

APPENDIX A

INSTALLATION RESTORATION PROGRAM

PRELIMINARY ASSESSMENT/ SITE INSPECTION REPORT

VOLUME I

**157th AIR CONTROL GROUP
JEFFERSON BARRACKS
AIR NATIONAL GUARD
MISSOURI AIR NATIONAL GUARD
ST. LOUIS, MISSOURI**

MARCH 1997



Prepared For
**ANGRC/CEVR
ANDREWS AFB, MARYLAND**

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Prepared By

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IRP PA/SI Report
157th ACG, Jefferson Barracks ANG, St. Louis, Missouri

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Table 6.3
AOC-B Drilling Summary Table
157th ACG, Jefferson Barracks ANGS, St. Louis, Missouri

Drilling Location/ Borehole Identification	Interval Submitted for Laboratory analysis (Feet BLS)
B-001BH	
INT-1	3.5 - 5.0
INT-2	10.0 - 11.5
INT-3	30.0 - 31.5
B-002BH	
INT-1	0.5 - 2.0
INT-2	5.0 - 6.5
INT-3	29.0 - 30.5
B-003BH	
INT-1	1.0 - 2.5
INT-2	5.0 - 6.5
INT-3	25.0 - 26.5
B-004BH	
INT-1	0.5 - 2.0
INT-2	10.0 - 11.5
INT-3	30.0 - 31.5

AOC – Area of Concern.
BLS – Below Land Surface.

INT – Interval.

benzo(a)pyrene were detected in soil from B-004BH (0.5-2.0) at concentrations shown on Table 6.4. Bis(2-ethylhexyl)phthalate was also detected at B-004BH. However this is attributed to laboratory-induced contamination. TPH results for AOC-B are shown in Table 6.5 and are presented on Figure 6.12. TPH analysis indicated #2 Fuel Oil was detected in B-001BH (3.5-5.0) and (30.0-31.5) at 440 and 100 mg/kg, respectively. Several other TPH quantities were reported as a particular hydrocarbon when the peak pattern did not match that of the reference standard. These quantities were detected in B-001BH (3.5-5.0) and reported TPH as lube oil at 39 mg/kg, and TPH as gasoline at 0.9 mg/kg. B-001BH (30.0-31.5) reported TPH as C20 at 4.1 mg/kg. B-003BH (5.0-6.5) reported TPH as C20 at 3.3 mg/kg.

Metals concentrations detected in soil samples from AOC-B are listed in Table 6.6 and shown on Figure 6.12. Antimony, mercury, selenium, silver, and thallium were not detected in concentrations above method reporting limits. Arsenic concentrations ranged from 2.0 to 10.6 mg/kg, beryllium ranged from non-detect to 1.3 mg/kg, cadmium ranged from non-detect to 2.6 mg/kg, chromium ranged from 8.6 to 39.6 mg/kg, copper ranged from 14.7 to 54.3 mg/kg, lead ranged from 7.1 to 133 mg/kg, nickel ranged from 10.7 to 38.9 mg/kg, and zinc ranged from 38.6 to 710 mg/kg.

Table 6.4
Semivolatile Organic Compounds Detected in Soil at AOC-B
157th ACG, Jefferson Barracks ANGS, St. Louis, Missouri

		Boring Identification/Interval (feet BLS)	
		B-003BH (1.0 - 2.5) (µg/kg)	B-004BH (0.5 - 2.0) (µg/kg)
Analyte			
SVOCs	Fluoranthene	900	2,400
	Pyrene	790	2,400
	Phenanthrene	620J	2,500
	Anthracene	110J	470
	Chrysene	400J	990
	Benzo(a)anthracene	350J	910
	Benzo(k)fluoranthene	190J	420
	Benzo(a)pyrene	220J	530
	Bis(2-ethylhexyl)phthalate*	780U	700

SVOCs – Semivolatile Organic Compounds by Method SW8270.
µg/kg – micrograms per kilogram.
BH – Borehole.
BLS – Below Land Surface.
U – Compound was analyzed for but was not detected. Detection limit is shown.

J – Indicates an estimated concentration. Indicates the presence of the compound that meets the identification criteria, but the result is less than the sample quantitation limit for the sample.
* – Common laboratory induced contaminant in SVOC analysis (USEPA, 1993).

Table 6.5
TPH Detected in Soil at AOC-B
157th ACG, Jefferson Barracks ANGS, St. Louis, Missouri

		Boring Identification/Interval (feet BLS)			
		B-001BH (3.5 - 5.0) (mg/kg)	B-001BH (30.0 - 31.5) (mg/kg)	B-003BH (5.0 - 6.5) (mg/kg)	B-004BH (0.5 - 2.0) (mg/kg)
Analyte					
TPH	TPH as #2 Fuel Oil	440	100	12U	12U
	TPH as Lube Oil	39	13U	12U	12U
	TPH as C20	11U	4.1	3.3	12U
	TPH as Gasoline	0.89	0.13U	0.12U	0.12U

TPH – Total Petroleum Hydrocarbons by Method CA. 8015 Modified.
BLS – Below Land Surface.
mg/kg – milligrams per kilogram.

BH – Borehole.
U – Compound was analyzed for but was not detected. Detection limit is shown.

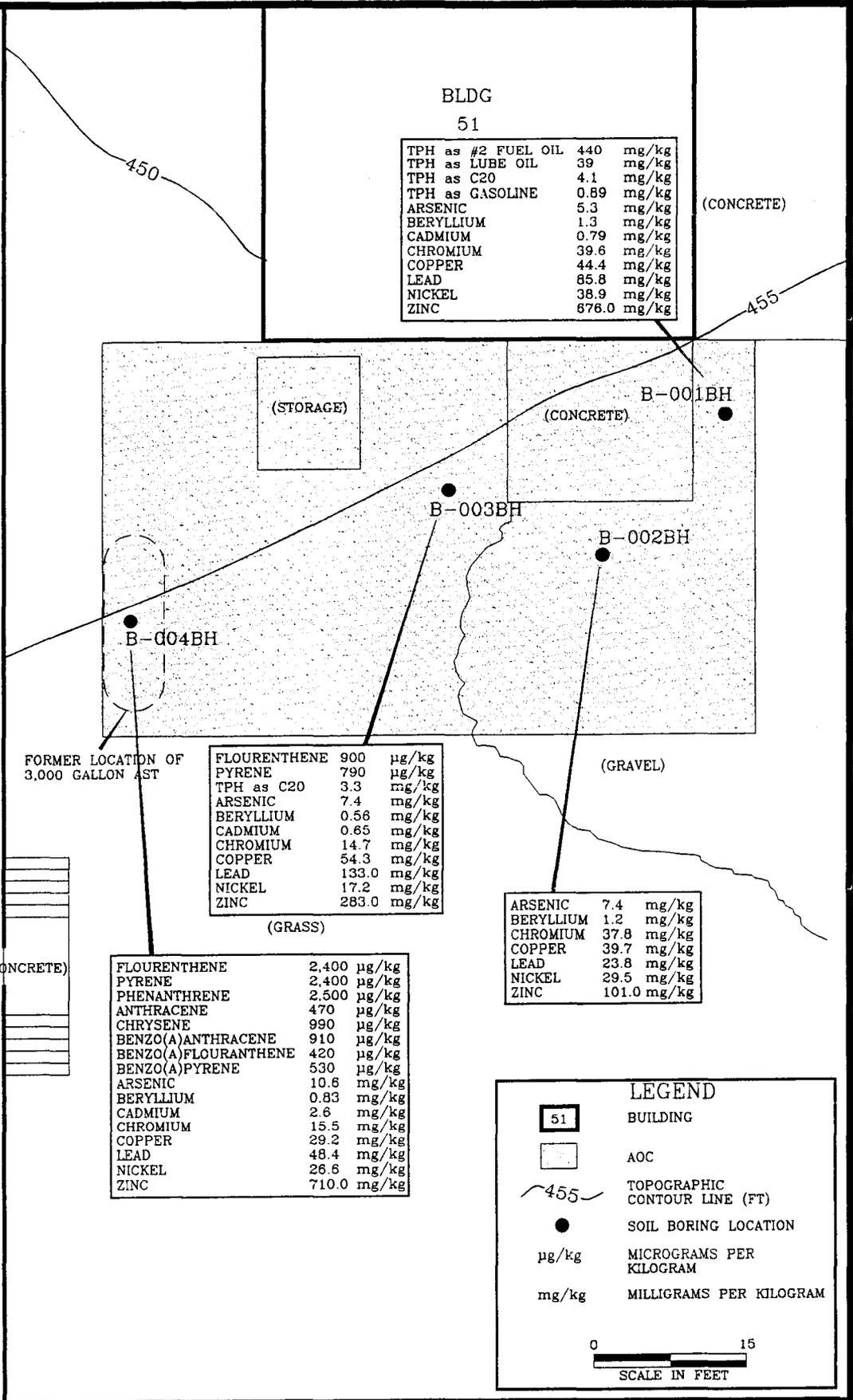
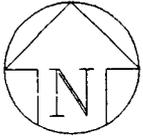


FIGURE 6.12

RESULTS OF LABORATORY ANALYSES
AT STORAGE AREA AOC (AOC B)
157th ACG, Jefferson Barracks ANG S
St. Louis, Missouri

OPTTECH
OPERATIONAL TECHNOLOGIES
CORPORATION

Table 6.6
AOC-B Metals Analyses Summary Table
157th ACG, Jefferson Barracks ANGS, St. Louis, Missouri

