PAUL BACA PROFESSIONAL COURT REPORTERS

# OIL CONSERVTIONS DIVISION

# CASE #: 14178

# EXHIBIT 6-A



# City of Carlsbad Municipal Water System 2007 Annual Consumer Report on the Quality of Your Drinking Water

#### For areas serviced by the Carlsbad Municipal and Double Eagle Water Systems

This is an **US EPA-required report** that is a result of an unfunded mandate added under the federal Safe Drinking Water Act amendment of 1996. The Safe Drinking Water Act (SDWA) was signed into law on December 16, 1974. The purpose of the law is to assure that the nation's water supply systems serving the public meet minimum national standards for the protection of public health.

Este noticia contiene información importante sobre la calidad del agua en su comunidad. Tradúzcalo o hable con alguien que lo entienda bien.

This brochure explains how drinking water provided by the City of Carlsbad is of high quality. Included is a listing of results from water-quality tests as well as an explanation of where our water comes from and tips on how to interpret the data. This "Consumer Confidence Report" is required by law. We're proud to share our results with you. Please read them carefully.

# Our drinking water currently meets or surpasses all federal and state drinking water quality standards.

#### Overview

In 2007, your water department distributed 2.589 billion gallons of water to Carlsbad area customers. Our system consists of 1162 miles of water distribution and transmission lines spread throughout the Carlsbad area, Lea and Eddy Counties. The Water Department office is located at 1502 W. Stevens Street. City water main leaks should be reported to the Water Department Superintendent at 885-6313 (M-F, 7 AM to 4 PM) or the Police Department at 885-2111 (after hours, weekends, and holidays). Water billing is handled through the Finance Department at City Hall (101 N. Halagueno Street). Billing inquires can be directed to Customer Service at 887-1191 (M-F, 8 AM to 5 PM).

#### Water Sources

The City of Carlsbad is serviced by two separate well fields - Sheep's Draw and Double Eagle (see Map below). Approximately 98% of Carlsbad's water (identified as Zone 1 in Table below) is supplied by groundwater pumped from 9 wells located 7 miles southwest of Carlsbad in an area called Sheep's Draw in the foothills of the Guadalupe Mountains. These wells range in depth from 500 to 900 feet and pull water from the same limestone formation that the Carlsbad Caverns was formed in. This aquifer is called the Capitan Aquifer. The City of Carlsbad, under the authority of its ordinance (Ordinance 2000-13) maintains and enforces a Wellhead Protection Program to protect your water from contamination and depletion.

Map A: Geographic Location of Sheep's Draw and Double Eagle



The Double Eagle well system serves the Ridgecrest Subdivision, Connie Road, Blackfoot Road, as well as the Hobbs Highway Industrial Park Area, Brantley Lake State Park, and the Waste Isolation Pilot Plant and is supplied by groundwater pumped from 11 wells near Maljamar, NM in northwestern Lea County. These wells are 150-350 fect in depth. Double Eagle water comes from a hydrologic formation known as the Ogallala Aquifer.

The SDWA covers all public water systems with piped water for human consumption with at least 15 service connections or a system that regularly serves at least 25 individuals. The SDWA directed the U.S. Environmental Protection Agency (EPA) to establish national drinking water standards. These standards limit the amount of certain contaminants provided by public water. Food and Drug Administration (FDA) regulations establish limits for contaminants

in bottled water. All drinking water, including bottled water, may reasonably be expected to contain at least small amounts of some contaminants. The presence of contaminants does not necessarily indicate that the water poses a health risk. More information about contaminants and potential health effects can be obtained by calling the <u>EPA Safe Drinking Water Hotline</u> (800-426-4791).

Case 14178 Mesquite SWD, Inc. OCD Exhibit 6-A

# Prepared by

## UNITED STATES DEPARTMENT OF THE INTERIOR

## GEOLOGICAL SURVEY

#### In cooperation with

### NEW MEXICO STATE ENGINEER

**Resource Map 4** 

# Published by

# NEW MEXICO BUREAU OF MINES & MINERAL RESOURCES

A Division of New Mexico Institute of Mining and Technology

Case 14178 Mesquite SWD, Inc. OCD Exhibit 6-B



-108 SUBMITTAL

#### ATTACHMENT VIII

The proposed injection zone is a fine grained sand in the Delaware Formation. It has several sands with varying thickness. There is possible drinking water overlying the injection in the surface sands at a depth of 0-250' and in the Seven Rivers formation 1000-2300'. There is no known source underlying the injection interval.

#### ATTACHMENT XI

There is one <u>inactive</u> fresh water well located in UL M Sec 9 T21S-R27E that is within one mile of the proposed disposal well.

