STATE OF NEW MEXICO
ENERGY AND MINERALS DEPARTMENT

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

FORM C-108
Revised 7-1-81

BEFORE EXAMINER
OIL CONSERVATION DIVISION
10062, 63, 64

APPLICATION FOR AUTHORIZATION TO INJECT

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

II. Operator: OXY USA INC.

Address: P. O. BOX 50250, Midland, Texas 79710

Contact party: Richard E. Foppiano Phone: 915/685-5913

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

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

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

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

VII. Attach data on the proposed operation, including:

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

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

IX. Describe the proposed stimulation program, if any.

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

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

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

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

XIV. Certification

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

Name: Richard E. Foppiano Title Regulatory Affairs Engr.

Signature: Richard E. Foppiano Date: 7-25-90

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

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

EXHIBIT 11

III. WELL DATA

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

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

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

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

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

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

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

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

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

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

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

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

XIV. PROOF OF NOTICE

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

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

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

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

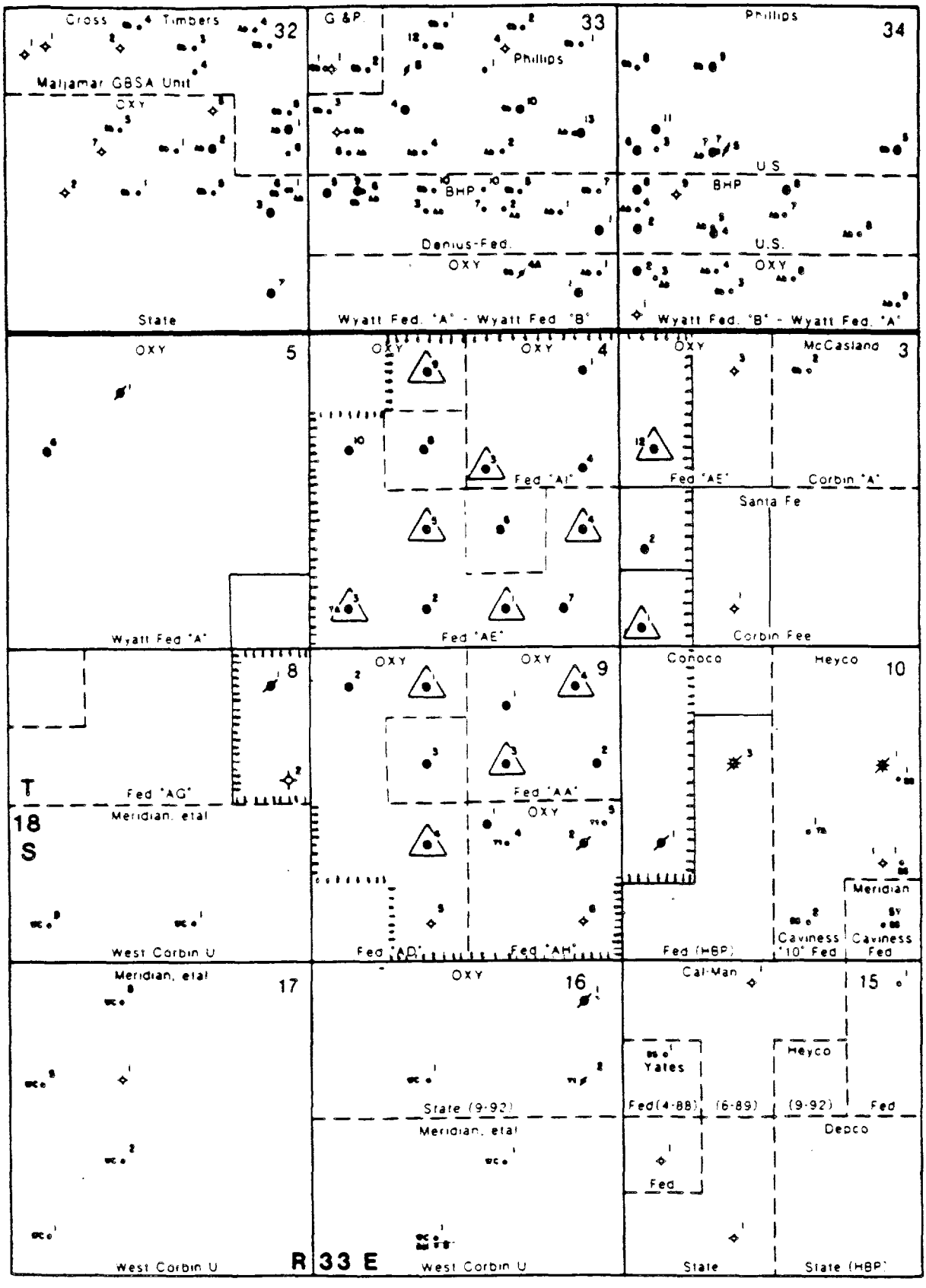
(3) the formation name and depth with expected maximum injection rates and pressures; and

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

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

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

ATTACHMENT 14



● QUEEN PRODUCER

• OTHER ZONES (Yates, Grayburg, Delaware, Abo, Bone Spring, Wolfcamp)

△ PROPOSED INJECTOR

EXHIBIT 4

CENTRAL CORBIN (QUEEN) FIELD

LEA COUNTY, NEW MEXICO

PROPOSED CONVERSION TO INJECTOR

0 — 1/2 MILE

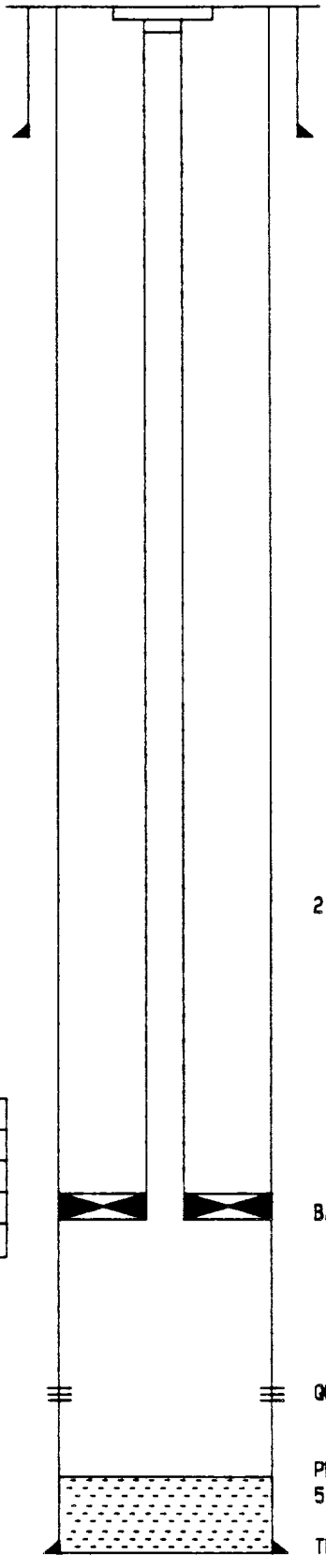
MARCH, 1990

PROPOSED TYPICAL WATER INJECTION WELL

FEDERAL AE #1
660' FSL & 1980' FEL SEC 4 T18S R33E
LEA COUNTY, NEW MEXICO

ELEVATION: KB: 4003'
GL: 3992'

TYPICAL PROPOSED WATER INJECTION WELL
IN THE CENTRAL CORBIN QUEEN FIELD
OTHER PROPOSED CONVERSIONS INCLUDE:
FEDERAL AA # 3
FEDERAL AA # 4
FEDERAL AD # 1
FEDERAL AD # 4
FEDERAL AE # 3
FEDERAL AE # 4
FEDERAL AE # 5
FEDERAL AE # 9
FEDERAL AE # 12
FEDERAL AI # 3



8 5/8" SURFACE CASING @ 388'
CMTD W/ 350 SX CMT CIRC
12 1/4" HOLE SIZE

2 3/8" 4.7# J-55 PLASTIC COATED TBG

BAKER MODEL AD-1 PKR @ 4170'

QUEEN PERFS (4221' - 4241')

PBTD @ 4256'
5 1/2" CSG @ 4300' CMTD W/ 1250 SX
CMT CIRC 7 7/8" HOLE SIZE
TD @ 4300'

	SURFACE	PRODUCTION	TUBING
SIZE	8 5/8"	5 1/2"	2 3/8"
WEIGHT	24 #	14 #	4.7 #
GRADE	K-55	K-55	J-55
THREAD	ST&C	ST&C	8rd EUE
DEPTH	388'	4300'	4170'

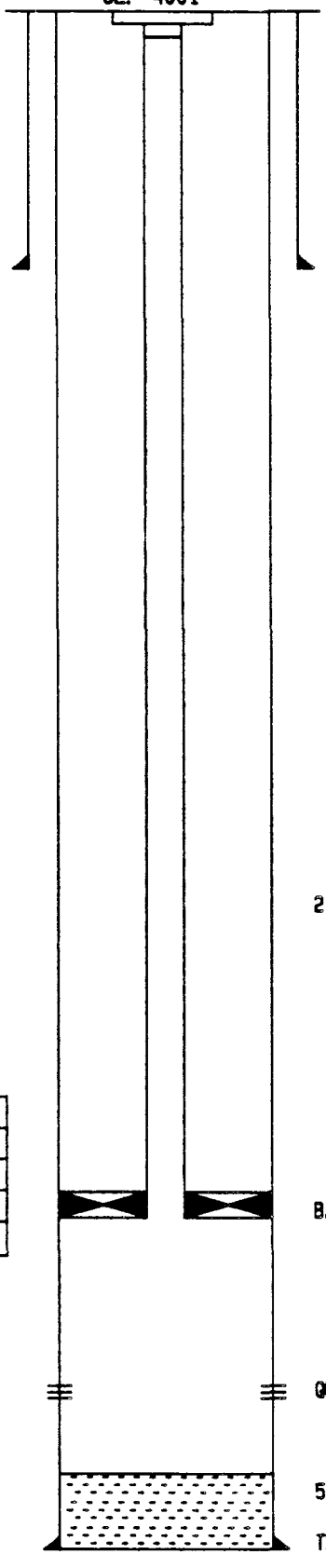
PREPRD BY: SCOTT E. GENGLER
DATE : JULY 12, 1990

EXHIBIT 7
Wellbore Schematics for
proposed injection wells

PROPOSED TYPICAL WATER INJECTION WELL

SANTA FE - CORBIN FEE #1
330' FSL & 330' FWL SEC 3 T18S R33E
LEA COUNTY, NEW MEXICO

ELEVATION: KB: 4009'
GL: 4001'



8 5/8" SURFACE CASING @ 1528'
CMTD W/ 710 SX CMT CIRC
12 1/4" HOLE SIZE

2 3/8" 4.7# J-55 PLASTIC COATED TBG

BAKER MODEL AD-1 PKR @ 4170'

QUEEN PERFS (4219' - 4266')

5 1/2" CSG @ 5052' CMTD W/ 800 SX
7 7/8" HOLE SIZE TOC - N.A.
TD @ 5052'

	SURFACE	PRODUCTION	TUBING
SIZE	8 5/8"	5 1/2"	2 3/8"
WEIGHT	24 #	17 #	4.7 #
GRADE	K-55	K-55	J-55
THREAD	STBC	STBC	8rd. EUE
DEPTH	1528'	5052'	4170'

PREPRD BY: SCOTT E. GENGLER
DATE : JULY 13, 1990

WELL Federal AA # 3

LOCATION 1980' FNL & FEL, Sec. 9, T-18-S, R-33-E, Lea County, NM

CURRENT OPERATOR OXY USA Inc.

1. Name of the Injection formation Queen

2. Name of Field or Pool Central Corbin Queen

3. Injection Interval 4236' - 4262' Open Hole ____ Perforated X

4. Was this well drilled for injection No

If not, for what purpose was the well originally drilled? Producer

5. Has the well ever been perforated in any other zones? No

List all such perforated intervals and give plugging detail. ____

6. Give the depth to and name of any overlying and/or underlying oil or gas zones in this area?

Yates - 3024'

EXHIBIT 6

Well data sheets

WELL Federal AA # 4

LOCATION 660' FNL & 790' FEL, Sec. 9, T-18-S, R-33-E, Lea County, NM

CURRENT OPERATOR OXY USA Inc.

1. Name of the Injection formation Queen

2. Name of Field or Pool Central Corbin Queen

3. Injection Interval 4213' - 4242' Open Hole ____ Perforated X

4. Was this well drilled for injection No

If not, for what purpose was the well originally drilled? Producer

5. Has the well ever been perforated in any other zones? No

List all such perforated intervals and give plugging detail. ____

6. Give the depth to and name of any overlying and/or underlying oil or gas zones in this area?

Yates - 3020'

WELL Federal AD # 1

LOCATION 660' FNL & 1980' FWL, Sec. 9, T-18-S, R-33-E, Lea County, NM

CURRENT OPERATOR OXY USA Inc.

1. Name of the Injection formation Queen

2. Name of Field or Pool Central Corbin Queen

3. Injection Interval 4206' - 4232' Open Hole ____ Perforated X

4. Was this well drilled for injection No

If not, for what purpose was the well originally drilled? Producer

5. Has the well ever been perforated in any other zones? No

List all such perforated intervals and give plugging detail.

6. Give the depth to and name of any overlying and/or underlying oil or gas zones in this area?

Yates - 2992'

WELL Federal AD # 4

LOCATION 1980' FSL & FWL, Sec. 9, T-18-S, R-33-E, Lea County, NM

CURRENT OPERATOR OXY USA Inc.

1. Name of the Injection formation Queen

2. Name of Field or Pool Central Corbin Queen

3. Injection Interval 4258' - 4271' Open Hole ____ Perforated X

4. Was this well drilled for injection No

If not, for what purpose was the well originally drilled? Producer

5. Has the well ever been perforated in any other zones? No

List all such perforated intervals and give plugging detail.

6. Give the depth to and name of any overlying and/or underlying oil or gas zones in this area?

Yates - 3016'

WELL Federal AE # 1

LOCATION 660' FSL & 1980' FEL, Sec. 4, T-18-S, R-33-E, Lea County, NM

CURRENT OPERATOR OXY USA Inc.

1. Name of the Injection formation Queen

2. Name of Field or Pool Central Corbin Queen

3. Injection Interval 4221' - 4241' Open Hole ____ Perforated X

4. Was this well drilled for injection No

   If not, for what purpose was the well originally drilled? Producer

5. Has the well ever been perforated in any other zones? No

   List all such perforated intervals and give plugging detail. ____

6. Give the depth to and name of any overlying and/or underlying oil or gas zones in this area?

   Yates - 3005'

WELL Federal AE # 3

LOCATION 660' FSL & FWL, Sec. 4, T-18-S, R-33-E, Lea County, NM

CURRENT OPERATOR OXY USA Inc.

1. Name of the Injection formation Queen

2. Name of Field or Pool Central Corbin Queen

3. Injection Interval 4243' - 4247' Open Hole ____ Perforated X

4. Was this well drilled for injection No

If not, for what purpose was the well originally drilled? Producer

5. Has the well ever been perforated in any other zones? Yes

List all such perforated intervals and give plugging detail. Yates (3029' - 4120')

Squeezed with 500 sacks cement

6. Give the depth to and name of any overlying and/or underlying oil or gas zones in this area?

Yates - 3014'

WELL Federal AE # 4

LOCATION 1980' FSL & 660' FEL, Sec. 4, T-18-S, R-33-E, Lea County, NM

CURRENT OPERATOR OXY USA Inc.

1. Name of the Injection formation Queen

2. Name of Field or Pool Central Corbin Queen

3. Injection Interval 4200' - 4217' Open Hole ____ Perforated X

4. Was this well drilled for injection No

If not, for what purpose was the well originally drilled? Producer

5. Has the well ever been perforated in any other zones? No

List all such perforated intervals and give plugging detail. ____

6. Give the depth to and name of any overlying and/or underlying oil or gas zones in this area?

Yates - 3013'

WELL Federal AE # 5

LOCATION 1980' FSL & FWL, Sec. 4, T-18-S, R-33-E, Lea County, NM

CURRENT OPERATOR OXY USA Inc.

1. Name of the Injection formation Queen

2. Name of Field or Pool Central Corbin Queen

3. Injection Interval 4174' - 4180' Open Hole ____ Perforated X

4. Was this well drilled for injection No

If not, for what purpose was the well originally drilled? Producer

5. Has the well ever been perforated in any other zones? No

List all such perforated intervals and give plugging detail. ____

6. Give the depth to and name of any overlying and/or underlying oil or gas zones in this area?

Yates - 3012'

WELL Federal AE # 9

LOCATION 660' FNL & 1980' FWL, Sec. 4, T-18-S, R-33-E, Lea County, NM

CURRENT OPERATOR OXY USA Inc.

1. Name of the Injection formation Queen

2. Name of Field or Pool Central Corbin Queen

3. Injection Interval 4152' - 4166' Open Hole ____ Perforated X

4. Was this well drilled for injection No

   If not, for what purpose was the well originally drilled? Producer

5. Has the well ever been perforated in any other zones? No

   List all such perforated intervals and give plugging detail. ____

6. Give the depth to and name of any overlying and/or underlying oil or gas zones in this area?

   Yates - 2963'

WELL Federal AE # 12

LOCATION 1980' FNL & 560' FWL, Sec. 3, T-18-S, R-33-E, Lea County, NM

CURRENT OPERATOR OXY USA Inc.

1. Name of the Injection formation Queen

2. Name of Field or Pool Central Corbin Queen

3. Injection Interval 4211' - 4215' Open Hole ____ Perforated X

4. Was this well drilled for injection No

If not, for what purpose was the well originally drilled? Producer

5. Has the well ever been perforated in any other zones? No

List all such perforated intervals and give plugging detail. ____

6. Give the depth to and name of any overlying and/or underlying oil or gas zones in this area?

Yates - 3022'

WELL Federal AI # 3

LOCATION 2310' FNL & 2310' FEL, Sec. 4, T-18-S, R-33-E, Lea County, NM

CURRENT OPERATOR OXY USA Inc.

