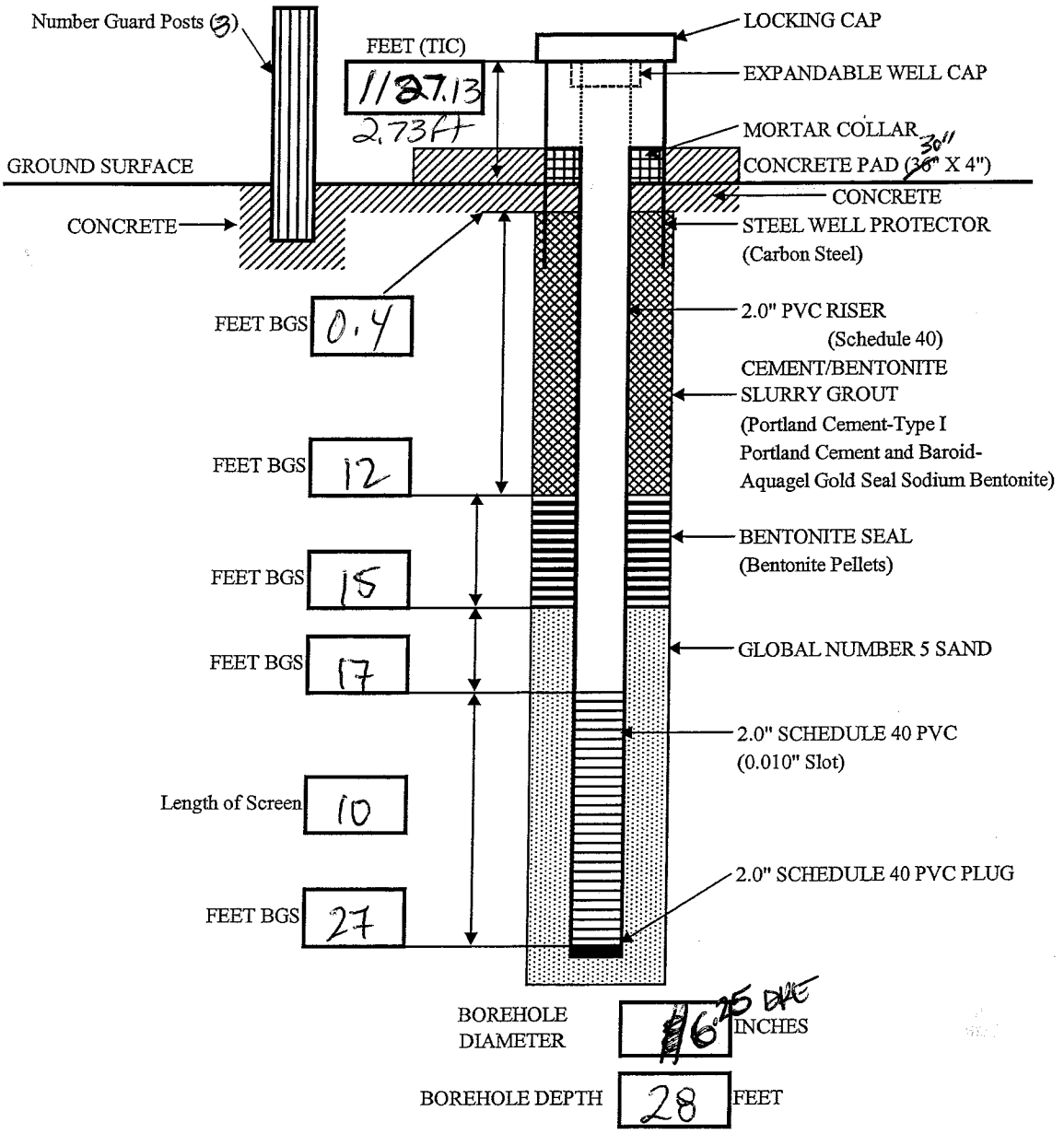
MONITORING WELL CONSTRUCTION DIAGRAM

RAVENNA ARMY AMMUNITION PLANT

Project: RVAAP RI14

Well Number: L10mw-002	Begin: 12/20/04	End: 12/21/04
Coordinates: N: 555523.36 E: 2355710.51	Elevation: 1124.40	Reference Point:
Logged By: DK HARVEST		



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.

(B) L10

Well Development Record

Well ID: ~~LL0mw~~ - 002 - mw
Date: 1/3/5

Ravenna Army Ammunition Plant-
RVAAP 14 AOC Characterization

Project: RVAAP
Development Company: MKM

Development Method: WHALE PUMPING
Comments:

Well TD: 29.64 FT TIC Depth to Water: 14.55 FT
Water Column Height: 15.09 FT One Well Volume: 9 Gals

Well Volume (gallons/foot): 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		
0915	DSB	14.55								
0920	DSE	14.50								
0921	DPB	14.50								
0928	DFM	14.85		9	6.10	0.262	4.24	12.6	892	1st well vol (9gal)
0935	DFM	14.91		9	6.12	0.239	5.32	12.2	293	2nd well vol (18gal)
0946	DFM	15.03		9	6.06	0.234	5.21	12.1	46	3rd well vol (27gal)
0950	DFM	15.22		9	6.07	0.234	5.22	12.1	0	4th well vol (36gal)
0955	DFM	15.34		9	6.10	0.234	5.20	12.0	0	5th well vol (45gal)
0958	DFM	15.49		9	5.95	0.234	5.21	12.0	0	6th well vol (54gal)
1006	DFM	15.56		9	6.02	0.233	5.19	12.0	0	7th well vol (63gal)
1011	DFM	15.70		9	6.02	0.234	5.20	12.0	0	8th well vol (72gal)
										Development complete
	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 Qualattaive Observations

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

Logged By: NILESH SHRINGARPURE (Please Print)
Signature: NShringarpure

Reviewed By: C. Esler
Date: 2/20/05

Monitoring Well Purging Form

Well ID: L10 ~~LLIO~~MW-0026W

Date: 01/10/05

Ravenna Army Ammunition Plant
Ravenna, Ohio

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:** 0.3 (ft)

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

	Present	Depth	Sampled Sample ID
LNAPL	Yes · No _____	Yes · No	
DNAPL	Yes · No _____	Yes · No	LL10MW-0026W

CALCULATIONS

(A) **Depth to Well Bottom** 29.6 (ft) (TOC) · TIC · BGS (Measured) · Previously Measured (circle one)

(B) **Depth to Water** 13.1 (ft) (TOC) · TIC · BGS **Time Measured:** 0859

(C) **Water Column Height (A-B)** 16.5 (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)** 2.64 (gal)

(F) **Volumes to be Evacuated** 5

(G) TOTAL VOLUME TO BE EVACUATED (E * F) 13.2 (gal)

EVACUATION METHOD

Well Evacuation Method: Bailer · Submersible Pump · (Other: Micro purging) _____ **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	
0900	13.1	—		0.243	10.37	7.28	0	4.44	
0903	13.2	—		0.239	10.52	6.71	0	3.18	
0906	13.22	—		0.238	10.50	6.65	0	2.85	
0909	13.23	—		0.235	10.48	6.62	0	2.71	

Logged By: Vijay Alluri (Please Print) Reviewed By: C. Eden

Signature: Vijay Date: 2/22/05

Field Sampling Report

Location ID: CRP LIO MW - 002 GW

Date: 01/10/05

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		Plastic Liner	
Type/Construction					Mattocks			
Miscellaneous	Well Purging Form (Yes) - No							

Sample Collection: 0920 hrs

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

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

Sample Depth: 20 FT (below surface)

Decon: Dedicated - Each Day - (Each Location)

Field Parameters
(at time of sample)

PID / FID Readings:		
Background:	0.0	ppm
DO	2.71	
Sample:	0.0	ppm
Water Level	13.1	FT
Temperature	10.48	°C
Sp. Conductance:	0.238	uMHOs
pH	6.47	units
Turbidity	0.0	N.T.U.

Analytical Parameters

VOC	X	TPH GRO	X
SVOC	X	TPH DRO	X
Explosives	X	Chromium +6	
Propellants		Nitrate	
TAL Metals	X		
Pesticides/PCBs	X		
Cyanides	X		
TOC			
Grain Size			

Other Parameters

Corrosivity	
Reactivity Sulfide/Cyanide	
Ignitability	

QA Samples

MS/MSD	Yes / No	NA
Duplicate ID		NA
Equipment Rinse ID		NA
(Trip Blank ID)	Trip Blank	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: ~~SA~~ Vijay Alluri (Please Print)

Signature: vijay

Reviewed by: ERIC ELLIS (Please Print)

Signature: ECS Date: 2/4/05

HTRW DRILLING LOG

	DISTRICT: Louisville	HOLE NUMBER: L10mw003
1. COMPANY NAME: MK&M Engineers Inc	2. DRILL SUBCONTRACTOR: H&D Drilling Contractors	SHEET 1 OF 3 SHEETS
3. PROJECT: RVAAP RI 14	4. LOCATION: Load Line 10	
5. NAME OF DRILLER: Sam Holler	6. MANUFACTURER'S DESIGNATION OF DRILL: CME LC-60	
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: 2" Split Spoons; 6.25 ID HSA; 2" Core Barrel; 6.25 OD Air Rotary Hammer	8. HOLE LOCATION: ADJACENT TO BLDG PE-3	
	9. SURFACE ELEVATION: 1127.40 ASL	
	10. DATE STARTED: 07 Jan 05	11. DATE COMPLETED: 07 Jan 05
12. OVERBURDEN THICKNESS: 12.5	15. DEPTH GROUNDWATER ENCOUNTERED: ~18.5	
13. DEPTH DRILLED INTO ROCK: 14	16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED: 16.19 @ 0850 01/10/05	
14. TOTAL DEPTH OF HOLE: 26.4	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY)	

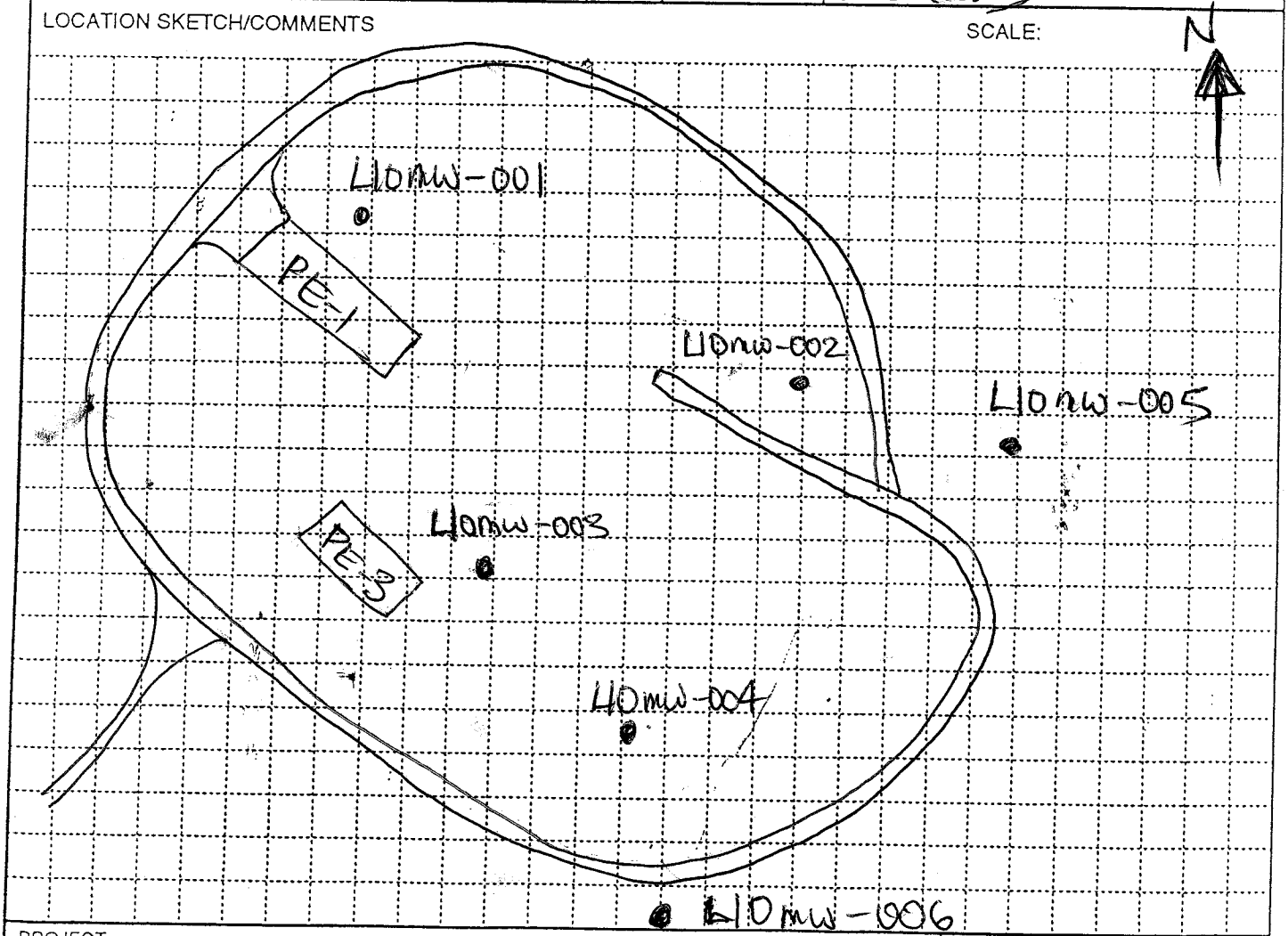
18. GEOTECHNICAL SAMPLES	DISTRICT	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
NONE	—	—	1

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE RECOVERY
	—	—	—	—	—	82%

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
	—	X	—	

LOCATION SKETCH/COMMENTS

SCALE:



PROJECT	HOLE NO.
RVAAP RI 14	L10mw-003

ENG FORM 5056-R, AUG 94

(Proponent: CECW-EG)

HTRW DRILLING LOG (CONTINUATION SHEET)

HOLE NUMBER: L10MW-003

PROJECT: RVAAP RI 14

INSPECTOR: Mark Dinder

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)
0930	0	6" Gravel from road Red/Br SAND 75% w/silt Dry Road Base No Odor No Staining No Plasticity SS Rock Frag Present	0.0	1.5	SM	1-11 8-6	5yr 5/8
	2	Br. SILT 65% w/ Clay Damp No Odor No Staining No Plasticity Grey Mottling Pres.	0.0	1.7	SM ML	3-2 4-7	7.5y-5/4
	4	Br. SILT 75% w Sand and fine Gravel No Odor No Plasticity No Staining	0.0	1.7	ML	1-5 7-13	SAA
	6	Becomes very shaly @ 5.5					
		2" Slit Stone Rock Frag. Grey	0.0	1.6	ML	2-12 8-12	7.5y-7/1 7.5yr 5/4
	8	Br. SILT 70% w/ Sand and Fine Gravel No Odor No Staining No Plasticity					
		SAA	0.0	1.6	ML	3-7 8-8	SAA
	10						
		SAA	0.0	1.5	ML	2-3 3-4	SAA
	12	Weathered SS Bedrock: Tan/LtBr SAND 85% Dry No Odor No Staining No Plasticity		0.6		6 50/3	7.5y-6/6
		Split Spoon Refusal @ 12.5 Weathered SS Bedrock					
0920	14	Top of Core #1 @ 14.3					
		2" Grey SS w/ horizontal bedding planes Pink/Grey SandStone w/ horizontal to 30° Bedding Planes Fine Grained	5y-7/1 7.5y-7/4				Recovery: 60/82.8 = 72% RQD: 9.6/60 = 16%
	16	Changes to Br @ 16.4					7.5y-6/4
		Iron Staining Present @ 17.4 and continues to bottom of Core					
	18						
▽							
	20						

PROJECT: RVAAP RI 14

HOLE NO.: L10MW-003

ENG FORM 5056A-R, AUG 94

(Proponent: CECW-EG)

HTRW DRILLING LOG (CONTINUATION SHEET)

HOLE NUMBER: LAPmw-003

PROJECT: RVAAP RI 14

INSPECTOR: Mark Dunlay

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)
0950		Top of Core # 2 @ 21.2					
		SAA					Recovery = $\frac{34}{55.2}$ = 97%
	22	Grey Fine Grained Sandstone Horizontal to 35° Bedding Planes Black Striations Present Throughout					RQD = $\frac{13.2}{54}$ = 24%
	24	Water Present btw Cores					
		Bottom of Core # 2 @ 25.8					
	26	Bot 26.4					Bot 26.4 Sand to 26 Screen from 26 to 16 Sand to 13 Bentonite to 10 Grout to Surface Stick-up well Completion 5 gallons of water used to hydrate Bentonite
	28						
	30						

PROJECT: RVAAP RI 14

HOLE NO.: LAPmw-003

ENG FORM 5056A-R, AUG 94

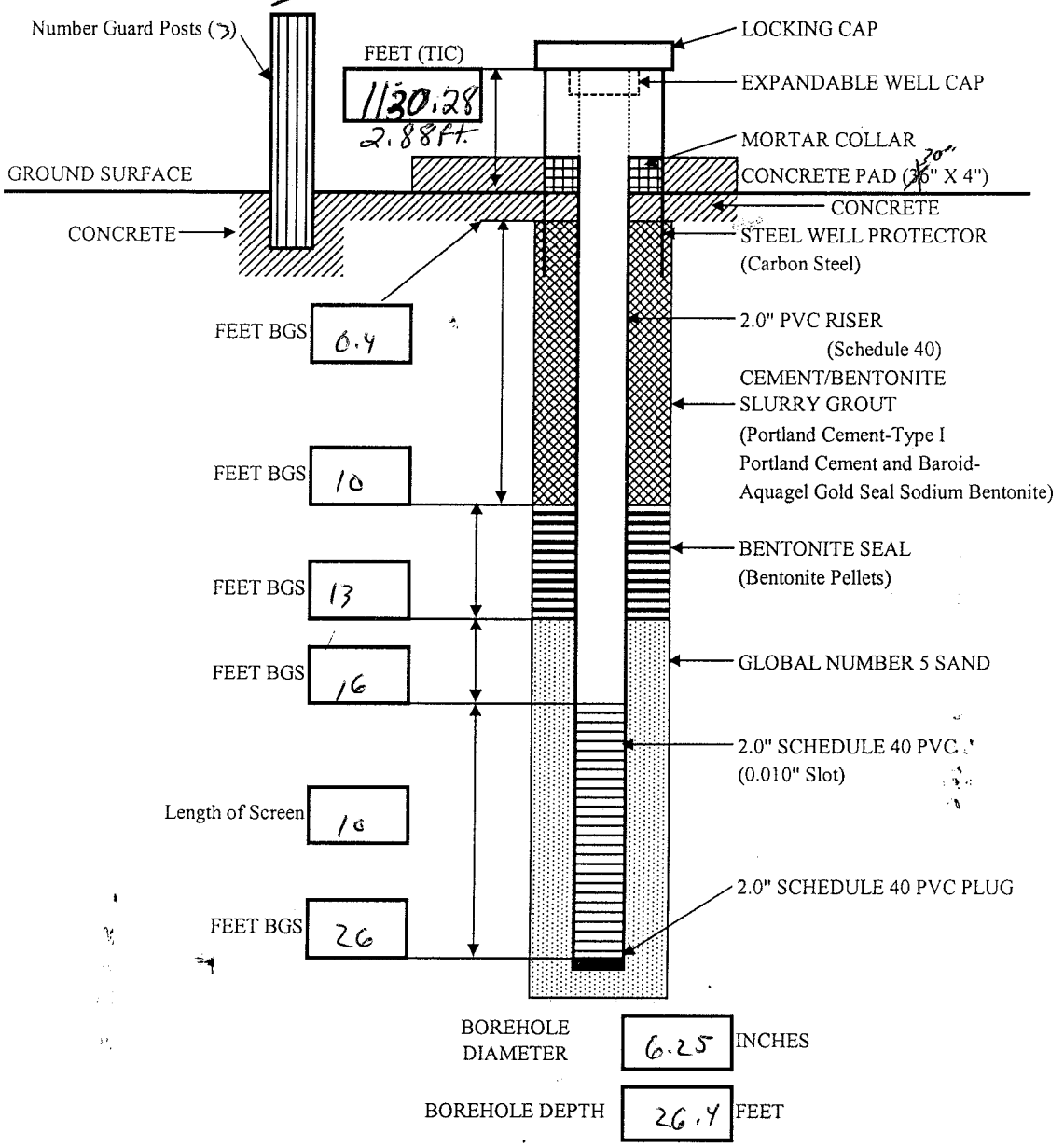
(Proponent: CECW-EG)

MONITORING WELL CONSTRUCTION DIAGRAM

RAVENNA ARMY AMMUNITION PLANT

Project: RVAAP RI/4

Well Number: L10MW-003	Begin: 07Jan05	End: 07Jan05
Coordinates: N: 555494.71 E: 2355389.92	Elevation: 1127.40	Reference Point:
Logged By:		



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: L10mw-003
Date: 01/10/05

Ravenna Army Ammunition Plant-
RVAAP 14 AOC Characterization

Project: RVAAP - RI 14
Development Company: MKM ENGINEER

Development Method: PURGE PUMP
Comments:

Well TD: 28A FT TIC
Water Column Height: 13.21 FT
Depth to Water: 16.19 FT
One Well Volume: 7.67 (8) Gals

Well Volume (gallons/foot): 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	COND	DO	TEMP		
850	DSB									
900	DSE									
910	DPB									
918	DFM	—	—	8.0	8.11	.284	6.20	10.10	999	H
926	DPE	—	—	11.0	—	—	—	—	—	
934	DPB	—	—	—	—	—	—	—		
939	DPE	—	—	15.0	—	—	—	—		
950	DPB	—	—	—	—	—	—	—		
953	DFM	—	—	16.00	8.22	.289	7.37	10.7	999	H
958	DPE	—	—	22.5	—	—	—	—		
1008	DPB	—	—	~~24~~	—	—	—	—		
1010	DFM	—	—	24.0	7.82	.287	7.42	10.7	224	M
1014	DPE	—	—	28.0	—	—	—	—		
1020	DPB	—	—		—	—	—	—		
1026	DPE	—	—	32.0	—	—	—	—		
	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 - Photolonizer (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 Qualattaive Observations

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

Logged By: DAVID K. GARNEST (Please Print)
Signature: David K Garnest

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

Well Development Record

Well ID: L10MW-003
Date: 01/10/05

Ravenna Army Ammunition Plant-
RVAAP 14 AOC Characterization

Project: RVAAP - RI14
Development Company: MKM ENGINEERS

Development Method: PURGE PUMP
Comments:

Well TD: 28.4 FT TIC Depth to Water: 16.19 FT
Water Column Height: 13.21 FT One Well Volume: 7.67 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		
1035	DPB									
1036	DFM			-	8.09	.292	7.90	10.5	528	M
1038	DPE			36	-	-	-	-	-	
1050	DPB			-	-	-	-	-	-	
1053	DFM			40	7.72	.281	7.85	10.7	357	M
1055	DPE			41	-	-	-	-	-	
1105	DPB			-	-	-	-	-	-	
1100	DPE			46	-	-	-	-	-	
1120	DPB			-	-	-	-	-	-	
1123	DFM			48	7.83	.293	7.50	10.5	10	L
1125	DPE			51	-	-	-	-	-	
1140	DPB			-	-	-	-	-	-	
1144	DFM			56	-	-	-	-	-	
1148	DPE			-	-	-	-	-	-	7 VOL
										DEVELOPMENT
	FINAL									COMPLETE

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 - Photolonizer (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 Qualattaive Observations

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

Logged By: DAVID K. LARMEST (Please Print)
Signature: David K. Larmest

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

Monitoring Well Purging Form

Well ID: L10mw-003GW

Date: 17 Jun 05

Ravenna Army Ammunition Plant
Ravenna, Ohio

WELL OBSERVATIONS

Protective Casing: Intact · Damaged **Locked:** Yes · No **Key No:**
Concrete Base: Intact · Damaged **Inner Casing:** 2" · 4" · 6" · 8" **Other:**
Stickup Height: 2.90 (ft) **TIC · TOC Difference:** 0.33 (ft)
Vapor Readings : HNu · OVA **Background:** _____ Inside Well Casing:

	Present	Depth	Sampled Sample ID
LNAPL	Yes · No	_____ Yes · No	L10MW-003-GW
DNAPL	Yes · No	_____ Yes · No	

CALCULATIONS

(A) **Depth to Well Bottom** 28.45 (ft) TOC · TIC · BGS **Measured · Previously Measured (circle one)**
(B) **Depth to Water** 15.85 (ft) TOC · TIC · BGS **Time Measured:** 1115
(C) **Water Column Height (A-B)** 12.60 (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)** 2.02 (gal)
(F) **Volumes to be Evacuated** 5
(G) **TOTAL VOLUME TO BE EVACUATED (E * F)** 10.08 (gal)

EVACUATION METHOD

Well Evacuation Method: Bailer · Submersible Pump · Other: Monpurge **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	
1129	15.85	Initial		0.489	7.78	6.84	94	9.02	
1132	16.00			0.478	9.15	7.13	102	6.93	
1135	15.98			0.491	9.32	7.24	97	6.63	
1138	16.00			0.492	9.43	7.31	81	6.88	

Logged By: Mark Dunlay (Please Print) Reviewed By: C. Esler

Signature: MDunlay Date: 2/22/05

Field Sampling Report

Location ID: L10mw-003-dW

Date: 17 Jan 05

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	
	Micropurge	X			Push Probe		Plastic Liner	
Type/Construction					Mattocks			
Miscellaneous	Well Purging Form Yes - No							

Sample Collection: 1145 hrs

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

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

Sample Depth: ~2 FT (below surface)

Decon: Dedicated - Each Day - (Each Location)

Field Parameters (at time of sample)

PID / FID Readings: Background:	0.0	ppm
Sample:	0.0	ppm
Water Level	16.06	FT
Temperature	9.43	°C
Sp. Conductance:	0.492	uMHOs
pH	7.31	units
Turbidity	81	N.T.U.

Analytical Parameters

VOC	X	TPH GRO	X
SVOC	X	TPH DRO	X
Explosives	X	Chromium +6	
Propellants	X	Nitrate	
TAL Metals	X		
Pesticides/PCBs	X		
Cyanides	X		
TOC			
Grain Size			

Other Parameters

Corrosivity			
Reactivity Sulfide/Cyanide			
Ignitability			

QA Samples

MS/MSD	Yes / No	NA
Duplicate ID		NA
Equipment Rinse ID		NA
(Trip Blank ID)	Trip Blank	NA

Sample Description

Clear No Odor No Sheen Low Turb.

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 Dunlay (Please Print)

Signature: [signature]

Reviewed by: ERIC EWIS (Please Print)

Signature: [signature] Date: 2/4/05

HTRW DRILLING LOG

	DISTRICT: Louisville	HOLE NUMBER: L10MW-004
1. COMPANY NAME: MKM Engineers Inc.	2. DRILL SUBCONTRACTOR: HAD Drilling Contractors	SHEET 1 OF 3 SHEETS
3. PROJECT: RVAAP RE 14	4. LOCATION: Load Line 10	
5. NAME OF DRILLER: Sam Holler	6. MANUFACTURER'S DESIGNATION OF DRILL: CME LC-60	
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: 2" Split Spoons; 6.25 ID HSA; 3" Shelby Tube; 2" Core Barrel; 6.25 OD Air Rotary Hammer	8. HOLE LOCATION: South of PE-9	
	9. SURFACE ELEVATION: 1119.60 ASL	
	10. DATE STARTED: 05 JAN 05	11. DATE COMPLETED: 07 JAN 05
12. OVERBURDEN THICKNESS: 18 ft	15. DEPTH GROUNDWATER ENCOUNTERED: ~24 ft	
13. DEPTH DRILLED INTO ROCK: 13.5	16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED: 8.85' @ 1440 01/11/05	
14. TOTAL DEPTH OF HOLE: 31.5	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY)	

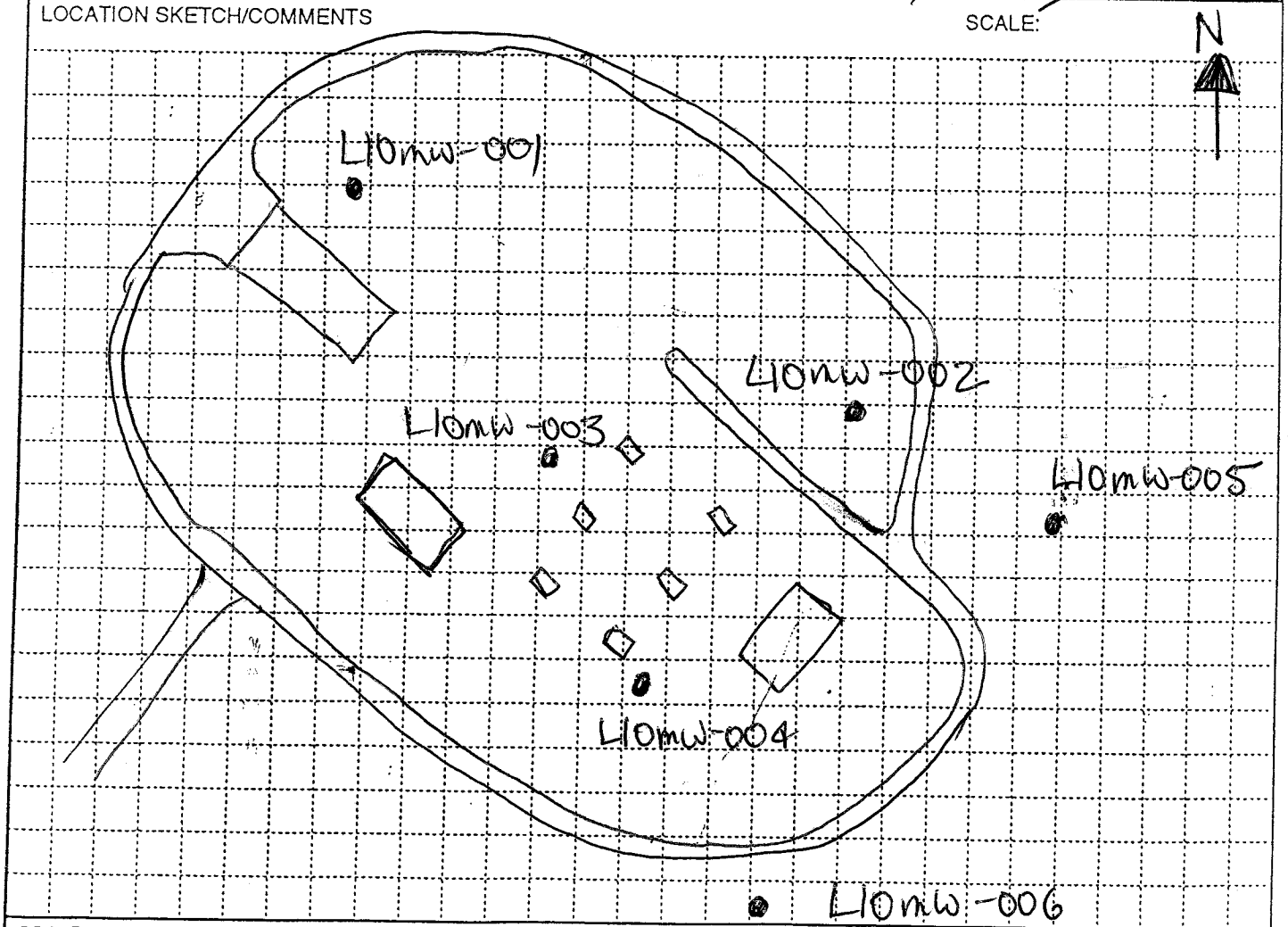
18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
SHELBY TUBE 8'-10'	~	X	1

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE RECOVERY
	~	~	~	~	~	88 %

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
	~	X	~	M. Daly

LOCATION SKETCH/COMMENTS

SCALE:



PROJECT	HOLE NO.
RVAAP RI 14	L10mw-004

ENG FORM 5056-R, AUG 94

(Proponent: CECW-EG)

HTRW DRILLING LOG (CONTINUATION SHEET)

HOLE NUMBER: L10MW-004

PROJECT: RVAAP RI 14

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. Recovery	ANALYTICAL SAMPLE NO. (f)	BLOW COUNT (g)	REMARKS (h)
		6" Topsoil Dk. Br. SILT 70% w/ Sand + Clay Damp No Odor No Staining No Plasticity	0.0	1.7	ML	Push-1 2-3	7.5yr 4/4
	2	Changes to Grey @ 2.1	0.0	1.6	ML	1-2 1-4	
	4	Red Br SAND 70% w/ Silt Dry No Odor No Plasticity No Staining			SM		
		Br. SILT 65% w/ Sand + Gravel Dry No Odor No Staining No Plasticity Gravel Stops @ 5.5	0.0	1.9	ML	1-5 7-8	7.5yr 5/6
	6	SAA	0.0	2.0	ML	1-4 7-8	
	8	1245 05 Jan 05 Shelby Tube					
	10	Br. SILT 70% w Sand Damp No Odor No Staining No Plasticity Rock Frag Present	0.0	1.8	ML	1-2 5-7	7.5yr 5/6
	12	SAA	0.0	2.0	ML	2-18 21-31	SAA
	14	SAA	0.0	1.6	ML	10-15 25-25	SAA
	16	SAA	0.0	1.1	ML	5-18 18-21	SAA
	18	Weathered SS Fragments w Sand Split Spoon Refusal @ 18.1					
CMS		Top of Core #1 @ 19.2 ft					
	20	Description on next page					

