



# Appendix J

## Geotechnical

C-Block Quarry

Load Line 12

Building 1200

Landfill North of Winklepeck Burning Grounds

Pistol Range

NACA Test Area

Load Line 5

Load Line 7

Load Line 8

Load Line 10

Buildings F-15/F-16

Atlas Scrap Yard

MKM US LAB USCS SUMMARY 04001-7G.GPJ PRIMENG.GDT 1/4/05

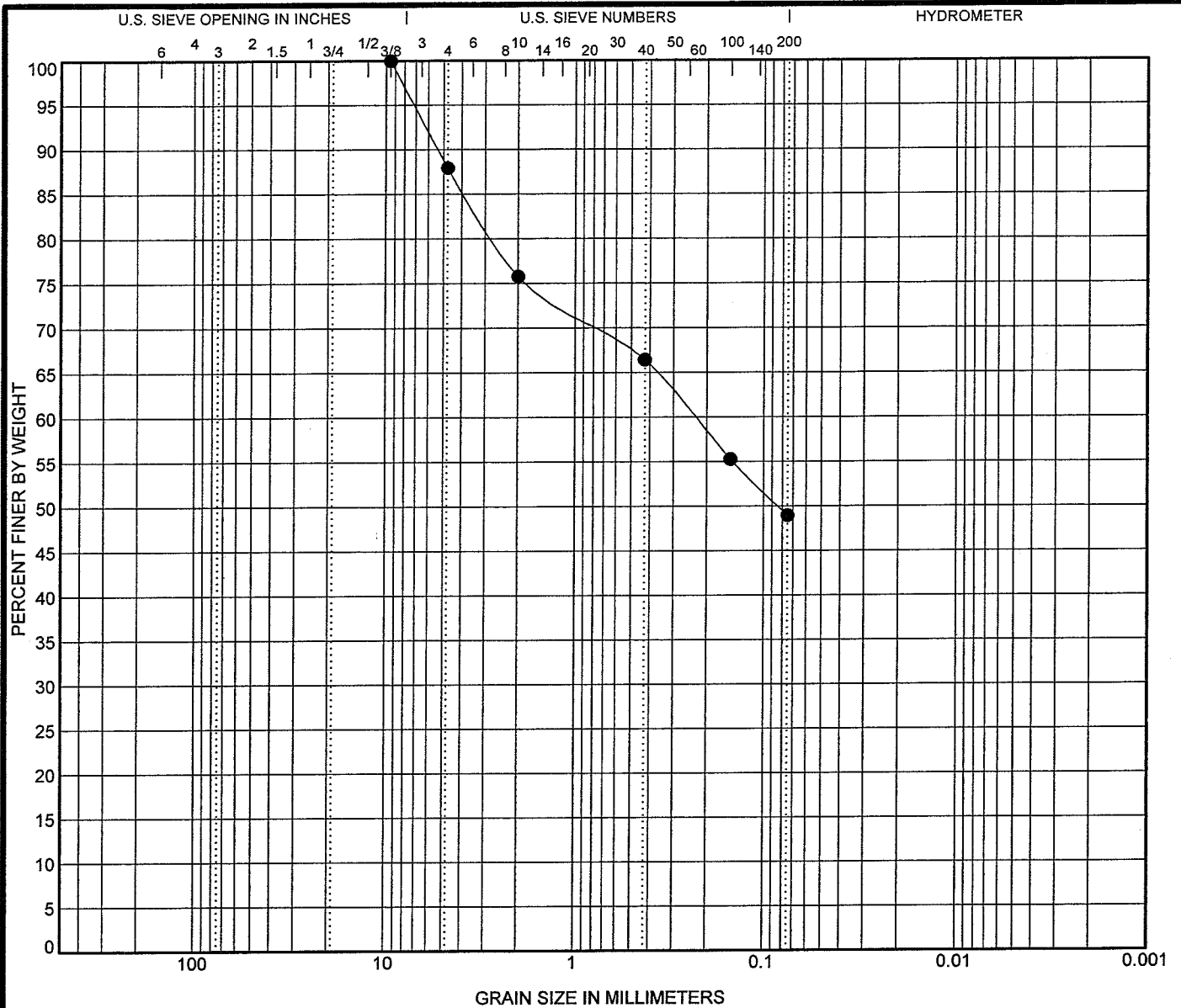
Sample Number	Depth (feet)	Moisture Content %	Liquid Limit %	Plastic Limit %	Plast. Index	Organic Content (%)	Agg. %	C Sand %	M Sand %	F Sand %	Silt %	Silt & Clay Comb.	Clay %	Soil Description	Class. Symbol
CBLmw-001	1.7	18.0	31	21	10		12.1	12.2	9.3	17.5		49.0		Mottled brown CLAYEY SAND, little gravel	SC



**Summary of Laboratory Results**

Client: MKM Engineers, Inc.  
 Project: Characterization of RVAAP 14 AOCs  
 Location: Ravenna, Ohio  
 Number: 04001-7G





COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Specimen Identification	Classification	LL	PL	PI	Cc	Cu
● CBLmw-001 1.7	Mottled brown CLAYEY SAND SC	31	21	10		

Specimen Identification	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
● CBLmw-001 1.7	9.5	0.233			12.1	39.0	49.0	

**GRAIN SIZE DISTRIBUTION**



Client: MKM Engineers, Inc.  
 Project: Characterization of RVAAP 14 AOCs  
 Location: Ravenna, Ohio  
 Number: 04001-7G

US GRAIN SIZE 04001-7G.GPJ PRIMENG.GDT 1/4/05



## Prime Engineering & Architecture

**Project No.:** 04001G  
**Project:** RVAAP  
**Client:** MKM Engineers  
**Technician(s):** Stephanie and Brandi  
**Date:** 1/4/2005

<b>Sample No:</b>	<b>pH Reading:</b>	<b>Specific Gravity:</b>
CBLmw-001	6.9	2.760

MKM US LAB USCS SUMMARY 04001-8G.GPJ PRIMENG.GDT 1/19/05

Sample Number	Depth (feet)	Moisture Content %	Liquid Limit %	Plastic Limit %	Plast. Index	Organic Content (%)	Agg. %	C Sand %	M Sand %	F Sand %	Silt %	Silt&Clay Comb.	Clay %	Soil Description	Class. Symbol
CBLmw-004	3.7	14.5	17	17	NP		2.9	3.1	10.3	34.1		49.6		Brown SILTY SAND, trace gravel	SM



**Summary of Laboratory Results**

Client: MKM Engineers, Inc.  
 Project: Characterization of RVAAP 14 AOC's  
 Location: Ravenna, Ohio  
 Number: 04001G

# Field Sampling Report

Location ID: CBLmw - 004 (2-4 ft)

Ravenna Army Ammunition Plant  
Characterization of 14 RVAAP AOCs

Date: 1-04-05

## Sampling Information

Source	Groundwater / Product	Surface Water	<u>Soils</u> / Sediments / Sludge
Method	Bailer	Sample Bottle	Scoop <span style="float: right;">Trowel</span>
	Pump	Bacon Bomb	Bowl <span style="float: right;">Hand Auger</span>
			Push Probe <span style="float: right;">Shelby Tube</span> <input checked="" type="checkbox"/>
Type/Construction			
Miscellaneous	Well Purging Form Yes - No		

Sample Collection: 0900 hrs      Sample Type: Composite - MI - Grab      Location: Plotted on Map - Staked in Field  
 If MI, # of increments taken: \_\_\_\_\_      Estimated - Measured - Surveyed  
 Sample Depth: 2-4 FT (below surface)      Decon: Dedicated - Each Day - Each Location

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

**Sample Description**

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*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: \_\_\_\_\_

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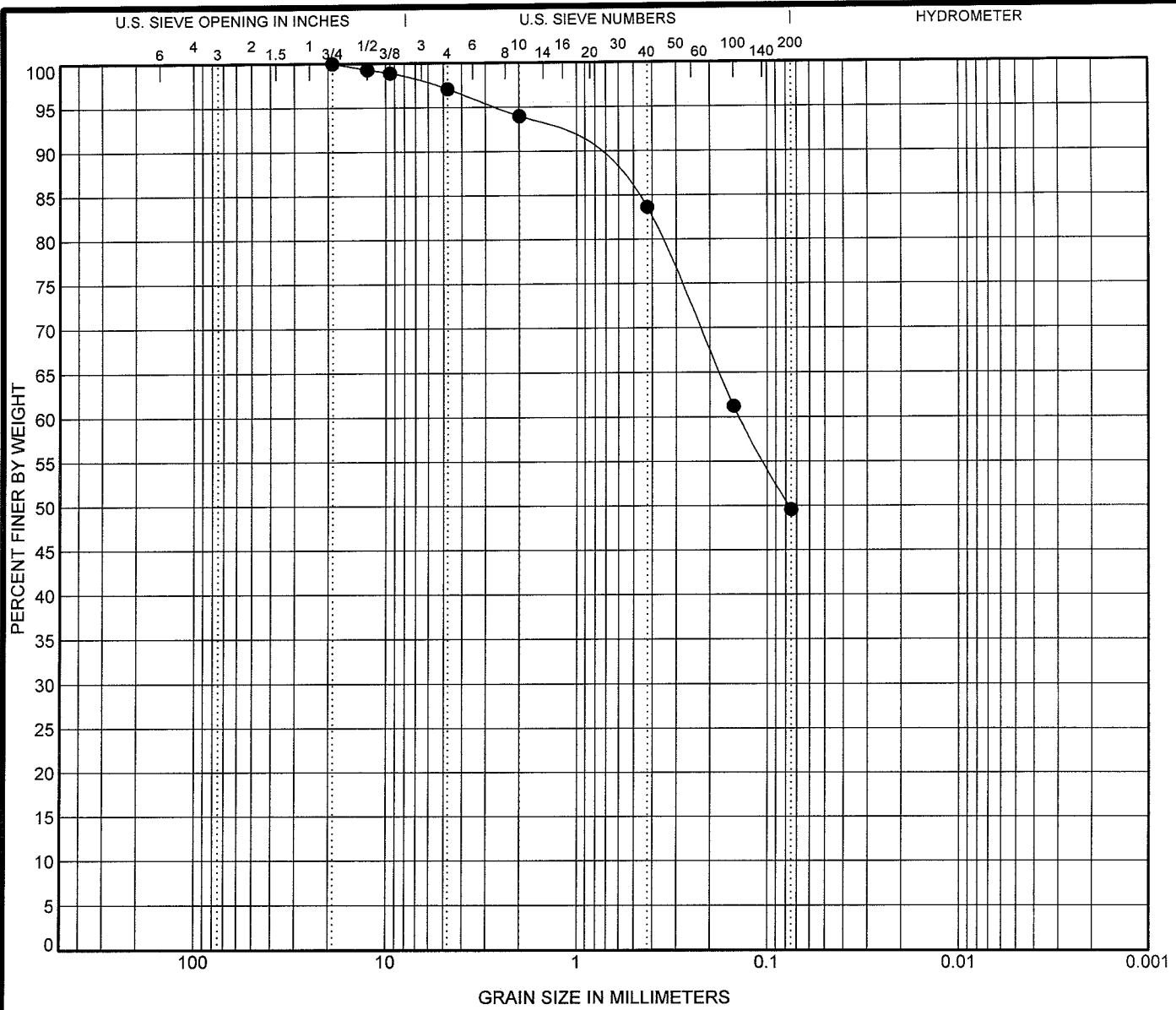
QA/QC Provided: MS/MSD - Duplicate - Trip Blanks - Field Blanks  
Parameters: Same as Above - As Listed

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Logged By: ERIC ELLIS (Please Print)      Reviewed by: Sue Boles (Please Print)

Signature: [Signature]      Signature: [Signature]      Date: 06/15/05





COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

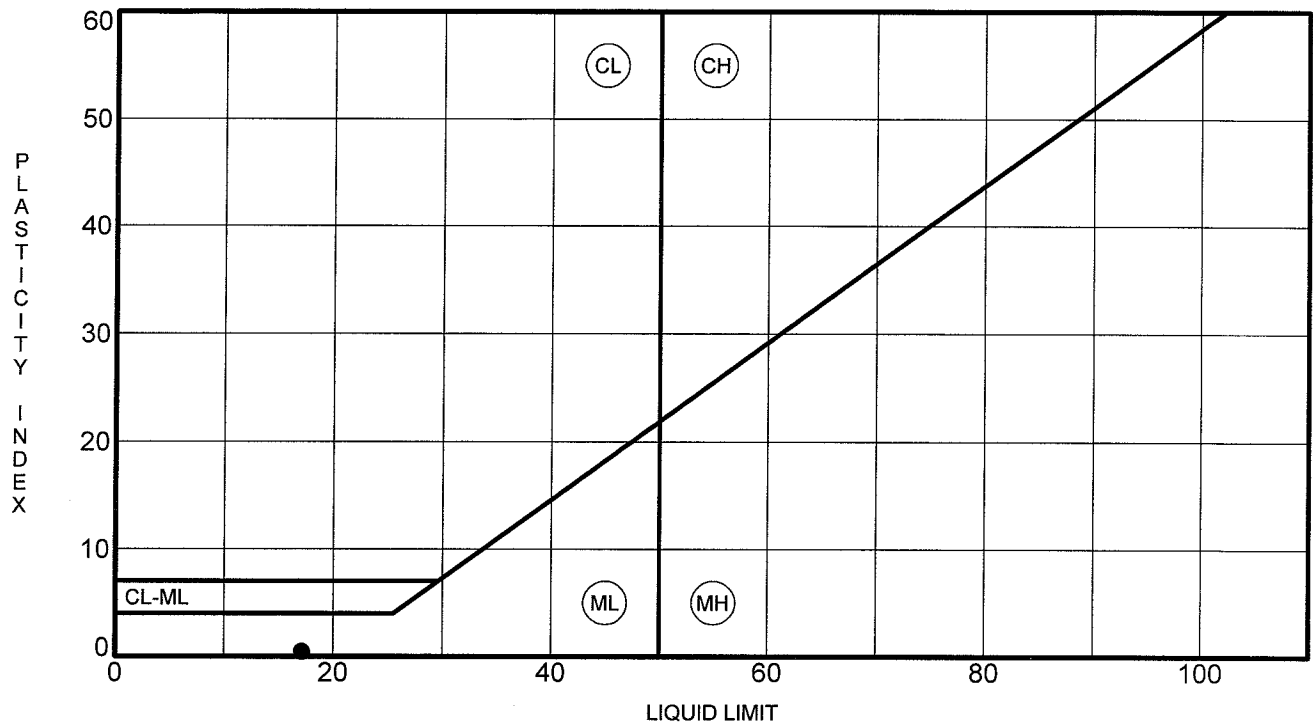
Specimen Identification	Classification	LL	PL	PI	Cc	Cu
● CBLmw-004 3.7	Brown, SILTY SAND SM	17	17	NP		

Specimen Identification	D100	D60	D30	D10	%Gravel	%Sand	%Silt&Clay	%Silt	%Clay
● CBLmw-004 3.7	19	0.139			2.9	47.5	49.6		

US GRAIN SIZE USCS 04001-SG.GPJ PRIMENG.GDT 1/19/05



**GRAIN SIZE DISTRIBUTION**  
 Client: MKM Engineers, Inc.  
 Project: Characterization of RVAAP 14 AOC's  
 Location: Ravenna, Ohio  
 Number: 04001G



Specimen Identification	LL	PL	PI	Fines	Classification	
● CBLmw-004	3.7	17	17	NP	50	SILTY SAND SM

US ATTERBERG LIMITS 04001-8G.GPJ PRIMENG.GDT 1/19/05



**ATTERBERG LIMITS' RESULTS**  
 Client: MKM Engineers, Inc.  
 Project: Characterization of RVAAP 14 AOC's  
 Location: Ravenna, Ohio  
 Number: 04001G

# Prime Engineering & Architecture

**Project No.:** 04001G  
**Project:** RVAAP  
**Client:** MKM Engineers  
**Technician(s):** Brandi  
**Date:** 1/17/2005

<b>Sample No:</b>	<b>pH Reading:</b>	<b>Specific Gravity:</b>
CBLmw-004	8.4	2.767

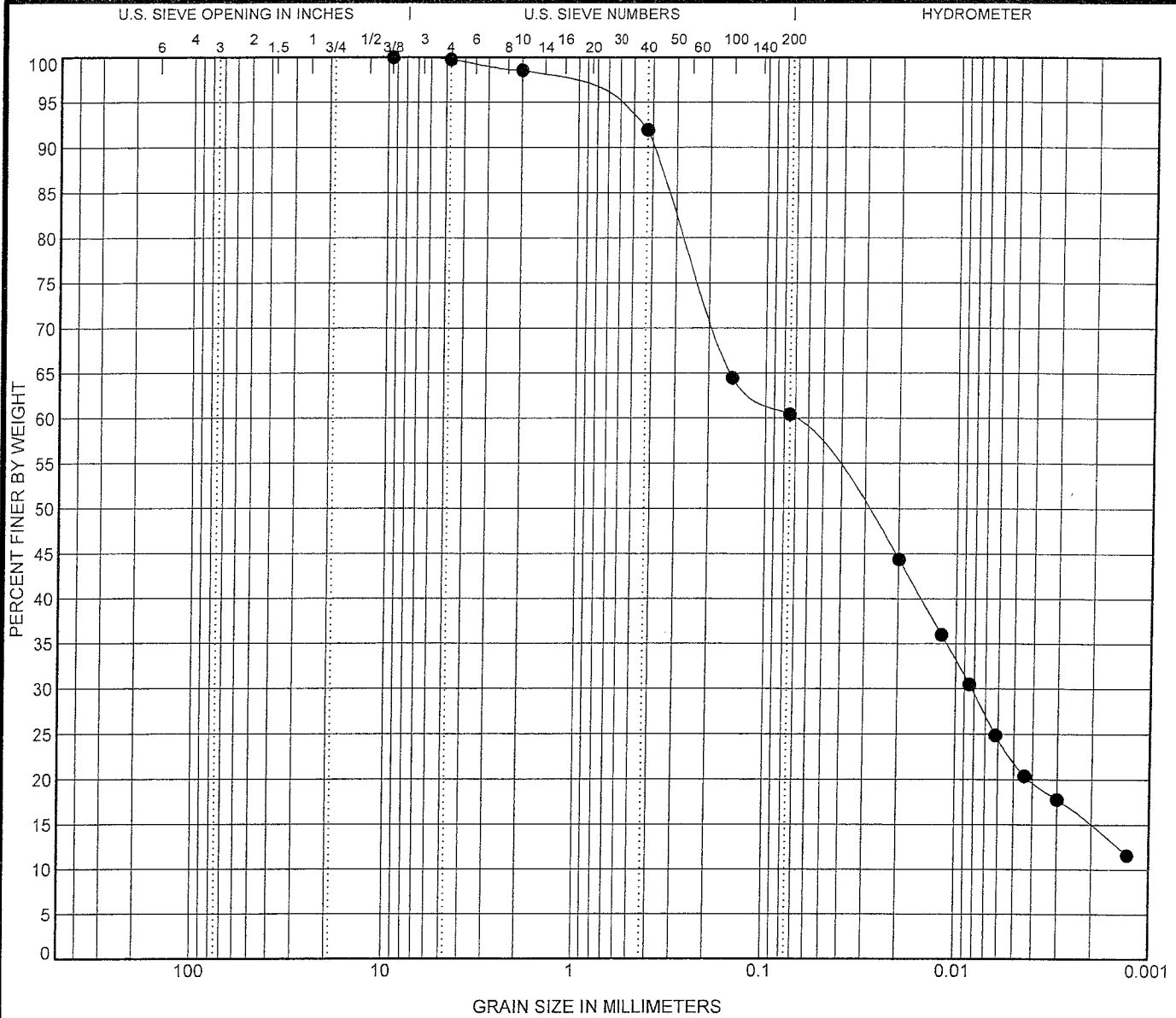
MKM US LAB USCS SUMMARY 04001-4G.GPJ PRIMENG.GDT 12/15/04

Sample Number	Depth (feet)	Moisture Content %	Liquid Limit %	Plastic Limit %	Plast. Index	Organic Content (%)	Agg. %	C Sand %	M Sand %	F Sand %	Silt %	Silt & Clay Comb.	Clay %	Soil Description	Class. Symbol
CBLsd-004M	0.0	48.3				4.1	0.2	1.2	6.6	31.5	45.6	60.4	14.8	Dark brown SANDY LEAN CLAY, trace gravel	CL

**PE** PRIME ENGINEERING & ARCHITECTURE INC.

**Summary of Laboratory Results**

Client: MKM Engineers, Inc.  
 Project: RVAAP  
 Location: Ravenna, Ohio  
 Number: 04001G-4



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Specimen Identification	Classification	LL	PL	PI	Cc	Cu
● CBLsd-004M 0.0	Dark brown SANDY LEAN CLAY, trace gravel, CL					

Specimen Identification	D100	D60	D30	D10	%Gravel	%Sand	%Silt&Clay	%Silt	%Clay
● CBLsd-004M 0.0	9.5	0.072	0.008		0.2	39.3		45.6	14.8

**GRAIN SIZE DISTRIBUTION**



Client: MKM Engineers, Inc.  
 Project: RVAAP  
 Location: Ravenna, Ohio  
 Number: 04001G-4

U.S. GRAIN SIZE USCS 04001-G.CPJ PRIMENG.GDT 12/15/04

Sample Number	Depth (feet)	Moisture Content %	Liquid Limit %	Plastic Limit %	Plast. Index	Organic Content (%)	Agg. %	C Sand %	M Sand %	F Sand %	Silt %	Silt & Clay Comb.	Clay %	Soil Description	Class. Symbol
ASYsd-024M	0.0	228.4	NP	NP	NP	9.3	0.0	0.5	4.8	8.4	60.9	86.3	25.4	Gray SILT, little sand	ML
B12sd-023M	0.0	116.7				6.8	1.7	2.1	3.3	8.3	52.8	84.7	31.9	Gray LEAN CLAY WITH SAND, trace gravel	CL
B12sd-024M	0.0	189.1	NP	NP	NP	11.7	0.7	9.5	4.4	7.2	54.6	78.2	23.7	Dark gray SILT WITH SAND, trace gravel	ML
CBLsd-001M	0.0	45.2	NP	NP	NP	3.3	6.4	5.8	9.0	16.5	45.4	62.3	16.9	Brown SANDY SILT, trace gravel	ML
CBLsd-002M	0.0	34.9	NP	NP	NP	3.5	1.7	2.1	5.2	17.3	56.0	73.7	17.7	Brown SILT WITH SAND, trace gravel	ML
CBLsd-003M	0.0	62.2	NP	NP	NP	4	4.2	2.1	3.9	10.3	56.4	79.5	23.2	Brown SILT WITH SAND, trace gravel	ML
L12MW-242	9.5	19.1	NP	NP	NP		0.0	0.0	0.2	0.5		99.3		Gray SILT, trace sand	ML
L12MW-242	13.5	27.5	NP	NP	NP		0.0	0.0	0.0	0.0		100.0		Gray SILT	ML
L12MW-244	7.5	17.1	33	22	11		0.3	1.9	4.9	12.8		80.1		Brown LEAN CLAY WITH SAND, trace gravel	CL
LL7sd-012M	0.0	36.8	NP	NP	NP	5.9	12.6	16.2	20.6	18.4	25.4	32.2	6.8	Brown SILTY SAND, little gravel	SM
LL7sd-029M	0.0	317.2	NP	NP	NP	39.8	2.1	3.7	13.8	27.7	44.5	52.7	8.2	Dark brown SANDY SILT, trace gravel	ML
LL8sd-001M	0.0	274.4	NP	NP	NP	26.1	0.6	5.2	11.2	10.8	54.4	72.3	17.9	Dark brown SILT WITH SAND, trace gravel	ML
LL8sd-002M	0.0	281.4	NP	NP	NP	20.8	3.4	7.9	6.8	13.8	47.4	68.1	20.7	Gray SANDY SILT, trace gravel	ML
LL8sd-003M	0.0	140.8	NP	NP	NP	11.1	0.4	3.4	5.6	21.6	49.7	69.0	19.3	Gray SANDY SILT, trace gravel	ML
LL8sd-006M	0.0	60.9	NP	NP	NP	5.8	4.4	4.2	11.1	24.4	37.1	56.0	18.9	Gray SANDY SILT, trace gravel	ML



### Summary of Laboratory Results

Client: MKM Engineers, Inc.  
 Project: RVAAP  
 Location: Ravenna, Ohio  
 Number: 04001-3g

Location ID: CBLSD-001M-SD

**Field Sampling Report**

Ravenna Army Ammunition Plant  
Characterization of 14 RVAAP AOCs

Date: 11-9-04

**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			Mattocks	
Miscellaneous	Well Purging Form Yes - No			

Sample Collection: 1505 hrs      Sample Type: Composite - MI - Grab      Location: Plotted on Map - Staked in Field  
 If MI, # of increments taken: 30  
 Sample Depth: 0-0.5 FT (below surface)      Decon: Dedicated - Each Day - Each Location  
 Estimated - Measured - Surveyed

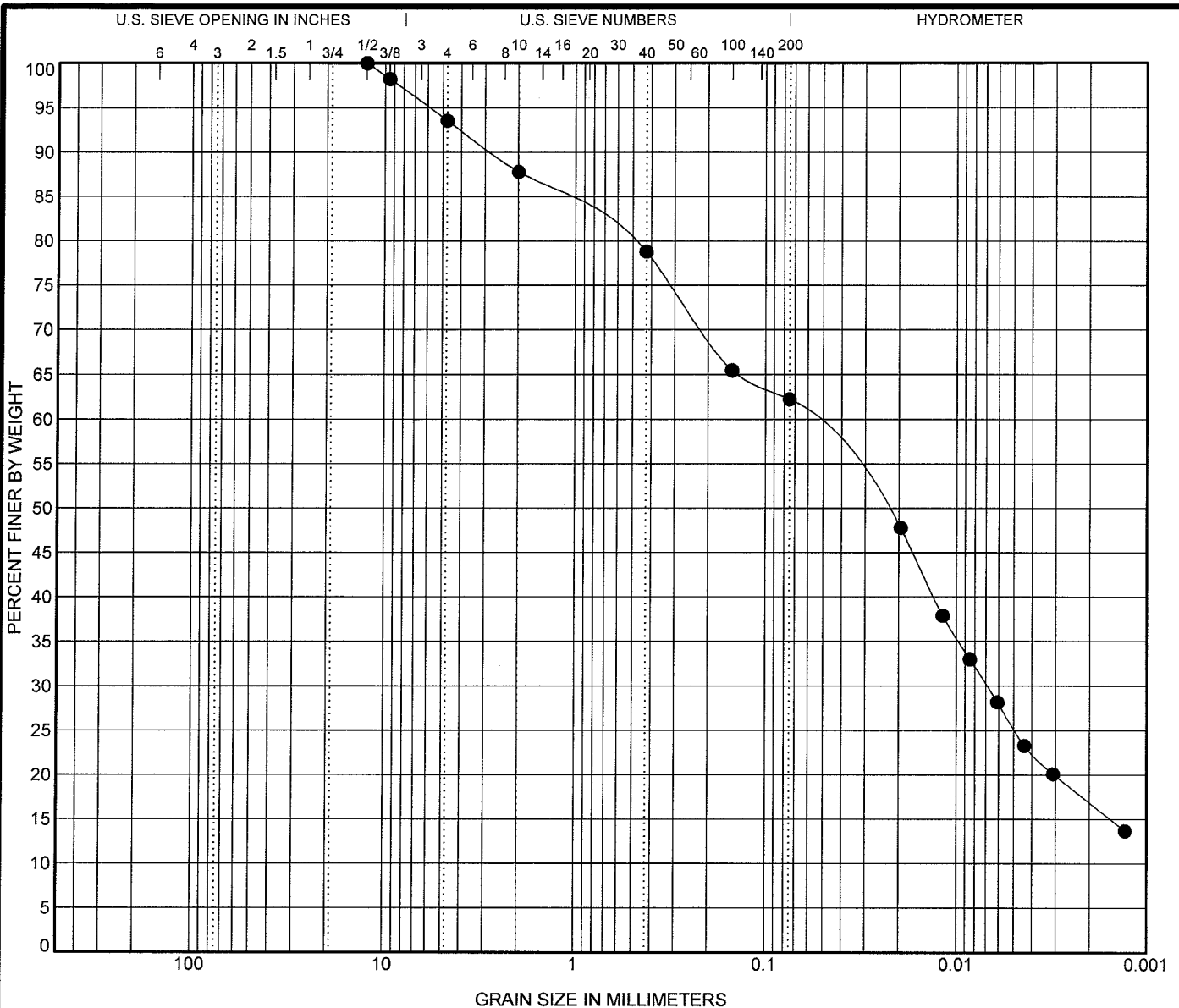
Field Parameters (at time of sample)	Analytical Parameters			Other Parameters		
PID / FID Readings: Background:      ppm <u>0.0</u>	VOC		TPH GRO	Corrosivity		
	SVOC		TPH DRO	Reactivity Sulfide/Cyanide		
	Explosives	X	Chromium +6	Ignitability		
Sample:      ppm <u>0.0</u>	Propellants		Nitrate			
Water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

**Sample Description**  
NO odor, NO staining  
10YR 4/6, wet, well sorted  
low plasticity, clay 40% silt 50%  
sand 30%

**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: Stephen Sturgeon (Please Print)      Reviewed by: Eric EWS (Please Print)  
 Signature: [Signature]      Signature: [Signature]      Date: 2/1/05



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Specimen Identification	Classification	LL	PL	PI	Cc	Cu
● CBLsd-001M 0.0	Brown, SANDY SILT ML	NP	NP	NP		

Specimen Identification	D100	D60	D30	D10	%Gravel	%Sand	%Silt&Clay	%Silt	%Clay
● CBLsd-001M 0.0	12.5	0.061	0.007		6.4	31.3		45.4	16.9

U.S. GRAIN SIZE USCS 04001-3G.GPJ PRIMENG.GDT 12/7/04

	<b>GRAIN SIZE DISTRIBUTION</b>	
	Client: MKM Engineers, Inc.	
	Project: RVAAP	
	Location: Ravenna, Ohio	
		Number: 04001-3g



Location ID: CBLsd-002M-SD Field Sampling Report

Ravenna Army Ammunition Plant  
Characterization of 14 RVAAP AOCs

Date: 11/9/04

**Sampling Information**

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

Sample Collection: 1400 hrs      Sample Type: Composite MI Grab      Location: Plotted on Map - Staked in Field  
 If MI, # of increments taken: 30      Estimated - Measured - Surveyed  
 Sample Depth: 0-0.5 FT (below surface)      Decon: Dedicated - Each Day Each Location

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

**Sample Description**  
No odor, no staining  
10 yr 4/4 well sorted wet  
clay 60% silt 35%, sand 5%  
low plasticity  
same as 002D-SD

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

Water sample description should include:  
 Color Odor Sheen Turbidity

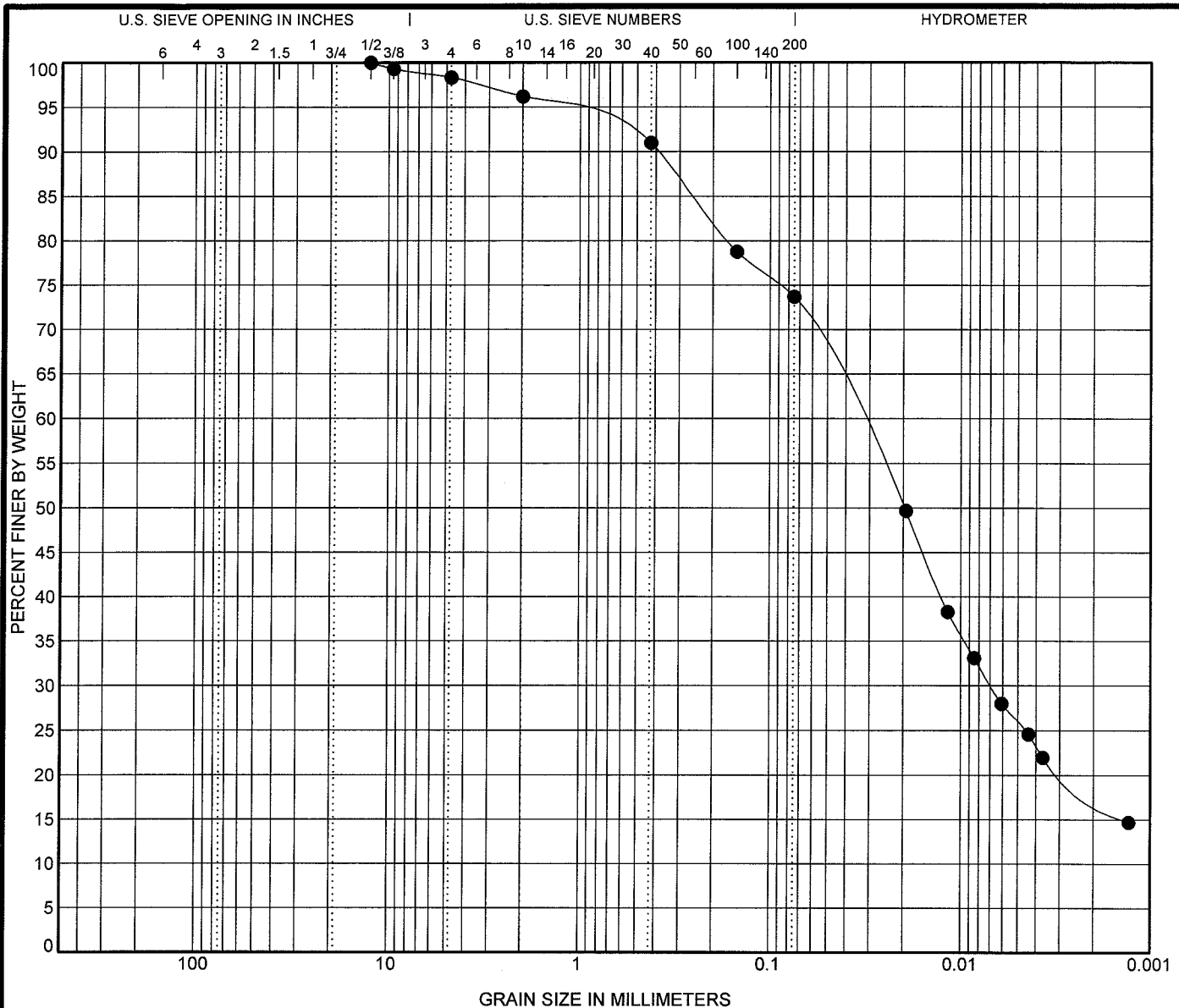
**Split Sample**  
 Split Sample ID:  
 Name:  
 Agency/Company:  
 Address:  
 QA/QC Provided: MS/MSD - Duplicate - Trip Blanks - Field Blanks  
 Parameters: Same as Above - As Listed

Logged By: James Panozzo (Please Print)

Signature: James Panozzo

Reviewed by: ERIC ELLIS (Please Print)

Signature: [Signature] Date: 2/4/04



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Specimen Identification	Classification	LL	PL	PI	Cc	Cu
● CBLsd-002M 0.0	Brown, SILT with SAND ML	NP	NP	NP		

Specimen Identification	D100	D60	D30	D10	%Gravel	%Sand	%Silt&Clay	%Silt	%Clay
● CBLsd-002M 0.0	12.5	0.035	0.007		1.7	24.6	56.0	17.7	

US GRAIN SIZE USCS 04001-3G.GPJ PRIMENG.GDT 12/7/04



**GRAIN SIZE DISTRIBUTION**  
 Client: MKM Engineers, Inc.  
 Project: RVAAP  
 Location: Ravenna, Ohio  
 Number: 04001-3g

Location ID: CBLsd-003M-5D

**Field Sampling Report**

Ravenna Army Ammunition Plant  
Characterization of 14 RVAAP AOCs

Date: 11/8/04

**Sampling Information**

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

Sample Collection: 1540 hrs

Sample Type: Composite - MI Grab  
If MI, # of increments taken: 10

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

Sample Depth: 0-0.5 FT (below surface)

Decon: Dedicated - Each Day - Each Location

**Field Parameters**  
(at time of sample)

**Analytical Parameters**

**Other Parameters**

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

**Sample Description:**  
Organic odor, no staining  
10 yr 4/6, fine grained, well sorted  
low plasticity, wet clay with a  
Trace of sand

Increments are <30 due to small size of MI grid.

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

Soil sample description should include:

Munsell Color Odor Staining Texture Sorting Plasticity Moisture

Water sample description should include:

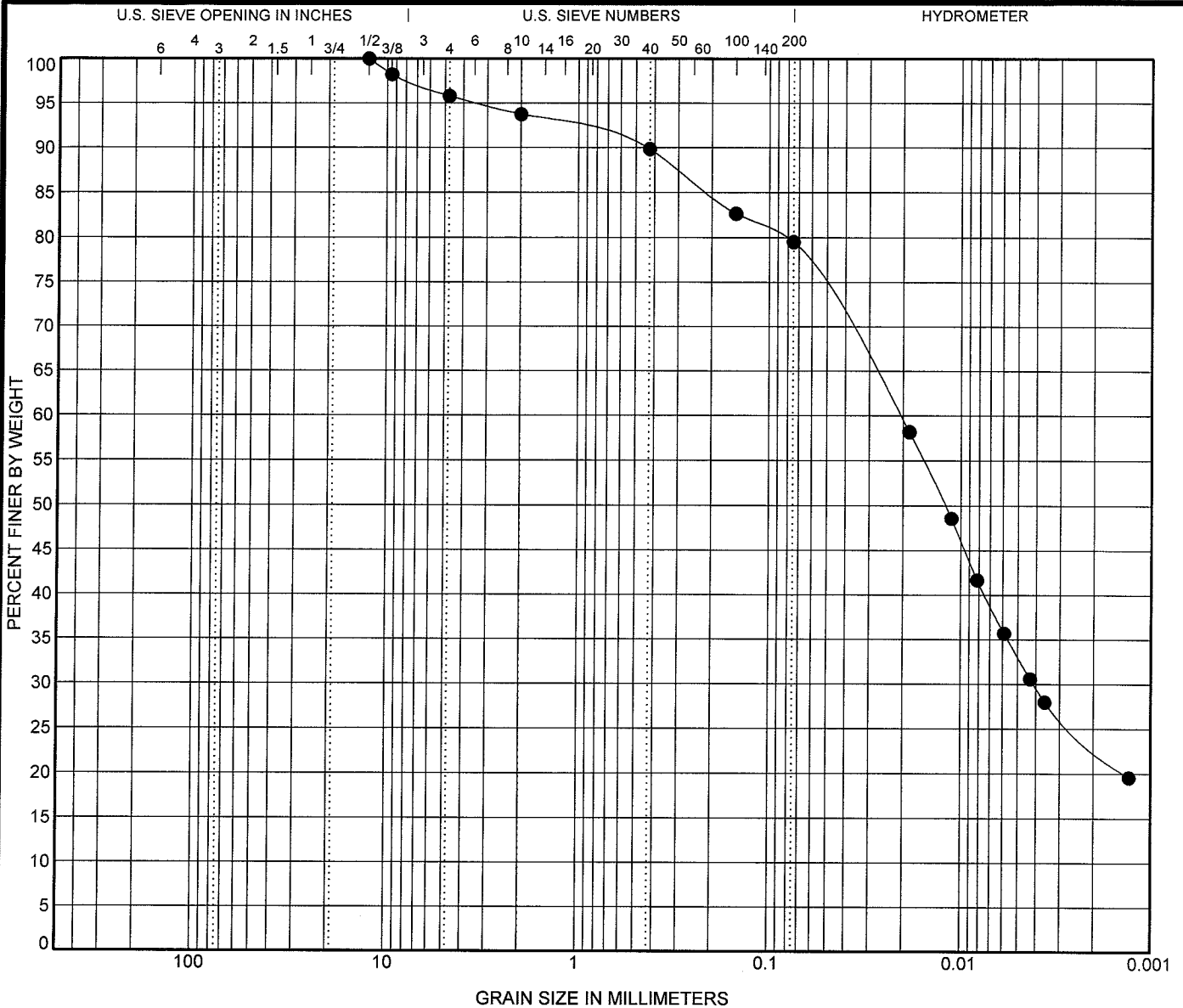
Color Odor Sheen Turbidity

Logged By: James Panovro (Please Print)

Reviewed by: ERIC ELIS (Please Print)

Signature: [Signature]

Signature: [Signature] Date: 2/4/04



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Specimen Identification	Classification	LL	PL	PI	Cc	Cu
● CBLsd-003M 0.0	Brown, SILT with SAND ML	NP	NP	NP		

Specimen Identification	D100	D60	D30	D10	%Gravel	%Sand	%Silt&Clay	%Silt	%Clay
● CBLsd-003M 0.0	12.5	0.021	0.004		4.2	16.3		56.4	23.2

U.S. GRAIN SIZE USCS 04001-3G.GPJ PRIMENG.GDT 12/7/04



**GRAIN SIZE DISTRIBUTION**  
 Client: MKM Engineers, Inc.  
 Project: RVAAP  
 Location: Ravenna, Ohio  
 Number: 04001-3g

Sample Number	Depth (feet)	Moisture Content %	Liquid Limit %	Plastic Limit %	Plast. Index	Organic Content (%)	Agg. %	C Sand %	M Sand %	F Sand %	Silt %	Silt&Clay Comb.	Clay %	Soil Description	Class. Symbol
ASYsd-024M	0.0	228.4	NP	NP	NP	9.3	0.0	0.5	4.8	8.4	60.9	86.3	25.4		
B12sd-023M	0.0	116.7				6.8	1.7	2.1	3.3	8.3	52.8	84.7	31.9	Gray SILT, little sand	ML
B12sd-024M	0.0	189.1	NP	NP	NP	11.7	0.7	9.5	4.4	7.2	54.6	78.2	23.7	Gray LEAN CLAY WITH SAND, trace gravel	CL
CBLsd-001M	0.0	45.2	NP	NP	NP	3.3	6.4	5.8	9.0	16.5	45.4	62.3	16.9	Dark gray SILT WITH SAND, trace gravel	ML
CBLsd-002M	0.0	34.9	NP	NP	NP	3.5	1.7	2.1	5.2	17.3	56.0	73.7	17.7	Brown SANDY SILT, trace gravel	ML
CBLsd-003M	0.0	62.2	NP	NP	NP	4	4.2	2.1	3.9	10.3	56.4	79.5	23.2	Brown SILT WITH SAND, trace gravel	ML
L12MW-242	9.5	19.1	NP	NP	NP		0.0	0.0	0.2	0.5		99.3		Brown SILT WITH SAND, trace gravel	ML
L12MW-242	13.5	27.5	NP	NP	NP		0.0	0.0	0.0	0.0		100.0		Gray SILT, trace sand	ML
L12MW-244	7.5	17.1	33	22	11		0.3	1.9	4.9	12.8		80.1		Gray SILT	ML
LL7sd-012M	0.0	36.8	NP	NP	NP	5.9	12.6	16.2	20.6	18.4	25.4	32.2	6.8	Brown LEAN CLAY WITH SAND, trace gravel	CL
LL7sd-029M	0.0	317.2	NP	NP	NP	39.8	2.1	3.7	13.8	27.7	44.5	52.7	8.2	Brown SILTY SAND, little gravel	SM
LL8sd-001M	0.0	274.4	NP	NP	NP	26.1	0.6	5.2	11.2	10.8	54.4	72.3	17.9	Dark brown SANDY SILT, trace gravel	ML
LL8sd-002M	0.0	281.4	NP	NP	NP	20.8	3.4	7.9	6.8	13.8	47.4	68.1	20.7	Dark brown SILT WITH SAND, trace gravel	ML
LL8sd-003M	0.0	140.8	NP	NP	NP	11.1	0.4	3.4	5.6	21.6	49.7	69.0	19.3	Gray SANDY SILT, trace gravel	ML
LL8sd-006M	0.0	60.9	NP	NP	NP	5.8	4.4	4.2	11.1	24.4	37.1	56.0	18.9	Gray SANDY SILT, trace gravel	ML



### Summary of Laboratory Results

Client: MKM Engineers, Inc.  
 Project: RVAAP  
 Location: Ravenna, Ohio  
 Number: 04001-3g

# Field Sampling Report

Location ID: L12mw-242 (8-10ft)

Ravenna Army Ammunition Plant  
Characterization of 14 RVAAP AOCs

Date: 11-10-04

## Sampling Information

Source	Groundwater / Product	Surface Water	<u>Soils</u> Sediments / Sludge
Method	Bailer	Sample Bottle	Scoop <span style="float: right;">Trowel</span>
	Pump	Bacon Bomb	Bowl <span style="float: right;">Hand Auger</span>
			Push Probe <span style="float: right;">Shelby Tube <input checked="" type="checkbox"/></span>
Type/Construction			
Miscellaneous	Well Purging Form Yes - No		

Sample Collection: 1520 hrs      Sample Type: Composite - MI - Grab      Location: Plotted on Map - Staked in Field  
 If MI, # of increments taken: \_\_\_\_\_  
 Sample Depth: 8-10 FT (below surface)      Decon: Dedicated - Each Day - Each Location      Estimated - Measured - Surveyed

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

### Sample Description

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*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: \_\_\_\_\_

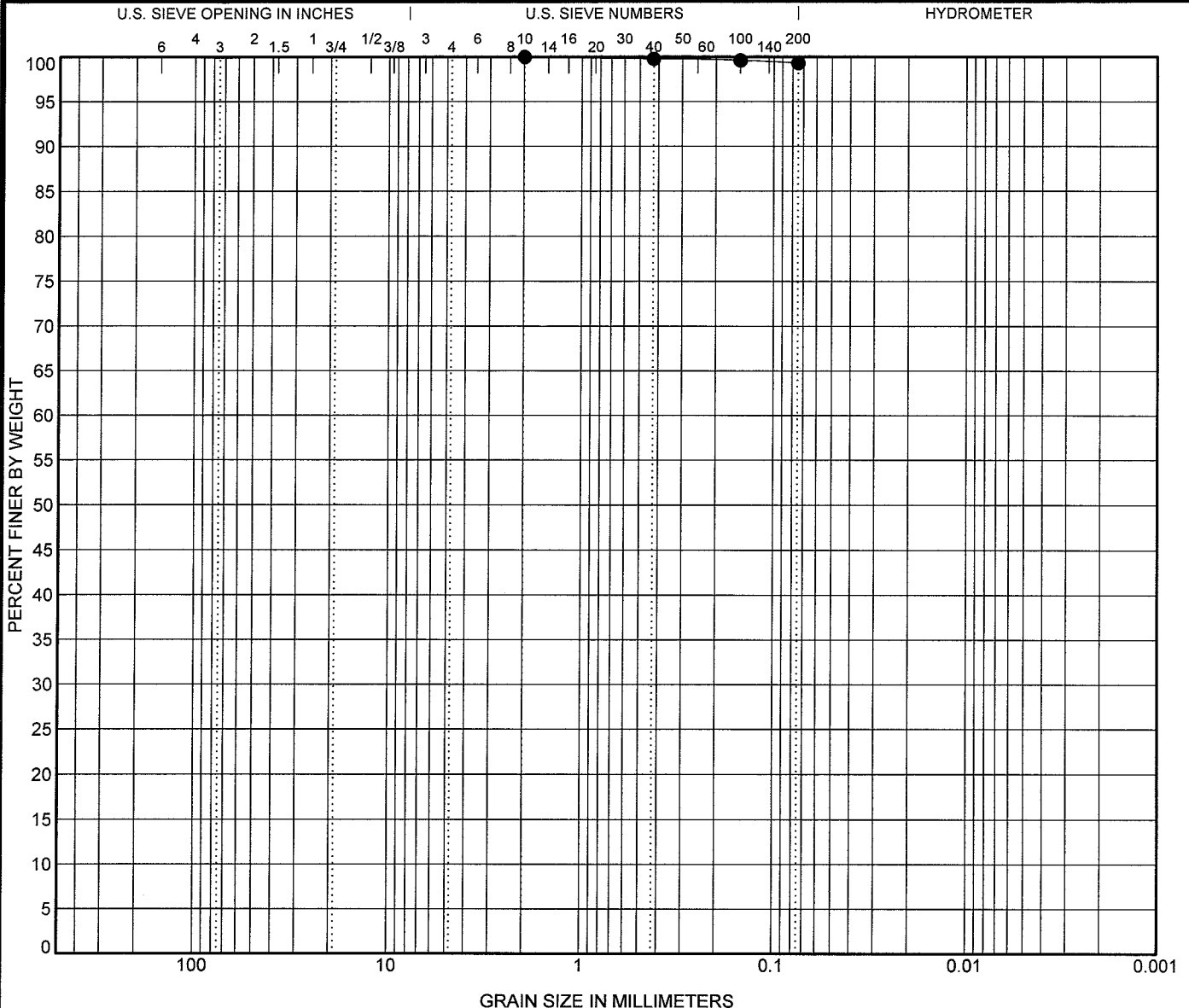
**QA/QC Provided:** MS/MSD - Duplicate - Trip Blanks - Field Blanks  
**Parameters:** Same as Above - As Listed

Logged By: ERIC ELLIS (Please Print)

Signature: [Signature]

Reviewed by: Sue Bojes (Please Print)

Signature: [Signature] Date: 06/15/05




COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Specimen Identification	Classification	LL	PL	PI	Cc	Cu
● L12MW-242 9.5	Gray, SILT ML	NP	NP	NP		

Specimen Identification	D100	D60	D30	D10	%Gravel	%Sand	%Silt&Clay	%Silt	%Clay
● L12MW-242 9.5	2				0.0	0.7	99.3		

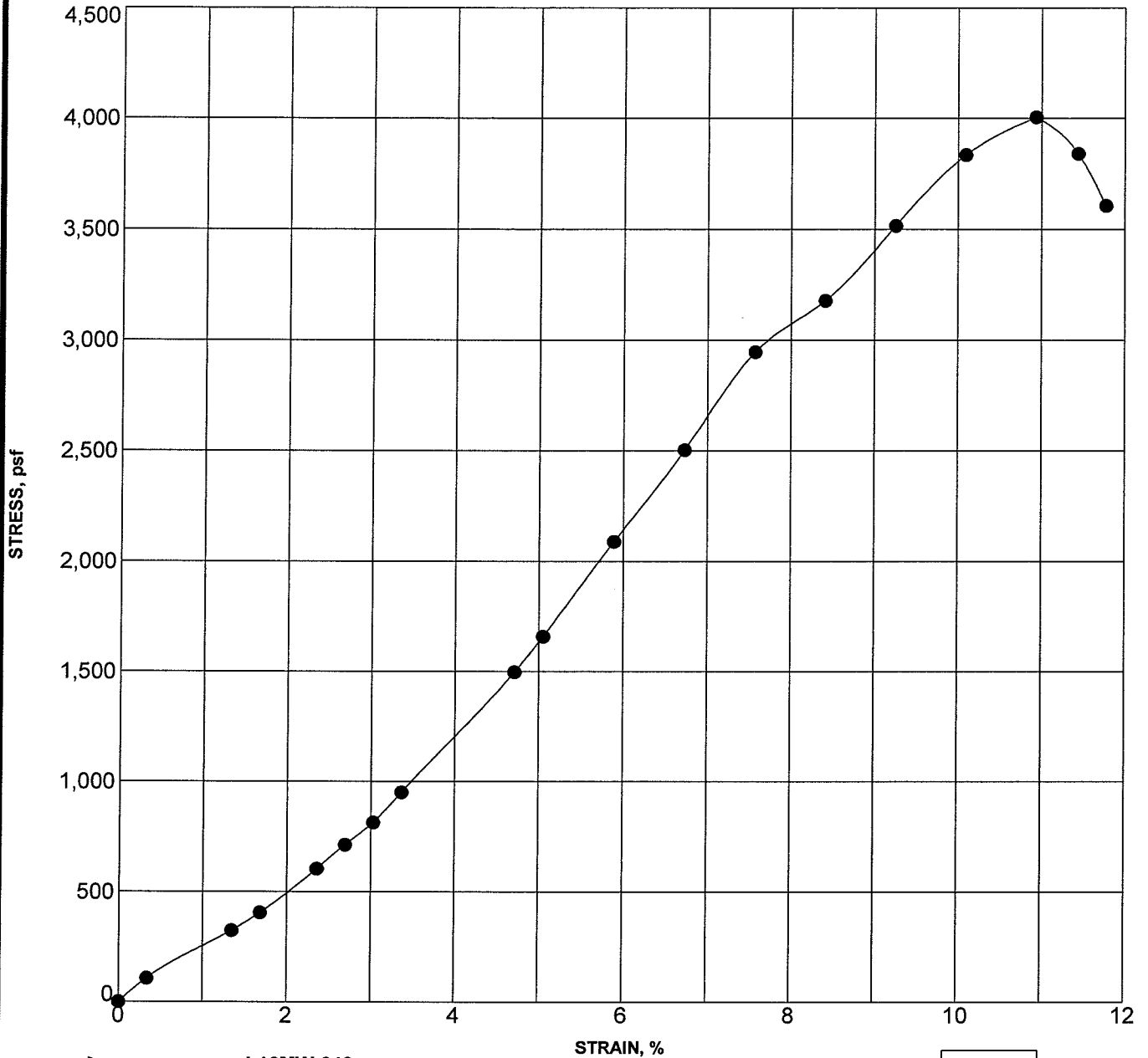
U.S. GRAIN SIZE USCS 04001-3G.GPJ PRIMENG.GDT 12/7/04



**PRIME ENGINEERING  
& ARCHITECTURE INC.**

**GRAIN SIZE DISTRIBUTION**

Client: MKM Engineers, Inc.  
 Project: RVAAP  
 Location: Ravenna, Ohio  
 Number: 04001-3g



Sample No: L12MW-242

Sample Depth : 9.5 ft.

