

3R-409

PO PIPKEN #3E

XTO ENERGY INC.

ANNUAL GROUNDWATER REPORT

2006

**P.O. PIPKEN #3E
(F) SECTION 17 – T27N – R10W, NMPM
SAN JUAN COUNTY, NEW MEXICO**

**PREPARED FOR:
MR. GLENN VON GONTEN
NEW MEXICO OIL CONSERVATION DIVISION**

January 2007

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2006 XTO GROUNDWATER REPORT

PO PIPKEN #3E

SITE DETAILS

Legals - Twn: 27N
NMOCD Hazard Ranking: 20

Rng: 10W

Sec: 17
Land Type: FEDERAL

Unit: I

PREVIOUS ACTIVITIES

Excavation: Sep-94 (450 CY)
Quarterly Sampling Initiated: Dec-99

Monitor Wells: Dec-99
Additional Monitor Wells: Jun-00

SITE MAP

A site map is presented as Figure 1.

SUMMARY TABLES

A summary of laboratory analytical data for groundwater samples collected since December 1999 is presented as Table 1. General water quality data is presented in Tables 2-3. Copies of the laboratory data sheets and associated quality assurance/quality control data for 2006 are presented as Attachment 1.

POTENTIOMETRIC SURFACE DIAGRAMS

Groundwater elevations collected since monitoring was initiated in June 2000 indicate the groundwater gradient trends to the northwest. The gradient is consistent and parallels the nearby surface drainage (Kutz Wash). Figure 2 illustrates the estimated groundwater gradient for October 2006.

2006 ACTIVITIES

Annual Groundwater Remediation Report- The 2005 annual groundwater report was submitted to New Mexico Oil Conservation Division (NMOCD) in January 2006, proposing annual sampling for benzene, toluene, ethyl benzene and total xylenes (BTEX) of groundwater monitor well MW-2 and termination of sampling in monitor wells MW-1, MW-3, MW-4, and MW-5, in accordance with the NMOCD approved Groundwater Management Plan.

Groundwater Monitoring – Groundwater samples were collected from MW-2 and submitted for laboratory analysis of BTEX in 2006. Laboratory results exceed New Mexico Water Quality Control Commission (NMWQCC) standards for benzene during the 2006 sampling event.

GEOLOGIC LOGS AND WELL COMPLETION DIAGRAMS

Bore/Test Hole Reports are presented as Figures 3-7 representing drilling that occurred on site in December 1999 and June 2000.

DISPOSITION OF GENERATED WASTES

Waste generated (groundwater) during monitor well sampling and development was placed in the produced water separator tank located on the well site.

CONCLUSIONS

In January 1998 XTO Energy Inc. (XTO) acquired the PO Pipken #3E from Amoco Production Company (Amoco). Remedial activities continued from the closure of three

2006 XTO GROUNDWATER REPORT

earthen production pits. Several groundwater monitoring wells were installed between 1999 and 2000 to evaluate impact to groundwater.

With the exception of monitor well MW-2, analyses of groundwater from other groundwater monitoring wells are below the NMWQCC standards for BTEX. Groundwater monitoring well MW-2 is located within the original source area of the earthen dehydrator pit (Figure 1). Down-gradient from the source area is MW-1, which has tested below NMWQCC closure standards and establishes the extent of impact. Monitor well MW-3 is located cross-gradient of the source area and demonstrates natural attenuation of petroleum hydrocarbons. The up-gradient monitor wells, MW-4 and MW-5, have shown no detectable levels of BTEX constituents.

XTO proposes continued annual sampling until natural attenuation reduces BTEX concentrations in MW-2. The addition of nutrients or application of an oxidizer is recommended for MW-2. Quarterly sampling will be conducted once groundwater is below NMWQCC standards in MW-2 and will continue until site closure is achieved.

RECOMMENDATIONS

- Annual sampling will continue at MW-2 until analytical results shows a reduction in BTEX. Then quarterly sampling is proposed until the well is below New Mexico groundwater standards for four (4) consecutive quarters.
- Following OCD approval for closure, all monitor well locations will be abandoned in accordance with the monitoring well abandonment plan.

TABLE 1
XTO ENERGY INC. GROUNDWATER LAB RESULTS

P.O. PIPKEN #3E- DEHYDRATOR PIT
UNIT I, SEC. 17, T27N, R10W

Revised Date: January 26, 2007

Sample Date	Monitor Well No.	DTW (ft)	TD (ft)	Product (ft)	Benzene ug/L	Toluene ug/L	Ethyl Benzene ug/L	Total Xylene ug/L
21-Dec-99	MW #1	25.01	33.00		1.2	ND	2.3	15.9
28-Jun-00		25.33			ND	ND	ND	ND
21-Dec-99	MW #2	24.66	33.00		510	45	140	990
28-Jun-00		24.69			600	5.4	120	277
05-May-01		24.79			260	ND	67	153
26-Jun-02		25.64			52	0.6	7.5	7.4
23-Jun-03		25.79			5.2	1.5	0.99	1.6
26-Aug-03		25.49			160	ND	14	140
16-Jun-04		25.10			110	ND	12	24
28-Jun-05		25.44			200	2.9	33	73
19-Oct-06		26.04	33.34		54	2.9	5.6	50
21-Dec-99	MW #3	24.14	33.00		1,500	5.6	520	935
28-Jun-00		24.44			300	ND	77	218.8
15-May-01		24.53			56	0.8	17	26
26-Jun-02		23.58	30.50		1.4	ND	1	ND
28-Aug-02		23.82			ND	ND	ND	ND
09-Dec-02		23.12	29.89		ND	ND	ND	ND
14-Mar-03		25.68			0.9	ND	ND	ND
28-Jun-00	MW #4	23.66	30.00		ND	ND	ND	ND
28-Jun-00	MW #5	23.52	30.00		ND	ND	ND	ND
NMWQCC GROUNDWATER STANDARDS					10	750	750	620

