

STATE OF NEW MEXICO
ENERGY AND MINERALS DEPARTMENT

WFX
OIL CONSERVATION DIVISION

POST OFFICE BOX 2018
STATE LAND OFFICE BUILDING
SANTA FE, NEW MEXICO 87501

8/1/96
FORM C-108
Revised 7-1-81

APPLICATION FOR AUTHORIZATION TO INJECT

- I. Purpose: ☒ Secondary Recovery ☐ Pressure Maintenance ☐ Disposal ☐ Storage
Application qualifies for administrative approval? ☐ yes ☒ no
- II. Operator: Yates Drilling Company
Address: 105 South 4th Street, Artesia, NM 88210
Contact party: Tobin L. Rhodes Phone: 505-748-4500
- 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 ☒ no
If yes, give the Division order number authorizing the project R-9075.
- 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: Tobin L. Rhodes Title: Petroleum Engineer
Signature: Tobin L. Rhodes Date: 7-15-96
- * 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.

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.

CHECKLIST for ADMINISTRATIVE INJECTION APPLICATIONS

Operator: YATES DRILLING COMPANY Well: CACTUS QUEEN UNIT No. 14

Contact: TOBIN L. RHODES Title: P.E. Phone: 505-748-9500

DATE IN 7-17-96 RELEASE DATE 8-1-96 DATE OUT 8-26-96

Proposed Injection Application is for: ☒ **WATERFLOOD** ☒ **Expansion** ☐ **Initial**

Original Order: R- 9075 ~~FOR~~ ☐ **Secondary Recovery** ☐ **Pressure Maintenance**

SENSITIVE AREAS

☐ **SALT WATER DISPOSAL** ☐ **Commercial Well**

☒ **WJPP** ☐ **Capitan Reef**

Data is complete for proposed well(s)? YES Additional Data Req'd _____

AREA of REVIEW WELLS

9 Total # of AOR

0 # of Plugged Wells

YES Tabulation Complete

N/A Schematics of P & A's

YES Cement Tops Adequate

N/A AOR Repair Required

INJECTION FORMATION

Injection Formation(s) QUEEN 2760-65' Compatible Analysis YES

Source of Water or Injectate AREA QUEEN + FW MAKE-UP

PROOF of NOTICE

☒ Copy of Legal Notice

☒ Information Printed Correctly

☒ Correct Operators

☒ Copies of Certified Mail Receipts

N/A Objection Received

☐ Set to Hearing _____ Date

NOTES:

APPLICATION QUALIFIES FOR ADMINISTRATIVE APPROVAL? YES

COMMUNICATION WITH CONTACT PERSON:

1st Contact:	<input type="checkbox"/> Telephoned	<input type="checkbox"/> Letter	_____ Date	Nature of Discussion _____
2nd Contact:	<input type="checkbox"/> Telephoned	<input type="checkbox"/> Letter	_____ Date	Nature of Discussion _____
3rd Contact:	<input type="checkbox"/> Telephoned	<input type="checkbox"/> Letter	_____ Date	Nature of Discussion _____

NEW MEXICO OIL CONSERVATION DIVISION
Form C-108 (Data)

Application of Yates Drilling Company
For Authorization to Inject Water
Into
Cactus Queen Unit #14
N-34-12S-31E
Chaves County, New Mexico

I. Purpose

Application is made for administrative authorization to inject water into the Queen formation underlying the existing boundaries of the Cactus Queen Unit by utilizing the Cactus Queen Unit #14 well as an injection well. The existing unit is a currently active secondary recovery unit in Sections 27 and 34 of Township 12 South, Range 31 East, Chaves County, New Mexico.

II. Operator

Yates Drilling Company
105 South 4th Street
Artesia, New Mexico 88210
(505) 748-4500
Contact: Tobin L. Rhodes

III. Injection Well Data

A well data sheet is attached for the proposed injection well. There is also a downhole schematic depicting how the well will be configured if this application is approved.

IV. Existing Project

The proposed injection well lies within the boundaries of the existing Cactus Queen Unit. No expansion of the boundaries of the existing unit is proposed. The unit was approved by order R-9075-A, dated March 15, 1990 and expanded by order R-9075-A-1, dated January 26, 1993. Permission to inject into selected wells within the Cactus Queen Unit was granted March 15, 1990 by authority of order R-9075-B and injection into the expanded unit was granted under order R-9075-B-1, dated January 26, 1993.

