3R-381

Ground Water Remediation Report

DATE:
Apr 2008

BLAGG ENGINEERING, INC.
P.O. Box 87, Bloomfield, New Mexico 87413

3R 381
COPY

April 25, 2008

Mr. Glenn von Gonten, Senior Hydrologist
New Mexico Oil Conservation Division-NMOCD
Environmental Bureau
1220 St. Francis Drive
Santa Fe, New Mexico 87505

Re: BP America Production Company
Groundwater Monitoring Report
GCU # 170, Unit K, Sec. 35, T29N, R12W, NMPM
San Juan County, New Mexico

NMOCD Administrative/Environmental Order #: 3RP-381-0

Dear Mr. von Gonten:

BP America Production Company (**BP**) has retained Blagg Engineering, Inc. (**BEI**) to conduct environmental monitoring of groundwater at the GCU # 170.

The last formal correspondence to NMOCD was conducted with a letter dated February 15, 2006. Since then, BP has followed its NMOCD approved groundwater management plan and continues to monitor the site. No permanent closure is requested at this time.

If you have any questions concerning the enclosed documentation, please contact either myself or Jeffrey C. Blagg at (505) 632-1199. Thank you for your cooperation and assistance.

Respectfully submitted:
Blagg Engineering, Inc.

Nelson J. Velez
Staff Geologist

Attachment: Groundwater Report (2 copies)

cc: Mr. Brandon Powell, Environmental Specialist, NMOCD District III Office, Aztec, NM
Mr. Larry Schlotterback, Environmental Coordinator, BP, Farmington, NM (without lab report)
Ms. Shannon Hoover, Senior Geologist, URS Corp., Austin, Texas

NJV/njv GCU 170 04-25-08 CVL.DOC

3R 381

BP AMERICA PRODUCTION CO.

COPY

GROUNDWATER REMEDIATION REPORT

GCU #170
(K) SECTION 35, T29N, R12W, NMPM
SAN JUAN COUNTY, NEW MEXICO

PREPARED FOR:
NEW MEXICO OIL CONSERVATION DIVISION
1220 ST. FRANCIS DRIVE
SANTA FE, NEW MEXICO 87504

APRIL 2008

PREPARED BY:
BLAGG ENGINEERING, INC.

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

BP AMERICA PRODUCTION COMPANY
GCU # 170 - Separator Pit
NE/4 SW/4, Sec. 35, T29N, R12W

Monitor Well Sampling Dates: **6/29/06, 6/25/07**

Site Historic Summary:

A site separator pit closure was initiated in March 1995 by removing impacted soil via excavation. Documentation for this work and subsequent groundwater monitoring data for the site have previously been submitted for New Mexico Oil Conservation Division (**NMOCD**) review. The reporting herein is for site monitoring for 2006 and 2007. Site features are depicted on Figure 1.

Groundwater Monitor Well Sampling Procedures:

Prior to sample collections, MW #3R was purged approximately three (3) well bore volumes with new disposable bailers. The groundwater samples were collected following US EPA: SW-846 protocol, were placed into laboratory supplied containers with appropriate preservative, and stored in an ice chest for express delivery to an analytical laboratory for testing under strict chain-of-custody procedures. Analytical testing included benzene, toluene, ethylbenzene, and total xylenes (**BTEX**) by US EPA Method 8021B.

Fluids generated during monitor well development and purging were managed by discarding into the separator tank pit located on the well site. The tank pit contents are then disposed through approved NMOCD operational procedures for removal of produced fluids.

Groundwater Quality & Flow Direction Information:

