



STATE OF NEW MEXICO
ENERGY AND MINERALS DEPARTMENT
OIL CONSERVATION DIVISION

BRUCE KING
GOVERNOR
LARRY KEHOE
SECRETARY

February 19, 1982

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: Mr. Stephen R. Sills

RE: Application to Expand
Empire Abo Unit Pressure
Maintenance Project

Dear Sir:

Pursuant to your application for expansion of the Empire Abo Unit Pressure Maintenance Project with the conversion of wells B-48 and B-49; this application cannot be administratively approved until the following information is supplied:

1. Section III - Well Data

For future applications please submit the casing weight for each string of casing.

2. Section VI

Under tabulation of data, construction details are not complete for the wells listed. Please submit cementing details for each casing string, the weight of pipe used for each casing string, and the owner of each well.

3. Section VIII

Please reply to the second part of Section VIII by supplying the geological names and depths to the bottom of all underground sources of drinking water both above and below the injection interval.

4. Section X

Please resubmit logs and test data for B-48 and 49 wells; this information is not on file.

5. Section XIV - Proof of Notice

Please furnish a list of leasehold operators within the area of review. Furnish proof that a copy of the application has been furnished by dated, certified or registered mail. (Submit photocopies)

If you have any questions concerning this matter, please do not hesitate to contact me at (505) 827-2534.

Sincerely,

A handwritten signature in cursive script that reads "Oscar A. Simpson III".

Oscar A. Simpson, III
Water Resource Specialist

OAS/dp



February 23, 1982

Mr. Oscar A Simpson, III
State of New Mexico
Energy and Minerals Dept.
Oil Conservation Division
P. O. Box 2038
Santa Fe, New Mexico 87501

Dear Mr. Simpson:

RE: Application to Expand Empire Abo
Unit Pressure Maintenance Project

In response to your letter of February 19, 1982, I have enclosed the additional information you requested in the matter of converting Empire Abo Unit Wells B-48 and B-49 to water injection. ARCO Oil and Gas Co., as operator of the Empire Abo Unit, has sent copies of this supplement via certified mail to the appropriate offset operators listed in the attachments and awaits your reply.

If any additional information is needed or administrative approval is granted, please contact me at your earliest convenience at (915) 684-0165.

Very truly yours,

A handwritten signature in black ink, appearing to read "Stephen R. Sills". The signature is written in a cursive style and is located below the "Very truly yours," text.

Stephen R. Sills
Engineer

SRS:cn

Attachments

cc: NMOCD -- Artesia
Offset Operators

SECTION III - Well Data

Empire Abo Unit #B-48: 8 5/8" @ 753' is 28#/ft.
5 1/2" @ 6306' is 15.5#/ft.

Empire Abo Unit #B-49: 8 5/8" @ 786' is 28#/ft.
5 1/2" @ 6300' is 15.5#/ft.

SECTION VI

ARCO Oil and Gas Company is operator of the Empire Abo Unit. The original owners of all unit wells are noted in Section VI of the original application dated 12/1/81. Operators and original owners of non-unit wells are given below and on the next page.

Empire Abo Unit #B-47: 8 5/8" @ 800' is 28#/ft.
cemented w/250 sx

5 1/2" @ 6313' is 15.5#/ft.
cemented w/566 sx

Empire Abo Unit #C-46: 8 5/8" @ 800' is 24#/ft.
cemented w/500 sx

4 1/2" @ 6358' is 9.5#/ft.
cemented w/850 sx

Empire Abo Unit #C-47: 8 5/8" @ 760' is 24#/ft.
cemented w/350 sx

5 1/2" @ 6359'* is 14 and 15.5#/ft.
cemented w/450 sx
*corrected value

Empire Abo Unit #C-48: 8 5/8" @ 765' is 28#/ft.
cemented w/375 sx

5 1/2" @ 6360' is 14 and 15.5#/ft.
cemented w/425 sx

Empire Abo Unit #C-49: 8 5/8" @ 778' is 28#/ft.
cemented w/225 sx

5 1/2" @ 6294' is 15.5#/ft.
cemented w/570 sx

Empire Abo Unit #C-50: 8 5/8" @ 760' is 28 and 24#/ft.
cemented w/225 sx

5 1/2" @ 6273' is 15.5#/ft.
originally cemented w/160 sx.
[When converted to WI in 9/78
5 1/2" was cemented from 4890'
to 2290'. 500 sx were then
pumped above 2290'.]

SECTION VIII

The proposed injection zone, the Abo, is encountered at approximately 5800'. Production of drinking water in the area is from the Santa Rosa zone, the bottom of which occurs at approximately 350'. No other sources of drinking water occur in the area either above or below the Abo.

SECTION X

See enclosed logs and test data for Empire Abo Unit Wells #B-48 and #B-49.

SECTION XIV

Surface rights in the area of review are federal. Copies of approved USGS Form 9-331 are enclosed.

Leasehold operators within the area of review are listed below. Photocopies of certified mail receipts are enclosed for mailings made to these operators. These mailings include copies of the initial application dated 12/1/81, a supplement dated 12/17/81, and this supplement.

Leasehold Operators:

General American
Kincaid & Watson
Continental (Conoco)
Depco, Husky, et.al.
El Paso
Amoco-Empire South Deep Unit

SECTION X TEST DATA - Empire Abo Unit Well # B-48

EMPIRE CORP., NEW YORK

WELL # B-48, 100' x 100' (Empire Abo Unit)

LOCATION: 2310' FEL 990' FEL Sec. 30-17S-29E

- 12/8/61 SPUDDED
- 12/11/61 8-5/8" set @ 753' w/125 sx Incor w/6% gel & 100 sx Incor w/2% CaCl₂ - started drlg w/gas @ 753'
- 12/12/61 Drlg. 2562' Dolomite
- 12/19/61 TD-6146', Dolo, mixing mud, good show OIG 6140-46', tentative top Abo Reef 6140'
- 12/20/61 TD-6306' Dolo., conditioned hole to run 5 1/2" csg, ran Schlbrg. Laterolog - GR Neutron from TD back to surf. - log top of reef 6140'
- 12/22/61 TD-6306', running 2" tbg - ran 5 1/2" OD 15.5# JS csg to 6306' & cement w/15% sx 50-50 pozmix & reg. w/18% gel & 3% salt followed by 416 sx 50-50 pozmix & Incor w/2% gel - after standing cement for 17 hrs nipples up & perf. csg fr 6265-77' w/4 jets/ft.
- 12/27/61 TD-6306' Dolo., SI, ran 2" tbg to 6282', displaced wtr w/oil, pulled to back to 6252' & set pkr @ 6199', acidized w/1000 gals 20% HCl fr 6265-77'. BDP-3600#, M. trtg press-3150#, immed. SD press-1600#, 30 mins SIP-50%, ran swab 6 times - well kicked off & flwd acid wtr to pits - turned into tanks & flwd 87 BO in 2 hrs thru 32/64" chk. (rt of 1044 BOPD) flwd 357 BO in 19 hrs thru 18/64" chk., flwd 142 BO in 24 hrs thru 12/64" chk., flwd 45.54 BO in 7 hrs thru 12/64" chk. w/GOR 110%/1
- FINAL REPORT

REMARKS: Spud: 12/ 9/61; Compl: 12/23/61; Elev: 3632' Grd; TD: 6306' Abo; T/Pay 6265', Prod thru perms 6265-77'
 IPF: 1,044 BOPD 32/64" chk., Grav. 44, TP 440#, CP pkr
 Tops: (EL) Abo Reef 6140'

SECTION X - TEST DATA Empire Abo Unit Well # B-49

EDDY COUNTY, NEW MEXICOGENERAL AMERICAN #7 Green "A" (Empire-Abo Field)

LOCATION: 1980' FWL 330' FWL Sec. 29-17S-29E

- 12/29/61 TD-786' Anhy., 8-5/8" @ 796' w/125 sx Incor w/6% gel & 2% CaCl & 100 sx Incor w/2% CaCl
- 1/10/62 TD-6398' Dolomite, Temp. Abndd. - while coming out of hole laying down DP dropped 3 jts 4-1/2" OD DP to bottom, did not fish out
FINAL REPORT
- 1/31/62 TD-6398', Dolomite - plugging back, prep to set whipstock
- 2/1/62 PB-2900'
- 2/9/62 Drlg. 5124' Dolomite, new hole
- 2/14/62 TD-6225', prep to mud up, show oil & gas 6220-25'
- 2/16/62 TD-6300' Dolomite, testing 5 1/2" OD @ 6300' w/150 sx 50-50 pozmix & reg. w/18% gel & 3% salt followed by 420 sx 50-50 pozmix & Incor w/2% gel - Perf. 6282-91" w/4 jets/ft - ran 2" tbg to 6288' & acidized w/1000 gals - 20% HCl, BD press-1300#, inj. press-3000#, 15 mins SIP-75#, opened well, flwd oil flush & acid wtr & then flwd 63 BO in 1 hr thru 1/2" tbg chk., FTP-475#
- 2/18/62 Flwd 144 BO in 8 1/2 hrs thru 18/64" chk. & 199.8 BO in 15 1/2 hrs thru 16/64" chk.
- 2/19/62 Flwd 21.6 BO in 2 hrs thru 16/64" chk. & 154.86 BO in 22 hrs thru 12/64" chk.
FINAL REPORT

RINEHART: Spud: 12/28/61; Compl: 2/16/62; Elev: 3618' DF; TD: 6390'
Abo; T/Pay 6282', prod thru perms 6282-91'
IPF: 405 BOPD 18/64" chk.
Tops: (EL) San Andres 2349', Loving 2445', Glor 3805', Abo
sh 5775'

SECTION XIV

OPERATOR'S COPY

Form 9-331
Dec. 1973

Form Approved.
Budget Bureau No. 42-R1424

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

SUNDRY NOTICES AND REPORTS ON WELLS

(Do not use this form for proposals to drill or to deepen or plug back to a different reservoir. Use Form 9-331-C for such proposals.)

1. oil well gas well other Convert To SWIW

2. NAME OF OPERATOR ARCO Oil and Gas Co.
Division of Atlantic Richfield Co.

3. ADDRESS OF OPERATOR
P. O. Box 1710, Hobbs, N M 88241-1710

4. LOCATION OF WELL (REPORT LOCATION CLEARLY. See space 17 below.)
AT SURFACE: 2310' FNL & 990' FEL
AT TOP PROD. INTERVAL: As above
AT TOTAL DEPTH: As above

16. CHECK APPROPRIATE BOX TO INDICATE NATURE OF NOTICE, REPORT, OR OTHER DATA

5. LEASE
LC-028480 (a)

6. IF INDIAN, ALLOTTEE OR TRIBE NAME

7. UNIT AGREEMENT NAME
Empire Abo Pressure Maintenance Project

8. FARM OR LEASE NAME
Empire Abo Unit "B"

9. WELL NO.
48

10. FIELD OR WILDCAT NAME
Empire Abo

11. SEC., T., R., M., OR BLK. AND SURVEY OR AREA
30-17S-29E

12. COUNTY OR PARISH
Eddy

13. STATE
N M

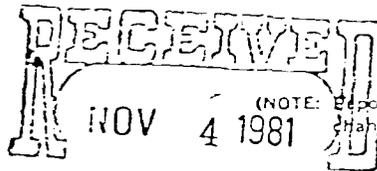
14. API NO.

15. ELEVATIONS (SHOW DF, KDB, AND WD)
3633' GR

REQUEST FOR APPROVAL TO: SUBSEQUENT REPORT OF:

TEST WATER SHUT-OFF	<input type="checkbox"/>	<input type="checkbox"/>
FRACTURE TREAT	<input type="checkbox"/>	<input type="checkbox"/>
SHOOT OR ACIDIZE	<input type="checkbox"/>	<input type="checkbox"/>
REPAIR WELL	<input type="checkbox"/>	<input type="checkbox"/>
PULL OR ALTER CASING	<input type="checkbox"/>	<input type="checkbox"/>
MULTIPLE COMPLETE	<input type="checkbox"/>	<input type="checkbox"/>
CHANGE ZONES	<input type="checkbox"/>	<input type="checkbox"/>
ABANDON*	<input type="checkbox"/>	<input type="checkbox"/>

(other) Convert Shut-in Oilwell to SWIW



(NOTE: Report results of multiple completion or zone change on Form 9-330.)

