3R - 113

REPORTS

DATE:

1999

CROSS TIMBERS OIL COMPANY

GROUNDWATER REMEDIATION REPORT

1999

HANEY GC B #1E
(M) SECTION 20, 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 (CTOC)
Haney GC B # 1E - Separator Pit
Sw/4 Sw/4 Sec. 20, 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 December 18, 1997 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 all MW's, but especially in MW #1, during the December 18, 1997 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, CTOC is requesting permanent closure status for the separator pit.

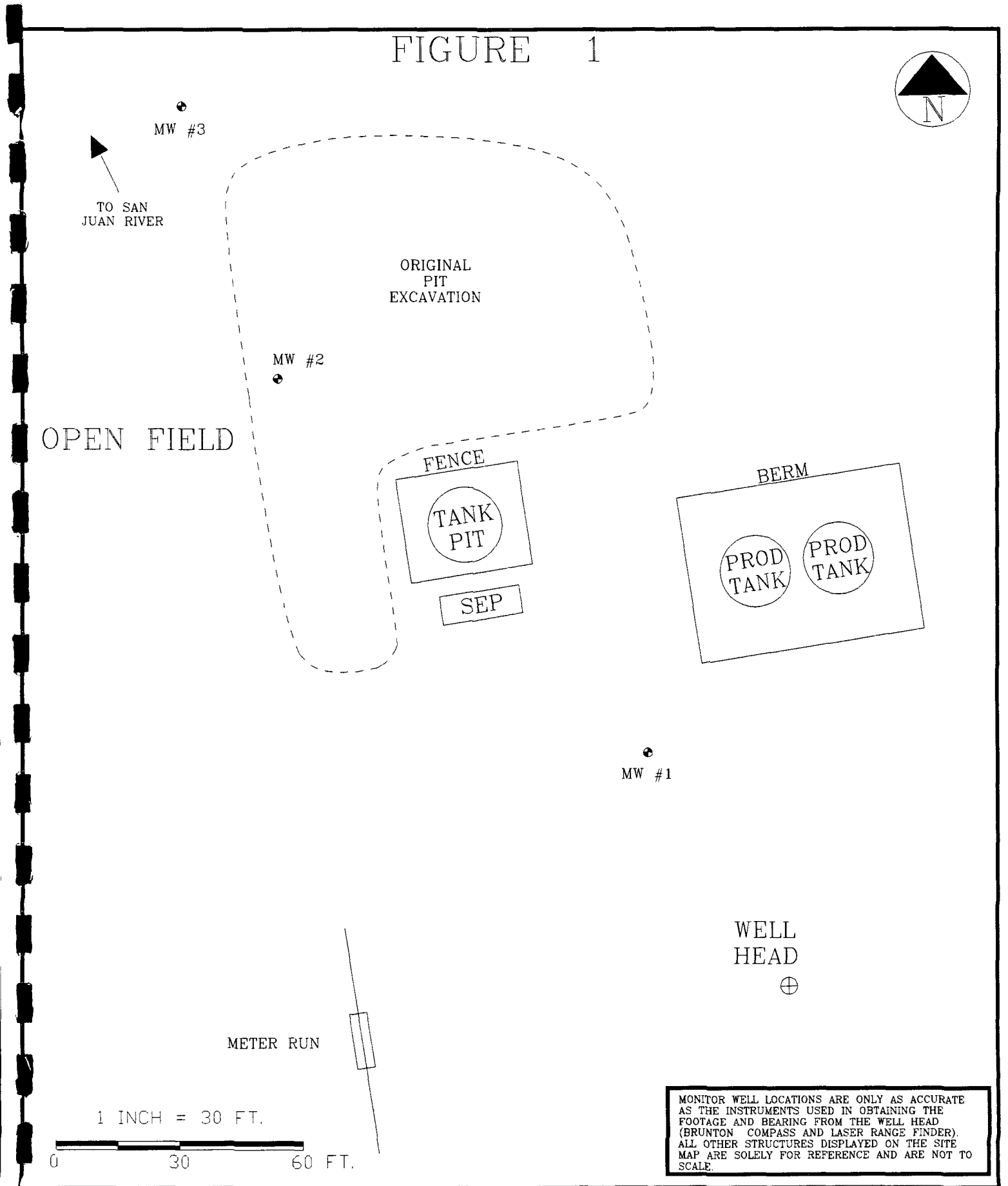
GENERAL WATER QUALITY
CROSS TIMBERS OIL COMPANY
HANEY GC B #1E
SAMPLE DATE : May 25 , 1999

