

APPLICATION FOR AUTHORIZATION TO INJECT

- I. PURPOSE: Secondary Recovery Pressure Maintenance XX Disposal Storage
Application qualifies for administrative approval? XX Yes No
- II. OPERATOR: Griffin Petroleum Company
ADDRESS: 550 W. Texas Suite 1240 Midland, TX 79701
CONTACT PARTY: Eric Griffin PHONE: (915) 687-104
- III. WELL DATA: Complete the data required on the reverse side of this form for each well processed for injection. Additional sheets may be attached if necessary.
- IV. Is this an expansion of an existing project: Yes XX No
If yes, give the Division order number authorizing the project APR 29 1999
- 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 of 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 sources 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: Eric Griffin TITLE: Vice President
SIGNATURE: Eric Griffin DATE: 4-27-99
- * If the information required under Sections VI, VIII, X, and XI above has been previously submitted, it need not be resubmitted. Please show the date and circumstance of the earlier submittal. _____

Griffin Petroleum Company

Form C-108 Supplement
Application for Authorization to Inject
Willow Lake Com #1
Eddy County, New Mexico

- III. See attached data sheets.
- IV. This is not an expansion of an existing project.
- V. See attached map.
- VI. See attached table.
- VII. Data on the proposed operation:
 - 1. The proposed average daily injection rate is 2000 barrels of water per day.
The proposed maximum daily injection rate is 3000 barrels of water per day.
 - 2. The injection station for the gathering and processing of water to be injected will be a closed system.
 - 3. The proposed average injection pressure is 1100 psig.
The proposed maximum injection pressure is 1436 psig.
 - 4. See attached water and compatibility analyses. All injection waters will be produced waters from Permian aged sandstone horizons and injected into the Lower Bone Spring, which is a Permian aged sandstone horizon. The attached compatibility analysis of the injection waters with the receiving formation waters indicate a potential scaling tendency, however, the same scaling tendency is present in the individual waters by themselves before mixing. In discussions with field personnel in this area, they indicate that no scale can be found on or in subsurface pumps when wells are pulled. If at a later date we find we have substantial excess capacity, we may open this well for commercial disposal.
 - 5. Water injection will be into a zone not productive of oil or gas. The Pardue well 1 mile to the west produces out of an Upper Bone Spring Sand horizon 800' higher than the proposed injection interval. This water was inferred to be close in composition to the proposed injection zone waters and was analyzed as such. See attached disposal zone water analysis.
- VIII. The Bone Spring formation is a primarily a fine to very fine grained sandstone, subrounded to subangular, unconsolidated to friable, with porosities up to 26%. Sandstones are separated by dolomitic siltstones and shales. This formation occurs at a depth of 7150' in the Willow Lake Com #1 well and has a gross thickness of 1900'. The Rustler formation is the fresh water aquifer in this area. The average depth to the bottom of this aquifer in this area is 93' from surface.
- IX. The injection completion interval will be perforated, acidized, and fracture stimulated if needed.

- X. The well logs have been filed with the Division. The well is currently shut-in and uneconomic.
- XI. See attached water analysis statement from the Office of the State Engineer.
- XII. We have examined available geologic and engineering data and found no evidence of open faults or any other hydrologic connection between the disposal zone and any underground source of drinking water.
- XIII. A copy of the Newspaper notice run on Sunday, April 25, 1999 in the Carlsbad Current Argus and Registered Mail receipts will be forwarded to the OCD when received.

Willow Lake Com #1
Conversion to Injection
Form C-108 Section III Well Data
Part A

1. **Lease:** Willow Lake Com
 Well No. 1
 Location: 660' FNL & 1980' FWL, Sec 22, TWP 24S, RNG 28E, Eddy County, NM

2.

Hole Size	Casing Size	Weight	Setting Depth	Sacks of Cement	Estimated TOC	TOC Method	Comments
17-1/2"	13-3/8"	54.5#	633'	600	Surface	Circulated	
12-1/4"	9-5/8"	47#	9825'	4500	Surface	Circulated	
8-1/2"	7-5/8" Liner	33.7#	11,725'	350	9505'	Calculated	Top of liner @ 9505'
6-1/2"	5" Liner	18#	13,205'	230	11,567'	Calculated	Top of liner @ 11,598'
8-1/2"	7-5/8" Tie Back	33.7#	9505'	900	Surface	Calculated	Tie 7-5/8" to surface

