

ADMINISTRATIVE ORDER SWD-679

APPLICATION OF POGO PRODUCING COMPANY FOR SALT WATER DISPOSAL, EDDY COUNTY, NEW MEXICO.

ADMINISTRATIVE ORDER OF THE OIL CONSERVATION DIVISION

Under the provisions of Rule 701(B), Pogo Producing Company made application to the New Mexico Oil Conservation Division on July 24, 1997, for permission to complete for salt water disposal its Cedar Canyon '28' Well No.4 located 1980 feet from the South line and 1980 feet from the West line (Unit K) of Section 28, Township 24 South, Range 29 East, NMPM, Eddy County, New Mexico.

THE DIVISION DIRECTOR FINDS THAT:

(1) The application has been duly filed under the provisions of Rule 701(B) of the Division Rules and Regulations;

(2) Satisfactory information has been provided that all offset operators and surface owners have been duly notified;

(3) The applicant has presented satisfactory evidence that all requirements prescribed in Rule 701 will be met; and

(4) No objections have been received within the waiting period prescribed by said rule.

IT IS THEREFORE ORDERED THAT:

The applicant herein, Pogo Producing Company is hereby authorized to complete its Cedar Canyon '28' Well No.4 located 1980 feet from the South line and 1980 feet from the West line (Unit K) of Section 28, Township 24 South, Range 29 East, NMPM, Eddy County, New Mexico, in such manner as to permit the injection of salt water for disposal purposes into the Bell Canyon, Upper and Middle Cherry Canyon formations at approximately 2950 feet to 4216 feet through 2 7/8-inch plastic-lined tubing set in a packer located at approximately 2850 feet.

IT IS FURTHER ORDERED THAT:

The operator shall take all steps necessary to ensure that the injected water enters only the proposed injection interval and is not permitted to escape to other formations or onto the surface.

Prior to commencing injection operations into the well, the casing shall be pressure tested from the surface to the packer setting depth to assure the integrity of said casing.

The casing-tubing annulus shall be loaded with an inert fluid and equipped with a pressure gauge at the surface or left open to the atmosphere to facilitate detection of leakage in the casing, tubing, or packer.

The injection well or system shall be equipped with a pressure limiting device which will limit the wellhead pressure on the injection well to no more than 590 psi.

The Director of the Division may authorize an increase in injection pressure upon a proper showing by the operator of said well that such higher pressure will not result in migration of the injected fluid from the Bell Canyon, Upper or Middle Cherry Canyon formations. Such proper showing shall consist of a valid step-rate test run in accordance with and acceptable to this office.

The operator shall notify the supervisor of the Artesia district office of the Division of the date and time of the installation of disposal equipment and of the mechanical integrity test so that the same may be inspected and witnessed.

The operator shall immediately notify the supervisor of the Artesia district office of the Division of the failure of the tubing, casing, or packer in said well and shall take such steps as may be timely and necessary to correct such failure or leakage.

<u>PROVIDED FURTHER THAT</u>, jurisdiction of this cause is hereby retained by the Division for the entry of such further order or orders as may be deemed necessary or convenient for the prevention of waste and/or protection of correlative rights; upon failure of the operator to conduct operations in a manner which will ensure the protection of fresh water or in a manner inconsistent with the requirements set forth in this order, the Division may, after notice and hearing, terminate the injection authority granted herein.

The operator shall submit monthly reports of the disposal operations in accordance with Rule Nos. 706 and 1120 of the Division Rules and Regulations.

The injection authority granted herein shall terminate one year after the effective date of this order if the operator has not commenced injection operations into the subject well, provided however, the Division, upon written request by the operator, may grant an extension thereof for good cause shown.

Approved at Santa Fe, New Mexico, on this 15th day of October, 1997.