TABLE 2
XTO ENERGY INC. GROUNDWATER LAB RESULTS

P.O. PIPKEN #3E- DEHYDRATOR PIT
UNIT I, SEC. 17, T27N, R10W

Revised Date: January 26, 2007
Sample Date: December 21, 1999

PARAMETERS	MW #1R	MW #2R	MW #3	UNITS
LAB Ph	7.89	7.3	7.56	s.u.
LAB CONDUCTIVITY @ 25 C	15,020	5,210	40,300	umhos/cm
TOTAL DISSOLVED SOLIDS @ 180 C	13,200	3,216	22,112	mg/L
TOTAL DISSOLVED SOLIDS (Calc)	12,410	3,030	19,820	mg/L
SODIUM ABSORPTION RATIO	64.5	39.9	86.2	ratio
TOTAL ALKALINITY AS CaCO3	540	1,092	1,872	mg/L
TOTAL HARDNESS AS CaCO3	648	116	964	mg/L
BICARBONATE AS HCO3	540	1,092	1,872	mg/L
CARBONATE AS CO3	< 0.1	< 0.1	< 0.1	mg/L
HYDROXIDE AS OH	< 0.1	< 0.1	< 0.1	mg/L
NITRATE NITROGEN	0.4	0.1	0.7	mg/L
NITRITE NITROGEN	0.038	0.011	0.006	mg/L
CHLORIDE	84	28	208	mg/L
FLUORIDE	8.2	1.98	11.7	mg/L
PHOSPHATE	1.2	1.4	6	mg/L
SULFATE	7,960	1,290	12,000	mg/L
IRON	0.043	0.053	0.044	mg/L
CALCIUM	211	46	142	mg/L
MAGNESIUM	29	< 0.1	148	mg/L
POTASSIUM	15.0	15.0	12.5	mg/L
SODIUM	3,770	988	6,152	mg/L
CATION/ANION DIFFERENCE	0.06	0.04	0	%

TABLE 3
XTO ENERGY INC. GROUNDWATER LAB RESULTS

P.O. PIPKEN #3E- DEHYDRATOR PIT
UNIT I, SEC. 17, T27N, R10W

Revised Date: January 26, 2007
Sample Date: June 28, 2000

PARAMETERS	MW #1R	MW 2R	MW #3	MW #4	MW #5	UNITS
LAB Ph	7.79	7.44	7.84	7.95	7.93	s.u.
LAB CONDUCTIVITY @ 25 C	17,000	6,720	19,600	8,030	7,540	umhos/cm
TOTAL DISSOLVED SOLIDS @ 180 C	8,340	3,350	9,700	4,000	3,760	mg/L
TOTAL DISSOLVED SOLIDS (Calc)	8,270	3,330	9,630	3,980	3,700	mg/L
SODIUM ABSORPTION RATIO	95.1	39.6	80.6	46.7	44.7	ratio
TOTAL ALKALINITY AS CaCO ₃	512	788	1,020	484	452	mg/L
TOTAL HARDNESS AS CaCO ₃	148	148	284	138	130	mg/L
BICARBONATE AS HCO ₃	512	788	1,020	484	452	mg/L
CARBONATE AS CO ₃	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	mg/L
HYDROXIDE AS OH	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	mg/L
NITRATE NITROGEN	0.2	0.1	0.3	2.3	< 0.1	mg/L
NITRITE NITROGEN	0.003	< 0.001	0.002	0.017	< 0.001	mg/L
CHLORIDE	124	44	588	46	18	mg/L
FLUORIDE	7.05	4.55	7.4	4.45	4.4	mg/L
PHOSPHATE	3.3	0.2	2	0.5	0.5	mg/L
SULFATE	5,110	1,680	5,190	2,320	2,180	mg/L
IRON	0.021	0.028	0.07	0.021	0.014	mg/L
CALCIUM	46.4	47.2	88	50.4	49.6	mg/L
MAGNESIUM	7.81	4.88	15.6	2.93	1.46	mg/L
POTASSIUM	1.9	3.9	2.1	2.0	2.1	mg/L
SODIUM	2,660	1,070	3,120	1,260	1,170	mg/L
CATION/ANION DIFFERENCE	0.04	0.04	0.26	0.35	0.03	%

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.

XTO ENERGY, INC.

P.O. PIPKIN # 3E

NE/4 SE/4 SEC. 17, T27N, R10W, N.M.P.M.

SAN JUAN COUNTY, NEW MEXICO

BLAGG ENGINEERING, INC.

