STATE OF NEW MEXICO

ENERGY AND MINERALS DEPARTMENT

OIL CONSERVATION DIVISION HOBBS DISTRICT OFFICE

10-30-90

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

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GARREY CARRUTHERS

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P. O.	BOX	2088	3		
SANTA	FE,	NEW	MEXI	C0	87501

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	NSP	-
	SWD 🔀	
	WFX	
	PMX	-

Gentlemen:

I have examined the application for the:

State 27 # 1-6 27-18-35 No. Unit S-T-R for. フナゼパー

and my recommendations are as follows:

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1-11/2, Adlal 57.7

Yours very truly, Verry Sexton

Supervisor, District 1

/ed

October 24, 1990

P.O. BOX 633 MIDLAND, TEXAS 79702

MIDLAND DIVISION

Oil Conservation Division P. O. Box 2088 Santa Fe, New Mexico, 87501 (3)

> WATER DISPOSAL WELL STATE SEC. 27 LEASE - WELL NO. 1 VACUUM DEVONIAN, SOUTH FIELD LEA COUNTY, NEW MEXICO

Gentlemen:

Mobil Exploration & Producing U.S. Inc., as agent for Mobil Producing Texas & New Mexico, Inc. (MPTM), respectfully requests authority to dispose of produced water into the Devonian formation in the subject well.

Conversion of this well to a water disposal well is necessary to economically dispose of lease and off lease water. The same water as permitted for disposal in the State Sec. 27 #2 will be disposed into the #1. The purpose for converting #1 is as back-up capacity to #2. Presently #1 is still P&A'd and we wish to permit the well before Mobil spends money to re-enter it.

The supporting information for this application is organized in accordance with Form C-108.

If any further information is needed concerning this application, please call J. W. Dixon at (915) 688-2452.

Yours very truly

G. N. Miller Environmental, Regulatory, & Loss Prevention Supervisor

Mobil Exploration & Producing U.S. Inc. as agent for Mobil Producing Texas & New Mexico, Inc.

JWD/fc attachments

cc: w/attachments Offset Operators Surface Owner New Mexico State Land Office P. O. Box 1148, Santa Fe, NM 87501 District Director OCD - Hobbs POST DIFICE BOX 2010 STATE LAND DIFICE BLILDING SAMRA PL NEW MEXICO 8/201

APPLICATION FO	DR I	UTHORIZATION	TO	INJECT
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Ι.	Purpose: Second	ondary Recovery 🔲 Press alifies for administrative	approval? yes Noo	Storage
11.		Producing Texas & New M		
	Address: C/O M	lobil Exploration & Produ	cing U.S. Inc., Box 633, Midla	nd, TX 79702
	Contact party:	Judy W. Dixon	Phone: (915) 688-245	2
111.	Well data: Comple	ste the data required on t	ne reverse side of this form for mal sheets may be sttached if n	each well ecessary.
IV.	Is this an expansi If yes, give the D	ion of an existing project Division order number autho	yes Incorriging the project	<u>.</u>
۷.	TUJECTION METT MIS	identifies all wells and 1 th a one-half mile radius (e identifies the well's are	eases within two ailes of any p Fircle drawn around each propose a of review.	roposed d injection
• VI.	well's type, const	posed injection zone. Such	public record within the area o data shall include a description ation, depth, record of complet: all plugging detail.	on of each
VII.	Attach data on the	proposed operation, inclu	ding:	
	2. Whether th 3. Proposed a 4. Sources an the rece 5. If injecti at or wi the disp	ne system is open or closed overage and maximum injecti nd an appropriate analysis diving formation if other t on is for disposal purpose othin one mile of the prop	on pressure; of injection fluid and compatib; han reinjected produced water; a s into a zone not productive of sed well, attach a chemical ana; (may be measured or inferred fro	ility with and oil or gas lysis of
• • 111.	bottom of all unde total dissolved so	nome, thickness, and dept rground sources of drinkin lids concentrations of 10, well as any such source kn	jection zone including appropria h. Give the geologic name, and g water (aquifers containing wat 000 mg/l or less) overlying the own to be immediately underlying	depth to ters with proposed
IX.	Describe the propo	sed stimulation program, i	f any.	
· x.	Attach appropriate with the Division	logging and test data on they need not be resubmitt	the well. (If well logs have be ed.)	een filed
XI.	available and prod	analysis of fresh water fr ucing) within one mile of and dates samples were tak	om two or more fresh water wells any injection or disposal well s en.	s (if showing
XII.	examined available	geologic and engineering logic connection between t	ffirmative statement that they h data and find no evidence of ope he disposal zone and any undergr	en faults
XIII.	Applicants must co	mplete the "Proof of Notic	e" section on the reverse side o	of this form.
XIV.	Certification			
	to the best of my	knowledge and belief.	ted with this application is tru	
	Name: Judy I	W. Dixon	/ Title Env/Reg. Technicia	an

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.