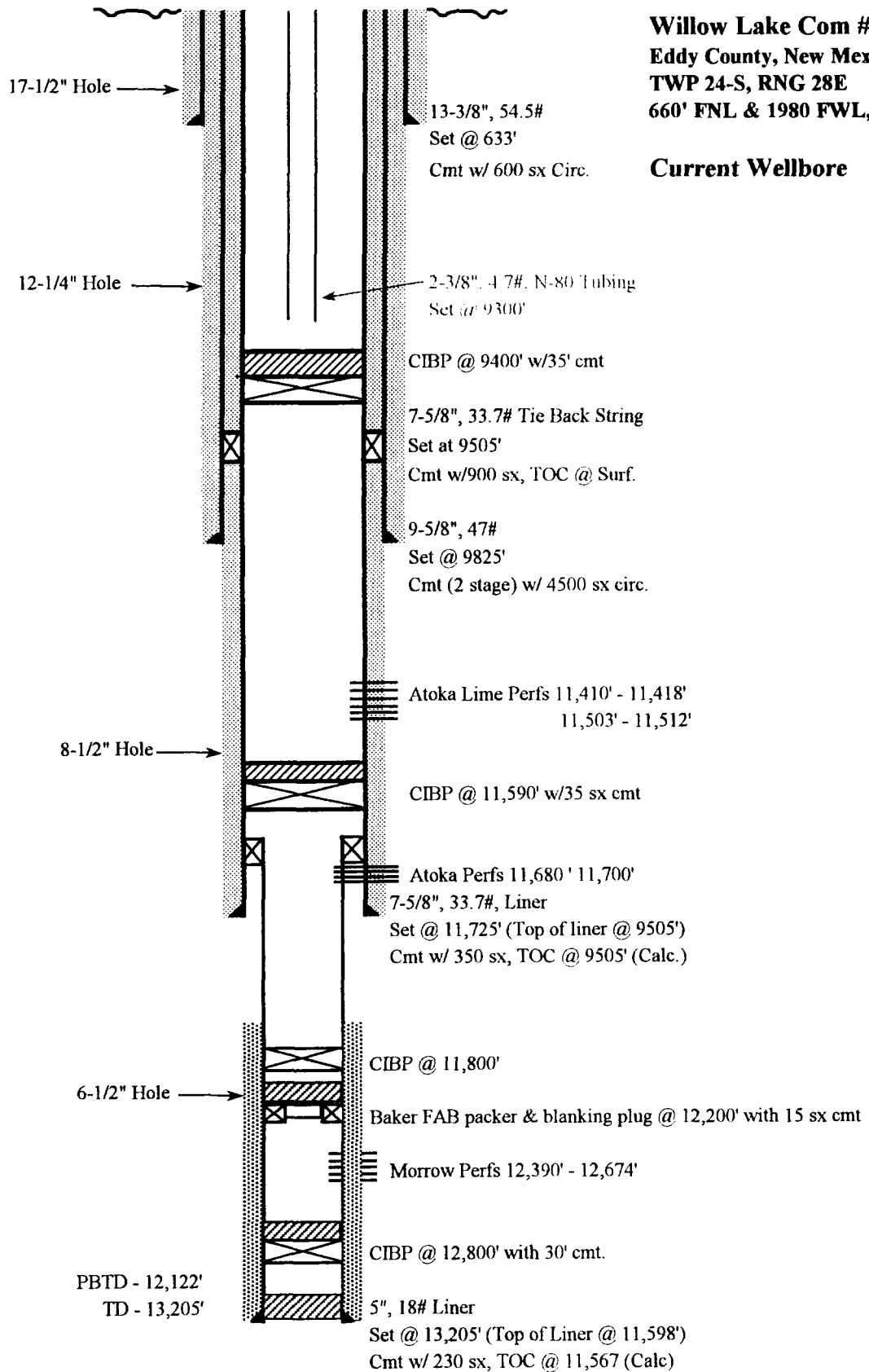
3. Injection tubing: 7140', 2-7/8", J-55, PVC Lined.
4. Injection Packer: Baker Lock-Set. Set at Approx. 7140'.

Willow Lake Com #1
Conversion to Injection
Form C-108 Section III Well Data
Part B