Failure Sketch:



**Test Result Summary:**

Average Diameter: 2.80 in.

Average Height: 5.94 in.

Height to Diameter Ratio: 2.12

Wet Density: 136 pcf

Moisture Content: 19%

Dry Density: 114 pcf

Liquid Limit: NP%

Plastic Limit: NP%

Plasticity Index: NP%

Classification: Gray SILT, trace sand

Average Rate of Strain: 1.000 %/Min.

Unconfined Compressive Strength: 4005 psf

Strain at Failure: 10.93%

**UNCONFINED COMPRESSION TEST**

Client: MKM Engineers, Inc.

Project: RVAAP

Location: Ravenna, Ohio

Number: 04001-3g





## Field Sampling Report

Location ID: L12.mw - 242 (12-14f)

Ravenna Army Ammunition Plant  
Characterization of 14 RVAAP AOCs

Date: 11-10-04

### Sampling Information

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

Sample Collection: 1530 hrs

Sample Type: Composite - MI - Grab

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

Sample Depth: 12-14 FT (below surface)

Decon: Dedicated - Each Day - Each Location

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

#### Sample Description

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

*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

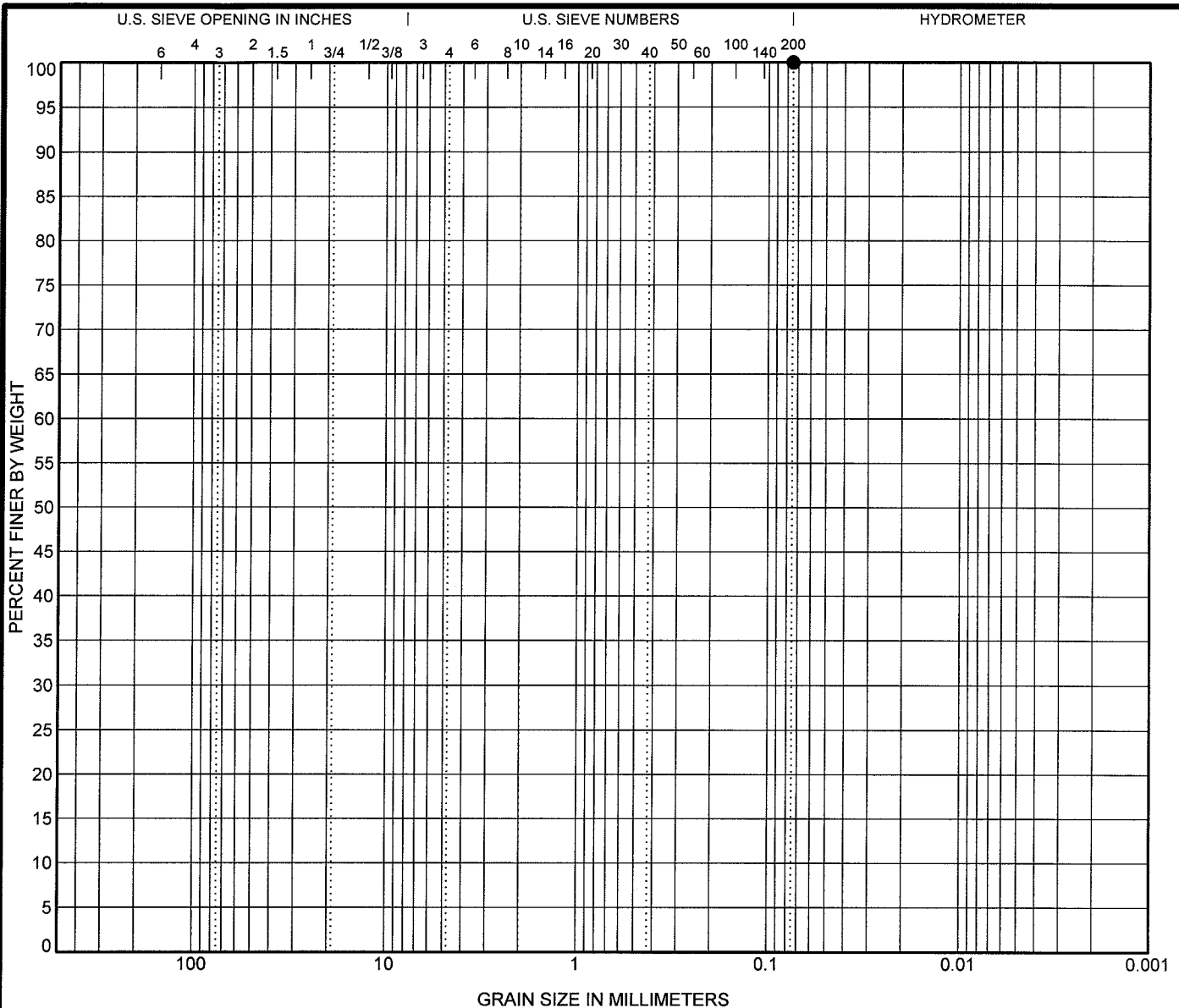
Parameters: Same as Above - As Listed

Logged By: ERIC ELLIS (Please Print)

Reviewed by: Sue Boles (Please Print)

Signature: [Signature]

Signature: [Signature] Date: 06/15/05



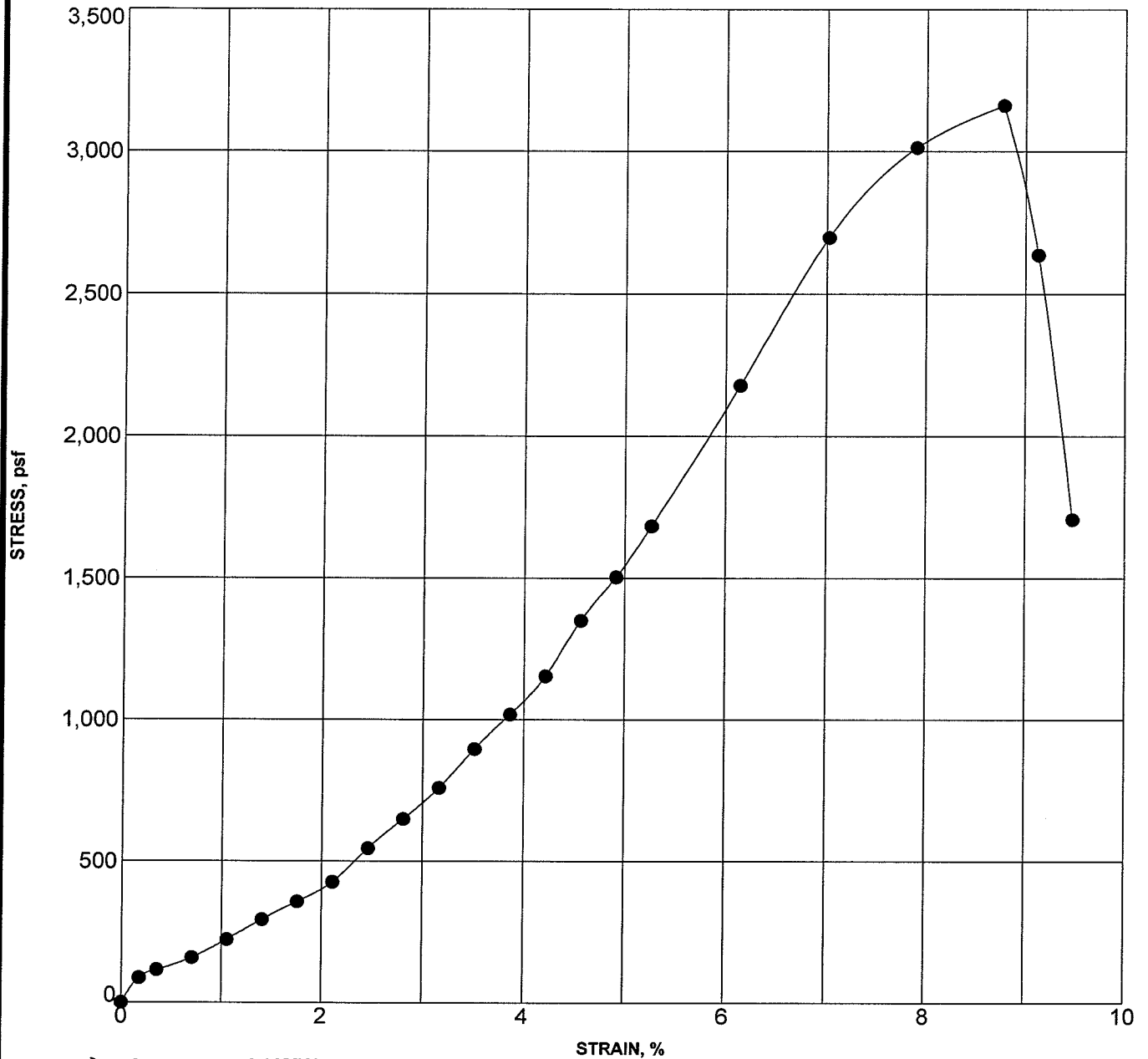
COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Specimen Identification	Classification					LL	PL	PI	Cc	Cu
● L12MW-242 13.5	Gray, SILT ML					NP	NP	NP		
Specimen Identification	D100	D60	D30	D10	%Gravel	%Sand	%Silt&Clay	%Silt	%Clay	
● L12MW-242 13.5	0.075				0.0	0.0	100.0			

US GRAIN SIZE USCS 04001-3G.GPJ PRIMENG.GDT 12/7/04



**GRAIN SIZE DISTRIBUTION**  
 Client: MKM Engineers, Inc.  
 Project: RVAAP  
 Location: Ravenna, Ohio  
 Number: 04001-3g



Sample No.: L12MW-242

Sample Depth : 13.5 ft.

Failure Sketch:



**Test Result Summary:**

Average Diameter: 2.89 in.

Average Height: 5.70 in.

Height to Diameter Ratio: 1.97

Wet Density: 121 pcf

Moisture Content: 27%

Dry Density: 95 pcf

Liquid Limit: NP%

Plastic Limit: NP%

Plasticity Index: NP%

Classification: Gray SILT

Average Rate of Strain: 1.480 %/Min.

Unconfined Compressive Strength: 3161 psf

Strain at Failure: 8.78%

**UNCONFINED COMPRESSION TEST**

Client: MKM Engineers, Inc.

Project: RVAAP

Location: Ravenna, Ohio

Number: 04001-3g

## Field Sampling Report

Location ID: L12.MW - 244 (6-8 ft)

Ravenna Army Ammunition Plant  
Characterization of 14 RVAAP AOCs

Date: 11-10-04

### Sampling Information

Source	Groundwater / Product	Surface Water	Soils Sediments / Sludge
Method	Bailer	Sample Bottle	Scoop <span style="float: right;">Trowel</span>
	Pump	Bacon Bomb	Bowl <span style="float: right;">Hand Auger</span>
			Push Probe <span style="float: right;">Shelby Tube <input checked="" type="checkbox"/></span>
Type/Construction			
Miscellaneous	Well Purging Form Yes - No		

Sample Collection: 0925 hrs      Sample Type: Composite - MI - Grab      Location: Plotted on Map + Staked in Field  
 If MI, # of increments taken: \_\_\_\_\_      Estimated - Measured - Surveyed

Sample Depth: 6-8 FT (below surface)      Decon: Dedicated - Each Day - Each Location

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

#### Sample Description

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*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: \_\_\_\_\_

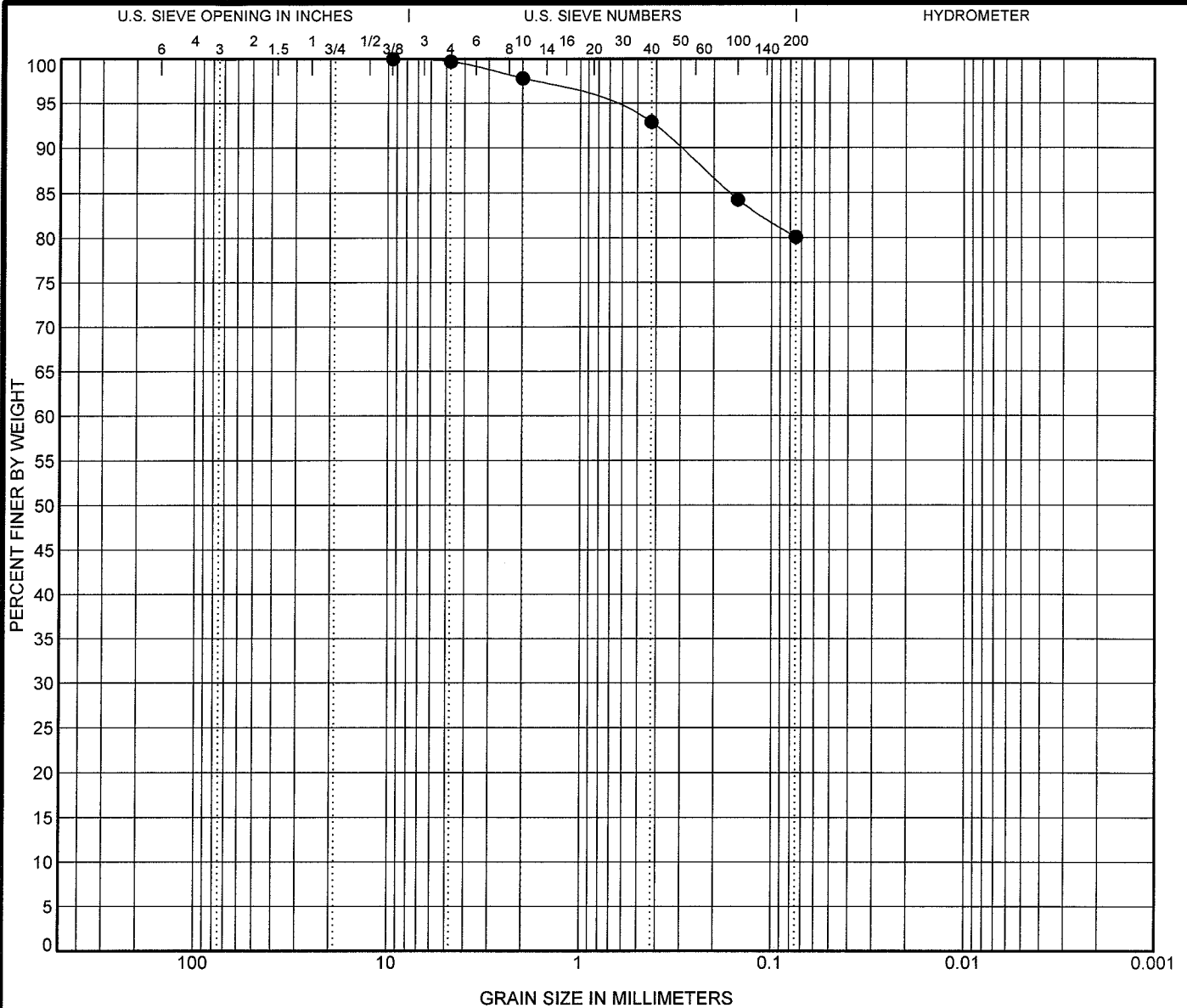
QA/QC Provided: MS/MSD - Duplicate - Trip Blanks - Field Blanks  
 Parameters: Same as Above - As Listed

Logged By: ERIC ELMS (Please Print)

Signature: [Signature]

Reviewed by: Sue Boles (Please Print)

Signature: [Signature] Date: 06/15/05



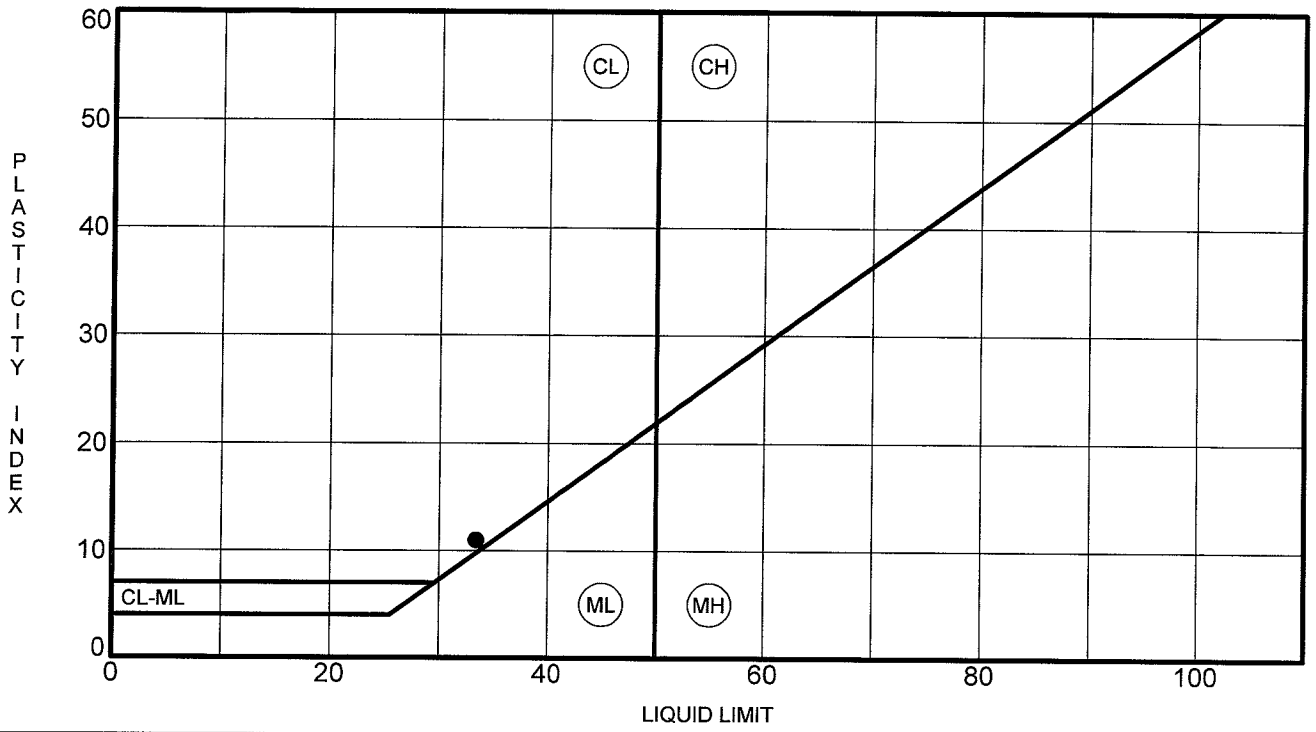
COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Specimen Identification	Classification	LL	PL	PI	Cc	Cu
● L12MW-244 7.5	Brown, LEAN CLAY with SAND CL	33	22	11		

Specimen Identification	D100	D60	D30	D10	%Gravel	%Sand	%Silt&Clay	%Silt	%Clay
● L12MW-244 7.5	9.5				0.3	19.6	80.1		

US GRAIN SIZE USCS 04001-3G.GPJ PRIMENG.GDT 12/7/04

<b>PRIME ENGINEERING &amp; ARCHITECTURE INC.</b>	<b>GRAIN SIZE DISTRIBUTION</b>	
	Client: MKM Engineers, Inc.	
	Project: RVAAP	
	Location: Ravenna, Ohio	
	Number: 04001-3g	



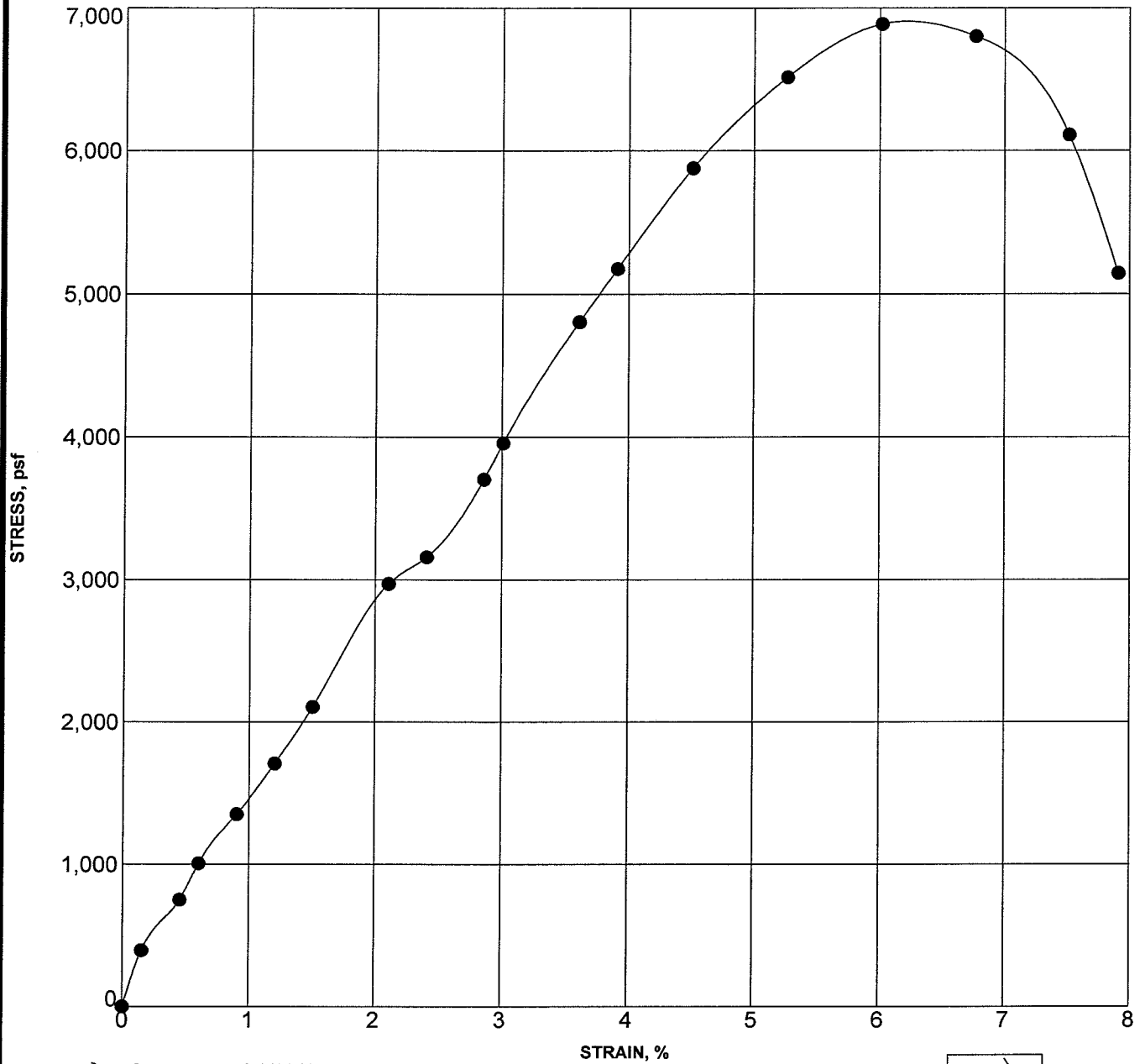
Specimen Identification	LL	PL	PI	Fines	Classification
● L12MW-244	7.5	33	22	11	80 LEAN CLAY with SAND CL

U.S. ATTERBERG LIMITS 04001-3G.GPJ PRIMENG.GDT 12/7/04



**ATTERBERG LIMITS' RESULTS**

Client: MKM Engineers, Inc.  
 Project: RVAAP  
 Location: Ravenna, Ohio  
 Number: 04001-3g



Sample No: L12MW-244

Sample Depth : 7.5 ft.

Failure Sketch:



**Test Result Summary:**

Average Diameter: 2.85 in.

Average Height: 6.65 in.

Height to Diameter Ratio: 2.33

Wet Density: 118 pcf

Moisture Content: 17%

Dry Density: 101 pcf

Liquid Limit: 33%

Plastic Limit: 22%

Plasticity Index: 11%

Classification: Brown LEAN CLAY WITH SAND, trace gravel

Average Rate of Strain: 2.100 %/Min.

Unconfined Compressive Strength: 6887 psf

Strain at Failure: 6.02%

**UNCONFINED COMPRESSION TEST**



Client: MKM Engineers, Inc.

Project: RVAAP

Location: Ravenna, Ohio

Number: 04001-3g

## Prime Engineering & Architecture

**Project No.:** 04001G  
**Project:** RVAAP  
**Client:** MKM Engineers  
**Technician(s):** Stephanie and Brandi  
**Date:** 12/6/2004

<b>Sample No:</b>	<b>pH Reading:</b>	<b>Specific Gravity:</b>
L12MW-242 8-10'	8.0	2.748
L12MW-244 6-8'	8.2	2.780
L12MW-242 12-14'	7.9	2.780



MKM US LAB USCS SUMMARY 04001-4G.GPJ PRIMENG.GDT 12/15/04

Sample Number	Depth (feet)	Moisture Content %	Liquid Limit %	Plastic Limit %	Plast. Index	Organic Content (%)	Agg. %	C Sand %	M Sand %	F Sand %	Silt %	Silt & Clay Comb.	Clay %	Soil Description	Class. Symbol
B12mw-011	1.5	23.2	39	24	15		1.3	1.4	12.0	17.8		67.5		Brown SANDY LEAN CLAY, trace gravel	CL

**PE** PRIME ENGINEERING & ARCHITECTURE INC.

**Summary of Laboratory Results**

Client: MKM Engineers, Inc.  
 Project: RVAAP  
 Location: Ravenna, Ohio  
 Number: 04001G-4

# Field Sampling Report

Location ID: B12mw-011 (0-2A)

Ravenna Army Ammunition Plant  
Characterization of 14 RVAAP AOCs

Date: 11-19-04

## Sampling Information

Source	Groundwater / Product	Surface Water	<u>Soils</u> / Sediments / Sludge
Method	Bailer	Sample Bottle	Scoop <span style="float: right;">Trowel</span>
	Pump	Bacon Bomb	Bowl <span style="float: right;">Hand Auger</span>
			Push Probe <span style="float: right;">Shelby Tube</span> <span style="float: right;">✓</span>
Type/Construction			
Miscellaneous	Well Purging Form Yes - No		

Sample Collection: 1250 hrs      Sample Type: Composite - MI - Grab      Location: Plotted on Map - Staked in Field  
 If MI, # of increments taken: \_\_\_\_\_      Estimated - Measured - Surveyed  
 Sample Depth: 0-2 FT (below surface)      Decon: Dedicated - Each Day - Each Location

Field Parameters (at time of sample)	Analytical Parameters	Other Parameters
PID / FID Readings: Background: ppm	VOC	TPH GRO
	SVOC	TPH DRO
	Explosives	Chromium +6
Sample: ppm	Propellants	Nitrate
Water Level: FT	TAL Metals	Geotechnical <span style="float: right;">✓</span>
Temperature: °C	Pesticides/PCBs	<b>QA Samples</b>
Sp. Conductance: uMHOs	Cyanides	MS/MSD      Yes / No      NA
pH: units	TOC	Duplicate ID      NA
Turbidity: N.T.U.	Grain Size <span style="float: right;">✓</span>	Equipment Rinse ID      NA
		Trip Blank ID      NA

**Sample Description**

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*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: \_\_\_\_\_

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

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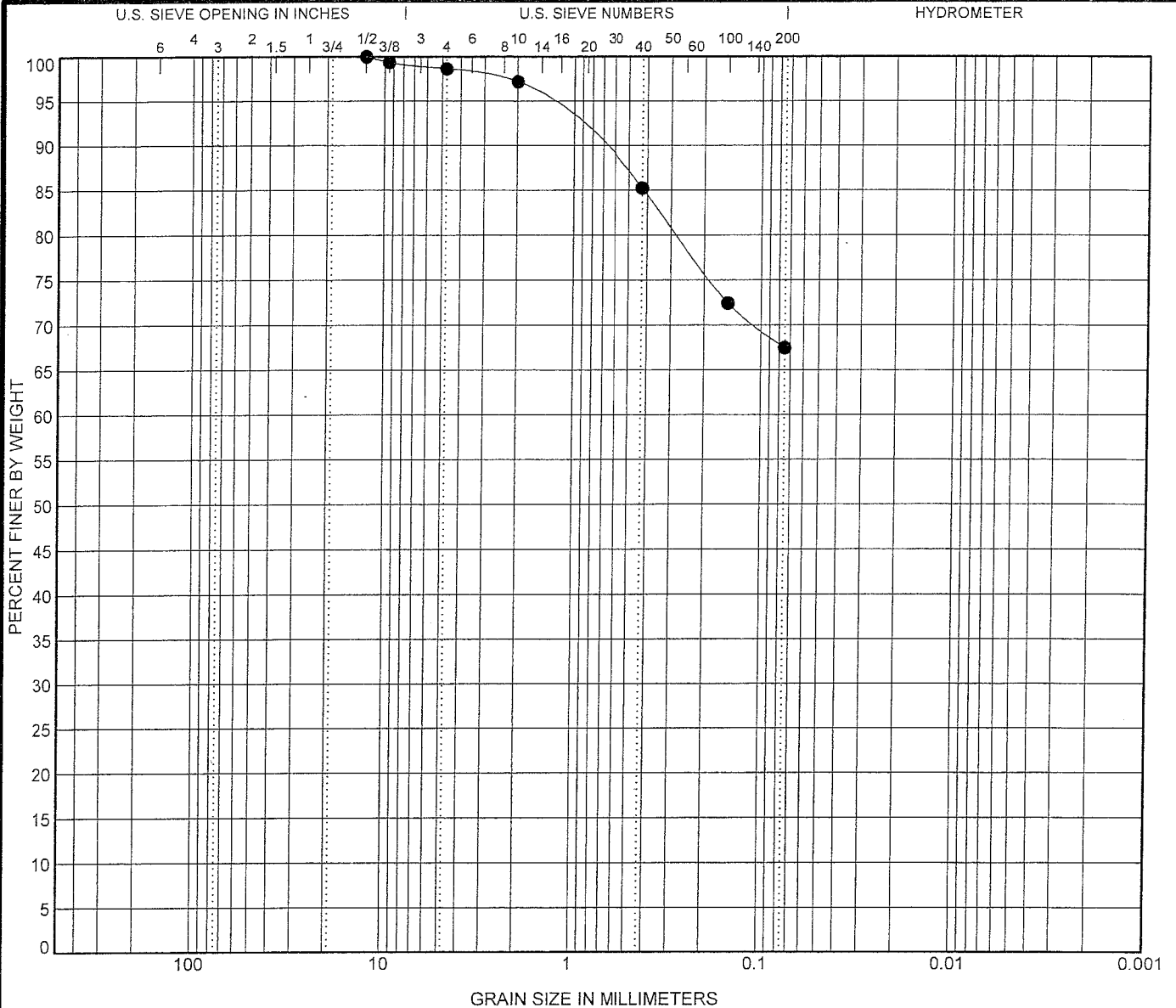
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Logged By: ERIC ELLIS (Please Print)      Reviewed by: Sue Boles (Please Print)

Signature: [Signature]      Signature: [Signature]      Date: 06/15/05



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

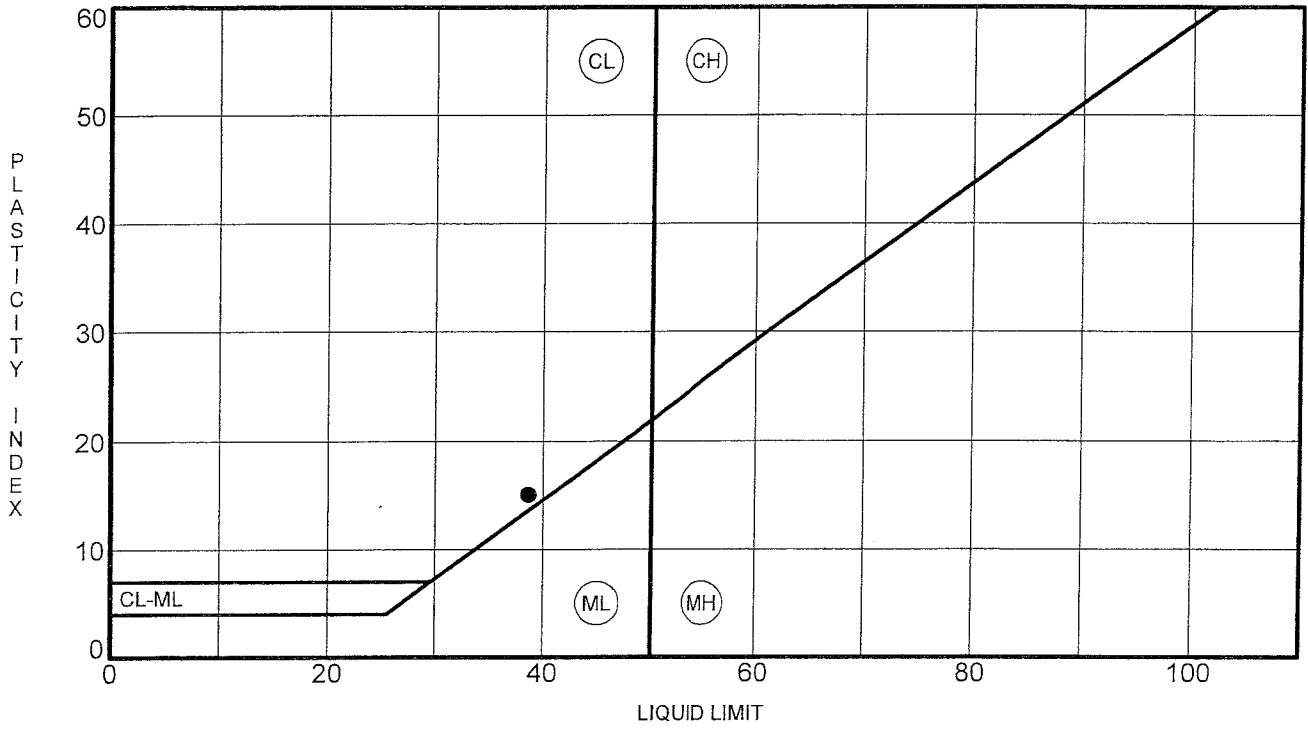
Specimen Identification	Classification	LL	PL	PI	Cc	Cu			
● B12mw-011 1.5	Brown, SANDY LEAN CLAY CL	39	24	15					
Specimen Identification	D100	D60	D30	D10	%Gravel	%Sand	%Silt&Clay	%Silt	%Clay
● B12mw-011 1.5	12.5				1.3	31.2	67.5		

**GRAIN SIZE DISTRIBUTION**



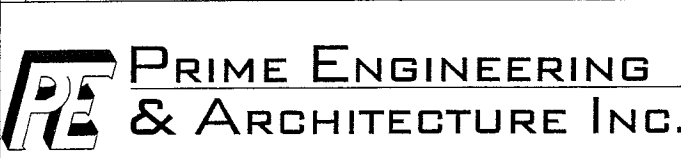
Client: MKM Engineers, Inc.  
 Project: RVAAP  
 Location: Ravenna, Ohio  
 Number: 04001G-4

US GRAIN SIZE USCS 04001-4G.GPJ PRIMENG.GDT 12/15/04



Specimen Identification	LL	PL	PI	Fines	Classification	
● B12mw-011	1.5	39	24	15	67	SANDY LEAN CLAY CL

US ATTERBERG LIMITS 04001-4G.GP.J PRIMENG.GDT 12/15/04



**ATTERBERG LIMITS' RESULTS**

Client: MKM Engineers, Inc.  
 Project: RVAAP  
 Location: Ravenna, Ohio  
 Number: 04001G-4

## Prime Engineering & Architecture

**Project No.:** 04001G  
**Project:** RVAAP  
**Client:** MKM Engineers  
**Technician(s):** Stephanie and Steve  
**Date:** 12/9/2004

<b>Sample No:</b>	<b>pH Reading:</b>	<b>Specific Gravity:</b>
B12MW-011 0-2'	5.4	2.704

MKM US LAB USCS SUMMARY 04001-3G.GPJ PRIMENG.GDT 12/6/04

Sample Number	Depth (feet)	Moisture Content %	Liquid Limit %	Plastic Limit %	Plast. Index	Organic Content (%)	Agg. %	C Sand %	M Sand %	F Sand %	Silt %	Silt & Clay Comb.	Clay %	Soil Description	Class. Symbol
ASysd-024M	0.0	228.4	NP	NP	NP	9.3	0.0	0.5	4.8	8.4	60.9	86.3	25.4	Gray SILT, little sand	ML
B12sd-023M	0.0	116.7				6.8	1.7	2.1	3.3	8.3	52.8	84.7	31.9		
B12sd-024M	0.0	189.1	NP	NP	NP	11.7	0.7	9.5	4.4	7.2	54.6	78.2	23.7	Gray LEAN CLAY WITH SAND, trace gravel	CL
CBLsd-001M	0.0	45.2	NP	NP	NP	3.3	6.4	5.8	9.0	16.5	45.4	62.3	16.9	Dark gray SILT WITH SAND, trace gravel	ML
CBLsd-002M	0.0	34.9	NP	NP	NP	3.5	1.7	2.1	5.2	17.3	56.0	73.7	17.7	Brown SANDY SILT, trace gravel	ML
CBLsd-003M	0.0	62.2	NP	NP	NP	4	4.2	2.1	3.9	10.3	56.4	79.5	23.2	Brown SILT WITH SAND, trace gravel	ML
L12MW-242	9.5	19.1	NP	NP	NP		0.0	0.0	0.2	0.5		99.3		Gray SILT, trace sand	ML
L12MW-242	13.5	27.5	NP	NP	NP		0.0	0.0	0.0	0.0		100.0		Gray SILT	ML
L12MW-244	7.5	17.1	33	22	11		0.3	1.9	4.9	12.8		80.1		Brown LEAN CLAY WITH SAND, trace gravel	CL
LL7sd-012M	0.0	36.8	NP	NP	NP	5.9	12.6	16.2	20.6	18.4	25.4	32.2	6.8	Brown SILTY SAND, little gravel	SM
LL7sd-029M	0.0	317.2	NP	NP	NP	39.8	2.1	3.7	13.8	27.7	44.5	52.7	8.2	Dark brown SANDY SILT, trace gravel	ML
LL8sd-001M	0.0	274.4	NP	NP	NP	26.1	0.6	5.2	11.2	10.8	54.4	72.3	17.9	Dark brown SILT WITH SAND, trace gravel	ML
LL8sd-002M	0.0	281.4	NP	NP	NP	20.8	3.4	7.9	6.8	13.8	47.4	68.1	20.7	Gray SANDY SILT, trace gravel	ML
LL8sd-003M	0.0	140.8	NP	NP	NP	11.1	0.4	3.4	5.6	21.6	49.7	69.0	19.3	Gray SANDY SILT, trace gravel	ML
LL8sd-006M	0.0	60.9	NP	NP	NP	5.8	4.4	4.2	11.1	24.4	37.1	56.0	18.9	Gray SANDY SILT, trace gravel	ML



**Summary of Laboratory Results**

Client: MKM Engineers, Inc.  
 Project: RVAAP  
 Location: Ravenna, Ohio  
 Number: 04001-3g

# Field Sampling Report

Location ID: B12sd-023M-5D

Ravenna Army Ammunition Plant  
Characterization of 14 RVAAP AOCs

Date: 11/5/04

## Sampling Information

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

Sample Collection: 11:25 hrs      Sample Type: Composite MI Grab      Location: Plotted on Map ~~Staked in Field~~  
 If ML, # of increments taken: 30      Estimated - Measured - Surveyed  
 Sample Depth: 0-0.5 FT (below surface)      Decon: Dedicated - Each Day Each Location

Field Parameters (at time of sample)	Analytical Parameters			Other Parameters			
PID / FID Readings: Background: _____ ppm	VOC		TPH GRO	Corrosivity			
	SVOC		TPH DRO			Reactivity Sulfide/Cyanide	
	Explosives	<input checked="" type="checkbox"/>	Chromium +6			Ignitability	
Sample: <u>0.0</u> ppm	Propellants		Nitrate				
<del>Water Level</del> _____ FT	TAL Metals	<input checked="" type="checkbox"/>		<b>QA Samples</b>			
<del>Temperature</del> _____ °C	Pesticides/PCBs			MS/MSD	Yes / No <u>NA</u>		
<del>Sp. Conductance:</del> _____ uMHOs	Cyanides			Duplicate ID	<u>B12sd-023M-DUP</u> NA		
<del>pH</del> _____ units	TOC	<input checked="" type="checkbox"/>		Equipment Rinse ID	<u>NA</u>		
<del>Turbidity</del> _____ NTU	Grain Size	<input checked="" type="checkbox"/>		Trip Blank ID	<u>NA</u>		

### Sample Description

No odor, No staining  
10YR 4/3, wet, well sorted  
heavy plastic, clay 70%, silt 30%

Split Sample  
 Split Sample ID: B12sd-023M-5D  
 Name: John Lent  
 Agency/Company: USACE - Louisville  
 Address: 600 DE MARIN WATER KING DR PLAZA  
LOUISVILLE KY 40202

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

**Soil sample description should include:**

Munsell Color Odor Staining Texture Sorting Plasticity Moisture

**Water sample description should include:**

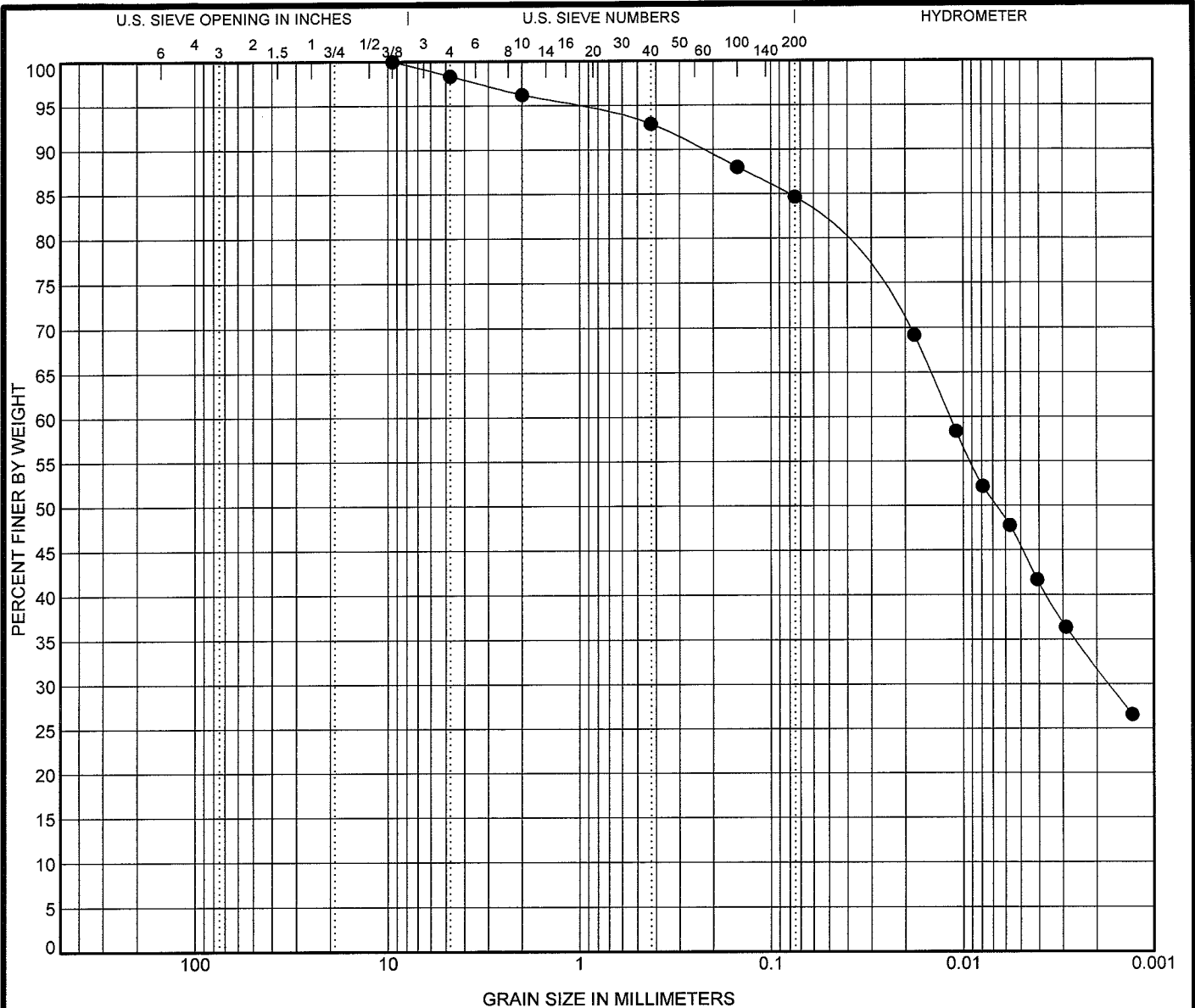
Color Odor Sheen Turbidity

Logged By: Michael Samstak (Please Print)

