3R - 131

REPORTS

DATE:
1999

3R431

CROSS TIMBERS OIL COMPANY

GROUNDWATER REMEDIATION REPORT

1999

SULLIVAN GC D #1
(B) SECTION 26, T29N, R11W, NMPM
SAN JUAN COUNTY, NEW MEXICO

RECEIVED

APR 27 2000

ENVIRONMENTAL BUREAU
OIL CONSERVATION DIVISION

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)
Sullivan GC D #1 - Blow & Separator Pits
Nw/4 Ne/4 Sec. 26, T29N, R11W

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 new disposable bailers and placed in new laboratory supplied 40 ml glass vials with teflon septa caps. Samples were analyzed for benzene, toluene, ethylbenzene, and total xylenes (BTEX) per USEPA Method 8021. Additional groundwater was collected and place in laboratory supplied 500 ml plastic containers and analyzed for general water quality per USEPA Method 600/4-79-020. The samples were preserved cool (BTEX samples also preserved with mercuric chloride) 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:

BTEX and general chemistry results for the 1999 annual sampling event are summarized in the following tables. Pursuant to the NMOCD previously approved groundwater management plan, only MW #1 was sampled for BTEX and yielded increases in all constituents reported from the previous 1998 sampling event.

In addressing the attached NMOCD letter dated April 21, 1999 (refer to section 1), all MW's were resampled for general water quality analysis. MW #2 (up gradient and apparent background) exposed the highest amounts of both total dissolved solids (TDS) and chlorides compared to the source and down gradient MW's. Blagg Engineering, Inc. (BEI) believes the most recent results are more indicative of the groundwater quality based on consistency of the analyses in relations to all pertinent constituents in the MW's. However, given the fact the MW #1 and MW #2 exhibited very poor recovery during the purging process (see notes on monitor well sampling data sheet), replacement of these MW's appears appropriate.

Summary and/or Recommendations:

Based on the enclosed documentation, BEI recommends the following;

1) Replacing MW #1 and MW #2 with deeper completed MW's, then resampling for TDS and chloride only (verification purposes).
2) Continued annual sampling of MW#1 for BTEX.
3) Installing a new MW down gradient of MW #1 for delineation of BTEX only.

CROSS TIMBERS OIL CO. GROUNDWATER MONITOR WELL LAB RESULT

SUBMITTED BY BLAGG ENGINEERING, INC.

SULLIVAN GC D #1 - BLOW & SEP. PITS
UNIT B, SEC. 26, T29N, R11W

REVISED DATE: June 8, 1999

FILENAME: (SU-2Q-99.WK4) NJV

SAMPLE DATE	MONITOR WELL No:	D.T.W. (ft)	T.D. (ft)	TDS (mg/L)	COND. (umhos/cm)	pH	PRODUCT (ft)	BTEX EPA METHOD 8020 (PPB) Benzene	Toluene	Ethyl Benzene	Total Xylene
10-Jun-96	MW #1	7.69	10.00	38,300	10,500	7.5		298	90.6	29.8	417.5
27-Jun-97		7.81	10.00		12,900	7.3		675	208	342	645
12-Jun-98		7.31	10.00		13,200	7.2		131	8.8	0.4	8.6
27-May-99		6.79		9,800	19,600	7.6		345	17.9	13.1	87.3
10-Jun-96	MW #2	7.85	10.00	10,600	5,500	7.4		ND	ND	ND	ND
01-Jun-99		6.44		23,200	59,200	7.4		NA	NA	NA	NA
10-Jun-96	MW #3	8.48	10.00	5,310	3,600	6.9		ND	13	ND	2.52
26-May-99		6.57		6,300	12,650	7.2		NA	NA	NA	NA
10-Jun-96	MW #4	8.04	10.00	10,700	3,500	7.0		ND	ND	ND	9.24
26-May-99		6.97		6,320	12,660	7.4		NA	NA	NA	NA