1. Name of the Injection formation Queen

2. Name of Field or Pool Central Corbin Queen

3. Injection Interval 4163' - 4440' Open Hole ____ Perforated X

4. Was this well drilled for injection No

If not, for what purpose was the well originally drilled? Producer

5. Has the well ever been perforated in any other zones? No

List all such perforated intervals and give plugging detail. ____

6. Give the depth to and name of any overlying and/or underlying oil or gas zones in this area?

Yates - 2975'

WELL Corbin Fee # 1

LOCATION 330' FSL & 330' FWL, Sec. 3, T-18-S, R-33-E, Lea County, NM

CURRENT OPERATOR Santa Fe

1. Name of the Injection formation Queen

2. Name of Field or Pool Central Corbin Queen

3. Injection Interval 4219' - 4266' Open Hole ____ Perforated X

4. Was this well drilled for injection No

   If not, for what purpose was the well originally drilled? Producer

5. Has the well ever been perforated in any other zones? No

   List all such perforated intervals and give plugging detail. ____

6. Give the depth to and name of any overlying and/or underlying oil or gas zones in this area?

   Yates - N.A.

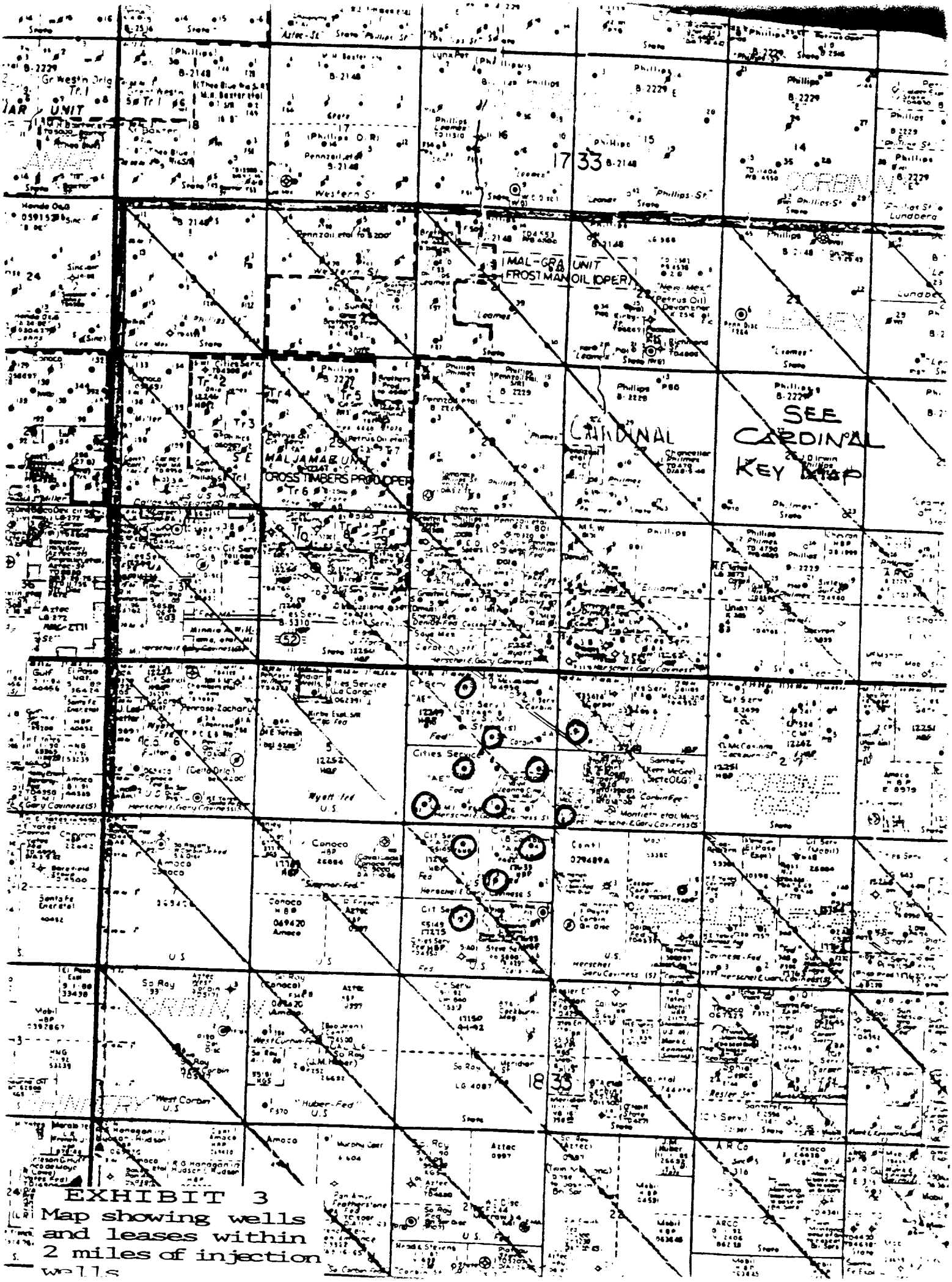
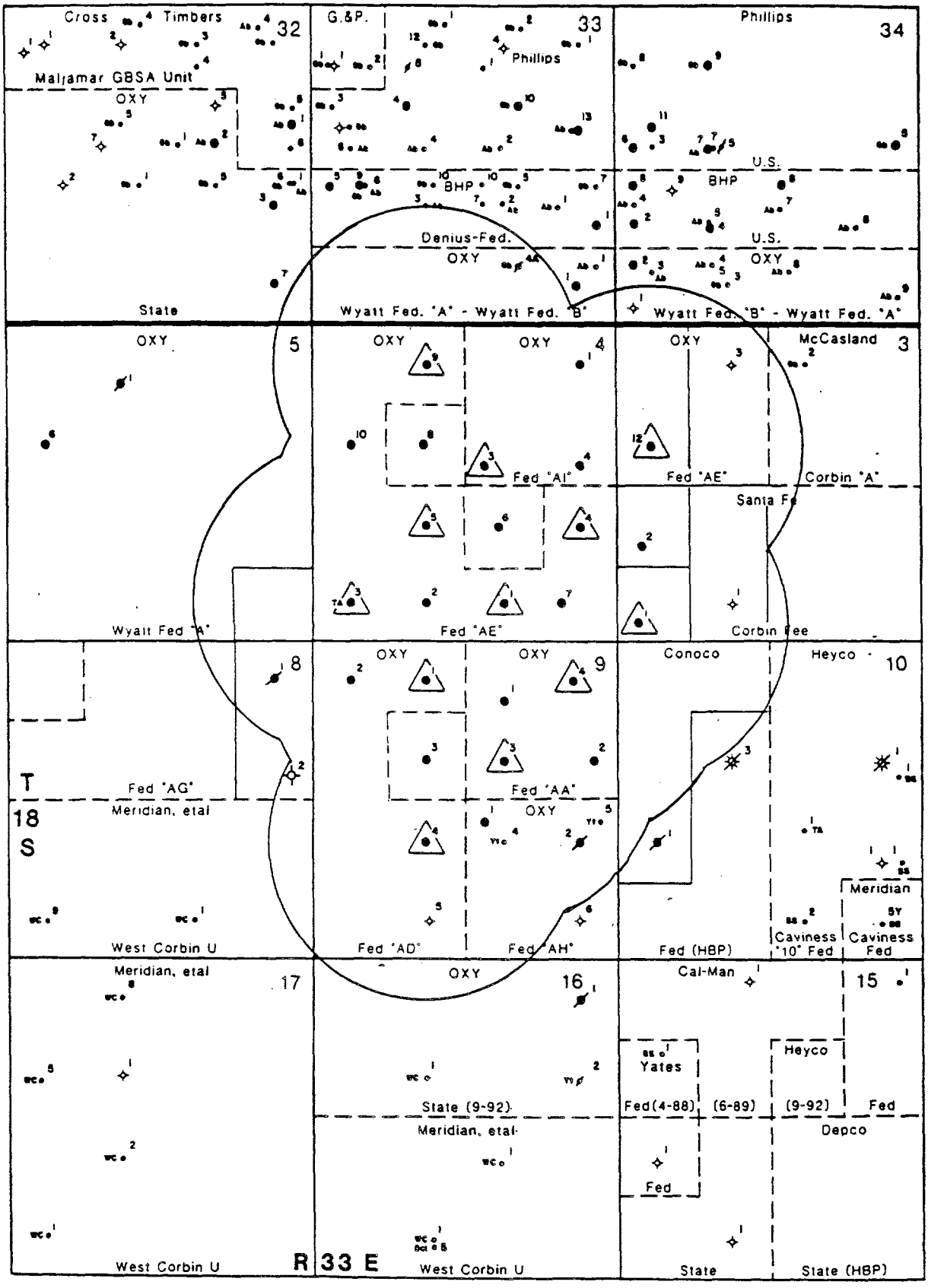


EXHIBIT 3

Map showing wells and leases within 2 miles of injection wells



● QUEEN PRODUCER

• OTHER ZONES { Yates, Grayburg, Delaware, Abo, Bone Spring, Wolfcamp

△ PROPOSED INJECTOR

CENTRAL CORBIN (QUEEN) FIELD

LEA COUNTY, NEW MEXICO

MAP IDENTIFYING ALL WELLS AND LEASES WITHIN 1/2 MILE OF EACH PROPOSED INJECTION WELL (AREA OF REVIEW)

0 — 1/2 MILE

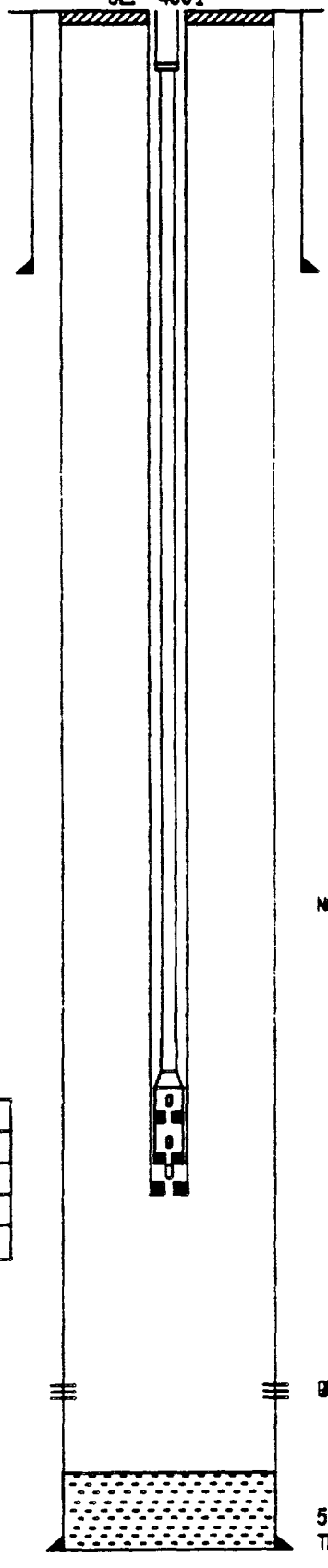
JULY, 1990

SANTA FE - CORBIN FEE #1
330' FSL & 330' FWL SEC 3 T18S R33E
LEA COUNTY, NEW MEXICO

ELEVATION: KB: 4009'
GL: 4001'

DATE DRILLED : 2/85

TOP OF QUEEN : 4219'



8 5/8" SURFACE CASING @ 1528'
CMTD W/ 710 SX CMT CIRC

NO TUBING DATA AVAILABLE

QUEEN PERFS (4219' - 4266')

5 1/2" CSG @ 5052' CMTD W/ 800 SX
TD @ 5052'

	SURFACE	PRODUCTION	
SIZE	8 5/8"	5 1/2"	
WEIGHT	24 #	17 #	
GRADE	K-55	K-55	
THREAD	STBC	STBC	
DEPTH	1528'	5052'	

PREPRD BY: SCOTT E. GENGLER
DATE : JULY 13, 1990

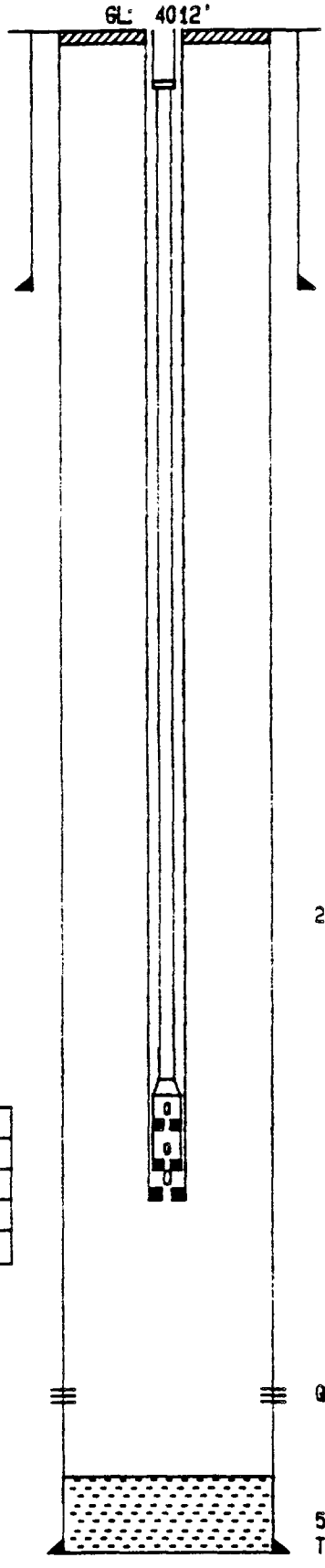
EXHIBIT 8

SANTA FE - CORBIN FEE #2
1650' FSL & 330' FWL SEC 3 T18S R33E
LEA COUNTY, NEW MEXICO

ELEVATION: KB: 4021'
GL: 4012'

DATE DRILLED : 11/85

TOP OF QUEEN : 4194'



8 5/8" SURFACE CASING @ 1554'
CMTD W/ 710 SX CMT CIRC

2 3/8" 4.7# J-55 TBG @ 4240'

QUEEN PERFS (4224' - 4234')

5 1/2" CSG @ 5200' CMTD W/ 350 SX
TD @ 5200'

	SURFACE	PRODUCTION	
SIZE	8 5/8"	5 1/2"	
WEIGHT	N.A.	N.A.	
GRADE	N.A.	N.A.	
THREAD	N.A.	N.A.	
DEPTH	1528'	5200'	

PREPRD BY: SCOTT E. GENGLER
DATE : JULY 13, 1990

EXHIBIT 8

FEDERAL AE #12
1980' FNL & 560' FWL SEC 3 T18S R33E
LEA COUNTY, NEW MEXICO

ELEVATION: KB: 4036'
GL: 4025'

DATE DRILLED : 1/87

TOP OF YATES : 3022'
TOP OF QUEEN : 4180'

8 5/8" SURFACE CASING @ 372'
CMTD W/ 300 SX CMT CIRC

1 JT 2 3/8" TBG W/ NOTCHED COLLAR	31.60
1 - 2 3/8" SN	1.10
135 JTS 2 3/8" 4.7# J55 TBG	4174.92
TOTAL	4207.82
KB	11.00
SET AT	4218.82

RODS : 164 3/4" CLASS D STEEL

PUMP : 2" X 1 1/4" X 16' X 20'

	SURFACE	PRODUCTION	TUBING
SIZE	8 5/8"	5 1/2"	2 3/8"
WEIGHT	24 #	14 #	4.7 #
GRADE	K-55	K-55	J-55
THREAD	STBC	STBC	8rd EUE
DEPTH	372'	4300'	4219'

2 3/8" SN @ 4156'

2 3/8" TBG W/ NOTCHED COLLAR @ 4219'

QUEEN PERFS (4211' - 4215')

PBTD @ 4260'
5 1/2" CSG @ 4300' CMTD W/ 1500 SX
TD @ 4300' CMT CIRC

PREPRD BY: SCOTT E. GENGLER
DATE : JULY 12, 1990

EXHIBIT 8

FEDERAL AE #1
660' FSL & 1980' FEL SEC 4 T18S R33E
LEA COUNTY, NEW MEXICO

ELEVATION: KB: 4003'
GL: 3992'

DATE DRILLED : 11/85

TOP OF YATES : 3005'
TOP OF QUEEN : 4193'

8 5/8" SURFACE CASING @ 388'
CMTD W/ 350 SX CMT CIRC

1 - 2 3/8" MUD ANCHOR W/ BP	30.83
1 - 2 3/8" PERF SUB	4.12
1 - 2 3/8" SN	1.10
4 JTS 2 3/8" 4.7# J-55 TBG	124.48
1 - 5 1/2" TRICO TAC	3.60
130 JTS 2 3/8" 4.7# J55 TBG	4036.87
TOTAL	4201.00
KB	11.00
SET AT	4212.00

RODS : 166 3/4" CLASS D STEEL

PUMP : 2" X 1 1/4" X 16' X 20'

TAC @ 4045'

	SURFACE	PRODUCTION	TUBING
SIZE	8 5/8"	5 1/2"	2 3/8"
WEIGHT	24 #	14 #	4.7 #
GRADE	K-55	K-55	J-55
THREAD	ST&C	ST&C	8rd EUE
DEPTH	388'	4300'	4212'

2 3/8" SN @ 4176'

2 3/8" MUD ANCHOR @ 4212'

QUEEN PERFS (4221' - 4241')

PBTD @ 4256'
5 1/2" CSG @ 4300' CMTD W/ 1250 SX
TD @ 4300' CMT CIRC

PREPRD BY: SCOTT E. GENGLER
DATE : JULY 12, 1990

EXHIBIT 8

FEDERAL AE #2
660' FSL & 1980' FWL SEC 4 T18S R33E
LEA COUNTY, NEW MEXICO

ELEVATION: KB: 3991'
GL: 3979'