PROJECT: RVAAP RI 14

HOLE NO. L10MW-004

HTRW DRILLING LOG (CONTINUATION SHEET)

HOLE NUMBER: L10mw004

PROJECT: RVAAP RI 14

INSPECTOR: Mark Dunlevy

SHEET 3 OF 3 SHEETS

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	Red/Br. Highly weathered Sandstone (from 19.2) Fine Grained w/ horizontal bedding Planes					Recovery = 120/135.6 = 88% RQD = 64.8/120 = 54% 7.5y-6/6
	22	Grey Competent Sandstone (Grey-Brown) Fine Grained w/ horizontal to 15-20° Bedding Planes					7.5y-6/3
▽	24	Lt. Grey Fine Grained Sandstone layer w/ water present btw cores @ 24					7.5y-7/1
		Br./Grey Sand stone Fine Grained horizontal Bedding Planes					7.5yr 6/3
	26	Grey Fine Grained Sandstone w/ horizontal to 45° Bedding Planes					7.5yr 6/2
▽		Water Present between cores Lt. Grey Fine Grained Sandstone					7.5y-7/1
	28	Grey/Br. Highly Competent Sand Stone w/ Horizontal to 20° Bedding Planes					7.5y-6/1
	30	Bottom of Core #1 @ 30.5'					
		BOH @ 31.2					BOH @ 31.2 Sand to 31 Screen from 31 to 21 Sand up to 19 Bentonite to 16 Grout to Surface Stick-up well completion
	32						
	34						
	36						

PROJECT: RVAAP RI 14

HOLE NO.: L10mw-004

ENG FORM 5056A-R, AUG 94

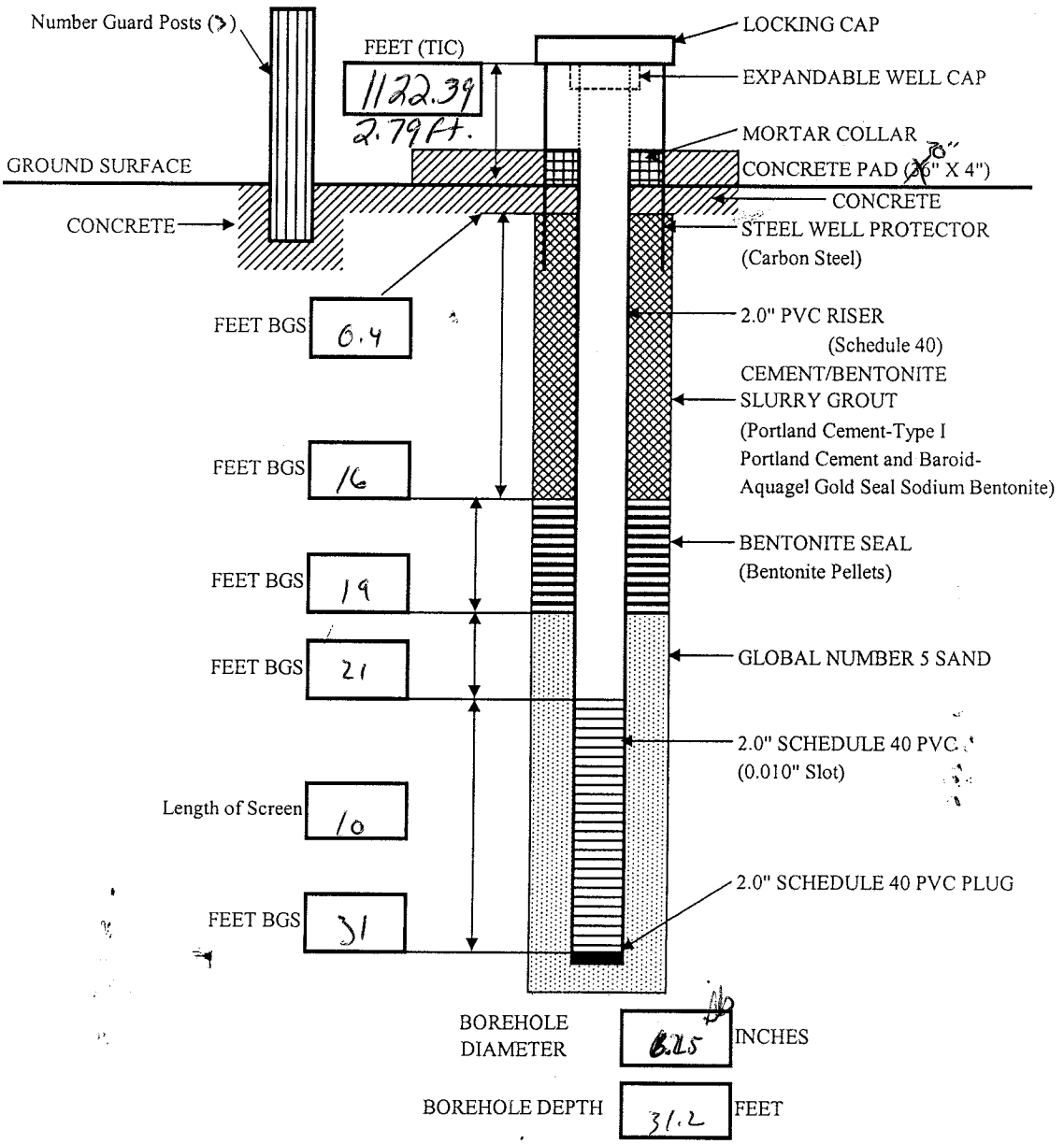
(Proponent: CECW-EG)

MONITORING WELL CONSTRUCTION DIAGRAM

RAVENNA ARMY AMMUNITION PLANT

Project: RVAAP RI 14

Well Number: L10 mw-004	Begin: 05Jan05	End: 07Jan05
Coordinates: N: 555236.59 E: 2355438.20	Elevation: 1119.60	Reference Point:
Logged By: MD Daly		



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: LIDMW-004
Date: 01/11/05

Ravenna Army Ammunition Plant-
RVAAP 14 AOC Characterization

Project: RVAAP
Development Company: MKM ENGINEERS

Development Method: WATERLE PUMP
Comments:

Well TD: 32.4 FT TIC Depth to Water: 8.85 FT ~14
Water Column Height: 23.55 FT One Well Volume: 13.9 Gals

Well Volume (gallons/foot): 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	COND	DO	TEMP		
1440	DSB									
1455	DSE									
1510	DPB									
1520	DFM			14	7.53	.312	4.21	10.8	999	1ST VOL
1530	DFM			14	7.51	.307	3.92	10.0	642	2ND VOL
1545	DFM			14	7.26	.290	3.75	10.0	999	3RD VOL
1555	DFM			14	7.34	.294	3.78	9.9	61	4TH VOL
1605	DFM			14	7.34	.304	3.56	9.8	999	5TH VOL
1620	DFM			14	7.34	.292	4.51	9.8	999	6TH VOL
1630	DFM			14	7.42	.295	4.49	9.8	10	7TH VOL
1635	DPE									
										DEVELOPMENT
										COMPLETE
	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 - Photolonizer (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 Qualattaive Observations

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

Logged By: DAVID K. EARNEST (Please Print)
Signature: David K. Earnest

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

Monitoring Well Purging Form

Well ID: ~~B12mw-012GW~~ ~~LL10mw-004 GW~~ L10 OB mw-004 GW (initialed JK)

Date: 01/19/05

Ravenna Army Ammunition Plant
Ravenna, Ohio

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:** 0.24 (ft)
Vapor Readings : HNu · OVA Background: ________ Inside Well Casing:

	Present		Depth	Sampled Sample ID
LNAPL	Yes · (No)	______	Yes · No	~~LL10mw-004GW~~ L10 mw-004GW (initialed SB)
DNAPL	Yes · (No)	______	Yes · No	

CALCULATIONS

(A)	Depth to Well Bottom	33.35 (ft) (TOC) · TIC · BGS	(Measured) · Previously Measured (circle one)
(B)	Depth to Water	9.55 (ft) (TOC) · TIC · BGS	Time Measured: 1058
(C)	Water Column Height (A-B)	23.8 (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)	3.81 (gal)	
(F)	Volumes to be Evacuated	5	
(G)	**TOTAL VOLUME TO BE EVACUATED (E * F)**	19.04 (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: HNu	Spec Cond	Temp	pH	Turb	DO	Comments
1100	9.55			0.439	7.58	7.92	25	12.29	Initial reading
1103	9.63			0.060	8.73	7.32	20	9.05	
1106	9.77			0.459	8.14	7.43	18	6.94	
1109	9.89			0.425	8.26	7.68	16	6.93	
1112	9.92			0.463	8.54	7.72	10	6.54	
1115	10.00			0.521	8.69	7.74	10	6.24	End purging

Logged By: Vijay Alluri (Please Print) Reviewed By: C. Koller

Signature: Vijay Date: 2/22/05

Field Sampling Report

Location ID: 10mw-004GW

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		Trowel	
	Pump		Bacon Bomb		Bowl		Hand Auger	
	Micro purge X				Push Probe		Plastic Liner	
Type/Construction					Mattocks			
Miscellaneous	Well Purging Form: Yes - No							

Sample Collection: 1115 hrs

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

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

Sample Depth: 20 FT (below surface)

Decon: Dedicated - Each Day - ~~Each Location~~

Field Parameters
(at time of sample)

PID / FID Readings:		
Background:	NT	ppm
Sample:	NT	ppm
Water Level	9.55	FT
Temperature	8.69	°C
Sp. Conductance:	0.521	uMHOs
pH	7.74	units
Turbidity	10	N.T.U.

Analytical Parameters

VOC	X	TPH GRO	X
SVOC	X	TPH DRO	X
Explosives	X	Chromium +6	
Propellants		Nitrate	
TAL Metals	X		
Pesticides/PCBs	X		
Cyanides	X		
TOC			
Grain Size			

Other Parameters

Corrosivity		
Reactivity Sulfide/Cyanide		
Ignitability		

QA Samples

MS/MSD	Yes / No	NA
Duplicate ID		NA
Equipment Rinse ID		NA
~~Trip Blank ID~~	Trip Blank	NA

Sample Description

No color, 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: Vijay Alluri (Please Print)

Signature: Vijay

Reviewed by: ERIC ELLIS (Please Print)

Signature: [signature] Date: 2/4/05

HTRW DRILLING LOG

	DISTRICT: Louisville	HOLE NUMBER: L10mw-005
1. COMPANY NAME: MKM Engineers	2. DRILL SUBCONTRACTOR: AAD Drilling Contractors	SHEET 1 OF 3 SHEETS
3. PROJECT: RVAAP RI 14	4. LOCATION: Load Line 10	
5. NAME OF DRILLER: Sam Holler	6. MANUFACTURER'S DESIGNATION OF DRILL: CME LC-60	
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: 6.25 ID HSA; 2" Split Spoons; 3" Shelby Tube; 6.25 OD Air Rotary Hammer; 2" ID Core Barrel	8. HOLE LOCATION: South of PE-33	
	9. SURFACE ELEVATION: 1122.90 ASL	
	10. DATE STARTED: 07 Jan 05	11. DATE COMPLETED: 10 Jan 05
12. OVERBURDEN THICKNESS: 12.5	15. DEPTH GROUNDWATER ENCOUNTERED: ~19	
13. DEPTH DRILLED INTO ROCK: 14.5	16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED: 10.90 @ 1343 01/12/05	
14. TOTAL DEPTH OF HOLE: 27.0	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY): —	

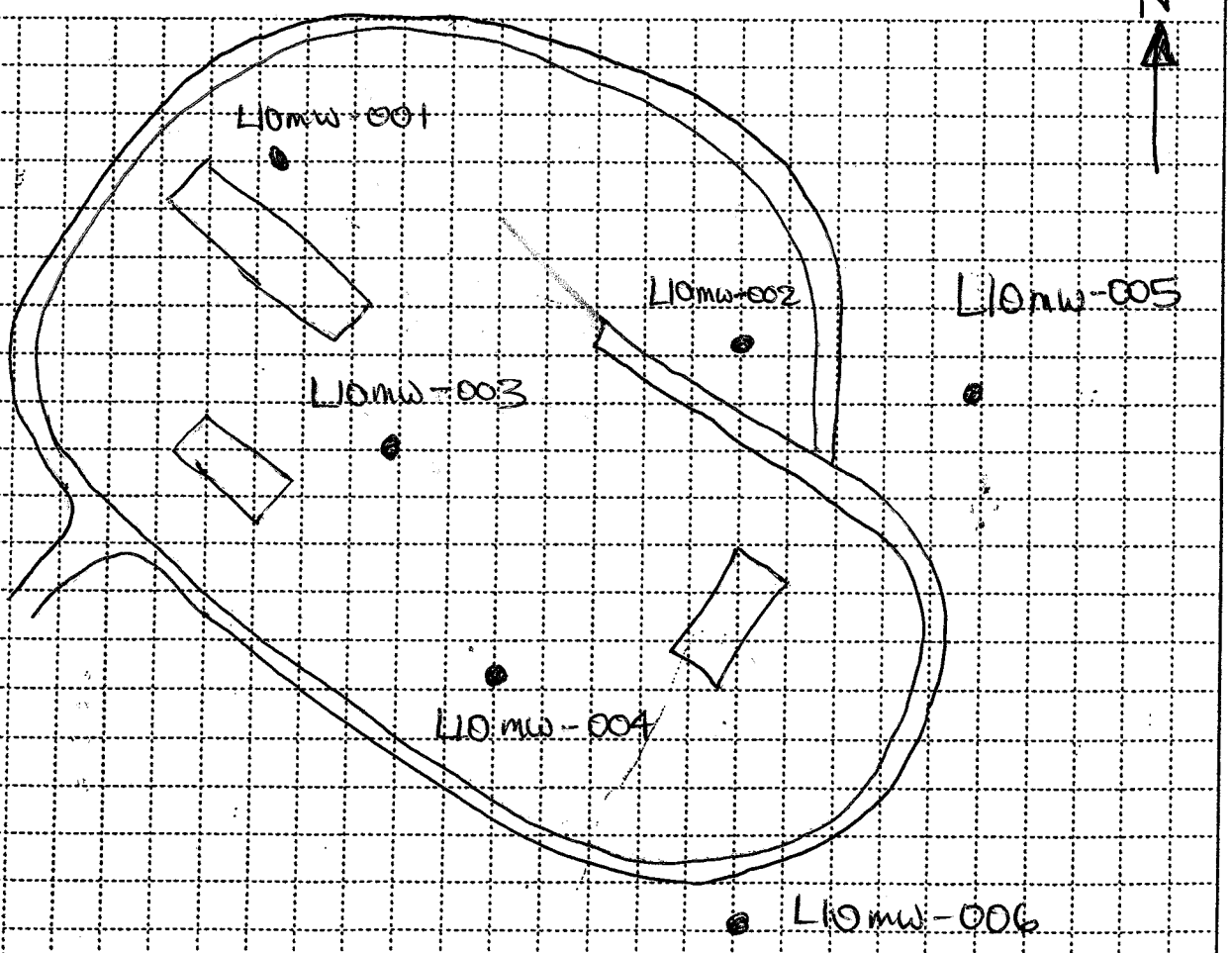
18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
SHELBY TUBE 4-6'	—	X	1

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE RECOVERY
	—	—	—	—	—	89 %

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
	—	X	—	

LOCATION SKETCH/COMMENTS

SCALE:



PROJECT	HOLE NO.
RVAAP RI 14	L10mw-005

ENG FORM 5056-R, AUG 94

(Proponent: CECW-EG)

HTRW DRILLING LOG (CONTINUATION SHEET)

HOLE NUMBER: L/6mw-005

PROJECT: RVAAP RI 14

INSPECTOR: Mark Dunlay

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. USES	BLOW COUNT - (g)	REMARKS (h)
1350	2	DK. Br. SILT 70% w/Sand Wet No Odor No Staining No Plasticity	0.0	1.7	ML	Weight	7.5y-4/3
	4	Red/Br. SILT 65% w/Sand Damp No Odor No Plasticity Grey Mottling	0.0	1.5	ML	1-2 4-6	5y-5/6
	6	1405 Offload Shelby Tube					
	8	Br. SILT 65% w/Sand Dry No Odor No Plasticity No Staining	0.0	1.6	ML	1-7 10-8	7.5y-4/4
	10	SAA	0.0	1.5	ML	5-6 5-7	SAA
	12	SAA Changes to wet @ 11.5 Changes to dry @ 12.1	0.0	1.0	ML	1-3 15-16	SAA
	14	SAA	0.0	1.0	M	1-2 13-18	SAA
1430		Weathered SS Bedrock Split Spoon Refusal @ 14.1					
0845		Top of Core #1 @ 15.2					Recovery = 108/122.4 = 88.2%
	16	Weathered Br/Gray Sandstone * Fine Grained Horizontal Bedding * layers Iron Stained layers Present					RQD = 558/108 = 51.6% 7.5y-6/4
	18						
▽		Saturated/wet Fractured Pieces of SS					
	20	Grey Fine Grained SS w/ Horizontal Bedding Layers w/ Iron Staining					7.5y-6/2

PROJECT: RVAAP RI 14

HOLE NO.: L/6mw-005

ENG FORM 5056A-R, AUG 94

(Proponent: CECW-EG)

HTRW DRILLING LOG (CONTINUATION SHEET)

HOLE NUMBER: 40MW-005

PROJECT: RVAAP RI 14

INSPECTOR: Mark Dunlay

SHEET 3 OF 3 SHEETS

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	Br Fine/Med. Grained Sandstone Black Striations Present Horizontal to 30° Bedding Planes					7.5Y-5/8
	22	Grey Fine Grained Sandstone Highly Cemented Horizontal Bedding Planes					7.5Y-6/2
	24						
0920		Bottom of Core #1 @ 25.4					
	26						
		BOH 27.0					BOH 27 Sand to 26.5 Screen from 26.5 to 16.5 Sand to 15 Bentonite to 10 Grout to Surface Stick-up Well Completion No Hydration water used
	28						
	30						

PROJECT: RVAAP RI 14

HOLE NO. 40MW-005

ENG FORM 5056A-R, AUG 94

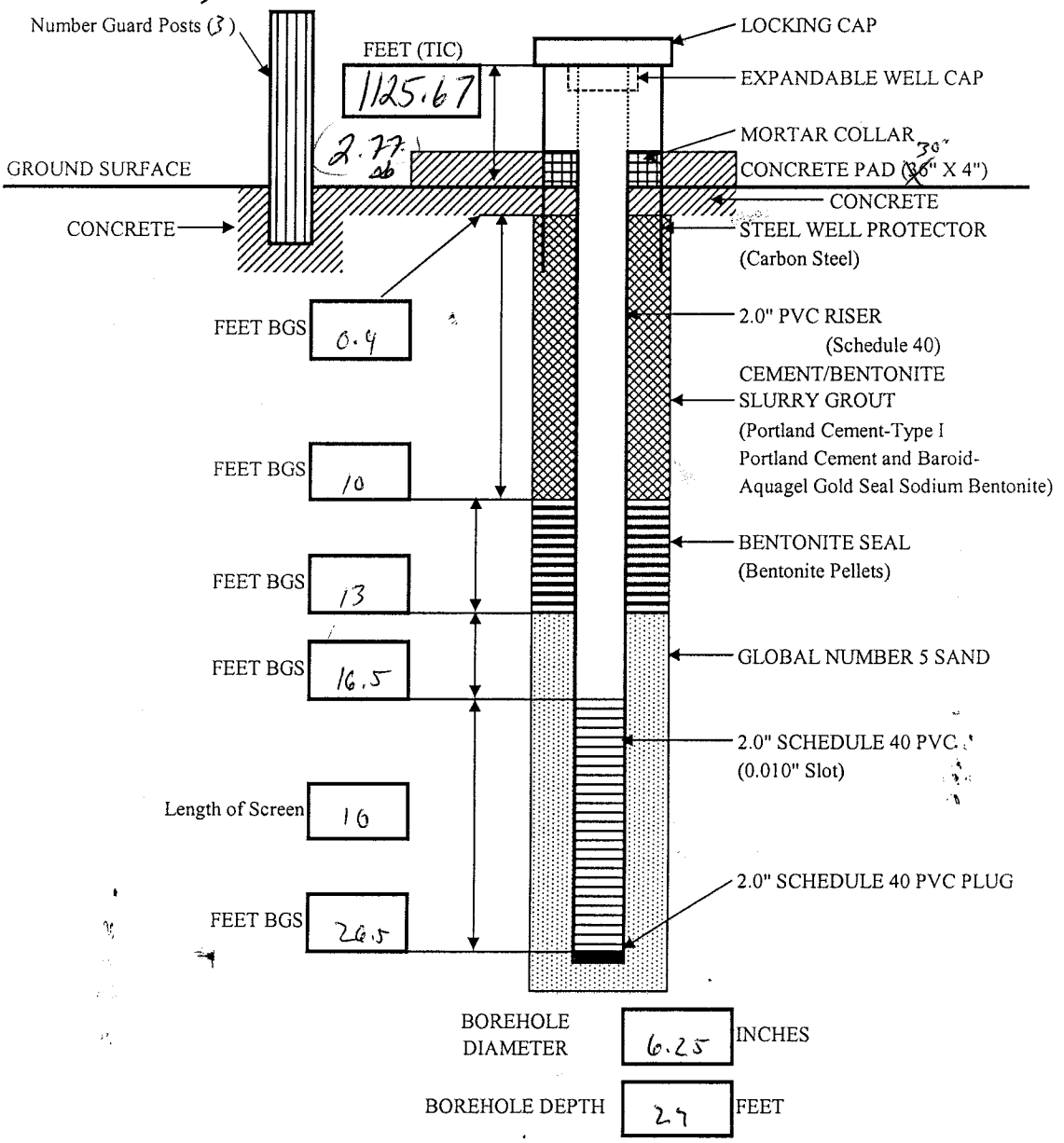
(Proponent: CECW-EG)

MONITORING WELL CONSTRUCTION DIAGRAM

RAVENNA ARMY AMMUNITION PLANT

Project: RVAAP12E 14

Well Number: L10MW-005	Begin: 07 Jan 05	End: 10 Jan 05
Coordinates: N: 555380.53 E: 2355943.55	Elevation: 1122.90	Reference Point:
Logged By:		



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.

@ LO

Well Development Record

Well ID: TTJOMW-005-GW
Date: 01/12/05

Ravenna Army Ammunition Plant-
RVAAP 14 AOC Characterization

Project: RVAAP 14
Development Company: MKM

Development Method: whale pumping
Comments:

Well TD: 29.1 FT TIC Depth to Water: 10.90 FT
Water Column Height: 18.20 FT One Well Volume: 10 Gals

Well Volume (gallons/foot): 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	Cond	DO	Temp		
1343	DSB	10.90	—	—						
1353	DSE	11.30	—	—						
1355	DPB	11.30								
1401	DFM	—		10 gal	7.25	.299	2.85	11.8	678	1st well vol (10 gal)
1406	DFM	—		10	7.64	.281	3.94	11.5	10	2nd well vol (20 gal)
1408	DFM	—		10	7.63	.286	3.44	11.4	510	3rd well vol (30 gal)
1415	DFM	—		10	7.75	.289	4.06	11.5	10	4th well vol (40 gal)
1425	DFM	—		10	8.05	.292	2.50	11.5	814	5th well vol (50 gal)
1435	DFM	—		10	7.93	.297	3.57	11.5	10	6th well vol (60 gal)
1445	DFM	14.50		10	7.79	.302	3.52	11.5	10	7th well vol (70 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 - Photolonizer (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 Qualattaive 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. Esker
Signature: Date: 2/22/05

Monitoring Well Purging Form

Well ID: ~~LL10~~ L10 MW-005GW

Date: 01-19-05

Ravenna Army Ammunition Plant
Ravenna, Ohio

WELL OBSERVATIONS

Protective Casing: (Intact) · Damaged   Locked: Yes · (No)   Key No:
Concrete Base: (Intact) · Damaged   Inner Casing: (2") · 4" · 6" · 8"   Other:
Stickup Height: 2.77 (ft)   TIC · TOC Difference: 0.31 (ft)
Vapor Readings: HNu · OVA   Background: ______   Inside Well Casing:

	Present		Depth
LNAPL	Yes · (No)	______	Yes · No
DNAPL	Yes · (No)	______	Yes · No

Sampled Sample ID ~~LL10~~ L10 MW-005GW

CALCULATIONS

(A) Depth to Well Bottom 29.1 (ft) (TOC) · TIC · BGS   (Measured) · Previously Measured (circle one)
(B) Depth to Water 10.9 (ft) (TOC) · TIC · BGS   Time Measured: 0900
(C) Water Column Height (A-B) 18.2 (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) 2.91 (gal)
(F) Volumes to be Evacuated 5
(G) **TOTAL VOLUME TO BE EVACUATED (E * F)** 14.56 (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)	HNu	Spec Cond	Temp	pH	Turb	DO	Comments
0911	10.9			0.405	8.54	7.56	120	4.62	Initial
0914	11.25			0.412	8.90	7.48	99	1.59	
0917	11.35			0.414	9.26	7.44	80	0.79	
0920	11.40			0.418	9.43	7.44	65	0.44	End Purging

Logged By: Shannon (Please Print)   Reviewed By: C. Eolk

Signature: [signature]   Date: 2/22/05

Field Sampling Report

Location ID: L10 MW-005 GW

Date: 01-19-05

Ravenna Army Ammunition Plant
Characterization of 14 RVAAP AOCs

Sampling Information

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

Sample Collection: 0930 hrs
Sample Depth: 25' FT (below surface)

Sample Type: Composite - MI - Grab (Grab circled)
If MI, # of increments taken: NA
Decon: Dedicated - Each Day - Each Location (Each Location circled)

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

Field Parameters (at time of sample)			Analytical Parameters				Other Parameters			
PID / FID Readings:			VOC	X	TPH GRO	X	Corrosivity			
Background:		ppm	SVOC	X	TPH DRO	X	Reactivity Sulfide/Cyanide			
	0.0		Explosives	X	Chromium +6		Ignitability			
Sample:	0.0	ppm	Propellants	~~X~~ FRE	Nitrate	~~X~~				
Water Level	10.9	FT	TAL Metals	X			**QA Samples**			
Temperature	9.43	°C	Pesticides/PCBs	X			MS/MSD	Yes / No	NA (circled)	
Sp. Conductance:	0.418	uMHOs	Cyanides				Duplicate ID	L10mw-005-DUP	NA	
pH	7.44	units	TOC				Equipment Rinse ID		NA (circled)	
Turbidity	65	N.T.U.	Grain Size				Trip Blank ID (circled)	TRIP BLANK	NA	

Sample Description

Clear water, no sheen
No odor, 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: L10mw-005-GW

Name: John Jent (CELRL-EC-ED)

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 (circled) - As Listed

Logged By: [illegible signature] (Please Print)

Signature: [signature]

Reviewed by: ERIC ELLIS (Please Print)

Signature: [signature] Date: 2/4/05

HTRW DRILLING LOG

	DISTRICT: Louisville	HOLE NUMBER: L10mw-006
1. COMPANY NAME: MK In Engineers Inc	2. DRILL SUBCONTRACTOR: HAD Drilling Contractors	SHEET 1 OF 3 SHEETS
3. PROJECT: RVAAP RI 14	4. LOCATION: Load Line 10	
5. NAME OF DRILLER: Sam Holler	6. MANUFACTURER'S DESIGNATION OF DRILL: CME-LC 60	
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: 10.25 OD HSA; 2" Split Spoons	8. HOLE LOCATION: South of PE10	
	9. SURFACE ELEVATION: 1121.20 ASL	
	10. DATE STARTED: 04Jan05	11. DATE COMPLETED: 05Jan05
12. OVERBURDEN THICKNESS: 23	15. DEPTH GROUNDWATER ENCOUNTERED: 15, 21	
13. DEPTH DRILLED INTO ROCK: 1	16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED: 7.4' @0835 01/07/05	
14. TOTAL DEPTH OF HOLE: 24ft	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY)	

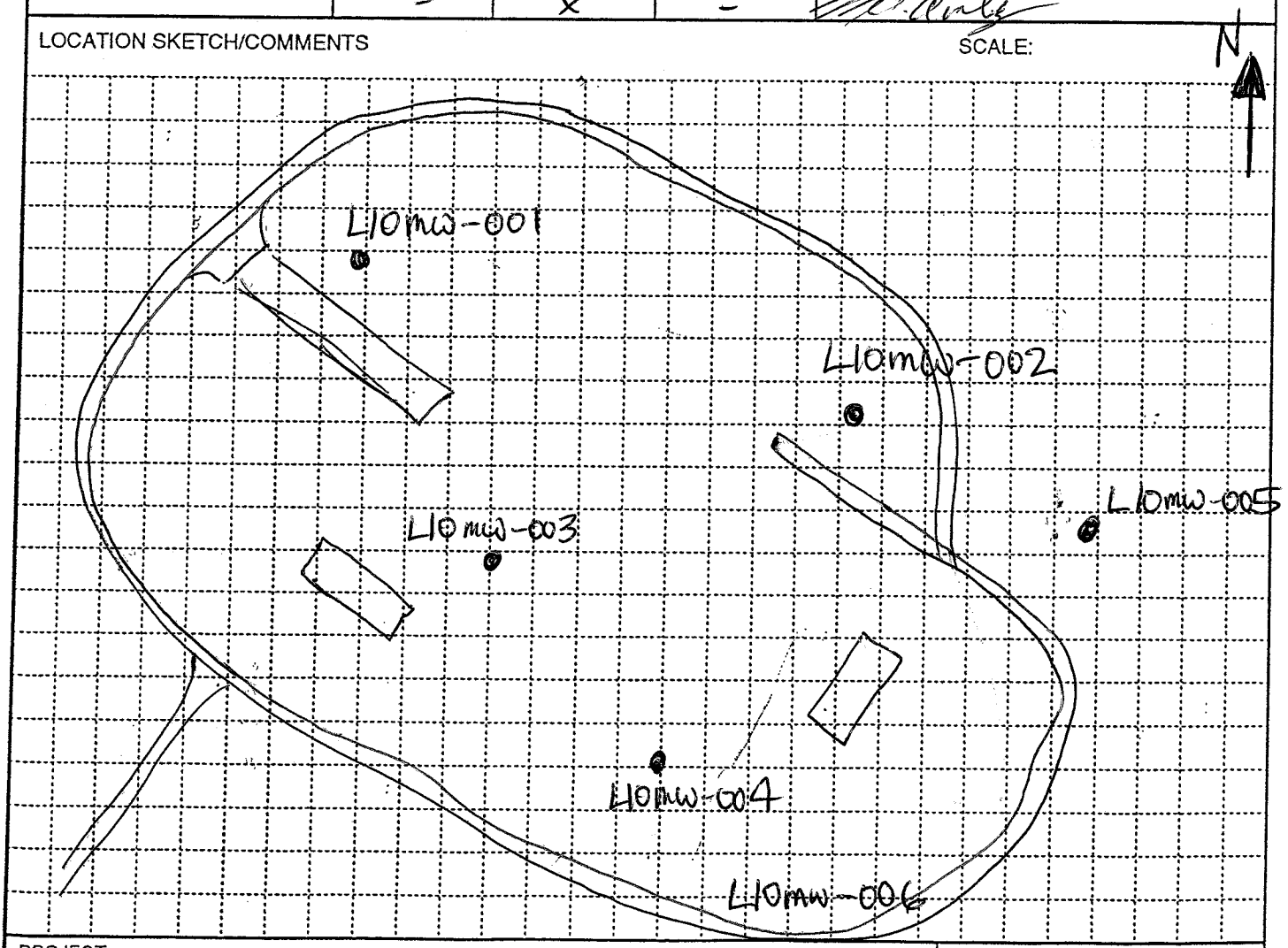
18. GEOTECHNICAL SAMPLES	DISTRICT	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
NONE	–	–	–

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE RECOVERY – %
	–	–	–	–	–	

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
	–	X	–	

LOCATION SKETCH/COMMENTS

SCALE:



PROJECT	HOLE NO.
RVAAP RI 14	L10mw-006

ENG FORM 5056-R, AUG 94

(Proponent: CECW-EG)

HTRW DRILLING LOG (CONTINUATION SHEET)