OIL & GAS
U.S. GEOLOGICAL SURVEY
ROSWELL, NEW MEXICO

17. DESCRIBE PROPOSED OR COMPLETED OPERATIONS (Clearly state all pertinent details, and give pertinent dates, including estimated date of starting any proposed work. If well is directionally drilled, give subsurface locations and measured and true vertical depths for all markers and zones pertinent to this work.)*

Propose to convert a shut-in oilwell to a water injection well in the Empire Abo Pressure Maintenance Project in the following manner:

1. Rig up, kill well, install BOP & POH w/tbg.
2. Set BP @ 6135' & test 5 1/2" OD csg.
3. Run vertilog & CBL.
4. Perf 5 1/2" csg @ TOC. Set cmt retr above perfs & circ Cl C cmt w/additives to surf.
5. Drill out retr & cmt. Press test csg & wellhead. POH w/RBP @ 6135'.
6. Perf Abo fm 6226-6234' w/2 JSPF.
7. RIH w/pkr set @ approx 6140' & acidize perfs 6183-6277' w/7500 gal of 15% HCL-LSTNE-FE agent w/rock salt. POH w/pkr & tbg. CO to PBD.
8. RIH w/2-7/8" OD plastic-coated tbg, on-off tool & retr pkr. Displ tbg/csg annulus w/ inhibited brine wtr, set pkr above perfs. Complete as a SWIW in

Subsurface Safety Valve: Manu. and Type _____ Set @ _____ Ft.

18. I hereby certify that the foregoing is true and correct

SIGNED [Signature] TITLE Dist. Drlg. Supt. DATE 10/30/81

APPROVED [Signature] (This space for Federal or State office use)

APPROVED BY [Signature] TITLE _____ DATE _____

CONDITIONS OF APPROVAL, IF ANY: NOV 6 1981

FOR

*Midland
Heller
Co-owner*

IS-SS-CP

SECTION XIV

OPERATOR'S COPY

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

SUNDRY NOTICES AND REPORTS ON WELLS

(Do not use this form for proposals to drill or to deepen or plug back to a different reservoir. Use Form 9-331-C for such proposals.)

1. oil well gas well Convert to other SWIW

2. NAME OF OPERATOR ARCO Oil and Gas Co.
Division of Atlantic Richfield Co.

3. ADDRESS OF OPERATOR
P. O. Box 1710, Hobbs, N M 88241-1710

4. LOCATION OF WELL (REPORT LOCATION CLEARLY. See space 17 below.)
AT SURFACE: 1980' FNL & 330' FWL
AT TOP PROD. INTERVAL: as Above
AT TOTAL DEPTH: as Above

5. LEASE
NM ~~---~~ 79781

6. IF INDIAN, ALLOTTEE OR TRIBE NAME

7. UNIT AGREEMENT NAME
Empire Abo Pressure Maintenance Project

8. FARM OR LEASE NAME
Empire Abo Unit "B"

9. WELL NO.
49

10. FIELD OR WILDCAT NAME
Empire Abo

11. SEC., T., R., M., OR BLK. AND SURVEY OR AREA
30-17S-29E

12. COUNTY OR PARISH | 13. STATE
Eddy | N M

14. API NO.

15. ELEVATIONS (SHOW DF, KDB, AND WD)
3633' GR

16. CHECK APPROPRIATE BOX TO INDICATE NATURE OF NOTICE, REPORT, OR OTHER DATA

REQUEST FOR APPROVAL TO:

TEST WATER SHUT-OFF

FRACTURE TREAT

SHOOT OR ACIDIZE

REPAIR WELL

PULL OR ALTER CASING

MULTIPLE COMPLETE

CHANGE ZONES

ABANDON*

(other) Convert Shut-In Oilwell to SWIW

SUBSEQUENT REPORT OF:

RECEIVED
NOV 4 1981

(NOTE) Report results of multiple completion or zone change on Form 9-330.)

OIL & GAS
U.S. GEOLOGICAL SURVEY
ROSWELL, NEW MEXICO

17. DESCRIBE PROPOSED OR COMPLETED OPERATIONS (Clearly state all pertinent details, and give pertinent dates, including estimated date of starting any proposed work. If well is directionally drilled, give subsurface locations and measured and true vertical depths for all markers and zones pertinent to this work.)*

Propose to convert a shut-in oilwell to a saltwater injection well in the Empire Abo Pressure Maintenance Project in the following manner:

1. Rig up, kill well, install BOP, POH w/tbg.
2. Set BP @ 6200' & test 5 1/2" OD csg.
3. Run vertilog & CBL.
4. Perforate 5 1/2" OD csg @ TOC. Set cmt retr above perfs & circ Cl C cmt w/additi to surf. WOC.
5. Drill out retr & cmt, press test csg & wellhead. POH w/RBP @ 6200'.
6. Perforate Abo fm 6256-6266', reperforate 6282-6292' w/2 JSPF.
7. RIH w/pkr, set @ 6200' & acidize perfs 6224-6292' w/7500 gals 15% HCL-LST-NE-FEXX agent w/rock salt. POH w/tbg & pkr. CO to PBD.
8. RIH w/2-7/8" OD plastic-coated tbg, on-off tool & retr pkr, displace tbg/csg annulus w/Inhibited brine wtr, set pkr above perfs. Complete as a SWIW in the

Subsurface Safety Valve: Manu. and Type _____ Set @ _____ FL

18. I hereby certify that the foregoing is true and correct

SIGNED George W. Schmidt TITLE Dist. Drlg. Supt. DATE 10/30/81

APPROVED BY Peter W. Chesser TITLE _____ DATE _____

CONDITIONS OF APPROVAL IF ANY:

NOV 6 1981
FOR
JAMES A. GILLHAM
DISTRICT SUPERVISOR

See Instructions on Reverse Side

*Madeline
Dillon
ew-dillon*

PS Form 3811, Jan. 1978

SENDER: Complete items 1, 2, and 3. Add your address in the "RETURN TO" space on reverse.

1. The following service is requested (check one.)

- Show to whom and date delivered.....
- Show to whom, date and address of delivery.....
- RESTRICTED DELIVERY
Show to whom and date delivered.....
- RESTRICTED DELIVERY.
Show to whom, date, and address of delivery. \$ _____

(CONSULT POSTMASTER FOR FEES)

2. ARTICLE ADDRESSED TO:
*Conoco 1
Box 1150
Midland TX 79702*

3. ARTICLE DESCRIPTION:
REGISTERED NO. CERTIFIED NO. INSURED NO.

(Always obtain signature of addressee or agent)

I have received the article described above.
SIGNATURE Addressee Authorized agent

4. DATE OF DELIVERY POSTMARK
James [Signature]
1981
DEC 7

5. ADDRESS (Complete only if requested)

6. UNABLE TO DELIVER BECAUSE: CLERK'S INITIALS

RETURN RECEIPT, REGISTERED, INSURED AND CERTIFIED MAIL

GPO : 1979-288-848

PS Form 3811, Jan. 1978

SENDER: Complete items 1, 2, and 3. Add your address in the "RETURN TO" space on reverse.

1. The following service is requested (check one.)

- Show to whom and date delivered.....
- Show to whom, date and address of delivery.....
- RESTRICTED DELIVERY
Show to whom and date delivered.....
- RESTRICTED DELIVERY.
Show to whom, date, and address of delivery. \$ _____

(CONSULT POSTMASTER FOR FEES)

2. ARTICLE ADDRESSED TO:
*General American
Box 3306
Odessa TX 79760*

3. ARTICLE DESCRIPTION:
REGISTERED NO. CERTIFIED NO. INSURED NO.

(Always obtain signature of addressee or agent)

I have received the article described above.
SIGNATURE Addressee Authorized agent

4. DATE OF DELIVERY POSTMARK
Cullester [Signature]
1981
DEC 7

5. ADDRESS (Complete only if requested)

6. UNABLE TO DELIVER BECAUSE: CLERK'S INITIALS

RETURN RECEIPT, REGISTERED, INSURED AND CERTIFIED MAIL

GPO : 1979-288-848

PS Form 3811, Jan. 1978

SENDER: Complete items 1, 2, and 3. Add your address in the "RETURN TO" space on reverse.

1. The following service is requested (check one.)

- Show to whom and date delivered.....
- Show to whom, date and address of delivery.....
- RESTRICTED DELIVERY
Show to whom and date delivered.....
- RESTRICTED DELIVERY.
Show to whom, date, and address of delivery. \$ _____

(CONSULT POSTMASTER FOR FEES)

2. ARTICLE ADDRESSED TO:
*El Paso
Petroleum Center
Midland TX 79701*

3. ARTICLE DESCRIPTION:
REGISTERED NO. CERTIFIED NO. INSURED NO.

(Always obtain signature of addressee or agent)

I have received the article described above.
SIGNATURE Addressee Authorized agent

4. DATE OF DELIVERY POSTMARK
Pat [Signature]
1981
DEC 8

5. ADDRESS (Complete only if requested)

6. UNABLE TO DELIVER BECAUSE: CLERK'S INITIALS

RETURN RECEIPT, REGISTERED, INSURED AND CERTIFIED MAIL

GPO : 1979-288-848

PS Form 3811, Jan. 1978

SENDER: Complete items 1, 2, and 3. Add your address in the "RETURN TO" space on reverse.

1. The following service is requested (check one.)

- Show to whom and date delivered.....
- Show to whom, date and address of delivery.....
- RESTRICTED DELIVERY
Show to whom and date delivered.....
- RESTRICTED DELIVERY.
Show to whom, date, and address of delivery. \$ _____

(CONSULT POSTMASTER FOR FEES)

2. ARTICLE ADDRESSED TO:
*Kincaid + Watson Dry
P.O. Box 489
Artesia NM*

3. ARTICLE DESCRIPTION:
REGISTERED NO. CERTIFIED NO. INSURED NO.

(Always obtain signature of addressee or agent)

I have received the article described above.
SIGNATURE Addressee Authorized agent

4. DATE OF DELIVERY POSTMARK
Nancy [Signature]
1981
DEC 8

5. ADDRESS (Complete only if requested)

6. UNABLE TO DELIVER BECAUSE: CLERK'S INITIALS

RETURN RECEIPT, REGISTERED, INSURED AND CERTIFIED MAIL

GPO : 1979-288-848

PS Form 3811, Jan. 1978

SENDER: Complete items 1, 2, and 3. Add your address in the "RETURN TO" space on reverse.

