



Appendix H

Monitoring Well – Drilling Logs/Construction Diagram/ Development/Purging/ Field Sampling Forms

C-Block Quarry

Load Line 12

Building 1200

Landfill North of Winklepeck Burning Grounds

NACA Test Area

Load Line 5

Load Line 7

Load Line 8

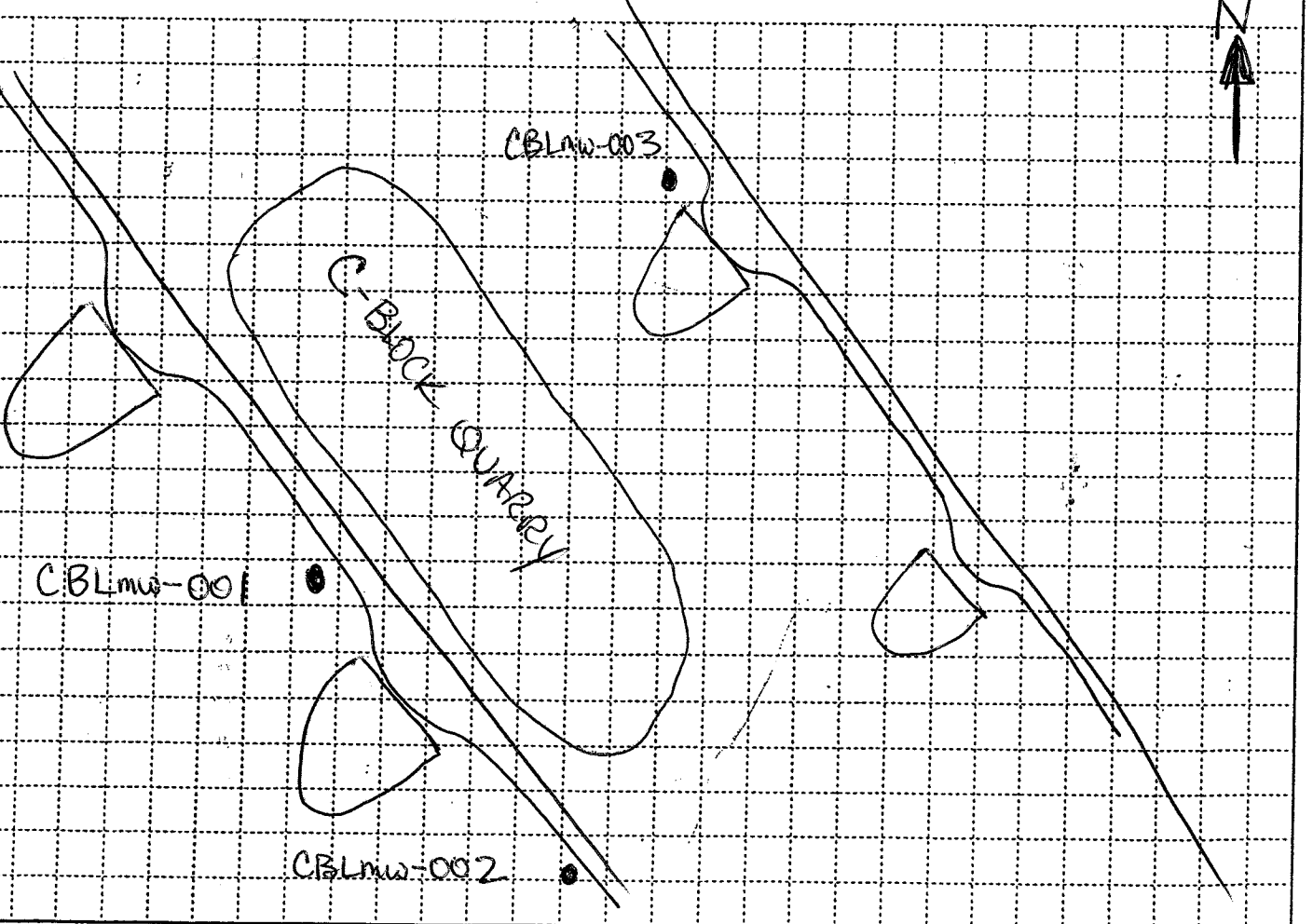
Load Line 10

Atlas Scrap Yard

HTRW DRILLING LOG			DISTRICT Louisville			HOLE NUMBER CBLmw-001		
1. COMPANY NAME MKM Engineers Inc			2. DRILL SUBCONTRACTOR HAD Drilling Contractors			SHEET SHEETS 1 OF 4		
3. PROJECT RVAAP RD 14			4. LOCATION C-Block Quarry					
5. NAME OF DRILLER Sam Holder			6. MANUFACTURER'S DESIGNATION OF DRILL CME LC-60					
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT 10.25 OD HSA 2" Split Spoon 6.125 Air Rotary Hammer 4" Core Barrel			8. HOLE LOCATION West side of the Quarry					
			9. SURFACE ELEVATION 1178.50 ASL					
			10. DATE STARTED 13 Dec 04			11. DATE COMPLETED 14 Dec 04		
12. OVERBURDEN THICKNESS 1.9			15. DEPTH GROUNDWATER ENCOUNTERED ~40ft					
13. DEPTH DRILLED INTO ROCK 50ft			16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED 42.5' @ 0918 12/22/04					
14. TOTAL DEPTH OF HOLE 50ft			17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY)					
18. GEOTECHNICAL SAMPLES			DISTURBED -		UNDISTURBED -		19. TOTAL NUMBER OF CORE BOXES 4	
20. SAMPLES FOR CHEMICAL ANALYSIS			VOC -	METALS -	OTHER (SPECIFY) -	OTHER (SPECIFY) -	OTHER (SPECIFY) -	21. TOTAL CORE RECOVERY %
22. DISPOSITION OF HOLE			BACKFILLED -	MONITORING WELL X	OTHER (SPECIFY) -	23. SIGNATURE OF INSPECTOR <i>[Signature]</i>		

LOCATION SKETCH/COMMENTS

SCALE:



PROJECT RVAAP RD 14	HOLE NO. CBLmw-001
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HTRW DRILLING LOG

(CONTINUATION SHEET)

HOLE NUMBER

CBLMW-001

PROJECT

RVAAPRI 14

INSPECTOR

Mark Dunley

SHEET SHEETS

2 OF 4

ELEV. (a)	DEPTH (b)	DESCRIPTION OF MATERIALS (c)	FIELD SCREENING RESULTS (d)	GEOTECH SAMPLE OR CORE BOX NO. (e)	ANALYTICAL SAMPLE NO. (f)	BLOW COUNT (g)	REMARKS (h)
	0	2" Topsoil Br. SILT 65% w/ Sand Dump Noode No Staining No Plasticity	0.0	1.7	M	1-1	Sampled Shelby Tube From 0-2 G 930 13 Dec 04
	2	split Spoon Re logal G 1.9 Weathered SS				4-15	7.5 yr 5/6
1027	6	Top of Core #1 G 6 C WEATHERED SANDSTONE LT. BRN FINE TO MED GRAIN LT. BRN TO WHITE					Recovery = $\frac{90}{114} = 78\%$ RQD = $\frac{49.5}{90} = 55\%$ 7.5 yr 5/6
	16	Bottom of Core #1 G 15.5					
1200 1215	16	Top of Core #2 reddish/BR SANDSTONE MED TO FINE GRAIN					Recovery = $\frac{110.4}{122.9} = 90.1\%$ RQD = $\frac{68.5}{110.4} = 62\%$ 5 yr 4/4
	18						
	20						

PROJECT

RVAAP RI 14

HOLE NO.

CBLMW-001

HTRW DRILLING LOG

(CONTINUATION SHEET)

HOLE NUMBER

CBLmw-001

PROJECT

RVAAP RE 14

INSPECTOR

Mark Dunlevy

SHEET SHEETS

3 OF 4

ELEV. (a)	DEPTH (b)	DESCRIPTION OF MATERIALS (c)	FIELD SCREENING RESULTS (d)	GEOTECH SAMPLE OR CORE BOX NO. (e)	ANALYTICAL SAMPLE NO. (f)	BLOW COUNT (g)	REMARKS (h)
	20						
	22	COLOR CHANGES TO LT BRN/GREY					7.54R 5/6
	24						
1250		Bottom of Core # 2 @ 25.7					
1330	26	Top of Core # 3					Recovery = $\frac{109.2}{116.4} = 93.8\%$ RQD = $\frac{16}{109.2} = 14.6\%$ 54R 4/6
	28	REDDISH BRN MED TO FINE GRAIN SANDSTONE					
	30	LT BRN					7.54R 5/6
	32						
	34						
1400		Bottom of Core # 3 @ 35.4					
1450	36	Top of Core # 4					
	38	LT BRN MED GRAIN SANDSTONE					7.54R 5/6
	40						

PROJECT

RVAAP RE 14

HOLE NO.

CBLmw-001

HTRW DRILLING LOG

(CONTINUATION SHEET)

HOLE NUMBER

CBDMW-001

PROJECT

RVAAP R114

INSPECTOR

Mark Dunlevy

SHEET SHEETS

4 OF 4

ELEV. (a)	DEPTH (b)	DESCRIPTION OF MATERIALS (c)	FIELD SCREENING RESULTS (d)	GEOTECH SAMPLE OR CORE BOX NO. (e)	ANALYTICAL SAMPLE NO. (f)	BLOW COUNT (g)	REMARKS (h)
	40	LT. BRN MED GRAIN SANDSTONE					7.54R5/6
	42						
	44						
	46						
	48						
	50	BoH 50 ft					BoH 50 Sand to 49 Screen from 49 to 39 Sand to 34 Bentonite to 31 Grout to Surface Stick-up well Completion
	52						

PROJECT

RVAAP R114

HOLE NO.

CBDMW-001

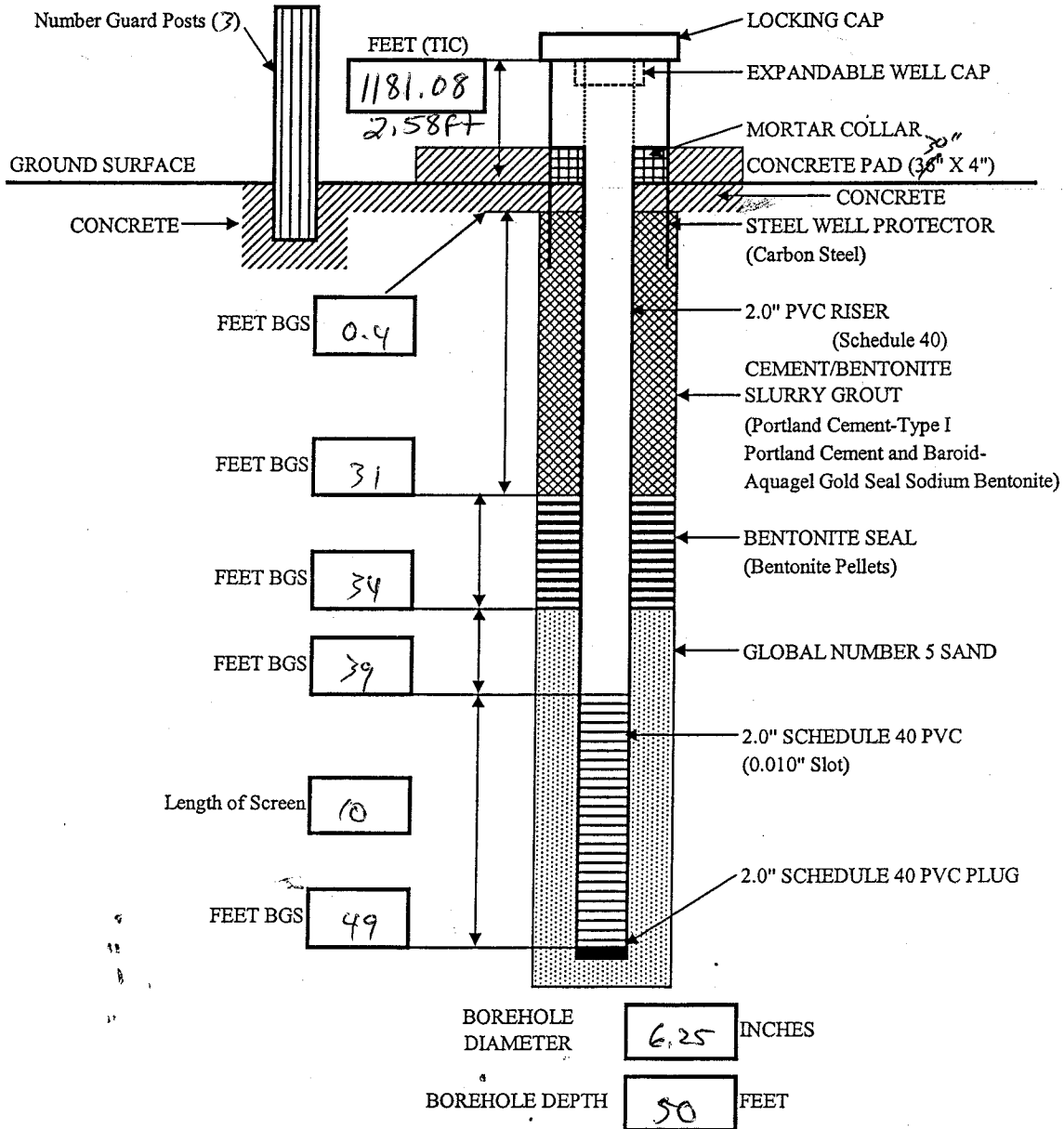


MONITORING WELL CONSTRUCTION DIAGRAM

RAVENNA ARMY AMMUNITION PLANT

Project: RWAP PI 14

Well Number: CBLMW-001	Begin: 13 Dec 04	End: 14 Dec 04
Coordinates: N: 559403.12 E: 2343657.08	Elevation: 1178.50	Reference Point:
Logged By: <i>[Signature]</i>		



Notes:

- 1) Figure not drawn to scale.
- 2) BGS = Below Ground Surface.
- 3) Well head protected with three guard posts set in triangle configuration about the concrete pad.

Well Development Record

Well ID: CBA-001-6W
 Date: 12/22/04

Ravenna Army Ammunition Plant-
 RVAAP 14 AOC Characterization

Project: RVAAP14
 Development Company: MCM

Development Method: Whale pumping
 Comments: -

Well TD: 52.5 FT TIC Depth to Water: 42.5 FT ~ 6 gal Well Volume (gallons/foot) 2-Inch = 0.16 6-Inch = 1.47
 Water Column Height: 10 FT One Well Volume: 5.9 Gals 4-Inch = 0.65 8-Inch = 2.61

Time	Well Dev. Code	Depth to Water (ft)	Purge Rate (gpm)	Purge Volume (gal)	Field Measurements				Turbidity	Comments
					pH	Con	DO	Temp		
0918	DSB	42.5	-	-	-	-	-	-	-	-
0927	DSE	43.0	-	-	-	-	-	-	-	-
1140	DPB	43.0	-	-	6.31	0.035	11.09	7.3	>1000	-
1149	DFM	-	-	6 gal	6.30	0.035	10.58	7.4	>1000	1st well vol (6 gal)
1150	DPE	51.0	-	-	-	-	-	-	-	-
1301	DSB	48.5	-	-	-	-	-	-	-	-
1305	DSE	47.5	-	-	-	-	-	-	-	-
1448	DBB	47.7	-	-	-	-	-	-	-	-
1511	DFM	48.1	-	6 gal	6.80	0.054	10.53	9.8	>1000	2nd well vol (12 gal)
1512	DBE	-	-	-	-	-	-	-	-	12 gal
1055	DPB/DPE	-	-	-	-	-	-	-	-	-
1320	DPB	-	-	-	-	-	-	-	-	-
	DFM	-	-	-	-	-	-	-	-	18 GAL
	DPE	-	-	6 GAL	8.39	0.025	-	-	-	-
0845	DPB	-	-	-	-	-	-	-	-	-
0920	FINAL DFM	-	-	8 gal	8.40	0.05	10.63	10.3	>1000	24 gal (4th well vol)

01/07/05

01/11/05

WELL DEVELOPMENT CODES

- DPB - Begin Pumping
- DPE - End Pumping
- DSB - Begin Surge Blocking
- DSE - End Surge Blocking
- DFM - Field Measurements
- DBB - Begin Bailing
- DBE - End Bailing
- DXB - Begin Other
- DXE - End Other
- Other: _____

FIELD MEASUREMENT CODES

- MTP - Temperature
- MSC - Specific Conductance
- MPD - Photoionizer (eg. HNU)
- MFD - Flame Ionizer (eg. OVA)
- MDO - Dissolved Oxygen
- MPH - pH
- MEH - eH
- MOT - Other _____

TURBIDITY

- Enter Turbidity Meter Reading (Final should be < 5 NTU)
- OR
- Enter Qualitative Observations
- H - High: Muddy/Silty
- M - Medium: Cloudy/Translucent
- L - Low: Transparent
- N - None: Clear/No Sediment

Logged By: NILESJI SHRINGARPURE (Please Print)

Reviewed By: C. Ecker

Signature: [Handwritten Signature]

Date: 2/22/05

Monitoring Well Purging Form

Well ID: CBLMW-001-GW

Ravenna Army Ammunition Plant
Ravenna, Ohio

Date: 01/20/04

WELL OBSERVATIONS

Protective Casings: Intact · Damaged Locked: Yes · No Key No:
 Concrete Base: Intact · Damaged Inner Casing: 2" · 4" · 6" · 8" Other:
 Stickup Height: 24 (ft) TIC · TOC Difference: 0.24 (ft)
 Vapor Readings: HNu · OVA Background: _____ Inside Well Casing:

	Present	Depth	Sampled Sample ID
LNAPL Yes · <input checked="" type="checkbox"/> No _____	Yes · No		<u>CBLMW-001-GW</u>
DNAPL Yes · <input checked="" type="checkbox"/> No _____	Yes · No		

CALCULATIONS

- (A) Depth to Well Bottom 39.3 (ft) TOC · TIC · BGS Measured Previously Measured (circle one)
 (B) Depth to Water 49.6 (ft) TOC · TIC · BGS Time Measured: 1030
 (C) Water Column Height (A-B) 10 or 5 (ft)
 (D) Well Diameter Factor 0.16 (gal/ft) (2" = 0.16, 4" = 0.65, 6" = 1.47, 8" = 2.61 GAL/FT)
 (E) One Well Volume (C*D) 1.65 (gal)
 (F) Volumes to be Evacuated 5
 (G) TOTAL VOLUME TO BE EVACUATED (E * F) 8.24 (gal)

EVACUATION METHOD

Well Evacuation Method: Bailer · Submersible Pump · Other: MicroPurge Device Number: _____
 Purge Water Disposition: 1. Discharged Onsite 2. Collected And: Stored · Disposed Onsite Offsite
 Collected In: Tanks Drums No. of Containers: _____

Comments: _____

TIME	DEPTH TO WATER (ft)	PURGE RATE (gpm)	Field Measurements						Comments
			HNu	Spec. Cond	Temp	pH	Turb	DO	
1031	39.3			0.046	8.73	8.19	999	12.46	
1034	39.6			0.046	8.90	7.97	999	12.49	
1037	39.71			0.058	9.26	7.49	999	12.52	
1041	39.71			0.037	9.45	7.16	999	12.54	
1044	39.83			0.037	9.46	7.16	999	12.58	

Logged By: Sudheer Gubba (Please Print)

Reviewed By: C. Swaller

Signature: C. Swaller

Date: 2/22/06

Location ID: CBLMN-001-GW

Field Sampling Report

Ravenna Army Ammunition Plant
Characterization of 14 RVAAP AOCs

Date: 0120104

Sampling Information

Source	Groundwater / Product	Surface Water	Soils / Sediments / Sludge	
Method	Bailer	Sample Bottle	Scoop	Trowel
	Pump	Bacon Bomb	Bowl	Hand Auger
	Micro purge <u>1 X</u>		Push Probe	Plastic Liner
Type/Construction	<u>Stainless steel</u>		Mattocks	
Miscellaneous	Well Purging Form <u>Yes</u> - No			

Sample Collection: 1300 hrs Sample Type: Composite - MI - Grab
 Sample Depth: 39.83 FT (below surface) Decon: Dedicated - Each Day - Each Location
 Location: Plotted on Map - Staked in Field
 Estimated - Measured - Surveyed

Field Parameters (at time of sample)	Analytical Parameters				Other Parameters			
PID / FID Readings:	VOC	<u>X</u>	TPH GRO		Corrosivity			
Background: <u>NT</u> ppm	SVOC	<u>X</u>	TPH DRO		Reactivity Sulfide/Cyanide			
Sample: <u>NT</u> ppm	Explosives	<u>X</u>	Chromium +6	<u>X</u>	Ignitability			
Water Level: <u>39.83</u> FT	Propellants	<u>X</u>	Nitrate		QA Samples			
Temperature: <u>9.46</u> °C	TAL Metals	<u>X</u>			MS/MSD	<u>Yes</u> / No	NA	
Sp. Conductance: <u>0.037</u> uMHOs	Pesticides/PCBs	<u>X</u>			Duplicate ID	<u>✓</u> CBLMN-001-GW	NA	
pH: <u>7.16</u> units	Cyanides				Equipment Rinse ID		<u>NA</u>	
Turbidity: <u>>1000</u> NTU	TOC				Trip Blank ID	<u>95</u> CBLMN-001-GW	TRIP BLANK	NA
	Grain Size							

Sample Description
 No odor, No sheen, low turbidity,
 Not clear water

Split Sample ID: CBLMN-001-GW
 Name: JOHN JEFF (CBLMN-ED-BW)
 Agency/Company: USACE - LOUISVILLE
 Address: 600 DR MARTIN LUTHER KING JR PLAZA
LOUISVILLE, KY 40202

QA/QC Provided: MS/MSD - Duplicate - Trip-Blanks - Field Blanks
 Parameters: Same as Above As Listed

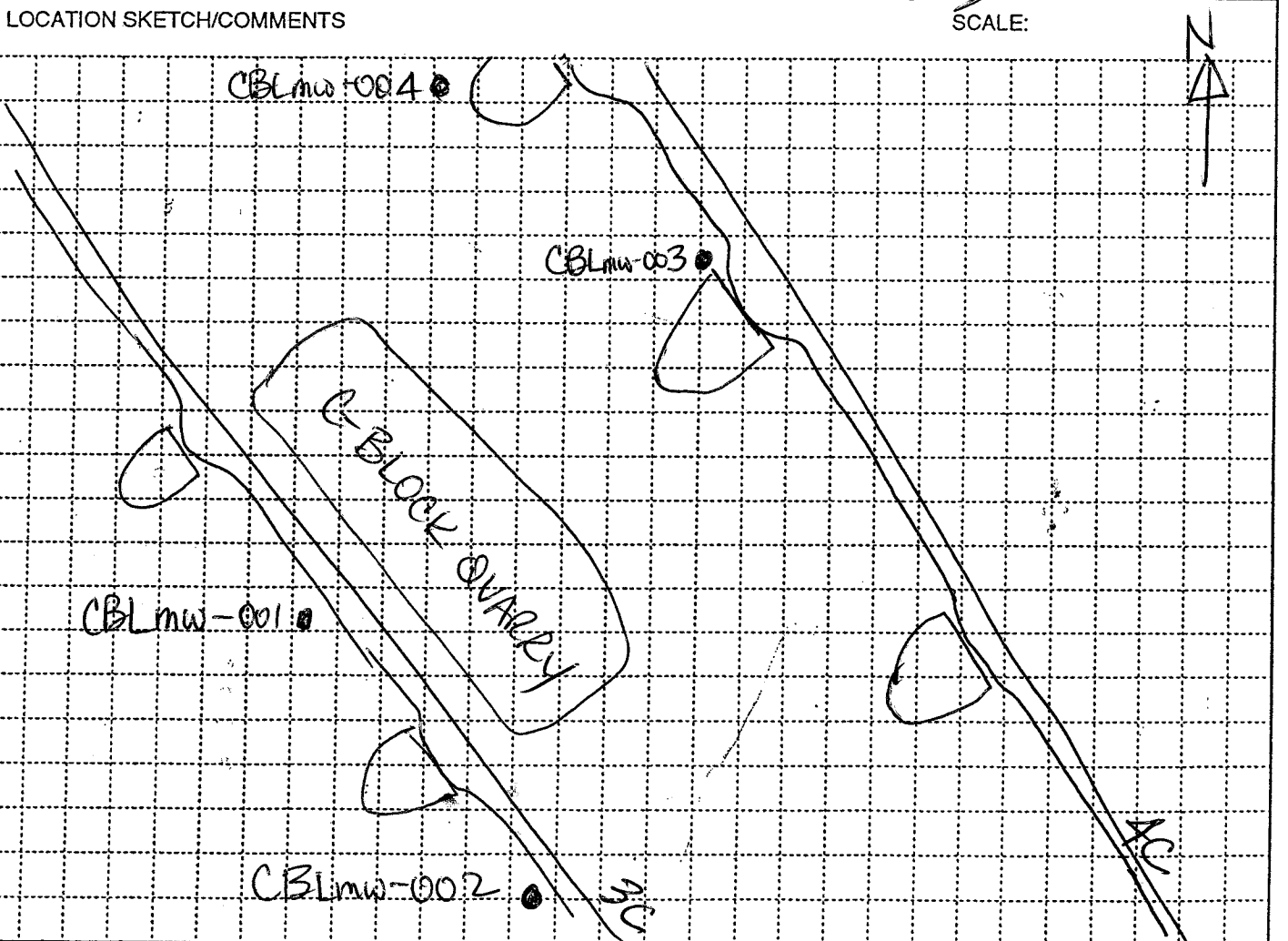
Soil sample description should include:
 Munsell Color Odor Staining Texture Sorting Plasticity Moisture

Water sample description should include:
 Color Odor Sheen Turbidity

Logged By: Sudheer Gubba (Please Print) Reviewed by: ERIC ELLIS (Please Print)
 Signature: [Signature] Signature: [Signature] Date: 2/1/5

HTRW DRILLING LOG		DISTRICT Covisville	HOLE NUMBER CBLmw-002
1. COMPANY NAME M&M Engineers Inc		2. DRILL SUBCONTRACTOR HAD Drilling Contractors	
3. PROJECT RVAAP RI 14		4. LOCATION C-Block Quarry	
5. NAME OF DRILLER Sam Haller		6. MANUFACTURER'S DESIGNATION OF DRILL CME LC-60	
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT 10.25 CD HSA 2" Split Specs 6.125" Air Rotary Hammer		8. HOLE LOCATION South of Egloo	
		9. SURFACE ELEVATION 1172.50 ASL	
		10. DATE STARTED 21 Dec 04	11. DATE COMPLETED 22 Dec 04
12. OVERBURDEN THICKNESS 6.0		15. DEPTH GROUNDWATER ENCOUNTERED 35 ft.	
13. DEPTH DRILLED INTO ROCK 45.3		16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED 43.69' @ 0925 1/4/05	
14. TOTAL DEPTH OF HOLE 45.3		17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY)	

18. GEOTECHNICAL SAMPLES		DISTURBED		UNDISTURBED		19. TOTAL NUMBER OF CORE BOXES 0 Boxes	
20. SAMPLES FOR CHEMICAL ANALYSIS		VOC		METALS		OTHER (SPECIFY)	
		-		-		-	
22. DISPOSITION OF HOLE		BACKFILLED		MONITORING WELL		OTHER (SPECIFY)	
		-		X		-	
						23. SIGNATURE OF INSPECTOR <i>[Signature]</i>	



PROJECT RVAAP RI 14	HOLE NO. CBLmw-002
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HTRW DRILLING LOG

(CONTINUATION SHEET)

HOLE NUMBER

CBLMW-002

PROJECT

RVAAP RI 14

INSPECTOR

Mart Dunlevy

SHEET SHEETS

2 OF 3

ELEV. (a)	DEPTH (b)	DESCRIPTION OF MATERIALS (c)	FIELD SCREENING RESULTS (d)	GEOTECH SAMPLE OR CORE BOX NO. RECOVERY	ANNUAL SAMPLE NO. USCS	BLOW COUNT (g)	REMARKS (h)
1450	0	Topsoil Br. SILT 60% w/ Sand Damp No odor No staining No Plasticity	0.0	1.6	ML	1-6 7-10	7.5y-416
	2	SAA					SAA
	4	Br. SAND 66% w/ silt Moist No odor No staining No Plasticity	0.0	1.0	ML	4-7 7-7	SAA
1446	6	weathered Lt. Br/white SAND/SS Reddish Br weathered SS	0.0	1.8	SM	2-8 18-27	SAA
	8	More competent Bedrock @ 8.5 ft Sandstone					Began Air Rotary Hammer @ 6.0 ft.
	10						
	12						
	14	white Lt. Br. SS → color change @ 13					7.5y-713
	16	Color change to Lt. Br. @ 15					7.5y-516
	18						
	20						
	22	Color changes to Reddish Br. @ 21 ft Color changes to Lt. Br./grey @ 22 ft					5y-414 7.5y-516
	24						
	26	Color changes to Reddish Br. @ 26 ft					5y-416
	28	Color changes to Lt. Br. @ 27 Color changes to Reddish Br. @ 29.5					7.5y-516 5y-416
	30						
	32						
	34						
	36	Saturated @ 35.0 ft. (took WL on 22 Dec 04)					
	38	Color change to Lt. Br. @ 37					7.5y-516
	40						

PROJECT

RVAAP RI 14

HOLE NO.

CBLMW-002

HTRW DRILLING LOG

(CONTINUATION SHEET)

HOLE NUMBER

CRW-002

PROJECT

RVAAP RZ 14

INSPECTOR

Mark Dunlap

SHEET SHEETS

3 OF 3

ELEV. (a)	DEPTH (b)	DESCRIPTION OF MATERIALS (c)	FIELD SCREENING RESULTS (d)	GEOTECH SAMPLE OR CORE BOX NO. (e)	ANALYTICAL SAMPLE NO. (f)	BLOW COUNT (g)	REMARKS (h)
	40	SAA					
	42						
	44						
	46	BoH 45.3					BoH 45.3
	48						Screen from 44.5
	50						to 34.5
	52						Screen to 29
	54						Bentonite to 26
	56						Grout to Surface
	58						Stack up well completion
	60						

PROJECT

RVAAP RZ 14

HOLE NO.

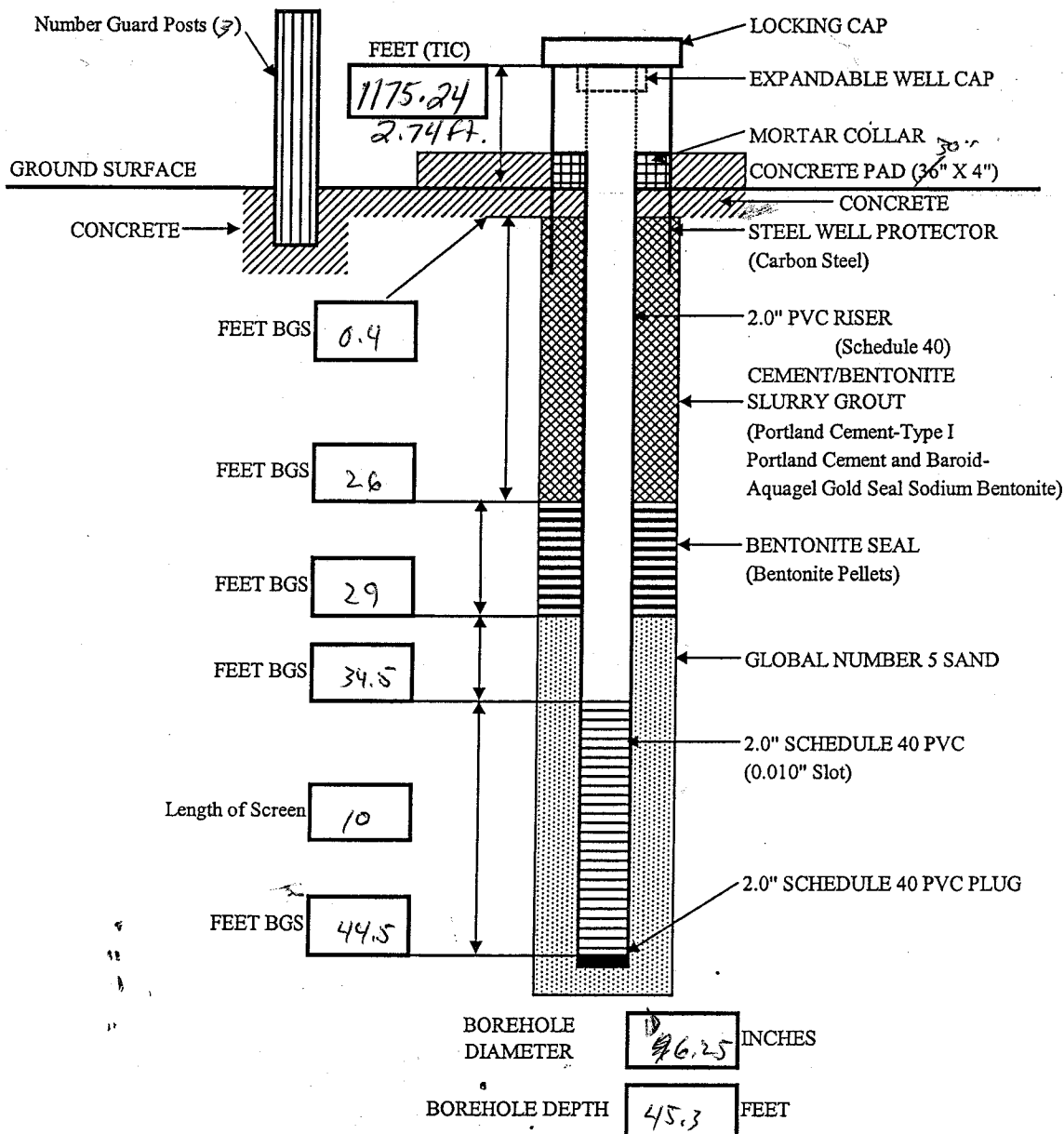
CRW-002



MONITORING WELL CONSTRUCTION DIAGRAM
RAVENNA ARMY AMMUNITION PLANT

Project: *ZVAAP R214*

Well Number: <i>CBLmw-002</i>	Begin: <i>21 Dec 04</i>	End: <i>22 Dec 04</i>
Coordinates: N: <i>559044.48</i> E: <i>2343845.22</i>	Elevation: <i>1172.50</i>	Reference Point:
Logged By: <i>[Signature]</i>		



Notes:

- Figure not drawn to scale.
- BGS = Below Ground Surface.
- Well head protected with three guard posts set in triangle configuration about the concrete pad.

Monitoring Well Purging Form

Well ID: CBLmw-002-GW

Ravenna Army Ammunition Plant
Ravenna, Ohio

Date: 01/12/05

WELL OBSERVATIONS

Protective Casing: Intact Damaged Locked: Yes No Key No:
 Concrete Base: Intact Damaged Inner Casing: 2" · 4" · 6" · 8" Other:
 Stickup Height: 2.8 (ft) TIC · TOC Difference: _____ (ft) 2.5 inches
 Vapor Readings : HNu · OVA Background: 0 Inside Well Casing:

	Present	Depth	Sampled Sample ID
LNAPL Yes · No _____	Yes · No _____	Yes · No _____	<u>CBLmw-002-GW</u>
DNAPL Yes · No _____	Yes · No _____	Yes · No _____	

CALCULATIONS

- (A) Depth to Well Bottom 47.3 (ft) TOC · TIC · BGS Measured · Previously Measured (circle one)
 (B) Depth to Water 35.3 (ft) TOC · TIC · BGS Time Measured: 1331
 (C) Water Column Height (A-B) 12 (ft)
 (D) Well Diameter Factor 0.16 (gal/ft) (2" = 0.10, 4" = 0.65, 6" = 1.47, 8" = 2.61 GAL/FT)
 (E) One Well Volume (C * D) 1.92 (gal)
 (F) Volumes to be Evacuated 5
 (G) TOTAL VOLUME TO BE EVACUATED (E * F) 9.60 (gal)

EVACUATION METHOD

Well Evacuation Method: Bailer · Submersible Pump · Other MicroPurge Device Number: _____

Purge Water Disposition: 1. Discharged Onsite 2. Collected And: Stored Disposed Onsite Offsite

Collected In: Tanks · Drums No. of Containers: _____

Comments: _____

TIME	DEPTH TO WATER (ft)	PURGE RATE (gpm)	Field Measurements						Comments
			HNu	Spec Cond	Temp	pH	Turb	DO	
1330	35.3			0.113	11.85	66.7	0	12.20	INITIAL READING
1333	36.1			0.112	11.82	59.3	0	11.85	
1336	36.2			0.112	11.85	56.3	0	11.05	
1339	36.1			0.110	11.84	57.1	0	12.20	MICROPURGING COMPLETE

Logged By: NILESH SHRINGARPURE (Please Print)

Reviewed By: C. E. Egan

Signature: N. Shringarpure

Date: 2/22/05

Field Sampling Report

Location ID: CBLmw-002-GW

Ravenna Army Ammunition Plant
Characterization of 14 RVAAP AOCs

Date: 01/12/05

Sampling Information

Source	Groundwater / Product	Surface Water	Soils / Sediments / Sludge		
Method	Bailer	Sample Bottle	Scoop		Trowel
	Pump <u>MICROBURGE PUMP</u> ✓	Bacon Bomb	Bowl		Hand Auger
Type/Construction			Push Probe		Plastic Liner
Miscellaneous	Well Purging Form Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>		Mattocks		

Sample Collection: 1330 hrs Sample Type: Composite - MI Grab
 If MI, # of increments taken: NA Location: Plotted on Map Staked in Field
 Sample Depth: 41.3 ^{ms} FT (below surface) Decon: Dedicated - Each Day Each Location
 Estimated - Measured - Surveyed

Field Parameters (at time of sample)	Analytical Parameters				Other Parameters		
PID / FID Readings: Background: <u>NT</u> ppm	VOC	✓	TPH GRO		Corrosivity		
	SVOC	✓	TPH DRO		Reactivity Sulfide/Cyanide		
	Explosives	✓	Chromium +6	✓	Ignitability		
Sample: <u>NT</u> ppm	Propellants	✓	Nitrate				
Water Level: <u>36.1</u> ^{SEE} FT	TAL Metals	✓			QA Samples		
Temperature: <u>11.84</u> °C	Pesticides/PCBs	✓			MS/MSD	Yes / No	NA
Sp. Conductance: <u>0.110</u> uMHOs	Cyanides				Duplicate ID		NA
pH: <u>5.71</u> units	TOC				Equipment Rinse ID		NA
Turbidity: <u>0</u> N.T.U.	Grain Size				<u>Trip Blank ID</u>	<u>Trip Blank</u>	NA

Sample Description
NO COLOR, NO ODOR, NO SHEEN, LOW
TURBIDITY

Split Sample

Split Sample ID: _____
 Name: _____
 Agency/Company: _____
 Address: _____

QA/QC Provided: MS/MSD - Duplicate - Tap Blanks - Field Blanks
 Parameters: Same as Above - As Listed

Soil sample description should include:
 Munsell Color Odor Staining Texture Sorting Plasticity Moisture

Water sample description should include:
 Color Odor Sheen Turbidity

Logged By: NILESH SHRINGARPURE (Please Print) Reviewed by: [Signature] (Please Print)
 Signature: [Signature] Signature: ERIC EWS Date: 2/1/05

HTRW DRILLING LOG		DISTRICT Louisville			HOLE NUMBER CBLmw-003	
1. COMPANY NAME MEM Engineers Inc		2. DRILL SUBCONTRACTOR HAD Drilling Contractors			SHEET SHEETS 1 OF 4	
3. PROJECT RVAAP RI 14			4. LOCATION C-Block Quarry			
5. NAME OF DRILLER Sgm Holter			6. MANUFACTURER'S DESIGNATION OF DRILL CME LC-60			
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT		10.25 OP HSA		8. HOLE LOCATION North of Igloo 4-C-9		
		2" Split Spear		9. SURFACE ELEVATION 1172.22 ASL		
		6.125 Air Rotary Hammer		10. DATE STARTED 19 Dec 04		
		2" ID Core Barrel		11. DATE COMPLETED 21 Dec 04		
12. OVERBURDEN THICKNESS 2.5 ft			15. DEPTH GROUNDWATER ENCOUNTERED ~30 ~38			
13. DEPTH DRILLED INTO ROCK 44			16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED 34.5 @ 1314 1/4/05			
14. TOTAL DEPTH OF HOLE 44			17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY)			
18. GEOTECHNICAL SAMPLES		DISTURBED -	UNDISTURBED -	19. TOTAL NUMBER OF CORE BOXES 3		
20. SAMPLES FOR CHEMICAL ANALYSIS		VOC -	METALS -	OTHER (SPECIFY) -	OTHER (SPECIFY) -	OTHER (SPECIFY) -
						21. TOTAL CORE RECOVERY %
22. DISPOSITION OF HOLE		BACKFILLED -	MONITORING WELL X	OTHER (SPECIFY) -	23. SIGNATURE OF INSPECTOR <i>M.D. Duly</i>	
LOCATION SKETCH/COMMENTS				SCALE:		
PROJECT RVAAP RI 14				HOLE NO. CBLmw-003		

HTRW DRILLING LOG

(CONTINUATION SHEET)

HOLE NUMBER

CBLW-003

PROJECT

RVAAP PE 14

INSPECTOR

Mark Dunlevy

SHEET SHEETS

2 OF 4

ELEV. (a)	DEPTH (b)	DESCRIPTION OF MATERIALS (c)	FIELD SCREENING RESULTS (d)	GEO TECH SAMPLE OR CORE BOX NO. RECOVERY	ANALYTICAL SAMPLE NO. USCS	BLOW COUNT (g)	REMARKS (h)
	0	3" Topsoil					
	2	Reddish Sandy SILT. Dry Noodor No Staining No Plasticity			ML		
	2	Weathered SS Split Spcn Refusal @ 2.5					
	4	Weathered SS Bedrock					
	6	Top of Core #1 @ 6"					
0835	6	LT BRN/TAN SANDSTONE FINE TO MED GRAINED				10YR 5/4	$Rec = \frac{110}{118} = 93.2\%$ $RQD = \frac{61}{110} = 55.45\%$ 5YR 5/6
	8	CHANGES TO RED/BR					
	10						
	12						
	14						
0936	16	Bottom of Core #1 @ 15.9					
0950	16	Top of Core #2					
	18	REDDISH BRN SANDSTONE					5YR 5/6
	20						

PROJECT

RVAAP PE 14

HOLE NO.

CBLW-003

HTRW DRILLING LOG

(CONTINUATION SHEET)

HOLE NUMBER

CBLOW-003

PROJECT

ZVAAPRE 14

INSPECTOR

Mark Dunlevy

SHEET SHEETS

3 OF 4

ELEV. (a)	DEPTH (b)	DESCRIPTION OF MATERIALS (c)	FIELD SCREENING RESULTS (d)	GEOTECH SAMPLE OR CORE BOX NO. (e)	ANALYTICAL SAMPLE NO. (f)	BLOW COUNT (g)	REMARKS (h)
	26	SAA					$Recovery = \frac{117}{122} = 95.9\%$ $RQD = \frac{30}{117} = 25.6\%$
16 Dec 09 0900 0915	26	Bottom of Core #2 @ 25.5 Top of Core #3					$Recovery = \frac{36}{120} = 30\%$ RQD = 104R 7/8
	26	LT BRN/TAN SANDSTONE					Recovery was so low due to drill bit on core barrel malfunctioned and pulverized the rock after 3 feet of coring.
1030 0940 21 Dec 09	36	Bottom of Core #3 @ 35.5 Top of Core #4					54R 5/6
	36	REDDISH/LT BROWN SANDSTONE					
	38						
	40						

PROJECT

ZVAAPRE 14

HOLE NO.

CBLOW-003

HTRW DRILLING LOG

(CONTINUATION SHEET)

HOLE NUMBER

CPLMW-003

PROJECT

RVAAP RE 14

INSPECTOR

Mark Dunlavy

SHEET SHEETS

4 OF 4

ELEV. (a)	DEPTH (b)	DESCRIPTION OF MATERIALS (c)	FIELD SCREENING RESULTS (d)	GEOTECH SAMPLE OR CORE BOX NO. (e)	ANALYTICAL SAMPLE NO. (f)	BLOW COUNT (g)	REMARKS (h)
	40	SAA					$Recovery = \frac{90}{102} = 88.2\%$ $RAD = \frac{51}{90} = 56.6\%$
1020	44	Bottom of Core G 44.0					
	44	BoH 44.0					BoH 44 Sand to 43 Screen from 43 to 35 Sand up to 28 Bentonite to 25 Grout to surface
	46						
	48						

PROJECT

RVAAP RE 14

HOLE NO.

