SHELL OIL COMPANY
1700 BROADWAY
DENVER, COLORADO 80202

April 16, 1974

New Mexico Oil & Gas Conservation Commission
1000 Rio Brazos Road
Aztec, New Mexico 87410

Attention Mr. E. C. Arnold

Gentlemen:

With reference to your recent approval to commingle gas and condensate production from our Mudge 300 and 301 wells with Carson Unit well 113-17, we now solicit your approval to dispose of waters produced from the Dakota formation into the Allison-Menefee-Point Lookout formation of our existing Carson Unit Salt Water Disposal well No. 24-1 and into which Gallup formation water is currently being injected. Waters from the Gallup and Dakota formations are not greatly dissimilar, both having total dissolved solids approximating 30,000 milligrams/liter. We attach herewith Water Analysis Reports from both the Gallup and Dakota formations, a location plat, a schematic drawing of the existing SWD unit well 24-1 and an amended form C-108.

Your early consideration will be greatly appreciated.

Very truly yours,

For: J. S. Mize
Division Operations Engineer
Rocky Mountain Operations

KWL:vh

Attachments

cc: U. S. Geological Survey
Farmington, New Mexico
Attention Mr. P. T. McGrath

SWD-127

Form C-108
Revised 1-1-65

NEW MEXICO OIL CONSERVATION COMMISSION

APPLICATION TO DISPOSE OF SALT WATER BY INJECTION INTO A POROUS FORMATION

OPERATOR	ADDRESS
Shell Oil Company	1700 Broadway, Denver, Colorado 80202

LEASE NAME	WELL NO.	FIELD	COUNTY
Carson Unit	24-1	Bisti	San Juan

LOCATION

UNIT LETTER A ; WELL IS LOCATED 454 FEET FROM THE north LINE AND 2074 FEET FROM THE east LINE, SECTION 24 TOWNSHIP 25N RANGE 12W NMPM.

CASING AND TUBING DATA

NAME OF STRING	SIZE	SETTING DEPTH	SACKS CEMENT	TOP OF CEMENT	TOP DETERMINED BY
SURFACE CASING	13-3/8"	70'	70	circulated	
INTERMEDIATE	8-5/8"	2835'	750	1100'	Temp. survey
~~XXXXXXX~~ Slotted Liner	6-5/8"	3815'	None, gravel packed		
TUBING Proposed	2-7/8"	2500'±	NAME, MODEL AND DEPTH OF TUBING PACKER: Baker Model AD-1 2500'±		

NAME OF PROPOSED INJECTION FORMATION	TOP OF FORMATION	BOTTOM OF ~~FORMATION~~ hole
Allison-Menefee and Point Lookout	2076'	3815'

IS INJECTION THROUGH TUBING, CASING, OR ANNULUS?	PERFORATIONS OR OPEN HOLE?	PROPOSED INTERVAL(S) OF INJECTION
Tubing	Gravel packed slotted liner	2835-3815

IS THIS A NEW WELL DRILLED FOR DISPOSAL?	IF ANSWER IS NO, FOR WHAT PURPOSE WAS WELL ORIGINALLY DRILLED?	HAS WELL EVER BEEN PERFORATED IN ANY ZONE OTHER THAN THE PROPOSED INJECTION ZONE?
No	Water Source Well	No

LIST ALL SUCH PERFORATED INTERVALS AND SACKS OF CEMENT USED TO SEAL OFF OR SQUEEZE EACH

None

DEPTH OF BOTTOM OF DEEPEST FRESH WATER ZONE IN THIS AREA	DEPTH OF BOTTOM OF NEXT HIGHER OIL OR GAS ZONE IN THIS AREA	DEPTH OF TOP OF NEXT LOWER OIL OR GAS ZONE IN THIS AREA
300'	None	4700'

ANTICIPATED DAILY INJECTION VOLUME (BBLS.)	MINIMUM	MAXIMUM	OPEN OR CLOSED TYPE SYSTEM	IS INJECTION TO BE BY GRAVITY OR PRESSURE?	APPROX. PRESSURE (PSI)
	600 0	1000-Gallup 1000-Dakota	Closed	Pressure	600 psi

ANSWER YES OR NO WHETHER THE FOLLOWING WATERS ARE MINERALIZED TO SUCH A DEGREE AS TO BE UNFIT FOR DOMESTIC, STOCK, IRRIGATION, OR OTHER GENERAL USE —	WATER TO BE DISPOSED OF	NATURAL WATER IN DISPOSAL ZONE	ARE WATER ANALYSES ATTACHED?
	Yes	Yes	Yes

NAME AND ADDRESS OF SURFACE OWNER (OR LESSEE, IF STATE OR FEDERAL LAND)

Federal Land - Lessee: Shell Oil Company

LIST NAMES AND ADDRESSES OF ALL OPERATORS WITHIN ONE-HALF (½) MILE OF THIS INJECTION WELL

Shell Oil Company

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DIST. 3

HAVE COPIES OF THIS APPLICATION BEEN SENT TO EACH OF THE FOLLOWING?	SURFACE OWNER	EACH OPERATOR WITHIN ONE-HALF MILE OF THIS WELL	THE NEW MEXICO STATE ENGINEER
	Federal Lessee: Shell Oil Co.	Shell Oil Co.	Yes
ARE THE FOLLOWING ITEMS ATTACHED TO THIS APPLICATION (SEE RULE 701-B)	**PLAT OF AREA**	**ELECTRICAL LOG**	**DIAGRAMMATIC SKETCH OF WELL**
	Yes	Yes	Yes

I hereby certify that the information above is true and complete to the best of my knowledge and belief.

