2R - 20

GENERAL CORRESPONDENCE

YEAR(S):

2000-1999

State of New Mexico
ENVIRONMENT DEPARTMENT
Drinking Water Bureau – Ruidoso Field Office
1216 Mechem Drive, Ruidoso, NM 88345
(505) 258-3272
(505) 258-4891 fax

GARY E. JOHNSON
GOVERNOR

PETER MAGGIORE
SECRETARY

PAUL RITZMA
DEPUTY SECRETARY

May 23, 2000

Mr. Oscar Vasquez – President
Malaga MDWC&SWA
P.O. Box 70
Malaga, NM 88263

Subject: Lopez Well Siting Inspection

Dear Mr. Vasquez:

This letter is a follow up to the technical assistance visit I conducted on May 18, 2000, to determine any siting problems or concerns for the Lopez well which Malaga MDWC&SWA is proposing to purchase for drinking water. According to the New Mexico Drinking Water Regulations, 70 CFR Section 109C.2. Siting Requirements. *"A public water supply source shall be located at least 100 feet horizontally from a privey (outhouse), septic tank or closed system, or a liquid waste treatment unit and at least 200 feet horizontally from an existing or potential pollution source, such as a liquid waste absorption system, cattle yard, landfill, or underground storage tank containing a contaminate."*

With the use of a range finder it was determined that the probable location of the liquid waste system is approximately 280 feet from the proposed well site. (Figure 1.) Therefore, the New Mexico Environment Department would approve of the proposed well location.

I was concerned however to learn of a brine injection well proposed for the property adjacent to the new well location, several thousand feet to the northwest. Unfortunately, there is no Drinking Water Regulation that prohibits the siting of an Oil Conservation Division-permitted injection well. If Malaga had a wellhead protection program in place to prohibit this type of contaminant source within the well delineation area, prior to the OCD permit, there may be more authority to stop the permit.

Hopefully, the OCD will require that the drilling, casing, and grouting of the well rigidly meets all State and Federal regulations and recommendations. In addition, monitor samples should be conducted before the injection well is completed, and after it is operation to insure the Total Dissolved Solids in the drinking water remains unchanged. If the TDS increases you may need to seek the assistance of the OCD, the Groundwater Bureau, or legal assistance to protect your well.

If you have any questions about this subject or any other drinking water concerns, please call (505) 258-3272 or email becky_crown@nmenv.state.nm.us

Sincerely,

Becky Crown

Becky Crown, Environmental Specialist

cc: Lisa Brown, WRES1
Darwin Pattengale, District IV Manager
Bill Owen, OCD
Jennifer Wellman, Source Water Assessment
Matt Holmes, Wellhead Protection, NM Rural Water
Sandra Alarcon, RUS
Senator Carrol Leavell, Jal
Representative John Heaton, Carlsbad
Steve Massey, Eddy County Manager
Francis Padilla, New Mexico Finance Authority

STATE OF NEW MEXICO
ENERGY, MINERALS AND NATURAL RESOURCES DEPARTMENT
OIL CONSERVATION DIVISION
2040 S. PACHECO
SANTA FE, NEW MEXICO 87505
(505) 827-7131

April 28, 2000

Mr. Oscar Vasquez
Malaga Water Mutual Domestic
P.O. Box 70
Malaga, New Mexico 88263

RE: WATER WELL SAMPLE ANALYSES
A.C. BURKHAM WELL
MALAGA WATER MUTUAL DOMESTIC

Dear Mr. Vasquez:

On March 20, 2000 the New Mexico Oil Conservation Division (OCD) obtained a water sample from the Malaga Water Mutual Domestic A.C. Burkham well in response to your complaint that the well is contaminated as a result of the Key Energy B.K.E. #1 SWD oilfield produced water injection well located approximately one half of a mile to the north. Enclosed you will find a copy of the laboratory analytical results of the water sample from the A.C. Burkham well. The water does not contain any dissolved petroleum related volatile organic compounds but does contain levels of total dissolved solids (TDS), sulfate, chloride and fluoride in excess of the New Mexico Water Quality Control Commission (WQCC) ground water standards. A comparison of the analytical results with those taken last year by your consultant Dames & Moore shows that the results of OCD's water quality analyses are similar but slightly lower than those previously obtained by Dames & Moore.

The OCD has conducted a review of the Burkham well logs that you provided and the geology and water quality in the vicinity. This information shows that the ground water quality problems in the Burkham well, including the chloride concentrations, are typical of the natural water quality problems in the area east of the Southern Canal. The Burkham well is completed through alluvium and into the top 25 feet of the Rustler Formation. Ground water from the Rustler Formation is not suitable for drinking water due to it's high TDS, sulfate and chloride content. The alluvium in the area east of the Southern Canal generally contains chlorides in the range of 1000 mg/l and sulfates in the range of 2000 mg/l which also makes the water not suitable for drinking water purposes. In addition, a water table elevation map for the area shows that the direction of ground water flow is to the east, therefore the Burkham well is not downgradient of the injection well.

Based upon the above information it appears that the elevated TDS, sulfate and chloride levels in water from the Burkham well are a result of naturally occurring ground water conditions in the area east of the Southern Canal.

If you have any questions or comments, please feel free to write to me or call me at (505) 827-7154.

Sincerely,

William C. Olson
Hydrologist
Environmental Bureau

Enclosure

xc w/ enclosure: Tim Gum, OCD Artesia District Supervisor

TRACEANALYSIS, INC.

6701 Aberdeen Avenue, Suite 9 Lubbock, Texas 79424 800•378•1296 806•794•1296 FAX 806•794•1298
4725 Ripley Avenue, Suite A El Paso, Texas 79922 888•588•3443 915•585•3443 FAX 915•585•4944
E-Mail: lab@traceanalysis.com

Analytical and Quality Control Report

Bill Olson
OCD
2040 S. Pacheco
Santa Fe, NM 87505

Report Date: 4/6/00

Project Number: N/A
Project Name: N/A
Project Location: Malaga

Order ID Number: A00032309

Enclosed are the Analytical Results and Quality Control Data Reports for the following samples submitted to TraceAnalysis, Inc. for analysis:

Sample Number	Sample Description	Matrix	Date Taken	Time Taken	Date Received
143096	0003201330(AC Burlcham Well)	Water	3/20/00	13:30	3/23/00

These results represent only the samples received in the laboratory. The Quality Control Report is generated on a batch basis. All information contained in this report is for the analytical batch(es) in which your sample(s) were analyzed.

This report consists of a total of 11 pages and shall not be reproduced except in its entirety, without written approval of TraceAnalysis, Inc.

Dr. Blair Leftwich, Director

Cation-Anion Balance Sheet

Sample # 143096 Date: 4/7/00

Cations	ppm	meq/L
Calcium	638	31.8362
Magnesium	153	12.59037
Sodium	272	11.832
Potassium	4.3	0.109994

Total Cations 56.3686 in meq/L

Anions	ppm	meq/L
Alkalinity	146	2.92
Sulfate	1300	27.066
Chloride	710	20.0291
Nitrate as N	6.4	0.456896
Fluoride	1.7	0.089488

Total Anions 50.5615 in meq/L

Percentage Error 10.8615 %
(needs to be <10%)

OTHER INFORMATION

TDS	3500				
EC	4200				
Measure EC and Cation Sums	5636.8564	Range should be:	3780	to	4620
Measure EC and Anion Sums	5056.1484	Range should be:	3780	to	4620
Calculated TDS/Conductivity	0.8333333	Range should be:	0.55	to	0.77
Measure TDS and Cation Sums	0.6209135	Range should be:	0.55	to	0.77
Measure TDS and Anion Sums	0.6922265	Range should be:	0.55	to	0.77

Analytical Results Report

Sample Number: 143096
Description: 0003201330(AC Burlcham Well)

Param	Result	Dilution	Analytical Method	Date Prepared	Date Analyzed	Analyst	Prep Batch #	QC Batch #	RDL
8260 (µg/L)									
Bromochloromethane	<2.00	1	S 8260B	3/29/00	3/29/00	JG	PB01495	QC01783	2
Dichlorodifluoromethane	<2.00	1	S 8260B	3/29/00	3/29/00	JG	PB01495	QC01783	2
Chloromethane (methyl chloride)	<2.00	1	S 8260B	3/29/00	3/29/00	JG	PB01495	QC01783	2
Vinyl Chloride	<2.00	1	S 8260B	3/29/00	3/29/00	JG	PB01495	QC01783	2
Bromomethane (methyl bromide)	<5.00	1	S 8260B	3/29/00	3/29/00	JG	PB01495	QC01783	5
Chloroethane	<2.00	1	S 8260B	3/29/00	3/29/00	JG	PB01495	QC01783	2
Trichlorofluoromethane	<2.00	1	S 8260B	3/29/00	3/29/00	JG	PB01495	QC01783	2
Acetone	<10.00	1	S 8260B	3/29/00	3/29/00	JG	PB01495	QC01783	10
Iodomethane (methyl iodide)	<2.00	1	S 8260B	3/29/00	3/29/00	JG	PB01495	QC01783	2
Carbon Disulfide	<2.00	1	S 8260B	3/29/00	3/29/00	JG	PB01495	QC01783	2
Acrylonitrile	<2.00	1	S 8260B	3/29/00	3/29/00	JG	PB01495	QC01783	2
2-Butanone (MEK)	<2.00	1	S 8260B	3/29/00	3/29/00	JG	PB01495	QC01783	2
4-methyl-2-pentanone (MIBK)	<10.00	1	S 8260B	3/29/00	3/29/00	JG	PB01495	QC01783	10
2-hexanone	<2.00	1	S 8260B	3/29/00	3/29/00	JG	PB01495	QC01783	2
trans 1,4-Dichloro-2-butene	<10.00	1	S 8260B	3/29/00	3/29/00	JG	PB01495	QC01783	10
1,1-Dichloroethene	<2.00	1	S 8260B	3/29/00	3/29/00	JG	PB01495	QC01783	2
Methylene chloride	<5.00	1	S 8260B	3/29/00	3/29/00	JG	PB01495	QC01783	5
MTBE	<2.00	1	S 8260B	3/29/00	3/29/00	JG	PB01495	QC01783	2
trans-1,2-Dichloroethene	<2.00	1	S 8260B	3/29/00	3/29/00	JG	PB01495	QC01783	2
1,1-Dichloroethane	<2.00	1	S 8260B	3/29/00	3/29/00	JG	PB01495	QC01783	2
cis-1,2-dichloroethene	<2.00	1	S 8260B	3/29/00	3/29/00	JG	PB01495	QC01783	2
2,2-Dichloropropane	<2.00	1	S 8260B	3/29/00	3/29/00	JG	PB01495	QC01783	2
1,2-Dichloroethane (EDC)	<2.00	1	S 8260B	3/29/00	3/29/00	JG	PB01495	QC01783	2
Chloroform	<2.00	1	S 8260B	3/29/00	3/29/00	JG	PB01495	QC01783	2
1,1,1-Trichloroethane	<2.00	1	S 8260B	3/29/00	3/29/00	JG	PB01495	QC01783	2
1,1-Dichloropropene	<2.00	1	S 8260B	3/29/00	3/29/00	JG	PB01495	QC01783	2
Benzene	<2.00	1	S 8260B	3/29/00	3/29/00	JG	PB01495	QC01783	2
Carbon Tetrachloride	<2.00	1	S 8260B	3/29/00	3/29/00	JG	PB01495	QC01783	2
1,2-Dichloropropane	<2.00	1	S 8260B	3/29/00	3/29/00	JG	PB01495	QC01783	2
Trichloroethene (TCE)	<2.00	1	S 8260B	3/29/00	3/29/00	JG	PB01495	QC01783	2
Dibromomethane (methylene bromide)	<2.00	1	S 8260B	3/29/00	3/29/00	JG	PB01495	QC01783	2
Bromodichloromethane	<2.00	1	S 8260B	3/29/00	3/29/00	JG	PB01495	QC01783	2
2-Chloroethyl vinyl ether	<10.00	1	S 8260B	3/29/00	3/29/00	JG	PB01495	QC01783	10
cis-1,3-Dichloropropene	<2.00	1	S 8260B	3/29/00	3/29/00	JG	PB01495	QC01783	2
trans-1,3-Dichloropropene	<2.00	1	S 8260B	3/29/00	3/29/00	JG	PB01495	QC01783	2
Toluene	<2.00	1	S 8260B	3/29/00	3/29/00	JG	PB01495	QC01783	2
1,1,2-Trichloroethane	<2.00	1	S 8260B	3/29/00	3/29/00	JG	PB01495	QC01783	2
1,3-Dichloropropane	<2.00	1	S 8260B	3/29/00	3/29/00	JG	PB01495	QC01783	2
Dibromochloromethane	<2.00	1	S 8260B	3/29/00	3/29/00	JG	PB01495	QC01783	2
1,2-Dibromoethane (EDB)	<2.00	1	S 8260B	3/29/00	3/29/00	JG	PB01495	QC01783	2
Tetrachloroethene (PCE)	<2.00	1	S 8260B	3/29/00	3/29/00	JG	PB01495	QC01783	2
Chlorobenzene	<2.00	1	S 8260B	3/29/00	3/29/00	JG	PB01495	QC01783	2
1,1,1,2-Tetrachloroethane	<2.00	1	S 8260B	3/29/00	3/29/00	JG	PB01495	QC01783	2
Ethylbenzene	<2.00	1	S 8260B	3/29/00	3/29/00	JG	PB01495	QC01783	2
m,p-Xylene	<2.00	1	S 8260B	3/29/00	3/29/00	JG	PB01495	QC01783	2
Bromoform	<2.00	1	S 8260B	3/29/00	3/29/00	JG	PB01495	QC01783	2
Styrene	<2.00	1	S 8260B	3/29/00	3/29/00	JG	PB01495	QC01783	2
o-Xylene	<2.00	1	S 8260B	3/29/00	3/29/00	JG	PB01495	QC01783	2

1,1,2,2-Tetrachloroethane	<2.00	1	S 8260B	3/29/00	3/29/00	JG	PB01495	QC01783	2
2-Chlorotoluene	<2.00	1	S 8260B	3/29/00	3/29/00	JG	PB01495	QC01783	2
1,2,3-Trichloropropane	<2.00	1	S 8260B	3/29/00	3/29/00	JG	PB01495	QC01783	2
Isopropylbenzene	<2.00	1	S 8260B	3/29/00	3/29/00	JG	PB01495	QC01783	2
Bromobenzene	<2.00	1	S 8260B	3/29/00	3/29/00	JG	PB01495	QC01783	2
n-Propylbenzene	<2.00	1	S 8260B	3/29/00	3/29/00	JG	PB01495	QC01783	2
1,3,5-Trimethylbenzene	<2.00	1	S 8260B	3/29/00	3/29/00	JG	PB01495	QC01783	2
tert-Butylbenzene	<2.00	1	S 8260B	3/29/00	3/29/00	JG	PB01495	QC01783	2
1,2,4-Trimethylbenzene	<2.00	1	S 8260B	3/29/00	3/29/00	JG	PB01495	QC01783	2
1,4-Dichlorobenzene (para)	<2.00	1	S 8260B	3/29/00	3/29/00	JG	PB01495	QC01783	2
sec-Butylbenzene	<2.00	1	S 8260B	3/29/00	3/29/00	JG	PB01495	QC01783	2
1,3-Dichlorobenzene	<2.00	1	S 8260B	3/29/00	3/29/00	JG	PB01495	QC01783	2
p-Isopropyltoluene	<2.00	1	S 8260B	3/29/00	3/29/00	JG	PB01495	QC01783	2
4-Chlorotoluene	<2.00	1	S 8260B	3/29/00	3/29/00	JG	PB01495	QC01783	2
1,2-Dichlorobenzene (ortho)	<2.00	1	S 8260B	3/29/00	3/29/00	JG	PB01495	QC01783	2
n-Butylbenzene	<2.00	1	S 8260B	3/29/00	3/29/00	JG	PB01495	QC01783	2
1,2-Dibromo-3-chloropropane	<5.00	1	S 8260B	3/29/00	3/29/00	JG	PB01495	QC01783	5
1,2,3-Trichlorobenzene	<5.00	1	S 8260B	3/29/00	3/29/00	JG	PB01495	QC01783	5
1,2,4-Trichlorobenzene	<5.00	1	S 8260B	3/29/00	3/29/00	JG	PB01495	QC01783	5
Naphthalene	<2.00	1	S 8260B	3/29/00	3/29/00	JG	PB01495	QC01783	2
Hexachlorobutadiene	<5.00	1	S 8260B	3/29/00	3/29/00	JG	PB01495	QC01783	5

Surrogate (µg/L)	Result	Dilution	Spike Amount	% Rec.	% Rec. Limit	Analyst	Prep Batch #	QC Batch #
Dibromofluoromethane	52.05	1	50	104	72 - 128	JG	PB01495	QC01783
Toluene-d8	48.98	1	50	98	91 - 107	JG	PB01495	QC01783
4-Bromofluorobenzene	48.65	1	50	97	74 - 106	JG	PB01495	QC01783
Alkalinity (mg/L as CaCo3)								
Hydroxide Alkalinity	<1.0	1	E 310.1	3/30/00	3/30/00	JS	PB01502	QC01789	1
Carbonate Alkalinity	<1.0	1	E 310.1	3/30/00	3/30/00	JS	PB01502	QC01789	1
Bicarbonate Alkalinity	146	1	E 310.1	3/30/00	3/30/00	JS	PB01502	QC01789	1
Total Alkalinity	146	1	E 310.1	3/30/00	3/30/00	JS	PB01502	QC01789	1
Conductivity (uMHOS/cm)								
Specific Conductance	4200	1	SM 2510B	3/28/00	3/28/00	JS	PB01472	QC01752	
Dissolved Metals (mg/L)								
Dissolved Calcium	638	1	E 200.7	3/24/00	3/27/00	RR	PB01441	QC01712	0.5
Dissolved Magnesium	153	1	E 200.7	3/24/00	3/27/00	RR	PB01441	QC01712	0.5
Dissolved Potassium	4.3	1	E 200.7	3/24/00	3/27/00	RR	PB01441	QC01712	0.5
Dissolved Sodium	272	1	E 200.7	3/24/00	3/27/00	RR	PB01441	QC01712	0.5
Ion Chromatography (IC) (mg/L)								
CL	710	1	E 300.0	3/23/00	3/23/00	JS	PB01428	QC01692	0.5
Fluoride	1.7	1	E 300.0	3/23/00	3/23/00	JS	PB01428	QC01692	0.2
Nitrate-N	* 6.4	1	E 300.0	3/23/00	3/23/00	JS	PB01428	QC01692	0.2
Sulfate	1300	1	E 300.0	3/23/00	3/23/00	JS	PB01428	QC01692	0.5
* Nitrate-N - Sample came in already out of hold time for NO3.									
pH (s.u.)								
pH	* 7.4	1	E 150.1	3/23/00	3/23/00	RS	PB01465	QC01744	1
* pH - Out of holding time.									
TDS (mg/L)								
Total Dissolved Solids	3500	1	E 160.1	3/23/00	3/24/00	JS	PB01426	QC01693	10