Case #9337, Order, #R-8645 dated May 5, 1988 - State SEction 27 #2

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

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DATE <u>4-23-90</u> WELL NO. / LEASE State Section 27 FIELD Vacuum Devonian South LOCATION 660' FNL \$ 1983' FEL Unit B Sec 27, T18: Lea Constr. New Mexico SIGNED DE Elmond GL DF KB PROPOSED WELLBORE DIAGRAM - 31/2" or 41/2" N-50/K-55 Duclined they, plur fluid on annulus -13³/8" 48⁴⁶/44 H-40 cg set to 360' w/350 sks, Cont circ (17° hole) 75/8" csg cut @ 1689' Primary Toc (95/8 - 75/8) @ 1715' (temp survey) _95/8" 36 16/44 J-55 csg set to 3800 w/ 3500 sks. emt circ (12 to hole) Devonian Perts 11,650 - 11,668', Squeeced w/150 ske (m) 4 SPF 72 holes Commenent plu set @ ± 11750 _75/8 26.4, 29.7, \$ 33.7 \$ 44 N-So Buttress + X-line Csg set to 11, 800 u/ 1165 sks Tropose Devonian Disposed Zone OH 11,800-13,970

Promotion TA 1200-1

District Office State Lease - 4 copies Fee Lease - 3 copies

DISTRICT I P.O. Box 1980, Habbs, NM \$8240

DISTRICT II P.O. Drawer DD, Artenia, NM 88210

DISTRICT III 1000 Rio Brazos Rd., Aziec, NM 87410

MALINEW INSEALOU Energy, Minerals and Natural Resources Department

OIL CONSERVATION DIVISION

P.O. Box 2088 Santa Fe, New Mexico 87504-2088

WELL LOCATION AND ACREAGE DEDICATION PLAT

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STATE JC. 27 #1 SWD PERMIT APPLICATION

<u>C-108</u>

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- I. Disposal
- II. Mobil
- III. A. 1. State Sec. 27 #1, 660' FNL & 1983' FEL, Sec. 27, T185, R3
 - 2. 13 3/8" csg @ 360' cmt w/350 sks of cmt, circ to surface 9 5/8" csg @ 3800' cmt w/3500 sks of cmt, circ to surface 7 5/8" csg @ 11,800' cmt w/1165 sks of cmt, TOC by temp survey @ 1715' 7 5/8" csg cmt @ 1689'
 - 3. 3 1/2 or 4 1/2" Duolined tubing (fiberglass lining) set @ 11,750'
 - 4. 7 5/8" permanent pkr + seal assembly set @ + 11,750'
 - B. 1. Devonian, South Vacuum
 - Proposed, 11,800 13,970', open hole Devonian Formation
 - 3. Originally drilled as Devonian producer
 - 4. Devonian perfs @ 11,650-668' squeezed w/150 sks
 - 5. Bone Springs, ± 8850'
- IV. Yes, Division order # R-8645 dated 5-5-88
 - V. See attached map, Exhibit "A"
- VI. Application filed March 2, 1988 for disposal permit for State Sec. 27 #2
- VII. 1. Average rate = 10,000 BWPD Maximum rate = 20,000 BWPD
 - 2. Closed system
 - 3. Average injection pressure = 0 (operate on gravity feed) Maximum injection pressure = 2390 psi
 - See attached Exhibit "B", plus chemical analysis of source water, statement from previous Reservoir Engineer
 - 5. See attached Exhibit "C"

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- VIII. 1. Lithologic detail
 - a) Composition Devonian, white to tan, medium to course crystalline with vuggy to cavernous porosity
 - b) Type structure faulted anticline
 - c) Average porosity 13%
 - d) Average permeability 5 to 30 md
 - 2. Geologic name Devonian
 - 3. Thickness average, 500'
 - 4. Average top of pay 12,000'
 - 5. Overlying fresh water zones, 10,000 ppm or less TDS:
 a) Ogalalla @ 300'
 b) Santa Rosa @ 1400'
 - 6. There are no fresh water zones immediately underlying the injection zone.
 - IX. Acidize Devonian w/2,000 gal 15% HCL acid + 10,000 gal gelled 15% HCL acid + 6000 lbs graded rock salt. Maximum treating rate = 5 BPM, maximum treating pressure = 5000 psi. Flush treatment with 50 bbls biocide-treated fresh water.
 - X. Well will need to be deepened from present PBTD of 11,752' to proposed new TD of <u>13,970'</u>. At that time, open-hole logs will be run and filed with the OCD.
 - XI. See attached Exhibit "D"
- XII. MPTM has examined the available geologic and engineering data and finds no evidence of open faults or other hydrological connection between the Devonian Formation and any underground source of drinking water.
- XII. See attached Exhibits "E" and "F" for Proof of Notice

Also attached:

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- Proposed sketch
- Map (Exhibit A) with 1/2 mile radius drawn

Exhibit "B"

INTEROFFICE CORRESPONDENCE

DATE: Feb. 15, 1933

TO: Ann Moore

CC:

With regards to the water capatability test conducted on fluids to be injected into the State 27 well #2 SWDW, the following statement can

A composite of produced water which represents the typical injection fluid consists of Abo (46%), San Andres (48%), Glorieta (2%), Pennsylvania (3%), and Blinebry (1%). This water was combined with Devonian produced water in varying amounts. In summary, the Devonian water alone, and mixtures of Devonian from 0 to 50% with the proposed injection fluid formed carbonate scale. Calcium sulfate becomes evident in the high percent composite range of 80 - 100%. Thus a scale prevention program is needed and chemical treatment of the well will be done as required to control both types of scale.

Ann, attached is a copy of the analysis performed by NL Treating Chemic If you have any questions, please give me a call at ext. 2076.