G Hallow — For: Division Operations Engineer — 4/16/74

(Signature) (Title) (Date)

NOTE: Should waivers from the State Engineer, the surface owner, and all operators within one-half mile of the proposed injection well. not accompany this application, the New Mexico Oil Conservation Commission will hold the application for a period of 15 days from the date of receipt by the Commission's Santa Fe office. If at the end of the 15-day waiting period no protest has been received by the Santa Fe office, the application will be processed. If a protest is received, the application will be set for hearing, if the applicant so requests. SEE RULE 701.


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SHELL OIL CO.
RM-330 (2-72)

WESTERN E&P REGION
ROCKY MOUNTAIN DIVISION

WATER ANALYSIS REPORT

— Sampled ± 10/26/73
Produced water from
Mudge #300
(DAKOTA "B")

LABORATORY NUMBER A-260
SAMPLE TAKEN
SAMPLE RECEIVED
RESULTS REPORTED

SAMPLE DESCRIPTION FIELD NO. Bisti
COMPANY Shell Oil LEASE WELL NO. Mudge 300
SEC. TWP. RGE. SUR.
DISTRICT FIELD COUNTY STATE
SAMPLE TAKEN FROM
PRODUCING FORMATION TOP
REMARKS

SAMPLE TAKEN BY

CHEMICAL AND PHYSICAL PROPERTIES

SPECIFIC GRAVITY @60/60° F. pH 7.9 RES. .23 OHM METERS @ 77°F

TOTAL HARDNESS Mg/L as $CaCO_3$ TOTAL ALKALINITY Mg/L as $CaCO_3$

CONSTITUENT	MILLIGRAMS PER LITER Mg/L.	MILLEQUIVALENTS PER LITER MEQ/L		REMARKS
CALCIUM - Ca^{++}	620.0	31.		
MAGNESIUM - Mg^{++}	203.0	17.		
SODIUM - Na^{+}	11,800.0	513.		
BARIUM (INCL. STRONTIUM) - Ba^{++}	4.0	--		
TOTAL IRON - Fe^{++} AND Fe^{+++}	1.80	0.6		
BICARBONATE - HCO_3^{-}	588.0	9.64		
CARBONATE - CO_3^{--}	0			
SULFATE - SO_4^{--}	1920	40		
CHLORIDE - Cl^{-}	18,744	529		
TOTAL DISSOLVED SOLIDS	30,160			

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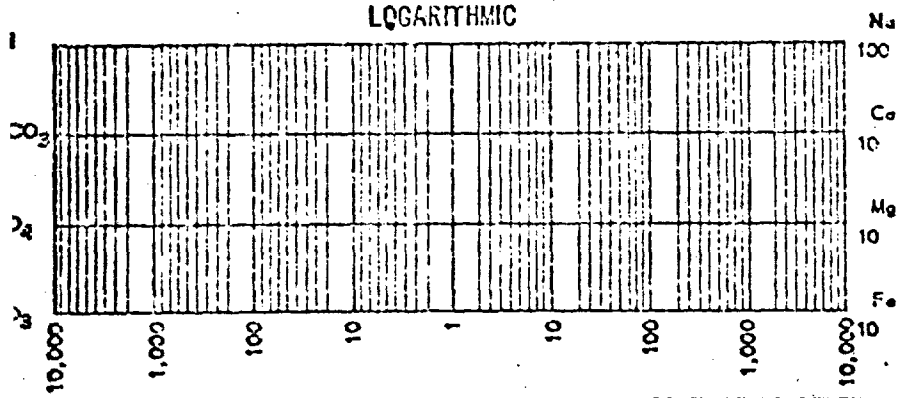
DIST. 3

MILLEQUIVALENTS PER LITER

LOGARITHMIC



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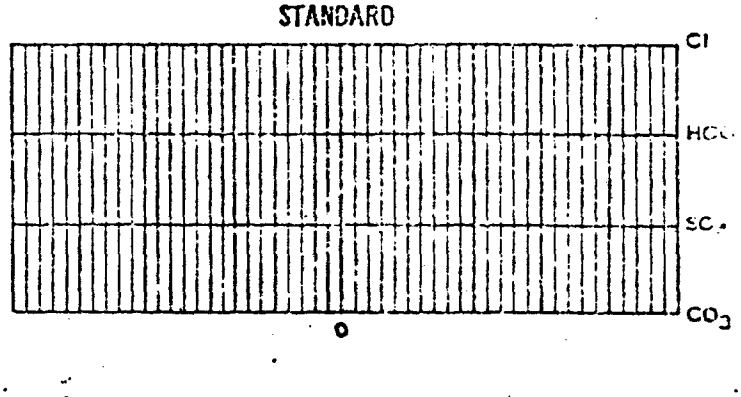