1. The following service is requested (check one.)

- Show to whom and date delivered.....
- Show to whom, date and address of delivery.....
- RESTRICTED DELIVERY
Show to whom and date delivered.....
- RESTRICTED DELIVERY.
Show to whom, date, and address of delivery. \$ _____

(CONSULT POSTMASTER FOR FEES)

2. ARTICLE ADDRESSED TO:
*El Paso Center
Odessa TX 79761*

3. ARTICLE DESCRIPTION:
REGISTERED NO. CERTIFIED NO. INSURED NO.

(Always obtain signature of addressee or agent)

I have received the article described above.
SIGNATURE Addressee Authorized agent

4. DATE OF DELIVERY POSTMARK
Walter [Signature]
1981
DEC 7

5. ADDRESS (Complete only if requested)

6. UNABLE TO DELIVER BECAUSE: CLERK'S INITIALS

RETURN RECEIPT, REGISTERED, INSURED AND CERTIFIED MAIL

GPO : 1979-288-848

No. 343704
 RECEIPT FOR CERTIFIED MAIL
 NO INSURANCE COVERAGE PROVIDED—
 NOT FOR INTERNATIONAL MAIL
 (See Reverse)

SENT TO		El Paso	
STREET AND NO.		1 Petroleum Center	
P.O., STATE AND ZIP CODE		Midland TX 79701	
POSTAGE		\$1.21	
CONSULT POSTMASTER FOR FEES			
CERTIFIED FEE		7¢	
SPECIAL DELIVERY		¢	
RESTRICTED DELIVERY		¢	
OPTIONAL SERVICES			
RETURN RECEIPT SERVICE	SHOW TO WHOM AND DATE DELIVERED	6-6	¢
RETURN RECEIPT SERVICE	SHOW TO WHOM, DATE, AND ADDRESS OF DELIVERY		¢
RETURN RECEIPT SERVICE	SHOW TO WHOM AND DATE DELIVERED WITH RESTRICTED DELIVERY		¢
RETURN RECEIPT SERVICE	SHOW TO WHOM, DATE AND ADDRESS OF DELIVERY WITH RESTRICTED DELIVERY		¢
TOTAL POSTAGE AND FEES		\$1.97	
POSTMARK OR DATE		MIDLAND, TX FEB 25 1982	

PS Form 3800, Apr. 1976

SENT TO		El Paso	
STREET AND NO.		P.O. Box 3092	
P.O., STATE AND ZIP CODE		Midland TX 79701	
POSTAGE		\$1.21	
CONSULT POSTMASTER FOR FEES			
CERTIFIED FEE		7¢	
SPECIAL DELIVERY		¢	
RESTRICTED DELIVERY		¢	
OPTIONAL SERVICES			
RETURN RECEIPT SERVICE	SHOW TO WHOM AND DATE DELIVERED		¢
RETURN RECEIPT SERVICE	SHOW TO WHOM, DATE, AND ADDRESS OF DELIVERY		¢
RETURN RECEIPT SERVICE	SHOW TO WHOM AND DATE DELIVERED WITH RESTRICTED DELIVERY		¢
RETURN RECEIPT SERVICE	SHOW TO WHOM, DATE AND ADDRESS OF DELIVERY WITH RESTRICTED DELIVERY		¢
TOTAL POSTAGE AND FEES		\$1.97	
POSTMARK OR DATE		MIDLAND, TX FEB 25 1982	

RECEIPT FOR CERTIFIED MAIL
 NO INSURANCE COVERAGE PROVIDED—
 NOT FOR INTERNATIONAL MAIL
 (See Reverse)

PS Form 3800, Apr. 1976

SENT TO		W M C D	
STREET AND NO.		Dexter JD	
P.O., STATE AND ZIP CODE		Dumas TX WM 88210	
POSTAGE		\$1.21	
CONSULT POSTMASTER FOR FEES			
CERTIFIED FEE		7¢	
SPECIAL DELIVERY		¢	
RESTRICTED DELIVERY		¢	
OPTIONAL SERVICES			
RETURN RECEIPT SERVICE	SHOW TO WHOM AND DATE DELIVERED		¢
RETURN RECEIPT SERVICE	SHOW TO WHOM, DATE, AND ADDRESS OF DELIVERY		¢
RETURN RECEIPT SERVICE	SHOW TO WHOM AND DATE DELIVERED WITH RESTRICTED DELIVERY		¢
RETURN RECEIPT SERVICE	SHOW TO WHOM, DATE AND ADDRESS OF DELIVERY WITH RESTRICTED DELIVERY		¢
TOTAL POSTAGE AND FEES		\$1.97	
POSTMARK OR DATE		DUMAS, TX FEB 25 1982	

RECEIPT FOR CERTIFIED MAIL
 NO INSURANCE COVERAGE PROVIDED—
 NOT FOR INTERNATIONAL MAIL
 (See Reverse)

PS Form 3800, Apr. 1976

SENT TO		General Business	
STREET AND NO.		P.O. Box 3306	
P.O., STATE AND ZIP CODE		Odessa TX 79760	
POSTAGE		\$1.21	
CONSULT POSTMASTER FOR FEES			
CERTIFIED FEE		7¢	
SPECIAL DELIVERY		¢	
RESTRICTED DELIVERY		¢	
OPTIONAL SERVICES			
RETURN RECEIPT SERVICE	SHOW TO WHOM AND DATE DELIVERED		¢
RETURN RECEIPT SERVICE	SHOW TO WHOM, DATE, AND ADDRESS OF DELIVERY		¢
RETURN RECEIPT SERVICE	SHOW TO WHOM AND DATE DELIVERED WITH RESTRICTED DELIVERY		¢
RETURN RECEIPT SERVICE	SHOW TO WHOM, DATE AND ADDRESS OF DELIVERY WITH RESTRICTED DELIVERY		¢
TOTAL POSTAGE AND FEES		\$1.97	
POSTMARK OR DATE		MIDLAND, TX FEB 25 1982	

RECEIPT FOR CERTIFIED MAIL
 NO INSURANCE COVERAGE PROVIDED—
 NOT FOR INTERNATIONAL MAIL
 (See Reverse)

No. 343705
 RECEIPT FOR CERTIFIED MAIL
 NO INSURANCE COVERAGE PROVIDED—
 NOT FOR INTERNATIONAL MAIL
 (See Reverse)

SENT TO		Depeco	
STREET AND NO.		800 Central	
P.O., STATE AND ZIP CODE		Odessa TX	
POSTAGE		\$1.21	
CONSULT POSTMASTER FOR FEES			
CERTIFIED FEE		7¢	
SPECIAL DELIVERY		¢	
RESTRICTED DELIVERY		¢	
OPTIONAL SERVICES			
RETURN RECEIPT SERVICE	SHOW TO WHOM AND DATE DELIVERED		¢
RETURN RECEIPT SERVICE	SHOW TO WHOM, DATE, AND ADDRESS OF DELIVERY		¢
RETURN RECEIPT SERVICE	SHOW TO WHOM AND DATE DELIVERED WITH RESTRICTED DELIVERY		¢
RETURN RECEIPT SERVICE	SHOW TO WHOM, DATE AND ADDRESS OF DELIVERY WITH RESTRICTED DELIVERY		¢
TOTAL POSTAGE AND FEES		\$1.97	
POSTMARK OR DATE		MIDLAND, TX FEB 25 1982	

PS Form 3800, Apr. 1976

PS Form 3800, Apr. 1976

SENT TO		Dumas	
STREET AND NO.		P.O. Box 1150	
P.O., STATE AND ZIP CODE		Midland TX 79702	
POSTAGE		\$1.21	
CONSULT POSTMASTER FOR FEES			
CERTIFIED FEE		7¢	
SPECIAL DELIVERY		¢	
RESTRICTED DELIVERY		¢	
OPTIONAL SERVICES			
RETURN RECEIPT SERVICE	SHOW TO WHOM AND DATE DELIVERED		¢
RETURN RECEIPT SERVICE	SHOW TO WHOM, DATE, AND ADDRESS OF DELIVERY		¢
RETURN RECEIPT SERVICE	SHOW TO WHOM AND DATE DELIVERED WITH RESTRICTED DELIVERY		¢
RETURN RECEIPT SERVICE	SHOW TO WHOM, DATE AND ADDRESS OF DELIVERY WITH RESTRICTED DELIVERY		¢
TOTAL POSTAGE AND FEES		\$1.97	
POSTMARK OR DATE		MIDLAND, TX FEB 25 1982	

RECEIPT FOR CERTIFIED MAIL
 NO INSURANCE COVERAGE PROVIDED—
 NOT FOR INTERNATIONAL MAIL
 (See Reverse)

PS Form 3800, Apr. 1976

SENT TO		Wanda Watson	
STREET AND NO.		P.O. Box 489	
P.O., STATE AND ZIP CODE		Dumas TX WM 88210	
POSTAGE		\$1.21	
CONSULT POSTMASTER FOR FEES			
CERTIFIED FEE		7¢	
SPECIAL DELIVERY		¢	
RESTRICTED DELIVERY		¢	
OPTIONAL SERVICES			
RETURN RECEIPT SERVICE	SHOW TO WHOM AND DATE DELIVERED		¢
RETURN RECEIPT SERVICE	SHOW TO WHOM, DATE, AND ADDRESS OF DELIVERY		¢
RETURN RECEIPT SERVICE	SHOW TO WHOM AND DATE DELIVERED WITH RESTRICTED DELIVERY		¢
RETURN RECEIPT SERVICE	SHOW TO WHOM, DATE AND ADDRESS OF DELIVERY WITH RESTRICTED DELIVERY		¢
TOTAL POSTAGE AND FEES		\$1.97	
POSTMARK OR DATE		MIDLAND, TX FEB 25 1982	

RECEIPT FOR CERTIFIED MAIL
 NO INSURANCE COVERAGE PROVIDED—
 NOT FOR INTERNATIONAL MAIL
 (See Reverse)

APPLICATION FOR AUTHORIZATION TO INJECT, SECTION III
INJECTION WELL DATA SHEET

JK

ARCO Oil and Gas Company Empire Abo Unit
OPERATOR LEASE

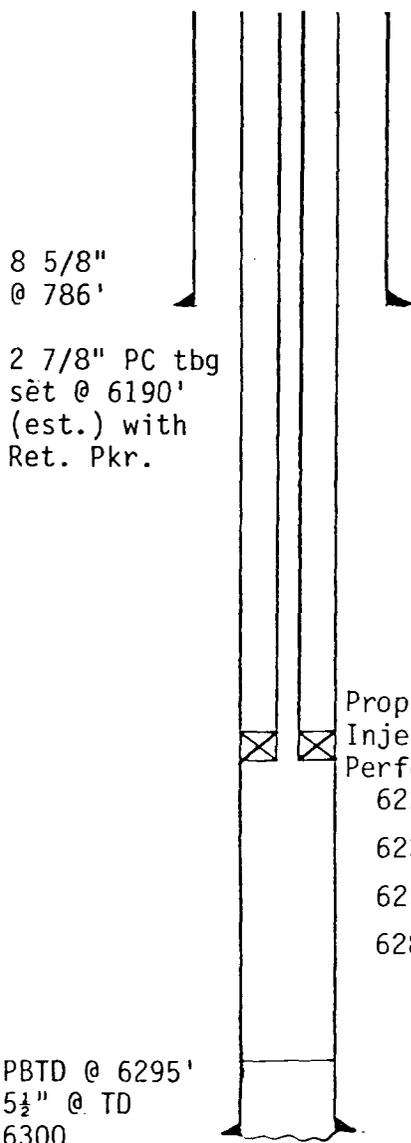
B-49 1980' FNL and 330' FWL 29 '17S 29E
WELL NO. FOOTAGE LOCATION SECTION TOWNSHIP RANGE

Eddy County, New Mexico

All depths referenced to KB, El. 3630'

Schematic

Tabular Data*



Surface Casing

Size 8 5/8 " Cemented with 225 sx.
TOC Unknown feet determined by -
Hole size 11"

Intermediate Casing

Size - " Cemented with - sx.
TOC - feet determined by -
Hole size -

Long string

Size 5 1/2 " Cemented with 570 sx.
TOC unknown** feet determined by -
Hole size 7 7/8"
Total depth 6300'

Injection interval (perforated)

6224 feet to 6292 feet (see diagram)
(perforated or open-hole, indicate which)

* Prior to running 5 1/2", an original hole was plugged back with cement to 2973', a whipstock set, and the well redrilled. Data given is for redrilled well.

** TOC will be located w/CBL, 5 1/2" casing perforated, and cement circulated to surface.

wt of casing

Proposed Tubing size 2 7/8" lined with Plastic coating set in a (material)

Retrievable (Brand subject to availability) packer at 6190 (est.) feet (brand and model)

(or describe any other casing-tubing seal).