Reviewed by: ERIC ELUS (Please Print)

Signature: Michael Samstak

Signature: ELUS Date: 2/1/05



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Specimen Identification	Classification	LL	PL	PI	Cc	Cu
● B12sd-023M 0.0	Gray LEAN CLAY WITH SAND, trace gravel, CL					

Specimen Identification	D100	D60	D30	D10	%Gravel	%Sand	%Silt&Clay	%Silt	%Clay
● B12sd-023M 0.0	9.5	0.012	0.002		1.7	13.7		52.8	31.9

<b>PRIME ENGINEERING &amp; ARCHITECTURE INC.</b>	<b>GRAIN SIZE DISTRIBUTION</b>	
	Client: MKM Engineers, Inc.	
	Project: RVAAP	
	Location: Ravenna, Ohio	
	Number: 04001-3g	

U.S. GRAIN SIZE USCS 04001-3G.GPJ PRIMENG.GDT 12/7/04



# Field Sampling Report

Location ID: B12sd-024M-5D

Ravenna Army Ammunition Plant  
Characterization of 14 RVAAP AOCs

Date: 11/5/04

## Sampling Information

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

Sample Collection: 10:20 hrs

Sample Type: Composite MI - Grab

Location: Plotted on Map - Staked in Field

If MI, # of increments taken: 30

Estimated - Measured - Surveyed

Sample Depth: 0-0.5 FT (below surface)

Decon: Dedicated - Each Day - Each Location

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

### Sample Description

No Odor, No Staining  
104R 2/1, wet, with silt & sand  
non plastic, organic clay with  
some silt & sand

### 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:

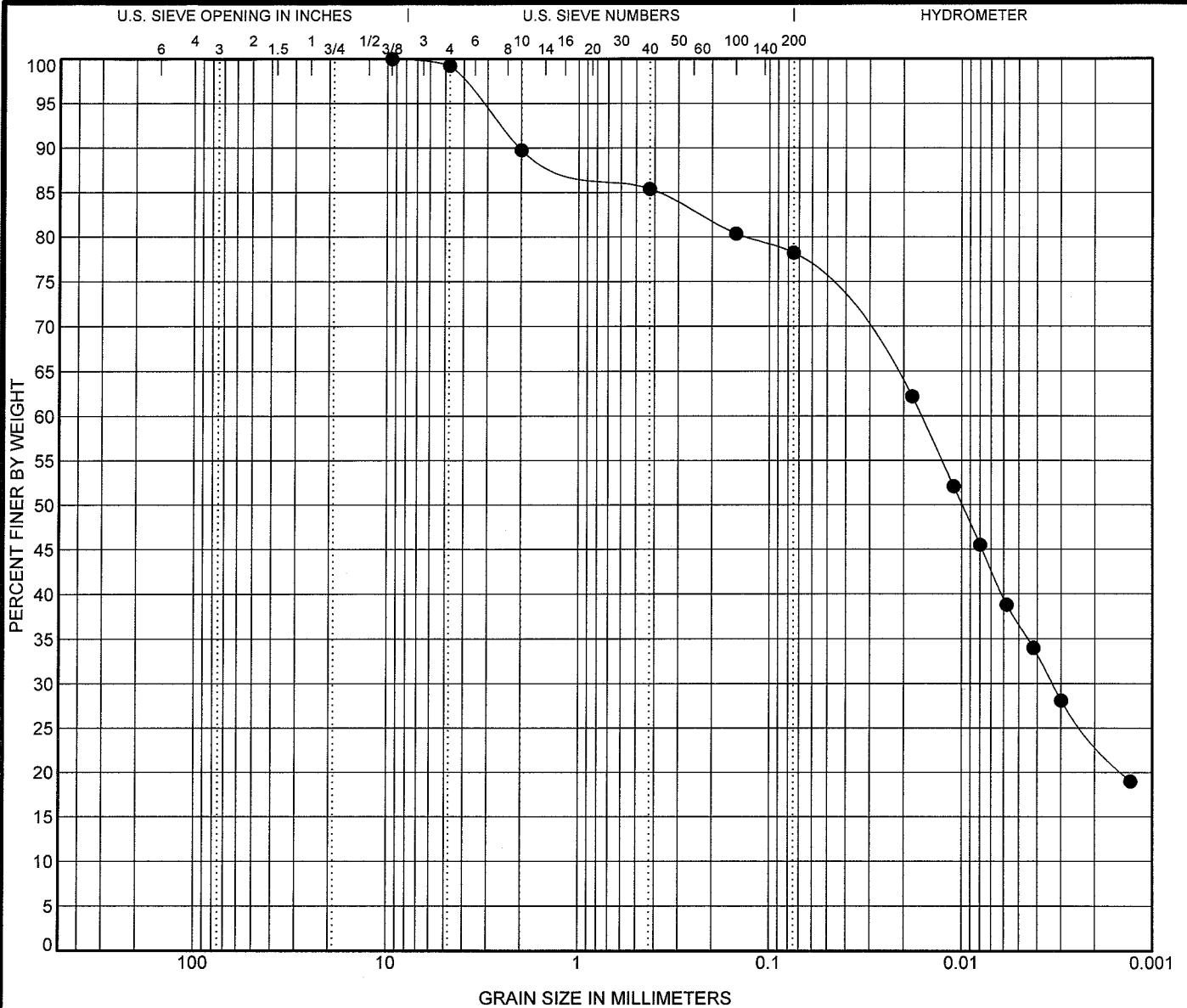
Color Odor Sheen Turbidity

Logged By: Michael Samuelak (Please Print)

Reviewed by: ERIC ELLIS (Please Print)

Signature: Michael Samuelak

Signature: Eric Ellis Date: 2/1/05



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Specimen Identification	Classification	LL	PL	PI	Cc	Cu
● B12sd-024M 0.0	Dark gray, SILT with SAND ML	NP	NP	NP		

Specimen Identification	D100	D60	D30	D10	%Gravel	%Sand	%Silt&Clay	%Silt	%Clay
● B12sd-024M 0.0	9.5	0.016	0.003		0.7	21.0		54.6	23.7

US GRAIN SIZE USCS 04001-3G.GPJ PRIMENG.GDT 12/7/04



**GRAIN SIZE DISTRIBUTION**

Client: MKM Engineers, Inc.  
 Project: RVAAP  
 Location: Ravenna, Ohio  
 Number: 04001-3g

MKM US LAB USCS SUMMARY 04001-7G.GPJ PRIMENG.GDT 1/4/05

Sample Number	Depth (feet)	Moisture Content %	Liquid Limit %	Plastic Limit %	Plast. Index	Organic Content (%)	Agg. %	C Sand %	M Sand %	F Sand %	Silt %	Silt & Clay Comb.	Clay %	Soil Description	Class. Symbol
LNWmw-024	5.7	17.2	34	20	14		1.8	1.5	5.4	16.3		75.1		Brown LEAN CLAY WITH SAND, trace gravel	CL
LNWmw-025	3.7	19.7	26	21	6		10.9	4.2	13.8	27.1		44.0		Brown SILTY, CLAYEY SAND, little gravel	SC-SM



**Summary of Laboratory Results**

Client: MKM Engineers, Inc.  
 Project: Characterization of RVAAP 14 AOCs  
 Location: Ravenna, Ohio  
 Number: 04001-7G

# Field Sampling Report

Location ID: LNWmw-024 (4-6 ft)

Ravenna Army Ammunition Plant  
Characterization of 14 RVAAP AOCs

Date: 12-15-04

## Sampling Information

Source	Groundwater / Product	Surface Water	<u>Soils</u> / Sediments / Sludge
Method	Bailer	Sample Bottle	Scoop <span style="float: right;">Trowel</span>
	Pump	Bacon Bomb	Bowl <span style="float: right;">Hand Auger</span>
			Push Probe <span style="float: right;">Shelby Tube</span> <span style="float: right;">✓</span>
Type/Construction			
Miscellaneous	Well Purging Form Yes - No		

**Sample Collection:** 0915 hrs     
 **Sample Type:** Composite - MI - Grab     
 **Location:** Plotted on Map - Staked in Field  
 If MI, # of increments taken: \_\_\_\_\_     
 Estimated - Measured - Surveyed

**Sample Depth:** 4-6 FT (below surface)     
 **Decon:** Dedicated - Each Day - Each Location

Field Parameters (at time of sample)	Analytical Parameters	Other Parameters
<b>PID / FID Readings:</b> Background: ppm	VOC	Corrosivity
	SVOC	Reactivity Sulfide/Cyanide
	Explosives	Ignitability
Sample: ppm	Propellants	
	Nitrate	
Water Level: FT	TAL Metals	<b>QA Samples</b>
	Geotechnical <span style="float: right;">✓</span>	
Temperature: °C	Pesticides/PCBs	MS/MSD      Yes / No      NA
Sp. Conductance: uMHOs	Cyanides	Duplicate ID      NA
pH: units	TOC	Equipment Rinse ID      NA
Turbidity: N.T.U.	Grain Size <span style="float: right;">✓</span>	Trip Blank ID      NA

**Sample Description**

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*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

\_\_\_\_\_

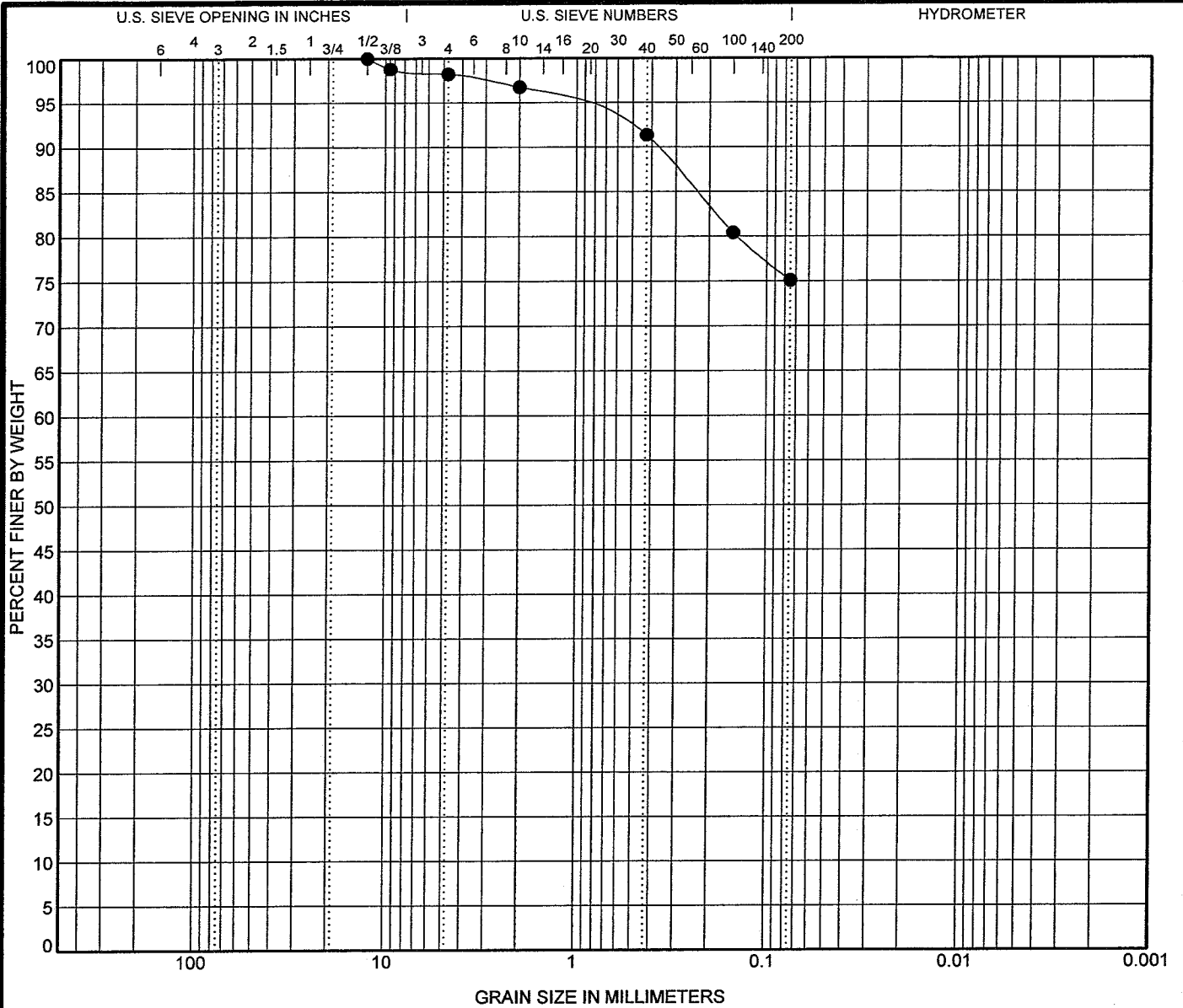
\_\_\_\_\_

Logged By: DAVID K. EARNEST (Please Print)

Signature: David K. Earnest

Reviewed by: Sue Boles (Please Print)

Signature: Sue Boles      Date: 06/15/05



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Specimen Identification	Classification	LL	PL	PI	Cc	Cu
● LNWmw-024 5.7	Brown LEAN CLAY with SAND CL	34	20	14		

Specimen Identification	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
● LNWmw-024 5.7	12.5				1.8	23.1	75.1	

**GRAIN SIZE DISTRIBUTION**



Client: MKM Engineers, Inc.  
 Project: Characterization of RVAAP 14 AOCs  
 Location: Ravenna, Ohio  
 Number: 04001-7G

U.S. GRAIN SIZE 04001-7G.GPJ PRIMENG.GDT 1/4/05

# Field Sampling Report

Location ID: LNWmw-025 (2-4ft)

Ravenna Army Ammunition Plant  
Characterization of 14 RVAAP AOCs

Date: 12-15-04

## Sampling Information

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

Sample Collection: 1325 hrs      Sample Type: Composite - MI - Grab      Location: Plotted on Map + Staked in Field  
 If MI, # of increments taken: \_\_\_\_\_      Estimated - Measured - Surveyed

Sample Depth: 2-4 FT (below surface)      Decon: Dedicated - Each Day - Each Location

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

**Sample Description**

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

*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

\_\_\_\_\_

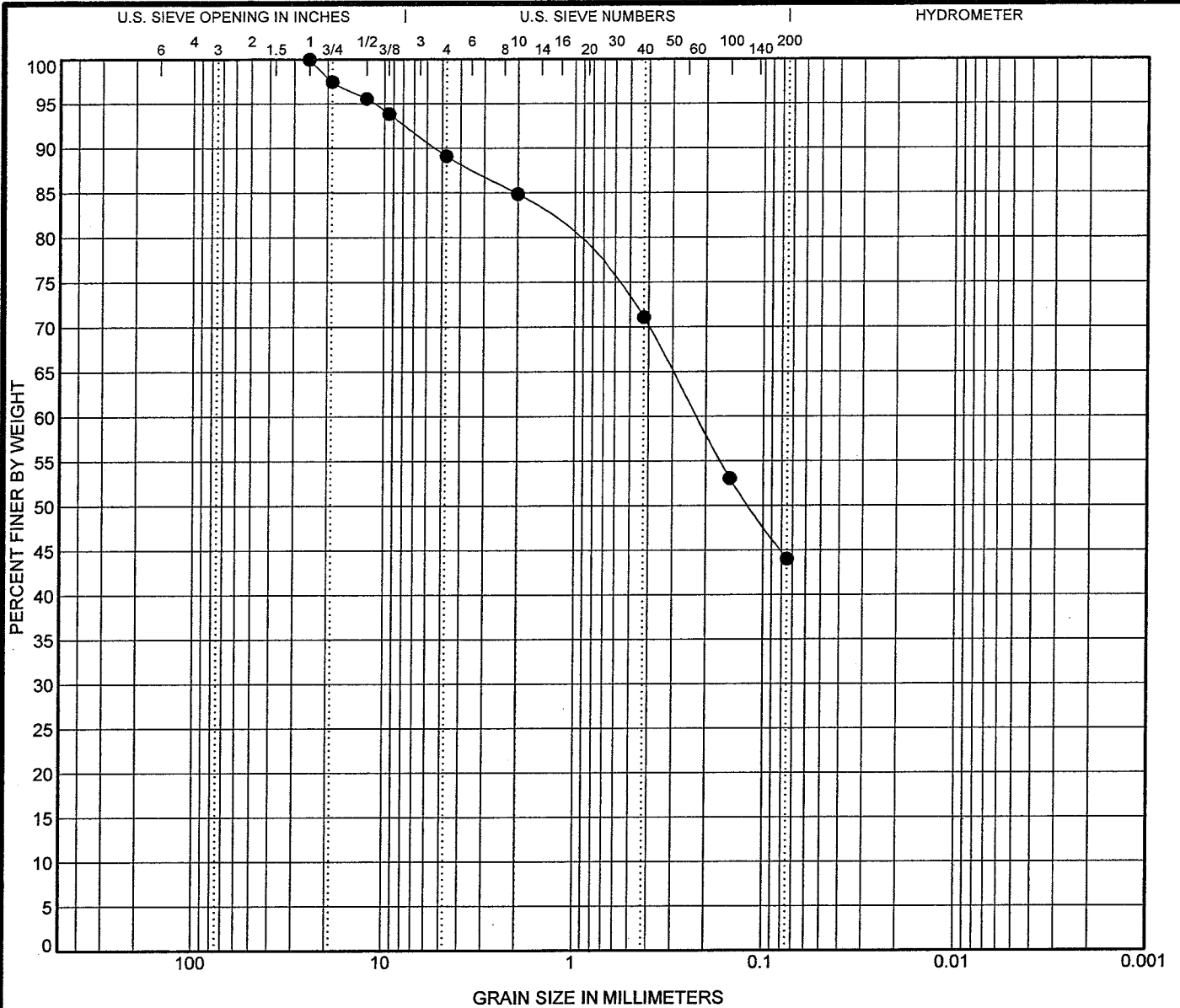
\_\_\_\_\_

Logged By: DAVID K. EARNEST (Please Print)

Signature: David K. Earnest

Reviewed by: Sue Boles (Please Print)

Signature: Sue Boles      Date: 06/15/05



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Specimen Identification	Classification	LL	PL	PI	Cc	Cu
● LNWmw-025 3.7	Brown SILTY, CLAYEY SAND SC-SM	26	21	5		

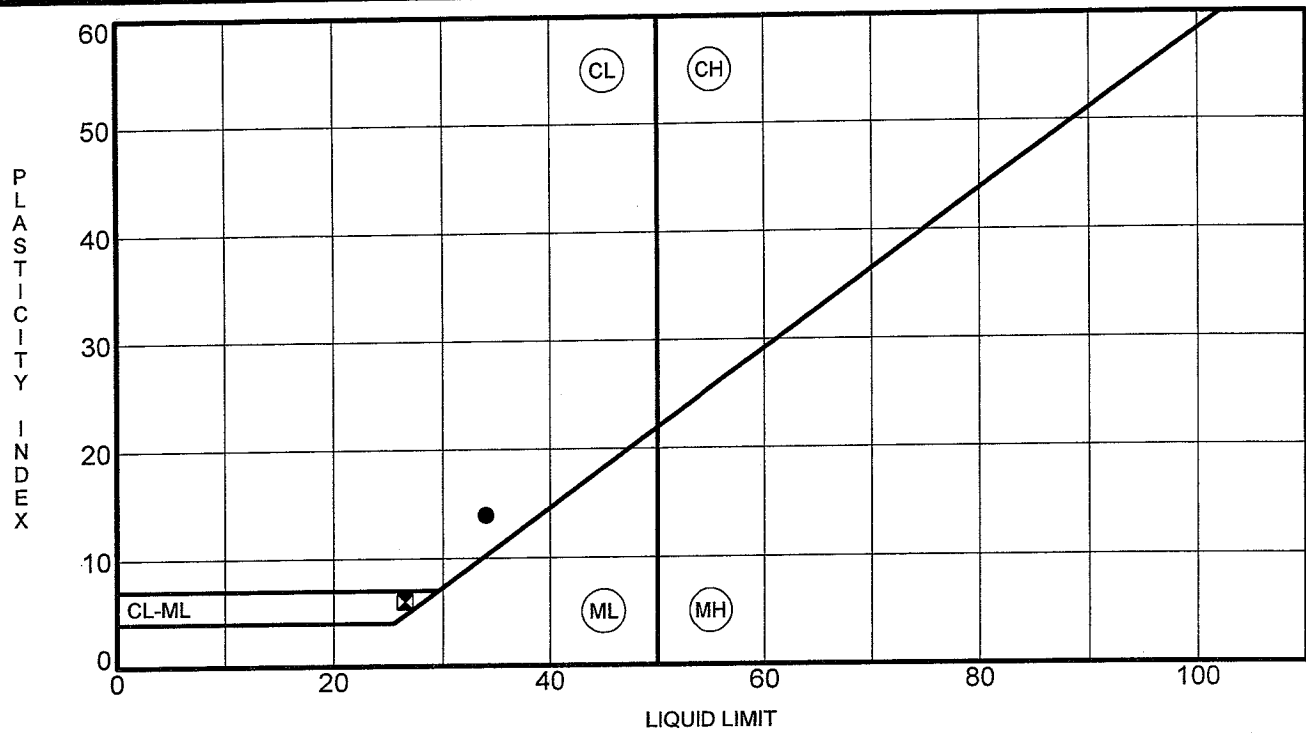
Specimen Identification	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
● LNWmw-025 3.7	25	0.224			10.9	45.1	44.0	

**GRAIN SIZE DISTRIBUTION**



Client: MKM Engineers, Inc.  
 Project: Characterization of RVAAP 14 AOCs  
 Location: Ravenna, Ohio  
 Number: 04001-7G

U.S. GRAIN SIZE 04001-7G.GPJ PRIMENG.GDT 1/4/05



Specimen Identification	LL	PL	PI	Fines	Classification
● LNWmw-024	5.7	34	20	14	75 LEAN CLAY with SAND CL
☒ LNWmw-025	3.7	26	21	5	44 SILTY, CLAYEY SAND SC-SM



## Prime Engineering & Architecture

**Project No.:** 04001G  
**Project:** RVAAP  
**Client:** MKM Engineers  
**Technician(s):** Stephanie and Brandi  
**Date:** 1/4/2005

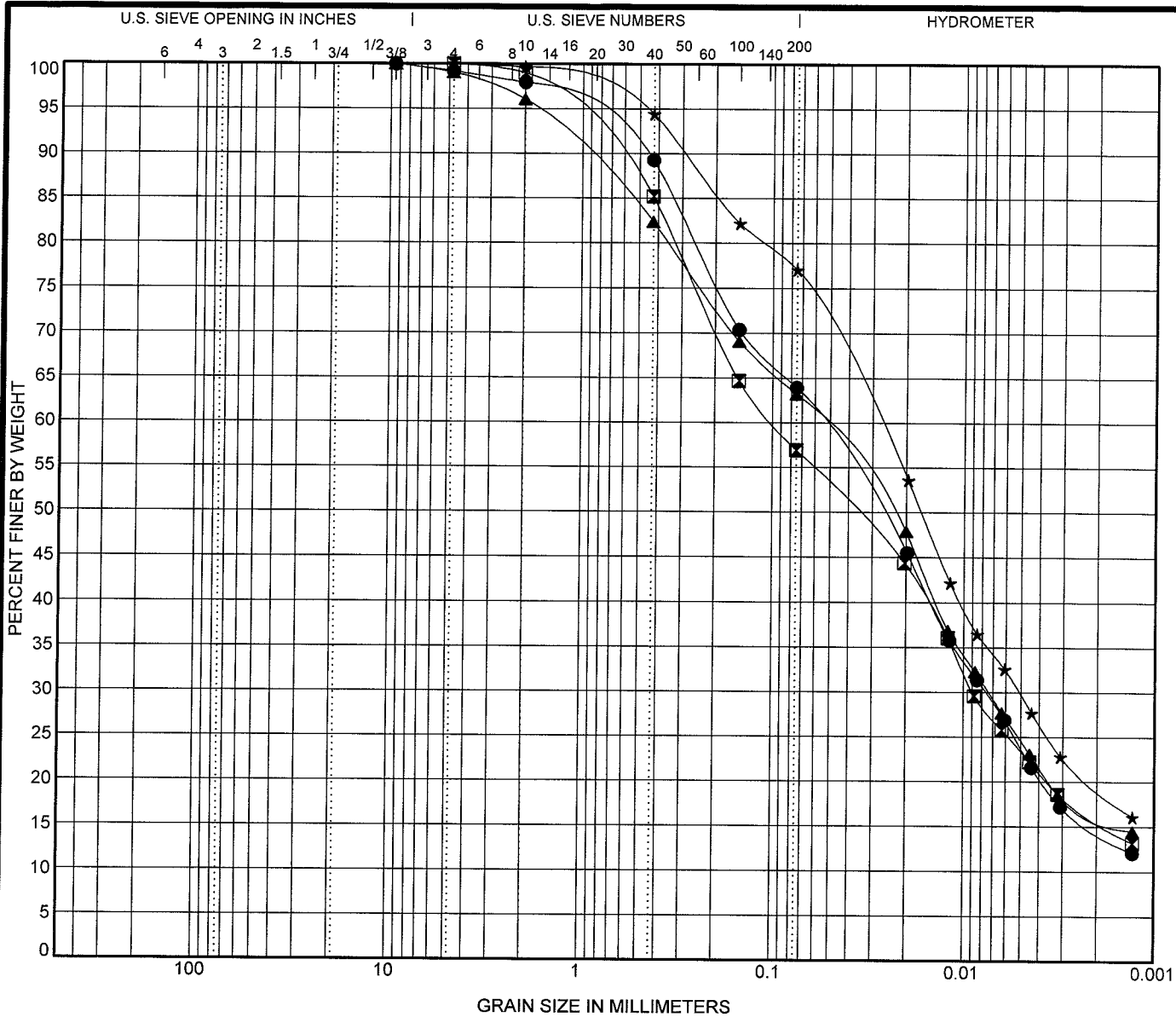
<b>Sample No:</b>	<b>pH Reading:</b>	<b>Specific Gravity:</b>
LNWmw-024	7.1	2.744
LNWmw-025	7.6	2.740

Sample Number	Depth (feet)	Moisture Content %	Liquid Limit %	Plastic Limit %	Plast. Index	Organic Content (%)	Agg. %	C Sand %	M Sand %	F Sand %	Silt %	Silt&Clay Comb.	Clay %	Soil Description	Class. Symbol
F16sd-001M	0.0	33.7				3.4	0.3	1.7	4.3	13.1	53.9	80.6	26.6	Brown LEAN CLAY WITH SAND, trace gravel	CL
F16sd-002M	0.0	193.0				9.7	1.0	1.0	4.7	16.5	52.4	76.8	24.4	Black LEAN CLAY WITH SAND, trace gravel	CL
LL8sd-004M	0.0	169.9	NP	NP	NP	15	1.2	1.2	8.6	29.9	41.9	59.1	17.1	Mottled brown and gray SANDY SILT, trace gravel	ML
LL8sd-005M	0.0	108.2	NP	NP	NP	8.2	1.9	5.1	13.4	22.4	38.1	57.1	19.1	Gray SANDY SILT, trace gravel	ML
LNWsd-043M	0.0	120.2	NP	NP	NP	5.8	0.8	1.2	8.7	25.3	49.3	63.9	14.6	Gray SANDY SILT, trace gravel	ML
LNWsd-044M	0.0	111.3	NP	NP	NP	7.5	0.0	1.0	13.8	28.3	41.2	56.9	15.8	Gray SANDY SILT	ML
LNWsd-045M	0.0	140.8	NP	NP	NP	9.4	1.0	3.0	13.7	19.2	46.8	63.2	16.4	Gray SANDY SILT, trace gravel	ML
LNWsd-046M	0.0	132.5	NP	NP	NP	7.9	0.0	0.3	5.2	17.4	57.6	77.1	19.4	Gray SILT WITH SAND	ML

**PE** PRIME ENGINEERING & ARCHITECTURE INC.

**Summary of Laboratory Results**

Client: MKM Engineers  
 Project: RVAAP  
 Location: Ravenna, Ohio  
 Number: 04001-2G



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Specimen Identification	Classification	LL	PL	PI	Cc	Cu
● LNWsd-043M 0.0	Gray, SANDY SILT ML	NP	NP	NP		
☒ LNWsd-044M 0.0	Gray, SANDY SILT ML	NP	NP	NP		
▲ LNWsd-045M 0.0	Gray, SANDY SILT ML	NP	NP	NP		
★ LNWsd-046M 0.0	Gray, SILT with SAND ML	NP	NP	NP		

Specimen Identification	D100	D60	D30	D10	%Gravel	%Sand	%Silt&Clay	%Silt	%Clay
● LNWsd-043M 0.0	9.5	0.056	0.008		0.8	35.2		49.3	14.6
☒ LNWsd-044M 0.0	4.75	0.099	0.009		0.0	43.1		41.2	15.8
▲ LNWsd-045M 0.0	9.5	0.057	0.007		1.0	35.8		46.8	16.4
★ LNWsd-046M 0.0	4.75	0.028	0.005		0.0	22.9		57.6	19.4

### GRAIN SIZE DISTRIBUTION



Client: MKM Engineers  
 Project: RVAAP  
 Location: Ravenna, Ohio  
 Number: 04001-2G

U.S. GRAIN SIZE USCS 04001-2G.GPJ PRIMENG.GDT 12/7/04

# Field Sampling Report

Location ID: LNWsd-043M-5d

Ravenna Army Ammunition Plant  
Characterization of 14 RVAAP AOCs

Date: 03 Nov 04

## Sampling Information

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

**Sample Collection:** 1005 hrs      **Sample Type:** Composite/(MI) - Grab      **Location:** Plotted on Map ~~Staked in Field~~  
 If MI, # of increments taken: 30      Estimated - Measured - Surveyed  
**Sample Depth:** 0-6" FT (below surface)      **Decon:** Dedicated - Each Day - Each Location

Field Parameters (at time of sample)	Analytical Parameters			Other Parameters																							
<b>PID / FID Readings:</b> Background: <u>0.0</u> ppm	VOC		TPH GRO	<div style="text-align: right;"><b>QA Samples</b></div> <table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 20%;">Corrosivity</td> <td></td> <td></td> </tr> <tr> <td>Reactivity Sulfide/Cyanide</td> <td></td> <td></td> </tr> <tr> <td>Ignitability</td> <td></td> <td></td> </tr> <tr> <td>MS/MSD</td> <td style="text-align: center;">Yes / No</td> <td style="text-align: center;">NA</td> </tr> <tr> <td>Duplicate ID</td> <td></td> <td style="text-align: center;">NA</td> </tr> <tr> <td>Equipment Rinse ID</td> <td></td> <td style="text-align: center;">NA</td> </tr> <tr> <td>Trip Blank ID</td> <td></td> <td style="text-align: center;">NA</td> </tr> </table>			Corrosivity			Reactivity Sulfide/Cyanide			Ignitability			MS/MSD	Yes / No	NA	Duplicate ID		NA	Equipment Rinse ID		NA	Trip Blank ID		NA
	Corrosivity																										
Reactivity Sulfide/Cyanide																											
Ignitability																											
MS/MSD	Yes / No	NA																									
Duplicate ID		NA																									
Equipment Rinse ID		NA																									
Trip Blank ID		NA																									
Sample: <u>0.0</u> ppm	SVOC	<input checked="" type="checkbox"/>	TPH DRO																								
	Explosives	<input checked="" type="checkbox"/>	Chromium +6																								
	Propellants		Nitrate																								
<b>Water Level</b>	TAL Metals	<input checked="" type="checkbox"/>																									
<b>Temperature</b>	Pesticides/PCBs																										
<b>Sp. Conductance:</b>	Cyanides																										
<b>pH</b>	TOC	<input checked="" type="checkbox"/>																									
<b>Turbidity</b>	Grain Size	<input checked="" type="checkbox"/>																									

**Sample Description**  
Dk Gray SILT 60% w/ Sand 25% Saturated  
No Plasticity No Staining  
ROYR 3/2

**Split Sample**

Split Sample ID: \_\_\_\_\_

Name: \_\_\_\_\_

Agency/Company: \_\_\_\_\_

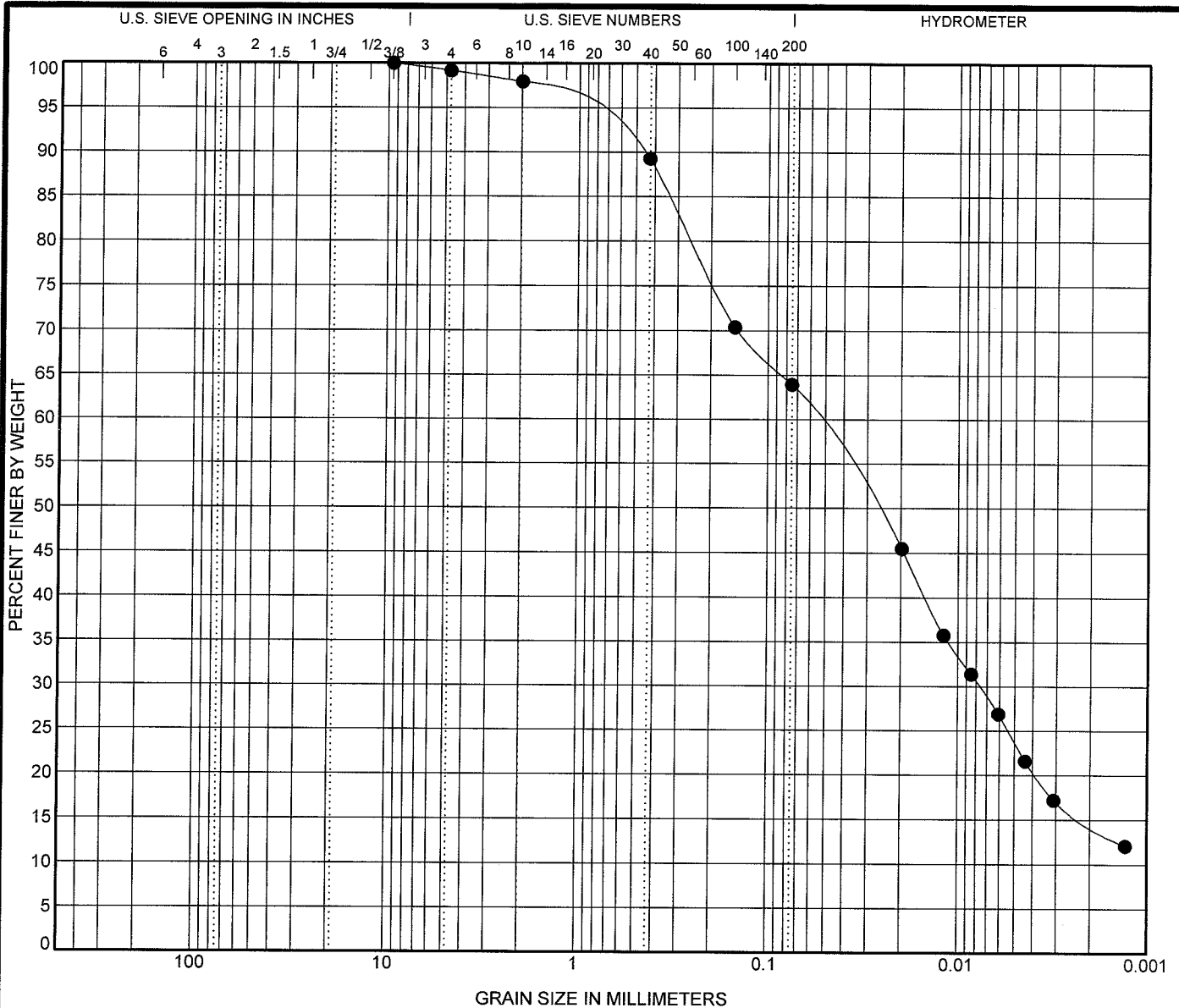
Address: \_\_\_\_\_

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



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Specimen Identification	Classification	LL	PL	PI	Cc	Cu
● LNWsd-043M 0.0	Gray, SANDY SILT ML	NP	NP	NP		

Specimen Identification	D100	D60	D30	D10	%Gravel	%Sand	%Silt&Clay	%Silt	%Clay
● LNWsd-043M 0.0	9.5	0.056	0.008		0.8	35.2		49.3	14.6

**GRAIN SIZE DISTRIBUTION**



Client: MKM Engineers  
 Project: RVAAP  
 Location: Ravenna, Ohio  
 Number: 04001-2G

U.S. GRAIN SIZE USCS 04001-2G.GPJ PRIMENG.GDT 12/7/04

LNWsd-044M-5D

# Field Sampling Report

Location ID: ~~LNWsd-044M-5D~~ 92

Ravenna Army Ammunition Plant  
Characterization of 14 RVAAP AOCs

Date: 02 Nov 04

## Sampling Information

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

Sample Collection: 14.5 hrs <sup>ms</sup> Sample Type: Composite (MI) - Grab  
If MI, # of increments taken: 20 Location: Plotted on Map Staked in Field  
Sample Depth: 0-0.5 FT (below surface) Decon: Dedicated - Each Day - Each Location  
Estimated - Measured - Surveyed

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

**Sample Description**  
DK Grey 70% SILT w/ Sand 20% saturated  
Organic Odor No Staining No Plasticity  
10 YR 3/2

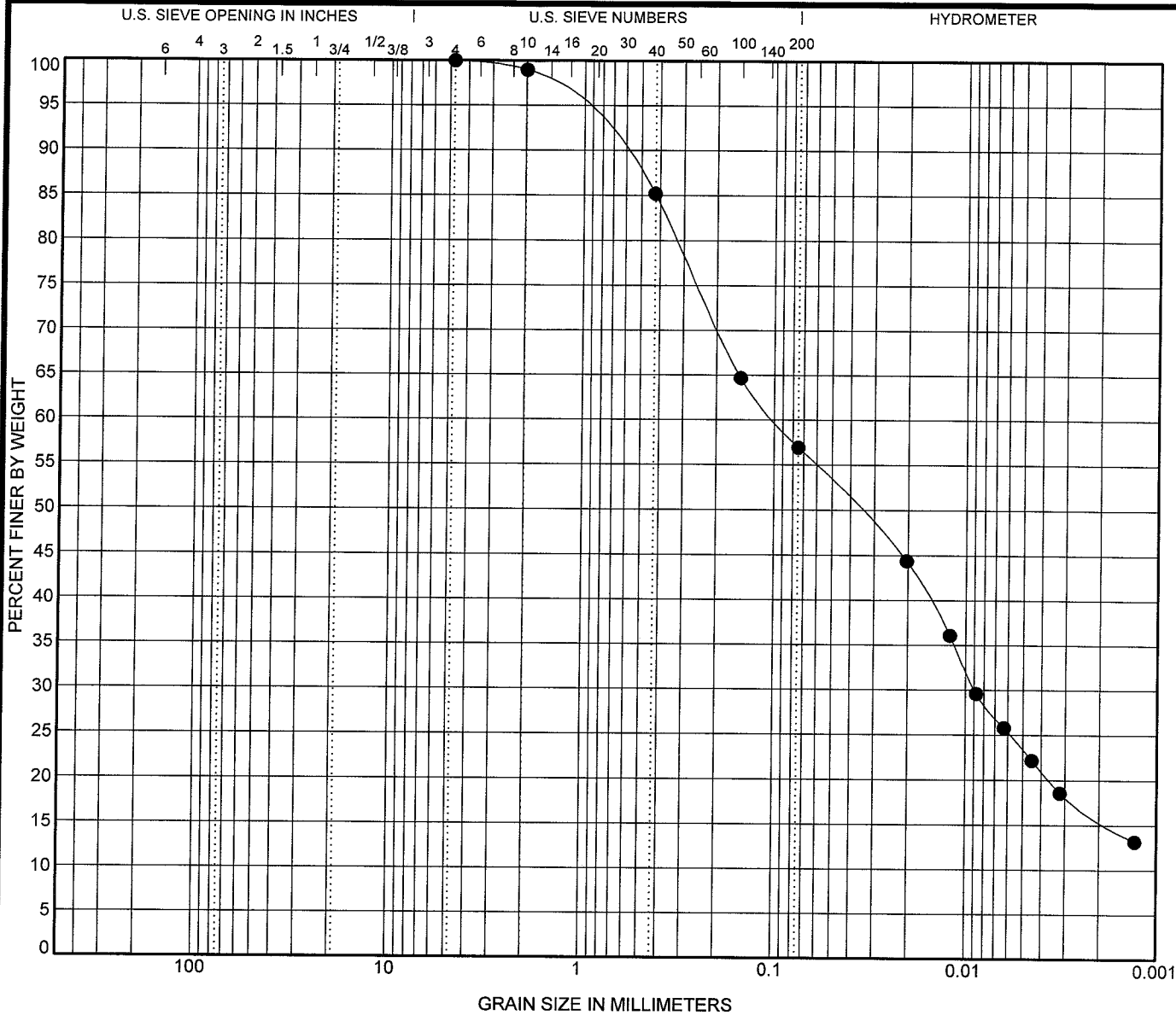
**Split Sample**  
 Split Sample ID: \_\_\_\_\_  
 Name: \_\_\_\_\_  
 Agency/Company: \_\_\_\_\_  
 Address: \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 QA/QC Provided: MS/MSD - Duplicate - Trip Blanks - Field Blanks  
 Parameters: Same as Above - As Listed

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 Dunlevy (Please Print)  
 Signature: [Signature]

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



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Specimen Identification	Classification	LL	PL	PI	Cc	Cu
● LNWsd-044M 0.0	Gray, SANDY SILT ML	NP	NP	NP		

Specimen Identification	D100	D60	D30	D10	%Gravel	%Sand	%Silt&Clay	%Silt	%Clay
● LNWsd-044M 0.0	4.75	0.099	0.009		0.0	43.1		41.2	15.8



**GRAIN SIZE DISTRIBUTION**  
 Client: MKM Engineers  
 Project: RVAAP  
 Location: Ravenna, Ohio  
 Number: 04001-2G

US GRAIN SIZE USCS 04001-2G.GPJ PRIMENG.GDT 12/7/04

# Field Sampling Report

Location ID: LNWsd-045M-scl

Ravenna Army Ammunition Plant  
Characterization of 14 RVAAP AOCs

Date: 2-NOV-04

## Sampling Information

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

Sample Collection: 1415 hrs

Sample Type: Composite MI - Grab  
If MI, # of increments taken: 30

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

Sample Depth: 0-0.5 FT (below surface)

Decon: Dedicated - Each Day - Each Location

Field Parameters (at time of sample)	Analytical Parameters	Other Parameters	
PID / FID Readings: Background: <u>0.0</u> ppm	VOC	Corrosivity	
	SVOC <input checked="" type="checkbox"/>	Reactivity Sulfide/Cyanide	
	Explosives <input checked="" type="checkbox"/>	Ignitability	
Sample: <u>0.0</u> ppm	TPH GRO		
	TPH DRO		
	Chromium +6		
	Propellants		
	Nitrate		
Water Level	TAL Metals <input checked="" type="checkbox"/>	<b>QA Samples</b>	
Temperature	Pesticides/PCBs	MS/MSD	Yes / No      NA
Sp. Conductance:	Cyanides	Duplicate ID	<u>LNWsd-045M-Dup</u> NA
pH	TOC <input checked="" type="checkbox"/>	Equipment Rinse ID	NA
Turbidity	Grain Size <input checked="" type="checkbox"/>	Trip Blank ID	NA

**Sample Description**

Dark grey, silt 60% w/sand 25%  
saturated. Organic Odor, no staining  
no plasticity 10gr 3/2

Split Sample ID: LNWsd-045 sd  
Name: John Jent / CERL-ED-E  
Agency/Company: USACE LOUISVILLE  
Address: 600 Dr. Martin Luther King 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

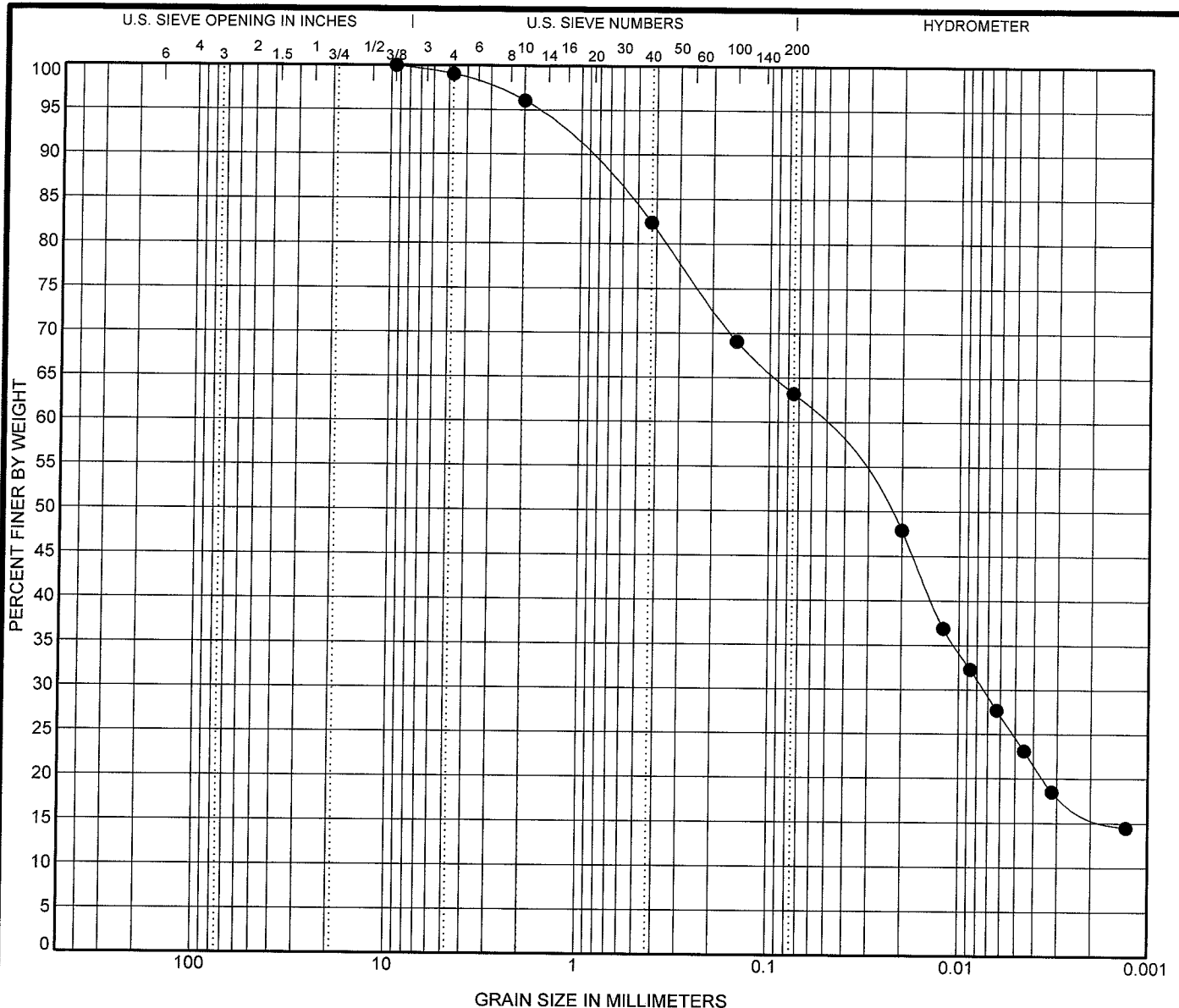
Logged By: James Lanzetta (Please Print)

