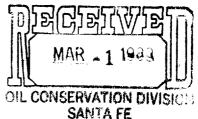
Shell Western E&P Inc.

A Subsidiary of Shell Oil Company



P.O. Box 576 Houston, TX 77001

February 27, 1989



State of New Mexico Energy, Minerals and Natural Resources Department Oil Conservation Division 310 Old Santa Fe Trail, Room 206 Santa Fe, NM 87503

Gentlemen:

SUBJECT: EXPANSION OF WATERFLOOD PROJECT

SHELL - NORTHEAST DRINKARD UNIT

NORTH EUNICE BLINEBRY-TUBB-DRINKARD OIL & GAS POOL

WELL NO. 913-K

SECTION 23, T21S, R37E LEA COUNTY, NEW MEXICO

Shell Western E&P Inc. (SWEPI) respectfully requests administrative approval for expansion of the subject waterflood project. Division Order No. R-8541 granted November 9, 1987 authorized SWEPI to conduct the Northeast Drinkard Unit Waterflood Project within the subject pool.

The "First Supplement - 1988" to the "Initial Plan of Operation" for the Northeast Drinkard Unit, approved by the NMOCD on May 3, 1988, outlined our intent to utilize the Sarkey's No. 6 (formerly operated by Arco) as a Blinebry/Tubb gas producer enabling NEDU No. 913 to be used as an injector.

The following information is submitted in support of this request:

- Plat of Unit identifying proposed injector and its project area.
- 2. Injection Well Data Sheet (with miscellaneous data attached).
- 3. An Affidavit of Publication certifying the newspaper legal notice.
- 4. List of offset operators and surface owner.
- 5. All entities in Item Four have been notified by certified mail.

If additional information is required, please advise.

Yours very truly,

W.F.N. Kelldor

Staff Production Engineer Safety, Environmental and Administration Western Division

JMW:SW

Attachments

cc: State of New Mexico Energy, Minerals and Natural Resources Department Oil Conservation Division P. O. Box 1980 Hobbs, NM 88240

State of New Mexico Office of Land Commissioner P. O. Box 1148 Santa Fe, NM 87501

of the earlier submittal.

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

FORM C-108 Revised 7-1-81

PPLICA	ATION FOR AUTHORIZATION TO INJECT
I.	Purpose: X Secondary Recovery Pressure Maintenance Disposal Storage Application qualifies for administrative approval? X yes no
11.	Operator: SHELL WESTERN E&P INC.
	Address: P. O. BOX 576, HOUSTON, TX 77001 (WCK 4435)
	Contact party: J. M. WINDER Phone: (713) 870-3797
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 expansion of an existing project? \overline{X} yes $\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ $
٧.	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:
	 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 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.).
111.	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.
х.	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.
all.	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: W.F.N. KELLDORF Title STAFF PRODUCTION ENGINEER
	Signature: Date: FEBRUARY 27, 1989

CASE NO. 9232, ORDER NO. R-8541

HEARING SEPTEMBER 24, 1987

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

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:
 - 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.

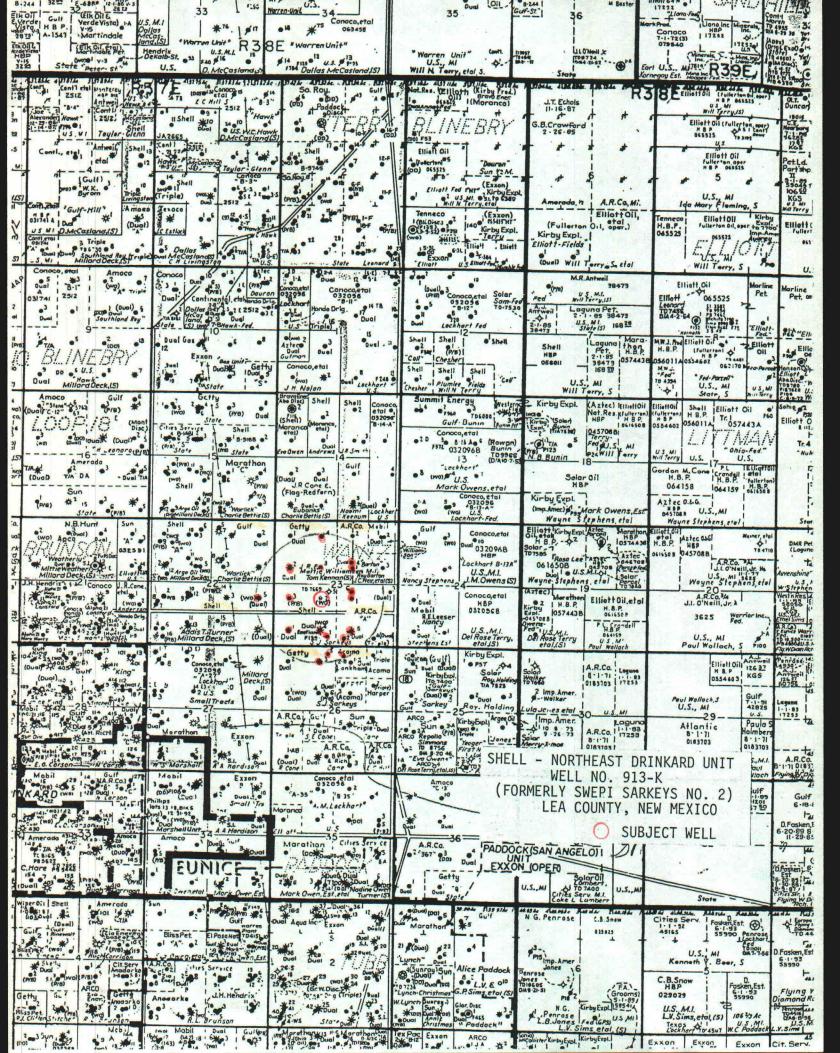
XIV. PROOF OF NOTICE

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 application was mailed to them.



