ftn Associates Ltd.
water resources / environmental consultants

ENTERGY INDEPENDENCE PLANT
LANDFILL CELLS 12 – 15

DEMONSTRATION OF COMPLIANCE WITH EPA CCR RULE SITING CRITERIA §257.64, UNSTABLE AREAS

PREPARED IN COMPLIANCE WITH THE EPA FINAL RULE FOR THE DISPOSAL OF COAL COMBUSTION RESIDUALS TITLE 40 CODE OF FEDERAL REGULATIONS PART 257

OCTOBER 17, 2018

ENTERGY INDEPENDENCE PLANT
LANDFILL CELLS 12 – 15

DEMONSTRATION OF COMPLIANCE WITH EPA CCR RULE SITING CRITERIA §257.64, UNSTABLE AREAS

Prepared for

Entergy Arkansas, Inc.
PO Box 551
Little Rock, AR 72203

Prepared by

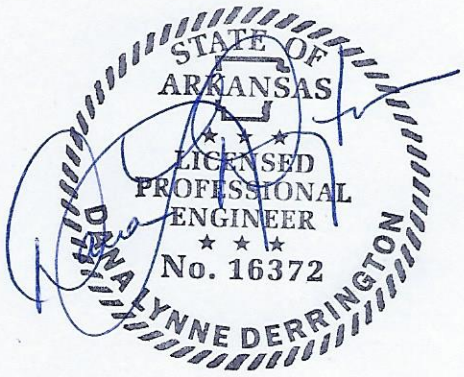
FTN Associates, Ltd.
3 Innwood Circle, Suite 220
Little Rock, AR 72211

FTN No. R07920-1872-001

October 17, 2018

PROFESSIONAL ENGINEER'S CERTIFICATION

With this certification, I certify that I, as a Professional Engineer in the State of Arkansas, am a qualified professional engineer as defined in §257.53 of Title 40 Code of Federal Regulations (40 CFR) Part 257, that this report has been prepared under my direction in accordance with generally accepted good engineering practices, that the findings are accurate to the best of my knowledge, and that the CCR unit that is subject to this certification meets the location restriction requirements under §257.64 of 40 CFR Part 257.



Dana L. Derrington, Arkansas PE #16372

10/17/2018
Date

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1.0 INTRODUCTION

Entergy Arkansas, Inc. (Entergy), operates the Independence plant located approximately 2 miles southeast of Newark, Arkansas. The plant utilizes four disposal cells, Cells 12 through 15, hereafter also referred to as the landfill, for the disposal of coal combustion residuals (CCRs) generated from the combustion of coal at the plant. Pursuant to §257.64 of Title 40 Code of Federal Regulations (40 CFR) Part 257, existing CCR landfills must not be located in an unstable area. An unstable area is defined by §257.53 as a location that is susceptible to natural or human-induced events or forces capable of impairing the integrity, including structural components of some or all of the CCR unit that are responsible for preventing releases from such unit. Unstable areas can include poor foundation conditions, areas susceptible to mass movements, and karst terrains. This report presents the findings of an evaluation of Cells 12 through 15 in support of the location restriction requirements of §257.64.

2.0 SITE DESCRIPTION

Per the CCR rule, an existing CCR unit is defined as a unit that "receives CCR both before and after October 19, 2015 or for which construction commenced prior to October 14, 2015." The CCR unit received CCR before and after October 19, 2015, and no lateral expansions have occurred after October 19, 2015. Thus, the Cells 12 through 15 are an existing landfill per the CCR rule.

The combined area of Cells 12 through 15 is approximately 45 acres with a maximum elevation of 284 ft North American Vertical Datum of 1988 (NAVD88) as of the date of the last survey, which was completed in November 2017. Natural topography surrounding the landfill is generally flat-lying, with ground surface elevations ranging from approximately 235 to 237 ft NAVD88, as shown on Figures 1 and 2 (Appendix A).

3.0 UNSTABLE AREA EVALUATION

Pursuant to §257.64(b), the owner or operator must consider all of the following factors, at a minimum, when determining whether an area is unstable:

1. Onsite or local soil conditions that may result in significant differential settling;
2. Onsite or local geologic or geomorphologic features; and
3. Onsite or local human-made features or events (both surface and subsurface).

FTN Associates, Ltd. (FTN) performed a review of site-specific boring logs, geotechnical data, US Geological Survey (USGS) publications, and documentation related to the landfill's Solid Waste Permit No. 0200-S3N-R2 issued by the Arkansas Department of Environmental Quality. Findings from this review are discussed below within the context of the factors listed in §257.64(b).

3.1 Review of Onsite or Local Soil Conditions

Several subsurface investigations have been performed in the vicinity of the landfill. Available soil boring logs and geotechnical data (Appendix B) show that onsite soils are comprised of low- to high-plasticity clays and low-plasticity silts to an approximate depth of 30 ft below ground surface (bgs) followed by sands and gravels that extend to an approximate depth of 130 ft bgs. These soils are bounded below by Paleozoic rocks and associated residuum (Albin, Hines, and Stephens 1967). A review of the subsurface data included in Appendix B showed that no organic soils, which are prone to settlement due to their high compressibility, were encountered in any of the borings. There were also no apparent lateral changes in the underlying lithology that would indicate a notable change in the compressibility of foundation soils, as can be seen from the soil boring logs. These factors, coupled with a review of the settlement calculations performed for Permit No. 0200-S3N-R2, indicate that significant differential settling is unlikely.

3.2 Review of Onsite or Local Geologic or Geomorphologic Features

Surficial deposits in the vicinity of the landfill are generally comprised of Quaternary alluvial and terrace deposits as shown by the geological map included as Figure 3. A review of the area topography (Figures 1 and 2) and the geological map shows no evidence of karst features or areas susceptible to mass movement (i.e., landslides) in the vicinity of the landfill.

3.3 Review of Onsite or Local Human-Made Features or Events (Both Surface and Subsurface)

Presently, there are no known visible onsite or local human-made features or events that would cause the area in the immediate vicinity of the landfill to be unstable. The underlying sands and gravels described in Section 3.2 are part of the Mississippi River Valley alluvial aquifer, which is used extensively in the vicinity of the plant for agricultural purposes. However, a review of an ongoing study conducted by USGS (Schrader 2015) indicates that recharge to aquifer is sufficient in the vicinity of the plant to balance seasonal withdrawals. As such, land subsidence due to groundwater removal is considered unlikely.

4.0 CONCLUSIONS

Based on a review of the available documentation in this report, Cells 12 through 15 at the Entergy Independence plant are not located in an unstable area and therefore meet the location restriction requirements of §257.64.

5.0 REFERENCES

Albin, D.R., M.S. Hines, and J.W. Stephens. 1967. *Water Resources of Jackson and Independence Counties, Arkansas* [USGS Water Supply Paper 1839-G]. Prepared in cooperation with the Arkansas Geological Commission. Washington, DC: United States Government Printing Office. 39 pp.

Schrader, T.P. 2015. *Water Levels and Water Quality in the Mississippi River Valley Alluvial Aquifer in Eastern Arkansas, 2012* [USGS Scientific Investigations Report 2015–5059]. Prepared in cooperation with the Arkansas Natural Resources Commission and the Arkansas Geological Survey. Reston, VA: US Geological Survey. http://dx.doi.org/10.3133/sir20155059 .

Stoeser, D.B., G.N. Green, L.C. Morath, W.D. Heran, A.B. Wilson, D.W. Moore, and B.S. Van Gosen. 2005. "The State of Arkansas." In *Preliminary Integrated Geologic Map Databases for the United States Central States: Montana, Wyoming, Colorado, New Mexico, Kansas, Oklahoma, Texas, Missouri, Arkansas, and Louisiana* [USGS Open-File Report 2005-1351]. Denver, CO: US Geological Survey. Available online at http://pubs.usgs.gov/of/2005/1351/.

USGS [US Geological Survey]. 1962 (rev 1981). "USGS 1:24000-Scale Quadrangle for Newark, AR 1962." US Geological Survey. Available online at https://www.sciencebase.gov/catalog/item/5a8a29e6e4b00f54eb3c797b.

APPENDIX A

Figures

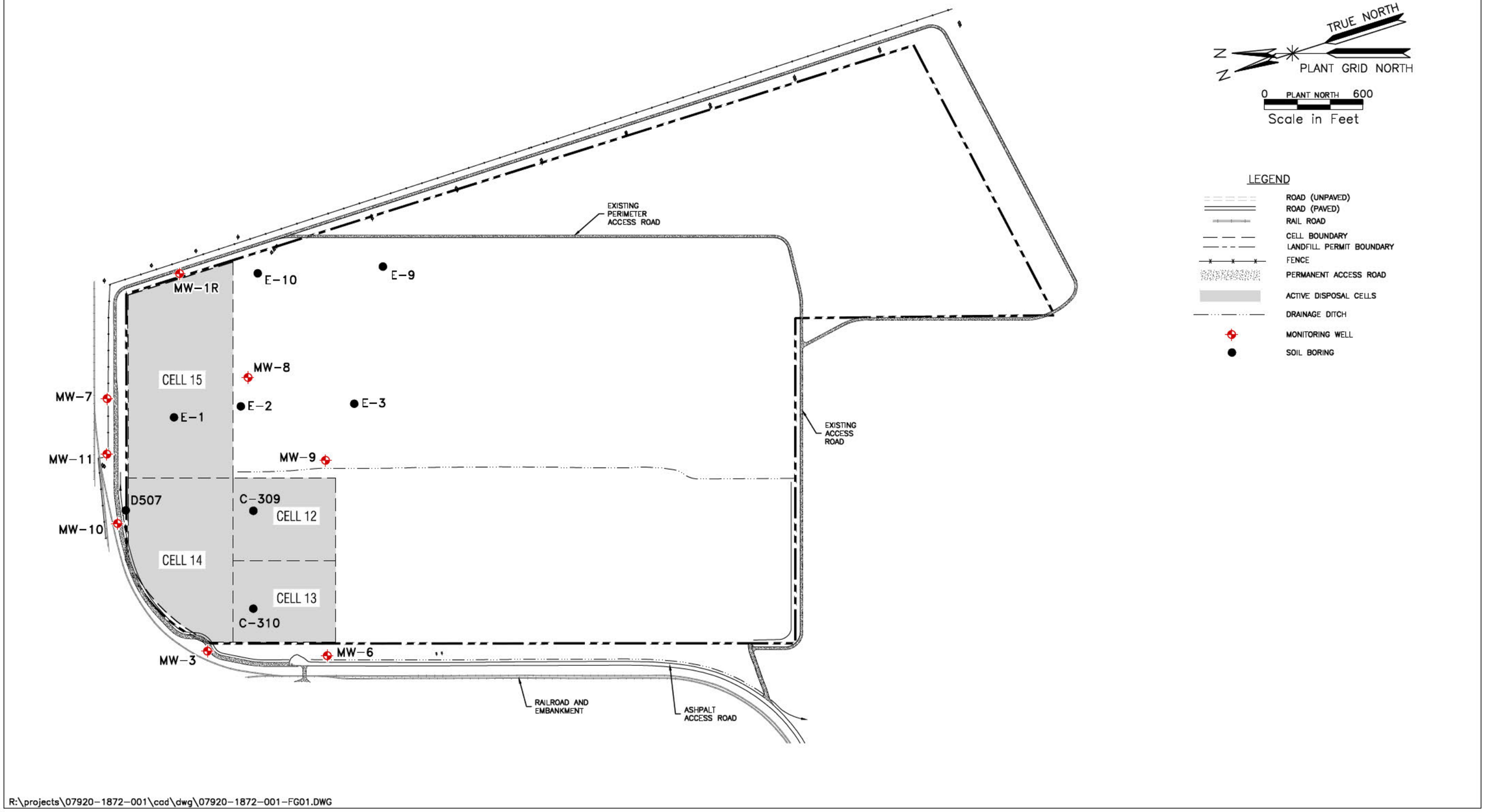


Figure 1. Site map, Entergy Independence landfill.

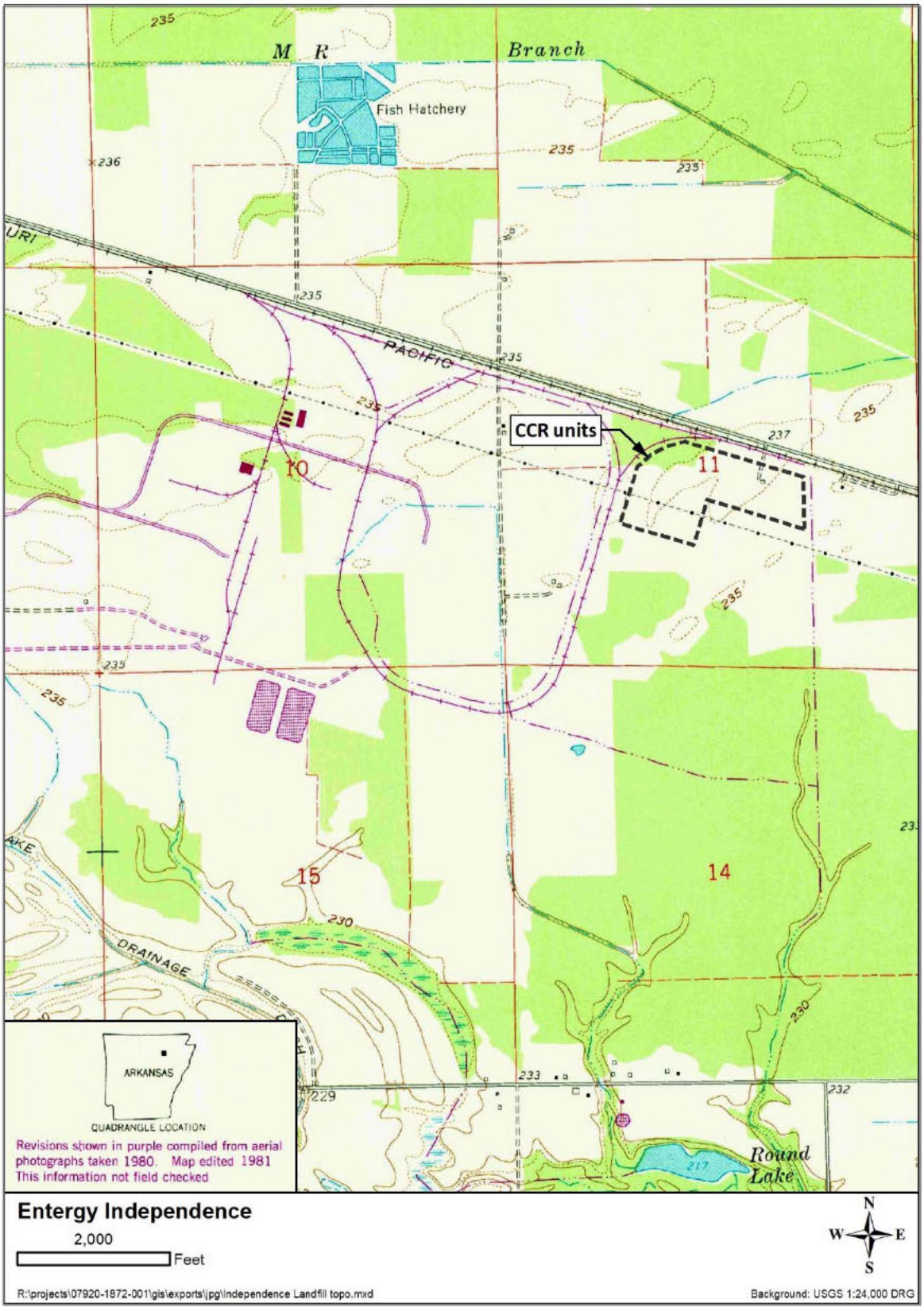


Figure 2. Topography of surrounding area based on USGS topographic quadrangle Newark, AR (1981).

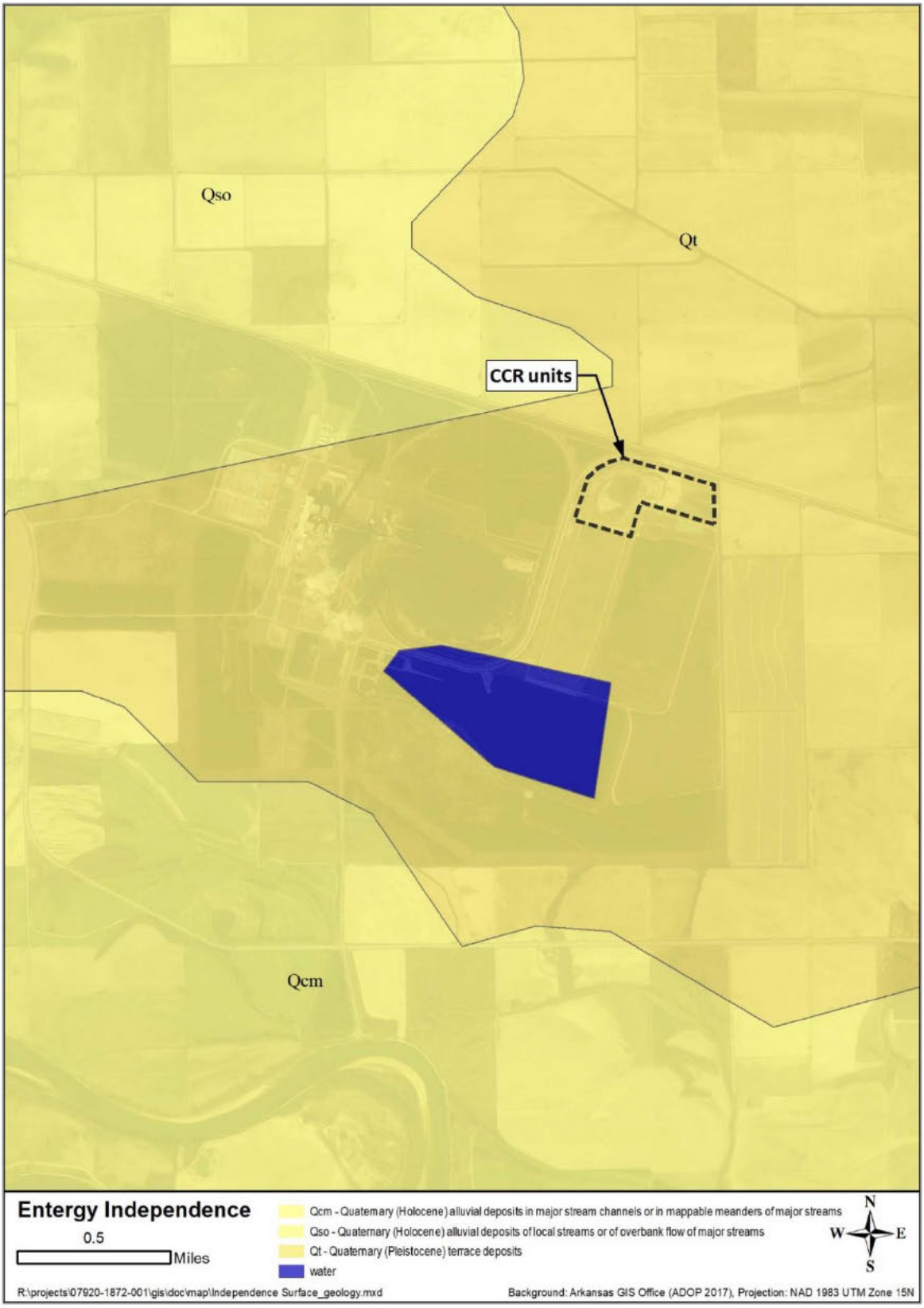


Figure 3. Surface geology of surrounding area based on Stoeser et al. 2005.