HOLE NUMBER: L10MW-006

PROJECT: RVAAP RI 14

INSPECTOR: Mark Dunlay

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)
1435		6" Topsoil Moist/wet				Push 1	
		Reddish/Gray/Br. SILT 65% w/ Sand No Odor No Plasticity Damp Red staining	0.0	1.5	ML	2-3	7.5y-6/6
	2						
		Br. SILT 70% w/ sand Sl M Dry No Odor No Plasticity Grey staining/Mottling	0.0	1.4	ML	Push 1 3-3	7.5y-5/4
	4						
		Gray SILT 60% w/ Clay Damp No Odor No staining Med. Plasticity Br. SILT 75% w/ Clay + Sand Dry Very Sl M No Odor White staining White	0.0	1.9	ML	1-4 7-10	7.5y-5/2
	6		0.0	1.6	ML	2-9 10-11	7.5y-5/4
	8	Br. SILT 65% w/ sand Dry No Odor No staining No Plasticity	0.0	1.6	ML	1-3 5-6	SAA
	10		0.0	1.1	ML	2-4 5-6	SAA
	12	Br. SAND 85% Fine-Med Grained Wet			SM		
		Br. SILT 65% w/ sand Damp No Odor No staining No Plasticity Becomes Dry @ 13.5	0.0	1.4	ML	1-4 11-24	SAA
	14						
▽		Br/Red Saturated SAND 85% No Odor No Plasticity Iron Staining	0.0	1.1	SM	4-7 13-6	5yr-4/6
		Br. SILT 65% w/ Sand No Odor No staining No Plasticity			ML		7.5yr-5/4
	16	Red/Br. SAND 85% Damp No Odor No Staining No Plasticity			SM	2-4	5yr-4/6
		Br. Changes to Gray SILT 65% w/ Sand and Small Gravel Damp No Odor No staining No Plasticity	0.0	1.7	ML	10-24	7.5yr-5/4 7.5yr-5/2
	18						
		Lt Br/Tan SAND 75% w/ Large Rock Frags. Dry	0.0	1.8	SP	2 18 18 16	7.5y-6/4
	20						

PROJECT: RVAAP RI 14

HOLE NO. L10MW-006

ENG FORM 5056A-R, AUG 94

(Proponent: CECW-EG)

HTRW DRILLING LOG (CONTINUATION SHEET)

HOLE NUMBER: L10MW-006

PROJECT: RVAAP RE 14

INSPECTOR: Mark Dunlay

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)
	20	Changes to Br.				1-4	
▽		Saturated	0.0	1.0	SP		7.5y-5/4
		changes Back to Dry				6-9	
	22	SS Bedrock Frag					
		Weathered Bedrock			SP		
1550	24	BOH 24 Ft.					BOH 24 Sand to 23.5 Screen from 23.5 to 13.5 Sand to 11 Bentonite to 8 Grout to Surface No Hydration water Used
	26						

PROJECT: RVAAP RE 14

HOLE NO.: L10MW-006

ENG FORM 5056A-R, AUG 94

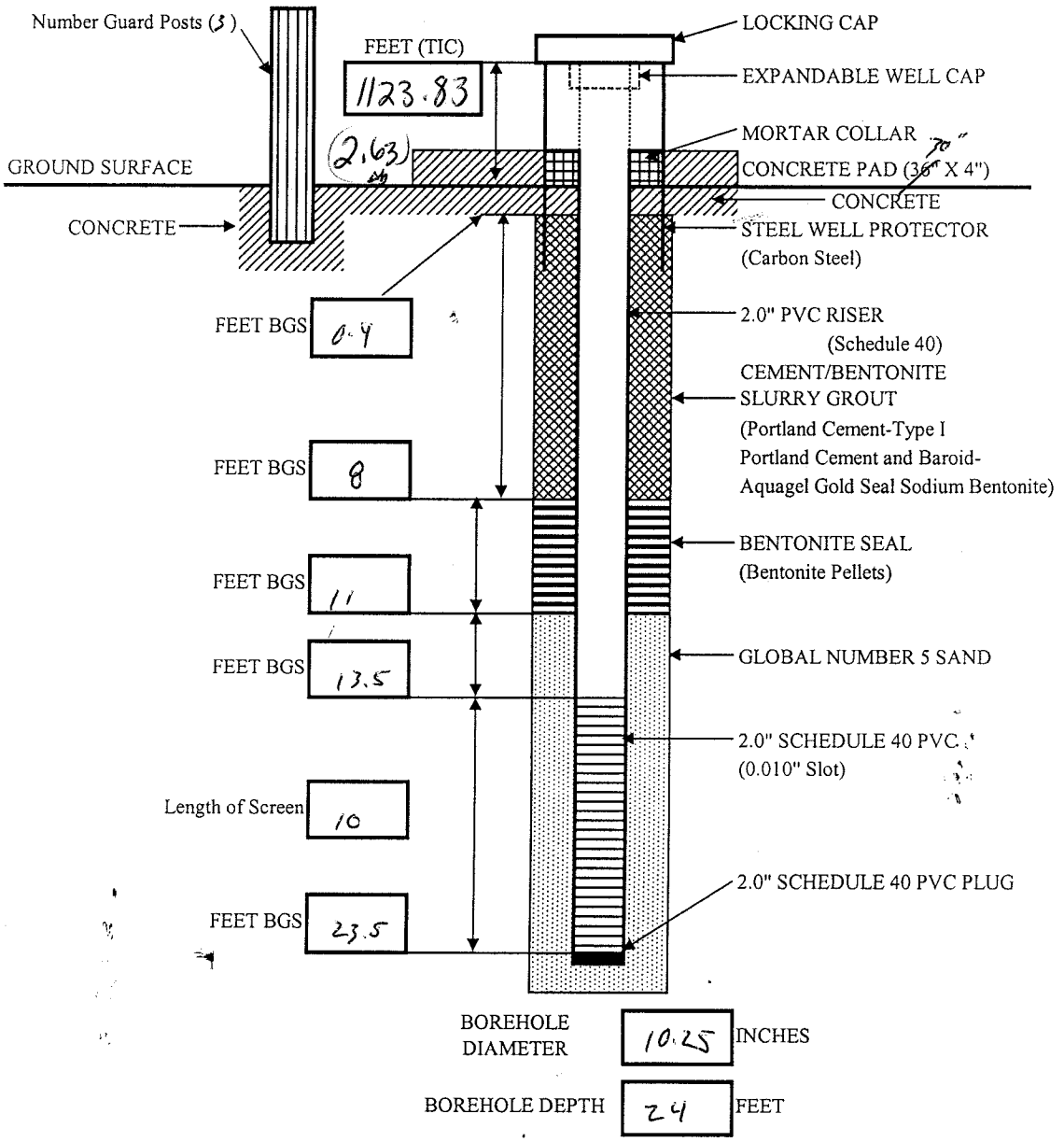
(Proponent: CECW-EG)

MONITORING WELL CONSTRUCTION DIAGRAM

RAVENNA ARMY AMMUNITION PLANT

Project: RVAAP RI 14

Well Number: L10mw-006	Begin: 04 Jan 05	End: 05 Jan 05
Coordinates: N: 554995.25 E: 2355654.80	Elevation: 1121.20	Reference Point:
Logged By: M.O. Andy		



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: LIO ~~LIOMW~~-006-GN
Date: 01/07/05

Ravenna Army Ammunition Plant-
RVAAP 14 AOC Characterization

Project: RVAAP14
Development Company: MKM
Development Method: whale pump
Comments:

Well TD: 25.7 FT TIC Depth to Water: 14 FT ≈11
Water Column Height: 18.3 FT One Well Volume: 10.79 Gals

Well Volume (gallons/foot): 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		
0835	DSB	7.4	—	—	—	—	—	—	—	Start Surge blocking
0845	DSE	7.98	—	—	—	—	—	—	—	—
0850	DPB	7.95	—	—	6.19	0.130	3.60	11.5	>1000	
0859	DFM	—	—	Hgal	7.00	0.153	4.48	9.4	>1000	11gal (1st well vol)
0909	DFM	—	—	11gal	6.10	0.169	2.76	10.1	>1000	22gal (2nd well vol)
0914	DFM	—	—	11gal	6.75	0.160	3.72	10.1	>1000	33gal (3rd well vol)
0930	DFM	—	—	11gal	6.51	0.158	2.82	9.7	>1000	44 gal (4th well vol)
0943	DFM	—	—	11gal	6.79	0.158	4.57	10.0	>1000	55gal (5th well vol)
0955	DFM	—	—	11gal	6.54	0.160	4.88	9.6	1000	66 gal (6th well vol)
1007	DFM	2.32	—	11gal	7.00	0.157	4.09	10.0	63	77 gal (7th 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 Qualattaive 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. Esler
Signature: Date: 2/22/05

Monitoring Well Purging Form

Well ID: L10 mw-006 cw

Date: 17 Jan 05

Ravenna Army Ammunition Plant
Ravenna, Ohio

WELL OBSERVATIONS

Protective Casing: Intact · Damaged
Locked: Yes · (No)
Key No:

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

Stickup Height: 2.87 (ft)
TIC · TOC Difference: 0.35 (ft)

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

	Present		Depth	Sampled Sample ID
LNAPL	Yes · (No)		Yes · (No)	L10mw-006 cw
DNAPL	Yes · (No)		Yes · (No)	

CALCULATIONS

(A) Depth to Well Bottom 26.35 (ft) TOC · (TIC) · BGS (Measured) · Previously Measured (circle one)

(B) Depth to Water 9.1 (ft) TOC · (TIC) · BGS Time Measured: 0915

(C) Water Column Height (A-B) 17.25 (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) 2.76 (gal)

(F) Volumes to be Evacuated 5

(G) **TOTAL VOLUME TO BE EVACUATED (E * F)** 13.80 (gal)

EVACUATION METHOD

Well Evacuation Method: Bailer · Submersible Pump · Other: Sample 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: HNu	Spec Cond	Temp	pH	Turb		Comments
934	9.1	Eq.		0.234	8.62	5.89	0	12.04	
0937	9.21			0.219	9.37	6.11	0	2.08	
0940	9.35			0.217	9.60	6.23	0	0	
0943	9.40			0.214	9.64	6.27	0	0	

Logged By: Mark Donley (Please Print)

Signature: M. Donley

Reviewed By: C. Esler

Date: 2/22/05

Field Sampling Report

Location ID: L10MW-006-GW

Date: 17 Jan 05

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	X	Bacon Bomb		Bowl		Hand Auger	
					Push Probe		Plastic Liner	
Type/Construction	Micro Purge				Mattocks			
Miscellaneous	Well Purging Form (Yes) - No							

Sample Collection: 0950 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 FT (below surface)

Decon: Dedicated - Each Day - (Each Location)

Field Parameters
(at time of sample)

PID / FID Readings:		
Background:	0.0	ppm
Sample:	0.0	ppm
Water Level	9.40	FT
Temperature	9.64	°C
Sp. Conductance:	0.217	uMHOs
pH	6.27	units
Turbidity	0	N.T.U.

Analytical Parameters

VOC	X	TPH GRO	X
SVOC	X	TPH DRO	X
Explosives	X	Chromium +6	
Propellants	ERL X	Nitrate	
TAL Metals	X		
Pesticides/PCBs	X		
Cyanides	X		
TOC			
Grain Size			

Other Parameters

Corrosivity			
Reactivity Sulfide/Cyanide			
Ignitability			

QA Samples

MS/MSD	Yes / No (NA)
Duplicate ID	(NA)
(Equipment Rinse ID)	L10mw-006-ER NA
(Trip Blank ID)	Trip Blank (NA)

Sample Description

Clear No Oil No Sheen No Turb

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: Mark Dunlay (Please Print)

Signature: MD Dunlay

Reviewed by: ERIC ELLIS (Please Print)

Signature: [signature] Date: 2/9/05

HTRW DRILLING LOG

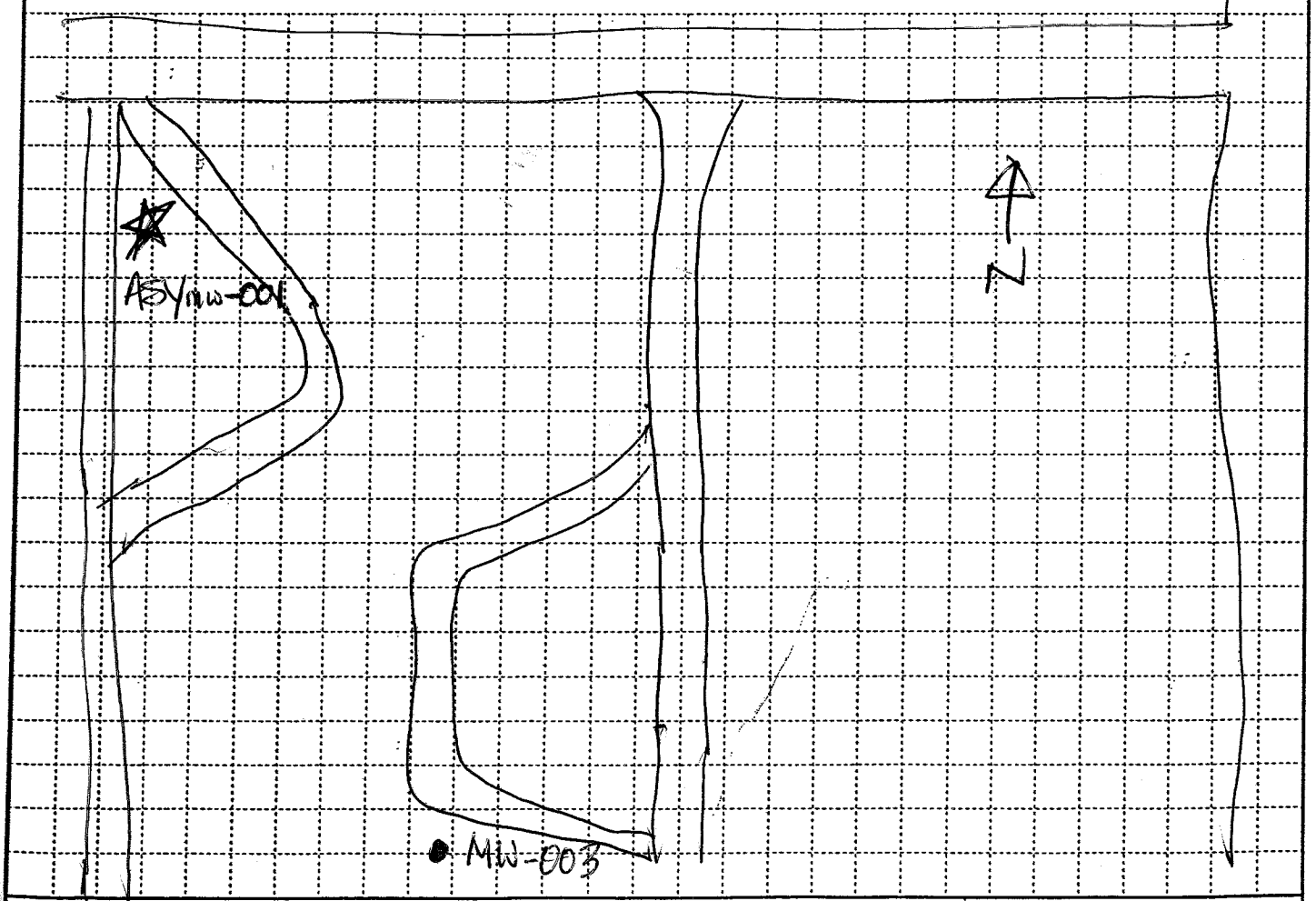
	DISTRICT: LOUISVILLE	HOLE NUMBER: ASYmw-001
1. COMPANY NAME: MKM ENGINEERS	2. DRILL SUBCONTRACTOR: HAD DRILLING	SHEET 1 OF 3 SHEETS
3. PROJECT: RVAAP-RI 14	4. LOCATION: RAVENNA, OH ATLAS SCRAP YARD	
5. NAME OF DRILLER: SCOTT HEISER	6. MANUFACTURER'S DESIGNATION OF DRILL: CME-55	
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: CME-55; 4¼" ID HSA; 2' SPLIT SPOON	8. HOLE LOCATION: NORTH WESTERN CORNER OF SITE	
	9. SURFACE ELEVATION: 978.40 ASL	
	10. DATE STARTED: 11/15/04	11. DATE COMPLETED: 11/15/04
12. OVERBURDEN THICKNESS: 16'	15. DEPTH GROUNDWATER ENCOUNTERED: ~18' BGS	
13. DEPTH DRILLED INTO ROCK: 6'	16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED: 11.24 @ 0842 11/23/04	
14. TOTAL DEPTH OF HOLE: 22' BGS	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY)	

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
A-6' BGS		X	NA

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE RECOVERY %
—	—	—	—	—	—	

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
	—	X	—	David K Emmett

LOCATION SKETCH/COMMENTS SCALE:



PROJECT	HOLE NO.
RVAAP-RI 14	ASYmw-001

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

HTRW DRILLING LOG (CONTINUATION SHEET)

HOLE NUMBER: ASYmw-001

PROJECT: RVAAP-RI 14 | INSPECTOR: DK EARNEST | SHEET 2 OF 3

ELEV. (a)	DEPTH (b)	DESCRIPTION OF MATERIALS (c)	FIELD SCREENING RESULTS (d)	~~GEOTECH SAMPLE OR CORE BOX NO.~~ RECOVERY (e)	~~ANALYTICAL SAMPLE NO.~~ (f)	BLOW COUNT (g)	REMARKS (h)
200		2" TOPSOIL					
		6" DEBRIS & SOIL					
		DK GREY (10%) SL CL SILT (75%) & SAND (15%)	7.2	1.4	ML	4/6	
	2					5/4	
		LT BRN MOTTLED W/ LT GREY CLAY (80%) NO ODOR TRACE RED SILT (70%)				4/6	DAMP TO MOIST
		MED PLASTIC	6.0	1.6	ML/CL		
	4	STIFF TO V.S.				9/10	
		SHELBY TUBE	—	—	—	~~##~~ —	1415
	6	SAA MED BRN					
		LOW PLASTIC	7.6	1.4	ML	1/4	WET ON SPOON
						5/6	
	8	SAA	9.5	2.0	ML	1/4	
						6/10	
	10	SAA				1/4	SAND LENS AT 10.5
			7.8	1.5	ML	6/7	MOIST TO WET AT END
		GREY SL CL SILT (20%) (80%)					
	12	SAA LOW PLASTIC				1/4	SAND LENS @ 13'
			8.6	1.5	ML	4/6	
	14	SAA					
			3.6	1.0	ML	1/12	
					—	24/50+	SPOON REFUSAL @ 15.5 SATURATED
	16	WEATHERED SANDSTONE					
		GREY FINE TO MED GRAINED	—	/	SS	—	DRILLED THRU WEATHERED
	18	SAA					ROCK TO 21'
			—	—	SS	—	
	20						

PROJECT: RVAAP - RI 14 | HOLE NO.: ASYmw - 001

HTRW DRILLING LOG (CONTINUATION SHEET)

HOLE NUMBER: ASYMW-001

PROJECT: RVAAP-R114

INSPECTOR: DK EARNEST

SHEET 3 OF 3 SHEETS

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)
		CLAY WEATHERED SANDSTONE					DRILLED TO 22'
500	22	BOH - 22'					

DRILLED TO 22

WELL SET AT 21

SCREEN 11-21'

SAND TO 9'

SEAL TO 7'

NO WATER ADDED

PROJECT: RVAAP-R114

HOLE NO.: ASYmw-001

ENG FORM 5056A-R, AUG 94

(Proponent: CECW-EG)

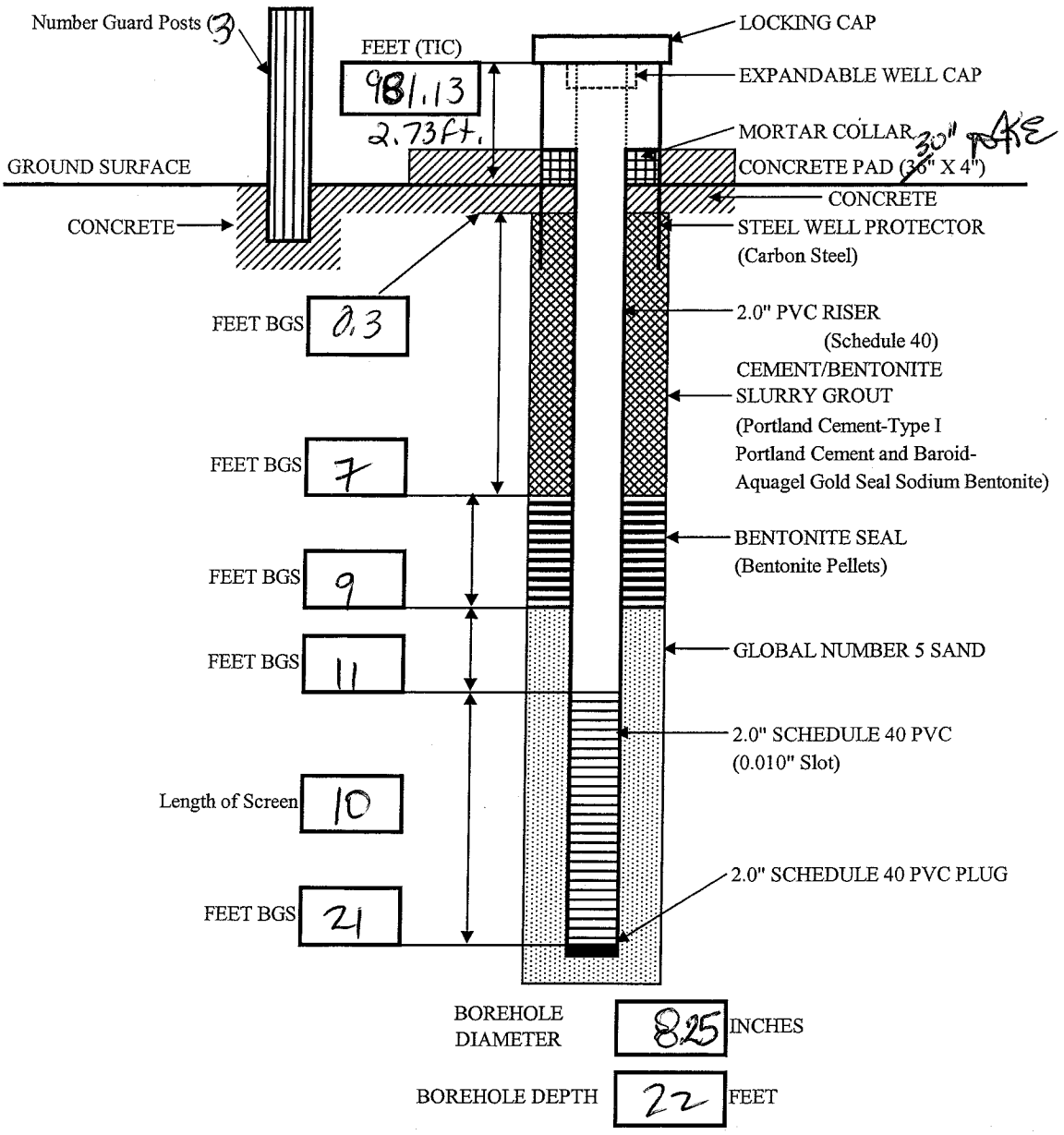
0 200

MONITORING WELL CONSTRUCTION DIAGRAM

RAVENNA ARMY AMMUNITION PLANT

Project: RVAAP RI14

Well Number: ASY MW-001	Begin: 11/15/04	End: 11/15/04
Coordinates: N: 558404.04 E: 2366260.85	Elevation: 978.40	Reference Point:
Logged By: DAVID K. 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

Well ID: ASYMW-001
Date: 11/23/04

Ravenna Army Ammunition Plant-
RVAAP 14 AOC Characterization

Project: RVAAP-14
Development Company: MKM

Development Method: whale pumping
Comments:

Well TD: 22.9 FT TIC Depth to Water: 10.85 FT
Water Column Height: 11.95 FT One Well Volume: 7.0 Gals

Well Volume (gallons/foot): 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		
0842	DSB									
0850	DSE	11.24								
0852	DPB	11.24			7.69	0.99	11.89	10.9	1000	Initial reading
0900	DFM	-	-	7	6.96	1.06	7.09	11.4	1000	7 gal 1st volume
0906	DFM	-	-	7	6.67	0.705	5.35	11.6	1000	14 gal 2nd volume
0914	DFM	-		7	6.93	0.649	6.36	11.6	1000	21 gal 3rd volume
0923	DFM	-	-	7	6.86	0.611	4.48	10.2	1000	28 gal 4th volume
0935	DFM	-	-	7	6.93	0.704	1.99	11.9	289	35 gal 5th volume
0949	DFM	-	-	7	7.05	0.684	4.18	11.8	90	42 gal 6th volume
1000	DFM	-	-	7	6.75	0.664	3.84	11.9	68	49 gal 7th volume
1011	DFM	-	-	7	6.92	0.670	5.07	11.9	1000	56 gal 8th volume
1025	DFM	-	-	7	6.90	0.666	4.93	11.9	362	63 gal 9th volume
1025	DPE	15.2	-	-	-	-	-	-	-	
	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 Qualattaive Observations

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

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

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

Monitoring Well Purging Form

Well ID: ASYMW-001-GW

Ravenna Army Ammunition Plant
Ravenna, Ohio

Date : 11/30/04

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: 2.5 (ft) **TIC · TOC Difference:** 0.26 (ft)
Vapor Readings : HNu · OVA Background: _____ Inside Well Casing:

	Present	Depth	Sampled Sample ID
LNAPL	Yes · No _____	Yes · (No)	ASYmw-001
DNAPL	Yes · No _____	Yes · (No)	

CALCULATIONS

(A) **Depth to Well Bottom** 21.0 (ft) (TOC) · TIC · BGS **Measured · Previously Measured** (circle one)
(B) **Depth to Water** 10.8 (ft) (TOC) · TIC · BGS **Time Measured:** 1450
(C) **Water Column Height (A-B)** 10.2 (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)** 1.63 (gal)
(F) **Volumes to be Evacuated** 5
(G) TOTAL VOLUME TO BE EVACUATED (E * F) 8.16 (gal)

EVACUATION METHOD

Well Evacuation Method: Bailer · Submersible Pump · Other: Micro purging **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	
1430	10.8			1.35	12.13	6.98	1000	4.70	Initial reading
1433	11.3			1.37	12.44	6.82	757	0.48	
1436	11.3			1.37	12.49	6.82	635	0.0	
1439	11.4			1.35	12.48	6.81	564	0.0	
1442	11.5			1.34	12.5	6.80	461	0.0	
1445	11.5			1.33	12.5	6.8	407	0.0	End purging

Logged By: Vijay Allur (Please Print) Reviewed By: _____
Signature: Vijay Date : 2/22/05

Field Sampling Report

Location ID: ASYMW-001-GW

Date: 11/30/04

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	
					Push Probe		Plastic Liner	
Type/Construction	Micro purging	X			Mattocks			
Miscellaneous	**Well Purging Form** (Yes) - No							

Sample Collection: 1450 hrs

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

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

Sample Depth: 16 FT (below surface)

Decon: Dedicated - Each Day - (Each Location)

Field Parameters
(at time of sample)

PID / FID Readings:		
Background:	0.0	ppm
Sample:	0.0	ppm
Water Level	10.8	FT
Temperature	12.5	°C
Sp. Conductance:	1.33	uMHOs
pH	6.8	units
Turbidity	407	N.T.U.

Analytical Parameters

VOC	X	TPH GRO	
SVOC	X	TPH DRO	
Explosives	X	Chromium +6	X
Propellants	X	Nitrate	
TAL Metals	X		
Pesticides/PCBs	X		
Cyanides			
TOC			
Grain Size			

Other Parameters

Corrosivity			
Reactivity Sulfide/Cyanide			
Ignitability			

QA Samples

MS/MSD	Yes / No	NA
Duplicate ID		NA
Equipment Rinse ID		NA
(Trip Blank ID)	Trip Blank	NA

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:

Name:

Agency/Company:

Address:

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

Logged By: Vijay Alluri (Please Print)

Signature: Vijay

Reviewed by: ERIC ELLIS (Please Print)

Signature: Eric Ellis Date:

HTRW DRILLING LOG

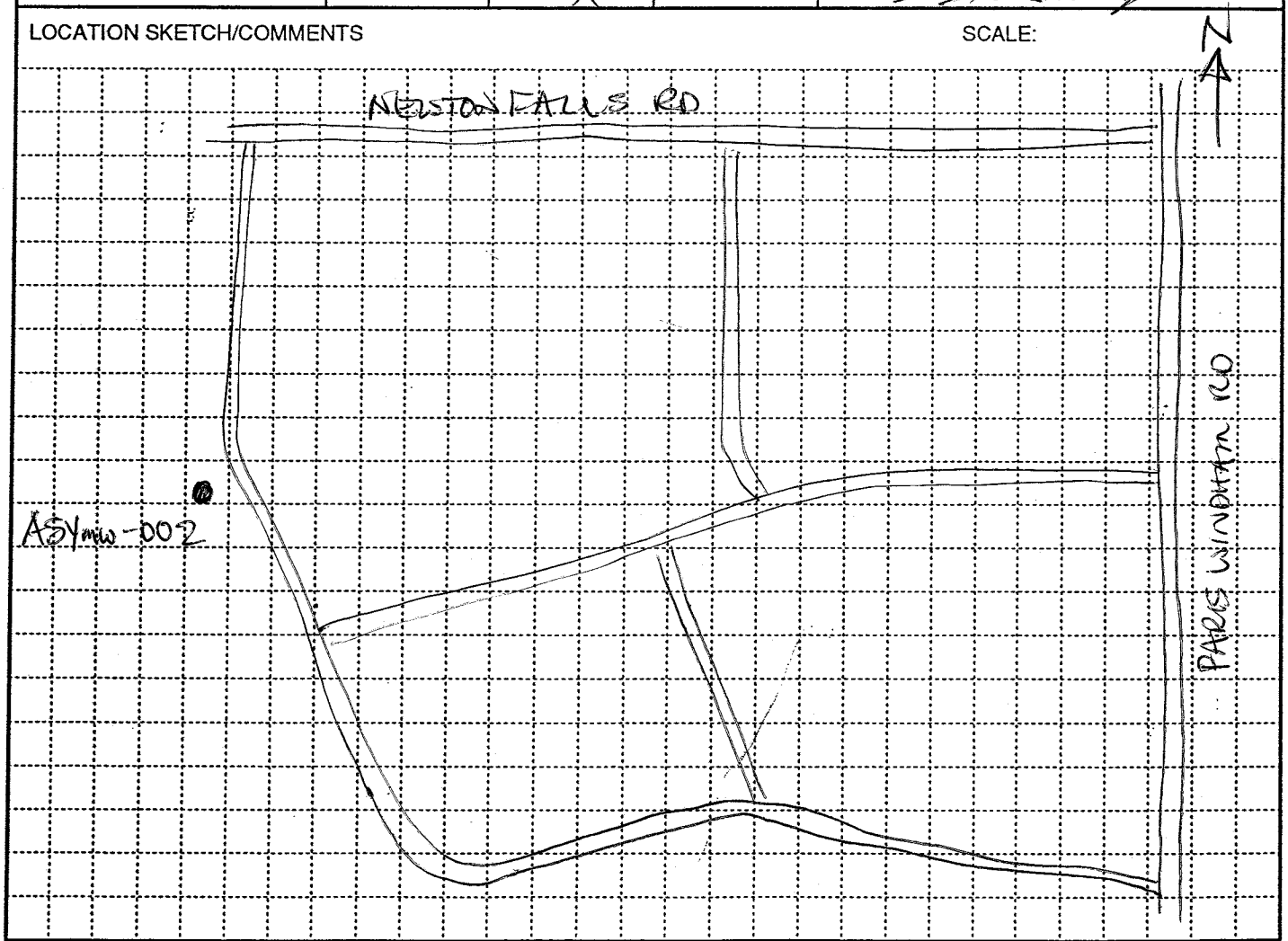
	DISTRICT: Louisville	HOLE NUMBER: ASymw-002
1. COMPANY NAME: MKM Engineers Inc	2. DRILL SUBCONTRACTOR: Had Drilling	SHEET 1 OF 2 SHEETS
3. PROJECT: RVAAP RI 14	4. LOCATION: Atlas Scrap Yard	
5. NAME OF DRILLER: Sam Hoffer	6. MANUFACTURER'S DESIGNATION OF DRILL: CME-LC60	
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: 8.25 OD HSA; 2" Split Spoons	8. HOLE LOCATION: West Center	
	9. SURFACE ELEVATION: 982.00 ASL	
	10. DATE STARTED: 16 Nov 04	11. DATE COMPLETED: 16 Nov 04
12. OVERBURDEN THICKNESS: 18 Ft (Mod)	15. DEPTH GROUNDWATER ENCOUNTERED: 11.7	
13. DEPTH DRILLED INTO ROCK: 2 Ft. (Weathered SS)	16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED: 14.58 @ 1302 11/22/04	
14. TOTAL DEPTH OF HOLE: 20 Ft	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY)	

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
	—	—	—

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE RECOVERY — %
	—	—	—	—	—	

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
		X		

LOCATION SKETCH/COMMENTS — SCALE:



PROJECT	HOLE NO.
RVAAP RI 14	ASYmw-002

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

HTRW DRILLING LOG (CONTINUATION SHEET)