OPERATOR		LEASE	(FORMERLY SWEPI'S)
SWEPI	NORTHE	SET DRINKARD UNIT	SARKEY'S No.2
WELL NO.	FOOTAGE LOCATION	SECTION	TOWNSHIP RANGE
913W	1980' FSL E 19	86' FWL	23-21S-37E
Schema	tic	Tak1	an Daha
30,70,000	1		ar Data
	13%" @ 229'	Surface Casing	_
			Cemented with 250 sx.
			t determined by <u>CIRC</u> ,
		Hole size 17"	
		Intermediate Casing	
		Size 85/8"	Cemented with 1500 sx.
			t determined by CIRC.
4	8 % " @ 2909	Hole size 11"	
		Long string	
			Cemented with 1000 sx.
		¬/	t determined by FREE Pr.
	# 50Z'D	Hole size	
	BUNEBRY I-II	Total depth 6010 (CS	37 TO 6460')
		Injection interval	
\bowtie	BLINEBON III	.5726 feet to (perforated or open-hole)	<u>lolo10'</u> feet
	THEN TUBB I		
	# SOZ'D	(PERPS FROM 5726 TO	6 6447', OPEN HOLE: 6A60'TO 6661C
	TUBB II-III		
	1		
	I DISINIKARD		
	5½" @ 6460°		
}	DRINKARD I-I	•	
}	OPEN HOLE		
TD=U	4010'		,
10-0			·
	2/11		
Tubing size	$\frac{2^{8}}{8}$ line	d with FIBERGLASS	EPOXY set in a
Gue	TV-14(1 unson	materi packer at	± 5700 feet
(pra	nd and model)		
(or describe	any other casing-tubin	ig seal).	
Other Data		D . H	1/2
		BLINBRRY / TU	
			IN TURB DRINK OIL & GAS HOOL
		<u> </u>	√ No
If no, f	_	e well originally drilled?	
		ARD OIL HRODUCER	
4. Has the	well ever been perfora	ted in any other zone(s)? s of cement or bridge olug(List all such perforated intervals s) used)
•	• _	SOZ'D 1958X IN LO	
			OSX PRIOR TO INJECTION.
			lying oil or gas zones (pools) in
5. Give the this er	•	any everying and/or under.	
			· · · · · · · · · · · · · · · · · · ·

ATTACHMENT TO FORM C-108 NORTHEAST DRINKARD UNIT #913-K MISCELLANEOUS DATA

III. WELL DATA

B.(5) next higher oil zone - Paddock @ 5210' next lower oil zone - Abo @ 6690'

VII. PROPOSED OPERATION

1.	Average	Injection	Rate	1350	BWPD
	Maximum	Injection	Rate	2000	BWPD

- 2. Closed Injection System
- 3. Average Injection Pressure

 Maximum Injection Pressure

 Approximately 1200 psi
 (will not exceed 0.2 psi/ft.
 to top perforation)
- 4. Source water San Andres, Analysis attached

IX. STIMULATION PROGRAM

Acid treatments with total volume of 7350 gals 15% HCl-NEA and diverting with ball sealers and rock salt.

SHELL WESTERN E&P INC. WATER ANALYSIS REPORT

WESTERN DIVISION

COMPANY Shell Western E&P, Inc.	,		rtin Water Labs., Inc.
		YROTARCEAL	
LEASE CDU			דס דו כ
		DATE SAMPLE TAKEN DATE SAMPLE RECEIVE	
WELL NUMBER		DATE SAMPLE REPORT	3-30-87
PRODUCING FORMATION San Andres		DATE SAMPLE REPORT	E)
WHERE SAMPLED Water Supply Well #20	00		
REMARKS			
ALIMANA.			
CHEMICAL AND PHYSICAL PROPERTIES			
TOTAL HARDNESS Mg/L AS Ca CC3	- 	TOTAL ALKALINITY M	g/L 45 C1 C03 760
CONSTITUENT	Mg/LITER	REACT, COSF.	Meq/LITER
SODIUM FINCL POTASSIUM AS NE 4	10,057	0.04350	437.3
CALCIUM - Cs + +	- 1,000	0.04990	49.9
MAGNESIUM - Mg + +	334	0.08224	27.5
IRON TOTAL - Fe++ & F6+++	2.9	0.03581	0.1
BARIUM - Bs + +		0.01460	
POSITIVE SUB-TOTAL	11,394		514.8
CHLORIDE - CI -	14,914	0.02820	420.6
- 2001 3 - CCC - TANDERSOIE & TEXTERNOL	927	0.01639 *	15.2
SULFATE - SO4*	2,027	0.02032	42.2
HYDROXYL - OH -	00	0.05830	0.0
SULFIDE - S =	589	0.05235	36.8
NEGATIVE SUB-TOTAL	18,457		514.8
TOTAL DISSOLVED SOLIDS	29,851		1,029.6
· BICARSONATE	•		
SPECIFIC GRAVITY 1.0222 & 60 of	рн. <u>6.7</u> 4	RES. <u>C. 270</u> e	_80_ of
			NALYST
REACTION VALUE = [MILLIGRAMS/LITER] X (REACTION COEFFICIENT = VALENCE ÷ MOLEC	REACTION COEFFICE SULAR WEIGHT	ENII	Anderson, Hobbs
Ne - 8 7 6 5 4 3 2	1 0 1		5 6 7 8 Ci-
1000	1 1 1		1000
C:++			HC03-
160			100
hts - +			504
Fe + - +	+ *		CC3
<u> </u>			<u></u>