Thanks

Jack Hamner RM - 240Project Reservoir Engineer



NL Treating Chemicals/NL Incustries, Inc. P.O. Eox 6020, Houston, Texas 77205 Tel. (713) \$87-5400 Telex: 4620243 NLOS UI

Water Analysis I

Mobil Producing	C Texas & New Mexic				SHEET NUMBE
	TERES & NEW MEXIC	:0			DATE
Vacuum			COUNTY CR FARISH		
EASE OR UNIT North	A CHUM ALO SAMPLESCU	10.00	Lea		STATE
	totet Unit #235	/hit			No
EPTH. FT. BHT.	F SAMPLE SOURCE			WATER SOURC	CE (FORMATION)
DATE SAMPLED		TEMPF	WATER BELIDAY 10	Abo IL ESLOAY	
	TYPE OF WATER: D	64	1 1		GAS. MMCF/DA
12-16-87	TYPE OF PRODUCTION	DUDUCED C SUPPLY	D WATERFLOGO D SAL	TWATER	
		U HAIE	RELOCD G CONFLOOD	G POLYUSE SI A	
		WATER ANALYS	D WATERFLOCO D SAL	C FOLTMENTLOC	D C STEAMFLOOD
Na + 20	(NUMEEF	EESIDE ION SYMEDL I	SIS PATTERN NDICATES meri SCALE UN		
Na + 20		5	INDICATES MERISCALE UN	(דו)	
		0	5	10	15
Ca ⁺ + <u> </u>					15 20
		<u> </u>			
				1 1 1 1 1 1	
Mg ⁺ +	<u> , , , , , , , , , , , , , , , , , ,</u>				
			1 1 1 1 1 1 1 1		
Fe ⁺⁺⁺			1 1 1 1 1 1 1		
					11114
			1111111		
SSOLVED SOLIDS					
TIONS			DISSOLVED GAS	ES	
al Hardness	me/i				
cium, Ca + +	128	тçЛ	Hydrogen Sulfide, H	loS	
gnesium, Mg + +	50	1.000	Carbon Dioxide, CO	2	mg/
(Total) Fe + +	78	952	- Oxycen 02	•	mg/i
um, Ba + +			-		mg/i
			- PHYSICAL PROPER	TIES	
um, Na + (Calc.)	75.1	1,727	_ pH (Field)		7.2
DNS		,/2/	En (Redox Potential)		1.2
			- Specific Gravity		MV
ide, CI	169.0	6,000	Turbidity, FTU Units		
e. 504 =		0,000	- Total Dissolved Solids	Cala	11.0()
nate, CO3 =		1,475	- Stability Index C		11,361 mg/
bonate, HCO3	3.4				-0.01
лу. ОН [—]		207			+0.30
e. S =				2 <u>0</u> •F	+0.45
			CaSO4 Solubility	•F	mg/t
			Max Caso D	*F	mg/l
			Max. CaSO4 Possible (Calc.)	mç/i
			Max. BaSO4 Possible (Calc.)	mg/i
			Residual Hydrones	-	
ENDED SOLIDS (CUALITA	NTIVE) cium Carbonate 🗆 — Calcium S TIONS:		Residual Hydrocarbons	-	

C ENGINEER				
Dickerson/Sivker	DIST. NO.	ADDRESS		
SLYIED BY	821	8	OFFICE PROME	HOMEPHONE
	DATE	I Digenia -		PROME PROME

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NL Treating Chemicals:NL Industries, Inc. P.O. Box 60020. Housion. Texas 77205 Tel. (713) 967-5400 Telex: 4620243 NLOS UI

Water Analysis F

COMPANY					SHEET NUMBER
FIELD FIELD	Texas & New Mexico				11
Vacuum					DATE
LEASE OR UNIT	· · · · · · · · · · · · · · · · · · ·		COUNTY OR PARISH		
	SAMPLE SOURCE		Lea		STATE
	lases 2102	•		WATER COLUMN	New Mexico
JEPIN.FT. OHT. F	SAMPLE SOURCE			WATER SOURCE (FC	RMATION)
DATE SAMPLED		TEMP. *F	WATER BELIDAY SILE	San Andres	
	TYPE OF WATER: CI PRO	1 70	1		GAS. MUCF/DAY
12-16-87	TYPE OF PRODUCTION: C	FEIMARY CHUR	C WATERFLOOD C SALTW	ATER OKRON	
				PCLYMEESION	
		WATER ANALYS	SIS PATTERN		STELLELOOD
Na + 20 1	(NUMEER BE	SIDE ION SYMEOL I	SIS PATTERN NDICATES men SCALE UNIT)		
	3 10	5 o	- SCALE UNIT)		
± 4			5 1	0 15	
Ca ⁺ + <u></u>				1 1 1 1 1	20 a -
			<u> </u>		
Mg ⁺ +					HCO
					1 1 1 1
Fe ⁺ ++					
DISSOLVED SOLIDS			, , , , , , , , , , , , , , , , , , , ,		<u></u> co,=
CATIONS			DISSOLVED GASES		j
Total Hardness	282	mg/l			
Salcium, Ca + +			Hydrogen Sulfide, H2S		
Aagnesium, Mg + +	156	3,120	- Carbon Dioxide, CO2		mg/l
°cn (Total) Fe + + +	126	1.537	- Oxycen, O2		mg/l
erium, Ba + +					mg/i
odium, Na + (Calc.)	071		- PHYSICAL PROPERTIES	6	
·	974.7	22.418	- pH (Field)	_ 6	. 63
NIONS			- Eh (Recox Potential)		MV
hloride, Cl T	1 195 -		- Specific Gravity		
vilate, SO4 =		42,000	Turbidity, FTU Units		
arbonate, CO'_ =	57.3	2,750	- Total Dissolved Solids (Ca	lic.) 72 (34 mg/
arbonate, HCO3	12.0		- Stability Index C 80	.*F +0.2	1
droxyl, OH	12.2	744	e <u>100</u>	•F +0.3	5
	4.1		- <u>e120</u>	•E -0 E	
		65	CaSO4 Solubility		mg/i
			Max Caso D	•F	mg/l
			Max. CaSO4 Possible (Calc	:.)	mg/l
			Max. BaSO4 Possible (Calc	.)	mg/i
PRENDED SOLIDS (OUL)			Residual Hydrocarbons		

