE/4	36	17	27
Amoco/State "BE" No. 1	H-21	SW/4 SW/4	31	17	28
Amoco/Malco "H" Fed. No. 9	I-10	NE/4 NW/4	3	18	27
Amoco/State "F" No. 8	I-18	NE/4 NW/4	1	18	27
Amoco/Malco "H" Fed. No. 2	J-12	SE/4 NE/4	3	18	27
Amoco/Windfohr Fed. No. 4	K-7	NW/4 SE/4	4	18	27
Exxon/CBDU "A" No. 8	M-6	SE/4 NW/4	9	18	27
Cities Service/Hudson A #1	J-10	SE/4 NW/4	3	18	27
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Exxon/CBDU "A" No. 7	P-5	330' FSL & 990' FWL	9	18	27
N/A	M-901	1300' FNL & 1220' FWL	10	18	27
N/A	L-111	2485' FEL & 20' FSL	3	18	27
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N/A	L-141	1360' FWL & 1050' FSL	2	18	27
N/A	K-182	2370' FWL & 1533' FSL	1	18	27
N/A	J-202	2490' FNL & 1299' FEL	1	18	27
N/A	J-223	2630' FNL & 1930' FWL	6	18	28
N/A	I-23	470' FNL & 2170' FEL	6	18	28
N/A	H-261	150' FSL & 1400' FWL	32	17	28
N/A	I-283	175' FNL & 300' FEL	5	18	28
N/A	H-302	1250' FSL & 1925' FWL	33	17	28
N/A	G-321	1520' FSL & 250' FEL	33	17	28
N/A	F-343	2300' FNL & 1675' FWL	34	17	28

EMPIRE ABO UNIT
1994 PRODUCTION HISTORY

Month	BO	BW	Gross Produced MCFG	Injected MCFG	Net MCFG
January	65,349	309,307	1,901,811	1,451,708	450,103
February	60,550	194,919	1,627,611	1,258,194	369,417
March	69,105	235,531	1,866,874	1,392,834	474,040
April	63,701	228,977	1,811,812	1,286,698	525,114
May	66,239	204,673	1,972,704	1,513,338	459,366
June	55,717	208,217	1,632,976	1,285,369	347,607
July	59,514	221,701	1,826,731	1,425,223	401,508
August	57,733	196,383	1,826,468	1,443,007	383,461
September	58,432	178,202	1,842,187	1,485,362	356,825
October	56,771	187,481	1,856,249	1,479,881	376,368
Totals	**613,111**	**2,165,391**	**18,165,423**	**14,021,614**	**4,143,809**

EMPIRE ABO UNIT



O/A Engineering, KEG EAUPROD.XLC

9:35 AM 2/9/95

EAU ABO UNIT GAS STORAGE GAS COMPANY OF NEW MEXICO											
	Jan-94	Feb-94	Mar-94	Apr-94	May-94	Jun-94	Jul-94	Aug-94	Sep-94	Oct-94	Nov-94
Balance Pre 11/90											
Cum. MMBTU Returnable Storage @14.65 PB	3753168	3753168	3753168	3753168	3753168	3753168	3753168	3753168	3753168	3753168	3753168
Cum. MCF Storage @ 14.65 PB	3854293	3854293	3854293	3854293	3854293	3854293	3854293	3854293	3854293	3854293	3854293
Balance Per 11/90 AGMNT											
MCF Injected per Day (Monthly Average)	0	0	0	0	0	0	0	0	0	0	0
Injected MCF @ 14.73 PB	0	0	0	0	0	0	0	0	0	0	0
Injected BTU @ 14.73 PB	0	0	0	0	0	0	0	0	0	0	0
Injected (MMBTU) @ 14.73 PB	0	0	0	0	0	0	0	0	85772	91616	43766
Injected by WNG (MMBTU) @14.73 PB	0	0	0	0	0	0	0	0	0	0	0
Withdrawn MCF @14.73 PB	43444	37344	29990	10900	0	0	0	0	0	0	0
Withdrawal BTU @ 14.73 PB	1.002	1.002	1.002	1.002	0	0	0	0	0	0	0
Withdrawn (MMBTU) @14.65 PB	43769	37623	30214	10981	0	0	0	0	0	0	0
Service Charge (12%) @ 14.65 PB	5252	4515	3626	1318	0	0	0	0	0	0	0
Total Due/<To Be Replaced> (MMBTU) @ 14.65	-121024	-163162	-197002	-209301	-209301	-209301	-209301	-209301	-123061	-30944	13061
Total Due/<To Be Replaced> (MMBTU) @ 14.73	-120367	-162276	-195932	-208164	-208164	-208164	-208164	-208164	-122392	-30776	12990
NOTES											
11/91 -7631 MCF Exempt from 12% adj.											
10/93 and 11/93 Withdrawals Exempt from 12%											
adjustment due to Plant pressure maint.											

ARCO Oil and Gas Company
Western Division
600 N. Marienfield
Midland, Texas 79701
Post Office Box 1610
Midland, Texas 79702
Telephone 915 688 5200

DIVISION

8 50

April 28, 1994

United States Department of the Interior
Bureau of Land Management
P.O. Drawer 1397
Roswell, New Mexico 88201

Attn: Mr. Tony L. Ferguson
Asst. District Manager

State of New Mexico
Mr. Jim Baca
Commissioner of Public Lands
P.O. Box 1148
Santa Fe, New Mexico 87501

Attn: Mr. Floyd O. Prando, Director (3)
Oil and Gas Division

State of New Mexico
Department of Energy and Minerals
P.O. Box 2088
Santa Fe, New Mexico 87501

Attn: Mr. William J. LeMay (3)
Division Director

Working Interest Owners
Empire Abo Unit
Eddy County, New Mexico

Gentlemen:

In compliance with Section 11 of the Unit Agreement, Empire Abo Unit, Eddy County, New Mexico, ARCO Oil and Gas Company, as Unit Operator, on behalf of itself and other participating working interest owners, hereby submits for your approval a Plan of Operation to cover the period beginning January 1, 1994, and extending through the remainder of calendar year 1994.

Yours very truly,

Gary B Smallwood

Gary B. Smallwood
Engineer

GBS:keg
Attachments

EMPIRE ABO UNIT
1994 Plan of Operation

SUBMITTED APRIL 4, 1994

1. Summary of the Plan of Operation for 1994

ARCO Oil and Gas Company proposes to continue operation of the Empire Abo Unit, Eddy County, New Mexico, substantially the same as in recent years. We will continue to reinject residue gas from the Phillips extraction plant and the Amoco extraction plant. Oil will be produced from the most efficient wells in order to maximize recovery. We may elect to sell up to 5 MMCFPD of residue gas. This would require an allowable change and NMOCD approval. Gas Company of New Mexico will be allowed to make emergency withdrawals of extraneous gas during the winter. The withdrawal will be replaced by Gas Company of New Mexico in the summer.

2. Project Area - Description and History

The Empire Abo Unit is located in portions of Sections 34, 35, 36, Township 17 South, Range 27 East; Sections 1, 2, 3, 4, 8, 9, 10, 11, 12, 15, 16, 17, Township 18 South, Range 27 East; Sections 25, 26, 27, 28, 31, 32, 33, 34, 35, 36, Township 17 South, Range 28 East; Sections 4, 5, 6, Township 18 South, Range 28 East; Sections 29, 30, Township 17 South, Range 29 East, Eddy County, New Mexico.

The Unit, as originally proposed, would have covered 11,399.15 acres. Certain tracts within the Unit Area did not qualify for participation as of October 1, 1973, the effective date of the Unit. These tracts are: 2, 6, 28, 41, 42, 46, 55, 56, 69, 79, 84, and 91. Total area of these tracts is 644.74 acres. The remaining 10,694.41 acres comprised the Project Area for pressure maintenance until September 1, 1975. On this date Tracts 41, 79, and 84 joined the Unit. The addition of these three tracts, which cover 120.03 acres, increased the total area of the Unit to 10,814.44 acres. Tracts 2, 6, 42, and 46 comprise the CITGO Empire Abo Unit, which received NMOCD approval in June 1974. The Unit Area is now disposed as follows:

	Acres
ARCO Empire Abo Unit	10,814.44
CITGO Empire Abo Unit	241.05
Non-Participating Tracts	283.66
Total Area	11,339.15

ARCO Oil and Gas Company operates a pressure maintenance project at the Empire Abo Unit. This project involves injection of plant residue gas from Abo production back into the Abo formation.

3. Current Performance

In December 1993, the Unitized Project Area averaged 2,224 BOPD with a 77 percent water cut and a gas-oil ratio of 28,999 cubic feet of gas per barrel of oil. Gas injection averaged 48,619 MCFPD (see attached Production History Plot).

Cumulative oil production from the Project Area through December 1993 was 214.1 MMBO. This is about 57.7 percent of the 371 MMBO originally in place. Cumulative net gas production from the Project Area through December 1993 was 304.7 BCF. This is about 65.1 percent of the 468 BCF originally in place. As of December 1993, the Unit has 199 active producing wells.

4. Basic Concepts Governing Future Unit Operations

- Field production history and reservoir numeric model studies have demonstrated that oil recovery is governed by gravity drainage and secondary gas cap expansion. We will be able to maximize the beneficial effects of these recovery mechanisms by observation of well performance and producing from the most efficient wells, those with the lowest GOR's. Natural gas liquid production from individual wells will also be considered when determining the most efficient wells in the future.
- Gas injection will help maintain reservoir pressure and control expansion of the secondary gas cap.

5. Discussion of Past, Current, and Future Operations

a) ***Gas Injection***

Fifteen gas injection wells along the north edge of the field and 16 new injection wells on the south edge handle all of the Empire Abo Unit injected gas. Table I lists these wells. Beginning in July 1974, and continuing through the latest month for which data is available (December 1993), all available plant residue gas has been injected into the Abo gas cap. The Unit receives plant residue gas at about 700 psi and compresses it to 2000 psi for injection. Superhydration facilities at the extraction plants reduce hydrogen sulfide content to minimize possible corrosion. A rigorous corrosion treatment program is maintained. Permits for the Gas Injection Facilities have been granted by the State of New Mexico Environmental Improvements Agency. We believe the injection facilities meet the requirements of the United States Geological Survey and the State of New Mexico.

b) ***Workovers***

An intensive workover program in previous years has been successful in maximizing low GOR production. The majority of the workovers consisted of recompleting wells lower in the reef. As a result of this program, almost all possible lower recompletions

have been performed. On the eastern portion of the field where water influx is occurring, workovers consisting of recompleting wells higher in the reef have been successful. We will continue to seek out wells with recompletion potential.

c) *Continuing Field Study*

In order to maximize future reserves, we will continue to maintain an intensive field surveillance program. We will also continue to evaluate alternate and enhanced recovery techniques.

d) *Injection of Non-Abo Gas*

Gas from non-Abo sources was delivered from the Gas Company of New Mexico (formerly Southern Union Gas Company) to the Empire Abo Unit. This began on June 18, 1976. The amount of gas stored in the Empire Abo Unit under the 1976 agreement through February 1989 is 3,753 MMMBTU or 3,854 MMCF. From November 1992 through March 1993, 400.5 MMBTU were withdrawn and 114.6 MMBTU were injected by Gas Company of New Mexico. From April 1993 through September 1993, 343.9 MMBTU were injected by Gas Company of New Mexico. Gas Company of New Mexico is underdelivered to the unit by 3.8 MMBTU as of September 30, 1993.

e) *Withdrawals of Non-Abo Gas*

Gas Company of New Mexico will be permitted to withdraw up to 300 MMCF of the extraneous stored gas for emergency use during the winter period, November 1 - March 31. The withdrawn gas will be replaced by Gas Company of New Mexico during the next summer season, April 1 - October 31.

f) *Voidage Limit Removal*

The voidage limit was replaced with a gas production limit of 65 MMCFPD in 1984. This will allow more efficient operation of the Unit. Also, the wet gas compressors were removed and the practice of injecting unprocessed gas was discontinued.

6. Modifications to Plan

It is understood that to meet changing conditions, this plan of operation may be modified from time to time, with the approval of the Supervisor of the U.S.G.S., the Commissioner of Public Lands of the State of New Mexico, and the Department of Energy and Minerals, Oil Conservation Division, State of New Mexico.

ARCO Oil and Gas Company, as Unit Operator, will act prudently to preserve the rights of the mineral owners, and to effectively and efficiently recover the Unit Area Reserves. This Company will meet all economical offset obligations, act to prevent waste, conserve natural resources, and protect correlative rights.

7. Effective Date and Duration of Plan

This Plan of Operation shall be effective January 1, 1994 and extend through the calendar year unless otherwise amended.

If this Plan of Operation meets with your approval, please sign on the next page and return one copy for our files.

Very truly yours,
ARCO Oil and Gas Company
OPERATOR

Gary B Smallwood

Gary B. Smallwood
Engineer

GBS:keg

APPROVED BY: _____ **DATE:** _____
District Manager
United States Department of the Interior
Bureau of Land Management - Roswell District

APPROVED BY: _____ **DATE:** _____
Commissioner of Public Lands
State of New Mexico

APPROVED BY: R. G. Johnson **DATE:** 5-10-94
For Division Director
Department of Energy and Minerals
Oil Conservation Division
State of New Mexico

TABLE I

EMPIRE ABO UNIT
Gas Injection Wells

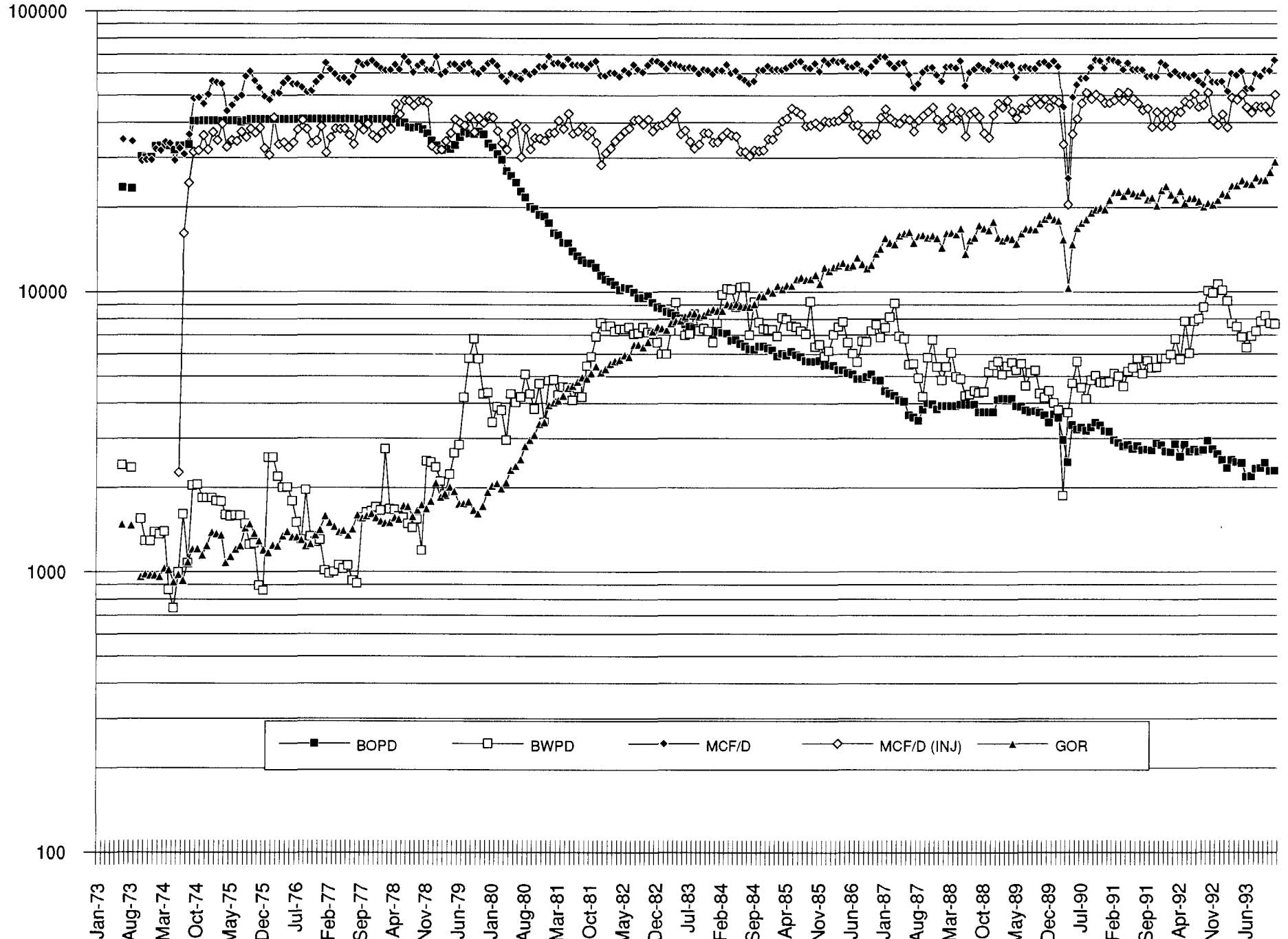
Previous Operator/ Lease and Well	Unit Well Designation	Location	Sec	Twp	Rng
Hondo/State "A" No. 24	C-39	NW/4 SE/4	26	17	28
Hondo/State "A" No. 16	D-37	SW/4 SW/4	26	17	28
Amoco/State "BV" No. 1	F-25	SW/4 NW/4	32	17	28
Hondo/State "A" No. 35	F-27	SW/4 NE/4	32	17	28
ARCO/M. Yates B (ARC) No. 8	F-31	SW/4 NE/4	33	17	28
Amoco/State "BM" No. 1	G-22	NE/4 SW/4	31	17	28
Hondo/State "A" No. 9	G-24	NE/4 SE/4	31	17	28
Gulf/NCT "C" No. 1	H-19	SW/4 SE/4	36	17	27
Amoco/State "BE" No. 1	H-21	SW/4 SW/4	31	17	28
Amoco/Malco "H" Fed. No. 9	I-10	NE/4 NW/4	3	18	27
Amoco/State "F" No. 8	I-18	NE/4 NW/4	1	18	27
Amoco/Malco "H" Fed. No. 2	J-12	SE/4 NE/4	3	18	27
Amoco/Windfohr Fed. No. 4	K-7	NW/4 SE/4	4	18	27
Exxon/CBDU "A" No. 8	M-6	SE/4 NW/4	9	18	27
Cities Service/Hudson A #1	J-10	SE/4 NW/4	3	18	27
Exxon/CBDU No. 13	*R-5	1980' FNL & 660' FWL	16	18	27
Exxon/CBDU "A" No. 7	P-5	330' FSL & 990' FWL	9	18	27
N/A	M-901	1300' FNL & 1220' FWL	10	18	27
N/A	L-111	2485' FEL & 20' FSL	3	18	27
N/A	L-131	100' FSL & 100' FWL	2	18	27
N/A	L-141	1360' FWL & 1050' FSL	2	18	27
N/A	*L-153	90' FSL & 1456' FEL	2	18	27
N/A	K-182	2370' FWL & 1533' FSL	1	18	27
N/A	J-202	2490' FNL & 1299' FEL	1	18	27
N/A	J-223	2630' FNL & 1930' FWL	6	18	28
N/A	I-23	470' FNL & 2170' FEL	6	18	28
N/A	H-261	150' FSL & 1400' FWL	32	17	28
N/A	I-283	175' FNL & 300' FEL	5	18	28
N/A	H-302	1250' FSL & 1925' FWL	33	17	28
N/A	*G-321	1520' FSL & 250' FEL	33	17	28
N/A	F-343	2300' FNL & 1675' FWL	34	17	28

* shut in -- waiting on NMOCD approval

EMPIRE ABO UNIT
1993 PRODUCTION HISTORY

Month	BO	BW	Gross Produced MCFG	Injected MCFG	Net MCFG
January	75,281	303,082	1,680,189	1,283,897	396,292
February	70,357	277,326	1,552,707	1,152,285	400,422
March	75,272	231,207	1,792,611	1,470,071	322,540
April	73,888	224,540	1,768,989	1,448,584	320,405
May	73,350	206,375	1,824,974	1,510,052	314,922
June	65,327	189,090	1,582,894	1,359,497	223,397
July	67,776	215,466	1,637,052	1,346,511	290,541
August	72,333	223,920	1,850,611	1,414,033	436,578
September	70,376	234,590	1,752,889	1,360,074	392,815
October	73,648	246,708	1,842,641	1,367,942	474,699
November	68,628	230,922	1,832,640	1,303,357	529,283
December	68,934	229,816	1,999,018	1,507,217	491,801
Totals	**855,170**	**2,813,042**	**21,117,215**	**16,523,520**	**4,593,695**

EMPIRE ABO UNIT



O/A Engineering, KEG EAUPROD.XLC

8:47 AM 4/4/94

State of New Mexico

OFFICE OF THE

Commissioner of Public Lands

Santa Fe

4952

JIM BACA
COMMISSIONER

P.O. BOX 1148
SANTA FE, NEW MEXICO 87504-1148

SLO REF NO. OG-1297

April 26, 1993

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

Attn: Mr. Gary B. Smallwood

Re: 1993 Plan of Development
Empire ABO Unit
Eddy County, New Mexico

Gentlemen:

The Commissioner of Public Lands has this date approved the above captioned Plan of Development. Our approval is subject to like approval by all other appropriate agencies.

The possibility of drainage by wells outside of the Unit Area and the need for further development of the unit may exist. You will be contacted at a later date regarding these possibilities.

If you have any questions, or if we may be of further help, please contact Pete Martinez at (505) 827-5791.

Very truly yours,

JIM BACA
COMMISSIONER OF PUBLIC LANDS

BY: Floyd O Prando
FLOYD O. PRANDO, Director
Oil and Gas Division
(505) 827-5744

JB/FOP/pm
cc: OCD
BLM

ARCO Oil and Gas Company
Western District
600 N. Marienfeld
Midland, Texas 79701
Post Office Box 1610
Midland, Texas 79702
Telephone 915 688 5200

DIVISION
JAN 8 56

April 15, 1993

United States Department of the Interior
Bureau of Land Management
P. O. Drawer 1397
Roswell, New Mexico 88201

Attn: Mr. Francis R. Cherry, Jr.
District Manager

State of New Mexico
Mr. Jim Baca
Commissioner of Public Lands
P. O. Box 1148
Santa Fe, New Mexico 87501

Attn: Mr. Floyd O. Prando, Director (3)
Oil and Gas Division

State of New Mexico
Department of Energy and Minerals
P. O. Box 2088
Santa Fe, New Mexico 87501

Attn: Mr. William J. LeMay (3)
Division Director

Working Interest Owners
Empire Abo Unit
Eddy County, New Mexico

Gentlemen:

In compliance with Section 11 of the Unit Agreement, Empire Abo Unit, Eddy County, New Mexico, ARCO Oil and Gas Company, as Unit Operator, on behalf of itself and other participating working interest owners, hereby submits for your approval a Plan of Operation to cover the period beginning January 1, 1993 and extending through the remainder of calendar year 1993.

Yours very truly,

Gary B Smallwood

Gary B. Smallwood
Senior Engineer

GBS:eeg
Attachments

ARCO Oil and Gas Company is a Division of Atlantic Richfield Company

EMPIRE ABO UNIT
1993 Plan of Operation

SUBMITTED MARCH 29, 1993

1. Summary of the Plan of Operation for 1993

ARCO Oil and Gas Company proposes to continue operation of the Empire Abo Unit, Eddy County, New Mexico, substantially the same as in recent years. We will continue to reinject all available residue gas from the Phillips extraction plant and the Amoco extraction plant. Oil will be produced from the most efficient wells in order to maximize recovery. Gas Company of New Mexico will be allowed to make emergency withdrawals of extraneous gas during the winter. The withdrawal will be replaced by Gas Company of New Mexico in the summer.

2. Project Area - Description and History

The Empire Abo Unit is located in portions of Sections 34, 35, 36, Township 17 South, Range 27 East; Sections 1, 2, 3, 4, 8, 9, 10, 11, 12, 15, 16, 17, Township 18 South, Range 27 East; Sections 25, 26, 27, 28, 31, 32, 33, 34, 35, 36, Township 17 South, Range 28 East; Sections 4, 5, 6, Township 18 South, Range 28 East; Sections 29, 30, Township 17 South, Range 29 East, Eddy County, New Mexico.

The Unit, as originally proposed, would have covered 11,399.15 acres. Certain tracts within the Unit Area did not qualify for participation as of October 1, 1973, the effective date of the Unit. These tracts are: 2, 6, 28, 41, 42, 46, 55, 56, 69, 79, 84, and 91. Total area of these tracts is 644.74 acres. The remaining 10,694.41 acres comprised the Project Area for pressure maintenance until September 1, 1975. On this date Tracts 41, 79, and 84 joined the Unit. The addition of these three tracts, which cover 120.03 acres, increased the total area of the Unit to 10,814.44 acres. Tracts 2, 6, 42, and 46 comprise the CITGO Empire Abo Unit, which received NMOCD approval in June 1974. The Unit Area is now disposed as follows:

	Acres
ARCO Empire Abo Unit	10,814.44
CITGO Empire Abo Unit	241.05
Non-Participating Tracts	283.66
Total Area	11,339.15

ARCO Oil and Gas Company operates a pressure maintenance project at the Empire Abo Unit. This project involves injection of plant residue gas from Abo production back into the Abo formation.

3. Current Performance

In December 1992, the Unitized Project Area averaged 2,539 BOPD with a 80.2 percent water cut and a gas-oil ratio of 21,222 cubic feet of gas per barrel of oil. Gas injection averaged 37,871 MCFPD (see attached Production History Plot).

Cumulative oil production from the Project Area through December 1992 was 213.3 MMBO. This is about 57.5 percent of the 371 MMBO originally in place. Cumulative net gas production from the Project Area through December 1992 was 300.2 BCF. This is about 64.2 percent of the 468 BCF originally in place. As of December 1992, the Unit has 204 active producing wells.

4. Basic Concepts Governing Future Unit Operations

- Field production history and reservoir numeric model studies have demonstrated that oil recovery is governed by gravity drainage and secondary gas cap expansion. We will be able to maximize the beneficial effects of these recovery mechanisms by observation of well performance and producing from the most efficient wells, those with the lowest GOR's. Natural gas liquid production from individual wells will also be considered when determining the most efficient wells in the future.
- Gas injection will help maintain reservoir pressure and control expansion of the secondary gas cap.

5. Discussion of Past, Current, and Future Operations

a) *Gas Injection*

Fifteen gas injection wells along the north edge of the field handle all of the Empire Abo Unit injected gas. Table I lists these wells. Beginning in July 1974, and continuing through the latest month for which data is available (December 1992), all available plant residue gas has been injected into the Abo gas cap. The Unit receives plant residue gas at about 700 psi and compresses it to 2000 psi for injection. Superhydration facilities at the extraction plants reduce hydrogen sulfide content to minimize possible corrosion. A rigorous corrosion treatment program is maintained. Permits for the Gas Injection Facilities have been granted by the State of New Mexico Environmental Improvements Agency. We believe the injection facilities meet the requirements of the United States Geological Survey and the State of New Mexico.

b) *Workovers*

An intensive workover program in previous years has been successful in maximizing low GOR production. The majority of the workovers consisted of recompleting wells lower in the reef. As a result of this program, almost all possible lower recompletions have been performed. On the eastern portion of the field where water influx is

occurring, workovers consisting of recompleting wells higher in the reef have been successful. We will continue to seek out wells with recompletion potential.

c) ***Continuing Field Study***

In order to maximize future reserves, we will continue to maintain an intensive field surveillance program. We will also continue to evaluate alternate and enhanced recovery techniques.

d) ***Injection of Non-Abo Gas***

Gas from non-Abo sources was delivered from the Gas Company of New Mexico (formerly Southern Union Gas Company) to the Empire Abo Unit. This began on June 18, 1976. The amount of gas stored in the Empire Abo Unit under the 1976 agreement through February 1989 is 3,753 MMMBTU or 3,854 MMCF. From February 1989 through October 1992, 516.4 MMCF were injected and 544.2 MMCF were withdrawn by Gas of New Mexico. Gas Company of New Mexico is underdelivered to the unit by 92.2 MMCF as of October 1992.

e) ***Withdrawals of Non-Abo Gas***

Gas Company of New Mexico will be permitted to withdraw up to 300 MMCF of the extraneous stored gas for emergency use during the winter period, November 1 - March 31. The withdrawn gas will be replaced by Gas Company of New Mexico during the next summer season, April 1 - October 31.

f) ***Voidage Limit Removal***

The voidage limit was replaced with a gas production limit of 65 MMCFPD in 1984. This will allow more efficient operation of the Unit. Also, the wet gas compressors were removed and the practice of injecting unprocessed gas was discontinued.

6. Modifications to Plan

It is understood that to meet changing conditions, this plan of operation may be modified from time to time, with the approval of the Supervisor of the U.S.G.S., the Commissioner of Public Lands of the State of New Mexico, and the Department of Energy and Minerals, Oil Conservation Division, State of New Mexico.

ARCO Oil and Gas Company, as Unit Operator, will act prudently to preserve the rights of the mineral owners, and to effectively and efficiently recover the Unit Area Reserves. This Company will meet all economical offset obligations, act to prevent waste, conserve natural resources, and protect correlative rights.

7. Effective Date and Duration of Plan

This Plan of Operation shall be effective January 1, 1993 and extend through the calendar year unless otherwise amended.

If this Plan of Operation meets with your approval, please sign on the next page and return one copy for our files.

Very truly yours,
ARCO Oil and Gas Company
OPERATOR

Gary B. Smallwood
Senior Engineer

GBS:eeg

APPROVED BY: _____ **DATE:** _____

District Manager
United States Department of the Interior
Bureau of Land Management - Roswell District

APPROVED BY: _____ **DATE:** _____

Commissioner of Public Lands
State of New Mexico

APPROVED BY: _____ **DATE:** 4-19-93

for Division Director
Department of Energy and Minerals
Oil Conservation Division
State of New Mexico

TABLE I

EMPIRE ABO UNIT
Gas Injection Wells

Previous Operator/ Lease and Well	Unit Well Designation	Location (Sec.-Twp-Rng)			
Hondo/State "A" No. 24	C-39	NW/4 SE/4	26	17	28
Hondo/State "A" No. 16	D-37	SW/4 SW/4	26	17	28
Amoco/State "BV" No. 1	F-25	SW/4 NW/4	32	17	28
Hondo/State "A" No. 35	F-27	SW/4 NE/4	32	17	28
ARCO/M. Yates B (ARC) No. 8	F-31	SW/4 NE/4	33	17	28
Amoco/State "BM" No. 1	G-22	NE/4 SW/4	31	17	28
Hondo/State "A" No. 9	G-24	NE/4 SE/4	31	17	28
Gulf/NCT "C" No. 1	H-19	SW/4 SE/4	36	17	27
Amoco/State "BE" No. 1	H-21	SW/4 SW/4	31	17	28
Amoco/Malco "H" Fed. No. 9	I-10	NE/4 NW/4	3	18	27
Amoco/State "F" No. 8	I-18	NE/4 NW/4	1	18	27
Amoco/Malco "H" Fed. No. 2	J-12	SE/4 NE/4	3	18	27
Amoco/Windfohr Fed. No. 4	K-7	NW/4 SE/4	4	18	27
Exxon/CBDU "A" No. 8	M-6	SE/4 NW/4	9	18	27
Cities Service/Hudson A #1	J-10	SE/4 NW/4	3	18	27

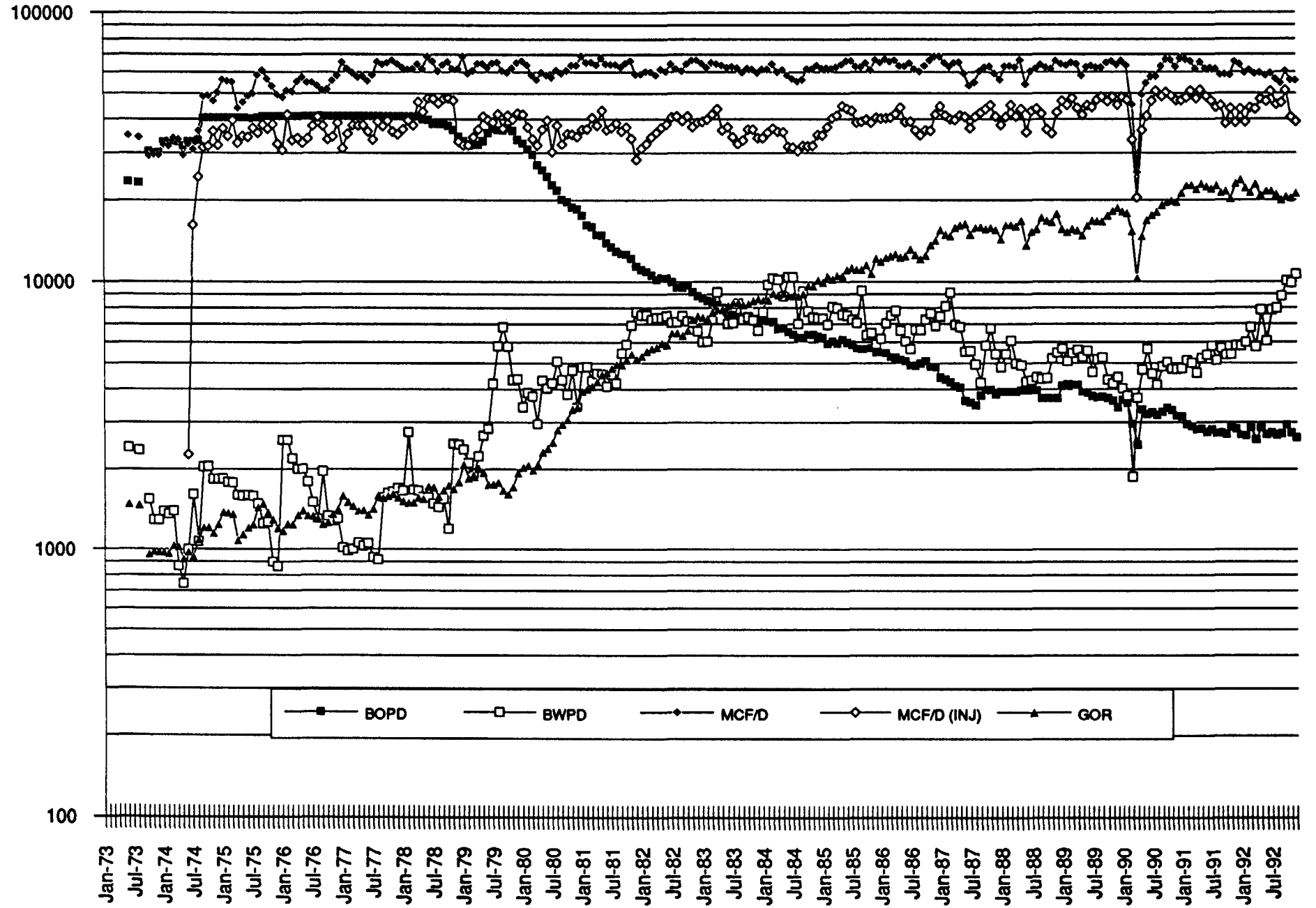
GBS:eeg
03/22/93

EMPIRE ABO UNIT
1992 PRODUCTION HISTORY

Month	BO	BW	Gross MCFG	Injected MCFG	Net MCFG
January	83,513	179,201	1,987,396	1,353,823	633,573
February	82,952	185,313	1,842,521	1,208,948	633,573
March	88,487	210,509	1,891,687	1,366,124	525,563
April	77,374	171,954	1,770,893	1,311,250	459,643
May	88,367	243,199	1,843,599	1,471,291	372,308
June	80,691	181,309	1,743,172	1,400,604	342,568
July	82,097	235,555	1,775,895	1,523,815	252,080
August	80,549	239,558	1,692,600	1,362,864	329,736
September	81,436	264,389	1,636,360	1,384,778	251,582
October	87,873	301,685	1,815,550	1,532,794	282,756
November	81,995	296,437	1,676,762	1,222,825	453,937
December	78,719	319,317	1,670,597	1,173,986	496,611
Totals	994,053	2,828,426	21,347,032	16,313,102	5,033,930

GBS:eeg
03/22/93

EMPIRE ABO UNIT



EEG 4/15/93

#4952

ARCO Oil and Gas Company
Western Division
600 N. Marienfeld
Midland, Texas 79701
Post Office Box 1610
Midland, Texas 79702
Telephone 915 688-5100

OIL CONSERVATION DIVISION
RECEIVED
'92 APR 6 AM 9 06

April 1, 1992

United States Department of the Interior
Bureau of Land Management
P. O. Drawer 1397
Roswell, New Mexico 88201

Attn: Mr. Francis R. Cherry, Jr.
District Manager

State of New Mexico
Mr. Bill Humphries
Commissioner of Public Lands
P. O. Box 1148
Santa Fe, New Mexico 87501

Attn: Mr. Floyd O. Prando, Director (3)
Oil and Gas Division

State of New Mexico
Department of Energy and Minerals
P. O. Box 2088
Santa Fe, New Mexico 87501

Attn: Mr. William J. LeMay (3)
Division Director

Gentlemen:

In compliance with Section 11 of the Unit Agreement, Empire Abo Unit, Eddy County, New Mexico, ARCO Oil and Gas Company, as Unit Operator, on behalf of itself and other participating working interest owners, hereby submits for your approval the 1992 Plan of Operation.

Yours very truly,

Gary B Smallwood

Gary B. Smallwood
Senior Engineer

GBS:eeg

Attachments

EMPIRE ABO UNIT
1992 Plan of Operation

SUBMITTED MARCH 16, 1992

1. Summary of the Plan of Operation for 1992

ARCO Oil and Gas Company proposes to continue operation of the Empire Abo Unit, Eddy County, New Mexico, substantially the same as in recent years. We will continue to reinject all available residue gas from the Phillips extraction plant and the Amoco extraction plant. Oil will be produced from the most efficient wells in order to maximize recovery. Gas Company of New Mexico will be allowed to make emergency withdrawals of extraneous gas during the winter. The withdrawal will be replaced by Gas Company of New Mexico in the summer.

2. Project Area - Description and History

The Empire Abo Unit is located in portions of Sections 34, 35, 36, Township 17 South, Range 27 East; Sections 1, 2, 3, 4, 8, 9, 10, 11, 12, 15, 16, 17, Township 18 South, Range 27 East; Sections 25, 26, 27, 28, 31, 32, 33, 34, 35, 36, Township 17 South, Range 28 East; Sections 4, 5, 6, Township 18 South, Range 28 East; Sections 29, 30, Township 17 South, Range 29 East, Eddy County, New Mexico.

The Unit, as originally proposed, would have covered 11,399.15 acres. Certain tracts within the Unit Area did not qualify for participation as of October 1, 1973, the effective date of the Unit. These tracts are: 2, 6, 28, 41, 42, 46, 55, 56, 69, 79, 84, and 91. Total area of these tracts is 644.74 acres. The remaining 10,694.41 acres comprised the Project Area for pressure maintenance until September 1, 1975. On this date Tracts 41, 79, and 84 joined the Unit. The addition of these three tracts, which cover 120.03 acres, increased the total area of the Unit to 10,814.44 acres. Tracts 2, 6, 42, and 46 comprise the CITGO Empire Abo Unit, which received NMOCD approval in June, 1974. The Unit Area is now disposed as follows:

	Acres
ARCO Empire Abo Unit	10,814.44
CITGO Empire Abo Unit	241.05
Non-Participating Tracts	283.66
Total Area	11,339.15

ARCO Oil and Gas Company operates a pressure maintenance project at the Empire Abo Unit. This project involves injection of plant residue gas from Abo production back into the Abo formation.

3. Current Performance

In December, 1991, the Unitized Project Area averaged 2,839 BOPD with a 67.2 percent water cut and a gas-oil ratio of 23,085 cubic feet of gas per barrel of oil. Gas injection averaged 38,874 MCFPD (see attached Production History Plot).

Cumulative oil production from the Project Area through December, 1991 was 212.3 MMBO. This is about 57.2 percent of the 371 MMBO originally in place. Cumulative net gas production from the Project Area through December, 1991 was 278.9 BCF. This is about 59.5 percent of the 468 BCF originally in place. As of December, 1991, the Unit has 205 active producing wells.

4. Basic Concepts Governing Future Unit Operations

- Field production history and reservoir numeric model studies have demonstrated that oil recovery is governed by gravity drainage and secondary gas cap expansion. We will be able to maximize the beneficial effects of these recovery mechanisms by observation of well performance and producing from the most efficient wells, those with the lowest GOR's. Natural gas liquid production from individual wells will also be considered when determining the most efficient wells in the future.
- Gas injection will help maintain reservoir pressure and control expansion of the secondary gas cap.

5. Discussion of Past, Current, and Future Operations

a) ***Gas Injection***

Fifteen gas injection wells along the north edge of the field handle all of the Empire Abo Unit injected gas. Table I lists these wells. Beginning in July, 1974, and continuing through the latest month for which data is available (December, 1991), all available plant residue gas has been injected into the Abo gas cap. The Unit receives plant residue gas at about 700 psi and compresses it to 2000 psi for injection. Superhydration facilities at the extraction plants reduce hydrogen sulfide content to

minimize possible corrosion. A rigorous corrosion treatment program is maintained. Permits for the Gas Injection Facilities have been granted by the State of New Mexico Environmental Improvements Agency. We believe the injection facilities meet the requirements of the United States Geological Survey and the State of New Mexico.

b) ***Workovers***

An intensive workover program in previous years has been successful in maximizing low GOR production. The majority of the workovers consisted of recompleting wells lower in the reef. As a result of this program, almost all possible lower recompletions have been performed. On the eastern portion of the field where water influx is occurring, workovers consisting of recompleting wells higher in the reef have been successful. We will continue to seek out wells with recompletion potential.

c) ***Continuing Field Study***

In order to maximize future reserves, we will continue to maintain an intensive field surveillance program. We will also continue to evaluate alternate and enhanced recovery techniques.

d) ***Injection of Non-Abo Gas***

Gas from non-Abo sources was delivered from the Gas Company of New Mexico (formerly Southern Union Gas Company) to the Empire Abo Unit. This began on June 18, 1976. Cumulative outside gas injected through December, 1991 was 4,134.6 MMCF. Cumulative gas delivered back to the supplier through December, 1991 was 655.84 MMCF and the net cumulative non-Abo gas bank was 3,478.8 MMCF.

e) ***Withdrawals of Non-Abo Gas***

Gas Company of New Mexico will be permitted to withdraw up to 300 MMCF of the extraneous stored gas for emergency use during the winter period, November 1 - March 31. The withdrawn gas will be replaced by Gas Company of New Mexico during the next summer season, April 1 - October 31.

f) ***Voidage Limit Removal***

The voidage limit was replaced with a gas production limit of 65 MMCFPD in 1984. This will allow more efficient operation of the Unit. Also, the wet gas compressors were removed and the practice of injecting unprocessed gas was discontinued.

6. Modifications to Plan

It is understood that to meet changing conditions, this plan of operation may be modified from time to time, with the approval of the Supervisor of the U.S.G.S., the Commissioner of Public Lands of the State of New Mexico, and the Department of Energy and Minerals, Oil Conservation Division, State of New Mexico.

ARCO Oil and Gas Company, as Unit Operator, will act prudently to preserve the rights of the mineral owners, and to effectively and efficiently recover the Unit Area Reserves. This Company will meet all economical offset obligations, act to prevent waste, conserve natural resources, and protect correlative rights.

7. Effective Date and Duration of Plan

This Plan of Operation shall be effective January 1, 1992 and extend through the calendar year unless otherwise amended.

If this Plan of Operation meets with your approval, please sign on the next page and return one copy for our files.

Very truly yours,
ARCO Oil and Gas Company
OPERATOR

Gary B. Smallwood
Senior Engineer

GBS:eeg

APPROVED BY: _____ **DATE:** _____

District Manager
United States Department of the Interior
Bureau of Land Management - Roswell District

APPROVED BY: _____ **DATE:** _____

Commissioner of Public Lands
State of New Mexico

APPROVED BY: _____ **DATE:** 4-6-92

~~Division Director~~
Department of Energy and Minerals
Oil Conservation Division
State of New Mexico

EMPIRE ABO UNIT
1991 PRODUCTION HISTORY

Month	BO	BW	Gross MCFG	Injected MCFG	Net MCFG
January	98,069	147,529	2,087,037	1,454,832	632,205
February	82,568	142,870	1,870,328	1,345,656	524,672
March	89,711	154,612	2,041,814	1,582,867	458,947
April	84,199	137,602	1,852,277	1,433,618	418,659
May	88,020	161,312	2,002,446	1,592,401	410,045
June	82,502	160,888	1,852,893	1,458,857	394,036
July	87,164	179,438	1,922,965	1,448,796	474,169
August	84,542	158,327	1,915,049	1,373,037	542,012
September	82,193	170,264	1,755,723	1,351,109	404,614
October	84,001	166,155	1,820,764	1,195,197	625,567
November	86,378	161,014	1,750,693	1,312,540	438,153
December	88,016	180,184	2,031,840	1,205,102	826,738
Totals	1,037,363	1,920,195	22,903,829	16,754,012	6,149,817

GBS:eeg
03/16/92

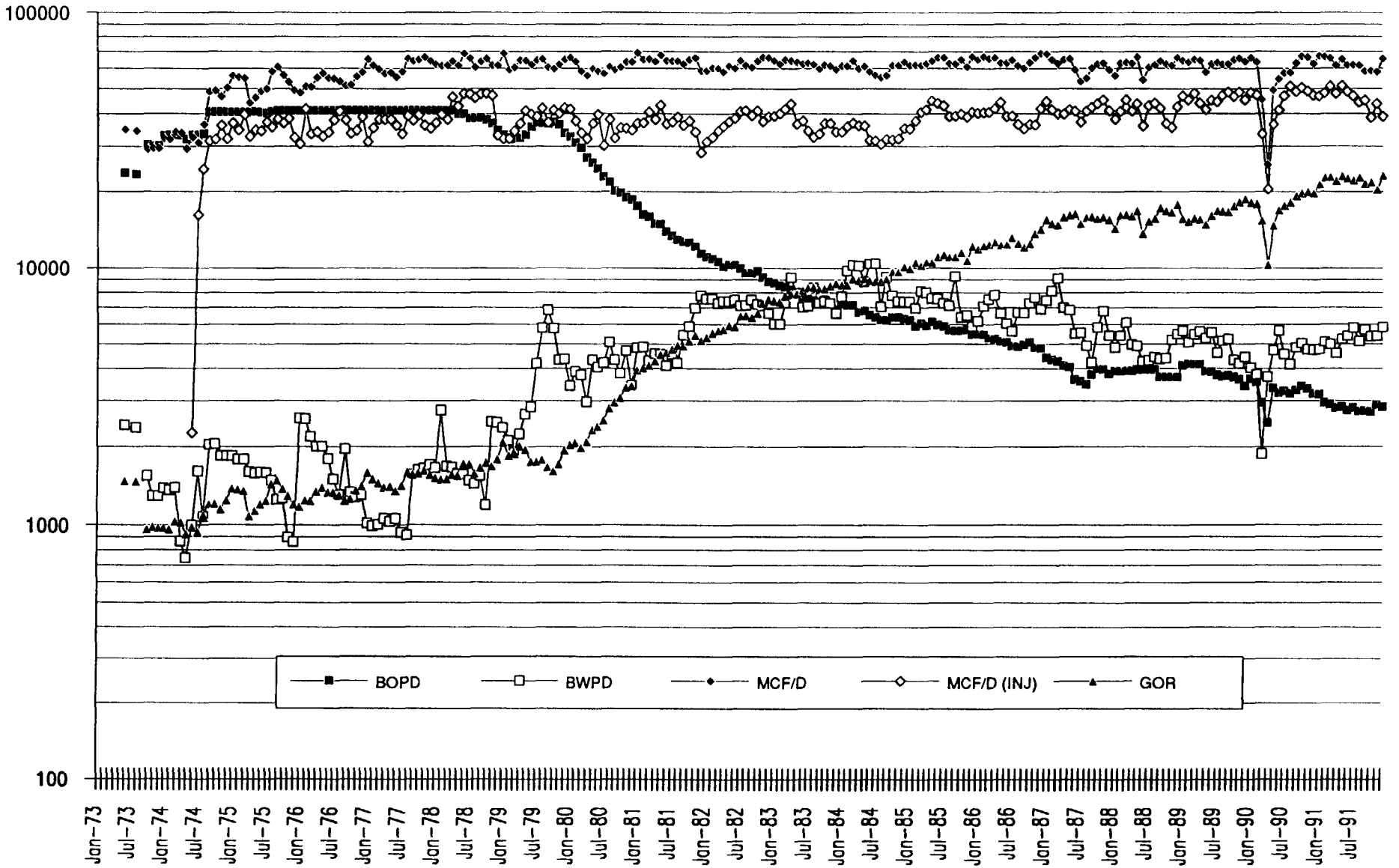
TABLE I

EMPIRE ABO UNIT
Gas Injection Wells

Previous Operator/ Lease and Well	Unit Well Designation	Location (Sec.-Twp-Rng)			
Hondo/State "A" No. 24	C-39	NW/4 SE/4	26	17	28
Hondo/State "A" No. 16	D-37	SW/4 SW/4	26	17	28
Amoco/State "BV" No. 1	F-25	SW/4 NW/4	32	17	28
Hondo/State "A" No. 35	F-27	SW/4 NE/4	32	17	28
ARCO/M. Yates B (ARC) No. 8	F-31	SW/4 NE/4	33	17	28
Amoco/State "BM" No. 1	G-22	NE/4 SW/4	31	17	28
Hondo/State "A" No. 9	G-24	NE/4 SE/4	31	17	28
Gulf/NCT "C" No. 1	H-19	SW/4 SE/4	36	17	27
Amoco/State "BE" No. 1	H-21	SW/4 SW/4	31	17	28
Amoco/Malco "H" Fed. No. 9	I-10	NE/4 NW/4	3	18	27
Amoco/State "F" No. 8	I-18	NE/4 NW/4	1	18	27
Amoco/Malco "H" Fed. No. 2	J-12	SE/4 NE/4	3	18	27
Amoco/Windfohr Fed. No. 4	K-7	NW/4 SE/4	4	18	27
Exxon/CBDU "A" No. 8	M-6	SE/4 NW/4	9	18	27
Cities Service/Hudson A #1	J-10	SE/4 NW/4	3	18	27

GBS:eeg
03/16/92

EMPIRE ABO UNIT



EEG 2/26/92

ARCO Oil and Gas Company
Central District
Post Office Box 1610
Midland, Texas 79702
Telephone 915 688 5200

OIL CONSERVATION DIVISION
RECEIVED
'91 MAR 21 AM 9 17

#4952

March 15, 1991

United States Department of the Interior
Bureau of Land Management
P. O. Drawer 1397
Roswell, New Mexico 88201

Attn: Mr. Francis R. Cherry, Jr.
District Manager

State of New Mexico
Mr. Bill Humphries
Commissioner of Public Lands
P. O. Box 1148
Santa Fe, New Mexico 87501

Attn: Mr. Floyd O. Prando, Director (3)
Oil and Gas Division

State of New Mexico
Department of Energy and Minerals
P. O. Box 2088
Santa Fe, New Mexico 87501

Attn: Mr. William J. LeMay (3)
Division Director

Gentlemen:

In compliance with Section 11 of the Unit Agreement, Empire Abo Unit, Eddy County, New Mexico, ARCO Oil and Gas Company, as Unit Operator, on behalf of itself and other participating working interest owners, hereby submits for your approval the 1991 Plan of Operation.

Yours very truly,

Gary B. Smallwood

Gary B. Smallwood
Senior Engineer

GBS:eeg

Attachments

EMPIRE ABO UNIT
1991 Plan of Operation

SUBMITTED FEBRUARY 15, 1991

1. Summary of the Plan of Operation for 1991

ARCO Oil and Gas Company proposes to continue operation of the Empire Abo Unit, Eddy County, New Mexico, substantially the same as in recent years. We will continue to reinject all available residue gas from the Phillips extraction plant and the Amoco extraction plant. Oil will be produced from the most efficient wells in order to maximize recovery. Gas Company of New Mexico will be allowed to make emergency withdrawals of extraneous gas during the winter. The withdrawal will be replaced by Gas Company of New Mexico in the summer.

2. Project Area - Description and History

The Empire Abo Unit is located in portions of Sections 34, 35, 36, Township 17 South, Range 27 East; Sections 1, 2, 3, 4, 8, 9, 10, 11, 12, 15, 16, 17, Township 18 South, Range 27 East; Sections 25, 26, 27, 28, 31, 32, 33, 34, 35, 36, Township 17 South, Range 28 East; Sections 4, 5, 6, Township 18 South, Range 28 East; Sections 29, 30, Township 17 South, Range 29 East, Eddy County, New Mexico.

The Unit, as originally proposed, would have covered 11,399.15 acres. Certain tracts within the Unit Area did not qualify for participation as of October 1, 1973, the effective date of the Unit. These tracts are: 2, 6, 28, 41, 42, 46, 55, 56, 69, 79, 84, and 91. Total area of these tracts is 644.74 acres. The remaining 10,694.41 acres comprised the Project Area for pressure maintenance until September 1, 1975. On this date Tracts 41, 79, and 84 joined the Unit. The addition of these three tracts, which cover 120.03 acres, increased the total area of the Unit to 10,814.44 acres. Tracts 2, 6, 42, and 46 comprise the CITGO Empire Abo Unit, which received NMOCD approval in June, 1974. The Unit Area is now disposed as follows:

	Acres
ARCO Empire Abo Unit	10,814.44
CITGO Empire Abo Unit	241.05
Non-Participating Tracts	283.66
Total Area	11,339.15

ARCO Oil and Gas Company operates a pressure maintenance project at the Empire Abo Unit. This project involves injection of plant residue gas from Abo production back into the Abo formation.

3. Current Performance

In December, 1990, the Unitized Project Area averaged 3,189 BOPD with a 59.7 percent water cut and a gas-oil ratio of 19,695 cubic feet of gas per barrel of oil. Gas injection averaged 47,025 MCFPD (see attached Production History Plot).

Cumulative oil production from the Project Area through December, 1990 was 211.3 MMBO. This is about 56.9 percent of the 371 MMBO originally in place. Cumulative net gas production from the Project Area through December, 1990 was 272.8 BCF. This is about 58.3 percent of the 468 BCF originally in place. As of December, 1990, the Unit has 210 active producing wells.

4. Basic Concepts Governing Future Unit Operations

- Field production history and reservoir numeric model studies have demonstrated that oil recovery is governed by gravity drainage and secondary gas cap expansion. We will be able to maximize the beneficial effects of these recovery mechanisms by observation of well performance and producing from the most efficient wells, those with the lowest GOR's. Natural gas liquid production from individual wells will also be considered when determining the most efficient wells in the future.
- Gas injection will help maintain reservoir pressure and control expansion of the secondary gas cap.

5. Discussion of Past, Current, and Future Operations

a) ***Gas Injection***

Fifteen gas injection wells along the north edge of the field handle all of the Empire Abo Unit injected gas. Table I lists these wells. Beginning in July, 1974, and continuing through the latest month for which data is available (December, 1990), all available plant residue gas has been injected into the Abo gas cap. The Unit receives plant residue gas at about 700 psi and compresses it to 2000 psi for injection. Superhydration facilities at the extraction plants reduce hydrogen sulfide content to minimize possible corrosion. A rigorous corrosion treatment program is maintained. Permits for the Gas Injection Facilities have been granted by the State of New Mexico Environmental Improvements Agency. We believe the injection facilities meet the requirements of the United States Geological Survey and the State of New Mexico.

b) *Workovers*

An intensive workover program in previous years has been successful in maximizing low GOR production. The majority of the workovers consisted of recompleting wells lower in the reef. As a result of this program, almost all possible lower recompletions have been performed. On the eastern portion of the field where water influx is occurring, workovers consisting of recompleting wells higher in the reef have been successful. We will continue to seek out wells with recompletion potential. In 1990, we converted the Empire Abo Unit No. J-10 to gas injection and have plans to convert the No. J-13 to gas injection in 1991. These conversions will increase recovery by balancing the Unit's gas injection and providing pressure support to low pressure areas of the Unit.

c) ***Continuing Field Study***

In order to maximize future reserves, we will continue to maintain an intensive field surveillance program. We will also continue to evaluate alternate and enhanced recovery techniques.

d) ***Injection of Non-Abo Gas***

Gas from non-Abo sources was delivered from the Gas Company of New Mexico (formerly Southern Union Gas Company) to the Empire Abo Unit. This began on June 18, 1976. Cumulative outside gas injected through December, 1990 was 4,106.33 MMCF. Cumulative gas delivered back to the supplier through December, 1990 was 462.2 MMCF and the net cumulative non-Abo gas bank was 3,644.1 MMCF.

e) ***Withdrawals of Non-Abo Gas***

Gas Company of New Mexico will be permitted to withdraw up to 300 MMCF of the extraneous stored gas for emergency use during the winter period, November 1 - March 31. The withdrawn gas will be replaced by Gas Company of New Mexico during the next summer season, April 1 - October 31.

f) ***Voidage Limit Removal***

The voidage limit was replaced with a gas production limit of 65 MMCFPD in 1984. This will allow more efficient operation of the Unit. Also, the wet gas compressors were removed and the practice of injecting unprocessed gas was discontinued.

6. Modifications to Plan

It is understood that to meet changing conditions, this plan of operation may be modified from time to time, with the approval of the Supervisor of the U.S.G.S., the Commissioner of Public Lands of the State of New Mexico, and the Department of Energy and Minerals, Oil Conservation Division, State of New Mexico.

ARCO Oil and Gas Company, as Unit Operator, will act prudently to preserve the rights of the mineral owners, and to effectively and efficiently recover the Unit Area Reserves. This Company will meet all economical offset obligations, act to prevent waste, conserve natural resources, and protect correlative rights.

7. Effective Date and Duration of Plan

This Plan of Operation shall be effective January 1, 1991 and extend through the calendar year unless otherwise amended.

If this Plan of Operation meets with your approval, please sign on the next page and return one copy for our files.

Very truly yours,
ARCO Oil and Gas Company
OPERATOR

Gary B. Smallwood
Senior Engineer

GBS:eeg

APPROVED BY: _____ DATE: _____

District Manager
United States Department of the Interior
Bureau of Land Management - Roswell District

APPROVED BY: _____ DATE: _____

Commissioner of Public Lands
State of New Mexico

APPROVED BY: _____ DATE: 3-21-91

~~Division Director~~
Department of Energy and Minerals
Oil Conservation Division
State of New Mexico

TABLE I

EMPIRE ABO UNIT
Gas Injection Wells

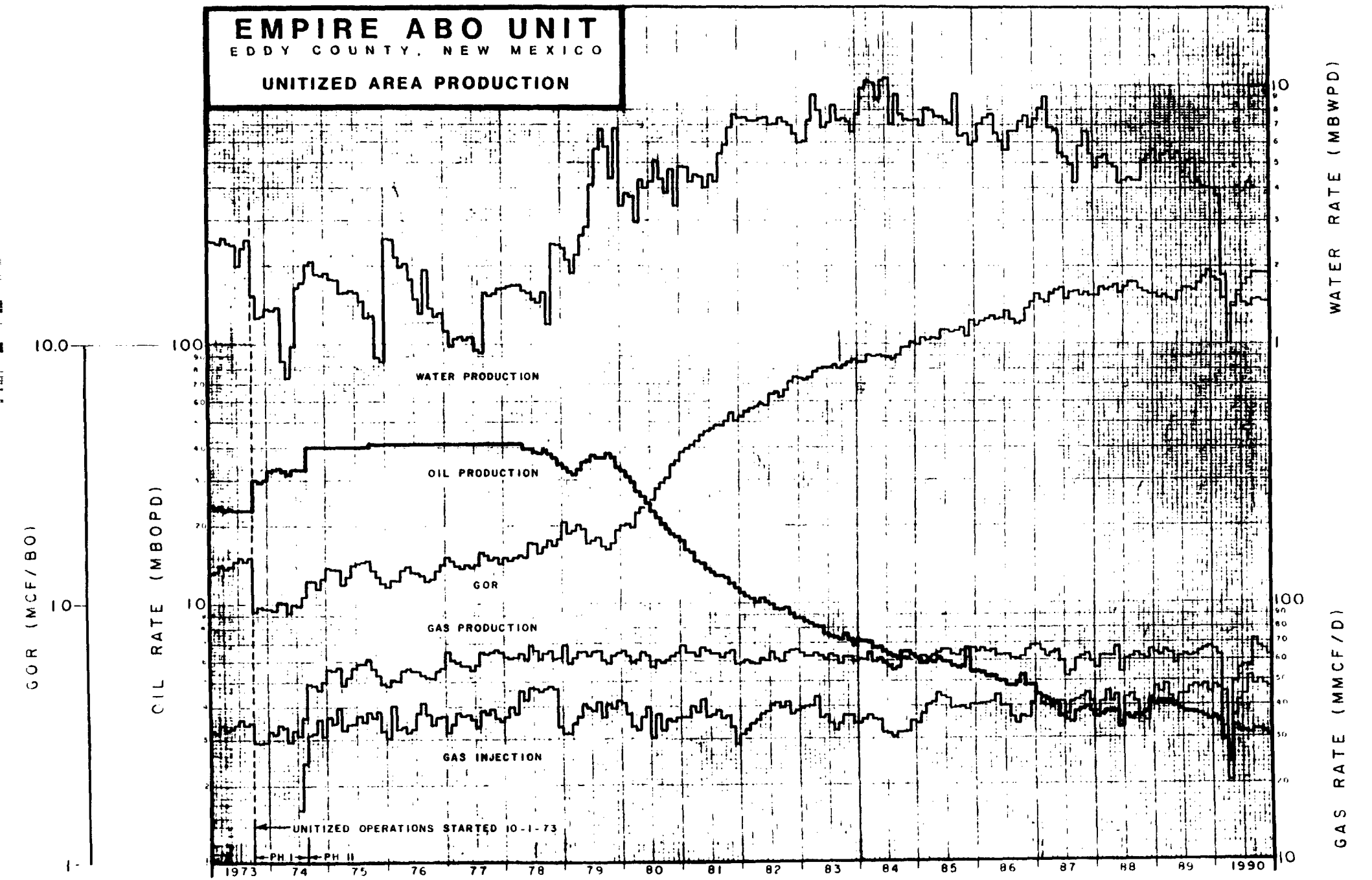
Previous Operator/ Lease and Well	Unit Well Designation	Location (Sec.-Twp-Rng)			
Hondo/State "A" No. 24	C-39	NW/4 SE/4	26	17	28
Hondo/State "A" No. 16	D-37	SW/4 SW/4	26	17	28
Amoco/State "BV" No. 1	F-25	SW/4 NW/4	32	17	28
Hondo/State "A" No. 35	F-27	SW/4 NE/4	32	17	28
ARCO/M. Yates B (ARC) No. 8	F-31	SW/4 NE/4	33	17	28
Amoco/State "BM" No. 1	G-22	NE/4 SW/4	31	17	28
Hondo/State "A" No. 9	G-24	NE/4 SE/4	31	17	28
Gulf/NCT "C" No. 1	H-19	SW/4 SE/4	36	17	27
Amoco/State "BE" No. 1	H-21	SW/4 SW/4	31	17	28
Amoco/Malco "H" Fed. No. 9	I-10	NE/4 NW/4	3	18	27
Amoco/State "F" No. 8	I-18	NE/4 NW/4	1	18	27
Amoco/Malco "H" Fed. No. 2	J-12	SE/4 NE/4	3	18	27
Amoco/Windfohr Fed. No. 4	K-7	NW/4 SE/4	4	18	27
Exxon/CBDU "A" No. 8	M-6	SE/4 NW/4	9	18	27
Cities Service/Hudson A #1	J-10	SE/4 NW/4	3	18	27

GBS:eeg
02/15/91

EMPIRE ABO UNIT
1990 PRODUCTION HISTORY

Month	BO	BW	Gross MCFG	Injected MCFG	Net MCFG
January	113,005	124,600	2,050,366	1,494,951	555,415
February	99,257	105,788	1,777,839	1,319,546	458,293
March	91,535	58,042	1,409,616	1,037,207	372,409
April	73,833	111,064	762,048	612,893	149,155
May	103,666	145,908	1,529,593	1,126,608	402,985
June	96,748	169,020	1,635,865	1,237,824	398,041
July	101,232	141,065	1,780,853	1,450,277	330,576
August	98,909	128,507	1,790,259	1,583,638	206,621
September	98,605	144,979	1,889,751	1,459,299	430,452
October	105,540	155,718	2,077,223	1,561,299	515,878
November	99,933	142,311	1,995,251	1,466,080	529,171
December	98,865	146,573	1,947,152	1,457,780	489,372
Totals	1,181,128	1,573,575	20,645,816	15,807,402	4,838,368

GBS:eeg
02/13/91


EMPIRE ABO UNIT
EDDY COUNTY, NEW MEXICO
UNITIZED AREA PRODUCTION
WATER PRODUCTION
OIL PRODUCTION
GOR
GAS PRODUCTION
GAS INJECTION
UNITIZED OPERATIONS STARTED 10-1-73
PH I
PH II
GOR (MCF/BO)
OIL RATE (MBOPD)
WATER RATE (MBWPD)
GAS RATE (MMCF/D)
10.0
1
100
10
1000
100
10
1973
74
75
76
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78
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1990

ARCO Oil and Gas Company
Central District
Post Office Box 1610
Midland, Texas 79702
Telephone 915 688 5200

OIL CONSERVATION DIVISION
RECEIVED
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Case 4952

October 25, 1991

Energy and Natural Resources Department
State of New Mexico Oil Conservation Division
P. O. Box 2088
State Land Office Building
Santa Fe, New Mexico 87504

Attn: Mr. William LeMay, Director

Re: Empire Abo Pressure Maintenance Project

On Monday, October 28, 1991, the Empire Abo Unit, operated by ARCO Oil and Gas Company, will experience a one-day operational upset, which will result in the Unit's being unable to reinject a volume of produced gas, estimated to be approximately 8000 MMBTU's during a period of roughly eight hours. Although this upset is foreseen, it cannot be postponed. Gas Company of New Mexico, cooperating with ARCO in efforts to prevent a waste of natural gas, has agreed to accept that volume of gas, which would otherwise be flared and lost, into its pipeline. Gas Company further agrees to reinject into the Empire Abo Unit a volume of gas equal to the volume of gas received during this upset period.

Since this singular occurrence is outside the time period included in "winter season" as set forth in Oil Conservation Division Order #R-4549-G, dated November 7, 1990, ARCO has sought prior approval from the NMOCD before committing to the above stated course of action. By telephone conversation of Friday, October 25, 1991, I received verbal approval for the proposed action from Mr. David Catanach of the Santa Fe office of the NMOCD.

ARCO thanks both the NMOCD and Gas Company of New Mexico for working with us to prevent waste of oil and natural gas.

Sincerely yours,

Craig Tellinghuisen

C. M. Tellinghuisen
Sr. Gas Engineer

CMT/dh
(102591.cmt)

cc: Gas Company of New Mexico
P. O. Box 26400
Albuquerque, NM 87125
Attn: A. L. McMurray

#4952

EMPIRE ABO UNIT

1987 Plan of Operation

SUBMITTED March 10, 1987

1. Summary of Proposed Plan of Operation for 1987

ARCO Oil and Gas Company proposes to continue operation of the Empire Abo Unit, Eddy County, New Mexico, substantially the same as in recent years. We will continue to reinject all available residue gas from the Phillips extraction plant and the Amoco extraction plant. Oil will be produced from the most efficient wells in order to maximize recovery.

2. Project Area - Description and History

The Empire Abo Unit is located in portions of Sections 34, 35, 36, Township 17 South, Range 27 East; Sections 1, 2, 3, 4, 8, 9, 10, 11, 12, 15, 16, 17, Township 18 South, Range 27 East; Sections 25, 26, 27, 28, 31, 32, 33, 34, 35, 36, Township 17 South, Range 28 East; Sections 4, 5, 6, Township 18 South, Range 28 East; Sections 29, 30, Township 17 South, Range 29 East, Eddy County, New Mexico.

The Unit, as originally proposed, would have covered 11,339.15 acres. Certain tracts within the Unit Area did not qualify for participation as of October 1, 1973, the effective date of the Unit. These tracts are: 2, 6, 28, 41, 42, 46, 55, 56, 69, 79, 84, and 91. Total area of these tracts is 644.74 acres. The remaining 10,694.41 acres comprised the Project Area for pressure maintenance until September 1, 1975. On this date

Tracts 41, 79, and 84 joined the Unit. The addition of these three tracts, which cover 120.03 acres, increased the total area of the Unit to 10,814.44 acres. Tracts 2, 6, 42, and 46 comprise the CITGO Empire Abo Unit, which received NMOCD approval in June, 1974. The Unit Area is now disposed as follows:

	Acres
ARCO Empire Abo Unit	10,814.44
CITGO Empire Abo Unit	241.05
Non-Participating Tracts	283.66
Total Area	11,339.15

ARCO Oil and Gas operates a pressure maintenance project at the Empire Abo Unit. This project involves injection of plant residue gas from Abo production back into the Abo formation.

3. Current Performance

In December, 1986, the Unitized Project Area averaged 4,825 BOPD with a 59 percent water cut and a gas-oil ratio of 14,239 cubic feet of gas per barrel of oil. Gas injection averaged 41,725 MCFPD (see attached Production History Plot).

Cumulative oil production from the Project Area through December, 1986 was 206.0 MMBO. This is about 55.5 percent of the 371 MMBO originally in place. Remaining oil reserves are estimated

to be 5.4 MMBO for an ultimate recovery of nearly 57 percent OOIP. Cumulative net gas production from the Project Area through December, 1986 was 234 BCF. This is about 50 percent of the 468 BCF originally in place. Remaining gas reserves are estimated to be 172 BCF for an ultimate recovery of nearly 87 percent OGIP. As of December, 1986, the Unit has 202 active producing wells.

4. Basic Concepts Governing Future Unit Operations

a) Field production history and reservoir numeric model studies have demonstrated that oil recovery is governed by gravity drainage and secondary gas cap expansion. We will be able to maximize the beneficial effects of these recovery mechanisms by observation of well performance and producing from the most efficient wells, those with the lowest GOR's.

b) Gas injection will help maintain reservoir pressure and control expansion of the secondary gas cap.

5. Discussion of Past, Current, and Future Operations

a) Gas Injection

Fifteen gas injection wells along the north edge of the field handle all of the Empire Abo Unit injected gas. Table I lists these wells, beginning in July, 1974, and continuing through the latest month for which data is available (December, 1986), all available plant residue

gas has been injected into the Abo gas cap. The Unit receives plant residue gas at about 700 psi and compresses it to 2000 psi for injection. Superhydration facilities at the extraction plants reduce hydrogen sulfide content to minimize possible corrosion. A rigorous corrosion treatment program is maintained. Permits for the Gas Injection Facilities have been granted by the State of New Mexico, Environmental Improvements Agency. We believe the injection facilities meet the requirements of the United States Geological Survey and the State of New Mexico.

b) Workovers

An intensive workover program in previous years has been successful in maximizing low GOR production. The majority of the workovers consisted of recompleting wells lower in the reef. As a result of this program, almost all possible lower recompletions have been performed. On the western portion of the field where water influx is occurring, workovers consisting of recompleting wells higher in the reef have been successful. We will continue to seek out wells with recompletion potential.

c) Horizontal Drainhole Drilling

In 1981 four existing wells were recompleted as drainholes. These wells are: K-15, 1980' FS&EL, Sec. 2, 18S, 27E; J-27, 1650' FNL, 2310' FEL, Sec. 5, 18S, 28E; K-182, 1533' FSL, 2370' FWL, Sec. 1, 18S, 27E; and G-312, 1550' FSL, 2511' FEL, Sec. 33, 17S, 28E. No other drainholes have been drilled since 1981.

d) Continuing Field Study

In order to maximize future reserves, we will continue to maintain an intensive field surveillance program. We will also continue to evaluate alternate and enhanced recovery techniques.

e) Injection of Non-Abo Gas

Gas from non-Abo sources was delivered from the Gas Company of New Mexico (formerly Southern Union Gas Company) to the Empire Abo Unit. This began on June 18, 1976. Cumulative outside gas injected through December, 1986 was 4,062 MMCF. Outside gas has not been injected since July, 1983. Cumulative gas delivered back to the supplier through December, 1986 was 411 MMCF and the net cumulative non-Abo gas bank was 3,650 MMCF.

f) Voidage Limit Removal

The voidage limit was replaced with a gas production limit of 65 MMCFPD in 1984. This will allow more efficient operation of the Unit. Also, the wet gas compressors were removed and the practice of injecting unprocessed gas was discontinued.

6. Modifications

It is understood that to meet changing conditions, this plan of operation may be modified from time to time, with the approval of the Supervisor of the U.S.G.S., the Commissioner of Public Lands of the State of New Mexico, and the Department of Energy and Minerals, Oil Conservation Division, State of New Mexico.

ARCO Oil and Gas Company, as Unit Operator, will act prudently to preserve all rights of the mineral owners, and to effectively and efficiently recover the Unit Area reserves. This Company will meet all economical offset obligations, act to prevent waste, conserve natural resources, and protect correlative rights.

7. Effective Date and Duration of Plan

This Plan of Operation shall be effective January 1, 1987, and extend through the calendar year unless otherwise amended.

If this Plan of Operation meets with your approval, please sign on the next page and return one copy for our files.

Very truly yours,

ARCO OIL AND GAS COMPANY

OPERATOR

Jack T. Lowder

Jack T. Lowder
Senior Engineer

JTL:tis

APPROVED BY: _____ DATE_____
District Manager
United States Department of the Interior
Bureau of Land Management - Roswell District

APPROVED BY: _____ DATE_____
Commissioner of Public Lands
State of New Mexico

APPROVED BY: _____ DATE_____
Division Director
Dept. of Energy and Minerals
Oil Conservation Division
State of New Mexico

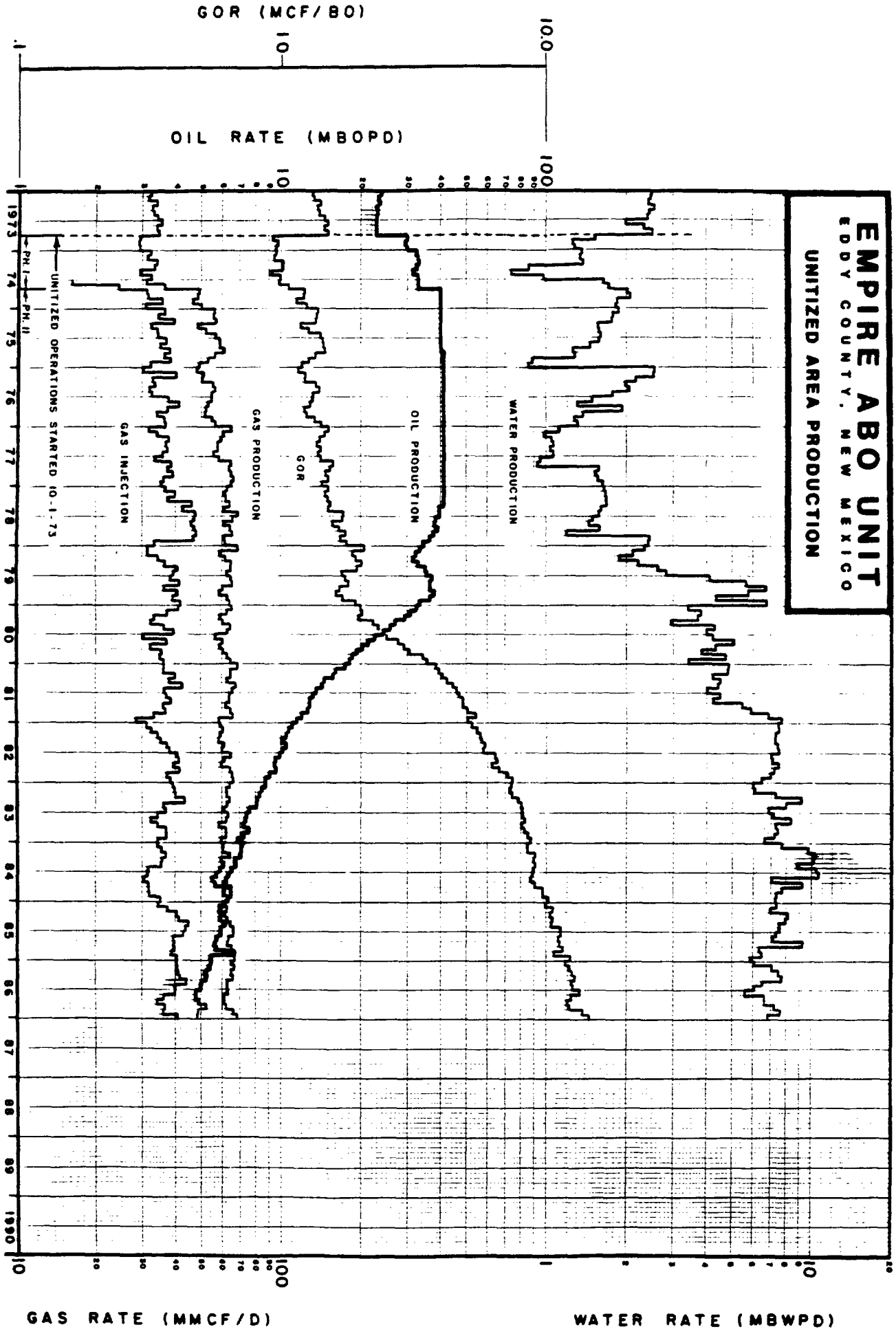

GOR (MCF/BO)
1
10
10.0
OIL RATE (MBOPD)
1
10
100
EMPIRE ABO UNIT
EDDY COUNTY, NEW MEXICO
UNITIZED AREA PRODUCTION
1973
74
75
76
77
78
79
80
81
82
83
84
85
86
87
88
89
1990
PH. I
PH. II
UNITIZED OPERATIONS STARTED 10-1-73
GAS INJECTION
GAS PRODUCTION
GOR
OIL PRODUCTION
WATER PRODUCTION
10
100
1
10
GAS RATE (MMCF/D)
WATER RATE (MBWPD)

TABLE I

EMPIRE ABO UNIT
GAS INJECTION WELLS

Previous Operator/ Lease and Well	Unit Well Designation	Location (Sec.-T.-R.)
Hondo/State "A" No. 24	C-39	NW/4 SE/4 26 17 28
Samedan/State "Walker" No. 1	D-35	SW/4 SE/4 27 17 28
Hondo/State "A" No. 16	D-37	SW/4 SW/4 26 17 28
Amoco/State "BV" No. 1	F-25	SW/4 NW/4 32 17 28
Hondo/State "A" No. 35	F-27	SW/4 NE/4 32 17 28
ARCO/M. Yates B(ARC) No. 8	F-31	SW/4 NE/4 33 17 28
Amoco/State "BM" No. 1	G-22	NE/4 SW/4 31 17 28
Hondo/State "A" No. 9	G-24	NE/4 SE/4 31 17 28
Gulf-NCT "C" No. 1	H-19	SW/4 SE/4 36 17 27
Amoco/State "BE" No. 1	H-21	SW/4 SW/4 31 17 18
Amoco/Malco "H" Fed. No. 9	I-10	NE/4 NW/4 3 18 27
Amoco/State "F" No. 8	I-18	NE/4 NW/4 1 18 27
Amoco/Malco "H" Federal No. 2	J-12	SE/4 NE/4 3 18 27
Amoco/Windfohr Federal No. 4	K-7	NW/4 SE/4 4 18 27
Exxon/CBDU "A" No. 8	M-6	NE/4 NW/4 9 18 27

EMPIRE ABO UNIT

1986 Production History

Month	BO	BW	Gross MCFG	Injected MCFG	Net MCFG
January	169,756	190,754	2,018,243	1,247,475	770,768
February	152,414	196,952	1,870,624	1,131,241	739,383
March	163,470	232,339	2,035,629	1,257,326	778,303
April	157,096	233,986	1,988,752	1,256,411	732,341
May	158,978	204,454	1,957,124	1,368,399	588,725
June	151,997	180,785	1,893,751	1,171,042	722,709
July	151,737	174,193	2,008,252	1,212,311	795,941
August	151,471	206,644	1,902,732	1,127,969	774,763
September	148,955	198,436	1,805,272	1,045,659	759,613
November	145,295	228,842	1,986,705	1,086,648	900,057
December	149,577	212,455	2,129,837	1,293,481	836,356
Total	1,862,529	2,484,461	23,560,531	14,324,382	9,236,149

EMPIRE ABO UNIT

1987 Plan of Operation

SUBMITTED March 10, 1987

1. Summary of Proposed Plan of Operation for 1987

ARCO Oil and Gas Company proposes to continue operation of the Empire Abo Unit, Eddy County, New Mexico, substantially the same as in recent years. We will continue to reinject all available residue gas from the Phillips extraction plant and the Amoco extraction plant. Oil will be produced from the most efficient wells in order to maximize recovery.

2. Project Area - Description and History

The Empire Abo Unit is located in portions of Sections 34, 35, 36, Township 17 South, Range 27 East; Sections 1, 2, 3, 4, 8, 9, 10, 11, 12, 15, 16, 17, Township 18 South, Range 27 East; Sections 25, 26, 27, 28, 31, 32, 33, 34, 35, 36, Township 17 South, Range 28 East; Sections 4, 5, 6, Township 18 South, Range 28 East; Sections 29, 30, Township 17 South, Range 29 East, Eddy County, New Mexico.

The Unit, as originally proposed, would have covered 11,339.15 acres. Certain tracts within the Unit Area did not qualify for participation as of October 1, 1973, the effective date of the Unit. These tracts are: 2, 6, 28, 41, 42, 46, 55, 56, 69, 79, 84, and 91. Total area of these tracts is 644.74 acres. The remaining 10,694.41 acres comprised the Project Area for pressure maintenance until September 1, 1975. On this date

Tracts 41, 79, and 84 joined the Unit. The addition of these three tracts, which cover 120.03 acres, increased the total area of the Unit to 10,814.44 acres. Tracts 2, 6, 42, and 46 comprise the CITGO Empire Abo Unit, which received NMOCD approval in June, 1974. The Unit Area is now disposed as follows:

	Acres
ARCO Empire Abo Unit	10,814.44
CITGO Empire Abo Unit	241.05
Non-Participating Tracts	283.66
Total Area	11,339.15

ARCO Oil and Gas operates a pressure maintenance project at the Empire Abo Unit. This project involves injection of plant residue gas from Abo production back into the Abo formation.

3. Current Performance

In December, 1986, the Unitized Project Area averaged 4,825 BOPD with a 59 percent water cut and a gas-oil ratio of 14,239 cubic feet of gas per barrel of oil. Gas injection averaged 41,725 MCFPD (see attached Production History Plot).

Cumulative oil production from the Project Area through December, 1986 was 206.0 MMBO. This is about 55.5 percent of the 371 MMBO originally in place. Remaining oil reserves are estimated

to be 5.4 MMBO for an ultimate recovery of nearly 57 percent OOIP. Cumulative net gas production from the Project Area through December, 1986 was 234 BCF. This is about 50 percent of the 468 BCF originally in place. Remaining gas reserves are estimated to be 172 BCF for an ultimate recovery of nearly 87 percent OGIP. As of December, 1986, the Unit has 202 active producing wells.

4. Basic Concepts Governing Future Unit Operations

a) Field production history and reservoir numeric model studies have demonstrated that oil recovery is governed by gravity drainage and secondary gas cap expansion. We will be able to maximize the beneficial effects of these recovery mechanisms by observation of well performance and producing from the most efficient wells, those with the lowest GOR's.

b) Gas injection will help maintain reservoir pressure and control expansion of the secondary gas cap.

5. Discussion of Past, Current, and Future Operations

a) Gas Injection

Fifteen gas injection wells along the north edge of the field handle all of the Empire Abo Unit injected gas. Table I lists these wells, beginning in July, 1974, and continuing through the latest month for which data is available (December, 1986), all available plant residue

gas has been injected into the Abo gas cap. The Unit receives plant residue gas at about 700 psi and compresses it to 2000 psi for injection. Superhydration facilities at the extraction plants reduce hydrogen sulfide content to minimize possible corrosion. A rigorous corrosion treatment program is maintained. Permits for the Gas Injection Facilities have been granted by the State of New Mexico, Environmental Improvements Agency. We believe the injection facilities meet the requirements of the United States Geological Survey and the State of New Mexico.

b) Workovers

An intensive workover program in previous years has been successful in maximizing low GOR production. The majority of the workovers consisted of recompleting wells lower in the reef. As a result of this program, almost all possible lower recompletions have been performed. On the western portion of the field where water influx is occurring, workovers consisting of recompleting wells higher in the reef have been successful. We will continue to seek out wells with recompletion potential.

c) Horizontal Drainhole Drilling

In 1981 four existing wells were recompleted as drainholes. These wells are: K-15, 1980' FS&EL, Sec. 2, 18S, 27E; J-27, 1650' FNL, 2310' FEL, Sec. 5, 18S, 28E; K-182, 1533' FSL, 2370' FWL, Sec. 1, 18S, 27E; and G-312, 1550' FSL, 2511' FEL, Sec. 33, 17S, 28E. No other drainholes have been drilled since 1981.

d) Continuing Field Study

In order to maximize future reserves, we will continue to maintain an intensive field surveillance program. We will also continue to evaluate alternate and enhanced recovery techniques.

e) Injection of Non-Abo Gas

Gas from non-Abo sources was delivered from the Gas Company of New Mexico (formerly Southern Union Gas Company) to the Empire Abo Unit. This began on June 18, 1976. Cumulative outside gas injected through December, 1986 was 4,062 MMCF. Outside gas has not been injected since July, 1983. Cumulative gas delivered back to the supplier through December, 1986 was 411 MMCF and the net cumulative non-Abo gas bank was 3,650 MMCF.

f) Voidage Limit Removal

The voidage limit was replaced with a gas production limit of 65 MMCFPD in 1984. This will allow more efficient operation of the Unit. Also, the wet gas compressors were removed and the practice of injecting unprocessed gas was discontinued.

6. Modifications

It is understood that to meet changing conditions, this plan of operation may be modified from time to time, with the approval of the Supervisor of the U.S.G.S., the Commissioner of Public Lands of the State of New Mexico, and the Department of Energy and Minerals, Oil Conservation Division, State of New Mexico.

ARCO Oil and Gas Company, as Unit Operator, will act prudently to preserve all rights of the mineral owners, and to effectively and efficiently recover the Unit Area reserves. This Company will meet all economical offset obligations, act to prevent waste, conserve natural resources, and protect correlative rights.

7. Effective Date and Duration of Plan

This Plan of Operation shall be effective January 1, 1987, and extend through the calendar year unless otherwise amended.

If this Plan of Operation meets with your approval, please sign on the next page and return one copy for our files.

Very truly yours,

ARCO OIL AND GAS COMPANY

OPERATOR

Jack T. Lowder

Jack T. Lowder
Senior Engineer

JTL:tis

APPROVED BY: _____ DATE_____

District Manager
United States Department of the Interior
Bureau of Land Management - Roswell District

APPROVED BY: _____ DATE_____

Commissioner of Public Lands
State of New Mexico

APPROVED BY: _____ DATE_____

Division Director
Dept. of Energy and Minerals
Oil Conservation Division
State of New Mexico

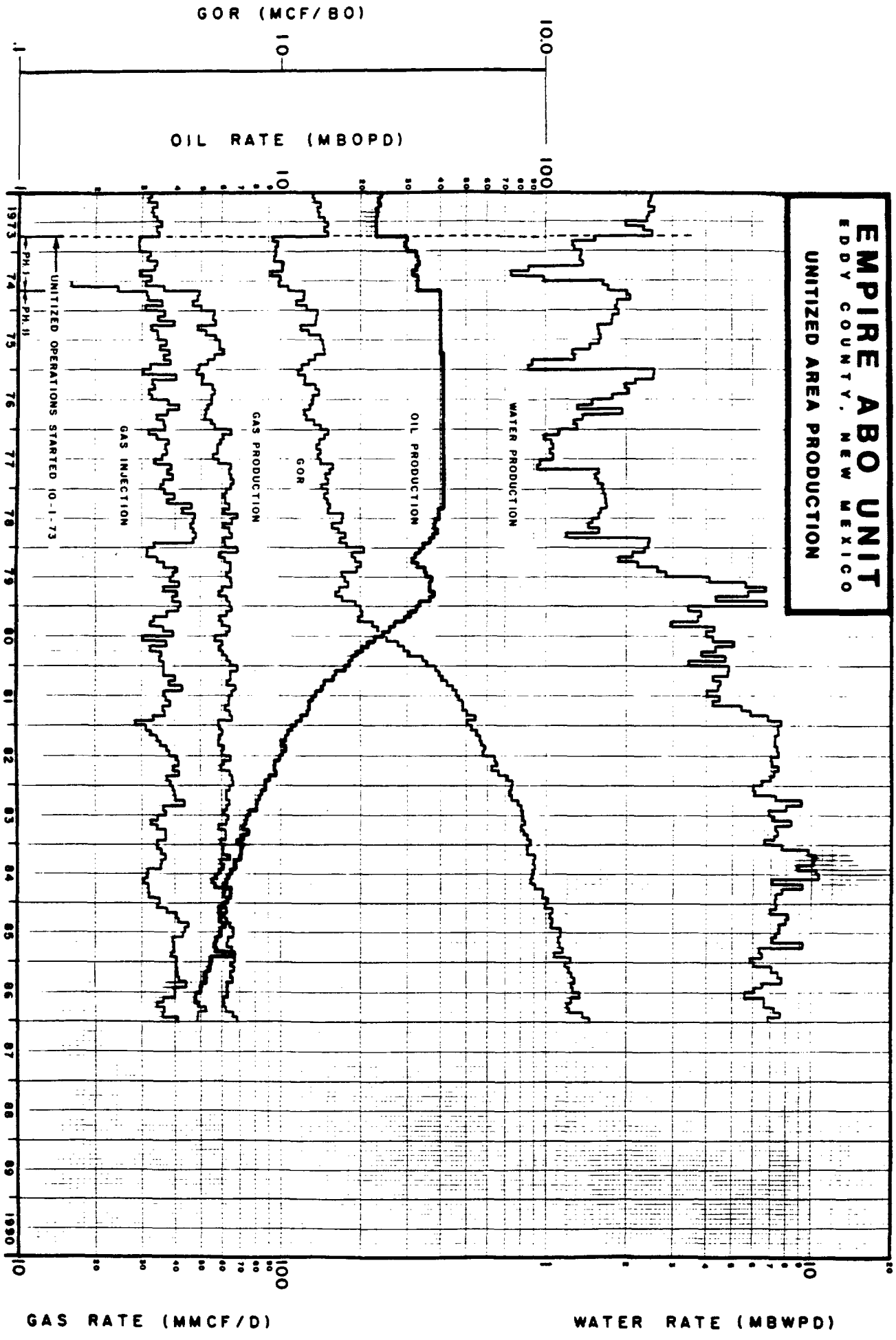

GOR (MCF/BO)
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OIL RATE (MBOPD)
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PH. I
PH. II
UNITIZED OPERATIONS STARTED 10-1-73
GAS INJECTION
GAS PRODUCTION
GOR
OIL PRODUCTION
WATER PRODUCTION
EMPIRE ABO UNIT
EDDY COUNTY, NEW MEXICO
UNITIZED AREA PRODUCTION
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GAS RATE (MMCF/D)
WATER RATE (MBWPD)

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EMPIRE ABO UNIT

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Total	1,862,529	2,484,461	23,560,531	14,324,382	9,236,149

State of New Mexico

TELEPHONE
505-827-2748



4952

Commissioner of Public Lands

December 27, 1974

ALEX J. ARMIJO
COMMISSIONER

P. O. BOX 1148
SANTA FE, NEW MEXICO

Atlantic Richfield Company
P. O. Box 1610
Midland, Texas 79701

Re: Plan of Operation for 1975
Empire Abo Unit
Eddy County, New Mexico

ATTENTION: Mr. P. E. Fletcher

Gentlemen:

The Commissioner of Public Lands has this date approved your Plan of Operation for the year 1975, for the Empire Abo Unit, Eddy County, New Mexico. This approval is subject to like approval by the United States Geological Survey and the Oil Conservation Commission.

One approved copy of the plan is enclosed herewith.

Please remit a Three ($3.00) Dollar filing fee.

Very truly yours,

RAY D. GRAHAM, Director
Oil and Gas Department

AJA/RDG/s
encls.
cc: USGS-Roswell, New Mexico
OCC- Santa Fe, New Mexico

United States Department of the Interior

GEOLOGICAL SURVEY
Drawer 1857
Roswell, New Mexico 88201

4952

January 16, 1975

Atlantic Richfield Company
Attention: Mr. P. E. Fletcher
P. O. Box 1610
Midland, Texas 79701

Gentlemen:

Four approved copies of your 1975 plan of operation for the Empire Abo unit area, Eddy County, New Mexico, are enclosed. Such plan, proposing continued production operations utilizing maximum reservoir energy, continued injection operations returning all available residue gas to the reservoir gas cap and the completion of all production and testing facilities was approved on this date subject to like approval by the appropriate official of the State of New Mexico.

Sincerely yours,

(SD) CARL

CARL C. TRAYWICK
Acting Area Oil and Gas Supervisor

cc:
Artesia (w/cy plan)
NMOCC, Santa Fe (ltr. only) ✓
Com. Pub. Lands, Santa Fe (ltr. only)

JAGillham:lh

United States Department of the Interior

GEOLOGICAL SURVEY
Drawer 1857
Roswell, New Mexico 88201

OIL CONSERVATION
Santa Fe

August 21, 1975

Atlantic Richfield Company
Attention: Mr. William L. Embry
P.O. Box 1610
Midland, Texas 79701

Gentlemen:

Your letter of August 15, 1975, transmitted one original and two copies of fifteen executed joinders, three copies of revised Exhibit C and E, and three copies of a revised page, showing Tract 79, to Exhibit B for the Empire Abo unit agreement No. 14-08-0001-13801, Eddy County, New Mexico. You advise that such joinders have been approved by more than 65 percent of the committed working interest owners. Such joinders are hereby approved on this date subject to like approval by the appropriate State officials. Accordingly, pursuant to Sections 14 and 32 of the unit agreement, Tracts 41, 79 and 84 are considered effectively committed to the Empire Abo unit and operating agreement effective as of September 1, 1975, the first day of the month following the filing with this office.

The revised page to Exhibit B, revised Exhibits C and E, all effective as of September 1, 1975, are hereby accepted for record purposes and copies thereof along with copies of the above joinders are being distributed to the appropriate Federal offices.

Sincerely yours,

(Orig. Sgd.) N. O. FREDERICK

N. O. FREDERICK
Area Oil and Gas Supervisor

cc:
BLM, Santa Fe (w/atchs)
Com. Pub. Lands, Santa Fe (ltr only)
NMOCC, Santa Fe (ltr only)
Artesia (w/atchs)
Accounts

JAGillham:ds

United States Department of the Interior

GEOLOGICAL SURVEY
Drawer 1857
Roswell, New Mexico 88201

October 20, 1975

Atlantic Richfield Company
Attention: Mr. G. V. Ricks
P.O. Box 1610
Midland, Texas 79701

Gentlemen:

Your revised plan of operation covering the period November 1, 1975, through December 31, 1975, for the Empire Abo unit area, Eddy County, New Mexico, has been approved on this date subject to like approval by the appropriate officials of the State of New Mexico. Such plan proposes the conversion of five additional wells to gas injection, and the use of injection gas from a non-Abo source. The plan indicates that such improved pressure maintenance program will result in greater ultimate oil recovery from the Abo formation.

Four approved copies of the plan are enclosed herewith.

Sincerely yours,

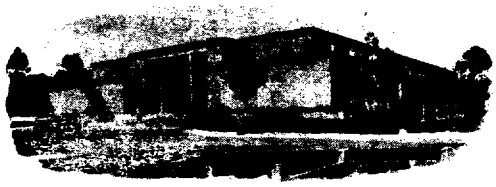
CARL C. TRAYWICK
Acting Area Oil and Gas Supervisor

cc:
NMOCC, Santa Fe (ltr only)
Com. Pub. Lands, Santa Fe (ltr only)
Artesia (w/cy plan)

ARStall:ds

RECEIVED
OCT 21 1975
OIL CONSERVATION COM
Santa Fe

State of New Mexico



Commissioner of Public Lands

October 30, 1975

PHIL R. LUCERO
COMMISSIONER

TELEPHONE
505-827-2748

RECEIVED
OCT 31 1975
OIL CONSERVATION COMM.
Santa Fe

P. O. BOX 1148
SANTA FE, NEW MEXICO 87501

Atlantic Richfield Company
P. O. Box 1610
Midland, Texas 79701

Re: Revised Plan of Operation for
November 1 through December 31, 1975
Empire Abo Unit
Eddy County, New Mexico

ATTENTION: Mr. G. V. Ricks

Gentlemen:

The Commissioner of Public Lands has this date approved your Revised Plan of Operation covering the period from November 1 through December 31, 1975. You propose to convert five additional wells to gas injection wells, also the use of injection gas from a non-Abo source.

The USGS gave their approval October 20, 1975.

Enclosed is one approved copy for your files. Please remit a Three ($3.00) Dollar filing fee.

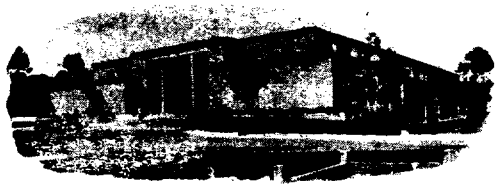
Very truly yours,

PHIL R. LUCERO
COMMISSIONER OF PUBLIC LANDS

BY:
RAY D. GRAHAM, Director
Oil and Gas Division

PRL/RDG/s
encl.
cc: USGS-Roswell, New Mexico
OCC- Santa Fe, New Mexico

State of New Mexico



Commissioner of Public Lands

PHIL R. LUCERO
COMMISSIONER

TELEPHONE
505-827-2748

P. O. BOX 1148
SANTA FE, NEW MEXICO 87501

January 5, 1976

Atlantic Richfield Company
P. O. Box 1610
Midland, Texas 79701

Re: Plan of Operation for 1976
Empire Abo Unit
Eddy County, New Mexico

ATTENTION: Mr. G. V. Ricks

Gentlemen:

The Commissioner of Public Lands has this date approved your Plan of Operation covering the period beginning January 1, 1976, and extending through the remainder of calendar year 1976. This approval is subject to like approval by the United States Geological Survey and the New Mexico Oil Conservation Commission.

Enclosed is one approved copy for your files.

Please remit a Three ($3.00) Dollar filing fee.

Very truly yours,

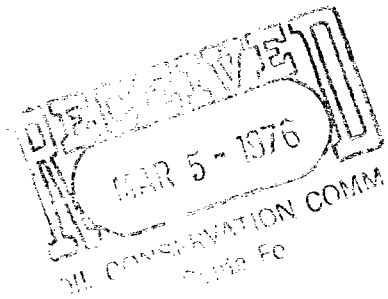
PHIL R. LUCERO
COMMISSIONER OF PUBLIC LANDS

BY:
RAY D. GRAHAM, Director
Oil and Gas Division

PRL/RDG/s
encls.
cc: USGS-Roswell, New Mexico
OCC- Santa Fe, New Mexico

P. O. Drawer 1857
Roswell, New Mexico 88201

March 3, 1976



Atlantic Richfield Company
Attention: Mr. G. V. Ricks
P. O. Box 1610
Midland, Texas 79701

Gentlemen:

Four approved copies of your 1976 plan of development for the Empire Abo unit area, Eddy County, New Mexico, proposing continuation of the gas injection pressure maintenance program, are enclosed. Such plan was approved on this date subject to like approval by the appropriate officials of the State of New Mexico.

It is requested that you provide this office with a copy of gas injection and production data covering unit operations, in graphical form at your earliest convenience and include an updated copy of such graph with all subsequent plans of operation.

Sincerely yours,

(ORIG. SGD.) CARL C. TRAYWICK

CARL C. TRAYWICK
Acting Area Oil and Gas Supervisor

cc:
Artesia
NMOCC, Santa Fe (ltr. only)
Com. Pub. Lands, Santa Fe (ltr. only)

This copy for

JAGillham:dlk

Conservation Division
Western Bank Building
505 Marquette, NW, Room 815
Albuquerque, New Mexico 87102

December 30, 1976

Atlantic Richfield Company
Attention: Mr. G. V. Ricks
P. O. Box 1610
Midland, Texas 79701

Gentlemen:

Four approved copies of your 1977 plan of development for the Empire Abo unit area, Eddy County, New Mexico, proposing continuation of the gas injection pressure maintenance program are enclosed. Such plan was approved on this date subject to like approval by the appropriate officials of the State of New Mexico.

Sincerely yours,

Orig. Signed - JAMES W. SUTHERLAND

JAMES W. SUTHERLAND
Area Oil and Gas Supervisor

Enclosures

NMOCC, Santa Fe (ltr. only) ← This Copy for
Com. Pub. Lands, Santa Fe (ltr. only)

United States Department of the Interior

GEOLOGICAL SURVEY

Conservation Division
P.O. Box 26124
Albuquerque, New Mexico 87125

RECEIVED
MAR 16 1978
OIL CONSERVATION COMM.
Santa Fe

MAR 15 1978

Atlantic Richfield Company
Attention: Mr. G. V. Ricks
P.O. Box 1610
Midland, Texas 79701

no. 47 52

Gentlemen:

Four approved copies of your 1978 plan of development for the Empire Abo unit area, Eddy County, New Mexico, proposing continuation of the gas injection pressure maintenance program are enclosed. Such plan was approved on this date subject to like approval by the appropriate officials of the State of New Mexico.

Sincerely yours,

(ORIG. SGD.) GENE F. DANIEL

Gene F. Daniel
Acting Area Oil and Gas Supervisor

Enclosure

cc: NMOCC, Santa Fe (ltr. only)
Com. Pub. Lands, Santa Fe (ltr. only)
Artesia (w/cy plan)

OIL CONSERVATION COMMISSION
P. O. BOX 2088
SANTA FE, NEW MEXICO 87501

January 17, 1978

Atlantic Richfield Company
Post Office Box 161[illegible]
Midland, Texas 7970[illegible]

Attention: G. V. Ricks

Re: Case No. 49[illegible]
Empire Abo U[illegible]
1978 Plan of [illegible]

Gentlemen: [illegible]n

We hereby approve the 1978 Plan of Operation fo[illegible] Empire Abo Unit, Eddy County, New Mexico, subject to approval by the United States Geological Survey and th[illegible] Commissioner of Public Lands.

Two approved copies of the Plan of Operation are returned herewith.

Very truly yours,

JOE D. RAMEY
Secretary-Director

JDR/LT/fd
enc.

cc: U.S.G.S. - Roswell
Commissioner of Public Lands

United States Department of the Interior

GEOLOGICAL SURVEY
P. O. Box 26124
Albuquerque, New Mexico 87125

FEB 05 1979

Atlantic Richfield Company
Attention: Mr. G. V. Ricks
P. O. Box 1610
Midland, Texas 79702

No. 4952

Gentlemen:

Your 1979 plan of development for the Empire Abo unit area, Eddy County, New Mexico, proposes continuation of the gas injection pressure maintenance project, completion of your Phase V infill drilling program, and commencement of a 50-well Phase VI infill drilling program. Such plan was approved on this date, subject to like approval by the appropriate officials of the State of New Mexico, and four approved copies are enclosed.

In order to update our records, please furnish this office two copies of a current map of the unit area showing the 15 injection wells and all producing wells.