SHELL WESTERN E&P INC. WATER ANALYSIS REPORT MID-CONTINENT DIVISION

		•	
SAMPLE DESCRIPTION			•
COMPANY SWEPI		LABORATORY	
FIELD DRINKARD		LABORATORY NUMB	,
LEASE TURNER		DATE SAMPLE TAKEN	
		DATE SAMPLE RECEIV	
WELL NUMBER 2 COUNTY & STATE LEA. NEW MEXICO		DATE SAMPLE REPOR	VED 4/9
COUNTY & STATE		DATE SAMPLE REPOR	120
PRODUCING FORMATIONBLINEBERRY			
WHERE SAMPLED			· · · · · · · · · · · · · · · · · · ·
REMARKS	·		
CHECKS AND DIRECTOR BROSERVIES			
CHEMICAL AND PHYSICAL PROPERTIES			
TOTAL HARDNESS May'L AS C+ CO3 30500		TOTAL ALKALINITY	Mg/L AS C+ CO3
CONSTITUENT	MayLITER	REACT, COEF,	Meq/LITER
SODIUM (INCL. POTASS; UM) AS Ne +	46995	0.04350	
CALCIUM - Ca - +	7400	0.04990	
MAGNESIUM - Mg++	2916	0.08224	
IRON TOTAL - Fo++& Fe+++	44	0.03581	
BARIUM - Ba + +	0	0.01480	
POSITIVE SUB-TOTAL	57355		
CHLORIDE - CI -	93035	0.02820	
CARSONATE & BICARSONATE - CO2 = & HCO2 -	246	0.01639 *	
SULFATE - SOA*	1262	0.02082	
HYDROXYL - OH -	0	0.05830	
SULFIDE - 5 =	0	0,05238	
NEGATIVE SUB-TOTAL	94543		
	151898		
TOTAL DISSOLVED SOLIDS	260161		<u> </u>
* BICARBONATE	6 33	040	
SPECIFIC GRAVITY 1.1068 5 60 of	pH	RES	<u>80</u> 07
			ANALYST
REACTION VALUE = (MILLIGRAMS/LITER) X (REACTION COEFFICIENT = VALENCE + MOLEC	REACTION COEFFIC	IENT)	REQUESTED BY
Na + E 7 8 5 4 3 2	1 0 1	2 3 4	5 8 7 8 CI-
1000			1000
C3++			, NO00
100			HCC3-
Mg + +			504
100	1 1		100
Fe-++			CO3
100			100

Ca504 N

SHELL WESTERN E&P INC. WATER ANALYSIS REPORT

WESTERN DIVISION

SAMP	LE	DESCRIPTION

COMPANY Shell Western E&P, Inc.		LABORATORY - M	artin Water Labs., Inc.
Fisho Drinkard		LABORATORY NUMBE	-
LEASE ATRO		DATE SAMPLE TAKEN	
WELL NUMBER #5			y€D 3-12-87
COUNTY & STATE Les, XM		DATE SAMPLE RECEN	TED 3-16-87
- COUNTY & STATE - Tubb		UNIT SAMPLE REPUR	TED
PRODUCING FORMATIONTubb		•	
WHERE SAMPLED			
REMARKS			
CHEMICAL AND PHYSICAL PROPERTIES			
TOTAL HARDNESS Mg/L AS C: CO3	_	TOTAL ALKALINITY	4g/L AS Ca CO390
CONSTITUENT	Mg/LITER	REACT, COEF,	Meq/LITER
SODIUM (INCL. POTASSIUM) AS NE-	6,152	0.04350	267.4
CALCIUM - Ca + +	1,640	0.04990 -	81.8
MAGNESIUM - Mg + ÷	401	0.08224	33.0
IRON TOTAL - Fe++& Fe+++	255	0.03521	9.2
EARIUM - BE++	0	0.01460	0.0
•			
POSITIVE SUB-TOTAL	8,448		391.4
CHLORIDE - CI -	13,494	0.02820	380.5
STATEDEATE'S BICARBONATE - YOU - & HCC3 -	110	0,01639 *	1.8
SULFATE - SOA-	438	0.02082	9.1
HYDROXYL - OH -	0	0.05880	0.0
SULFIDE - S =	0.0	0,05235	0.0
	14 043		000
NEGATIVE SUBTOTAL	14,041		391.4
·		·	,
TOTAL DISSOLVED SOLIDS	22,490		782.8
* BICARBONATE			
SPECIFIC GRAVITY 1.0181 \$ 60 of	oH_6.02	RES 0.390 @	80 ₆₅ .
		-	ANALYST
REACTION VALUE - (MILLIGRAMS/LITER) X (REACTION COEFFICE	ENITI F	REQUESTED BY
REACTION COEFFICIENT - VALENCE + MOLEC	CULAR WEIGHT.	Mr. Do	nnie Anderson, Hobbs
1000	1 0 1	2 3 4	5 6 7 E CI-
1000			
C6 7 + 1000			HC03-
M; - + 100			504
.			
5e +	1 1		CO3
			10.
	1 : 1	1 1	