WILLIAM J. LEMAY, Director

WJL/BES

xc: Oil Conservation Division - Artesia

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Contact: Terry Gan	Title:	(21.21:	-1/	Phone: <u>715</u>	-651-6511
DATE IN	RELEAS	E DATE <u></u>	<u>)</u> DA1	re out <u>70-75-</u> ,	<u>97</u> 7
Proposed Injection Application	is for:	WATERF	LOOD	Expansion	Initial
Original Order: R	-	\succeq Secondar	y Recovery	Pressure Mai	intenance
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PROOF of NOTICE					
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Correct Op	erators		Copies of	f Certified Mail Rece	ipts
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NOTES:			, 		
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COMMUNICATION WITH CONTACT PERSON:	•				
Ist Contact:Telepho	ned Letter	Uate	Nature o f Discussion		
3rd Contact: Telepho	ned letter	Date	Nature of Discussion		
		V015			



POGO PRODUCING COMPANY

CERTIFIED MAIL - RETURN RECEIPT REQUESTED

July 14, 1997

- To: Offset Leasehold Operators and Surface Owner (See Attached List)
 - Re: Cedar Canyon Prospect NM-615 <u>Eddy County, New Mexico</u> Application for Administrative Approval to Inject Saltwater into the Cedar Canyon "28" Federal No. 4 Well located 1980' FSL & 1980' FWL Section 28, T-24-S, R-29-E, N.M.P.M.

Gentlemen:

Pogo Producing Company has applied to the New Mexico Oil Conservation Division for Administrative Approval to inject saltwater into the captioned well.

A copy of the Form C-108 submitted by Pogo to the Division is enclosed.

If you object to and/or request that a hearing be held pertaining to this Application, you must notify the Division within fifteen (15) days from the date of Pogo's Application.

If you have any questions, please contact the undersigned or Mr. Richard L. Wright.

Very truly yours,

\POGO PRODUCING COMPANY Gant Senior Landman

TG:lf/c:SWD.89

Enclosure

cc: New Mexico Oil Conservation Division 2040 South Pacheco Street Santa Fe, New Mexico 87505 Attention: Mr. David R. Catanach Attached to Notification Letter dated July 14, 1997 regarding Pogo's Application for Administrative Approval to Inject Saltwater into the Cedar Canyon "28" Federal No. 4 Well

> Bureau of Land Management P. O. Box 27115 Santa Fe, New Mexico 87502-0115

Penwell Energy, Inc. 600 N. Marienfeld, Suite 1100 Midland, Texas 79701 Attention: Mr. Mark Wheeler

Enron Oil & Gas Company P. O. Box 2267 Midland, Texas 79702 Attention: Mr. Pat Tower

Bettis Brothers, Inc. 500 West Texas, Suite 830 Midland, Texas 79701 Attention: Mr. John Bettis

CNG Producing Company Four Greenspoint Plaza 16945 Northchase Drive, Suite 1750 Houston, Texas 77060 Attention: Ms. Donna Mullen

Nearburg Exploration Company, L.L.C. 3300 North "A", Building 2, Suite 120 Midland, Texas 79705 Attention: Mr. Bob Shelton



 SENDER: Complete items 1 and/or 2 for additional services. Complete items 3, 4a, and 4a, and 4a Perform your name and address on the reverse of this form so that 	ve can return this	I also wish to receive the following services (for an
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		Consult postmaster for fee.
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🕅 Attn: Mr. Mark Wheeler	Express	Mail 🗆 Insure
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	General Ind. For Net Window Add All Co. 8/ SO 1
APPLIC	Cedar Canyon "28" Federal No. 4
1.	Purpase: Secondary Recovery Pressure Maintenance XDinnosal Storage Application qualifies for administrative approval? XX yes Inc
11.	Operator: POGO PRODUCING COMPANY
	Address: P.O. BOX 10340, Midland, Texas 79702
	Contact party: Richard L. Wright Phone:915/682-6822
111.	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 expension of an existing project? yes no If yes, give the Division order number authorizing the project
۷.	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 ravisw.
→ YI.	Attach a tabulation of data on all walls 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 datail.
VII.	Attach data on the procosed operation, including:
	 Proposed average and maximum daily rate and volume of fluids to be injected; Whether the system is open or closed; Proposed average and maximum injection pressure; Sources and an appropriate analysis of injection fluid and compatibility with the receiving formation if other than reinjected produced water; and If injection is for disposed purposes into a zone not productive of oil or gas at or within one mile of the proposed well, stach a chemical analysis of the disposal zone formation water (may be measured or inferred from existing literature, studies, nearby wells, etc.).
*YIII,	Attach appropriate geological date of the injection zone including appropriate lithologic detail, geological name, thicknass, 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 loga have been filed with the Division they need not be resubmitted.)
• XI.	Attach a chemical analysis of frash water from two or more fresh water wells (if svai ³ able 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: Bill F. Halepeska
	Signature: All Kalipesta Date: 6/17/97