Sincerely yours,

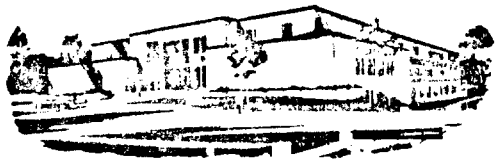
(ORIG. SGD.) JAMES W. SUTHERLAND

JAMES W. SUTHERLAND
Oil and Gas Supervisor, SRMA

Enclosures 4

cc:
NMOCD, Santa Fe (letter only)
Comm. Pub. Lands, Santa Fe (letter only)

State of New Mexico



Commissioner of Public Lands

February 1, 1979

ALEX J. ARMIJO
COMMISSIONER

P. O. BOX 1148
SANTA FE, NEW MEXICO

Atlantic Richfield Company
P. O. Box 1610
Midland, Texas 79702

Re: Empire Abo Unit
Eddy County, New Mexico
1979 PLAN OF OPERATIONS

ATTENTION: Mr. G. V. Ricks

No. 4952

Gentlemen:

The Commissioner of Public Lands has this date approved your 1979 Plan of Operations for the Empire Abo Unit, Eddy County, New Mexico. Our approval is subject to like approval by the United States Geological Survey and the New Mexico Oil Conservation Division.

Enclosed is one approved copy for your files.

Please remit a Three ($3.00) Dollar filing fee.

Very truly yours,

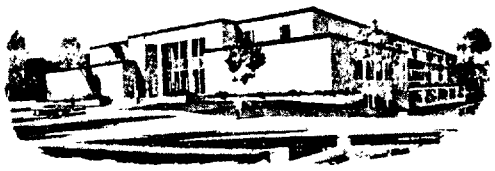
ALEX J. ARMIJO
COMMISSIONER OF PUBLIC LANDS

BY:
RAY D. GRAHAM, Director
Oil and Gas Division

AJA/RDG/s
encls.
cc: OCD-Santa Fe, New Mexico
USGS-Roswell, New Mexico
USGS-Albuquerque, New Mexico

#4952

State of New Mexico



Commissioner of Public Lands

JIM BACA
COMMISSIONER

P.O. BOX 1148
SANTA FE, NEW MEXICO 87504-1148

January 20, 1984

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

Re: 1984 Plan of Operation
Empire Abo Unit
Eddy County, New Mexico

ATTENTION: Mr. Timothy J. Detmering

Gentlemen:

The Commissioner of Public Lands has this date approved your 1984 Plan of Operation for the Empire Abo Unit, Eddy County, New Mexico. Such plan proposes to continue the operation of the Empire Abo Unit, substantially the same as in recent years. Our approval is subject to like approval by the Bureau of Land Management and the New Mexico Oil Conservation Division.

Enclosed is an approved copy for your files.

Very truly yours,

JIM BACA
COMMISSIONER OF PUBLIC LANDS

BY:
RAY D. GRAHAM, Director
Oil and Gas Division
AC 505/827-5744

JB/RDG/pm
encls.
cc: OCD-Santa Fe, New Mexico
BLM-Albuquerque, New Mexico
BLM-Roswell, New Mexico

State of New Mexico



Commissioner of Public Lands

ALEX J. ARMIJO
COMMISSIONER

P. O. BOX 1148
SANTA FE, NEW MEXICO 87501

January 6, 1981

4952

Atlantic Richfield Company
Attention: Mr. G. V. Ricks
P. O. Box 1610
Midland, Texas 79702

Re: Empire Abo Unit
Eddy County, New Mexico
1981 PLAN OF OPERATION

Gentlemen:

The Commissioner of Public Lands has this date approved your 1981 Plan of Operation for the Empire Abo Unit, Eddy County, New Mexico. Such plan proposes the following operations:

1. Continue operations of the Unit in 1981 substantially the same as in recent years. Continue to reinject all available residue gas along with gas available from other sources.

2. Oil will be produced from the lowest gas/oil ratio wells available to maximize oil recovery efficiency.

3. Infill drilling will consist of at least two and possibly five horizontal drainhole wells, pending contined evaluations of the drainhole programs.

Our approval is subject to like approval by the United States Geological Survey and the New Mexico Oil Conservation Division.

Enclosed is one approved copy for your files.

Please remit a Three ($3.00) Dollar filing fee.

Very truly yours,

ALEX J. ARMIJO
COMMISSIONER OF PUBLIC LANDS

BY:
FLOYD O. PRANDO, Assistant
Director- Oil & Gas Division

AJA/FOP/s
encls.
cc: OCD, USGS-Roswell, USGS Albuquerque

United States Department of the Interior

GEOLOGICAL SURVEY

Drawer 1857
Roswell, New Mexico 88201

January 18, 1974

Atlantic Richfield Company
Attention: Mr. P. E. Fletcher
P.O. Box 1610
Midland, Texas 79701

Gentlemen:

Your 1974 plan of operation for the Empire Abo unit area, Eddy County, New Mexico, has been approved on this date subject to like approval by the appropriate officials of the State of New Mexico. Such plan proposes finalization of the enlargement and centralization of production and testing facilities, the initiation of residue gas injection into eight wells located in the Abo gas cap and continued production operation in a manner employing maximum utilization of reservoir energy.

Four approved copies of the plan are enclosed.

Sincerely yours,

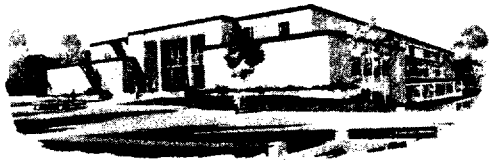
CARL C. TRAYWICK
Acting Area Oil and Gas Supervisor

cc:
NMOCC, Santa Fe (ltr only)
Com. Pub. Lands, Santa Fe (ltr only)
Artesia (w/cy plan)

JAGillham:ds

State of New Mexico

TELEPHONE
505-827-2748



Commissioner of Public Lands

4/15

ALEX J. ARMIJO
COMMISSIONER

January 14, 1974

P. O. BOX 1148
SANTA FE, NEW MEXICO

Atlantic Richfield Company
P. O. Box 1610
Midland, Texas 79701

Re: Plan of Operation for 1974
Empire Abo Unit
Eddy County, New Mexico

ATTENTION: Mr. P. E. Fletcher

Gentlemen:

The Commissioner of Public Lands has this date approved your Plan of Operation for the Empire Abo Unit covering the period from January 1, 1974 to January 1, 1975. This approval is subject to like approval by the United States Geological Survey and the Oil Conservation Commission.

One approved copy of the plan is enclosed herewith.

Please remit a Three ($3.00) Dollar filing fee.

Very truly yours,

RAY D. GRAHAM, Director
Oil and Gas Division

AJA/RDG/s
encls.
cc: USGS-Roswell, New Mexico
OCC- Santa Fe, New Mexico

SENDER: Be sure to follow instructions on other side

PLEASE FURNISH SERVICE(S) INDICATED BY CHECKED BLOCK(S)
(Additional charges required for these services)

☐ Show to whom, date and address where delivered ☐ Deliver ONLY to addressee

RECEIPT
Received the numbered article described below

REGISTERED NO.

CERTIFIED NO. 480299

INSURED NO.

① SIGNATURE OR NAME OF ADDRESSEE *(Must always be filled in)*

② SIGNATURE OF ADDRESSEE'S AGENT, IF ANY

DATE DELIVERED 6/22/73

③ SHOW WHERE DELIVERED *(Only if requested, and include ZIP Code)*

RECEIPT FOR CERTIFIED MAIL—30¢

No. 480299

SENT TO Mr. Ely Hurwitz

STREET AND NO. 1310 19th Street, N.W.

P. O., STATE, AND ZIP CODE Washington, D.C. 20036

POSTMARK OR DATE

EXTRA SERVICES FOR ADDITIONAL FEES

Return Receipt: Shows to whom and date delivered ☐ 10¢ fee; Shows to whom, date, and where delivered ☐ 35¢ fee

Deliver to Addressee Only ☐ 50¢ fee

POD Form 3800 Mar. 1966 **NO INSURANCE COVERAGE PROVIDED— NOT FOR INTERNATIONAL MAIL** *(See other side)*

SENDER: Be sure to follow instructions on other side

PLEASE FURNISH SERVICE(S) INDICATED BY CHECKED BLOCK(S)
(Additional charges required for these services)

☐ Show to whom, date and address where delivered ☐ Deliver ONLY to addressee

RECEIPT
Received the numbered article described below

REGISTERED NO.

CERTIFIED NO. 480304

INSURED NO.

① SIGNATURE OR NAME OF ADDRESSEE *(Must always be filled in)*

② SIGNATURE OF ADDRESSEE'S AGENT, IF ANY

DATE DELIVERED 6/21/73

③ SHOW WHERE DELIVERED *(Only if requested, and include ZIP Code)*

No. 480304

RECEIPT FOR CERTIFIED MAIL—30¢

SENT TO Michael P. Grace

STREET AND NO. P. O. Box 1418

P. O., STATE, AND ZIP CODE Carlsbad, New Mexico 88220

POSTMARK OR DATE

EXTRA SERVICES FOR ADDITIONAL FEES

Return Receipt: Shows to whom and date delivered ☐ 10¢ fee; Shows to whom, date, and where delivered ☐ 35¢ fee

Deliver to Addressee Only ☐ 50¢ fee

POD Form 3800 Mar. 1966 **NO INSURANCE COVERAGE PROVIDED— NOT FOR INTERNATIONAL MAIL** *(See other side)*

SENDER: Be sure to follow instructions on other side

PLEASE FURNISH SERVICE(S) INDICATED BY CHECKED BLOCK(S)
(Additional charges required for these services)

☐ Show to whom, date and address where delivered ☐ Deliver ONLY to addressee

RECEIPT
Received the numbered article described below

REGISTERED NO.

CERTIFIED NO. 48030[illegible]

INSURED NO.

① SIGNATURE OR NAME OF ADDRESSEE *(Must always be filled in)*

② SIGNATURE OF ADDRESSEE'S AGENT, IF ANY

DATE DELIVERED 6/21/73

③ SHOW WHERE DELIVERED *(Only if requested, and include ZIP Code)*

No. 480305

RECEIPT FOR CERTIFIED MAIL—30¢

SENT TO Corinne Grace

STREET AND NO. P. O. Box 1418

P. O., STATE, AND ZIP CODE Carlsbad, N. M. 88220

POSTMARK OR DATE

EXTRA SERVICES FOR ADDITIONAL FEES

Return Receipt: Shows to whom and date delivered ☐ 10¢ fee; Shows to whom, date, and where delivered ☐ 35¢ fee

Deliver to Addressee Only ☐ 50¢ fee

POD Form 3800 Mar. 1966 **NO INSURANCE COVERAGE PROVIDED— NOT FOR INTERNATIONAL MAIL** *(See other side)*

PLEASE FURNISH SERVICE(S) INDICATED BY CHECKED BLOCK(S).
REQUIRED FEE(S) PAID.

☐ Show to whom, date and address where delivered ☐ Deliver ONLY to addressee

RECEIPT

Received the numbered article described below.

REGISTERED NO.

CERTIFIED NO.
635873

INSURED NO.

DATE DELIVERED
MAY 3 1973

1 SIGNATURE OR NAME OF ADDRESSEE (*Must always be filled in*)

2 SIGNATURE OF ADDRESSEE'S AGENT, IF ANY

3 SHOW WHERE DELIVERED (*only if requested*)

c55—16—71548-11 347-198 GPO

PLEASE FURNISH SERVICE(S) INDICATED BY CHECKED BLOCK(S).
REQUIRED FEE(S) PAID.
Show to whom, date and address where delivered
Deliver ONLY to addressee
RECEIPT
Received the numbered article described below.
REGISTERED NO.
SIGNATURE OR NAME OF ADDRESSEE (Must always be filled in)
CERTIFIED NO.
635868
INSURED NO.
SIGNATURE OF ADDRESSEE'S AGENT, IF ANY
DATE DELIVERED
SHOW WHERE DELIVERED (only if requested)
c55—16—71548-11 347-198 GPO

No. 480306

RECEIPT FOR CERTIFIED MAIL—30¢

SENT TO
Pennzoil

STREET AND NO.
Box 1828

P. O., STATE, AND ZIP CODE
Midland, Texas 79701

EXTRA SERVICES FOR ADDITIONAL FEES
Return Receipt
☐ 10¢ fee — Shows to whom and date delivered
☐ 35¢ fee — Shows to whom, date, and where delivered
☐ 50¢ fee — Deliver to Addressee Only

POSTMARK OR DATE

POD Form 3800 Mar. 1966 **NO INSURANCE COVERAGE PROVIDED—NOT FOR INTERNATIONAL MAIL** (See other side)

SENDER: Be sure to follow instructions on other side

PLEASE FURNISH SERVICE(S) INDICATED BY CHECKED BLOCK(S)
(Additional charges required for these services)

☐ Show to whom, date and address where delivered ☐ Deliver ONLY to addressee

RECEIPT

Received the numbered article described below

REGISTERED NO.

CERTIFIED NO.
480306

INSURED NO.

DATE DELIVERED
JUN 21 1973

1 SIGNATURE OR NAME OF ADDRESSEE (*Must always be filled in*)
Pennzoil Company

2 SIGNATURE OF ADDRESSEE'S AGENT, IF ANY
Loy S. Johnson

3 SHOW WHERE DELIVERED (*Only if requested, and include ZIP Code*)

SENDER: Be sure to follow instructions on other side

PLEASE FURNISH SERVICE(S) INDICATED BY CHECKED BLOCK(S)
(Additional charges required for these services)

☐ Show to whom, date and address where delivered

☐ Deliver ONLY to addressee

RECEIPT
Received the numbered article described below

SIGNATURE OR NAME OF ADDRESSEE *(Must always be filled in)*: Marvin R Antwell

SIGNATURE OF ADDRESSEE'S AGENT, IF ANY: Johnny Cox

SHOW WHERE DELIVERED *(Only if requested, and include ZIP Code)*

REGISTERED NO.

CERTIFIED NO. 480302

INSURED NO.

DATE DELIVERED

No. 480302

RECEIPT FOR CERTIFIED MAIL—30¢

SENT TO: Mr. Morris Antwell

STREET AND NO. Box 2010

P. O., STATE, AND ZIP CODE: Hobbs, New Mexico 88240

EXTRA SERVICES FOR ADDITIONAL FEES

Return Receipt
- ☐ 10¢ fee — Shows to whom and date delivered
- ☐ 35¢ fee — Shows to whom, date, and where delivered

☐ 50¢ fee — Deliver to Addressee Only

POSTMARK OR DATE

POD Form 3800 Mar. 1966 **NO INSURANCE COVERAGE PROVIDED— NOT FOR INTERNATIONAL MAIL** (See other side)

SENDER: Be sure to follow instructions on other side

PLEASE FURNISH SERVICE(S) INDICATED BY CHECKED BLOCK(S)
(Additional charges required for these services)

☐ Show to whom, date and address where delivered

☐ Deliver ONLY to addressee

RECEIPT
Received the numbered article described below

REGISTERED NO.

SIGNATURE OR NAME OF ADDRESSEE *(Must always be filled in)*: Phillips Pet. Co.

CERTIFIED NO. 480307

SIGNATURE OF ADDRESSEE'S AGENT, IF ANY: W Worston

INSURED NO.

DATE DELIVERED: 6-21-66

SHOW WHERE DELIVERED *(Only if requested, and include ZIP Code)*

No. 480307

RECEIPT FOR CERTIFIED MAIL—30¢

SENT TO: Phillips Petroleum Corp.

STREET AND NO. Phillips Building 4th and Washington

P. O., STATE, AND ZIP CODE: Odessa, Texas 79760

EXTRA SERVICES FOR ADDITIONAL FEES

Return Receipt
- ☐ 10¢ fee — Shows to whom and date delivered
- ☐ 35¢ fee — Shows to whom, date, and where delivered

☐ 50¢ fee — Deliver to Addressee Only

POSTMARK OR DATE

POD Form 3800 Mar. 1966 **NO INSURANCE COVERAGE PROVIDED— NOT FOR INTERNATIONAL MAIL** (See other side)

SENDER: Be sure to follow instructions on other side

PLEASE FURNISH SERVICE(S) INDICATED BY CHECKED BLOCK(S)
(Additional charges required for these services)

☐ Show to whom, date and address where delivered

☐ Deliver ONLY to addressee

RECEIPT
Received the numbered article described below

REGISTERED NO.

SIGNATURE OR NAME OF ADDRESSEE *(Must always be filled in)*: Cities Service Oil Co.

CERTIFIED NO. 480303

SIGNATURE OF ADDRESSEE'S AGENT, IF ANY: Mary Ann Cox

INSURED NO.

DATE DELIVERED: 6-21-66

SHOW WHERE DELIVERED *(Only if requested, and include ZIP Code)*: Midland, Texas

No. 480303

RECEIPT FOR CERTIFIED MAIL—30¢

SENT TO: Cities Service Oil Co.

STREET AND NO. 800 Vaughan Building

P. O., STATE, AND ZIP CODE: Midland, Texas 79701

EXTRA SERVICES FOR ADDITIONAL FEES

Return Receipt
- ☐ 10¢ fee — Shows to whom and date delivered
- ☐ 35¢ fee — Shows to whom, date, and where delivered

☐ 50¢ fee — Deliver to Addressee Only

POSTMARK OR DATE

POD Form 3800 Mar. 1966 **NO INSURANCE COVERAGE PROVIDED— NOT FOR INTERNATIONAL MAIL** (See other side)

SENDER: Be sure to follow instructions on other side

PLEASE FURNISH SERVICE(S) INDICATED BY CHECKED BLOCK(S)
(Additional charges required for these services)

☐ Show to whom, date and address where delivered ☐ Deliver ONLY to addressee

RECEIPT
Received the numbered article described below

REGISTERED NO.

CERTIFIED NO.
480298

INSURED NO.

① SIGNATURE OR NAME OF ADDRESSEE *(Must always be filled in)*

② SIGNATURE OF ADDRESSEE'S AGENT, IF ANY

DATE DELIVERED
JUN 21 [illegible]

③ SHOW WHERE DELIVERED *(Only if requested, and include ZIP Code)*

L L Taylor

No. 480298

RECEIPT FOR CERTIFIED MAIL—30¢

SENT TO El Paso Natural Gas Co.

STREET AND NO. P. O. Box 1492

P. O., STATE, AND ZIP CODE El Paso, Texas 7[illegible]

EXTRA SERVICES FOR ADDITIONAL FEES

☐ 10¢ fee — Shows to whom and date delivered
☐ 35¢ fee — Shows to whom, date, and where delivered
Return Receipt
☐ 50¢ fee — Deliver to Addressee Only

POSTMARK OR DATE

POD Form 3800 Mar. 1966 **NO INSURANCE COVERAGE PROVIDED— NOT FOR INTERNATIONAL MAIL** *(See other side)*

SENDER: Be sure to follow instructions on other side

PLEASE FURNISH SERVICE(S) INDICATED BY CHECKED BLOCK(S)
(Additional charges required for these services)

☐ Show to whom, date and address where delivered ☐ Deliver ONLY to addressee

RECEIPT
Received the numbered article described below

REGISTERED NO.

CERTIFIED NO.
480301

INSURED NO.

① SIGNATURE OR NAME OF ADDRESSEE *(Must always be filled in)*

② SIGNATURE OF ADDRESSEE'S AGENT, IF ANY

DATE DELIVERED
JUN 2[illegible] 1973

③ SHOW WHERE DELIVERED *(Only if requested, and include ZIP Code)*

L L Taylor

No. 480301

RECEIPT FOR CERTIFIED MAIL—30¢

SENT TO LLANO INC.

STREET AND NO. Box 2215

P. O., STATE, AND ZIP CODE Hobbs, New Mexico 88240

EXTRA SERVICES FOR ADDITIONAL FEES

☐ 10¢ fee — Shows to whom and date delivered
☐ 35¢ fee — Shows to whom, date, and where delivered
Return Receipt
☐ 50¢ fee — Deliver to Addressee Only

POSTMARK OR DATE

POD Form 3800 Mar. 1966 **NO INSURANCE COVERAGE PROVIDED— NOT FOR INTERNATIONAL MAIL** *(See other side)*

SENDER: Be sure to follow instructions on other side

PLEASE FURNISH SERVICE(S) INDICATED BY CHECKED BLOCK(S)
(Additional charges required for these services)

☐ Show to whom, date and address where delivered ☐ Deliver ONLY to addressee

RECEIPT
Received the numbered article described below

REGISTERED NO.

CERTIFIED NO.
480300

INSURED NO.

① SIGNATURE OR NAME OF ADDRESSEE *(Must always be filled in)*

Transwestern Pipeline

② SIGNATURE OF ADDRESSEE'S AGENT, IF ANY

John Agosta

DATE DELIVERED
JUN 22 1973

③ SHOW WHERE DELIVERED *(Only if requested, and include ZIP Code)*

No. 480300

RECEIPT FOR CERTIFIED MAIL—30¢

SENT TO TRANSWESTERN PIPE LINE CO

STREET AND NO. Box 2521

P. O., STATE, AND ZIP CODE Houston, Texas 77001

EXTRA SERVICES FOR ADDITIONAL FEES

☐ 10¢ fee — Shows to whom and date delivered
☐ 35¢ fee — Shows to whom, date, and where delivered
Return Receipt
☐ 50¢ fee — Deliver to Addressee Only

POSTMARK OR DATE

POD Form 3800 Mar. 1966 **NO INSURANCE COVERAGE PROVIDED— NOT FOR INTERNATIONAL MAIL** *(See other side)*

PLEASE FURNISH SERVICE(S) INDICATED BY CHECKED BLOCK(S).
REQUIRED FEE(S) PAID.

☐ Show to whom, date and address where delivered ☐ Deliver ONLY to addressee

RECEIPT

Received the numbered article described below.

REGISTERED NO.

CERTIFIED NO. 63687

INSURED NO.

DATE DELIVERED MAY 03 1973

1 SIGNATURE OR NAME OF ADDRESSEE (*Must always be filled in*) Jane Doe

2 SIGNATURE OF ADDRESSEE'S AGENT, IF ANY Wm Boyd

3 SHOW WHERE DELIVERED (*only if requested*)

c55—16—71548-11 347-198 GPO

PLEASE FURNISH SERVICE(S) INDICATED BY CHECKED BLOCK(S).
REQUIRED FEE(S) PAID.

☐ Show to whom, date and address where delivered ☐ Deliver ONLY to addressee

RECEIPT

Received the numbered article described below.

REGISTERED NO.

CERTIFIED NO. 635872

INSURED NO.

DATE DELIVERED 5-4-73

SIGNATURE OR NAME OF ADDRESSEE (*Must always be filled in*)

1 Pennzoil Company

2 SIGNATURE OF ADDRESSEE'S AGENT, IF ANY Roy L. Johnson

3 SHOW WHERE DELIVERED (*only if requested*)

c55—16—71548-11 347-198 GPO

No. 480308

RECEIPT FOR CERTIFIED MAIL—30¢

SENT TO Superior Oil Company

STREET AND NO. Box 1900

P. O., STATE AND ZIP CODE Midland, Texas 79701

EXTRA SERVICES FOR ADDITIONAL FEES

Return Receipt Shows to whom, and date delivered ☐ 10¢ fee

Shows to whom, date, and where delivered ☐ 35¢ fee

Deliver to Addressee Only ☐ 50¢ fee

POSTMARK OR DATE

POD Form 3800 Mar. 1966 NO INSURANCE COVERAGE PROVIDED— NOT FOR INTERNATIONAL MAIL (See other side)

SENDER: Be sure to follow instructions on other side

PLEASE FURNISH SERVICE(S) INDICATED BY CHECKED BLOCK(S)
(*Additional charges required for these services.*)

☐ Show to whom, date and address where delivered ☐ Deliver ONLY to addressee

Received the numbered article described below

REGISTERED NO.

CERTIFIED NO. 480308

INSURED NO.

DATE DELIVERED JUN 21 1973

1 SIGNATURE OR NAME OF ADDRESSEE (*Must always be filled in*) Superior

2 SIGNATURE OF ADDRESSEE'S AGENT, IF ANY Box 1900

3 SHOW WHERE DELIVERED (*Only if requested, and include ZIP Code*) Rec'd 2:01 PM

RECEIPT

SIGNATURE OR NAME OF ADDRESSEE (*Must always be filled in*)

REGISTERED NO.

CERTIFIED NO. 635877

INSURED NO.

DATE DELIVERED MAY 4 1973

SHOW WHERE DELIVERED (*only if requested*)

SIGNATURE OF ADDRESSEE'S AGENT, IF ANY

PLEASE FURNISH SERVICE(S) INDICATED BY CHECKED BLOCK(S).
REQUIRED FEE(S) PAID.

☐ Show to whom, date and address where delivered ☐ Deliver ONLY to addressee

Received the numbered article described below.

c55—16—71548-11 347-198 GPO

PLEASE FURNISH SERVICE(S) INDICATED BY CHECKED BLOCK(S).
REQUIRED FEE(S) PAID.

☐ Show to whom, date and address where delivered ☐ Deliver ONLY to addressee

RECEIPT

Received the numbered article described below.

REGISTERED NO.

CERTIFIED NO. 635875

INSURED NO.

DATE DELIVERED MAY 1973

SIGNATURE OR NAME OF ADDRESSEE (*Must always be filled in*) 1 Morris Antwerl

SIGNATURE OF ADDRESSEE'S AGENT, IF ANY 2 Johnny Cope

SHOW WHERE DELIVERED (*only if requested*) 3

e55—16—71548-11 347-198 GPO

PLEASE FURNISH SERVICE(S) INDICATED BY CHECKED BLOCK(S).
REQUIRED FEE(S) PAID.

☐ Show to whom, date and address where delivered ☐ Deliver ONLY to addressee

RECEIPT

Received the numbered article described below.

REGISTERED NO.

CERTIFIED NO. 635874

INSURED NO.

DATE DELIVERED 5-3-73

SIGNATURE OR NAME OF ADDRESSEE (*Must always be filled in*) 1 Litia Strzie

SIGNATURE OF ADDRESSEE'S AGENT, IF ANY 2 M. Burrell

SHOW WHERE DELIVERED (*only if requested*) 3

e55—16—71548-11 347-198 GPO

PLEASE FURNISH SERVICE(S) INDICATED BY CHECKED BLOCK(S).
REQUIRED FEE(S) PAID.

☐ Show to whom, date and address where delivered ☐ Deliver ONLY to addressee

RECEIPT

Received the numbered article described below.

REGISTERED NO.

CERTIFIED NO. 635871

INSURED NO.

DATE DELIVERED 5/4/73

SIGNATURE OR NAME OF ADDRESSEE (*Must always be filled in*) 1 Rubye Pitt

SIGNATURE OF ADDRESSEE'S AGENT, IF ANY 2 Barbara Lee

SHOW WHERE DELIVERED (*only if requested*) 3

PLEASE FURNISH SERVICE(S) INDICATED BY CHECKED BLOCK(S).
REQUIRED FEE(S) PAID.

☐ Show to whom, date and address where delivered ☐ Deliver ONLY to addressee

RECEIPT

Received the numbered article described below.

REGISTERED NO.

CERTIFIED NO. 635870

INSURED NO.

DATE DELIVERED 5-3-73

SIGNATURE OR NAME OF ADDRESSEE (*Must always be filled in*) 1 Stephen al e

SIGNATURE OF ADDRESSEE'S AGENT, IF ANY 2 Bey 1900

SHOW WHERE DELIVERED (*only if requested*) 3 Pedro Garcia

e55—16—71548-11 347-198 GPO

PLEASE FURNISH SERVICE(S) INDICATED BY CHECKED BLOCK(S).
REQUIRED FEE(S) PAID.

☐ Show to whom, date and address where delivered ☐ Deliver ONLY to addressee

RECEIPT

Received the numbered article described below.

REGISTERED NO.

CERTIFIED NO. 635878

INSURED NO.

DATE DELIVERED MAY 4 1973

SIGNATURE OR NAME OF ADDRESSEE (*Must always be filled in*) 1

SIGNATURE OF ADDRESSEE'S AGENT, IF ANY 2

SHOW WHERE DELIVERED (*only if requested*) 3

e55—16—71548-11 347-198 GPO

No. 635872

RECEIPT FOR CERTIFIED MAIL—20¢

SENT TO: PENNZOIL

POSTMARK OR DATE

STREET AND NO.: Box 1828

CITY, STATE, AND ZIP CODE: Midland, Texas 79701

If you want a return receipt, check which ☐ *10¢ shows to whom and when delivered* ☐ *35¢ shows to whom, when, and address where delivered*

If you want delivery only to addressee, check here ☐ *50¢ fee*

FEES ADDITIONAL TO 20¢ FEE

POD Form 3800 July 1963 **NO INSURANCE COVERAGE PROVIDED— NOT FOR INTERNATIONAL MAIL** *(See other side)*

No. 635871

RECEIPT FOR CERTIFIED MAIL—20¢

SENT TO: PHILLIPS PETROLEUM CORP

POSTMARK OR DATE

STREET AND NO.: Phillips Building

CITY, STATE, AND ZIP CODE: odessa, Texas 79760

If you want a return receipt, check which ☐ *10¢ shows to whom and when delivered* ☐ *35¢ shows to whom, when, and address where delivered*

If you want delivery only to addressee, check here ☐ *50¢ fee*

FEES ADDITIONAL TO 20¢ FEE

POD Form 3800 July 1963 **NO INSURANCE COVERAGE PROVIDED— NOT FOR INTERNATIONAL MAIL** *(See other side)*

No. 635870

RECEIPT FOR CERTIFIED MAIL—20¢

SENT TO: SUPERIOR OIL CO.

POSTMARK OR DATE

STREET AND NO.: P. O. Box 1900

CITY, STATE, AND ZIP CODE: Midland, Texas 79701

If you want a return receipt, check which ☐ *10¢ shows to whom and when delivered* ☐ *35¢ shows to whom, when, and address where delivered*

If you want delivery only to addressee, check here ☐ *50¢ fee*

FEES ADDITIONAL TO 20¢ FEE

POD Form 3800 July 1963 **NO INSURANCE COVERAGE PROVIDED— NOT FOR INTERNATIONAL MAIL** *(See other side)*

No. 635868

RECEIPT FOR CERTIFIED MAIL—20¢

SENT TO: ELY HURWITZ

POSTMARK OR DATE

STREET AND NO.: 1310 19th St, NW

CITY, STATE, AND ZIP CODE: Washington, D. C. 20036

If you want a return receipt, check which ☐ *10¢ shows to whom and when delivered* ☐ *35¢ shows to whom, when, and address where delivered*

If you want delivery only to addressee, check here ☐ *50¢ fee*

FEES ADDITIONAL TO 20¢ FEE

POD Form 3800 July 1963 **NO INSURANCE COVERAGE PROVIDED— NOT FOR INTERNATIONAL MAIL** *(See other side)*

No. 635878

RECEIPT FOR CERTIFIED MAIL—20¢

SENT TO: EL PASO NATURAL GAS
STREET AND NO.: Box 1492
CITY, STATE, AND ZIP CODE: El Paso, Texas
POSTMARK OR DATE

If you want a return receipt, check which ☐ *10¢ shows to whom and when delivered* ☐ *35¢ shows to whom, when, and address where delivered*
If you want delivery only to addressee, check here ☐ *50¢ fee*
FEES ADDITIONAL TO 20¢ FEE

POD Form 3800 July 1963 **NO INSURANCE COVERAGE PROVIDED— NOT FOR INTERNATIONAL MAIL** *(See other side)*

No. 635877

RECEIPT FOR CERTIFIED MAIL—20¢

SENT TO: TRANSWESTERN PIPE LINE CO.
STREET AND NO.: Box 2521
CITY, STATE, AND ZIP CODE: Houston, Texas 77001
POSTMARK OR DATE

If you want a return receipt, check which ☐ *10¢ shows to whom and when delivered* ☐ *35¢ shows to whom, when, and address where delivered*
If you want delivery only to addressee, check here ☐ *50¢ fee*
FEES ADDITIONAL TO 20¢ FEE

POD Form 3800 July 1963 **NO INSURANCE COVERAGE PROVIDED— NOT FOR INTERNATIONAL MAIL** *(See other side)*

No. 635876

RECEIPT FOR CERTIFIED MAIL—20¢

SENT TO: LLANO INC.
STREET AND NO.: Box 2215
CITY, STATE, AND ZIP CODE: Hobbs, New Mexico 88240
POSTMARK OR DATE

If you want a return receipt, check which ☐ *10¢ shows to whom and when delivered* ☐ *35¢ shows to whom, when, and address where delivered*
If you want delivery only to addressee, check here ☐ *50¢ fee*
FEES ADDITIONAL TO 20¢ FEE

POD Form 3800 July 1963 **NO INSURANCE COVERAGE PROVIDED— NOT FOR INTERNATIONAL MAIL** *(See other side)*

No. 635875

RECEIPT FOR CERTIFIED MAIL—20¢

SENT TO: MORRIS ANTWEIL
STREET AND NO.: Box 2010
CITY, STATE, AND ZIP CODE: Hobbs, New Mexico 88240
POSTMARK OR DATE

If you want a return receipt, check which ☐ *10¢ shows to whom and when delivered* ☐ *35¢ shows to whom, when, and address where delivered*
If you want delivery only to addressee, check here ☐ *50¢ fee*
FEES ADDITIONAL TO 20¢ FEE

POD Form 3800 July 1963 **NO INSURANCE COVERAGE PROVIDED— NOT FOR INTERNATIONAL MAIL** *(See other side)*

No. 635874

RECEIPT FOR CERTIFIED MAIL—20¢

SENT TO: CITIES SERVICE OIL CO.
STREET AND NO.: 800 Vaughan Building
CITY, STATE, AND ZIP CODE: Midland, Texas 79701
POSTMARK OR DATE

If you want a return receipt, check which ☐ *10¢ shows to whom and when delivered* ☐ *35¢ shows to whom, when, and address where delivered*
If you want delivery only to addressee, check here ☐ *50¢ fee*
FEES ADDITIONAL TO 20¢ FEE

POD Form 3800 July 1963 **NO INSURANCE COVERAGE PROVIDED— NOT FOR INTERNATIONAL MAIL** *(See other side)*

No. 635873

RECEIPT FOR CERTIFIED MAIL—20¢

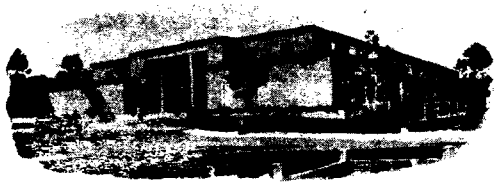
SENT TO: MICHAEL P. & CORINNE GRACE
STREET AND NO.: Box 1418
CITY, STATE, AND ZIP CODE: Carlsbad, New Mexico 88220
POSTMARK OR DATE

If you want a return receipt, check which ☐ *10¢ shows to whom and when delivered* ☐ *35¢ shows to whom, when, and address where delivered*
If you want delivery only to addressee, check here ☐ *50¢ fee*
FEES ADDITIONAL TO 20¢ FEE

POD Form 3800 July 1963 **NO INSURANCE COVERAGE PROVIDED— NOT FOR INTERNATIONAL MAIL** *(See other side)*

State of New Mexico

TELEPHONE
505-827-2748



PHIL R. LUCERO
COMMISSIONER

Commissioner of Public Lands

August 20, 1975

P. O. BOX 1148
SANTA FE, NEW MEXICO 87501

Atlantic Richfield Company
P. O. Box 1610
Midland, Texas 79701

Re: Empire Abo Unit
Eddy County, New Mexico
Proposed Projected Enlargement
and Increased Allowable

ATTENTION: Mr. Wm. L. Embry

Gentlemen:

The Commissioner of Public Lands has this date approved the enlargement of the Empire Abo Unit by the commitment of Tract Nos. 41, 79 and 84 which, together, cover the following lands:

Tract 41	Sec. 4, Twp. 18 S., Rge 28 E.	NE/4NE/4
Tract 79	Sec.27, Twp. 17 S., Rge 28 E.	SE/4SW/4
Tract 84	Sec. 5, Twp. 18 S., Rge 28 E.	SE/4NW/4

All joinders from all working interest owners and Lessees of record under the above mentioned tracts as well as Joinders from Cities Service and Tenneco committing their interests have been received and approved as well as revised Exhibits "B", "C" and "E".

This approval is subject to like approval by the United States Geological Survey and the New Mexico Oil Conservation Commission.

Please advise when the USGS approves so as to establish the effective date, which should be the first day of the month following the filing with the Commissioner and the Supervisor.

All requirements of Section 32 have been complied with.

Very truly yours,

PHIL R. LUCERO
COMMISSIONER OF PUBLIC LANDS

BY: Ray D. Graham
RAY D. GRAHAM, Director
Oil and Gas Division

PRL/RDG/s
cc: USGS-Roswell, New Mexico
OCC- Santa Fe, New Mexico

AtlanticRichfieldCompany
North American Producing Division
Permian District
Post Office Box 1610
Midland, Texas 79701
Telephone 915 682 8631

S. L. Smith
District Manager

August 15, 1975

Area Oil & Gas Supervisor
United States Geological Survey, P. O. Drawer 1857
Roswell, New Mexico 88201

Commissioner of Public Lands
State of New Mexico
Attention: Mr. Ray D. Graham
District Oil & Gas Department, P. O. Box 1148
Santa Fe, New Mexico 87501

New Mexico Oil Conservation Commission
Box 2088
Santa Fe, New Mexico 87501

Subject: Empire Abo Unit
Eddy County, New Mexico
Proposed Projected Enlargement
and Increased Allowable

The unit working interest owners were balloted June 4, 1975 pursuant to Section 32 (Subsequent Joinder) of the Unit Agreement for their approval of inclusion of tracts 41, 79 and 84 (on original basis) and also for their approval to allow Cities Service and Tenneco to commit their interests in tracts previously indemnified. We have now secured more than the 65% approval required under the Unit Agreement.

Our hearing before the NMOCC was held on June 10, 1975 to bring in tracts 41, 79 and 84 and to increase unit allowable by virtue thereof. On July 1, 1975 the Commission entered its Order R-4549-C approving the application for expansion of the pressure maintenance project for the Empire Abo pool also increasing the allowable effective as of the date of ratification of the Unit Agreement by the parties committing additional acreage.

We have now secured Joinders from all working interest owners and lessees of record under tracts 41, 79 and 84 as well as Joinders from Cities Service and Tenneco committing their interests in unit tracts previously indemnified. There are no overriding royalty owners under tracts 79 and 84 and the overriding royalty owners under tract 41 were previously signed up as of the effective date of the unit and their respective Joinders were furnished to the Supervisor and Commissioner.

We furnish the Supervisor herewith the following:

1. Original and two copies of Joinders executed by Cities Service, Tenneco Oil Company and the remainder of the working interest owners under tract 79 as shown on the enclosed revised Exhibit "B".

2. Three copies of revised Exhibit "B" and "C" to the Unit Agreement and revised Exhibit "E" to the Unit Operating Agreement.

We furnish the Commissioner herewith original and one copy of all Joinders referred to above and two copies of the revised Exhibits.

We furnish the Commission herewith one xerox copy of all Joinders and revised Exhibits referred to above.

We respectfully request the Supervisor and Commissioner approve the Joinders and revised Exhibits as soon as possible so that the Joinders will be effective September 1, 1975 and that the Commission make its Order effective September 1, 1975. If any additional information is desired, please so advise.

Very truly yours,

WM. L. EMBRY
LAND DEPARTMENT

WLE:bk

Enclosures

REVISED
EXHIBIT "E"
To Unit Operating Agreement
EMPIRE ABO UNIT
Eddy County, New Mexico

Working Interest Owner	Unit Participation, Percent Phase II
Abo Petroleum Corporation	1.05860
C. H. Albaugh	None
Ernest Bryan Alexander Trust	None
Amoco Production Company	34.06690
American Petrofina Company of Texas	.40319
Estate of B. Aston (C Trust)	.20309
Estate of Charles Aston	.06769
Estate of Lincoln Aston	.06769
Rogers Aston	.06769
Atlantic Richfield Company	34.14066
George W. Baker	None
Dedric D. Baxter	None
Robert E. Boling	.01268
John E. Bourdeau	None
Bascom W. Broaddus	None
John S. Brown	.03085
Thomas C. Brown	.02572
T. J. Brown	.02572
Cactus Drilling Corporation	None
Castle and Wigzell	None
C & K Petroleum, Inc.	.41350
Cities Service Oil Company	.75307
Tracy Clark	.00836
Continental Oil Company	.61007
Ben A. Copass, Jr.	.00610
R. G. Cox/D. L. Benscoter	None
Bruce Crampton	None
Walter E. Crockett	None
James I. DeLoache	.00096
R. E. Davis	None
Joe D. Denton	None
Depco, Inc.	3.78795
Dixon and Yates Oil Company	.09514
Carmen Edwards	.05041
Edward Egbert, M. D.	None
Exxon Corporation	4.61547
Estate of W. D. Flynn	.08155
K. L. Fouch	.00359
General American Oil Company of Texas	.44228
Judith A. Gilchrist	.00605
Walter Granberry	.03398
Gulf Oil Company - U.S.	1.91678
Hanagan and Hanagan	None
Hanover Planning Company	None
Ruth Hatch	.20160

(Revised 6-1-75)
(Effective 9-1-75)

Working Interest Owners	Unit Participation, Percent Phase II
A. H. Hedden	.02059
C. F. Henderson	None
Margaret Holcomb	.02265
Husky Oil Company of Delaware	3.78794
Tom L. Ingram	.03446
James K. Jeanblanc	None
Lindsey R. Jeanblanc	None
Harold Kersey	.09061
F. M. Late	None
Lee Drilling Company	.00296
Carolyn Kay Lisle	.01077
Marathon Oil Company	.95631
Delton Marcum	.03021
Bessie H. Marcum Estate	.03021
Gordon Marcum	.03021
L. S. Melzer	None
L. B. Meaders	None
Thelma Methvin	.02265
J. O. Miller	.04307
J. Hiram Moore	.88076
Hugh Munn	.02059
Myco Industries, Inc.	1.05859
Eugene L. Nearburg	.02492
Arthur L. Owen	.01030
Partnership Properties	.02574
Penroc Oil Corporation	None
Louis F. Polk	.01544
James F. Pritchett	None
L. J. Reischman	.03398
M. V. Roberts	None
W. V. Roberts	None
W. V. Roberts A/W FNB	None
Bill J. Rogers	None
Joe G. Roper	.01030
Rutter and Wilbanks Corporation	.10768
John C. Ryan	None
Samedan Oil Corporation	.28857
Estate of Nelle G. Scheurich	.15119
Marla J. Schmid	.00605
Seven Oil Ltd.	.06169
Vilas P. Sheldon	.68315
Jetta L. Shewmake	None
James B. Shewmake, Minor	None
Signal Oil and Gas Company	None
Walter Solt	.00948
Southland Royalty	.96768
Sun Oil Company	2.58208
Tenneco Oil Company	.74653
Texas American Oil Company	.12339
Dorothy Topliff	.01812
Mary Ann Treadwell	.01077

(Revised 6-1-75)
(Effective 9-1-75)

Working Interest Owners	Unit Participation, Percent Phase II
Estate of Fred Turner, Jr.	None
B. F. Walker Estate	.10987
Joe A. Warren	.00345
Estate of Beth N. Wilbanks	.10768
Ann Burnett Windfohr	.26559
Ann V. B. Windfohr Trust	.35413
Harvey E. Yates	.06880
John A. Yates	.00360
Martin Yates III	.09704
S. P. Yates	.37082
Yates Brothers	.17294
Yates Drilling Company	1.05859
Yates Petroleum Corporation	1.18198
Robert H. Ziegler, Sr.	.08853
Total	100.00000

(Revised 6-1-75)
(Effective 9-1-75)

SPECIAL JOINDER

TO UNIT OPERATING AGREEMENT AND UNIT AGREEMENT

EMPIRE ABO UNIT

(Tract No. 79)

EDDY COUNTY, NEW MEXICO

The undersigned, as an owner of both working interests and royalty interests acknowledges receipt of a counterpart of an instrument titled "Unit Agreement, Empire Abo Unit, Eddy County, New Mexico", dated as of the first day of October, 1972, providing for the conduct of unit operations in the Abo formation of the Empire Abo Field, located in Eddy County, New Mexico, and also acknowledges receipt of a counterpart of an instrument titled "Unit Operating Agreement, Empire Abo Unit, Eddy County, New Mexico", dated as of the first day of October, 1972.

The undersigned is the owner of a working interest, royalty interest or interest as "Lessee of Record" in Tract No. 79 as described in Exhibits "A" and "B" of the Unit Agreement and Unit Operating Agreement, which tract has not been included in the Unit for failure of execution by sufficient working interest owners to qualify the tract and it is now desired to commit said tract to the Unit Agreement.

The Unit Agreement and the Unit Operating Agreement provide that any person may become a party to the agreements by signing the original, counterpart, or other instrument which evidences an intention to be bound by the terms of such agreements.

NOW, THEREFORE, each undersigned party agrees to become a party to and be bound by the provisions of the Unit Agreement and the Unit Operating Agreement (where such party is the owner of a working interest) as to the interest of the undersigned of whatsoever nature, whether as a royalty interest, a working interest or an interest as "Lessee of Record" in Tract No. 79 as described in Exhibits "A" and "B" of the Unit Agreement. The undersigned agrees that the parties to the Unit Agreement and the Unit Operating Agreement are those that signed the originals, any counterparts of said instruments or any instrument which evidences an intention to be so bound.

It is understood that commitment of the above tract will be on the same basis of participation as provided in the original Unit Agreement subject to approval (by ballot) of working interest owners of not less than 65% of the Unit Participation now in effect and approval by the Commissioner of Public Lands of the State of New Mexico and the Supervisor, United States Geological Survey, and shall become effective as of the first day of the month following the filing with the Land Commissioner and the Supervisor of duly executed counterparts of all documents necessary to establish effective commitment, as provided in Section 32 of the Unit Agreement.

EXECUTED as of the 8th day of August, 1975.

Name	Interest(%)	Address
Continental Oil Company	12.50000	P. O. Box 959, Midland, Texas 79701

by: E A Austin

E. A. Austin
Attorney-in-Fact

Name	Interest	Address

STATE OF Texas)

COUNTY OF Harris)

The foregoing instrument was acknowledged before me this 8th day of August, 1975, by E. A. Austin, Attorney-in-Fact, of CONTINENTAL OIL COMPANY, a Delaware corporation, on behalf of said corporation.

My commission expires:

DORIS MARLETT
Notary Public in and for Harris County, Texas
My Commission Expires June 1, 1977

Doris Marlett
Notary Public in and for
Harris County, Texas

STATE OF)

COUNTY OF)

The foregoing instrument was acknowledged before me this _____ day of _____, 1975, by _____.

My commission expires:

_____
Notary Public in and for

STATE OF)

COUNTY OF)

The foregoing instrument was acknowledged before me this _____ day of _____, 1975, by _____.

My commission expires:

_____
Notary Public in and for

SPECIAL JOINDER

TO UNIT OPERATING AGREEMENT AND UNIT AGREEMENT

EMPIRE ABO UNIT

(Tract No. 79)

EDDY COUNTY, NEW MEXICO

The undersigned, as an owner of both working interests and royalty interests acknowledges receipt of a counterpart of an instrument titled "Unit Agreement, Empire Abo Unit, Eddy County, New Mexico", dated as of the first day of October, 1972, providing for the conduct of unit operations in the Abo formation of the Empire Abo Field, located in Eddy County, New Mexico, and also acknowledges receipt of a counterpart of an instrument titled "Unit Operating Agreement, Empire Abo Unit, Eddy County, New Mexico", dated as of the first day of October, 1972.

The undersigned is the owner of a working interest, royalty interest or interest as "Lessee of Record" in Tract No. 79 as described in Exhibits "A" and "B" of the Unit Agreement and Unit Operating Agreement, which tract has not been included in the Unit for failure of execution by sufficient working interest owners to qualify the tract and it is now desired to commit said tract to the Unit Agreement.

The Unit Agreement and the Unit Operating Agreement provide that any person may become a party to the agreements by signing the original, counterpart, or other instrument which evidences an intention to be bound by the terms of such agreements.

NOW, THEREFORE, each undersigned party agrees to become a party to and be bound by the provisions of the Unit Agreement and the Unit Operating Agreement (where such party is the owner of a working interest) as to the interest of the undersigned of whatsoever nature, whether as a royalty interest, a working interest or an interest as "Lessee of Record" in Tract No. 79 as described in Exhibits "A" and "B" of the Unit Agreement. The undersigned agrees that the parties to the Unit Agreement and the Unit Operating Agreement are those that signed the originals, any counterparts of said instruments or any instrument which evidences an intention to be so bound.

It is understood that commitment of the above tract will be on the same basis of participation as provided in the original Unit Agreement subject to approval (by ballot) of working interest owners of not less than 65% of the Unit Participation now in effect and approval by the Commissioner of Public Lands of the State of New Mexico and the Supervisor, United States Geological Survey, and shall become effective as of the first day of the month following the filing with the Land Commissioner and the Supervisor of duly executed counterparts of all documents necessary to establish effective commitment, as provided in Section 32 of the Unit Agreement.

EXECUTED as of the 7th day of August, 1975.

Name	Interest (%)	Address
Marla J. Schmid	0.26042	727 Oxford, Tyler, Texas 75701

"a married woman dealing in her sole and separate property"

Name	Interest	Address
_____	_____	_____
_____	_____	_____
_____	_____	_____

STATE OF)

COUNTY OF)

The foregoing instrument was acknowledged before me this _____ day of _____, 1975, by _____, _____, of _____, a _____ corporation, on behalf of said corporation.

My commission expires:

_____

_____
Notary Public in and for

STATE OF Tx)

COUNTY OF Tarrant)

The foregoing instrument was acknowledged before me this 7 day of Aug, 1975, by Marla J Schmied.

My commission expires:

Commission Expires June 1, 1977

Karen Beaver
Notary Public in and for Tarrant County

STATE OF)

COUNTY OF)

The foregoing instrument was acknowledged before me this _____ day of _____, 1975, by _____ _____.

My commission expires:

_____

_____
Notary Public in and for

SPECIAL JOINDER

TO UNIT OPERATING AGREEMENT AND UNIT AGREEMENT

EMPIRE ABO UNIT

(Tract No. 79)

EDDY COUNTY, NEW MEXICO

The undersigned, as an owner of both working interests and royalty interests acknowledges receipt of a counterpart of an instrument titled "Unit Agreement, Empire Abo Unit, Eddy County, New Mexico", dated as of the first day of October, 1972, providing for the conduct of unit operations in the Abo formation of the Empire Abo Field, located in Eddy County, New Mexico, and also acknowledges receipt of a counterpart of an instrument titled "Unit Operating Agreement, Empire Abo Unit, Eddy County, New Mexico", dated as of the first day of October, 1972.

The undersigned is the owner of a working interest, royalty interest or interest as "Lessee of Record" in Tract No. 79 as described in Exhibits "A" and "B" of the Unit Agreement and Unit Operating Agreement, which tract has not been included in the Unit for failure of execution by sufficient working interest owners to qualify the tract and it is now desired to commit said tract to the Unit Agreement.

The Unit Agreement and the Unit Operating Agreement provide that any person may become a party to the agreements by signing the original, counterpart, or other instrument which evidences an intention to be bound by the terms of such agreements.

NOW, THEREFORE, each undersigned party agrees to become a party to and be bound by the provisions of the Unit Agreement and the Unit Operating Agreement (where such party is the owner of a working interest) as to the interest of the undersigned of whatsoever nature, whether as a royalty interest, a working interest or an interest as "Lessee of Record" in Tract No. 79 as described in Exhibits "A" and "B" of the Unit Agreement. The undersigned agrees that the parties to the Unit Agreement and the Unit Operating Agreement are those that signed the originals, any counterparts of said instruments or any instrument which evidences an intention to be so bound.

It is understood that commitment of the above tract will be on the same basis of participation as provided in the original Unit Agreement subject to approval (by ballot) of working interest owners of not less than 65% of the Unit Participation now in effect and approval by the Commissioner of Public Lands of the State of New Mexico and the Supervisor, United States Geological Survey, and shall become effective as of the first day of the month following the filing with the Land Commissioner and the Supervisor of duly executed counterparts of all documents necessary to establish effective commitment, as provided in Section 32 of the Unit Agreement.

EXECUTED as of the 7 day of August, 1975.

Name	Interest (%)	Address
Dorothy Topliff Dorothy Topliff A single woman	0.78125	4201 Spring Branch Drive Fort Worth, Texas 76116

Name	Interest	Address
_____	_____	_____
_____	_____	_____
_____	_____	_____

STATE OF)

COUNTY OF)

The foregoing instrument was acknowledged before me this _____ day of _____, 1975, by _____, _____, of _____, a _____ corporation, on behalf of said corporation.

My commission expires:

_____

_____
Notary Public in and for

_____

STATE OF Tx)

COUNTY OF Tarrant)

The foregoing instrument was acknowledged before me this 7 day of Aug, 1975, by Dorothy Topliff. A single woman

My commission expires:

_____

Karen Beaver
Notary Public in and for Tarrant County

STATE OF)

COUNTY OF)

The foregoing instrument was acknowledged before me this _____ day of _____, 1975, by _____ _____.

My commission expires:

_____

_____
Notary Public in and for

_____

SPECIAL JOINDER

TO UNIT OPERATING AGREEMENT AND UNIT AGREEMENT

EMPIRE ABO UNIT

(Tracts Nos. 9, 73A, 73B, 73C, 79 and 84)

EDDY COUNTY, NEW MEXICO

The undersigned Tenneco Oil Company, as an owner of both working interests and royalty interests acknowledges receipt of a counterpart of an instrument titled "Unit Agreement, Empire Abo Unit, Eddy County, New Mexico", dated as of the first day of October, 1972, providing for the conduct of unit operations in the Abo formmation of the Empire Abo Field, located in Eddy County, New Mexico, and also acknowledges receipt of a counterpart of an instrument titled "Unit Operating Agreement, Empire Abo Unit, Eddy County, New Mexico", dated as of the first day of October, 1972.

The Unit Agreement, by Exhibit "A" shows on a map the boundary lines of the Unit Area and the Tracts therein, and by Exhibit "B" describes each Tract in the Unit Area. The undersigned Tenneco Oil Company represents that it is the owner of either a working interest or a royalty interest, as defined in said Unit Agreement, in Tracts Nos. 9, 55, 73A, 73B, 73C, 79 and 84, as described in Exhibit "B" of the said Unit Agreement, and is a Lessee of Record in Tracts Nos. 56, 73A, 73B, 73C, 79 and 84.

By Special Joinder dated August 30, 1973, Tenneco Oil Company committed its interest as "Lessee of Record" in Tracts numbered 56, 73A, 73B, 73C and 79 as described in Exhibits "A" and "B" of the Unit Agreement but excepted and withheld from its joinder all royalty interest and working interest in any portion of the Unit Area.

It is now desired by Tenneco Oil Company to commit all its royalty and working interest (in addition to its interest as "Lessee of Record") in Tracts Nos. 9, 73A, 73C, 79, as well as its working interest and interest as "Lessee of Record" in Tract No. 84.

The Unit Agreement and the Unit Operating Agreement provide that any person may become a party to the agreements by signing the original, counterpart, or other instrument which evidences an intention to be bound by the terms of such agreements.

NOW, THEREFORE, the undersigned Tenneco Oil Company agrees to become a party to and be bound by the provisions of the Unit Agreement and the Unit Operating Agreement only as to Tracts Nos. 9, 73A, 73B, 73C, 79 and also its working interest and interest as "Lessee of Record" in Tract No. 84 as described in Exhibits "A" and "B" of the Unit Agreement, excepting and withholding from its joinder hereby all interest of whatsoever nature in Tract No. 55. The undersigned agrees that the parties to the Unit Agreement and the Unit Operating Agreement are those that sign the originals, any counterparts of said instruments or any instrument which evidences an intention to be so bound.

It is understood that commitment of the above tracts will be on the same basis of participation as provided in the original Unit Agreement subject to approval (by ballot) of working interest owners of not less than 65% of the Unit Participation now in effect and approval by the Commissioner of Public Lands of the State of New Mexico and the Supervisor, United States Geological Survey, and shall become effective as of the first day of the month following the filing with the Land Commissioner and the Supervisor of duly executed counterparts of all documents necessary to establish effective commitment, as provided in Section 32 of the Unit Agreement.

EXECUTED as of the 7th day of August, 1975.

TENNECO OIL COMPANY

By _____
Attorney in Fact

STATE OF COLORADO)

COUNTY OF DENVER)

The foregoing instrument was acknowledged before me this 7th day of August, 1975, by _____, Attorney in Fact of TENNECO OIL COMPANY, a Delaware corporation, on behalf of said corporation.

My commission expires:

My Commission expires July 7, 1976

_____
Notary Public in and for
Denver County, Colorado

SPECIAL JOINDER

TO UNIT OPERATING AGREEMENT AND UNIT AGREEMENT

EMPIRE ABO UNIT

(Tracts 3, 5, 30, 35, 39, 41 and 73C)

EDDY COUNTY, NEW MEXICO

The undersigned Cities Service Oil Company, as an owner of both working interests and royalty interests acknowledges receipt of a counterpart of an instrument titled "Unit Agreement, Empire Abo Unit, Eddy County, New Mexico", dated as of the first day of October, 1972, providing for the conduct of unit operations in the Abo formation of the Empire Abo Field, located in Eddy County, New Mexico, and also acknowledges receipt of a counterpart of an instrument titled "Unit Operating Agreement, Empire Abo Unit, Eddy County, New Mexico", dated as of the first day of October, 1972.

The Unit Agreement, by Exhibit "A", shows on a map the boundary lines of the Unit Area and the Tracts therein, and by Exhibit "B" describes each Tract in the Unit Area. The undersigned Cities Service Oil Company represents that it is the owner of either a working interest or a royalty interest, as defined in said Unit Agreement, in Tracts Nos. 2, 3, 5, 6, 30, 35, 39, 41, 42, 46 and 73C, as described in Exhibit "B" of the said Unit Agreement, and is a Lessee of Record in Tracts Nos. 2, 6, 41, 42 and 46.

The Unit Agreement and the Unit Operating Agreement provide that any person may become a party to the agreements by signing the original, counterpart, or other instrument which evidences an intention to be bound by the terms of such agreements.

NOW, THEREFORE, the undersigned Cities Service Oil Company agrees to become a party to and be bound by the provisions of the Unit Agreement and the Unit Operating Agreement only as to the interest of the undersigned in Tracts numbered 3, 5, 30, 35, 39, 41 and 73C as described in Exhibits "A" and "B" of the Unit Agreement, specifically excepting and withholding from its joinder hereby all interest of the undersigned in Tracts numbered 2, 6, 42 and 46. The undersigned agrees that the parties to the Unit Agreement and the Unit Operating Agreement are those that sign the originals, any counterparts of said instruments or any instrument which evidences an intention to be so bound.

It is understood that commitment of the above tracts will be on the same basis of participation as provided in the original Unit Agreement subject to approval (by ballot) of working interest owners of not less than 65% of Unit Participation now in effect and approval by the Commissioner of Public Lands of the State of New Mexico and the Supervisor, United States Geological Survey, and shall become effective as of the first day of the month following the filing with the Land Commissioner and the Supervisor of duly executed counterparts of all documents necessary

to establish effective commitment, as provided in Section 32 of the Unit Agreement.

EXECUTED as of the 11th day of August, 1975.

ATTEST:

CITIES SERVICE OIL COMPANY

Vivian M. Spessard
Assistant Secretary

By D L Kastner
Vice President
D. L. KASTNER

STATE OF OKLAHOMA)

COUNTY OF TULSA)

The foregoing instrument was acknowledged before me this 11th day of August, 1975, by D. L. KASTNER Vice President, of CITIES SERVICE OIL COMPANY, a Delaware corporation, on behalf of said corporation.

My commission expires:

JUL 25 1976

Evelyn M. Schultz
Notary Public in and for
Tulsa County, Oklahoma
Evelyn M. Schultz

SPECIAL JOINDER

TO UNIT OPERATING AGREEMENT AND UNIT AGREEMENT

EMPIRE ABO UNIT

(Tract No. 79)

EDDY COUNTY, NEW MEXICO

The undersigned, as an owner of both working interests and royalty interests acknowledges receipt of a counterpart of an instrument titled "Unit Agreement, Empire Abo Unit, Eddy County, New Mexico", dated as of the first day of October, 1972, providing for the conduct of unit operations in the Abo formation of the Empire Abo Field, located in Eddy County, New Mexico, and also acknowledges receipt of a counterpart of an instrument titled "Unit Operating Agreement, Empire Abo Unit, Eddy County, New Mexico", dated as of the first day of October, 1972.

The undersigned is the owner of a working interest, royalty interest or interest as "Lessee of Record" in Tract No. 79 as described in Exhibits "A" and "B" of the Unit Agreement and Unit Operating Agreement, which tract has not been included in the Unit for failure of execution by sufficient working interest owners to qualify the tract and it is now desired to commit said tract to the Unit Agreement.

The Unit Agreement and the Unit Operating Agreement provide that any person may become a party to the agreements by signing the original, counterpart, or other instrument which evidences an intention to be bound by the terms of such agreements.

NOW, THEREFORE, each undersigned party agrees to become a party to and be bound by the provisions of the Unit Agreement and the Unit Operating Agreement (where such party is the owner of a working interest) as to the interest of the undersigned of whatsoever nature, whether as a royalty interest, a working interest or an interest as "Lessee of Record" in Tract No. 79 as described in Exhibits "A" and "B" of the Unit Agreement. The undersigned agrees that the parties to the Unit Agreement and the Unit Operating Agreement are those that signed the originals, any counterparts of said instruments or any instrument which evidences an intention to be so bound.

It is understood that commitment of the above tract will be on the same basis of participation as provided in the original Unit Agreement subject to approval (by ballot) of working interest owners of not less than 65% of the Unit Participation now in effect and approval by the Commissioner of Public Lands of the State of New Mexico and the Supervisor, United States Geological Survey, and shall become effective as of the first day of the month following the filing with the Land Commissioner and the Supervisor of duly executed counterparts of all documents necessary to establish effective commitment, as provided in Section 32 of the Unit Agreement.

EXECUTED as of the 5th day of August, 1975.

Name	Interest (%)	Address
Estate of Bessie H. Marcum	1.30208	P. O. Box 5094, Midland, Texas 79701

by:

Name	Interest	Address

BY:

Delton D. Marcum _____ _____

Delton D. Marcum, Co-Executor of Bessie H. Marcum Estate

Gordon Marcum _____ _____

Gordon Marcum, Co-Executor of Bessie H. Marcum Estate

Dorothy M. Topliff _____ _____

Dorothy M. Topliff, Co-Executor of Bessie H. Marcum Estate

STATE OF TEXAS)

COUNTY OF MIDLAND)

The foregoing instrument was acknowledged before me this 5th day of August, 1975, by Delton D. Marcum, ~~Co-Executor of Bessie H. Marcum Estate~~.

My commission expires:

1 June 77

Notary Public in and for
Midland County, Texas

STATE OF TEXAS)

COUNTY OF MIDLAND)

The foregoing instrument was acknowledged before me this 5th day of August, 1975, by ~~Gordon Marcum Co-Executor of Bessie H. Marcum Estate~~.

My commission expires:

1 June 77

Notary Public in and for
Midland County, Texas

STATE OF TEXAS)

COUNTY OF Tarrant)

The foregoing instrument was acknowledged before me this 7 day of August, 1975, by Dorothy M. Topliff, ~~Co-Executor of Bessie H. Marcum Estate~~. a single woman

My commission expires:

KAREN BEAVERS, Notary Public
In and for Tarrant County, Texas
My Commission Expires June 1, 19 77

Karen Beavers
Notary Public in and for Tarrant County

SPECIAL JOINDER

TO UNIT OPERATING AGREEMENT AND UNIT AGREEMENT

EMPIRE ABO UNIT

(Tract No. 79)

EDDY COUNTY, NEW MEXICO

The undersigned, as an owner of both working interests and royalty interests acknowledges receipt of a counterpart of an instrument titled "Unit Agreement, Empire Abo Unit, Eddy County, New Mexico", dated as of the first day of October, 1972, providing for the conduct of unit operations in the Abo formation of the Empire Abo Field, located in Eddy County, New Mexico, and also acknowledges receipt of a counterpart of an instrument titled "Unit Operating Agreement, Empire Abo Unit, Eddy County, New Mexico", dated as of the first day of October, 1972.

The undersigned is the owner of a working interest, royalty interest or interest as "Lessee of Record" in Tract No. 79 as described in Exhibits "A" and "B" of the Unit Agreement and Unit Operating Agreement, which tract has not been included in the Unit for failure of execution by sufficient working interest owners to qualify the tract and it is now desired to commit said tract to the Unit Agreement.

The Unit Agreement and the Unit Operating Agreement provide that any person may become a party to the agreements by signing the original, counterpart, or other instrument which evidences an intention to be bound by the terms of such agreements.

NOW, THEREFORE, each undersigned party agrees to become a party to and be bound by the provisions of the Unit Agreement and the Unit Operating Agreement (where such party is the owner of a working interest) as to the interest of the undersigned of whatsoever nature, whether as a royalty interest, a working interest or an interest as "Lessee of Record" in Tract No. 79 as described in Exhibits "A" and "B" of the Unit Agreement. The undersigned agrees that the parties to the Unit Agreement and the Unit Operating Agreement are those that signed the originals, any counterparts of said instruments or any instrument which evidences an intention to be so bound.

It is understood that commitment of the above tract will be on the same basis of participation as provided in the original Unit Agreement subject to approval (by ballot) of working interest owners of not less than 65% of the Unit Participation now in effect and approval by the Commissioner of Public Lands of the State of New Mexico and the Supervisor, United States Geological Survey, and shall become effective as of the first day of the month following the filing with the Land Commissioner and the Supervisor of duly executed counterparts of all documents necessary to establish effective commitment, as provided in Section 32 of the Unit Agreement.

EXECUTED as of the 11th day of August, 1975.

Name	Interest (%)	Address
C & K Petroleum, Inc.	18.75000	607 Midland National Bank Bldg. Midland, Tx. 79701

by: _____

Executive Vice President

ATTEST:

_____

Ass't. Secretary

Name	Interest	Address
_____	_____	_____
_____	_____	_____
_____	_____	_____

STATE OF TEXAS)

COUNTY OF MIDLAND)

The foregoing instrument was acknowledged before me this 11th day of August, 1975, by W. D Kennedy, Exec. V-President, of Cox Petroleum Inc, a Delaware corporation, on behalf of said corporation.

My commission expires:

6-1-77

Notary Public in and for
Midland County, Texas

STATE OF)

COUNTY OF)

The foregoing instrument was acknowledged before me this _____ day of _____, 1975, by _____.

My commission expires:

_____

Notary Public in and for

STATE OF)

COUNTY OF)

The foregoing instrument was acknowledged before me this _____ day of _____, 1975, by _____.

My commission expires:

_____

Notary Public in and for

SPECIAL JOINDER

TO UNIT OPERATING AGREEMENT AND UNIT AGREEMENT

EMPIRE ABO UNIT

(Tract No. 79)

EDDY COUNTY, NEW MEXICO

The undersigned, as an owner of both working interests and royalty interests acknowledges receipt of a counterpart of an instrument titled "Unit Agreement, Empire Abo Unit, Eddy County, New Mexico", dated as of the first day of October, 1972, providing for the conduct of unit operations in the Abo formation of the Empire Abo Field, located in Eddy County, New Mexico, and also acknowledges receipt of a counterpart of an instrument titled "Unit Operating Agreement, Empire Abo Unit, Eddy County, New Mexico", dated as of the first day of October, 1972.

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EXECUTED as of the 7 day of August, 1975.

Name	Interest (%)	Address
Carolyn Kay Lisle (A married woman dealing in her sole and separate property)	3.12500	3033 ~~Finchley~~ Lane Oklahoma City, Oklahoma 73120

Name	Interest	Address
_____	_____	_____
_____	_____	_____
_____	_____	_____

STATE OF)

COUNTY OF)

The foregoing instrument was acknowledged before me this _____ day of _____, 1975, by _____, _____, of _____, a _____ corporation, on behalf of said corporation.

My commission expires:

_____

_____
Notary Public in and for

STATE OF OKLAHOMA)

COUNTY OF OKLAHOMA)

The foregoing instrument was acknowledged before me this 9th day of August, 1975, by Carolyn Kay Lisle.

My commission expires:

2-27-77

Notary Public in and for
Oklahoma County, Oklahoma

STATE OF)

COUNTY OF)

The foregoing instrument was acknowledged before me this _____ day of _____, 1975, by _____.

My commission expires:

_____

_____
Notary Public in and for

SPECIAL JOINDER

TO UNIT OPERATING AGREEMENT AND UNIT AGREEMENT

EMPIRE ABO UNIT

(Tract No. 79)

EDDY COUNTY, NEW MEXICO

The undersigned, as an owner of both working interests and royalty interests acknowledges receipt of a counterpart of an instrument titled "Unit Agreement, Empire Abo Unit, Eddy County, New Mexico", dated as of the first day of October, 1972, providing for the conduct of unit operations in the Abo formation of the Empire Abo Field, located in Eddy County, New Mexico, and also acknowledges receipt of a counterpart of an instrument titled "Unit Operating Agreement, Empire Abo Unit, Eddy County, New Mexico", dated as of the first day of October, 1972.

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EXECUTED as of the 8th day of August, 1975.

Name	Interest (%)	Address
Samedan Oil Corporation	19.96429	P. O. Box 909, Ardmore, Oklahoma

by: George Mitchell
President

Attest:
Secretary

Name	Interest	Address

STATE OF Oklahoma)

COUNTY OF Carter)

The foregoing instrument was acknowledged before me this 8th day of August, 1975, by George J. McNeely, President, of Samedan Oil Corporation, a Delaware corporation, on behalf of said corporation.

My commission expires:

July 10, 1978

Martha Ann Cude

Notary Public in ~~and for~~

Carter County, Oklahoma

STATE OF)

COUNTY OF)

The foregoing instrument was acknowledged before me this _____ day of _____, 1975, by _____ _____.

My commission expires:

_____

Notary Public in and for

STATE OF)

COUNTY OF)

The foregoing instrument was acknowledged before me this _____ day of _____, 1975, by _____ _____.

My commission expires:

_____

Notary Public in and for

SPECIAL JOINDER

TO UNIT OPERATING AGREEMENT AND UNIT AGREEMENT

EMPIRE ABO UNIT

(Tract No. 79)

EDDY COUNTY, NEW MEXICO

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The undersigned is the owner of a working interest, royalty interest or interest as "Lessee of Record" in Tract No. 79 as described in Exhibits "A" and "B" of the Unit Agreement and Unit Operating Agreement, which tract has not been included in the Unit for failure of execution by sufficient working interest owners to qualify the tract and it is now desired to commit said tract to the Unit Agreement.

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EXECUTED as of the 8th day of August, 1975.

Name	Interest (%)	Address
Amoco Production Company	23.78571	P. O. Box 3092 Houston, Texas 77001

by: John W. Prescott
Attorney-in-Fact

APPROVED

Name	Interest	Address
_____	_____	_____
_____	_____	_____
_____	_____	_____

STATE OF Texas)

COUNTY OF Harris)

The foregoing instrument was acknowledged before me this 8th day of August, 1975, by JOHN W. PHENICIE, ATTORNEY-IN-FACT, of AMOCO PRODUCTION COMPANY, a corporation, on behalf of said corporation.

My commission expires:

DOROTHY E. MIDDLETON
Notary Public in and for Harris County, Texas
My Commission Expires 6-1-77

Notary Public in and for
Harris County, Texas

STATE OF)

COUNTY OF)

The foregoing instrument was acknowledged before me this _____ day of _____, 1975, by _____ _____.

My commission expires:

_____

Notary Public in and for

STATE OF)

COUNTY OF)

The foregoing instrument was acknowledged before me this _____ day of _____, 1975, by _____ _____.

My commission expires:

_____

Notary Public in and for

SPECIAL JOINDER

TO UNIT OPERATING AGREEMENT AND UNIT AGREEMENT

EMPIRE ABO UNIT

(Tract No. 79)

EDDY COUNTY, NEW MEXICO

The undersigned, as an owner of both working interests and royalty interests acknowledges receipt of a counterpart of an instrument titled "Unit Agreement, Empire Abo Unit, Eddy County, New Mexico", dated as of the first day of October, 1972, providing for the conduct of unit operations in the Abo formation of the Empire Abo Field, located in Eddy County, New Mexico, and also acknowledges receipt of a counterpart of an instrument titled "Unit Operating Agreement, Empire Abo Unit, Eddy County, New Mexico", dated as of the first day of October, 1972.

The undersigned is the owner of a working interest, royalty interest or interest as "Lessee of Record" in Tract No. 79 as described in Exhibits "A" and "B" of the Unit Agreement and Unit Operating Agreement, which tract has not been included in the Unit for failure of execution by sufficient working interest owners to qualify the tract and it is now desired to commit said tract to the Unit Agreement.

The Unit Agreement and the Unit Operating Agreement provide that any person may become a party to the agreements by signing the original, counterpart, or other instrument which evidences an intention to be bound by the terms of such agreements.

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It is understood that commitment of the above tract will be on the same basis of participation as provided in the original Unit Agreement subject to approval (by ballot) of working interest owners of not less than 65% of the Unit Participation now in effect and approval by the Commissioner of Public Lands of the State of New Mexico and the Supervisor, United States Geological Survey, and shall become effective as of the first day of the month following the filing with the Land Commissioner and the Supervisor of duly executed counterparts of all documents necessary to establish effective commitment, as provided in Section 32 of the Unit Agreement.

EXECUTED as of the 1 day of August, 1975.

Name	Interest (%)	Address
K. L. Fouch	1.04167	P. O. Box 3106, Midland, Texas 79701
Delphia Fouch, wife of K. L. Fouch		

Name	Interest	Address
_____	_____	_____
_____	_____	_____
_____	_____	_____

STATE OF)

COUNTY OF)

The foregoing instrument was acknowledged before me this _____ day of _____, 1975, by _____, _____, of _____, a _____ corporation, on behalf of said corporation.

My commission expires:

_____

_____
Notary Public in and for

STATE OF Texas)

COUNTY OF Childress)

The foregoing instrument was acknowledged before me this 8th day of Aug, 1975, by K. L. Tauch.

My commission expires:

6-77

Georgia Greenlee
Notary Public in and for
Childress County, Texas

STATE OF Texas)

COUNTY OF Childress)

The foregoing instrument was acknowledged before me this 8th day of Aug, 1975, by Evelyn Tauch.

My commission expires:

6-77

Georgia Greenlee
Notary Public in and for
Childress County, Texas

SPECIAL JOINDER

TO UNIT OPERATING AGREEMENT AND UNIT AGREEMENT

EMPIRE ABO UNIT

(Tract No. 79)

EDDY COUNTY, NEW MEXICO

The undersigned, as an owner of both working interests and royalty interests acknowledges receipt of a counterpart of an instrument titled "Unit Agreement, Empire Abo Unit, Eddy County, New Mexico", dated as of the first day of October, 1972, providing for the conduct of unit operations in the Abo formation of the Empire Abo Field, located in Eddy County, New Mexico, and also acknowledges receipt of a counterpart of an instrument titled "Unit Operating Agreement, Empire Abo Unit, Eddy County, New Mexico", dated as of the first day of October, 1972.

The undersigned is the owner of a working interest, royalty interest or interest as "Lessee of Record" in Tract No. 79 as described in Exhibits "A" and "B" of the Unit Agreement and Unit Operating Agreement, which tract has not been included in the Unit for failure of execution by sufficient working interest owners to qualify the tract and it is now desired to commit said tract to the Unit Agreement.

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EXECUTED as of the 12 day of August, 1975.

Name	Interest (%)	Address
Mary Ann Treadwell	3.12500	1504 Bedford Drive Oklahoma City, Oklahoma 73116

Mary Ann Treadwell
(A married woman dealing in her sole and separate property)

Name	Interest	Address
_____	_____	_____
_____	_____	_____
_____	_____	_____

STATE OF)

COUNTY OF)

The foregoing instrument was acknowledged before me this _____ day of _____, 1975, by _____, _____, of _____, a _____ corporation, on behalf of said corporation.

My commission expires:

_____

_____
Notary Public in and for

_____

STATE OF Colorado)

COUNTY OF Mineral)

The foregoing instrument was acknowledged before me this 12 day of August, 1975, by Mary Ann Treadwell.

My commission expires:
My Commission expires March 10, 1977

_____

C Ilse Rogers
Notary Public in and for
Mineral County, Colorado

STATE OF)

COUNTY OF)

The foregoing instrument was acknowledged before me this _____ day of _____, 1975, by _____ _____.

My commission expires:

_____

_____
Notary Public in and for

_____

SPECIAL JOINDER

TO UNIT OPERATING AGREEMENT AND UNIT AGREEMENT

EMPIRE ABO UNIT

(Tract No. 79)

EDDY COUNTY, NEW MEXICO

The undersigned, as an owner of both working interests and royalty interests acknowledges receipt of a counterpart of an instrument titled "Unit Agreement, Empire Abo Unit, Eddy County, New Mexico", dated as of the first day of October, 1972, providing for the conduct of unit operations in the Abo formation of the Empire Abo Field, located in Eddy County, New Mexico, and also acknowledges receipt of a counterpart of an instrument titled "Unit Operating Agreement, Empire Abo Unit, Eddy County, New Mexico", dated as of the first day of October, 1972.

The undersigned is the owner of a working interest, royalty interest or interest as "Lessee of Record" in Tract No. 79 as described in Exhibits "A" and "B" of the Unit Agreement and Unit Operating Agreement, which tract has not been included in the Unit for failure of execution by sufficient working interest owners to qualify the tract and it is now desired to commit said tract to the Unit Agreement.

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EXECUTED as of the 9th day of August, 1975.

Name	Interest (%)	Address
X Judith A. Gilchrist Judith A. Gilchrist "a married woman dealing in her sole & separate property"	0.26042	Route 1, Thorndale, Texas 76577

STATE OF)

COUNTY OF)

The foregoing instrument was acknowledged before me this _____ day of _____, 1975, by _____ _____.

My commission expires:

_____

Notary Public in and for

_____

STATE OF TEXAS)

COUNTY OF TARRANT)

The foregoing instrument was acknowledged before me this 9th day of August, 1975, by Judith A Gilchrist.

My commission expires:

CAROLYN REDDING, Notary Public
In and for Tarrant County, Texas
My Commission Expires June 1, 1977

Carolyn Redding

Notary Public in and for

Tarranty County, Texas

SPECIAL JOINDER

TO UNIT OPERATING AGREEMENT AND UNIT AGREEMENT

EMPIRE ABO UNIT

(Tract No. 79)

EDDY COUNTY, NEW MEXICO

The undersigned, as an owner of both working interests and royalty interests acknowledges receipt of a counterpart of an instrument titled "Unit Agreement, Empire Abo Unit, Eddy County, New Mexico", dated as of the first day of October, 1972, providing for the conduct of unit operations in the Abo formation of the Empire Abo Field, located in Eddy County, New Mexico, and also acknowledges receipt of a counterpart of an instrument titled "Unit Operating Agreement, Empire Abo Unit, Eddy County, New Mexico", dated as of the first day of October, 1972.

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EXECUTED as of the 5 day of August, 1975.

Name	Interest (%)	Address
Gordon Marcum	1.30208	P. O. Box 5004, Midland, Texas 79701

Gordon Marcum

Marjorie S. Marcum, wife of
Gordon Marcum

Name	Interest	Address
_____	_____	_____
_____	_____	_____
_____	_____	_____

STATE OF)

COUNTY OF)

The foregoing instrument was acknowledged before me this _____ day of _____, 1975, by _____, _____, of _____, a _____ corporation, on behalf of said corporation.

My commission expires:

_____

_____
Notary Public in and for

STATE OF Texas)

COUNTY OF Midland)

The foregoing instrument was acknowledged before me this 5th day of August, 1975, by Marion Nelson.

My commission expires:

1 June 77

_____
Notary Public in and for
Midland County, Texas

STATE OF Texas)

COUNTY OF Midland)

The foregoing instrument was acknowledged before me this 5th day of August, 1975, by Margaret S Nelson.

My commission expires:

1 June 77

_____
Notary Public in and for
Midland County, Texas

SPECIAL JOINDER

TO UNIT OPERATING AGREEMENT AND UNIT AGREEMENT

EMPIRE ABO UNIT

(Tract No. 79)

EDDY COUNTY, NEW MEXICO

The undersigned, as an owner of both working interests and royalty interests acknowledges receipt of a counterpart of an instrument titled "Unit Agreement, Empire Abo Unit, Eddy County, New Mexico", dated as of the first day of October, 1972, providing for the conduct of unit operations in the Abo formation of the Empire Abo Field, located in Eddy County, New Mexico, and also acknowledges receipt of a counterpart of an instrument titled "Unit Operating Agreement, Empire Abo Unit, Eddy County, New Mexico", dated as of the first day of October, 1972.

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The Unit Agreement and the Unit Operating Agreement provide that any person may become a party to the agreements by signing the original, counterpart, or other instrument which evidences an intention to be bound by the terms of such agreements.

NOW, THEREFORE, each undersigned party agrees to become a party to and be bound by the provisions of the Unit Agreement and the Unit Operating Agreement (where such party is the owner of a working interest) as to the interest of the undersigned of whatsoever nature, whether as a royalty interest, a working interest or an interest as "Lessee of Record" in Tract No. 79 as described in Exhibits "A" and "B" of the Unit Agreement. The undersigned agrees that the parties to the Unit Agreement and the Unit Operating Agreement are those that signed the originals, any counterparts of said instruments or any instrument which evidences an intention to be so bound.

It is understood that commitment of the above tract will be on the same basis of participation as provided in the original Unit Agreement subject to approval (by ballot) of working interest owners of not less than 65% of the Unit Participation now in effect and approval by the Commissioner of Public Lands of the State of New Mexico and the Supervisor, United States Geological Survey, and shall become effective as of the first day of the month following the filing with the Land Commissioner and the Supervisor of duly executed counterparts of all documents necessary to establish effective commitment, as provided in Section 32 of the Unit Agreement.

EXECUTED as of the 5th day of August, 1975.

Name	Interest (%)	Address
Delton Marcum	1.30208	P. O. Box 5094, Midland, Texas 79701

Delton Marcum

LaVonne Marcum

LaVonne Marcum, wife of
Delton Marcum

Name	Interest	Address

STATE OF)

COUNTY OF)

The foregoing instrument was acknowledged before me this _____ day of _____, 1975, by _____, _____, of _____, a _____ corporation, on behalf of said corporation.

My commission expires:

_____

_____
Notary Public in and for

STATE OF Texas)

COUNTY OF Midland)

The foregoing instrument was acknowledged before me this 5th day of August, 1975, by R. Olson Jr. Trustee.

My commission expires:

1 June '77

Notary Public in and for
Midland County, Texas

STATE OF Texas)

COUNTY OF Midland)

The foregoing instrument was acknowledged before me this 5th day of August, 1975, by Katherine Olson.

My commission expires:

1 June '77

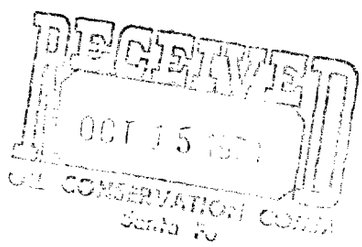
Notary Public in and for
Midland C ounty, Texas

Atlantic Richfield Company

North American Producing Division
[illegible] District
[illegible], Box [illegible]
[illegible], Texas [illegible]
[illegible]

[illegible] Area
[illegible] and Mines

1952



October 12, 1973

Oil Conservation Commission
State of New Mexico
P. O. Box 2088
Santa Fe, New Mexico 87501

Attention: Mr. A. L. Porter, Jr.
Secretary-Director

Re: Empire Abo Unit
Eddy County, New Mexico

Gentlemen:

We furnish you herewith the following items pertaining to the captioned Unit:

1. Counterpart copy of Unit Agreement with Atlantic Richfield Company's Joinder attached thereto.

2. Certified copy of Affidavit pertaining to execution by Working Interest Owners.

3. Certified copy of Certificate of Effectiveness.

4. Copy of Exhibit "E" to the Unit Operating Agreement revised October 1, 1973, showing the Working Interest Owners and their participation percentages as of the effective date of the Unit.

If you desire further information, please advise.

Very truly yours,

William L. Embry
Land Department

WLE:jrb

Enclosures

cc: Mr. C. H. McClure
Mr. J. R. Rhotenberry
Mr. H. N. Burton

CERTIFICATE OF EFFECTIVENESS
EMPIRE ABO UNIT
EDDY COUNTY, NEW MEXICO

WHEREAS, that certain Unit Agreement and Unit Operating Agreement, Empire Abo Unit Area, Eddy County, New Mexico, dated October 1, 1972, has been executed or ratified by Working Interest Owners and Royalty Owners in accordance with the terms and provisions of said Unit Agreement and a counterpart original of said Unit Agreement has been filed in the office of the County Clerk of Eddy County, New Mexico, and now appears of record in Book 108, Page 235, of the Miscellaneous Records of said office; and

WHEREAS, the Unit Agreement was approved by the Oil Conservation Commission of the State of New Mexico on June 15, 1973, by the Commissioner of Public Lands of the State of New Mexico on September 14, 1973, and by the Area Oil and Gas Supervisor of the United States Geological Survey on September 20, 1973, and the Unit Agreement provides in Section 23 thereof, that the agreement shall become effective on the first day of the calendar month next following the approval by the Supervisor, the Land Commissioner and the Commission; and

WHEREAS, under the terms of Section 23 of the Unit Agreement, Unit Operator is instructed, within 30 days after the effective date of the agreement, to file for record a certificate to the effect that the agreement became effective according to its terms and stating further the effective date;

NOW THEREFORE, KNOW ALL MEN BY THESE PRESENTS: That Atlantic Richfield Company, the Unit Operator of the Empire Abo Unit, does hereby certify and declare that in accordance with Section 23 of said Unit Agreement, said Unit became effective as of October 1, 1973.

IN WITNESS WHEREOF, Atlantic Richfield Company, has executed this certificate on this 10th day of October, 1973.

ATLANTIC RICHFIELD COMPANY

By S. L. Smith
Attorney-in-Fact

STATE OF TEXAS)
COUNTY OF MIDLAND)

The foregoing instrument was acknowledged before me this 10th day of October, 1973 by S. L. Smith, Attorney-in-Fact of ATLANTIC RICHFIELD COMPANY, a Pennsylvania corporation, on behalf of said corporation.

My commission expires:
June 1, 1975

Lawrence Brooks
Notary Public in and for
Midland County, Texas

STATE OF NEW MEXICO, County of Eddy, ss. I hereby certify that this instrument was filed for record on the 11th day of Oct. 1973 at 10:30 o'clock A M., and duly recorded in Book 108 Page 327 of the Records of Miscellaneous
GERALDINE MAHAFFEY, County Clerk
By Eunice M. Lawrence Deputy

CLERK'S CERTIFICATE
Certified this 11th day of Oct. 1973
as a true and correct copy of the original on file in this office.
Geraldine Mahaffey
Clerk of Eddy County, N. Mex.
Eunice M. Lawrence Deputy

AFFIDAVIT CONCERNING
THE EMPIRE ABO UNIT
EDDY COUNTY, NEW MEXICO

Before me, the undersigned authority, on this 16th day of October, 1973, personally appeared William L. Embry, and first being by me duly sworn, upon his oath did depose and state;

That Affiant is employed by Atlantic Richfield Company as a landman in its offices at Midland, Texas, and personally handled the sign up of the working interest executing or ratifying that certain Unit Agreement and Unit Operating Agreement for the development and operation of the Empire Abo Unit Area, Eddy County, New Mexico dated October 1, 1972, and is personally cognizant of the matters of fact herein stated;

That said Unit Agreement covers the following described land situated in Eddy County, New Mexico, to wit:

Township 17 South, Range 27 East, NMPM

Section 34: S/2 SE/4
Section 35: S/2 S/2
Section 36: S/2

Township 17 South, Range 28 East, NMPM

Section 25: S/2, S/2 N/2
Section 26: S/2, SE/4 NW/4, S/2 NE/4
Section 27: S/2
Section 28: SE/4 SE/4
Section 31: S/2, S/2 N/2
Section 32: S/2, NE/4 NW/4, S/2 NW/4, NE/4
Section 33: All
Section 34: All
Section 35: N/2, N/2 S/2
Section 36: SW/4 NW/4, N/2 NW/4

Township 17 South, Range 29 East, NMPM

Section 29: S/2 NW/4, N/2 SW/4
Section 30: S/2 N/2, SW/4, N/2 SE/4

Township 18 South, Range 27 East, NMPM

Section 1: All
Section 2: All
Section 3: All
Section 4: S/2 NE/4, SE/4, NE/4 SW/4, S/2 SW/4
Section 8: SE/4 NE/4, E/2 SE/4
Section 9: All
Section 10: W/2, NE/4
Section 11: NW/4, N/2 NE/4,SW/4 NE/4
Section 12: N/2 NW/4

Township 18 South, Range 27 East, NMPM

Section 15: N/2 NW/4, SW/4 NW/4
Section 16: N/2, SW/4, N/2 SE/4, SW/4 SE/4
Section 17: NE/4 NE/4, S/2 NE/4, N/2 SE/4, NE/4 SW/4, SE/4 NW/4

Township 18 South, Range 28 East, NMPM

Section 4: N/2 N/2, SW/4 NW/4
Section 5: N/2
Section 6: N/2, SW/4, N/2 SE/4, SW/4 SE/4

Containing 11,339.15 acres more or less;

That said Unit Agreement was duly approved by the Oil Conservation Commission of the State of New Mexico, the Commissioner of Public Lands of the State of New Mexico and by the Area Oil and Gas Supervisor of the United States Geological Survey and became effective as of October 1, 1973, at 7:00 a.m., that a duplicate original copy of said Unit Agreement is filed for record in the office of the County Clerk of Eddy County, New Mexico, and now appears of record in Book 108, Page 235, of the Miscellaneous Records of said office; that the following named persons and corporate parties owning working interest have joined and become bound by said Unit Agreement, to wit:

(As shown on Exhibit A - attached hereto)

That the original executed copies of the Joinders by the Working Interest Owners above named or shown in the Exhibit attached hereto have not been filed for record in Eddy County, New Mexico, and in lieu of filing such instruments, this affidavit is executed and is being filed of record in the office of County Clerk of Eddy County, New Mexico to give notice to all interested parties that such Working Interest Owners have become bound by the terms of said Unit Agreement and Unit Operating Agreement, and the original copies of said Joinders may be examined by any interested person, or copies thereof obtained, by requesting same from Atlantic Richfield Company at its offices in Midland, Texas.

Further that original Joinders executed by Royalty Owners to said Unit Agreement may also be examined by any interested person upon request of Atlantic Richfield Company at its offices in Midland, Texas.

Further Affiant saith not.

William L. Embry
Landman, Atlantic Richfield Company

SUBSCRIBED AND SWORN TO before me by the said William L. Embry this 10th day of October, 1973, to certify which witness my hand and seal of office.

My commission expires:
June 1, 1975

Notary Public in and for
Midland County, Texas

STATE OF TEXAS)

COUNTY OF MIDLAND)

The foregoing instrument was acknowledged before me this 10th day of October, 1973, by William L. Embry.

My commission expires:
June 1, 1975

Notary Public

EXHIBIT "A"

Abo Petroleum Corporation
Ernest Bryan Alexander Trust
Amoco Production Company
Rogers Aston
Rogers Aston and The First National Bank in Dallas, Co-Trustees of the "C" Trusts U/W of Bert Aston, Dec'd
Rogers Aston, Trustee for Charles Aston, U/W of Esther Aston
Rogers Aston, Trustee for Lincoln Aston U/W of Esther Aston
Atlantic Richfield Company
Robert E. Boling and Mary L. Boling
John S. Brown
Thomas C. Brown and Rosalynde A. Brown
T. J. Brown and Joan S. Brown
C & K Petroleum, Inc.
Tracy Clark and Mary Jane Clark
Continental Oil Company
Ben A. Copass, Jr.
James I. DeLoache and Mrs. James I. DeLoache
DEPCO, Inc.
Dixon & Yates Oil Company
Carmen Edwards and Herbert C. Edwards, Sr.
Exxon Corporation
Fair Oil Company
Continental Illinois National Bank & Trust Company of Chicago, Executor and Trustee U/W of William D. Flynn
K. L. Fouch
Franklin, Aston & Fair, Inc.
General American Oil Company of Texas
Judith A. Gilchrist and John T. Gilchrist
Walter Granberry
Gulf Oil Corporation
Ruth Hatch
A. H. Hedden
Margaret Holcomb
Hondo Oil & Gas Company
Husky Oil Company of Delaware
Tom L. Ingram and Joan L. Ingram
Harold Kersey
Lee Drilling Company
Carolyn Kay Lisle
Marathon Oil Company
Delton Marcum and LaVonne Marcum
Delton Marcum, Gordon Marcum and Dorothy M. Topliff, Co-Executors and Co-Executrix for the Estate of Elizabeth H. Marcum
Gordon Marcum and Marjorie S. Marcum
Thelma Methvin
J. O. Miller
J. Hiram Moore and Betty Jane Moore, Trustees under Indenture of Trust dated July 1, 1971 between J. Hiram Moore and wife, Betty Jane Moore, as Trustors, and J. Hiram Moore, Betty Jane Moore and Michael Harrison Moore, Trustees
Hugh Munn and Mrs. Hugh Munn
Myco Industries, Inc.
Eugene E. Nearburg
Arthur L. Owen and Barbara B. Owen
Partnership Properties Company
Louis F. Polk and Pauline Polk
L. J. Reischman
Joe G. Roper
Rutter & Wilbanks Corporation
Samedan Oil Corporation
The Carlsbad National Bank, Trustee for the Estate of Nelle G. Scheurich
Marla Jo Schmid
Seven Oil Ltd.
Vilas P. Sheldon

EXHIBIT "A"

Walter Solt and Bernice Solt
Sun Oil Company (Delaware)
Tenneco Oil Company (as Lessee of Record only)
Texas American Oil Company
Dorothy Topliff
Mary Ann Treadwell
Buddy F. Walker, Individually and as Executor of the Estate of B. F. Walker, Deceased
Marjorie A. Walker, Widow and one of the two beneficiaries U/W of B. F. Walker, Deceased
Joe A. Warren
Anne Burnett Tandy Formerly Anne Burnett Windfohr
R. H. Weaver, Independent Executor of the Estate of Beth Naomi Wilbanks, Deceased
The First National Bank of Fort Worth, Trustee for Ann Valliant Burnett Windfohr Trust
The First National Bank of Fort Worth, Co-executor of the Will of R. H. Windfohr (as Lessee of Record only)
Harvey E. Yates
John A. Yates
Martin Yates, III
S. P. Yates
Yates Brothers
Yates Drilling Company
Yates Petroleum Corporation
Robert H. Ziegler, Sr.

CLERK'S CERTIFICATE

Certified this 11 day of Oct. 1973.
as a true and correct copy of the original on
file in this office.

Geraldine Mahaffey
Clerk of Eddy County, N. Mex.
Juanita Carpenter, Deputy

STATE OF NEW MEXICO, County of Eddy, ss. I hereby certify that this instrument was filed for record on the 11 day of October 1973 at 10:30 o'clock A.M., and duly recorded in Book 108 Page 328 of the Records of Miscellaneous

GERALDINE MAHAFFEY, County Clerk
By Juanita Carpenter, Deputy

REVISED
EXHIBIT "E"
To Unit Operating Agreement
EMPIRE ABO UNIT
Eddy County, New Mexico
October 1, 1973

Working Interest Owner	Unit Participation, Percent	
	Phase I	Phase II
Abo Petroleum Corporation	.98399	1.06829
C. H. Albaugh	None	None
Ernest Bryan Alexander Trust	None	None
Amoco Production Company	32.97286	33.27167
Estate of B. Aston (C Trust)	.17723	.20479
Estate of Charles Aston	.05907	.06828
Estate of Lincoln Aston	.05907	.06826
Rogers Aston	.05907	.06826
Atlantic Richfield Company	35.13712	34.43666
George W. Baker	None	None
Dedric D. Baxter	None	None
Robert E. Boling	.03614	.02446
John E. Bourdeau	None	None
Bascom W. Broaddus	None	None
John S. Brown	.03614	.03565
Thomas C. Brown	.02852	.02823
T. J. Brown	.02852	.02823
Cactus Drilling Corporation	None	None
Castle and Wigzell	None	None
C & K Petroleum, Inc.	.38292	.37931
Cities Service Oil Company	None	None
Tracy Clark	.01355	.01603
Continental Oil Company	1.06318	.64249
Ben A. Copass, Jr.	.00579	.00616
R. G. Cox/D. L. Benscoter	None	None
Bruce Crampton	None	None
Walter E. Crockett	None	None
James I. DeLoache	.00113	.00111
R. E. Davis	None	None
Joe D. Denton	None	None
Depco, Inc.	3.89638	3.82219
Dixon and Yates Oil Company	.22929	.09589
Carmen Edwards	.04374	.05084
Edward Egbert, M. D.	None	None
Exxon Corporation	4.12006	4.65685
Fair Oil Company	.34982	.40662
Estate of W. D. Flynn	.21315	.08222
K. L. Fouch	None	None
Franklin, Aston, & Fair, Inc.	2.09888	2.43971
General American Oil Company of Texas	.54512	.44520
Judith A. Gilchrist	.00571	.00565
Walter Granberry	.06459	.03423
Gulf Oil Company - U.S.	1.95689	1.93396
Hanagan and Hanagan	None	None
Hanover Planning Company	None	None
Ruth Hatch	.17490	.20330

REVISED
EXHIBIT "E"
Page 2

October 1, 1973

Working Interest Owners	Unit Participation, Percent Phase I	Phase II
A. H. Hedden	.02090	.02082
C. F. Henderson	None	None
Margaret Holcomb	.04306	.02282
Husky Oil Company of Delaware	3.89639	3.82218
Tom L. Ingram	.03269	.03482
James K. Jeanblanc	None	None
Lindsey R. Jeanblanc	None	None
Harold Kersey	.17223	.09128
F. M. Late	None	None
Lee Drilling Company	.00464	.00297
Carolyn Kay Lisle	None	None
Marathon Oil Company	1.20255	1.28927
Delton Marcum	.02852	.02823
Elizabeth H. Marcum	.02852	.02823
Gordon Marcum	.02852	.02823
L. S. Melzer	None	None
L. B. Meaders	None	None
Thelma Methvin	.04306	.02282
J. O. Miller	.04264	.04342
J. Hiram Moore	.60757	.88807
Hugh Munn	.02090	.02082
Myco Industries, Inc.	.98398	1.06829
Eugene L. Nearburg	.02364	.02518
Arthur L. Owen	.01045	.01041
Partnership Properties	.02612	.02602
Penroc Oil Corporation	None	None
Louis F. Polk	.01567	.01561
James F. Pritchett	None	None
L. J. Reischman	.06458	.03423
M. V. Roberts	None	None
W. V. Roberts	None	None
W. V. Roberts A/W FNB	None	None
Bill J. Rogers	None	None
Joe G. Roper	.01045	.01041
Rutter and Wilbanks Corporation	.12354	.10846
John C. Ryan	None	None
Samedan Oil Corporation	.33871	.22193
Estate of Nelle G. Scheurich	.13118	.15249
Marla Jo Schmid	.00571	.00565
Seven Oil Ltd.	.07229	.07129
Vilas P. Sheldon	.53815	.68860
Jetta L. Shewmake	None	None
James B. Shewmake, Minor	None	None
Signal Oil and Gas Company	None	None
Walter Solt	.00000	.00953
Sun Oil Company	2.24940	2.60775
Tenneco Oil Company	None	None
Texas American Oil Company	.14457	.14258
Dorothy Topliff	.01711	.01695
Mary Ann Treadwell	None	None

REVISED
EXHIBIT "E"
Page 3
October 1, 1973

Working Interest Owners	Unit Participation, Percent Phase I	Phase II
Estate of Fred Turner, Jr.	None	None
B. F. Walker Estate	.16936	.11096
Joe A. Warren	.00327	.00348
Estate of Beth N. Wilbanks	.12353	.10846
Ann Burnett Windfohr	.34238	.26741
Ann V. B. Windfohr Trust	.45651	.35654
Harvey E. Yates	.07393	.06939
John A. Yates	.00953	.00364
Martin Yates III	.13787	.09760
S. P. Yates	.37269	.37417
Yates Brothers	.15337	.17443
Yates Drilling Company	.98398	1.06829
Yates Petroleum Corporation	1.38889	1.19260
Robert H. Ziegler, Sr.	.11412	.08913
Total	100.00000	100.00000

J. O. SETH (1883-1963)
A. K. MONTGOMERY
WM. FEDERICI
FRANK ANDREWS
FRED C. HANNAHS
RICHARD S. MORRIS
SUMNER G. BUELL
SETH D. MONTGOMERY
FRANK ANDREWS III

OWEN M. LOPEZ
JEFFREY R. BRANNEN
JOHN BENNETT POUND

MONTGOMERY, FEDERICI, ANDREWS, HANNAHS & MORRIS
ATTORNEYS AND COUNSELORS AT LAW
350 EAST PALACE AVENUE
SANTA FE, NEW MEXICO 87501

POST OFFICE BOX 2307
AREA CODE 505
TELEPHONE 982-3876

April 13, 1973

Mr. Ray Graham
Director, Oil & Gas Department
Office of the Commissioner of
Public Lands
P. O. Box 1148
Santa Fe, New Mexico 87501

Re: Proposed Empire Abo Unit Agreement,
Eddy County, New Mexico

Dear Mr. Graham:

Signal Oil and Gas Company is the owner, operator and lessee of record of State of New Mexico oil and gas lease E-7179-1 which covers the SW/4 NW/4 of Section 5 and the SW/4 SW/4 and Lot 7 of Section 6, Township 18 South, Range 28 East, Eddy County, New Mexico, upon which lands it has drilled and is presently producing two wells completed in the Empire Abo Pool. The lands covered by Signal's state lease lie within the Empire Abo Unit as proposed by the Atlantic Richfield Company (Arco). Signal supports the concept of unitization but is strenuously opposed to the tract participation formula in the unit agreement as presently proposed.

Signal Oil and Gas Company has made a study, utilizing the reserve information developed by Arco and Amoco, of the effect of the proposed tract participation formula upon its future operations and upon the reserves that will be recovered from all state oil and gas leases within the proposed unit area, which study shows that the state lands, including the Signal leases, will suffer a substantially adverse effect as the result of unit operations under the tract participation formula as presently proposed by Arco. Using either the Arco or Amoco reserve estimates, the net loss of royalty to the state is estimated to be

COPY

in excess of $1,000,000. The net loss to Signal, which holds a full working interest in its lease, also is estimated to be in excess of $1,000,000.

Signal Oil and Gas Company intends to oppose approval of the unit agreement in its present form at the hearing before the New Mexico Oil Conservation Commission which is scheduled for April 25, 1973. Regardless of the action taken by the NMOCC, Signal respectfully suggests that the Commissioner of Public Lands should make an independent review of the effect of the tract participation formula contained in the unit agreement as presently proposed and should refuse to approve the unit agreement until such time as the formula is amended to afford adequate protection to the state and to all state leases within the unit area.

Very truly yours,

MONTGOMERY, FEDERICI, ANDREWS,
HANNAHS & MORRIS

RSM:sbw

BY: Richard S. Morris
Attorneys for Signal Oil and Gas Company

cc: Mr. Clarence Hinkel
Mr. Jason Kellahin
Mr. John J. LaBouff
New Mexico Oil Conservation Commission

Case 4952

DRS. EGBERT AND OLIVE
ALLERGY
EL PASO MEDICAL CENTER 1501 ARIZONA AVENUE
EL PASO, TEXAS 79902

EDWARD EGBERT, M. D.
J. T. OLIVE, JR., M. D.

RECEIVED
APR 24 1973
OIL CONSERVATION COMM
Santa Fe

"New Mexico Oil Conservation Commission
Attention Mr. A. L. Porter, Jr., Secretary-Director
Phone (505) 827-2432
State Land Office Building
Santa Fe, New Mexico 87501

As a Working interest owner on State owned lands in the Empire Abo Field, I object to the formation of the Unit under the present participation factors. My interest and the State's Royalty would be reduced approximately 1/2 under the proposed factors."