Reviewed by: Sue Bales (Please Print)

Signature: [Signature]

Signature: [Signature] Date: 02/23/05





COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Specimen Identification	Classification	LL	PL	PI	Cc	Cu
● LNWsd-045M 0.0	Gray, SANDY SILT ML	NP	NP	NP		

Specimen Identification	D100	D60	D30	D10	%Gravel	%Sand	%Silt&Clay	%Silt	%Clay
● LNWsd-045M 0.0	9.5	0.057	0.007		1.0	35.8		46.8	16.4

**GRAIN SIZE DISTRIBUTION**  
 Client: MKM Engineers  
 Project: RVAAP  
 Location: Ravenna, Ohio  
 Number: 04001-2G



US GRAIN SIZE USCS 04001-2G.GPJ PRIMENG.GDT 12/7/04

# Field Sampling Report

Location ID: LNWsd-046M-sd

Ravenna Army Ammunition Plant  
Characterization of 14 RVAAP AOCs

Date: 11-2-04

## Sampling Information

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

Sample Collection: 1053 hrs

Sample Type: Composite - MI - Grab

Location: Plotted on Map - Staked in Field

If MI, # of increments taken: 30

Estimated - Measured - Surveyed

Sample Depth: 0-6" FT (below surface)

Decon: Dedicated - Each Day - Each Location

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

### Sample Description

No staining, organic odor,  
10yr 3/3, moist sorted  
NON plastic, silt 70% clay 20%  
sand 10%

### Split Sample

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

Soil sample description should include:

Munsell Color Odor Staining Texture Sorting Plasticity Moisture

Water sample description should include:

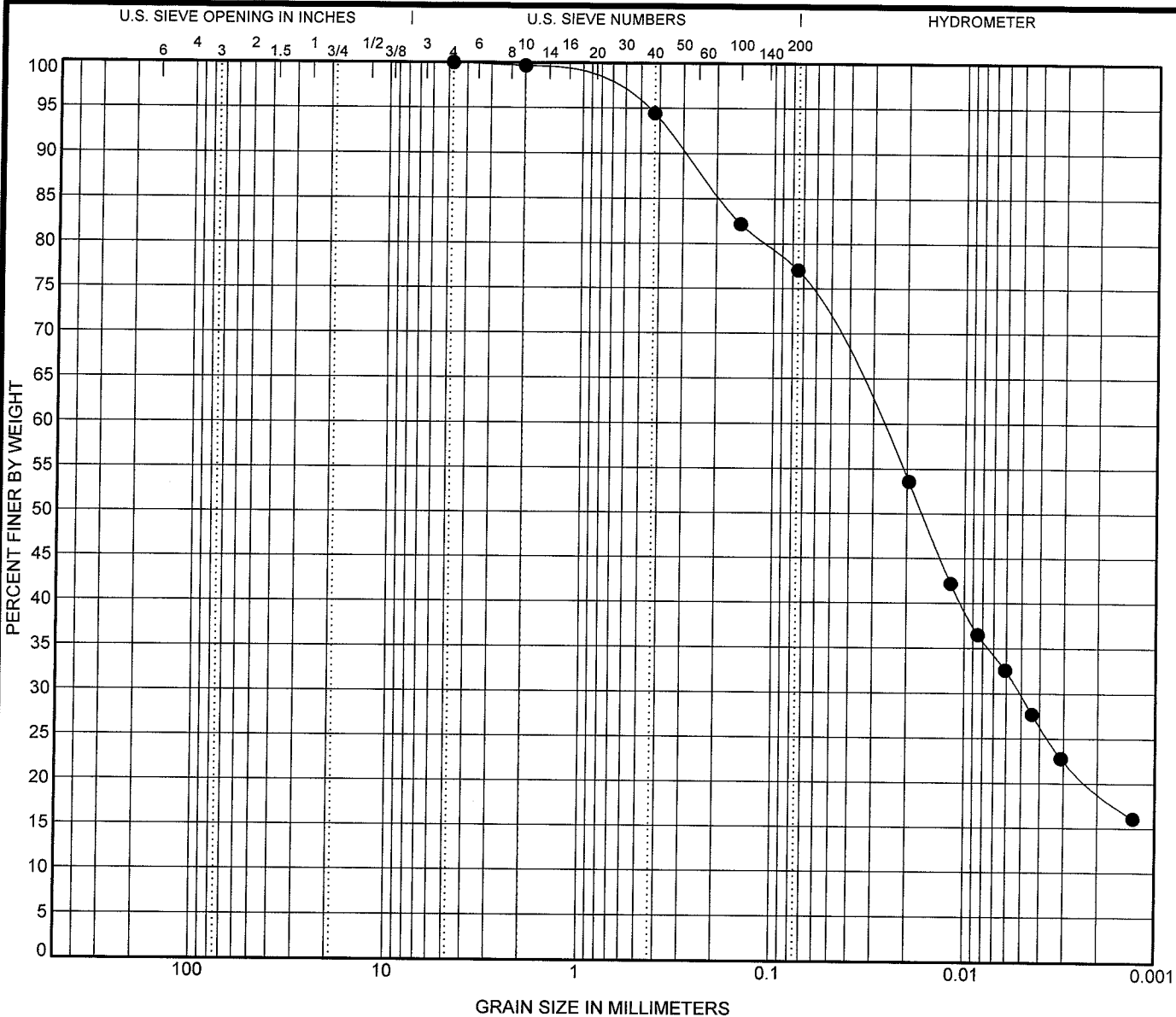
Color Odor Sheen Turbidity

Logged By: James Panerzo (Please Print)

Reviewed by: Sue Boles (Please Print)

Signature: [Signature]

Signature: [Signature] Date: 11/2/04



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Specimen Identification	Classification	LL	PL	PI	Cc	Cu
● LNWsd-046M 0.0	Gray, SILT with SAND ML	NP	NP	NP		

Specimen Identification	D100	D60	D30	D10	%Gravel	%Sand	%Silt&Clay	%Silt	%Clay
● LNWsd-046M 0.0	4.75	0.028	0.005		0.0	22.9	77.1	57.6	19.4



**GRAIN SIZE DISTRIBUTION**  
 Client: MKM Engineers  
 Project: RVAAP  
 Location: Ravenna, Ohio  
 Number: 04001-2G

US GRAIN SIZE USCS 04001-2G.GPJ PRIMENG.GDT 12/7/04

MKM US LAB USCS SUMMARY 04001-4G.GPJ PRIMENG.GDT 12/15/04

Sample Number	Depth (feet)	Moisture Content %	Liquid Limit %	Plastic Limit %	Plast. Index	Organic Content (%)	Agg. %	C Sand %	M Sand %	F Sand %	Silt %	Silt & Clay Comb.	Clay %	Soil Description	Class. Symbol
PIRsd-001M	0.0	34.7	NP	NP	NP	2.3	29.5	7.9	14.8	31.0	12.2	16.8	4.6	Dark brown SILTY SAND WITH GRAVEL	SM
PIRsd-002M	0.0	24.1	NP	NP	NP	1.6	25.9	12.3	23.6	31.2	4.4	6.9	2.5	Dark brown POORLY GRADED SAND WITH SILT AND GRAVEL	SP-SM



**Summary of Laboratory Results**

Client: MKM Engineers, Inc.  
 Project: RVAAP  
 Location: Ravenna, Ohio  
 Number: 04001G-4

Location ID: PIRsd-001M-SD

**Field Sampling Report**

Ravenna Army Ammunition Plant  
Characterization of 14 RVAAP AOCs

Date: 17 Nov 04

**Sampling Information**

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

MS 11/17/04

Sample Collection: 15-20 hrs      Sample Type: Composite MI Grab      Location: Plotted on Map Staked in Field  
 If MI, # of increments taken: 30      Estimated - Measured - Surveyed  
 Sample Depth: 0-0.5 FT (below surface)      Decon: Dedicated - Each Day Each Location

Field Parameters (at time of sample)	Analytical Parameters			Other Parameters		
PID / FID Readings:	VOC		TPH GRO	Corrosivity		
Background: ppm	SVOC	✓	TPH DRO	Reactivity Sulfide/Cyanide		
Sample: ppm	Explosives	✓	Chromium +6	Ignitability		
	Propellants	✓	Nitrate			
Water Level FT	TAL Metals	✓		QA Samples		
Temperature °C	Pesticides/PCBs	✓		MS/MSD	Yes / No	<u>NA</u>
Sp. Conductance: uMHos	Cyanides			Duplicate ID	<u>PIRsd-001M-DUP</u> <u>NA</u>	
pH units	TOC	✓		Equipment Rinse ID	<u>NA</u>	
Turbidity N.T.U.	Grain Size	✓		Trip Blank ID	<u>NA</u>	

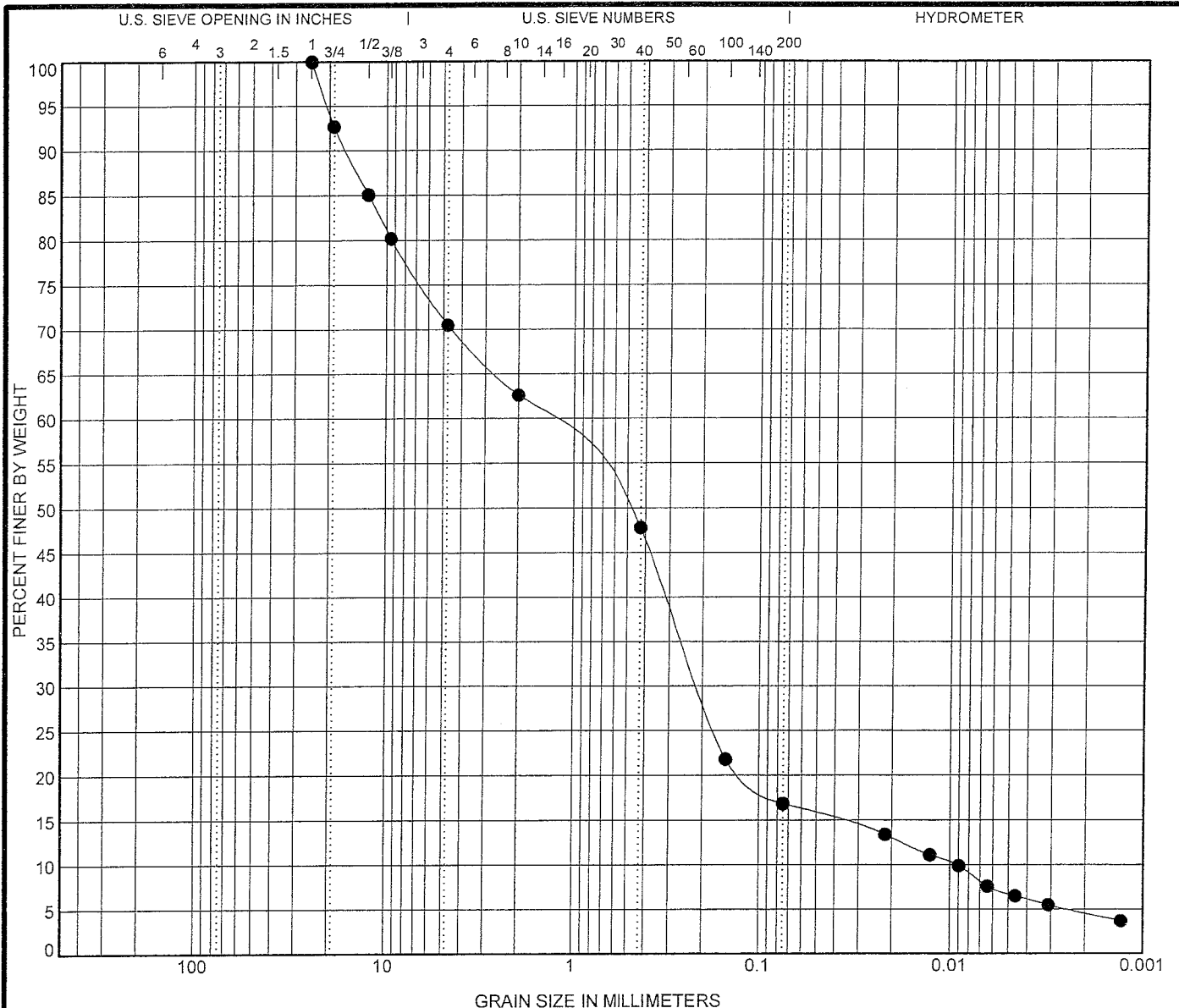
**Sample Description**  
No Odor, No Staining, 0.5-1ft Running  
water in stream  
10 YR 3/3, med, poorly sorted,  
non plastic, silt & clay 40%,  
sand & gravel 60%

**Split Sample**  
 Split Sample ID: PIRsd-001M-SD  
 Name: John Lent  
 Agency/Company: USACE - Louisville  
 Address: 600 DE MARTIN WITHER KING JR PARK  
LOUISVINE 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: Michael G. A. (Please Print)      Reviewed by: ERIC ELMS (Please Print)  
 Signature: Michael Samplak      Signature: [Signature]      Date: 2/1/05

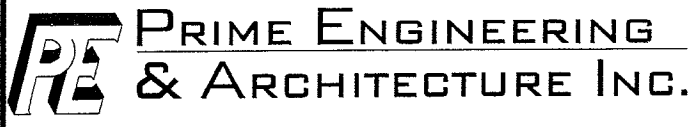


COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Specimen Identification	Classification	LL	PL	PI	Cc	Cu
● PIRsd-001M 0.0	Dark brown, SILTY SAND with GRAVEL SM	NP	NP	NP	3.08	163.96

Specimen Identification	D100	D60	D30	D10	%Gravel	%Sand	%Silt&Clay	%Silt	%Clay
● PIRsd-001M 0.0	25	1.519	0.208	0.009	29.5	53.7		12.2	4.6

**GRAIN SIZE DISTRIBUTION**



Client: MKM Engineers, Inc.  
 Project: RVAAP  
 Location: Ravenna, Ohio  
 Number: 04001G-4

US GRAIN SIZE USCS 04001-4G.GPJ PRIMENG.GDT 12/15/04

Location ID: PIRsd-002M-5D

**Field Sampling Report**

Ravenna Army Ammunition Plant  
Characterization of 14 RVAAP AOCs

Date: 17/Nov/04

**Sampling Information**

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

Sample Collection: 1620 hrs

Sample Type: Composite - MI - Grab  
If MI, # of increments taken: 30

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

Sample Depth: 0-0.5 FT (below surface)

Decon: Dedicated - Each Day Each Location

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

**Sample Description**

No Odor, No Staining, 0.5-3ft of w/ running in ditch  
104R 3/2, well, sorted, non plastic sandy silt with some clay

**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:

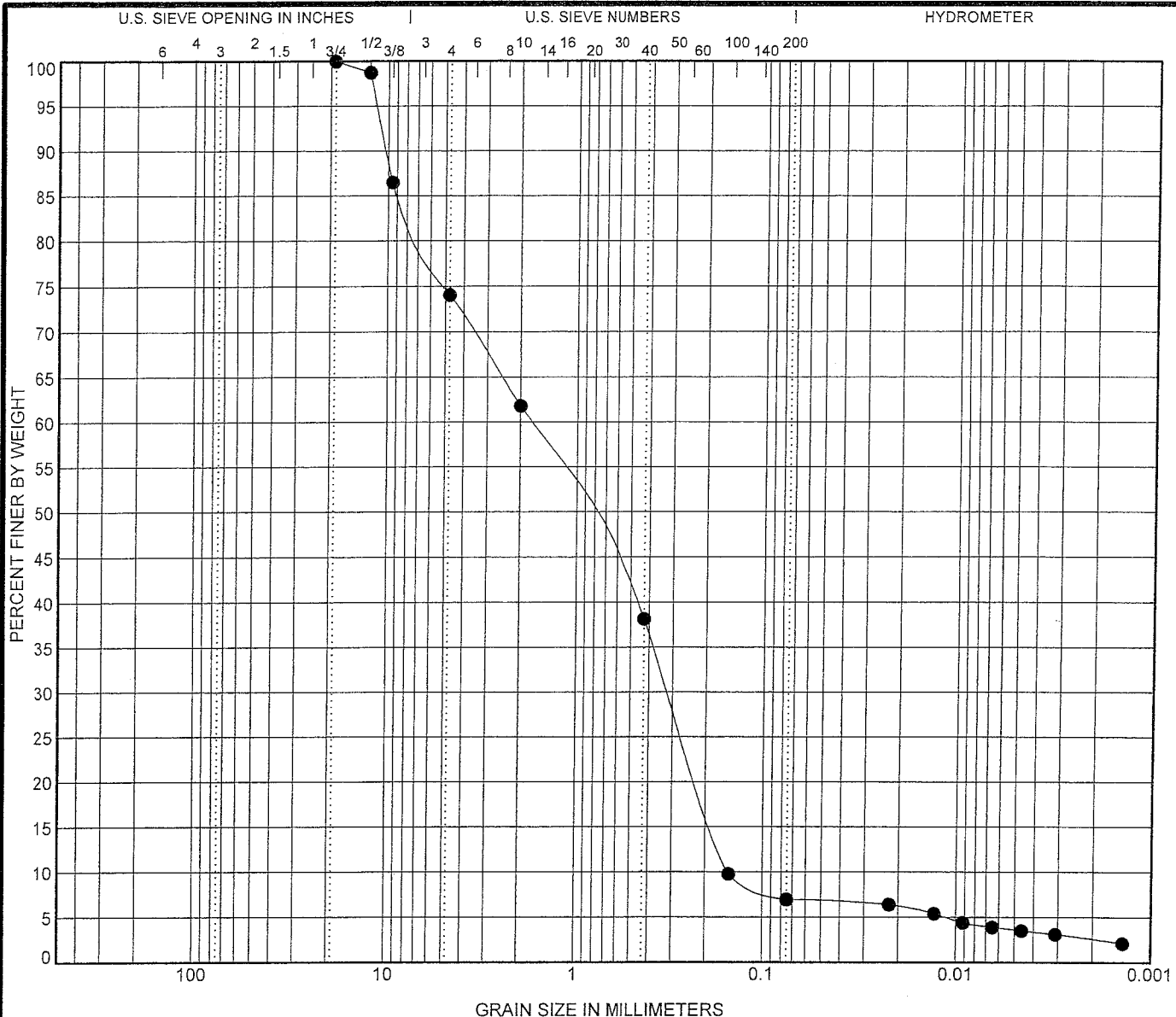
Color Odor Sheen Turbidity

Logged By: Michael Samolok (Please Print)

Signature: Michael Samolok

Reviewed by: ERIC ELWIS (Please Print)

Signature: [Signature] Date: 21/10/05



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Specimen Identification	Classification	LL	PL	PI	Cc	Cu
● PIRsd-002M 0.0	Dark brown, POORLY GRADED SAND with SILT and GRAVEL SP-SM	NP	NP	NP	0.37	11.75

Specimen Identification	D100	D60	D30	D10	%Gravel	%Sand	%Silt&Clay	%Silt	%Clay
● PIRsd-002M 0.0	19	1.777	0.315	0.151	25.9	67.1		4.4	2.5

**GRAIN SIZE DISTRIBUTION**



Client: MKM Engineers, Inc.  
 Project: RVAAP  
 Location: Ravenna, Ohio  
 Number: 04001G-4

US GRAIN SIZE USCS 04001-G.GPJ PRIMENG.GDT 12/15/04



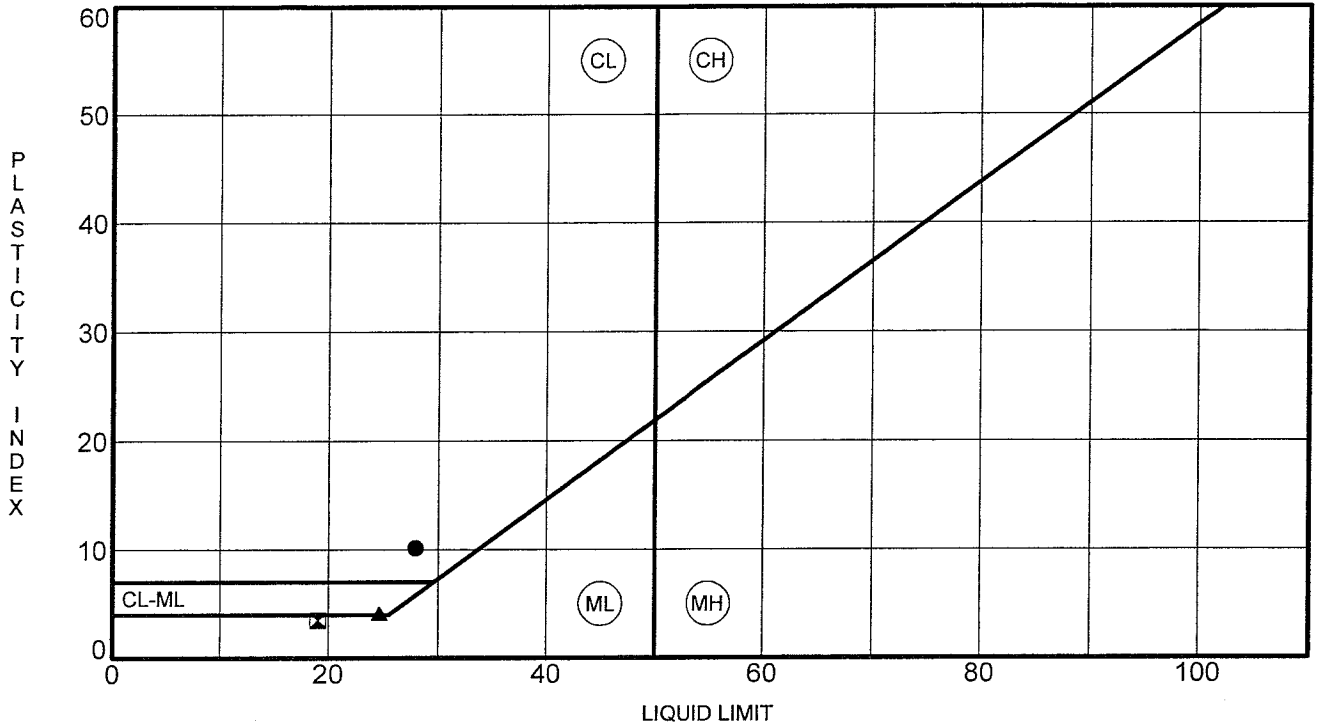
MKM US LAB USCS SUMMARY 04001-G.G.P.J. PRIMENG.GDT. 12/17/04

Sample Number	Depth (feet)	Moisture Content %	Liquid Limit %	Plastic Limit %	Plast. Index	Organic Content (%)	Agg. %	C Sand %	M Sand %	F Sand %	Silt %	Silt & Clay Comb.	Clay %	Soil Description	Class. Symbol
NTAmw-111	5.5	21.7	28	18	10		0.0	0.0	0.2	0.7		99.1		Mottled brown and gray LEAN CLAY (CL), trace sand	CL
NTAmw-112	11.5	10.7	19	16	3		5.5	4.5	10.0	23.5		56.6		Gray SANDY SILT (ML), trace gravel	ML
NTAmw-113	7.5	20.3	25	21	4		0.0	0.0	0.2	3.8		96.0		Brown SILTY CLAY (CL-ML), trace sand	CL-ML



**Summary of Laboratory Results**

Client: MKM Engineers, Inc.  
 Project: RVAAP  
 Location: Ravenna, Ohio  
 Number: 04001G-5



Specimen Identification	LL	PL	PI	Fines	Classification	
● NTAmw-111	5.5	28	18	10	99	LEAN CLAY CL
■ NTAmw-112	11.5	19	16	3	57	SANDY SILT ML
▲ NTAmw-113	7.5	25	21	4	96	SILTY CLAY CL-ML

US ATTERBERG LIMITS 04001-5G.GPJ PRIMENG.GDT 12/17/04



**ATTERBERG LIMITS' RESULTS**

Client: MKM Engineers, Inc.  
 Project: RVAAP  
 Location: Ravenna, Ohio  
 Number: 04001G-5

## Prime Engineering & Architecture

**Project No.:** 04001G  
**Project:** RVAAP  
**Client:** MKM Engineers  
**Technician(s):** Stephanie and Brandi  
**Date:** 12/17/2004

<b>Sample No:</b>	<b>pH Reading:</b>	<b>Specific Gravity:</b>
NTAmw-111	8.4	2.753
NTAmw-112	8.4	2.715
NTAmw-113	8.2	2.763

# Field Sampling Report

Location ID: NTAmw-111 (4-6ft)

Ravenna Army Ammunition Plant  
Characterization of 14 RVAAP AOCs

Date: 12-03-04

## Sampling Information

Source	Groundwater / Product	Surface Water	<u>Soils</u> / Sediments / Sludge
Method	Bailer	Sample Bottle	Scoop <span style="float: right;">Trowel</span>
	Pump	Bacon Bomb	Bowl <span style="float: right;">Hand Auger</span>
			Push Probe <span style="float: right;">Shelby Tube</span> <span style="float: right;">✓</span>
Type/Construction			
Miscellaneous	Well Purging Form Yes - No		

Sample Collection: 0845 hrs      Sample Type: Composite - MI - Grab      Location: Plotted on Map - Staked in Field  
 If MI, # of increments taken: \_\_\_\_\_  
 Sample Depth: 4-6 FT (below surface)      Decon: Dedicated - Each Day - Each Location  
 Estimated - Measured - Surveyed

Field Parameters (at time of sample)	Analytical Parameters	Other Parameters
PID / FID Readings: Background: ppm	VOC	Corrosivity
	SVOC	Reactivity Sulfide/Cyanide
	Explosives	Ignitability
Sample: ppm	Propellants	
	Nitrate	
Water Level: FT	TAL Metals	<b>QA Samples</b>
Temperature: °C	Geotechnical <span style="float: right;">✓</span>	
Sp. Conductance: uMHOs	Pesticides/PCBs	MS/MSD      Yes / No      NA
pH: units	Cyanides	Duplicate ID      NA
Turbidity: N.T.U.	TOC	Equipment Rinse ID      NA
	Grain Size <span style="float: right;">✓</span>	Trip Blank ID      NA

**Sample Description**

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*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: \_\_\_\_\_

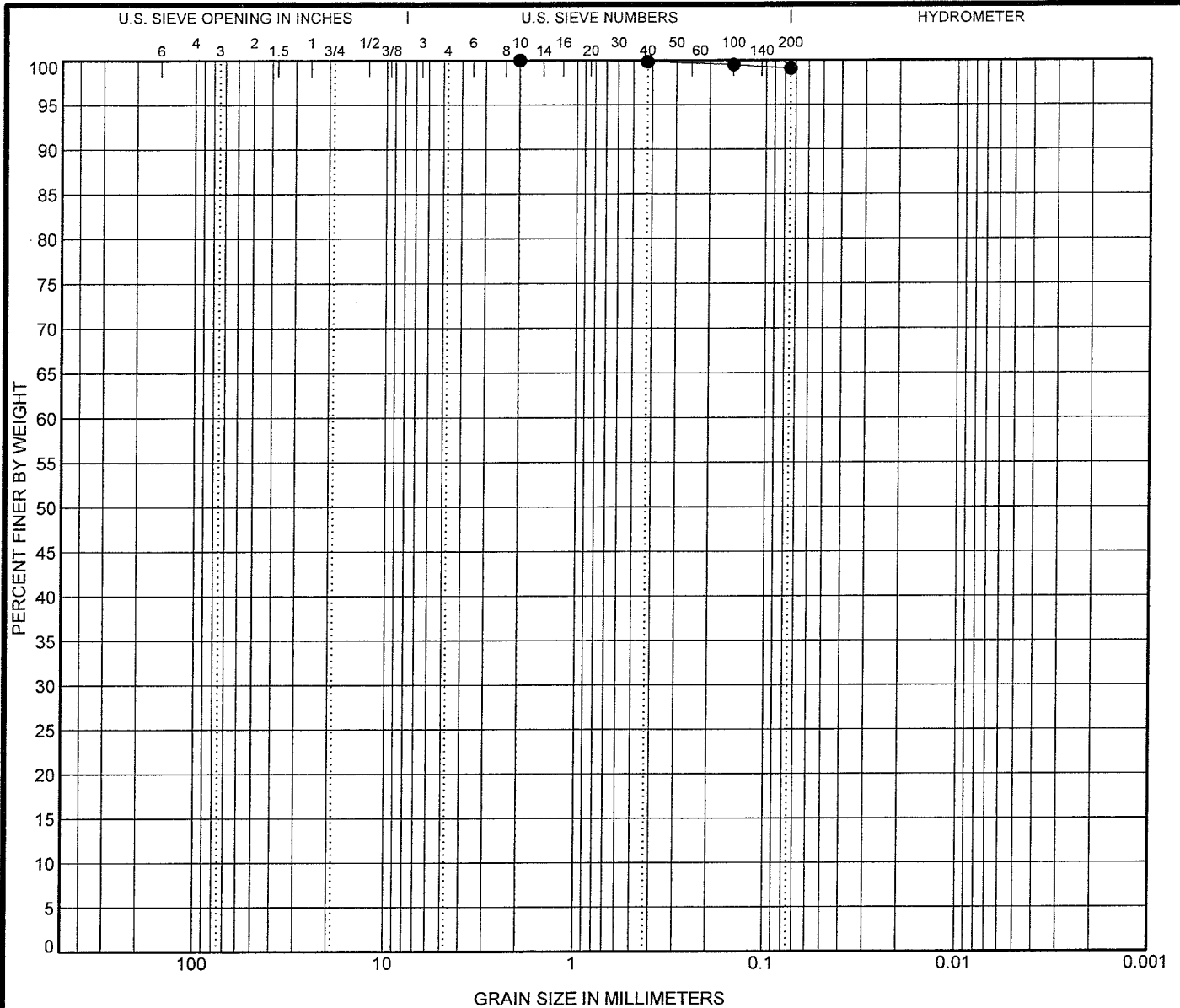
Address: \_\_\_\_\_

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

Logged By: ERK EWS (Please Print)      Reviewed by: Sue Boles (Please Print)

Signature: [Signature]      Signature: [Signature]      Date: 06/15/05



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Specimen Identification	Classification	LL	PL	PI	Cc	Cu
● NTAmw-111 5.5	LEAN CLAY CL	28	18	10		

Specimen Identification	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
● NTAmw-111 5.5	2				0.0	0.9	99.1	

**GRAIN SIZE DISTRIBUTION**



Client: MKM Engineers, Inc.  
 Project: RVAAP  
 Location: Ravenna, Ohio  
 Number: 04001G-5

## Field Sampling Report

Location ID: NTAmw-112 (10-12ft)

Ravenna Army Ammunition Plant  
Characterization of 14 RVAAP AOCs

Date: 12-02-04

### Sampling Information

Source	Groundwater / Product	Surface Water	<u>Soils</u> Sediments / Sludge
Method	Bailer	Sample Bottle	Scoop <span style="float: right;">Trowel</span>
	Pump	Bacon Bomb	Bowl <span style="float: right;">Hand Auger</span>
			Push Probe <span style="float: right;">Shelby Tube</span> <span style="float: right;">✓</span>
Type/Construction			
Miscellaneous	Well Purging Form Yes - No		

Sample Collection: 1250 hrs      Sample Type: Composite - MI - Grab      Location: Plotted on Map, Staked in Field  
 If MI, # of increments taken: \_\_\_\_\_      Estimated - Measured - Surveyed

Sample Depth: 10-12 FT (below surface)      Decon: Dedicated - Each Day - Each Location

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

#### Sample Description

\_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

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

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

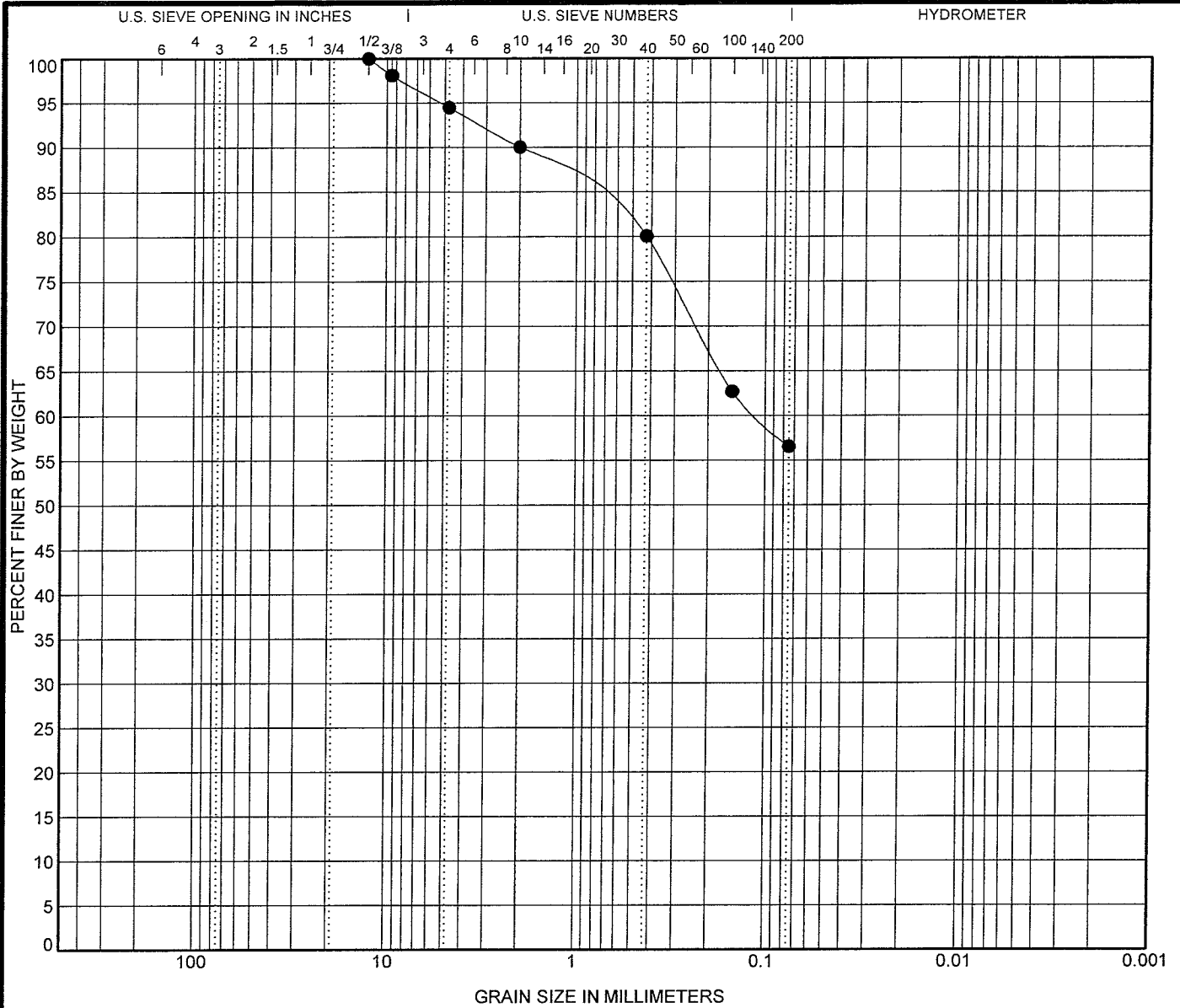
#### Split Sample

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: ERIC ELUS (Please Print)  
 Signature: [Signature]

Reviewed by: Site Boles (Please Print)  
 Signature: [Signature]      Date: 06/15/05



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Specimen Identification	Classification	LL	PL	PI	Cc	Cu
● NTAmw-112 11.5	SANDY SILT ML	19	16	3		

Specimen Identification	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
● NTAmw-112 11.5	12.5	0.111			5.5	37.9	56.6	

**GRAIN SIZE DISTRIBUTION**



Client: MKM Engineers, Inc.  
 Project: RVAAP  
 Location: Ravenna, Ohio  
 Number: 04001G-5

US GRAIN SIZE 04001-5G.GPJ PRIMENG.GDT 12/17/04

# Field Sampling Report

Location ID: NTA mw-113 (6-8 ft)

Ravenna Army Ammunition Plant  
Characterization of 14 RVAAP AOCs

Date: 12-02-04

## Sampling Information

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

Sample Collection: 0052 hrs      Sample Type: Composite - MI - Grab      Location: Plotted on Map - Staked in Field  
 If MI, # of increments taken: \_\_\_\_\_      Estimated - Measured - Surveyed  
 Sample Depth: 6-8 FT (below surface)      Decon: Dedicated - Each Day - Each Location

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

**Sample Description**

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*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: \_\_\_\_\_

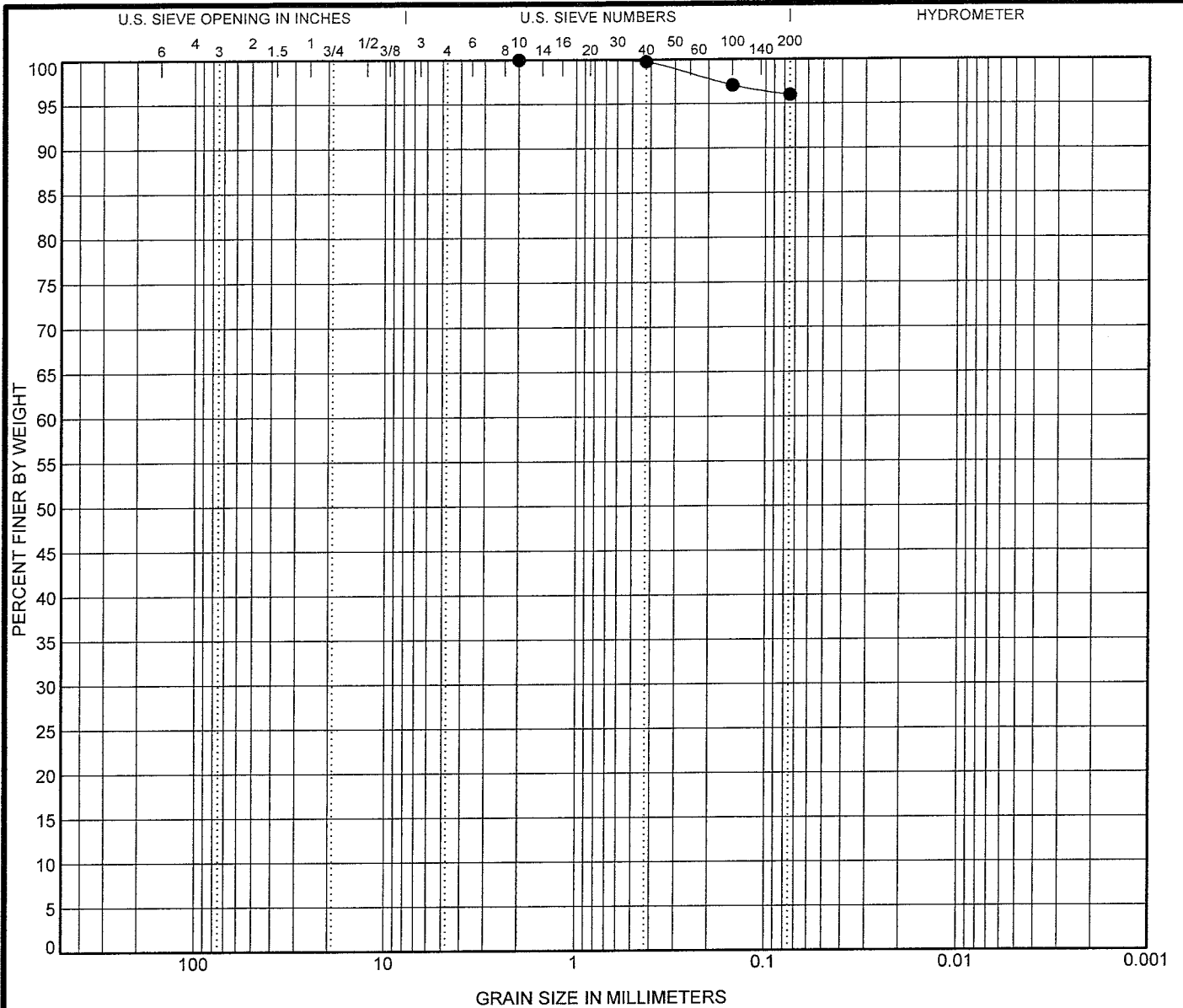
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QA/QC Provided: MS/MSD - Duplicate - Trip Blanks - Field Blanks  
 Parameters: Same as Above - As Listed

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Logged By: ERIC ELUS (Please Print)      Reviewed by: Sue Boles (Please Print)  
 Signature: [Signature]      Signature: [Signature]      Date: 06/15/05





COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Specimen Identification	Classification	LL	PL	PI	Cc	Cu
● NTAmw-113 7.5	SILTY CLAY CL-ML	25	21	4		

Specimen Identification	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
● NTAmw-113 7.5	2				0.0	4.0	96.0	

**GRAIN SIZE DISTRIBUTION**



Client: MKM Engineers, Inc.  
 Project: RVAAP  
 Location: Ravenna, Ohio  
 Number: 04001G-5

U.S. GRAIN SIZE 04001-5G.GPJ PRIMENG.GDT 12/17/04

Sample Number	Depth (feet)	Moisture Content %	Liquid Limit %	Plastic Limit %	Plast. Index	Organic Content (%)	Agg. %	C Sand %	M Sand %	F Sand %	Silt %	Silt & Clay Comb.	Clay %	Soil Description	Class. Symbol
LL5mw-001	7.6	20.6	39	25	14		1.1	0.5	1.9	8.4		88.1		Brown LEAN CLAY, little sand, trace gravel	CL
LL5mw-003	9.6	22.0	NP	NP	NP		0.0	0.0	0.0	2.5		97.5		Brown SILT, trace sand	ML
LL5mw-006	11.6	17.9	29	21	8		0.7	2.6	2.0	8.1		86.5		Brown LEAN CLAY, little sand, trace gravel	CL

MKM US LAB USCS SUMMARY 04001-6G.GPJ PRIMENG.GDT 12/29/04



**Summary of Laboratory Results**

Client: MKM Engineers, Inc.  
 Project: Characterization of RVAAP 14 AOCs  
 Location: Ravenna, Ohio  
 Number: 04001G-6

# Field Sampling Report

Location ID: LL5mw-001 (6-8 ft)

Ravenna Army Ammunition Plant  
Characterization of 14 RVAAP AOCs

Date: 12-08-04

## Sampling Information

Source	Groundwater / Product	Surface Water	<u>Soils</u> / Sediments / Sludge
Method	Bailer	Sample Bottle	Scoop <span style="float: right;">Trowel</span>
	Pump	Bacon Bomb	Bowl <span style="float: right;">Hand Auger</span>
			Push Probe <span style="float: right;">Shelby Tube</span> <span style="float: right;">✓</span>
Type/Construction			
Miscellaneous	Well Purging Form Yes - No		

Sample Collection: 1240 hrs      Sample Type: Composite - MI - Grab      Location: Plotted on Map - Staked in Field  
 If MI, # of increments taken: \_\_\_\_\_      Estimated - Measured - Surveyed

Sample Depth: 6-8 FT (below surface)      Decon: Dedicated - Each Day - Each Location

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

### Sample Description

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*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: \_\_\_\_\_

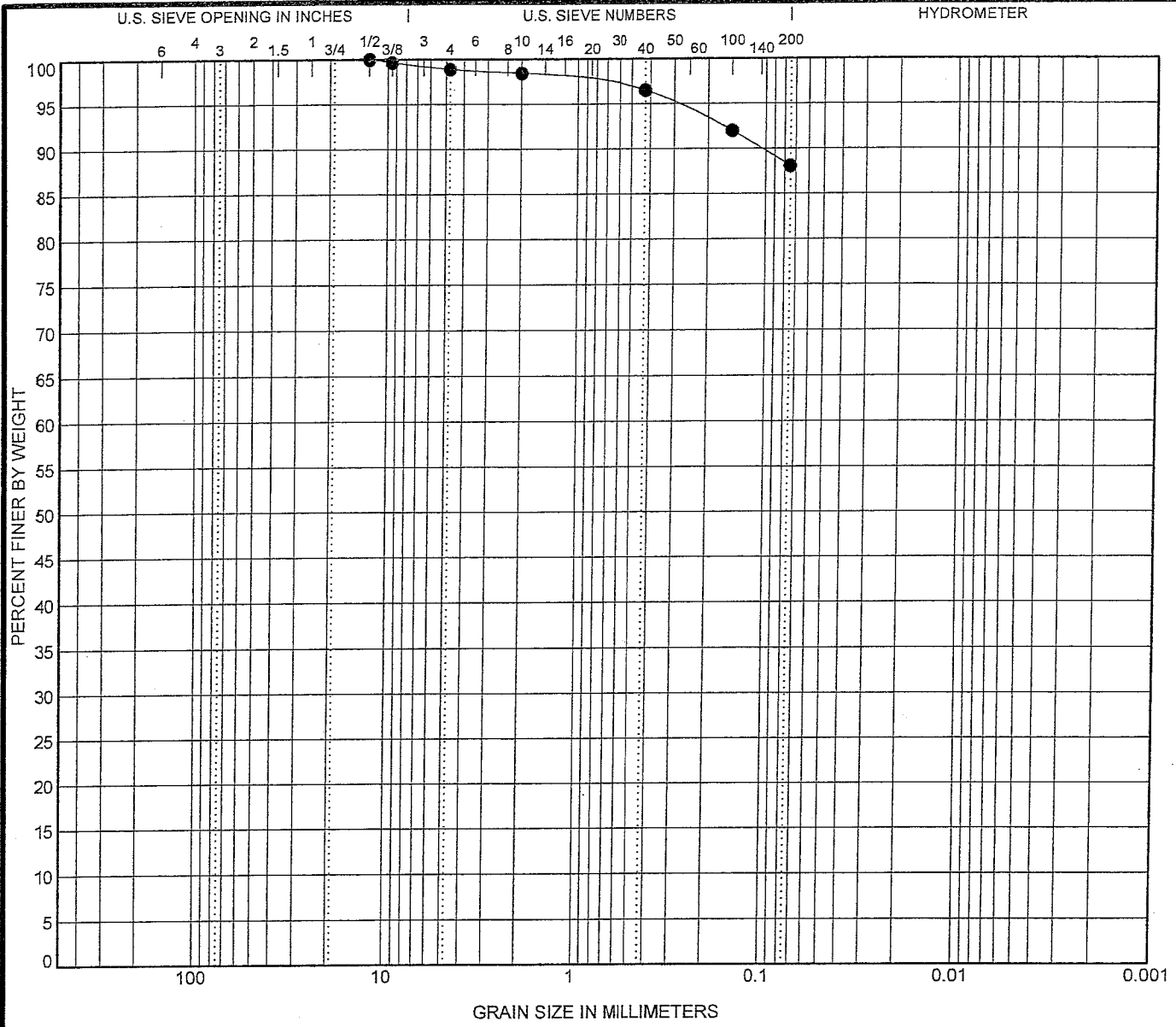
QA/QC Provided: MS/MSD - Duplicate - Trip Blanks - Field Blanks  
 Parameters: Same as Above - As Listed

Logged By: ERIC EWIS (Please Print)

Signature: EREW

Reviewed by: JUE BOLES (Please Print)

Signature: Jue Boles Date: 06/15/05



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Specimen Identification	Classification	LL	PL	PI	Cc	Cu
● LL5mw-001 7.6	Brown LEAN CLAY CL	39	25	14		

Specimen Identification	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
● LL5mw-001 7.6	12.5				1.1	10.8	88.1	

**GRAIN SIZE DISTRIBUTION**



Client: MKM Engineers, Inc.  
 Project: Characterization of RVAAP 14 AOCs  
 Location: Ravenna, Ohio  
 Number: 04001G-6

U.S. GRAIN SIZE 04001-G-6.PJ PRIMENG.GDT 12/29/04

## Field Sampling Report

Location ID: LL5mw - 003 (8-10 ft)

Ravenna Army Ammunition Plant  
Characterization of 14 RVAAP AOCs

Date: 12-09-04

### Sampling Information

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

**Sample Collection:** 1050 hrs     
 **Sample Type:** Composite - MI - grab     
 **Location:** Plotted on Map - Staked in Field  
 If MI, # of increments taken: \_\_\_\_\_  
**Sample Depth:** 8-10 FT (below surface)     
 **Decon:** Dedicated - Each Day - Each Location     
 Estimated - Measured - Surveyed