Quality Control Report
Method Blanks

Param	Flag	Blank Result	Reporting Limit	Date Analyzed	Prep Batch #	QC Batch #
Bromochloromethane (µg/L)		<2.00	2	3/29/00	PB01495	QC01783
Dichlorodifluoromethane (µg/L)		<2.00	2	3/29/00	PB01495	QC01783
Chloromethane (methyl chloride) (µg/L)		<2.00	2	3/29/00	PB01495	QC01783
Vinyl Chloride (µg/L)		<2.00	2	3/29/00	PB01495	QC01783
Bromomethane (methyl bromide) (µg/L)		<5.00	5	3/29/00	PB01495	QC01783
Chloroethane (µg/L)		<2.00	2	3/29/00	PB01495	QC01783
Trichlorofluoromethane (µg/L)		<2.00	2	3/29/00	PB01495	QC01783
Acetone (µg/L)		<10.00	10	3/29/00	PB01495	QC01783
Iodomethane (methyl iodide) (µg/L)		<2.00	2	3/29/00	PB01495	QC01783
Carbon Disulfide (µg/L)		<2.00	2	3/29/00	PB01495	QC01783
Acrylonitrile (µg/L)		<2.00	2	3/29/00	PB01495	QC01783
2-Butanone (MEK) (µg/L)		<2.00	2	3/29/00	PB01495	QC01783
4-methyl-2-pentanone (MIBK) (µg/L)		<10.00	10	3/29/00	PB01495	QC01783
2-hexanone (µg/L)		<2.00	2	3/29/00	PB01495	QC01783
trans 1,4-Dichloro-2-butene (µg/L)		<10.00	10	3/29/00	PB01495	QC01783
1,1-Dichloroethene (µg/L)		<2.00	2	3/29/00	PB01495	QC01783
Methylene chloride (µg/L)		<5.00	5	3/29/00	PB01495	QC01783
MTBE (µg/L)		<2.00	2	3/29/00	PB01495	QC01783
trans-1,2-Dichloroethene (µg/L)		<2.00	2	3/29/00	PB01495	QC01783
1,1-Dichloroethane (µg/L)		<2.00	2	3/29/00	PB01495	QC01783
cis-1,2-dichloroethene (µg/L)		<2.00	2	3/29/00	PB01495	QC01783
2,2-Dichloropropane (µg/L)		<2.00	2	3/29/00	PB01495	QC01783
1,2-Dichloroethane (EDC) (µg/L)		<2.00	2	3/29/00	PB01495	QC01783
Chloroform (µg/L)		<2.00	2	3/29/00	PB01495	QC01783
1,1,1-Trichloroethane (µg/L)		<2.00	2	3/29/00	PB01495	QC01783
1,1-Dichloropropene (µg/L)		<2.00	2	3/29/00	PB01495	QC01783
Benzene (µg/L)		<2.00	2	3/29/00	PB01495	QC01783
Carbon Tetrachloride (µg/L)		<2.00	2	3/29/00	PB01495	QC01783
1,2-Dichloropropane (µg/L)		<2.00	2	3/29/00	PB01495	QC01783
Trichloroethene (TCE) (µg/L)		<2.00	2	3/29/00	PB01495	QC01783
Dibromomethane (methylene bromide) (µg		<2.00	2	3/29/00	PB01495	QC01783
Bromodichloromethane (µg/L)		<2.00	2	3/29/00	PB01495	QC01783
2-Chloroethyl vinyl ether (µg/L)		<10.00	10	3/29/00	PB01495	QC01783
cis-1,3-Dichloropropene (µg/L)		<2.00	2	3/29/00	PB01495	QC01783
trans-1,3-Dichloropropene (µg/L)		<2.00	2	3/29/00	PB01495	QC01783
Toluene (µg/L)		<2.00	2	3/29/00	PB01495	QC01783
1,1,2-Trichloroethane (µg/L)		<2.00	2	3/29/00	PB01495	QC01783
1,3-Dichloropropane (µg/L)		<2.00	2	3/29/00	PB01495	QC01783
Dibromochloromethane (µg/L)		<2.00	2	3/29/00	PB01495	QC01783
1,2-Dibromoethane (EDB) (µg/L)		<2.00	2	3/29/00	PB01495	QC01783
Tetrachloroethene (PCE) (µg/L)		<2.00	2	3/29/00	PB01495	QC01783
Chlorobenzene (µg/L)		<2.00	2	3/29/00	PB01495	QC01783
1,1,1,2-Tetrachloroethane (µg/L)		<2.00	2	3/29/00	PB01495	QC01783
Ethylbenzene (µg/L)		<2.00	2	3/29/00	PB01495	QC01783
m,p-Xylene (µg/L)		<2.00	2	3/29/00	PB01495	QC01783

Bromoform (µg/L)	<2.00	2	3/29/00	PB01495	QC01783
Styrene (µg/L)	<2.00	2	3/29/00	PB01495	QC01783
o-Xylene (µg/L)	<2.00	2	3/29/00	PB01495	QC01783
1,1,2,2-Tetrachloroethane (µg/L)	<2.00	2	3/29/00	PB01495	QC01783
2-Chlorotoluene (µg/L)	<2.00	2	3/29/00	PB01495	QC01783
1,2,3-Trichloropropane (µg/L)	<2.00	2	3/29/00	PB01495	QC01783
Isopropylbenzene (µg/L)	<2.00	2	3/29/00	PB01495	QC01783
Bromobenzene (µg/L)	<2.00	2	3/29/00	PB01495	QC01783
n-Propylbenzene (µg/L)	<2.00	2	3/29/00	PB01495	QC01783
1,3,5-Trimethylbenzene (µg/L)	<2.00	2	3/29/00	PB01495	QC01783
tert-Butylbenzene (µg/L)	<2.00	2	3/29/00	PB01495	QC01783
1,2,4-Trimethylbenzene (µg/L)	<2.00	2	3/29/00	PB01495	QC01783
1,4-Dichlorobenzene (para) (µg/L)	<2.00	2	3/29/00	PB01495	QC01783
sec-Butylbenzene (µg/L)	<2.00	2	3/29/00	PB01495	QC01783
1,3-Dichlorobenzene (µg/L)	<2.00	2	3/29/00	PB01495	QC01783
p-Isopropyltoluene (µg/L)	<2.00	2	3/29/00	PB01495	QC01783
4-Chlorotoluene (µg/L)	<2.00	2	3/29/00	PB01495	QC01783
1,2-Dichlorobenzene (ortho) (µg/L)	<2.00	2	3/29/00	PB01495	QC01783
n-Butylbenzene (µg/L)	<2.00	2	3/29/00	PB01495	QC01783
1,2-Dibromo-3-chloropropane (µg/L)	<5.00	5	3/29/00	PB01495	QC01783
1,2,3-Trichlorobenzene (µg/L)	<5.00	5	3/29/00	PB01495	QC01783
1,2,4-Trichlorobenzene (µg/L)	<5.00	5	3/29/00	PB01495	QC01783
Naphthalene (µg/L)	<2.00	2	3/29/00	PB01495	QC01783
Hexachlorobutadiene (µg/L)	<5.00	5	3/29/00	PB01495	QC01783

Surrogate	Result	Spike Amount	% Rec.	% Rec. Limit	QC Batch #
Dibromofluoromethane (µg/L)	49.09	50	98	72 - 128	QC01783
Toluene-d8 (µg/L)	49.60	50	99	91 - 107	QC01783
4-Bromofluorobenzene (µg/L)	50.68	50	101	74 - 106	QC01783

Param	Flag	Blank Result	Reporting Limit	Date Analyzed	Prep Batch #	QC Batch #
Hydroxide Alkalinity (mg/L as CaCo3)		<1.0	1	3/30/00	PB01502	QC01789
Carbonate Alkalinity (mg/L as CaCo3)		<1.0	1	3/30/00	PB01502	QC01789
Bicarbonate Alkalinity (mg/L as CaCo3)		<4.0	1	3/30/00	PB01502	QC01789
Total Alkalinity (mg/L as CaCo3)		<4.0	1	3/30/00	PB01502	QC01789

Param	Flag	Blank Result	Reporting Limit	Date Analyzed	Prep Batch #	QC Batch #
Specific Conductance (uMHOS/cm)		7.4		3/28/00	PB01472	QC01752

Param	Flag	Blank Result	Reporting Limit	Date Analyzed	Prep Batch #	QC Batch #
Dissolved Calcium (mg/L)		<.50	0.5	3/27/00	PB01441	QC01712
Dissolved Magnesium (mg/L)		<.50	0.5	3/27/00	PB01441	QC01712
Dissolved Potassium (mg/L)		<.50	0.5	3/27/00	PB01441	QC01712
Dissolved Sodium (mg/L)		<.50	0.5	3/27/00	PB01441	QC01712

Param	Flag	Blank Result	Reporting Limit	Date Analyzed	Prep Batch #	QC Batch #
CL (mg/L)		<0.5	0.5	3/23/00	PB01428	QC01692
Fluoride (mg/L)		<0.2	0.2	3/23/00	PB01428	QC01692
Nitrate-N (mg/L)		<0.2	0.2	3/23/00	PB01428	QC01692
Sulfate (mg/L)		<0.5	0.5	3/23/00	PB01428	QC01692

Param	Flag	Blank Result	Reporting Limit	Date Analyzed	Prep Batch #	QC Batch #
Total Dissolved Solids (mg/L)		<10	10	3/24/00	PB01426	QC01693

Quality Control Report
Matrix Spike and Matrix Duplicate Spike

Standard	Param	Sample Result	Dil.	Spike Amount Added	Matrix Spike Result	% Rec.	RPD	% Rec. Limit	RPD Limit	QC Batch #
MS	CL (mg/L)	710	1	625	1296.69	94		80 - 120	-	QC01692
MS	Fluoride (mg/L)	1.7	1	125	127.36	101		80 - 120	-	QC01692
MS	Nitrate-N (mg/L)	6.4	1	250	252.69	99		80 - 120	-	QC01692
MS	Sulfate (mg/L)	1300	1	625	1944.29	103		80 - 120	-	QC01692
MSD	CL (mg/L)	710	1	625	1296.55	94	0	-	0 - 20	QC01692
MSD	Fluoride (mg/L)	1.7	1	125	128.99	102	1	-	0 - 20	QC01692
MSD	Nitrate-N (mg/L)	6.4	1	250	253.51	99	0	-	0 - 20	QC01692
MSD	Sulfate (mg/L)	1300	1	625	1955.56	105	2	-	0 - 20	QC01692

Standard	Param	Sample Result	Dil.	Spike Amount Added	Matrix Spike Result	% Rec.	RPD	% Rec. Limit	RPD Limit	QC Batch #
MS	Dissolved Calcium (mg/L)	89	1	1000	1178	109		75 - 125	-	QC01712
MS	Dissolved Magnesium (mg/L)	22	1	1000	1062	104		75 - 125	-	QC01712
MS	Dissolved Potassium (mg/L)	1.4	1	1000	947	95		75 - 125	-	QC01712
MS	Dissolved Sodium (mg/L)	25	1	1000	1003	98		75 - 125	-	QC01712
MSD	Dissolved Calcium (mg/L)	89	1	1000	1161	107	2	-	0 - 20	QC01712
MSD	Dissolved Magnesium (mg/L)	22	1	1000	1050	103	1	-	0 - 20	QC01712
MSD	Dissolved Potassium (mg/L)	1.4	1	1000	978	98	3	-	0 - 20	QC01712
MSD	Dissolved Sodium (mg/L)	25	1	1000	1001	98	0	-	0 - 20	QC01712

Standard	Param	Sample Result	Dil.	Spike Amount Added	Matrix Spike Result	% Rec.	RPD	% Rec. Limit	RPD Limit	QC Batch #
MS	1,1-Dichloroethene (ug/L)		1	100	120	120		79 - 129	-	QC01783
MS	1,1-Dichloroethene (ug/L)		1	100	120	120		80 - 120	-	QC01783
MS	Benzene (ug/L)	<2.00	1	100	106	106		77 - 130	-	QC01783
MS	Trichloroethene (TCE) (ug/L)		1	100	107	107		83 - 108	-	QC01783
MS	Toluene (ug/L)	4.09	1	100	108	108		85 - 114	-	QC01783
MS	Chlorobenzene (ug/L)		1	100	104	104		87 - 114	-	QC01783

Standard	Surrogate	Result	Dil.	Spike Amount	Analyst	% Rec.	% Rec. Limit	Prep Batch #	QC Batch #
MS	Dibromofluoromethane (µg/L)	48.64	1	50	JG	97	72 - 128	PB01495	QC01783
MS	Toluene-d8 (µg/L)	48.92	1	50	JG	98	91 - 107	PB01495	QC01783
MS	4-Bromofluorobenzene (µg/L)	49.91	1	50	JG	100	74 - 106	PB01495	QC01783

Standard	Param	Sample Result	Dil.	Spike Amount Added	Matrix Spike Result	% Rec.	RPD	% Rec. Limit	RPD Limit	QC Batch #
MSD	1,1-Dichloroethene (ug/L)		1	100	124	124	3	-	0 - 20	QC01783
MSD	1,1-Dichloroethene (ug/L)		1	100	124	124	3	-	0 - 20	QC01783
MSD	Benzene (ug/L)	<2.00	1	100	108	108	2	-	0 - 20	QC01783
MSD	Trichloroethene (TCE) (ug/L)		1	100	109	109	2	-	0 - 20	QC01783
MSD	Toluene (ug/L)	4.09	1	100	110	110	2	-	0 - 20	QC01783

MSD	Chlorobenzene (ug/L)		1	100	105	105	1	-	0 - 20	QC01783

Standard	Surrogate	Result	Dil.	Spike Amount	Analyst	% Rec.	% Rec. Limit	Prep Batch #	QC Batch #
MSD	Dibromofluoromethane (µg/L)	50.38	1	50	JG	101	72 - 128	PB01495	QC01783
MSD	Toluene-d8 (µg/L)	49.27	1	50	JG	99	91 - 107	PB01495	QC01783
MSD	4-Bromofluorobenzene (µg/L)	49.52	1	50	JG	99	74 - 106	PB01495	QC01783

Quality Control Report
Duplicates

Standard	Param	Flag	Duplicate Result	Sample Result	Dilution	RPD	RPD Limit	QC Batch #
Duplicate	Hydroxide Alkalinity (mg/L as CaCo		<1.0	<1.0	1	0	0 - 20	QC01789
Duplicate	Carbonate Alkalinity (mg/L as CaCo		<1.0	<1.0	1	0	0 - 20	QC01789
Duplicate	Bicarbonate Alkalinity (mg/L as CaC		58	54	1	7	0 - 20	QC01789
Duplicate	Total Alkalinity (mg/L as CaCo3)		58	54	1	7	0 - 20	QC01789

Standard	Param	Flag	Duplicate Result	Sample Result	Dilution	RPD	RPD Limit	QC Batch #
Duplicate	Specific Conductance (uMHOS/cm)		412472	370000	1	11	0 - 20	QC01752

Standard	Param	Flag	Duplicate Result	Sample Result	Dilution	RPD	RPD Limit	QC Batch #
Duplicate	pH (s.u.)		7.2	7.1	1	1	0 - 20	QC01744

Standard	Param	Flag	Duplicate Result	Sample Result	Dilution	RPD	RPD Limit	QC Batch #
Duplicate	Total Dissolved Solids (mg/L)		3318	3340	1	1	0 - 20	QC01693

Quality Control Report
Lab Control Spikes and Duplicate Spike

	Param	Blank Result	Dil.	Spike Amount Added	Matrix Spike Result	% Rec.	RPD	% Rec. Limit	RPD Limit	QC Batch #
LCS	1,1-Dichloroethene (ug/L)	<2.00	1	100	121	121		80 - 120	-	QC01783
LCS	Benzene (ug/L)	<2.00	1	100	105	105		77 - 130	-	QC01783
LCS	Trichloroethene (TCE) (ug/L)	<2.00	1	100	107	107		83 - 108	-	QC01783
LCS	Toluene (ug/L)	<2.00	1	100	106	106		85 - 114	-	QC01783
LCS	Chlorobenzene (ug/L)	<2.00	1	100	103	103		87 - 114	-	QC01783

Standard	Surrogate	Dil.	Spike Amount	Result	% Rec.	% Rec. Limit	QC Batch #
LCS	Dibromofluoromethane (µg/L)	1	50	52.76	106	72 - 128	QC01783
LCS	Toluene-d8 (µg/L)	1	50	48.56	97	91 - 107	QC01783
LCS	4-Bromofluorobenzene (µg/L)	1	50	50.03	100	74 - 106	QC01783

LCSD	1,1-Dichloroethene (ug/L)	<2.00	1	100	124	124	2	-	0 - 20	QC01783
LCSD	1,1-Dichloroethene (ug/L)	<2.00	1	100	124	124	2	-	0 - 20	QC01783
LCSD	Benzene (ug/L)	<2.00	1	100	109	109	4	-	0 - 20	QC01783
LCSD	Trichloroethene (TCE) (ug/L)	<2.00	1	100	107	107	0	-	0 - 20	QC01783
LCSD	Toluene (ug/L)	<2.00	1	100	107	107	1	-	0 - 20	QC01783
LCSD	Chlorobenzene (ug/L)	<2.00	1	100	106	106	3	-	0 - 20	QC01783

Standard	Surrogate	Dil.	Spike Amount	Result	% Rec.	% Rec. Limit	QC Batch #
LCSD	Dibromofluoromethane (µg/L)	1	50	53.79	108	72 - 128	QC01783
LCSD	Toluene-d8 (µg/L)	1	50	49.16	98	91 - 107	QC01783
LCSD	4-Bromofluorobenzene (µg/L)	1	50	49.64	99	74 - 106	QC01783

	Param	Blank Result	Dil.	Spike Amount Added	Matrix Spike Result	% Rec.	RPD	% Rec. Limit	RPD Limit	QC Batch #
LCS	Dissolved Calcium (mg/L)	<.50	1	1000	1095	110		75 - 125	-	QC01712
LCS	Dissolved Magnesium (mg/L)	<.50	1	1000	1045	105		75 - 125	-	QC01712
LCS	Dissolved Potassium (mg/L)	<.50	1	1000	947	95		75 - 125	-	QC01712
LCS	Dissolved Sodium (mg/L)	<.50	1	1000	900	90		75 - 125	-	QC01712
LCSD	Dissolved Calcium (mg/L)	<.50	1	1000	1105	111	1	-	0 - 20	QC01712
LCSD	Dissolved Magnesium (mg/L)	<.50	1	1000	1043	104	0	-	0 - 20	QC01712
LCSD	Dissolved Potassium (mg/L)	<.50	1	1000	1078	108	13	-	0 - 20	QC01712
LCSD	Dissolved Sodium (mg/L)	<.50	1	1000	1015	101	12	-	0 - 20	QC01712

Quality Control Report
Continuing Calibration Verification Standard

Standard	Param	Flag	CCVs TRUE Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed	QC Batch #
CCV 1	Vinyl Chloride (µg/L)		100	115	115	80 - 120	3/29/00	QC01783
CCV 1	1,1-Dichloroethene (µg/L)		100	111	111	80 - 120	3/29/00	QC01783
CCV 1	Chloroform (µg/L)		100	107	107	80 - 120	3/29/00	QC01783
CCV 1	1,2-Dichloropropane (µg/L)		100	103	103	80 - 120	3/29/00	QC01783
CCV 1	Toluene (µg/L)		100	103	103	80 - 120	3/29/00	QC01783
CCV 1	Chlorobenzene (µg/L)		100	106	106	80 - 120	3/29/00	QC01783
CCV 1	Ethylbenzene (µg/L)		100	105	105	80 - 120	3/29/00	QC01783
CCV 1	Dibromofluoromethane (µg/L)		50	50.59	101	80 - 120	3/29/00	QC01783
CCV 1	Toluene-d8 (µg/L)		50	49.94	100	80 - 120	3/29/00	QC01783
CCV 1	4-Bromofluorobenzene (µg/L)		50	51.99	104	80 - 120	3/29/00	QC01783

Standard	Param	Flag	CCVs TRUE Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed	QC Batch #
ICV	Hydroxide Alkalinity (mg/L as CaCo3)		0	<1.0	0	80 - 120	3/30/00	QC01789
ICV	Carbonate Alkalinity (mg/L as CaCo3)		0	192	0	80 - 120	3/30/00	QC01789
ICV	Bicarbonate Alkalinity (mg/L as CaCo3)		0	23	0	80 - 120	3/30/00	QC01789
ICV	Total Alkalinity (mg/L as CaCo3)		236	215	91	80 - 120	3/30/00	QC01789
CCV 1	Hydroxide Alkalinity (mg/L as CaCo3)		0	<1.0	0	80 - 120	3/30/00	QC01789
CCV 1	Carbonate Alkalinity (mg/L as CaCo3)		0	240	0	80 - 120	3/30/00	QC01789
CCV 1	Bicarbonate Alkalinity (mg/L as CaCo3)		0	6	0	80 - 120	3/30/00	QC01789
CCV 1	Total Alkalinity (mg/L as CaCo3)		236	246	104	80 - 120	3/30/00	QC01789