PARAMETERS	MW # 1	MW # 2	MW # 3	Units
LAB pH	7.57	7.06	7.24	s. u.
LAB CONDUCTIVITY @ 25 C	6,500	6,680	7,830	umhos / cm
TOTAL DISSOLVED SOLIDS @ 180 C	3,225	3,330	3,910	mg / L
TOTAL DISSOLVED SOLIDS (Calc)	3,202	3,296	3,851	mg / L
SODIUM ABSORPTION RATIO	8.3	7.6	8.9	ratio
TOTAL ALKALINITY AS CaCO3	652	622	480	mg / L
TOTAL HARDNESS AS CaCO3	1,052	1,130	1,250	mg / L
BICARBONATE as HCO3	652	622	480	mg / L
CARBONATE AS CO3	< 1	< 1	< 1	mg / L
HYDROXIDE AS OH	< 1	< 1	< 1	mg / L
NITRATE NITROGEN	0.1	0.2	0.4	mg / L
NITRITE NITROGEN	0.001	0.004	0.003	mg / L
CHLORIDE	5.6	6.0	4.8	mg / L
FLUORIDE	1.07	1.06	1.18	mg / L
PHOSPHATE	23.6	< 0.1	18.2	mg / L
SULFATE	1,760	1,860	2,320	mg / L
IRON	0.10	1.65	1.63	mg / L
CALCIUM	331	373	413	mg / L
MAGNESIUM	54.7	47.9	52.7	mg / L
POTASSIUM	10.0	40.0	30.0	mg / L
SODIUM	620	590	720	mg / L
CATION / ANION DIFFERENCE	0.10	0.17	0.13	

GENERAL WATER QUALITY
AMOCO PRODUCTION COMPANY
HANEY GC B # 1E
SAMPLE DATE : DECEMBER 18, 1997

PARAMETERS		MW # 1	MW # 2	MW # 3	Units
GENERAL	LAB pH	7.27	7.07	7.07	s. u.
	LAB CONDUCTIVITY (25 DEG. CELCIUS)	5,584	3,280	3,092	umhos cm
	TOTAL DISSOLVED SOLIDS (180 DEG. CELCIUS)	2,792	1,636	1,544	mg / L
	TOTAL DISSOLVED SOLIDS (CALCULATED)	2,807	1,620	1,544	mg / L
ANIONS	TOTAL ALKALINITY AS CaCO3	620	400	438	mg / L
	BICARBONATE ALKALINITY (AS HCO3)	620	400	438	mg / L
	CARBONATE ALKALINITY (AS CO3)	< 1	< 1	< 1	mg / L
	HYDROXIDE ALKALINITY (AS CaCO3)	< 1	< 1	< 1	mg / L
	CHLORIDE	1546	755	719	mg / L
	SULFATE	46.6	54.5	23.2	mg / L
	PHOSPHATE	0.8	0.2	0.1	mg / L
	FLUORIDE	1.75	4.40	1.14	mg / L
	NITRATE NITROGEN	0.4	0.3	0.2	mg / L
	NITRITE NITROGEN	0.013	0.001	0.007	mg / L
CATIONS	TOTAL HARDNESS AS CaCO3	2,704	1,378	1,332	mg / L
	CALCIUM	402	476	448	mg / L
	MAGNESIUM	415	46.0	51.8	mg / L
	POTASSIUM	7.00	4.70	5.70	mg / L
	SODIUM	11.0	36.2	28.7	mg / L
DATA VALIDATION					ACCEPTANCE LEVEL
	CATION/ANION DIFFERENCE	0.00	0.00	0.00	+/- 5 %
	SODIUM ABSORPTION RATIO	0.1	0.4	0.3	