APPENDIX B

Well Construction Diagrams, Soil Boring Logs, and Geotechnical Data

Well Construction Diagrams and Soil Boring Logs

LOG OF BORING NO. C-309

INDEPENDENCE GENERATING STATION
ARKANSAS POWER AND LIGHT COMPANY
NEWARK, ARKANSAS

TYPE: Wash

LOCATION: N 3500, E 5660

SURF. EL: 306.7

DEPTH, FT	DESCRIPTION OF MATERIAL
	Very stiff light gray with some tan silty clay with ferrous nodules
5	Very stiff light gray clayey silt and silty clay and ferrous nodules -some tan below 6 ft -sand seams below 8 ft
10	Stiff tan slightly blocky and slickensided clay with calcareous nodules and tan stains
15	
20	Very stiff to stiff light gray and tan silty clay with sand seams and pockets and ferrous nodules -clayey silt seams below 24 ft
25	
30	Firm gray clay
35	Dense tan sand with gravel

NOTE SCALE CHANGE

BLOWS PER FT

UNIT DRY WT LB/CU FT

COHESION, TON/SQ FT
0.2 0.4 0.6 0.8 1.0 1.2 1.4

PLASTIC LIMIT — WATER CONTENT, % — LIQUID LIMIT
10 20 30 40 50 60 70

% RECOVERY

COMPLETION DEPTH: 35 ft
DATE: 11/10/78

DEPTH TO WATER IN BORING:

DATE:

McCLELLAND ENGINEERS

PLATE

LOG OF BORING NO. C-310

INDEPENDENCE GENERATING STATION
ARKANSAS POWER AND LIGHT COMPANY
NEWARK, ARKANSAS

TYPE: Wash

LOCATION: N 3500, E 5060

SURF. EL: 306.7

DEPTH, FT	DESCRIPTION OF MATERIAL
	Very stiff light gray clayey silt with ferrous nodules
	Very stiff light gray silty clay with ferrous nodules
5	-slight sandy below 4 ft
	Very stiff light gray and tan clayey silt with some silty clay and ferrous nodules and stains
10	Stiff light gray and tan blocky and slickensided clay with ferrous stains
15	-calcareous nodules below 13 ft
	Very stiff light gray and tan silty clay with ferrous nodules and calcareous nodules
20	Medium dense tan sand with gravel
25	

NOTE SCALE CHANGE

SYMBOL | SAMPLES | BLOWS PER FT | UNIT DRY WT LB/CU FT

COHESION, TON/SQ FT
0.2 0.4 0.6 0.8 1.0 1.2 1.4

PLASTIC LIMIT — WATER CONTENT, % — LIQUID LIMIT
10 20 30 40 50 60 70

% RECOVERY

COMPLETION DEPTH: 25 ft
DATE: 11/9/78

DEPTH TO WATER IN BORING: DATE:

McCLELLAND ENGINEERS

PLATE

Boring #: E-1	FTN Associates, Ltd. Little Rock, Arkansas 3 Innwood Circle, Suite 220, 72211	Location: ENTERGY – Independence Plant	
Date: 4/2/01		Drilling Method: HSA	
Elevation: 308		Driller: Tri State Testing, Inc.	
Job No.: 6040-320		Logged By: MSR	

Depth, Feet	Litho. Symbol	Classification	Sample Type	Blow Counts	PPR	Depth, Feet
		0.0 – 6.0 Stiff, tan, dry to moist silty clay with ferrous nodules				
			SHELBY TUBE	N/A	N/A	
			SPLIT SPOON	10,12,14	4.5	
5						5
		6.0 – 8.5 Medium stiff, tan, dry silt	SPLIT SPOON	6,8,10	1.5	
		8.5 – 24.0 Soft, brown, moist clay with ferrous staining	SPLIT SPOON	2,2,3	0.5	
10						10
			SHELBY TUBE	N/A	N/A	
			SPLIT SPOON	3,5,6	1.5	
15						15
		@ 18.5 – 20.0 calcareous nodules	SPLIT SPOON	4,3,5	1.75	
20						20
		24.0 – 34.0 Loose, light brown and gray, wet, fine sand with some silt and clay	SPLIT SPOON	2,2,3	0.5	
25						25
			SPLIT SPOON	2,1,5	N/A	
30						30
		34.0 – 35.0 Medium dense, light brown, wet, fine to coarse sandy gravel	SPLIT SPOON	16,16,12	N/A	
35						35
		Boring terminated @ 35 ft bgs				
40						40
45						45

Boring #: E-2	FTN Associates, Ltd. Little Rock, Arkansas	Location: Entergy – Independence Plant	
Date: 04/03/01	3 Innwood Circle, Suite 220, 72211	Drilling Method: HSA	
Elevation: 306		Driller: Tri State Testing, Inc.	
Job No.: 6040-320		Logged By: MSR	

Depth, Feet	Litho. Symbol	Classification	Sample Type	Blow Counts	PPR	Depth, Feet
		0.0 – 23.0 Soft to stiff, tan to light gray, moist silty clay with ferrous nodules and occasional very fine sand	SPLIT SPOON	1,3,3	2.5	
			SHELBY TUBE	N/A	N/A	
5			SPLIT SPOON	4,5,6	2.25	5
			SPLIT SPOON	3,5,5	2.0	
10			SHELBY TUBE	N/A	N/A	10
			SPLIT SPOON	5,5,7	2.5	
15			SPLIT SPOON	4,5,10	1.5	15
20						20
		23.0 – 24.5 Medium dense, tan, wet, clayey fine sand	SPLIT SPOON	11,15,10	N/A	
25		24.5 – 30.0 Medium dense, light brown, wet, fine to coarse sandy gravel with some clay				25
30		Boring terminated @ 30 ft bgs	SPLIT SPOON	9,7,11	N/A	30
35						35
40						40
45						45

Boring #: E-3	FTN Associates, Ltd. Little Rock, Arkansas	Location: Entergy – Independence Plant	
Date: 04/03/01	3 Innwood Circle, Suite 220, 72211	Drilling Method: HSA	
Elevation: 305		Driller: Tri State Testing, Inc.	
Job No.: 6040-320		Logged By: MSR	

Depth, Feet	Litho. Symbol	Classification	Sample Type	Blow Counts	PPR	Depth, Feet
		0.0 – 29.5 Soft to stiff, gray to tan, dry to moist silty clay with ferrous staining				
			SPLIT SPOON	2,2,3	1.5	
5			SPLIT SPOON	5,8,13	3.5	5
			SHELBY TUBE	N/A	N/A	
			SPLIT SPOON	7,7,8	3.5	
10						10
15			SHELBY TUBE	N/A	N/A	15
		@ 18.5 –20.0 occasional calcareous nodules				
			SPLIT SPOON	4,3,4	2.5	
20						20
		▽				
			SPLIT SPOON	4,4,4	2.25	
25						25
			SPLIT SPOON	6,21,18	N/A	
30		29.5 – 33.5 Medium dense, brown, wet, fine to coarse sandy gravel				30
		33.5 – 34.5 Loose, brown, wet, fine to coarse sand	SPLIT SPOON	8,8,7	N/A	
35						35
		34.5 – 35.0 Loose, brown, wet, fine sandy gravel				
		Boring terminated @ 35 ft bgs				
40						40
45						45

Boring #: E-9	FTN Associates, Ltd. Little Rock, Arkansas 3 Innwood Circle, Suite 220, 72211	Location: Entergy – Independence Plant	
Date: 04/05/01		Drilling Method: HSA	
Elevation: 304		Driller: Tri State Testing, Inc.	
Job No.: 6040-320		Logged By: MSR	

Depth, Feet	Litho. Symbol	Classification	Sample Type	Blow Counts	PPR	Depth, Feet
		0.0 – 23.5 Medium stiff, tan and gray, moist silty clay with ferrous staining	SPLIT SPOON	2,3,3	1.25	
			SPLIT SPOON	4,6,7	1.0	5
			SHELBY TUBE	N/A	N/A	
10			SPLIT SPOON	5,7,9	2.5	10
			SPLIT SPOON	3,4,5	2.0	
15			SHELBY TUBE	N/A	N/A	15
			SPLIT SPOON	4,6,5	1.5	
20						20
25		23.5 – 25.0 Very loose, brown, moist to wet clayey sand with ferrous staining	SPLIT SPOON	2,3,2	0.5	25
		25.0 – 30.0 Medium dense, brown, wet, fine to coarse sandy gravel with some clay				
30			SPLIT SPOON	8,7,10	N/A	30
		Boring terminated @ 30 ft bgs				
35						35
40						40
45						45

Boring #: E-10	FTN Associates, Ltd.	Location: Entergy – Independence Plant	
Date: 04/05/01	Little Rock, Arkansas	Drilling Method: HSA	
Elevation: 306	3 Innwood Circle, Suite 220, 72211	Driller: Tri State Testing, Inc.	
Job No.: 6040-320		Logged By: MSR	

Depth, Feet	Litho. Symbol	Classification	Sample Type	Blow Counts	PPR	Depth, Feet
		0.0 – 23.5 Soft to stiff, tan and gray, moist silty clay with ferrous staining				
			SPLIT SPOON	2,4,5	2.0	
5			SPLIT SPOON	6,8,9	2.0	5
			SPLIT SPOON	3,4,4	1.5	
10			SHELBY TUBE	N/A	N/A	10
			SPLIT SPOON	4,4,7	2.25	
15						15
			SHELBY TUBE	N/A	N/A	
20						20
		23.5 – 25.0 Loose, brown, moist to wet sandy clay with ferrous staining	SPLIT SPOON	1,2,6	N/A	
25		25.0 – 27.5 Loose, brown, wet, fine sand				25
		27.5 – 30.0 Medium dense, brown, wet fine to coarse sandy gravel with some clay	SPLIT SPOON	8,11,18	N/A	
30		Boring terminated @ 30 ft bgs				30
35						35
40						40
45						45

Monitoring Well No. D-507

PROJECT: ISES GWM
DATE: 09-03-92
LOGGED BY: C.G. McGuth
INITIAL GW DEPTH: 34 ft.
HOLE DIA: 8.25 in.
DRILLER: J & R Drilling
DRILL. METHOD: Hollow Stem Auger
FINAL GW: 29.88 (9/92) ft.
HOLE ELEV: 308.70 ft. MSL

DESCRIPTION	USCS CLASS	GRAPHIC LOG	DEPTH	SAMPLE	Sample ID.	WELL CONSTRUCTION DETAIL
SILT – lt.tan–brown (topsoil),organics present (grass,roothairs),v.stiff /dense,sl.moist.	ML		0	1	S-1	
Elev. = 307.70 ft.	CH					
CLAY – lt.tan,tan–buff,v.stiff,mottled,granular texture in zones,sl–tr silt,blocky texture in some areas, no organics present,sl.moist.			5	2	S-2	
			10	3	S-3	
			15	4	S-4	
			20	5	S-5	
			25	6	S-6	
			30	7	S-7	
Elev. = 274.70 ft.						
Gravel – lt.tan,brown,some silt,some sand,some chert,saturated.	GC		35	8	S-8	
– grains ranging in size from granule – pebble (not exceeding 3").			40	9	S-9	
			45	10	S-10	
			50			

ASSOCIATES, LTD.
water resource consultants

Notes:

Project No.
6046-0201

Monitoring Well No. D-507

PROJECT: ISES GWM
DATE: 09-03-92
LOGGED BY: C.Q. McGuth
INITIAL GW DEPTH: 34 ft.
HOLE DIA: 8.25 in.
DRILLER: J & R Drilling
DRILL. METHOD: Hollow Stem Auger
FINAL GW: 29.88 (9/92) ft.
HOLE ELEV: 308.70 ft. MSL

DESCRIPTION	USCS CLASS	GRAPHIC LOG	DEPTH	SAMPLE	Sample ID.	WELL CONSTRUCTION DETAIL
	GC		50	11	S-11	
			55	12	S-12	
			60	13	S-13	
			65	14	S-14	
			70	15	S-15	
Elev. = 235.70 ft.						
SILT - dk.gray,gray,v.fine silt,w/some-tr.sand,v.stiff-mod.stiff.	SM		75			
Elev. = 233.70 ft.						
Boring Terminated at 75 Feet (in silt).			80			
			85			
			90			
			95			
			100			

ASSOCIATES, LTD.
water resource consultants

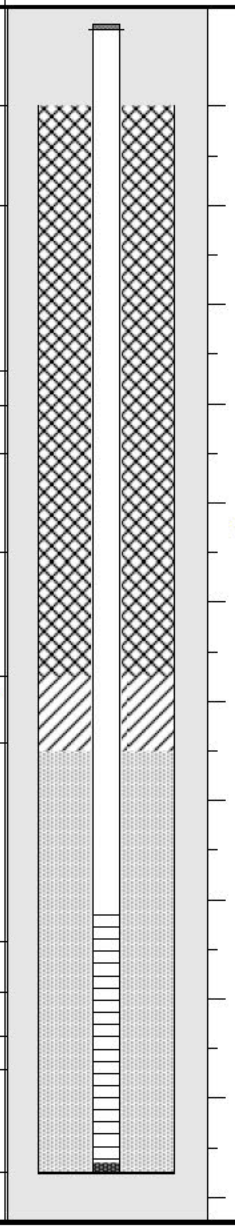
Notes:

Project No.
6046-020I

ftn Associates Ltd. water resources / environmental consultants	PROJECT: **Monitoring Well Installation**	BORING ID: **MW-1R**	
	LOCATION: **Entergy Independence Landfill**	WELL ID: **MW-1R**	
	DRILLING CONTRACTOR: **McCray Drilling,LLC**	NORTHING: **7164.3**	EASTING: **3899.0**
	DRILLING EQUIPMENT: **CME 750X**	GROUND SURFACE ELEV.: **310.2 ft SRE**	TOC ELEVATION: **313.28 ft SRE**
	DRILLING METHOD: **8.25" Hollow Stem Auger (HSA)**	TOTAL DEPTH: **46.2 ft from TOC**	DEPTH TO WATER: (1/27/2016) **20.34 ft below TOC**
LOGGED BY: **RSH**	SAMPLING METHOD: **5-ft continuous split barrel sampler**	DATE STARTED: **1/19/2016**	DATE COMPLETED: **1/20/2016**

Depth (feet)	% REC	USCS	Description
0			
	33	FILL	Non-CCR roadbase.
4			
	40	CL	LEAN CLAY, silty, light grey with carbanceous material and iron oxide staining, medium stiff, moist.
8			@8 ft bgs SAA, increasing silt with depth.
	100	ML	CLAYEY SILT with fine-grained sand, grey with orange mottling and carbanaceous material, moist.
12		CH	FAT CLAY with silt, greyish brown with iron oxide staining and carbanceous material, stiff, moist.
	100	CL	LEAN CLAY, with silt, light grey with iron oxide staining and carbanceous material, stiff, moist.
16			@17 ft bgs granular calcite concretions.
			FAT CLAY to LEAN CLAY with silt, light grey with iron oxide staining, stiff, moist.
20	100	CL/CH	
24		CL	SANDY CLAY, fine-grained, brownish grey, increasing sand content with depth, soft, very moist.
	90		POORLY GRADED SAND, fine- to medium-grained, light brown, loose, saturated.
28		SP	
	40		
32			@33-33.7ft bgs, SAA with gravel, coarse-grained, subangular.
	78	SC	CLAYEY SAND, fine- to medium-grained, grey, dense, very moist.
36		GW	WELL GRADED GRAVEL, fine- to coarse-grained, subangular, with fine- to medium-grained sand, loose, saturated.
		SP	POORLY GRADED SAND, medium- to coarse-grained, angular to subangular, loose, saturated.
40	45	GW	WELL GRADED GRAVEL, fine- to coarse-grained (<40mm), angular to subrounded with angular sand, saturated.
44			

Well Construction



- Above ground completion including 2x2 ft concrete pad, four pipe bollards, and locking outer steel casing
- 35.8 ft of 2 in dia., Sch. 40 PVC solid riser, including 3.1 ft of above ground stickup
- Cement/bentonite grout from 0 ft bgs to 23 ft bgs
- Bentonite pellet seal from 23 ft bgs to 26 ft bgs
- Silica size 10/20 filter pack from 26 ft bgs to 43 ft bgs
- 10 ft of 2 in dia., 0.010 in slot, Sch. 40 PVC screen
- 0.35 ft, 2 in dia., Sch. 40 PVC end cap
- 43 ft BOH

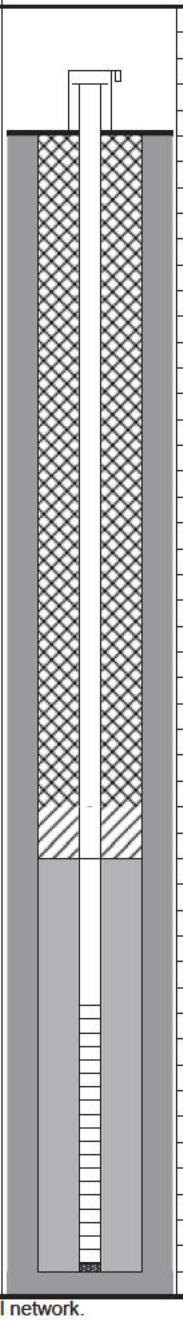
NOTES: Horizontal and vertical coordinates are based on the site-referenced coordinate system
Borehole and/or well IDs were updated to reflect the nomenclature used for the EPA CCR Rule network.

ftn Associates Ltd.
water resources / environmental consultants

FTN Project # R06040-0093-001

PROJECT: **Entergy Independence Plant 3N Landfill**		BORING ID: **MW-3**	
LOCATION: **Newark, Arkansas**		WELL ID: **MW-3**	
DRILLING CONTRACTOR: **Tri-State Testing Services**		NORTH: (AR State Plane NAD83N) **490823.74**	EAST: (AR State Plane NAD83N) **1492589.45**
DRILLING EQUIPMENT: **CME 750x**		GROUND ELEV. (SRE): **310.45**	TOC ELEVATION (SRE): **313.54**
DRILLING METHOD: **Hollow Stem Auger**		TOTAL DEPTH of BORING: **44 ft bgs**	DEPTH TO WATER from TOC: **34.40 ft (7/24/2013)**
LOGGED BY: **EJB**	SAMPLING METHOD: **5-foot continous sampler**	DATE STARTED: **7/16/2013**	DATE COMPLETED: **7/16/2013**