V. Area of Review

A lease ownership map is attached which identifies all wells and lease ownership within two miles of the proposed injection well. The area of review has been identified by drawing a one half mile radius around the proposed injection well on the attached base map.

VI. Well Data

There are presently ten wells, including the proposed injection well, within the area of review. There are no wells within the area of review that have been plugged and abandoned. There are three wells within the area of review that are active injection wells, injecting water into the Queen formation. There are seven wells that are active producing oil wells, producing from the Queen formation. Available data for each of these wells is included in a well data sheet.

VII. Project Data

1. The proposed daily average water injection rate is expected to be approximately 200 barrels per day for the proposed injection well. The maximum injection rate for the proposed injection well will be based on fracture pressures as determined by step-rate pressure tests to be conducted on the injection well. The maximum injection rate is expected to be less than 400 barrels per day.
2. Produced water and fresh water from the supply well will be stored in covered fiberglass storage tanks.
3. Initially, this injection well may take water on a vacuum, but as the reservoir fills a positive surface injection pressure will be required to inject water. The maximum injection pressure will also be determined by the planned step-rate pressure tests. At no time prior to the step-rate tests will the injection pressure exceed a pressure limitation of 0.2 PSIG per foot of depth to the top of the injection interval.

4. The source of injection fluid will be produced water from the Queen formation and fresh water from our fresh water well producing from the Ogollala Aquifer.
5. The Ogollala has been the source of water for many Queen waterfloods for many years without significant compatibility problems. We have had compatibility tests run with no compatibility problems observed.

VIII. Geologic Data:

The Cactus Queen Unit produces from the upper sandstone member of the Queen formation, upper Guadalupian series, Permian system. The average producing depth in the field is approximately 2990 feet.

The productive/injection interval, as indicated from a whole core analysis on the Cactus Queen Unit #6 (330' FNL & 1980' FEL, Section 34-12S-31E, Chaves County, New Mexico) and from sidewall cores from numerous wells, is fine grained, friable, gray quartz sandstone. The grains are subangular to subrounded and well sorted. The cementing materials are anhydrite and dolomite. The exact depositional environment is unknown. Porosity and permeability are intergranular in nature. The sandstone is not naturally fractured.

The Cactus Queen Unit reservoir is a stratigraphic trap. Cementation of the sandstone results in the loss of porosity and permeability, creating a barrier on all sides with the exception of the east. An oil/water contact has been established on the eastern edge of the reservoir.

The primary source of fresh water in this area is the Ogollala formation of Tertiary age, the base of which is estimated to be 300 feet below the surface. This aquifer is protected behind the surface casing and cement of the proposed injection well. The Chinlee formation is also a fresh water aquifer which immediately underlies the Ogollala formation. The base of the Chinlee is estimated to be approximately 500 feet below the surface in the unit area.

IX. Stimulation Program

The proposed injection well has previously received a fracture treatment. The details of this treatment is outlined in the data sheet for the well.

This well may require a small clean-up acid treatment prior to injection. If needed we will treat the well with 500 to 1000 gallons of 7 1/2% hydrochloric acid. This treatment should insure that existing perforations are open and that the well will accept water at the lowest possible pressure.

X. Well Logs

Well logs for the subject well have previously been submitted to the Hobbs office of the NMOCD.

XI. Fresh Water

The office of the State Engineer in Roswell has a record of seven wells within one mile of the unit area. The exact total depth of the wells is unknown, however all wells are assumed to be producing from the Ogollala formation. A water analysis was conducted on four of the wells. A copy of each analysis is attached.

XII. Injection Zone Isolation

Available engineering and geologic data has been examined and no evidence of open faulting or any other hydrologic connection between the injection zone and any underground source of drinking water has been found.

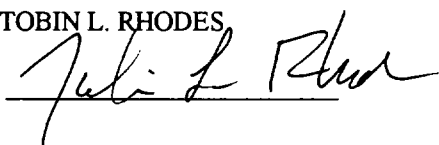
XIII. Proof of Notice

A listing of off-set leasehold operators within one half-mile of the proposed injection well and the surface owner(s) that have received a copy of this application by certified mail is attached.