heros of the child

SHELL WESTERN E&P INC. WATER ANALYSIS REPORT

Caso4 N

WESTERN DIVISION

SAMPLE DESCRIPTION

COMPANY Shell Western E&P, Inc.		LABORATORY MET	tir Water Labs., Inc
Drinkard		LABORATORY NUMBER	
LEASE ATRO "A"	•	DATE SAMPLE TAKEN	
WELL NUMBER #3		DATE SAMPLE RECEIVE	
COUNTY & STATE Les, NY		DATE SAMPLE REPORTS	
PRODUCING FORMATIONDrinkard			
WHERE SAMPLED			<u></u>
REMARKS			·.
			<u></u>
CHEMICAL AND PHYSICAL PROPERTIES			
TOTAL HARDNESS Mg/L AS Ca CO3 23,200		TOTAL ALKALINITY Mg	/L AS 0± CO3106
CONSTITUENT	MOLLITER	REACT. COEF.	MaskLiTER
SODIUM (INCL. POTASSIUM) AS NE -	26,603	0.04350	1,156.6
CALCIUM - CE - +	6,920	0.04890	345.3
MAGNESIUM - Mg + +	1.434	0.08224	117.9
IRON TOTAL - Fe++ & Fe+++	351	0.03581	12.6
BARIUM - Ba++	0	0.01450	0.0
POSITIVE SUB-TOTAL	35,308		1,632.4
CHLORIDE - C! -	57,525	0,02820	1,622.2
XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX	129	0.01838	2.1
SULFATE - SOZ=	390	0.02082	8.1
HYDR0XYU - OH -	0	0.05820	0.0
SULFIDE - S =	0.0	0.05238	C.O
	• • • · · · ·		
NEGATIVE SUBTOTAL	58,045	1	1,632.4
TOTAL DISSOLVED SOLIDS	93,353		3,264.8
* BICARBONATE			
SPECIFIC GRAVITY 1.0651 @ 60 of	рн <u>5,9</u>	RES. 0.098 6	<u>80</u> of
			ALYST
REACTION VALUE = [MILLIGRAMS/LITER] X [REACTION COEFFICIENT = VALENCE MOLEC	REACTION COEFFICE		OUESTED BY
Na + 8 7 6 5 4 3 2	OLAK WEIGHT.	7 3 4 5	
1000			1000
Ce + +	i ti		HSC3-
Mig			S04-
		. .	
05			C03 -
~~			1 100
	! ; ;	i i '	i • 1