Depth (feet)	USCS	Description	% REC
-4			
0	ML	SILT with clay and angular white chert gravel, gray, medium stiff, dry.	100
	SP	SAND, brown to gray, loose, medium grained, dry.	
4	CL	CLAY, gray, lean, stiff, dry to moist. @ 4-5 ft. moist.	100
8	ML	SILT with clay and sand, gray with 15% orange mottling and ferrous staining, stiff, fine grained sand, dry. @ 9 ft. no sand, brown with 30% orange and black mottling, soft to medium stiff, moist.	
12	CH	FAT CLAY, gray with 10% ferrous stains, fat, stiff to hard, blocky texture, dry to moist.	100
16		@ 18.5 ft. gray with 30% orange mottling and ferrous staining.	100
20	CL	CLAY with silt, gray with 30 - 50% orange mottling, medium stiff, fat to lean, dry to moist. @ 20 ft. angular gray concretions.	100
24	CL	CLAY with sand, orange to brown, medium stiff, fat to lean, fine to medium grained sand, dry.	50
28	SC	SAND with clay, yellow-orange, loose to medium dense, dry to moist.	
	SP	SAND, brown, medium to fine grained, loose, saturated.	
32	GM	GRAVEL with sand and silt, brown to orange, rounded to sub-angular, loose, medium grained sand, saturated.	5
36			25
40	GM/SP	GRAVEL interlayered with sand and silt, saturated.	25
44			



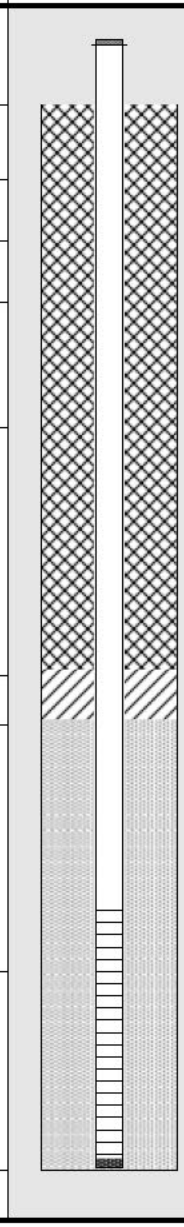
Well Construction

- 3.1 ft. of stick-up and protective steel casing
- PVC vented below cap
- 35.3 ft of 2 in dia., Sch. 40 PVC solid riser
- Cement/Bentonite grout from 0 ft to 26 ft bgs
- Bentonite pellet seal from 26 ft bgs to 28 ft bgs
- Natural filter pack from 28 ft bgs to 44 ft bgs
- 10 ft of 2 in dia., 0.010 in slot, Sch. 40 PVC screen
- 0.3 ft, 2 in dia., Sch. 40 PVC end cap
- Drilling terminated at 44 ft bgs

NOTES: Borehole and/or well IDs were updated to reflect the nomenclature used for the EPA CCR well network.
Well completion of 2' x 2' x 4" concrete pad, 4" x 4" steel protective cover. Total depth from TOC - 45.57 ft. Heaving sands and gravels encountered during drilling

ftn Associates Ltd. water resources / environmental consultants	PROJECT: **Monitoring Well Installation**	BORING ID: **MW-6**	
	LOCATION: **Entergy Independence Landfill**	WELL ID: **MW-6**	
	DRILLING CONTRACTOR: **McCray Drilling, LLC**	NORTHING: **3049.51**	EASTING: **4777.76**
	DRILLING EQUIPMENT: **CME 750X**	GROUND SURFACE ELEV.: **308.5 ft SRE**	TOC ELEVATION: **310.89 ft SRE**
	DRILLING METHOD: **8.25" Hollow Stem Auger**	TOTAL DEPTH: **45.3 ft from TOC**	DEPTH TO WATER: (8/20/2015) **28.54 ft below TOC**
LOGGED BY: **RSH**	SAMPLING METHOD: **5-ft continous split barrel**	DATE STARTED: **8/19/2015**	DATE COMPLETED: **8/19/2015**

Depth (feet)	% REC	USCS	Description
0	n/a		Non-CCR road base, plugged augers to drill through to insitu soils.
4	100	CH	FAT CLAY with silt, light gray, medium stiff, moist. Increasing silt with depth.
8	100	ML	S LT, light gray to brown with organic material and iron oxide staining, medium stiff, moist.
12		ML/CL	S LT to LEAN CLAY, gray, moist.
16	ST	CH	FAT CLAY to ELASTIC S LT, light gray, with trace fine- to medium-grained sand, moist (see note).
20	n/a		
24	n/a	ML/CL	S LT to LEAN CLAY, light gray, moist.
28	n/a	SW	WELL GRADED SAND, fine- to coarse-grained.
32	n/a		
36	n/a	GW	WELL GRADED GRAVEL, fine- to coarse-grained, subrounded to angular, fine-to-medium-grained sand.
40	n/a		
44			



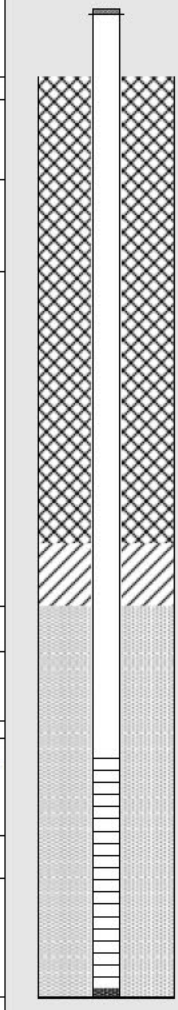
Well Construction

- Above ground completion including 2X2 ft concrete pad, four pipe bollards, and locking outer steel casing
- 34.9 ft of 2 in dia., Sch. 40 PVC solid riser, including 2.4 ft of above ground stickup
- Cement/bentonite grout from 0 ft bgs to 22.8 ft bgs
- Bentonite pellet seal from 22.8 ft bgs to 24.8 ft bgs
- Silica size 10/20 filter pack from 24.8 ft bgs to 43 ft bgs
- 10 ft of 2 in dia., 0.010 in slot, Sch. 40 PVC screen from 32.5 ft bgs to 42.5 ft bgs
- 0.35 ft, 2 in dia., Sch. 40 PVC end cap
- 43 ft BOH

NOTES: Horizontal and vertical coordinates are based on the site-referenced coordinate system. Borehole and/or well IDs were updated to reflect the nomenclature used for the EPA CCR well network. Plugged augers at 16 ft bgs due to safety concerns from area electrical storms. Soils logged by auger cuttings.

ftn Associates Ltd. water resources / environmental consultants	PROJECT: **Monitoring Well Installation**	BORING ID: **MW-7**	
	LOCATION: **Entergy Independence Landfill**	WELL ID: **MW-7**	
	DRILLING CONTRACTOR: **McCray Drilling, LLC**	NORTHING: **4390.24**	EASTING: **6342.87**
	DRILLING EQUIPMENT: **CME 750X**	GROUND SURFACE ELEV.: **307.9 ft SRE**	TOC ELEVATION: **310.62 ft SRE**
	DRILLING METHOD: **8.25" Hollow Stem Auger**	TOTAL DEPTH: **42.7 ft from TOC**	DEPTH TO WATER: (8/20/2015) **28.42 ft below TOC**
LOGGED BY: **RSH**	SAMPLING METHOD: **5-ft continous split barrel**	DATE STARTED: **8/18/2015**	DATE COMPLETED: **8/18/2015**

Depth (feet)	% REC	USCS	Graphic Log	Description
0				TOP SO L, clayey silt with organic matter.
	100	CL		LEAN CLAY, silty, light gray with minor ferrous staining, medium stiff, dry.
4				
	100	ML		S LT, light gray to light brown with ferrous staining and organic material, soft. @ 4.5-5.5 ft, saturated.
8				
	100			FAT CLAY, light gray to gray with ferrous staining, staining increases with depth, some organic material, blocky, stiff, moist.
12				
16	100	CH		@15 5 ft, with granular calcite concretions.
20	100			@18-23 ft, fat clay with fine grained sand, stiff, light brown to orange brown, increasing sand content with depth.
24		SM		S LTY SAND, light brown with a minor amount of clay @ 24-25 ft, color changes to tan, loose, saturated.
	47	GP		POORLY GRADED GRAVEL, with silty sand, fine-grained gravel with few coarse-grained gravels (<30mm), angular to subrounded, loose, light brown, saturated.
28		SP		POORLY GRADED SAND, medium grained, loose, light brown, saturated.
	40	GW		WELL GRADED GRAVEL, fine-to-coarse-grained, rounded to subangular, with fine-to-coarse-grained, angular to subanglur sand, loose, light brown, saturated.
32		SP		POORLY GRADED SAND, fine to medium grained, loose, light brown, saturated @ 34 ft, orange iron-oxide staining.
36	n/a	GW		WELL GRADED GRAVEL, fine-to-coarse-grained, angular to subrounded with fine-to-medium-grained sand, loose, light brown, saturated.
40				
44				



Well Construction

Above ground completion including 2X2 ft concrete pad, four pipe bollards, and locking outer steel casing

32.3 ft of 2 in dia., Sch. 40 PVC solid riser, including 2.7 ft of above ground stick up

Cement/bentonite grout from 0 ft bgs to 20.3 ft bgs

Bentonite pellet seal from 20.3 ft bgs to 23 ft bgs

Silica size 10/20 filter pack from 23 ft bgs to 40 ft bgs

10 ft of 2 in dia., 0.010 in slot, Sch. 40 PVC screen from 29.6 ft bgs to 39.6 ft bgs

0.35 ft, 2 in dia., Sch. 40 PVC end cap

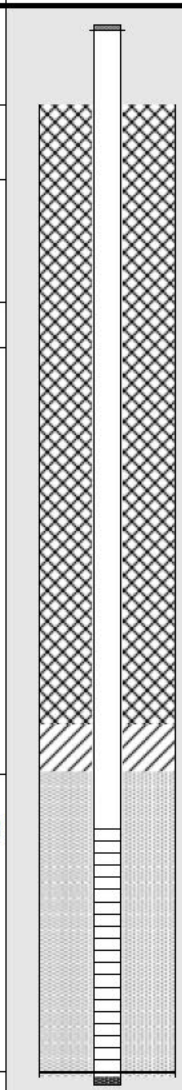
40 ft BOH

NOTES: Horizontal and vertical coordinates are based on the site-referenced coordinate system

Borehole and/or well IDs were updated to reflect the nomenclature used for the EPA CCR Rule network.

ftn Associates Ltd. water resources / environmental consultants	PROJECT: **Monitoring Well Installation**	BORING ID: **MW-8**	
	LOCATION: **Entergy Independence Landfill**	WELL ID: **MW-8**	
	DRILLING CONTRACTOR: **McCray Drilling, LLC**	NORTHING: **3531.09**	EASTING: **6472.65**
	DRILLING EQUIPMENT: **CME 750X**	GROUND SURFACE ELEV.: **308.4 ft SRE**	TOC ELEVATION: **311.42 ft SRE**
	DRILLING METHOD: **8.25" Hollow Stem Auger**	TOTAL DEPTH: **42.6 ft from TOC**	DEPTH TO WATER: (8/20/2015) **29.36 ft below TOC**
LOGGED BY: **RSH**	SAMPLING METHOD: **5-ft continous split barrel**	DATE STARTED: **8/18/2015**	DATE COMPLETED: **8/18/2015**

Depth (feet)	% REC	USCS	Graphic Log	Description
0	n/a			Non-CCR road base, plugged augers to drill through to insitu soils.
4	100	CH		FAT CLAY, light gray, very stiff, dry to moist. @3-3.5 silty clay, minor brown organic material and orange ferrous staining.
8		ML		SILT, tan to light gray, medium stiff, ferrous staining, with fine clay laminations (<1mm), moist.
12	78			FAT CLAY, tan, stiff, with carbonaceous material and ferrous staining, dry to moist. @12 ft, with granular calcite concretions.
16	100	CH		@ 17 ft, silty, decreased carbonaceous material. @ 18 ft, color changes to light gray to gray with iron oxide staining, stiff, moist. @ 19.8 ft, with grannular calcite concretions.
20	100			@ 21.5 ft, occasional fine-grained sand partings, sand is yellowish orange, clay has iron oxide staining in vertical fractures. @ 23 ft, color changes to brown, soft, moist to very moist.
24	72			@ 26.8 ft, sandy clay, sand is fine-grained, saturated.
28	44	GW		WELL GRADED GRAVEL with sand, clayey in upper 0.2 ft, fine- to coarse-grained gravel (less than 2"), fine- to coarse-grained sand, gravel is rounded to subangular, sand is subangular to angular, loose, brown, saturated, chert gravel.
32				
36	n/a			
40				
44				



Well Construction

- Above ground completion including 2X2 ft concrete pad, four pipe bollards, and locing outer steel casing
- 32.2 ft of 2 in dia., Sch. 40 PVC solid riser, including 3.0 ft of above ground stickup
- Cement/bentonite grout from 0 ft bgs to 25 ft bgs
- Bentonite pellet seal from 25 ft bgs to 26.9 ft bgs
- Silica size 10/20 filter pack from 26.9 ft bgs to 39.4 ft bgs
- 10 ft of 2 in dia., 0.010 in slot, Sch. 40 PVC screen from 29.2 ft bgs to 39.2 ft bgs
- 0.35 ft, 2 in dia., Sch. 40 PVC end cap
- 39 ft BOH

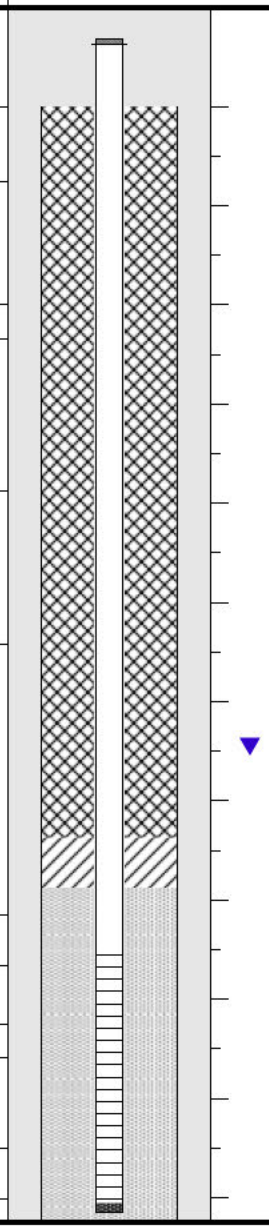
NOTES: Horizontal and vertical coordinates are based on the site-referenced coordinate system

Borehole and/or well IDs were updated to reflect the nomenclature used for the EPA CCR Rule network.

ftn Associates Ltd. water resources / environmental consultants	PROJECT: **Monitoring Well Installation**	BORING ID: **MW-9**	
	LOCATION: **Entergy Independence Landfill**	WELL ID: **MW-9**	
	DRILLING CONTRACTOR: **McCray Drilling, LLC**	NORTHING: **3059.28**	EASTING: **5967.5**
	DRILLING EQUIPMENT: **CME 750X**	GROUND SURFACE ELEV.: **307.9 ft SRE**	TOC ELEVATION: **310.39 ft SRE**
	DRILLING METHOD: **8.25" Hollow Stem Auger**	TOTAL DEPTH: **47.8 ft from TOC**	DEPTH TO WATER: (8/20/2015) **28.28 ft below TOC**
LOGGED BY: **RSH**	SAMPLING METHOD: **5-ft continous split barrel**	DATE STARTED: **8/17/2015**	DATE COMPLETED: **8/17/2015**

Depth (feet)	% REC	USCS	Graphic Log	Description
0	n/a			Non-CCR road base, plugged augers to drill through to insitu soils
4	50	CH		FAT CLAY with silt, light gray, very stiff, with carbonaceous material and calcite concretions, moist to dry.
8		SC		CLAYEY SAND, fine- to medium-grained, light gray, loose, with carbonaceous material, moist.
	100			FAT CLAY with increasing silt content with depth, light gray, very stiff, moist, with calcitic concretions and carbonaceous material, orange and black ferrous staining in vertical fractures.
12		CH		
16	100			S LT, light gray with orange and black ferrous staining, soft, moist.
		ML		@ 17.5 ft, with clay and minor very fine-grained sand.
				@ 18 ft, very moist.
20	80			@ 20.7 ft, saturated.
				FAT CLAY, light gray to light brown, stiff to very stiff, moist.
24				@ 23 ft, SAA with iron oxide staining and peat-like organic matter.
	100			@ 24.7 ft color changes to dark gray with minor silt partings, moist.
28		CH		@ 28 ft, color changes to gray, soft.
	100			
32		GW		WELL GRADED GRAVEL with fine- to medium-grained sand, fine- to coarse-grained chert gravel less than 30 mm, subrounded to angular, light brown to yellowish orange, saturated.
		SW		WELL GRADED SAND, fine- to coarse-grained sand, loose, light brown, saturated
36	34			
		GW		WELL GRADED GRAVEL, fine- to coarse-grained , subangular to angular, quartz/ chert gravel grain size fines upwards saturated.
				WELL GRADED SAND, fine to coarse sand, subrounded to angular, saturated.
40	34	SW		
		GW		WELL GRADED GRAVEL, fine- to coarse-grained (less than 3"), with medium-grained sand, subrounded to subangular, quartz/ chert gravel, saturated.
44	n/a			

Well Construction



Above ground completion including 2X2 ft concrete pad, four pipe bollards, and locking outer steel casing

37.4 ft of 2 in dia., Sch. 40 PVC solid riser, including 2.5 ft of above ground stickup

Cement/bentonite grout from 0 ft bgs to 29.5 ft bgs

Bentonite pellet seal from 29.5 ft bgs to 31.5 ft bgs

Silica size 10/20 filter pack from 31.5 ft bgs to 45 ft bgs

10 ft of 2 in dia., 0.010 in slot, Sch. 40 PVC screen from 34.9 ft bgs to 44.9 ft bgs

0.35 ft, 2 in dia., Sch. 40 PVC end cap

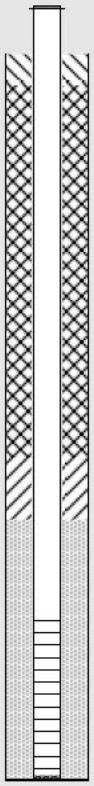
45 ft BOH

NOTES: Horizontal and vertical coordinates are based on the site-referenced coordinate system

Borehole and/or well IDs were updated to reflect the nomenclature used for the EPA CCR Rule network.

