3R - 104

REPORTS

DATE:

FEB 2000

CROSS TIMBERS OIL COMPANY

GROUNDWATER REMEDIATION REPORT

1999

BACA GC A #1A
(G) SECTION 26, T29N, R10W, NMPM
SAN JUAN COUNTY, NEW MEXICO

PREPARED FOR:
MR. WILLIAM C. OLSON
NEW MEXICO OIL CONSERVATION DIVISION

FEBRUARY 2000

PREPARD BY:
BLAGG ENGINEERING, INC.

Consulting Petroleum / Reclamation Services
P.O. Box 87
Bloomfield, New Mexico 87413

Cross Timbers Oil Company
Baca GC A # 1A - Separator Pit
Se/4 Nw/4 Sec. 26, T29N, R10W

Groundwater Monitor Well Sampling Procedures:

Groundwater samples were collected from site monitor wells (MW's) following USEPA: SW-846 protocol. The samples were collected using laboratory supplied 500 ml plastic containers and analyzed for general water quality per USEPA Method 600/4-79-020. The samples were preserved cool and hand delivered to a qualified laboratory for testing. Waste generated during monitor well sampling and development was disposed of utilizing the separator tank pit located on the well site.

Water Quality Information:

The BTEX results for all three (3) MW's during the June 12, 1996 sampling event were non detectable or below 25% of the New Mexico Water Quality Control Commission's (NMWQCC) allowable concentration for groundwater (for explanation, please refer to the previously approved groundwater management plan). Resampling for general water quality was conducted on May 25, 1999 as a result of a high chloride level initially detected in MW #3 during the June 12, 1996 sampling event. The resampling results reveal that all MW's are well below NMWQCC regulatory standards for chloride.

Summary and/or Recommendations:

Based on the enclosed documentation and addressing the attached NMOCD correspondence letter, dated April 22, 1999 (refer to section B), the groundwater adjacent to the separator pit area appears to meet all pertinent criteria for permanent closure. All aspects of the previously approved groundwater management plan have been adhered to. Therefore, Cross Timbers Oil Company is requesting permanent closure status for the separator pit.

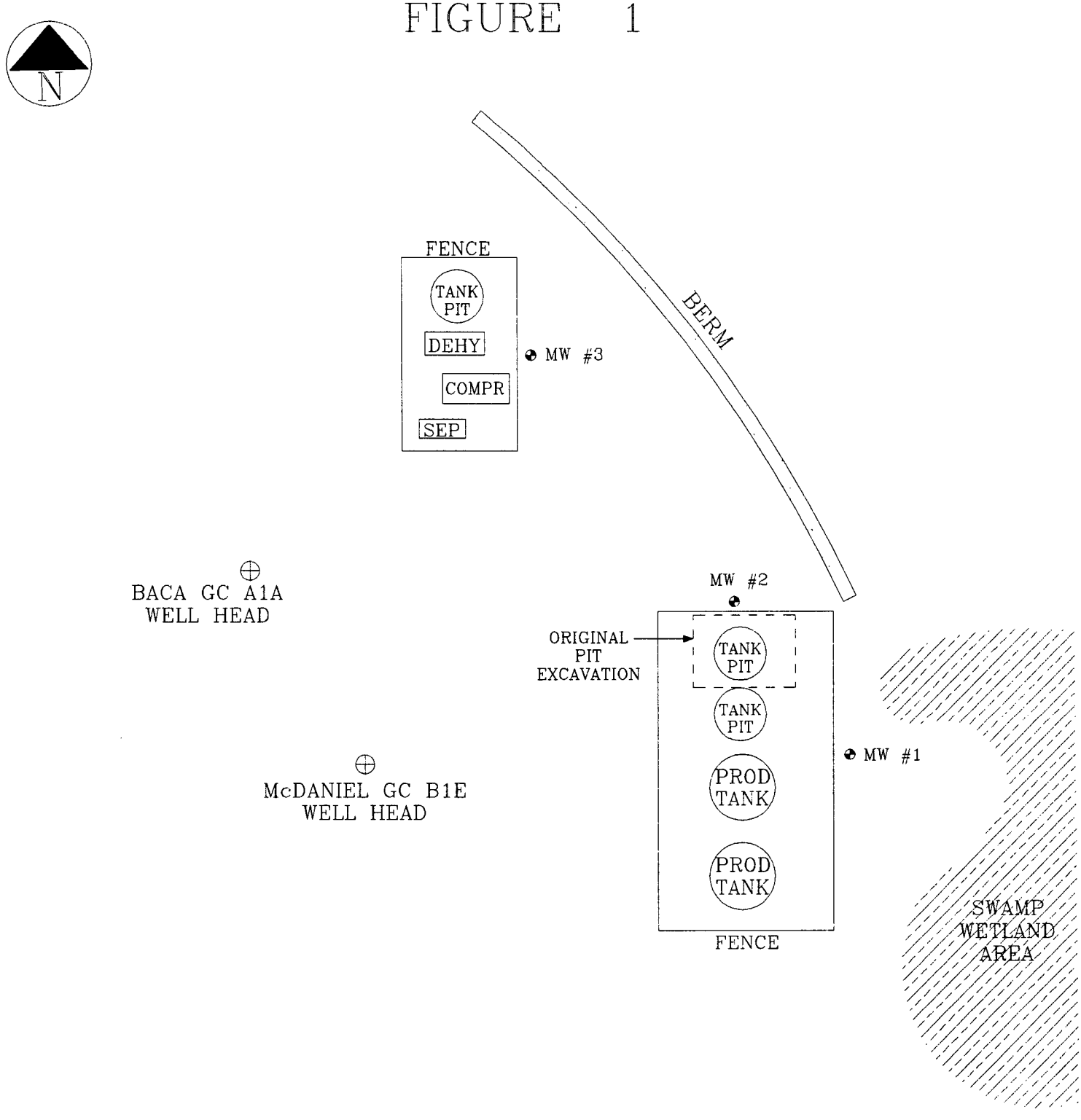
GENERAL WATER QUALITY
CROSS TIMBERS OIL COMPANY
BACA GC A #1A
SAMPLE DATE : May 25 , 1999