XIV. Certification

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

TOBIN L. RHODES



PETROLEUM ENGINEER

July 15, 1996

AREA OF REVIEW
WELL DATA

WELL	GARNER FEDERAL #1	GARNER FEDERAL #4	GARNER FEDERAL #6	TAO FEDERAL #1	CQU UNIT #8	CQU UNIT #10
LOCATION	D-3-13S-31E Chaves County, NM	O-34-12S-31E Chaves County, NM	C-3-13S-31E Chaves County, NM	B-3-13S-31E Chaves County, NM	F-34-12S-31E Chaves County, NM	L-34-12S-31E Chaves County, NM
OPERATOR	Yates Drilling Company	Yates Drilling Company	Yates Drilling Company	Circle Ridge Production, Inc.	Yates Drilling Company	Yates Drilling Company
COMPLETION DATE	1-Mar-84	7-Jul-84	14-Aug-84	6-Jun-84	7-Apr-84	1-Sep-82
TOTAL DEPTH	2925 Feet	3108 Feet	2900 Feet	3114 Feet	3,100 Feet	2,900 Feet
CASING PROGRAM	8 5/8" @ 37.4 W/300 Sxs. 5 1/2" @ 2,920' W/ 230 Sxs.	8 5/8" @ 408' W/250 Sxs. 5 1/2" @ 3108' W/ 250 Sxs.	8 5/8" @ 371' W/230 Sxs. 5 1/2" @ 2891' W/ 235 Sxs.	8 5/8" @ 566' W/225 Sxs. 5 1/2" @ 3114' W/ 252 Sxs.	8 5/8" @ 450' W/300 Sxs. 5 1/2" @ 3,080' W/ 360 Sxs.	8 5/8" @ 400' W/240 Sxs. 4 1/2" @ 2,900' W/ 250 Sxs.
PERFORATIONS	2695'-2701'	2989'-2997'	2773'-2789'	2983'-3003'	2874'-2882'	2718'-2748'
COMPLETION RECORD	Frac'd w/ 750 gals. 15% HCL 30,000 gals. gelled water 24,000# 20/40 Sand 12,500# 10/20 Sand	Frac'd w/ 1000 gals. 15% HCL 35,000 gals. gelled water 25% CO2 and Frac 30 43,000# 20/40 Sand 22,000# 12/20 Sand	Frac'd w/ 1500 gals. 15% HCL 14,215# 20/40 Sand 13,500# 10/20 Sand	Frac'd w/ 500 gals. 15% HCL 20,000 gals. gelled water 20,000# Sand	Frac'd w/ 750 gals. 15% NE 20,000 gals. gelled water 25% CO2 16,500# 20/40 Sand 6,000# 12/20 Sand	Frac'd w/ 2,500 gals. 15% MCA 10,000 gals. gelled water 7,000# 20/40 Sand 6,800# 12/20 Sand
CURRENT STATUS	Pumping	Pumping	Pumping	Pumping	Pumping	Injection

**AREA OF REVIEW
WELL DATA**

WELL	CQU UNIT #11	CQU UNIT #12	CQU UNIT #13	CQU UNIT #14
LOCATION	K-34-12S-31E Chaves County, NM	J-34-12S-31E Chaves County, NM	M-34-12S-31E Chaves County, NM	N-34-12S-31E Chaves County, NM
OPERATOR	Yates Drilling Company	Yates Drilling Company	Yates Drilling Company	Yates Drilling Company
COMPLETION DATE	1-Mar-84	1-Jun-84	9-Feb-84	12-Dec-83
TOTAL DEPTH	2,925 Feet	3100 Feet	2,925 Feet	2,925 Feet
CASING PROGRAM	8 5/8" @ 374 W/275 Sxs. 5 1/2" @ 2,915' W/ 250 Sxs. 2773'-2781'	8 5/8" @ 410' W/250 Sxs. 5 1/2" @ 3,098' W/ 550 Sxs. 2982'-2990'	8 5/8" @ 368' W/265 Sxs. 5 1/2" @ 2,925' W/ 250 Sxs. 2723'-2730'	8 5/8" @ 390' W/220 Sxs. 5 1/2" @ 2,925' W/ 950 Sxs. 2760'-2765'
PERFORATIONS				
COMPLETION RECORD	Frac'd w/ 750 gals. 15% HCL 20,000 gals. gelled water 16,000 20/40 Sand 6,000# 12/20 Sand	Frac'd w/ 750 gals. 15% HCL 20,000 gals. gelled water 16,500# 20/40 Sand 1,700# 12/20 Sand	Frac'd w/ 750 gals. 15% HCL 15,000 gals. gelled water 5,000 gals. CO2 16,500# 20/40 Sand 6,000# 10/20 Sand	Frac'd w/ 15,000 gals gelled water 5,000 gals. CO2 16,500 # 20/40 Sand 7,000 # 10/20 Sand
CURRENT STATUS	Pumping	Injection	Injection	Pumping