CPLMW-003

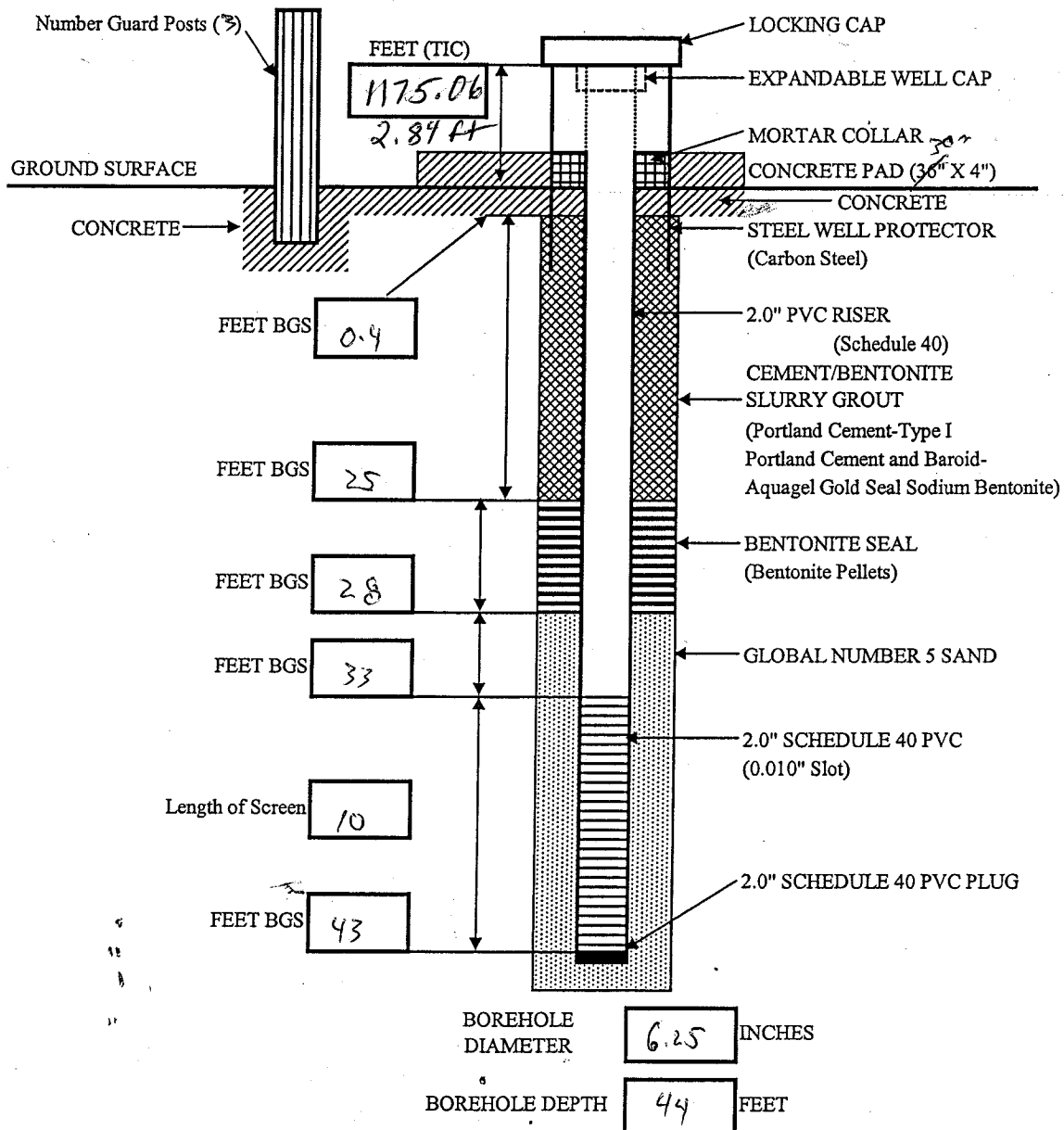


MONITORING WELL CONSTRUCTION DIAGRAM

RAVENNA ARMY AMMUNITION PLANT

Project: RVAAP RZ 14

Well Number: CBLMW-003	Begin: 14 Dec 04	End: 21 Dec 04
Coordinates: N: 559695.52 E: 2343970.00	Elevation: 1172.22	Reference Point:
Logged By: <i>[Signature]</i>		



Notes:

- 1) Figure not drawn to scale.
- 2) BGS = Below Ground Surface.
- 3) Well head protected with three guard posts set in triangle configuration about the concrete pad.

Monitoring Well Purging Form

Well ID: CBLmw-003-GW

Ravenna Army Ammunition Plant
Ravenna, Ohio

Date: 01/12/05

WELL OBSERVATIONS

Protective Casing: Intact Damaged Locked: Yes No Key No:
 Concrete Base: Intact Damaged Inner Casing: 2" 4" · 6" · 8" Other:
 Stickup Height: 3.4 (ft) TIC · TOC Difference: _____ (ft) 4 inches.
 Vapor Readings : HNu · OVA Background: 0 Inside Well Casing:

	Present	Depth	Sampled Sample ID
LNAPL Yes · No	_____	Yes · No	CBLmw - 003 - GW
DNAPL Yes · No	_____	Yes · No	

CALCULATIONS

- (A) Depth to Well Bottom 44.7 (ft) TOC TIC · BGS Measured Previously Measured (circle one)
 (B) Depth to Water 31.5 (ft) TOC TIC · BGS Time Measured: 1433
 (C) Water Column Height (A-B) 13.2 (ft)
 (D) Well Diameter Factor 0.16 (gal/ft) 2" = 0.16, 4" = 0.65, 6" = 1.47, 8" = 2.61 GAL/FT
 (E) One Well Volume (C*D) 2.11 (gal)
 (F) Volumes to be Evacuated 5
 (G) **TOTAL VOLUME TO BE EVACUATED (E * F)** 10.56 (gal)

EVACUATION METHOD

Well Evacuation Method: Bailer Submersible Pump Other: _____ Device Number: _____

Purge Water Disposition: 1. Discharged Onsite 2. Collected And: Stored Disposed Onsite Offsite

Collected In: Tanks Drums No. of Containers: _____

Comments: _____

TIME	DEPTH TO WATER (ft)	PURGE RATE (gpm)	Field Measurements						Comments
			HNu	Spec Cond	Temp	pH	Turb	DO	
1434	31.5			0.114	12.54	6.04	38	15.43	INITIAL READING
1437	31.65			0.102	12.04	5.93	0	15.42	
1440	31.65			0.112	12.10	5.73	0	15.43	
1443	31.65			0.114	12.10	5.93	0	15.42	MICROSURGING COMPLETE

Logged By: NILESH SHRINGARPURE (Please Print)

Reviewed By: C. - roller

Signature: N. Shringarpure

Date: 2/22/05

Field Sampling Report

Location ID: CBLmw - 003-GW

Ravenna Army Ammunition Plant
Characterization of 14 RVAAP AOCs

Date: 01/12/05

Sampling Information

Source	Groundwater / Product	Surface Water	Soils / Sediments / Sludge	
Method	Bailer	Sample Bottle	Scoop	Trowel
	Pump <u>MICRO PURGE PUMP</u> ✓	Bacon Bomb	Bowl	Hand Auger
			Push Probe	Plastic Liner
Type/Construction			Mattocks	
Miscellaneous	Well Purging Form <u>Yes</u> - No			

Sample Collection: 1455 hrs Sample Type: Composite - MI - Grab Location: Plotted on Map - Staked in Field
 If MI, # of increments taken: NA
 Sample Depth: 381 FT (below surface) Decon: Dedicated - Each Day - Each Location Estimated - Measured - Surveyed

Field Parameters (at time of sample)	Analytical Parameters				Other Parameters			
PID / FID Readings: Background: <u>NT</u> ppm	VOC	✓	TPH GRO		Corrosivity			
	SVOC	✓	TPH DRO		Reactivity Sulfide/Cyanide			
	Explosives	✓	Chromium +6	✓	Ignitability			
Sample: <u>NT</u> ppm	Propellants	✓	Nitrate					
Water Level: <u>31.65</u> FT	TAL Metals	✓			QA Samples			
Temperature: <u>12.10</u> °C	Pesticides/PCBs	✓			MS/MSD	Yes / No		NA
Sp. Conductance: <u>0.114</u> uMHOs	Cyanides				Duplicate ID			NA
pH: <u>5.93</u> units	TOC				Equipment Rinse ID			NA
Turbidity: <u>0</u> N.T.U.	Grain Size				<u>Trip Blank ID</u>	<u>Trip Blank</u>		NA

Sample Description

NO COLOR NO ODOR NO SHEEN NO TURBIDITY

Soil sample description should include:
Munsell Color Odor Staining Texture Sorting Plasticity Moisture

Water sample description should include:
Color Odor Sheen Turbidity

Split Sample

Split Sample ID: _____

Name: _____

Agency/Company: _____

Address: _____

QA/QC Provided: MS/MSD - Duplicate - Trip Blanks - Field Blanks
 Parameters: Same as Above - As Listed

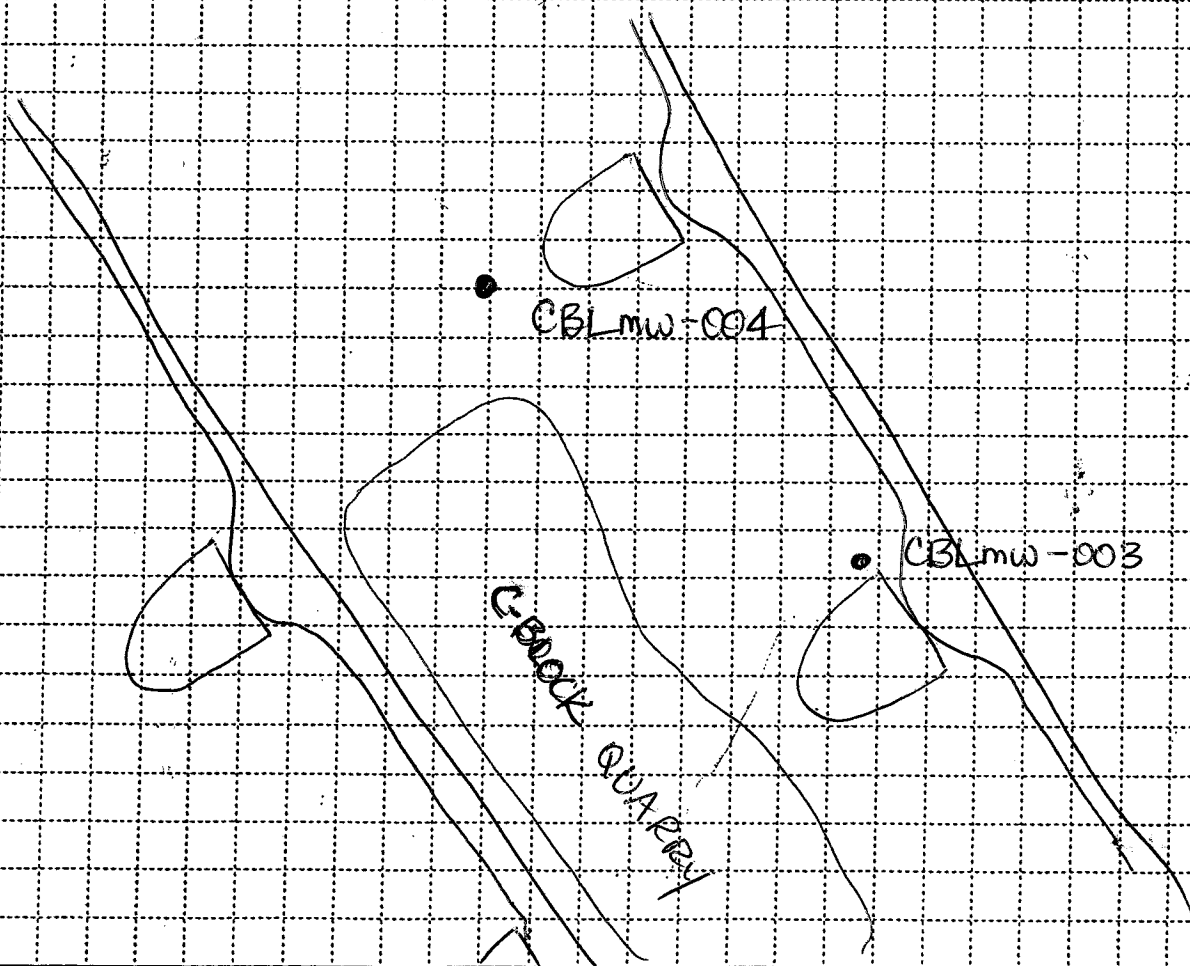
Logged By: NILESH SHRINGARPURE (Please Print) Reviewed by: ERIC EWIS (Please Print)

Signature: N Shringarpure Signature: Eric Date: 2/1/05

HTRW DRILLING LOG			DISTRICT Louisville			HOLE NUMBER CBLmw-004		
1. COMPANY NAME MKM Engineers Inc			2. DRILL SUBCONTRACTOR HAD Drilling Contractors			SHEET SHEETS 1 OF 3		
3. PROJECT RVAAPRI14			4. LOCATION C Block Quarry					
5. NAME OF DRILLER Sam Holler			6. MANUFACTURER'S DESIGNATION OF DRILL CME-LC60					
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT 6.25 ID HSA 2" Split Spoon 3" Shelby Tube 6.00 OD Air Rotary Hammer			8. HOLE LOCATION North of Quarry					
			9. SURFACE ELEVATION 1172.08 ASL					
			10. DATE STARTED 04 Jan 05			11. DATE COMPLETED 04 Jan 05		
12. OVERBURDEN THICKNESS 5.0			15. DEPTH GROUNDWATER ENCOUNTERED ~16, ~35-37					
13. DEPTH DRILLED INTO ROCK 45			16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED 34.2 @ 0909 01/07/05					
14. TOTAL DEPTH OF HOLE 45			17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY)					
18. GEOTECHNICAL SAMPLES		DISTURBED -		UNDISTURBED X		19. TOTAL NUMBER OF CORE BOXES -		
20. SAMPLES FOR CHEMICAL ANALYSIS		VOC -	METALS -	OTHER (SPECIFY) -	OTHER (SPECIFY) -	OTHER (SPECIFY) -	21. TOTAL CORE RECOVERY 0 %	
22. DISPOSITION OF HOLE		BACKFILLED +	MONITORING WELL X	OTHER (SPECIFY) -	23. SIGNATURE OF INSPECTOR <i>[Signature]</i>			

LOCATION SKETCH/COMMENTS

SCALE:



PROJECT RVAAPRI14	HOLE NO. CBLmw-004
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HTRW DRILLING LOG

(CONTINUATION SHEET)

HOLE NUMBER
CBL MW-004
SHEET 2 OF 3

PROJECT
RVAAP RE 14

INSPECTOR
Mark Dunlevy

845

915
938

ELEV. (A)	DEPTH (B)	DESCRIPTION OF MATERIALS (C)	FIELD SCREENING RESULTS (D)	TEST SAMPLE OR CORE BOX NO. RECOVERY (E)	ANALYTICAL SAMPLE NO. USES (F)	BLOW COUNT (G)	REMARKS (H)
	2	3" TOPSOIL BR CL SILT LT BR CL SILT (10%) / SAND (10%) (15%) TRACE ROCK FRAG (5%) LOW PLASTIC DAMP NO ODCR	0.0	1.5	ML	-11 2/4	104R 5/4
	4	BR SAND SILT w/ GRAVEL (10%) (30%) (55%) TRACE CLAY (5%) NO PLASTIC WEATHERED SS FRAG AT BOTTOM	-	1.5		--	900 SHELBY TUBE
	6	BR SAND SILT w/ GRAVEL (10%) (30%) (55%) TRACE CLAY (5%) NO PLASTIC WEATHERED SS FRAG AT BOTTOM	0.0	2.0	ML	1/5 6/50+	104R 5/4 AUGER REFUSAL 5'
	8	LT BR / TAN SANDSTONE					
	10	Color changes to Red/Br. @ 10					54-916
	12						
	14						
V	16	Color changes to DK Red saturated clay					54-916
	18	6" Gray shale Reddish Br. SS					7.54-611 54-516
	20	Dk Gray / Black shale					7.54-411
	22	DK Red shale					5.54-411
	24	Dk gray / Black shale Reddish Br. SS					7.54-411 54-516
	26						
	28	Color changes to Br/Tan @ 27.5 Color changes mid					7.54-713
	30						
	32						
	34	Color changes to Yellow/Br/Tan					104-718
	36	Color mid					
	38						
	40	Color changes to Red/Br @ 39.5					54-516

PROJECT
RVAAP RE 14

HOLE NO.
CBL MW-004

HTRW DRILLING LOG

(CONTINUATION SHEET)

HOLE NUMBER

CBLM-804

PROJECT

RVAAP RI 14

INSPECTOR

Mark Dunlap

SHEET SHEETS

3 OF 3

ELEV. (a)	DEPTH (b)	DESCRIPTION OF MATERIALS (c)	FIELD SCREENING RESULTS (d)	GEOTECH SAMPLE OR CORE BOX NO. (e)	ANALYTICAL SAMPLE NO. (f)	BLOW COUNT (g)	REMARKS (h)
	40	SAA					SAA
	42						
	44						
	46	Bott 45 ft.					Bott 45 Sand to 44 Screen from 44 to 34 Sand up to 28.7 Bentonite to 25 Grout to surface Stack-up well completion 5 gallons of water - For hydration
	48						
	50						

PROJECT

RVAAP RI 14

HOLE NO.

CBLM-804

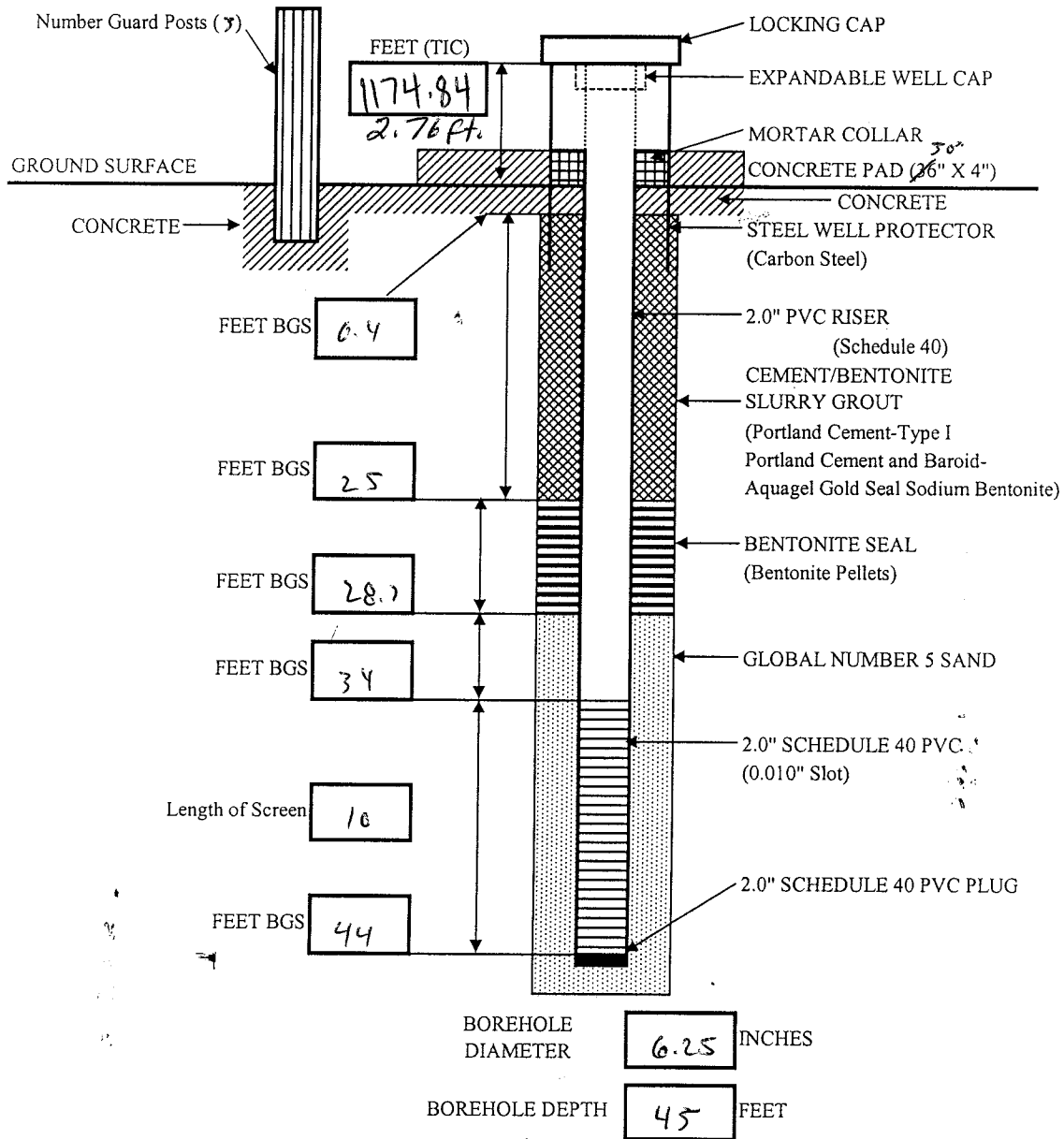


MONITORING WELL CONSTRUCTION DIAGRAM

RAVENNA ARMY AMMUNITION PLANT

Project: *LVAAP RI 14*

Well Number: <i>CBLmw-004</i>	Begin: <i>04 Jan 05</i>	End: <i>04 Jan 05</i>
Coordinates: N: <i>559951.68</i> E: <i>2343688.76</i>	Elevation: <i>1172.08</i>	Reference Point:
Logged By: <i>[Signature]</i>		



Notes:

- 1) Figure not drawn to scale.
- 2) BGS = Below Ground Surface.

- 3) Well head protected with three guard posts set in triangle configuration about the concrete pad.

Monitoring Well Purging Form

Well ID: CBLmw-004

Ravenna Army Ammunition Plant
Ravenna, Ohio

Date: 17 Jan 05

WELL OBSERVATIONS

Protective Casing: Intact · Damaged Locked: Yes · No Key No:
 Concrete Base: Intact · Damaged Inner Casing: 2" · 4" · 6" · 8" Other:
 Stickup Height: 2.76 (ft) TIC · TOC Difference: 0.38 (ft)
 Vapor Readings: HNu · OVA Background: 0 Inside Well Casing:

Present Depth Sampled Sample ID
 LNAPL Yes · No _____ Yes · No CBLmw-004-GW
 DNAPL Yes · No _____ Yes · No

CALCULATIONS

- (A) Depth to Well Bottom 46.9 (ft) TOC (TIC) BGS Measured · Previously Measured (circle one)
 (B) Depth to Water 32.2 (ft) TOC (TIC) BGS Time Measured: 13.70
 (C) Water Column Height (A-B) 14.7 (ft)
 (D) Well Diameter Factor 0.16 (gal/ft) (2" = 0.16, 4" = 0.65, 6" = 1.47, 8" = 2.61 GAL/FT)
 (E) One Well Volume (C*D) 2.36 (gal)
 (F) Volumes to be Evacuated 5
 (G) TOTAL VOLUME TO BE EVACUATED (E * F) 11.76 (gal)

EVACUATION METHOD

Well Evacuation Method: Bailer · Submersible Pump · Other: Micro-purge Device Number: _____

Purge Water Disposition: 1. Discharged Onsite 2. Collected And: Stored · Disposed Onsite · Offsite

Collected In: Tanks · Drums No. of Containers: _____

Comments: _____

TIME	DEPTH TO WATER (ft)	PURGE RATE (gpm)	Field Measurements						Comments
			HNu	Spec Cond	Temp	pH	Turb		
1416	32.20	Initial		0.0630	8.09	6.78	1000	11.68	
1419	32.31			0.061	8.61	6.46	1000	11.20	
1422	32.40			0.060	8.86	6.13	1000	10.92	
1425	32.41			0.061	9.77	5.93	995	11.12	Pump & Meter
1430	32.40			0.061	9.82	5.87	879	11.25	
14303	32.35			0.060	9.79	5.81	759	11.26	

Logged By: Mark Dunlop (Please Print)

Signature: [Signature]

Reviewed By: C. Colby

Date: 2/21/05

Field Sampling Report

Location ID: CBLMV-004-GW

Ravenna Army Ammunition Plant
Characterization of 14 RVAAP AOCs

Date: 17 Jan 05

Sampling Information

Source	Groundwater / Product	Surface Water	Soils / Sediments / Sludge
Method	Bailer	Sample Bottle	Scoop / Trowel
	Pump	Bacon Bomb	Bowl / Hand Auger
	<i>Microprobe</i> <input checked="" type="checkbox"/>		Push Probe / Plastic Liner
Type/Construction			Mattocks
Miscellaneous	Well Purging Form <input checked="" type="checkbox"/> Yes - No		

Sample Collection: 1435 hrs Sample Type: Composite - MI Grab Location: Plotted on Map - Staked in Field
 Sample Depth: ~41 FT (below surface) Decon: NA Estimated - Measured - Surveyed
If MI # of increments taken: NA
Dedicated - Each Day - Each Location

Field Parameters (at time of sample)	Analytical Parameters	Other Parameters
PID / FID Readings:	VOC <input checked="" type="checkbox"/> TPH GRO	Corrosivity
Background: <u>0.0</u> ppm	SVOC <input checked="" type="checkbox"/> TPH DRO	Reactivity Sulfide/Cyanide
Sample: <u>0.0</u> ppm	Explosives <input checked="" type="checkbox"/> Chromium +6 <input checked="" type="checkbox"/>	Ignitability
Water Level: <u>32.35</u> FT	Propellants <input checked="" type="checkbox"/> Nitrate	
Temperature: <u>9.79</u> °C	TAL Metals <input checked="" type="checkbox"/>	QA Samples
Sp. Conductance: <u>0.060</u> uMHOs	Pesticides/PCBs <input checked="" type="checkbox"/>	MS/MSD Yes / No <u>NA</u>
pH: <u>5.87</u> units	Cyanides	Duplicate ID <u>NA</u>
Turbidity: <u>754</u> ^{MDD} N.T.U.	TOC	Equipment Rinse ID <u>NA</u>
	Grain Size	<u>Trip Blank ID</u> <u>Trip Blank</u> <u>NA</u>

Sample Description

Clear No odor No sheen High Turbidity

Soil sample description should include:
Munsell Color Odor Staining Texture Sorting Plasticity Moisture

Water sample description should include:
Color Odor Sheen Turbidity

Split-Sample

Split Sample ID: _____

Name: _____

Agency/Company: _____

Address: _____

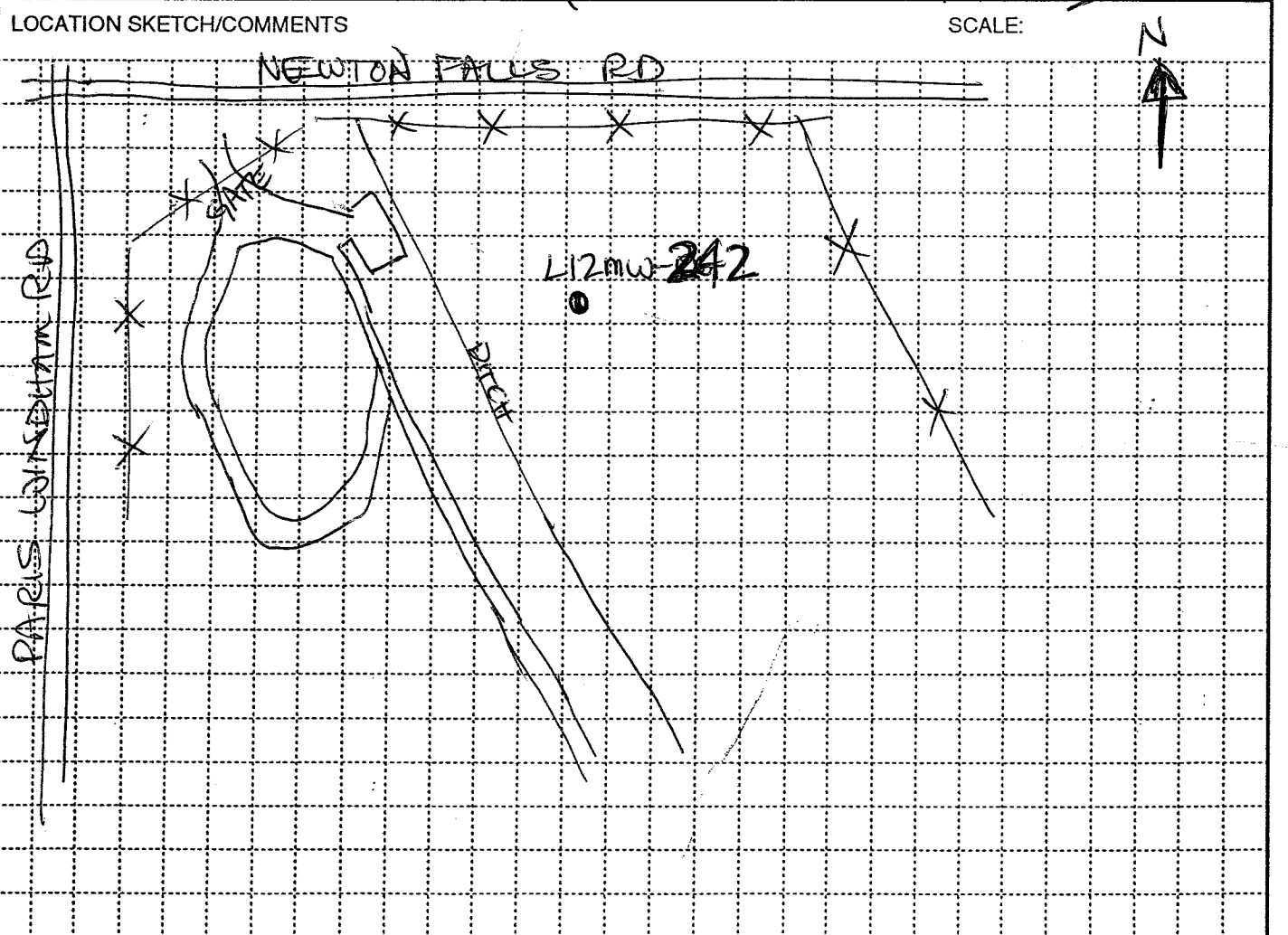
QA/QC Provided: MS/MSD - Duplicate - Trip Blanks - Field Blanks
 Parameters: Same as Above - As Listed

Logged By: Mark Dunlop (Please Print) Reviewed by: ERIC ELIS (Please Print)

Signature: [Signature] Signature: [Signature] Date: 2/1/05

HTRW DRILLING LOG		DISTRICT <i>Louisville</i>	HOLE NUMBER <i>L12mw-242</i>
1. COMPANY NAME <i>MKM Engineers Inc</i>		2. DRILL SUBCONTRACTOR <i>HAD Drilling Contractors</i>	
3. PROJECT <i>RVAAP RZ 14</i>		4. LOCATION <i>Lead Line 12</i>	
5. NAME OF DRILLER <i>Sam Hebler</i>		6. MANUFACTURER'S DESIGNATION OF DRILL <i>CME-LC 60</i>	
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT <i>6.25" ID HSA</i> <i>2" Split Spoons</i>		8. HOLE LOCATION <i>NE side of Lead Line 12</i>	
		9. SURFACE ELEVATION <i>978.40 ASL</i>	
		10. DATE STARTED <i>10 Nov 04</i>	11. DATE COMPLETED <i>10 Nov 04</i>
12. OVERBURDEN THICKNESS <i>26.3</i>		15. DEPTH GROUNDWATER ENCOUNTERED <i>14.5</i>	
13. DEPTH DRILLED INTO ROCK <i>0.0</i>		16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED <i>7.96 @ 1059 11/16/04</i>	
14. TOTAL DEPTH OF HOLE <i>26.3</i>		17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY)	

18. GEOTECHNICAL SAMPLES <i>SHELBY/TUBES 8-10, 12-14</i>	DISTURBED	UNDISTURBED <i>X</i>	19. TOTAL NUMBER OF CORE BOXES <i>0</i>		
20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)
	<i>-</i>	<i>-</i>	<i>-</i>	<i>-</i>	<i>-</i>
22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR <i>M.D. Early</i>	
	<i>-</i>	<i>X</i>	<i>-</i>		



PROJECT <i>RVAAP RZ 14</i>	HOLE NO. <i>L12mw-242</i>
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HTRW DRILLING LOG

(CONTINUATION SHEET)

HOLE NUMBER

C/2 MW-242

PROJECT

RVAADRI 14

INSPECTOR

Mark Dunbar

SHEET SHEETS

2 OF 3

ELEV. (a)	DEPTH (b)	DESCRIPTION OF MATERIALS (c)	FIELD SCREENING RESULTS (d)	GEO TECH SAMPLE OR CORE BOX NO. (e)	ANALYTICAL SAMPLE NO. (f)	BLOW COUNT (g)	REMARKS (h)
	0	6" Top soil					
	2	Br SILT 60% w/ Sand 25% Dry Stiff No Odor No Plasticity	0.0	1.5	ML	Push	5yr 5/6
	4	Same As Above Color change to DK. Br.	0.0	1.2	ML	3-6 8-10	7.5yr 4/6
	6	Same As Above	0.0	2.0	ML	1-4 9-10	7.5yr 5/6
	8	Rock Frag	0.0	1.8	ML	4-10 13-19	
	10	1520 10 Nov 04 Shelby Tube	—	—	—	—	
	12	Gray SILT 80% w/ Clay Damp No Plasticity No Odor No staining	0.0	1.3	ML	1-3 4-5	10yr 6/1
	14	1530 10 Nov 04 Shelby Tube	—	—	—	—	
	16	6-24 SILT 80% w/ Clay Saturated No Plasticity No Odor No staining	0.0	1.7	ML	1-2 ^{MDD} 4-4 ^{MDD}	
	18	Changes to Damp @ 16 ft	1.0	2.0	ML	1-2 4-4	
	20		1.4	2.0	ML	1+1 5-3	

PROJECT

RVAADRI 14

HOLE NO.

C/2 MW-242

HTRW DRILLING LOG

(CONTINUATION SHEET)

HOLE NUMBER
 6612 MW 242

PROJECT
 RUAAP RI 14

INSPECTOR
 Mark Dunlavy

SHEET SHEETS
 3 OF 3

ELEV. (a)	DEPTH (b)	DESCRIPTION OF MATERIALS (c)	FIELD SCREENING RESULTS (d)	GEOTECH SAMPLE OR CORE BOX NO. (e)	ANALYTICAL SAMPLE NO. (f)	BLOW COUNT (g)	REMARKS (h)
	20	SAME AS ABOVE		1.7	ML	1-4 5-7	10y-6/1
	22	Grey SAND 70% w/ Silt 20% Saturated No Plasticity No Staining No Odor		1.5	SM	1-1	10y-6/1
		Grey SILT 70% w/ Clay wet No Plasticity No Staining No Odor			ML	2-2	
	24	Changes to Dry @ 24.5		2.0	ML	7-11	
						14-14	
	26	Bottom 26.3					Bottom 26.3' Sand up to 25.5 Screen from 25.5 to 25.5 Sand up to 14' Bentonite up to 91 Grout to surface 5 gallons Hydrabond 8 Bags Sand 1.5 Bags Bentonite

PROJECT
 RUAAP RI 14

HOLE NO.
 6612 MW - 242

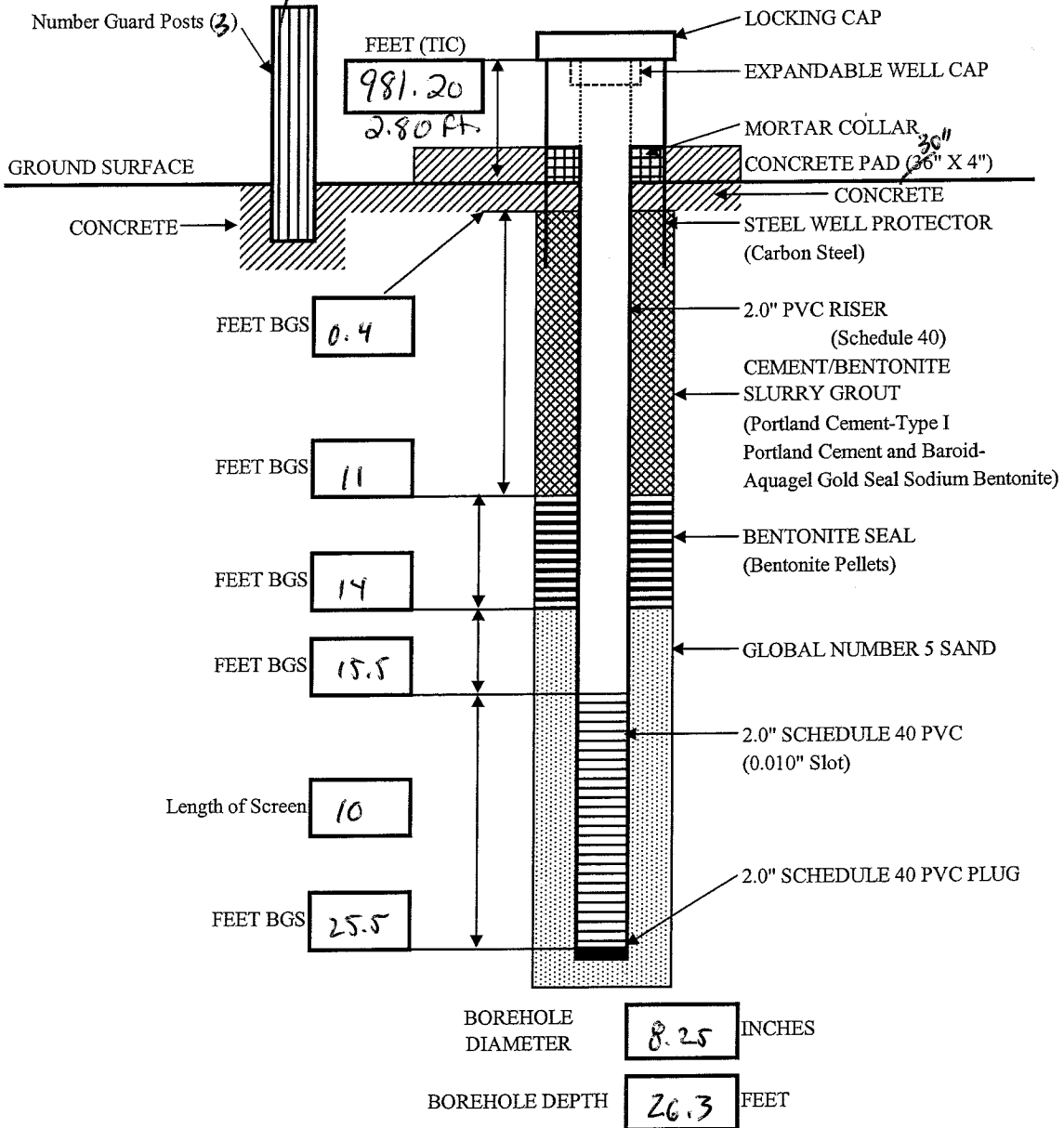


MONITORING WELL CONSTRUCTION DIAGRAM

RAVENNA ARMY AMMUNITION PLANT

Project: RVAAP RE14

Well Number: L12mw-242	Begin: 10 Nov 04	End: 10 Nov 04
Coordinates: N: 558020.51 E: 2368545.29	Elevation: 978.40	Reference Point:
Logged By: Mark Dwyer		



Notes:

- Figure not drawn to scale.
- BGS = Below Ground Surface.
- Well head protected with three guard posts set in triangle configuration about the concrete pad.

Well Development Record

Well ID: L12 MW - 242 - GW
 Date: 11/16/04

Ravenna Army Ammunition Plant-
 RVAAP 14 AOC Characterization

Project: RVAAP - 14
 Development Company: MKM

Development Method: WHALE PUMP
 Comments: _____

Well TD: 29.35 FT TIC 21.39 Depth to Water: 7.96 FT
 Water Column Height: 7.96 FT One Well Volume: 12.61 Gals

2-inch = 0.16
 4-inch = 0.65
 6-inch = 1.47
 8-inch = 2.61

Time	Well Dev. Code	Depth to Water (ft)	Purge Rate (gpm)	Purge Volume (gal)	Field Measurements				Turbidity	Comments
					pH	CON	DO	Temp		
1039	DSB	7.96	-	-	-	-	-	-	-	
1043	DSE	8.65	-	-	-	-	-	-	-	
1045	DPB	8.65	-	-	7.74	0.716	3.12	10.2	1000	
1052	DFM	-	-	-	7.58	0.724	10.23	10.2	250	1 WELL VOL
1058	DPE	DRY	-	14.9	-	-	-	-	-	17.5 (DRY)
1256	DPB	9.25	-	-	-	-	-	-	-	
1306	DFM	-	-	-	7.39	0.625	2.45	11.9	1000	2 nd WELL VOL (9.5 gal)
1319	DPE	DRY	-	10.0	-	-	-	-	-	10+25=35 gal.
1335	DPB	16.1	-	-	-	-	-	-	-	
1341	DFM	-	-	-	7.33	0.746	10.72	11.7	1000	3 rd WELL VOL (37.8 gal)
1346	DPE	DRY	-	6.0	-	-	-	-	-	43.8 (DRY)
1406	DPB	15.8	-	-	-	-	-	-	-	
1414	DFM	-	-	-	7.67	0.723	10.72	11.5	1000	4 th WELL VOL (50.44 gal)
1418	DPE	DRY	-	2.5	-	-	-	-	-	52.94 gal.
1440	DPB	15	-	-	-	-	-	-	-	
	FINAL									

12.61
 x3
 37.83
 12.5
 x4
 50.0
 17.5
 12.6
 .9

WELL DEVELOPMENT CODES

DPB - Begin Pumping
 DPE - End Pumping
 DSB - Begin Surge Blocking
 DSE - End Surge Blocking
 DFM - Field Measurements
 DBB - Begin Bailing
 DBE - End Bailing
 DXB - Begin Other
 DXE - End Other
 Other: _____

FIELD MEASUREMENT CODES

MTP - Temperature
 MSC - Specific Conductance
 MPD - Photoionizer (eg. HNu)
 MFD - Flame Ionizer (eg. OVA)
 MDO - Dissolved Oxygen
 MPH - pH
 MEH - eH
 MOT - Other _____

TURBIDITY

Enter Turbidity Meter Reading
 (Final should be < 5 NTU)
 OR
 Enter Qualitative Observations

H - High: Muddy/Silty
 M - Medium: Cloudy/Translucent
 L - Low: Transparent
 N - None: Clear/No Sediment

Logged By: NILESH SHRINGARPURE (Please Print)

Reviewed By: C. Esler

Signature: *N. Shringarpure*

Date: 2/22/05

Well ID: ^{05 L10} ~~HR~~ MW-242GW
 Date: 11/30/04

Monitoring Well Purging Form

Ravenna Army Ammunition Plant
 Ravenna, Ohio

WELL OBSERVATIONS

Protective Casing: Intact · Damaged Locked: Yes · No Key No: 6000
 Concrete Base: Intact · Damaged Inner Casing: 2" · 4" · 6" · 8" Other:
 Stickup Height: 2.75 (ft) TIC · TOC Difference: 0.3 (ft)
 Vapor Readings: HNu · OVA Background: _____ Inside Well Casing:
 Present Depth Sampled Sample ID: L12
 LNAPL Yes · No _____ Yes · No ~~HR~~ MW-242GW
 DNAPL Yes · No _____ Yes · No

CALCULATIONS

- (A) Depth to Well Bottom 25.5 (ft) FOC · TIC · BGS (Measured · Previously Measured (circle one))
- (B) Depth to Water 7.5 (ft) TOC · TIC · BGS Time Measured: 906
- (C) Water Column Height (A-B) 18.0 (ft)
- (D) Well Diameter Factor 0.16 (gal/ft) (2" = 0.16, 4" = 0.65, 6" = 1.47, 8" = 2.61 GAL/FT)
- (E) One Well Volume (C*D) 2.88 (gal)
- (F) Volumes to be Evacuated 5
- (G) TOTAL VOLUME TO BE EVACUATED (E * F) 14.4 (gal)

EVACUATION METHOD

Well Evacuation Method: Bailer · Submersible Pump · Other: Micid purge Device Number: _____
 Purge Water Disposition: 1. Discharged Onsite 2. Collected And: Stored · Disposed (Onsite · Offsite)
 Collected In: Tanks · Drums No. of Containers: _____

Comments: _____

TIME	DEPTH TO WATER (ft)	PURGE RATE (gpm)	Field Measurements						Comments
			HNu	Spec Cond	Temp	pH	Turb	DO	
0908	7.5		-	0.977	11.73	6.49	1000	4.81	Initial
0911	8.5		-	0.95	11.85	6.39	1000	0.21	
0914	8.5		-	0.94	11.82	6.98	1000	0.0	
0917	8.7		-	0.935	11.75	7.01	1000	0.0	
0920	8.95		-	0.931	11.69	7.01	1000	0.0	
0923	8.8		-	0.929	11.64	7.01	1000	0.0	End purging

Logged By: Vijay Alluri (Please Print)
 Signature: vijay

Reviewed By: C. Keller
 Date: 2/22/05

Field Sampling Report

Location ID: 112 MW-242 GW

Ravenna Army Ammunition Plant
Characterization of 14 RVAAP AOCs

Date: 11/30/04

Sampling Information

Source	Groundwater/ Product	Surface Water	Soils / Sediments / Sludge
Method	Bailer	Sample Bottle	Scoop
	Pump	Bacon Bomb	Bowl
	Micro purging X		Hand Auger
Type/Construction			
Miscellaneous	Well Purging Form Yes <input checked="" type="checkbox"/> No		
Sample Collection: <u>0930</u> hrs Sample Type: Composite/(MI) - <u>Grab</u> If MI, # of increments taken: <u>NA</u> Location: <u>Plotted on Map</u> - <u>Staked in Field</u> Sample Depth: <u>20</u> FT (below surface) Decon: Dedicated - Each Day - <u>Each Location</u> Estimated - Measured - Surveyed			

Field Parameters (at time of sample)	Analytical Parameters	Other Parameters
PID / FID Readings: Background: <u>0.0</u> ppm Sample: <u>0.0</u> ppm	VOC X	Corrosivity
	SVOC X	Reactivity Sulfide/Cyanide
	Explosives X	Ignitability
	TPH GRO	QA Samples MS/MSD <u>Yes</u> / No NA Duplicate ID <u>L12MW-242-DJP</u> NA Equipment Rinse ID <u>NA</u> Trip Blank ID <u>TRIP BLANK</u> NA
	TPH DRO	
	Chromium +6	
	Propellants X Nitrate X	
Water Level <u>7.5</u> FT	TAL Metals X	
Temperature <u>11.64</u> °C	Pesticides/PCBs X	
Sp. Conductance: <u>0.929</u> uMHOs	Cyanides	
pH <u>7.01</u> units	TOC	
Turbidity <u>1000</u> N.T.U.	Grain Size	

Sample Description

clear, no odor, no sheen, low turbidity

Soil sample description should include:
Munsell Color Odor Staining Texture Sorting Plasticity Moisture

Water sample description should include:
Color Odor Sheen Turbidity

Split Sample

Split Sample ID: L12MW-242-SW

Name: JOHN JEAT (CELRL-ED-EK)
 Agency/Company: USACE - LOUISVILLE
 Address: 600 DR MARTIN LUTHER KING JR Pkwy
LOUISVILLE KY 40202