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

#### Sample Description

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\_\_\_\_\_

#### 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:*

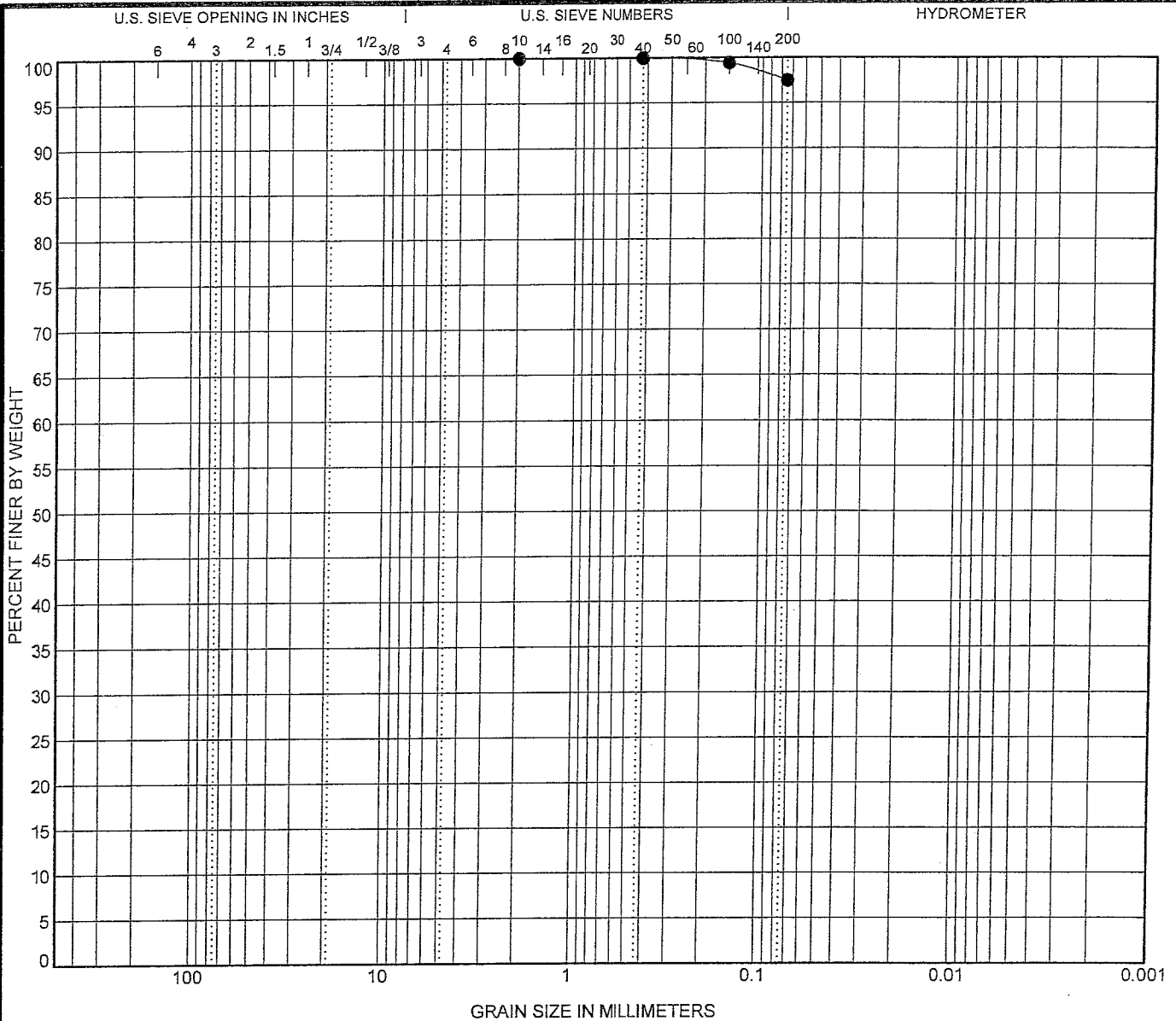
*Color Odor Sheen Turbidity*

Logged By: ERIC EWS (Please Print)

Reviewed by: Sue Boles (Please Print)

Signature: [Signature]

Signature: [Signature] Date: 06/15/05



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Specimen Identification	Classification	LL	PL	PI	Cc	Cu
● LL5mw-003 9.6	Brown SILT ML	NP	NP	NP		

Specimen Identification	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
● LL5mw-003 9.6	2				0.0	2.5	97.5	

**GRAIN SIZE DISTRIBUTION**



Client: MKM Engineers, Inc.  
 Project: Characterization of RVAAP 14 AOCs  
 Location: Ravenna, Ohio  
 Number: 04001G-6

US GRAIN SIZE 04001-G.G.G.P.J. PRIMENG.GDT 12/29/04

# Field Sampling Report

Location ID: LL5mw-006 (10-12 ft)

Ravenna Army Ammunition Plant  
Characterization of 14 RVAAP AOCs

Date: 12-10-04

## Sampling Information

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

Sample Collection: 0845 hrs      Sample Type: Composite - MI - Grab      Location: Plotted on Map + Staked in Field  
 If MI, # of increments taken: \_\_\_\_\_      Estimated - Measured - Surveyed

Sample Depth: 10-12 FT (below surface)      Decon: Dedicated - Each Day - Each Location

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

**Sample Description**

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*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: \_\_\_\_\_

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

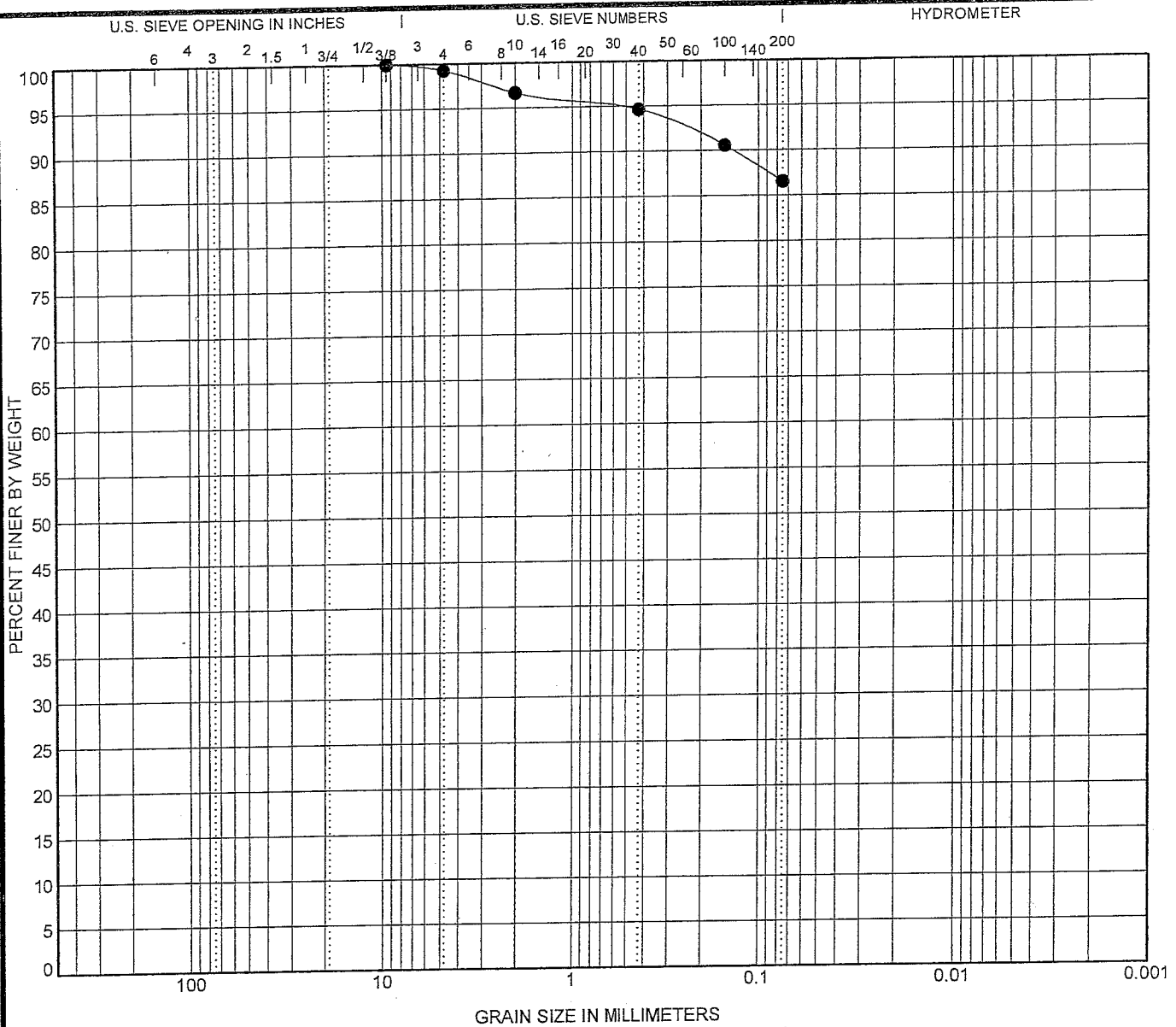
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Logged By: ERIC ELLIS (Please Print)  
 Signature: [Signature]

Reviewed by: Sue Boles (Please Print)  
 Signature: [Signature]      Date: 06/15/05



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Specimen Identification	Classification	LL	PL	PI	Cc	Cu
● LL5mw-006 11.6	Brown LEAN CLAY CL	29	21	8		

Specimen Identification	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
● LL5mw-006 11.6	9.5				0.7	12.7	86.5	

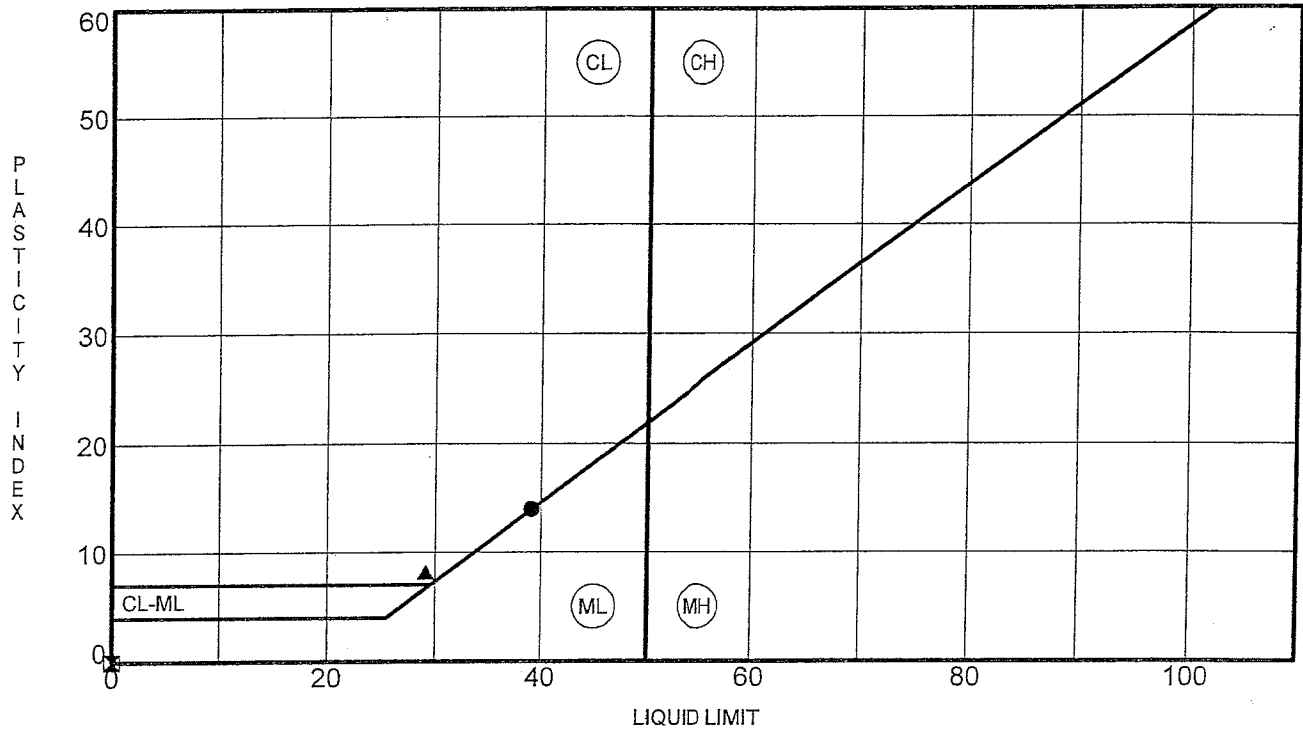
**GRAIN SIZE DISTRIBUTION**



Client: MKM Engineers, Inc.  
 Project: Characterization of RVAAP 14 AOCs  
 Location: Ravenna, Ohio  
 Number: 04001G-6

U.S. GRAIN SIZE 04001-SG-GPJ PRIMENG.GDT 12/29/04





Specimen Identification	LL	PL	PI	Fines	Classification
● LL5mw-001	7.6	39	25	14	88 LEAN CLAY CL
☒ LL5mw-003	9.6	NP	NP	NP	97 SILT ML
▲ LL5mw-006	11.6	29	21	8	87 LEAN CLAY CL

US ATTERBERG LIMITS 04001-6G.GPJ PRIMENG.GDT 12/29/04

**ATTERBERG LIMITS' RESULTS**

## Prime Engineering & Architecture

Project No.: 04001G  
Project: RVAAP  
Client: MKM Engineers  
Technician(s): Stephanie and Brandi  
Date: 12/22/2004

Sample No:	pH Reading:	Specific Gravity:
LL5mw-001	8.5	2.782
LL5mw-003	8.4	2.732
LL5mw-006	8.8	2.788

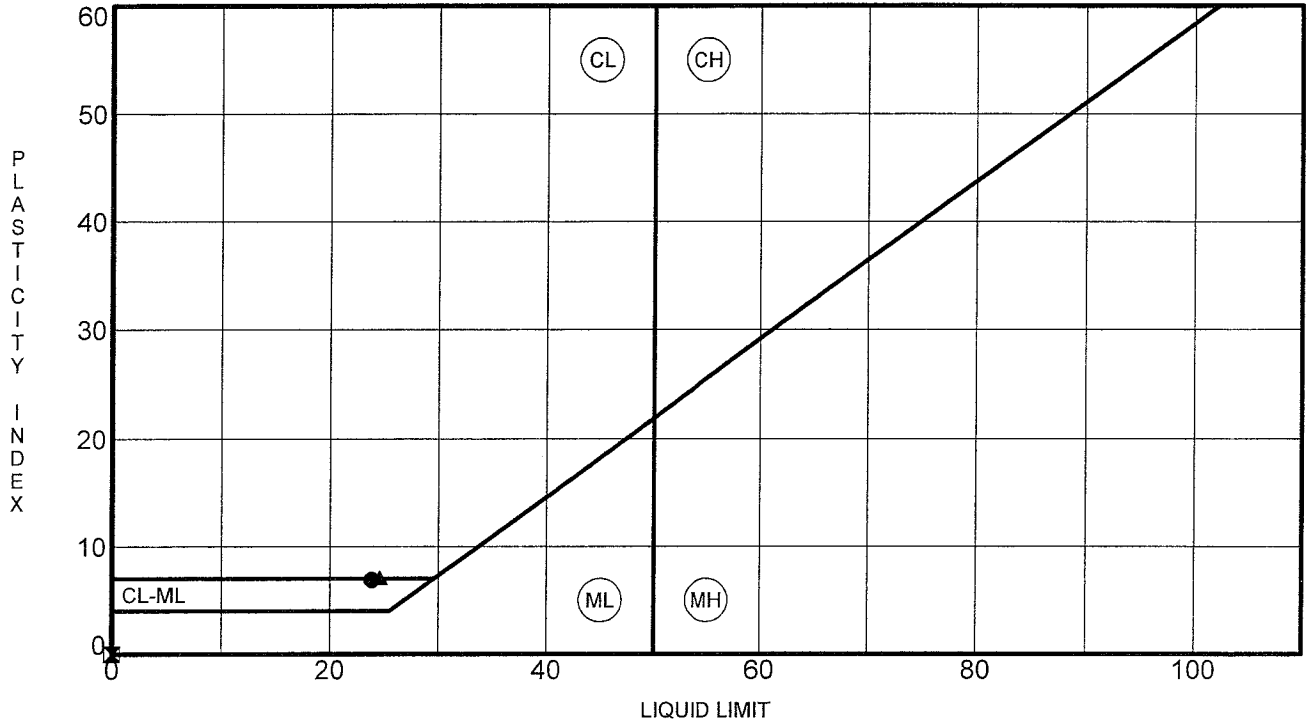
Sample Number	Depth (feet)	Moisture Content %	Liquid Limit %	Plastic Limit %	Plast. Index	Organic Content (%)	Agg. %	C Sand %	M Sand %	F Sand %	Silt %	Silt&Clay Comb.	Clay %	Soil Description	Class. Symbol
LL7mw-003	5.8	12.8	24	17	7		1.7	2.8	9.3	25.1		59.3		Brown SANDY SILTY CLAY, trace gravel	CL-ML
LL7mw-005	1.2	9.7	NP	NP	NP		64.8	2.4	15.5	14.0		3.3		Brown POORLY GRADED GRAVEL WITH SAND, trace fines	GP
LL7mw-006	3.8	13.9	25	18	7		15.9	2.4	8.3	22.3		51.2		Brown SANDY SILTY CLAY WITH GRAVEL	CL-ML

MKM US LAB USCS SUMMARY 04001-9C.GPJ PRIMENG.GDT 2/1/05

**PE** PRIME ENGINEERING & ARCHITECTURE INC.

**Summary of Laboratory Results**

Client: MKM Engineers  
 Project: RVAAP  
 Location: Ravenna, Ohio  
 Number: 04001G



Specimen Identification	LL	PL	PI	Fines	Classification	
● LL7mw-003	5.8	24	17	7	59	SANDY SILTY CLAY CL-ML
☒ LL7mw-005	1.2	NP	NP	NP	3	POORLY GRADED GRAVEL with SAND GP
▲ LL7mw-006	3.8	25	18	7	51	SANDY SILTY CLAY with GRAVEL CL-ML

**PRIME ENGINEERING & ARCHITECTURE INC.**

**ATTERBERG LIMITS' RESULTS**  
 Client: MKM Engineers  
 Project: RVAAP  
 Location: Ravenna, Ohio  
 Number: 04001G

# Field Sampling Report

Location ID: LL7 MW - 003 (4-6 ft)

Ravenna Army Ammunition Plant  
Characterization of 14 RVAAP AOCs

Date: 1-13-05

## Sampling Information

Source	Groundwater / Product	Surface Water	Soils / Sediments / Sludge
Method	Bailer	Sample Bottle	Scoop <span style="float: right;">Trowel</span>
	Pump	Bacon Bomb	Bowl <span style="float: right;">Hand Auger</span>
			Push Probe <span style="float: right;">Shelby Tube <input checked="" type="checkbox"/></span>
Type/Construction			
Miscellaneous	Well Purging Form Yes - No		

**Sample Collection:** 1100 hrs     
 **Sample Type:** Composite - MI - Grab     
 **Location:** Plotted on Map - Staked in Field  
 If MI, # of increments taken: \_\_\_\_\_     
 Estimated - Measured - Surveyed

**Sample Depth:** 4-6 FT (below surface)     
 **Decon:** Dedicated - Each Day - Each Location

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

### Sample Description

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### 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:*

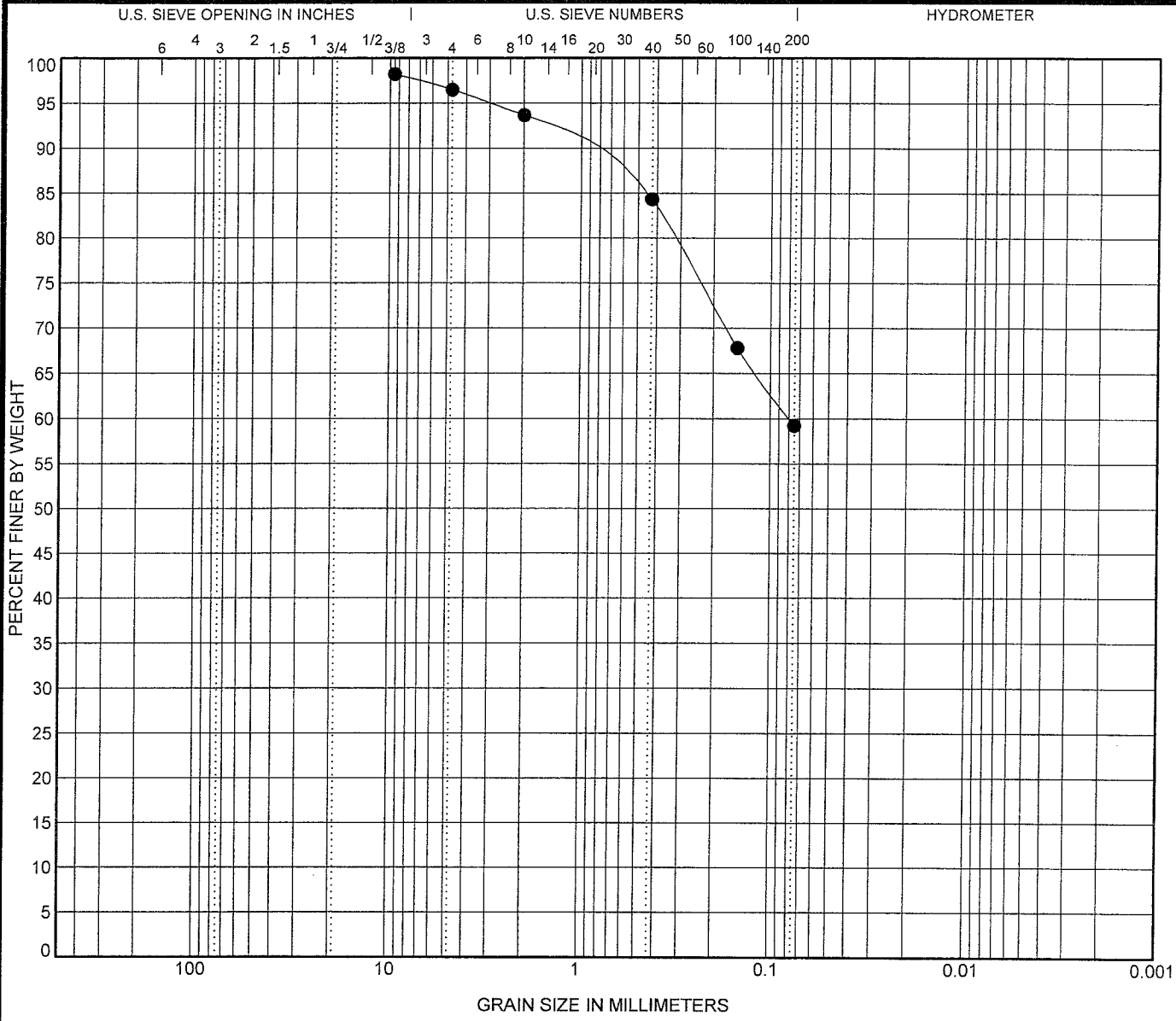
*Color Odor Sheen Turbidity*

Logged By: ERIC ELLIS (Please Print)

Reviewed by: Sue Boles (Please Print)

Signature: ERIC ELLIS

Signature: Sue Boles Date: 01/15/05



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Specimen Identification	Classification	LL	PL	PI	Cc	Cu
● LL7mw-003 5.8	SANDY SILTY CLAY CL-ML	24	17	7		

Specimen Identification	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
● LL7mw-003 5.8	9.5	0.08			1.7	37.3	59.3	

U.S. GRAIN SIZE: 04001-SG.GPJ PRIMENG.GDT 1/28/05

	<b>GRAIN SIZE DISTRIBUTION</b>	
	Client: MKM Engineers	
	Project: RVAAP	
	Location: Ravenna, Ohio	
		Number: 04001G

## Field Sampling Report

Location ID: LL7mw - 005 (0-2 ft)

Ravenna Army Ammunition Plant  
Characterization of 14 RVAAP AOCs

Date: 1-11-05

### Sampling Information

Source	Groundwater / Product	Surface Water	<b>Soils</b> Sediments / Sludge
<b>Method</b>	Bailer	Sample Bottle	Scoop <span style="float: right;">Trowel</span>
	Pump	Bacon Bomb	Bowl <span style="float: right;">Hand Auger</span>
			Push Probe <span style="float: right;">Shelby Tube <input checked="" type="checkbox"/></span>
<b>Type/Construction</b>			
<b>Miscellaneous</b> Well Purging Form Yes - No			

**Sample Collection:** 1420 hrs      **Sample Type:** Composite - MI - Grab      **Location:** Plotted on Map - Staked in Field  
 If MI, # of increments taken: \_\_\_\_\_      Estimated - Measured - Surveyed  
**Sample Depth:** 0-2 FT (below surface)      **Decon:** Dedicated - Each Day - Each Location

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

**Sample Description**

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*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

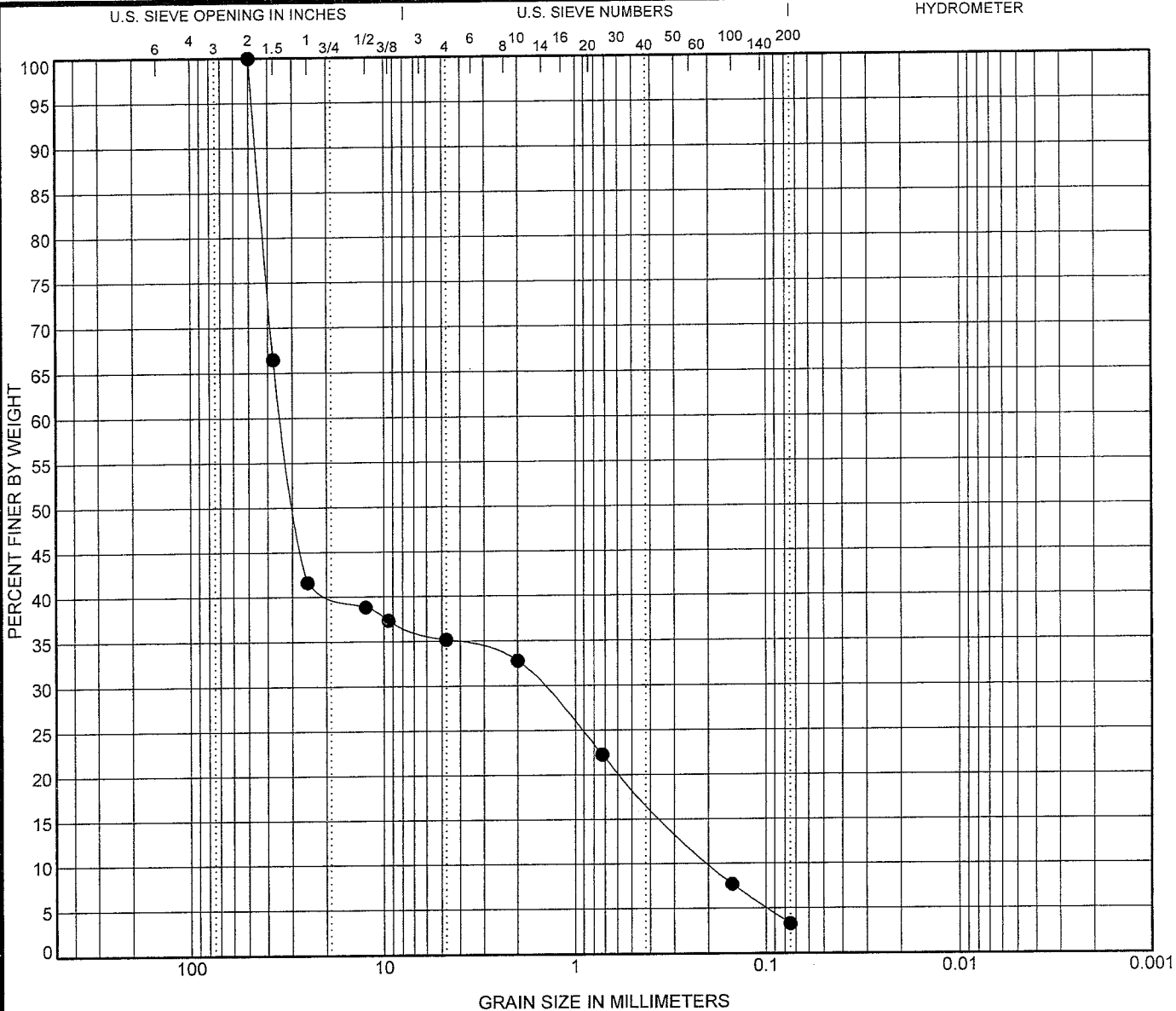
**Parameters:** Same as Above - As Listed

\_\_\_\_\_

\_\_\_\_\_

Logged By: ERIC EWIS (Please Print)  
Signature: [Signature]

Reviewed by: Sue Boles (Please Print)  
Signature: [Signature] Date: 06/15/05



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Specimen Identification	Classification	LL	PL	PI	Cc	Cu
● LL7mw-005 1.2	POORLY GRADED GRAVEL with SAND GP	NP	NP	NP	0.36	175.39

Specimen Identification	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
● LL7mw-005 1.2	50	33.736	1.528	0.192	64.8	31.9	3.3	

**GRAIN SIZE DISTRIBUTION**

Client: MKM Engineers  
 Project: RVAAP  
 Location: Ravenna, Ohio  
 Number: 04001G



US GRAIN SIZE 04001-9G.GPJ PRIMENG.GDT 1/28/05



## Field Sampling Report

Location ID: LL7mw-006 (2-4 ft)

Ravenna Army Ammunition Plant  
Characterization of 14 RVAAP AOCs

Date: 1-12-05

### Sampling Information

Source	Groundwater / Product	Surface Water	<u>Soils</u> Sediments / Sludge
<b>Method</b>	Bailer	Sample Bottle	Scoop <span style="float: right;">Trowel</span>
	Pump	Bacon Bomb	Bowl <span style="float: right;">Hand Auger</span>
			Push Probe <span style="float: right;">Shelby Tube</span> <input checked="" type="checkbox"/>
<b>Type/Construction</b>			
<b>Miscellaneous</b>	<b>Well Purging Form</b> Yes - No		

**Sample Collection:** 0845 hrs      **Sample Type:** Composite - MI - Grab      **Location:** Plotted on Map Staked in Field  
 If MI, # of increments taken: \_\_\_\_\_      Estimated - Measured - Surveyed  
**Sample Depth:** 2-4 FT (below surface)      **Decon:** Dedicated - Each Day - Each Location

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

**Sample Description**

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

*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:** \_\_\_\_\_

\_\_\_\_\_

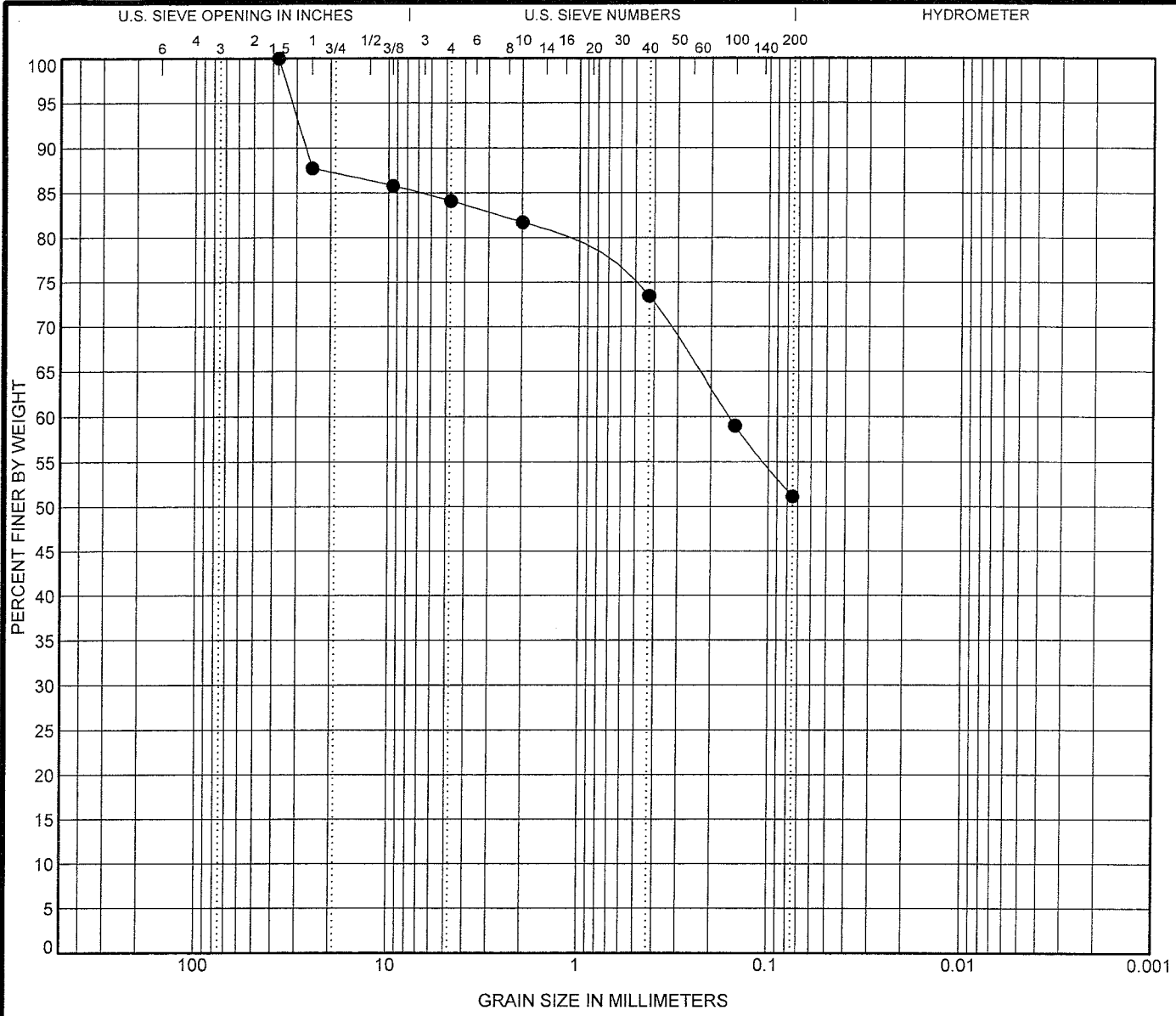
**QA/QC Provided:** MS/MSD - Duplicate - Trip Blanks - Field Blanks  
**Parameters:** Same as Above - As Listed

Logged By: ERIC ELLIS (Please Print)

Signature: [Signature]

Reviewed by: Sue Boles (Please Print)

Signature: [Signature] Date: 06/15/05



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Specimen Identification	Classification	LL	PL	PI	Cc	Cu
● LL7mw-006 3.8	SANDY SILTY CLAY with GRAVEL CL-ML	25	18	7		

Specimen Identification	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
● LL7mw-006 3.8	37.5	0.161			15.9	33.0	51.2	

**GRAIN SIZE DISTRIBUTION**



Client: MKM Engineers  
 Project: RVAAP  
 Location: Ravenna, Ohio  
 Number: 04001G

US GRAIN SIZE 04001-9G.GPJ PRIMENG.GDT 1/28/05

## Prime Engineering & Architecture

**Project No.:** 04001G  
**Project:** RVAAP  
**Client:** MKM Engineers  
**Technician(s):** Brandi & Eric  
**Date:** 1/27/2005

<b>Sample No:</b>	<b>pH Reading:</b>	<b>Specific Gravity:</b>
LL7mw-003	7.8	2.742
LL7mw-005	8.6	2.716
LL7mw-006	7.7	2.729

Sample Number	Depth (feet)	Moisture Content %	Liquid Limit %	Plastic Limit %	Plast. Index	Organic Content (%)	Agg. %	C Sand %	M Sand %	F Sand %	Silt %	Silt&Clay Comb.	Clay %	Soil Description	Class. Symbol
ASysd-024M	0.0	228.4	NP	NP	NP	9.3	0.0	0.5	4.8	8.4	60.9	86.3	25.4		
B12sd-023M	0.0	116.7				6.8	1.7	2.1	3.3	8.3	52.8	84.7	31.9	Gray SILT, little sand	ML
B12sd-024M	0.0	189.1	NP	NP	NP	11.7	0.7	9.5	4.4	7.2	54.6	78.2	23.7	Gray LEAN CLAY WITH SAND, trace gravel	CL
CBLsd-001M	0.0	45.2	NP	NP	NP	3.3	6.4	5.8	9.0	16.5	45.4	62.3	16.9	Dark gray SILT WITH SAND, trace gravel	ML
CBLsd-002M	0.0	34.9	NP	NP	NP	3.5	1.7	2.1	5.2	17.3	56.0	73.7	17.7	Brown SANDY SILT, trace gravel	ML
CBLsd-003M	0.0	62.2	NP	NP	NP	4	4.2	2.1	3.9	10.3	56.4	79.5	23.2	Brown SILT WITH SAND, trace gravel	ML
L12MW-242	9.5	19.1	NP	NP	NP		0.0	0.0	0.2	0.5		99.3		Brown SILT WITH SAND, trace gravel	ML
L12MW-242	13.5	27.5	NP	NP	NP		0.0	0.0	0.0	0.0		100.0		Gray SILT, trace sand	ML
L12MW-244	7.5	17.1	33	22	11		0.3	1.9	4.9	12.8		80.1		Gray SILT	ML
LL7sd-012M	0.0	36.8	NP	NP	NP	5.9	12.6	16.2	20.6	18.4	25.4	32.2	6.8	Brown LEAN CLAY WITH SAND, trace gravel	CL
LL7sd-029M	0.0	317.2	NP	NP	NP	39.8	2.1	3.7	13.8	27.7	44.5	52.7	8.2	Brown SILTY SAND, little gravel	SM
LL8sd-001M	0.0	274.4	NP	NP	NP	26.1	0.6	5.2	11.2	10.8	54.4	72.3	17.9	Dark brown SANDY SILT, trace gravel	ML
LL8sd-002M	0.0	281.4	NP	NP	NP	20.8	3.4	7.9	6.8	13.8	47.4	68.1	20.7	Dark brown SILT WITH SAND, trace gravel	ML
LL8sd-003M	0.0	140.8	NP	NP	NP	11.1	0.4	3.4	5.6	21.6	49.7	69.0	19.3	Gray SANDY SILT, trace gravel	ML
LL8sd-006M	0.0	60.9	NP	NP	NP	5.8	4.4	4.2	11.1	24.4	37.1	56.0	18.9	Gray SANDY SILT, trace gravel	ML

**PE** PRIME ENGINEERING & ARCHITECTURE INC.

**Summary of Laboratory Results**

Client: MKM Engineers, Inc.  
 Project: RVAAP  
 Location: Ravenna, Ohio  
 Number: 04001-3g

# Field Sampling Report

Location ID: LL7sd-012M-5D

Ravenna Army Ammunition Plant  
Characterization of 14 RVAAP AOCs

Date: 10 Nov 04

### Sampling Information

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

Sample Collection: 1340 hrs      Sample Type: Composite - MI - Grab      Location: Plotted on Map - Staked in Field  
 If MI, # of increments taken: 30  
 Sample Depth: 0-0.5 FT (below surface)      Decon: Dedicated - Each Day - Each Location  
 Estimated - Measured - Surveyed

Field Parameters (at time of sample)	Analytical Parameters			Other Parameters		
PID / FID Readings: Background: <u>0.0</u> ppm	VOC		TPH GRO	Corrosivity		
	SVOC		TPH DRO	Reactivity Sulfide/Cyanide		
Sample: <u>0.0</u> ppm	Explosives	✓	Chromium +6	Ignitability		
	Propellants	✓	Nitrate			
Water Level	TAL Metals	✓		<b>QA Samples</b>		
Temperature	Pesticides/PCBs			MS/MSD	Yes / No	(NA)
Sp. Conductance:	Cyanides			Duplicate ID	<u>EL7sd-012M-DUP</u> NA	
pH	TOC	✓		Equipment Rinse ID	(NA)	
Turbidity	Grain Size	✓		Trip Blank ID	(NA)	

**Sample Description**

No odor, No stainings, Collected from  
Sample outside doorway of Bldg 1B-1  
104R 2/2, moist, poorly sorted,  
completive, silt 60%, sand 35%  
clay 5%

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

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

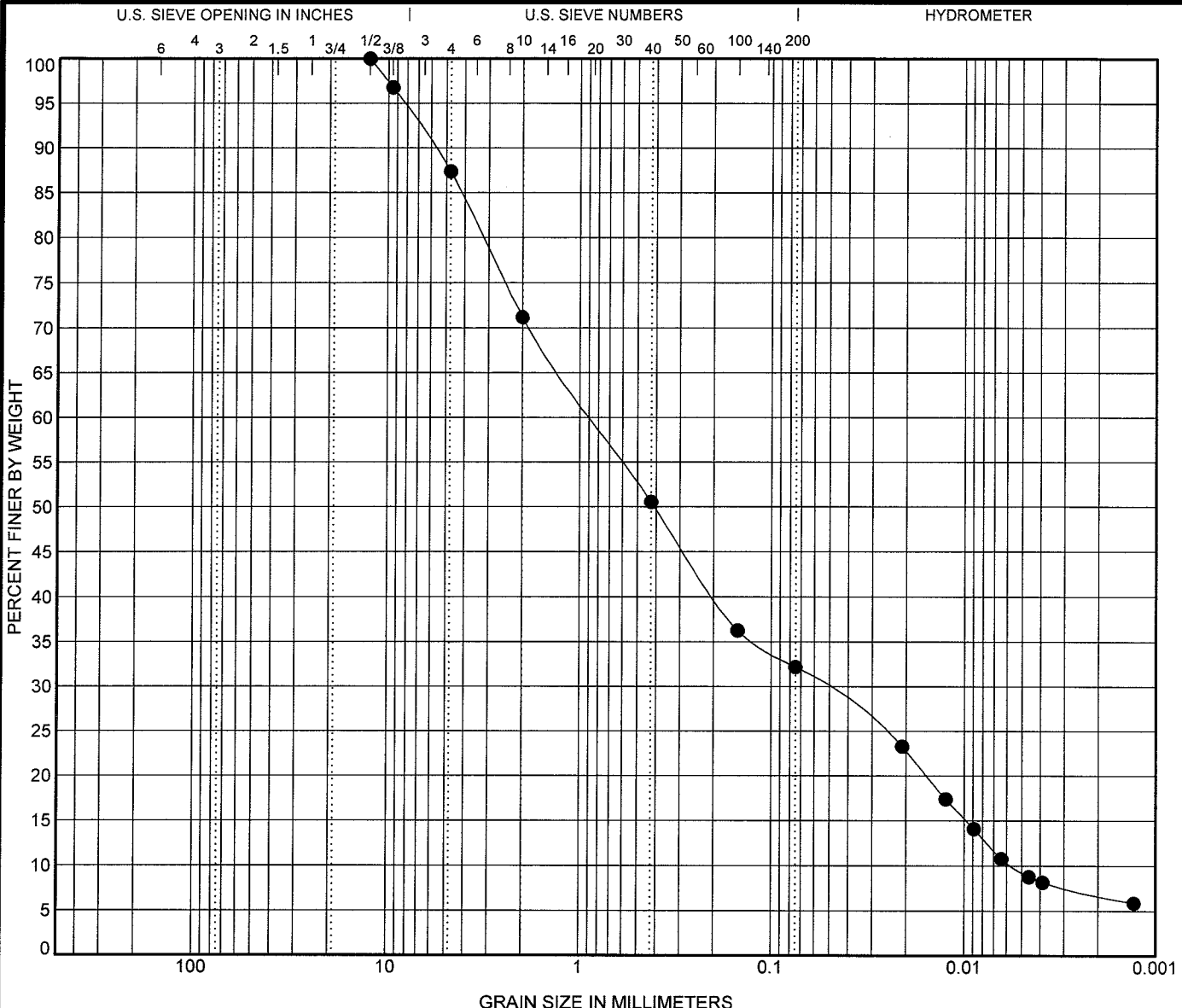
**Split Sample**

Split Sample ID: LL7sd-012M-5D

Name: John Vent (cover ex-5)  
 Agency/Company: USACE - Louisville  
 Address: 600 PUL MARTIN WITH 22 KING OF PAVA  
LOUISVILLE, KY 40202

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

Logged By: Michael Samolaj (Please Print)      Reviewed by: ERIC EWS (Please Print)  
 Signature: Michael Samolaj      Signature: ERIC EWS      Date: 2/4/05



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

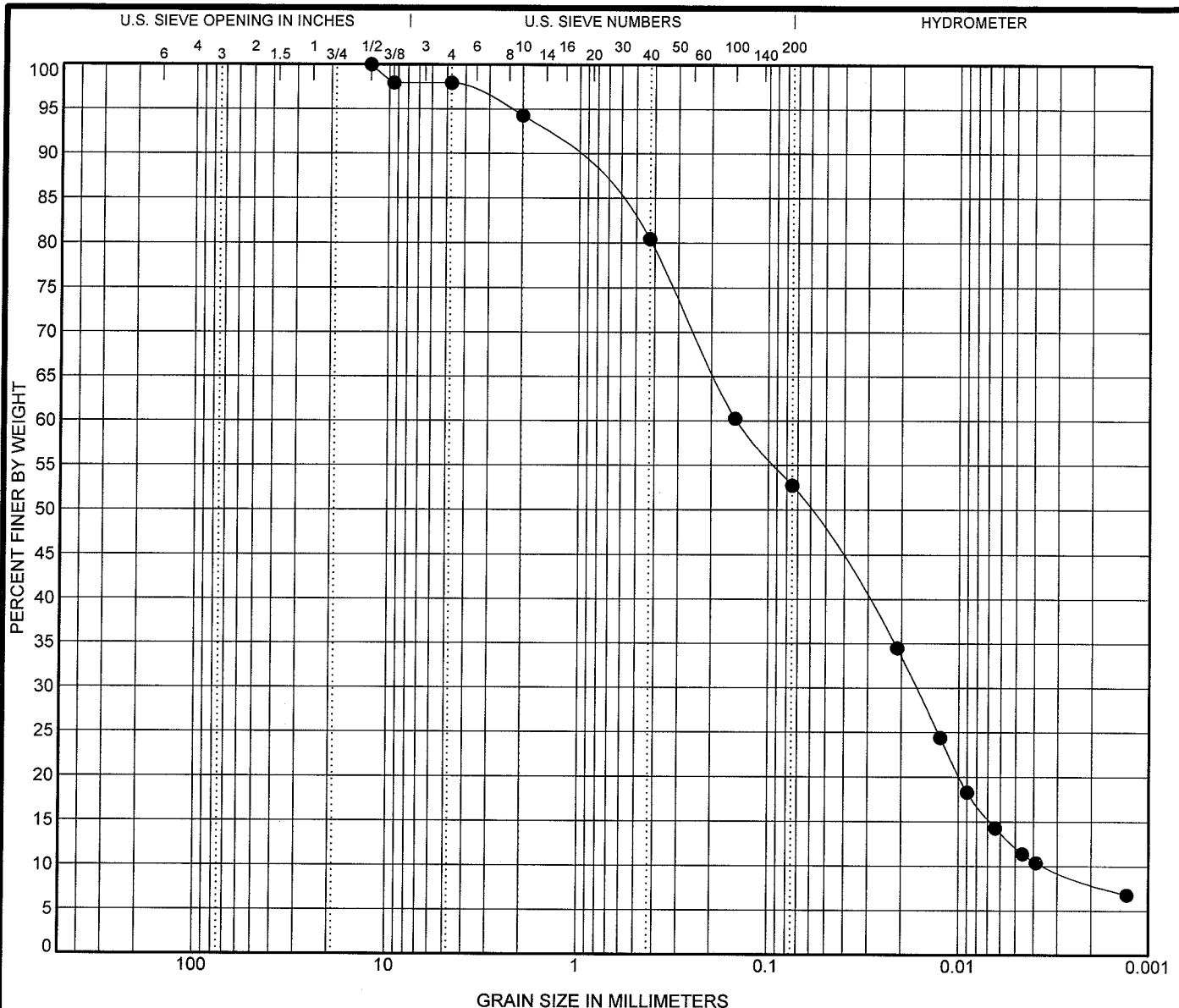
Specimen Identification	Classification	LL	PL	PI	Cc	Cu
● LL7sd-012M 0.0	Brown, SILTY SAND SM	NP	NP	NP	0.62	154.00

Specimen Identification	D100	D60	D30	D10	%Gravel	%Sand	%Silt&Clay	%Silt	%Clay
● LL7sd-012M 0.0	12.5	0.864	0.055	0.006	12.6	55.2		25.4	6.8