DATE DRILLED : 10/85

TOP OF YATES : 2982'
TOP OF QUEEN : 4178'

8 5/8" SURFACE CASING @ 394'
CMTD W/ 350 SX CMT CIRC

1 JT 2 3/8" TBG W/NOTCHED COLLAR	31.11
1 - 2 3/8" SN	1.10
135 JTS 2 3/8" 4.7# J55 TBG	4160.42
TOTAL	4192.63
KB	10.00
SET AT	4102.63

RODS : 166 3/4" CLASS D STEEL

PUMP : 2" X 1 1/4" X 16' X 20'

	SURFACE	PRODUCTION	TUBING
SIZE	8 5/8"	5 1/2"	2 3/8"
WEIGHT	24 #	14 #	4.7 #
GRADE	K-55	K-55	J-55
THREAD	ST&C	ST&C	8rd EUE
DEPTH	394'	4300'	4212'

2 3/8" SN @ 4171'

2 3/8" TBG W/ NOTCHED COLLAR @ 4103'

QUEEN PERFS (4207' - 4226')

PBTD @ 4256'
5 1/2" CSG @ 4300' CMTD W/ 1250 SX
TD @ 4300' CMT CIRC

PREPRD BY: SCOTT E. GENGLER
DATE : JULY 12, 1990

EXHIBIT 8

FEDERAL AE #3
660' FSL & 660' FWL SEC 4 T18S R33E
LEA COUNTY, NEW MEXICO

ELEVATION: KB: 4006'
GL: 3994'

DATE DRILLED : 11/85

TOP OF YATES : 3014'
TOP OF QUEEN : 4216'

8 5/8" SURFACE CASING @ 378'
CMTD W/ 250 SX CMT CIRC

	SURFACE	PRODUCTION	TUBING
SIZE	8 5/8"	5 1/2"	
WEIGHT	24 #	14 #	
GRADE	K-55	K-55	
THREAD	STEC	STEC	
DEPTH	378'	4325'	

YATES PERFS (3029' - 4120') SQZD

CIBP & PBTD @ 4200'

QUEEN PERFS (4243' - 4247')

ORIGINAL PBTD @ 4279'
5 1/2" CSG @ 4325' CMTD W/ 1300 SX
TD @ 4325' CMT CIRC

PREPRD BY: SCOTT E. GENGLER
DATE : JULY 12, 1990

EXHIBIT 8

FEDERAL AE #4
1980' FSL & 660' FEL SEC 4 T18S R33E
LEA COUNTY, NEW MEXICO

ELEVATION: KB: 4022'
GL: 4010'

DATE DRILLED : 9/86

TOP OF YATES : 3013'
TOP OF QUEEN : 4178'

8 5/8" SURFACE CASING @ 350'
CMTD W/ 300 SX CMT CIRC

1 - 2 3/8" NOTCHED & PINNED COLLAR	0.43
1 JT 2 3/8" 4.7# J-55 TBG	31.10
1 - 2 3/8" SN	1.10
2 JTS 2 3/8" 4.7# J-55 TBG	61.56
1 - 5 1/2" TRICO TAC	2.90
131 JTS 2 3/8" 4.7# J55 TBG	4083.92
TOTAL	4180.51
KB	10.00
SET AT	4190.51

RODS : 163 3/4" CLASS D STEEL

PUMP : 2" X 1 1/4" X 16' X 20'

TAC @ 4093'

	SURFACE	PRODUCTION	TUBING
SIZE	8 5/8"	5 1/2"	2 3/8"
WEIGHT	24 #	14 #	4.7 #
GRADE	K-55	K-55	J-55
THREAD	STEC	STEC	8rd EUE
DEPTH	350'	4350'	4191'

2 3/8" SN @ 4158'

2 3/8" MUD ANCHOR @ 4191'

QUEEN PERFS (4200' - 4217')

PBTD @ 4314'
5 1/2" CSG @ 4350' CMTD W/ 1400 SX
TD @ 4350' CMT CIRC

PREPRD BY: SCOTT E. GENGLER
DATE : JULY 12, 1990

EXHIBIT 8

FEDERAL AE #5
1980' FSL & FWL SEC 4 T18S R33E
LEA COUNTY, NEW MEXICO

ELEVATION: KB: 4012'
GL: 4000'

DATE DRILLED : 11/85

TOP OF YATES : 3012'
TOP OF QUEEN : 4218'

8 5/8" SURFACE CASING @ 383'
CMTD W/ 300 SX CMT CIRC

1 - 2 3/8" MUD ANCHOR W/ BP	31.93
1 - 2 3/8" PERF SUB	3.80
1 - 2 3/8" SN	1.10
2 JTS 2 3/8" 4.7# J-55 TBG	58.18
1 - 5 1/2" GUIB TAC	3.60
130 JTS 2 3/8" 4.7# J55 TBG	4101.42
TOTAL	4200.03
KB	11.00
SET AT	4211.03

RODS : 165 3/4" CLASS D STEEL

PUMP : 2" X 1 1/4" X 16' X 20'

TAC @ 4112'

	SURFACE	PRODUCTION	TUBING
SIZE	8 5/8"	5 1/2"	2 3/8"
WEIGHT	24 #	14 #	4.7 #
GRADE	K-55	K-55	J-55
THREAD	STGC	STGC	8rd EUE
DEPTH	383'	4280'	4211'

2 3/8" SN @ 4174'

2 3/8" MUD ANCHOR @ 4211'

QUEEN PERFS (4174' - 4180')

PREPRD BY: SCOTT E. GENGLER
DATE : JULY 12, 1990

PBTD @ 4240'
5 1/2" CSG @ 4280' CMTD W/ 1150 SX
TD @ 4280' CMT CIRC

EXHIBIT 8

FEDERAL AE #6
1980' FSL & 2067' FEL SEC 4 T18S R33E
LEA COUNTY, NEW MEXICO

ELEVATION: KB: 4014'
GL: 4002'

DATE DRILLED : 1/86

TOP OF YATES : 2992'
TOP OF QUEEN : 4170'

8 5/8" SURFACE CASING @ 350'
CMTD W/ 300 SX CMT CIRC

1 - 2 3/8" NOTCHED & PINNED COLLAR	0.40
1 JT 2 3/8" 4.7# J-55 TBG	30.42
1 - 2 3/8" SN	1.10
2 JTS 2 3/8" 4.7# J-55 TBG	65.73
1 - 5 1/2" GUIB TAC	2.80
131 JTS 2 3/8" 4.7# J55 TBG	4119.84
TOTAL	4220.29
KB	12.00
SET AT	4232.29

RODS : 165 3/4" CLASS D STEEL

PUMP : 2" X 1 1/4" X 16' X 20'

TAC @ 4128'

	SURFACE	PRODUCTION	TUBING
SIZE	8 5/8"	5 1/2"	2 3/8"
WEIGHT	24 #	14 #	4.7 #
GRADE	K-55	K-55	J-55
THREAD	STEC	STEC	8rd EUE
DEPTH	350'	4300'	4232'

2 3/8" SN @ 4197'

2 3/8" MUD ANCHOR @ 4232'

QUEEN PERFS (4184' - 4215')

PREPRD BY: SCOTT E. GENGLER
DATE : JULY 12, 1990

PBTD @ 4252'
5 1/2" CSG @ 4300' CMTD W/ 1650 SX
TD @ 4300' CMT CIRC

EXHIBIT 8

FEDERAL AE #7
660' FSL & 990' FEL SEC 4 T18S R33E
LEA COUNTY, NEW MEXICO

ELEVATION: KB: 4014'
GL: 4003'

DATE DRILLED : 12/86

TOP OF YATES : 3016'
TOP OF QUEEN : 4192'

8 5/8" SURFACE CASING @ 396'
CMTD W/ 300 SX CMT CIRC

1 - 2 3/8" NOTCHED & PINNED COLLAR	0.30
1 JT 2 3/8" 4.7# J-55 TBG	31.54
1 - 2 3/8" SN	1.10
135 JTS 2 3/8" 4.7# J55 TBG	4276.73
TOTAL	4309.67
KB	11.00
SET AT	4320.67

RODS : 170 3/4" CLASS D STEEL

PUMP : 2" X 1 1/4" X 16' X 20'

	SURFACE	PRODUCTION	TUBING
SIZE	8 5/8"	5 1/2"	2 3/8"
WEIGHT	24 #	14 #	4.7 #
GRADE	K-55	K-55	J-55
THREAD	STEC	STEC	8rd EUE
DEPTH	396'	4523'	4321'

2 3/8" SN @ 4277'

2 3/8" TBG W/ NOTCHED COLLAR @ 4321'

QUEEN PERFS (4203' - 4227')

PBTD @ 4478'
5 1/2" CSG @ 4523' CMTD W/ 1400 SX
TD @ 4530' CMT CIRC

PREPRD BY: SCOTT E. GENGLER
DATE : JULY 12, 1990

EXHIBIT 8

FEDERAL AE #8
1980' FNL & FWL SEC 4 T18S R33E
LEA COUNTY, NEW MEXICO

ELEVATION: KB: 4025'
GL: 4013'

DATE DRILLED : 1/86

TOP OF YATES : 2966'
TOP OF QUEEN : 4140'

8 5/8" SURFACE CASING @ 350'
CMTD W/ 300 SX CMT CIRC

1 - 2 3/8" MUD ANCHOR W/ BP	32.90
1 - 2 3/8" PERF SUB	4.10
1 - 2 3/8" SN	1.10
3 JTS 2 3/8" 4.7# J-55 TBG	93.92
1 - 5 1/2" GUIB TAC	2.84
129 JTS 2 3/8" 4.7# J55 TBG	4015.62
TOTAL	4150.48
KB	10.00
SET AT	4160.48

RODS : 163 3/4" CLASS D STEEL

PUMP : 2" X 1 1/4" X 16' X 20'

TAC @ 4026'

	SURFACE	PRODUCTION	TUBING
SIZE	8 5/8"	5 1/2"	2 3/8"
WEIGHT	24 #	14 #	4.7 #
GRADE	K-55	K-55	J-55
THREAD	STBC	STBC	8rd EUE
DEPTH	350'	4266'	4160'

2 3/8" SN @ 4122'

2 3/8" MUD ANCHOR @ 4160'

QUEEN PERFS (4151' - 4177')

PBTD @ 4222'
5 1/2" CSG @ 4266' CMTD W/ 1350 SX
TD @ 4275' CMT CIRC

PREPRD BY: SCOTT E. GENGLER
DATE : JULY 16, 1990

EXHIBIT 8

FEDERAL AE #9
660' FNL & 1980' FWL SEC 4 T18S R33E
LEA COUNTY, NEW MEXICO

ELEVATION: KB: 4040'
GL: 4029'

DATE DRILLED : 11/86

TOP OF YATES : 2963'
TOP OF QUEEN : 4120'

8 5/8" SURFACE CASING @ 391'
CMTD W/ 300 SX CMT CIRC

1 - 2 3/8" NOTCHED & PINNED COLLAR	0.43
1 JT 2 3/8" 4.7# J-55 TBG	31.15
1 - 2 3/8" SN	1.10
135 JTS 2 3/8" 4.7# J55 TBG	4188.55
TOTAL	4221.23
KB	10.00
SET AT	4231.23

RODS : 166 3/4" CLASS D STEEL

PUMP : 2" X 1 1/4" X 16' X 20'

	SURFACE	PRODUCTION	TUBING
SIZE	8 5/8"	5 1/2"	2 3/8"
WEIGHT	24 #	14 #	4.7 #
GRADE	K-55	K-55	J-55
THREAD	STEC	STEC	8rd EUE
DEPTH	391'	4452'	4231'

2 3/8" SN @ 4198'

2 3/8" TBG W/ NOTCHED COLLAR @ 4231'

QUEEN PERFS (4152' - 4166')

PBTD @ 4398'
5 1/2" CSG @ 4452' CMTD W/ 1400 SX
TD @ 4452' CMT CIRC

PREPRD BY: SCOTT E. GENGLER
DATE : JULY 16, 1990

EXHIBIT 8

FEDERAL AE #10
1980' FNL & 660' FWL SEC 4 T18S R33E
LEA COUNTY, NEW MEXICO

ELEVATION: KB: 4024'
GL: 4013'

DATE DRILLED : 12/86

TOP OF YATES : 2952'
TOP OF QUEEN : 4122'

8 5/8" SURFACE CASING @ 394'
CMTD W/ 300 SX CMT CIRC

1 - 2 3/8" NOTCHED & PINNED COLLAR	0.43
1 JT 2 3/8" 4.7# J-55 TBG	31.17
1 - 2 3/8" SN	1.10
132 JTS 2 3/8" 4.7# J55 TBG	4070.35
TOTAL	4103.05
KB	11.00
SET AT	4114.05

RODS : 162 3/4" CLASS D STEEL

PUMP : 2" X 1 1/4" X 16' X 20'

	SURFACE	PRODUCTION	TUBING
SIZE	8 5/8"	5 1/2"	2 3/8"
WEIGHT	24 #	14 #	4.7 #
GRADE	K-55	K-55	J-55
THREAD	STBC	STBC	8rd EUE
DEPTH	394'	4275'	4114'

2 3/8" SN @ 4081'

2 3/8" TBG W/ NOTCHED COLLAR @ 4114'

QUEEN PERFS (4134' - 4138')

PBTD @ 4173'
5 1/2" CSG @ 4273' CMTD W/ 1400 SX
TD @ 4275' CMT CIRC

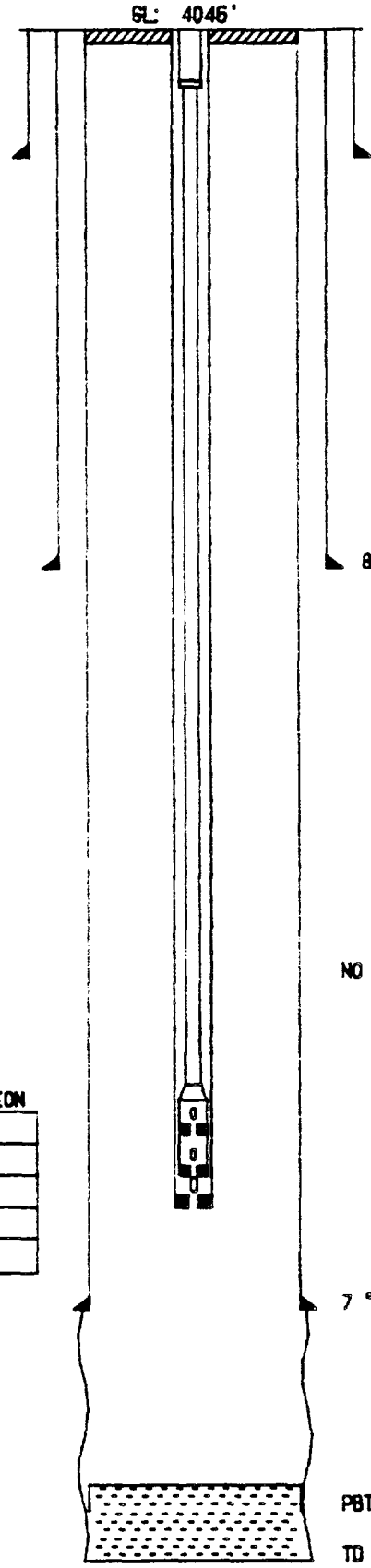
PREPRD BY: SCOTT E. GENGLER
DATE : JULY 16, 1990

EXHIBIT 8

FEDERAL AI #1
660' FNL & FEL SEC 4 T18S R33E
LEA COUNTY, NEW MEXICO

ELEVATION: KB: N.A.
GL: 4046'

DATE DRILLED : 12/46



10 3/4" SURFACE CASING @ 346'
CMTD W/ 150 SX CMT CIRC

8 5/8" INTERMEDIATE CASING @ 1587'
CMTD W/ 50 SX

NO TUBING DATA AVAILABLE

7 " CASING @ 3921' CMTD W/ 100 SX

PBTD @ 4927'

TD @ 5257'

	SURFACE	INTERMED	PRODUCTION
SIZE	10 3/4"	8 5/8"	7 "
WEIGHT	34 #	28 #	20 #
GRADE	N.A.	N.A.	N.A.
THREAD	N.A.	N.A.	N.A.
DEPTH	346'	1587'	3921'

PREPRD BY: SCOTT E. GENGLER
DATE : JULY 25, 1990

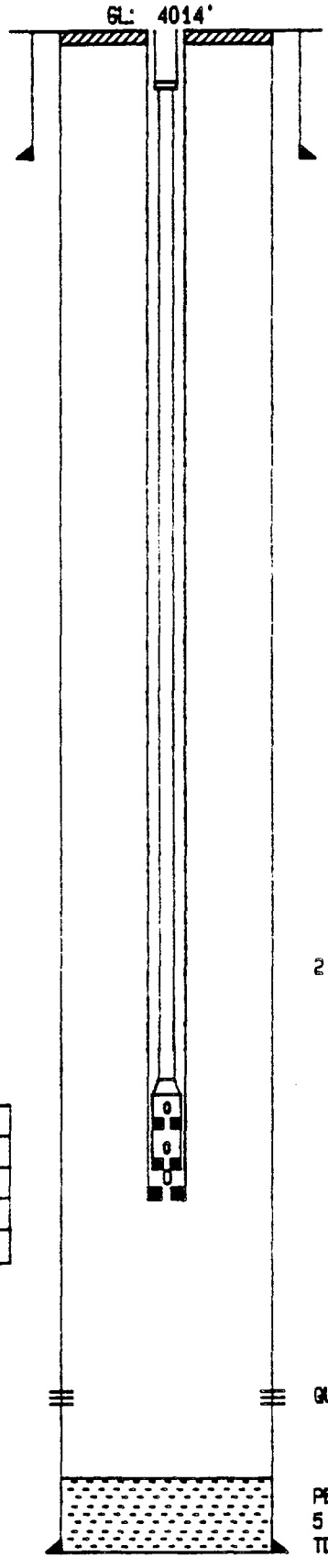
EXHIBIT 8

FEDERAL AI #3
2310' FNL & FEL SEC 4 T18S R33E
LEA COUNTY, NEW MEXICO

ELEVATION: KB: 4025'
GL: 4014'