GENERAL WATER QUALITY

CROSS TIMBERS OIL COMPANY

SULLIVAN GC D #1

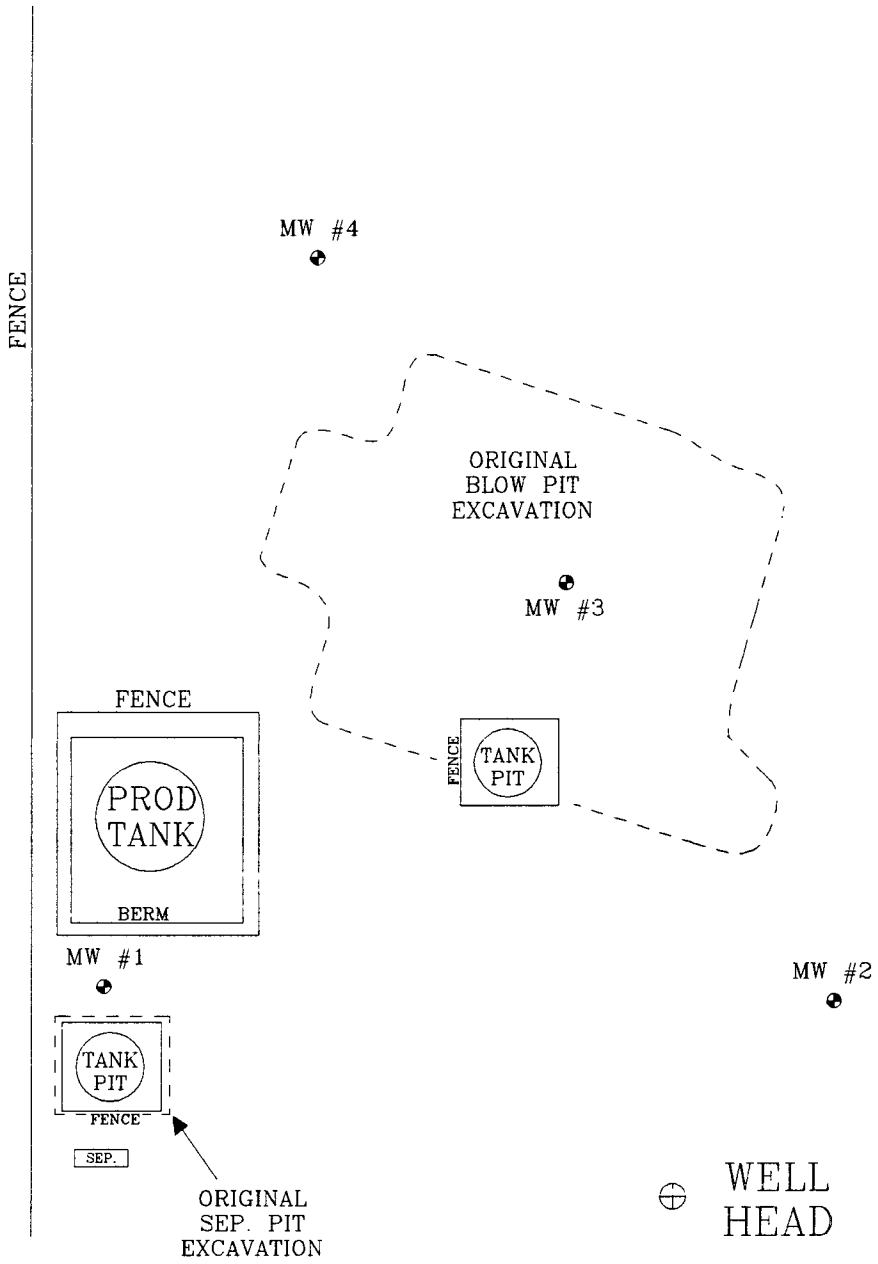
SAMPLE DATE : MAY 26, 1999

PARAMETERS	MW # 1	MW # 2	MW # 3	MW # 4	Units
LAB pH	7.60	7.41	7.16	7.40	s. u.
LAB CONDUCTIVITY @ 25 C	19,600	59,200	12,650	12,660	umhos / cm
TOTAL DISSOLVED SOLIDS @ 180 C	9,800	23,200	6,300	6,320	mg / L
TOTAL DISSOLVED SOLIDS (Calc)	9,764	22,121	6,285	6,230	mg / L
SODIUM ABSORPTION RATIO	26.2	73.9	21.7	23.6	ratio
TOTAL ALKALINITY AS CaCO3	1,484	485	444	592	mg / L
TOTAL HARDNESS AS CaCO3	1,720	1,495	1,040	904	mg / L
BICARBONATE as HCO3	1,484	485	444	592	mg / L
CARBONATE AS CO3	< 1	< 1	< 1	< 1	mg / L
HYDROXIDE AS OH	< 1	< 1	< 1	< 1	mg / L
NITRATE NITROGEN	2.2	0.6	0.7	0.3	mg / L
NITRITE NITROGEN	0.001	0.058	0.036	0.013	mg / L
CHLORIDE	88.0	170.0	68.0	120	mg / L
FLUORIDE	1.42	1.79	1.23	1.24	mg / L
PHOSPHATE	23.0	2.0	0.5	2.5	mg / L
SULFATE	5,600	14,550	3,930	3,720	mg / L
IRON	0.210	0.307	0.037	0.089	mg / L
CALCIUM	464	408	350	272	mg / L
MAGNESIUM	137	116	40.0	54.7	mg / L
POTASSIUM	52.5	8.0	15.0	70.0	mg / L
SODIUM	2,495	6,570	1,610	1,630	mg / L
CATION / ANION DIFFERENCE	0.05	0.02	0.07	0.09	%

GENERAL WATER QUALITY
AMOCO PRODUCTION COMPANY
SULLIVAN GC D#1