CONSULTING PETROLEUM / RECLAMATION SERVICES

P.O. BOX 87

BLOOMFIELD, NEW MEXICO 87413

PHONE: (505) 632-1199

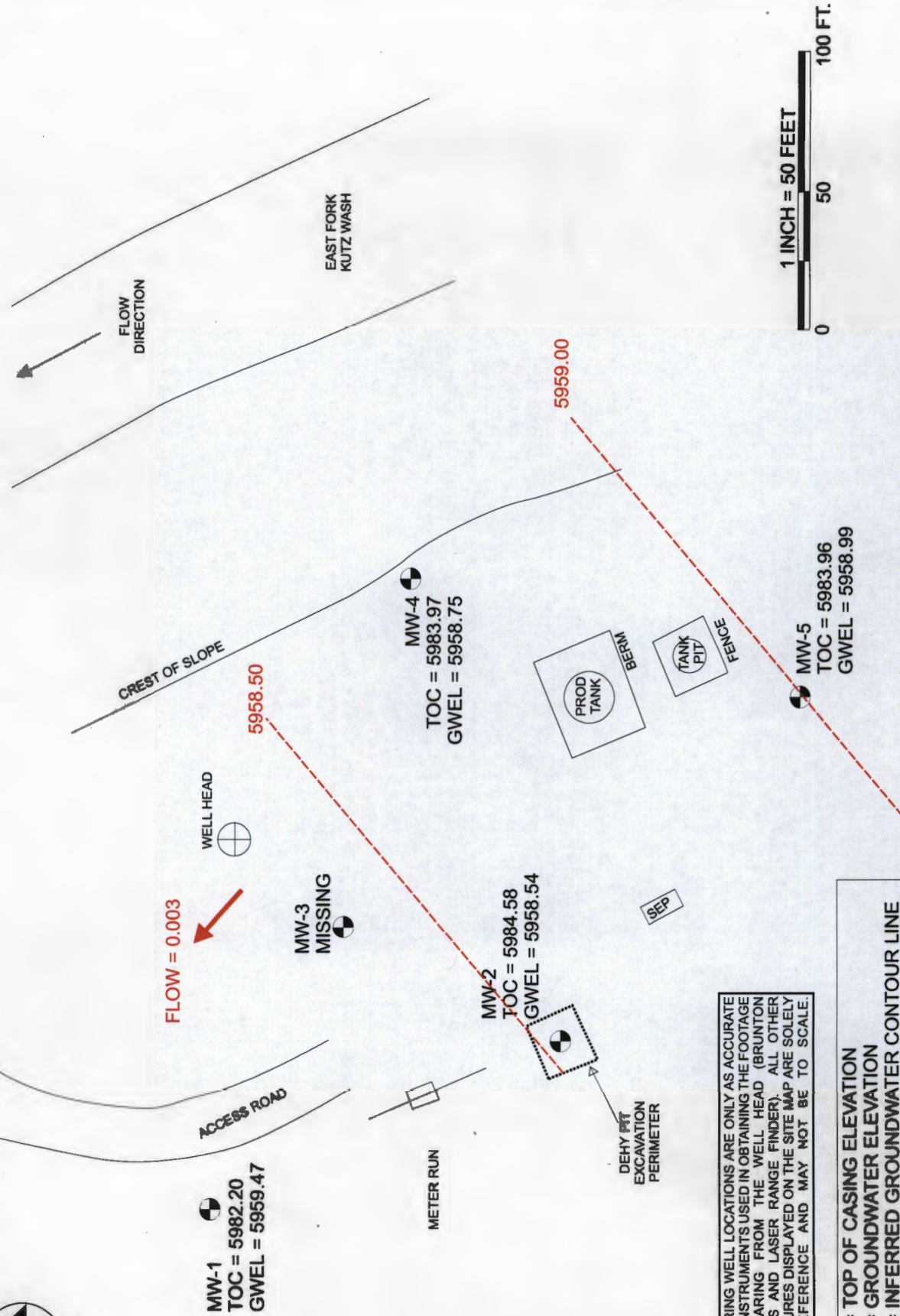
PROJECT: MW INSTALL.

REVISÉD BY: NJV

FILENAME: P.O. PIPKIN 3E-SM.SKF

SITE MAP

06/90



MONITORING 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 MAY NOT BE TO SCALE.

TOC = TOP OF CASING ELEVATION
GWEL = GROUNDWATER ELEVATION
--- = INFERRED GROUNDWATER CONTOUR LINE

Lodestar Services, Inc
PO Box 3861
Farmington, NM 87499

PO PIPKEN #3E
NE 1/4 SE 1/4 SEC. 17, T27N, R10W
SAN JUAN COUNTY, NEW MEXICO

PROJECT: XTO GROUND WATER
DRAWN BY: ALA
REVISED: 01/05/07

FIGURE 2
GROUNDWATER GRADIENT MAP
10/19/2006

FIGURE 3

BLAGG ENGINEERING, Inc.