DATE DRILLED : 7/86

TOP OF YATES : 2975'
TOP OF QUEEN : 4154'



8 5/8" SURFACE CASING @ 352'
CMTD W/ 350 SX CMT CIRC

RODS : 177 3/4" CLASS D STEEL

PUMP : 2" X 1 1/4" X 18' X 20'

2 3/8" 4.7# J-55 TBG @ 4412'

	SURFACE	PRODUCTION	
SIZE	8 5/8"	5 1/2"	
WEIGHT	24 #	17 #	
GRADE	J-55	K-55	
THREAD	STEC	STEC	
DEPTH	352'	4983'	

QUEEN PERFS (4163' - 4440')

PREPRD BY: SCOTT E. GENGLER
DATE : JULY 25, 1990

PBTD @ 4928'
5 1/2" CSG @ 4983' CMTD W/ 1500 SX
TD @ 5000' CMT CIRC

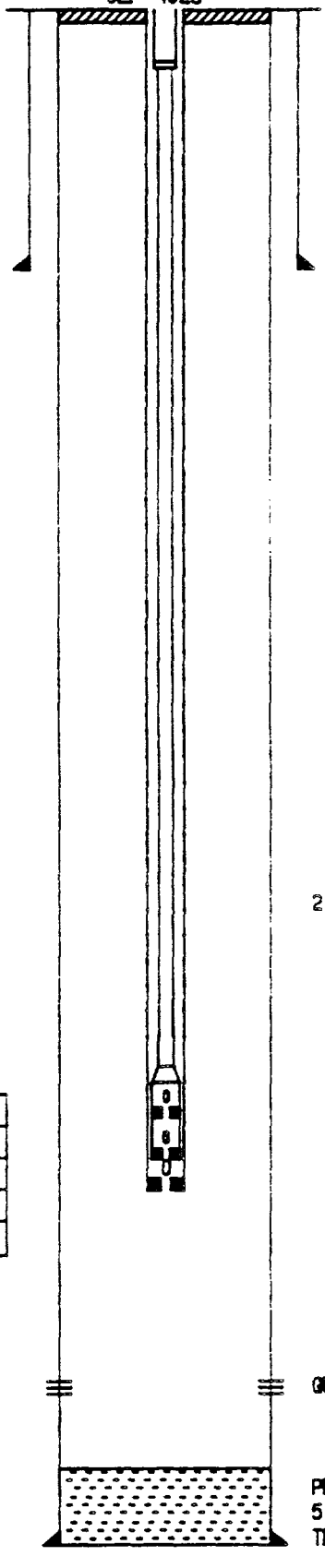
EXHIBIT 8

FEDERAL AI #4
2310' FNL & 660' FEL SEC 4 T18S R33E
LEA COUNTY, NEW MEXICO

ELEVATION: KB: 4036'
GL: 4025'

DATE DRILLED : 11/86

TOP OF YATES : 2980'
TOP OF QUEEN : 4180'



8 5/8" SURFACE CASING @ 1511'
CMTD W/ 700 SX CMT CIRC

2 3/8" 4.7# J-55 TBG @ 4460'

QUEEN PERFS (4180' - 4442')

PBTD @ 4864'
5 1/2" CSG @ 4994' CMTD W/ 1625 SX
TD @ 5000' CMT CIRC

	SURFACE	PRODUCTION	
SIZE	8 5/8"	5 1/2"	
WEIGHT	24 #	17 #	
GRADE	N.A.	N.A.	
THREAD	STEC	STEC	
DEPTH	1511'	4994'	

PREPRD BY: SCOTT E. GENGLER
DATE : JULY 25, 1990

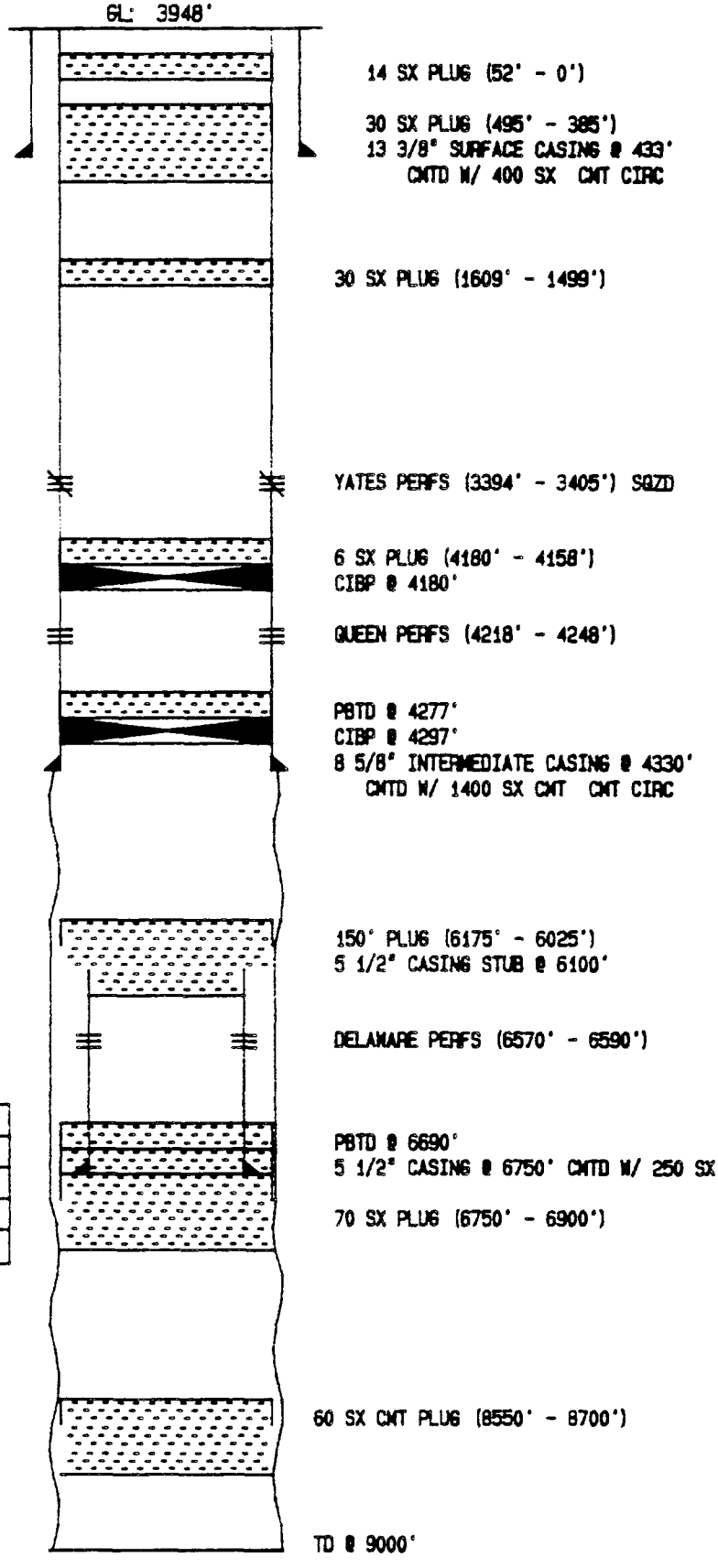
EXHIBIT 8

FEDERAL AG #1
660' FNL & FEL SEC 8 T18S R33E
LEA COUNTY, NEW MEXICO

ELEVATION: KB: 3959'
GL: 3948'

DATE DRILLED : 11/87

TOP OF YATES : 2964'
TOP OF QUEEN : 4213'



	SURFACE	INTERMED	
SIZE	13 3/8"	8 5/8"	
WEIGHT	54.5#	24 & 32#	
GRADE	K-55	K-55	
THREAD	ST&C	ST&C	
DEPTH	433'	4330'	

PREPRD BY: SCOTT E. GENGLER
DATE : JULY 25, 1990

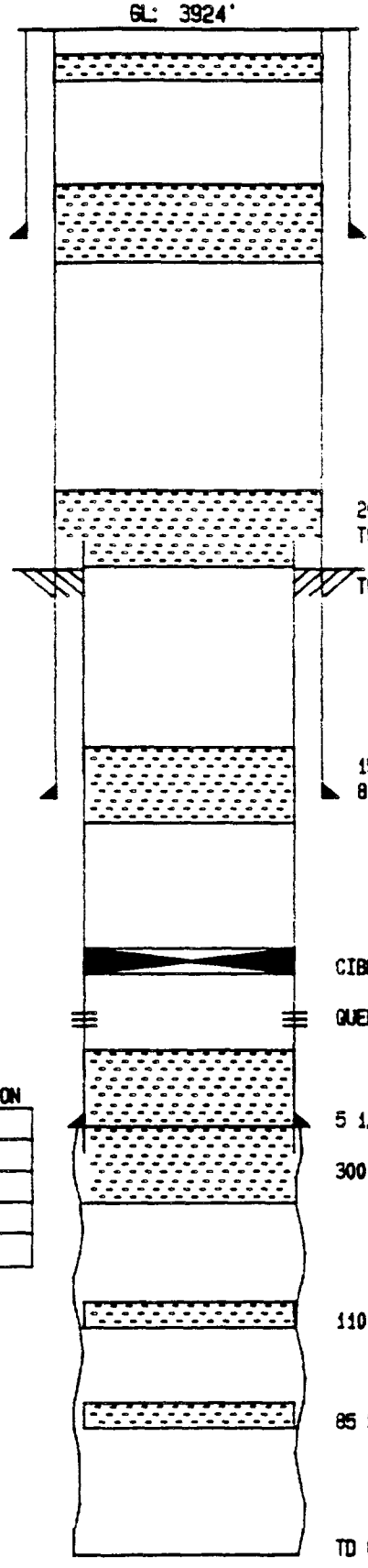
EXHIBIT 8

FEDERAL AG #2
2310' FNL & 330' FEL SEC 8 T18S R33E
LEA COUNTY, NEW MEXICO

ELEVATION: KB: 3942'
GL: 3924'

DATE DRILLED : 10/88

TOP OF YATES : 2982'
TOP OF QUEEN : 4139'



20 SX CMT PLUG (60' - 0')

30 SX CMT PLUG (415' - 315')
13 3/8" SURFACE CASING @ 365'
CMTD W/ 400 SX CMT CMT CIRC

20 SX CMT PLUG (1500' - 1400')
TOP OF 5 1/2" CSG STUB @ 1450'

TOC @ 1600'

15 SX CMT PLUG (3214' - 3114')
8 5/8" INTERMEDIATE CASING @ 3175'
CMT W/ 1150 SX CMT CMT CIRC

CIBP @ 4200'

QUEEN PERFS (4270' - 4279')

5 1/2" CSG @ 4321' CMTD W/ 550 SX

300 SX PLUG (4809' - 4321')

110 SX PLUG (6900' -6700')

85 SX PLUG (10103' - 9869')

TD @ 11465'

	SURFACE	INTERMED	PRODUCTION
SIZE	13 3/8"	8 5/8"	5 1/2"
WEIGHT	48 #	24 & 32#	15.5 #
GRADE	H-40	K-55	K-55
THREAD	STEC	STEC	LTEC
DEPTH	365'	3175'	4321'

PREPRD BY: SCOTT E. GENGLER
DATE : JULY 24, 1990

EXHIBIT 8

FEDERAL AA #1
990' FNL & 1980' FEL SEC 9 T18S R33E
LEA COUNTY, NEW MEXICO

ELEVATION: KB: 3984'
GL: 3966'

DATE DRILLED : 3/85

TOP OF YATES : 2960'
TOP OF QUEEN : 4189'

1 - 2 7/8" MUD ANCHOR W/ BP	30.75
1 - 2 7/8" PERF SUB	4.10
1 - 2 7/8" SN	1.10
2 JTS 2 7/8" 6.5# N-80 TBG	60.23
1 - 5 1/2" TAC	3.54
136 JTS 2 7/8" 6.5# N80 TBG	4185.87
TOTAL	4285.59
KB	18.50
SET AT	4304.05

RODS : 165 3/4" CLASS D STEEL

PUMP : 2" X 1 1/4" X 16' X 20'

	SURFACE	INTERMED	PRODUCTION
SIZE	13 3/8"	9 5/8"	5 1/2"
WEIGHT	48 #	36 #	17, 20#
GRADE	H-40	S-80	S-95&P-110
THREAD	STBC	STBC	LTBC
DEPTH	430'	5100'	13825'

	TUBING
SIZE	2 7/8"
WEIGHT	6.5#
GRADE	N-80
THREAD	8RD EUE
DEPTH	4304'

PREPRD BY: SCOTT E. GENGLER
DATE : JULY 20, 1990

13 3/8" SURFACE CASING @ 430'
CMTD W/ 420 SX CMT CIRC

TOC @ 3600'

TAC @ 4204'

QUEEN PERFS (4228' - 4238')

2 7/8" SN @ 4268'

2 7/8" MUD ANCHOR @ 4304'

PBTD @ 4850'
CIBP @ 4900'
PERMIER PERFS (4961' - 4968')

9 5/8" INTERMEDIATE CASING @ 5100'
CMT W/ 3300 SX CMT CMT CIRC

PBTD @ 6500'
CIBP @ 6600'
BONE SPRINGS PERFS (6667' - 6724')
CIBP @ 8100'
BONE SPRINGS PERFS (8140' - 8176')
CIBP @ 8470'
BONE SPRINGS PERFS (8510' - 8528')
CIBP @ 8700'
BONE SPRINGS PERFS (8760' - 8798')
5 1/2 DVTOOL @ 9204' CMTD W/ 1800 SX

5 1/2" CSG XOVER @ 9596'
17# S-95 ABOVE & 17# P-110 BELOW
PBTD @ 11272'
CIBP @ 11300'
WOLFCAMP PERFS (11334' - 11348')
5 1/2" CSG XOVER @ 12604'
17# P-110 ABOVE & 20# S-95 BELOW
PBTD @ 13422'
CIBP @ 13437'
MORROW PERFS (13478' - 13544')
CIBP @ 13650'
MORROW PERFS (13669' - 13672')
ORIGINAL PBTD @ 11780'
5 1/2" CASING @ 13825' CMTD W/1300 SX
TD @ 13825'

EXHIBIT 8

FEDERAL AA #2
1980' FNL & 430' FEL SEC 9 T18S R33E
LEA COUNTY, NEW MEXICO

ELEVATION: KB: 3992'
GL: 3979'

DATE DRILLED : 7/85

TOP OF YATES : 3050'
TOP OF QUEEN : 4242'

8 5/8" SURFACE CASING @ 380'
CMTD W/ 300 SX CMT CIRC

1 - 2 3/8" MUD ANCHOR W/ BP	30.16
1 - 2 3/8" PERF SUB	3.87
1 - 2 3/8" SN	1.10
3 JTS 2 3/8" 4.7# J-55 TBG	91.09
1 - 5 1/2" TAC	3.60
133 JTS 2 3/8" 4.7# J55 TBG	4112.78
TOTAL	4242.60
KB	13.00
SET AT	4255.60

RODS : 166 3/4" CLASS D STEEL

PUMP : 2" X 1 1/4" X 16' X 20'

TAC @ 4126'

	SURFACE	PRODUCTION	TUBING
SIZE	8 5/8"	5 1/2"	2 3/8"
WEIGHT	24 #	14 #	4.7 #
GRADE	K-55	K-55	J-55
THREAD	STEC	STEC	8rd EUE
DEPTH	380'	4366'	4256'

2 3/8" SN @ 4220'

2 3/8" MUD ANCHOR @ 4256'

QUEEN PERFS (4270' - 4282')

PBTD @ 4339'
5 1/2" CSG @ 4366' CMTD W/ 1550 SX
TD @ 4375' CMT CIRC

PREPRD BY: SCOTT E. GENGLER
DATE : JULY 20, 1990

EXHIBIT 8

FEDERAL AA #3
1980' FNL & FEL SEC 9 T18S R33E
LEA COUNTY, NEW MEXICO

ELEVATION: KB: 3976'
GL: 3966'

DATE DRILLED : 9/86

TOP OF YATES : 3024'
TOP OF QUEEN : 4222'

8 5/8" SURFACE CASING @ 360'
CMTD W/ 400 SX CMT CIRC

1 - 2 3/8" MUD ANCHOR W/ BP	31.30
1 - 2 3/8" PERF SUB	3.80
1 - 2 3/8" SN	1.10
1 JTS 2 3/8" 4.7# J-55 TBG	30.86
1 - 5 1/2" BAKER TAC	2.75
135 JTS 2 3/8" 4.7# J55 TBG	4160.34
TOTAL	4230.15
KB	10.00
SET AT	4240.15

RODS : 168 3/4" CLASS D STEEL

PUMP : 2" X 1 1/4" X 16' X 20'

TAC @ 4170'

	SURFACE	PRODUCTION	TUBING
SIZE	8 5/8"	5 1/2"	2 3/8"
WEIGHT	24 #	14 #	4.7 #
GRADE	K-55	K-55	J-55
THREAD	ST&C	ST&C	8rd EUE
DEPTH	360'	4350'	4240'

2 3/8" SN @ 4204'

2 3/8" MUD ANCHOR @ 4240'

QUEEN PERFS (4236' - 4262')