PARAMETERS	MW # 1	MW # 2	MW # 3	Units
LAB pH	6.88	7.29	7.19	s. u.
LAB CONDUCTIVITY @ 25 C	10,700	8,800	6,470	umhos / cm
TOTAL DISSOLVED SOLIDS @ 180 C	5,350	4,380	3,230	mg / L
TOTAL DISSOLVED SOLIDS (Calc)	5,317	4,351	3,209	mg / L
SODIUM ABSORPTION RATIO	9.9	7.9	8.7	ratio
TOTAL ALKALINITY AS CaCO3	570	352	326	mg / L
TOTAL HARDNESS AS CaCO3	1,795	975	934	mg / L
BICARBONATE as HCO3	570	352	326	mg / L
CARBONATE AS CO3	< 1	< 1	< 1	mg / L
HYDROXIDE AS OH	< 1	< 1	< 1	mg / L
NITRATE NITROGEN	0.2	0.4	0.2	mg / L
NITRITE NITROGEN	0.003	0.025	< 0.001	mg / L
CHLORIDE	11.5	58.8	54.0	mg / L
FLUORIDE	6.30	1.80	1.55	mg / L
PHOSPHATE	< 0.1	23.2	< 0.1	mg / L
SULFATE	3,300	2,710	1,920	mg / L
IRON	1.15	0.15	0.27	mg / L
CALCIUM	552	520	328	mg / L
MAGNESIUM	101.0	79.4	27.8	mg / L
POTASSIUM	40.0	14.0	70.0	mg / L
SODIUM	960	730	610	mg / L
CATION / ANION DIFFERENCE	0.09	0.14	0.12	