U.S. GRAIN SIZE USCS 04001-3G.GPJ PRIMENG.GDT 12/7/04



**GRAIN SIZE DISTRIBUTION**  
 Client: MKM Engineers, Inc.  
 Project: RVAAP  
 Location: Ravenna, Ohio  
 Number: 04001-3g



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Specimen Identification	Classification	LL	PL	PI	Cc	Cu
● LL7sd-029M 0.0	Dark brown, SANDY SILT ML	NP	NP	NP	0.55	42.42

Specimen Identification	D100	D60	D30	D10	%Gravel	%Sand	%Silt&Clay	%Silt	%Clay
● LL7sd-029M 0.0	12.5	0.146	0.017	0.003	2.1	45.2		44.5	8.2

U.S. GRAIN SIZE USCS 04001-3G.GPJ PRIMENG.GDT 12/7/04




**GRAIN SIZE DISTRIBUTION**

Client: MKM Engineers, Inc.  
 Project: RVAAP  
 Location: Ravenna, Ohio  
 Number: 04001-3g

Sample Number	Depth (feet)	Moisture Content %	Liquid Limit %	Plastic Limit %	Plast. Index	Organic Content (%)	Agg. %	C Sand %	M Sand %	F Sand %	Silt %	Silt & Clay Comb.	Clay %	Soil Description	Class. Symbol
LL8mw-001	11.6	17.3	26	20	6		35.3	16.5	10.8	17.1		20.3		Brown SILTY CLAYEY SAND WITH GRAVEL	SC-SM
LL8mw-006	9.6	13.0	22	17	5		19.9	20.5	13.3	29.3		17.1		Brown SILTY CLAYEY SAND WITH GRAVEL	SC-SM

MKM US LAB USCS SUMMARY\_04001-6G.GPJ\_PRIMENG.GDT\_12/29/04



**PRIME ENGINEERING  
& ARCHITECTURE INC.**

**Summary of Laboratory Results**

Client: MKM Engineers, Inc.  
 Project: Characterization of RVAAP 14 AOCs  
 Location: Ravenna, Ohio  
 Number: 04001G-6



# Field Sampling Report

Location ID: LL8mw-001 (10-12ft)

Ravenna Army Ammunition Plant  
Characterization of 14 RVAAP AOCs

Date: 12-08-04

## Sampling Information

Source	Groundwater / Product	Surface Water	<u>Soils</u> / Sediments / Sludge
Method	Bailer	Sample Bottle	Scoop <span style="float: right;">Trowel</span>
	Pump	Bacon Bomb	Bowl <span style="float: right;">Hand Auger</span>
			Push Probe <span style="float: right;">Shelby Tube <input checked="" type="checkbox"/></span>
Type/Construction			
Miscellaneous	Well Purging Form Yes - No		

Sample Collection: 0840 hrs

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

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

Sample Depth: 10-12 FT (below surface)

Decon: Dedicated - Each Day - Each Location

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

### Sample Description

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

### 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:*

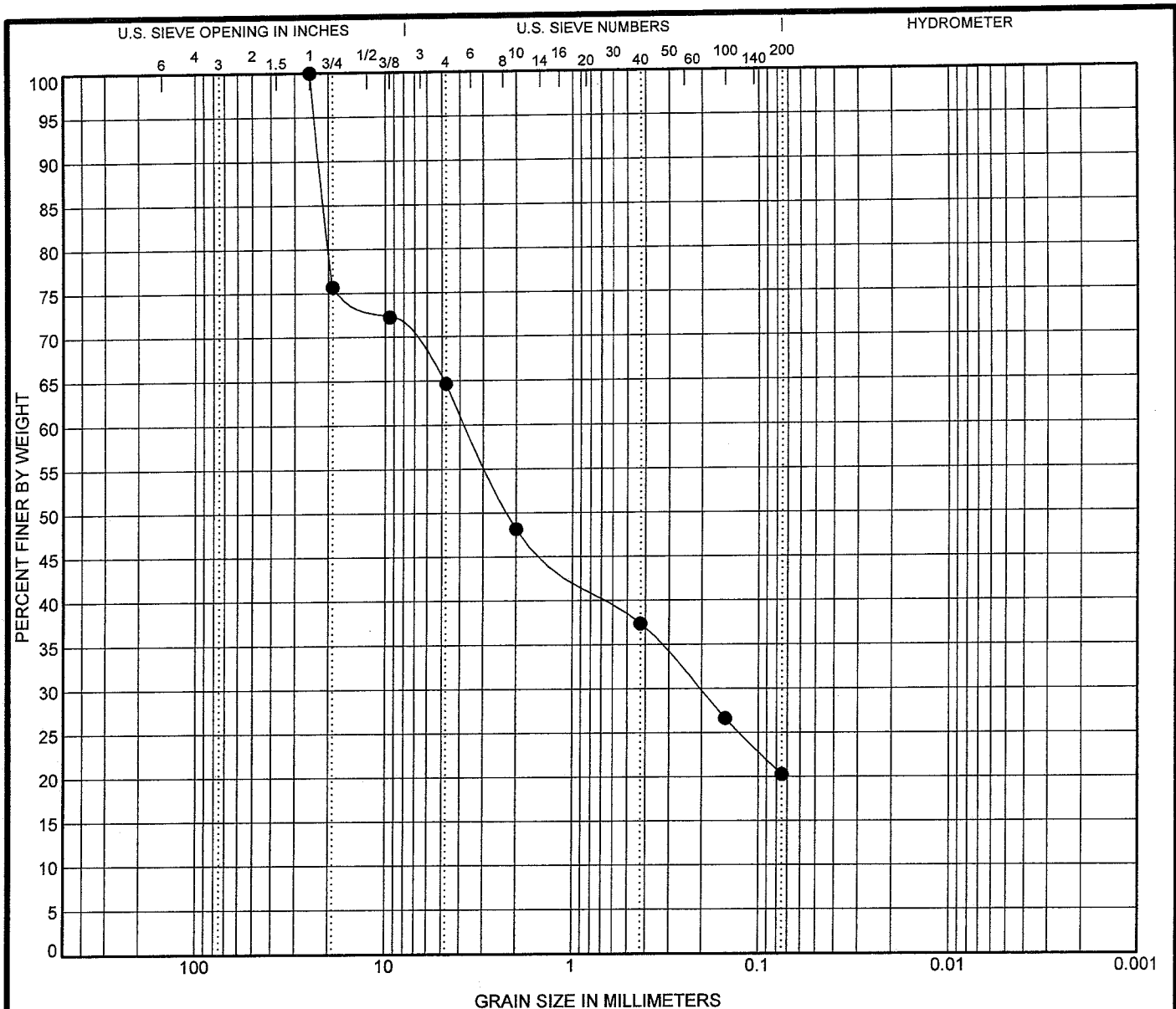
*Color Odor Sheen Turbidity*

Logged By: ERIC EWS (Please Print)

Reviewed by: Sue Boles (Please Print)

Signature: [Signature]

Signature: [Signature] Date: 06/15/05



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Specimen Identification	Classification	LL	PL	PI	Cc	Cu
● LL8mw-001 11.6	Brown, SILTY, CLAYEY SAND with GRAVEL SC-SM	26	20	6		

Specimen Identification	D100	D60	D30	D10	%Gravel	%Sand	%Silt&Clay	%Silt	%Clay
● LL8mw-001 11.6	25	3.718	0.208		35.3	44.4	20.3		

**GRAIN SIZE DISTRIBUTION**

Client: MKM Engineers, Inc.  
 Project: Characterization of RVAAP 14 AOCs  
 Location: Ravenna, Ohio  
 Number: 04001G-6



## Field Sampling Report

Location ID: LL8mw-006 (8-10 ft)

Ravenna Army Ammunition Plant  
Characterization of 14 RVAAP AOCs

Date: 12-07-04

### Sampling Information

Source	Groundwater / Product	Surface Water	<u>Soils</u> Sediments / Sludge
Method	Bailer	Sample Bottle	Scoop <span style="float: right;">Trowel</span>
	Pump	Bacon Bomb	Bowl <span style="float: right;">Hand Auger</span>
			Push Probe <span style="float: right;">Shelby Tube</span> <span style="float: right;">✓</span>
Type/Construction			
Miscellaneous	Well Purging Form Yes - No		

Sample Collection: 0040 hrs

Sample Type: Composite - MI - Grab

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

Sample Depth: 8-10 FT (below surface)

Decon: Dedicated - Each Day - Each Location

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

#### Sample Description

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*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: \_\_\_\_\_

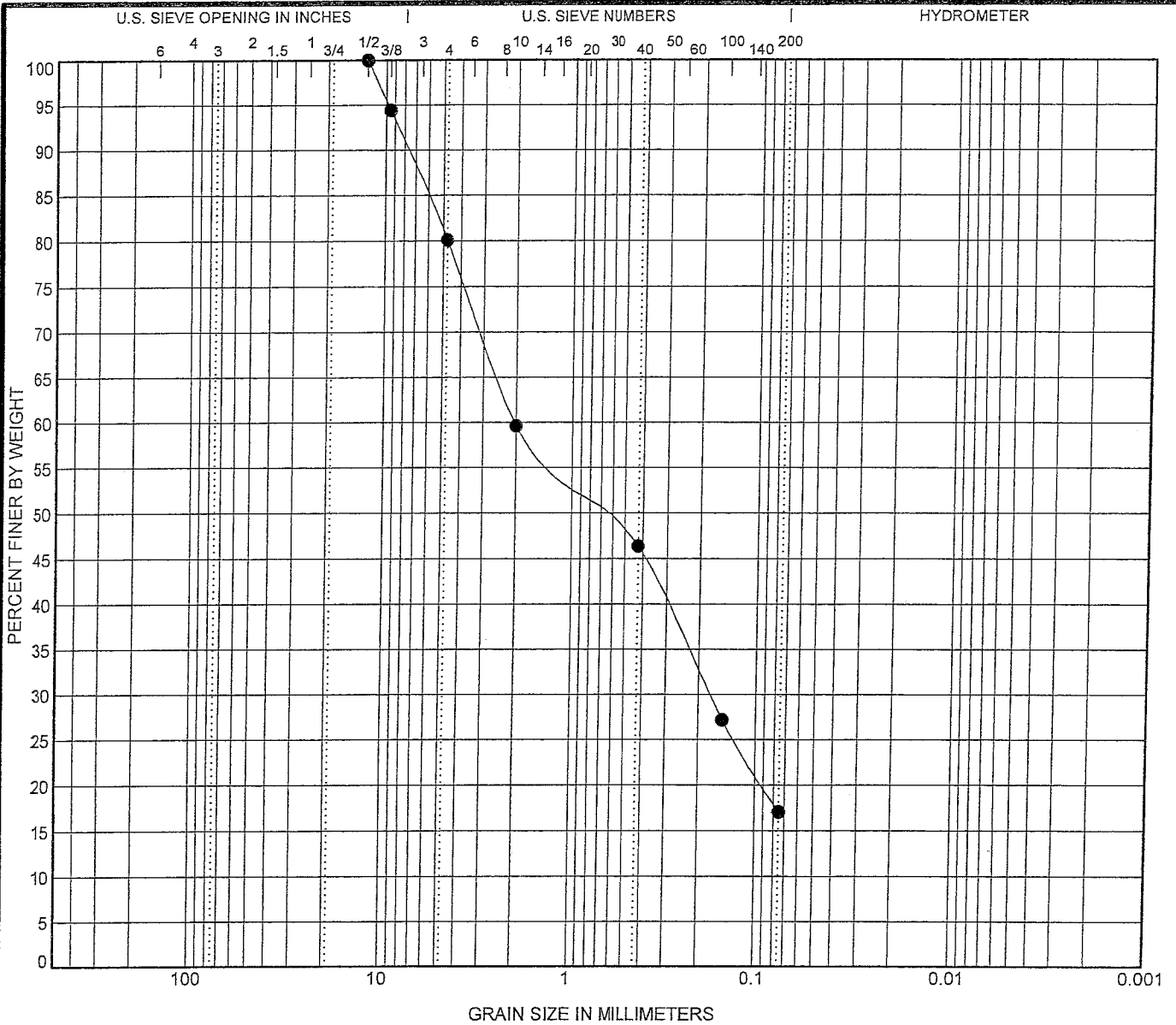
QA/QC Provided: MS/MSD - Duplicate - Trip Blanks - Field Blanks  
Parameters: Same as Above - As Listed

Logged By: ERIC EWS (Please Print)

Reviewed by: Sue Boles (Please Print)

Signature: [Signature]

Signature: [Signature] Date: 06/15/05



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Specimen Identification	Classification	LL	PL	PI	Cc	Cu
● LL8mw-006 9.6	Brown SILTY, CLAYEY SAND with GRAVEL SC-SM	22	17	5		

Specimen Identification	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
● LL8mw-006 9.6	12.5	2.029	0.175		19.9	63.1	17.1	

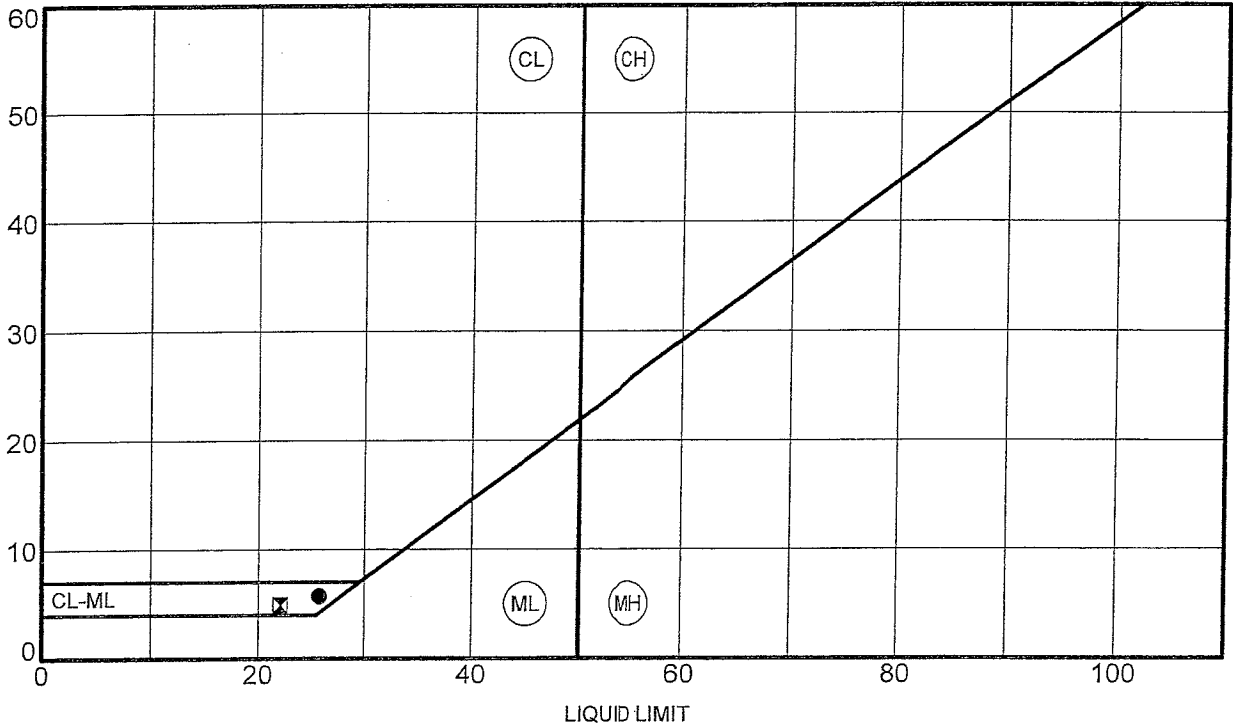
**GRAIN SIZE DISTRIBUTION**



Client: MKM Engineers, Inc.  
 Project: Characterization of RVAAP 14 AOCs  
 Location: Ravenna, Ohio  
 Number: 04001G-6

US GRAIN SIZE 04001-GG.GPJ PRIMENG.GDT 12/29/04

P L A S T I C I T Y I N D E X



Specimen Identification	LL	PL	PI	Fines	Classification
● LL8mw-001	11.6	26	20	6 20	SILTY, CLAYEY SAND with GRAVEL SC-SM
⊠ LL8mw-006	9.6	22	17	5 17	SILTY, CLAYEY SAND with GRAVEL SC-SM

US ATTERBERG LIMITS 04001-6G.GPJ PRIMENG.GDT 12/29/04

**PRIME ENGINEERING & ARCHITECTURE INC.**

**ATTERBERG LIMITS' RESULTS**

Client: MKM Engineers, Inc.  
 Project: Characterization of RVAAP 14 AOCs  
 Location: Ravenna, Ohio  
 Number: 04001G-6

## Prime Engineering & Architecture

**Project No.:** 04001G  
**Project:** RVAAP  
**Client:** MKM Engineers  
**Technician(s):** Stephanie and Brandi  
**Date:** 12/28/2004

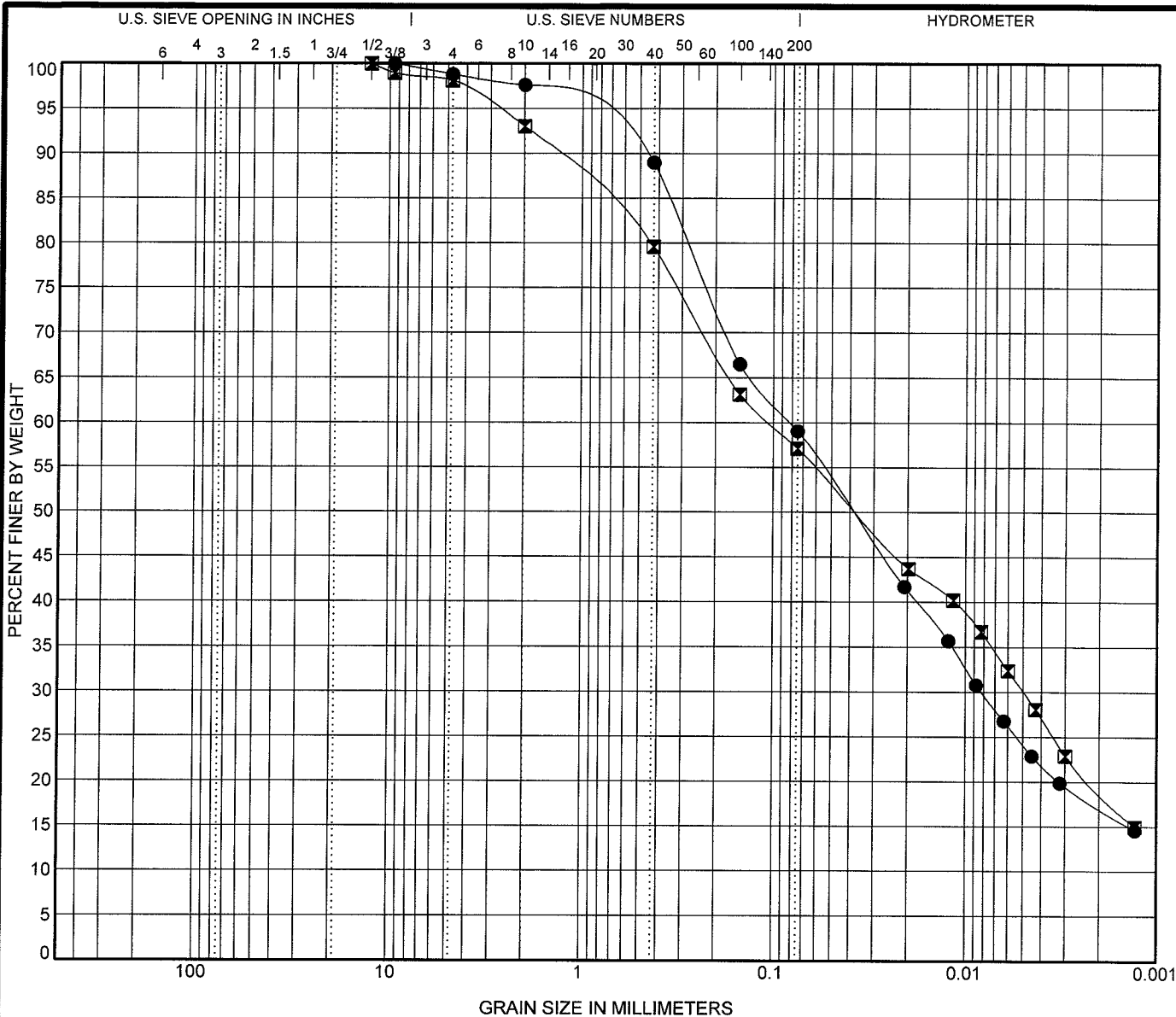
<b>Sample No:</b>	<b>pH Reading:</b>	<b>Specific Gravity:</b>
LL8mw-001	8.5	2.728
LL8mw-006	8.5	2.739

Sample Number	Depth (feet)	Moisture Content %	Liquid Limit %	Plastic Limit %	Plast. Index	Organic Content (%)	Agg. %	C Sand %	M Sand %	F Sand %	Silt %	Silt&Clay Comb.	Clay %	Soil Description	Class. Symbol
F16sd-001M	0.0	33.7				3.4	0.3	1.7	4.3	13.1	53.9	80.6	26.6	Brown LEAN CLAY WITH SAND, trace gravel	CL
F16sd-002M	0.0	193.0				9.7	1.0	1.0	4.7	16.5	52.4	76.8	24.4	Black LEAN CLAY WITH SAND, trace gravel	CL
LL8sd-004M	0.0	169.9	NP	NP	NP	15	1.2	1.2	8.6	29.9	41.9	59.1	17.1	Mottled brown and gray SANDY SILT, trace gravel	ML
LL8sd-005M	0.0	108.2	NP	NP	NP	8.2	1.9	5.1	13.4	22.4	38.1	57.1	19.1	Gray SANDY SILT, trace gravel	ML
LNWsd-043M	0.0	120.2	NP	NP	NP	5.8	0.8	1.2	8.7	25.3	49.3	63.9	14.6	Gray SANDY SILT, trace gravel	ML
LNWsd-044M	0.0	111.3	NP	NP	NP	7.5	0.0	1.0	13.8	28.3	41.2	56.9	15.8	Gray SANDY SILT	ML
LNWsd-045M	0.0	140.8	NP	NP	NP	9.4	1.0	3.0	13.7	19.2	46.8	63.2	16.4	Gray SANDY SILT, trace gravel	ML
LNWsd-046M	0.0	132.5	NP	NP	NP	7.9	0.0	0.3	5.2	17.4	57.6	77.1	19.4	Gray SILT WITH SAND	ML

MKM US LAB USCS SUMMARY 04001-2G.GPJ PRIMENG.GDT 12/1/04



**Summary of Laboratory Results**  
 Client: MKM Engineers  
 Project: RVAAP  
 Location: Ravenna, Ohio  
 Number: 04001-2G



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Specimen Identification	Classification	LL	PL	PI	Cc	Cu
● LL8sd-004M 0.0	Mottled brown and gray, SANDY SILT ML	NP	NP	NP		
☒ LL8sd-005M 0.0	Gray, SANDY SILT ML	NP	NP	NP		

Specimen Identification	D100	D60	D30	D10	%Gravel	%Sand	%Silt&Clay	%Silt	%Clay
● LL8sd-004M 0.0	9.5	0.082	0.008	1.2	39.7		41.9	17.1	
☒ LL8sd-005M 0.0	12.5	0.104	0.005	1.9	41.0		38.1	19.1	



**GRAIN SIZE DISTRIBUTION**  
 Client: MKM Engineers  
 Project: RVAAP  
 Location: Ravenna, Ohio  
 Number: 04001-2G

U.S. GRAIN SIZE USCS 04001-2G.GPJ PRIMENG.GDT 12/7/04



Location ID: LL85d-004M-SD  
 Date: 11-2-04

**Field Sampling Report**

Ravenna Army Ammunition Plant  
 Characterization of 14 RVAAP AOCs

**Sampling Information**

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

Sample Collection: 1430 hrs      Sample Type: Composite -  - Grab 30      Location:  Plotted on Map  Staked in Field  
 If MI, # of increments taken: 30  
 Sample Depth: 6" FT (below surface)      Decon: Dedicated - Each Day -  Each Location  
 Estimated - Measured - Surveyed

Field Parameters (at time of sample)	Analytical Parameters			Other Parameters		
PID / FID Readings: Background: <u>0.0</u> ppm	VOC		TPH GRO	/		
	SVOC	<input checked="" type="checkbox"/>	TPH DRO			
	Explosives	<input checked="" type="checkbox"/>	Chromium +6			
Sample: <u>0.0</u> ppm	Propellants	<input checked="" type="checkbox"/>	Nitrate			
	TAL Metals	<input checked="" type="checkbox"/>				
	Pesticides/PCBs	<input checked="" type="checkbox"/>				
Water Level			<b>QA Samples</b>			
Temperature			MS/MSD	Yes / No	NA	
Sp. Conductance:			Duplicate ID		NA	
pH			Equipment Rinse ID		NA	
Turbidity			Trip Blank ID		NA	

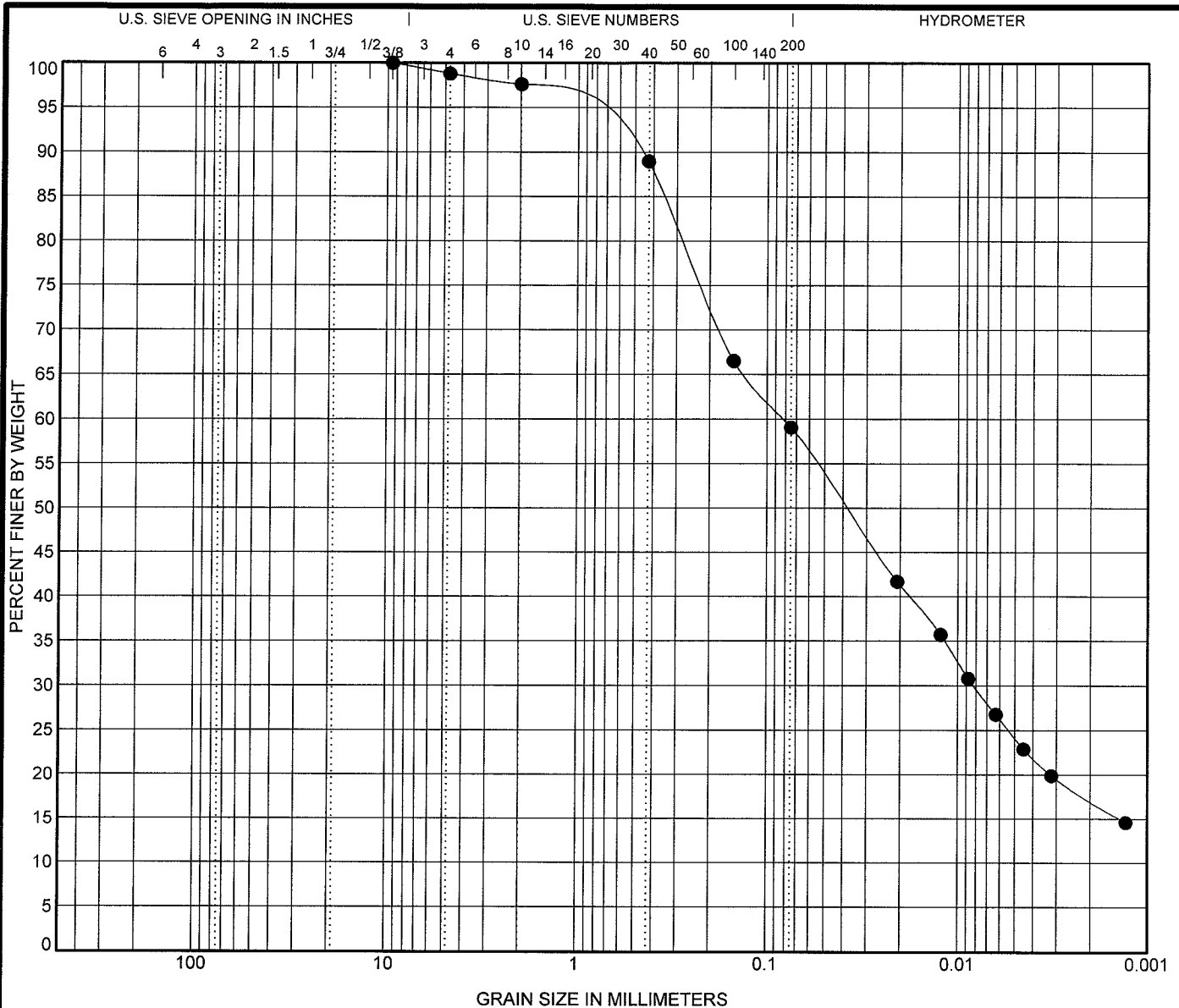
**Sample Description**  
No-odor, no staining  
104R 3/3, well sorted, med  
med plasticity, silt with some  
clay & sand 20%, 60%

**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: Stephen Sturgeon (Please Print)      Reviewed by: ERIC ELLIS (Please Print)  
 Signature: S. Sturgeon      Signature: EE      Date: 2/4/05



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

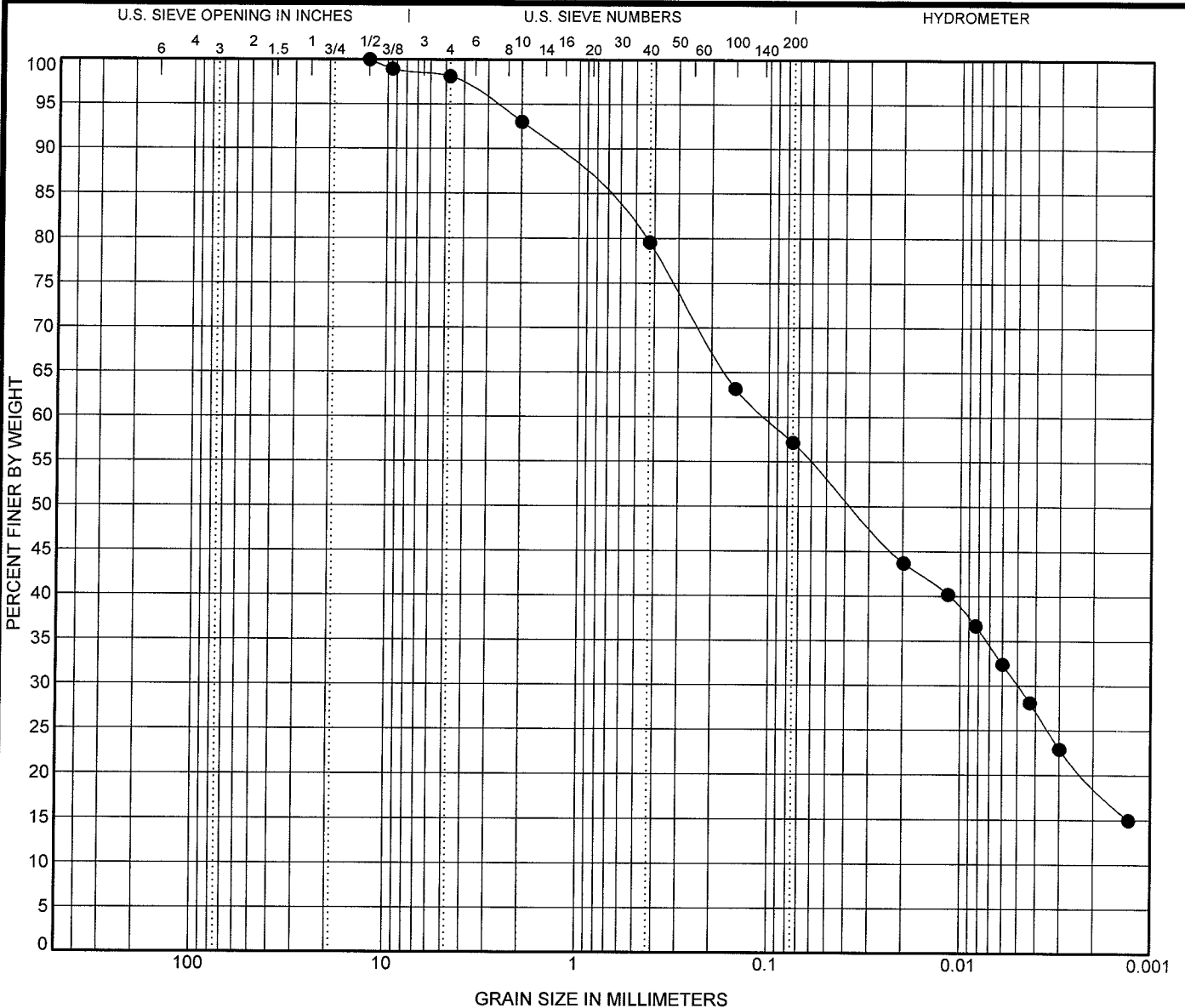
Specimen Identification	Classification	LL	PL	PI	Cc	Cu
● LL8sd-004M 0.0	Mottled brown and gray, SANDY SILT ML	NP	NP	NP		

Specimen Identification	D100	D60	D30	D10	%Gravel	%Sand	%Silt&Clay	%Silt	%Clay
● LL8sd-004M 0.0	9.5	0.082	0.008		1.2	39.7		41.9	17.1

**GRAIN SIZE DISTRIBUTION**  
 Client: MKM Engineers  
 Project: RVAAP  
 Location: Ravenna, Ohio  
 Number: 04001-2G



U.S. GRAIN SIZE - USCS 04001-2G-GPJ PRIMENG.GDT 12/7/04



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Specimen Identification	Classification	LL	PL	PI	Cc	Cu			
● LL8sd-005M 0.0	Gray, SANDY SILT ML	NP	NP	NP					
Specimen Identification	D100	D60	D30	D10	%Gravel	%Sand	%Silt&Clay	%Silt	%Clay
● LL8sd-005M 0.0	12.5	0.104	0.005		1.9	41.0		38.1	19.1

**GRAIN SIZE DISTRIBUTION**



Client: MKM Engineers  
 Project: RVAAP  
 Location: Ravenna, Ohio  
 Number: 04001-2G

U.S. GRAIN SIZE USCS 04001-2G.GPJ PRIMENG.GDT 12/7/04

Sample Number	Depth (feet)	Moisture Content %	Liquid Limit %	Plastic Limit %	Plast. Index	Organic Content (%)	Agg. %	C Sand %	M Sand %	F Sand %	Silt %	Silt & Clay Comb.	Clay %	Soil Description	Class. Symbol
ASysd-024M	0.0	228.4	NP	NP	NP	9.3	0.0	0.5	4.8	8.4	60.9	86.3	25.4	Gray SILT, little sand	ML
B12sd-023M	0.0	116.7				6.8	1.7	2.1	3.3	8.3	52.8	84.7	31.9	Gray LEAN CLAY WITH SAND, trace gravel	CL
B12sd-024M	0.0	189.1	NP	NP	NP	11.7	0.7	9.5	4.4	7.2	54.6	78.2	23.7	Dark gray SILT WITH SAND, trace gravel	ML
CBLsd-001M	0.0	45.2	NP	NP	NP	3.3	6.4	5.8	9.0	16.5	45.4	62.3	16.9	Brown SANDY SILT, trace gravel	ML
CBLsd-002M	0.0	34.9	NP	NP	NP	3.5	1.7	2.1	5.2	17.3	56.0	73.7	17.7	Brown SILT WITH SAND, trace gravel	ML
CBLsd-003M	0.0	62.2	NP	NP	NP	4	4.2	2.1	3.9	10.3	56.4	79.5	23.2	Brown SILT WITH SAND, trace gravel	ML
L12MW-242	9.5	19.1	NP	NP	NP		0.0	0.0	0.2	0.5		99.3		Gray SILT, trace sand	ML
L12MW-242	13.5	27.5	NP	NP	NP		0.0	0.0	0.0	0.0		100.0		Gray SILT	ML
L12MW-244	7.5	17.1	33	22	11		0.3	1.9	4.9	12.8		80.1		Brown LEAN CLAY WITH SAND, trace gravel	CL
LL7sd-012M	0.0	36.8	NP	NP	NP	5.9	12.6	16.2	20.6	18.4	25.4	32.2	6.8	Brown SILTY SAND, little gravel	SM
LL7sd-029M	0.0	317.2	NP	NP	NP	39.8	2.1	3.7	13.8	27.7	44.5	52.7	8.2	Dark brown SANDY SILT, trace gravel	ML
LL8sd-001M	0.0	274.4	NP	NP	NP	26.1	0.6	5.2	11.2	10.8	54.4	72.3	17.9	Dark brown SILT WITH SAND, trace gravel	ML
LL8sd-002M	0.0	281.4	NP	NP	NP	20.8	3.4	7.9	6.8	13.8	47.4	68.1	20.7	Gray SANDY SILT, trace gravel	ML
LL8sd-003M	0.0	140.8	NP	NP	NP	11.1	0.4	3.4	5.6	21.6	49.7	69.0	19.3	Gray SANDY SILT, trace gravel	ML
LL8sd-006M	0.0	60.9	NP	NP	NP	5.8	4.4	4.2	11.1	24.4	37.1	56.0	18.9	Gray SANDY SILT, trace gravel	ML

MKM US LAB USCS SUMMARY 04001-3G.GPJ PRIMENG.GDT 12/6/04



**Summary of Laboratory Results**

Client: MKM Engineers, Inc.  
 Project: RVAAP  
 Location: Ravenna, Ohio  
 Number: 04001-3g

# Field Sampling Report

Location ID: LL8sd-001M-sd

Ravenna Army Ammunition Plant  
Characterization of 14 RVAAP AOCs

Date: 11/08/04

## Sampling Information

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

Sample Collection: 1625 hrs      Sample Type: Composite - MI - Grab      Location: Plotted on Map Staked in Field  
 If MI, # of increments taken: 30  
 Sample Depth: 0-1 FT (below surface)      Decon: Dedicated - Each Day Each Location  
 Estimated - Measured - Surveyed

Field Parameters (at time of sample)	Analytical Parameters	Other Parameters	
PID / FID Readings: Background: <u>0.0</u> ppm	VOC	Corrosivity	
	SVOC	Reactivity Sulfide/Cyanide	
Sample: <u>0.0</u> ppm	Explosives	Ignitability	
	Propellants		
Water Level	TAL Metals	<b>QA Samples</b>	
Temperature	Pesticides/PCBs		MS/MSD
Sp. Conductance:	Cyanides		Duplicate ID
pH	TOC		Equipment Rinse ID
Turbidity	Grain Size	Trip Blank ID	

**Sample Description**  
no odors, no stain.  
(Same as 001D-sd)  
10YR 3/2, no odor, no stain  
wet, non plastic, poorly sorted  
sand & gravel with some  
silt & clay

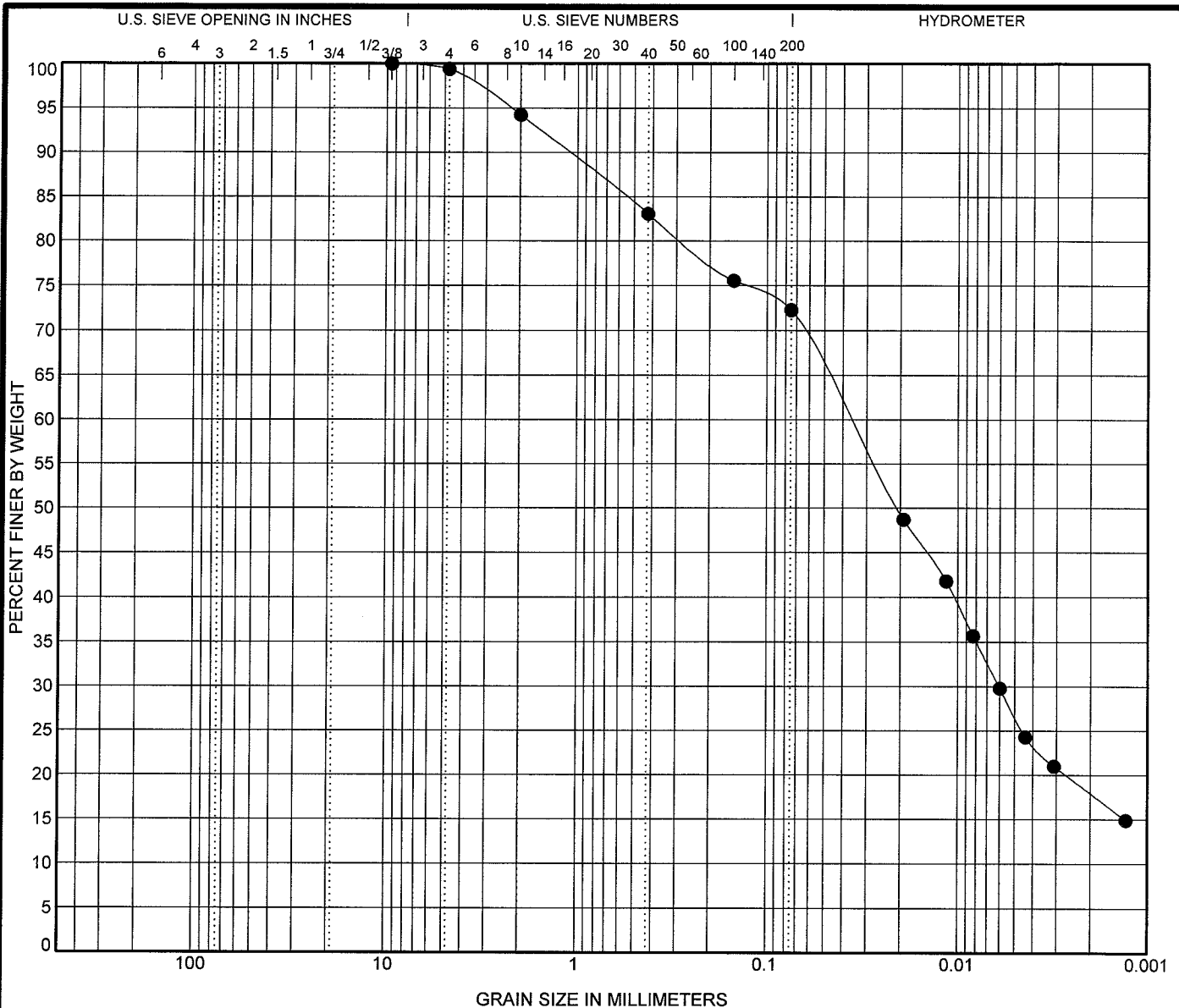
**Split Sample**

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

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

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

Logged By: Sudheer Gubba (Please Print)      Reviewed by: ERIC FUIS (Please Print)  
 Signature: [Signature]      Signature: [Signature]      Date: 11/4/05



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Specimen Identification	Classification	LL	PL	PI	Cc	Cu
● LL8sd-001M 0.0	Dark brown, SILT with SAND ML	NP	NP	NP		

Specimen Identification	D100	D60	D30	D10	%Gravel	%Sand	%Silt&Clay	%Silt	%Clay
● LL8sd-001M 0.0	9.5	0.037	0.006		0.6	27.1		54.4	17.9

U.S. GRAIN SIZE USCS 04001-3G.GPJ PRIMENG.GDT 12/7/04

<b>PRIME ENGINEERING &amp; ARCHITECTURE INC.</b>	<b>GRAIN SIZE DISTRIBUTION</b>	
	Client: MKM Engineers, Inc.	
	Project: RVAAP	
	Location: Ravenna, Ohio	
	Number: 04001-3g	

# Field Sampling Report

Location ID: LL8SD-002M-SD

Ravenna Army Ammunition Plant  
Characterization of 14 RVAAP AOCs

Date: 11/08/06

## Sampling Information

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

Sample Collection: 1100 hrs      Sample Type: Composite (MI) - Grab      Location: Plotted on Map - Staked in Field  
 If MI, # of increments taken: 30      Estimated - Measured - Surveyed  
 Sample Depth: 0-1 FT (below surface)      Decon: Dedicated - Each Day - (Each Location)

Field Parameters (at time of sample)	Analytical Parameters			Other Parameters		
PID / FID Readings: Background: <u>0.0</u> ppm <u>0.0</u>	VOC		TPH GRO	Corrosivity		
	SVOC		TPH DRO	Reactivity Sulfide/Cyanide		
	Explosives	<input checked="" type="checkbox"/>	Chromium +6	Ignitability		
Sample: _____ ppm	Propellants		Nitrate			
Water Level _____ FT	TAL Metals	<input checked="" type="checkbox"/>		<b>QA Samples</b>		
Temperature _____ °C	Pesticides/PCBs			MS/MSD	<input checked="" type="checkbox"/> Yes / No	NA
Sp. Conductance: _____ uMHOs	Cyanides			Duplicate ID	<u>LL8SD-002M-DUP</u>	NA
pH _____ units	TOC	<input checked="" type="checkbox"/>		Equipment Rinse ID		<u>(NA)</u>
Turbidity _____ N.T.U.	Grain Size	<input checked="" type="checkbox"/>		Trip Blank ID		<u>(NA)</u>

**Sample Description**

no odors, no staining  
12YR 3/2, met, non plastic

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

Water sample description should include:  
 Color    Odor    Sheen    Turbidity

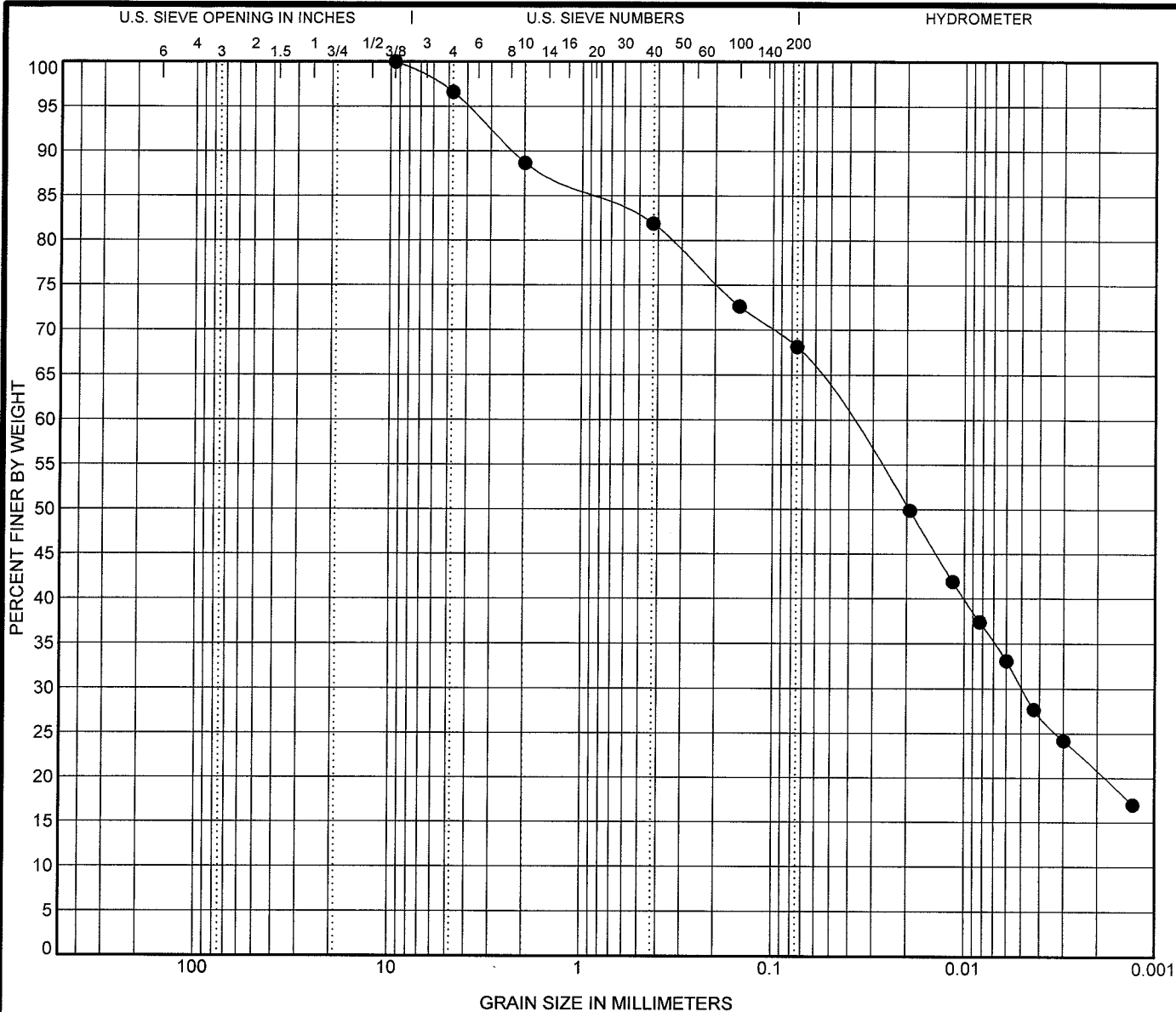
Split Sample

Split Sample ID: LL8SD-002M-SD

Name: JAN JENT (CERCL-56-80)  
 Agency/Company: USACE-WINDSVILLE  
 Address: 600 DR MARTIN LUTHER KING JR DRIVE  
WINDSVILLE, KY 40202