Metals	B-001BH 3.5 - 5.0 (Ft BLS)	B-001BH 10.0 - 11.5 (Ft BLS)	B-001BH 30.0 - 31.5 (Ft BLS)	B-002BH 0.5 - 2.0 (Ft BLS)	B-002BH 5.0 - 6.5 (Ft BLS)	B-002BH 29.0 - 30.5 (Ft BLS)
Antimony	3.8U	4.7U	4.7U	5.6B	4.6U	5.1U
Arsenic	2.2	5.3	2.6	6.6	7.4	5.0
Beryllium	0.10U	0.42B	1.3	0.44B	0.47B	1.2
Cadmium	0.79	0.25U	0.43B	0.22U	0.24U	0.27U
Chromium	10.7	12.8	39.6	11.4	8.6	37.8
Copper	15.4	44.4	25.5	14.7	39.7	18.8
Lead	85.8	15.8	17.4	23.8	8.4	19.6
Nickel	12.1	20	38.9	14.1	23	29.5
Zinc	676	148	83.1	52.6	101	63.6

Metals	B-003BH 1.0 - 2.5 (Ft BLS)	B-003BH 5.0 - 6.5 (Ft BLS)	B-003BH 25.0 - 26.5 (Ft BLS)	B-004BH 0.5 - 2.0 (Ft BLS)	B-004BH 10.0 - 11.5 (Ft BLS)	B-004BH 25.0 - 31.5 (Ft BLS)
Antimony	4.2U	4.4U	4.5U	4.5U	4.5U	4.1U
Arsenic	7.4	7.2	4.7	7.1	10.6	2.0
Beryllium	0.56	0.46B	0.59B	0.79	0.83	0.22U
Cadmium	0.65	0.23U	0.24U	2.6	0.78	0.22U
Chromium	13.2	11.4	14.7	15.5	14.2	12.9
Copper	25.2	54.3	34.6	29.2	21.3	19.6
Lead	133	79.8	14.2	48.4	13.3	7.1
Nickel	15.6	15.1	17.2	22.2	26.6	10.7
Zinc	283	149	45.7	710	79.7	38.6

U - Indicates compound was analyzed for but was not detected.

B - Sample value range greater than the instrument detection limit, but less than the reporting limit.

AOC - Area of Concern.

BH - Borehole.

BLS - Below Land Surface.

Ft. - Feet.

Note: All analyte concentrations expressed in milligrams per kilogram (mg/kg). Analytical Methods: SW6010 with the exception of arsenic (SW7060), and lead (SW7421).

6.5 DRAINAGE DITCH AOC (AOC-C)

AOC-C is located approximately 150 feet south of Building 75 and is immediately north of a military vehicle parking area (see Figure 6.13). The AOC measures approximately 375 feet long and 10 feet wide and centers on the ditch that is the subject of the investigation. A large majority of the area is grass covered, with a culvert and gravel road passing over the ditch near the west end of the AOC. The soil boring locations for AOC-C are shown on Figure 6.13. Five soil borings were drilled at this AOC. Borings C-001BH, C-002BH, C-003BH, C-004BH,

APPENDIX B

SOIL BORING LOG

Boring / Well Number: SB-1		Facility Name: Jefferson Barracks ANG Station, IRP Site No. 2.		Facility Street Address: 65 Kearney Street, St. Louis, Missouri.		
Boring Depth (ft) X Diameter (in): 10 feet X 2 inch OD				Drilling Method: Geoprobe®		
Well Contractor Name: Brotcke Well & Pump, Inc. Registration Number: 001189M				Logged by: Diane M. Krueger (MWH)		
Ground Surface Elevation (ASL): N/A			Top of Casing Elevation (ASL): DNA			
Date: 10/08/03 Start Time: 0923		Date: 10/08/03 End Time: 0950		UST Number: DNA LUST Number: DNA		
Depth (feet)	Boring Details	Blow Count	Sample No.	Recovery	PID Reading	Rock Formations, Soil, Color Classifications, Observations (moisture, odor, etc.), USCS.
0	<p style="font-size: small;">Ground Surface</p> <p style="font-size: small;">Gravel</p> <p style="font-size: small;">ML-CL</p>	N/A	0-4	2.5	0.0	<p>0-3': GRAVEL AND SILTY CLAY, gray gravel and brown silty clay, dry, crumbly, no odor, roots.</p> <p>3-8': SILTY CLAY WITH GRAVEL LAYERS, brown silty clay, gray gravel (fill from adjacent utility piping), moist, no odor.</p> <p>End of boring at 10'.</p>
1		4-8	2	0.0		
2		8-10	2	0.0		
3						
4						
5						
6						
7						
8						
9						
10						
11						
12						
13						
14						
15						

* SS (split spoon) HSA (hollow stem auger) N/A (not available) DNA (does not apply)

SOIL BORING LOG

Boring / Well Number: SB-2		Facility Name: Jefferson Barracks ANG Station, IRP Site No. 2.		Facility Street Address: 65 Kearney Street, St. Louis, Missouri.		
Boring Depth (ft) X Diameter (in): 10 feet X 2 inch OD				Drilling Method: Geoprobe®		
Well Contractor Name: Brotcke Well & Pump, Inc. Registration Number: 001189M				Logged by: Diane M. Krueger (MWH)		
Ground Surface Elevation (ASL): N/A			Top of Casing Elevation (ASL): DNA			
Date: 10/08/03 Start Time: 1020		Date: 10/08/03 End Time: 1040		UST Number: DNA LUST Number: DNA		
Depth (feet)	Boring Details	Blow Count	Sample No.	Recovery	PID Reading	Rock Formations, Soil, Color Classifications, Observations (moisture, odor, etc.), USCS.
0	<p style="font-size: small;">Ground Surface</p> <p style="font-size: small;">Gravel</p> <p style="font-size: small;">ML-CL</p>	N/A	0-4	3.6	0.0	0-2': GRAVEL AND SILTY CLAY, brown to gray, dry, crumbly, no odor, roots. 2-4.5': SILTY CLAY WITH SOME GRAVEL, gray to brown, dry, crumbly, no odor. 4.5-10': SILTY CLAY, brown, moist, slightly soft, no odor, low plasticity, coarse brown poorly-sorted sand layer from 6.5-6.9'. End of boring at 10'.
1						
2						
3						
4						
5						
6						
7						
8						
9						
10						
11						
12						
13						
14						
15						

* SS (split spoon) HSA (hollow stem auger) N/A (not available) DNA (does not apply)

SOIL BORING LOG

Boring / Well Number: SB-3		Facility Name: Jefferson Barracks ANG Station, IRP Site No. 2.		Facility Street Address: 65 Kearney Street, St. Louis, Missouri.		
Boring Depth (ft) X Diameter (in): 10 feet X 2 inch OD				Drilling Method: Geoprobe®		
Well Contractor Name: Brotcke Well & Pump, Inc. Registration Number: 001189M				Logged by: Diane M. Krueger (MWH)		
Ground Surface Elevation (ASL): N/A			Top of Casing Elevation (ASL): DNA			
Date: 10/08/03 Start Time: 1317		Date: 10/08/03 End Time: 1340		UST Number: DNA LUST Number: DNA		
Depth (feet)	Boring Details	Blow Count	Sample No.	Recovery	PID Reading	Rock Formations, Soil, Color Classifications, Observations (moisture, odor, etc.), USCS.
0		N/A	0-4	3.2	0.0	0-1': FILL GRAVEL AND SILTY CLAY, gray gravel and brown silty clay, dry, crumbly, no odor, red brick pieces. 1-6': SILTY CLAY, brown, moist, soft to firm, low to medium plasticity, no odor. 6-10': SILTY CLAY WITH SAND LAYER, green, very coarse black sand horizon at 6', with strong odor, moist, soft to firm, low to medium plasticity, petroleum-like odor. End of boring at 10'.
1		4-8	3.2	*		
2		8-10	2	74		
3						
4						
5						
6						
7						
8						
9						
10						
11						
12						
13						
14						
15						

* SS (split spoon) HSA (hollow stem auger) N/A (not available) DNA (does not apply)

SOIL BORING LOG

Boring / Well Number: SB-4		Facility Name: Jefferson Barracks ANG Station, IRP Site No. 2.		Facility Street Address: 65 Kearney Street, St. Louis, Missouri.		
Boring Depth (ft) X Diameter (in): 10 feet X 2 inch OD				Drilling Method: Geoprobe®		
Well Contractor Name: Brotcke Well & Pump, Inc. Registration Number: 001189M				Logged by: Diane M. Krueger (MWH)		
Ground Surface Elevation (ASL): N/A			Top of Casing Elevation (ASL): DNA			
Date: 10/09/03 Start Time: 0915		Date: 10/09/03 End Time: 0930		UST Number: DNA LUST Number: DNA		
Depth (feet)	Boring Details	Blow Count	Sample No.	Recovery	PID Reading	Rock Formations, Soil, Color Classifications, Observations (moisture, odor, etc.), USCS.
0		N/A	0-4	2	0.0	0-4': GRAVEL WITH SILTY CLAY, gray gravel with brown silty clay, dry, crumbly, no odor. 4-10': SILTY CLAY, brown, moist, soft to firm, low to medium plasticity, no odor. End of boring at 10'.
1		4-8	3	0.0		
2		8-10	1	0.0		
3						
4						
5						
6						
7						
8						
9						
10						
11						
12						
13						
14						
15						