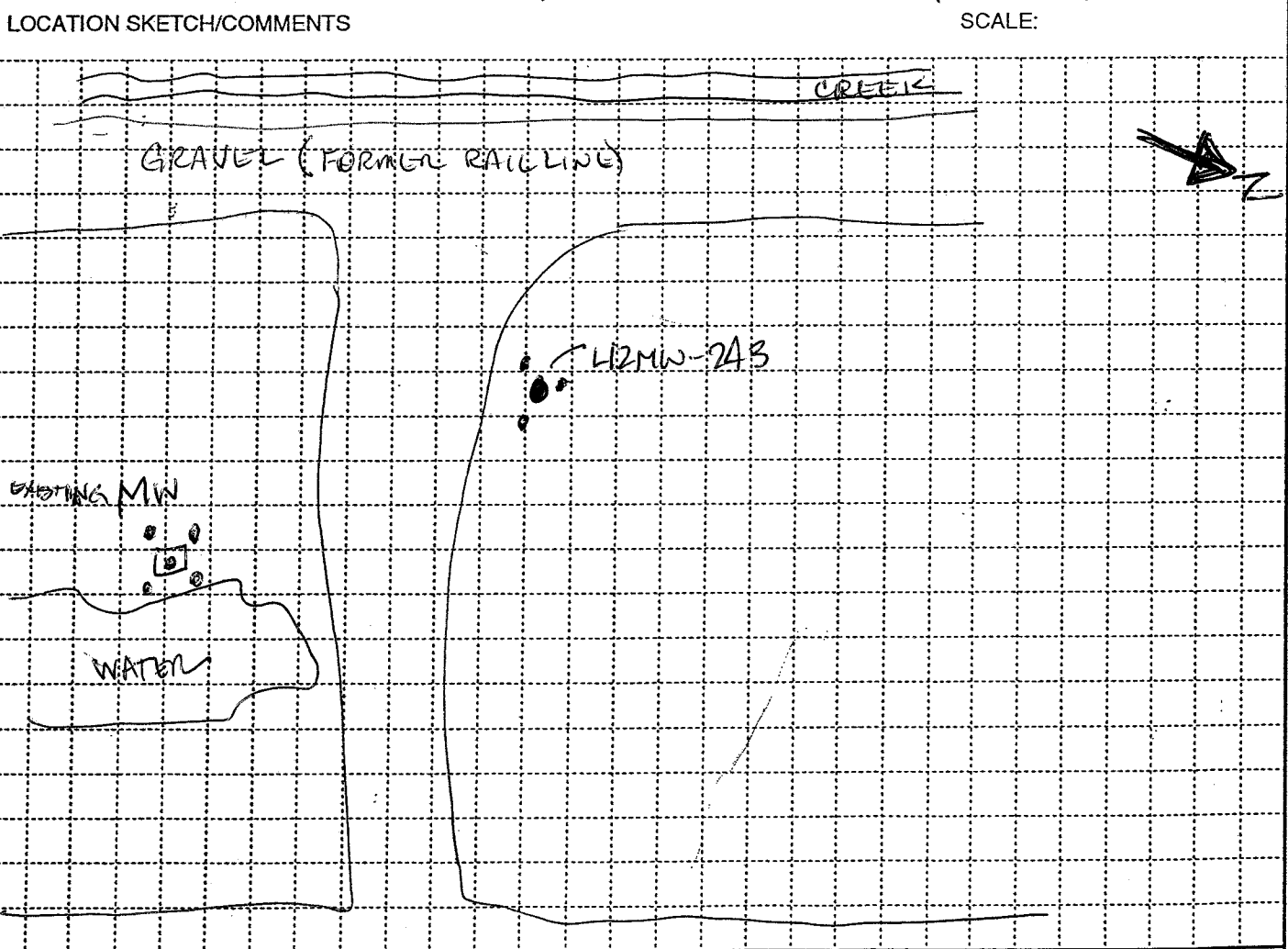
QA/QC Provided: MS/MSD - Duplicate - Trip Blanks - Field Blanks
 Parameters: Same as Above - As Listed

Logged By: vijay Alluri (Please Print) Reviewed by: ERIC BLIS (Please Print)

Signature: vijay Signature: ERBL Date: 2/1/05

HTRW DRILLING LOG		DISTRICT LOUISVILLE	HOLE NUMBER L12MW-243
1. COMPANY NAME MKM ENGINEERS		2. DRILL SUBCONTRACTOR HAD DRILLING	SHEET SHEETS 1 OF 3
3. PROJECT RVAAP-R114		4. LOCATION RAVENNA, OH LOADLINE 12	
5. NAME OF DRILLER SCOTT		6. MANUFACTURER'S DESIGNATION OF DRILL CME-55	
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT 4 1/4" ID HISA 2' SPLIT SPOON		8. HOLE LOCATION LL-12	
		9. SURFACE ELEVATION 978.10 ASL	
		10. DATE STARTED 11/10/04	11. DATE COMPLETED 11/10/04
12. OVERBURDEN THICKNESS 24.0		15. DEPTH GROUNDWATER ENCOUNTERED 14'	
13. DEPTH DRILLED INTO ROCK 0.0		16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED 12.27' @ 1050, 11/15/04	
14. TOTAL DEPTH OF HOLE 24'		17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY)	

18. GEOTECHNICAL SAMPLES SHELBUTUBE 8-10	DISTURBED <input type="checkbox"/>	UNDISTURBED <input checked="" type="checkbox"/>	19. TOTAL NUMBER OF CORE BOXES NA		
20. SAMPLES FOR CHEMICAL ANALYSIS	VOC <input type="checkbox"/>	METALS <input type="checkbox"/>	OTHER (SPECIFY) <input type="checkbox"/>	OTHER (SPECIFY) <input type="checkbox"/>	OTHER (SPECIFY) <input type="checkbox"/>
22. DISPOSITION OF HOLE	BACKFILLED <input type="checkbox"/>	MONITORING WELL <input checked="" type="checkbox"/>	OTHER (SPECIFY) <input type="checkbox"/>	23. SIGNATURE OF INSPECTOR [Signature]	
					21. TOTAL CORE RECOVERY % -



PROJECT RVAAP-R114	HOLE NO. L12MW-243
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HTRW DRILLING LOG

(CONTINUATION SHEET)

HOLE NUMBER
LL12MW-243

PROJECT
RVAAP-RI 14

INSPECTOR
DAVID K. EARNEST

SHEET SHEETS
2 OF 3

ELEV. (a)	DEPTH (b)	DESCRIPTION OF MATERIALS (c)	FIELD SCREENING RESULTS (d)	GEOTECH SAMPLE OR CORE BOX NO. (e)	ANALYTICAL SAMPLE NO. (f)	BLOW COUNT (g)	REMARKS (h)
	1	CLAY, SANDY (50%) / SILT (10%) (60%) BROWN w/ GREY FRAGMENTED GRAVEL / CONC DEBRIS	9.5	# 1.2'	CL	1/1	7.5 YR 4/3
	2	LOW TO MED PLASTIC			CL	4/3	15% MOISTEN
	4	SAA w/ CRUSHED BRICK	3.8	0.8'	CL	5/3	
	4	SAND, CLAYEY 6-12" THICK BROWN w/ GREY			SC	3/3	
	6	BROWN w/ GREY SILTY (20%) CLAY, SANDY (70%) TRACE SAND (10%) MED PLASTIC	5.2	0.8'	CL	1/2	7.5 YR 4/3
	6	STIFF NO ODOOR			CL	2/4	BOTTLED w/ 6/1/30% WET PERCH ZONE
	8	SAA BRICK FRAG ASPHALT " ROCK "	9.4	0.3'	CL	2/5	MOIST
	8					7/12	
	10	SHELBY TUBE	NS	NR			SHELBY TUBE ROCK/DEBRIS AT TIP
	12	CLAY, SILTY (20%) V. STIFF (80%) MED PLASTIC NO ODOOR GRY w/ BROWN	8.8	0.9	CL	2/7	7.5 YR 4/2
	12	SAA				11/16	NOTTED 10% 5/6
	14	SL SILT, CLAYEY (15%) GREY (85%) MED TO LOW PLASTIC	9.6	1.8	ML	2/6	7.5 YR moist
	14	SAA NO ODOOR				7/6	
	16	MED DENSE NO STRAINING	6.0	2.0	mc	1/2	WET
	16	SAA				2/4	
	18	SAA	6.4	2.0	ML	1/1	WET TO SAT.
	18	SAA				3/5	
	20	SAA	8.2	2.0	ML	1/1	SAT
	20					2/4	

PROJECT
RVAAP-RI 14

HOLE NO.
L12MW-243

HTRW DRILLING LOG

(CONTINUATION SHEET)

HOLE NUMBER
LL12MW-243

PROJECT
RVAAP - R114

INSPECTOR
DK BARNETT

SHEET SHEETS
3 OF 3

ELEV. (a)	DEPTH (b)	DESCRIPTION OF MATERIALS (c)	FIELD SCREENING RESULTS (d)	GEO TECH SAMPLE OR CORE BOX NO. RECOVERY	ANALYTICAL SAMPLING METHODS	BLOW COUNT (g)	REMARKS (h)
	22	SAA	12.3	2.0	ML	1/1 3/6	WET/SAT
	24	SAA	11.2	2.0	ML	1/2 3/5	WET/SAT
	26						
	28						
		EOB 24' WELL SET AT 23' SCREEN @ 13-23 SAND TO 10' BENT TO 7' SEAL WATER IN HOLE; NO WATER ADDED 9 BASS SAND					

PROJECT
RVAAP - R114

HOLE NO.
LL12MW-243

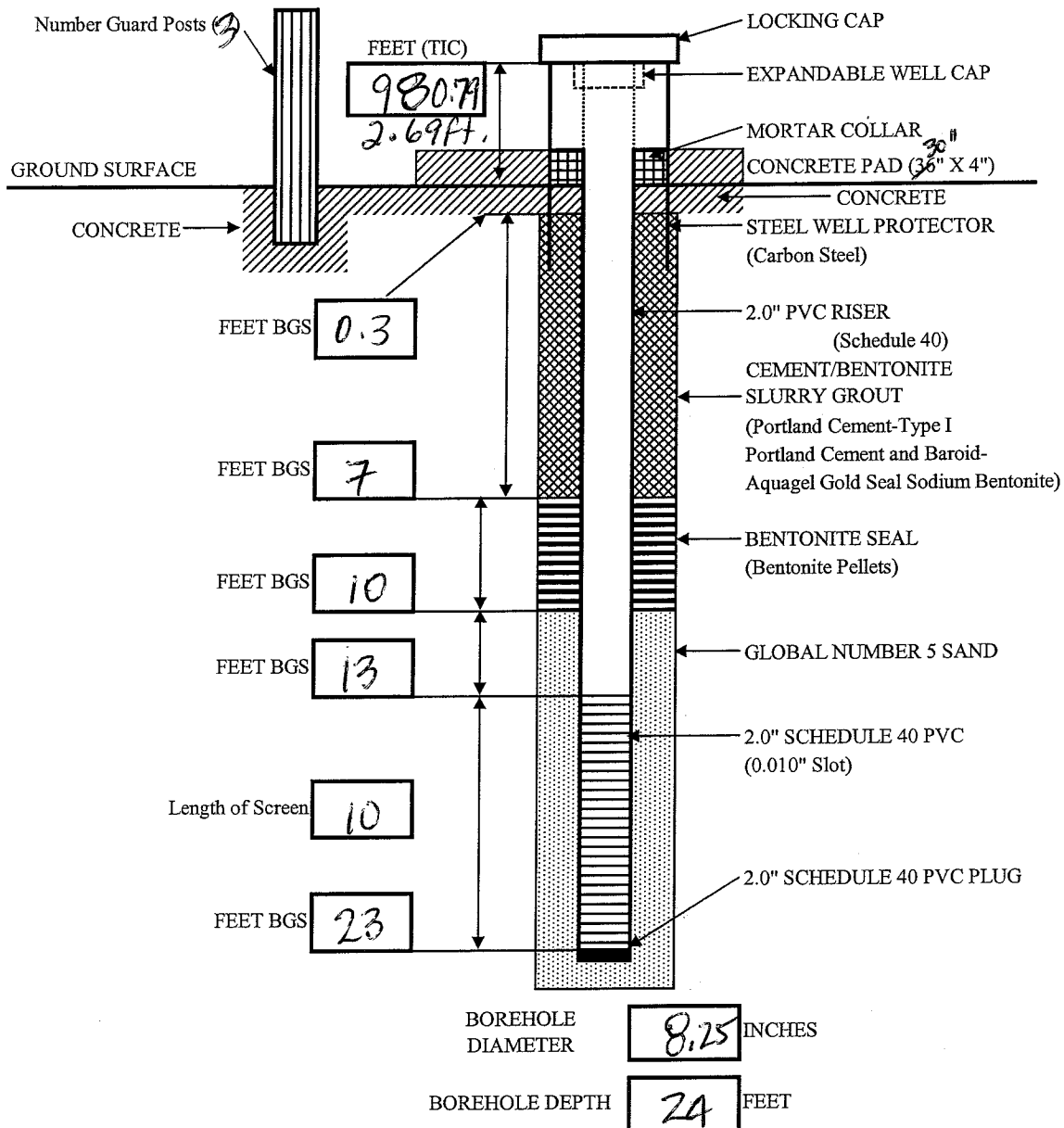


MONITORING WELL CONSTRUCTION DIAGRAM

RAVENNA ARMY AMMUNITION PLANT

Project: RVAAP RI 14

Well Number: L12MW-243	Begin: 11/10/04	End: 11/10/04
Coordinates: N: 557376.32 E: 2368190.04	Elevation: 978.10	Reference Point:
Logged By: JOK EARNEST		



Notes:

- 1) Figure not drawn to scale.
- 2) BGS = Below Ground Surface.

- 3) Well head protected with three guard posts set in triangle configuration about the concrete pad.

Well Development Record

Ravenna Army Ammunition Plant-
RVAAP 14 AOC Characterization

Well ID: L12 - MW - 243 - GW
Date: NOV 15, 04

Project: RVAAP-14
Development Company: MKM

Development Method: WELL PUMP
Comments: _____

Well TD: 25.95 FT TIC Depth to Water: 12.27 FT
Water Column Height: 3.68 FT One Well Volume: 8.06 Gals

Well Volume (gallons/foot) 2-inch = 0.16 6-inch = 1.47
4-inch = 0.65 8-inch = 2.61

Time	Well Dev. Code	Depth to Water (ft)	Purge Rate (gpm)	Purge Volume (gal)	Field Measurements				Turbidity	Comments
					pH	CON	DO	TEMP		
10:50	DSB	12.27	-	-	-	-	-	-	-	-
10:55	DSE	12.8	-	-	-	-	-	-	-	-
11:01	DPB	12.8	-	-	10.65	0.773	2.48	4.1	71000	INITIAL READING
11:05	DPE	DRY	-	6.0						6.0 gal dry
13:12	DPB	17.0	-	-						-
13:14	DFM	23.7	-	2.06	7.75	0.95	10.33	12.3	279	1 WELL VOL
13:15	DPE	DRY	-	3.0						9.0 gal (dry)
14:00	DPB	19.65	-	-						-
14:05	DPE	DRY	-	3.0						12.0 (dry)
15:00	DPB	20.8	-	-						-
15:03	DPE	DRY	-	1.5						13.5 (dry)
8:47	DSB	9.05	-	-						-
8:53	DSE	9.45	-	-						-
8:55	DPB	9.45	-	-	7.5	0.92	9.62	11.1	271	-
8:56	DFM	-	-	-	7.31	1.12	9.01	11.1	7000	2 nd WELL VOL (16.12 gal)
	FINAL									

WELL DEVELOPMENT CODES	FIELD MEASUREMENT CODES	TURBIDITY
DPB - Begin Pumping DPE - End Pumping DSB - Begin Surge Blocking DSE - End Surge Blocking DFM - Field Measurements DBB - Begin Bailing DBE - End Bailing DXB - Begin Other DXE - End Other Other: _____	MTP - Temperature MSC - Specific Conductance MPD - Photoionizer (eg. HNU) MFD - Flame Ionizer (eg. OVA) MDO - Dissolved Oxygen MPH - pH MEH - eH MOT - Other _____	Enter Turbidity Meter Reading (Final should be < 5 NTU) OR Enter Qualitative Observations H - High: Muddy/Silty M - Medium: Cloudy/Translucent L - Low: Transparent N - None: Clear/No Sediment

Logged By: NILESH SHRINGARPURE (Please Print) Reviewed By: C. Eder
Signature: *N. Shringarpure* Date: 2/22/05

Well Development Record

Well ID: L12-MW-243-GW
 Date: Nov 16, 04

Ravenna Army Ammunition Plant-
 RVAAP 14 AOC Characterization

Project: RVAAP -14
 Development Company: MKM

Development Method: WHALE PUMP
 Comments: _____

Well TD: 25.25 FT TIC Depth to Water: 12.27 FT
 Water Column Height: 13.68 FT One Well Volume: 8.0 Gals

Well Volume (gallons/foot) 2-inch = 0.16 6-inch = 1.47
 4-inch = 0.65 8-inch = 2.61

Time	Well Dev. Code	Depth to Water (ft)	Purge Rate (gpm)	Purge Volume (gal)	Field Measurements				Turbidity	Comments
					pH	CON	DO	TEMP		
8:59	DPE	DRY	-	2.5	-	-	-	-	-	19.5 (DRY)
11:34	DPB	15.7	-	4.0	-	-	-	-	-	23.5
11:40	DPE	DRY	-	4.0	-	-	-	-	-	23.5 (DRY)
15:10	DPB	14.17	-	-	7.42	-	-	-	-	-
15:11	DFM	-	-	-	7.42	0.97	10.38	12	279	3 rd Well Volume (24 gal)
15:17	DPE	DRY	-	4.0	-	-	-	-	-	28 gal
08:46	DSB	9.2	-	-	-	-	-	-	-	-
08:50	DEB	9.35	-	-	-	-	-	-	-	-
08:52	DBB	9.35	-	-	7.01	1.08	10.57	11.9	>1000	-
08:55	DFM	-	-	4.0	7.13	1.13	9.08	12.5	>1000	4 th well vol (32 gal)
09:00	DEP	DRY	-	3.0	-	-	-	-	-	35 gal
15:45	DPB	10.3	-	-	-	-	-	-	-	-
	DFM	-	-	5.0	-	-	-	-	-	40 gal (5 th well vol)
15:30	DPE	DRY	-	4.5	-	-	-	-	-	-
09:00	DSB	9.15	-	-	-	-	-	-	-	-
	FINAL									

WELL DEVELOPMENT CODES

DPB - Begin Pumping
 DPE - End Pumping
 DSB - Begin Surge Blocking
 DSE - End Surge Blocking
 DFM - Field Measurements
 DBB - Begin Bailing
 DBE - End Bailing
 DXB - Begin Other
 DXE - End Other
 Other: _____

FIELD MEASUREMENT CODES

MTP - Temperature
 MSC - Specific Conductance
 MPD - Photoionizer (eg. HNu)
 MFD - Flame Ionizer (eg. OVA)
 MDO - Dissolved Oxygen
 MPH - pH
 MEH - eH
 MOT - Other _____

TURBIDITY

Enter Turbidity Meter Reading
 (Final should be < 5 NTU)
 OR
 Enter Qualitative Observations
 H - High: Muddy/Silty
 M - Medium: Cloudy/Translucent
 L - Low: Transparent
 N - None: Clear/No Sediment

Logged By: NILESH SHRINGARAO (Please Print)

Reviewed By: P. Ecker

Signature: N. Shringarao SB 2/22/05

Date: 2/22/05

Monitoring Well Purging Form

Well ID: L12MW-243-GW

Ravenna Army Ammunition Plant
Ravenna, Ohio

Date: 11/29/04

WELL OBSERVATIONS

Protective Casing: Intact · Damaged Locked: Yes · No Key No:
 Concrete Base: Intact · Damaged Inner Casing: 2" · 4" · 6" · 8" Other:
 Stickup Height: 2.40 (ft) TIC · TOC Difference: 0.30 (ft)
 Vapor Readings: HNu · OVA Background: 0.0 Inside Well Casing:

Present Depth
 LNAPL Yes · No _____ Yes · No
 DNAPL Yes · No _____ Yes · No

Sampled Sample ID L12
L12MW-243-GW

CALCULATIONS

- (A) Depth to Well Bottom 25.3 (ft) FOC · TIC · BGS Measured · Previously Measured (circle one)
 (B) Depth to Water 9.95 (ft) FOC · TIC · BGS Time Measured: 1425
 (C) Water Column Height (A-B) 15.35 (ft)
 (D) Well Diameter Factor 0.16 (gal/ft) (2" = 0.16, 4" = 0.65, 6" = 1.47, 8" = 2.61 GAL/FT)
 (E) One Well Volume (C*D) 2.54 (gal)
 (F) Volumes to be Evacuated 5
 (G) **TOTAL VOLUME TO BE EVACUATED (E * F)** 12.68 (gal)

EVACUATION METHOD

Well Evacuation Method: Bailer · Submersible Pump · Other: Micro purge Device Number: _____

Purge Water Disposition: 1. Discharged Onsite 2. Collected And: Stored · Disposed Onsite · Offsite

Collected In: Tanks · Drums No. of Containers: _____

Comments: _____

TIME	DEPTH TO WATER (ft)	PURGE RATE (gpm)	Field Measurements						Comments
			HNu	Spec Cond	Temp	pH	Turb	DO	
1447	9.95		0.0	1.11	11.06	7.33	999	9.86	Initial
1450	9.72		0.0	1.13	11.51	7.13	999	4.05	
1453	10.00		0.0	1.15	11.70	7.10	779	3.19	
1456	10.00		0.0	1.16	11.54	7.09	555	1.26	
1459									

Logged By: Sudheer Gubba (Please Print)

Reviewed By: C. S. Allen

Signature: S. Gubba

Date: 2/22/05

Field Sampling Report

Location ID: L12MN-243-BJW

Ravenna Army Ammunition Plant
Characterization of 14 RVAAP AOCs

Date: 11/29/04

Sampling Information

Source	Groundwater / Product	Surface Water	Soils / Sediments / Sludge
Method	Bailer	Sample Bottle	Scoop
	Pump	Bacon Bomb	Bowl
	Micro Purgling <input checked="" type="checkbox"/>		Hand Auger
Type/Construction	Stainless Steel		Plastic Liner
Miscellaneous	Well Purgling Form Yes - No		Mattocks

Sample Collection: 1455 hrs Sample Type: Composite - MI - Grab
 If MI # of increments taken: NA Location: Plotted on Map - Staked in Field
 Sample Depth: 10.30 FT (below surface) Decon: Dedicated Each Day - Each Location
 Estimated - Measured - Surveyed

Field Parameters (at time of sample)	Analytical Parameters				Other Parameters			
PID / FID Readings: Background: <u>0.0</u> ppm	VOC	<input checked="" type="checkbox"/>	TPH GRO		Corrosivity			
	SVOC	<input checked="" type="checkbox"/>	TPH DRO		Reactivity Sulfide/Cyanide			
	Explosives	<input checked="" type="checkbox"/>	Chromium +6		Ignitability			
Sample: <u>0.0</u> ppm	Propellants	<input checked="" type="checkbox"/>	Nitrate	<input checked="" type="checkbox"/>	QA Samples MS/MSD Yes / No NA Duplicate ID NA Equipment Rinse ID NA Trip Blank ID <u>Trip Blank</u> NA			
Water Level <u>10.30</u> FT	TAL Metals	<input checked="" type="checkbox"/>						
Temperature <u>11.54</u> °C	Pesticides/PCBs	<input checked="" type="checkbox"/>						
Sp. Conductance: <u>1.16</u> uMHOs	Cyanides							
pH <u>7.09</u> units	TOC							
Turbidity <u>558</u> N.T.U.	Grain Size							

Sample Description
clear water, No odor, No Sheen, moderate turbidity.

Split Sample

Split Sample ID: _____
 Name: _____
 Agency/Company: _____
 Address: _____

QA/QC Provided: MS/MSD - Duplicate - Trip Blanks - Field Blanks
 Parameters: Same as Above - As Listed

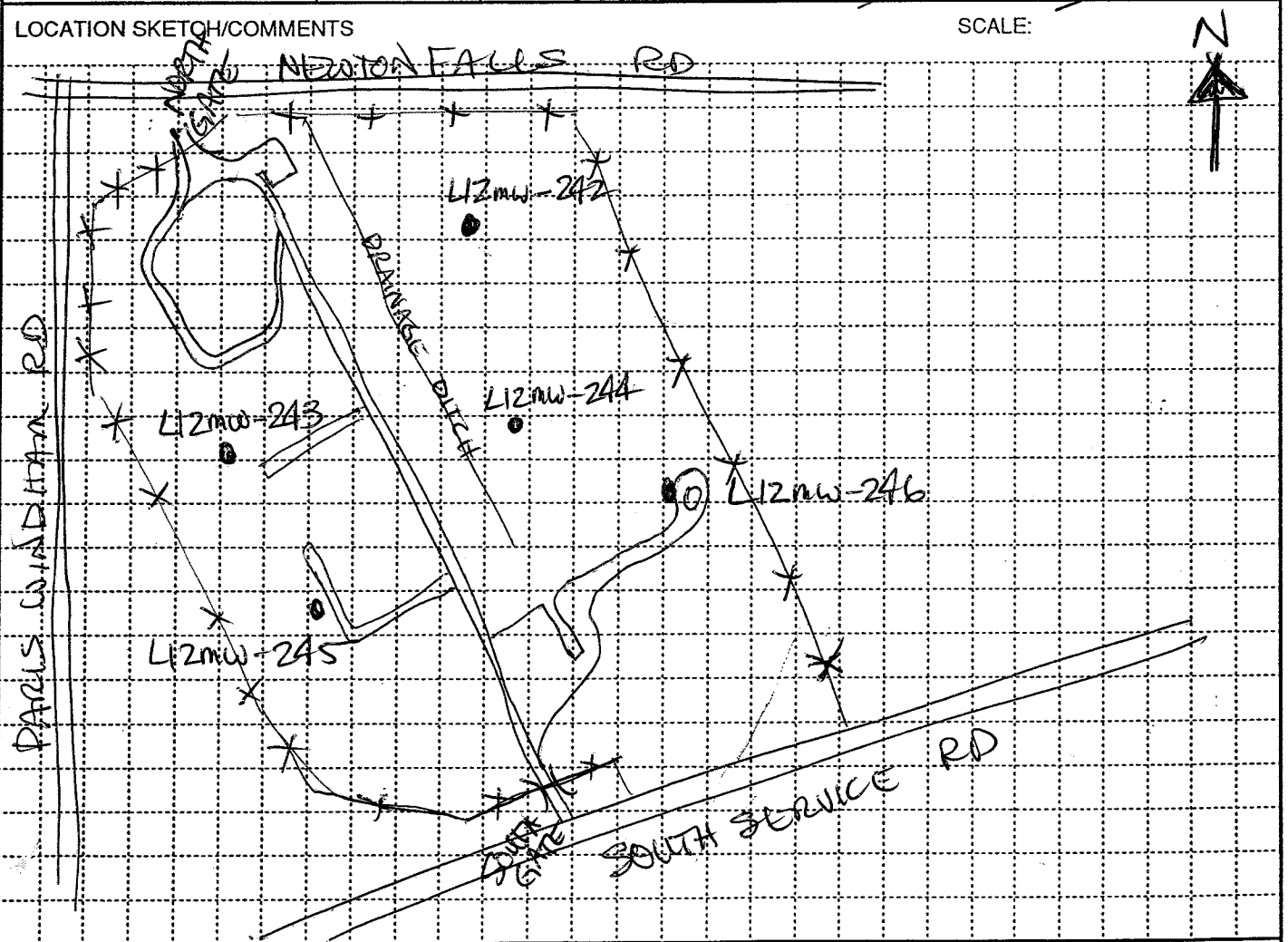
Soil sample description should include:
 Munsell Color Odor Staining Texture Sorting Plasticity Moisture

Water sample description should include:
 Color Odor Sheen Turbidity

Logged By: Shahram Taheri (Please Print) Reviewed by: ERIC BLIS (Please Print)
 Signature: [Signature] Signature: [Signature] Date: 2/1/05

HTRW DRILLING LOG		DISTRICT <i>Louisville</i>	HOLE NUMBER <i>L12mw-244</i>
1. COMPANY NAME <i>MKM Engineers Inc.</i>		2. DRILL SUBCONTRACTOR <i>HAD Drilling</i>	SHEET SHEETS <i>1 OF 3</i>
3. PROJECT <i>RVAAP RI 14</i>		4. LOCATION <i>Load Line 12</i>	
5. NAME OF DRILLER <i>Sam Holler</i>		6. MANUFACTURER'S DESIGNATION OF DRILL	
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT <i>8.25 HSA</i> <i>2" Split Spoons</i>		8. HOLE LOCATION <i>Middle of LL, East Side, Under Powerline Rightofway</i>	
		9. SURFACE ELEVATION <i>978.10 ASL</i>	
		10. DATE STARTED <i>10 Nov 04</i>	11. DATE COMPLETED <i>10 Nov 04</i>
12. OVERBURDEN THICKNESS <i>30'</i>		15. DEPTH GROUNDWATER ENCOUNTERED <i>17'</i>	
13. DEPTH DRILLED INTO ROCK <i>0'</i>		16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED <i>8.93' @ 1350</i> <i>11/11/04</i>	
14. TOTAL DEPTH OF HOLE <i>30'</i>		17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY)	

18. GEOTECHNICAL SAMPLES/ <i>SKELBY TUBE 6-8'</i>	DISTURBED <i>—</i>	UNDISTURBED <i>X</i>	19. TOTAL NUMBER OF CORE BOXES <i>NA</i>		
20. SAMPLES FOR CHEMICAL ANALYSIS	VOC <i>—</i>	METALS <i>—</i>	OTHER (SPECIFY) <i>—</i>	OTHER (SPECIFY) <i>—</i>	OTHER (SPECIFY) <i>—</i>
21. TOTAL CORE RECOVERY <i>NA %</i>					
22. DISPOSITION OF HOLE <i>—</i>	BACKFILLED <i>—</i>	MONITORING WELL <i>X</i>	OTHER (SPECIFY) <i>—</i>	23. SIGNATURE OF INSPECTOR <i>[Signature]</i>	



PROJECT <i>RVAAP RI 14</i>	HOLE NO. <i>L12mw-244</i>
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HTRW DRILLING LOG

(CONTINUATION SHEET)

HOLE NUMBER
212 MW-244

PROJECT
KVAAP RE 14

INSPECTOR
Mark Dunlop

SHEET 2 OF 3 SHEETS

ELEV. (a)	DEPTH (b)	DESCRIPTION OF MATERIALS (c)	FIELD SCREENING RESULTS (d)	GEOTECH SAMPLE OR CORE BOX NO. Recovery	ANALYTICAL SAMPLE NO. (f)	BLOW COUNT (g)	REMARKS (h)
0900	0	4" top soil					
	2	Br. SILT 70% w/ Sand 15% Dry No Plasticity No Odor No Staining Red/Orange and Gray Mottles Present	0.9	2.0	ML	Push	5y-5/8
	4	Same As Above	0.7	1.7	ML	4-9 13-13	5y-5/8
	6	Br. SILT 60% w/ Sand 35% Moist No Plasticity No Odor Gray Mottling	0.0	1.6	ML	2-4 4-5	5y-5/8
	8	Shelby Tube 0925 10 Nov 04					
	10	Br. SILT 70% w/ clay Dry No Plasticity No Odor No Staining	1.5	1.0	ML	3-9 9-15	7.5y-5/6
	12	Br. SILT 70% w/ Sand Dry No Plasticity No Odor No Staining	0.0	1.7	ML	3-10 12-15	7.5y-5/6
	14		0.6	1.9	ML	3-7 11-14	
	16	Gray SILT 75% w/ Clay and Sand Dry No Odor No Staining No Plasticity	0.0	2.0	ML	1-4 5-7	
	17	Saturated @ 17'					
	18	Same As Above, but changes to wet	0.5	2.0	ML	1-3 5-5	10y-6/11
			0.0	2.0	ML	1-2 3-4	

PROJECT
KVAAP RE 14

HOLE NO.
212 MW-244

HTRW DRILLING LOG

(CONTINUATION SHEET)

HOLE NUMBER
L12 MW-244

PROJECT
ZVAAP RE 14

INSPECTOR
Mark Dooling

SHEET SHEETS
3 OF 3

ELEV. (a)	DEPTH (b)	DESCRIPTION OF MATERIALS (c)	FIELD SCREENING RESULTS (d)	GEOTECH SAMPLE OR CORE BOX NO. (e)	ANALYTICAL SAMPLE NO. (f)	BLOW COUNT (g)	REMARKS (h)
	20	Soil Remains Wet				1-3	10yr G/I
			0.1	2.0	ML	4-5	
	22	Same As Above				2-2	10yr G/I
			0.0	2.0	ML	3-5	
	24	Same As Above				1-5	10yr G/I
			0.0	0.8	ML	5-8	
	26	Same As Above				1-6	10yr G/I
			0.0	1.7	ML	8-11	
	28					1-7	10yr G/I
			0.0	1.0	ML	10-15	
	30	Grey SAND 60% w/ Silt 35% Dry No Plasticity No Odor No Staining			ML		Bolt 30' 6" Sand @ Bottom Screen From 29.5 to 19.5 Sand up to 16 Bentonite to 13 Grout to Surface
		Grey Silt 80% w/ Clay Dry STIFF No Plasticity No Odor No Staining					
		Bot 30'					

PROJECT
ZVAAP RE 14

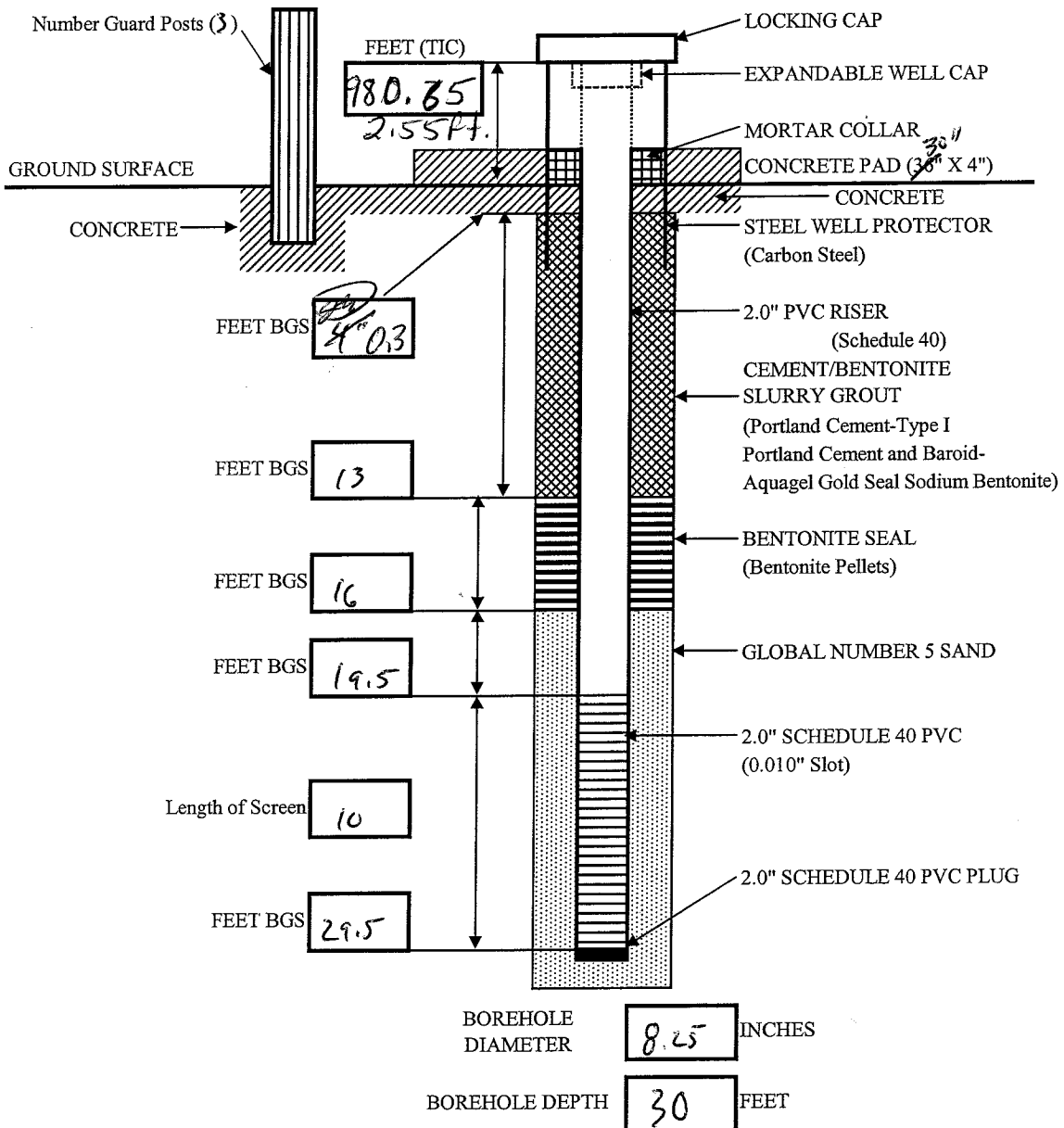
HOLE NO.
L12 MW-244



MONITORING WELL CONSTRUCTION DIAGRAM
RAVENNA ARMY AMMUNITION PLANT

Project: *RVAAP RI 14*

Well Number: <i>L12MW-244</i>	Begin: <i>10 Nov 04</i>	End: <i>10 Nov 04</i>
Coordinates: N: <i>557377.17</i> E: <i>2368751.42</i>	Elevation: <i>978.10</i>	Reference Point:
Logged By: <i>Mark Denney</i>		



Notes:

- 1) Figure not drawn to scale.
- 2) BGS = Below Ground Surface.

- 3) Well head protected with three guard posts set in triangle configuration about the concrete pad.

Well Development Record

Well ID: L12MW-244-GW
 Date: 11/11/04

Ravenna Army Ammunition Plant-
 RVAAP 14 AOC Characterization

Project: RVAAP 14
 Development Company: MKM

Development Method: Whale pumping
 Comments: _____

Well TD: 31.5 FT TIC Depth to Water: 8.93 FT
 Water Column Height: 22.57 FT One Well Volume: 13.3 Gals

Well Volume (gallons/foot)
 2-inch = 0.16 6-inch = 1.47
 4-inch = 0.65 8-inch = 2.61

Time	Well Dev. Code	Depth to Water (ft)	Purge Rate (gpm)	Purge Volume (gal)	Field Measurements				Turbidity	Comments
					PH	CON	DO	Temp		
1350	DSB	8.93	-	-	-	-	-	-	-	
1400	DSE	9.42	-	-	-	-	-	-	-	
1414	DPB	9.42	-	-	6.32	0.792	2.05	11.95	>1000	Initial Reading
1421	DPE	Dry	-	11 gal	-	-	-	-	-	
1442	DPB	13.6	-	-	-	-	-	-	-	
1445	DFM	-	-	7.3 7.3 gal	7.32	0.810	6.21	11.22	1000	1 Well volume (13.3)
1450	DPE	Dry	-	16.35 16.5 gal	-	-	-	-	-	16.5 gal.
1515	DPB	17.69	-	-	-	-	-	-	-	
1520	DPE	Dry	-	4.5	-	-	-	-	-	21.3 gal
1547	DPB	18.9	-	5	-	-	-	-	-	
	DFM	-	-	5.3	7.42	0.839	5.67	11.11	1000	2 Well vol (26.6)
1555	DPE	Dry	-	-	-	-	-	-	-	
1615	DPB	20.31	-	5	-	-	-	-	-	
1620	DPE	Dry	-	5	-	-	-	-	-	31.6 gal.
	FINAL									

WELL DEVELOPMENT CODES

- DPB - Begin Pumping
- DPE - End Pumping
- DSB - Begin Surge Blocking
- DSE - End Surge Blocking
- DFM - Field Measurements
- DBB - Begin Bailing
- DBE - End Bailing
- DXB - Begin Other
- DXE - End Other
- Other: _____

FIELD MEASUREMENT CODES

- MTP - Temperature
- MSC - Specific Conductance
- MPD - Photoionizer (eg. HNU)
- MFD - Flame Ionizer (eg. OVA)
- MDO - Dissolved Oxygen
- MPH - pH
- MEH - eH
- MOT - Other _____

TURBIDITY

- Enter Turbidity Meter Reading (Final should be < 5 NTU)
- OR
- Enter Qualitative Observations
- H - High: Muddy/Silty
- M - Medium: Cloudy/Translucent
- L - Low: Transparent
- N - None: Clear/No Sediment

Logged By: Sudheer Guha (Please Print)

Reviewed By: C. Epler

Signature: [Signature]

Date: 2/22/05

Well Development Record

Well ID: L12 MW-244-GW

Ravenna Army Ammunition Plant-
RVAAP 14 AOC Characterization

Date: 11/12/04

Project: RVAAP 14

Development Method: whale pumping

Development Company: MKM

Comments: _____

Well TD: 31.5 FT TIC Depth to Water: 8.93 FT Well Volume (gallons/foot) 2-inch = 0.16 6-inch = 1.47
 Water Column Height: 22.57 FT One Well Volume: 13.3 Gals 4-inch = 0.65 8-inch = 2.61

Time	Well Dev. Code	Depth to Water (ft)	Purge Rate (gpm)	Purge Volume (gal)	Field Measurements				Turbidity	Comments
					PH	CON	DO	Temp		
DSB	-	-	-	-	-	-	-	-	-	-
1047	DSB	9.02	-	-	-	-	-	-	-	-
1059	DSE	9.71	-	-	7.60	-	-	-	-	-
1102	DPB	9.71	-	-	7.60	0.77	5.06	13.02	1000	-
1110	DPE	Dry	-	7	-	-	-	-	-	38.6
1354	DPB	9.31	-	-	-	-	-	-	-	-
1400	DFM	-	-	1.3	7.73	0.754	7.05	11.91	1000	39.9 3 rd well vol
1405	DPE	Dry	-	5.5	-	-	-	-	-	45.4
1506	DPB	12.67	-	-	-	-	-	-	-	-
1515	DPE	Dry	-	5.0	-	-	-	-	-	50.4
0945	DSB	9.01	-	-	-	-	-	-	-	-
0956	DSE	9.64	-	-	-	-	-	-	-	-
1000	DPB	9.64	-	-	7.07	0.554	10.06	11.2	309	-
1005	DFM	-	-	2.8	7.26	0.585	4.11	12.2	>1000	53.2 4 th well vol
1009	DPE	-	-	4.0	-	-	-	-	-	57.2
	FINAL									

11/15/04

well vol

well vol

WELL DEVELOPMENT CODES	FIELD MEASUREMENT CODES	TURBIDITY
DPB - Begin Pumping DPE - End Pumping DSB - Begin Surge Blocking DSE - End Surge Blocking DFM - Field Measurements DBB - Begin Bailing DBE - End Bailing DXB - Begin Other DXE - End Other Other: _____	MTP - Temperature MSC - Specific Conductance MPD - Photoionizer (eg. HNu) MFD - Flame Ionizer (eg. OVA) MDO - Dissolved Oxygen MPH - pH MEH - eH MOT - Other _____	Enter Turbidity Meter Reading (Final should be < 5 NTU) OR Enter Qualitative Observations H - High: Muddy/Silty M - Medium: Cloudy/Translucent L - Low: Transparent N - None: Clear/No Sediment

Logged By: Sudheer Gubba (Please Print)

Reviewed By: C. Eder

Signature: _____

Date: 2/22/05

39.9
13.3
53.2
13.3
66.5

Well Development Record

Well ID: L 12 MW-244-GW
 Date: 11/15/04

Ravenna Army Ammunition Plant-
 RVAAP 14 AOC Characterization

Project: RVAAP - 14

Development Method: WHALE PUMP

Development Company: MKM

Comments: _____

Well TD: 31.5 FT TIC Depth to Water: 8.93 FT
 Water Column Height: 22.57 FT One Well Volume: 13.3 Gals

Well Volume (gallons/foot)
 2-inch = 0.16 6-inch = 1.47
 4-inch = 0.65 8-inch = 2.61

Time	Well Dev. Code	Depth to Water (ft)	Purge Rate (gpm)	Purge Volume (gal)	Field Measurements				Turbidity	Comments
					PH	CON	DO	Temp		
1150	DPB	9.95	-	-	-	-	-	-	-	-
1200	DPE	Dry	-	7.0	-	-	-	-	-	64.2
1338	DPB	10.2	-	-	-	-	-	-	-	-
1340	DFM	-	-	2.3	6.23	0.873	6.97	12.22	1000	66.5 5 th well volume
1345	DPE	Dry	-	4.8	-	-	-	-	-	71.3
1452	DPB	11.56	-	-	-	-	-	-	-	-
1504	DPE	Dry	-	7.5	-	-	-	-	-	78.8
0906	DSB	9.05	-	-	-	-	-	-	-	-
0911	DSE	9.50	-	-	-	-	-	-	-	-
0912	DPB	9.50	-	-	-	-	-	-	-	-
0912	DFM	-	-	-	7.46	0.471	6.43	10.9	1000	79.8 6 th well vol
0916	DPE	DRY	-	5.5	-	-	-	-	-	85.3
1000	DPB	-	-	-	-	-	-	-	-	-
1105	DPB	9.60	-	8	-	-	-	-	-	-
1112	DFM	-	-	8.0	7.51	0.53	10.21	11.1	256	93.3 7 th well vol
	FINAL									

WELL DEVELOPMENT CODES

DPB - Begin Pumping
 DPE - End Pumping
 DSB - Begin Surge Blocking
 DSE - End Surge Blocking
 DFM - Field Measurements
 DBB - Begin Bailing
 DBE - End Bailing
 DXB - Begin Other
 DXE - End Other
 Other: _____

FIELD MEASUREMENT CODES

MTP - Temperature
 MSC - Specific Conductance
 MPD - Photoionizer (eg. HNu)
 MFD - Flame Ionizer (eg. OVA)
 MDO - Dissolved Oxygen
 MPH - pH
 MEH - eH
 MOT - Other _____

TURBIDITY

Enter Turbidity Meter Reading
 (Final should be < 5 NTU)
 OR
 Enter Qualitative Observations

H - High: Muddy/Silty
 M - Medium: Cloudy/Translucent
 L - Low: Transparent
 N - None: Clear/No Sediment

Logged By: NILESH SHRINGARPURE (Please Print)

Reviewed By: C. Esler

Signature: [Signature]

Date: 2/22/05

66.5
 13.3
 71.279.8

16th Nov

13.3
 66.5
 79.8
 85.3
 93.3
 28

Monitoring Well Purging Form

Well ID: L12MN-244-GW

Ravenna Army Ammunition Plant
Ravenna, Ohio

Date: 11/29/04

WELL OBSERVATIONS

Protective Casing: Intact · Damaged Locked: Yes No Key No:
 Concrete Base: Intact · Damaged Inner Casing: 2" · 4" · 6" · 8" Other:
 Stickup Height: 245 (ft) TIC · TOC Difference: 0.30 (ft)
 Vapor Readings: HNu · OVA Background: _____ Inside Well Casing:

Present Depth Sampled Sample ID L12
 LNAPL Yes No _____ Yes · No L12MN-244-GW
 DNAPL Yes No _____ Yes · No

CALCULATIONS

- (A) Depth to Well Bottom 32.15 (ft) TOC · TIC · BGS Measured · Previously Measured (circle one)
 (B) Depth to Water 3.45 (ft) TOC · TIC · BGS Time Measured: 1058
 (C) Water Column Height (A-B) 23.70 (ft)
 (D) Well Diameter Factor 0.16 (gal/ft) (2" = 0.16, 4" = 0.65, 6" = 1.47, 8" = 2.61 GAL/FT)
 (E) One Well Volume (C * D) 3.79 (gal)
 (F) Volumes to be Evacuated 5
 (G) **TOTAL VOLUME TO BE EVACUATED (E * F)** 18.96 (gal)

EVACUATION METHOD

Well Evacuation Method: Bailer · Submersible Pump · Other: MCO Pump Device Number: _____

Purge Water Disposition: 1. Discharged Onsite 2. Collected And: Stored · Disposed Onsite · Offsite

Collected In: Tanks · Drums No. of Containers: _____

Comments: _____

TIME	DEPTH TO WATER (ft)	PURGE RATE (gpm)	Field Measurements						Comments
			HNu	Spec Cond	Temp	pH	Turb	DO	
1100	8.45		0.0	0.64	10.79	7.23	1000	3.6	Start purging
1103	10.20		0.0	0.61	11.51	7.17	1000	0.38	
1106	11.10		0.0	0.61	11.65	7.15	1000	0.44	
1109	12.23		0.0	0.594	11.63	7.17	1000	0.07	
1112	12.97		0.0	0.593	11.68	7.17	1000	0	
1115	13.70		0.0	0.592	11.73	7.15	1000	0	

Logged By: Sue Boles (Please Print)

Reviewed By: C. Eddy

Signature: Sue Boles

Date: 11/29/04

Field Sampling Report

Location ID: L12MN-244-GW

Ravenna Army Ammunition Plant
Characterization of 14 RVAAP AOCs

Date: 11/29/04

Sampling Information

Source	Groundwater / Product	Surface Water	Soils / Sediments / Sludge	
Method	Bailer	Sample Bottle	Scoop	Trowel
	Pump	Bacon Bomb	Bowl	Hand Auger
	<u>MICAP purge</u> / X		Push Probe	Plastic Liner
Type/Construction	<u>stainless steel</u>		Mattocks	
Miscellaneous	Well Purging Form Yes - No			

Sample Collection: 1120 hrs Sample Type: Composite - MI - Grab
 If MI # of increments taken: NA Location: Plotted on Map Staked in Field
 Sample Depth: 13.70 FT (below surface) Decon: Dedicated Each Day - Each Location
 Estimated - Measured - Surveyed

Field Parameters (at time of sample)	Analytical Parameters			Other Parameters		
PID / FID Readings: Background: <u>0.0</u> ppm	VOC	X	TPH GRO	Corrosivity		
	SVOC	X	TPH DRO	Reactivity Sulfide/Cyanide		
	Explosives	X	Chromium +6	Ignitability		
Sample: <u>0.0</u> ppm	Propellants	X	Nitrate	X		
Water Level: <u>13.70</u> FT	TAL Metals	X		QA Samples		
Temperature: <u>11.73</u> °C	Pesticides/PCBs	X		MS/MSD	Yes / No	NA
Sp. Conductance: <u>0.592</u> uMHOs	Cyanides			Duplicate ID		NA
pH: <u>7.18</u> units	TOC			Equipment Rinse ID		NA
Turbidity: <u>1000</u> N.T.U.	Grain Size			<u>Top Blank ID</u>	<u>Trip Blank</u>	NA

Sample Description
Not clear, no odor, no sheen, highly turbid

Soil sample description should include:
 Munsell Color Odor Staining Texture Sorting Plasticity Moisture

Water sample description should include:
 Color Odor Sheen Turbidity

Split Sample

Split Sample ID: _____

Name: _____

Agency/Company: _____

Address: _____

QA/QC Provided: MS/MSD - Duplicate - Top Blanks - Field Blanks
 Parameters: Same as Above - As Listed

Logged By: Sudheer Gabbay (Please Print) Reviewed by: ERIC ELUIS (Please Print)
 Signature: [Signature] Signature: [Signature] Date: 2/1/05

HTRW DRILLING LOG		DISTRICT LOUISVILLE		HOLE NUMBER L12mw-245	
1. COMPANY NAME MKM		2. DRILL SUBCONTRACTOR HAD DRILLING		SHEET SHEETS 1 OF 3	
3. PROJECT RVAAP-RL14			4. LOCATION L12-245 RAVENNA, OH LOAD LINE 12		
5. NAME OF DRILLER SCOTT HEISER			6. MANUFACTURER'S DESIGNATION OF DRILL CME-55		
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT 4 1/2" ID HSA 2' SPLIT SPOON		8. HOLE LOCATION Center of LL12 N of S. Servio Rd			
		9. SURFACE ELEVATION 977.50 ASL			
		10. DATE STARTED 11/09/04		11. DATE COMPLETED 11/09/04	
12. OVERBURDEN THICKNESS 29.0'		15. DEPTH GROUNDWATER ENCOUNTERED 18'			
13. DEPTH DRILLED INTO ROCK NA		16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED 7.66 @ 1018 11/15/04			
14. TOTAL DEPTH OF HOLE 29'		17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY) -			
18. GEOTECHNICAL SAMPLES		DISTURBED -	UNDISTURBED -	19. TOTAL NUMBER OF CORE BOXES NA	
20. SAMPLES FOR CHEMICAL ANALYSIS		VOC -	METALS -	OTHER (SPECIFY) -	OTHER (SPECIFY) -
					21. TOTAL CORE RECOVERY %
22. DISPOSITION OF HOLE -		BACKFILLED -	MONITORING WELL X	OTHER (SPECIFY) -	23. SIGNATURE OF INSPECTOR David K. Earnest
LOCATION SKETCH/COMMENTS					SCALE:
PROJECT RVAAP-RL14				HOLE NO. L12mw-245	

BL12MW-245

HTRW DRILLING LOG

(CONTINUATION SHEET)

HOLE NUMBER BL12MW-245

SHEET 2 OF 3

PROJECT RVAAP-RI14

INSPECTOR DK EARNEST

SHEET 2 OF 3

ELEV. (a)	DEPTH (b)	DESCRIPTION OF MATERIALS (c)	FIELD SCREENING RESULTS (d)	GEO TECH SAMPLE OR CORE BOX NO. (e)	ANALYTICAL SAMPLE NO. (f)	BLOW COUNT (g)	REMARKS (h)
		TOPSOIL, GRASS, ROOTS				5/3	
	2	MOTTLED GRAY W/BRN SILTY (20%) V.F. SAND (80%)	1.0	1.0	SM	5/4	MOIST 7.5YR 3/1 w/TRACE 7.5YR 5/6
	4	BROWN W/GRAY MED PLASTIC SILTY (30%) CLAY (70%) NO ODDER NO STRAINING	0.5	1.0	CL	4/5 7/5	7.5YR 5/8 & 6/1 MOIST
	6	SAA TRACE SAND MED PLASTIC NO ODDER	0.2	1.0	CL	1/3 5/0	7.5YR 5/1 w/ 7.5YR 6/8
	8	SAA TRACE FINE GRAVEL	2.0	1.2	CL	2/5 7/10	MOIST
	10	GRAY W/BRN CLAY (20%) SILT (80%) LOW PLASTIC	2.4	1.5	ML	2/8 9/13	7.5YR 4/1 w/4/6
	12	SAA TRACE ROCK FRAG.	2.7	1.6	ML	3/9 12/15	
	14	SAA	1.5	2.0	ML	3/5 7/7	
	16	SAA LOW TO MED PLASTIC	2.7	2.0	ML	1/3 5/6	
	18	SAA	2.3	2/0	ML	1/1 2/5	7.5YR 5/1 WET
	20	SAA	—	2.0	ML	1/1 3/5	WET

PROJECT RVAAP-RI14

HOLE NO. BL12MW-245

HTRW DRILLING LOG

(CONTINUATION SHEET)

HOLE NUMBER
L12 MW - 245

PROJECT
RVAAP - RE 14

INSPECTOR
DK EARNEST

SHEET SHEETS
3 OF 3

ELEV. (a)	DEPTH (b)	DESCRIPTION OF MATERIALS (c)	FIELD SCREENING RESULTS (d)	GEO TECH SAMPLE OR CORE BOX NO. RECOVERY	ANALYTICAL SAMPLE NO. W/CS	BLOW COUNT (g)	REMARKS (h)
		SAA	2.0	2.0	ML	1/1 4/4	WET
	22	SAA	4.0	2.0	ML	1/1 3/5	SAT
	24	SAA	1.8	2.0	ML	1/1 4/3	SAT
	26	SAA	1.9	2.0	ML	1/1 4/4	WET
	28	SAA	1.2	2.0	ML	1/1 4/4	WET
	30	BOH 29' SAMPLED TO 30' DRILL TO 29' SCREEN AT 18-28 SAND TO 15' SEAL TO 12' 5 GALS WATER TO HYDRATE					

130

PROJECT
RVAAP - RE 14

HOLE NO.
L12 MW - 245

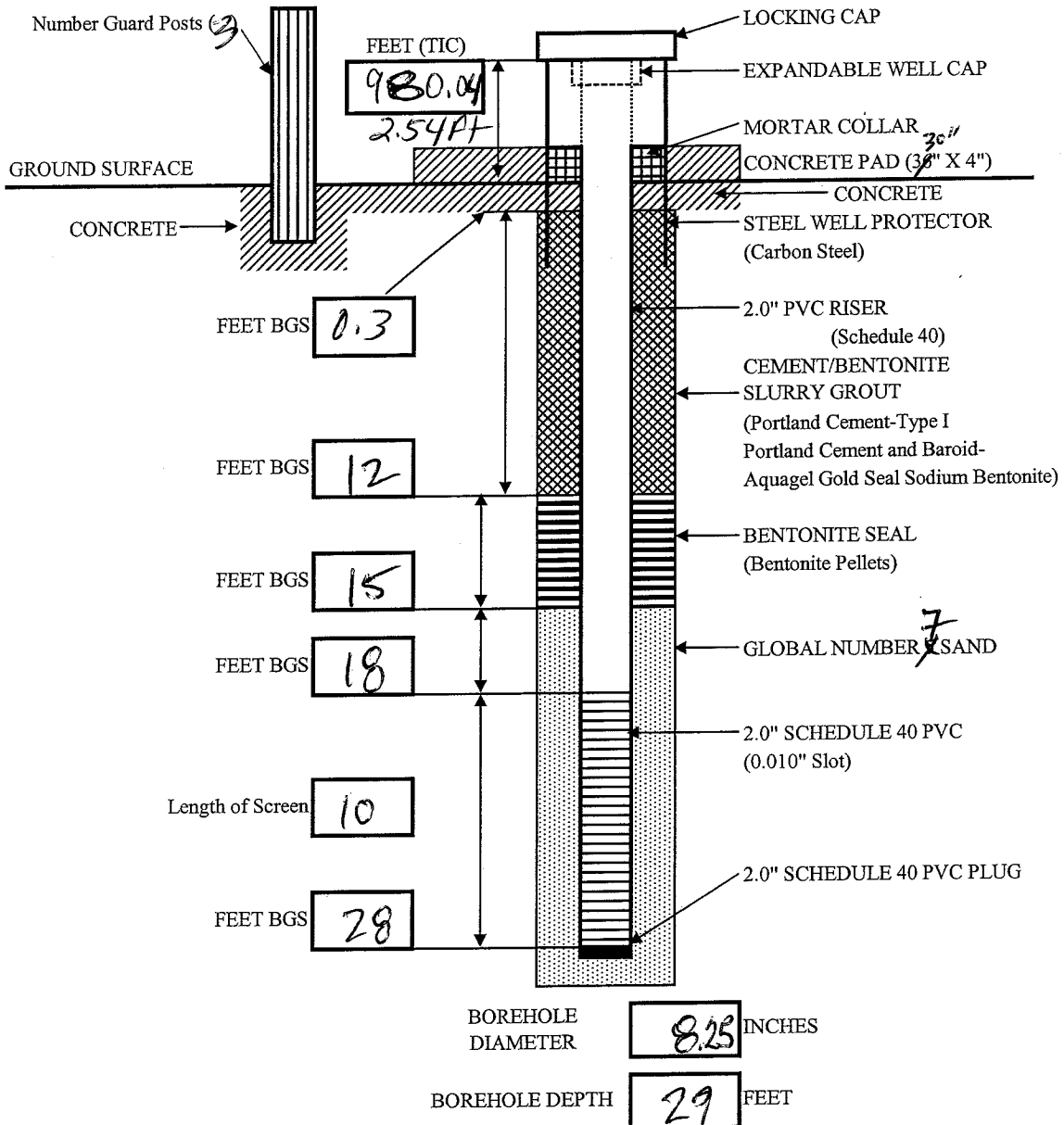


MONITORING WELL CONSTRUCTION DIAGRAM

RAVENNA ARMY AMMUNITION PLANT

Project: *RVAAP RI14*

Well Number: <i>L12M12245</i>	Begin: <i>11/09/04</i>	End: <i>11/09/04</i>
Coordinates: N: <i>557044.55</i> E: <i>2368370.74</i>	Elevation: <i>977.50</i>	Reference Point:
Logged By: <i>DK EARNEST</i>		



Notes:

- Figure not drawn to scale.
- BGS = Below Ground Surface.

- Well head protected with three guard posts set in triangle configuration about the concrete pad.

Well Development Record

Well ID: LL12-MW-245-GW
 Date: NOV 15, 04

Ravenna Army Ammunition Plant-
 RVAAP 14 AOC Characterization

Project: RVAAP-14
 Development Company: MKM

Development Method: WELL PUMP
 Comments: _____

Well TD: 30.29 FT TIC Depth to Water: 7.66 FT
 Water Column Height: 22.63 FT One Well Volume: 13.3 Gals

2-inch = 0.16 6-inch = 1.47
 4-inch = 0.65 8-inch = 2.61

Time	Well Dev. Code	Depth to Water (ft)	Purge Rate (gpm)	Purge Volume (gal)	Field Measurements				Turbidity	Comments
					PH	CON	DO	TEMP		
Nov 15 10:18	DSB	7.66	-	-	-	-	-	-	-	-
10:26	DSE	7.00	-	-	-	-	-	-	-	-
10:29	DPB	-	-	-	7.15	0.92	8.20	11.2	>1000	INITIAL READING
10:39	DPE	DRY	-	9 gal	-	-	-	-	-	9.0 gal (DRY)
12:59	DPB	27.00	-	-	-	-	-	-	-	-
13:00	DPE	DRY	-	2.5 gal	-	-	-	-	-	11.5 gal (DRY)
13:25	DPB	25.05	-	-	-	-	-	-	-	-
13:27	DPE	DRY	-	1.5 gal DRY	7.24	1.07	11.04	11.1	>1000	1 WELL VOL
14:13	DPB	26.6	-	-	-	-	-	-	-	-
14:17	DPE	DRY	-	1.5	-	-	-	-	-	14.8 (DRY)
15:16	DPB	26.8	-	-	-	-	-	-	-	-
15:21	DPE	DRY	-	1.5	-	-	-	-	-	16.3 (DRY)
Nov 16 8:25	DSB	9.4	-	-	-	-	-	-	-	-
8:33	DSE	9.0	-	-	-	-	-	-	-	-
8:34	DPB	9.0	-	-	7.59	0.93	9.35	10.3	>1000	-
	FINAL									

WELL DEVELOPMENT CODES

DPB - Begin Pumping
 DPE - End Pumping
 DSB - Begin Surge Blocking
 DSE - End Surge Blocking
 DFM - Field Measurements
 DBB - Begin Bailing
 DBE - End Bailing
 DXB - Begin Other
 DXE - End Other
 Other: _____

FIELD MEASUREMENT CODES

MTP - Temperature
 MSC - Specific Conductance
 MPD - Photoionizer (eg. HNu)
 MFD - Flame Ionizer (eg. OVA)
 MDO - Dissolved Oxygen
 MPH - pH
 MEH - eH
 MOT - Other _____

TURBIDITY

Enter Turbidity Meter Reading
 (Final should be < 5 NTU)
 OR
 Enter Qualitative Observations

H - High: Muddy/Silty
 M - Medium: Cloudy/Translucent
 L - Low: Transparent
 N - None: Clear/No Sediment

Logged By: NILESH SHRINGARPURE (Please Print)

Reviewed By: C. Esler

Signature: N Shringarpure

Date: 9/2/05

Well Development Record

Well ID: L12-MW-245-GW
 Date: NOV 16, 04

Ravenna Army Ammunition Plant-
 RVAAP 14 AOC Characterization

Project: RVAAP -14
 Development Company: MKM

Development Method: WELL PUMP
 Comments: _____

Well TD: 30.29 FT TIC Depth to Water: 7.66 FT
 Water Column Height: 22.63 FT One Well Volume: 13.3 Gals

Well Volume (gallons/foot)
 2-inch = 0.16 6-inch = 1.47
 4-inch = 0.65 8-inch = 2.61

26.6
 23.8
 2.8
 16.3
 7.5
 23.8

Time	Well Dev. Code	Depth to Water (ft)	Purge Rate (gpm)	Purge Volume (gal)	Field Measurements				Turbidity	Comments
					pH	CON	DO	TEMP		
8:39	DPE	DRY	-	7.5	-	-	-	-	-	23.8 (DRY)
11:22	DPB	21.7	-	-	-	-	-	-	-	
11:26	DFM	-	-	-	7.26	1.24	10.77	11.0	305	2 nd WELL (VOL) 26 gal
11:28	DPE	DRY	-	2.0	-	-	-	-	-	28.6
15:00	DPB	21.7	-	-	-	-	-	-	-	
15:02	DPE	DRY	-	3.5	-	-	-	-	-	
17 th NO → 08:20	DSB	8.95	-	-	-	-	-	-	-	
08:25	DSE	9.25	-	-	-	-	-	-	-	
18 th NO → 08:31	DBB	9.25	-	-	6.4	0.9	9.5	12°	1000	
08:40	DFM	-	-	8	7.2	0.91	11.1	11°C	1000	3 rd well vol (40 gal)
08:42	DPE	DRY	-	-	-	-	-	-	-	
15:25	DPB	14.5	-	-	-	-	-	-	-	
15:35	DPE	DRY	-	6.5	-	-	-	-	-	
18 th NO → 08:40	DSB	8.95	-	-	-	-	-	-	-	
08:45	DSE	9.05	-	-	-	-	-	-	-	
	FINAL									

WELL DEVELOPMENT CODES

DPB - Begin Pumping
 DPE - End Pumping
 DSB - Begin Surge Blocking
 DSE - End Surge Blocking
 DFM - Field Measurements
 DBB - Begin Bailing
 DBE - End Bailing
 DXB - Begin Other
 DXE - End Other
 Other: _____

FIELD MEASUREMENT CODES

MTP - Temperature
 MSC - Specific Conductance
 MPD - Photoionizer (eg. HNU)
 MFD - Flame Ionizer (eg. OVA)
 MDO - Dissolved Oxygen
 MPH - pH
 MEH - eH
 MOT - Other _____

TURBIDITY

Enter Turbidity Meter Reading
 (Final should be < 5 NTU)
 OR
 Enter Qualitative Observations

H - High: Muddy/Silty
 M - Medium: Cloudy/Translucent
 L - Low: Transparent
 N - None: Clear/No Sediment

Logged By: Sue Boles (Please Print)
 Signature: Sue Boles

Reviewed By: C. Eder
 Date: 2/22/05

Well Development Record

Well ID: L12 LRMN-245-GW
 Date: 11/18/04

Ravenna Army Ammunition Plant-
 RVAAP 14 AOC Characterization

Project: RVAAP-14
 Development Company: MKM

Development Method: Whale pumping
 Comments: _____

Well ID: 30.29 FT TIC Depth to Water: 7.66 FT
 Water Column Height: 22.63 FT One Well Volume: 13.33 Gals

Well Volume (gallons/foot) 2-inch = 0.16 6-inch = 1.47
 4-inch = 0.65 8-inch = 2.61

Time	Well Dev. Code	Depth to Water (ft)	Purge Rate (gpm)	Purge Volume (gal)	Field Measurements				Turbidity	Comments
					pH	CON	DO	Temp		
0846	DPB DPE	9.05	—	—	—	—	—	—	—	
0850	DFM			6.8	6.21	1.11	8.32	12.1	1000	4th well vol (53.8)
0855	DPE			2.5	—	—	—	—	—	55.3
1555	DPB	9.80	—	—	—	—	—	—	—	
1559	DFM	—	—	9.8	6.4	1.29	6.30	12.8	1000	67.1 (5th well vol)
1603	DPE	Dry	—	3.0	—	—	—	—	—	70.1
0820	DSB	8.35	—	—	—	—	—	—	—	
0824	DSE	8.30	—	—	—	—	—	—	—	
0825	DPB	8.36	—	—	6.98	1.05	11.69	11.5	1000	
0835	DFM	—	—	10.3	6.73	1.03	7.63	11.3	1000	33.4 (6th well vol)
0837	DPE	Dry	—	—	—	—	—	—	—	
1550	DPB	9.73	—	5	—	—	—	—	—	88.4
1600	DPE	Dry	—	5	—	—	—	—	—	88.4
0845	DPB	8.31	—	—	6.21	1.14	10.28	10.8	1000	
	FINAL									

WELL DEVELOPMENT CODES

DPB - Begin Pumping
 DPE - End Pumping
 DSB - Begin Surge Blocking
 DSE - End Surge Blocking
 DFM - Field Measurements
 DBB - Begin Bailing
 DBE - End Bailing
 DXB - Begin Other
 DXE - End Other
 Other: _____

FIELD MEASUREMENT CODES

MTP - Temperature
 MSC - Specific Conductance
 MPD - Photoionizer (eg. HNU)
 MFD - Flame Ionizer (eg. OVA)
 MDO - Dissolved Oxygen
 MPH - pH
 MEH - eH
 MOT - Other _____

TURBIDITY

Enter Turbidity Meter Reading
 (Final should be < 5 NTU)
 OR
 Enter Qualitative Observations
 H - High: Muddy/Silty
 M - Medium: Cloudy/Translucent
 L - Low: Transparent
 N - None: Clear/No Sediment

Logged By: Joe Boles (Please Print)

Reviewed By: C. Esler

Signature: Joe Boles

Date: 2/22/05

11/24/04

Monitoring Well Purging Form

Well ID: L12MN-245-GW

Ravenna Army Ammunition Plant
Ravenna, Ohio

Date: 11/29/04

WELL OBSERVATIONS

Protective Casing: Intact · Damaged Locked: Yes · No Key No:
 Concrete Base: Intact · Damaged Inner Casing: 2" · 4" · 6" · 8" Other:
 Stickup Height: 2.40 (ft) TIC · TOC Difference: 0.30 (ft)
 Vapor Readings: HNu · OVA Background: 0.0 Inside Well Casing:

L12MN-245-GW

	Present	Depth	Sampled Sample ID
LNAPL Yes · <u>No</u>	_____	Yes · No	
DNAPL Yes · <u>No</u>	_____	Yes · No	

CALCULATIONS

- (A) Depth to Well Bottom 30.2 (ft) TOC · TIC · BGS Measured · Previously Measured (circle one)
 (B) Depth to Water 5.45 (ft) TOC · TIC · BGS Time Measured: 1330
 (C) Water Column Height (A-B) 24.75 (ft)
 (D) Well Diameter Factor 0.16 (gal/ft) (2" = 0.16, 4" = 0.65, 6" = 1.47, 8" = 2.61 GAL/FT)
 (E) One Well Volume (C*D) 3.94 (gal)
 (F) Volumes to be Evacuated 5
 (G) **TOTAL VOLUME TO BE EVACUATED (E * F)** 19.80 (gal)

EVACUATION METHOD

Well Evacuation Method: Bailer · Submersible Pump · Other: Micro Purge Device Number: _____

Purge Water Disposition: 1. Discharged Onsite 2. Collected And: Stored · Disposed Onsite · Offsite

Collected In: Tanks Drums No. of Containers: _____

Comments: _____

TIME	DEPTH TO WATER (ft)	PURGE RATE (gpm)	Field Measurements						Comments
			HNu	Spec Cond	Temp	pH	Turb	DO	
1335	5.45		0.0	1.10	11.58	6.97	999	7.86	Initial.
1338	9.40		0.0	1.11	11.82	6.94	629	7.59	
1341	10.55		0.0	1.11	11.94	6.95	281	7.41	
1344	11.70		0.0	1.11	11.96	6.96	203	7.88	End purging.

Logged By: Sudheer Gubba (Please Print)

Reviewed By: C. Keeler

Signature: [Signature]

Date: 2/22/05

Field Sampling Report

Location ID: L12MN - 245-GW

Ravenna Army Ammunition Plant
Characterization of 14 RVAAP AOCs

Date: 11/29/04

Sampling Information

Source	Groundwater / Product	Surface Water	Soils / Sediments / Sludge
Method	Bailer	Sample Bottle	Scoop / Trowel
	Pump	Bacon Bomb	Bowl / Hand Auger
	Micro purge <input checked="" type="checkbox"/>		Push Probe / Plastic Liner
Type/Construction	Stainless Steel		Mattocks
Miscellaneous	Well Purging Form Yes - No		

Sample Collection: 1350 hrs Sample Type: Composite - MI - Grab Location: Plotted on Map - Staked in Field
 If MI # of increments taken: NA Estimated - Measured - Surveyed
 Sample Depth: 11.70 FT (below surface) Decon: Dedicated - Each Day - Each Location

Field Parameters (at time of sample)	Analytical Parameters	Other Parameters	
PID / FID Readings: Background: <u>0.0</u> ppm	VOC <input checked="" type="checkbox"/>	Corrosivity	
	SVOC <input checked="" type="checkbox"/>	Reactivity Sulfide/Cyanide	
	Explosives <input checked="" type="checkbox"/>	Ignitability	
Sample: <u>0.0</u> ppm	TPH GRO		
	TPH DRO		
	Chromium +6		
	Propellants <input checked="" type="checkbox"/>		
	Nitrate <input checked="" type="checkbox"/>		
Water Level: <u>11.70</u> FT	TAL Metals <input checked="" type="checkbox"/>	QA Samples	
Temperature: <u>11.96</u> °C	Pesticides/PCBs <input checked="" type="checkbox"/>	MS/MSD	Yes / No NA
Sp. Conductance: <u>1.11</u> uMHOs	Cyanides	Duplicate ID	NA
pH: <u>6.96</u> units	TOC	Equipment Rinse ID	NA
Turbidity: <u>203</u> N.T.U.	Grain Size	<u>Trip Blank ID</u>	<u>Trip Blank</u> NA

Sample Description
clear water, no odor, no sheen, no turbidity

Soil sample description should include:
 Munsell Color Odor Staining Texture Sorting Plasticity Moisture

Water sample description should include:
 Color Odor Sheen Turbidity

Split Sample

Split Sample ID: _____

Name: _____

Agency/Company: _____

Address: _____

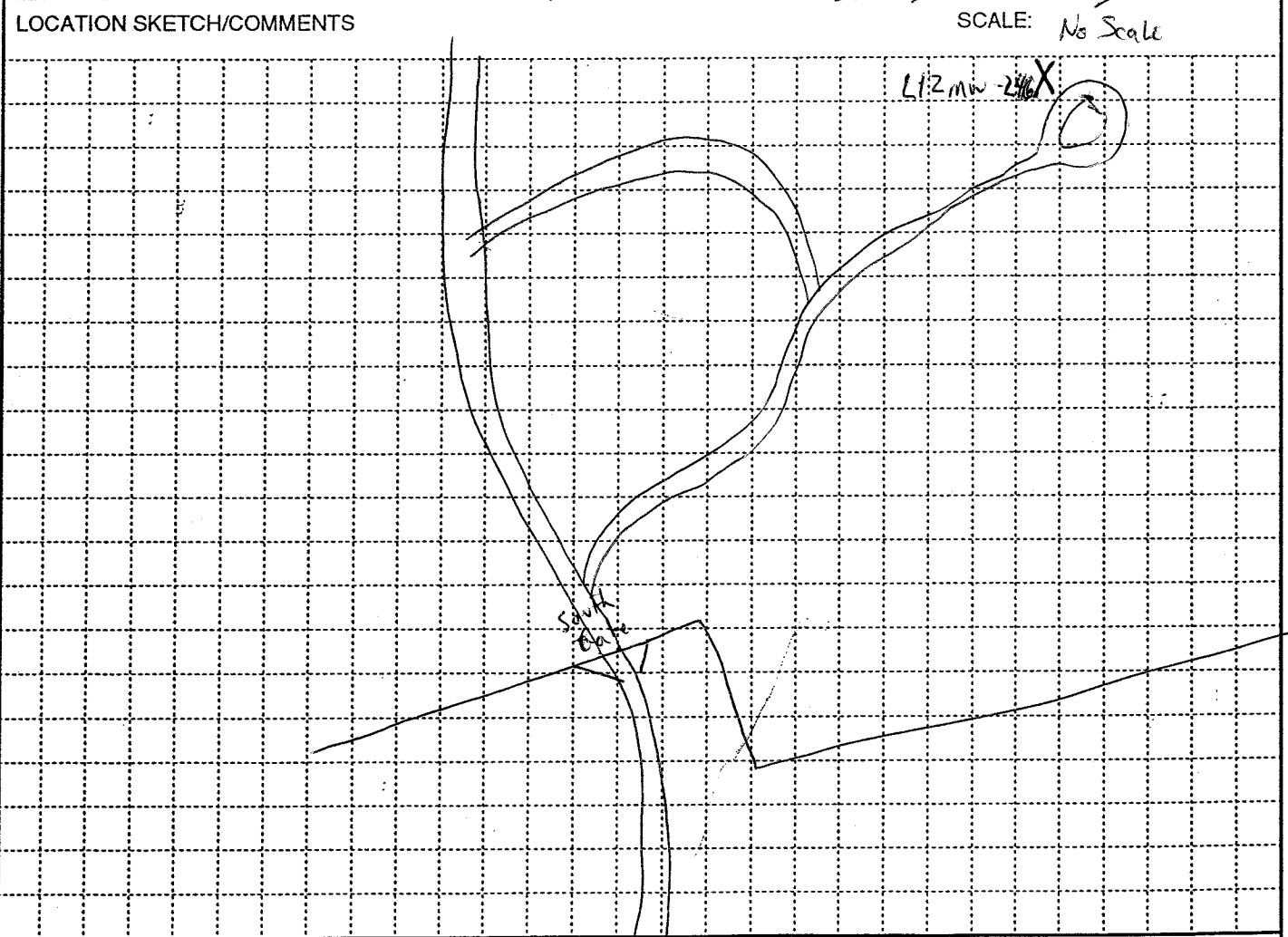
QA/QC Provided: MS/MSD - Duplicate - Trip Blanks - Field Blanks
 Parameters: Same as Above - As Listed

Logged By: Sudheer Gubba (Please Print)
 Signature: S. Gubba

Reviewed by: PEREWS (Please Print)
 Signature: [Signature] Date: 2/1/05

HTRW DRILLING LOG		DISTRICT <i>Louisville</i>	HOLE NUMBER <i>L12mw-246</i>
1. COMPANY NAME <i>M&M Engineers</i>		2. DRILL SUBCONTRACTOR <i>HAD Drilling</i>	SHEET SHEETS <i>1 OF 3</i>
3. PROJECT <i>RVAAP RE 14</i>		4. LOCATION <i>Lead Line 12</i>	
5. NAME OF DRILLER <i>Sam Holter</i>		6. MANUFACTURER'S DESIGNATION OF DRILL <i>CME LC-60</i>	
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT <i>4.25" ED HSA</i> <i>2" Split Spoons</i>		8. HOLE LOCATION <i>SE of LL, near Southern Gate</i>	
		9. SURFACE ELEVATION <i>982.00 ASL</i>	
		10. DATE STARTED <i>09 Nov 04</i>	11. DATE COMPLETED <i>09 Nov 04</i>
12. OVERBURDEN THICKNESS <i>32'</i>		15. DEPTH GROUNDWATER ENCOUNTERED <i>25'</i>	
13. DEPTH DRILLED INTO ROCK <i>-0-</i>		16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED <i>15.15' 0932 11/12/04</i>	
14. TOTAL DEPTH OF HOLE <i>32'</i>		17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY)	

18. GEOTECHNICAL SAMPLES <i>NONE</i>	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES <i>NA</i>		
20. SAMPLES FOR CHEMICAL ANALYSIS <i>NA</i>	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)
22. DISPOSITION OF HOLE <i>Monitor well</i>	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR <i>[Signature]</i>	
		<i>MW</i>			



PROJECT <i>RVAAP RE 14</i>	HOLE NO. <i>L12mw-246</i>
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HTRW DRILLING LOG

(CONTINUATION SHEET)

HOLE NUMBER
L12/mw-296
SHEET SHEETS
2 OF 3

PROJECT
RVAAP RI 14

INSPECTOR
M. O. O'Connell

ELEV. (a)	DEPTH (b)	DESCRIPTION OF MATERIALS (c)	FIELD SCREENING RESULTS (d)	GEOTECH SAMPLE OR CORE BOX NO. Recovery	ANALYTICAL SAMPLE NO. (f)	BLOW COUNT (g)	REMARKS (h)
		Black Topsoil / Road Base 4"	0.0	0.4		2-3 6-7 (MD)	7.5y-2.5/2
	2	Br. SILT 65% w/ Clay 20% Dry Non Plastic / No Color No Staining Grey Mottling Present	0.0	1.7	ML	2-3 8-7	7.5y-5/6
	4	Same As Above	0.0	1.5	NCL	2-5 7-9	7.5y-5/6
	6	Mottling Stops @ 6.0' Same As Above	0.0	1.4	ML	1-4 6-8	7.5y-5/6
	8	Br. SILT 70% w/ Clay Still Dry No Plasticity No Color No Staining	0.0	2.1	ML	1-7	7.5y-5/6
	10	Br. SILT 80% Still Dry No Plasticity	0.0	2.1	ML	15-28	7.5y-5/6
	12	Same As Above	0.0	1.8	ML	1-6 12-19	7.5y-5/6
	14	Color Change Same As Above	0.0	1.7	ML	8-7 15-20	7.5y-4/3
	16	Grey SILT Damp 70% w Clay 20% No Plasticity No Color No Staining	0.0	2.0	ML	1-6 14-20	16y-6/1
	18	Same As Above	0.0	2.0	ML	2-3 5-7	16y-6/1
	20	Same As Above	0.0	2.0	ML	1-5 6-8	70y-6/1

PROJECT
RVAAP RI 14

HOLE NO.
L12/mw-296

HTRW DRILLING LOG

(CONTINUATION SHEET)

HOLE NUMBER

L12mw-246

PROJECT

RVAAPRE 14

INSPECTOR

M. J. ...

SHEET

3 OF 3

ELEV. (a)	DEPTH (b)	DESCRIPTION OF MATERIALS (c)	FIELD SCREENING RESULTS (d)	GEOTECH SAMPLE OR CORE BOX NO. (e)	ANALYTICAL SAMPLE NO. (f)	BLOW COUNT (g)	REMARKS (h)
		Grey soft SILT 80% wet w/ sand and clay Mod. Plasticity	0.0	2.0	ML	1-1 2-4	log-6/1
	22	SILT changes to very wet Poss. Saturation	0.0	2.0	ML	1-1 3-6	log-6/1
	24					1-2	
	26	2" Grey SAND 70% w/ SILT saturated No Plasticity No Odor No staining Grey SILT 80% damp w/ clay No Plasticity. No Odor No staining	0.0	2.0	SM	5-9	log-6/1
					ML	1-6	log-6/1
	28		0.0	2.0		9-12	
		Same As Above	0.0	2.0	ML	7-5 9-12	
	30						
			0.0	2.0	ML		
	32	Weathered					
		BoH 32"					
	24						BoH 32 Sand to 31.5 Screen from 31.5-21.5 Sand up to 18 Bentonite to 14 Grout to surface Stick-up construction
	30						8 Bags Sand 1 Bag Bentonite 5 gallons to hydrate

PROJECT

RVAAPRE 14

HOLE NO.

L12mw-246

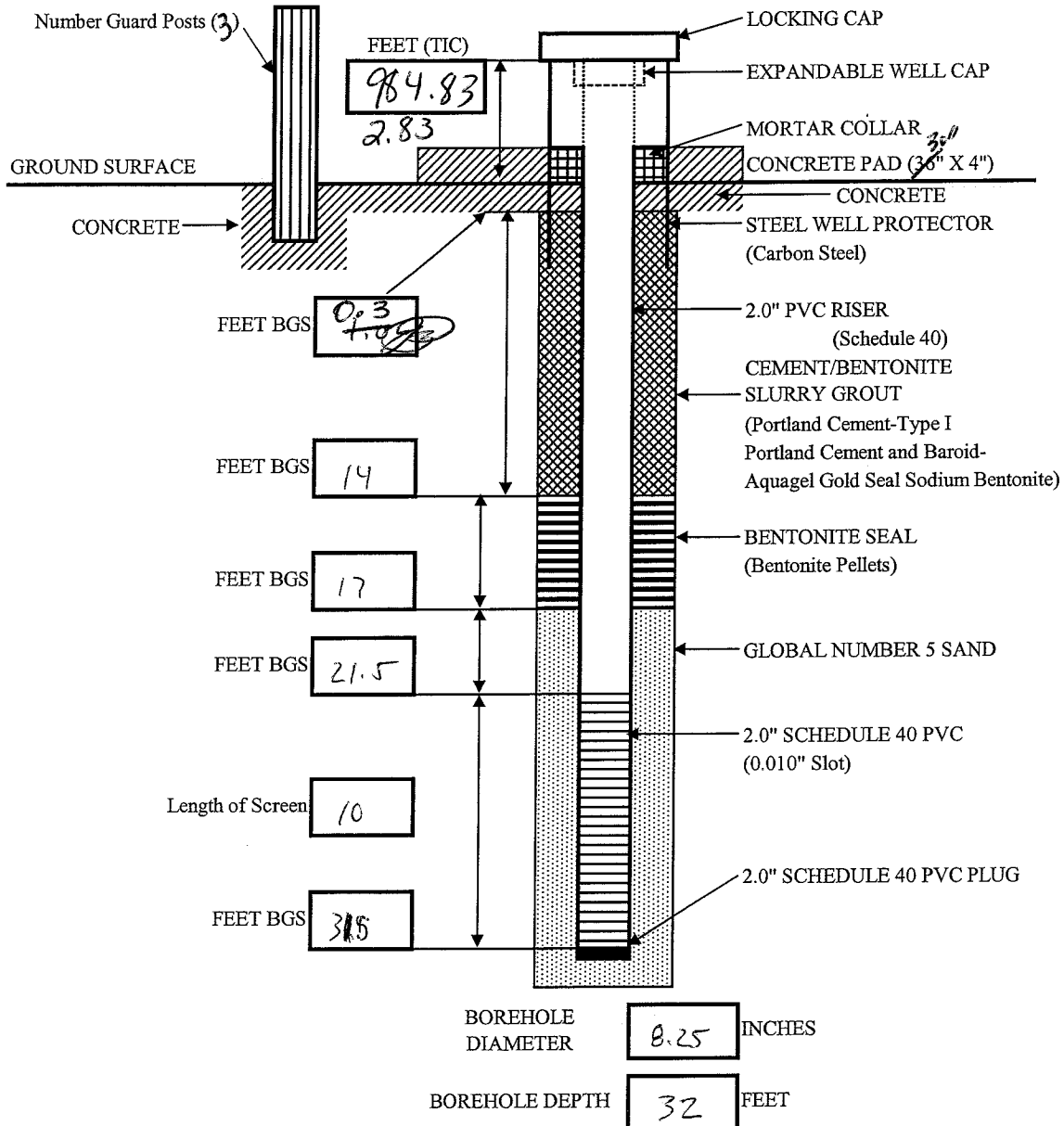


MONITORING WELL CONSTRUCTION DIAGRAM

RAVENNA ARMY AMMUNITION PLANT

Project: RUAAP RE 14

Well Number: L12MW-246	Begin: 09 Nov04	End: 09 Nov04
Coordinates: N: 556658.89 E: 2369432.17	Elevation: 982.00	Reference Point:
Logged By: Mark Dunlavy		



Notes:

- Figure not drawn to scale.
- BGS = Below Ground Surface.

- Well head protected with three guard posts set in triangle configuration about the concrete pad.