P.O. BOX 87

BLOOMFIELD, NM 87413

(505) 632-1199

BORE / TEST HOLE REPORT

CLIENT: **CROSS TIMBERS OIL COMPANY**
 LOCATION NAME: **PIPKIN P.O. # 3E - DEHY. PIT, UNIT I, SEC. 17, T27N, R10W**
 CONTRACTOR: **BLAGG ENGINEERING, INC.**
 EQUIPMENT USED: **MOBILE DRILL RIG (EARTHPROBE)**
 BORING LOCATION: **186 FT., N86W FEET FROM WELL HEAD.**

BORING #..... **BH - 1**
 MW #..... **1**
 PAGE #..... **2**
 DATE STARTED **12/14/99**
 DATE FINISHED **12/14/99**
 OPERATOR..... **REP**
 PREPARED BY **NJV**

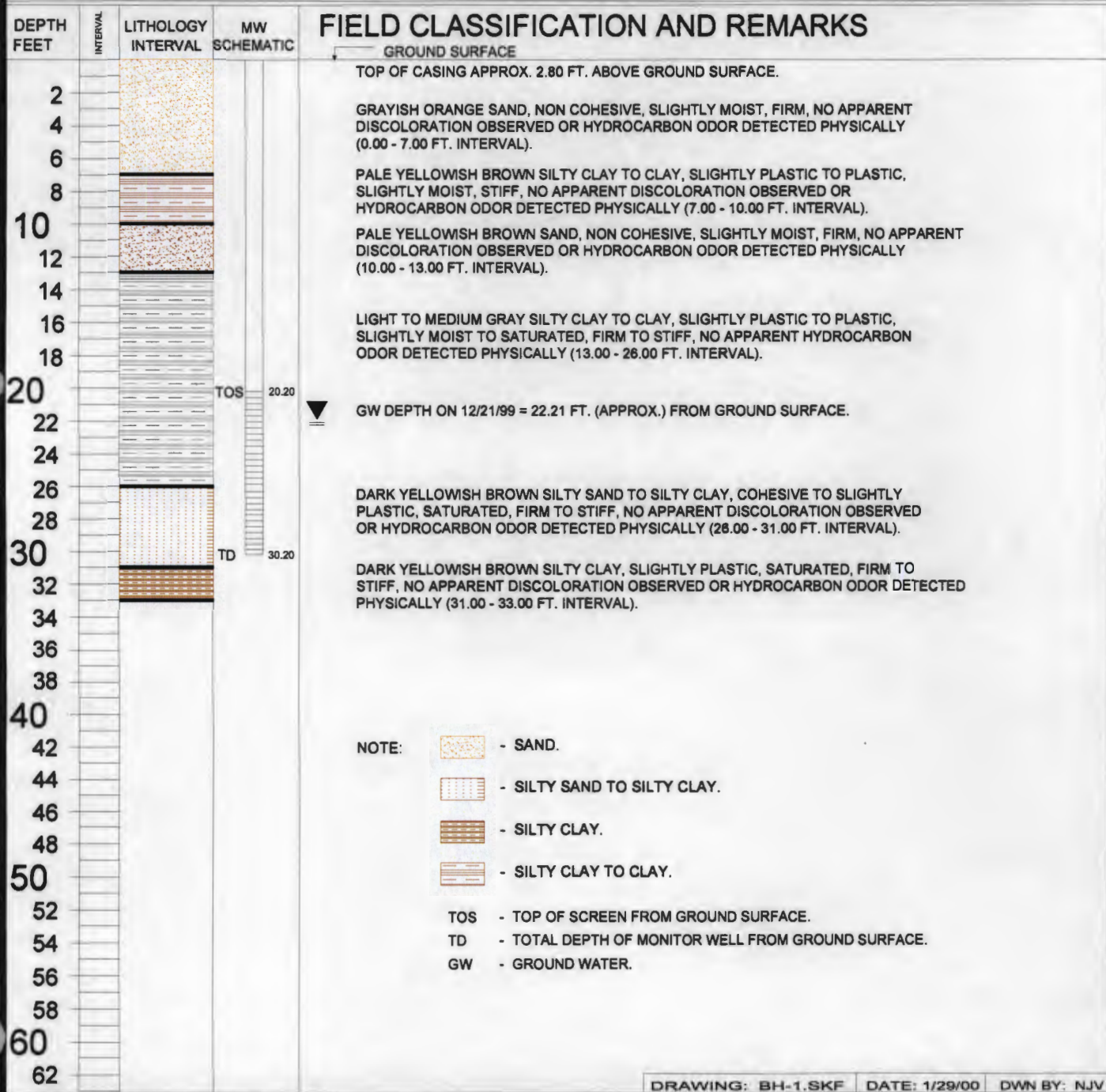


FIGURE 4

BLAGG ENGINEERING, Inc.

P.O. BOX 87
BLOOMFIELD, NM 87413
(505) 632-1199

BORE / TEST HOLE REPORT

CLIENT: CROSS TIMBERS OIL COMPANY
LOCATION NAME: PIPKIN P.O. # 3E - DEHY. PIT, UNIT I, SEC. 17, T27N, R10W
CONTRACTOR: BLAGG ENGINEERING, INC.
EQUIPMENT USED: MOBILE DRILL RIG (EARTHPROBE)
BORING LOCATION: 141 FT., S32W FEET FROM WELL HEAD.

