2040 Pacheco St. JWD 5/14/99 Revised 7-1-81 Santa Fe, NM 87505 744

_DATE: <u>4-27-99</u>

APPLICATION FOR AUTHORIZATION TO INJECT

I. PURPOSE: Secondary Recovery Presure Mantenance Disposal Storge Application qualifies for administrative segroval? We s No II. OPERATOR: Griffin Petroleum Company ADDRESS: 550 W. Texas Suite 1240 Midland. TX 79701 CONTACT PARTY: Eric Griffin III. WELL DATA: Complete the data required on the reverse side of this form for each well processed for injection. Additional above and be attached if necessary. IV. Is this an expansion of an existing project: Yes Xo IV. Is this an expansion of an existing project: Yes Xo IV. Attach a map that identifies all wells and leases within two miles of any proposed injection well with a one-half mile radius circle dawn around each proposed injection well. This circle identifies the well's are of review. VI. Attach a tabalizion of data on all wells of public moord within the area of review which proposed injection one. Such data on the proposed operation, including: . 1. Proposed average and maximum dialy rate and volume of fluids to be injected; . VII. Attach data on the proposed operation, including: . . 1. Proposed average and maximum injection pressure; . . S. Ordouced water; and		
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 accessary. IV. Is this an expansion of an existing project: Yes. XX No 2.9 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 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 peersteak the proposed injection sead. Such data shall include a description of each well's representation, data drilled, location, depth, Texas of oroughtion, and a schematic of axo plugged well illustrating all plugging detail. VII. Attach a tabulation of data on all wells of public record within the area of review which peersteak the proposed injection sead. VII. Attach data on the proposed operation, including:	I.	PURPOSE: Secondary Recovery Pressure Maintenance XX Disposal Storage Application qualifies for administrative approval? XXYes No
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SIGNATURE: Fin Dit		NAME: Eric Griffin TITLE: Vice President
DATE: $4 - \frac{1}{4}$		SIGNATURE: Juie Pitt

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 Letroleum 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 perfora	ted intervals:	
	Zone Morrow	<u>Perfs</u> 12,390' - 12,674'	Isolation 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.





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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.



FW01W305

BJ SERVICES COMPANY

WATER ANALYSIS #FW01W305

ARTESIA LAB

	GENERAL II	NFORMATION	
OPERATOR: WELL: FIELD: SUBMITTED WORKED BY PHONE NUMB	GRIFFIN PETROLEUM WILLOW LAKE 2-22 BY:REX GLENN :KEITH JACKSON ER:	DEPTH: DATE SAMPLED: DATE RECEIVED: COUNTY:EDDY FORMATION: DEL	+/- 6025' 03/25/99 03/25/99 STATE:NM EWARE

SAMPLE	DESCRIPTION					
PROPOSED INJECTION WAT	ree					
PHYSICAL AND	PHYSICAL AND CHEMICAL DETERMINATIONS					
SPECIFIC GRAVITY:1.205@ 76°FPH:5.45RESISTIVITY (CALCULATED):0.025 ohms@ 75°FIRON (FE++):8 ppmSULFATE:141 ppmCALCIUM:30,902 ppmTOTAL HARDNESS102,136 ppmMAGNESIUM:6,050 ppmBICARBONATE:51 ppmCHLORIDE:155,152 ppmSODIUM CHLORIDE(Calc)255,225 ppmSODIUM+POTASS:72,639 ppmTOT. DISSOLVED SOLIDS:330,118 ppmIODINE:POTASSIUM K+:1125 PPM						
REMARKS						

STIFF TYPE PLOT (IN MEQ/L)