	PROJECT: **Monitoring Well Installations**	BORING ID: **MW-10**	
	LOCATION: **Entergy Independence Landfill**	WELL ID: **MW-10**	
	DRILLING CONTRACTOR: **Cascade Environmental**	NORTHING: **4326.9**	EASTING: **5583.2**
	DRILLING EQUIPMENT: **TS 150 Rig #1154**	GROUND SURFACE ELEV.: **310.7 ft SRE**	TOC ELEVATION: **313.63 ft SRE**
	DRILLING METHOD: **Sonic with 4x6 in dia. core and case**	TOTAL WELL DEPTH: **49.7 ft below TOC**	DEPTH TO WATER: 3/6/2017 **32.85 ft below TOC**
LOGGED BY: **RSH**	SAMPLING METHOD: **Continuous with 10 ft, 4 in dia. core barrel**	DATE STARTED: **2/13/2017**	DATE COMPLETED: **2/14/2017**

Depth (feet)	% REC	USCS	Description
0		FILL	FILL, limestone gravel road base material.
	75	CH	FAT CLAY, light grey to tan with organic material, medium stiff, moist, silty upper 1 ft.
		CL	LEAN CLAY, silty, light grey with orange ferrous staining and organic material, stiff, moist.
10	100	ML	SILT with clay, light grey to light brown with organic material and ferrous staining, soft, moist.
			CLAY with silt, light grey with orange ferrous staining, blocky, stiff, moist.
20	100	CL	@24-26 ft with increased ferrous staining. @26-28 ft sandy, very fine-grained, light brown, soft, wet.
30	80	CH	FAT CLAY, light grey with ferrous staining, stiff, moist. @30-31 ft sandy, sand is fine-grained, grey, very moist, soft.
			POORLY GRADED GRAVEL with sand, fine to coarse-grained, sand is fine to medium-grained, brown, loose, saturated. @36-46 ft with minor silt content, fine to coarse grained-sand, fine to medium-grained subrounded chert gravel. @38-38.5 ft with increased sand content.
40	20	GP	@46-47 ft with coarse-grained subangular sand and gravel (<1 in)
			Boring terminated at 47 ft.
50			Soil descriptions are based on the soil log from 710D located 30 ft from 710S. Soils were continuously sampled and logged at 710D using a 4-in core barrel. Samples from 710S were visually observed to verify that 710S was advanced in similar soils logged for 710D.
60			
70			



Well Construction

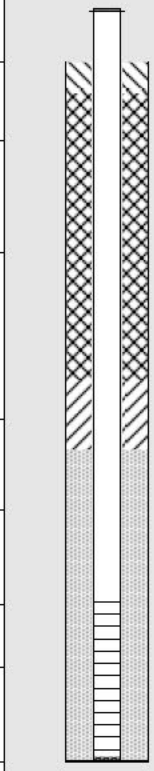
- Above ground completion including 3x3 ft concrete pad, four pipe bollards, and locking outer aluminum casing
- Concrete from 0 ft to 2.0 ft
- 39.5 ft of 2 in dia., Sch. 40 PVC solid riser, including 2.9 ft of stickup and a 0.12 ft PVC coupler for dedicated pump mount.
- Cement/bentonite grout from 2.0 ft to 26.0 ft
- Bentonite pellet seal from 26.0 ft to 30.0 ft
- Silica size 10/20 filter pack from 30.0 ft to 47.0 ft
- 10.0 ft of 2 in dia., 0.010 in slot, Sch. 40 PVC screen
- 0.25 ft, 2 in dia., Sch. 40 PVC end cap

NOTES: Borehole and/or well IDs were updated to reflect the nomenclature used for the EPA CCR Rule network.

Horizontal and vertical data are based on the Harmon Surveying report dated April 10, 2017 (site referenced coordinate system). SRE=Site referenced elevation.

	PROJECT: **Monitoring Well Installations**	BORING ID: **MW-11**	
	LOCATION: **Entergy Independence Landfill**	WELL ID: **MW-11**	
	DRILLING CONTRACTOR: **Cascade Environmental**	NORTHING: **4392.0**	EASTING: **6005.9**
	DRILLING EQUIPMENT: **Geoprobe 8140LC**	GROUND SURFACE ELEV.: **310.0 ft SRE**	TOC ELEVATION: **313.25 ft SRE**
	DRILLING METHOD: **Sonic with 4x6 in dia. core and case**	TOTAL WELL DEPTH: **49.0 ft below TOC**	DEPTH TO WATER: 3/6/2017 **32.51 ft below TOC**
LOGGED BY: **RSH**	SAMPLING METHOD: **Continuous 5 ft and 10 ft, 4 in dia. core barrel**	DATE STARTED: **2/23/2017**	DATE COMPLETED: **2/23/2017**

Depth (feet)	% REC	USCS	Description
0	0		NO RECOVERY, limestone gravel road base material at surface.
10	60	ML	SILT with clay, light grey with orange ferrous staining and brown organic material, medium stiff, moist. @7-10 ft with decreased clay content, with minor fine-grained sand content, soft, very moist to wet. @10-11 ft clayey.
	90	CL	LEAN CLAY, silty, light grey with orange ferrous staining, blocky, stiff, moist. @15-20 ft medium stiff, moist to very moist.
20	85		@20 ft sandy, with reddish brown ferrous staining, soft, increasing sand content with depth.
	100	GC	CLAYEY GRAVEL with sand, fine-to coarse-grained, sand is medium to coarse-grained, brown, loose, saturated. @26.5 ft gravely fat clay lens (0.5 ft), clay is grey, gravel is fine-grained, wet, soft.
30	50	CL	SANDY LEAN CLAY, grey, sand is very fine-grained, soft, very moist.
		SC	CLAYEY SAND, fine to medium-grained, medium dense, saturated, increasing clay content with depth.
40	50	GC	CLAYEY GRAVEL with sand, fine to coarse chert, sand is fine to medium-grained, clay is fat and grey, wet to saturated.
50			Boring terminated at 45 ft.
60			
70			



Well Construction

- Above ground completion including 3x3 ft concrete pad, four pipe bollards, and locking outer aluminum casing
- Concrete from 0 ft to 2.0 ft
- 38.8 ft of 2 in dia., Sch. 40 PVC solid riser, including 3.3 ft of stickup and a 0.12 ft PVC coupler for dedicated pump mount
- Cement/bentonite grout from 2.0 ft bgs to 20.5 ft
- Bentonite pellet seal from 20.5 ft bgs to 25.0 ft
- Silica size 10/20 filter pack from 25.0 ft bgs to 45.0 ft
- 10.0 ft of 2 in dia., 0.010 in slot, Sch. 40 PVC screen
- 0.20 ft, 2 in dia., Sch. 40 PVC end cap

NOTES: Borehole and/or well IDs were updated to reflect the nomenclature used for the EPA CCR Rule network.

Horizontal and vertical data are based on the Harmon Surveying report dated April 10, 2017 (site referenced coordinate system). SRE=Site referenced elevation.

Geotechnical Data

ENTERGY INDEPENDENCE PLANT WELL ID NUMBER KEY.

EPA CCR Well ID on Site Map	Well ID on Geotechnical Data Test Forms[a]
MW-1R[b]	701S-R, 701M, 701D[b]
MW-3[a]	703S, 703M, 703D[b]
MW-6	706S
MW-7	707S
MW-8	708S
MW-9[b]	709S, 709M, 709D[b]
MW-10[b]	710S, 710M, 710D[b]
MW-11	711S

Notes:

a. Geotechnical soil samples were collected and tested using well IDs associated with the landfill's ADEQ solid waste permit (Permit No. 0200-S3N-R2).

b. Well cluster consisting of three closely spaced wells with different depths. Due to scale, these are represented as one well on the site map.

TESTING SERVICES, INC.

Measurement of Hydraulic Conductivity

Client: FTN

Date of Report: 06/07/01 **Job #:** E-5-672

Project Name: Entergy/Independence Plant

Sample I.D.: Composite Sample Boring E-10

Soil Description: Brown Clay/Remolded Sample

Test Media: City of Memphis Public Water Supply

	Pre-Test
Wet Density	122.1 lbs/ft^3
Dry Density	99.5 lbs/ft^3
Moisture (% Dry Wt)	22.7%
Porosity (n) Total	.372
Initial Degree of Saturation	92.3%
Percent Compaction	95.9%
Deviation from Opt. Moisture	+3.1%
"B" Coefficient (post saturation)	1.00
Range of Hydraulic Gradient	20.1-34.8

Permeability

Temperature Correction, R_t = 1.002

$K_1 = 3.7 \times 10^{-9}$ cm/sec
$K_2 = 3.4 \times 10^{-9}$ cm/sec
$K_3 = 3.5 \times 10^{-9}$ cm/sec
$K_4 = 3.6 \times 10^{-9}$ cm/sec

Coefficient of Permeability, $K_{20} = 3.6 \times 10^{-9}$ cm/sec

Tested in accordance with ASTM D-5084-90.

Lab No. P-01-034 Reviewed By: David D. McCray

6756 Buckles Cove Memphis, TN 38133 901-385-1199 fax 901-386-6614

TRI STATE
TESTING SERVICES, INC.

Measurement of Hydraulic Conductivity

Client: FTN

Date of Report: 06/07/01 **Job #:** E-5-672

Project Name: Entergy/Independence Plant

Sample I.D.: Boring E-2 Shelby Tube, Depth 12'-14'

Soil Description: Brown Clay

Test Media: City of Memphis Public Water Supply

	Pre-Test
Wet Density	111.5 lbs/ft^3
Dry Density	81.3 lbs/ft^3
Moisture (% Dry Wt)	37.2%
Porosity (n) Total	.501
Initial Degree of Saturation	93.2%
"B" Coefficient (post saturation)	1.00
Range of Hydraulic Gradient	16.0-31.3

Permeability

Temperature Correction, R_t = 1.004

$K_1 = 2.0 \times 10^{-8}$ cm/sec
$K_2 = 1.5 \times 10^{-8}$ cm/sec
$K_3 = 1.3 \times 10^{-8}$ cm/sec
$K_4 = 1.8 \times 10^{-8}$ cm/sec

Coefficient of Permeability, K_{20} = 1.7×10^{-8} cm/sec

Tested in accordance with ASTM D-5084-90.

Lab No. P-01-027

Reviewed By: David D. McCray

6756 Buckles Cove Memphis, TN 38133 901-385-1199 FAX 901-386-6614

TESTING SERVICES, INC.

Measurement of Hydraulic Conductivity

Client: FTN

Date of Report: 06/07/01 **Job #:** E-5-672

Project Name: Entergy/Independence Plant

Sample I.D.: Boring E-9 Shelby Tube, Depth 16'-18'

Soil Description: Brown Clay

Test Media: City of Memphis Public Water Supply

	Pre-Test
Wet Density	114.6 lbs/ft^3
Dry Density	84.7 lbs/ft^3
Moisture (% Dry Wt)	35.3%
Porosity (n) Total	.480
Initial Degree of Saturation	94.7%
"B" Coefficient (post saturation)	1.00
Range of Hydraulic Gradient	18.7-34.8

Permeability

Temperature Correction, R_t = 1.002

$K_1 = 6.7 \times 10^{-9}$ cm/sec
$K_2 = 7.1 \times 10^{-9}$ cm/sec
$K_3 = 7.2 \times 10^{-9}$ cm/sec
$K_4 = 7.1 \times 10^{-9}$ cm/sec

Coefficient of Permeability, K_{20} = 7.0×10^{-9} cm/sec

Tested in accordance with ASTM D-5084-90.

Lab No. P-01-031 Reviewed By: David D. McCray

6756 Buckles Cove Memphis, TN 38133 901-385-1199 fax 901-386-6614

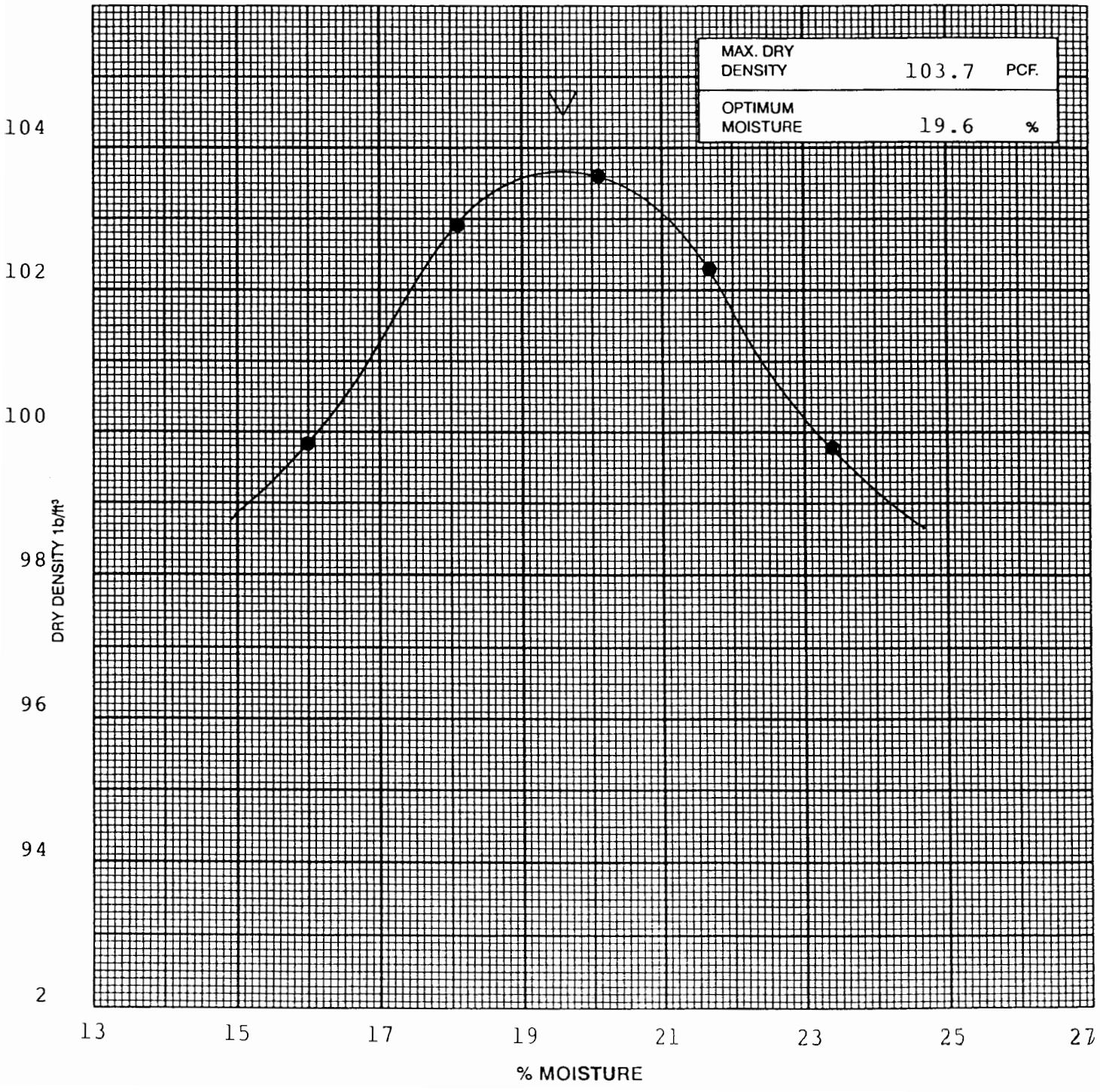
STATE TESTING SERVICES, INC.
6756 Buckles Cove • Memphis, TN 38133
901-385-1199 FAX 901-386-6614

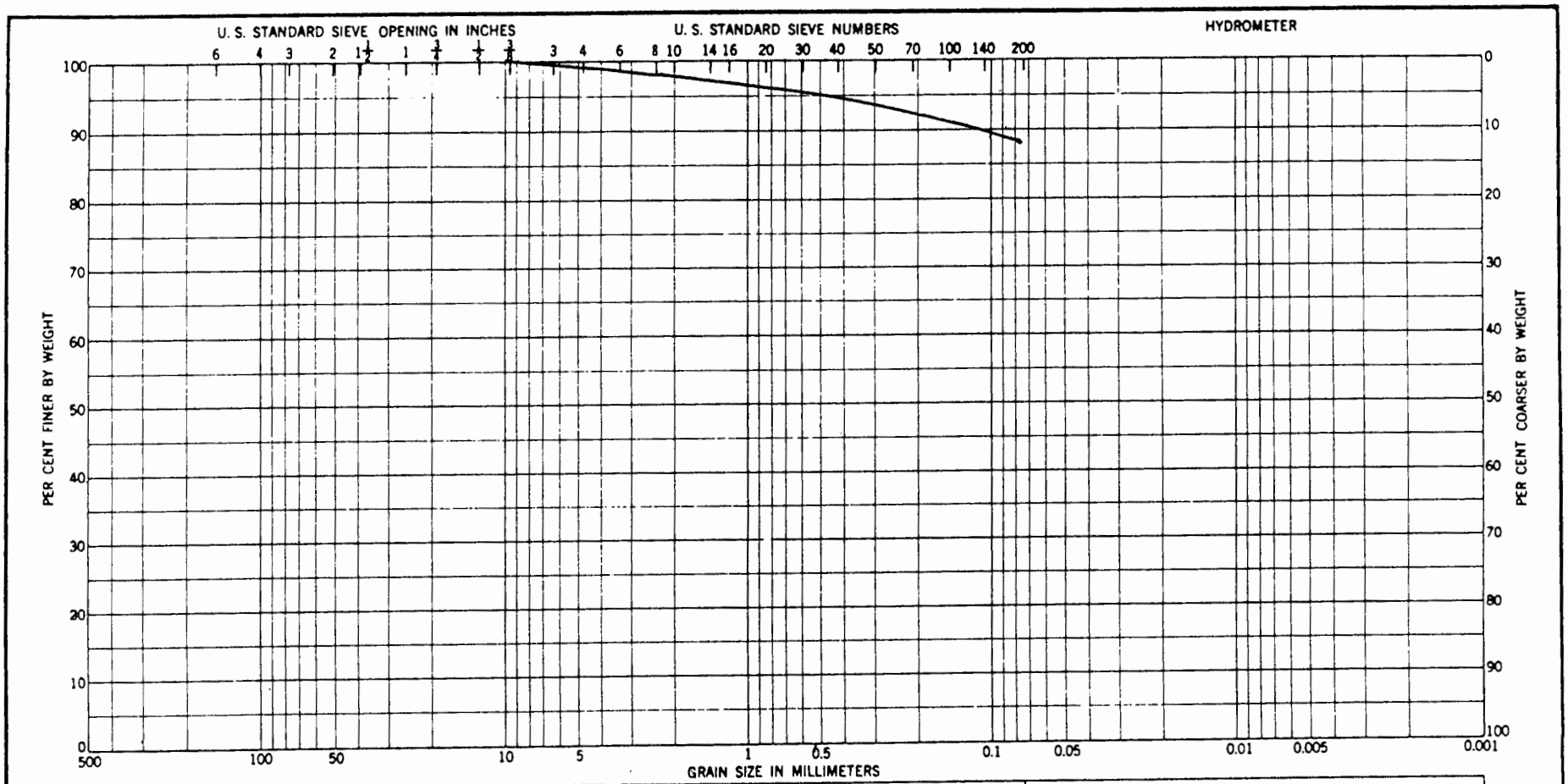
LAB NO. P-01-034

MOISTURE-DENSITY RELATIONS PLOT

OWNER Entergy Corp.
PROJECT Independence Plant
LOCATION E-10
CLIENT FTN & Associates

