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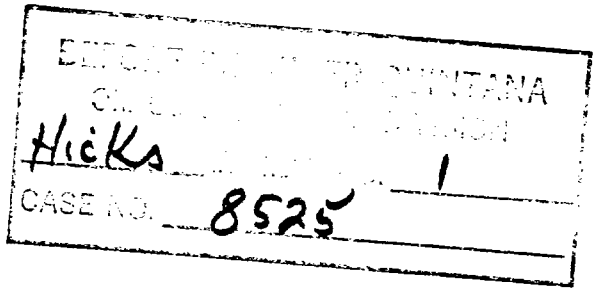
Post Office Box 2265
Santa Fe, New Mexico 87504-2265

Jason Kellahin
W. Thomas Kellahin
Karen Aubrey

Telephone 982-4285
Area Code 505

February 25, 1985



Mr. Richard L. Stamets
Oil Conservation Division
Post Office Box 2088
Santa Fe, New Mexico 87501

Re: Hicks Oil & Gas, Inc.
Salt Water Disposal
Section 15, T28N, R13W, NMPM
San Juan County, New Mexico

"Certified Mail-Return Receipt"

Dear Mr. Stamets:

On February 18, 1985, on behalf of Hicks Oil & Gas Inc. I filed an application which is set for hearing on March 13, 1985, for approval of the SE Cha Cha Well 37, located in Unit of the referenced section 15 for use of the Gallup formation for disposal.

Please find enclosed the required Division Form C-108 and attachments. By copy of this letter we are sending Form C-108 by certified mail, return receipt to the surface owner, the OCD District Office, and all operators within a one-half mile radius.

Very truly yours,

W. Thomas Kellahin

WTK:sg
Enc.

cc: Mr. Frank Chavez
Oil Conservation Div.
1000 Rio Brazos Road
Aztec, NM 87410

Mr. Mike Hicks
Hicks Oil & Gas Inc.
P. O. Drawer 3307
Farmington, NM 87499

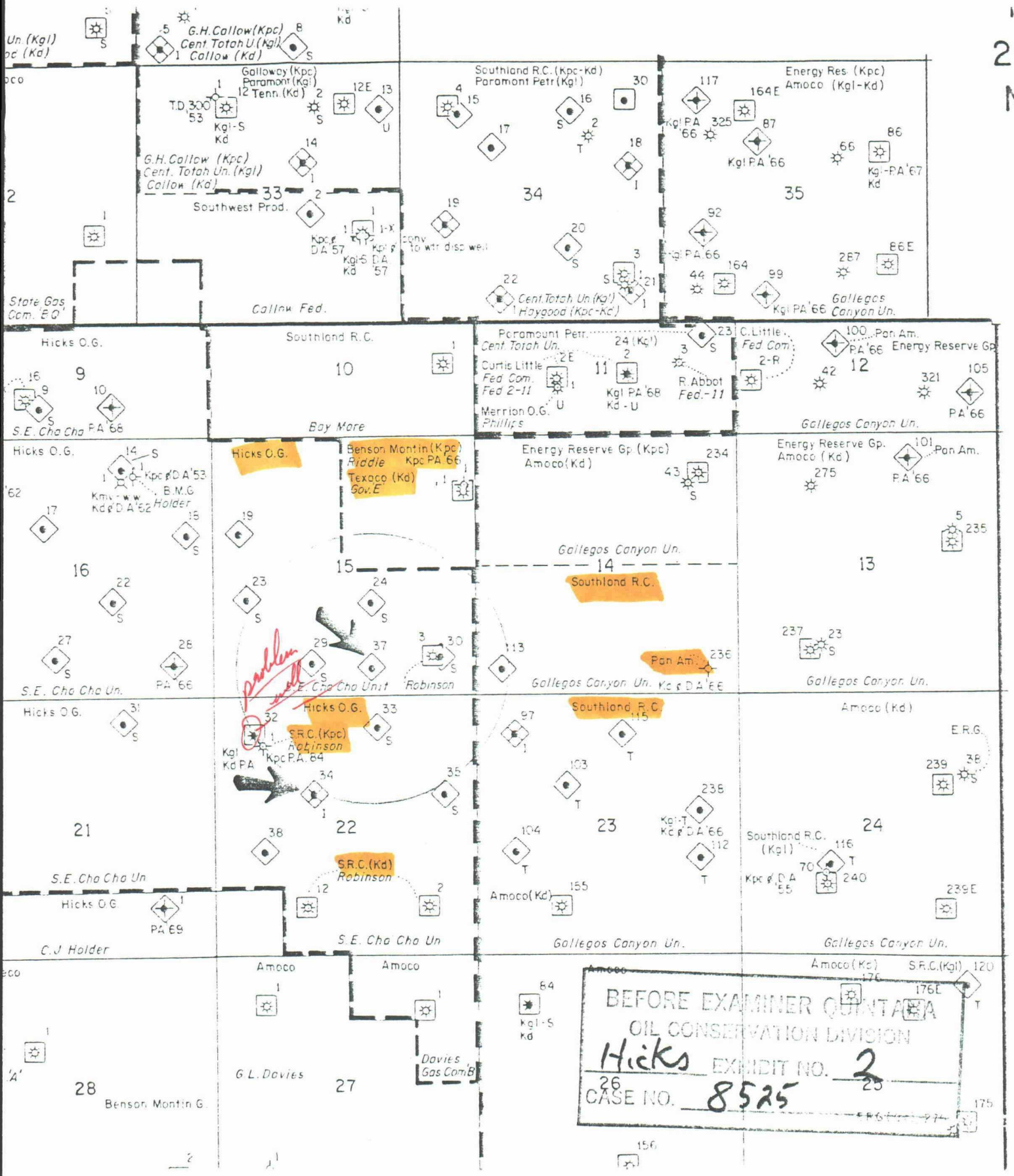
Texaco, Inc.
P. O. Box 2100
Denver, CO 80201
Attn: Mr. C. E. Kosul

Southland Royalty Company
P. O. Drawer 570
Farmington, NM 87499
Attn: Mr. Robert Fielder

Mr. Al Greer
Benson, Montin Greer Drilling Corp.
221 Petroleum Center Building
Farmington, NM 87401

Bureau of Indian Affairs
Navajo Indian Irrigation Pro.
3539 E. 30th Street
N.W. Energy Bldg., Room 103
Farmington, NM 87401