HOLE NUMBER: ASYMW-002

PROJECT: RVAAP RI 14

INSPECTOR: Mark Dunlay

SHEET 2 OF 2 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)
		2" Topsoil					Began Drilling 1030
		Br. SILT 70% w/ Sand Dry No odor No Staining No Plasticity Gray Mottles Present	0.0	1.4	ML	1-1 2-4	7.5yr 5/8
	2						
		Br SILT 75% w/ Sand Dry No odor Mottles Stop No Plasticity	0.0	0.6	ML	1-4 5-10	7.5y 5/4
	4						
		Br SILT 75% w/ Clay - Dry No odor No Plasticity	0.0	1.8	ML	3-7 10-12	7.5yr 4/3 5yr 4/4
		Br/Red SAND 75% w/ Silt Damp No odor No Staining No Plasticity					
	6	Rock Fragments Pres.			SM	6-10	
		4" SILT Layer 70% w/ Sand Dry No odor No Staining	0.0	1.8	ML	7-11	7.5y 4/4
	8	Red/Br SAND 75% w/ Silt Dry No odor No Staining No Plasticity			SM		7.5y 5/6
		Fill Br SILT w/ Sand Dry No Plasticity	0.0	1.8	ML	4-6	7.5y 6/6
		Br SAND 80% w/ Silt Dry No odor No Staining No Plasticity			SM	7-10	7.5y 5/4
	10						
			0.0	1.7	SM	4-4 3-2	Same As Above
▽	12	Saturated @ 11.7					
		Same As Above → wet	0.0	1.3	SM	1-2 2-2	Same As Above
	14						
		Same As Above	7.5	1.0	SM	2-2 3-2	7.5yr 4/6
	16						
		Same As Above	2.9	1.4	SM	2-2 Refusal	7.5yr 4/4
	18	Split Spoon Refusal @ 18ft.					
		Augered to 20ft	—	—		—	Boff 20 Sand to 8.5 Sand to 19.5 Bentonite to 5 Screen from 19.5 Grout to No 9.5 Surface
		Boff 20ft					
	20						

PROJECT: RVAAP RI 14

HOLE NO. ASYMW-002

ENG FORM 5056A-R, AUG 94

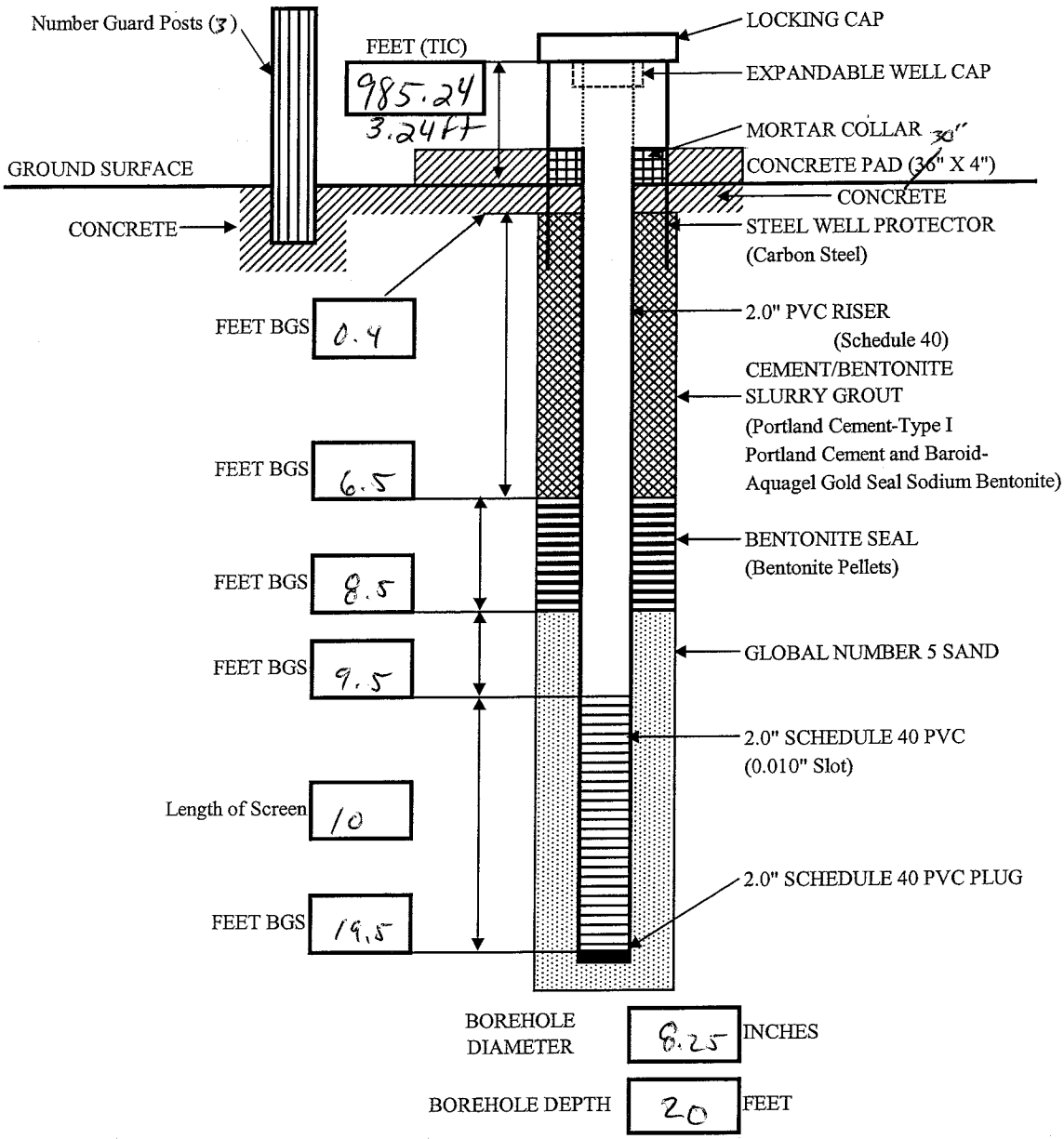
(Proponent: CECW-EG)

MONITORING WELL CONSTRUCTION DIAGRAM

RAVENNA ARMY AMMUNITION PLANT

Project: RVAAP RI-14

Well Number: ASYmw-002	Begin: 16 Nov 04	End: 16 Nov 04
Coordinates: N: 557887.86 E: 2366170.86	Elevation: 982.00	Reference Point:
Logged By: M. Daly		



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: ASYMW-002
Date: 11/22/04

Ravenna Army Ammunition Plant-
RVAAP 14 AOC Characterization

Project: RVAAP-14
Development Company: MKM

Development Method: Whale Pumping
Comments:

Well TD: 22.82 FT TIC Depth to Water: 14.58 FT
Water Column Height: 8.24 FT One Well Volume: 4.85 Gals

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

Time well Dev code	Well Dev. Code Time	Depth to Water (ft)	Purge Rate (gpm)	Purge Volume (gal)	Field Measurements pH	CON	DO	Temp	Turbidity	Comments
DSB	1302	14.58								
DSE	1307	14.62			7.50	.800	6.11	NO	1000	Initial Readings
DPB	1315	14.62	—	—	7.50	0.80	6.11	11.0	1000	1st
DFM	1320	—	—	—	7.43	0615	7.49	11.5	1000	1st 5
DFM	1328	—	—	—	7.22	0.550	6.28	12.0	1000	2nd 10
DFM	1335	—	—	—	7.65	0.530	8.19	11.6	945	3rd 15
DFM	1340	—	—	—	7.32	0.548	7.32	11.8	1000	4th 20
DFM	1345	—	—	—	7.29	0.522	6.60	11.3	337	5th 25
DFM	1349	—	—	—	7.21	0.53	5.82	11.8	1000	6th 30
DFM	1352	—	—	—	7.22	0.513	6.84	11.7	1000	7th 35
DFM	1358	—	—	—	7.10	0.510	5.86	11.9	426	8th 40
DFM	1402	—	—	—	7.15	0.508	6.25	11.9	999	9th 45
DFM	1405	—	—	—	7.35	0.510	6.69	11.9	455	10th 50
DPE	1606	16.55	—	—	—	—	—	—	—	
	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 Qualattaive 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. Eder
Signature: Vijay Date: 2/22/05

Monitoring Well Purging Form

Well ID: ASYMW-002GW

Ravenna Army Ammunition Plant
Ravenna, Ohio

Date : 11/30/04

WELL OBSERVATIONS

Protective Casing: ~~Intact~~ · Damaged **Locked:** Yes (No) **Key No:**
Concrete Base: Intact · Damaged **Inner Casing:** (2") · 4" · 6" · 8" **Other:**
Stickup Height: 2.65 (ft) **TIC · TOC Difference:** 0.25 (ft)
Vapor Readings : HNu · OVA Background: _____ Inside Well Casing:

	Present	Depth	Sampled Sample ID
LNAPL	Yes · No _____	Yes · (No)	ASYmw-0026W
DNAPL	Yes · No _____	Yes · (No)	

CALCULATIONS

(A) **Depth to Well Bottom** 19.5 (ft) (TOC) · TIC · BGS (Measured) · **Previously Measured** (circle one)
(B) **Depth to Water** 14.4 (ft) (TOC) · TIC · BGS **Time Measured:** 1326
(C) **Water Column Height (A-B)** 5.1 (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)** .82 (gal)
(F) **Volumes to be Evacuated** 5
(G) TOTAL VOLUME TO BE EVACUATED (E * F) 4.08 (gal)

EVACUATION METHOD

Well Evacuation Method: Bailer · Submersible Pump · Other: Micro purging **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	
1327	14.4			0.623	12.47	7.14	1000	8.05	Initial reading
1330	14.7			0.627	12.46	7.49	1000	6.88	
1333	14.8			0.627	12.44	7.06	956	6.62	
1336	14.7			0.629	12.44	7.11	789	6.61	
1339	14.7			0.629	12.42	7.07	528	6.7	
1342	14.7			0.629	12.43	7.05	446	6.72	End purging

Logged By: Vijay Alluri (Please Print) Reviewed By: J. Eckel

Signature: Vijay Date 2/22/05

Field Sampling Report

Location ID: ASY MW-002-GW

Date: 11/30/04

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 purge	X			Push Probe		Plastic Liner	
Type/Construction					Mattocks			
Miscellaneous	**Well Purging Form** (Yes) / No							

Sample Collection: 1350 hrs

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

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

Sample Depth: 15 FT (below surface)

Decon: Dedicated - Each Day - (Each Location)

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	X	Ignitability			
Sample:	0.0	ppm	Propellants	X	Nitrate					
Water Level	14.4	FT	TAL Metals	X						
Temperature	12.43	°C	Pesticides/PCBs	X						
Sp. Conductance:	0.629	uMHOs	Cyanides							
pH	7.05	units	TOC							
Turbidity	446	N.T.U.	Grain Size							

QA Samples		
MS/MSD	Yes / No	NA
Duplicate ID		NA
Equipment Rinse ID		NA
Trip Blank ID	Trip Blank	NA

Sample Description

Not clear, No odor, No sheen, Medium 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: Vijay Alluri (Please Print)

Signature: Vijay

Reviewed by: ERIC ELLIS (Please Print)

Signature: [signature] Date: 2/3/05

HTRW DRILLING LOG

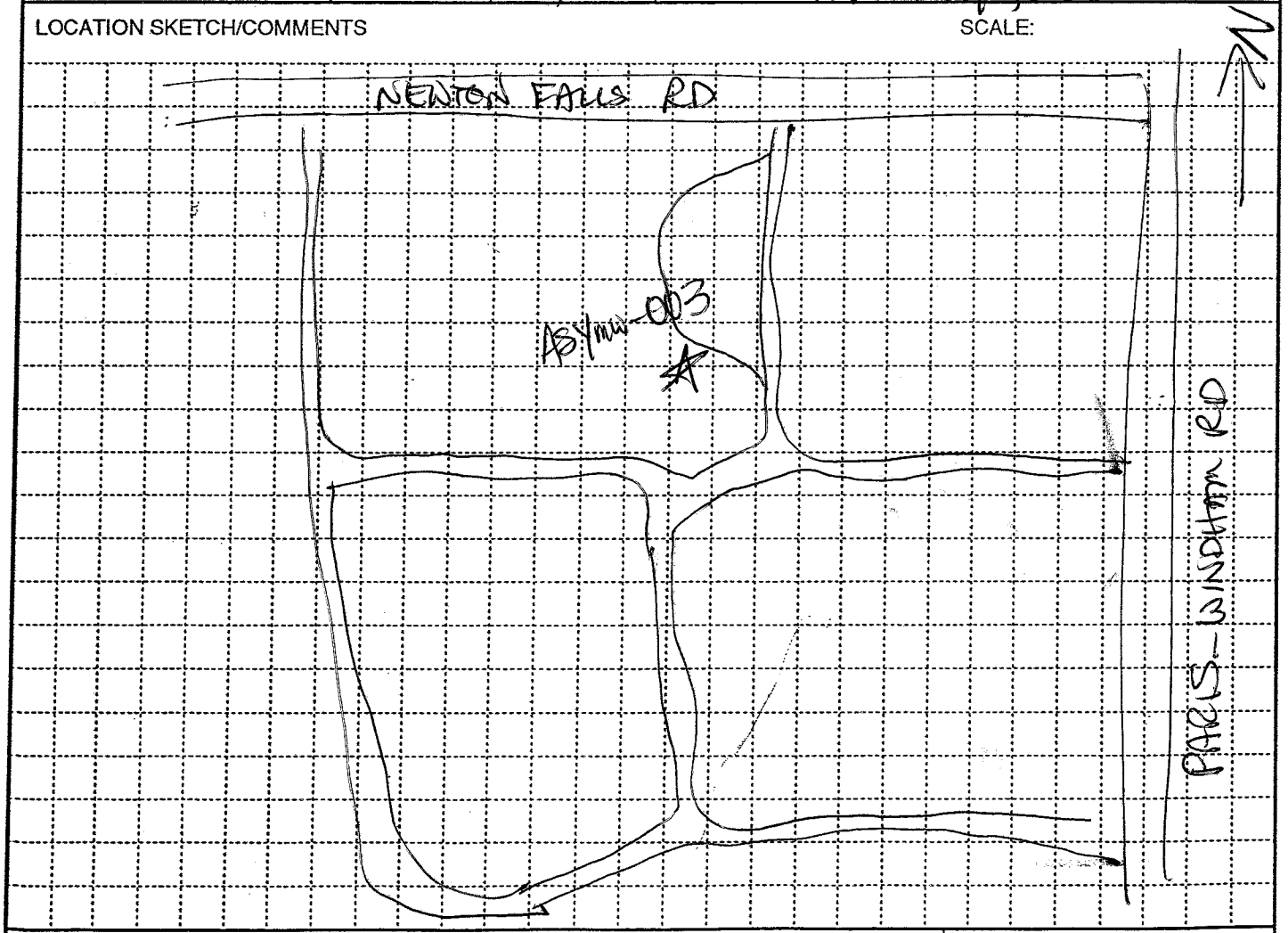
DISTRICT: LOUISVILLE		HOLE NUMBER: ASH MW-003
1. COMPANY NAME: MKM ENGINEERS	2. DRILL SUBCONTRACTOR: HAD DRILLING	SHEET 1 OF 3 SHEETS
3. PROJECT: RVAAP-R114	4. LOCATION: RAVENNA, OH ATLAS SCRAP YARD	
5. NAME OF DRILLER: SCOTT HEISER	6. MANUFACTURER'S DESIGNATION OF DRILL: CME	
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: 4¼" ID HSA; 2' – 1½" ID SPLITSPOON	8. HOLE LOCATION: NORTHERN CENTRAL PART OF SITE	
	9. SURFACE ELEVATION: 979.70 ASL	
	10. DATE STARTED: 11/11/04	11. DATE COMPLETED: 11/11/04
12. OVERBURDEN THICKNESS: 20	15. DEPTH GROUNDWATER ENCOUNTERED: 15'	
13. DEPTH DRILLED INTO ROCK: 1.5	16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED: 12.15 @ 0915 11/17/04	
14. TOTAL DEPTH OF HOLE: 21.5'	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY): —	

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
SHELBY TUBE 6'-8' BGS		X	NA

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE RECOVERY: NA %
—	—	—	—	—	—	

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
	—	X	—	David A. Smith

LOCATION SKETCH/COMMENTS — SCALE:



PROJECT: RVAAP-R114	HOLE NO: ASH MW-003

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

HTRW DRILLING LOG (CONTINUATION SHEET)

HOLE NUMBER: ASYmw-003

PROJECT: RVAAP-RI 14 | INSPECTOR: DK EARNEST | SHEET 2 OF 3 SHEETS

1230

ELEV. (a)	DEPTH (b)	DESCRIPTION OF MATERIALS (c)	FIELD SCREENING RESULTS (d)	~~GEOTECH SAMPLE OR CORE BOX NO.~~ RECOVERY	~~ANALYTICAL SAMPLE NO.~~ USCS	BLOW COUNT (g)	REMARKS (h)
	0–2	6" TOPSOIL w/ DEBRIS; BROWN SILT (80%) MOTTLED w/GREY, LOW PLASTIC; ~~GREY w/BRN~~ TRACE SAND (10%); BROWN w/GREY ~~SMALL PEBBLES~~ DKE FINE GRAVEL (10%)	3.4	1.1	ML	6/5, 3/3	7.5YR 4/3 DAMP; DRY
	2–4	LESS MOTTLING w/ DEPTH; STIFF	3.3	1.5	ML	5/6, 7/9	7.5YR 5/6; 25% MOTTLING ~~5/6~~ DRY
	4–6		3.9	1.5	ML	1/4, 7/11	
	6–8	SHELBY TUBE	—	—	—	—	1245
	8–10	2" SAND SEAM; BROWN CLAYEY (20%) SILT (80%), STIFF TO V.S., NO PLASTIC	3.4	1.5	ML	1/4, 8/10	7.5YR 5/6 DRY
	10–12	SAND SEAM 3" AT TOP; ROCK FRAGS AT 10.5, FINE TO SMALL GRAVEL	2.3	1.5	ML	2/3, 5/6	MOIST
	12–14	GREY SILT (85%), TRACE PEBBLE, TRACE SAND, NON PLASTIC, MED DENSE	2.8	1.8	ML	2/6, 5/4	MOIST
	14–16		3.7	1.8	ML	1/3, 2/3	7.5YR 4/1; WET @ 15
	16–18	SAA, SOME SAND, SOME PEBBLES; SAND SEAM AT 17; (20%) SANDY SILT (80%)	2.8	1.7	ML	1/3, 5/7	
	18–20	DK GREY CLAYEY (20%) SILT (80%); 3" ROCK FRAGS & PEBBLES; SAND SEAM	4	1.6	ML; SM	2/11, 37/50+	10YR 3/1; SPOON REFUSAL

1330

PROJECT: RVAAP-RI 14 | HOLE NO. ASYmw-003

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

ASY MW-003

HTRW DRILLING LOG (CONTINUATION SHEET)

HOLE NUMBER: ASY MW-003

PROJECT: RVAAP-RI 14

INSPECTOR: DK EARNEST

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)
	20	DRILLED INTO SS TO 21.5'					
	21	BOTTOMED 21.5'					
		WELL TO BE SET AT 21.0'					
		6" SAND BELOW SCREEN					
		SCREEN AT 11-21' BGS					
		SAND TO 9'					
		SEAL TO 7'					

PROJECT: RVAAP-RI 14

HOLE NO: ASY MW-003

ENG FORM 5056A-R, AUG 94

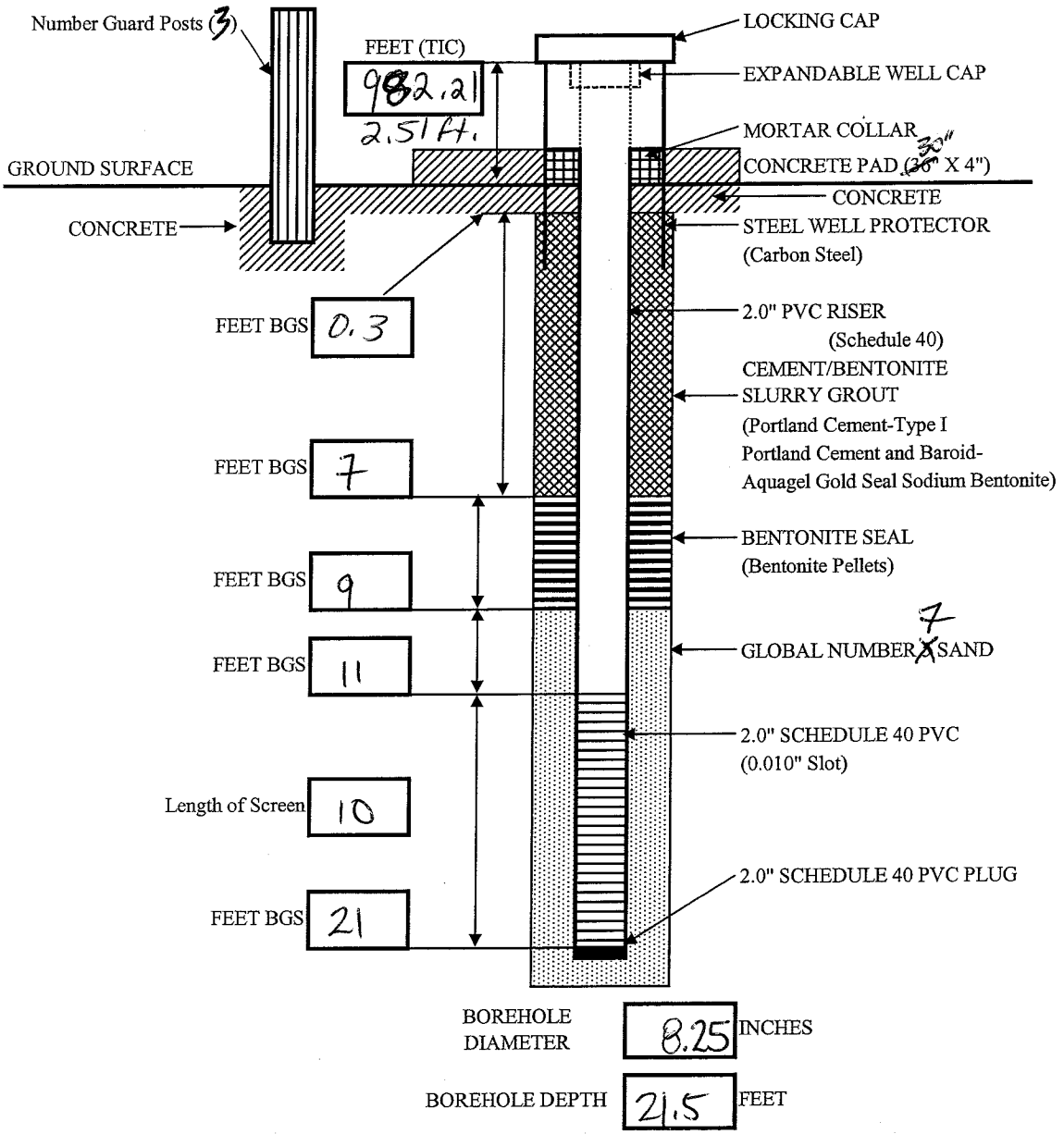
(Proponent: CECW-EG)

MONITORING WELL CONSTRUCTION DIAGRAM

RAVENNA ARMY AMMUNITION PLANT

Project: RVAAP RI 14

Well Number: ASY mw-008 ~~HSE~~	Begin: 11/11/04	End: 11/11/04
Coordinates: N: 558015.94 E: 2366651.49	Elevation: 979.70	Reference Point:
Logged By: DK 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

Well ID: ASYMW-003-GW
Date: 11/17/04

Ravenna Army Ammunition Plant-
RVAAP 14 AOC Characterization

Project: RVAAP 14
Development Company: MKM

Development Method: Whale Pump
Comments:

Well TD: 23.35 FT TIC Depth to Water: 12.15 FT
Water Column Height: 21.2 FT One Well Volume: 12.5 Gals

Well Volume (gallons/foot): 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		
0915	DSB	12.15								
0920	DSE	12.35								
0923	DPB	12.35			7.23	0.992	10.22	12.6	>1000	Initial Reading
—	~~DPE~~	~~Dry~~								
0935	DFM			12.5	6.99	1.44	6.54	12.4	>1000	12.5 (1 well vol)
	~~DPE~~	~~Dry~~								
0945	DFM	—	—	12.5	6.84	1.47	1.88	12.03	>1000	25 (2nd well vol)
0946	DPE	Dry	—	0.5	—	—	—	—	—	25.5
1103	DPB	12.25	—	—	—	—	—	—	—	
1115	DFM	~~12~~	—	12.00	7.07	1.48	3.61	12.4	>1000	~~38.5~~ 37.5 (3rd well vol)
1118	DPE	Dry	—	1	—	—	—	—	—	38.5
1320	DPB	12.20	—	—	—	—	—	—	—	
1331	DFM	—	—	11.5	7.17	150	3.63	12.6	000	50.0 (4th well vol)
1340	DFM	—	—	12.5	7.17	1.57	3.36	12.4	1000	~~62.5~~ 62.5 (5th well vol)
1354	DFM	—	—	12.5	7.25	1.39	4.33	12.4	999	75.0 (6th 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 Qualattaive Observations

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

Logged By: Sudheer Gubbala (Please Print)
Signature:

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

Well Development Record

Well ID: ASWMU-008-GW
Date: 11/17/04

Ravenna Army Ammunition Plant-
RVAAP 14 AOC Characterization

Project: RVAAP 14
Development Company: MLM

Development Method: Whale pumping.
Comments:

Well TD: _____ FT TIC Depth to Water: _____ FT
Water Column Height: _____ FT One Well Volume: _____ 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		
1405	DFM			12.5	7.05	1.65	3.64	12.4	1000	7th 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 Qualattaive Observations

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

Logged By: Sudheer Gubbala (Please Print) Reviewed By: C. Eslu
Signature: [signature] Date: 2/22/05

Monitoring Well Purging Form

Well ID: ASYmw-003-GW

Ravenna Army Ammunition Plant
Ravenna, Ohio

Date : 12/1/04

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:** 0.3 (ft)

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

	Present	Depth	Sampled Sample ID
LNAPL	Yes · No _____	Yes · (No)	ASYmw-003-GW
DNAPL	Yes · No _____	Yes · (No)	

CALCULATIONS

(A) **Depth to Well Bottom** 23.3 (ft) (TOC) · TIC · BGS (Measured) · **Previously Measured** (circle one)

(B) **Depth to Water** 12 (ft) (TOC) · TIC · BGS **Time Measured:** 1305

(C) **Water Column Height (A-B)** 11.3 (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)** 1.81 (gal)

(F) **Volumes to be Evacuated** 5

(G) TOTAL VOLUME TO BE EVACUATED (E * F) 9.04 (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	
1314	12.0		0.0	1.14	12.4	7.02	244	3.60	Initial
1317	12.3		0.0	1.16	12.60	7.03	244	2.51	
1320	12.23		0.0	1.17	12.72	7.01	235	1.60	
1323	12.20		0.0	1.17	12.83	6.99	221	1.27	End

Logged By: Sudheer Gubba (Please Print) Reviewed By: _____

Signature: _____ Date : 2/22/05

Field Sampling Report

Location ID: ASYMW-003-GW

Date: 12/1/04

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 Purge	X			Push Probe		Plastic Liner	
Type/Construction	Stainless Steel				Mattocks			
Miscellaneous	~~Well Purging Form~~ Yes - No							

Sample Collection: 1330 hrs

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

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

Sample Depth: 12-20 FT (below surface)

Decon: (Dedicated) - Each Day - Each Location

Field Parameters (at time of sample)		
PID / FID Readings: Background:		ppm
Sample:		ppm
Water Level	1220	FT
Temperature	12.83	°C
Sp. Conductance:	1.17	uMHOs
pH	6.79	units
Turbidity	221	N.T.U.

Analytical Parameters			
VOC	X	TPH GRO	
SVOC	X	TPH DRO	
Explosives	X	Chromium +6	X
Propellants	X	Nitrate	X EDB
TAL Metals	X		
Pesticides/PCBs	X		
Cyanides			
TOC			
Grain Size			

Other Parameters			
Corrosivity			
Reactivity Sulfide/Cyanide			
Ignitability			

QA Samples		
MS/MSD	(Yes) / No	NA
Duplicate ID	✓ ASYMW-003-DP	NA
Equipment Rinse ID		(NA)
(Trip Blank ID)	✓ TRIP BLANK	NA

Sample Description

Clear water, No odor, No sheen, Low turbidity

Split Sample

Split Sample ID: ASYMW-003-GW

Name: John Scot (CELRL-EC-ED)

Agency/Company: USACE-Louisville

Address: 600 Dr. Martin Luther King Jr Place
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)

Signature: [signature]

Reviewed by: ERK EMS (Please Print)

Signature: [signature] Date: 2/3/05

HTRW DRILLING LOG

	DISTRICT: LOUISVILLE	HOLE NUMBER: ASYMW-004
1. COMPANY NAME: MKM ENGINEERS	2. DRILL SUBCONTRACTOR: HAD DRILLING	SHEET 1 OF 3 SHEETS

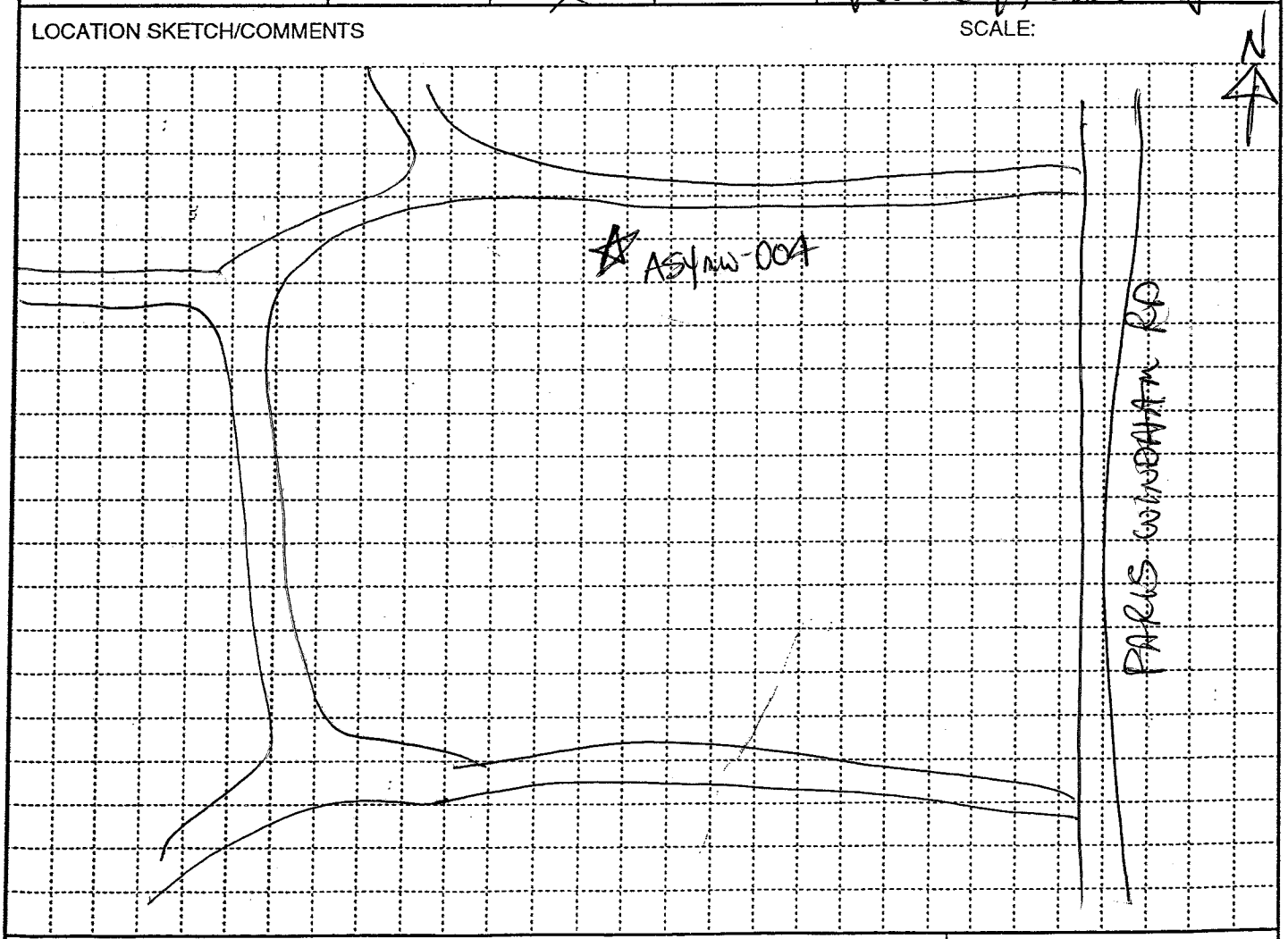
3. PROJECT: RVAAP - R114	4. LOCATION: RAVENNA, OH ATLAS SCRAP YARD
5. NAME OF DRILLER: SCOTT HETSER	6. MANUFACTURER'S DESIGNATION OF DRILL: CME-55
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: 4 1/4" ID HSA; 1 1/2" ID 2' SPLITSPOON	8. HOLE LOCATION: CENTER OF SITE
	9. SURFACE ELEVATION: 977.10 ASL
	10. DATE STARTED: 11/10/04 — 11. DATE COMPLETED: 11/11/04
12. OVERBURDEN THICKNESS: 27.5	15. DEPTH GROUNDWATER ENCOUNTERED: 16'
13. DEPTH DRILLED INTO ROCK: NA	16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED: 9.15 @ 0950 — 11/17/04
14. TOTAL DEPTH OF HOLE: 27.8'	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY): —