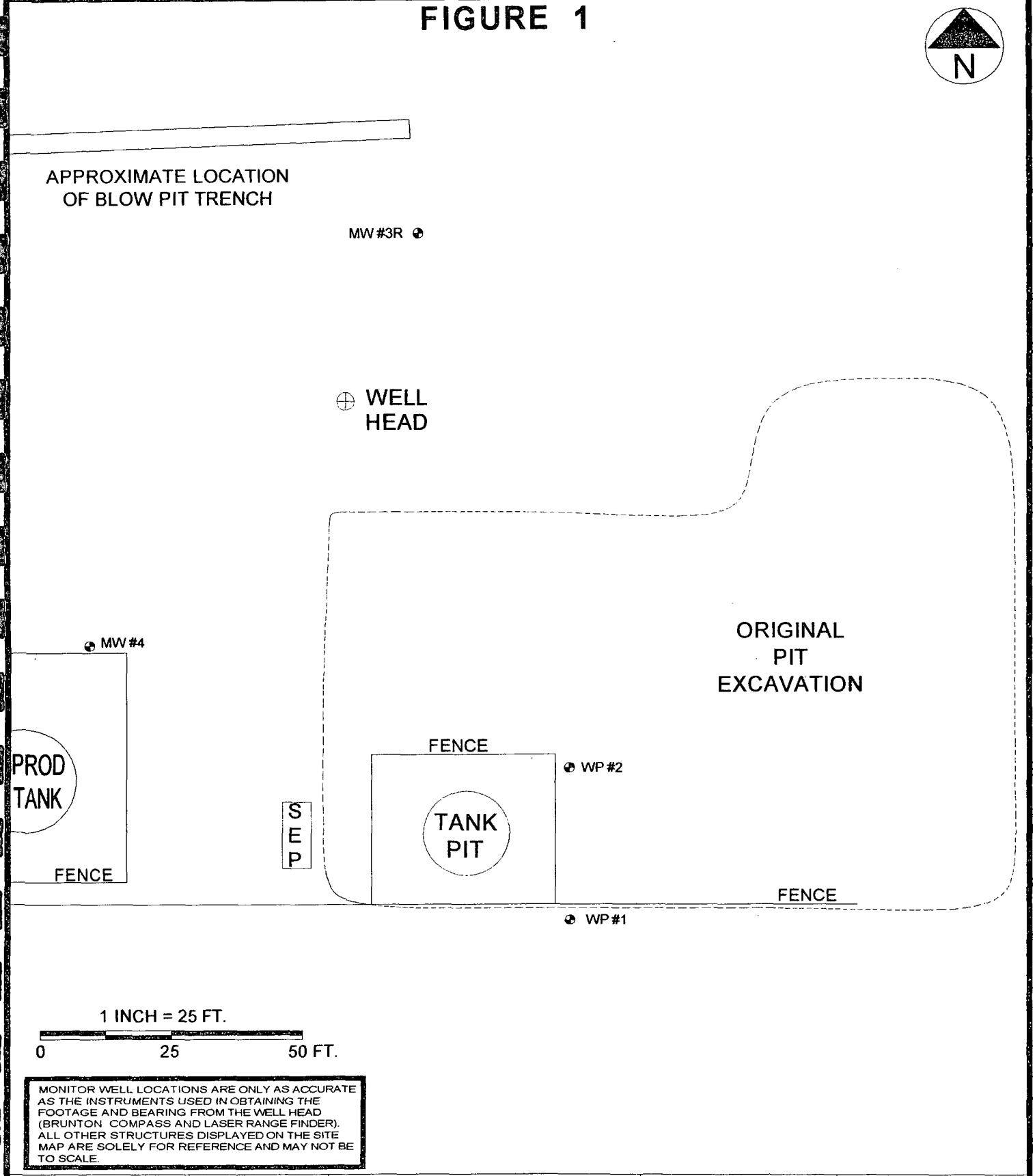
Annual sampling of groundwater monitor well MW #3R was conducted in June 2006 and June 2007. A historical summary of laboratory analytical results is included within the tables on the following pages and field/laboratory reports are included.

Groundwater elevations have consistently been measured with a gradient towards the northwest direction (Figures 2 and 3).

Summary and/or Recommendations:

Continued site monitoring per BP's NMOCD approved Ground Water Management Plan is recommended. Hydrocarbon impacts appear to be in a steady state condition with benzene as the only analyte with concentrations above the New Mexico Water Quality Control Commission (**NMWQCC**) groundwater standards. No additional remedial actions are indicated or suggested at this time. Further delineation of down-gradient impacts is indicated with one (1) or more additional monitor wells proposed to address this issue.

