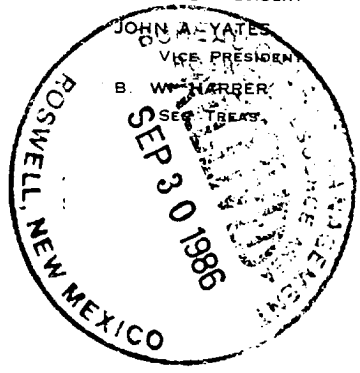
N. M. OIL CONS. COMMISSION
P. O. BOX 1980
HOBBS, NEW MEXICO 88240

YATES PETROLEUM CORPORATION
207 SOUTH FOURTH STREET
ARTESIA, NEW MEXICO 88210
TELEPHONE (505) 748-1331



September 26, 1986

United States Department of the Interior
Bureau of Land Management
P.O. Box 1857
Roswell, New Mexico 88201

Subject: Sun "UW" Federal #3, #NM-31211
Sec. 10-T8S-R33E, Chavez County

Dear Sirs:

The subject federal lease produces water. Therefore, we are requesting your approval of our disposal method pursuant to NTL-2B.

The well has produced 43,950 barrels of water in 1986, about 181 barrels of water per day. The well produced 61,133 barrels of water in 1985.

The tank battery has an open top fiberglass tank (16' diameter, 210 barrel capacity) used for storage and accumulation until a full load is available to be transported by pipeline to our disposal well; Sun "UW" #2, an approved disposal well, order #R-8271, located 1650' FNL and 330' FEL of Section 10-T8S-R33E.

Table I shows data pertaining to the disposal well

Table II is an analysis of water from the subject well.

YATES PETROLEUM CORPORATION

Johnny M. Morgan
Production Manager

SUBJECT TO LIKE APPROVAL BY STATE

APPROVED
PETER W. CHESTER
SEP 30 1986
BUREAU OF LAND MANAGEMENT
ROSWELL RESOURCE AREA

JMM/pt
ENC.

TABLE I

OPERATOR:	YATES PETROLEUM CORPORATION
ADDRESS:	207 SOUTH 4TH STREET ARTESIA, NEW MEXICO 88210
LEASE NAME:	SUN UW FEDERAL
WELL NUMBER:	2
FIELD:	CHAVEROO SAN ANDRES
COUNTY, STATE:	CHAVES, NEW MEXICO
LOCATION:	1650 FNL & 330 FEL, SEC 10-T08S-R33E
INJECTION INTERVAL:	4219'-4308'
TOTAL DEPTH:	4350'
PACKER:	GUIBERSON UNI VI @ 4026'
ANNULUS FLUID:	INHIBITED FRESH WATER

CASING AND TUBING DATA

NAME OF STRING	SIZE	DEPTH	SX CEMENT	CEMENT TOP
SURFACE	10 3/4"	385'	300	CIRC.
LONG STRING	4 1/2"	4397'	225	CIRC.
TUBING	2 3/8"	4026'	NONE	NONE

TRETOLITE DIVISION
369 Marshall Avenue / Saint Louis, Missouri 63119
(314) WO 1-3500/TWX 910 760-1660/Telex 44-2417

WATER ANALYSIS REPORT

COMPANY Yates Petroleum ADDRESS _____ DATE: 8-23-85

SOURCE Sun U W Federal # 3 DATE SAMPLED 8-22-85 ANALYSIS NO. _____

Analysis	Mg/L	*Meq/L	
1. pH	5.2		
2. H_2S (Qualitative)	40 ppm		
3. Specific Gravity	1.180		
4. Dissolved Solids	233,638		
5. Suspended Solids			
6. Phenolphthalein Alkalinity ($CaCO_3$)			
7. Methyl Orange Alkalinity ($CaCO_3$)	200		
8. Bicarbonate (HCO_3)	HCO_3 244	÷61 4	HCO_3
9. Chlorides (Cl)	Cl 146258	÷35.5 4120	Cl
10. Sulfates (SO_4)	SO_4 375	÷48 8	SO_4
11. Calcium (Ca)	Ca 22800	÷20 1140	Ca
12. Magnesium (Mg)	Mg 5346	÷12.2 438	Mg
13. Total Hardness ($CaCO_3$)	79000		
14. Total Iron (Fe)			
15. Barium (Qualitative)			
16. Strontium			

*Milli equivalents per liter

PROBABLE MINERAL COMPOSITION

1140	Ca ←	→ HCO_3
438	Mg →	→ SO_4
2554	Na →	→ Cl

4		
8		
4120		

Saturation Values Distilled Water 20°C

$CaCO_3$	13 Mg/L
$CaSO_4 \cdot 2H_2O$	2,090 Mg/L
$MgCO_3$	103 Mg/L

Compound	Equiv. Wt.	X Meq/L =	Mg/L
$Ca(HCO_3)_2$	81.04	4	324
$CaSO_4$	68.07	8	545
$CaCl_2$	55.50	1128	62,604
$Mg(HCO_3)_2$	73.17	0	0
$MgSO_4$	60.19	0	0
$MgCl_2$	47.62	438	20,858
$NaHCO_3$	84.00	0	0
Na_2SO_4	71.03	0	0
NaCl	58.46	2554	149,307