Standard	Param	Flag	CCVs TRUE Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed	QC Batch #
ICV	Specific Conductance (uMHOS/cm)		1413	1330	94	80 - 120	3/28/00	QC01752
CCV 1	Specific Conductance (uMHOS/cm)		1413	1334	94	80 - 120	3/28/00	QC01752

Standard	Param	Flag	CCVs TRUE Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed	QC Batch #
ICV	Dissolved Calcium (mg/L)		25	24.9	100	75 - 125	3/27/00	QC01712
ICV	Dissolved Magnesium (mg/L)		25	24.9	100	75 - 125	3/27/00	QC01712
ICV	Dissolved Potassium (mg/L)		25	24.4	98	75 - 125	3/27/00	QC01712
ICV	Dissolved Sodium (mg/L)		25	23.5	94	75 - 125	3/27/00	QC01712
CCV 1	Dissolved Calcium (mg/L)		25	25.4	102	75 - 125	3/27/00	QC01712
CCV 1	Dissolved Magnesium (mg/L)		25	25.1	100	75 - 125	3/27/00	QC01712
CCV 1	Dissolved Potassium (mg/L)		25	24.8	99	75 - 125	3/27/00	QC01712
CCV 1	Dissolved Sodium (mg/L)		25	23.9	96	75 - 125	3/27/00	QC01712

Quality Control Report
Continuing Calibration Verification Standard

Standard	Param	Flag	CCVs TRUE Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed	QC Batch #
ICV	CL (mg/L)		12.5	11.55	92	80 - 120	3/23/00	QC01692
ICV	Fluoride (mg/L)		2.5	2.54	102	80 - 120	3/23/00	QC01692
ICV	Nitrate-N (mg/L)		5	4.67	93	80 - 120	3/23/00	QC01692
ICV	Sulfate (mg/L)		12.5	12.13	97	80 - 120	3/23/00	QC01692
CCV 1	CL (mg/L)		12.5	11.62	93	80 - 120	3/23/00	QC01692
CCV 1	Fluoride (mg/L)		2.5	2.56	102	80 - 120	3/23/00	QC01692
CCV 1	Nitrate-N (mg/L)		5	4.70	94	80 - 120	3/23/00	QC01692
CCV 1	Sulfate (mg/L)		12.5	12.15	97	80 - 120	3/23/00	QC01692

Standard	Param	Flag	CCVs TRUE Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed	QC Batch #
ICV	pH (s.u.)		7	7.0	100	80 - 120	3/23/00	QC01744
CCV 1	pH (s.u.)		7	7.0	100	80 - 120	3/23/00	QC01744

Standard	Param	Flag	CCVs TRUE Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed	QC Batch #
ICV	Total Dissolved Solids (mg/L)		1000	1018	102	80 - 120	3/24/00	QC01693
CCV 1	Total Dissolved Solids (mg/L)		1000	1004	100	80 - 120	3/24/00	QC01693

143096

Page 1 of 1

6701 Aberdeen Avenue, Ste. 9
Lubbock, Texas 79424
Tel (806) 794-1296
Fax (806) 794-1298
1 (800) 378-1296

TraceAnalysis, Inc.

4725 Ripley Dr., Ste A
El Paso, Texas 79922-1028
Tel (915) 585-3443
Fax (915) 585-4944
1 (888) 588-3443

CHAIN-OF-CUSTODY AND ANALYSIS REQUEST

LAB Order ID # A00032309

Company Name: NM Oil Conservation Division
Phone #: (505) 827-7154
Address: (Street, City, Zip) 2040 S. Pacheco, Santa Fe, NM 87505
Fax #: (505) 827-8177
Contact Person: Bill Olson
Invoice to: (If different from above)
Project #:
Project Name:
Project Location: Malaga
Sampler Signature: Bill Olson

LAB # (LAB USE ONLY)	FIELD CODE	# CONTAINERS	Volume/Amount	MATRIX: WATER	SOIL	AIR	SLUDGE	PRESERVATIVE METHOD: HCL	HNO3	ICE	NONE	SAMPLING: DATE	TIME
143096	000320 1330 (AC Burkham Well)	2	40ml	X				X		X		3/20/00	1330
	000320 1330 (AC Burkham Well)	1	1L	X						X		3/20/00	1330

ANALYSIS REQUEST
(Circle or Specify Method No.)

	MTBE 8021B/602	BTEX 8021B/602	TPH 418.1/TX1005	PAH 8270C	Total Metals Ag As Ba Cd Cr Pb Se Hg 6010B/200.7	TCLP Metals Ag As Ba Cd Cr Pb Se Hg	TCLP Volatiles	TCLP Semi Volatiles	TCLP Pesticides	RCI	GC-MS Vol. 8260B/624	GC/MS Semi. Vol. 8270C/625	PCB's 8082/608	Pesticides 8081A/608	BOD, TSS, pH	Gen. Chem. - Old Contract #24	Turn Around Time if different from standard	Hold
143096											2					1		

Relinquished by:	Date:	Time:	Received by:	Date:	Time:
Bill Olson	3/22/00	0830			
Relinquished by:	Date:	Time:	Received by:	Date:	Time:
Relinquished by:	Date:	Time:	Received at Laboratory by: Vicki Hensley	Date: 3-23-00	Time: 9:00AM

LAB USE ONLY
Intact Y / N
Headspace Y / N
Temp 1° °
Log-in Review MB

REMARKS:

Carrier # FedEx 8157-3603-1850

Submittal of samples constitutes agreement to Terms and Conditions listed on reverse side of C.O.C.

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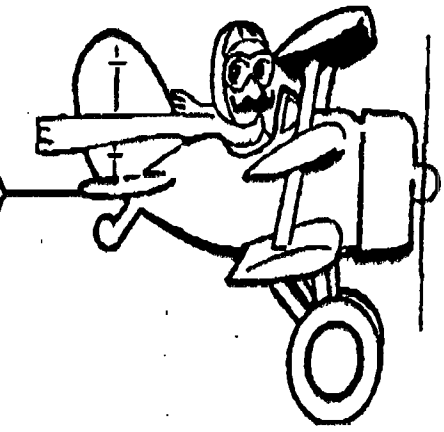
DATE: 4/25/2000

700-827-8177

ATTENTION: Willy Olson

FROM: Mike Stubblefield

NUMBER OF PAGES INCLUDING COVER SHEET: III



OIL CONSERVATION DIVISION
DISTRICT II
ARTESIA, NM 88210

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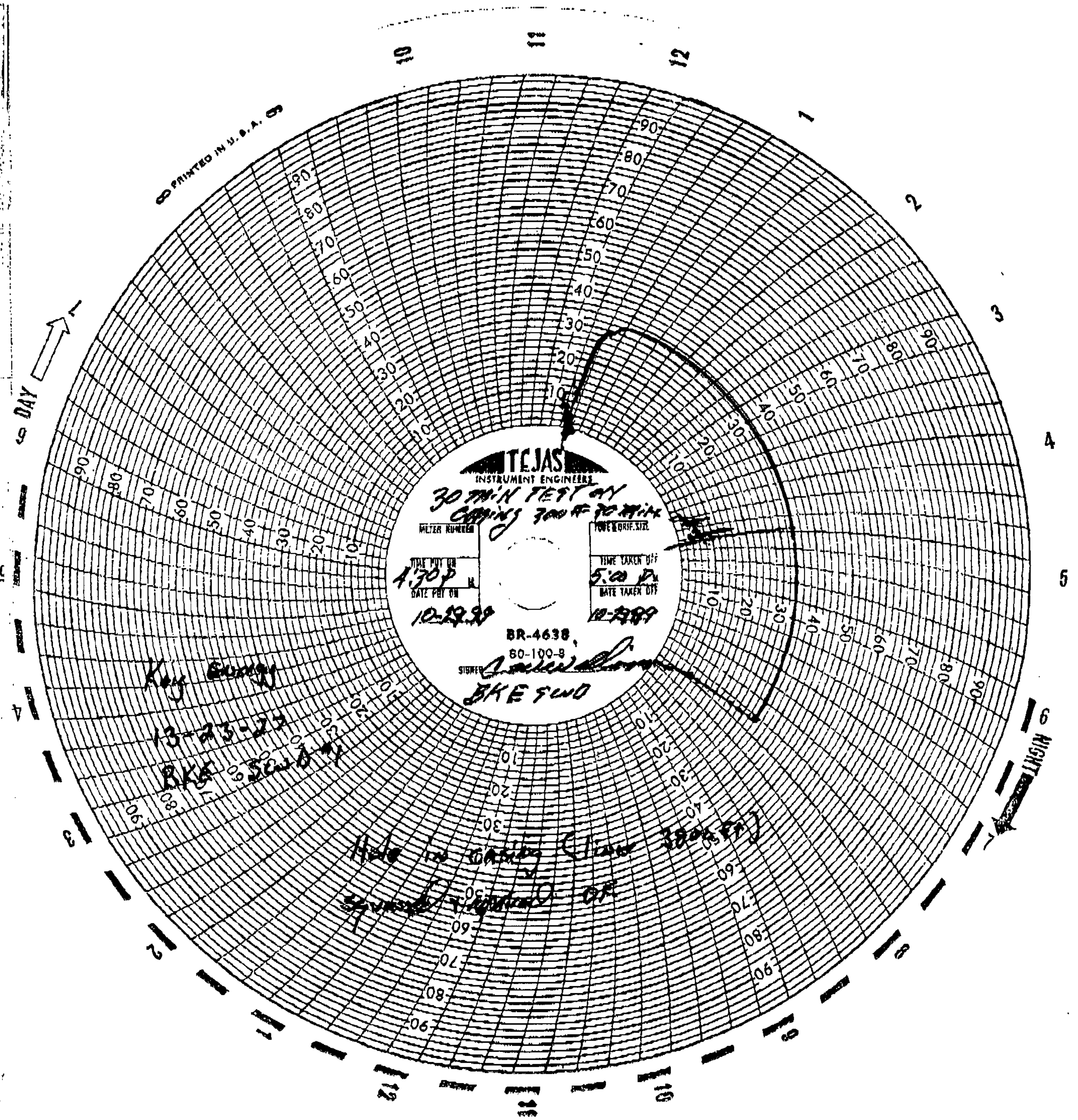
FAX NUMBER: (505) 748-9720

505-8211

HAVE A GREAT DAY!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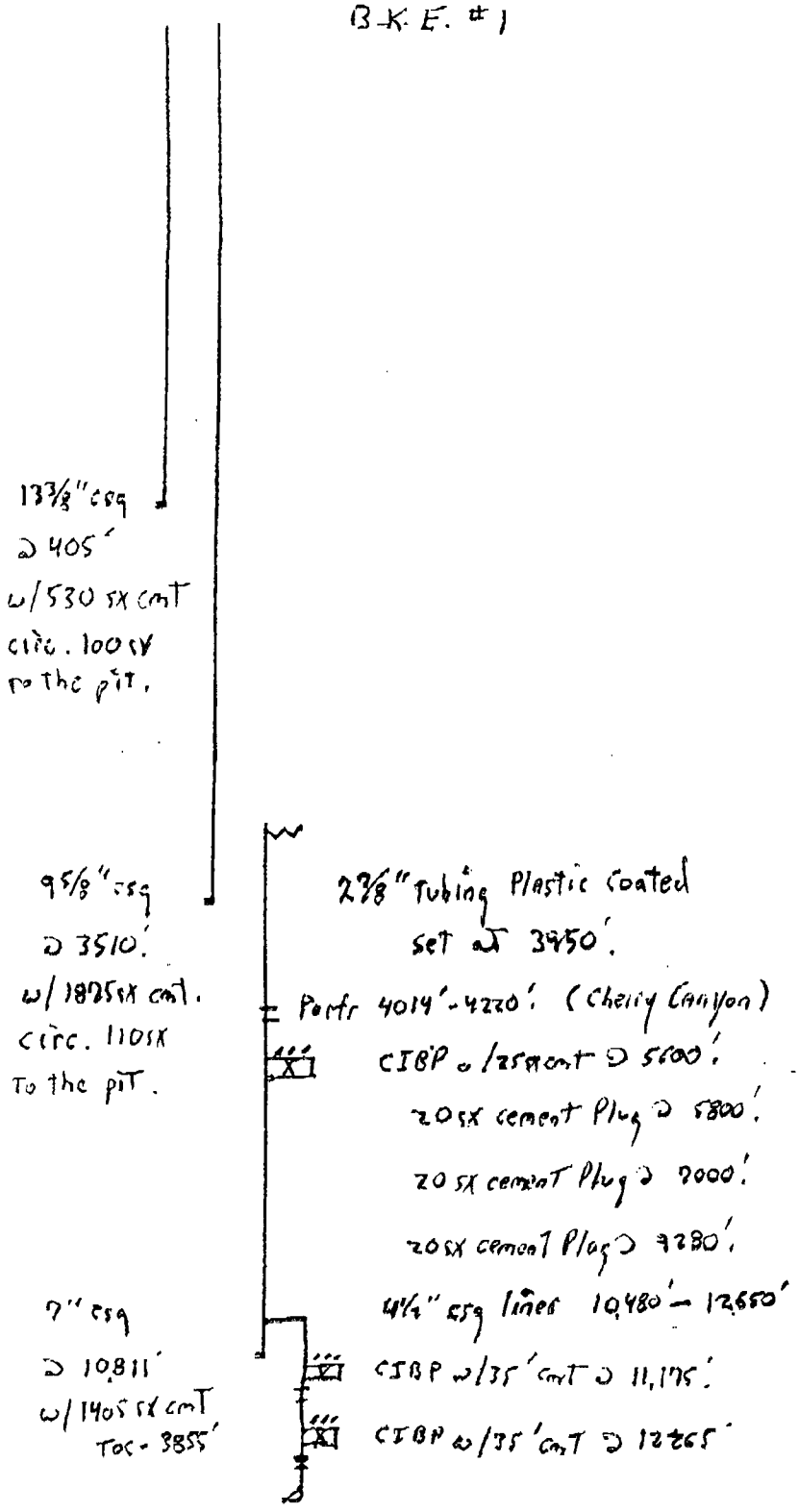
Key Energy Services

B.K.E. #1



Tops

T. SALT - 420'

B. SALT - 2162'

T. Delaware - 2390'

T. B.S. - 5858'

T. W.C. - 9230'

13 3/8" csg @ 405'
w/ 530 sx cmt.
circ. 100 sx

9 5/8" csg @ 3510'
w/ 1825 sx cmt.
circ. 110 sx

7" csg @ 10811'
w/ 1405 sx cmt.
Toc - 3855'
P.B.T.D. - 5600'

7" csg cut & Pulled
@ 3380'.

* All B.H. surveys OK.

* 10/29/99 7" csg was pulled after hole in csg was squeeze cemented. Tested ok.

Gum, Tim

From: Coy Webb[SMTP:coy_webb@nmenv.state.nm.us]
Sent: Thursday, March 16, 2000 3:26 PM
To: Gum, Tim
Subject: Malaga Question

Hi Tim,

In a recent discussion with a water resources consultant, I was told that the town of Malaga was prospecting around for a new municipal well for potable water supply. The story goes that they found a rancher willing to sell an existing well but water was a little hard and he gave them data from a few years back. It looked like it was usable, so the town ran some samples but they came back with TDS in the 4000 mg/L range intead of the several 100's they expected based on the previous data. Well they noticed a deep bine injection well nearby and think that it may be pressuring the lower beds and leaking into the potable well casing or formation. Could you send me a list of permitted brine injection wells in the Malaga vicinty and any deep monitoring data you may have?

--
Coy D. Webb, P.E.
New Mexico Environment Department, Construction Programs Bureau
Phone: (505) 827-2812
Fax: (505) 827-2837
e-mail: coy_webb@nmenv.state.nm.us

PINNACLE LABORATORIES

2709-D Pan American Freeway NE
Albuquerque, New Mexico 87107
Phone (505) 344-3777
Fax (505) 344-4413

PL I.D. **907048**

August 19, 1999

Dames & Moore
6565 Americas Parkway NE
Albuquerque, NM 87110

Project Name/Number: MALAGA WUA

Attention: Clay Kilmer

On **07/16/99**, Pinnacle Laboratories Inc., (ADHS License No. AZ0592), received a request to analyze **aqueous** samples. The samples were analyzed with EPA methodology or equivalent methods. The results of these analyses and the quality control data, which follow each set of analyses, are enclosed.

All analyses were performed by Environmental Services Laboratory, Durham, OR.

If you have any questions or comments, please do not hesitate to contact us at (505) 344-3777.

Kimberly D. McNeill
Project Manager

H. Mitchell Rubenstein, Ph.D.
General Manager

MR:jt

Enclosure

2709-D Pan American Freeway NE
Albuquerque, New Mexico 87107
Phone (505) 344-3777
Fax (505) 344-4413

CLIENT	:DAMES & MOORE	DATE RECEIVED	:07/16/99
PROJECT #	:(NONE)		
PROJECT NAME	:MALAGA WUA	REPORT DATE	:08/19/99

PL ID: 907048

	PINNACLE ID #	CLIENT DESCRIPTION	MATRIX	DATE COLLECTED
01	907048-01	72' MWUA	AQUEOUS	07/15/99
02	907048-02	94' MWUA	AQUEOUS	07/15/99
03	907048-03	125' MWUA	AQUEOUS	07/15/99
04	907048-04	169' MWUA	AQUEOUS	07/15/99
05	907048-05	207' MWUA	AQUEOUS	07/15/99

—TOTALS—

MATRIX	#SAMPLES
AQUEOUS	5

Environmental Services Laboratory, Inc.

E S L

17400 SW Upper Boones Ferry Road • Suite 270 • Portland, OR 97224 • (503) 670-8520

August 17, 1999

Kim McNeill
Pinnacle Laboratories
2709-D Pan American Fwy NE
Albuquerque, NM 87107
TEL: 505-344-3777
FAX (505) 344-4413

RE: 907048/DM/Malaga WUA

Order No.: 9907106

Dear Kim McNeill,

Environmental Services Laboratory received 5 samples on 7/20/99 for the analyses presented in the following report.

The Samples were analyzed for the following tests:

Alkalinity (Alkalinity)
CHLORIDE (Chloride)
ICP Metals (ICPMET)
Sulfate (Sulfate)
TOTAL DISSOLVED SOLIDS (E160.1)

There were no problems with the analyses and all data for associated QC met EPA or laboratory specifications except where noted in the Case Narrative. Results apply only to the samples analyzed. Reproduction of this report is permitted only in its entirety, without the written approval from the Laboratory.

If you have any questions regarding these tests results, please feel free to call.