Well Development Record

Well ID: L12MW-246 - GW

Date: 11/12/04

Ravenna Army Ammunition Plant-
RVAAP 14 AOC Characterization

Project: RVAAP14

Development Method: whale pumping

Development Company: MKM

Comments: _____

Well TD: 34.79 FT TIC Depth to Water: 15.15 FT Well Volume (gallons/foot) 2-inch = 0.16 6-inch = 1.47
 Water Column Height: 19.64 FT One Well Volume: 11.5 Gals 4-inch = 0.65 8-inch = 2.61

Time	Well Dev. Code	Depth to Water (ft)	Purge Rate (gpm)	Purge Volume (gal)	Field Measurements				Turbidity	Comments
					PH	CON	DO	Temp		
0932	DSB	15.15	-	-	-	-	-	-	-	-
0945	DSE	15.55	-	-	-	-	-	-	-	-
1000	DPB	15.55	-	-	6.17	1.08	7.68	11.64	1000	Initial reading
1015	DFM	-	-	11.5	7.26	1.02	7.72	10.45	>1000	one volume
1025	DPE	DRY	-	3.5	-	-	-	-	-	15 gal
1137	DPB	16.9	-	-	-	-	-	-	-	-
1155	DFM	-	-	8.0	7.15	0.99	6.55	11.07	1000	23 gal second vol
1200	DPE	DRY	-	3.5	-	-	-	-	-	26.5 gal
1323	DPB	17.09	-	-	-	-	-	-	-	-
1342	DPE	DRY	-	8.0	7.04	1.00	6.28	11.52	1000	34.5 Third vol
1430	DPB	18.41	-	-	-	-	-	-	-	-
1447	DPE	DRY	-	8.0	-	-	-	-	-	42.5
	DFM	-	-	-	-	-	-	-	-	-
1545	DPB	18.12	-	-	-	-	-	-	-	-
1552	DFM	-	-	3.5 7.30	7.30	1.00	7.01	11.64	1000	46.0 4th vol
	FINAL									

WELL DEVELOPMENT CODES

DPB - Begin Pumping
 DPE - End Pumping
 DSB - Begin Surge Blocking
 DSE - End Surge Blocking
 DFM - Field Measurements
 DBB - Begin Bailing
 DBE - End Bailing
 DXB - Begin Other
 DXE - End Other
 Other: _____

FIELD MEASUREMENT CODES

MTP - Temperature
 MSC - Specific Conductance
 MPD - Photoionizer (eg. HNu)
 MFD - Flame Ionizer (eg. OVA)
 MDO - Dissolved Oxygen
 MPH - pH
 MEH - eH
 MOT - Other _____

TURBIDITY

Enter Turbidity Meter Reading
 (Final should be < 5 NTU)
 OR
 Enter Qualitative Observations

H - High: Muddy/Silty
 M - Medium: Cloudy/Translucent
 L - Low: Transparent
 N - None: Clear/No Sediment

Logged By: Vijay Alluri (Please Print)

Reviewed By: C. Esler

Signature: Vijay

Date: 2/2/05

Well Development Record

Well ID: L12MW-246-GW
 Date: 11/12/04

Ravenna Army Ammunition Plant-
 RVAAP 14 AOC Characterization

Project: RVAAP14

Development Method: Whale pumping

Development Company: MKM

Comments: _____

Well TD: 34.79 FT TIC Depth to Water: 15.15 FT
 Water Column Height: 19.64 FT One Well Volume: 11.15 Gals

Well Volume (gallons/foot)
 2-inch = 0.16 6-inch = 1.47
 4-inch = 0.65 8-inch = 2.61

Time	Well Dev. Code	Depth to Water (ft)	Purge Rate (gpm)	Purge Volume (gal)	Field Measurements				Turbidity	Comments
					PH	CON	DO	Temp		
1603	DPE	Dry	-	5	-	-	-	-	-	51.0
	DP	-	-	<u>11/15/04</u>	-	-	-	-	-	-
0907	DBB	15.5	-	-	-	-	-	-	-	-
0913	DBE	15.74	-	-	-	-	-	-	-	-
0919	DPB	15.74	-	-	5.35	0.94	3.85	10.4	> 1000	-
0929	DFM	-	-	6.5	6.64	0.99	10.82	10.7	280	5 th vol 57.5
0935	DPE	Dry	-	2	-	-	-	-	-	59.5
1121	DPB	16.1	-	-	-	-	-	-	-	-
1132	DFM	-	-	9.5	8.7	0.92	3.6	11.00	1000	69.0 6 th vol
1135	DPE	Dry	-	-	-	-	-	-	-	-
1315	DPB	16.52	-	-	-	-	-	-	-	-
1330	DPE	Dry	-	9.5	-	-	-	-	-	78.5
1425	DPB	18.21	-	-	-	-	-	-	-	-
1431	DFM	-	-	2	7.01	0.95	9.09	11.55	605	80.5
1431	DFM	-	-	2	7.01	0.95	9.09	11.55	6.05	80.5 7 th vol
	FINAL									

WELL DEVELOPMENT CODES

DPB - Begin Pumping
 DPE - End Pumping
 DSB - Begin Surge Blocking
 DSE - End Surge Blocking
 DFM - Field Measurements
 DBB - Begin Bailing
 DBE - End Bailing
 DXB - Begin Other
 DXE - End Other
 Other: _____

FIELD MEASUREMENT CODES

MTP - Temperature
 MSC - Specific Conductance
 MPD - Photoionizer (eg. HNu)
 MFD - Flame Ionizer (eg. OVA)
 MDO - Dissolved Oxygen
 MPH - pH
 MEH - eH
 MOT - Other _____

TURBIDITY

Enter Turbidity Meter Reading
 (Final should be < 5 NTU)
 OR
 Enter Qualitative Observations
 H - High: Muddy/Silty
 M - Medium: Cloudy/Translucent
 L - Low: Transparent
 N - None: Clear/No Sediment

Logged By: Sudheer Gubb (Please Print)

Reviewed By: C. Egan

Signature: [Signature]

Date: 2/22/05

Monitoring Well Purging Form

Well ID: L12MW-246-GW

Ravenna Army Ammunition Plant
Ravenna, Ohio

Date: 11/29/05

WELL OBSERVATIONS

Protective Casing: Intact · Damaged Locked: Yes · No Key No:
 Concrete Base: Intact · Damaged Inner Casing: 2" · 4" · 6" · 8" Other:
 Stickup Height: 2.70 (ft) TIC · TOC Difference: 0.21 (ft)
 Vapor Readings : HNu · OVA Background: 0.00 Inside Well Casing:

Sampled Sample ID
L12MW-246-GW

Present Depth Yes · No Yes · No

LNAPL Yes · No Yes · No

DNAPL Yes · No Yes · No

CALCULATIONS

- (A) Depth to Well Bottom 34.75 (ft) TOC · TIC · BGS Measured · Previously Measured (circle one)
- (B) Depth to Water 15 (ft) TOC · TIC · BGS Time Measured: 0900
- (C) Water Column Height (A-B) 19.75 (ft)
- (D) Well Diameter Factor 0.16 (gal/ft) (2" = 0.16, 4" = 0.65, 6" = 1.47, 8" = 2.61 GAL/FT)
- (E) One Well Volume (C*D) 3.16 (gal)
- (F) Volumes to be Evacuated 5
- (G) TOTAL VOLUME TO BE EVACUATED (E * F) 15.80 (gal)

EVACUATION METHOD

Well Evacuation Method: Bailer · Submersible Pump · Other: Micro Purge Device Number: _____

Purge Water Disposition: 1. Discharged Onsite 2. Collected And: Stored · Disposed Onsite · Offsite

Collected In: Tanks · Drums No. of Containers: _____

Comments: _____

TIME	DEPTH TO WATER (ft)	PURGE RATE (gpm)	Field Measurements						Comments
			HNu	Spec Cond	Temp	pH	Turb	DO	
<u>0928</u>	<u>15</u>		<u>0.0</u>	<u>1.01</u>	<u>10.27</u>	<u>6.14</u>	<u>241</u>	<u>4.22</u>	<u>Initial Purging</u>
<u>0931</u>	<u>16.15</u>		<u>0.0</u>	<u>0.99</u>	<u>11.19</u>	<u>6.77</u>	<u>136</u>	<u>0.04</u>	
<u>0934</u>	<u>16.74</u>		<u>0.0</u>	<u>0.98</u>	<u>11.28</u>	<u>6.84</u>	<u>125</u>	<u>0</u>	
<u>0937</u>	<u>17.55</u>		<u>0.0</u>	<u>0.98</u>	<u>11.27</u>	<u>6.87</u>	<u>117</u>	<u>0</u>	<u>end purging</u>

Logged By: Sudheer Gubba (Please Print)

Reviewed By: C. Coler

Signature: Sudheer Gubba

Date: 2/22/05

Field Sampling Report

Location ID: L12^{MIN}-246-GW

Ravenna Army Ammunition Plant
Characterization of 14 RVAAP AOCs

Date: 11/29/04

Sampling Information

Source	Groundwater / Product	Surface Water	Soils / Sediments / Sludge		
Method	Bailer	/	Sample Bottle	Scoop	Trowel
	Pump		Bacon Bomb	Bowl	Hand Auger
	Micro Pnuge		X	Push Probe	Plastic Liner
Type/Construction	Stainless Steel		Mattocks		
Miscellaneous	Well Purging Form (Yes) - No				

Sample Collection: 0945 hrs Sample Type: Composite - MI - Grab
 If MI # of increments taken: NA Location: Plotted on Map - Staked in Field
 Sample Depth: 17.55 FT (below surface) Decon: Dedicated Each Day - Each Location
 Estimated - Measured - Surveyed

Field Parameters (at time of sample)	Analytical Parameters				Other Parameters		
PID / FID Readings: Background: <u>0.0</u> ppm	VOC	X	TPH GRO		Corrosivity		
	SVOC	X	TPH DRO		Reactivity Sulfide/Cyanide		
	Explosives	X	Chromium +6		Ignitability		
Sample: <u>0.0</u> ppm	Propellants	X	Nitrate	X			
Water Level: <u>17.55</u> FT	TAL Metals	X			QA Samples		
Temperature: <u>11.27</u> °C	Pesticides/PCBs	X			MS/MSD	Yes / No	NA
Sp. Conductance: <u>0.98</u> uMHOs	Cyanides				Duplicate ID		NA
pH: <u>6.87</u> units	TOC				Equipment Rinse ID		NA
Turbidity: <u>117</u> N.T.U.	Grain Size				<u>Trip Blank ID</u>	<u>Trip Blank</u>	NA

Sample Description

clear water, no odor, no sheen
No turbidity

Split Sample

Split Sample ID: _____
 Name: _____
 Agency/Company: _____
 Address: _____

 QA/QC Provided: MS/MSD - Duplicate - Trip Blanks - Field Blanks
 Parameters: Same as Above - As Listed

Soil sample description should include:

Munsell Color Odor Staining Texture Sorting Plasticity Moisture

Water sample description should include:

Color Odor Sheen Turbidity

Logged By: Sudheer Gubka (Please Print)

Reviewed by: ERIC ELUS (Please Print)

Signature: G. Gubka

Signature: Eric Elus Date: 2/1/05

Monitoring Well Purging Form

Well ID: L12 MW, 088 - GW

Ravenna Army Ammunition Plant
Ravenna, Ohio

Date: 26-10-04

WELL OBSERVATIONS

Protective Casing: Intact · Damaged Locked: Yes · No

Key No: 600P

Concrete Base: Intact · Damaged Inner Casing: 2" · 4" · 6" · 8" Other:

Stickup Height: 2.63 (ft) TIC · TOC Difference: 0.6 (ft)

Vapor Readings : HNu · OVA Background: _____ Inside Well Casing:

Present Depth Sampled Sample ID

LNAPL Yes · No _____ Yes · No

DNAPL Yes · No _____ Yes · No

L12mw-088

CALCULATIONS

(A) Depth to Well Bottom 27.42 (ft) TOC · TIC · BGS Measured · Previously Measured (circle one)

(B) Depth to Water 6.35 (ft) TOC · TIC · BGS Time Measured: 13.52

(C) Water Column Height (A-B) 21.07 (ft)

(D) Well Diameter Factor 2.07 (gal/ft) (2" = 0.16, 4" = 0.65, 6" = 1.47, 8" = 2.61 GAL/FT)

(E) One Well Volume (C*D) 3.3 (gal)

(F) Volumes to be Evacuated 17.53

(G) TOTAL VOLUME TO BE EVACUATED (E * F) 10.1 (gal)

EVACUATION METHOD

Well Evacuation Method: Bailer · Submersible Pump · Other: micropurge Device Number: _____

Purge Water Disposition: 1. Discharged Onsite 2. Collected And: Stored · Disposed Onsite · Offsite

Collected In: Tanks · Drums No. of Containers: _____

Comments: _____

TIME	DEPTH TO WATER (ft)	PURGE RATE (gpm)	Field Measurements						Comments
			HNu	Spec Cond	Temp	pH	Turb	DO	
15.26	6.35	<500ml		0.660	14.41	8.39	249	4.17	at intinel
15.29	7.70			0.577	14.52	8.70	791	1.56	
15.32	9.70			0.520	14.41	8.96	301	1.19	
15.35	10.8			0.533	14.61	9.03	289	1.04	
15.38	11.75			0.525	14.56	9.5	227	1.00	End Purging

Logged By: Shahram (Please Print)

Reviewed By: C. G. Lu

Signature: [Signature]

Date: 2/21/05

Field Sampling Report

Location ID: L12 MW088, GW
 Date: 26 Oct - 19 - Oct

Ravenna Army Ammunition Plant
 Characterization of 14 RVAAP AOCs

Sampling Information

Source	Groundwater / Product	Surface Water	Soils / Sediments / Sludge
Method	Bailer	Sample Bottle	Scoop
	Pump	Bacon Bomb	Bowl
	<u>Microprobe</u> <input checked="" type="checkbox"/>		Hand Auger
Type/Construction	<u>Stainless</u>		Push Probe
Miscellaneous	Well Purging Form <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No		

Sample Collection: 1550 hrs Sample Type: Composite (MI) - Grab Location: Plotted on Map - Staked in Field
If MI, # of increments taken: NA Estimated - Measured - Surveyed
 Sample Depth: 17.5 FT (below surface) Decon: Dedicated - Each Day Each Location

Field Parameters <small>(at time of sample)</small>	Analytical Parameters	Other Parameters
PID / FID Readings: Background: _____ ppm <u>NT</u> Sample: _____ ppm <u>NT</u>	VOC <input checked="" type="checkbox"/>	Corrosivity
	SVOC <input checked="" type="checkbox"/>	Reactivity Sulfide/Cyanide
	Explosives <input checked="" type="checkbox"/>	Ignitability
Water Level <u>11.75</u> FT	Propellants <input checked="" type="checkbox"/>	QA Samples MS/MSD Yes / No NA Duplicate ID NA Equipment Rinse ID NA Trip Blank ID <u>Trip Blank</u> NA
Temperature <u>14.56</u> °C	TAL Metals <input checked="" type="checkbox"/>	
Sp. Conductance: <u>0.525</u> uMHOs	Pesticides/PCBs <input checked="" type="checkbox"/>	
pH <u>9.5</u> units	Cyanides <input checked="" type="checkbox"/> <small>FREE</small>	
Turbidity <u>227</u> N.T.U.	Nitrate <input checked="" type="checkbox"/>	
	TOC	
	Grain Size	

Sample Description
Clear, no odor, no sheen
Moderate turbidity

Split Sample
 Split Sample ID: _____
 Name: _____
 Agency/Company: _____
 Address: _____

Soil sample description should include:
 Munsell Color Odor Staining Texture Sorting Plasticity Moisture

Water sample description should include:
 Color Odor Sheen Turbidity

QA/QC Provided: MS/MSD - Duplicate - Trip Blanks - Field Blanks
Parameters: Same as Above - As Listed

Logged By: Shahram (Please Print)
 Signature: [Signature]

Reviewed by: [Signature] (Please Print)
 Signature: [Signature] Date: 2/1/05

Well ID: L12 L10 LL12 MW107-GW
 Date: 10/27/04

Monitoring Well Purging Form

Ravenna Army Ammunition Plant
 Ravenna, Ohio

WELL OBSERVATIONS

Protective Casing: Intact · Damaged Locked: Yes · No Key No: 6000
 Concrete Base: Intact · Damaged Inner Casing: 2" · 4" · 6" · 8" Other:
 Stickup Height: _____ (ft) TIC · TOC Difference: 0.31 (ft)
 Vapor Readings : HNu · OVA Background: _____ Inside Well Casing:
 Present Depth Sampled Sample ID L10 MW-107-GW
 LNAPL Yes · No _____ Yes · No L12
 DNAPL Yes · No _____ Yes · No

CALCULATIONS

- (A) Depth to Well Bottom 33.55 (ft) TOC · TIC · BGS Measured · Previously Measured (circle one)
- (B) Depth to Water 8.31 (ft) TOC · TIC · BGS Time Measured: 9:08
- (C) Water Column Height (A-B) 25.24 (ft)
- (D) Well Diameter Factor 6.09 (gal/ft) (2" = 0.16, 4" = 0.65, 6" = 1.47, 8" = 2.61 GAL/FT)
- (E) One Well Volume (C*D) 4.038 (gal)
- (F) Volumes to be Evacuated 5
- (G) TOTAL VOLUME TO BE EVACUATED (E * F) 20.19 (gal)

EVACUATION METHOD

Well Evacuation Method: Bailer · Submersible Pump · Other Microperforated Device Number: _____
 Purge Water Disposition: 1. Discharged Onsite 2. Collected And: Stored · Disposed Onsite · Offsite
 Collected In: Tanks · Drums No. of Containers: _____

Comments: _____

TIME	DEPTH TO WATER (ft)	PURGE RATE (gpm)	Field Measurements						Comments
			HNu	Spec Cond	Temp	pH	Turb	DO	
9.26	8.31			1.29	12.73	6.54	414	6.43	initial
9.29	9.33			1.29	12.39	6.58	278	3.48	
9.32	10.76			1.23	12.45	6.62	201	3.31	
9.35	11.91			1.19	12.47	6.66	136	3.56	End Purging

Logged By: Shahram (Please Print)
 Signature: _____

Reviewed By: C. Collier
 Date: 2/21/05

Field Sampling Report

Location ID: ELR MW 107-GW

Ravenna Army Ammunition Plant
Characterization of 14 RVAAP AOCs

Date: 10/27/04

Sampling Information

Source	Groundwater Product	Surface Water	Soils / Sediments / Sludge
Method	Bailer	Sample Bottle	Scoop
	Pump	Bacon Bomb	Bowl
	Micro Purge Stainless Steel		Push Probe
Type/Construction			
Miscellaneous	Well Purging Form <input checked="" type="checkbox"/> Yes - No		

Sample Collection: 9:45 hrs Sample Type: Composite/(MI) - Grab
 If MI, # of increments taken: NA Location: Plotted on Map Staked in Field
 Estimated - Measured - Surveyed
 Sample Depth: 21.5 FT (below surface) Decon: Dedicated - Each Day - Each Location

Field Parameters (at time of sample)	Analytical Parameters	Other Parameters	
PID / FID Readings: Background: _____ ppm	VOC <input checked="" type="checkbox"/>	TPH GRO	
	SVOC <input checked="" type="checkbox"/>	TPH DRO	
Sample: <u>NT</u> ppm	Explosives <input checked="" type="checkbox"/>	Chromium +6	
	Propellants <input checked="" type="checkbox"/>	Nitrate <input checked="" type="checkbox"/>	
Water Level: <u>11.91</u> FT	TAL Metals <input checked="" type="checkbox"/>	QA Samples	
Temperature: <u>12.47</u> °C	Pesticides/PCBs <input checked="" type="checkbox"/>	MS/MSD	Yes / No NA
Sp. Conductance: <u>1.19</u> uMHOs	Cyanides	Duplicate ID	NA
pH: <u>6.66</u> units	TOC	Equipment Rinse ID	NA
Turbidity: <u>136</u> N.T.U.	Grain Size	<u>Trip Blank ID</u>	<u>Trip Blank</u> NA

Sample Description
Water sample is clear
No odor, No Sheen, Low-moderate turbidity

Soil sample description should include:
 Munsell Color Odor Staining Texture Sorting Plasticity Moisture

Water sample description should include:
 Color Odor Sheen Turbidity

Split Sample

Split Sample ID: _____

Name: _____
 Agency/Company: _____
 Address: _____

QA/QC Provided: MS/MSD - Duplicate - Trip Blanks - Field Blanks
Parameters: Same as Above - As Listed

Logged By: Sudheer Gubba (Please Print)
 Signature: [Signature]

Reviewed by: ERIC ELLIS (Please Print)
 Signature: [Signature] Date: 2/1/05

Well Development Record

Well ID: L12 MW-113-G-W
 Date: 28 Oct 04

Ravenna Army Ammunition Plant
 Characterization of 14 RVAAP AOCs

Project: RVAAP R114

Development Method: Whale Pump

Development Company: MKM

Comments: _____

Well TD: 23.33 FT TIC Depth to Water: 6.35 FT
 Water Column Height: 16.98 FT One Well Volume: 10.01 Gals

Well Volume (gallons/foot)
 2-inch = 0.16 6-inch = 1.47
 4-inch = 0.65 8-inch = 2.61

Time	Well Dev. Code	Depth to Water (ft)	Purge Rate (gpm)	Purge Volume (gal)	Field Measurements				Turbidity	Comments
					pH	Cond.	DO	Temp		
0945	DPB	7.25	—	—	7.38	1.43	5.61	14.42	>1000	18 gal removed
0947	DPE	Dry	—	5.0	—	—	—	—	—	
1118	DPB	6.65	—	—	—	—	—	—	—	
1020	DFM	19.35	—	2.0	7.0	1.34	4.54	15.67	>1000	2nd well volume 20 gal
1133	DPE	Dry	—	9.5	—	—	—	—	—	29.5 gal
1337	DSB	6.97	—	—	—	—	—	—	—	
1341	DSE	7.12	—	—	—	—	—	—	—	
1345	DPB	7.10	—	0.5	7.13	1.19	4.18	15.99	>1000	3rd well volume 30 gal
1348	DPE	Dry	—	3.5	—	—	—	—	—	33.5 gal
1455	DPB	8.0	—	—	—	—	—	—	—	
1458	DPE	Dry	—	4.5	—	—	—	—	—	38 gal
1544	DPB	8.6	—	—	—	—	—	—	—	
1547	DFM			4	7.82	1.36	7.27	15.33	1000	42 gal - 4th well vol
1547	DPE	Dry	—	—	—	—	—	—	—	42 gal
	FINAL									

WELL DEVELOPMENT CODES

DPB - Begin Pumping
 DPE - End Pumping
 DSB - Begin Surge Blocking
 DSE - End Surge Blocking
 DFM - Field Measurements
 DBB - Begin Bailing
 DBE - End Bailing
 DXB - Begin Other
 DXE - End Other
 Other: _____

FIELD MEASUREMENT CODES

MTP - Temperature
 MSC - Specific Conductance
 MPD - Photoionizer (eg. HNu)
 MFD - Flame Ionizer (eg. OVA)
 MDO - Dissolved Oxygen
 MPH - pH
 MEH - eH
 MOT - Other _____

TURBIDITY

Enter Turbidity Meter Reading
 (Final should be < 5 NTU)
 OR
 Enter Qualitative Observations

H - High: Muddy/Silty
 M - Medium: Cloudy/Translucent
 L - Low: Transparent
 N - None: Clear/No Sediment

Logged By: Mark Dunlop (Please Print)

Reviewed By: Stan Swartz

Signature: [Signature]

Date: 07 NOV 04

Well Development Record

Well ID: L12mw-113
 Date: 28 Oct 04

Ravenna Army Ammunition Plant
 Characterization of 14 RVAAP AOCs

Project: RVAAP RZ14

Development Method: Whale Pump

Development Company: MKM

Comments: _____

Well TD: 23.33 FT TIC Depth to Water: 6.35 FT Well Volume (gallons/foot) 2-inch = 0.16 8-inch = 1.47
 Water Column Height: 16.98 FT One Well Volume: 10.01 Gals 4-inch = 0.65 8-inch = 2.61

Time	Well Dev. Code	Depth to Water (ft)	Purge Rate (gpm)	Purge Volume (gal)	Field Measurements				Turbidity	Comments
					pH	Cond	DO	Temp		
1612	DPB	9.65	-	-	-	-	-	-	High	
1624	DFM	24.00	-	8 gal	7.18	1.23	1.27	14.96	1000	5th Well Volume 50 gal
1632	DPE	Dry	-	5 gal	-	-	-	-	-	55 gal
29 Oct 04 0827	DSB	5.38	-	-	-	-	-	-	-	23.85 Depth to Bottom ~ 14.5 ft
0832	DSE DEM	-	-	-	5.72	1.42	3.66	14.54	-	
0832	DBB	-	-	-	-	-	-	-	-	
0835	DFM	-	-	-	5.72	1.42	3.66	14.54	1000	
0837	DFM	-	-	5 gal	6.68	1.43	7.84	15.4	1000	609.5th well vol.
0838	DPE	Dry	-	1 gal	-	-	-	-	-	61 gal
0935	DPB	7.83	-	-	-	-	-	-	-	
0942	DPE	Dry	-	8.5	-	-	-	-	-	69.5 gal
1116	DPB	7.56	-	0.5	6.84	1.22	4.49	14.45	>1000	70.9 gallon 7 well vol.
1119	DPE	Dry	-	4.5	-	-	-	-	-	70.5 gallon
	FINAL									

WELL DEVELOPMENT CODES

- DPB - Begin Pumping
- DPE - End Pumping
- DSB - Begin Surge Blocking
- DSE - End Surge Blocking
- DFM - Field Measurements
- DBB - Begin Bailing
- DBE - End Bailing
- DXB - Begin Other
- DXE - End Other
- Other: _____

FIELD MEASUREMENT CODES

- MTP - Temperature
- MSC - Specific Conductance
- MPD - Photoionizer (eg. HNu)
- MFD - Flame Ionizer (eg. OVA)
- MDO - Dissolved Oxygen
- MPH - pH
- MEH - eH
- MOT - Other _____

TURBIDITY

- Enter Turbidity Meter Reading (Final should be < 5 NTU)
- OR
- Enter Qualitative Observations
- H - High: Muddy/Silty
- M - Medium: Cloudy/Translucent
- L - Low: Transparent
- N - None: Clear/No Sediment

Logged By: Mark Dynlwy (Please Print)

Reviewed By: Don Severn

Signature: [Signature]

Date: 02 Nov 04

Monitoring Well Purging Form

Well ID: KW 8L12MW 113

Ravenna Army Ammunition Plant
Ravenna, Ohio

Date: 11/05/04

WELL OBSERVATIONS

Protective Casing: Intact · Damaged Locked: Yes · No Key No: 6000
 Concrete Base: Intact · Damaged Inner Casing: 2" · 4" · 6" · 8" Other:
 Stickup Height: 2.95 (ft) TIC · TOC Difference: 0.42 (ft)
 Vapor Readings : HNu · OVA Background: _____ Inside Well Casing:

03 L12
HHZ MW 113

Present Depth Sampled Sample ID
 LNAPL Yes · No _____ Yes · No
 DNAPL Yes · No _____ Yes · No

CALCULATIONS

- (A) Depth to Well Bottom 23.2 (ft) TOC TIC · BGS Measured · Previously Measured (circle one)
 (B) Depth to Water 5.25 (ft) TOC · TIC · BGS Time Measured: 0315
 (C) Water Column Height (A-B) 17.95 (ft)
 (D) Well Diameter Factor 0.16 (gal/ft) (2" = 0.16, 4" = 0.65, 6" = 1.47, 8" = 2.61 GAL/FT)
 (E) One Well Volume (C*D) 2.872 (gal)
 (F) Volumes to be Evacuated 5
 (G) TOTAL VOLUME TO BE EVACUATED (E * F) 14.35 (gal)

EVACUATION METHOD

Well Evacuation Method: Bailer · Submersible Pump · Other: Micro Purge Device Number: _____

Purge Water Disposition: 1. Discharged Onsite 2. Collected And: Stored · Disposed Onsite · Offsite

Collected In: Tanks · Drums No. of Containers: _____

Comments: _____

TIME	DEPTH TO WATER (ft)	PURGE RATE (gpm)	Field Measurements						Comments
			HNu	Spec Cond	Temp	pH	Turb	DO	
0830	5.25		0	1.93	14.55	6.02	1000	267	Initial reading
0833	6.74		0	1.95	15.76	6.59	1000	0.0	
0836	7.65		0	1.94	15.82	6.61	1000	0.0	
0839	8.65		0	1.90	15.76	6.61	1000	0.0	
0842	9.51		0	1.89	15.70	6.62	1000	0.0	
0845	9.94		0	1.87	15.59	6.61	1000	0.0	End Purging

Logged By: Shaham Taheran (Please Print)

Reviewed By: C. Keller

Signature: [Signature]

Date: 2/21/05

Field Sampling Report

Location ID: KW EL12 MW 113-GW
 Date: 11/05/04

Ravenna Army Ammunition Plant
 Characterization of 14 RVAAP AOCs

Sampling Information

Source	Groundwater / Product	Surface Water	Soils / Sediments / Sludge
Method	Bailer	Sample Bottle	Scoop
	Pump	Bacon Bomb	Bowl
	Micro Airge X		Push Probe
Type/Construction	Stainless steel		Plastic Liner
Miscellaneous	Well Purging Form Yes - No		Mattocks

Sample Collection: 0850 hrs Sample Type: Composite - MI - Grab
 If MI, # of increments taken: N/A Location: Plotted on Map - Staked in Field
 Sample Depth: 12.5 FT (below surface) Decon: Dedicated - Each Day Each Location
 Estimated - Measured - Surveyed

Field Parameters (at time of sample)	Analytical Parameters			Other Parameters		
PID / FID Readings: Background: <u>0.0</u> ppm	VOC	X	TPH GRO	/		
	SVOC	X	TPH DRO			
	Explosives	X	Chromium +6			
Sample: <u>0.0</u> ppm	Propellants	X	Nitrate	X		
Water Level: <u>9.94</u> FT	TAL Metals	X	QA Samples			
Temperature: <u>15.59</u> °C	Pesticides/PCBs	X	MS/MSD	Yes / No	NA	
Sp. Conductance: <u>1.87</u> uMHOs	Cyanides		Duplicate ID		NA	
pH: <u>6.61</u> units	TOC		Equipment Rinse ID		NA	
Turbidity: <u>> 1000</u> N.T.U.	Grain Size		Trip Blank ID	<u>Trip Blank</u>	NA	

Sample Description
not clear, no odor
no sheen, highly turbid

Split Sample

Split Sample ID: _____
 Name: _____
 Agency/Company: _____
 Address: _____

QA/QC Provided: MS/MSD - Duplicate - Trip Blanks - Field Blanks
 Parameters: Same as Above - As Listed

Soil sample description should include:
 Munsell Color Odor Staining Texture Sorting Plasticity Moisture

Water sample description should include:
 Color Odor Sheen Turbidity

Logged By: Sudheer Gubba (Please Print) Reviewed by: ERIC EWIS (Please Print)
 Signature: [Signature] Signature: [Signature] Date: 2/1/05

Monitoring Well Purging Form

Well ID: L12 MW 128-GW

Ravenna Army Ammunition Plant
Ravenna, Ohio

Date: 10-27-04

WELL OBSERVATIONS

Protective Casing: Intact Damaged Locked: Yes No

Key No: 6000

Concrete Base: Intact Damaged Inner Casing: 2" 4" · 6" · 8" Other:

Stickup Height: 2.4 (ft) TIC · TOC Difference: 0.35 (ft)

Vapor Readings: HNu · OVA Background: _____ Inside Well Casing:

	Present	Depth	
LNAPL Yes · <u>No</u>	_____	Yes · No	
DNAPL Yes · <u>No</u>	_____	Yes · No	

Sampled Sample ID

L12 MW 128-GW

CALCULATIONS

- (A) Depth to Well Bottom 34.30 (ft) TOC · TIC · BGS Measured Previously Measured (circle one)
- (B) Depth to Water 18.54 (ft) TOC · TIC · BGS Time Measured: 13.40
- (C) Water Column Height (A-B) 20.71 (ft)
- (D) Well Diameter Factor 0.16 (gal/ft) (2" = 0.16, 4" = 0.65, 6" = 1.47, 8" = 2.61 GAL/FT)
- (E) One Well Volume (C*D) 332.8 (gal)
- (F) Volumes to be Evacuated 5
- (G) **TOTAL VOLUME TO BE EVACUATED (E * F)** 16.61 (gal)

EVACUATION METHOD

Well Evacuation Method: Bailer · Submersible Pump · Other: micropurge Device Number: _____

Purge Water Disposition: 1. Discharged Onsite 2. Collected And: Stored Disposed Onsite Offsite

Collected In: Tanks · Drums No. of Containers: _____

Comments: _____

TIME	DEPTH TO WATER (ft)	PURGE RATE (gpm)	Field Measurements						Comments
			HNu	Spec Cond	Temp	pH	Turb	DO	
13.59	14.2			1.83	13.46	6.11	760	8.26	initial
14.02	15.6			1.84	12.81	6.68	518	3.22	
14.05	16.51			1.83	12.64	6.68	539	2.85	
14.08	17.65			1.81	12.63	6.62	450	2.69	End Purging
									total vol 1.5 gal

Logged By: Shahram (Please Print)

Reviewed By: C. Coln

Signature: [Signature]

Date: 2/21/05

Field Sampling Report

Ravenna Army Ammunition Plant
Characterization of 14 RVAAP AOCs

Location ID: L12 MW 128 - GW

Date: 27 Oct, 04

Sampling Information

Source	Groundwater Product	Surface Water	Soils / Sediments / Sludge
Method	Bailer	Sample Bottle	Scoop
	Pump <u>stainless steel</u> <input checked="" type="checkbox"/>	Bacon Bomb	Bowl
	Micropurging <input checked="" type="checkbox"/>		Push Probe
Type/Construction			
Miscellaneous	Well Purging Form (Yes) - No		

Sample Collection: 14:15 hrs

Sample Type: Composite/(MI) - Grab
If MI, # of increments taken: NA

Location: Plotted on Map - Staked in Field
Estimated - Measured - Surveyed

Sample Depth: 23 FT (below surface)

Decon: Dedicated - Each Day (Each Location)

Field Parameters (at time of sample)	Analytical Parameters	Other Parameters		
PID / FID Readings: Background: <u>NT</u> ppm	VOC <input checked="" type="checkbox"/>	TPH GRO		
	SVOC <input checked="" type="checkbox"/>	TPH DRO		
	Explosives <input checked="" type="checkbox"/>	Chromium +6		
Sample: <u>NT</u> ppm	Propellants <input checked="" type="checkbox"/>	Nitrate <input checked="" type="checkbox"/>		
Water Level: <u>17.65</u> FT	TAL Metals <input checked="" type="checkbox"/>	QA Samples		
Temperature: <u>12.63</u> °C	Pesticides/PCBs <input checked="" type="checkbox"/>	MS/MSD	Yes / No	NA
Sp. Conductance: <u>1.81</u> uMHOs	Cyanides	Duplicate ID		NA
pH: <u>6.62</u> units	TOC	Equipment Rinse ID		NA
Turbidity: <u>450</u> N.T.U.	Grain Size	<u>Trip Blank ID</u>	<u>Trip Blank</u>	NA

Sample Description

color - white, no odor, no sheen, high turbidity.

Soil sample description should include:

Munsell Color Odor Staining Texture Sorting Plasticity Moisture

Water sample description should include:

Color Odor Sheen Turbidity

Split Sample

Split Sample ID: _____

Name: _____

Agency/Company: _____

Address: _____

QA/QC Provided: MS/MSD - Duplicate - Trip Blanks - Field Blanks

Parameters: Same as Above - As Listed

Logged By: [Signature] (Please Print)

Signature: [Signature]

Reviewed by: FRANK BUIS (Please Print)

Signature: [Signature] Date: 2/1/05

Monitoring Well Purging Form

Well ID: ~~LL-12-MW-153~~ ⁹²³ ~~LL-12~~ MW153-GW

Ravenna Army Ammunition Plant
Ravenna, Ohio

Date: 10/28/04

WELL OBSERVATIONS

Protective Casing: Intact Damaged Locked: Yes No Key No: 6000
 Concrete Base: Intact Damaged Inner Casing: 2" 4" 6" 8" Other:
 Stickup Height: 2.95 (ft) TIC · TOC Difference: 0.55 (ft)
 Vapor Readings: HNu OVA Background: 0.0 Inside Well Casing: 0.0

Present Depth Sampled Sample ID
 LNAPL Yes No _____ Yes · No ^{L12}
 DNAPL Yes No _____ Yes · No ~~LL-12~~ MW-153

CALCULATIONS

- (A) Depth to Well Bottom 25.04 (ft) TIC · BGS Measured · Previously Measured (circle one)
- (B) Depth to Water 6.21 (ft) TOC · BGS Time Measured: 1325
- (C) Water Column Height (A-B) 18.83 (ft)
- (D) Well Diameter Factor 0.16 (gal/ft) (2" = 0.16, 4" = 0.65, 6" = 1.47, 8" = 2.61 GAL/FT)
- (E) One Well Volume (C*D) 3.01 (gal)
- (F) Volumes to be Evacuated 3
- (G) TOTAL VOLUME TO BE EVACUATED (E * F) 15.06 (gal)

EVACUATION METHOD

Well Evacuation Method: Bailer · Submersible Pump · Other: Misc Pump Device Number: _____

Purge Water Disposition: 1. Discharged Onsite 2. Collected And: Stored Disposed Onsite Offsite

Collected In: Tanks · Drums No. of Containers: _____

Comments: _____

TIME	DEPTH TO WATER (ft)	PURGE RATE (gpm)	Field Measurements						Comments
			HNu	Spec Cond	Temp	pH	Turb	DO	
13.16	6.21		0.0	1.17	15.67	7.01	14.6	2.31	Initial Reading
13.19	7.42		0.0	1.17	14.64	7.03	36.5	0.73	
13.22	8.33		0.0	1.18	14.44	7.05	32.0	0.0	
13.25	9.29		0.0	1.18	14.31	7.03	23.0	0.0	End Purging

Logged By: Shahyan (Please Print)

Reviewed By: C. Collier

Signature: _____

Date: 2/1/05

Location ID: EL12 MW-153-GW

Field Sampling Report

Ravenna Army Ammunition Plant
Characterization of 14 RVAAP AOCs

Date: 10/28/04

Sampling Information

Source	Groundwater / Product	Surface Water	Soils / Sediments / Sludge
Method	Bailer	Sample Bottle	Scoop
	Pump	Bacon Bomb	Bowl
	<u>Micro Purging 1x</u>		Hand Auger
Type/Construction	<u>Stainless Steel</u>		Push Probe
Miscellaneous	Well Purging Form <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No		

Sample Collection: 13:30 hrs Sample Type: Composite/(MI) Grab Location: Plotted on Map - Staked in Field
 If MI, # of increments taken: 1/A Estimated - Measured - Surveyed
 Sample Depth: 29.13 FT (below surface) Decon: Dedicated - Each Day Each Location

Field Parameters (at time of sample)	Analytical Parameters			Other Parameters		
PID / FID Readings: Background: <u>NT</u> ppm	VOC	<input checked="" type="checkbox"/>	TPH GRO	Corrosivity		
	SVOC	<input checked="" type="checkbox"/>	TPH DRO	Reactivity Sulfide/Cyanide		
	Explosives	<input checked="" type="checkbox"/>	Chromium +6	Ignitability		
Sample: <u>NT</u> ppm	Propellants	<input checked="" type="checkbox"/>	Nitrate	<input checked="" type="checkbox"/>		
Water Level: <u>9.29</u> FT	TAL Metals	<input checked="" type="checkbox"/>		QA Samples MS/MSD Yes / No NA Duplicate ID NA Equipment Rinse ID NA Trip Blank ID <u>Trip Blank</u> NA		
Temperature: <u>14.31</u> °C	Pesticides/PCBs	<input checked="" type="checkbox"/>				
Sp. Conductance: <u>1.18</u> uMHOs	Cyanides					
pH: <u>7.83</u> units	TOC					
Turbidity: <u>23</u> N.T.U.	Grain Size					

Sample Description
Clear water
no odor, no sheen, low turbidity

Soil sample description should include:
 Munsell Color Odor Staining Texture Sorting Plasticity Moisture

Water sample description should include:
 Color Odor Sheen Turbidity

Split Sample
 Split Sample ID: _____
 Name: _____
 Agency/Company: _____
 Address: _____

QA/QC Provided: MS/MSD - Duplicate - Trip Blanks - Field Blanks
Parameters: Same as Above - As Listed

Logged By: Sudheer Gubba (Please Print) Reviewed by: ERIC ELLIS (Please Print)
 Signature: [Signature] Signature: [Signature] Date: 2/1/05

Monitoring Well Purging Form

Well ID: L12
DMN154-6W

Ravenna Army Ammunition Plant
Ravenna, Ohio

Date: 10/28/04

WELL OBSERVATIONS

Protective Casing: Intact · Damaged Locked: Yes · No Key No: 6000
 Concrete Base: Intact · Damaged Inner Casing: 2" · 4" · 6" · 8" Other:
 Stickup Height: 2.56 (ft) TIC · TOC Difference: 0.55 (ft)
 Vapor Readings : HNu · OVA Background: 0.0 Inside Well Casing: 0.0

Sampled Sample ID L12
DMN154-6W

Present Depth

LNAPL Yes · No _____ Yes · No
 DNAPL Yes · No _____ Yes · No

CALCULATIONS

(A) Depth to Well Bottom 28.72 (ft) TOC · TIC · BGS Measured · Previously Measured (circle one)
 (B) Depth to Water 15.64 (ft) TOC · TIC · BGS Time Measured: 1424 114
 (C) Water Column Height (A-B) 13.08 (ft) 13.08
 (D) Well Diameter Factor 0.16 (gal/ft) (2" = 0.16, 4" = 0.65, 6" = 1.47, 8" = 2.61 GAL/FT) .10
 (E) One Well Volume (C*D) 2.1 (gal) 17908
 (F) Volumes to be Evacuated 3 1308
 (G) TOTAL VOLUME TO BE EVACUATED (E * F) 6.3 (gal) 20988

EVACUATION METHOD

Well Evacuation Method: Bailer · Submersible Pump · Other: Micro Sussgung Device Number: _____

Purge Water Disposition: 1. Discharged Onsite 2. Collected And: Stored · Disposed Onsite · Offsite

Collected In: Tanks Drums · No. of Containers: _____

Comments: _____

TIME	DEPTH TO WATER (ft)	PURGE RATE (gpm)	Field Measurements						Comments
			HNu	Spec Cond	Temp	pH	Turb	DO	
14.24	15.64		0.0	1.03	14.89	7.11	1000	1.51	Initial
14.27	14.78		0.0	1.03	13.92	7.07	1000	0.0	
14.30	14.92		0.0	1.03	13.78	7.06	1000	0.0	
14.33	15.04		0.0	1.03	13.63	7.06	1000	0.0	
14.36	15.12		0.0	1.03	13.65	7.05	1000	0.0	
14.39	15.14		0.0	1.03	13.58	7.04	1000	0.0	End Purging

Logged By: Shahram (Please Print)
 Signature: _____

Reviewed By: C. Suler
 Date: 2/21/05

Field Sampling Report

Location ID: ⁵⁰⁶ #L12 MW-154-SW
 Date: 10/28/04

Ravenna Army Ammunition Plant
 Characterization of 14 RVAAP AOCs

Sampling Information

Source	Groundwater Product	Surface Water	Soils / Sediments / Sludge	
Method	Bailer	Sample Bottle	Scoop	Trowel
	Pump	Bacon Bomb	Bowl	Hand Auger
	Micro Purging <input checked="" type="checkbox"/>		Push Probe	
Type/Construction	Stainless steel			
Miscellaneous	Well Purging Form (Yes) - No			

Sample Collection: 16:45 hrs Sample Type: Composite/(MI) Grab Location: Plotted on Map Staked in Field
If MI, # of increments taken NA Estimated - Measured - Surveyed
 Sample Depth: 24 FT (below surface) Decon: Dedicated - Each Day - Each Location

Field Parameters (at time of sample)	Analytical Parameters				Other Parameters		
PID / FID Readings: Background: <u>0.0</u> ppm	VOC	<input checked="" type="checkbox"/>	TPH GRO		/		
	SVOC	<input checked="" type="checkbox"/>	TPH DRO				
	Explosives	<input checked="" type="checkbox"/>	Chromium +6				
Sample: <u>0.0</u> ppm	Propellants	<input checked="" type="checkbox"/>	Nitrate	<input checked="" type="checkbox"/>			
Water Level: <u>15.14</u> FT	TAL Metals	<input checked="" type="checkbox"/>					
Temperature: <u>13.58</u> °C	Pesticides/PCBs	<input checked="" type="checkbox"/>					
Sp. Conductance: <u>1.03</u> uMHOS	Cyanides						
pH: <u>7.04</u> units	TOC						
Turbidity: <u>1000</u> N.T.U.	Grain Size						
					QA Samples		
					MS/MSD	Yes / No	NA
					Duplicate ID		NA
					Equipment Rinse ID		NA
					<u>Trip Blank ID</u>	<u>Trip Blank</u>	NA

Sample Description
not clear
no odor
no sheen
Highly turbid

Split Sample
 Split Sample ID: _____
 Name: _____
 Agency/Company: _____
 Address: _____

QA/QC Provided: MS/MSD - Duplicate - Trip Blanks - Field Blanks
Parameters: Same as Above - As Listed

Soil sample description should include:
 Munsell Color Odor Staining Texture Sorting Plasticity Moisture

Water sample description should include:
 Color Odor Sheen Turbidity

Logged By: Sadheer Gubba (Please Print)
 Signature: [Signature]

Reviewed by: ERIC ELUIS (Please Print)
 Signature: [Signature] Date: 2/1/05

Well ID: ^{L12} ~~L12~~ MW 182-GW

Monitoring Well Purging Form

Ravenna Army Ammunition Plant
Ravenna, Ohio

Date: 10-29-04

WELL OBSERVATIONS

Protective Casing: Intact Damaged Locked: Yes: No Key No: 6000
 Concrete Base: Intact Damaged Inner Casing: 2" · 4" · 6" · 8" Other:
 Stickup Height: 9.25 (ft) TIC · TOC Difference: 0.45 (ft)
 Vapor Readings: HNu · OVA Background: 0.0 Inside Well Casing: 0.0

Present Depth Sampled Sample ID ^{L12} ~~L12~~ MW 182
 LNAPL Yes · No _____ Yes · No
 DNAPL Yes · No _____ Yes · No

CALCULATIONS

(A) Depth to Well Bottom ^{38.06} ~~37.06~~ (ft) TOC · TIC · BGS Measured · Previously Measured (circle one)
 (B) Depth to Water 9.2 (ft) TOC · TIC · BGS Time Measured: 13:15
 (C) Water Column Height (A-B) 28.86 (ft)
 (D) Well Diameter Factor 0.16 (gal/ft) (2" = 0.16, 4" = 0.65, 6" = 1.47, 8" = 2.61 GAL/FT)
 (E) One Well Volume (C*D) 4.6176 (gal)
 (F) Volumes to be Evacuated 5
 (G) TOTAL VOLUME TO BE EVACUATED (E * F) 23.05 (gal)

EVACUATION METHOD

Well Evacuation Method: Bailer · Submersible Pump · Other: Micro Sump Device Number: _____

Purge Water Disposition: 1. Discharged Onsite 2. Collected And: Stored Disposed Onsite Offsite

Collected In: Tanks Drums No. of Containers: _____

Comments: _____

TIME	DEPTH TO WATER (ft)	PURGE RATE (gpm)	Field Measurements						Comments
			HNu	Spec Cond	Temp	pH	Turb	DO	
			0.89						
13:27	9.2		4.3	0.829	13	8.83	182	4.35	Initial
13:30	11.26		3.8	0.765	12.31	8.39	43.7	2.04	
13:33	12.35		3.5	0.842	12.29	8.62	18.3	1.85	
13:36	13.00		0	0.878	12.25	8.45	21.3	1.53	
13:39	13.54		0	0.916	12.24	8.20	0	1.18	End Purging

Logged By: [Signature] (Please Print)

Reviewed By: C. Keller

Signature: [Signature]

Date: 2/21/05

Location ID: ^{E06} EL 12 MW 182-GW
 Date: 10/29/04

Field Sampling Report

Ravenna Army Ammunition Plant
 Characterization of 14 RVAAP AOCs

Sampling Information

Source	Groundwater / Product	Surface Water	Soils / Sediments / Sludge
Method	Bailer	Sample Bottle	Scoop
	Pump	Bacon Bomb	Bowl
	<u>Micro Barge</u> / X		Hand Auger
Type/Construction	<u>Stainless Steel</u>		Push Probe
Miscellaneous	Well Purging Form Yes - No		

Sample Collection: 13:45 hrs Sample Type: Composite/(MI) - Grab
 If MI, # of increments taken: NA Location: Plotted on Map, Staked in Field
 Sample Depth: 30 FT (below surface) Decon: Dedicated - Each Day - Each Location
 Estimated - Measured - Surveyed

Field Parameters (at time of sample)	Analytical Parameters			Other Parameters
PID / FID Readings:	VOC	X	TPH GRO	Corrosivity
Background: 0.0 ppm	SVOC	X	TPH DRO	Reactivity Sulfide/Cyanide
	Explosives	X	Chromium +6	Ignitability
Sample: 0.0 ppm	Propellants	X	Nitrate	X
Water Level: 13.54 FT	TAL Metals	X		
Temperature: 12.24 °C	Pesticides/PCBs	X		
Sp. Conductance: 0.916 uMHOs	Cyanides			
pH: 8.20 units	TOC			
Turbidity: 0 N.T.U.	Grain Size			
				QA Samples
				MS/MSD Yes / No <u>NA</u>
				Duplicate ID <u>EL 12 MW-182</u> <u>DUP</u> <u>NA</u>
				Equipment Rinse ID <u>NA</u>
				Trip Blank ID <u>TRIP BLANK</u> <u>NA</u>

Sample Description
clear water
no odor
no sheen
low turbidity

Soil sample description should include:
 Munsell Color Odor Staining Texture Sorting Plasticity Moisture

Water sample description should include:
 Color Odor Sheen Turbidity

Split Sample ID: 42 Split Sample
EL 12 MW 182 GW
 Name: John Jent (CEAL-ED-EK)
 Agency/Company: VSACE-LOUISVILLE
 Address: 600 DR. MARTIN LUTHER KING PLAZA
LOUISVILLE, KY 40202

QA/QC Provided: MS/MSD Duplicate Trip Blanks - Field Blanks
 Parameters: Same as Above - As Listed

Logged By: Sudhree Gubba (Please Print)
 Signature: S. Gubba

Reviewed by: ERIC ELLIS (Please Print)
 Signature: [Signature] Date: 2/1/05

Monitoring Well Purging Form

Well ID: ^{L12} ~~L12~~ MW 183-GW

Ravenna Army Ammunition Plant
Ravenna, Ohio

Date: 11/01/04

WELL OBSERVATIONS

Protective Casing: Intact · Damaged Locked: Yes · No Key No: 6000
 Concrete Base: Intact · Damaged Inner Casing: 2" · 4" · 6" · 8" Other:
 Stickup Height: 2.66 (ft) TIC · TOC Difference: 0.4 (ft)
 Vapor Readings : HNu · OVA Background: 0.0 Inside Well Casing:

Present Depth Sampled Sample ID
 LNAPL Yes · No _____ Yes · No
 DNAPL Yes · No _____ Yes · No

^{L12}
~~L12~~ MW 183

CALCULATIONS

- (A) Depth to Well Bottom 36.2 (ft) TOC · TIC · BGS Measured · Previously Measured (circle one)
 (B) Depth to Water 11.32 (ft) TOC · TIC · BGS Time Measured: 10:00
 (C) Water Column Height (A-B) 24.88 (ft)
 (D) Well Diameter Factor 0.16 (gal/ft) (2" = 0.16, 4" = 0.65, 6" = 1.47, 8" = 2.61 GAL/FT)
 (E) One Well Volume (C*D) 3.9808 (gal)
 (F) Volumes to be Evacuated 5
 (G) TOTAL VOLUME TO BE EVACUATED (E * F) 19.90 (gal)