SHELL WESTERN E&P INC. WATER ANALYSIS REPORT

CO3 - -

WESTERN DIVISION

CHLORIDE - CI - 58,946 0.02820 1,662.3 CARROCATE & BICARBONATE - TOY & HCO3 - 403 0.01629* 6.6 SULFATE - SO4* 1,742 0.02082 36.3 HYDROXYL - OH - 0 0.05880 0.0 SULFIDE - S * 0.0 0.06238 0.0 NEGATIVE SUB-TOTAL 61,090 1,705.2 TOTAL DISSOLVED SOLIDS 97,318 3,410.4 * BICARBONATE SPECIFIC GRAVITY 1.0770 @ 60 of PH 6.49 RES. 0.096 @ 80 of REACTION VALUE * IMILLIGRAMS/LITER) X IREACTION COEFFICIENT; REQUESTED BY REACTION COEFFICIENT REQUESTED BY MT. Donnie Anderson, Hobbs 1000 Na + 8 7 6 5 4 3 2 1 0 1 2 3 4 5 6 7 8 CI-1000 Ca + + 1000 Mg + 1000 Mg +	SAMPLE DESCRIPTION			
Date Sample Taken 3-30-87	COMPANY Shell Western E&P, Inc.		LABORATORY Marti	n Water Labs., Inc
Date Sample Taken 3-30-87	FIELDDrinkard		LABORATORY NUMBER _	
WELL NUMBER COUNTY & STATE Lea NM	LEASE Sarkey		DATE SAMPLE TAKEN	3-30-87
COUNTY & STATE Lez. NM	WELL NUMBER		DATE SAMPLE RECEIVED_	4-2-87
### PRODUCING FORMATION WHERE SAMPLED REMARKS CHEMICAL AND PHYSICAL PROPERTIES TOTAL HARDNESS Mg/L AS Ca CO3	COUNTY & STATE Lez. NM	·	DATE SAMPLE REPORTED	4-8-87
### WHERE SAMPLED REMARKS CHEMICAL AND PHYSICAL PROPERTIES TOTAL HARDNESS Mg/L AS Ca CO3	•		,	
### REMARKS CHEMICAL AND PHYSICAL PROPERTIES TOTAL HARDNESS Mg/L AS Ca CO3				
TOTAL HARDNESS Mg/L AS C3 C03 29,600 TOTAL ALKALINITY Mg/L AS C3 C03 330 CONSTITUENT Mg/LITER REACT.COEF. Mea/LITER SODIUM (INCL. POTASSIUM) AS N3+ 25,607 0.04350 1,113.4 CALCIUM - C3++ 8,680 0.04950 433.1 MAGNESIUM - M9++ 1,920 0.08274 157.9 IRON TOTAL - Fe++& Fe+++ 21.6 0.05581 0.8 BARIUM - B3++ 0 0 0.01460 0.0 POSITIVE SUB-TOTAL 36.228 1.705.2 CHLORIDE - C1 - 58,946 0.02820 1,662.3 CARBODAYE & BICARBONATE - VOX - & HCO3 - 403 0.01639 6.6 SULFATE - S04- 1,742 0.02062 36.3 HYDROXYL - OH - 0 0.05880 0.0 SULFIDE - S - 0.0 0.05880 0.0 NEGATIVE SUB-TOTAL 61,090 1,705.2 TOTAL DISSOLVED SOLIDS 97.318 3,410.4 * BICARBONATE SPECIFIC GRAVITY 1.0770 @ 60 OF PH 6.49 RES. 0.096 @ 80 OF ANALYST REQUESTED BY REACTION VALUE = [MILLIGRAMS/LITER] X IREACTION COEFFICIENT) REQUESTED BY MR. Donnie Anderson, Hobbs NA + 8 7 6 5 4 3 2 1 0 1 2 3 4 5 6 7 8 C1- 1000 C3+ HODROY - HODROW - HOCOS- 1000 MG + + HODROW - HODROW - HOCOS- 1000 MG + HODROW - HOCOS- 1000 1000 SQ4- HCO3- 1000 SQ4-				
TOTAL HARDNESS Mg/L AS C3 C03 29,600 TOTAL ALKALINITY Mg/L AS C3 C03 330 CONSTITUENT Mg/LITER REACT.COEF. Mea/LITER SODIUM (INCL. POTASSIUM) AS N3+ 25,607 0.04350 1,113.4 CALCIUM - C3++ 8,680 0.04950 433.1 MAGNESIUM - M9++ 1,920 0.08274 157.9 IRON TOTAL - Fe++& Fe+++ 21.6 0.05581 0.8 BARIUM - B3++ 0 0 0.01460 0.0 POSITIVE SUB-TOTAL 36.228 1.705.2 CHLORIDE - C1 - 58,946 0.02820 1,662.3 CARBODAYE & BICARBONATE - VOX - & HCO3 - 403 0.01639 6.6 SULFATE - S04- 1,742 0.02062 36.3 HYDROXYL - OH - 0 0.05880 0.0 SULFIDE - S - 0.0 0.05880 0.0 NEGATIVE SUB-TOTAL 61,090 1,705.2 TOTAL DISSOLVED SOLIDS 97.318 3,410.4 * BICARBONATE SPECIFIC GRAVITY 1.0770 @ 60 OF PH 6.49 RES. 0.096 @ 80 OF ANALYST REQUESTED BY REACTION VALUE = [MILLIGRAMS/LITER] X IREACTION COEFFICIENT) REQUESTED BY MR. Donnie Anderson, Hobbs NA + 8 7 6 5 4 3 2 1 0 1 2 3 4 5 6 7 8 C1- 1000 C3+ HODROY - HODROW - HOCOS- 1000 MG + + HODROW - HODROW - HOCOS- 1000 MG + HODROW - HOCOS- 1000 1000 SQ4- HCO3- 1000 SQ4-	CHEMICAL AND PHYSICAL PROPERTIES			
SODIUM (INCL, POTASSIUM) AS No. + 25,607 0.04350 1,113.4			TOTAL ALKALINITY Mg/L A	As Ca CO3330
CALCIUM - C3++	CONSTITUENT	Mg/LITER	REACT. COEF.	Meq/LITER
MAGNESIUM - Mg +	SODIUM (INCL. POTASSIUM) AS Na +	25,607	0.04350	1,113.4
IRON TOTAL = Fe++& Fe+++	CALCIUM - Ca + +	8,680	0.04990	433.1
BARIUM - B3++	MAGNESIUM - Mg ++	1,920	0.08224	157.9
POSITIVE SUB—TOTAL 36.228 CHLORIDE - CI - 58,946 SULFATE - SO4- 1,662.3 CNARSONATE - BICARBONATE - FDY - & HCO2 - 403 HYDROXYL - OH - 0 0.05880 SULFIDE - S - 0.0 0.06238 NEGATIVE SUB—TOTAL 61,090 1,705.2 TOTAL DISSOLVED SOLIDS 97.318 3,410.4 * BICARBONATE SPECIFIC GRAVITY 1.0770 © 60 of pH 6.49 RES 0.096 © 80 of ANALYST REACTION COEFFICIENT) REACTION VALUE = IMILLIGRAMS/LITER) × IREACTION COEFFICIENT) REACTION COEFFICIENT = VALENCE + MOLECULAR WEIGHT. Na + 7 5 5 4 3 2 1 0 1 2 3 4 5 5 7 8 CI- 1000 Ca + + 1000 Ca + + 1000 Mg + + 1000 Mg + + 1000 Mg + + 1000 SOA-	IRON TOTAL - Fe++ & Fe+++	21.6	0.03581	0.8