SWD-875-A 2/1/07 (UNIT B/S&16/215/27E) RAT WESTALL (RANDALL HARRIS GEOLOGIST) 5,000' FINJECTION Well (CHEMY CANYON)

Case 14178 Mesquite SWD, Inc. OCD Exhibit 6-C

				eg inter a sine a s	n a Sasaaran		01
			L'AND AND AND AND AND AND AND AND AND AND	and the second secon	። ትትቃ ነል።	TE* CODA	UNDOWED SP
1 E	Form 3160-3 Guly 1992)	LIN	ITED STATES	Albern (Albern	Minictions on	OMB NC	D. 1004-0136
		DEPARTME	NT OF THE IN	TERIOR	+3£310C)	Expires: Feb	ON AND SEBIAL NO.
		BUREAU OF	LAND MANAGE	MENT J Hard	li tor	NMNM 01119	
-	APPLICA	TION FOR PER	MIT TO DRILL	OR DEEPEN	<del>n yy</del>	6. IF INDIAN, ALLOT	TEE OR TRUBE NAME
ł.	a. TYPE OF WORK DF		DEEPEN			7. UNIT AGREEMENT	NAME E LINTT
-	OIL X	GAS WELL OTHER		SINGLE MULTH ZONE ZONE	`LE 🔲	X. FARM OR LEASE N	AME, WELL NO.
2	EXXON CORPC	RATION ATTN:	7673 REGULATORY	AFFAIRS ML#14	4	2012 523 9. API WELL NO.	17612
3	. ADDRESS AND TELEPHO	P. O. BOX	600		<del></del>	30-015	- 28910
	. 1.0CATION OF WELLI (R	MIDLAND, T> eport location clearly and in acco	<b>79702</b>	nents.*)		AVALON DELAWARE	3715
1336	1386' FNL A	ND 1314 FWL	UNORTHODOS	Like Approval	et Al Ara-	HE SEC., T., R., M., OR AND SURVEY OR A	BLK. REA
1326	At proposed prod. zone	ND 1314' FWL	UnitE	Lo By State		SEC 31, T2	05, R28E
10	U DISTANCE IN MILES AN	D DIRECTION FROM NEAR	EST TOWN OR POST OFFIC	Е.		12. COUNTY OR PARIS	5H 13. STATE NM
1.5	5. DESTANCE FROM PROP NEAREST PROPERTY O	USED' LOCATION TO 264 R LEASE LINE, FT.	6' Ić.	NO. OF A RESIN LEASE	- [ <sup>1</sup> . NO. 0 TO TI	F ACRÉS ASSIGNED	· ·
: ·	Viso to nearest drig, unit	DSED LOCATION•	FEL 19.	2118.78× PROPOSED DEPTH	20. ROTA	AU XX RY OR CABLE TOOLS	· ·
	TO NEAREST WELL, DRI OR APPLIED FOR, ON TI	ILLING, COMPLETED, HIS LEASE, FT. 885' S	Е ТО #2113	4500	RU	IARY	WORK WILL START
	3283' GR	aner Dr. KI, OK, etc.)	Capitar	Controlled Water B	lasin	02/10/9	<b>6</b>
21			PROPOSED CASING AND	CEMENTING PROGRAM			
	SIZE OF HOLE	GRADE, SIZE OF CASING	WEIGHT PER FOOT	SETTING DEPTH	60 0	QUANTITY OF CEME	
	14 3/4	10 3/4	40.4#/K-55	600'	350	CU. FT. TO	SURF.
9718	9 112"	7 5/8"	26.4#/K-55	2540'	500	CU. FT. TO	SURF.
	6 3/4"	4 1/2"	4.56#/***	**** JOm P	300	CU. FTLN	R. TOP
	See Lina	CREACE - 216	for ferry			ODOX LOCAT	
	SIMULTANEOU	SLY DEDICATE	D W∕ #2111.	***4 1/2" PR	OD. ST	RING IS FIE	BERGLASS
	**** 4 1/2"	PROD. STRIN	G FROM 2300'	TO TD.			Port ID-1
	CSG.	CMT. TYP	=			0	4-5-96
	10 3/4"	LITE CMT	. & CLASS "C	. 4		The	v hac + H FL
	7 5/8"	LITE CMT	. & CLASS "C	DRTLLING D		N WTIL BE 2	DAYS.
	FOR SURFACE	USE PLAN ANI	D DRILLING E	IGHT POINT PL	AN REF	ER TO UNIT	VIDE
	ACTIVITIES	E. BOND COVI	ERAGE PURSUA /IDED BY EXX	NT TO 43 CFR . On corporation	3104 F N'S NA'	OR LEASE TIONWIDE OI	L AND
- 12	GAS BLANKET	BOND NUMBER	511-23-06 () propusal is to deepen, give	BLM BOND NO.	0024).	i new productive zone. If	proposal is to drill or
. <u>1</u>	expendirectionally, give pertinei	nt data on subsurface locations and	I measured and true vertical dep	ths. Give blowout preventer progra	im, if any.	(01	5) 699-6793
	NIGNED CCC	Allarea		R.REGULATORY	SPECIA	LIST 08/	15/95
	This space for Federat or S	/ State office usej	- <u></u>	<u>,</u>		<u></u>	· · · · · · · · · · · · · · · · · · ·
	PERMIT NO.			APPROVAL DATE			
			TITLE	11 - 11 - 11 - 11 - 11 - 11 - 11 - 11	• •		585
	CONDITIONS OF APPROV	AL, IF ANY:		-	· · ·		<u>,</u> _
		ł	×-10460-	B		Case 1417	78
ſ.	He IN C'S C'Section 10	0) makes it a crime for a	"See Instruction	ts On Reverse Side	ent	Mesquite SWI	D, Inc.
				, <b></b> ,, .	ı	UUD EXMU	ли <b>О-Д</b>