Edward Egbert

Edward Egbert

Telegram western union

RECEIVED
APR 24 1973
OIL CONSERVATION COMM.
Santa Fe

IPMFEKA SANA
2-124254E114 04/24/73 1973 APR 24 AM 7:09
ICS IPMBNGZ CSP
3142918000 TDBN DALLAS TX 04-24 0846A EST
PMS THE NEW MEXICO OIL CONSERVATION COMMISSION
STATE LAND OFFICE BLDG
SANTA FE NM 87501
ATTN A L PORTER JR HANOVER PLANNING COMPANY INC AS A WORKING INTEREST OWNER OF STATE OF NEW MEXICO LANDS IN THE EMPIRE ABO FIELD OBJECTS TO THE PROPOSED FORMATION OF THE UNIT UNDER PRESENT PARTICIPATION FACTORS. IN OUR OPINION HANOVERS INTEREST AND THE STATE OF NEW MEXICO ROYALTY INTEREST WOULD BE REDUCED BY 50 PERCENT BY APPLYING PROPOSED PARAMETERS
HANOVER PLANNING INC W F WEST PRESIDENT

0847 EST

IPMFEKA SANA

Telegram western union

RECEIVED
APR 23 1973
OIL CONSERVATION COMM
Santa Fe

1973 APR 23 PM 3:53

IPMFEKA SANA
1-045103A113 04/23/73
ICS IPMAYKB ABQ
02102 ROSWELL NM 43 02-23 1242P MST
PMS NEW MEX OIL CONSERVATION COMMISSION (PLUS COPY)
ATT A A L PORTER JR SECT DIRECTOR STATE LAND OFFICE
FONE 827-2432
SANTA FE NMEX 87501
AS WORKING INTEREST OWNERS UNDER STATE OWNED LAND IN THE EMPIRE ABO FIELD WE OBJECT TO THE FORMATION OF THE UNIT UNDER THE PRESENT PROPOSED PARTICIPATION FACTORS OUR INTEREST AND THE STATES ROYALTY WOULD BE REDUCED APPROXIMATELY ONE HALF UNDER THE PROPOSED FACTORS
HANAGAN AND HANAGAN

1750 EST

IPMFEKA SANA

western union

Telegram

BNE370(1636)(2-216253E109)PD 04/19/73 1636
ICS IPMBNGZ CSP
9156831861 TDBN MIDLAND TX 51 04-19 0436P EST
FON 5058272432
NEW MEXICO OIL CONSERVATION COMM, FONE
STATE LAND OFFICE BLDG
SANTA FE NM 87501
ATTN MR A L PORTER JR SECRETARY DIRECTOR AS A WORKING INTEREST
OWNER ON STATE OWNED LAND IN THE EMPIRE ABO FIELD, I OBJECT
TO THE FORMATION OF THE UNIT UNDER THE PRESENT PARTICIPATION
FACTORS. MY INTEREST AND THE STATES ROYALTY WOULD BE REDUCED
APPROXIMATELY ONE HALF UNDER THE PROPOSED FACTORS
PENROC OIL CORP

SF-1201 (R5-69)

western union

Telegram

BNA369(1635)(2-216198E109)PD 04/19/73 1635
ICS IPMBNGZ CSP
9156831861 TDBN MIDLAND TX 51 04-19 0435P EST
FON 5058272432
NEW MEXICO OIL CONSERVATION COMM, FONE
STATE LAND OFFICE BLDG BOX 2088
SANTA FE NM 87501
ATTN MR A L PORTER JR SECRETARY DIRECTOR AS A WORKING INTEREST
OWNER ON STATE OWNED LAND IN THE EMPIRE ABO FIELD, I OBJECT
TO THE FORMATION OF THE UNIT UNDER THE PRESENT PARTICIPATION
FACTORS. MY INTEREST AND THE STATES ROYALTY WOULD BE REDUCED
APPROXIMATELY ONE HALF UNDER THE PROPOSED FACTORS
MONROE ROBERTS

SF-1201 (R5-69)

western union

Telegram

BNA371(1637)(2-216288E109)PD 04/19/73 1636
ICS IPMBNGZ CSP
9156831861 TDBN MIDLAND TX 51 04-19 0436P EST
FON 5058272432
NEW MEXICO OIL CONSERVATION COMM, FONE
STATE LAND OFFICE BLDG
BOX 2088 SANTA FE NM 87501
ATTN MR A L PORTER JR SECRETARY DIRECTOR AS A WORKING INTEREST
OWNER ON STATE OWNED LAND IN THE EMPIRE ABO FIELD, I OBJECT
TO THE FORMATION OF THE UNIT UNDER THE PRESENT PARTICIPATION
FACTORS. MY INTEREST AND THE STATES ROYALTY WOULD BE REDUCED
APPROXIMATELY ONE HALF UNDER THE PROPOSED FACTORS
CASTLE AND WIGZELL

SF-1201 (R5-69)

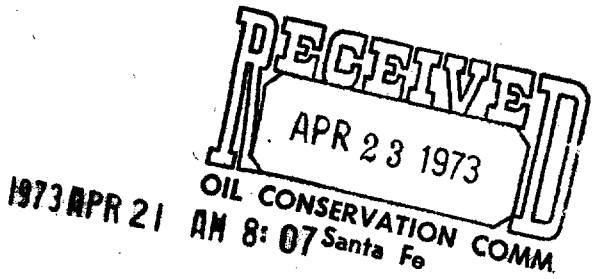
western union

Telegram

BNA179(1036)(2-242308E110)PD 04/20/73 1036
ICS IPMBNGZ CSP
9156942277 IDBN MIDLAND TX 45 04-20 1036A EST
FON 5058272432
NEW MEXICO OIL CONSERVATION COMMISSION
PO BOX 2088 SANTA FE NM 87501
ATTN A L PORTER JR SECRETARY DIRECTOR STATELAND OFFICE BLDG
AS A WORKING INTEREST OWNER ON STATE OWNED LAND IN THE EMPIRE
ABO FIELD I OBJECT TO THE FORMATION OF THE UNIT UNDER THE PRESENT
PARTICIPATION FACTORS, MY INTEREST AND THE STATES ROYALTY WOULD
BE REDUCED BY APPROXIMATELY 50-0/0 UNDER THE PROPOSED FACTORS
RESPECTFULLY YOURS
W V ROBERTS PRODUCER

SF-1201 (R5-69)

Telegram western union Telegram



1973 APR 21 AM 8:07

IPMFEKA SANA
1-004575A111003 04/21/73
ICS IPMDDTE DAL
05013 NL COLORADO CITY TEX 100 04-2 1130A CST
PMS NEW MEXICO OIL CONSERVATION COMMISSION, ATTN A L WHORTER JR SECTY
FONE 505 827 2432 STATE LAND OFFICE BLDG
SANTA FE NM
AS A WORKING INTEREST OWNER ON STATE OWNED LAND IN THE EMPIRE AVO
FIELD, I OBJECT TO THE FORMATION OF THE UNIT UNDER THE PRESENT
PARTICIPATION FACTORS, MY INTERET AND THE STATES ROYALTY WOULD BE
REDUCED APPROXIMATELY 1/2 UNDER THE PROPOSED FACTORS
B W BROADDUS

1007 EST

IPMFEKA SANA

Telegram western union
am western union

RECEIVED
APR 23 1973
OIL CONSERVATION COMM
Santa Fe

1973 APR 20 PM 6:34

IPMFEKA SANA
1-045406A110 04/20/73
ICS IPMAYKA ABQ
01075 HOBBS NMEX 42 04-20 200P MST
PMS NEW MEXICO OIL CONSERVATION COMMISSION DLR
ATTN MR A L PORTER SECURITARY-DIRECTOR
STATE LAND OFFICE BLDG
SANTA FE NMEX 87501
AS A WORKING INTEREST OWNER ON STATE OWNED LAND IN THE
EMPIRE ABO FIELD I OBJECT TO THE FORMATION OF THE
UNIT UNDER THE PRESENT PARTICIPATION FACTORS
MY INTEREST AND THE STATES ROYALTY WOULD BE REDUCED
APPROXIMATELY 1/2 UNDER THE PROPOSED FACTORS
J F PRITCHETT

2053 EST

IPMFEKA SANA

RECEIVED
APR 23 1973
OIL CONSERVATION COMM.
Santa Fe

1973 APR 20 PM 12:41

IPMFEKA SANA
2-255429E110 04/20/73
ICS IPMRNCZ CSP
2134667337 TDRN LOS ANGELES CA 51 04-20 0238P EST
PMS NEW MEXICO OIL CONSERVATION COMMISSION, DLR
STATE LAND OFFICE BLDG
SANTA FE NM 87501
ATTN MR A L PORTER JR SECRETARY DIRECTOR
AS A WORKING INTEREST OWNER ON STATE OWNED LAND IN THE EMPIRE ABO FIELD, I OBJECT TO THE FORMATION OF THE UNIT UNDER THE PRESENT PARTICIPATION FACTORS. MY INTEREST AND THE STATES ROYALTY WOULD BE REDUCED APPROXIMATELY ONE HALF UNDER THE PROPOSED FACTORS.

CLARENCE H ALBAUGH MD

1440 EST

IPMFEKA SANA

B339(1203)(2-247022E110)PD 04/20/73 1203
ICS IPMBNGZ CSP
9156831861 TDBN MIDLAND TX 04-20 1203P EST 1973APR 20 AM 11:43
PMS NEW MEXICO OIL CONSERVATION COMM, BACKDATE 04-19 0435P EST
WILL CALL WESTERN UNION
SANTE FE NM 87501
ATTN MR A L PORTER JR SECRETARY DIRECTOR AS A WORKING INTEREST
OWNER ON STATE OWNED LAND IN THE EMPIRE ABO FIELD, I OBJECT
TO THE FORMATION OF THE UNIT UNDER THE PRESENT PARTICIPATION
FACTORS. MY INTEREST AND THE STATES ROYALTY WOULD BE REDUCED
APPROXIMATELY ONE HALF UNDER THE PROPOSED FACTORS
JOHN C RYAN

RECEIVED
APR 23 1973
OIL CONSERVATION COMM
Santa Fe

RECEIVED
APR 23 1973
OIL CONSERVATION COMM.
Santa Fe

WU MGR SANA

RECEIVED
APR 23 1973
OIL CONSERVATION COMM
Santa Fe

1973 APR 22 AM 7:55

X
IPMFDOX
IPMFEKA SANA
2-053539E111 04/21/73
ICS IPMMTZZ CSP
2023625469 NL TDMT WASHINGTON DC 100 04-21 1101P EST
PMS NEW MEXICO OIL CONSERVATION COMMISSION ATTN MR A L PORTER
JR SECRETARY DIRECTOR , DLVY MUST BE MONDAY MORNING...MORNING
DLY ONLY, DLR
STATE LAND OFFICE BUILDING
SANTA FE NM 87501
AS WORKING INTEREST OWNERS ON STATE OWNED LANDS IN THE EMPIRE
ABO FIELD WE OBJECT TO THE FORMATION OF THE UNIT UNDER THE PRESENT
PARTICIPATION FACOTRS OUR INTEREST AND THE STATES' ROYALTY WOULD
BE REDUCED, APPROXIMATELY 1/2 UNDER THE PROPOSED FACTORS
L R JEAN BLANC AND JAMES K [redacted]BLANC

2304 EST

IPMFEKA SANA

Telegram western union Telegram

1973 APR 23 AM 10: 18

IPMFEKA SANA
1-016142 A113 04/23/73
TLX OC BK&TR DAL
83 DAL TEX APR 23
PMS NEW MEXICO OIL CONSERVATION COMMISSION
ATTENTION MR A L PORTER JR SECRETARY-DIRECTOR
STATE LAND OFFICE BUILDING
SANTA FE NEW MEXICO

AS A WORKING INTEREST OWNER ON STATE OWNED LANDS IN THE EMPIRE ABO FIELD, I OBJECT TO THE FORMATION OF THE UNIT UNDER THE PRESENT PARTICIPATION FACTOR. MY INTEREST AND THE STATE'S ROYALTY WOULD BE REDUCED APPROXIMATELY 1/2 UNDER THE PROPOSED PARTICIPATION UNIT OF THE EMPIRE ABO FIELD.

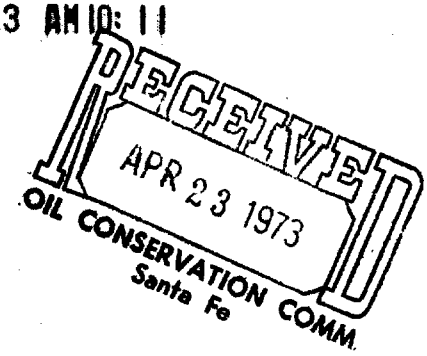
BRUCE CRAMPTON

1216 EST

IPMFEKA SANA

Telegram western union Telegram western union

1973 APR 23 AM 10: 11



IPMFEKA SANA
1-015416A113 04/23/73
TLX OC BK&TR DAL
82 DAL TEX APR 23
PMS NEW MEXICO OIL CONSERVATION COMMISSION
ATTENTION MR A L PORTER JR SECRETARY-DIRECTOR
STATE LAND OFFICE BUILDING
SANTA FE NEW MEXICO

AS A WORKING INTEREST OWNER ON STATE OWNED LANDS IN THE EMPIRE ABO FIELD, I OBJECT TO THE FORMATION OF THE UNIT UNDER THE PRESENT PARTICIPATION FACTOR. MY INTEREST AND THE STATE'S ROYALTY WOULD BE REDUCED APPROXIMATELY 1/2 UNDER THE PROPOSED PARTICIPATION UNIT OF THE EMPIRE ABO FIELD.

JOE D. DENTON

1206 EST

IPMFEKA SANA

OIL CONSERVATION COMMISSION

STATE OF NEW MEXICO
P. O. BOX 2088 - SANTA FE
87501

GOVERNOR
BRUCE KING
CHAIRMAN

LAND COMMISSIONER
ALEX J. ARMIJO
MEMBER

STATE GEOLOGIST
A. L. PORTER, JR.
SECRETARY - DIRECTOR

April 23 1913

DALLAS, TEXAS

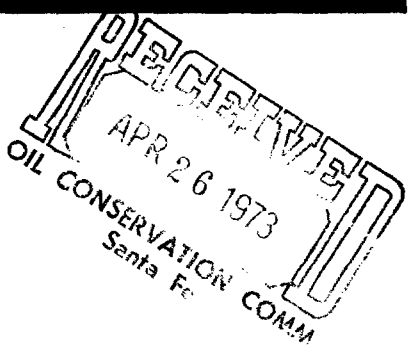
As a working interest owner on state owned land in the Empire Abo Field, we object to the formation of the unit under the present participation factor. Our interest in the state royalties would be reduced approximately 1/2 under the proposed factor.

F. M. LATE OIL COMPANY
2626 Fidelity Union
Dallas, Texas 7501

Copy of telegram will follow.

western union

Telegram

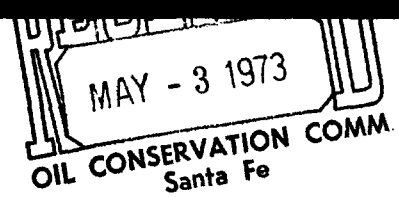


BNC084(1047)(2-083698E113)PD 04/23/73 1047
ICS IPMBNGZ CSP
2147417531 TDBN DALLAS TX 48 04-23 1047A EST
FON 5058272432
NEW MEXICO OIL CONSERVATION COMMISSION, A L PORTER
STATE LAND OFFICE BLDG BOX 2088
SANTA FE NM 87501
AS A WORKING INTEREST OWNER ON STATE OWNED LANDS IN THE EMPIRE ABO FIELD, WE OBJECT TO THE FORMATION OF THE UNIT UNDER THE PRESENT PARTICIPATION FACTORS. OUR INTEREST IN THE STATES ROYALITY WOULD BE REDUCED APPROXIMATELY 1/2 UNDER THE PROPOSED FACTORS.
F M LATE, LATE OIL COMPANY 2626 FIDELITY UNION TOWER DALLAS 75201

SF-1201 (R5-69)

western union

Telegram



BNC322(1718)(2-098863E113)PD 04/23/73 1542
ICS IPMBNGZ CSP
2146518133 TDBN DALLAS TX 61 04-23 0342P EST
FON 5058272432
THE NEW MEXICO OIL CONSERVATION COMMISSION
STATE LAND OFFICE BLDG
SANTA FE NM 87501
ATTN A L PORTER JR HANOVER PLANNING COMPANY INC AS A WORKING INTEREST OWNER OF STATE OF NEW MEXICO LANDS IN THE EMPIRE ABO FIELD OBJECTS TO THE PROPOSED FORMATION OF THE UNIT UNDER PRESENT PARTICIPATION FACTORS. IN OUR OPINION HANOVERS INTEREST AND THE STATE OF NEW MEXICO ROYALTY INTEREST WOULD BE REDUCED BY 50 PERCENT BY APPLYING PROPOSED PARAMETERS.
HANOVER PLANNING INC W F WEST PRESIDENT

SF-1201 (R5-69)

western union

Telegram

Case 4952

RECEIVED
APR 25 1973
OIL CONSERVATION COMM.
Santa Fe

B NB388(1618)(2-260922E110)PD 04/20/73 1617
ICS IPMBNGZ CSP
9156828337 TDBN MIDLAND TX 43 04-20 0417P EST
FON 5058272432 verified
982-0458 RES
NEW MEXICO OIL CONSERVATION COMMISSSION
ATTN A L PORTER JR STATE LAND OFFICE BLDG
SANTA FE NM 87501
AS A WORKING INTEREST OWNER ON STATE OWNED LAND IN THE EMPIRE ABO FIELD I OBJECT TO THE FORMATION OF THE UNIT UNDER THE PRESENT PARTICIPATION FACTORS MY INTEREST AND THE STATES ROYALTY WOULD BE REDUCED APPROXIMATELY ONE HALF UNDER THE PROPOSED FACTORS

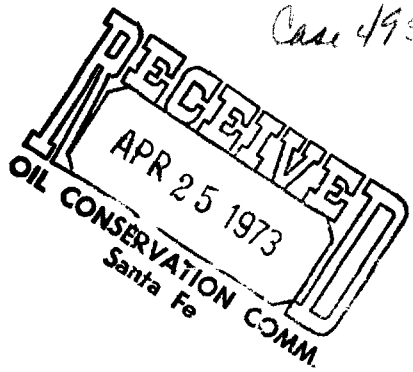
WALTER CROCKETT

SF-1201 (R5-69)

western union

Telegram

Case 4952



BND141(1228)(2-088311E113)PD 04/23/73 1228
ICS IPMBNGZ CSP
9156948801 TDBN MIDLAND TX 43 04-23 1228P EST
FON 5058272432
NEW MEXICO OIL CONSERVATION COMMISSION
STATE LAND OFFICE BLDG PO BOX 2088
SANTA FE NM 87501
AS A WORKING INTEREST OWNER ON STATE OWNED LAND IN THE EMPIRE ABO FIELD, I OBJECT TO THE FORMATION OF THE UNIT UNDER THE PRESENT PARTICIPATION FACTOR MY INTEREST AND THE STATE ROYALTY WOULD BE REDUCED APPROXIMATELY ONE HALF UNDER THE PROPOSED FACTOR

BILL J ROGERS

SF-1201 (R5-69)

western union

Telegram

Case 4952

RECEIVED
APR 25 1973
OIL CONSERVATION COM.
Santa Fe

BNE079(1047)(2-083666E113)PD 04/23/73 1046
ICS IPMBNGZ CSP
2147417531 TDBN DALLAS TX 48 04-23 1046A EST
FON 5058272432
NEW MEXICO OIL CONSERVATION COMMISSION, A L PORTER
STATE LAND OFFICE BLDG
SANTA FE NM 87501
AS A WORKING INTEREST OWNER ON STATE OWNED LANDS IN THE EMPIRE ABO FIELD, WE OBJECT TO THE FORMATION OF THE UNIT UNDER THE PRESENT PARTICIPATION FACTORS. OUR INTEREST IN THE STATES ROYALITY WOULD BEREDUCED APPROXIMATELY 1/2 UNDER THE PROPOSED FACTORS.
CACTUS DRILLING CORPORATION 2626 FIDELITY UNION TOWER DALLAS 75201

SF-1201 (R5-69)

Memo

5-18-73

From DARLENE GRIEGO

ADMINISTRATIVE OFFICE

To MR. BANKS

Please take this to Pete Porter at O.C.C.

Darlene

STATE ROYALTY STATUS

(A) Total Pool Reserves Updated to 1-1-73

	ARCO	AMOCO
Reserves 1-1-73	110,896,823B	100,297,240B
Projected Production to 7-1-73*	4,638,154B	4,638,154B
Projected Total Pool Reserves 7-1-73	106,258,669B	95,659,086B

*On the basis of average daily production for January, 1973.

(B) Federal Tracts Reserves Updated to 1-1-73

Reserves 1-1-73	28,146,681B	26,121,994B
Projected Production to 7-1-73	- 1,447,404B	- 1,447,404B
Projected Reserves 7-1-73	26,699,277B	24,674,590B

(C) State Tract Reserves Projected to 7-1-73 (By subtracting B from A)

	79,559,392B	70,984,496B

(D) State's Equity Under Formula #47

Phase I	70.03220%	7,703,542B	7,703,542B
Phase II	71.86482%	68,457,471B	60,840,099B
	Total	76,161,013B	68,543,641B

(E) State Deficit Under Formula #47 (By subtracting D from C)

Total Tract Reserves	3,398,379	2,440,855	
12.5% Royalty	424,797	305,107	
			Average
Value @ $3.50/Bbl	$1,486,800	$1,067,900	$1,277,400
Value @ $3.81/Bbl	$1,618,500	$1,162,500	$1,390,500

DEDRIC B. BAXTER
Petroleum Geologist
P. O. BOX 4171 (915) MU 3-3485
MIDLAND, TEXAS 79701

RECEIVED
APR 26 1973
OIL CONSERVATION COMM
Santa Fe

April 25, 1973

New Mexico Oil Conservation Commission
State Land Office Building
Santa Fe, New Mexico 87501

Attention: Mr. A. L. Porter, Jr.

Re: Proposed Empire Abo Unit
Eddy County, New Mexico

Dear Mr. Porter:

In addition to being a working interest owner under production from the Empire Abo Field I am also a Petroleum Geologist with extensive experience in SE New Mexico and West Texas and am professionally qualified to assess the merits of the proposal by Arco to unitize this production.

The terms of this proposed unit are patently unfair and designed to upgrade poor and non-existant production to the benefit of a few large corporations and to deprive other smaller owners of their rightful production obtained through individual investments of their own private funds and individual risk.

It is most urgently requested that you exert all possible effort to reject the terms of the participation factors proposed to be incorporated in this unit. These proposed participation factors would not only deprive the individual non-participating owner of a rightful share of his production but would simultaneously deprive the State of New Mexico of its corresponding participation in the production.

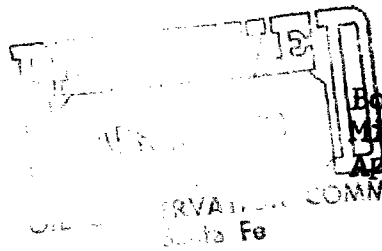
Again, please carefully consider this proposal. Its obvious inequities and economically disastrous alternatives are apparent.

Sincerely yours,

Dedric B. Baxter

Dedric B. Baxter

DBB:gk



Box 1088
Midland, Texas 79701
April 27, 1973

Oil Conservation Commission
State of New Mexico
Att'n; Pat Porter and Examiner
Santa Fe, New Mexico 87510

Dear Sir:

Due to the lack of time, I was unable to make an appearance or hear all the testimony on the two cases before the OCC #4952 & 4953 on April 25, 1973.

My stand in these cases was not made known to you so I take this form of presentation to breifly state my case as it applies to tract #3 and tract #5 shown on Atlantic-Richfield maps and exhibits.

I appose the formula used in this Unit in both Phase I and Phase II because they are unfair to tracts #3 and #5. During Phase I 50% of the participation was determined by the revenue derived from oil and gas income. As you know the higher wells in the field are penalized by the State of New Mexico for high Gas- Oil ratios. This applies to Tracts #3 & #5. Because of this and because gas production and reserves were ignored in all the other parameters in the participation formulas my Phase I participation was also penalized. In Phase II my participation was even more drastically unfair because the parameters ignored entirely the reserves of gas and the value of gas to the entire Unit project.

If it takes 24 years to deplete the oil from this giant resevoir, then you still have remaining a large gas field of which many of the favored tracts contributed very little of the gas. The value of gas could easily be in excess of $1.00 a thousand at that time and the "inefficient well",as pointed out by Mr. Christinson, could easily have contributed a large additional value to the owners.

The Atlantic-Richfiled reserve figures used for Tracts #3 &5 were considerably lower than the ones I used. This of course is a personal opinion but it affects my judgement about not joining the Unit.

Mr. Charles F. Henderson of Midland, Texas, who owns an equal interest to mine, agrees with my stand on this Unit Agreement and unless some adjustments are made, we will not sign the Unit Agreement as proposed and further we would like to request that no injection well be allowed closer than 2640' from our two tracts.

Thank you for your consideration.

Yours very truly,

L. S. Melzer

CC: Charles F. Henderson
Box 1791
Midland, Texas

M

Box 1088
Midland, Texas 79701
April 27, 1973

...TION COMM.
Santa Fe

Oil Conservation Commission
State of New Mexico
Att'n; Pat Porter and Examiner
Santa Fe, New Mexico 87510

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Yours very truly,

L. S. Melzer

CC: Charles F. Henderson
Box 1791
Midland, Texas

M

FRANKLIN, ASTON & FAIR, INC.
OIL PRODUCERS
P. O. BOX 1090
101 N. MISSOURI AVE.
ROSWELL, NEW MEXICO 88201

TELEPHONE:
AREA CODE 505 622-2040

R. R. ASTON
PRESIDENT

TOM P. STEPHENS
EXECUTIVE VICE PRESIDENT
TREASURER

LADORA LUCAS
VICE PRESIDENT

RICHARD L. RAY
VICE PRESIDENT

MARY ANN MORRISON
SECRETARY

May 1, 1973

RECEIVED
MAY - 3 1973
OIL CONSERVATION COMM
Santa Fe

AtlanticRichfieldCompany
North American Producing Division
Permian District
P. O. Box 1610
Midland, Texas 79701

Attention: Mr. J. R. Rhotenberry

Gentlemen:

Franklin, Aston & Fair, Inc. is a working interest owner under the Empire Abo Unit. Our firm has ratified the Unit Agreement and Unit Operating Agreement under Formula 47. We recently attended the OCC Hearing on April 25 under Case No. 4952 whereby ARCO requested OCC approval of the formation of this Unit.

Franklin, Aston & Fair, Inc. still feels that the formation of this Unit for the Empire Abo is important and in the interest of good oil field practice. The testimony at this Hearing did create certain questions that need to be resolved prior to any well-informed final commitment to the Unit.

This letter is to inform you that Franklin, Aston & Fair, Inc. is withdrawing its ratification of the Unit under Formula 47, subject only to the working out of an agreeable Supplementary Agreement as required on Page 15 of your Casinghead Gas Contract, dated November 17, 1959, by and between Franklin, Aston & Fair, Inc. et al as Sellers and Pan American Petroleum Corporation and Hondo Oil & Gas Company as Buyers. On Page 15 of EA-8-26-59, your Purchase Contract reads:

> "Residue gas for such purposes shall be made available at the Plant fence and existing Plant discharge pressure. Agreement between the parties hereto on the compression charges and other conditions of delivery of such gas shall be subject to a supplementary agreement hereto prior to the time of such need, and in the absence of such supplementary agreement, Buyer shall not be obligated to deliver to Seller residue gas for the purpose of pressure maintenance and repressuring operations."

Equity would dictate that a Supplemental Agreement concerning the residue gas should be determined at the same time that any effort to get Unit

approval is sought. This is particularly true when the company owning the gas plant is also one of the largest working interest owners in the Empire Abo Field.

The purpose of this letter is not to attack the efforts to get the Unit approved at the earliest possible date. The purpose of this letter is to get the Supplemental Agreement called for in the Sales Contract covering the Empire Abo gas as required by said Contract.

Franklin, Aston & Fair, Inc., therefore, withdraws conditionally its ratification of the Unit as per Formula 47 until the Supplemental Agreement required under the Sales Contract is prepared and agreed upon. This should not be a stumbling block and should not delay approval of the Unit if the Supplementary Agreement required is expeditiously prepared and submitted to the parties of interest. It is further felt that all compressor facilities and the gas injection system should be owned by the working interest owners of the Unit and the actual costs of operating such compressors and injection system should be the direct expenses of the working interest owners on a pro rata basis.

Sincerely yours,

FRANKLIN, ASTON & FAIR, INC.

By: R. R. Aston
R. R. Aston

RRA:mm

cc: New Mexico Oil Conservation Commission
P. O. Box 2088
Santa Fe, New Mexico 87501

United States Geological Survey
P. O. Drawer 1857
Roswell, New Mexico 88201

First National Bank in Dallas
P. O. Box 6031
Dallas, Texas 75222

Amoco Production Company
P. O. Box 1410
Fort Worth, Texas 76101

Case 4952

10:30 am
Apr. 25, '73

Telephone call from Mr. Lindsey R. Blanc confirming position by Jean Blanc and James Blanc in telegram Empire-Abo Unit case and requesting that we do all we can" to protect the little operator from take-over by big oil companys in this pool."

OIL CONSERVATION COMMISSION

STATE OF NEW MEXICO
P. O. BOX 2088 - SANTA FE
87501

COVERNOR
BRUCE KING
CHAIRMAN

LAND COMMISSIONER
ALEX J. ARMIJO
MEMBER

STATE GEOLOGIST
A. L. PORTER, JR.
SECRETARY - DIRECTOR

June 15, 1973

Re: Case No. 4952
Order No. R-4548
Applicant:
Atlantic Richfield Company

Mr. Clarence Hinkle
Hinkle, Bondurant, Cox & Eaton
Attorneys at Law
Post Office Box 10
Roswell, New Mexico 88201

Dear Sir:

Enclosed herewith are two copies of the above-referenced Commission order recently entered in the subject case.

Very truly yours,

A. L. PORTER, Jr.
Secretary-Director

ALP/ir

Copy of order also sent to:

Hobbs OCC x
Artesia OCC x
Aztec OCC

Other Unit Division - Land Office
Mr. A. J. Losee, Mr. Jason Kellahin, Mr. Richard Morris, Mr. Bruce A. Landis

State of New Mexico

Commissioner of Public Lands

W.R. HUMPHRIES
COMMISSIONER

#4952

SLO REF NO OG-733

P.O. BOX 1148
SANTA FE, NEW MEXICO 87504-1148

March 24, 1988

ARCO Oil and Gas Company
ATTN: Mr. Jack T. Lowder
P. O. Box 1610
Midland, Texas 79702

Re: 1988 Plan of Development
Empire Abo Unit
Eddy County, New Mexico

Gentlemen:

The Commissioner of Public Lands has this date approved your 1988 Plan of Development for the above captioned unit area.

Our approval is subject to like approval by all other appropraiate agencies.

Enclosed is an approved copy for your files.

If we may be of further help please do not hesitate to call on us.

Very truly yours,

W. R. HUMPHRIES
COMMISSIONER OF PUBLIC LANDS

BY: Floyd O. Prando
FLOYD O. PRANDO, Director
Oil and Gas Division
(505) 827-5744

WRH/FOP/pm
encls.
cc: OCD
BLM

ARCO Oil and Gas Company
Central District
Post Office Box 1610
Midland, Texas 79702
Telephone 915 688 5200

March 8, 1988

United States Department of the Interior
Bureau of Land Management
P. O. Drawer 1397
Roswell, NM 88201

Attn: Mr. Francis R. Cherry, Jr.
District Manager

State of New Mexico
Mr. Jim Baca
Commissioner of Public Lands
P. O. Box 1148
Santa Fe, NM 87501

Attn: Mr. Floyd O. Prando, Director (3)
Oil and Gas Division

State of New Mexico
Department of Energy and Minerals
P. O. Box 2088
Santa Fe, NM 87501

Attn: Mr. William J. LeMay (3)
Division Director

Working Interest Owners
Empire Abo Unit
Eddy County, New Mexico

Gentlemen:

In compliance with Section 11 of the Unit Agreement, Empire Abo Unit, Eddy County, New Mexico, ARCO Oil and Gas Company, as Unit Operator, on behalf of itself and other participating working interest owners, hereby submits for your approval a Plan of Operation to cover the period beginning January 1, 1988, and extending through the remainder of calendar year 1988.

Yours very truly,

Jack T. Lowder

Jack T. Lowder
Senior Engineer

JTL:jee

Attachments

EMPIRE ABO UNIT

1988 Plan of Operation

SUBMITTED March 8, 1988

1. Summary of Proposed Plan of Operation for 1988

ARCO Oil and Gas Company proposes to continue operation of the Empire Abo Unit, Eddy County, New Mexico, substantially the same as in recent years. We will continue to reinject all available residue gas from the Phillips extraction plant and the Amoco extraction plant. Oil will be produced from the most efficient wells in order to maximize recovery.

2. Project Area - Description and History

The Empire Abo Unit is located in portions of Sections 34, 35, 36, Township 17 South, Range 27 East; Sections 1, 2, 3, 4, 8, 9, 10, 11, 12, 15, 16, 17, Township 18 South, Range 27 East; Sections 25, 26, 27, 28, 31, 32, 33, 34, 35, 36, Township 17 South, Range 28 East; Sections 4, 5, 6, Township 18 South, Range 28 East; Sections 29, 30, Township 17 South, Range 29 East, Eddy County, New Mexico.

The Unit, as originally proposed, would have covered 11,399.15 acres. Certain tracts within the Unit Area did not qualify for participation as of October 1, 1973, the effective date of the Unit. These tracts are: 2, 6, 28, 41, 42, 46, 55, 56, 69, 79, 84, and 91. Total area of these tracts is 644.74 acres. The remaining 10,694.41 acres comprised the Project Area for pressure maintenance until September 1, 1975. On this date Tracts 41, 79, and 84 joined the Unit. The addition of these three tracts, which cover 120.03 acres, increased the total area of the Unit to 10,814.44 acres. Tracts 2, 6, 42, and 46 comprise the CITGO Empire Abo Unit, which received NMOCD approval in June, 1974. The Unit Area is now disposed as follows:

	Acres
ARCO Empire Abo Unit	10,814.44
CITGO Empire Abo Unit	241.05
Non-Participating Tracts	283.66
Total Area	11,339.15

ARCO Oil and Gas Company operates a pressure maintenance project at the Empire Abo Unit. This project involves injection of plant residue gas from Abo production back into the Abo formation.

3. Current Performance

In December, 1987, the Unitized Project Area averaged 3,811 BOPD with a 59 percent water cut and a gas-oil ratio of 15,530 cubic feet of gas per barrel of oil. Gas injection averaged 41,095 MCFPD (see attached Production History Plot).

Cumulative oil production from the Project Area through December, 1987 was 207.4 MMBO. This is about 55.9 percent of the 371 MMBO originally in place. Cumulative net gas production from the Project Area through December, 1987 was 241 BCF. This is about 51 percent of the 468 BCF originally in place. As of December, 1987, the Unit has 196 active producing wells.

4. Basic Concepts Governing Future Unit Operations

a) Field production history and reservoir numeric model studies have demonstrated that oil recovery is governed by gravity drainage and secondary gas cap expansion. We will be able to maximize the beneficial effects of these recovery mechanisms by observation of well performance and producing from the most efficient wells, those with the lowest GOR's. Natural gas liquid production from individual wells will also be considered when determining the most efficient wells in the future.

b) Gas injection will help maintain reservoir pressure and control expansion of the secondary gas cap.

5. Discussion of Past, Current, and Future Operations

a) Gas Injection

Fourteen gas injection wells along the north edge of the field handle all of the Empire Abo Unit injected gas. Table I lists these wells. Beginning in July, 1974, and continuing through the latest month for which data is available (December, 1987), all available plant residue gas has been injected into the Abo gas cap. The Unit receives plant residue gas at about 700 psi and compresses it to 2000 psi for injection.

Superhydration facilities at the extraction plants reduce hydrogen sulfide content to minimize possible corrosion. A rigorous corrosion treatment program is maintained. Permits for the Gas Injection Facilities have been granted by the State of New Mexico, Environmental Improvements Agency. We believe the injection facilities meet the requirements of the United States Geological Survey and the State of New Mexico.

b) Workovers

An intensive workover program in previous years has been successful in maximizing low GOR production. The majority of the workovers consisted of recompleting wells lower in the reef. As a result of this program, almost all possible lower recompletions have been performed. On the eastern portion of the field where water influx is occurring, workovers consisting of recompleting wells higher in the reef have been successful. We will continue to seek out wells with recompletion potential.

c) Continuing Field Study

In order to maximize future reserves, we will continue to maintain an intensive field surveillance program. We will also continue to evaluate alternate and enhanced recovery techniques.

d) Injection of Non-Abo Gas

Gas from non-Abo sources was delivered from the Gas Company of New Mexico (formerly Southern Union Gas Company) to the Empire Abo Unit. This began on June 18, 1976. Cumulative outside gas injected through December, 1987 was 4,061.8 MMCF. Outside gas has not been injected since July, 1983. Cumulative gas delivered back to the supplier through December, 1986 was 411.3 MMCF and the net cumulative non-Abo gas bank was 3,650.5 MMCF.

e) Voidage Limit Removal

The voidage limit was replaced with a gas production limit of 65 MMCFPD in 1984. This will allow more efficient operation of the Unit. Also, the wet gas compressors were removed and the practice of injecting unprocessed gas was discontinued.

6. Modifications to Plan

It is understood that to meet changing conditions, this plan of operation may be modified from time to time, with the approval of the Supervisor of the U.S.G.S., the Commissioner of Public Lands of the State of New Mexico, and the Department of Energy and Minerals, Oil Conservation Division, State of New Mexico.

ARCO Oil and Gas Company, as Unit Operator, will act prudently to preserve the rights of the mineral owners, and to effectively and efficiently recover the Unit Area Reserves. This Company will meet all economical offset obligations, act to prevent waste, conserve natural resources, and protect correlative rights.

7. Effective Date and Duration of Plan

This Plan of Operation shall be effective January 1, 1988 and extend through the calendar year unless otherwise amended.

If this Plan of Operation meets with your approval, please sign on the next page and return one copy for our files.

Very truly yours,
ARCO OIL AND GAS COMPANY
OPERATOR

Jack T. Lowder

Jack T. Lowder
Senior Engineer

JTL:jee

APPROVED BY: _____ DATE: _____
District Manager
United States Department of the Interior
Bureau of Land Management - Roswell District

APPROVED BY: _____ DATE: _____
Commissioner of Public Lands
State of New Mexico

APPROVED BY: For Bill LeMay DATE: 3-11-88
Division Director
Department of Energy and Minerals
Oil Conservation Division
State of New Mexico

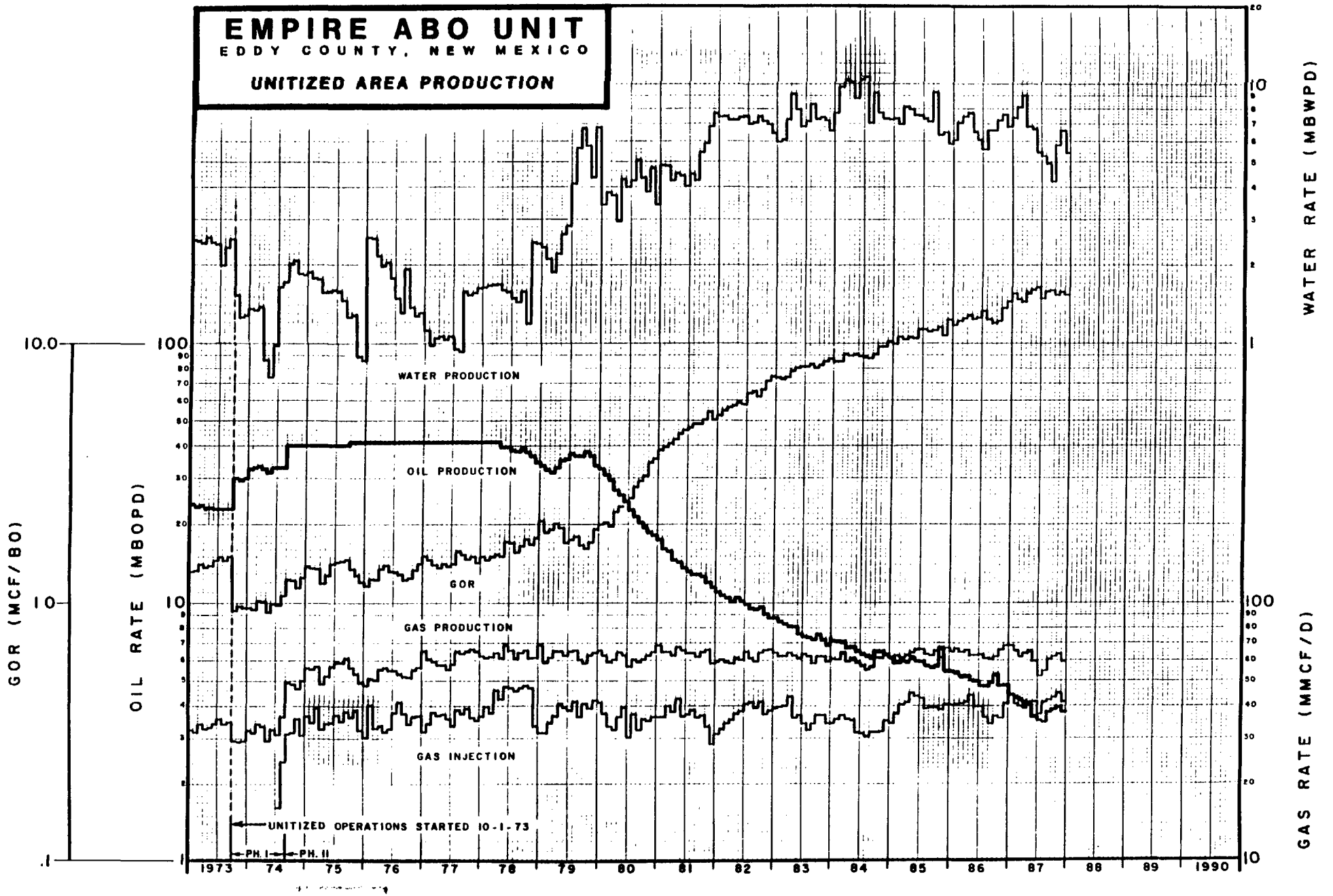

EMPIRE ABO UNIT
EDDY COUNTY, NEW MEXICO
UNITIZED AREA PRODUCTION
WATER PRODUCTION
OIL PRODUCTION
GOR
GAS PRODUCTION
GAS INJECTION
UNITIZED OPERATIONS STARTED 10-1-73
PH. I
PH. II
GOR (MCF/BO)
OIL RATE (MBOPD)
WATER RATE (MBWPD)
GAS RATE (MMCF/D)
10.0
1.0
.1
100
10
1
1973
74
75
76
77
78
79
80
81
82
83
84
85
86
87
88
89
1990

TABLE I

EMPIRE ABO UNIT
Gas Injection Wells

Previous Operator/ Lease and Well	Unit Well Designation	Location (Sec.-T-R)
Hondo/State "A" No. 24	C-39	NW/4 SE/4 26 17 28
Hondo/State "A" No. 16	D-37	SW/4 SW/4 26 17 28
Amoco/State "BV" No. 1	F-25	SW/4 NW/4 32 17 28
Hondo/State "A" No. 35	F-27	SW/4 NE/4 32 17 28
ARCO/M. Yates B(ARC) No. 8	F-31	SW/4 NE/4 33 17 28
Amoco/State "BM" No. 1	G-22	NE/4 SW/4 31 17 28
Hondo/State "A" No. 9	G-24	NE/4 SE/4 31 17 28
Gulf/NCT "C" No. 1	H-19	SW/4 SE/4 36 17 27
Amoco/State "BE" No. 1	H-21	SW/4 SW/4 31 17 18
Amoco/Malco "H" Fed. No. 9	I-10	NE/4 NW/4 3 18 27
Amoco/State "F" No. 8	I-18	NE/4 NW/4 1 18 27
Amoco/Malco "H" Fed. No. 2	J-12	SE/4 NE/4 3 18 27
Amoco/Windfohr Fed. No. 4	K-7	NW/4 SE/4 4 18 27
Exxon/CBDU "A" No. 8	M-6	NE/4 NW/4 9 18 27

EMPIRE ABO UNIT

1987 Production History

Month	BO	BW	Gross MCFG	Injected MCFG	Net MCFG
January	136,565	230,661	2,126,796	1,385,888	740,908
February	121,540	226,863	1,822,464	1,158,952	663,512
March	131,733	282,024	1,947,459	1,240,907	706,552
April	123,011	208,369	1,953,825	1,192,317	761,508
May	125,557	210,787	2,029,383	1,283,654	745,729
June	108,574	164,995	1,779,323	1,227,791	551,532
July	110,235	171,715	1,651,924	1,151,611	500,313
August	107,681	152,648	1,703,028	1,265,956	437,072
September	113,828	126,522	1,813,608	1,269,622	543,986
October	123,741	180,316	1,939,216	1,353,492	585,724
November	119,004	202,030	1,890,606	1,357,068	533,538
December	118,151	167,410	1,834,897	1,273,960	560,937
Total	1,439,620	2,324,340	22,492,529	15,161,218	7,331,311

State of New Mexico



SLO REF. NO. OG-390

W.R. HUMPHRIES
COMMISSIONER

Commissioner of Public Lands

P.O. BOX 1148
SANTA FE, NEW MEXICO 87504-1148

September 2, 1987

Arco Oil & Gas Company
Attention: Jack T. Lowder
P. O. Box 1610
Midland, Texas 79702

Re: Empire Abo Unit
1987 Plan of Development

Gentlemen:

The Commissioner of Public Lands has this date approved the above captioned Plan of Development. Our approval is subject to like approval by all appropriate agencies.

If we may be of further help, please do not hesitate to call on us.

Very truly yours,

W. R. HUMPHRIES
COMMISSIONER OF PUBLIC LANDS

BY: _____
FLOYD O. PRANDO, Director
Oil & Gas Division
(505) 827-5744

WRH/FOP/ams
enclosure
cc: Bureau of Land Management
Oil Conservation Division

For Unit
File

ARCO Oil and Gas Company
Permian District
Post Office Box 1610
Midland, Texas 79702
Telephone 915 684 0100

March 26, 1987

Mr. William J. LeMay
New Mexico Oil Conservation Division
P. O. Box 2088
Santa Fe, New Mexico 87501

Dear Mr. LeMay:

Empire Abo Unit
Order No. R-4549-F
Clarification of Gas Bank Allowance

ARCO Oil and Gas Company, the operator of the Empire Abo Pressure Maintenance Project, requested a clarification of Rule 5, Paragraph 2 of NMOCD Order No. R-4549-F regarding the gas bank allowance. Based on a telephone conversation with Mr. Harold Garcia on March 25, 1987, I was informed that ARCO has obtained administrative approval to include cumulative gas underproduction as well as gas overproduction in the Empire Abo Unit gas bank allowance.

NMOCD Order No. R-4549-F established a maximum daily project allowable for the Empire Abo Pressure Maintenance Project on April 20, 1984. The allowable is based on the amount of oil which will result in monthly average associated gas production of no more than 65 MMCF per day. Rule 5, Paragraph 2 of Order No. R-4549-F states "The allowable assigned shall result in production of casinghead gas averaging not more than 65 MMCF per day for the month, provided however, that on a cumulative basis, the unit operator may carry gas overproduction of 325 MMCF."

The monthly gas underproduction and overproduction for the Empire Abo Unit since the effective date of NMOCD Order No. R-4549-F is attached. Please notify me at (915) 688-5557 if there are any modifications in this decision.

Yours very truly,

Jack T. Lowder
Senior Engineer

JTL:sc
Attachments

cc: Mr. Harold Garcia
NMOCD
P. O. Box 2088
Santa Fe, New Mexico 87501

cc: Mr. L. A. Clements
NMOCD
P. O. Drawer DD
Artesia, New Mexico 88210

ARCO Oil and Gas Company is a Division of AtlanticRichfieldCompany

EMPIRE ABO UNIT
GAS BANK BALANCE

MONTH	GAS PRODUCED (MCF)	ALLOWABLE @ 65 MMCFD (MCF)	MONTHLY UNDER/(OVER) ALLOWABLE (MCF)	CUMULATIVE UNDER/(OVER) ALLOWABLE (MCF)	GAS BANK BALANCE (MCF)
4/84	1798318	1950000	151682	-	325000
5	1893118	2015000	121882	121882	446882
6	1744697	1950000	205303	327185	652185
7	1752642	2015000	262358	589543	914543
8	1712006	2015000	302994	892537	1217537
9	1686617	1950000	263383	1155920	1480920
10	1909558	2015000	105442	1261362	1586362
11	1850728	1950000	99272	1360634	1685634
12	1973394	2015000	41606	1402240	1727240
1/85	1915830	2015000	99170	1501410	1826410
2	1737635	1820000	82365	1583775	1908775
3	1907564	2015000	107436	1691211	2016211
4	1878389	1950000	71611	1762822	2087822
5	1989462	2015000	25538	1788360	2113360
6	1981217	1950000	-31217	1757143	2082143
7	2050138	2015000	-35138	1722005	2047005
8	1949042	2015000	65958	1787963	2112963
9	1876481	1950000	73519	1861482	2186482
10	2012658	2015000	2342	1863824	2188824
11	1826204	1950000	123796	1987620	2312620
12	2068120	2015000	-53120	1934500	2259500
1/86	2018243	2015000	-3243	1931257	2256257
2	1870624	1820000	-50624	1880633	2205633
3	2035629	2015000	-20629	1860004	2185004
4	1988752	1950000	-38752	1821252	2146252
5	1957124	2015000	57876	1879128	2204128
6	1893751	1950000	56249	1935377	2260377
7	2008252	2015000	6748	1942125	2267125
8	1902732	2015000	112268	2054393	2379393
9	1805272	1950000	144728	2199121	2524121
10	1963610	2015000	51390	2250511	2575511
11	1986705	1950000	-36705	2213806	2538806
12	2129837	2015000	-114837	2098969	2423969
1/87	2126796	2015000	-111796	1987173	2312173
2	1822464	1820000	-2464	1984709	2309709

STATE OF NEW MEXICO
ENERGY AND MINERALS DEPARTMENT
OIL CONSERVATION DIVISION

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

CASE NO. 8060
Order No. R-4549-F

APPLICATION OF ARCO OIL & GAS COMPANY FOR AMENDMENT OF ORDER NO. R-4549, AS AMENDED, EDDY COUNTY, NEW MEXICO.

ORDER OF THE DIVISION

BY THE DIVISION:

This cause came on for hearing at 8:00 a.m. on February 1, 1984, at Santa Fe, New Mexico, before Examiner Richard L. Stamets.

NOW, on this 20th day of April, 1984, the Division Director having considered the testimony, the record, and the recommendations of the Examiner, and being fully advised in the premises,

FINDS:

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

(2) That the applicant, Arco Oil & Gas Company, is the operator of the Empire-Abo Pressure Maintenance Project, Empire-Abo Pool, Eddy County, New Mexico, which project was authorized by Division Order No. R-4549 and is governed by operating rules contained in the Special Rules and Regulations for the Empire-Abo Pressure Maintenance Project included in said Order as amended by Orders Nos. R-4549-A through R-4549-E.

(3) That said special rules and regulations provide for well allowables based upon reservoir voidage.

(4) That the applicant seeks the recision of such rules for setting allowables and the establishment of a maximum daily project allowable of 65 MMCFD.

(5) That the evidence presented in this case established that this proposed method of setting allowables will result in the greater recovery of liquid hydrocarbons from such project.

(6) That the proposed amendment of said special rules will not result in violation of correlative rights.

(7) That the application for amendment of said special rules should be approved.

IT IS THEREFORE ORDERED:

(1) That Rules 3, 4, 4(A), 5, 6, 7, 8, 9, 10, 11, 12, and 13 of the Special Rules and Regulations for the Empire-Abo Pressure Maintenance Project contained in Division Order No. R-4549, as amended, are hereby rescinded.

(2) That said special rules are hereby amended by the adoption of new Rules 3, 4, 5, and 6 which read in their entirety as follows:

"RULE 3: That the maximum daily project allowable shall be an amount of oil which will result in monthly average associated gas production of no more than 65 MMCF per day.

For the purpose of these rules, "Available Residue Gas" shall be defined as being all gas produced from the unitized formation less plant shrinkage, plant fuel, and lease fuel required for operation of the lease.

"RULE 4: That all available unit residue gas shall be reinjected. No raw gas nor plant residue gas attributable to the project shall be sold or otherwise disposed of by any other means. That in addition to the injection of available residue gas, the project operator may inject up to and including 35 million cubic feet of extraneous gas per day into the Abo formation underlying the project area; further, that withdrawals of said extraneous gas may be made, but pending reservoir blow-down, during not more than 30 days in any one 180-day period; provided however, that pending blow-down, the daily rate of withdrawal shall not exceed the average daily rate of injection of such extraneous gas during the preceding 180-day period; provided further, that the project operator shall establish and maintain an "Extraneous Gas Bank Statement" which shall be filed with the Division each month concurrently with the project operator's "Empire-Abo Pressure Maintenance Project Monthly Report", and which shall show thereon each month the volume of extraneous gas injected, the cumulative volume of such gas injected, the volume of gas

delivered back to the supplier of extraneous gas, the cumulative volume of gas delivered back to the supplier, and the net cumulative extraneous gas bank.

"RULE 5. Allowables shall be assigned to unit wells in accordance with nominations submitted by the unit operator during the months of March, July, and November of each year. That such nominations shall accompany the Pressure Maintenance Project Operator's Report filed for that month.

The allowables assigned shall result in production of casinghead gas averaging not more than 65 MMCF per day for the month, provided however, that on a cumulative basis, the unit operator may carry gas overproduction of 325 MMCF.

That no producing well in the project area which directly or diagonally offsets a well not committed to the unit, and producing from the same common source of supply, shall receive an allowable or produce in excess of two times the top unit allowable for the pool.

"RULE 6. Each month the project operator shall submit to the Division a Pressure Maintenance Project Operator's Report on a form prescribed by the Division. The report shall show all project wells, production of oil, gas, and water; volumes of water, residue gas, and extraneous gas injected; total production of oil, gas, and water, and such other data as the Division may require"

(3) That Rule 14A, 14B, 14C, and 14D of said Special Rules are hereby redesignated Rule 7A, 7B, 7C and 7D, respectively.

(4) That Rule 15 of said Special Rules is hereby redesignated Rule 8 and is amended to read in its entirety as follows:

"RULE 8. Expansion or contraction of the project area may be approved by the Director of the Division administratively when good cause is shown therefor."

(5) That 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

JOE D. RAMEY,
Director

S E A L

ARCO Oil and Gas Company
Permian District
Post Office Box 1610
Midland, Texas 79702
Telephone 915 684 0100

March 26, 1987

Mr. L. A. Clements
Oil Conservation Division of the New Mexico
Department of Energy and Minerals
P. O. Drawer DD
Artesia, New Mexico 88210

Dear Mr. Clements:

ARCO - Empire Abo Unit
Pressure Maintenance Report - February, 1987

ARCO Oil and Gas Company, A Division of Atlantic Richfield Company, as operator of the Empire Abo Unit Pressure Maintenance Project, Eddy County, New Mexico, submits with this letter the gas bank statements for February, 1987. The allowable for January through April, 1987 has been set at 4760 BOPD.

Sincerely,

Jack T. Lowder

Jack T. Lowder
Senior Engineer

JTL:tis
Attachments

xc: Mr. William J. LeMay
Oil Conservation Division of the New Mexico
Department of Energy and Minerals
P. O. Box 2088
Santa Fe, New Mexico 87501

OLD METHOD

EMPIRE ABO UNIT PRESSURE MAINTENANCE PROJECT
(NMOCD Orders R-4548, R-4549, R-4549A, R-4549B, R-4549C, R-4549D, R-4549E, R-4549F)
ABO GAS BANK STATEMENT
MONTHLY REPORT FEBRUARY 1987

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
MONTH	GAS PRODUCED (MCF)	ALLOWABLE GAS PROD. @ 65MMCFPD (MCF)	AMOUNT UNDER (OVER) ALLOWABLE (MCF)	CUMULATIVE AMOUNT UNDER (OVER) ALLOWABLE (MCF)	GAS BANK BALANCE (LESSER OF LAST MONTH'S COL. 5 OR 325 MMCF) (MCF)	MAX. GAS RATE ALLOWABLE TO BALANCE GAS BANK (MCF)	TOTAL PLANT RESIDUE AVAILABLE (MCF)	ABO GAS INJECTED (MCF)	FRACTION OF AVAILABLE RESIDUE GAS INJECTED (FRACTION)
JANUARY	2,126,796	2,015,000	(111,796)	74,967	186,763	65,000	1,385,888	1,385,888	1.00
FEBRUARY	1,822,464	1,820,000	(2,464)	72,503	74,967	65,000	1,158,952	1,158,952	1.00

NEW METHOD

EMPIRE ABO UNIT PRESSURE MAINTENANCE PROJECT
(NMOCD Orders R-4548, R-4549, R-4549A, R-4549B, R-4549C, R-4549D, R-4549E, R-4549F)
ABO GAS BANK STATEMENT
MONTHLY REPORT FEBRUARY 1987

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
MONTH	GAS PRODUCED (MCF)	ALLOWABLE GAS PROD. @ 65MMCFPD (MCF)	AMOUNT UNDER (OVER) ALLOWABLE (MCF)	CUMULATIVE AMOUNT UNDER (OVER) ALLOWABLE (MCF)	GAS BANK BALANCE (325 MMCF + COL. 5) (MCF)	MAX. GAS RATE ALLOWABLE TO BALANCE GAS BANK (MCF)	TOTAL PLANT RESIDUE AVAILABLE (MCF)	ABO GAS INJECTED (MCF)	FRACTION OF AVAILABLE RESIDUE GAS INJECTED (FRACTION)
JANUARY	2,126,796	2,015,000	(111,796)	1,987,173	2,312,173	65,000	1,385,888	1,385,888	1.00
FEBRUARY	1,822,464	1,820,000	(2,464)	1,984,709	2,309,709	65,000	1,158,952	1,158,952	1.00

EMPIRE ABO UNIT PRESSURE MAINTENANCE PROJECT
NON-ABO GAS BANK STATEMENT
MONTHLY REPORT FEBRUARY 1987

MONTH	GAS INJECTED (MCF)	CUMULATIVE GAS INJECTED (MCF)	GAS DELIVERED TO TO SUPPLIER (MCF)	CUMULATIVE GAS DELIVERED TO SUPPLIER (MCF)	NET CUMULATIVE NON-ABO GAS BANK (MCF)
JANUARY	-0-	4,061,826	-0-	411,342	3,650,484
FEBRUARY	-0-	4,061,826	-0-	411,342	3,650,484

10:34:25 03/25/87

EMPIRE ABO PRESSURE MAINTENANCE PROJECT

TO: N.M.O.C.C. DIST II (3)
P.O. DRAWER DD (N.M.O.C.C. ORDERS R-4548, R-4549, R-4549-A, R-4549-B, R-4549-C, R-4549-D, R-4549-E, R-4549F)
ARTESIA, NEW MEXICO-88210
ATTN:MR. W.A. GRESSETT ATLANTIC RICHFIELD COMPANY - OPERATOR

MONTHLY REPORT FOR FEB., 1987

PROJECT AREA: EMPIRE ABO UNIT
SHEET A TOTAL REQUESTED ALLOWABLE FOR JAN.-APR., 1987 IS 4760. BOPD

(1)	(2)	(3)	(4)								(5)				(6)			(7)	(8)	(9)	(10)	(11)
															INJECTION-AVERAGE						REQUES	
															FEB. ,1987			VOID	REQUE-	NET	NET	REQU-
						TEST DATA					PRODUCTION AVERAGE				WATER		CUM.	AVAIL.	STED	VOID	VOID	ESTED
						(LATEST 24-HR)					(FEB. ,1987)				BWPD	WHINJ	INJ.	FOR(1)	VOID	AT NUA	(8+9)	OIL
TCT	WELL				WEL	DATE	OIL	WTR	GAS	GOR	OIL	WTR	GAS	GOR	GAS	PRESS	MBW	TRANS.	TRANS.	(2)	SEE I9	ALLOW
NO.	NO.	UN	SEC	T R	STA	M YR	BBL	BBL	MCF	CF/B	BOPD	BWPD	MCF/D	CF/B	MCF/D	PSI	MMCF	RSVB/D	RSVB/D	RSVB/D	RSVB/D	BOPD
B	40	H	26	17 28	S																	
B	45	E	30	17 29	S	7 73	9.	3.	23.	2556.								53.				
B	46	F	30	17 29	S	7 73	85.	12.	85.	1000.								206.				
B	47	G	30	17 29	S	7 73	40.	175.	80.	2000.								366.				
B	48	H	30	17 29	I		WATER INJECTOR								2824.	1300.	3428.	0.				
B	49	E	29	17 29	I		WATER INJECTOR								2840.	0.	4591.	0.				
C	34	K	27	17 28	S	8 73	22.	0.	40.	1818.								91.				
C	35	J	27	17 28	S	5 73	71.	0.	89.	1254.								207.				
C	36	I	27	17 28	S	6 73	21.	0.	4.	190.								-3.				
C	37	L	26	17 28	F	6 86	9.	1.	511.	56778.	6.	3.	462.	81791.						150.	150.	2.
C	38	K	26	17 28	I		GAS INJECTOR								0.	0.	830.	700.				
C	39	J	26	17 28	I		GAS INJECTOR								2405.	1822.	12618.	700.				
C	40	I	26	17 28	F	8 86	44.	7.	4.	91.	62.	38.	68.	1084.						102.	102.	92.
C	41	L	25	17 28	P	8 86	84.	115.	120.	1429.	85.	217.	106.	1252.						294.	294.	90.
C	42	K	25	17 28	S	9 76	44.	1.	172.	3909.								432.				
C	43	J	25	17 28	S	9 76	12.	255.	67.	5583.								419.				
C	44	I	25	17 28	S	11 76	5.	374.	0.	0.								366.				
C	45	L	30	17 29	S	7 73	72.	297.	14.	194.								308.				
C	46	K	30	17 29	S	5 73	30.	306.	140.	4667.								657.				
C	47	J	30	17 29	S	8 73	10.	105.	11.	1100.								123.				
C	49	L	29	17 29	I		WATER INJECTOR								1473.	1300.	7403.	0.				
C	50	K	29	17 29	I		WATER INJECTOR								331.	0.	2757.	0.				
D	33	M	27	17 28	S	3 85	3.	2.	1501.	500333.								700.				
D	34	N	27	17 28	F	8 86	18.	0.	1259.	69944.	18.	14.	468.	25966.						251.	251.	10.
D	35	O	27	17 28	S		GAS INJECTOR								0.	0.	1540.	700.				
D	36	P	27	17 28	P	7 86	107.	1.	31.	290.	66.	0.	31.	469.						8.	8.	60.
D	361	P	27	17 28	P	7 86	18.	23.	197.	10944.	4.	24.	8.	1954.						44.	44.	15.
D	37	M	26	17 28	I		GAS INJECTOR								6628.	1817.	19679.	700.				
D	38	N	26	17 28	S	8 86	0.	0.	0.	0.	0.	0.	0.	0.						-8.	-8.	0.
D	39	O	26	17 28	P	8 86	7.	163.	7.	1000.	13.	144.	177.	13589.						453.	453.	25.
D	40	P	26	17 28	S	7 85	8.	40.	10.	1250.								56.				
D	41	M	25	17 28	S	9 76	6.	460.	21.	3500.								505.				
D	42	N	25	17 28	S	9 76	17.	68.	142.	8353.								427.				
D	43	O	25	17 28	S	2 79	11.	157.	16.	1455.								188.				
D	44	P	25	17 28	P	7 86	32.	465.	67.	2094.	26.	626.	81.	3148.						711.	711.	34.
E	26	C	32	17 28	S	5 73	2.	1.	0.	0.								-7.				
E	27	B	32	17 28	S	8 73	3.	0.	0.	0.								-8.				
E	28	A	32	17 28	S	5 73	15.	0.	55.	3667.								132.				
E	30	C	33	17 28	S	9 76	31.	0.	462.	14903.								700.				

E 31	B	33	17	28*	S	7	81	22.	8.	224.	10182.*					*			*	580.*	*	*	*		
E 32	A	33	17	28*	S	10	78	43.	0.	1441.	33512.*					*			*	700.*	*	*	*		
E 33	D	34	17	28*	S	11	79	6.	2.	178.	29667.*					*			*	458.*	*	*	*		
E 34	C	34	17	28*	S	3	80	168.	0.	642.	3821.*					*			*	700.*	*	*	*		
E 341	C	34	17	28*	S	11	79	6.	0.	1122.	187000.*					*			*	700.*	*	*	*		
E 35	B	34	17	28*	S	3	80	6.	0.	450.	75000.*					*			*	700.*	*	*	*		
E 351	B	34	17	28*	S	7	81	40.	1.	1336.	33400.*					*			*	700.*	*	*	*		
E 36	A	34	17	28*	P	8	86	38.	207.	17.	447.*	8.	141.	75.	9827.*	*			*	*	*	411.*	411.*	30.	
E 361	A	34	17	28*	S	3	81	0.	0.	648.	0.*					*			*	706.*	*	*	*		
E 362	A	34	17	28*	P	6	86	174.	119.	104.	598.*	17.	160.	5.	311.*	*			*	*	*	164.*	164.*	120.	
E 363	A	34	17	28*	P	7	86	82.	224.	51.	622.*	12.	260.	28.	2379.*	*			*	*	*	323.*	323.*	35.	
E 37	D	35	17	28*	S	6	85	2.	263.	13.	6500.*	0.	0.	0.	0.*	*			*	*	*	-2.*	-2.*	0.	
E 371	D	35	17	28*	S	6	85	79.	355.	90.	1139.*	42.	3.	534.	12849.*	*			*	*	*	1.*	1.*	0.	
E 372	D	35	17	28*	S	6	85	2.	110.	11.	5500.*	0.	0.	0.	0.*	*			*	*	*	-2.*	-2.*	0.	
E 373	D	35	17	28*	P	8	86	57.	481.	45.	789.*	4.	210.	4.	973.*	*			*	*	*	267.*	267.*	85.	
E 374	D	35	17	28*	P	8	86	74.	319.	138.	1865.*	18.	440.	13.	745.*	*			*	*	*	461.*	461.*	50.	
E 38	C	35	17	28*	S	1	81	0.	334.	5.	0.*					*			*	339.*	*	*	*		
E 381	C	35	17	28*	S	5	85	2.	164.	17.	8500.*					*			*	200.*	*	*	*		
E 382	C	35	17	28*	S	6	86	0.	42.	1.	0.*	0.	0.	0.	0.*	*			*	*	*	-4.*	-4.*	0.	
E 383	C	35	17	28*	S	6	85	3.	492.	22.	7333.*					*			*	545.*	*	*	*		
E 384	C	35	17	28*	S	8	85	0.	262.	10.	0.*	0.	0.	0.	0.*	*			*	*	*	-8.*	-8.*	0.	
E 39	B	35	17	28*	S	1	81	3.	182.	4.	1333.*					*			*	183.*	*	*	*		
E 391	B	35	17	28*	S	3	85	0.	0.	0.	0.*					*			*	-8.*	*	*	*		
E 392	B	35	17	28*	S	6	85	2.	230.	9.	4500.*					*			*	245.*	*	*	*		
E 393	B	35	17	28*	S	6	85	0.	22.	16.	0.*	0.	0.	0.	0.*	*			*	*	*	-8.*	-8.*	0.	
E 395	B	35	17	28*	S	7	82	0.	132.	2.	0.*					*			*	129.*	*	*	*		
E 40	A	35	17	28*	S	11	76	1.	317.	0.	0.*					*			*	309.*	*	*	*		
E 41	D	36	17	28*	S	3	79	30.	257.	21.	700.*					*			*	296.*	*	*	*		
F 22	F	31	17	28*	S	5	73	3.	0.	12.	4000.*					*			*	22.*	*	*	*		
F 25	E	32	17	28*	I			GAS INJECTOR			*					*	710.	1929.	2515.*	700.*	*	*	*		
F 26	F	32	17	28*	S	9	76	76.	0.	622.	8184.*					*			*	700.*	*	*	*		
F 27	G	32	17	28*	I			GAS INJECTOR			*					*	2940.	1905.	12236.*	700.*	*	*	*		
F 28	H	32	17	28*	S	9	76	313.	0.	701.	2240.*					*			*	700.*	*	*	*		
F 29	E	33	17	28*	S	9	76	39.	0.	1138.	29179.*					*			*	700.*	*	*	*		
F 30	F	33	17	28*	S	10	77	267.	0.	1089.	4079.*					*			*	700.*	*	*	*		
F 31	G	33	17	28*	I			GAS INJECTOR			*					*	6674.	1856.	42858.*	700.*	*	*	*		
F 32	H	33	17	28*	F	7	86	7.	0.	1482.	211714.*	3.	0.	183.	71319.*	*			*	*	*	127.*	127.*	2.	
F 321	H	33	17	28*	S	8	80	2.	0.	516.	258000.*					*			*	700.*	*	*	*		
F 322	H	33	17	28*	S	10	81	2.	1.	1302.	651000.*					*			*	700.*	*	*	*		
F 33	E	34	17	28*	S	2	82	24.	0.	416.	17333.*					*			*	700.*	*	*	*		
F 331	E	34	17	28*	P	6	86	100.	29.	10.	100.*	86.	13.	30.	349.*	*			*	*	*	19.*	19.*	93.	
F 332	E	34	17	28*	F	7	86	16.	0.	1696.	106000.*	8.	0.	450.	54017.*	*			*	*	*	305.*	305.*	6.	
F 333	E	34	17	28*	S	7	80	3.	0.	1536.	512000.*					*			*	707.*	*	*	*		
F 334	E	34	17	28*	S	6	81	4.	1.	590.	147500.*					*			*	707.*	*	*	*		
F 335	E	34	17	28*	P	7	86	51.	0.	1738.	34078.*	30.	0.	748.	24731.*	*			*	*	*	229.*	229.*	10.	
F 336	E	34	17	28*	P	7	86	5.	0.	1173.	234600.*	1.	0.	142.	132900.*	*			*	*	*	249.*	249.*	2.	
F 34	F	34	17	28*	S	3	80	12.	0.	1440.	120000.*					*			*	700.*	*	*	*		
F 341	F	34	17	28*	S	3	81	6.	0.	1359.	226500.*					*			*	700.*	*	*	*		
F 342	F	34	17	28*	F	8	86	2.	0.	1696.	848000.*	6.	2.	594.	107387.*	*			*	*	*	508.*	508.*	5.	
F 343	F	34	17	28*	P	8	86	4.	1.	1184.	296000.*	5.	0.	344.	68850.*	*			*	*	*	323.*	323.*	5.	
F 35	G	34	17	28*	S	4	84	4.	9.	1279.	319750.*					*			*	31.*	*	*	*		
F 351	G	34	17	28*	F	7	86	1.	149.	853.	853000.*	35.	48.	2761.	78736.*	*			*	*	*	419.*	419.*	5.	
F 352	G	34	17	28*	S	4	81	0.	0.	1704.	0.*					*			*	706.*	*	*	*		
F 353	G	34	17	28*	P	7	86	66.	359.	141.	2136.*	4.	249.	2.	431.*	*			*	*	*	256.*	256.*	60.	
F 354	G	34	17	28*	F	7	86	12.	0.	45.	3750.*	75.	2.	1729.	23159.*	*			*	*	*	2175.*	2175.*	100.	
F 36	H	34	17	28*	F	7	86	2.	0.	1370.	685000.*	17.	5.	351.	20477.*	*			*	*	*	196.*	196.*	10.	
F 361	H	34	17	28*	S	7	85	6.	157.	1760.	293333.*					*			*	707.*	*	*	*		
F 362	H	34	17	28*	P	6	86	65.	19.	169.	2600.*	55.	268.	30.	538.*	*			*	*	*	284.*	284.*	66.	
F 363	H	34	17	28*	P	6	86	4.	76.	91.	22750.*	12.	260.	20.	1758.*	*			*	*	*	301.*	301.*	30.	
F 364	H	34	17	28*	P	7	86	157.	466.	186.	1185.*	33.	500.	20.	613.*	*			*	*	*	505.*	505.*	40.	

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I 282	A	5	18	28*	P	8	86	12.	14.	198.	16500.*	12.	14.	125.	10790.*					*	*	*	213.*	213.*	20.
I 283	A	5	18	28*	P	7	86	9.	3.	13.	1444.*	8.	5.	69.	8476.*					*	*	*	97.*	97.*	12.
I 29	D	4	18	28*	S	10	79	56.	63.	217.	3875.*									*	609.*	*	*	*	
I 291	D	4	18	28*	P	7	86	11.	7.	66.	6000.*	50.	20.	69.	1389.*					*	*	*	59.*	59.*	40.
I 292	D	4	18	28*	P	8	86	21.	34.	25.	1190.*	2.	17.	39.	16373.*					*	*	*	136.*	136.*	8.
I 30	C	4	18	28*	S	11	79	14.	10.	18.	1286.*									*	45.*	*	*	*	
J 8	H	4	18	27*	S	5	73	3.	0.	9.	3000.*									*	15.*	*	*	*	
J 9	E	3	18	27*	S	10	76	53.	0.	583.	11000.*									*	700.*	*	*	*	
J 10	F	3	18	27*	S	10	76	142.	0.	847.	5965.*									*	700.*	*	*	*	
J 11	G	3	18	27*	S	9	76	127.	0.	423.	3331.*									*	700.*	*	*	*	
J 12	H	3	18	27*	I			GAS	INJECTOR		*									*	700.*	*	*	*	
J 13	E	2	18	27*	S	10	77	104.	0.	1096.	10538.*									*	700.*	*	*	*	
J 14	F	2	18	27*	F	7	86	5.	0.	1443.	288600.*	7.X	0.	131.	18990.*					*	*	*	170.*	170.*	10.
J 15	G	2	18	27*	F	8	86	19.	1.	1360.	71579.*	17.X	1.	540.	30898.*					*	*	*	372.*	372.*	13.
J 17	E	1	18	27*	S	9	76	90.	0.	971.	10789.*									*	700.*	*	*	*	
J 18	F	1	18	27*	S	8	81	3.	0.	1551.	517000.*									*	700.*	*	*	*	
J 19	G	1	18	27*	F	8	86	40.	0.	540.	13500.*	29.	0.	509.	17367.*					*	*	*	481.*	481.*	30.
J 191	G	1	18	27*	S	1	78	33.	0.	1523.	46152.*									*	700.*	*	*	*	
J 20	H	1	18	27*	S	1	81	0.	0.	68.	0.*									*	170.*	*	*	*	
J 201	H	1	18	27*	F	7	86	41.	1.	1797.	43829.*	9.	0.	314.	33938.*					*	*	*	767.*	767.*	24.
J 202	H	1	18	27*	P	6	86	9.	2.	17.	1889.*	11.	1.	23.	2087.*					*	*	*	31.*	31.*	19.
J 203	H	1	18	27*	F	8	86	63.	1.	1755.	27857.*	12.	0.	302.	24624.*					*	*	*	345.*	345.*	15.
J 21	E	6	18	28*	F	6	86	33.	0.	1172.	35515.*	5.	0.	163.	34007.*					*	*	*	287.*	287.*	9.
J 211	E	6	18	28*	F	8	86	32.	1.	1590.	49688.*	3.	0.	95.	31435.*					*	*	*	28.*	28.*	1.
J 212	E	6	18	28*	F	8	86	23.	0.	1498.	65130.*	13.	1.	392.	29902.*					*	*	*	451.*	451.*	16.
J 213	E	6	18	28*	P	7	86	10.	1.	60.	6000.*	11.	3.	38.	3331.*					*	*	*	39.*	39.*	13.
J 22	F	6	18	28*	F	6	86	36.	0.	1540.	42778.*	1.	0.	54.	46152.*					*	*	*	41.*	41.*	1.
J 221	F	6	18	28*	F	6	86	52.	0.	1683.	32365.*	2.	0.	127.	51609.*					*	*	*	340.*	340.*	7.
J 222	F	6	18	28*	P	7	86	3.	0.	15.	5000.*	24.	1.	93.	3807.*					*	*	*	5.*	5.*	2.
J 23	G	6	18	28*	S	11	79	28.	0.	982.	35071.*									*	700.*	*	*	*	
J 231	G	6	18	28*	F	7	86	59.	0.	1303.	22085.*	14.	0.	638.	44640.*					*	*	*	632.*	632.*	15.
J 232	G	6	18	28*	F	7	86	56.	0.	1711.	30554.*	42.	0.	1568.	37337.*					*	*	*	1658.*	1658.*	47.
J 233	G	6	18	28*	F	7	86	34.	0.	1589.	46735.*	5.	0.	326.	63804.*					*	*	*	604.*	604.*	10.
J 234	G	6	18	28*	F	8	86	17.	1.	1575.	92647.*	2.	0.	128.	55937.*					*	*	*	51.*	51.*	1.
J 235	G	6	18	28*	F	7	86	5.	0.	1465.	293000.*	2.	0.	276.	135474.*					*	*	*	385.*	385.*	3.
J 24	H	6	18	28*	F	8	86	76.	0.	330.	4342.*	33.X	0.	543.	16289.*					*	*	*	576.*	576.*	38.
J 241	H	6	18	28*	P	7	86	30.	2.	83.	2767.*	40.X	7.	39.	982.*					*	*	*	21.*	21.*	26.
J 26	F	5	18	28*	P	7	86	4.	1.	1617.	404250.*	119.	4.	1012.	8535.*					*	*	*	918.*	918.*	117.
J 27	G	5	18	28*	S	5	84	1.	128.	63.	63000.*									*	284.*	*	*	*	
J 28	H	5	18	28*	P	7	86	6.	97.	95.	15833.*	10.	146.	47.	4811.*					*	*	*	168.*	168.*	7.
K 7	J	4	18	27*	I			GAS	INJECTOR		*									*	700.*	*	*	*	
K 8	I	4	18	27*	S	5	73	56.	0.	617.	11018.*					2280.	1925.	10328.*		*	700.*	*	*	*	
K 9	L	3	18	27*	F	8	86	50.	1.	867.	17340.*	18.	0.	287.	15741.*					*	*	*	360.*	360.*	25.
K 10	K	3	18	27*	F	8	86	26.	0.	256.	9846.*	25.	0.	395.	15808.*					*	*	*	303.*	303.*	21.
K 11	J	3	18	27*	S	7	82	12.	0.	1803.	150250.*									*	700.*	*	*	*	
K 12	I	3	18	27*	F	6	86	20.	0.	984.	49200.*	9.	1.	243.	26054.*					*	*	*	164.*	164.*	7.
K 13	L	2	18	27*	F	7	86	1.	0.	1497.	********	2.	0.	177.	112909.*					*	*	*	318.*	318.*	3.
K 131	L	2	18	27*	P	7	86	20.	0.	1050.	52500.*	13.	0.	316.	24773.*					*	*	*	113.*	113.*	5.
K 14	K	2	18	27*	P	7	86	1.	0.	173.	173000.*	4.	0.	413.	95612.*					*	*	*	997.*	997.*	11.
K 141	K	2	18	27*	F	7	86	51.	15.	956.	18745.*	22.	6.	375.	16956.*					*	*	*	386.*	386.*	24.
K 142	K	2	18	27*	P	7	86	17.	1.	661.	38882.*	41.	0.	441.	10678.*					*	*	*	504.*	504.*	51.
K 143	K	2	18	27*	P	7	86	66.	20.	1226.	18576.*	62.	20.	1204.	19438.*					*	*	*	1187.*	1187.*	64.
K 15	J	2	18	27*	F	7	86	57.	0.	1034.	18140.*	28.X	0.	578.	20888.*					*	*	*	503.*	503.*	26.
K 16	I	2	18	27*	P	8	86	8.	31.	97.	12125.*	22.X	25.	71.	3201.*					*	*	*	55.*	55.*	12.
K 161	I	2	18	27*	F	8	86	32.	6.	47.	1469.*	40.X	2.	59.	1498.*					*	*	*	55.*	55.*	48.
K 17	L	1	18	27*	F	7	86	121.	0.	1463.	12091.*	64.X	0.	1054.	16418.*					*	*	*	838.*	838.*	55.
K 18	K	1	18	27*	F	8	86	131.	35.	1026.	7832.*	42.	1.	590.	14016.*					*	*	*	681.*	681.*	52.
K 181	K	1	18	27*	F	8	86	93.	0.	848.	9118.*	17.	0.	224.	13031.*					*	*	*	242.*	242.*	20.
K 182	K	1	18	27*	P	7	86	23.	15.	8.	348.*	37.	0.	263.	7147.*					*	*	*	156.*	156.*	24.
K 183	K	1	18	27*	P	7	86	37.	9.	204.	5514.*	58.	5.	115.	1983.*					*	*	*	105.*	105.*	62.

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M	132	D	11	18	27*	F	7	86	8.	21.	152.	19000.*	12.	30.	180.	15652.*	*	*	*	158.*	158.*	9.
M	133	D	11	18	27*	F	7	86	40.	41.	1034.	25850.*	2.	2.	75.	41235.*	*	*	*	37.*	37.*	1.
M	14	C	11	18	27*	S	8	79	140.	0.	1828.	13057.*				*	*	700.*	*	*	*	
M	141	C	11	18	27*	F	8	86	36.	41.	862.	23944.*	7.	9.	182.	24599.*	*	*	*	163.*	163.*	7.
M	15	B	11	18	27*	P	7	86	14.	75.	205.	14643.*	30.	58.	333.	10967.*	*	*	*	107.*	107.*	5.
M	151	B	11	18	27*	P	7	86	14.	31.	168.	12000.*	17.	7.	532.	30890.*	*	*	*	588.*	588.*	20.
M	152	B	11	18	27*	F	7	86	35.	24.	1340.	38286.*	6.	1.	217.	35273.*	*	*	*	466.*	466.*	14.
M	153	B	11	18	27*	F	7	86	28.	3.	1178.	42071.*	3.	0.	123.	40047.*	*	*	*	188.*	188.*	5.
M	16	A	11	18	27*	P	7	86	22.	5.	66.	3000.*	26.	32.	59.	2239.*	*	*	*	58.*	58.*	18.
N	4	H	8	18	27*	S						*				*	*	*	*	*	*	
N	5	E	9	18	27*	S	5	73	24.	1.	45.	1875.*				*	*	105.*	*	*	*	
N	6	F	9	18	27*	S	5	73	16.	4.	181.	11313.*				*	*	465.*	*	*	*	
N	7	G	9	18	27*	F	6	86	70.	3.	1375.	19643.*	17.	0.	241.	14211.*	*	*	*	284.*	284.*	22.
N	701	G	9	18	27*	S						*				*	*	*	*	*	*	
N	8	H	9	18	27*	S	6	73	49.	0.	577.	11776.*				*	*	700.*	*	*	*	
N	801	H	9	18	27*	S						*				*	*	*	*	*	*	
N	9	E	10	18	27*	P	8	86	18.	3.	14.	778.*	16.	1.	10.	582.*	*	*	*	1.*	1.*	25.
N	901	E	10	18	27*	P	8	86	22.	2.	5.	227.*	12.	2.	33.	2729.*	*	*	*	34.*	34.*	17.
N	10	F	10	18	27*	F	8	86	22.	4.	1517.	68955.*	41.	1.	675.	16574.*	*	*	*	769.*	769.*	50.
N	11	G	10	18	27*	P	7	86	20.	21.	582.	29100.*	15.	27.	290.	19659.*	*	*	*	407.*	407.*	21.
N	12	H	10	18	27*	P	6	86	26.	1.	367.	14115.*	49.	28.	1069.	21982.*	*	*	*	972.*	972.*	46.
N	13	E	11	18	27*	P	7	86	3.	73.	70.	23333.*	9.	110.	515.	57186.*	*	*	*	156.*	156.*	1.
N	131	E	11	18	27*	T						*				*	*	*	*	*	*	
N	14	F	11	18	27*	T						*				*	*	*	*	*	*	
O	4	I	8	18	27*	S	5	73	11.	1.	92.	8364.*				*	*	231.*	*	*	*	
O	5	L	9	18	27*	S	7	73	17.	3.	73.	4294.*				*	*	182.*	*	*	*	
O	6	K	9	18	27*	S	7	73	37.	10.	606.	16378.*				*	*	700.*	*	*	*	
O	7	J	9	18	27*	F	8	86	109.	3.	1023.	9385.*	31.	0.	292.	9411.*	*	*	*	236.*	236.*	28.
O	3	I	9	18	27*	F	6	85	84.	0.	1394.	16595.*	13.	0.	315.	23731.*	*	*	*	215.*	215.*	10.
O	9	L	10	18	27*	S	6	73	145.	6.	125.	862.*				*	*	290.*	*	*	*	
P	4	P	8	18	27*	S	5	73	15.	1.	64.	4267.*				*	*	156.*	*	*	*	
P	5	M	9	18	27*	S	5	73	15.	0.	136.	9067.*				*	*	344.*	*	*	*	
P	6	N	9	18	27*	S	5	73	18.	2.	116.	6444.*				*	*	293.*	*	*	*	
P	7	O	9	18	27*	S						*				*	*	*	*	*	*	
P	701	O	9	18	27*	S	7	73	96.	0.	1149.	11969.*				*	*	700.*	*	*	*	
P	8	P	9	18	27*	P	8	86	8.	18.	8.	1000.*	7.	11.	9.	1228.*	*	*	*	18.*	18.*	16.
P	9	M	10	18	27*	P	8	86	161.	98.	68.	422.*	185.	123.	459.	2484.*	*	*	*	571.*	571.*	215.
Q	5	D	16	18	27*	S	7	73	8.	1.	46.	5750.*				*	*	111.*	*	*	*	
Q	6	C	16	18	27*	S	5	73	18.	2.	80.	4444.*				*	*	199.*	*	*	*	
Q	7	B	16	18	27*	S	5	73	11.	4.	160.	14545.*				*	*	412.*	*	*	*	
Q	8	A	16	18	27*	S	5	73	41.	3.	40.	976.*				*	*	89.*	*	*	*	
Q	9	D	15	18	27*	S	5	73	27.	50.	13.	481.*				*	*	69.*	*	*	*	
R	3	G	17	18	27*	T						*				*	*	*	*	*	*	
R	4	H	17	18	27*	S	5	73	5.	5.	62.	12400.*				*	*	158.*	*	*	*	
R	5	E	16	18	27*	S	7	73	6.	3.	52.	8667.*				*	*	129.*	*	*	*	
R	6	F	16	18	27*	S	5	73	6.	3.	34.	5667.*				*	*	82.*	*	*	*	
R	7	G	16	18	27*	S	3	80	72.	0.	643.	8931.*				*	*	700.*	*	*	*	
R	8	H	16	18	27*	S	6	73	48.	32.	70.	1458.*				*	*	195.*	*	*	*	
S	2	K	17	18	27*	S	5	73	7.	5.	35.	5000.*				*	*	87.*	*	*	*	
S	3	J	17	18	27*	S	5	73	12.	11.	31.	2583.*				*	*	81.*	*	*	*	
S	5	L	16	18	27*	S	5	73	8.	4.	43.	5375.*				*	*	106.*	*	*	*	
S	6	K	16	18	27*	S	5	73	15.	7.	23.	1533.*				*	*	55.*	*	*	*	
S	7	J	16	18	27*	S	7	73	46.	138.	31.	674.*				*	*	200.*	*	*	*	
S	8	I	16	18	27*	T						*				*	*	*	*	*	*	
T	6	N	16	18	27*	T						*				*	*	*	*	*	*	
T	7	O	16	18	27*	S	0	76	236.	0.	617.	2614.*				*	*	700.*	*	*	*	

EMPIRE ABO UNIT OIL PRODUCTION= 4341. BOPD (TOTAL COL. A-5) 121540. BOPM

EMPIRE ABO UNIT WATER PRODUCTION= 8102. BWPD (TOTAL COL. A-5) 226863. BWPM

EMPIRE ABO UNIT GAS PRODUCTION= 65088. MCF/D (TOTAL COL. A-5) 1822464. MCF/M

EMPIRE ABO UNIT GOR= 14995. CF/B

EMPIRE ABO UNIT GAS INJECTED= 41391. MCF/D 1158952. MCF/M
OUTSIDE SOURCES GAS INJECTED= 0. MCF/D 0. MCF/M
TOTAL GAS INJECTED= 41391. MCF/D 1158952. MCF/M

EMPIRE ABO UNIT CUM. GAS INJ.= 158494. MMCF
OUTSIDE SOURCES CUM. GAS INJ.= 4062. MMCF
TOTAL CUMULATIVE GAS INJECTED= 162556. MMCF

TOTAL WATER INJ. (ABO FORMATION)= 7468. BWPD 209092. BWPM

TOTAL CUM. WATER INJ.= 18177856. BW

TOTAL VOIDAGE AVAIL. FOR TRANS= 79267. RSVB/D

TOTAL REQUESTED VOIDAGE TRANS= -117. RSVB/D

TOTAL NET VOIDAGE AT NUA= 66713. RSVB/D

TOTAL REQUESTED NET VOIDAGE= 59128. RSVB/D

PROJECT AREA-1972 NET DAILY RESERVOIR VOIDAGE= 56912. RSVB/D

TOTAL REQUESTED OIL ALLOWABLE= 4760. BOPD

(1-SEE ATTACHMENT I (B) COL. (9)).
(2-SEE ATTACHMENT I (A) COL. (10)).
(X= PRODUCTION LIMITED TO TWICE NUA)
(Y=LIMITED CAPACITY, SEE ATTACHMENT I (C) COL.'S (9) + 9(C).)

EMPIRE ABO PRESSURE MAINTENANCE PROJECT

MONTHLY REPORT FOR FEB. ,1987

ATTACHMENT I: ALLOWABLE CALCULATIONS BASED ON NET RESERVOIR VOIDAGE.

A) WELLS ACCEPTING TRANSFERRED ALLOWABLES	TCT NO.	WELL NO.	(1) PROD STBOPD	(2) QO= PER WELL ALLOW FRACTION	(3) GI/GP (A6/A5)	(4) 1- GI/GP (1-(3))	(5) RP,FROM COL. A-5 GOR MCF/BO	(6) RPN= EQU. 1A (5)X(4) MCF/BO	(7) VR(HC) (EQU. 1) RSVB/D	(8) VR(W) (EQU. 2) RSVB/D	(9) VRT= (7)+(8) TOTAL RES VOID RSVB/D	(10) VR(HC) PER WELL AT NUA (EQU. 1) RSVB/D
	G	312	21.	0.636	0.364	2.995	1.090	55.	199.1	254.	371.
A) TOTALS:			21.					55.	199.1	254.	371.
B) WELLS TRANSFERING ALLOWABLES	B	45	9.	0.0	1.000	2.556	2.556	58.	-5.3	53.	
	B	46	85.	0.0	1.000	1.000	1.000	202.	3.7	206.	
	B	47	40.	0.0	1.000	2.000	2.000	200.	166.7	366.	
	C	34	22.	0.0	1.000	1.818	1.818	99.	-8.3	91.	
	C	35	71.	0.0	1.000	1.254	1.254	216.	-8.3	207.	
	C	36	21.	0.0	1.000	0.190	0.190	5.	-8.3	-3.	
	C	38	142.	0.0	1.000	2.000	2.000	709.	-8.3	700.	
	C	39	142.	0.0	1.000	2.000	2.000	709.	-8.3	700.	
	C	42	44.	0.0	1.000	3.909	3.909	439.	-7.3	432.	
	C	43	12.	0.0	1.000	5.583	5.583	172.	246.7	419.	
	C	44	5.	0.0	1.000	0.0	0.0	0.	365.7	366.	
	C	45	72.	0.0	1.000	0.194	0.194	19.	288.7	308.	
	C	46	30.	0.0	1.000	4.667	4.667	359.	297.7	657.	
	C	47	10.	0.0	1.000	1.100	1.100	26.	96.7	123.	
	D	33	1.	0.0	1.000	500.333	500.333	743.	-6.3	737.	
	D	35	142.	0.0	1.000	2.000	2.000	709.	-8.3	700.	
	D	37	142.	0.0	1.000	2.000	2.000	709.	-8.3	700.	
	D	40	8.	0.0	1.000	1.250	1.250	24.	31.7	56.	
	D	41	6.	0.0	1.000	3.500	3.500	53.	451.7	505.	
	D	42	17.	0.0	1.000	8.353	8.353	367.	59.7	427.	
	D	43	11.	0.0	1.000	1.455	1.455	39.	148.7	188.	
	E	26	2.	0.0	1.000	0.0	0.0	0.	-7.3	-7.	
	E	27	3.	0.0	1.000	0.0	0.0	0.	-8.3	-8.	
	E	28	15.	0.0	1.000	3.667	3.667	140.	-8.3	132.	
	E	30	19.	0.0	1.000	14.903	14.903	738.	-8.3	730.	
	E	31	22.	0.0	1.000	10.182	10.182	581.	-0.3	580.	
	E	32	8.	0.0	1.000	33.512	33.512	741.	-8.3	733.	
	E	33	6.	0.0	1.000	29.667	29.667	464.	-6.3	458.	
	E	34	74.	0.0	1.000	3.821	3.821	725.	-8.3	717.	
	E	341	2.	0.0	1.000	187.000	187.000	743.	-8.3	734.	
	E	35	4.	0.0	1.000	75.000	75.000	742.	-8.3	734.	

E 351	9.	0.0	1.000	33.400	33.400	741.	-7.3	734.
E 361	0.	0.0	1.000	0.0	0.0	1695.	-2.8	1692.
E 38	0.	0.0	1.000	0.0	0.0	13.	325.7	339.
E 381	2.	0.0	1.000	8.500	8.500	44.	155.7	200.
E 383	3.	0.0	1.000	7.333	7.333	57.	487.8	545.
E 39	3.	0.0	1.000	1.333	1.333	10.	173.7	183.
E 391	0.	0.0	1.000	0.0	0.0	0.	-8.3	-8.
E 392	2.	0.0	1.000	4.500	4.500	23.	221.7	245.
E 395	0.	0.0	1.000	0.0	0.0	5.	123.7	129.
E 40	1.	0.0	1.000	0.0	0.0	0.	308.7	309.
E 41	30.	0.0	1.000	0.700	0.700	48.	248.7	296.
F 22	3.	0.0	1.000	4.000	4.000	31.	-8.3	22.
F 25	142.	0.0	1.000	2.000	2.000	709.	-8.3	700.
F 26	35.	0.0	1.000	8.184	8.184	735.	-8.3	726.
F 27	142.	0.0	1.000	2.000	2.000	709.	-8.3	700.
F 28	127.	0.0	1.000	2.240	2.240	712.	-8.3	704.
F 29	10.	0.0	1.000	29.179	29.179	741.	-8.3	732.
F 30	70.	0.0	1.000	4.079	4.079	726.	-8.3	718.
F 31	142.	0.0	1.000	2.000	2.000	709.	-8.3	700.
F 321	1.	0.0	1.000	*258.000	*258.000	743.	-8.3	734.
F 322	0.	0.0	1.000	*651.000	*651.000	743.	-7.3	736.
F 33	16.	0.0	1.000	17.333	17.333	739.	-8.3	731.
F 333	1.	0.0	1.000	*512.000	*512.000	743.	-2.1	741.
F 334	2.	0.0	1.000	*147.500	*147.500	742.	-1.1	741.
F 34	2.	0.0	1.000	*120.000	*120.000	742.	-8.3	734.
F 341	1.	0.0	1.000	*226.500	*226.500	743.	-8.3	734.
F 35	1.	0.0	1.000	13.015	13.015	30.	0.7	31.
F 352	0.	0.0	1.000	0.0	0.0	4458.	-2.8	4455.
F 361	1.	0.0	1.000	*293.333	*293.333	743.	154.9	898.
F 372	1.	0.0	1.000	13.000	13.000	34.	166.9	201.
F 375	2.	0.0	1.000	4.500	4.500	23.	218.8	242.
F 38	0.	0.0	1.000	0.0	0.0	34.	378.7	413.
F 382	1.	0.0	1.000	22.000	22.000	57.	451.7	509.
F 383	1.	0.0	1.000	13.000	13.000	34.	309.7	343.
F 39	1.	0.0	1.000	8.000	8.000	21.	446.7	467.
F 391	26.	0.0	1.000	0.077	0.077	5.	87.7	93.
F 40	0.	0.0	1.000	0.0	0.0	3.	97.7	100.
G 19	142.	0.0	1.000	2.000	2.000	709.	-8.3	700.
G 20	73.	0.0	1.000	3.315	3.315	615.	-8.3	607.
G 21	50.	0.0	1.000	5.643	5.643	731.	-8.3	722.
G 22	142.	0.0	1.000	2.000	2.000	709.	-8.3	700.
G 23	37.	0.0	1.000	7.605	7.605	734.	-8.3	726.
G 24	142.	0.0	1.000	2.000	2.000	709.	-8.3	700.
G 28	168.	0.0	1.000	1.693	1.693	702.	-8.3	694.
G 31	0.	0.0	1.000	0.0	0.0	4180.	-2.3	4178.
G 33	1.	0.0	1.000	*556.000	*556.000	743.	-6.3	737.
G 34	1.	0.0	1.000	*315.000	*315.000	743.	49.7	792.
G 341	0.	0.0	1.000	0.0	0.0	4442.	-8.3	4434.
G 36	0.	0.0	1.000	*680.500	*680.500	743.	7.7	751.
G 38	0.	0.0	1.000	0.0	0.0	0.	178.7	179.
H 12	42.	0.0	1.000	6.524	6.524	707.	-8.3	698.
H 17	31.	0.0	1.000	9.185	9.185	735.	-8.3	727.
H 18	1.	0.0	1.000	*348.500	*348.500	743.	-8.3	734.
H 19	142.	0.0	1.000	2.000	2.000	709.	-8.3	700.
H 20	0.	0.0	1.000	********	********	743.	-8.3	735.
H 21	142.	0.0	1.000	2.000	2.000	709.	-8.3	700.
H 22	0.	0.0	1.000	0.0	0.0	1483.	-8.3	1475.
H 32	37.	0.0	1.000	7.577	7.577	734.	-8.3	726.
H 331	6.	0.0	1.000	2.333	2.333	35.	27.7	63.
H 34	1.	0.0	1.000	*425.666	*425.666	743.	-8.3	734.

I 10	142.	0.0	1.000	2.000	2.000	709.	-8.3	700.
I 11	1.	0.0	1.000	*404.200	*404.200	743.	-7.3	735.
I 13	1.	0.0	1.000	*518.500	*518.500	743.	-7.3	736.
I 17	2.	0.0	1.000	*168.143	*168.143	743.	-8.3	734.
I 18	142.	0.0	1.000	2.000	2.000	709.	-8.3	700.
I 23	21.	0.0	1.000	13.810	13.810	738.	-8.3	730.
I 251	2.	0.0	1.000	*152.750	*152.750	742.	-8.3	734.
I 29	56.	0.0	1.000	3.875	3.875	554.	54.7	609.
I 30	14.	0.0	1.000	1.286	1.286	44.	1.7	45.
J 8	3.	0.0	1.000	3.000	3.000	23.	-8.3	15.
J 9	26.	0.0	1.000	11.000	11.000	737.	-8.3	728.
J 10	48.	0.0	1.000	5.965	5.965	731.	-8.3	723.
J 11	85.	0.0	1.000	3.331	3.331	722.	-8.3	714.
J 12	142.	0.0	1.000	2.000	2.000	709.	-8.3	700.
J 13	27.	0.0	1.000	10.538	10.538	736.	-8.3	728.
J 17	26.	0.0	1.000	10.789	10.789	737.	-8.3	728.
J 18	1.	0.0	1.000	*517.000	*517.000	743.	-8.3	735.
J 191	6.	0.0	1.000	46.151	46.151	741.	-8.3	733.
J 20	0.	0.0	1.000	0.0	0.0	178.	-8.3	170.
J 23	8.	0.0	1.000	35.071	35.071	741.	-8.3	733.
J 27	1.	0.0	1.000	63.000	63.000	165.	119.7	284.
K 7	142.	0.0	1.000	2.000	2.000	709.	-8.3	700.
K 8	26.	0.0	1.000	11.018	11.018	737.	-8.3	728.
K 11	2.	0.0	1.000	*150.250	*150.250	742.	-8.3	734.
K 191	30.	0.0	1.000	9.372	9.372	736.	-2.8	733.
K 194	21.	0.0	1.000	13.548	13.548	738.	-8.3	730.
K 24	201.	0.0	1.000	0.284	0.284	101.	5.7	106.
L 5	0.	0.0	1.000	0.0	0.0	1863.	-7.3	1855.
L 6	0.	0.0	1.000	0.0	0.0	1368.	-8.3	1360.
L 7	29.	0.0	1.000	9.800	9.800	736.	-8.3	728.
L 8	66.	0.0	1.000	3.470	3.470	583.	-8.3	575.
L 11	41.	0.0	1.000	6.892	6.892	733.	-8.3	725.
L 141	5.	0.0	1.000	57.600	57.600	742.	-2.8	739.
L 151	25.	0.0	1.000	11.392	11.392	737.	-2.8	734.
L 153	4.	0.0	1.000	68.864	68.864	742.	-8.3	734.
L 154	2.	0.0	1.000	*139.636	*139.636	742.	-8.3	734.
L 18	1.	0.0	1.000	*219.400	*219.400	743.	11.7	754.
L 19	51.	0.0	1.000	5.566	5.566	731.	-8.3	722.
M 6	142.	0.0	1.000	2.000	2.000	709.	-8.3	700.
M 901	0.	0.0	1.000	*715.000	*715.000	743.	-8.3	735.
M 10	8.	0.0	1.000	35.556	35.556	741.	-8.3	733.
M 13	4.	0.0	1.000	69.667	69.667	742.	139.7	882.
M 14	22.	0.0	1.000	13.057	13.057	738.	-8.3	729.
N 5	24.	0.0	1.000	1.875	1.875	112.	-7.3	105.
N 6	16.	0.0	1.000	11.313	11.313	470.	-4.3	465.
N 8	24.	0.0	1.000	11.776	11.776	737.	-8.3	729.
O 4	11.	0.0	1.000	8.364	8.364	238.	-7.3	231.
O 5	17.	0.0	1.000	4.294	4.294	187.	-5.3	182.
O 6	17.	0.0	1.000	16.378	16.378	739.	1.7	740.
O 9	145.	0.0	1.000	0.862	0.862	292.	-2.3	290.
P 4	15.	0.0	1.000	4.267	4.267	164.	-7.3	156.
P 5	15.	0.0	1.000	9.067	9.067	352.	-8.3	344.
P 6	18.	0.0	1.000	6.444	6.444	299.	-6.3	293.
P 701	24.	0.0	1.000	11.969	11.969	737.	-8.3	729.
Q 5	8.	0.0	1.000	5.750	5.750	118.	-7.3	111.
Q 6	18.	0.0	1.000	4.444	4.444	205.	-6.3	199.
Q 7	11.	0.0	1.000	14.545	14.545	416.	-4.3	412.
Q 8	41.	0.0	1.000	0.976	0.976	95.	-5.3	89.
Q 9	27.	0.0	1.000	0.481	0.481	27.	41.7	69.
R 4	5.	0.0	1.000	12.400	12.400	161.	-3.3	158.