Other Well Information

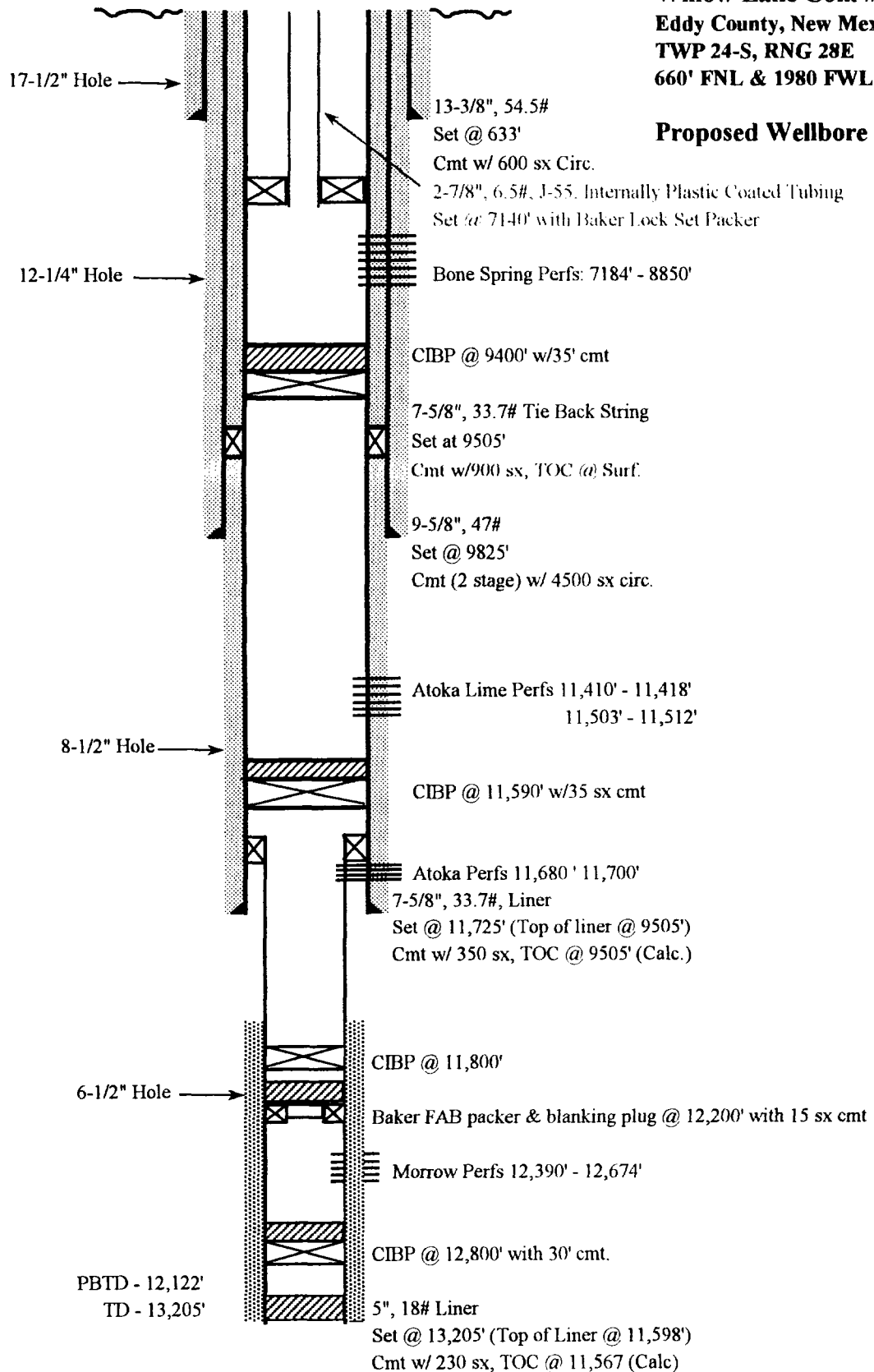
1. Injection Formation: Bone Spring
Field: Malaga, East
2. Initial Perfs: 7184' - 7192', 7198' - 7204', 7258' - 7282', 7308' - 7316'
7354' - 7380', 7524' - 7536', 7543' - 7555', 8590' - 8636'
8794' - 8800', 8805' - 8813', 8815' - 8822', 8838' - 8850'
3. The well was originally drilled as a Morrow and Atoka Gas Producer.
4. Other perforated intervals:

<u>Zone</u>	<u>Perfs</u>	<u>Isolation</u>
Morrow	12,390' - 12,674'	Packer w/blanking plug at 12,200' with 15 sacks cement on top.
Atoka Sand	11,680' - 11,700'	CIBP @ 11,590' with 35 sacks cement on top.
Atoka Lime	11,410' - 11,512'	CIBP @ 9400' with 35 sacks cement on top. Approved by OCD due to lower casing leaks.
5. Within this wellbore there are no upper zones commercially productive of oil & gas.
The next lower productive horizon is the Atoka Lime at 11,410', however it is uneconomic to produce.



Willow Lake Com #1
Eddy County, New Mexico
TWP 24-S, RNG 28E
660' FNL & 1980 FWL, Sec 22

Proposed Wellbore



[illegible]

Willow Lake Com #1
Conversion to Injection
Form C-108
Section VI - Wells Within 1/2 Mile Radius