COPENDED SOLIDS (QUALITATIVE)

Sulfide I Iron Oxide C Calcium Carbonate C Calcium Sulfate Acid Insoluble

CENGINEER

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ICFFICE PHONE

----- ppm(VolVol)



NL Treating Chemicals/NL Incustries, Inc. P.O. Box 60020, Houston, Texas 77205 Tel. (713) 987-5400 Telex: 4620243 NLOS UI

Water Analysis Re

- PETT (VolVol)

CCMPANY MODEL 1	_				SHEET NUMBER
FIELD	Texas & New Mexico				3
Vacuum					DATE
LEASE OR UNIT			COUNTY CE PARISH		
	SAMPLE SOURCE		Lea		STATE
Bridges-State (DEPTH. FT. BHT	Leases #114			WATER SOURCE	New Mexico
DEPTH. FT. BHT.	"F SAMPLE SOURCE	TEMP, *F		Gleriata	(PORMATION)
DATE SAMPLED			WATER ESUDAY	DIL ESUDAY	IGAR MAN
12-16-87	TYPE OF WATER: C PRO				GAS, MACFIDAY
12-10-07	TYPE OF PRODUCTION: C	PRIMARY C WATER	D WATERFLOOD D S	LT WATER DISPOSAL	
				C POLYMER FLOOD	G STEAMFLOOD
	(MILLESS OF	WATER ANALYSI	SPATTEEN		C STEMPLOOD
Na + 20	15 10	SIDE ION SYMBOL IN	IS PATTERN IDICATES men SCALE U	NIT	
		5 0		and the second se	•
		1 1 1 1 1 1	5		15 20 -
Ca++				1 1 1 1 1	<u> </u>
			1 1 1 1 1 1 1		
Mg++			1 1 1 1 1 1 1	+ + + + + + + + + + + + + + + + + + +	HCO,
Mg ' '					
	1				
Fe ⁺ ++				1 1 1 1 1	so,=.
DISSOLVED SOLIDS					<u> </u>
LATIONS			DISSOLVED GA	SES	
otal Hardness	me/j	mg/l	hi a		
alcium, Ca + +	276		Hydrogen Sutlide.	H ₂ S	mg/i
lagnesium, Mg + +	188	3.760	- Carbon Dioxide, C	ς ζ	mg/l
on (Total) Fe + + +	88	107	- Oxygen O2		mg/l
arium, Ba + +					
ocium, Na + (Calc.)	2 (20		- PHYSICAL PROPE	ities	
	3.698.9	85 075	- pH (Field)		6.45
10NS			- Eh (Redox Potential)	MV
loride, CI	• • • •		- Specific Gravity		
ifate, SO4 =	3.915.5	130,000	Turbidity, FTU Units		
rbonate, CO3 =	47.4	2,275	Total Dissolved Solik	:s (Calc.) 2	31 712 004
arbonate, HCO3			. Stability Index 6.	<u>_80</u> •F	+0.77
proxyl, OI	7.5	458		<u>100</u> •F	+0.96
lide, S≈			C	120•F	+1,21
· · · · ·	4.5	72	CaSO4 Solubility	*F	mg/t
			С	• 5 -	mg/l
			Max. CaSO4 Possible	(Calc.)	mg/1
			Max. BaSO4 Possible	(Calc)	mg/l
PENDER COURSE			Residual Hydrocarboi	าร	

USPENDED SOLIDS (OUALITATIVE)

on Suitice De Iron Oxide De Calcium Carbonate De Calcium Sulfate De Acid Insoluble D EMARKS AND RECOMMENDATIONS:

IC ENGINEER	10.00			
Dickerson/Slvker	DIST. NO.	ADDRESS		
AVID BY	821 .		OFFICE PHONE	HOMEPHONE
	I CATE	1010-2-21-2-04		I NOME PHONE



NL Treating Chemicals/NL Industries, Inc. P.O. Box 60020, Houston, Texas 77205 Tel. (713) 957-5400 Telex: 4620243 NLOS UI