ANALYST

SHELL OIL CO.
SWM-320 (2-72)

GPD
GNI

WESTERN E&P REGION
ROCKY MOUNTAIN DIVISION

WATER ANALYSIS REPORT

LABORATORY NUMBER A-404
SAMPLE TAKEN 12-14-73 1:00 PM
SAMPLE RECEIVED 12-13-73 8:00 AM
RESULTS REPORTED

SAMPLE DESCRIPTION FIELD NO.
COMPANY Shell Oil Co. LEASE Bisti Field New Mexico WELL NO.
SEC. TWP. RGE. SUR.
DISTRICT FIELD COUNTY STATE
SAMPLE TAKEN FROM
PRODUCING FORMATION Gallup TOP
REMARKS From treater dump @ tank battery

SAMPLE TAKEN BY

CHEMICAL AND PHYSICAL PROPERTIES

SPECIFIC GRAVITY @60/60° F. 1.003 pH 7.3 RES. 24 OHM METERS @ 77°F

TOTAL HARDNESS Mg/L as $CaCO_3$ 827 TOTAL ALKALINITY 480 Mg/L as $CaCO_3$

CONSTITUENT	MILLIGRAMS PER LITER Mg/L.	MILLEQUIVALENTS PER LITER MEQ/L		REMARKS
CALCIUM - Ca^{++}	230.0	11.5		
MAGNESIUM - Mg^{++}	83.0	6.8		
SODIUM - Na^{+}	13700.0	813.0		
Hydroxide	0.0			
BARIUM (INCL. STRONTIUM) - Ba^{++}	360.0	5.2		
TOTAL IRON - Fe^{++} AND Fe^{+++}	5.9	0.2		
BICARBONATE - HCO_3^{-}	480	7.9		
CARBONATE - CO_3^{--}	0			
SULFATE - SO_4^{--}	4.9ppm	0.01		
CHLORIDE - CL^{-}	2789	78.7		
TOTAL DISSOLVED SOLIDS	27720			

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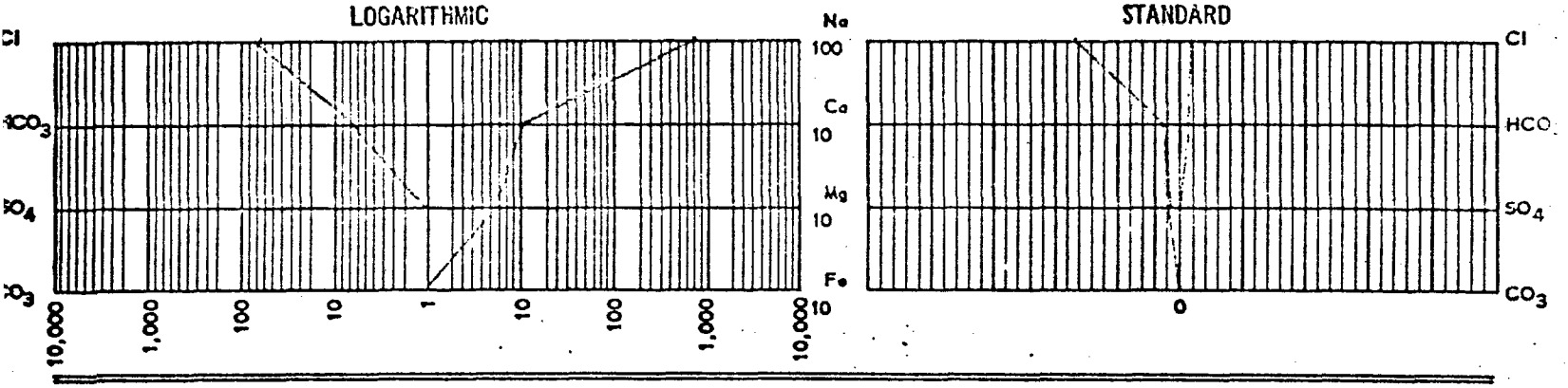
OIL CON. COM.
DIST. 3