Sincerely,

Kimberly Hill
Project Manager

Technical Review

Environmental Services Laboratory

Date: *17-Aug-99*

CLIENT:	Pinnacle Laboratories	**Client Sample ID:**	907048-01
Lab Order:	9907106	**Tag Number:**	
Project:	907048/DM/Malaga WUA	**Collection Date:**	7/15/99
Lab ID:	9907106-01A	**Matrix:**	AQUEOUS

Analyses	Result	Limit	Qual	Units	DF	Date Analyzed
TOTAL DISSOLVED SOLIDS		**E160.1**				Analyst: **sld**
Total Dissolved Solids (Residue, Filterable)	3,800	10		mg/L	1	7/21/99
ICP METALS		**ICPMET**				Analyst: **btn**
Hardness	2,300	33		mg/L	1	7/23/99

Qualifiers:

ND - Not Detected at the Reporting Limit

J - Analyte detected below quantitation limits

B - Analyte detected in the associated Method Blank

* - Value exceeds Maximum Contaminant Level

S - Spike Recovery outside accepted recovery limits

R - RPD outside accepted recovery limits

E - Value above quantitation range

Environmental Services Laboratory

Date: *17-Aug-99*

CLIENT:	Pinnacle Laboratories	**Client Sample ID:**	907048-02
Lab Order:	9907106	**Tag Number:**	
Project:	907048/DM/Malaga WUA	**Collection Date:**	7/15/99
Lab ID:	9907106-02A	**Matrix:**	AQUEOUS

Analyses	Result	Limit	Qual	Units	DF	Date Analyzed
ALKALINITY		**ALKALINITY**				Analyst: sld
Alkalinity, Total (As CaCO3)	150	5.0	AA	mg/L CaCO3	1	8/11/99
CHLORIDE		**CHLORIDE**				Analyst: sld
Chloride	950	250		mg/L	200	8/12/99
SULFATE		**SULFATE**				Analyst: sld
Sulfate	890	250		mg/L	50	8/12/99
TOTAL DISSOLVED SOLIDS		**E160.1**				Analyst: sld
Total Dissolved Solids (Residue, Filterable)	4,700	10		mg/L	1	7/21/99
ICP METALS		**ICPMET**				Analyst: btn
Hardness	2,200	33		mg/L	1	7/23/99
Sodium	410	20		mg/L	1	7/23/99

Qualifiers:	ND - Not Detected at the Reporting Limit	S - Spike Recovery outside accepted recovery limits
	J - Analyte detected below quantitation limits	R - RPD outside accepted recovery limits
	B - Analyte detected in the associated Method Blank	E - Value above quantitation range
	* - Value exceeds Maximum Contaminant Level	

Environmental Services Laboratory

Date: *17-Aug-99*

CLIENT:	Pinnacle Laboratories	**Client Sample ID:**	907048-03
Lab Order:	9907106	**Tag Number:**	
Project:	907048/DM/Malaga WUA	**Collection Date:**	7/15/99
Lab ID:	9907106-03A	**Matrix:**	AQUEOUS

Analyses	Result	Limit	Qual	Units	DF	Date Analyzed
TOTAL DISSOLVED SOLIDS		**E160.1**				Analyst: **sld**
Total Dissolved Solids (Residue, Filterable)	4,600	10		mg/L	1	7/21/99
ICP METALS		**ICPMET**				Analyst: **btn**
Hardness	2,300	33		mg/L	1	7/23/99

Qualifiers:	ND - Not Detected at the Reporting Limit	S - Spike Recovery outside accepted recovery limits
	J - Analyte detected below quantitation limits	R - RPD outside accepted recovery limits
	B - Analyte detected in the associated Method Blank	E - Value above quantitation range
	* - Value exceeds Maximum Contaminant Level	

Environmental Services Laboratory

Date: *17-Aug-99*

CLIENT:	Pinnacle Laboratories	**Client Sample ID:**	907048-04
Lab Order:	9907106	**Tag Number:**	
Project:	907048/DM/Malaga WUA	**Collection Date:**	7/15/99
Lab ID:	9907106-04A	**Matrix:**	AQUEOUS

Analyses	Result	Limit	Qual	Units	DF	Date Analyzed
TOTAL DISSOLVED SOLIDS		**E160.1**				Analyst: **sld**
Total Dissolved Solids (Residue, Filterable)	4,300	10		mg/L	1	7/21/99
ICP METALS		**ICPMET**				Analyst: **btn**
Hardness	2,100	33		mg/L	1	7/23/99

Qualifiers:

ND - Not Detected at the Reporting Limit

J - Analyte detected below quantitation limits

B - Analyte detected in the associated Method Blank

* - Value exceeds Maximum Contaminant Level

S - Spike Recovery outside accepted recovery limits

R - RPD outside accepted recovery limits

E - Value above quantitation range

Environmental Services Laboratory

Date: *17-Aug-99*

CLIENT:	Pinnacle Laboratories	**Client Sample ID:**	907048-05
Lab Order:	9907106	**Tag Number:**	
Project:	907048/DM/Malaga WUA	**Collection Date:**	7/15/99
Lab ID:	9907106-05A	**Matrix:**	AQUEOUS

Analyses	Result	Limit	Qual	Units	DF	Date Analyzed
TOTAL DISSOLVED SOLIDS		**E160.1**				Analyst: **sld**
Total Dissolved Solids (Residue, Filterable)	4,500	10		mg/L	1	7/21/99
ICP METALS		**ICPMET**				Analyst: **btn**
Hardness	2,200	33		mg/L	1	7/23/99

Qualifiers:	ND - Not Detected at the Reporting Limit	S - Spike Recovery outside accepted recovery limits
	J - Analyte detected below quantitation limits	R - RPD outside accepted recovery limits
	B - Analyte detected in the associated Method Blank	E - Value above quantitation range
	* - Value exceeds Maximum Contaminant Level	

Pinnacle Laboratories, Inc. — **Interlab Chain of Custody** — Date: 7/19 — Page: 1 of 1 — 9907106

Network Project Manager: Kimberly D. McNeill

Pinnacle Laboratories, Inc.
2709-D Pan American Freeway, NE
Albuquerque, New Mexico 87107
(505) 344-3777 Fax (505) 344-4413

* Na, Alk., Cl, SO4 on HOLD until further notice per client!

SAMPLE ID	DATE	TIME	MATRIX	LAB ID	Metals (8) RCRA	RCRA TCLP METALS	Metals-13 PP List	Metals-TAL		TOX	TOC	Gen Chemistry: Na, Alk. Cl, SO4*	Hardness, TDS	Oil and Grease	Volatile Organics GC/MS (8260)	BOD	COD	PESTICIDES/PCB (608/8080)	8270 BY GC/MS	PNA (8310)	8240 (TCLP 1311) ZHE	Herbicides (615/8150)	Base/Neutral Acid Compounds GC/MS (625/8270)	URANIUM	RADIUM 226+228	Gross Alpha/Beta	TO-14	NUMBER OF CONTAINERS
907048-01	7/15	1045	AQ	01								X	X															
-02		1100		02				Added Bleiben				⊗	X															
-03		1115		03								X	X															
-04		1190		04								X	X															
-05	↓	1145	↓	05								X	X															

PROJECT INFORMATION		SAMPLE RECEIPT		SAMPLES SENT TO:		RELINQUISHED BY: 1.	RELINQUISHED BY: 2.
PROJECT #:	907048	Total Number of Containers		PENSACOLA - STL-FL		Signature: Time: Francine Trino 1700	Signature: Time:
PROJ. NAME:	DM	Chain of Custody Seals		PORTLAND - ESL-OR	X	Printed Name: Date: Francine Trino 7/19/99	Printed Name: Date:
QC LEVEL:	(STD) IV	Received Intact?		STL - CT		Pinnacle Laboratories, Inc.	Company
QC REQUIRED:	(MS) MSD BLANK	Received Good Cond./Cold		STL- NEW JERSEY		RECEIVED BY: 1.	RECEIVED BY: 2
TAT:	(STANDARD) RUSH!!	LAB NUMBER:		N. CREEK		Signature: Time: [illegible] 10A	Signature: Time:
				BARRINGER		Printed Name: Date: 7/20/99	Printed Name: Date:
DUE DATE:	7/30	COMMENTS:		SEQUOIA			
RUSH SURCHARGE:	—						
CLIENT DISCOUNT:	—						
SPECIAL CERTIFICATION REQUIRED: YES	(NO)						

PINNACLE LABORATORIES

Pinnacle Laboratories Inc.

CHAIN OF CUSTODY

DATE: 7-6-99 PAGE: 1 OF ____

PLI Accession #: 907048

SHADED AREAS ARE FOR LAB USE ONLY.

PLEASE FILL THIS FORM IN COMPLETELY.

PROJECT MANAGER:

COMPANY: Daniel B. Stephens & Assoc.
ADDRESS: 6565 Americas Pkwy NE, ABQ NM 87110
PHONE: 505 884-2511
FAX: 505 828-1930
BILL TO: Clay Kilmer
COMPANY: Same
ADDRESS:

ANALYSIS REQUEST

SAMPLE ID	DATE	TIME	MATRIX	LAB I.D.	Petroleum Hydrocarbons (418.1) TRPH	(MOD.8015) Diesel/Direct Inject	Hardness, Na, AIK, TDS, Cl, SO4	(M8015) Gas/Purge & Trap	8021 (BTEX)/8015 (Gasoline) MTBE	8021 (BTEX) ☐ MTBE ☐ TMB ☐ PCE	8021 (TCL)	8021 (EDX)	8021 (HALO)	8021 (CUST)	504.1 EDB ☐ / DBCP ☐	8260 (TCL) Volatile Organics	8260 (Full) Volatile Organics	8260 (CUST) Volatile Organics	8260 (Landfill) Volatile Organics	Pesticides /PCB (608/8081/8082)	Herbicides (615/8151)	Base/Neutral/Acid Compounds GC/MS (625/8270)	Polynuclear Aromatics (610/8310/8270-SIMS)	General Chemistry:		Priority Pollutant Metals (13)	Target Analyte List Metals (23)	RCRA Metals (8)	RCRA Metals by TCLP (Method 1311)	Metals:		NUMBER OF CONTAINERS
72' MWUA	7-6-99	10:45	H_2O	01			2																									2
94' MWUA	"	11:00	"	02			2																									2
125' MWUA	"	11:15	"	03			2																									2
165' MWUA	"	11:30	"	04			2																									2
207' MWUA	"	11:45	"	05			2																									2

PROJECT INFORMATION

PROJ. NO.:
PROJ. NAME: Malaga WUA
P.O. NO.:
SHIPPED VIA:

SAMPLE RECEIPT

NO. CONTAINERS	10
CUSTODY SEALS	Y/N/NA
RECEIVED INTACT	Y
BLUE ICE/ICE	23.8

PRIOR AUTHORIZATION IS REQUIRED FOR RUSH PROJECTS

(RUSH) ☐ 24hr ☐ 48hr ☐ 72hr ☐ 1 WEEK (NORMAL) ☑

CERTIFICATION REQUIRED: ☐ NM ☐ SDWA ☐ OTHER

METHANOL PRESERVATION ☐

COMMENTS: FIXED FEE ☐

Run Hardness & TDS first, transmit verbal to Clay Kilmer prior to running other analytes. Remaining analyses dependent upon results of Hardness, TDS

RELINQUISHED BY: 1.

Signature: [signature] Time: 8:25
Printed Name: Clay Kilmer Date: 7-6-99
Company: Daniel B. Stephens & Assoc.
See reverse side (Force Majeure)

RECEIVED BY: 1.

Signature: Time:
Printed Name: Date:
Company:

RELINQUISHED BY: 2.

Signature: Time:
Printed Name: Date:
Company:

RECEIVED BY: (LAB) 2.

Signature: Rose Galbraith Time: 8:25
Printed Name: Rose Galbraith Date: 7/6/99
Pinnacle Laboratories Inc.

Environmental Services Laboratory

Date: *17-Aug-99*

CLIENT: Pinnacle Laboratories
Work Order: 9907106
Project: 907048/DM/Malaga WUA

QC SUMMARY REPORT
Method Blank

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Sample ID: MBlank Batch ID: 01 ALK A-8/1 Test Code: Alkalinity Units: mg/L CaCO3 Analysis Date 8/11/99 Prep Date:											
Client ID: 9907106 Run ID: NO INST_990811A SeqNo: 19853											
Alkalinity, Bicarbonate (As CaCO3)	ND	5									
Alkalinity, Carbonate (As CaCO3)	ND	5									
Alkalinity, Total (As CaCO3)	ND	5									
Sample ID: MBlank Batch ID: 01 CL A-8/13/ Test Code: Chloride Units: mg/L Analysis Date 8/12/99 Prep Date:											
Client ID: 9907106 Run ID: NO INST_990812C SeqNo: 20075											
Chloride	ND	2.5									
Sample ID: MBlank Batch ID: 01 SULFATE Test Code: Sulfate Units: mg/L Analysis Date 8/12/99 Prep Date:											
Client ID: 9907106 Run ID: HIT MAN_990812B SeqNo: 20087											
Sulfate	ND	5									
Sample ID: MBlank Batch ID: 01 TDS-07/22/ Test Code: E160.1 Units: mg/L Analysis Date 7/21/99 Prep Date:											
Client ID: 9907106 Run ID: NO INST_990721F SeqNo: 18304											
Total Dissolved Solids (Residue, Filtera	ND	10									

Qualifiers:
ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
B - Analyte detected in the associated Method Blank

CLIENT: Pinnacle Laboratories
Work Order: 9907106
Project: 907048/DM/Malaga WUA

QC SUMMARY REPORT
Method Blank

Sample ID: MB-662 Batch ID: 662 Test Code: ICPMET Units: mg/L Analysis Date 7/23/99 Prep Date: 7/22/99
Client ID: 9907106 Run ID: ICP_990723B SeqNo: 18474

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Arsenic	ND	0.005									
Barium	ND	0.005									
Cadmium	ND	0.002									
Chromium, 200.7	ND	0.005									
Copper, 200.7	ND	0.005									
Hardness	ND	0.33									
Iron	ND	0.01									
Lead	ND	0.005									
Manganese	ND	0.005									
Selenium	ND	0.005									
Silver	ND	0.005									
Zinc, 200.7	ND	0.005									

Qualifiers:
ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
B - Analyte detected in the associated Method Blank

CLIENT: Pinnacle Laboratories
Work Order: 9907106
Project: 907048/DM/Malaga WUA

QC SUMMARY REPORT
Sample Duplicate

Sample ID: 9908052-01A DUP Batch ID: 01 ALK A-8/1 Test Code: Alkalinity Units: mg/L CaCO3 Analysis Date 8/11/99 Prep Date:
Client ID: 9907106 Run ID: NO INST_990811A SeqNo: 19857

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Alkalinity, Bicarbonate (As CaCO3)	240	5	0	0	0.0%	0	0	250	4.1%	20	
Alkalinity, Carbonate (As CaCO3)	ND	5	0	0	0.0%	0	0	0	0.0%	20	
Alkalinity, Total (As CaCO3)	240	5	0	0	0.0%	0	0	250	4.1%	20	

Sample ID: 9908059-01A DUP Batch ID: 01 CL A-8/13/ Test Code: Chloride Units: mg/L Analysis Date 8/12/99 Prep Date:
Client ID: 9907106 Run ID: NO INST_990812C SeqNo: 20080

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Chloride	28.75	12	0	0	0.0%	0	0	30	4.3%	20	

Sample ID: 9908034-01A DUP Batch ID: 01 SULFATE Test Code: Sulfate Units: mg/L Analysis Date 8/12/99 Prep Date:
Client ID: 9907106 Run ID: HIT MAN_990812B SeqNo: 20090

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Sulfate	460.8	120	0	0	0.0%	80	120	471	2.2%	20	

Sample ID: 9907114-02A DUP Batch ID: 01 TDS-07/22/ Test Code: E160.1 Units: mg/L Analysis Date 7/21/99 Prep Date:
Client ID: 9907106 Run ID: NO INST_990721F SeqNo: 18314

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Total Dissolved Solids (Residue, Filtera	2000	10	0	0	0.0%	0	0	1900	5.1%	20	

Qualifiers:
ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
B - Analyte detected in the associated Method Blank

CLIENT: Pinnacle Laboratories
Work Order: 9907106
Project: 907048/DM/Malaga WUA

QC SUMMARY REPORT
Sample Duplicate

Sample ID: 9907101-01A DUP Batch ID: 662 Test Code: ICPMET Units: mg/L Analysis Date 7/23/99 Prep Date: 7/22/99
Client ID: 9907106 Run ID: ICP_990723B SeqNo: 18467

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Arsenic	ND	0.005	0	0	0.0%	0	0	0	0.0%	20	
Barium	ND	0.005	0	0	0.0%	0	0	0	0.0%	20	
Cadmium	ND	0.002	0	0	0.0%	0	0	0	0.0%	20	
Chromium, 200.7	ND	0.005	0	0	0.0%	0	0	0	0.0%	20	
Copper, 200.7	ND	0.005	0	0	0.0%	0	0	0	0.0%	20	
Hardness	20.31	0.33	0	0	0.0%	0	0	20.36	0.2%	20	
Iron	.06132	0.01	0	0	0.0%	0	0	0.06552	6.6%	20	
Lead	ND	0.005	0	0	0.0%	0	0	0	0.0%	20	
Manganese	ND	0.005	0	0	0.0%	0	0	0	0.0%	20	
Selenium	ND	0.005	0	0	0.0%	0	0	0	0.0%	20	
Silver	ND	0.005	0	0	0.0%	0	0	0	0.0%	20	
Sodium	6.877	0.2	0	0	0.0%	0	0	6.866	0.2%	20	
Zinc, 200.7	.006049	0.005	0	0	0.0%	0	0	0.007443	20.7%	20	T

Qualifiers:
ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
B - Analyte detected in the associated Method Blank

Environmental Services Laboratory

Date: *17-Aug-99*

CLIENT: Pinnacle Laboratories
Work Order: 9907106
Project: 907048/DM/Malaga WUA

QC SUMMARY REPORT
Sample Matrix Spike

Sample ID: 9908059-01A MS	Batch ID: 01 CL A-8/13/	Test Code: Chloride	Units: mg/L	Analysis Date 8/12/99	Prep Date:
Client ID:	9907106	Run ID: NO INST_990812C		SeqNo: 20081	

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Chloride	67.5	12	37.5	30	100.0%	75	125	0			

Sample ID: 9908059-01A MSD	Batch ID: 01 CL A-8/13/	Test Code: Chloride	Units: mg/L	Analysis Date 8/12/99	Prep Date:
Client ID:	9907106	Run ID: NO INST_990812C		SeqNo: 20082	

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Chloride	68.75	12	37.5	30	103.3%	75	125	67.5	1.8%	20	

Sample ID: 9908034-01A MS	Batch ID: 01 SULFATE	Test Code: Sulfate	Units: mg/L	Analysis Date 8/12/99	Prep Date:
Client ID:	9907106	Run ID: HIT MAN_990812B		SeqNo: 20091	

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Sulfate	639.5	120	200	471	84.3%	75	125	0			

Sample ID: 9908034-01A MSD	Batch ID: 01 SULFATE	Test Code: Sulfate	Units: mg/L	Analysis Date 8/12/99	Prep Date:
Client ID:	9907106	Run ID: HIT MAN_990812B		SeqNo: 20092	

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Sulfate	636.2	120	200	471	82.6%	75	125	639.5	0.5%	20	

Qualifiers:
ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
B - Analyte detected in the associated Method Blank

CLIENT: Pinnacle Laboratories
Work Order: 9907106
Project: 907048/DM/Malaga WUA

QC SUMMARY REPORT
Sample Matrix Spike

Sample ID: 9907101-01A MS **Batch ID:** 662 **Test Code:** ICPMET **Units:** mg/L **Analysis Date** 7/23/99 **Prep Date:** 7/22/99
Client ID: 9907106 **Run ID:** ICP_990723B **SeqNo:** 15468

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Arsenic	.9976	0.005	1	0	99.8%	80	120	0			
Barium	.9201	0.005	1	0	92.0%	80	120	0			
Cadmium	.9917	0.002	1	0	99.2%	80	120	0			
Chromium, 200.7	.9963	0.005	1	0	99.6%	80	120	0			
Copper, 200.7	.9443	0.005	1	0	94.4%	80	120	0			
Hardness	85.33	0.33	66.2	20.36	98.1%	80	120	0			
Iron	10.15	0.01	10	0.06552	100.9%	80	120	0			
Lead	.9712	0.005	1	0	97.1%	80	120	0			
Manganese	.9739	0.005	1	0	97.4%	80	120	0			
Selenium	.9475	0.005	1	0	94.8%	80	120	0			
Silver	.9776	0.005	1	0	97.8%	80	120	0			
Sodium	16.06	0.2	10	6.866	91.9%	80	120	0			
Zinc, 200.7	.9911	0.005	1	0.007443	98.4%	80	120	0			