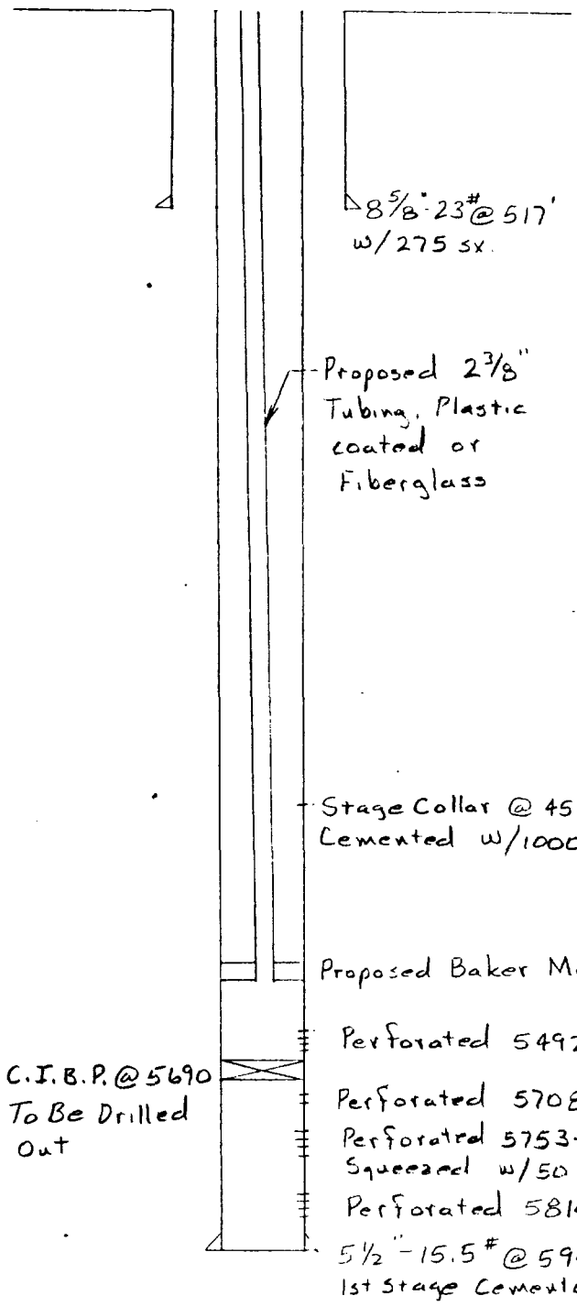
ILLEGIBLE


29 N
T 28 N
G.H. Callow (Kpc)
Cent. Totah U (Kgl)
Callow (Kd)
Galloway (Kpc)
Paramont (Kgl)
Tenn. (Kd)
T.D. 3300 '53
Kgl-S Kd
G.H. Callow (Kpc)
Cent. Totah Un. (Kgl)
Callow (Kd)
Southwest Prod.
Kpc & D A '57
Kgl-S D A '57
conv. to wtr disp well
Southland R.C. (Kpc-Kd)
Paramont Petr (Kgl)
Cent. Totah Un. (Kgl)
Haygood (Kpc-Kd)
Energy Res. (Kpc)
Amoco (Kgl-Kd)
Kgl PA '66
Kgl-PA '67 Kd
Gallegos Canyon Un.
State Gas Com. 'E' 0'
Callow Fed.
Hicks O.G.
S.E. Cha Cha PA '66
Southland R.C.
Bay More
Paramount Petr.
Cent. Totah Un.
Curtis Little Fed. Com. Fed 2-11
Kgl PA '68 Kd-U
R. Abbot Fed.-11
Merrion O.G. Phillips
C. Little Fed. Com. 2-R
Pan Am. PA '66
Energy Reserve Gp.
PA '66
Hicks O.G.
Kpc & D A '53
Kmv-wtr disp well
Kd & D A '62
B.M.G. Holder
Benson Montin (Kpc) Riddle Kpc PA '66
Texaco (Kd) Gov't E
Energy Reserve Gp (Kpc) Amoco (Kd)
Energy Reserve Gp. Amoco (Kd)
Pan Am. P.A '66
Gallegos Canyon Un.
Southland R.C.
Pan Am.
Kd & D A '66
S.E. Cha Cha Un.
S.E. Cha Cha Unit
Robinson
Hicks O.G.
S.R.C. (Kpc) Robinson
Kgl Kd PA
Kpc P.A. 64
Southland R.C.
Amoco (Kd)
E.R.G.
Kgl-T Kd & D A '66
Southland R.C. (Kgl)
Kpc & D A '65
Amoco (Kd)
S.R.C. (Kd) Robinson
S.E. Cha Cha Un
Hicks O.G.
PA '69
C.J. Holder
Gallegos Canyon Un.
Amoco
Amoco (Kd)
S.R.C. (Kgl)
Kgl-S Kd
Davies Gas Com B
G.L. Davies
Benson Montin G.
problem well
BEFORE EXAMINER QUINTANA
OIL CONSERVATION DIVISION
Hicks EXHIBIT NO. 2
CASE NO. 8525

INJECTION WELL DATA SHEET

Hicks Oil & Gas, Inc.	S.E. Cha Cha Unit			
OPERATOR	LEASE			
37	2100' FEL & 550' FSL	15	T28N	R13W
WELL NO.	FOOTAGE LOCATION	SECTION	TOWNSHIP	RANGE

Schematic



Tabular Data

Surface Casing

Size 8 5/8"-23# " Cemented with 275 sx.

TOC Surface feet determined by Circulation

Hole size 12¼"

Intermediate Casing

Size _____" Cemented with _____ sx.

TOC _____ feet determined by _____

Hole size _____

Long string

Size 5½"-15.5# " Cemented with 1280 sx.

TOC 500' feet determined by temperature survey

Hole size 7 7/8"

Total depth 5940'

Injection interval

5492' feet to 5824' feet
(perforated or open-hole, indicate which)

[illegible] GUNNER QUINTANA
[illegible] INSPECTOR
Hicks [illegible] UNIT NO. 3
[illegible] NO. 8525

new well drilled in 1980
S.I. Prod. well
(since) 8/84

Tubing size 2 3/8" lined with Plastic or Fiberglass (material) set in a Baker Model "D" (brand and model) packer at 5400' feet.

(or describe any other casing-tubing seal).

Other Data

1. Name of the injection formation Gallup
2. Name of Field or Pool (if applicable) S.E. Cha Cha
3. Is this a new well drilled for injection? [ ] Yes [X] No

   If no, for what purpose was the well originally drilled? Oil Well

4. Has the well ever been perforated in any other zone(s)? List all such perforated intervals and give plugging detail (sacks of cement or bridge plug(s) used) NO

5. Give the depth to and name of any overlying and/or underlying oil or gas zones (pools) in this area. Picture Cliff gas zone approximately 3700' above Dakota gas zone

   approximately 1500' below.

Hicks Oil & Gas, Inc.
P. O. DRAWER 3307
FARMINGTON, NM 87499
505-327-4902

1/17/85

APPLICATION FOR SALT WATER DISPOSAL
S.E. CHA CHA UNIT WELL #37

VII

1. Lease production currently averages 90 BWPD and this volume would be split between other injection wells. Also, we are planning to operate the injection well for commercial salt water disposal. At this time, it is estimated that we will be disposing of 100 bbls of water per day from wells off the lease. We do anticipate this volume to increase as the NMOCD revises it's rules concerning disposal of produced water in unlined pits. From injection records of wells in the field when the unit was actively water flooded it is estimated that 750 BWPD could be injected at 1000 psi.

2. The system will be an open system.

3. Average injection pressure 500 psi. Maximum injection pressure 1000 psi.

4. Sources of injected water.
   1. Produced water from the lease. Water analysis attatched.
   2. Produced water from San Juan Basin oil and gas wells. Typical water analysis attatched.

IX Stimulation treatment will consist of 500-1000 gallons of 15% Iron Sequestering HCL acid. If necessary the well may be frac treated with approximately 30,000 gallons of gelled water and 30,000# of 20/40 sand.

X Well logs on file with NMOCD.

XI No fresh water wells within one mile.

BEFORE EXAMINER SANTANA
OIL CONSERVATION DIVISION
Hicks EXHIBIT NO. 4
CASE NO. 8525

Hicks Oil & Gas, Inc.
P. O. DRAWER 3307
FARMINGTON, NM 87499
505-327-4902

XII Affirmative Statement

I, Mike Hicks, 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.

Mike Hicks
President
Hicks Oil & Gas, Inc.

TABULATION OF WELLS
WITHIN ½ MILE RADIUS
OF PROPOSED SALT WATER DISPOSAL WELL
S.E. CHA CHA UNIT WELL # 37

WELL	LOCATION	SURFACE CASING	CEMENT	T.O.C.	PRODUCTION CASING	CEMENT	T.O.C.	PRODUCING INTERVAL	TD
S.E. Cha Cha 24	J-15-28-13	8 5/8 @328'	225sx	surface	5½ @5850'	300sx 2 stage sq.100sx	5200' 1600' 3407'	Gallup 5740-5758	5852'
S,E, Cha Cha 29	N-15-28-13	8 5/8 @317	225sx	surface	4½ @5830'	400sx 2 stage sq.100sx	1610' 3518'	Gallup 5751'	5830'
S.E. Cha Cha 30	P-15-28-13	8 5/8 @324	225sx	surface	4½ @5859	400sx 2 stage	1600' 4500'	Gallup 5748-5824	5860'
S.E. Cha Cha 32	D-22-28-13	8 5/8 @321	225sx	surface	4½ @6499	500sx 2 stage	1500' 4920'	Dakota P&A 6273-6377 Gallup 5670-5742	6500'
S.E. Cha Cha 33	B-22-28-13	8 5/8 @202	160sx	Surface	4½ @5864	400sx 2 stage	1670' 4620'	Gallup 5758-5770	5865
GCU 113	M-14-28-13	8 5/8 @210'	200sx	surface	4½ @5855'	340sx		Gallup P&A 5712-5780	5865'
Southland Royalty Robinson #3	15-28-13	8 5/8 @330'	225sx	surface	4½ @6500' DV @1954'	300sx	30% over 5305' Unknown Calc. ?	Dakota 6332-6418	6500'