REFERENCE CURVE NO. 2A
METHOD OF TEST ASTM D-698A
SOIL DESCRIPTION Brown Clay



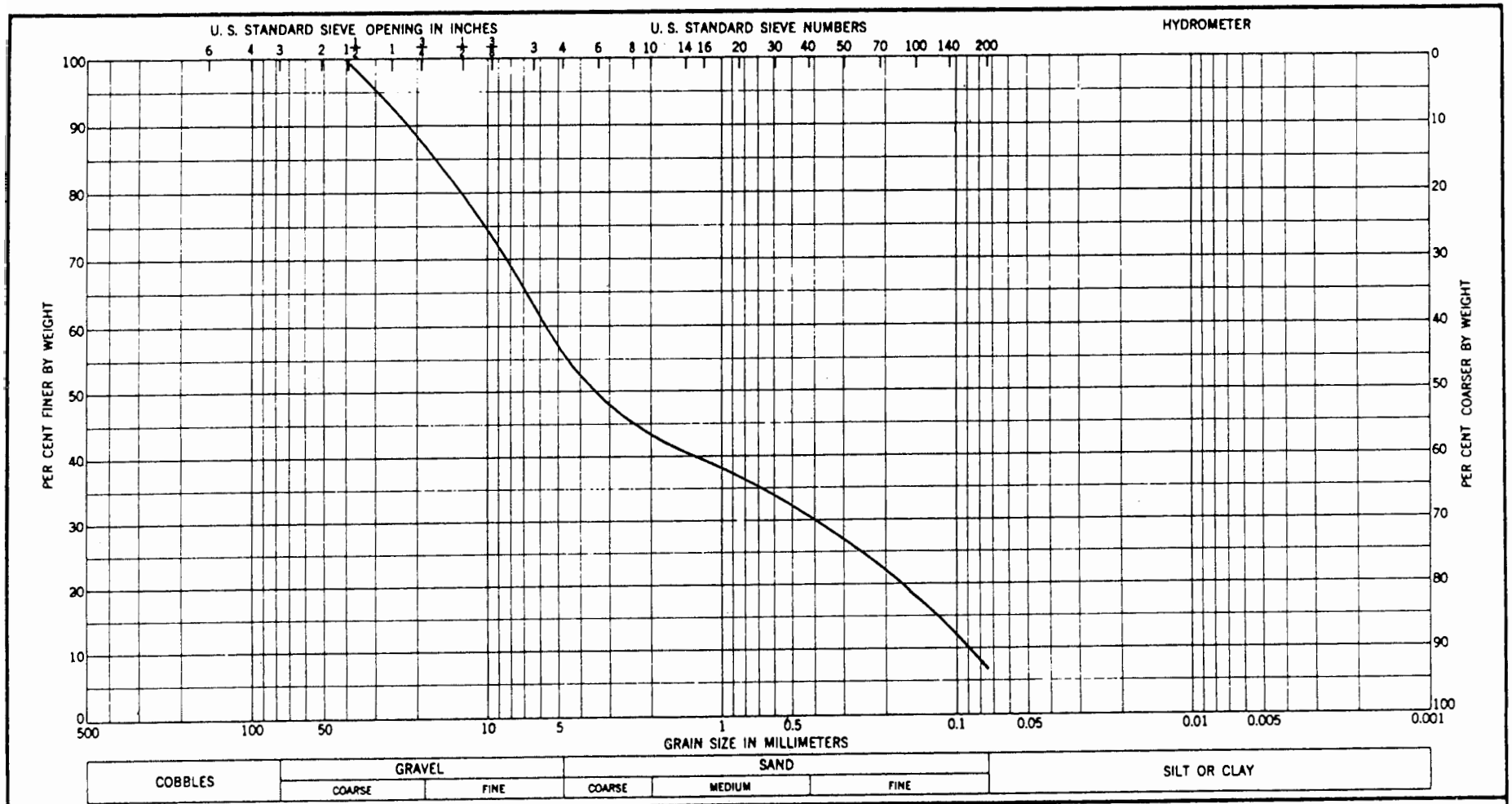


Sample No.	Elev or Depth	Classification	Nat w %	LL	PL	PI
ST	1-3	CL	31	32	16	16

GRADATION CURVES

Project Independence Plant
Newark, AR
Area Proposed Landfill
Boring No. E-1
Date 5/16/01

TRI-STATE TESTING SERVICES, INC.

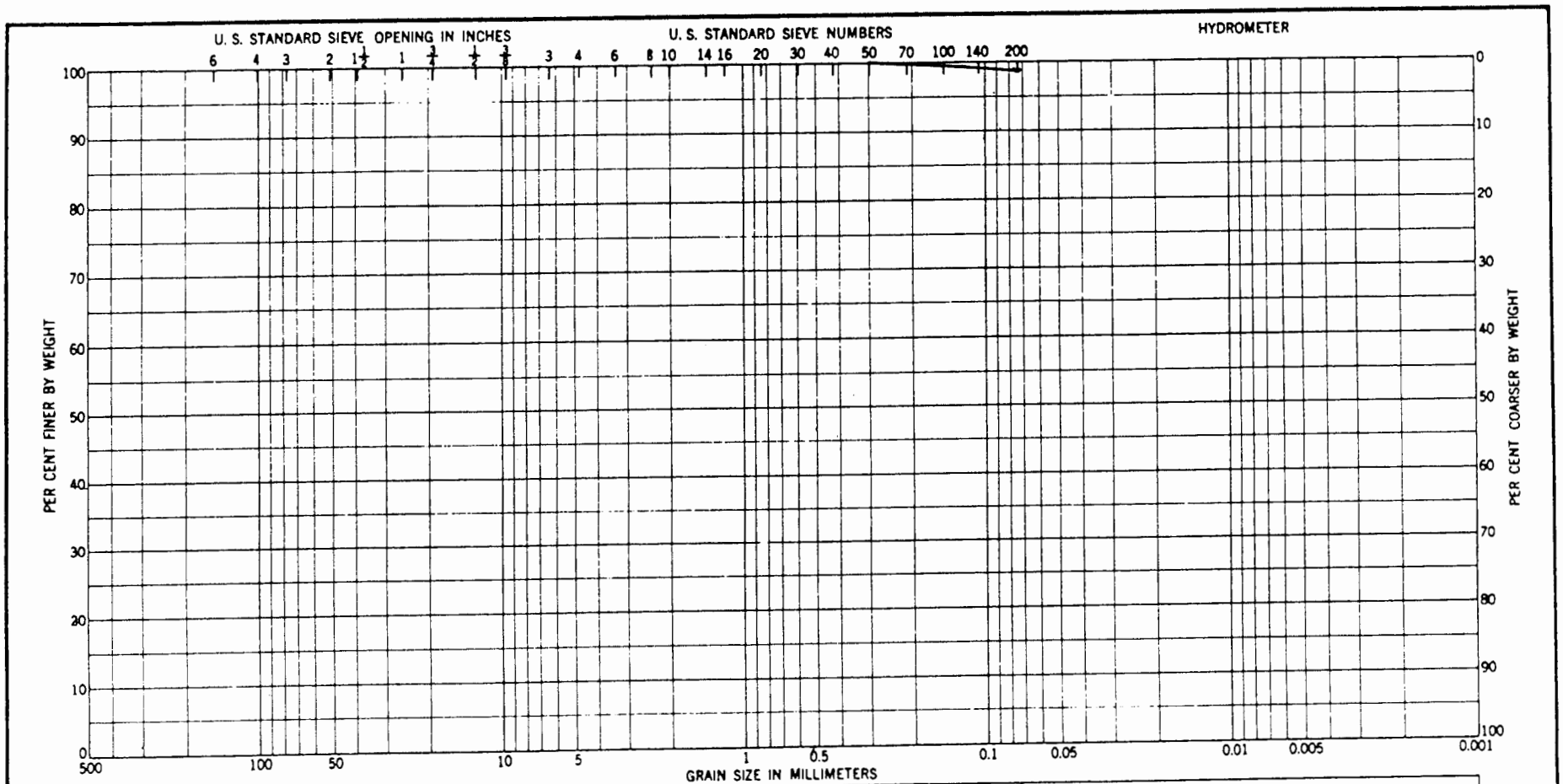


Sample No.	Elev or Depth	Classification	Nat w %	LL	PL	PI
SS	33.5-35	SP-SM	19	NP	NP	NP

GRADATION CURVES

Project: Independence Plant
Newark, AR
Area: Proposed Landfill
Boring No.: E-1
Date: 5/16/01

TRI-STATE TESTING SERVICES, INC.

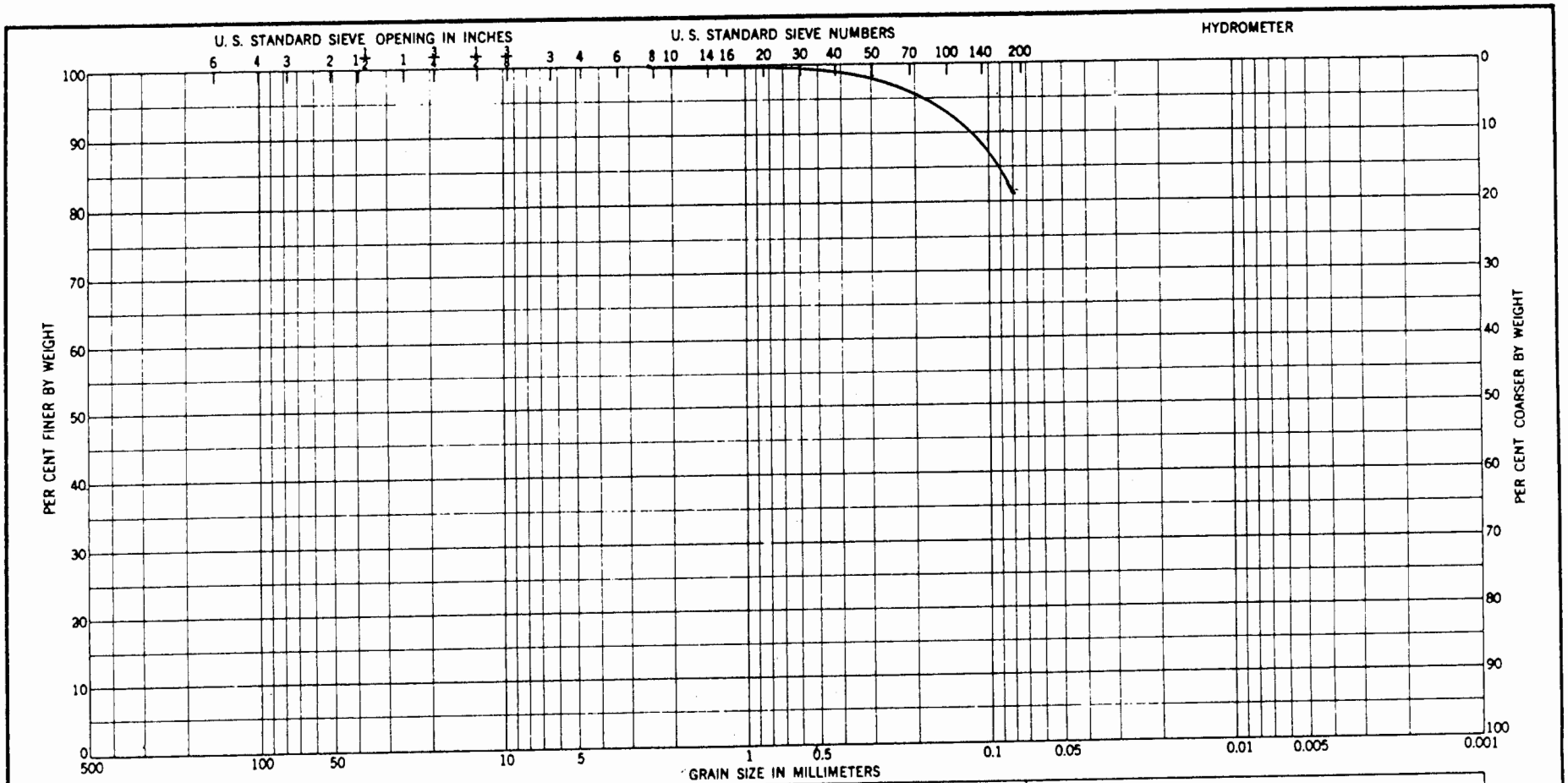


Sample No.	Elev or Depth	Classification	Nat w %	LL	PL	PI
SS	6-7.5	CH	30	82	30	52

GRADATION CURVES

Project Independence Plant
Newark, AR
Area Proposed Landfill
Boring No. E-2
Date 5/16/01

TRI-STATE TESTING SERVICES, INC.

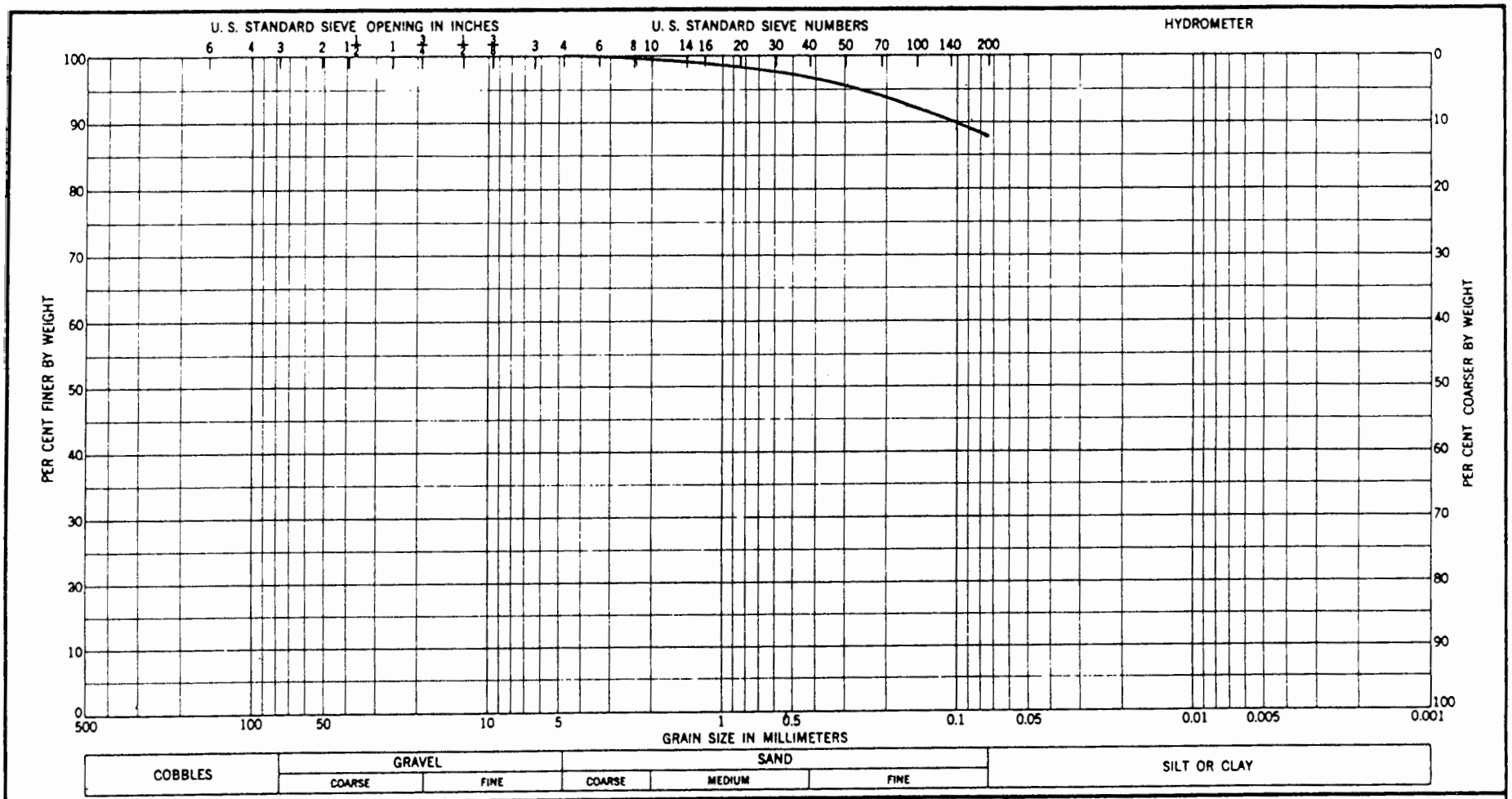


Sample No.	Elev or Depth	Classification	Nat w %	LL	PL	PI
ST	12-14	CH	37.2	72	26	46

GRADATION CURVES

Project Independence Plant
Newark, AR
Area Proposed Landfill
Boring No. E-2
Date 5/16/01

TRI-STATE TESTING SERVICES, INC.

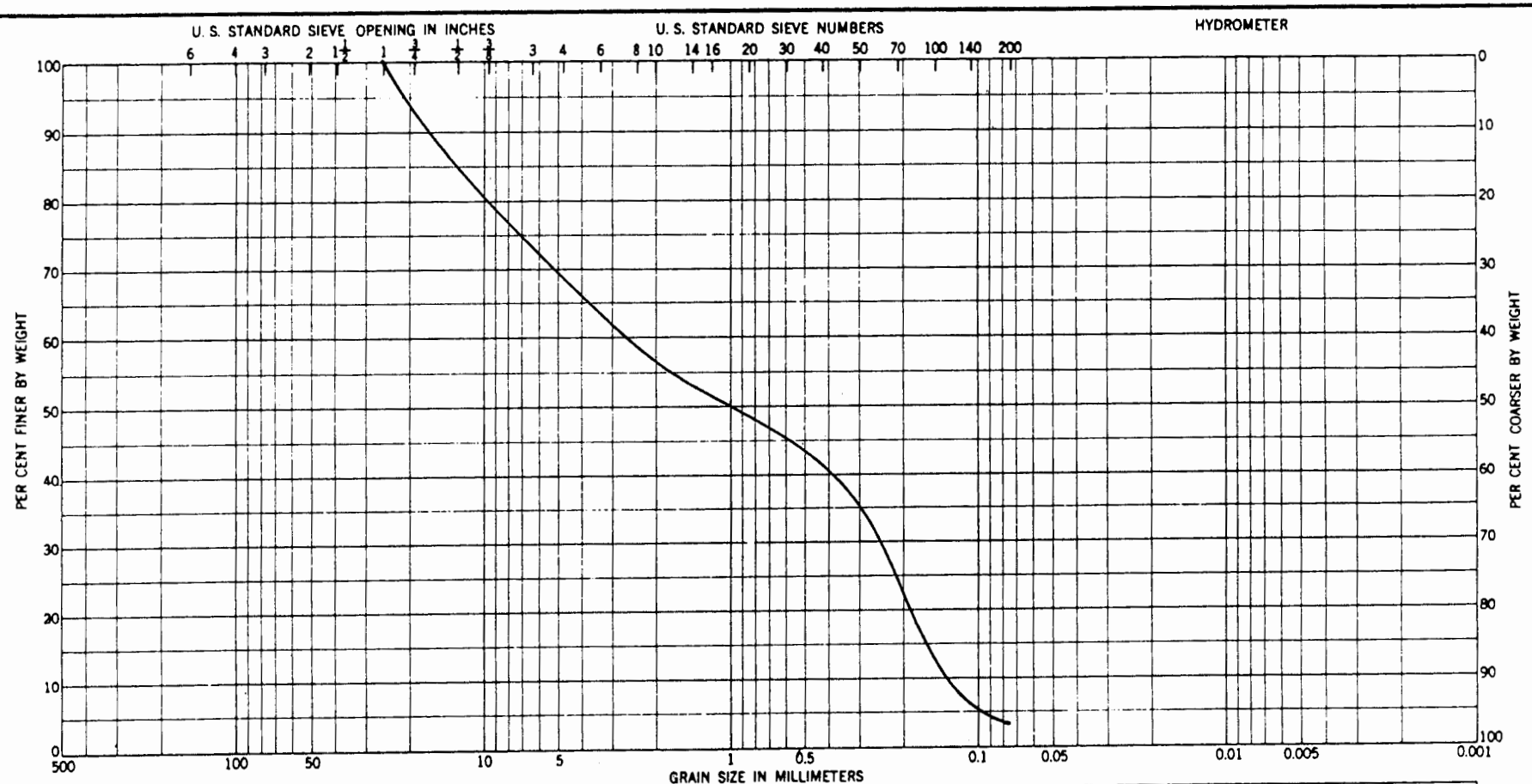


Sample No.	Elev or Depth	Classification	Nat w %	LL	PL	PI
SS	3.5-5	CH	25	53	20	33

GRADATION CURVES

Project Independence Plant
Newark, AR
Area Proposed Landfill
Boring No. E-3
Date 5/16/01

TRI-STATE TESTING SERVICES, INC.