EVACUATION METHOD

Well Evacuation Method: Bailer · Submersible Pump · Other: MICRO ^{Surgings} Device Number: _____

Purge Water Disposition: 1. Discharged Onsite 2. Collected And: Stored · Disposed Onsite · Offsite

Collected In: Tanks · Drums No. of Containers: _____

Comments: _____

TIME	DEPTH TO WATER (ft)	PURGE RATE (gpm)	Field Measurements						Comments
			HNu	Spec Cond	Temp	pH	Turb	DO	
10:04	11.32		0.0	0.739	13.14	8.85	30.9	6.30	Initial
10:07	12.30		0.0	0.740	13.13	8.79	26.1	8.77	
10:10	13.38		0.0	0.750	13.09	8.78	30.7	8.13	
10:13	14.02		0.0	0.774	13.04	8.58	25.1	7.17	End Purging

Logged By: Chahram (Please Print)

Reviewed By: C. Esler

Signature: [Signature]

Date: 2/21/05

Monitoring Well Purging Form

Well ID: ^{L12}~~L12~~ MW 184 - GW

Ravenna Army Ammunition Plant
Ravenna, Ohio

Date: 10-29-04

WELL OBSERVATIONS

Protective Casing: Intact · Damaged Locked: Yes · No

Key No: 6008

Concrete Base: Intact · Damaged Inner Casing: 2" · 4" · 6" · 8" Other:

Stickup Height: 2.5 (ft) TIC · TOC Difference: 0.4 (ft)

Vapor Readings: HNu · OVA Background: · Inside Well Casing: 0.0

Present Depth Sampled Sample ID

LNAPL Yes: No _____ Yes · No

DNAPL Yes: No _____ Yes · No

L12
~~L12~~ MW 184

CALCULATIONS

- (A) Depth to Well Bottom 31.26 (ft) TOC · TIC · BGS Measured · Previously Measured (circle one)
- (B) Depth to Water 11.71 (ft) TOC · TIC · BGS Time Measured: 10.25
- (C) Water Column Height (A-B) 19.55 (ft)
- (D) Well Diameter Factor 0.16 (gal/ft) (2" = 0.16, 4" = 0.65, 6" = 1.47, 8" = 2.61 GAL/FT)
- (E) One Well Volume (C*D) 3.128 (gal)
- (F) Volumes to be Evacuated 5
- (G) TOTAL VOLUME TO BE EVACUATED (E * F) 15.64 (gal)

EVACUATION METHOD

Well Evacuation Method: Bailer · Submersible Pump · Other: _____ Device Number: _____

Purge Water Disposition: 1. Discharged Onsite 2. Collected And: Stored Disposed Onsite Offsite

Collected In: Tanks Drums No. of Containers: _____

Comments: _____

TIME	DEPTH TO WATER (ft)	PURGE RATE (gpm)	Field Measurements						Comments
			HNu	Spec Cond	Temp	pH	Turb	DO	
10:29	11.71		0	1.08	13.54	7.30	16	7.84	Initial Reading
10:32	12.83		0	1.46	13.07	6.90	0	5.28	
10:35	13.05		0	1.87	12.93	6.72	0	3.05	
10:38	13.37		0	2.10	12.76	6.67	0	1.06	End Purging

Logged By: Shelton (Please Print)

Reviewed By: C. Toln

Signature: _____

Date: 2/21/05

Location ID: 12-MN184-6W **Field Sampling Report** Ravenna Army Ammunition Plant
Characterization of 14 RVAAP AOCs
 Date: 10-29-04

Sampling Information			
Source	Groundwater / Product	Surface Water	Soils / Sediments / Sludge
Method	Bailer	Sample Bottle	Scoop
	Pump	Bacon Bomb	Bowl
	Micro Purging <input checked="" type="checkbox"/>		Hand Auger
Type/Construction	Stainless Steel		Push Probe
Miscellaneous	Well Purging Form Yes - No		

Sample Collection: 10:40 hrs Sample Type: Composite/(MI) - Grab Location: Plotted on Map - Staked in Field
 Sample Depth: 13.37 FT (below surface) If MI, # of increments taken: NA Estimated - Measured - Surveyed
 Decon: Dedicated - Each Day - Each Location

Field Parameters (at time of sample)	Analytical Parameters	Other Parameters
PID / FID Readings: Background: <u>0.00</u> ppm	VOC <input checked="" type="checkbox"/>	Corrosivity
	SVOC <input checked="" type="checkbox"/>	Reactivity Sulfide/Cyanide
	Explosives <input checked="" type="checkbox"/>	Ignitability
Sample: <u>0.00</u> ppm	Propellants <input checked="" type="checkbox"/>	
Water Level: <u>13.37</u> FT	TAL Metals <input checked="" type="checkbox"/>	
Temperature: <u>12.76</u> °C	Pesticides/PCBs <input checked="" type="checkbox"/>	
Sp. Conductance: <u>2.10</u> uMHOs	Cyanides	
pH: <u>6.67</u> units	TOC	
Turbidity: <u>0</u> N.T.U.	Grain Size	
		QA Samples
		MS/MSD Yes / No NA
		Duplicate ID NA
		Equipment Rinse ID NA
		Trip Blank ID <u>Trip Blank</u> NA

Sample Description
clear water
no odor
no sheen
no turbidity

Soil sample description should include:
 Munsell Color Odor Staining Texture Sorting Plasticity Moisture

Water sample description should include:
 Color Odor Sheen Turbidity

Split Sample
 Split Sample ID: _____
 Name: _____
 Agency/Company: _____
 Address: _____

QA/QC Provided: MS/MSD - Duplicate - Trip Blanks - Field Blanks
 Parameters: Same as Above - As Listed

Logged By: Sudheer Gubba (Please Print) Reviewed by: SAL EWS (Please Print)
 Signature: [Signature] Signature: [Signature] Date: 2/1/05

Monitoring Well Purging Form

Well ID: ^{L12} ~~LL12~~ MW 185 - GW
 Date: 1/10/04

Ravenna Army Ammunition Plant
 Ravenna, Ohio

WELL OBSERVATIONS

Protective Casing: Intact · Damaged Locked: Yes · No Key No: 6000
 Concrete Base: Intact · Damaged Inner Casing: 2" · 4" · 6" · 8" Other:
 Stickup Height: 2.7 (ft) TIC · TOC Difference: 0.5 (ft)
 Vapor Readings: HNu · OVA Background: 0.0 Inside Well Casing: 0.0
 Present Depth Sampled Sample ID
 LNAPL Yes · No _____ Yes · No ^{L12}
 DNAPL Yes · No _____ Yes · No ~~LL12~~ MW 185

CALCULATIONS

- (A) Depth to Well Bottom 23.21 (ft) TOC · TIC · BGS Measured · Previously Measured (circle one)
- (B) Depth to Water 15.04 (ft) TOC · TIC · BGS Time Measured: 0851
- (C) Water Column Height (A-B) 8.17 (ft)
- (D) Well Diameter Factor 0.16 (gal/ft) (2" = 0.16, 4" = 0.65, 6" = 1.47, 8" = 2.61 GAL/FT)
- (E) One Well Volume (C*D) 1.3082 (gal)
- (F) Volumes to be Evacuated 5
- (G) TOTAL VOLUME TO BE EVACUATED (E * F) 6.50 (gal)

EVACUATION METHOD

Well Evacuation Method: Bailer · Submersible Pump · Other: Micro Sucker Device Number: _____
 Purge Water Disposition: 1. Discharged Onsite 2. Collected And: Stored · Disposed Onsite · Offsite
 Collected In: Tanks · Drums No. of Containers: _____

Comments: _____

TIME	DEPTH TO WATER (ft)	PURGE RATE (gpm)	Field Measurements						Comments
			HNu	Spec Cond	Temp	pH	Turb	DO	
<u>0851</u>	<u>15.04</u>		<u>0.0</u>	<u>6.07</u>	<u>13.35</u>	<u>6.31</u>	<u>513</u>	<u>6.11</u>	<u>initial reading</u>
<u>8.54</u>	<u>15.67</u>		<u>0.0</u>	<u>6.07</u>	<u>13.33</u>	<u>6.36</u>	<u>446</u>	<u>3.07</u>	
<u>8.57</u>	<u>15.95</u>		<u>0.0</u>	<u>6.07</u>	<u>13.33</u>	<u>6.38</u>	<u>360</u>	<u>2.15</u>	
<u>9.00</u>	<u>16.20</u>		<u>0.0</u>	<u>6.08</u>	<u>13.37</u>	<u>6.38</u>	<u>302</u>	<u>1.30</u>	<u>End purging</u>

Logged By: Shahram (Please Print)
 Signature: _____

Reviewed By: [Signature]
 Date: 2/21/05

Field Sampling Report

Location ID: 000 L 12-MW-185-GW

Ravenna Army Ammunition Plant
Characterization of 14 RVAAP AOCs

Date: 11/01/04

Sampling Information

Source	Groundwater / Product	Surface Water	Soils / Sediments / Sludge	
Method	Bailer	Sample Bottle	Scoop	Trowel
	Pump	Bacon Bomb	Bowl	Hand Auger
	Micro Purging X		Push Probe	
Type/Construction	Stainless Steel			
Miscellaneous	Well Purging Form Yes - No			

Sample Collection: 0905 hrs Sample Type: Composite/(MI) Grab
 If MI, # of increments taken: NA Location: Plotted on Map - Staked in Field
 Sample Depth: 17.5 FT (below surface) Decon: Dedicated - Each Day (Each Location)
 Estimated - Measured (Surveyed)

Field Parameters (at time of sample)	Analytical Parameters			Other Parameters	
PID / FID Readings: Background: <u>0.0</u> ppm	VOC	X	TPH GRO	Corrosivity	
	SVOC	X	TPH DRO	Reactivity Sulfide/Cyanide	
	Explosives	X	Chromium +6	Ignitability	
Sample: <u>0.0</u> ppm	Propellants	X	Nitrate	X	
Water Level: <u>16.20</u> FT	TAL Metals	X		QA Samples	
Temperature: <u>13.37</u> °C	Pesticides/PCBs	X		MS/MSD	Yes / No NA
Sp. Conductance: <u>6.08</u> uMHOs	Cyanides			Duplicate ID	NA
pH: <u>6.38</u> units	TOC			Equipment Rinse ID	NA
Turbidity: <u>302</u> N.T.U.	Grain Size			Trip Blank ID	<u>Trip Blank</u> NA

Sample Description
no odor, not clear.
no sheen.
low-moderate turbid.

* 1 - 500 mL Propellant bottle broke during transport from field - will reallocate prior to shipment - ECE 11/1/04

Soil sample description should include:
 Munsell Color Odor Staining Texture Sorting Plasticity Moisture

Water sample description should include:
 Color Odor Sheen Turbidity

Replacement sample collected at 13:50 with bailer

Split Sample

Split Sample ID: _____
 Name: _____
 Agency/Company: _____
 Address: _____

QA/QC Provided: MS/MSD - Duplicate - Trip Blanks - Field Blanks
 Parameters: Same as Above - As Listed

Logged By: Sudheer Gubba (Please Print) Reviewed by: ERIC ELWIS (Please Print)
 Signature: [Signature] Signature: [Signature] Date: 2/1/05

Well ID: L12 ET2 MW186-GW

Monitoring Well Purging Form

Ravenna Army Ammunition Plant
Ravenna, Ohio

Date: 10/6/04

WELL OBSERVATIONS

Protective Casing: Intact · Damaged Locked: Yes · No Key No: 6000
 Concrete Base: Intact · Damaged Inner Casing: 2" · 4" · 6" · 8" Other:
 Stickup Height: _____ (ft) TIC · TOC Difference: 0.42 (ft)
 Vapor Readings : HNu · OVA Background: _____ Inside Well Casing:
 Present Depth Sampled Sample ID L12
 LNAPL Yes · No _____ Yes · No ET2 MW186
 DNAPL Yes · No _____ Yes · No

CALCULATIONS

- (A) Depth to Well Bottom 30.88 (ft) TOC · TIC · BGS Measured · Previously Measured (circle one)
- (B) Depth to Water 4.95 (ft) TOC · TIC · BGS Time Measured: 11:20
- (C) Water Column Height (A-B) 15.93 (ft)
- (D) Well Diameter Factor 0.16 (gal/ft) (2" = 0.16, 4" = 0.65, 6" = 1.47, 8" = 2.61 GAL/FT)
- (E) One Well Volume (C*D) 2.5398 (gal)
- (F) Volumes to be Evacuated 5
- (G) TOTAL VOLUME TO BE EVACUATED (E * F) 12.69 (gal)

EVACUATION METHOD

Well Evacuation Method: Bailer · Submersible Pump · Other: Micro ^{Surging} Device Number: _____
 Purge Water Disposition: 1. Discharged Onsite 2. Collected And: Stored · Disposed Onsite · Offsite
 Collected In: Tanks · Drums No. of Containers: _____

Comments: _____

TIME	DEPTH TO WATER (ft)	PURGE RATE (gpm)	Field Measurements						Comments
			HNu	Spec Cond	Temp	pH	Turb	DO	
11:30	4.95		0.0	1.01	14.07	7.03	232	7.15	Initial readings
11:33	6.91		0.0	1.01	14.13	6.98	78.2	4.72	
11:36	8.43		0.0	1.00	14.09	6.96	0	4.43	
11:39	10.53		0.0	1.00	14.06	6.95	0	4.28	End Purging

Logged By: Shahram (Please Print)
 Signature: _____

Reviewed By: C. W. ...
 Date: 2/21/05

Location ID: ^{ch} EL12-MW186-6W

Field Sampling Report

Ravenna Army Ammunition Plant
Characterization of 14 RVAAP AOCs

Date: 11/01/04

Sampling Information

Source	Groundwater / Product	Surface Water	Soils / Sediments / Sludge
Method	Bailer	Sample Bottle	Scoop
	Pump	Bacon Bomb	Bowl
	Micro Purging / X		Hand Auger
Type/Construction	Stainless steel		Push Probe
Miscellaneous	Well Purging Form Yes - No		

Sample Collection: 1:45 hrs Sample Type: Composite/(MI) Grab
If MI, # of increments taken: NA Location: Plotted on Map - Staked in Field
Sample Depth: 11 FT (below surface) Decon: Dedicated - Each Day Each Location Estimated - Measured - Surveyed

Field Parameters (at time of sample)	Analytical Parameters			Other Parameters		
PID / FID Readings:	VOC	X	TPH GRO	Corrosivity		
Background: 0.0 ppm	SVOC	X	TPH DRO	Reactivity Sulfide/Cyanide		
	Explosives	X	Chromium +6	Ignitability		
Sample: 0.0 ppm	Propellants	X	Nitrate	X		
Water Level: 10.53 FT	TAL Metals	X		QA Samples		
Temperature: 14.06 °C	Pesticides/PCBs	X		MS/MSD	Yes / No	NA
Sp. Conductance: 1.00 uMHOs	Cyanides			Duplicate ID		NA
pH: 6.95 units	TOC			Equipment Rinse ID		NA
Turbidity: 6 N.T.U.	Grain Size			<u>Trip Blank ID</u>	<u>Trip Blank</u>	NA

Sample Description
clear water
no odor
no sheen
low turbidity

Split Sample
Split Sample ID: _____
Name: _____
Agency/Company: _____
Address: _____
QA/QC Provided: MS/MSD - Duplicate - Trip Blanks - Field Blanks
Parameters: Same as Above - As Listed

Soil sample description should include:

Munsell Color Odor Staining Texture Sorting Plasticity Moisture

Water sample description should include:

Color Odor Sheen Turbidity

Logged By: Sudheer Gubba (Please Print)

Reviewed by: ERIC ELLIS (Please Print)

Signature: [Signature]

Signature: [Signature] Date: 11/01/04

Well ID: L12 ELL12MW 187-GW

Monitoring Well Purging Form

Ravenna Army Ammunition Plant
Ravenna, Ohio

Date: 10/29/04

WELL OBSERVATIONS

Protective Casing: Intact · Damaged Locked: Yes · No Key No: 6000

Concrete Base: Intact · Damaged Inner Casing: 2" · 4" · 6" · 8" Other:

Stickup Height: 2.46 (ft) TIC · TOC Difference: 0.43 (ft)

Vapor Readings: HNu · OVA Background: 0.0 Inside Well Casing: 0.0

Present Depth Sampled Sample ID
LNAPL Yes No Yes · No

DNAPL Yes No Yes · No

L12_{ab} 187_{ab}
ELL12MW187

CALCULATIONS

(A) Depth to Well Bottom 28.81 (ft) TOC · TIC · BGS Measured · Previously Measured (circle one)

(B) Depth to Water 8.52 (ft) TOC · TIC · BGS Time Measured: 09:05

(C) Water Column Height (A-B) 20.29 (ft)

(D) Well Diameter Factor 0.16 (gal/ft) (2" = 0.16, 4" = 0.65, 6" = 1.47, 8" = 2.61 GAL/FT)

(E) One Well Volume (C*D) 3.245 (gal)

(F) Volumes to be Evacuated 5

(G) TOTAL VOLUME TO BE EVACUATED (E * F) 16.22 (gal)

EVACUATION METHOD

Well Evacuation Method: Bailer · Submersible Pump · Other: Micro Sump Device Number: _____

Purge Water Disposition: 1. Discharged Onsite 2. Collected/And: Stored Disposed Onsite · Offsite

Collected In: Tanks/Drums No. of Containers: _____

Comments: _____

TIME	DEPTH TO WATER (ft)	PURGE RATE (gpm)	Field Measurements						Comments
			HNu	Spec Cond	Temp	pH	Turb	DO	
9.10	8.52		0.0	13.9	12.85	6.32	6.9	2.89	Initial Reading
9.13	9.29		0.0	14.0	12.79	6.31	0.00	0.32	
9.16	9.67		0.0	14.0	12.71	6.39	0	0	
9.22	9.82		0.0	14.0	12.66	6.33	0	0	End Purging

Logged By: Shawna (Please Print)

Reviewed By: C. Gola

Signature: [Signature]

Date: 2/21/05

Location ID: ^{ERL} L12MN-187-GW
 Date: 10/29/04

Field Sampling Report

Ravenna Army Ammunition Plant
 Characterization of 14 RVAAP AOCs

Sampling Information

Source	Groundwater / Product		Surface Water		Soils / Sediments / Sludge	
Method	Bailer		Sample Bottle		Scoop	Trowel
	Pump		Bacon Bomb		Bowl	Hand Auger
	Micro Purging	X			Push Probe	
Type/Construction	stainless steel					
Miscellaneous	Well Purging Form Yes - No					

Sample Collection: 0925 hrs Sample Type: Composite/(MI) - Grab
 If MI, # of increments taken: NA Location: Plotted on Map - Staked in Field
 Sample Depth: 9.82 FT (below surface) Decon: Dedicated - Each Day - Each Location
 Estimated - Measured Surveyed

Field Parameters (at time of sample)	Analytical Parameters			Other Parameters		
PID / FID Readings:	VOC	X	TPH GRO	Corrosivity		
Background: <u>0.0</u> ppm	SVOC	X	TPH DRO	Reactivity Sulfide/Cyanide		
	Explosives	X	Chromium +6	Ignitability		
Sample: <u>0.0</u> ppm	Propellants	X	Nitrate	X		
Water Level: <u>9.82</u> FT	TAL Metals	X		QA Samples		
Temperature: <u>12.66</u> °C	Pesticides/PCBs	X		MS/MSD	Yes / No	NA
Sp. Conductance: <u>14.0</u> uMHOs	Cyanides			Duplicate ID		NA
pH: <u>6.33</u> units	TOC			Equipment Rinse ID		NA
Turbidity: <u>0.00</u> N.T.U.	Grain Size			Trip Blank ID	<u>Trip Blank</u>	NA

Sample Description
not clear water
no odors, no sheen, low turbidity

Split Sample
 Split Sample ID: _____
 Name: _____
 Agency/Company: _____
 Address: _____

 QA/QC Provided: MS/MSD - Duplicate - Trip Blanks - Field Blanks
 Parameters: Same as Above - As Listed

Soil sample description should include:
 Munsell Color Odor Staining Texture Sorting Plasticity Moisture

Water sample description should include:
 Color Odor Sheen Turbidity

Logged By: G Swell (Please Print) Reviewed by: ERIC ELMS (Please Print)
 Signature: G Swell Signature: [Signature] Date: 2/1/05

Monitoring Well Purging Form

Well ID: LL12MN-188-GW

Ravenna Army Ammunition Plant
Ravenna, Ohio

Date: 10/28/04

WELL OBSERVATIONS

Protective Casing: Intact · Damaged Locked: Yes · No Key No: 6000
 Concrete Base: Intact · Damaged Inner Casing: 2" 4" · 6" · 8" Other:
 Stickup Height: 2.55 (ft) TIC · TOC Difference: 0.55 (ft)
 Vapor Readings : HNu · OVA Background: — Inside Well Casing: —

	Present	Depth		Sampled Sample ID
LNAPL Yes <u>No</u>			Yes · No	<u>LL12MW-188</u>
DNAPL Yes <u>No</u>			Yes · No	

CALCULATIONS

(A)	Depth to Well Bottom	<u>23.33</u> (ft) <u>TOC</u> · TIC · BGS	Measured · Previously Measured (circle one)	
(B)	Depth to Water	<u>7.68</u> (ft) <u>TOC</u> · TIC · BGS	Time Measured: <u>0915</u>	$\begin{array}{r} 333 \\ 15,65 \\ \hline 10 \\ \hline 9390 \\ 1565 \\ \hline 25040 \end{array}$
(C)	Water Column Height (A-B)	<u>15.65</u> (ft)		
(D)	Well Diameter Factor	<u>0.16</u> (gal/ft) (2" = 0.16, 4" = 0.65, 6" = 1.47, 8" = 2.61 GAL/FT)		
(E)	One Well Volume (C*D)	<u>2.50</u> (gal)		
(F)	Volumes to be Evacuated	<u>3</u>		
(G)	TOTAL VOLUME TO BE EVACUATED (E * F)		<u>7.5</u> (gal)	

EVACUATION METHOD

Well Evacuation Method: Bailer · Submersible Pump · Other: Micro Pump Device Number: _____
 Purge Water Disposition: 1. Discharged Onsite 2. Collected And · Stored · Disposed Onsite · Offsite
 Collected In: Tanks · Drums No. of Containers: _____

Comments: _____

TIME	DEPTH TO WATER (ft)	PURGE RATE (gpm)	Field Measurements					Comments	
			HNu	Spec Cond	Temp	pH	Turb		DO
9:15	7.68			1.52	13.63	6.89	1000	6.24	Initial
9:18	8.85			1.52	13.72	6.82	1000	2.38	
9:21	9.65			1.52	13.72	6.84	1000	1.90	
9:24	10.39			1.52	13.73	6.83	1000	1.52	
9:30	10.72			1.57	13.73	6.83	1000	1.22	
9:33	11.20			1.59	13.75	6.83	1000	1.07	

Logged By: Sudheer Gubba (Please Print) Reviewed By: C. G. Gubba
 Signature: [Signature] Date: 2/21/05

Field Sampling Report

Location ID: ^{50E} 112 MW 188-GW
 Date: 10/28/04

Ravenna Army Ammunition Plant
 Characterization of 14 RVAAP AOCs

Sampling Information

Source	Groundwater / Product	Surface Water	Soils / Sediments / Sludge
Method	Bailer	Sample Bottle	Scoop
	Pump	Bacon Bomb	Bowl
	<u>Micro purging</u> <input checked="" type="checkbox"/>		Push Probe
Type/Construction	<u>Stainless Steel</u>		
Miscellaneous	<u>Well Purging Form</u> Yes - No		

Sample Collection: 9:40 hrs Sample Type: Composite/(MI) - Grab
 If MI, # of increments taken: NA Location: Plotted on Map - Staked in Field
 Sample Depth: 13 FT (below surface) Decon: Dedicated - Each Day - Each Location
 Estimated - Measured - Surveyed

Field Parameters (at time of sample)	Analytical Parameters	Other Parameters
PID / FID Readings: Background: <u>NT</u> ppm Sample: <u>NT</u> ppm	VOC <input checked="" type="checkbox"/>	Corrosivity
	SVOC <input checked="" type="checkbox"/>	Reactivity Sulfide/Cyanide
	Explosives <input checked="" type="checkbox"/>	Ignitability
	TPH GRO	
	TPH DRO	
	Chromium +6	
	Propellants <input checked="" type="checkbox"/>	
	Nitrate <input checked="" type="checkbox"/>	
Water Level: <u>11:20</u> FT	TAL Metals <input checked="" type="checkbox"/>	
Temperature: <u>13.75</u> °C	Pesticides/PCBs <input checked="" type="checkbox"/>	
Sp. Conductance: <u>1.59</u> uMHOs	Cyanides	
pH: <u>6.83</u> units	TOC	
Turbidity: <u>1000</u> N.T.U.	Grain Size	
		QA Samples
		MS/MSD Yes / No NA
		Duplicate ID NA
		Equipment Rinse ID NA
		<u>Trip Blank ID</u> <u>Trip Blank</u> NA

Sample Description
Not clear
no odor, no sheen, high turbidity.

*Soil sample description should include:
 Munsell Color Odor Staining Texture Sorting Plasticity Moisture*

*Water sample description should include:
 Color Odor Sheen Turbidity*

Split Sample

Split Sample ID: _____
 Name: _____
 Agency/Company: _____
 Address: _____

QA/QC Provided: MS/MSD - Duplicate - Trip Blanks - Field Blanks
 Parameters: Same as Above - As Listed

Logged By: Sudheer Gubba (Please Print)
 Signature: [Signature]

Reviewed by: ERIC ELLIS (Please Print)
 Signature: [Signature] Date: 2/1/05

Monitoring Well Purging Form

Well ID: LL12 MW-189-GW

Ravenna Army Ammunition Plant
Ravenna, Ohio

Date: 10/28/04

WELL OBSERVATIONS

Protective Casing: Intact Damaged Locked: Yes · No Key No: 6000
 Concrete Base: Intact · Damaged Inner Casing: 2" · 4" · 6" · 8" Other: _____
 Stickup Height: 2.4 (ft) TIC · TOC Difference: 0.47 (ft)
 Vapor Readings: HNu · OVA Background: 0.0 Inside Well Casing: 0.0

Present Depth Sampled Sample ID LL12MW-189
 LNAPL Yes No _____ Yes · No
 DNAPL Yes No _____ Yes · No

CALCULATIONS

- (A) Depth to Well Bottom 20.2 (ft) TOC TIC · BGS Measured · Previously Measured (circle one)
 (B) Depth to Water 3.62 (ft) TOC TIC · BGS Time Measured: 10.48
 (C) Water Column Height (A-B) 26.4 (ft)
 (D) Well Diameter Factor 0.16 (gal/ft) (2" = 0.16, 4" = 0.65, 6" = 1.47, 8" = 2.61 GAL/FT)
 (E) One Well Volume (C*D) 4.224 (gal)
 (F) Volumes to be Evacuated 3
 (G) TOTAL VOLUME TO BE EVACUATED (E * F) 12.66 (gal)

26.4
 1.16 2
 1584
 264
 4224

EVACUATION METHOD

Well Evacuation Method: Bailer · Submersible Pump · Other: _____ Device Number: _____

Purge Water Disposition: 1. Discharged Onsite 2. Collected And: Stored · Disposed Onsite · Offsite

Collected In: Tanks Drums No. of Containers: _____

Comments: _____

TIME	DEPTH TO WATER (ft)	PURGE RATE (gpm)	Field Measurements						Comments
			HNu	Spec Cond	Temp	pH	Turb	DO	
10:59	3.62		0.0	1.44	15.27	7.15	791	3.55	Initial.
11:02	5.47		0.0	1.44	14.23	7.01	350	0.00	
11:05	6.65		0.0	1.44	14.13	7.01	315	0.00	
11:08	7.83		0.0	1.44	14.12	7.00	307	0.00	End Purging

Logged By: Shah (Please Print) Reviewed By: C. Ealy
 Signature: _____ Date: 2/21/05

Field Sampling Report

Location ID: 382 EL12 MW189-GN Ravenna Army Ammunition Plant
Characterization of 14 RVAAP AOCs
 Date: 10/28/04

Sampling Information			
Source	Groundwater / Product	Surface Water	Soils / Sediments / Sludge
Method	Bailer	Sample Bottle	Scoop
	Pump str	Bacon Bomb	Bowl
	Micro Purging		Push Probe
Type/Construction	Stainless Steel		
Miscellaneous	Well Purging Form Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>		

Sample Collection: 11:15 hrs Sample Type: Composite/(MI) Grab
 If MI, # of increments taken: NA Location: Plotted on Map - Staked in Field
 Sample Depth: 7.83 FT (below surface) Decon: Dedicated - Each Day - Each Location
 Estimated - Measured - Surveyed

Field Parameters (at time of sample)	Analytical Parameters	Other Parameters															
PID / FID Readings: Background: <u>0.0</u> ppm	VOC <input checked="" type="checkbox"/>	Corrosivity															
	SVOC <input checked="" type="checkbox"/>	Reactivity Sulfide/Cyanide															
	Explosives <input checked="" type="checkbox"/>	Ignitability															
Sample: <u>0.0</u> ppm	Propellants <input checked="" type="checkbox"/>	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th colspan="3">QA Samples</th> </tr> <tr> <th>MS/MSD</th> <th>Yes / No</th> <th>NA</th> </tr> </thead> <tbody> <tr> <td>Duplicate ID</td> <td></td> <td>NA</td> </tr> <tr> <td>Equipment Rinse ID</td> <td></td> <td>NA</td> </tr> <tr> <td><u>Trip Blank ID</u></td> <td><u>Trip Blank</u></td> <td>NA</td> </tr> </tbody> </table>	QA Samples			MS/MSD	Yes / No	NA	Duplicate ID		NA	Equipment Rinse ID		NA	<u>Trip Blank ID</u>	<u>Trip Blank</u>	NA
QA Samples																	
MS/MSD	Yes / No		NA														
Duplicate ID			NA														
Equipment Rinse ID		NA															
<u>Trip Blank ID</u>	<u>Trip Blank</u>	NA															
Water Level: <u>7.83</u> FT	TAL Metals <input checked="" type="checkbox"/>																
Temperature: <u>14.12</u> °C	Pesticides/PCBs <input checked="" type="checkbox"/>																
Sp. Conductance: <u>1.44</u> uMHOs	Cyanides																
pH: <u>7.00</u> units	TOC																
Turbidity: <u>0.00</u> N.T.U.	Grain Size																

Sample Description
not clear
no odor, no sheen, moderate turbidity.

Soil sample description should include:
 Munsell Color Odor Staining Texture Sorting Plasticity Moisture

Water sample description should include:
 Color Odor Sheen Turbidity

Split Sample

Split Sample ID: _____
 Name: _____
 Agency/Company: _____
 Address: _____

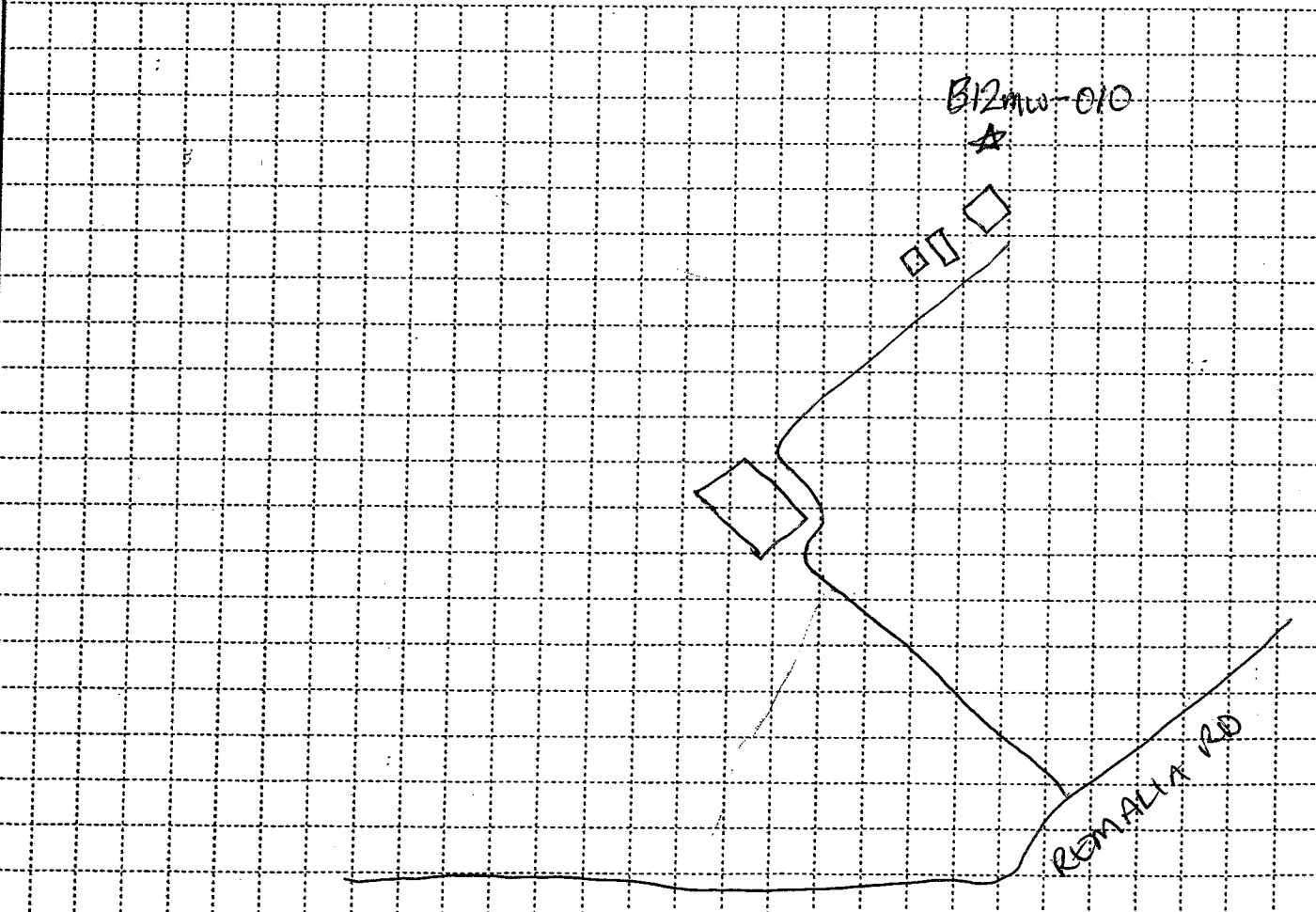
QA/QC Provided: MS/MSD - Duplicate - Trip Blanks - Field Blanks
 Parameters: Same as Above - As Listed

Logged By: Sudheer Gubba (Please Print) Reviewed by: ERIC ELIUS (Please Print)
 Signature: [Signature] Signature: [Signature] Date: 2/1/05

HTRW DRILLING LOG		DISTRICT LOUISVILLE		HOLE NUMBER B12mw-010	
1. COMPANY NAME MKM ENGINEERS		2. DRILL SUBCONTRACTOR HAD DRILLING		SHEET SHEETS 1 OF 3	
3. PROJECT RVAAP - R114			4. LOCATION RAVENNA, OH BLDG 1200		
5. NAME OF DRILLER SCOTT HEISTER			6. MANUFACTURER'S DESIGNATION OF DRILL OME-55		
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT OME-55 6 1/2" ID HSA 3" DIA CORE BARREL X 10'		8. HOLE LOCATION NORTH WEST PORTION OF SITE		9. SURFACE ELEVATION 1002.72 ASL	
12. OVERBURDEN THICKNESS 3'		15. DEPTH GROUNDWATER ENCOUNTERED ~12'		10. DATE STARTED 11/17/04	
13. DEPTH DRILLED INTO ROCK 17'		16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED ~6' BGS 24HR 11/20/04		11. DATE COMPLETED 11/18/04	
14. TOTAL DEPTH OF HOLE 21' BGS		17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY) 15.6' @ 110 11/23/04		19. TOTAL NUMBER OF CORE BOXES 2	
18. GEOTECHNICAL SAMPLES NA		DISTURBED <input type="checkbox"/>	UNDISTURBED <input type="checkbox"/>	21. TOTAL CORE RECOVERY %	
20. SAMPLES FOR CHEMICAL ANALYSIS		VOC <input type="checkbox"/>	METALS <input type="checkbox"/>	OTHER (SPECIFY) <input type="checkbox"/>	OTHER (SPECIFY) <input type="checkbox"/>
22. DISPOSITION OF HOLE <input type="checkbox"/>		BACKFILLED <input type="checkbox"/>	MONITORING WELL <input checked="" type="checkbox"/>	OTHER (SPECIFY) <input type="checkbox"/>	23. SIGNATURE OF INSPECTOR <i>David Keimel</i>

LOCATION SKETCH/COMMENTS

SCALE:



PROJECT RVAAP - R114	HOLE NO. B12mw-010
--------------------------------	------------------------------

ENG FORM 5056-R, AUG 94 (Proponent: CECW-EG)

HTRW DRILLING LOG

(CONTINUATION SHEET)

HOLE NUMBER
B12mw-010

PROJECT RVAAP - R1 14

INSPECTOR DK EARNEST

SHEET 2 OF 3 SHEETS

900

ELEV. (a)	DEPTH (b)	DESCRIPTION OF MATERIALS (c)	FIELD SCREENING RESULTS (d)	TEST SAMPLE OR CORE NO. (e)	ANALYTICAL SAMPLE NO. (f)	BLOW COUNT (g)	REMARKS (h)
		TOPSOIL - GRASS & ROOTS DK BROWN CLAYEY SILT				2/2	7.5YR 3/2 MOIST
	2	DK BROWN CL SILT YELLOW BROWN SANDSTONE SILTY, FINE	2.A	1.4		2/21	10YR 5/4
	4	HAMMERED TO 5' START CORING AT 5'	A.6	0.5		55/3	10YR 6/6 WET
	6	SANDSTONE, FINE GRAINED WELL SORTED LT GRAY DARK BEDDING STRAITENS 5% DARK GRAINS					WATER IN HOLE AT START OF CORING CORED - 5-13.3 FT 10YR 7/1
	8	SHALE STRAINING ON BEDDING PLANES					20 / 20% 99.6
	10	HORIZONTAL BEDDING					
	11.6	BROWN 0.2	SOFT				5YR 5/5
	11.8	WHITE TO BEG 0.3	WELL CEMENTED HARD				10YR 10/1
	12.1	BROWN 0.9	SOFT				10YR 5/6
	13.0	WHITE 0.3	WELL CEMENTED	HARD			
	13.9	LT BROWN SANDSTONE HARD, WELL CEMENTED				2.5YR 6/2 10YR 5/3	2ND CORE TO APPROX 18' THEN PART OF RIG BROKE
	14.3	5% DARK GRAINS SHALE GRAY FRAGILE SAA					3L = 43 60
	16						
	18	LT GRAY SANDSTONE					18.3-20.9 0 / 31.2 = 0 10YR 7/1
	20						

PROJECT RVAAP - R1 14

HOLE NO B12mw-010

HTRW DRILLING LOG

(CONTINUATION SHEET)

HOLE NUMBER
B12mw-010

PROJECT
RVAAP-R1 1A

INSPECTOR
DK EARNEST

SHEET SHEETS
3 OF 3

ELEV. (a)	DEPTH (b)	DESCRIPTION OF MATERIALS (c)	FIELD SCREENING RESULTS (d)	GEOTECH SAMPLE OR CORE BOX NO. (e)	ANALYTICAL SAMPLE NO. (f)	BLOW COUNT (g)	REMARKS (h)
		<p>SHALE 20.3-20.6 grey CORED TO 20.9</p>					
		<p>DRILLED OUT HOLE TO 20.9</p> <p>WELL SET AT 20</p> <p>SCREEN AT 10-20</p> <p>SAND TO 8</p> <p>SEAL TO 5</p>					

PROJECT
RVAAP-R1 1A

HOLE NO.
B12mw-010

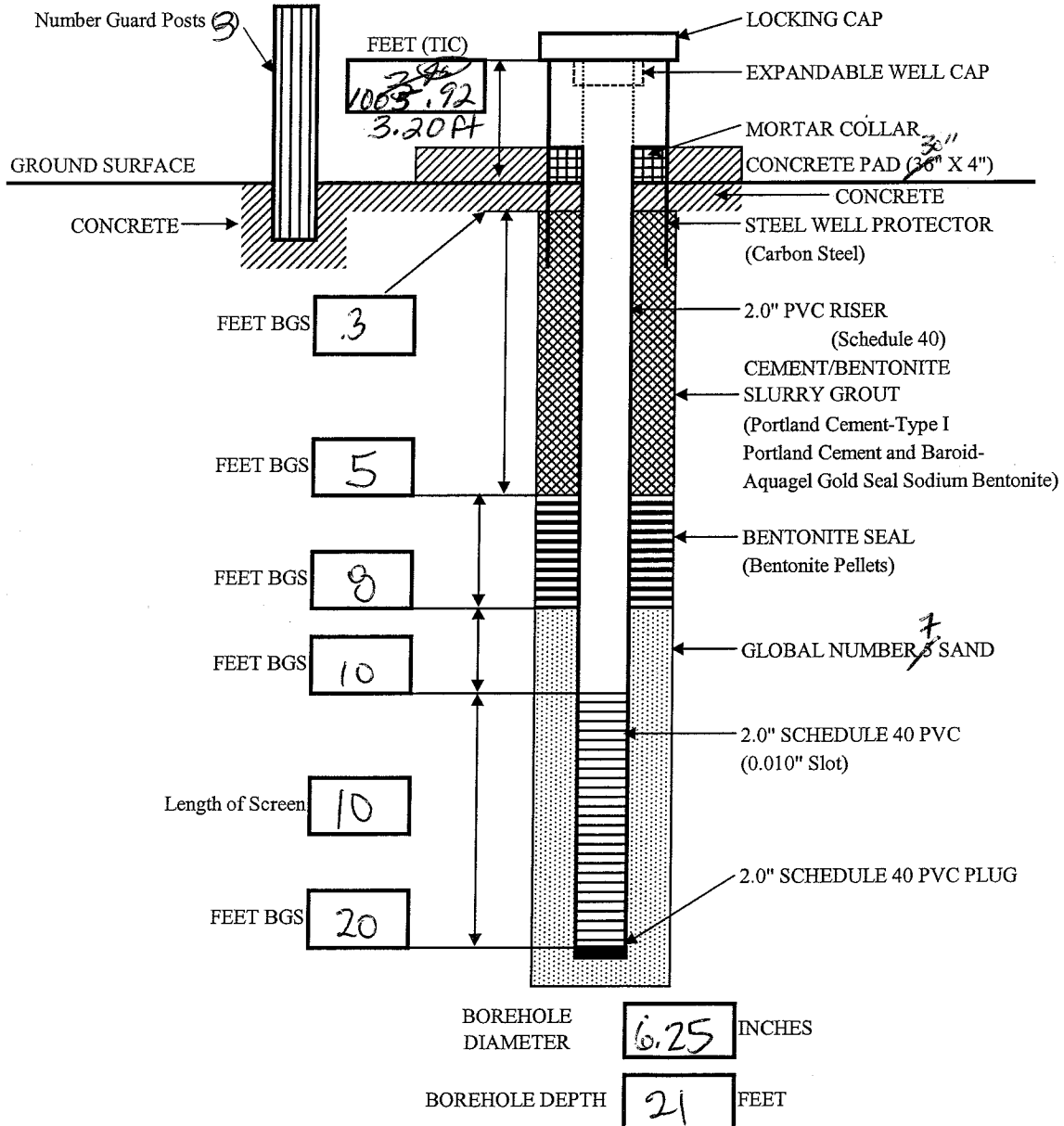


MONITORING WELL CONSTRUCTION DIAGRAM

RAVENNA ARMY AMMUNITION PLANT

Project: AVAAP RI 14

Well Number: B12MW-010	Begin: 11/19/04	End: 11/18/04
Coordinates: N: 565827.43 E: 8371292.81	Elevation: 1002.72	Reference Point:
Logged By: DKEARNEST		



Notes:

- Figure not drawn to scale.
- BGS = Below Ground Surface.
- Well head protected with three guard posts set in triangle configuration about the concrete pad.