18. GEOTECHNICAL SAMPLES	DISTRICT	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
NONE	—	—	NA

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE RECOVERY %
—	—	—	—	—	—	

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
	—	X	—	David Reamer

LOCATION SKETCH/COMMENTS — SCALE:



PROJECT	HOLE NO.
RVAAP - R114	ASYMW-004

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

HTRW DRILLING LOG (CONTINUATION SHEET)

HOLE NUMBER: ASYmw-004

PROJECT: RVAAP-RI 14 | INSPECTOR: DREARNEST | SHEET 2 OF 3

ELEV. (a)	DEPTH (b)	DESCRIPTION OF MATERIALS (c)	FIELD SCREENING RESULTS (d)	GEOTECH SAMPLE OR CORE BOX NO. RECOVERY	ANALYTICAL SAMPLE NO. USCS	BLOW COUNT (g)	REMARKS (h)
930	0	~~0'~~ GREY TOPSOIL					930 AM
		LT GREY W/ ORANGE CLAY & SILT (90%) MED TO LOW PLASTIC TRACE SAND (10%)	3.9	1.3	CL	3/5 7/11	~~7.5 YR 6/2~~ DRY WITH 5/6 30%
	2	BROWN W/ GREY MOTTLED TRACE SMALL PEBBLES	7.6	1.4	CL	8/11 11/13	~~7.5 YR 4/3~~ ~~DRY~~ DRY
	4	LESS MOTTLING W/ DEPTH	4.8	1.4	CL	1/6 12/13	7.5 YR 4/3 DRY
	6	SAA	7.7	1.5	CL	2/7 11/17	DRY
	8	SAA	6.2	1.6	CL	4/10 13/21	DRY
	10	GREY SILT, SL CLAY (80% / 20%) LOW TO NO PLASTIC STIFF NO ODOR	6.5	1.4 PID	ML	2/5 8/10	11' DAMP TO WET 7.5 YR 5/1
	12	SAA MED TO STIFF	5.7	1.7	ML	1/3 4/5	
	14	SAA	6.1	2.0	ML	1/2 3/5	
	16	SAA	3.3	2.0	ML	2/3 4/6	16-16.5 SAT
	18	SAA	3.8	1.8	ML	1/3 5/7	18-18.5 SAT
	20						

PROJECT: RVAAP-RI 14 | HOLE NO: ASYmw-004

HTRW DRILLING LOG (CONTINUATION SHEET)

HOLE NUMBER: ASWMU-004

PROJECT: RVAAP-RI 14

INSPECTOR: DKEARNEST

SHEET 3 OF 3

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)
	20	SAA				1/2	
			4.1	1.8	ML	3/6	1" SAND @ 21.5' 2.5Y 4/2
	22	SILT, SANDY OLIVE GRAY LOW PLASTIC SOME COARSE SAND TO SMALL ~~PEBBLES~~ GRAVEL ~~FINE~~	27	2.0	ML	1/4 8/12	22.5' 4" COARSE SAND SEAM
	24	NONPLASTIC				4/8	7.5 YR 4/1
		DK GREY AT 25'	8.2	1.8	ML	12/13	7.5YR 2.5/1
	26	SOME SS ROCK FRAGS	7.7	1.3	ML	2/11	
		SANDSTONE				50T	27.5 REFUSAL
	28	BOH 27.8'					
	30	REFUSAL 27.8'					
		SCREEN 17-27					
		SAND TO 14'	8 BAGS #7 SAND				
		SEAL TO 11'					

PROJECT: RVAAP-RI 14

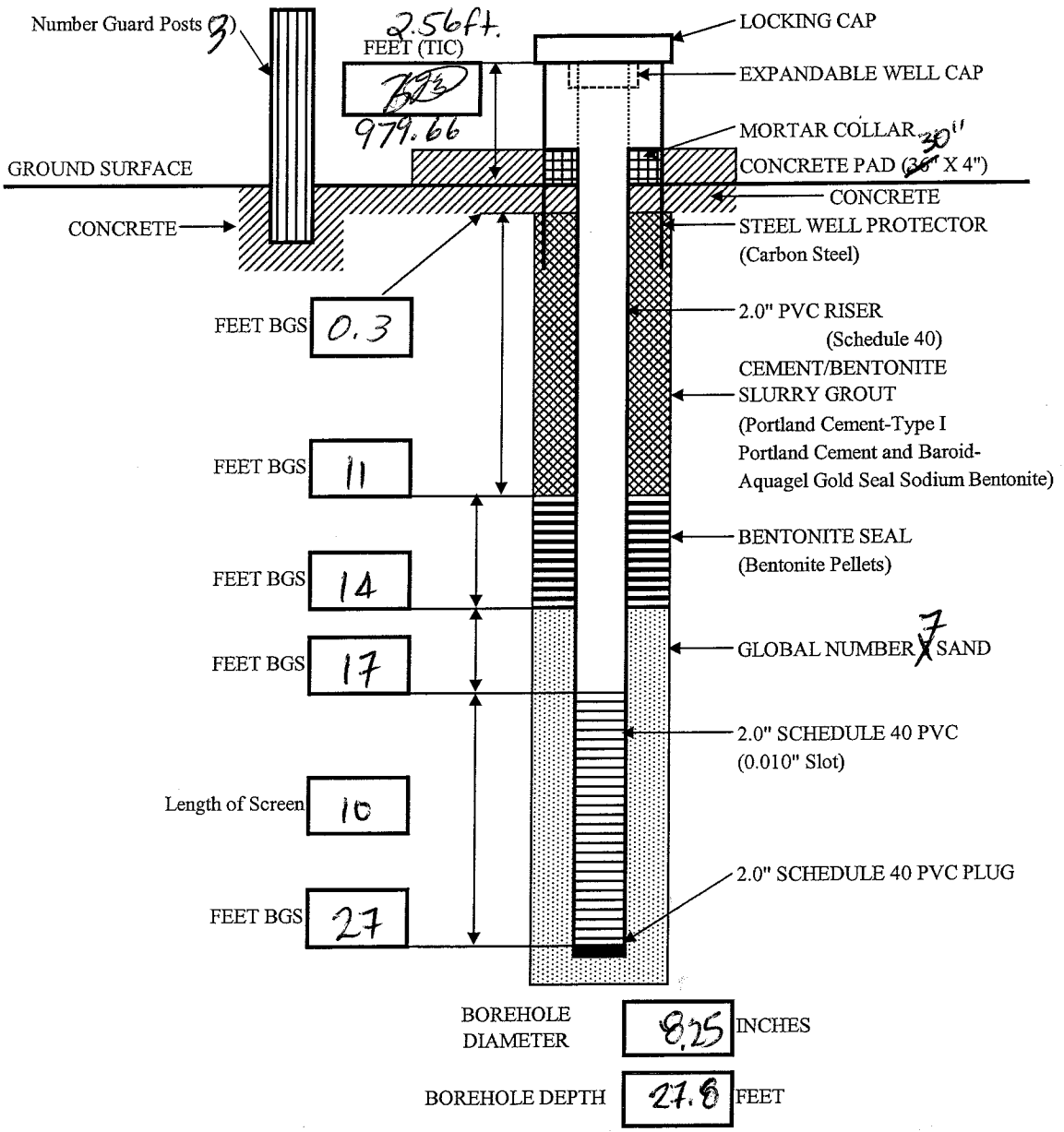
HOLE NO: ASWMU-004

MONITORING WELL CONSTRUCTION DIAGRAM

RAVENNA ARMY AMMUNITION PLANT

Project: RVAAP RI 14

Well Number: ASY mw -004	Begin: 11/11/04	End: 11/11/04
Coordinates: N: 557640.81 E: 2367166.04	Elevation: 977.10	Reference Point:
Logged By: DK 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

Well ID: ASYMW-004-GW
Date: 11/17/04

Ravenna Army Ammunition Plant-
RVAAP 14 AOC Characterization

Project: RVAAP14
Development Company: MEM

Development Method: Whale pumping
Comments:

Well TD: 29.7 FT TIC Depth to Water: 9.15 FT
Water Column Height: 20.55 FT One Well Volume: 12.0 Gals

Well Volume (gallons/foot): 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	COND	DO	Temp		
0950	DSB	9.15	—	—	—	—	—	—	—	—
0955	DSE	9.20	—	—	—	—	—	—	—	
1003	DPB	9.20	—	—	7.24	1.36	9.95	10.6	>1000	Initial Reading
1012	DPE	Dry	—	10.5	—	—	—	—	—	10.5 gal.
1123	DPB	14.50	—	—	—	—	—	—	—	-
1125	DFM	—	—	1.5	7.7	1.36	533	11.8	808	12 gal (1 well vol
1133	DPE	Dry	—	6.5	—	—	—	—	—	18.5 gal
1420	DPB	9.95	—	—	—	—	—	—	—	—
1424	DFM	—	—	5.5	7.17	1.21	5.46	12.0	1000	24 gal (2 well vol)
1428	DPE	Dry	—	3.5	—	—	—	—	—	27.5 gal.
1507	DPB	20.9	—	—	—	—	—	—	—	—
1515	DPE	Dry	—	5.5						33.0
~~0920~~	~~DSB~~	~~14.50~~	—	—	—	—	—	—	—	— CE
~~0925~~	~~DSE~~	~~15.00~~	—	—	—	—	—	—	—	CE
~~0927~~	~~DPB~~	~~15.00~~	—	—	6.94	1.15	7.09	11.9	1000 CE	—
~~0932 CE~~	FINAL	~~Dry CE~~	—	~~3gal~~	—	—	—	—	—	~~36 gal (3 vol well vol)~~ CE

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 Qualattaive Observations

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

Logged By: Sudhee Gubba (Please Print)
Signature:

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

Well Development Record

Well ID: AS4MW-004-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 TD: 29.7 FT TIC
Depth to Water: 9.15 FT
Water Column Height: 20.6 FT
One Well Volume: 12.0 Gals

Well Volume (gallons/foot): 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 pH	CON	DO	Temp	Turbidity	Comments
0950	DSB	9.35		—						
0952	DSE	9.40		—						
0955	DPB	9.40		—						
0957	DFM	~~Dry~~		3	7.24	1.35	7.43	12.8	1000	36 gal (4th well)
1004	DPE	Dry ~~12.65~~		6.0						42 gal
1131	DPB	12.65		—						
1136	DFM	~~Dry~~		6	7.31	1.37	5.42	12.2	1000	48 gal (5th well)
1140	DPE	Dry ~~12.28~~		1						49
1304	DPB	12.28 ~~Dry~~		—						
1311	DPE	Dry ~~10.65~~		7.0						56
1529	DPB	10.65								
1532	DFM	—		4.0	7.05	1.19	6.54	12.5	212	60 (6th well vol)
1540	DPE	Dry		4.5						64.5
0916	DPB	9.2		—						
0917	DFM	—		—						
	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 Qualattaive Observations

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

Logged By: Sudhir Gubbo (Please Print)
Signature: [signature]
Reviewed By: C. Eoler
Date: 2/22/05

Well Development Record

Well ID: ASYmw-004-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 TD: 29.7 FT TIC Depth to Water: 9.15 FT
Water Column Height: 20.55 FT One Well Volume: 120 Gals

Well Volume (gallons/foot) 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		
0919	DPE			7.5	7.25	1.35	6.72	12.1	722	72901 (7th well 901)
	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 - Photolonizer (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 Qualattaive Observations

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

Logged By: Sudheer Gubbala (Please Print) Reviewed By: C. Colby
Signature: Colby Date: 2/22/05

Monitoring Well Purging Form

Well ID: ASYMW-004-GW

Ravenna Army Ammunition Plant
Ravenna, Ohio

Date : 12/3/04

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:** 0.35 (ft)
Vapor Readings : HNu · OVA Background: _____ Inside Well Casing:

	Present	Depth	Sampled Sample ID
LNAPL	Yes · No _____	Yes · (No)	ASYmw-004-GW
DNAPL	Yes · No _____	Yes · (No)	

CALCULATIONS

(A) **Depth to Well Bottom** 29.7 (ft) (TOC) · TIC · BGS **Measured · Previously Measured** (circle one)
(B) **Depth to Water** 9 (ft) (TOC) · TIC · BGS **Time Measured:** 1425
(C) **Water Column Height (A-B)** 20.7 (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)** 3.31 (gal)
(F) **Volumes to be Evacuated** 5
(G) TOTAL VOLUME TO BE EVACUATED (E * F) 16.54 (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	
1430	9.0		0.0	1.43	10.83	7.00	67	6.91	Initial Reading
1433	9.5		0.0	1.44	11.69	6.91	42	3.08	
1436	10.45		0.0	1.46	12.05	6.90	37	2.07	
1439	11.00		0.0	1.46	12.14	6.88	30.6	1.74	

Logged By: Sudheer Gubbu (Please Print) Reviewed By: C. Colon
Signature: S. Gubbu Date : 2/22/05

Field Sampling Report

Location ID: AS4MW-004-GW

Date: 12/3/04

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 Purge	X			Push Probe		Plastic Liner	
Type/Construction	stainless steel				Mattocks			
Miscellaneous	**Well Purging Form** (Yes) No							

Sample Collection: 1445 hrs

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

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

Sample Depth: 11.00 FT (below surface)

Decon: (Dedicated) - Each Day - Each Location

Field Parameters (at time of sample)		Analytical Parameters				Other Parameters			
PID / FID Readings:		VOC	X	TPH GRO		Corrosivity			
Background:	ppm	SVOC	X	TPH DRO		Reactivity Sulfide/Cyanide			
		Explosives	X	Chromium +6	X	Ignitability			
Sample:	ppm	Propellants	X	Nitrate					
Water Level	11.00 FT	TAL Metals	X						
Temperature	(Q) 1.46 12.14 °C	Pesticides/PCBs	X						
Sp. Conductance:	146 uMHOs	Cyanides							
pH	6.88 units	TOC							
Turbidity	30.6 N.T.U.	Grain Size							

QA Samples		
MS/MSD	Yes / No	NA
Duplicate ID		NA
Equipment Rinse ID		NA
Trip Blank ID	Trip Blank	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: G. Sudheer

Reviewed by: ERIC ELLIS (Please Print)

Signature: [signature] Date: 2/3/05

HTRW DRILLING LOG

DISTRICT: LOUISVILLE		HOLE NUMBER: ASYmw-005
1. COMPANY NAME: MKM ENGINEERS	2. DRILL SUBCONTRACTOR: HAD DRILLING	SHEET 1 OF 3
3. PROJECT: RVAAP-RI IA	4. LOCATION: ATLAS SCRAP YARD	
5. NAME OF DRILLER: SAM HOFFER	6. MANUFACTURER'S DESIGNATION OF DRILL: CME-LC60	
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: 8.25" OD HSA; 2" SPLIT SPOON	8. HOLE LOCATION: EAST CENTER OF SITE	
	9. SURFACE ELEVATION: 977.60 ASL	
	10. DATE STARTED: 15 Nov 04	11. DATE COMPLETED: 16 Nov 04
12. OVERBURDEN THICKNESS:	15. DEPTH GROUNDWATER ENCOUNTERED: ~14.5'	
13. DEPTH DRILLED INTO ROCK:	16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED: 7.4 @ 1055 11/19/04	
14. TOTAL DEPTH OF HOLE: 25'	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY): —	

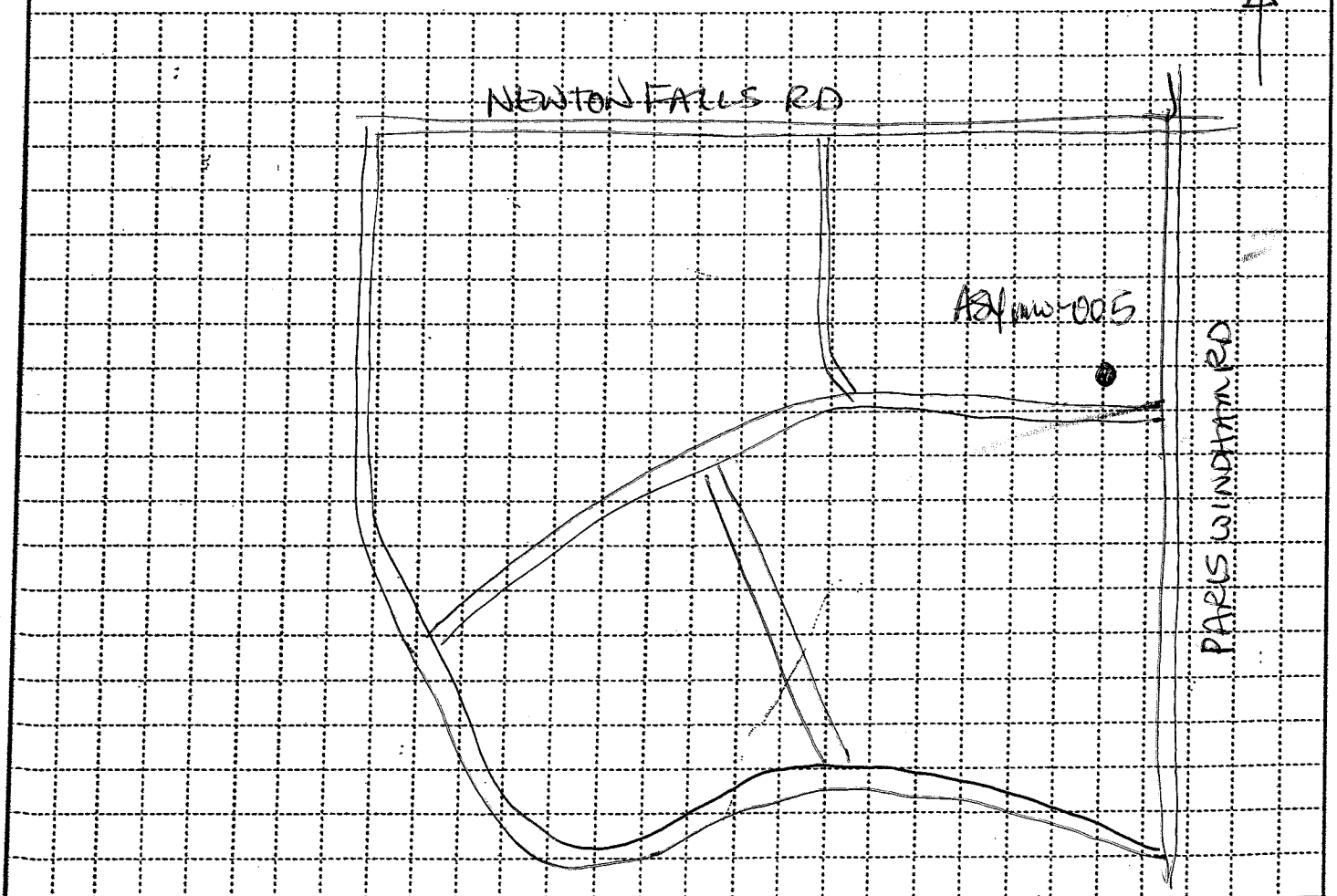
18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
NONE	—	—	NA

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE RECOVERY %
—	—	—	—	—	—	

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
	—	X	—	

LOCATION SKETCH/COMMENTS

SCALE:



PROJECT	HOLE NO.
RVAAP-RI IA	ASYmw-005

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

HTRW DRILLING LOG (CONTINUATION SHEET)

HOLE NUMBER: ASYmw-005

PROJECT: RVAAP RI 14

INSPECTOR: Mark Dunlay

SHEET 2 OF 3 SHEETS

ELEV. (a)	DEPTH (b)	DESCRIPTION OF MATERIALS (c)	FIELD SCREENING RESULTS (d)	~~GEOTECH SAMPLE OR~~ CORE BOX NO. Recovery (e)	ANALYTICAL SAMPLE NO. (f)	BLOW COUNT (g)	REMARKS (h)
	0	0.7 Topsoil Br. SILT 70% w/ Sand 20% Damp No Odor No Plasticity Grey Mottles	1.5	1.6	ML	Mt-1 1-3	7.5Y-5/6
	2	Rock in end of Split Spoon	0.0	0		1-5 5-5	
	4	Br. SILT 70% w/ Sand 20% Dry No Odor No Plasticity Grey Mottles	0.9	1.4	ML	1-2 5-7	7.5yr 5/6
	6	Same As Above	0.0	1.6	ML	3-6 10-11	7.5Y-5/6
	8	Same As Above	0.0	1.6	ML	4-6 10-13	7.5Y-5/6
	10	Same As Above	0.0	1.6	ML	7-5 10-11	7.5Y-4/4
	12	Grey SILT 75% w/ Clay Wet/Sat. No Plasticity No Odor No Staining	0.0	1.6	ML	5-10 11-10	7.5yr 5/1
▽	14	4" Sand w/ Silt Saturated ~~Same As Above~~	0.0	1.0	ML	1-3 5-7	SAA
	16	Grey/Br. SILT 70% w/ Sand Dry No Plasticity No Odor No Staining	0.0	1.2	ML	1-3 5-8	SAA
	18	1" Dry Sand Layer Grey SILT 70% w/ Sand Dry No Plasticity No Odor No Staining	0.0	1.3	ML	1-3 5-8	SAA
	20						

PROJECT: RVAAP RI 14

HOLE NO. ASYmw-005

ENG FORM 5056A-R, AUG 94

(Proponent: CECW-EG)

HTRW DRILLING LOG (CONTINUATION SHEET)

HOLE NUMBER: ASVmw-005

PROJECT: RVAAPRI 14

INSPECTOR: Mark Donley

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 w/ rock frag beginning @ 21 Ft.	0.0	1.4	ML	1-3 6-7	SAA
	24	Same As Above	0.0	1.7	ML	2-7 10-11	SAA
	26	Grey SILT 70% w/ Sand 20% Dry Stiff Nodular No Staining No Plasticity Split spoon Refusal @ 26 Ft	0.0	1.8	ML	2-7 6-16 21-22 (for 11)	SAA
	28				ML		
	30	BOH 29 Ft					BOH 29 Ft - waited over night to check water level - 13 Ft. of silt in borehole in morning - cleaned out/re drilled hole to 28 Ft. BOH 25 Sand to 24 Screen from 24 to 14 Sand to 11 Bentonite to 8 Grout to Surface Completion

PROJECT: RVAAPRI 14

HOLE NO.: ASVmw-005

ENG FORM 5056A-R, AUG 94

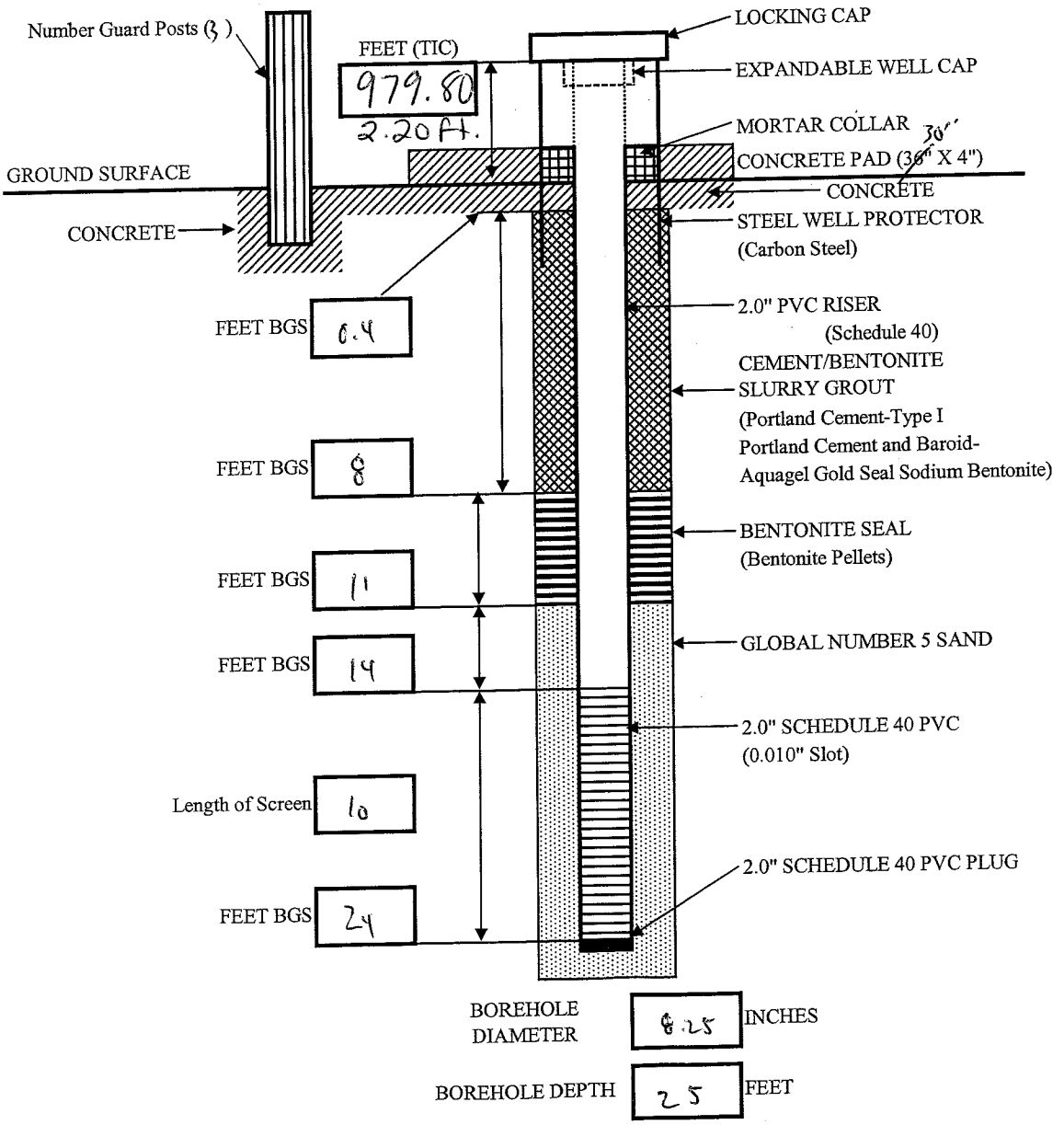
(Proponent: CECW-EG)

MONITORING WELL CONSTRUCTION DIAGRAM

RAVENNA ARMY AMMUNITION PLANT

Project: RVAAP RI 14

Well Number: ASYmw-005	Begin: 15 Nov 04	End: 16 Nov 04
Coordinates: N: 557783.01 E: 2367448.16	Elevation: 977.60	Reference Point:
Logged By: Mark Dunlay		



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: AS465-005-MW28
Date: 11/19/04

Ravenna Army Ammunition Plant-
RVAAP 14 AOC Characterization

Project: RVAAP 14
Development Company: WKM

Development Method: Whale pumping
Comments:

Well TD: 27.15 FT TIC Depth to Water: 7.4 FT
Water Column Height: 19.75 FT One Well Volume: 11.6 Gals

Well Volume (gallons/foot): 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		
1035	DSB	7.4	—	—	—	—	—	—	—	
1100	DSB	7.1	—	—	—	—	—	—	—	
1105	DPB	7.1	—	—	7.77	0.76	6.79	12.5	1000	Initial Reading
11:10	DPE	Dry	—	5	—	—	—	—	—	—
11/22/04 0958	DSB	7.31	—	—	—	—	—	—	—	
1001	DSE	—	—	—	—	—	—	—	—	
1002	DPB	7.52	—	—	7.5	0.762	3.63	9.6	1000	
1010	DPE	Dry	—	5	—	—	—	—	—	10
11.27	DPB	10.9	—	—	—	—	—	—	—	
1130	DFM	—	—	1.6	7.44	6.62	2.99	10.5	1000	11.6 1st volume
1132	DPE	Dry	—	2.0	—	—	—	—	—	13.6
1505	DPB	9.05	—	—	—	—	—	—	—	
1510	DPE	Dry	—	4.0	—	—	—	—	—	17.6
11/23/04 0830	DSB	13.2								
1035	DSE	13.55								
	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 - Photolonizer (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 Qualattaive 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. Cole
Signature: Vijay Date: 2/2/05

Well Development Record

Well ID: ASY-MW-005-AA(ab)
Date: 11/23/04

Ravenna Army Ammunition Plant-
RVAAP 14 AOC Characterization

Project: RVAAP-14
Development Company: MKM

Development Method: Whale pumping
Comments:

Well TD: 27.15 FT TIC Depth to Water: 7.4 FT
Water Column Height: 19.75 FT One Well Volume: 11.6 Gals

Well Volume (gallons/foot): 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		
1240	DPB	7.6	—	—	—	—	—	—	—	
1251	DFM	—	—	5.6	7.65	1.00	6.71	11.7	1000	23.2 2nd volume
1255	DPE	Dry	—	+	—	—	—	—	—	24.2
1401	DPB	11.35	—	—	—	—	—	—	—	
1410	DPE	Dry	—	5	—	—	—	—	—	~~27.2~~ 29.2
1530	DPB	11.28	—	—	—	—	—	—	—	
1536	DFM	—	—	5.6	7.43	1.02	8.24	12.1	1000	~~34.8~~ 3rd volume
1537	DPE	Dry	—	1	—	—	—	—	—	35.8
11/24/04 0945	DSB	7.35	—	—	—	—	—	—	—	
0955	DSE	7.48	—	—	—	—	—	—	—	
0956	D PB	7.48	—	—	—	—	—	—	—	
1002	DPE	Dry	—	6.5	—	—	—	—	—	42.3
1120	DPB	7.4	—		7.50	0.99	6.95	11.6	1000	
1124	DFM	—	—	~~4.1~~ 3.5	—	—	—	—	—	~~46.4~~ 4th volume
1125	DPE	Dry	—	1	←	—	—	—	—	47.4
	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 Qualattaive 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. Eder
Signature: Vijay Date: 2/22/05

Well Development Record

Well ID: ASY~~SS~~ (GW) -005-~~M~~ (GW)
Date: 11/29/04

Ravenna Army Ammunition Plant- RVAAP 14 AOC Characterization

Project: RVAAP - 14
Development Company: MKM
Development Method: WHALE PUMP
Comments:

Well TD: 27.15 FT TIC **Depth to Water:** 7.4 FT
Water Column Height: 19.75 FT **One Well Volume:** 11.6 Gals
Well Volume (gallons/foot) 2-inch =0.16, 4-inch =0.65, 6-inch = 1.47, 8-inch = 2.61

Date	Time	Well Dev. Code	Depth to Water (ft)	Purge Rate (gpm)	Purge Volume (gal)	Field Measurements: PH	CON	DO	Temp	Turbidity	Comments	
11/29/04	1016	DSB	7.1	–	–	–	–	–	–	–		
	1023	DSE	7.35	–	–	–	–	–	–	–		
	1025	DPB	7.35	–	–	–	–	–	–	–		
	1031	DPE	Dry	–	5	–	–	–	–	–	52.4	
	1115	DPB	11.9	–	~~3.5~~	–	–	–	–		–0–	
	1120	DPE	Dry	–	3.5	–	–	–	–		55.9	
	1412	DPB	10.8	–	–	–	–	–	–			
	1416	DFM	–	–	2	7.64	1.65	7.19	10.8	1000	57.9	5th volume
	1417	DPE	Dry	–	1	–	–	–	–		58.9	
	1504	DPB	11.9	–	–	–	–	–	–			
	1515	DPE	Dry	–	3	–	–	–	–		61.9 Dry	
11/30/04	0852	DSB	7.23	–	–	–	–	–	–			
	0856	DSE	7.41	–	–	–	–	–				
	0858	DPB	7.42	–	–	7.59	0.55	7.46	10.7	>1000		
	0900	DPE	–		6 dry				–		68 DRY	
		FINAL										

115
55
65.0

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 Qualattaive Observations

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

Logged By: Vijay Alluri (Please Print)
Signature: Vijay
Reviewed By: C. Esler
Date: 2/22/05

Well Development Record

Well ID: ASY~~55~~MW(05) - 005 - ~~MW~~ 05
Date: 11/30/04

Ravenna Army Ammunition Plant-
RVAAP 14 AOC Characterization

Project: RVAAP - 14

Development Company: MKM

Development Method: WHALE PUMP

Comments:

Well TD: 27.15 FT TIC Depth to Water: 7.4 FT
Water Column Height: 19.75 FT One Well Volume: 11.6 Gals

Well Volume (gallons/foot): 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 pH	CON	DO	TEMP	Turbidity	Comments
1118	DPB	10	–	–	–	–	–	–		
1120	DFM		–	1gal	7.35	1.21	6.21	10.7	1000	6th well vol 69.0
1121	DPE	DRY	–	3 dry	–	–	–	–		72 gal DRY
1255	DPB	11	–		–	–	–	–		
1258	DPE	DRY	–	4 dry	–	–	–	–		76 gal DRY.
1317	DPB	15.6	–		–	–	–	–		
1320	DPE	DRY	–	2 dry	–	–	–	–		78 gal DRY.
1423	DPB	14.6	–		–	–	–	–		
1424	DFM	–	–	2.5	7.46	0.85	8.18	11.1	131	7th well vol
1425	DPE	–	–	1.5 dry	–	–	–	–		Development complete
	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 Qualattaive Observations

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

Logged By: NILESH SHRINGARPURE (Please Print)

Signature: N Shringarpure

Reviewed By: C. Golen

Date: 2/22/05

Monitoring Well Purging Form

Well ID: ASYMW-005-GW

Ravenna Army Ammunition Plant
Ravenna, Ohio

Date : 12/06/04

WELL OBSERVATIONS

Protective Casing: (Intact) · Damaged **Locked:** Yes (No) **Key No:**
Concrete Base: (Intact) · Damaged **Inner Casing:** (2") · 4" · 6" · 8" **Other:**
Stickup Height: 2.6 (ft) **TIC · TOC Difference:** 0.75 (ft)
Vapor Readings : HNu · OVA Background: _____ Inside Well Casing:

	Present	Depth	Sampled Sample ID
LNAPL	Yes · No _____	Yes · (No)	ASYMW-005-GW
DNAPL	Yes · No _____	Yes · (No)	

CALCULATIONS

(A) **Depth to Well Bottom** 24 (ft) (TOC) · TIC · BGS (Measured) · Previously Measured (circle one)
(B) **Depth to Water** 6.95 (ft) (TOC) · TIC · BGS **Time Measured:** 1340
(C) **Water Column Height (A-B)** 17.05 (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)** 2.73 (gal)
(F) **Volumes to be Evacuated** 5
(G) TOTAL VOLUME TO BE EVACUATED (E * F) 13.64 (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	
1351	6.95			0.879	10.6	7.23	440	8.27	Initial
1354	8.15			1.19	10.9	7.29	156	7.46	
1357	10.55			0.890	10.9	7.46	148	7.56	
1400	11.5			0.895	10.8	7.36	137	10.82	End Purging

Logged By: Shahram Tahersima (Please Print) Reviewed By: C. Esler

Signature: Shahram Date : 2/22/05

Field Sampling Report

Location ID: ASYMW-005-GW

Date: 12-6-04

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 Purge	X			Push Probe		Plastic Liner	
Type/Construction					Mattocks			
Miscellaneous	**Well Purging Form** Yes - No							

Sample Collection: 1440 hrs

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

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

Sample Depth: 19.5 FT (below surface)

Decon: Dedicated - Each Day - Each Location

Field Parameters
(at time of sample)

PID / FID Readings:		
Background:	0.0	ppm
Sample:	0.0	ppm
Water Level	11.5	FT
Temperature	10.8	°C
Sp. Conductance:	0.895	uMHOs
pH	7.36	units
Turbidity	137	N.T.U.