WELL DATA SHEET

OPERATOR: YATES DRILLING COMPANY
LEASE: CACTUS QUEEN UNIT #14
FOOTAGE: 990' FSL & 1650' FWL LOCATION: Section 34-12S-31E
COUNTY, STATE: Chaves County, New Mexico
SPUD DATE: November 16, 1983
COMPLETION DATE: December 12, 1983
CURRENT STATUS: Active producing well - Queen
PROPOSED STATUS: Active injection well - Queen

TUBULAR DATA

SURFACE CASING

CASING SIZE: 8.625"
CASING WEIGHT: 24.000 POUNDS/FOOT
CASING GRADE: J-55
DEPTH SET: 390'
CEMENT USED: 220 SXS.
TOP OF CEMENT: 0'
DETERMINED BY: CIRCULATE
HOLE SIZE: 12.25"

PRODUCTION CASING

CASING SIZE: 5.5"
CASING WEIGHT: 14.000 POUNDS/FOOT
CASING GRADE: J-55
DEPTH SET: 2925'
CEMENT USED: 950 SXS.
TOP OF CEMENT: 0'
DETERMINED BY: CIRCULATE
HOLE SIZE: 7.875"
TOTAL DEPTH: 2,925'
PLUG BACK: 2880'

INJECTION OR PRODUCING INTERVAL

INTERVAL TOP: 2760' INTERVAL BOTTOM: 2765'
COMMENTS: Perforated
PREVIOUS STIMULATION: 15,000 gals. 30#/1000 gelled KCL water, 5000 gals. CO₂,
16,500# 20/40 and 7,000# 10/20 sand.
PROPOSED STIMULATION: 500-1000 gallons of 7 1/2% HCL to clean perforations.

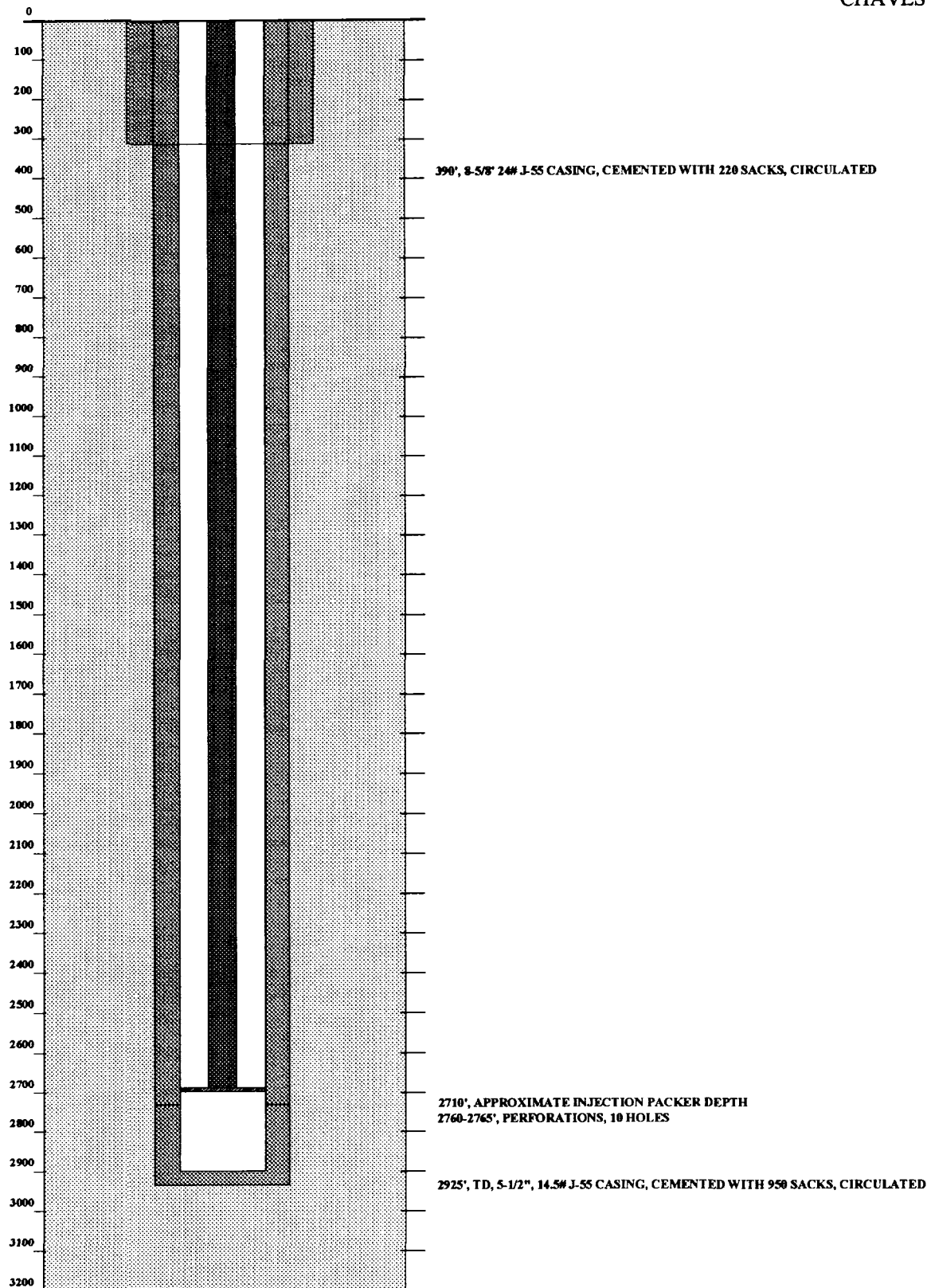
TUBING:

TUBING SIZE: 2.375" LINED WITH: Plastic
PACKER: Nickel plated tension packer DEPTH TO BE SET: 2713.45'

OTHER DATA

- NAME OF INJECTION OR PRODUCING INTERVAL:
Queen
- NAME OF FIELD OR POOL (IF APPLICABLE):
SE Chaves Queen
- IS THIS A NEW WELL DRILLED FOR INJECTION?
No
IF NO, FOR WHAT PURPOSE WAS THE WELL ORIGINALLY DRILLED?
This well was originally drilled as a Queen producing well.
- HAS WELL EVER BEEN PERFORATED IN ANY OTHER ZONE(S)?
No
LIST ALL SUCH PERFORATED INTERVALS AND GIVE PLUGGING DETAILS (SACKS OF CEMENT OR BRIDGE PLUG (S) USED):
None
- GIVE DEPTH TO AND NAME OF ANY OVERLYING AND/OR UNDERLYING OIL OR GAS ZONES (POOLS) IN THIS AREA:
There has never been any production from any formation other than the Queen in the area surrounding this well.
- IF WELL IS PLUGGED AND ABANDONED, LIST DETAILS OF PLUGGING AND ATTACH SCHEMATIC.
Not applicable.

CACTUS QUEEN UNIT #14
N34-12S-31E
CHAVES COUNTY, NM



PROPOSED INJECTION CONFIGURATION

Water Wells

SEC	TWN	RNG	UNIT LTR	QTR OF UNIT	TD	TYPE	#
24	12S	31E	IK	1?	148	DOM.	L4993
24	12S	31E	IP	1?	160	DOM.	L6649
26	12S	31E	IE	1?	166	DOM. & STK	L6746
✓26	12S	31E	IL	1?	1?	IRR.	L2117
✓26	12S	31E	IO	1?	198	COM. (OIL & GAS)	L9566
✓26	12S	31E	IO	1?	198	COM., DOM. & STK	L6749
✓27	12S	31E	IH	1?	160	DOM. & STK	L6650
✓35	12S	31E	IF	INW	55	DOM.	L4170
✓35	12S	31E	IJOP	1?	1?	1?	L2932
1	13S	31E	IK	SE	190	WF	L3460
1	13S	31E	IP	SE	220	WF	L3461
1	13S	31E	IM	SW	190	COM. & STK	L3837X
1	13S	31E	IM	SW	165	COM. & STK	L3837
2	13S	31E	IH	SW	165	DEC.	L3834
2	13S	31E	IH	1?	1?	WF	L4295
2	13S	31E	IH	NE	196	SRO	L3914
2	13S	31E	IH	SW	165	DEC.	L3835
2	13S	31E	IP	SE	1?	1?	L3806
2	13S	31E	II	NE	216	SRO	L2745
12	13S	31E	IA	1?	217	SRO	L3460
13	13S	31E	IABCD	1?	1?	OWD	L2933
24	13S	31E	IH	NE	196	IND.	L3914
35	13S	31E	IF	SW	1?	DOM.	L2849