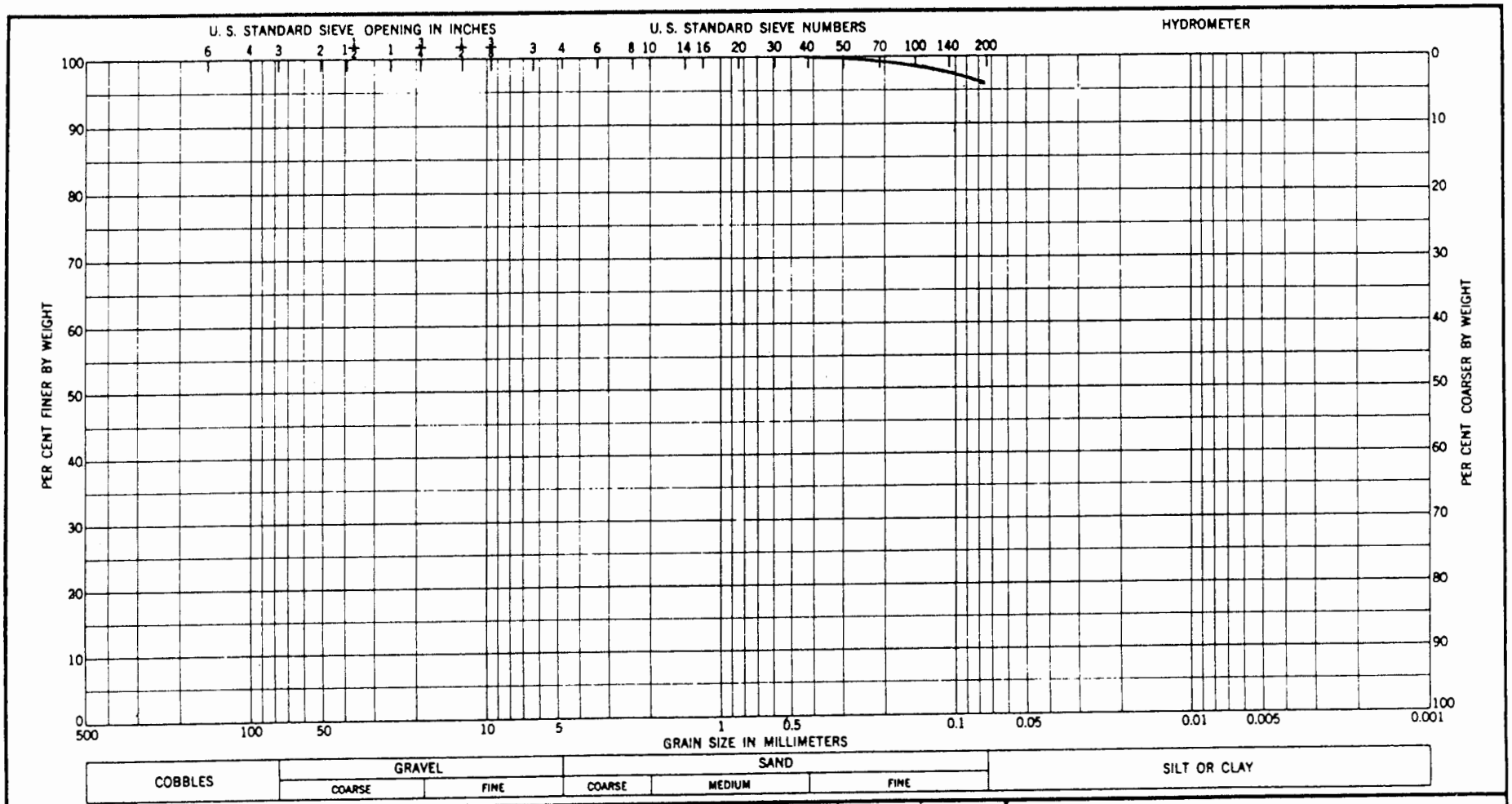


Sample No.	Elev or Depth	Classification	Nat w %	LL	PL	PI
SS	33.5-35.0	SP	14.4	NP	NP	NP

GRADATION CURVES

Project: Independence Plant
Newark, AR
Area: Proposed Landfill
Boring No.: E-3
Date: 5/24/01

TRI-STATE TESTING SERVICES, INC.

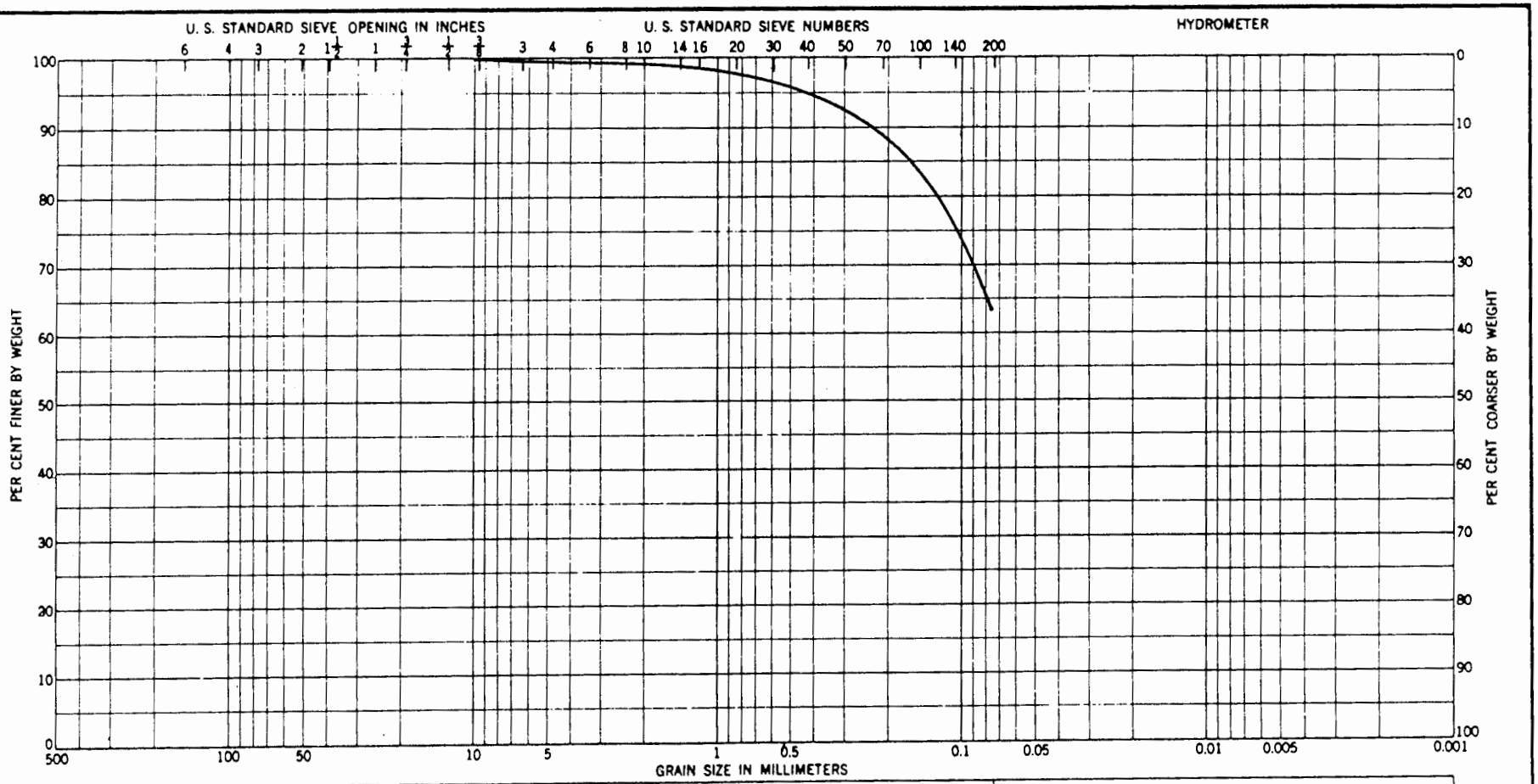


Sample No.	Elev or Depth	Classification	Nat w %	LL	PL	PI
SS	9.0-10.5	CH	36	83	32	51

GRADATION CURVES

Project Independence Plant
Newark, AR
Area Proposed Landfill
Boring No. E-9
Date 5/29/01

TRI-STATE TESTING SERVICES, INC.

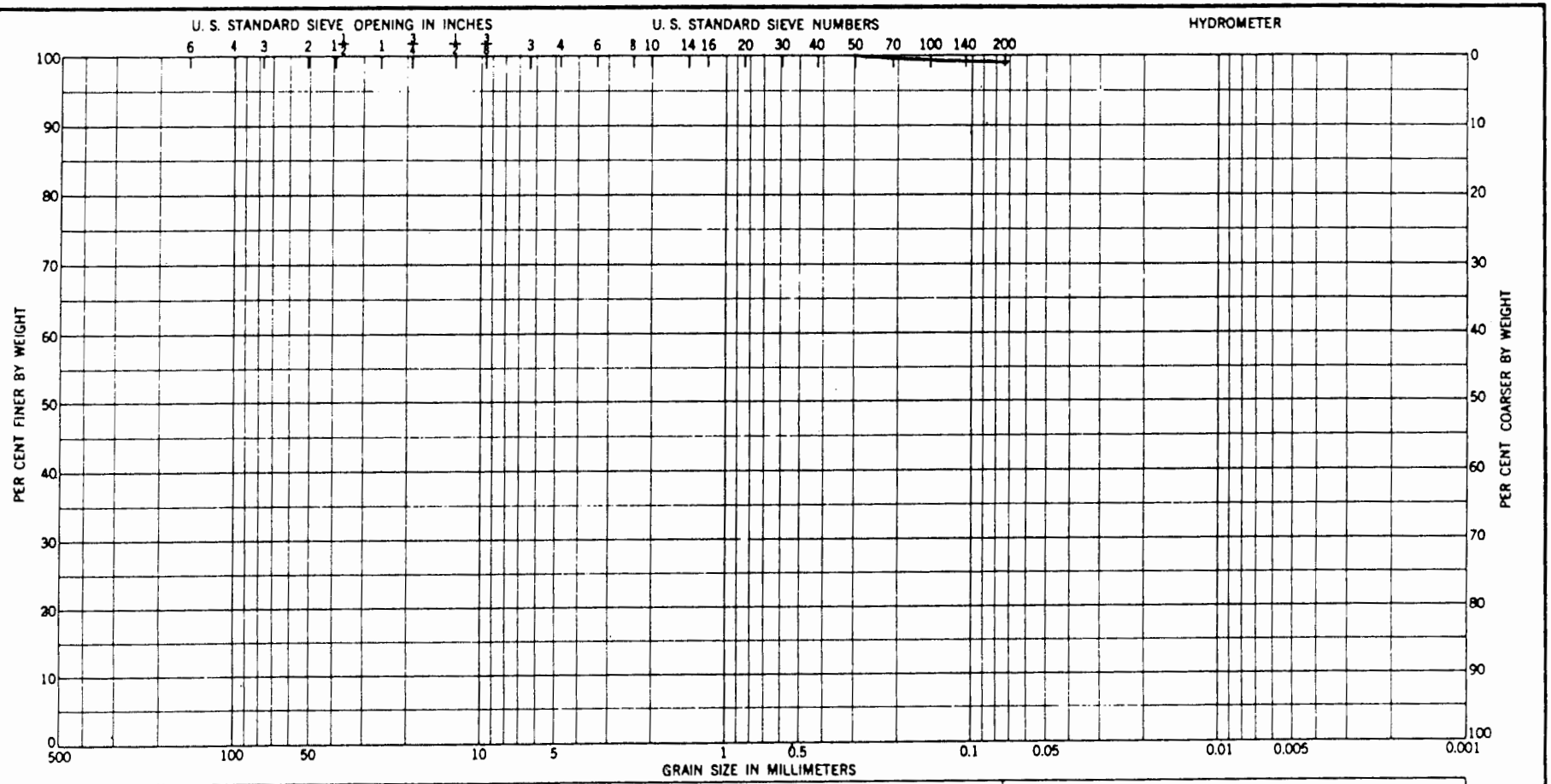


Sample No.	Elev or Depth	Classification	Nat w %	LL	PL	PI
SS	23.5-25.0	CL	21.5	25	14	11

GRADATION CURVES

Project Independence Plant
Newark, AR
Area Proposed Landfill
Boring No. E-9
Date 5/24/01

TRI-STATE TESTING SERVICES, INC.



Sample No.	Elev or Depth	Classification	Nat w %	LL	PL	PI
SS	13.5-15.0	CH	40	87	31	56

GRADATION CURVES

Project: Independence Plant
Newark, AR
Area: Proposed Landfill
Boring No.: E-10
Date: 5/29/01

TRI-STATE TESTING SERVICES, INC.

Unconsolidated, Undrained (Q) Compressive Strength Of Cohesive Soils In Triaxial Compression

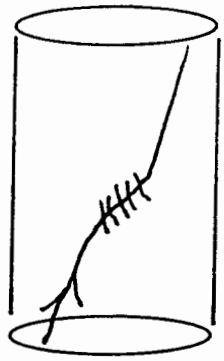
AASHTO T 296-94 / ASTM D 2850

Tri State Testing Services Memphis, Tennessee

April 17, 2001

Job No. 1182
Boring No. E-3
Depth 15.5 ft.
Sample No. n/a
Specimen No.
Test No.

Top Dia.	7.2619	cm
Mid Dia.	7.2619	cm
Bot Dia.	7.2619	cm
Avg Dia.	7.2619	cm
Area	41.418	cm^2
Height	14.585	cm
Wet Weight	1098.70	gm
Spec. Grav.	2.71	
Wet Density	113.55	pcf
Dry Density	82.96	pcf
Void Ratio	1.039	
Saturation	96.142	



Failure Sketch

	Before Test	After Test
Tare No.		120.00
Wet Wt.+Tare		170.24
Dry Wt.+Tare		132.78
Tare Weight		31.19
Wt. Water		37.46
Wet Soil		139.05
Dry soil		101.59
Water Content		36.87

Confining pressure: 12 psi
Rate of strain: 1.27228 mm/minute

Material:
Stiff light gray clay (CH), slightly silty, slickensided and friable

Elapsed Time	Dial Reading	Dial Reading	Axial Strain	1-Strain	Corrected Area	Axial Load	Deviator Stress	Cohesion
hh:mm	mm	.001 in.	in/in		cm^2	lbs	tsf	psf
0:00	0.000	0.000	0.0000	1.000	41.42	0.00	0.00	0
0:00	0.519	20.436	0.0036	0.996	41.57	50.20	0.56	561
0:00	1.006	39.623	0.0069	0.993	41.71	75.88	0.85	845
0:01	1.474	58.043	0.0101	0.990	41.84	94.18	1.05	1046
0:01	1.971	77.585	0.0135	0.986	41.99	105.18	1.16	1164
0:02	2.477	97.525	0.0170	0.983	42.13	108.16	1.19	1193
0:02	2.888	113.686	0.0198	0.980	42.25	106.56	1.17	1172
0:02	3.443	135.547	0.0236	0.976	42.42	91.11	1.00	998
0:03	3.958	155.833	0.0271	0.973	42.57	81.80	0.89	893
0:03	4.383	172.551	0.0301	0.970	42.70	77.02	0.84	838
0:04	5.903	232.416	0.0405	0.960	43.17	67.48	0.73	726
0:04	6.043	237.927	0.0414	0.959	43.21	67.27	0.72	723

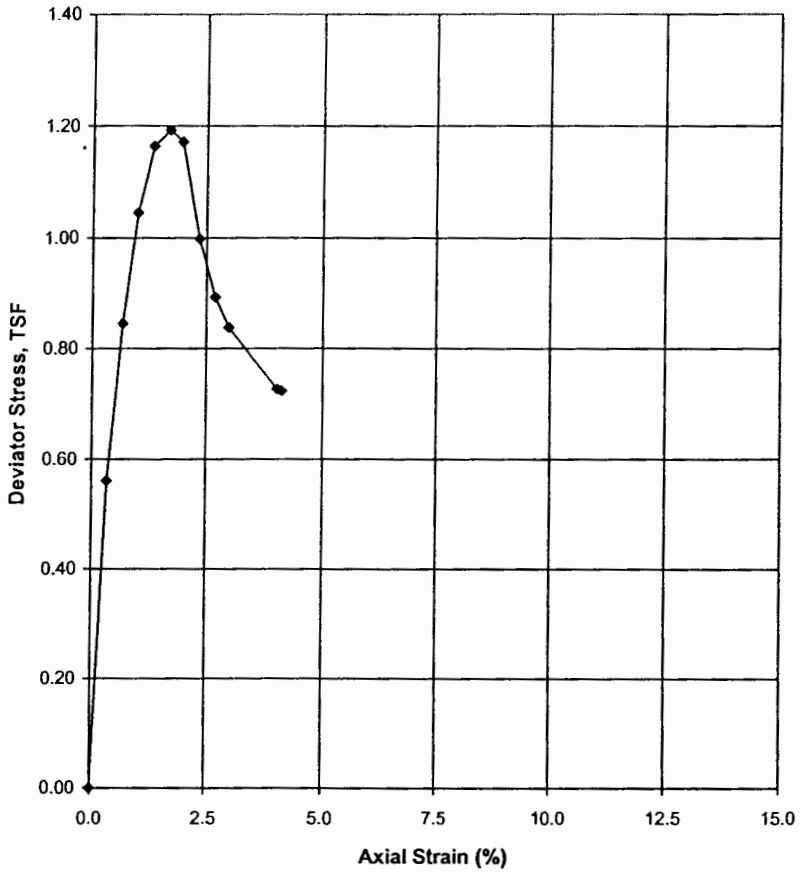
Tested By: H *Computed By:* H *Checked By:*

Figure 1

Burns Cooley Dennis, Inc.
551 Sunnybrook Road
Ridgeland, MS 39157
Voice (601) 856-9911
Fax (601) 856-9774

Unconsolidated, Undrained (Q) Compressive Strength Of Cohesive Soils In Triaxial Compression

AASHTO T 296-94 / ASTM D 2850



Specimen number:	1			
Cohesion , psf	1193			
Confining pressure, psi	12.10			
Rate of strain, mm/min	1.27228			
Water content, %	36.9			
Void ratio	1.039			
Saturation, %	96.1			
Dry density, pcf	83.0			
Specimen diameter, cm	7.262			
Specimen height, cm	14.585			

Description: Stiff light gray clay (CH), slightly silty, slickensided and friable

LL=	PL=	PI=	Gs= 2.71 (Est.)	Type: Undisturbed

Project No: 1182

Date: April 17, 2001

Remarks:

Project: Tri State Testing Services Memphis, Tennessee

Boring No.: E-3
Sample No.: n/a
Depth, feet: 15.5

BURNS COOLEY DENNIS, INC.