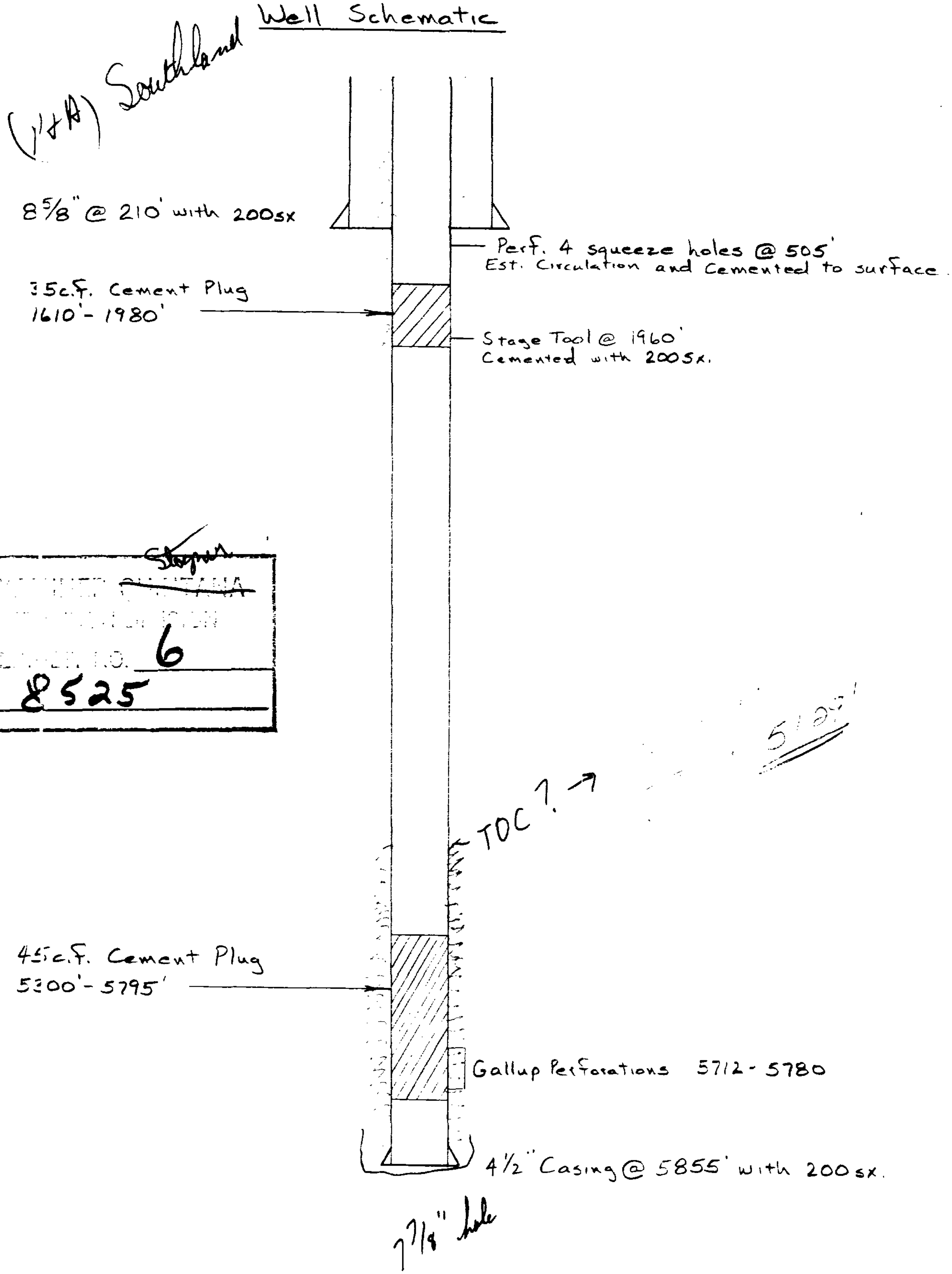
T of Gallup 5393 in well →

EXAMINER QUINTANA
OIL CONSERVATION DIVISION
Hicks EXHIBIT NO. 5
CASE NO. 8525

Gallegos Canyon Unit Well #113

Unit M- Sec. 14, T28N, R13W

Well Schematic



ROY L. PRITCHARD - *PETROLEUM GEOLOGIST*
Petroleum Club Plaza Suite 103 • P.O. Box 2372 • Farmington, New Mexico 87499 • Telephone: (505) 325-2209

CHA CHA GALLUP

Producing sandstone of the Cha Cha Gallup Oil Pool are the result of the transition of the regressive Carlile Seas, leaving the Gallup sandstones and the transgressive Niobrara Seas. The advancing seas caused truncation of the Gallup and deposition of new sands, silts and muds. The lower sands are cleaner and generally thought to be offshore bars deposited by currents parallel to the shore line. These basal Niobrara sandstones are oil bearing as are some of the cleaner Gallup sandstones.

The entire complex of upper Carlile-lower Niobrara sandstones has been known as "the Gallup" since the late nineteen fifties when production began along the Bisti-Hourseshoe Canyon trend.

Several of the basal Niobrara sandstones are present in the Cha Cha Gallup Pool.

These sandstones have been described as follows:

> Light-gray to gray-brown, fine to coarse grained quartz sandstone with minor chert, feldspar and rock fragments. Traces of glauconite and mica are present. Cement is primarily calcite with some secondary quartz. There is porosity present and oil staining is evident.

DRINKING WATER SOURCES

Considerable effort was made to obtain chemical analyses of the water bearing rocks in Township 28 North, Range 13 West, San Juan County, N.M. These efforts failed but analyses were observed of waters taken from sources outside the township which had similar ages and depositional histories.

The analyses showed the following:

1. There is no known source of potable* water immediately below the Cha Cha Gallup producing zones.

2. The only potable water aquifers found above the injection zones (Cha Cha Gallup) are:
   a. the Cretaceous Kirtland (Farmington Sandstone) at depths of 630-815' in section 21. (This information obtained from Ed Welder, U.S.G.S., Albuquerque.

ROY L. PRITCHARD - *PETROLEUM GEOLOGIST*
Petroleum Club Plaza Suite 103 • P.O. Box 2372 • Farmington, New Mexico 87499 • Telephone: (505) 325-2209

DRINKING WATER SOURCES cont.

b. the Ojo Alamo (Tertiary Period) has water with very low solids (350-850 mg/l). This is found to a depth of 350-450' in the area of interest.

*All references herein to potable or drinking water are based on dissolved solids of 10,000 mg/l or less as found in item VIII of Application for Authorization to Inject.

UNICHEM INTERNATIONAL

601 NORTH LEECH P.O.BOX1499

HOBBS, NEW MEXICO 88240

COMPANY : ENERGY RESERVES GROUP
DATE : 7-5-84
FIELD,LEASE&WELL : CH RANDAL GALLUP
SAMPLING POINT: SEPERATOR
DATE SAMPLED : 6-29-84

SPECIFIC GRAVITY = 1.007
TOTAL DISSOLVED SOLIDS = 11292
PH = 6.08

		ME/L	MG/L
CATIONS			
CALCIUM	(CA)+2	.96	19.3
MAGNESIUM	(MG)+2	.72	8.7
SODIUM	(NA),CALC.	171.	3939.
ANIONS			
BICARBONATE	(HCO3)-1	34	2074.
CARBONATE	(CO3)-2	0	0
HYDROXIDE	(OH)-1	0	0
SULFATE	(SO4)-2	26.0	1250
CHLORIDES	(CL)-1	113	4000
DISSOLVED GASES			
CARBON DIOXIDE	(CO2)	NOT RUN	
HYDROGEN SULFIDE	(H2S)	NOT RUN	
OXYGEN	(O2)	NOT RUN	
IRON(TOTAL)	(FE)		764
BARIUM	(BA)+2	.01	1
MANGANESE	(MN)	NOT RUN	

IONIC STRENGTH (MOLAL) =.189

SCALING INDEX	TEMP 30C 86F	48.8C 120F
CARBONATE INDEX	-1.4	-1.0
CALCIUM CARBONATE SCALING	UNLIKELY	UNLIKELY
CALCIUM SULFATE INDEX	-28.	-28.
CALCIUM SULFATE SCALING	UNLIKELY	UNLIKELY

ILLEGIBLE

Hobbs

UNICHEM INTERNATIONAL

601 NORTH LEECH P.O.BOX1499

HOBBS, NEW MEXICO 88240

COMPANY : ENERGY RESOURCES
DATE : 5-6-82
FIELD,LEASE&WELL : N.E. HOGBACK WELL#33
SAMPLING POINT:
DATE SAMPLED : 4-28-82

SPECIFIC GRAVITY = 1.04
TOTAL DISSOLVED SOLIDS = 59566
PH = 6.7

		ME/L	MG/L
CATIONS			
CALCIUM	(CA)+2	70	1402.
MAGNESIUM	(MG)+2	20	243.
SODIUM	(NA),CALC.	936.	21538.
ANIONS			
BICARBONATE	(HCO3)-1	10	610.
CARBONATE	(CO3)-2	0	0
HYDROXIDE	(OH)-1	0	0
SULFATE	(SO4)-2	1.6	80
CHLORIDES	(CL)-1	1015.	35991.
DISSOLVED GASES			
CARBON DIOXIDE	(CO2)	NOT RUN	
HYDROGEN SULFIDE	(H2S)	1	17.0
OXYGEN	(O2)	NOT RUN	
IRON(TOTAL)	(FE)		3.2
BARIUM	(BA)+2	1.0	73.2
MANGANESE	(MN)	NOT RUN	

SCALING INDEX	TEMP
	30C
	86F
CARBONATE INDEX	.952
CALCIUM CARBONATE SCALING	LIKELY
SULFATE INDEX	-34.
CALCIUM SULFATE SCALING	UNLIKELY

ILLEGIBLE

UNICHEM INTERNATIONAL

601 NORTH LEECH P.O.BOX1499

HOBBS, NEW MEXICO 88240

COMPANY : ENERGY RESOURCES
DATE : 5-6-82
FIELD,LEASE&WELL : N.E. HOGBACK TANK BATTERY #2
SAMPLING POINT: HEATER TREATER
DATE SAMPLED : 4-28-82