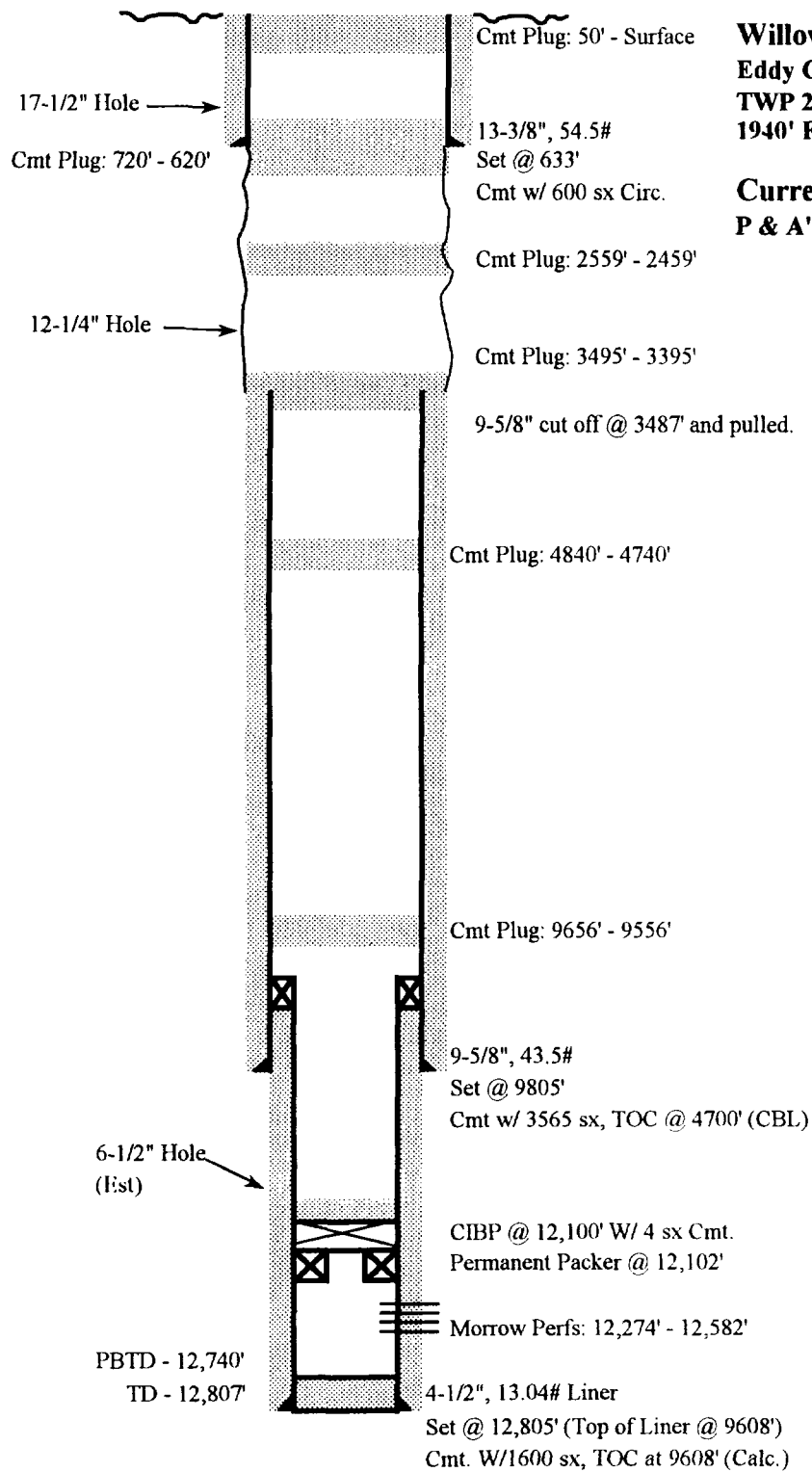
Lease: Willow Lake 15
Well No. 1
Location: 660' FSL & 1980' FEL, Sec 15, TWP 24S, RNG 28E, Eddy County, NM
Operator: Kaiser-Francis
Well Type: Atoka Gas Producer
Date Drilled: Spud 8/20/89, Completed 10/17/89
TD/PBTD: 11,829'/11,746'
Completion: Atoka Perfs: 11,664' - 11,675'

Hole Size	Casing Size	Weight	Setting Depth	Sacks of Cement	Estimated TOC	TOC Method	Comments
17-1/2"	13-3/8"	48# & 54.5#	604'	650	Surface	Circulated	
12-1/4"	9-5/8"	36#	2492'	985	Surface	Circulated	
8-3/4"	7"	26#	10,476'	650			
6-1/8"	4-1/2" Liner		11,828'	294			Top of liner @ 10,184'

Lease: Willow Lake 15
Well No. 3
Location: 660' FSL & 1980' FEL, Sec 15, TWP 24S, RNG 28E, Eddy County, NM
Operator: Aminoil
Well Type: Atoka Gas Producer
Date Drilled: Spud 12/28/77, Completed 3/19/78
TD/PBTD: 12,805'/11,746'
Completion: Morrow Perfs: 12,274' - 12,582', Currently Plugged & Abandoned

Hole Size	Casing Size	Weight	Setting Depth	Sacks of Cement	Estimated TOC	TOC Method	Comments
17-1/2"	13-3/8"	54.5#	640'	650	Surface	Circulated	
12-1/4"	9-5/8"	43.5#	9805'	3665	2600'	Temp. Surv.	2 Stage Cmt/DV @ 4796'
6-1/2" est	4-1/2" Liner	13.04#	12,805'	1600	9608'	Calc	Top of liner @ 9,608'

Plugging Detail: CIBP @ 12,100' with 4 sx cement on top. Cut 9-5/8" casing at 3487' and pull out of hole.
Spot cement plugs from : 9656' - 9556', 4840' - 4740', 3495' - 3395', 2559' - 2459', 720' - 620', 50' - Surface.