GEOLOGY COMMENTS ON FORM G-108

The injection zone is in the Guadalupian age Delaware sands. VIII. The sands are light gray, very fine grained, subangular to subround, moderate to well sorted with thin argillareous lamintations. The degree of induration varies from friable sands to consolidated, calcareous-cemented sandstone. Four separate injection zones in the Delaware sands are included in the plan: 3840'-3856', 3869'-3880', 3898'-3934' and 3964'-4022'.

The Rustler formation is the primary source of drinking water for this area. The base of the fresh water is + 400 ft. A second underground aquifer which contains low salinity water in this area, is the Capitan Reef. The base of the low salinity water in this unit is + 2450 ft. No fresh water aquifer underlies the injection zone.

RAT WESTALL (RANDALL HARRIS GEOLOGIST) SWD APPLICATION IN DELAWARE (MAY 1990) MYRTLE MYRASUP 30-015-21515 (LOCATED JUST OVER ONE MILE ESE)

Case 14178 Mesquite SWD, Inc. OCD Exhibit 6-E

SWD-711 30-015-25346 A/12/215/27E

Saltwater will be injected into the Cherry Canyon Formation through perforations at 2802' - 2950' in the subject well. The Cherry Canyon formation is composed of alternating sequences of tight fine-grained sandstones, limestones and shale.

In this area, native fresh waters are encountered in aquifers from 0' to 592' below the earth's surface. In the subject well, native fresh waters have been protected from wellbore fluids by large diameter casing. There are no sources of fresh water underlying the Cherry Canyon Injection Zone at 2802' - 2950' MD.

I have examined the 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.

> 2.5 MILES NE OF EXXON STATE #8

Gordon Jenner, Geologist

DELAWARE SUD APPLICATION

> Case 14178 Mesquite SWD, Inc. OCD Exhibit 6-F

#### UNICHEM INTERNATIONAL

#### 707 NORTH LEECH

P.O.80X 1499

# HOBBS, NÈW MEXICO 88240

COMPANY : MOBIL PRODUC DATE : 04/18/86 FIELD,LEASE&WELL : AVA SAMPLING POINT: SPEARS DATE SAMPLED : 04/15/0	CING TX & N Alon Bone SP S Fresh Wate 36	1 PRINGS ER WELL BI	URTUN FLAT	LEASE
SPECIFIC GRAVITY = 1-0 TOTAL DISSOLVED SOLIDS PH = 7.52	101 5 = 3844		SECTIONS OF	7,200 215/27E)
		- ,	MEZL	MG/L
CATIONS				
CALCIUM MAGNESIUM SODIUM	(CA)+2 (MG)+2 (NA),CALC.		28.4 14.4 18.7	529. 175. 430.
ANIONS				
SICAREONATE CARBONATE HYDROXIDE SULFATE CHLORIDES	(HCO3)-1 (CO3)-2 (OH)-1 (SO4)-2 (CL)-1		1.8 0 43.7 14	109. 0 2100 <b>500</b>
DISSOLVED GASES				
CARBON DIOXIDE Hydrogen sulfide Gxygen	(CO2) (H2S) (O2)		NOT RUN NOT RUN NOT RUN	
IRON(TOTAL) BARIUM MANGANESE	(FE) (BA)+2 (MN)	·	U NOT RUN	.4 0
IONIC STRENGTH (MOLAL	> =.102			
SCALING	INDEX	TEMF	•	Real Contractor
CARBONATE INDEX Calcium carbonate sca	LING	30C 86F .500 LIKELY	• •	A <sup>20</sup>
CALCIUM SULFATE INDEX CALCIUM SULFATE SCALIN	٩G	4.56 LIKELY	:	Case 1417