SAMPLE DATE : JUNE 10, 1996

PARAMETERS		MW # 1	MW # 2	MW # 3	MW # 4	Units
GENERAL	LAB pH	7.9	7.8	7.1	7.3	s. u.
	LAB CONDUCTIVITY (25 DEG. CELCIUS)	38,600	11,300	6,470	11,800	umhos cm
	TOTAL DISSOLVED SOLIDS (180 DEG. CELCIUS)	38,300	10,600	5,310	10,700	mg / L
	TOTAL DISSOLVED SOLIDS (CALCULATED)	26,900	10,100	4,930	7,930	mg / L
ANIONS	TOTAL ALKALINITY AS CaCO3	640	478	1,100	3,440	mg / L
	BICARBONATE ALKALINITY (AS CaCO3)	640	478	1,100	3,440	mg / L
	CARBONATE ALKALINITY (AS CaCO3)	NA	NA	NA	NA	mg / L
	HYDROXIDE ALKALINITY (AS CaCO3)	NA	NA	NA	NA	mg / L
	CHLORIDE	200	1,250	177	180	mg / L
	SULFATE	18,100	5,050	2,550	2,740	mg / L
	NITRATE + NITRITE - N	NA	NA	NA	NA	
	NITRATE - N	NA	NA	NA	NA	
	NITRITE - N	NA	NA	NA	NA	
CATIONS	TOTAL HARDNESS AS CaCO3	2,790	1,390	1,670	2,230	mg / L
	CALCIUM	526	354	575	598	mg / L
	MAGNESIUM	358	124	56.4	179	mg / L
	POTASSIUM	14.0	24.0	21.0	670	mg / L
	SODIUM	7,400	3,000	890	1,500	mg / L
DATA VALIDATION						ACCEPTANCE LEVEL
	CATION/ANION DIFFERENCE	2.17	2.92	4.94	1.54	+/- 5 %
	TDS (180):TDS (CALCULATED)	1.4	1.0	1.1	1.3	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

SULLIVAN GC D1

NW/4 NE/4 SEC. 26, T29N, R11W

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: ANNUAL SAMP.