R	5	6.	0.0	1.000	8.667	8.667	135.	-5.3	129.			
R	6	6.	0.0	1.000	5.667	5.667	87.	-5.3	82.			
R	7	32.	0.0	1.000	8.931	8.931	735.	-8.3	727.			
R	8	48.	0.0	1.000	1.458	1.458	172.	23.7	195.			
S	2	7.	0.0	1.000	5.000	5.000	90.	-3.3	87.			
S	3	12.	0.0	1.000	2.583	2.583	78.	2.7	81.			
S	5	8.	0.0	1.000	5.375	5.375	111.	-4.3	106.			
S	6	15.	0.0	1.000	1.533	1.533	57.	-1.3	55.			
S	7	46.	0.0	1.000	0.674	0.674	70.	129.7	200.			
T	7	109.	0.0	1.000	2.614	2.614	717.	-8.3	708.			

B) TOTALS: 5422. 89609. 6468.5 96077.

C) CAPACITY WELLS, ALLOWABLE CALCULATIONS

										(9A) VRT FOR TA MAX GOR WELL IB(9) RSVB/D	(9B) RATIO VRT(9A)/VRT(9) (Z) FRACTION	(9C) REQ. CAP. ALLOW=COL.(2) OR COL(2)X(9B) BOPD
C	37	2.	0.636	0.364	81.791	29.778	155.	-5.3	150.	700.	4.67	2.
C	40	92.	0.636	0.364	1.084	0.395	73.	29.7	102.	700.	6.83	92.
C	41	90.	0.636	0.364	1.252	0.456	86.	208.7	294.	700.	2.38	90.
D	34	10.	0.636	0.364	25.966	9.454	245.	5.6	251.	700.	2.80	10.
D	36	60.	0.636	0.364	0.469	0.171	12.	-4.1	8.	704.	86.49	60.
D	361	15.	0.636	0.364	1.954	0.711	24.	19.8	44.	704.	15.96	15.
D	38	0.	0.636	0.364	0.0	0.0	0.	-8.3	-8.	700.	84.37	0.
D	39	25.	0.636	0.364	13.589	4.947	318.	135.7	453.	700.	1.55	25.
D	44	34.	0.636	0.364	3.148	1.146	94.	617.7	711.	700.	0.98	34.
E	36	30.	0.636	0.364	9.827	3.578	274.	137.9	411.	706.	1.72	30.
E	362	120.	0.636	0.364	0.311	0.113	7.	157.2	164.	706.	4.31	120.
E	363	35.	0.636	0.364	2.379	0.866	71.	251.7	323.	700.	2.17	35.
E	37	0.	0.636	0.364	6.500	2.366	0.	-1.7	-2.	707.	425.87	0.
E	371	0.	0.636	0.364	12.849	4.678	0.	0.8	1.	707.	841.60	0.
E	372	0.	0.636	0.364	5.500	2.002	0.	-1.7	-2.	707.	425.87	0.
E	373	85.	0.636	0.364	0.973	0.354	58.	208.3	267.	707.	2.65	85.
E	374	50.	0.636	0.364	0.745	0.271	23.	438.1	461.	707.	1.53	50.
E	382	0.	0.636	0.364	0.0	0.0	0.	-4.1	-4.	704.	169.75	0.
E	384	0.	0.636	0.364	0.0	0.0	0.	-8.3	-8.	700.	84.37	0.
E	393	0.	0.636	0.364	0.0	0.0	0.	-8.3	-8.	700.	84.37	0.
F	32	2.	0.636	0.364	71.319	25.966	135.	-8.3	127.	700.	5.51	2.
F	331	93.	0.636	0.364	0.349	0.127	8.	10.9	19.	707.	36.58	93.
F	332	6.	0.636	0.364	54.017	19.666	307.	-1.8	305.	707.	2.31	6.
F	335	10.	0.636	0.364	24.731	9.004	233.	-4.1	229.	704.	3.08	10.
F	336	2.	0.636	0.364	132.900	48.386	253.	-4.1	249.	704.	2.83	2.
F	342	5.	0.636	0.364	107.387	39.097	510.	-1.9	508.	704.	1.39	5.
F	343	5.	0.636	0.364	68.850	25.067	327.	-4.1	323.	704.	2.18	5.
F	351	5.	0.636	0.364	78.736	28.666	374.	44.8	419.	706.	1.69	5.
F	353	60.	0.636	0.364	0.431	0.157	10.	246.2	256.	706.	2.75	60.
F	354	100.	0.636	0.364	23.159	8.432	2182.	-6.5	2175.	700.	0.32	100.
F	36	10.	0.636	0.364	20.477	7.455	193.	3.0	196.	707.	3.61	10.
F	362	66.	0.636	0.364	0.538	0.196	18.	265.9	284.	707.	2.49	66.
F	363	30.	0.636	0.364	1.758	0.640	43.	257.9	301.	707.	2.35	30.
F	364	40.	0.636	0.364	0.613	0.223	14.	491.7	505.	700.	1.39	40.
F	37	0.	0.636	0.364	2.714	0.988	0.	-2.1	-2.	707.	340.50	0.
F	371	70.	0.636	0.364	1.947	0.709	113.	497.9	611.	707.	1.16	70.
F	373	30.	0.636	0.364	1.618	0.589	39.	564.8	604.	707.	1.17	30.
F	374	50.	0.636	0.364	0.439	0.160	9.	515.8	525.	704.	1.34	50.

F 376	12.	0.636	0.364	4.000	1.456	43.	-8.3	35.	700.	20.29*	12.	
F 381	0.	0.636	0.364	0.0	0.0	0.	-8.3	-8.	700.	84.37*	0.	
G 25	12.	0.636	0.364	21.995	8.008	248.	-8.3	240.	700.	2.92*	12.	
G 26	2.	0.636	0.364	27.132	9.878	51.	-8.3	43.	700.	16.32*	2.	
G 27	2.	0.636	0.364	83.928	30.556	159.	-8.3	151.	700.	4.64*	2.	
G 29	2.	0.636	0.364	24.364	8.870	46.	-4.1	42.	704.	16.86*	2.	
G 291	6.	0.636	0.364	46.449	16.911	264.	-4.1	260.	704.	2.71*	6.	
G 30	20.	0.636	0.364	29.165	10.618	551.	-3.5	547.	704.	1.29*	20.	
G 301	40.	0.636	0.364	6.056	2.205	221.	-4.1	217.	704.	3.25*	40.	
G 311	14.	0.636	0.364	30.319	11.038	401.	-1.7	399.	707.	1.77*	14.	
G 313	37.	0.636	0.364	4.261	1.551	141.	331.6	473.	707.	1.50*	37.	
G 314	25.	0.636	0.364	49.147	17.893	1164.	159.3	1324.	707.	0.53*	25.	
G 315	20.	0.636	0.364	0.781	0.284	10.	-1.7	8.	707.	84.31*	20.	
G 32	40.	0.636	0.364	6.212	2.262	227.	2.3	229.	707.	3.08*	40.	
G 321	0.	0.636	0.364	192.722	70.166	0.	-1.7	-2.	707.	425.87*	0.	
G 322	28.	0.636	0.364	19.776	7.200	521.	-1.7	519.	707.	1.36*	28.	
G 323	3.	0.636	0.364	24.567	8.944	69.	16.1	86.	707.	8.26*	3.	
G 324	7.	0.636	0.364	21.302	7.756	140.	-1.1	139.	707.	5.08*	7.	
G 331	23.	0.636	0.364	1.593	0.580	29.	3.9	33.	707.	21.25*	23.	
G 332	15.	0.636	0.364	34.786	12.665	493.	-0.7	493.	707.	1.43*	15.	
G 333	3.	0.636	0.364	56.222	20.469	160.	-2.1	158.	707.	4.48*	3.	
G 334	2.	0.636	0.364	56.207	20.464	107.	1.6	108.	707.	6.53*	2.	
G 342	19.	0.636	0.364	35.094	12.777	630.	37.8	668.	704.	1.05*	19.	
G 343	2.	0.636	0.364	75.056	27.326	142.	-2.4	140.	704.	5.03*	2.	
G 35	4.	0.636	0.364	51.656	18.807	196.	60.8	257.	707.	2.75*	4.	
G 351	10.	0.636	0.364	77.176	28.098	733.	62.5	795.	707.	0.89*	10.	
G 352	2.	0.636	0.364	88.155	32.095	167.	23.2	191.	707.	3.71*	2.	
G 353	10.	0.636	0.364	3.130	1.140	27.	71.9	99.	707.	7.11*	10.	
G 361	20.	0.636	0.364	1.433	0.522	22.	318.7	341.	700.	2.05*	20.	
G 37	0.	0.636	0.364	1.667	0.607	0.	-8.3	-8.	700.	84.37*	0.	
H 23	16.	0.636	0.364	22.325	8.128	336.	-7.7	329.	700.	2.13*	16.	
H 24	20.	0.636	0.364	11.373	4.141	212.	-8.3	203.	700.	3.44*	20.	
H 25	17.	0.636	0.364	33.337	12.137	536.	-8.3	527.	700.	1.33*	17.	
H 26	15.	0.636	0.364	2.745	1.000	36.	-4.1	31.	704.	22.40*	15.	
H 261	20.	0.636	0.364	5.314	1.935	96.	-4.1	92.	704.	7.64*	20.	
H 27	2.	0.636	0.364	39.049	14.217	74.	-2.8	71.	706.	9.92*	2.	
H 271	2.	0.636	0.364	62.246	22.662	118.	-2.8	115.	706.	6.12*	2.	
H 272	2.	0.636	0.364	78.061	28.420	148.	-2.8	145.	706.	4.85*	2.	
H 28	10.	0.636	0.364	24.245	8.827	228.	-3.9	225.	704.	3.14*	10.	
H 281	12.	0.636	0.364	3.530	1.285	37.	-2.1	35.	704.	19.96*	12.	
H 29	28.	0.636	0.364	10.998	4.004	287.	6.3	293.	707.	2.41*	28.	
H 291	10.	0.636	0.364	8.070	2.938	74.	-1.4	73.	707.	9.68*	10.	
H 292	2.	0.636	0.364	24.556	8.940	46.	27.6	74.	707.	9.57*	2.	
H 293	5.	0.636	0.364	29.276	10.659	138.	-1.4	137.	707.	5.17*	5.	
H 294	10.	0.636	0.364	15.916	5.795	149.	-1.4	148.	707.	4.79*	10.	
H 295	20.	0.636	0.364	9.079	3.306	168.	-1.2	167.	707.	4.24*	20.	
H 30	0.	0.636	0.364	40.750	14.836	0.	-2.1	-2.	707.	340.50*	0.	
H 301	10.	0.636	0.364	24.545	8.936	231.	14.9	246.	707.	2.87*	10.	
H 302	10.	0.636	0.364	41.357	15.057	391.	-2.1	389.	707.	1.81*	10.	
H 303	0.	0.636	0.364	0.500	0.182	0.	-2.1	-2.	707.	340.50*	0.	
H 31	0.	0.636	0.364	0.500	0.182	0.	-2.8	-3.	706.	255.12*	0.	
H 311	5.	0.636	0.364	11.786	4.291	55.	83.2	138.	706.	5.11*	5.	
H 312	0.	0.636	0.364	47.000	17.112	0.	-2.8	-3.	706.	255.12*	0.	
H 321	16.	0.636	0.364	9.477	3.450	141.	75.8	216.	704.	3.26*	16.	
H 322	21.	0.636	0.364	2.136	0.778	38.	75.6	113.	704.	6.22*	21.	
H 33	18.	0.636	0.364	32.559	11.854	554.	249.7	804.	700.	0.87*	18.	
H 341	2.	0.636	0.364	59.721	21.743	113.	-8.3	105.	700.	6.67*	2.	
H 35	3.	0.636	0.364	4.085	1.487	11.	68.7	80.	700.	8.79*	3.	
I 12	9.	0.636	0.364	32.532	11.844	277.	-8.3	268.	700.	2.61*	9.	
I 16	9.	0.636	0.364	22.853	8.320	194.	-8.1	186.	700.	3.77*	9.	

I 19	5.	0.636	0.364	36.385	13.247	172.	-8.3	164.	700.	4.28*	5.	
I 20	55.	0.636	0.364	16.577	6.035	855.	-8.3	847.	700.	0.83*	55.	
I 21	23.	0.636	0.364	3.010	1.096	60.	-8.3	52.	700.	13.45*	23.	
I 22	6.	0.636	0.364	12.449	4.532	70.	-7.3	62.	700.	11.22*	6.	
I 231	16.	0.636	0.364	16.026	5.835	240.	-7.8	233.	700.	3.01*	16.	
I 24	12.	0.636	0.364	44.889	16.343	510.	-8.3	502.	700.	1.40*	12.	
I 25	8.	0.636	0.364	52.233	19.017	396.	-8.3	388.	700.	1.81*	8.	
I 26	6.	0.636	0.364	29.064	10.582	165.	-4.1	160.	704.	4.39*	6.	
I 261	11.	0.636	0.364	25.669	9.345	266.	-4.1	262.	704.	2.69*	11.	
I 27	15.	0.636	0.364	26.416	9.617	374.	-2.1	372.	707.	1.90*	15.	
I 271	5.	0.636	0.364	72.928	26.551	346.	-2.1	344.	707.	2.05*	5.	
I 272	15.	0.636	0.364	0.0	0.0	-4.	-2.1	-6.	707.	123.90*	15.	
I 273	15.	0.636	0.364	11.634	4.236	163.	4.9	168.	707.	4.22*	15.	
I 28	30.	0.636	0.364	17.891	6.514	504.	-2.1	502.	707.	1.41*	30.	
I 281	15.	0.636	0.364	1.811	0.659	22.	7.9	30.	707.	23.42*	15.	
I 282	20.	0.636	0.364	10.790	3.928	201.	12.0	213.	707.	3.32*	20.	
I 283	12.	0.636	0.364	8.476	3.086	94.	2.9	97.	707.	7.29*	12.	
I 291	40.	0.636	0.364	1.389	0.506	43.	15.9	59.	704.	11.92*	40.	
I 292	8.	0.636	0.364	16.373	5.961	123.	12.9	136.	704.	5.19*	8.	
J 14	10.	0.636	0.364	18.990	6.914	178.	-8.3	170.	700.	4.12*	10.	
J 15	13.	0.636	0.364	30.898	11.249	379.	-7.8	372.	700.	1.88*	13.	
J 19	30.	0.636	0.364	17.367	6.323	489.	-8.3	481.	700.	1.46*	30.	
J 201	24.	0.636	0.364	33.938	12.356	770.	-2.8	767.	706.	0.92*	24.	
J 202	19.	0.636	0.364	2.087	0.760	33.	-1.8	31.	706.	22.48*	19.	
J 203	15.	0.636	0.364	24.624	8.965	348.	-2.8	345.	706.	2.04*	15.	
J 21	9.	0.636	0.364	34.007	12.381	289.	-2.1	287.	707.	2.46*	9.	
J 211	1.	0.636	0.364	31.435	11.445	30.	-2.1	28.	707.	25.58*	1.	
J 212	16.	0.636	0.364	29.902	10.887	452.	-0.8	451.	707.	1.57*	16.	
J 213	13.	0.636	0.364	3.331	1.213	38.	0.9	39.	707.	18.10*	13.	
J 22	1.	0.636	0.364	46.152	16.803	44.	-2.8	41.	706.	17.24*	1.	
J 221	7.	0.636	0.364	51.609	18.789	342.	-2.7	340.	706.	2.08*	7.	
J 222	2.	0.636	0.364	3.807	1.386	7.	-1.8	5.	706.	141.13*	2.	
J 231	15.	0.636	0.364	44.640	16.252	634.	-1.7	632.	707.	1.12*	15.	
J 232	47.	0.636	0.364	37.337	13.593	1660.	-1.7	1658.	707.	0.43*	47.	
J 233	10.	0.636	0.364	63.804	23.230	605.	-1.7	604.	707.	1.17*	10.	
J 234	1.	0.636	0.364	55.937	20.366	53.	-1.7	51.	707.	13.76*	1.	
J 235	3.	0.636	0.364	135.474	49.323	386.	-1.7	385.	707.	1.84*	3.	
J 24	38.	0.636	0.364	16.289	5.931	580.	-4.1	576.	704.	1.22*	38.	
J 241	26.	0.636	0.364	0.982	0.358	18.	2.9	21.	704.	33.73*	26.	
J 26	117.	0.636	0.364	8.535	3.107	923.	-4.3	918.	700.	0.76*	117.	
J 28	7.	0.636	0.364	4.811	1.752	30.	137.7	168.	700.	4.17*	7.	
K 9	25.	0.636	0.364	15.741	5.731	369.	-8.3	360.	700.	1.94*	25.	
K 10	21.	0.636	0.364	15.808	5.755	311.	-8.3	303.	700.	2.31*	21.	
K 12	7.	0.636	0.364	26.054	9.486	172.	-7.8	164.	700.	4.26*	7.	
K 13	3.	0.636	0.364	112.909	41.108	322.	-3.9	318.	704.	2.22*	3.	
K 131	5.	0.636	0.364	24.773	9.019	117.	-4.1	113.	704.	6.26*	5.	
K 14	11.	0.636	0.364	95.611	34.810	999.	-1.8	997.	707.	0.71*	11.	
K 141	24.	0.636	0.364	16.956	6.173	382.	3.9	386.	707.	1.83*	24.	
K 142	51.	0.636	0.364	10.678	3.888	506.	-2.1	504.	707.	1.40*	51.	
K 143	64.	0.636	0.364	19.438	7.077	1169.	17.9	1187.	707.	0.60*	64.	
K 15	26.	0.636	0.364	20.888	7.605	511.	-8.3	503.	700.	1.39*	26.	
K 16	12.	0.636	0.364	3.201	1.165	34.	20.8	55.	704.	12.92*	12.	
K 161	48.	0.636	0.364	1.498	0.545	57.	-2.1	55.	704.	12.88*	48.	
K 17	55.	0.636	0.364	16.418	5.977	847.	-8.3	838.	700.	0.84*	55.	
K 18	52.	0.636	0.364	14.016	5.103	682.	-0.4	681.	707.	1.04*	52.	
K 181	20.	0.636	0.364	13.031	4.744	243.	-1.7	242.	707.	2.92*	20.	
K 182	24.	0.636	0.364	7.147	2.602	158.	-1.7	156.	707.	4.53*	24.	
K 183	62.	0.636	0.364	1.983	0.722	102.	3.3	105.	707.	6.70*	62.	
K 184	82.	0.636	0.364	10.296	3.748	784.	-1.7	783.	707.	0.90*	82.	
K 19	30.	0.636	0.364	20.218	7.361	570.	-2.8	568.	706.	1.24*	30.	

K 192	37.	0.636	0.364	26.931	9.805	940.	18.3	958.	706.	0.74	37.		
K 193	13.	0.636	0.364	23.413	8.524	287.	-8.3	278.	700.	2.52	13.		
K 20	23.	0.636	0.364	12.209	4.445	262.	2.7	265.	700.	2.65	23.		
K 21	18.	0.636	0.364	25.779	9.385	438.	-4.1	433.	704.	1.63	18.		
K 211	8.	0.636	0.364	20.849	7.591	157.	-4.1	153.	704.	4.61	8.		
K 22	14.	0.636	0.364	25.215	9.180	333.	-8.3	325.	700.	2.16	14.		
K 23	23.	0.636	0.364	14.028	5.107	302.	-4.1	298.	704.	2.37	23.		
K 231	26.	0.636	0.364	23.361	8.505	572.	-4.1	568.	704.	1.24	26.		
L 9	9.	0.636	0.364	13.004	4.735	109.	-8.3	101.	700.	6.93	9.		
L 10	33.	0.636	0.364	14.591	5.312	451.	-8.3	442.	700.	1.58	33.		
L 111	36.	0.636	0.364	13.886	5.056	467.	-8.3	459.	700.	1.53	36.		
L 12	37.	0.636	0.364	11.625	4.232	401.	-2.1	399.	707.	1.77	37.		
L 121	33.	0.636	0.364	7.255	2.641	220.	-1.1	219.	707.	3.23	33.		
L 122	4.	0.636	0.364	33.504	12.198	127.	-2.0	125.	707.	5.67	4.		
L 123	22.	0.636	0.364	3.761	1.369	73.	-0.7	73.	707.	9.70	22.		
L 13	1.	0.636	0.364	394.708	143.704	376.	0.3	376.	707.	1.88	1.		
L 131	16.	0.636	0.364	21.312	7.759	321.	-0.8	320.	707.	2.21	16.		
L 132	27.	0.636	0.364	7.049	2.566	175.	0.3	175.	707.	4.04	27.		
L 133	32.	0.636	0.364	12.087	4.400	361.	-1.1	360.	707.	1.97	32.		
L 134	16.	0.636	0.364	27.031	9.841	408.	0.3	408.	707.	1.73	16.		
L 14	32.	0.636	0.364	13.246	4.823	396.	4.2	400.	706.	1.76	32.		
L 142	9.	0.636	0.364	19.504	7.101	165.	3.4	168.	706.	4.19	9.		
L 143	40.	0.636	0.364	46.910	17.079	1777.	-8.3	1769.	700.	0.40	40.		
L 15	19.	0.636	0.364	21.986	8.005	393.	1.2	394.	706.	1.79	19.		
L 152	15.	0.636	0.364	24.245	8.827	343.	-1.5	341.	706.	2.07	15.		
L 155	10.	0.636	0.364	28.874	10.512	273.	-3.8	269.	704.	2.62	10.		
L 156	16.	0.636	0.364	12.722	4.632	190.	1.6	192.	704.	3.68	16.		
L 16	64.	0.636	0.364	14.213	5.174	851.	11.4	862.	700.	0.81	64.		
L 17	32.	0.636	0.364	10.152	3.696	302.	-2.4	299.	704.	2.35	32.		
L 171	35.	0.636	0.364	5.876	2.139	187.	5.9	193.	704.	3.64	35.		
L 20	32.	0.636	0.364	0.584	0.213	10.	10.7	21.	700.	33.75	32.		
L 22	18.	0.636	0.364	26.235	9.551	445.	-2.9	443.	700.	1.58	18.		
M 7	22.	0.636	0.364	39.909	14.530	831.	-8.3	823.	700.	0.85	22.		
M 8	15.	0.636	0.364	37.390	13.613	531.	-8.3	522.	700.	1.34	15.		
M 9	45.	0.636	0.364	10.878	3.960	455.	-8.3	447.	700.	1.57	45.		
M 101	11.	0.636	0.364	30.878	11.242	321.	-8.3	313.	700.	2.24	11.		
M 11	51.	0.636	0.364	4.119	1.500	188.	-7.3	180.	700.	3.88	51.		
M 12	5.	0.636	0.364	32.172	11.713	152.	-2.1	150.	706.	4.71	5.		
M 121	37.	0.636	0.364	17.954	6.537	624.	-2.0	622.	706.	1.14	37.		
M 123	4.	0.636	0.364	22.336	8.132	84.	-2.8	81.	706.	8.68	4.		
M 132	9.	0.636	0.364	15.652	5.699	132.	25.8	158.	704.	4.46	9.		
M 133	1.	0.636	0.364	41.235	15.013	39.	-2.5	37.	704.	19.29	1.		
M 141	7.	0.636	0.364	24.599	8.956	162.	0.4	163.	700.	4.30	7.		
M 15	5.	0.636	0.364	10.967	3.993	51.	55.9	107.	707.	6.61	5.		
M 151	20.	0.636	0.364	30.890	11.246	584.	4.9	588.	707.	1.20	20.		
M 152	14.	0.636	0.364	35.273	12.842	467.	-0.8	466.	707.	1.52	14.		
M 153	5.	0.636	0.364	40.046	14.580	189.	-1.8	188.	707.	3.76	5.		
M 16	18.	0.636	0.364	2.239	0.815	34.	23.7	58.	700.	12.13	18.		
N 7	22.	0.636	0.364	14.211	5.174	292.	-8.3	284.	700.	2.46	22.		
N 9	25.	0.636	0.364	0.582	0.212	8.	-7.3	1.	700.	1364.23	25.		
N 901	17.	0.636	0.364	2.729	0.994	40.	-6.3	34.	700.	20.74	17.		
N 10	50.	0.636	0.364	16.574	6.034	777.	-7.8	769.	700.	0.91	50.		
N 11	21.	0.636	0.364	19.659	7.157	388.	18.7	407.	700.	1.72	21.		
N 12	46.	0.636	0.364	21.982	8.003	952.	19.7	972.	700.	0.72	46.		
N 13	1.	0.636	0.364	57.186	20.820	54.	101.7	156.	700.	4.49	1.		
O 7	28.	0.636	0.364	9.411	3.426	244.	-8.3	236.	700.	2.97	28.		
O 8	10.	0.636	0.364	23.731	8.640	224.	-8.3	215.	700.	3.25	10.		
P 8	16.	0.636	0.364	1.228	0.447	15.	2.7	18.	700.	39.91	16.		
P 9	215.	0.636	0.364	2.484	0.904	457.	114.7	571.	700.	1.23	215.		

(Z NOTE: CAPACITY WELLS ALLOWED TO PRODUCE AT ANY RATE AS LONG AS VRT(9A)/VRT(9) > OR = 1.0
WHEN VRT(9A)/VRT(9) IS LESS THAN 1.0, DAILY OIL
ALLOWABLE OF CAPACITY WELLS MUST BE NO GREATER
THAN (2) X VRT(9A)/VRT(9) OR (2) X (9B)).

FLUID FACTORS: (BASED ON PREVIOUS RESERVOIR PRESSURE SURVEY, 942. PSI, DEC , 1986):
****
BO, OIL FORMATION VOLUME FACTOR, RES. BBLS/STBO = 1.333
BG, GAS FORMATION VOLUME FACTOR, RES. BBLS/MCF =2.616
RS, SOLUTION GAS-OIL RATIO, MCF/STBO = 0.602
BW, WATER FORMATION VOLUME FACTOR, RES. BBLS/STBBL = 1.000

ESTABLISHED CONSTANTS: QWE, NATURAL WATER ENCROACHMENT, STBW/DAY, BASED ON NUMERIC MODEL STUDIES = 1950. BWPD
****
QO, TOP PER-WELL N.U.A., STBOPD= 142.

BASIC VOIDAGE EQUATIONS: 1) VR(HC)=QO X (BO + (RPN- RS) X BG), NET HYDROCARBON RESV. VOIDAGE, RSVB/D
****
1A) RPN= RP X (1.0 - GI/GP), MCF/STBO
2) VRW= (QWP - QWE(PER WELL)) X BW, NET RESV. SPACE VOIDED BY WATER, RSVB/D
3) VRT= VR(HC) + VRW, TOTAL NET RESV. SPACE VOIDED ON DAILY BASIS, RSVB/D

ADDITIONAL ALLOWABLE IN EXCESS OF 33272. BOPD

(BASED ON R=(GI/GA)X10.0, RATIO)

ADDITIONAL ALLOWABLE = 41.05 X (2RXR +R),BOPD

R= (GI/GA)X10.0 = 10.000

GAS BANK CREDITS USED = 0. MCF

ADDITIONAL ALLOWABLE = 7799. BOPD

EMPIRE ABO PRESSURE MAINTENANCE PROJECT

ATLANTIC RICHFIELD COMPANY - OPERATOR

ATTACHMENT II: ALLOWABLE SUMMARY - SUPPLEMENTAL FORM

TOTAL REQUESTED OIL ALLOWABLE FOR JAN.-APR.,1987 IS 4760. BOPD

EMPIRE ABO UNIT	TCT NO.	WELL NO.	UN	S	T	R	WELL STATUS	DAILY ALLOW BOPD	MONTHLY ALLOW BOPM
EMPIRE ABO UNIT	B	40	H	26	17	28	S.I.		
EMPIRE ABO UNIT	B	45	E	30	17	29	S.I.		
EMPIRE ABO UNIT	B	46	F	30	17	29	S.I.		
EMPIRE ABO UNIT	B	47	G	30	17	29	S.I.		
EMPIRE ABO UNIT	B	48	H	30	17	29	INJ.		
EMPIRE ABO UNIT	B	49	E	29	17	29	INJ.		
EMPIRE ABO UNIT	C	34	K	27	17	28	S.I.		
EMPIRE ABO UNIT	C	35	J	27	17	28	S.I.		
EMPIRE ABO UNIT	C	36	I	27	17	28	S.I.		
EMPIRE ABO UNIT	C	37	L	26	17	28	F	2.0	60.0
EMPIRE ABO UNIT	C	38	K	26	17	28	INJ.		
EMPIRE ABO UNIT	C	39	J	26	17	28	INJ.		
EMPIRE ABO UNIT	C	40	I	26	17	28	F	92.0	2760.0
EMPIRE ABO UNIT	C	41	L	25	17	28	P	90.0	2700.0
EMPIRE ABO UNIT	C	42	K	25	17	28	S.I.		
EMPIRE ABO UNIT	C	43	J	25	17	28	S.I.		
EMPIRE ABO UNIT	C	44	I	25	17	28	S.I.		
EMPIRE ABO UNIT	C	45	L	30	17	29	S.I.		
EMPIRE ABO UNIT	C	46	K	30	17	29	S.I.		
EMPIRE ABO UNIT	C	47	J	30	17	29	S.I.		
EMPIRE ABO UNIT	C	49	L	29	17	29	INJ.		
EMPIRE ABO UNIT	C	50	K	29	17	29	INJ.		
EMPIRE ABO UNIT	D	33	M	27	17	28	S.I.		
EMPIRE ABO UNIT	D	34	N	27	17	28	F	10.0	300.0
EMPIRE ABO UNIT	D	35	O	27	17	28	INJ.		
EMPIRE ABO UNIT	D	36	P	27	17	28	P	60.0	1800.0
EMPIRE ABO UNIT	D	361	P	27	17	28	P	15.0	450.0
EMPIRE ABO UNIT	D	37	M	26	17	28	INJ.		
EMPIRE ABO UNIT	D	38	N	26	17	28	S	0.0	0.0
EMPIRE ABO UNIT	D	39	O	26	17	28	P	25.0	750.0
EMPIRE ABO UNIT	D	40	P	26	17	28	S.I.		
EMPIRE ABO UNIT	D	41	M	25	17	28	S.I.		
EMPIRE ABO UNIT	D	42	N	25	17	28	S.I.		
EMPIRE ABO UNIT	D	43	O	25	17	28	S.I.		
EMPIRE ABO UNIT	D	44	P	25	17	28	P	34.0	1020.0
EMPIRE ABO UNIT	E	26	C	32	17	28	S.I.		
EMPIRE ABO UNIT	E	27	B	32	17	28	S.I.		
EMPIRE ABO UNIT	E	28	A	32	17	28	S.I.		
EMPIRE ABO UNIT	E	30	C	33	17	28	S.I.		
EMPIRE ABO UNIT	E	31	B	33	17	28	S.I.		
EMPIRE ABO UNIT	E	32	A	33	17	28	S.I.		
EMPIRE ABO UNIT	E	33	D	34	17	28	S.I.		
EMPIRE ABO UNIT	E	34	C	34	17	28	S.I.		

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EMPIRE	ABO	UNIT	F	374	E	35	17	28	P	50.0	1500.0
EMPIRE	ABO	UNIT	F	375	E	35	17	28	S.I.		
EMPIRE	ABO	UNIT	F	376	E	35	17	28	P	12.0	360.0
EMPIRE	ABO	UNIT	F	38	F	35	17	28	S.I.		
EMPIRE	ABO	UNIT	F	381	F	35	17	28	S	0.0	0.0
EMPIRE	ABO	UNIT	F	382	F	35	17	28	S.I.		
EMPIRE	ABO	UNIT	F	383	F	35	17	28	S.I.		
EMPIRE	ABO	UNIT	F	39	G	35	17	28	S.I.		
EMPIRE	ABO	UNIT	F	391	G	35	17	28	S.I.		
EMPIRE	ABO	UNIT	F	40	H	35	17	28	S.I.		
EMPIRE	ABO	UNIT	G	17	L	36	17	27	S.I.		
EMPIRE	ABO	UNIT	G	18	K	36	17	27	S.I.		
EMPIRE	ABO	UNIT	G	19	J	36	17	27	INJ.		
EMPIRE	ABO	UNIT	G	20	I	36	17	27	S.I.		
EMPIRE	ABO	UNIT	G	21	L	31	17	28	S.I.		
EMPIRE	ABO	UNIT	G	22	K	31	17	28	INJ.		
EMPIRE	ABO	UNIT	G	23	J	31	17	28	S.I.		
EMPIRE	ABO	UNIT	G	24	I	31	17	28	INJ.		
EMPIRE	ABO	UNIT	G	25	L	32	17	28	F	12.0	360.0
EMPIRE	ABO	UNIT	G	26	K	32	17	28	F	2.0	60.0
EMPIRE	ABO	UNIT	G	27	J	32	17	28	F	2.0	60.0
EMPIRE	ABO	UNIT	G	28	I	32	17	28	S.I.		
EMPIRE	ABO	UNIT	G	29	L	33	17	28	F	2.0	60.0
EMPIRE	ABO	UNIT	G	291	L	33	17	28	F	6.0	180.0
EMPIRE	ABO	UNIT	G	30	K	33	17	28	F	20.0	600.0
EMPIRE	ABO	UNIT	G	301	K	33	17	28	P	40.0	1200.0
EMPIRE	ABO	UNIT	G	31	J	33	17	28	S.I.		
EMPIRE	ABO	UNIT	G	311	J	33	17	28	F	14.0	420.0
EMPIRE	ABO	UNIT	G	312	J	33	17	28	P	21.0	630.0
EMPIRE	ABO	UNIT	G	313	J	33	17	28	P	37.0	1110.0
EMPIRE	ABO	UNIT	G	314	J	33	17	28	P	25.0	750.0
EMPIRE	ABO	UNIT	G	315	J	33	17	28	F	20.0	600.0
EMPIRE	ABO	UNIT	G	32	I	33	17	28	P	40.0	1200.0
EMPIRE	ABO	UNIT	G	321	I	33	17	28	S	0.0	0.0
EMPIRE	ABO	UNIT	G	322	I	33	17	28	F	28.0	840.0
EMPIRE	ABO	UNIT	G	323	I	33	17	28	P	3.0	90.0
EMPIRE	ABO	UNIT	G	324	I	33	17	28	P	7.0	210.0
EMPIRE	ABO	UNIT	G	33	L	34	17	28	S.I.		
EMPIRE	ABO	UNIT	G	331	L	34	17	28	P	23.0	690.0
EMPIRE	ABO	UNIT	G	332	L	34	17	28	F	15.0	450.0
EMPIRE	ABO	UNIT	G	333	L	34	17	28	P	3.0	90.0
EMPIRE	ABO	UNIT	G	334	L	34	17	28	P	2.0	60.0
EMPIRE	ABO	UNIT	G	34	K	34	17	28	S.I.		
EMPIRE	ABO	UNIT	G	341	K	34	17	28	S.I.		
EMPIRE	ABO	UNIT	G	342	K	34	17	28	P	19.0	570.0
EMPIRE	ABO	UNIT	G	343	K	34	17	28	F	2.0	60.0
EMPIRE	ABO	UNIT	G	35	J	34	17	28	F	4.0	120.0
EMPIRE	ABO	UNIT	G	351	J	34	17	28	F	10.0	300.0
EMPIRE	ABO	UNIT	G	352	J	34	17	28	F	2.0	60.0
EMPIRE	ABO	UNIT	G	353	J	34	17	28	F	10.0	300.0
EMPIRE	ABO	UNIT	G	36	I	34	17	28	S.I.		
EMPIRE	ABO	UNIT	G	361	I	34	17	28	P	20.0	600.0
EMPIRE	ABO	UNIT	G	37	L	35	17	28	P	0.0	0.0
EMPIRE	ABO	UNIT	G	38	K	35	17	28	S.I.		
EMPIRE	ABO	UNIT	H	12	P	34	17	27	S.I.		
EMPIRE	ABO	UNIT	H	17	M	36	17	27	S.I.		
EMPIRE	ABO	UNIT	H	18	N	36	17	27	S.I.		
EMPIRE	ABO	UNIT	H	19	O	36	17	27	INJ.		
EMPIRE	ABO	UNIT	H	20	P	36	17	27	S.I.		
EMPIRE	ABO	UNIT	H	21	M	31	17	28	INJ.		

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EMPIRE	ABO	UNIT	I	292	*	D	4	18	28	*	P	*	8.0	*	240.0	*
EMPIRE	ABO	UNIT	I	30	*	C	4	18	28	*	S.I.	*		*		*
EMPIRE	ABO	UNIT	J	8	*	H	4	18	27	*	S.I.	*		*		*
EMPIRE	ABO	UNIT	J	9	*	E	3	18	27	*	S.I.	*		*		*
EMPIRE	ABO	UNIT	J	10	*	F	3	18	27	*	S.I.	*		*		*
EMPIRE	ABO	UNIT	J	11	*	G	3	18	27	*	S.I.	*		*		*
EMPIRE	ABO	UNIT	J	12	*	H	3	18	27	*	INJ.	*		*		*
EMPIRE	ABO	UNIT	J	13	*	E	2	18	27	*	S.I.	*		*		*
EMPIRE	ABO	UNIT	J	14	*	F	2	18	27	*	F	*	10.0	*	300.0	*
EMPIRE	ABO	UNIT	J	15	*	G	2	18	27	*	F	*	13.0	*	390.0	*
EMPIRE	ABO	UNIT	J	17	*	E	1	18	27	*	S.I.	*		*		*
EMPIRE	ABO	UNIT	J	18	*	F	1	18	27	*	S.I.	*		*		*
EMPIRE	ABO	UNIT	J	19	*	G	1	18	27	*	F	*	30.0	*	900.0	*
EMPIRE	ABO	UNIT	J	191	*	G	1	18	27	*	S.I.	*		*		*
EMPIRE	ABO	UNIT	J	20	*	H	1	18	27	*	S.I.	*		*		*
EMPIRE	ABO	UNIT	J	201	*	H	1	18	27	*	F	*	24.0	*	720.0	*
EMPIRE	ABO	UNIT	J	202	*	H	1	18	27	*	P	*	19.0	*	570.0	*
EMPIRE	ABO	UNIT	J	203	*	H	1	18	27	*	F	*	15.0	*	450.0	*
EMPIRE	ABO	UNIT	J	21	*	E	6	18	28	*	F	*	9.0	*	270.0	*
EMPIRE	ABO	UNIT	J	211	*	E	6	18	28	*	F	*	1.0	*	30.0	*
EMPIRE	ABO	UNIT	J	212	*	E	6	18	28	*	F	*	16.0	*	480.0	*
EMPIRE	ABO	UNIT	J	213	*	E	6	18	28	*	P	*	13.0	*	390.0	*
EMPIRE	ABO	UNIT	J	22	*	F	6	18	28	*	F	*	1.0	*	30.0	*
EMPIRE	ABO	UNIT	J	221	*	F	6	18	28	*	F	*	7.0	*	210.0	*
EMPIRE	ABO	UNIT	J	222	*	F	6	18	28	*	P	*	2.0	*	60.0	*
EMPIRE	ABO	UNIT	J	23	*	G	6	18	28	*	S.I.	*		*		*
EMPIRE	ABO	UNIT	J	231	*	G	6	18	28	*	F	*	15.0	*	450.0	*
EMPIRE	ABO	UNIT	J	232	*	G	6	18	28	*	F	*	47.0	*	1410.0	*
EMPIRE	ABO	UNIT	J	233	*	G	6	18	28	*	F	*	10.0	*	300.0	*
EMPIRE	ABO	UNIT	J	234	*	G	6	18	28	*	F	*	1.0	*	30.0	*
EMPIRE	ABO	UNIT	J	235	*	G	6	18	28	*	F	*	3.0	*	90.0	*
EMPIRE	ABO	UNIT	J	24	*	H	6	18	28	*	F	*	38.0	*	1140.0	*
EMPIRE	ABO	UNIT	J	241	*	H	6	18	28	*	P	*	26.0	*	780.0	*
EMPIRE	ABO	UNIT	J	26	*	F	5	18	28	*	P	*	117.0	*	3510.0	*
EMPIRE	ABO	UNIT	J	27	*	G	5	18	28	*	S.I.	*		*		*
EMPIRE	ABO	UNIT	J	28	*	H	5	18	28	*	P	*	7.0	*	210.0	*
EMPIRE	ABO	UNIT	K	7	*	J	4	18	27	*	INJ.	*		*		*
EMPIRE	ABO	UNIT	K	8	*	I	4	18	27	*	S.I.	*		*		*
EMPIRE	ABO	UNIT	K	9	*	L	3	18	27	*	F	*	25.0	*	750.0	*
EMPIRE	ABO	UNIT	K	10	*	K	3	18	27	*	F	*	21.0	*	630.0	*
EMPIRE	ABO	UNIT	K	11	*	J	3	18	27	*	S.I.	*		*		*
EMPIRE	ABO	UNIT	K	12	*	I	3	18	27	*	F	*	7.0	*	210.0	*
EMPIRE	ABO	UNIT	K	13	*	L	2	18	27	*	F	*	3.0	*	90.0	*
EMPIRE	ABO	UNIT	K	131	*	L	2	18	27	*	P	*	5.0	*	150.0	*
EMPIRE	ABO	UNIT	K	14	*	K	2	18	27	*	P	*	11.0	*	330.0	*
EMPIRE	ABO	UNIT	K	141	*	K	2	18	27	*	F	*	24.0	*	720.0	*
EMPIRE	ABO	UNIT	K	142	*	K	2	18	27	*	P	*	51.0	*	1530.0	*
EMPIRE	ABO	UNIT	K	143	*	K	2	18	27	*	P	*	64.0	*	1920.0	*
EMPIRE	ABO	UNIT	K	15	*	J	2	18	27	*	F	*	26.0	*	780.0	*
EMPIRE	ABO	UNIT	K	16	*	I	2	18	27	*	P	*	12.0	*	360.0	*
EMPIRE	ABO	UNIT	K	161	*	I	2	18	27	*	F	*	48.0	*	1440.0	*
EMPIRE	ABO	UNIT	K	17	*	L	1	18	27	*	F	*	55.0	*	1650.0	*
EMPIRE	ABO	UNIT	K	18	*	K	1	18	27	*	F	*	52.0	*	1560.0	*
EMPIRE	ABO	UNIT	K	181	*	K	1	18	27	*	F	*	20.0	*	600.0	*
EMPIRE	ABO	UNIT	K	182	*	K	1	18	27	*	P	*	24.0	*	720.0	*
EMPIRE	ABO	UNIT	K	183	*	K	1	18	27	*	P	*	62.0	*	1860.0	*
EMPIRE	ABO	UNIT	K	184	*	K	1	18	27	*	F	*	82.0	*	2460.0	*
EMPIRE	ABO	UNIT	K	19	*	J	1	18	27	*	F	*	30.0	*	900.0	*
EMPIRE	ABO	UNIT	K	191	*	J	1	18	27	*	S.I.	*		*		*
EMPIRE	ABO	UNIT	K	192	*	J	1	18	27	*	F	*	37.0	*	1110.0	*

EMPIRE	ABO	UNIT	K	193	J	1	18	27	F		13.0		390.0	
EMPIRE	ABO	UNIT	K	194	J	1	18	27	S.I.					
EMPIRE	ABO	UNIT	K	20	I	1	18	27	F		23.0		690.0	
EMPIRE	ABO	UNIT	K	21	L	6	18	28	F		18.0		540.0	
EMPIRE	ABO	UNIT	K	211	L	6	18	28	F		8.0		240.0	
EMPIRE	ABO	UNIT	K	22	K	6	18	28	F		14.0		420.0	
EMPIRE	ABO	UNIT	K	23	J	6	18	28	F		23.0		690.0	
EMPIRE	ABO	UNIT	K	231	J	6	18	28	F		26.0		780.0	
EMPIRE	ABO	UNIT	K	24	I	6	18	28	S.I.					
EMPIRE	ABO	UNIT	L	5	M	4	18	27	S.I.					
EMPIRE	ABO	UNIT	L	6	N	4	18	27	S.I.					
EMPIRE	ABO	UNIT	L	7	O	4	18	27	S.I.					
EMPIRE	ABO	UNIT	L	8	P	4	18	27	S.I.					
EMPIRE	ABO	UNIT	L	9	M	3	18	27	F		9.0		270.0	
EMPIRE	ABO	UNIT	L	10	N	3	18	27	F		33.0		990.0	
EMPIRE	ABO	UNIT	L	11	O	3	18	27	S.I.					
EMPIRE	ABO	UNIT	L	111	O	3	18	27	F		36.0		1080.0	
EMPIRE	ABO	UNIT	L	12	P	3	18	27	F		37.0		1110.0	
EMPIRE	ABO	UNIT	L	121	P	3	18	27	P		33.0		990.0	
EMPIRE	ABO	UNIT	L	122	P	3	18	27	F		4.0		120.0	
EMPIRE	ABO	UNIT	L	123	P	3	18	27	P		22.0		660.0	
EMPIRE	ABO	UNIT	L	13	M	2	18	27	F		1.0		30.0	
EMPIRE	ABO	UNIT	L	131	M	2	18	27	F		16.0		480.0	
EMPIRE	ABO	UNIT	L	132	M	2	18	27	P		27.0		810.0	
EMPIRE	ABO	UNIT	L	133	M	2	18	27	P		32.0		960.0	
EMPIRE	ABO	UNIT	L	134	M	2	18	27	F		16.0		480.0	
EMPIRE	ABO	UNIT	L	14	N	2	18	27	P		32.0		960.0	
EMPIRE	ABO	UNIT	L	141	N	2	18	27	S.I.					
EMPIRE	ABO	UNIT	L	142	N	2	18	27	F		9.0		270.0	
EMPIRE	ABO	UNIT	L	143	N	2	18	27	F		40.0		1200.0	
EMPIRE	ABO	UNIT	L	15	O	2	18	27	F		19.0		570.0	
EMPIRE	ABO	UNIT	L	151	O	2	18	27	S.I.					
EMPIRE	ABO	UNIT	L	152	O	2	18	27	F		15.0		450.0	
EMPIRE	ABO	UNIT	L	153	O	2	18	27	S.I.					
EMPIRE	ABO	UNIT	L	154	O	2	18	27	S.I.					
EMPIRE	ABO	UNIT	L	155	O	2	18	27	F		10.0		300.0	
EMPIRE	ABO	UNIT	L	156	O	2	18	27	F		16.0		480.0	
EMPIRE	ABO	UNIT	L	16	P	2	18	27	P		64.0		1920.0	
EMPIRE	ABO	UNIT	L	17	M	1	18	27	F		32.0		960.0	
EMPIRE	ABO	UNIT	L	171	M	1	18	27	F		35.0		1050.0	
EMPIRE	ABO	UNIT	L	18	N	1	18	27	S.I.					
EMPIRE	ABO	UNIT	L	19	O	1	18	27	S.I.					
EMPIRE	ABO	UNIT	L	20	P	1	18	27	P		32.0		960.0	
EMPIRE	ABO	UNIT	L	22	N	6	18	28	F		18.0		540.0	
EMPIRE	ABO	UNIT	M	6	C	9	18	27	INJ.					
EMPIRE	ABO	UNIT	M	7	B	9	18	27	P		22.0		660.0	
EMPIRE	ABO	UNIT	M	8	A	9	18	27	F		15.0		450.0	
EMPIRE	ABO	UNIT	M	9	D	10	18	27	F		45.0		1350.0	
EMPIRE	ABO	UNIT	M	901	D	10	18	27	S.I.					
EMPIRE	ABO	UNIT	M	10	C	10	18	27	S.I.					
EMPIRE	ABO	UNIT	M	101	C	10	18	27	F		11.0		330.0	
EMPIRE	ABO	UNIT	M	11	B	10	18	27	F		51.0		1530.0	
EMPIRE	ABO	UNIT	M	12	A	10	18	27	F		5.0		150.0	
EMPIRE	ABO	UNIT	M	121	A	10	18	27	F		37.0		1110.0	
EMPIRE	ABO	UNIT	M	123	A	10	18	27	F		4.0		120.0	
EMPIRE	ABO	UNIT	M	13	D	11	18	27	S.I.					
EMPIRE	ABO	UNIT	M	132	D	11	18	27	F		9.0		270.0	
EMPIRE	ABO	UNIT	M	133	D	11	18	27	F		1.0		30.0	
EMPIRE	ABO	UNIT	M	14	C	11	18	27	S.I.					
EMPIRE	ABO	UNIT	M	141	C	11	18	27	F		7.0		210.0	

EMPIRE	ABO	UNIT	M	15	*	B	11	18	27	*	P	*	5.0	*	150.0 *
EMPIRE	ABO	UNIT	M	151	*	B	11	18	27	*	P	*	20.0	*	600.0 *
EMPIRE	ABO	UNIT	M	152	*	B	11	18	27	*	F	*	14.0	*	420.0 *
EMPIRE	ABO	UNIT	M	153	*	B	11	18	27	*	F	*	5.0	*	150.0 *
EMPIRE	ABO	UNIT	M	16	*	A	11	18	27	*	P	*	18.0	*	540.0 *
EMPIRE	ABO	UNIT	N	4	*	H	8	18	27	*	S.I.	*		*	*
EMPIRE	ABO	UNIT	N	5	*	E	9	18	27	*	S.I.	*		*	*
EMPIRE	ABO	UNIT	N	6	*	F	9	18	27	*	S.I.	*		*	*
EMPIRE	ABO	UNIT	N	7	*	G	9	18	27	*	F	*	22.0	*	660.0 *
EMPIRE	ABO	UNIT	N	701	*	G	9	18	27	*	S.I.	*		*	*
EMPIRE	ABO	UNIT	N	8	*	H	9	18	27	*	S.I.	*		*	*
EMPIRE	ABO	UNIT	N	801	*	H	9	18	27	*	S.I.	*		*	*
EMPIRE	ABO	UNIT	N	9	*	E	10	18	27	*	P	*	25.0	*	750.0 *
EMPIRE	ABO	UNIT	N	901	*	E	10	18	27	*	P	*	17.0	*	510.0 *
EMPIRE	ABO	UNIT	N	10	*	F	10	18	27	*	F	*	50.0	*	1500.0 *
EMPIRE	ABO	UNIT	N	11	*	G	10	18	27	*	P	*	21.0	*	630.0 *
EMPIRE	ABO	UNIT	N	12	*	H	10	18	27	*	P	*	46.0	*	1380.0 *
EMPIRE	ABO	UNIT	N	13	*	E	11	18	27	*	P	*	1.0	*	30.0 *
EMPIRE	ABO	UNIT	N	131	*	E	11	18	27	*	S.I.	*		*	*
EMPIRE	ABO	UNIT	N	14	*	F	11	18	27	*	S.I.	*		*	*
EMPIRE	ABO	UNIT	O	4	*	I	8	18	27	*	S.I.	*		*	*
EMPIRE	ABO	UNIT	O	5	*	L	9	18	27	*	S.I.	*		*	*
EMPIRE	ABO	UNIT	O	6	*	K	9	18	27	*	S.I.	*		*	*
EMPIRE	ABO	UNIT	O	7	*	J	9	18	27	*	F	*	28.0	*	840.0 *
EMPIRE	ABO	UNIT	O	8	*	I	9	18	27	*	F	*	10.0	*	300.0 *
EMPIRE	ABO	UNIT	O	9	*	L	10	18	27	*	S.I.	*		*	*
EMPIRE	ABO	UNIT	P	4	*	P	8	18	27	*	S.I.	*		*	*
EMPIRE	ABO	UNIT	P	5	*	M	9	18	27	*	S.I.	*		*	*
EMPIRE	ABO	UNIT	P	6	*	N	9	18	27	*	S.I.	*		*	*
EMPIRE	ABO	UNIT	P	7	*	O	9	18	27	*	S.I.	*		*	*
EMPIRE	ABO	UNIT	P	701	*	O	9	18	27	*	S.I.	*		*	*
EMPIRE	ABO	UNIT	P	8	*	P	9	18	27	*	P	*	16.0	*	480.0 *
EMPIRE	ABO	UNIT	P	9	*	M	10	18	27	*	P	*	215.0	*	6450.0 *
EMPIRE	ABO	UNIT	Q	5	*	D	16	18	27	*	S.I.	*		*	*
EMPIRE	ABO	UNIT	Q	6	*	C	16	18	27	*	S.I.	*		*	*
EMPIRE	ABO	UNIT	Q	7	*	B	16	18	27	*	S.I.	*		*	*
EMPIRE	ABO	UNIT	Q	8	*	A	16	18	27	*	S.I.	*		*	*
EMPIRE	ABO	UNIT	Q	9	*	D	15	18	27	*	S.I.	*		*	*
EMPIRE	ABO	UNIT	R	3	*	G	17	18	27	*	S.I.	*		*	*
EMPIRE	ABO	UNIT	R	4	*	H	17	18	27	*	S.I.	*		*	*
EMPIRE	ABO	UNIT	R	5	*	E	16	18	27	*	S.I.	*		*	*
EMPIRE	ABO	UNIT	R	6	*	F	16	18	27	*	S.I.	*		*	*
EMPIRE	ABO	UNIT	R	7	*	G	16	18	27	*	S.I.	*		*	*
EMPIRE	ABO	UNIT	R	8	*	H	16	18	27	*	S.I.	*		*	*
EMPIRE	ABO	UNIT	S	2	*	K	17	18	27	*	S.I.	*		*	*
EMPIRE	ABO	UNIT	S	3	*	J	17	18	27	*	S.I.	*		*	*
EMPIRE	ABO	UNIT	S	5	*	L	16	18	27	*	S.I.	*		*	*
EMPIRE	ABO	UNIT	S	6	*	K	16	18	27	*	S.I.	*		*	*
EMPIRE	ABO	UNIT	S	7	*	J	16	18	27	*	S.I.	*		*	*
EMPIRE	ABO	UNIT	S	8	*	I	16	18	27	*	S.I.	*		*	*
EMPIRE	ABO	UNIT	T	6	*	N	16	18	27	*	S.I.	*		*	*
EMPIRE	ABO	UNIT	T	7	*	O	16	18	27	*	S.I.	*		*	*

TOTALS: 4760.0 142800.0

ARCO Oil and Gas Company
Permian District
Post Office Box 1610
Midland, Texas 79702
Telephone 915 684 0100

March 20, 1987

Mr. L. Clements
Oil Conservation Division of the New Mexico
Department of Energy and Minerals
P. O. Drawer DD
Artesia, New Mexico 88210

Dear Mr. Clements:

ARCO - Empire Abo Unit
Pressure Maintenance Report - January, 1987

ARCO Oil and Gas Company, A Division of Atlantic Richfield Company, as operator of the Empire Abo Unit Pressure Maintenance Project, Eddy County, New Mexico, submits with this letter the gas bank statements for January, 1987. The allowable for January through April, 1987 has been set 4760 BOPD.

Sincerely,

Jack T. Lowder

Jack T. Lowder
Senior Engineer

JTL:tis
Attachments

xc: Mr. William J. LeMay
Oil Conservation Division of the New Mexico
Department of Energy and Minerals
P. O. Box 2088
Santa Fe, New Mexico 87501

RECEIVED
MAR 24 1987
OIL CONSERVATION DIVISION
SANTA FE

EMPIRE ABO UNIT PRESSURE MAINTENANCE PROJECT
(NMOCD Orders R-4548, R-4549, R-4549A, R-4549B, R-4549C, R-4549D, R-4549E, R-4549F)
ABO GAS BANK STATEMENT
MONTHLY REPORT JANUARY 1987

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
MONTH	GAS PRODUCED (MCF)	ALLOWABLE GAS PROD. @ 65MMCFPD (MCF)	AMOUNT UNDER (OVER) ALLOWABLE (MCF)	CUMULATIVE AMOUNT UNDER (OVER) ALLOWABLE (MCF)	GAS BANK BALANCE (LESSER OF LAST MONTH'S COL. 5 OR 325 MMCF) (MCF)	MAX. GAS RATE ALLOWABLE TO BALANCE GAS BANK (MCF)	TOTAL PLANT RESIDUE AVAILABLE (MCF)	ABO GAS INJECTED (MCF)	FRACTION OF AVAILABLE RESIDUE GAS INJECTED (FRACTION)
JANUARY	2,126,796	2,015,000	(111,796)	74,967	186,763	65,000	1,158,952	1,158,952	1.00

EMPIRE ABO UNIT PRESSURE MAINTENANCE PROJECT
NON-ABO GAS BANK STATEMENT
MONTHLY REPORT JANUARY 1987

MONTH	GAS INJECTED (MCF)	CUMULATIVE GAS INJECTED (MCF)	GAS DELIVERED TO TO SUPPLIER (MCF)	CUMULATIVE GAS DELIVERED TO SUPPLIER (MCF)	NET CUMULATIVE NON-ABO GAS BANK (MCF)
JANUARY	-0-	4,061,826	-0-	411,342	3,650,484

09:36:19 03/19/87

EMPIRE ABO PRESSURE MAINTENANCE PROJECT

TO: N.M.O.C.C. DIST II (3)
P.O. DRAWER DD (N.M.O.C.C. ORDERS R-4548, R-4549, R-4549-A, R-4549-B, R-4549-C, R-4549-D, R-4549-E, R-4549F)
ARTESIA, NEW MEXICO-88210
ATTN:MR. W.A. GRESSETT ATLANTIC RICHFIELD COMPANY - OPERATOR

MONTHLY REPORT FOR JAN., 1987

PROJECT AREA: EMPIRE ABO UNIT
SHEET A TOTAL REQUESTED ALLOWABLE FOR JAN.-APR., 1987 IS 4760. BOPD

(1)	(2)	(3)	(4)							(5)				(6)			(7)	(8)	(9)	(10)	(11)
														INJECTION-AVERAGE						REQUES	
														JAN. ,1987			VOID	REQUE-	NET	NET	REQU-
			TEST DATA							PRODUCTION AVERAGE						CUM.	AVAIL.	STED	VOID	VOID	ESTED
			(LATEST 24-HR)							(JAN. ,1987)				WATER		INJ.	FOR(1)	VOID	AT NUA	(8+9)	OIL
TCT	WELL		WEL	DATE		OIL	WTR	GAS	GOR	OIL	WTR	GAS	GOR	BWPD	WHINJ	MBW	TRANS.	TRANS.	(2)	SEE I9	ALLOW
NO.	NO.	UN SEC T R	STA	M	YR	BBL	BBL	MCF	CF/B	BOPD	BWPD	MCF/D	CF/B	MCF/D	PRESS	MMCF	RSVB/D	RSVB/D	RSVB/D	RSVB/D	BOPD
B	40	H 26 17 28	S																		
B	45	E 30 17 29	S	7	73	9.	3.	23.	2556.								53.				
B	46	F 30 17 29	S	7	73	85.	12.	85.	1000.								206.				
B	47	G 30 17 29	S	7	73	40.	175.	80.	2000.								366.				
B	48	H 30 17 29	I			WATER INJECTOR								2574.	1300.	3349.	0.				
B	49	E 29 17 29	I			WATER INJECTOR								2869.	0.	4511.	0.				
C	34	K 27 17 28	S	8	73	22.	0.	40.	1818.								91.				
C	35	J 27 17 28	S	5	73	71.	0.	89.	1254.								207.				
C	36	I 27 17 28	S	6	73	21.	0.	4.	190.								-3.				
C	37	L 26 17 28	F	6	86	9.	1.	511.	56778.	1.	0.	564.	563677.						1019.	1019.	2.
C	38	K 26 17 28	I			GAS INJECTOR								0.	0.	830.	700.				
C	39	J 26 17 28	I			GAS INJECTOR								2598.	1822.	12551.	700.				
C	40	I 26 17 28	F	8	86	44.	7.	4.	91.	67.	21.	75.	1117.						84.	84.	92.
C	41	L 25 17 28	P	8	86	84.	115.	120.	1429.	85.	151.	63.	745.						182.	182.	90.
C	42	K 25 17 28	S	9	76	44.	1.	172.	3909.								432.				
C	43	J 25 17 28	S	9	76	12.	255.	67.	5583.								419.				
C	44	I 25 17 28	S	11	76	5.	374.	0.	0.								366.				
C	45	L 30 17 29	S	7	73	72.	297.	14.	194.								308.				
C	46	K 30 17 29	S	5	73	30.	306.	140.	4667.								657.				
C	47	J 30 17 29	S	8	73	10.	105.	11.	1100.								123.				
C	49	L 29 17 29	I			WATER INJECTOR								1057.	1300.	7362.	0.				
C	50	K 29 17 29	I			WATER INJECTOR								293.	0.	2748.	0.				
D	33	M 27 17 28	S	3	85	3.	2.	1501.	500333.								700.				
D	34	N 27 17 28	F	8	86	18.	0.	1259.	69944.	13.	0.	718.	55361.						494.	494.	10.
D	35	O 27 17 28	S			GAS INJECTOR								0.	0.	1540.	700.				
D	36	P 27 17 28	P	7	86	107.	1.	31.	290.	59.	13.	3.	46.						-3.	-3.	60.
D	361	P 27 17 28	P	7	86	18.	23.	197.	10944.	10.	21.	16.	1639.						36.	36.	15.
D	37	M 26 17 28	I			GAS INJECTOR								7159.	1817.	19493.	700.				
D	38	N 26 17 28	S	8	86	0.	0.	0.	0.	0.	0.	0.	0.						-8.	-8.	0.
D	39	O 26 17 28	P	8	86	7.	163.	7.	1000.	17.	153.	21.	1230.						167.	167.	25.
D	40	P 26 17 28	S	7	85	8.	40.	10.	1250.								56.				
D	41	M 25 17 28	S	9	76	6.	460.	21.	3500.								505.				
D	42	N 25 17 28	S	9	76	17.	68.	142.	8353.								427.				
D	43	O 25 17 28	S	2	79	11.	157.	16.	1455.								188.				
D	44	P 25 17 28	P	7	86	32.	465.	67.	2094.	22.	565.	46.	2078.						613.	613.	34.
E	26	C 32 17 28	S	5	73	2.	1.	0.	0.								-7.				
E	27	B 32 17 28	S	8	73	3.	0.	0.	0.								-8.				
E	28	A 32 17 28	S	5	73	15.	0.	55.	3667.								132.				
E	30	C 33 17 28	S	9	76	31.	0.	462.	14903.								700.				

E 31	B	33	17	28*	S	7	81	22.	8.	224.	10182.*					*			*	580.*	*	*	*	
E 32	A	33	17	28*	S	10	78	43.	0.	1441.	33512.*					*			*	700.*	*	*	*	
E 33	D	34	17	28*	S	11	79	6.	2.	178.	29667.*					*			*	458.*	*	*	*	
E 34	C	34	17	28*	S	3	80	168.	0.	642.	3821.*					*			*	700.*	*	*	*	
E 341	C	34	17	28*	S	11	79	6.	0.	1122.	187000.*					*			*	700.*	*	*	*	
E 35	B	34	17	28*	S	3	80	6.	0.	450.	75000.*					*			*	700.*	*	*	*	
E 351	B	34	17	28*	S	7	81	40.	1.	1336.	33400.*					*			*	700.*	*	*	*	
E 36	A	34	17	28*	P	8	86	38.	207.	17.	447.*	10.	408.	27.	2735.*	*			*	*	*	473.*	473.*	30.
E 361	A	34	17	28*	S	3	81	0.	0.	648.	0.*					*			*	706.*	*	*	*	
E 362	A	34	17	28*	P	6	86	174.	119.	104.	598.*	35.	317.	12.	348.*	*			*	*	*	323.*	323.*	120.
E 363	A	34	17	28*	P	7	86	82.	224.	51.	622.*	28.	173.	357.	12654.*	*			*	*	*	560.*	560.*	35.
E 37	D	35	17	28*	S	6	85	2.	263.	13.	6500.*	0.	0.	0.	0.*	*			*	*	*	-2.*	-2.*	0.
E 371	D	35	17	28*	S	6	85	79.	355.	90.	1139.*	0.	0.	0.	0.*	*			*	*	*	-2.*	-2.*	0.
E 372	D	35	17	28*	S	6	85	2.	110.	11.	5500.*	0.	0.	0.	0.*	*			*	*	*	-2.*	-2.*	0.
E 373	D	35	17	28*	P	8	86	57.	481.	45.	789.*	15.	465.	4.	290.*	*			*	*	*	465.*	465.*	85.
E 374	D	35	17	28*	P	8	86	74.	319.	138.	1865.*	24.	446.	20.	832.*	*			*	*	*	471.*	471.*	50.
E 38	C	35	17	28*	S	1	81	0.	334.	5.	0.*					*			*	339.*	*	*	*	
E 381	C	35	17	28*	S	5	85	2.	164.	17.	3500.*					*			*	200.*	*	*	*	
E 382	C	35	17	28*	S	6	86	0.	42.	1.	0.*	0.	0.	0.	0.*	*			*	*	*	-4.*	-4.*	0.
E 383	C	35	17	28*	S	6	85	3.	492.	22.	7333.*					*			*	545.*	*	*	*	
E 384	C	35	17	28*	S	8	85	0.	262.	10.	0.*	0.	0.	0.	0.*	*			*	*	*	-8.*	-8.*	0.
E 39	B	35	17	28*	S	1	81	3.	182.	4.	1333.*					*			*	183.*	*	*	*	
E 391	B	35	17	28*	S	3	85	0.	0.	0.	0.*					*			*	-8.*	*	*	*	
E 392	B	35	17	28*	S	6	85	2.	230.	9.	4500.*					*			*	245.*	*	*	*	
E 393	B	35	17	28*	S	6	85	0.	22.	16.	0.*	0.	0.	0.	0.*	*			*	*	*	-8.*	-8.*	0.
E 395	B	35	17	28*	S	7	82	0.	132.	2.	0.*					*			*	129.*	*	*	*	
E 40	A	35	17	28*	S	11	76	1.	317.	0.	0.*					*			*	309.*	*	*	*	
E 41	D	36	17	28*	S	3	79	30.	257.	21.	700.*					*			*	296.*	*	*	*	
F 22	F	31	17	28*	S	5	73	3.	0.	12.	4000.*					*			*	22.*	*	*	*	
F 25	E	32	17	28*	I			GAS INJECTOR			*					*			*	700.*	*	*	*	
F 26	F	32	17	28*	S	9	76	76.	0.	622.	8184.*					*	767.	1929.	2495.*	700.*	*	*	*	
F 27	G	32	17	28*	I			GAS INJECTOR			*					*	3175.	1905.	12154.*	700.*	*	*	*	
F 28	H	32	17	28*	S	9	76	313.	0.	701.	2240.*					*			*	700.*	*	*	*	
F 29	E	33	17	28*	S	9	76	39.	0.	1138.	29179.*					*			*	700.*	*	*	*	
F 30	F	33	17	28*	S	10	77	267.	0.	1089.	4079.*					*			*	700.*	*	*	*	
F 31	G	33	17	28*	I			GAS INJECTOR			*					*	7209.	1856.	42671.*	700.*	*	*	*	
F 32	H	33	17	28*	F	7	86	7.	0.	1482.	211714.*	7.	0.	394.	52638.*	*			*	*	*	87.*	87.*	2.
F 321	H	33	17	28*	S	8	80	2.	0.	516.	258000.*					*			*	700.*	*	*	*	
F 322	H	33	17	28*	S	10	81	2.	1.	1302.	651000.*					*			*	700.*	*	*	*	
F 33	E	34	17	28*	S	2	82	24.	0.	416.	17333.*					*			*	700.*	*	*	*	
F 331	E	34	17	28*	P	6	86	100.	29.	10.	100.*	106.	11.	75.	704.*	*			*	*	*	46.*	46.*	93.
F 332	E	34	17	28*	F	7	86	16.	0.	1696.	106000.*	9.	0.	512.	60152.*	*			*	*	*	326.*	326.*	6.
F 333	E	34	17	28*	S	7	80	3.	0.	1536.	512000.*					*			*	707.*	*	*	*	
F 334	E	34	17	28*	S	6	81	4.	1.	590.	147500.*					*			*	707.*	*	*	*	
F 335	E	34	17	28*	P	7	86	51.	0.	1738.	34078.*	34.	0.	767.	22687.*	*			*	*	*	200.*	200.*	10.
F 336	E	34	17	28*	P	7	86	5.	0.	1173.	234600.*	1.	0.	53.	37682.*	*			*	*	*	64.*	64.*	2.
F 34	F	34	17	28*	S	3	80	12.	0.	1440.	120000.*					*			*	700.*	*	*	*	
F 341	F	34	17	28*	S	3	81	6.	0.	1359.	226500.*					*			*	700.*	*	*	*	
F 342	F	34	17	28*	F	8	86	2.	0.	1696.	848000.*	2.	1.	212.	119564.*	*			*	*	*	540.*	540.*	5.
F 343	F	34	17	28*	P	8	86	4.	1.	1184.	296000.*	9.	0.	722.	76675.*	*			*	*	*	344.*	344.*	5.
F 35	G	34	17	28*	S	4	84	4.	9.	1279.	319750.*					*			*	700.*	*	*	*	
F 351	G	34	17	28*	F	7	86	1.	149.	853.	853000.*	5.	55.	395.	87564.*	*			*	*	*	450.*	450.*	5.
F 352	G	34	17	28*	S	4	81	0.	0.	1704.	0.*					*			*	706.*	*	*	*	
F 353	G	34	17	28*	P	7	86	66.	359.	141.	2136.*	16.	432.	92.	5813.*	*			*	*	*	732.*	732.*	60.
F 354	G	34	17	28*	F	7	86	12.	0.	45.	3750.*	84.	2.	1606.	19155.*	*			*	*	*	1715.*	1715.*	100.
F 36	H	34	17	28*	F	7	86	2.	0.	1370.	685000.*	22.	6.	903.	41764.*	*			*	*	*	382.*	382.*	10.
F 361	H	34	17	28*	S	7	85	6.	157.	1760.	293333.*					*			*	707.*	*	*	*	
F 362	H	34	17	28*	P	6	86	65.	19.	169.	2600.*	43.	77.	77.	1778.*	*			*	*	*	166.*	166.*	66.
F 363	H	34	17	28*	P	6	86	4.	76.	91.	22750.*	35.	258.	56.	1581.*	*			*	*	*	292.*	292.*	30.
F 364	H	34	17	28*	P	7	86	157.	466.	186.	1185.*	33.	483.	145.	4378.*	*			*	*	*	624.*	624.*	40.

F	37	E	35	17	28*	S	6	85	35.	304.	95.	2714.*	0.	0.	0.	0.*					*	*	*	-2.*	-2.*	0.
F	371	E	35	17	28*	P	8	86	172.	261.	263.	1529.*	112.	397.	4.	35.*					*	*	*	380.*	380.*	70.
F	372	E	35	17	28*	S	6	85	1.	169.	13.	13000.*									*	201.*	*	*	*	
F	373	E	35	17	28*	P	7	86	22.	508.	47.	2136.*	5.	550.	14.	2735.*					*	*	*	615.*	615.*	30.
F	374	E	35	17	28*	P	8	86	120.	491.	137.	1142.*	50.	492.	40.	799.*					*	*	*	512.*	512.*	50.
F	375	E	35	17	28*	S	6	85	2.	223.	9.	4500.*									*	242.*	*	*	*	
F	376	E	35	17	28*	P	7	86	1.	376.	4.	4000.*	0.	0.	0.	0.*					*	*	*	33.*	33.*	12.
F	38	F	35	17	28*	S	6	85	0.	387.	13.	0.*									*	413.*	*	*	*	
F	381	F	35	17	28*	S	6	85	0.	0.	0.	0.*	0.	0.	0.	0.*					*	*	*	-8.*	-8.*	0.
F	382	F	35	17	28*	S	6	85	1.	460.	22.	22000.*									*	509.*	*	*	*	
F	383	F	35	17	28*	S	7	85	1.	318.	13.	13000.*									*	343.*	*	*	*	
F	39	G	35	17	28*	S	11	82	1.	455.	8.	8000.*									*	467.*	*	*	*	
F	391	G	35	17	28*	S	1	82	26.	96.	2.	77.*									*	93.*	*	*	*	
F	40	H	35	17	28*	S	7	82	0.	106.	1.	0.*									*	100.*	*	*	*	
G	17	L	36	17	27*	S						*									*	*	*	*	*	
G	18	K	36	17	27*	S						*									*	*	*	*	*	
G	19	J	36	17	27*	S			GAS INJECTOR			*									*	700.*	*	*	*	
G	20	I	36	17	27*	S	5	73	73.	0.	242.	3315.*									*	607.*	*	*	*	
G	21	L	31	17	28*	S	6	73	70.	0.	395.	5643.*									*	700.*	*	*	*	
G	22	K	31	17	28*	I			GAS INJECTOR			*									*	700.*	*	*	*	
G	23	J	31	17	28*	S	7	73	43.	0.	327.	7605.*									*	700.*	*	*	*	
G	24	I	31	17	28*	I			GAS INJECTOR			*									*	700.*	*	*	*	
G	25	L	32	17	28*	F	8	86	21.	0.	182.	8667.*	26.	1.	369.	14087.*					*	*	*	143.*	143.*	12.
G	26	K	32	17	28*	F	6	86	2.	0.	282.	141000.*	6.	1.	213.	33040.*					*	*	*	52.*	52.*	2.
G	27	J	32	17	28*	F	7	86	14.	1.	1175.	83929.*	0.	0.	0.	0.*					*	*	*	144.*	144.*	2.
G	28	I	32	17	28*	S	9	76	387.	0.	655.	1693.*									*	694.*	*	*	*	
G	29	L	33	17	28*	F	7	86	1.	0.	471.	471000.*	5.	0.	157.	30344.*					*	*	*	51.*	51.*	2.
G	291	L	33	17	28*	F	6	86	33.	1.	202.	6121.*	6.	0.	317.	51721.*					*	*	*	277.*	277.*	6.
G	30	K	33	17	28*	F	8	86	25.	0.	267.	10680.*	11.	0.	202.	18537.*					*	*	*	329.*	329.*	20.
G	301	K	33	17	28*	P	7	86	50.	0.	17.	340.*	50.	0.	46.	912.*					*	*	*	19.*	19.*	40.
G	31	J	33	17	28*	S	8	82	0.	6.	1598.	0.*									*	700.*	*	*	*	
G	311	J	33	17	28*	F	6	86	30.	84.	842.	28067.*	5.	0.	185.	33765.*					*	*	*	426.*	426.*	14.
G	312	J	33	17	28*	P	7	86	27.	4.	25.	926.*	26.	2.	80.	3089.*					*	*	-311.*	365.*	54.*	21.
G	313	J	33	17	28*	P	8	86	37.	0.	25.	676.*	30.	1.	94.	3104.*					*	*	*	95.*	95.*	37.
G	314	J	33	17	28*	P	7	86	21.	107.	0.	0.*	19.	130.	14.	733.*					*	*	*	139.*	139.*	25.
G	315	J	33	17	28*	F	7	86	32.	1.	25.	781.*	0.	0.	0.	0.*					*	*	*	8.*	8.*	20.
G	32	I	33	17	28*	P	7	86	40.	3.	25.	625.*	32.	0.	36.	1133.*					*	*	*	30.*	30.*	40.
G	321	I	33	17	28*	S	7	85	18.	114.	3469.	192722.*	0.	0.	0.	0.*					*	*	*	-2.*	-2.*	0.
G	322	I	33	17	28*	F	7	86	40.	1.	1464.	36600.*	28.	0.	629.	22503.*					*	*	*	566.*	566.*	28.
G	323	I	33	17	28*	P	7	86	12.	21.	50.	4167.*	5.	0.	106.	19837.*					*	*	*	52.*	52.*	3.
G	324	I	33	17	28*	P	6	86	60.	2.	866.	14433.*	8.	0.	135.	16677.*					*	*	*	103.*	103.*	7.
G	33	L	34	17	28*	S	9	81	2.	2.	1112.	556000.*									*	700.*	*	*	*	
G	331	L	34	17	28*	P	7	86	22.	26.	88.	4000.*	2.	6.	38.	19145.*					*	*	*	400.*	400.*	23.
G	332	L	34	17	28*	F	7	86	65.	2.	1221.	18785.*	23.	0.	1148.	50039.*					*	*	*	679.*	679.*	15.
G	333	L	34	17	28*	P	7	86	9.	4.	1481.	164556.*	3.	0.	190.	62617.*					*	*	*	168.*	168.*	3.
G	334	L	34	17	28*	P	7	86	7.	2.	1209.	172714.*	0.	1.	165.	340400.*					*	*	*	619.*	619.*	2.
G	34	K	34	17	28*	S	6	85	1.	58.	315.	315000.*									*	700.*	*	*	*	
G	341	K	34	17	28*	S	4	81	0.	0.	1698.	0.*									*	700.*	*	*	*	
G	342	K	34	17	28*	P	8	86	23.	40.	257.	11174.*	30.	45.	129.	4256.*					*	*	*	110.*	110.*	19.
G	343	K	34	17	28*	F	8	86	10.	17.	1127.	112700.*	10.	2.	841.	83580.*					*	*	*	150.*	150.*	2.
G	35	J	34	17	28*	F	8	86	11.	59.	1033.	93909.*	14.	69.	722.	50861.*					*	*	*	252.*	252.*	4.
G	351	J	34	17	28*	F	7	86	17.	43.	1278.	75176.*	13.	34.	1332.	100218.*					*	*	*	943.*	943.*	10.
G	352	J	34	17	28*	F	8	86	16.	71.	1146.	71625.*	8.	70.	760.	98167.*					*	*	*	246.*	246.*	2.
G	353	J	34	17	28*	F	6	86	8.	28.	1113.	139125.*	33.	81.	600.	18241.*					*	*	*	242.*	242.*	10.
G	36	I	34	17	28*	S	11	81	2.	16.	1361.	680500.*									*	700.*	*	*	*	
G	361	I	34	17	28*	P	8	86	49.	239.	250.	5102.*	81.	287.	291.	3601.*					*	*	*	339.*	339.*	20.
G	37	L	35	17	28*	P	8	86	3.	110.	5.	1667.*	0.	0.	0.	0.*					*	*	*	-8.*	-8.*	0.
G	38	K	35	17	28*	S	10	76	0.	187.	0.	0.*									*	179.*	*	*	*	
H	12	P	34	17	27*	S	5	73	42.	0.	274.	6524.*									*	698.*	*	*	*	
H	17	M	36	17	27*	S	10	76	65.	0.	597.	9185.*									*	700.*	*	*	*	

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I	282	A	5	18	28*	P	8	86	12.	14.	198.	16500.*	23.	17.	141.	6207.*				*	*	*	123.*	123.*	20.
I	283	A	5	18	28*	P	7	86	9.	3.	13.	1444.*	13.	1.	87.	6841.*				*	*	*	71.*	71.*	12.
I	29	D	4	18	28*	S	10	79	56.	63.	217.	3875.*				*				*	609.*	*	*	*	
I	291	D	4	18	28*	P	7	86	11.	7.	66.	6000.*	55.	17.	55.	988.*				*	*	*	40.*	40.*	40.
I	292	D	4	18	28*	P	8	86	21.	34.	25.	1190.*	4.	6.	55.	13677.*				*	*	*	100.*	100.*	8.
I	30	C	4	18	28*	S	11	79	14.	10.	18.	1286.*				*				*	45.*	*	*	*	
J	8	H	4	18	27*	S	5	73	3.	0.	9.	3000.*				*				*	15.*	*	*	*	
J	9	E	3	18	27*	S	10	76	53.	0.	583.	11000.*				*				*	700.*	*	*	*	
J	10	F	3	18	27*	S	10	76	142.	0.	847.	5965.*				*				*	700.*	*	*	*	
J	11	G	3	18	27*	S	9	76	127.	0.	423.	3331.*				*				*	700.*	*	*	*	
J	12	H	3	18	27*	I			GAS INJECTOR			*				*	6427.	1950.	9781.*	*	700.*	*	*	*	
J	13	E	2	18	27*	S	10	77	104.	0.	1096.	10538.*				*				*	700.*	*	*	*	
J	14	F	2	18	27*	F	7	86	5.	0.	1443.	288600.*	10.X	1.	343.	35403.*				*	*	*	313.*	313.*	10.
J	15	G	2	18	27*	F	8	86	19.	1.	1360.	71579.*	10.X	0.	194.	20020.*				*	*	*	226.*	226.*	13.
J	17	E	1	18	27*	S	9	76	90.	0.	971.	10789.*				*				*	700.*	*	*	*	
J	18	F	1	18	27*	S	8	81	3.	0.	1551.	517000.*				*				*	700.*	*	*	*	
J	19	G	1	18	27*	F	8	86	40.	0.	540.	13500.*	40.	1.	399.	10032.*				*	*	*	260.*	260.*	30.
J	191	G	1	18	27*	S	1	78	33.	0.	1523.	46152.*				*				*	700.*	*	*	*	
J	20	H	1	18	27*	S	1	81	0.	0.	68.	0.*				*				*	170.*	*	*	*	
J	201	H	1	18	27*	F	7	86	41.	1.	1797.	43829.*	15.	0.	588.	40513.*				*	*	*	878.*	878.*	24.
J	202	H	1	18	27*	P	6	86	9.	2.	17.	1889.*	9.	0.	252.	27964.*				*	*	*	477.*	477.*	19.
J	203	H	1	18	27*	F	8	86	63.	1.	1755.	27857.*	11.	0.	310.	27417.*				*	*	*	368.*	368.*	15.
J	21	E	6	18	28*	F	6	86	33.	0.	1172.	35515.*	4.	0.	152.	39175.*				*	*	*	317.*	317.*	9.
J	211	E	6	18	28*	F	8	86	32.	1.	1590.	49688.*	1.	0.	111.	123179.*				*	*	*	110.*	110.*	1.
J	212	E	6	18	28*	F	8	86	23.	0.	1498.	65130.*	15.	1.	483.	33300.*				*	*	*	481.*	481.*	16.
J	213	E	6	18	28*	P	7	86	10.	1.	60.	6000.*	11.	0.	39.	3611.*				*	*	*	38.*	38.*	13.
J	22	F	6	18	28*	F	6	86	36.	0.	1540.	42778.*	2.	0.	126.	62887.*				*	*	*	54.*	54.*	1.
J	221	F	6	18	28*	F	6	86	52.	0.	1683.	32365.*	5.	0.	282.	57487.*				*	*	*	362.*	362.*	7.
J	222	F	6	18	28*	P	7	86	3.	0.	15.	5000.*	2.	0.	72.	36161.*				*	*	*	63.*	63.*	2.
J	23	G	6	18	28*	S	11	79	28.	0.	982.	35071.*				*				*	700.*	*	*	*	
J	231	G	6	18	28*	F	7	86	59.	0.	1303.	22085.*	15.	0.	613.	41309.*				*	*	*	560.*	560.*	15.
J	232	G	6	18	28*	F	7	86	56.	0.	1711.	30554.*	45.	1.	1704.	38164.*				*	*	*	1623.*	1623.*	47.
J	233	G	6	18	28*	F	7	86	34.	0.	1589.	46735.*	8.	0.	550.	71046.*				*	*	*	643.*	643.*	10.
J	234	G	6	18	28*	F	8	86	17.	1.	1575.	92647.*	4.	0.	232.	57095.*				*	*	*	50.*	50.*	1.
J	235	G	6	18	28*	F	7	86	5.	0.	1465.	293000.*	3.	0.	511.	150867.*				*	*	*	410.*	410.*	3.
J	24	H	6	18	28*	F	8	86	76.	0.	330.	4342.*	29.X	0.	440.	15306.*				*	*	*	517.*	517.*	38.
J	241	H	6	18	28*	P	7	86	30.	2.	83.	2767.*	36.X	2.	33.	932.*				*	*	*	14.*	14.*	26.
J	26	F	5	18	28*	P	7	86	4.	1.	1617.	404250.*	123.	9.	998.	8089.*				*	*	*	835.*	835.*	117.
J	27	G	5	18	28*	S	5	84	1.	128.	63.	63000.*				*				*	284.*	*	*	*	
J	28	H	5	18	28*	P	7	86	6.	97.	95.	15833.*	12.	107.	38.	3189.*				*	*	*	117.*	117.*	7.
K	7	J	4	18	27*	I			GAS INJECTOR			*				*	2462.	1925.	10264.*	*	700.*	*	*	*	
K	8	I	4	18	27*	S	5	73	56.	0.	617.	11018.*				*				*	700.*	*	*	*	
K	9	L	3	18	27*	F	8	86	50.	1.	867.	17340.*	17.	1.	3482.	207184.*				*	*	*	4707.*	4707.*	25.
K	10	K	3	18	27*	F	8	86	26.	0.	256.	9846.*	22.	1.	4.	183.*				*	*	*	-9.*	-9.*	21.
K	11	J	3	18	27*	S	7	82	12.	0.	1803.	150250.*				*				*	700.*	*	*	*	
K	12	I	3	18	27*	F	6	86	20.	0.	984.	49200.*	14.	0.	331.	24460.*				*	*	*	146.*	146.*	7.
K	13	L	2	18	27*	F	7	86	1.	0.	1497.	********	5.	0.	351.	72513.*				*	*	*	193.*	193.*	3.
K	131	L	2	18	27*	P	7	86	20.	0.	1050.	52500.*	8.	0.	150.	18660.*				*	*	*	80.*	80.*	5.
K	14	K	2	18	27*	P	7	86	1.	0.	173.	173000.*	6.	0.	687.	106470.*				*	*	*	1063.*	1063.*	11.
K	141	K	2	18	27*	F	7	86	51.	15.	956.	18745.*	21.	4.	259.	12355.*				*	*	*	266.*	266.*	24.
K	142	K	2	18	27*	P	7	86	17.	1.	661.	38882.*	50.	3.	607.	12146.*				*	*	*	553.*	553.*	51.
K	143	K	2	18	27*	P	7	86	66.	20.	1226.	18576.*	75.	15.	116.	1544.*				*	*	*	88.*	88.*	64.
K	15	J	2	18	27*	F	7	86	57.	0.	1034.	18140.*	27.X	0.	497.	18526.*				*	*	*	425.*	425.*	26.
K	16	I	2	18	27*	P	8	86	8.	31.	97.	12125.*	15.X	18.	53.	3566.*				*	*	*	50.*	50.*	12.
K	161	I	2	18	27*	F	8	86	32.	6.	47.	1469.*	45.X	2.	38.	854.*				*	*	*	24.*	24.*	48.
K	17	L	1	18	27*	F	7	86	121.	0.	1463.	12091.*	60.X	0.	912.	15126.*				*	*	*	737.*	737.*	55.
K	18	K	1	18	27*	F	8	86	131.	35.	1026.	7832.*	56.	18.	586.	10557.*				*	*	*	504.*	504.*	52.
K	181	K	1	18	27*	F	8	86	93.	0.	848.	9118.*	24.	0.	452.	18546.*				*	*	*	332.*	332.*	20.
K	182	K	1	18	27*	P	7	86	23.	13.	8.	348.*	31.	0.	11.	351.*				*	*	*	0.*	0.*	24.
K	183	K	1	18	27*	P	7	86	37.	9.	204.	5514.*	50.	6.	256.	5120.*				*	*	*	279.*	279.*	62.

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M	132	D	11	18	27*	F	7	86	8.	21.	152.	19000.*	11.	2.	185.	17391.*	*	*	*	139.*	139.*	9.
M	133	D	11	18	27*	F	7	86	40.	41.	1034.	25850.*	3.	3.	69.	22323.*	*	*	*	19.*	19.*	1.
M	14	C	11	18	27*	S	8	79	140.	0.	1828.	13057.*				*	*	700.*	*	*	*	
M	141	C	11	18	27*	F	8	86	36.	41.	862.	23944.*	8.	9.	206.	26571.*	*	*	*	168.*	168.*	7.
M	15	B	11	18	27*	P	7	86	14.	75.	205.	14643.*	25.	58.	318.	12717.*	*	*	*	113.*	113.*	5.
M	151	B	11	18	27*	P	7	86	14.	31.	168.	12000.*	15.	43.	516.	34398.*	*	*	*	663.*	663.*	20.
M	152	B	11	18	27*	F	7	86	35.	24.	1340.	38286.*	14.	3.	532.	39283.*	*	*	*	499.*	499.*	14.
M	153	B	11	18	27*	F	7	86	28.	3.	1178.	42071.*	5.	0.	216.	44600.*	*	*	*	200.*	200.*	5.
M	16	A	11	18	27*	P	7	86	22.	5.	66.	3000.*	15.	43.	106.	7037.*	*	*	*	145.*	145.*	18.
N	4	H	8	18	27*	S						*				*	*	*	*	*	*	
N	5	E	9	18	27*	S	5	73	24.	1.	45.	1875.*				*	*	105.*	*	*	*	
N	6	F	9	18	27*	S	5	73	16.	4.	181.	11313.*				*	*	465.*	*	*	*	
N	7	G	9	18	27*	F	6	86	70.	3.	1375.	19643.*	11.	0.	184.	16314.*	*	*	*	313.*	313.*	22.
N	701	G	9	18	27*	S						*				*	*	*	*	*	*	
N	8	H	9	18	27*	S	6	73	49.	0.	577.	11776.*				*	*	700.*	*	*	*	
N	801	H	9	18	27*	S						*				*	*	*	*	*	*	
N	9	E	10	18	27*	P	8	86	18.	3.	14.	778.*	14.	1.	83.	5947.*	*	*	*	122.*	122.*	25.
N	901	E	10	18	27*	P	8	86	22.	2.	5.	227.*	21.	8.	86.	4104.*	*	*	*	59.*	59.*	17.
N	10	F	10	18	27*	F	8	86	22.	4.	1517.	68955.*	27.	0.	716.	26124.*	*	*	*	1170.*	1170.*	50.
N	11	G	10	18	27*	P	7	86	20.	21.	582.	29100.*	15.	23.	481.	32073.*	*	*	*	624.*	624.*	21.
N	12	H	10	18	27*	P	6	86	26.	1.	367.	14115.*	40.	20.	833.	20662.*	*	*	*	867.*	867.*	46.
N	13	E	11	18	27*	P	7	86	3.	73.	70.	23333.*	15.	85.	578.	38523.*	*	*	*	112.*	112.*	1.
N	131	E	11	18	27*	T						*				*	*	*	*	*	*	
N	14	F	11	18	27*	T						*				*	*	*	*	*	*	
O	4	I	8	18	27*	S	5	73	11.	1.	92.	8364.*				*	*	231.*	*	*	*	
O	5	L	9	18	27*	S	7	73	17.	3.	73.	4294.*				*	*	182.*	*	*	*	
O	6	K	9	18	27*	S	7	73	37.	10.	606.	16378.*				*	*	700.*	*	*	*	
O	7	J	9	18	27*	F	8	86	109.	3.	1023.	9385.*	35.	0.	293.	8260.*	*	*	*	196.*	196.*	28.
O	8	I	9	18	27*	F	6	85	84.	0.	1394.	16595.*	13.	0.	566.	44306.*	*	*	*	393.*	393.*	10.
O	9	L	10	18	27*	S	6	73	145.	6.	125.	862.*				*	*	290.*	*	*	*	
P	4	P	8	18	27*	S	5	73	15.	1.	64.	4267.*				*	*	156.*	*	*	*	
P	5	M	9	18	27*	S	5	73	15.	0.	136.	9067.*				*	*	344.*	*	*	*	
P	6	N	9	18	27*	S	5	73	18.	2.	116.	6444.*				*	*	293.*	*	*	*	
P	7	O	9	18	27*	S						*				*	*	*	*	*	*	
P	701	O	9	18	27*	S	7	73	96.	0.	1149.	11969.*				*	*	700.*	*	*	*	
P	8	P	9	18	27*	P	8	86	8.	18.	8.	1000.*	15.	5.	15.	976.*	*	*	*	7.*	7.*	16.
P	9	M	10	18	27*	P	8	86	161.	98.	68.	422.*	224.	126.	199.	889.*	*	*	*	240.*	240.*	215.
Q	5	D	16	18	27*	S	7	73	8.	1.	46.	5750.*				*	*	111.*	*	*	*	
Q	6	C	16	18	27*	S	5	73	18.	2.	80.	4444.*				*	*	199.*	*	*	*	
Q	7	B	16	18	27*	S	5	73	11.	4.	160.	14545.*				*	*	412.*	*	*	*	
Q	8	A	16	18	27*	S	5	73	41.	3.	40.	976.*				*	*	89.*	*	*	*	
Q	9	D	15	18	27*	S	5	73	27.	50.	13.	481.*				*	*	69.*	*	*	*	
R	3	G	17	18	27*	T						*				*	*	*	*	*	*	
R	4	H	17	18	27*	S	5	73	5.	5.	62.	12400.*				*	*	158.*	*	*	*	
R	5	E	16	18	27*	S	7	73	6.	3.	52.	8667.*				*	*	129.*	*	*	*	
R	6	F	16	18	27*	S	5	73	6.	3.	34.	5667.*				*	*	82.*	*	*	*	
R	7	G	16	18	27*	S	3	80	72.	0.	643.	8931.*				*	*	700.*	*	*	*	
R	8	H	16	18	27*	S	6	73	48.	32.	70.	1458.*				*	*	195.*	*	*	*	
S	2	K	17	18	27*	S	5	73	7.	5.	35.	5000.*				*	*	87.*	*	*	*	
S	3	J	17	18	27*	S	5	73	12.	11.	31.	2583.*				*	*	81.*	*	*	*	
S	5	L	16	18	27*	S	5	73	8.	4.	43.	5375.*				*	*	106.*	*	*	*	
S	6	K	16	18	27*	S	5	73	15.	7.	23.	1533.*				*	*	55.*	*	*	*	
S	7	J	16	18	27*	S	7	73	46.	138.	31.	674.*				*	*	200.*	*	*	*	
S	8	I	16	18	27*	T						*				*	*	*	*	*	*	
T	6	N	16	18	27*	T						*				*	*	*	*	*	*	
T	7	O	16	18	27*	S	0	76	236.	0.	617.	2614.*				*	*	700.*	*	*	*	

EMPIRE ABO UNIT OIL PRODUCTION= 4405. BOPD (TOTAL COL. A-5) 136565. BOPM

EMPIRE ABO UNIT WATER PRODUCTION= 7440. BWPD (TOTAL COL. A-5) 230661. BWPM

EMPIRE ABO UNIT GAS PRODUCTION= 68606. MCF/D (TOTAL COL. A-5) 2126796. MCF/M

EMPIRE ABO UNIT GOR= 15574. CF/B

EMPIRE ABO UNIT GAS INJECTED=	44706. MCF/D	1385888. MCF/M
OUTSIDE SOURCES GAS INJECTED=	0. MCF/D	0. MCF/M
TOTAL GAS INJECTED=	44706. MCF/D	1385888. MCF/M

EMPIRE ABO UNIT CUM. GAS INJ.=	157335. MMCF
OUTSIDE SOURCES CUM. GAS INJ.=	4062. MMCF
TOTAL CUMULATIVE GAS INJECTED=	161397. MMCF

TOTAL WATER INJ. (ABO FORMATION)= 6793. BWPD 210571. BWPM

TOTAL CUM. WATER INJ.= 17968736. BW

TOTAL VOIDAGE AVAIL. FOR TRANS= 79937. RSVB/D

TOTAL REQUESTED VOIDAGE TRANS= -311. RSVB/D

TOTAL NET VOIDAGE AT NUA= 70910. RSVB/D

TOTAL REQUESTED NET VOIDAGE= 63806. RSVB/D

PROJECT AREA-1972 NET DAILY RESERVOIR VOIDAGE= 56912. RSVB/D

TOTAL REQUESTED OIL ALLOWABLE= 4760. BOPD

(1-SEE ATTACHMENT I (B) COL. (9)).
(2-SEE ATTACHMENT I (A) COL. (10)).
(X= PRODUCTION LIMITED TO TWICE NUA)
(Y=LIMITED CAPACITY, SEE ATTACHMENT I (C) COL.'S (9) + 9(C).)

EMPIRE ABO PRESSURE MAINTENANCE PROJECT

MONTHLY REPORT FOR JAN. ,1987

ATTACHMENT I: ALLOWABLE CALCULATIONS BASED ON NET RESERVOIR VOIDAGE.

A) WELLS ACCEPTING TRANSFERRED ALLOWABLES	(1)	(2) QO= PER WELL ALLOW (A6/A5)	(3) GI/GP (1-(3)) FRACTION	(4) 1- GI/GP FRACTION	(5) RP,FROM COL. A-5 GOR MCF/BO	(6) RPN= EQU. 1A (5)X(4) MCF/BO	(7) VR(HC) (EQU. 1) RSVB/D	(8) VR(W) (EQU. 2) RSVB/D	(9) VRT= (7)+(8) TOTAL RES VOID RSVB/D	(10) VR(HC) PER WELL AT NUA (EQU. 1) RSVB/D
TCT NO.	WELL NO.	STBOPD								
G 312	21.	0.652	0.348	3.089	1.076	54.	-0.0	54.	365.

A) TOTALS: 21. 54. -0.0 54. 365.

B) WELLS TRANSFERING ALLOWABLES									
B 45	9.	0.0	1.000	2.556	2.556	58.	-5.3	53.	
B 46	85.	0.0	1.000	1.000	1.000	202.	3.7	206.	
B 47	40.	0.0	1.000	2.000	2.000	200.	166.7	366.	
C 34	22.	0.0	1.000	1.818	1.818	99.	-8.3	91.	
C 35	71.	0.0	1.000	1.254	1.254	216.	-8.3	207.	
C 36	21.	0.0	1.000	0.190	0.190	5.	-8.3	-3.	
C 38	142.	0.0	1.000	2.000	2.000	709.	-8.3	700.	
C 39	142.	0.0	1.000	2.000	2.000	709.	-8.3	700.	
C 42	44.	0.0	1.000	3.909	3.909	439.	-7.3	432.	
C 43	12.	0.0	1.000	5.583	5.583	172.	246.7	419.	
C 44	5.	0.0	1.000	0.0	0.0	0.	365.7	366.	
C 45	72.	0.0	1.000	0.194	0.194	19.	288.7	308.	
C 46	30.	0.0	1.000	4.667	4.667	359.	297.7	657.	
C 47	10.	0.0	1.000	1.100	1.100	26.	96.7	123.	
D 33	1.	0.0	1.000	500.333	500.333	743.	-6.3	737.	
D 35	142.	0.0	1.000	2.000	2.000	709.	-8.3	700.	
D 37	142.	0.0	1.000	2.000	2.000	709.	-8.3	700.	
D 40	8.	0.0	1.000	1.250	1.250	24.	31.7	56.	
D 41	6.	0.0	1.000	3.500	3.500	53.	451.7	505.	
D 42	17.	0.0	1.000	8.353	8.353	367.	59.7	427.	
D 43	11.	0.0	1.000	1.455	1.455	39.	148.7	188.	
E 26	2.	0.0	1.000	0.0	0.0	0.	-7.3	-7.	
E 27	3.	0.0	1.000	0.0	0.0	0.	-8.3	-8.	
E 28	15.	0.0	1.000	3.667	3.667	140.	-8.3	132.	
E 30	19.	0.0	1.000	14.903	14.903	738.	-8.3	730.	
E 31	22.	0.0	1.000	10.182	10.182	581.	-0.3	580.	
E 32	8.	0.0	1.000	33.512	33.512	741.	-8.3	733.	
E 33	6.	0.0	1.000	29.667	29.667	464.	-6.3	458.	
E 34	74.	0.0	1.000	3.821	3.821	725.	-8.3	717.	
E 341	2.	0.0	1.000	187.000	187.000	743.	-8.3	734.	
E 35	4.	0.0	1.000	75.000	75.000	742.	-8.3	734.	

E 351	9.	0.0	1.000	33.400	33.400	741.	-7.3	734.
E 361	0.	0.0	1.000	0.0	0.0	1695.	-2.8	1692.
E 38	0.	0.0	1.000	0.0	0.0	13.	325.7	339.
E 381	2.	0.0	1.000	8.500	8.500	44.	155.7	200.
E 383	3.	0.0	1.000	7.333	7.333	57.	487.8	545.
E 39	3.	0.0	1.000	1.333	1.333	10.	173.7	183.
E 391	0.	0.0	1.000	0.0	0.0	0.	-8.3	-8.
E 392	2.	0.0	1.000	4.500	4.500	23.	221.7	245.
E 395	0.	0.0	1.000	0.0	0.0	5.	123.7	129.
E 40	1.	0.0	1.000	0.0	0.0	0.	308.7	309.
E 41	30.	0.0	1.000	0.700	0.700	48.	248.7	296.
F 22	3.	0.0	1.000	4.000	4.000	31.	-8.3	22.
F 25	142.	0.0	1.000	2.000	2.000	709.	-8.3	700.
F 26	35.	0.0	1.000	8.184	8.184	735.	-8.3	726.
F 27	142.	0.0	1.000	2.000	2.000	709.	-8.3	700.
F 28	127.	0.0	1.000	2.240	2.240	712.	-8.3	704.
F 29	10.	0.0	1.000	29.179	29.179	741.	-8.3	732.
F 30	70.	0.0	1.000	4.079	4.079	726.	-8.3	718.
F 31	142.	0.0	1.000	2.000	2.000	709.	-8.3	700.
F 321	1.	0.0	1.000	*258.000	*258.000	743.	-8.3	734.
F 322	0.	0.0	1.000	*651.000	*651.000	743.	-7.3	736.
F 33	16.	0.0	1.000	17.333	17.333	739.	-8.3	731.
F 333	1.	0.0	1.000	*512.000	*512.000	743.	-2.1	741.
F 334	2.	0.0	1.000	*147.500	*147.500	742.	-1.1	741.
F 34	2.	0.0	1.000	*120.000	*120.000	742.	-8.3	734.
F 341	1.	0.0	1.000	*226.500	*226.500	743.	-8.3	734.
F 35	1.	0.0	1.000	*319.750	*319.750	743.	0.7	743.
F 352	0.	0.0	1.000	0.0	0.0	4458.	-2.8	4455.
F 361	1.	0.0	1.000	*293.333	*293.333	743.	154.9	898.
F 372	1.	0.0	1.000	13.000	13.000	34.	166.9	201.
F 375	2.	0.0	1.000	4.500	4.500	23.	218.8	242.
F 38	0.	0.0	1.000	0.0	0.0	34.	378.7	413.
F 382	1.	0.0	1.000	22.000	22.000	57.	451.7	509.
F 383	1.	0.0	1.000	13.000	13.000	34.	309.7	343.
F 39	1.	0.0	1.000	8.000	8.000	21.	446.7	467.
F 391	26.	0.0	1.000	0.077	0.077	5.	87.7	93.
F 40	0.	0.0	1.000	0.0	0.0	3.	97.7	100.
G 19	142.	0.0	1.000	2.000	2.000	709.	-8.3	700.
G 20	73.	0.0	1.000	3.315	3.315	615.	-8.3	607.
G 21	50.	0.0	1.000	5.643	5.643	731.	-8.3	722.
G 22	142.	0.0	1.000	2.000	2.000	709.	-8.3	700.
G 23	37.	0.0	1.000	7.605	7.605	734.	-8.3	726.
G 24	142.	0.0	1.000	2.000	2.000	709.	-8.3	700.
G 28	168.	0.0	1.000	1.693	1.693	702.	-8.3	694.
G 31	0.	0.0	1.000	0.0	0.0	4180.	-2.3	4178.
G 33	1.	0.0	1.000	*556.000	*556.000	743.	-6.3	737.
G 34	1.	0.0	1.000	*315.000	*315.000	743.	49.7	792.
G 341	0.	0.0	1.000	0.0	0.0	4442.	-8.3	4434.
G 36	0.	0.0	1.000	*680.500	*680.500	743.	7.7	751.
G 38	0.	0.0	1.000	0.0	0.0	0.	178.7	179.
H 12	42.	0.0	1.000	6.524	6.524	707.	-8.3	698.
H 17	31.	0.0	1.000	9.185	9.185	735.	-8.3	727.
H 18	1.	0.0	1.000	*348.500	*348.500	743.	-8.3	734.
H 19	142.	0.0	1.000	2.000	2.000	709.	-8.3	700.
H 20	0.	0.0	1.000	********	********	743.	-8.3	735.
H 21	142.	0.0	1.000	2.000	2.000	709.	-8.3	700.
H 22	0.	0.0	1.000	0.0	0.0	1483.	-8.3	1475.
H 32	37.	0.0	1.000	7.577	7.577	734.	-8.3	726.
H 331	6.	0.0	1.000	2.333	2.333	35.	27.7	63.
H 34	1.	0.0	1.000	*425.666	*425.666	743.	-8.3	734.