Water Analysis Re

CMPANY Mobil Dend					SHEET NUMBER
HODII Producing	Texas & New Mexico				15
Vacuum					DATE
			COUNTY OR PARISH		
EASE OR UNIT	SAMPLE SOURC		Lea		STATE
Bridges-State Lei	ases #120	ξ			New Mexico
EPTH. FT. EHT. "F	SAMPLE SOURCE			WATER SOURC	C (PURMATION)
ATE SAMPLED		TEMP, *F	WATER SELDAY	Unner S	Penn
	TYPE OF WATER: D PRO	72	1 1	AL BELDAY	GAS, MMCERDAY
12-16-87	TYPE OF PRONIETION	OUCED C SUPPLY	C WATERELOOD D. D.		
	TYPE OF PRODUCTION: C	PRIMARY C WATE	C WATERFLOOD C SA	LT VIATER DISPOSAL	
		WATER ANALYS		E POLYMER FLOO	D C STEAMFLOOD
	(NUMBER 5	WATER ANALYS	IS PATTERN NDICATES men SCALE UI		
Na + 20 1	5 10		NDICATES men SCALE UI	הוא	
1	1 1 1 1 1 1 1 1 1		5		
Ca ⁺ +,		1	1 1 1 1 1 1 1	10	15 20
		1			1 1 1 1 1 0
Mg ⁺ +			1 1 1 1 1 1 1		HCO
		1 1 1 1 1 1		<u></u>	
Fe+++				1 1 1 1 1 1	
	11111111		1111		
SOLVED SOLIDS					
			Discourse		l ∞ ₃ =
ions			DISSOLVED GAS	SES	
Il Hardness	246	mç/i	hiterite a second		
ium, Ca + +			Hydrogen Sulfide, H	125	
nesium, Mg + +	132	2,640	- Carbon Dioxide, CC	2	mg/t
(Total) Fe + + +	114	1.391	- Oxycan C2		mg/
m, Ba + +			-		mg/l
um, Na + (Calc.)			- PHYSICAL PROPER	TIES	
	2,197	50.531	– PH (Field)		6.16
NS			- Eh (Redox Potential)		
ts de, Cl ⁻			 Specific Gravity 		MV
e, SO ₄ =	2.366.2	84 000	Turbidity, FTU Units		
-	46.4	84.000	- Total Dissolved Solic		
nale. CO3 =		.1 3,225	Stability Index	A -	141,813mg/
onate, HCO3	12		•-		+0 12
M. OH		732			+0_03
,	16.4			120°F	<u>+0_22</u>
		204	CaSO4 Solubility C_	*F	mg/!
			Mar Caso a	*F	mg/I
			Max. CaSO4 Possible (Calc.) _	mg/i
			Max. BaSC4 Possible (Caic.)	mç1
NDED SOLIDS (OUALITAT			Residual Hydrocarbons	5	ppm(Vol/Vol)

SPENDED SOLIDS (QUALITATIVE)

Suilide D Iron Oxide D Calcium Carbonate D Calcium Sulfate D Acid Inscluble D

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ENGINEER		
ickerson/Slyker	DIST. NO. ADDRESS	
-YZED BY	821 .	CEFICE PHONE
	DATE DISTRIEUTION CONTRACT	HOME PHONE
	12/17/87 CISTONER	E REGION



NL Treating Chemicals/NL industries, inc. P.O. Box 60020, Houston, Texas 77205 Tel. (713) 987-5400 Telex: 4620243 NLOS UI

Water Analysis I

Mobil Producing Texa						SHEET NUME
FIELD	is & New Mexico				,	DATE
Vacuum			COUNTY OR PARISH			
LEASE OR UNIT	SAMPLE SOURC	6	Lea		1	STATE
Bridges-State Leases	#165	<u>د</u>		INATEN		New Mex
SETH PT. BHT PF	SAMPLE SOURCE			MAIER 3		TICNI
ATE SAMPLED	1	TEMP, *F	WATER. BEL/DAY		le Penn	
12-16-87	TYPE OF WATER: C PRO	DUCED C O	1	1	la	S. MMCF/C
10-07	TYPE OF WATER: C PRO TYPE OF PRODUCTION: C	PRIMARY C HUNT	U WATERFLOOD C	SALT WATER DISE		
• –	TYPE OF PRODUCTION: C			O C POLYMER	I ELCOD C =	· ,
		WATER ANALYS	IS PATTERN		L ST	EAMFLOOD
Na + 20 15		ESIDE ION SYMBOL II	IS PATTERN NDICATES MEA SCALE			
	10	5 0		UNII)		
Ca+-				10	15	20
				' • • · -		20
	111111		<u></u>			
Mg ⁺ + [,] , .	-		11111	1111		1.1.1
						1 27
				<u> </u>		
_Fe ⁺⁺⁺				1 1 1 1		┿┿┥╝
			!			· ·
SSOLVED SOLIDS				1111		
TIONS			DISSOLVED G	ASES		
al Hardness	172 me/	mg/i				
cium, Ca + +	100		Hydrogen Sulfide	H ₂ S	_	
nesium, Mg + +		2.000	- Carbon Dioxide, (20 ₂		mg/t
(Tota) Fe + + +	72	878	- Oxygen Og			mg/t
um, Ba + +						mg/l
um, Na + (Calc.)			- PHYSICAL PROPI	ERTIES		
			_ рн (Lab)			
			- Eh (Redox Potentia	•0	77	-
			- Specific Gravity			_ MV
ride, CI	647.9	22.000	Turbidity, FTU Unit	-		-
le. 504 =	33.9	23.000	- Total Dissolved So			-
mate. CO3 =		1,625				_ mg/t
bonate, HCO3				•F		-
Dayl, OH				•F		-
e, S =			Casa	•F		_
			CaSO4 Solubility	*F		. mg/l
			C.	•F		. mg/l
			Max. CaSO4 Possib	e (Calc.)		
			Max. BaSO4 Possibl	e (Calc.)		mg/l
		and the second se	Residual Lt	,		/ng/t
ENDED SOLIDS (OUALITATIVE)			Residual Hydrocarbo	DOS		ppm(Vo:/Vi

Note: Small sample of water obtained.