MILLEQUIVALENTS PER LITER



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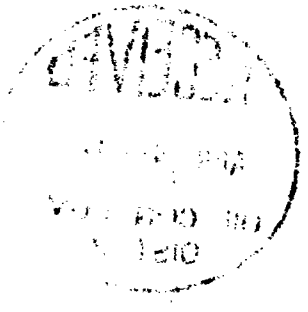
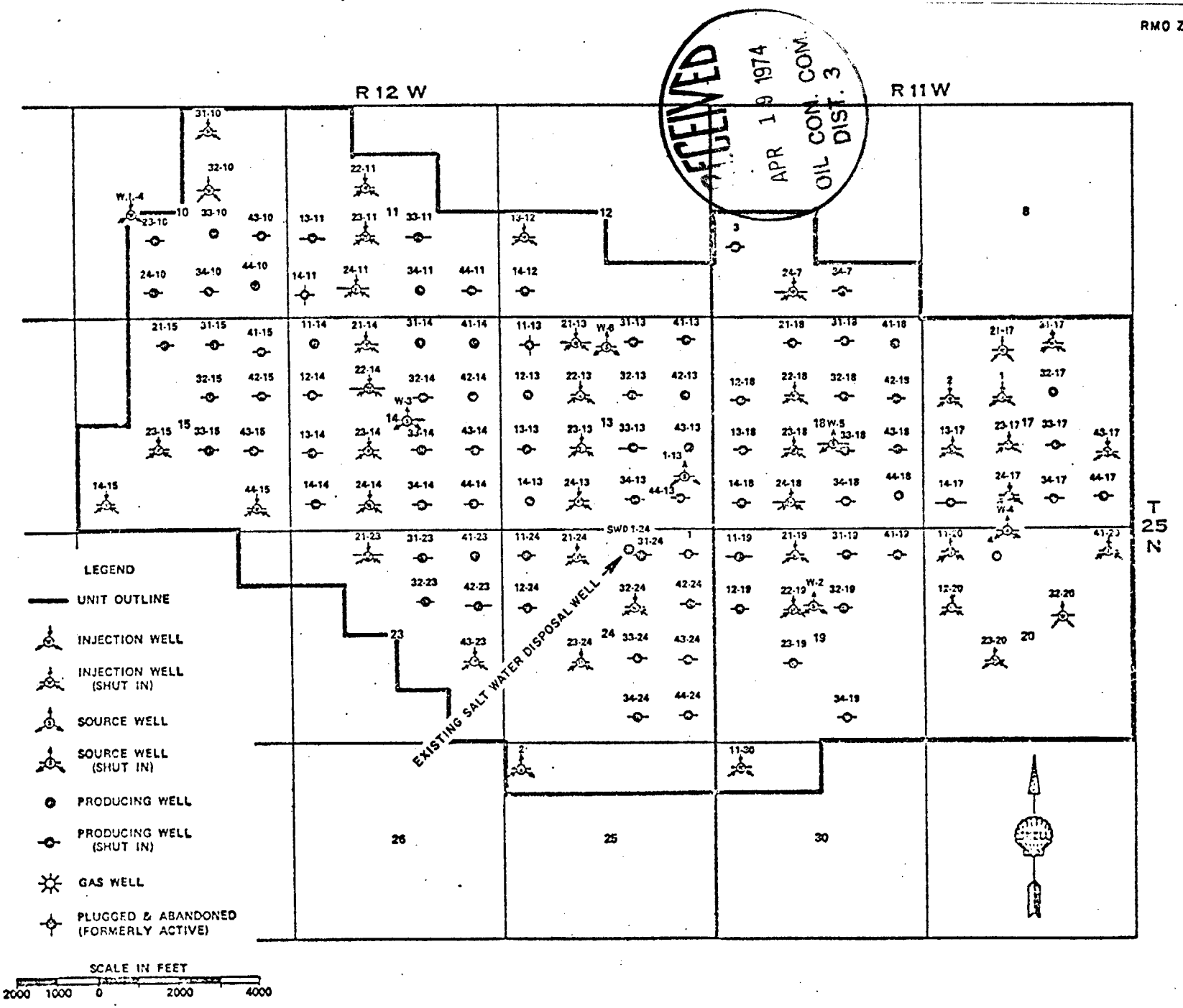
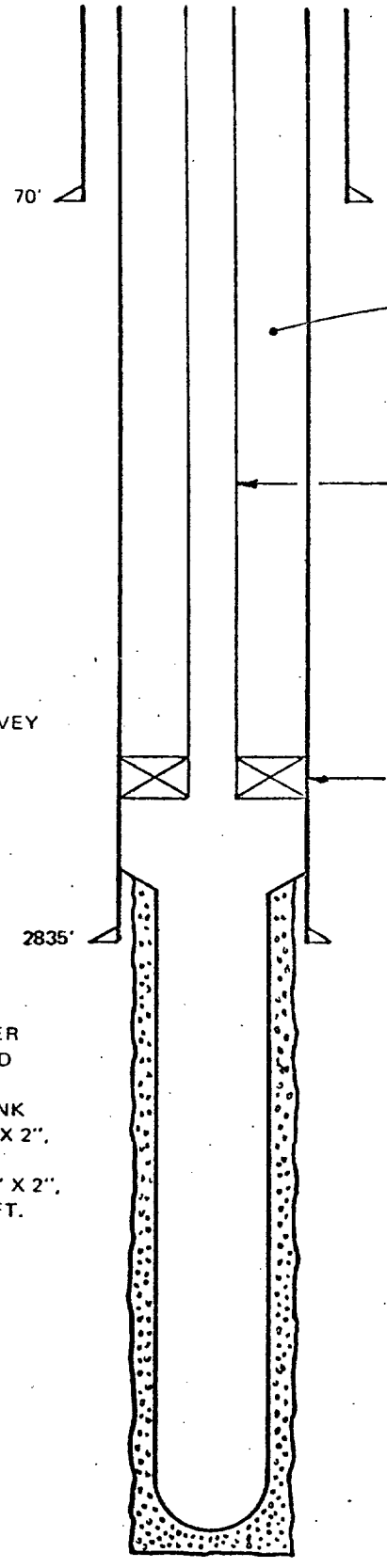




BISTI FIELD
CARSON FLOOD UNIT
SAN JUAN COUNTY, N. MEX.