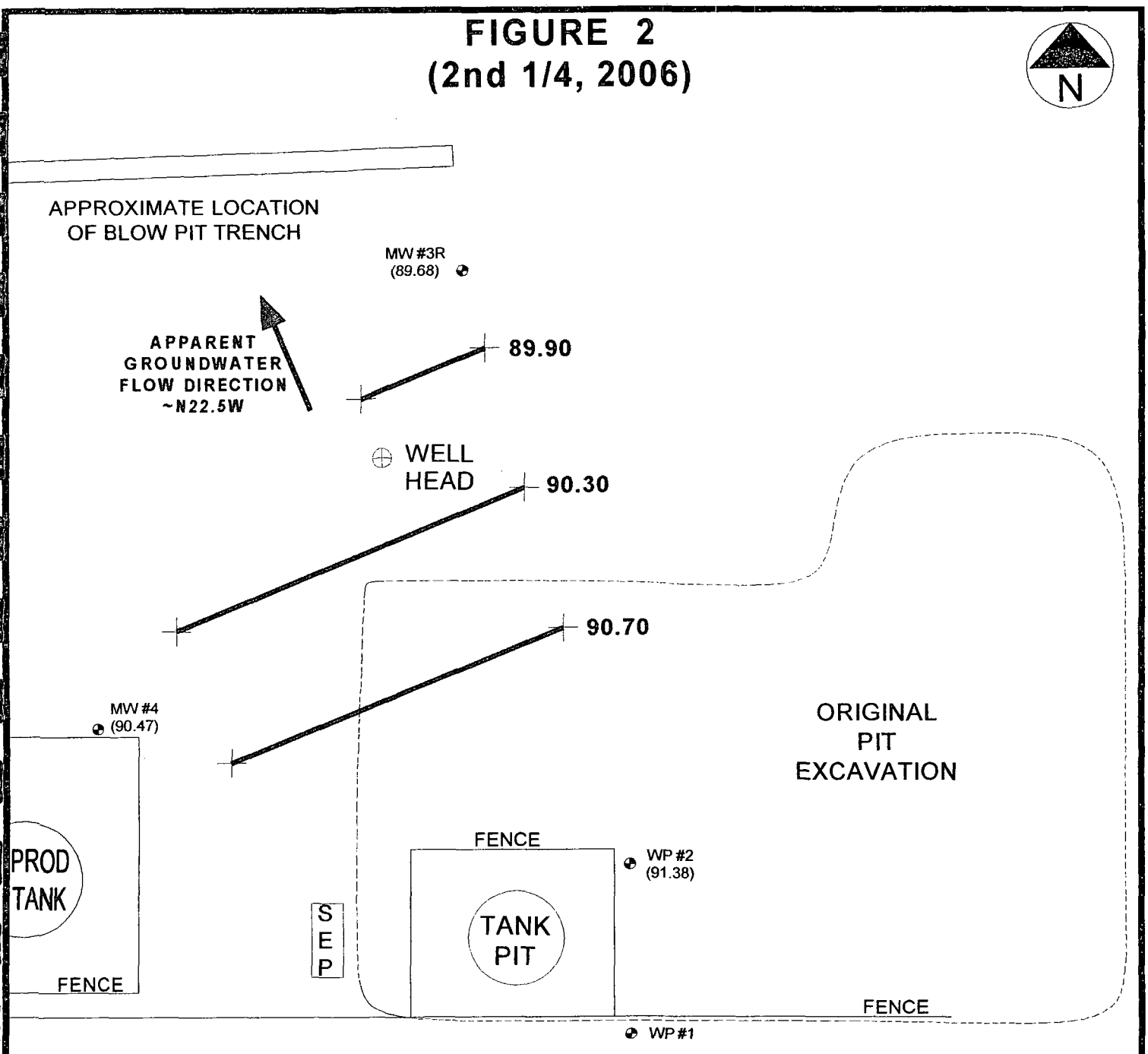
FIGURE 1



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 MAY NOT BE TO SCALE.

BP AMERICA PRODUCTION COMPANY GCU 170 NE/4 SW/4 SEC. 35, T29N, R12W 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 SAMPLING DRAWN BY: NJV FILENAME: GCU170-SM-06-06.SKF REVISED: 06/29/06 NJV	SITE MAP 06/06

FIGURE 2
(2nd 1/4, 2006)