GENERAL WATER QUALITY
AMOCO PRODUCTION COMPANY
BACA GC A # 1A
SAMPLE DATE : JUNE 12, 1996

PARAMETERS		MW # 1	MW # 2	MW # 3	Units
GENERAL	LAB pH	7.3	7.5	7.2	s. u.
	LAB CONDUCTIVITY (25 DEG. CELCIUS)	8,210	3,720	5,670	umhos cm
	TOTAL DISSOLVED SOLIDS (180 DEG. CELCIUS)	8,210	2,860	4,710	mg / L
	TOTAL DISSOLVED SOLIDS (CALCULATED)	7,860	2,560	4,130	mg / L
ANIONS	TOTAL ALKALINITY AS CaCO3	764	239	358	mg / L
	BICARBONATE ALKALINITY (AS CaCO3)	764	239	358	mg / L
	CARBONATE ALKALINITY (AS CaCO3)	NA	NA	NA	mg / L
	HYDROXIDE ALKALINITY (AS CaCO3)	NA	NA	NA	mg / L
	CHLORIDE	40.0	17.5	342	mg / L
	SULFATE	4,960	1,600	2,250	mg / L
	NITRATE + NITRITE - N	NA	NA	NA	
	NITRATE - N	NA	NA	NA	
	NITRITE - N	NA	NA	NA	
CATIONS	TOTAL HARDNESS AS CaCO3	4,620	900	1,460	mg / L
	CALCIUM	497	311	498	mg / L
	MAGNESIUM	91.6	30.2	53.2	mg / L
	POTASSIUM	17.0	36.0	12.00	mg / L
	SODIUM	1,800	420	760	mg / L
DATA VALIDATION					ACCEPTANCE LEVEL
	CATION/ANION DIFFERENCE	3.75	1.87	0.80	+/- 5 %
	TDS (180):TDS (CALCULATED)	1.0	1.1	1.1	1.0 - 1.2

FIGURE 1



MONITOR WELL LOCATIONS ARE ONLY AS ACCURATE AS THE INSTRUMENTS USED IN OBTAINING THE FOOTAGE AND BEARING FROM THE WELL HEAD (BRUNTON COMPASS AND LASER RANGE FINDER). ALL OTHER STRUCTURES DISPLAYED ON THE SITE MAP ARE SOLELY FOR REFERENCE AND ARE NOT TO SCALE.

ONE INCH = 50 FEET

0 50 100 FT.

AMOCO PRODUCTION COMPANY

BACA GC A1A

SE/4 NW/4 SEC. 26, T29N, R10W

SAN JUAN COUNTY, NEW MEXICO

BLAGG ENGINEERING, INC.

CONSULTING PETROLEUM / RECLAMATION SERVICES

P.O. BOX 87

BLOOMFIELD, NEW MEXICO 87413

PHONE: (505) 632-1199

PROJECT: MW INSTALL.