Willow Lake 15 #3
Eddy County, New Mexico
TWP 24-S, RNG 28E
1940' FSL & 1940' FWL, Sec 15

Current Wellbore
P & A'd 11-25-81

BJ SERVICES COMPANY
WATER ANALYSIS #FW01W305
ARTESIA LAB

GENERAL INFORMATION

OPERATOR: GRIFFIN PETROLEUM	DEPTH: +/- 6025'
WELL: WILLOW LAKE 2-22	DATE SAMPLED: 03/25/99
FIELD:	DATE RECEIVED: 03/25/99
SUBMITTED BY: REX GLENN	COUNTY: EDDY STATE: NM
WORKED BY: KEITH JACKSON	FORMATION: DELEWARE
PHONE NUMBER:	

SAMPLE DESCRIPTION

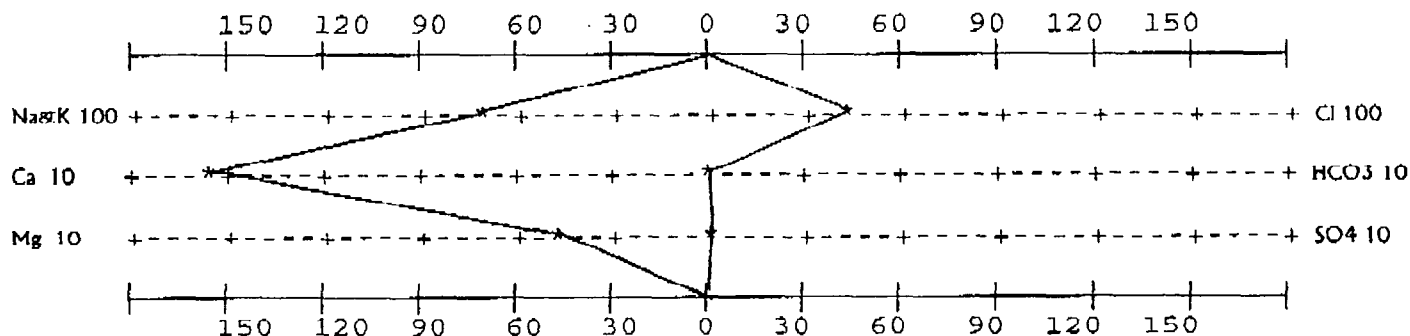
PROPOSED INJECTION WATER

PHYSICAL AND CHEMICAL DETERMINATIONS

SPECIFIC GRAVITY: 1.205 @ 76°F	PH: 5.45
RESISTIVITY (CALCULATED): 0.025 ohms @ 75°F	
IRON (FE++) : 8 ppm	SULFATE: 141 ppm
CALCIUM: 30,902 ppm	TOTAL HARDNESS 102,136 ppm
MAGNESIUM: 6,050 ppm	BICARBONATE: 51 ppm
CHLORIDE: 155,152 ppm	SODIUM CHLORIDE (Calc) 255,225 ppm
SODIUM+POTASS: 72,639 ppm	TOT. DISSOLVED SOLIDS: 330,118 ppm
IODINE:	POTASSIUM K+: 1125 PPM

REMARKS

STIFF TYPE PLOT (IN MEQ/L)



SCALING TENDENCIES

CASO4 SCALING IS PROBABLE

CACO3 SCALING IS PROBABLE

FW01W278

BJ SERVICES COMPANY
WATER ANALYSIS #FW01W278
ARTESIA LAB

GENERAL INFORMATION

OPERATOR:	CHI ENERGY	DEPTH:	
WELL:	GUMBY #1	DATE SAMPLED:	01/21/99
FIELD:		DATE RECEIVED:	01/21/99
SUBMITTED BY:		COUNTY:	EDDY STATE: NM
WORKED BY:	BRETT DEMPSEY	FORMATION:	BRUSHY CANYON
PHONE NUMBER:			