Mesquite SWD, Inc. OCD Exhibit 6-G

LING SUPPORT	$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	Lub, Anal. <u>Cl. Density</u> , Project No. <u>NM-28-C</u> Sampling depth [1]] Type <sup>c</sup>	26     29     30       70     20     20       71     20	Total $-m$ Abs $42$ $45$ Dissol. $2.5$ ml Abs $2.5.5$ [00]	Min         Imin         Imin	Disol. — ml Abs — []. []. []. []. []. []. []. []. []. [].	Pb ml 53 54	Znml 55 57	Subtotal cations (Al, Fc, Ma, Cu, Pb, Zn) Subtotal cations (Ca, Mg, Na, K)	Dissolved solids $(1/2)^{0.9}$ $[1/1/7]^{0}$ $[0]$ $\mathbb{R}^{1}$ Residue at 180° $(1/2)^{0.9}$ $\mathbb{R}^{1}$ $\mathbb{R}^$	Calculated $(1, 1, 2, 0, 0, 0)$ Hardness $\frac{2.5 \cdot 5 \circ 0 \cdot 50}{3.7 \cdot 5}$ $(3, 1, 0)$ $(3, 2, 4, 0)$	$\frac{1}{2} \frac{N_{\text{outcarbonate}}}{N_{\text{outcarbonate}}} = \frac{2!}{5!} \frac{10}{5!} \frac{13}{2!} $	Color 73-79 Card R 30 R
UNITED STATES MULES NW OF EXUN UNITED STATES REPAREMENT OF THE INTERIOR Gound Way Julysis	$E_{\frac{1}{2}} \qquad \text{Latitude} \qquad \boxed{5} 2 2 3 0 3 0 3 0 11 \text{ longitude} \boxed{1} 0 12 \text{ longitude} \boxed{1} 0 12 \text{ longitude} \boxed{1} 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0$	ge D. Riggs Collected by Jerry Davidson Source:011 well Depth: 532'	sol (2012) (217) [217] cpm	/0-500 - 10 ml 3.35 [5] 11 - 142 - 14230 1(260) ml 2.35 08 2,2,2,6,0,3,370 ml 2.36 2.44	Clso-100 ml - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 -	Mg : AgNO <sub>3</sub> '.O C. C. C. L. L. L. L. L. C. C. L. L. C.	F ml Abs 23	NO <sub>3</sub> ml Abs 29 32	Poi / Daul I Abs 33 33 Abs $2 \cdot 0 \cdot 0$ % Live the fire $33 \cdot 33$	$\frac{HPO_4}{COLACCE} = \frac{h_1 PO_4}{C} + \frac{1}{2} \frac{PO_4}{C} = \frac{1}{2} \frac{V}{V}$ Total anions $\frac{1}{1000} + \frac{1}{1000} + \frac{1}{1000} + \frac{1}{10000}$	B         f         ml         g           Abs         1         36         38           Al         ml         1         1	- Abs (Ål + Fc)	Remarks and explanation on other side
Geological: () EXHIBIT D	State N. Mex. [2] 6 County Eddy ]	Vell No.: <u>21.27.5.000</u> Owner <sup>b</sup> Geor Vell No.: <u>Welch No.</u> 3 North of Carlsbad WBF <u>Cepitan</u> Reef Appearance Wcorssin's Wa	KX100 R KC1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 -	$\begin{array}{c c} & & & & \\ \hline \\ & & & \\ \hline \\ \hline$	102   ml	1/18 2 75 21 (748) 7 4 8 37 33 2 52/1/25 49 37 33	877 32 4) [33-4] 27 47	Subtotal cations (Ca. Mz)ml	m = 1 = 1 = 1 = 1 = 1 = 1 = 1 = 1 = 1 =	59 61 subfotal cations (Ca, Ma, Na, K)	0, 46.8.0 <u>50</u> ml 1.6.0.0 1.6.0.0 1.6.0.0 1.6.0.0 1.6.0.0 1.6.0.0 1.6.0.0 1.6.0.0 1.6.0.0 1.6.0.0 1.6.0.0 1.6.0.0 1.6.0.0 1.6.0.0 1.6.0.0 1.6.0.0 1.6.0.0 1.6.0.0 1.6.0.0 1.6.0.0 1.6.0.0 1.6.0.0 1.6.0.0 1.6.0.0 1.6.0.0 1.6.0.0 1.6.0.0 1.6.0.0 1.6.0.0 1.6.0.0 1.6.0.0 1.6.0.0 1.6.0.0 1.6.0.0 1.6.0.0 1.6.0.0 1.6.0.0 1.6.0.0 1.6.0.0 1.6.0.0 1.6.0.0 1.6.0.0 1.6.0.0 1.6.0.0 1.6.0.0 1.6.0.0 1.6.0.0 1.6.0.0 1.6.0.0 1.6.0.0 1.6.0.0 1.6.0.0 1.6.0.0 1.6.0.0 1.6.0.0 1.6.0.0 1.6.0.0 1.6.0.0 1.6.0.0 1.6.0.0 1.6.0.0 1.6.0.0 1.6.0.0 1.6.0.0 1.6.0.0 1.6.0.0 1.6.0.0 1.6.0.0 1.6.0.0 1.6.0.0 1.6.0.0 1.6.0.0 1.6.0.0 1.6.0.0 1.6.0.0 1.6.0.0 1.6.0.0 1.6.0.0 1.6.0.0 1.6.0.0 1.6.0.0 1.6.0.0 1.6.0.0 1.6.0.0 1.6.0.0 1.6.0.0 1.6.0.0 1.6.0.0 1.6.0.0 1.6.0.0 1.6.0.0 1.6.0.0 1.6.0.0 1.6.0.0 1.6.0.0 1.6.0.0 1.6.0.0 1.6.0.0 1.6.0.0 1.6.0.0 1.6.0.0 1.6.0.0 1.6.0.0 1.6.0.0 1.6.0.0 1.6.0.0 1.6.0.0 1.6.0.0 1.6.0.0 1.6.0.0 1.6.0.0 1.6.0.0 1.6.0.0 1.6.0.0 1.6.0.0 1.6.0.0 1.6.0.0 1.6.0.00 1.6.0.00 1.6.0.00 1.6.0.00 1.6.0.00 1.6.0.000 1.6.0.0000000000	5.5. <sup>10</sup>	Case 141/8 Mesquite SWD, Inc. OCD Exhibit 6-H