Well Development Record

Well ID: B12mw - 010-GW
 Date: 11/23/04

Ravenna Army Ammunition Plant-
 RVAAP 14 AOC Characterization

Project: RVAAP

Development Method: WHALE PUMP

Development Company: MKM

Comments: _____

Well TD: 22.75 FT TIC Depth to Water: 15.6 FT
 Water Column Height: 7.15 FT One Well Volume: 4.2 Gals

Well Volume (gallons/foot) 2-inch = 0.16 6-inch = 1.47
 4-inch = 0.65 8-inch = 2.61

Time	Well Dev. Code	Depth to Water (ft)	Purge Rate (gpm)	Purge Volume (gal)	Field Measurements				Turbidity	Comments
					pH	CON	DO	Temp		
1110	DSB	15.6	-	-	-	-	-	-	-	-
1115	DSE	15.1	-	-	-	-	-	-	-	-
1120	DPB	15.1	-	-	7.8	0.36	10.8	11.99	1000	-
1126	DPE	DRY	-	3	-	-	-	-	-	3 gal (dry)
1316	DPB	19.51	-	-	-	-	-	-	-	-
1319	DFM	DRY	-	1	6.85	0.37	10.85	12.45	1000	1 well vol (4 gal dry)
1431	DRB	20.5	-	-	-	-	-	-	-	-
1441	DPE	DRY	-	1	-	-	-	-	-	5 gal (DRY)
0915	DSB	16.45	-	-	-	-	-	-	-	-
0920	DSE	16.2	-	-	-	-	-	-	-	-
0925	DPB		-	-	6.42	0.26	10.27	12.47	1000	-
0926	DFM	DRY	-	-	6.72	0.37	9.8	12.19	1000	2nd well vol (8 gal dry)
0945	DSB	14.9	-	-	-	-	-	-	-	-
0950	DSE	15.2	-	-	-	-	-	-	-	-
0952	DRB	15.2	-	-	-	-	-	-	-	-
FINAL										

DPE

11/24/04

12/1/04

WELL DEVELOPMENT CODES	FIELD MEASUREMENT CODES	TURBIDITY
DPB - Begin Pumping DPE - End Pumping DSB - Begin Surge Blocking DSE - End Surge Blocking DFM - Field Measurements DBB - Begin Bailing DBE - End Bailing DXB - Begin Other DXE - End Other Other: _____	MTP - Temperature MSC - Specific Conductance MPD - Photoionizer (eg. HNu) MFD - Flame Ionizer (eg. OVA) MDO - Dissolved Oxygen MPH - pH MEH - eH MOT - Other _____	Enter Turbidity Meter Reading (Final should be < 5 NTU) OR Enter Qualitative Observations H - High: Muddy/Silty M - Medium: Cloudy/Translucent L - Low: Transparent N - None: Clear/No Sediment

Logged By: NILESH SHRINGARPURE (Please Print)

Reviewed By: C. Edin

Signature: N. Shringarpure

Date: 2/23/05

Well Development Record

Well ID: B12MW-010GW
 Date: 12/1/04

Ravenna Army Ammunition Plant-
 RVAAP 14 AOC Characterization

Project: RVAAP-14
 Development Company: MKM

Development Method: Whale Pump
 Comments: _____

Well TD: 22.75 FT TIC. Depth to Water: 15.6 FT
 Water Column Height: 7.15 FT One Well Volume: 42 Gals
 Well Volume (gallons/foot) 2-inch = 0.16 6-inch = 1.47
 4-inch = 0.65 8-inch = 2.61

Time	Well Dev. Code	Depth to Water (ft)	Purge Rate (gpm)	Purge Volume (gal)	Field Measurements				Turbidity	Comments
					pH	CON	DO	Temp		
1000	DPE	DRY	-	4	7.81	0.121	11.05	9.5	1000	12 gal 3 rd volume
0924	DSB	14.9	-	-	-	-	-	-	-	-
0927	DSE	15.2	-	-	-	-	-	-	-	-
0928	DPB	-	-	-	5.71	0.153	10.25	9.8	1000	-
0930	DPE	DRY	-	3	-	-	-	-	-	(15 gal. dry)
0945	DSB	15.4	-	-	-	-	-	-	-	-
0948	DSE	15.8	-	-	-	-	-	-	-	-
0955	DPB	-	-	-	-	-	-	-	-	-
0955	DPA	-	-	1	5.85	0.15	9.61	10.3	1000	4 th well vol (16 gal)
0956	DPE	DRY	-	2.5	-	-	-	-	-	(15 gal. dry)
0902	DSB	15.99	-	-	-	-	-	-	-	-
0910	DSE	15.72	-	-	-	-	-	-	-	-
0915	DPB	15.72	-	-	-	-	-	-	-	-
0917	DFM	-	-	1.5	5.32	0.095	5.54	10.9	>1000	5 th well vol (20 gal)
0918	DPE	-	-	1.5	-	-	-	-	-	21.5 (dry)
FINAL										

WELL DEVELOPMENT CODES

DPB - Begin Pumping
 DPE - End Pumping
 DSB - Begin Surge Blocking
 DSE - End Surge Blocking
 DFM - Field Measurements
 DBB - Begin Bailing
 DBE - End Bailing
 DXB - Begin Other
 DXE - End Other
 Other: _____

FIELD MEASUREMENT CODES

MTP - Temperature
 MSC - Specific Conductance
 MPD - Photoionizer (eg. HNu)
 MFD - Flame Ionizer (eg. OVA)
 MDO - Dissolved Oxygen
 MPH - pH
 MEH - eH
 MOT - Other _____

TURBIDITY

Enter Turbidity Meter Reading
 (Final should be < 5 NTU)
 OR
 Enter Qualitative Observations

H - High: Muddy/Silty
 M - Medium: Cloudy/Translucent
 L - Low: Transparent
 N - None: Clear/No Sediment

Logged By: Sue Boles (Please Print)
 Signature: Sue Boles

Reviewed By: C. Kelly
 Date: 2/22/05

Monitoring Well Purging Form

Well ID: B12mw-010-GW

Ravenna Army Ammunition Plant
Ravenna, Ohio

Date: 01/14/05

WELL OBSERVATIONS

Protective Casing: Intact · Damaged Locked: Yes No Key No: _____
 Concrete Base: Intact · Damaged Inner Casing: 2" · 4" · 6" · 8" Other: _____
 Stickup Height: 1.8 (ft) TIC · TOC Difference: _____ (ft) 3.5"
 Vapor Readings: HNu · OVA Background: _____ Inside Well Casing: _____

Present Depth Sampled Sample ID
 LNAPL Yes No _____ Yes · No _____ B12mw-010-GW
 DNAPL Yes No _____ Yes · No _____

CALCULATIONS

- (A) Depth to Well Bottom 22.7 (ft) TOC · TIC · BGS Measured · Previously Measured (circle one)
 (B) Depth to Water 15.05 (ft) TOC · TIC · BGS Time Measured: 0930
 (C) Water Column Height (A-B) 7.65 (ft)
 (D) Well Diameter Factor 0.16 (gal/ft) (2" = 0.16, 4" = 0.65, 6" = 1.47, 8" = 2.61 GAL/FT)
 (E) One Well Volume (C*D) 1.27 (gal)
 (F) Volumes to be Evacuated 5
 (G) TOTAL VOLUME TO BE EVACUATED (E * F) 6.12 (gal)

EVACUATION METHOD

~~BAILER~~ MICROPURGE

Well Evacuation Method: Bailer · Submersible Pump · Other: _____ Device Number: _____

Purge Water Disposition: 1. Discharged Onsite 2. Collected And: Stored · Disposed Onsite · Offsite

Collected In: Tanks · Drums No. of Containers: _____

Comments: _____

TIME	DEPTH TO WATER (ft)	PURGE RATE (gpm)	Field Measurements						Comments
			HNu	Spec Cond	Temp	pH	Turb	DO	
0940	15.05			0.111	8.712	5.30	71000	13.99	INITIAL READING
0943	15.10			0.083	7.97	5.30	71000	14.00	
0947	15.21			0.080	8.47	5.30	71000	14.00	
0950	15.40			0.080	8.67	5.30	71000	14.00	
0953	15.50			0.080	8.67	5.60	71000	14.01	PURGING COMPLETE

Logged By: NILESH SHRINGAPURE (Please Print)

Reviewed By: [Signature]

Signature: [Signature]

Date: 2/22/05

Location ID: B12 MW - 010 - 61W

Field Sampling Report

Ravenna Army Ammunition Plant
Characterization of 14 RVAAP AOCs

Date: 01/14/05

Sampling Information

Source	Groundwater/Product	Surface Water	Soils / Sediments / Sludge	
Method	Bailer	Sample Bottle	Scoop	Trowel
	Pump	Bacon Bomb	Bowl	Hand Auger
	<u>MICROPURGE PUMP</u>		Push Probe	Plastic Liner
Type/Construction			Mattocks	
Miscellaneous	Well Purging Form <u>(Yes)</u> - No			

Sample Collection: 1000 hrs Sample Type: Composite - MI - Grab
If MI, # of increments taken: NA Location: Plotted on Map - Staked in Field
Sample Depth: 19 FT (below surface) Decon: Dedicated - Each Day - Each Location Estimated - Measured Surveyed

Field Parameters (at time of sample)	Analytical Parameters			Other Parameters		
PID / FID Readings: Background: ppm	VOC	<input checked="" type="checkbox"/>	TPH GRO	Corrosivity		
	SVOC	<input checked="" type="checkbox"/>	TPH DRO	Reactivity Sulfide/Cyanide		
	Explosives	<input checked="" type="checkbox"/>	Chromium +6	Ignitability		
Sample: ppm	Propellants	<input checked="" type="checkbox"/>	Nitrate			
Water Level: <u>15.50</u> FT	TAL Metals	<input checked="" type="checkbox"/>		QA Samples		
Temperature: <u>8.67</u> °C	Pesticides/PCBs	<input checked="" type="checkbox"/>				
Sp. Conductance: <u>0.080</u> uMHOs	Cyanides			MS/MSD	Yes / No	NA
pH: <u>5.60</u> units	TOC			Duplicate ID		NA
Turbidity: <u>> 1000</u> N.T.U.	Grain Size			Equipment Rinse ID		NA
				Trip Blank ID	<u>TRIP BLANK</u>	NA

DO - 1401
MOSTLY MEDIUM LIGHT BROWN COLOR
NO ODOOR, NO SHEEN, NO SLEW, MED-HIGH
TURBIDITY

Soil sample description should include:
Munsell Color Odor Staining Texture Sorting Plasticity Moisture

Water sample description should include:
Color Odor Sheen Turbidity

Split Sample ID: NA Split Sample

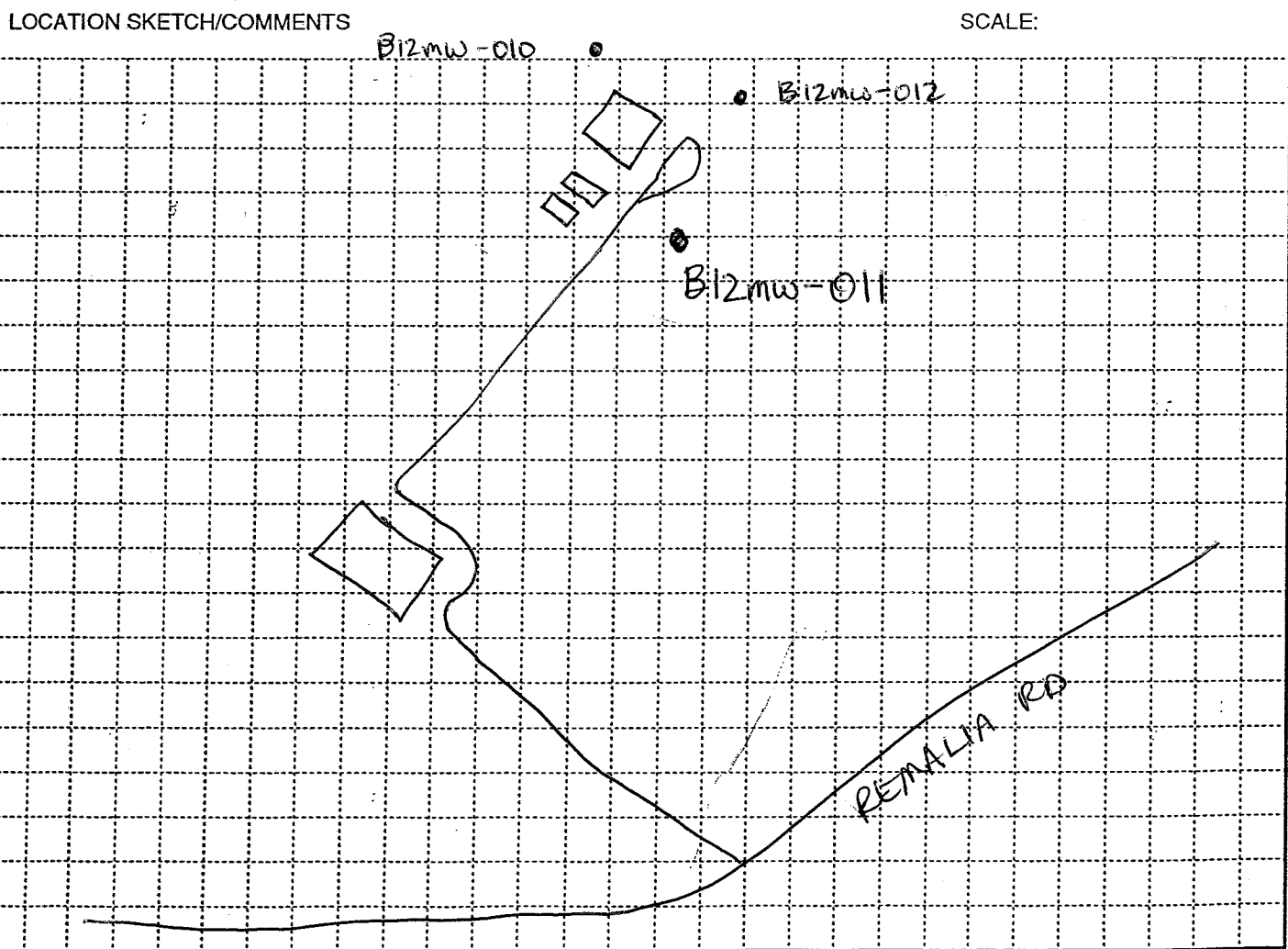
Name: _____
Agency/Company: _____
Address: _____

QA/QC Provided: MS/MSD - Duplicate - Trip-Blanks - Field Blanks
Parameters: Same as Above - As Listed

Logged By: NILESH SIBRINGAPURE (Please Print) Reviewed by: ERIC ELLIS (Please Print)

Signature: [Signature] Signature: [Signature] Date: 2/1/05

HTRW DRILLING LOG		DISTRICT Louisville		HOLE NUMBER B12mw-011	
1. COMPANY NAME MAM Engineers Inc		2. DRILL SUB CONTRACTOR HAD Drilling Contractors		SHEET SHEETS 1 OF 3	
3. PROJECT RVAAP RI 14			4. LOCATION Building 1200 Area		
5. NAME OF DRILLER Sam Hoffer			6. MANUFACTURER'S DESIGNATION OF DRILL CME-LC-60		
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT		8. HOLE LOCATION			
6.25 ID HSA		East well btw. Existing and NE well			
2" Shelby Tube		9. SURFACE ELEVATION 1003.76 ASL			
6" OD Air Hammer		10. DATE STARTED 19 Nov 04		11. DATE COMPLETED 19 Nov 04	
12. OVERBURDEN THICKNESS 2.0 ft			15. DEPTH GROUNDWATER ENCOUNTERED ~ 20 ft		
13. DEPTH DRILLED INTO ROCK 29.7 ft			16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED 19.95 @ 1036 11/23/04		
14. TOTAL DEPTH OF HOLE 24.7 ft			17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY)		
18. GEOTECHNICAL SAMPLES SHELBY TUBE 0'-2'		DISTURBED -	UNDISTURBED X	19. TOTAL NUMBER OF CORE BOXES 0	
20. SAMPLES FOR CHEMICAL ANALYSIS		VOC -	METALS -	OTHER (SPECIFY) -	OTHER (SPECIFY) -
22. DISPOSITION OF HOLE		BACKFILLED -	MONITORING WELL X	OTHER (SPECIFY) -	23. SIGNATURE OF INSPECTOR <i>[Signature]</i>
21. TOTAL CORE RECOVERY %					



PROJECT RVAAP RI 14	HOLE NO. B12mw-011
------------------------	-----------------------

HTRW DRILLING LOG

(CONTINUATION SHEET)

HOLE NUMBER

B12mw-011

PROJECT

RVAAP R114

INSPECTOR

Mark Dunlevy

SHEET

2 OF 3

ELEV. (a)	DEPTH (b)	DESCRIPTION OF MATERIALS (c)	FIELD SCREENING RESULTS (d)	GEOTECH SAMPLE OR CORE BOX NO. (e)	ANALYTICAL SAMPLE NO. (f)	BLOW COUNT (g)	REMARKS (h)
	2	19 NOV 04 1910					
	4	Drilled Through Weathered SS Bedrock to set 6.25 ID Augers for Air Rotary					7.5yr 5/6
1300	6	Br. SS Bedrock Fine Grained Sand					
	8	Color Changes to DK. Br.					7.5yr 4/4
	10	Color Changes to LT. Gray					7.5yr 7/2
	12	Color Changes to Br.					7.5yr 5/6
	14						
	16	Layered Shale - DK Gray/Black and SS - Br /Redish Br.					- Drilled to 24 ft and let borehole sit open to check for water - 1340 → - 1300 - checked WL up to 20 ft.
	18						
	20						

PROJECT

RVAAP R114

HOLE NO.

B12mw-011

HTRW DRILLING LOG

(CONTINUATION SHEET)

HOLE NUMBER

812mw-011

PROJECT

RVAAP RE 14

INSPECTOR

Mark Dunlavy

SHEET

3 OF 3

ELEV. (A)	DEPTH (B)	DESCRIPTION OF MATERIALS (C)	FIELD SCREENING RESULTS (D)	GEOTECH SAMPLE OR CORE BOX NO. (E)	ANALYTICAL SAMPLE NO. (F)	BLOW COUNT (G)	REMARKS (H)
	22	Same As Above					
	24						
1340	26	BoH 24.7					BoH 24.7 Sand to 24 screen from 24 to 14 Sand to 10 Dentonite 7 Grout to Surface Stick up Constructions <u>3 gallons to Hydrate</u>

PROJECT

RVAAP RE 14

HOLE NO.

812mw-011

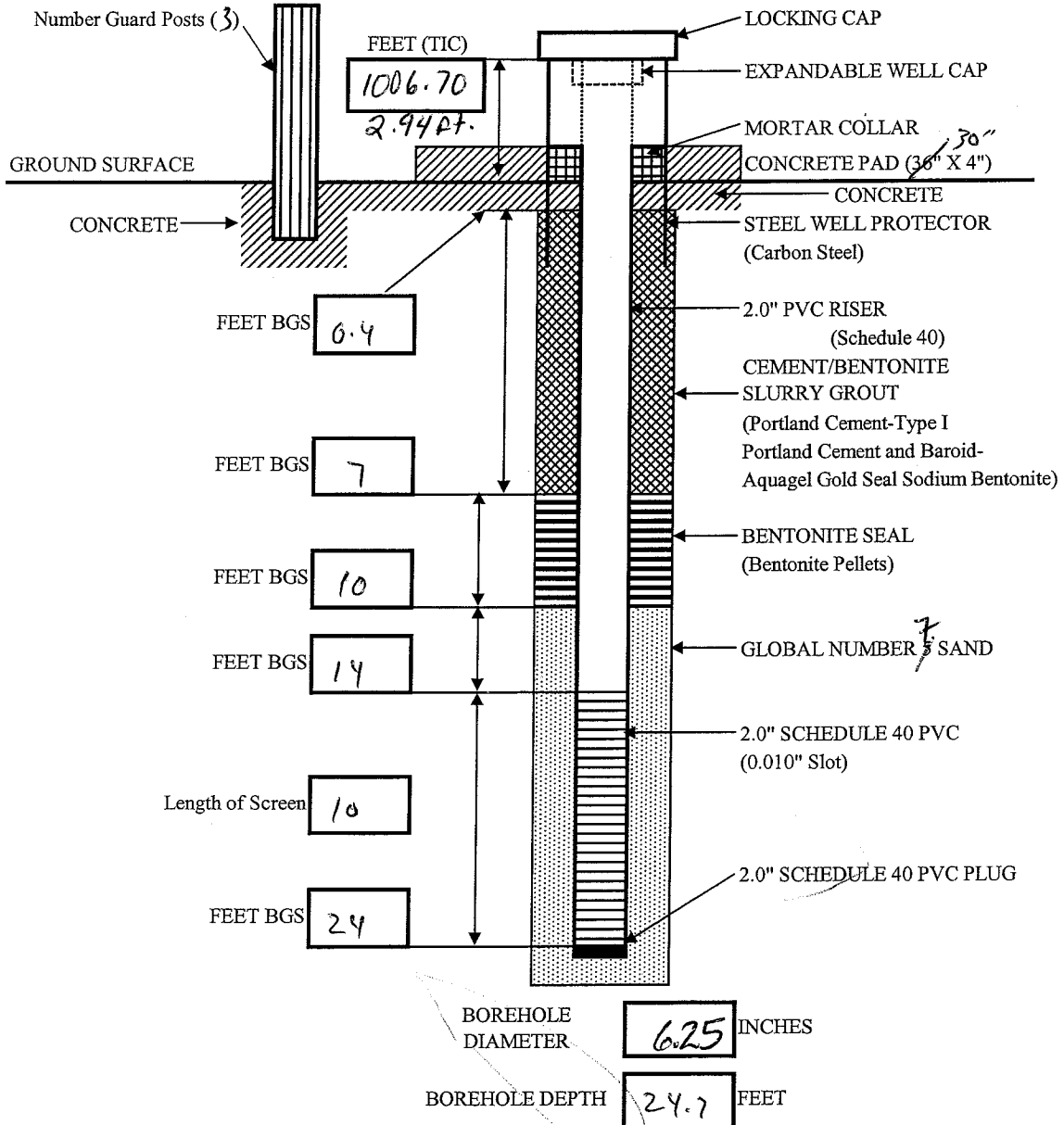


MONITORING WELL CONSTRUCTION DIAGRAM

RAVENNA ARMY AMMUNITION PLANT

Project: RUAAP RE 14

Well Number: B12mw-011	Begin: 19 Nov 04	End: 19 Nov 04
Coordinates: N: 565687.82 E: 2371416.15	Elevation: 1003.76	Reference Point:
Logged By: Mark Dunlavy		



Notes:

- 1) Figure not drawn to scale.
- 2) BGS = Below Ground Surface.

- 3) Well head protected with three guard posts set in triangle configuration about the concrete pad.

Well Development Record

Well ID: B12 MW - 011 - GW
 Date: 11/23/04

Ravenna Army Ammunition Plant-
 RVAAP 14 AOC Characterization

Project: RVAAP

Development Method: WHALE PUMP

Development Company: MKM

Comments: _____

Well TD: 26.70 FT TIC Depth to Water: 19.95 FT
 Water Column Height: 6.75 FT One Well Volume: 389 Gals

Well Volume (gallons/foot)
 2-inch = 0.16 6-inch = 1.47
 4-inch = 0.65 8-inch = 2.61

Time	Well Dev. Code	Depth to Water (ft)	Purge Rate (gpm)	Purge Volume (gal)	Field Measurements				Turbidity	Comments
					pH	CON	DO	TEMP		
1036	DSB	19.95	-	-	-	-	-	-	-	-
1040	DSE	19.65	-	-	-	-	-	-	-	-
1052	DPB	-	-	-	7.66	0.24	10.33	11.90	1000	-
1055	DFM	-	-	-	7.33	0.22	10.83	12.01	-	1 well vol reached
1056	DPB DPE	21.4 DRY	-	-	-	-	-	-	-	-
1133	DPB	21.4	-	-	-	-	-	-	-	-
1135	DPB	DRY	-	1.5	-	-	-	-	-	5.5 gal (dry)
1305	DPB	20.35	-	-	-	-	-	-	-	-
1310	DFM	-	-	-	7.11	0.22	8.52	12.48	1000	2 nd well vol reached 8 gal
1312	DPE	DRY	-	1.0	-	-	-	-	-	9 gal.
1444	DPB	20.35	-	-	-	-	-	-	-	-
1445	DFM	20.86	-	-	7.32	0.226	10.05	12.43	1000	3 rd well vol 12 gal
146	DPE	DRY	-	0.5	-	-	-	-	-	12.5 gal.
NOV 24, 0900	DSB	19.85	-	-	-	-	-	-	-	-
0905	DSE	19.95	-	-	5.18	0.30	9.45	12.27	1000	-
FINAL										

WELL DEVELOPMENT CODES	FIELD MEASUREMENT CODES	TURBIDITY
DPB - Begin Pumping DPE - End Pumping DSB - Begin Surge Blocking DSE - End Surge Blocking DFM - Field Measurements DBB - Begin Bailing DBE - End Bailing DXB - Begin Other DXE - End Other Other: _____	MTP - Temperature MSC - Specific Conductance MPD - Photoionizer (eg. HNU) MFD - Flame Ionizer (eg. OVA) MDO - Dissolved Oxygen MPH - pH MEH - eH MOT - Other _____	Enter Turbidity Meter Reading (Final should be < 5 NTU) OR Enter Qualitative Observations H - High: Muddy/Silty M - Medium: Cloudy/Translucent L - Low: Transparent N - None: Clear/No Sediment

Logged By: NILESH SHRINGARPURE (Please Print) Reviewed By: C. Esler
 Signature: N. Shringarpure Date: 2/21/05

Well Development Record

Well ID: B/2mw-011-GW
 Date: 11/24/04

Ravenna Army Ammunition Plant-
 RVAAP 14 AOC Characterization

Project: RVAAP

Development Method: WHALE PUMP

Development Company: MKM

Comments: _____

Well TD: 26.70 FT TIC Depth to Water: 19.25 FT
 Water Column Height: 6.75 FT One Well Volume: 3.89 Gals

Well Volume (gallons/foot) 2-inch = 0.16 6-inch = 1.47
 4-inch = 0.65 8-inch = 2.61

Time	Well Dev. Code	Depth to Water (ft)	Purge Rate (gpm)	Purge Volume (gal)	Field Measurements				Turbidity	Comments
					pH	CON	DO	TEMP		
0910	DFM	DRY	-	-	5.54	0.24	9.96	12.48	1000	4 th well vol (16 gal DRY)
12/1/04 0936	DSB	19.5	-	-	-	-	-	-	-	-
0941	DSE	20.1	-	-	-	-	-	-	-	-
0942	DPB	20.1	-	-	-	-	-	-	-	-
12/4/04 0946	DFM	DRY	-	4 gal	5.52	1.36	3.21	10	1000	5 th well vol (20 gal DRY)
0908	DBB	20.0	-	-	-	-	-	-	-	-
0912	DSE	20.6	-	-	-	-	-	-	-	-
0913	DPB	20.6	-	-	5.72	0.192	4.08	10.8	23.7	-
0914	DPE	DRY	-	3.5 dry	-	-	-	-	-	23.5 (dry)
0902	DBB	19.7	-	-	-	-	-	-	-	-
0905	DSE	19.9	-	-	-	-	-	-	-	-
0906	DPB	19.9	-	-	-	-	-	-	-	-
0907	DFM		-	0.5	5.8	0.186	4.48	10.5	1000	6 th well vol (24 gal)
0909	DPE	DRY	-	3.5	-	-	-	-	-	27.5 (dry)
0947	DPB	21.9	-	-	-	-	-	-	-	-
FINAL										

WELL DEVELOPMENT CODES

DPB - Begin Pumping
 DPE - End Pumping
 DSB - Begin Surge Blocking
 DSE - End Surge Blocking
 DFM - Field Measurements
 DBB - Begin Bailing
 DBE - End Bailing
 DXB - Begin Other
 DXE - End Other
 Other: _____

FIELD MEASUREMENT CODES

MTP - Temperature
 MSC - Specific Conductance
 MPD - Photoionizer (eg. HNu)
 MFD - Flame Ionizer (eg. OVA)
 MDO - Dissolved Oxygen
 MPH - pH
 MEH - eH
 MOT - Other _____

TURBIDITY

Enter Turbidity Meter Reading
 (Final should be < 5 NTU)
 OR
 Enter Qualitative Observations

H - High: Muddy/Silty
 M - Medium: Cloudy/Translucent
 L - Low: Transparent
 N - None: Clear/No Sediment

Logged By: NILESH SHRINGAR PURE (Please Print)

Reviewed By: C. Ealy

Signature: [Handwritten Signature]

Date: 2/22/05

Monitoring Well Purging Form

Well ID: B12MW-011GW

Ravenna Army Ammunition Plant
Ravenna, Ohio

Date: 12/09/04

WELL OBSERVATIONS

Protective Casing: Intact · Damaged Locked: Yes · No Key No:
 Concrete Base: Intact · Damaged Inner Casing: 2" · 4" · 6" · 8" Other:
 Stickup Height: 2.4 (ft) TIC · TOC Difference: 0.2 (ft)
 Vapor Readings: HNu · OVA Background: _____ Inside Well Casing:

Present Depth Sampled Sample ID
 LNAPL Yes · No _____ Yes · No
 DNAPL Yes · No _____ Yes · No B12MW-011GW

CALCULATIONS

- (A) Depth to Well Bottom 27 (ft) TOC · TIC · BGS Measured · Previously Measured (circle one)
 (B) Depth to Water 19.6 (ft) TOC · TIC · BGS Time Measured: 1349
 (C) Water Column Height (A-B) 07.4 (ft)
 (D) Well Diameter Factor 0.16 (gal/ft) (2" = 0.16, 4" = 0.65, 6" = 1.47, 8" = 2.61 GAL/FT)
 (E) One Well Volume (C*D) 1.18 (gal)
 (F) Volumes to be Evacuated 5
 (G) TOTAL VOLUME TO BE EVACUATED (E * F) 5.92 (gal)

EVACUATION METHOD

Well Evacuation Method: Micro purging · Bailer · Submersible Pump · Other: _____ Device Number: _____

Purge Water Disposition: 1. Discharged Onsite 2. Collected And: Stored Disposed Onsite · Offsite

Collected In: Tanks · Drums No. of Containers: _____

Comments: _____

TIME	DEPTH TO WATER (ft)	PURGE RATE (gpm)	Field Measurements						Comments
			HNu	Spec Cond	Temp	pH	Turb	DO	
1350	19.6			0.196	11.18	5.87	12.6	3.74	Initial reading
1353	19.9			0.188	12.07	5.76	5.2	1.69	
1356	19.8			0.186	12.14	5.74	2.7	1.49	
1359	20.5			0.184	12.17	5.69	0.0	1.22	End purging

Logged By: Vijay Aluri (Please Print)

Reviewed By: C. S. S. S.

Signature: Vijay

Date: 2/20/05

Field Sampling Report

Location ID: B12 MW - 011 - GW

Ravenna Army Ammunition Plant
Characterization of 14 RVAAP AOCs

Date: 12/09/04

Sampling Information

Source	Groundwater / Product	Surface Water	Soils / Sediments / Sludge	
Method	Bailer	Sample Bottle	Scoop	Trowel
	Pump	Bacon Bomb	Bowl	Hand Auger
	<u>Micro purging</u>		Push Probe	Plastic Liner
Type/Construction			Mattocks	
Miscellaneous	Well Purging Form <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No			

Sample Collection: 1400 hrs

Sample Type: Composite - MI - Grab
If MI, # of increments taken: NA

Location: Plotted on Map - Staked in Field
Estimated - Measured - Surveyed

Sample Depth: 33 FT (below surface)

Decon: Dedicated - Each Day Each Location

Field Parameters (at time of sample)	Analytical Parameters			Other Parameters	
PID / FID Readings: Background: ppm	VOC	<input checked="" type="checkbox"/>	TPH GRO	Corrosivity	
	SVOC	<input checked="" type="checkbox"/>	TPH DRO	Reactivity Sulfide/Cyanide	
	Explosives	<input checked="" type="checkbox"/>	Chromium +6	Ignitability	
Sample: ppm	Propellants	<input checked="" type="checkbox"/>	Nitrate		
Water Level: <u>19.6</u> FT	TAL Metals	<input checked="" type="checkbox"/>		QA Samples	
Temperature: <u>12.17</u> °C	Pesticides/PCBs	<input checked="" type="checkbox"/>		MS/MSD	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> NA
Sp. Conductance: <u>0.184</u> uMHOs	Cyanides			Duplicate ID	<u>B12MW-011-DUP</u> NA
pH: <u>5.69</u> units	TOC			Equipment Rinse ID	<u>NA</u>
Turbidity: <u>0.0</u> N.T.U.	Grain Size			Trip Blank ID	<u>TRIP BLANK</u> NA

Sample Description

No color, No odor, No sheen,
very low turbidity

Split Sample

Split Sample ID: B12MW-011-GW

Name: JOHN JAY (LEWIS-ED-EL)

Agency/Company: USACE - LOUISVILLE

Address:

600 DR MARTIN LUTHER KING JR PLAZA
LOUISVILLE KY 40202

QA/QC Provided: MS/MSD - Duplicate - Trip Blanks - Field Blanks

Parameters: Same as Above - As Listed

Soil sample description should include:

Munsell Color Odor Staining Texture Sorting Plasticity Moisture

Water sample description should include:

Color Odor Sheen Turbidity

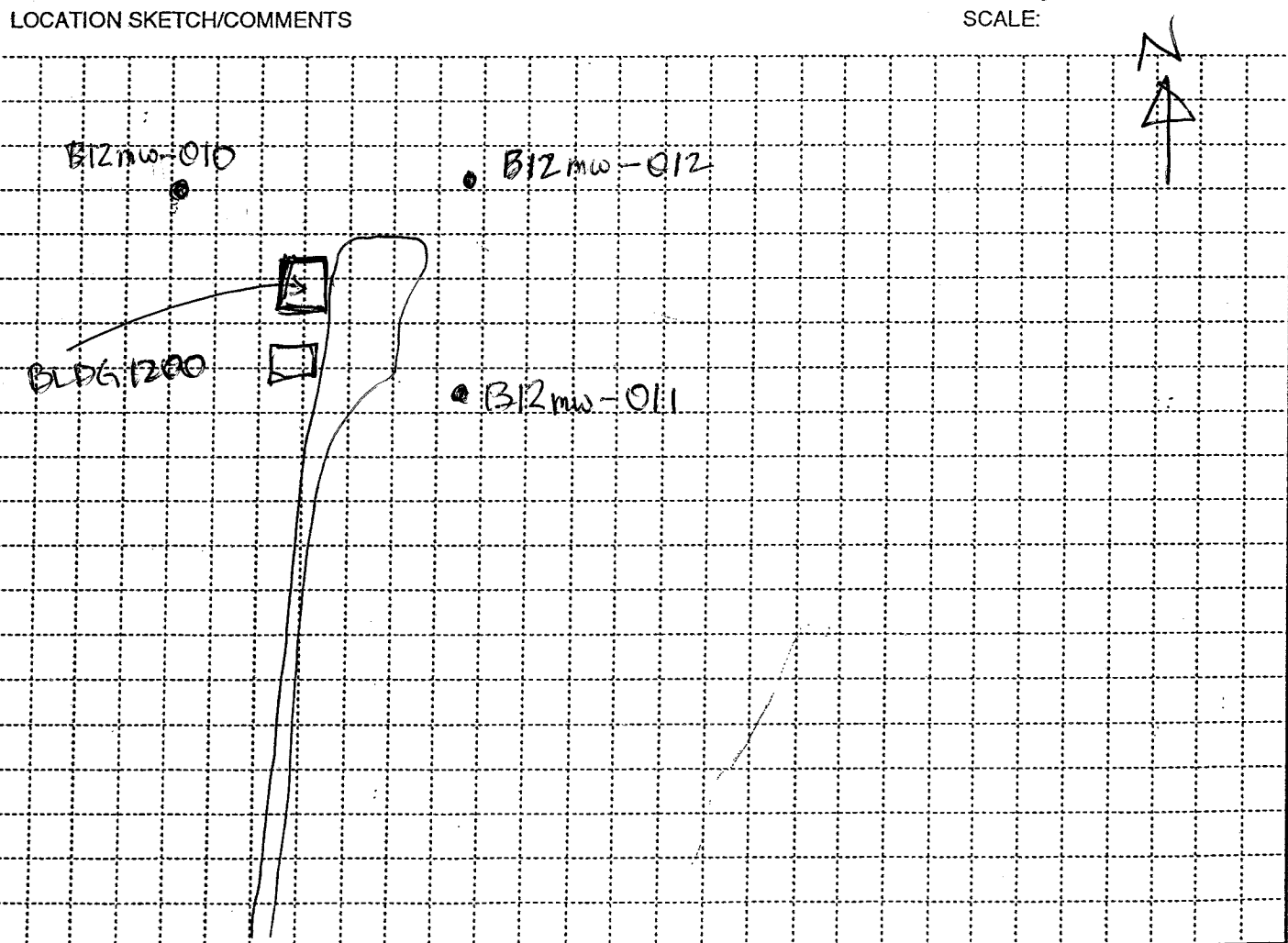
Logged By: Vijay Alluri (Please Print)

Reviewed by: ERIC EWS (Please Print)

Signature: Vijay

Signature: ERIC EWS Date: 2/1/05

HTRW DRILLING LOG		DISTRICT <i>Louisville</i>		HOLE NUMBER <i>B12mw-012</i>	
1. COMPANY NAME <i>MEM Engineers Inc</i>		2. DRILL SUBCONTRACTOR <i>HAD Drilling Contractors</i>		SHEET SHEETS <i>1 OF 3</i>	
3. PROJECT <i>RVAAP RE 14</i>			4. LOCATION NACA Fes^{HPD} <i>Building 1200 Area</i>		
5. NAME OF DRILLER <i>Andy Wolf</i>			6. MANUFACTURER'S DESIGNATION OF DRILL <i>CME LC60</i>		
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT <i>8.25" OD HSA</i> <i>6.25" OD Core Barrel</i>		8. HOLE LOCATION <i>NE Corner</i>		9. SURFACE ELEVATION <i>1003.43 ASL</i>	
12. OVERBURDEN THICKNESS <i>2.5 ft</i>		15. DEPTH GROUNDWATER ENCOUNTERED <i>~18.5</i>		11. DATE COMPLETED <i>29 Nov 04</i>	
13. DEPTH DRILLED INTO ROCK 19.5 ft <i>19.8 ft</i>		16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED <i>19.3 @ 1030 12/01/04</i>		10. DATE STARTED <i>22 Nov 04</i>	
14. TOTAL DEPTH OF HOLE <i>22.3</i>		17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY)			
18. GEOTECHNICAL SAMPLES		DISTURBED <i>-</i>	UNDISTURBED <i>-</i>	19. TOTAL NUMBER OF CORE BOXES <i>2</i>	
20. SAMPLES FOR CHEMICAL ANALYSIS		VOC <i>-</i>	METALS <i>-</i>	OTHER (SPECIFY) <i>-</i>	OTHER (SPECIFY) <i>-</i>
22. DISPOSITION OF HOLE		BACKFILLED <i>-</i>	MONITORING WELL <i>X</i>	OTHER (SPECIFY) <i>-</i>	21. TOTAL CORE RECOVERY % <i>76%</i>
				23. SIGNATURE OF INSPECTOR <i>[Signature]</i>	



PROJECT <i>RVAAP RE 14</i>	HOLE NO. <i>B12mw-012</i>
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HTRW DRILLING LOG

(CONTINUATION SHEET)

HOLE NUMBER
B12mw 012
SHEET 2 OF 3

PROJECT
RVAAP RI 14

INSPECTOR
Mark Dunlap

ELEV. (a)	DEPTH (b)	DESCRIPTION OF MATERIALS (c)	FIELD SCREENING RESULTS (d)	GEOTECH SAMPLE OR CORE BOX NO. Recovery	ANALYTICAL SAMPLE NO. USGS	BLOW COUNT (g)	REMARKS (h)
	6"	Top Soil				1-2	
		Reddish Br. SILT 70% w/ Sand Damp No Odor; No Staining Grey Mottles Present	0.0	1-5	ML	2-4	7.5yr S/6
	2	Saturated Above Bedrock splits Weathered Grey SS				1 Refusal	used Air hammer to 7.0 due to length of Core Barrel
	4						
	6						
1230	7.0	Begin Core #1 @ 7.0 Grey weathered, Fine Grained SS Very fractured Wet					7.5yr S/2 Core #1 Recovery RQD
	8	Br./Grey SHALE, very soft/fine Highly layered					7.5yr S/3
	10	Br./Grey SS Fine Grained Iron Stained					7.5yr S/2
	12	Reddish Br. SHALE, thick layers - 1/8" Br./Grey Fine Grained SS - highly fractured btw. 11.8 + 12.2					5yr S/4 7.5yr S/3
	14	Changes to Grey w/Black + Iron Stained Layers Less Fractured					7.5yr G/2
	16	DK. Grey SHALE, Highly Compacted Br./Grey Fine Grained SS Bottom of Core #1 Top of Core #2					7.5yr 4/1 7.5yr S/3 Core #2 Recovery RQD $\frac{24.4}{26.8} = 90.9\%$ $\frac{39}{52.4} =$
1370 1345	18	Grey/Blk Layered Shale Reddish Grey Fine Grained SS Changes to Grey @ 17.8					7.5yr G/2 7.5yr S/3
1420 0936	20	Bottom of Core #2 11/22/04 Top of Core #3 11/29/04 Same As Above Grey/Blk Shale Highly Layered					Alter 7 days only ylt of water present, Cored more 7.5yr G/2

PROJECT
RVAAP RI 14

HOLE NO.
B12mw-012

HTRW DRILLING LOG

(CONTINUATION SHEET)

HOLE NUMBER
B12mw-012

PROJECT

RVAAP RI 14

INSPECTOR

Mark DeLuca

SHEET SHEETS
3 OF 3

ELEV. (a)	DEPTH (b)	DESCRIPTION OF MATERIALS (c)	FIELD SCREENING RESULTS (d)	GEOTECH SAMPLE OR CORE BOX NO. (e)	ANALYTICAL SAMPLE NO. (f)	BLOW COUNT (g)	REMARKS (h)
	20	-SAA Grey Fine-grained ss w/ Black Striations Very Compacted Grey/Black Shale Very Layered					7.5y-5/3 7.5y6/2
10.00	22	Bottom of Core 22.1 Grey highly compacted ss BOTH 22.3					7.5y-5/3
	24						BOH 22.3 Sand to 22.0 Screen from 22 to 12 Sand up to 9 Bentonite up to 6 Grout to Surface Stick up - 1.5 ft Cut off Bottom <hr/> 5 gallons of Hydrant water used

PROJECT

RVAAP RI 14

HOLE NO.