RMO 2-23

SALT WATER DISPOSAL WELL
CARSON UNIT 24-1, A24 – 25N – 12W
ELEV. 6425.7' G.L.
6433.4' D.F.
6434.9' K.B.
SAN JUAN CO., N. MEX.



13-3/8" 48 LBS., H-40 SET @ 70', CEMENTED W/70 SX., 2% $CaCl_2$, GOOD RETURNS TO SURFACE

SKETCH DEPICTS CURRENT CASING, LINER, TUBING AND PACKER FOR WATER INJECTION

INHIBITED FRESH WATER ANNULAR FLUID

3½" J-55 TUBING

8-5/8" 32 LBS. H-40 SET @ 2835', CEMENTED W/650 SX. 1:1 DIAMIX & 100 SX. REG. CEMENT TOP @ 1100' DETERMINED BY TEMP. SURVEY

PACKER AT 2519'

B & W LINER HANGER TOP @ 2779'

6-5/8" 18.9 LBS. & 20 LB. LINER SET @ 3815', GRAVEL PACKED
LINER DETAIL:

TOP JT.	30.15' BLANK
NEXT JT.	30.69' .05" X 2", 1 SLOT/FT.
REMAINDER	963.89' .05" X 2", 47 SLOTS/FT.

BOTTOM OF LINER @ 3815' BULLNOSED

LOS ANGELES PRODUCTION LABORATORY
WATER ANALYSIS

FIELD: Bisti

SAMPLED: 12-3-60

WELL: Water Well W-1

After 23,263.5 bbls. production

Constituent		PPM	Meq./Liter
Carbonate	CO_3	0	0
Bicarbonate	HCO_3	659	10.8
Chloride	Cl	20,768	585.0
Sulfate	SO_4	7	0.15
Barium	Ba	160	2.33
Calcium	Ca	248	12.4
Magnesium	Mg	102	8.4
Ammonium	NH_4	12	0.67
Iron	Fe	0	0
Sodium	Na	13,159	572.15
Total dissolved solids (by addition)		35,116	
Total dissolved solids (105°C)		35,182	
Resistivity (ohmmeters at 74.5°F)		0.21	
pH		7.85	
Salinity (NaCl)		34,223	
Total Hardness ($CaCO_3$)		1,040	
Boron (B)		1	
Suspended inorganic solids		11	
Suspended hydrocarbons		42	

Farmington Division
WMW:jr 1-9-61

GLI-51

CHEM LAB

WATER ANALYSIS EXCHANGE REPORT

MEMBER COMPANY	Gulf Oil Corporation	DATE	May 15, 1958 REPORT NO. 5-658
OPERATOR	Gulf Oil Corporation	LOCATION	Section 24-25N-11W
WELL NO.	No. 5 Carson	FORMATION	Gallup
FIELD	Bisti	DEPTHS	4924 - 5080
COUNTY	San Juan	SAMPLE FROM	Treater
STATE	New Mexico		

DESCRIPTION OF SAMPLE: Clear water, correlates with Gallup water from this area.

CONSTITUENTS	PPM	MEQ.	MEQ.%
SODIUM	12,135	527.86	47.14
CALCIUM	374	18.66	1.67
MAGNESIUM	163	13.40	1.19
SULFATE	-	-	-
CHLORIDE	19,600	552.72	49.36
CARBONATE	-	-	-
BICARBONATE	439	7.20	0.64
HYDROXIDE	-	-	-

OBSERVED pH - 7.3

CHLORIDE as NaCl 32,313

RESISTIVITY @ 68° F., ohm-meters
MEASURED 0.23
CALCULATED

TOTAL SOLIDS IN PARTS PER MILLION

BY EVAPORATION	32,582
AFTER IGNITION	32,506
CALCULATED	32,488

PROPERTIES OF REACTION IN PERCENT

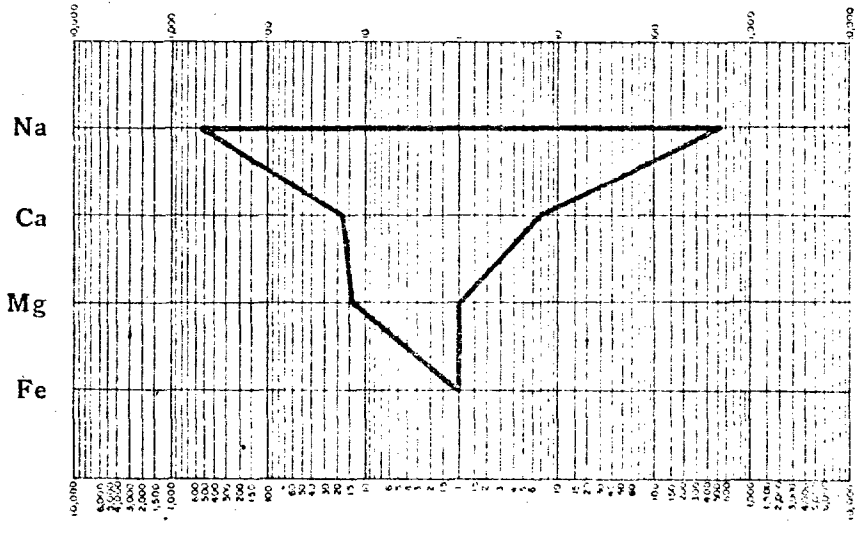
PRIMARY SALINITY	94.28
SECONDARY SALINITY	1.44
PRIMARY ALKALINITY	0.00
SECONDARY ALKALINITY	1.28
CHLORIDE SALINITY	100.00
SULFATE SALINITY	0.00