Other Data

- Name of the injection formation Abo
- Name of Field or Pool (if applicable) Empire Abo Field
- Is this a new well drilled for injection? Yes No
If no, for what purpose was the well originally drilled? Oil Production

4. Has the well ever been perforated in any other zone(s)? List all such perforated intervals and give plugging detail (sacks of cement or bridge plug(s) used)
No. All perforations have been in Abo

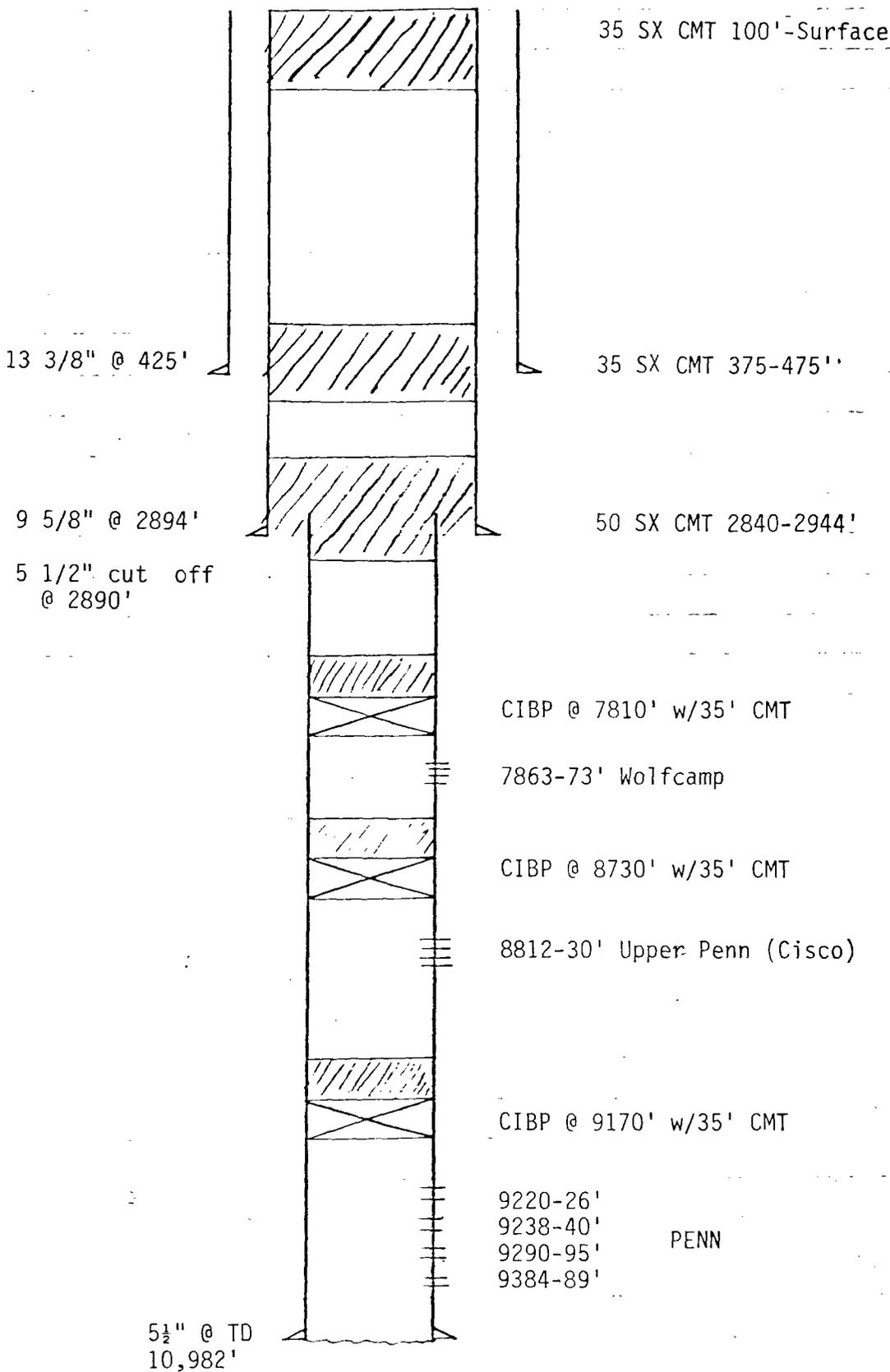
5. Give the depth to and name of any overlying and/or underlying oil or gas zones (pools) in this area.
Above: 4775' Tubbs
Below: 7800' (est.) Wolfcamp

RECORDS OF COMPLETION



Subject		APPLICATION FOR AUTHORIZATION TO INJECT Section VI	Page of Pages
By	SRS	Date 11/19/81	

PLUGGING SCHEMATIC
 EMPIRE SOUTH DEEP UNIT #7



Section VI cont'd.

Green "A" #10 : 11 3/4" @ 333' is 42#/ft
Owned & Operated by : cemented w/300 sx
General American
8 5/8" @ 2674' is 32#/ft.
cemented w/ 300 sx

Empire South Deep : Details of original well condition are
Unit # 7 as follows:
Operated by Amoco
as Unit Operator 13 3/8" @ 425' is 48#/ft.
Owned by Empire cemented w/475 sx
South Deep Unit
9 5/8" @ 2894' is 32.3#/ft.
cemented w/1305 sx
5 1/2" @ 10,982' is 15 and 17.5 #/ft.
cemented w/2220 sx

Empire South Deep : 12 3/4" @ 400' is 34#/ft
Unit #18 cemented w/475 sx
Operated by Amoco
Original cwned by 8 5/8" @ 2895' is 24 and 28#/ft.
Harvey E. Yates Co., cemented w/1200 sx
Inc. (HEYCO)
5 1/2" @ 11,010' is 17#/ft.
cemented w/1525 sx

APPLICATION FOR AUTHORIZATION TO INJECT, SECTION III
INJECTION WELL DATA SHEET

OK

ARCO Oil and Gas Co. Empire Abo Unit
OPERATOR LEASE
B-48 2310' FNL and 990' FEL 30 17S 29E
WELL NO. FOOTAGE LOCATION SECTION TOWNSHIP RANGE
Eddy County, New Mexico

Proposed Schematic

All depths referenced to KB, El. 3643'
Tabular Data

Surface Casing

Size 8 5/8 " Cemented with 225 sx.
TOC 0 feet determined by circulation
Hole size 11"

Intermediate Casing

Size - " Cemented with - sx.
TOC - feet determined by -
Hole size -

Long string

Size 5 1/2 " Cemented with 566 sx.
TOC unknown * feet determined by -
Hole size 7 7/8"
Total depth 6306'

Injection interval (Perforated)

6183 feet to 6277 feet (see diagram)
(perforated or open-hole, indicate which)

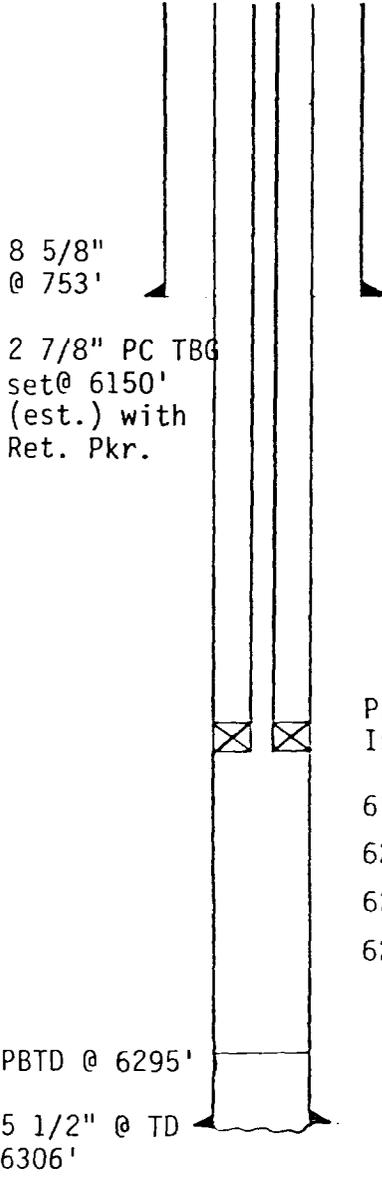
Proposed Abo Injection Perforations

- 6183-88'
- 6206-13'
- 6226-34'
- 6265-77'

NOTE

*TOC will be located w/CBL, 5 1/2" casing perforated, and cement circulated to surface.

wt of casing



Proposed

Tubing size 2 7/8" lined with plastic coating set in a
(material)
Retrievable (Brand subject to availability) packer at 6150 (est.) feet
(brand and model)
(or describe any other casing-tubing seal).

Other Data

1. Name of the injection formation ABO
2. Name of Field or Pool (if applicable) Empire Abo Field
3. Is this a new well drilled for injection? Yes No
If no, for what purpose was the well originally drilled? Oil Production
4. Has the well ever been perforated in any other zone(s)? List all such perforated intervals and give plugging detail (sacks of cement or bridge plug(s) used) No. All perforations have been in Abo.
5. Give the depth to and name of any overlying and/or underlying oil or gas zones (pools) in this area.
Above: 4795' (est.) Tubbs
Below: 7300' (est.) Wolfcamp

BEFORE THE OIL CONSERVATION COMMISSION
OF THE STATE OF NEW MEXICO

IN THE MATTER OF THE HEARING
CALLED BY THE OIL CONSERVATION
COMMISSION OF NEW MEXICO FOR
THE PURPOSE OF CONSIDERING:

CASE NO. 4953
Order No. R-4549

APPLICATION OF ATLANTIC RICHFIELD
COMPANY FOR A PRESSURE MAINTENANCE
PROJECT, EDDY COUNTY, NEW MEXICO.

ORDER OF THE COMMISSION

BY THE COMMISSION:

This cause came on for hearing at 9 a.m. on April 25, 1973,
at Santa Fe, New Mexico, before Examiner Richard L. Stamets.

NOW, on this 15th day of June, 1973, the Commission, a
quorum being present, 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 Commission has jurisdiction of this cause and the
subject matter thereof.

(2) That the applicant, Atlantic Richfield Company, seeks
authority to institute a pressure maintenance project in the
Empire-Abo Pool in its Empire-Abo Unit Area, Eddy County, New
Mexico, by initially limiting reservoir voidage, and within
one year by reinjection of approximately 70 percent of the
produced gas, as plant residue gas, into the Abo formation
through eight wells in Section 36, Township 17 South, Range 27
East, Sections 3, 4, and 9, Township 18 South, Range 27 East,
and Sections 26, 31, 32, and 33, Township 17 South, Range 28
East.

(3) That the applicant further seeks the designation of
the project area and the promulgation of special rules and
regulations governing said project, including provision for
the assignment of special allowables to wells in the project
area based on reservoir voidage factors, net gas-oil ratios,
the shutting in or curtailment of less efficient wells, and
allowable credit for gas injection wells.

(4) That initially the project area should comprise only
the following described area:

EDDY COUNTY, NEW MEXICO

TOWNSHIP 17 SOUTH, RANGE 27 EAST, NMPM

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

TOWNSHIP 17 SOUTH, RANGE 28 EAST, NMPM

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

TOWNSHIP 17 SOUTH, RANGE 29 EAST, NMPM

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

TOWNSHIP 18 SOUTH, RANGE 27 EAST, NMPM

Section 1: All
Section 2: S/2, NE/4 NE/4, SW/4 NE/4, S/2 NW/4, and
NW/4 NW/4
Section 3: All
Section 4: SE/4, S/2 NE/4, S/2 SW/4, and NE/4 SW/4
Section 8: E/2 SE/4 and SE/4 NE/4
Section 9: All
Section 10: W/2 and NE/4
Section 11: NW/4, W/2 NE/4, and NE/4 NE/4
Section 15: N/2 NW/4 and SW/4 NW/4
Section 16: N/2, SW/4, N/2 SE/4, and SW/4 SE/4
Section 17: S/2 NE/4, NE/4 NE/4, SE/4 NW/4, NE/4 SW/4,
and N/2 SE/4

TOWNSHIP 18 SOUTH, RANGE 28 EAST, NMPM

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

(5) That the applicant has been a major operator in the Empire-Abo Pool and that with a majority of the other operators in said pool has conducted extensive reservoir evaluations and studies in and of said pool.

(6) That said evaluations and studies show that the Empire-Abo Pool will be more efficiently produced through the curtailment of production from high gas-oil ratio wells or by reinjection of plant residue gas or both, and operation of the pool on a net reservoir voidage basis.

(7) That said evaluations and studies show that production from the project area as described in Finding (4) of this order should be limited to the average reservoir voidage for the project area for the calendar year 1972 or 30,000 barrels of oil per day, whichever is less, except that after reinjection of approximately 70 percent of the produced gas has been achieved, the production from said project area should be limited to the average reservoir voidage for the calendar year 1972 or 40,192 barrels of oil per day, whichever is less.