1 INCH = 25 FT.

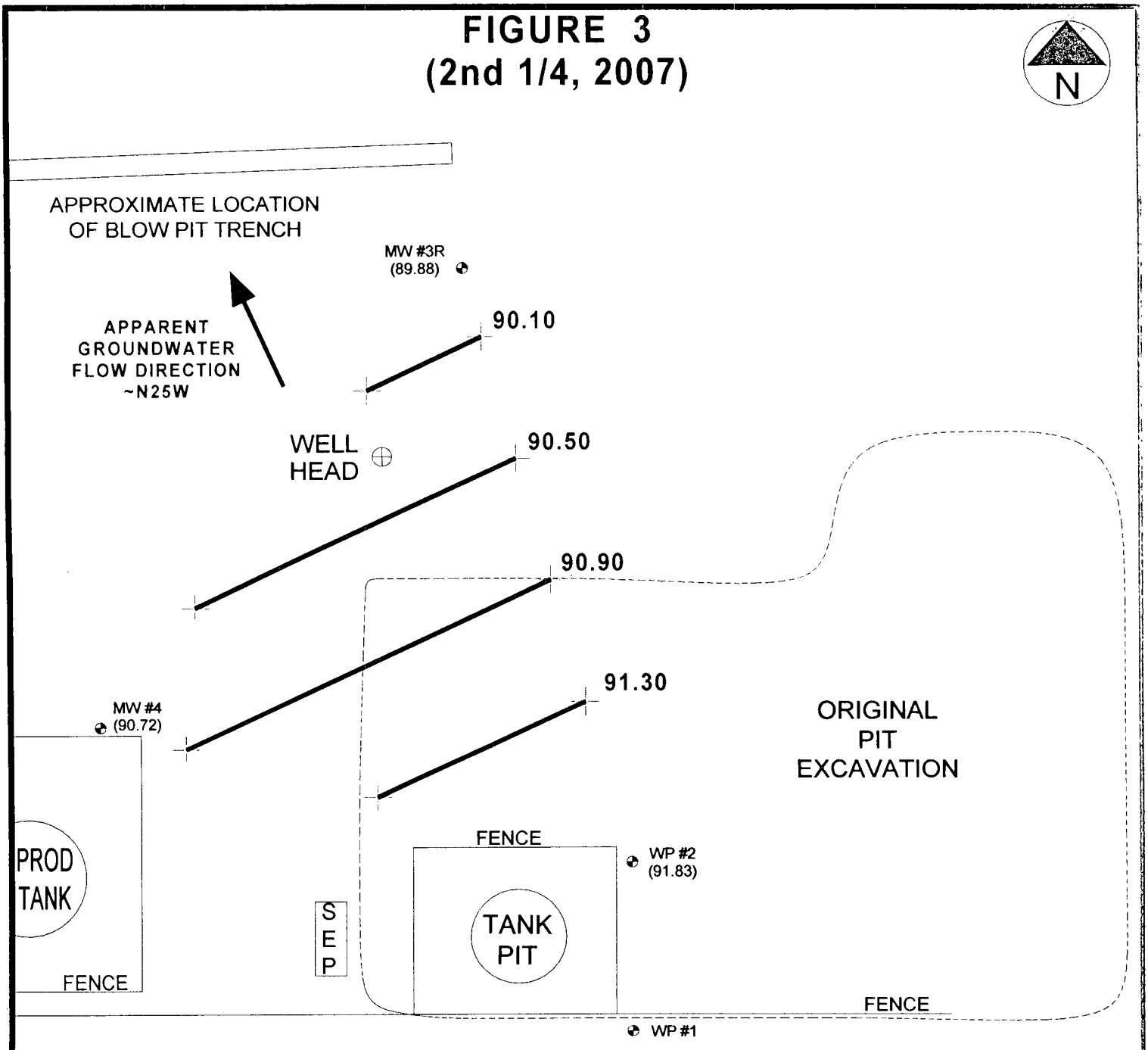
0 25 50 FT.

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 MAY NOT BE TO SCALE.

	Top of Well Elevation
WP #2	(100.80)
MW #3R	(99.59)
MW #4	(101.14)
MW #4 (90.47)	Groundwater Elevation as of 6/29/06.

BP AMERICA PRODUCTION COMPANY GCU 170 NE/4 SW/4 SEC. 35, T29N, R12W 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 SAMPLING DRAWN BY: NJV FILENAME: 06-29-06-GW.SKF REVISED: 12/06/05 NJV	GROUNDWATER CONTOUR MAP 06/06

FIGURE 3
(2nd 1/4, 2007)



1 INCH = 25 FT.

0 25 50 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 MAY NOT BE TO SCALE.

	Top of Well Elevation
WP #2	(100.80)
MW #3R	(99.59)
MW #4	(101.14)
MW #4 (90.72)	Groundwater Elevation as of 6/25/07.