DRAWN BY: NJV

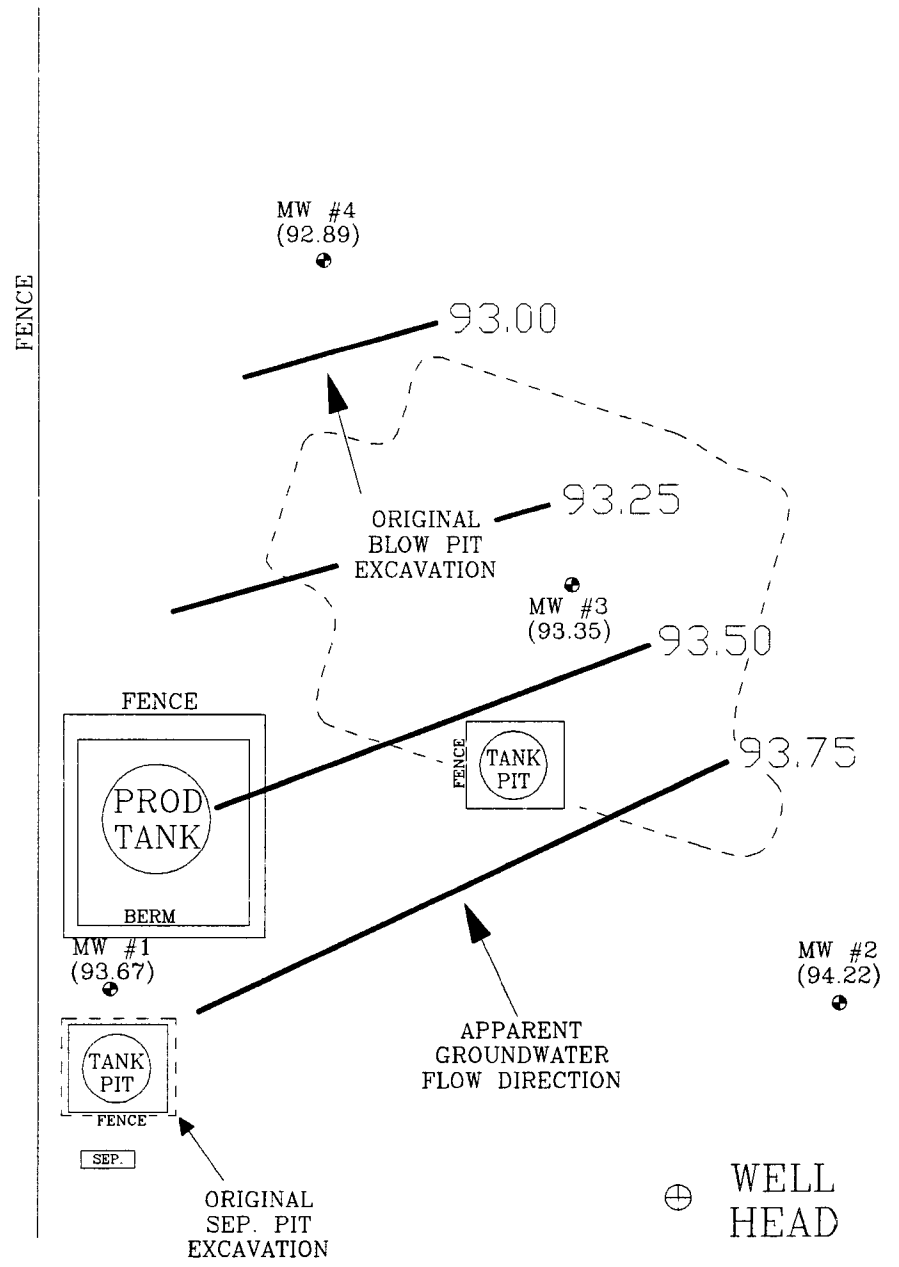
FILENAME: 05-26-SM

REVISED: 6/17/99 NJV

SITE MAP

5/99

FIGURE 2
(2nd 1/4, 1999)



Top of Well Elevation	
MW #1	(100.46)
MW #2	(100.66)
MW #3	(99.92)
MW #4	(99.86)

MW #1 (93.67) Groundwater Elevation as of 5/26/99.

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.

0 50 100 FT.

AMOCO PRODUCTION COMPANY
SULLIVAN GC D1
NW/4 NE/4 SEC. 26, T29N, R11W
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: ANNUAL SAMP.
DRAWN BY: NJV
FILENAME: 05-26-GW
REVISED: 6/17/99 NJV

GROUNDWATER GRADIENT MAP
5/99

BLAGG ENGINEERING, INC.

MONITOR WELL SAMPLING DATA

CLIENT : AMOCO PRODUCTION CO.

CHAIN-OF-CUSTODY # : 6685
6692

SULLIVAN GC D #1 - BLOW & SEP. PITS
UNIT B, SEC. 26, T29N, R11W

LABORATORY (S) USED : ENVIROTECH, INC.