(8) That to provide incentive for the reinjection of produced gas prior to achievement of the full 70 percent reinjection planned, production in excess of the aforementioned 30,000 barrels per day should be permitted within the project area. Said excess production should be computed in accordance with the following formula and should be limited to 10,192 barrels per day:

$$\begin{aligned} \text{Additional Allowable in} \\ \text{Excess of 30,000 BOPD} &= 97.07 \left[2 \left(\frac{\text{MCF gas inj. previous month} \times 10}{\text{MCF gas prod. previous month}} \right)^2 \right. \\ &\quad \left. + \left(\frac{\text{MCF gas inj. previous month} \times 10}{\text{MCF gas prod. previous month}} \right) \right] \end{aligned}$$

(9) That the aforesaid pressure maintenance project, designated the ARCO Empire-Abo Unit Pressure Maintenance Project, and comprising the above-described area, is in the interest of conservation and should result in the recovery of approximately thirty million barrels of additional oil from said reservoir.

(10) That an administrative procedure should be established whereby said project area may be contracted or expanded for good cause shown and whereby additional injection wells and producing wells at orthodox and unorthodox locations in the project area may be approved without the necessity of notice and hearing.

(11) That special rules and regulations for the operation of the ARCO Empire-Abo Unit Pressure Maintenance Project should be promulgated and, for operational convenience, such rules should provide certain flexibility in authorizing the production of the project allowable from any well or wells in the project area in any proportion, provided that no well in the project area which directly or diagonally offsets a well not committed to said unit producing from the same common source of supply should be allowed to produce more than two top unit allowables for the Empire-Abo Pool.

(12) That approval of the application for a pressure maintenance project and the proposed special rules therefore is in the interest of sound conservation practices and will not cause waste or harm correlative rights.

IT IS THEREFORE ORDERED:

(1) That the applicant, Atlantic Richfield Company, is hereby authorized to institute a pressure maintenance project in the Empire-Abo Pool in its Empire-Abo Unit Area, Eddy County, New Mexico, to be designated the ARCO Empire-Abo Unit Pressure Maintenance Project, initially by the shutting in or curtailment of production from less efficient wells within the project and within 12 months after the effective date of this order by the reinjection of approximately 70 percent of the produced gas, as plant residue gas, into the Abo formation, through the following described wells:

<u>OPERATOR</u>	<u>LEASE NAME</u>	<u>WELL NO.</u>	<u>SECTION</u>	<u>LOCATION</u>
Amoco	Malco "H" Federal	2	3	H
Amoco	Windfuhr Federal	4	4	J
Exxon	Chalk Bluff Draw Unit "A"	4	9	C

All in Township 18 South, Range 27 East, NMPM.

M. Yates III	Dooley Abo State	2	36	J
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In Township 17 South, Range 27 East, NMPM.

Hondo	State "A"	21	26	K
Amoco	State "BM"	1	31	K
Amoco	State "BV"	1	32	F
Arco	M. Yates B (ARC)	8	33	G

All in Township 17 South, Range 28 East, NMPM.

(2) That the injection should be through 2 3/8-inch internally coated tubing installed in a packer set within 100 feet of the uppermost perforations, and that the casing-tubing annulus should be fitted with a pressure gauge in order to determine leakage in the casing, tubing, or packer.

(3) That Special Rules and Regulations governing the operation of the ARCO Empire-Abo Unit Pressure Maintenance Project, Eddy County, New Mexico, are hereby promulgated as follows:

SPECIAL RULES AND REGULATIONS
 FOR THE
EMPIRE-ABO PRESSURE MAINTENANCE PROJECT

RULE 1. The project area of the ARCO Empire-Abo Unit Pressure Maintenance Project, hereinafter referred to as the Project, shall comprise the area described as follows:

EDDY COUNTY, NEW MEXICO

TOWNSHIP 17 SOUTH, RANGE 27 EAST, NMPM

Section 34: S/2 SE/4

Section 36: S/2

TOWNSHIP 17 SOUTH, RANGE 28 EAST, NMPM

Section 25: S/2 and S/2 N/2

Section 26: S/2, S/2 NE/4, and SE/4 NW/4

Section 27: N/2 S/2, SE/4 SE/4, and SW/4 SW/4

Section 31: S/2 and S/2 N/2

Section 32: S/2, NE/4, S/2 NW/4, and NE/4 NW/4

Section 33: S/2, NE/4, S/2 NW/4, and NE/4 NW/4

Section 34: N/2, SW/4, and N/2 SE/4

Section 35: N/2 and N/2 S/2

Section 36: N/2 NW/4 and SW/4 NW/4

TOWNSHIP 17 SOUTH, RANGE 29 EAST, NMPM

Section 29: S/2 NW/4 and N/2 SW/4

Section 30: SW/4, S/2 N/2, and N/2 SE/4

TOWNSHIP 18 SOUTH, RANGE 27 EAST, NMPM

Section 1: All

Section 2: S/2, NE/4 NE/4, SW/4 NE/4, S/2 NW/4, and NW/4 NW/4

Section 3: All

Section 4: SE/4, S/2 NE/4, S/2 SW/4, and NE/4 SW/4

Section 8: E/2 SE/4 and SE/4 NE/4

Section 9: All

Section 10: W/2 and NE/4

Section 11: NW/4, W/2 NE/4, and NE/4 NE/4

Section 15: N/2 NW/4 and SW/4 NW/4

Section 16: N/2, SW/4, N/2 SE/4, and SW/4 SE/4

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

TOWNSHIP 18 SOUTH, RANGE 28 EAST, NMPM

Section 4: N/2 NW/4, SW/4 NW/4, and NW/4 NE/4

Section 5: NE/4 and N/2 NW/4

Section 6: NW/4, N/2 SW/4, N/2 SE/4, SW/4 SE/4, S/2 NE/4, and NE/4 NE/4

RULE 2. The allowable for the Project shall be the sum of the allowables of the several wells within the project area, including those wells which are shut in, curtailed, or used as injection wells. Allowables for all wells shall be determined in a manner hereinafter prescribed.

RULE 3. That the maximum daily project allowable shall be an amount of oil which will result in reservoir voidage no greater than the average daily reservoir voidage in the project

area for the calendar year 1972 or 30,000 barrels of oil per day, whichever is less, except that after reinjection of approximately 70 percent of the produced gas has been achieved the maximum daily project allowable shall be an amount of oil which will result in reservoir voidage no greater than the average daily reservoir voidage for the project area for the year 1972 or 40,192 barrels of oil per day, whichever is less.

RULE 4. That after gas reinjection has commenced but before the full 70 percent reinjection has been achieved, allowable in addition to the above-described 30,000 barrels per day may be assigned to the project area, provided that said allowable shall be based on gas produced and injected in the project area and shall be computed in accordance with Rule 10 below and the following formula and shall not exceed 10,192 barrels of oil per day:

$$\text{Additional Allowable in Excess of 30,000 BOPD} = 97.07 \left[2 \left(\frac{\text{MCF gas inj. previous month} \times 10}{\text{MCF gas prod. previous month}} \right)^2 + \left(\frac{\text{MCF gas inj. previous month} \times 10}{\text{MCF gas prod. previous month}} \right) \right]$$

RULE 5. That all calculations of reservoir voidage shall be in accordance with the formula set out in Attachment "A" to this order utilizing the Table of Fluid Properties set out in Attachment "B" of this order.

RULE 6. Allowable credit for injection wells may be transferred to producing wells within the project area, as may the allowable credit for producing wells which, in the interest of more efficient operation of the Project, are shut in or curtailed because of high gas-oil ratio or are shut in for any of the following reasons: Pressure regulation, control of pattern or sweep efficiencies, or to observe changes in pressures or changes in characteristics of reservoir liquids or progress of sweep.

RULE 7. The allowable credit assigned to any well which is shut in or which is curtailed in accordance with the provisions of Rule 6 which allowable credit is to be transferred to any well or wells in the project area for production, shall in no event be greater than its ability to produce during the test prescribed by Rule 9 below or greater than the current top unit allowable for the pool during the month of transfer, whichever is less.

RULE 8. The allowable credit assigned to any injection well on a 40-acre proration unit shall be top unit allowable for the Empire-Abo Pool.

RULE 9. The allowable credit assigned to any well which is shut in or curtailed in accordance with Rule 6, shall be determined by a 24-hour test at a stabilized rate of production, which shall be the final 24-hour period of a 72-hour test throughout which the well should be produced in the same manner and at a constant rate. The daily tolerance limitation set forth in Commission Rule 502 I (a) and the limiting gas-oil ratio (2,000 to 1) for the pool shall be waived during such tests. The project operator shall notify all operators offsetting the well, as well as the Commission, of the exact time such tests are to be conducted. Tests may be witnessed by representatives of the offsetting operators and the Commission, if they so desire.

RULE 10. The allowable credit for residue gas injection shall be calculated in accordance with the appropriate fluid properties current in the reservoir (as determined in accordance with Attachment "B" to this Order) and shall be shown on the Pressure Maintenance Project Operator's Monthly Report.

RULE 11. The basic allowable assigned to each producing well in the Project shall be equal to the well's ability to produce or to top unit allowable for the pool, whichever is less. Wells capable of producing more than top unit allowable may also receive transfer allowable, provided however, that no producing well in the project area which directly or diagonally offsets a well not committed to the unit producing from the same common source of supply shall receive an allowable or produce in excess of two times top unit allowable for the pool.

RULE 12. Each month the project operator shall submit to the Commission a Pressure Maintenance Project Operator's Report, on a form prescribed by the Commission, outlining thereon the data required, and requesting allowables for each of the several wells in the Project as well as the total project allowable. The aforesaid Pressure Maintenance Project Operator's Report shall be filed in lieu of Form C-120 for the Project.

RULE 13. The Commission shall, upon review of the report and after any adjustments deemed necessary, calculate the allowable for each well in the Project for the next succeeding month in accordance with these rules. The sum of the allowables so calculated shall be assigned to the Project and may be produced from the wells in the Project in any proportion except that no well in the Project which directly or diagonally offsets a well not committed to the unit producing from the same common source of supply shall produce in excess of two times top unit allowable for the pool.

RULE 14. The Secretary-Director of the Commission is hereby authorized to approve such additional producing wells and injection wells at orthodox and unorthodox locations within the boundaries of the ARCO Empire-Abo Unit Area as may be necessary to complete an efficient production and injection pattern, provided

said wells are drilled no closer than 660 feet to the outer boundary of said unit nor closer than 10 feet to any quarter-quarter section or subdivision inner boundary and provided that no well shall be approved for gas injection when such well is located closer than 1650 feet to a tract which is not committed to the unit and on which is located a well producing from the same common source of supply. To obtain such approval, the project operator shall file proper application with the Commission, which application, if it seeks authorization to convert additional wells to injection or to drill additional production or injection wells shall include the following:

(1) A plat identifying the lands committed to the unit agreement and those lands not committed to said agreement, and showing the location of the proposed well, all wells within the unit area, and offset operators.

(2) A schematic drawing of the proposed well which fully describes the casing, tubing, perforated interval, and depth.

(3) A letter stating that all offset operators to the proposed well have been furnished a complete copy of the application and the date of notification.

The Secretary-Director may approve the proposed well if, within 20 days after receiving the application, no objection to the proposal is received. The Secretary-Director may grant immediate approval, provided waivers of objection are received from all offset operators.

RULE 15. Expansion or contractions of the project area may be approved by the Secretary-Director of the Commission administratively when good cause is shown therefor.

(4) That jurisdiction of this cause is retained for the entry of such further orders as the Commission may deem necessary.

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

STATE OF NEW MEXICO
OIL CONSERVATION COMMISSION

I. R. TRUJILLO, Chairman

ALEX J. ARMIJO, Member

S E A L

A. L. PORTER, Jr., Member & Secretary

dr/

EMPIRE ABO UNIT

Reservoir Voidage Formula:

$$\text{Equation 1: } V_{rvb} = Q_o \left[B_o + (R_{pn} - R_s) B_g \right] + (Q_{wp} - Q_{we}) B_w$$

Where:

- V_{rvb} = Reservoir voidage, bbls. per day
- Q_o = Oil production rate, Stock tank bbls. per day
- B_o = Oil formation volume factor (1), reservoir volumetric bbls/stock tank bbl.
- R_{pn} = Net producing gas-oil ratio, MCF/S.T.B.O.

$$R_{pn} = R_p \left(1.0 - \frac{G_i}{G_p} \right)$$

- Where: R_p = producing gas-oil ratio, MCF/BO
- G_i = daily volume of gas injected, MCF/Day
- G_p = daily volume of gas produced, MCF/Day

- R_s = Solution gas-oil ratio(2), MCF/STBO
- B_g = Gas formation volume factor(3), RVB/MCF
- Q_{wp} = Water production rate, S.T.B.W./Day
- Q_{we} = Aquifer water influx rate, S.T.B.W./Day, determined from reservoir numeric model runs to be 1950 BWP
- B_w = Water formation volume factor, RVBW/STBW, use 1.0

(1), (2), (3): These values calculated from Table of Fluid Properties, Attachment "B".