DRAWN BY: NJV

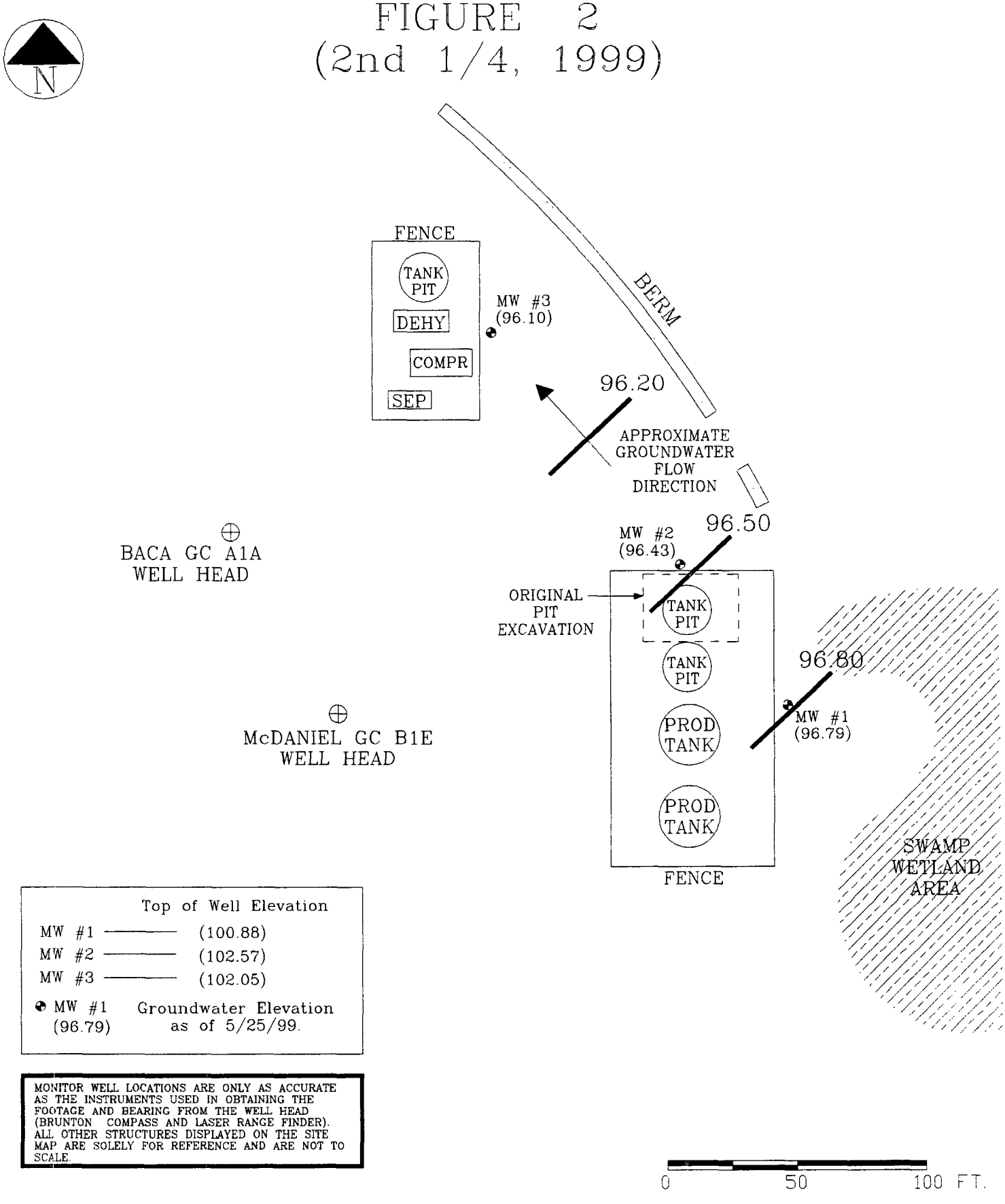
FILENAME: BACA-SM

REVISED: 1/17/97 NJV

SITE MAP

6/96

FIGURE 2
(2nd 1/4, 1999)



MONITOR WELL LOCATIONS ARE ONLY AS ACCURATE AS THE INSTRUMENTS USED IN OBTAINING THE FOOTAGE AND BEARING FROM THE WELL HEAD (BRUNTON COMPASS AND LASER RANGE FINDER). ALL OTHER STRUCTURES DISPLAYED ON THE SITE MAP ARE SOLELY FOR REFERENCE AND ARE NOT TO SCALE.

AMOCO PRODUCTION COMPANY BACA GC A1A SE/4 NW/4 SEC. 26, T29N, R10W SAN JUAN COUNTY, NEW MEXICO	BLAGG ENGINEERING, INC. CONSULTING PETROLEUM / RECLAMATION SERVICES P.O. BOX 87 BLOOMFIELD, NEW MEXICO 87413 PHONE: (505) 632-1199	PROJECT: 1/4ly Monitor. DRAWN BY: NJV FILENAME: 05-25-GW.SKD REVISED: 6/14/99 NJV	GROUNDWATER GRADIENT MAP 5/99

BLAGG ENGINEERING, INC.

MONITOR WELL SAMPLING DATA

CLIENT : AMOCO PRODUCTION CO.

CHAIN-OF-CUSTODY # : 6681

BACA GC A # 1A - SEPARATOR PIT
UNIT F, SEC. 26, T29N, R10W

LABORATORY (S) USED : ENVIROTECH, INC.

Date : May 25, 1999

SAMPLER : N J V

Filename : 05-25-99.WK4

PROJECT MANAGER : N J V

WELL #	WELL ELEV. (ft)	WATER ELEV. (ft)	DEPTH TO WATER (ft)	TOTAL DEPTH (ft)	SAMPLING	pH TIME	CONDUCT (umhos)	VOLUME PURGED (gal.)	FREE PRODUCT (ft)
1	100.88	96.79	4.09	7.79	0800	-	-	1.50	-
2	102.57	96.43	6.14	10.03	0830	-	-	1.50	-
3	102.05	96.10	5.95	9.24	0900	-	-	1.25	-

NOTES : Volume of water purged from well prior to sampling: V = pi X r2 X h X 7.48 gal./ft3) X 3 (wellbores).

(i.e. 2" MW r = (1/12) ft. h = 1 ft.) (i.e. 4" MW r = (2/12) ft. h = 1 ft.)