I 10	142.	0.0	1.000	2.000	2.000	709.	-8.3	700.
I 11	1.	0.0	1.000	*404.200	*404.200	743.	-7.3	735.
I 13	1.	0.0	1.000	*518.500	*518.500	743.	-7.3	736.
I 17	2.	0.0	1.000	*168.143	*168.143	743.	-8.3	734.
I 18	142.	0.0	1.000	2.000	2.000	709.	-8.3	700.
I 23	21.	0.0	1.000	13.810	13.810	738.	-8.3	730.
I 251	2.	0.0	1.000	*152.750	*152.750	742.	-8.3	734.
I 29	56.	0.0	1.000	3.875	3.875	554.	54.7	609.
I 30	14.	0.0	1.000	1.286	1.286	44.	1.7	45.
J 8	3.	0.0	1.000	3.000	3.000	23.	-8.3	15.
J 9	26.	0.0	1.000	11.000	11.000	737.	-8.3	728.
J 10	48.	0.0	1.000	5.965	5.965	731.	-8.3	723.
J 11	85.	0.0	1.000	3.331	3.331	722.	-8.3	714.
J 12	142.	0.0	1.000	2.000	2.000	709.	-8.3	700.
J 13	27.	0.0	1.000	10.538	10.538	736.	-8.3	728.
J 17	26.	0.0	1.000	10.789	10.789	737.	-8.3	728.
J 18	1.	0.0	1.000	*517.000	*517.000	743.	-8.3	735.
J 191	6.	0.0	1.000	46.151	46.151	741.	-8.3	733.
J 20	0.	0.0	1.000	0.0	0.0	178.	-8.3	170.
J 23	8.	0.0	1.000	35.071	35.071	741.	-8.3	733.
J 27	1.	0.0	1.000	63.000	63.000	165.	119.7	284.
K 7	142.	0.0	1.000	2.000	2.000	709.	-8.3	700.
K 8	26.	0.0	1.000	11.018	11.018	737.	-8.3	728.
K 11	2.	0.0	1.000	*150.250	*150.250	742.	-8.3	734.
K 191	30.	0.0	1.000	9.372	9.372	736.	-2.8	733.
K 194	21.	0.0	1.000	13.548	13.548	738.	-8.3	730.
K 24	201.	0.0	1.000	0.284	0.284	101.	5.7	106.
L 5	0.	0.0	1.000	0.0	0.0	1863.	-7.3	1855.
L 6	0.	0.0	1.000	0.0	0.0	1368.	-8.3	1360.
L 7	29.	0.0	1.000	9.800	9.800	736.	-8.3	728.
L 8	66.	0.0	1.000	3.470	3.470	583.	-8.3	575.
L 11	41.	0.0	1.000	6.892	6.892	733.	-8.3	725.
L 141	5.	0.0	1.000	57.600	57.600	742.	-2.8	739.
L 151	25.	0.0	1.000	11.392	11.392	737.	-2.8	734.
L 153	4.	0.0	1.000	68.864	68.864	742.	-8.3	734.
L 154	2.	0.0	1.000	*139.636	*139.636	742.	-8.3	734.
L 18	1.	0.0	1.000	*219.400	*219.400	743.	11.7	754.
L 19	51.	0.0	1.000	5.566	5.566	731.	-8.3	722.
M 6	142.	0.0	1.000	2.000	2.000	709.	-8.3	700.
M 901	0.	0.0	1.000	*715.000	*715.000	743.	-8.3	735.
M 10	8.	0.0	1.000	35.556	35.556	741.	-8.3	733.
M 13	4.	0.0	1.000	69.667	69.667	742.	139.7	882.
M 14	22.	0.0	1.000	13.057	13.057	738.	-8.3	729.
N 5	24.	0.0	1.000	1.875	1.875	112.	-7.3	105.
N 6	16.	0.0	1.000	11.313	11.313	470.	-4.3	465.
N 8	24.	0.0	1.000	11.776	11.776	737.	-8.3	729.
O 4	11.	0.0	1.000	8.364	8.364	238.	-7.3	231.
O 5	17.	0.0	1.000	4.294	4.294	187.	-5.3	182.
O 6	17.	0.0	1.000	16.378	16.378	739.	1.7	740.
O 9	145.	0.0	1.000	0.862	0.862	292.	-2.3	290.
P 4	15.	0.0	1.000	4.267	4.267	164.	-7.3	156.
P 5	15.	0.0	1.000	9.067	9.067	352.	-8.3	344.
P 6	18.	0.0	1.000	6.444	6.444	299.	-6.3	293.
P 701	24.	0.0	1.000	11.969	11.969	737.	-8.3	729.
Q 5	8.	0.0	1.000	5.750	5.750	118.	-7.3	111.
Q 6	18.	0.0	1.000	4.444	4.444	205.	-6.3	199.
Q 7	11.	0.0	1.000	14.545	14.545	416.	-4.3	412.
Q 8	41.	0.0	1.000	0.976	0.976	95.	-5.3	89.
Q 9	27.	0.0	1.000	0.481	0.481	27.	41.7	69.
R 4	5.	0.0	1.000	12.400	12.400	161.	-3.3	158.

R	5	6.	0.0	1.000	8.667	8.667	135.	-5.3	129.			
R	6	6.	0.0	1.000	5.667	5.667	87.	-5.3	82.			
R	7	32.	0.0	1.000	8.931	8.931	735.	-8.3	727.			
R	8	48.	0.0	1.000	1.458	1.458	172.	23.7	195.			
S	2	7.	0.0	1.000	5.000	5.000	90.	-3.3	87.			
S	3	12.	0.0	1.000	2.583	2.583	78.	2.7	81.			
S	5	8.	0.0	1.000	5.375	5.375	111.	-4.3	106.			
S	6	15.	0.0	1.000	1.533	1.533	57.	-1.3	55.			
S	7	46.	0.0	1.000	0.674	0.674	70.	129.7	200.			
T	7	109.	0.0	1.000	2.614	2.614	717.	-8.3	708.			

B) TOTALS: 5422. 90321. 6468.5 96790.

C) CAPACITY WELLS, ALLOWABLE CALCULATIONS

										(9A) VRT FOR TA MAX GOR WELL IB(9) RSVB/D	(9B) RATIO VRT(9A)/VRT(9) (Z) FRACTION	(9C) REQ. CAP. ALLOW=COL. (2) OR COL (2)X(9B) BOPD
C	37	2.	0.652	0.348	563.677	196.368	1027.	-8.3	1019.	700.	0.69	2.
C	40	92.	0.652	0.348	1.117	0.389	71.	13.0	84.	700.	8.30	92.
C	41	90.	0.652	0.348	0.745	0.260	39.	142.8	182.	700.	3.84	90.
D	34	10.	0.652	0.348	55.361	19.286	502.	-8.3	494.	700.	1.42	10.
D	36	60.	0.652	0.348	0.046	0.016	-12.	8.9	-3.	704.	223.06	60.
D	361	15.	0.652	0.348	1.639	0.571	19.	17.1	36.	704.	19.63	15.
D	38	0.	0.652	0.348	0.0	0.0	0.	-8.3	-8.	700.	84.37	0.
D	39	25.	0.652	0.348	1.230	0.428	22.	144.7	167.	700.	4.20	25.
D	44	34.	0.652	0.348	2.078	0.724	56.	556.7	613.	700.	1.14	34.
E	36	30.	0.652	0.348	2.735	0.953	68.	405.2	473.	706.	1.49	30.
E	362	120.	0.652	0.348	0.348	0.121	9.	314.3	323.	706.	2.18	120.
E	363	35.	0.652	0.348	12.654	4.408	395.	165.1	560.	700.	1.25	35.
E	37	0.	0.652	0.348	6.500	2.264	0.	-1.7	-2.	707.	425.87	0.
E	371	0.	0.652	0.348	1.139	0.397	0.	-1.7	-2.	707.	425.87	0.
E	372	0.	0.652	0.348	5.500	1.916	0.	-1.7	-2.	707.	425.87	0.
E	373	85.	0.652	0.348	0.290	0.101	2.	463.3	465.	707.	1.52	85.
E	374	50.	0.652	0.348	0.832	0.290	26.	444.7	471.	707.	1.50	50.
E	382	0.	0.652	0.348	0.0	0.0	0.	-4.1	-4.	704.	169.75	0.
E	384	0.	0.652	0.348	0.0	0.0	0.	-8.3	-8.	700.	84.37	0.
E	393	0.	0.652	0.348	0.0	0.0	0.	-8.3	-8.	700.	84.37	0.
F	32	2.	0.652	0.348	52.638	18.337	95.	-8.3	87.	700.	8.03	2.
F	331	93.	0.652	0.348	0.704	0.245	37.	8.4	46.	707.	15.48	93.
F	332	6.	0.652	0.348	60.151	20.955	327.	-1.8	326.	707.	2.17	6.
F	335	10.	0.652	0.348	22.687	7.903	204.	-4.1	200.	704.	3.52	10.
F	336	2.	0.652	0.348	37.682	13.127	68.	-4.0	64.	704.	10.98	2.
F	342	5.	0.652	0.348	119.564	41.652	544.	-3.4	540.	704.	1.30	5.
F	343	5.	0.652	0.348	76.675	26.711	348.	-4.1	344.	704.	2.05	5.
F	351	5.	0.652	0.348	87.564	30.505	398.	51.9	450.	706.	1.57	5.
F	353	60.	0.652	0.348	5.813	2.025	303.	429.2	732.	706.	0.96	60.
F	354	100.	0.652	0.348	19.155	6.673	1721.	-6.6	1715.	700.	0.41	100.
F	36	10.	0.652	0.348	41.764	14.549	378.	4.0	382.	707.	1.85	10.
F	362	66.	0.652	0.348	1.778	0.620	91.	74.8	166.	707.	4.26	66.
F	363	30.	0.652	0.348	1.581	0.551	36.	256.2	292.	707.	2.42	30.
F	364	40.	0.652	0.348	4.378	1.525	150.	474.6	624.	700.	1.12	40.
F	37	0.	0.652	0.348	2.714	0.946	0.	-2.1	-2.	707.	340.50	0.
F	371	70.	0.652	0.348	0.035	0.012	-15.	395.0	380.	707.	1.86	70.
F	373	30.	0.652	0.348	2.735	0.953	68.	547.9	615.	707.	1.15	30.
F	374	50.	0.652	0.348	0.799	0.278	24.	487.4	512.	704.	1.38	50.

F 376	12.	0.652	0.348	4.000	1.393	41.	-8.3	33.	700.	21.52	12.		
F 381	0.	0.652	0.348	0.0	0.0	0.	-8.3	-8.	700.	84.37	0.		
G 25	12.	0.652	0.348	14.087	4.908	151.	-7.8	143.	700.	4.88	12.		
G 26	2.	0.652	0.348	33.040	11.510	60.	-7.7	52.	700.	13.45	2.		
G 27	2.	0.652	0.348	83.928	29.238	152.	-8.3	144.	700.	4.86	2.		
G 29	2.	0.652	0.348	30.344	10.571	55.	-3.8	51.	704.	13.81	2.		
G 291	6.	0.652	0.348	51.721	18.018	281.	-4.1	277.	704.	2.54	6.		
G 30	20.	0.652	0.348	18.537	6.458	333.	-4.1	329.	704.	2.14	20.		
G 301	40.	0.652	0.348	0.912	0.318	24.	-4.1	19.	704.	36.30	40.		
G 311	14.	0.652	0.348	33.765	11.763	427.	-1.7	426.	707.	1.66	14.		
G 313	37.	0.652	0.348	3.104	1.081	96.	-1.0	95.	707.	7.47	37.		
G 314	25.	0.652	0.348	0.733	0.255	11.	127.9	139.	707.	5.10	25.		
G 315	20.	0.652	0.348	0.781	0.272	9.	-1.7	8.	707.	91.30	20.		
G 32	40.	0.652	0.348	1.133	0.395	32.	-1.7	30.	707.	23.58	40.		
G 321	0.	0.652	0.348	192.722	67.138	0.	-1.7	-2.	707.	425.87	0.		
G 322	28.	0.652	0.348	22.503	7.840	567.	-1.7	566.	707.	1.25	28.		
G 323	3.	0.652	0.348	19.837	6.911	54.	-1.7	52.	707.	13.63	3.		
G 324	7.	0.652	0.348	16.677	5.810	105.	-1.2	103.	707.	6.83	7.		
G 331	23.	0.652	0.348	19.145	6.670	396.	3.9	400.	707.	1.77	23.		
G 332	15.	0.652	0.348	50.039	17.432	680.	-1.6	679.	707.	1.04	15.		
G 333	3.	0.652	0.348	62.617	21.814	170.	-2.1	168.	707.	4.20	3.		
G 334	2.	0.652	0.348	340.400	118.585	620.	-1.0	619.	707.	1.14	2.		
G 342	19.	0.652	0.348	4.256	1.483	69.	41.2	110.	704.	6.39	19.		
G 343	2.	0.652	0.348	83.580	29.117	152.	-1.8	150.	704.	4.69	2.		
G 35	4.	0.652	0.348	50.861	17.719	184.	67.2	252.	707.	2.81	4.		
G 351	10.	0.652	0.348	100.218	34.913	911.	32.1	943.	707.	0.75	10.		
G 352	2.	0.652	0.348	98.167	34.198	178.	67.6	246.	707.	2.87	2.		
G 353	10.	0.652	0.348	18.241	6.355	164.	78.5	242.	707.	2.92	10.		
G 361	20.	0.652	0.348	3.601	1.254	61.	278.3	339.	700.	2.07	20.		
G 37	0.	0.652	0.348	1.667	0.581	0.	-8.3	-8.	700.	84.37	0.		
H 23	16.	0.652	0.348	81.075	28.244	1178.	-8.3	1170.	700.	0.60	16.		
H 24	20.	0.652	0.348	18.390	6.406	330.	-8.3	322.	700.	2.17	20.		
H 25	17.	0.652	0.348	37.123	12.932	571.	-8.3	563.	700.	1.24	17.		
H 26	15.	0.652	0.348	22.871	7.968	309.	-4.1	305.	704.	2.31	15.		
H 261	20.	0.652	0.348	9.621	3.352	171.	-3.9	167.	704.	4.23	20.		
H 27	2.	0.652	0.348	47.200	16.443	86.	-2.8	83.	706.	8.53	2.		
H 271	2.	0.652	0.348	69.314	24.147	126.	-2.6	123.	706.	5.73	2.		
H 272	2.	0.652	0.348	85.976	29.952	156.	-2.8	153.	706.	4.60	2.		
H 28	10.	0.652	0.348	26.995	9.404	244.	-4.1	239.	704.	2.94	10.		
H 281	12.	0.652	0.348	24.320	8.472	263.	-4.1	259.	704.	2.72	12.		
H 29	28.	0.652	0.348	12.684	4.419	317.	4.6	322.	707.	2.20	28.		
H 291	10.	0.652	0.348	12.859	4.480	115.	5.1	120.	707.	5.90	10.		
H 292	2.	0.652	0.348	54.710	19.059	99.	9.6	109.	707.	6.50	2.		
H 293	5.	0.652	0.348	38.762	13.503	175.	-1.4	174.	707.	4.06	5.		
H 294	10.	0.652	0.348	22.600	7.873	204.	-1.4	202.	707.	3.50	10.		
H 295	20.	0.652	0.348	14.473	5.042	259.	-1.4	258.	707.	2.75	20.		
H 30	0.	0.652	0.348	40.750	14.196	0.	-2.1	-2.	707.	340.50	0.		
H 301	10.	0.652	0.348	27.355	9.530	247.	14.9	262.	707.	2.70	10.		
H 302	10.	0.652	0.348	46.026	16.034	417.	-2.1	415.	707.	1.70	10.		
H 303	0.	0.652	0.348	0.500	0.174	0.	-2.1	-2.	707.	340.50	0.		
H 31	0.	0.652	0.348	0.500	0.174	0.	-2.8	-3.	706.	255.12	0.		
H 311	5.	0.652	0.348	6.833	2.381	30.	19.8	50.	706.	14.19	5.		
H 312	0.	0.652	0.348	47.000	16.373	0.	-2.8	-3.	706.	255.12	0.		
H 321	16.	0.652	0.348	18.469	6.434	265.	38.6	304.	704.	2.32	16.		
H 322	21.	0.652	0.348	3.516	1.225	62.	18.3	80.	704.	8.75	21.		
H 33	18.	0.652	0.348	6.953	2.422	110.	199.9	310.	700.	2.26	18.		
H 341	2.	0.652	0.348	99.587	34.693	181.	-5.8	175.	700.	4.00	2.		
H 35	3.	0.652	0.348	24.613	8.574	67.	51.7	118.	700.	5.92	3.		
I 12	9.	0.652	0.348	34.887	12.153	284.	-8.0	276.	700.	2.54	9.		
I 16	9.	0.652	0.348	13.338	4.647	107.	-8.1	99.	700.	7.07	9.		

I 19	5.	0.652	0.348	53.234	18.545	241.	-8.3	233.	700.	3.00	5.	
I 20	55.	0.652	0.348	18.459	6.431	912.	-8.3	904.	700.	0.77	55.	
I 21	23.	0.652	0.348	33.748	11.757	702.	-7.4	694.	700.	1.01	23.	
I 22	6.	0.652	0.348	13.932	4.854	75.	-6.9	68.	700.	10.33	6.	
I 231	16.	0.652	0.348	17.385	6.056	250.	-7.8	242.	700.	2.90	16.	
I 24	12.	0.652	0.348	41.427	14.432	450.	-8.0	442.	700.	1.58	12.	
I 25	8.	0.652	0.348	56.974	19.848	413.	-8.3	405.	700.	1.73	8.	
I 26	6.	0.652	0.348	23.305	8.119	126.	-4.1	122.	704.	5.78	6.	
I 261	11.	0.652	0.348	29.045	10.118	289.	-4.1	284.	704.	2.48	11.	
I 27	15.	0.652	0.348	26.061	9.079	353.	-1.9	351.	707.	2.01	15.	
I 271	5.	0.652	0.348	81.205	28.289	369.	-2.1	367.	707.	1.93	5.	
I 272	15.	0.652	0.348	0.0	0.0	-4.	-2.1	-6.	707.	123.90	15.	
I 273	15.	0.652	0.348	16.964	5.910	228.	2.9	231.	707.	3.06	15.	
I 28	30.	0.652	0.348	14.574	5.077	391.	-2.1	389.	707.	1.82	30.	
I 281	15.	0.652	0.348	1.927	0.671	23.	-2.1	21.	707.	34.22	15.	
I 282	20.	0.652	0.348	6.207	2.162	108.	15.1	123.	707.	5.73	20.	
I 283	12.	0.652	0.348	6.841	2.383	72.	-1.3	71.	707.	10.00	12.	
I 291	40.	0.652	0.348	0.988	0.344	26.	13.3	40.	704.	17.75	40.	
I 292	8.	0.652	0.348	13.677	4.765	98.	1.9	100.	704.	7.07	8.	
J 14	10.	0.652	0.348	35.403	12.333	320.	-7.6	313.	700.	2.24	10.	
J 15	13.	0.652	0.348	20.020	6.974	234.	-8.1	226.	700.	3.10	13.	
J 19	30.	0.652	0.348	10.032	3.495	267.	-7.5	260.	700.	2.70	30.	
J 201	24.	0.652	0.348	40.513	14.114	880.	-2.8	878.	706.	0.80	24.	
J 202	19.	0.652	0.348	27.964	9.742	480.	-2.8	477.	706.	1.48	19.	
J 203	15.	0.652	0.348	27.417	9.551	371.	-2.8	368.	706.	1.92	15.	
J 21	9.	0.652	0.348	39.175	13.647	319.	-2.0	317.	707.	2.23	9.	
J 211	1.	0.652	0.348	123.178	42.912	112.	-2.1	110.	707.	6.43	1.	
J 212	16.	0.652	0.348	33.300	11.601	482.	-0.8	481.	707.	1.47	16.	
J 213	13.	0.652	0.348	3.611	1.258	40.	-2.1	38.	707.	18.81	13.	
J 22	1.	0.652	0.348	62.887	21.908	57.	-2.8	54.	706.	13.00	1.	
J 221	7.	0.652	0.348	57.487	20.027	365.	-2.7	362.	706.	1.95	7.	
J 222	2.	0.652	0.348	36.161	12.597	65.	-2.8	63.	706.	11.26	2.	
J 231	15.	0.652	0.348	41.309	14.391	561.	-1.4	560.	707.	1.26	15.	
J 232	47.	0.652	0.348	38.164	13.295	1623.	-0.3	1623.	707.	0.44	47.	
J 233	10.	0.652	0.348	71.046	24.750	645.	-1.7	643.	707.	1.10	10.	
J 234	1.	0.652	0.348	57.095	19.890	52.	-1.4	50.	707.	14.04	1.	
J 235	3.	0.652	0.348	150.867	52.557	412.	-1.7	410.	707.	1.72	3.	
J 24	38.	0.652	0.348	15.306	5.332	521.	-4.1	517.	704.	1.36	38.	
J 241	26.	0.652	0.348	0.932	0.325	16.	-2.3	14.	704.	52.12	26.	
J 26	117.	0.652	0.348	8.089	2.818	834.	1.0	835.	700.	0.84	117.	
J 28	7.	0.652	0.348	3.189	1.111	19.	98.5	117.	700.	5.98	7.	
K 9	25.	0.652	0.348	207.184	72.177	4714.	-7.8	4707.	700.	0.15	25.	
K 10	21.	0.652	0.348	0.183	0.064	-2.	-7.6	-9.	700.	76.16	21.	
K 12	7.	0.652	0.348	24.459	8.521	154.	-8.0	146.	700.	4.79	7.	
K 13	3.	0.652	0.348	72.513	25.261	198.	-4.1	193.	704.	3.64	3.	
K 131	5.	0.652	0.348	18.660	6.501	84.	-4.1	80.	704.	8.84	5.	
K 14	11.	0.652	0.348	106.470	37.091	1065.	-1.7	1063.	707.	0.66	11.	
K 141	24.	0.652	0.348	12.355	4.304	264.	1.9	266.	707.	2.65	24.	
K 142	51.	0.652	0.348	12.146	4.231	552.	1.1	553.	707.	1.28	51.	
K 143	64.	0.652	0.348	1.544	0.538	75.	13.3	88.	707.	8.04	64.	
K 15	26.	0.652	0.348	18.526	6.454	433.	-8.0	425.	700.	1.65	26.	
K 16	12.	0.652	0.348	3.566	1.242	36.	13.5	50.	704.	14.22	12.	
K 161	48.	0.652	0.348	0.854	0.297	26.	-1.8	24.	704.	29.42	48.	
K 17	55.	0.652	0.348	15.126	5.269	745.	-8.3	737.	700.	0.95	55.	
K 18	52.	0.652	0.348	10.557	3.678	488.	15.9	504.	707.	1.40	52.	
K 181	20.	0.652	0.348	18.546	6.461	333.	-1.7	332.	707.	2.13	20.	
K 182	24.	0.652	0.348	0.351	0.122	2.	-1.7	0.	707.	3353.07	24.	
K 183	62.	0.652	0.348	5.120	1.784	274.	4.5	279.	707.	2.54	62.	
K 184	82.	0.652	0.348	11.466	3.994	837.	-1.7	835.	707.	0.85	82.	
K 19	30.	0.652	0.348	35.530	12.378	964.	0.6	965.	706.	0.73	30.	

K 192	37.	0.652	0.348	16.717	5.824	555.	41.9	597.	706.	1.18*	37.	
K 193	13.	0.652	0.348	35.274	12.288	415.	-8.3	406.	700.	1.72*	13.	
K 20	23.	0.652	0.348	19.183	6.683	397.	-1.9	395.	700.	1.77*	23.	
K 21	18.	0.652	0.348	26.012	9.062	422.	-4.1	418.	704.	1.68*	18.	
K 211	8.	0.652	0.348	21.774	7.585	157.	-4.1	153.	704.	4.61*	8.	
K 22	14.	0.652	0.348	21.531	7.501	271.	-8.3	263.	700.	2.66*	14.	
K 23	23.	0.652	0.348	15.341	5.344	316.	-4.1	312.	704.	2.26*	23.	
K 231	26.	0.652	0.348	21.739	7.573	509.	-3.9	505.	704.	1.40*	26.	
L 9	9.	0.652	0.348	15.603	5.436	126.	-8.2	118.	700.	5.96*	9.	
L 10	33.	0.652	0.348	18.589	6.476	551.	-8.3	543.	700.	1.29*	33.	
L 111	36.	0.652	0.348	4.241	1.478	130.	-8.0	122.	700.	5.72*	36.	
L 12	37.	0.652	0.348	15.646	5.451	519.	-2.1	517.	707.	1.37*	37.	
L 121	33.	0.652	0.348	8.269	2.881	241.	-0.8	240.	707.	2.95*	33.	
L 122	4.	0.652	0.348	40.650	14.161	147.	-2.1	145.	707.	4.87*	4.	
L 123	22.	0.652	0.348	10.467	3.646	205.	-0.3	204.	707.	3.46*	22.	
L 13	1.	0.652	0.348	*446.354	*155.496	407.	6.3	413.	707.	1.71*	1.	
L 131	16.	0.652	0.348	24.914	8.679	359.	0.1	359.	707.	1.97*	16.	
L 132	27.	0.652	0.348	20.360	7.093	494.	21.4	516.	707.	1.37*	27.	
L 133	32.	0.652	0.348	8.835	3.078	250.	-1.0	249.	707.	2.84*	32.	
L 134	16.	0.652	0.348	25.390	8.845	366.	1.6	368.	707.	1.92*	16.	
L 14	32.	0.652	0.348	14.750	5.138	422.	2.7	425.	706.	1.66*	32.	
L 142	9.	0.652	0.348	19.920	6.940	161.	-0.8	160.	706.	4.40*	9.	
L 143	40.	0.652	0.348	22.377	7.796	806.	-6.8	799.	700.	0.88*	40.	
L 15	19.	0.652	0.348	35.388	12.328	608.	-1.9	606.	706.	1.16*	19.	
L 152	15.	0.652	0.348	27.002	9.407	365.	-1.5	364.	706.	1.94*	15.	
L 155	10.	0.652	0.348	21.796	7.593	196.	-4.1	192.	704.	3.67*	10.	
L 156	16.	0.652	0.348	14.164	4.934	203.	-0.5	202.	704.	3.49*	16.	
L 16	64.	0.652	0.348	10.119	3.525	575.	6.4	581.	700.	1.21*	64.	
L 17	32.	0.652	0.348	13.710	4.776	392.	0.2	392.	704.	1.80*	32.	
L 171	35.	0.652	0.348	6.543	2.279	200.	3.7	204.	704.	3.45*	35.	
L 20	32.	0.652	0.348	2.141	0.746	55.	-7.5	47.	700.	14.85*	32.	
L 22	18.	0.652	0.348	2.997	1.044	45.	-4.0	41.	700.	17.16*	18.	
M 7	22.	0.652	0.348	44.440	15.482	886.	-8.3	877.	700.	0.80*	22.	
M 8	15.	0.652	0.348	35.066	12.216	476.	-8.3	467.	700.	1.50*	15.	
M 9	45.	0.652	0.348	12.112	4.219	486.	-8.3	478.	700.	1.47*	45.	
M 101	11.	0.652	0.348	34.386	11.979	342.	-8.3	334.	700.	2.10*	11.	
M 11	51.	0.652	0.348	2.039	0.710	82.	-5.7	77.	700.	9.12*	51.	
M 12	5.	0.652	0.348	32.047	11.164	145.	-2.5	142.	706.	4.96*	5.	
M 121	37.	0.652	0.348	17.539	6.110	582.	-2.8	580.	706.	1.22*	37.	
M 123	4.	0.652	0.348	24.870	8.664	90.	-2.8	87.	706.	8.12*	4.	
M 132	9.	0.652	0.348	17.391	6.058	140.	-1.8	139.	704.	5.08*	9.	
M 133	1.	0.652	0.348	22.323	7.777	20.	-1.6	19.	704.	38.08*	1.	
M 141	7.	0.652	0.348	26.571	9.256	168.	0.4	168.	700.	4.16*	7.	
M 15	5.	0.652	0.348	12.717	4.430	57.	56.2	113.	707.	6.25*	5.	
M 151	20.	0.652	0.348	34.398	11.983	622.	40.6	663.	707.	1.07*	20.	
M 152	14.	0.652	0.348	39.283	13.685	498.	0.7	499.	707.	1.42*	14.	
M 153	5.	0.652	0.348	44.600	15.537	202.	-1.7	200.	707.	3.53*	5.	
M 16	18.	0.652	0.348	7.037	2.451	111.	34.4	145.	700.	4.81*	18.	
N 7	22.	0.652	0.348	16.314	5.683	322.	-8.3	313.	700.	2.23*	22.	
N 9	25.	0.652	0.348	5.947	2.072	129.	-7.2	122.	700.	5.73*	25.	
N 901	17.	0.652	0.348	4.104	1.430	59.	-0.1	59.	700.	11.80*	17.	
N 10	50.	0.652	0.348	26.124	9.101	1178.	-8.3	1170.	700.	0.60*	50.	
N 11	21.	0.652	0.348	32.073	11.173	609.	15.2	624.	700.	1.12*	21.	
N 12	46.	0.652	0.348	20.662	7.198	855.	11.6	867.	700.	0.81*	46.	
N 13	1.	0.652	0.348	38.523	13.420	35.	76.7	112.	700.	6.28*	1.	
O 7	28.	0.652	0.348	8.260	2.878	204.	-8.3	196.	700.	3.58*	28.	
O 8	10.	0.652	0.348	44.306	15.435	401.	-8.3	393.	700.	1.78*	10.	
P 8	16.	0.652	0.348	0.976	0.340	10.	-3.3	7.	700.	99.09*	16.	
P 9	215.	0.652	0.348	0.889	0.310	122.	117.7	240.	700.	2.92*	215.	

(Z NOTE: CAPACITY WELLS ALLOWED TO PRODUCE AT ANY RATE AS LONG AS VRT(9A)/VRT(9) > OR = 1.0
WHEN VRT(9A)/VRT(9) IS LESS THAN 1.0, DAILY OIL
ALLOWABLE OF CAPACITY WELLS MUST BE NO GREATER
THAN (2) X VRT(9A)/VRT(9) OR (2) X (9B)).

FLUID FACTORS: (BASED ON PREVIOUS RESERVOIR PRESSURE SURVEY, 942. PSI, DEC , 1986):
********** BO, OIL FORMATION VOLUME FACTOR, RES. BBLS/STBO = 1.333
BG, GAS FORMATION VOLUME FACTOR, RES. BBLS/MCF =2.616
RS, SOLUTION GAS-OIL RATIO, MCF/STBO = 0.602
BW, WATER FORMATION VOLUME FACTOR, RES. BBLS/STBBL = 1.000

ESTABLISHED CONSTANTS: QWE, NATURAL WATER ENCROACHMENT, STBW/DAY, BASED ON NUMERIC MODEL STUDIES = 1950. BWPD
********** QO, TOP PER-WELL N.U.A., STBOPD= 142.

BASIC VOIDAGE EQUATIONS: 1) VR(HC)=QO X (BO + (RPN- RS) X BG), NET HYDROCARBON RESV. VOIDAGE, RSVB/D
********** 1A) RPN= RP X (1.0 - GI/GP), MCF/STBO
2) VRW= (QWP - QWE(PER WELL)) X BW, NET RESV. SPACE VOIDED BY WATER, RSVB/D
3) VRT= VR(HC) + VRW, TOTAL NET RESV. SPACE VOIDED ON DAILY BASIS, RSVB/D

ADDITIONAL ALLOWABLE IN EXCESS OF 33272. BOPD

(BASED ON R=(GI/GA)X10.0, RATIO)

ADDITIONAL ALLOWABLE = 41.05 X (2RXR +R),BOPD

R= (GI/GA)X10.0 = 10.000

GAS BANK CREDITS USED = 0. MCF

ADDITIONAL ALLOWABLE = 7799. BOPD

EMPIRE ABO PRESSURE MAINTENANCE PROJECT

ATLANTIC RICHFIELD COMPANY - OPERATOR

ATTACHMENT II: ALLOWABLE SUMMARY - SUPPLEMENTAL FORM

TOTAL REQUESTED OIL ALLOWABLE FOR JAN.-APR.,1987 IS 4760. BOPD

EMPIRE ABO UNIT	TCT NO.	WELL NO.	UN	S	T	R	WELL STATUS	DAILY ALLOW BOPD	MONTHLY ALLOW BOPM
EMPIRE ABO UNIT	B	40	H	26	17	28	S.I.		
EMPIRE ABO UNIT	B	45	E	30	17	29	S.I.		
EMPIRE ABO UNIT	B	46	F	30	17	29	S.I.		
EMPIRE ABO UNIT	B	47	G	30	17	29	S.I.		
EMPIRE ABO UNIT	B	48	H	30	17	29	INJ.		
EMPIRE ABO UNIT	B	49	E	29	17	29	INJ.		
EMPIRE ABO UNIT	C	34	K	27	17	28	S.I.		
EMPIRE ABO UNIT	C	35	J	27	17	28	S.I.		
EMPIRE ABO UNIT	C	36	I	27	17	28	S.I.		
EMPIRE ABO UNIT	C	37	L	26	17	28	F	2.0	62.0
EMPIRE ABO UNIT	C	38	K	26	17	28	INJ.		
EMPIRE ABO UNIT	C	39	J	26	17	28	INJ.		
EMPIRE ABO UNIT	C	40	I	26	17	28	F	92.0	2852.0
EMPIRE ABO UNIT	C	41	L	25	17	28	P	90.0	2790.0
EMPIRE ABO UNIT	C	42	K	25	17	28	S.I.		
EMPIRE ABO UNIT	C	43	J	25	17	28	S.I.		
EMPIRE ABO UNIT	C	44	I	25	17	28	S.I.		
EMPIRE ABO UNIT	C	45	L	30	17	29	S.I.		
EMPIRE ABO UNIT	C	46	K	30	17	29	S.I.		
EMPIRE ABO UNIT	C	47	J	30	17	29	S.I.		
EMPIRE ABO UNIT	C	49	L	29	17	29	INJ.		
EMPIRE ABO UNIT	C	50	K	29	17	29	INJ.		
EMPIRE ABO UNIT	D	33	M	27	17	28	S.I.		
EMPIRE ABO UNIT	D	34	N	27	17	28	F	10.0	310.0
EMPIRE ABO UNIT	D	35	O	27	17	28	INJ.		
EMPIRE ABO UNIT	D	36	P	27	17	28	P	60.0	1860.0
EMPIRE ABO UNIT	D	361	P	27	17	28	P	15.0	465.0
EMPIRE ABO UNIT	D	37	M	26	17	28	INJ.		
EMPIRE ABO UNIT	D	38	N	26	17	28	S	0.0	0.0
EMPIRE ABO UNIT	D	39	O	26	17	28	P	25.0	775.0
EMPIRE ABO UNIT	D	40	P	26	17	28	S.I.		
EMPIRE ABO UNIT	D	41	M	25	17	28	S.I.		
EMPIRE ABO UNIT	D	42	N	25	17	28	S.I.		
EMPIRE ABO UNIT	D	43	O	25	17	28	S.I.		
EMPIRE ABO UNIT	D	44	P	25	17	28	P	34.0	1054.0
EMPIRE ABO UNIT	E	26	C	32	17	28	S.I.		
EMPIRE ABO UNIT	E	27	B	32	17	28	S.I.		
EMPIRE ABO UNIT	E	28	A	32	17	28	S.I.		
EMPIRE ABO UNIT	E	30	C	33	17	28	S.I.		
EMPIRE ABO UNIT	E	31	B	33	17	28	S.I.		
EMPIRE ABO UNIT	E	32	A	33	17	28	S.I.		
EMPIRE ABO UNIT	E	33	D	34	17	28	S.I.		
EMPIRE ABO UNIT	E	34	C	34	17	28	S.I.		

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EMPIRE	ABO	UNIT	F	374	*	E	35	17	28	*	P	*	50.0	*	1550.0	*
EMPIRE	ABO	UNIT	F	375	*	E	35	17	28	*	S.I.	*		*		*
EMPIRE	ABO	UNIT	F	376	*	E	35	17	28	*	P	*	12.0	*	372.0	*
EMPIRE	ABO	UNIT	F	38	*	F	35	17	28	*	S.I.	*		*		*
EMPIRE	ABO	UNIT	F	381	*	F	35	17	28	*	S	*	0.0	*	0.0	*
EMPIRE	ABO	UNIT	F	382	*	F	35	17	28	*	S.I.	*		*		*
EMPIRE	ABO	UNIT	F	383	*	F	35	17	28	*	S.I.	*		*		*
EMPIRE	ABO	UNIT	F	39	*	G	35	17	28	*	S.I.	*		*		*
EMPIRE	ABO	UNIT	F	391	*	G	35	17	28	*	S.I.	*		*		*
EMPIRE	ABO	UNIT	F	40	*	H	35	17	28	*	S.I.	*		*		*
EMPIRE	ABO	UNIT	G	17	*	L	36	17	27	*	S.I.	*		*		*
EMPIRE	ABO	UNIT	G	18	*	K	36	17	27	*	S.I.	*		*		*
EMPIRE	ABO	UNIT	G	19	*	J	36	17	27	*	INJ.	*		*		*
EMPIRE	ABO	UNIT	G	20	*	I	36	17	27	*	S.I.	*		*		*
EMPIRE	ABO	UNIT	G	21	*	L	31	17	28	*	S.I.	*		*		*
EMPIRE	ABO	UNIT	G	22	*	K	31	17	28	*	INJ.	*		*		*
EMPIRE	ABO	UNIT	G	23	*	J	31	17	28	*	S.I.	*		*		*
EMPIRE	ABO	UNIT	G	24	*	I	31	17	28	*	INJ.	*		*		*
EMPIRE	ABO	UNIT	G	25	*	L	32	17	28	*	F	*	12.0	*	372.0	*
EMPIRE	ABO	UNIT	G	26	*	K	32	17	28	*	F	*	2.0	*	62.0	*
EMPIRE	ABO	UNIT	G	27	*	J	32	17	28	*	F	*	2.0	*	62.0	*
EMPIRE	ABO	UNIT	G	28	*	I	32	17	28	*	S.I.	*		*		*
EMPIRE	ABO	UNIT	G	29	*	L	33	17	28	*	F	*	2.0	*	62.0	*
EMPIRE	ABO	UNIT	G	291	*	L	33	17	28	*	F	*	6.0	*	186.0	*
EMPIRE	ABO	UNIT	G	30	*	K	33	17	28	*	F	*	20.0	*	620.0	*
EMPIRE	ABO	UNIT	G	301	*	K	33	17	28	*	P	*	40.0	*	1240.0	*
EMPIRE	ABO	UNIT	G	31	*	J	33	17	28	*	S.I.	*		*		*
EMPIRE	ABO	UNIT	G	311	*	J	33	17	28	*	F	*	14.0	*	434.0	*
EMPIRE	ABO	UNIT	G	312	*	J	33	17	28	*	P	*	21.0	*	651.0	*
EMPIRE	ABO	UNIT	G	313	*	J	33	17	28	*	P	*	37.0	*	1147.0	*
EMPIRE	ABO	UNIT	G	314	*	J	33	17	28	*	P	*	25.0	*	775.0	*
EMPIRE	ABO	UNIT	G	315	*	J	33	17	28	*	F	*	20.0	*	620.0	*
EMPIRE	ABO	UNIT	G	32	*	I	33	17	28	*	P	*	40.0	*	1240.0	*
EMPIRE	ABO	UNIT	G	321	*	I	33	17	28	*	S	*	0.0	*	0.0	*
EMPIRE	ABO	UNIT	G	322	*	I	33	17	28	*	F	*	28.0	*	868.0	*
EMPIRE	ABO	UNIT	G	323	*	I	33	17	28	*	P	*	3.0	*	93.0	*
EMPIRE	ABO	UNIT	G	324	*	I	33	17	28	*	P	*	7.0	*	217.0	*
EMPIRE	ABO	UNIT	G	33	*	L	34	17	28	*	S.I.	*		*		*
EMPIRE	ABO	UNIT	G	331	*	L	34	17	28	*	P	*	23.0	*	713.0	*
EMPIRE	ABO	UNIT	G	332	*	L	34	17	28	*	F	*	15.0	*	465.0	*
EMPIRE	ABO	UNIT	G	333	*	L	34	17	28	*	P	*	3.0	*	93.0	*
EMPIRE	ABO	UNIT	G	334	*	L	34	17	28	*	P	*	2.0	*	62.0	*
EMPIRE	ABO	UNIT	G	34	*	K	34	17	28	*	S.I.	*		*		*
EMPIRE	ABO	UNIT	G	341	*	K	34	17	28	*	S.I.	*		*		*
EMPIRE	ABO	UNIT	G	342	*	K	34	17	28	*	P	*	19.0	*	589.0	*
EMPIRE	ABO	UNIT	G	343	*	K	34	17	28	*	F	*	2.0	*	62.0	*
EMPIRE	ABO	UNIT	G	35	*	J	34	17	28	*	F	*	4.0	*	124.0	*
EMPIRE	ABO	UNIT	G	351	*	J	34	17	28	*	F	*	10.0	*	310.0	*
EMPIRE	ABO	UNIT	G	352	*	J	34	17	28	*	F	*	2.0	*	62.0	*
EMPIRE	ABO	UNIT	G	353	*	J	34	17	28	*	F	*	10.0	*	310.0	*
EMPIRE	ABO	UNIT	G	36	*	I	34	17	28	*	S.I.	*		*		*
EMPIRE	ABO	UNIT	G	361	*	I	34	17	28	*	P	*	20.0	*	620.0	*
EMPIRE	ABO	UNIT	G	37	*	L	35	17	28	*	P	*	0.0	*	0.0	*
EMPIRE	ABO	UNIT	G	38	*	K	35	17	28	*	S.I.	*		*		*
EMPIRE	ABO	UNIT	H	12	*	P	34	17	27	*	S.I.	*		*		*
EMPIRE	ABO	UNIT	H	17	*	M	36	17	27	*	S.I.	*		*		*
EMPIRE	ABO	UNIT	H	18	*	N	36	17	27	*	S.I.	*		*		*
EMPIRE	ABO	UNIT	H	19	*	O	36	17	27	*	INJ.	*		*		*
EMPIRE	ABO	UNIT	H	20	*	P	36	17	27	*	S.I.	*		*		*
EMPIRE	ABO	UNIT	H	21	*	M	31	17	28	*	INJ.	*		*		*

EMPIRE	ABO	UNIT	H	22	*	N	31	17	28	*	S.I.	*		*		*
EMPIRE	ABO	UNIT	H	23	*	O	31	17	28	*	F	*	16.0	*	496.0	*
EMPIRE	ABO	UNIT	H	24	*	P	31	17	28	*	F	*	20.0	*	620.0	*
EMPIRE	ABO	UNIT	H	25	*	M	32	17	28	*	F	*	17.0	*	527.0	*
EMPIRE	ABO	UNIT	H	26	*	N	32	17	28	*	F	*	15.0	*	465.0	*
EMPIRE	ABO	UNIT	H	261	*	N	32	17	28	*	F	*	20.0	*	620.0	*
EMPIRE	ABO	UNIT	H	27	*	O	32	17	28	*	F	*	2.0	*	62.0	*
EMPIRE	ABO	UNIT	H	271	*	O	32	17	28	*	F	*	2.0	*	62.0	*
EMPIRE	ABO	UNIT	H	272	*	O	32	17	28	*	F	*	2.0	*	62.0	*
EMPIRE	ABO	UNIT	H	28	*	P	32	17	28	*	F	*	10.0	*	310.0	*
EMPIRE	ABO	UNIT	H	281	*	P	32	17	28	*	P	*	12.0	*	372.0	*
EMPIRE	ABO	UNIT	H	29	*	M	33	17	28	*	F	*	28.0	*	868.0	*
EMPIRE	ABO	UNIT	H	291	*	M	33	17	28	*	P	*	10.0	*	310.0	*
EMPIRE	ABO	UNIT	H	292	*	M	33	17	28	*	P	*	2.0	*	62.0	*
EMPIRE	ABO	UNIT	H	293	*	M	33	17	28	*	F	*	5.0	*	155.0	*
EMPIRE	ABO	UNIT	H	294	*	M	33	17	28	*	F	*	10.0	*	310.0	*
EMPIRE	ABO	UNIT	H	295	*	M	33	17	28	*	F	*	20.0	*	620.0	*
EMPIRE	ABO	UNIT	H	30	*	N	33	17	28	*	S	*	0.0	*	0.0	*
EMPIRE	ABO	UNIT	H	301	*	N	33	17	28	*	P	*	10.0	*	310.0	*
EMPIRE	ABO	UNIT	H	302	*	N	33	17	28	*	F	*	10.0	*	310.0	*
EMPIRE	ABO	UNIT	H	303	*	N	33	17	28	*	S	*	0.0	*	0.0	*
EMPIRE	ABO	UNIT	H	31	*	O	33	17	28	*	S	*	0.0	*	0.0	*
EMPIRE	ABO	UNIT	H	311	*	O	33	17	28	*	P	*	5.0	*	155.0	*
EMPIRE	ABO	UNIT	H	312	*	O	33	17	28	*	P	*	0.0	*	0.0	*
EMPIRE	ABO	UNIT	H	32	*	P	33	17	28	*	S.I.	*		*		*
EMPIRE	ABO	UNIT	H	321	*	P	33	17	28	*	P	*	16.0	*	496.0	*
EMPIRE	ABO	UNIT	H	322	*	P	33	17	28	*	P	*	21.0	*	651.0	*
EMPIRE	ABO	UNIT	H	33	*	M	34	17	28	*	P	*	18.0	*	558.0	*
EMPIRE	ABO	UNIT	H	331	*	M	34	17	28	*	S.I.	*		*		*
EMPIRE	ABO	UNIT	H	34	*	N	34	17	28	*	S.I.	*		*		*
EMPIRE	ABO	UNIT	H	341	*	N	34	17	28	*	F	*	2.0	*	62.0	*
EMPIRE	ABO	UNIT	H	35	*	O	34	17	28	*	P	*	3.0	*	93.0	*
EMPIRE	ABO	UNIT	I	10	*	C	3	18	27	*	INJ.	*		*		*
EMPIRE	ABO	UNIT	I	11	*	B	3	18	27	*	S.I.	*		*		*
EMPIRE	ABO	UNIT	I	12	*	A	3	18	27	*	F	*	9.0	*	279.0	*
EMPIRE	ABO	UNIT	I	13	*	D	2	18	27	*	S.I.	*		*		*
EMPIRE	ABO	UNIT	I	16	*	A	2	18	27	*	F	*	9.0	*	279.0	*
EMPIRE	ABO	UNIT	I	17	*	D	1	18	27	*	S.I.	*		*		*
EMPIRE	ABO	UNIT	I	18	*	C	1	18	27	*	INJ.	*		*		*
EMPIRE	ABO	UNIT	I	19	*	B	1	18	27	*	F	*	5.0	*	155.0	*
EMPIRE	ABO	UNIT	I	20	*	A	1	18	27	*	F	*	55.0	*	1705.0	*
EMPIRE	ABO	UNIT	I	21	*	D	6	18	28	*	F	*	23.0	*	713.0	*
EMPIRE	ABO	UNIT	I	22	*	C	6	18	28	*	F	*	6.0	*	186.0	*
EMPIRE	ABO	UNIT	I	23	*	B	6	18	28	*	S.I.	*		*		*
EMPIRE	ABO	UNIT	I	231	*	B	6	18	28	*	P	*	16.0	*	496.0	*
EMPIRE	ABO	UNIT	I	24	*	A	6	18	28	*	F	*	12.0	*	372.0	*
EMPIRE	ABO	UNIT	I	25	*	D	5	18	28	*	F	*	8.0	*	248.0	*
EMPIRE	ABO	UNIT	I	251	*	D	5	18	28	*	S.I.	*		*		*
EMPIRE	ABO	UNIT	I	26	*	C	5	18	28	*	F	*	6.0	*	186.0	*
EMPIRE	ABO	UNIT	I	261	*	C	5	18	28	*	F	*	11.0	*	341.0	*
EMPIRE	ABO	UNIT	I	27	*	B	5	18	28	*	F	*	15.0	*	465.0	*
EMPIRE	ABO	UNIT	I	271	*	B	5	18	28	*	P	*	5.0	*	155.0	*
EMPIRE	ABO	UNIT	I	272	*	B	5	18	28	*	F	*	15.0	*	465.0	*
EMPIRE	ABO	UNIT	I	273	*	B	5	18	28	*	F	*	15.0	*	465.0	*
EMPIRE	ABO	UNIT	I	28	*	A	5	18	28	*	F	*	30.0	*	930.0	*
EMPIRE	ABO	UNIT	I	281	*	A	5	18	28	*	P	*	15.0	*	465.0	*
EMPIRE	ABO	UNIT	I	282	*	A	5	18	28	*	P	*	20.0	*	620.0	*
EMPIRE	ABO	UNIT	I	283	*	A	5	18	28	*	P	*	12.0	*	372.0	*
EMPIRE	ABO	UNIT	I	29	*	D	4	18	28	*	S.I.	*		*		*
EMPIRE	ABO	UNIT	I	291	*	D	4	18	28	*	P	*	40.0	*	1240.0	*

EMPIRE	ABO	UNIT	I	292	*	D	4	18	28	*	P	*	8.0	*	248.0	*
EMPIRE	ABO	UNIT	I	30	*	C	4	18	28	*	S.I.	*		*		*
EMPIRE	ABO	UNIT	J	8	*	H	4	18	27	*	S.I.	*		*		*
EMPIRE	ABO	UNIT	J	9	*	E	3	18	27	*	S.I.	*		*		*
EMPIRE	ABO	UNIT	J	10	*	F	3	18	27	*	S.I.	*		*		*
EMPIRE	ABO	UNIT	J	11	*	G	3	18	27	*	S.I.	*		*		*
EMPIRE	ABO	UNIT	J	12	*	H	3	18	27	*	INJ.	*		*		*
EMPIRE	ABO	UNIT	J	13	*	E	2	18	27	*	S.I.	*		*		*
EMPIRE	ABO	UNIT	J	14	*	F	2	18	27	*	F	*	10.0	*	310.0	*
EMPIRE	ABO	UNIT	J	15	*	G	2	18	27	*	F	*	13.0	*	403.0	*
EMPIRE	ABO	UNIT	J	17	*	E	1	18	27	*	S.I.	*		*		*
EMPIRE	ABO	UNIT	J	18	*	F	1	18	27	*	S.I.	*		*		*
EMPIRE	ABO	UNIT	J	19	*	G	1	18	27	*	F	*	30.0	*	930.0	*
EMPIRE	ABO	UNIT	J	191	*	G	1	18	27	*	S.I.	*		*		*
EMPIRE	ABO	UNIT	J	20	*	H	1	18	27	*	S.I.	*		*		*
EMPIRE	ABO	UNIT	J	201	*	H	1	18	27	*	F	*	24.0	*	744.0	*
EMPIRE	ABO	UNIT	J	202	*	H	1	18	27	*	P	*	19.0	*	589.0	*
EMPIRE	ABO	UNIT	J	203	*	H	1	18	27	*	F	*	15.0	*	465.0	*
EMPIRE	ABO	UNIT	J	21	*	E	6	18	28	*	F	*	9.0	*	279.0	*
EMPIRE	ABO	UNIT	J	211	*	E	6	18	28	*	F	*	1.0	*	31.0	*
EMPIRE	ABO	UNIT	J	212	*	E	6	18	28	*	F	*	16.0	*	496.0	*
EMPIRE	ABO	UNIT	J	213	*	E	6	18	28	*	P	*	13.0	*	403.0	*
EMPIRE	ABO	UNIT	J	22	*	F	6	18	28	*	F	*	1.0	*	31.0	*
EMPIRE	ABO	UNIT	J	221	*	F	6	18	28	*	F	*	7.0	*	217.0	*
EMPIRE	ABO	UNIT	J	222	*	F	6	18	28	*	P	*	2.0	*	62.0	*
EMPIRE	ABO	UNIT	J	23	*	G	6	18	28	*	S.I.	*		*		*
EMPIRE	ABO	UNIT	J	231	*	G	6	18	28	*	F	*	15.0	*	465.0	*
EMPIRE	ABO	UNIT	J	232	*	G	6	18	28	*	F	*	47.0	*	1457.0	*
EMPIRE	ABO	UNIT	J	233	*	G	6	18	28	*	F	*	10.0	*	310.0	*
EMPIRE	ABO	UNIT	J	234	*	G	6	18	28	*	F	*	1.0	*	31.0	*
EMPIRE	ABO	UNIT	J	235	*	G	6	18	28	*	F	*	3.0	*	93.0	*
EMPIRE	ABO	UNIT	J	24	*	H	6	18	28	*	F	*	38.0	*	1178.0	*
EMPIRE	ABO	UNIT	J	241	*	H	6	18	28	*	P	*	26.0	*	806.0	*
EMPIRE	ABO	UNIT	J	26	*	F	5	18	28	*	P	*	117.0	*	3627.0	*
EMPIRE	ABO	UNIT	J	27	*	G	5	18	28	*	S.I.	*		*		*
EMPIRE	ABO	UNIT	J	28	*	H	5	18	28	*	P	*	7.0	*	217.0	*
EMPIRE	ABO	UNIT	K	7	*	J	4	18	27	*	INJ.	*		*		*
EMPIRE	ABO	UNIT	K	8	*	I	4	18	27	*	S.I.	*		*		*
EMPIRE	ABO	UNIT	K	9	*	L	3	18	27	*	F	*	25.0	*	775.0	*
EMPIRE	ABO	UNIT	K	10	*	K	3	18	27	*	F	*	21.0	*	651.0	*
EMPIRE	ABO	UNIT	K	11	*	J	3	18	27	*	S.I.	*		*		*
EMPIRE	ABO	UNIT	K	12	*	I	3	18	27	*	F	*	7.0	*	217.0	*
EMPIRE	ABO	UNIT	K	13	*	L	2	18	27	*	F	*	3.0	*	93.0	*
EMPIRE	ABO	UNIT	K	131	*	L	2	18	27	*	P	*	5.0	*	155.0	*
EMPIRE	ABO	UNIT	K	14	*	K	2	18	27	*	P	*	11.0	*	341.0	*
EMPIRE	ABO	UNIT	K	141	*	K	2	18	27	*	F	*	24.0	*	744.0	*
EMPIRE	ABO	UNIT	K	142	*	K	2	18	27	*	P	*	51.0	*	1581.0	*
EMPIRE	ABO	UNIT	K	143	*	K	2	18	27	*	P	*	64.0	*	1984.0	*
EMPIRE	ABO	UNIT	K	15	*	J	2	18	27	*	F	*	26.0	*	806.0	*
EMPIRE	ABO	UNIT	K	16	*	I	2	18	27	*	P	*	12.0	*	372.0	*
EMPIRE	ABO	UNIT	K	161	*	I	2	18	27	*	F	*	48.0	*	1488.0	*
EMPIRE	ABO	UNIT	K	17	*	L	1	18	27	*	F	*	55.0	*	1705.0	*
EMPIRE	ABO	UNIT	K	18	*	K	1	18	27	*	F	*	52.0	*	1612.0	*
EMPIRE	ABO	UNIT	K	181	*	K	1	18	27	*	F	*	20.0	*	620.0	*
EMPIRE	ABO	UNIT	K	182	*	K	1	18	27	*	P	*	24.0	*	744.0	*
EMPIRE	ABO	UNIT	K	183	*	K	1	18	27	*	P	*	62.0	*	1922.0	*
EMPIRE	ABO	UNIT	K	184	*	K	1	18	27	*	F	*	82.0	*	2542.0	*
EMPIRE	ABO	UNIT	K	19	*	J	1	18	27	*	F	*	30.0	*	930.0	*
EMPIRE	ABO	UNIT	K	191	*	J	1	18	27	*	S.I.	*		*		*
EMPIRE	ABO	UNIT	K	192	*	J	1	18	27	*	F	*	37.0	*	1147.0	*

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State of New Mexico
Commissioner of Public Lands

#4952

W. R. Humphries
COMMISSIONER

Advisory Board
George Clark
Chairman
Kristin Conniff
Vice Chairman
Melvin Cordova
Joe Kelly
Robert Portillos
Nancy Lynch Vigil
Rex Wilson

April 30, 1990

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

ATTN: Mr. J.T. Lowder MIO 733

RE: Empire Abo Unit
1990 Plan of Development

Gentlemen:

The Commissioner of Public Lands has this date approved the 1990 Plan of Development for the Empire Abo Unit. Our approval is subject to like approval by all other appropriate agencies.

The possibility of drainage by wells outside of the Unit Area and the need for further development of the Unit may exist. You will be contacted at a later date regarding these possibilities.

Enclosed is an approved copy of the 1990 Plan of Development for your files. If we may be of further help, please do not hesitate to contact this office at (505) 827-5746.

Very truly yours,

W.R. HUMPHRIES,
COMMISSIONER OF PUBLIC LANDS

BY: for Floyd Prando

FLOYD O. PRANDO, Director
Oil and Gas Division
(505) 827-5746

cc: OCD - Santa Fe, New Mexico
BLM
Unit Correspondence File
Unit P.O.D. File

WRH/FOP/SMH

ARCO Oil and Gas Company
Central District
Post Office Box 1610
Midland, Texas 79702
Telephone 915 688 5200

OIL CONSERVATION DIVISION
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September 4, 1990

United States Department of the Interior
Bureau of Land Management
P. O. Drawer 1397
Roswell, New Mexico 88201

Attn: Mr. Francis R. Cherry, Jr.
District Manager

State of New Mexico
Mr. Bill Humphries
Commissioner of Public Lands
P. O. Box 1148
Santa Fe, New Mexico 87501

Attn: Mr. Floyd O. Prando, Director (3)
Oil and Gas Division

State of New Mexico
Department of Energy and Minerals
P. O. Box 2088
Santa Fe, New Mexico 87501

Attn: Mr. William J. LeMay (3)
Division Director

Gentlemen:

In compliance with Section 11 of the Unit Agreement, Empire Abo Unit, Eddy County, New Mexico, ARCO Oil and Gas Company, as Unit Operator, on behalf of itself and other participating working interest owners, hereby submits for your approval an amended 1990 Plan of Operation. The amended plan will cover the remainder of 1990.

The primary reason for amending the Plan of Operation is described in paragraph 5(e). Withdrawals of extraneous stored gas are currently allowed by NMOCD Order No. R-4549-F. We will seek to amend the order as stated in paragraph 5(e) to make it more flexible during times of emergency needs by the Gas Company of New Mexico.

Yours very truly,

Gary B. Smallwood

Gary B. Smallwood
Senior Engineer

GBS:eeg

Attachments

EMPIRE ABO UNIT
1990 Plan of Operation

SUBMITTED SEPTEMBER 4, 1990

1. Summary of the Amended Plan of Operation for 1990

ARCO Oil and Gas Company proposes to continue operation of the Empire Abo Unit, Eddy County, New Mexico, substantially the same as in recent years. We will continue to reinject all available residue gas from the Phillips extraction plant and the Amoco extraction plant. Oil will be produced from the most efficient wells in order to maximize recovery. Gas Company of New Mexico will be allowed to make emergency withdrawals of extraneous gas during the winter. The withdrawal will be replaced by Gas Company of New Mexico in the summer.

2. Project Area - Description and History

The Empire Abo Unit is located in portions of Sections 34, 35, 36, Township 17 South, Range 27 East; Sections 1, 2, 3, 4, 8, 9, 10, 11, 12, 15, 16, 17, Township 18 South, Range 27 East; Sections 25, 26, 27, 28, 31, 32, 33, 34, 35, 36, Township 17 South, Range 28 East; Sections 4, 5, 6, Township 18 South, Range 28 East; Sections 29, 30, Township 17 South, Range 29 East, Eddy County, New Mexico.

The Unit, as originally proposed, would have covered 11,399.15 acres. Certain tracts within the Unit Area did not qualify for participation as of October 1, 1973, the effective date of the Unit. These tracts are: 2, 6, 28, 41, 42, 46, 55, 56, 69, 79, 84, and 91. Total area of these tracts is 644.74 acres. The remaining 10,694.41 acres comprised the Project Area for pressure maintenance until September 1, 1975. On this date Tracts 41, 79, and 84 joined the Unit. The addition of these three tracts, which cover 120.03 acres, increased the total area of the Unit to 10,814.44 acres. Tracts 2, 6, 42, and 46 comprise the CITGO Empire Abo Unit, which received NMOCD approval in June, 1974. The Unit Area is now disposed as follows:

	Acres
ARCO Empire Abo Unit	10,814.44
CITGO Empire Abo Unit	241.05
Non-Participating Tracts	283.66
Total Area	11,339.15

ARCO Oil and Gas Company operates a pressure maintenance project at the Empire Abo Unit. This project involves injection of plant residue gas from Abo production back into the Abo formation.

3. Current Performance

In June, 1990, the Unitized Project Area averaged 3,225 BOPD with a 64 percent water cut and a gas-oil ratio of 16,907 cubic feet of gas per barrel of oil. Gas injection averaged 41,261 MCFPD (see attached Production History Plot).

Cumulative oil production from the Project Area through June, 1990 was 210.8 MMBO. This is about 56.8 percent of the 371 MMBO originally in place. Cumulative net gas production from the Project Area through June, 1990 was 277 MCF. This is about 59 percent of the 468 BCF originally in place. As of June, 1990, the Unit has 205 active producing wells.

4. Basic Concepts Governing Future Unit Operations

- Field production history and reservoir numeric model studies have demonstrated that oil recovery is governed by gravity drainage and secondary gas cap expansion. We will be able to maximize the beneficial effects of these recovery mechanisms by observation of well performance and producing from the most efficient wells, those with the lowest GOR's. Natural gas liquid production from individual wells will also be considered when determining the most efficient wells in the future.
- Gas injection will help maintain reservoir pressure and control expansion of the secondary gas cap.

5. Discussion of Past, Current, and Future Operations

a) ***Gas Injection***

Fifteen gas injection wells along the north edge of the field handle all of the Empire Abo Unit injected gas. Table I lists these wells. Beginning in July, 1974, and continuing through the latest month for which data is available (June, 1990), all available plant residue gas has been injected into the Abo gas cap. The Unit receives plant residue gas at about 700 psi and compresses it to 2000 psi for injection. Superhydration facilities at the extraction plants reduce hydrogen sulfide content to minimize possible corrosion. A rigorous corrosion treatment program is maintained. Permits for the Gas Injection Facilities have been granted by the State of New Mexico Environmental Improvements Agency. We believe the injection facilities meet the requirements of the United States Geological Survey and the State of New Mexico.

b) ***Workovers***

An intensive workover program in previous years has been successful in maximizing low GOR production. The majority of the workovers consisted of recompleting wells lower in the reef. As a result of this program, almost all possible lower recompletions have been performed. On the eastern portion of the field where water influx is occurring, workovers consisting of recompleting wells higher in the reef have been successful. We will continue to seek out wells with recompletion potential. In 1990, we converted the Empire Abo Unit No. J-10 and plan to convert the No. J-13 to gas injection. These conversions will increase recovery by balancing the Unit's gas injection and providing pressure support to low pressure areas of the Unit.

c) ***Continuing Field Study***

In order to maximize future reserves, we will continue to maintain an intensive field surveillance program. We will also continue to evaluate alternate and enhanced recovery techniques.

d) ***Injection of Non-Abo Gas***

Gas from non-Abo sources was delivered from the Gas Company of New Mexico (formerly Southern Union Gas Company) to the Empire Abo Unit. This began on June 18, 1976. Cumulative outside gas injected through July, 1990 was 4,106.33 MMCF. Cumulative gas delivered back to the supplier through July, 1990 was 451.1 MMCF and the net cumulative non-Abo gas bank was 3,655.3 MMCF.

e) ***Withdrawals of Non-Abo Gas***

Gas Company of New Mexico will be permitted to withdraw up to 300 MMCF of the extraneous stored gas for emergency use during the winter period, November 1 - March 31. The withdrawn gas will be replaced by Gas Company of New Mexico during the next summer season, April 1 - October 31.

f) ***Voidage Limit Removal***

The voidage limit was replaced with a gas production limit of 65 MMCFPD in 1984. This will allow more efficient operation of the Unit. Also, the wet gas compressors were removed and the practice of injecting unprocessed gas was discontinued.

6. Modifications to Plan

It is understood that to meet changing conditions, this plan of operation may be modified from time to time, with the approval of the Supervisor of the U.S.G.S., the Commissioner of Public Lands of the State of New Mexico, and the Department of Energy and Minerals, Oil Conservation Division, State of New Mexico.

ARCO Oil and Gas Company, as Unit Operator, will act prudently to preserve the rights of the mineral owners, and to effectively and efficiently recover the Unit Area Reserves. This Company will meet all economical offset obligations, act to prevent waste, conserve natural resources, and protect correlative rights.

7. Effective Date and Duration of Plan

This Amended Plan of Operation shall be effective September 1, 1990 and extend through the calendar year unless otherwise amended.

If this Plan of Operation meets with your approval, please sign on the next page and return one copy for our files.

Very truly yours,
ARCO Oil and Gas Company
OPERATOR

Gary B. Smallwood
Senior Engineer

GBS:eeg

APPROVED BY: _____ DATE: _____

District Manager
United States Department of the Interior
Bureau of Land Management - Roswell District

APPROVED BY: _____ DATE: _____

Commissioner of Public Lands
State of New Mexico

APPROVED BY: _____ DATE: _____

Division Director
Department of Energy and Minerals
Oil Conservation Division
State of New Mexico

EMPIRE ABO UNIT
1989 AND 1990 PRODUCTION HISTORY

Month	BO	BW	Gross MCFG	Injected MCFG	Net MCFG
January	127,553	174,883	1,998,160	1,449,096	549,064
February	116,620	142,094	1,782,261	1,266,858	515,403
March	128,827	168,504	2,019,490	1,483,893	535,597
April	124,539	167,780	1,932,008	1,317,495	614,513
May	121,138	162,709	1,801,256	1,285,547	515,709
June	116,402	166,224	1,875,606	1,349,515	526,091
July	116,771	143,037	1,961,348	1,375,908	585,440
August	115,150	159,399	1,929,303	1,459,950	469,353
September	112,295	157,023	1,871,241	1,455,967	415,274
October	114,934	134,100	2,017,084	1,442,749	574,335
November	108,525	125,801	1,976,391	1,454,917	521,474
December	105,920	137,114	1,980,927	1,398,743	582,184
January	113,005	124,600	2,050,366	1,494,951	555,415
February	99,257	105,788	1,777,839	1,319,546	458,293
March	91,535	58,042	1,409,616	1,037,207	372,409
April	73,833	111,064	762,048	612,893	149,155
May	103,666	145,908	1,529,593	1,126,608	402,985
June	96,748	169,020	1,635,865	1,237,824	398,041
Totals	1,986,718	2,553,090	32,310,402	23,569,667	8,740,735

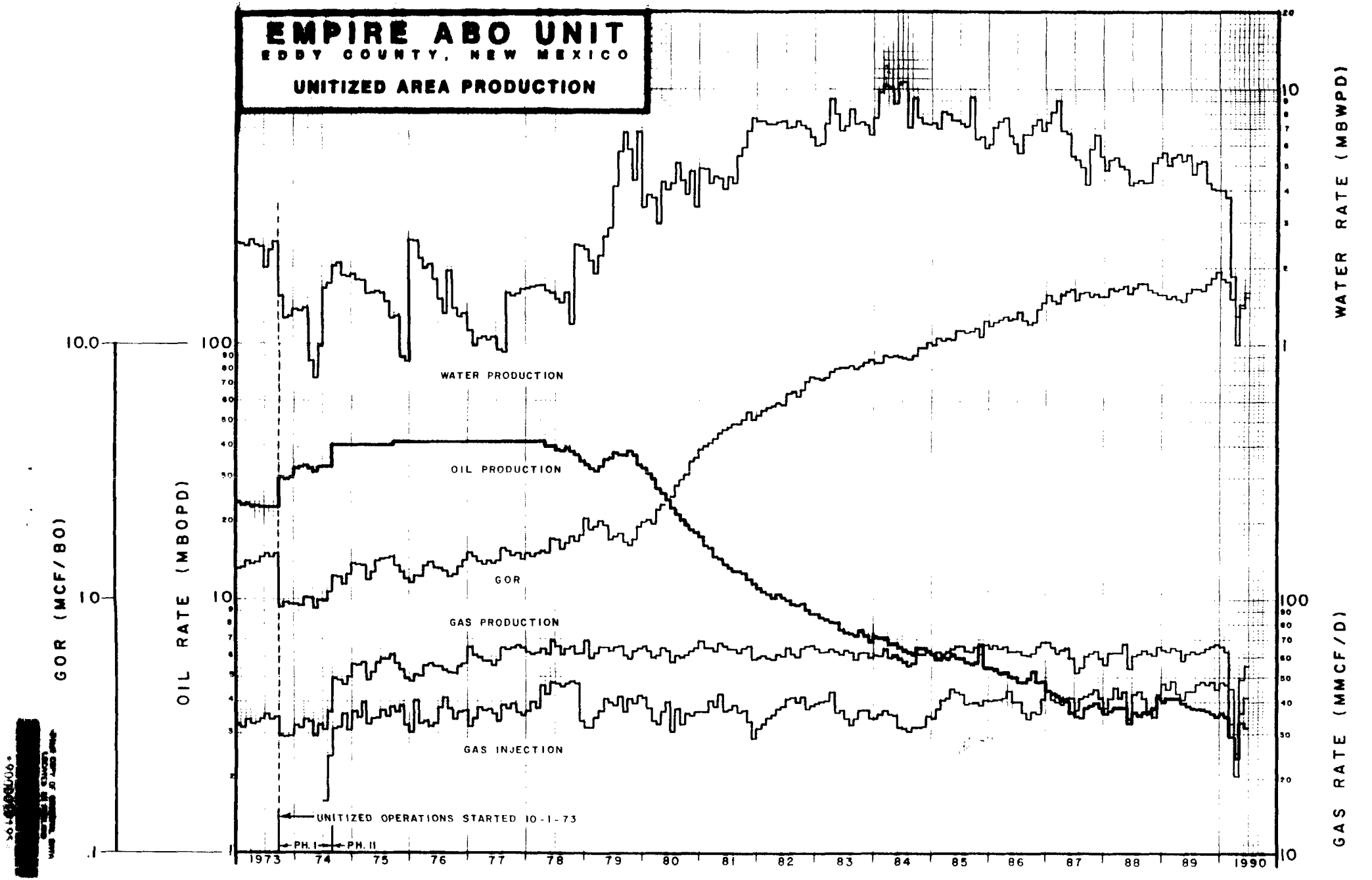
GBS:eeg
08/20/90

TABLE I

EMPIRE ABO UNIT
Gas Injection Wells

Previous Operator/ Lease and Well	Unit Well Designation	Location (Sec.-Twp-Rng)			
Hondo/State "A" No. 24	C-39	NW/4 SE/4	26	17	28
Hondo/State "A" No. 16	D-37	SW/4 SW/4	26	17	28
Amoco/State "BV" No. 1	F-25	SW/4 NW/4	32	17	28
Hondo/State "A" No. 35	F-27	SW/4 NE/4	32	17	28
ARCO/M. Yates B (ARC) No. 8	F-31	SW/4 NE/4	33	17	28
Amoco/State "BM" No. 1	G-22	NE/4 SW/4	31	17	28
Hondo/State "A" No. 9	G-24	NE/4 SE/4	31	17	28
Gulf/NCT "C" No. 1	H-19	SW/4 SE/4	36	17	27
Amoco/State "BE" No. 1	H-21	SW/4 SW/4	31	17	28
Amoco/Malco "H" Fed. No. 9	I-10	NE/4 NW/4	3	18	27
Amoco/State "F" No. 8	I-18	NE/4 NW/4	1	18	27
Amoco/Malco "H" Fed. No. 2	J-12	SE/4 NE/4	3	18	27
Amoco/Windfohr Fed. No. 4	K-7	NW/4 SE/4	4	18	27
Exxon/CBDU "A" No. 8	M-6	SE/4 NW/4	9	18	27
Cities Service/Hudson A #1	J-10	SE/4 NW/4	3	18	27

GBS:eeg
09/04/90


EMPIRE ABO UNIT
EDDY COUNTY, NEW MEXICO
UNITIZED AREA PRODUCTION
WATER PRODUCTION
OIL PRODUCTION
GOR
GAS PRODUCTION
GAS INJECTION
UNITIZED OPERATIONS STARTED 10-1-73
PH. I
PH. II
GOR (MCF/BO)
OIL RATE (MBOPD)
WATER RATE (MBWPD)
GAS RATE (MMCF/D)
10.0
10
1
.1
100
10
1
10
100
1973
74
75
76
77
78
79
80
81
82
83
84
85
86
87
88
89
1990

#4952

ARCO Oil and Gas Company
Central District
Post Office Box 1610
Midland, Texas 79702
Telephone 915 688 5200

DIVISION

7 AM 8 45

March 2, 1990

3-8-90
D-UNIT LETTER
Thx
IR

United States Department of the Interior
Bureau of Land Management
P. O. Drawer 1397
Roswell, New Mexico 88201

Attn: Mr. Francis R. Cherry, Jr.
District Manager

State of New Mexico
Mr. Bill Humphries
Commissioner of Public Lands
P. O. Box 1148
Santa Fe, New Mexico 87501

Attn: Mr. Floyd O. Prando, Director (3)
Oil and Gas Division

State of New Mexico
Department of Energy and Minerals
P. O. Box 2088
Santa Fe, New Mexico 87501

Attn: Mr. William J. LeMay (3)
Division Director

Working Interest Owners
Empire Abo Unit
Eddy County, New Mexico

Gentlemen:

In compliance with Section 11 of the Unit Agreement, Empire Abo Unit, Eddy County, New Mexico, ARCO Oil and Gas Company, as Unit Operator, on behalf of itself and other participating working interest owners, hereby submits for your approval a Plan of Operation to cover the period beginning January 1, 1990 and extending through the remainder of calendar year 1990.

Yours very truly,

Gary B. Smallwood
Gary B. Smallwood
Senior Engineer

GBS:eeg

Attachments

EMPIRE ABO UNIT
1990 Plan of Operation

SUBMITTED JANUARY 24, 1990

1. Summary of Proposed Plan of Operation for 1990

ARCO Oil and Gas Company proposes to continue operation of the Empire Abo Unit, Eddy County, New Mexico, substantially the same as in recent years. We will continue to reinject all available residue gas from the Phillips extraction plant and the Amoco extraction plant. Oil will be produced from the most efficient wells in order to maximize recovery.

2. Project Area - Description and History

The Empire Abo Unit is located in portions of Sections 34, 35, 36, Township 17 South, Range 27 East; Sections 1, 2, 3, 4, 8, 9, 10, 11, 12, 15, 16, 17, Township 18 South, Range 27 East; Sections 25, 26, 27, 28, 31, 32, 33, 34, 35, 36, Township 17 South, Range 28 East; Sections 4, 5, 6, Township 18 South, Range 28 East; Sections 29, 30, Township 17 South, Range 29 East, Eddy County, New Mexico.

The Unit, as originally proposed, would have covered 11,399.15 acres. Certain tracts within the Unit Area did not qualify for participation as of October 1, 1973, the effective date of the Unit. These tracts are: 2, 6, 28, 41, 42, 46, 55, 56, 69, 79, 84, and 91. Total area of these tracts is 644.74 acres. The remaining 10,694.41 acres comprised the Project Area for pressure maintenance until September 1, 1975. On this date Tracts 41, 79, and 84 joined the Unit. The addition of these three tracts, which cover 120.03 acres, increased the total area of the Unit to 10,814.44 acres. Tracts 2, 6, 42, and 46 comprise the CITGO Empire Abo Unit, which received NMOCD approval in June, 1974. The Unit Area is now disposed as follows:

	Acres
ARCO Empire Abo Unit	10,814.44
CITGO Empire Abo Unit	241.05
Non-Participating Tracts	283.66
Total Area	11,339.15

ARCO Oil and Gas Company operates a pressure maintenance project at the Empire Abo Unit. This project involves injection of plant residue gas from Abo production back into the Abo formation.

3. Current Performance

In December, 1989, the Unitized Project Area averaged 3,417 BOPD with a 56 percent water cut and a gas-oil ratio of 18,702 cubic feet of gas per barrel of oil. Gas injection averaged 45,121 MCFPD (see attached Production History Plot).

Cumulative oil production from the Project Area through December, 1989 was 210.2 MMBO. This is about 56.7 percent of the 371 MMBO originally in place. Cumulative net gas production from the Project Area through December, 1989 was 268 BCF. This is about 57 percent of the 468 BCF originally in place. As of December, 1989, the Unit has 213 active producing wells.

4. Basic Concepts Governing Future Unit Operations

- Field production history and reservoir numeric model studies have demonstrated that oil recovery is governed by gravity drainage and secondary gas cap expansion. We will be able to maximize the beneficial effects of these recovery mechanisms by observation of well performance and producing from the most efficient wells, those with the lowest GOR's. Natural gas liquid production from individual wells will also be considered when determining the most efficient wells in the future.
- Gas injection will help maintain reservoir pressure and control expansion of the secondary gas cap.

5. Discussion of Past, Current, and Future Operations

a) *Gas Injection*

Fourteen gas injection wells along the north edge of the field handle all of the Empire Abo Unit injected gas. Table I lists these wells. Beginning in July, 1974, and continuing through the latest month for which data is available (December, 1989), all available plant residue gas has been injected into the Abo gas cap. The Unit receives plant residue gas at about 700 psi and compresses it to 2000 psi for injection. Superhydration facilities at the extraction plants reduce hydrogen sulfide content to minimize possible corrosion. A rigorous corrosion treatment program is maintained. Permits for the Gas Injection

Facilities have been granted by the State of New Mexico Environmental Improvements Agency. We believe the injection facilities meet the requirements of the United States Geological Survey and the State of New Mexico.

b) *Workovers*

An intensive workover program in previous years has been successful in maximizing low GOR production. The majority of the workovers consisted of recompleting wells lower in the reef. As a result of this program, almost all possible lower recompletions have been performed. On the eastern portion of the field where water influx is occurring, workovers consisting of recompleting wells higher in the reef have been successful. We will continue to seek out wells with recompletion potential. In 1990, we plan to convert the Empire Abo Unit Nos. J-10 and J-13 to gas injection. These conversions will increase recovery by balancing the Unit's gas injection and providing pressure support to low pressure areas of the Unit.

c) ***Continuing Field Study***

In order to maximize future reserves, we will continue to maintain an intensive field surveillance program. We will also continue to evaluate alternate and enhanced recovery techniques.

d) ***Injection of Non-Abo Gas***

Gas from non-Abo sources was delivered from the Gas Company of New Mexico (formerly Southern Union Gas Company) to the Empire Abo Unit. This began on June 18, 1976. Cumulative outside gas injected through December, 1987 was 4,061.8 MMCF. Outside gas has not been injected since July, 1983. Cumulative gas delivered back to the supplier through December, 1986 was 411.3 MMCF and the net cumulative non-Abo gas bank was 3,650.5 MMCF.

e) ***Voidage Limit Removal***

The voidage limit was replaced with a gas production limit of 65 MMCFPD in 1984. This will allow more efficient operation of the Unit. Also, the wet gas compressors were removed and the practice of injecting unprocessed gas was discontinued.

6. Modifications to Plan

It is understood that to meet changing conditions, this plan of operation may be modified from time to time, with the approval of the Supervisor of the U.S.G.S., the Commissioner of Public Lands of the State of New Mexico, and the Department of Energy and Minerals, Oil Conservation Division, State of New Mexico.

ARCO Oil and Gas Company, as Unit Operator, will act prudently to preserve the rights of the mineral owners, and to effectively and efficiently recover the Unit Area Reserves. This Company will meet all economical offset obligations, act to prevent waste, conserve natural resources, and protect correlative rights.

7. Effective Date and Duration of Plan

This Plan of Operation shall be effective January 1, 1990 and extend through the calendar year unless otherwise amended.

If this Plan of Operation meets with your approval, please sign on the next page and return one copy for our files.

Very truly yours,
ARCO Oil and Gas Company
OPERATOR

Gary B Smallwood
Gary B. Smallwood
Senior Engineer

GBS:eeg

APPROVED BY: _____ DATE: _____
District Manager
United States Department of the Interior
Bureau of Land Management - Roswell District

APPROVED BY: _____ DATE: _____
Commissioner of Public Lands
State of New Mexico

APPROVED BY: _____ DATE: 3-12-90
Division Director
Department of Energy and Minerals
Oil Conservation Division
State of New Mexico

TABLE I

EMPIRE ABO UNIT
Gas Injection Wells

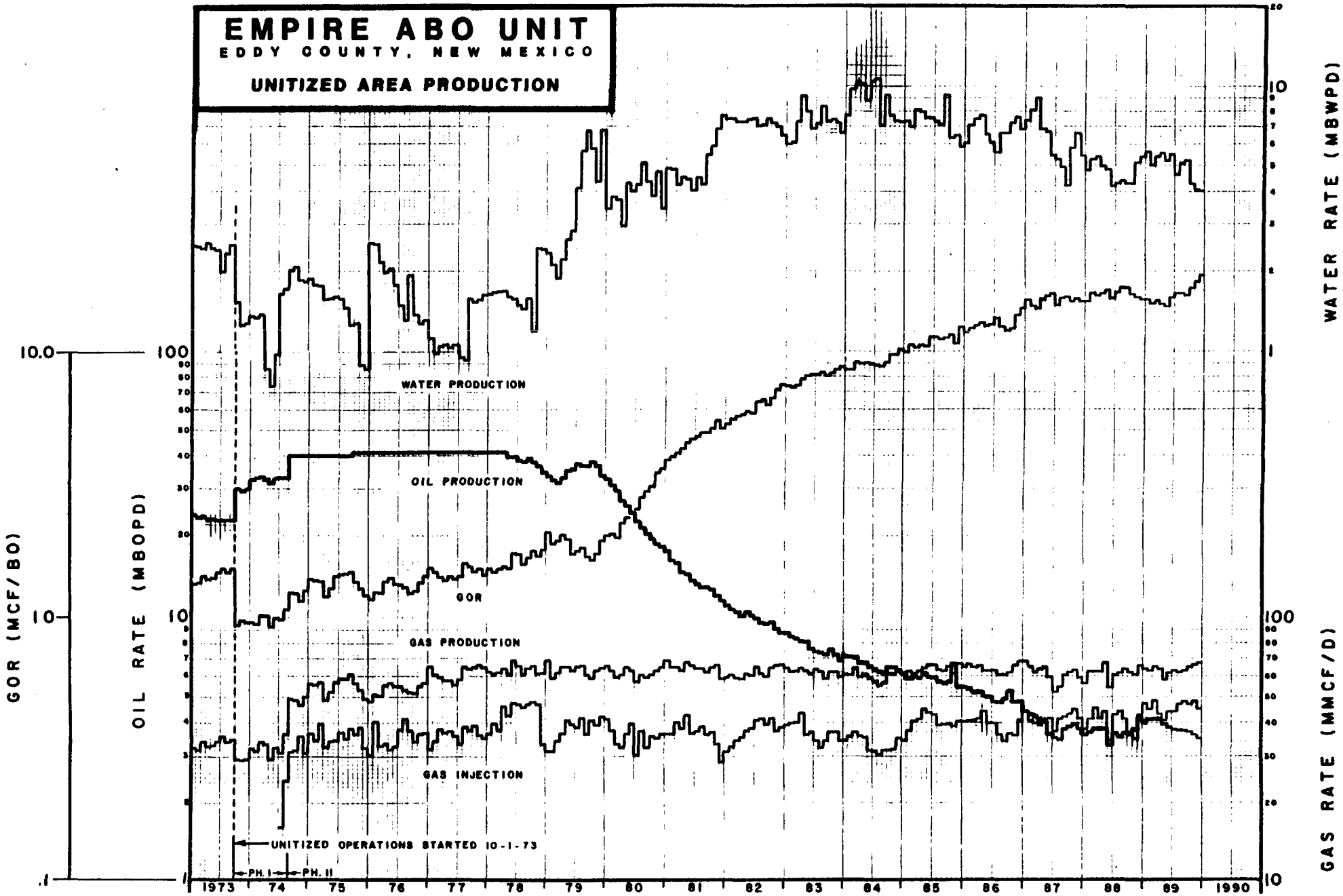
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Amoco/Malco "H" Fed. No. 9	I-10	NE/4 NW/4	3	18	27
Amoco/State "F" No. 8	I-18	NE/4 NW/4	1	18	27
Amoco/Malco "H" Fed. No. 2	J-12	SE/4 NE/4	3	18	27
Amoco/Windfohr Fed. No. 4	K-7	NW/4 SE/4	4	18	27
Exxon/CBDU "A" No. 8	M-6	SE/4 NW/4	9	18	27

KFK:eeg

EMPIRE ABO UNIT
1989 PRODUCTION HISTORY

Month	BO	BW	Gross MCFG	Injected MCFG	Net MCFG
January	127,553	174,883	1,998,160	1,449,096	549,064
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November	108,525	125,801	1,976,391	1,454,917	521,474
December	105,920	137,114	1,980,927	1,398,743	582,184
Totals	1,408,674	1,838,668	23,145,075	16,740,638	6,404,437

KFK:eeg


EMPIRE ABO UNIT
EDDY COUNTY, NEW MEXICO
UNITIZED AREA PRODUCTION
WATER PRODUCTION
OIL PRODUCTION
GOR
GAS PRODUCTION
GAS INJECTION
UNITIZED OPERATIONS STARTED 10-1-73
PH. I
PH. II
GOR (MCF/BO)
OIL RATE (MBOPD)
WATER RATE (MBWPD)
GAS RATE (MMCF/D)
10.0
1.0
.1
100
10
1
10
100
1000
1973
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75
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1990

State of New Mexico
Commissioner of Public Lands

#4963

W. R. Humphries
COMMISSIONER

Advisory Board
George Clark
Chairman
Kristin Conniff
Vice Chairman
Melvin Cordova
Joe Kelly
Robert Portillos
Nancy Lynch Vigil
Rex Wilson

March 20, 1990

Greenhill Petroleum Corporation
16010 Barker's Point Lane, Suite 325
Houston, Texas 77079

ATTN: Mr. Gene Linton

RE: North Benson Queen Unit

Gentlemen:

We received your correspondence regarding the approval of the resignation of Texaco as Unit Operator and the designation of Greenhill Petroleum Corporation as Successor Unit Operator for the North Benson Queen Unit.

The Commissioner of Public Lands has this date approved the resignation of Texaco as Unit Operator and the designation of Greenhill Petroleum Corporation as the successor Unit Operator of the North Benson Queen Unit. Please advise all interested parties.

If you have any questions, please contact Susan Howarth at (505) 827-5791.

Very truly yours,

W.R. HUMPHRIES,
COMMISSIONER OF PUBLIC LANDS

BY: [signature]
FLOYD O. PRANDO, Director
Oil and Gas Division
(505) 827-5744

#4972

Texaco USA
Producing Department
Midland Division
P. O. Box 3109
Midland, Texas 79702

March 23, 1990

District Supervisor
Bureau of Land Management
Roswell District Office
P. O. Box 1397
Roswell, New Mexico 88201

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

New Mexico Oil Conservation Division
P. O. Box 2088
Santa Fe, New Mexico 87501

All Working Interest Owners
(Address List Attached)

RE: FORTY NINER RIDGE UNIT
EDDY COUNTY, NEW MEXICO

Gentlemen:

In accordance with Section 10 of the Unit Agreement for the Development and Operations of the Forty Niner Ridge Unit, Eddy County, New Mexico, Texaco Inc. submits for your approval a report of past operations and a plan of development for the year 1990. Enclosed are a map of the area, production plots, a list showing the status of wells in the unit and a monthly operating report.

PAST OPERATIONS

The Forty Niner Ridge Unit No. 1 was completed November 10, 1973, in the Morrow gas zone for an initial CAOF of 3,703 MCFPD. The well is located in Unit Letter "J", 1980 FSL and FEL, Section 16, T-23-S, R-30-E, Eddy County, New Mexico. The cumulative Morrow production at abandonment on October 1, 1981, was 870,011 MCF.

A Wolfcamp completion in Forty Niner Ridge Unit Well No. 1 during June, 1982, proved to be non-productive. Later in June, a successful completion of the Forty Niner Ridge Bone Spring pay was made from perforations 7564 feet to 7589 feet. The Bone Spring initially produced 37 BOPD and 250 MCF on June 27, 1982, and stabilized at 12 BOPD and 15 MCFPD in July, 1982. The Bone Spring pay was plugged back in August, 1984. Cumulative production from the Bone Spring in Forty Niner Ridge Unit Well No. 1 was 2,744 barrels of oil.

Forty Niner Ridge Unit Well No. 1 was recompleted in the Delaware Cherry Canyon on August, 1984. Initial production was 128 BOPD, 267 BWPD, and 19 MCF. Cumulative production from the Delaware zone as of December 1, 1987, was 38,170 barrels of oil. The average daily production during November, 1987, was 18 BOPD, 219 BWPD, and 14 MCFPD. A workover is currently being done in this well to test another zone in the Delaware. The well is currently swabbing load water.

A second well, the Forty Niner Ridge Unit No. 2, was completed in November, 1974, as a Morrow producer. The well is located 1980' FNL and FEL of Section 21, T-23-S, R-30-E. The initial CAOF was 2492 MCFPD. Cumulative production from the Morrow zone was 42,696 MCF prior to abandonment in August, 1977.

The Forty Niner Ridge Unit No. 2 was recompleted in the Forty Niner Ridge Bone Spring on September 1, 1979. Perforations were from 7514 feet to 7568 feet. The initial potential on October 19, 1977, was 11 BOPD, 46 MCFPD, and 8 BWPD. Cumulative production from this zone was 16,920 BO.

The Forty Niner Ridge Unit No. 2 was recompleted to the Delaware in November of 1987. It potentialed for 270 BOPD, 69 BWPD, GOR 370 from perforations 6043 feet to 4048 feet.

Forty Niner Ridge Unit No. 3 was completed on January 31, 1988. It potentialed for 112 BOPD, 442 BWPD, and a GOR of 1277.

PLANS FOR DEVELOPMENT 1990

In 1990 Texaco plans to drill the Forty Niner Ridge Unit No. 4 in the NE/4 of Section 21 (see enclosed map). This well will test Delaware sands equivalent to zones currently producing in the Forty Niner Ridge Unit No. 2. Potential workover zones will be investigated in the Forty Niner Ridge Unit No. 3.

Yours very truly,

S. G. Snyder
Portfolio Manager

MOS/srt
Attachments

file
chrono

FORTY NINER RIDGE UNIT
EDDY COUNTY, NEW MEXICO

Working Interest Owners

Attention: R. A. Lowery
Maralo, Inc.
P. O. Box 832
Midland, Texas 79702

Meridian Oil, Inc.
21 Desta Drive
Midland, Texas 79705

Bass Enterprises Prod. Co.
First City Bank Tower
201 Main Street
Fort Worth, Texas 76102

Mrs. Erma Lowe
4600 Post Oak Pl., Suite 307
Houston, Texas 77027

FORTY NINER RIDGE UNIT

Supplementary Production Information

Wells Nos. 1, 2, & 3

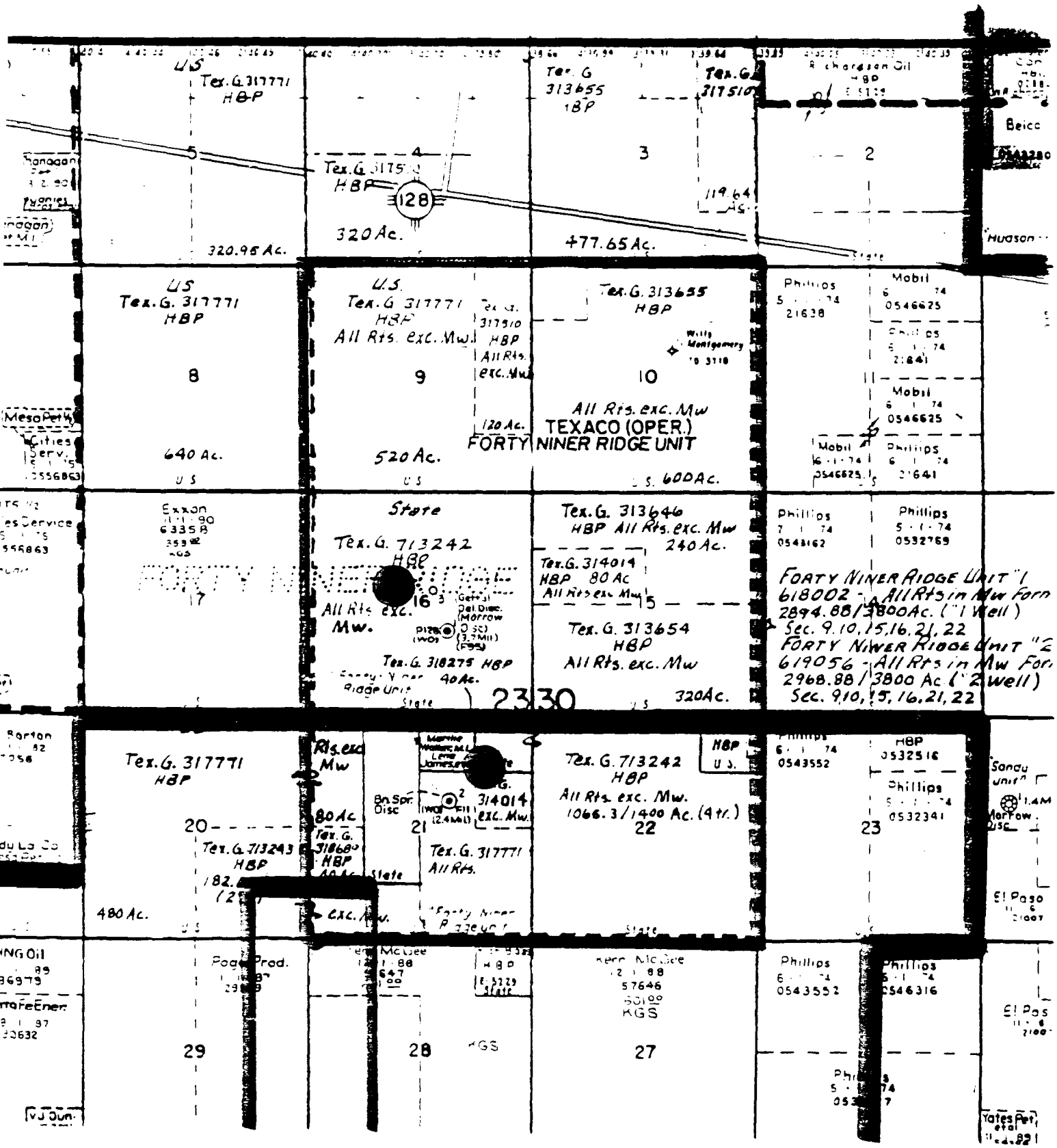
	OCT-89	NOV-89	DEC-89	JAN-90	FEB-90
OIL	1306	1397	1245	986	1094
WATER	4107	6090	6178	6563	3598
GAS	1404	1339	1339	1187	870

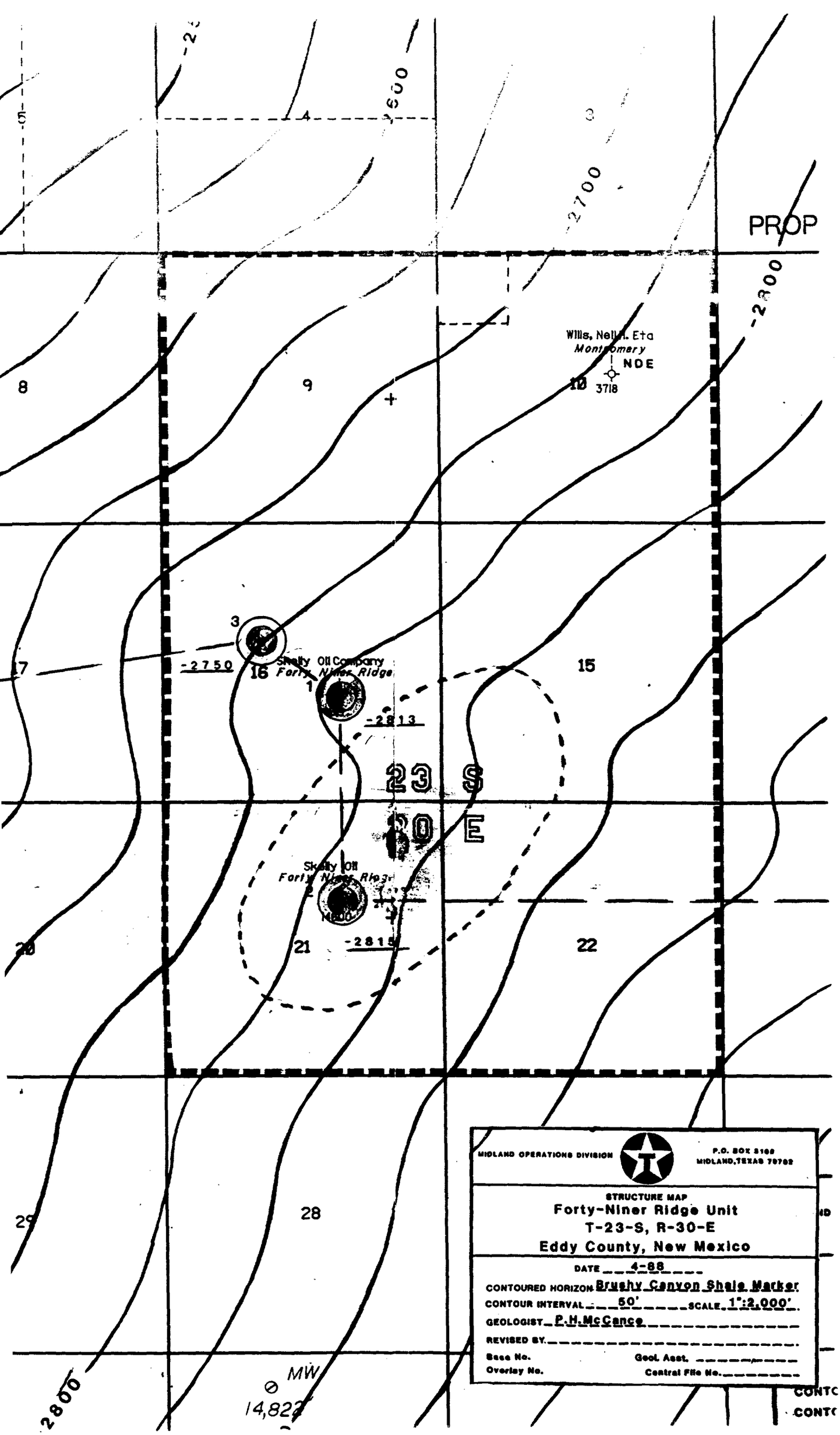
TEXACO PRODUCING INC.

MIDLAND DIVISION HOBBS DISTRICT MONTH ENDING 01-01-90

FIELD NAME/ LEASE NO.	LEASE NAME/ FRS NO.	WELL NO.	WELL STATUS	COMMENTS	CONDITION	SEQUENCE NUMBER	API NUMBER
	(2) JOINTLY OWNED AND OPERATED BY TEXACO						
	TEXACO WI = 64.9325800					22230000	
110	FORTY NINER RIDGE UNIT 333000061030110 31800280 TEXACO WI = 78.3030000	1	PM			22230100 22230100 22230100 22230100	3001520899
301	FORTY NINER RIDGE UNIT 333000061030301 TEXACO WI = 94.7030000	3	PM			22230200 22230200 22230200	3001525454
111	FORTY NINER RIDGE UNIT 333000061030111 31905600 TEXACO WI = 96.6095000	2	PM			22230300 22230300 22230300 22230300	3001521175
1	GETTY FED 24 333000061070001 TEXACO WI = 50.0000000	1	PM			22230400 22230400 22230400	3001523348
49	GETTY 1 STATE 333000061070049 TEXACO WI = 87.2938800	1	NG-CN			22230500 22230500 22230500	3002526372
50	GETTY "2" STATE 333000061070050 40283400 TEXACO WI = 49.1906900	1	SI-NG		11-22-89	22230600 22230600 22230600 22230600	3002525617
308	GETTY 32 STATE 333000061070013 49015900 TEXACO WI = 43.5429600	1	NG-CN			22230700 22230700 22230700 22230700	3002526986
51	GETTY 35 STATE COM. 333000061070051	2	NG-CN			22230800 22230800	3002526705

SUB-AREA -6104 HOBBS-MONUMENT SUB-AREA


US
Tex.G.317771
HBP
320.95 Ac.
Tex.G.317510
HBP
320 Ac.
Tex. G
313655
HBP
3
119.64 Ac.
477.65 Ac.
Richardson Oil
HBP
E 5129
2
Beico
Hudson
8
640 Ac.
US
9
520 Ac.
All Rts. exc. Mw.
120 Ac.
10
All Rts. exc. Mw
TEXACO (OPER.)
FORTY NINER RIDGE UNIT
600 Ac.
Tex.G. 313635
HBP
Willis Montgomery
TD 3118
Phillips
5-1-74
21638
Mobil
6-1-74
0546625
Phillips
5-1-74
21641
Mobil
6-1-74
0546625
Phillips
6-1-74
21641
Mesa Petr.
Cities Serv.
Exxon
11-1-90
63358
State
Tex.G. 713242
HBP
All Rts. exc.
Mw.
16
Tex.G. 318275 HBP
40 Ac.
Forty Niner Ridge Unit
State
Tex.G. 313646
HBP All Rts. exc. Mw
240 Ac.
Tex.G. 314014
HBP 80 Ac
All Rts exc Mw
5
Tex.G. 313654
HBP
All Rts. exc. Mw
320 Ac.
2330
Phillips
7-1-74
0543162
Phillips
5-1-74
0532769
FORTY NINER RIDGE UNIT "1
618002 - All Rts in Mw Form
2894.88/3800 Ac. ("1 Well")
Sec. 9,10,15,16,21,22
FORTY NINER RIDGE UNIT "2
619056 - All Rts in Mw Form
2968.88/3800 Ac ("2 well")
Sec. 9,10,15,16,21,22
Tex.G. 317771
HBP
480 Ac.
Rts. exc
Mw
80 Ac
Tex.G.
318680
HBP
40 Ac
State
20
21
Tex.G. 713243
HBP
182.
(2
exc. Mw.
Tex.G. 317771
All Rts.
Tex.G. 314014
exc. Mw.
Tex.G. 713242
HBP
All Rts. exc. Mw.
1066.3/1400 Ac. (4 tr.)
22
HBP
U.S.
Phillips
6-1-74
0543552
HBP
0532516
Phillips
5-1-74
0532341
23
Sandy Unit
Morrow
Disc
El Paso
Phillips
6-1-74
0543552
Phillips
5-1-74
0546316
El Paso
29
28
27
McGee
HBP
E 5229
State
McGee
57646
KGS
Yates Pet. et al



MIDLAND OPERATIONS DIVISION

P.O. BOX 3109
MIDLAND, TEXAS 79702

STRUCTURE MAP

Forty-Niner Ridge Unit

T-23-S, R-30-E

Eddy County, New Mexico

DATE 4-88

CONTOURED HORIZON Brushy Canyon Shale Marker

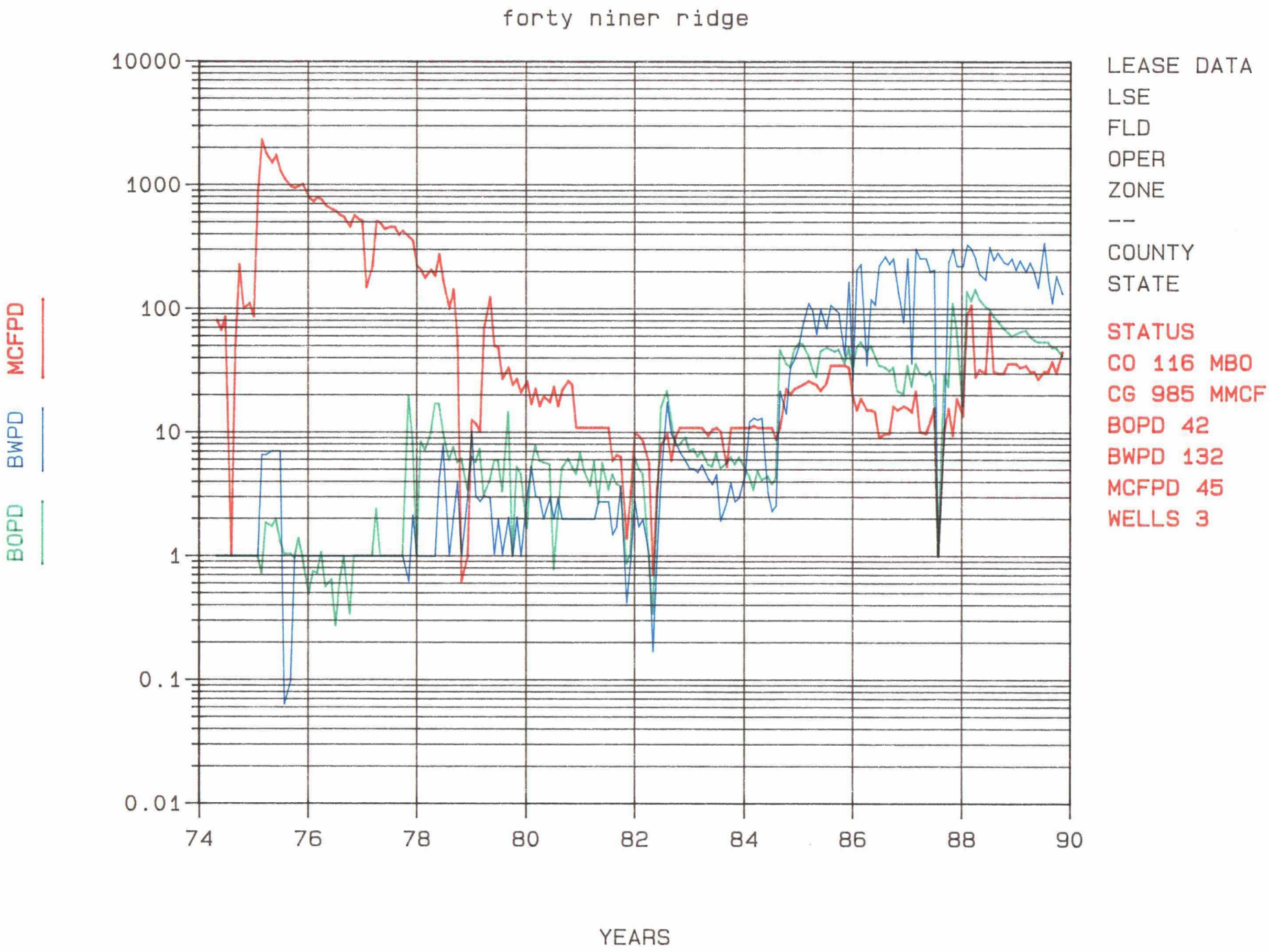
CONTOUR INTERVAL 50' SCALE 1":2,000'

GEOLOGIST P.H.McCance

REVISED BY

Base No. Geol. Asst.