Figure 1A

Standard Test Method for Consolidated Undrained (R) Triaxial Compression Test for Cohesive Soils

AASHTO T 297 / ASTM D 4767-95

Tri State Testing Service, Memphis, Tennessee

		Before Test			At Test					
August 30, 2000		Top Dia.	7.2568	cm	Delta H	0.08	cm		Before Test	After Test
		Mid Dia.	7.2568	cm	Delta Vol	-18.60	ml			
		Bot Dia.	7.2568	cm				Tare No.	151	
Job No.	1182	Avg Dia.	7.2568	cm				Wet Wt.+Tare	217.80	
Boring No.	E-10	Area	41.360	cm^2	Area	40.265	cm^2	Dry Wt.+Tare	172.14	
Depth 0 ft.	19	Height	14.526	cm	Height	14.446	cm	Tare Weight	30.38	
Sample No.		Wet Weight	1079.30	gm	Wet Weight	1097.90	gm	Wt. Water	45.66	
Specimen No.		Spec. Grav.	2.72		Water Content	34.49%		Wet Soil	187.42	
Test No.		Wet Density	112.2	pcf	Wet Density	117.8	pcf	Dry soil	141.76	
		Dry Density	84.8	pcf	Dry Density	87.6	pcf	Water Content	32.21	
		Void Ratio	1.002		Void Ratio	0.938		Confining pressure: 15.2 psi		
Material:		Saturation	87.451		Saturation	100.0%		Rate of strain: 0.01726 mm/minute		

Stiff tan and light gray clay (CH)

Elapsed Time	Pore Pressure	Change In Pore Pres.	Dial Reading	Dial Reading	Axial Strain	1-Strain	Corrected Area	Axial Load	Deviator Stress
hh:mm	psi	psi	mm	.001 in.	in/in		cm^2	lbs	tsf
0:00	70.95	0.00	0.000	0.000	0.0000	1.000	41.36	0.00	0.00
0:30	70.10	-0.85	0.494	19.457	0.0034	0.997	41.50	48.12	0.54
0:59	69.62	-1.33	0.983	38.720	0.0068	0.993	41.64	71.09	0.79
1:24	69.31	-1.65	1.398	55.034	0.0096	0.990	41.76	87.11	0.97
1:56	69.02	-1.93	1.955	76.965	0.0135	0.987	41.92	101.29	1.12
2:21	68.69	-2.27	2.365	93.114	0.0163	0.984	42.04	107.59	1.19
2:54	68.45	-2.50	2.923	115.069	0.0201	0.980	42.21	112.54	1.24
3:19	68.34	-2.61	3.341	131.529	0.0230	0.977	42.33	114.44	1.26
3:52	68.29	-2.67	3.916	154.177	0.0270	0.973	42.51	113.94	1.25
4:17	68.22	-2.73	4.345	171.057	0.0299	0.970	42.64	111.37	1.21
5:39	68.06	-2.89	5.760	226.788	0.0397	0.960	43.07	101.33	1.09
7:14	67.59	-3.37	7.387	290.834	0.0509	0.949	43.58	92.73	0.99
8:36	67.88	-3.08	8.839	347.994	0.0608	0.939	44.04	84.65	0.89
9:58	67.62	-3.34	10.248	403.450	0.0705	0.929	44.50	81.85	0.85
11:20	67.74	-3.21	11.693	460.346	0.0805	0.920	44.98	82.56	0.85
12:43	67.75	-3.21	13.156	517.939	0.0906	0.909	45.48	84.54	0.86
14:05	67.51	-3.44	14.589	574.351	0.1004	0.900	45.98	85.26	0.86

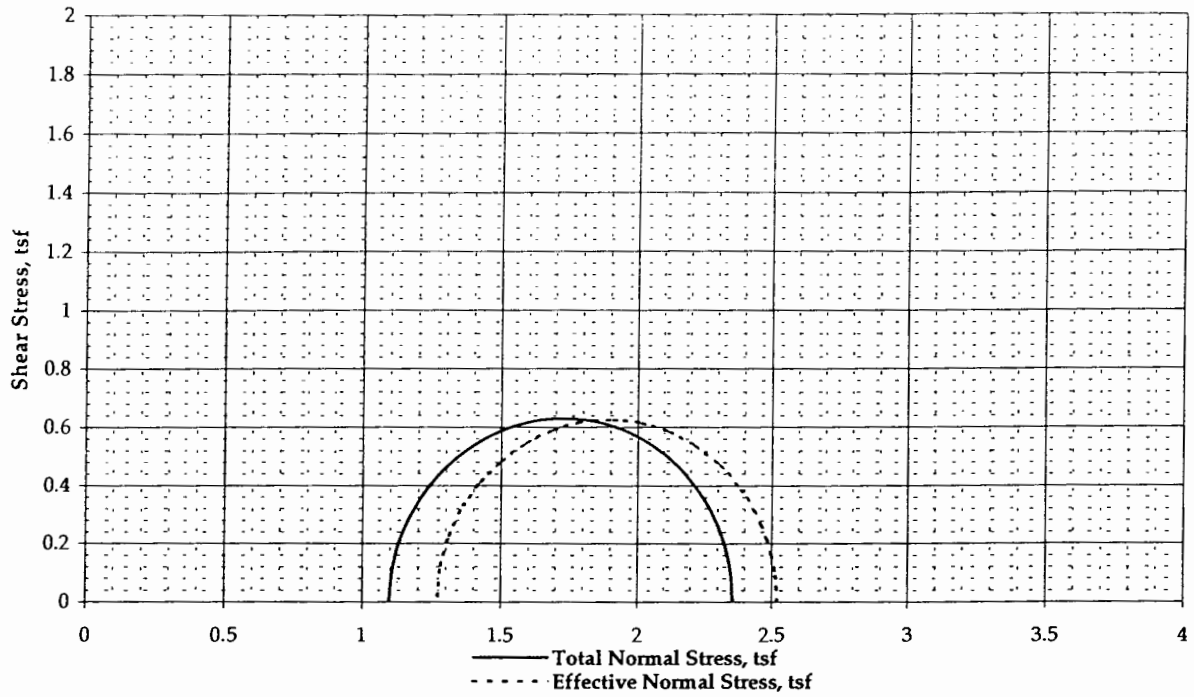
Tested By: H *Computed By:* H *Checked By:*

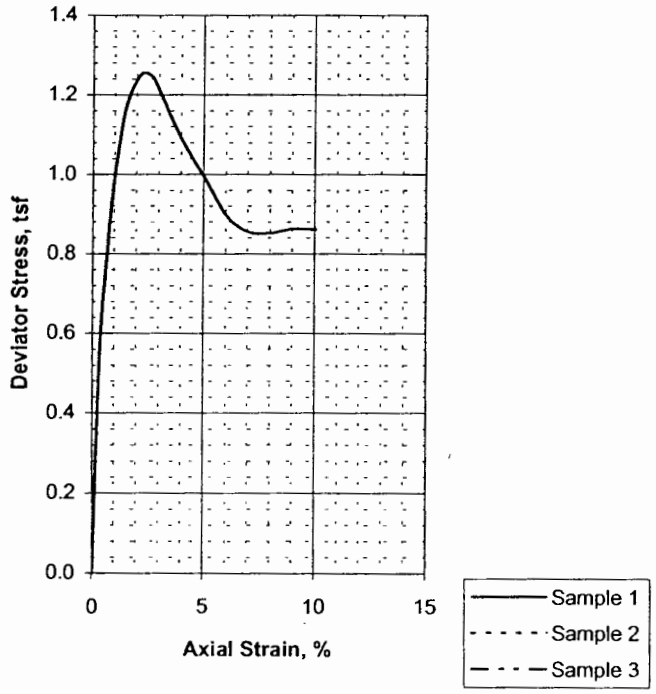
Figure 4

Burns Cooley Dennis Inc.
551 Sunnybrook Rd.
Ridgeland, MS 39157

Voice (601) 856-9911
Fax (601) 856-9774

Standard Test Method for Consolidated Undrained (R) Triaxial Compression Test for Cohesive Soils
AASHTO T 297 / ASTM D 4767-95





Sample No.:		1	2	3
Initial	Water Content, %	32.21		
	Dry Density, pcf	84.8		
	Saturation, %	87.5		
	Void Ratio	1.002		
	Diameter, in	2.857		
	Height, in	5.719		
At Test	Water Content, %	34.49		
	Dry Density, pcf	87.6		
	Saturation, %	100.00		
	Void Ratio	0.938		
	Diameter, in	2.819		
	Height, in	5.688		
Back Pressure, tsf		5.109		
Init. Eff. Stress, tsf		1.097		
Failure Stress, tsf		1.251		
Pore Pressure, tsf		-0.172		
Time to Failure, min.		181.13		
Rate, % / min.		0.012		
Ultimate Stress, tsf		1.260		

Description: Stiff tan and light gray clay (CH)

LL =	PL =	PI =	G_S = 2.72	% Passing No. 200 Sieve =

Type of Specimer

Type of Test : Controled Strain Test

Project No. 1182

Date: 22-Apr-01

Remarks:

Project: Tri State Testing Service, Memphis, Tennessee

Boring No. E-10

Sample No.

Depth/Elev. 19

BURNS COOLEY DENNIS, INC.

FIGURE 4A

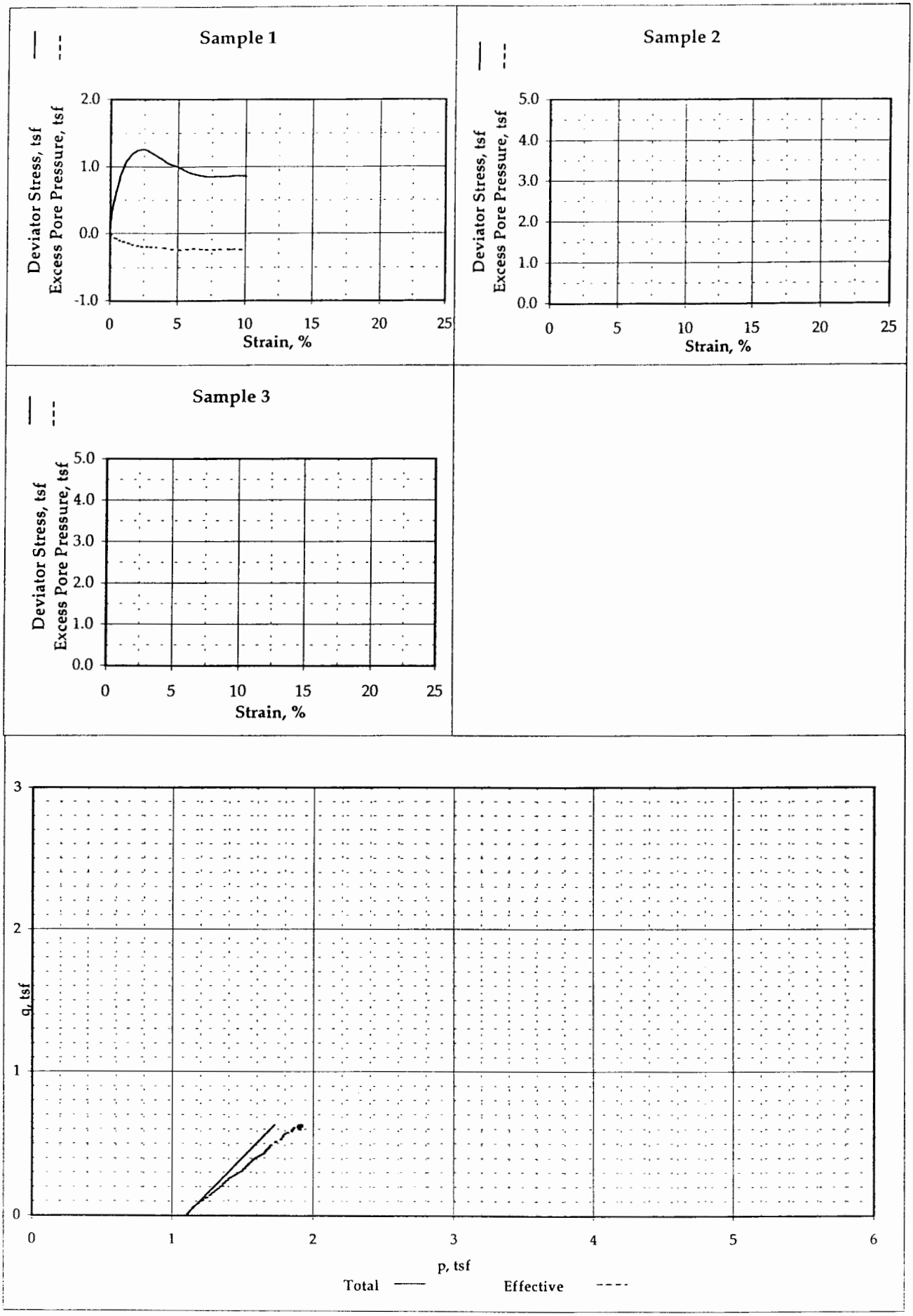


Figure 4B

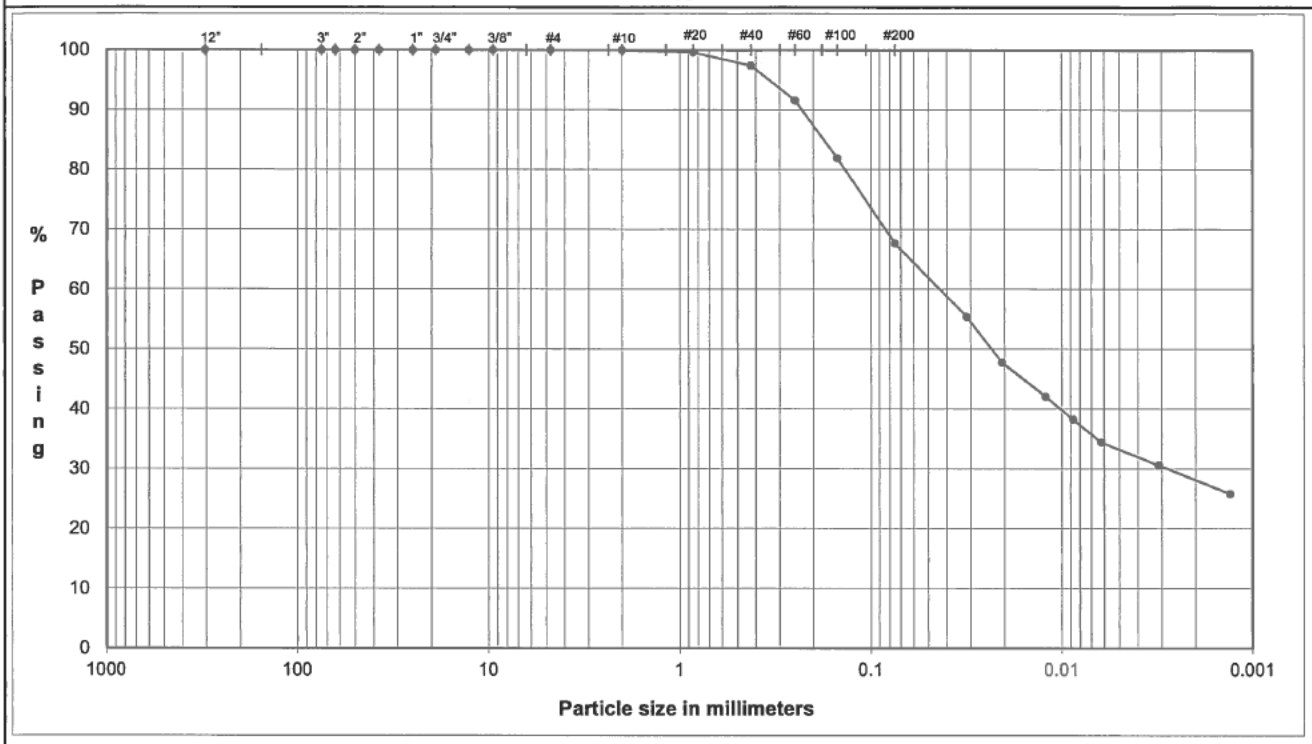
Burns Cooley Dennis, Inc.
551 Sunnybrook Rd.
Ridgeland, MS 39157
Voice (601) 856-9911
Fax (601) 856-9774

MARCH 2017 1776956

PARTICLE SIZE DISTRIBUTION & ATTERBERG LIMITS

ASTM D421, D422, D4318

PROJECT NAME: **FTN/ENTERGY INDEPENDENCE/AR**
SAMPLE ID: **703M** Depth: **21.0-23.5'**
TYPE: **UD**



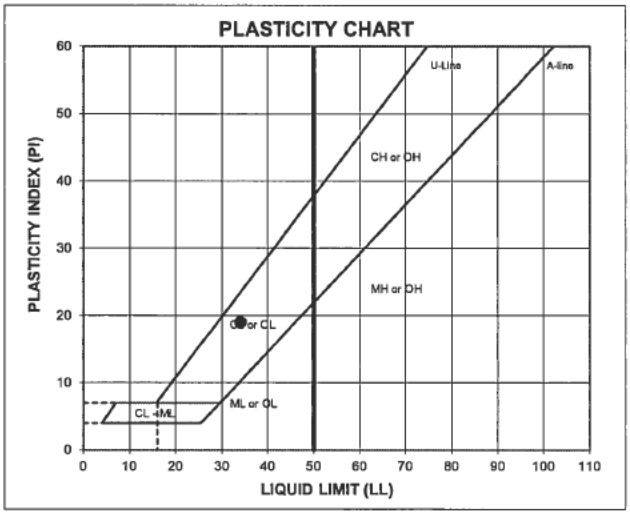
COBBLES	GRAVEL		SAND			FINES
	Coarse	Fine	Coarse	Medium	Fine	Silt or Clay

U.S. Standard Sieves Sizes and Numbers

	Particle Size (mm)	% Passing	Particle Size Classification	Percentage
12.0"	304.8	100.0		
3.0"	75.0	100.0	Cobbles	0.0
2.5"	63.5	100.0		
2.0"	50.0	100.0		
1.5"	37.5	100.0		
1.0"	25.0	100.0		
0.75"	19.0	100.0	Coarse Gravel	0.0
0.50"	12.7	100.0		
0.375"	9.5	100.0		
#4	4.8	100.0	Fine Gravel	0.0
#10	2.00	100.0	Coarse Sand	0.0
#20	0.85	99.6		
#40	0.43	97.4	Medium Sand	2.6
#60	0.25	91.6		
#100	0.15	81.9		
#200	0.075	67.7	Fine Sand	29.7

Hydrometer Analysis

(mm)	%Finer		
0.032	55.4		
0.021	47.8		
0.012	42.0	Fines	
0.0087	38.2	Silt or Clay	67.7
0.0062	34.4		
0.0031	30.6		
0.0013	25.8		



ATTERBERG LIMITS

Method -B (Dry preparation)

M_c	LL	PL	PI	LI
21.0	34	15	19	0.33

LL (oven-dried) / < 0.75 = ORGANIC (OL/OH)

DESCRIPTION: sandy SILTY CLAY, fine to medium; yellowish brown and olive.