SPECIFIC GRAVITY = 1.027
TOTAL DISSOLVED SOLIDS = 40747
PH = 7.42

		ME/L	MG/L
CATIONS			
CALCIUM	(CA)+2	17.3	347.
MAGNESIUM	(MG)+2	19.6	239.
SODIUM	(NA),CALC.	657.	15110.
ANIONS			
BICARBONATE	(HCO3)-1	16.8	1025.
CARBONATE	(CO3)-2	0	0
HYDROXIDE	(OH)-1	0	0
SULFATE	(SO4)-2	.65	31.5
CHLORIDES	(CL)-1	676.	23994.
DISSOLVED GASES			
CARBON DIOXIDE	(CO2)	NOT RUN	
HYDROGEN SULFIDE	(H2S)	NOT RUN	
OXYGEN	(O2)	NOT RUN	
IRON(TOTAL)	(FE)		3.6
BARIUM	(BA)+2	.36	25.1
MANGANESE	(MN)	NOT RUN	

SCALING INDEX	TEMP
	30C
	86F
CARBONATE INDEX	1.15
CALCIUM CARBONATE SCALING	LIKELY
SULFATE INDEX	-100
CALCIUM SULFATE SCALING	UNLIKELY

ILLEGIBLE

UNICHEM INTERNATIONAL

601 NORTH LEECH P.O.BOX1499

HOBBS, NEW MEXICO 88240

COMPANY : ENERGY RESOURCES
DATE : 5-6-82
FIELD,LEASE&WELL : N.E. HOGBACK WELL#8
SAMPLING POINT:
DATE SAMPLED : 4-28-82

SPECIFIC GRAVITY = 1.029
TOTAL DISSOLVED SOLIDS = 43892
PH = 7.12

		ME/L	MG/L
CATIONS			
CALCIUM	(CA)+2	23.3	467.
MAGNESIUM	(MG)+2	12.6	153.
SODIUM	(NA).CALC.	712.	16371.
ANIONS			
BICARBONATE	(HCO3)-1	14.4	878.
CARBONATE	(CO3)-2	0	0
HYDROXIDE	(OH)-1	0	0
SULFATE	(SO4)-2	.54	26
CHLORIDES	(CL)-1	733.	25994.
DISSOLVED GASES			
CARBON DIOXIDE	(CO2)	0	0
HYDROGEN SULFIDE	(H2S)	4.5	76.6
OXYGEN	(O2)	NOT RUN	
IRON(TOTAL)	(FE)		1.6
BARIUM	(BA)+2	.07	5.3
MANGANESE	(MN)	NOT RUN	

SCALING INDEX	TEMP
	30C
	86F
CARBONATE INDEX	.968
CALCIUM CARBONATE SCALING	LIKELY
SULFATE INDEX	-121
CALCIUM SULFATE SCALING	UNLIKELY

ILLEGIBLE

UNICHEM INTERNATIONAL

601 NORTH LEECH P.O.BOX1499

HOBBS, NEW MEXICO 88240

COMPANY : CHACE OIL CO.
DATE : 9-5-84
FIELD,LEASE&WELL : JICARILLA 71-30
SAMPLING POINT: SEPERATOR
DATE SAMPLED : 8-27-84

SPECIFIC GRAVITY = 1.01
TOTAL DISSOLVED SOLIDS = 17892
PH = 7.67

		ME/L	MG/L
CATIONS			
CALCIUM	(CA)+2	5	100.
MAGNESIUM	(MG)+2	5	60.7
SODIUM	(NA),CALC.	290.	6674.
ANIONS			
BICARBONATE	(HCO3')-1	13.4	817.
CARBONATE	(CO3)-2	0	0
HYDROXIDE	(OH)-1	0	0
SULFATE	(SO4)-2	4.9	237.
CHLORIDES	(CL)-1	282	10000
DISSOLVED GASES			
CARBON DIOXIDE	(CO2)	NOT RUN	
HYDROGEN SULFIDE	(H2S)	NOT RUN	
OXYGEN	(O2)	NOT RUN	
IRON(TOTAL)	(FE)		1.7
BARIUM	(BA)+2	.03	1.8
MANGANESE	(MN)	NOT RUN	

IONIC STRENGTH (MOLAL) = .313

SCALING INDEX	TEMP 30C 86F	48.8C 120F
CARBONATE INDEX	.252	.653
CALCIUM CARBONATE SCALING	LIKELY	LIKELY
CALCIUM SULFATE INDEX	-96.	-96.
CALCIUM SULFATE SCALING	UNLIKELY	UNLIKELY

ILLEGIBLE

Gallup - Combined

UNICHEM INTERNATIONAL

601 NORTH LEECH P.O.BOX1499

HOBBS, NEW MEXICO 88240

COMPANY : CHACE OIL CO.
DATE : 9-5-84
FIELD,LEASE&WELL : JICARILLA 71-27
SAMPLING POINT: SEPERATOR
DATE SAMPLED : 8-27-84

SPECIFIC GRAVITY = 1.004
TOTAL DISSOLVED SOLIDS = 6747
PH = 7.96

		ME/L	MG/L
CATIONS			
CALCIUM	(CA)+2	1.5	30.0
MAGNESIUM	(MG)+2	1.8	22.2
SODIUM	(NA),CALC.	110.	2533.
ANIONS			
BICARBONATE	(HCO3)-1	.6	36.6
CARBONATE	(CO3)-2	0	0
HYDROXIDE	(OH)-1	0	0
SULFATE	(SO4)-2	10.9	525
CHLORIDES	(CL)-1	102	3600
DISSOLVED GASES			
CARBON DIOXIDE	(CO2)	NOT RUN	
HYDROGEN SULFIDE	(H2S)	NOT RUN	
OXYGEN	(O2)	NOT RUN	
IRON(TOTAL)	(FE)		1.4
BARIUM	(BA)+2	0	.2
MANGANESE	(MN)	NOT RUN	

IONIC STRENGTH (MOLAL) =.172

SCALING INDEX	TEMP 33C 92F	58.4C 137F
CARBONATE INDEX	-.58	-.47
CALCIUM CARBONATE SCALING	UNLIKELY	UNLIKELY
CALCIUM SULFATE INDEX	-26.	-26.
CALCIUM SULFATE SCALING	UNLIKELY	UNLIKELY

ILLEGIBLE

UNICHEM INTERNATIONAL

601 NORTH LEECH P.O.BOX1499

HOBBS, NEW MEXICO 88240

COMPANY : [illegible] OIL COMPANY
DATE : 6-19-84
FIELD,LEASE/WELL : WELL #71-14
SAMPLING POINT: SEPERATORS
DATE SAMPLED : 6-11-84

SPECIFIC GRAVITY = 1.009
TOTAL DISSOLVED SOLIDS = 17684
PH = 7.69

		ME/L	MG/L
CATIONS			
CALCIUM	(CA)+2	5.3	106.
MAGNESIUM	(MG)+2	1.3	16.2
SODIUM	(NA),CALC.	289.	6657.
ANIONS			
BICARBONATE	(HCO3)-1	10.6	646.
CARBONATE	(CO3)-2	0	0
HYDROXIDE	(OH)-1	0	0
SULFATE	(SO4)-2	3.6	175
CHLORIDES	(CL)-1	282	10000
DISSOLVED GASES			
CARBON DIOXIDE	(CO2)	NOT RUN	
HYDROGEN SULFIDE	(H2S)	NOT RUN	
OXYGEN	(O2)	NOT RUN	
IRON(TOTAL)	(FE)		11
BARIUM	(BA)+2	.03	2
MANGANESE	(MN)	NOT RUN	

IONIC STRENGTH (MOL/L) = .306

SCALING INDEX	TEMP	
	30C	49.8C
	86F	122F
CARBONATE INDEX	.206	.597
CALCIUM CARBONATE SCALING	LIKELY	LIKELY
CALCIUM SULFATE INDEX	-.96.	-.96.
CALCIUM SULFATE SCALING	UNLIKELY	UNLIKELY

ILLEGIBLE

UNICHEM INTERNATIONAL

601 NORTH LEECH P.O.BOX1499

HOBBS, NEW MEXICO 88240

COMPANY : CHASE OIL COMPANY
DATE : 4-19-84
FIELD,LEASE&WELL : WELL #21-31
SAMPLING POINT: SEPERATORS
DATE SAMPLED : 4-11-84

SPECIFIC GRAVITY = 1.009
TOTAL DISSOLVED SOLIDS = 15493
PH = 6.3

		MG/L	MG/L
CATIONS			
CALCIUM	(CA)+2	2.8	56.4
MAGNESIUM	(MG)+2	2.6	32.3
SODIUM	(NA),CALC.	257.	5910.
ANIONS			
BICARBONATE	(HCO3)-1	7	427.
CARBONATE	(CO3)-2	0	0
HYDROXIDE	(OH)-1	0	0
SULFATE	(SO4)-2	1.4	68
CHLORIDES	(CL)-1	354	9000
DISSOLVED GASES			
CARBON DIOXIDE	(CO2)	NOT RUN	
HYDROGEN SULFIDE	(H2S)	NOT RUN	
OXYGEN	(O2)	NOT RUN	
IRON(TOTAL)	(FE)		6.9
BARIUM	(BA)+2	.03	2.4
MANGANESE	(MN)	NOT RUN	