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If the information required under Sections VI. VIII. A. 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 shell include:
 - (1) Lease name; Well No.: location by Section, Township, and Range; and footage location within the mection.
 - (2) Sach staing string wast with his area, wetting depth, marks of emment used, hole size, top of cement, and how much top was determined.
 - (3) A description of the tubing to be used including its size, lining material, and setsing depth.
 - (4) The name, model, and setting depth of the parker 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 walls 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 macks 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.
- XIY. 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 bil Conservation Division, P. C. Box 2088, Santa Fe, New Maxico 87501 within 15 days.

ND ANTION WILL BE TAKEN ON THE APPLICATION UNTIL PROPER PROOF OF NOTICE HAS BEEN SUBMITTED.

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

	Inn. 6850' Long string casing; 4-1/2" at 6850' cemented with 685 sx, TOC at 1050'	perforated interval; 6500' - 44'	perforated interval; 5213' - 40'	PBTD 4787'; CIBP set @5165'	injection interval; 2950' - 4216'	injection string; 2-7/8" poly lined, set at2850' injection packer; 4-1/2" Guiberson Uni-VI set at 2850'	surface casing: 10-3/4" set at 505', cemented with 510 sx, cmt. circulated 70C long string at 1050'		SCHEMATIC	FORM C-108 ITEM 111-A INJECTION
Setting depth <u>2850'</u> ft.	(4) INJECTION PACKER: Size <u>4-1/2</u> in.; Make/Model <u>Guiberson Uni VI</u>	Setting depth <u>2850</u> ft.	Injection interval, from <u>2950'</u> to <u>4216</u> ft. (3). INJECTION TUBING STAING: Size <u>2-7/8</u> in., conted/lined with <u>poly</u>	Size <u>4-1/2" Depth 6850'</u> Cemented W/ <u>685</u> sx. TOC <u>1050'</u> Determined by <u>CBL</u> Hole size <u>6-3/4"</u>	TOC Determined by Hole size Long String	TOC <u>surfaceDetermined by circulated</u> Hole size <u>14-3/4"</u> Intermediate Casing Size <u>Depth</u> <u>Cemented w/</u> sx.	(2). CASING STRINGS: Surface Casing Size <u>10-3/4</u> Depth <u>505</u> Cemented w/ <u>510</u> sx.	(1). LEASE: <u>Cedar Canyon "28" Federal Well # 4</u> LOCATION: Sec. <u>28</u> TWP <u>24-S</u> Fange <u>29-E</u> County <u>Eddy</u> Entrop 1980' FST. £1980' FWL	TABULAR DATA	UWELL DATA SHEET

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Pogo Producing Company

FORM C-108 ITEM V

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FORM C-108

Pogo Producing Company Cedar Canyon "28" Fed. No. 4

ITEM 111-B

INJECTION WELL DATA

- (1). Injection formation: <u>Bell Canyon and Up. & Mid. Cherry Canyon (D</u>elaware) Field/Pool: <u>Cedar Canyon Delaware</u>
- (2). Injection interval, from <u>2950</u>ft. to <u>4216</u>ft.
 Perforated <u>XX</u> Open Hole _____
- (3). Original purpose well drilled -- test of Lower Delaware and Bone Spring
- (4). Other perforated intervals; <u>XX</u> Yes _____ No
 Squeezed with ______ sx., or isolated by perfs 6500 44' isolated with
 <u>CIBP @ 6375'; perfs 5213 6304' isolated by CIBP set @ 5105', top/25 sx.</u>