BORING #..... BH - 2
MW #..... 2
PAGE #..... 3
DATE STARTED 12/17/99
DATE FINISHED 12/17/99
OPERATOR..... REP
PREPARED BY NJV

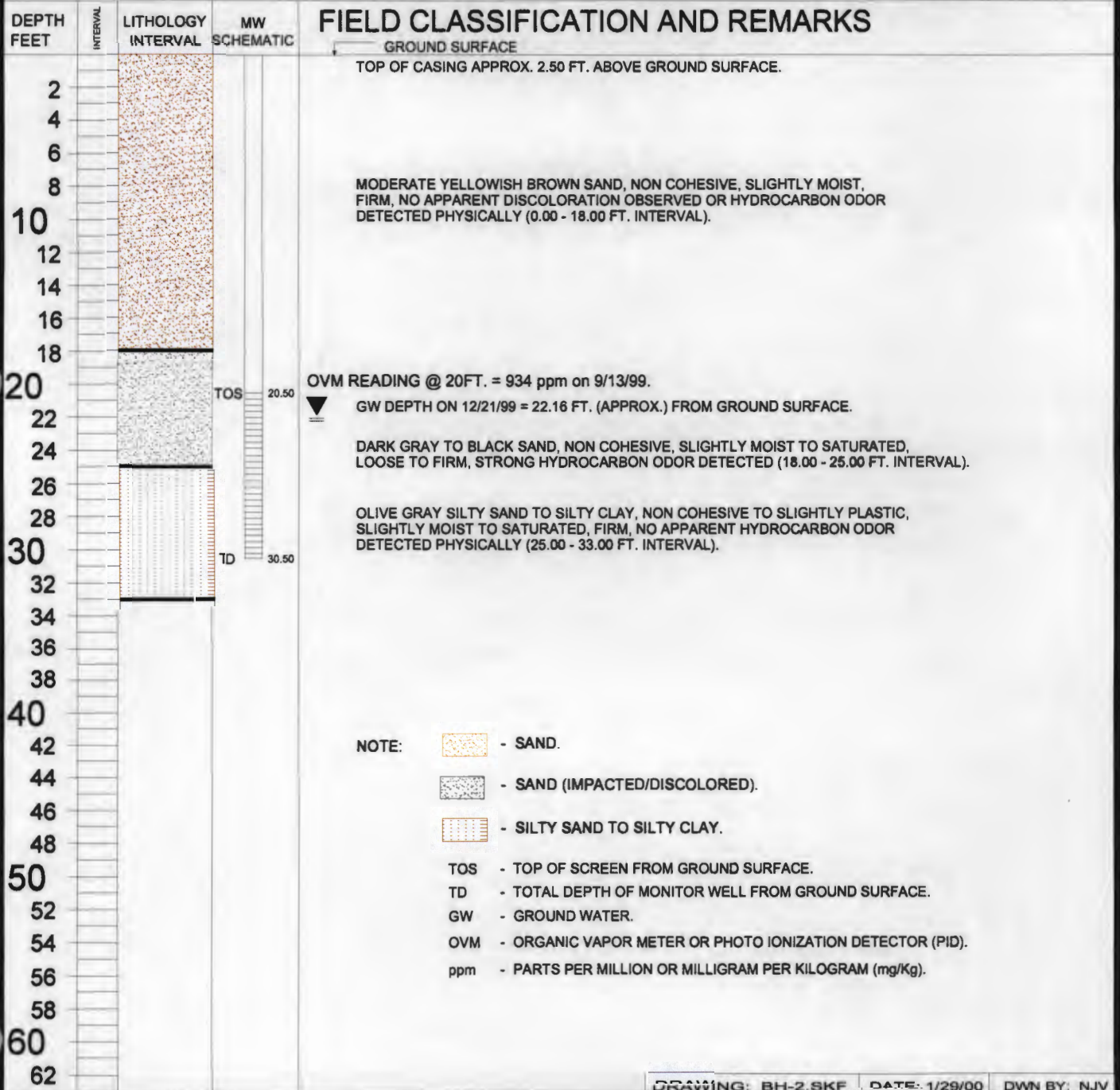


FIGURE 5

BLAGG ENGINEERING, Inc.

P.O. BOX 87
BLOOMFIELD, NM 87413

(505) 632-1199

BORE / TEST HOLE REPORT

CLIENT: **CROSS TIMBERS OIL COMPANY**
LOCATION NAME: **PIPKIN P.O. #3E - DEHY. PIT, UNIT I, SEC. 17, T27N, R10W**
CONTRACTOR: **BLAGG ENGINEERING, INC.**
EQUIPMENT USED: **MOBILE DRILL RIG (EARTHPROBE)**
BORING LOCATION: **50.5 FT., S37W FEET FROM WELL HEAD.**

BORING #..... **BH - 3**
MW #..... **3**
PAGE #..... **4**
DATE STARTED **12/17/99**
DATE FINISHED **12/17/99**
OPERATOR..... **REP**
PREPARED BY **NJV**