CENGINEER				
ickerson/Slyker	DIST. NO.	ADDRESS		
ALYZED BY	821		CFFICE PHONE	HOMEPHONE
• =	DATE	10.57515 TOL	_	-



NL Treating Chemicals/NL Incustries, Inc. P.O. Eox 60020. Houston, Texas 77205 Tel. (713) 987-5400 Telex: 4620243 NLCS UI

Water Analysis

Mobil Procueir	ng Texas & New Mexico				SHEE 4	TNUME
FIELD)			DATE	
LEASE OR LINIT			COUNTY OR PARIS	ч		
Bridges-State	SAMPLE SOUT	NCE	Lea		STAT	-
JEPTH. FT. I AM	Leeses 27			IWATER	New	Hexi
en en	T. *F SAMPLE SOURCE	TEMP. "F		PT :	SOURCE (FORMATION)	
DATE SAMPLED			WATER. BOLCAY	OIL SELVOAY	hebry	
12-16-87	TYPE OF WATER: C PI				GAS. M	MCF/DA
	TYPE OF PRODUCTION:	CDUCED C SUPPLY C PRIMARY C WATER WATER ANALYS	C WATERFLOOD D	SALT WATER OK	20004	
				CO C POLYME	A FLOOD	
	(NUMEER	WATER ANALYS	SIS PATTERN		AFLOOD D STEAMF	1000
Na + 20	15 10	EESIDE ION SYMEOL IN	NDICATES MER SCALE			
		5 0		UNIT)		
Ca++ , , , ,		1 1 1 1 1 1 1		10	15	20
						<u></u> 20 a
			<u> </u>			
Mg ⁺ +			1 1 1 1 1 1			нс
4 4 4 4						-
E. + + +		1 1 1 1 1 1 1		<u>, , , ,</u>		.
	<u> </u>			1 1 1 1 1	1 1 1 1 1 1	- so
		11111	<u> </u>	1	•	
DISSOLVED SOLIDS					111111	_1003
ATIONS			DISSOLVED		<u> </u>	
	men			ASES		
otal Hardness	734	mç/l	Hydrogen Sulfid			
alcium; Ca + +	546		- Carbon Dioxide.	e. h ₂ s	fi	ng/i
esium, Mg + + =+ + +	188	10,920	- Oxycan, C2	602		
-e + +		2.204	-			ng/l
			- PHYSICAL PROP			•
iva T (Calc.)	2.665.7		- PH (Field)	ERIES	-	
IONS		61,311	- Eh (Redox Potenti	·•1	7.05	
loride, CI [—]			- Specific Gravity	-41)	M'	V
late, SO4 =	-3.352.1	110 000	Turbidity, FTU Uni	it e		
Donale, CO3 =	41.7	119 000	Total Dissolved Sc	lide (Cal- 1		
arbonate, HCO3		2,000	Stability Index	B80 °F	105 885 mg	ก่
roxyl, OH	5.9	2/1		100°F	<u>+1 55</u>	
ide, S =				<u>120</u> •F	<u>+1 74</u>	
_			CaSO ₄ Sclubility		<u>+1 07</u>	
			e	• •=	mg/	1
			Max. CaSO Possib		mg/	
			Max. Basor Possib	le (Cala)	mç/	
PENDED SOLIDS (QUALIT			Residual Hydrocarb		mg/l	
	IATIVE)				ppm((VolVol)

-- Sulfide D Iron Oxide D Calcium Carbonate D Calcium Sulfate D Acid Inscluble D EMARKS AND RECOMMENDATIONS.

TO ENGINEER			•	
Dickerson/Slyher	DIST NO A	DRESS		
ALYZED BY	<u> </u>		CEFICE PHONE	HOME PHONE
	DATE DIS	STRIBUTION C CUTTO		HUMEPHONE
	• • • • • • • •	CUSTONES		

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Exhibit "C"



January 20, 1988

Mr. David Howell Mobil Producing Texas & New Mexico P. O. Box 1800 Hobbs, New Mexico 88240

Subject: Vacuum Area Waters - Compatibility Study with

Dear Mr. Howell:

Appended are individual produced water analyses pertaining to those Mr. Dickerson and I took with you on December 16, 1987. Also included is the Union's Devonian water

A mixture of your produced water was made as follows:

Abo	46%
San Andres	48%
Glorieta	2%
Pennsylvania	3%
Blinebry	15

That mixture was blended with Devonian water in 10% increments. Samples were placed in an oven for 5 days at

The "Compatibility" appendage describes how reacted. Brief general summary comments are these: samples

- No major initial incompatibility was seen at the 1. time of mixing.
- Moderate calcium carbonate deposition was found in 2. the Devonian by itself (100%).
- 3. Mixtures were stable and stayed clear in the 90%-60% Devonian range.
- Calcium carbonate deposition was seen in all samples 4. from 50% Devonian to 0% (or 100% composite produced
- Calcium sulfate deposition was observed in the 5. 80%-100% composite produced water ratios.

Mobil Producing Texas & New Mexico Page Two

In summary, the Devonian alone, and mixtures of Devonian from 50% to 0% formed carbonate scale. Calcium sulfate becomes a known in the high percent composite mixture range. In other words, scale prevention treatment is advisable throughout most of the mixing range. One treatment can handle

We would be pleased to discuss this report with you at a mutually agreeable time.