FORM	C-108	5	Pogo Producing Company
ITEM	Vl		Cedar Canyon "28" Federal No. 4
		WELL DATA - AREA OF RE	VIEW
	(1).	Location: <u>NONE</u>	
		Operator: Lease:	Well #
		Well type: Oil Gas DSA _	Total depthft.
		Date drilled:	
		Completion Data:	
		· ·	
		Plugged Date:	(Schematic attached)
	(2).	Location:	
		Operator: Leas	e: Well #
		Well Type: Oil Gas DSA	Total Depth: ft.
		Date Drilled:	
		Completion Data:	
		PluggedDate	(Schematic attached)
	(3)	. Location:	
		Operator:Leas	Well #
		Well Type ; Oil Gas DSA	Total Depth:ft.
		Date Drilled:	
		Completion Data:	
		Plugged Date	(Schematic attached)

 FORM C-108
 Pogo Producing Company Cedar Canyon "28" Federal No. 4

 ITEM VII
 OPERATIONAL DATA

 (1). Average expected injection rate: __1000__BWPD; maximum anticipated rate: __3000___BWPD

 (2). Closed system

 (3). Estimated average injection pressure: __500__psi. Estimated maximum pressure: __590__psi.

 (4). Source of injection water: __produced water from nearby POGO

 ______operated wells______

 Analysis of waters attached.
 EXHIBITS I & II

 (5). Analysis of injection zonerwater attached.
 EXHIBIT III

 Data source: __Herrandura Bend Delaware; Roswell Geological

____Society Symposium 1988_

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the construction of the pro-

1.1

FORM C-108

ITEM VIII

GEOLOGICAL DATA

INJECTION ZONE

Lithological description: <u>sandstone</u>, <u>fine</u> <u>-</u> <u>v</u>. <u>fine</u> <u>grained</u>, <u>lt. tan</u> <u>-</u> <u>gray</u>, <u>poorly</u> <u>consolidated</u> <u>-</u> <u>friable</u>, <u>cal</u>. <u>cementing</u>

Geological name: <u>Delaware (Bell Canyon and Upper & Middle Cherry</u> Cn. Zone thickness: <u>1266</u> ft.; Depth: <u>4216</u> ft.

FRESH WATER SOURCES

Geological name: <u>Recent shallow alluvium; none produced nearby</u>. Depth to bottom of zone: <u>200</u> ft.

ITEM 1X

STIMULATION PROGRAM (Proposed)

ACIDIZE:

Volume: _______ Type acid: _______ HCl/Pentol 100

Bate: 5_BPM; Misc. ball sealers

FRACTURE:

F.	luid volume: <u>55,000</u> gal.; Type: <u>XL</u> GW
Pi	rop type: <u>16/30 sand</u> Volume (#): <u>250,000</u>
Ra	ate: <u>30</u> BPM; Conductor: $4-1/2$ in.
M	lsc

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FORM C-108

Pogo Producing Company Cedar Canyon "28" Federal No. 4

ITEM X

LOGGING PROGRAM

Logging program included: GR/CND; ILES; CBL

Copy of <u>GR/CND</u> log included in attachments

ITEM XI

FRESH WATER ANALYSIS

Fresh water well within 1 mile radius; _____ Yes _____ No

Chemical analysis from well(s) located: _____ see tabulation, EXHIBIT IV

Date sampled: _____

Chemical analysis from well(s) located: _____

Date sampled: _____

ITEM XII

HYDROLOGY

Engineering data and area well logs reveal no evidence that hydrologic connection might exist between the intended injection zone (Bell Canyon - Cherry Canyon) at 2950' and probable fresh water zone at 200'.

ITEM XIII

COMMERCIAL INTENT

Initially, only water from Pogo operated wells will be disposed of in the subject well. Eventually, Pogo could take water from other leases in the area operated by someone else, but in which Pogo has a working interest. Only piped water will be taken into the system.