QA/QC Provided: MS/MSD - Duplicate - Trip Blanks - Field Blanks  
 Parameters: (Same as Above) - As Listed  
w/o TOC / GRAIN SIZE

Logged By: Sudheer Gubba (Please Print)      Reviewed by: ERIC ELLIS (Please Print)  
 Signature: [Signature]      Signature: [Signature]      Date: 2/4/05



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Specimen Identification	Classification	LL	PL	PI	Cc	Cu
● LL8sd-002M 0.0	Gray, SANDY SILT ML	NP	NP	NP		

Specimen Identification	D100	D60	D30	D10	%Gravel	%Sand	%Silt&Clay	%Silt	%Clay
● LL8sd-002M 0.0	9.5	0.041	0.005		3.4	28.5		47.4	20.7



### GRAIN SIZE DISTRIBUTION

Client: MKM Engineers, Inc.  
 Project: RVAAP  
 Location: Ravenna, Ohio  
 Number: 04001-3g

U.S. GRAIN SIZE USCS 04001-3G.GPJ PRIMENG.GDT 12/7/04



# Field Sampling Report

Location ID: 1185d-003M-SD

Ravenna Army Ammunition Plant  
Characterization of 14 RVAAP AOCs

Date: 11/06/04

## Sampling Information

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

Sample Collection: 1415 hrs <sup>56</sup> Sample Type: Composite MI Grab 30 Location: Plotted on Map Staked in Field  
 If MI, # of increments taken: 30  
 Sample Depth: 0-1 FT (below surface) Decon: Dedicated - Each Day - Each Location  
 Estimated - Measured - Surveyed

Field Parameters (at time of sample)	Analytical Parameters	Other Parameters
PID / FID Readings: Background: <u>0.0</u> ppm <u>0.2</u>	VOC	Corrosivity
	SVOC	Reactivity Sulfide/Cyanide
	Explosives <input checked="" type="checkbox"/>	Chromium +6
Sample: _____ ppm	Propellants	Nitrate
Water Level _____ FT	TAL Metals <input checked="" type="checkbox"/>	
Temperature _____ °C	Pesticides/PCBs	
Sp. Conductance: _____ uMHOs	Cyanides	
pH _____ units	TOC <input checked="" type="checkbox"/>	
Turbidity _____ N.T.U.	Grain Size <input checked="" type="checkbox"/>	
		<b>QA Samples</b>
		MS/MSD Yes / No NA
		Duplicate ID NA
		Equipment Rinse ID NA
		Trip Blank ID NA

**Sample Description**  
no odor, no stain  
1 1/2" x 3/4" , wet, nonplastic  
well sorted, clay with some silt

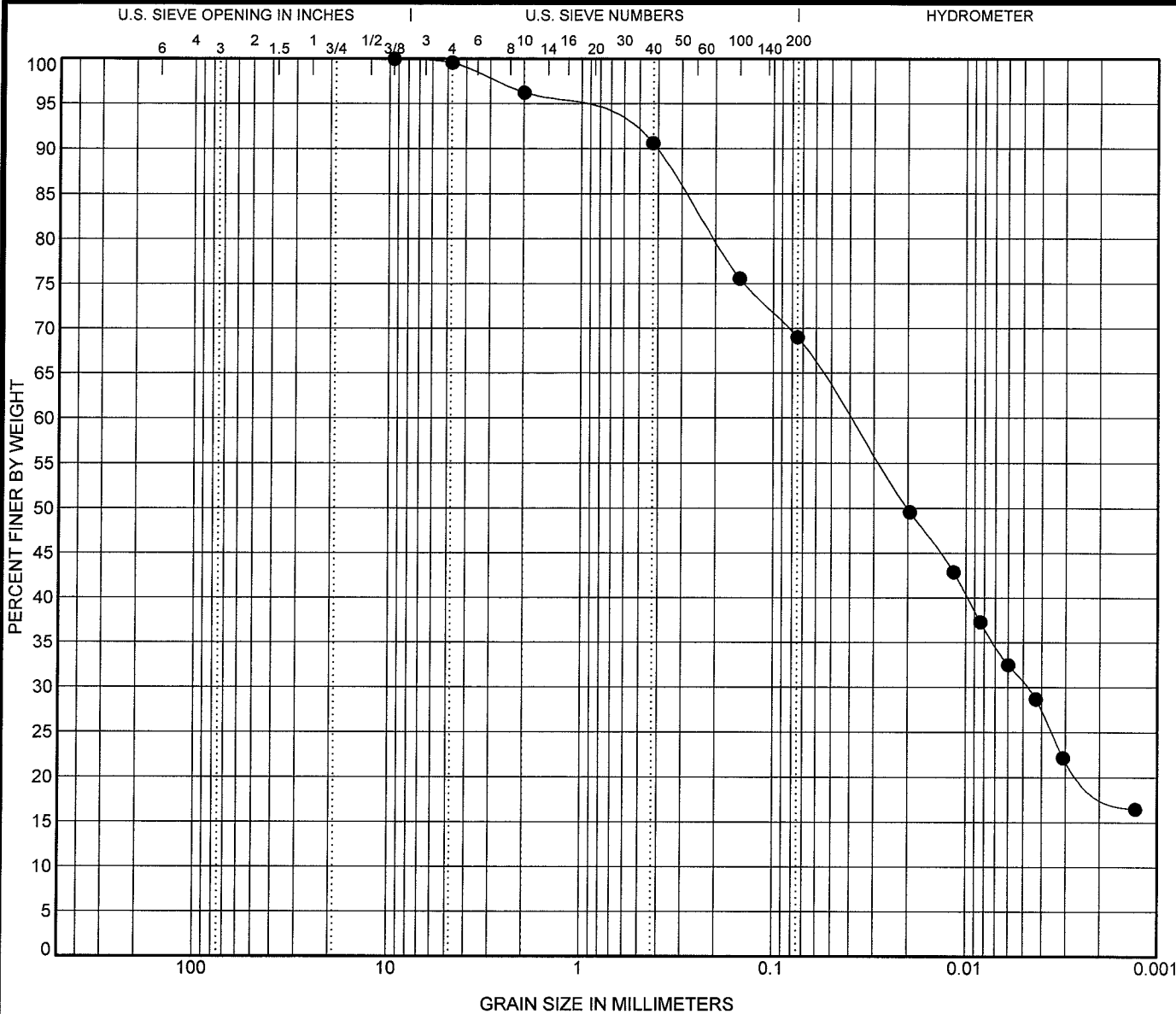
**Split Sample**

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

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

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

Logged By: Sudheer Gubky (Please Print) Reviewed by: Eric EUS (Please Print)  
 Signature: [Signature] Signature: [Signature] Date: 2/4/05



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Specimen Identification	Classification	LL	PL	PI	Cc	Cu
● LL8sd-003M 0.0	Gray, SANDY SILT ML	NP	NP	NP		

Specimen Identification	D100	D60	D30	D10	%Gravel	%Sand	%Silt&Clay	%Silt	%Clay
● LL8sd-003M 0.0	9.5	0.04	0.005		0.4	30.6		49.7	19.3

<b>PRIME ENGINEERING &amp; ARCHITECTURE INC.</b>	<b>GRAIN SIZE DISTRIBUTION</b>	
	Client: MKM Engineers, Inc.	
	Project: RVAAP	
	Location: Ravenna, Ohio	
	Number: 04001-3g	

U.S. GRAIN SIZE USCS 04001-3G.GPJ PRIMENG.GDT 12/7/04

Location ID: LL8sd-006M-sd

**Field Sampling Report**

Ravenna Army Ammunition Plant  
Characterization of 14 RVAAP AOCs

Date: 11/08/04

**Sampling Information**

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

Sample Collection: 6540 hrs      Sample Type: Composite - (MI) - Grab      Location: Plotted on Map (Staked in Field)  
 If MI, # of increments taken: 30      Estimated - Measured - Surveyed  
 Sample Depth: 0-1 FT (below surface)      Decon: Dedicated - Each Day - Each Location

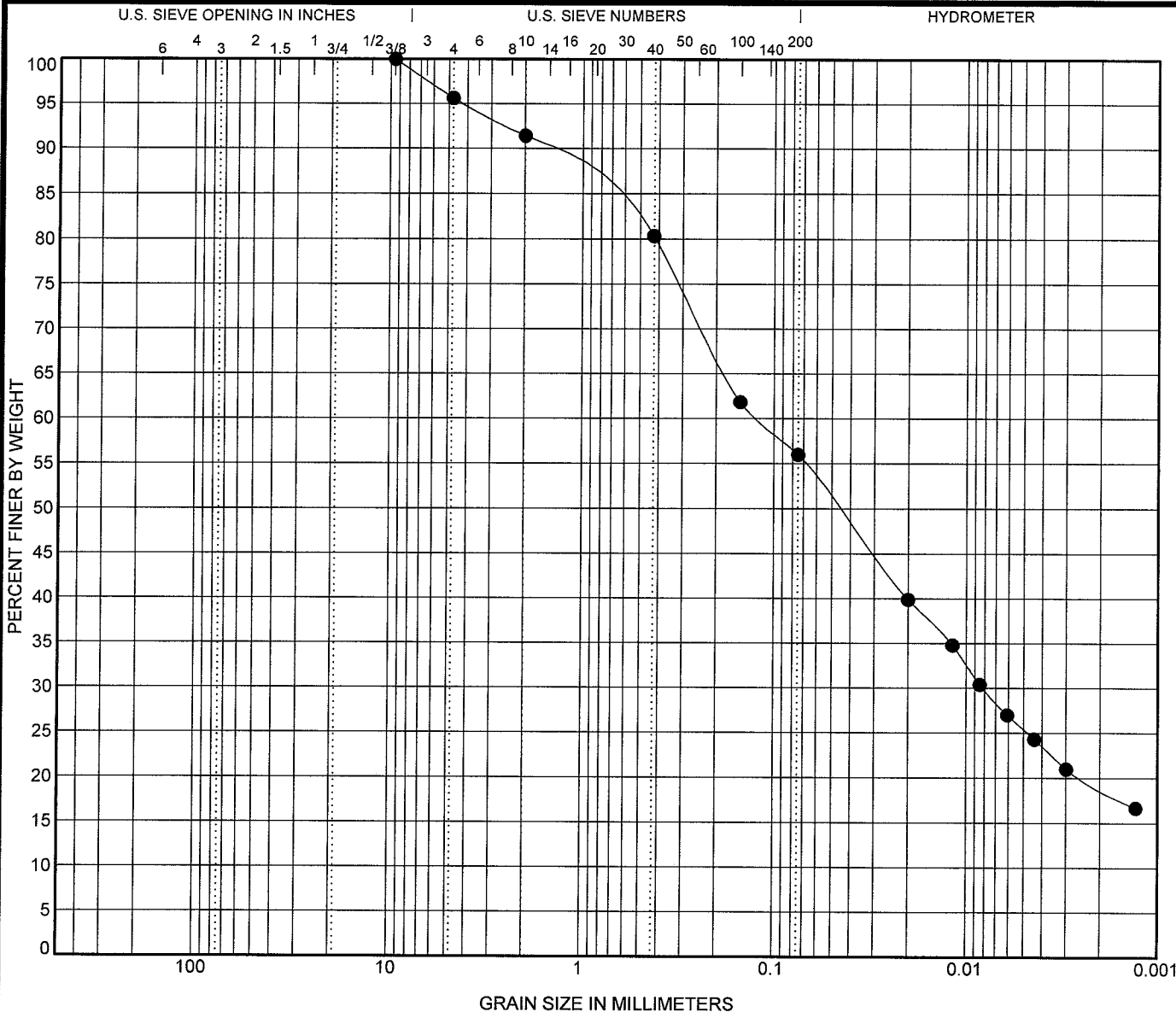
Field Parameters (at time of sample)	Analytical Parameters			Other Parameters		
PID / FID Readings: Background:      ppm	VOC		TPH GRO	Corrosivity		
	SVOC		TPH DRO	Reactivity Sulfide/Cyanide		
Sample:      ppm	Explosives	<input checked="" type="checkbox"/>	Chromium +6	Ignitability		
	Propellants		Nitrate			
Water Level      FT	TAL Metals	<input checked="" type="checkbox"/>		<b>QA Samples</b>		
Temperature      °C	Pesticides/PCBs					
Sp. Conductance:      uMHOs	Cyanides			Duplicate ID		NA
pH      units	TOC	<input checked="" type="checkbox"/>		<u>Equipment Rinse ID</u>	<u>LL8sd-006M-ER</u>	NA
Turbidity      N.T.U.	Grain Size	<input checked="" type="checkbox"/>		Trip Blank ID		NA

**Sample Description**  
no odor, no stain  
107R 3/1, met, poorly sorted  
non plastic, clay, silt & sand  
60%      20%      20%

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

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

Logged By: Sudheer Gubba (Please Print)      Reviewed by: ERIC EUIS (Please Print)  
 Signature: [Signature]      Signature: [Signature]      Date: 2/4/05



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Specimen Identification	Classification	LL	PL	PI	Cc	Cu
● LL8sd-006M 0.0	Gray, SANDY SILT ML	NP	NP	NP		

Specimen Identification	D100	D60	D30	D10	%Gravel	%Sand	%Silt&Clay	%Silt	%Clay
● LL8sd-006M 0.0	9.5	0.121	0.008		4.4	39.7		37.1	18.9

**GRAIN SIZE DISTRIBUTION**

Client: MKM Engineers, Inc.  
 Project: RVAAP  
 Location: Ravenna, Ohio  
 Number: 04001-3g

U.S. GRAIN SIZE USCS 04001-3G.GPJ PRIMENG.GDT 12/7/04

MKM US LAB USCS SUMMARY 04001-5G.GPJ PRIMENG.GDT 12/17/04

Sample Number	Depth (feet)	Moisture Content %	Liquid Limit %	Plastic Limit %	Plast. Index	Organic Content (%)	Agg. %	C Sand %	M Sand %	F Sand %	Silt %	Silt & Clay Comb.	Clay %	Soil Description	Class. Symbol
LL8mw-004	7.5	16.0	38	23	14		0.6	1.2	4.1	22.2		72.0		Brown LEAN CLAY WITH SAND (CL), trace gravel	CL

**PE PRIME ENGINEERING & ARCHITECTURE INC.**

**Summary of Laboratory Results**

Client: MKM Engineers, Inc.  
 Project: RVAAP  
 Location: Ravenna, Ohio  
 Number: 04001G-5

# Field Sampling Report

Location ID: LL8mw-004(6-8f)

Ravenna Army Ammunition Plant  
Characterization of 14 RVAAP AOCs

Date: 12-06-04

## Sampling Information

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

Sample Collection: 1250 hrs      Sample Type: Composite - MI - Grab      Location: Plotted on Map Staked in Field  
 If MI, # of increments taken: \_\_\_\_\_      Estimated - Measured - Surveyed  
 Sample Depth: 6-8 FT (below surface)      Decon: Dedicated - Each Day - Each Location

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

**Sample Description**

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*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: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

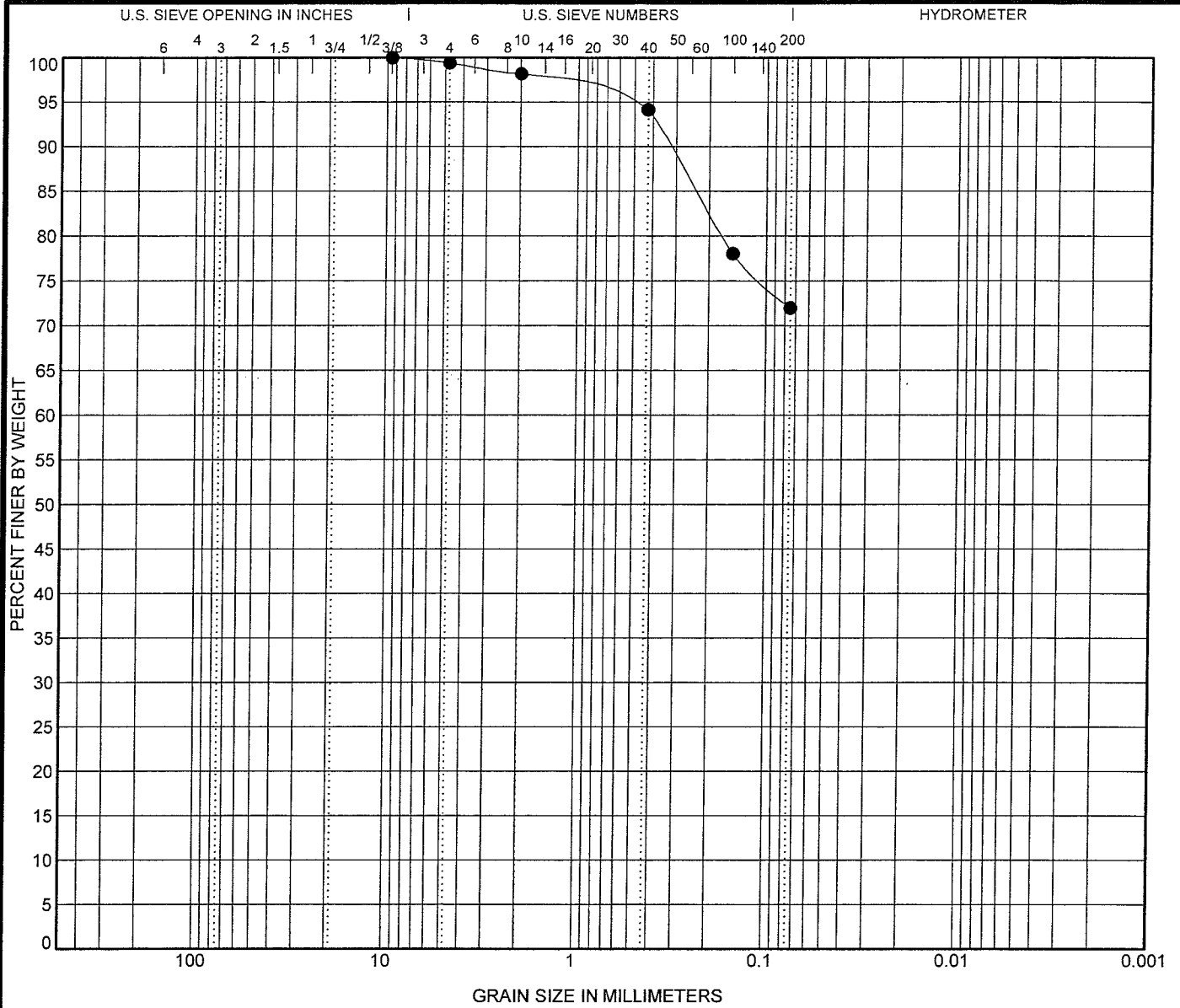
QA/QC Provided: MS/MSD - Duplicate - Trip Blanks - Field Blanks  
 Parameters: Same as Above - As Listed

\_\_\_\_\_

\_\_\_\_\_

Logged By: ERIC ELLIS (Please Print)      Reviewed by: Sue Boles (Please Print)

Signature: [Signature]      Signature: [Signature]      Date: 06/15/05



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Specimen Identification	Classification	LL	PL	PI	Cc	Cu
● LL8mw-004 7.5	LEAN CLAY with SAND CL	38	23	15		

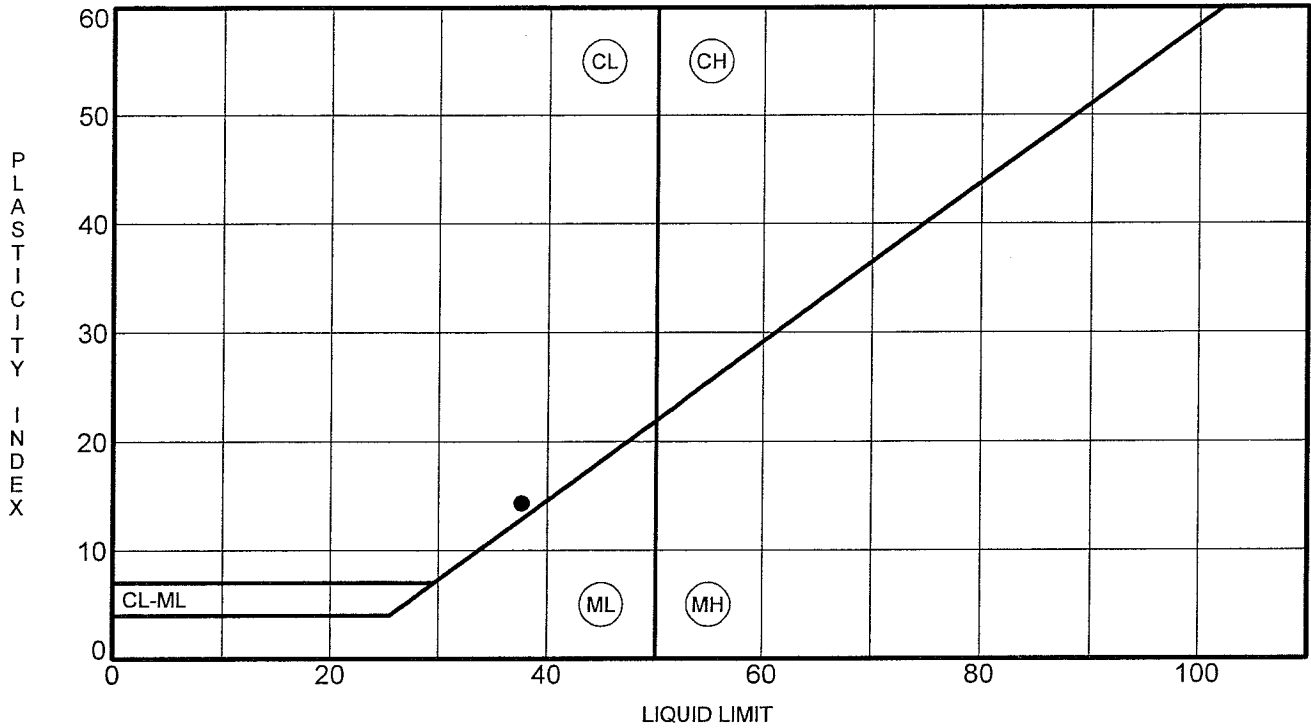
Specimen Identification	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
● LL8mw-004 7.5	9.5				0.6	27.4	72.0	

**GRAIN SIZE DISTRIBUTION**



Client: MKM Engineers, Inc.  
 Project: RVAAP  
 Location: Ravenna, Ohio  
 Number: 04001G-5

US GRAIN SIZE 04001-5G.GPJ PRIMENG.GDT 12/17/04



Specimen Identification		LL	PL	PI	Fines	Classification	
●	LL8mw-004	7.5	38	23	15	72	LEAN CLAY with SAND CL

US ATTERBERG LIMITS 04001-5G.GPJ PRIMENG.GDT 12/17/04



### ATTERBERG LIMITS' RESULTS

Client: MKM Engineers, Inc.  
 Project: RVAAP  
 Location: Ravenna, Ohio  
 Number: 04001G-5



## Prime Engineering & Architecture

**Project No.:** 04001G  
**Project:** RVAAP  
**Client:** MKM Engineers  
**Technician(s):** Stephanie and Brandi  
**Date:** 12/17/2004

<b>Sample No:</b>	<b>pH Reading:</b>	<b>Specific Gravity:</b>
LL8mw-004	8.1	2.775

MKM US LAB USCS SUMMARY 04001-7G.GPJ PRIMENG.GDT 1/4/05

Sample Number	Depth (feet)	Moisture Content %	Liquid Limit %	Plastic Limit %	Plast. Index	Organic Content (%)	Agg. %	C Sand %	M Sand %	F Sand %	Silt %	Silt & Clay Comb.	Clay %	Soil Description	Class. Symbol
L10mw-001	7.7	15.7	23	20	3		4.3	2.8	6.6	16.0		70.2		Brown SILT WITH SAND, trace gravel	ML

**PE** PRIME ENGINEERING & ARCHITECTURE INC.

**Summary of Laboratory Results**

Client: MKM Engineers, Inc.  
 Project: Characterization of RVAAP 14 AOCs  
 Location: Ravenna, Ohio  
 Number: 04001-7G

# Field Sampling Report

Location ID: 40mw-001 (6-8 ft)

Ravenna Army Ammunition Plant  
Characterization of 14 RVAAP AOCs

Date: 12-16-04

## Sampling Information

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

Sample Collection: 1545 hrs      Sample Type: Composite - MI - Grab      Location: Plotted on Map & Staked in Field  
 If MI, # of increments taken: \_\_\_\_\_      Estimated - Measured - Surveyed  
 Sample Depth: 6-8 FT (below surface)      Decon: Dedicated - Each Day - Each Location

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

### Sample Description

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*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: \_\_\_\_\_

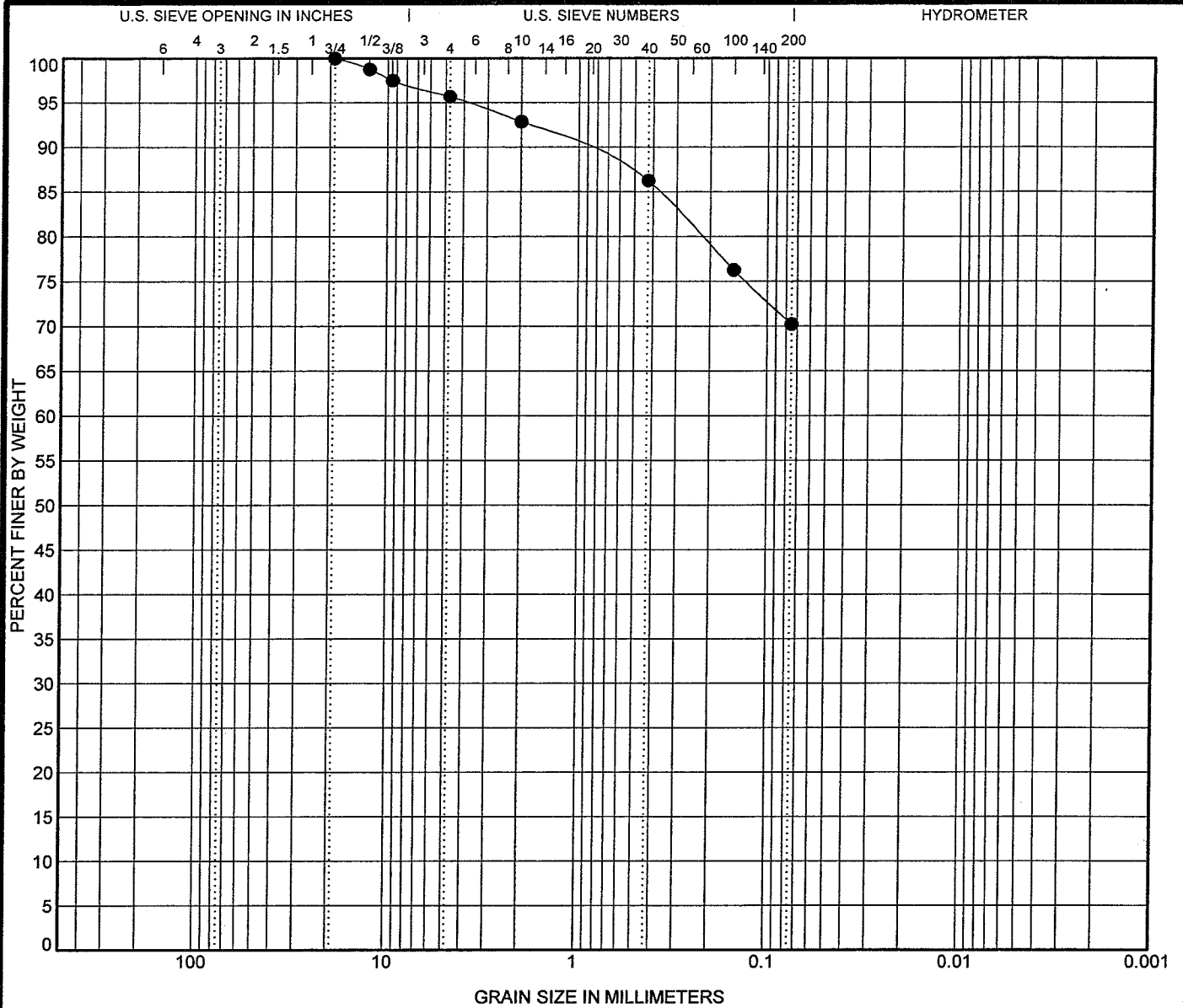
**QA/QC Provided:** MS/MSD - Duplicate - Trip Blanks - Field Blanks  
**Parameters:** Same as Above - As Listed

Logged By: DAVID K. EARNEST (Please Print)

Signature: David K. Earnest

Reviewed by: Sue Boles (Please Print)

Signature: Sue Boles      Date: 06/15/05



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Specimen Identification	Classification	LL	PL	PI	Cc	Cu
● L10mw-001 7.7	Brown SILT with SAND ML	23	20	3		

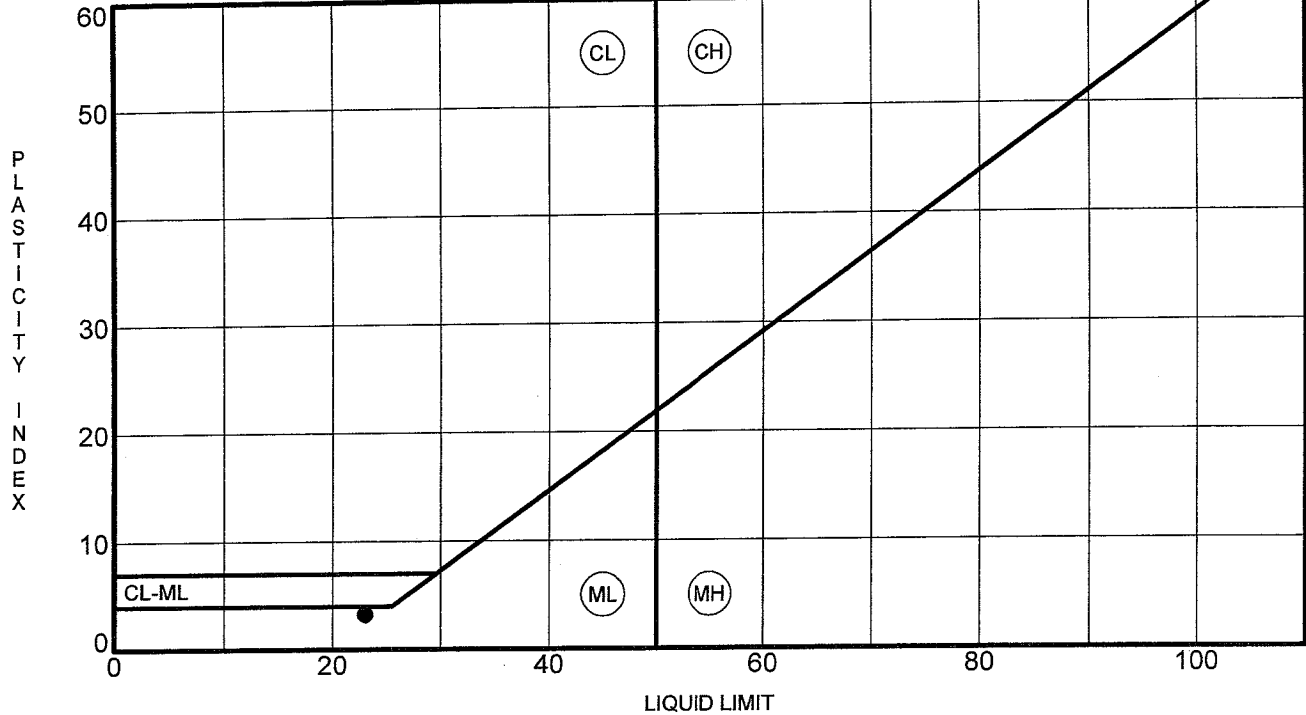
Specimen Identification	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
● L10mw-001 7.7	19				4.3	25.5	70.2	

**GRAIN SIZE DISTRIBUTION**



Client: MKM Engineers, Inc.  
 Project: Characterization of RVAAP 14 AOCs  
 Location: Ravenna, Ohio  
 Number: 04001-7G

US GRAIN SIZE 04001-7G.GPJ PRIMENG.GDT 1/4/05



Specimen Identification	LL	PL	PI	Fines	Classification
● L10mw-001	23	20	3	70	SILT with SAND ML



**ATTERBERG LIMITS' RESULTS**

Client: MKM Engineers, Inc.  
 Project: Characterization of RVAAP 14 AOCs  
 Location: Ravenna, Ohio  
 Number: 04001-7G

# Prime Engineering & Architecture

**Project No.:** 04001G  
**Project:** RVAAP  
**Client:** MKM Engineers  
**Technician(s):** Stephanie and Brandi  
**Date:** 1/4/2005

<b>Sample No:</b>	<b>pH Reading:</b>	<b>Specific Gravity:</b>
L10mw-001	10.07	2.725

Sample Number	Depth (feet)	Moisture Content %	Liquid Limit %	Plastic Limit %	Plast. Index	Organic Content (%)	Agg. %	C Sand %	M Sand %	F Sand %	Silt %	Silt & Clay Comb.	Clay %	Soil Description	Class. Symbol
L10mw-004	9.7	14.2	20	17	3		2.2	2.6	11.0	27.1		57.2		Brown SANDY SILT, trace gravel	ML
L10mw-005	5.7	15.2	28	18	9		5.1	2.6	7.2	19.1		66.0		Brown SANDY LEAN CLAY, trace gravel	CL

MKM, US LAB USCS SUMMARY 04001-8G.GPJ PRIMENG.GDT 1/19/05

**PE** PRIME ENGINEERING & ARCHITECTURE INC.

**Summary of Laboratory Results**

Client: MKM Engineers, Inc.  
 Project: Characterization of RVAAP 14 AOC's  
 Location: Ravenna, Ohio  
 Number: 04001G

## Field Sampling Report

Location ID: L10mw-004 (8-10 ft)

Ravenna Army Ammunition Plant  
Characterization of 14 RVAAP AOCs

Date: 1-05-05

### Sampling Information

Source	Groundwater / Product	Surface Water	<u>Soils</u> / Sediments / Sludge
Method	Bailer	Sample Bottle	Scoop <span style="float: right;">Trowel</span>
	Pump	Bacon Bomb	Bowl <span style="float: right;">Hand Auger</span>
			Push Probe <span style="float: right;">Shelby Tube</span> <input checked="" type="checkbox"/>
Type/Construction			
Miscellaneous	Well Purging Form Yes - No		

Sample Collection: 1245 hrs      Sample Type: Composite - MI - Grab      Location: Plotted on Map - Staked in Field  
If MI, # of increments taken: \_\_\_\_\_  
Estimated - Measured - Surveyed

Sample Depth: 8-10 FT (below surface)      Decon: Dedicated - Each Day - Each Location

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

#### Sample Description

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

*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

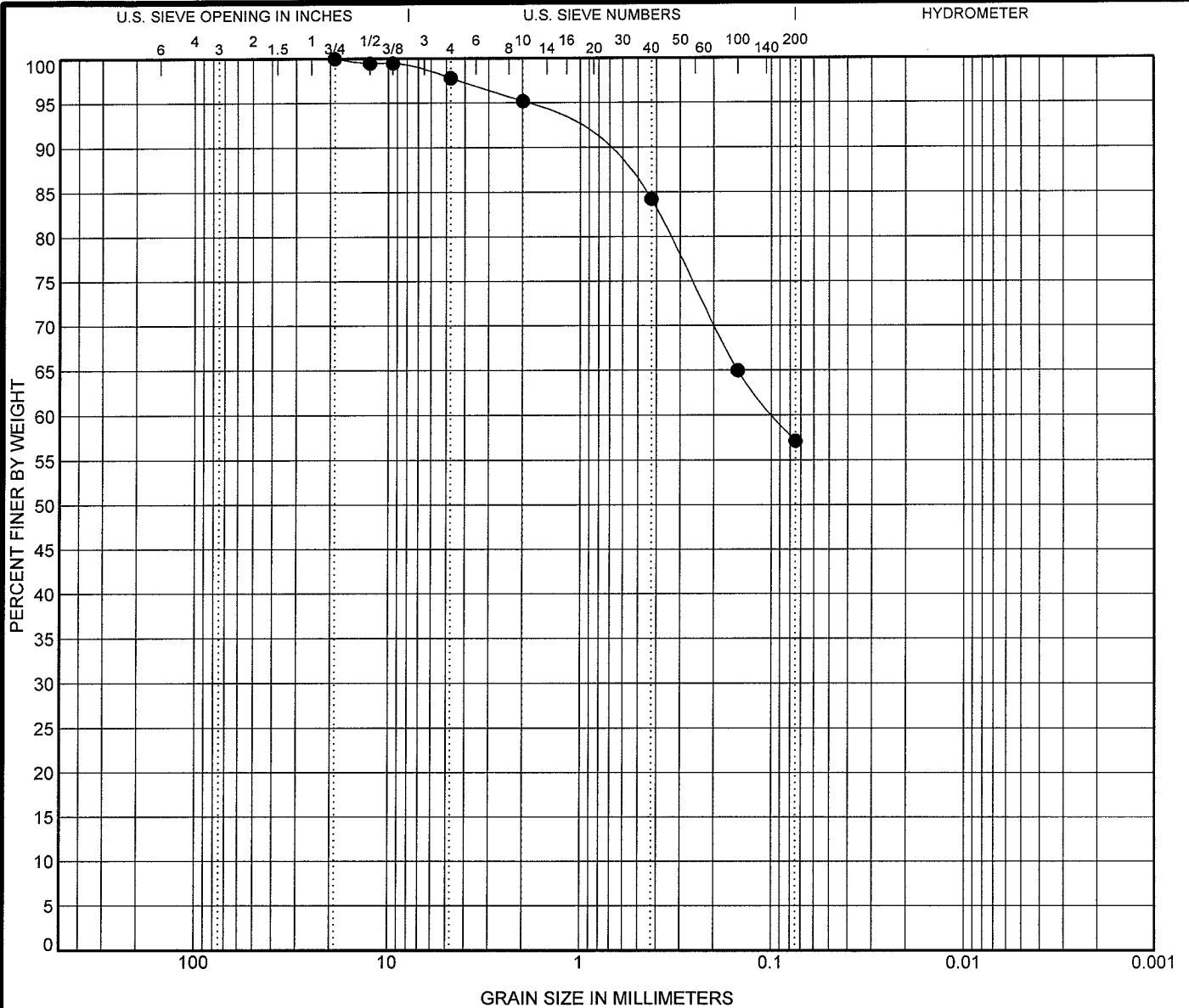
Logged By: ERIC EWIS (Please Print)

Signature: [Signature]

Reviewed by: Sue Boles (Please Print)

Signature: [Signature] Date: 06/15/05

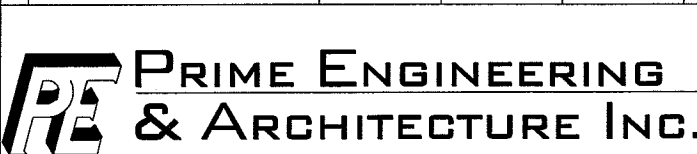




COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Specimen Identification	Classification	LL	PL	PI	Cc	Cu
● L10mw-004 9.7	Brown, SANDY SILT ML	20	17	3		

Specimen Identification	D100	D60	D30	D10	%Gravel	%Sand	%Silt&Clay	%Silt	%Clay
● L10mw-004 9.7	19	0.096			2.2	40.6	57.2		



**GRAIN SIZE DISTRIBUTION**  
 Client: MKM Engineers, Inc.  
 Project: Characterization of RVAAP 14 AOC's  
 Location: Ravenna, Ohio  
 Number: 04001G

US GRAIN SIZE USCS 04001-8G.GPJ PRIMENG.GDT 1/19/05

# Field Sampling Report

Location ID: LIOMW - 005 (4-6 ft)

Ravenna Army Ammunition Plant  
Characterization of 14 RVAAP AOCs

Date: 1-07-05

## Sampling Information

Source	Groundwater / Product	Surface Water	<u>Soils / Sediments / Sludge</u>
Method	Bailer	Sample Bottle	Scoop <span style="float: right;">Trowel</span>
	Pump	Bacon Bomb	Bowl <span style="float: right;">Hand Auger</span>
			Push Probe <span style="float: right;">Shelby Tube</span> <span style="float: right;">✓</span>
Type/Construction			
Miscellaneous	Well Purging Form Yes - No		

Sample Collection: 1405 hrs      Sample Type: Composite - MI - Grab      Location: Plotted on Map - Staked in Field  
 If MI, # of increments taken: \_\_\_\_\_      Estimated - Measured - Surveyed  
 Sample Depth: 4-6 FT (below surface)      Decon: Dedicated - Each Day - Each Location

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

**Sample Description**

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*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: \_\_\_\_\_

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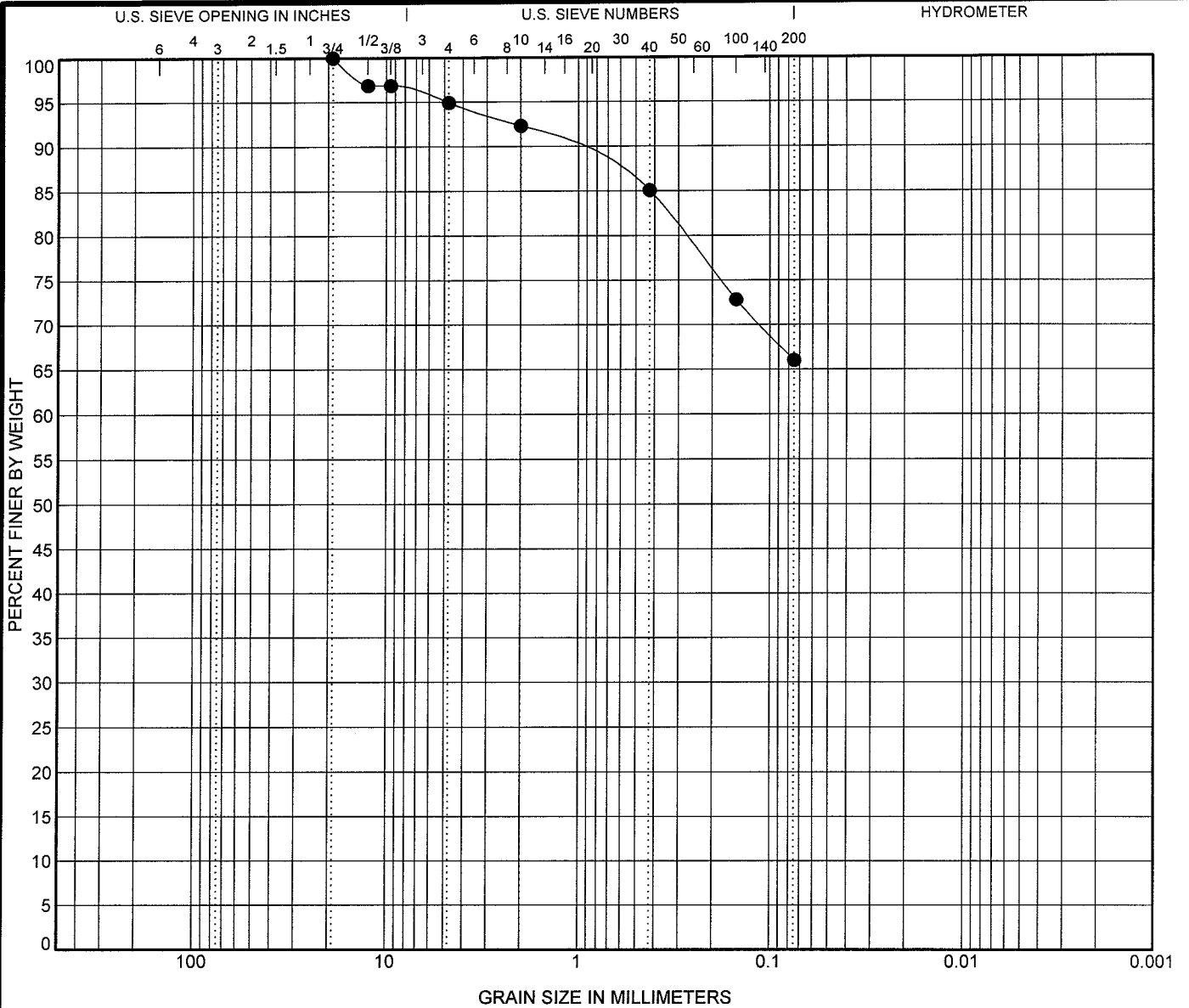
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QA/QC Provided: MS/MSD - Duplicate - Trip Blanks - Field Blanks  
 Parameters: Same as Above - As Listed

Logged By: ERIC FLYS (Please Print)      Reviewed by: Sue Boles (Please Print)  
 Signature: [Signature]      Signature: [Signature]      Date: 06/15/05



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

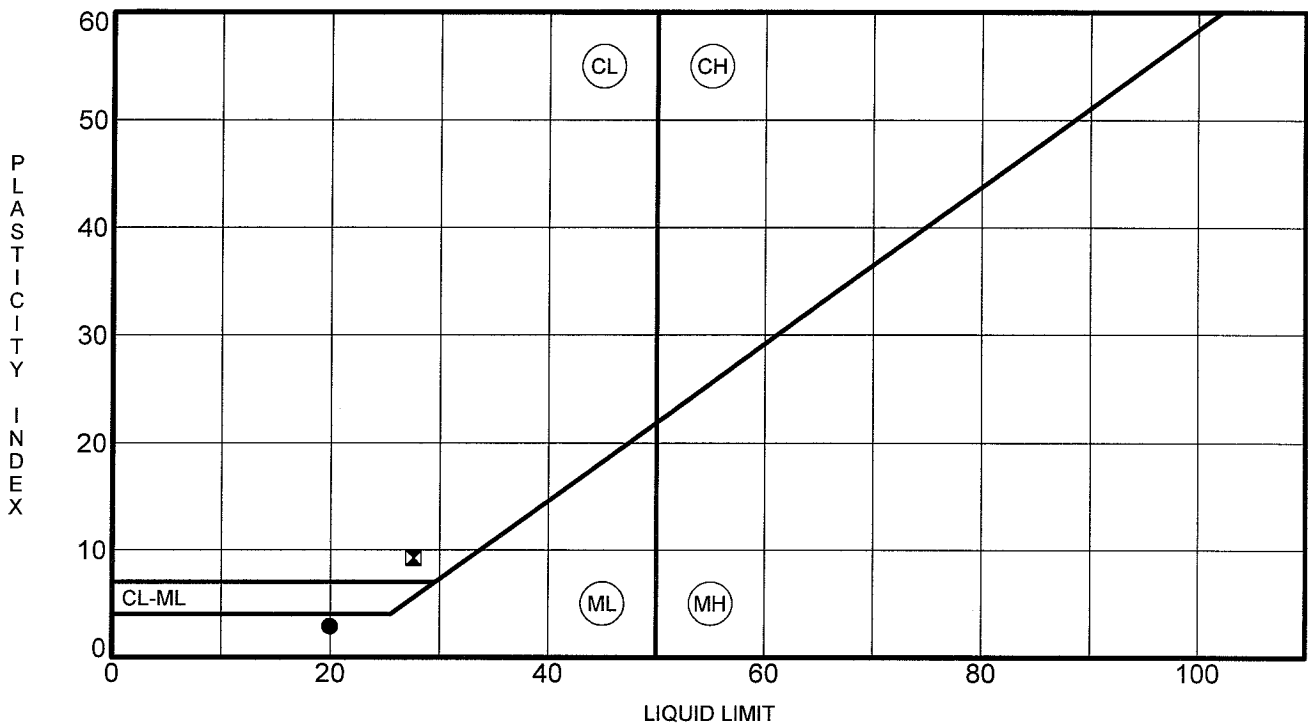
Specimen Identification	Classification	LL	PL	PI	Cc	Cu
● L10mw-005 5.7	Brown, SANDY LEAN CLAY CL	28	18	10		

Specimen Identification	D100	D60	D30	D10	%Gravel	%Sand	%Silt&Clay	%Silt	%Clay
● L10mw-005 5.7	19				5.1	28.9	66.0		