PREPRD BY: SCOTT E. GENGLER
DATE : JULY 20, 1990

PBTD @ 4314'
5 1/2" CSG @ 4350' CMTD W/ 1400 SX
TD @ 4350' CMT CIRC

EXHIBIT 8

FEDERAL AA #4
660' FNL & 790' FEL SEC 9 T18S R33E
LEA COUNTY, NEW MEXICO

ELEVATION: KB: 3997'
GL: 3985'

DATE DRILLED : 10/86

TOP OF YATES : 3020'
TOP OF QUEEN : 4204'

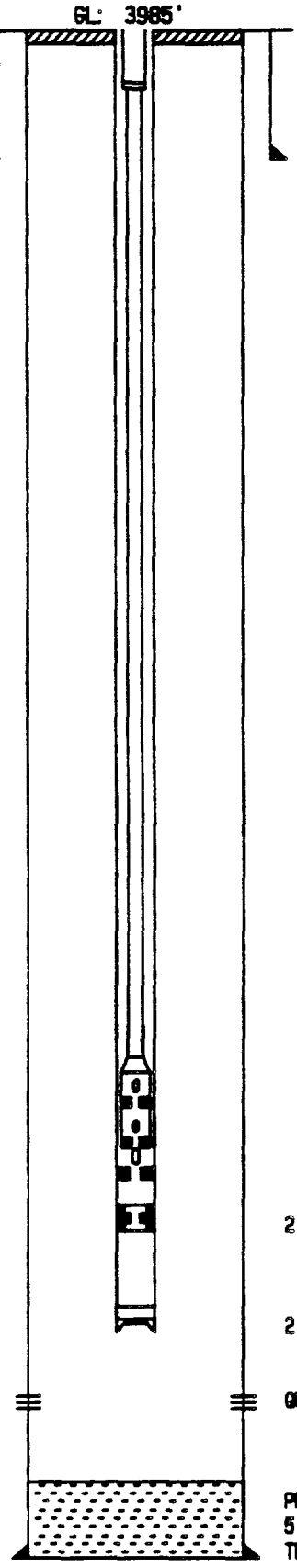
8 5/8" SURFACE CASING @ 375'
CMTD W/ 300 SX CMT CIRC

1 JT 2 3/8" TBG W/NOTCHED COLLAR	30.50
1 - 2 3/8" SN	1.10
137 JTS 2 3/8" 4.7# J55 TBG	4211.57
TOTAL	4243.17
KB	10.00
SET AT	4253.17

RODS : 167 3/4" CLASS D STEEL

PUMP : 2" X 1 1/4" X 16' X 20'

	SURFACE	PRODUCTION	TUBING
SIZE	8 5/8"	5 1/2"	2 3/8"
WEIGHT	24 #	14 #	4.7 #
GRADE	K-55	K-55	J-55
THREAD	STEC	STEC	8rd EUE
DEPTH	375'	4325'	4253'



2 3/8" SN @ 4221'

2 3/8" TBG W/ NOTCHED COLLAR @ 4253'

QUEEN PERFS (4213' - 4242')

PBTD @ 4312'
5 1/2" CSG @ 4325' CMTD W/ 1400 SX
TD @ 4325' CMT CIRC

PREPRD BY: SCOTT E. GENGLER
DATE : JULY 20, 1990

EXHIBIT 8

FEDERAL AO #1
660' FNL & 1980' FWL SEC 9 T18S R33E
LEA COUNTY, NEW MEXICO

ELEVATION: KB: 3977'
GL: 3965'

DATE DRILLED : 7/85

TOP OF YATES : 2992'
TOP OF QUEEN : 4198'

8 5/8" SURFACE CASING @ 369'
CMTD W/ 350 SX CMT CIRC

1 JT 2 3/8" TBG W/NOTCHED COLLAR	31.73
1 - 2 3/8" SN	1.10
136 JTS 2 3/8" 4.7# J55 TBG	4178.70
TOTAL	4211.53
KB	12.00
SET AT	4223.53

RODS : 165 3/4" CLASS D STEEL

PUMP : 2" X 1 1/4" X 16' X 20'

	SURFACE	PRODUCTION	TUBING
SIZE	8 5/8"	5 1/2"	2 3/8"
WEIGHT	24 #	14 #	4.7 #
GRADE	K-55	K-55	J-55
THREAD	STBC	STBC	8rd EUE
DEPTH	369'	4310'	4223'

2 3/8" SN @ 4191'

2 3/8" TBG W/ NOTCHED COLLAR @ 4223'

QUEEN PERFS (4206' - 4232')

PBTD @ 4256'
5 1/2" CSG @ 4310' CMTD W/ 1350 SX
TD @ 4310' CMT CIRC

PREPRD BY: SCOTT E. GENGLER
DATE : JULY 16, 1990

EXHIBIT 8

FEDERAL AD #2
660' FNL & FWL SEC 9 T18S R33E
LEA COUNTY, NEW MEXICO

ELEVATION: KB: 3970'
GL: 3958'

DATE DRILLED : 11/85

TOP OF YATES : 2982'
TOP OF QUEEN : 4165'

8 5/8" SURFACE CASING @ 363'
CMTD W/ 350 SX CMT CIRC

1 - 2 3/8" MUD ANCHOR W/ BP	32.09
1 - 2 3/8" PERF SUB	3.90
1 - 2 3/8" SN	1.10
2 JTS 2 3/8" 4.7# J-55 TBG	64.51
1 - 5 1/2" GUIB TAC	3.60
131 JTS 2 3/8" 4.7# J55 TBG	4139.75
TOTAL	4244.95
KB	11.00
SET AT	4255.95

RODS : 167 3/4" CLASS D STEEL

PUMP : 2" X 1 1/4" X 16' X 20'

TAC @ 4151'

	SURFACE	PRODUCTION	TUBING
SIZE	8 5/8"	5 1/2"	2 3/8"
WEIGHT	24 #	14 #	4.7 #
GRADE	K-55	K-55	J-55
THREAD	ST&C	ST&C	8rd EUE
DEPTH	363'	4320'	4256'

2 3/8" SN @ 4219'

2 3/8" MUD ANCHOR @ 4256'

QUEEN PERFS (4220' - 4255')

PREPRD BY: SCOTT E. GENGLER
DATE : JULY 16, 1990

PBTD @ 4264'
5 1/2" CSG @ 4320' CMTD W/ 1250 SX
TD @ 4320' CMT CIRC

EXHIBIT 8

FEDERAL AD #3
1980' FNL & FWL SEC 9 T18S R33E
LEA COUNTY, NEW MEXICO

ELEVATION: KB: 3957'
GL: 3947'

DATE DRILLED : 1/86

TOP OF YATES : 3002'
TOP OF QUEEN : 4222'

8 5/8" SURFACE CASING @ 362'
CMTD W/ 300 SX CMT CIRC

1 - 2 3/8" NOTCHED & PINNED COLLAR	0.53
1 JT 2 3/8" 4.7# J-55 TBG	31.10
1 - 2 3/8" SN	1.10
3 JTS 2 3/8" 4.7# J-55 TBG	94.92
1 - 5 1/2" GUIB TAC	2.75
132 JTS 2 3/8" 4.7# J55 TBG	4087.32
TOTAL	4217.72
KB	11.00
SET AT	4227.72

RODS : 166 3/4" CLASS D STEEL

PUMP : 2" X 1 1/4" X 16' X 20'

TAC @ 4097'

	SURFACE	PRODUCTION	TUBING
SIZE	8 5/8"	5 1/2"	2 3/8"
WEIGHT	24 #	14 #	4.7 #
GRADE	K-55	K-55	J-55
THREAD	STBC	STBC	8rd EUE
DEPTH	362'	4319'	4228'

2 3/8" SN @ 4195'

2 3/8" MUD ANCHOR @ 4228'

QUEEN PERFS (4245' - 4253')

PBTD @ 4277'
5 1/2" CSG @ 4319' CMTD W/ 1450 SX
TD @ 4320' CMT CIRC

PREPRD BY: SCOTT E. GENGLER
DATE : JULY 16, 1990

EXHIBIT 8

FEDERAL AD #4
1980' FSL & FWL SEC 9 T18S R33E
LEA COUNTY, NEW MEXICO

ELEVATION: KB: 3950'
GL: 3938'

DATE DRILLED : 10/86

TOP OF YATES : 3016'
TOP OF QUEEN : 4236'

8 5/8" SURFACE CASING @ 351'
CMTD W/ 300 SX CMT CIRC

1 JT 2 3/8" TBG W/NOTCHED COLLAR	31.75
1 - 2 3/8" SN	1.10
134 JTS 2 3/8" 4.7# J55 TBG	4200.44
TOTAL	4233.29
KB	10.00
SET AT	4243.29

RODS : 167 3/4" CLASS D STEEL

PUMP : 2" X 1 1/4" X 16' X 20'

	SURFACE	PRODUCTION	TUBING
SIZE	8 5/8"	5 1/2"	2 3/8"
WEIGHT	24 #	14 #	4.7 #
GRADE	K-55	K-55	J-55
THREAD	STEC	STEC	8rd EUE
DEPTH	351'	4350'	4243'

2 3/8" SN @ 4210'

2 3/8" TBG W/ NOTCHED COLLAR @ 4243'

QUEEN PERFS (4258' - 4271')

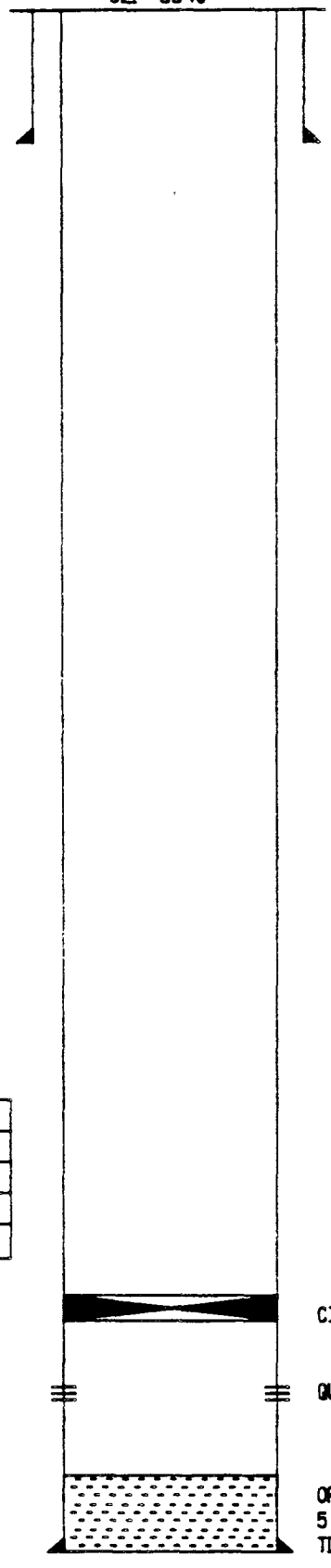
PBTD @ 4288'
5 1/2" CSG @ 4350' CMTD W/ 1400 SX
TD @ 4350' CMT CIRC

PREPRD BY: SCOTT E. GENGLER
DATE : JULY 16, 1990

EXHIBIT 8

FEDERAL AD #5
660' FSL & 2055' FWL SEC 9 T18S R33E
LEA COUNTY, NEW MEXICO

ELEVATION: KB: 3951'
GL: 3940'



8 5/8" SURFACE CASING @ 373'
CMTD W/ 300 SX CMT CIRC

DATE DRILLED : 12/87

TOP OF YATES : 3026'
TOP OF QUEEN : 4252'

	SURFACE	PRODUCTION	TUBING
SIZE	8 5/8"	5 1/2"	
WEIGHT	24 #	14 #	
GRADE	K-55	K-55	
THREAD	STGC	STGC	
DEPTH	373'	4352'	

CIBP & PBTD @ 4200'

QUEEN PERFS (4275' - 4291')

ORIGINAL PBTD @ 4307'
5 1/2" CSG @ 4352' CMTD W/ 1525 SX
TD @ 4352' CMT CIRC

PREPRD BY: SCOTT E. GENGLER
DATE : JULY 23, 1990

EXHIBIT 8

FEDERAL AH #1
2310' FSL & FEL SEC 9 T18S R33E
LEA COUNTY, NEW MEXICO

ELEVATION: KB: 3983'
GL: 3967'

DATE DRILLED : 6/87

TOP OF YATES : 3000'
TOP OF QUEEN : 4160'

8 5/8" SURFACE CASING @ 380'
CMTD W/ 250 SX CMT CIRC

1 - 3 1/2" MUD ANCHOR W/ BP
1 - 2 7/8" SN
2 JTS 2 7/8" 6.5# J-55 TBG
1 - 5 1/2" MATSON TAC
134 JTS 2 7/8" 6.5# J55 TBG

TOTAL	4177.00
KB	16.00
SET AT	4193.00

5 1/2" CSG XOVER @ 3640'
14# J55 ABOVE & 15.5# K55 BELOW

5 1/2" CSG XOVER @ 3961'
15.5# K55 ABOVE & 17# K55 BELOW

RODS : 100 3/4" CLASS D STEEL
68 7/8" CLASS D STEEL

PUMP : 2" X 1 1/4" X 16' X 20'

TAC @ 4111'

	SURFACE	PRODUCTION	TUBING
SIZE	8 5/8"	5 1/2"	2 3/8"
WEIGHT	24 #	14 #	4.7 #
GRADE	K-55	K-55	J-55
THREAD	STBC	STBC	8rd EUE
DEPTH	363'	4320'	4256'

2 3/8" SN @ 4172'

3 1/2" MUD ANCHOR @ 4193'

QUEEN PERFS (4274' - 4294')

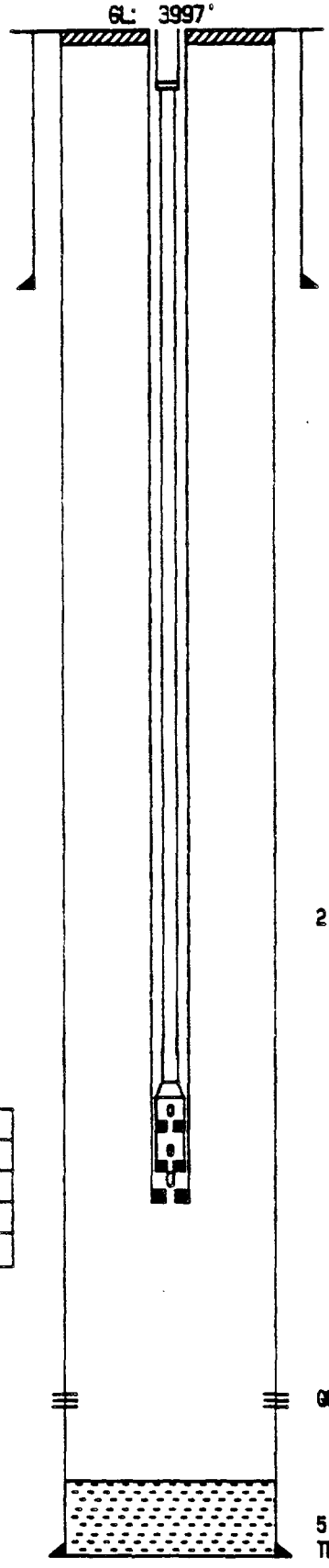
PREPRD BY: SCOTT E. GENGLER
DATE : JULY 25, 1990

PBTD @ 4352'
5 1/2" CSG @ 4400' CMTD W/ 850 SX
TD @ 4400' TOC - N.A.