Ideally a minimum of three (3) wellbore volumes:

1.25 " well diameter = 0.19 gallons per foot of water (or 24 oz.).

2 bails per foot - small teflon bailer.

3 bails per foot - 3 / 4 " teflon bailer.

2.00 " well diameter = 0.49 gallons per foot of water.

4.00 " well diameter = 1.95 gallons per foot of water.

Comments or note well diameter if not standard 2 ".

Collected anion / cation for all MW's listed above .

ENVIROTECH LABS

PRACTICAL SOLUTIONS FOR A BETTER TOMORROW

CATION / ANION ANALYSIS

Client:	Blagg / Cross Timbers	Project #:	403410
Sample ID:	MW #1	Date Reported:	05-27-99
Laboratory Number:	F383	Date Sampled:	05-25-99
Chain of Custody:	6681	Date Received:	05-25-99
Sample Matrix:	Water	Date Extracted:	N/A
Preservative:	Cool	Date Analyzed:	05-26-99
Condition:	Cool & Intact		

Parameter	Analytical Result	Units		Units
pH	**6.88**	s.u.		
Conductivity @ 25° C	**10,700**	umhos/cm		
Total Dissolved Solids @ 180C	**5,350**	mg/L		
Total Dissolved Solids (Calc)	**5,317**	mg/L		
SAR	**9.9**	ratio		
Total Alkalinity as CaCO3	**570**	mg/L		
Total Hardness as CaCO3	**1,795**	mg/L		
Bicarbonate as HCO3	**570**	mg/L	9.34	meq/L
Carbonate as CO3	**<1**	mg/L	0.00	meq/L
Hydroxide as OH	**<1**	mg/L	0.00	meq/L
Nitrate Nitrogen	**0.2**	mg/L	0.00	meq/L
Nitrite Nitrogen	**0.003**	mg/L	0.00	meq/L
Chloride	**11.5**	mg/L	0.32	meq/L
Fluoride	**6.30**	mg/L	0.33	meq/L
Phosphate	**<0.1**	mg/L	0.00	meq/L
Sulfate	**3,300**	mg/L	68.71	meq/L
Iron	**1.15**	mg/L		
Calcium	**552**	mg/L	27.54	meq/L
Magnesium	**101**	mg/L	8.31	meq/L
Potassium	**40.0**	mg/L	1.02	meq/L
Sodium	**960**	mg/L	41.76	meq/L
Cations			78.64	meq/L
Anions			78.71	meq/L
Cation/Anion Difference			**0.09%**	

Reference: U.S.E.P.A., 600/4-79-020, "Methods for Chemical Analysis of Water and Wastes", 1983. Water And Waste Water", 18th ed., 1992.

Comments: **Baca GC A #1A.**

Analyst

Review

5796 U.S. Highway 64 • Farmington, NM 87401 • Tel 505 • 632 • 0615 • Fax 505 • 632 • 1865

ENVIROTECH LABS

PRACTICAL SOLUTIONS FOR A BETTER TOMORROW

CATION / ANION ANALYSIS

Client:	Blagg / Cross Timbers	Project #:	403410
Sample ID:	MW #2	Date Reported:	05-27-99
Laboratory Number:	F384	Date Sampled:	05-25-99
Chain of Custody:	6681	Date Received:	05-25-99
Sample Matrix:	Water	Date Extracted:	N/A
Preservative:	Cool	Date Analyzed:	05-26-99
Condition:	Cool & Intact		

Parameter	Analytical Result	Units		Units
pH	**7.29**	s.u.		
Conductivity @ 25° C	**8,800**	umhos/cm		
Total Dissolved Solids @ 180C	**4,380**	mg/L		
Total Dissolved Solids (Calc)	**4,351**	mg/L		
SAR	**7.9**	ratio		
Total Alkalinity as CaCO3	**352**	mg/L		
Total Hardness as CaCO3	**975**	mg/L		
Bicarbonate as HCO3	**352**	mg/L	5.77	meq/L
Carbonate as CO3	**<1**	mg/L	0.00	meq/L
Hydroxide as OH	**<1**	mg/L	0.00	meq/L
Nitrate Nitrogen	**0.4**	mg/L	0.01	meq/L
Nitrite Nitrogen	**0.025**	mg/L	0.00	meq/L
Chloride	**58.8**	mg/L	1.66	meq/L
Fluoride	**1.80**	mg/L	0.09	meq/L
Phosphate	**23.2**	mg/L	0.73	meq/L
Sulfate	**2,710**	mg/L	56.42	meq/L
Iron	**0.150**	mg/L		
Calcium	**520**	mg/L	25.95	meq/L
Magnesium	**79.4**	mg/L	6.53	meq/L
Potassium	**14.0**	mg/L	0.36	meq/L
Sodium	**730**	mg/L	31.76	meq/L
Cations			64.59	meq/L
Anions			64.68	meq/L
Cation/Anion Difference			**0.14%**	