EMPIRE ABO UNIT AREA

Table of Fluid Properties (P Base = 15.025 P_{bp} = 2231)

Tres. = 109°F (569° R)

<u>P_r (PSIA)</u>	<u>B_o (RVBO/STBO)</u>	<u>B_g RVB/MCF</u>	<u>R_s (MCF/BBL)</u>	<u>Z</u>
15.025	1.000	194.696	0	1.0
100	1.125	28.229	.180	.965
200	1.163	13.749	.235	.940
300	1.193	8.970	.290	.920
400	1.218	6.692	.345	.915
500	1.244	5.236	.395	.895
600	1.263	4.276	.445	.877
700	1.285	3.644	.495	.872
800	1.304	3.108	.540	.850
900	1.325	2.746	.585	.845
1000	1.344	2.437	.625	.833
1100	1.364	2.178	.675	.819
1200	1.384	1.962	.725	.805
1300	1.404	1.790	.775	.795
1400	1.425	1.649	.825	.789
1500	1.445	1.516	.875	.777
1600	1.465	1.404	.925	.768
1700	1.485	1.304	.975	.758
1800	1.505	1.220	1.025	.751
1900	1.525	1.147	1.075	.745
2000	1.548	1.053	1.125	.720
2100	1.573	1.000	1.175	.718
2200	1.597	.953	1.225	.717
2231	1.606	.939	1.250	.716

P_r = Reservoir average pressure at datum -2264' subsea, lbs/in² absolute.

B_o = Oil formation volume factor, reservoir volumetric bbls/stock tank bbl.

B_g = Gas formation volume factor, reservoir volumetric bbls/thousand std. cu. ft.

R_s = Solution Gas/Oil Ratio, Thousand std. cu. ft/stock tank bbls. oil.

Z = Gas Compressibility Factor.

ATTACHMENT "B"

dr/

BEFORE THE OIL CONSERVATION COMMISSION
OF THE STATE OF NEW MEXICO

IN THE MATTER OF THE HEARING
CALLED BY THE OIL CONSERVATION
COMMISSION OF NEW MEXICO FOR
THE PURPOSE OF CONSIDERING:

CASE NO. 5135
Order No. R-4549-A

APPLICATION OF ATLANTIC RICHFIELD
COMPANY FOR AMENDMENT OF ORDER
NO. R-4945, EDDY COUNTY, NEW
MEXICO.

ORDER OF THE COMMISSION

BY THE COMMISSION:

This cause came on for hearing at 9 a.m. on January 3, 1974, at Santa Fe, New Mexico, before Examiner Daniel S. Nutter.

NOW, on this 15th day of January, 1974, the Commission, a quorum being present, 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 Commission has jurisdiction of this cause and the subject matter thereof.

(2) That by Order No. R-4548, dated June 15, 1973, the Commission granted approval of the Empire-Abo Unit Agreement.

(3) That by Order No. R-4549, dated June 15, 1973, the applicant, Atlantic Richfield Company, was authorized to institute a pressure maintenance project in the Empire-Abo Pool in its Empire-Abo Unit Area, Eddy County, New Mexico, designated the ARCO Empire-Abo Unit Pressure Maintenance Project.

(4) That Order No. R-4549 further promulgated Special Rules and Regulations for the Empire-Abo Pressure Maintenance Project.

(5) That Finding (7) of Order No. R-4549 limits production from the project area as described in Finding (4) of said order to the average reservoir voidage for the calendar year 1972 or 30,000 barrels of oil per day, whichever is less, during the period prior to the start of gas injection.

(6) That the allowable figure of 30,000 barrels of oil per day was based on assumptions as to the future size of the unitized project area and the estimated gas and water production expected after unitization.

(7) That since the formation of the Empire-Abo Unit Pressure Maintenance Project the following additional tracts, comprising 200.13 acres of land, within the Empire-Abo Unit Area have been committed to the unit:

EDDY COUNTY, NEW MEXICO
TOWNSHIP 17 SOUTH, RANGE 28 EAST, NMPM
Section 27: SW/4 SE/4
Section 34: S/2 SE/4

TOWNSHIP 18 SOUTH, RANGE 28 EAST, NMPM
Section 6: NW/4 NE/4 (Lot 2) and
SE/4 SW/4

(8) That these additional tracts were not considered in arriving at the 30,000 barrels of oil per day project allowable provided for in Order No. R-4549.

(9) That the actual production of gas and water has been less than was anticipated under unitized operations.

(10) That due to more unit area wells and greater efficiency than was expected, an increased allowable can be produced while continuing to limit reservoir voidage to the average voidage set for calendar year 1972 in Order No. R-4945.

(11) That the project allowable should be increased to 33,000 barrels of oil per day effective retroactively to January 1, 1974.

(12) That increasing the project allowable to 33,000 barrels of oil per day is in the interest of conservation, prevention of waste and protection of correlative rights.

IT IS THEREFORE ORDERED:

(1) That Order No. R-4945 is hereby amended to include within the Empire-Abo Unit Pressure Maintenance Project the following tracts which comprise 200.13 acres:

EDDY COUNTY, NEW MEXICO
TOWNSHIP 17 SOUTH, RANGE 28 EAST, NMPM
Section 27: SW/4 SE/4
Section 34: S/2 SE/4

TOWNSHIP 18 SOUTH, RANGE 28 EAST, NMPM
Section 6: NW/4 NE/4 (Lot 2) and
SE/4 SW/4

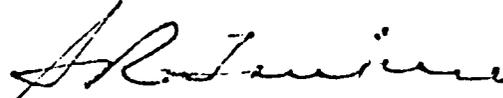
(2) That the project allowable is increased to 33,000 barrels of oil per day effective retroactively to January 1, 1974.

Case No. 5135
Order No. R-4549-A

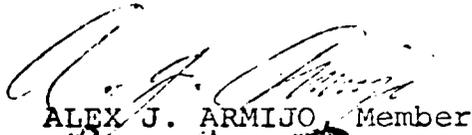
(3) That jurisdiction of this cause is retained for the entry of such further orders as the Commission may deem necessary.

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

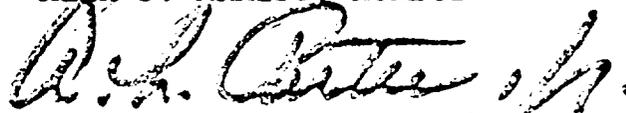
STATE OF NEW MEXICO
OIL CONSERVATION COMMISSION



I. R. TRUJILLO, Chairman



ALEX J. ARMIJO, Member



A. L. PORTER, Jr., Member & Secretary

S-E A L

dr/

BEFORE THE OIL CONSERVATION COMMISSION
OF THE STATE OF NEW MEXICO

IN THE MATTER OF THE HEARING
CALLED BY THE OIL CONSERVATION
COMMISSION OF NEW MEXICO FOR
THE PURPOSE OF CONSIDERING:

CASE NO. 5177
Order No. R-4549-B

APPLICATION OF ATLANTIC RICHFIELD
COMPANY FOR THE AMENDMENT OF ORDER
NO. R-4549, EDDY COUNTY, NEW MEXICO.

ORDER OF THE COMMISSION

BY THE COMMISSION:

This cause came on for hearing at 9 a.m. on February 27, 1974, at Santa Fe, New Mexico, before Examiner Daniel S. Nutter.

NOW, on this 30th day of April, 1974, the Commission, a quorum being present, 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 Commission has jurisdiction of this cause and the subject matter thereof.

(2) That the applicant, Atlantic Richfield Company, is the operator of the Empire-Abo Pressure Maintenance Project, Empire-Abo Pool, Eddy County, New Mexico, which project was authorized by Commission Order No. R-4549, and is governed by operating rules included in said order as amended by Order No. R-4549-A.

(3) That the applicant seeks the amendment of said Order No. R-4549, as amended, to include an increase in the maximum project allowable from 40,192 barrels of oil per day to 40,555 barrels of oil per day because of additional lands committed to the unit and participating in the project and to provide that the maximum project allowable of 40,555 barrels of oil per day would be achieved upon injection of "all available residue gas" rather than "70 percent of the produced gas," as now provided in the project rules.

(4) That the applicant further seeks the amendment of Order No. R-4549, as amended, to include a provision for administrative approval for water injection wells and to include a reservoir voidage replacement credit for water injected into the Abo formation within the project area, and to provide for the establishment of a gas injection credit "bank", against which

injection credit could be drawn in order to maintain full allowables during such times that full gas injection cannot be maintained because of injection plant shutdowns or other mechanical problems.

(5) That the increase in maximum allowable for the Empire-Abo Pressure Maintenance Project from 40,192 barrels of oil per day to 40,555 barrels of oil per day is justified inasmuch as the original 40,192 barrels was based on numeric model studies of the reservoir assuming only those tracts actually committed to the unit at the time of the original hearing would participate; that additional tracts have now been committed to the unit and the maximum permissible allowable should therefore be increased accordingly to 40,555 barrels of oil per day.

(6) That the aforesaid maximum allowable should be made available upon injection of 95 percent of all available residue gas rather than upon injection of 70 percent of the produced gas as is presently provided by Rule 3 of the Project Rules as promulgated by Order No. R-4549, as amended by Order No. R-4549-A; that "Available Residue Gas" should be defined as being all gas produced from the unitized formation less plant shrinkage and plant fuel and lease fuel required for operations; that there should be a prohibition against the sale of gas from the project except during emergency situations of temporary nature.

(7) That in addition to the administrative procedure currently in effect pursuant to Order No. R-4549 for approval of the injection of gas into the Abo formation without notice and hearing, an administrative procedure should be adopted whereby approval could be given for the injection of water into said formation within the project area without notice and hearing, provided certain restrictions regarding proximity to non-participating tracts are observed.

(8) That credit should be allowed in the project's Reservoir Voidage Formula for water injected into the reservoir as well as for gas, as now provided.

(9) That in order to allow for the maintenance of full allowables and full production schedules during such times as injection well failures, injection plant shutdowns, and other temporary conditions of unforeseen nature which prevent the injection of 95 percent of all available residue gas, a provision should be made in the project rules for the establishment of a system for the accumulation of gas injection credits which could be applied in the "Additional Allowable" formula contained in Rule 4 of the project rules; that monthly gas injection credits which may be accumulated should be limited to the volume of gas injected which exceeds 95 percent of the residue gas available for injection during any given month; and that the maximum amount of gas injection credits which should be permitted to

accrue to the gas injection credit bank should be equal to 100 percent of the average of the total monthly injection volumes for the previous three months, not including the month being reported.

IT IS THEREFORE ORDERED:

(1) That Rule 3 of the Special Rules and Regulations for the Empire-Abo Pressure Maintenance Project as promulgated by Order No. R-4549, as amended by Order No. R-4549-A, is hereby amended to read in its entirety as follows:

"RULE 3. That the maximum daily project allowable shall be an amount of oil which will result in reservoir voidage no greater than the average daily reservoir voidage in the project area for calendar year 1972 (56,513 reservoir barrels) or 33,000 barrels of oil per day, whichever is less, except that when injection of 95 percent of all available residue gas is achieved, the maximum daily project allowable shall be an amount of oil which will result in reservoir voidage no greater than the average daily reservoir voidage in the project area for calendar year 1972 (56,513 reservoir barrels) or 40,555 barrels of oil per day, whichever is less."