Very truly yours,

Wayne Dictuson John U. St Wayne Dickerson John V. Slyker Sales Engineer Sales Representative

/cg

cc: W. Reeves D. Seale

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NL Treating Chemicals/NL Industries, Inc. P. O. Box 4305 Houston, Texas 77210

REPORT OF TE

Mobil Pro				
-0011 Pro				
FIELD OR PLANT	ducina Texas & New	Mexico		
				CATE
Vacuum Are	ee Leeses		COUNTY OR PARISH	12-16-87
		WELLIS MAKE & NO.	Lea	STATE
TYPE SAMPLE			SAMPLE SOURCE	New Mexico
			See Below	
REASON FOR TEST			TYPE TEST	
Possible	Salt Water Disposa		<u>Compatibility</u> of	Devonian with Mix
RESULTS:	Ster Disposa	1		Series with MIX
Compatil	h : 1 ·			
comperit	bility Mixture %	Observest	· •	
Devonian	Composite	Observations (Initial	(100 [°] F)	
	Produced Waters	Appearance		. · · ·
100	0	Clear	5 days	
90 80	10	Clear	Hoderate and	
70	20	Clear	No deposition	ium carbo nate Deposi
60	30	Clear	No deposition	
50	40	Slightly hazy	No deposition	
40	50 60	Slightly hazy	NO deposition	
	60	Slightly hazy; sligh	noderate calci	um carbonate deposit
30	70	J'UY LAST		carbonate deposition carbonate
	/0	Slightly hazy, sligh		
20	80			carbonate depositio
		Slightly hazy, slight		
		gray cast		m sulfate & slight
10	90			
		Slightly hazy; slight		
0		gray cast	Start Calcium e	
0	100	Slichtly		
		Slightly hazy, slight gray cast		
		J.97 CASI		
			moderate amount	of including of including
			compounds formed	or insoluble iron

REMARKS & RECOMMENDATIONS:

LES ENGINEER	CIST NO	I ACCACT.
	• • •	
Blinebry	1	
Pennsylvania	3	
	2	
Cloricta	48	
San Andres	46	
Аро		•
Source	Mixture 3	
Composite Produc	ced Water Ratios	

Exhibit "D"



P.O.BOX 2187 HOBBS, N.M. 88240

WATER ANALYSIS REPORT

Report for: Date sampled: 5-8-90 cc: DONNA ELWOOD-JR. GARCIA Date reported: 5-9-90 CC: Lease or well # : SNYDER WINDMILL CC: County: State: Company: MOBIL Formation: Address: Depth: Service Engineer: OWEN ROBERTS Submitted by: OWEN ROBERTS CHEMICAL COMPOSITION : mg/L mea/L Chloride (Cl) 50 1 Iron (Fe) (total) 3.0 Total hardness 230 Calcium (Ca) 48 2 Magnesium (Mg) 26 2 Bicarbonates (HCO3) 146 2 Carbonates (003) n/a Sulfates (SO4) 39 1 Hydrogen sulfide (H2S) 15 Carbon dioxide (002) 39 Sodium (Na) 2 0 Total dissolved solids 312 Barium (Ba) n/a Strontium (Sr) n/a Specific Gravity 1.000 Density (#/gal.) 8.334 pH 6.350 IONIC STRENGTH 0.01 Stiff-Davis (CaCO3) Stability Index : SI = pH - pCa - pAlk - KSI @ 86 F = -0.74104 F = -0.53122 F = -0.30140 F = -0.06158 F = +0.19This water is 2389 mg/l (%-100.00%) under ITS CALCULATED CaSO4 saturation value at 82 F. SATURATION= 2389 mg/L PRESENT= 0 mg/L . REPORTED BY RANDOLPH SCOTT

CHEMIST



PBTA: 1,752

DATE 4-23-90 WELL NO. / LEASE State Section 27 FIELD Vacuum Devenian South LOCATION 660' FNL \$ 1983 FEL Unit B Sec 27, TISS, Lea County New Mexico SIGNED A G Elwood GL 3881 DF KВ 9'AGL) ZERO PROPOSED WELLBORE DIAGRAM - 31/2" or 41/2" N-SU/K-55 Duclined they, plan fluid on annulus -13³/8" 48⁴⁶/ff H-40 cy set to 360' w/350 sks, cmt circ (17° hole) 75/8" csg cut @ 1689' Primary Toc (95/8 - 75/8) @ 1715' (temp survey) _95/8" 36 16/4 J-55 cy set to 3800' w/ 3500 sks cmt circ (12 to hole) Devonian Perts 11,650 - 11,668', Squeezed w/150 sta cmit 4 SPF 72 holes icomanent plu set @± 11,750 .75/8° 26.4, 29.7, \$ 33.7 ^{16/}ff N-80 Buttress + X-line Csg set to 11,800' ω/1165 sks Proposed Devonian Disposed Zone OH 11,500 - 13,970'

Property TA 12970'

State of New Mexico



W.A. HUMPHRIES



Commissioner of Public Lands March 10, 1988

P.O. BOX 1148 SANTA FE, NEW MEXICO 87504-1148

Mobil Exploration & Producing U.S., Inc. P. O. Box 633 Midland, Texas 79702

> Re: Water Disposal Well State Section 27 Lease Well No. 2 Vacuum Devonian, South Field Lea County, New Mexico

Attn: Mr. C. A. Moore

Gentlemen:

In connection with the above application submitted to the Oil Conservation Division by Mobil's letter dated March 2, 1988, the Land Commissioner has no objections at this time as to the above application, but reserves the right to refuse to grant an easement if it would be detrimental to the Trust Lands.

Because an oil and gas lessee is entitled to dispose of the Salt Water produced exclusively from wells located on the leased premises, no salt water disposal easement will be needed; however, if any of the salt water to be injected is produced from wells outside of the leased lands, you must apply for a Salt Vater Disposal Easement.