Analytical Parameters

VOC	X	TPH GRO	
SVOC	X	TPH DRO	
Explosives	X	Chromium +6	X
Propellants	X	~~Nitrate~~	~~X~~ FAC
TAL Metals	X		
Pesticides/PCBs	X		
Cyanides			
TOC			
Grain Size			

Other Parameters

Corrosivity			
Reactivity Sulfide/Cyanide			
Ignitability			

QA Samples

MS/MSD	Yes / No	NA
Duplicate ID		NA
Equipment Rinse ID		NA
Trip Blank ID	Trip Blank	NA

Sample Description

clear water
no sheen
no odor.
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: Shahram Khorsandi (Please Print)

Signature: Shahram

Reviewed by: ERIC ELLIS (Please Print)

Signature: [signature] Date: 2/3/5

HTRW DRILLING LOG

1. COMPANY NAME: MKM ENGINEERS	2. DRILL SUBCONTRACTOR: HAD DRILLING	DISTRICT: LOUISVILLE; HOLE NUMBER: ASY mw-006; SHEET 1 OF 3
3. PROJECT: RVAAP-RI 14	4. LOCATION: RAVENNA, OH ATLAS SCRAP YARD	
5. NAME OF DRILLER: SCOTT HEISER	6. MANUFACTURER'S DESIGNATION OF DRILL: CME-55	
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: CME-55; 4¼" ID HSA; 2' SPLITSPOON	8. HOLE LOCATION: SOUTH WESTERN PORTION OF SITE	
	9. SURFACE ELEVATION: 980.20 ASL	
	10. DATE STARTED: 11/15/04	11. DATE COMPLETED: 11/15/04
12. OVERBURDEN THICKNESS:	15. DEPTH GROUNDWATER ENCOUNTERED: 12'	
13. DEPTH DRILLED INTO ROCK:	16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED: 13.45 @ 1442 11/18/04	
14. TOTAL DEPTH OF HOLE: 27' BGS	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY):	

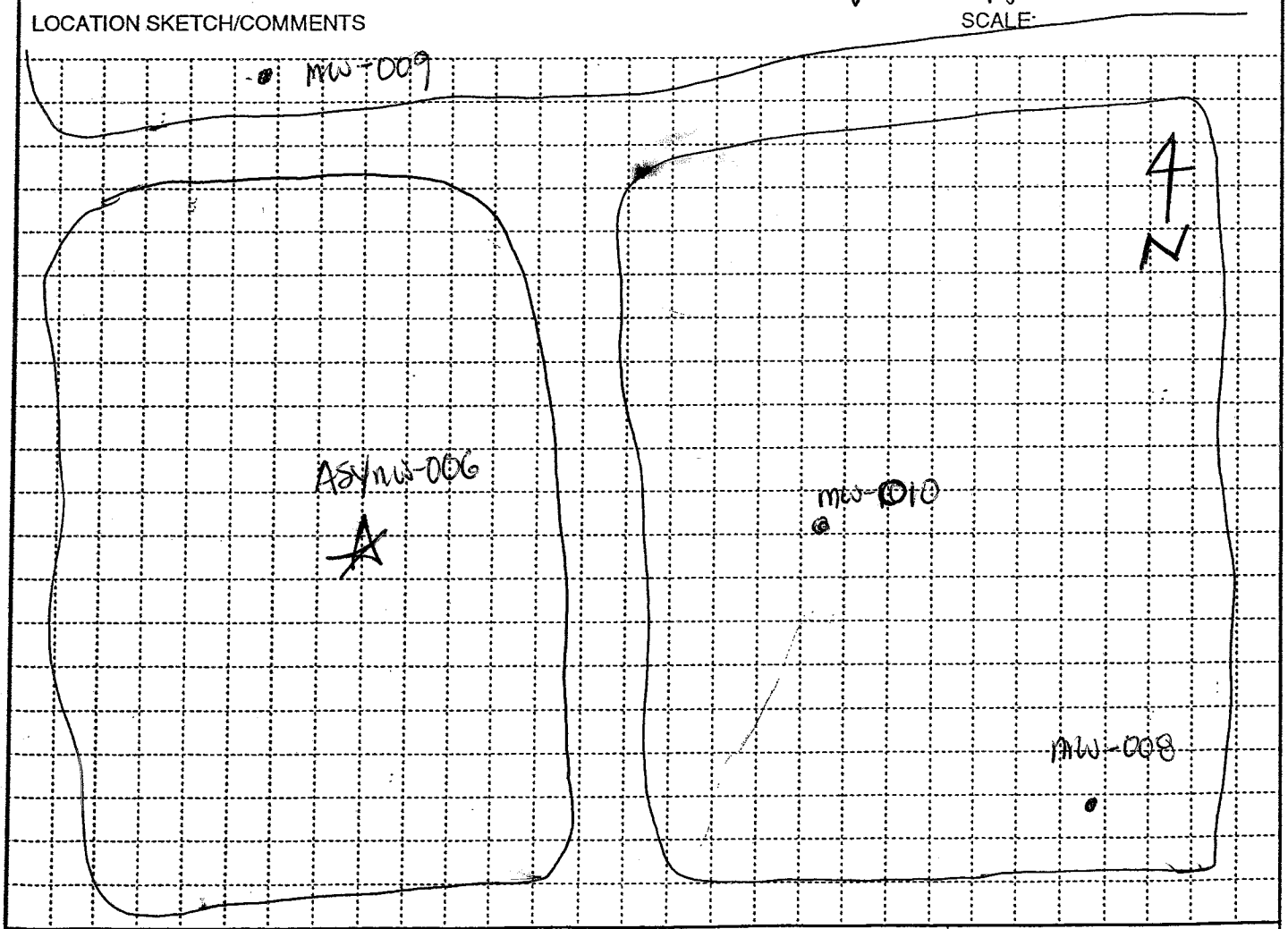
18. GEOTECHNICAL SAMPLES	DISTRICT	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
NONE			NA

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE RECOVERY %

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
		X		David Kleinert

LOCATION SKETCH/COMMENTS

SCALE:



PROJECT	HOLE NO.
RVAAP-RI 14	ASY mw-006

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

HTRW DRILLING LOG (CONTINUATION SHEET)

HOLE NUMBER: ASYMW-006
SHEET 2 OF 3

PROJECT: RVAAP - RI 14
INSPECTOR: DK EARNEST

ELEV. (a)	DEPTH (b)	DESCRIPTION OF MATERIALS (c)	FIELD SCREENING RESULTS (d)	GEOTECH SAMPLE OR CORE BOX NO. RECOVERY (e)	ANALYTICAL SAMPLE NO. USCS	BLOW COUNT (g)	REMARKS (h)
915		TOPSOIL - GRASS & ROOTS DK BROWN CLAYEY SILT (80%) (20%) MED DENSE LOW PLASTIC	5.4	0.2	ML	4/3 3/3	
	2	MED BRN MOTTLED W/ LT GREY CLAYEY SILT (30%) (70%) STIFF TO V.S.	7.6	0.3	ML	4/6 8/11	10YR 4/6 10YR 6/1 30%
	4	SAA SMALL GRAVEL ~~PEBBLES~~	(12.4) 210 ~~684~~	1.2	ML	1/3 7/8	* 684
	6	~~SAA~~	676 (7.4)	1.7	ML	2/4 9/17	*
	8	VERY STIFF LESS MOTTLING W/ DEPTH ~~SAA~~	10.8	1.7	ML	2/10 12/17	WET @ 9.5
	10	~~SAA~~ BROWN SL CL SILT (90%) (10%) LOW PLASTIC STIFF TO V.S.	6.2	1.7	ML	1/5 7/9	10YR 4/3 DRY WET @ 11.5
	12	GREY SL CL SILT (80%) LITTLE FINE SAND (10%) (10%) LOW PLASTIC MED DENSE	11.5	1.7	ML	1/3 4/5	7.5YR 4/1 SAT
	14	SAA	6.9	1.8	ML	1/3 3/3	SAT
	16	SAA	4.2	1.8	ML	1/2 2/3	SAT
	18	SAA	6.1	2.0	ML	1/1 1/2	SAT

PROJECT: RVAAP - RI 14
HOLE NO: ASYMW - 006

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

* INITIAL PID READINGS WERE ~~THOUGH~~ AND THOUGHT TO BE ANNOMOLUS, RECHECK OF SOIL AFTER SEVERAL MINUTES RESULTS IN SUBSTANCIALLY REDUCED READINGS (IN PARA). ~~BACK~~ TO LAB TO CONFIRM ON ANOTHER MACHINE.

HTRW DRILLING LOG (CONTINUATION SHEET)

HOLE NUMBER: ASYmw-006

PROJECT: RUAAP - RI 14

INSPECTOR: DK Ennett

SHEET 3 OF 3 SHEETS

ELEV. (a)	DEPTH (b)	DESCRIPTION OF MATERIALS (c)	FIELD SCREENING RESULTS (d)	GEOTECH SAMPLE OR ~~CORE BOX NO.~~ RECOVERY (e)	ANALYTICAL SAMPLE NO. (f)	BLOW COUNT (g)	REMARKS (h)
		SAA	8.6	1.1	ML-	1/1	SAT
	22	GREY SANDY SILT (40%) SOFT (60%)			ML/SM	1/3	
		SAA	4.7	2.0	ML	1/2	
	24	DK GREY SANDY SILT (40%) ROCK FRAG (60%)				9/11	DRY
		DENSE WEATHERED SANDSTONE	10.3	1.0	ALY/SM	9/11	7.5YR 2.5/1 DRY
	26					27/32	
			10.5	0.3	SM	4/50/3	SPOON REFUSAL
1040		BOH 27'					
	~~28~~	AUGER REFUSAL @ 27'					
		SET WELL @ 26'					
		SCREEN 16-26'					
	~~30~~	SAND TO 13'					
		BENT. SEAL TO 10'					

PROJECT: RUAAP - RI 14

HOLE NO: ASYmw-006

ENG FORM 5056A-R, AUG 94

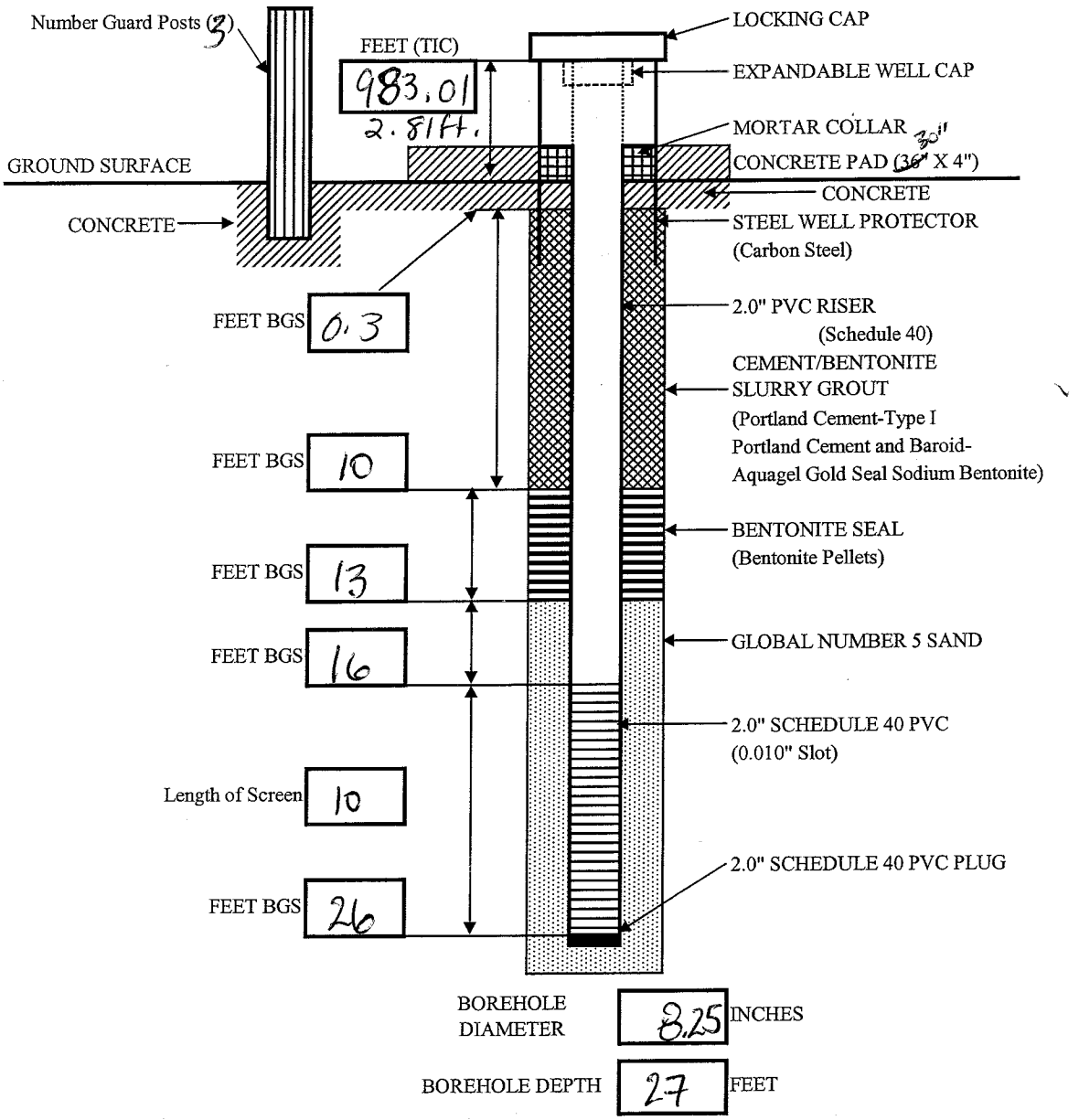
(Proponent: CECW-EG)

MONITORING WELL CONSTRUCTION DIAGRAM

RAVENNA ARMY AMMUNITION PLANT

Project: RVAAP RI 14

Well Number: AS4mw-006	Begin: 11/15/04	End: 11/15/04
Coordinates: N: 557257.72 E: 2366746.73	Elevation: 980.20	Reference Point:
Logged By: DAVID K. 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

Well ID: ASYMW-006-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 TD: 28.8 FT TIC Depth to Water: 13.45 FT
Water Column Height: 15.35 FT One Well Volume: 9.04 Gals

Well Volume (gallons/foot): 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		
1447	DSB	~~13.45~~ ~~13.45~~	—	—	—	—	—	—	—	—
1452	DSE	13.35	—	—	—	—	—	—	—	—
1500	DPB	13.35	—	—	7.50	1.14	3.42	13.7	1000	
1505	DPE	Dry	—	5 gal	—	—	—	—	—	5 gal.
0901	DSB	12.7	—	—	—	—	—	—	—	—
0906	DSE	12.9	—	—	—	—	—	—	—	
~~0925~~	~~DPB~~				~~6.98~~	~~1.05~~	~~11.69~~	~~11.5~~	~~1000 (E)~~	
0907	DPB	12.9	—	—	7.55	1.07	5.18	11.4	1000	
0910	DFM	—	—	4gal	7.44	1.18	5.24	12.0	1000	9 gal (1st well vol)
0912	DPE	Dry	—	2gal	—	—	—	—	—	@ 11 gal
1131	DPB	13.5	—	—	—	—	—	—	—	—
1140	DPE	Dry	—	5.5	—	—	—	—	—	16.5 gal
11/22/04 0940	DSB	13.15	—	—	—	—	—	—	—	
0945	DSE	13.45	—	—	—	—	—	—	—	
0946	DPB	13.45	—	—	—	—	—	~~10.6~~	—	
	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 Qualattaive Observations

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

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

Reviewed By: T. Eddy
Date: 2/22/05

Well Development Record

Well ID: ASYMW-006-GW
Date: 11/22/04

Ravenna Army Ammunition Plant-
RVAAP 14 AOC Characterization

Project: RVAAP-14
Development Company: MKM

Development Method: Whale pumping
Comments:

Well TD: 28.8 FT TIC Depth to Water: 13.45 FT
Water Column Height: 15.35 FT One Well Volume: 9.04 Gals

Well Volume (gallons/foot): 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		
0945	DFM	—	—	1.5	7.6	1.11	4.75	10.6	1000	18 gal 2nd volume
0949	DPE	Dry	—	3	—	—	—	—	—	21 gal
1107	DPB	14.09	—	—	—	—	—	—	—	
1111	DPE	Dry	—	3	—	—	—	—	—	24 gal
1457	DPB	14.50	—	—	—	—	—	—	—	
1500	DPE	Dry	—	2.5	—	—	—	—	—	26.5 gal
11/23/04 1030	DSB	13.2	—	—	—	—	—	—	—	
1035	DSE	13.55	—	—	—	—	—	—	—	
1035	DPB	13.55	—	—	7.1	1.06	7.81	10.7	1000	
1041	DFM	—	—	0.5	6.9	1.02	6.49	10.6	1000	27 gal 3rd volume
1043	DPE	Dry	—	5.5	—	—	—	—	—	32.5 gal
1307	DPB	13.5	—	8.0	—	—	—	—	—	
1311	DFM	—	—	3.5	7.56	1.08	4.94	11.2	1000	36 gal 4th volume
1312	DPE	Dry	—	1	—	—	—	—	—	37 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 Qualattaive Observations

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

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

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

Well Development Record

Well ID: ASYMW-006-GW
Date: 11/23/04

Ravenna Army Ammunition Plant-
RVAAP 14 AOC Characterization

Project: RVAAP 14
Development Company: MKM

Development Method: whale
Comments:

Well TD: 28.8 FT TIC Depth to Water: 13.45 FT
Water Column Height: 15.35 FT One Well Volume: 9.04 Gals

Well Volume (gallons/foot): 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		
1465	DPB	13.85	-	-	-	-	-	-	-	-
1455	DPE	Dry	-	5.5	-	-	-	-	-	42.5 gal
11/23/04 0910	DSB	13.26	-	-	-	-	-	-	-	
0920	DSE	13.4	-	-	-	-	-	-	-	
0922	DPB	13.4	-	-	-	-	-	-	-	
0924	DFM	-	-	2.5	7.29	1.11	10.3	12	1000	45 gal 5th volume
0929	DPE	Dry	-	3.0	-	-	-	-	-	48 gal
0939	DPB	23.3	-	~~0.0~~	-	-	-	-	-	~~48 gal~~ ditto
0941	DPE	Dry	-	1.0	-	-	-	-	-	49 gal
1109	DPB	16.5	-	-	-	-	-	-	-	
1114	DPE	Dry	-	4.0	-	-	-	-	-	53 gal
11/24/04 0949	DSB	13.7	-	-	-	-	-	-	-	
0953	DSE	13.8	-	-	-	-	-	-	-	
0955	DPB	13.8	-	-	-	-	-	-	-	
0950	DFM	-	-	1.0	7.22	1.73	4.63	10.6	1000	54 gal 6th volume
	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 Qualattaive 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: 2/22/05

Well Development Record

Well ID: ASYMW-006--GW
Date: 11/29/04

Ravenna Army Ammunition Plant-
RVAAP 14 AOC Characterization

Project: RVAAP-14
Development Company: MKM
Development Method: whale
Comments:

Well TD: 28.8 FT TIC Depth to Water: 13.45 FT
Water Column Height: 15.35 FT One Well Volume: 9.04 Gals

Well Volume (gallons/foot): 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		
1008	DPE	Dry	-	6	-	-	-	-		60
1128	DPB	15.5	-	-	-	-	-	-		
1132	DFM		-	3	7.17	1.76	4.74	10.5	1000	63 7th volume
1135	DPE	Dry	-	2	-	-	-	-		65
1353	DPB	13.55	-	-	-	-	-	-		
1400	DPE	Dry	-	5	7.3	1.72	4.09	10.4	1000	70 final reading
	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 - Photolonizer (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 Qualattaive 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. Cole
Signature: Vijay Date: 2/22/05

Monitoring Well Purging Form

Well ID: ASYmw-006-

Date : 12/07/04

Ravenna Army Ammunition Plant
Ravenna, Ohio

WELL OBSERVATIONS

Protective Casing: (Intact) · Damaged **Locked:** Yes · (No) **Key No:**
Concrete Base: (Intact) · Damaged **Inner Casing:** (2") · 4" · 6" · 8" **Other:**
Stickup Height: 3.05 (ft) **TIC · TOC Difference:** 0.2 (ft)
Vapor Readings : HNu · OVA Background: ~~0~~ Inside Well Casing:

	Present	Depth	Sampled Sample ID
LNAPL	Yes · (No)	Yes · No	
DNAPL	Yes · (No)	Yes · No	

CALCULATIONS

(A) **Depth to Well Bottom** 28.8 (ft) TOC · (TIC) · BGS (Measured) · Previously Measured (circle one)
(B) **Depth to Water** 12.37 (ft) TOC · TIC · BGS **Time Measured:** 13.27
(C) **Water Column Height (A-B)** 16.43 (ft)
(D) **Well Diameter Factor** ~~0.263~~ 0.16 (gal/ft) (2" = 0.16, 4" = 0.65, 6" = 1.47, 8" = 2.61 GAL/FT)
(E) **One Well Volume (C*D)** 2.63 (gal)
(F) **Volumes to be Evacuated** 5
(G) TOTAL VOLUME TO BE EVACUATED (E * F) 13.14 (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: 2

Comments: _____

TIME	DEPTH TO WATER (ft)	PURGE RATE (gpm)	Field Measurements						Comments
			HNu	Spec Cond	Temp	pH	Turb	DO	
1334	12.37	Microperge	—	1.30	13.22	6.92	44.7	3.25	initial
1337	14.00	"	—	1.32	12.84	6.96	55	0	
1340	14.55	"	—	1.33	12.55	6.96	55	0	
1343	15.2	"	—	1.34	12.48	6.96	32	0	End purging

Logged By: Vijay Alluri (Please Print) Reviewed By: C. Cole

Signature: Vijay Alluri/SB. Date : 2/22/05

Field Sampling Report

Location ID: ASyMW-006-GW

Date: 12/07/04

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	
	Micropurge	X			Push Probe		Plastic Liner	
Type/Construction					Mattocks			
Miscellaneous	**Well Purging Form** (Yes) - No							

Sample Collection: 1245 hrs

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

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

Sample Depth: 19.5 FT (below surface)

Decon: Dedicated - Each Day - (Each Location)

Field Parameters
(at time of sample)

PID / FID Readings:		
Background:	0.0	ppm
Sample:		ppm
Water Level	15.2	FT
Temperature	12.48	°C
Sp. Conductance:	1.34	uMHOs
pH	6.96	units
Turbidity	32	N.T.U.

Analytical Parameters

VOC	X	TPH GRO	
SVOC	X	TPH DRO	
Explosives	X	Chromium +6	X
Propellants	X	Nitrate	
TAL Metals	X		
Pesticides/PCBs	X		
Cyanides			
TOC			
Grain Size			

Other Parameters

Corrosivity			
Reactivity Sulfide/Cyanide			
Ignitability			

QA Samples

MS/MSD	Yes / No	NA
Duplicate ID		NA
Equipment Rinse ID		NA
(Trip Blank ID)	Trip Blank	NA

Sample Description

Not 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: NILESH SHRINGARPURE (Please Print)

Signature: NShringarpure

Reviewed by: ERIC ELLIS (Please Print)

Signature: EE

Date: 2/3/05

HTRW DRILLING LOG

DISTRICT: LOUISVILLE		HOLE NUMBER: ASYmw-007
1. COMPANY NAME: MKM ENGINEERS	2. DRILL SUBCONTRACTOR: HAD DRILLING	SHEET 1 OF 3 SHEETS
3. PROJECT: RVAAP-RI 14	4. LOCATION: RAVENNA, OH ATLAS SCRAPYARD	
5. NAME OF DRILLER: SCOTT HEISER	6. MANUFACTURER'S DESIGNATION OF DRILL: CME	
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: 4¼" ID HSA; 1½" ID 2' SPLIT SPOON	8. HOLE LOCATION: SOUTH WESTERN PORTION OF SITE	
	9. SURFACE ELEVATION: 981.40 ASL	
	10. DATE STARTED: 11/12/04	11. DATE COMPLETED: 11/12/04
12. OVERBURDEN THICKNESS:	15. DEPTH GROUNDWATER ENCOUNTERED: 17'	
13. DEPTH DRILLED INTO ROCK:	16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED: 14.5 @ 1025 11/13/04	
14. TOTAL DEPTH OF HOLE: 28'	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY): —	

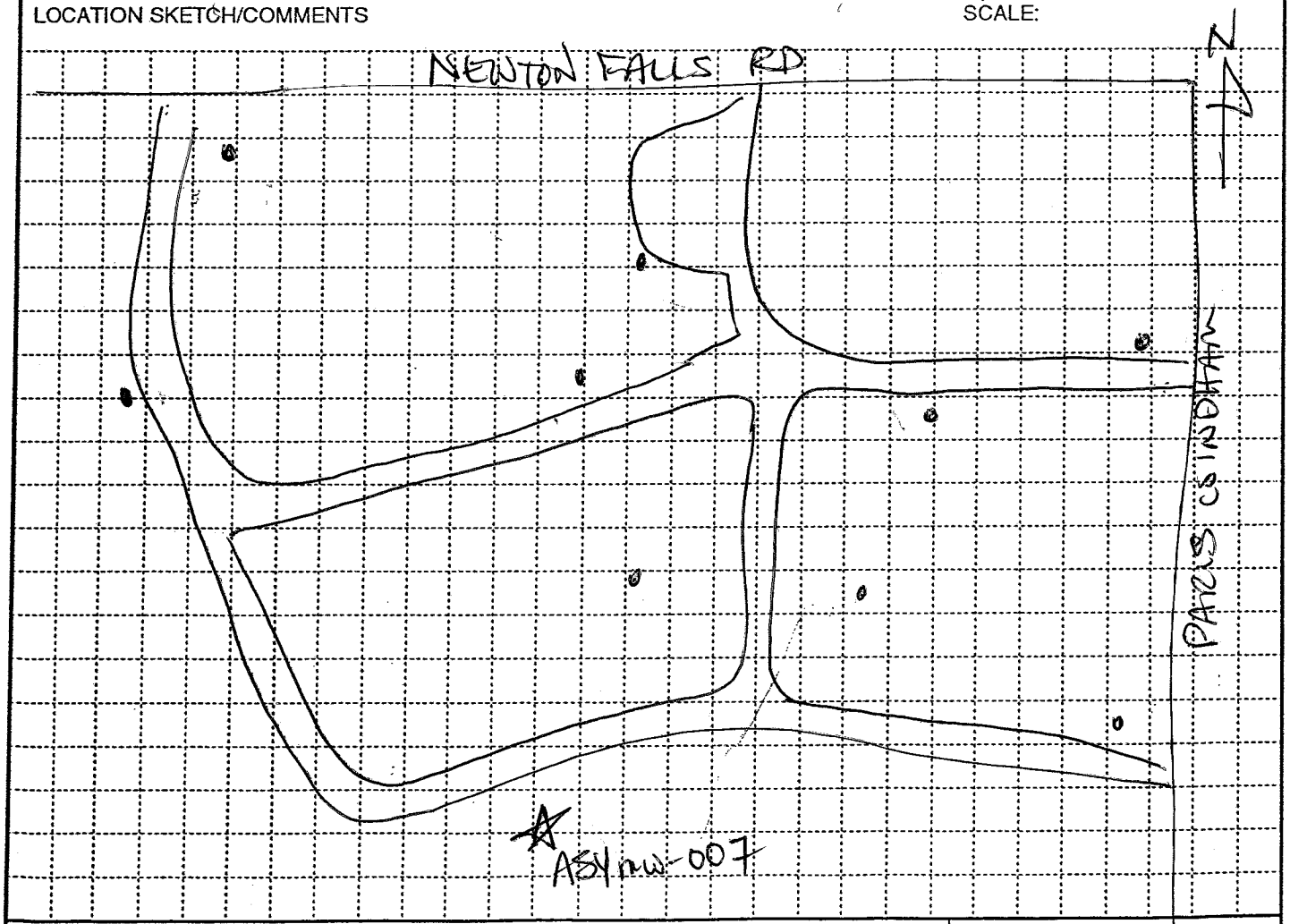
18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
SHELBY TUBE 8-10' BGS		X	NA

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE RECOVERY %
—	—	—	—	—	—	

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
—	—	X	—	

LOCATION SKETCH/COMMENTS

SCALE:



PROJECT	HOLE NO.
RVAAP-RI 14	ASYmw-007

ENG FORM 5056-R, AUG 94

(Proponent: CECW-EG)

HTRW DRILLING LOG (CONTINUATION SHEET)

HOLE NUMBER: ASYMW-007

PROJECT: RVAAP-RI 14 | INSPECTOR: DK EARNEST | 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.~~ USCS	BLOW COUNT (g)	REMARKS (h)
1200		6" TOPSOIL DK BRN SANDY SILT				4/6	DRY
		2" DEBRIS	7.4	1.4	ML	2/4	
	2	LT BROWN MOTTLED W/ LT GREY (20%) CLAYEY SILT (70%) TRACE SAND (10%) LOW PLASTIC					MOIST
			8.4	1.5	ML	4/5	10YR 6/6
	4					6/6	
		FINE ROOTS @ 5.5'	5.4	1.3	ML	1/4	
	6					8/11	
		MED BROWN CLAYEY SILT 10% MOTTLING RED @ 6.5' MED TO LOW PLASTIC	8.8	1.9	ML	2/5	10YR 5/4
	8					8/10	
		SHELBY TUBE	—	—	—	~~5/13~~	1230 PM
	10					~~12/15~~	
		SAA NO ODOR				5/13	
		SAND, MED BRN (80%) MED TO FINE GRAIN SILTY (20%) MED TO DENSE NO PLASTIC	10.6	1.4	SM/SP	12/15	WET SAND 10YR 5/4
	12					3/6	
		~~SILT~~ VF SAND	7.2	1.3	SM	7/11	MOIST TO WET
	14					3/7	
			5.2	1.3	SM	5/7	
	16	MED GRAIN					
					SM	1/3	7.5YR 5/1
		GREY SILT (90%)	7.2	1.8			WET
	18	TRACE SAND (10%) LOW PLASTIC			ML	3/5	
		NO ODOR				1/1	SAT
			5.4	1.6	ML	2/4	
	20						

PROJECT: RVAAP-RI 14 | HOLE NO: ASYMW-007

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

1134

HTRW DRILLING LOG (CONTINUATION SHEET)