IONIC STRENGTH (MOLAL) = .269

SCALING INDEX	TEMP	
	30C	49.5C
	86F	121F
CARBONATE INDEX	.352	.784
CALCIUM CARBONATE SCALING	LIKELY	LIKELY
CALCIUM SULFATE INDEX	-.45.	-.66.
CALCIUM SULFATE SCALING	UNLIKELY	UNLIKELY

ILLEGIBLE

UNICHEM INTERNATIONAL

601 NORTH LEECH P.O.BOX1499

HOBBS, NEW MEXICO 88240

COMPANY : ENERGY RESERVES GROUP
DATE : 7-5-84
FIELD,LEASE/WELL : OH RANDAL DAKOTA
SAMPLING POINT SEPERATOR
DATE SAMPLED : 6-29-84

SPECIFIC GRAVITY = 1
TOTAL DISSOLVED SOLIDS = 48
PH = 6.29

		ME/L	MG/L
CATIONS			
CALCIUM	(CA)+2	.4	8.0
MAGNESIUM	(MG)+2	.2	2.4
SODIUM	(NA),CALC.	.02	.45
ANIONS			
BICARBONATE	(HCO3)-1	.6	36.6
CARBONATE	(CO3)-2	0	0
HYDROXIDE	(OH)-1	0	0
SULFATE	(SO4)-2	.02	1
CHLORIDES	(CL)-1	0	0
DISSOLVED GASES			
CARBON DIOXIDE	(CO2)	NOT RUN	
HYDROGEN SULFIDE	(H2S)	NOT RUN	
OXYGEN	(O2)	NOT RUN	
IRON(TOTAL)	(FE)		27.1
BARIUM	(BA)+2	0	.2
MANGANESE	(MN)	NOT RUN	

IONIC STRENGTH (MOLAL) =1E-03

SCALING INDEX	TEMP 30C 86F	TEMP 48.8C 120F
CARBONATE INDEX	2.66	3.04
CALCIUM CARBONATE SCALING	LIKELY	LIKELY
CALCIUM SULFATE INDEX	-19.	-19.
CALCIUM SULFATE SCALING	UNLIKELY	UNLIKELY

ILLEGIBLE

UNICHEM INTERNATIONAL

401 NORTH LEECH P.O.BOX1499

HOBBS, NEW MEXICO 88240

COMPANY : ODESSA NATURAL
DATE : 10-14-83
FIELD,LEASE&WELL CHACON JICARILLA D 43
SAMPLING POINT: WELLHEAD
DATE SAMPLED : 10-7-83

SPECIFIC GRAVITY = 1.01
TOTAL DISSOLVED SOLIDS = 16158
PH = 6.98

		ME/L	MG/L
CATIONS			
CALCIUM	(CA)+2	10	200.
MAGNESIUM	(MG)+2	39	474.
SODIUM	(NA),CALC.	231.	5325.
ANIONS			
BICARBONATE	(HCO3)-1	6.4	390.
CARBONATE	(CO3)-2	0	0
HYDROXIDE	(OH)-1	0	0
SULFATE	(SO4)-2	3.5	170
CHLORIDES	(CL)-1	270.	9597.
DISSOLVED GASES			
CARBON DIOXIDE	(CO2)	NOT RUN	
HYDROGEN SULFIDE	(H2S)	NOT RUN	
OXYGEN	(O2)	NOT RUN	
IRON(TOTAL)	(FE)		3712.
BARIUM	(BA)+2		0.08
MANGANESE	(MN)	NOT RUN	

SCALING INDEX	TEMP
	30C
	86F
CARBONATE INDEX	-.45
CALCIUM CARBONATE SCALING	UNLIKELY
SULFATE INDEX	-11.
CALCIUM SULFATE SCALING	UNLIKELY

Dakota

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601 NORTH LEECH P.O.BOX1499

HOBBS, NEW MEXICO 88240

OMPANY : ENERGY RESERVES GROUP
ATE : 5-22-84
IELD,LEASE&WELL : E.H. PIPKIN WELL #8 DAKOTA FIELD
AMPLING POINT: WELLHEAD
ATE SAMPLED : 5-15-84

PECIFIC GRAVITY = 1
OTAL DISSOLVED SOLIDS = 734
H = 7.61

		ME/L	MG/L
CATIONS			
ALCIUM	(CA)+2	.6	12.0
AGNESIUM	(MG)+2	.5	6.0
ODIUM	(NA),CALC.	9.6	222.
ANIONS			
ICARBONATE	(HCO3)-1	3.2	195.
ARBONATE	(CO3)-2	0	0
YDROXIDE	(OH)-1	0	0
ULFATE	(SO4)-2	.58	28
HLORIDES	(CL)-1	7	260
DISSOLVED GASES			
ARBON DIOXIDE	(CO2)	NOT RUN	
YDROGEN SULFIDE	(H2S)	NOT RUN	
XYGEN	(O2)	NOT RUN	
RON(TOTAL)	(FE)		23.3
ARIUM	(BA)+2	.16	11
ANGANESE	(MN)	NOT RUN	

ONIC STRENGTH (MOLAL) =.012

SCALING INDEX	TEMP 30C 86F	90C 194F
ARBONATE INDEX	1.28	3.17
ALCIUM CARBONATE SCALING	LIKELY	LIKELY
ALCIUM SULFATE INDEX	-19.	-19.
ALCIUM SULFATE SCALING	UNLIKELY	UNLIKELY

Chemical Consultants

P.O. Box 421

WATER ANALYSIS TEST REPORT

COMPANY: HICKS

DATE: 12-2-82

FIELD

COUNTY OR PARISH

STATE

LEASE OR UNIT: SE Cha Cha

WELL(S) NAME OR NO.: 36

WATER SOURCE (FORMATION)

DEPTH, FT. | BHT, F | SAMPLE SOURCE | TEMP, F | WATER, BBL/DAY | OIL, BBL/DAY | GAS, MMCF/DAY

TYPE OF OIL | API GRAVITY | TYPE OF WATER: ☐ PRODUCED WATER ☐ INJECTION WATER OTHER

WATER ANALYSIS PATTERN

Na⁺ / Ca⁺⁺ / Mg⁺⁺ / Fe⁺⁺⁺ — scale 20, 5, 10, 5, 0, 5, 10, 15, 20

BEFORE EXAMINER QUINTANA
OIL CONSERVATION DIVISION
Hicks EXHIBIT NO. 8
CASE NO. 8526

DISSOLVED SOLIDS

CATIONS	me/l*	mg/l*
Total Hardness	55	27.6
Sodium, Na^{+} (calc.)	.43	8.6
Calcium, Ca^{++}	53.3	1,226.
Magnesium, Mg^{++}	.12	1.5
Iron (Total), Fe^{+++}	.15	2.7
ANIONS		
Chloride, Cl^{-}	33.8	1200.
Sulfate, $SO_4^{=}$	2.0	95
Carbonate, $CO_3^{=}$	2.3	70.
Bicarbonate, HCO_3^{-}	15.9	971.
Hydroxyl, OH^{-}	0	0
Sulfide, $S^{=}$		
Phosphate-Meta, PO_3^{-}		
Phosphate-Ortho, $PO_4^{\equiv}$		

DISSOLVED GASES

Hydrogen Sulfide, H_2S		mg/l*
Carbon Dioxide, CO_2		mg/l*
Oxygen, O_2		mg/l*

PHYSICAL PROPERTIES

pH	8.12	
Eh (Redox Potential)		MV
Specific Gravity		
Turbidity, JTU Units		
Total Dissolved Solids (Calc.)	3575	mg/l*
Stability Index @ F		
@ F		
$CaSO_4$ Solubility @ F		mg/l*
@ F		mg/l*
Max. $CaSO_4$ Possible (Calc.)		mg/l*
Max. $BaSO_4$ Possible (Calc.)		mg/l*
Residual Hydrocarbons		ppm(Vol/Vol)

SUSPENDED SOLIDS (QUALITATIVE)

Iron Sulfide ☐ Iron Oxide ☐ Calcium Carbonate ☐ Acid Insoluble ☐

* NOTE: me/l and mg/l are commonly used interchangeably for epm and ppm respectively. Where epm and ppm are used, corrections should be made for specific gravity.