* SS (split spoon) HSA (hollow stem auger) N/A (not available) DNA (does not apply)

SOIL BORING LOG

Boring / Well Number: SB-5		Facility Name: Jefferson Barracks ANG Station, IRP Site No. 2.		Facility Street Address: 65 Kearney Street, St. Louis, Missouri.		
Boring Depth (ft) X Diameter (in): 10 feet X 2 inch OD				Drilling Method: Geoprobe®		
Well Contractor Name: Brotcke Well & Pump, Inc. Registration Number: 001189M				Logged by: Diane M. Krueger (MWH)		
Ground Surface Elevation (ASL): N/A			Top of Casing Elevation (ASL): DNA			
Date: 10/09/03 Start Time: 0840		Date: 10/09/03 End Time: 0900		UST Number: DNA LUST Number: DNA		
Depth (feet)	Boring Details	Blow Count	Sample No.	Recovery	PID Reading	Rock Formations, Soil, Color Classifications, Observations (moisture, odor, etc.), USCS.
0		N/A	0-4	3	1.7	0-2.2': GRAVEL AND SILTY CLAY, gray gravel and brown to gray silty clay, dry, crumbly, no odor. 2.2-10': SILTY CLAY, brown, moist, firm, medium plasticity, no odor. End of boring at 10'.
1			4-8	4	0.0	
2			8-10	2	4.7	
3						
4						
5						
6						
7						
8						
9						
10						
11						
12						
13						
14						
15						

* SS (split spoon) HSA (hollow stem auger) N/A (not available) DNA (does not apply)

SOIL BORING LOG

Boring / Well Number: SB-6		Facility Name: Jefferson Barracks ANG Station, IRP Site No. 2.		Facility Street Address: 65 Kearney Street, St. Louis, Missouri.		
Boring Depth (ft) X Diameter (in): 10 feet X 2 inch OD				Drilling Method: Geoprobe®		
Well Contractor Name: Brotcke Well & Pump, Inc. Registration Number: 001189M				Logged by: Diane M. Krueger (MWH)		
Ground Surface Elevation (ASL): N/A			Top of Casing Elevation (ASL): DNA			
Date: 10/08/03 Start Time: 1515		Date: 10/08/03 End Time: 1540		UST Number: DNA LUST Number: DNA		
Depth (feet)	Boring Details	Blow Count	Sample No.	Recovery	PID Reading	Rock Formations, Soil, Color Classifications, Observations (moisture, odor, etc.), USCS.
0		N/A	0-4	3.7	0.0	0-2': GRAVEL AND SOME SILTY CLAY, gray and black gravel and brown silty clay, dry, crumbly, no odor. 2-10': SILTY CLAY, brown, moist, firm, medium plasticity, no odor. End of boring at 10'.
1		4-8	4	0.0		
2		8-10	2	0.0		
3						
4						
5						
6						
7						
8						
9						
10						
11						
12						
13						
14						
15						

* SS (split spoon) HSA (hollow stem auger) N/A (not available) DNA (does not apply)

SOIL BORING LOG

Boring / Well Number: SB-7		Facility Name: Jefferson Barracks ANG Station, IRP Site No. 2.		Facility Street Address: 65 Kearney Street, St. Louis, Missouri.		
Boring Depth (ft) X Diameter (in): 10 feet X 2 inch OD				Drilling Method: Geoprobe®		
Well Contractor Name: Brotcke Well & Pump, Inc. Registration Number: 001189M				Logged by: Diane M. Krueger (MWH)		
Ground Surface Elevation (ASL): N/A			Top of Casing Elevation (ASL): DNA			
Date: 10/08/03 Start Time: 1408		Date: 10/08/03 End Time: 1425		UST Number: DNA LUST Number: DNA		
Depth (feet)	Boring Details	Blow Count	Sample No.	Recovery	PID Reading	Rock Formations, Soil, Color Classifications, Observations (moisture, odor, etc.), USCS.
0	<p style="text-align: center;">ML-CL</p>	N/A	0-4	3.7	0.0	0-0.5': FILL GRAVEL AND SILTY CLAY, gray gravel and brown silty clay, dry, crumbly, no odor, red brick pieces at 0.5'. 0.5-10': SILTY CLAY, brown, moist, soft to semi-firm, low to medium plasticity, no odor. End of boring at 10'.
1		4-8	4.8	0.0		
2		8-10	2	0.0		
3						
4						
5						
6						
7						
8						
9						
10						
11						
12						
13						
14						
15						

* SS (split spoon) HSA (hollow stem auger) N/A (not available) DNA (does not apply)

SOIL BORING LOG

Boring / Well Number: SB-8		Facility Name: Jefferson Barracks ANG Station, IRP Site No. 2.		Facility Street Address: 65 Kearney Street, St. Louis, Missouri.		
Boring Depth (ft) X Diameter (in): 10 feet X 2 inch OD				Drilling Method: Geoprobe®		
Well Contractor Name: Brotcke Well & Pump, Inc. Registration Number: 001189M				Logged by: Diane M. Krueger (MWH)		
Ground Surface Elevation (ASL): N/A			Top of Casing Elevation (ASL): DNA			
Date: 10/08/03 Start Time: 1125		Date: 10/08/03 End Time: 1140		UST Number: DNA LUST Number: DNA		
Depth (feet)	Boring Details	Blow Count	Sample No.	Recovery	PID Reading	Rock Formations, Soil, Color Classifications, Observations (moisture, odor, etc.), USCS.
0	<p>The diagram shows a vertical boring log. The ground surface is indicated by a horizontal line at the top. Below it, a hatched area represents gravel from 0 to 1.8 feet depth. Below the gravel, a solid gray area represents ML-CL soil from 1.8 to 10 feet depth. The total depth of the boring is 10 feet.</p>	N/A	0-4	3.7	0.0	<p>0-1.8': GRAVEL AND SILTY CLAY, brown, dry, crumbly, no odor, roots.</p> <p>1.8-4.2': SILTY CLAY WITH SOME GRAVEL, gray to brown, dry, crumbly, no odor, coarse poorly-sorted sand layer from 2.4-3'.</p> <p>4.2-10': SILTY CLAY, brown, moist, slightly soft, low to medium plasticity, no odor.</p> <p>End of boring at 10'.</p>
1		4-8	4	0.0		
2		8-10	2	0.0		
3						
4						
5						
6						
7						
8						
9						
10						
11						
12						
13						
14						
15						

* SS (split spoon) HSA (hollow stem auger) N/A (not available) DNA (does not apply)

SOIL BORING LOG AND MONITORING WELL CONSTRUCTION DIAGRAM

Boring / Well Number: MW-3	Facility Name: Jefferson Barracks ANG Station, IRP Site No. 2.	Facility Street Address: 65 Kearney Street, St. Louis, Missouri.
Well Depth (ft) X Diameter (in): 26 feet X 6 1/4 inch OD		Drilling Method: HSA
Well Contractor Name: Brotcke Well & Pump, Inc.		Logged by: Diane M. Krueger (MWH)
Registration Number: 001189M		

Ground Surface Elevation (ASL): 453.92	Top of Casing Elevation (ASL): 453.45
Date: 10/07/2003	Date: 10/07/2003
Start Time: 0855	End Time: 1000
UST Number: DNA	LUST Number: DNA

Depth (feet)	Well Construction Details	Blow Count	Sample No.	Recovery	PID Reading	Rock Formations, Soil, Color Classifications, Observations (moisture, odor, etc.), USCS.
0		N/A	0-2	1.5	106	0-3.5': GRAVEL WITH SOME SILTY CLAY AND SAND, gray silty clay and sand, dry, no odor, some black organic horizons. 3.5-26': SILTY CLAY, brown, medium plasticity, dry to moist, no odor, gravel seam at 6', stickier and high plasticity below 9.5, water at 20-22'. End of boring at 26'. * PID not working properly until this point. Shallower PID readings are suspect.
1			2-4	0.3	104	
2			4-6	1.5	253	
3			6-8	2	229	
4			8-10	0.3	67.5	
5			10-12	2	30.4	
6			12-14	2	1.3 *	
7			14-16	2	0.0	
8			16-18	2	0.0	
9			18-20	2	0.0	
10			20-22	2	0.0	
11			22-24	2	0.0	
12			24-26	2	0.0	
13						
14						
15						
16						
17						
18						
19						
20						
21						
22						
23						
24						
25						
26						

SS (split spoon) HSA (hollow stem auger) N/A (not available) DNA (does not apply) ASL (above mean sea level)

Observations	Date:	10/9/2003	12/4/2003	12/5/2003		
Water Levels (ASL)	Level:	No water	430.73	430.69		
	Time:	1030	1330	1425		

SOIL BORING LOG AND MONITORING WELL CONSTRUCTION DIAGRAM

Boring / Well Number: MW-4	Facility Name: Jefferson Barracks ANG Station, IRP Site No. 2.	Facility Street Address: 65 Kearney Street, St. Louis, Missouri.
Well Depth (ft) X Diameter (in): 25 feet X 6 1/4 inch OD		Drilling Method: HSA
Well Contractor Name: Brotcke Well & Pump, Inc.		Logged by: Diane M. Krueger (MWH)
Registration Number: 001189M		