TRETOLITE DIVISION

 (505) 746-3588
 Fax (505) 746-3580

 Reply to:
 P.O. Box 1140
 Artesia, NM
 88211-7531

WATER ANALYSIS REPORT

 Company : YATES DRILLING
 Address : ARTESIA, NM
 Lease : WILLIAMS
 Well : RANCH HOUSE
 Sample Pt. :

 Date : 04/16/96
 Date Sampled : 04/15/96
 Analysis No. : 0273

ANALYSIS		mg/L		* meq/L	
-----		----		-----	
1.	pH	7.1			
2.	H ₂ S	0 PPM			
3.	Specific Gravity	1.000			
4.	Total Dissolved Solids	690.3			
5.	Suspended Solids	NR			
6.	Dissolved Oxygen	NR			
7.	Dissolved CO ₂	NR			
8.	Oil In Water	NR			
9.	Phenolphthalein Alkalinity (CaCO ₃)				
10.	Methyl Orange Alkalinity (CaCO ₃)				
11.	Bicarbonate	HCO ₃	256.0	HCO ₃	4.2
12.	Chloride	Cl	106.0	Cl	3.0
13.	Sulfate	SO ₄	125.0	SO ₄	2.6
14.	Calcium	Ca	74.0	Ca	3.7
15.	Magnesium	Mg	12.2	Mg	1.0
16.	Sodium (calculated)	Na	117.1	Na	5.1
17.	Iron	Fe	0		
18.	Barium	Ba	NR		
19.	Strontium	Sr	NR		
20.	Total Hardness (CaCO ₃)		235.0		

PROBABLE MINERAL COMPOSITION

*milli equivalents per Liter		Compound		Equiv wt X meq/L		= mg/L	
+-----+		+-----+		+-----+		+-----+	
4	*Ca <----- *HCO ₃	4	Ca(HCO ₃) ₂	81.0	3.7	299	
	/----->		CaSO ₄	68.1			
1	*Mg -----> *SO ₄	3	CaCl ₂	55.5			
	<-----/		Mg(HCO ₃) ₂	73.2	0.5	37	
5	*Na -----> *Cl	3	MgSO ₄	60.2	0.5	30	
			MgCl ₂	47.6			
Saturation Values Dist. Water 20 C			NaHCO ₃	84.0			
	CaCO ₃ 13 mg/L		Na ₂ SO ₄	71.0	2.1	149	
	CaSO ₄ * 2H ₂ O 2090 mg/L		NaCl	58.4	3.0	175	
	BaSO ₄ 2.4 mg/L						

REMARKS:

Petrolite Oilfield Chemicals Group

 Respectfully submitted,
 SHAWNA MATTHEWS

TRETOLITE DIVISION

 (505) 746-3588
 Fax (505) 746-3580

 Reply to:
 P.O. Box 1140
 Artesia, NM
 88211-7531

WATER ANALYSIS REPORT

 Company : YATES DRILLING
 Address : ARTESIA, NM
 Lease : TIVIS
 Well : RANCH HOUSE
 Sample Pt. :

 Date : 04/16/96
 Date Sampled : 04/15/96
 Analysis No. : 0276

ANALYSIS		mg/L		* meq/L
-----		----		-----
1. pH	7.0			
2. H ₂ S	0 PPM			
3. Specific Gravity	1.000			
4. Total Dissolved Solids		731.1		
5. Suspended Solids		NR		
6. Dissolved Oxygen		NR		
7. Dissolved CO ₂		NR		
8. Oil In Water		NR		
9. Phenolphthalein Alkalinity (CaCO ₃)				
10. Methyl Orange Alkalinity (CaCO ₃)				
11. Bicarbonate	HCO ₃	231.0	HCO ₃	3.8
12. Chloride	Cl	106.0	Cl	3.0
13. Sulfate	SO ₄	175.0	SO ₄	3.6
14. Calcium	Ca	102.0	Ca	5.1
15. Magnesium	Mg	6.1	Mg	0.5
16. Sodium (calculated)	Na	110.9	Na	4.8
17. Iron	Fe	0		
18. Barium	Ba	NR		
19. Strontium	Sr	NR		
20. Total Hardness (CaCO ₃)		280.0		