Qualifiers:
ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
B - Analyte detected in the associated Method Blank

CLIENT: Pinnacle Laboratories
Work Order: 9907106
Project: 907048/DM/Malaga WUA

QC SUMMARY REPORT
Sample Matrix Spike Duplicate

Sample ID: 9907101-01A MSD Batch ID: 662 Test Code: ICPMET Units: mg/L Analysis Date 7/23/99 Prep Date: 7/22/99
Client ID: 9907106 Run ID: ICP_990723B SeqNo: 18469

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Arsenic	.9949	0.005	1	0	99.5%	80	120	0.9976	0.3%	20	
Barium	.9181	0.005	1	0	91.8%	80	120	0.9201	0.2%	20	
Cadmium	.8988	0.002	1	0	89.9%	80	120	0.9917	9.8%	20	
Chromium, 200.7	.9044	0.005	1	0	90.4%	80	120	0.9963	9.7%	20	
Copper, 200.7	.9426	0.005	1	0	94.3%	80	120	0.9443	0.2%	20	
Hardness	84.95	0.33	66.2	20.36	97.6%	80	120	85.33	0.4%	20	
Iron	10.09	0.01	10	0.06552	100.2%	80	120	10.15	0.6%	20	
Lead	.8804	0.005	1	0	88.0%	80	120	0.9712	9.8%	20	
Manganese	.9683	0.005	1	0	96.8%	80	120	0.9739	0.6%	20	
Selenium	.8575	0.005	1	0	85.7%	80	120	0.9475	10.0%	20	
Silver	.9771	0.005	1	0	97.7%	80	120	0.9776	0.0%	20	
Sodium	16.08	0.2	10	6.866	92.1%	80	120	16.06	0.1%	20	
Zinc, 200.7	.8996	0.005	1	0.007443	89.2%	80	120	0.9911	9.7%	20	

Qualifiers:
ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
B - Analyte detected in the associated Method Blank

CLIENT: Pinnacle Laboratories
Work Order: 9907106
Project: 907048/DM/Malaga WUA

QC SUMMARY REPORT

Laboratory Control Spike - generic

Sample ID: LCS	Batch ID: 01 ALK A-8/1	Test Code: Alkalinity	Units: mg/L CaCO3	Analysis Date 08/11/99	Prep Date:
Client ID:	9907106	Run ID: NO INST_990811A		SeqNo: 19854	

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Alkalinity, Total (As CaCO3)	155	5	157	0	98.7%	85	115	0			

Sample ID: LCS	Batch ID: 01 CL A-8/13/	Test Code: Chloride	Units: mg/L	Analysis Date 08/12/99	Prep Date:
Client ID:	9907106	Run ID: NO INST_990812C		SeqNo: 20076	

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Chloride	10	2.5	10	0	100.0%	85	115	0			

Sample ID: LCS	Batch ID: 01 SULFATE	Test Code: Sulfate	Units: mg/L	Analysis Date 08/12/99	Prep Date:
Client ID:	9907106	Run ID: HIT MAN_990812B		SeqNo: 20088	

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Sulfate	13.38	5	11.68	0	114.6%	85	115	0			

Sample ID: LCS	Batch ID: 01 TDS-07/22/	Test Code: E160.1	Units: mg/L	Analysis Date 07/21/99	Prep Date:
Client ID:	9907106	Run ID: NO INST_990721F		SeqNo: 18305	

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Total Dissolved Solids (Residue, Filtera	2750	10	2662	0	103.3%	85	115	0			

Qualifiers:
ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
B - Analyte detected in the associated Method Blank

CLIENT: Pinnacle Laboratories
Work Order: 9907106
Project: 907048/DM/Malaga WUA

QC SUMMARY REPORT
Laboratory Control Spike - generic

Sample ID: LCS-662 Batch ID: 662 Test Code: ICPMET Units: mg/L Analysis Date 07/23/99 Prep Date: 07/22/99
Client ID: 9907106 Run ID: ICP_990723B SeqNo: 18473

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Arsenic	.9936	0.005	1	0	99.4%	80	120	0			
Barium	.9037	0.005	1	0	90.4%	80	120	0			
Cadmium	.999	0.002	1	0	99.9%	80	120	0			
Chromium, 200.7	.9975	0.005	1	0	99.8%	90	110	0			
Copper, 200.7	.9309	0.005	1	0	93.1%	90	110	0			
Hardness	64.78	0.33	66.2	0	97.9%	80	120	0			
Iron	10.05	0.01	10	0	100.5%	80	120	0			
Lead	.9683	0.005	1	0	96.8%	80	120	0			
Manganese	.9662	0.005	1	0	96.6%	80	120	0			
Selenium	.9499	0.005	1	0	95.0%	80	120	0			
Silver	.9709	0.005	1	0	97.1%	80	120	0			
Sodium	9.791	0.2	10	0	97.9%	80	120	0			
Zinc, 200.7	.9874	0.005	1	0	98.7%	90	110	0			

Qualifiers:
ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
B - Analyte detected in the associated Method Blank

Environmental Services Laboratory

Date: *17-Aug-99*

CLIENT: Pinnacle Laboratories
Work Order: 9907106
Project: 907048/DM/Malaga WUA

QC SUMMARY REPORT
Minerals ICV for ICP

Sample ID: CCVHI	Batch ID: 662	Test Code: ICPMET	Units: mg/L	Analysis Date 7/23/99	Prep Date:
Client ID:	9907106	Run ID: ICP_990723B		SeqNo: 18471	

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Hardness	166.1	0.33	165	0	100.7%	90	110	0			
Sodium	5.239	0.2	5	0	104.8%	90	110	0			

Sample ID: CCVLOW	Batch ID: 662	Test Code: ICPMET	Units: mg/L	Analysis Date 7/23/99	Prep Date:
Client ID:	9907106	Run ID: ICP_990723B		SeqNo: 18472	

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Arsenic	.5151	0.005	0.5	0	103.0%	90	110	0			
Barium	.487	0.005	0.5	0	97.4%	90	110	0			
Cadmium	.5157	0.002	0.5	0	103.1%	90	110	0			
Chromium, 200.7	.5162	0.005	0.5	0	103.2%	95	105	0			
Copper, 200.7	.504	0.005	0.5	0	100.8%	95	105	0			
Iron	.5092	0.01	0.5	0	101.8%	90	110	0			
Lead	.5211	0.005	0.5	0	104.2%	90	110	0			
Manganese	.502	0.005	0.5	0	100.4%	90	110	0			
Selenium	.5066	0.005	0.5	0	101.3%	90	110	0			
Silver	.499	0.005	0.5	0	99.8%	90	110	0			
Zinc, 200.7	.5097	0.005	0.5	0	101.9%	95	105	0			

Qualifiers:
ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
B - Analyte detected in the associated Method Blank

DAMES & MOORE
GROUP
A DAMES & MOORE GROUP COMPANY

Two Park Square
6565 Americas Parkway, N.E.
Suite 610
Albuquerque, New Mexico 87110
505 884 2611 Tel
505 888 1930 Fax

August 25, 1999

Ms. Adrienne Widmer
Molzen-Corbin & Associates
800 S. Telshor Blvd
Ste 200
Las Cruces, NM 88011

RE: Results of water quality and well integrity investigation, Malaga MDWC&SWA Well C-231-S

Dear Ms. Widmer:

I am transmitting this letter to summarize the results of our investigations of the above referenced well. The work described herein was performed in accordance with a workplan which was transmitted to Molzen-Corbin and approved by M. Jerry Paz on July 6, 1999. The scope of work included performing a down-hole video survey of the well to investigate the condition of the well. A series of water samples were also collected from the well to determine the quality of water that might be produced from one or more of the perforated zones in the well casing.

The video well logging was performed on July 15, 1999 by Mr. Tom Coneway of Video Surveys Company in Hereford, Texas. The video log indicated that the well casing appears to be structurally sound; however many of the perforations in the casing appear to be occluded by mineral growth or by rust accumulation. The static water level in the well was approximately 65 feet below land surface; this is considerably deeper than the 6 foot depth reported by the driller on the State Engineer Office (SEO) Well Record upon completion of the well in 1976. The video survey also indicated the well depth was 218 feet; depth reported on the Well Record was 253 feet. Copies of Mr. Coneway's written notes and a videotape of the survey are included with this submittal.

After completing the video logging, I collected discrete interval water samples from the well within screened zones at depths of 72', 94', 125', 169' and 207'. The samples were submitted to Pinnacle Laboratories in Albuquerque, NM and analyzed for Total Dissolved Solids (TDS) and Hardness. The sample from 94' was also analyzed for Chloride, Sulfate and Alkalinity. The results of the analyses indicate that the water is highly mineralized and exceeds drinking water standards for all analytes examined. The water in this well is unsuitable for residential use.

You provided me with a copy of a laboratory report from National Testing Laboratories, Inc., Cleveland Ohio of analyses on a water sample collected from the well in June 1993 by Mr. A.C. Burkham. This report indicated that the well water was fairly mineralized, containing elevated levels of hardness and TDS. The samples I collected from the well last month contained much higher levels of several dissolved minerals. A comparison of the two analyses is presented in the table below. Copies of the 1993 and 1999 laboratory reports are included with this submittal.

Analyte	6/15/93 Sample concentration mg/l	7/15/99 (94 ft) Sample concentration mg/l
Alkalinity	145	150
Chloride	46	950
Sulfate	88	890
Total Dissolved Solids	1085	4700
Hardness	1675	2200

I called Mr. Mike Stapelton of the State Engineer Office in Roswell on August 12 to discuss the water quality problems we discovered and to discuss the possibility of moving the Malaga MDWC&SWA water rights from Well C-231-S to another location. Mr. Stapelton informed me that the State Engineer Office issued an Administrative Order (Order 143) in 1993 that could have resulted in degraded groundwater quality in the area. Order 143 prohibits farmers from pumping irrigation wells unless there is insufficient water in the irrigation canal system to water crops. Mr. Stapelton indicated that there is speculation that this order could cause levels of dissolved solids in ground water in the area to rise; he also indicated that water users in the vicinity of Loving have complained of rising salt levels in ground water in the area.

I have not researched water quality trends in the area; however I am skeptical that changes in irrigation practices alone could cause such a dramatic increase in salinity in such a short period of time. Assuming that both of the laboratory analyses were performed on water that came from the same well, I conclude that the degradation of water quality in Well C-231-S has been nothing short of spectacular.

Mr. Vasquez has indicated that an oilfield brine injection well is located approximately 1200 feet to the north of Well C-231-S. Oilfield brines are typically very high in dissolved chlorides and sulfates. Due to the precipitous rise in these two analytes in Well C-231-S, the nearby injection well is suspected as a potential source of brine contamination at the site. I suggest that you or a representative of the Malaga cooperative

contact the New Mexico Oil Conservation Division and inform them that there may be a problem with the injection well.

We recommend that the Malaga MDWC&SWA sever their water rights from Well C-231-S and move them to another location where water quality can be shown to be acceptable for residential supply. Mr. Stapelton informed me that Order 143 does not affect public water supply wells in the area and that moving the water rights would not be opposed by the State Engineer Office. The move would require a demonstration that other water rights owners would not be impaired at any "move to" location that the Malaga MDWC&SWA would select.

I regret that the water quality investigation has resulted in the discovery of such poor water quality at Well C-231-S; however it is fortunate that this information was obtained before significant efforts were expended to extend infrastructure to the well. I hope that the information contained in this submittal is adequate for your needs. If you have any questions, please do not hesitate to contact me directly. Dames & Moore appreciates the opportunity to assist Molzen-Corbin with this project.

Sincerely,
Dames & Moore

L. Clay Kilmer
Sr. Hydrogeologist, CGWP

WELL SURVEYS COMPANY

P.O. Box 805
Hereford, TX 79045

CLOSED CIRCUIT TV DATA SHEET

CUSTOMER: Malaga Water Users Association
AREA: SE of Carlsbad, NM **DATE:** July 15, 1999
WELL NO: **S.W.L.** 65' **DEPTH of WELL:** 253'
DEPTH OF SURVEY: 218'
DEPTH & KIND OF PERFS.: 67'-72', 92'-96', 112'-138', 160'-178', 195'-245' Torch Cut
LOCATION: 23S. 27E. Sec. 13.4441 Eddy County Permit # C-231-S
REMARKS: 16" Casing 0'-209' 14" 209'-TD

DESCRIPTION & REMARKS	DEPTH
Weld	34'
SWL, little hazy	65'
Torch cut Perfs. 6 row 3/8" wide, clean	67'-72'
Piece of black tape	71'
Torch cut slots	92'-96'
Torch cut slots, little more plugging	112'-138'
Heavy buildup	150'+
See a few open slots	168'
Casing cleaner	173'
Side view, about 1/2 of slots plugged with rust	174'
Piece of rusted cable which was attached to pump	183'-192'
Side view, slots plugged solid	205'
Casing reduction to 14", slight ledge, debris	209'
TD	218'

This survey was being made to inspect the overall condition of the casing. The water district had recently purchased this well & was curious as to the condition of it. The water was a little hazy throughout the survey. In general, the casing looked good & we didn't see any obvious holes or breaks. The log showed torch cut perforations in 5 different areas. The upper perfs. were fairly clean, but the deeper we went, the more plugging we noted. It was difficult to see any open perfs. in the bottom part of the well.

DATE COLLECTED	DATE RECEIVED	DATE COMPLETED	SAMPLE CODE
06/15/93	06/25/[illegible]	07/08/93	9541267

CUSTOMER ADDRESS

A C BURKHAM
134 NYMEYER
LOVING, NM 88256-

DEALER ADDRESS

THE WATER WORKS
313 S. CANAL
CARLSBAD, NM 88220-

WATERCHECK / NATIONAL TESTING LABORATORIES INC.
6555 Wilson Mills Road
Cleveland, OH 44143
(216) 449-2525

DRINKING WATER ANALYSIS RESULTS

NOTE: "*" indicates that the MCL (Maximum Contaminant Level) has been exceeded, or in the case of pH is either too high OR too low.
"ND" indicates that none of this contaminant has been detected at or above our detection level.
"**" Result may be invalid due to lack of "Time Collected" or because the sample has exceeded the 30-hour time frame.
"BD" Bacteria destroyed due to lack of collection information or because the sample has exceeded the 48-hour time frame.
TNTC-Too Numerous To Count NBS-No Bacteria Submitted

Analysis performed	MCL (mg/l)	Detection Level	Level Detected
Microbiological:			
Total coliform (organism/100ml)	0	0.0	BD
Inorganic chemicals - metals:			
Aluminum	0.2	0.1	ND
Arsenic	0.05	0.010	ND
Barium	2.0	0.30	ND
Cadmium	0.005	0.002	ND
Chromium	0.1	0.004	ND
Copper	1.3	0.004	ND
Iron	0.3	0.020	ND
Lead	0.015	0.002	ND
Manganese	0.05	0.004	ND
Mercury	0.002	0.001	ND
Nickel	0.1	0.02	ND
Selenium	0.05	0.002	ND
Silver	0.1	0.002	ND
Sodium	---	1.0	190
Zinc	5.0	0.004	ND
Inorganic chemicals - other, and physical factors:			

Alkalinity (Total as CaCO3)	---	10.0	145
Chloride	250	5.0	46
Fluoride	4.0	0.5	ND
Nitrate as N	10.	0.5	4.2
Nitrite as N	1.0	0.5	ND
Sulfate	250	5.0	88
Hardness (suggested limit = 100)		10.0	1675*
pH (Standard Units)	6.5-8.5	---	7.9
Total Dissolved Solids	500	20.0	1085*
Turbidity (Turbidity Units)	1.0	0.1	0.1
Organic chemicals - trinalomethanes:			
Bromoform	---	0.004	ND
Bromodichloromethane	---	0.002	ND
Chloroform	---	0.002	ND
Dibromochloromethane	---	0.004	ND
Total THMs (sum of four above)	0.1	0.002	ND
Organic chemicals - volatiles:			
Benzene	0.005	0.001	ND
Vinyl Chloride	0.002	0.001	ND
Carbon Tetrachloride	0.005	0.001	ND
1,2-Dichloroethane	0.005	0.001	ND

COPY

Analysis performed	MCL (mg/l)	Detection Level	Level Detected
Trichloroethylene	0.005	0.001	ND
1,4-Dichlorobenzene	0.075	0.001	ND
1,1-Dichloroethylene	0.007	0.001	ND
1,1,1,-Trichloroethane	0.20	0.001	ND
Bromobenzene	---	0.002	ND
Bromomethane	---	0.002	ND
Chlorobenzene	0.1	0.001	ND
Chloroethane	---	0.002	ND
Chloromethane	---	0.002	ND
2-Dichlorotoluene	---	0.001	ND
4-Dichlorotoluene	---	0.001	ND
Dibromochloropropane (DBCP)	---	0.001	ND
Dibromomethane	---	0.002	ND
1,2-Dichlorobenzene	0.6	0.001	ND
1,3-Dichlorobenzene	---	0.001	ND
Dichlorodifluoromethane	---	0.002	ND
1,1-Dichloroethane	---	0.002	ND
Trans-1,2-Dichloroethylene	0.1	0.002	ND
cis-1,2-Dichloroethylene	0.07	0.002	ND
Dichloromethane	0.005	0.002	ND
1,2-Dichloropropane	0.005	0.002	ND
trans-1,3-Dichloropropene	---	0.002	ND
1-3-Dichloropropene	---	0.002	ND
2,2-Dichloropropane	---	0.002	ND
1,1-Dichloropropene	---	0.002	ND
1,3-Dichloropropane	---	0.002	ND
Ethylbenzene	0.7	0.001	ND
Ethylenedibromide (EDB)	---	0.001	ND
Styrene	0.1	0.001	ND
1,1,1,2-Tetrachloroethane	---	0.002	ND
1,1,2,2-Tetrachloroethane	---	0.002	ND
Tetrachloroethylene (PCE)	0.005	0.002	ND
1,2,3-Trichlorobenzene	---	0.002	ND
1,2,4-Trichlorobenzene	---	0.002	ND
1,1,2-Trichloroethane	0.005	0.002	ND
Trichlorofluoromethane	---	0.002	ND
1,2,3-Trichloropropane	---	0.002	ND
Toluene	1.0	0.001	ND
Xylene	10	0.001	ND

I certify that the analyses performed for this report are accurate, and that the laboratory tests were conducted by methods approved by the U.S. Environmental Protection Agency or variations of these EPA methods. These test results are intended to be used for informational purposes only and may not be used for regulatory compliance.

PRESIDENT, NATIONAL TESTING LABORATORIES, INC.

REV. 3-92

Revised June 1972

STATE ENGINEER OFFICE

WELL RECORD

FIELD ENGR. LOG

Section 1. GENERAL INFORMATION

(1) Owner of well Raymond E. Rogers Owner's Well No. C * 231-S

Street or Post Office Address Rt. 1, Box 264

City and State Carlsbad, n.m. 88220

Well was drilled under Permit No. C-231-S and is located in the:

a. NW SE ¼ SE ¼ SE ¼ SE ¼ of Section 13 Township 23S Range 27E N.M.P.M.

b. Tract No. _____ of Map No. _____ of the _____

c. Lot No. _____ of Block No. _____ of the _____

Subdivision, recorded in _____ County.

d. X= _____ feet, Y= _____ feet, N.M. Coordinate System _____ Zone in the _____ Grant.

(3) Drilling Contractor Howard Hamler License No. WD-24

Address Frijole Rt., Carlsbad

Drilling Began 3/1/76 Completed 3/15/76 Type tools Cable Size of hole 16 in.

Elevation of land surface or _____ at well is _____ ft. Total depth of well 253 ft.