Ground Surface Elevation (ASL): 455.05	Top of Casing Elevation (ASL): 454.52
Date: 10/08/2003 Start Time: 0840	Date: 10/08/2003 End Time: 1010
UST Number: DNA	LUST Number: DNA

Depth (feet)	Well Construction Details	Blow Count	Sample No.	Recovery	PID Reading	Rock Formations, Soil, Color Classifications, Observations (moisture, odor, etc.), USCS.
0		N/A	0-2	0.5	0.0	0-3.5': SILTY CLAY AND GRAVEL, brown to gray, dry, crumbly, no odor. 3.5-3.8': SAND FILL, brown, medium- to coarse-grained, moist, poorly sorted, no odor. 3.8-25': SILTY CLAY, brown, moist, soft to slightly firm, medium plasticity, trace gravel, some iron mottling, stiff and firm with iron mottling from 9-16', back to softer silty clay below 16', wet from 22-24', no odor. End of boring at 25'.
1			2-4	0.8	0.0	
2			4-6	2	0.0	
3			6-8	2	5.7	
4			8-10	2	0.0	
5			10-12	2	3.5	
6			12-14	2	0.0	
7			14-16	2	0.0	
8			16-18	2	0.0	
9			18-20	2	2.7	
10			20-22	2	0.0	
11			22-24	2	6.3	
12			24-25	1	0.0	
13						
14						
15						
16						
17						
18						
19						
20						
21						
22						
23						
24						
25						

SS (split spoon) HSA (hollow stem auger) N/A (not available) DNA (does not apply) ASL (above mean sea level)

Observations	Date:	10/9/2003	12/4/2003			
Water Levels (ASL)	Level:	431.88	433.11			
	Time:	1030	1330			

APPENDIX C



MISSOURI DEPARTMENT OF
NATURAL RESOURCES
DIVISION OF GEOLOGY AND
LAND SURVEY

(573) 368-2165

**MONITORING WELL
CERTIFICATION RECORD**

OFFICE USE ONLY		DATE RECEIVED
REF. NO. 267218		
C.R.NO.	CHECK NO.	
STATE WELL NUMBER	REVENUE NO.	
ENTERED Ph 1 Ph 2 Ph 3	APPROVED BY	RCUTE

INFORMATION SUPPLIED BY PRIMARY CONTRACTOR OR DRILLING CONTRACTOR

OWNER NAME <i>T Jefferson Barracks Int'l Guard Station</i>		WELL NUMBER <i>mw1</i>		VARIANCE GRANTED BY THE D.N.R.
OWNER ADDRESS <i>685 Kearney St</i>		CITY <i>St Louis</i>	STATE <i>MO</i>	ZIP CODE <i>63125</i>
SITE NAME <i>TJP # 2</i>		CONTACT NAME <i>Arthur Schuermer</i>		
SITE ADDRESS <i>Building 51 Jefferson Barracks</i>		CITY <i>St Louis</i>	STATE <i>MO</i>	ZIP CODE <i>63125</i>
PROPOSED USE OF WELL <input type="checkbox"/> GAS MONITORING WELL <input checked="" type="checkbox"/> MONITORING WELL <input type="checkbox"/> EXTRACTION WELL <input type="checkbox"/> PIEZOMETERS		TYPE OF POTENTIAL SITE <input type="checkbox"/> HAZARDOUS MATERIAL <input type="checkbox"/> LANDFILL <input type="checkbox"/> INITIAL SITE ASSESSMENT <input checked="" type="checkbox"/> L.U.S.T. <input type="checkbox"/> WATER LEVEL DRAWDOWN		MONITORING FOR: (CHECK ALL THAT APPLY) <input type="checkbox"/> RADIONUCLIDES <input type="checkbox"/> PETROLEUM PRODUCTS ONLY <input type="checkbox"/> EXPLOSIVES <input checked="" type="checkbox"/> METALS <input checked="" type="checkbox"/> V.O.C. <input type="checkbox"/> SVOCs <input type="checkbox"/> PESTICIDES/HERBICIDES

SKETCH LOCATION OF WELL INCLUDING MILEAGE ON ALL ROADS TRAVELLED FROM NEAREST TOWNS. <i>Bldg 42 / Xmw1</i>	LOCATION OF WELL LAT. <i>90° 46'</i> LONG. <i>90° 30' 05"</i>	AREA <i>St Louis</i>	ELEV <i>~455' amsl</i>
SMALLEST _____ 1/4 _____ 1/4 _____ 1/4		LARGEST _____ 1/4 _____ 1/4 _____ 1/4	
SEC. _____ TWN. _____ N RNG. _____ E OR W			

DESCRIBE LOCATION OF THE WELL SO WE WOULD BE ABLE TO VISIT THE WELL SITE
30' South and 12' West of Bldg 51's SW Corner

TYPE OF SURFACE COMPLETION <input type="checkbox"/> ABOVE GROUND <input checked="" type="checkbox"/> FLUSH MOUNT	LENGTH OF PROTECTIVE CASING FT.	DIAMETER OF PROTECTIVE CASING IN.	DIAMETER AND DEPTH OF THE HOLE PROTECTIVE CASING WAS PLACED IN. FT.	PROTECTIVE CASING MATERIAL <input type="checkbox"/> STEEL <input type="checkbox"/> ALUMINUM <input type="checkbox"/> PLASTIC	LOCKING CAP? <input type="checkbox"/> YES <input type="checkbox"/> NO
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WEEP HOLE? <input type="checkbox"/> YES <input type="checkbox"/> NO	VENTED CAP? <input type="checkbox"/> YES <input type="checkbox"/> NO	LENGTH OF FLUSH MOUNT FT.	DIAMETER OF FLUSH MOUNT IN.	DIAMETER AND DEPTH OF THE HOLE FLUSH MOUNT WAS PLACED IN. FT.	SURFACE COMPLETION GROUT <input checked="" type="checkbox"/> CONCRETE <input type="checkbox"/> OTHER
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RISER PIPE DETAIL	LENGTH <i>15 FT.</i>	DIAMETER <i>2 IN.</i>	WEIGHT OR SDR#	DIAMETER OF DRILL HOLE <i>10" FT.</i>	MATERIAL <input type="checkbox"/> STEEL <input checked="" type="checkbox"/> THERMOPLASTIC (PVC) <input type="checkbox"/> OTHER	BENTONITE SEAL LENGTH OF SEAL <i>4.4 FT.</i>	MATERIAL <input type="checkbox"/> SLURRY <input type="checkbox"/> GRANULAR <input checked="" type="checkbox"/> CHIPS
	SECONDARY FILTER PACK <input type="checkbox"/> SATURATED ZONE <input type="checkbox"/> UNSATURATED ZONE HYDRATED <input type="checkbox"/> YES <input type="checkbox"/> NO <input type="checkbox"/> BOTH ZONES <input type="checkbox"/> IF YES, HYDRATED <input type="checkbox"/> YES <input type="checkbox"/> NO				DEPTH FROM TO FORMATION DESCRIPTION <i>0 25 Silty Clay</i>		

PRIMARY FILTER PACK	LENGTH <i>12 FT.</i>	DEPTH TO TOP OF PRIMARY FILTER PACK <i>13 FT.</i>	SECONDARY FILTER PACK LENGTH FT.
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ANNULAR SEAL	<input type="checkbox"/> BENTONITE SLURRY <input type="checkbox"/> NON SLURRY BENTONITE TYPE	<input checked="" type="checkbox"/> CEMENT/BENTONITE SLURRY BAGS OF CEMENT USED _____ % OF BENTONITE USED _____ WATER USED/BAG _____ GAL.	LENGTH <i>76 FT.</i>
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WELL SCREEN	LENGTH <i>10 FT.</i>	DIAMETER <i>2 IN.</i>	DIAMETER OF DRILL HOLE <i>10 IN.</i>	DEPTH TO TOP OF SCREEN <i>15 FT.</i>	MATERIAL <input type="checkbox"/> STEEL <input checked="" type="checkbox"/> THERMOPLASTIC (PVC) <input type="checkbox"/> OTHER
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MULTIPLE CASED WELLS YES NO PUMP INSTALLED FOR REMEDIATION YES NO
SUBMIT ADDITIONAL AS BUILT DIAGRAMS SHOWING WELL CONSTRUCTION DETAILS INCLUDING TYPE AND SIZE OF ALL CASING, HOLE DIAMETERS AND GROUT USED

TOTAL DEPTH: *25*

SIGNATURE (PRIMARY CONTRACTOR) <i>Drew M Gmegec</i>	PERMIT NUMBER <i>003568 M</i>	STATIC WATER LEVEL <i>17.12 # bas</i> FEET FROM MEASURING POINT	DATE WELL DRILLING WAS COMPLETED <i>10/09/03</i>
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I HEREBY CERTIFY THAT THE MONITORING WELL HEREIN DESCRIBED WAS CONSTRUCTED IN ACCORDANCE WITH THE DEPARTMENT OF NATURAL RESOURCES REQUIREMENTS FOR THE CONSTRUCTION OF MONITORING WELLS.