Reference: U.S.E.P.A., 600/4-79-020, "Methods for Chemical Analysis of Water and Wastes", 1983. Water And Waste Water", 18th ed., 1992.

Comments: **Baca GC A #1A.**

Analyst

Review

5796 U.S. Highway 64 • Farmington, NM 87401 • Tel 505 • 632 • 0615 • Fax 505 • 632 • 1865

ENVIROTECH LABS

PRACTICAL SOLUTIONS FOR A BETTER TOMORROW

CATION / ANION ANALYSIS

Client:	Blagg / Cross Timbers	Project #:	403410
Sample ID:	MW #3	Date Reported:	05-27-99
Laboratory Number:	F385	Date Sampled:	05-25-99
Chain of Custody:	6681	Date Received:	05-25-99
Sample Matrix:	Water	Date Extracted:	N/A
Preservative:	Cool	Date Analyzed:	05-26-99
Condition:	Cool & Intact		

Parameter	Analytical Result	Units		Units
pH	**7.19**	s.u.		
Conductivity @ 25° C	**6,470**	umhos/cm		
Total Dissolved Solids @ 180C	**3,230**	mg/L		
Total Dissolved Solids (Calc)	**3,209**	mg/L		
SAR	**8.7**	ratio		
Total Alkalinity as CaCO3	**326**	mg/L		
Total Hardness as CaCO3	**934**	mg/L		
Bicarbonate as HCO3	**326**	mg/L	5.34	meq/L
Carbonate as CO3	**<1**	mg/L	0.00	meq/L
Hydroxide as OH	**<1**	mg/L	0.00	meq/L
Nitrate Nitrogen	**0.2**	mg/L	0.00	meq/L
Nitrite Nitrogen	**<0.001**	mg/L	0.00	meq/L
Chloride	**54.0**	mg/L	1.52	meq/L
Fluoride	**1.55**	mg/L	0.08	meq/L
Phosphate	**<0.1**	mg/L	0.00	meq/L
Sulfate	**1,920**	mg/L	39.97	meq/L
Iron	**0.270**	mg/L		
Calcium	**328**	mg/L	16.37	meq/L
Magnesium	**27.8**	mg/L	2.29	meq/L
Potassium	**70.0**	mg/L	1.79	meq/L
Sodium	**610**	mg/L	26.54	meq/L
Cations			46.98	meq/L
Anions			46.93	meq/L
Cation/Anion Difference			**0.12%**	

Reference: U.S.E.P.A., 600/4-79-020, "Methods for Chemical Analysis of Water and Wastes", 1983. Water And Waste Water", 18th ed., 1992.

Comments: **Baca GC A #1A.**

Analyst

Review

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CHAIN OF CUSTODY RECORD

6681

Client / Project Name	Project Location	ANALYSIS / PARAMETERS
BLAGG/CROSS TIMBERS	BACA GC A #1A	

Sampler:	Client No.
NJV	403410

Sample No./ Identification	Sample Date	Sample Time	Lab Number	Sample Matrix	No. of Containers	ANION/CATION						Remarks
												ALL SAMPLES
												PRESERV. - COOL
mw #1	5/25/99	0800	F383	WATER	1	✓						
mw #2	5/25/99	0830	F384	WATER	1	✓						
mw #3	5/25/99	0900	F385	WATER	1	✓						

Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time
Nelson Velez	5/25/99	1313	Kristine Waetz	5-25-99	13:13
Relinquished by: (Signature)			Received by: (Signature)		
Relinquished by: (Signature)			Received by: (Signature)		

ENVIROTECH INC.