Completed well is ☐ shallow ☐ artesian. Depth to water upon completion of well 6 ft.

Section 2. PRINCIPAL WATER-BEARING STRATA

Depth in Feet From	Depth in Feet To	Thickness in Feet	Description of Water-Bearing Formation	Estimated Yield (gallons per minute)
67	72	5	Conglomerate	
92	96	4	Conglomerate	
112	138	26	Conglomerate & Gravel	
160	178	18	Conglomerate & Gravel	

Section 3. RECORD OF CASING

Diameter (inches)	Pounds per foot	Threads per in.	Depth in Feet		Length (feet)	Type of Shoe	Perforations	
			Top	Bottom			From	To
16	42	Weld	0	-218	218	None	at each	
14	50	Weld	214	253	39	None	water	strata

Section 4. RECORD OF MUDDING AND CEMENTING

Depth in Feet		Hole Diameter	Sacks of Mud	Cubic Feet of Cement	Method of Placement
From	To				

STATE ENGINEER OFFICE
ROSWELL, N. M.
'76 MAR 24 AM 8 23

Section 5. PLUGGING RECORD

Plugging Contractor _____
Address _____
Plugging Method _____
Date Well Plugged _____
Plugging approved by: _____
State Engineer Representative

No.	Depth in Feet		Cubic Feet of Cement
	Top	Bottom	
1			
2			
3			
4			

FOR USE OF STATE ENGINEER ONLY

Date Received

Quad _____ FWL _____ FSL _____

File No. C-231-5 Use I.R.R. Location No. 23.27.13.44411

Tract 2 Section 44

Section 6. LOG OF HOLE

Depth in Feet From	Depth in Feet To	Thickness in Feet	Color and Type of Material Encountered
0	3	3	Topsoil
3	17	14	Clay-gray
17	18	1	Cong.-br.
18	67	49	Clay-red, gray
67	72	5	Cong.-br
72	92	20	Clay-red
92	96	4	Cong.-br
96	112	16	Clay-red, gray
112	138	26	Cong., Gravel-br
138	160	22	Clay-red
160	178	18	Cong., Gravel-gray, br
178	195	17	Clay-red
195	217	22	Cong., Gravel-gray, br
217	219	2	Clay-red
219	225	6	Cong., Gravel-gray, br
225	228	3	Clay-yellow
228	245	17	Lime-yellow
245	251	6	Shale-red
251	253	2	Gyp-white

Section 7. REMARKS AND ADDITIONAL INFORMATION

Section 2 cont'd

From	To	Thickness	Formation
195	217	22	Cong., Gravel
219	225	6	Cong., Gravel
228	245	17	Lime

Section 7. REMARKS AND ADDITIONAL INFORMATION

Section 2 cont'd

From	To	Thickness	Formation
195	217	22	Cong., Gravel
219	225	6	Cong., Gravel
228	245	17	Lime

Total est. yeild - 2000 to2500 gal. per min.

The undersigned hereby certifies that, to the best of his knowledge and belief, the foregoing is a true and correct record of the above-described hole.

W D Brinnatool
Driller

INSTRUCTIONS: This fo[illegible]uld be executed in triplicate, preferably typewritten, and submitted t[illegible] appropriate district office of the State Engineer. All [illegible]ions, except Section 5, shall be answered as completely and accurate[illegible] possible when any well is drilled, repaired or deepened. When this form is used as a plugging record, only Section 1(a) and Section 5 need be completed.

=== COVER PAGE ===

TO: David Catanach

FAX:

FROM: MALAGA MDWC & SWA

FAX: 505-745-2913

TEL: 505-745-2913

0 PAGE[S] TO FOLLOW

COMMENT:

Call me on a cell Phone
361 3784 to
let me ~~know~~ know you
Received

Oscar F. Vargas

DAMES & MOORE
GROUP A DAMES & MOORE GROUP COMPANY

Two Park Square
6565 Americas Parkway, N.E.
Suite 610
Albuquerque, New Mexico 87110
505 884 2611 Tel
505 888 1930 Fax

August 25, 1999

Ms. Adrienne Widmer
Molzen-Corbin & Associates
800 S. Telshor Blvd
Ste 200
Las Cruces, NM 88011

RE: Results of water quality and well integrity investigation, Malaga MDWC&SWA Well C-231-S

Dear Ms. Widmer:

I am transmitting this letter to summarize the results of our investigations of the above referenced well. The work described herein was performed in accordance with a workplan which was transmitted to Molzen-Corbin and approved by M. Jerry Paz on July 6, 1999. The scope of work included performing a down-hole video survey of the well to investigate the condition of the well. A series of water samples were also collected from the well to determine the quality of water that might be produced from one or more of the perforated zones in the well casing.

The video well logging was performed on July 15, 1999 by Mr. Tom Coneway of Video Surveys Company in Hereford, Texas. The video log indicated that the well casing appears to be structurally sound; however many of the perforations in the casing appear to be occluded by mineral growth or by rust accumulation. The static water level in the well was approximately 65 feet below land surface; this is considerably deeper than the 6 foot depth reported by the driller on the State Engineer Office (SEO) Well Record upon completion of the well in 1976. The video survey also indicated the well depth was 218 feet; depth reported on the Well Record was 253 feet. Copies of Mr. Coneway's written notes and a videotape of the survey are included with this submittal.

After completing the video logging, I collected discrete interval water samples from the well within screened zones at depths of 72', 94', 125', 169' and 207'. The samples were submitted to Pinnacle Laboratories in Albuquerque, NM and analyzed for Total Dissolved Solids (TDS) and Hardness. The sample from 94' was also analyzed for Chloride, Sulfate and Alkalinity. The results of the analyses indicate that the water is highly mineralized and exceeds drinking water standards for all analytes examined. The water in this well is unsuitable for residential use.

DAMES & MOORE
A DAMES & MOORE GROUP COMPANY

You provided me with a copy of a laboratory report from National Testing Laboratories, Inc., Cleveland Ohio of analyses on a water sample collected from the well in June 1993 by Mr. A.C. Burkham. This report indicated that the well water was fairly mineralized, containing elevated levels of hardness and TDS. The samples I collected from the well last month contained much higher levels of several dissolved minerals. A comparison of the two analyses is presented in the table below. Copies of the 1993 and 1999 laboratory reports are included with this submittal.

Analyte	6/15/93 Sample concentration mg/l	7/15/99 (94 ft) Sample concentration mg/l
Alkalinity	145	150
Chloride	46	950
Sulfate	88	890
Total Dissolved Solids	1085	4700
Hardness	1675	2200

I called Mr. Mike Stapelton of the State Engineer Office in Roswell on August 12 to discuss the water quality problems we discovered and to discuss the possibility of moving the Malaga MDWC&SWA water rights from Well C-231-S to another location. Mr. Stapelton informed me that the State Engineer Office issued an Administrative Order (Order 143) in 1993 that could have resulted in degraded groundwater quality in the area. Order 143 prohibits farmers from pumping irrigation wells unless there is insufficient water in the irrigation canal system to water crops. Mr. Stapelton indicated that there is speculation that this order could cause levels of dissolved solids in ground water in the area to rise; he also indicated that water users in the vicinity of Loving have complained of rising salt levels in ground water in the area.

I have not researched water quality trends in the area; however I am skeptical that changes in irrigation practices alone could cause such a dramatic increase in salinity in such a short period of time. Assuming that both of the laboratory analyses were performed on water that came from the same well, I conclude that the degradation of water quality in Well C-231-S has been nothing short of spectacular.

Mr. Vasquez has indicated that an oilfield brine injection well is located approximately 1200 feet to the north of Well C-231-S. Oilfield brines are typically very high in dissolved chlorides and sulfates. Due to the precipitous rise in these two analytes in Well C-231-S, the nearby injection well is suspected as a potential source of brine contamination at the site. I suggest that you or a representative of the Malaga cooperative

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contact the New Mexico Oil Conservation Division and inform them that there may be a problem with the injection well.

We recommend that the Malaga MDWC&SWA sever their water rights from Well C-231-S and move them to another location where water quality can be shown to be acceptable for residential supply. Mr. Stapelton informed me that Order 143 does not affect public water supply wells in the area and that moving the water rights would not be opposed by the State Engineer Office. The move would require a demonstration that other water rights owners would not be impaired at any "move to" location that the Malaga MDWC&SWA would select.

I regret that the water quality investigation has resulted in the discovery of such poor water quality at Well C-231-S; however it is fortunate that this information was obtained before significant efforts were expended to extend infrastructure to the well. I hope that the information contained in this submittal is adequate for your needs. If you have any questions, please do not hesitate to contact me directly. Dames & Moore appreciates the opportunity to assist Molzen-Corbin with this project.

Sincerely,
Dames & Moore

L. Clay Kilmer
Sr. Hydrogeologist, CGWP

FAX TRANSMITTAL

MOLZEN-CORBIN & Associates
ENGINEERS/PLANNERS/CONSULTANTS Albuquerque • Las Cruces • Los Alamos

880 South Telshor, Suite 200
Las Cruces, New Mexico 88011
Phone (505) 522-0049
FAX (505) 522-7884

11 Pages including cover sheet

Date: 8/23/99

From: ADRIENNE WIDMER

To: BILL OLSON
NM OIL CONSERVATION DIVISION

Fax #: 505-827-8177 Telephone #: 505-827-7154

Subject: Malaga, NM Well

Project Name: Malaga Water System Improvements

Project #: MWC91-11

COMMENTS:

Bill,

Here is the well record, the 1993 drinking water analysis results, and the recent water quality results on the Malaga well. We look forward to hearing from you soon. If you require additional information, just let me know.

Thank You,
Adrienne

If you do not receive the correct number of pages, please call (505) 522-0049.

Revised June 1972

COPY

STATE ENGINEER OFFICE

WELL RECORD

FIELD ENGR. LOG

Section 1. GENERAL INFORMATION

(A) Owner of well Raymond E. Rogers Owner's Well No. C * 231-S

Street or Post Office Address Rt. 1, Box 264

City and State Carlsbad, n.m. 88220

Well was drilled under Permit No. C-231-S and is located in the:

a. ~~SE~~ NW ¼ SE ¼ SE ¼ SE ¼ of Section 13 Township 23S Range 27E N.M.P.M.

b. Tract No. _____ of Map No. _____ of the _____

c. Lot No. _____ of Block No. _____ of the _____

Subdivision, recorded in _____ County.

d. X= _____ feet, Y= _____ feet, N.M. Coordinate System _____ Zone in the _____ Grant.

(B) Drilling Contractor Howard Hamler License No. WD-24

Address Frijole Rt., Carlsbad

Drilling Began 3/1/76 Completed 3/15/76 Type tools Cable Size of hole 16 in.

Elevation of land surface or _____ at well is _____ ft. Total depth of well 253 ft.

Completed well is ☐ shallow ☐ artesian. Depth to water upon completion of well 6 ft.

Section 2. PRINCIPAL WATER-BEARING STRATA

Depth in Feet From	Depth in Feet To	Thickness in Feet	Description of Water-Bearing Formation	Estimated Yield (gallons per minute)
67	72	5	Conglomerate	
92	96	4	Conglomerate	
112	138	26	Conglomerate & Gravel	
160	178	18	Conglomerate & Gravel	

Section 3. RECORD OF CASING

Diameter (inches)	Pounds per foot	Threads per in.	Depth in Feet Top	Depth in Feet Bottom	Length (feet)	Type of Shoe	Perforations From	Perforations To
16	42	Weld	0	218	218	None	at each	
14	50	Weld	214	253	39	None	water	strata

Section 4. RECORD OF MUDDING AND CEMENT

Depth in Feet From	Depth in Feet To	Hole Diameter	Sacks of Mud	Cubic Feet of Cement	Method of Placement

Section 5. PLUGGING RECORD

Plugging Contractor _____

Address _____

Plugging Method _____

Date Well Plugged _____

Plugging approved by: _____

State Engineer Representative

No.	Depth in Feet Top	Depth in Feet Bottom	Cubic Feet of Cement
1			
2			
3			
4			

FOR USE OF STATE ENGINEER ONLY

Date Received

Quad _____ FWL _____ FSL _____

File No. C-231-S Use IRR. Location No. 23.27.13.44411

Trn'd ✓

Section 6. LOG OF HOLE

Depth in Feet From	Depth in Feet To	Thickness in Feet	Color and Type of Material Encountered
0	3	3	Topsoil
3	17	14	Clay-gray
17	18	1	Cong.-br.
18	67	49	Clay-red, gray
67	72	5	Cong.-br
72	92	20	Clay-red
92	96	4	Cong.-br
96	112	16	Clay-red, gray
112	138	26	Cong., Gravel-br
138	160	22	Clay-red
160	178	18	Cong., Gravel-gray, br
178	195	17	Clay-red
195	217	22	Cong., Gravel-gray, br
217	219	2	Clay-red
219	225	6	Cong., Gravel-gray, br
225	228	3	Clay-yellow
228	245	17	Lime-yellow
245	251	6	Shale-red
251	253	2	Gyp-white

Section 7. REMARKS AND ADDITIONAL INFORMATION

Section 2 cont'd

From	To	Thickness	Formation
195	217	22	Cong., Gravel
219	225	6	Cong., Gravel
228	245	17	Lime

Total est. yeild - 2000 to2500 gal. per min.

The undersigned hereby certifies that, to the best of his knowledge and belief, the foregoing is a true and correct record of the above-described hole.

av D Bruinstool
Driller

INSTRUCTIONS: This fo[illegible]uld be executed in triplicate, preferably typewritten, and submitted t[illegible] appropriate district office of the State Engineer. All [illegible]ions, except Section 5, shall be answered as completely and accurate[illegible] possible when any well is drilled, repaired or deepened. When this form is used as a plugging record, only Section 1(a) and Section 5 need be completed.

DATE COLLECTED	DATE RECEIVED	DATE COMPLETED	SAMPLE CODE
06/15/93	06/25/93	07/08/93	9541267

CUSTOMER ADDRESS

A C BURKHAM
134 NYMEYER
LOVING, NM 88256-

DEALER ADDRESS

THE WATER WORKS
313 S. CANAL
CARLSBAD, NM 88220-

WATERCHECK / NATIONAL TESTING LABORATORIES INC.
6555 Wilson Mills Road
Cleveland, OH 44143
(216) 449-9525

DRINKING WATER ANALYSIS RESULTS

NOTE: "*" indicates that the MCL (Maximum Contaminant Level) has been exceeded, or in the case of pH is either too high OR too low.
"ND" indicates that none of this contaminant has been detected at or above our detection level.
"**" Result may be invalid due to lack of "Time Collected" or because the sample has exceeded the 30-hour time frame.
"BD" Bacteria destroyed due to lack of collection information or because the sample has exceeded the 48-hour time frame.
TNTC Too Numerous To Count NBS-No Bacteria Submitted

Analysis performed	MCL (mg/l)	Detection Level	Level Detected
Microbiological:			
Total coliform (organism/100ml)	0	0.0	BD
Inorganic chemicals - metals:			
Aluminum	0.2	0.1	ND
Arsenic	0.05	0.010	ND
Barium	2.0	0.30	ND
Cadmium	0.005	0.002	ND
Chromium	0.1	0.004	ND
Copper	1.3	0.004	ND
Iron	0.3	0.020	ND
Lead	0.015	0.002	ND
Manganese	0.05	0.004	ND
Mercury	0.002	0.001	ND
Nickel	0.1	0.02	ND
Selenium	0.05	0.002	ND
Silver	0.1	0.002	ND
Sodium	---	1.0	190
Zinc	5.0	0.001	ND

Inorganic chemicals - other, and physical factors:			
Alkalinity (Total as CaCO3)	---	10.0	145
Chloride	250	5.0	46
Fluoride	4.0	0.5	ND
Nitrate as N	10	0.5	4.2
Nitrite as N	1.0	0.5	ND
Sulfate	250	5.0	88
Hardness (suggested limit = 100)		10.0	1675*
pH (Standard Units)	6.5-8.5	---	7.9
Total Dissolved Solids	500	20.0	1085*
Turbidity (Turbidity Units)	1.0	0.1	0.1
Organic chemicals - trihalomethanes:			
Bromoform	---	0.004	ND
Bromodichloromethane	---	0.002	ND
Chloroform	---	0.002	ND
Dibromochloromethane	---	0.004	ND
Total THMs (sum of four above)	0.1	0.002	ND
Organic chemicals - volatiles:			
Benzene	0.005	0.001	ND
Vinyl Chloride	0.002	0.001	ND
Carbon Tetrachloride	0.005	0.001	ND
1,2-Dichloroethane	0.005	0.001	ND

page 2. Sample code: 9541267

Analysis performed	MCL (mg/l)	Detection Level	Level Detected
Trichloroethylene	0.005	0.001	ND
1,4-Dichlorobenzene	0.075	0.001	ND
1,1-Dichloroethylene	0.007	0.001	ND
1,1,1,-Trichloroethane	0.20	0.001	ND
Bromobenzene	---	0.002	ND
Bromomethane	---	0.002	ND
Chlorobenzene	0.1	0.001	ND
Chloroethane	---	0.002	ND
Chloromethane	---	0.002	ND
2-Dichlorotoluene	---	0.001	ND
4-Dichlorotoluene	---	0.001	ND
Dibromochloropropane (DBCP)	---	0.001	ND
Dibromomethane	---	0.002	ND
1,2-Dichlorobenzene	0.6	0.001	ND
1,3-Dichlorobenzene	---	0.001	ND
Dichlorodifluoromethane	---	0.002	ND
1,1-Dichloroethane	---	0.002	ND
Trans-1,2-Dichloroethylene	0.1	0.002	ND
cis-1,2-Dichloroethylene	0.07	0.002	ND
Dichloromethane	0.005	0.002	ND
1,2-Dichloropropane	0.005	0.002	ND
trans-1,3-Dichloropropene	---	0.002	ND
1-3-Dichloropropene	---	0.002	ND
2,2-Dichloropropane	---	0.002	ND
1,1-Dichloropropene	---	0.002	ND
1,3-Dichloropropane	---	0.002	ND
Ethylbenzene	0.7	0.001	ND
Ethylenedibromide (EDB)	---	0.001	ND
Styrene	0.1	0.001	ND
1,1,1,2-Tetrachloroethane	---	0.002	ND
1,1,2,2-Tetrachloroethane	---	0.002	ND
Tetrachloroethylene (PCE)	0.005	0.002	ND
1,2,3-Trichlorobenzene	---	0.002	ND
1,2,4-Trichlorobenzene	---	0.002	ND
1,1,2-Trichloroethane	0.005	0.002	ND
Trichlorofluoromethane	---	0.002	ND
1,2,3-Trichloropropane	---	0.002	ND
Toluene	1.0	0.001	ND
Xylene	10	0.001	ND

I certify that the analyses performed for this report are accurate, and that the laboratory tests were conducted by methods approved by the U.S. Environmental Protection Agency or variations of these EPA methods.

These test results are intended to be used for informational purposes only and may not be used for regulatory compliance.

PRESIDENT, NATIONAL TESTING LABORATORIES, INC.

REV. 3-93

2709-D Pan American Freeway NE
Albuquerque, New Mexico 87107
Phone (505) 344-3777
Fax (505) 344-4413

PL I.D. 907048

August 19, 1999

Dames & Moore
6565 Americas Parkway NE
Albuquerque, NM 87110

Project Name/Number: MALAGA WUA

Attention: Clay Kilmer

On 07/16/99, Pinnacle Laboratories Inc., (ADHS License No. AZ0592), received a request to analyze aqueous samples. The samples were analyzed with EPA methodology or equivalent methods. The results of these analyses and the quality control data, which follow each set of analyses, are enclosed.

All analyses were performed by Environmental Services Laboratory, Durham, OR.

If you have any questions or comments, please do not hesitate to contact us at (505) 344-3777.