Date : May 26, 1999

Filename : 05-26-99.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	100.46	93.67	6.79	10.00	0710	-	-	1.00	-
2	100.66	94.22	6.44	10.00	0735	-	-	0.75	-
3	99.92	93.35	6.57	10.00	1005	-	-	1.50	-
4	99.86	92.89	6.97	10.00	1035	-	-	1.75	-

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 #'s 1 & 2 - very poor recovery . Collected BTEX samples for MW # 1 only . Collected anion / cation for all MW's listed above . MW #4 top of casing crimped, removed 1.15 ft. from top of casing & purged, DTW measured from top of casing before cutting . Collected samples for MW #1 on May 27, 1999 and MW #2 on June 1, 1999 .

5 / 26 / 99 - on site @ 0900 bailed water in MW #'s 1 & 2 no recovery .

5 / 26 / 99 - on site @ 1415 no recovery in MW # 2, only 8 inches in MW #1 .

5 / 27 / 99 - on site @ 0655 only 1 foot recovery in MW # 2, sampled MW #1 DTW = 5.97 ft.

6 / 01 / 99 - sampled MW #2 for anion / cation, DTW = 7.50 ft.

ENVIROTECH LABS

PRACTICAL SOLUTIONS FOR A BETTER TOMORROW

EPA METHOD 8021
AROMATIC VOLATILE ORGANICS

Client:	Blagg / Cross Timbers	Project #:	403410
Sample ID:	MW # 1	Date Reported:	05-27-99
Chain of Custody:	6685	Date Sampled:	05-27-99
Laboratory Number:	F400	Date Received:	05-27-99
Sample Matrix:	Water	Date Analyzed:	05-27-99
Preservative:	HgCl2 & Cool	Analysis Requested:	BTEX
Condition:	Cool & Intact		

Parameter	Concentration (ug/L)	Dilution Factor	Det. Limit (ug/L)
Benzene	**345**	**1**	**0.2**
Toluene	**17.9**	**1**	**0.2**
Ethylbenzene	**13.1**	**1**	**0.2**
p,m-Xylene	**67.2**	**1**	**0.2**
o-Xylene	**20.1**	**1**	**0.1**
Total BTEX	**463**		

ND - Parameter not detected at the stated detection limit.

Surrogate Recoveries:	Parameter	Percent Recovery
	Trifluorotoluene	**96 %**
	Bromofluorobenzene	**96 %**

References: Method 5030B, Purge-and-Trap, Test Methods for Evaluating Solid Waste, SW-846, USEPA, December 1996.

Method 8021B, Aromatic and Halogenated Volatiles by Gas Chromatography Using Photoionization and/or Electrolytic Conductivity Detectors, SW-846, USEPA December 1996.

Comments: **Sullivan GC D #1.**

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 #1	Date Reported:	05-28-99
Laboratory Number:	F400	Date Sampled:	05-27-99
Chain of Custody:	6685	Date Received:	05-27-99
Sample Matrix:	Water	Date Extracted:	N/A
Preservative:	Cool	Date Analyzed:	05-28-99
Condition:	Cool & Intact		

Parameter	Analytical Result	Units		Units
pH	**7.60**	s.u.		
Conductivity @ 25° C	**19,600**	umhos/cm		
Total Dissolved Solids @ 180C	**9,800**	mg/L		
Total Dissolved Solids (Calc)	**9,764**	mg/L		
SAR	**26.2**	ratio		
Total Alkalinity as CaCO3	**1,484**	mg/L		
Total Hardness as CaCO3	**1,720**	mg/L		
Bicarbonate as HCO3	**1,484**	mg/L	24.32	meq/L
Carbonate as CO3	**<1**	mg/L	0.00	meq/L
Hydroxide as OH	**<1**	mg/L	0.00	meq/L
Nitrate Nitrogen	**2.2**	mg/L	0.04	meq/L
Nitrite Nitrogen	**0.001**	mg/L	0.00	meq/L
Chloride	**88.0**	mg/L	2.48	meq/L
Fluoride	**1.42**	mg/L	0.07	meq/L
Phosphate	**23.0**	mg/L	0.73	meq/L
Sulfate	**5,600**	mg/L	116.59	meq/L
Iron	**0.210**	mg/L		
Calcium	**464**	mg/L	23.15	meq/L
Magnesium	**137**	mg/L	11.27	meq/L
Potassium	**52.5**	mg/L	1.34	meq/L
Sodium	**2,495**	mg/L	108.53	meq/L
Cations			144.30	meq/L
Anions			144.23	meq/L
Cation/Anion Difference			**0.05%**	