5796 U.S. Highway 64
Farmington, New Mexico 87401
(505) 632-0615

Sample Receipt	Y	N	N/A
Received Intact	✓		
Cool - Ice/Blue Ice	✓		

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 22, 1999

CERTIFIED MAIL
RETURN RECEIPT NO: Z-274-520-642

Ms. Nina Hutton
Cross Timbers Oil Company
810 Houston St., Suite 2000
Fort Worth, Texas 76102-6298

RE: PIT CLOSURE/GROUND WATER MONITORING REPORTS

Dear Ms. Hutton:

The New Mexico Oil Conservation Division (OCD) has reviewed Cross Timbers Oil Company's (CTOC) February 17, 1999 "CROSS TIMBERS OIL CO. (AMOCO) PIT CLOSURE/GROUNDWATER MONITORING REPORTS, SAN JUAN COUNTY, NEW MEXICO" which was submitted on behalf of CTOC by their consultant Blagg Engineering, Inc. This document contains the results of CTOC's investigation, remediation and monitoring of ground water contamination related to the disposal of oilfield wastes in unlined pits at 20 sites in the San Juan Basin and requests closure of the remedial actions.

Below is the OCD's review of the above referenced documents:

A. The soil and ground water remedial actions at the sites listed below are satisfactory and the OCD **approves** of the closure of these pit sites. Please be advised that OCD approval does not relieve CTOC of liability if remaining contaminants pose a future threat to ground water, surface water, human health or the environment. In addition, OCD approval does not relieve CTOC of responsibility for compliance with any other federal, state, tribal or local laws and regulations.

1.	Abrams GC C #1 (Blow pit)	Unit F, Sec. 25, T29N, R10W.
2.	Anderson GC A#1(Blow pit)	Unit C, Sec. 28, T29N, R10W.
3.	Armenta GC A#1 (Blow pit)	Unit D, Sec. 27, T29N, R10W.
4.	Baca GC A#1 (Blow pit)	Unit H, Sec. 26, T29N, R10W.
5.	Baca GC A#1 (Dehy pit)	Unit H, Sec. 26, T29N, R10W.
6.	Chavez GC C#1R (Blow/separator pit)	Unit J, Sec. 23, T29N, R10W.
7.	Federal GC 3-1 (Blow pit)	Unit N, Sec. 23, T29N, R10W.
8.	Garcia GC B#1E (Blow pit)	Unit M, Sec. 21, T29N, R10W.
9.	Hare GC C#1 (Blow pit)	Unit M, Sec. 25, T29N, R10W.
10.	Hare GC C#1E (Blow pit)	Unit F, Sec. 25, T29N, R10W.

11.	Hare GC F#1 (Separator pit)	Unit G, Sec. 23, T29N, R11W.
12.	Lefkovitz GC B#1 (Blow pit)	Unit A, Sec. 25, T29N, R10W.
13.	Lefkovitz GC B#1 (Separator pit)	Unit A, Sec. 25, T29N, R10W.
14.	Masden GC #1 (Separator pit)	Unit A, Sec. 28, T29N, R11W.
15.	Romero GC A#1 (Separator pit)	Unit K, Sec. 27, T29N, R10W.
16.	Stedje GC #1 (Blow pit)	Unit F, Sec. 27, T30N, R12W.
17.	Stedje GC #1E (Separator pit)	Unit A, Sec. 27, T30N, R12W.
18.	Trujillo GC A#1 (Blow pit)	Unit C, Sec. 28, T29N, R10W.

B. The sites listed below have chloride and/or total dissolved solids (TDS) contamination of ground water in excess of New Mexico Water Quality Control Commission (WQCC) standards. In addition, the downgradient and/or lateral extent of chloride and/or TDS contamination in ground water at these sites has not been completely defined. Therefore, approval of the closure actions at these sites is **denied**. The OCD requires that CTOC investigate the extent of and remediate these contaminants at each site pursuant to the previously approved ground water management plan.

1.	Baca GC A #1A (Blow/separator pit)	Unit F, Sec. 26, T29N, R10W.
2.	Haney GC B#1E (Separator pit)	Unit M, Sec. 20, T29N, R10W.

If you have any questions, please contact me at (505) 827-7154.

Sincerely,

William C. Olson
Hydrologist
Environmental Bureau

xc: Denny Foust, OCD Aztec District Office
Bill Liess, BLM Farmington District Office
Nelson Velez, Blagg Engineering, Inc.