Kimberly D. McNeill
Project Manager

H. Mitchell Rubenstein, Ph.D.
General Manager

MR:jt

Enclosure

Environmental Services Laboratory, Inc. E S L

17400 SW Upper Boones Ferry Road - Suite 270 - Portland, OR 97224 - (503) 670-8520

August 17, 1999

Kim McNeill
Pinnacle Laboratories
2709-D Pan American Fwy NE
Albuquerque, NM 87107
TEL: 505-344-3777
FAX (505) 344-4413

RE: 907048/DM/Malaga WUA Order No.: 9907106

Dear Kim McNeill,

Environmental Services Laboratory received 5 samples on 7/20/99 for the analyses presented in the following report.

The Samples were analyzed for the following tests:

Alkalinity (Alkalinity)
CHLORIDE (Chloride)
ICP Metals (ICPMET)
Sulfate (Sulfate)
TOTAL DISSOLVED SOLIDS (E160.1)

There were no problems with the analyses and all data for associated QC met EPA or laboratory specifications except where noted in the Case Narrative. Results apply only to the samples analyzed. Reproduction of this report is permitted only in its entirety, without the written approval from the Laboratory.

If you have any questions regarding these tests results, please feel free to call.

Sincerely,

Kimberly Hill
Project Manager

Keith Hunter
Technical Review

Environmental Services Laboratory

Date: *17-Aug-99*

CLIENT:	Pinnacle Laboratories	**Client Sample ID:**	907048-02
Lab Order:	9907106	**Tag Number:**	
Project:	907048/DM/Malaga WUA	**Collection Date:**	7/15/99
Lab ID:	9907106-02A	**Matrix:**	AQUEOUS

Analyses	Result	Limit	Qual	Units	DF	Date Analyzed
ALKALINITY		**ALKALINITY**				Analyst: sld
Alkalinity, Total (As CaCO3)	150	5.0	AA	mg/L CaCO3	1	8/11/99
CHLORIDE		**CHLORIDE**				Analyst: sld
Chloride	950	250		mg/L	200	8/12/99
SULFATE		**SULFATE**				Analyst: sld
Sulfate	690	250		mg/L	50	8/12/99
TOTAL DISSOLVED SOLIDS		**E160.1**				Analyst: sld
Total Dissolved Solids (Residue, Filterable)	4,700	10		mg/L	1	7/21/99
ICP METALS		**ICPMET**				Analyst: btn
Hardness	2,200	33		mg/L	1	7/23/99
Sodium	410	20		mg/L	1	7/23/99

Qualifiers:	ND - Not Detected at the Reporting Limit	S - Spike Recovery outside accepted recovery limits
	J - Analyte detected below quantitation limits	R - RPD outside accepted recovery limits
	B - Analyte detected in the associated Method Blank	E - Value above quantitation range
	* - Value exceeds Maximum Contaminant Level	

NEW MEXICO ENERGY, MINERALS
& NATURAL RESOURCES DEPARTMENT

OIL CONSERVATION DIVISION
2040 South Pacheco Street
Santa Fe, New Mexico 87505
(505) 827-7131

ADMINISTRATIVE ORDER SWD-719

APPLICATION OF RAY WESTALL FOR SALT WATER DISPOSAL, EDDY COUNTY, NEW MEXICO.

ADMINISTRATIVE ORDER
OF THE OIL CONSERVATION DIVISION

Under the provisions of Rule 701(B), Ray Westall made application to the New Mexico Oil Conservation Division on July 16, 1998, for permission to complete for salt water disposal its Forehand Well No.3 located 1980 feet from the South line and 1980 feet from the East line (Unit J) of Section 15, Township 23 South, Range 27 East, NMPM, Eddy County, New Mexico.

THE DIVISION DIRECTOR FINDS THAT:

(1) The application has been duly filed under the provisions of Rule 701(B) of the Division Rules and Regulations;

(2) Satisfactory information has been provided that all offset operators and surface owners have been duly notified;

(3) The applicant has presented satisfactory evidence that all requirements prescribed in Rule 701 will be met; and

(4) An objection was received within the waiting period prescribed by said rule and was subsequently rectified.

IT IS THEREFORE ORDERED THAT:

The applicant herein, is hereby authorized to complete its Forehand Well No.3 located 1980 feet from the South line and 1980 feet from the East line (Unit J) of Section 15, Township 23 South, Range 27 East, NMPM, Eddy County, New Mexico, in such manner as to permit the injection of salt water for disposal purposes into the Delaware formation at approximately 3,146 feet to 3,974 feet through 2 7/8-inch plastic-lined tubing set in a packer located at approximately 3,100 feet.

IT IS FURTHER ORDERED THAT:

The operator shall take all steps necessary to ensure that the injected water enters only the proposed injection interval and is not permitted to escape to other formations or onto the surface.

Prior to commencing injection operations into the well, the casing shall be pressure tested from the surface to the packer setting depth to assure the integrity of said casing.

The casing-tubing annulus shall be loaded with an inert fluid and equipped with a pressure gauge at the surface or left open to the atmosphere to facilitate detection of leakage in the casing, tubing, or packer.

The injection well or system shall be equipped with a pressure limiting device which will limit the wellhead pressure on the injection well to no more than 629 psi.

The Director of the Division may authorize an increase in injection pressure upon a proper showing by the operator of said well that such higher pressure will not result in migration of the injected fluid from the Delaware formation. Such proper showing shall consist of a valid step-rate test run in accordance with and acceptable to this office.

The operator shall notify the supervisor of the Artesia district office of the Division of the date and time of the installation of disposal equipment and of the mechanical integrity test so that the same may be inspected and witnessed.

The operator shall immediately notify the supervisor of the Artesia district office of the Division of the failure of the tubing, casing, or packer in said well and shall take such steps as may be timely and necessary to correct such failure or leakage.

PROVIDED FURTHER THAT, jurisdiction is retained by the Division for the entry of such further orders as may be necessary for the prevention of waste and/or protection of correlative rights or upon failure of the operator to conduct operations (1) to protect fresh water or (2) consistent with the requirements in this order, whereupon the Division may, after notice and hearing, terminate the injection authority granted herein.

The operator shall submit monthly reports of the disposal operations on Division Form C-115, in accordance with Rule Nos. 706 and 1120 of the Division Rules and Regulations.

The injection authority granted herein shall terminate one year after the effective date of this order if the operator has not commenced injection operations into the subject well, provided however, the Division, upon written request by the operator, may grant an extension thereof for good cause shown.

Approved at Santa Fe, New Mexico, on this 8th day of September, 1998.

LORI WROTENBERY, Director

LW/BES/kv

cc: Oil Conservation Division - Artesia

SWD 7/31/98

VERBAL OK 9-2-98 BG

71°

Ray Westall Operating, Inc.
Independent Oil Producer
Post Office Box 4 • Loco Hills, New Mexico 88255
Ph. 505-677-2370

Randall L. Harris/Geologist

July 7, 1998

New Mexico Oil Conservation Division
2040 S. Pacheco
Santa Fe, New Mexico 87505

Attn.: Benjamin Stone

Re: Ray Westall
Forehand #3
Water Disposal Application

Dear Mr. Stone:

It has been several weeks since we discussed the captioned C-108, but I finally found an original copy. I have also enclosed a letter agreement between the surface owner, Jim Ogden, and Ray Westall. Mr. Ogden objections were based on concerns of increased truck traffic on his ranch roads. We have no objection if the OCD would include this stipulation on the approval for possible future operators.

If any additional information is needed give me a call.

Very truly yours

Randall L. Harris

CHECKLIST for ADMINISTRATIVE INJECTION APPLICATIONS

Operator: RAY WESTALL Well: FOREHAND #3

Contact: RANDY HARRIS Title: GEOLOGIST Phone: 505 667-2370

DATE IN 7-16-98 RELEASE DATE 7-31-98 DATE OUT 9-2-98

Proposed Injection Application is for: ___ **WATERFLOOD** ___ Expansion ___ Initial

Original Order: R-_____ ___ Secondary Recovery ___ Pressure Maintenance

SENSITIVE AREAS X **SALT WATER DISPOSAL** ___ Commercial Well

___ WIPP ___ Capitan Reef

Data is complete for proposed well(s)? YES Additional Data Req'd _____

AREA of REVIEW WELLS

2 Total # of AOR 0 # of Plugged Wells

YES Tabulation Complete ___ Schematics of P & A's

YES Cement Tops Adequate ___ AOR Repair Required

INJECTION FORMATION

Injection Formation(s) DELAWARE Compatible Analysis YES

Source of Water or Injectate AREA PRODUCTION

PROOF of NOTICE

YES Copy of Legal Notice ___ Information Printed Correctly

YES Correct Operators ___ Copies of Certified Mail Receipts

YES ~~NO~~ Objection Received ___ Set to Hearing _____ Date

NOTES: LANDOWNER GOT AGREEMENT FOR NO TRUCKS TO HAUL TO THIS SWD - ALL WATERS WILL BE PIPED IN - AGREEMENT IN FILE

APPLICATION QUALIFIES FOR ADMINISTRATIVE APPROVAL? YES

COMMUNICATION WITH CONTACT PERSON:

1st Contact:	X Telephoned	___ Letter	9-2-98 Date	Nature of Discussion VERBAL APPROVAL.
2nd Contact:	___ Telephoned	___ Letter	_____ Date	Nature of Discussion _____
3rd Contact:	___ Telephoned	___ Letter	_____ Date	Nature of Discussion _____

Ray Westall Operating, Inc.

Independent Oil Producer
Post Office Box 4
Loco Hills, New Mexico 88255
PH. 505-677-2370 • FAX 505-677-2361

May 26, 1998

Salt Water Disposal
Forehand #3
Section 15, T23S R27E
Eddy County, New Mexico

It is agreed up between the Odgen Estate and Ray Westall Operating that the Forehand #3 will be used as a Salt Water Disposal for the use of on lease disposal of water from the Forehand Lease. (No trucks will haul into this disposal)

Ray Westall 5-26-98
RAY WESTALL Date

JIM OGDEN Date

STATE OF NEW MEXICO
ENERGY AND MINERALS DEPARTMENT

OIL CONSERVATION DIVISION
POST OFFICE BOX 2088
STATE LAND OFFICE BUILDING
SANTA FE, NEW MEXICO 87501

FORM C-108
Revised 7-1-81

APPLICATION FOR AUTHORIZATION TO INJECT

I. Purpose: ☐ Secondary Recovery ☐ Pressure Maintenance ☒ Disposal ☐ Storage
Application qualifies for administrative approval? ☒ yes ☐ no

II. Operator: RAY WESTALL

Address: P.O. BOX 4 LOCO HILLS NM 88255

Contact party: RANDALL HARRIS Phone: 505-677-2370

III. Well data: Complete the data required on the reverse side of this form for each well proposed for injection. Additional sheets may be attached if necessary.

IV. Is this an expansion of an existing project? ☐ yes ☒ no
If yes, give the Division order number authorizing the project _____.

V. Attach a map that identifies all wells and leases within two miles of any proposed injection well with a one-half mile radius circle drawn around each proposed injection well. This circle identifies the well's area of review.

VI. Attach a tabulation of data on all wells of public record within the area of review which penetrate the proposed injection zone. Such data shall include a description of each well's type, construction, date drilled, location, depth, record of completion, and a schematic of any plugged well illustrating all plugging detail.

VII. Attach data on the proposed operation, including:

1. Proposed average and maximum daily rate and volume of fluids to be injected;
2. Whether the system is open or closed;
3. Proposed average and maximum injection pressure;
4. Sources and an appropriate analysis of injection fluid and compatibility with the receiving formation if other than reinjected produced water; and
5. If injection is for disposal purposes into a zone not productive of oil or gas at or within one mile of the proposed well, attach a chemical analysis of the disposal zone formation water (may be measured or inferred from existing literature, studies, nearby wells, etc.).

VIII. Attach appropriate geological data on the injection zone including appropriate lithologic detail, geological name, thickness, and depth. Give the geologic name, and depth to bottom of all underground sources of drinking water (aquifers containing waters with total dissolved solids concentrations of 10,000 mg/l or less) overlying the proposed injection zone as well as any such source known to be immediately underlying the injection interval.

IX. Describe the proposed stimulation program, if any.

* X. Attach appropriate logging and test data on the well. (If well logs have been filed with the Division they need not be resubmitted.)

* XI. Attach a chemical analysis of fresh water from two or more fresh water wells (if available and producing) within one mile of any injection or disposal well showing location of wells and dates samples were taken.

XII. Applicants for disposal wells must make an affirmative statement that they 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.

XIII. Applicants must complete the "Proof of Notice" section on the reverse side of this form.

XIV. Certification

I hereby certify that the information submitted with this application is true and correct to the best of my knowledge and belief.

Name: RANDALL HARRIS Title GEOLOGIST

Signature: _____ Date: 6/18/87

* 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.

III. WELL DATA

A. The following well data must be submitted for each injection well covered by this application. The data must be both in tabular and schematic form and shall include:

(1) Lease name; Well No.; location by Section, Township, and Range; and footage location within the section.

(2) Each casing string used with its size, setting depth, sacks of cement used, hole size, top of cement, and how such top was determined.

(3) A description of the tubing to be used including its size, lining material, and setting depth.

(4) The name, model, and setting depth of the packer used or a description of any other seal system or assembly used.

Division District offices have supplies of Well Data Sheets which may be used or which may be used as models for this purpose. Applicants for several identical wells may submit a "typical data sheet" rather than submitting the data for each well.

B. The following must be submitted for each injection well covered by this application. All items must be addressed for the initial well. Responses for additional wells need be shown only when different. Information shown on schematics need not be repeated.

(1) The name of the injection formation and, if applicable, the field or pool name.

(2) The injection interval and whether it is perforated or open-hole.

(3) State if the well was drilled for injection or, if not, the original purpose of the well.

(4) Give the depths of any other perforated intervals and detail on the sacks of cement or bridge plugs used to seal off such perforations.

(5) Give the depth to and name of the next higher and next lower oil or gas zone in the area of the well, if any.

XIV. PROOF OF NOTICE

All applicants must furnish proof that a copy of the application has been furnished, by certified or registered mail, to the owner of the surface of the land on which the well is to be located and to each leasehold operator within one-half mile of the well location.

Where an application is subject to administrative approval, a proof of publication must be submitted. Such proof shall consist of a copy of the legal advertisement which was published in the county in which the well is located. The contents of such advertisement must include:

(1) The name, address, phone number, and contact party for the applicant;

(2) the intended purpose of the injection well; with the exact location of single wells or the section, township, and range location of multiple wells;

(3) the formation name and depth with expected maximum injection rates and pressures; and

(4) a notation that interested parties must file objections or requests for hearing with the Oil Conservation Division, P. O. Box 2088, Santa Fe, New Mexico 87501 within 15 days.

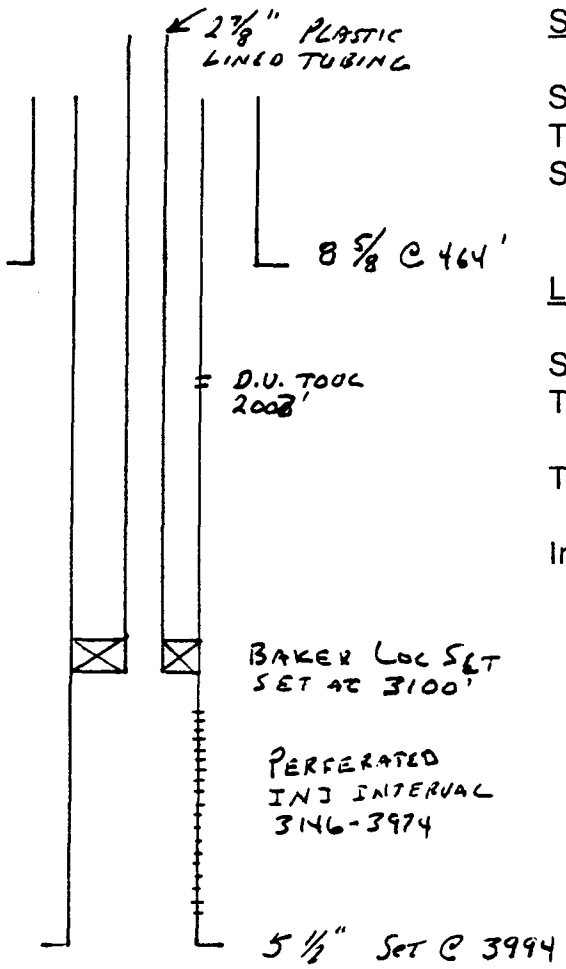
NO ACTION WILL BE TAKEN ON THE APPLICATION UNTIL PROPER PROOF OF NOTICE HAS BEEN SUBMITTED.

NOTICE: Surface owners or offset operators must file any objections or requests for hearing of administrative applications within 15 days from the date this application was mailed to them.

INJECTION WELL DATA SHEET

RAY WESTALL OPERATOR FOREHAND #3
1980' FSL & 1980' FEL SECTION 15, TOWNSHIP-23-SOUTH, RANGE-27-EAST

Schematic



Tabular data

Surface Casing

Size 8 5/8" Cemented with 275 sxs
TOC Circulated Hole size 12 1/4"
Set at 464'

Long string

Size 51/2" Cemented with 1160 SXS
Two staged with D.V. tool @ 2007'
TOC Circulated
Total depth 3994'

Injection Interval 3146-3974' perforated

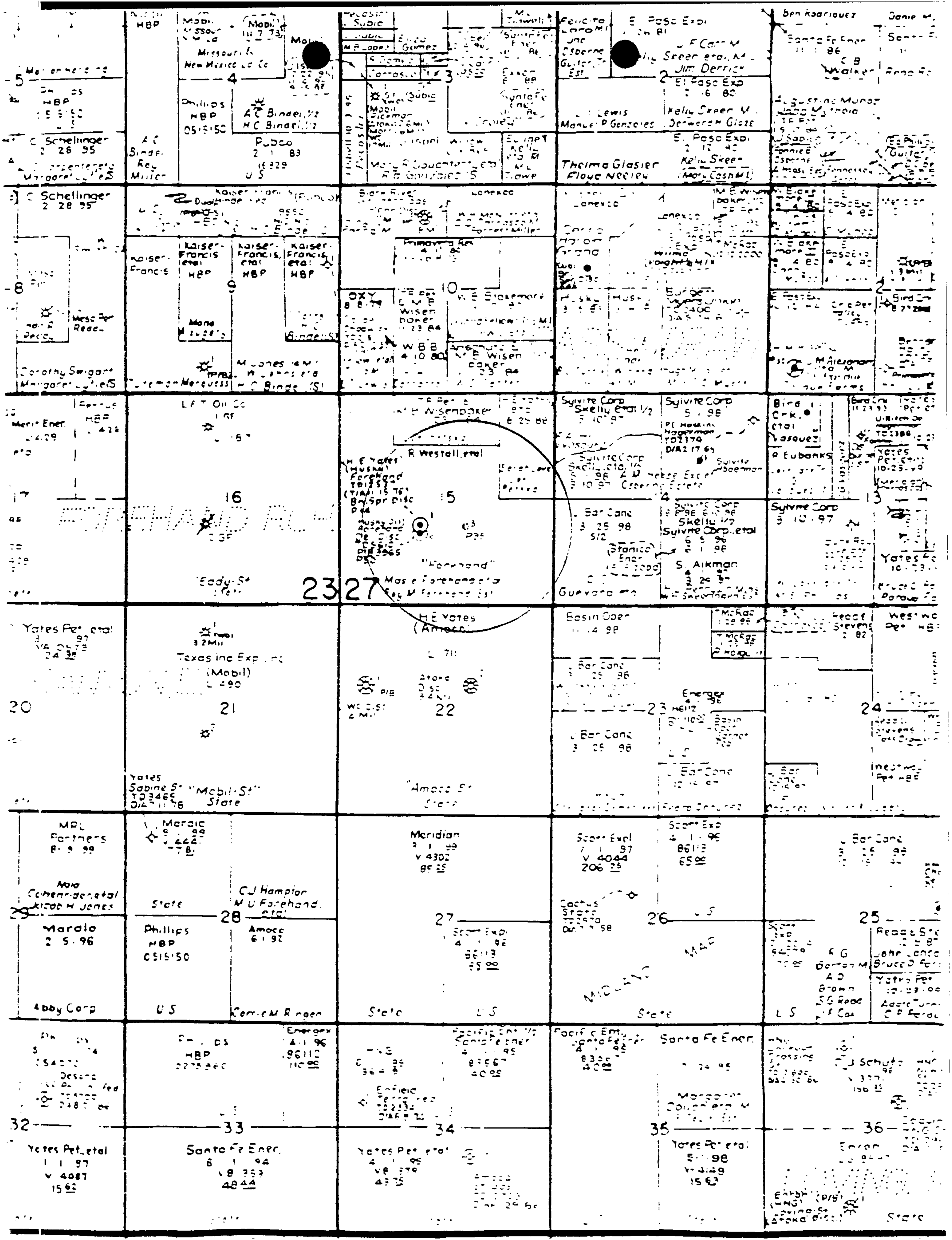
Tubing size 2 7/8" lined with plastic set in a BAKER LOC-SET packer at 3100'.