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: **Sullivan GC D #1.**

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 #2	Date Reported:	06-01-99
Laboratory Number:	F433	Date Sampled:	06-01-99
Chain of Custody:	6692	Date Received:	06-01-99
Sample Matrix:	Water	Date Extracted:	N/A
Preservative:	Cool	Date Analyzed:	06-01-99
Condition:	Cool & Intact		

Parameter	Analytical Result	Units		Units
pH	**7.41**	s.u.		
Conductivity @ 25° C	**59,200**	umhos/cm		
Total Dissolved Solids @ 180C	**23,200**	mg/L		
Total Dissolved Solids (Calc)	**22,121**	mg/L		
SAR	**73.9**	ratio		
Total Alkalinity as CaCO3	**485**	mg/L		
Total Hardness as CaCO3	**1,495**	mg/L		
Bicarbonate as HCO3	**485**	mg/L	7.95	meq/L
Carbonate as CO3	**<1**	mg/L	0.00	meq/L
Hydroxide as OH	**<1**	mg/L	0.00	meq/L
Nitrate Nitrogen	**0.6**	mg/L	0.01	meq/L
Nitrite Nitrogen	**0.058**	mg/L	0.00	meq/L
Chloride	**170**	mg/L	4.80	meq/L
Fluoride	**1.79**	mg/L	0.09	meq/L
Phosphate	**2.0**	mg/L	0.06	meq/L
Sulfate	**14,550**	mg/L	302.93	meq/L
Iron	**0.307**	mg/L		
Calcium	**408**	mg/L	20.36	meq/L
Magnesium	**116**	mg/L	9.55	meq/L
Potassium	**8.0**	mg/L	0.20	meq/L
Sodium	**6,570**	mg/L	285.80	meq/L
Cations			315.90	meq/L
Anions			315.84	meq/L
Cation/Anion Difference			**0.02%**	

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: **Sullivan GC D #1.**

Analyst

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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:	05-28-99
Laboratory Number:	F401	Date Sampled:	05-26-99
Chain of Custody:	6685	Date Received:	05-27-99
Sample Matrix:	Water	Date Extracted:	N/A
Preservative:	Cool	Date Analyzed:	05-28-99
Condition:	Cool & Intact		

Parameter	Analytical Result	Units		Units
pH	**7.16**	s.u.		
Conductivity @ 25° C	**12,650**	umhos/cm		
Total Dissolved Solids @ 180C	**6,300**	mg/L		
Total Dissolved Solids (Calc)	**6,285**	mg/L		
SAR	**21.7**	ratio		
Total Alkalinity as CaCO3	**444**	mg/L		
Total Hardness as CaCO3	**1,040**	mg/L		
Bicarbonate as HCO3	**444**	mg/L	7.28	meq/L
Carbonate as CO3	**<1**	mg/L	0.00	meq/L
Hydroxide as OH	**<1**	mg/L	0.00	meq/L
Nitrate Nitrogen	**0.7**	mg/L	0.01	meq/L
Nitrite Nitrogen	**0.036**	mg/L	0.00	meq/L
Chloride	**68.0**	mg/L	1.92	meq/L
Fluoride	**1.23**	mg/L	0.06	meq/L
Phosphate	**0.5**	mg/L	0.02	meq/L
Sulfate	**3,930**	mg/L	81.82	meq/L
Iron	**0.037**	mg/L		
Calcium	**350**	mg/L	17.47	meq/L
Magnesium	**40.0**	mg/L	3.29	meq/L
Potassium	**15.0**	mg/L	0.38	meq/L
Sodium	**1,610**	mg/L	70.04	meq/L
Cations			91.18	meq/L
Anions			91.11	meq/L
Cation/Anion Difference			**0.07%**	

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: **Sullivan GC D #1.**

Analyst

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ENVIROTECH LABS

PRACTICAL SOLUTIONS FOR A BETTER TOMORROW

CATION / ANION ANALYSIS

Client:	Blagg / Cross Timbers	Project #:	403410
Sample ID:	MW #4	Date Reported:	05-28-99
Laboratory Number:	F402	Date Sampled:	05-26-99
Chain of Custody:	6685	Date Received:	05-27-99
Sample Matrix:	Water	Date Extracted:	N/A
Preservative:	Cool	Date Analyzed:	05-28-99
Condition:	Cool & Intact		