(2) That Rule 4 of the Special Rules and Regulations for the Empire-Abo Pressure Maintenance Project is hereby amended to read in its entirety as follows:

"RULE 4. That upon commencement of gas injection and for as long thereafter as such injection continues, extra allowable in addition to the 33,000 barrels per day described above may be assigned to the project area, provided that such additional allowable shall be based upon the proportion of residue gas available for injection which is actually injected into the unitized formation and shall be computed in accordance with the following formula:

$$\begin{aligned}
&\text{Additional Allowable} \\
&\text{in Excess of 33,000} \\
&\text{BOPD}
\end{aligned}
= 39.76 \left[2 \left(\frac{\text{MCF gas inj. previous month} \times 10}{\text{MCF residue gas available prev. month}} \right)^2 \right.$$

$$\left. + \left(\frac{\text{MCF gas inj. previous month} \times 10}{\text{MCF residue gas available previous month}} \right) \right]$$

That the maximum additional allowable which may be earned by gas injection shall be 7,555 barrels per day. That this maximum may be earned by the injection of 95 percent of the available residue gas into the unitized formation; that gas volumes in excess of said 95 percent which are injected into the unitized formation shall be credited each month to a gas injection bank account which shall be permitted to accrue such gas injection credits up to 100 percent of the average of the total monthly injection volumes for the three previous months, not including the month being reported; that during such times as injection well failures, injection plant shutdowns, and other temporary conditions of unforeseen nature which prevent the injection of at least 95 percent of the available residue gas, said gas injection bank account may be charged a sufficient volume to add to the actual volume of injection achieved to equal 95 percent of the available residue gas for the month. In the event there are insufficient credits accrued to the gas injection bank account to bring actual injection plus applied credits up to 95 percent of available residue gas, production shall be reduced to 33,000 barrels of oil per day plus the amount which the actual injection plus the accrued credits will actually earn. Production beyond this amount shall be considered overproduction and shall be compensated for by underproduction during the following month.

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.

No raw gas nor plant residue gas attributable to the project shall be sold or otherwise disposed of by any means other than injection into the unitized formation except during emergency situations of temporary nature."

(3) That Rule 5 of the Special Rules and Regulations for the Empire-Abo Pressure Maintenance Project is hereby amended to read in its entirety as follows:

"RULE 5. That all calculations of reservoir voidage shall be made in accordance with the formula set forth in Attachment "A" to this order entitled "EMPIRE-ABO UNIT AREA-Reservoir Voidage Formula - Gas and Water Injection Credit" utilizing the reservoir and fluid data set forth in Attachment "B" to this order entitled EMPIRE-ABO UNIT AREA - Table of Fluid Properties."

(4) That Rule 14 of the Special Rules and Regulations for the Empire-Abo Pressure Maintenance Project is hereby amended to read in its entirety as follows:

"RULE 14. The Secretary-Director of the Commission is hereby authorized to approve such additional producing wells and gas injection and water injection wells at orthodox and unorthodox locations within the boundaries of the ARCO Empire-Abo Unit Area as may be necessary to complete an efficient production and injection pattern, provided said wells are drilled no closer than 660 feet to the outer boundary of said unit nor closer than 10 feet to any quarter-quarter section or subdivision inner boundary and provided that no well shall be approved for gas or water injection when such well is located closer than 1650 feet to a tract which is not committed to the unit and on which is located a well producing from the same common source of supply. To obtain such approval, the project operator shall file proper application with the Commission, which application, if it seeks authorization to convert additional wells to injection or to drill additional production or injection wells shall include the following:

(1) A plat identifying the lands committed to the unit agreement and those lands not committed to said agreement, and showing the location of the proposed well, all wells within the unit area, and offset operators.

(2) A schematic drawing of the proposed well which fully describes the casing, tubing, perforated interval, and depth.

(3) A letter stating that all offset operators to the proposed well have been furnished a complete copy of the application and the date of notification.

The Secretary-Director may approve the proposed well if, within 20 days after receiving the application, no objection to the proposal is received. The Secretary-Director may grant immediate approval, provided waivers of objection are received from all offset operators."

(5) That jurisdiction of this cause is retained for the entry of such further orders as the Commission may deem necessary.

Case No. 5177
Order No. R-4549-B

DONE at Santa Fe, New Mexico, on the day and year herein-
above designated.

STATE OF NEW MEXICO
OIL CONSERVATION COMMISSION


I. R. TRUJILLO, Chairman

ALEX J. ARMIJO, Member


A. L. PORTER, Jr., Member & Secretary

S E A L

EMPIRE ABO UNIT AREA

Reservoir Voidage Formula - Gas and Water Injection Credit

$$\text{Equation 1: } V_{rvb} = Q_o \left[B_o + (R_{pn} - R_s) B_g \right] + \left[Q_{wp} - (Q_{we} + Q_{wi}) \right] B_w$$

Where:

- V_{rvb} = Reservoir voidage, bbls. per day
- Q_o = Oil Production rate, Stock tank bbls. per day
- B_o = Oil formation volume factor (1), reservoir volumetric bbls/stock tank bbl.
- R_{pn} = Net producing gas-oil ratio, MCF/S.T.B.O.

$$R_{pn} = R_p \left(1.0 - \frac{G_i}{G_p} \right)$$

Where:

- R_p = producing gas-oil ratio, MCF/BO
- G_i = daily volume of gas injected, MCF/Day
- G_p = daily volume of gas produced, MCF/Day

- R_s = Solution gas-oil ratio (2), MCF/STBO
- B_g = Gas formation volume factor (3), RVB/MCF
- Q_{wp} = Water production rate, S.T.B.W./Day
- Q_{we} = Aquifer water influx rate, S.T.B.W./Day, determined from reservoir numeric model runs to be 1950 BWPD
- Q_{wi} = Daily volume of water injected, S.T.B.W./Day
- B_w = Water formation volume factor, RVBW/STBW, use 1.0

(1), (2), (3): These values calculated from Table of Fluid Properties, Attachment "B".

EMPIRE ABO UNIT AREA

Table of Fluid Properties

$P_{base} = 15.025$ psia, $P_{bp} = 2231$ psia, $T_{res} = 109^{\circ}$ F (569° R)

P_r (PSIA)	B_0 (RVBO/STBO)	B_g RVB/MCF	R_s (MCF/BBL)	Z
15.025	1.000	194.696	0	1.0
100	1.125	28.229	.180	.965
200	1.163	13.749	.235	.940
300	1.193	8.970	.290	.920
400	1.218	6.692	.345	.915
500	1.244	5.236	.395	.895
600	1.263	4.276	.445	.877
700	1.285	3.644	.495	.872
800	1.304	3.108	.540	.850
900	1.325	2.746	.585	.845
1000	1.344	2.437	.625	.833
1100	1.364	2.178	.675	.819
1200	1.384	1.962	.725	.805
1300	1.404	1.790	.775	.795
1400	1.425	1.649	.825	.789
1500	1.445	1.516	.875	.777
1600	1.465	1.404	.925	.768
1700	1.485	1.304	.975	.758
1800	1.505	1.220	1.025	.751
1900	1.525	1.147	1.075	.745
2000	1.548	1.053	1.125	.720
2100	1.573	1.000	1.175	.718
2200	1.597	.953	1.225	.717
2231	1.606	.939	1.250	.716

P_r = Reservoir average pressure at datum -2264' subsea, lbs/in² absolute.

B_0 = Oil formation volume factor, reservoir volumetric bbls/stock tank bbl.

B_g = Gas formation volume factor, reservoir volumetric bbls/thousand std. cu. ft.

R_s = Solution Gas/Oil Ratio, Thousand std. cu. ft/stock tank bbls. oil.

Z = Gas Compressibility Factor.

BEFORE THE OIL CONSERVATION COMMISSION
OF THE STATE OF NEW MEXICO

IN THE MATTER OF THE HEARING
CALLED BY THE OIL CONSERVATION
COMMISSION OF NEW MEXICO FOR
THE PURPOSE OF CONSIDERING:

CASE NO. 5505
Order No. R-4549-C

THE APPLICATION OF THE ATLANTIC
RICHFIELD COMPANY FOR PRESSURE
MAINTENANCE PROJECT EXPANSION,
EDDY COUNTY, NEW MEXICO.

ORDER OF THE COMMISSION

BY THE COMMISSION:

This cause came on for hearing at 9 a.m. on June 10, 1975,
at Santa Fe, New Mexico, before Examiner Daniel S. Nutter.

NOW, on this 1st day of July, 1975, the Commission, a
quorum being present, 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 Commission has jurisdiction of this cause and the
subject matter thereof.

(2) That the applicant, The Atlantic Richfield Company,
is the operator of the Empire-Abo Pressure Maintenance Project,
Empire-Abo Pool, Eddy County, New Mexico, which project was
authorized by Commission Order No. R-4549, expanded by Order
No. R-4549-A, and is operated pursuant to Special Rules and
Regulations promulgated by Order No. R-4549, as amended by
Orders Nos. R-4549-A and R-4549-B.

(3) That the applicant seeks the further expansion of
the pressure maintenance project area as defined by said
Order No. R-4549 and expanded by said Order No. R-4549-A by
the inclusion of the following described lands, which are to
be committed to the Empire Abo Unit Area:

TOWNSHIP 17 SOUTH, RANGE 28 EAST, NMPM
Section 27: SE/4 SW/4, being 40.00 acres

TOWNSHIP 18 SOUTH, RANGE 28 EAST, NMPM
Section 4: NE/4 NE/4, being 40.03 acres
Section 5: SE/4 NW/4, being 40.00 acres

(4) That in conjunction with the expansion of said project area, applicant also seeks the amendment of Rule 3 of the Special Rules and Regulations for the Empire Abo Pressure Maintenance Project as promulgated by Order No. R-4549 and amended by Orders Nos. R-4549-A and R-4549-B to provide that the maximum daily project allowable will result in average daily reservoir voidage no greater than the reservoir voidage in the project area, as expanded, for calendar year 1972 (56,912 reservoir barrels) or 33,242 barrels of oil per day, whichever is less, except that when injection of 95 percent of all available residue gas is achieved, the project allowance would be an amount of oil no greater than would result in average daily reservoir voidage in the project area, as expanded, for calendar year 1972 (56,912 reservoir barrels) or 41,041 barrels of oil per day, whichever is less.

(5) That to accomplish the aforesaid increase in project base allowable and maximum project allowable, certain modifications to Rule 4 of the project rules would be necessary.

(6) That the proposed expansion of the Empire-Abo Pressure Maintenance Project Area and the concurrent increase in base allowable and maximum project allowable is in the interest of increased recovery of oil and gas, will prevent waste and will not violate correlative rights, and should be approved.

IT IS THEREFORE ORDERED:

(1) That the project area for the Empire-Abo Pressure Maintenance Project is hereby expanded to include therein:

TOWNSHIP 17 SOUTH, RANGE 28 EAST, NMPM
Section 27: SE/4 SW/4

TOWNSHIP 18 SOUTH, RANGE 28 EAST, NMPM
Section 4: NE/4 NE/4
Section 5: SE/4 NW/4

being 120.03 acres, all in Eddy County, New Mexico.

(2) That Rule 3 of the Special Rules and Regulations for the Empire-Abo Pressure Maintenance Project as promulgated by Order No. R-4549, as amended by Orders Nos. R-4549-A and R-4549-B, is hereby amended to read in its entirety as follows:

"RULE 3. That the maximum daily project allowable shall be an amount of oil which will result in reservoir voidage no greater than the average daily reservoir voidage in the project area for calendar year 1972 (56,912 reservoir barrels) or 33,242 barrels of oil per day,

whichever is less, except that when injection of 95 percent of all available residue gas is achieved, the maximum daily project allowable shall be an amount of oil which will result in reservoir voidage no greater than the average daily reservoir voidage in the project area for calendar year 1972 (56,912 reservoir barrels) or 41,041 barrels of oil per day, whichever is less."