PROBABLE MINERAL COMPOSITION

*milli equivalents per Liter		Compound	Equiv wt X meq/L	= mg/L
-----	-----	-----	-----	-----
5 *Ca <----- *HCO ₃	4	Ca(HCO ₃) ₂	81.0	3.8
/----->		CaSO ₄	68.1	1.3
1 *Mg -----> *SO ₄	4	CaCl ₂	55.5	
<-----/		Mg(HCO ₃) ₂	73.2	
5 *Na -----> *Cl	3	MgSO ₄	60.2	0.5
		MgCl ₂	47.6	
Saturation Values Dist. Water 20 C		NaHCO ₃	84.0	
CaCO ₃ 13 mg/L		Na ₂ SO ₄	71.0	1.8
CaSO ₄ * 2H ₂ O 2090 mg/L		NaCl	58.4	3.0
BaSO ₄ 2.4 mg/L				175

REMARKS:

Petrolite Oilfield Chemicals Group

 Respectfully submitted,
 SHAWNA MATTHEWS

TRETOLITE DIVISION

 (505) 746-3588
 Fax (505) 746-3580

 Reply to:
 P.O. Box 1140
 Artesia, NM
 88211-7531

WATER ANALYSIS REPORT

 Company : YATES DRILLING
 Address : ARTESIA, NM
 Lease : GRAHAM
 Well : WATER WELL
 Sample Pt. :

 Date : 04/16/96
 Date Sampled : 04/15/96
 Analysis No. : 0275

ANALYSIS		mg/L		* meq/L
-----		----		-----
1. pH	7.0			
2. H2S	0 PPM			
3. Specific Gravity	1.000			
4. Total Dissolved Solids		1102.7		
5. Suspended Solids		NR		
6. Dissolved Oxygen		NR		
7. Dissolved CO2		NR		
8. Oil In Water		NR		
9. Phenolphthalein Alkalinity (CaCO3)				
10. Methyl Orange Alkalinity (CaCO3)				
11. Bicarbonate	HCO3	244.0	HCO3	4.0
12. Chloride	Cl	127.0	Cl	3.6
13. Sulfate	SO4	400.0	SO4	8.3
14. Calcium	Ca	106.0	Ca	5.3
15. Magnesium	Mg	20.7	Mg	1.7
16. Sodium (calculated)	Na	205.0	Na	8.9
17. Iron	Fe	0		
18. Barium	Ba	NR		
19. Strontium	Sr	NR		
20. Total Hardness (CaCO3)		350.0		

PROBABLE MINERAL COMPOSITION

*milli equivalents per Liter		Compound	Equiv wt X meq/L	=	mg/L
-----+	-----+	-----	-----		-----
5 *Ca <----- *HCO3	4	Ca(HCO3)2	81.0	4.0	324
----- /----->	-----	CaSO4	68.1	1.3	88
2 *Mg -----> *SO4	8	CaCl2	55.5		
----- <-----/	-----	Mg(HCO3)2	73.2		
9 *Na -----> *Cl	4	MgSO4	60.2	1.7	103
-----+	-----+	MgCl2	47.6		
Saturation Values Dist. Water 20 C		NaHCO3	84.0		
CaCO3	13 mg/L	Na2SO4	71.0	5.3	379
CaSO4 * 2H2O	2090 mg/L	NaCl	58.4	3.6	209
BaSO4	2.4 mg/L				

REMARKS:

Petrolite Oilfield Chemicals Group

 Respectfully submitted,
 SHAWNA MATTHEWS

TRETOLITE DIVISION

(505) 746-3588
Fax (505) 746-3580

Reply to:
P.O. Box 1140
Artesia, NM
88211-7531

WATER ANALYSIS REPORT

Company : YATES DRILLING
Address : ARTESIA, NM
Lease : CACTUS QUEEN
Well : WATER WELL
Sample Pt. :

Date : 04/16/96
Date Sampled : 04/15/96
Analysis No. : 0274

ANALYSIS		mg/L	* meq/L	
-----		----	-----	
1.	pH	7.1		
2.	H ₂ S	0 PPM		
3.	Specific Gravity	1.000		
4.	Total Dissolved Solids	647.6		
5.	Suspended Solids	NR		
6.	Dissolved Oxygen	NR		
7.	Dissolved CO ₂	NR		
8.	Oil In Water	NR		
9.	Phenolphthalein Alkalinity (CaCO ₃)			
10.	Methyl Orange Alkalinity (CaCO ₃)			
11.	Bicarbonate	HCO ₃ 195.0	HCO ₃	3.2
12.	Chloride	Cl 127.0	Cl	3.6
13.	Sulfate	SO ₄ 125.0	SO ₄	2.6
14.	Calcium	Ca 102.0	Ca	5.1
15.	Magnesium	Mg 0.1	Mg	NR
16.	Sodium (calculated)	Na 98.5	Na	4.3
17.	Iron	Fe 0		
18.	Barium	Ba NR		
19.	Strontium	Sr NR		
20.	Total Hardness (CaCO ₃)	255.0		