SIGNATURE (WELL DRILLER) <i>X Donald L. Howarth</i>	PERMIT NUMBER <i>001189 M</i>	DATE <i>11/2/03</i>	SIGNATURE (PUMP INSTALLER) <i>X</i>	PERMIT NUMBER	DATE
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MISSOURI DEPARTMENT OF
NATURAL RESOURCES
DIVISION OF GEOLOGY AND
LAND SURVEY
(573) 368-2165
**MONITORING WELL
CERTIFICATION RECORD**

OFFICE USE ONLY		DATE RECEIVED
REF. NO. 267217		CHECK NO.
C.R.NO.		REVENUE NO.
STATE WELL NUMBER		APPROVED BY
ENTERED Ph. Ph2 Ph3	ROUTE / /	

INFORMATION SUPPLIED BY PRIMARY CONTRACTOR OR DRILLING CONTRACTOR

OWNER NAME <i>Jefferson Barracks Int'l Guard Sta.</i>		WELL NUMBER <i>MW2</i>		VARIANCE GRANTED BY THE D.N.R. <input checked="" type="checkbox"/> NO <input type="checkbox"/> YES, ATTACH A COPY OF THE VARIANCE	
OWNER ADDRESS <i>15 Kearney St.</i>		CITY <i>St Louis</i>	STATE <i>MO</i>	ZIP CODE <i>63125</i>	
SITE NAME <i>T&P Site #2</i>		CONTACT NAME <i>Arthur Schwesman</i>			
SITE ADDRESS <i>Building 51, Jefferson Barracks</i>		CITY <i>St Louis</i>	STATE <i>MO</i>	ZIP CODE <i>63125</i>	
PROPOSED USE OF WELL <input type="checkbox"/> GAS MONITORING WELL <input checked="" type="checkbox"/> MONITORING WELL <input type="checkbox"/> EXTRACTION WELL <input type="checkbox"/> PIEZOMETERS		TYPE OF POTENTIAL SITE <input type="checkbox"/> HAZARDOUS MATERIAL <input type="checkbox"/> LANDFILL <input type="checkbox"/> INITIAL SITE ASSESSMENT <input checked="" type="checkbox"/> L.U.S.T. <input type="checkbox"/> WATER LEVEL DRAWDOWN		MONITORING FOR: (CHECK ALL THAT APPLY) <input type="checkbox"/> RADIONUCLIDES <input type="checkbox"/> PETROLEUM PRODUCTS ONLY <input type="checkbox"/> EXPLOSIVES <input checked="" type="checkbox"/> METALS <input checked="" type="checkbox"/> V.O.C. <input checked="" type="checkbox"/> SVOCs <input type="checkbox"/> PESTICIDES/HERBICIDES	

SKETCH LOCATION OF WELL INCLUDING M LEAGE OR ALL ROADS TRAVELLED FROM NEAREST TOWNS. 	LOCATION OF WELL		AREA	ELEV. <i>455' AMSL</i>
	LAT. <i>90° 16' 45"</i> LONG. <i>88° 30' 05"</i>		COUNTY <i>St Louis</i>	
SMALLEST _____ 1/4 _____ 1/4 _____ 1/4		LARGEST _____ 1/4 _____ 1/4 _____ 1/4		
SEC. _____		TWN. _____		N. RING. _____ E. OR W. _____

DESCRIBE LOCATION OF THE WELL SO WE WOULD BE ABLE TO VISIT THE WELL SITE
Approx 15' south of Bldg 51

DRILLER NOTES:

TYPE OF SURFACE COMPLETION <input type="checkbox"/> ABOVE GROUND <input checked="" type="checkbox"/> FLUSH MOUNT	LENGTH OF PROTECTIVE CASING _____ FT.	DIAMETER OF PROTECTIVE CASING _____ IN.	DIAMETER AND DEPTH OF THE HOLE PROTECTIVE CASING WAS PLACED _____ IN. _____ FT.	PROTECTIVE CASING MATERIAL <input type="checkbox"/> STEEL <input type="checkbox"/> ALUMINUM <input type="checkbox"/> PLASTIC	LOCKING CAP? <input type="checkbox"/> YES <input type="checkbox"/> NO
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WEEP HOLE? <input type="checkbox"/> YES <input type="checkbox"/> NO	VENTED CAP? <input type="checkbox"/> YES <input type="checkbox"/> NO	LENGTH OF FLUSH MOUNT _____ FT.	DIAMETER OF FLUSH MOUNT _____ IN.	DIAMETER AND DEPTH OF THE HOLE FLUSH MOUNT WAS PLACED _____ IN. _____ FT.	SURFACE COMPLETION GROUT <input checked="" type="checkbox"/> CONCRETE <input type="checkbox"/> OTHER
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RISER PIPE DETAIL	LENGTH <i>15</i> FT.	DIAMETER <i>2</i> IN.	WEIGHT OR SDR#	DIAMETER OF DRILL HOLE <i>10</i> FT.	MATERIAL <input type="checkbox"/> STEEL <input checked="" type="checkbox"/> THERMOPLASTIC (PVC) <input type="checkbox"/> OTHER	BENTONITE SEAL LENGTH OF SEAL <i>4.2</i> FT.	MATERIAL <input type="checkbox"/> SLURRY <input type="checkbox"/> PELLETS <input checked="" type="checkbox"/> GRANULAR <input checked="" type="checkbox"/> CHIPS
	GLUED <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO		SECONDARY FILTER PACK <input type="checkbox"/> SATURATED ZONE <input type="checkbox"/> UNSATURATED ZONE HYDRATED <input type="checkbox"/> YES <input type="checkbox"/> NO <input type="checkbox"/> BOTH ZONES <input type="checkbox"/> IF YES, HYDRATED <input type="checkbox"/> YES <input type="checkbox"/> NO			DEPTH FROM TO	FORMATION DESCRIPTION

PRIMARY FILTER PACK	LENGTH <i>13</i> FT.	DEPTH TO TOP OF PRIMARY FILTER PACK <i>12</i> FT.	SECONDARY FILTER PACK LENGTH _____ FT.	DEPTH FROM TO <i>0 25</i>	FORMATION DESCRIPTION <i>Silty clay</i>
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ANNULAR SEAL	<input type="checkbox"/> BENTONITE SLURRY <input type="checkbox"/> NON SLURRY BENTONITE TYPE	<input checked="" type="checkbox"/> CEMENT/BENTONITE SLURRY BAGS OF CEMENT USED _____ % OF BENTONITE USED _____ WATER USED/BAG _____ GAL	LENGTH <i>11</i> FT.
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WELL SCREEN	LENGTH <i>10</i> FT.	DIAMETER <i>2</i> IN.	DIAMETER OF DRILL HOLE <i>10</i> IN.	DEPTH TO TOP OF SCREEN <i>15</i> FT.	MATERIAL <input type="checkbox"/> STEEL <input checked="" type="checkbox"/> THERMOPLASTIC (PVC) <input type="checkbox"/> OTHER
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MULTIPLE CASED WELLS YES NO PUMP INSTALLED FOR REMEDIATION YES NO

SUBMIT ADDITIONAL AS BUILT DIAGRAMS SHOWING WELL CONSTRUCTION DETAILS INCLUDING TYPE AND SIZE OF ALL CASING, HOLE DIAMETERS AND GROUT USED

TOTAL DEPTH: *25*

SIGNATURE (PRIMARY CONTRACTOR) <i>David M. Amegon</i>	PERMIT NUMBER <i>003568 M</i>	STATIC WATER LEVEL <i>22.55 ft bgs</i> FEET FROM MEASURING POINT	DATE WELL DRILLING WAS COMPLETED <i>10/09/2003</i>
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I HEREBY CERTIFY THAT THE MONITORING WELL HEREIN DESCRIBED WAS CONSTRUCTED IN ACCORDANCE WITH THE DEPARTMENT OF NATURAL RESOURCES REQUIREMENTS FOR THE CONSTRUCTION OF MONITORING WELLS.

SIGNATURE (WELL DRILLER) <i>Donald J. Hovest</i>	PERMIT NUMBER <i>CC1189M</i>	DATE <i>11/3/03</i>	SIGNATURE (PUMP INSTALLER) <i>X</i>	PERMIT NUMBER	DATE
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MISSOURI DEPARTMENT OF
NATURAL RESOURCES
DIVISION OF GEOLOGY AND
LAND SURVEY

(573) 368-2165

**MONITORING WELL
CERTIFICATION RECORD**

OFFICE USE ONLY		DATE RECEIVED
REF. NO. 267220		
C.R.NO.	CHECK NO.	
STATE WELL NUMBER	REVENUE NO.	
ENTERED Ph 1 Ph 2 Ph 3	APPROVED BY	ROUTE / /

INFORMATION SUPPLIED BY PRIMARY CONTRACTOR OR DRILLING CONTRACTOR

OWNER NAME <i>Jefferson Parkards Tot'l Guard Station</i>		WELL NUMBER <i>MW3</i>		VARIANCE GRANTED BY THE D.N.R.	
OWNER ADDRESS <i>165 Kennedy Street</i>	CITY <i>St Louis</i>	STATE <i>MO</i>	ZIP CODE <i>63125</i>	<input checked="" type="checkbox"/> NO <input type="checkbox"/> YES, ATTACH A COPY OF THE VARIANCE	
SITE NAME <i>TWP Site #12</i>	CONTACT NAME <i>Arthur Schumann</i>		VARIANCE NUMBER		
SITE ADDRESS <i>Building 51 Jefferson Parkards St Louis</i>	CITY <i>St Louis</i>	STATE <i>MO</i>	ZIP CODE <i>63125</i>		
PROPOSED USE OF WELL <input type="checkbox"/> GAS MONITORING WELL <input type="checkbox"/> EXTRACTION WELL	<input checked="" type="checkbox"/> MONITORING WELL <input type="checkbox"/> PIEZOMETERS	TYPE OF POTENTIAL SITE <input type="checkbox"/> HAZARDOUS MATERIAL <input type="checkbox"/> INITIAL SITE ASSESSMENT <input type="checkbox"/> WATER LEVEL DRAWDOWN	<input type="checkbox"/> LANDFILL <input checked="" type="checkbox"/> L.U.S.T.	MONITORING FOR: (CHECK ALL THAT APPLY) <input type="checkbox"/> RADIONUCLIDES <input type="checkbox"/> EXPLOSIVES <input checked="" type="checkbox"/> SVOCs	<input type="checkbox"/> PETROLEUM PRODUCTS ONLY <input checked="" type="checkbox"/> METALS <input checked="" type="checkbox"/> V.O.C. <input type="checkbox"/> PESTICIDES/HERBICIDES