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Th till ~ Perry Parte سرجا راجله التاجم ATOUT L. Furar A. MA. Z. MAKI

WRH:FOP:cw

Very truly yours,

W. R. Humphries Commissioner of Public Lands

d le V

By: Floyd O. Frando, Director Oil and Gas Division A/C 505-827-5744

RECEIVED

MAR 1 4 1988

cc: Oil Conservation Division

ENV. & REG.

Mobil

MOBIL PRODUCING TEXAS & NEW MEXICO, INC. STATE SEC. 27, WELL #1 SOUTH VACUUM (DEVONIAN) FIELD LEA COUNTY, TEXAS

EXHIBIT "F"

OFFSET OPERATORS

Arco Oil & Gas Co. P. O. Box 1610 Midland, Tx 79702

Hanley Petroleum 445 W. Wall - Suite 1500 Midland, Tx. 79701

UNOCAL Corporation P. O. Box 671 Midland, Texas 79702 Exxon Company, USA P. O. Box 1600 Midland, Texas 79702

Hondo Oil & Gas P. O. Box 2208 Roswell, NM 88202

Yates Energy P. O. Box 2323 Roswell, NM 88202

SURFACE OWNER

Snyder Ranches, Inc. P. O. Box 2158 Lovington, New Mexico 88260

. •

October 24, 1990

P.O. BOX 633 MIDLAND, TEXAS 79702

MIDLAND DIVISION

CERTIFIED MAIL RETURN RECEIPT REQUESTED

Arco Oil & Gas Co. P. O. Box 1610 Midland, Tx 79702

> NOTICE OF APPLICATION FOR WATER DISPOSAL WELL STATE SEC. 27 LEASE, WELL NO. 1 VACUUM DEVONIAN, SOUTH FIELD LEA COUNTY, NEW MEXICO

Gentlemen:

Mobil Exploration & Producing U.S. Inc., as agent for Mobil Producing Texas & New Mexico, Inc., (MPTM), has made application to the Oil Conservation Division of New Mexico for authority to dispose of produced water into a reservoir not productive of oil or gas in the above captioned well.

A copy of this application is furnished to you for your information.

Yours very truly,

G. N. Miller Environmental, Regulatory & Loss Prevention Supervisor

Mobil Exploration & Producing U.S. Inc. as agent for Mobil Producing Texas & New Mexico, Inc.

JWD:fc attachments

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October 24, 1990

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JWD:fc attachments

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xc: Oil Conservation Division

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October 24, 1990

P.O. BOX 633 MIDLAND, TEXAS 79702

MIDLAND DIVISION

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Exxon Company, USA P. O. Box 1600 Midland, Texas 79702

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JWD:fc attachments

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JWD:fc attachments

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October 24, 1990

P.O. BOX 633 MIDLAND, TEXAS 79702

MIDLAND DIVISION

CERTIFIED MAIL RETURN RECEIPT REQUESTED

Snyder Ranches, Inc. P. O. Box 2158 Lovington, New Mexico 88260

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JWD:fc attachments

October 24, 1990

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G. N. Miller Environmental, Regulatory & Loss Prevention Supervisor

Mobil Exploration & Producing U.S. Inc. as agent for Mobil Producing Texas & New Mexico, Inc.

JWD:fc attachments

Affidavit of Publication

STATE OF NEW MEXICO

COUNTY OF LEA

)) **s**s.)

JOYCE CLEMENS being first duly sworn on oath deposes and says that he is Adv. Director of THE LOVINGTON DAILY LEADER, a daily newspaper of general paid circulation published in the English language at Lovington, Lea County, New Mexico; that said newspaper has been so published in such county continuously and uninterruptedly for a period in excess of Twenty-six (26) consecutive weeks next prior to the first publication of the notice hereto attached as hereinafter shown; and that said newspaper is in all things duly qualified to publish legal notices within the meaning of Chapter 167 of the 1937 Session Laws of the State of New Mexico.

That the notice which is hereto attached, entitled Application For Authorization To

Inject
and numbered in the
Court of Lea
County, New Mexico, was published in a regular and
entire issue of THE LOVINGTON DAILY LEADER and
not in any supplement thereof, once each week on the
same day of the week, for <u>One (1)</u>
consecutive weeks, beginning with the issue of
October 18
and ending with the issue of
October 18

And that the cost of publishing said notice is the sum of \$.57

which sum has been (Paid) CALENSED) as Court Costs へしへつ day of October **/**____, <u>19.90</u>___ lurer an

Notary Public, Les County, New Mexico

My Commission Expires Sept. 28 94 .., 19.....

LEGAL NOTICE APPLICATION FOR AUTHORIZATION TO INJECT 1. Mobil Producing TX&NM Inc., D. Box 633, Midland, Texas 70702, Attention: G. N. Miller, (915)688-1753, will apply for permission to inject produced water into the following well/wells for the purpose of Disposal. 2. Well Name and Number: State Sec.

27 No. 1 Location: 660 FNL & 1983 FEL Sec. 27

Section: 27, T 18-S, R 35-E County: Lea 3. Formation Name: Devonian Injection Interval: 11,800-13,970

Maximun Injection Rate: 20,000 BWPD

Maxium Pressure: 2390 PSI

4. Interested parties who can show that they are adversely affected by this application, must file objections or requests for hearing with the Energy and Minerals Department, Oil Conservation Division, P.O. Box 2088, Santa Fe, New Mexico 87501 within 15 days after this publication.

Published in the Lovington Daily Leader October 18, 1990.