HOLE NUMBER: ASYmw-007

PROJECT: RVAAP-RI 14

INSPECTOR: DK EARNEST

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 SILT (60%) ~~FRAGS~~ SAND (10%) LOW PLASTIC	6.3	1.5	ML	1/1 3/4	7.5YR 5/1
	22	SAA	8.4	1.8	ML	1/1 2/2	SAT
	24	SAA	6.1	1.5	ML	2/4 6/9	SAT
	26	SANDY & ROCK FRAG	5.2	1.5	ML	2/5 7/10	WET
	28	~~SAA~~ ~~BOH~~ ~~28'~~ 30% SAND	5.7	1.4	ML/SM	1/7 7/10	WET
330	30	DARK GREY ROCK FRAG					
		SAMPLED TO 30'					
		DRILLED TO 28'					
		SET WELL AT 26'					
		SCREEN AT 16-26					
		SAND TO 13'					
1845		SEAL TO 10' (6 GALS)					

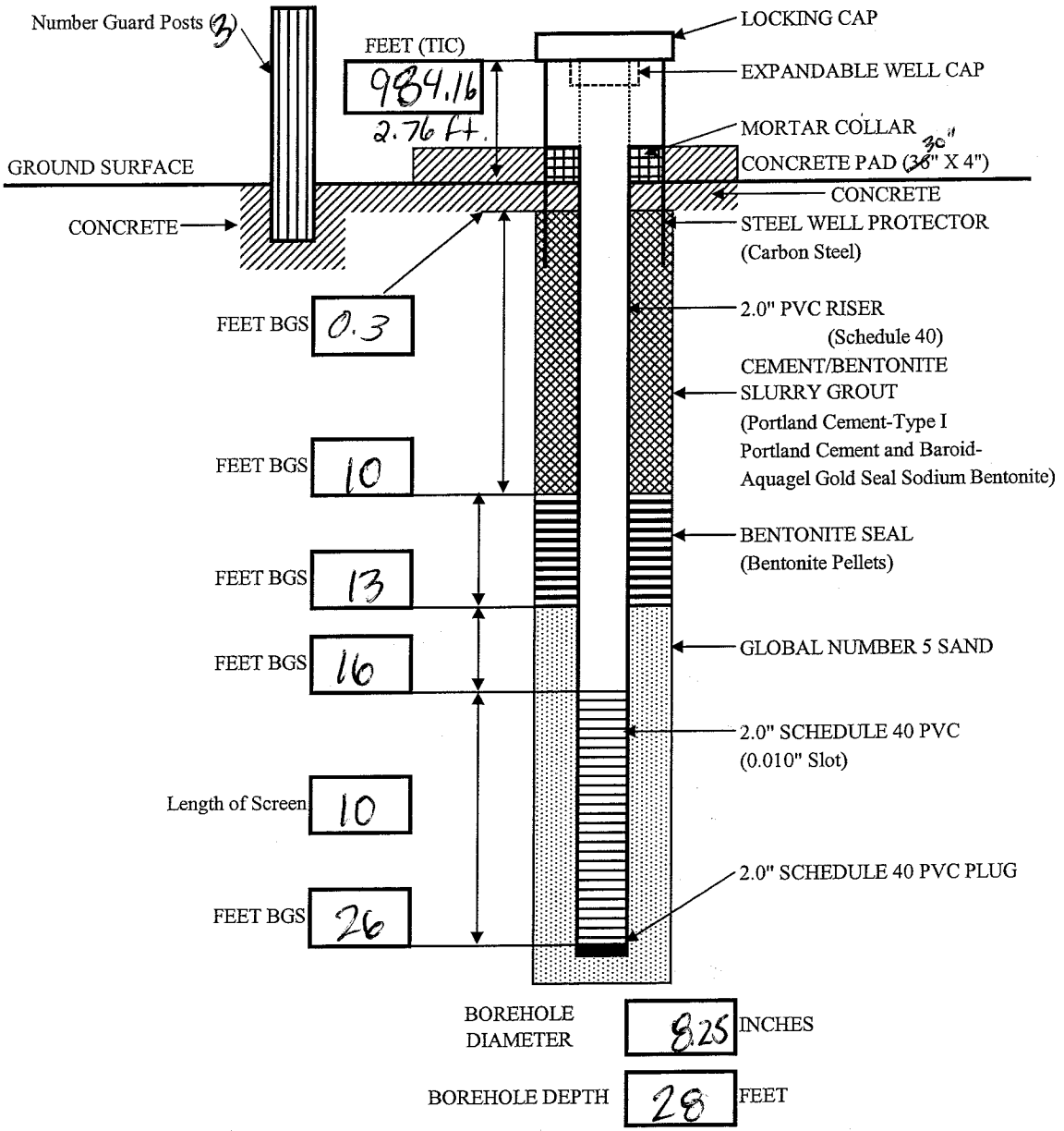
PROJECT RVAAP-RI 14 HOLE NO. ASYmw-007

MONITORING WELL CONSTRUCTION DIAGRAM

RAVENNA ARMY AMMUNITION PLANT

Project: RVAAP RI 14

Well Number: ASYmw-007	Begin: 11/12/04	End: 11/12/04
Coordinates: N: 556818.08 E: 2366834.49	Elevation: 981.40	Reference Point:
Logged By: David K. 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

Well ID: ASYMW-007-GW
Date: 11/17/04

Ravenna Army Ammunition Plant-
RVAAP 14 AOC Characterization

Project: RVAAP 14
Development Company: MRM

Development Method: Whale pumping
Comments: _____

Well TD: 28.7 FT TIC Depth to Water: 14.5 FT
Water Column Height: 14.2 FT One Well Volume: 7.5 Gals

Well Volume (gallons/foot): 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	COND	DO	Temp		
1025	DSB	14.5	—	—	—	—	—	—	—	—
1030	DSE	14.4	—	—	—	—	—	—	—	—
1032	DPB	14.4			7.20	1.18	7.09	12.1	>1000	Initial Reading
1037	~~DPE~~	Dry	—	5.5	—	—	—	—	—	5.5
1139	DPB	14.6	—	—	—	—	—	—	—	—
1143	DFM			2	7.11	1.24	5.22	12.3	1000	7.5 (1 well vol)
1150	DPE	Dry		5.5	7.24	1.118	10.35	11.7	1000	~~7.5~~ 13 (2 well vol)
1455	~~DPB~~ DPB	14.5	—	7.5	7.20	1.20	5.35	11.9	1000	22.5 (3rd well vol)
1435	DPB	14.5	—	—	—	—	—	—	—	—
1453	DFM	—	—	7.5	7.20	1.20	5.35	11.9	1000	22.5 (3rd well vol)
1456	DPE	Dry	—	2.0	—	—	—	—	—	24.5
0920	DSB	14.50	—	—	—	—	—	—	—	—
0925	DSE	15.00								
0928	DPB	15.00	—	—	6.94	1.15	7.09	1.19	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 Qualattaive 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. Cole
Date: 2/22/05

Well Development Record

Well ID: ASYNN-007-6W
Date: 11/8/04

Ravenna Army Ammunition Plant-
RVAAP 14 AOC Characterization

Project: RVAAP 14
Development Company: MEM

Development Method: Whale pumping
Comments:

Well TD: 28.7 FT TIC Depth to Water: 14.5 FT
Water Column Height: 14.2 FT One Well Volume: 7.5 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		
0931	DFM	—	—	5 5 gal	7.04	1.20	7.54	12.5	1000	32 gal (4th well vol)
0941	DPE	Dry	—	5 gal	—	—	—	—	—	37 gal.
1116	DPB	14.45	—	—	—	—	—	—	—	—
1120	DFM	—	—	2.5	7.04	1.16	6.74	12.5	1000	39.5 5th well vol
1125	DPE	Dry	—	5 gal	—	—	—	—	—	44.5
1255	DPB	14.45	—	—	—	—	—	—	—	—
1257	DFM	—	—	2.5 gal	7.26	1.17	8.07	12.6	1000	47 gal (6th well vol)
1259	DPE	Dry	—	2.5 gal	—	—	—	—	—	49.5 gal.
1514	DPB	14.45	—	—	—	—	—	—	—	—
1517	DFM	~~Dry~~	—	5 gal	6.99	1.18	6.5	12.2	1000	54.5 gal (7th well vol)
1520	DPE	Dry	—	2 gal	—	—	—	—	—	56.5 gal
0935	DSB	1435	—	—	—	—	—	—	—	—
0940	DBE	14.45	—	—	—	—	—	—	—	—
0941	DPB	14.45	—	—	7.19	1.18	7.80	11.6	1000	—
0945	DFM	—	—	5 gal	7.33	1.19	10.65	11.9	1000	61.5 (8th Well vol)
0950	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 Qualattaive 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. Esler
Date: 2/22/05

Monitoring Well Purging Form

Well ID: ASYMW-~~00?~~ 007 GW

Date: 12/3/04

Ravenna Army Ammunition Plant
Ravenna, Ohio

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:** 0.3 (ft)

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

	Present	Depth	Sampled	Sample ID
LNAPL	Yes · No		Yes · No	ASYMW-007GW
DNAPL	Yes · No		Yes · No	

CALCULATIONS

(A)	Depth to Well Bottom	26 (ft) (TOC) · TIC · BGS	(Measured) · Previously Measured (circle one)
(B)	Depth to Water	14.5 (ft) (TOC) · TIC · BGS	Time Measured: 1320
(C)	Water Column Height (A-B)	11.5 (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)	1.84 (gal)	
(F)	Volumes to be Evacuated	5	

(G) TOTAL VOLUME TO BE EVACUATED (E * F) 9.20 (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	14.5		0.0	1.25	10.89	6.91	330	4.37	Initial
1338	15.5		0.0	1.27	11.99	6.77	337	0.11	
1341	15.7		0.0	1.26	12.44	6.77	255	0.12	
1344	15.0		0.0	1.27	12.17	6.75	193	0.0	End

Logged By: Sudheer Gubba (Please Print) Reviewed By: C. Esler

Signature: [signature] Date: 2/22/05

Field Sampling Report

Location ID: ASP$_{MW}$-007 - GW

Date: 12/3/04

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 purge	X			Push Probe		Plastic Liner	
Type/Construction	Stainless Steel				Mattocks			
Miscellaneous	**Well Purging Form** (Yes) - No							

Sample Collection: 1345 hrs

Sample Depth: 15.0 FT (below surface)

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

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:		ppm	VOC	X	TPH GRO		Corrosivity			
Background:			SVOC	X	TPH DRO		Reactivity Sulfide/Cyanide			
			Explosives	X	Chromium +6	X	Ignitability			
Sample:		ppm	Propellants	X	Nitrate					
Water Level	15.0	FT	TAL Metals	X						
Temperature	12.17	°C	Pesticides/PCBs	X			**QA Samples**			
Sp. Conductance:	1.27	uMHOs	Cyanides				MS/MSD	Yes / No		NA
pH	6.95	units	TOC				Duplicate ID			NA
Turbidity	0.0	N.T.U.	Grain Size				Equipment Rinse ID			NA
							Trip Blank ID	Trip Blank		NA

Sample Description

No odor, No sheen, Clear water
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)

Signature: [signature]

Reviewed by: ERIC ELLIS (Please Print)

Signature: [signature] Date: 2/3/05

HTRW DRILLING LOG

HTRW DRILLING LOG	DISTRICT: LOUISVILLE	HOLE NUMBER: ASYmw-008
1. COMPANY NAME: MKM ENGINEERS	2. DRILL SUBCONTRACTOR: HAD DRILLING	SHEET 1 OF 3 SHEETS
3. PROJECT: RVAAP-RI 14	4. LOCATION: RAVENNA, OH ATLAS SCRAPYARD	
5. NAME OF DRILLER: SCOTT	6. MANUFACTURER'S DESIGNATION OF DRILL: CME-55	
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: CME-55; 4¼" ID HSA; 2" DIA 2' SPLIT SPOON	8. HOLE LOCATION: SOUTH EASTERN CORNER OF SITE	
	9. SURFACE ELEVATION: 976.20 ASL	
	10. DATE STARTED: 11/16/04	11. DATE COMPLETED: 11/16/04
12. OVERBURDEN THICKNESS	15. DEPTH GROUNDWATER ENCOUNTERED: 15'	
13. DEPTH DRILLED INTO ROCK	16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED: 4.7' @ 1015 11/19/04	
14. TOTAL DEPTH OF HOLE: 26' BGS	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY)	

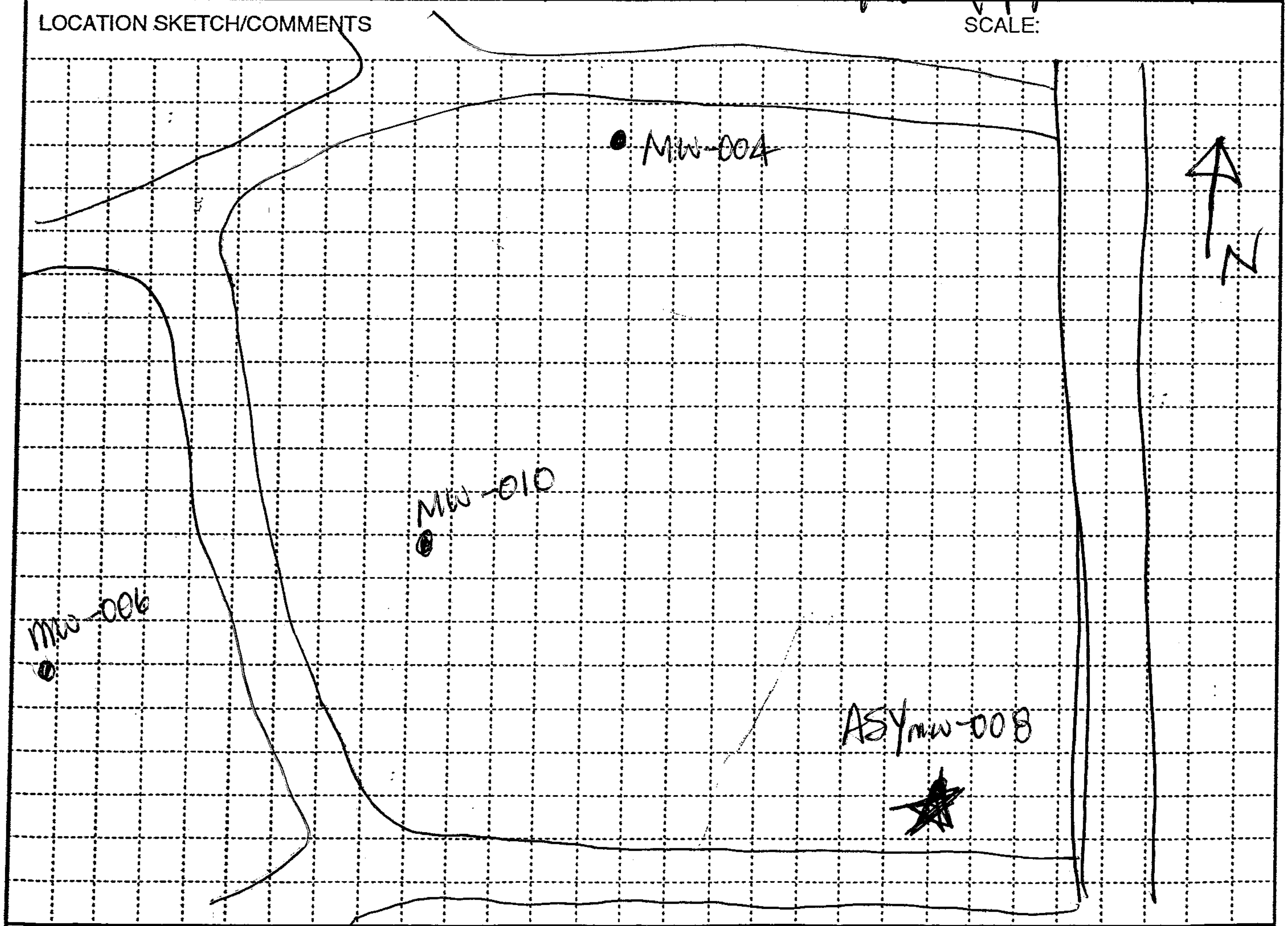
18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
NONE	—	—	NA

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE RECOVERY %
—	—	—	—	—	—	

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
—	—	X	—	[signature]

LOCATION SKETCH/COMMENTS

SCALE:



PROJECT: RVAAP-RI 14	HOLE NO. ASYmw-008

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

HTRW DRILLING LOG (CONTINUATION SHEET)

HOLE NUMBER: ASYmw-008

PROJECT: RVAAP - RI 14

INSPECTOR: DK EARNEST

SHEET 2 OF 3 SHEETS

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)
	0	2" TOPSOIL TOP 10" DRY OLIVE BRN CL SILT W/DEBRIS NO TO LOW PLASTIC LT BRN MOTTLED W/LT GREY CL SILT (30%) LOW PLASTIC COHESIVE	5.0	1.5	ML	4/3 4/4	DAMP
	2	SAA	16.9	1.1	ML	4/7 7/6	MANGANESE
	4	MED BROWN W/GREY CL SILT (30%) BLK IRON OXIDES @ 5' W/SM GRAVEL SAA LESS GREY MOTTLING W/DEPTH COHESIVE GRAVEL @ 4' STIFF TO V.S.	3.9	1.6	ML	1/4 7/12	DAMP
	6	SAA	3.6	2.0	ML	2/9 11/13	DRY TO DAMP
	8	GREY SL CLAYEY SILT (20%) (80%) LOW PLASTIC STIFF	7.2	1.8	ML	1/4 6/8	MOIST TO WET AT BOTTOM
	10	SAA @ 10.5 & 11.0 THIN SANDY SEAMS	2.4	2.0	ML	1/4 6/7	MOIST TO WET WET AT SAND
	12	SAA	6.5	2.0	ML	1/3 5/5	~~SAT~~
	14	SAA LESS DENSE	2.5	2.0	ML	1/4 3/5	WET SAT
	16	SAA	4.1	2.0	ML	1/1 2/4	~~WET~~ SAT
	18	SAA	31	2.0	ML	1/1 2/3	~~WET TO~~ SAT
	20						

PROJECT RVAAP - RI 14 HOLE NO. ASYmw-008

HTRW DRILLING LOG (CONTINUATION SHEET)

HOLE NUMBER: ASYmw-008

PROJECT: RVAAP-R114

INSPECTOR: DK EARNEST

SHEET 3 OF 3 SHEETS

ELEV. (a)	DEPTH (b)	DESCRIPTION OF MATERIALS (c)	FIELD SCREENING RESULTS (d)	~~GEOTECH SAMPLE OR CORE BOXNO.~~ RECOVERY	~~ANALYTICAL SAMPLE NO.~~ USCS	BLOW COUNT (g)	REMARKS (h)
		SAA	3.8	2.0	ML	1/2 3/5	WET TO SAT
	22	SAA	4.8	2.0	ML	1/1 2/4	23
915	24	~~SAA~~ GREY SILTY CLAY (30%) (70%) MED PLASTIC SEVERAL THIN SILT SEAMS	6.4	2.0	CL	1/4 4/7	7.5YR 5/1 DAMP TO MOIST
	26	GREY SILTY CLAY MED PLASTIC	5.0	2.0	CL	1/4 4/4	
930	28	BOH 26' SAMPLE TO 28' DRILLED TO 26' SET WELL AT 25' SCREEN 15'-25' SAND TO 13' SEAL TO 9'					8 BAGS #7 ADDED ~5 GALS TO HYDRATE
	30						

PROJECT: RVAAP-R114

HOLE NO. ASYmw-008

ENG FORM 5056A-R, AUG 94

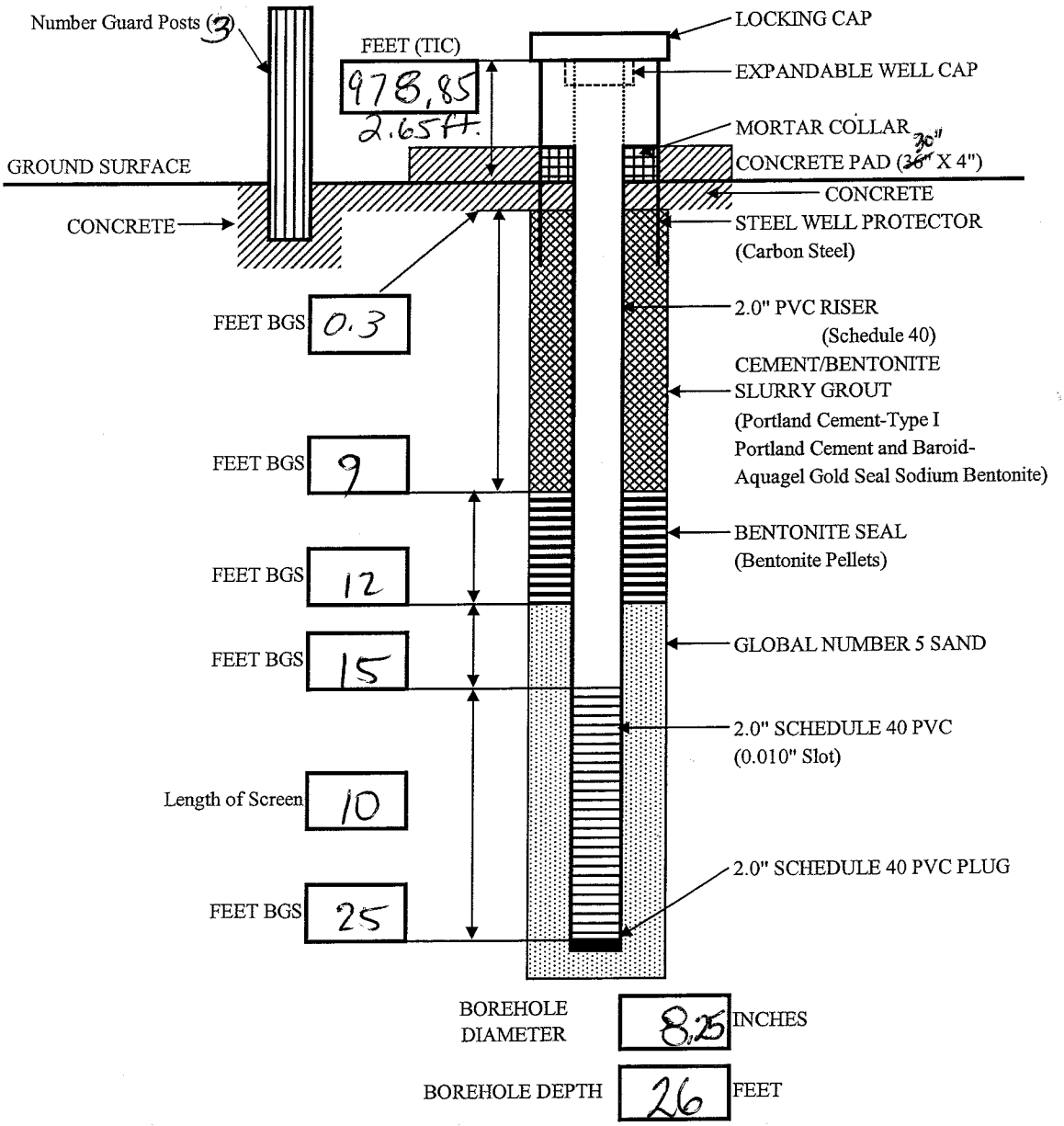
(Proponent: CECW-EG)

MONITORING WELL CONSTRUCTION DIAGRAM

RAVENNA ARMY AMMUNITION PLANT

Project: RVAAP RI 14

Well Number: ASY MW-008	Begin: 11/16/04	End: 11/16/04
Coordinates: N: 557087.66 E: 2367475.07	Elevation: 976.20	Reference Point:
Logged By: DAVID K. 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

Well ID: ASYMN-008-GN
Date: 11/19/04

Ravenna Army Ammunition Plant-
RVAAP 14 AOC Characterization

Project: RVAA PIG
Development Company: MKM
Development Method: Whale pumping
Comments:

Well TD: 27.7 FT TIC Depth to Water: 4.7 FT
Water Column Height: 23 FT One Well Volume: 13.5 Gals

Well Volume (gallons/foot): 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		
1015	DSB	4.7	—	—	—	—	—	—	—	
1019	DSE	5.04	—	—	—	—	—	—	—	
1020	DPB	5.04	—	—	7.73	1.208	8.62	12.1	1000	Initial Reading
1035	DPE	Dry	—	10.5	—	—	—	—	—	10.5 gal.
11/22/04 0910	DSB	4.8	—	—	—	—	—	—	—	
0917	DSE	4.92	—	—	—	—	—	—	—	
0920	DPB	4.92	—	—	7.14	1.29	8.59	11.3	1000	
0923	DFM	—	—	3	6.62	1.39	0.13	12.3	1000	13.5 1st well volume
0928	DPE	Dry	—	5.5	—	—	—	—	—	19.0
1042	DPB	19.89	—	—	—	—	—	—	—	
1047	DPE	Dry		2.0	—	—	—	—	—	21.0
1445	DPE	14.55	—	—	—	—	—	—	—	—
1448	DPE	Dry	—	5.0	—	—	—	—	—	26.0
11/23/04 1050	DSB	5.3'	—	—	—	—	—	—	—	
1055	DSE	5.6	—	—	—	—	—	—	—	—
	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 Qualattaive Observations

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

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

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

Well Development Record

Well ID: ASYMW-008-GW
Date: 11/23/04

Ravenna Army Ammunition Plant-
RVAAP 14 AOC Characterization

Project: RVAAP14
Development Company: 23 MM

Development Method: whale pumping
Comments:

Well TD: 27.7 FT TIC Depth to Water: 4.7 FT
Water Column Height: 23 FT One Well Volume: 13.5 Gals

Well Volume (gallons/foot): 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		
1057	DPB	5.6	—	—	—	—	—	—	—	
1058	DFM	—	—	1	7.27	1.28	7.18	11.6	1000	27 2nd volume
1103	DPE	Dry	—	7	—	—	—	—	—	34
1505	DPB	12.8	—	—	—	—	—	—	—	
1512	DPE	Dry	—	5.5	—	—	—	—	—	39.5
11/29/04 0845	DSB	5.5	—	—	—	—	—	—	—	
0851	DSE	5.8	—	—	—	—	—	—	—	
0855	DPB	5.8	—	—	—	—	—	—	—	
0904	DFM	—	—	1	7.17	1.46	6.80	11.8	1000	40.5 3rd volume
0908	DPE	Dry	—	6	—	—	—	—	—	46.5
11/29/04 0918	DSB	4.4	—	—	—	—	—	—	—	
0925	DSE	4.7	—	—	—	—	—	—	—	
0927	DPB	4.7	—	7.5	—	—	—	—	—	
0933	DPE	Dry (DFM)		7.5	6.29	2.02	2.26	10.7	1000	54.0 4th volume
1431	DPB	9.4								
	FINAL									

54
13.5
67.5

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 Qualattaive Observations

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

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

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

Well Development Record

Well ID: ASYMW-008-GW
Date: 11/29/04

Ravenna Army Ammunition Plant-
RVAAP 14 AOC Characterization

Project: RVAAP-14
Development Company: MKM
Development Method: Whale Pumping
Comments:

Well TD: 27.7 FT TIC
Water Column Height: 23 FT
Depth to Water: 4.4 FT
One Well Volume: 13.5 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		
1437	DPE	Dry	5	-	-	-	-	-		59 gal (dry)
11/30/04 0830	DSB	5.1	-	-	-	-	-	-		
0835	DSE	5.3	-	-	-	-	-	-		
0837	DPB		-	-	4.38	1.26	3.70	10.8	1000	
0840	DPE	DRY	-	6.5	-	-	-	-		65.5 gal (dry)
1440	DPB	8.35	-	-	-	-	-	-		
1442	DFM		-	2.0	7.03	1.42	10.96	11.6	572	5th well vol (67.5)
1445	DPE	DRY	-	3.5	-	-	-	-		71 gal dry
0845	DSB	5.4	-	-	-	-	-	-		
0850	DSE	5.5	-	-	-	-	-	-		
0851	DPB	5.5	-	-	-	-	-	-		
0900	DPE	Dry	-	7	-	-	-	-		78 gal
12/2/04 0840	DSB	5.12	-	-	-	-	-	-		
0845	DSE	5.28	/	-	-	-	-	-		
0846	DPB									
	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 Qualattaive Observations

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

Logged By: NILESH SHRINGARPURE (Please Print)
Signature: NShringarpure

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

Well Development Record

Well ID: ASYmw-008-GW
Date: 12/2/04

Ravenna Army Ammunition Plant-
RVAAP 14 AOC Characterization

Project: RVAAP-14
Development Company: MKM
Development Method: WHALE PUMPING
Comments:

Well TD: 27.7 FT TIC Depth to Water: 4.7 FT
Water Column Height: 23 FT One Well Volume: 13.5 Gals

Well Volume (gallons/foot): 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		
0847	DPM		-	3	6.76	1.51	4.15	12.2	1000	6th well vol 81 gal
0848	DPE	DRY	-	3	-	-	-	-		8+ gal dry
12/03/04 0840	DSB	4.85	-	-	-	-	-	-		
0846	DSE	5.10	-	-	-	-	-	-		
0847	DPB	5.10	-	-	6.5	1.49	4.16	10.2	1000	
0852	DPE	DRY	-	7 dry	-	-	-	-		91 gal dry
12/06/04 0855	DSB	4.5	-	-	-	-	-	-		
0905	DSE	4.6	-	-	-	-	-	-		
0905	DPB	4.6	-	-	-	-	-	-		
0910	DPE	18.55		3.5	6.3	1.4	5.4	11.0	1000	94.5 7th well vol.
	DFM									↓
										Final volume
	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 Qualattaive Observations

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

Logged By: NILESH SHRINGARPURE (Please Print)
Signature:

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

Well ID: ASYmw-008-MGW **Monitoring Well Purging Form**

Date: 12/13/04

Ravenna Army Ammunition Plant
Ravenna, Ohio

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:** 0.16 (ft)
Vapor Readings: HNu · OVA Background: ____ Inside Well Casing:

	Present		Depth	Sampled Sample ID
LNAPL	Yes · No		Yes · No	ASYMW-008MGW
DNAPL	Yes · No		Yes · No	

CALCULATIONS

(A) Depth to Well Bottom 27.7 (ft) TOC · TIC · BGS Measured · Previously Measured (circle one)
(B) Depth to Water 4.3 (ft) TOC · TIC · BGS Time Measured: 1414
(C) Water Column Height (A-B) 23.4 (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) 3.74 ~~13.5~~ (gal)
(F) Volumes to be Evacuated 5
(G) TOTAL VOLUME TO BE EVACUATED (E * F) 18.72 (gal)

EVACUATION METHOD

Well Evacuation Method: Bailer · Submersible Pump · Other: micropurging **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	
1415	4.3			1.41	10.69	7.11	35.6	7.22	INITIAL
1418	5.55			1.27	11.49	6.95	21.1	3.26	
1421	7.3			1.26	11.61	6.93	22.5	2.81	
1424	8.1			1.27	10.84	6.90	28.1	2.67	PURGING COMPLETE

Logged By: NILESH SHRIN GARPURE (Please Print) Reviewed By: T. Eoly

Signature: [signature] Date: 2/21/05

Field Sampling Report

Location ID: ASYMW-008-GW

Date: 12/13/04

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	
	MICROPURGE PUMP	✓			Push Probe		Plastic Liner	
Type/Construction					Mattocks			
Miscellaneous	Well Purging Form Yes - No							

Sample Collection: 1415 hrs

Sample Depth: ~~3~~ 10 ~~5~~ 6 FT (below surface)

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

Decon: Dedicated - Each Day - Each Location

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

Field Parameters
(at time of sample)

PID / FID Readings: Background:		ppm
Sample:		ppm
Water Level	4.3	FT
Temperature	10.84	°C
Sp. Conductance:	1.27	uMHOs
pH	6.90	units
Turbidity	28.1	N.T.U.