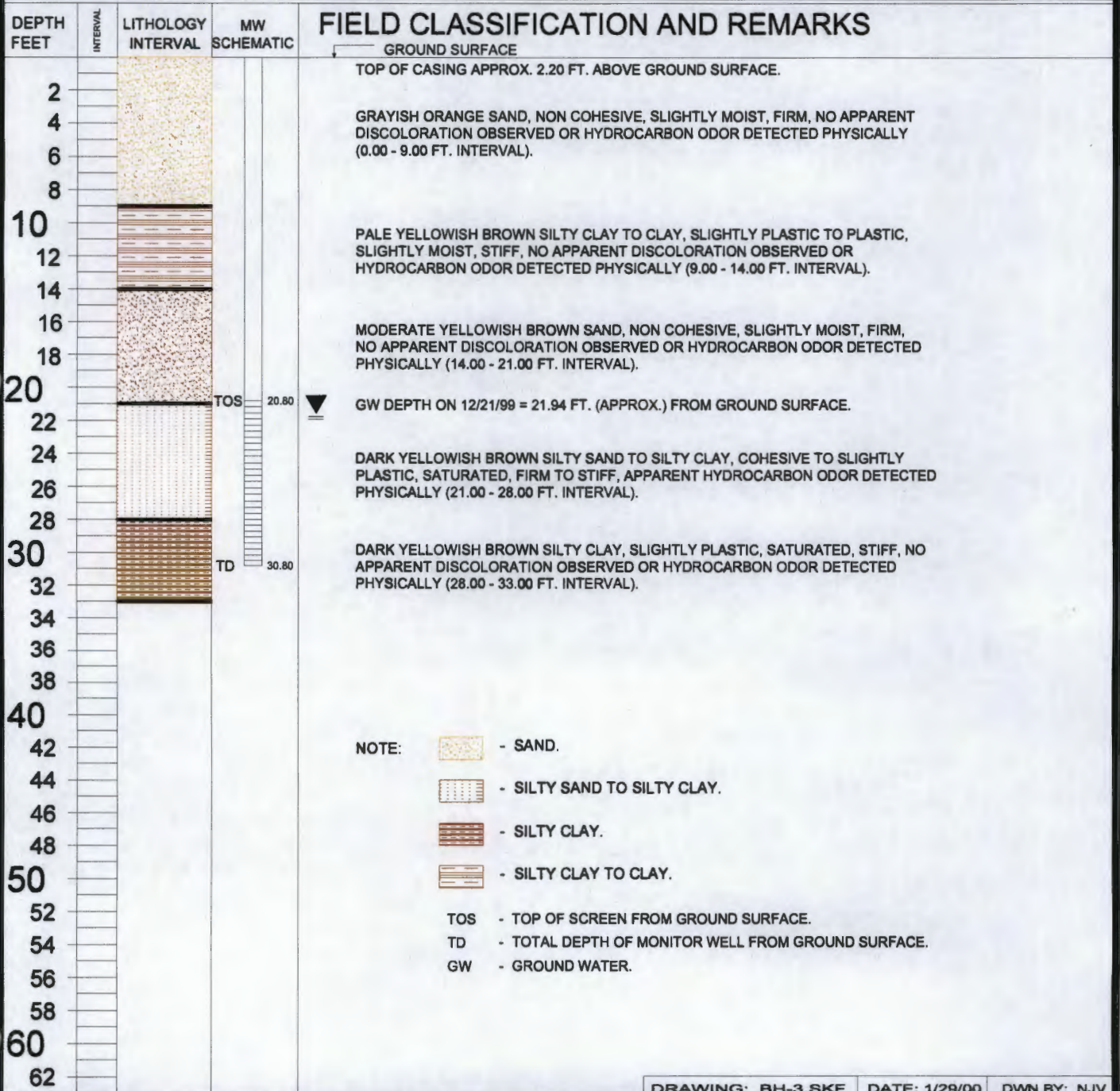


FIGURE 6

BLAGG ENGINEERING, Inc.

P.O. BOX 87

BLOOMFIELD, NM 87413

(505) 632-1199

BORE / TEST HOLE REPORT

CLIENT:

LOCATION NAME:

CONTRACTOR:

EQUIPMENT USED:

BORING LOCATION:

CROSS TIMBERS OIL COMPANY

PIPKIN P.O. # 3E - DEHY. PIT, UNIT I, SEC. 17, T27N, R10W

BLAGG ENGINEERING, INC.

MOBILE DRILL RIG (EARTHPROBE)

116 FT., S56.5E FEET FROM WELL HEAD.

BORING #..... **BH - 4**

MW #..... **4**

PAGE #..... **5**

DATE STARTED **06/23/00**

DATE FINISHED **06/23/00**

OPERATOR..... **JCB**

PREPARED BY **NJV**



FIGURE 7

BLAGG ENGINEERING, Inc.

P.O. BOX 87

BLOOMFIELD, NM 87413

(505) 632-1199

BORE / TEST HOLE REPORT

CLIENT:

LOCATION NAME:

CONTRACTOR:

EQUIPMENT USED:

BORING LOCATION:

CROSS TIMBERS OIL COMPANY

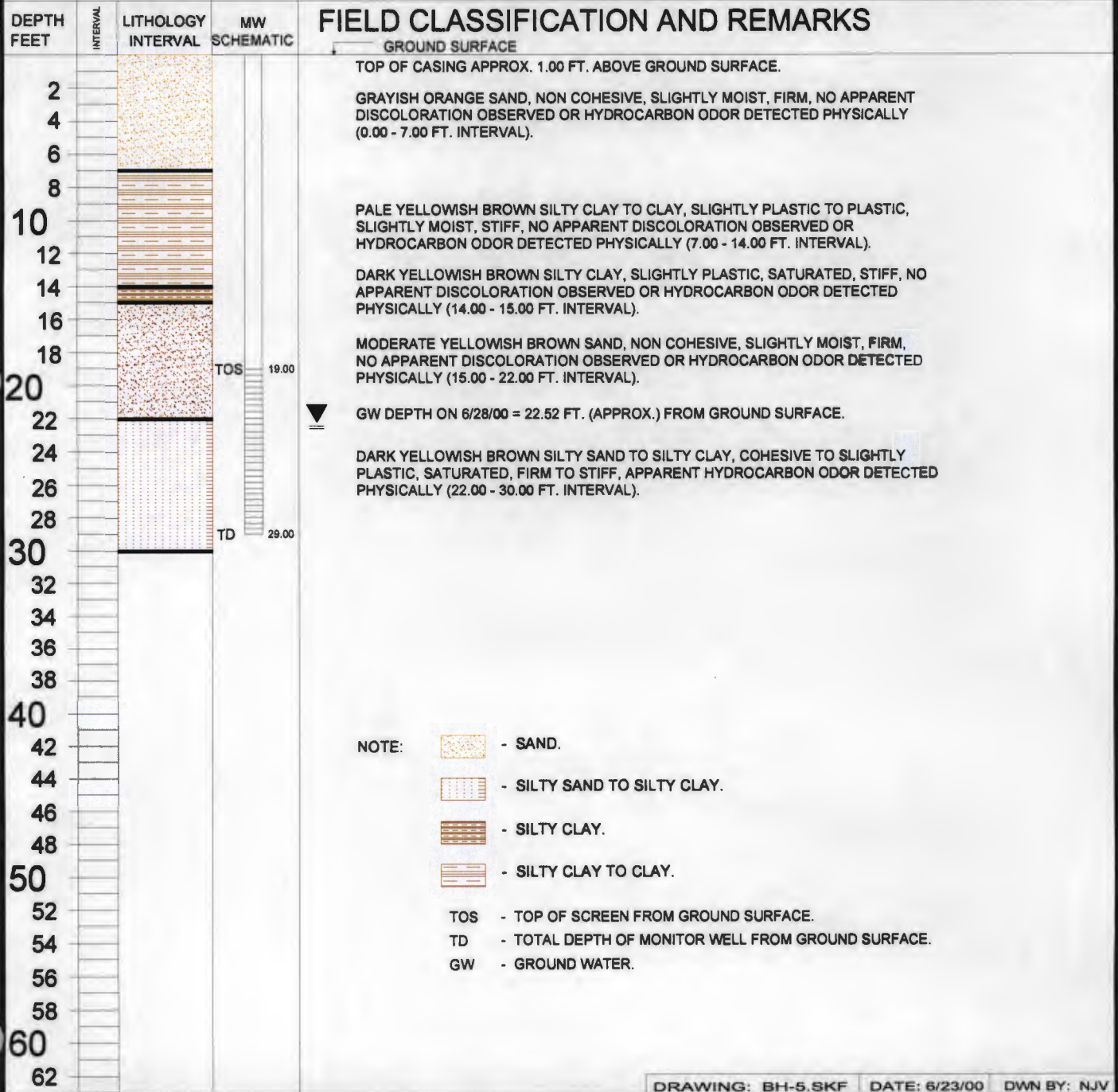
PIPKIN P.O. #3E - DEHY. PIT, UNIT I, SEC. 17, T27N, R10W

BLAGG ENGINEERING, INC.

MOBILE DRILL RIG (EARTHPROBE)

217 FT., S14E FEET FROM WELL HEAD.

BORING #.....	BH - 5
MW #.....	5
PAGE #.....	6
DATE STARTED	06/23/00
DATE FINISHED	06/23/00
OPERATOR.....	JCB
PREPARED BY	NJV



Hall Environmental Analysis Laboratory, Inc.

Date: 26-Oct-06

CLIENT: XTO Energy
Project: XTO Ground Water

Lab Order: 0610236

Lab ID: 0610236-01
Client Sample ID: PO Pipkin 3E MW-2

Collection Date: 10/19/2006 2:21:00 PM

Matrix: AQUEOUS

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
EPA METHOD 8021B: VOLATILES						Analyst: NSB
Benzene	54	1.0		µg/L	1	10/23/2006 1:49:04 PM
Toluene	2.9	1.0		µg/L	1	10/23/2006 1:49:04 PM
Ethylbenzene	5.6	1.0		µg/L	1	10/23/2006 1:49:04 PM
Xylenes, Total	50	3.0		µg/L	1	10/23/2006 1:49:04 PM
Surr: 4-Bromofluorobenzene	95.9	72.2-125		%REC	1	10/23/2006 1:49:04 PM

Lab ID: 0610236-02
~~Client Sample ID: Snyder Gas Com 1A MW 1~~

Collection Date: 10/19/2006 12:58:00 PM

Matrix: AQUEOUS

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
EPA METHOD 8021B: VOLATILES						Analyst: NSB
Benzene	2.7	1.0		µg/L	1	10/23/2006 2:19:23 PM
Toluene	9.1	1.0		µg/L	1	10/23/2006 2:19:23 PM
Ethylbenzene	1.1	1.0		µg/L	1	10/23/2006 2:19:23 PM
Xylenes, Total	28	3.0		µg/L	1	10/23/2006 2:19:23 PM
Surr: 4-Bromofluorobenzene	99.5	72.2-125		%REC	1	10/23/2006 2:19:23 PM