SKETCH LOCATION OF WELL INCLUDING MILEAGE ON ALL ROADS TRAVELLED FROM NEAREST TOWNS. <i>Bldg 42 / Bldg 51 X MW3</i>	LOCATION OF WELL LAT. <i>30° 16' 45"</i> LONG. <i>90° 30' 05"</i>	AFEA	ELEV <i>2455' amsl</i>
SMALLEST _____ 1/4 _____ 1/4 _____ 1/4		LARGEST _____ 1/4 _____ 1/4 _____ 1/4	
SEC. _____ TWN. _____ N. RNG. _____ E. OR W.		COUNTY <i>St Louis</i>	

DESCRIBE LOCATION OF THE WELL SO WE WOULD BE ABLE TO VISIT THE WELL SITE <i>Southeast corner of Bldg 51</i>	DRILLER NOTES:
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TYPE OF SURFACE COMPLETION <input type="checkbox"/> ABOVE GROUND <input checked="" type="checkbox"/> FLUSH MOUNT	LENGTH OF PROTECTIVE CASING FT.	DIAMETER OF PROTECTIVE CASING IN.	DIAMETER AND DEPTH OF THE HOLE PROTECTIVE CASING WAS PLACED IN. FT.	PROTECTIVE CASING MATERIAL <input type="checkbox"/> STEEL <input type="checkbox"/> ALUMINUM <input type="checkbox"/> PLASTIC	LOCKING CAP? <input type="checkbox"/> YES <input type="checkbox"/> NO
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WEEP HOLE? <input type="checkbox"/> YES <input type="checkbox"/> NO	VENTED CAP? <input type="checkbox"/> YES <input type="checkbox"/> NO	LENGTH OF FLUSH MOUNT 1 FT.	DIAMETER OF FLUSH MOUNT 8 IN.	DIAMETER AND DEPTH OF THE HOLE FLUSH MOUNT WAS PLACED 10 IN. FT.	SURFACE COMPLETION GROUT <input checked="" type="checkbox"/> CONCRETE <input type="checkbox"/> OTHER
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RISER PIPE DETAIL LENGTH <i>16</i> FT. DIAMETER <i>2</i> IN. WEIGHT OF SDR# _____ DIAMETER OF DRILL HOLE <i>10</i> " FT. MATERIAL <input type="checkbox"/> STEEL <input checked="" type="checkbox"/> THERMOPLASTIC (PVC) <input type="checkbox"/> OTHER	BENTONITE SEAL LENGTH OF SEAL <i>4</i> FT. MATERIAL <input type="checkbox"/> SLURRY <input type="checkbox"/> GRANULAR <input checked="" type="checkbox"/> CHIPS	DEPTH FROM TO	FORMATION DESCRIPTION <i>c 20 silty clay</i>
	SECONDARY FILTER PACK <input type="checkbox"/> SATURATED ZONE <input type="checkbox"/> UNSATURATED ZONE <input type="checkbox"/> HYDRATED <input type="checkbox"/> YES <input type="checkbox"/> NO <input type="checkbox"/> BOTH ZONES <input type="checkbox"/> IF YES, HYDRATED <input type="checkbox"/> YES <input type="checkbox"/> NO		

PRIMARY FILTER PACK LENGTH <i>13.2</i> FT. DEPTH TO TOP OF PRIMARY FILTER PACK <i>12.8</i> FT. SECONDARY FILTER PACK LENGTH _____ FT.
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ANNULAR SEAL <input type="checkbox"/> BENTONITE SLURRY <input type="checkbox"/> NON SLURRY BENTONITE TYPE <input checked="" type="checkbox"/> CEMENT/BENTONITE SLURRY BAGS OF CEMENT USED _____ % OF BENTONITE USED _____ WATER USED/BAG _____ GAL	LENGTH <i>7.8</i> FT.
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WELL SCREEN LENGTH <i>10</i> FT. DIAMETER <i>2</i> IN. DIAMETER OF DRILL HOLE <i>10</i> IN. DEPTH TO TOP OF SCREEN <i>11</i> FT. MATERIAL <input type="checkbox"/> STEEL <input checked="" type="checkbox"/> THERMOPLASTIC (PVC) <input type="checkbox"/> OTHER

MULTIPLE CASED WELLS <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO	PUMP INSTALLED FOR REMEDIATION <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO	TOTAL DEPTH: <i>26</i>
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SIGNATURE (PRIMARY CONTRACTOR) <i>Don M. Kuegel</i>	PERMIT NUMBER <i>003568 M</i>	STATIC WATER LEVEL <i>25.95 ft. bgs</i> FEET FROM MEASURING POINT	DATE WELL DRILLING WAS COMPLETED <i>1/16/03</i>
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I HEREBY CERTIFY THAT THE MONITORING WELL HEREIN DESCRIBED WAS CONSTRUCTED IN ACCORDANCE WITH THE DEPARTMENT OF NATURAL RESOURCES REQUIREMENTS FOR THE CONSTRUCTION OF MONITORING WELLS.

SIGNATURE (WELL DRILLER) <i>X Donald A. Houston</i>	PERMIT NUMBER <i>001189 M</i>	DATE <i>1/13/03</i>	SIGNATURE (PUMP INSTALLER) <i>X</i>	PERMIT NUMBER	DATE
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MISSOURI DEPARTMENT OF
NATURAL RESOURCES
DIVISION OF GEOLOGY AND
LAND SURVEY
(573) 368-2165
**MONITORING WELL
CERTIFICATION RECORD**

OFFICE USE ONLY		DATE RECEIVED
REF. NO. 267215		
C.R.NO.	CHECK NO.	
STATE WELL NUMBER	REVENUE NO.	
ENTERED Ph 1 Ph 2 Ph 3	APPROVED BY	ROUTE

INFORMATION SUPPLIED BY PRIMARY CONTRACTOR OR DRILLING CONTRACTOR

OWNER NAME <i>Jefferson Barracks Int'l Guard Station</i>		WELL NUMBER <i>MW-4</i>		VARIANCE GRANTED BY THE D.N.R.
OWNER ADDRESS <i>165 Kearney St.</i>		CITY <i>St Louis</i>	STATE <i>MO</i>	ZIP CODE <i>63125</i>
SITE NAME <i>Top Site #2</i>		CONTACT NAME <i>Arthur Schuermann</i>		<input checked="" type="checkbox"/> NO <input type="checkbox"/> YES, ATTACH A COPY OF THE VARIANCE
SITE ADDRESS <i>Building 51, Jefferson Barracks</i>		CITY <i>St Louis</i>	STATE <i>MO</i>	ZIP CODE <i>63125</i>

PROPOSED USE OF WELL <input type="checkbox"/> GAS MONITORING WELL <input checked="" type="checkbox"/> MONITORING WELL <input type="checkbox"/> EXTRACTION WELL <input type="checkbox"/> PIEZOMETERS		TYPE OF POTENTIAL SITE <input checked="" type="checkbox"/> HAZARDOUS MATERIAL <input type="checkbox"/> LANDFILL <input type="checkbox"/> INITIAL SITE ASSESSMENT <input checked="" type="checkbox"/> L.U.S.T. <input type="checkbox"/> WATER LEVEL DRAWDOWN		MONITORING FOR: (CHECK ALL THAT APPLY) <input type="checkbox"/> RADIONUCLIDES <input type="checkbox"/> PETROLEUM PRODUCTS ONLY <input type="checkbox"/> EXPLOSIVES <input checked="" type="checkbox"/> METALS <input checked="" type="checkbox"/> V.O.C. <input checked="" type="checkbox"/> SVOCs <input type="checkbox"/> PESTICIDES/HERBICIDES	
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SKETCH LOCATION OF WELL INCLUDING M LEAGE ON ALL ROADS TRAVELLED FROM NEAREST TOWNS 	LOCATION OF WELL LAT. <i>30° 16' 45"</i> LONG. <i>98° 20' 05"</i>	AREA	ELEV <i>455' AMSL</i>
SMALLEST _____ 1/4 _____ 1/4 _____ 1/4		LARGEST _____ 1/4 _____ 1/4 _____ 1/4	
SEC. _____ TWN. _____ N. RING. _____ E OR W		COUNTY <i>St Louis</i>	