# SUPPLEMENT TO APPLICATION FOR AUTHORIZATION TO INJECT AVALON (DELAWARE) UNIT #516 EDDY COUNTY, NEW MEXICO

I. - IV. Form C-108

UNITA/SEC 31/T205/R28E

V. Composite map attached (Wells and Leases within 2 Miles / Unit map with 1/2 Mile Area of Review). 4.5 MIES NW oF

VI. Tabulation of well data within the 1/2 mile Area of Review (AOR). EXAMPLE TATE #8

#### VII. Proposed Operations:

 Average daily injection rate: Maximum daily injection rate: Volumes of fluids to be injected: = 500 BPD = 2000 BPD = 141,200,000 Bbls

2. Open system.

- Average and Maximum injection pressures: Average: = 400 psi Maximum = 500 psi
- Sources, analysis, and compatibility of injection fluid: Source water is from the Delaware and fresh water which will not exceed 20% of total volume. The water will be produced from Avalon Unit wells, two or three source water wells completed in non-productive intervals of the Lower Delaware, and fresh water from the cities of Carlsbad and Bill Taylor, New Mexico.
- NA

#### VIII. Geologic Data:

3.

4

5.

The proposed interval for injection at the Avalon (Delaware) Field is a porous and permeable zone within the Delaware Mountain Group, which in the Avalon area consists of fine sandstones and coarse siltstones of the Cherry Canyon and Brushy Canyon Formations. The estimated average top and base for the Delaware at Avalon are:

Delaware Montain Goup

<u>TOP</u> 2494 ft. (767 ft. subsea) BASE 4860 ft. (-1599 ft. subsea) Top of Bone Spring Fm., 2366 ft. thick

Fresh water in this area occurs primarily in the Capitan aquifer, which occurs at approximately \_750 feet deep (2500 feet subsea) [Hiss, 1976, New Mexico Bureau of Mines and Mineral Resources Resource Map 6]. At Avalon, approximately 600 feet of low porosity Goat Seep Reef separate the Delaware from porous zones within the Capitan aquifer. Other potential fresh water zones (primarily the Rustler Formation) occur above the Salado salt and anhydrite. The top of the anhydrite/salt at this location is generally less than 300 feet deep. This unit serves as an effective barrier between injected and fresh water zones near the surface. No fresh water occurs below the proposed injection zone.