**GRAIN SIZE DISTRIBUTION**  
 Client: MKM Engineers, Inc.  
 Project: Characterization of RVAAP 14 AOC's  
 Location: Ravenna, Ohio  
 Number: 04001G

U.S. GRAIN SIZE USCS 04001-SG.GPJ PRIMENG.GDT 1/19/05



Specimen Identification	LL	PL	PI	Fines	Classification	
● L10mw-004	9.7	20	17	3	57	SANDY SILT ML
☒ L10mw-005	5.7	28	18	10	66	SANDY LEAN CLAY CL

US ATTERBERG LIMITS 04001-8G.GPJ PRIMENG.GDT 1/19/05

**PRIME ENGINEERING & ARCHITECTURE INC.**

**ATTERBERG LIMITS' RESULTS**

Client: MKM Engineers, Inc.  
 Project: Characterization of RVAAP 14 AOC's  
 Location: Ravenna, Ohio  
 Number: 04001G

# Prime Engineering & Architecture

**Project No.:** 04001G  
**Project:** RVAAP  
**Client:** MKM Engineers  
**Technician(s):** Brandi  
**Date:** 1/17/2005

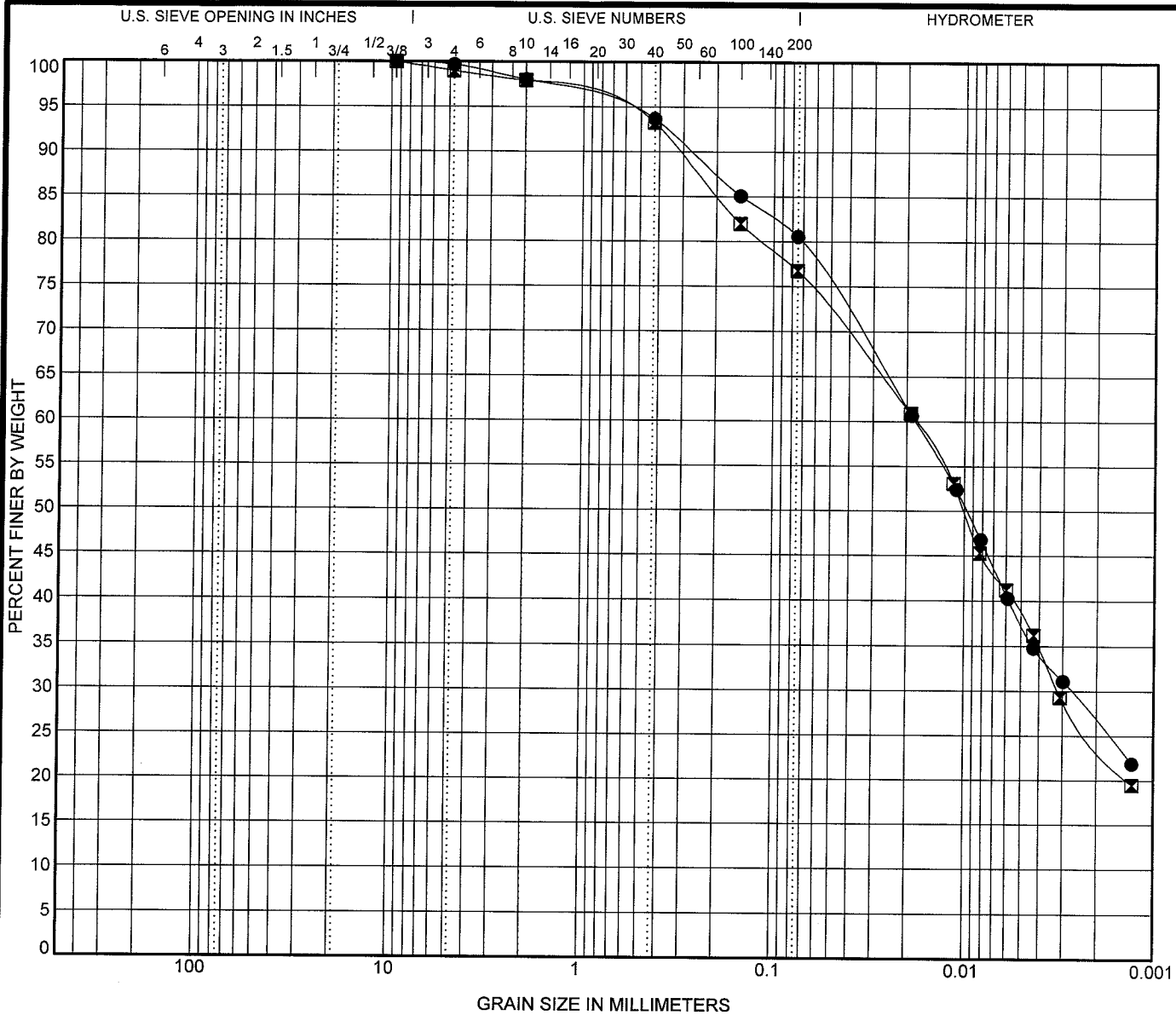
<b>Sample No:</b>	<b>pH Reading:</b>	<b>Specific Gravity:</b>
L10mw-004	8.1	2.656
L10mw-005	8.2	2.801

Sample Number	Depth (feet)	Moisture Content %	Liquid Limit %	Plastic Limit %	Plast. Index	Organic Content (%)	Agg. %	C Sand %	M Sand %	F Sand %	Silt %	Silt & Clay Comb.	Clay %	Soil Description	Class. Symbol
F16sd-001M	0.0	33.7				3.4	0.3	1.7	4.3	13.1	53.9	80.6	26.6	Brown LEAN CLAY WITH SAND, trace gravel	CL
F16sd-002M	0.0	193.0				9.7	1.0	1.0	4.7	16.5	52.4	76.8	24.4	Black LEAN CLAY WITH SAND, trace gravel	CL
LL8sd-004M	0.0	169.9	NP	NP	NP	15	1.2	1.2	8.6	29.9	41.9	59.1	17.1	Mottled brown and gray SANDY SILT, trace gravel	ML
LL8sd-005M	0.0	108.2	NP	NP	NP	8.2	1.9	5.1	13.4	22.4	38.1	57.1	19.1	Gray SANDY SILT, trace gravel	ML
LNWsd-043M	0.0	120.2	NP	NP	NP	5.8	0.8	1.2	8.7	25.3	49.3	63.9	14.6	Gray SANDY SILT, trace gravel	ML
LNWsd-044M	0.0	111.3	NP	NP	NP	7.5	0.0	1.0	13.8	28.3	41.2	56.9	15.8	Gray SANDY SILT	ML
LNWsd-045M	0.0	140.8	NP	NP	NP	9.4	1.0	3.0	13.7	19.2	46.8	63.2	16.4	Gray SANDY SILT, trace gravel	ML
LNWsd-046M	0.0	132.5	NP	NP	NP	7.9	0.0	0.3	5.2	17.4	57.6	77.1	19.4	Gray SILT WITH SAND	ML

MKM US LAB USCS SUMMARY 04001-2G.GPJ PRIMENG.GDT 12/1/04



**Summary of Laboratory Results**  
 Client: MKM Engineers  
 Project: RVAAP  
 Location: Ravenna, Ohio  
 Number: 04001-2G



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Specimen Identification	Classification	LL	PL	PI	Cc	Cu
● F16sd-001M 0.0	Brown LEAN CLAY WITH SAND, CL					
■ F16sd-002M 0.0	Black LEAN CLAY WITH SAND, CL					

Specimen Identification	D100	D60	D30	D10	%Gravel	%Sand	%Silt&Clay	%Silt	%Clay
● F16sd-001M 0.0	9.5	0.018	0.003		0.3	19.1	53.9	26.6	
■ F16sd-002M 0.0	9.5	0.018	0.003		1.0	22.2	52.4	24.4	

**GRAIN SIZE DISTRIBUTION**



Client: MKM Engineers  
 Project: RVAAP  
 Location: Ravenna, Ohio  
 Number: 04001-2G

US GRAIN SIZE USCS 04001-2G.GPJ PRIMENG.GDT 12/7/04

# Field Sampling Report

Location ID: F16SD-001M-SD

Ravenna Army Ammunition Plant  
Characterization of 14 RVAAP AOCs

Date: 11/3/04

## Sampling Information

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

Sample Collection: 1525 hrs      Sample Type: Composite  MI Grab      Location: Plotted on Map  Staked in Field  
 If MI, # of increments taken: 30  
 Sample Depth: 0-0.5 FT (below surface)      Decon: Dedicated - Each Day  Each Location      Estimated - Measured - Surveyed

Field Parameters (at time of sample)	Analytical Parameters			Other Parameters	
PID / FID Readings: Background: <u>0.0</u> ppm	VOC		TPH GRO	Corrosivity	
	SVOC		TPH DRO	Reactivity Sulfide/Cyanide	
	Explosives	<input checked="" type="checkbox"/>	Chromium +6	Ignitability	
Sample: <u>0.0</u> ppm	Propellants		Nitrate		
Water Level	TAL Metals	<input checked="" type="checkbox"/>		<b>QA Samples</b>	
Temperature	Pesticides/PCBs			MS/MSD	Yes / No <input checked="" type="checkbox"/> NA
Sp. Conductance:	Cyanides			Duplicate ID	<u>F16SD-001M-DUP</u> NA
pH	TOC	<input checked="" type="checkbox"/>		Equipment Rinse ID	<input checked="" type="checkbox"/> NA
Turbidity	Grain Size	<input checked="" type="checkbox"/>		<del>Trip Blank ID</del> <input checked="" type="checkbox"/>	<input checked="" type="checkbox"/> NA

### Sample Description

No odor, No staining  
10yr 4/6 Br. SELT 60% w/ clay + sand Moist Low Plasticity  
No sorting

Split Sample  
 Split Sample ID: F16SD-001M-SD  
 Name: John Tent (CEM-FK-EP)  
 Agency/Company: USACE - Louisville  
 Address: 600 DE MARTIN WATERS KING JR PLAZA  
LOUISVILLE KY 40202

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

Soil sample description should include:

Munsell Color    Odor    Staining    Texture    Sorting    Plasticity    Moisture

Water sample description should include:

Color    Odor    Sheen    Turbidity

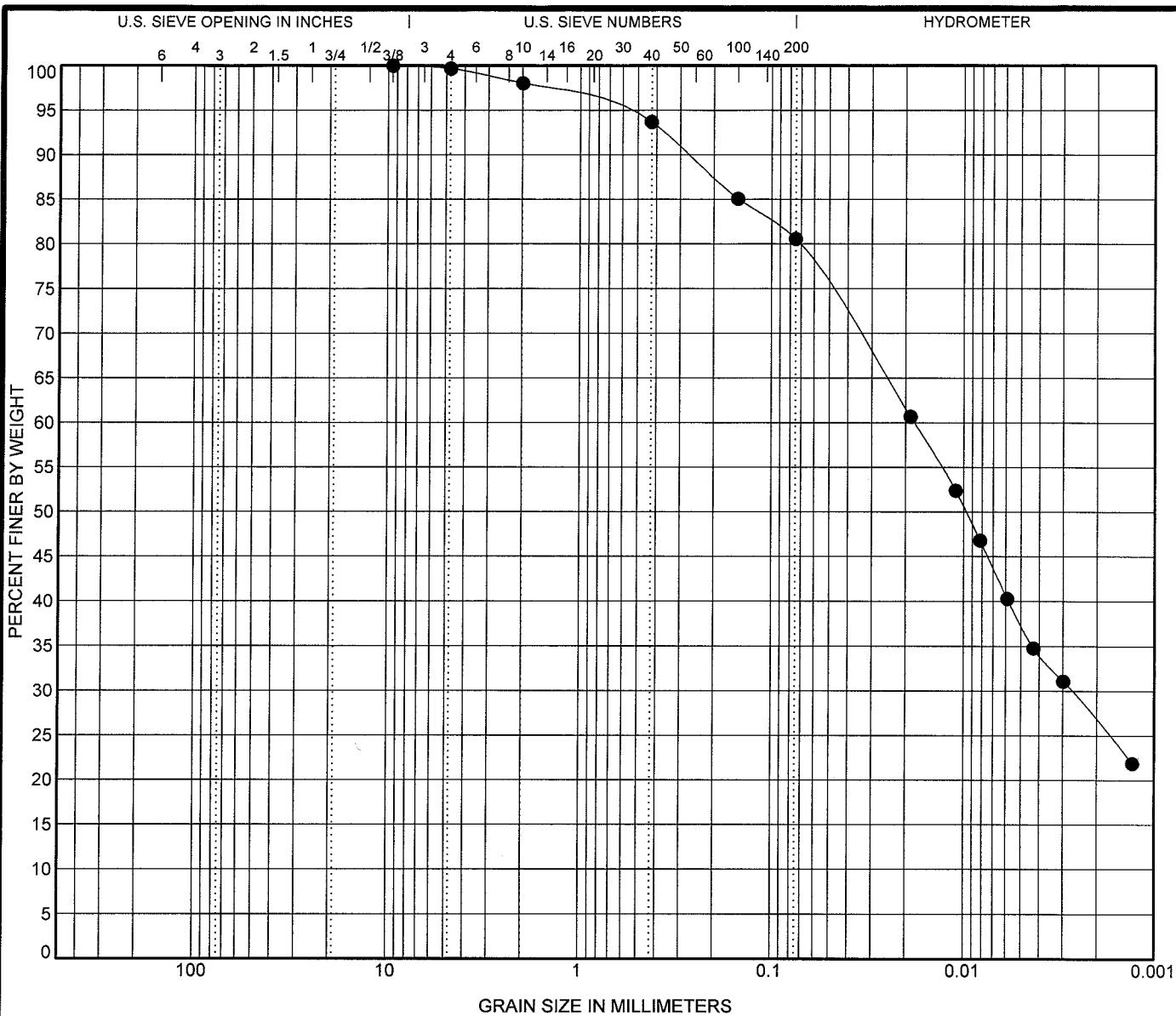
Logged By: James Panuzzo (Please Print)

Reviewed by: ERIC ELLIS (Please Print)

Signature: *James Panuzzo*

Signature: *ERIC ELLIS*      Date: 2/3/05





COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Specimen Identification	Classification	LL	PL	PI	Cc	Cu
● F16sd-001M 0.0	Brown LEAN CLAY WITH SAND, CL					

Specimen Identification	D100	D60	D30	D10	%Gravel	%Sand	%Silt&Clay	%Silt	%Clay
● F16sd-001M 0.0	9.5	0.018	0.003		0.3	19.1		53.9	26.6

**GRAIN SIZE DISTRIBUTION**



Client: MKM Engineers  
 Project: RVAAP  
 Location: Ravenna, Ohio  
 Number: 04001-2G

U.S. GRAIN SIZE USCS 04001-2G.GPJ PRIMENG.GDT 12/7/04

# Field Sampling Report

Location ID: F16sd - 002 M - SD

Ravenna Army Ammunition Plant  
Characterization of 14 RVAAP AOCs

Date: 11/03/04

## 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 <span style="float: right;">X</span>
Type/Construction			Mattocks		
Miscellaneous	Well Purging Form Yes - No				

Sample Collection: 1550 hrs      Sample Type: Composite MI Grab      Location: Plotted on Map Staked in Field  
 If MI, # of increments taken: 30  
 Sample Depth: 0-6" FT (below surface)      Decon: Dedicated - Each Day Each Location  
 Estimated - Measured - Surveyed

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

**Sample Description**

No odor, No staining

10yr 2/1 Black SILT 60% w/ Sand saturated

No Plasticity well sorted

**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

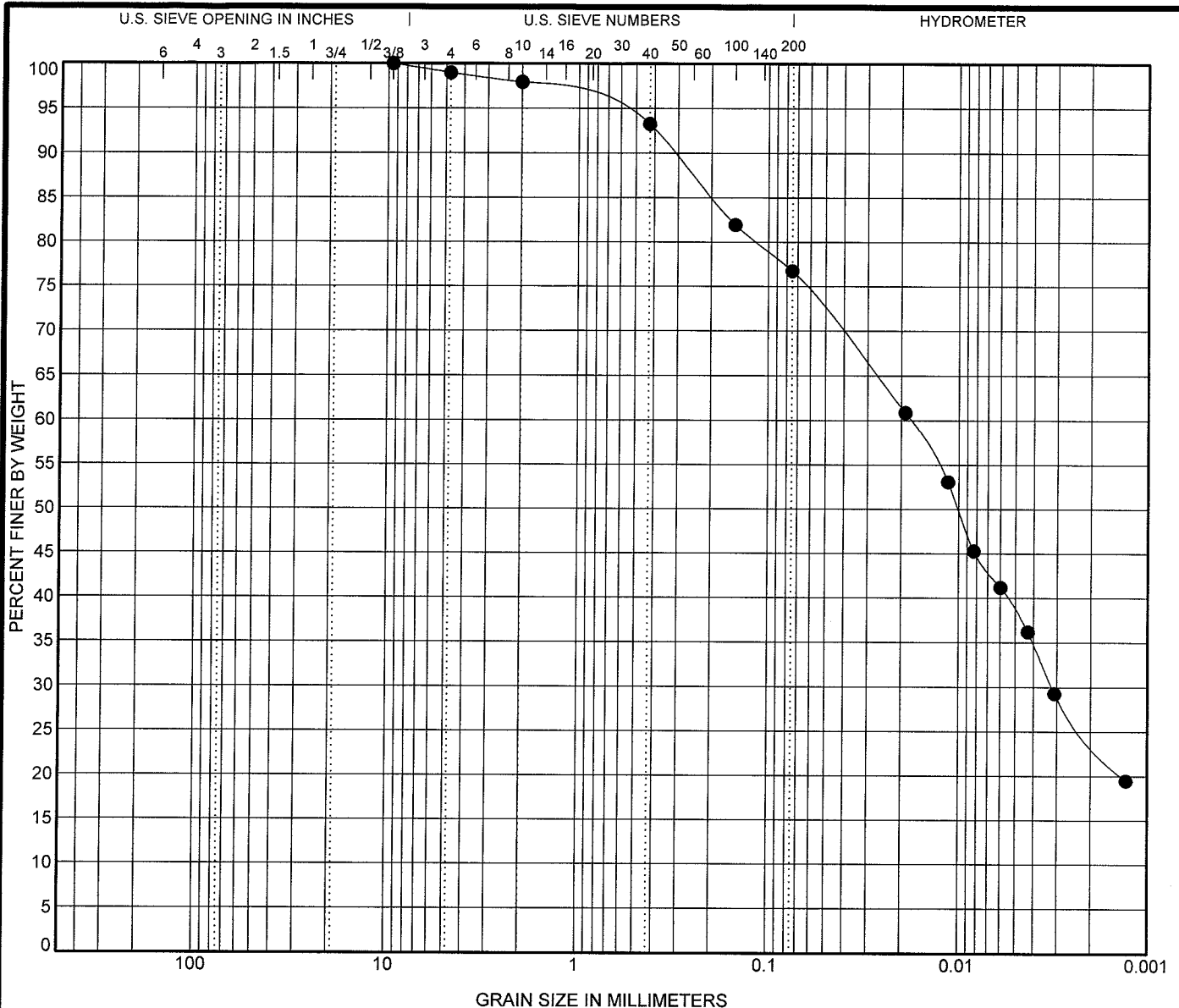
*Soil sample description should include:*

Munsell Color   Odor   Staining   Texture   Sorting   Plasticity   Moisture

*Water sample description should include:*

Color   Odor   Sheen   Turbidity

Logged By: Vijay Alluri (Please Print)      Reviewed by: ERIC ELUS (Please Print)  
 Signature: Vijay      Signature: [Signature]      Date: 2/3/05



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Specimen Identification	Classification	LL	PL	PI	Cc	Cu
● F16sd-002M 0.0	Black LEAN CLAY WITH SAND, CL					

Specimen Identification	D100	D60	D30	D10	%Gravel	%Sand	%Silt&Clay	%Silt	%Clay
● F16sd-002M 0.0	9.5	0.018	0.003		1.0	22.2	52.4	24.4	



**GRAIN SIZE DISTRIBUTION**  
 Client: MKM Engineers  
 Project: RVAAP  
 Location: Ravenna, Ohio  
 Number: 04001-2G

U.S. GRAIN SIZE USCS: 04001-2G.GPJ PRIMENG.GDT 12/7/04

MKM US LAB USCS SUMMARY 04001-4G.3PJ PRIMENG.GDT 12/15/04

Sample Number	Depth (feet)	Moisture Content %	Liquid Limit %	Plastic Limit %	Plast. Index	Organic Content (%)	Agg. %	C Sand %	M Sand %	F Sand %	Silt %	Silt & Clay Comb.	Clay %	Soil Description	Class. Symbol
ASYmw-001	5.5	17.7	33	21	12		4.6	1.6	5.1	12.4		76.4		Brown LEAN CLAY WITH SAND, trace gravel	CL
ASYmw-003	7.5	15.7	31	22	10		3.9	2.7	6.1	12.7		74.6		Brown LEAN CLAY WITH SAND, trace gravel	CL
ASYmw-007	9.5	16.5	32	21	11		0.4	1.5	4.8	13.8		79.4		Brown LEAN CLAY WITH SAND, trace gravel	CL

**PE** PRIME ENGINEERING & ARCHITECTURE INC.

**Summary of Laboratory Results**

Client: MKM Engineers, Inc.  
 Project: RVAAP  
 Location: Ravenna, Ohio  
 Number: 04001G-4

# Field Sampling Report

Location ID: ASYmw-001 (4-6 ft)

Ravenna Army Ammunition Plant  
Characterization of 14 RVAAP AOCs

Date: 11-15-04

## Sampling Information

Source	Groundwater / Product	Surface Water	<u>Soils</u> Sediments / Sludge
Method	Bailer	Sample Bottle	Scoop <span style="float: right;">Trowel</span>
	Pump	Bacon Bomb	Bowl <span style="float: right;">Hand Auger</span>
			Push Probe <span style="float: right;">Shelby Tube <input checked="" type="checkbox"/></span>
Type/Construction			
Miscellaneous	Well Purging Form Yes - No		

Sample Collection: 1415 hrs      Sample Type: Composite - MI - Grab      Location: Plotted on Map - Staked in Field  
 If MI, # of increments taken: \_\_\_\_\_      Estimated - Measured - Surveyed  
 Sample Depth: 4-6 FT (below surface)      Decon: Dedicated - Each Day - Each Location

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

**Sample Description**

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*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: \_\_\_\_\_

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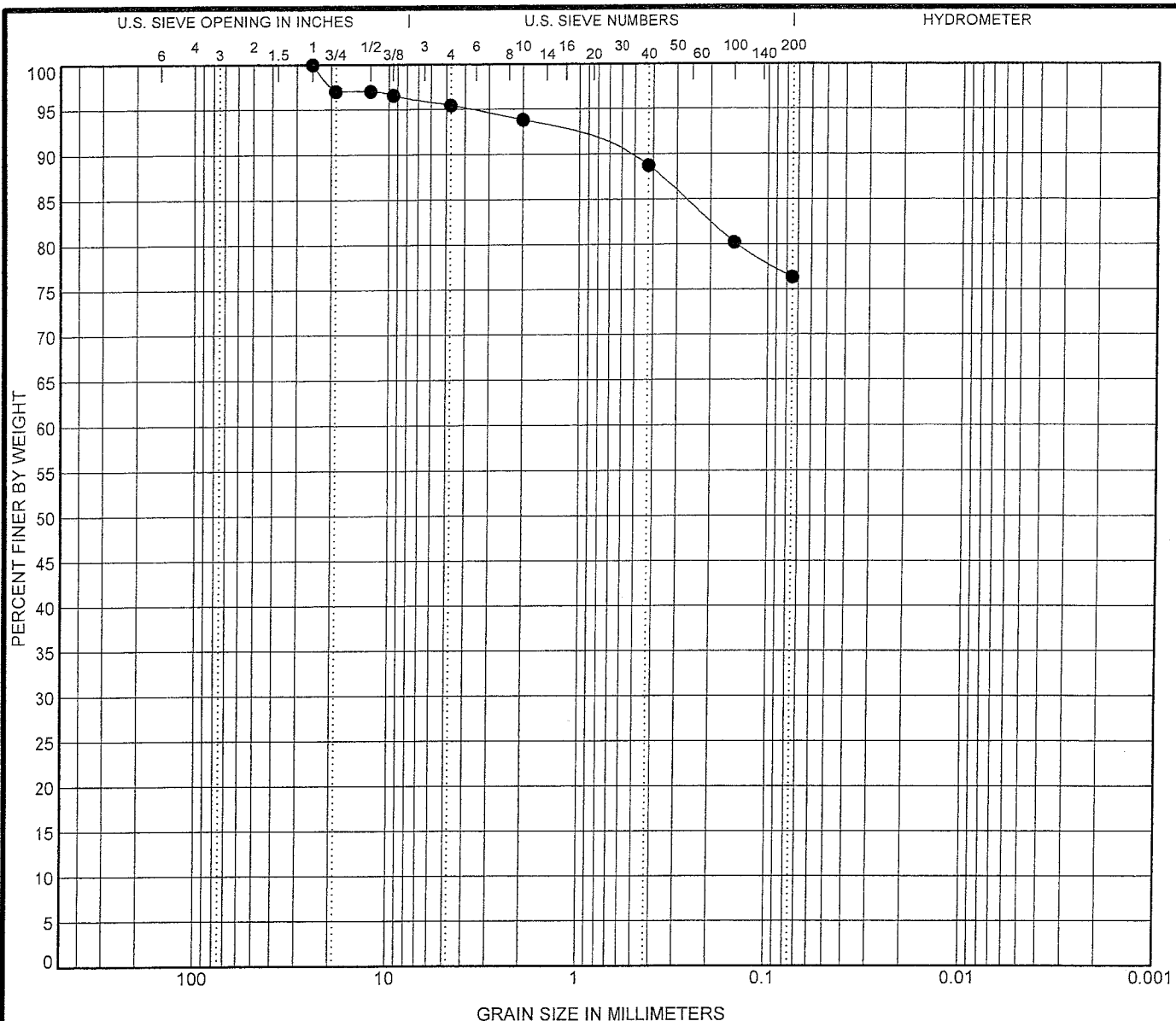
**QA/QC Provided:** MS/MSD - Duplicate - Trip Blanks - Field Blanks  
**Parameters:** Same as Above - As Listed

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Logged By: DAVID K. EARNEST (Please Print)      Reviewed by: Sue Boles (Please Print)  
 Signature: [Signature]      Signature: [Signature]      Date: 06/15/05



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Specimen Identification	Classification	LL	PL	PI	Cc	Cu
● ASYmw-001 5.5	Brown, LEAN CLAY with SAND CL	33	21	12		

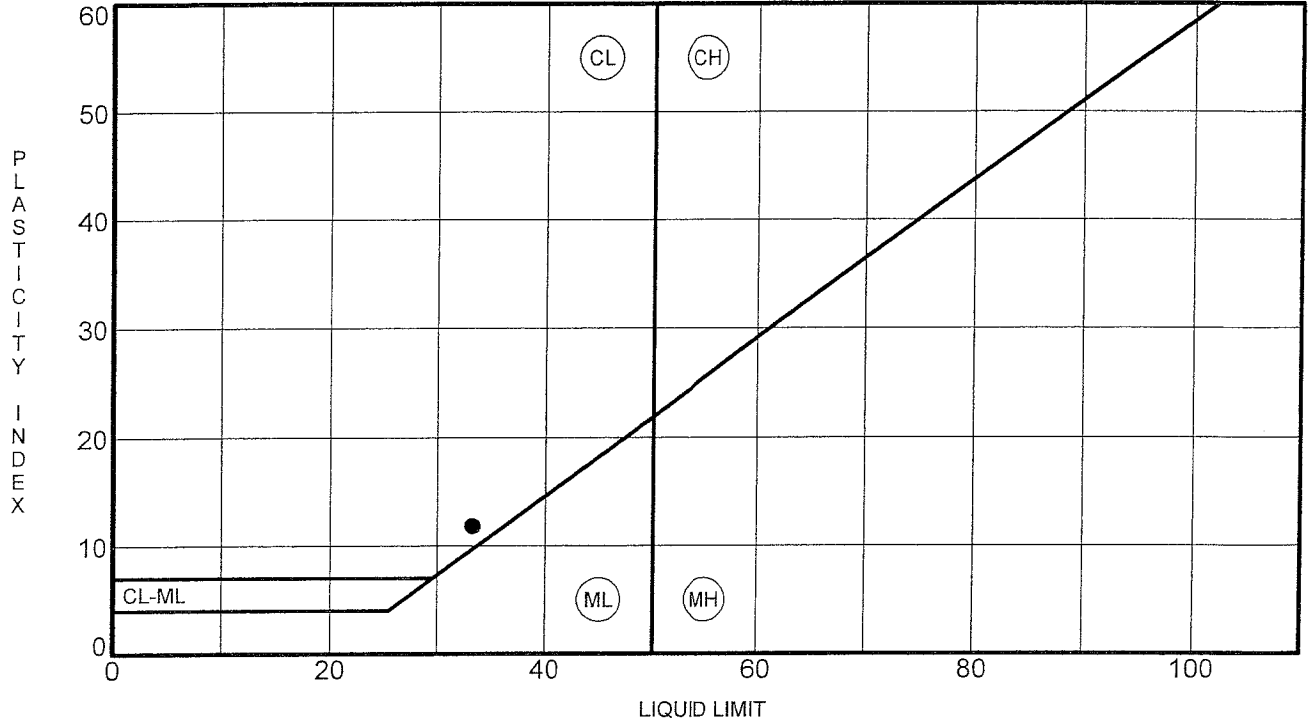
Specimen Identification	D100	D60	D30	D10	%Gravel	%Sand	%Silt&Clay	%Silt	%Clay
● ASYmw-001 5.5	25				4.6	19.1	76.4		

**GRAIN SIZE DISTRIBUTION**



Client: MKM Engineers, Inc.  
 Project: RVAAP  
 Location: Ravenna, Ohio  
 Number: 04001G-4

U.S. GRAIN SIZE USCS 04001-4G.GPJ PRIMENG.GDT 12/15/04



Specimen Identification	LL	PL	PI	Fines	Classification	
● ASYmw-001	5.5	33	21	12	76	LEAN CLAY with SAND CL

US ATTERBERG LIMITS 04001-AG.GPJ PRIMENG.GDT 12/15/04



**ATTERBERG LIMITS' RESULTS**

Client: MKM Engineers, Inc.  
 Project: RVAAP  
 Location: Ravenna, Ohio  
 Number: 04001G-4

# Field Sampling Report

Location ID: ASY MW - 003 (6-8A)

Ravenna Army Ammunition Plant  
Characterization of 14 RVAAP AOCs

Date: 11-11-04

## Sampling Information

Source	Groundwater / Product	Surface Water	<u>Soils</u> / Sediments / Sludge
Method	Bailer	Sample Bottle	Scoop <span style="float: right;">Trowel</span>
	Pump	Bacon Bomb	Bowl <span style="float: right;">Hand Auger</span>
			Push Probe <span style="float: right;">Shelby Tube <input checked="" type="checkbox"/></span>
Type/Construction			
Miscellaneous	Well Purging Form Yes - No		

Sample Collection: 1245 hrs      Sample Type: Composite - MI - Grab      Location: Plotted on Map Staked in Field  
 If MI, # of increments taken: \_\_\_\_\_      Estimated - Measured - Surveyed  
 Sample Depth: 6-8 FT (below surface)      Decon: Dedicated - Each Day - Each Location

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

**Sample Description**

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*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: \_\_\_\_\_

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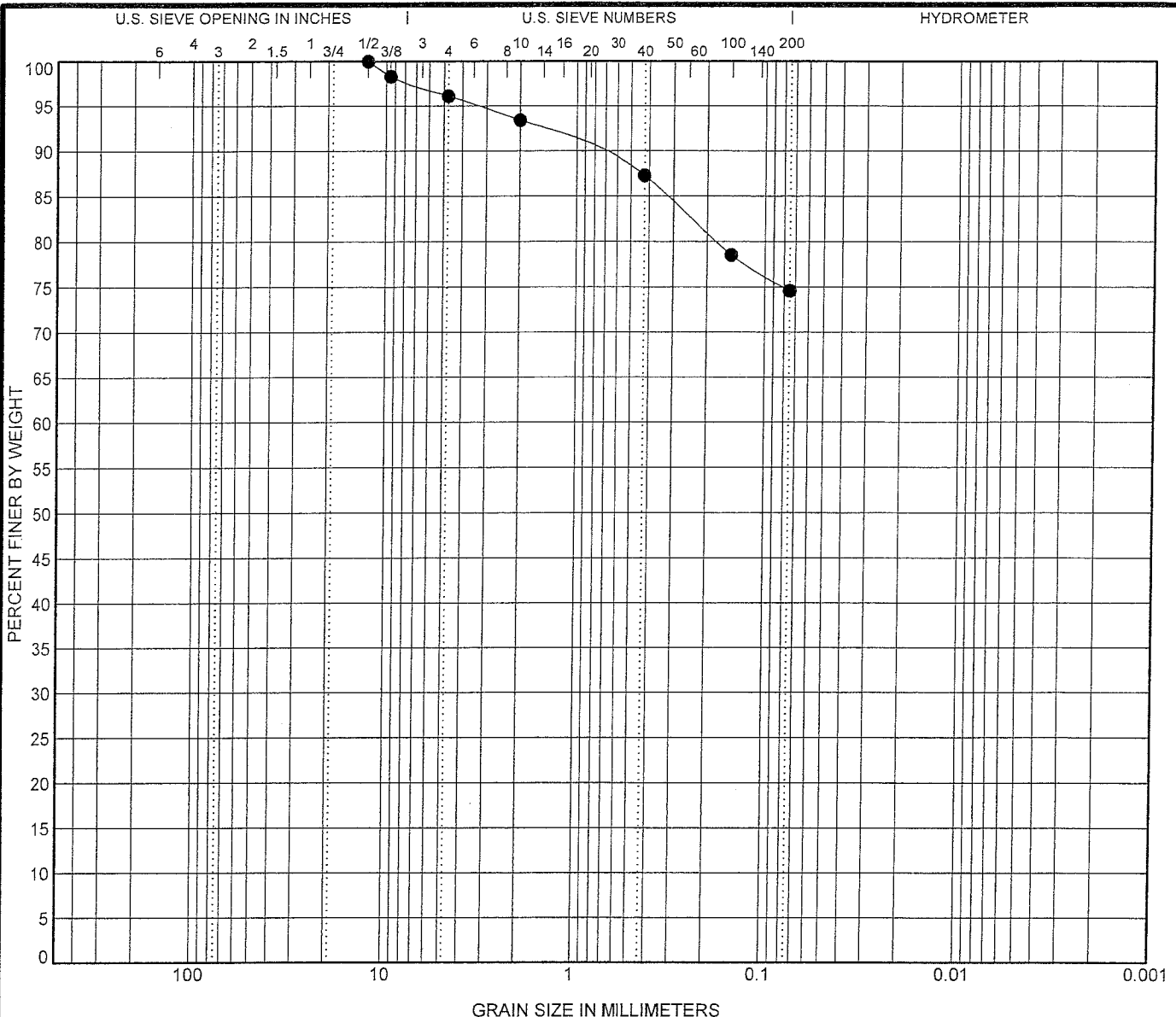
**QA/QC Provided:** MS/MSD - Duplicate - Trip Blanks - Field Blanks  
**Parameters:** Same as Above - As Listed

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

Reviewed by: Sue Boles (Please Print)  
 Signature: Sue Boles      Date: 06/15/05





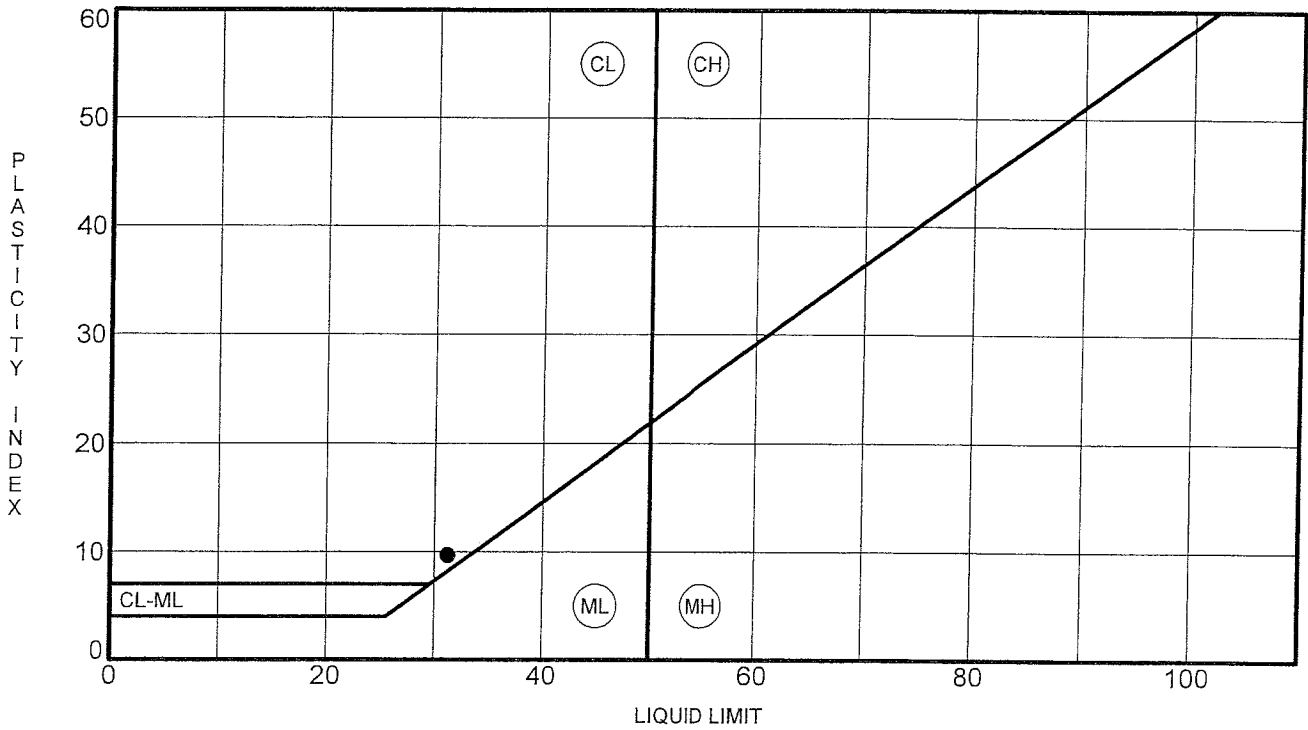
COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Specimen Identification	Classification	LL	PL	PI	Cc	Cu
● ASYmw-003 7.5	Brown, LEAN CLAY with SAND CL	31	22	9		

Specimen Identification	D100	D60	D30	D10	%Gravel	%Sand	%Silt&Clay	%Silt	%Clay
● ASYmw-003 7.5	12.5				3.9	21.5	74.6		

U.S. GRAIN SIZE USCS 04001-4G.GPJ PRIMENG.GDT 12/15/04

	<b>GRAIN SIZE DISTRIBUTION</b>	
	Client: MKM Engineers, Inc.	
	Project: RVAAP	
	Location: Ravenna, Ohio	
		Number: 04001G-4



Specimen Identification	LL	PL	PI	Fines	Classification
● ASYmw-003	7.5	31	22	9 75	LEAN CLAY with SAND CL

Location ID: ASYmw-007 (8-10ft)

**Field Sampling Report**

Ravenna Army Ammunition Plant  
Characterization of 14 RVAAP AOCs

Date: 11-12-04

**Sampling Information**

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

Sample Collection: 1230 hrs      Sample Type: Composite - MI - Grab      Location: Plotted on Map Staked in Field  
 If MI, # of increments taken: \_\_\_\_\_  
 Sample Depth: 8-10 FT (below surface)      Decon: Dedicated - Each Day - Each Location  
 Estimated - Measured - Surveyed

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

**Sample Description**

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

*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: \_\_\_\_\_

\_\_\_\_\_

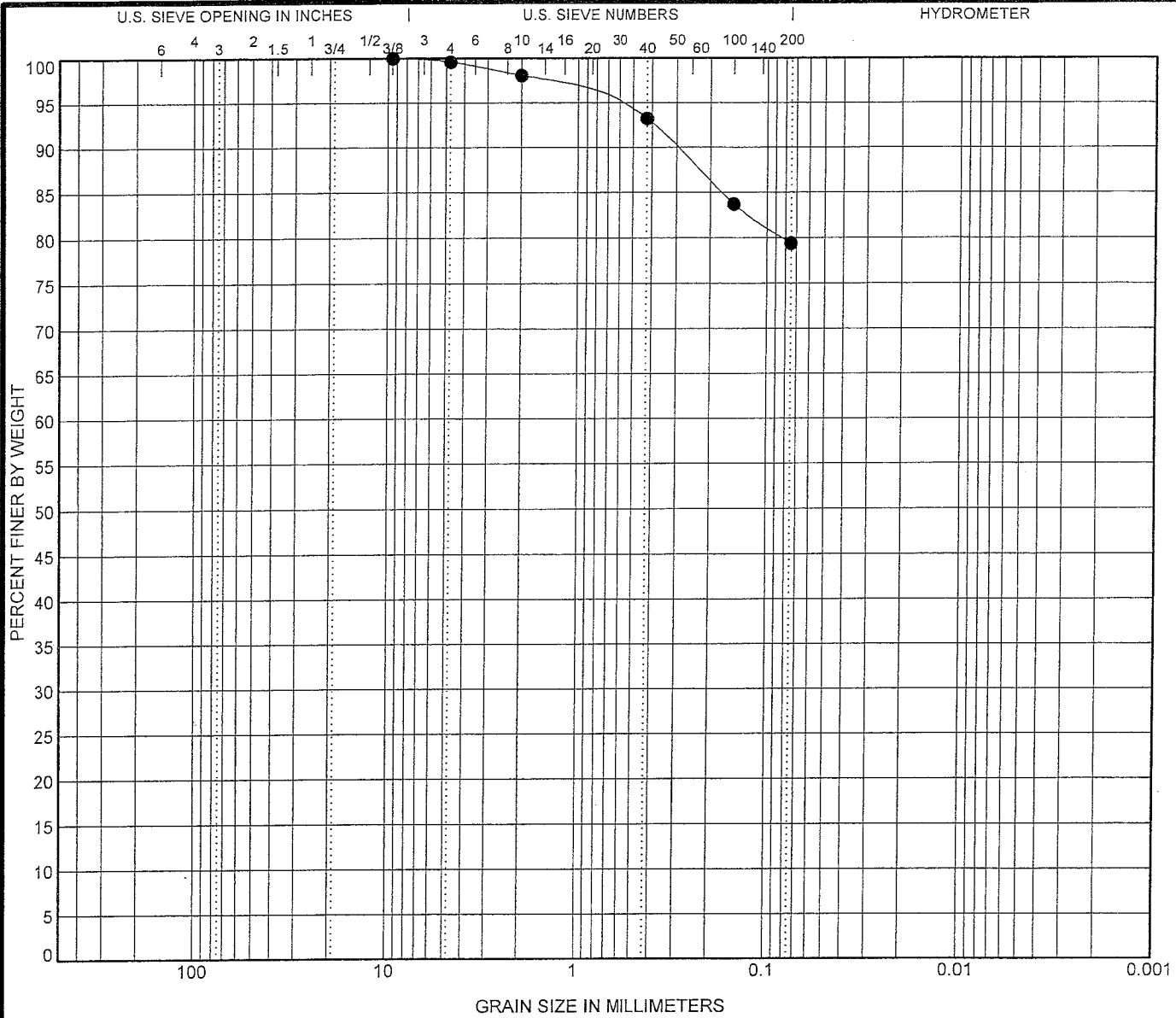
QA/QC Provided: MS/MSD - Duplicate - Trip Blanks - Field Blanks  
 Parameters: Same as Above - As Listed

\_\_\_\_\_

\_\_\_\_\_

Logged By: DAVID K. EARNEST (Please Print)  
 Signature: [Signature]

Reviewed by: Sue Boles (Please Print)  
 Signature: [Signature]      Date: 06/15/05



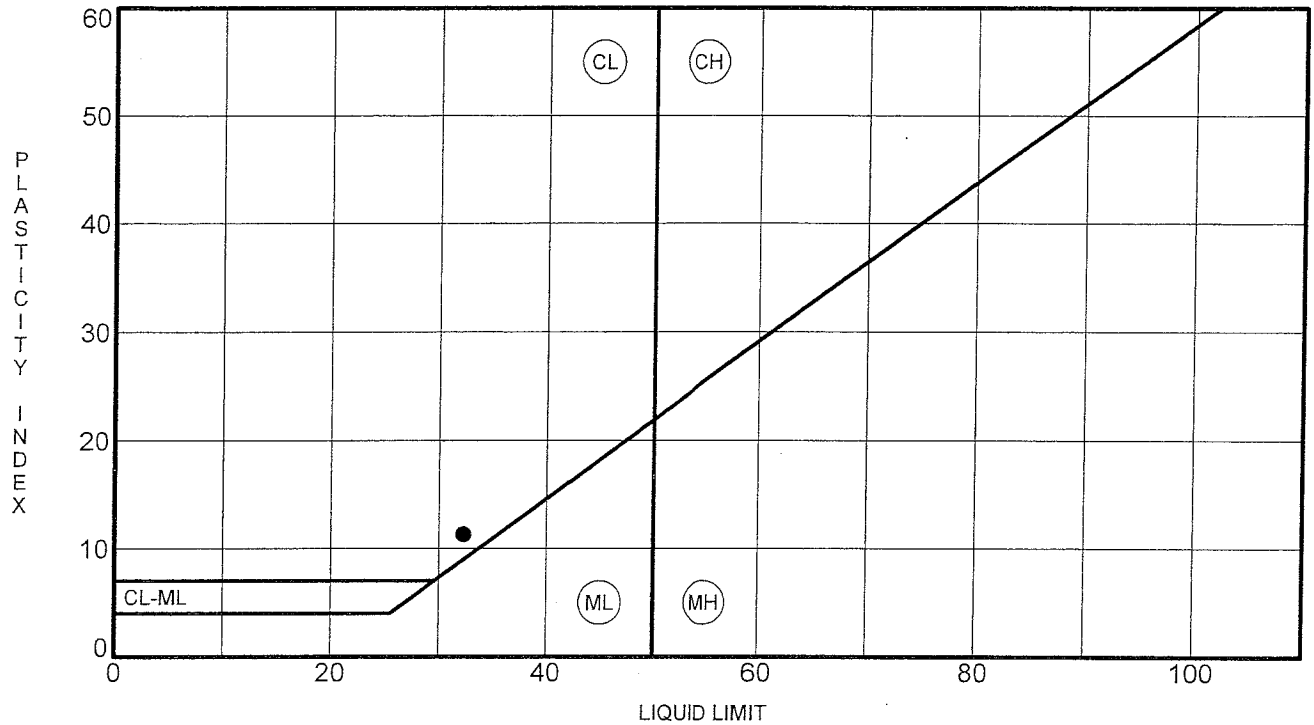
COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Specimen Identification	Classification	LL	PL	PI	Cc	Cu
● ASYmw-007 9.5	Brown, LEAN CLAY with SAND CL	32	21	11		

Specimen Identification	D100	D60	D30	D10	%Gravel	%Sand	%Silt&Clay	%Silt	%Clay
● ASYmw-007 9.5	9.5				0.4	20.2	79.4		

U.S. GRAIN SIZE USCS 04001-4G.GPJ PRIMENG.GDT 12/15/04

	<b>GRAIN SIZE DISTRIBUTION</b>	
	Client: MKM Engineers, Inc.	
	Project: RVAAP	
	Location: Ravenna, Ohio	
		Number: 04001G-4



Specimen Identification	LL	PL	PI	Fines	Classification	
● ASYmw-007	9.5	32	21	11	79	LEAN CLAY with SAND CL

US ATTERBERG LIMITS 04001-4G.GPJ PRIMENG.GDT 12/15/04



**ATTERBERG LIMITS' RESULTS**  
 Client: MKM Engineers, Inc.  
 Project: RVAAP  
 Location: Ravenna, Ohio  
 Number: 04001G-4

## Prime Engineering & Architecture

**Project No.:** 04001G  
**Project:** RVAAP  
**Client:** MKM Engineers  
**Technician(s):** Stephanie and Steve  
**Date:** 12/9/2004

<b>Sample No:</b>	<b>pH Reading:</b>	<b>Specific Gravity:</b>
ASYMW-001 5-7'	7.4	2.691
ASYMW-003 6-8'	8.5	2.542
ASYMW-007 8-10'	7.6	2.672