DESCRIBE LOCATION OF THE WELL SO WE WOULD BE ABLE TO VISIT THE WELL SITE <i>South of Building 51 south of concrete pad</i>	DRILLER NOTES:
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TYPE OF SURFACE COMPLETION <input type="checkbox"/> ABOVE GROUND <input checked="" type="checkbox"/> FLUSH MOUNT	LENGTH OF PROTECTIVE CASING <i>1</i> FT.	DIAMETER OF PROTECTIVE CASING <i>18</i> IN.	DIAMETER AND DEPTH OF THE HOLE PROTECTIVE CASING WAS PLACED <i>10</i> IN. <i>10</i> FT.	PROTECTIVE CASING MATERIAL <input type="checkbox"/> STEEL <input checked="" type="checkbox"/> ALUMINUM <input type="checkbox"/> PLASTIC	LOCKING CAP? <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO
---	---	--	--	--	---

WEEP HOLE? <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO	VENTED CAP? <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO	LENGTH OF FLUSH MOUNT <i>1</i> FT.	DIAMETER OF FLUSH MOUNT <i>18</i> IN.	DIAMETER AND DEPTH OF THE HOLE FLUSH MOUNT WAS PLACED <i>10</i> IN. <i>10</i> FT.	SURFACE COMPLETION GROUT <input checked="" type="checkbox"/> CONCRETE <input type="checkbox"/> OTHER
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RISER PIPE DETAIL GLUED <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO	LENGTH <i>15</i> FT.	DIAMETER <i>2</i> IN.	WEIGHT OR SDR#	DIAMETER OF DRILL HOLE <i>10"</i> FT.	MATERIAL <input type="checkbox"/> STEEL <input checked="" type="checkbox"/> THERMOPLASTIC (PVC) <input type="checkbox"/> OTHER	BENTONITE SEAL <i>3</i> FT.	LENGTH OF SEAL <i>3</i> FT.	MATERIAL <input checked="" type="checkbox"/> SLURRY <input type="checkbox"/> GRANULAR <input type="checkbox"/> PELLETS <input checked="" type="checkbox"/> CHIPS
	SECONDARY FILTER PACK <input type="checkbox"/> SATURATED ZONE <input type="checkbox"/> UNSATURATED ZONE HYDRATED <input type="checkbox"/> YES <input type="checkbox"/> NO BOTH ZONES <input type="checkbox"/> IF YES, HYDRATED <input type="checkbox"/> YES <input type="checkbox"/> NO			DEPTH FROM <i>0</i> TO <i>25</i>		FORMATION DESCRIPTION <i>Silty clay</i>		

PRIMARY FILTER PACK LENGTH <i>12.4</i> FT.	DEPTH TO TOP OF PRIMARY FILTER PACK <i>12.6</i> FT.	SECONDARY FILTER PACK LENGTH <i>0</i> FT.
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ANNULAR SEAL <input type="checkbox"/> BENTONITE SLURRY <input checked="" type="checkbox"/> CEMENT/BENTONITE SLURRY <input type="checkbox"/> NON SLURRY BENTONITE TYPE	BAGS OF CEMENT USED _____ % OF BENTONITE USED _____ WATER USED/BAG _____ GAL	LENGTH <i>6.8</i> FT.
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WELL SCREEN LENGTH <i>10</i> FT.	DIAMETER <i>2</i> IN.	DIAMETER OF CRILL HOLE <i>10</i> IN.	DEPTH TO TOP OF SCREEN <i>150</i> FT.	MATERIAL <input type="checkbox"/> STEEL <input checked="" type="checkbox"/> THERMOPLASTIC (PVC) <input type="checkbox"/> OTHER
-------------------------------------	-----------------------	--------------------------------------	---------------------------------------	--

M/JLTIPLE CASED WELLS <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO	PUMP INSTALLED FOR REMEDIATION <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO	TOTAL DEPTH: <i>25</i>
---	--	------------------------

SIGNATURE (PRIMARY CONTRACTOR) <i>Don M. Spurger</i>	PERMIT NUMBER <i>003568M</i>	STATIC WATER LEVEL <i>22.64</i> FT. HAS FEET FROM MEASURING POINT	DATE WELL DRILLING WAS COMPLETED <i>1/10/03</i>
---	---------------------------------	---	--

I HEREBY CERTIFY THAT THE MONITORING WELL HEREIN DESCRIBED WAS CONSTRUCTED IN ACCORDANCE WITH THE DEPARTMENT OF NATURAL RESOURCES REQUIREMENTS FOR THE CONSTRUCTION OF MONITORING WELLS.

SIGNATURE (WELL DRILLER) <i>Donald L. Harts</i>	PERMIT NUMBER <i>001189M</i>	DATE <i>1/13/03</i>	SIGNATURE (PUMP INSTALLER) <i>X</i>	PERMIT NUMBER	DATE
--	---------------------------------	------------------------	--	---------------	------

APPENDIX D

CHAIN OF CUSTODY RECORD



600 E. 17th St. S.
 Newton, IA 50208
 Phone: 641-792-8451
 Fax: 641-792-7989

3012 Ansbrough Ave.
 Waterloo, IA 50701
 Phone: 319-235-4440
 Fax: 319-235-2480

1304 Adams
 Kansas City, KS 66103
 Phone: 913-321-7856
 Fax: 913-321-7937

PAGE 1 OF 2

PRINT OR TYPE INFORMATION BELOW
 SAMPLER: Diane Krueger
 SITE NAME: Jefferson Barracks
 ADDRESS: St. Louis, MO
 CITY/ST/ZIP: _____
 PHONE: _____

REPORT TO: Diane Krueger
 NAME: Diane Krueger
 COMPANY NAME: MWH
 ADDRESS: 41551 Eleven Mile Road
 CITY/ST/ZIP: Novi, MI 48375
 PHONE: 248-344-4934
 FAX: 248-344-0217

BILL TO: Cathy Kuzdal
 NAME: Cathy Kuzdal
 COMPANY NAME: MWH
 ADDRESS: 41551 Eleven Mile Rd.
 CITY/ST/ZIP: Novi, MI 48375
 PHONE: 248-344-0205
 Keystone Quote No.: _____
 (If Applicable)

CLIENT SAMPLE NUMBER	DATE	TIME	SAMPLE LOCATION	NO. OF CONTAINERS	MATRIX	GRAB/COMPOSITE	ANALYSES REQUIRED							LAB USE ONLY		
							VOC-8260	SWC-8270	TPH-GROUP	Total Metals	PCBS-8082	LABORATORY WORK ORDER NO.	LABORATORY SAMPLE NUMBER			
SB-1-0-8	10/8/03	0950		3	S	G	X	X	X	X	X	X				01
SB-1-8-10	10/8/03	1012		3	S	G	X	X	X	X	X	X				02
SB-2-0-4		1040		↓	↓	↓	↓	↓	↓	↓	↓	↓				03
SB-2-8-10	↓	1050		↓	↓	↓	↓	↓	↓	↓	↓	↓				04
SB-8-0-4	↓	1140		↓	↓	↓	↓	↓	↓	↓	↓	↓				05
SB-8-8-10	↓	1153		↓	↓	↓	↓	↓	↓	↓	↓	↓				06
SB-3-6-8	↓	1340		↓	↓	↓	↓	↓	↓	↓	↓	↓				07
SB-3-8-10	↓	1400		↓	↓	↓	↓	↓	↓	↓	↓	↓				08
SB-7-0-4	↓	1425		↓	↓	↓	↓	↓	↓	↓	↓	↓				09
SB-7-8-10	↓	1450		↓	↓	↓	↓	↓	↓	↓	↓	↓				10

Relinquished by: (Signature) <u>Diane Krueger</u>	Date <u>10/8/03</u> Time <u>1:00</u>	Received by: (Signature) _____	Date _____ Time _____	Turn-Around: <input checked="" type="checkbox"/> Standard <input type="checkbox"/> Rush Contact Lab Prior to Submission
Relinquished by: (Signature) _____	Date _____ Time _____	Received for Lab by: (Signature) <u>_____</u>	Date <u>10-9-03</u> Time <u>11:50</u>	Remarks: <u>* Total Metals = total 8 RCRA metals</u>

CHAIN OF CUSTODY RECORD



LABORATORIES, INC.

600 E. 17th St. S.
Newton, IA 50208
Phone: 641-792-8451
Fax: 641-792-7989

3012 Ansbrough Ave.
Waterloo, IA 50701
Phone: 319-235-4440
Fax: 319-235-2480

1304 Adams
Kansas City, KS 66103
Phone: 913-321-7856
Fax: 913-321-7937

PAGE 2 OF 2

PRINT OR TYPE INFORMATION BELOW

SAMPLER: Diane Kwoeger
SITE NAME: Jefferson Barracks
ADDRESS:
CITY/ST/ZIP: St. Louis, MO
PHONE:

REPORT TO:
NAME: Diane Kwoeger
COMPANY NAME: MWH
ADDRESS:
CITY/ST/ZIP: NOVI, MI
PHONE: 248-244-9347
FAX: 248-344-0217

BILL TO:
NAME: Cathy Kuzdal
COMPANY NAME: MWH
ADDRESS:
CITY/ST/ZIP: NOVI, MI
PHONE: 248-344-0205
Keystone Quote No.:
(If Applicable)

CLIENT SAMPLE NUMBER	DATE	TIME	SAMPLE LOCATION	NO. OF CONTAINERS	MATRIX	GRAB/COMPOSITE	ANALYSES REQUIRED						LAB USE ONLY	
							PCBS-8260	SWCs-8270	TPH-GRO/DRD	Total Metals*	PCBS-8082	LABORATORY WORK ORDER NO.	SAMPLE TEMPERATURE UPON RECEIPT. °C	LABORATORY SAMPLE NUMBER
SB-6-0-4	10/8/03	1540		3	S	G	X	X	X	X	X			11
SB-6-7-10		1555		↓	↓	↓	X	X	X	X	X			12
Dup-1		0800		↓	↓	↓	X	X	X	X	X			13
 <div style="font-size: 2em; font-weight: bold; opacity: 0.5;"> D. M. Kwoeger 10/8/03 </div> 														

Relinquished by: (Signature) <u>Diane M. Kwoeger</u>	Date <u>10/8/03</u>	Received by: (Signature) <u>[Signature]</u>	Date <u>10-9-03</u>	Turn-Around: <input checked="" type="checkbox"/> Standard <input type="checkbox"/> Rush Contact Lab Prior to Submission
Relinquished by: (Signature)	Date <u>11:50</u>	Received for Lab by: (Signature) <u>[Signature]</u>	Date <u>11:50</u>	Remarks: <u>* Total Metals = total 8 PCEA metals</u>

CHAIN OF CUSTODY RECORD

Keystone

LABORATORIES, INC.