SAMPLE DESCRIPTION

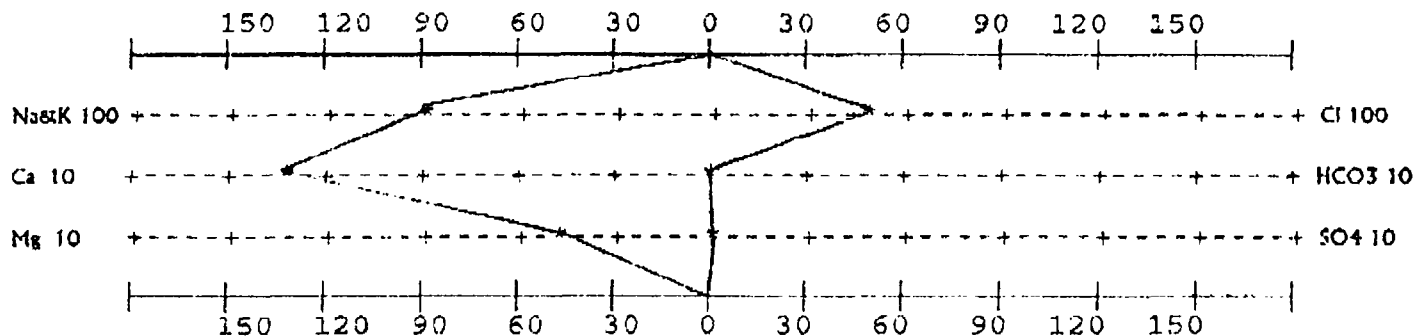
PROPOSED INJECTION WATER

PHYSICAL AND CHEMICAL DETERMINATIONS

SPECIFIC GRAVITY:	1.205	@ 71°F	PH:	6.05
RESISTIVITY (CALCULATED):	0.025	ohms @ 75°F		
IRON (FE++) :	150 ppm	SULFATE:		249 ppm
CALCIUM:	26,583 ppm	TOTAL HARDNESS		91,341 ppm
MAGNESIUM:	6,050 ppm	BICARBONATE:		162 ppm
CHLORIDE:	167,597 ppm	SODIUM CHLORIDE (Calc)		275,697 ppm
SODIUM+POTASS:	90,363 ppm	TOT. DISSOLVED SOLIDS:		349,733 ppm
IODINE:		POTASSIUM CHLORIDE:		

REMARKS

STIFF TYPE PLOT (IN MEQ/L)



ANALYST

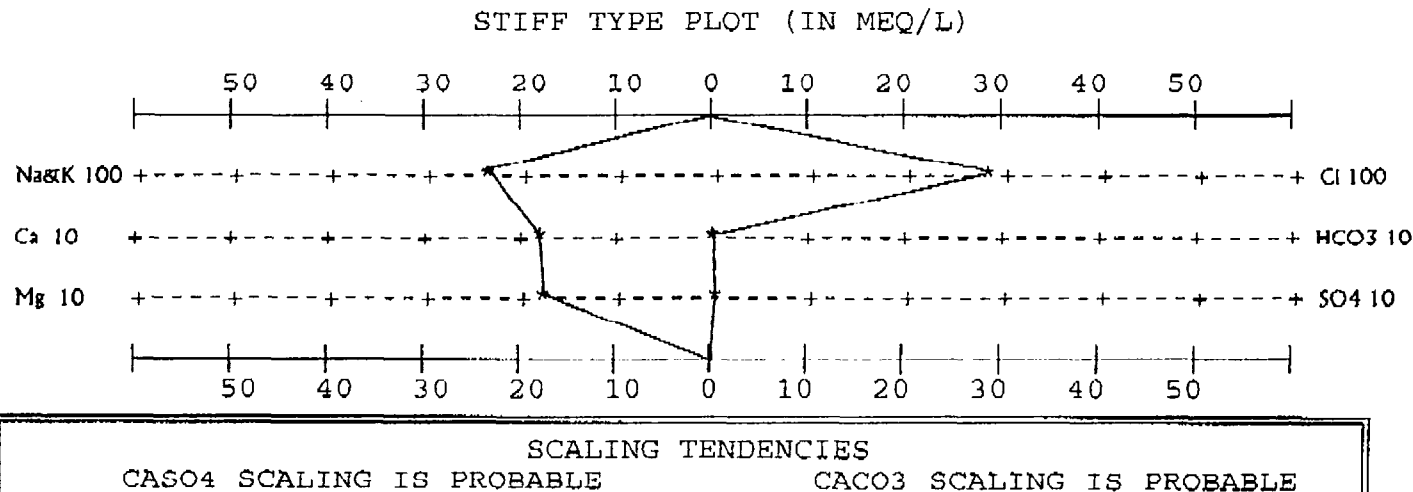
BRETT DEMPSEY

FW01W321

BJ SERVICES COMPANY
WATER ANALYSIS #FW01W321
ARTESIA LAB

GENERAL INFORMATION			
OPERATOR:	GRIFFIN PETROLEUM	DEPTH:	
WELL:	PROPOSED INJECTION INTERV	DATE SAMPLED:	01/21/99
FIELD:		DATE RECEIVED:	01/21/99
SUBMITTED BY:		COUNTY:	EDDY STATE: NM
WORKED BY:	BRETT DEMPSEY	FORMATION:	BONE SPRINGS
PHONE NUMBER:			