Application For Authorization to Inject (NM Form C-108) Avalon (Delaware) Unit #516 Case 14178 Mesquite SWD, Inc. OCD Exhibit 6-1

						BAKER AI HUGHES
Baker Pe	trolite		• • •			422 W. Main P.O. Box 1140 Artesia, NM 88210 USA Tel 505-746-3588 Fax 505-746-3580 www.bakethurghes.com/baby
		WATER ANA	LYSIS	REPORT		· · · · · · · · · · · · · · · · · · ·
Compan Addres Lease Well Sample	y : Exxon Compa s : Carlsbad, N : ADU Bill Taylor Pt. : Water Tank	ny USA M		Date Date Sampled Analysis No.	: 14 Nov : 14 Nov :	00 00
	ANALYSIS			mg/L	,	* meg/L
1. 2. 3. 4. 5. 6. 7. 8. 9.	pH H2S Specific Gravity Total Dissolved Solids Suspended Solids Dissolved Oxygen Dissolved CO2 Oil In Water Phenolphthalein Alka Methyl Orange Alkali	7.2 0 1.000 ids alinity (C	aCO3) O3)	2840.6 N/R N/R 6 N/R	$\sum$	
11. 12. 13. 14. 15. 16. 17. 18. 19. 20.	Bicarbonate Chloride Sulfate Calcium Magnesium Sodium (calculated) Iron Barium Strontium Total Hardness (CaCC	)3)	HCO3 Cl SO4 Ca Mg Na Fe Ba Sr	76.0 500.0 1346.0 348.0 31.9 537.7 1.0 N/R N/R 1000.4	HCO3 Cl SO4 Ca Mg Na	1.2 14.1 28.0 17.4 2.6 23.4

#### PROBABLE MINERAL COMPOSITION

\_\_\_\_\_

*milli equivalents per Liter	Compound	Equiv wt	X meq/L	= mg/L
+~~~ <b>~~</b> +~~~~+				
17  *Ca < *HCO3   1	Ca.(HCO3)2	81.0	1.2	101
>  >	CaSO4	68.1	16.1	1097
3  *Mg> *SO4   28	CaC12	55.5		
<b	Mg (HCO3) 2	73.2		
23  *Na> *Cl   14	MgSO4	60.2	2.6	158
+~~+ +~~+	MgCl2	47.6		
Saturation Values Dist. Water 20 C	NaHCO3	84.0		
CaCO3 13 mg/L	Na2504	71.0	9.3	659
CaSO4 * 2H2O 2090 mg/L	NaCl	58.4	14.1	824
BaSO4 2.4 mg/L				

REMARKS :

-----

Baker Petrolite

Respectfully submitted, ... W.C. Peterson

		n an an Arway Arway			BAKER HUGI	HES
Baker Pe	trolite	WATER ANALYS	IS REPORT		422 W. Main P.O. Box 114 Artesia, NM 8 Tel 505-746- Fax 505-746- www.bakerhu	0 38210 USA 3588 3580 ghes.com/baj
Compan Addres Lease Well Sample	y : Exxon Compa s : Carlsbad, N : ADU : Carlsbad Pt : Fresh Water	ny USA M Tank	Date Date Sample Analysis No	: 14 Nov ed : 14 Nov o. :	7 00 7 00	
	ANALYSIS		mg/L		* meg/L	
1. 2. 3. 4. 5. 6. 7. 8. 9.	pH H2S Specific Gravity Total Dissolved Sol Suspended Solids Dissolved Cozygen Dissolved CO2 Oil In Water Phenolphthalein Alk	7.4 26 1.003 ids alinity (CaCC	5199.5 N/R N/R 50 N/R 03)			
10. 11. 12. 13. 14. 15. 16. 17. 18.	Methyl Orange Alkal Bicarbonate Chloride Sulfate Calcium Magnesium Sodium (calculated) Iron Barium	inity (CaCO3) HC Cl SC Ca Mg Na Fe Ba	03 145.2 2130.0 4 1075.0 280.0 73.1 1491.1 5.0 N/R	HCO3 Cl SO4 Ca Mg Na	2.4 60.1 22.4 14.0 6.0 64.9	

#### PROBABLE MINERAL COMPOSITION

		-		
*milli equivalents per Liter	Compound	Equiv wt	X meg/L	= mg/L
<u>ᢥ╾╾╾</u> ╾╾┽ <u></u> ╋┯╼╼╼╼┽		~~~~~~~	• • • • •	
14; *Ca < *HCO3 ( 2)	Ca (HCO3) 2	61.0	2.4	193
/>	CaSO4	68.1	11.6	789
6 *Mg> *SO4   22	CaCl2	55.5		
</td <td>Mg (HCO3) 2</td> <td>73.2</td> <td>*</td> <td></td>	Mg (HCO3) 2	73.2	*	
65  *Na> *Cl   60	MgSO4	60.2	6.0	362
╪┈┈┈┈ <b>┉┉┿</b> , ┿╍╼╼═╔═┹┿	MgC12	47.6		
Saturation Values Dist. Water 20 C	NaHCO3	B4.0		
CaCO3 13 mg/L	Na2\$04	71.0	4.8	339
$Ca504 \pm 2H20$ 2090 mg/L	NaCl	58.4	60.1	3511
BaSO4 2.4 mg/L				

REMARKS: Sample contained some Bill Taylor water.