EXHIBIT I

Endura Products C P.O. Box 3394 Midland, Texas 7970 Phone (915) 684-4233 * Fax (915) 684-42

WATER ANALYSIS

Date 12/11/95Endura Rep TERRY SOLANSKYSampling Point/Date WELL HEAD - 12/9/95State NEW MEXICOCompany POGO PRODUCINGCounty EDDYFieldLease RIVERBEND FEDERAL Well #7

DISSOLVED SOLIDS

CATIONS	mg/1	me/1
Sodium, Na+ (Calc.)	81,949	3,563
Total Hardness as Ca-	5,120	0
Calcium, Ca↔	4,600	230
Magnesium, Mg	317	26
Barium, Ba++	0	0
Iron (Total) Fe	16	1

ANIONS

Chlorides, COl-	135,000	3,803
Sulfate, SO4-	280	. 6
Carbonate, CO3-	0	0
Bicarbonate, HCO3-	659	11
Sulfide, S-	0	0
Total Dissolved Solids (Calc.)	222,821	

OTHER PROPERTIES

pH-		6.360
Specific Gravity,	60-/60 F	1.123
TURBIDITY		300

SCALING INDICIES

TEMP, F	CA CO3	CASO4*2H2O	CA SO4	BA SO4
80	0.8303	-0.8962	-1.1875	-29.3893
120	1.2618	-0.9091	-1.0200	-29.5634
160	1.9214	-0.9331	-0.8713	-29.7858

FORM C-108 ITEM VII(4)

ANALYSIS- Bone Spring Produced Water

POGO PRODUCING COMPANY Cedar Canyon "28" Federal No. 4 Section 28, T-24S, R-29E Eddy County, New Mexico

EXHIBIT II

Endura Products P.O. Box 3394 Midland, Texas 797 Phone (915) 684-4233 * Fax (915) 684-

WATER ANALYSIS

FORM C-108 ITEM VII(4)

ANALYSIS -Lower Delaware Produced Water

POGO PRODUCING COMPANY Cedar Canyon "28" Federal No. 4 Section 28, T-24S, R-29E Eddy County, New Mexico

County EDDY

State NEW MEXICO

Endura Rep TERRY SOLANSKY Date 4-17-97 Sampling Point/Date WELL HEAD / 4-14-97 Company POGO PRODUCING CO. Lease RIVERBEND FEDERAL Well #1 Field

DISSOLVED SOLIDS

CATIONS	mg/1	me/1
Sodium, Na+ (Calc.)	77,395 43,600	3,365
Calcium, Ca-	36,000	1,800
Magnesium, Mg↔ Barium, Ba↔	4,634 0	386 0
Iron (Total) Fe	11	1

ANIONS

Chlorides, COl-	197,000	5,549
Sulfate, SO4-	63	1
Carbonate, CO3-	0	0
Bicarbonate, HCO3-	146	2
Sulfide, S-	0	0
Total Dissolved Solids (Calc.)	315,249	

OTHER PROPERTIES

pH-			5.700
Specific Gravity,	60°/60	F	1.2
TURBIDITY			320

SCALING INDICIES

TEMP, F	CA CO3	CASO4*2H2O	CA SO4	BA SO4
80	2.0099	-0.3647	-0.8065	-29.5893
120	2.7105	-0.3742	-0.6355	-29.6881
160	3.7638	-0.3656	-0.4543	-29.8776
PERF'S	5,248'	- 5,264'		

EXHIBIT III

FORM C-108 ITEM VII(5)

ANALYSIS- Injection Zone Produced Water

POGO PRODUCING COMPANY Cedar Canyon "28" Federal No. 4 Section 28, T-24S, R-29E Eddy County, New Mexico

ROSWELL GEOLOGICAL SOCIETY SYMPOSIUM -

Author: David S. Harle

Date: March 1988

Field Name: Herradura Bend Delaware (Oil)

Affiliation: Hondo Oil and Gas Company

county & State: Eddy County, New Mexico

Location: T.22-235., R.27-28E.