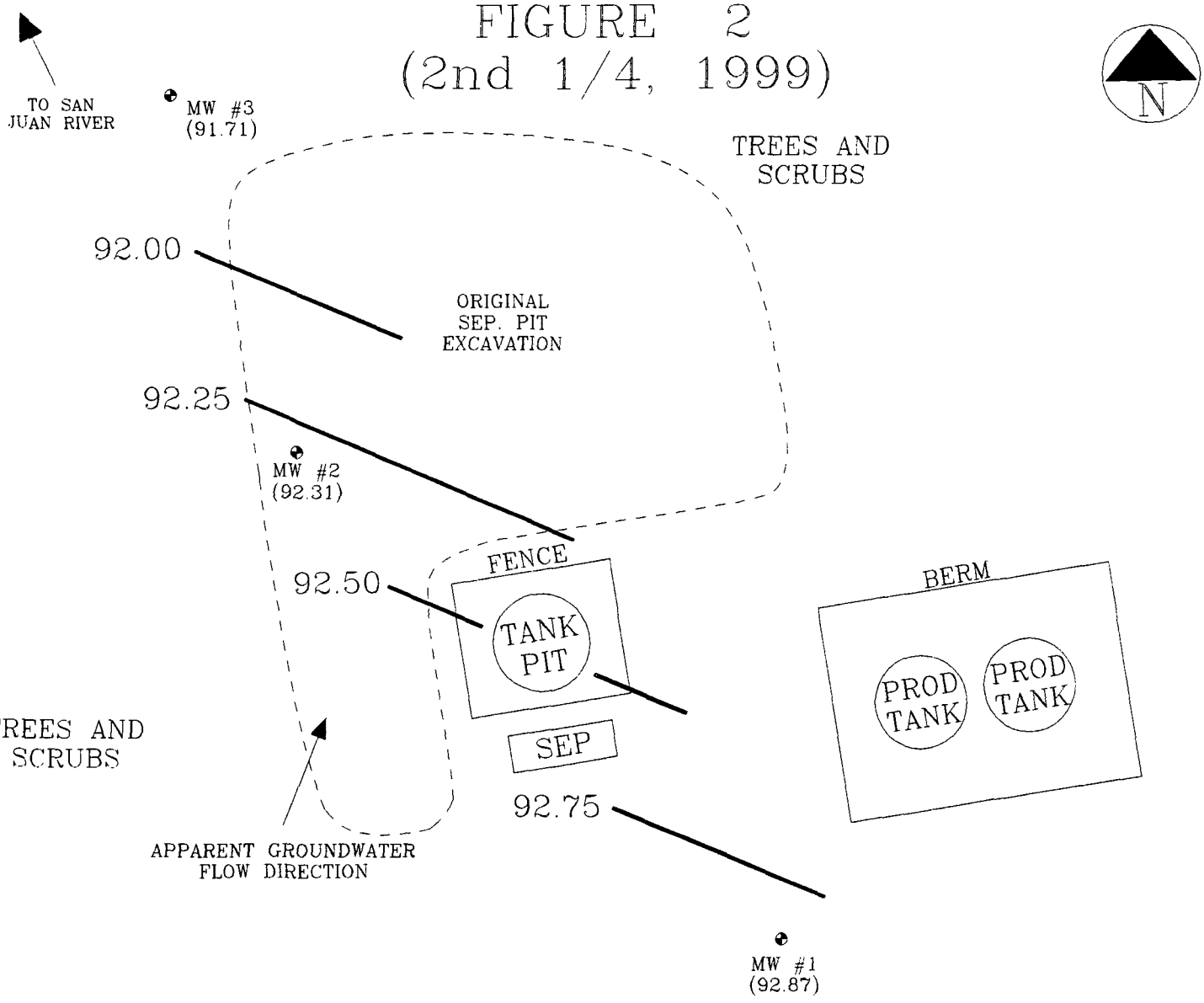
FIGURE 1



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.

AMOCO PRODUCTION COMPANY HANEY GC # 1E SW/4 SW/4 SEC. 20, 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 Samp. DRAWN BY: NJV FILENAME: HANE-SM REVISED: 5/11/98 NJV	SITE MAP 12/97

FIGURE 2
(2nd 1/4, 1999)



⊕ WELL HEAD

1 INCH = 30 FT.

0 30 60 FT.

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.

Top of Well Elevation	
MW #1	(100.14)
MW #2	(101.70)
MW #3	(102.54)

◕ MW #1 (92.87) Groundwater Elevation as of 5/25/99.

AMOCO PRODUCTION COMPANY

HANEY GC # 1E

SW/4 SW/4 SEC. 20, 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 Samp.

DRAWN BY: NJV

FILENAME: 05-25-GW

REVISED: 6/15/99 NJV

GROUNDWATER GRADIENT MAP 5/99

BLAGG ENGINEERING, INC.

MONITOR WELL SAMPLING DATA

CLIENT : AMOCO PRODUCTION CO.

CHAIN-OF-CUSTODY # : 6682

HANEY GC B # 1E - SEPARATOR PIT
UNIT M, SEC. 20, T29N, R10W

LABORATORY (S) USED : ENVIROTECH, INC.

Date : May 25, 1999

Filename : 05-25-99.WK4

SAMPLER : N J V

PROJECT MANAGER : N J V

WELL #	WELL ELEV. (ft)	WATER ELEV. (ft)	DEPTH TO WATER (ft)	TOTAL DEPTH (ft)	SAMPLING TIME	pH	CONDUCT (umhos)	VOLUME PURGED (gal.)	FREE PRODUCT (ft)
1	100.14	92.87	7.27	9.00	0950	-	-	1.00	-
2	101.70	92.31	9.39	15.00	1020	-	-	2.75	-
3	102.54	91.71	10.83	15.00	1050	-	-	2.00	-

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 ".

MW # 1 top of casing broken off. Measured @ 1.33 ft. from a relative point after piecing together .