BP AMERICA PRODUCTION COMPANY GCU # 170 NE/4 SW/4 SEC. 35, T29N, R12W 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 SAMPLING DRAWN BY: NJV FILENAME: 06-25-07-GW.SKF REVISED: 06/25/07 NJV	GROUNDWATER CONTOUR MAP 06/07

BLAGG ENGINEERING, INC.

MONITOR WELL DEVELOPMENT & / OR SAMPLING DATA

CLIENT : BP AMERICA PROD. CO.

CHAIN-OF-CUSTODY # : N / A

GCU # 170 - SEPARATOR PIT
UNIT K, SEC. 35, T29N, R12W

LABORATORY (S) USED : HALL ENVIRONMENTAL

Date : **June 29, 2006**

SAMPLER : N J V

Filename : **06-29-06.WK4**

PROJECT MANAGER : N J V

WELL #	WELL ELEV. (ft)	WATER ELEV. (ft)	DEPTH TO WATER (ft)	TOTAL DEPTH (ft)	SAMPLING TIME	pH	CONDUCT (umhos)	TEMP. (celcius)	VOLUME PURGED (gal.)
WP-2	100.80	91.38	9.42	15.00	-	-	-	-	-
MW-3R	99.59	89.68	9.91	19.50	1255	6.92	1,900	24.5	4.75
MW-4	101.14	90.47	10.67	18.50	-	-	-	-	-
					INSTRUMENT CALIBRATIONS =	7.00	2,800		
					DATE & TIME =	06/26/06	0630		

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

Comments or note well diameter if not standard 2 ".

Poor / fair recovery in MW # 3R . Collected BTEX sample from MW # 3R only .

Hall Environmental Analysis Laboratory, Inc.

Date: *12-Jul-06*

CLIENT:	Blagg Engineering	**Client Sample ID:**	MW #3R
Lab Order:	0606375	**Collection Date:**	6/29/2006 12:55:00 PM
Project:	GCU #170	**Date Received:**	6/30/2006
Lab ID:	0606375-01	**Matrix:**	AQUEOUS

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
EPA METHOD 8021B: VOLATILES						Analyst: **NSB**
Benzene	130	5.0		µg/L	5	7/11/2006 1:20:17 PM
Toluene	39	1.0		µg/L	1	7/10/2006 5:10:06 PM
Ethylbenzene	8.3	1.0		µg/L	1	7/10/2006 5:10:06 PM
Xylenes, Total	150	15		µg/L	5	7/11/2006 1:20:17 PM
Surr: 4-Bromofluorobenzene	112	72.2-125		%REC	1	7/10/2006 5:10:06 PM

Qualifiers:

*	Value exceeds Maximum Contaminant Level	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Reporting Limit
S	Spike Recovery outside accepted recovery limits		

CHAIN-OF-CUSTODY RECORD

Accreditation Applied:
NELAC ☐ USACE ☐
Other: _____

HALL ENVIRONMENTAL ANALYSIS LABORATORY
4901 Hawkins NE, Suite D
Albuquerque, New Mexico 87109
Tel. 505.345.3975 Fax 505.345.4107
www.hallenvironmental.com

Client: BLAGG ENGR. / BP AMERICA
Project Name: GCU #170
Address: P.O. BOX 87 BLFD. NM 87413
Project #: NV
Project Manager: NV
Phone #: 632-1199
Sampler: NV
Fax #:
Sample Temperature: 6°

ANALYSIS REQUEST

Date	Time	Matrix	Sample I.D. No.	Number/Volume	Preservative $HgCl_2$	Preservative HNO_3	HEAL No.	(BTEX) + MTBE + TMB's (8021B)	BTEX + MTBE + TPH (Gasoline Only)	TPH Method 8015B (Gas/Diesel)	TPH (Method 418.1)	EDB (Method 504.1)	EDC (Method 8021)	8310 (PNA or PAH)	RCRA 8 Metals	Anions (F, Cl, NO_3, NO_2, PO_4, SO_4)	8081 Pesticides / PCB's (8082)	8260B (VOA)	8270 (Semi-VOA)				Air Bubbles or Headspace (Y or N)
6/29/06	1255	WATER	MW #3R	2-40ml	✓		0606355-1	✓															

Date: 6/30/06 Time: Relinquished By: (Signature) Received By: (Signature) 6/30/06 1653 Remarks:
Date: Time: Relinquished By: (Signature) Received By: (Signature)