Overlay No. Central File No.


forty niner ridge
10000
1000
100
10
1
0.1
0.01
74
76
78
80
82
84
86
88
90
YEARS
MCFPD
BWPD
BOPD
LEASE DATA
LSE
FLD
OPER
ZONE
--
COUNTY
STATE
STATUS
CO 116 MBO
CG 985 MMCF
BOPD 42
BWPD 132
MCFPD 45
WELLS 3

State of New Mexico



Commissioner of Public Lands

W.R. HUMPHRIES
COMMISSIONER

P.O. BOX 1148
SANTA FE, NEW MEXICO 87504-1148

SLO REF NO. OG-1064

March 27, 1989

#4952

ARCO Oil and Gas Company
Attn: Karl F. Kurz
P.O. Box 1610
Midland, Texas 79702

Re: 1989 Plan of Development
Empire ABO Unit
Eddy County, New Mexico

Gentlemen:

The Commissioner of Public Lands has this date approved the above captioned Plan of Development.

Our approval is subject to like approval by all other appropriate agencies.

Enclosed is an approved copy for your files.

If we may be of further help please do not hesitate to call on us.

Very truly yours,

W. R. HUMPHRIES
COMMISSIONER OF PUBLIC LANDS

BY: Floyd O. Prando
FLOYD O. PRANDO, Director
Oil and Gas Division
(505) 827-5744

cc: OCD
BLM

ARCO Oil and Gas Company
Central District
Post Office Box 1610
Midland, Texas 79702
Telephone 915 688 5200

March 2, 1989

United States Department of the Interior
Bureau of Land Management
P. O. Drawer 1397
Roswell, New Mexico 88201

Attn: Mr. Francis R. Cherry, Jr.
District Manager

State of New Mexico
Mr. Bill Humphries
Commissioner of Public Lands
P. O. Box 1148
Santa Fe, New Mexico 87501

Attn: Mr. Floyd O. Prando, Director (3)
Oil and Gas Division

State of New Mexico
Department of Energy and Minerals
P. O. Box 2088
Santa Fe, New Mexico 87501

Attn: Mr. William J. LeMay (3)
Division Director

Working Interest Owners
Empire Abo Unit
Eddy County, New Mexico

Gentlemen:

In compliance with Section 11 of the Unit Agreement, Empire Abo Unit, Eddy County, New Mexico, ARCO Oil and Gas Company, as Unit Operator, on behalf of itself and other participating working interest owners, hereby submits for your approval a Plan of Operation to cover the period beginning January 1, 1989 and extending through the remainder of calendar year 1989.

Yours very truly,

Karl F. Kurz

Karl F. Kurz
Senior Engineer

KFK:ls

Attachments

EMPIRE ABO UNIT
1989 Plan of Operation

SUBMITTED JANUARY 27, 1989

1. Summary of Proposed Plan of Operation for 1989

ARCO Oil and Gas Company proposes to continue operation of the Empire Abo Unit, Eddy County, New Mexico, substantially the same as in recent years. We will continue to reinject all available residue gas from the Phillips extraction plant and the Amoco extraction plant. Oil will be produced from the most efficient wells in order to maximize recovery.

2. Project Area - Description and History

The Empire Abo Unit is located in portions of Sections 34, 35, 36, Township 17 South, Range 27 East; Sections 1, 2, 3, 4, 8, 9, 10, 11, 12, 15, 16, 17, Township 18 South, Range 27 East; Sections 25, 26, 27, 28, 31, 32, 33, 34, 35, 36, Township 17 South, Range 28 East; Sections 4, 5, 6, Township 18 South, Range 28 East; Sections 29, 30, Township 17 South, Range 29 East, Eddy County, New Mexico.

The Unit, as originally proposed, would have covered 11,399.15 acres. Certain tracts within the Unit Area did not qualify for participation as of October 1, 1973, the effective date of the Unit. These tracts are: 2, 6, 28, 41, 42, 46, 55, 56, 69, 79, 84, and 91. Total area of these tracts is 644.74 acres. The remaining 10,694.41 acres comprised the Project Area for pressure maintenance until September 1, 1975. On this date Tracts 41, 79, and 84 joined the Unit. The addition of these three tracts, which cover 120.03 acres, increased the total area of the Unit to 10,814.44 acres. Tracts 2, 6, 42, and 46 comprise the CITGO Empire Abo Unit, which received NMOCD approval in June, 1974. The Unit Area is now disposed as follows:

	Acres
ARCO Empire Abo Unit	10,814.44
CITGO	241.05
Non-Participating Tracts	283.66
Total Area	11,339.15

ARCO Oil and Gas Company operates a pressure maintenance project at the Empire Abo Unit. This project involves injection of plant residue gas from Abo production back into the Abo formation.

3. Current Performance

In December, 1988, the Unitized Project Area averaged 4,204 BOPD with a 56 percent water cut and a gas-oil ratio of 15,722 cubic feet of gas per barrel of oil. Gas injection averaged 42,555 MCFPD (see attached Production History Plot).

Cumulative oil production from the Project Area through December, 1988 was 208.8 MMBO. This is about 56.3 percent of the 371 MMBO originally in place. Cumulative net gas production from the Project Area through December, 1988 was 262 BCF. This is about 56 percent of the 468 BCF originally in place. As of December, 1988, the Unit has 196 active producing wells.

4. Basic Concepts Governing Future Unit Operations

- Field production history and reservoir numeric model studies have demonstrated that oil recovery is governed by gravity drainage and secondary gas cap expansion. We will be able to maximize the beneficial effects of these recovery mechanisms by observation of well performance and producing from the most efficient wells, those with the lowest GOR's. Natural gas liquid production from individual wells will also be considered when determining the most efficient wells in the future.
- Gas injection will help maintain reservoir pressure and control expansion of the secondary gas cap.

5. Discussion of Past, Current, and Future Operations

a) *Gas Injection*

Fourteen gas injection wells along the north edge of the field handle all of the Empire Abo Unit injected gas. Table I lists these wells. Beginning in July, 1974, and continuing through the latest month for which data is available (December, 1988), all available plant residue gas has been injected into the Abo gas cap. The Unit receives plant residue gas at about 700 psi and compresses it to 2000 psi for injection. Superhydration facilities at the extraction plants reduce hydrogen sulfide content to minimize possible corrosion. A rigorous corrosion treatment program is maintained. Permits for the Gas Injection Facilities have been granted by the State of New Mexico Environmental

Improvements Agency. We believe the injection facilities meet the requirements of the United States Geological Survey and the State of New Mexico.

b) ***Workovers***

An intensive workover program in previous years has been successful in maximizing low GOR production. The majority of the workovers consisted of recompleting wells lower in the reef. As a result of this program, almost all possible lower recompletions have been performed. On the eastern portion of the field where water influx is occurring, workovers consisting of recompleting wells higher in the reef have been successful. We will continue to seek out wells with recompletion potential.

c) ***Continuing Field Study***

In order to maximize future reserves, we will continue to maintain an intensive field surveillance program. We will also continue to evaluate alternate and enhanced recovery techniques.

d) ***Injection of Non-Abo Gas***

Gas from non-Abo sources was delivered from the Gas Company of New Mexico (formerly Southern Union Gas Company) to the Empire Abo Unit. This began on June 18, 1976. Cumulative outside gas injected through December, 1987 was 4,061.8 MMCF. Outside gas has not been injected since July, 1983. Cumulative gas delivered back to the supplier through December, 1986 was 411.3 MMCF and the net cumulative non-Abo gas bank was 3,650.5 MMCF.

e) ***Voidage Limit Removal***

The voidage limit was replaced with a gas production limit of 65 MMCFPD in 1984. This will allow more efficient operation of the Unit. Also, the wet gas compressors were removed and the practice of injecting unprocessed gas was discontinued.

6. Modifications to Plan

It is understood that to meet changing conditions, this plan of operation may be modified from time to time, with the approval of the Supervisor of the U.S.G.S.,

the Commissioner of Public Lands of the State of New Mexico, and the Department of Energy and Minerals, Oil Conservation Division, State of New Mexico.

ARCO Oil and Gas Company, as Unit Operator, will act prudently to preserve the rights of the mineral owners, and to effectively and efficiently recover the Unit Area Reserves. This Company will meet all economical offset obligations, act to prevent waste, conserve natural resources, and protect correlative rights.

7. Effective Date and Duration of Plan

This Plan of Operation shall be effective January 1, 1989 and extend through the calendar year unless otherwise amended.

If this Plan of Operation meets with your approval, please sign on the next page and return one copy for our files.

Very truly yours,
ARCO Oil and Gas Company
OPERATOR

Karl F. Kurz
Senior Engineer

KFL:ls

APPROVED BY: _____ DATE: _____
District Manager
United States Department of the Interior
Bureau of Land Management - Roswell District

APPROVED BY: _____ DATE: _____
Commissioner of Public Lands
State of New Mexico

APPROVED BY: for Roy E. Johnson DATE: 3-8-89
Division Director
Department of Energy and Minerals
Oil Conservation Division
State of New Mexico

TABLE I

EMPIRE ABO UNIT
Gas Injection Wells

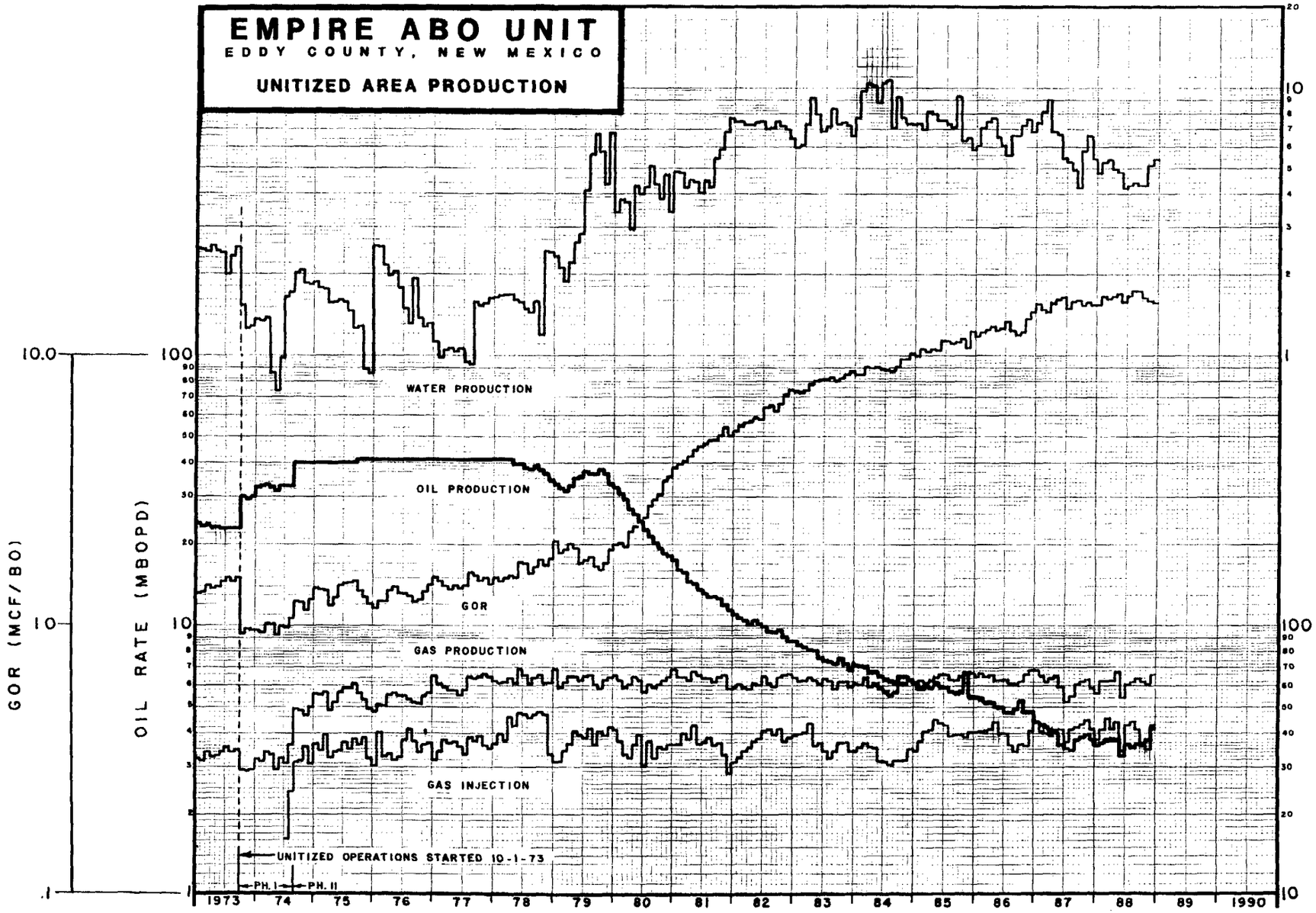
Previous Operator/ Lease and Well	Unit Well Designation	Location (Sec.-Twp-Rng)			
Hondo/State "A" No. 24	C-39	NW/4 SE/4	26	17	28
Hondo/State "A" No. 16	D-37	SW/4 SW/4	26	17	28
Amoco/State "BV" No. 1	F-25	SW/4 NW/4	32	17	28
Hondo/State "A" No. 35	F-27	SW/4 NE/4	32	17	28
ARCO/M. Yates B (ARC) No. 8	F-31	SW/4 NE/4	33	17	28
Amoco/State "BM" No. 1	G-22	NE/4 SW/4	31	17	28
Hondo/State "A" No. 9	G-24	NE/4 SE/4	31	17	28
Gulf/NCT "C" No. 1	H-19	SW/4 SE/4	36	17	27
Amoco/State "BE" No. 1	H-21	SW/4 SW/4	31	17	28
Amoco/Malco "H" Fed. No. 9	I-10	NE/4 NW/4	3	18	27
Amoco/State "F" No. 8	I-18	NE/4 NW/4	1	18	27
Amoco/Malco "H" Fed. No. 2	J-12	SE/4 NE/4	3	18	27
Amoco/Windfohr Fed. No. 4	K-7	NW/4 SE/4	4	18	27
Exxon/CBDU "A" No. 8	M-6	SE/4 NW/4	9	18	27

KFK:ls

EMPIRE ABO UNIT
1988 PRODUCTION HISTORY

Month	BO	BW	Gr. MCFG	Inj. MCFG	Net MCFG
January	113,818	149,648	1,741,581	1,182,366	559,215
February	108,925	156,440	1,830,786	1,187,228	643,558
March	118,744	187,991	1,963,603	1,398,517	565,086
April	114,649	149,198	1,881,405	1,228,990	652,415
May	119,566	151,639	2,064,023	1,353,393	710,630
June	101,679	127,624	1,623,061	1,073,659	549,402
July	112,261	133,287	1,874,456	1,330,213	544,243
August	110,940	137,430	1,920,841	1,357,566	563,275
September	110,977	130,694	1,921,380	1,257,732	663,648
October	116,935	136,058	1,934,267	1,135,832	798,435
November	114,838	155,527	1,850,061	1,060,974	789,087
December	130,279	169,384	2,048,971	1,319,197	729,774
Totals	1,373,611	1,784,920	22,654,435	14,885,667	7,768,768

KFK:EEG:ls


EMPIRE ABO UNIT
EDDY COUNTY, NEW MEXICO
UNITIZED AREA PRODUCTION
WATER PRODUCTION
OIL PRODUCTION
GOR
GAS PRODUCTION
GAS INJECTION
UNITIZED OPERATIONS STARTED 10-1-73
PH. I
PH. II
GOR (MCF/BO)
OIL RATE (MBOPD)
WATER RATE (MBWPD)
GAS RATE (MMCF/D)
10.0
1.0
.1
100
10
1
10
100
1973
74
75
76
77
78
79
80
81
82
83
84
85
86
87
88
89
1990

4952

State of New Mexico



W.R. HUMPHRIES
COMMISSIONER

Commissioner of Public Lands

SLO REF NO OG-723
P.O. BOX 1148
SANTA FE, NEW MEXICO 87504-1148

March 24, 1988

Cities Service Corp.
Attn: Mr. Frank A. Vitrano
P. O. Box 50250
Midland, Texas 79710

Re: 1988 Plan of Development
Citgo Empire Abo Unit
Eddy County, New Mexico

Gentlemen:

The Commissioner of Public Lands has this date approved your 1988 Plan of Development for the above captioned unit area.

Our approval is subject to like approval by all other appropraiate agencies.

Enclosed is an approved copy for your files.

If we may be of further help please do not hesitate to call on us.

Very truly yours,

W. R. HUMPHRIES
COMMISSIONER OF PUBLIC LANDS

BY: Floyd Prando
FLOYD O. PRANDO, Director
Oil and Gas Division
(505) 827-5744

WRH/FOP/pm
encls.
cc: OCD
BLM

CITIES SERVICE OIL AND GAS CORPORATION
P.O.BOX 50250 MIDLAND, TEXAS 79710
(915) 685-5600

February 10, 1988

D - Unit Agreement letter file 12-7

United States Department of the Interior
Bureau of Land Management
P.O. Box 1397
Roswell, NM 88201-1397

Gentlemen:

In compliance with section 10 of the Unit Agreement, Citgo Empire Abo Unit, Eddy County, New Mexico, Cities Service Oil and Gas Corporation as Unit Operator hereby submits for your approval a Plan of Operation beginning January 1, 1988, and extending through December 31, 1988.

Sincerely yours,

Frank A. Vitrano

Frank A. Vitrano
Operations Manager
Midland District

FAV;SEG:ff

cc: State of New Mexico, Commissioner of Public Lands
New Mexico Oil Conservation Division

Citgo Empire Abo Unit

1988 Plan of Operation

1.) Summary of Proposed Plan of Operation for 1988

Cities Service Oil and Gas Corporation as operator of the Citgo Empire Abo Unit, Eddy County, New Mexico, proposes to continue operation of the unit in 1988 substantially the same as in recent years. We will continue to re-inject all available residue gas and will produce oil from the lowest gas-oil ratio wells to maximize efficiency.

2.) Project Area - Description, History, and Performance

The Citgo Empire Abo Unit consists of 361.06 acres in Eddy County, New Mexico. The area is located in portions of Section 35, T-17-S, R-27-E, and Section 2, T-18-S, R-27-E. In December 1988, the Unit averaged 12 BOPD and 1 BWPD with a gas-oil ratio of 29,019 cubic feet of gas per barrel of oil. Gas injection averaged 306 MCFPD, and cumulative production has been 2,541 MBO. The unit was unitized in June 1974, with gas injection begining in June 1975. A natural gas liquids extraction operation was initiated in January 1977 and was suspended in December 1986 due to low product prices.

3.) Discussion of Operations

The unit currently injects gas into the Abo gas cap through one injection well located on the north end of the unit. All available residue gas is injected into the Abo gas cap through this well. Since the shut down of the natural gas liquids plant, the unit picks up the gas from the unit seperators at 50 psi and compresses it to 1600 psi for injection. The are no plans at this time to do any remedial work on the Citgo Empire Abo Unit. We will continue to evaluate the feasability of re-activating the natural gas liquids plant as product prices continue to rise and the feasability of selling small amounts of gas from the high GOR wells within the limits of the field rules for reservoir voidage.

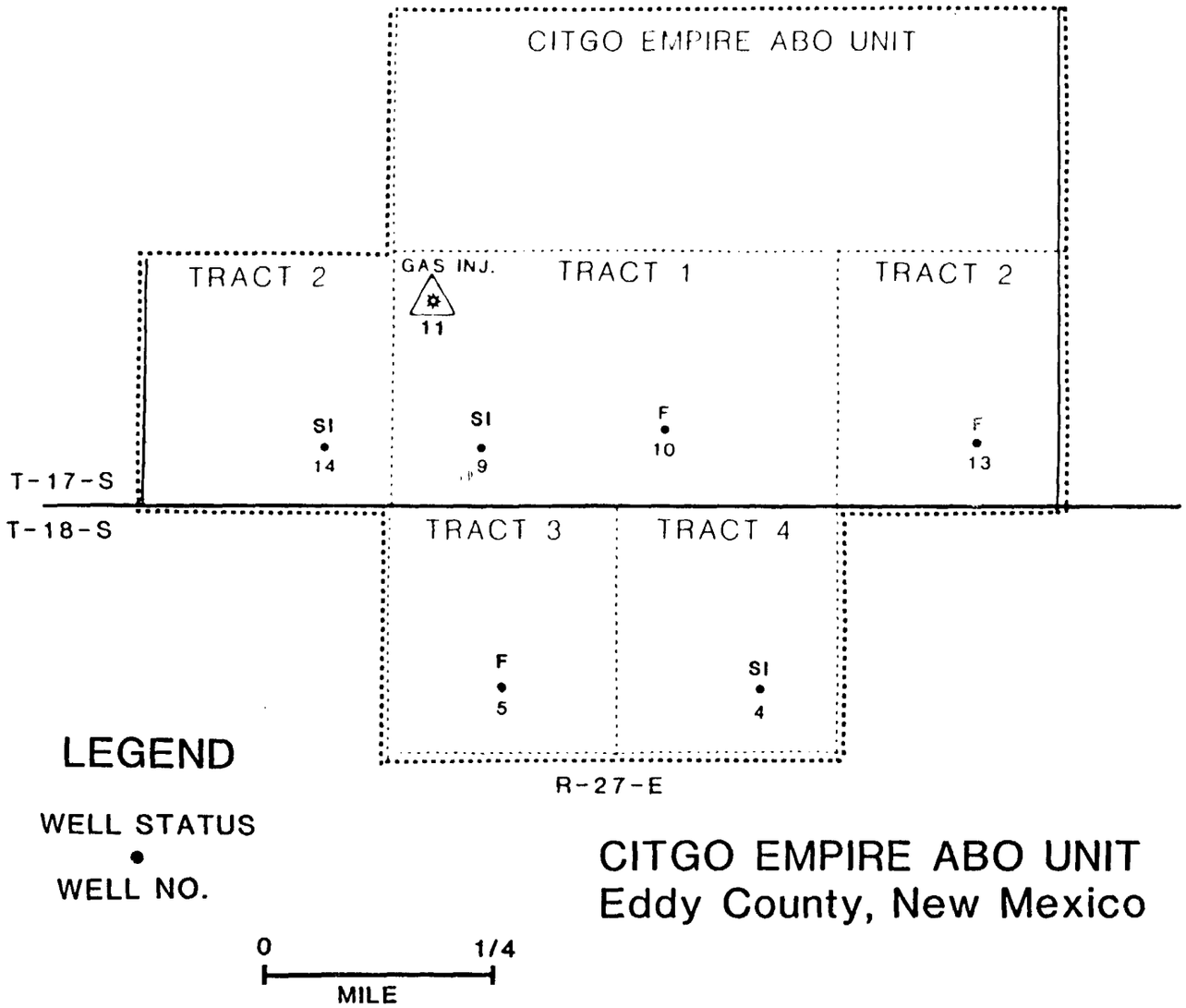
4.) Modifications

This plan of operation may be modified to meet any changing conditions at any time with the approval of the Bureau of Land Management, the Commisioner of Public Lands of the State

of New Mexico, and the New Mexico Oil Conservation Division. Cities Service Oil and Gas Corporation, as Unit operator, will preserve all rights of the mineral owners, and will efficiently attempt to recover all recoverable Unit area reserves.

5.) Effective Date and Duration of Plan

This plan of operation shall be effective January 1, 1988 and extend through December 31, 1988 unless otherwise amended.


CITGO EMPIRE ABO UNIT
TRACT 2
GAS INJ.
11
TRACT 1
TRACT 2
SI
14
SI
9
F
10
F
13
T-17-S
T-18-S
TRACT 3
TRACT 4
F
5
SI
4
R-27-E
LEGEND
WELL STATUS
WELL NO.
0
1/4
MILE
CITGO EMPIRE ABO UNIT
Eddy County, New Mexico

SEP 11 1987

State of New Mexico



SLO REF. NO. OG-432

W.R. HUMPHRIES
COMMISSIONER

Commissioner of Public Lands

P.O. BOX 1148
SANTA FE, NEW MEXICO 87504-1148

September 9, 1987

Cities Service Oil & Gas Corp.
Attention: Frank A. Vitrano
P. O. Box 1919
Midland, Texas 79702

Re: CitgoEmpire Abo Unit
1987 Plan of Development
Eddy County, New Mexico

Gentlemen:

The Commissioner of Public Lands has this date approved the above captioned Plan of Development. Our approval is subject to like approval by all appropriate agencies.

If we may be of further help, please do not hesitate to call on us.

Very truly yours,

W. R. HUMPHRIES
COMMISSIONER OF PUBLIC LANDS

BY: D Cyclone Rand
FLOYD O. PRANDO, Director
Oil & Gas Division
(505) 827-5744

WRH/FOP/ams
enclosure
cc: Bureau of Land Management
Oil Conservation Division

United States Department of the Interior

GEOLOGICAL SURVEY
P. O. Box 26124
Albuquerque, New Mexico 87125

JAN 28 1980

4952

RECEIVED
JAN 29 1980
OIL CONSERVATION DIVISION
SANTA FE

Atlantic Richfield Company
Attention: Mr. G.V. Ricks
P. O. Box 1610
Midland, Texas 79702

Gentlemen:

The 1980 plan of development submitted for the Empire Abo unit area, Eddy County, New Mexico, was approved on this date subject to like approval by the appropriate State officials.

Such plan proposes continuation of the gas injection pressure maintenance program with a reduced rate of infill drilling and further evaluation of horizontal drainhole wells. Four approved copies are enclosed.

Sincerely yours

(ORIG. SGD.) JAMES W. SUTHERLAND

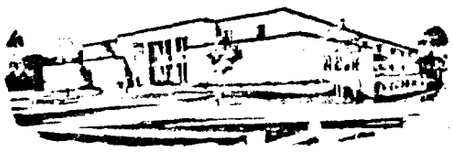
Area Oil and Gas Supervisor, SRMA

Enclosure

cc: NMOCD, Santa Fe (ltr only)

ONE HUNDRED YEARS OF EARTH SCIENCE IN THE PUBLIC SERVICE

State of New Mexico



Commissioner of Public Lands

January 22, 1980

ALEX J. ARMIJO
COMMISSIONER

P. O. BOX 1148
SANTA FE, NEW MEXICO 87501

4952

Atlantic Richfield Company
P. O. Box 1610
Midland, Texas 79702

Re: Empire Abo Unit
Eddy County, New Mexico

ATTENTION: Mr. G. V. Ricks

Gentlemen:

The Commissioner of Public Lands has this date approved your Plan of Operation covering the period beginning January 1, 1980 and extending through the remainder of calender year 1980. Our approval is subject to like approval by the United States Geological Survey and the New Mexico Oil Conservation Division.

Enclosed is one approved copy for your files.

Please remit a Three ($3.00) Dollar diling fee.

Very truly yours,

ALEX J. ARMIJO
COMMISSIONER OF PUBLIC LANDS

BY:
RAY D. GRAHAM, Director
Oil and Gas Division
AC 505-827-2748

AJA/RDG/s
encls.
cc: OCD-Santa Fe, New Mexico
USGS-Roswell New Mexico
USGS-Albuquerque, New Mexico

RECEIVED
JAN 24 1980
Oil Conservation

United States Department of the Interior

BUREAU OF LAND MANAGEMENT
Roswell District Office
P. O. Box 1397
Roswell, New Mexico 88201

#4952

IN REPLY
REFER TO:

Empire Abo Unit

April 11, 1984

ARCO Oil and Gas Company
Attention: Mr. Timothy J. Detmering
P.O. Box 1610
Midland, TX 79702

Gentlemen:

Enclosed are four approved copies of your 1984 Plan of Development and Operation for the Empire Abo Unit Area, Eddy County, New Mexico, covering the period beginning January 1, 1984 and ending December 31, 1984. This plan, proposing to drill horizontal drain holes from Unit Wells No. K-15, J-27, K-182 and G-312 and to continue to maintain an intensive field surveillance program in order to evaluate alternate and/or enhanced recovery techniques during 1984, was approved this date, subject to like approval by the New Mexico Commissioner of Public Lands and the New Mexico Oil Conservation Division.

Sincerely yours,

(Orig. Sgd.) Earl R. Cunningham

District Manager

Enclosures: (4)

cc: NMOCD, Santa Fe

ARCO Oil and Gas Company
Permian District
Post Office Box 1610
Midland, Texas 79702
Telephone 915 684 0100



RECEIVED BY
FEB 25 1985
O. C. D.
ARTESIA, OFFICE

#4952

February 22, 1985

Mr. L. Clements
Oil Conservation Division of the New Mexico
Department of Energy and Minerals
P. O. Drawer DD
Artesia, New Mexico 88210

Dear Mr. Clements:

ARCO - Empire Abo Unit
Pressure Maintenance Report and
Allowable Request for January through April, 1985

ARCO Oil and Gas Company, A Division of Atlantic Richfield Company, as operator of the Empire Abo Unit Pressure Maintenance Project, Eddy County, New Mexico, submits with this letter the gas bank statements for January, 1985. The allowable for January through April, 1985, has been set at 6534 BOPD.

Sincerely,

Teresa C. Block

Teresa C. Block
Associate Engineering Technician

TCB:sc
Atts.

Xc: Mr. Dan Nutter
Oil Conservation Division of the New Mexico
Department of Energy and Minerals
P. O. Box 2088
Santa Fe, New Mexico

EMPIRE ABO UNIT PRESSURE MAINTENANCE PROJECT
(N.M.O.C.D. ORDERS R-4548, R-4549, R-4549A, R-4549B, R-4549C, R-4549D, R-4549E, R-4549F)
ARCO OIL AND GAS CO. A DIVISION OF ATLANTIC RICHFIELD CO. - OPERATOR

ABO GAS BANK STATEMENT

MONTHLY REPORT FOR JANUARY, 1985

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
MONTH	GAS PRODUCED (MCF)	ALLOWABLE GAS PRODUCTION AT 65 MMCFPD (MCF)	AMOUNT UNDER (OVER) ALLOWABLE (MCF)	CUMULATIVE AMOUNT UNDER (OVER) ALLOWABLE (MCF)	GAS BANK BALANCE (LESSOR OF COL. 5 OR 325 MMCF) (MCF)	MAXIMUM GAS RATE ALLOWABLE TO BALANCE GAS BANK (MCFPD)	TOTAL PLANT RESIDUE AVAILABLE (MCF)	ABO GAS INJECTED (MCF)	FRACTION OF AVAILABLE RESIDUE GAS INJECTED (FRACTION)
JANUARY	1,915,830	2,015,000	99,170	424,170	325,000	65,000	1,080,077	1,080,077	1.000

RECEIVED BY
FEB 25 1985
O. C. D.
ARTESIA, OFFICE

EMPIRE ABO PRESSURE MAINTENANCE PROJECT
NON-ABO GAS BANK STATEMENT

MONTHLY REPORT FOR JANUARY, 1985

MONTH	(1) GAS INJECTED (MCF)	(2) CUMULATIVE GAS INJECTED (MCF)	(3) GAS DELIVERED TO SUPPLIER (MCF)	(4) CUMULATIVE GAS DELIVERED TO SUPPLIER (MCF)	(5) NET CUMULATIVE NON-ABO GAS BANK (COL. (2) - COL. (4)) (MCF)
JANUARY	- 0 -	4,061,826	- 0 -	411,342	3,650,484

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08:15:18 02/22/85

EMPIRE ABO PRESSURE MAINTENANCE PROJECT

TO: N.M.O.C.C. DIST II (3)
P.O. DRAWER DD (N.M.O.C.C. ORDERS R-4548, R-4549, R-4549-A, R-4549-B, R-4549-C, R-4549-D, R-4549-E, R-4549F)
ARTESIA, NEW MEXICO-88210
ATTN:MR. W.A. GRESSETT ATLANTIC RICHFIELD COMPANY - OPERATOR

MONTHLY REPORT FOR JAN., 1985

PROJECT AREA: EMPIRE ABO UNIT
SHEET A TOTAL REQUESTED ALLOWABLE FOR JAN.-APR., 1985 IS 6534. BOPD

(1)	(2)	(3)	(4)								(5)					(6)			(7)	(8)	(9)	(10)	(11)
																INJECTION-AVERAGE							
							TEST DATA									JAN. ,1985			VOID	REQUE-	NET	REQUES	NET	REQU-
							(LATEST 24-HR)				PRODUCTION AVERAGE					WATER		CUM.	AVAIL.	STED	VOID	NET	VOID	ESTED
TCT	WELL		WEL	DATE			OIL	WTR	GAS	GOR	(JAN. ,1985)					BWPD	WHINJ	INJ.	FOR(1)	VOID	AT NUA	(8+9)	SEE I9	OIL
NO.	NO.	UN SEC T R	STA	M	YR		BBL	BBL	MCF	CF/B	OIL BOPD	WTR BWPD	GAS MCF/D	GOR CF/B		GAS MCF/D	PRESS PSI	MBW MMCF	TRANS. RSVB/D	TRANS. RSVB/D	(2) RSVB/D	RSVB/D	ALLOW BOPD
B	40	H 26 17 28	S																				
B	45	E 30 17 29	S	7	73		9.	3.	23.	2556.									50.				
B	46	F 30 17 29	S	7	73		85.	12.	85.	1000.									197.				
B	47	G 30 17 29	S	7	73		40.	175.	80.	2000.									356.				
B	48	H 30 17 29	I				WATER INJECTOR									2594.	1300.	2179.	0.				
B	49	E 29 17 29	I				WATER INJECTOR									2340.	0.	3173.	0.				
C	34	K 27 17 28	S	8	73		22.	0.	40.	1818.									86.				
C	35	J 27 17 28	S	5	73		71.	0.	89.	1254.									198.				
C	36	I 27 17 28	S	6	73		21.	0.	4.	190.									-2.				
C	37	L 26 17 28	F	11	84		41.	3.	589.	14366.	3.	3.	35.	11538.						44.	44.	4.	
C	38	K 26 17 28	I				GAS INJECTOR									0.	0.	830.	665.				
C	39	J 26 17 28	I				GAS INJECTOR									2504.	1714.	11384.	665.				
C	40	I 26 17 28	F	11	84		64.	32.	78.	1219.	80.	63.	59.	734.						103.	103.	80.	
C	41	L 25 17 28	P	11	84		90.	134.	168.	1867.	87.	87.	90.	1032.						159.	159.	87.	
C	42	K 25 17 28	S	9	76		44.	1.	172.	3909.									408.				
C	43	J 25 17 28	S	9	76		12.	255.	67.	5583.									410.				
C	44	I 25 17 28	S	11	76		5.	374.	0.	0.									366.				
C	45	L 30 17 29	S	7	73		72.	297.	14.	194.									310.				
C	46	K 30 17 29	S	5	73		30.	306.	140.	4667.									637.				
C	47	J 30 17 29	S	8	73		10.	105.	11.	1100.									122.				
C	49	L 29 17 29	I				WATER INJECTOR									1301.	1300.	6832.	0.				
C	50	K 29 17 29	I				WATER INJECTOR									702.	0.	2537.	0.				
D	33	M 27 17 28	S	11	81		30.	0.	1056.	35200.									665.				
D	34	N 27 17 28	F	11	84		40.	0.	1704.	42600.	13.	0.	526.	39362.						624.	624.	15.	
D	35	O 27 17 28	I				GAS INJECTOR									730.	1753.	1334.	665.				
D	36	P 27 17 28	P	10	84		116.	0.	311.	2681.	45.	8.	98.	2178.						111.	111.	50.	
D	361	P 27 17 28	F	11	84		70.	16.	83.	1186.	18.	7.	80.	4446.						94.	94.	20.	
D	37	M 26 17 28	I				GAS INJECTOR									4111.	1742.	16134.	665.				
D	38	N 26 17 28	P	12	84		2.	98.	88.	44000.	2.	48.	1.	710.						41.	41.	2.	
D	39	O 26 17 28	P	11	84		19.	156.	29.	1526.	22.	135.	27.	1238.						152.	152.	22.	
D	40	P 26 17 28	P	12	84		8.	56.	2.	250.	11.	89.	2.	202.						81.	81.	11.	
D	41	M 25 17 28	S	9	76		6.	460.	21.	3500.									502.				
D	42	N 25 17 28	S	9	76		17.	68.	142.	8353.									407.				
D	43	O 25 17 28	S	2	79		11.	157.	16.	1455.									186.				
D	44	P 25 17 28	P	11	84		54.	492.	82.	1519.	46.	46.	11.	248.						41.	41.	46.	
E	26	C 32 17 28	S	5	73		2.	1.	0.	0.									-7.				
E	27	B 32 17 28	S	8	73		3.	0.	0.	0.									-8.				
E	28	A 32 17 28	S	5	73		15.	0.	55.	3667.									124.				
E	30	C 33 17 28	S	9	76		31.	0.	462.	14903.									665.				

E 31	B	33	17	28*	S	7	81	22.	8.	224.	10182.*					*				*	548.*	*	*	*				
E 32	A	33	17	28*	S	10	78	43.	0.	1441.	33512.*					*				*	665.*	*	*	*				
E 33	D	34	17	28*	S	11	79	6.	2.	178.	29667.*					*				*	431.*	*	*	*				
E 34	C	34	17	28*	S	3	80	168.	0.	642.	3821.*					*				*	665.*	*	*	*				
E 341	C	34	17	28*	S	11	79	6.	0.	1122.	187000.*					*				*	665.*	*	*	*				
E 35	B	34	17	28*	S	3	80	6.	0.	450.	75000.*					*				*	665.*	*	*	*				
E 351	B	34	17	28*	S	7	81	40.	1.	1336.	33400.*					*				*	665.*	*	*	*				
E 36	A	34	17	28*	P	11	84	56.	232.	168.	3000.*	62.	457.	183.	2929.*	*				*	*	*	659.*	659.*	69.			
E 361	A	34	17	28*	S	3	81	0.	0.	648.	0.*					*				*	670.*	*	*	*				
E 362	A	34	17	28*	P	11	84	112.	68.	44.	393.*	140.	171.	54.	383.*	*				*	*	*	203.*	203.*	155.			
E 363	A	34	17	28*	F	11	84	135.	347.	60.	444.*	158.	158.	57.	361.*	*				*	*	*	185.*	185.*	175.			
E 37	D	35	17	28*	P	10	84	3.	411.	1.	333.*	5.	95.	20.	4058.*	*				*	*	*	114.*	114.*	5.			
E 371	D	35	17	28*	P	11	84	16.	204.	22.	1375.*	40.	40.	10.	254.*	*				*	*	*	42.*	42.*	40.			
E 372	D	35	17	28*	P	11	84	1.	174.	13.	13000.*	20.	480.	211.	10561.*	*				*	*	*	702.*	702.*	20.			
E 373	D	35	17	28*	F	12	84	186.	12.	1054.	5667.*	30.	1.	138.	4603.*	*				*	*	*	142.*	142.*	30.			
E 374	D	35	17	28*	P	11	84	4.	400.	14.	3500.*	70.	319.	796.	11374.*	*				*	*	*	1160.*	1160.*	70.			
E 38	C	35	17	28*	S	1	81	0.	334.	5.	0.*					*				*	338.*	*	*	*				
E 381	C	35	17	28*	P	11	84	2.	332.	4.	2000.*	10.	190.	16.	1623.*	*				*	*	*	203.*	203.*	10.			
E 382	C	35	17	28*	F	12	84	74.	68.	44.	595.*	65.	65.	31.	484.*	*				*	*	*	85.*	85.*	65.			
E 383	C	35	17	28*	P	10	84	6.	266.	6.	1000.*	8.	152.	13.	1621.*	*				*	*	*	162.*	162.*	8.			
E 384	C	35	17	28*	P	10	84	4.	384.	4.	1000.*	4.	36.	3.	806.*	*				*	*	*	37.*	37.*	4.			
E 39	B	35	17	28*	S	1	81	3.	182.	4.	1333.*					*				*	183.*	*	*	*				
E 391	B	35	17	28*	P	10	84	2.	16.	2.	1000.*	7.	168.	6.	811.*	*				*	*	*	170.*	170.*	7.			
E 392	B	35	17	28*	P	9	84	8.	342.	10.	1250.*	2.	98.	2.	1000.*	*				*	*	*	97.*	97.*	2.			
E 393	B	35	17	28*	P	11	84	10.	126.	18.	1800.*	6.	194.	9.	1457.*	*				*	*	*	200.*	200.*	6.			
E 395	B	35	17	28*	S	7	82	0.	132.	2.	0.*					*				*	129.*	*	*	*				
E 40	A	35	17	28*	S	11	76	1.	317.	0.	0.*					*				*	309.*	*	*	*				
E 41	D	36	17	28*	S	3	79	30.	257.	21.	700.*					*				*	295.*	*	*	*				
F 22	F	31	17	28*	S	5	73	3.	0.	12.	4000.*					*				*	21.*	*	*	*				
F 25	E	32	17	28*	I			GAS INJECTOR			*					*	873.	1791.	1999.*	665.*	*	*	*				
F 26	F	32	17	28*	S	9	76	76.	0.	622.	8184.*					*				*	665.*	*	*	*				
F 27	G	32	17	28*	I			GAS INJECTOR			*					*	2015.	1778.	11217.*	665.*	*	*	*				
F 28	H	32	17	28*	S	9	76	313.	0.	701.	2240.*					*				*	665.*	*	*	*				
F 29	E	33	17	28*	S	9	76	39.	0.	1138.	29179.*					*				*	665.*	*	*	*				
F 30	F	33	17	28*	S	10	77	267.	0.	1089.	4079.*					*				*	665.*	*	*	*				
F 31	G	33	17	28*	I			GAS INJECTOR			*					*	11695.	1742.	37804.*	665.*	*	*	*				
F 32	H	33	17	28*	F	12	84	52.	0.	1830.	35192.*	5.	0.	60.	11916.*	*				*	*	*	55.*	55.*	5.			
F 321	H	33	17	28*	S	8	80	2.	0.	516.	258000.*					*				*	665.*	*	*	*				
F 322	H	33	17	28*	S	10	81	2.	1.	1302.	651000.*					*				*	665.*	*	*	*				
F 33	E	34	17	28*	S	2	82	24.	0.	416.	17333.*					*				*	665.*	*	*	*				
F 331	E	34	17	28*	P	12	84	88.	44.	36.	409.*	90.	74.	30.	332.*	*				*	*	*	89.*	89.*	100.			
F 332	E	34	17	28*	F	12	84	79.	0.	1853.	23456.*	4.	0.	101.	25323.*	*				*	*	*	106.*	106.*	4.			
F 333	E	34	17	28*	S	7	80	3.	0.	1536.	512000.*					*				*	671.*	*	*	*				
F 334	E	34	17	28*	S	6	81	4.	1.	590.	147500.*					*				*	671.*	*	*	*				
F 335	E	34	17	28*	P	12	84	74.	4.	1648.	22270.*	25.	0.	452.	18092.*	*				*	*	*	478.*	478.*	25.			
F 336	E	34	17	28*	P	11	84	14.	4.	1008.	72000.*	5.	1.	292.	58490.*	*				*	*	*	310.*	310.*	5.			
F 34	F	34	17	28*	S	3	80	12.	0.	1440.	120000.*					*				*	665.*	*	*	*				
F 341	F	34	17	28*	S	3	81	6.	0.	1359.	226500.*					*				*	665.*	*	*	*				
F 342	F	34	17	28*	F	11	84	27.	0.	1853.	68630.*	5.	0.	3664.	732722.*	*				*	*	*	3935.*	3935.*	5.			
F 343	F	34	17	28*	P	10	84	24.	24.	1539.	64125.*	5.	1.	146.	29142.*	*				*	*	*	153.*	153.*	5.			
F 35	G	34	17	28*	S	4	84	4.	9.	1279.	319750.*					*				*	665.*	*	*	*				
F 351	G	34	17	28*	P	11	84	41.	261.	1260.	30732.*	5.	45.	229.	45839.*	*				*	*	*	288.*	288.*	5.			
F 352	G	34	17	28*	S	4	81	0.	0.	1704.	0.*					*				*	670.*	*	*	*				
F 353	G	34	17	28*	P	11	84	104.	290.	56.	538.*	135.	135.	48.	356.*	*				*	*	*	162.*	162.*	150.			
F 354	G	34	17	28*	F	10	84	28.	0.	245.	8750.*	18.	1.	1453.	80430.*	*				*	*	*	1718.*	1718.*	20.			
F 36	H	34	17	28*	S	7	84	21.	1.	1689.	80429.*					*				*	665.*	*	*	*				
F 361	H	34	17	28*	F	12	84	10.	120.	1019.	101900.*	6.	18.	497.	82785.*	*				*	*	*	548.*	548.*	6.			
F 362	H	34	17	28*	S	3	81	18.	4.	750.	41667.*					*				*	670.*	*	*	*				
F 363	H	34	17	28*	F	11	84	25.	135.	231.	9240.*	18.	82.	59.	3248.*	*				*	*	*	146.*	146.*	20.			
F 364	H	34	17	28*	F	11	84	80.	218.	1445.	18063.*	45.	43.	8.	185.*	*				*	*	*	36.*	36.*	50.			

F 37	E	35	17	28*	P	12	84	70.	223.	88.	1257.*	55.	251.	2.	39.*				*	*	*	241.*	241.*	55.
F 371	E	35	17	28*	F	10	84	141.	48.	1619.	11482.*	16.	7.	30.	1877.*				*	*	*	35.*	35.*	16.
F 372	E	35	17	28*	P	11	84	16.	330.	26.	1625.*	15.	199.	17.	1135.*				*	*	*	213.*	213.*	15.
F 373	E	35	17	28*	P	11	84	138.	178.	58.	420.*	100.	233.	62.	617.*				*	*	*	279.*	279.*	100.
F 374	E	35	17	28*	F	11	84	191.	176.	878.	4597.*	60.	134.	36.	600.*				*	*	*	160.*	160.*	60.
F 375	E	35	17	28*	P	11	84	32.	342.	26.	813.*	83.	194.	50.	602.*				*	*	*	230.*	230.*	83.
F 376	E	35	17	28*	P	11	84	140.	324.	170.	1214.*	90.	270.	89.	986.*				*	*	*	340.*	340.*	90.
F 38	F	35	17	28*	P	11	84	14.	402.	26.	1857.*	30.	90.	45.	1509.*				*	*	*	131.*	131.*	30.
F 381	F	35	17	28*	P	12	84	2.	277.	6.	3000.*	4.	196.	10.	2435.*				*	*	*	204.*	204.*	4.
F 382	F	35	17	28*	P	10	84	4.	362.	2.	500.*	19.	71.	8.	404.*				*	*	*	74.*	74.*	19.
F 383	F	35	17	28*	P	12	84	4.	310.	4.	1000.*	4.	196.	3.	806.*				*	*	*	197.*	197.*	4.
F 39	G	35	17	28*	S	11	82	1.	455.	8.	8000.*				*				*	466.*	*	*	*	
F 391	G	35	17	28*	S	1	82	26.	96.	2.	77.*				*				*	88.*	*	*	*	
F 40	H	35	17	28*	S	7	82	0.	106.	1.	0.*				*				*	100.*	*	*	*	
G 17	L	36	17	27*	S						*				*				*	*	*	*	*	
G 18	K	36	17	27*	T						*				*				*	*	*	*	*	
G 19	J	36	17	27*	I			GAS	INJECTOR		*				*	0.	0.	489.*	665.*	*	*	*	*	
G 20	I	36	17	27*	S	5	73	73.	0.	242.	3315.*				*				*	574.*	*	*	*	
G 21	L	31	17	28*	S	6	73	70.	0.	395.	5643.*				*				*	665.*	*	*	*	
G 22	K	31	17	28*	I			GAS	INJECTOR		*				*	1741.	1797.	9833.*	665.*	*	*	*	*	
G 23	J	31	17	28*	S	7	73	43.	0.	327.	7605.*				*				*	665.*	*	*	*	
G 24	I	31	17	28*	I			GAS	INJECTOR		*				*	1055.	711.	6073.*	665.*	*	*	*	*	
G 25	L	32	17	28*	F	11	84	6.	0.	272.	45333.*	15.	0.	104.	6961.*				*	*	*	101.*	101.*	15.
G 26	K	32	17	28*	F	12	84	17.	0.	603.	35471.*	2.	0.	27.	13468.*				*	*	*	20.*	20.*	2.
G 27	J	32	17	28*	F	12	84	50.	0.	931.	18620.*	5.	0.	54.	10897.*				*	*	*	50.*	50.*	5.
G 28	I	32	17	28*	S	9	76	387.	0.	655.	1693.*				*				*	660.*	*	*	*	
G 29	L	33	17	28*	F	12	84	22.	0.	705.	32045.*	3.	1.	18.	6086.*				*	*	*	16.*	16.*	3.
G 291	L	33	17	28*	F	11	84	60.	0.	692.	11533.*	5.	0.	337.	67426.*				*	*	*	357.*	357.*	5.
G 30	K	33	17	28*	F	12	84	36.	4.	274.	7611.*	15.	0.	212.	14114.*				*	*	*	221.*	221.*	15.
G 301	K	33	17	28*	P	11	84	72.	4.	94.	1306.*	54.	54.	108.	2000.*				*	*	*	168.*	168.*	60.
G 31	J	33	17	28*	S	8	82	0.	6.	1598.	0.*				*				*	665.*	*	*	*	
G 311	J	33	17	28*	F	11	84	23.	46.	1029.	44739.*	15.	18.	545.	36346.*				*	*	*	599.*	599.*	15.
G 312	J	33	17	28*	P	10	84	31.	3.	8.	258.*	20.	1.	4.	208.*				*	*	-5.*	5.*	-0.*	20.
G 313	J	33	17	28*	P	12	84	74.	2.	184.	2486.*	55.	55.	111.	2019.*				*	*	*	162.*	162.*	55.
G 314	J	33	17	28*	F	12	84	48.	24.	40.	833.*	34.	87.	23.	676.*				*	*	*	104.*	104.*	34.
G 315	J	33	17	28*	F	12	84	42.	16.	374.	8905.*	40.	40.	212.	5299.*				*	*	*	259.*	259.*	40.
G 32	I	33	17	28*	P	12	84	54.	4.	500.	9259.*	60.	2.	2133.	35781.*				*	*	*	2527.*	2527.*	66.
G 321	I	33	17	28*	F	11	84	10.	70.	1832.	183200.*	5.	37.	1118.	223613.*				*	*	*	1236.*	1236.*	5.
G 322	I	33	17	28*	F	11	84	69.	3.	1176.	17043.*	59.	0.	3003.	51142.*				*	*	*	3561.*	3561.*	65.
G 323	I	33	17	28*	P	11	84	22.	6.	190.	8636.*	30.	27.	17.	580.*				*	*	*	38.*	38.*	30.
G 324	I	33	17	28*	P	12	84	48.	8.	658.	13708.*	10.	0.	1801.	180087.*				*	*	*	1933.*	1933.*	10.
G 33	L	34	17	28*	S	9	81	2.	2.	1112.	556000.*				*				*	665.*	*	*	*	
G 331	L	34	17	28*	P	12	84	27.	41.	13.	481.*	10.	19.	4.	390.*				*	*	*	19.*	19.*	10.
G 332	L	34	17	28*	F	11	84	90.	14.	1689.	18767.*	23.	3.	657.	29080.*				*	*	*	778.*	778.*	25.
G 333	L	34	17	28*	P	12	84	10.	8.	1006.	100600.*	5.	0.	409.	81729.*				*	*	*	436.*	436.*	5.
G 334	L	34	17	28*	F	10	84	6.	0.	1120.	186667.*	5.	0.	758.	151600.*				*	*	*	812.*	812.*	5.
G 34	K	34	17	28*	P	12	84	8.	119.	302.	37750.*	14.	219.	429.	30668.*				*	*	*	676.*	676.*	14.
G 341	K	34	17	28*	S	4	81	0.	0.	1698.	0.*				*				*	670.*	*	*	*	
G 342	K	34	17	28*	F	11	84	124.	0.	1445.	11653.*	18.	11.	458.	25330.*				*	*	*	549.*	549.*	20.
G 343	K	34	17	28*	F	11	84	34.	82.	1760.	51765.*	2.	2.	84.	42048.*				*	*	*	83.*	83.*	2.
G 35	J	34	17	28*	F	11	84	64.	217.	1667.	26047.*	4.	8.	85.	21153.*				*	*	*	96.*	96.*	4.
G 351	J	34	17	28*	P	11	84	40.	83.	1850.	46250.*	10.	10.	382.	38184.*				*	*	*	416.*	416.*	10.
G 352	J	34	17	28*	P	11	84	27.	62.	1577.	58407.*	10.	8.	774.	77368.*				*	*	*	836.*	836.*	10.
G 353	J	34	17	28*	P	11	84	85.	145.	1760.	20706.*	10.	15.	904.	90410.*				*	*	*	983.*	983.*	10.
G 36	I	34	17	28*	S	11	81	2.	16.	1361.	680500.*				*				*	665.*	*	*	*	
G 361	I	34	17	28*	P	11	84	28.	166.	18.	643.*	18.	82.	9.	521.*				*	*	*	81.*	81.*	20.
G 37	L	35	17	28*	P	10	84	2.	86.	4.	2000.*	15.	92.	24.	1624.*				*	*	*	107.*	107.*	15.
G 38	K	35	17	28*	S	10	76	0.	187.	0.	0.*				*				*	179.*	*	*	*	
H 12	P	34	17	27*	S	5	73	42.	0.	274.	6524.*				*				*	659.*	*	*	*	
H 17	M	36	17	27*	S	10	76	65.	0.	597.	9185.*				*				*	665.*	*	*	*	

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I 282	A	5	18	28*	P	11	84	22.	18.	234.	10636.*	25.	20.	176.	7030.*					*	*	*	202.*	202.*	25.
I 283	A	5	18	28*	P	11	84	9.	1.	34.	3778.*	13.	1.	40.	3067.*					*	*	*	39.*	39.*	13.
I 29	D	4	18	28*	S	10	79	56.	63.	217.	3875.*									*	579.*	*	*	*	
I 291	D	4	18	28*	P	11	84	35.	20.	281.	8029.*	50.	17.	110.	2205.*					*	*	*	122.*	122.*	50.
I 292	D	4	18	28*	P	12	84	24.	66.	92.	3833.*	25.	21.	54.	2165.*					*	*	*	71.*	71.*	25.
I 30	C	4	18	28*	S	11	79	14.	10.	18.	1286.*									*	43.*	*	*	*	
J 8	H	4	18	27*	S	5	73	3.	0.	9.	3000.*									*	13.*	*	*	*	
J 9	E	3	18	27*	S	10	76	53.	0.	583.	11000.*									*	665.*	*	*	*	
J 10	F	3	18	27*	S	10	76	142.	0.	847.	5965.*									*	665.*	*	*	*	
J 11	G	3	18	27*	S	9	76	127.	0.	423.	3331.*									*	665.*	*	*	*	
J 12	H	3	18	27*	I			GAS	INJECTOR		*									*	665.*	*	*	*	
J 13	E	2	18	27*	S	10	77	104.	0.	1096.	10538.*									*	665.*	*	*	*	
J 14	F	2	18	27*	F	12	84	81.	1.	1461.	18037.*	6.X	0.	88.	14624.*					*	*	*	85.*	85.*	6.
J 15	G	2	18	27*	F	11	84	79.	1.	1434.	18152.*	14.X	0.	1730.	123581.*					*	*	*	1850.*	1850.*	14.
J 17	E	1	18	27*	S	9	76	90.	0.	971.	10789.*									*	665.*	*	*	*	
J 18	F	1	18	27*	S	8	81	3.	0.	1551.	517000.*									*	665.*	*	*	*	
J 19	G	1	18	27*	F	12	84	43.	0.	644.	14977.*	40.	1.	431.	10765.*					*	*	*	448.*	448.*	40.
J 191	G	1	18	27*	S	1	78	33.	0.	1523.	46152.*									*	665.*	*	*	*	
J 20	H	1	18	27*	S	1	81	0.	0.	68.	0.*									*	159.*	*	*	*	
J 201	H	1	18	27*	F	12	84	50.	0.	1927.	38540.*	18.	0.	245.	13561.*					*	*	*	285.*	285.*	20.
J 202	H	1	18	27*	P	12	84	16.	2.	8.	500.*	14.	3.	6.	449.*					*	*	*	5.*	5.*	14.
J 203	H	1	18	27*	F	12	84	77.	0.	1597.	20740.*	7.	0.	97.	13917.*					*	*	*	101.*	101.*	7.
J 21	E	6	18	28*	F	12	84	58.	0.	1238.	21345.*	7.	0.	100.	14221.*					*	*	*	104.*	104.*	7.
J 211	E	6	18	28*	F	12	84	87.	0.	1578.	18138.*	5.	0.	94.	18852.*					*	*	*	98.*	98.*	5.
J 212	E	6	18	28*	F	12	84	80.	0.	1427.	17837.*	18.	0.	271.	15043.*					*	*	*	286.*	286.*	18.
J 213	E	6	18	28*	P	12	84	49.	0.	18.	367.*	13.	0.	8.	625.*					*	*	*	4.*	4.*	13.
J 22	F	6	18	28*	F	11	84	68.	0.	1638.	24088.*	3.	0.	660.	220021.*					*	*	*	706.*	706.*	3.
J 221	F	6	18	28*	F	12	84	81.	0.	1674.	20667.*	3.	0.	55.	18280.*					*	*	*	56.*	56.*	3.
J 222	F	6	18	28*	P	12	84	24.	2.	18.	750.*	45.	0.	24.	541.*					*	*	*	17.*	17.*	50.
J 23	G	6	18	28*	S	11	79	28.	0.	982.	35071.*									*	665.*	*	*	*	
J 231	G	6	18	28*	F	12	84	16.	4.	1104.	69000.*	12.	0.	673.	56056.*					*	*	*	719.*	719.*	12.
J 232	G	6	18	28*	F	12	84	95.	1.	1680.	17684.*	76.	0.	970.	12767.*					*	*	*	1027.*	1027.*	76.
J 233	G	6	18	28*	F	12	84	54.	0.	1164.	21556.*	10.	0.	214.	21400.*					*	*	*	227.*	227.*	10.
J 234	G	6	18	28*	F	12	84	69.	4.	1737.	25174.*	10.	0.	231.	23123.*					*	*	*	245.*	245.*	10.
J 235	G	6	18	28*	F	11	84	42.	0.	1380.	32857.*	10.	0.	340.	34039.*					*	*	*	363.*	363.*	10.
J 24	H	6	18	28*	F	11	84	32.	0.	316.	9875.*	44.X	0.	353.	8022.*					*	*	*	368.*	368.*	44.
J 241	H	6	18	28*	P	12	84	47.	3.	37.	787.*	42.X	2.	11.	259.*					*	*	*	1.*	1.*	42.
J 26	F	5	18	28*	P	12	84	171.	1.	156.	912.*	154.	2.	114.	741.*					*	*	*	97.*	97.*	171.
J 27	G	5	18	28*	S	5	84	1.	128.	63.	63000.*									*	275.*	*	*	*	
J 28	H	5	18	28*	P	12	84	26.	163.	80.	3077.*	17.	72.	42.	2471.*					*	*	*	106.*	106.*	17.
K 7	J	4	18	27*	I			GAS	INJECTOR		*									*	665.*	*	*	*	
K 8	I	4	18	27*	S	5	73	56.	0.	617.	11018.*									*	665.*	*	*	*	
K 9	L	3	18	27*	F	12	84	107.	0.	578.	5402.*	20.	0.	106.	5281.*					*	*	*	101.*	101.*	20.
K 10	K	3	18	27*	F	12	84	40.	0.	271.	6775.*	23.	0.	149.	6452.*					*	*	*	161.*	161.*	25.
K 11	J	3	18	27*	S	7	82	12.	0.	1803.	150250.*									*	665.*	*	*	*	
K 12	I	3	18	27*	F	11	84	73.	1.	890.	12192.*	15.	0.	176.	11746.*					*	*	*	179.*	179.*	15.
K 13	L	2	18	27*	F	12	84	40.	0.	1483.	37075.*	5.	0.	173.	34632.*					*	*	*	181.*	181.*	5.
K 131	L	2	18	27*	P	12	84	56.	1.	1207.	21554.*	10.	0.	18.	1829.*					*	*	*	14.*	14.*	10.
K 14	K	2	18	27*	P	12	84	9.	0.	186.	20667.*	15.	2.	341.	22746.*					*	*	*	364.*	364.*	15.
K 141	K	2	18	27*	F	12	84	130.	12.	1247.	9592.*	41.	6.	490.	12059.*					*	*	*	579.*	579.*	45.
K 142	K	2	18	27*	P	12	84	75.	2.	187.	2493.*	55.	5.	121.	2198.*					*	*	*	135.*	135.*	61.
K 143	K	2	18	27*	P	12	84	113.	23.	1120.	9912.*	113.	28.	903.	7998.*					*	*	*	1078.*	1078.*	125.
K 15	J	2	18	27*	F	12	84	80.	2.	894.	11175.*	5.X	0.	210.	42026.*					*	*	*	217.*	217.*	5.
K 16	I	2	18	27*	P	12	84	17.	2.	91.	5353.*	30.X	30.	90.	3027.*					*	*	*	127.*	127.*	33.
K 161	I	2	18	27*	F	12	84	34.	3.	11.	324.*	50.X	4.	6.	125.*					*	*	*	-3.*	-3.*	55.
K 17	L	1	18	27*	F	12	84	94.	0.	1451.	15436.*	40.X	0.	546.	13643.*					*	*	*	571.*	571.*	40.
K 18	K	1	18	27*	F	12	84	103.	17.	1448.	14058.*	54.	8.	494.	9119.*					*	*	*	583.*	583.*	60.
K 181	K	1	18	27*	F	12	84	84.	6.	1344.	16000.*	51.	3.	656.	12743.*					*	*	*	771.*	771.*	57.
K 182	K	1	18	27*	P	12	84	3.	14.	5.	1667.*	10.	3.	14.	1419.*					*	*	*	15.*	15.*	10.
K 183	K	1	18	27*	P	12	84	46.	4.	278.	6043.*	90.	8.	402.	4452.*					*	*	*	466.*	466.*	100.

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EMPIRE ABO UNIT OIL PRODUCTION= 6201. BOPD (TOTAL COL. A-5) 192237. BOPM

EMPIRE ABO UNIT WATER PRODUCTION= 7322. BWPD (TOTAL COL. A-5) 226984. BWPM

EMPIRE ABO UNIT GAS PRODUCTION= 61801. MCF/D (TOTAL COL. A-5) 1915830. MCF/M

EMPIRE ABO UNIT GOR= 9966. CF/B

EMPIRE ABO UNIT GAS INJECTED= 34841. MCF/D 1080077. MCF/M
OUTSIDE SOURCES GAS INJECTED= 0. MCF/D 0. MCF/M
TOTAL GAS INJECTED= 34841. MCF/D 1080077. MCF/M

EMPIRE ABO UNIT CUM. GAS INJ.= 137401. MMCF
OUTSIDE SOURCES CUM. GAS INJ.= 4062. MMCF
TOTAL CUMULATIVE GAS INJECTED= 141463. MMCF

TOTAL WATER INJ. (ABO FORMATION)= 6937. BWPD 215055. BWPM

TOTAL CUM. WATER INJ.= 14720265. BW

TOTAL VOIDAGE AVAIL. FOR TRANS= 73501. RSVB/D

TOTAL REQUESTED VOIDAGE TRANS= -5. RSVB/D

TOTAL NET VOIDAGE AT NUA= 74562. RSVB/D

TOTAL REQUESTED NET VOIDAGE= 67620. RSVB/D

PROJECT AREA-1972 NET DAILY RESERVOIR VOIDAGE= 56912. RSVB/D

TOTAL REQUESTED OIL ALLOWABLE= 6534. BOPD

(1-SEE ATTACHMENT I (B) COL. (9)).
(2-SEE ATTACHMENT I (A) COL. (10)).
(X= PRODUCTION LIMITED TO TWICE NUA)
(Y=LIMITED CAPACITY, SEE ATTACHMENT I (C) COL.'S (9) + 9(C).)

EMPIRE ABO PRESSURE MAINTENANCE PROJECT

MONTHLY REPORT FOR JAN. ,1985

ATTACHMENT I: ALLOWABLE CALCULATIONS BASED ON NET RESERVOIR VOIDAGE.

A) WELLS ACCEPTING TRANSFERRED ALLOWABLES	(1)	(2) QO= PER WELL ALLOW	(3) GI/GP	(4) 1- GI/GP	(5) RP,FROM COL. A-5	(6) RPN= EQU. 1A	(7) VR(HC)	(8) VR(W)	(9) VRT= (7)+(8)	(10) VR(HC) PER WELL AT NUA
TCT NO.	WELL NO.	PROD STBOPD	FRACTION	FRACTION	GOR MCF/BO	(5)X(4) MCF/BO	RSVB/D (EQU. 1)	RSVB/D (EQU. 2)	RES VOID TOTAL RSVB/D	(EQU. 1) RSVB/D
G	312	20.	0.564	0.436	0.208	0.091	1.	-0.8	-0.	5.
A) TOTALS:		20.					1.	-0.8	-0.	5.
B) WELLS TRANSFERING ALLOWABLES										
B	45	9.	0.0	1.000	2.556	2.556	55.	-5.3	50.	
B	46	85.	0.0	1.000	1.000	1.000	193.	3.7	197.	
B	47	40.	0.0	1.000	2.000	2.000	190.	166.7	356.	
C	34	22.	0.0	1.000	1.818	1.818	94.	-8.3	86.	
C	35	71.	0.0	1.000	1.254	1.254	206.	-8.3	198.	
C	36	21.	0.0	1.000	0.190	0.190	6.	-8.3	-2.	
C	38	142.	0.0	1.000	2.000	2.000	673.	-8.3	665.	
C	39	142.	0.0	1.000	2.000	2.000	673.	-8.3	665.	
C	42	44.	0.0	1.000	3.909	3.909	416.	-7.3	408.	
C	43	12.	0.0	1.000	5.583	5.583	163.	246.7	410.	
C	44	5.	0.0	1.000	0.0	0.0	0.	365.7	366.	
C	45	72.	0.0	1.000	0.194	0.194	21.	288.7	310.	
C	46	30.	0.0	1.000	4.667	4.667	339.	297.7	637.	
C	47	10.	0.0	1.000	1.100	1.100	25.	96.7	122.	
D	33	8.	0.0	1.000	35.200	35.200	699.	-8.3	690.	
D	35	142.	0.0	1.000	2.000	2.000	673.	-8.3	665.	
D	37	142.	0.0	1.000	2.000	2.000	673.	-8.3	665.	
D	41	6.	0.0	1.000	3.500	3.500	51.	451.7	502.	
D	42	17.	0.0	1.000	8.353	8.353	347.	59.7	407.	
D	43	11.	0.0	1.000	1.455	1.455	37.	148.7	186.	
E	26	2.	0.0	1.000	0.0	0.0	0.	-7.3	-7.	
E	27	3.	0.0	1.000	0.0	0.0	0.	-8.3	-8.	
E	28	15.	0.0	1.000	3.667	3.667	133.	-8.3	124.	
E	30	19.	0.0	1.000	14.903	14.903	696.	-8.3	688.	
E	31	22.	0.0	1.000	10.182	10.182	548.	-0.3	548.	
E	32	8.	0.0	1.000	33.512	33.512	698.	-8.3	690.	
E	33	6.	0.0	1.000	29.667	29.667	438.	-6.3	431.	
E	34	74.	0.0	1.000	3.821	3.821	686.	-8.3	678.	
E	341	2.	0.0	1.000	187.000	187.000	700.	-8.3	691.	
E	35	4.	0.0	1.000	75.000	75.000	699.	-8.3	691.	
E	351	9.	0.0	1.000	33.400	33.400	698.	-7.3	691.	

E 361	0.	0.0	1.000	0.0	0.0	1597.	-2.8	1595.
E 38	0.	0.0	1.000	0.0	0.0	12.	325.7	338.
E 39	3.	0.0	1.000	1.333	1.333	9.	173.7	183.
E 395	0.	0.0	1.000	0.0	0.0	5.	123.7	129.
E 40	1.	0.0	1.000	0.0	0.0	0.	308.7	309.
E 41	30.	0.0	1.000	0.700	0.700	46.	248.7	295.
F 22	3.	0.0	1.000	4.000	4.000	29.	-8.3	21.
F 25	142.	0.0	1.000	2.000	2.000	673.	-8.3	665.
F 26	35.	0.0	1.000	8.184	8.184	694.	-8.3	685.
F 27	142.	0.0	1.000	2.000	2.000	673.	-8.3	665.
F 28	127.	0.0	1.000	2.240	2.240	676.	-8.3	668.
F 29	10.	0.0	1.000	29.179	29.179	698.	-8.3	690.
F 30	70.	0.0	1.000	4.079	4.079	687.	-8.3	679.
F 31	142.	0.0	1.000	2.000	2.000	673.	-8.3	665.
F 321	1.	0.0	1.000	*258.000	*258.000	700.	-8.3	692.
F 322	0.	0.0	1.000	*651.000	*651.000	700.	-7.3	693.
F 33	16.	0.0	1.000	17.333	17.333	697.	-8.3	689.
F 333	1.	0.0	1.000	*512.000	*512.000	700.	-2.1	698.
F 334	2.	0.0	1.000	*147.500	*147.500	700.	-1.1	699.
F 34	2.	0.0	1.000	*120.000	*120.000	700.	-8.3	691.
F 341	1.	0.0	1.000	*226.500	*226.500	700.	-8.3	692.
F 35	1.	0.0	1.000	*319.750	*319.750	700.	0.7	701.
F 352	0.	0.0	1.000	0.0	0.0	4200.	-2.8	4198.
F 36	4.	0.0	1.000	80.428	80.428	699.	-7.3	692.
F 362	7.	0.0	1.000	41.667	41.667	699.	1.2	700.
F 39	1.	0.0	1.000	8.000	8.000	20.	446.7	466.
F 391	26.	0.0	1.000	0.077	0.077	0.	87.7	88.
F 40	0.	0.0	1.000	0.0	0.0	2.	97.7	100.
G 19	142.	0.0	1.000	2.000	2.000	673.	-8.3	665.
G 20	73.	0.0	1.000	3.315	3.315	583.	-8.3	574.
G 21	50.	0.0	1.000	5.643	5.643	691.	-8.3	682.
G 22	142.	0.0	1.000	2.000	2.000	673.	-8.3	665.
G 23	37.	0.0	1.000	7.605	7.605	693.	-8.3	685.
G 24	142.	0.0	1.000	2.000	2.000	673.	-8.3	665.
G 28	168.	0.0	1.000	1.693	1.693	668.	-8.3	660.
G 31	0.	0.0	1.000	0.0	0.0	3939.	-2.3	3937.
G 33	1.	0.0	1.000	*556.000	*556.000	700.	-6.3	694.
G 341	0.	0.0	1.000	0.0	0.0	4186.	-2.8	4183.
G 36	0.	0.0	1.000	*680.500	*680.500	700.	7.7	708.
G 38	0.	0.0	1.000	0.0	0.0	0.	178.7	179.
H 12	42.	0.0	1.000	6.524	6.524	667.	-8.3	659.
H 17	31.	0.0	1.000	9.185	9.185	694.	-8.3	686.
H 18	1.	0.0	1.000	*348.500	*348.500	700.	-8.3	692.
H 19	142.	0.0	1.000	2.000	2.000	673.	-8.3	665.
H 20	0.	0.0	1.000	********	********	700.	-8.3	692.
H 21	142.	0.0	1.000	2.000	2.000	673.	-8.3	665.
H 22	0.	0.0	1.000	0.0	0.0	1398.	-8.3	1389.
H 32	37.	0.0	1.000	7.577	7.577	693.	-8.3	685.
H 331	6.	0.0	1.000	2.333	2.333	33.	27.7	61.
H 34	1.	0.0	1.000	*425.666	*425.666	700.	-8.3	692.
I 10	142.	0.0	1.000	2.000	2.000	673.	-8.3	665.
I 11	1.	0.0	1.000	*404.200	*404.200	700.	-7.3	693.
I 13	1.	0.0	1.000	*518.500	*518.500	700.	-7.3	693.
I 17	2.	0.0	1.000	*168.143	*168.143	700.	-8.3	691.
I 18	142.	0.0	1.000	2.000	2.000	673.	-8.3	665.
I 23	21.	0.0	1.000	13.810	13.810	696.	-8.3	688.
I 251	2.	0.0	1.000	*152.750	*152.750	700.	-8.3	691.
I 29	56.	0.0	1.000	3.875	3.875	524.	54.7	579.
I 30	14.	0.0	1.000	1.286	1.286	42.	1.7	43.
J 8	3.	0.0	1.000	3.000	3.000	22.	-8.3	13.

J 9	26.	0.0	1.000	11.000	11.000	695.	-8.3	687.
J 10	48.	0.0	1.000	5.965	5.965	691.	-8.3	683.
J 11	85.	0.0	1.000	3.331	3.331	684.	-8.3	676.
J 12	142.	0.0	1.000	2.000	2.000	673.	-8.3	665.
J 13	27.	0.0	1.000	10.538	10.538	695.	-8.3	687.
J 17	26.	0.0	1.000	10.789	10.789	695.	-8.3	687.
J 18	1.	0.0	1.000	*517.000	*517.000	700.	-8.3	692.
J 191	6.	0.0	1.000	46.151	46.151	699.	-8.3	691.
J 20	0.	0.0	1.000	0.0	0.0	168.	-8.3	159.
J 23	8.	0.0	1.000	35.071	35.071	699.	-8.3	690.
J 27	1.	0.0	1.000	63.000	63.000	155.	119.7	275.
K 7	142.	0.0	1.000	2.000	2.000	673.	-8.3	665.
K 8	26.	0.0	1.000	11.018	11.018	695.	-8.3	687.
K 11	2.	0.0	1.000	*150.250	*150.250	700.	-8.3	691.
K 191	30.	0.0	1.000	9.372	9.372	694.	-2.8	692.
K 194	21.	0.0	1.000	13.548	13.548	696.	-8.3	688.
K 24	201.	0.0	1.000	0.284	0.284	103.	5.7	108.
L 5	0.	0.0	1.000	0.0	0.0	1755.	-7.3	1748.
L 6	0.	0.0	1.000	0.0	0.0	1289.	-8.3	1281.
L 7	29.	0.0	1.000	9.800	9.800	695.	-8.3	686.
L 8	66.	0.0	1.000	3.470	3.470	552.	-8.3	544.
L 11	41.	0.0	1.000	6.892	6.892	692.	-8.3	684.
L 141	5.	0.0	1.000	57.600	57.600	699.	-2.8	696.
L 151	25.	0.0	1.000	11.392	11.392	695.	-2.8	693.
L 153	4.	0.0	1.000	68.864	68.864	699.	-8.3	691.
L 154	2.	0.0	1.000	*139.636	*139.636	700.	-8.3	691.
L 18	1.	0.0	1.000	*219.400	*219.400	700.	11.7	712.
L 19	51.	0.0	1.000	5.566	5.566	690.	-8.3	682.
M 6	142.	0.0	1.000	2.000	2.000	673.	-8.3	665.
M 901	0.	0.0	1.000	*715.000	*715.000	700.	-8.3	692.
M 10	8.	0.0	1.000	35.556	35.556	699.	-8.3	690.
M 13	4.	0.0	1.000	69.667	69.667	699.	139.7	839.
M 14	22.	0.0	1.000	13.057	13.057	696.	-8.3	688.
N 5	24.	0.0	1.000	1.875	1.875	106.	-7.3	99.
N 6	16.	0.0	1.000	11.313	11.313	443.	-4.3	439.
N 8	24.	0.0	1.000	11.776	11.776	696.	-8.3	687.
O 4	11.	0.0	1.000	8.364	8.364	225.	-7.3	217.
O 5	17.	0.0	1.000	4.294	4.294	177.	-5.3	171.
O 6	17.	0.0	1.000	16.378	16.378	697.	1.7	698.
O 9	145.	0.0	1.000	0.862	0.862	281.	-2.3	278.
P 4	15.	0.0	1.000	4.267	4.267	155.	-7.3	148.
P 5	15.	0.0	1.000	9.067	9.067	332.	-8.3	324.
P 6	18.	0.0	1.000	6.444	6.444	283.	-6.3	276.
P 701	24.	0.0	1.000	11.969	11.969	696.	-8.3	687.
Q 5	8.	0.0	1.000	5.750	5.750	112.	-7.3	105.
Q 6	18.	0.0	1.000	4.444	4.444	194.	-6.3	188.
Q 7	11.	0.0	1.000	14.545	14.545	392.	-4.3	388.
Q 8	41.	0.0	1.000	0.976	0.976	91.	-5.3	86.
Q 9	27.	0.0	1.000	0.481	0.481	27.	41.7	69.
R 4	5.	0.0	1.000	12.400	12.400	152.	-3.3	149.
R 5	6.	0.0	1.000	8.667	8.667	127.	-5.3	122.
R 6	6.	0.0	1.000	5.667	5.667	83.	-5.3	77.
R 7	32.	0.0	1.000	8.931	8.931	694.	-8.3	686.
R 8	48.	0.0	1.000	1.458	1.458	163.	23.7	187.
S 2	7.	0.0	1.000	5.000	5.000	85.	-3.3	82.
S 3	12.	0.0	1.000	2.583	2.583	74.	2.7	77.
S 5	8.	0.0	1.000	5.375	5.375	104.	-4.3	100.
S 6	15.	0.0	1.000	1.533	1.533	54.	-1.3	53.
S 7	46.	0.0	1.000	0.674	0.674	68.	129.7	197.
T 7	109.	0.0	1.000	2.614	2.614	680.	-8.3	671.

B) TOTALS: 5418. 84999. 3846.9 88846.

C) CAPACITY WELLS, ALLOWABLE CALCULATIONS										(9A) VRT FOR TA MAX GOR WELL IB(9) RSVB/D	(9B) RATIO VRT(9A)/VRT(9) (Z) FRACTION	(9C) REQ. CAP. ALLOW=COL. (2) OR COL (2)X(9B) BOPD
C 37	4.	0.564	0.436	11.538	5.033	49.	-5.3	44.	665.	15.26	4.
C 40	80.	0.564	0.436	0.734	0.320	48.	54.6	103.	665.	6.48	80.
C 41	87.	0.564	0.436	1.032	0.450	80.	78.7	159.	665.	4.19	87.
D 34	15.	0.564	0.436	39.362	17.171	632.	-8.3	624.	665.	1.07	15.
D 36	50.	0.564	0.436	2.178	0.950	108.	3.8	111.	669.	6.00	50.
D 361	20.	0.564	0.436	4.446	1.940	92.	2.5	94.	669.	7.09	20.
D 38	2.	0.564	0.436	0.710	0.310	1.	39.7	41.	665.	16.28	2.
D 39	22.	0.564	0.436	1.238	0.540	25.	126.8	152.	665.	4.38	22.
D 40	11.	0.564	0.436	0.202	0.088	0.	80.7	81.	665.	8.21	11.
D 44	46.	0.564	0.436	0.248	0.108	4.	37.7	41.	665.	16.10	46.
E 36	69.	0.564	0.436	2.929	1.278	204.	454.3	659.	670.	1.02	69.
E 362	155.	0.564	0.436	0.383	0.167	35.	168.3	203.	670.	3.30	155.
E 363	175.	0.564	0.436	0.361	0.157	35.	149.8	185.	665.	3.60	175.
E 37	5.	0.564	0.436	4.058	1.770	21.	93.3	114.	672.	5.88	5.
E 371	40.	0.564	0.436	0.254	0.111	3.	38.3	42.	672.	16.10	40.
E 372	20.	0.564	0.436	10.561	4.607	223.	478.3	702.	672.	0.96	20.
E 373	30.	0.564	0.436	4.603	2.008	143.	-0.7	142.	672.	4.73	30.
E 374	70.	0.564	0.436	11.374	4.962	843.	317.2	1160.	672.	0.58	70.
E 381	10.	0.564	0.436	1.623	0.708	16.	187.9	203.	671.	3.30	10.
E 382	65.	0.564	0.436	0.484	0.211	22.	62.9	85.	671.	7.94	65.
E 383	8.	0.564	0.436	1.621	0.707	12.	149.9	162.	671.	4.13	8.
E 384	4.	0.564	0.436	0.806	0.352	3.	33.9	37.	671.	18.32	4.
E 391	7.	0.564	0.436	0.811	0.354	5.	165.2	170.	670.	3.94	7.
E 392	2.	0.564	0.436	1.000	0.436	2.	95.2	97.	670.	6.91	2.
E 393	6.	0.564	0.436	1.457	0.636	8.	191.2	200.	670.	3.36	6.
F 32	5.	0.564	0.436	11.916	5.198	63.	-8.3	55.	665.	12.13	5.
F 331	100.	0.564	0.436	0.332	0.145	17.	71.8	89.	671.	7.57	100.
F 332	4.	0.564	0.436	25.323	11.047	108.	-2.1	106.	671.	6.33	4.
F 335	25.	0.564	0.436	18.092	7.892	482.	-3.9	478.	669.	1.40	25.
F 336	5.	0.564	0.436	58.490	25.516	314.	-3.2	310.	669.	2.16	5.
F 342	5.	0.564	0.436	732.722	319.642	3939.	-4.0	3935.	669.	0.17	5.
F 343	5.	0.564	0.436	29.142	12.713	156.	-2.7	153.	669.	4.37	5.
F 351	5.	0.564	0.436	45.839	19.997	246.	42.2	288.	670.	2.33	5.
F 353	150.	0.564	0.436	0.356	0.155	29.	132.7	162.	670.	4.14	150.
F 354	20.	0.564	0.436	80.430	35.087	1726.	-7.8	1718.	665.	0.39	20.
F 361	6.	0.564	0.436	82.785	36.114	533.	15.2	548.	670.	1.22	6.
F 363	20.	0.564	0.436	3.248	1.417	66.	79.5	146.	670.	4.60	20.
F 364	50.	0.564	0.436	0.185	0.081	1.	35.1	36.	665.	18.68	50.
F 37	55.	0.564	0.436	0.039	0.017	-8.	249.2	241.	672.	2.79	55.
F 371	16.	0.564	0.436	1.877	0.819	29.	5.5	35.	672.	19.33	16.
F 372	15.	0.564	0.436	1.135	0.495	15.	197.9	213.	672.	3.15	15.
F 373	100.	0.564	0.436	0.617	0.269	48.	231.9	279.	672.	2.40	100.
F 374	60.	0.564	0.436	0.600	0.262	27.	132.2	160.	672.	4.21	60.
F 375	83.	0.564	0.436	0.602	0.262	38.	192.3	230.	672.	2.92	83.
F 376	90.	0.564	0.436	0.986	0.430	78.	261.7	340.	665.	1.95	90.
F 38	30.	0.564	0.436	1.509	0.658	43.	87.9	131.	671.	5.13	30.
F 381	4.	0.564	0.436	2.435	1.062	10.	193.9	204.	671.	3.30	4.
F 382	19.	0.564	0.436	0.404	0.176	5.	69.4	74.	671.	9.06	19.

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I 19	7.	0.564	0.436	13.599	5.932	101.	-8.2	93.	665.	7.16*	7.
I 20	75.	0.564	0.436	8.661	3.778	684.	-7.6	677.	665.	0.98*	75.
I 21	5.	0.564	0.436	15.342	6.693	82.	-7.6	74.	665.	9.00*	5.
I 22	25.	0.564	0.436	9.099	3.969	240.	-8.3	232.	665.	2.87*	25.
I 231	5.	0.564	0.436	11.613	5.066	61.	-8.3	53.	665.	12.50*	5.
I 24	21.	0.564	0.436	13.098	5.714	292.	-8.3	284.	665.	2.35*	21.
I 25	22.	0.564	0.436	15.710	6.853	367.	-7.1	360.	665.	1.85*	22.
I 26	5.	0.564	0.436	18.271	7.970	97.	-4.1	93.	669.	7.18*	5.
I 261	20.	0.564	0.436	17.158	7.485	365.	-3.5	362.	669.	1.85*	20.
I 27	35.	0.564	0.436	27.329	11.922	1022.	-1.7	1020.	671.	0.66*	35.
I 271	15.	0.564	0.436	9.477	4.134	150.	-0.2	150.	671.	4.48*	15.
I 272	40.	0.564	0.436	9.219	4.022	389.	0.5	389.	671.	1.72*	40.
I 273	25.	0.564	0.436	4.755	2.074	123.	6.2	129.	671.	5.19*	25.
I 28	50.	0.564	0.436	4.081	1.780	210.	-2.1	208.	671.	3.23*	50.
I 281	34.	0.564	0.436	0.579	0.252	15.	21.5	36.	671.	18.50*	34.
I 282	25.	0.564	0.436	7.030	3.067	184.	17.6	202.	671.	3.33*	25.
I 283	13.	0.564	0.436	3.067	1.338	40.	-1.5	39.	671.	17.26*	13.
I 291	50.	0.564	0.436	2.205	0.962	109.	12.5	122.	669.	5.50*	50.
I 292	25.	0.564	0.436	2.165	0.945	53.	17.1	71.	669.	9.47*	25.
J 14	6.	0.564	0.436	14.624	6.379	93.	-8.0	85.	665.	7.81*	6.
J 15	14.	0.564	0.436	123.581	53.911	1858.	-8.2	1850.	665.	0.36*	14.
J 19	40.	0.564	0.436	10.765	4.696	455.	-7.5	448.	665.	1.48*	40.
J 201	20.	0.564	0.436	13.561	5.916	288.	-2.8	285.	670.	2.35*	20.
J 202	14.	0.564	0.436	0.449	0.196	4.	0.7	5.	670.	138.57*	14.
J 203	7.	0.564	0.436	13.917	6.071	103.	-2.5	101.	670.	6.65*	7.
J 21	7.	0.564	0.436	14.221	6.204	106.	-2.1	104.	671.	6.48*	7.
J 211	5.	0.564	0.436	18.852	8.224	100.	-2.0	98.	671.	6.82*	5.
J 212	18.	0.564	0.436	15.043	6.562	288.	-2.1	286.	671.	2.35*	18.
J 213	13.	0.564	0.436	0.625	0.273	6.	-1.9	4.	671.	154.60*	13.
J 22	3.	0.564	0.436	220.021	95.982	709.	-2.7	706.	670.	0.95*	3.
J 221	3.	0.564	0.436	18.280	7.974	58.	-2.8	56.	670.	12.05*	3.
J 222	50.	0.564	0.436	0.541	0.236	20.	-2.8	17.	670.	39.66*	50.
J 231	12.	0.564	0.436	56.056	24.454	721.	-1.7	719.	672.	0.93*	12.
J 232	76.	0.564	0.436	12.767	5.569	1029.	-1.7	1027.	672.	0.65*	76.
J 233	10.	0.564	0.436	21.400	9.335	228.	-1.2	227.	672.	2.96*	10.
J 234	10.	0.564	0.436	23.123	10.087	247.	-1.6	245.	672.	2.74*	10.
J 235	10.	0.564	0.436	34.039	14.849	364.	-1.3	363.	672.	1.85*	10.
J 24	44.	0.564	0.436	8.022	3.500	371.	-3.7	368.	669.	1.82*	44.
J 241	42.	0.564	0.436	0.259	0.113	4.	-2.4	1.	669.	494.29*	42.
J 26	171.	0.564	0.436	0.741	0.323	104.	-6.8	97.	665.	6.84*	171.
J 28	17.	0.564	0.436	2.471	1.078	42.	64.2	106.	665.	6.26*	17.
K 9	20.	0.564	0.436	5.281	2.304	110.	-8.3	101.	665.	6.55*	20.
K 10	25.	0.564	0.436	6.452	2.815	169.	-7.8	161.	665.	4.13*	25.
K 12	15.	0.564	0.436	11.746	5.124	187.	-8.0	179.	665.	3.72*	15.
K 13	5.	0.564	0.436	34.632	15.108	185.	-4.0	181.	669.	3.69*	5.
K 131	10.	0.564	0.436	1.829	0.798	18.	-4.0	14.	669.	48.40*	10.
K 14	15.	0.564	0.436	22.746	9.923	364.	0.4	364.	671.	1.84*	15.
K 141	45.	0.564	0.436	12.059	5.260	575.	4.0	579.	671.	1.16*	45.
K 142	61.	0.564	0.436	2.198	0.959	133.	2.7	135.	671.	4.96*	61.
K 143	125.	0.564	0.436	7.998	3.489	1052.	26.2	1078.	671.	0.62*	125.
K 15	5.	0.564	0.436	42.026	18.333	225.	-7.8	217.	665.	3.06*	5.
K 16	33.	0.564	0.436	3.027	1.321	101.	25.7	127.	669.	5.27*	33.
K 161	55.	0.564	0.436	0.125	0.054	-3.	-0.4	-3.	669.	195.85*	55.
K 17	40.	0.564	0.436	13.643	5.951	579.	-7.9	571.	665.	1.16*	40.
K 18	60.	0.564	0.436	9.119	3.978	577.	6.4	583.	672.	1.15*	60.
K 181	57.	0.564	0.436	12.743	5.559	770.	1.0	771.	672.	0.87*	57.
K 182	10.	0.564	0.436	1.419	0.619	13.	1.3	15.	672.	45.64*	10.
K 183	100.	0.564	0.436	4.452	1.942	460.	6.2	466.	672.	1.44*	100.
K 184	25.	0.564	0.436	9.261	4.040	244.	-0.6	244.	672.	2.76*	25.
K 19	105.	0.564	0.436	9.626	4.199	1067.	11.4	1078.	670.	0.62*	105.

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(Z NOTE: CAPACITY WELLS ALLOWED TO PRODUCE AT ANY RATE AS LONG AS VRT(9A)/VRT(9) > OR = 1.0
WHEN VRT(9A)/VRT(9) IS LESS THAN 1.0, DAILY OIL
ALLOWABLE OF CAPACITY WELLS MUST BE NO GREATER
THAN (2) X VRT(9A)/VRT(9) OR (2) X (9B)).

FLUID FACTORS: (BASED ON PREVIOUS RESERVOIR PRESSURE SURVEY, 991. PSI, OCT , 1984):
****
BO, OIL FORMATION VOLUME FACTOR, RES. BBLS/STBO = 1.342
BG, GAS FORMATION VOLUME FACTOR, RES. BBLS/MCF =2.465
RS, SOLUTION GAS-OIL RATIO, MCF/STBO = 0.621
BW, WATER FORMATION VOLUME FACTOR, RES. BBLS/STBBL = 1.000

ESTABLISHED CONSTANTS: QWE, NATURAL WATER ENCROACHMENT, STBW/DAY, BASED ON NUMERIC MODEL STUDIES = 1950. BWPD
********** QO, TOP PER-WELL N.U.A., STBOPD= 142.

BASIC VOIDAGE EQUATIONS: 1) VR(HC)=QO X (BO + (RPN- RS) X BG), NET HYDROCARBON RESV. VOIDAGE, RSVB/D
********** 1A) RPN= RP X (1.0 - GI/GP), MCF/STBO
2) VRW= (QWP - QWE(PER WELL)) X BW, NET RESV. SPACE VOIDED BY WATER, RSVB/D
3) VRT= VR(HC) + VRW, TOTAL NET RESV. SPACE VOIDED ON DAILY BASIS, RSVB/D

ADDITIONAL ALLOWABLE IN EXCESS OF 33272. BOPD

(BASED ON R=(GI/GA)X10.0, RATIO)

ADDITIONAL ALLOWABLE = 41.05 X (2RXR +R),BOPD

R= (GI/GA)X10.0 = 10.000

GAS BANK CREDITS USED = 0. MCF

ADDITIONAL ALLOWABLE = 7799. BOPD

EMPIRE ABO PRESSURE MAINTENANCE PROJECT

ATLANTIC RICHFIELD COMPANY - OPERATOR

RECEIVED BY
FEB 25 1985
O. C. D.
ARTESIA, OFFICE

ATTACHMENT II: ALLOWABLE SUMMARY - SUPPLEMENTAL FORM

TOTAL REQUESTED OIL ALLOWABLE FOR JAN.-APR.,1985 IS 6534. BOPD

EMPIRE ABO UNIT	TCT NO.	WELL NO.	UN	S	T	R	WELL STATUS	DAILY ALLOW BOPD	MONTHLY ALLOW BOPM
EMPIRE ABO UNIT	B	40	H	26	17	28	S.I.		
EMPIRE ABO UNIT	B	45	E	30	17	29	S.I.		
EMPIRE ABO UNIT	B	46	F	30	17	29	S.I.		
EMPIRE ABO UNIT	B	47	G	30	17	29	S.I.		
EMPIRE ABO UNIT	B	48	H	30	17	29	INJ.		
EMPIRE ABO UNIT	B	49	E	29	17	29	INJ.		
EMPIRE ABO UNIT	C	34	K	27	17	28	S.I.		
EMPIRE ABO UNIT	C	35	J	27	17	28	S.I.		
EMPIRE ABO UNIT	C	36	I	27	17	28	S.I.		
EMPIRE ABO UNIT	C	37	L	26	17	28	F	4.0	124.0
EMPIRE ABO UNIT	C	38	K	26	17	28	INJ.		
EMPIRE ABO UNIT	C	39	J	26	17	28	INJ.		
EMPIRE ABO UNIT	C	40	I	26	17	28	F	80.0	2480.0
EMPIRE ABO UNIT	C	41	L	25	17	28	P	87.0	2697.0
EMPIRE ABO UNIT	C	42	K	25	17	28	S.I.		
EMPIRE ABO UNIT	C	43	J	25	17	28	S.I.		
EMPIRE ABO UNIT	C	44	I	25	17	28	S.I.		
EMPIRE ABO UNIT	C	45	L	30	17	29	S.I.		
EMPIRE ABO UNIT	C	46	K	30	17	29	S.I.		
EMPIRE ABO UNIT	C	47	J	30	17	29	S.I.		
EMPIRE ABO UNIT	C	49	L	29	17	29	INJ.		
EMPIRE ABO UNIT	C	50	K	29	17	29	INJ.		
EMPIRE ABO UNIT	D	33	M	27	17	28	S.I.		
EMPIRE ABO UNIT	D	34	N	27	17	28	F	15.0	465.0
EMPIRE ABO UNIT	D	35	O	27	17	28	INJ.		
EMPIRE ABO UNIT	D	36	P	27	17	28	P	50.0	1550.0
EMPIRE ABO UNIT	D	361	P	27	17	28	F	20.0	620.0
EMPIRE ABO UNIT	D	37	M	26	17	28	INJ.		
EMPIRE ABO UNIT	D	38	N	26	17	28	P	2.0	62.0
EMPIRE ABO UNIT	D	39	O	26	17	28	P	22.0	682.0
EMPIRE ABO UNIT	D	40	P	26	17	28	P	11.0	341.0
EMPIRE ABO UNIT	D	41	M	25	17	28	S.I.		
EMPIRE ABO UNIT	D	42	N	25	17	28	S.I.		
EMPIRE ABO UNIT	D	43	O	25	17	28	S.I.		
EMPIRE ABO UNIT	D	44	P	25	17	28	P	46.0	1426.0
EMPIRE ABO UNIT	E	26	C	32	17	28	S.I.		
EMPIRE ABO UNIT	E	27	B	32	17	28	S.I.		
EMPIRE ABO UNIT	E	28	A	32	17	28	S.I.		
EMPIRE ABO UNIT	E	30	C	33	17	28	S.I.		
EMPIRE ABO UNIT	E	31	B	33	17	28	S.I.		
EMPIRE ABO UNIT	E	32	A	33	17	28	S.I.		
EMPIRE ABO UNIT	E	33	D	34	17	28	S.I.		
EMPIRE ABO UNIT	E	34	C	34	17	28	S.I.		