Parameter	Analytical Result	Units		Units
pH	**7.40**	s.u.		
Conductivity @ 25° C	**12,660**	umhos/cm		
Total Dissolved Solids @ 180C	**6,320**	mg/L		
Total Dissolved Solids (Calc)	**6,230**	mg/L		
SAR	**23.6**	ratio		
Total Alkalinity as CaCO3	**592**	mg/L		
Total Hardness as CaCO3	**904**	mg/L		
Bicarbonate as HCO3	**592**	mg/L	9.70	meq/L
Carbonate as CO3	**<1**	mg/L	0.00	meq/L
Hydroxide as OH	**<1**	mg/L	0.00	meq/L
Nitrate Nitrogen	**0.3**	mg/L	0.00	meq/L
Nitrite Nitrogen	**0.013**	mg/L	0.00	meq/L
Chloride	**120**	mg/L	3.39	meq/L
Fluoride	**1.24**	mg/L	0.07	meq/L
Phosphate	**2.5**	mg/L	0.08	meq/L
Sulfate	**3,720**	mg/L	77.45	meq/L
Iron	**0.089**	mg/L		
Calcium	**272**	mg/L	13.57	meq/L
Magnesium	**54.7**	mg/L	4.50	meq/L
Potassium	**70.0**	mg/L	1.79	meq/L
Sodium	**1,630**	mg/L	70.91	meq/L
Cations			90.77	meq/L
Anions			90.69	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: **Sullivan GC D #1.**

Analyst

Review

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CHAIN OF CUSTODY RECORD

6685

Client / Project Name	Project Location	ANALYSIS / PARAMETERS
BLAGG/CROSS TIMBERS	SULLIVAN GC D #1	

Sampler:	Client No.
NJV	403410

Sample No./ Identification	Sample Date	Sample Time	Lab Number	Sample Matrix	No. of Containers	ANION/ CATION	BTEX (8021)					Remarks
												ALL SAMPLES PRESERV. - COOL
MW # 1	5/27/99	0710	F400	WATER	3	✓	✓					BTEX PRESERV. - $HgCl_2$ & COOL
~~MW # 2~~	~~5/27/99~~			WATER	1	✓						~~MW # 2 5/27/99~~
MW # 3	5/26/99	1005	F401	WATER	1	✓						
MW # 4	5/26/99	1035	F402	WATER	1	✓						

Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time
Nelson Velez	5/27/99	0740	Thomas L. Copeland	5.27.99	0740
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	✓		

CHAIN OF CUSTODY RECORD

6692

Client / Project Name	Project Location	ANALYSIS / PARAMETERS
BLAGG/CROSS TIMBERS	SULLIVAN GC D #1	

Sampler:	Client No.
NJV	403410

Sample No./ Identification	Sample Date	Sample Time	Lab Number	Sample Matrix	No. of Containers	ANION/ CATION						Remarks
MW #2	6/1/99	0735	F433	WATER	1	✓						PRESERV. - COOL

Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time
Nelson Velez	6/1/99	0800	Dawn L. Spencer	6.1.99	0800
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	✓		

ENVIROTECH LABS

PRACTICAL SOLUTIONS FOR A BETTER TOMORROW

EPA METHOD 8021
AROMATIC VOLATILE ORGANICS
QUALITY ASSURANCE REPORT

Client:	N/A	Project #:	N/A
Sample ID:	05-27-BTEX QA/QC	Date Reported:	05-27-99
Laboratory Number:	F398	Date Sampled:	N/A
Sample Matrix:	Water	Date Received:	N/A
Preservative:	N/A	Date Analyzed:	05-27-99
Condition:	N/A	Analysis:	BTEX

Calibration and Detection Limits (ug/L)	I-Cal RF:	C-Cal RF:	%Diff. Accept. Range 0 - 15%	Blank Conc.	Detect. Limit
Benzene	1.6360E-002	1.6412E-002	0.32%	ND	0.2
Toluene	1.7563E-002	1.7566E-002	0.02%	ND	0.2
Ethylbenzene	7.1313E-003	7.1398E-003	0.12%	ND	0.2
p,m-Xylene	8.5740E-003	8.5758E-003	0.02%	ND	0.2
o-Xylene	7.9281E-003	7.9520E-003	0.30%	ND	0.1