QA/QC SUMMARY REPORT

Client: Blagg Engineering
Project: GCU #170 **Work Order:** 0606375

Analyte	Result	Units	PQL	%Rec	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Method: SW8021									
Sample ID: 5ML RB		*MBLK*			Batch ID:	**R19846**	Analysis Date:	7/10/2006 8:44:37 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:	**R19868**	Analysis Date:	7/11/2006 8:11:30 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:	**R19846**	Analysis Date:	7/10/2006 1:14:32 PM	
Benzene	19.16	µg/L	1.0	95.8	85	115			
Toluene	18.37	µg/L	1.0	90.3	85	118			
Ethylbenzene	19.10	µg/L	1.0	95.5	85	116			
Xylenes, Total	59.24	µg/L	3.0	96.2	85	119			
Sample ID: 100NG BTEX LCS		*LCS*			Batch ID:	**R19868**	Analysis Date:	7/11/2006 7:20:12 PM	
Benzene	18.97	µg/L	1.0	94.8	85	115			
Toluene	17.83	µg/L	1.0	89.1	85	118			
Ethylbenzene	18.23	µg/L	1.0	91.1	85	116			
Xylenes, Total	56.77	µg/L	3.0	93.1	85	119			
Sample ID: 100NG BTEX LCSD		*LCSD*			Batch ID:	**R19846**	Analysis Date:	7/10/2006 6:40:10 PM	
Benzene	19.17	µg/L	1.0	95.9	85	115	0.0730	27	
Toluene	17.96	µg/L	1.0	88.2	85	118	2.27	19	
Ethylbenzene	18.63	µg/L	1.0	93.2	85	116	2.46	10	
Xylenes, Total	59.62	µg/L	3.0	96.8	85	119	0.643	13	
Sample ID: 100NG BTEX LCSD		*LCSD*			Batch ID:	**R19868**	Analysis Date:	7/11/2006 7:49:12 PM	
Benzene	19.72	µg/L	1.0	98.6	85	115	3.88	27	
Toluene	19.09	µg/L	1.0	95.4	85	118	6.84	19	
Ethylbenzene	19.91	µg/L	1.0	99.6	85	116	8.83	10	
Xylenes, Total	61.88	µg/L	3.0	102	85	119	8.61	13	

Qualifiers:

E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Reporting Limit
R	RPD outside accepted recovery limits	S	Spike Recovery outside accepted recovery limits

Hall Environmental Analysis Laboratory, Inc.

Sample Receipt Checklist

Client Name BLAGG | Date and Time Received: 6/30/2006

Work Order Number 0606375 | Received by AT

Checklist completed by _____ (Signature) | 6/30/06 (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?	6°	*4° C ± 2 Acceptable* If given sufficient time to cool.		

COMMENTS:

Client contacted _____ Date contacted: _____ Person contacted _____

Contacted by: _____ Regarding _____

Comments: _____

Corrective Action _____

BLAGG ENGINEERING, INC.

MONITOR WELL DEVELOPMENT & / OR SAMPLING DATA

CLIENT : BP AMERICA PROD. CO.

CHAIN-OF-CUSTODY # : N / A

GCU # 170 - SEPARATOR PIT
UNIT K, SEC. 35, T29N, R12W

LABORATORY (S) USED : HALL ENVIRONMENTAL

Date : June 25, 2007

SAMPLER : N J V

Filename : 06-25-07.WK4

PROJECT MANAGER : N J V

WELL #	WELL ELEV. (ft)	WATER ELEV. (ft)	DEPTH TO WATER (ft)	TOTAL DEPTH (ft)	SAMPLING TIME	pH	CONDUCT (umhos)	TEMP. (celcius)	VOLUME PURGED (gal.)
WP-2	100.80	91.83	8.97	15.00	-	-	-	-	-
MW-3R	99.59	89.88	9.71	19.50	0815	6.76	2,000	15.8	4.75
MW-4	101.14	90.72	10.42	18.50	-	-	-	-	-
					INSTRUMENT CALIBRATIONS =	7.00	2,800		
					DATE & TIME =	06/25/07	0550		

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

Comments or note well diameter if not standard 2 ".

Excellent recovery in MW # 3R . Collected sample from MW # 3R for BTEX analysis only .

Hall Environmental Analysis Laboratory, Inc.