EXHIBIT 8

FEDERAL AH #5
2310' FSL & 330' FEL SEC 9 T18S R33E
LEA COUNTY, NEW MEXICO

ELEVATION: KB: N.A.
GL: 3997'



DATE DRILLED : 4/52

TOP OF YATES : 3443'
TOP OF QUEEN : 4271'

7" SURFACE CASING @ 1530'
CMTD W/ 50 SX CMT CIRC

RODS : 47 3/4" CLASS D STEEL
73 5/8" CLASS D STEEL

2 3/8" 4.7# J-55 TBG @ 3000'

	SURFACE	PRODUCTION	
SIZE	7 "	5 1/2"	
WEIGHT	17 #	14 #	
GRADE	N.A.	N.A.	
THREAD	N.A.	N.A.	
DEPTH	1530'	3417'	

QUEEN PERFS (4219' - 4266')

PREPRD BY: SCOTT E. GENGLER
DATE : JULY 25, 1990

5 1/2" CSG @ 3417' CMTD W/ 50 SX
TD @ 4305'

EXHIBIT 8

FEDERAL AH #4
1980' FSL & FEL SEC 9 T18S R33E
LEA COUNTY, NEW MEXICO

ELEVATION: KB: N.A.
GL: 3982'

DATE DRILLED : 11/53

12 3/4" SURFACE CASING @ 275'
CMTD W/ 150 SX CMT CIRC

1 - 2 3/8" MUD ANCHOR
1 - 2 3/8" PERF SUB
1 - 2 3/8" SN
2 3/8" 4.7# J55 TBG

SET AT 3400.00

8 5/8" INTERMEDIATE CASING @ 1539'
CMTD W/ 625 SX

RODS : 133 5/8" CLASS D STEEL

PUMP : 2" X 1 1/2" X 12'

	SURFACE	INTERMED	PRODUCTION
SIZE	12 3/4"	8 5/8"	5 1/2"
WEIGHT	N.A.	N.A.	N.A.
GRADE	N.A.	N.A.	N.A.
THREAD	N.A.	N.A.	N.A.
DEPTH	275'	1539'	4324'

	TUBING
SIZE	2 3/8"
WEIGHT	4.7#
GRADE	J-55
THREAD	8RD10 RD
DEPTH	3400'

PREPRD BY: SCOTT E. GENGLER
DATE : JULY 25, 1990

2 3/8" SN @ 3365'

2 3/8" MUD ANCHOR @ 3400'

YATES PERFS (3435' - 3488')

CIBP @ 3520'

QUEEN PERFS

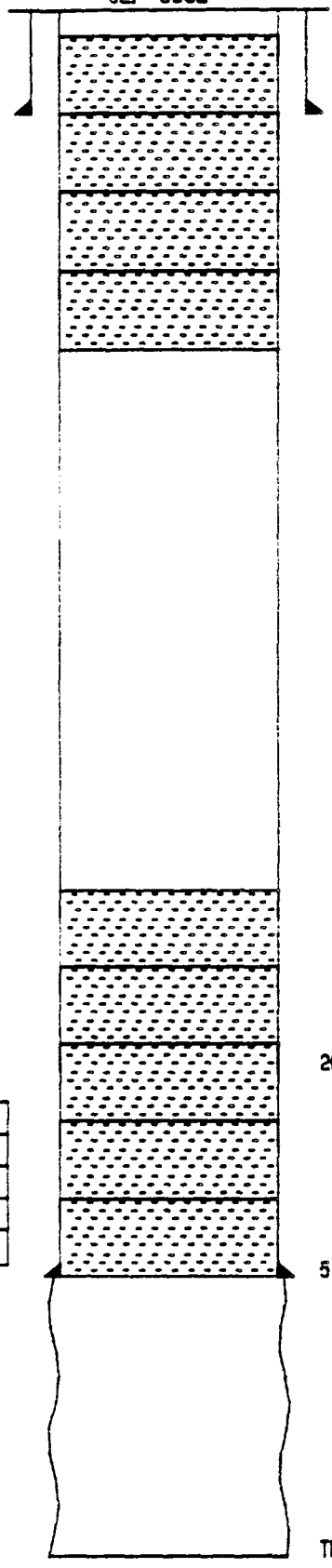
PBTD @ 4927'
5 1/2" CASING @ 4324' CMTD W/ 215 SX
TD @ 5257'

EXHIBIT 8

H&P - CORBIN FEDERAL #2
1980' FSL & 660' FEL SEC 9 T18S R33E
LEA COUNTY, NEW MEXICO

ELEVATION: KB: N.A.
GL: 3982'

DATE DRILLED : 10/40



10 3/4" SURFACE CASING @ 264'
CMTD W/ 150 SX CMT CIRC

500 SX PLUG (825' - 0')

200 SX PLUG (4228' - 2278')

5 1/2" CSG @ 4228' CMTD W/ 528 SX

TD @ 4350'

	SURFACE	PRODUCTION	
SIZE	10 3/4"	5 1/2"	
WEIGHT	N.A.	N.A.	
GRADE	N.A.	N.A.	
THREAD	N.A.	N.A.	
DEPTH	264'	4228'	

PREPRD BY: SCOTT E. GENGLER
DATE : JULY 24, 1990

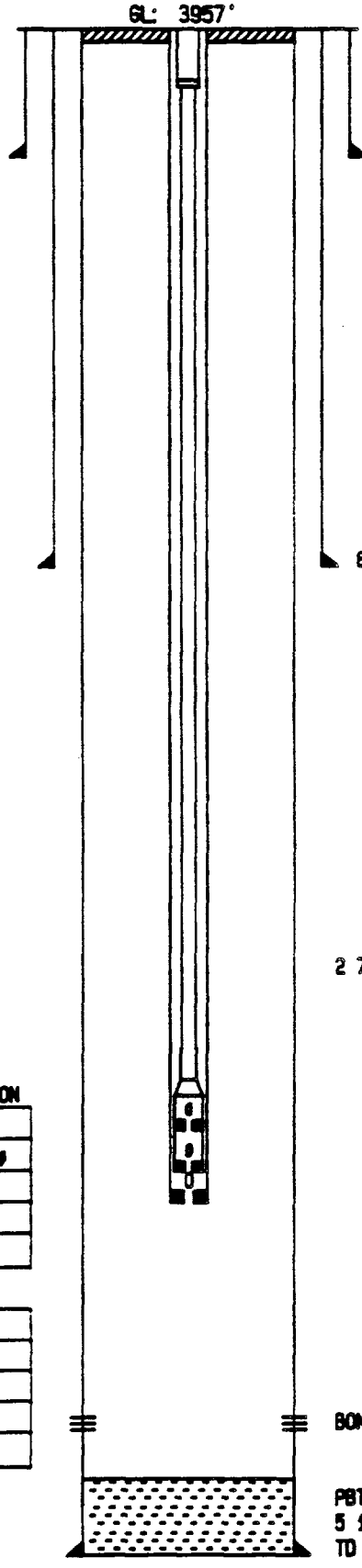
EXHIBIT 8

CHEVRON - COCKBURN FEDERAL G #1
1650' FSL & 940' FWL SEC 10 T18S R33E
LEA COUNTY, NEW MEXICO

ELEVATION: KB: N.A.
GL: 3957'

DATE DRILLED : 1/90

TOP OF QUEEN : 4244'



	SURFACE	INTERMED	PRODUCTION
SIZE	13 3/8"	8 5/8"	5 1/2"
WEIGHT	48#	32 #	15.5 & 17#
GRADE	N.A.	N.A.	N.A.
THREAD	N.A.	N.A.	N.A.
DEPTH	465'	3189'	9599'

	TUBING
SIZE	2 7/8"
WEIGHT	6.5#
GRADE	J-55
THREAD	8RD EUE
DEPTH	9070'

PREPRD BY: SCOTT E. GENGLER
DATE : JULY 26, 1990

EXHIBIT 8

Exhibit 9

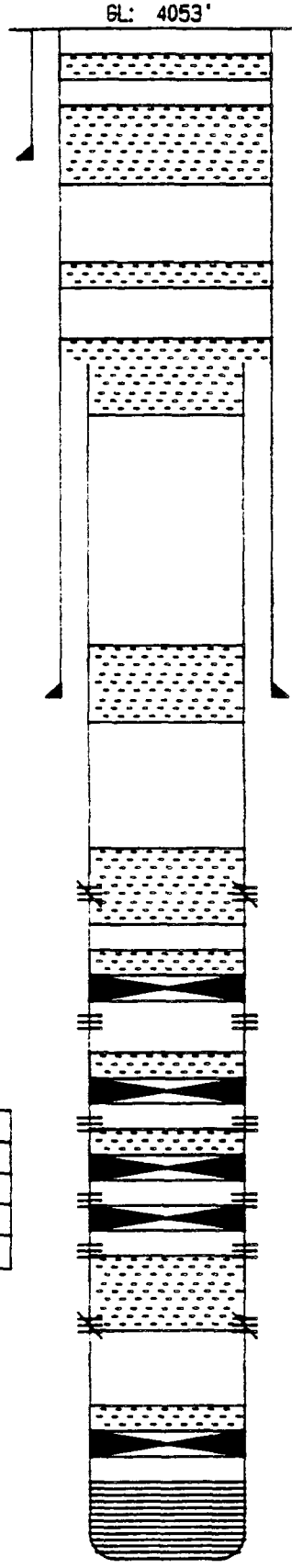
"Based on Tom's Research"

WYATT FEDERAL A #4
990' FSL & 1650' FEL SEC 33 T17S R33E
LEA COUNTY, NEW MEXICO

ELEVATION: KB: 4065'
GL: 4053'

DATE DRILLED : 2/62

TOP OF YATES : 2895'
TOP OF QUEEN : 4039'
TOP OF GLORIETA : 6660'
TOP OF ABO : 8792'



18 SX CMT PLUG (60' - 0')

40 SX CMT PLUG (391' - 247')
13 3/8" SURFACE CASING @ 310'
CMTD W/ 340 SX CMT CMT CIRC

40 SX CMT PLUG (1449' - 1305')

17 SX CMT PLUG (2044' - 1944')
TOP OF 4 1/2" CSG STUB @ 1994'

25 SX CMT PLUG (3173' - 2819')
8 5/8" INTERMEDIATE CASING @ 3105'
CMT W/ 1050 SX CMT

10 SX CMT PLUG (4090' - 3946')
QUEEN PERFS (4042' - 4056')

PBTD @ 4601'
CIBP @ 4630
GRAYBURG PERFS (4668' - 4684')

PBTD @ 4698'
CIBP @ 4720'
GRAYBURG (4730' - 4756')
PBTD @ 4825'
CIBP @ 4848'
PREMIER PERFS (4860' - 4900')
CIBP @ 5005'
SAN ANDRES PERFS (6092' - 6454')
PBTD @ 6822'

SQUEEZE HOLES (6849' - 6850')

PBTD @ 8620'
CIBP @ 8650'

4 1/2" CASING @ 8790' CMTD W/ 1325 SX
TD @ 8797'

	SURFACE	INTERMED	PRODUCTION
SIZE	13 3/8"	8 5/8"	4 1/2"
WEIGHT	40 #	24 & 32#	9.5&11.6&#
GRADE	NA	NA	NA
THREAD	NA	NA	NA
DEPTH	310'	3105'	8790'

PREPRD BY: SCOTT E. GENGLER
DATE : JULY 23, 1990

EXHIBIT 10

WYATT FEDERAL B #1
990' FSL & 330' FEL SEC 33 T17S R33E
LEA COUNTY, NEW MEXICO

ELEVATION: KB: 4071'
GL: 4060'

DATE DRILLED : 1/61

TOP OF YATES : 2876'
TOP OF QUEEN : 4008'

13 3/8" SURFACE CASING @ 309'
CMTD W/ 340 SX CMT CIRC

1 - SEAL ASSY W/O SEALS	0.40
1 - 2 3/8" PERF SUB	4.10
1 - 2 3/8" SN	1.10
211 JTS 2 3/8" 4.7# J-55 TBG	6429.57
68 JTS 2 7/8" 6.5# J-55 TBG	2107.93
4 JTS 2 7/8" 6.5# J-55 TBG SUBS	27.90
TOTAL	8571.00
KB	11.00
SET AT	8582.00

8 5/8" INTERMEDIATE CASING @ 4213'
CMTD W/ 1900 SX TOC @ 250'

RODS : 176 3/4" CLASS D STEEL
84 7/8" CLASS D STEEL
80 1" CLASS D STEEL

PUMP : 2" X 1 1/4" X 20' X 24'

	SURFACE	INTERMED	PRODUCTION
SIZE	13 3/8"	8 5/8"	4 1/2"
WEIGHT	48#	24, 28, 32#	9.5&11.6#
GRADE	N.A.	N.A.	N.A.
THREAD	N.A.	N.A.	N.A.
DEPTH	309'	4213'	8850'

2 3/8" SN @ 8578'

BAKER MODEL D PKR @ 8582'

ABO PERFS (8617' - 8764')

PBTD @ 8810'
4 1/2" CASING @ 8850' CMTD W/ 200 SX
TD @ 8850'

PREPRD BY: SCOTT E. GENGLER
DATE : JULY 25, 1990

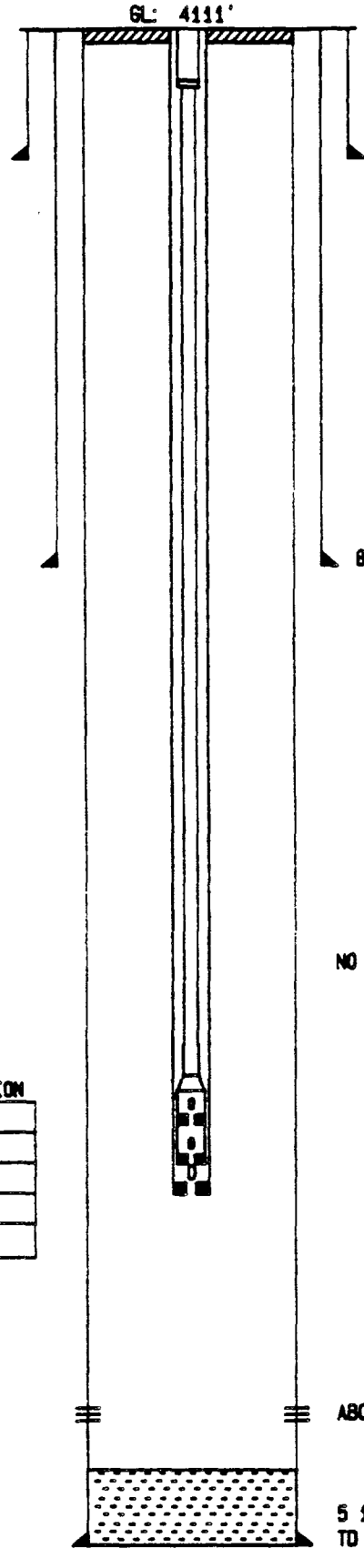
EXHIBIT 10

BHP - DENIUS FEDERAL #3
1980' FSL & FWL SEC 33 T17S R33E
LEA COUNTY, NEW MEXICO

ELEVATION: KB: N.A.
GL: 4111'

DATE DRILLED : 9/60

TOP OF YATES : 2800'
TOP OF QUEEN : 3910'



13 3/8" SURFACE CASING @ 309'
CMTD W/ 340 SX CMT CIRC

8 5/8" INTERMEDIATE CASING @ 2920'
CMTD W/ 850 SX

NO TUBING DATA AVAILABLE

ABO PERFS (8576' - 8740')

5 1/2" CASING @ 9068' CMTD W/ 250 SX
TD @ 9071'

	SURFACE	INTERMED	PRODUCTION
SIZE	13 3/8"	8 5/8"	4 1/2"
WEIGHT	48#	24 & 32#	11.6 #
GRADE	N.A.	N.A.	N.A.
THREAD	N.A.	N.A.	N.A.
DEPTH	309'	2920'	9068'

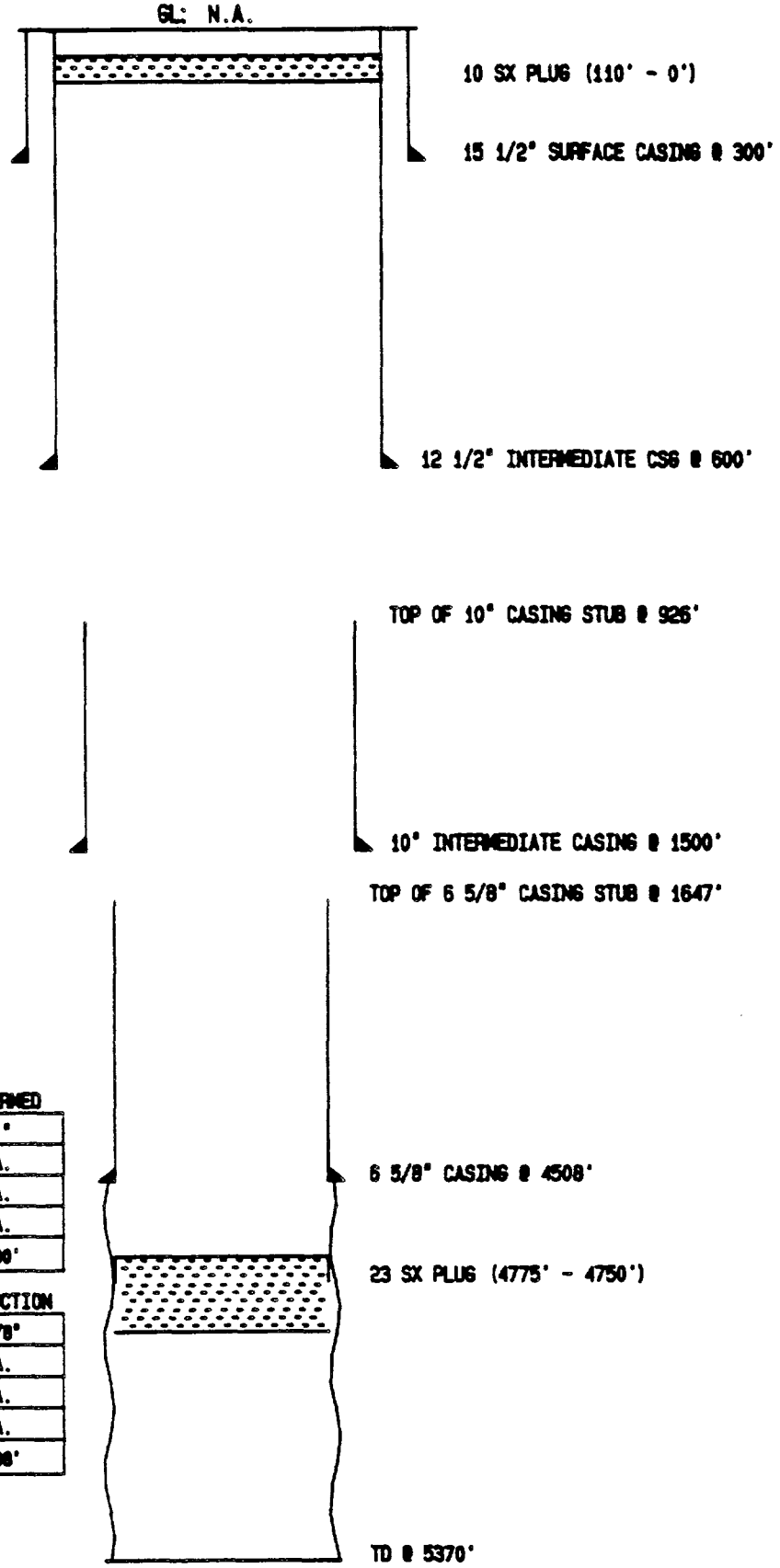
PREPRD BY: SCOTT E. GENGLER
DATE : JULY 26, 1990

EXHIBIT 10

HENDERSON, DEXTER, BLACK - WYATT #1
330' FSL & FWL SEC 34 T17S R33E
LEA COUNTY, NEW MEXICO

ELEVATION: KB: N.A.
GL: N.A.