REMARKS _____

Respectfully submitted
TRETOLITE COMPANY

STABILITY INDEX CALCULATIONS
(Stiff-Davis Method)
$CaCO_3$ Scaling Tendency

SAMPLE

Sample Test No. _____

Company Yates Sample Date 8-22-85

Address _____ Submitted by _____

Sample Sun U W Federal # 3 Field _____

S. I. = pH - pCa - pAlk - K

where S. I. = stability index
pH = pH as measured on fresh sample
pCa = negative logarithm of calcium concentration
pAlk = negative logarithm of total alkalinity
K = constant, depends upon temperature and salt content

pH = 5.2 pCa = .6 pAlk = 2.4

CALCULATION OF IONIC STRENGTH AND K VALUE

Na	(.58742) X (2.2×10^{-5}) =	1.2923
Ca	(.22800) X (5.0×10^{-5}) =	1.1400
Mg	(.05346) X (8.2×10^{-5}) =	.4384
Cl	(1.46258) X (1.4×10^{-5}) =	2.0476
HCO_3	(.00244) X (0.8×10^{-5}) =	.0020
SO_4	(.00375) X (2.1×10^{-5}) =	.0079

TOTAL IONIC STRENGTH = 4.9282

K = 2.4 @ 80 °F.

K = 1.9 @ 120 °F.

SI at (80)° = (5.2) - (.6) - (2.4) - (2.4) or -0.2

SI at (120)° = (5.2) - (.6) - (2.4) - (1.9) or +0.3

SI = O or water is relatively stable at _____ °F.

Remarks: Very Mild Scaling Indicated at Higher Temperatures.

SCALING TENDENCY CALCULATIONS

CALCIUM SULFATE

(Skillman-McDonald-Stiff Method)

pany Yates Petroleum Water Analysis No. _____

ress _____ Date 8-23-85

-ce Sun U W Federal # 3 Field _____

$$S = 1000 \left(\sqrt{X^2 + 4K} - X \right)$$

re S = Solubility of Calcium Sulfate under given conditions
X = Excess common ion factor
K = Constant dependent on ionic strength, U, and temperature

CULATION OF IONIC STRENGTH AND K VALUE

	mg/l	X	factor	=	Ionic Strength
Na	(.58742)	X	(2.2×10^{-5})	=	1.2923
Ca	(.22800)	X	(5.0×10^{-5})	=	1.1400
Mg	(.05346)	X	(8.2×10^{-5})	=	.4384
Cl	(1.46258)	X	(1.4×10^{-5})	=	2.0476
HCO_3	(.00244)	X	(0.8×10^{-5})	=	.0020
SO_4	(.00375)	X	(2.1×10^{-5})	=	.0079
			TOTAL IONIC STRENGTH	=	4.9282

K = 23.80 x 10 -4 @ 70 °F

X = 24.87 x 10 -4 @ 110 °F

CALCULATION OF EXCESS COMMON ION FACTOR

$$X = \left| (2.5\ Ca - 1.04\ SO_4) \right| \times 10^{-5}$$

where Ca and SO_4 are expressed in mg/l

$X = \left| \left[2.5 \left(\quad 22,800 \quad \right) - 1.04 \left(\quad 375 \quad \right) \right] \right| \times 10^{-}$

$X = \left| \left(\quad 57,000 \quad - \quad 390 \quad \right) \right| \times 10^{-}$

$X = \quad 56.61 \times 10^{-2} \quad X^2 \quad 3204.69 \times 10^{-4}$

CALCULATION OF SOLUBILITY

$$S = 1000 \left(\sqrt{X^2 + 4K} - X \right.$$

$S = 1000 \left[\sqrt{\left(\quad 3204.69 \times 10^{-4} \quad + 4 \left(\quad 24.87 \times 10^{-4} \quad \right) \right.} - \left(56.61 \times 10^{-2} \right.$

$S = 1000 \left[\sqrt{\quad 3304.17 \times 10^{-4} \quad} - \left(\quad 56.61 \times 10^{-2} \quad \right) \right]$

$S = 1000 \left[\left(\quad 57.48 \times 10^{-2} \quad \right) - \left(\quad 56.61 \times 10^{-2} \right. \right.$

$S = S = \quad .87 \times 10^{-2} \quad$ meq/l

$S = \quad 8.7 \quad (68.07) = \quad 592 \quad$ mg/l @ 110

REMARKS No Sulfate Scaling Indicated