PROBABLE MINERAL COMPOSITION

*milli equivalents per Liter				Compound	Equiv wt	X meq/L	=	mg/L
+-----+				-----				
5	*Ca	<-----	*HCO3	3	Ca(HCO3)2	81.0	3.2	259
		/----->			CaSO4	68.1	1.9	129
0	*Mg	----->	*SO4	3	CaCl2	55.5		
		<-----/			Mg(HCO3)2	73.2		
4	*Na	----->	*Cl	4	MgSO4	60.2	NR	0
+-----+				-----				
					MgCl2	47.6		
					NaHCO3	84.0		
Saturation Values Dist. Water 20 C					Na2SO4	71.0	0.7	50
	CaCO3		13 mg/L		NaCl	58.4	3.6	209
	CaSO4 * 2H2O		2090 mg/L					
	BaSO4		2.4 mg/L					

REMARKS:

AFFIDAVIT OF PUBLICATION

County of Chaves
State of New Mexico

I, Gina Brooks,
Legal Clerk,

Of the Roswell Daily Record, a daily newspaper published at Roswell, New Mexico, do solemnly swear that the clipping hereto attached was published once a week in the regular and entire issue of said paper and not in a supplement thereof for a period

of: one time weeks

beginning with issue dated
June 13TH, 1996

and ending with the issue dated
June 13TH, 1996

Gina Brooks
Clerk

Sworn and subscribed to before me

this 13TH day of
June, 1996

Marylon L. Hopper
Notary Public

My Commission expires

July 25, 1998

(SEAL)

Published June 13, 1996
Yates Drilling Company hereby gives notice to the public that it will be filing an application with New Mexico Oil Conservation Division seeking authority to inject water for the purpose of secondary recovery in its Cactus Queen Unit well #14, located 990 feet from the South line and 1650 feet from the West line of Section 34, Township 12 South, Range 31 East, N.M.P.M. Chaves County, New Mexico. The proposed injection will be into the Queen formation between the depths of 2760 feet and 2765 feet. The maximum injection rate sought is 400 barrels per day and the maximum initial surface pressure to be used will be 552 PSIG. Any increase in the maximum surface pressure will be based on step-rate tests and subject to New Mexico Oil Conservation Division approval. Any objection to this application must be filed within fifteen (15) days of the date of this advertisement at the Oil Conservation Division, Post Office Box 2088, Santa Fe, New Mexico 87504. Questions concerning this application should be directed to Mr. Doug Hurlbut, Yates Drilling Company, 105 South 4th Street, Artesia, New Mexico 88210. Telephone (505) 748-1471.

LEASEHOLD OWNERSHIP

T-12-S, R-31-E
Section 33: SE/4NE/4, E/2SE/4
Section 34: S/2NW/4, SW/4, SW/4NE/4, W/2SE/4

T-13-S, R-31-E
Section 3: N/2NW/4
Section 4: NE/4NE/4
Chaves County, New Mexico

Yates Drilling Company
105 South 4th Street
Artesia, NM 88210

T-13-S, R-31-E
Section 3: NW/4NE/4
Chaves County, NM

Circle Ridge Production, Inc.
300 E. Northside Dr.
Fort Worth, Texas 76106-9234

SURFACE OWNER

W.T. Tivis, Jr.
P.O. Box 1614
Eunice, NM 88231

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

WFX - 691



STATE OF NEW MEXICO
ENERGY, MINERALS AND NATURAL RESOURCES DEPARTMENT

OIL CONSERVATION DIVISION
HOBBS DISTRICT OFFICE

7/19/96

GOVERNOR

POST OFFICE BOX 1980
HOBBS, NEW MEXICO 88241-1980
(505) 393-6161

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

RE: Proposed:

MC	_____
DHC	_____
NSL	_____
NSP	_____
SWD	_____
WFX	<u>X</u>
PMX	_____

Gentlemen:

I have examined the application for the:

<u>Yates Drilling Co</u>	<u>Cactus Queen Unit</u>	<u>#14-N</u>	<u>34-12-31</u>
Operator	Lease & Well No.	Unit	S-T-R

and my recommendations are as follows:

OK

Yours very truly,

Jerry Sexton
Jerry Sexton
Supervisor, District 1

/ed