SAMPLE DESCRIPTION	
Original sample taken from Chi Pardue well	
PROPOSED INJECTION WATER & DISPOSAL ZONE WATER	
PHYSICAL AND CHEMICAL DETERMINATIONS	
SPECIFIC GRAVITY:	1.125 @ 75°F PH: 6.27
RESISTIVITY (CALCULATED):	0.025 ohms @ 75°F
IRON (FE++) :	500 ppm SULFATE: 356 ppm
CALCIUM:	3,559 ppm TOTAL HARDNESS 17,788 ppm
MAGNESIUM:	2,160 ppm BICARBONATE: 434 ppm
CHLORIDE:	97,756 ppm SODIUM CHLORIDE (Calc) 160,808 ppm
SODIUM+POTASS:	75,009 ppm TOT. DISSOLVED SOLIDS: 191,343 ppm
IODINE:	POTASSIUM CHLORIDE:
REMARKS	



BJ SERVICES COMPANY
WATER ANALYSIS #FW01W322
ARTESIA LAB

GENERAL INFORMATION

OPERATOR: GRIFFIN PETROLEUM	DEPTH:	
WELL: PROPOSED INJECTION INTERV	DATE SAMPLED: 01/21/99	
FIELD:	DATE RECEIVED: 01/21/99	
SUBMITTED BY:	COUNTY: EDDY	STATE: NM
WORKED BY : BRETT DEMPSEY	FORMATION: BONE SPRINGS DELEWAR	
PHONE NUMBER:		

SAMPLE DESCRIPTION

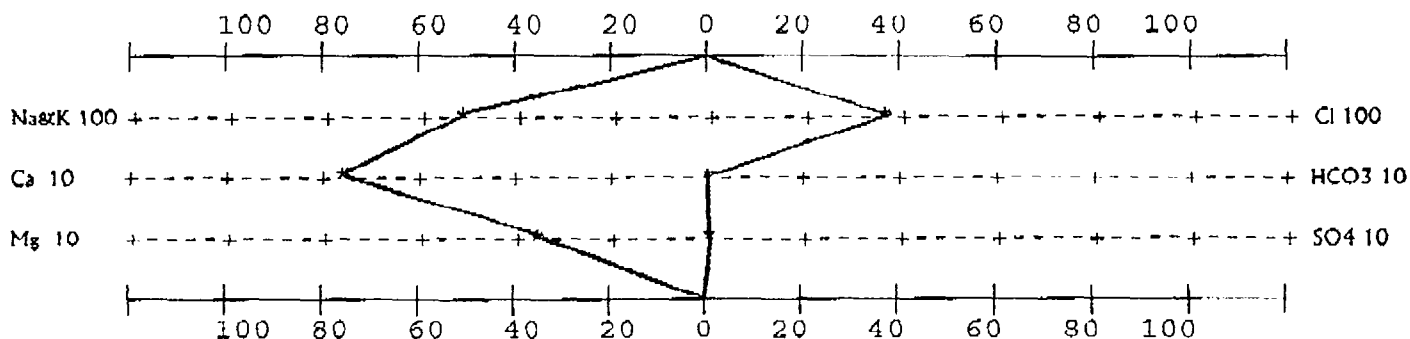
Results from mixing Pardue water with Gumby water

PHYSICAL AND CHEMICAL DETERMINATIONS

SPECIFIC GRAVITY:	1.165 @ 73°F	PH: 6.16
RESISTIVITY (CALCULATED):	0.025 ohms @ 75°F	
IRON (FE++) :	325 ppm	SULFATE: 300 ppm
CALCIUM:	15,466 ppm	TOTAL HARDNESS 55,827 ppm
MAGNESIUM:	4,172 ppm	BICARBONATE: 304 ppm
CHLORIDE:	133,875 ppm	SODIUM CHLORIDE (Calc) 220,225 ppm
SODIUM+POTASS:	82,950 ppm	TOT. DISSOLVED SOLIDS: 273,257 ppm
IODINE:		POTASSIUM CHLORIDE:

REMARKS

STIFF TYPE PLOT (IN MEQ/L)