CHLORIDE - CI - 58,946 0.02820 1,662.3 CARROCATE & BICARBONATE - TOY & HCO3 - 403 0.01629* 6.6 SULFATE - SO4* 1,742 0.02082 36.3 HYDROXYL - OH - 0 0.05880 0.0 SULFIDE - S * 0.0 0.06238 0.0 NEGATIVE SUB-TOTAL 61,090 1,705.2 TOTAL DISSOLVED SOLIDS 97,318 3,410.4 * BICARBONATE SPECIFIC GRAVITY 1.0770 @ 60 of PH 6.49 RES. 0.096 @ 80 of REACTION VALUE * IMILLIGRAMS/LITER) X IREACTION COEFFICIENT; REQUESTED BY REACTION COEFFICIENT REQUESTED BY MT. Donnie Anderson, Hobbs 1000 Na + 8 7 6 5 4 3 2 1 0 1 2 3 4 5 6 7 8 CI-1000 Ca + + 1000 Mg + 1000 Mg +	BARIUM - Ba++	0	0.01460	0.0
CHLORIDE - CI - 58,946 0.02820 1,662.3 CARROCATE & BICARBONATE - TOY & HCO3 - 403 0.01629* 6.6 SULFATE - SO4* 1,742 0.02082 36.3 HYDROXYL - OH - 0 0.05880 0.0 SULFIDE - S * 0.0 0.06238 0.0 NEGATIVE SUB-TOTAL 61,090 1,705.2 TOTAL DISSOLVED SOLIDS 97,318 3,410.4 * BICARBONATE SPECIFIC GRAVITY 1.0770 @ 60 of PH 6.49 RES. 0.096 @ 80 of REACTION VALUE * IMILLIGRAMS/LITER) X IREACTION COEFFICIENT; REQUESTED BY REACTION COEFFICIENT REQUESTED BY MT. Donnie Anderson, Hobbs 1000 Na + 8 7 6 5 4 3 2 1 0 1 2 3 4 5 6 7 8 CI-1000 Ca + + 1000 Mg + 1000 Mg +				
CARBORATE & BICARBONATE - LON - & HCO3 - 403 0.01639 * 6.6 SULFATE - SO2* 1,742 0.02082 36.3 HYDROXYL - OH - 0 0.05880 0.0 SULFIDE - S - 0.0 0.06238 0.0 NEGATIVE SUB-TOTAL 61,090 1,705.2 TOTAL DISSOLVED SOLIDS 97,318 3,410.4 *BICARBONATE SPECIFIC GRAVITY 1.0770 6 60 of	POSITIVE SUB-TOTAL	36.228	·	1.705.2
1,742	CHLORIDE - CI -	58,946	0.02820	-1,662.3
HYDROXYL = OH	CHABONATE & BICARBONATE - TOY = & HCO3 -	403	0.01639 *	6.6
SULFIDE - S =	SULFATE - SO4=	1,742	0.02082	36.3
NEGATIVE SUB—TOTAL 61,090 1,705.2 TOTAL DISSOLVED SOLIDS 97.318 3,410.4 *BICARBONATE SPECIFIC GRAVITY 1.0770 © 60 of pH 6.49 RES. 0.096 © 80 of ANALYST REACTION VALUE = (MILLIGRAMS/LITER) × (REACTION COEFFICIENT) REQUESTED BY REACTION COEFFICIENT = VALENCE ÷ MOLECULAR WEIGHT. Mr. Donnie Anderson, Hobbs Na + 8 7 6 5 4 3 2 1 0 1 2 3 4 5 6 7 8 CI— 1000 Ca + + 1000 Mg + + 1000 Mg + + 1000	HYDROXYL - OH -	0	0.05880	0.0
**BICARBONATE SPECIFIC GRAVITY 1.0770 @ 60 of ph 6.49 RES. 0.096 @ 80 of ANALYST REQUESTED BY **REACTION VALUE ** (MILLIGRAMS/LITER) X (REACTION COEFFICIENT) REACTION COEFFICIENT ANALYST REQUESTED BY Na + 8 7 6 5 4 3 2 1 0 1 2 3 4 5 6 7 8 CI- 1000 **Ca + + 1000 Mg + + 1000 SOa-	SULFIDE - S =	0.0	0.06238	0.0
**BICARBONATE SPECIFIC GRAVITY 1.0770 @ 60 of ph 6.49 RES. 0.096 @ 80 of ANALYST REQUESTED BY **REACTION VALUE ** (MILLIGRAMS/LITER) X (REACTION COEFFICIENT) REACTION COEFFICIENT ANALYST REQUESTED BY Na + 8 7 6 5 4 3 2 1 0 1 2 3 4 5 6 7 8 CI- 1000 **Ca + + 1000 Mg + + 1000 SOa-				,
*BICARBONATE SPECIFIC GRAVITY 1.0770 @ 60 of ph 6.49 RES. 0.096 @ 80 of ANALYST REACTION VALUE * IMILLIGRAMS/LITER) X IREACTION COEFFICIENT) REACTION VALUE * IMILLIGRAMS/LITER) X IREACTION COEFFICIENT) REACTION COEFFICIENT * VALENCE ÷ MOLECULAR WEIGHT. Na + 8 7 6 5 4 3 2 1 0 1 2 3 4 5 6 7 8 CI- 1000 Ca + + 1000 Mg + + 1000 Mg + + 1000	NEGATIVE SUB-TOTAL	61,090		1,705.2
*BICARBONATE SPECIFIC GRAVITY 1.0770 @ 60 of ph 6.49 RES. 0.096 @ 80 of ANALYST REACTION VALUE * IMILLIGRAMS/LITER) X IREACTION COEFFICIENT) REACTION VALUE * IMILLIGRAMS/LITER) X IREACTION COEFFICIENT) REACTION COEFFICIENT * VALENCE ÷ MOLECULAR WEIGHT. Na + 8 7 6 5 4 3 2 1 0 1 2 3 4 5 6 7 8 CI- 1000 Ca + + 1000 Mg + + 1000 Mg + + 1000				•
SPECIFIC GRAVITY 1.0770 @ 60 of pH 6.49 RES. 0.096 @ 80 of REACTION VALUE * (MILLIGRAMS/LITER) X (REACTION COEFFICIENT) REACTION COEFFICIENT * VALENCE ÷ MOLECULAR WEIGHT. Na + 8 7 6 5 4 3 2 1 0 1 2 3 4 5 6 7 8 CI- 1000 Ca + + 1000 Mg + ÷	TOTAL DISSOLVED SOLIDS	97,318		3,410.4
SPECIFIC GRAVITY 1.0770 @ 60 of pH 6.49 RES. 0.096 @ 80 of REACTION VALUE * (MILLIGRAMS/LITER) X (REACTION COEFFICIENT) REACTION COEFFICIENT * VALENCE ÷ MOLECULAR WEIGHT. Na + 8 7 6 5 4 3 2 1 0 1 2 3 4 5 6 7 8 CI- 1000 Ca + + 1000 Mg + ÷				
## REACTION VALUE = (MILLIGRAMS/LITER) X [REACTION COEFFICIENT] ## REQUESTED BY ## REQUESTED BY ## Donnie Anderson, Hobbs ## Na+	SPECIFIC GRAVITY 1.0770 @ 60 of	pH 6.49	RES 0.096 @ 80) _{of}
### REACTION VALUE * [MILLIGRAMS/LITER] X [REACTION COEFFICIENT] ### REACTION COEFFICIENT * VALENCE ÷ MOLECULAR WEIGHT. Na +	•	• -		
REACTION COEFFICIENT = VALENCE ÷ MOLECULAR WEIGHT. Mr. Donnie Anderson, Hobbs Na + 8	REACTION VALUE * [MILLIGRAMS/LITER] X [R	REACTION COEFFICE	ENT) REQUE	STED BY
1000 Ca++ 1000 Mg++	REACTION COEFFICIENT - VALENCE - MOLECO	ULAR WEIGHT.	Mr. Donnie	
Ca + + : HCO3- 100 Mg + ÷ SO4-	Na+	' 	4 5	
100 Mg + ÷				
Mg + ÷ SO4 -	Ca++	+		HCO3-
100 1 1 1 1 1 1 1 1 1	Mg + + 100			SO4