Other Data

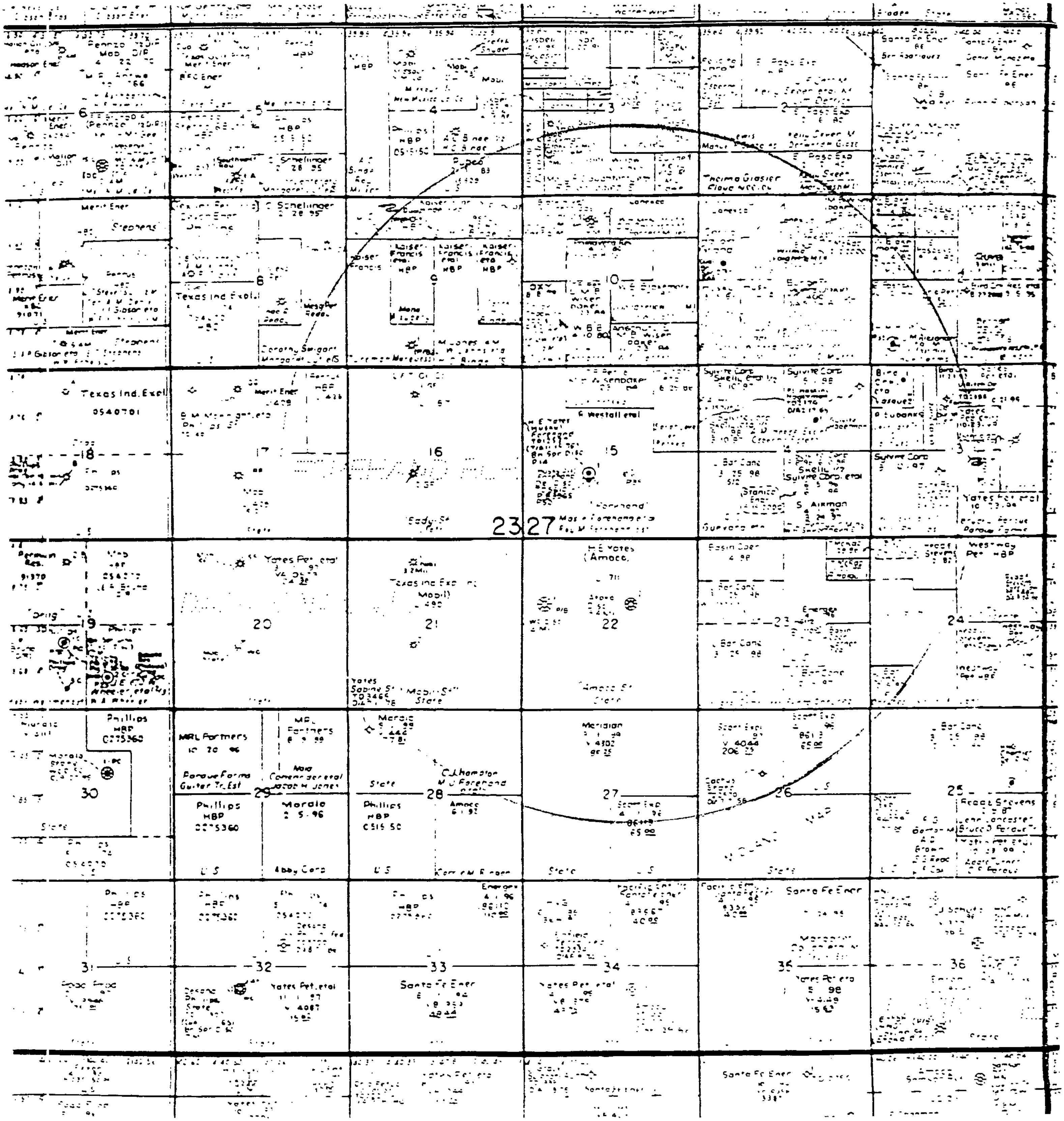
1. Name of the injection formation: DELAWARE
2. Name of Pool: FOREHAND RANCH DELAWARE.
3. Origional purpose of well: OIL & GAS PRODUCTION
4. No other perforations in this well.
5. Forehand Ranch Bone Springs underlie this area at approximately 8600'.

ATTACHMENT V

Maps that identifies all wells of public record within two miles of each proposed injection well, and the area of review one-half mile radius around each proposed injection well.



Philips HBP
A C Binder 1/2
H C Binder 1/2
Pubco
Missouri & New Mexico
El Paso Exp
Jim Derrick
Thelma Glasier
Floyd Neeley
C Schellinger 2 28 95
Kaiser Francis etal HBP
OXY
W B B 4 10 80
M E Wisenbaker
Sylvite Corp
Skelly etal 1/2
R Westall, etal
Dorothy Swigart
Margaret Lutrell
M Jones
H C Binder
Merit Ener.
L.E.T. Oil Co
Eady-St
"Forehand"
Mattie Forehand etal
Bar Cons 3 25 98
S. Aikman
Guevara etal
H E Yates (Amoco)
Yates Pet., etal
Texas Inc Exp. Inc (Mobil)
Basin Oper
Energex
Yates Sabine St
"Mobil-St" State
"Amoco St" State
MRL Partners
Meridian
Scott Expl
CJ Hampton
M U Forehand, etal
Mardio 2 5 96
Phillips HBP
Amoco 6 1 92
Abby Corp
Corrie M Ringen
Cactus State
MIDLAND MAP
Santa Fe Ener.
Pacific Ent.
Yates Pet. etal
State



Texas Ind. Expl
0540701
Merit Ener
Stephens
Texas Ind Expl
Dorothy Swigart
Texas Ind Expl
Mobil
Eddy St
H.E. Yates (Amoco)
Yates Pet. etal
Phillips HBP
0275360
MRL Partners
Parque Farms
Gutter Tr. Est
Phillips HBP
C515 50
Moralo
C.J. Thompson
Amoco
Meridian
Scott Exp
State
U.S.
Abby Corp
Santa Fe Ener
Yates Pet. etal
Westway Pet HBP
Sylvite Corp
Thelma Glasier
Road Stevens
Santa Fe Ener
Pacific Ener
Yates Pet etal
Bar Cons
Energen
S. Aikman
W.E. Blasemore
Fasken
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ATTACHMENT VI

Data on all wells of public record within the area of review. There are no plugged wells.

Well name	Location	Spud date	Sur. Casing	Int. Casing	Prod. Casing	Completion
Ray Westall Forehand #1	NWSW Sec 15 T23S-R27E	08/13/75	13 3/8" @ 428 425 sxs Circ.	8 5/8"@ 5590 3275 sxs Circ.	5 1/2"@ 12352 1150 sxs T/	8642-8857 Forehand Ranch Bone Springs Oil
Ray Westall Forehand #2	NWSW Sec 15 T23S-R27E	07/08/76	12 3/4"@ 444 400 sxs Circ.	8 5/8"@ 1966 625 sxs Circ	5 1/2" @ 5581 1300 sxs T/above 1900'	3737-3751 Forehand Ranch Delawaree Oil

NEW MEXICO OIL CONSERVATION COMMISSION
WELL COMPLETION OR RECOMPLETION REPORT AND LOG

DISTRIBUTION
SANTA FE
FILE
U.S.G.S.
LAND OFFICE
OPERATOR

Revised 1-1-65

5a. Indicate Type of Lease: State [ ] Fee [X]
5b. State Oil & Gas Lease No.

1a. TYPE OF WELL
OIL WELL [X] GAS WELL [ ] DRY [ ] OTHER

1b. TYPE OF COMPLETION
NEW WELL [X] WORK OVER [ ] DEEPEN [ ] PLUG BACK [ ] DIFF. RESVR. [ ] OTHER

7a. Unit Agreement Name: --
8. Farm or Lease Name: Forehand
2. Name of Operator: Husky Oil Company / Delaware
9. Well No.: 3
3. Address of Operator: 600 So. Cherry St., Denver, CO 80222
10. Field and Pool, or Wildcat: Forehand Ranch ~~Delaware~~
4. Location of Well: UNIT LETTER J LOCATED 1980 FEET FROM THE South LINE AND 1980 FEET FROM THE East LINE OF SEC. 15 TWP. 23S RGE. 27E NMPM
12. County: Eddy

15. Date Spudded	16. Date T.D. Reached	17. Date Compl. (Ready to Prod.)	18. Elevations (DF, RKB, RT, GR, etc.)	19. Elev. Casinghead
8/29/77	9/8/77	10/21/77	3142 KB	3129 GR

20. Total Depth	21. Plug Back T.D.	22. If Multiple Compl., How Many	23. Intervals Drilled By	Rotary Tools	Cable Tools
4000 KB	3994 KB	--	→	All	None

24. Producing Interval(s), of this completion — Top, Bottom, Name
Delaware 3146-3974'

25. Was Directional Survey Made: No

26. Type Electric and Other Logs Run
CNL, FDC, DLL, BHC, CBL

27. Was Well Cored: No

CASING RECORD (Report all strings set in well)

CASING SIZE	WEIGHT LB. FT.	DEPTH SET	HOLE SIZE	CEMENTING RECORD	AMOUNT PULLED
8-5/8"	32#	464 KB	12¼"	275sx Class C w/2% CaCl	--
5½"	17#	3994 KB	7-7/8"	1st stg: 310sx Howco Lite w/200sx Class H. 2nd stg: 550sx Howco Lite w/100sx Class C, DV tool @ 2007'	

LINER RECORD

SIZE	TOP	BOTTOM	SACKS CEMENT	SCREEN
--				

30. TUBING RECORD

SIZE	DEPTH SET	PACKER SET
2-7/8"	3124'	--

31. Perforation Record (Interval, size and number)
" csg gun, 4 SPF: 3146-48, 3180-3202, 232-40, 3332-40, 3422-30, 3726-40, 750-64, 3786-3802, 3820-30, 3840-44, 900-04, 3910-16, 3954-66, 3970-74.

32. ACID, SHOT, FRACTURE, CEMENT SQUEEZE, ETC.

DEPTH INTERVAL	AMOUNT AND KIND MATERIAL USED
3954-74	1600 gals 7½% HCL
3840-44	400 gals 7½% HCL
3788-3830	2600 gals 7½% HCL
3726-3764	2800 gals 7½% HCL (over)

PRODUCTION

Date First Production	Production Method (Flowing, gas lift, pumping — Size and type pump)	Well Status (Prod. or Shut-in)
10/23/77	Pumping 2 X 1½ X 12 X 16	Producing

Date of Test	Hours Tested	Choke Size	Prod'n. For Test Period →	Oil — Bbls.	Gas — MCF	Water — Bbls.	Gas — Oil Ratio
11/4/77	24	--	→	35	--	95	--

Flow Tubing Press.	Casing Pressure	Calculated 24-Hour Rate →	Oil — Bbls.	Gas — MCF	Water — Bbls.	Oil Gravity — API (Corr.)
--	--	→	35	--	95	--

33. Disposition of Gas (Sold, used for fuel, vented, etc.)
--

Test Witnessed by

34. List of Attachments
Logs previously submitted.

35. I hereby certify that the information shown on both sides of this form is true and complete to the best of my knowledge and belief.

SIGNED D. L. Rice TITLE Senior Engineer DATE 8/17/78

ATTACHMENT VII

PROPOSED OPERATION

1. Plans are to inject 150-200 bbls of produced water per day.

2. The injection system is be a closed system.

3. The estimated injection pressure is 300 psig. Maximum pressure will be 600 psig.

4. Injection fluid will be reinjected produced water from the Forehand nos. 1 & 2.

5. A sample of produced water is attached.

FW01W124

BJ SERVICES COMPANY

WATER ANALYSIS #FW01W124

ARTESIA LAB

GENERAL INFORMATION

OPERATOR:	RAY WESTALL OPERATING	DEPTH:	
WELL:	FOREHAND #1	DATE SAMPLED:	11/11/96
FIELD:		DATE RECEIVED:	11/11/96
SUBMITTED BY:	RANDY HARRIS	COUNTY:	EDDY STATE: NM
WORKED BY :	CRAIG BAILEY	FORMATION:	DELAWARE
PHONE NUMBER:			

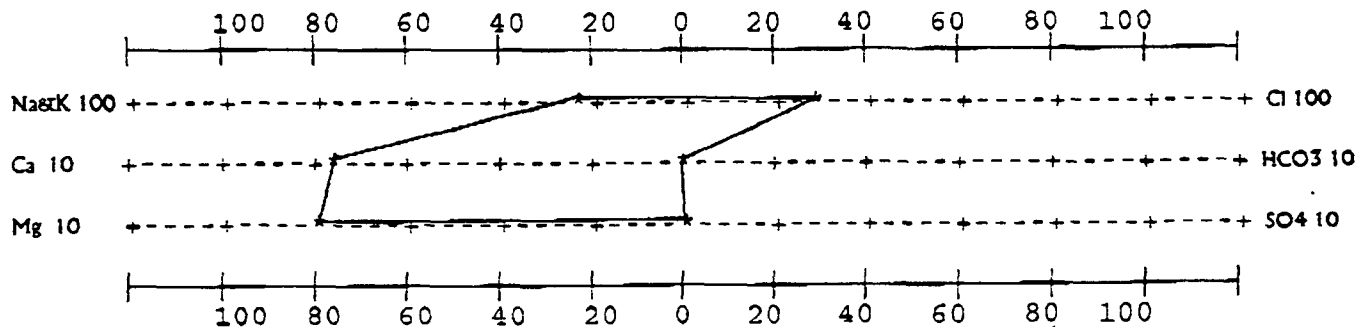
SAMPLE DESCRIPTION

PHYSICAL AND CHEMICAL DETERMINATIONS

SPECIFIC GRAVITY:	1.120 @ 68°F	PH:	7.61
RESISTIVITY (CALCULATED):	0.035 ohms @ 75°F		
IRON (FE++) :	1 ppm	SULFATE:	357 ppm
CALCIUM:	15,373 ppm	TOTAL HARDNESS	78,619 ppm
MAGNESIUM:	9,763 ppm	BICARBONATE:	240 ppm
CHLORIDE:	98,192 ppm	SODIUM CHLORIDE(Calc)	161,526 ppm
SODIUM+POTASS:	37,588 ppm	TOT. DISSOLVED SOLIDS:	214,996 ppm
IODINE:		POTASSIUM CHLORIDE:	

REMARKS

STIFF TYPE PLOT (IN MEQ/L)



ANALYST Craig Bailey

CRAIG BAILEY

ATTACHMENT VIII

The proposed injection zones are sands of the Delaware Formation. These sands are composed of fine-grained quartz sand with varing amounts of shales. They have varing thickness from 1-100 feet thick. There is possible drinking water overlying the injection in the surface sands at a depth of 0-350' There is no known source underlying the injection interval.

ATTACHMENT XI

Sample of water was taken from the Forehand Ranch domestic water well analysis is attached.

FW01W187

BJ SERVICES COMPANY

WATER ANALYSIS #FW01W187

ARTESIA LAB

GENERAL INFORMATION			
OPERATOR:	RAY WESTALL	DEPTH:	
WELL:	FORE HAND RANCH WATER WEL	DATE SAMPLED:	06/05/97
FIELD:		DATE RECEIVED:	06/05/97
SUBMITTED BY:	RAY WESTALL	COUNTY: EDDY	STATE: NM
WORKED BY	JAIME LOPEZ	FORMATION:	
PHONE NUMBER:	FAX505-677-2361		

SAMPLE DESCRIPTION

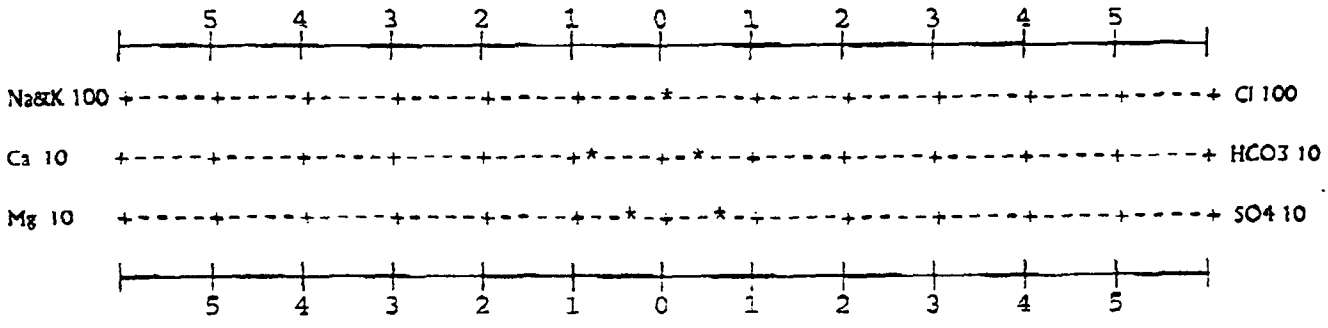
Fore Hand Ranch Water Well

PHYSICAL AND CHEMICAL DETERMINATIONS

SPECIFIC GRAVITY:	1.000 @ 78°F	PH:	7.38
RESISTIVITY (CALCULATED):	3.345 ohms @ 75°F		
IRON (FE++) :	0 ppm	SULFATE:	250 ppm
CALCIUM:	144 ppm	TOTAL HARDNESS	540 ppm
MAGNESIUM:	44 ppm	BICARBONATE:	256 ppm
CHLORIDE:	240 ppm	SODIUM CHLORIDE(Calc)	395 ppm
SODIUM+POTASS:	124 ppm	TOT. DISSOLVED SOLIDS:	1,410 ppm
IODINE:		POTASSIUM CHLORIDE:	

REMARKS

STIFF TYPE PLOT (IN MEQ/L)



ANALYST JAIME LOPEZ

ATTACHMENT XII

All available geologic and engineering data have been examined and there is no evidence of open faults or any other hydrologic connection between the disposal zone and any source of drinking water.

ATTACHMENT XIV

PROOF OF NOTICE

The Leasehold operator within one-half mile of the well location is H. E. Yates. This operator was provided a copy of our application by certified mail. Proof of notice is enclosed. The surface owner is Masie Forehand Etal.

PROOF OF PUBLICATION

Proof of publication will be from the Artesia Daily Press and will be forwarded.

Copies of this application has been sent to:

Heyco
P.O. Box 1933
Roswell, NM. 88201

Certified Mail # P 333 336 147

Oil Conservation Division
811 S. 1st Street
Artesia, NM 88210

Oil Conservation Division
2040 So. Pacheco St.
Santa Fe, NM. 87505-5472

SURFACE OWNER

Masie Forehand etal.
c/o Sue F. Ogden
159 W. Ogden Rd.
Loving, NM. 88256

Certified Mail # P 333 336 148