B12mw-012



MONITORING WELL CONSTRUCTION DIAGRAM

RAVENNA ARMY AMMUNITION PLANT

Project: RVAAP RZ 14

Well Number: B12mw-012 012 013 014 015 016 017 018 019 020 021 022 023 024 025 026 027 028 029 030 031 032 033 034 035 036 037 038 039 040 041 042 043 044 045 046 047 048 049 050 051 052 053 054 055 056 057 058 059 060 061 062 063 064 065 066 067 068 069 070 071 072 073 074 075 076 077 078 079 080 081 082 083 084 085 086 087 088 089 090 091 092 093 094 095 096 097 098 099 100 101 102 103 104 105 106 107 108 109 110 111 112 113 114 115 116 117 118 119 120 121 122 123 124 125 126 127 128 129 130 131 132 133 134 135 136 137 138 139 140 141 142 143 144 145 146 147 148 149 150 151 152 153 154 155 156 157 158 159 160 161 162 163 164 165 166 167 168 169 170 171 172 173 174 175 176 177 178 179 180 181 182 183 184 185 186 187 188 189 190 191 192 193 194 195 196 197 198 199 200 201 202 203 204 205 206 207 208 209 210 211 212 213 214 215 216 217 218 219 220 221 222 223 224 225 226 227 228 229 230 231 232 233 234 235 236 237 238 239 240 241 242 243 244 245 246 247 248 249 250 251 252 253 254 255 256 257 258 259 260 261 262 263 264 265 266 267 268 269 270 271 272 273 274 275 276 277 278 279 280 281 282 283 284 285 286 287 288 289 290 291 292 293 294 295 296 297 298 299 300 301 302 303 304 305 306 307 308 309 310 311 312 313 314 315 316 317 318 319 320 321 322 323 324 325 326 327 328 329 330 331 332 333 334 335 336 337 338 339 340 341 342 343 344 345 346 347 348 349 350 351 352 353 354 355 356 357 358 359 360 361 362 363 364 365 366 367 368 369 370 371 372 373 374 375 376 377 378 379 380 381 382 383 384 385 386 387 388 389 390 391 392 393 394 395 396 397 398 399 400 401 402 403 404 405 406 407 408 409 410 411 412 413 414 415 416 417 418 419 420 421 422 423 424 425 426 427 428 429 430 431 432 433 434 435 436 437 438 439 440 441 442 443 444 445 446 447 448 449 450 451 452 453 454 455 456 457 458 459 460 461 462 463 464 465 466 467 468 469 470 471 472 473 474 475 476 477 478 479 480 481 482 483 484 485 486 487 488 489 490 491 492 493 494 495 496 497 498 499 500 501 502 503 504 505 506 507 508 509 510 511 512 513 514 515 516 517 518 519 520 521 522 523 524 525 526 527 528 529 530 531 532 533 534 535 536 537 538 539 540 541 542 543 544 545 546 547 548 549 550 551 552 553 554 555 556 557 558 559 560 561 562 563 564 565 566 567 568 569 570 571 572 573 574 575 576 577 578 579 580 581 582 583 584 585 586 587 588 589 590 591 592 593 594 595 596 597 598 599 600 601 602 603 604 605 606 607 608 609 610 611 612 613 614 615 616 617 618 619 620 621 622 623 624 625 626 627 628 629 630 631 632 633 634 635 636 637 638 639 640 641 642 643 644 645 646 647 648 649 650 651 652 653 654 655 656 657 658 659 660 661 662 663 664 665 666 667 668 669 670 671 672 673 674 675 676 677 678 679 680 681 682 683 684 685 686 687 688 689 690 691 692 693 694 695 696 697 698 699 700 701 702 703 704 705 706 707 708 709 710 711 712 713 714 715 716 717 718 719 720 721 722 723 724 725 726 727 728 729 730 731 732 733 734 735 736 737 738 739 740 741 742 743 744 745 746 747 748 749 750 751 752 753 754 755 756 757 758 759 760 761 762 763 764 765 766 767 768 769 770 771 772 773 774 775 776 777 778 779 780 781 782 783 784 785 786 787 788 789 790 791 792 793 794 795 796 797 798 799 800 801 802 803 804 805 806 807 808 809 810 811 812 813 814 815 816 817 818 819 820 821 822 823 824 825 826 827 828 829 830 831 832 833 834 835 836 837 838 839 840 841 842 843 844 845 846 847 848 849 850 851 852 853 854 855 856 857 858 859 860 861 862 863 864 865 866 867 868 869 870 871 872 873 874 875 876 877 878 879 880 881 882 883 884 885 886 887 888 889 890 891 892 893 894 895 896 897 898 899 900 901 902 903 904 905 906 907 908 909 910 911 912 913 914 915 916 917 918 919 920 921 922 923 924 925 926 927 928 929 930 931 932 933 934 935 936 937 938 939 940 941 942 943 944 945 946 947 948 949 950 951 952 953 954 955 956 957 958 959 960 961 962 963 964 965 966 967 968 969 970 971 972 973 974 975 976 977 978 979 980 981 982 983 984 985 986 987 988 989 990 991 992 993 994 995 996 997 998 999 1000 1001 1002 1003 1004 1005 1006 1007 1008 1009 1010 1011 1012 1013 1014 1015 1016 1017 1018 1019 1020 1021 1022 1023 1024 1025 1026 1027 1028 1029 1030 1031 1032 1033 1034 1035 1036 1037 1038 1039 1040 1041 1042 1043 1044 1045 1046 1047 1048 1049 1050 1051 1052 1053 1054 1055 1056 1057 1058 1059 1060 1061 1062 1063 1064 1065 1066 1067 1068 1069 1070 1071 1072 1073 1074 1075 1076 1077 1078 1079 1080 1081 1082 1083 1084 1085 1086 1087 1088 1089 1090 1091 1092 1093 1094 1095 1096 1097 1098 1099 1100 1101 1102 1103 1104 1105 1106 1107 1108 1109 1110 1111 1112 1113 1114 1115 1116 1117 1118 1119 1120 1121 1122 1123 1124 1125 1126 1127 1128 1129 1130 1131 1132 1133 1134 1135 1136 1137 1138 1139 1140 1141 1142 1143 1144 1145 1146 1147 1148 1149 1150 1151 1152 1153 1154 1155 1156 1157 1158 1159 1160 1161 1162 1163 1164 1165 1166 1167 1168 1169 1170 1171 1172 1173 1174 1175 1176 1177 1178 1179 1180 1181 1182 1183 1184 1185 1186 1187 1188 1189 1190 1191 1192 1193 1194 1195 1196 1197 1198 1199 1200 1201 1202 1203 1204 1205 1206 1207 1208 1209 1210 1211 1212 1213 1214 1215 1216 1217 1218 1219 1220 1221 1222 1223 1224 1225 1226 1227 1228 1229 1230 1231 1232 1233 1234 1235 1236 1237 1238 1239 1240 1241 1242 1243 1244 1245 1246 1247 1248 1249 1250 1251 1252 1253 1254 1255 1256 1257 1258 1259 1260 1261 1262 1263 1264 1265 1266 1267 1268 1269 1270 1271 1272 1273 1274 1275 1276 1277 1278 1279 1280 1281 1282 1283 1284 1285 1286 1287 1288 1289 1290 1291 1292 1293 1294 1295 1296 1297 1298 1299 1300 1301 1302 1303 1304 1305 1306 1307 1308 1309 1310 1311 1312 1313 1314 1315 1316 1317 1318 1319 1320 1321 1322 1323 1324 132

Well Development Record

Well ID: B12MW-012GW
 Date: 12/11/04

Ravenna Army Ammunition Plant-
 RVAAP 14 AOC Characterization

Project: RVAAP-14
 Development Company: MKM

Development Method: whale pump
 Comments: _____

Well TD: 24.8 FT TIC Depth to Water: 19.3 FT
 Water Column Height: 5.5 FT One Well Volume: 3.2 Gals

Well Volume (gallons/foot)
 2-inch = 0.16 6-inch = 1.47
 4-inch = 0.65 8-inch = 2.61

Time	Well Dev. Code	Depth to Water (ft)	Purge Rate (gpm)	Purge Volume (gal)	Field Measurements				Turbidity	Comments
					PH	CON	DO	Temp		
1030	DSB	19.3	-	-	-	-	-	-	-	-
1035	DSE	20.1	-	-	-	-	-	-	-	-
1040	DPB	20.1	-	-	-	-	-	-	-	-
1043	DPE	DRY	-	2	-	-	-	-	-	-
12/2/04 0936	DSB	-	-	-	-	-	-	-	-	-
0939	DSE	-	-	-	-	-	-	-	-	-
0941	DPB	-	-	-	-	-	-	-	-	-
0942	DFM	-	-	1	6.53	0.68	5.2	10.7	1000	1 well vol
0943	DPE	DRY	-	0.5	-	-	-	-	-	3.5 dry
12/3/04 0935	DSB	19.5	-	-	-	-	-	-	-	-
0939	DSE	20.3	-	-	-	-	-	-	-	-
0941	DPB	20.3	-	-	-	-	-	-	-	-
0942	DPE	DRY	-	1.5	-	-	-	-	-	5 gal DRY
12/10/04 0950	DSB	19.73	-	-	-	-	-	-	-	-
0960	DSE	-	-	-	-	-	-	-	-	-
0909	DFM	-	-	1 gal	6.60	0.490	6.21	11.2	>1000	6 gal

WELL DEVELOPMENT CODES

DPB - Begin Pumping
 DPE - End Pumping
 DSB - Begin Surge Blocking
 DSE - End Surge Blocking
 DFM - Field Measurements
 DBB - Begin Bailing
 DBE - End Bailing
 DXB - Begin Other
 DXE - End Other
 Other: _____

FIELD MEASUREMENT CODES

MTP - Temperature
 MSC - Specific Conductance
 MPD - Photoionizer (eg. HNu)
 MFD - Flame Ionizer (eg. OVA)
 MDO - Dissolved Oxygen
 MPH - pH
 MEH - eH
 MOT - Other _____

TURBIDITY

Enter Turbidity Meter Reading
 (Final should be < 5 NTU)
 OR
 Enter Qualitative Observations

H - High: Muddy/Silty
 M - Medium: Cloudy/Translucent
 L - Low: Transparent
 N - None: Clear/No Sediment

Logged By: Sue Bales (Please Print)
 Signature: Sue Bales

Reviewed By: Christy Ecker
 Date: 2/21/05

Monitoring Well Purging Form

Well ID: B12mw-012GW

Ravenna Army Ammunition Plant
Ravenna, Ohio

Date: 01/19/05

WELL OBSERVATIONS

Protective Casing: Intact Damaged Locked: Yes · No Key No:
 Concrete Base: Intact · Damaged Inner Casing: 2" · 4" · 6" · 8" Other:
 Stickup Height: 2.5 (ft) TIC · TOC Difference: 0.23 (ft)
 Vapor Readings: HNu · OVA Background: _____ Inside Well Casing:

Present Depth Sampled Sample ID
 LNAPL Yes · No _____ Yes No B12mw-012GW
 DNAPL Yes · No _____ Yes No

CALCULATIONS

- (A) Depth to Well Bottom 24.7 (ft) TOC · TIC · BGS Measured · Previously Measured (circle one)
 (B) Depth to Water 18.35 (ft) TOC · TIC · BGS Time Measured: 1412
 (C) Water Column Height (A-B) 6.35 (ft)
 (D) Well Diameter Factor 0.16 (gal/ft) (2" = 0.16, 4" = 0.65, 6" = 1.47, 8" = 2.61 GAL/FT)
 (E) One Well Volume (C*D) 1.02 (gal)
 (F) Volumes to be Evacuated 5
 (G) TOTAL VOLUME TO BE EVACUATED (E * F) 5.08 (gal)

EVACUATION METHOD

Micro purging

Well Evacuation Method: Bailer · Submersible Pump · Other: _____ Device Number: _____
 Purge Water Disposition: 1. Discharged Onsite 2. Collected And: Stored · Disposed Onsite · Offsite
 Collected In: Tanks · Drums No. of Containers: _____

Comments: _____

TIME	DEPTH TO WATER (ft)	PURGE RATE (gpm)	Field Measurements						Comments
			HNu	Spec Cond	Temp	pH	Turb	DO	
1413	18.1			0.550	8.17	7.80	120	11	Initial reading
1416	18.5			0.553	9.17	7.56	108	7.16	
1419	18.9			0.573	9.32	7.47	89	5.31	
1422	19.1			0.577	9.51	7.50	78	4.79	
1425	21.0			0.453	9.42	7.69	74	4.24	End of purging

Logged By: Vijay Alluri (Please Print)

Reviewed By: C. Ecker

Signature: Vijay

Date: 2/22/05

Field Sampling Report

Location ID: B12mw-012GW

Ravenna Army Ammunition Plant
Characterization of 14 RVAAP AOCs

Date: 01/19/05

Sampling Information

Source	Groundwater / Product	Surface Water	Soils / Sediments / Sludge
Method	Bailer	Sample Bottle	Scoop
	Pump	Bacon Bomb	Bowl
	<u>Micro purge X</u>		Hand Auger
Type/Construction			Push Probe
Miscellaneous	Well Purging Form <u>Yes</u> - No		Plastic Liner
			Mattocks

Sample Collection: 1430 hrs Sample Type: Composite - MI - Grab Location: Plotted on Map - Staked in Field
 If MI, # of increments taken: NA
 Sample Depth: 93 FT (below surface) Decon: Dedicated - Each Day Each Location Estimated - Measured - Surveyed

Field Parameters (at time of sample)	Analytical Parameters			Other Parameters	
PID / FID Readings: Background: <u>0</u> ppm	VOC	X	TPH GRO	Corrosivity	
	SVOC	X	TPH DRO		Reactivity Sulfide/Cyanide
	Explosives	X	Chromium +6		Ignitability
Sample: <u>DO 4.24</u> ppm	Propellants	X	Nitrate		
Water Level: <u>18.35</u> FT	TAL Metals	X		QA Samples	
Temperature: <u>9.42</u> °C	Pesticides/PCBs	X		MS/MSD Yes / No NA	
Sp. Conductance: <u>0.453</u> uMHOs	Cyanides			Duplicate ID NA	
pH: <u>7.69</u> units	TOC			Equipment Rinse ID NA	
Turbidity: <u>74</u> N.T.U.	Grain Size			Trip Blank ID <u>TRIP BLANK</u> NA	

Sample Description
No color, No odor, No sheen,
Low turbidity.

Split Sample

Split Sample ID: _____
 Name: _____
 Agency/Company: _____
 Address: _____

QA/QC Provided: MS/MSD - Duplicate - Trip Blanks - Field Blanks
 Parameters: Same as Above - As Listed

Soil sample description should include:
 Munsell Color Odor Staining Texture Sorting Plasticity Moisture

Water sample description should include:
 Color Odor Sheen Turbidity

Logged By: James Panozzo (Please Print) Reviewed by: ERIC LEWIS (Please Print)
 Signature: [Signature] Signature: [Signature] Date: 2/1/05

Well ID: BKGMW-010-6W
BKGMW-010-6W
 Date: 01-21-05

Monitoring Well Purging Form

Ravenna Army Ammunition Plant
 Ravenna, Ohio

WELL OBSERVATIONS

Protective Casing: Intact · Damaged Locked: Yes · No Key No: 6009
 Concrete Base: Intact · Damaged Inner Casing: 2" · 4" · 6" · 8" Other:
 Stickup Height: 2.38 (ft) TIC · TOC Difference: .07 (ft)
 Vapor Readings: HNu · OVA Background: _____ Inside Well Casing:

Present Depth Sampled Sample ID
 LNAPL Yes · No _____ Yes · No BKGMW-010-6W
 DNAPL Yes · No _____ Yes · No

CALCULATIONS

- (A) Depth to Well Bottom 21.9 (ft) TOC · TIC · BGS Measured · Previously Measured (circle one)
 (B) Depth to Water 14.25 (ft) TOC · TIC · BGS Time Measured: 14:30
 (C) Water Column Height (A-B) 7.65 (ft)
 (D) Well Diameter Factor 0.16 (gal/ft) (2" = 0.16, 4" = 0.65, 6" = 1.47, 8" = 2.61 GAL/FT)
 (E) One Well Volume (C * D) 1.22 (gal)
 (F) Volumes to be Evacuated 9
 (G) TOTAL VOLUME TO BE EVACUATED (E * F) 16.18 (gal)

EVACUATION METHOD

Well Evacuation Method: Bailer · Submersible Pump · Other: Micro Purge Device Number: _____

Purge Water Disposition: 1. Discharged Onsite 2. Collected And: Stored · Disposed Onsite · Offsite

Collected In: Tanks · Drums No. of Containers: _____
 Comments: _____

TIME	DEPTH TO WATER (ft)	PURGE RATE (gpm)	Field Measurements						Comments
			HNu	Spec Cond	Temp	pH	Turb		
1440	14.25			0.231	6.82	7.50	13	9.14	Initial
1443	14.45			0.225	5.85	7.63	8	8.15	
1446	14.70			0.227	5.31	7.80	1	2.33	
1449	14.95			0.226	5.25	7.86	0	5.22	End Purging

Logged By: Sharon Takey (Please Print)

Signature: [Signature]

Reviewed By: [Signature]

Date: 2/22/05

Field Sampling Report

Ravenna Army Ammunition Plant
Characterization of 14 RVAAP AOCs

Location ID: BK6 MW-010 GW
~~BG6 MW-010 GW~~
Date: 01-21-05

Sampling Information

Source	Groundwater / Product	Surface Water	Soils / Sediments / Sludge		
Method	Bailer	Sample Bottle	Scoop		Trowel
	Pump	Bacon Bomb	Bowl		Hand Auger
	MicroPurge X		Push Probe		Plastic Liner
Type/Construction			Mattocks		
Miscellaneous	Well Purging Form Yes - No				

Sample Collection: 1500 hrs. Sample Type: Composite - MI - Grab
If MI, # of increments taken: NA Location: Plotted on Map, Staked in Field
Sample Depth: 17 FT (below surface) Decon: Dedicated - Each Day - Each Location
Estimated - Measured - Surveyed

Field Parameters (at time of sample)	Analytical Parameters			Other Parameters		
PID / FID Readings: Background: <u>0.0</u> ppm	VOC	X	TPH GRO	Corrosivity		
	SVOC	X	TPH DRO	Reactivity Sulfide/Cyanide		
	Explosives	X	Chromium +6	Ignitability		
Sample: <u>0.0</u> ppm	Propellants	X	Nitrate			
Water Level: <u>14.25</u> FT	TAL Metals	X		QA Samples		
Temperature: <u>5.25</u> °C	Pesticides/PCBs	X		MS/MSD	Yes / No	NA
Sp. Conductance: <u>0.226</u> uMHOs	Cyanides			Duplicate ID		NA
pH: <u>7.86</u> units	TOC			Equipment Rinse ID		NA
Turbidity: <u>0</u> N.T.U.	Grain Size			Trip Blank ID	<u>TRIP BLANK</u>	NA

Sample Description

clear water, no sheen,
no odor, low turbidity

Split Sample

Split Sample ID: _____
Name: _____
Agency/Company: _____
Address: _____

QA/QC Provided: MS/MSD - Duplicate - Trip Blanks - Field Blanks
Parameters: Same as Above - As Listed

Soil sample description should include:

Munsell Color Odor Staining Texture Sorting Plasticity Moisture

Water sample description should include:

Color Odor Sheen Turbidity

Logged By: Shahram Taheri (Please Print)

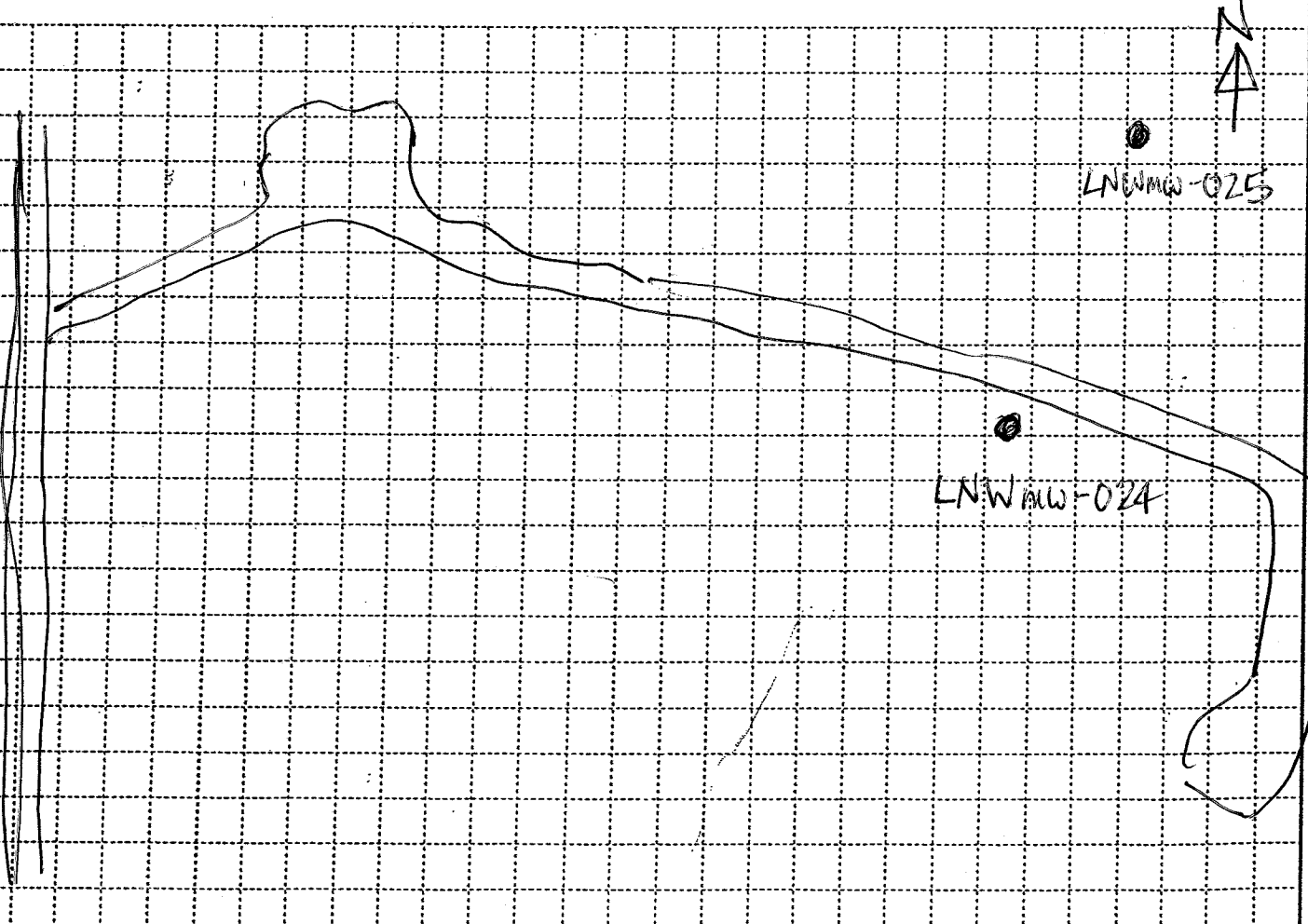
Reviewed by: ERIC EWIS (Please Print)

Signature: [Signature]

Signature: [Signature] Date: 2/1/05

HTRW DRILLING LOG		DISTRICT LOUISVILLE		HOLE NUMBER LNWMW-024	
1. COMPANY NAME MKM ENGINEERS		2. DRILL SUBCONTRACTOR HAD DRILLING		SHEET SHEETS 1 OF 3	
3. PROJECT RVAAP-R114			4. LOCATION RAVENNA, OH LANDFILL NORTH		
5. NAME OF DRILLER GREG			6. MANUFACTURER'S DESIGNATION OF DRILL CME-1060		
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT		8. HOLE LOCATION		9. SURFACE ELEVATION	
4" ID HSA		SOUTH SIDE OF ENTRANCE RD		1035.30 ASL	
1/2" X 24" SPLITSPOON		10. DATE STARTED 12/14/04		11. DATE COMPLETED 12/15/04	
12. OVERBURDEN THICKNESS 17.5'			15. DEPTH GROUNDWATER ENCOUNTERED 15' BGS		
13. DEPTH DRILLED INTO ROCK 3.5'			16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED 10.74' @ 09:17 12/22/04		
14. TOTAL DEPTH OF HOLE 24' BGS DRILLED TO 22'			17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY)		
18. GEOTECHNICAL SAMPLES		19. TOTAL NUMBER OF CORE BOXES		21. TOTAL CORE RECOVERY %	
SHELL TUBE 4'6'		NA			
20. SAMPLES FOR CHEMICAL ANALYSIS		22. DISPOSITION OF HOLE		23. SIGNATURE OF INSPECTOR	
VOC		BACKFILLED		David Ernest	
METALS		MONITORING WELL			
OTHER (SPECIFY)		OTHER (SPECIFY)			

LOCATION SKETCH/COMMENTS SCALE:



PROJECT RVAAP-R114	HOLE NO. LNWMW-024
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HTRW DRILLING LOG

(CONTINUATION SHEET)

HOLE NUMBER
LNNW-024
SHEET 2 OF 3 SHEETS

PROJECT RVAMP - RI 14

INSPECTOR DK GARNETT

ELEV. (a)	DEPTH (b)	DESCRIPTION OF MATERIALS (c)	FIELD SCREENING RESULTS (d)	GEOTECH SAMPLE OR CORE BOXING RECOVERY	ANALYTICAL SAMPLE NO. USCS	BLOW COUNT (g)	REMARKS (h)
		3" TOPSOIL, GRASS, ROOTS				2/3	MOIST
	2	BROWN SILTY (30%) CLAY (60%) TRACE SAND & GRAVEL MED PLASTIC	0	0.5	CL	4/6	10YR 5/3
	4	TRACE GREY MOTTLING SAA MED TO STIFF	0	1.7	CL	5/10 11/10	
	6	SHELBY TUBE	—	—	—	—	COLLECTED 1545
	8	SAA LOW PLASTIC STIFF TO V. STIFF	0	1.3	CL/ML	6/11 17/22	DRY
	10	SAA	0	1.9		8/10 15/17	DRY
	12	BROWN CLAYEY SILT TRACE SAND & GRAVEL LOW PLASTIC MED DENSE	0	1.8	ML	6/9 12/10	MOIST AT 9.5' 10YR 4/4 DAMP
	14	BROWN SILTY CLAY MED TO LOW PLASTIC TRACE SAND & GRAVEL SAA MEDIUM	0	1.8	CL/ML	3/4 4/6	
	16	BROWN SILTY SAND (15%) (85%) MED TO FINE GRAINED WELL SORTED MED DENSE SAA	0	1.5	SM	2/4 8/9	10YR 4/4 WET
	18	BROWN SANDY (30%) SILT (65%) TRACE CLAY, LOW PLASTIC	0	1.3	SM ML	3/5 8/7	WET TO SAT 10YR 4/3
	20	DK GREY WEATHERED FISSELE SHALE	0	1.3	SH	4/11 18/14	10YR 3/1

1530

1630
900



PROJECT RVAMP - RI 14

HOLE NO. LNNW-024

HTRW DRILLING LOG

(CONTINUATION SHEET)

HOLE NUMBER
LNWmw-024

PROJECT
RVAAP-R114

INSPECTOR
DK EARNEST

SHEET SHEETS
3 OF 3

ELEV. (a)	DEPTH (b)	DESCRIPTION OF MATERIALS (c)	FIELD SCREENING RESULTS (d)	GEOCHEMISTRY OR CORE BOX NO. RETURNS USGS	ANALYTICAL SAMPLE NO.	BLOW COUNT (g)	REMARKS (h)
	22	SAA	0	1.0		8/10 11/50+	104R 3/1
	24	SAA	0	0.5		17/50+	
	24	BOFF 24'					
	26	SAMPLED TO 24' DRILLED TO 22'					
	28	SET WELL AT 21'20' * 21' SCREEN AT 21' BGS 10-20' * 21' SAND TO 8' BGS SEAL TO 6' BGS * SAND BRIDGED & WELL WAS PULLED UP 1' TO 20'					

1000

PROJECT
RVAAP-R114

HOLE NO.
LNWmw-024

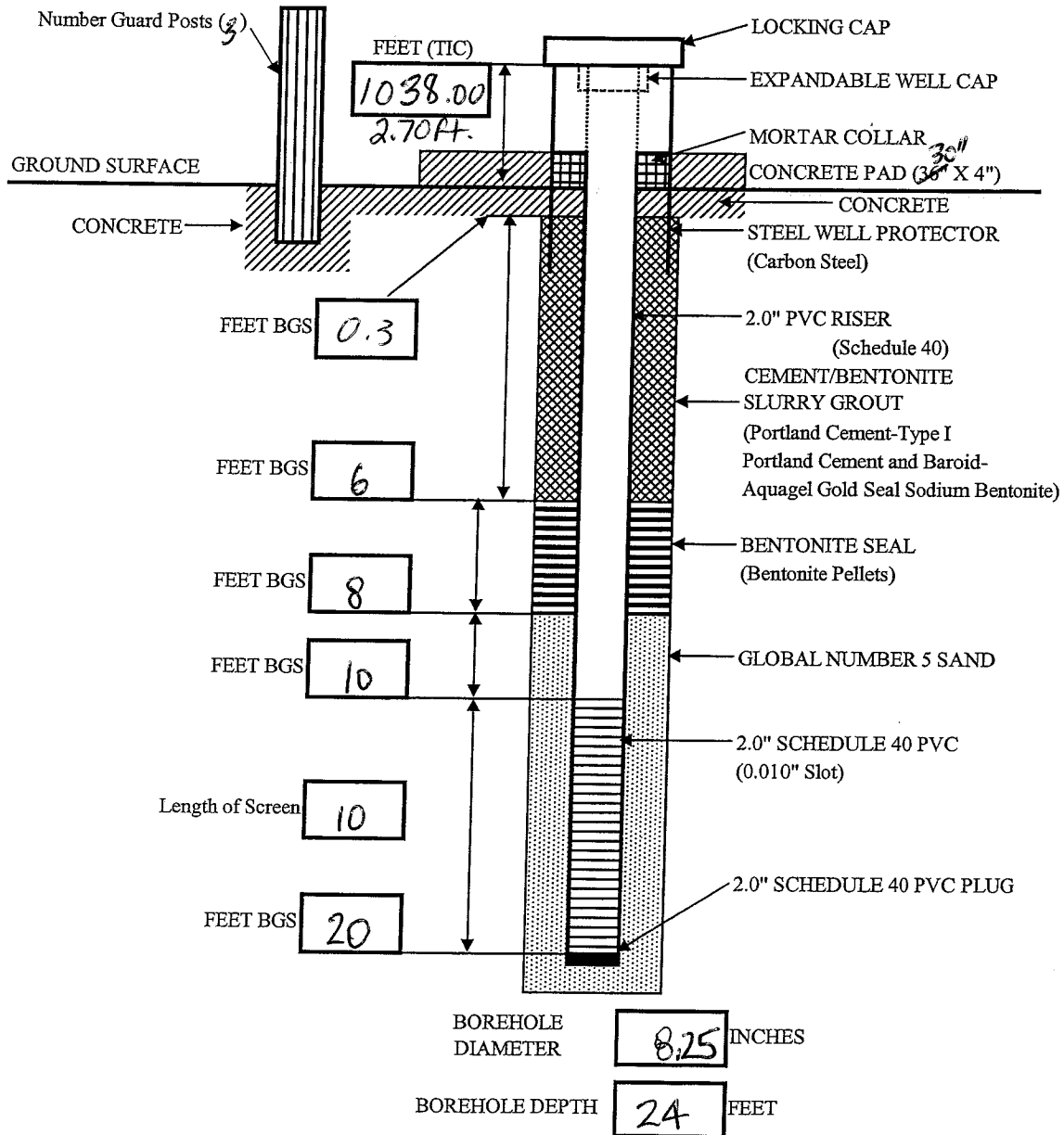


MONITORING WELL CONSTRUCTION DIAGRAM

RAVENNA ARMY AMMUNITION PLANT

Project: *RVAAP RI14*

Well Number: <i>LNWmw-024</i>	Begin: <i>12/14/04</i>	End: <i>12/15/04</i>
Coordinates: N: <i>564825.89</i> E: <i>2358403.21</i>	Elevation: <i>1035.30</i>	Reference Point:
Logged By: <i>DK EARNEST</i>		



- Notes:
- 1) Figure not drawn to scale.
 - 2) BGS = Below Ground Surface.
 - 3) Well head protected with three guard posts set in triangle configuration about the concrete pad.

Well Development Record

Well ID: LNWmw-024-GW
 Date: 12/22/04

Ravenna Army Ammunition Plant-
 RVAAP 14 AOC Characterization

Project: RVAAP

Development Method: WALK PUMP

Development Company: MRM

Comments: _____

Well TD: 20.85 FT TIC Depth to Water: 10.74 FT
 Water Column Height: 10.11 FT One Well Volume: 6 Gals

Well Volume (gallons/foot)
 2-inch = 0.16 6-inch = 1.47
 4-inch = 0.65 8-inch = 2.61

Time	Well Dev. Code	Depth to Water (ft)	Purge Rate (gpm)	Purge Volume (gal)	Field Measurements				Turbidity	Comments
					pH	CON	DO	TEMP		
0917	DSB	10.74	-	-	-	-	-	-	-	-
0924	DSE	11.7	-	-	-	-	-	-	-	-
0926	DPB	11.7	-	-	-	-	-	-	-	-
0937	DFM	18.73	-	6.0	6.98	0.626	4.8	12.1	>1000	1 well vol (6 gal)
0951	DPE	DRY	-	3.5	-	-	-	-	-	9.5 gal (DRY)
1012	DPB	15.32	-	-	-	-	-	-	-	-
1013	DFM	18.9	-	2.5	7.12	0.598	4.78	11.8	>1000	12 gal (2 nd well vol)
1014	DPE	DRY	-	-	-	-	-	-	-	12 gal (dry)
1130	DPB	15.4	-	4.0	-	-	-	-	-	-
1133	DPE	DRY	-	4.0	-	-	-	-	-	16 gal (dry)
1303	DPB	11.3	-	-	-	-	-	-	-	-
1308	DFM	19.1	-	2.0	7.15	0.589	4.69	11.1	>1000	18 gal (3 rd well vol)
1309	DPE	DRY	-	3.5	-	-	-	-	-	19.5 gal (dry)
1330	DPB	14.3	-	-	-	-	-	-	-	-
1333	DPE	DRY	-	0.5	-	-	-	-	-	20 gal (dry)
	FINAL									

WELL DEVELOPMENT CODES

DPB - Begin Pumping
 DPE - End Pumping
 DSB - Begin Surge Blocking
 DSE - End Surge Blocking
 DFM - Field Measurements
 DBB - Begin Bailing
 DBE - End Bailing
 DXB - Begin Other
 DXE - End Other
 Other: _____

FIELD MEASUREMENT CODES

MTP - Temperature
 MSC - Specific Conductance
 MPD - Photoionizer (eg. HNU)
 MFD - Flame Ionizer (eg. OVA)
 MDO - Dissolved Oxygen
 MPH - pH
 MEH - eH
 MOT - Other _____

TURBIDITY

Enter Turbidity Meter Reading
 (Final should be < 5 NTU)
 OR
 Enter Qualitative Observations

H - High: Muddy/Silty
 M - Medium: Cloudy/Translucent
 L - Low: Transparent
 N - None: Clear/No Sediment

Logged By: NILESH SHRINGARPURE (Please Print)

Reviewed By: C. Coler

Signature: N. Shringarpure

Date: 2/22/05

Well ID: LNW/mw-024-GW

Monitoring Well Purging Form

Ravenna Army Ammunition Plant
Ravenna, Ohio

Date: 01/12/05

WELL OBSERVATIONS

Protective Casing: Intact Damaged Locked: Yes No Key No:
 Concrete Base: Intact Damaged Inner Casing: 2" · 4" · 6" · 8" Other:
 Stickup Height: 2.64 (ft) TIC · TOC Difference: _____ (ft) 1.5 inch
 Vapor Readings: HNu · OVA Background: ○ Inside Well Casing: ○

Present Depth Sampled Sample ID
 LNAPL Yes · No _____ Yes · No LNW/mw-024-GW
 DNAPL Yes · No _____ Yes · No

CALCULATIONS

- (A) Depth to Well Bottom 20.85 (ft) TOC · TIC · BGS Measured · Previously Measured (circle one)
 (B) Depth to Water 10.25 (ft) TOC · TIC · BGS Time Measured: 0852
 (C) Water Column Height (A-B) 10.60 (ft)
 (D) Well Diameter Factor 0.16 (gal/ft) (2" = 0.16, 4" = 0.65, 6" = 1.47, 8" = 2.61 GAL/FT)
 (E) One Well Volume (C*D) 6 (gal)
 (F) Volumes to be Evacuated 7
 (G) TOTAL VOLUME TO BE EVACUATED (E * F) 42 (gal)

EVACUATION METHOD

Well Evacuation Method: Bailer · Submersible Pump · Other: _____ Device Number: _____

Purge Water Disposition: 1. Discharged Onsite 2. Collected And: Stored Disposed Onsite · Offsite

Collected In: Tanks Drums No. of Containers: _____

Comments: _____

TIME	DEPTH TO WATER (ft)	PURGE RATE (gpm)	Field Measurements						Comments
			HNu	Spec Cond	Temp	pH	Turb	DO	
0852	10.25		0.68		11.17	6.28	689	9.09	INITIAL READING
0855	11.15		0.674		10.31	6.30	704	6.16	
0858	11.25		0.674		10.81	6.28	653	6.16	
0901	11.25		0.672		10.83	7.14	455	6.33	MICROPURGING COMPLETED

Logged By: NILESH SHARMA GARR-26 (Please Print)

Reviewed By: C. Eddy

Signature: [Signature]

Date: 2/22/05

Location ID: LNWmw - 024 - GW

Field Sampling Report

Ravenna Army Ammunition Plant
Characterization of 14 RVAAP AOCs

Date: 01/12/05

Sampling Information

Source	Groundwater / Product	Surface Water	Soils / Sediments / Sludge	
Method	Bailer	Sample Bottle	Scoop	Trowel
	Pump	Bacon Bomb	Bowl	Hand Auger
	MICROPURGE PUMP ✓		Push Probe	Plastic Liner
Type/Construction			Mattocks	
Miscellaneous	Well Purging Form Yes - No			

Sample Collection: 0900 hrs Sample Type: Composite - MI - Grab
 If MI, # of increments taken: NA Location: Plotted on Map - Staked in Field
 Sample Depth: 15.55 FT (below surface) Decon: Dedicated - Each Day - Each Location
 Estimated - Measured - Surveyed

Field Parameters (at time of sample)	Analytical Parameters			Other Parameters		
PID / FID Readings: Background: <u>NT</u> ppm Sample: <u>NT</u> ppm	VOC	✓	TPH GRO	Corrosivity		
	SVOC	✓	TPH DRO	Reactivity Sulfide/Cyanide		
	Explosives	✓	Chromium +6	Ignitability		
Water Level	11.25 FT	TAL Metals	✓	QA Samples		
Temperature	10.83 °C	Pesticides/PCBs	✓	MS/MSD	Yes / No	NA
Sp. Conductance:	0.672 uMHOs	Cyanides		Duplicate ID		NA
pH	7.14 units	TOC		Equipment Rinse ID	<u>LNWmw-024-ER</u>	NA
Turbidity	455 N.T.U.	Grain Size		Trip Blank ID	<u>Trip Blank</u>	NA

Sample Description

HAZY COLOR

NO ODOR

NO SHEEN

SLIGHTLY TURBID

Split Sample

Split Sample ID: _____

Name: _____

Agency/Company: _____

Address: _____

QA/QC Provided: MS/MSD - Duplicate - Trip Blanks - Field Blanks

Parameters: Same as Above - As Listed

Soil sample description should include:
 Munsell Color Odor Staining Texture Sorting Plasticity Moisture

Water sample description should include:
 Color Odor Sheen Turbidity

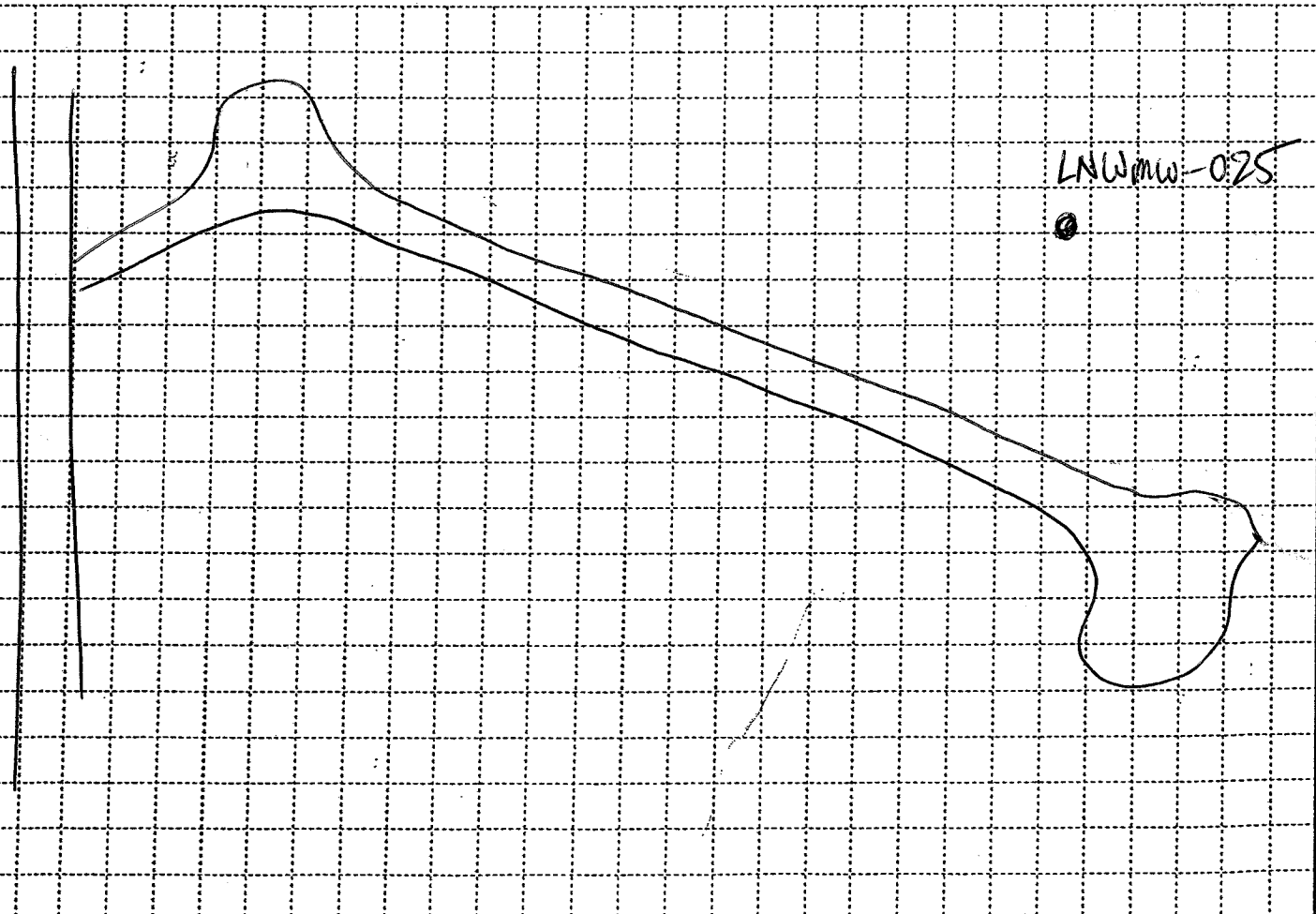
Logged By: NILESH SHRINGARPURE (Please Print) Reviewed by: EARL FUS (Please Print)

Signature: N Shringarpure Signature: Earl Fus Date: 2/1/05

HTRW DRILLING LOG		DISTRICT LOUISVILLE		HOLE NUMBER LNWmw-025	
1. COMPANY NAME MKM ENGINEERS		2. DRILL SUBCONTRACTOR HAD DRILLING		SHEET SHEETS 1 OF 2	
3. PROJECT RVAAP-R114			4. LOCATION RAVENNA, OH LAND FILL NORTH		
5. NAME OF DRILLER GREG			6. MANUFACTURER'S DESIGNATION OF DRILL CME-LC60		
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT 4 1/4" ID HSA		8. HOLE LOCATION NORTH OF ENTRANCE ROAD			
1 1/2" x 24" SPLIT SPOON		9. SURFACE ELEVATION 1027.20 ASL			
		10. DATE STARTED 12/15/04		11. DATE COMPLETED 12/15/04	
12. OVERBURDEN THICKNESS 12'		15. DEPTH GROUNDWATER ENCOUNTERED ~10' BGS			
13. DEPTH DRILLED INTO ROCK 7'		16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED 3.1 @ 1415 12/22/04			
14. TOTAL DEPTH OF HOLE 19'		17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY)			
18. GEOTECHNICAL SAMPLES 2-4' SHELBY TUBE 4 to BGS		DISTURBED —	UNDISTURBED X	19. TOTAL NUMBER OF CORE BOXES	
20. SAMPLES FOR CHEMICAL ANALYSIS		VOC —	METALS —	OTHER (SPECIFY) —	OTHER (SPECIFY) —
22. DISPOSITION OF HOLE —		BACKFILLED —	MONITORING WELL X	OTHER (SPECIFY) —	21. TOTAL CORE RECOVERY %
				23. SIGNATURE OF INSPECTOR Dorothy Earnest	

LOCATION SKETCH/COMMENTS

SCALE:



PROJECT **RVAAP-R114**

HOLE NO. **LNWmw-025**

HTRW DRILLING LOG

(CONTINUATION SHEET)

HOLE NUMBER
 1NW1W-025
 SHEET SHEETS
 2 OF 2

PROJECT **RVAAP - R114**

INSPECTOR **DK EARNEST**

1300

ELEV. (a)	DEPTH (b)	DESCRIPTION OF MATERIALS (c)	FIELD SCREENING RESULTS (d)	RECOVERY (e)	USCS (f)	BLOW COUNT (g)	REMARKS (h)
		3" TOPSOIL, ROOTS, GRASS					
	2	BROWN CLAY (20%) SILT (75%) SOME GRAY MOTTLING LOW TO MED PLASTIC MED DENSE TRACE SAND (5%)	0	1.8	ML	DUST	MOIST TO DAMP 10YR 5/4
	4	SHELBY TUBE	—	—	—	—	COLLECTED 1320
	6	SAA	0	1.8	ML	4/6 8/8	MOIST
	8	SAA	0	2.0	ML	5/6 10/11	MOIST
	10	BROWN V. FINE SANDY (40%) SILT (60%) LOW PLASTIC TRACE CLAY MED DENSE	0	1.8	ML	6/6 8/7	SAT AT 9.5
	12		0	1.5	ML	1/6 10/14	10YR 4/2 SAT
	14	DK GRAY WEATHERED SHALE FISSE (SOFT)	0	1.5	SH	20/38 34/48	10YR 3/1
	16	SAA	0	1.5	SH	5/25 36/50+	
	18	SAA	0	1.0	SH	25/50+	
	20	BOH 14' SAMPLED TO 18' DRILLED TO 19' SET SCREEN AT 8-18' BGS SAND TO 6', SEAL TO 4', SEVEN BAGS SAND, NO WATER ADDED					WILL CUT 2' FROM CASING

PROJECT **RVAAP - R114**

HOLE NO. **1NW1W-025**

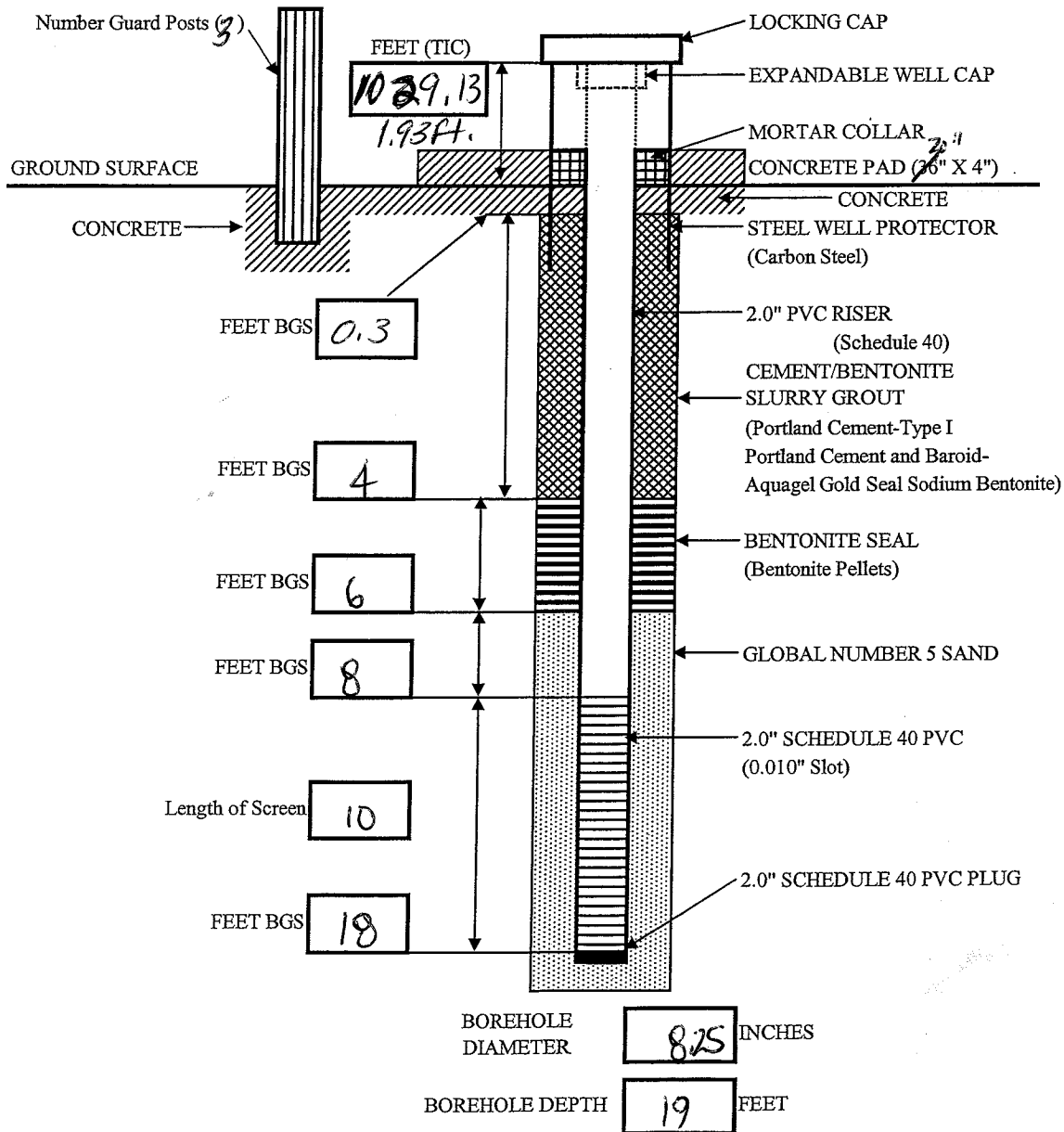


MONITORING WELL CONSTRUCTION DIAGRAM

RAVENNA ARMY AMMUNITION PLANT

Project: *AVAAP RI 14*

Well Number: <i>LNWmw-025DK</i>	Begin: <i>12/15/04</i>	End: <i>12/15/04</i>
Coordinates: N: <i>565071.92</i> E: <i>2358417.06</i>	Elevation: <i>1027.20</i>	Reference Point:
Logged By: <i>DK BARNES</i>		



Notes:

- 1) Figure not drawn to scale.
- 2) BGS = Below Ground Surface.

- 3) Well head protected with three guard posts set in triangle configuration about the concrete pad.