REMARKS AND RECOMMENDATIONS:

ILLEGIBLE

ENGINEER | DIST. NO. | ADDRESS: P.O. Box 421 | PHONE

Chemical Consultants

P.O. Box 421
Farmington, New Mexico

WATER ANALYSIS TEST REPORT

COMPANY: HICKS			DATE: 12-13-82
FIELD: Cha Cha Gallup		COUNTY OR PARISH: San Juan	STATE: N.M.
LEASE OR UNIT: S.E. Cha Cha	WELL(S) NAME OR NO.: 37	WATER SOURCE (FORMATION): Well Head	
DEPTH, FT.:	BHT, F:	SAMPLE SOURCE:	TEMP, F:
WATER, BBL/DAY:	OIL, BBL/DAY:	GAS, MCF/DAY:	
TYPE OF OIL:	GRAVITY: 0	TYPE OF WATER: [X] PRODUCED WATER [ ] INJECTION WATER OTHER	

WATER ANALYSIS PATTERN

(NUMBER BESIDE EACH SYMBOL INDICATES me/l SCALE UNIT)

Na⁺ 20 15 10 5 0 5 10 15 20 Cl⁻

Ca⁺⁺ — HCO3⁻

Mg⁺⁺ — SO4⁼

Fe⁺⁺⁺ — CO3⁼

DISSOLVED SOLIDS

CATIONS	me/l*	mg/l*
Total Hardness	9	450
Sodium, Na⁺ (calc)	170.	3910.
Calcium, Ca^{++}	4.2	84
Magnesium, Mg^{++}	4.8	58.3
Iron (Total), Fe^{+++}	.03	.5
ANIONS		
Chloride, Cl^-	164.	5,800.
Sulfate, $SO_4^=$	2.5	120
Carbonate, $CO_3^=$	0	0
Bicarbonate, HCO_3^-	12.4	756.
Hydroxyl, OH^-	0	0
Sulfide, $S^=$		
Phosphate-Meta, PO_3^-		
Phosphate-Ortho, $PO_4^{\equiv}$		

DISSOLVED GASES

Hydrogen Sulfide, H_2S		mg/l*
Carbon Dioxide, CO_2		mg/l*
Oxygen, O_2		mg/l*

PHYSICAL PROPERTIES

pH	7.75	
Eh (Redox Potential)		MV
Specific Gravity		
Turbidity, JTU Units		
Total Dissolved Solids (Calc)	10,278.3	mg/l*
Stability Index @ ___F		
@ ___F		
$CaSO_4$ Solubility @ ___F		mg/l*
@ ___F		mg/l*
Max. $CaSO_4$ Possible (Calc.)		mg/l*
Max. $BaSO_4$ Possible (Calc.)		mg/l*
Residual Hydrocarbons		ppm (Vol/Vol)

SUSPENDED SOLIDS (QUALITATIVE)

Iron Sulfide [ ] Iron Oxide [ ] Calcium Carbonate [ ] Acid Insoluble [ ]

* NOTE: me/l and mg/l are commonly used interchangeably for epm and ppm respectively. Where epm and ppm are used, corrections should be made for specific gravity.

REMARKS AND RECOMMENDATIONS:

ILLEGIBLE

ENGINEER: | DIST. NO.: | ADDRESS: P.O. BOX 421 | OFFICE PHONE: | HOME PHONE:

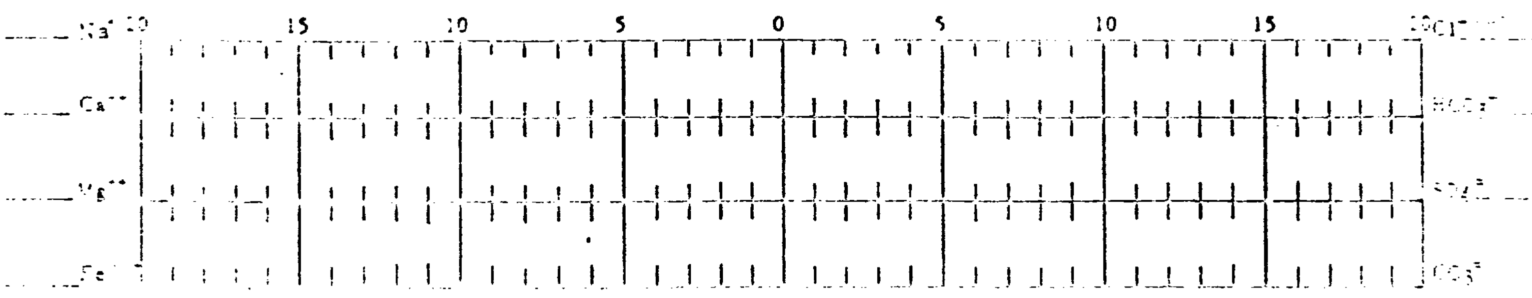
Chemical Consultants

All Type Oil Field Chemicals and Services
P.O. Box 421
Farmington, New Mexico 87401

WATER ANALYSIS TEST REPORT

SHEET NUMBER	
COMPANY	
DATE	12-13-82
FIELD	Hicks
COUNTY OR PARISH	San Juan
STATE	N.M.
LEASE OR UNIT	Cha Cha Gallup
WELL(S) NAME OR NO.	39
WATER SOURCE (FORMATION)	
LEASE OR UNIT	S.F. Cha Cha
DEPTH, FT.	
BHT, F	
SAMPLE SOURCE	
TEMP, F	
WATER, BBL/DAY	
OIL, BBL/DAY	
GAS, MMCF/DAY	
DATE SAMPLED	
TYPE OF WATER	[X] PRODUCED WATER [ ] INJECTION WATER OTHER ____

WATER ANALYSIS PATTERN
(NUMBER BESIDE ION SYMBOL INDICATES meq/l SCALE UNIT)



DISSOLVED SOLIDS

CATIONS	meq/l*	mg/l*
Total Hardness	9.2	460
Sodium, Na^{+} (calc.)	125.2	[illegible]
Calcium, Ca^{++}	6.2	124.
Magnesium, Mg^{++}	3.0	36.5
Iron (Total), Fe^{+++}	.05	1.0
ANIONS		
Chloride, Cl^{-}	169.0	6000.
Sulfate, $SO_4^{=}$	1.1	55
Carbonate, $CO_3^{=}$	3.6	108.
Bicarbonate, HCO_3^{-}	10.6	647.
Hydroxyl, OH^{-}	0	0
Sulfide, $S^{=}$		
Phosphate, PO_3^{-}		
Orthophosphate, $PO_4^{\equiv}$		

DISSOLVED GASES

Hydrogen Sulfide, H_2S		mg/l*
Carbon Dioxide, CO_2		mg/l*
Oxygen, O_2		mg/l*

PHYSICAL PROPERTIES

pH	8.3	
Eh (Redox Potential)		mV
Specific Gravity		
Turbidity, JTU Units		
Total Dissolved Solids (Calc.)	10,998.5	mg/l*
Stability Index @ ___ F		
@ ___ F		
$CaSO_4$ Solubility @ ___ F		mg/l*
@ ___ F		mg/l*
Max. $CaSO_4$ Possible (Calc.)		mg/l*
Max. $BaSO_4$ Possible (Calc.)		mg/l*
Residual Hydrocarbons		ppm (Vol.)

SUSPENDED SOLIDS (QUALITATIVE)

Iron Sulfide [ ] Iron Oxide [ ] Calcium Carbonate [ ] Acid Insoluble [ ]

REMARKS AND RECOMMENDATIONS:

ILLEGIBLE

* NOTE: meq/l and mg/l are commonly used interchangeably for epm and ppm respectively. Where epm and ppm are used, corrections should be made for specific gravity.

	BOX NO.	ADDRESS	PHONE	
		Box 421 Farmington, N.M.	[illegible]	

Chemical Consultants

P.O. Box 421

WATER ANALYSIS TEST REPORT

SHEET NUMBER	
COMPANY: Hicks Oil & Gas	DATE: 11-29-82
FIELD	COUNTY OR PARISH	STATE
LEASE OR UNIT: S.E. Cha Cha	WELL(S) NAME OR NO.: #40	WATER SOURCE (FORMATION)
DEPTH, FT.	BHT, F	SAMPLE SOURCE	TEMP, F	WATER, BBL/DAY	OIL, BBL/DAY	GAS, MMCF/DAY
TYPE OF OIL	GRAVITY	TYPE OF WATER: ☐ PRODUCED WATER ☐ INJECTION WATER OTHER	

WATER ANALYSIS PATTERN

(NUMBER BESIDE ION SYMBOL INDICATES me/l SCALE UNIT)

Na⁺ 20 15 10 5 0 5 10 15 20 Cl⁻

Ca⁺⁺ — HCO₃⁻

Mg⁺⁺ — SO₄⁼

Fe — CO₃⁼

DISSOLVED SOLIDS

CATIONS	me/l*	mg/l*
Total Hardness		
Sodium, Na^+ (calc.)		
Calcium, Ca^{++}		
Magnesium, Mg^{++}		
Iron (Total), Fe^{+++}		
ANIONS		
Chloride, Cl^-	107.2	3,800
Sulfate, $SO_4^=$	.73	35
Carbonate, $CO_3^=$		
Bicarbonate, HCO_3^-		
Hydroxyl, OH^-		
Sulfide, $S^=$		
Phosphate-Meta, PO_3^-		
Phosphate-Ortho, $PO_4^{\equiv}$		

DISSOLVED GASES

Hydrogen Sulfide, H_2S		mg/l*
Carbon Dioxide, CO_2		mg/l*
Oxygen, O_2		mg/l*

PHYSICAL PROPERTIES

pH	8.0	
Eh (Redox Potential)		MV
Specific Gravity		
Turbidity, JTU Units		
Total Dissolved Solids (Calc.)	6,200	mg/l*
Stability Index @ ___ F		
@ ___ F		
$CaSO_4$ Solubility @ ___ F		mg/l*
@ ___ F		mg/l*
Max. $CaSO_4$ Possible (Calc.)		mg/l*
Max. $BaSO_4$ Possible (Calc.)		mg/l*
Residual Hydrocarbons		ppm(Vol/Vol)

SUSPENDED SOLIDS (QUALITATIVE)

Iron Sulfide ☐ Iron Oxide ☐ Calcium Carbonate ☐ Acid Insoluble ☐

REMARKS AND RECOMMENDATIONS:

ILLEGIBLE

* NOTE: me/l and mg/l are commonly used interchangeably for epm and ppm respectively. Where epm and ppm are used, corrections should be made for specific gravity.