AFFIDAVIT OF PUBLICATION

I, George W. Moore ___

State of New Mexico, County of Lea.

of the Hobbs Daily News-Sun, a
daily newspaper published at
Hobbs, New Mexico, do solemnly
swear that the clipping attached
hereto was published once a week
in the regular and entire issue of

said paper, and not a supplement thereof for a period

One weeks.

Beginning with the issue dated

January 19 , 1989 and ending with the issue dated

Such More

Sworn and subscribed to before

me this 20 day of

January, 1989 Ulsa Musphy Notary Public.

My Commission expires____

November 14 , 1992 (Seal)

This newspaper is duly qualified to publish legal notices or advertisements within the meaning of Section 3, Chapter 167, Laws of 1937, and payment of fees for said publication has been made.

LEGAL NÓTICE

January 19, 1989
NOTICE is hereby given of the application of Shell Western E&P Inc., Attention: A.J. Fore, Supervisor Regulatory and Permiting, P.O. Box 57.6, Houston, TX 77001, (713) 870-3787, to the Oil Conservation Division, New Mexico Energy, Minerals, and Natural Resources Department, for approval of the following injection well for the purpose of secondary recovery.

Pool Name: North Eunice Blinebry-Tubb-Drinkard Oil & Gas, Lease/Unit Name: Northeast Drinkard Unit, Well No.: 913, Location: 1980' FSL and 1980' FWL Sec_23, T21S, R37E; NMPM, Lea County, New

MAMM, Lea County, New Mexico.

The injection formations are the Blinebry, Tubb and Drinkard at depths of approximately 5700′, 5980′ and 6410′ respectively below the surface of the ground. Expected maximum injection rate is 2000 barrels per day, and expected maximum injection pressure is 1200 psi. Interested parties must file objections or requests for hearing with the Oil Conservation Division, P.O. Box 2088, Santa Fe, New Mexico 87504, within fifteen (15) days.