BJ SERVICES COMPANY

WATER ANALYSIS #FW01W278

ARTESIA LAB

GENERAL	INFORMATION					
OPERATOR: CHI ENERGY WELL: GUMBY #1 FIELD: SUBMITTED BY: WORKED BY :BRETT DEMPSEY PHONE NUMBER:	DEPTH: DATE SAMPLED: 01/21/99 DATE RECEIVED:01/21/99 COUNTY:EDDY STATE:NM FORMATION: BRUSHY CANYON					
SAMPLE	DESCRIPTION					
PROPOSED INJECTION WATE						
PHYSICAL AND	PHYSICAL AND CHEMICAL DETERMINATIONS					
SPECIFIC GRAVITY:1.205RESISTIVITY (CALCULATED):0.025IRON (FE++):150 ppmCALCIUM:26,583 ppmMAGNESIUM:6,050 ppmCHLORIDE:167,597 ppmSODIUM+PCTASS:90,363 ppmIODINE:1001000000000000000000000000000000000	SPECIFIC GRAVITY:1.205Ø71°FPH:6.05RESISTIVITY (CALCULATED):0.025ohms @75°FIRON (FE++):150 ppmSULFATE:249 ppmCALCIUM:26,583 ppmTOTAL HARDNESS91,341 ppmMAGNESIUM:6,050 ppmBICARBONATE:162 ppmCHLORIDE:167,597 ppmSODIUM CHLORIDE(Calc)275,697 ppmSODIUM+PCTASS:90,363 ppmTOT.DISSOLVED SOLIDS:349,733 ppmIODINE:POTASSIUM CHLORIDE:POTASSIUM CHLORIDE:169,733 ppm					
RI	EMARKS					
STIFF TYPE	E PLOT (IN MEQ/L)					



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FW01W321

BJ SERVICES COMPANY

WATER ANALYSIS #FW01W321

ARTESIA LAB

	GENERAI	J INFORMATION	
OPERATOR: WELL: FIELD: SUBMITTED BY: WORKED BY : PHONE NUMBER:	GRIFFIN PETROLEUM PROPOSED INJECTION BRETT DEMPSEY	DEPTH: INTERVDATE SAMPLED: 01/21 DATE RECEIVED:01/21 COUNTY:EDDY FORMATION: BONE SPE	./99 ./99 STATE:NM 2INGS

SAMPLE Original sample taken from Chi P	DESCRIPTION ardue well					
PROPOSED INJECTION WATER &	DISPOSAL ZONE WATER					
PHYSICAL AND	CHEMICAL DETERMINATIONS					
SPECIFIC GRAVITY:1.125@ 75°FPH:6.27RESISTIVITY (CALCULATED):0.025ohms @ 75°FIIRON (FE++):500ppmSULFATE:356CALCIUM:3,559ppmTOTAL HARDNESS17,788MAGNESIUM:2,160ppmBICARBONATE:434CHLORIDE:97,756ppmSODIUM CHLORIDE(Calc)160,808SODIUM+POTASS:75,009ppmTOT.DISSOLVEDFOTASSIUM CHLORIDE:900FOTASSIUM191,343						
R	EMARKS					

STIFF TYPE PLOT (IN MEQ/L) 5Q 20 10 0 10 30 40 30 20 40 50 Na8(K 100 + - - - + · *=+ --+---+ CI 100 Ca 10 ----+ HCO3 10 -+ - - + Mg 10 ----+ SO4 10 -+ ~+---+> -+---· --- |-50 40 30 20 10 0 10 20 30 4 Ó 50 SCALING TENDENCIES CASO4 SCALING IS PROBABLE CACO3 SCALING IS PROBABLE

FW01W322

BJ SERVICES COMPANY

WATER ANALYSIS #FW01W322

ARTESIA LAB

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



STIFF TYPE PLOT (IN MEQ/L)



BJ SERVICES COMPANY

WATER ANALYSIS #FW01W323

ARTESIA LAB

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

SAMPLE DESCRIPTION Results from mixing Pardue water with Willow Lake 22-2 water				
PHYSICAL AND C SPECIFIC GRAVITY: 1.165 RESISTIVITY (CALCULATED): 0.025 IRON (FE++): 254 ppm CALCIUM: 17,700 ppm MAGNESIUM: 4,172 ppm CHLORIDE: 127,439 ppm SODIUM+POTASS: 73,783 ppm IODINE:	@ 75°F PH: 5.86 ohms @ 75°F SULFATE: TOTAL HARDNESS BICARBONATE: SODIUM CHLORIDE(Calc) TOT. DISSOLVED SOLIDS: POTASSIUM CHLORIDE:	245 ppm 61,410 ppm 236 ppm 209,637 ppm 263,113 ppm		
REMARKS				

STIFF TYPE PLOT (IN MEQ/L)



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

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The chloride information for the area of interest is:

Location	<u>Chloride Level</u>	Date Sampled
24S.28E.15.21224*	630	3/26/92
24\$.28E.15.21224*	308	8/20/97
24\$.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 Detroleum 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