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EMPIRE	ABO	UNIT	H	22	N	31	17	28	S.I.				
EMPIRE	ABO	UNIT	H	23	C	31	17	28	F		20.0		620.0
EMPIRE	ABO	UNIT	H	24	P	31	17	28	F		60.0		1860.0
EMPIRE	ABO	UNIT	H	25	M	32	17	28	F		10.0		310.0
EMPIRE	ABO	UNIT	H	26	N	32	17	28	F		20.0		620.0
EMPIRE	ABO	UNIT	H	261	N	32	17	28	F		20.0		620.0
EMPIRE	ABO	UNIT	H	27	O	32	17	28	F		3.0		93.0
EMPIRE	ABO	UNIT	H	271	O	32	17	28	F		5.0		155.0
EMPIRE	ABO	UNIT	H	272	O	32	17	28	F		10.0		310.0
EMPIRE	ABO	UNIT	H	28	P	32	17	28	F		25.0		775.0
EMPIRE	ABO	UNIT	H	281	P	32	17	28	P		14.0		434.0
EMPIRE	ABO	UNIT	H	29	M	33	17	28	F		20.0		620.0
EMPIRE	ABO	UNIT	H	291	M	33	17	28	P		18.0		558.0
EMPIRE	ABO	UNIT	H	292	M	33	17	28	P		20.0		620.0
EMPIRE	ABO	UNIT	H	293	M	33	17	28	F		5.0		155.0
EMPIRE	ABO	UNIT	H	294	M	33	17	28	F		10.0		310.0
EMPIRE	ABO	UNIT	H	295	M	33	17	28	F		25.0		775.0
EMPIRE	ABO	UNIT	H	30	N	33	17	28	P		6.0		186.0
EMPIRE	ABO	UNIT	H	301	N	33	17	28	P		10.0		310.0
EMPIRE	ABO	UNIT	H	302	N	33	17	28	P		13.0		403.0
EMPIRE	ABO	UNIT	H	303	N	33	17	28	P		2.0		62.0
EMPIRE	ABO	UNIT	H	31	O	33	17	28	P		17.0		527.0
EMPIRE	ABO	UNIT	H	311	O	33	17	28	P		9.0		279.0
EMPIRE	ABO	UNIT	H	312	O	33	17	28	P		5.0		155.0
EMPIRE	ABO	UNIT	H	32	P	33	17	28	S.I.				
EMPIRE	ABO	UNIT	H	321	P	33	17	28	P		10.0		310.0
EMPIRE	ABO	UNIT	H	322	P	33	17	28	P		30.0		930.0
EMPIRE	ABO	UNIT	H	33	M	34	17	28	P		50.0		1550.0
EMPIRE	ABO	UNIT	H	331	M	34	17	28	S.I.				
EMPIRE	ABO	UNIT	H	34	N	34	17	28	S.I.				
EMPIRE	ABO	UNIT	H	341	N	34	17	28	P		5.0		155.0
EMPIRE	ABO	UNIT	H	35	O	34	17	28	P		25.0		775.0
EMPIRE	ABO	UNIT	I	10	C	3	18	27	INJ.				
EMPIRE	ABO	UNIT	I	11	B	3	18	27	S.I.				
EMPIRE	ABO	UNIT	I	12	A	3	18	27	F		23.0		713.0
EMPIRE	ABO	UNIT	I	13	D	2	18	27	S.I.				
EMPIRE	ABO	UNIT	I	16	A	2	18	27	F		6.0		186.0
EMPIRE	ABO	UNIT	I	17	D	1	18	27	S.I.				
EMPIRE	ABO	UNIT	I	18	C	1	18	27	INJ.				
EMPIRE	ABO	UNIT	I	19	B	1	18	27	F		7.0		217.0
EMPIRE	ABO	UNIT	I	20	A	1	18	27	F		75.0		2325.0
EMPIRE	ABO	UNIT	I	21	D	6	18	28	F		5.0		155.0
EMPIRE	ABO	UNIT	I	22	C	6	18	28	F		25.0		775.0
EMPIRE	ABO	UNIT	I	23	B	6	18	28	S.I.				
EMPIRE	ABO	UNIT	I	231	B	6	18	28	P		5.0		155.0
EMPIRE	ABO	UNIT	I	24	A	6	18	28	F		21.0		651.0
EMPIRE	ABO	UNIT	I	25	D	5	18	28	F		22.0		682.0
EMPIRE	ABO	UNIT	I	251	D	5	18	28	S.I.				
EMPIRE	ABO	UNIT	I	26	C	5	18	28	F		5.0		155.0
EMPIRE	ABO	UNIT	I	261	C	5	18	28	F		20.0		620.0
EMPIRE	ABO	UNIT	I	27	B	5	18	28	F		35.0		1085.0
EMPIRE	ABO	UNIT	I	271	B	5	18	28	P		15.0		465.0
EMPIRE	ABO	UNIT	I	272	B	5	18	28	F		40.0		1240.0
EMPIRE	ABO	UNIT	I	273	B	5	18	28	F		25.0		775.0
EMPIRE	ABO	UNIT	I	28	A	5	18	28	F		50.0		1550.0
EMPIRE	ABO	UNIT	I	281	A	5	18	28	P		34.0		1054.0
EMPIRE	ABO	UNIT	I	282	A	5	18	28	P		25.0		775.0
EMPIRE	ABO	UNIT	I	283	A	5	18	28	P		13.0		403.0
EMPIRE	ABO	UNIT	I	29	D	4	18	28	S.I.				
EMPIRE	ABO	UNIT	I	291	D	4	18	28	P		50.0		1550.0

EMPIRE	ABO	UNIT	I	292	*	D	4	18	28	*	P	*	25.0	*	775.0	*
EMPIRE	ABO	UNIT	I	30	*	C	4	18	28	*	S.I.	*		*		*
EMPIRE	ABO	UNIT	J	8	*	H	4	18	27	*	S.I.	*		*		*
EMPIRE	ABO	UNIT	J	9	*	E	3	18	27	*	S.I.	*		*		*
EMPIRE	ABO	UNIT	J	10	*	F	3	18	27	*	S.I.	*		*		*
EMPIRE	ABO	UNIT	J	11	*	G	3	18	27	*	S.I.	*		*		*
EMPIRE	ABO	UNIT	J	12	*	H	3	18	27	*	INJ.	*		*		*
EMPIRE	ABO	UNIT	J	13	*	E	2	18	27	*	S.I.	*		*		*
EMPIRE	ABO	UNIT	J	14	*	F	2	18	27	*	F	*	6.0	*	186.0	*
EMPIRE	ABO	UNIT	J	15	*	G	2	18	27	*	F	*	14.0	*	434.0	*
EMPIRE	ABO	UNIT	J	17	*	E	1	18	27	*	S.I.	*		*		*
EMPIRE	ABO	UNIT	J	18	*	F	1	18	27	*	S.I.	*		*		*
EMPIRE	ABO	UNIT	J	19	*	G	1	18	27	*	F	*	40.0	*	1240.0	*
EMPIRE	ABO	UNIT	J	191	*	G	1	18	27	*	S.I.	*		*		*
EMPIRE	ABO	UNIT	J	20	*	H	1	18	27	*	S.I.	*		*		*
EMPIRE	ABO	UNIT	J	201	*	H	1	18	27	*	F	*	20.0	*	620.0	*
EMPIRE	ABO	UNIT	J	202	*	H	1	18	27	*	P	*	14.0	*	434.0	*
EMPIRE	ABO	UNIT	J	203	*	H	1	18	27	*	F	*	7.0	*	217.0	*
EMPIRE	ABO	UNIT	J	21	*	E	6	18	28	*	F	*	7.0	*	217.0	*
EMPIRE	ABO	UNIT	J	211	*	E	6	18	28	*	F	*	5.0	*	155.0	*
EMPIRE	ABO	UNIT	J	212	*	E	6	18	28	*	F	*	18.0	*	558.0	*
EMPIRE	ABO	UNIT	J	213	*	E	6	18	28	*	P	*	13.0	*	403.0	*
EMPIRE	ABO	UNIT	J	22	*	F	6	18	28	*	F	*	3.0	*	93.0	*
EMPIRE	ABO	UNIT	J	221	*	F	6	18	28	*	F	*	3.0	*	93.0	*
EMPIRE	ABO	UNIT	J	222	*	F	6	18	28	*	P	*	50.0	*	1550.0	*
EMPIRE	ABO	UNIT	J	23	*	G	6	18	28	*	S.I.	*		*		*
EMPIRE	ABO	UNIT	J	231	*	G	6	18	28	*	F	*	12.0	*	372.0	*
EMPIRE	ABO	UNIT	J	232	*	G	6	18	28	*	F	*	76.0	*	2356.0	*
EMPIRE	ABO	UNIT	J	233	*	G	6	18	28	*	F	*	10.0	*	310.0	*
EMPIRE	ABO	UNIT	J	234	*	G	6	18	28	*	F	*	10.0	*	310.0	*
EMPIRE	ABO	UNIT	J	235	*	G	6	18	28	*	F	*	10.0	*	310.0	*
EMPIRE	ABO	UNIT	J	24	*	H	6	18	28	*	F	*	44.0	*	1364.0	*
EMPIRE	ABO	UNIT	J	241	*	H	6	18	28	*	P	*	42.0	*	1302.0	*
EMPIRE	ABO	UNIT	J	26	*	F	5	18	28	*	P	*	171.0	*	5301.0	*
EMPIRE	ABO	UNIT	J	27	*	G	5	18	28	*	S.I.	*		*		*
EMPIRE	ABO	UNIT	J	28	*	H	5	18	28	*	P	*	17.0	*	527.0	*
EMPIRE	ABO	UNIT	K	7	*	J	4	18	27	*	INJ.	*		*		*
EMPIRE	ABO	UNIT	K	8	*	I	4	18	27	*	S.I.	*		*		*
EMPIRE	ABO	UNIT	K	9	*	L	3	18	27	*	F	*	20.0	*	620.0	*
EMPIRE	ABO	UNIT	K	10	*	K	3	18	27	*	F	*	25.0	*	775.0	*
EMPIRE	ABO	UNIT	K	11	*	J	3	18	27	*	S.I.	*		*		*
EMPIRE	ABO	UNIT	K	12	*	I	3	18	27	*	F	*	15.0	*	465.0	*
EMPIRE	ABO	UNIT	K	13	*	L	2	18	27	*	F	*	5.0	*	155.0	*
EMPIRE	ABO	UNIT	K	131	*	L	2	18	27	*	P	*	10.0	*	310.0	*
EMPIRE	ABO	UNIT	K	14	*	K	2	18	27	*	P	*	15.0	*	465.0	*
EMPIRE	ABO	UNIT	K	141	*	K	2	18	27	*	F	*	45.0	*	1395.0	*
EMPIRE	ABO	UNIT	K	142	*	K	2	18	27	*	P	*	61.0	*	1891.0	*
EMPIRE	ABO	UNIT	K	143	*	K	2	18	27	*	P	*	125.0	*	3875.0	*
EMPIRE	ABO	UNIT	K	15	*	J	2	18	27	*	F	*	5.0	*	155.0	*
EMPIRE	ABO	UNIT	K	16	*	I	2	18	27	*	P	*	33.0	*	1023.0	*
EMPIRE	ABO	UNIT	K	161	*	I	2	18	27	*	F	*	55.0	*	1705.0	*
EMPIRE	ABO	UNIT	K	17	*	L	1	18	27	*	F	*	40.0	*	1240.0	*
EMPIRE	ABO	UNIT	K	18	*	K	1	18	27	*	F	*	60.0	*	1860.0	*
EMPIRE	ABO	UNIT	K	181	*	K	1	18	27	*	F	*	57.0	*	1767.0	*
EMPIRE	ABO	UNIT	K	182	*	K	1	18	27	*	P	*	10.0	*	310.0	*
EMPIRE	ABO	UNIT	K	183	*	K	1	18	27	*	P	*	100.0	*	3100.0	*
EMPIRE	ABO	UNIT	K	184	*	K	1	18	27	*	F	*	25.0	*	775.0	*
EMPIRE	ABO	UNIT	K	19	*	J	1	18	27	*	F	*	105.0	*	3255.0	*
EMPIRE	ABO	UNIT	K	191	*	J	1	18	27	*	S.I.	*		*		*
EMPIRE	ABO	UNIT	K	192	*	J	1	18	27	*	F	*	25.0	*	775.0	*

EMPIRE	ABO	UNIT	K	193	J	1	18	27	F	50.0	1550.0
EMPIRE	ABO	UNIT	K	194	J	1	18	27	S.I.		
EMPIRE	ABO	UNIT	K	20	I	1	18	27	F	40.0	1240.0
EMPIRE	ABO	UNIT	K	21	L	6	18	28	F	30.0	930.0
EMPIRE	ABO	UNIT	K	211	L	6	18	28	F	10.0	310.0
EMPIRE	ABO	UNIT	K	22	K	6	18	28	F	6.0	186.0
EMPIRE	ABO	UNIT	K	23	J	6	18	28	F	20.0	620.0
EMPIRE	ABO	UNIT	K	231	J	6	18	28	F	40.0	1240.0
EMPIRE	ABO	UNIT	K	24	I	6	18	28	S.I.		
EMPIRE	ABO	UNIT	L	5	M	4	18	27	S.I.		
EMPIRE	ABO	UNIT	L	6	N	4	18	27	S.I.		
EMPIRE	ABO	UNIT	L	7	O	4	18	27	S.I.		
EMPIRE	ABO	UNIT	L	8	P	4	18	27	S.I.		
EMPIRE	ABO	UNIT	L	9	M	3	18	27	F	7.0	217.0
EMPIRE	ABO	UNIT	L	10	N	3	18	27	F	30.0	930.0
EMPIRE	ABO	UNIT	L	11	O	3	18	27	S.I.		
EMPIRE	ABO	UNIT	L	111	O	3	18	27	F	20.0	620.0
EMPIRE	ABO	UNIT	L	12	P	3	18	27	F	30.0	930.0
EMPIRE	ABO	UNIT	L	121	P	3	18	27	F	30.0	930.0
EMPIRE	ABO	UNIT	L	122	P	3	18	27	F	12.0	372.0
EMPIRE	ABO	UNIT	L	123	P	3	18	27	P	30.0	930.0
EMPIRE	ABO	UNIT	L	13	M	2	18	27	F	5.0	155.0
EMPIRE	ABO	UNIT	L	131	M	2	18	27	F	13.0	403.0
EMPIRE	ABO	UNIT	L	132	M	2	18	27	P	35.0	1085.0
EMPIRE	ABO	UNIT	L	133	M	2	18	27	P	30.0	930.0
EMPIRE	ABO	UNIT	L	134	M	2	18	27	F	10.0	310.0
EMPIRE	ABO	UNIT	L	14	N	2	18	27	P	25.0	775.0
EMPIRE	ABO	UNIT	L	141	N	2	18	27	S.I.		
EMPIRE	ABO	UNIT	L	142	N	2	18	27	F	25.0	775.0
EMPIRE	ABO	UNIT	L	143	N	2	18	27	F	40.0	1240.0
EMPIRE	ABO	UNIT	L	15	O	2	18	27	F	21.0	651.0
EMPIRE	ABO	UNIT	L	151	O	2	18	27	S.I.		
EMPIRE	ABO	UNIT	L	152	O	2	18	27	F	20.0	620.0
EMPIRE	ABO	UNIT	L	153	O	2	18	27	S.I.		
EMPIRE	ABO	UNIT	L	154	O	2	18	27	S.I.		
EMPIRE	ABO	UNIT	L	155	O	2	18	27	F	15.0	465.0
EMPIRE	ABO	UNIT	L	156	O	2	18	27	F	38.0	1178.0
EMPIRE	ABO	UNIT	L	16	P	2	18	27	P	53.0	1643.0
EMPIRE	ABO	UNIT	L	17	M	1	18	27	F	90.0	2790.0
EMPIRE	ABO	UNIT	L	171	M	1	18	27	F	45.0	1395.0
EMPIRE	ABO	UNIT	L	18	N	1	18	27	S.I.		
EMPIRE	ABO	UNIT	L	19	O	1	18	27	S.I.		
EMPIRE	ABO	UNIT	L	20	P	1	18	27	P	43.0	1333.0
EMPIRE	ABO	UNIT	L	22	N	6	18	28	F	12.0	372.0
EMPIRE	ABO	UNIT	M	6	C	9	18	27	INJ.		
EMPIRE	ABO	UNIT	M	7	B	9	18	27	P	13.0	403.0
EMPIRE	ABO	UNIT	M	8	A	9	18	27	F	12.0	372.0
EMPIRE	ABO	UNIT	M	9	D	10	18	27	F	50.0	1550.0
EMPIRE	ABO	UNIT	M	901	D	10	18	27	S.I.		
EMPIRE	ABO	UNIT	M	10	C	10	18	27	S.I.		
EMPIRE	ABO	UNIT	M	101	C	10	18	27	F	15.0	465.0
EMPIRE	ABO	UNIT	M	11	B	10	18	27	F	72.0	2232.0
EMPIRE	ABO	UNIT	M	12	A	10	18	27	F	5.0	155.0
EMPIRE	ABO	UNIT	M	121	A	10	18	27	F	80.0	2480.0
EMPIRE	ABO	UNIT	M	123	A	10	18	27	F	6.0	186.0
EMPIRE	ABO	UNIT	M	13	D	11	18	27	S.I.		
EMPIRE	ABO	UNIT	M	132	D	11	18	27	F	5.0	155.0
EMPIRE	ABO	UNIT	M	133	D	11	18	27	F	5.0	155.0
EMPIRE	ABO	UNIT	M	14	C	11	18	27	S.I.		
EMPIRE	ABO	UNIT	M	141	C	11	18	27	F	16.0	496.0

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OIL CONSERVATION DIVISION
P. O. BOX 2088
SANTA FE, NEW MEXICO 87501

February 20, 1980

ARCO Oil and Gas Company
Post Office Box 1610
Midland, Texas 79702

Attention: G. V. Ricks

Re: Case No. 4952
Empire Abo Unit
1980 Plan of
Operation

Gentlemen:

We hereby approve the 1980 Plan of Operation for the Empire Abo Unit, Eddy County, New Mexico, subject to like approval by the United States Geological Survey and the Commissioner of Public Lands.

Two approved copies of the Plan of Operation are returned herewith.

Yours very truly,

JOE D. RAMEY
Director

JDR/EP/fd
enc.

cc: U.S.G.S. - Roswell
Commissioner of Public Lands

COPY

ARCO Oil and Gas Company
Permian District
Post Office Box 1610
Midland, Texas 79702
Telephone 915 684 0100

1952

January 9, 1980

United States Department of the Interior
Geological Survey
P. O. Drawer 1857
Roswell, New Mexico 88201

Attn: Mr. James A. Gillham (6)
Supervisory Petroleum Engineer

ok for approval
EP
1/10/80

State of New Mexico
Mr. Alex J. Armijo
Commissioner of Public Lands
P. O. Box 1148
Santa Fe, New Mexico 87501

Attn: Mr. Ray D. Graham, Director (3)
Oil and Gas Department

State of New Mexico
Department of Energy and Minerals
P. O. Box 2088
Santa Fe, New Mexico 87501

Attn: Mr. Joe D. Ramey (3)
Division Director

Working Interest Owners
Empire Abo Unit
Eddy County, New Mexico

Gentlemen:

In compliance with Section 11 of the Unit Agreement, Empire Abo Unit, Eddy County, New Mexico, Atlantic Richfield Company, as Unit Operator, on behalf of itself and the other participating working interest owners, hereby submits for your approval a Plan of Operation to cover the period beginning January 1, 1980 and extending through the remainder of calender year 1980.

Very truly yours,

JAN 3 1980
OIL CONSERVATION DIV.
SANTA FE

ATLANTIC RICHFIELD COMPANY,
OPERATOR

G. V. Ricks

G. V. Ricks
District Production-Drilling Superintendent

RSL:ad
Attachments

ARCO Oil and Gas Company is a Division of AtlanticRichfieldCompany

EMPIRE ABO UNIT
1980 PLAN OF OPERATION

SUBMITTED DECEMBER 19, 1979

1. Summary of Proposed Plan of Operation for 1980

ARCO Oil and Gas Company, Division of Atlantic Richfield Company, as operator of the Empire Abo Unit, Eddy County, New Mexico, proposes to continue operation of the Unit in 1980 substantially the same as in recent years. We will continue to reinject all available residual gas along with gas available from other sources.

Oil will be produced from the lowest gas/oil ratio wells available to maximize oil recovery efficiency.

The rate of infill well drilling in 1980 will be greatly reduced from that of 1979 with a major emphasis placed on the evaluation of horizontal drainhol wells.

2. Project Area - Description and History

The Empire Abo Unit area consists of some 11,339.15 acres in Eddy County, New Mexico. The area is located in portions of Sections 34, 35, 36, Township 17 South, Range 27 East; Sections 1, 2, 3, 4, 8, 9, 10, 11, 12, 15, 16, 17, Township 18 South, Range 27 East, Sections 25, 26, 27, 28, 31, 32, 33, 34, 35, 36, Township 17 South, Range 28 East, Sections 4, 5, 6, Township 18 South, Range 28 East; Sections 29, 30, Township 17 South, Range 29 East. Within the Unit area, the following tracts did not qualify for participation as of the effective date of the Unit (October 1, 1973): 2, 6, 28, 41, 42, 46, 55, 56, 69, 79, 84, 91. These non-participating tracts totaled 644.74 acres. The remaining 10,694.41 acres were initially developed as the project area for pressure maintenance by the injection of plant residue gas from Abo production back into the unitized Abo formation. The Unit, on September 1, 1975, expanded the Project Area by inclusion of tracts 41, 79, and 84 (total 120.03 acres). Tracts 2, 6, 42, and 46 (total 241.05 acres) have been formed into the CITGO Cmpire Abo Unit, which received N. M. O. C. C. approval in June 1974, and began gas injection in mid-1975. The original proposed Unit Area is now disposed as follows:

	Acres
ARCO Empire Abo Unit	10,814.44
CITGO Empire Abo Unit	241.05
Non-participating tracts	283.66
	11,339.15

3. Current Production

In September 1973, just before Unitization, the pool had 235 producing wells averaging 24,734 BOPD with 9.3% water production and a gas-oil ratio of 1543 cubic feet/BO.

The pool total production was equivalent to 67,120 RSVB/D net voidage. The Project Area, in September 1973, had 222 producing wells averaging 23,252 BOPD with 9.8% water production and a gas-oil ratio of 1505 cubic feet/BO. The project area production was equivalent to 61,808 RSVB/D net voidage. In November 1979, the Unitized Project Area averaged 36208 BOPD with a 11.9% water production and a gas-oil ratio of 1718 cubic feet/BO. Gas injection averaged 39,921 MCF per day. The project area production for November 1979 was equivalent to 41,182 RSVB/D net voidage (see attached Production History Plot). Unit operations have thus increased the project area oil production by 12,956 BOPD and reduced reservoir voidage by 20,626 RSVB/D. Unitized residue gas injection for pressure maintenance is calculated to increase future recovery by about 30 MMBO compared to continued primary operations.

4. Basic Concepts Governing Future Unit Operations

a) Field production history and reservoir numeric model studies have demonstrated that reservoir recovery is governed by a gravity drainage mechanism with an expanding secondary gas cap. Under unitized operations Atlantic Recovery Company, as operator, will be able to maximize the beneficial effects of this most efficient recovery mechanism by careful observation of well performance and shutting in or curtailing production from inefficient wells. As of November 1979, the Project Area had approximately 135 former producing wells shut-in due to high gas-oil ratios.

b) Injection of gas will act toward pressure maintenance and the orderly control of expansion of the secondary gas cap.

5. Discussion of Past, Current, and Future Operations

a) Gas Injection

At present, the Unit has the capability to inject gas into the Abo gas cap through fifteen injection wells located along the north edge of the field. Table I lists the gas injection wells.

Beginning in July 1974 and continuing through the latest month in which data is available (November 1979) all available plant residue gas has been injected into the Abo gas cap.

The Unit picks up plant residue gas at about 700 psi and compresses it to 2000 psi for injection. The gas contains hydrogen sulfide and superdehydration facilities are installed to minimize possible corrosion. A rigorous corrosion checking program is maintained. Permits for the Gas Injection Facilities have been granted by the State of New Mexico, Environmental Improvements Agency. Atlantic Richfield Company believes the injection facilities meet the requirements of the United States Geological Survey and the State of New Mexico. In addition, the Injection Facilities provide enough operational flexibility to meet changing field conditions.

b) Workovers

A continuous workover study is in progress on the Unit. The major emphasis of this program is to identify wells with lower completion possibilities within the Abo Reef and to perform these recompletions as the wells begin to produce at excessively high GOR's. Through this program we try to maximize our low GOR production, thereby maximizing our oil production efficiency. During 1979 thirty-five of these squeeze-and-recomplete-lower type workovers were performed.

Other types of remedial work were also performed during 1979. Thirteen casing leak repairs were done. In addition, three gas cone healing procedures were undertaken, one well was converted to a gas injector and two Chalk Bluff Draw area wells were restored and evaluated. We also acidized fifty wells during 1979 and added perforations to one gas injection well.

c) Continuing Field Study

In order to maximize future reserves, ARCO Oil and Gas Company, as Unit operator, will continue to maintain an intensive field surveillance program. We will also continue to evaluate possible future recovery techniques.

d) Infill Drilling

During 1979, five Phase V and fifty Phase VI infill wells were put on production. This completed the 100 well

drilling program proposed in 1977. Tables II and III list the 1979 infill wells along with their January 1980 allowables and expected producing gas/oil ratios.

e) Horizontal Drainhole Drilling

The Empire Abo Unit well K-142 was drilled in 1979 as the first test of horizontal drainholes in the Unit. The drainhole was successfully drilled and the well is now producing approximately 200 BOPD.

Numeric model studies indicate that horizontal drainholes can recover significant additional reserves due to the dispersion of withdrawals from the formation resulting in a reduction of a well's suceptability to gas coning.

We have proposed a second horizontal drainhole well, the Empire Abo Unit J-213. We expect to spud the J-213 in February, 1980. If the J-213 proves successful, we will probably propose a small package of drainhole wells to the Unit co-owners in 1980.

f) Injection of Non-Abo Gas

Gas from non-Abo sources is delivered from the Gas Company of New Mexico (formerly Southern Union Gas Company) to the Empire Abo Unit. It commenced on June 18, 1976. Injection of this outside gas during November 1979 averaged 3047 MCF/D. Cumulative outside gas injected through November 30, 1979 is 3041 MMCF. Cumulative gas delivered back to the supplier through 30, 1979 is 301 MMCF and the net cumulative non-Abo gas bank is 2740 MMCF.

6. Modifications

It is understood that to meet changing conditions, this plan of operation may be modified from time to time, with the approval of the Supervisor, the Commissioner of Public Lands of the State of New Mexico, and the Dept. of Energy and Minerals, Oil Conservation Division, State of New Mexico.

Atlantic Richfield Company, as Unit Operator, will act prudently to preserve all rights of the mineral owners, and to effectively and efficiently recover the Unit area reserves. This Company will meet all economical offset obligations, act to prevent waste, conserve natural resources, and protect correlative rights.

7. Effective Date and Duration of Plan

This Plan of Operations shall be effective January 1, 1980, and extend through the calendar year unless otherwise amended.

If this Plan of Operation meets with your approval, please indicate in the space below and return one copy for our files.

Very truly yours,

G. V. Ricks

ATLANTIC RICHFIELD COMPANY
OPERATOR

G. V. Ricks
District Production/Drilling Superintendent

RLS:ad

APPROVED BY: _____ DATE: _____

Supervisory Petroleum Engineer
United States Geological Survey

APPROVED BY: _____ DATE: _____

Commissioner of Public Lands
State of New Mexico

APPROVED BY: _____ DATE: 2/21/80

Division Director
Dept. of Energy & Minerals
Oil Conservation Division
State of New Mexico

TABLE I

EMPIRE ABO UNIT
GAS INJECTION WELLS

Previous Operator/ Lease and Well	Unit Well Designation	Location (Sec.-T.-R.)				
Hondo/State "A" No. 21	C-38	NE/4	SW/4	26	17	28
Hondo/State "A" No. 24	C-39	NW/4	SE/4	26	17	28
Samedan/State "Walker" No. 1	D-35	SW/4	SE/4	27	17	28
Hondo/State "A" No. 16	D-37	SW/4	SW/4	26	17	28
Amoco/State "BV" No. 1	F-25	SW/4	NW/4	32	17	28
Hondo/State "A" No. 35	F-27	SW/4	NE/4	32	17	28
ARCO/M.Yates B(ARC) No. 8	F-31	SW/4	NE/4	33	17	28
Amoco/State "BM" No. 1	G-22	NE/4	SW/4	31	17	28
Hondo/State "A" No. 9	G-24	NE/4	SE/4	31	17	28
Gulf-NCT "C" No. 1	H-19	SW/4	SE/4	36	17	27
Amoco/State "BE" No. 1	H-21	SW/4	SW/4	31	17	28
Amoco/Malco "H" Fed. No. 9	I-10	NE/4	NW/4	3	18	27
Amoco/State "F" No. 8	I-18	NE/4	NW/4	1	18	27
Amoco/Windfohr Federal No. 4	K-7	NW/4	SE/4	4	18	27
Amoco/Malco "H" Federal No.2	J-12	SE/4	NE/4	3	18	27
Exxon/CBDU "A" No. 8	M-6	NE/4	NW/4	9	18	27

TABLE II

EMPIRE ABO UNIT
1979 PHASE V INFILL WELLS

WELL	JANUARY 1980 ALLOWABLE (BOPD)	RECENT TEST GOR (CF/BO)
H-303	40	2100
I-251	1	16032
I-261	20	3264
L-142	150	2574
M-132	15	14850

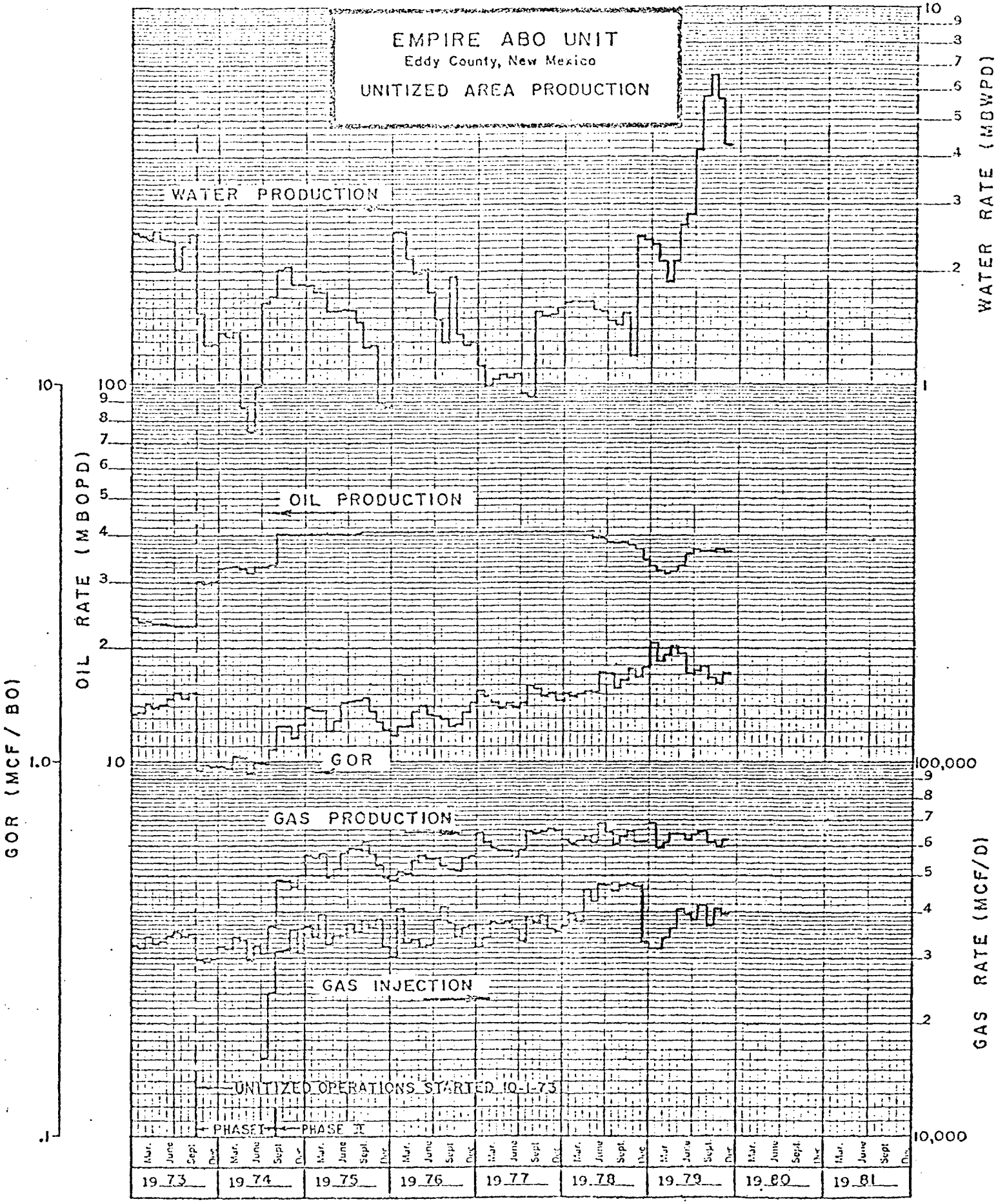
TABLE III

EMPIRE ABO UNIT
1979 PHASE VI INFILL WELLS

Well	January 1980 Allowable (BOPD)	Recent Test GOR (CF/BO)
D-361	350	685
E-362	500	517
E-363	300	641
E-374	400	781
E-383	450	743
E-384	450	952
E-392	238	1137
E-393	125	1269
E-395	100	1591
F-334	75	2027
F-335	372	935
F-336	425	504
F-342	400	781
F-343	425	633
F-354	500	433
F-363	500	487
F-364	375	459
F-373	425	813
F-374	200	1401
F-375	430	784
F-376	198	1164
F-382	350	840
F-383	300	665
F-391	250	972
G-291	5	9353

TABLE III (CONT'D)

Well	January 1980 Allowable (BOPD)	Recent Test GOR (CF/BO)
G-314	300	533
G-315	150	628
G-324	125	1440
G-334	368	627
G-352	450	537
G-353	500	384
G-361	450	504
H-341	500	415
I-292	125	1283
J-235	75	2321
K-131	100	1250
K-142	200	732
K-143	140	750
K-161	175	534
L-122	75	7767
L-123	74	1559
L-133	150	1284
L-134	5	19900
L-155	100	7488
L-156	75	5498
L-171	140	650
M-123	15	12703
M-133	100	2435
M-141	60	1534
M-153	1	11640


EMPIRE ABO UNIT
Eddy County, New Mexico
UNITIZED AREA PRODUCTION
WATER PRODUCTION
OIL PRODUCTION
GOR
GAS PRODUCTION
GAS INJECTION
UNITIZED OPERATIONS STARTED 10-1-73
PHASE I
PHASE II
WATER RATE (MBWPD)
OIL RATE (MBOPD)
GOR (MCF / BO)
GAS RATE (MCF/D)
10
9
8
7
6
5
4
3
2
1
100
10
1.0
.1
100,000
10,000
Mar.
June
Sept.
Dec.
19 73
19 74
19 75
19 76
19 77
19 78
19 79
19 80
19 81

OIL CONSERVATION DIVISION
P. O. BOX 2088
SANTA FE, NEW MEXICO 87501

February 17, 1981

ARCO Oil and Gas Company
Post Office Box 1710
Hobbs, New Mexico 88240

Attention: G. V. Ricks

Re: Case No. 4952
Empire Abo Unit
1981 Plan of Operation

Gentlemen:

We hereby approve the 1981 Plan of Operation for the Empire Abo Unit, Eddy County, New Mexico, subject to like approval by the United States Geological Survey and the Commissioner of Public Lands.

Two approved copies of the Plan of Operation are returned herewith.

Yours very truly,

JOE D. RAMEY
Director

JDR/EP/fd
enc.

cc: U.S.G.S. - Albuquerque
Commissioner of Public Lands

COPY

ARCO Oil and Gas Company
Permian District - West Area
Post Office Box 1710
Hobbs, New Mexico 88240
Telephone 505 393 7163

George V. Ricks
Superintendent
Production & Drilling

4952

December 23, 1980

United States Department of the Interior
Geological Survey
P. O. Drawer 1857
Roswell, New Mexico 88201

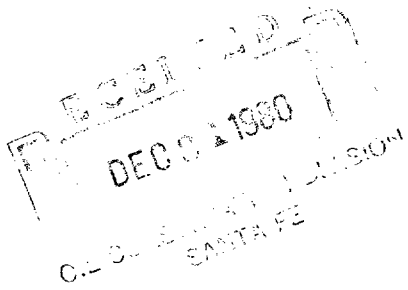
Attn: Mr. James A. Gillham (6)
Supervisory Petroleum Engineer

State of New Mexico
Mr. Alex J. Armijo
Commissioner of Public Lands
P. O. Box 1148
Santa Fe, New Mexico 87501

Attn: Mr. Ray D. Graham, Director (3)
Oil and Gas Department

State of New Mexico
Department of Energy and Minerals
P. O. Box 2088
Santa Fe, New Mexico 87501

Attn: Mr. Joe D. Ramey (3)
Division Director



Working Interest Owners
Empire Abo Unit
Eddy County, New Mexico

Gentlemen:

In compliance with Section II of the Unit Agreement, Empire Abo Unit, Eddy County, New Mexico, ARCO Oil and Gas Company, as Unit Operator, on behalf of itself and the other participating working interest owners, hereby submits for your approval a Plan of Operation to cover the period beginning January 1, 1981 and extending through the remainder of calendar year 1981.

Yours truly,

ARCO OIL AND GAS COMPANY
OPERATOR

G. V. Ricks
District Prod-Drlg Superintendent

ARCO Oil and Gas Company is a Division of Atlantic Richfield Company

EMPIRE ABO UNIT
1981 PLAN OF OPERATION

SUBMITTED NOVEMBER 20, 1980

1. Summary of Proposed Plan of Operation for 1981

ARCO Oil and Gas Company, Division of Atlantic Richfield Company, as operator of the Empire Abo Unit, Eddy County, New Mexico, proposes to continue operation of the Unit in 1981 substantially the same as in recent years. We will continue to reinject all available residue gas along with gas available from other sources.

Oil will be produced from the lowest gas/oil ratio wells available to maximize oil recovery efficiency.

Infill drilling will consist of at least two and possibly five horizontal drainhole wells, pending continued evaluations of the drainhole programs.

2. Project Area - Description and History

The Empire Abo Unit area consists of some 11,339.15 acres in Eddy County, New Mexico. The area is located in portions of Sections 34, 35, 36, Township 17 South, Range 27 East; Sections 1, 2, 3, 4, 8, 9, 10, 11, 12, 15, 16, 17, Township 18 South, Range 27 East; Sections 25, 26, 27, 28, 31, 32, 33, 34, 35, 36, Township 17 South, Range 28 East; Sections 4, 5, 6, Township 18 South, Range 28 East; Sections 29, 30, Township 17 South, Range 29 East. Within the Unit area, the following tracts did not qualify for participation as of the effective date of the Unit (October 1, 1973): 2, 6, 28, 41, 42, 46, 55, 56, 69, 79, 84, 91. These non-participating tracts totaled 644.74 acres. The remaining 10,694.41 acres were initially developed as the project area for pressure maintenance by the injection of plant residue gas from Abo production back into the unitized Abo formation. The Unit, on September 1, 1975, expanded the Project Area by inclusion of tracts 41, 79, and 84 (total 120.03 acres). Tracts 2, 6, 42, and 46 (total 241.05 acres) have been formed into the CITGO Empire Abo Unit, which received N.M.O.C.C. approval in June 1974, and began gas injection in mid-1975. The original proposed Unit Area is now disposed as follows:

	Acres
ARCO Empire Abo Unit	10,814.44
CITGO Empire Abo Unit	241.05
Non-participating tracts	283.66
	11,339.15

3. Current Performance

In September, 1980, the Unitized Project Area averaged 20,072 BOPD with a 17.7% water production and a gas-oil ratio of 2959 cubic feet of gas per barrel of oil. Gas injection averaged 32,204 MCFPD (see attached Production History Plot). The project area production for September, 1980 was equivalent to 52,552 RSVBPD net voidage.

Cumulative production to date is 186.7 MMBO which is about 50% of the OOIP (371 MMBO). Remaining reserves are predicted at 23.2 MMBO for an ultimate recovery of nearly 57% OOIP.

4. Basic Concepts Governing Future Unit Operations

a) Field production history and reservoir numeric model studies have demonstrated that reservoir recovery is governed by a gravity drainage mechanism with an expanding secondary gas cap. Under unitized operations ARCO Oil and Gas Company, as operator, will be able to maximize the beneficial effects of this most efficient recovery mechanism by careful observation of well performance and shutting in or curtailing production from inefficient wells. As of September, 1980, the Project Area had approximately 152 former producing wells shut-in due to high gas-oil ratios.

b) Injection of gas will act toward pressure maintenance and the orderly control of expansion of the secondary gas cap.

5. Discussion of Past, Current, and Future Operations

a) Gas Injection

At present, the Unit has the capability to inject gas into the Abo gas cap through sixteen injection wells located along the north edge of the field. Table I lists the gas injection wells.

Beginning in July 1974 and continuing through the latest month in which data is available (September 1980) all available plant residue gas has been injected into the Abo gas cap.

The Unit picks up plant residue gas at about 700 psi and compresses it to 2000 psi for injection. The gas contains hydrogen sulfide and superdehydration facilities are installed to minimize possible corrosion. A rigorous corrosion checking program is maintained. Permits for the Gas Injection Facilities have been granted by the State of New Mexico, Environmental Improvements Agency. ARCO Oil and Gas Company believes the injection facilities meet the requirements of the United States Geological Survey and the State of New Mexico. In addition, the Injection Facilities provide enough operational flexibility to meet changing field conditions.

b) Workovers

A continuous workover study is in progress on the Unit. The major emphasis of this program is to identify wells with lower completion possibilities within the Abo Reef and to perform these recompletions as the wells begin to produce at excessively high GOR's. Through this program we try to maximize our low GOR production, thereby maximizing our oil production efficiency. During 1980 fifteen of these squeeze-and-recomplete-lower type workovers were performed. Four more of these workovers are scheduled for the near future.

Other types of remedial work were also performed during 1980. Five casing leak repairs were done. In addition, one well was recompleted higher to reduce its high water production and the upper perfs in another well were squeezed to reduce the gas coning effect. A gas cone block was attempted on another of our wells in an effort to create a permeability barrier between the perforations and gas cap. Other miscellaneous work included an evalu-

ation of a Chalk Bluff Draw Area well and plugging and abandoning a well with collapsed casing. By the end of 1980, we also expect to have improved our injection capacity by either acidizing or adding perforations to eight of our injection wells.

c) Continuing Field Study

In order to maximize future reserves, ARCO Oil and Gas Company, as Unit operator, will continue to maintain an intensive field surveillance program. We will also continue to evaluate possible future recovery techniques.

d) Infill Drilling - Horizontal Drainholes

The Empire Abo Unit Well J-213 was drilled in 1980 as the second test of horizontal drainholes in the Unit. The drainhole was a mechanical success, but was inadvertently drilled in a localized tight section of the reef. The well is currently producing at the rate of 35 BOPD with no water production and a GOR of 900-1000 cubic feet of gas per barrel of oil. The first drainhole well, the K-142 has maintained a 200 BOPD, low GOR production rate since its completion in October, 1979.

Numeric model studies indicate that horizontal drainholes can recover significant additional reserves due to the dispersion of withdrawals from the formation resulting in a reduction of a well's susceptibility to gas coning.

We now have approval to drill two more drainhole wells, the Empire Abo Unit J-241 and K-211. They are scheduled to be drilled and completed by mid 1981.

We will most likely be submitting a package for three more drainhole wells to the co-owners early in the year. This will allow us to drill all five wells in sequence without the six to nine month delay we experienced this time in waiting on a rig. Of course, the five well drilling program can be terminated at any time before or during the actual drilling pending the continuing evaluations of our current drainhole wells and the initial production tests of the J-241 and K-211 as they are completed.

e) Injection of Non-Abo Gas

Gas from non-Abo sources is delivered from the Gas Company of New Mexico (formerly Southern Union Gas Company) to the Empire Abo Unit. It commenced on June 18, 1976. Cumulative outside gas injected through September 30, 1980 is 3304 MMCF. Cumulative gas delivered back to the supplier through September 30, 1980 is 352 MMCF and the net cumulative non-Abo gas bank is 2952 MMCF.

6. Modifications

It is understood that to meet changing conditions, this plan of operation may be modified from time to time, with the approval of the Supervisor of the U.S.G.S, the Commissioner of Public Lands of the State of New Mexico, and the Department of Energy and Minerals, Oil Conservation Division, State of New Mexico.

ARCO Oil and Gas Company, as Unit Operator, will act prudently to preserve all rights of the mineral owners, and to effectively and efficiently recover the Unit area reserves. This Company will meet all economical offset obligations, act to prevent waste, conserve natural resources, and protect correlative rights.

7. Effective Date and Duration of Plan

This Plan of Operation shall be effective January 1, 1981, and extend through the calendar year unless otherwise amended.

If this Plan of Operation meets with your approval, please sign on the next page and return one copy for our files.

Very truly yours,

ARCO OIL AND GAS COMPANY
OPERATOR

G. V. Ricks
District Production/Drilling Superintendent

JLC:jaf

APPROVED BY: _____ DATE: _____

Supervisory Petroleum Engineer
United States Geological Survey

APPROVED BY: _____ DATE: _____

Commissioner of Public Lands
State of New Mexico

APPROVED BY: _____ DATE: 2/17/81

Division Director
Dept. of Energy and Minerals
Oil Conservation Division
State of New Mexico

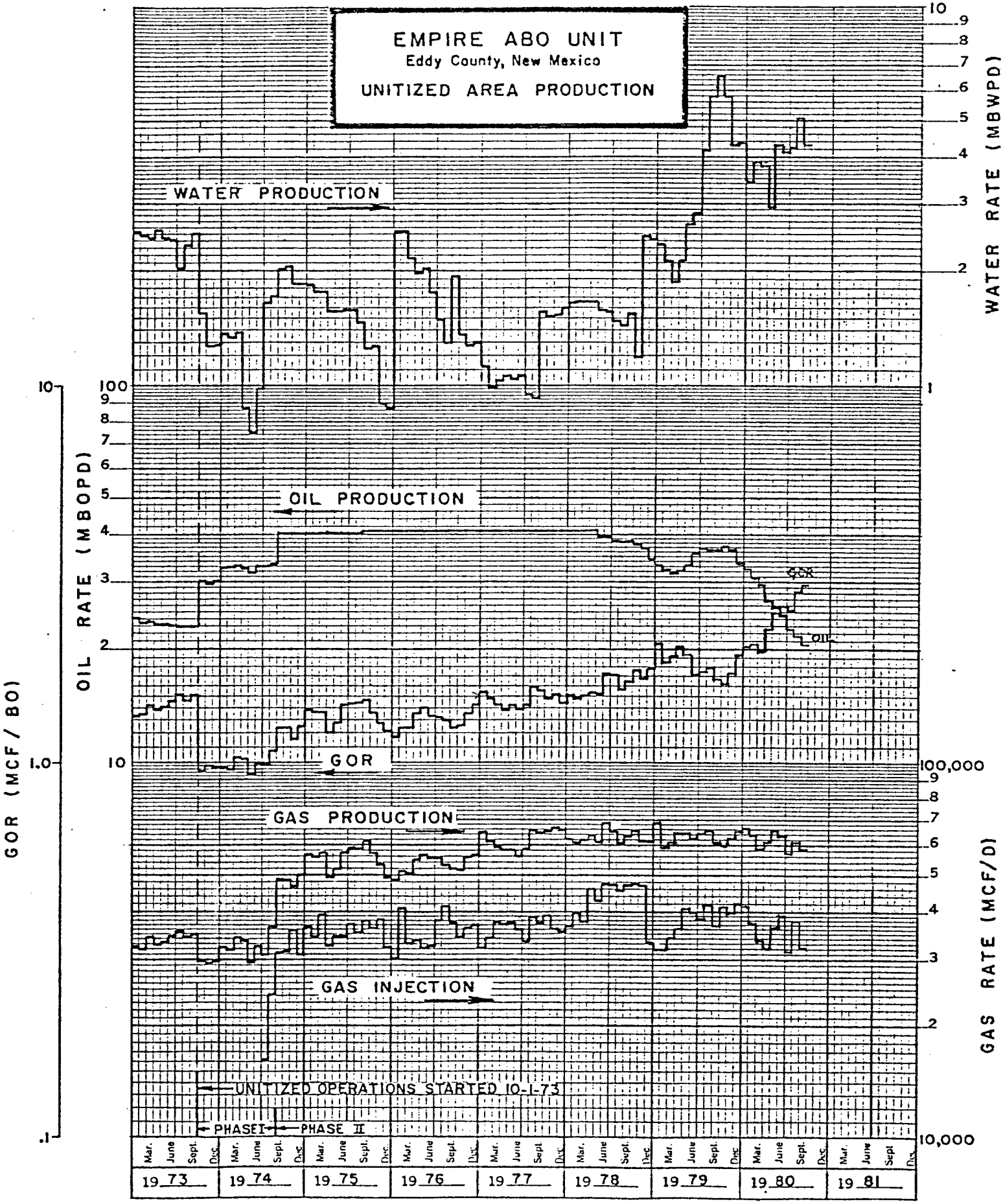

EMPIRE ABO UNIT
Eddy County, New Mexico
UNITIZED AREA PRODUCTION
WATER PRODUCTION
OIL PRODUCTION
GOR
GAS PRODUCTION
GAS INJECTION
OIL
GOR
UNITIZED OPERATIONS STARTED 10-1-73
PHASE I
PHASE II
WATER RATE (MBWPD)
OIL RATE (MBOPD)
GOR (MCF / BO)
GAS RATE (MCF/D)
Mar. June Sept. Dec.
19 73
19 74
19 75
19 76
19 77
19 78
19 79
19 80
19 81

TABLE I

EMPIRE ABO UNIT
GAS INJECTION WELLS

Previous Operator/ Lease and Well	Unit Well Designation	Location (Sec.-T.-R.)
Hondo/State "A" No. 21	C-38	NE/4 SW/4 26 17 28
Hondo/State "A" No. 24	C-39	NW/4 SE/4 26 17 28
Samedan/State "Walker" No. 1	D-35	SW/4 SE/4 27 17 28
Hondo/State "A" No. 16	D-37	SW/4 SW/4 26 17 28
Amoco/State "BV" No. 1	F-25	SW/4 NW/4 32 17 28
Hondo/State "A" No. 35	F-27	SW/4 NE/4 32 17 28
ARCO/M. Yates B(ARC) No. 8	F-31	SW/4 NE/4 33 17 28
Amoco/State "BM" No. 1	G-22	NE/4 SW/4 31 17 28
Hondo/State "A" No. 9	G-24	NE/4 SE/4 31 17 28
Gulf-NCT "C" No. 1	H-19	SW/4 SE/4 36 17 27
Amoco/State "BE" No. 1	H-21	SW/4 SW/4 31 17 18
Amoco/Malco "H" Fed. No. 9	I-10	NE/4 NW/4 3 18 27
Amoco/State "F" No. 8	I-18	NE/4 NW/4 1 18 27
Amoco/Malco "H" Federal No. 2	J-12	SE/4 NE/4 3 18 27
Amoco/Windfohr Federal No. 4	K-7	NW/4 SE/4 4 18 27
Exxon/CBDU "A" No. 8	M-6	NE/4 NW/4 9 18 27

United States Department of the Interior

GEOLOGICAL SURVEY
South Central Region
P. O. Box 26124
Albuquerque, New Mexico 87125

RECEIVED
DEC 21 1981
OIL CONSERVATION DIVISION
DEC 15 1981
SANTA FE

ARCO Oil and Gas Company
Attention: Stephen R. Sills
P. O. Box 1610
Midland, Texas 79702

4952

Gentlemen:

Four approved copies of your 1982 plan of development for the Empire Abo unit area, Eddy County, New Mexico, are enclosed. Such plan, proposing to continue gas injection and to drill three to five horizontal drainhole wells, was approved on this date subject to like approval by the appropriate officials of the State of New Mexico.

Sincerely yours,

(ORIG. SGD.) JAMES W. SHELTON

FOR Gene F. Daniel
Deputy Conservation Manager
Oil and Gas

Enclosures

cc:
Comm. of Public Lands, Santa Fe
NMOCD, Santa Fe

STATE OF NEW MEXICO
ENERGY AND MINERALS DEPARTMENT
OIL CONSERVATION DIVISION

BRUCE KING
GOVERNOR

LARRY KEHOE
SECRETARY

December 29, 1981

POST OFFICE BOX 2088
STATE LAND OFFICE BUILDING
SANTA FE, NEW MEXICO 87501
(505) 827-2434

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

Attention: Steven R. Sills

Re: 1982 Plan of Operation for
Empire Abo Unit, Eddy County,
New Mexico

Dear Mr. Sills:

Enclosed please find two approved copies of your 1982 Plan of Operation for the Empire Abo Unit. This approval is subject to like approval from the U. S. Geological Survey and the Commissioner of Public Lands for the State of New Mexico.

Sincerely,

W. PERRY PEARCE
General Counsel

WPP/dr
enc.

cc: U. S. Geological Survey - Albuquerque
Commissioner of Public Lands

ARCO Oil and Gas Company
Permian District
Post Office Box 1610
Midland, Texas 79702
Telephone 915 684 0100

RECEIVED
DEC 11 1981
OIL CONSERVATION DIVISION
SANTA FE

December 7, 1981

United States Department of the Interior
Geological Survey
P. O. Drawer 1857
Roswell, New Mexico 88201

Attn: Mr. James A. Gillham (6)
Supervisory Petroleum Engineer

State of New Mexico
Mr. Alex J. Armijo
Commissioner of Public Lands
P. O. Box 1148
Santa Fe, New Mexico 87501

4952

Attn: Mr. Ray D. Graham, Director (3)
Oil and Gas Department

State of New Mexico
Department of Energy and Minerals
P. O. Box 2088
Santa Fe, New Mexico 87501

Attn: Mr. Joe D. Ramey (3)
Division Director

Working Interest Owners
Empire Abo Unit
Eddy County, New Mexico

Gentlemen:

In compliance with Section II of the Unit Agreement, Empire Abo Unit, Eddy County, New Mexico, ARCO Oil and Gas Company, as Unit Operator, on behalf of itself and other participating working interest owners, hereby submits for your approval a Plan of Operation to cover the period beginning January 1, 1982, and extending through the remainder of calendar year 1982.

Yours truly,

ARCO OIL AND GAS COMPANY
OPERATOR

Stephen R. Sills
Engineer

SRS:cn

cc: G. V. Ricks
Central File

ARCO Oil and Gas Company is a Division of AtlanticRichfieldCompany

EMPIRE ABO UNIT

1982 Plan of Operation

SUBMITTED DECEMBER 7, 1981

1. Summary of Proposed Plan of Operation for 1982

ARCO Oil and Gas Company, Division of Atlantic Richfield Company, as operator of the Empire Abo Unit, Eddy County, New Mexico, proposes to continue operation of the Unit in 1982 substantially the same as in recent years. We will continue to reinject all available residue gas along with gas available from other sources.

Oil will be produced from the lowest gas/oil ratio wells available to maximize oil recovery efficiency.

Infill drilling will consist of at least three and possibly five horizontal drainhole wells, pending continued evaluations of the drainhole programs.

2. Project Area - Description and History

The Empire Abo Unit area consists of some 11,339.15 acres in Eddy County, New Mexico. The area is located in portions of Sections 34, 35, 36, Township 17 South, Range 27 East; Sections 1, 2, 3, 4, 8, 9, 10, 11, 12, 15, 16, 17, Township 18 South, Range 27 East; Sections 25, 26, 27, 28, 31, 32, 33, 34, 35, 36, Township 17 South, Range 28 East; Sections 4, 5, 6, Township 18 South, Range 28 East; Sections 29, 30, Township 17 South, Range 29 East. Within the Unit area, the following tracts did not qualify for participation as of the effective date of the Unit (October 1, 1973): 2, 6, 28, 41, 42, 46, 55, 56, 69, 79, 84, 91. These nonparticipating tracts totaled 644.74 acres. The remaining 10,694.41 acres were initially developed as the project area for pressure maintenance by the injection of plant residue gas from Abo production back into the unitized Abo formation. The Unit, on September 1, 1975, expanded the Project Area by inclusion of tracts 41, 79, and 84 (total 120.03 acres). Tracts 2, 6, 42, and 46 (total 241.05 acres) have been formed into the CITGO Empire Abo Unit, which received N.M.O.C.C. approval in June, 1974, and began gas injection in mid-1975. The original proposed Unit Area is now disposed as follows:

	Acres
ARCO Empire Abo Unit	10,814.44
CITGO Empire Abo Unit	241.05
Non-participating tracts	283.66
	11,339.15

3. Current Performance

In October, 1981, the Unitized Project Area averaged 12,620 BOPD with a 32% water production and a gas-oil ratio of 5141 cubic feet of gas per barrel of oil. Gas injection averaged 37,385 MCFPD (see attached Production History Plot). The project area production for September, 1981, was equivalent to 54, 676 RSVBPD net voidage.

Cumulative production to date is 192.4 MMBO which is about 52% of the OOIP (371 MMBO). Remaining reserves are predicted at 17.7 MMBO for an ultimate recovery of nearly 57% OOIP.

4. Basic Concepts Governing Future Unit Operations

a) Field production history and reservoir numeric model studies have demonstrated that reservoir recovery is governed by a gravity drainage mechanism with an expanding secondary gas cap. Under unitized operations ARCO Oil and Gas Company, as operator, will be able to maximize the beneficial effects of this most efficient recovery mechanism by careful observation of well performance and shutting in or curtailing production from inefficient wells. As of October, 1981, the production from Project Area had approximately 156 former producing wells shut-in due to high gas-oil ratios.

b) Injection of gas will act toward pressure maintenance and the orderly control of expansion of the secondary gas cap.

5. Discussion of Past, Current, and Future Operations

a) Gas Injection

At present, the Unit has the capability to inject gas into the Abo gas cap through sixteen injection wells located along the north edge of the field. Table I lists the gas injection wells.

Beginning in July, 1974, and continuing through the latest month in which data is available (October, 1981), all available plant residue gas has been injected into the Abo gas cap.

The Unit picks up plant residue gas at about 700 psi and compresses it to 2000 psi for injection. The gas contains hydrogen sulfide and superdehydration facilities are installed to minimize possible corrosion. A rigorous corrosion checking program is maintained. Permits for the Gas Injection Facilities have been granted by the State of New Mexico, Environmental Improvements Agency. ARCO Oil and Gas Company believes the injection facilities meet the requirements of the United States

Geological Survey and the State of New Mexico. In addition, the Injection Facilities provide enough operational flexibility to meet changing field conditions.

b) Workovers

An intensive workover program in the last few years has been successful in maximizing low GOR production by identifying and recompleting wells with possibilities for production lower in the reef. As a result of this program, almost all possible lower recompletions have been performed, but ARCO Oil and Gas Company will continue to seek out wells with recompletion potential.

Various types of remedial work were performed in 1981. Two wells were deepened and recompleted in the first quarter of 1981. Although the E-361 encountered low-porosity and was subsequently temporarily abandoned, deepening the L-15 increased the oil rate from 33 to 116 BOPD and reduced the GOR from 20,000 to 1,900 CF/BBL. The F-354 was treated unsuccessfully with an injectant designed to harden in the reservoir in an attempt to prevent gas coning. A workover is planned for the first quarter of 1982 to recomplete this well below the present interval inadvertently plugged off. Also during 1981, casing in the F-382 was repaired to stop water flow into the wellbore from a non-Abo zone. The B-48 and B-49 are slated for conversion to injection of produced water late this year. This will increase oil production by allowing more production from wells with high water cuts. Produced water is currently being reinjected in the C-49 and C-50.

c) Continuing Field Study

In order to maximize future reserves, ARCO Oil and Gas Company, as Unit operator, will continue to maintain an intensive field surveillance program. We will also continue to evaluate possible future recovery techniques.

d) Horizontal Drainhole Drilling

Two additional drainholes were drilled in 1981 bringing the current number of horizontal completions to four. The third drainhole, the J-241,was inadvertantly drilled in an area of low porosity but has continued to produce 30 to 35 BOPD at solution GOR since completion. A conventional completion in this well would most likely have been impossible. Directional problems were encountered in the last drainhole well, the K-211, with the drainhole climbing up toward the gas-oil contact. As a result, early tests indicate the well is beginning to cone gas. ARCO Oil and Gas Company is presently evaluating methods of plugging back the drainhole to minimize this problem. New techniques presently under study will allow more frequent directional surveys while drilling which should improve directional control and the ultimate performance of future drainholes.

Three more drainholes will be drilled in the first quarter of 1982. In addition, if equipment problems are overcome, two additional drainholes will be kicked out from existing wells.

Application for method approval of the drainhole process as it is used in the Empire Abo Unit to reduce gas coning was made with the IRS October 5. A final ruling should be made in the near future on this tertiary application.

e) Injection of Non-Abo Gas

Gas from non-Abo sources is delivered from the Gas Company of New Mexico (formerly Southern Union Gas Company) to the Empire Abo Unit. It commenced on June 18, 1976. Cumulative outside gas injected through October 31, 1981, is 3641 MMCF. Cumulative gas delivered back to the supplier through October 31, 1981 is 386 MMCF and the net cumulative non-Abo gas bank is 3255 MMCF.

6. Modifications

It is understood that to meet changing conditions, this plan of operation may be modified from time to time, with the approval of the Supervisor of the U.S.G.S., the Commissioner of Public Lands of the State of New Mexico, and the Department of Energy and Minerals, Oil Conservation Division, State of New Mexico.

ARCO Oil and Gas Company, as Unit Operator, will act prudently to preserve all rights of the mineral owners, and to effectively and efficiently recover the Unit area reserves. This Company will meet all economical offset obligations, act to prevent waste, conserve natural resources, and protect correlative rights.

7. Effective Date and Duration of Plan

This Plan of Operation shall be effective January 1, 1982, and extend through the calendar year unless otherwise amended.

If this Plan of Operation meets with your approval, please sign on the next page and return one copy for our files.

Very truly yours,

ARCO OIL AND GAS COMPANY
OPERATOR

Stephen R. Sills
Engineer

SRS:cn

APPROVED BY: _____ DATE _____
Supervisory Petroleum Engineer
United States Geological Survey

APPROVED BY: _____ DATE _____
Commisioner of Public Lands
State of New Mexico

APPROVEL BY: W. Ray Keeler DATE 12/29/81
Division Director
Dept. of Energy and Minerals
Oil Conservation Division
State of New Mexico

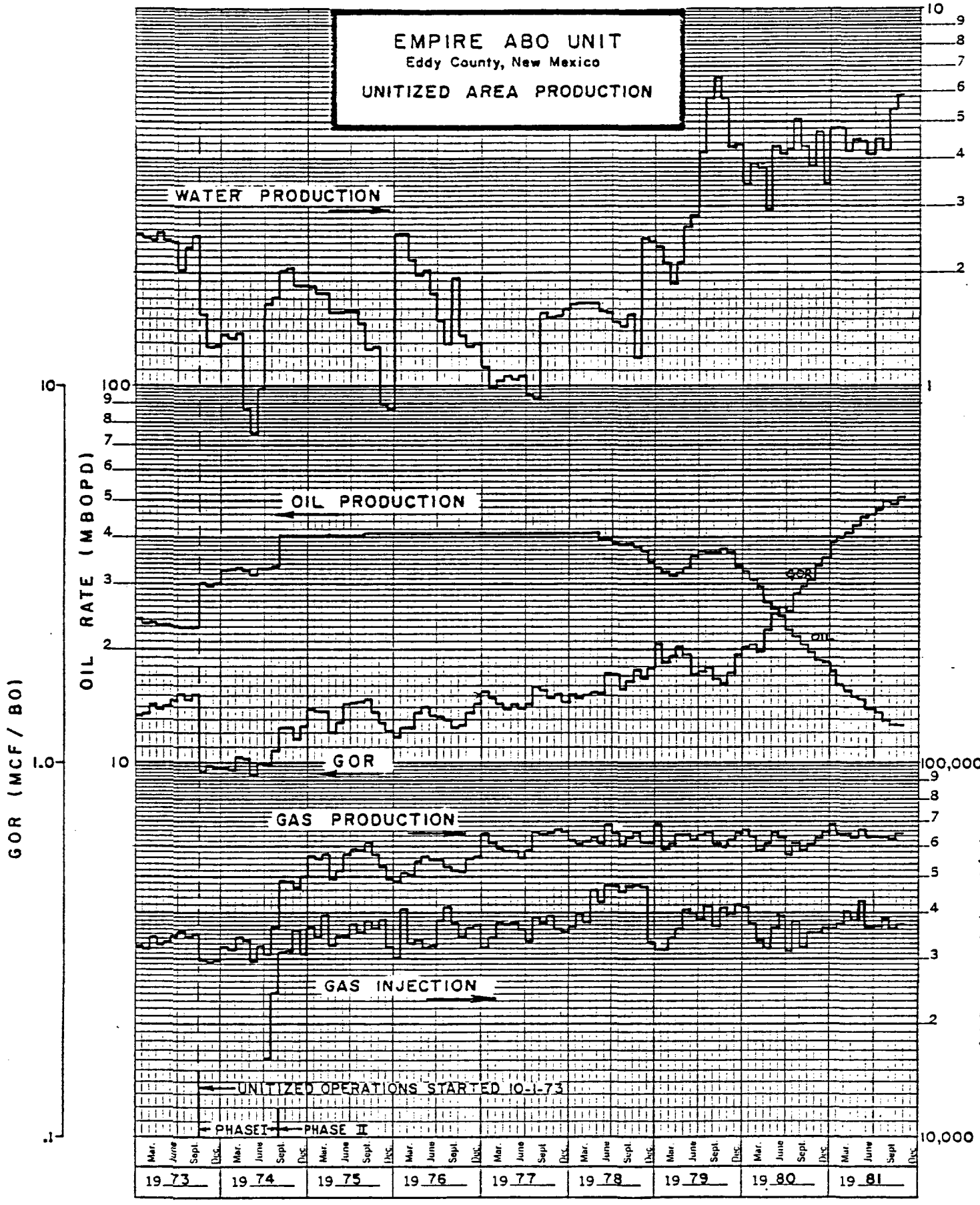

EMPIRE ABO UNIT
Eddy County, New Mexico
UNITIZED AREA PRODUCTION
WATER PRODUCTION
OIL PRODUCTION
GOR
GAS PRODUCTION
GAS INJECTION
WATER RATE (MBWPD)
OIL RATE (MBOPD)
GOR (MCF / BO)
GAS RATE (MCF/D)
UNITIZED OPERATIONS STARTED 10-1-73
PHASE I
PHASE II
Mar. June Sept. Dec.
19 73
19 74
19 75
19 76
19 77
19 78
19 79
19 80
19 81

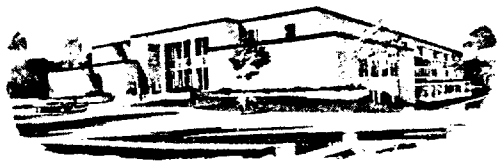
TABLE I

EMPIRE ABO UNIT
GAS INJECTION WELLS

Previous Operator/ Lease and Well	Unit Well Designation	Location (Sec.-T.-R.)
Hondo/State "A" No. 21	C-38	NE/4 SW/4 26 17 28
Hondo/State "A" No. 24	C-39	NW/4 SE/4 26 17 28
Samedan/State "Walker" No. 1	D-35	SW/4 SE/4 27 17 28
Hondo/State "A" No. 16	D-37	SW/4 SW/4 26 17 28
Amoco/State "BV" No. 1	F-25	SW/4 NW/4 32 17 28
Hondo/State "A" No. 35	F-27	SW/4 NE/4 32 17 28
ARCO/M. Yates B(ARC) No. 8	F-31	SW/4 NE/4 33 17 28
Amoco/State "BM" No. 1	G-22	NE/4 SW/4 31 17 28
Hondo/State "A" No. 9	G-24	NE/4 SE/4 31 17 28
Gulf-NCT "C" No. 1	H-19	SW/4 SE/4 36 17 27
Amoco/State "BE" No. 1	H-21	SW/4 SW/4 31 17 18
Amoco/Malco "H" Fed. No. 9	I-10	NE/4 NW/4 3 18 27
Amoco/State "F" No. 8	I-18	NE/4 NW/4 1 18 27
Amoco/Malco "H" Federal No. 2	J-12	SE/4 NE/4 3 18 27
Amoco/Windfohr Federal No. 4	K-7	NW/4 SE/4 4 18 27
Exxon/CBDU "A" No. 8	M-6	NE/4 NW/4 9 18 27

State of New Mexico

#4952



Commissioner of Public Lands

JIM BACA
COMMISSIONER

P.O. BOX 1148
SANTA FE, NEW MEXICO 87504-1148

September 9, 1986

ARCO Oil and Gas Company
ATTENTION: Mr. Jack T. Lowder
P. O. Box 1610
Midland, Texas 79702

Re: Empire Abo Unit
1986 Plan of Operations
Eddy County, New Mexico

Gentlemen:

The Commissioner of Public Lands has this date approved your 1986 Plan of Operations, for the Empire Abo Unit Area, Eddy County, New Mexico. Such plan provides for continued operation of the unit substantially the same as in recent years and will continue to reinject all available residue gas from the Phillips extraction plant and the Amoco extraction plant. Our approval is subject to like approval by the New Mexico Oil Conservation Division and the Bureau of Land Management.

Enclosed is an approved copy for your files.

Very truly yours,

JIM BACA
COMMISSIONER OF PUBLIC LANDS

BY: FLOYD O. PRANDO

FLOYD O. PRANDO, Director
Oil and Gas Division
(505) 827-5744

JB/FOP/pm
encls.
cc: OCD-Santa Fe, New Mexico
BLM-Roswell, New Mexico Attn: Mr. Armando Lopez

ARCO Oil and Gas Company
Permian District
Post Office Box 1610
Midland, Texas 79702
Telephone 915 684 0100

RECEIVED
AUG 20 1986
OIL CONSERVATION DIVISION
SANTA FE

July 23, 1986

United States Department of the Interior
Bureau of Land Management
P. O. Drawer 1397
Roswell, New Mexico 88201

Attn: Mr. Earl R. Cunningham
District Manager

State of New Mexico
Mr. Jim Baca
Commissioner of Public Lands
P. O. Box 1148
Santa Fe, New Mexico 87501

Attn: Mr. Ray D. Graham, Director (3)
Oil and Gas Department

State of New Mexico
Department of Energy and Minerals
P. O. Box 2088
Santa Fe, New Mexico 87501

Attn: Mr. Richard L. Stamets (3)
Division Director

Working Interest Owners
Empire Abo Unit
Eddy County, New Mexico

Gentlemen:

In compliance with Section II of the Unit Agreement, Empire Abo Unit, Eddy County, New Mexico, ARCO Oil and Gas Company, as Unit Operator, on behalf of itself and other participating working interest owners, hereby submits for your approval a Plan of Operation to cover the period beginning January 1, 1986, and extending through the remainder of calendar year 1986.

Yours very truly,

Jack T. Lowder

Jack T. Lowder
Senior Engineer

JTL:tis
Attachment

EMPIRE ABO UNIT

1986 Plan of Operation

SUBMITTED July 23, 1986

1. Summary of Proposed Plan of Operation for 1986

ARCO Oil and Gas Company proposes to continue operation of the Empire Abo Unit, Eddy County, New Mexico, substantially the same as in recent years. We will continue to reinject all available residue gas from the Phillips extraction plant and the Amoco extraction plant. Oil will be produced from the most efficient wells in order to maximize recovery.

2. Project Area - Description and History

The Empire Abo Unit is located in portions of Sections 34, 35, 36, Township 17 South, Range 27 East; Sections 1, 2, 3, 4, 8, 9, 10, 11, 12, 15, 16, 17, Township 18 South, Range 27 East; Sections 25, 26, 27, 28, 31, 32, 33, 34, 35, 36, Township 17 South, Range 28 East; Sections 4, 5, 6, Township 18 South, Range 28 East; Sections 29, 30, Township 17 South, Range 29 East, Eddy County, New Mexico.

The Unit, as originally proposed, would have covered 11,339.15 acres. Certain tracts within the Unit Area did not qualify for participation as of October 1, 1973, the effective date of the Unit. These tracts are: 2, 6, 28, 41, 42, 46, 55, 56, 69, 79, 84, and 91. Total area of these tracts is 644.74 acres. The remaining 10,694.41 acres comprised the Project Area for pressure maintenance until September 1, 1975. On this date

Tracts 41, 79, and 84 joined the Unit. The addition of these three tracts, which cover 120.03 acres, increased the total area of the Unit to 10,814.44 acres. Tracts 2, 6, 42, and 46 comprise the CITGO Empire Abo Unit, which received NMOCD approval in June, 1974. The Unit Area is now disposed as follows:

	Acres
ARCO Empire Abo Unit	10,814.44
CITGO Empire Abo Unit	241.05
Non-Participating Tracts	283.66
Total Area	11,339.15

ARCO Oil and Gas operates a pressure maintenance project at the Empire Abo Unit. This project involves injection of plant residue gas from Abo production back into the Abo formation.

3. Current Performance

In March, 1986, the Unitized Project Area averaged 5,273 BOPD with a 59 percent water cut and a gas-oil ratio of 12,453 cubic feet of gas per barrel of oil. Gas injection averaged 40,559 MCFPD (see attached Production History Plot).

Cumulative oil production from the Project Area through March, 1986 was 204.7 MMBO. This is about 55.2 percent of the 371 MMBO originally in place. Remaining oil reserves are estimated

to be 6.7 MMBO for an ultimate recovery of nearly 57 percent OOIP. Cumulative net gas production from the Project Area through March, 1986 was 227 BCF. This is about 49 percent of the 468 BCF originally in place. Remaining gas reserves are estimated to be 179 BCF for an ultimate recovery of nearly 87 percent OGIP. As of March, 1986, the Unit has 219 active producing wells.

4. Basic Concepts Governing Future Unit Operations

a) Field production history and reservoir numeric model studies have demonstrated that oil recovery is governed by gravity drainage and secondary gas cap expansion. We will be able to maximize the beneficial effects of these recovery mechanisms by observation of well performance and producing from the most efficient wells, those with the lowest GOR's.

b) Gas injection will help maintain reservoir pressure and control expansion of the secondary gas cap.

5. Discussion of Past, Current, and Future Operations

a) Gas Injection

Fifteen gas injection wells along the north edge of the field handle all of the Empire Abo Unit injected gas. Table I lists these wells, Beginning in July, 1974, and continuing through the latest month for which data is available (March, 1986), all available plant residue gas

has been injected into the Abo gas cap. The Unit receives plant residue gas at about 700 psi and compresses it to 2000 psi for injection. Superhydration facilities at the extraction plants reduce hydrogen sulfide content to minimize possible corrosion. A rigorous corrosion treatment program is maintained. Permits for the Gas Injection Facilities have been granted by the State of New Mexico, Environmental Improvements Agency. We believe the injection facilities meet the requirements of the United States Geological Survey and the State of New Mexico.

b) Workovers

An intensive workover program in the last few years has been successful in maximizing low GOR production. The majority of the workovers consisted of recompleting wells lower in the reef. As a result of this program, almost all possible lower recompletions have been performed. We will continue to seek out wells with recompletion potential.

c) Horizontal Drainhole Drilling

In 1981 four existing wells were recompleted as drainholes. These wells are: K-15, 1980' FS&EL, Sec. 2, 18S, 27E; J-27, 1650' FNL, 2310' FEL, Sec. 5, 18S, 28E; K-182, 1533' FSL, 2370' FWL, Sec. 1, 18S, 27E; and G-312, 1550' FSL, 2511' FEL, Sec. 33, 17S, 28E. The results of these workovers are found in Table 1.

Table 1. Drainhole Drilling Results

Well	OPT	Status	Comments
K-15	83 BO/9 BW/852 MCFG	Pmpg.	Good porosity, high GOR due to existing gas cone. Drainhole length 155 ft.
J-27	Water	SI	Good porosity, watered out by water encroachment. Drainhole length 240 ft.
K-182	10 BO/35 BW/12 MCFG	Pmpg.	Low porosity, possibly shale. Drainhole length 340 ft.
G-312	26 BO/3 BW/98 MCFG	Pmpg.	Good porosity, low rate due to short (54 ft) drainhole. Drainhole spiraled.

d) Continuing Field Study

In order to maximize future reserves, we will continue to maintain an intensive field surveillance program. We will also continue to evaluate alternate and enhanced recovery techniques.

e) Injection of Non-Abo Gas

Gas from non-Abo sources is delivered from the Gas Company of New Mexico (formerly Southern Union Gas Company) to the Empire Abo Unit. This began on June 18, 1976. Cumulative outside gas injected through March, 1986 was 4,062 MMCF. Outside gas has not been injected since July, 1983. Cumulative gas delivered back to the supplier through March, 1986 was 411 MMCF and the net cumulative non-Abo gas bank was 3,650 MMCF.

f) Voidage Limit Removal

The voidage limit was replaced with a gas production limit of 65 MMCFPD in 1984. This will allow more efficient operation of the Unit. Also, the wet gas compressors were removed and the practice of injecting unprocessed gas was discontinued.

6. Modifications

It is understood that to meet changing conditions, this plan of operation may be modified from time to time, with the approval of the Supervisor of the U.S.G.S., the Commissioner of Public Lands of the State of New Mexico, and the Department of Energy and Minerals, Oil Conservation Division, State of New Mexico.

ARCO Oil and Gas Company, as Unit Operator, will act prudently to preserve all rights of the mineral owners, and to effectively and efficiently recover the Unit Area reserves. This Company will meet all economical offset obligations, act to prevent waste, conserve natural resources, and protect correlative rights.

7. Effective Date and Duration of Plan

This Plan of Operation shall be effective January 1, 1986, and extend through the calendar year unless otherwise amended.

If this Plan of Operation meets with your approval, please sign on the next page and return one copy for our files.

Very truly yours,

ARCO OIL AND GAS COMPANY

OPERATOR

Jack T. Lowder

Jack T. Lowder
Senior Engineer

JTL:tis

APPROVED BY: _____ DATE _____
District Manager
United States Department of the Interior
Bureau of Land Management - Roswell District

APPROVED BY: _____ DATE _____
Commissioner of Public Lands
State of New Mexico

APPROVED BY: _____ DATE 8/21/86
Division Director
Dept. of Energy and Minerals
Oil Conservation Division
State of New Mexico

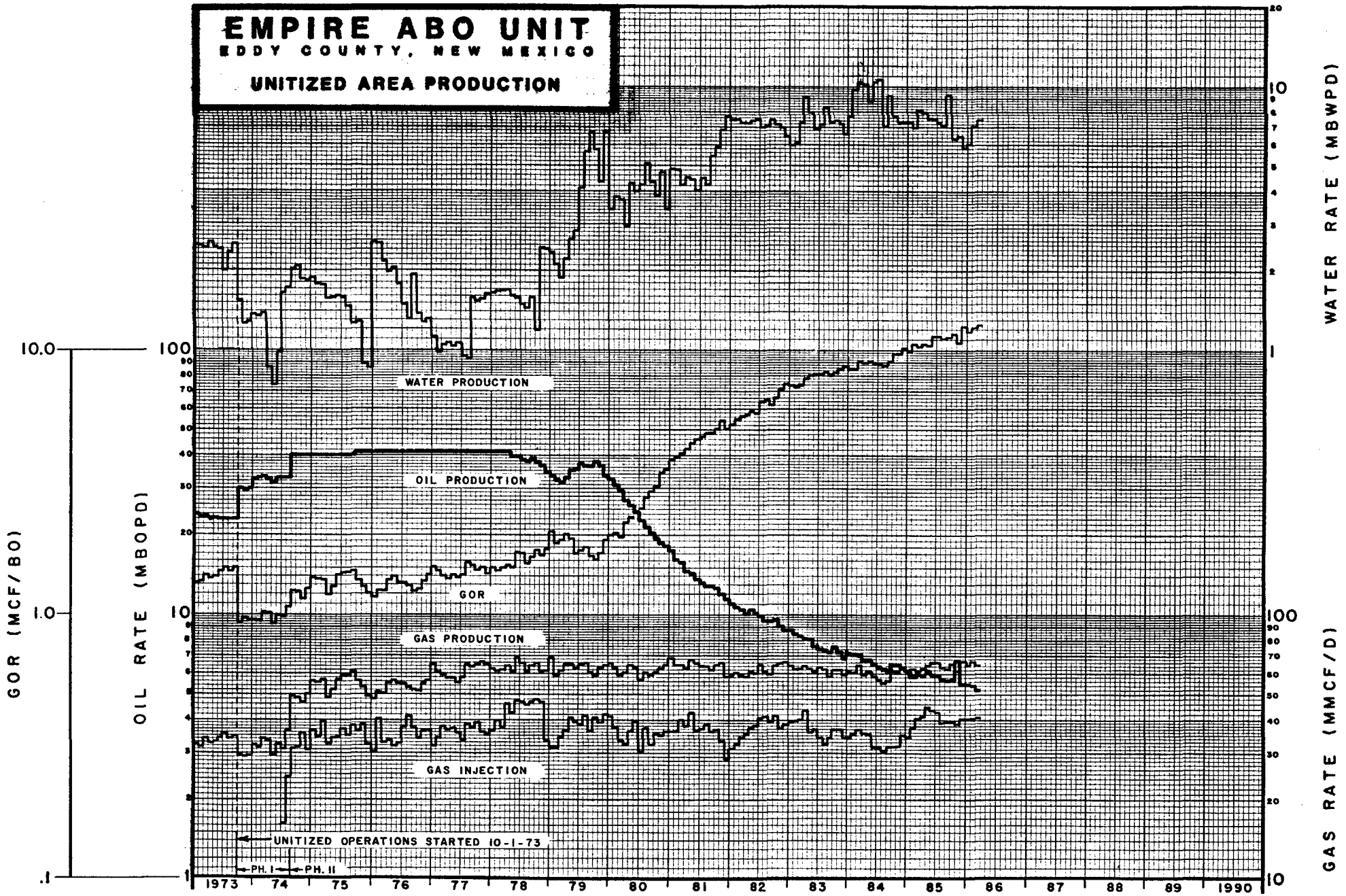

EMPIRE ABO UNIT
EDDY COUNTY, NEW MEXICO
UNITIZED AREA PRODUCTION
WATER PRODUCTION
OIL PRODUCTION
GOR
GAS PRODUCTION
GAS INJECTION
UNITIZED OPERATIONS STARTED 10-1-73
PH. I
PH. II
GOR (MCF/BO)
OIL RATE (MBOPD)
WATER RATE (MBWPD)
GAS RATE (MMCF/D)
10.0
1.0
.1
100
10
1
10
100
1973
74
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84
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87
88
89
1990

TABLE I

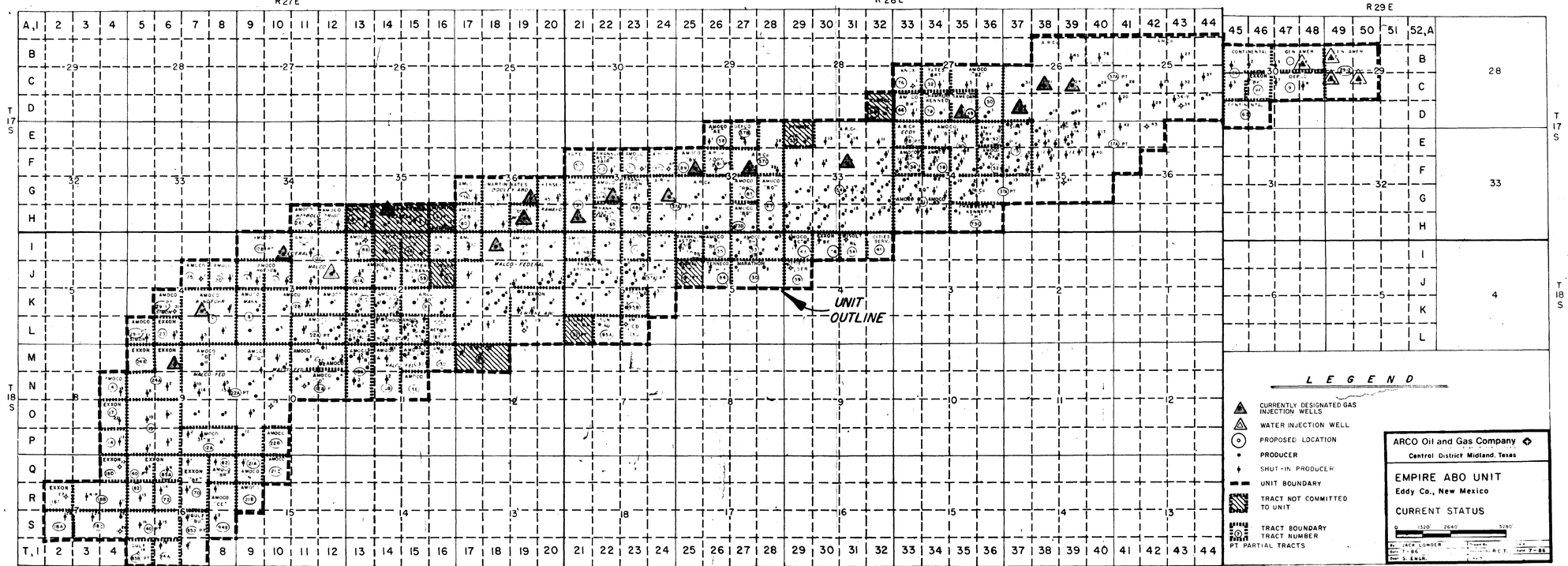
EMPIRE ABO UNIT
GAS INJECTION WELLS

Previous Operator/ Lease and Well	Unit Well Designation	Location (Sec.-T.-R.)
Hondo/State "A" No. 24	C-39	NW/4 SE/4 26 17 28
Samedan/State "Walker" No. 1	D-35	SW/4 SE/4 27 17 28
Hondo/State "A" No. 16	D-37	SW/4 SW/4 26 17 28
Amoco/State "BV" No. 1	F-25	SW/4 NW/4 32 17 28
Hondo/State "A" No. 35	F-27	SW/4 NE/4 32 17 28
ARCO/M. Yates B(ARC) No. 8	F-31	SW/4 NE/4 33 17 28
Amoco/State "BM" No. 1	G-22	NE/4 SW/4 31 17 28
Hondo/State "A" No. 9	G-24	NE/4 SE/4 31 17 28
Gulf-NCT "C" No. 1	H-19	SW/4 SE/4 36 17 27
Amoco/State "BE" No. 1	H-21	SW/4 SW/4 31 17 18
Amoco/Malco "H" Fed. No. 9	I-10	NE/4 NW/4 3 18 27
Amoco/State "F" No. 8	I-18	NE/4 NW/4 1 18 27
Amoco/Malco "H" Federal No. 2	J-12	SE/4 NE/4 3 18 27
Amoco/Windfohr Federal No. 4	K-7	NW/4 SE/4 4 18 27
Exxon/CBDU "A" No. 8	M-6	NE/4 NW/4 9 18 27

EMPIRE ABO UNIT

1985 Production History

Month	BO	BW	Gross MCFG	Injected MCFG	Net MCFG
January	192,237	226,984	1,915,830	1,080,077	835,753
February	165,035	194,190	1,737,635	1,048,331	689,304
March	186,294	250,540	1,907,564	1,254,300	653,264
April	177,743	239,060	1,878,389	1,241,095	637,294
May	188,960	234,298	1,989,462	1,392,688	596,774
June	178,195	225,125	1,981,217	1,316,712	664,505
July	181,590	224,527	2,050,138	1,331,508	718,630
August	175,955	218,953	1,949,042	1,206,069	742,973
September	168,913	277,091	1,876,481	1,172,843	703,638
October	174,607	197,090	2,012,658	1,235,820	776,838
November	170,276	194,145	1,826,204	1,163,701	662,503
December	168,935	181,986	2,068,120	1,255,622	812,498
Total	2,128,740	2,663,989	23,192,740	14,698,766	8,493,974


R27E
R28E
R29E
T 17 S
T 18 S
UNIT OUTLINE
LEGEND
CURRENTLY DESIGNATED GAS INJECTION WELLS
WATER INJECTION WELL
PROPOSED LOCATION
PRODUCER
SHUT-IN PRODUCER
UNIT BOUNDARY
TRACT NOT COMMITTED TO UNIT
TRACT BOUNDARY
TRACT NUMBER
PT PARTIAL TRACTS
ARCO Oil and Gas Company
Central District Midland, Texas
EMPIRE ABO UNIT
Eddy Co., New Mexico
CURRENT STATUS
0 1320 2640 5280
By: JACK LONDER
Date: 7-86
Dwn. By: R.C.T.
Date: 7-86
Engr. S. ENGR.

STATE OF NEW MEXICO
ENERGY AND MINERALS DEPARTMENT
OIL CONSERVATION DIVISION

TONEY ANAYA
GOVERNOR

50 YEARS
1935 - 1985

POST OFFICE BOX 2088
STATE LAND OFFICE BUILDING
SANTA FE, NEW MEXICO 87501
(505) 827-5800

March 26, 1985

#4952

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

Attention: Timothy J. Detmering

Re: Working Interest Owners
Empire Abo Unit
Eddy County, NM
1985 Plan of Operation

Dear Mr. Detmering:

Enclosed please find an approved copy of the material referenced above. Such approval is contingent upon like approval by the Commissioner of Public Lands and the Bureau of Land Management.

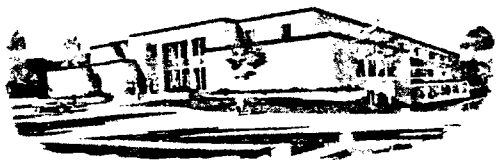
Sincerely,

ROY E. JOHNSON
Senior Petroleum Geologist

REJ/dp

cc: Commissioner of Public Lands - Santa Fe
Bureau of Land Management - Albuquerque
OCD District Office - Artesia

State of New Mexico



Commissioner of Public Lands

JIM BACA
COMMISSIONER

P.O. BOX 1148
SANTA FE, NEW MEXICO 87504-1148
Express Mail Delivery Use:
310 Old Santa Fe Trail
Santa Fe, New Mexico 87501

March 28, 1985

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

Re: 1985 Plan of Development
Empire Abo Unit
Eddy County, New Mexico

ATTENTION: Mr. Timothy J. Detmering

Gentlemen:

The Commissioner of Public Lands has this date approved your 1985 Plan of Development for the Empire Abo Unit, Eddy County, New Mexico. Such plan proposes to continue operation of The Empire Abo Unit, substantially the same as in recent years. This Plan of Operation is effective as of January 1, 1985, and extends through the calander year. Our approval is subject to like approval by the New Mexico Oil Conservation Division and the Bureau of Land Management.

Enclosed is an approved copy for your files.

Very truly yours,

JIM BACA
COMMISSIONER OF PUBLIC LANDS

BY: Ray D. Graham
RAY D. GRAHAM, Director
Oil and Gas Division
AC 505/827-5744

JB/RDG/pm
encls.
cc: OCD-Santa Fe, New Mexico
BLM-Albuquerque, New Mexico Attn: Fluids Branch
BLM-Roswell, New Mexico Attn: Mr. Armando Lopez

ARCO Oil and Gas Company
Permian District
Post Office Box 1610
Midland, Texas 79702
Telephone 915 684 0100

March 20, 1985

United States Department of the Interior
Bureau of Land Management
P. O. Drawer 1397
Roswell, New Mexico 88201

Attn: Mr. Earl R. Cunningham
District Manager

State of New Mexico
Mr. Jim Baca
Commissioner of Public Lands
P. O. Box 1148
Santa Fe, New Mexico 87501

Attn: Mr. Ray D. Graham, Director (3)
Oil and Gas Department

State of New Mexico
Department of Energy and Minerals
P. O. Box 2088
Santa Fe, New Mexico 87501

Attn: Mr. Richard L. Stamets (3)
Division Director

Working Interest Owners
Empire Abo Unit
Eddy County, New Mexico

Gentlemen:

In compliance with Section II of the Unit Agreement, Empire Abo Unit, Eddy County, New Mexico, ARCO Oil and Gas Company, as Unit Operator, on behalf of itself and other participating working interest owners, hereby submits for your approval a Plan of Operation to cover the period beginning January 1, 1985, and extending through the remainder of calendar year 1985.

Yours very truly,

Timothy J. Detmering
Engineer

TJD:sc

Xc: Mr. G. V. Ricks
CF

EMPIRE ABO UNIT

1985 Plan of Operation

SUBMITTED March 20, 1985

1. Summary of Proposed Plan of Operation for 1985

ARCO Oil and Gas Company proposes to continue operation of the Empire Abo Unit, Eddy County, New Mexico, substantially the same as in recent years. We will continue to reinject all available residue gas from the Phillips extraction plant and the Amoco extraction plant. Oil will be produced from the most efficient wells in order to maximize recovery.

2. Project Area - Description and History

The Empire Abo Unit is located in portions of Sections 34, 35, 36, Township 17 South, Range 27 East; Sections 1, 2, 3, 4, 8, 9, 10, 11, 12, 15, 16, 17, Township 18 South, Range 27 East; Sections 25, 26, 27, 28, 31, 32, 33, 34, 35, 36, Township 17 South, Range 28 East; Sections 4, 5, 6, Township 18 South, Range 28 East; Sections 29, 30, Township 17 South, Range 29 East, Eddy County, New Mexico.

The Unit, as originally proposed, would have covered 11,339.15 acres. Certain tracts within the Unit Area did not qualify for participation as of October 1, 1973, the effective date of the Unit. These tracts are: 2, 6, 28, 41, 42, 46, 55, 56, 69, 79, 84, and 91. Total area of these tracts is 644.74 acres. The remaining 10,694.41 acres comprised the Project

Area for pressure maintenance until September 1, 1975. On this date Tracts 41, 79, and 84 joined the Unit. The addition of these three tracts, which cover 120.03 acres, increased the total area of the Unit to 10,814.44 acres. Tracts 2, 6, 42, and 46 comprise the CITGO Empire Abo Unit, which received NMOCD approval in June, 1974. The Unit Area is now disposed as follows:

	Acres
ARCO Empire Abo Unit	10,814.44
CITGO Empire Abo Unit	241.05
Non-Participating Tracts	283.66
Total Area	11,339.15

ARCO Oil and Gas operates a pressure maintenance project at the Empire Abo Unit. This project involves injection of plant residue gas from Abo production back into the Abo formation.

3. Current Performance

In September, 1984, the Unitized Project Area averaged 6,214 BOPD with a 60 percent water cut and a gas-oil ratio of 9,047 cubic feet of gas per barrel of oil. Gas injection averaged 31,858 MCFPD (see attached Production History Plot).

Cumulative oil production from the Project Area through September, 1984 was 201.4 MMBO. This is about 54.3 percent

of the 371 MMBO originally in place. Remaining oil reserves are estimated to be 9.9 MMBO for an ultimate recovery of nearly 57 percent OOIP. Cumulative net gas production from the Project Area through September, 1984 was 213 BCF. This is about 46 percent of the 468 BCF originally in place. Remaining gas reserves are estimated to be 193 BCF for an ultimate recovery of nearly 87 percent OGIP. As of September, 1984, the Unit has 248 active producing wells.

4. Basic Concepts Governing Future Unit Operations

a) Field production history and reservoir numeric model studies have demonstrated that oil recovery is governed by gravity drainage and secondary gas cap expansion. We will be able to maximize the beneficial effects of these recovery mechanisms by observation of well performance and producing from the most efficient wells, those with the lowest GOR's.

b) Gas injection will help maintain reservoir pressure and control expansion of the secondary gas cap.

5. Discussion of Past, Current, and Future Operations

a) Gas Injection

Fifteen gas injection wells along the north edge of the field handle all of the Empire Abo Unit injected gas. Table I lists these wells. Beginning in July, 1974, and continuing through the latest month for which data is available (September, 1984), all available plant residue gas has been injected into the Abo gas cap. The Unit

receives plant residue gas at about 700 psi and compresses it to 2000 psi for injection. Superhydration facilities at the extraction plants reduce hydrogen sulfide content to minimize possible corrosion. A rigorous corrosion treatment program is maintained. Permits for the Gas Injection Facilities have been granted by the State of New Mexico, Environmental Improvements Agency. We believe the injection facilities meet the requirements of the United States Geological Survey and the State of New Mexico.

b) Workovers

An intensive workover program in the last few years has been successful in maximizing low GOR production. The majority of the workovers consisted of recompleting wells lower in the reef. As a result of this program, almost all possible lower recompletions have been performed. We will continue to seek out wells with recompletion potential.

c) Horizontal Drainhole Drilling

In 1981 four existing wells were recompleted as drainholes. These wells are: K-15, 1980' FS&EL, Sec. 2, 18S, 27E; J-27, 1650' FNL, 2310' FEL, Sec. 5, 18S, 28E; K-182, 1533' FSL, 2370' FWL, Sec. 1, 18S, 27E; and G-312, 1550' FSL, 2511' FEL, Sec. 33, 17S, 28E. The results of these workovers are found in Table 1.

Table 1. 1984 Drainhole Drilling Results

Well	OPT	Status	Comments
K-15	83 BO/9 BW/852 MCFG	Pmpg.	Good porosity, high GOR due to existing gas cone. Drainhole length 155 ft.
J-27	Water	SI	Good porosity, watered out by water encroachment. Drainhole length 240 ft.
K-182	10 BO/35 BW/12 MCFG	Pmpg.	Low porosity, possibly shale. Drainhole length 340 ft.
G-512	26 BO/3 BW/ 98 MCFG	Pmpg.	Good porosity, low rate due to short (54 ft) drainhole. Drainhole spiraled.

d) Continuing Field Study

In order to maximize future reserves, we will continue to maintain an intensive field surveillance program. We will also continue to evaluate alternate and enhanced recovery techniques.

e) Injection of Non-Abo Gas

Gas from non-Abo sources is delivered from the Gas Company of New Mexico (formerly Southern Union Gas Company) to the Empire Abo Unit. This began on June 18, 1976. Cumulative outside gas injected through September 31, 1984 was 4,061 MMCF. Cumulative gas delivered back to the supplier through September 31, 1984 was 411 MMCF and the net cumulative non-Abo gas bank was 3,650 MMCF.

f) Voidage Limit Removal

The voidage limit was replaced with a gas production limit of 65 MMCFPD in 1984. This will allow more efficient

operation of the Unit. Also, the wet gas compressors were removed and the practice of injecting unprocessed gas was discontinued.

6. Modifications

It is understood that to meet changing conditions, this plan of operation may be modified from time to time, with the approval of the Supervisor of the U.S.G.S., the Commissioner of Public Lands of the State of New Mexico, and the Department of Energy and Minerals, Oil Conservation Division, State of New Mexico.

ARCO Oil and Gas Company, as Unit Operator, will act prudently to preserve all rights of the mineral owners, and to effectively and efficiently recover the Unit Area reserves. This Company will meet all economical offset obligations, act to prevent waste, conserve natural resources, and protect correlative rights.

7. Effective Date and Duration of Plan

This Plan of Operation shall be effective January 1, 1985, and extend through the calendar year unless otherwise amended.

If this Plan of Operation meets with your approval, please sign on the next page and return one copy for our files.

Very Truly yours,

ARCO OIL AND GAS COMPANY

OPERATOR

Timothy J. Detmering
Engineer

TJD:sc

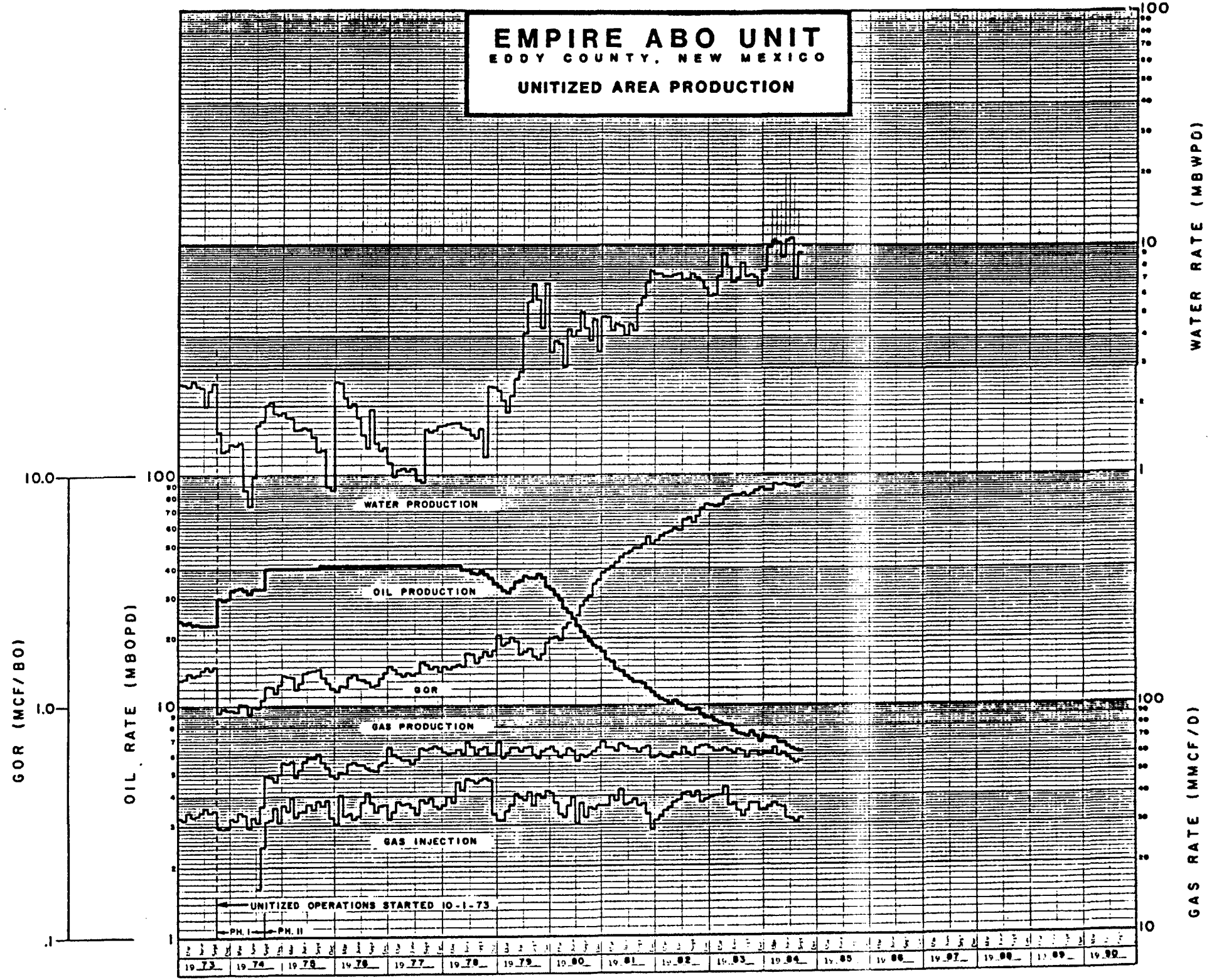

EMPIRE ABO UNIT
EDDY COUNTY, NEW MEXICO
UNITIZED AREA PRODUCTION
WATER PRODUCTION
OIL PRODUCTION
GOR
GAS PRODUCTION
GAS INJECTION
UNITIZED OPERATIONS STARTED 10-1-73
PH. I
PH. II
GOR (MCF/BO)
OIL RATE (MBOPD)
WATER RATE (MBWPD)
GAS RATE (MMCF/D)
10.0
1.0
.1
100
10
1
100
10
19 73
19 74
19 75
19 76
19 77
19 78
19 79
19 80
19 81
19 82
19 83
19 84
19 85
19 86
19 87
19 88
19 89
19 90

TABLE I

EMPIRE ABO UNIT
GAS INJECTION WELLS

Previous Operator/ Lease and Well	Unit Well Designation	Location (Sec.-T.-R.)
Hondo/State "A" No. 24	C-39	NW/4 SE/4 26 17 28
Samedan/State "Walker" No. 1	D-35	SW/4 SE/4 27 17 28
Hondo/State "A" No. 16	D-37	SW/4 SW/4 26 17 28
Amoco/State "BV" No. 1	F-25	SW/4 NW/4 32 17 28
Hondo/State "A" No. 35	F-27	SW/4 NE/4 32 17 28
ARCO/M. Yates B(ARC) No. 8	F-31	SW/4 NE/4 33 17 28
Amoco/State "BM" No. 1	G-22	NE/4 SW/4 31 17 28
Hondo/State "A" No. 9	G-24	NE/4 SE/4 31 17 28
Gulf-NCT "C" No. 1	H-19	SW/4 SE/4 36 17 27
Amoco/State "BE" No. 1	H-21	SW/4 SW/4 31 17 18
Amoco/Malco "H" Fed. No. 9	I-10	NE/4 NW/4 3 18 27
Amoco/State "F" No. 8	I-18	NE/4 NW/4 1 18 27
Amoco/Malco "H" Federal No. 2	J-12	SE/4 NE/4 3 18 27
Amoco/Windfohr Federal No. 4	K-7	NW/4 SE/4 4 18 27
Exxon/CBDU "A" No. 8	M-6	NE/4 NW/4 9 18 27

APPROVED BY: _____ DATE_____
District Manager
United States Department of the Interior
Bureau of Land Management - Roswell District

APPROVED BY: _____ DATE_____
Commissioner of Public Lands
State of New Mexico

APPROVED BY: Roy E. Johnson DATE 3-25-85
Division Director
Dept. of Energy and Minerals
Oil Conservation Division
State of New Mexico

OIL CONSERVATION DIVISION
P. O. BOX 2088
SANTA FE, NEW MEXICO 87501

January 31, 1979

Atlantic Richfield Company
Post Office Box 1610
Midland, Texas 79702

Attention: G. V. Ricks

Re: Case No. 4952
Empire Abo Unit
1979 Plan of Operation

Gentlemen:

We hereby approve the 1979 Plan of Operation for the Empire Abo Unit, Eddy County, New Mexico, subject to like approval by the United States Geological Survey and the Commissioner of Public Lands.

Two approved copies of the Plan of Operation are returned herewith.

Yours very truly,

JOE D. RAMEY
Director

JDR/LT/fd
enc.

cc: U.S.G.S. - Roswell
Commissioner of Public Lands

COPY

AtlanticRichfieldCompany
North American Producing Division
Permian District
Post Office Box 1610
Midland, Texas 79702
Telephone 915/684-6601

January 26, 1979

United States Department of the Interior
Geological Survey
P. O. Drawer 1857
Roswell, New Mexico 88201

Attn: Mr. James A. Gillham (6)
Supervisory Petroleum Engineer

State of New Mexico
Mr. Alex J. Armijo
Commissioner of Public Lands
P. O. Box 1148
Santa Fe, New Mexico 87501

Attn: Mr. Ray D. Graham, Director (3)
Oil and Gas Department

Approved
4-9-79

State of New Mexico
Department of Energy and Minerals
Oil Conservation Division
P. O. Box 2088
Santa Fe, New Mexico 87501

Attn: Mr. Joe D. Ramey (3)
Division Director

Working Interest Owners
Empire Abo Unit
Eddy County, New Mexico

Gentlemen:

In compliance with Section 11 of the Unit Agreement, Empire Abo Unit, Eddy County, New Mexico, Atlantic Richfield Company, as Unit Operator, on behalf of itself and the other participating working interest owners, hereby submits for your approval a Plan of Operation to

cover the period beginning January 1, 1979 and extending through the remainder of calendar year 1979.