Specific gravity @ 70° F. - 1.020

WATER ANALYSIS PATTERNS

MEQ per unit

LOGARITHMIC



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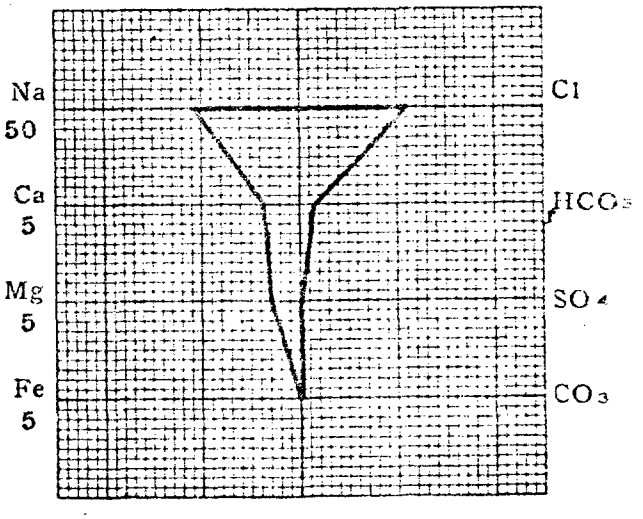


NOTE: PPM = Milligrams per liter (1 PPM is equivalent to 0.0001% by weight).
MEQ = Milliequivalents per liter. MEQ% = Milliequivalents per liter in percent.

CLI-51

CHEM LAB

WATER ANALYSIS EXCHANGE REPORT

MEMBER COMPANY	Gulf Oil Corporation	DATE	August 2, 1957 — REPORT NO. 11-860
OPERATOR	Gulf Oil Corporation	LOCATION	Section 21-25N-11W
WELL NO.	1 Tah Nez Bah Heirs Navajo	FORMATION	Gallup
FIELD	Bisti	DEPTHS	4938 - 4975
COUNTY	San Juan	SAMPLE FROM	Flowing
STATE	New Mexico		

DESCRIPTION OF SAMPLE: Clear water with oil scum. Correlates with Gallup water in this field.

CONSTITUENTS	MILLIGRAMS PER LITER	MEQ. PER LITER	MEQ.%
SODIUM	14,719	640.26	47.50
CALCIUM	484	24.15	1.79
MAGNESIUM	117	9.62	0.71
SULFATE	10	0.21	0.02
CHLORIDE	23,400	659.88	48.95
CARBONATE	-	-	-
BICARBONATE	850	13.94	1.03
HYDROXIDE	-	-	-

TOTAL SOLIDS IN PARTS PER MILLION	
BY EVAPORATION	41,186
AFTER IGNITION	38,508
CALCULATED	39,149

PROPERTIES OF REACTION IN PERCENT	
PRIMARY SALINITY	95.00
SECONDARY SALINITY	2.94
PRIMARY ALKALINITY	0.00
SECONDARY ALKALINITY	2.06
CHLORIDE SALINITY	99.96
SULFATE SALINITY	0.04