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:	F386	Date Sampled:	05-25-99
Chain of Custody:	6682	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	**7.57**	s.u.		
Conductivity @ 25° C	**6,500**	umhos/cm		
Total Dissolved Solids @ 180C	**3,225**	mg/L		
Total Dissolved Solids (Calc)	**3,202**	mg/L		
SAR	**8.3**	ratio		
Total Alkalinity as CaCO3	**652**	mg/L		
Total Hardness as CaCO3	**1,052**	mg/L		
Bicarbonate as HCO3	**652**	mg/L	10.69	meq/L
Carbonate as CO3	**<1**	mg/L	0.00	meq/L
Hydroxide as OH	**<1**	mg/L	0.00	meq/L
Nitrate Nitrogen	**0.1**	mg/L	0.00	meq/L
Nitrite Nitrogen	**0.001**	mg/L	0.00	meq/L
Chloride	**5.6**	mg/L	0.16	meq/L
Fluoride	**1.07**	mg/L	0.06	meq/L
Phosphate	**23.6**	mg/L	0.75	meq/L
Sulfate	**1,760**	mg/L	36.64	meq/L
Iron	**0.100**	mg/L		
Calcium	**331**	mg/L	16.52	meq/L
Magnesium	**54.7**	mg/L	4.50	meq/L
Potassium	**10.0**	mg/L	0.26	meq/L
Sodium	**620**	mg/L	26.97	meq/L
Cations			48.24	meq/L
Anions			48.29	meq/L
Cation/Anion Difference			**0.10%**	

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: **Haney GC B #1E.**

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:	F387	Date Sampled:	05-25-99
Chain of Custody:	6682	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	**7.06**	s.u.		
Conductivity @ 25° C	**6,680**	umhos/cm		
Total Dissolved Solids @ 180C	**3,330**	mg/L		
Total Dissolved Solids (Calc)	**3,296**	mg/L		
SAR	**7.6**	ratio		
Total Alkalinity as CaCO3	**622**	mg/L		
Total Hardness as CaCO3	**1,130**	mg/L		
Bicarbonate as HCO3	**622**	mg/L	10.19	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	**0.004**	mg/L	0.00	meq/L
Chloride	**6.0**	mg/L	0.17	meq/L
Fluoride	**1.06**	mg/L	0.06	meq/L
Phosphate	**<0.1**	mg/L	0.00	meq/L
Sulfate	**1,860**	mg/L	38.73	meq/L
Iron	**1.65**	mg/L		
Calcium	**373**	mg/L	18.60	meq/L
Magnesium	**47.9**	mg/L	3.94	meq/L
Potassium	**40.0**	mg/L	1.02	meq/L
Sodium	**590**	mg/L	25.67	meq/L
Cations			49.23	meq/L
Anions			49.15	meq/L
Cation/Anion Difference			**0.17%**	

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: **Haney GC B #1E.**

Analyst

Review

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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:	F388	Date Sampled:	05-25-99
Chain of Custody:	6682	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	**7.24**	s.u.		
Conductivity @ 25° C	**7,830**	umhos/cm		
Total Dissolved Solids @ 180C	**3,910**	mg/L		
Total Dissolved Solids (Calc)	**3,851**	mg/L		
SAR	**8.9**	ratio		
Total Alkalinity as CaCO3	**480**	mg/L		
Total Hardness as CaCO3	**1,250**	mg/L		
Bicarbonate as HCO3	**480**	mg/L	7.87	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	**0.003**	mg/L	0.00	meq/L
Chloride	**4.8**	mg/L	0.14	meq/L
Fluoride	**1.18**	mg/L	*0.06*	*meq/L*
Phosphate	**18.2**	mg/L	0.57	meq/L
Sulfate	**2,320**	mg/L	48.30	meq/L
Iron	**1.63**	mg/L		
Calcium	**413**	mg/L	20.60	meq/L
Magnesium	**52.7**	mg/L	4.34	meq/L
Potassium	**30.0**	mg/L	0.77	meq/L
Sodium	**720**	mg/L	31.32	meq/L
Cations			57.02	meq/L
Anions			56.95	meq/L
Cation/Anion Difference			**0.13%**	

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: **Haney GC B #1E.**

Analyst

Review

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CHAIN OF CUSTODY RECORD

6682

Client / Project Name	Project Location	ANALYSIS / PARAMETERS
BLAGG/CROSS TIMBERS	HANEY GC B #1E	
Sampler: NJV	Client No. 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	0950	F386	WATER	1	✓						
			[redacted] KW									
MW #2	5/25/99	1020	F387	WATER	1	✓						
MW #3	5/25/99	1050	F388	WATER	1	✓						

Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time
Nelson Velez	5/25/99	1313	Christine Waeltz	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.