600 E. 17th St. S. 3012 Ansborough Ave. 1304 Adams
 Newton, IA 50208 Waterloo, IA 50701 Kansas City, KS 66103
 Phone: 641-792-8451 Phone: 319-235-4440 Phone: 913-321-7856
 Fax: 641-792-7989 Fax: 319-235-2480 Fax: 913-321-7937

PAGE 1 OF 1

PRINT OR TYPE INFORMATION BELOW SAMPLER: <u>Diane Knoeger</u> SITE NAME: <u>Jefferson Barracks</u> ADDRESS: _____ CITY/ST/ZIP: <u>St. Louis, MO</u> PHONE: _____	REPORT TO: NAME: <u>Diane Knoeger</u> COMPANY NAME: <u>MWH</u> ADDRESS: <u>41551 Eleven Mile Rd.</u> CITY/ST/ZIP: <u>Novi, MI 48375</u> PHONE: <u>248-449-3417</u> FAX: <u>248-344-0217</u>	BILL TO: NAME: <u>Cathy Kuzdal</u> COMPANY NAME: <u>MWH</u> ADDRESS: <u>41551 Eleven Mile Rd.</u> CITY/ST/ZIP: <u>Novi, MI 48375</u> PHONE: <u>248-344-0205</u> Keystone Quote No.: _____ (If Applicable)
---	---	--

CLIENT SAMPLE NUMBER	DATE	TIME	SAMPLE LOCATION	NO. OF CONTAINERS	MATRIX	GRAB/COMPOSITE	ANALYSES REQUIRED						LAB USE ONLY	
							VOCs-8260	SVOCs-8270	TPH-Grp/BRO	Total Metals*	PCBs-8082	LABORATORY WORK ORDER NO.	SAMPLE TEMPERATURE UPON RECEIPT: °C	LABORATORY SAMPLE NUMBER
SB-5-0-4	10/9/03	0900		3	S	G	X	X	X	X	X			01
SB-5-8-10		0910		1			X	X	X	X	X			02
SB-4-0-8		0930					X	X	X	X	X			03
SB-4-8-10		1000					X	X	X	X	X			04
Dup-2		0800					X	X	X	X	X			05
Blank 10/9/03														

Relinquished by: (Signature) <u>Diane M. Knoeger</u>	Date <u>10/9/03</u>	Received by: (Signature) _____	Date _____	Turn-Around: <input checked="" type="checkbox"/> Standard <input type="checkbox"/> Rush Contact Lab Prior to Submission
Relinquished by: (Signature) _____	Date _____	Received for Lab by: (Signature) <u>Kuo</u>	Date <u>10/10/03</u>	Remarks: <u>*Total Metals = total 8 PCRA metals</u>

CHAIN OF CUSTODY RECORD



600 E. 17th St. S. 3012 Ansborough Ave. 1304 Adams
 Newton, IA 50208 Waterloo, IA 50701 Kansas City, KS 66103
 Phone: 641-792-8451 Phone: 319-235-4440 Phone: 913-321-7856
 Fax: 641-792-7989 Fax: 319-235-2480 Fax: 913-321-7937

PAGE 1 OF 1

PRINT OR TYPE INFORMATION BELOW SAMPLER: <u>Diane Kroege</u> SITE NAME: <u>Jefferson Edwards</u> ADDRESS: CITY/ST/ZIP: <u>St. Louis, MO</u> PHONE:	REPORT TO: NAME: <u>Diane Kroege</u> COMPANY NAME: <u>MWH</u> ADDRESS: <u>4551 Eleven Mile Rd.</u> CITY/ST/ZIP: <u>Novi, MI 48375</u> PHONE: <u>248-449-3417</u> FAX: <u>248-344-0217</u>	BILL TO: NAME: <u>Cathy Kuzdal</u> COMPANY NAME: <u>MWH</u> ADDRESS: <u>(same)</u> CITY/ST/ZIP: PHONE: <u>248-344-0205</u> Keystone Quote No.: _____ (If Applicable)
---	---	---

CLIENT SAMPLE NUMBER	DATE	TIME	SAMPLE LOCATION	NO. OF CONTAINERS	MATRIX	GRAB/COMPOSITE	ANALYSES REQUIRED								LAB USE ONLY	
							VOCs-8260	TPH-6200 (M)	SUCs-8270	PCBs-8082	TPH-DRO (M)	Total 8 PCBs/Meth	LABORATORY WORK ORDER NO.	LABORATORY SAMPLE NUMBER		
Dup -1	10/1/03	0800		11	GW	A	X	X	X	X	X	X			01	
MW-1*		1200		15	↓	↓	X	X	X	X	X	X			02	
MW-2		1015		11	↓	↓	X	X	X	X	X	X			03	
Trip Blank	10/3/03	10:45	JRF Sealed	2	W	-	X								04	
 Diane M. Kroege 10/1/03 																

Relinquished by: (Signature) <u>Diane M. Kroege</u>	Date <u>10/1/03</u> Time <u>16:00</u>	Received by: (Signature) <u>JSO</u>	Date <u>10/3/03</u> Time <u>8:25 11:00</u>	Turn-Around: <input checked="" type="checkbox"/> Standard <input type="checkbox"/> Rush	Remarks: <u>* Extra volume for MS/MSD</u>
Relinquished by: (Signature)	Date Time	Received for Lab by: (Signature)	Date Time	Contact Lab Prior to Submission	

CHAIN OF CUSTODY RECORD

Keystone

LABORATORIES, INC.

600 E. 17th St. S.
 Newton, IA 50208
 Phone: 641-792-8451
 Fax: 641-792-7989

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 Fax: 319-235-2480

1304 Adams
 Kansas City, KS 66103
 Phone: 913-321-7856
 Fax: 913-321-7937

PAGE 1 OF 1

PRINT OR TYPE INFORMATION BELOW

SAMPLER: Diane Krueger
 SITE NAME: Jefferson Barracks
 ADDRESS: _____
 CITY/ST/ZIP: St. Louis, MO
 PHONE: _____

REPORT TO:
 NAME: Diane Krueger
 COMPANY NAME: MWH
 ADDRESS: 41551 Steven Mile Rd.
 CITY/ST/ZIP: Novi, MI 48375
 PHONE: 248-449-3417
 FAX: 248-344-0211

BILL TO:
 NAME: Cathy Kuzdal
 COMPANY NAME: MWH
 ADDRESS: (Same)
 CITY/ST/ZIP: _____
 PHONE: 248-344-0205
 Keystone Quote No.: _____
(If Applicable)

CLIENT SAMPLE NUMBER	DATE	TIME	SAMPLE LOCATION	NO. OF CONTAINERS	MATRIX	GRAB/COMPOSITE	ANALYSES REQUIRED											LAB USE ONLY				
							VOCs	SVOCs	PCBs	TPH/PAHs	TPH/PAHs	Total & PCBs/MS/MSDs	Oil & Grease	PH	DO	Temp	LABORATORY WORK ORDER NO.	LABORATORY SAMPLE NUMBER				
NW-1 *	12/4/03	1625		11			X	X	X	X	X	X	X	X	X	X	X	X	X	X	1320340	01
Dup-1	12/4/03			11			X	X	X	X	X	X	X	X	X	X	X	X	X	X		02
MW-2	12/5/03	0920		11			X	X	X	X	X	X	X	X	X	X	X	X	X	X		03
MW-3		1430		9			X	X	X	X	X	X	X	X	X	X	X	X	X	X		04
MW-4		1130		11			X	X	X	X	X	X	X	X	X	X	X	X	X	X		05
Drumwater		1515		7			X	X	X	X	X	X	X	X	X	X	X	X	X	X		06
TRP Blank	12/3	2:30	GSD Sealed	2			X															07
Blank 12/3/03																						

Relinquished by: (Signature) <u>Diane M. Krueger</u>	Date: <u>12/5/03</u>	Received by: (Signature) <u>[Signature]</u>	Date	Turn-Around: <input checked="" type="checkbox"/> Standard <input type="checkbox"/> Rush
	Time: <u>9:00</u>		Time	
Relinquished by: (Signature)	Date	Received for Lab by: (Signature)	Date: <u>12-6-03</u>	Remarks: <u>*complete extra set of MW-1 specifically for MS/MSDs</u>
	Time		Time: <u>1:00</u>	