Baker Petrolite

6,0

Mai du că

- UU:10 - RV 243 · 713 431 1985

Respectfully submitted, W.C. Peterson

110.012

11

	tronte				422 W. Main P.O. Box 1140
	и	ATER ANALYSIS	REPORT		Artesia, NM 88210 USA Tel 505-746-3588 Fax 505-746-3580 www.hakerhughes.com/bi
	-				
Company	y : Exxon Company	USA	Date	: 14 No	<b>v</b> 00
Addres	s : Carlsbad, NM		Date Sample	d : 14 No	v 00
Lease	: ADU		Analysis No	. :	
Well	: Injection Pum	ιp			
Sample	pt. : Inlet				
	ANALYSIS		mg/L		* meq/L .
1.	 pH	8.3			
2.	H2S	96	Commenter and the second second	and a state of the	and a second secon
		20			
3.	Specific Gravity	1.100			IN RE
3. 4.	Specific Gravity Total Dissolved Solid	1.100 Is (	155393.4	DELA	WARE
3. 4. 5.	Specific Gravity Total Dissolved Solid Suspended Solids	1.100 ls (	155393.4 N/R	DELA	NARE) R
З. 4. 5. б.	Specific Gravity Total Dissolved Solid Suspended Solids Dissolved Oxygen	1.100 Is (	155393.4 N/R N/R	DELA	NARE R
з. 4. 5. б. 7.	Specific Gravity Total Dissolved Solid Suspended Solids Dissolved Oxygen Dissolved CO2	1.100 Is (	155393.4 N/R N/R 100	DELA	NARE) R
з. 4. 5. б. 7. 8.	Specific Gravity Total Dissolved Solid Suspended Solids Dissolved Oxygen Dissolved CO2 Oil In Water	1.100 Is (	155393.4 N/R N/R 100 N/R	DELA	WARE R
3. 4. 5. 6. 7. 8. 9.	Specific Gravity Total Dissolved Solid Suspended Solids Dissolved Oxygen Dissolved CO2 Oil In Water Phenolphthalein Alkal	1.100 is (	155393.4 N/R N/R 100 N/R	DELA	WARE
3. 4. 5. 6. 7. 8. 9. 10.	Specific Gravity Total Dissolved Solid Suspended Solids Dissolved Oxygen Dissolved CO2 Oil In Water Phenolphthalein Alkal Methyl Orange Alkalin	1.100 s ( inity (CaCO3) ity (CaCO3)	155393.4 N/R N/R 100 N/R	DELA	WARE R
3. 4. 5. 6. 7. 8. 9. 10. 11.	Specific Gravity Total Dissolved Solid Suspended Solids Dissolved Oxygen Dissolved CO2 Oil In Water Phenolphthalein Alkal Methyl Orange Alkalin Bicarbonate	1.100 is (CaCO3) ity (CaCO3) HCO3	155393.4 N/R N/R 100 N/R 248.9	HCO3	NARE R 4.1
3. 4. 5. 6. 7. 8. 9. 10. 11. 12.	Specific Gravity Total Dissolved Solid Suspended Solids Dissolved Oxygen Dissolved CO2 Oil In Water Phenolphthalein Alkal Methyl Orange Alkalin Bicarbonate Chloride	1.100 is (CaCO3) ity (CaCO3) HCO3 Cl	155393.4 N/R N/R 100 N/R 248.9 94359.0	HCO3	4.1 2661.7
3. 4. 5. 6. 7. 8. 9. 10. 11. 12. 13.	Specific Gravity Total Dissolved Solid Suspended Solids Dissolved Oxygen Dissolved CO2 Oil In Water Phenolphthalein Alkal Methyl Orange Alkalin Bicarbonate Chloride Sulfate Calcium	1.100 is (CaCO3) ity (CaCO3) HCO3 Cl SO4	155393.4 N/R N/R 100 N/R 248.9 94359.0 1150.0	HCO3 C1 SO4	4.1 2661.7 23.9