ENGINEER	DIST. NO.	ADDRESS	OFFICE PHONE	HOME PHONE
		P.O. Box 421 Farmington, N.M.	( ) 327-7775	

UNICHEM INTERNATIONAL

601 NORTH LEECH P.O.BOX1499

HOBBS, NEW MEXICO 88240

COMPANY : ENERGY RESERVES GROUP
DATE : 5-22-84
FIELD,LEASE&WELL : E.H. PIPKIN Well #23 PICTURE CLIFF FIELD
SAMPLING POINT: WELLHEAD
DATE SAMPLED : 5-15-84

SPECIFIC GRAVITY = 1.018
TOTAL DISSOLVED SOLIDS = 28012
PH = 7.49

		ME/L	MG/L
CATIONS			
CALCIUM	(CA)+2	3.3	76.1
MAGNESIUM	(MG)+2	11	133.
SODIUM	(NA),CALC.	457.	10513.
ANIONS			
BICARBONATE	(HCO3)-1	21	1281.
CARBONATE	(CO3)-2	0	0
HYDROXIDE	(OH)-1	0	0
SULFATE	(SO4)-2	0	0
CHLORIDES	(CL)-1	451	16000
DISSOLVED GASES			
CARBON DIOXIDE	(CO2)	NOT RUN	
HYDROGEN SULFIDE	(H2S)	NOT RUN	
OXYGEN	(O2)	NOT RUN	
IRON(TOTAL)	(FE)		5.6
BARIUM	(BA)+2	.15	10.3
MANGANESE	(MN)	NOT RUN	

IONIC STRENGTH (MOLAL) =.49

SCALING INDEX	TEMP	
	30C	1 C
	86F	1 F
CARBONATE INDEX	0.0	1.8
CALCIUM CARBONATE SCALING	UNLIKELY	UNLIKELY
CALCIUM SULFATE INDEX	-60.	-7.
CALCIUM SULFATE SCALING	UNLIKELY	UNLIKELY

ILLEGIBLE

Pictured Cliffs

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601 NORTH LEECH P.O.BOX1499

HOBBS, NEW MEXICO 88240

COMPANY : ENERGY RESERVES GROUP
DATE : 12-12-83
FIELD,LEASE&WELL : G.C.U. #318
SAMPLING POINT: WELLHEAD
DATE SAMPLED : 12-7-83

SPECIFIC GRAVITY = 1.03[illegible]
TOTAL DISSOLVED SOLIDS = 51278
PH = 6.68

		ME/L	MG/L
CATIONS			
CALCIUM	(CA)+2	80	1603.
MAGNESIUM	(MG)+2	110	1338.
SODIUM	(NA),CALC.	714.	16423
ANIONS			
BICARBONATE	(HCO3)-1	12.4	756.
CARBONATE	(CO3)-2	0	0
HYDROXIDE	(OH)-1	0	0
SULFATE	(SO4)-2	0	0
CHLORIDES	(CL)-1	902	32000
DISSOLVED GASES			
CARBON DIOXIDE	(CO2)	NOT RUN	
HYDROGEN SULFIDE	(H2S)	NOT RUN	
OXYGEN	(O2)	NOT RUN	
IRON(TOTAL)	(FE)		109.
BARIUM	(BA)+2	.82	56.
MANGANESE	(MN)	NOT RUN	

IONIC STRENGTH (MOTAL) =1.032

SCALING INDEX	TEMP	
	30C	[illegible]C
	86F	[illegible]F
CARBONATE INDEX	.293	[illegible]
CALCIUM CARBONATE SCALING	LIKELY	LIKELY
CALCIUM SULFATE INDEX	-59.	[illegible]
CALCIUM SULFATE SCALING	UNLIKELY	UNLIKELY
BARIUM SULFATE INDEX	-2.1	-3.3
BARIUM SULFATE SCALING	UNLIKELY	UNLIKELY

ILLEGIBLE

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651 NORTH LEECH P.O BOX1499

HOBBS, NEW MEXICO 88240

COMPANY : ENERGY RESERVERS GROUP
DATE : 12-17-93
FIELD,LEASE,WELL : C C U #315
SAMPLING POINT: WELLHEAD
DATE SAMPLED : 12-7 93

SPECIFIC GRAVITY = 1.04
TOTAL DISSOLVED SOLIDS = 59303
PH = 6.61

		ME/L	MG/L
CATIONS			
CALCIUM	(CA)+2	80	1603
MAGNESIUM	(MG)+2	90	1091
SODIUM	(NA) (CALC.)	834.	19191.
ANIONS			
BICARBONATE	(HCO3)-1	4.8	293.
CARBONATE	(CO3)-2	0	0
HYDROXIDE	(OH)-1	0	0
SULFATE	(SO4)-2	0	0
CHLORIDES	(CL)-1	1000	37000
DISSOLVED GASES			
CARBON DIOXIDE	(CO2)	NOT RUN	
HYDROGEN SULFIDE	(H2S)	NOT RUN	
OXYGEN	(O2)	NOT RUN	
IRON(TOTAL)	(FE)		33.5
BARIUM	(BA)+2	1.7	121
MANGANESE	(MN)	NOT RUN	

IONIC STRENGTH (MOLAL) =1.159

SCALING INDEX	TEMP 30C 86F	TEMP 18.3C 100F
CARBONATE INDEX	-.40	0.0
CALCIUM CARBONATE SCALING	UNLIKELY	UNLIKELY
CALCIUM SULFATE INDEX	-.57	-.47
CALCIUM SULFATE SCALING	UNLIKELY	UNLIKELY
BARIUM SULFATE INDEX	-1.1	-1.7
BARIUM SULFATE SCALING	UNLIKELY	UNLIKELY

ILLEGIBLE

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601 NORTH LEECH P.O.BOX1499

HOBBS, NEW MEXICO 88240

COMPANY : ENERGY RESERVES GROUP
DATE : 12-11-83
FIELD,LEASE,WELL : G.T.U. 4313
SAMPLING POINT: WELLHEAD
DATE SAMPLED : 12-7-83

SPECIFIC GRAVITY = 1.095
TOTAL DISSOLVED SOLIDS = 83180
PH = 6.93

		ME/L	MG/L
CATIONS			
CALCIUM	(CA)+2	44.6	895
MAGNESIUM	(MG)+2	48.3	587.
SODIUM	(NA),CALC.	610.	12870.
ANIONS			
BICARBONATE	(HCO3)-1	11.8	719.
CARBONATE	(CO3)-2	0	0
HYDROXIDE	(OH)-1	0	0
SULFATE	(SO4)-2	0	0
CHLORIDES	(CL)-1	902	32000
DISSOLVED GASES			
CARBON DIOXIDE	(CO2)	NOT RUN	
HYDROGEN SULFIDE	(H2S)	NOT RUN	
OXYGEN	(O2)	NOT RUN	
IRON(TOTAL)	(FE)		57.4
BARIUM	(BA)+2	1.5	108.
MANGANESE	(MN)	NOT RUN	

IONIC STRENGTH (MOLAL) = 999

SCALING INDEX	TEMP	
	30C 86F	15.5C 60F
CARBONATE INDEX	.979	.979
CALCIUM CARBONATE SCALING	LIKELY	LIKELY
CALCIUM SULFATE INDEX	-69.	-15.
CALCIUM SULFATE SCALING	UNLIKELY	UNLIKELY
BARIUM SULFATE INDEX	-1.1	-1.7
BARIUM SULFATE SCALING	UNLIKELY	UNLIKELY

ILLEGIBLE

UNICHEM INTERNATIONAL

601 NORTH LEECH P.O.BOX1499

HOBBS, NEW MEXICO 88240

COMPANY ENERGY RESERVES GROUP
DATE 12-12-[illegible]
FIELD [illegible] . C C U . #311
SAMPLING POINT WELLHEAD
DATE SAMPLED 12-7-8[illegible]

SPECIFIC GRAVITY = 1.0[illegible]5
TOTAL DISSOLVED SOLIDS = 53[illegible]33
PH = 7.[illegible]7