Duplicate Conc. (ug/L)	Sample	Duplicate	%Diff.	Accept Limit
Benzene	78.9	79.0	0.1%	0 - 30%
Toluene	22.0	22.2	0.9%	0 - 30%
Ethylbenzene	51.6	52.1	1.0%	0 - 30%
p,m-Xylene	207	216	4.4%	0 - 30%
o-Xylene	66.9	67.4	0.7%	0 - 30%

Spike Conc. (ug/L)	Sample	Amount Spiked	Spiked Sample	% Recovery	Accept Limits
Benzene	78.9	50.0	128	99%	39 - 150
Toluene	22.0	50.0	72.0	100%	46 - 148
Ethylbenzene	51.6	50.0	102	100%	32 - 160
p,m-Xylene	207	100.0	305	99%	46 - 148
o-Xylene	66.9	50.0	117	100%	46 - 148

ND - Parameter not detected at the stated detection limit.

* - Administrative Limits set at 80 - 120%.

References: Method 5030B, Purge-and-Trap, Test Methods for Evaluating Solid Waste, SW-846, USEPA, December 1996.
Method 8021B, Aromatic and Halogenated Volatiles by Gas Chromatography Using Photoionization and/or Electrolytic Conductivity Detectors, SW-846, USEPA December 1996.

Comments: **QA/QC for samples F398 - F400, F405 - F406 and F408 - F409.**

Analyst

Review

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

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 21, 1999

CERTIFIED MAIL
RETURN RECEIPT NO: Z-274-520-641

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

RE: SAN JUAN BASIN GROUND WATER MONITORING REPORTS

Dear Ms. Hutton:

The New Mexico Oil Conservation Division (OCD) has reviewed Cross Timbers Oil Company's (CTOC) February 11, 1999 "CROSS TIMBERS OIL CO. GROUNDWATER MONITORING (AMOCO) 1996-1998 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 7 sites in the San Juan Basin.

Based upon a review of the above referenced documents, the OCD has the following comments and requirements:

1. The downgradient and/or lateral extent of chloride and/or total dissolved solids contamination at the sites listed below has not been completely defined. The OCD requires that CTOC completely define the extent of these contaminants at each site pursuant to the previously approved ground water management plan for these sites.

   - Bergin GC #1E — Unit F, Sec. 21, T29N, R11W
   - Rowland GC #1 — Unit P, Sec. 25, T30N, R12W
   - State GC BS #1 — Unit F, Sec. 21, T29N, R11W
   - Sullivan GC D#1 — Unit B, Sec. 26, T29N, R11W

2. The downgradient and/or lateral extent of benzene, toluene, ethylbenzene, xylene (BTEX), chloride and/or total dissolved solids contamination at the sites listed below has not been completely defined. The OCD requires that CTOC completely define the extent of these contaminants at each site pursuant to the previously approved ground water management plan for these sites.

   - Bruington GC #1 — Unit E, Sec. 14, T29N, R11W
   - Valdez A #1E — Unit G, Sec. 24, T29N, R11W

3. A review of the sampling data shows that during some samplings only ground water from the monitor wells at the source is sampled and there is no downgradient monitoring to show that contaminated ground water is contained. In order to effectively monitor contaminant migration, the OCD requires that the ground water monitoring plan be modified to include additional ground water sampling of all monitor wells at each site on an annual basis. During the annual sampling event ground water from all monitor wells will be sampled and analyzed for BTEX, TDS, polynuclear aromatic hydrocarbons (PAH) and New Mexico Water Quality Control Commission (WQCC) cations and anions and metals using EPA approved methods and quality assurance/quality control procedures. Specific analytes may be dropped from the annual sampling event for certain sites if that analyte has not been found to be above WQCC standard in the sites source areas and the reasons for dropping those analytes are included in the annual reports. This sampling requirement will also be added to the ground water monitoring plan for all future ground water sampling at all CTOC sites with contaminated ground water.

4. CTOC recently purchased a number of well sites in the San Juan Basin from Amoco. Some of these sites were found to have ground water contamination which was discovered by Amoco during pit closure activities. The OCD does not have a listing of status of these sites. Please provide the OCD with a listing of all CTOC well sites in the San Juan Basin at which the presence of ground water was discovered during pit assessment or closure activities and the status of each site.

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
Nelson Velez, Blagg Engineering, Inc.