Lab ID: 0610236-03
~~Client Sample ID: Snyder Gas Com 1A MW 3~~

Collection Date: 10/19/2006 12:45:00 PM

Matrix: AQUEOUS

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
EPA METHOD 8021B: VOLATILES						Analyst: NSB
Benzene	82	2.0		µg/L	2	10/24/2006 10:46:24 AM
Toluene	5.5	2.0		µg/L	2	10/24/2006 10:46:24 AM
Ethylbenzene	ND	2.0		µg/L	2	10/24/2006 10:46:24 AM
Xylenes, Total	19	6.0		µg/L	2	10/24/2006 10:46:24 AM
Surr: 4-Bromofluorobenzene	88.9	72.2-125		%REC	2	10/24/2006 10:46:24 AM

Qualifiers:

- * Value exceeds Maximum Contaminant Level
- E Value above quantitation range
- J Analyte detected below quantitation limits
- ND Not Detected at the Reporting Limit
- S Spike recovery outside accepted recovery limits

B Analyte detected in the associated Method Blank

H Holding times for preparation or analysis exceeded

MCL Maximum Contaminant Level

RL Reporting Limit

QA/QC SUMMARY REPORT

Client: XTO Energy
Project: XTO Ground Water

Work Order: 0610236

Analyte	Result	Units	PQL	%Rec	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Method: SW8021									
Sample ID: 5ML RB		MBLK			Batch ID: R21131		Analysis Date: 10/23/2006 9:04:00 AM		
Benzene	ND	µg/L	1.0						
Toluene	ND	µg/L	1.0						
Ethylbenzene	ND	µg/L	1.0						
Xylenes, Total	ND	µg/L	3.0						
Sample ID: 5ML RB		MBLK			Batch ID: R21155		Analysis Date: 10/24/2006 8:46:50 AM		
Benzene	ND	µg/L	1.0						
Toluene	ND	µg/L	1.0						
Ethylbenzene	ND	µg/L	1.0						
Xylenes, Total	ND	µg/L	3.0						
Sample ID: 100NG BTEX LCS		LCS			Batch ID: R21131		Analysis Date: 10/23/2006 6:54:04 PM		
Benzene	20.64	µg/L	1.0	103	85	115			
Toluene	20.86	µg/L	1.0	104	85	118			
Ethylbenzene	20.75	µg/L	1.0	104	85	116			
Xylenes, Total	43.17	µg/L	3.0	108	85	119			
Sample ID: 100NG BTEX LCS		LCS			Batch ID: R21155		Analysis Date: 10/24/2006 6:01:40 PM		
Benzene	20.39	µg/L	1.0	102	85	115			
Toluene	20.73	µg/L	1.0	104	85	118			
Ethylbenzene	20.80	µg/L	1.0	104	85	116			
Xylenes, Total	42.15	µg/L	3.0	105	85	119			
Sample ID: 100NG BTEX LCSD		LCSD			Batch ID: R21131		Analysis Date: 10/23/2006 7:24:33 PM		
Benzene	19.92	µg/L	1.0	99.6	85	115	3.53	27	
Toluene	20.05	µg/L	1.0	100	85	118	3.98	19	
Ethylbenzene	20.09	µg/L	1.0	100	85	116	3.21	10	
Xylenes, Total	41.06	µg/L	3.0	103	85	119	5.00	13	

Qualifiers:

E Value above quantitation range
J Analyte detected below quantitation limits
R RPD outside accepted recovery limits

H Holding times for preparation or analysis exceeded
ND Not Detected at the Reporting Limit
S Spike recovery outside accepted recovery limits

Hall Environmental Analysis Laboratory, Inc.

Sample Receipt Checklist

Client Name XTO ENERGY

Date and Time Received:

10/20/2006

Work Order Number 0610236

Received by AT

Checklist completed by

Signature

Date

Matrix

Carrier name Greyhound

Shipping container/cooler in good condition?

Yes ☒

No ☐

Not Present ☐

Custody seals intact on shipping container/cooler?

Yes ☒

No ☐

Not Present ☐

Not Shipped ☐

Custody seals intact on sample bottles?

Yes ☐

No ☐

N/A ☒

Chain of custody present?

Yes ☒

No ☐

Chain of custody signed when relinquished and received?

Yes ☒

No ☐

Chain of custody agrees with sample labels?

Yes ☒

No ☐

Samples in proper container/bottle?

Yes ☒

No ☐

Sample containers intact?

Yes ☒

No ☐

Sufficient sample volume for indicated test?

Yes ☒

No ☐

All samples received within holding time?

Yes ☒

No ☐

Water - VOA vials have zero headspace?

No VOA vials submitted ☐

Yes ☒

No ☐

Water - pH acceptable upon receipt?

Yes ☐

No ☐

N/A ☒

Container/Temp Blank temperature?

1°

4° C ± 2 Acceptable

If given sufficient time to cool.

COMMENTS:

Client contacted

Date contacted:

Person contacted

Contacted by:

Regarding

Comments:

Corrective Action