Discovery Well: Orla Petco, Inc., No. 1 Pardue. 660' FNL, 1,900' FEL, Sec. 6, T.23S., R.28E. Compl. 8/23/77. T.D. 4,099'.

Exploration Method Leading to Discovery: Subsurface mapping.

Pay Zone: 2,466'-2,474': IPP 38 BOPD + 50 BW. Formation Name: Delaware (Bell Canyon). Depth & Datum Discovery Well: 2,449' (+597'). Lithology Description: Sandstone.

Approximate average pay: <u>10</u> gross <u>10</u> net Productive Area <u>1,120</u> acres

Type Trap: Structural-stratigraphic. Production is from a porous sandstone that pinches out updip. There is some structural rollover on top of the pay zone that is probably caused by the deposition of the pay sand. Reservoir Data:

<u>23</u> * Porosity <u>Md</u> Permeability <u>Sw</u> * Sw oil: Grav. 41.5, GOR 100-1. Gas: Water: <u>60</u> Na+K <u>6.400</u> Ca <u>970</u> Mg14000 Cl <u>TR</u> SO₄ <u>CO₂ or HCO₃ Fe (PPM) Specific Gravity <u>1.074</u> Resistivity <u>.076</u> ohms <u>8</u> <u>74</u> • F Initial Field Pressure: <u>psi 8</u> <u>datum</u> Reservoir Temp. • F Type of Drive : Solution gas.</u>

Normal Completion Practices: Open hole completion. Acidize with 1,500 to 3,000 gals. acid.

Type completion: Pumping.

Normal Well Spacing 40 Acres

Deepest Horizon Penetrated & Depth: Bone Spring 5,600' (-2,554'). Exxon Corp. No. 1 New Mexico "DU" State, 1,673' FNL, 1,809' FWL, Sec. 36, T.22S., R.27E. T.D. 5,890'. Other Producing Formations in Field: Cherry Canyon.

Production Data: Field designated 12/77. Production shown only through December 1986.

LAR .	PE	¥0. of 1 yr	of wells yr. end	PRODUC OIL IN E	TTION BARRELS	AR	bi We. of wells bi # yr. end		A Man of wells PRODUCTION I M I YT. and OIL IN BARRELS CAS IN MACT		CTION BARRELS
ΧF	Ę	Prod.	5.1. of Abd.	ANNUAL	CUMULATIVE	Ř	2	Pred.	5.1. ar Xbd.	ANNUAL	CUMULATIVE
79	OIL	19		80.023	171,732	83	OIL	20	6	63,625	476,501
	GAS			4 529	5,904		GAS			3.3	21,777
30	OIL	20	1	72,098	243,830	84	OIL	27	6	54,511	531,012
	GAS			5.536	11.440		GAS			4,667	25,844
31	IOIL	26	1	82,194	326.024	85	OIL	22	7	40.549	571.561
	IGAS			3,137	14.577		GAS			7 777	29 58
22	OIL	21	5	86.852	412.876	86	OIL	21	9	49,736	621,297
	GAS			3.3	17.877		GAS			3.975	33,556

EXHIBIT IV

FORM C-108 ITEM XI

ANALYSIS-Fresh Water Source(s)

FRESH WATER SOURCES WATER QUALITY INFORMATION

Supplied by State Engineers Office, State of New Mexico

POGO PRODUCING COMPANY Cedar Canyon "28" Federal No.4 Section 28, T-24S, R-29E Eddy County, New Mexico

USE	LOCATION	CHLORIDES	CONDUCTIVITY	DEPTH	DATE
stk	26.23S.31E	122	3455		12/79
stk	26.23S.31E	150			12/70
stk	26.23S.31E	134	3503		10/76
stk	04.24S.31E	246	3690		07/87
stk	04.24S.31E	310	3680		04/92
irr	11.24S.28E	1180	6240	200	03/92
irr	16.24S.28E	1039	7449	161	05/81
stk	30.24S.28E	490	3830	201	04/92
irr	07.24S.29E	2330	8540	160	03/92
irr	07.24S.29E	2150	8860	160	04/85