SCALING TENDENCIES

CASO4 SCALING IS PROBABLE

CACO3 SCALING IS PROBABLE

FW01W323

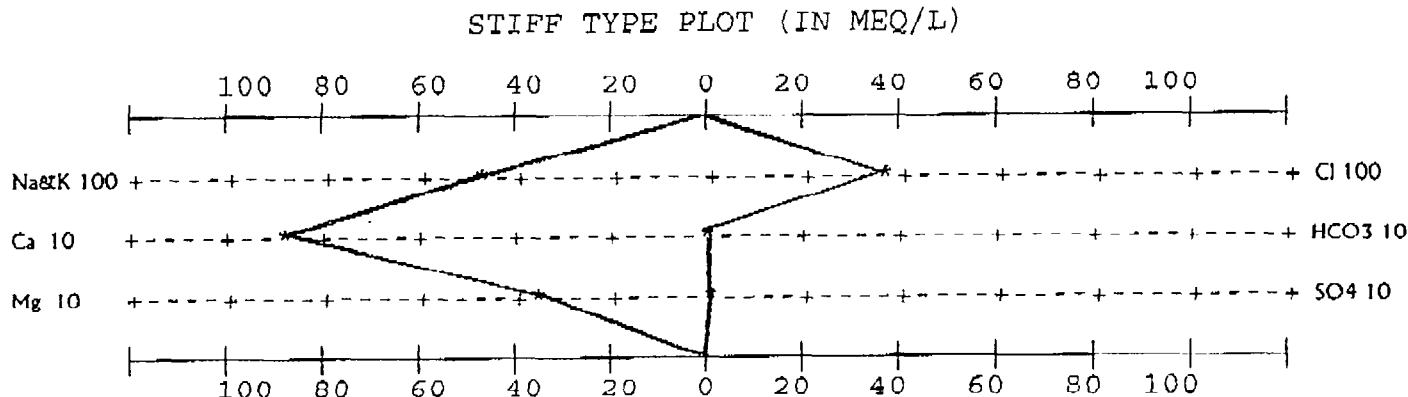
BJ SERVICES COMPANY
WATER ANALYSIS #FW01W323
ARTESIA LAB

GENERAL INFORMATION	
OPERATOR:	GRIFFIN PETROLEUM
WELL:	PROPOSED INJECTION INTERV
FIELD:	DATE SAMPLED: 01/21/99
SUBMITTED BY:	DATE RECEIVED: 01/21/99
WORKED BY :	COUNTY: EDDY STATE: NM
PHONE NUMBER:	FORMATION: BONE SPRINGS AND 22-

SAMPLE DESCRIPTION
Results from mixing Pardue water with Willow Lake 22-2 water

PHYSICAL AND CHEMICAL DETERMINATIONS	
SPECIFIC GRAVITY:	1.165 @ 75°F PH: 5.86
RESISTIVITY (CALCULATED):	0.025 ohms @ 75°F
IRON (FE++) :	254 ppm
CALCIUM:	17,700 ppm
MAGNESIUM:	4,172 ppm
CHLORIDE:	127,439 ppm
SODIUM+POTASS:	73,783 ppm
IODINE:	
SULFATE:	245 ppm
TOTAL HARDNESS	61,410 ppm
BICARBONATE:	236 ppm
SODIUM CHLORIDE (Calc)	209,637 ppm
TOT. DISSOLVED SOLIDS:	263,113 ppm
POTASSIUM CHLORIDE:	

REMARKS



SCALING TENDENCIES
CASO4 SCALING IS PROBABLE
CACO3 SCALING IS PROBABLE

Office of the State Engineer

1900 W. Second St.
Roswell, NM 88201
(505) 622-6521
Fax: (505) 623-8559

FAX TRANSMISSION COVER SHEET

Date: April 21, 1999
To: Eric Griffin
Fax: 1-915-687-2504
Re: water well info
Sender: Eric C. Milstead

*YOU SHOULD RECEIVE 13 PAGE(S), INCLUDING THIS COVER SHEET. IF
YOU DO NOT RECEIVE ALL THE PAGES, PLEASE CALL (505) 622-6521*

The chloride information for the area of interest is:

<u>Location</u>	<u>Chloride Level</u>	<u>Date Sampled</u>
24S.28E.15.21224*	630	3/26/92
24S.28E.15.21224*	308	8/20/97
24S.28E.16.33111	1039	5/28/81
24S.28E.21.443113	785	7/13/55

*same well

I hope this information is helpful to you in your endeavors. Also, the well location system is based upon the quarter system rather than the letter system used in the oilfield. The OSE has assigned the following:

1=Northwest
2=Northeast
3=Southwest
4=Southeast

If you have any questions, please, call.

Griffin Petroleum Company

Form C-108 Application for Authorization to Inject

Mailing List

BLM
2909 W. Second Street
Roswell, NM 88201

Kaiser-Francis Oil Company
P. O. Box 21468
Tulsa, OK 74121-1468

Dinero Operating Company
P. O. Box 10505
Midland, TX 79702-7505

Chi Energy, Inc.
P. O. Box 1799
Midland, TX 79702-1799

OCD
P. O. Box 2088
Santa Fe, NM 87504-2088

OCD – District II
811 South First
Artesia, NM 88210