(3) That Rule 4 of the Special Rules and Regulations for the Empire-Abo Pressure Maintenance Project is hereby amended to read in its entirety as follows:

"RULE 4. That upon commencement of gas injection and for as long thereafter as such injection continues, extra allowable in addition to the 33,242 barrels per day described above may be assigned to the project area, provided that such additional allowable shall be based upon the proportion of residue gas available for injection which is actually injected into the unitized formation and shall be computed in accordance with the following formula:

Additional Allowable
in Excess of 33,242 = 41.05
BOPD

$$\left[2 \left(\frac{\text{MCF gas inj. previous month} \times 10}{\text{MCF residue gas available prev. month}} \right) \right]^2 + \left(\frac{\text{MCF gas inj. previous month} \times 10}{\text{MCF residue gas available previous month}} \right)$$

2

That the maximum additional allowable which may be earned by gas injection shall be 7,799 barrels per day. That this maximum may be earned by the injection of 95 percent of the available residue gas into the unitized formation; that gas volumes in excess of said 95 percent which are injected into the unitized formation shall be credited each month to a gas injection bank account which shall be permitted to accrue such gas injection credits up to 100 percent of the average of the total monthly injection volumes for the three previous months, not including the month being reported; that during such times as injection well failures, injection plant shutdowns, and other temporary conditions of unforeseen nature which prevent the injection of at least 95 percent of the available residue gas, said gas injection bank account may be charged a sufficient volume to add to the actual volume of injection achieved to equal 95 percent of the available residue gas for the month. In the event there are insufficient credits accrued to the

gas injection bank account to bring actual injection plus applied credits up to 95 percent of available residue gas, production shall be reduced to 33,242 barrels of oil per day plus the amount which the actual injection plus the accrued credits will actually earn. Production beyond this amount shall be considered overproduction and shall be compensated for by underproduction during the following month.

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.

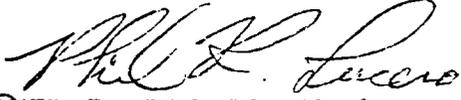
No raw gas nor plant residue gas attributable to the project shall be sold or otherwise disposed of by any means other than injection into the unitized formation except during emergency situations of temporary nature."

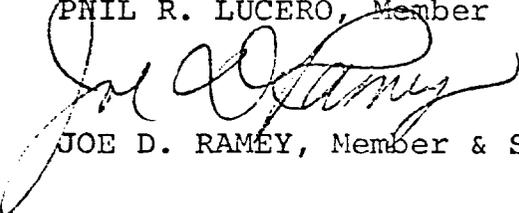
(4) That the effective date of this order shall be the effective date of ratification of the unit agreement by the parties concerned.

(5) That jurisdiction of this cause is retained for the entry of such further orders as the Commission may deem necessary.

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

STATE OF NEW MEXICO
OIL CONSERVATION COMMISSION


PHIL R. LUCERO, Member


JOE D. RAMEY, Member & Secretary

S E A L

dr/

BEFORE THE OIL CONSERVATION COMMISSION
OF THE STATE OF NEW MEXICO

IN THE MATTER OF THE HEARING
CALLED BY THE OIL CONSERVATION
COMMISSION OF NEW MEXICO FOR
THE PURPOSE OF CONSIDERING:

CASE NO. 5577
Order No. R-4549-D

APPLICATION OF ATLANTIC RICHFIELD
COMPANY FOR AMENDMENT OF ORDER NO.
R-4549, AS AMENDED, EDDY COUNTY,
NEW MEXICO.

ORDER OF THE COMMISSION

BY THE COMMISSION:

This cause came on for hearing at 9 a.m. on October 22, 1975, at Santa Fe, New Mexico, before Examiner Daniel S. Nutter.

NOW, on this 17th day of November, 1975, the Commission, a quorum being present, 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 Commission has jurisdiction of this cause and the subject matter thereof.
- (2) That pursuant to Commission Order No. R-4549, dated June 15, 1973, as amended by Orders Nos. R-4549-A, R-4549-B, and R-4549-C, dated January 15, 1974, April 30, 1974, and July 1, 1975, respectively, the applicant Atlantic Richfield Company is conducting pressure maintenance operations in the Empire Abo Unit Area, Empire-Abo Pool, Eddy County, New Mexico.
- (3) That said pressure maintenance operations include the reinjection of casinghead gas produced from said Empire-Abo Pool back into the reservoir from which it came.
- (4) That even with the reinjection of all available casinghead gas produced from said pool, there still remains considerable reservoir voidage resulting from the production of liquid hydrocarbons from the reservoir.
- (5) That the applicant seeks to minimize this reservoir voidage by the injection into the Abo formation of extraneous gas brought in from other sources.

(6) That the injection of from 25 million to 35 million cubic feet of extraneous gas per day into the Abo formation will virtually eliminate the net voidage of the reservoir underlying the Empire Abo Unit Area, will result in the recovery of additional oil, thereby enhancing the recovery of oil from the reservoir and otherwise prevent waste, will not impair correlative rights, and should be approved.

IT IS THEREFORE ORDERED:

(1) That the Special Rules and Regulations for the Empire-Abo Pressure Maintenance Project, as promulgated by Commission Order No. R-4549, and as amended by Commission Order Nos. R-4549-A, R-4549-B, and R-4549-C, are hereby further amended by the addition of the following Rule 4(A):

"RULE 4(A).

That in addition to the injection of available residue gas and the establishment of an available residue gas injection bank as described in Rules 3 and 4 above, 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 Commission each month concurrently with the project operator's "Empire-Abo Pressure Maintenance Project Monthly Report" and "Abo Gas Bank Statement", 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."

(2) That jurisdiction of this cause is retained for the entry of such further orders as the Commission may deem necessary.

DONE at Santa Fe, New Mexico, on the day and year herein-
above designated.

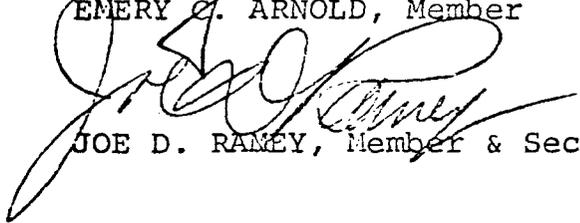
STATE OF NEW MEXICO
OIL CONSERVATION COMMISSION



PHIL R. LUCERO, Chairman



EMERY C. ARNOLD, Member



JOE D. RAMEY, Member & Secretary

S E A L

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. 6742
Order No. R-4549-E

APPLICATION OF ARCO OIL AND GAS
COMPANY FOR AN ADMINISTRATIVE
PROCEDURE, EDDY COUNTY, NEW MEXICO.

ORDER OF THE DIVISION

BY THE DIVISION:

This cause came on for hearing at 9 a.m. on November 28, 1979, at Santa Fe, New Mexico, before Examiner Richard L. Stamets.

NOW, on this 28th day of January, 1980, 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 and 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 included in said order as amended by Orders Nos. R-4549-A through R-4549-D.

(3) That the applicant seeks the amendment of Rule 14 of the Special Rules and Regulations for said project adopted by Order No. R-4549, as amended, to additionally provide for an administrative procedure for authorizing the drilling, for production or injection purposes, of "horizontal drainholes" within such project.

(4) That the drilling of said horizontal drainholes within the boundaries of said project should result in the recovery of oil and gas therefrom which might not otherwise

EXHIBIT "A"
ORDER NO. R-4549-E

RULE 14 A. The Director of the Division is hereby authorized to approve such additional producing wells and gas injection and water injection wells at orthodox and un-orthodox locations within the boundaries of the ARCO Empire Abo Unit Area as may be necessary to complete an efficient production and injection pattern, provided said wells are drilled no closer than 660 feet to the outer boundary of said unit nor closer than 10 feet to any quarter-quarter section or subdivision inner boundary and provided that no well shall be approved for gas or water injection when such well is located closer than 1650 feet to a tract which is not committed to the unit and on which is located a well producing from the same common source of supply. To obtain such approval, the project operator shall file proper application with the Division Director, which application, if it seeks authorization to convert additional wells to injection or to drill additional production or injection wells shall include the following:

(1) A plat identifying the lands committed to the unit agreement and those lands not committed to said agreement, and showing the location of the proposed well, all wells within the unit area, and offset operators.

(2) A schematic drawing of the proposed well which fully describes the casing, tubing, perforated interval, and depth.

(3) A letter stating that all offset operators to the proposed well have been furnished a complete copy of the application and the date of notification.

RULE 14 B. The Director of the Division is hereby authorized to approve the drilling of "horizontal drainholes" for the purposes of production or injection within the boundaries of the ARCO Empire Abo Unit Area as may be necessary to complete an efficient production and injection pattern, provided no perforated or openhole portion of said wells shall be closer than 330 feet to the outer boundary of said unit or to any tract not committed to such unit nor, in the case of a well to be used for injection closer than 1650 feet to such boundary or tract. To obtain such approval, the project operator shall file proper application with the Division Director, which application, if it seeks authorization to convert additional wells to injection or to drill additional production or injection wells shall include the following:

(1) A plat identifying the lands committed to the unit agreement and those lands not committed to said agreement, and showing the location of the proposed well, all wells within the unit area, and offset operators.

(2) Schematic drawings of the proposed well which fully describes the casing, tubing, perforated or open-hole interval, kick-off point, and proposed trajectory of the drainhole section.

(3) A letter stating that all offset operators to the proposed well have been furnished a complete copy of the application and the date of notification.

RULE 14 C. The Director may approve the proposed well if, within 20 days after receiving the application, no objection to the proposal is received. The Director may grant immediate approval, provided waivers of objection are received from all offset operators.

RULE 14 D. Within 20 days following completion of any horizontal drainhole the operator shall submit a report to the Division Director with sufficient detail to locate the kick-off point and the trajectory of the deviated portion of the well bore with respect to any quarter-quarter section(s) penetrated by such well and any 40-acre tract directly or diagonally offsetting such quarter-quarter section(s).

The Director may approve the final location of the horizontal drainhole by acceptance of such report.

The Director may rescind the authority for any horizontal drainhole if the perforated or openhole portion of such hole is located closer to the unit boundary or any uncommitted tract than permitted by these rules or if it should appear that such rescission is necessary to prevent waste or protect correlative rights.

be produced thereby preventing waste.

(5) That correlative rights will not be violated provided that no perforated or openhole portion of any horizontal drainhole shall be closer than 330 feet to the outer boundary of the Empire Abo Unit or any tract not committed to said unit nor, in the case of a well to be used for injection, closer than 1650 feet to such boundary or tract.

(6) That the application for administrative procedure should be approved by amending said Rule 14 to read in its entirety as shown on Exhibit "A" attached to this order.

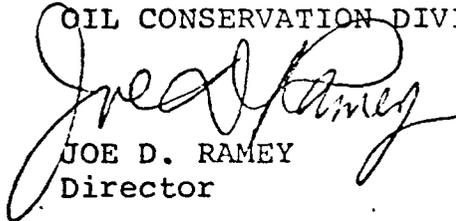
IT IS THEREFORE ORDERED:

(1) That Rule 14 of the Special Rules and Regulations for the Empire Abo Pressure Maintenance Project is hereby amended to read in its entirety as shown on Exhibit "A" to this order.

(2) 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

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rock is composed of Leonardian Age dolomitized limestone and is fractured and vugular. The average reef thickness in the Empire Abo Unit is 300' with the reef top occurring at approximately 5800'.

No major fresh water aquifers exist in this area, however, shallow triassic fresh water zones are found from approximately 300 to 350 feet. It is general practice in the area to set surface pipe in a salt section which occurs from 600 to 800 feet.

SECTION IX

The proposed stimulation programs call for treating each injection well with 7500 gal. of 15% HCL-LSTNE FEXX agent with rock salt, followed by a formation water flush. Temperature surveys will be run before and after treatment.

SECTION X

Log and test data for these wells were filed with the Division at the time of original completion.

SECTION XI

A one mile radius around the subject well is being examined for producing fresh water wells. If any are found, samples will be taken and analyzed. These reports or a statement that no producing wells were found will be forwarded as soon as possible to complete this application.

SECTION XII

The subject wells are to become part of an existing pressure maintenance project.

SECTION XIII

A copy of this application has been sent by certified mail to each leasehold operator within one-half mile of the subject wells. The surface rights are Federal and the appropriate forms have been filed with the USGS.

Since this application is subject to administrative approval, proper notice will be published in the Artesia Daily Press (see attached letter). Copies of this notice will be forwarded by the paper to Santa Fe and the Artesia district office at the time of publication.

LARGE FORMAT
EXHIBIT HAS
BEEN REMOVED
AND IS LOCATED
IN THE NEXT FILE