Very truly yours,

ATLANTIC RICHFIELD COMPANY
OPERATOR

G. V. Ricks
District Production-Drilling Superintendent

WC/agp

Attachments

PLAN OF OPERATION FOR 1979
EMPIRE ABO UNIT

Submitted: January 26, 1979

1. Project Area

History and Background

The Empire Abo Unit area consists of some 11,339.15 acres in Eddy County, New Mexico. The area is located in portions of Sections 34, 35, 36, Township 17 South, Range 27 East; Sections 1, 2, 3, 4, 8, 9, 10, 11, 12, 15, 16, 17, Township 18 South, Range 27 East, Sections 25, 26, 27, 28, 31, 32, 33, 34, 35, 36, Township 17 South, Range 28 East, Sections 4, 5, 6, Township 18 South, Range 28 East; Sections 29, 30, Township 17 South, Range 29 East. Within the Unit area, the following tracts did not qualify for participation as of the effective date of the Unit (October 1, 1973): 2, 6, 28, 41, 42, 46, 55, 56, 69, 79, 84, 91. These non-participating tracts totaled 644.74 acres. The remaining 10,694.41 acres were intially developed as the project area for pressure maintenance by the injection of plant residue gas from Abo production back into the unitized Abo formation. The Unit, on September 1, 1975, expanded the Project Area by inclusion of tracts 41, 79, and 84 (total 120.03 acres). Tracts 2, 6, 42, and 46 (total 241.05 acres) have been formed into the CITGO Empire Abo Unit, which received N. M. O. C. C. approval in June 1974, and began gas injection in mid-1975. The original proposed Unit Area is now disposed as follows:

	Acres
ARCO Empire Abo Unit	10,814.44
CITGO Empire Abo Unit	241.05
Non-participating tracts	283.66
	11,339.15

2. Current Production

In September 1973, just before Unitization, the pool had 235 producing wells averaging 24,734 BOPD with 9.3% water production and a gas-oil ratio of 1543 cubic feet/BO.

The pool total production was equivalent to 67,120 RSVB/D net voidage. The Project Area, in September 1973, had 222 producing wells averaging 23,252 BOPD with 9.8% water production and a gas-oil ratio of 1505 cubic feet/BO. The project area production was equivalent to 61,808 RSVB/D net voidage. In November 1978, the Unitized Project Area averaged 36,570 BOPD with a 6.36% water production and a gas-oil ratio of 1684 cubic feet/BO. Gas injection averaged 47,006 MCF per day. The project area production for November 1978 was equivalent to 26,135 RSVB/D net voidage (see attached Production History Plot). Unit operations have thus increased the project area oil production by 13,318 BOPD and reduced reservoir voidage by 35,673 RSVB/D. Unitized residue gas injection for pressure maintenance is calculated to increase future recovery by about 30 MMBO compared to continued primary operations.

3. Basic Concepts Governing Future Unit Operations

a) Field production history and reservoir numeric model studies have demonstrated that reservoir recovery is governed by a gravity drainage mechanism with an expanding secondary gas cap. Under unitized operations Atlantic Richfield Company, as operator, will be able to maximize the beneficial effects of this most efficient recovery mechanism by careful observation of well performance and shutting in or curtailing production from inefficient wells. As of November 1978, the Project Area had 133 former producing wells shut in or restricted due to high gas-oil ratio, used for injectors or being otherwise inefficient producers.

b) Injection of gas will act toward pressure maintenance and the orderly control of expansion of the secondary gas cap.

4. Operating Plans, Progress

a) Gas Injection Facilities

At present, the Unit is injecting gas into the Abo Gas Cap in the following fifteen wells:

Previous Operator/ Lease and Well	Unit Well Designation	Location (Sec.-T.- R.)
Hondo/State "A" No. 21	C-38	NE/4 SW/4 26 17 28
Hondo/State "A" No. 24	C-39	NW/4 SE/4 26 17 28
Samedan/State "Walker" No. 1	D-35	SW/4 SE/4 27 17 28
Hondo/State "A" No. 16	D-37	SW/4 SW/4 26 17 28
Amoco/State "BV" No. 1	F-25	SW/4 NW/4 32 17 28
Hondo/State "A" No. 35	F-27	SW/4 NE/4 32 17 28
ARCo/M. Yates B (ARC) No. 8	F-31	SW/4 NE/4 33 17 28
Amoco/State "BM" No. 1	G-22	NE/4 SW/4 31 17 28
Hondo/State "A" No. 9	G-24	NE/4 SE/4 31 17 28
Gulf-NCT "C" No. 1	H-19	SW/4 SE/4 36 17 27
Amoco/State "BE" No. 1	H-21	SW/4 SW/4 31 17 28
Amoco/Malco "H" Federal No. 9	I-10	NE/4 NW/4 3 18 27
Amoco/State "F" No. 8	I-18	NE/4 NW/4 1 18 27
Amoco/Windfohr Rederal No. 4	K-7	NW/4 SE/4 4 18 27
Exxon/CBDU "A" No. 8	M-6	NE/4 NW/4 9 18 27

Beginning in July 1974 and continuing through the latest month in which data is available (November 1978) all available plant residue gas has been injected into the Abo gas cap.

The Unit picks up plant residue gas at about 700 psi and compresses it to 2000 psi for injection. The gas contains hydrogen sulfide and superdehydration facilities are installed to minimize possible corrosion. A rigorous corrosion checking program is maintained. Permits for the Gas Injection Facilities have been granted by the State of New Mexico, Environmental Improvement Agency. Atlantic Richfield Company believes the injection facilities meet the requirements of the United States Geological Survey and the State of New Mexico. In addition. the Injection Facilities provide enough operational flexibility to meet changing field conditions.

b) Oil Production and Test Facilities

Since September 1, 1974, injection of all available residue gas within the project area earned a top allowable of 41,041 BOPD or an increase of 17,789 BOPD over primary operations. In order to effectively and efficiently handle this increased production, the oil production and test facilities were enlarged and centralized as outlined in the Plan of Operation for 1974. The facilities are 100% complete and the consolidated batteries are operating satisfactorily.

Prior to Unit operations there were approximately fifty (50) batteries within the project area. Fourteen (14) separate battery and test facility locations will provide enough operational flexibility to hold lost production at an absolute minimum, as a result of equipment failure or a shut-down due to fire or other catastrophe. The ten largest of the new batteries are handling all of the Unit production and serve all producing wells with automatic testing facilities. The remaining four batteries will not be put into service until the need arises.

c) Workovers

A continuous workover study is in progress, so that whenever well production data and reservoir conditions so indicate, workovers are performed to lower gas-oil or water-oil ratios, and maximize producing well efficiency. Seventeen workovers of this type have been performed in 1978 to date.

d) Continuing Field Study

In order to maximize future reserves, Atlantic Richfield Company, as Unit Operator, will continue to maintain a comprehensive production and bottom hole testing program in conjunction with numeric reservoir simulator studies for field performance predictions.

e) New Producing Well Program

We are moving ahead with the program to drill new producing wells in the most favorable part of the Abo Reef section to gain efficient low gas-oil ratio production.

Listed below are the new Phase IV Infill Drilling Program wells completed in 1978 with their allowable rate and gas-oil ratio. The Phase V Infill wells that have been completed in 1978 are also shown with their allowable and gas-oil ratio.

UNIT WELL DESIGNATION	ALLOWABLE OIL RATE(BOPD	RECENT TEST GOR (CF/BO)
E-341	250	5400
E-351	250	4000
E-361	300	500
E-373	400	675
F-321	300	750
G-322	250	700
G-323	300	550
G-332	50	3500
H-301 (A)	100	16000
H-321	100	7000
H-322 (B)	0	--
H-331	150	2250
I-272	100	1020
I-273	100	1320
I-282	100	870
J-223 (A)	0	--
J-233	250	3200
K-184 (C)	0	--
K-192	250	1100
K-231	350	930
K-232 (D)	0	--
M-131 (A)	0	--
M-151 (B)	0	--
M-152	200	860

(A) Workover recommended
(B) Waiting on electricity for pump
(C) Will be assigned an allowable in February 1979
(D) Waiting on an acid-frac stimulation treatment

PHASE V INFILL DRILLING PROGRAM

UNIT WELL DESIGNATION	ALLOWABLE OIL RATE (BOPD)	RECENT TEST GOR (CF/BO)
F-322	300	2400
F-352	200	500
F-353	200	560
F-362	350	560
G-313 (A)	0	00
G-333	150	1100
H-281	200	800
H-295	200	800
H-302	50	1100
H-303 (B)	0	--
H-312	200	680
I-283	40	1280
I-291	200	1120
J-203	150	5900
J-234	100	7650
K-193	100	1450
K-194	150	600
L-154	350	800

To be completed in early 1979: G-343, H-294, I-251, I-261 J-212, L-142, L-143, M-132.

(A) Waiting on acid stimulation
(B) Waiting on electricity for pump

We plan to start the 50-well Phase VI Infill Drilling Program during the first week in January 1979.

f) Injection of Non-Abo Gas

Gas from non-Abo sources is delivered from the Gas Company of New Mexico (formerly Southern Union Gas Gas Company) to the Empire Abo Unit. It commenced at 4:30 PM on June 18, 1976. Injection of this outside gas during November 1978 averaged 3189 MCF/D. Cumulative outside gas injected through November 30, 1978 is 2287 MMCF. Cumulative gas delivered back to the supplier through November 30, 1978 is 264 MMCF and the net cumulative non-Abo gas bank is 2023 MMCF.

5. Modifications

It is understood that to meet changing conditions, this plan of operation may be modified from time to time, with the approval of the Supervisor, the Commissioner of Public Lands of the State of New Mexico, and the Dept. of Energy & Minerals, Oil Conservation Division, State of New Mexico.

Atlantic Richfield Company, as Unit Operator, will act prudently to preserve all rights of the mineral owners, and to effectively and efficiently recover the Unit area reserves. This Company will meet all economical offset obligations, act to prevent waste, conserve natural resources, and protect correlative rights.

6. Effective Date

This Plan of Operations shall be effective January 1, 1979, and extend through the calendar year unless otherwise amended.

If this Plan of Operation meets with your approval, please indicate in the space below and return one copy for our files.

Very truly yours,

ATLANTIC RICHFIELD COMPANY
OPERATOR

G. V. Ricks
District Production/Drilling Superintendent

WC/agp

APPROVED BY: _____ DATE: _____
Supervisory Petroleum Engineer
United States Geological Survey

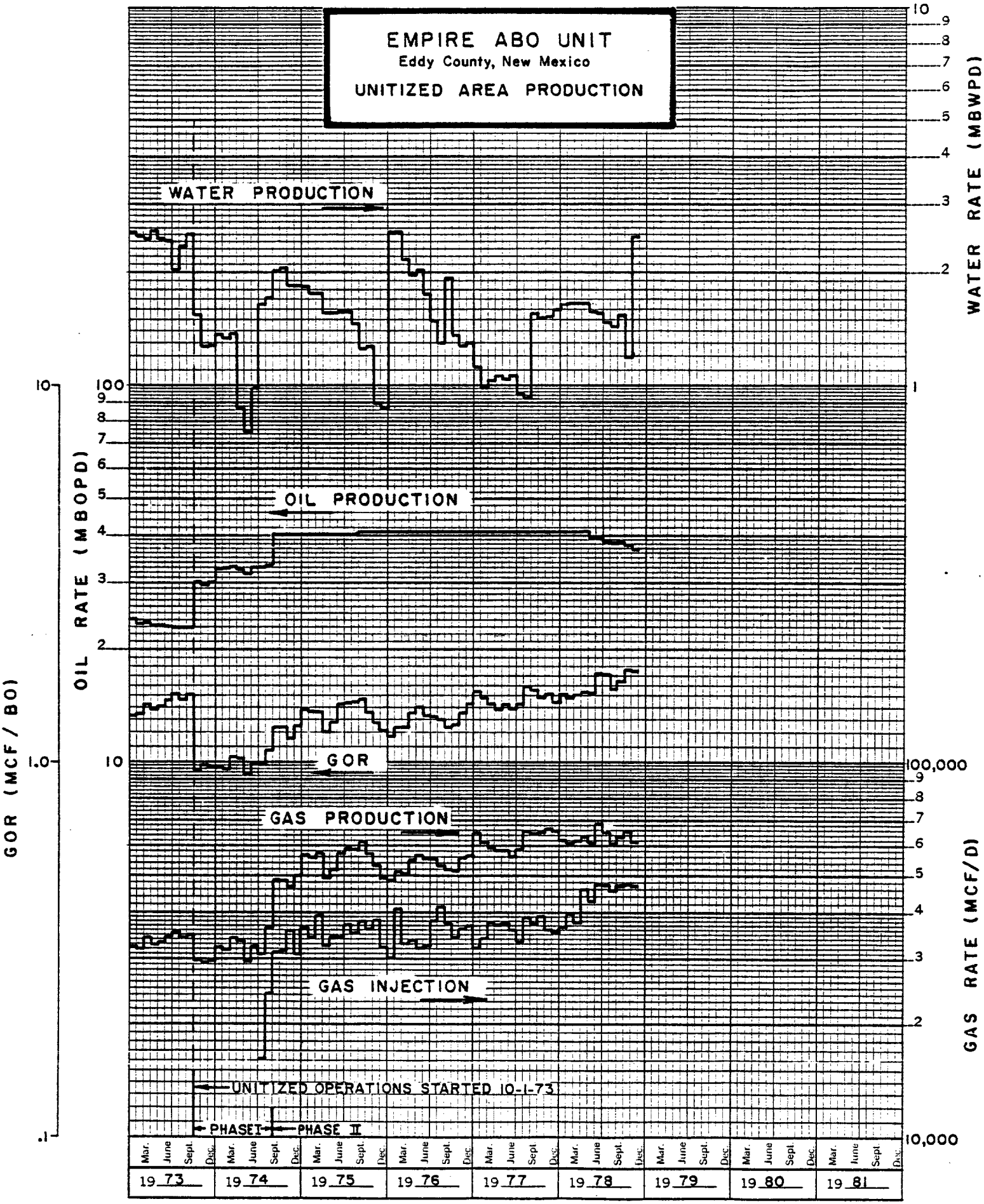
APPROVED BY: _____ DATE: _____
Commissioner of Public Lands
State of New Mexico

APPROVED BY: _____ DATE: 1/31/79
Division Director
Dept. of Energy & Minerals
Oil Conservation Division
State of New Mexico

EMPIRE ABO UNIT

Eddy County, New Mexico

UNITIZED AREA PRODUCTION



AtlanticRichfieldCompany
North American Producing Division
Permian District
Post Office Box 1610
Midland, Texas 79702
Telephone 915 684 0100

January 10, 1978

United States Department
of the Interior
Geological Survey
P. O. Drawer 1857
Roswell, New Mexico 88201

Attn: Mr. Carl C. Traywick (6)
Assistant Area Oil and Gas Supervisor

State of New Mexico
Mr. Phil R. Lucero
Commissioner of Public Lands
P. O. Box 1148
Santa Fe, New Mexico 87501

Attn: Mr. Ray D. Graham, Director (3)
Oil and Gas Department

State of New Mexico
Oil Conservation Commission
P. O. Box 2088
Santa Fe, New Mexico 87501

Attn: Mr. Joe D. Ramey (3)
Secretary-Director

Working Interest Owners
Empire Abo Unit
Eddy County, New Mexico

Gentlemen:

In compliance with Section 11 of the Unit Agreement, Empire Abo Unit, Eddy County, New Mexico, Atlantic Richfield Company, as Unit Operator, on behalf of itself and the other participating working interest owners, hereby submits for your approval a Plan of Operation to cover the period beginning January 1, 1978,

and extending through the remainder of calendar year 1978.

Very truly yours,

ATLANTIC RICHFIELD COMPANY
OPERATOR

G. V. Ricks
District Production - Drilling
Superintendent

GVR/ASK:agp

Attachments

PLAN OF OPERATION FOR 1978
EMPIRE ABO UNIT

Submitted: January 10, 1978

1. Project Area

History and Background

The Empire Abo Unit area consists of some 11,339.15 acres in Eddy County, New Mexico. The area is located in portions of Sections 34, 35, 36, Township 17 South, Range 27 East; Sections 1, 2, 3, 4, 8, 9, 10, 11, 12, 15, 16, 17, Township 18 South, Range 27 East; Sections 25, 26, 27, 28, 31, 32, 33, 34, 35, 36, Township 17 South, Range 28 East, Sections 4, 5, 6, Township 18 South, Range 28 East; Sections 29, 30, Township 17 South, Range 29 East. Within the Unit area, the following tracts did not qualify for participation as of the effective date of the Unit (October 1, 1973): 2, 6, 28, 41, 42, 46, 55, 56, 69, 79, 84, 91. These non-participating tracts totaled 644.74 acres. The remaining 10,694.41 acres were intially developed as the project area for pressure maintenance by the injection of plant residue gas from Abo production back into the unitized Abo formation. The Unit, on September 1, 1975, expanded the Project Area by inclusion of tracts 41, 79, and 84 (total 120.03 acres). Tracts 2, 6, 42, and 46 (total 241.05 acres) have been formed into the CITGO Empire Abo Unit, which received N. M. O. C. C. approval in June 1974, and began gas injection in mid-1975. The original proposed Unit Area is now disposed as follows:

	Acres
ARCO Empire Abo Unit:	10,814.44
CITGO Empire Abo Unit:	241.05
Non-participating tracts:	283.66
	11,339.15

2. Current Production, Future Recovery

In September 1973, just before Unitization, the pool had 235 producing wells averaging 24,734 BOPD with 9.3% water production and a gas-oil ratio of 1543 cubic feet/BO. The pool total production was equivalent to 67,120 RSVB/D net voidage. The

Project Area, in September 1973, had 222 producing wells averaging 23,252 BOPD with 9.8% water production and a gas-oil ratio of 1505 cubic feet/BO. The project area production was equivalent to 61,808 RSVB/D net voidage. In October 1977, the Unitized Project Area averaged 41,040 BOPD with 3.82% water production and a gas-oil ratio of 1585 cubic feet/BO. Gas injection averaged 39,444 MCF per day. The project area production for October 1977 was equivalent to 42,261 RSVB/D net voidage (see attached Production History Plot). Unit operations have thus increased the project area oil production by 17,788 BOPD and reduced reservoir voidage by 19,547 RSVB/D. Unitized residue gas injection for pressure maintenance is calculated to increase future recovery by about 30 MMBO compared to continued primary operations.

3. Basic Concepts Governing Future Unit Operations

a) Field production history and reservoir numeric model studies have demonstrated that reservoir recovery is governed by a gravity drainage mechanism with an expanding secondary gas cap. Under unitized operations, Atlantic Richfield Company, as operator, will be able to maximize the beneficial effects of this most efficent recovery mechanism by careful observation of well performance and shutting in or curtailing production from inefficient wells. As of October 1977, the Project Area had 115 former producing wells shut in or restricted due to high gas-oil ratio, used for injectors or being otherwise inefficient producers.

b) Injection of gas will act toward pressure maintenance and the orderly control of expansion of the secondary gas cap.

4. Operating Plans, Progress

a) Gas Injection Facilities

At present, the Unit is injecting gas into the Abo Gas Cap in the following fifteen wells:

Previous Operator/ Lease and Well	Unit Well Designation	Location
Hondo/State "A" No. 21	C-38	NE/4 SW/4 Sec. 26, T-17S, R-28E
Hondo/State "A" No. 24	C-39	NW/4 SE/4 Sec. 26, T-17S, R-28E
Samedan/State "Walker" No. 1	D-35	SW/4 SE/4 Sec. 27, T-17S, R-28E
Hondo/State "A" No. 16	D-37	SW/4 SW/4 Sec. 26, T-17S, R-28E
Amoco/State "BV" No. 1	F-25	SW/4 NW/4 Sec. 32, T-17S, R-28E
Hondo/State "A" No. 35	F-27	SW/4 NE/4 Sec. 32, T-17S, R-28E
ARCo/M. Yates B (ARC) No. 8	F-31	SW/4 NE/4 Sec. 33, T-17S, R-28E
Amoco/State "BM" No. 1	G-22	NE/4 SW/4 Sec. 31, T-17S, R-28E
Hondo/State "A" No. 9	G-24	NE/4 SE/4 Sec. 31, T-17S, R-28E
Gulf/NCT "C" No. 1	H-19	SW/4 SE/4 Sec. 36, T-17S, R-27E
Amoco/State "BE" No. 1	H-21	SW/4 SW/4 Sec. 31, T-17S, R-28E
Amoco/Malco "H" Federal No. 9	I-10	NE/4 NW/4 Sec. 3, T-18S, R-27E
Amoco/State "F" No. 8	I-18	NE/4 NW/4 Sec. 1, T-18S, R-27E
Amoco/Windfohr Federal No. 4	K-7	NW/4 SE/4 Sec. 4, T-18S, R-27E
Exxon/CBDU "A" No. 8	M-6	NE/4 NW/4 Sec. 9, T-18S, R-27E

Beginning in July 1974, and continuing through the latest month on which data is available (October 1977), all available plant residue gas has been injected into the Abo gas cap.

The Unit picks up plant residue gas at about 700 psi and compresses it to 2000 psi for injection. The gas contains hydrogen sulfide and superdehydration facilities are installed to minimize possible corrosion. A rigorous corrosion checking program is maintained. Permists for the Gas Injection Facilities have been granted by the State of New Mexico, Environmental Improvement Agency. Atlantic Richfield Company believes the injection facilities meet the requirements of the United States Geological Survey and the State of New Mexico. In addition, the Injection Facilities provide enough operational flexibility to meet changing field conditions.

b) Oil Production and Test Facilities

Since September 1, 1974, injection of all available residue gas within the project area has earned an allowable of 41,041 BOPD or an increase of 17,789 BOPD over primary operations. In order to effectively and efficiently handle this increased production, the oil production and test facilities were enlarged and centralized as outlined in the Plan of Operation for 1974. The facilities are 100% complete and the consolidated batteries are operating satisfactorily.

Prior to Unit operations there were approximately fifty (50) batteries within the project area. Fourteen (14) separate battery and test facility locations will provide enough operational flexibility to hold lost production at an absolute minimum, as a result of equipment failure or a shutdown due to fire or other catastrophe. The ten largest of the new batteries are handling all of the Unit production and serve all producing wells with automatic testing facilities. The remaining four batteries will not be put into service until the need arises.

c) Workovers

A continuous workover study is in progress, so that whenever well production data and reservoir conditions so indicate, workovers are performed to lower gas-oil or water-oil ratios, and maximize producing well efficiency. Fourteen workovers of this type have been performed in 1977 to date. In addition, one producing well will be worked over by the end of the year.

d) Continuing Field Study

In order to maximize future reserves, Atlantic Richfield Company, as Unit Operator, will continue to maintain a comprehensive production and bottom hole testing program in conjunction with numeric reservoir simulator studies for field performance predictions.

e) New Producing Well Program

We are moving ahead with the program to drill new producing wells in the most favorable part of the Abo Reef section to gain efficient, low gas-oil ratio production.

Listed below are the new Phase III Infill Drilling Program wells completed through October with their allowable rate and gas-oil ratio.

UNIT WELL DESIGNATION	ALLOWABLE OIL RATE (BOPD)	RECENT TEST GAS-OIL RATIO (CU.FT./BO)
F-332	400	500
G-342	400	470
F-361	425	570
F-333	350	400
E-372	350	800
F-341	350	460
F-372	175	1020
F-381	200	840
G-351	350	760
H-272	100	1900
H-292	350	830
H-293	375	610
H-311	225	700
I-281	175	870
K-141	300	560
K-183	150	820
L-121	220	690
L-153	300	400
M-901	150	690
M-101	150	3720
N-901	50	610
J-222	0*	---
M-122	0*	---

(*Remedial study in progress.)

With co-owner approval to purchase the ARCO-Empire 33 State Com No. 1 well, an additional Phase II well (Empire Abo Unit G-301 location) was completed on 1/4/77. This well has produced 73.7 MBO by 12/1/77 and a recent GOR test shows that it has 760 CF/BO. The December 1977 allowable for this well is 250 BOPD.

f) Injection of Non-Abo Gas

Gas from non-Abo sources is delivered from the Gas Company of New Mexico (formerly Southern Union Gas Company) to the Empire Abo Unit. It commenced at 4:30 PM on June 18, 1976. Injection of this outside gas during October 1977 averaged 402 MCF/D. Cumulative outside gas injected through October 31, 1977 is 1381 MMCF. Cumulative gas delivered back to the supplier through October 31, 1977 is 264 MMCF and the net cumulative non-Abo gas bank is 1117 MMCF. Also, the construction of a larger compression liquids flash and storage system for the gas injection plant has been completed.

5. Modifications

It is understood that to meet changing conditions, this plan of operation may be modified from time to time, with the approval of the Supervisor, the Commissioner of Public Lands of the State of New Mexico, and the New Mexico Oil Conservation Commission.

Atlantic Richfield Company, as Unit Operator, will act prudently to preserve all rights of the mineral owners, and to effectively and efficiently recover the Unit area reserves. This Company will meet all economical offset obligations, act to prevent waste, conserve natural resources, and protect correlative rights.

6. Effective Date

This Plan of Operations shall be effective January 1, 1978, and extend through the calendar year unless otherwise amended.

If this Plan of Operation meets with your approval, please indicate in the space below and return one copy for our files.

Very truly yours,

ATLANTIC RICHFIELD COMPANY
OPERATOR

G. V. Ricks
District Production-Drilling
Superintendent

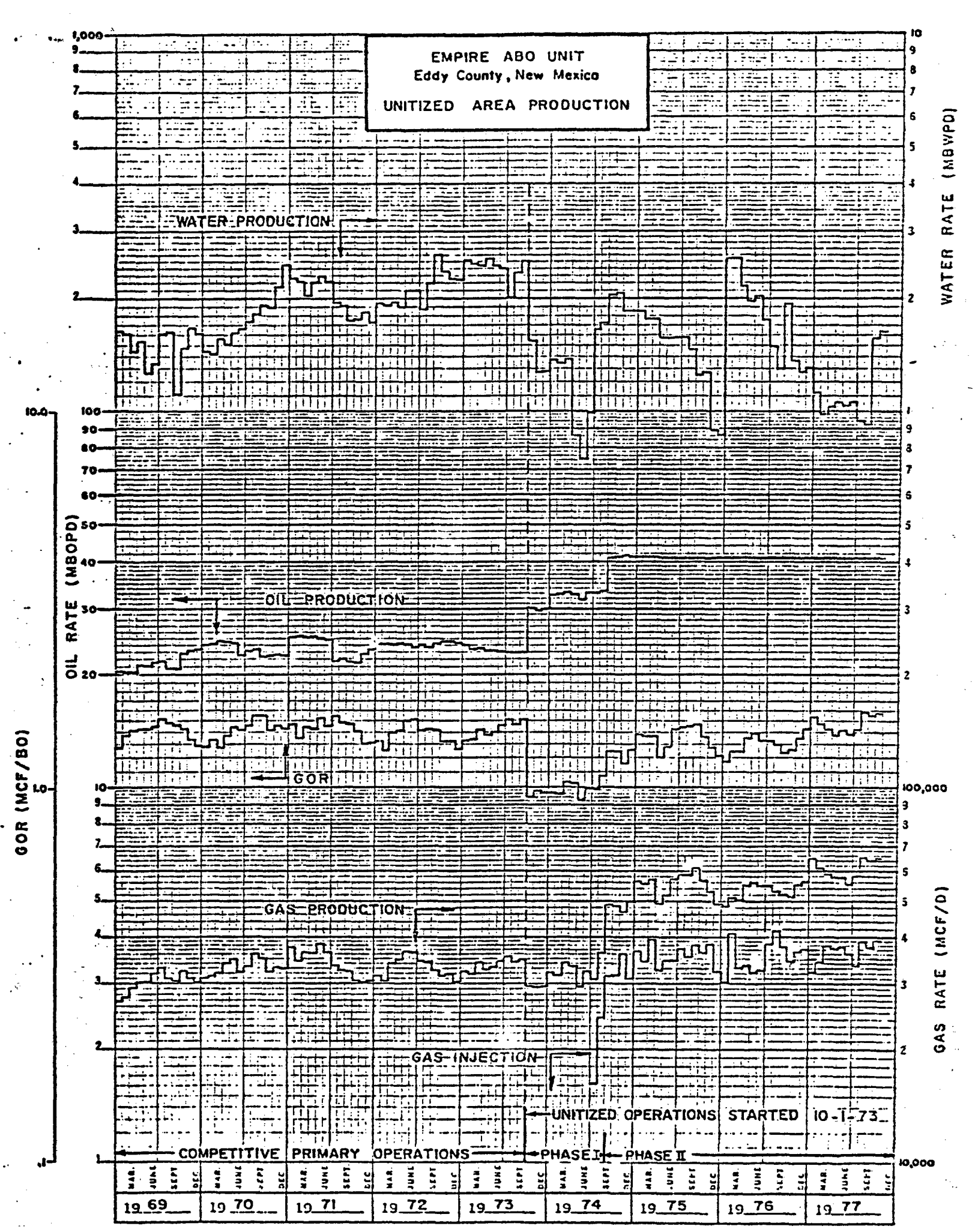
ASK/agp

APPROVED BY: _____ DATE: _____
Supervisor of United States
Geological Survey

APPROVED BY: _____ DATE: _____
Commissioner of Public Lands
State of New Mexico

APPROVED BY: _____ DATE: 1/18/78
Secretary-Director
New Mexico Oil Conservation Commission

[illegible] TO LIKE APPROVAL
[illegible] STATES GEOLOGICAL
[illegible] COMMISSIONER OF PUBLIC LANDS,
OF THE [illegible] OF NEW MEXICO.


EMPIRE ABO UNIT
Eddy County, New Mexico
UNITIZED AREA PRODUCTION
WATER PRODUCTION
OIL PRODUCTION
GOR
GAS PRODUCTION
GAS INJECTION
WATER RATE (MBWPD)
OIL RATE (MBOPD)
GOR (MCF/BO)
GAS RATE (MCF/D)
UNITIZED OPERATIONS STARTED 10-1-73
COMPETITIVE
PRIMARY OPERATIONS
PHASE I
PHASE II
MAR. JUNE SEPT DEC
1969
1970
1971
1972
1973
1974
1975
1976
1977

4952

OIL CONSERVATION COMMISSION
P. O. BOX 2088
SANTA FE, NEW MEXICO 87501

January 4, 1977

Atlantic Richfield Company
P. O. Box 1610
Midland, Texas 79701

Attention: Mr. G.V. Ricks

Re: 1977 Plan of Operation
Empire Abo Unit, Eddy County,
New Mexico.

Gentlemen:

This is to advise that the New Mexico Oil Conservation Commission has this date approved the Plan of Operation for the calendar year 1977 for the Empire Abo Unit, Eddy County, New Mexico, subject to like approval by the United States Geological Survey and the Commissioner of Public Lands of the State of New Mexico.

Two approved copies of the plan are returned herewith.

Very truly yours,

JOE D. RAMEY
Secretary-Director

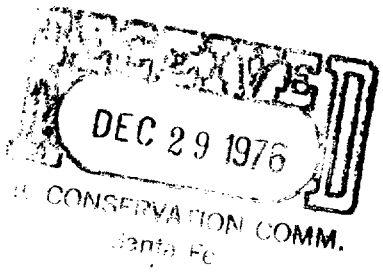
JDR/JEK/og

cc: Commissioner of Public Lands - Santa Fe
United States Geological Survey - Roswell

COPY

AtlanticRichfieldCompany
North American Producing Division
Permian District
Post Office Box 1610
Midland, Texas 79701
Telephone 915 682 8631





December 9, 1976

United States Department
of the Interior
Geological Survey
P. O. Drawer 1857
Roswell, New Mexico 88201

Attn: Mr. Carl C. Traywick (6)
Assistant Area Oil and Gas Supervisor

State of New Mexico
Mr. Phil R. Lucero
Commissioner of Public Lands
P. O. Box 1148
Santa Fe, New Mexico 87501

Attn: Mr. Ray D. Graham, Director (3)
Oil and Gas Department

State of New Mexico
Oil Conservation Commission
P. O. Box 2088
Santa Fe, New Mexico 87501

Attn: Mr. Joe D. Ramey (3)
Secretary-Director

Working Interest Owners
Empire Abo Unit

Re: Plan of Operation for 1977
Empire Abo Unit
Eddy County, New Mexico

Gentlemen:

In compliance with Section 11 of the Unit Agreement, Empire Abo Unit, Eddy County, New Mexico, Atlantic Richfield Company, as Unit Operator, on behalf of itself and the other participating working interest owners, hereby submits for your approval a Plan of Operation to cover the period beginning January 1, 1977,

and extending through the remainder of calendar year 1977.

Very truly yours,

ATLANTIC RICHFIELD COMPANY
OPERATOR

L. Troop for G.V.R.

G. V. Ricks
District Production - Drilling
Superintendent

GVR/WWC:agp

Attachments

PLAN OF OPERATION FOR 1977
EMPIRE ABO UNIT

Submitted: December 9, 1976

1. Project Area

History and Background

The Empire Abo Unit area consists of some 11,339.15 acres in Eddy County, New Mexico. The area is located in portions of Sections 34, 35, 36, Township 17 South, Range 27 East; Sections 1, 2, 3, 4, 8, 9, 10, 11, 12, 15, 16, 17, Township 18 South, Range 27 East; Sections 25, 26, 27, 28, 31, 32, 33, 34, 35, 36, Township 17 South, Range 28 East; Sections 4, 5, 6, Township 18 South, Range 28 East; Sections 29, 30, Township 17 South, Range 29 East. Within the Unit area, the following tracts did not qualify for participation as of the effective date of the Unit (October 1, 1973): 2, 6, 28, 41, 42, 46, 55, 56, 69, 79, 84, 91. These non-participating tracts totaled 644.74 acres. The remaining 10,694.41 acres were initially developed as the project area for pressure maintenance by the injection of plant residue gas from Abo production back into the unitized Abo formation. The Unit, on September 1, 1975, expanded the Project Area by inclusion of tracts 41, 79, and 84 (total 120.03 acres). Tracts 2, 6, 42, and 46 (total 241.05 acres) have been formed into the CITGO Empire Abo Unit, which received N. M. O. C. C. approval in June 1974, and began gas injection in mid-1975. The original proposed Unit Area is now disposed as follows:

	Acres
ARCO Empire Abo Unit:	10,814.44
CITGO Empire Abo Unit:	241.05
Non-participating tracts:	283.66
	11,339.15

2. Current Production, Future Recovery

In September 1973, just before Unitization, the pool had 235 producing wells averaging 24,734 BOPD with 9.3% water production and a gas-oil ratio of 1543 cubic feet/BO. The pool total production was equivalent to 67,120 RSVB/D net voidage. The

Project Area, in September 1973, had 222 producing wells averaging 23,252 BOPD with 9.8% water production and a gas-oil ratio of 1505 cubic feet/BO. The project area production was equivalent to 61,808 RSVB/D net voidage. In October 1976, the Unitized Project Area averaged 41,045 BOPD with 3.25% water production and a gas-oil ratio of 1262 cubic feet/BO. Gas injection averaged 33,651 MCF per day. The project area production for October 1976 was equivalent to 24,344 RSVB/D net voidage (see attached Production History Plot). Unit operations have thus increased the project area oil production by 17,793 BOPD and reduced reservoir voidage by 37,464 RSVB/D. Unitized residue gas injection for pressure maintenance is calculated to increase future recovery by about 30 MMBO compared to continued primary operations.

3. Basic Concepts Governing Future Unit Operations

a) Field production history and reservoir numeric model studies have demonstrated that reservoir recovery is governed by a gravity drainage mechanism with an expanding secondary gas cap. Under unitized operations, Atlantic Richfield Company, as operator, will be able to maximize the beneficial effects of this most efficient recovery mechanism by careful observation of well performance and shutting in or curtailing production from inefficient wells. As of October 1976, the Project Area had 119 former producing wells shut in or restricted due to high gas-oil ratio, used for injectors or being otherwise inefficient producers.

b) Injection of gas will act toward pressure maintenance and the orderly control of expansion of the secondary gas cap.

4. Operating Plans, Progress

a) Gas Injection Facilities

At present, the Unit is injecting gas into the Abo Gas Cap in the following twelve wells:

Previous Operator/ Lease and Well	Unit Well Designation	Location
Hondo/State "A" No. 24	C-39	NW/4 SE/4 Sec. 26, T-17S, R-28E
Samedan/State "Walker" No. 1	D-35	SW/4 SE/4 Sec. 27, T-17S, R-28E
Hondo/State "A" No. 16	D-37	SW/4 SW/4 Sec. 26, T-17S, R-28E
Amoco/State "BV" No. 1	F-25	SW/4 NW/4 Sec. 32, T-17S, R-28E
Hondo/State "A" No. 35	F-27	SW/4 NE/4 Sec. 32, T-17S, R-28E
ARCo/M. Yates B (ARC) No. 8	F-31	SW/4 NE/4 Sec. 33, T-17S, R-28E
Amoco/State "BM" No. 1	G-22	NE/4 SW/4 Sec. 31, T-17S, R-28E
Hondo/State "A" No. 9	G-24	NE/4 SE/4 Sec. 31, T-17S, R-28E
Gulf/NCT "C" No. 1	H-19	SW/4 SE/4 Sec. 36, T-17S, R-27E
Amoco/State "BE" No. 1	H-21	SW/4 SW/4 Sec. 31, T-17S, R-28E
Amoco/Malco "H" Federal No. 9	I-10	NE/4 NW/4 Sec. 3, T-18S, R-27E
Amoco/State "F" No. 8	I-18	NE/4 NW/4 Sec. 1, T-18S, R-27E

Beginning in July 1974, and continuing through the latest month on which data is available (October 1976), all available plant residue gas has been injected into the Abo gas cap.

The Unit picks up plant residue gas at about 700 psi and compresses it to 1900 psi for injection. The gas contains hydrogen sulfide and superdehydration facilities are installed to minimize possible corrosion. A rigorous corrosion checking program is maintained. Permits for the Gas Injection Facilities have been granted by the State of New Mexico, Environmental Improvement Agency. Atlantic Richfield Company believes the injection facilities meet the requirements of the United States Geological Survey and the State of New Mexico. In addition, the Injection Facilities provide enough operational flexibility to meet changing field conditions.

b) Oil Production and Test Facilities

Since September 1, 1974, injection of all available residue gas within the project area has earned an allowable of 41,041 BOPD or an increase of 17,789 BOPD over primary operations. In order to effectively and efficiently handle this increased production, the oil production and test facilities were enlarged and centralized as outlined in the Plan of Operation for 1974. The facilities are 100% complete and final inspection in April 1976 showed the consolidated batteries to be operating satisfactorily.

Prior to Unit operations there were approximately fifty (50) batteries within the project area. Fourteen (14) separate battery and test facility locations will provide enough operational flexibility to hold lost production at an absolute minimum, as a result of equipment failure or a shutdown due to fire or other catastrophe. The ten largest of the new batteries are handling all of the Unit production and serve all producing wells with automatic testing facilities. The remaining four batteries will not be put into service until the need arises.

c) Workovers

A continuous workover study is in progress, so that whenever well production data and reservoir conditions so indicate, workovers are performed to lower gas-oil or water-oil ratios, and maximize producing well efficiency. Five workovers of this type have been performed in 1976 to date. In addition, one producing well and one injection well will be worked over by the end of the year.

d) Continuing Field Study

In order to maximize future reserves, Atlantic Richfield Company, as Unit Operator, will continue to maintain a comprehensive production and bottom hole testing program in conjunction with numeric model tests for field performance and predictions.

e) New Producing Well Program

We are moving ahead with the program to drill new producing wells in the most favorable part of the Abo Reef section to gain efficient, low gas-oil ratio production.

Listed below are the new Phase II Infill Drilling Program wells completed through October with their allowable rate and gas-oil ratio.

UNIT WELL DESIGNATION	ALLOWABLE OIL RATE (BOPD)	INITIAL GAS-OIL RATIO (CU. FT./BO)
E-382	250	680
E-391	300	805
F-371	450	531
G-312	150	797
G-321	400	627
G-331	400	499
G-341	309	524
I-271	200	795
J-202	224	1104
J-221	350	452
J-232	450	408
K-182	200	716
K-191	150	644
L-111	150	713
L-131	130	528
L-132	350	558
L-152	400	586

An additional proposed Phase II well (Empire Abo Unit G-301 location) will be completed when co-owner approval is obtained to purchase the ARCo Empire 33 State Com No. 1 well.

The first well in the approved Phase III(a) Infill Drilling Program is scheduled to be spudded in December 1976. The other two wells are scheduled to be drilled and completed in the first quarter of 1977.

The Phase III(b) Infill Drilling Program, consisting of twenty (20) wells has been submitted to the co-owners for approval. If approved, these wells will be drilled and completed during 1977.

f) New Program of Improved Pressure Maintenance

Engineering studies indicate that ultimate oil recovery from the Abo formation can be increased by augmenting the present injection of Abo plant residue gas with additional injection gas from non-Abo sources. As much as 25 MMCF per day of non-Abo gas may be available for injection. The supplier requires the option to take back this non-Abo gas at the same rate it was furnished, for a maximum of 30 days out of any 180-day period. After Unit gas injection is halted, 60% of the Unit share of produced residue gas will be returned to the non-Abo gas supplier until that supplier has recovered 88% of the original BTUs supplied.

Deliveries from the Gas Company of New Mexico (formerly Southern Union Gas Company) to the Empire Abo Unit commenced at 4:30 P. M. on June 19, 1976. Injection of outside gas during October averaged 4598 MCF/D. Cumulative outside gas injected through October 31, 1976 is 865 MMCF.

The construction of the additional gas injection pipelines, four Crall high-pressure filters, and additional gas injection conversions for the Improved Pressure Maintenance Project is now complete. Listed below are the injection conversions which were submitted October 22, 1975.

UNIT WELL DESIGNATION	LOCATION
C-39	NW/4 SE/4 Sec. 26, T-17S, R-28E
D-35	SW/4 SE/4 Sec. 27, T-17S, R-28E
G-24	NE/4 SE/4 Sec. 31, T-17S, R-28E
H-21	SW/4 SW/4 Sec. 31, T-17S, R-28E
I-18	NE/4 NW/4 Sec. 1, T-18S, R-27E

The construction of a larger compression liquids flash and storage system for the gas injection plant which was submitted on October 29, 1976 and approved by co-owners will be completed by the end of 1976.

5. Modifications

It is understood that to meet changing conditions, this plan of operation may be modified from time to time, with the approval of the Supervisor, the Commissioner of Public Lands of the State of New Mexico, and the New Mexico Oil Conservation Commission.

Atlantic Richfield Company, as Unit Operator will act prudently to preserve all rights of the mineral owners, and to effectively and efficiently recovery the Unit area reserves. This Company will meet all economical offset obligations, act to prevent waste, conserve natural resources, and protect correlative rights.

6. Effective Date

This Plan of Operations shall be effective January 1, 1977, and extend through the calendar year unless otherwise amended.

If this Plan of Operation meets with your approval, please indicate in the space below and return one copy for our files.

Very truly yours,

ATLANTIC RICHFIELD COMPANY
OPERATOR

L. Troop for G.V.R.

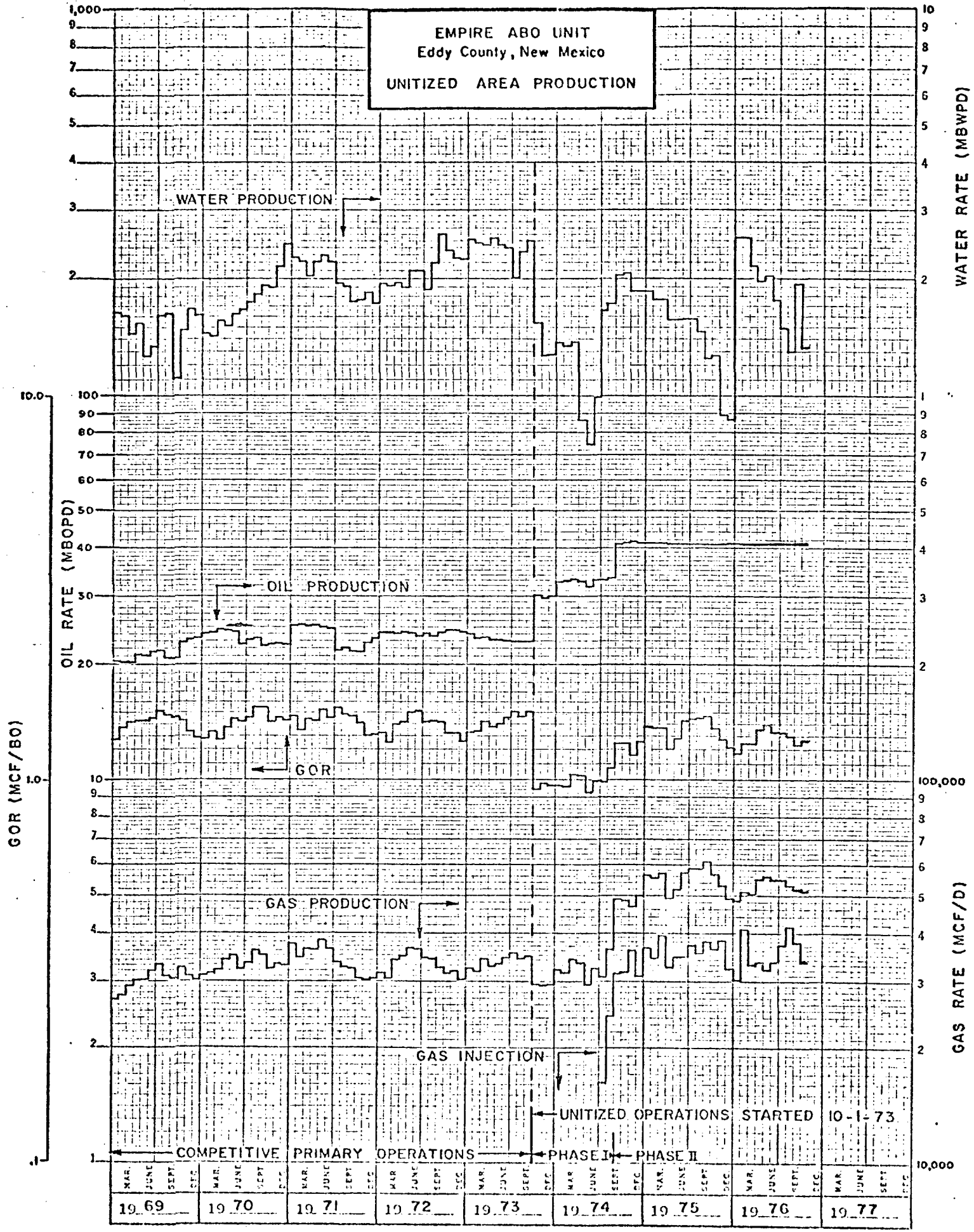
G. V. Ricks
District Production-Drilling
Superintendent

WWC/agp

APPROVED BY: _____ DATE: _____
Supervisor of United States
Geological Survey

APPROVED BY: _____ DATE: _____
Commissioner of Public Lands
State of New Mexico

APPROVED BY: _____ DATE: January 4, 1977
Secretary-Director
New Mexico Oil Conservation Commission


EMPIRE ABO UNIT
Eddy County, New Mexico
UNITIZED AREA PRODUCTION
WATER PRODUCTION
OIL PRODUCTION
GOR
GAS PRODUCTION
GAS INJECTION
WATER RATE (MBWPD)
OIL RATE (MBOPD)
GOR (MCF/BO)
GAS RATE (MCF/D)
COMPETITIVE PRIMARY OPERATIONS
UNITIZED OPERATIONS STARTED 10-1-73
PHASE I
PHASE II
MAR. JUNE SEPT. DEC.
1969
1970
1971
1972
1973
1974
1975
1976
1977

OIL CONSERVATION COMMISSION
P. O. BOX 2088
SANTA FE NEW MEXICO 87501

4952

January 6, 1976

Atlantic Richfield Company
P. O. Box 1610
Midland, Texas 79701

Attention: Mr. G. V. Ricks

Re: 1976 Plan of Operation
Empire Abo Unit
Eddy County, New Mexico

Gentlemen:

This is to advise that the New Mexico Oil Conservation Commission has this date approved the Plan of Operation for the calendar year 1976 for the Empire Abo Unit, Eddy County, New Mexico, subject to like approval by the United States Geological Survey and the Commissioner of Public Lands of the State of New Mexico.

Two approved copies of the plan are returned herewith.

Very truly yours,

JOE D. RAMEY
Secretary-Director

JDR/JEK/og

cc: U. S. Geological Survey - Roswell
Commissioner of Public Lands - Santa Fe

COPY

AtlanticRichfieldCompany
North American Producing Division
Permian District
Post Office Box 1610
Midland, Texas 79701
Telephone 915 682 8631

December 11, 1975

United States Department
of the Interior
Geological Survey
P. O. Drawer 1857
Roswell, New Mexico 88201

Attn: Mr. N. O. Frederick (6)
Area Oil and Gas Supervisor

State of New Mexico
Mr. Phil R. Lucero
Commissioner of Public Lands
P. O. Box 1148
Santa Fe, New Mexico 87501

Attn: Mr. Ray D. Graham, Director (3)
Oil and Gas Department

State of New Mexico
Oil Conservation Commission
P. O. Box 2088
Santa Fe, New Mexico 87501

Attn: Mr. Joe D. Ramey (3)
Secretary-Director

Working Interest Owners
Empire Abo Unit

Re: Plan of Operation for 1976
Empire Abo Unit
Eddy County, New Mexico

Gentlemen:

In compliance with Section 11 of the Unit Agreement, Empire Abo Unit, Eddy County, New Mexico, Atlantic Richfield Company, as Unit Operator, on behalf of itself and the other participating working interest owners, hereby submits for your approval a Plan of Operation to cover the period beginning January 1,1976,

and extending through the remainder of calendar year 1976.

Very truly yours,

ATLANTIC RICHFIELD COMPANY
OPERATOR

G. V. Ricks
District Production - Drilling
Superintendent

GVR/SHC:agp

Attachments

PLAN OF OPERATION FOR 1976
EMPIRE ABO UNIT

Submitted: December 11, 1975

1. Project Area

History and Background

The Empire Abo Unit area consists of some 11,339.15 acres in Eddy County, New Mexico. The area is located in portions of Sections 34, 35, 36, Township 17 South, Range 27 East; Sections 1, 2, 3, 4, 8, 9, 10, 11, 12, 15, 16, 17, Township 18 South, Range 27 East; Sections 25, 26, 27, 28, 31, 32, 33, 34, 35, 36, Township 17 South, Range 28 East; Sections 4, 5, 6, Township 18 South, Range 28 East; Sections 29, 30, Township 17 South, Range 29 East. Within the Unit area, the following tracts did not qualify for participation as of the effective date of the Unit (October 1, 1973): 2, 6, 28, 41, 42, 46, 55, 56, 69, 79, 84, 91. These non-participating tracts totaled 644.74 acres. The remaining 10,694.41 acres were initially developed as the project area for pressure maintenance by the injection of plant residue gas from Abo production back into the unitized Abo formation. The Unit, on September 1, 1975, expanded the Project Area by inclusion of tracts 41, 79, and 84 (total 120.03 acres). Tracts 2, 6, 42, and 46 (total 241.05 acres) have been formed into the CITGO Empire Abo Unit, which received N. M. O. C. C. approval in June 1974, and began gas injection in mid-1975. The original proposed Unit Area is now disposed as follows:

	Acres
ARCO Empire Abo Unit:	10,814.44
CITGO Empire Abo Unit:	241.05
Non-participating tracts:	283.66
	11,339.15

2. Current Production, Future Recovery

In September 1973, just before Unitization, the pool had 235 producing wells averaging 24,734 BOPD with 9.3% water production and a gas-oil ratio of 1543 cubic feet/BO. The pool total production was equivalent to 67,120 RSVB/D net voidage. The

Project Area, in September 1973, had 222 producing wells averaging 23,252 BOPD with 9.8% water production and a gas-oil ratio of 1505 cubic feet/BO. The project area production was equivalent to 61,808 RSVB/D net voidage. In October 1975, the Unitized Project Area averaged 41,041 BOPD with 3.1% water production and a gas-oil ratio of 1377 cubic feet/BO. Gas injection averaged 36,819 MCF per day. The project area production for October 1975, was equivalent to 37,568 RSVB/D net voidage. Unit operations have thus increased the project area oil production by 17,789 BOPD and reduced reservoir voidage by 24,240 RSVB/D. Unitized residue gas injection for pressure maintenance is calculated to increase future recovery by about 30 MMBO compared to continued primary operations.

3. Basic Concepts Governing Future Unit Operations

a) Field production history and reservoir numeric model studies have demonstrated that reservoir recovery is governed by a gravity drainage mechanism with an expanding secondary gas cap. Under unitized operations, Atlantic Richfield Company, as operator, will be able to maximize the beneficial effects of this most efficient recovery mechanism by careful observation of well performance and shutting in or curtailing production from inefficient wells. As of December 1975, the Project Area had 103 former producing wells shut in or restricted due to high gas-oil ratio, used for injectors or being otherwise inefficient producers.

b) Injection of gas will act toward pressure maintenance and the orderly control of expansion of the secondary gas cap.

4. Operating Plans, Progress

a) Gas Injection Facilities

At present, the Unit is injecting gas into the Abo Gas Cap in the following ten wells:

Previous Operator/ Lease and Well	Unit Well Designation	Location
Exxon/Chalk Bluff Draw Unit "A" No. 4	M-6	NE/4 NW/4 Sec. 9-T18S-R27E
Amoco/Windfohr Federal No. 4	K-7	NW/4 SE/4 Sec. 4-T18S-R27E
Amoco/MALCO "H" Federal No. 9	I-10	NE/4 NW/4 Sec. 3-T18S-R27E
Amoco/State "BM" No. 1	G-22	NE/4 SW/4 Sec. 31-T17S-R28E
Amoco/State "BV" No. 1	F-25	SW/4 NW/4 Sec. 32-T17S-R28E
ARCo/M. Yates B (ARC) No. 8	F-31	SW/4 NE/4 Sec. 33-T17S-R28E
Hondo/State "A" No. 21	C-38	NE/4 SW/4 Sec. 26-T17S-R28E
Hondo/State "A" No. 35	F-27	SW/4 NE/4 Sec. 32-T17S-R28E
Hondo/State "A" No. 16	D-37	SW/4 SW/4 Sec. 26-T17S-R28E
Gulf/NCT "C" No. 1	H-19	SW/4 SE/4 Sec. 36-T17S-R27E

Beginning in July 1974, and continuing through the latest month on which data is available (October 1975), all available plant residue gas has been injected into the Abo gas cap. The Unit picks up plant residue gas at about 700 psi and compresses it to 1900 psi for injection. The gas contains hydrogen sulfide and superdehydration facilities are installed to minimize possible corrosion. A rigorous corrosion checking program is maintained. Permits for the Gas Injection Facilities have been granted by the State of New Mexico, Environmental Improvement Agency. Atlantic Richfield Company believes the injection facilities meet the requirements of the United States Geological Survey and the State of New Mexico. In addition, the Injection Facilities provide enough operational flexibility to meet changing field conditions.

b) Oil Production and Test Facilities

Since September 1, 1974, injection of all available residue gas within the project area has earned an allowable of 41,041 BOPD or an increase of 17,789 BOPD over primary operations. In order to effectively and efficiently handle this increased production, work is in progress on enlarging and centralizing oil production and test facilities. Design criteria for these facilities were outlined in the Plan of Operation for 1974. These have continued to be the guide during final design and construction.

Prior to Unit operations there were approximately fifty (50) batteries within the project area. The design plan which evolved is composed of 14 strategically located production and test station facilities. Exhibit 1, attached to the Plan of Operation for 1974, shows the location of each of the fourteen (14) sites and the wells going into each battery, along with location of gas injection wells, residue gas injection lines, and gas plant locations. Fourteen (14) separate battery and test facility locations will provide enough operational flexibility to hold lost production at an absolute minimum, as a result of equipment failure or a shut-down due to fire or other catastrophe. The ten largest of the new batteries have been completed. They are handling all of the Unit production and serve all producing wells with automatic testing facilities. The remaining four batteries will not be put into service until the need arises.

c) Workovers

A continuous workover study is in progress, so that whenever well production data and reservoir conditions so indicate, workovers are performed to lower gas-oil or water-oil ratios, and maximize producing well efficiency. Seven workovers of this type have been performed in 1975 to date.

d) Continuing Field Study

In order to maximize future reserves, Atlantic Richfield Company, as Unit Operator, will continue to maintain a comprehensive production and bottom hole testing program in conjunction with numeric model tests for field performance and predictions.

e) New Producing Well Program

We are moving ahead with the program to drill new producing wells in the most favorable part of the Abo Reef section to gain efficient, low gas-oil ratio production.

Listed below are the new wells completed through November with their allowable oil rate and gas-oil ratio.

Unit Well Designation	Allowable Oil Rate (BOPD)	Gas-Oil Ratio (Cu. ft./BO)
E-371	400	748
E-381	350	581
F-331	450	407
F-351	350	433
G-311	400	480
H-261	50	675
H-271	349	442
H-291	190	395
I-231	400	865
J-191	300	605
J-201	278	618
J-211	400	592
J-231	300	608
K-181	200	639
L-141	300	802
L-151	400	393
M-121	350	853

f) New Program of Improved Pressure Maintenance

Engineering studies indicate that ultimate oil recovery from the Abo formation can be increased by augmenting the present injection of Abo plant residue gas with additional injection gas from non-Abo sources. As much as 25 MMCF per day of non-Abo gas may be available for injection. The supplier requires the option to take back this non-Abo gas at the same rate it was furnished, for a maximum of 30 days out of any 180-day period. After Unit gas injection is halted, 60% of the Unit share of produced residue gas will be returned to the non-Abo gas supplier until that supplier has recovered 88% of the original BTUs supplied.

Undertaking this project will require the Unit working interest owners to invest considerable money expanding injection compressors, increasing injection line capacity and converting five additional wells to gas injection.

Following are the five wells proposed for conversion to gas injection (see map attached to, "Revised Plan of Operation for November 1 through December 31, 1975," submitted October 22, 1975).

Unit Well Designation	Location
C-39	NW/4 SE/4 Sec. 26-T17S-R28E
D-35	SW/4 SE/4 Sec. 27-T17S-R28E
G-24	NE/4 SE/4 Sec. 31-T17S-R28E
H-21	SW/4 SW/4 Sec. 31-T17S-R28E
I-18	NE/4 NW/4 Sec. 1-T18S-R27E

5. Modifications

It is understood that to meet changing conditions, this plan of operation may be modified from time to time, with the approval of the Supervisor, the Commissioner of Plublic Lands of the State of New Mexico, and the New Mexico Oil Conservation Commission.

Atlantic Richfield Company, as Unit Operator will act prudently to preserve all rights of the mineral owners, and to effectively and efficiently recover the Unit area reserves. This Company will meet all economical offset obligations, act to prevent waste, conserve natural resources, and protect correlative rights.

6. Effective Date

This Plan of Operations shall be effective January 1, 1976, and extend through the calendar year unless otherwise amended.

If this Plan of Operation meets with your approval, please indicate in the space below and return one copy for our files.

Very truly yours,

ATLANTIC RICHFIELD COMPANY
OPERATOR

G. V. Ricks
District Production - Drilling
Superintendent

GVR/SHC:agp

APPROVED BY: _____ DATE: _____
Supervisor of United States
Geological Survey

APPROVED BY: _____ DATE: _____
Commissioner of Public Lands
State of New Mexico

APPROVED BY: _____ DATE: Jan 6, 1976
Secretary-Director
New Mexico Oil Conservation Commission

OIL CONSERVATION COMMISSION
P. O. BOX 2088
SANTA FE, NEW MEXICO 87501

November 7, 1975

Atlantic Richfield Company
P. O. Box 1610
Midland, Texas 79701

Attention: Mr. G. V. Ricks

Re: Revised Plan of Operation
November 1 through December 31,
1975, Empire Abo Unit, Eddy
County, New Mexico.

Gentlemen:

This is to advise that the New Mexico Oil Conservation Commission has this date approved the Revised Plan of Operation, dated October 22, 1975, for the period November 1 through December 31, 1975 for the Empire Abo Unit, Eddy County, New Mexico, subject to like approval by the United States Geological Survey and the Commissioner of Public Lands of the State of New Mexico.

Two approved copies of the application are returned herewith.

Very truly yours,

JOE D. RAMEY
Secretary-Director

JDR/JEK/og

cc: United States Geological Survey
Roswell, New Mexico

Commissioner of Public Lands
Santa Fe, New Mexico

AtlanticRichfieldCompany
North American Producing Division
Permian District
Post Office Box 1610
Midland, Texas 79701
Telephone 915 682 8631

October 22, 1975

United States Department
of the Interior
Geological Survey
P. O. Drawer 1857
Roswell, New Mexico 88201

Attn: Mr. N. O. Frederick (6)
Area Oil and Gas Supervisor

State of New Mexico
Mr. Phil R. Lucero
Commissioner of Public Lands
P. O. Box 1148
Santa Fe, New Mexico 87501

Attn: Mr. Ray D. Graham, Director (3)
Oil and Gas Department

State of New Mexico
Oil Conservation Commission
P. O. Box 2088
Santa Fe, New Mexico 87501

Attn: Mr. Joe D. Ramey (3)
Secretary-Director

Working Interest Owners
Empire Abo Unit

Re: Revised Plan of Operation for
November 1 through December 31, 1975
Empire Abo Unit
Eddy County, New Mexico

Gentlemen:

In compliance with Section 11 of the Unit Agreement, Empire Abo Unit, Eddy County, New Mexico, Atlantic Richfield Company, as Unit Operator, on behalf of itself and the other participating working interest owners, hereby submits for your approval a Revised Plan of Operation to cover the period beginning

November 1, 1975, and extending through the remainder of calendar year 1975.

Principal reason for the requested revision is the proposed Improved Pressure Maintenance Program for injection of additional gas as discussed in paragraph 4.f) of the attached Revised Plan.

Very truly yours,

ATLANTIC RICHFIELD COMPANY
OPERATOR

G. V. Ricks
District Production - Drilling
Superintendent

GVR/SHC/hr

Attachments

REVISED PLAN OF OPERATION FOR
NOVEMBER 1 THROUGH DECEMBER 31, 1975
EMPIRE ABO UNIT

Submitted: October 22, 1975

1. Project Area

History and Background

The Empire Abo Unit area consists of some 11,339.15 acres in Eddy County, New Mexico. The area is located in portions of Sections 34, 35, 36, Township 17 South, Range 27, East; Sections 1, 2, 3, 4, 8, 9, 10, 11, 12, 15, 16, 17, Township 18 South, Range 27 East; Sections 25, 26, 27, 28, 31, 32, 33, 34, 35, 36, Township 17 South, Range 28 East; Sections 4, 5, 6, Township 18 South, Range 28 East; Sections 29, 30, Township 17 South Range 29 East. Within the Unit area, the following tracts did not qualify for participation as of the effective date of the Unit (October 1, 1973): 2, 6, 28, 41, 42, 46, 55, 56, 69, 79, 84, 91. These non-participating tracts total 644.74 acres. The remaining 10,694.41 acres are being developed as the project area for pressure maintenance by the injection of plant residue gas from Abo production back into the unitized Abo formation. The Unit, on September 1, 1975, expanded the Project Area by inclusion of tracts 41, 79, and 84. Tracts 2, 6, 42, and 46 have been formed into the CITGO Empire Abo Unit, which received N. M. O. C. C. approval in June 1974, and recently began gas injection.

2. Current Production, Future Recovery

In September 1973, just before Unitization, the pool had 235 producing wells averaging 24,734 BOPD with 9.3% water production and a gas-oil ratio of 1543 cubic feet/BO. The pool total production was equivalent to 67,120 RSVB/D net voidage. The Project Area, in September 1973, had 222 producing wells averaging 23,252 BOPD with 9.8% water production and a gas-oil ratio of 1505 cubic feet/BO. The project area production was equivalent to 61,808 RSVB/D net voidage. In June 1975, the Unitized Project Area averaged 40,559 BOPD with 3.8% water production and a gas-oil ratio of 1205 cubic feet/BO. Gas injection

averaged 34,377 MCF per day. The project area production for June 1975, was equivalent to 30,531 RSVB/D net voidage. Unit operations have thus increased the project area oil production by 17,307 BOPD and reduced reservoir voidage by 31,277 RSVB/D. Unitized residue gas injection for pressure maintenance is calculated to increase future recovery by about 30 MMBO compared to continued primary operations.

3. Basic Concepts Governing Future Unit Operations

a) Field production history and reservoir numeric model studies have demonstrated that reservoir recovery is governed by a gravity drainage mechanism with an expanding secondary gas cap. Under unitized operations, Atlantic Richfield Company, as operator, will be able to maximize the beneficial effects of this most efficient recovery mechanism by careful observation of well performance and shutting in or curtailing production from inefficient wells. As of June 1975, the Project Area had 62 former producing wells shut in due to high gas-oil ratio, used for injectors or being otherwise inefficient producers. In addition, 22 other inefficient wells were restricted to very low producing rates.

b) Injection of gas will act toward pressure maintenance and the orderly control of expansion of the secondary gas cap.

4. Operating Plans, Progress

a) Gas Injection Facilities

At present, the Unit is injecting gas into the Abo Gas Cap in the following eight wells:

Previous Operator/ Lease and Well	Unit Well Designation	Location
Exxon/Chalk Bluff Draw Unit "A" No. 4	M-6	NE/4 NW/4 Sec. 9-T18S-R27E
Amoco/Windfohr Federal No. 4	K-7	NW/4 SE/4 Sec. 4-T18S-R27E
Amoco/MALCO "H" Federal No. 9	I-10	NE/4 NW/4 Sec. 3-T18S-R27E
M. Yates, III Dooley ABO State No. 2	G-19	NW/4 SE/4 Sec. 36-T17S-R27E
Amoco/State "BM" No. 1	G-22	NE/4 SW/4 Sec. 31-T17S-R28E
Amoco/State "BV" No. 1	F-25	SW/4 NW/4 Sec. 32-T17S-R28E
ARCo/M. Yates B (ARC) No. 8	F-31	SW/4 NE/4 Sec. 33-T17S-R28E
Hondo/State "A" No. 21	C-38	NE/4 SW/4 Sec. 26-T17S-R28E

Three additional wells have been approved by the New Mexico Oil Conservation Commission for conversion to gas injection. All three of these wells (Unit F-27, Unit D-37, and Unit H-19) are now injecting gas. The object of these added injection wells is to achieve a better balance of injected gas throughout the gas cap. Construction of gas injection facilities and preparation of injection wells was completed in time to begin injecting gas in June 1974. Beginning in July and continuing through the latest month on which data is available (July 1975), all available plant residue gas has been injected into the Abo gas cap. The Unit picks up plant residue gas at about 700 psi and compresses it to 1900 psi for injection. The gas contains hydrogen sulfide and superdehydration facilities are installed to minimize possible corrosion. A rigorous corrosion checking program

will be maintained. Permits for the Gas Injection Facilities have been granted by the State of New Mexico, Environmental Improvement Agency. Atlantic Richfield Company believes the injection facilities meet the requirements of the United States Geological Survey and the State of New Mexico. In addition, the Injection Facilities provide enough operational flexibility to meet changing field conditions.

b) Oil Production and Test Facilities

Since September 1, 1974, injection of all available residue gas within the project area has earned an allowable of 41,041 BOPD or an increase of 17,789 BOPD over primary operations. In order to effectively and efficiently handle this increased production, work is in progress on enlarging and centralizing oil production and testing facilities. Design criteria for these facilities were outlined in the Plan of Operation for 1974. These have continued to be the guide during final design and construction.

Prior to Unit operations there were approximately fifty (50) batteries within the project area. The design plan which evolved is composed of 14 strategically located production and test station facilities. Exhibit 1, attached to the Plan of Operation for 1974, shows the location of each of the fourteen (14) sites and the wells going into each battery, along with location of gas injection wells, residue gas injection lines, and gas plant locations. Fourteen (14) separate battery and test facility locations will provide enough operational flexibility to hold lost production at an absolute minimum, as a result of equipment failure or a shut-down due to fire or other catastrophe. The nine largest of the new batteries have been completed. They are handling 91% of the Unit production and serve 83% of the producing wells with automatic testing facilities. Wells which will be served by the remaining five batteries continue to produce through their present facilities, while equipment installation goes on. Completion of all oil production and test facilities is now scheduled for the last quarter of 1975.

c) Workovers

A continuous workover study is in progress, so that whenever well production data and reservoir conditions so indicate, workovers are performed to lower gas-oil or water-oil ratios, and maximize producing well efficiency. Three workovers of this type have been performed in 1975 to date.

d) Continuing Field Study

In order to maximize future reserves, Atlantic Richfield Company, as Unit Operator, will continue to maintain a comprehensive production and bottom hole testing program in conjunction with numeric model tests for field performance and predictions.

e) New Producing Well Program

We are moving ahead with the program to drill new producing wells in the most favorable part of the Abo Reef section to gain efficient, low gas-oil ratio production.

Listed below are the new wells completed through September with their allowable oil rate and gas-oil ratio.

Unit Well Designation	Allowable Oil Rate (BOPD)	Gas-Oil Ratio (Cu. ft./BO)
E-371	250	748
E-381	350	581
F-331	450	776
G-311	300	480
H-261	300	675
H-271	300	442
H-291	190	395
J-191	300	605
J-201	250	618
J-211	450	866
L-141	300	802

Locations for the remaining wells have been approved by the N.M.O.C.C. and the wells are in various stages of drilling or completion at the present time. Based on results of this program, further drilling will be considered in the future.

f) New Program of Improved Pressure Maintenance

Engineering studies indicate that ultimate oil recovery from the Abo formation can be increased by augmenting the present injection of Abo plant residue gas with additional injection gas from non-Abo sources. As much as 25 MMCF per day of non-Abo gas may be available for injection. The supplier requires the option to take back this non-Abo gas at the same rate it was furnished, for a maximum of 30 days out of any 180-day period. After Unit gas injection is halted, 60% of the Unit share of produced residue gas will be returned to the non-Abo gas supplier until that supplier has recovered 88% of the original BTUs supplied.

Undertaking this project will require the Unit working interest owners to invest considerable money expanding injection compressors, increasing injection line capacity and converting five additional wells to gas injection.

Following are the five wells proposed for conversion to gas injection (see map attached):

Unit Well Designation	Location
C-39	NW/4 SE/4 Sec. 26-T17S-R28E
D-35	SW/4 SE/4 Sec. 27-T17S-R28E
G-24	NE/4 SE/4 Sec. 31-T17S-R28E
H-21	SW/4 SW/4 Sec. 31-T17S-R28E
I-18	NE/4 NW/4 Sec. 1-T18S-R27E

5. Modifications

It is understood that to meet changing conditions, this plan of operation may be modified from time to time, with the approval of the Supervisor, the Commissioner of Public Lands of the State of New Mexico, and the New Mexico Oil Conservation Commission.

Atlantic Richfield Company, as Unit Operator will act

prudently to preserve all rights of the mineral owners, and to effectively and efficiently recover the Unit area reserves. This Company will meet all economical offset obligations, act to prevent waste, conserve natural resources, and protect correlative rights.

6. Effective Date

This Plan of Operations shall be effective November 1, 1975, and extend through the calendar year unless otherwise amended.

If this plan of Operation meets with your approval, please indicate in the space below and return one copy for our files.

Very truly yours,

ATLANTIC RICHFIELD COMPANY
OPERATOR

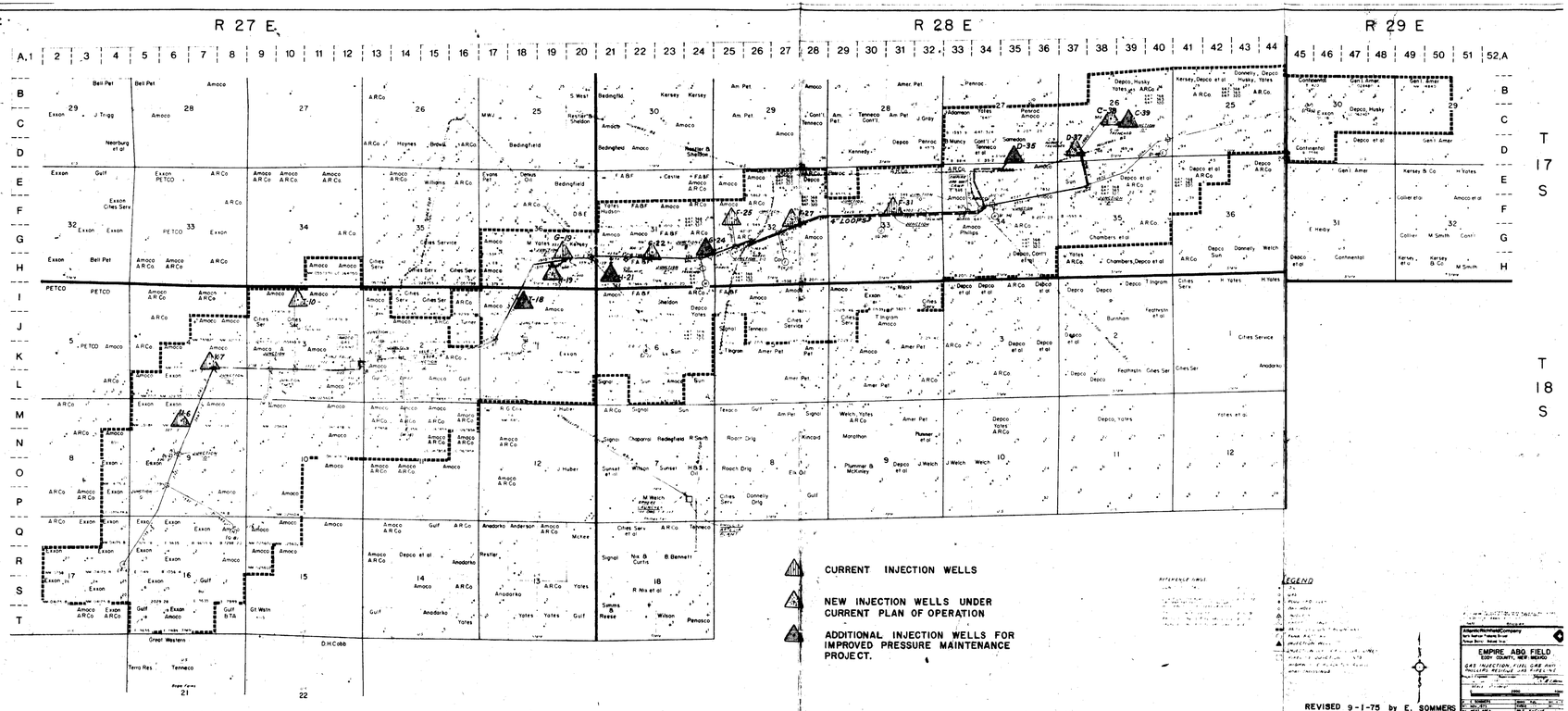
G. V. Ricks
District Production - Drilling
Superintendent

GVR/SHC/hr

APPROVED BY: _____ DATE: _____
Supervisor of Unites States
Geological Survey

APPROVED BY: _____ DATE: _____
Commissioner of Public Lands
State of New Mexico

APPROVED BY: _____ DATE: Nov 7, 1975 -
Secretary-Director
New Mexico Oil Conservation
Commission


R 27 E
R 28 E
R 29 E
T 17 S
T 18 S
CURRENT INJECTION WELLS
NEW INJECTION WELLS UNDER CURRENT PLAN OF OPERATION
ADDITIONAL INJECTION WELLS FOR IMPROVED PRESSURE MAINTENANCE PROJECT.
LEGEND
REVISED 9-1-75 by E. SOMMERS
Atlantic Richfield Company
EMPIRE ABO FIELD
EDDY COUNTY, NEW MEXICO
GAS INJECTION, FUEL GAS AND PRODUCER PRESSURE MAINTENANCE

AtlanticRichfieldCompany

North American Producing Division
Permian District
Post Office Box 1610
Midland, Texas 79701
Telephone 915 682 8631

C. H. McClure
District Land Manager

RECEIVED
OCT 3 - 1975
OIL CONSERVATION COMM.
Santa Fe

September 30, 1975

4952

Area Oil & Gas Supervisor
United States Geological Survey
P. O. Drawer 1857
Roswell, New Mexico 88201

Commissioner of Public Lands
State of New Mexico
Attention: Mr. Ray D. Graham
District Oil & Gas Department
P. O. Box 1148
Santa Fe, New Mexico 87501

New Mexico Oil Conservation Commission
Box 2088
Santa Fe, New Mexico 87501

Subject: Empire Abo Unit
Eddy County, New Mexico
Proposed Projected Enlargement
and Increased Allowable
Commitment of Tracts 41, 79 & 84

We furnish each of you herewith photostatic copy of original recorded Amended Certificate of Effectiveness executed September 16, 1975 by Atlantic Richfield Company as operator, effective September 1, 1975.

All Working Interest Joinders under tracts 41, 79 and 84 were recorded in Eddy County, New Mexico on September 19, 1975.

Very truly yours,

WM. L. EMBRY
LAND DEPARTMENT

WLE:bk

Enclosure

RECEIVED
OCT 3 - 1975
OIL CONSERVATION COMM.
Santa Fe

AMENDED CERTIFICATE OF EFFECTIVENESS
EMPIRE ABO UNIT
(Tracts 41, 79 and 84)
EDDY COUNTY, NEW MEXICO

WHEREAS, that certain Unit Agreement, Empire Abo Unit, Eddy County, New Mexico, dated October 1, 1972, recorded in Book 108, Page 235, of the Miscellaneous Records of Eddy County, New Mexico, became effective October 1, 1973, except as to certain Tracts in the Unit Area which failed to qualify for lack of execution by sufficient Working Interest Owners, among which excluded Tracts were the following:

Tract 41: NE/4 NE/4, Sec. 4, T-18-S, R-28-E, NMPM;

Tract 79: SE/4 SW/4, Sec. 27, T-17-S, R-28-E, NMPM;

Tract 84: SE/4 NW/4, Sec. 5, T-18-S, R-28-E, NMPM; and

WHEREAS, Section 32 of said Unit Agreement provides that from and after the Effective Date the right of subsequent joinder shall be subject to such requirements and on such basis as may be agreed upon by Working Interest Owners owning not less than 65% of the Unit Participation then in effect, and approved by the Commissioner of Public Lands of the State of New Mexico and the Supervisor, United States Geological Survey; such subsequent joinder by a proposed Working Interest Owner must be evidenced by the execution or ratification of the Unit Agreement and Unit Operating Agreement and approved by the Land Commissioner and Supervisor where State and Federal land is involved; and further that subsequent joinder shall be effective as of the first day of the month following the filing with the Land Commissioner and the Supervisor of duly executed counterparts of all documents necessary to establish effective commitment of any Tract to the Agreement; and

WHEREAS, prior to September 1, 1975, the Working Interest Owners of more than 65% of the Unit Participation then in effect approved the joinder and inclusion of Tracts Nos. 41, 79 and 84 on the same basis of participation as provided in the original Unit Agreement, and also prior to September 1, 1975, sufficient owners of Working Interest and the holder of record title to each State lease involved ratified the Unit Agreement and Unit Operating Agreement to qualify Tracts Nos. 41, 79 and 84 for inclusion in the Unit Area, and all documents necessary to establish effective commitment of such Tracts were filed with the Land Commissioner and Supervisor; and

WHEREAS, the commitment of Tracts Nos. 41, 79 and 84 was approved by the Land Commissioner on August 20, 1975, by the New Mexico Oil Conservation Commission on July 1, 1975 (Order No. R-4549-C), and by the Area Oil and Gas Supervisor, United States Geological Survey on August 21, 1975.

NOW, THEREFORE, KNOW ALL MEN BY THESE PRESENTS: That ATLANTIC RICHFIELD COMPANY, the Unit Operator of the Empire Abo Unit, does hereby certify and declare that all requirements of Section 32 of the Unit Agreement, Empire Abo Unit, for the subsequent joinder of Tracts Nos. 41, 79 and 84 have been met

and satisfied and that such Tracts were committed to the Unit Agreement effective September 1, 1975.

IN WITNESS WHEREOF, Atlantic Richfield Company has executed this Certificate on this 16th day of September, 1975.

ATTEST:

Assistant Secretary

ATLANTIC RICHFIELD COMPANY

By J. L. Wilson
J. L. Wilson
Vice President

STATE OF TEXAS)

COUNTY OF DALLAS)

The foregoing instrument was acknowledged before me this 16th day of September, 1975, by J. L. WILSON, Vice President of ATLANTIC RICHFIELD COMPANY, a Pennsylvania corporation, on behalf of said corporation.

My commission expires:
July 23, 1977

Billie F. Newsome
Notary Public in and for
Dallas County, Texas BILLIE F. NEWSOME

STATE OF NEW MEXICO, County of Eddy, ss: I hereby certify that this instrument was filed for record on the 19 day of Sept 1975 at 10:45 o'clock A.M and duly recorded in book 130, page 470 of the Records of Miscellaneous
Mildred Branch, County Clerk
By Helen G. DeLinda Deputy

OIL CONSERVATION COMMISSION
P. O. BOX 2088
SANTA FE NEW MEXICO 87501

January 8, 1975

4952

Atlantic Richfield Company
P. O. Box 1610
Midland, Texas 79701

Attention: Mr. P. E. Fletcher

Re: 1975 Plan of Operations
Empire Abo Unit, Eddy
County, New Mexico

COPY

Gentlemen:

This is to advise that the New Mexico Oil Conservation Commission has this date approved the Plan of Operations for the calendar year 1975 for the Empire Abo Unit, Eddy County, New Mexico, subject to like approval by the United States Geological Survey and the Commissioner of Public Lands of the State of New Mexico, subject to like approval by the United States Geological Survey and the Commissioner of Public Lands of the State of New Mexico.

Two approved copies of the plan are returned herewith.

Very truly yours,

A. L. PORTER, Jr.
Secretary-Director

ALP/JEK/og

cc: Commissioner of Public Lands
Santa Fe, New Mexico

United States Geological Survey
Roswell, New Mexico

AtlanticRichfieldCompany
North American Producing Division
Permian District
Post Office Box 1610
Midland, Texas 79701
Telephone 915 682 8631

December 20, 1974

United States Department
of the Interior
Geological Survey
P. O. Drawer 1857
Roswell, New Mexico 88201

Attn: Mr. N. O. Frederick (6)
Area Oil and Gas Supervisor

State of New Mexico
Mr. Alex J. Armijo
Commissioner of Public Lands
P. O. Box 1148
Santa Fe, New Mexico 87501

Attn: Mr. Ray D. Graham, Director (3)
Oil and Gas Department

State of New Mexico
Oil Conservation Commission
P. O. Box 2088
Santa Fe, New Mexico 87501

Attn: Mr. A. L. Porter, Jr. (3)
Secretary-Director

Working Interest Owners
Empire Abo Unit
(See attached list)

Re: Plan of Operation for 1975
Empire Abo Unit
Eddy County, New Mexico

Gentlemen:

In compliance with Section 11 of the Unit Agreement, Empire Abo Unit, Eddy County, New Mexico, Atlantic Richfield Company, as Unit Operator, on behalf of itself and the other participating working interest owners, hereby submits for your approval a Plan of

Operation to cover the period beginning January 1, 1975, and extending through the remainder of calendar year 1975.

Very truly yours,

ATLANTIC RICHFIELD COMPANY
OPERATOR

P. E. Fletcher
Operations Manager

PEF/SHC/agp

PLAN OF OPERATION FOR 1975
EMPIRE ABO UNIT

Submitted: December 20, 1974

1. Project Area

History and Background

The Empire Abo Unit area consists of some 11,339.15 acres in Eddy County, New Mexico. The area is located in portions of Sections 34, 35, 36, Township 17 South, Range 27 East; Sections 1, 2, 3, 4, 8, 9, 10, 11, 12, 15, 16, 17, Township 18 South, Range 27 East; Sections 25, 26, 27, 28, 31, 32, 33, 34, 35, 36, Township 17 South, Range 28 East; Sections 4, 5, 6, Township 18 South, Range 28 East; Sections 29, 30, Township 17 South, Range 29 East. Within the Unit area, the following tracts did not qualify for participation as of the effective date of the Unit (October 1, 1973): 2, 6, 28, 41, 42, 46, 55, 56, 69, 79, 84, 91. These non-participating tracts total 644.74 acres. The remaining 10,694.41 acres are being developed as the project area for pressure maintenance by the injection of plant residue gas from Abo production back into the unitized Abo formation.

Tracts 2, 6, 42, and 46 have been formed into the CITGO Empire Abo Unit, which received N. M. O. C. C. approval in June 1974, but is not yet in effect.

2. Current Production, Future Recovery

In September 1973, just before Unitization, the pool had 235 producing wells averaging 24,734 BOPD with 9.3% water production and a gas-oil ratio of 1543 cubic feet/BO. The pool total production was equivalent to 67,120 RSVB/D net voidage. The Project Area, in September 1973, had 222 producing wells averaging 23,252 BOPD with 9.8% water production and a gas-oil ratio of 1505 cubic feet/BO. The project area production was equivalent to 61,808 RSVB/D net voidage. In October 1974, the Unitized Project Area

averaged 40,533 BOPD with 4.8% water production and a gas-oil ratio of 1211 cubic feet/BO. Gas injection averaged 31,811 MCF per day. The project area production for October 1974, was equivalent to 32,564 RSVB/D net voidage. Unit operations have thus increased the project area oil production by 17,281 BOPD and reduced reservoir voidage by 29,244 RSVB/D. Unitized residue gas injection for pressure maintenance is calculated to increase future recovery by about 30 MMBO compared to continued primary operations.

3. Basic Concepts Governing Future Unit Operations

a) Field production history and reservoir numeric model studies have demonstrated that reservoir recovery is governed by a gravity drainage mechanism with an expanding secondary gas cap. Under unitized operations, Atlantic Richfield Company, as operator, will be able to maximize the beneficial effects of this most efficient recovery mechanism by careful observation of well performance and shutting in or curtailing production from inefficient wells. As of October 1974, the Project Area had 62 former producing wells shut in due to high gas-oil ratio, used for injectors or being otherwise inefficient producers.

b) Injection of plant residue gas will act toward pressure maintenance and the orderly control of expansion of the secondary gas cap.

4. Operating Plans, Progress

a) Gas Injection Facilities

At present, the Unit is injecting gas into the Abo Gas Cap in the following eight wells:

Previous Operator/ Lease and Well	Unit Well Designation	Location
Exxon/Chalk Bluff Draw Unit "A" No. 4	M-6	NE/4 NW/4 Sec. 9-T18S-R27E
Amoco/Windfohr Federal No. 4	K-7	NW/4 SE/4 Sec. 4-T18S-R27E
Amoco/MALCO "H" Federal No. 9	I-10	NE/4 NW/4 Sec. 3-T18S-R-27E
M. Yates, III/Dooley ABO State No. 2	G-19	NW/4 SE/4 Sec. 36-T17S-R27E
Amoco/State "BM" No. 1	G-22	NE/4 SW/4 Sec. 31-T17S-R28E
Amoco/State "BV" No. 1	F-25	SW/4 NW/4 Sec. 32-T17S-R28E
ARCo/M. Yates B (ARC) No. 8	F-31	SW/4 NE/4 Sec. 33-T17S-R28E
Hondo/State "A" No. 21	C-38	NE/4 SW/4 Sec. 26-T17S-R28E

One additional well, the former Hondo/State "A" No. 35 (Unit designation F-27) has been approved by the New Mexico Oil Conservation Commission for conversion to gas injection. Present plans are to make the actual conversion when the well is needed.

Construction of gas injection facilities and preparation of injection wells was completed in time to begin injecting gas in June 1974. Beginning in July and continuing through the latest month on which data is available (October 1974), all available plant residue gas has been injected into the Abo gas cap. The Unit picks up plant residue gas at about 700 psi and compresses it to 1900 psi for injection. The gas contains hydrogen sulfide and superdehydration facilities are installed to minimize possible corrosion. A rigorous corrosion checking program will be maintained. Permits for the Gas Injection Facilities have been granted by the State of New Mexico, Environmental Improvement Agency. Atlantic

Richfield Company believes the injection facilities meet the requirements of the United States Geological Survey and the State of New Mexico. In addition, the Injection Facilities provide enough operational flexibility to meet changing field conditons.

b) Oil Production and Test Facilities

Since September 1, 1974, injection of all available residue gas within the project area has earned an allowable of 40,555 BOPD or an increase of 17,303 BOPD over primary operations. In order to effectively and efficiently handle this increased production, work is in progress on enlarging and centralizing oil production and testing facilities. Design criteria for these facilities were outlined in the previous Plan of Operation for 1974. These have continued to be the guide during final design and construction.

Prior to Unit operations there were approximately fifty (50) batteries within the project area. The design plan which evolved is composed of 14 strategically located production and test station facilities. Exhibit 1, attached to the Plan of Operation for 1974, shows the location of each of the fourteen (14) sites and the wells going into each battery, along with location of gas injection wells, residue gas injection lines, and gas plant locations. Fourteen (14) separate battery and test facility locations will provide enough operational flexibility to hold lost production at an absolute minimum, as a result of equipment failure or a shut-down due to fire or other catastrophe. The four largest of the new batteries have been completed. They are handling 48% of the Unit production and serve 44% of the producing wells with automatic testing facilities. Wells which will be served by the remaining 10 batteries continue to produce through their present facilities, while equipment installation goes on. Completion of all oil production and test facilities is now scheduled for the last half of 1975.

c) Workovers

A continuous workover study is in progess, so that whenever well production data and reservoir conditions so indicate, workovers are performed to lower gas-oil or water-oil ratios, and maximize producing well efficiency. Six workovers of this type have been performed in the past year.

d) Continuing Field Study

In order to maximize future reserves, Atlantic Richfield Company, as Unit operator, will continue to maintain a comprehensive production and bottom hole testing program in conjunction with numeric model tests for field performance and predictions.

e) New Producing Well Program

Preliminary results of a study now in progress indicated the desirability of drilling new producing wells in the most favorable part of the Abo Reef section to gain efficient, low gas-oil ratio production. Two wells were approved by the N. M. O. C. C. for drilling at Unit locations F331 and J211. At present the F331 is in process of completion. The J211 is now drilling.

Modifications - It is understood that to meet changing conditions, this plan of operation may be modified from time to time, with the approval of the Supervisor, the Commissioner of Public Lands of the State of New Mexico, and the New Mexico Oil Conservation Commission.

Atlantic Richfield Company, as Unit Operator, will act prudently to preserve all rights of the mineral owners, and to effectively and efficiently recover the Unit area reserves. This Company will meet all economical offset obligations, act to prevent waste, conserve natural resources, and protect correlative rights.

Effective Date - This plan of operations shall be effective January 1, 1975, and extend through the calendar year unless otherwise amended.

If this Plan of Operation meets with your approval, please indicate in the space below and return one copy for our files.

Very truly yours,

ATLANTIC RICHFIELD COMPANY
OPERATOR

P. E. Fletcher
Operations Manager

PEF/SHC/agp

APPROVED BY: _____ DATE: _____
Supervisor of United States
Geological Survey

APPROVED BY: _____ DATE: _____
Commissioner of Public Lands
State of New Mexico

APPROVED BY: A. L. Porter DATE: January 8, 1975
Secretary-Director
New Mexico Oil Conservation
Commission

OIL CONSERVATION COMMISSION
P. O. BOX 2088
SANTA FE, NEW MEXICO 87501

4752

January 9, 1974

COPY

Atlantic Richfield Company
P. O. Box 1610
Midland, Texas 79701

Attention: Mr. P. E. Fletcher

Re: 1974 Plan of Operation
Empire Abo Unit, Eddy
County, New Mexico

Gentlemen:

This is to advise that the New Mexico Oil Conservation Commission has this date approved the Plan of Operation for the calendar year 1974 for the Empire Abo Unit, Eddy County, New Mexico, subject to like approval by the United States Geological Survey and the Commissioner of Public Lands of the State of New Mexico.

Two approved copies of the plan are returned herewith.

Very truly yours,

A. L. PORTER, Jr.
Secretary-Director

ALP/JEK/og

cc: Commissioner of Public Lands - Santa Fe
United States Geological Survey - Roswell

AtlanticRichfieldCompany
North American Producing Division
Permian District
Post Office Box 1610
Midland, Texas 79701
Telephone 915 682 8631

December 10, 1973

United States Department
of the Interior
Geological Survey
P. O. Drawer 1857
Roswell, New Mexico 88201

Attention: Mr. N. O. Frederick (6)
Area Oil and Gas Supervisor

State of New Mexico
Mr. Alex J. Armijo
Commissioner of Public Lands
P. O. Box 1148
Santa Fe, New Mexico

Attention: Mr. Ray D. Graham, Director (3)
Oil and Gas Department

State of New Mexico
Oil Conservation Commission
P. O. Box 2088
Santa Fe, New Mexico

Attention: Mr. A. L. Porter, Jr. (3)
Secretary-Director

Working Interest Owners
Empire Abo Unit
(See attached address list)

Re: Plan of Operation for 1974
Empire Abo Unit
Eddy County, New Mexico

Gentlemen:

In compliance with Section 11 of the Unit Agreement, [illegible]
Abo Unit, Eddy County, New Mexico, Atlantic [illegible]
pany, as Unit Operator on behalf of itself and [illegible]
participating working interest owners, hereby submits [illegible]

your approval a Plan of Operation to cover the period beginning January 1, 1974, and extending through the remainder of calendar year 1974.

Very truly yours,

ATLANTIC RICHFIELD COMPANY
OPERATOR

P. E. Fletcher
Operations Manager

PEF/SHC/agp

PLAN OF OPERATION FOR 1974
EMPIRE ABO UNIT

1. Project Area — Submitted: December 10, 1973

History and Background

The Empire Abo Unit area consists of some 11,339.15 acres in Eddy County, New Mexico (see attached plat, Exhibit 1). The area is located in portions of Sections 34, 35, 36, Township 17 South, Range 27 East; Sections 1, 2, 3, 4, 8, 9, 10, 11, 12, 15, 16, 17, Township 18 South, Range 27 East; Sections 25, 26, 27, 28, 31, 32, 33, 34, 35, 36, Township 17 South, Range 28 East; Sections 4, 5, 6, Township 18 South, Range 28 East; Sections 29, 30, Township 17 South, Range 29 East. Within the Unit area, the follwing tracts did not qualify for participation as of the effective date of the Unit (October 1, 1973): 2, 6, 28, 41, 42, 46, 55, 56, 69, 79, 84, 91. These non-participating tracts total 644.74 acres. The remaining 10,694.41 acres are being developed as the project area for pressure maintenance by the injection of plant residue gas from Abo production back into the unitized Abo formation.

The Abo producing zone is found at an average depth of about 5800 feet (see attached type log, Exhibit 2). The Abo is a lower Leonard (Permian) carbonate reef which has undergone complete dolomitization. Vugs, fractures and fissures have been observed in cores throughout the main reef, with local anhydrite infilling sometimes restricting flow. Reef development is long (12-1/2 miles) and narrow (1-1/2 miles). The reef crest dips about 1^{o} from southwest to northeast. Average gross reef thickness is about 300 feet, ranging to the maximum of 732 feet on the Amoco State AT No. 1 (L2-18S-27E).

On the up-dip west and southwest end of the reservoir productive limits are the result of anhydrite deposition, while on the back-reef north side there is a facies change to an impermeable carbonate "mud" interspersed with green shale. Limits to the south, east, and northeast result as the top of the reef dips below the oil-water contact.

2. Current Production, Future Recovery

In September, 1973, the pool had 235 producing wells averaging 24,734 BOPD with 9.3% water production and a gas-oil ratio of 1543 cubic feet/BO. The pool total production was equivalent to 67,120 RSVB/D net voidage. The Project Area, in September 1973, had 222 producing wells averaging 23,252 BOPD with 9.8% water production and a gas-oil ratio of 1505 cubic feet/BO. The project area production was equivalent to 61,808 RSVB/D net voidage. The first month of unit operations (October 1973) the project area averaged 30,374 BOPD with 4.8% water production and a gas-oil ratio of 961 cubic feet/BO. The project area production for October 1973, was equivalent to 51,303 RSVB/D net voidage. Unit operations have therefore increased the project area oil production by 7,122 BOPD and reduced reservoir voidage by 10,505 RSVB/D. Unitized residue gas injection for pressure maintenance is calculated to increase future recovery by about 30 MMBO compared to continued primary operations.

3. Basic Concepts Governing Future Unit Operations

a) Field production history and reservoir numeric model studies have demonstrated that reservoir recovery is governed by a gravity drainage mechanism with an expanding secondary gas cap. Under unitized operations, Atlantic Richfield Company, as operator, will be able to maximize the beneficial effects of this most efficient recovery mechanism by careful observation of well performance and shutting in or curtailing production from inefficient wells.

b) Injection of plant residue gas will act toward pressure maintenance and the orderly control of expansion of the secondary gas cap.

4. Operating Plans, Progress

a) Gas Injection Facilities

Initially gas injection will be into the Abo Gas Cap in the following eight (8) wells (see plat, Exhibit 1):

Previous Operator/ Lease and Well	Unit Well Designation	Location
Exxon/Chalk Bluff Draw Unit "A" No. 4	M-6	NE/4 NW/4 Sec. 9-T18S-R27E
Amoco/Windfohr Federal No. 4	K-7	NW/4 SE/4 Sec. 4-T18S-R27E
Amoco/MALCO "H" Federal No. 9	I-10	NE/4 NW/4 Sec. 3-T18S-R27E
M. Yates, III/Dooley ABO State No. 2	G-19	NW/4 SE/4 Sec. 36-T17S-R27E
Amoco/State "BM" No. 1	G-22	NE/4 SW/4 Sec. 31-T17S-R28E
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ARCo/M. Yates B (ARC) No. 8	F-31	SW/4 NE/4 Sec. 33-T17S-R28E
Hondo/State "A" No. 21	C-38	NE/4 SW/4 Sec. 26-T17S-R28E

The only significant change in the injection wells is the substitution of the Amoco/Malco "H" Federal No. 9 for the Amoco/Malco "H" Federal No. 2. Prior to gas injection Atlantic Richfield Company will obtain all necessary regulatory body approvals for this substitution. Initial plans are to pick up plant residue gas at about 700 psi and compress it to 2000 psi for injection. The gas will contain hydrogen sulfide and superdehydration facilities are planned in order to minimize possible corrosion. A rigorous corrosion checking program will be maintained. Permits for the Gas Injection Facilities have been granted by the State of New Mexico, Environmental Improvement Agency, and construction is in progress. Atlantic Richfield Company believes the injection facilities will meet the requirements of the United States Geological Survey and the State of New Mexico. In addition, the Injection Facilities should provide enough operational flexibility to meet changing field conditions. Present timing and construction progress indicate we will be ready to commence gas injection by the start of the 2nd quarter, 1974.

b) Oil Production and Test Facilities

Upon the start of gas injection the project area will have an allowable of 40,192 BOPD or an increase of 16,940 BOPD over primary operations. In order to

effectively and efficiently handle this increased production, work has begun on enlarging and centralizing oil production and testing facilities. Designs for these facilities were governed by the following requirements:

1. Meet all existing and foreseeable environmental quality requirements by the State of New Mexico and the Federal Government.

2. Provide the maximum long-range economic benefit to the Unit for the minimum practical cost.

3. Incorporate the maximum practical use of present equipment.

4. Install well test facilities adequate to obtain the well performance data required for sound engineering surveillance of reservoir performance.

5. Eliminate or minimize down time and resultant lost production.

Prior to Unit operations there were approximately fifty (50) batteries within the project area. The design plan which has evolved is composed of 14 strategically located production and test station facilities. Exhibit 1 shows the location of each of the fourteen (14) sites and the wells going into each battery, along with location of gas injection wells, residue gas injection lines, and gas plant locations. Fourteen (14) separate battery and test facility locations will provide enough operational flexibility to hold lost production at an absolute minimum, as a result of equipment failure or a shut-down due to fire or other catastrophe.

c) Workovers

Whenever well production data and reservoir conditions so indicate, workovers will be performed to lower gas-oil or water-oil ratios, and maximize producing well efficiency.

d) Continuing Field Study

In order to maximize future reserves, Atlantic Richfield Company as Unit operator will maintain a comprehensive production and bottom hole testing program in conjunction with numeric model tests for field performance and predictions.

Modifications - It is understood that to meet changing conditions, this plan of operation may be modified from time to time, with the approval of the Supervisor, the Commissioner of Public Lands of the State of New Mexico, and the New Mexico Oil Conservation Commission.

Atlantic Richfield Company, as Unit operator, will act prudently to preserve all rights of the mineral owners and to effectively and efficiently recover the Unit area reserves. This Company will meet all economical offset obligations, act to prevent waste, conserve natural resources, and protect correlative rights.

Effective Date - This plan of operation shall be effective January 1, 1974, and extend through the calendar year unless otherwise amended.

If this Plan of Operation meets with your approval, please indicate in the space below and return one copy for our files.

Very truly yours,

ATLANTIC RICHFIELD COMPANY
OPERATOR

P. E. Fletcher

P. E. Fletcher
Operations Manager

PEF/SHC/agp

APPROVED BY: _____ Date: _____
Supervisor of United States
Geological Survey

APPROVED BY: _____ Date: _____
Commissioner of Public Lands,
State of New Mexico

APPROVED BY: A. L. Porter, Jr. Date: January 9, 1974
Secretary-Director
New Mexico Oil Conservation
Commission

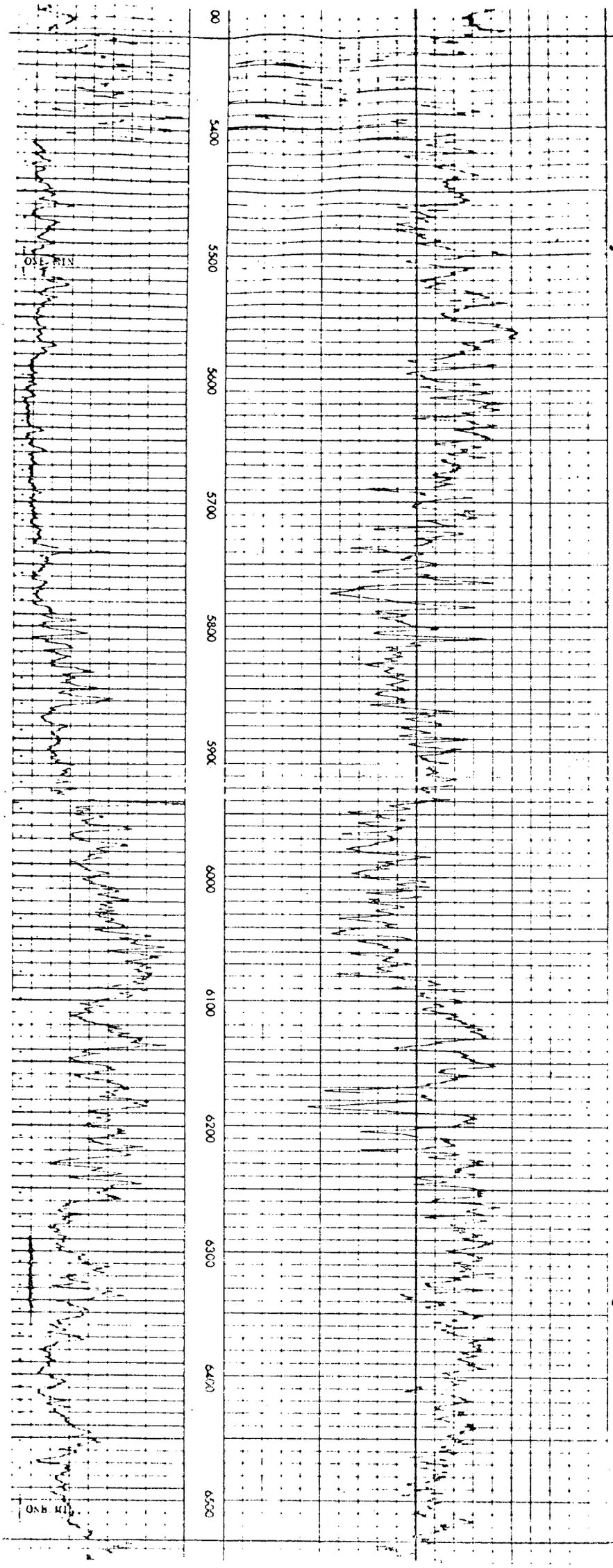
AMOCO PRODUCTION COMPANY

State AU No. 1

1980' FSL & 1830' FWL SEC. 2, T-18-S, R-27-E

EDDY COUNTY, NEW MEXICO

RADIOACTIVITY LOG



EMPIRE ABO UNIT - PLAN OF OPERATION EXHIBIT 2