Analytical Parameters

VOC	✓	TPH GRO	
SVOC	✓	TPH DRO	
Explosives	✓	Chromium +6	✓
Propellants	✓	~~Nitrate~~	~~✓~~ FRZ
TAL Metals	✓		
Pesticides/PCBs	✓		
Cyanides			
TOC			
Grain Size			

Other Parameters

Corrosivity			
Reactivity Sulfide/Cyanide			
Ignitability			

QA Samples

MS/MSD	Yes / No	NA
Duplicate ID		NA
Equipment Rinse ID		NA
(Trip Blank ID)	Trip Blank	NA

Sample Description

NO ODOR NO SHEEN
Clear water 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: NILESH SHRINGARPURE (Please Print)

Signature: Nilesh Shringarpure

Reviewed by: ERIC ELLIS (Please Print)

Signature: Eric Ellis Date: 2/3/05

HTRW DRILLING LOG

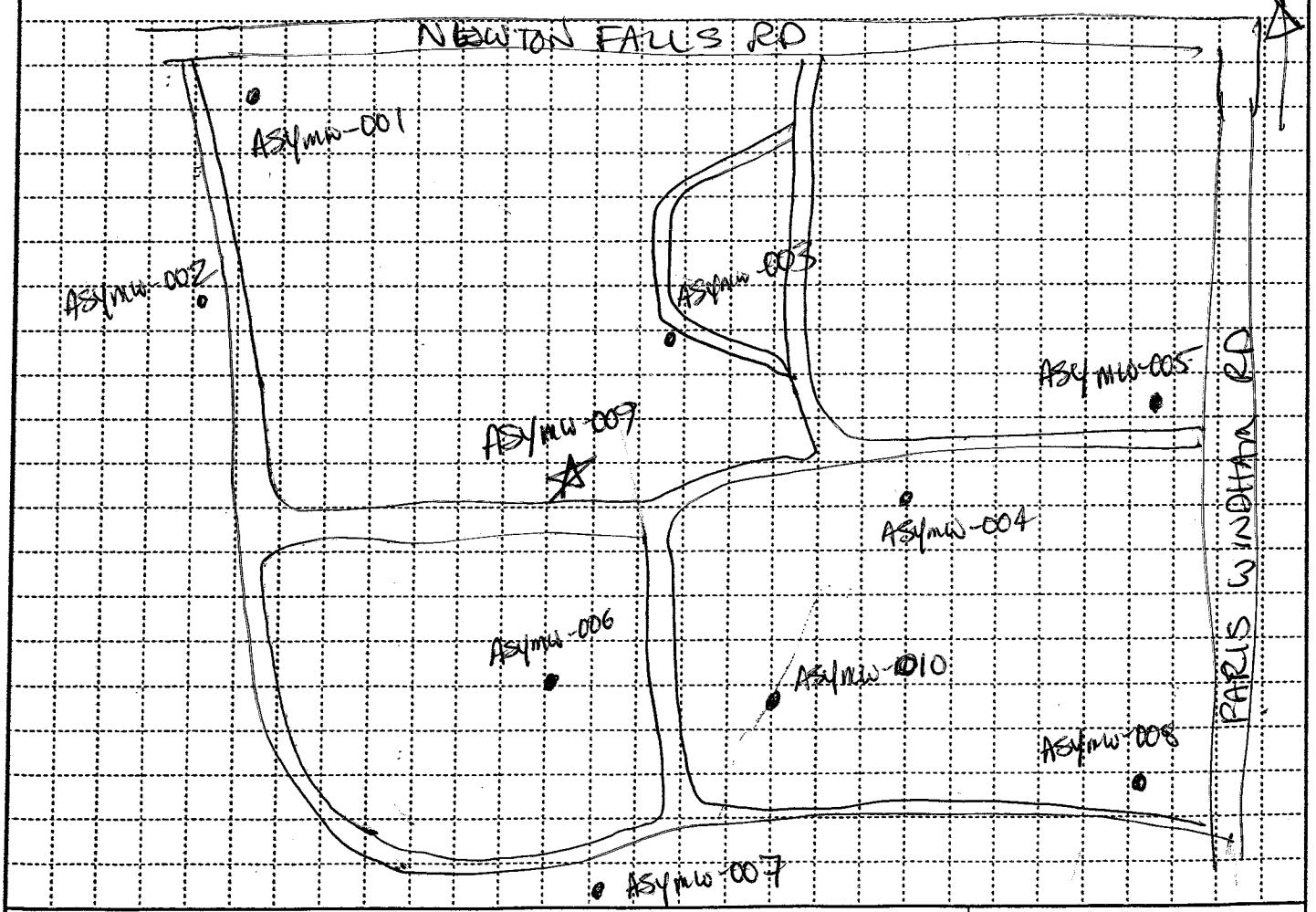
DISTRICT: LOUISVILLE		HOLE NUMBER: ASY/MW-009
1. COMPANY NAME: MKM ENGINEERS	2. DRILL SUBCONTRACTOR: HAD DRILLING	SHEET 1 OF 3 SHEETS
3. PROJECT: RVAAP - RI 14	4. LOCATION: RAVENNA, OH ATLAS SCRAP YARD	
5. NAME OF DRILLER: SCOTT HEISER	6. MANUFACTURER'S DESIGNATION OF DRILL: CME - 55	
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: 4¼" ID HSA; 1½" ID 2' SPLIT SPOON	8. HOLE LOCATION: WEST CENTRAL	
	9. SURFACE ELEVATION: 979.90 ASL	
	10. DATE STARTED: 11/12/04	11. DATE COMPLETED: 11/12/04
12. OVERBURDEN THICKNESS	15. DEPTH GROUNDWATER ENCOUNTERED: 14'	
13. DEPTH DRILLED INTO ROCK: 0.5'	16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED: 12.45 @ 1010 11/18/04	
14. TOTAL DEPTH OF HOLE: 22'	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY)	

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
NONE			NA

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE RECOVERY %

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
		X		

LOCATION SKETCH/COMMENTS — SCALE:



PROJECT: RVAAP - RI 14	HOLE NO: ASY/MW-009

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

HTRW DRILLING LOG (CONTINUATION SHEET)

HOLE NUMBER: ASYmw-009

PROJECT: RVAAP-R1 14

INSPECTOR: DK EARNEST

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.~~ USCS	BLOW COUNT (g)	REMARKS (h)
845	0	4" TOP SOIL, GRASS & ROOTS					
		MED BROWN CLAYEY SILT (70%) (20%) LOW PLASTIC MOTTLED SOME ROCK FRAG & DEBRIS (10%) MED DENSE	1.2	0.6	ML	2/3 3/3	DAMP 10YR 5/3
	2	LT BROWN MOTTLED W/LT GREY	2.9	1.6	ML	2/3 3/5	MOIST @ 2.5 10YR 6/3
	4	~~LESS~~ SAA LESS GREY MOTTLING REDDISH 4-4.5 TRACE ROCK FRAG	8.6	1.5	ML	1/4 6/6	DAMP
	6	SAA TRACE GREY	8.8	1.8	ML	5/5 8/10	DRY 10YR 4/3
	8	SAA	8.6	1.5	ML	3/7 10/15	
	10	GREY SILT (80%) NO PLASTIC DRY TRACE SAND (20%)	4.4	1.5	ML	4/6 10/12	7.5YR 5/1
	12	SAND (80%) MED BROWN (20%) SILTY MED TO FINE 3" GREY CLAY SEAM @ 13' LOOSE TO MED DENSE	9.6	1.2	SM	1/4 5/5	10YR 5/4 MOIST TO WET
▽	14	SAA	6.5	1.3	SM	2/3 4/5	SAT SAND
	16	~~MH~~ SILT, GREY (80%) SMALL ROCK FRAGS (10%) SOME SAND (10%)	10.3	1.5	ML	1/1 2/2	7.5YR 5/1 SAT
	18		7.6	1.8	ML	2/7 10/13	SAT
	20						

PROJECT: RVAAP-R1 14

HOLE NO: ASYmw-009

ENG FORM 5056A-R, AUG 94

(Proponent: CECW-EG)

HTRW DRILLING LOG (CONTINUATION SHEET)

HOLE NUMBER ASYmw-009

PROJECT RVAAP-R1 14 | INSPECTOR DK EARNEST | SHEET 3 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)
	20					1/7	~~TOTR~~ ~~3/1~~
		DK GREY SILT, 90% SOME SAND 10%	11.0	1.5			10YR 3/1
1000	22	ROCK FRAG NO PLASTIC				11/50+	SPOON REFUSAL
		BOH ~~22~~					
		BED ROCK @ ~22'					
		SET WELL @ 21.5					
		SCREEN 11.5 - 21.5					
		SAND TO 9.5					
1115		SEAL TO 7.5					
		7 BAGS #7 SAND					

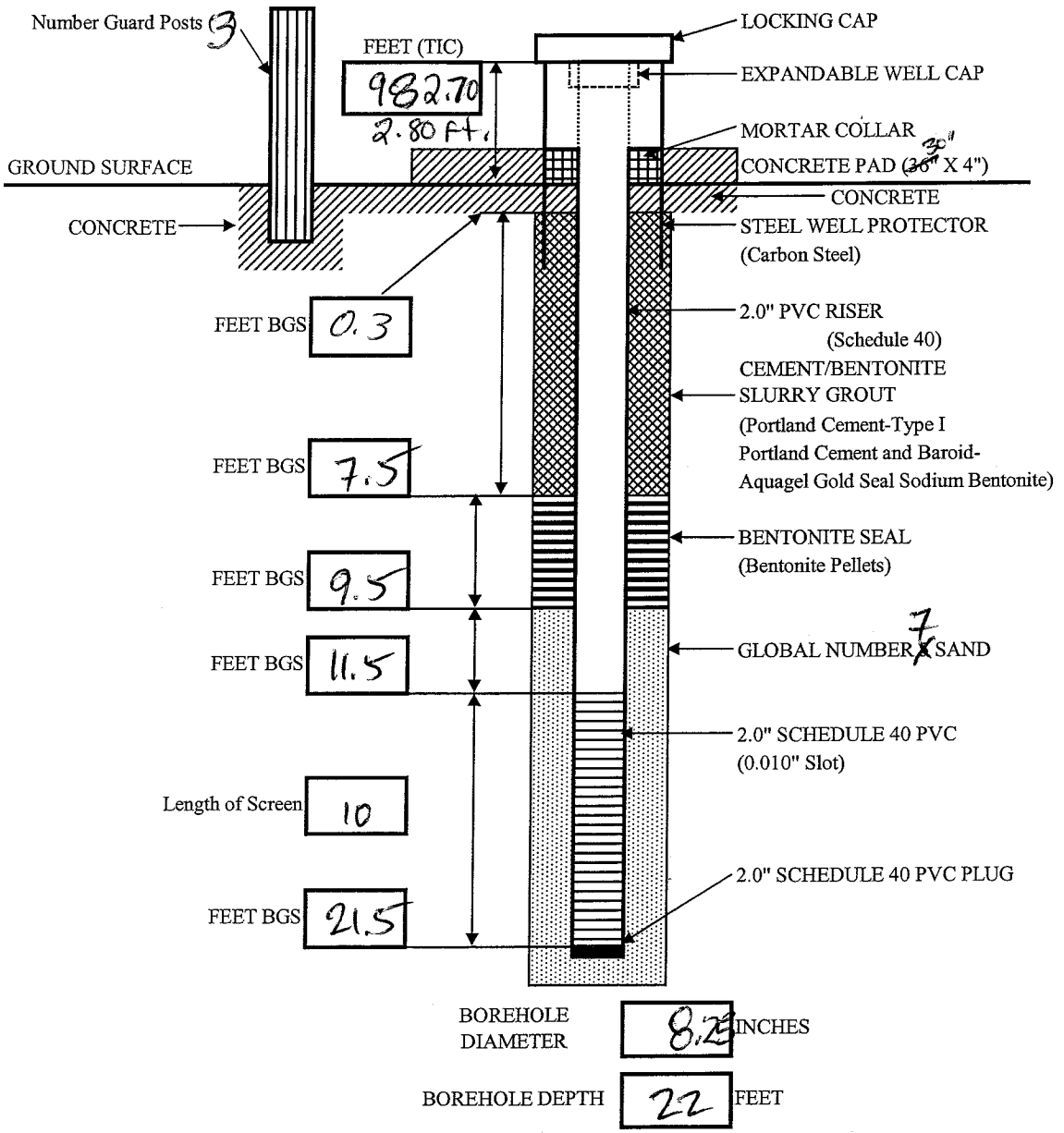
PROJECT RVAAP-R1 14 | HOLE NO. ASYmw-009

MONITORING WELL CONSTRUCTION DIAGRAM

RAVENNA ARMY AMMUNITION PLANT

Project: RVAAP RI 14

Well Number: ASYmw-009 ~~RE~~	Begin: 11/12/04	End: 11/12/04
Coordinates: N: 557603.68 E: 2366631.94	Elevation: 979.90	Reference Point:
Logged By: ~~D.KEARNEST~~		



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: AS4MW-009-GW
Date: 11/18/04

Ravenna Army Ammunition Plant-
RVAAP 14 AOC Characterization

Project: RVAAP14
Development Company: MCM

Development Method: Whale pumpin
Comments:

Well TD: 24.55 FT TIC Depth to Water: 12.45 FT
Water Column Height: 12.10 FT One Well Volume: 7.1 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	ON	DO	Temp		
1010	DSB	12.45	—	—	—	—	—	—	—	—
1015	DSE	12.50	←	—	—	—	—	—		
1016	~~DBB~~	12.50	←	—	7.01	1.12	2.61	12.8	1000	Initial Reading
1021	DFM	—	←	7gal	7.29	1.28	5.36	12.8	1000	1well vol (7gal)
1027	DFM	—	←	~~HD~~ 7gal	7.20	1.44	5.11	12.7	1000	2nd well vol (14gal)
1034	DFM	←	←	7gal	7.20	1.27	4.03	12.8	1000	3rd well vol (21gal)
1039	DFM	←	←	7gal	7.27	1.16	5.00	12.7	1000	4th well vol (28gal)
1045	DFM	←	←	7gal	7.24	1.29	4.28	12.8	1000	5th well vol (35gal)
1050	DFM	←	←	7gal	7.31	1.29	5.52	12.8	1000	6th well vol (42gal)
1056	DFM	←	←	7gal	7.20	1.29	4.73	12.5	1000	7th well vol (49gal)
1102	DFM	←	←	7gal	7.34	1.28	5.51	12.8	1000	8th well vol (56gal
	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 Qualattaive Observations

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

Logged By: Sudheer Gubby (Please Print)
Signature:

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

Monitoring Well Purging Form

Well ID: ASYMW-009-GW

Ravenna Army Ammunition Plant
Ravenna, Ohio

Date: 12/02/04

WELL OBSERVATIONS

Protective Casing: (Intact) · Damaged **Locked:** Yes · (No) **Key No:**

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

Stickup Height: 2.3 (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	ASYMW-009-GW
DNAPL	Yes · No _____	Yes · No	

CALCULATIONS

(A) **Depth to Well Bottom** 21.5 (ft) **TOC · TIC · BGS** (Measured) · **Previously Measured** (circle one)

(B) **Depth to Water** 12.2 (ft) (TOC) · TIC · BGS **Time Measured:** 1425

(C) **Water Column Height (A-B)** 9.3 (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)** 1.49 (gal)

(F) **Volumes to be Evacuated** 5

(G) TOTAL VOLUME TO BE EVACUATED (E * F) 7.44 (gal)

EVACUATION METHOD

Well Evacuation Method: Bailer · Submersible Pump · Other: Micro purging **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	
1426	12.2			1.29	12.18	7.08	412	5.09	Initial reading
1429	12.2			1.41	12.91	6.85	423	5.7	
1432	12.3			1.42	12.81	6.78	408	2.96	
1435	12.3			1.42	12.70	6.75	255	1.30	
1438	12.3			1.41	12.55	6.74	125	0.14	End purging

Logged By: Vijay Alluri (Please Print) Reviewed By: C. Eslen

Signature: Vijay Date: 2/21/05

Field Sampling Report

Location ID: ASYMW-009-GW

Date: 12/02/04

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 purge	X			Push Probe		Plastic Liner	
Type/Construction					Mattocks			
Miscellaneous	**Well Purging Form** Yes - No							

Sample Collection: 1450 hrs

Sample Depth: ~~0~~ 5 15 FT (below surface)

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

Decon: Dedicated - Each Day - (Each Location)

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

Field Parameters
(at time of sample)

PID / FID Readings: Background:	0.0	ppm
Sample:		ppm
Water Level	12.3	FT
Temperature	12.55	°C
Sp. Conductance:	1.41	uMHOs
pH	6.74	units
Turbidity	125	N.T.U.

Analytical Parameters

VOC	X	TPH GRO	
SVOC	X	TPH DRO	
Explosives	X	Chromium +6	X
Propellants	X	Nitrate	
TAL Metals	X		
Pesticides/PCBs	X		
Cyanides			
TOC			
Grain Size			

Other Parameters

Corrosivity			
Reactivity Sulfide/Cyanide			
Ignitability			

QA Samples

MS/MSD	Yes / No	(NA)
Duplicate ID		(NA)
Equipment Rinse ID	ASYMW-009-ER	NA
(Trip Blank ID)	Trip Blank	~~NA~~

Sample Description

No color, No odor, No sheen
Medium 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: Vijay Alluri (Please Print)

Signature: vijay

Reviewed by: ERIC ELLIS (Please Print)

Signature: [signature] Date: 2/3/05

HTRW DRILLING LOG

	DISTRICT: Louisville	HOLE NUMBER: ASYmw-010
1. COMPANY NAME: MKM Engineers Inc	2. DRILL SUBCONTRACTOR: HAD Drilling	SHEET 1 OF 3 SHEETS
3. PROJECT: RVAAP RE 14	4. LOCATION: Atlas Scrap Yard	
5. NAME OF DRILLER: Sam Hoffer	6. MANUFACTURER'S DESIGNATION OF DRILL: CME-LC60	
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: 8.25" OD HSA; 2" Splitspoons	8. HOLE LOCATION: West of Pwr Road/East of 1st road in Atlas	
	9. SURFACE ELEVATION: 978.20 ASL	
	10. DATE STARTED: 15Nov04	11. DATE COMPLETED: 15 NOV 04
12. OVERBURDEN THICKNESS	15. DEPTH GROUNDWATER ENCOUNTERED: ~13' BGS	
13. DEPTH DRILLED INTO ROCK	16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED: 11.5' @1319 11/18/04	
14. TOTAL DEPTH OF HOLE: 28' BGS	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY)	

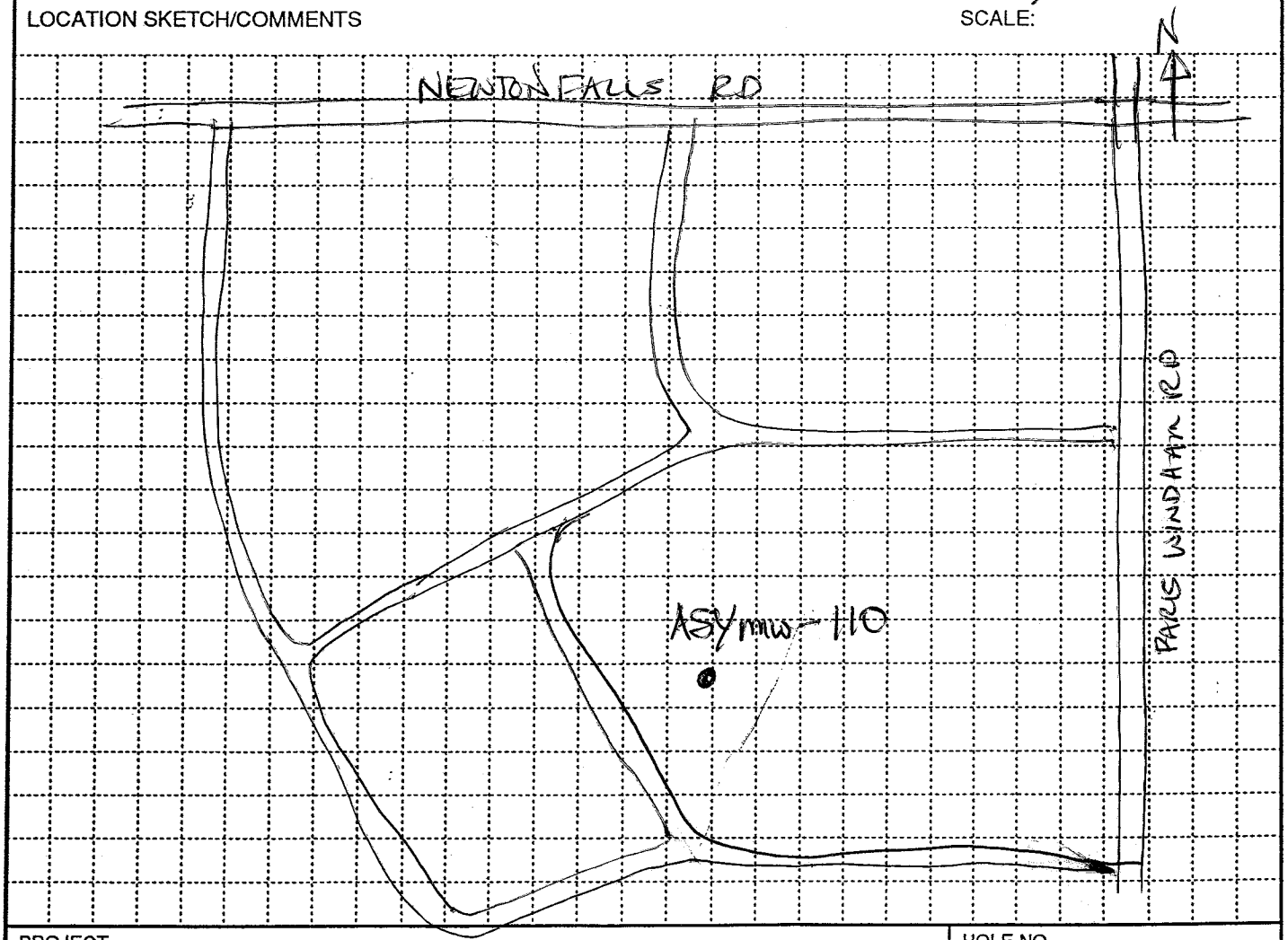
18. GEOTECHNICAL SAMPLES	DISTRICT	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
NONE	—	—	NA

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE RECOVERY — %
—	—	—	—	—	—	

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
		X		

LOCATION SKETCH/COMMENTS

SCALE:



PROJECT	HOLE NO.
RVAAP RT. 14	ASY MW-010

ENG FORM 5056-R, AUG 94

(Proponent: CECW-EG)

HTRW DRILLING LOG (CONTINUATION SHEET)

HOLE NUMBER: ASYmw-010

PROJECT: RVAAP RI 14

INSPECTOR: Mark Durkay

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.~~ USCS	BLOW COUNT (g)	REMARKS (h)
		0.6 Topsoil					
		Br. SILT 70% w/Sand 15% Dry Grey Mottles No Staining No Plasticity	0.2	1.5	ML	2-3 3-5	7.5yr 5/6
	2	Same As Above	0.5	1.5	ML	1-5 7-8	7.5yr 5/6
	4	Br. SILT 75% w/Clay 20% Dry Stiff Grey Mottles No Staining No Plasticity	0.0	2.0	ML	2-6 8-8	7.5yr 5/4
	6	Br. SILT 70% w/Sand 20% Dry No Staining No Plasticity	0.0	2.0	ML	3-7 15-16	7.5yr 5/4
	8	↓					
	10	Grey SILT 75% w/Clay 15% Dry STIFF No Plasticity No Staining	0.0	2.0	ML	2-11 16-18	7.5yr 4/1
		Br. SILT 70% w/Sand 25% Dry Crumbled in Split Spoon No Plasticity No staining	0.0	1.7	ML	2-8 8-6	7.5yr 5/1 7.5yr 5/1
	12	Grey SILT 75% w/Clay 15% Dry STIFF No Plasticity No Staining					
		Grey SILT 85% w/Clay Wet/Saturated No Plasticity No Staining	0.0	1.3	ML	1-2 5-5	7.5yr 5/1
	14	Same As Above	0.0	1.8	ML	1-2 2-3	7.5yr 5/1
	16	Same As Above	0.0	1.7	ML	1-1 1-2	7.5yr 5/1
	18	Same As Above	0.0	1.6	ML	1-1 2	7.5yr 5/1
	20						

PROJECT: RVAAP RI 14

HOLE NO.: ASYmw-010

ENG FORM 5056A-R, AUG 94

(Proponent: CECW-EG)

HTRW DRILLING LOG (CONTINUATION SHEET)

HOLE NUMBER: ASY MW-016

PROJECT: RVAAP RI 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)
		Same As Above	0.0	1.7	ML	1-1 3-3	7.5yr 5/1
	22	Grey SAND 70% w/ Silt wet/saturated No Plasticity No odor No Staining			SM		
		Grey SILT 70% w/ clay Damp No Plasticity No odor No Staining	0.0	1.4	ML	2-3 6-8	7.5yr 5/2
	24						
			0.0	1.6	ML	4-8 10-11	7.5yr 5/2
	26						
		Grey SAND 90% Dry No odor No staining No Plasticity → Grey weathered S	0.0	1.5	ML SP/SM	4-10 18-21	
	28	BoH 28					BoH 28 Sand 27 Screen 27-17 Sand up to 14 Bentonite to 11 Grout to Surface Stick up Completion

PROJECT: RVAAP RI 14

HOLE NO. ASY MW-010

ENG FORM 5056A-R, AUG 94

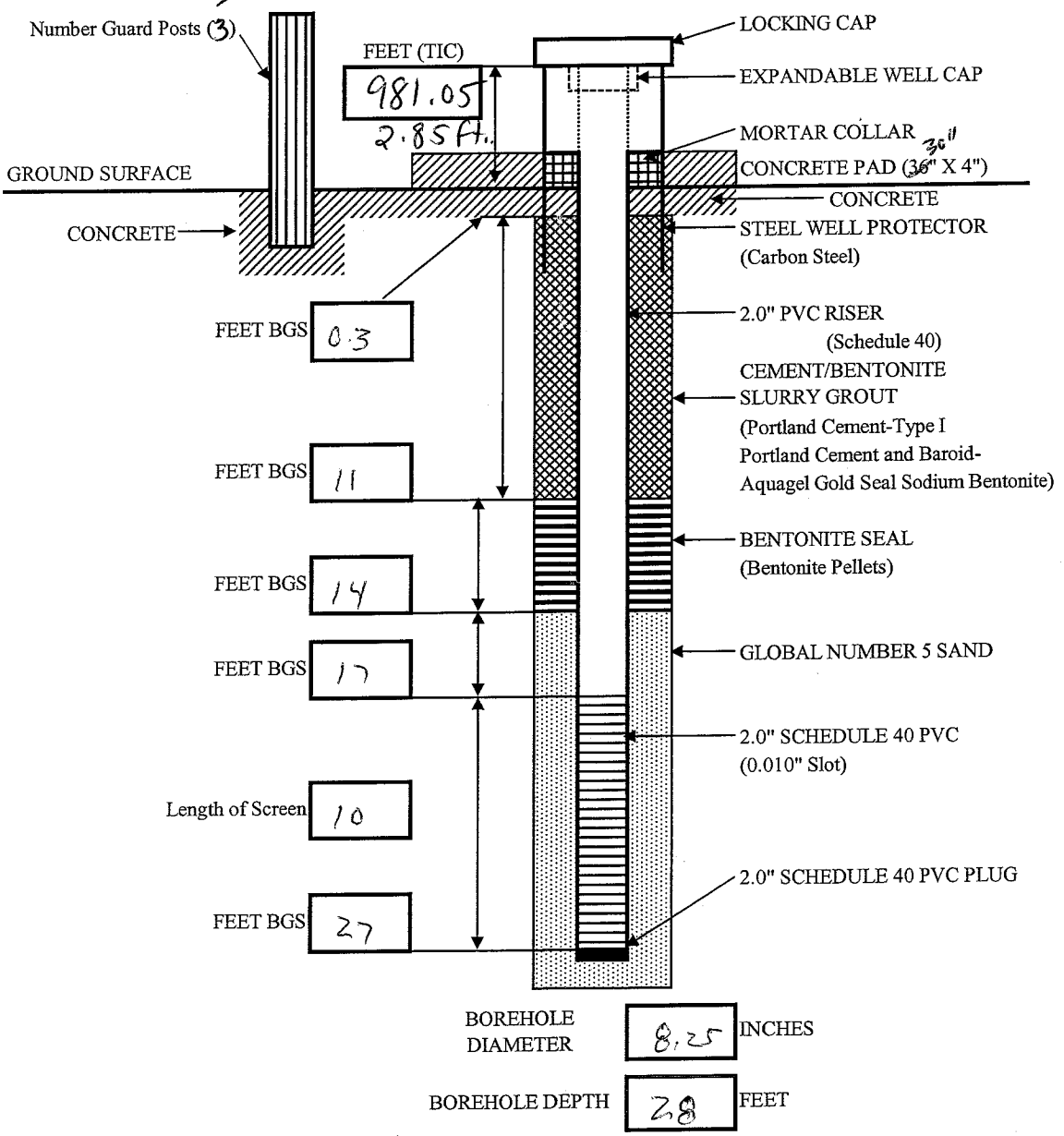
(Proponent: CECW-EG)

MONITORING WELL CONSTRUCTION DIAGRAM

RAVENNA ARMY AMMUNITION PLANT

Project: RVAAP RI 14

Well Number: ASYMW-010	Begin: 15 Nov 04	End: 15 Nov 04
Coordinates: N: 557270.61 E: 2366985.37	Elevation: 978.20	Reference Point:
Logged By:		



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: ASYMW-010-GW
Date: 11/18/04

Ravenna Army Ammunition Plant-
RVAAP 14 AOC Characterization

Project: RVAAP14
Development Company: MKM
Development Method: Whale pumping
Comments:

Well TD: 31 FT TIC
Water Column Height: 19.5 FT
Depth to Water: 11.5 FT
One Well Volume: 11.5 Gals

Well Volume (gallons/foot): 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	Cond	DO	Temp		
1319	DSB	11.5	—	—	—	—	—	—	—	—
1325	DSE	12.1	—	—	—	—	—	—	—	—
1331	DPB	12.1			7.26	0.975	2.45	12.2	1000	Initial bailing
	~~DPE~~									
1340	DFM	—	—	11.5	7.26	1.17	3.49	11.9	1000	1 well vol (11.5)
1347	DFM	—	—	11.5	7.14	1.19	3.24	11.9	1000	23 gal (2nd well vol)
1355	DFM	—	—	11.5	7.09	1.19	3.08	11.7	1000	34.5 gal (3rd well vol)
1403	DFM	—	—	11.5	7.14	1.03	3.61	12.0	1000	46 gal (4th well vol)
1411	DFM	—	—	11.5	7.11	1.03	3.29	11.9	1000	57.5 gal (5th well vol)
1419	DFM	—	—	11.5	7.22	1.02	5.02	12.0	1000	69.0 gal (6th well vol)
1427	DFM	—	—	11.5	7.11	1.04	4.72	12.0	1000	80.5 gal (7th well vol)
1435	DFM	—	—	11.5	7.13	1.04	4.98	12.0	1000	92.0 gal (8th well vol)
1436	DPE	13.25	—	—	—	—	—	—	—	—
	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 Qualattaive Observations

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

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

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

Monitoring Well Purging Form

Well ID: ASYMW-010GW

Ravenna Army Ammunition Plant
Ravenna, Ohio

Date : 12/02/04

WELL OBSERVATIONS

Protective Casing: (Intact) · Damaged **Locked:** Yes · (No) **Key No:**

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

Stickup Height: 2.7 (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	ASYMW-010GW
DNAPL	Yes · No _____	Yes · No	

CALCULATIONS

(A) **Depth to Well Bottom** 27 (ft) (TOC) · TIC · BGS **Measured · Previously Measured** (circle one)

(B) **Depth to Water** 11.5 (ft) (TOC) · TIC · BGS **Time Measured:** _____

(C) **Water Column Height (A-B)** 15.5 (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)** 2.48 (gal)

(F) **Volumes to be Evacuated** 5

(G) TOTAL VOLUME TO BE EVACUATED (E * F) 12.4 (gal)

EVACUATION METHOD

Well Evacuation Method: Bailer · Submersible Pump · Other: Micropurging **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	
1322	11.5			1.14	10.96	7.32	80 ~~553~~	9.6	Initial reading
1325	11.6			1.1	11.81	7.34	93	10.95	
1328	11.6			1.16	12.06	7.34	31	11.22	
1331	11.7			1.16	12.09	7.03	20	11.18	
1334	11.6			1.12	12.05	7.24	20	11.21	
1337	11.5			1.10	12.07	7.20	18	11.16	End purging

Logged By: Vijay Alluri (Please Print) Reviewed By: C. Keller

Signature: Vijay Date : 2/21/05

Field Sampling Report

Location ID: ASY MW - 010-GW

Date: 12/02/04

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	X			Push Probe			
Type/Construction								
Miscellaneous	**Well Purging Form** (Yes) - No							

Sample Collection: 1345 hrs

Sample Depth: 18 FT (below surface)

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

Decon: Dedicated - Each Day - (Each Location)

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

Field Parameters (at time of sample)		
PID / FID Readings:		
Background:	0.0	ppm
Sample:		ppm
Water Level	11.5	FT
Temperature	12.07	°C
Sp. Conductance:	1.10	uMHOs
pH	7.20	units
Turbidity	18	N.T.U.

Analytical Parameters			
VOC	X	TPH GRO	
SVOC	X	TPH DRO	
Explosives	X	Chromium +6	X
Propellants	X	Nitrate	
TAL Metals	X		
Pesticides/PCBs	X		
Cyanides			
TOC			
Grain Size			

Other Parameters			
Corrosivity			
Reactivity Sulfide/Cyanide			
Ignitability			

QA Samples		
MS/MSD	Yes / No	NA
Duplicate ID		NA
Equipment Rinse ID		NA
(Trip Blank ID)	Trip Blank	NA

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:

Name:

Agency/Company:

Address:

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

Logged By: Vijay Alluri (Please Print)

Signature: Vijay

Reviewed by: ERIC ELLIS (Please Print)

Signature: [signature] Date: 2/3/05