3. 4. 5. 6. 7. 8. 9. 10. 11. 12. 13. 14. 15.	Specific Gravity Total Dissolved Solid Suspended Solids Dissolved Oxygen Dissolved CO2 Oil In Water Phenolphthalein Alkal Methyl Orange Alkalin Bicarbonate Chloride Sulfate Calcium Magnesium	1.100 is (CaCO3) ity (CaCO3) HCO3 Cl SO4 Ca Ma	155393.4 N/R N/R 100 N/R 248.9 94359.0 1150.0 6840.0 1342.6	HCO3 C1 SO4 Ca	4.1 2661.7 23.9 341.3 110.5
3. 4. 5. 6. 7. 8. 9. 10. 11. 12. 13. 14. 15. 16.	Specific Gravity Total Dissolved Solid Suspended Solids Dissolved Oxygen Dissolved CO2 Oil In Water Phenolphthalein Alkal Methyl Orange Alkalin Bicarbonate Chloride Sulfate Calcium Magnesium Sodium (calculated)	1.100 inity (CaCO3) ity (CaCO3) HCO3 Cl SO4 Ca Mg Na	155393.4 N/R N/R 100 N/R 248.9 94359.0 1150.0 6840.0 1342.6 51451.7	HCO3 C1 SO4 Ca Mg	4.1 2661.7 23.9 341.3 110.5 2238.0
3. 4. 5. 6. 7. 8. 9. 10. 11. 12. 13. 14. 15. 16. 17.	Specific Gravity Total Dissolved Solid Suspended Solids Dissolved Oxygen Dissolved CO2 Oil In Water Phenolphthalein Alkal Methyl Orange Alkalin Bicarbonate Chloride Sulfate Calcium Magnesium Sodium (calculated) Iron	1.100 inity (CaCO3) ity (CaCO3) HCO3 Cl SO4 Ca Mg Na Fe	155393.4 N/R N/R 100 N/R 248.9 94359.0 1150.0 6840.0 1342.6 51451.7 1.3	HCO3 C1 SO4 Ca Mg Na	4.1 2661.7 23.9 341.3 110.5 2238.0
3. 4. 5. 6. 7. 8. 9. 10. 11. 12. 13. 14. 15. 16. 17. 18.	Specific Gravity Total Dissolved Solid Suspended Solids Dissolved Oxygen Dissolved CO2 Oil In Water Phenolphthalein Alkal Methyl Orange Alkalin Bicarbonate Chloride Sulfate Calcium Magnesium Sodium (calculated) Iron Barium	1.100 inity (CaCO3) ity (CaCO3) HCO3 Cl SO4 Ca Mg Na Fe Ba	155393.4 N/R N/R 100 N/R 248.9 94359.0 1150.0 6840.0 1342.6 51451.7 1.3 N/R	HCO3 C1 SO4 Ca Ng Na	4.1 2661.7 23.9 341.3 110.5 2238.0
3. 4. 5. 6. 7. 8. 9. 10. 11. 12. 13. 14. 15. 16. 17. 18. 19.	Specific Gravity Total Dissolved Solid Suspended Solids Dissolved Oxygen Dissolved CO2 Oil In Water Phenolphthalein Alkal Methyl Orange Alkalin Bicarbonate Chloride Sulfate Calcium' Magnesium Sodium (calculated) Iron Barium Strontium	1.100 is (CaCO3) ity (CaCO3) HCO3 Cl SO4 Ca Mg Na Fe Ba Sr	155393.4 N/R N/R 100 N/R 248.9 94359.0 1150.0 6840.0 1342.6 51451.7 1.3 N/R N/R	HCO3 C1 SO4 Ca Mg Na	4.1 2661.7 23.9 341.3 110.5 2238.0

Amilli equivalents per Liter	Compound	Equiv wt	X meq/L	= mg/L
++ ++				
341  *Ca < *HCO3   4	Ca (HCO3) 2	61.0	4.1	331
/>   <b></b>	CaSO4	68.1	23.9	1630
110  *Mg> *SO4   24	CaCl2	55.5	313.3	17384
/  <b -	Mg (HCO3) 2	73.2		
2238  *Na> *Cl   2662	MgSO4	60.2		
++ . ++	MgCl2	47.6	110.5	5258
Saturation Values Dist. Water 20 C	NaHCO3	84.0		
CaCO3 13 mg/L	Na2SO4	71.0		
Ca3O4 * 2H2O 2090 mg/L BaSO4 2.4 mg/L	NaC1	58.4	2238.0	130789

REMARKS:

-----

Baker Petrolite

Respectfully submitted, W.C. Peterson