Date: *02-Jul-07*

CLIENT:	Blagg Engineering	**Client Sample ID:**	MW #3R
Lab Order:	0706378	**Collection Date:**	6/25/2007 8:15:00 AM
Project:	GCU #170	**Date Received:**	6/26/2007
Lab ID:	0706378-01	**Matrix:**	AQUEOUS

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
EPA METHOD 8021B: VOLATILES						Analyst: **NSB**
Benzene	270	10		µg/L	10	7/1/2007 7:54:53 AM
Toluene	170	10		µg/L	10	7/1/2007 7:54:53 AM
Ethylbenzene	27	10		µg/L	10	7/1/2007 7:54:53 AM
Xylenes, Total	310	20		µg/L	10	7/1/2007 7:54:53 AM
Surr: 4-Bromofluorobenzene	88.2	70.2-105		%REC	10	7/1/2007 7:54:53 AM

Qualifiers:

*	Value exceeds Maximum Contaminant Level	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	MCL	Maximum Contaminant Level
ND	Not Detected at the Reporting Limit	RL	Reporting Limit
S	Spike recovery outside accepted recovery limits		

CHAIN-OF-CUSTODY RECORD

QA / QC Package:
Std ☐ Level 4 ☐
Other:

HALL ENVIRONMENTAL ANALYSIS LABORATORY
4901 Hawkins NE, Suite D
Albuquerque, New Mexico 87109
Tel. 505.345.3975 Fax 505.345.4107
www.hallenvironmental.com

Client: BLAGG ENGR. / BP AMERICA
Project Name: GCU #170
Address: P.O. BOX 87 BLFD, NM 87413
Project #:
Project Manager: NV
Phone #: 632-1199
Sampler: NV
Fax #:
Sample Temperature: 8

Date	Time	Matrix	Sample I.D. No.	Number/Volume	Preservative $HgCl_2$	Preservative HNO_3	HEAL No.
6/25/07	0815	WATER	MW #3R	2-40ml	✓		0706378 1

ANALYSIS REQUEST

(BTEX + MTBE + TMB's (8021B))	BTEX + MTBE + TPH (Gasoline Only)	TPH Method 8015B (Gas/Diesel)	TPH (Method 418.1)	EDB (Method 504.1)	EDC (Method 8021)	8310 (PNA or PAH)	RCRA 8 Metals	Anions (F, Cl, NO_3, NO_2, PO_4, SO_4)	8081 Pesticides / PCB's (8082)	8260B (VOA)	8270 (Semi-VOA)					Air Bubbles or Headspace (Y or N)
✓																

Date:	Time:	Relinquished By: (Signature)	Received By: (Signature)
6/25/07	1515		13:55 6/26/07
Date:	Time:	Relinquished By: (Signature)	Received By: (Signature)

Remarks:

QA/QC SUMMARY REPORT

Client: Blagg Engineering
Project: GCU #170
Work Order: 0706378

Analyte	Result	Units	PQL	%Rec	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Method: SW8021									
Sample ID: 5ML REAGENT BLA		*MBLK*			Batch ID: **R24198**		Analysis Date:	6/30/2007 6:59:05 PM	
Benzene	ND	µg/L	1.0						
Toluene	ND	µg/L	1.0						
Ethylbenzene	ND	µg/L	1.0						
Xylenes, Total	ND	µg/L	2.0						
Sample ID: 100NG BTEX LCS		*LCS*			Batch ID: **R24198**		Analysis Date:	6/30/2007 11:44:25 PM	
Benzene	19.42	µg/L	1.0	97.1	85.9	113			
Toluene	19.80	µg/L	1.0	99.0	86.4	113			
Ethylbenzene	20.03	µg/L	1.0	100	83.5	118			
Xylenes, Total	59.67	µg/L	2.0	99.4	83.4	122			

Qualifiers:

E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Reporting Limit
R	RPD outside accepted recovery limits	S	Spike recovery outside accepted recovery limits

Hall Environmental Analysis Laboratory, Inc.

Sample Receipt Checklist

Client Name BLAGG | Date and Time Received: 6/26/2007

Work Order Number 0706378 | Received by ARS

Checklist completed by  Signature 6/26/07 Date

Matrix | Carrier name UPS

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 - Preservation labels on bottle and cap match?	Yes ☐	No ☐	N/A ☑	
Water - pH acceptable upon receipt?	Yes ☐	No ☐	N/A ☑	
Container/Temp Blank temperature?	8°	*4° C ± 2 Acceptable* If given sufficient time to cool.		

COMMENTS:

Client contacted | Date contacted: | Person contacted

Contacted by: | Regarding

Comments:

Corrective Action