OBSERVED pH - 7.2

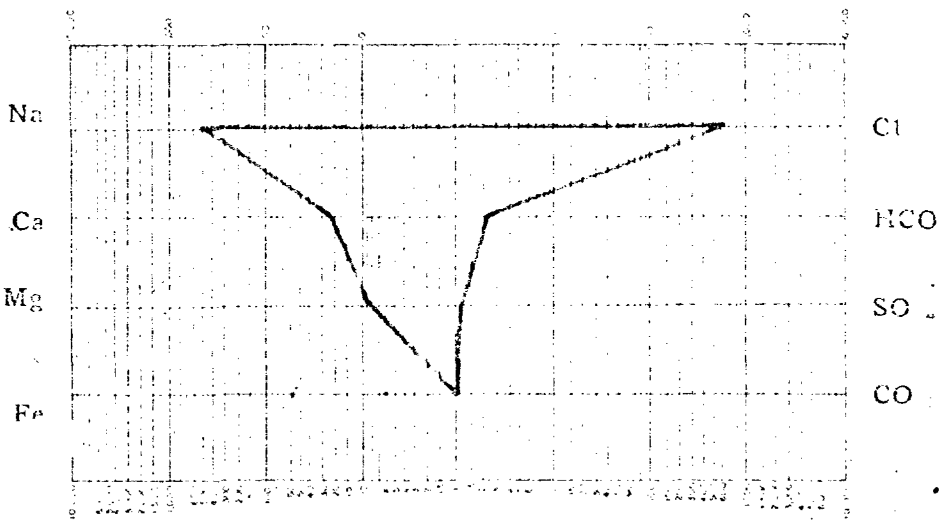
NaCl Equivalent 39,047

RESISTIVITY @ 68 F., ohm-meters
MEASURED 0.20
CALCULATED 0.19

WATER ANALYSIS PATTERNS

MEQ per unit

LOGARITHMIC



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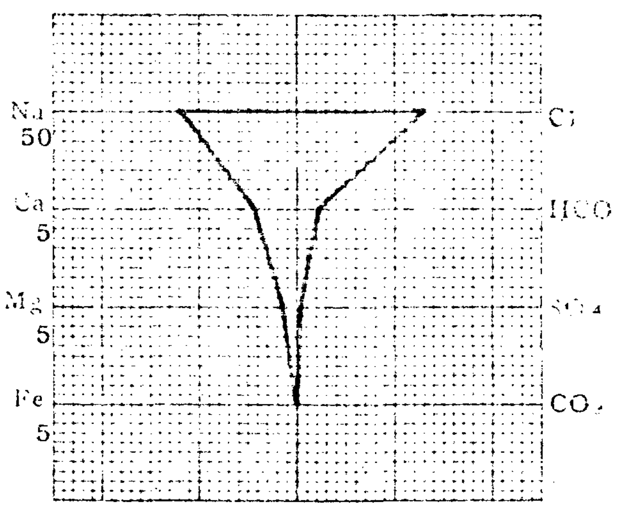


NOTE: MEQ = Milliequivalents per liter. MEQ% = Milliequivalents per liter in percent.
NaCl Equivalent = by Dunlap & Hawthorne calculation from total constituents

CLI-51

CHEM LAB

WATER ANALYSIS EXCHANGE REPORT

MEMBER COMPANY Shell Oil Company
OPERATOR Shell Oil Company
WELL NO. Carson Unit No. 2
FIELD Carson
COUNTY San Juan
STATE New Mexico

DATE April 15, 1957 REPORT NO. 4-1157
LOCATION Sec. 25-25N-12W
FORMATION Gallup
DEPTHS
SAMPLE FROM Production water

DESCRIPTION OF SAMPLE Clear water. Correlates with Gallup water in this field.

CONSTITUENTS	PPM	MEQ.	MEQ %
SODIUM	17,404	757.06	47.26
CALCIUM	528	26.35	1.64
MAGNESIUM	214	17.59	1.10
SULFATE	-	-	-
CHLORIDE	28,000	789.60	49.29
CARBONATE	-	-	-
BICARBONATE	695	11.40	0.71
HYDROXIDE	-	-	-

OBSERVED pH - 6.2

CHLORIDE as NaCl 46,161

Specific gravity @ 70°F. - 1.036

RESISTIVITY @ 68 F., ohm-meters
MEASURED 0.17
CALCULATED

TOTAL SOLIDS IN PARTS PER MILLION

BY EVAPORATION	45,216
AFTER IGNITION	44,164
CALCULATED	46,488

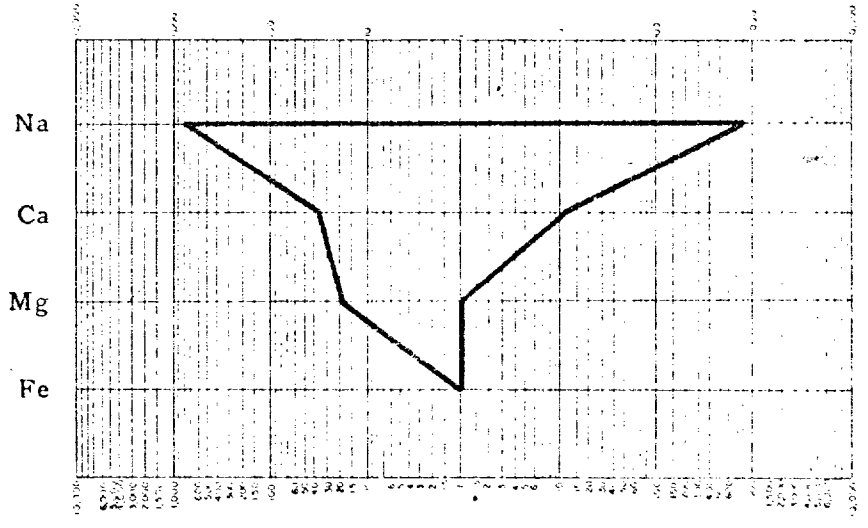
PROPERTIES OF REACTION IN PERCENT

PRIMARY SALINITY	94.52
SECONDARY SALINITY	4.06
PRIMARY ALKALINITY	0.00
SECONDARY ALKALINITY	1.42
CHLORIDE SALINITY	100.00
SULFATE SALINITY	0.00

WATER ANALYSIS PATTERNS

MEQ per unit

LOGARITHMIC



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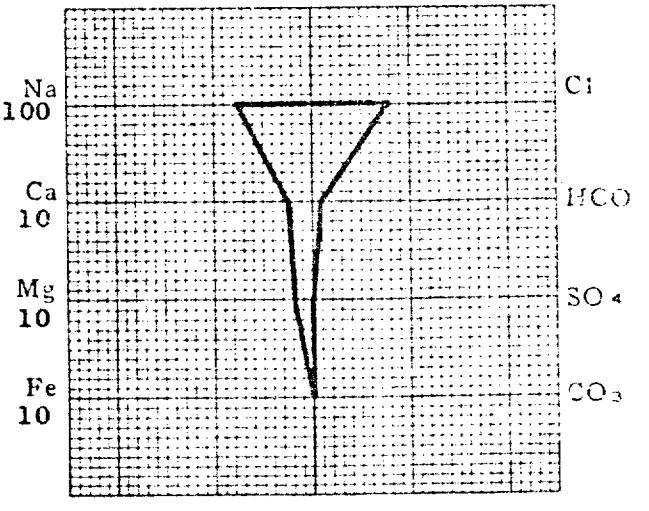


NOTE: PPM = Milligrams per liter (1 PPM is equivalent to 0.0001% by weight).
MEQ = Milliequivalents per liter. MEQ% = Milliequivalents per liter in percent.