		ME/L	MG/L
CATIONS			
CALCIUM	(CA)+2	38[illegible]	761.
MAGNESIUM	(MG)+2	50	6[illegible]7.
SODIUM	(NA),CALC	827.	19026.
ANIONS			
BICARBONATE	(HCO3)-1	13.6	829.
CARBONATE	(CO3)-2	0	0
HYDROXIDE	(OH)-1	0	0
SULFATE	(SO4)-2	0	0
CHLORIDES	(CL)-1	902	32000
DISSOLVED GASES			
CARBON DIOXIDE	(CO2)	NOT RUN	
HYDROGEN SULFIDE	(H2S)	NOT RUN	
OXYGEN	(O2)	NOT RUN	
IRON(TOTAL)	(FE)		13
BARIUM	(BA)+2	1.5	108
MANGANESE	(MN)	NOT RUN	

IONIC STRENGTH (MOLAL) =.998

SCALING INDEX	TEMP	
	30C	48.9C
	86F	120F
CARBONATE INDEX	.611	1.01
CALCIUM CARBONATE SCALING	LIKELY	LIKELY
CALCIUM SULFATE INDEX	-66.	-67
CALCIUM SULFATE SCALING	UNLIKELY	UNLIKELY
BARIUM SULFATE INDEX	-1.1	-1.7
BARIUM SULFATE SCALING	UNLIKELY	UNLIKELY

ILLEGIBLE

UNICHEM INTERNATIONAL

601 NORTH LEECH P.O.BOX1499

HOBBS, NEW MEXICO 88240

COMPANY : ENERGY RESERVES GROUP
DATE : 12-12-83
FIELD,LEASE&WELL : C C U [illegible]
SAMPLING POINT: SEPERATOR
DATE SAMPLED : 12-7-83

SPECIFIC GRAVITY = 1.0[illegible]
TOTAL DISSOLVED SOLIDS = 48[illegible]
PH = 7.[illegible]

		ME/L	MG/L
CATIONS			
CALCIUM	(CA)+2	38	761
MAGNESIUM	(MG)+2	37	[illegible]
SODIUM	(NA),CALC	751.	17[illegible]
ANIONS			
BICARBONATE	(HCO3)-1	8.2	500
CARBONATE	(CO3)-2	0	0
HYDROXIDE	(OH)-1	0	0
SULFATE	(SO4)-2	0	0
CHLORIDES	(CL)-1	815	[illegible]000
DISSOLVED GASES			
CARBON DIOXIDE	(CO2)	NOT RUN	
HYDROGEN SULFIDE	(H2S)	NOT RUN	
OXYGEN	(O2)	NOT RUN	
IRON(TOTAL)	(FE)		[illegible]
BARIUM	(BA)+2	1.7	1[illegible]
MANGANESE	(MN)	NOT RUN	

IONIC STRENGTH (MOL/L) =.875

SCALING INDEX	TEMP	
	30C	48.8C
	86F	120F
CARBONATE INDEX	.194	.[illegible]
CALCIUM CARBONATE SCALING	LIKELY	LIKELY
CALCIUM SULFATE INDEX	-63.	-64.
CALCIUM SULFATE SCALING	UNLIKELY	UNLIKELY
BARIUM SULFATE INDEX	-.91	-1.[illegible]
BARIUM SULFATE SCALING	UNLIKELY	UNLIKELY

ILLEGIBLE

UNICHEM INTERNATIONAL

601 NORTH LEACH P.O.BOX1499

HOBBS, NEW MEXICO 88240

COMPANY : ENERGY RESERVES GROUP
DATE : 12-12-83
FIELD OR LEASE NAME : G.C.U. #291
SAMPLING POINT: WELLHEAD
DATE SAMPLED : 12-7-83

SPECIFIC GRAVITY = 1.043
TOTAL DISSOLVED SOLIDS = 43770
PH = 7.19

		MEQ/L	MG/L
CATIONS			
CALCIUM	(CA)+2	36.6	736.
MAGNESIUM	(MG)+2	45.3	551.
SODIUM	(NA)..CALC.	1029.	23670.
ANIONS			
BICARBONATE	(HCO3)-1	11.6	707.
CARBONATE	(CO3)-2	0	0
HYDROXIDE	(OH)-1	0	0
SULFATE	(SO4)-2	0	0
CHLORIDES	(CL)-1	1100	39000
DISSOLVED GASES			
CARBON DIOXIDE	(CO2)	NOT RUN	
HYDROGEN SULFIDE	(H2S)	NOT RUN	
OXYGEN	(O2)	NOT RUN	
IRON, (TOTAL)	(FE)		10.3
BARIUM	(BA)+2	1.5	104.
MANGANESE	(MN)	NOT RUN	

IONIC STRENGTH (MOLAL) =1.191

SCALING INDEX	TEMP	
	37C 98F	75.8C 168F
CARBONATE INDEX	.216	.208
CALCIUM CARBONATE SCALING	LIKELY	LIKELY
CALCIUM SULFATE INDEX	-72.	-75.
CALCIUM SULFATE SCALING	UNLIKELY	UNLIKELY
BARIUM SULFATE INDEX	-1.5	-3.0
BARIUM SULFATE SCALING	UNLIKELY	UNLIKELY

ILLEGIBLE

UNICHEM INTERNATIONAL

601 NORTH LEECH P.O.BOX1369

HOBBS, NEW MEXICO 88240

COMPANY : ENERGY RESERVERS GROUP
DATE : 12-12-83
FIELD,LEASE,WELL : G C U 4300
SAMPLING POINT: SEPERATOR
DATE SAMPLED : 12-7-83

SPECIFIC GRAVITY = 1.092
TOTAL DISSOLVED SOLIDS = 98109
PH = 7.11

		ME/L	MG/L
CATIONS			
CALCIUM	(CA)+2	33.3	666
MAGNESIUM	(MG)+2	51.6	626.
SODIUM	(NA) CALC.	792.	18219.
ANIONS			
BICARBONATE	(HCO3)-1	9.8	597
CARBONATE	(CO3) 2	0	0
HYDROXIDE	(OH)-1	0	0
SULFATE	(SO4)-2	0	0
CHLORIDES	(CL)-1	819	29033
DISSOLVED GASES			
CARBON DIOXIDE	(CO2)	NOT RUN	
HYDROGEN SULFIDE	(H2S)	NOT RUN	
OXYGEN	(O2)	NOT RUN	
IRON(TOTAL)	(FE)		15.1
BARIUM	(BA)+2	2.0	198.
MANGANESE	(MN)	NOT RUN	

IONIC STRENGTH (MOLAL) = 907

SCALING INDEX	TEMP	
	70C	158.8C
	86F	320F
CARBONATE INDEX	.073	.473
CALCIUM CARBONATE SCALING	LIKELY	LIKELY
CALCIUM SULFATE INDEX	-.65.	-.66.
CALCIUM SULFATE SCALING	UNLIKELY	UNLIKELY
BARIUM SULFATE INDEX	-.81	-1.2
BARIUM SULFATE SCALING	UNLIKELY	UNLIKELY

ILLEGIBLE

UNICHEM INTERNATIONAL

601 NORTH LEECH P.O.BOX1499

HOBBS, NEW MEXICO 88240

COMPANY : ENERGY RESERVES
DATE : 12-12 88
FIELD,LEASE&WELL . G C U 1390
SAMPLING POINT SEPERATOR
DATE SAMPLED . 12 7-88

SPECIFIC GRAVITY = 1.035
TOTAL DISSOLVED SOLIDS = 53443
PH = 7.08

		ME/L	MG/L
CATIONS			
CALCIUM	(CA)+2	41.3	828
MAGNESIUM	(MG)+2	36.6	445
SODIUM	(NA),CALC.	837.	19251
ANIONS			
BICARBONATE	(HCO3)-1	13.4	817.
CARBONATE	(CO3)-2	0	0
HYDROXIDE	(OH)-1	0	0
SULFATE	(SO4)-2	0	0
CHLORIDES	(CL)-1	902	32000
DISSOLVED GASES			
CARBON DIOXIDE	(CO2)	NOT RUN	
HYDROGEN SULFIDE	(H2S)	NOT RUN	
OXYGEN	(O2)	NOT RUN	
IRON(TOTAL)	(FE)		9.1
BARIUM	(BA)+2	1.7	120
MANGANESE	(MN)	NOT RUN	

IONIC STRENGTH (MOLAL) =.993

SCALING INDEX	TEMP	
	26.6C	48.8C
	80F	120F
CARBONATE INDEX	.302	.672
CALCIUM CARBONATE SCALING	LIKELY	LIKELY
CALCIUM SULFATE INDEX	[illegible]	[illegible]
CALCIUM SULFATE SCALING	UNLIKELY	UNLIKELY
BARIUM SULFATE INDEX	-1.3	-1.5
BARIUM SULFATE SCALING	UNLIKELY	UNLIKELY

ILLEGIBLE