SERVICE LIST SHELL - NORTHEAST DRINKARD UNIT WELL NO. 913-K EXPANSION OF WATERFLOOD PROJECT

OFFSET OPERATORS

Texaco Producing Inc.

Box 728

Hobbs, NM 88240

ARCO Oil & Gas Co. P. O. Box 1610 Midland, TX 79702

Chevron USA Inc. P. O. Box 670

Hobbs, NM 88240

Acoma Oil Corporation

Executive Plaza Bldg.; Ste. 1200

210 W. 6th

Fort Worth, TX 76102

SURFACE OWNER

Nadine Owens 909 W. Taos

Hobbs, NM 88240

PS Form 3811, July 1983 447-845	SENDÉR: Complete items 1, 2, 3 and 4. Put your address in the "RETURN TO" space on the reverse side. Failure to do this will prevent this card being returned to you. The raturn receipt fee will prevent the name of the person delivered to and the date delivery. For additional fees the following services are available. Consult postmaster for fees and check box for service(s) requested. 1. Show to whom, date and address of delivery. 2. Restricted Delivery.	rom vide being returned to you. The return receipt fee will provide you the name of the person delivered to and the date of delivery. For additional fees the following services are
846	3. Article Addressed to: ACOMA OIL CORP. EXECUTIVE PLAZA BLDG.; STE 210 W. 6TH FORT WORTH, TX 76102	ARCO OTL & GAS CO
	4. Type of Service: Article Number Registered Insured P 495 091 419 Certified COD Express Mail	4. Type of Service: Article Number Registered Insured COD P 495 091 414 Express Mail
DOMESTIC RETURN RECEIPT	Always obtain signature of addressee or agent and DATE DELIVERED. 5. Signature — Addressee X 6. Signature — Agent X 7. Date of Delivery 8. Addressee's Address (ONLY if requested and fee page 1)	
CEIPT		RECEIPT

ПЕТИВИ ВЕСЕІРТ	DOMESTIC				978- 7	VV E861	PS Form 3811, July
7. Date of Delivery 8. Addressee's Address (ONLY if requested and fee paid)	5. Signature – Addressee X 6. Signature – Agent X	Always obtain signature of addressee or agent and DATE DELIVERED.	Registered COD P 495 091 416 Express Mail	TEXACO PRODUCIN BOX 728 HOBBS, NM 8824		 X Show to whom, date and address of delivery. Restricted Delivery. 	SENDER: Complete items 1, 2, 3 and 4. Put your address in the "RETURIN TO" space on the reverse side. Failure to do this will prevent this card from being returned to you. The return receipt fee will provide you the name of the person delivered to and the date of delivery. For additional fees the following services are available. Consult postmaster for fees and check box(es) for service(s) requested.

PS Form 3811, July 1983 447-845	SENDER: Complete items 1, 2, 3 and 4. Put your address in the "RETURN TO" space on the reverse side. Failure to do this will prevent this card from being returned to you. The return receipt fee will provide you the name of the person delivered to and the date of delivery. For additional fees the following services are available. Consult postmaster for fees and check box(es) for service(s) requested. 1. Show to whom, date and address of delivery. 2. Restricted Delivery.			
85	3. Article Addressed to:			
	NADINE OWENS 909 W. TAOS HOBBS, NM 8824	10		
	4. Type of Service:	Article Number		
	☐ Registered ☐ Insured ☐ Certified ☐ COD ☐ Express Mail	P 495 091 418		
	Always obtain signature of ac DATE DELIVERED.	ddressee <u>or</u> agent and		
0	5. Signature – Addressee			
ME	X			
ST	6. Signature – Agent +			
CRET	7. Date of Delivery			
DOMESTIC RETURN RECEIPT	8. Addressee's Address (ONL	Y if requested and fee paid)		

PS Form 3811, July 1983 447-845	Put your address in the "RETURN TO" space on the reverse side. Failure to do this will prevent this card from being returned to you. The return receipt fee will provide you the name of the person delivered to and the date of delivery. For additional fees the following services are available. Consult postmaster for fees and check box(es) for service(s) requested. 1. Show to whom, date and address of delivery.				
447-	2. Aestricted Delivery.				
45	3. Article Addressed to: CHEVRON USA INC P. O. BOX 670 HOBBS, NM 8824				
	4. Type of Service:	Article Number			
	Registered Insured	P 495 091 417			
	☐ Contified ☐ COD ☐ Express Mail	,			
	Always obtain signature of ac	`			
WOO	Always obtain signature of ac	`			
DOMESTIC	Always obtain signature of ac DATE DELIVERED. 5. Signature – Addressee	`			
DOMESTIC RETURN RECEIP	Always obtain signature of ac DATE DELIVERED. 5. Signature – Addressee X 6. Signature – Agent	`			



STATE OF NEW MEXICO

ENERGY AND MINERALS DEPARTMENT

OIL CONSERVATION DIVISION HOBBS DISTRICT OFFICE

3-2-89

GARREY CARRUTHERS
GOVERNOR

POST DELICE ROX 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 PMX	MAR - 0 1993
Gentlemen:	
I have examined the application for Shell Western Exp Inc. Operator Lease	or the: <u>Northeast Drkd ut # 913-K 23-21-3</u> & Well No. Unit S-T-R
and my recommendations are as fol	Tows:
OK	
Yours very truly, Jerry Sexton Supervisor, District 1	