DATE DRILLED : 8/20



	SURFACE	INTERMED	INTERMED
SIZE	15 1/2"	12 1/2"	10 "
WEIGHT	N.A.	N.A.	N.A.
GRADE	N.A.	N.A.	N.A.
THREAD	N.A.	N.A.	N.A.
DEPTH	300'	600'	1500'

	PRODUCTION
SIZE	6 5/8"
WEIGHT	N.A.
GRADE	N.A.
THREAD	N.A.
DEPTH	4508'

PREPRD BY: SCOTT E. GENGLER
DATE : JULY 26, 1990

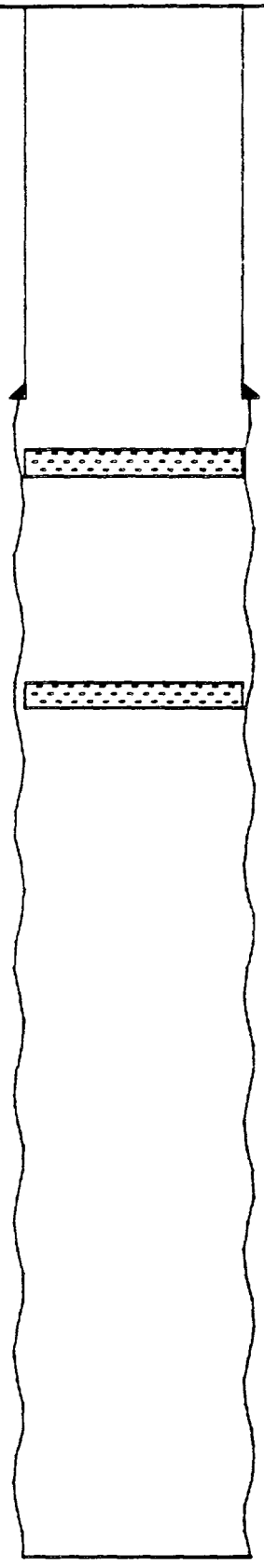
EXHIBIT 10

CARPER - CORBIN #3 B
660' FNL & 1980' FWL SEC 3 T18S R33E
LEA COUNTY, NEW MEXICO

ELEVATION: KB: N.A.
GL: 4041'

DATE DRILLED : 10/57

TOP OF QUEEN : 4119'



8 5/8" SURFACE CASING @ 1567'
CMTD W/ 50 SX

10 SX PLUG (1675' - 1635')

10 SX PLUG (2775' - 2735')

TD @ 5424'

SURFACE

SIZE	8 5/8"		
WEIGHT	24 #		
GRADE	N.A.		
THREAD	N.A.		
DEPTH	1567'		

PREPRD BY: SCOTT E. GENGLER
DATE : JULY 24, 1990

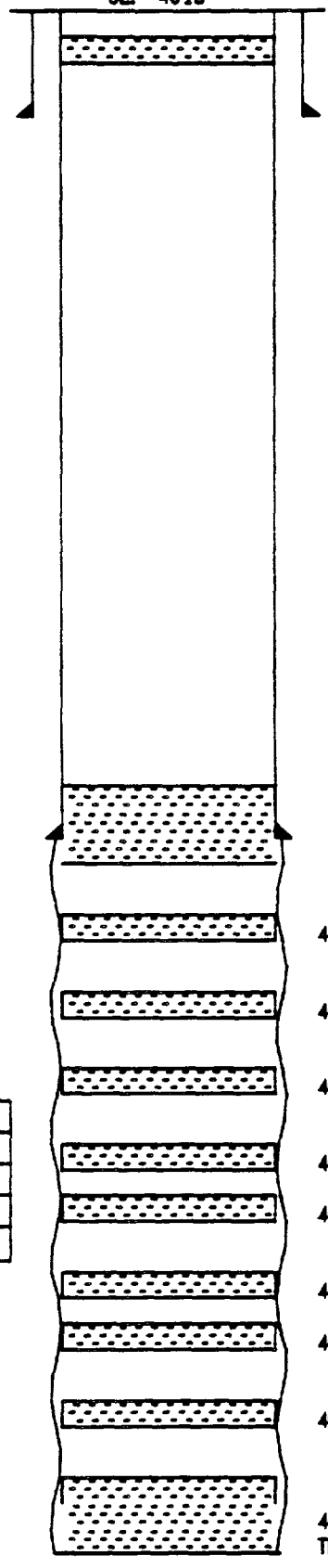
EXHIBIT 10

STOLTZ, WAGNER & BROWN #1
660' FSL & 1980' FWL SEC 3 T18S R33E
LEA COUNTY, NEW MEXICO

ELEVATION: KB: 4035'
GL: 4018'

DATE DRILLED : 11/74

TOP OF YATES : 2994'
TOP OF QUEEN : 4215'



15 SX PLUG (40' - 0')

13 3/8" SURFACE CASING @ 300'
CMTD W/ 300 SX CMT CIRC

40 SX CMT PLUG (3450' - 3350')
9 5/8" INTERMEDIATE CASING @ 3402'
CMT W/ 300 SX CMT

40 SX CMT PLUG (5250' - 5150')

40 SX CMT PLUG (6900' - 6800')

40 SX CMT PLUG (8200' - 8100')

40 SX CMT PLUG (9500' - 9400')

40 SX CMT PLUG (9700' - 9600')

40 SX CMT PLUG (10520' - 10420')

40 SX CMT PLUG (11000' - 10900')

40 SX CMT PLUG (12900' - 12800')

40 SX CMT PLUG (13700' - 13600')
TD @ 13700'

	SURFACE	INTERMED	
SIZE	13 3/8"	9 5/8"	
WEIGHT	NA	NA	
GRADE	NA	NA	
THREAD	NA	NA	
DEPTH	300'	3402'	

PREPRD BY: SCOTT E. GENGLER
DATE : JULY 24, 1990

EXHIBIT 10

B. COCKBURN - CORBIN #6
660' FSL & FEL SEC 9 T18S R33E
LEA COUNTY, NEW MEXICO

ELEVATION: KB: N.A.
GL: N.A.

DATE DRILLED : 5/55

8 5/8" SURFACE CASING @ 1525'
CMTD W/ 100 SX

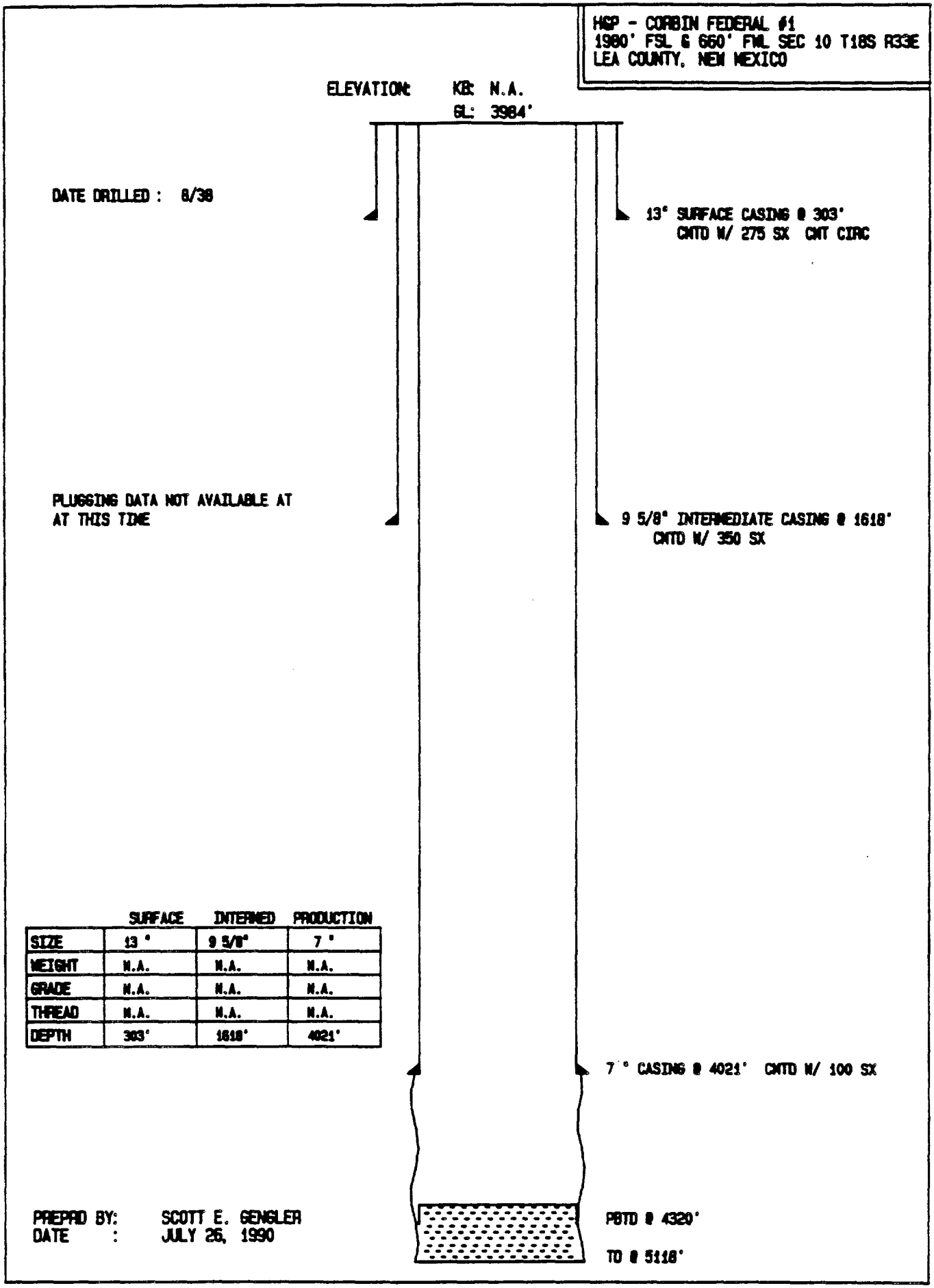
PLUGGING DATA NOT AVAILABLE AT
THIS TIME

	SURFACE	PRODUCTION	
SIZE	8 5/8"		
WEIGHT	N.A.		
GRADE	N.A.		
THREAD	N.A.		
DEPTH	1525'		

PREPRD BY: SCOTT E. GENGLER
DATE : JULY 26, 1990

TD @ 4927'

EXHIBIT 10



	SURFACE	INTERMED	PRODUCTION
SIZE	13 "	9 5/8"	7 "
WEIGHT	N.A.	N.A.	N.A.
GRADE	N.A.	N.A.	N.A.
THREAD	N.A.	N.A.	N.A.
DEPTH	303'	1618'	4021'

EXHIBIT 10

ITEM VII

Proposed Average Injection Rate (per well, per day): 200 BPD

Proposed Maximum Injection Rate (per well, per day): 1000 BPD

Proposed Average Injection Pressure: 1500 PSI

Proposed Maximum Injection Pressure: 2000 PSI

Type of System: Open, make-up water will come from Ogalalla formation, and off-lease wells producing from the Bone Spring formation.

UNICHEM
INTERNATIONAL

Home Office 707 N. Leech, P.O. Box 1499 / Hobbs, NM 88240 / Ph. 505/393-7751, TWX 910/986-0010

July 24, 1990

Mr. Sid Nichols
Oxy USA, Inc.
Box 69
Hobbs, NM 88241

Dear Mr. Nichols:

Enclosed please find our water analysis and compatability report on the samples submitted July 20, 1990, from the **State DW #4** and **Federal AH.**

If you have any questions or require further information, please contact us.

Sincerely,

Sharon Wright
Laboratory Technician

SW/sr

Enclosures

cc: John Offutt
Joe Gibson
Scott Gengler
Joe Hay

Unichem International

707 North Leech P.O.Box 1499

Hobbs, New Mexico 88240

Company : OXY USA, INC.
Date : 07-24-1990
Location: BONESPRINGS-STATE DW #4 (on 07-20-1990)

	Sample 1
Specific Gravity:	1.136
Total Dissolved Solids:	190561
pH:	7.00
IONIC STRENGTH:	3.474

CATIONS:		me/liter	mg/liter
Calcium	(Ca^{+2})	240	4800
Magnesium	(Mg^{+2})	100	1220
Sodium	(Na^{+1})	2940	67600
Iron (total)	(Fe^{+2})	0.355	9.90
Barium	(Ba^{+2})	0.004	0.300
Manganese	(Mn^{+2})	0.029	0.800
ANIONS:			
Bicarbonate	(HCO_3^{-1})	4.60	281
Carbonate	(CO_3^{-2})	0	0
Hydroxide	(OH^{-1})	0	0
Sulfate	(SO_4^{-2})	33.8	1630
Chloride	(Cl^{-1})	3240	115000

SCALING INDEX (positive value indicates scale)

Temperature		Calcium Carbonate	Calcium Sulfate
86°F	30°C	0.98	-14

Unichem International

707 North Leech P.O.Box 1499

Hobbs, New Mexico 88240

Company : OXY USA, INC.
Date : 07-24-1990
Location: STATE DW #4 & FEDERAL AH - COMPATABILITY (on 07-20-1990)

	Sample 1
Specific Gravity:	1.109
Total Dissolved Solids:	152201
pH:	6.90
IONIC STRENGTH:	2.867

CATIONS:		me/liter	mg/liter
Calcium	(Ca^{+2})	194	3880
Magnesium	(Mg^{+2})	212	2580
Sodium	(Na^{+1})	2240	51500
Iron (total)	(Fe^{+2})	1.23	34.5
Barium	(Ba^{+2})	0.004	0.250
Manganese	(Mn^{+2})	0.110	3.02
ANIONS:			
Bicarbonate	(HCO_3^{-1})	4.30	262
Carbonate	(CO_3^{-2})	0	0
Hydroxide	(OH^{-1})	0	0
Sulfate	(SO_4^{-2})	31.5	1510
Chloride	(Cl^{-1})	2610	92500
DISSOLVED GASES			
Carbon Dioxide	(CO_2)		0
Hydrogen Sulfide	(H_2S)		0
Oxygen	(O_2)		0

SCALING INDEX (positive value indicates scale)

Temperature		Calcium Carbonate	Calcium Sulfate
86°F	30°C	0.52	-25

Comments:
STATE DW #4= 50% & FEDERAL AH= 50%

Unichem International

707 North Leech P.O.Box 1499

Hobbs, New Mexico 88240

Company : OXY USA, INC.
Date : 07-24-1990
Location: QUEEN-FEDERAL AH (on 07-20-1990)

	Sample 1
Specific Gravity:	1.081
Total Dissolved Solids:	113841
pH:	6.80
IONIC STRENGTH:	2.259

CATIONS:		me/liter	mg/liter
Calcium	(Ca^{+2})	148	2950
Magnesium	(Mg^{+2})	324	3940
Sodium	(Na^{+1})	1540	35300
Iron (total)	(Fe^{+2})	2.11	59.0
Barium	(Ba^{+2})	0.003	0.200
Manganese	(Mn^{+2})	0.191	5.24
ANIONS:			
Bicarbonate	(HCO_3^{-1})	4.00	244
Carbonate	(CO_3^{-2})	0	0
Hydroxide	(OH^{-1})	0	0
Sulfate	(SO_4^{-2})	29.1	1400
Chloride	(Cl^{-1})	1970	70000

SCALING INDEX (positive value indicates scale)

Temperature		Calcium Carbonate	Calcium Sulfate
86°F	30°C	0.06	-35

CITIES SERVICE OIL AND GAS CORPORATION

INTEROFFICE LETTER

September 9, 1986

TO: Ms. Rebecca Egg

FROM: Loyd A. Nixon LAN

SUBJECT: Federal AA, AD, AE Brines Mixed with Fresh Water for Waterflood

Conclusions

1. The produced brine itself is very likely to be scaling $CaCO_3$, and possible gypsum (Table I).

2. Blending fresh water with this brine lessens the tendency to deposit $CaCO_3$, $CaSO_4$, $BaSO_4$ and $SrSO_4$ (Figure 1-4).

3. Due to the high iron content of the produced water and the amount of oxygen in the fresh water (~7ppm) formation of iron oxide (red water) is certain.

Recommendations

1. The above waters are essentially compatible and will not cause precipitation of any of the four major scales. Therefore, it should be used as a source water (Tables I, II, - Figures 1, 2, 3 and 4).

2. Scavenge the oxygen from the fresh water using either NH_4HSO_3 (ammonium bisulfite 50% liquid solution) or SO_2 (sulphur dioxide). Ammonium bisulfite is usually effective in fresh water at a rate of 10 ppm per 1 ppm oxygen.

3. Provide tankage on the lease to give the fresh water at least two hours retention time. This will provide ample time for the scavenger to work before contacting produced water.

Discussion

The calcium magnesium ratio of the produced brines, as well as the calcite stability index values, leads to the conclusion that calcium scales may already be or will become a problem in these wells. Inhibition may be a necessary part of operation if it is not already.

Oxygen in the fresh water must be removed before it is mixed with the produced brine or red water (Fe_2O_3) will form. The cost of NH_4HSO_3 for use for this purpose would be ~$11.32/1000 bbl. fresh water /day. This assumes a cost of $3.50/gal. for 50% NH_4HSO_3 solution. SO_2 should be somewhat cheaper if bought on a no service basis from a jobber other than Kemex.