CHEM LAB

WATER ANALYSIS EXCHANGE REPORT

10615-4

MEMBER COMPANY Shell Oil Company
OPERATOR Skelly Oil Company
WELL NO Skelly-Navajo E-1
FIELD San Juan Basin
COUNTY San Juan
STATE New Mexico

DATE March 6, 1956 REPORT NO
LOCATION SW NE SE 14-26N-12W
FORMATION Gallup
DEPTHS
SAMPLE FROM Production water

DESCRIPTION OF SAMPLE

CONSTITUENTS	PPM	MEQ.	MEQ %
SODIUM	10,838	471.45	46.20
CALCIUM	636	31.74	3.11
MAGNESIUM	86	7.07	0.69
SULFATE	412	8.57	0.84
CHLORIDE	17,200	485.04	47.53
CARBONATE	-	-	-
BICARBONATE	1,015	16.65	1.63
HYDROXIDE	-	-	-

OBSERVED pH - 7.0

CHLORIDE as NaCl 28,356

RESISTIVITY @ 68 F., ohm-meters
MEASURED 0.30
CALCULATED

Specific gravity @ 70°F. - 1.022

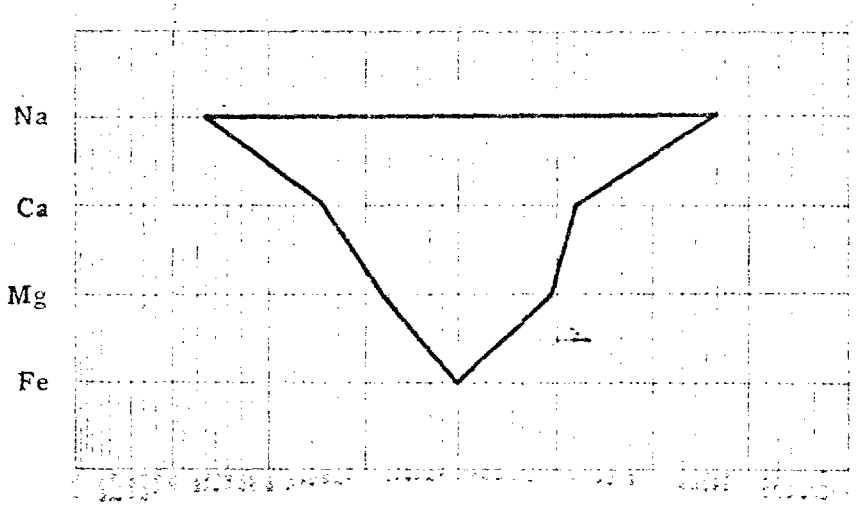
TOTAL SOLIDS IN PARTS PER MILLION	
BY EVAPORATION	32,680
AFTER IGNITION	29,596
CALCULATED	29,672

PROPERTIES OF REACTION IN PERCENT	
PRIMARY SALINITY	92.40
SECONDARY SALINITY	4.34
PRIMARY ALKALINITY	0.00
SECONDARY ALKALINITY	3.26
CHLORIDE SALINITY	98.26
SULFATE SALINITY	1.74

WATER ANALYSIS PATTERNS

MEQ per unit

LOGARITHMIC



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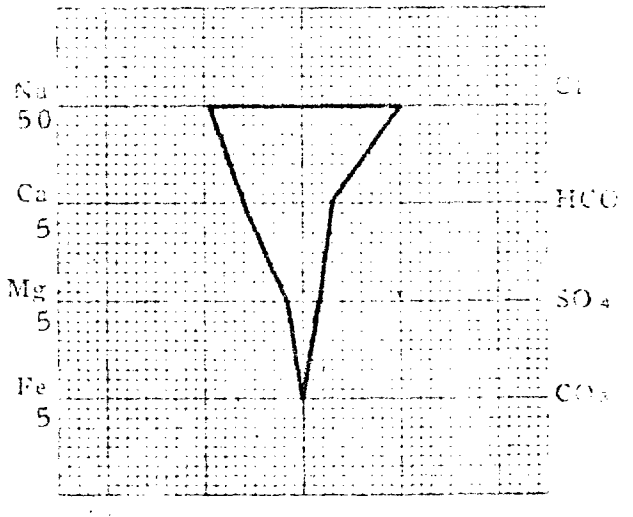

NOTE: PPM = Milligrams per liter (1 PPM is equivalent to 0.0001% by weight)
MEQ = Milliequivalents per liter MEQ% = Milliequivalents per liter in percent