LAN/cb

cc: Messrs. G. L. Davis
C. L. Oney
E. Pittinger

Temp °F	Compound	Produced Water (%) 100	80	60	40	20	0
32	$CaCO_3$	+1.22	+0.31	-0.63	-1.17	-1.15	+0.13[1]
	$CaSO_4$-$2H_2O$	+0.61	+0.27	-0.02	-0.29	-0.59	-1.33
	$BaSO_4$	+0.31	+0.20	+0.10	-0.15	-0.15	-
	$SrSO_4$	+0.21	+0.05	-0.15	-0.35	-0.57	-
68	$CaCO_3$	+1.97	+0.83	-0.30	-0.94	-0.88	+0.60
	$CaSO_4$-$2H_2O$	+0.57	+0.27	-0.02	-0.29	-0.59	-1.33
	$BaSO_4$	+0.18	+0.13	+0.05	-0.06	-0.24	-
	$SrSO_4$	+0.21	+0.05	-0.15	-0.35	-0.57	-
104	$CaCO_3$	+2.47	+1.66	-0.20	-0.52	-0.45	+1.00
	$CaSO_4$-$2H_2O$	+0.56	+0.28	-0.03	-0.29	-0.58	-1.33
	$BaSO_4$	+0.09	+0.04	-0.03	-0.14	-0.33	-
	$SrSO_4$	+0.21	+0.05	-0.15	-0.35	-0.57	-

Table I Stability and solubility index values for Calcite. Gypsum Barite and Celestite for a mixture o Feberal AA, AD and AE brine with fresh water from well on lease. (Values >0 are in excess i saturation with respect to a particular scale values <0 are undersaturated with respect to tha compound).

[1] Langelier index used to calculate stability index rather than Stiff Davis due to the low TDS of this water.

Fresh Water (%)	Produced Brine %	Calcium as $CaCO_3$ At Start (ppm)	Calcium as $CaCO_3$ At End[1] (ppm)	Calcium Deposited As $CaCO_3$ (ppm)	pH In	pH Out
0	100	12000	12000	0	6.0	5.1
20	80	10200	10200	80	6.2	5.3
40	60	7000	7300	-300	6.1	5.8
60	40	5100	5100	0	6.0	6.3
80	20	2700	2800	100	6.4	7.1
100	0	136	136	0	7.6	8.4

Table II Calcium scale deposition values when Fed. AA, AD, AE brine is mixed with fresh water from water well on lease.

[1]Test length 24 hours, temperature 90°F

Fresh Water %	Produced Brine (ppm)	Iron (Fe^{++}) At Start (ppm)	Iron (Fe^{++}) At Finish[1] (ppm)	Iron (Fe^{++}) Deposited As Fe_2O_2 (%) (ppm)	Deposition (%)
0	100	90	10	76.3	88.9
20	80	40	2	36.2	95.0
40	60	30	0.1	28.5	99.7
60	40	20	0.0	19.0	100.0
80	20	10	0.0	9.5	100.0
100	0	0.5	0.5	0.0	0

Table III Iron oxide deposition when Federal AA, AD, AE brine is mixed with fresh water from well on lease.

[1]Test length 24 hours, temperature 90°F

CENTRAL CORBIN QUEEN FIELD

RESERVOIR DESCRIPTION

The Central Corbin (Queen) Field is located on the north basin platform structural province, near the northern edge of the Delaware Basin. The Queen Formation is part of the Guadalupian age Artesia Group, which includes the Goat Seep and Capitan carbonate reef systems. Central Corbin, along with several other Queen fields in the area (Corbin, E-K, and North E-K) produces from the upper part of the Queen, locally referred to as the Shattuck member, or Queen sandstone. The Central Corbin Field is primarily a stratigraphic trap, with a structural influence at its southern edge.

Queen core is available on three wells in Central Corbin: the Federal "AA" No. 2 (4236-4291), Federal "AD" No. 1 (4198-4245) and the Federal "AE" No. 1 (4194-4242). Open hole logs are available on most of the wells. The gamma ray-neutron/density log has proven to be the most useful correlation tool. Regional subsurface mapping has provided valuable analogies from more mature Queen fields.

In Central Corbin, the Queen sandstone is 48-60 feet thick, with gradational contacts with the underlying and overlying anhydrite. The reservoir consists of very fine grained (62.5-125 microns) well sorted, sub-angular quartzarenite. Corrensite clay (a mixed layer chlorite-smectite clay) lines the pore throats. X-ray analysis indicates clay volumes ranging from 4.2-8.6% (± 2%).

Authegenic potassium feldspar, dolomite and gilsonite occur in small quantities. The better reservoir rocks exhibit low-angle planar cross-bedding, and the grain size is on the coarse end of the range (88-125 microns). Oil-bearing rocks are buff-gray, whereas non-oil-bearing rocks are red. Visible oil within red sandstones are surrounded by buff-gray rings, indicating that the color change is due to reduction of iron oxides in the rock by the presence of hydrocarbons.

Porosity is interparticle, ranging up to 14%, and averaging 10.4%. Pay thickness (porosity $\geq$ 8%) ranges up to 34 feet, and averages 21 feet. Anhydrite is the dominant cement type in the reservoir. The degree of anhydrite plugging is a function of grain size. Sandstone on the coarse end of the range is less affected by anhydrite cementation. Permeability ranges up to 207 md, and averages 3.8 md. Porosity-permeability plots derived from core data cluster along a fairly linear trend. Oriented core, recovered from the Federal "AD" No. 1 indicates no preferred permeability direction. Oil staining and reduction spots on core surfaces show preferred fluid flow parallel to the low-angle cross-bedding, which probably dips to the south. Anhydrite cement distribution in the cross-bedded sandstones suggest tortuous permeability paths. Natural fractures probably influence permeability paths, however, the core does not reveal an extensive fracture system. Random distribution of anhydrite cement appears to have the greatest impact on permeability paths, therefore, near-wellbore permeability paths should be radial.

Non-reservoir rock within the Queen sandstone consists of coarse-grained (31.2-62.5 microns), sub-angular, well-sorted quartz siltstone. It is mostly red, with some red-buff wavy laminae, and wisps, or nodules of anhydrite. Porosity is completely plugged with anhydrite.

Structural strike at Central Corbin is east-west, dipping southerly 100-150 feet/mile. An east-west trending monoclinal fold occurs north of Central Corbin, in the Corbin (Queen) Field. The monoclinal fold appears to have influenced pay development in Corbin. An oil-water contact occurs at -300 feet based on the recovery of the Federal AD #5 and the Federal AG wells.

The most significant porosity zone in the Queen occurs in the lower half of the section with three other thin zones correlatable throughout the field.

The net pay isopach of the Queen sandstone, using an 8% porosity cut-off helps define the limits of the reservoir. The reservoir is bounded on the north, east and west by a pinchout of the porosity, and to the south by the oil-water contact.

The Queen sandstone is a widespread deposit of probable eolian origin. A trend of Queen sandstone production occurs along the northern edge of the underlying Goat Seep Reef lagoon. The digitate lagoon-sabkha boundary is defined by lithologic logs; dolomite underlies the Queen sandstone in the lagoon, and anhydrite underlies the Queen in the sabkha. Along this boundary, the eolian transported sands were re-worked by marginal marine processes, creating the reservoir. Central Corbin Field is located within a narrow embayment in the lagoon, where tidal

currents re-worked the sands. Depositional strike is north-south, perpendicular to the shoreline. The Corbin Field, to the north, is located along the shoreline, where shoreline currents re-worked the sands. Depositional strike is therefore east-west, parallel to the shoreline.

Dry holes separate the north-south trending Central Corbin (Queen) Field from the east-west trending Corbin (Queen) Field. The proposed unit area includes all the active wells in the Central Corbin (Queen) Field, as well as the Oxy Federal "AI" No. 1, an old completion in the Corbin (Queen) Field (NE/4 NE/4, section 4). Current mapping indicates that this well is in communication with Central Corbin, and separate from Corbin.

KELLAHIN, KELLAHIN AND AUBREY
ATTORNEYS AT LAW
EL PATIO BUILDING
117 NORTH GUADALUPE
POST OFFICE BOX 2265
SANTA FE, NEW MEXICO 87504-2265

W. THOMAS KELLAHIN
KAREN AUBREY

CANDACE HAMANN CALLAHAN

JASON KELLAHIN
OF COUNSEL

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

July 31, 1990

HAND DELIVERED

Mr. William J. LeMay
Oil Conservation Division
P.O. Box 2088
Santa Fe, New Mexico 87501

Re: (1) Application of OXY USA Inc. for Statutory Unitization for the Central Corbin Queen Unit, Lea County, New Mexico

(2) Application of OXY USA for Authority to Institute a waterflood project for the Central Corbin Queen Unit, Lea County, New Mexico.

Dear Mr. LeMay:

On behalf of OXY USA Inc, we would appreciate your setting the enclosed two Applications for a public hearing on the Division's Examiner docket now scheduled for August 22, 1990.

By copy of this letter to all parties to be subject to any orders issued in these cases, we are notifying them by certified mail-return receipt, that they have the right to appear at the hearing, to make a statement to the Division, to present evidence and cross-examine witnesses either in support of or in opposition to the Application. Those parties are directed to contact the Division or the Applicant's attorney to determine what additional rights they may have. In addition, they are advised that the entry of a statutory unitization order will affect their rights to share in the production from the subject unit.

Any party desiring to participate in the hearing should file a prehearing statement with the Division and the applicant's attorney by 4:00 P.M. on August 17, 1990.

Sincerely,

W. Thomas Kellahin

WTK/tic
Encl.

STATE OF NEW MEXICO
DEPARTMENT OF ENERGY AND MINERALS
OIL CONSERVATION DIVISION

APPLICATION OF OXY USA, INC. FOR AUTHORITY TO INSTITUTE A WATERFLOOD PROJECT FOR THE CENTRAL CORBIN QUEEN UNIT, LEA COUNTY, NEW MEXICO

NO.

A P P L I C A T I O N

OXY USA INC. ("OXY") hereby applies to the New Mexico Oil Conservation Commission for an order authorizing OXY to institute a waterflood project for the Central Corbin Queen Unit, Lea County, New Mexico, and in support of its application states:

1. OXY USA Inc. ("OXY") is a Delaware corporation authorized to transact business in the State of New Mexico, and is engaged in the business of, among other things, producing and selling oil and gas.

2. The proposed area (the "Project Area") for which application is made is known as the Central Corbin Queen Unit and consists of 1560 acres, more or less, in Lea County, New Mexico, and is more particularly shown in Exhibit No. 1 attached hereto and incorporated herein by reference. OXY proposes to seek an order pursuant to the New Mexico Statutory Unitization Act providing for the unitized management, operation and further development of the Project Area.

3. By converting certain presently producing wells to water injection wells and by drilling new water injection wells, OXY proposes to inject fluids into the producing interval which shall include the formations which extend from an upper limit described as 215 feet below mean sea level or at the top of the Queen formation, whichever is higher, to a lower limit at the base of the Queen formation. The geologic markers have been previously found by the Oil Conservation Division to occur at 4200 feet and 4246 feet, respectively, in OXY USA Inc.'s Federal "AA" No. 1 Well (located at 990 feet from the North line and 1980 feet from the East line of Section 9, Township 18 South, Range 33 East, Lea County, New Mexico) and as recorded on the Schlumberger CNL-LDT Log taken on November 10, 1984, said Log being measured from a kelly drive bushing elevation of 3985 feet above sea level. A copy of the Welex Log for said well on said date is attached hereto and incorporated herein by reference as Exhibit No. 2. Also attached hereto and incorporated herein by reference as Exhibit No. 3 is a Well Status Map of the Central Corbin Queen Unit Area showing the location and current status of all wells and leases located within the project area as well as those that are located within a two mile radius of the proposed injection wells. Also attached hereto and incorporated herein by reference is Exhibit No. 4 which is a Well Status Map of the Central Corbin Queen Unit which also shows the proposed Unit

injection wells. Exhibit No. 5, in conjunction with Exhibit No. 1, is the proposed well numbering system within the unit. Regarding both Exhibit No. 4 and Exhibit No. 5 and attached hereto and incorporated herein by reference as Exhibit No. 6 are well data sheets relating current and proposed well data on each proposed injection well within the Unit Area. Diagrammatic sketches illustrating the wellbore configurations typical of the majority of the proposed injection wells and showing the manner in which the wells will be equipped for injection are attached hereto and incorporated herein by reference as Exhibit No. 7. Schematic diagrams for other wells in the units are attached and incorporated herein by reference as Exhibit No. 8. All the available well logs of the proposed injection wells are currently on file with the Oil Conservation Division. Attached hereto and incorporated herein by reference as Exhibit No. 9 is a list of those injection wells for which well logs are not available.

4. Schematic diagrams on all other wells located within one-half mile radius of the proposed injection wells showing all casing strings, setting depths, sacks of cement used, cement tops, total depth, producing intervals, well identification, and location are attached hereto and incorporated herein by reference as Exhibit No. 10.

Included in this attachment are schematics of all plugged and abandoned wells located within a one-half mile radius of the proposed injection wells.

5. Initially, water to be used for injection for the waterflood project will come from the Ogallala and the Bone Spring formations. As production increases, and the number of injection wells increase, it is expected that produced water will become the primary source of injected water supplemented by water from the Ogallala formation.

6. Water is to be injected at a surface pressure not to exceed 0.2 psi per foot of depth to the top of the injection zone provided that surface pressure in excess of 0.2 psi per foot of depth to injection zone may be applied upon administrative approval of the Director of the Oil Conservation Division after showing that such higher pressure will not result in fracturing of the confining strata.

7. Furthermore, filed with this application is Division Form C-108 with remaining attachments, which is incorporated herein by reference as Exhibit No. 11.

8. Approval of this application for the Central Corbin Queen Unit waterflood project will substantially increase recoverable reserves thereby preventing waste.

9. In accordance with Division Notice Rules, a copy of this application has been sent certified mail return receipt to those offset operators and surface owners as set forth on Exhibit 12 and they are hereby notified of the hearing set for August 22, 1990.

WHEREFORE, OXY respectfully requests that this application be set for hearing before the Oil Conservation Division on August 22, 1990 and that the Division enter its order approving the waterflood project for the Central Corbin Queen Unit.

KELLAHIN, KELLAHIN & AUBREY

By: _____
W. Thomas Kellahin
Post Office Box 2265
Santa Fe, New Mexico 87504
(505) 982-4285

ATTORNEYS FOR OXY USA, INC.

EXHIBIT 12

List of Offset Operators
and Surface Owners

BHP Petroleum Inc.
5847 San Felipe St. 3600
Houston, Texas 77057

Dallas McCasland
Box 206
Eunice, N.M. 88231

Meridian Oil Inc.
21 Desta Drive
Midland, Texas 79705
Attn: Tom Ollie

Conoco Inc.
10 Desta Drive West
Midland, Texas 79705
Attn: Jerry Hoover

Harvey E. Yates Company (Heyco)
P. O. Box 1933
Roswell, New Mexico 08202
Attn: Rosemary Avery

Santa Fe Energy Operating Partners
500 W. Illinois
Midland, Texas 79701

Santa Fe Exploration Company
P. O. Box 1136
Roswell, New Mexico 88201

Surface Owner

Bureau of Land Management
P. O. Box 17789
Carlsbad, New Mexico 88220

OXY USA INC.
Box 50250, Midland, TX 79710

August 13, 1990

STATE LAND OFFICE
P. O. Box 2088
Santa Fe, New Mexico 87504

** CERTIFIED MAIL **

Re: Application for OXY USA Inc. for Authority to Institute a Waterflood Project for the Central Corbin Queen Unit, Lea County, New Mexico.

Dear Sir:

Please find attached copies of the referenced application. I apologize because you were inadvertently left out of the original mailing.

Sorry for the inconvienence.

Yours Truly,

Richard E. Foppiano

Regulatory Affairs Engineering Advisor

REF/Ref
attachments

OXY USA INC.
Box 50250, Midland, TX 79710

August 13, 1990

Herschel Caviness
Gary Caviness
East Star Route
Maljamar, New Mexico 88264

** CERTIFIED MAIL **

Re: Application for OXY USA Inc. for Authority to Institute a Waterflood Project for the Central Corbin Queen Unit, Lea County, New Mexico.

Dear Sir:

Please find attached copies of the referenced application. I apologize because you were inadvertently left out of the original mailing.

Sorry for the inconvienence.

Yours Truly,

Richard E. Foppiano

Richard E. Foppiano

Regulatory Affairs Engineering Advisor

REF/Ref
attachments

CENTRAL CORBIN QUEEN UNIT

WELL CROSS REFERENCE

TRACT	PREVIOUS OPERATOR	LEASE NAME AND WELL NUMBER	UNIT DESIGNATION
5	SANTE FE	FEDERAL AG #1	NOT USED
5	SANTE FE	FEDERAL AG #2	NOT USED
4	OXY	FEDERAL AD #1	401W
4	OXY	FEDERAL AD #2	402
4	OXY	FEDERAL AD #3	403
4	OXY	FEDERAL AD #4	404W
4	OXY	FEDERAL AD #5	405
1A	OXY	FEDERAL AA #1	101
1A	OXY	FEDERAL AA #2	102
1A	OXY	FEDERAL AA #3	103W
1A	OXY	FEDERAL AA #4	104W
1B	OXY	FEDERAL AH #1	105
1B	OXY	FEDERAL AH #2	NOT USED
2A	OXY	FEDERAL AE #1	201W
2A	OXY	FEDERAL AE #2	202
2A	OXY	FEDERAL AE #3	203W
2A	OXY	FEDERAL AE #4	204W
2A	OXY	FEDERAL AE #5	205W
2A	OXY	FEDERAL AE #6	206
2A	OXY	FEDERAL AE #7	207
2A	OXY	FEDERAL AE #8	208
2A	OXY	FEDERAL AE #9	209W
2A	OXY	FEDERAL AE #10	210
2A	OXY	FEDERAL AE #12	212W
2B	OXY	FEDERAL AI #1	215
2B	OXY	FEDERAL AI #3	214
2B	OXY	FEDERAL AI #4	213W
3	CONOCO	FEDERAL (BHP) #1	NOT USED
6	SANTA FE	CORBIN FEE #1	601W
7	SANTA FE	CORBIN FEE #2	602

NOTE: FEDERAL AG #1 and #2 will be #501 and #502 if used.

EXHIBIT 5

Proposed well
numbering system