USCS: CL

TECH	FT/JS/WD
DATE	3/14/17
CHECK	JA
REVIEW	
APPROVE	

FLEXIBLE WALL TRIAXIAL PERMEABILITY
ASTM D 5084
METHOD C, FALLING HEAD W/INCREASING TAIL WATER PRESSURE

PROJECT TITLE	FTN/ENTERGY INDEPENDENCE/AR			**Using Pipettes Only**	YES	**COMMENTS**	
PROJECT NUMBER	1776956			**Using Pipettes & Burettes**	NO		
SAMPLE ID	703M	21.0-23.5'	**BOARD#**	5	**TECH**	SDM/PWM	
SAMPLE TYPE	UD		**CELL #**	5	**DATE**	3/15/17	

Sample Data, Initial

Height, inches	3.125
Diameter, inches	2.858
Area, cm^2	41.39
Volume, cm^3	328.52
Mass, g	663.88
Moisture Content, %	21.0
Dry Density, pcf	104.2
Spec. Gravity (assumed)	2.700
Volume Solids, cm^3	203.20
Volume Voids, cm^3	125.32
Void Ratio	0.62
Saturation	92.0%

B-Value,f	0.97	
Cell Pres.	68.0	psi
Bot. Pres.	53.0	psi
Top Pres.	50.0	psi
Head, cm	211.02	
Max. Grad.	29.68	
Min. Grad.	27.47	
Max. E.S.	18.00	
Min. E.S.	15.00	

Sample Data, Final

Height, inches	3.123
Diameter, inches	2.835
Area, cm^2	40.73
Volume, cm^3	323.05
Mass, g	665.52
Moisture Content %	21.30
Dry Density, pcf	105.98
Saturation	97.5%
Inflow Volume per (cc)	1.00
Outflow Volume per (cc)	1.00

Water Contents	**Initial**	**Final**
Wt soil&tare, i	663.88	673.36
Wt soil&tare, f	548.65	556.59
Wt Tare	0.00	8.43
Wt Moisture Lost	115.23	116.77
Wt Dry Soil	548.65	548.16
Water Content	21.00%	21.30%

DESCRIPTION sandy SILTY CLAY, fine to medium; yellowish brown and olive.

USCS CL

PERMEANT: Deaired Tap Water

TIME FUNCTION			READINGS			TIME IN MINUTES & SECONDS						VOLUME		PERMEABILITY	
DATE	HOUR	MIN	Inflow (cc)	Outflow (cc)	Temp.	dt (min)	dt (sec)	dt, acc (sec)	Head (cm)	(H1/H2) (inc.)	Gradient	Inflow (cc)	Outflow (cc)	@ 20 Degrees C (cm/sec)	
03/15/17	13	23	0.0	25.0	20.6	0.0	0.0	0	235.44		29.68	0.00	0.00	0.0	
03/15/17	13	34	0.9	24.2	20.6	11.0	660	660	233.78	1.01	29.47	0.90	0.80	1.0E-06	
03/15/17	13	45	1.8	23.5	20.6	11.0	660	1320	232.22	1.01	29.28	0.90	0.70	9.8E-07	
03/15/17	13	58	2.7	22.6	20.6	13.0	780	2100	230.47	1.01	29.05	0.90	0.90	9.4E-07	
03/15/17	14	39	5.6	20.1	20.6	41.0	2460	4560	225.21	1.02	28.39	2.90	2.50	9.0E-07	
03/15/17	15	37	9.4	17.0	20.6	58.0	3480	8040	218.48	1.03	27.54	3.80	3.10	8.4E-07	
03/16/17	7	41	0.0	25.0	18.7	964.0	57840	65880	235.44	0.93	29.68	0.00	0.00	-	
03/16/17	8	11	1.8	23.2	19.1	30.0	1800	67680	231.93	1.02	29.24	1.80	1.80	8.3E-07	
03/16/17	8	16	2.1	22.9	19.1	5.0	300	67980	231.34	1.00	29.16	0.30	0.30	8.4E-07	*
03/16/17	9	10	5.1	20.0	19.3	54.0	3240	71220	225.59	1.03	28.44	3.00	2.90	7.7E-07	*
03/16/17	10	6	8.1	17.1	19.3	56.0	3360	74580	219.84	1.03	27.71	3.00	2.90	7.6E-07	*
03/16/17	10	26	9.1	16.1	19.7	20.0	1200	75780	217.90	1.01	27.47	1.00	1.00	7.3E-07	*

Inflow Rate	0.000244
Outflow Rate	0.000223
Outflow/Inflow Ratio	0.91

***PERMEABILITY REPORTED AS** 7.8E-07 cm/sec

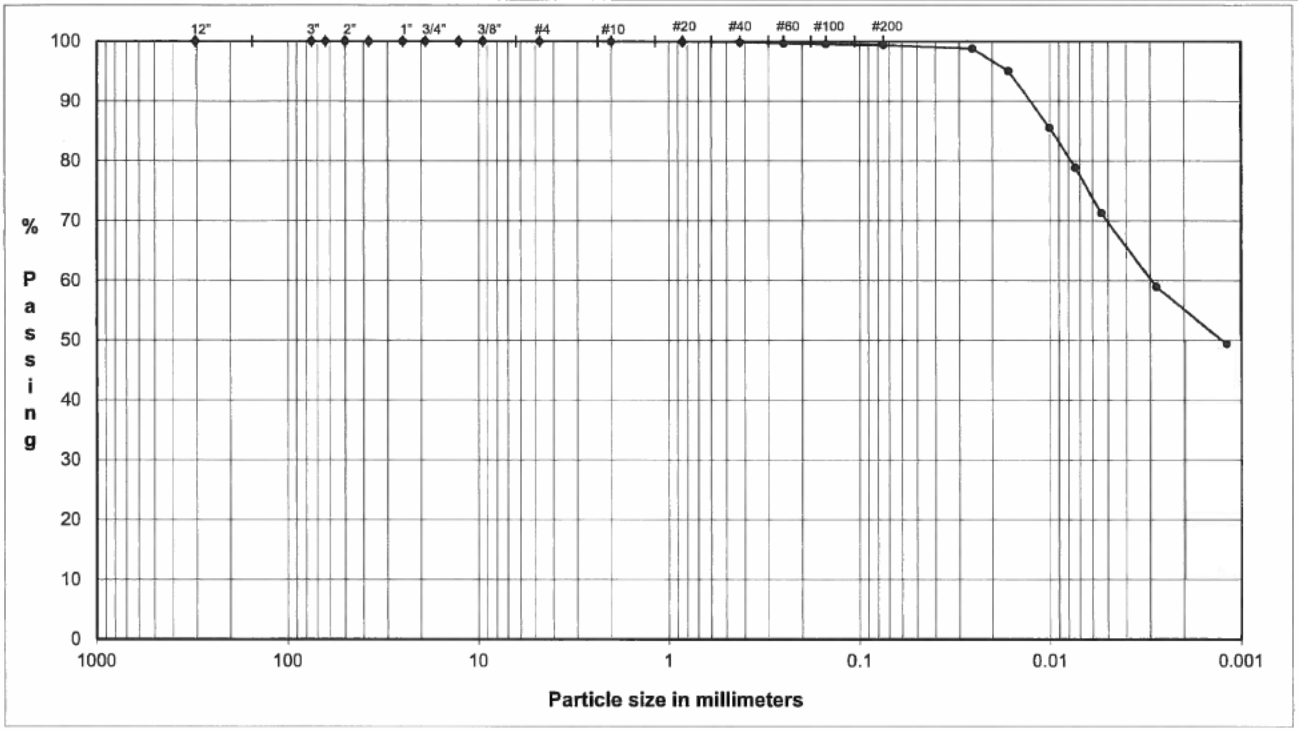
DATE	3/15/17
CHECK	SDA
REVIEW	PWN
APPROVE	

GOLDER ASSOCIATES INC.

PARTICLE SIZE DISTRIBUTION & ATTERBERG LIMITS

ASTM D421, D422, D4318

PROJECT NAME: **FTN/ENTERGY INDEPENDENCE/AR**
SAMPLE ID: **709M** Depth: **26.0-28.5'**
TYPE: **UD**



COBBLES	Coarse	Fine	Coarse	Medium	Fine	Silt or Clay
	GRAVEL		SAND			FINES

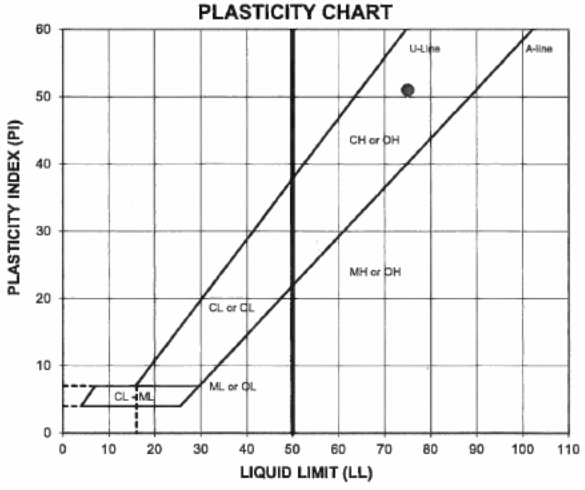
U.S. Standard Sieves Sizes and Numbers

	Particle Size (mm)	% Passing	Particle Size Classification	Percentage
12.0"	304.8	**100.0**		
3.0"	75.0	**100.0**	Cobbles	**0.0**
2.5"	63.5	**100.0**		
2.0"	50.0	**100.0**		
1.5"	37.5	**100.0**		
1.0"	25.0	**100.0**		
0.75"	19.0	**100.0**	Coarse Gravel	**0.0**
0.50"	12.7	**100.0**		
0.375"	9.5	**100.0**		
#4	4.8	**100.0**	Fine Gravel	**0.0**
#10	2.00	**100.0**	Coarse Sand	**0.0**
#20	0.85	**99.9**		
#40	0.43	**99.8**	Medium Sand	**0.1**
#60	0.25	**99.7**		
#100	0.15	**99.6**		
#200	0.075	**99.4**	Fine Sand	**0.5**

Hydrometer Analysis

(mm)	%Finer		
0.026	**98.8**		
0.016	**95.0**		
0.010	**85.5**	Fines	
0.0074	**78.9**	Silt or Clay	**99.4**
0.0054	**71.3**		
0.0028	**58.9**		
0.0012	**49.4**		

PLASTICITY CHART



ATTERBERG LIMITS

Method -B (Dry preparation)

M,	LL	PL	PI	LI
40.8	**75**	**24**	**51**	**0.32**

LL (oven-dried) / < 0.75 = ORGANIC (OL/OH)

DESCRIPTION: CLAY, trace fine to medium sand; olive.

USCS: CH

TECH	FT/JS/WD
DATE	3/16/17
CHECK	
REVIEW	
APPROVE	

FLEXIBLE WALL TRIAXIAL PERMEABILITY
ASTM D 5084
METHOD C, FALLING HEAD W/INCREASING TAIL WATER PRESSURE

PROJECT TITLE	FTN/ENTERGY INDEPENDENCE/AR			**Using Pipettes Only**	YES	**COMMENTS**	
PROJECT NUMBER	1776956			**Using Pipettes & Burettes**	NO		
SAMPLE ID	709M	26.0-28.5'	**BOARD#**	6	**TECH**	SDM/PWM	
SAMPLE TYPE	UD		**CELL #**	6	**DATE**	3/15/17	

Sample Data, Initial

Height, inches	3.120			
Diameter, inches	2.842	B-Value,f	0.99	
Area, cm^2	40.93	Cell Pres.	72.0	psi
Volume, cm^3	324.33	Bot. Pres.	53.0	psi
Mass, g	574.80	Top Pres.	50.0	psi
Moisture Content, %	40.8	Head, cm	211.02	
Dry Density, pcf	78.6	Max. Grad.	29.98	
Spec. Gravity (assumed)	2.700	Min. Grad.	29.30	
Volume Solids, cm^3	151.25	Max. E.S.	22.00	
Volume Voids, cm^3	173.09	Min. E.S.	19.00	
Void Ratio	1.14			
Saturation	96.2%			

Sample Data, Final

Height, inches	3.092
Diameter, inches	2.792
Area, cm^2	39.50
Volume, cm^3	310.21
Mass, g	572.30
Moisture Content %	40.15
Dry Density, pcf	82.14
Saturation	100.0%
Inflow Volume per (cc)	1.00
Outflow Volume per (cc)	1.00

Water Contents	**Initial**	**Final**
Wt soil&tare, i	574.80	580.32
Wt soil&tare, f	408.36	416.50
Wt Tare	0.00	8.43
Wt Moisture Lost	166.44	163.82
Wt Dry Soil	408.36	408.07
Water Content	40.76%	40.15%

DESCRIPTION CLAY, trace fine to medium sand; olive.

USCS CH

PERMEANT: Deaired Tap Water

TIME FUNCTION			READINGS			TIME IN MINUTES & SECONDS						VOLUME		PERMEABILITY	
DATE	HOUR	MIN	Inflow (cc)	Outflow (cc)	Temp.	dt (min)	dt (sec)	dt, acc (sec)	Head (cm)	(H1/H2) (inc.)	Gradient	Inflow (cc)	Outflow (cc)	@ 20 Degrees C (cm/sec)	
03/15/17	13	26	0.0	25.0	20.6	0.0	0.0	0	235.44		29.98	0.00	0.00	0.0	
03/15/17	14	16	0.2	24.6	20.6	50.0	3000	3000	234.85	1.00	29.90	0.20	0.40	8.2E-08	
03/15/17	15	44	0.0	25.0	20.0	88.0	5280	8280	235.44	1.00	29.98	0.00	0.00	-	
03/16/17	7	38	1.7	22.8	18.7	954.0	57240	65520	231.64	1.02	29.49	1.70	2.20	2.9E-08	
03/16/17	9	18	1.8	22.6	19.3	100.0	6000	71520	231.34	1.00	29.46	0.10	0.20	2.1E-08	
03/16/17	10	8	1.9	22.5	19.3	50.0	3000	74520	231.15	1.00	29.43	0.10	0.10	2.9E-08	*
03/16/17	11	52	2.1	22.3	19.3	104.0	6240	80760	230.76	1.00	29.38	0.20	0.20	2.7E-08	*
03/16/17	14	19	2.4	22.1	19.3	147.0	8820	89580	230.27	1.00	29.32	0.30	0.20	2.4E-08	*
03/16/17	15	6	2.5	22.0	19.3	47.0	2820	92400	230.08	1.00	29.30	0.10	0.10	3.0E-08	*

Inflow Rate	0.000030
Outflow Rate	0.000036
Outflow/Inflow Ratio	1.20

***PERMEABILITY REPORTED AS** **2.8E-08** cm/sec

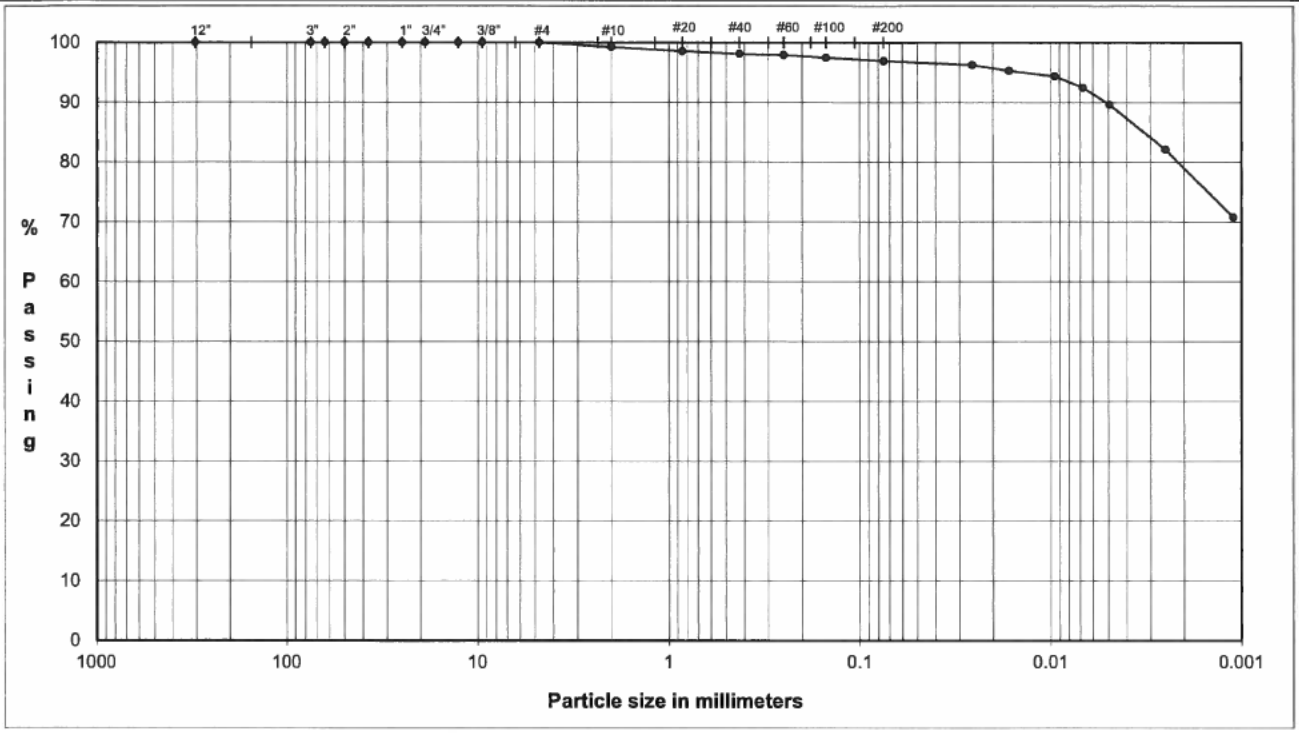
DATE	3/15/17
CHECK	DA
REVIEW	
APPROVE	

GOLDER ASSOCIATES INC.

PARTICLE SIZE DISTRIBUTION & ATTERBERG LIMITS

ASTM D421, D422, D4318

PROJECT NAME: **FTN/ENTERGY INDEPENDENCE/AR**
SAMPLE ID: **710S** Depth: **16.0-18.5'**
TYPE: **UD**



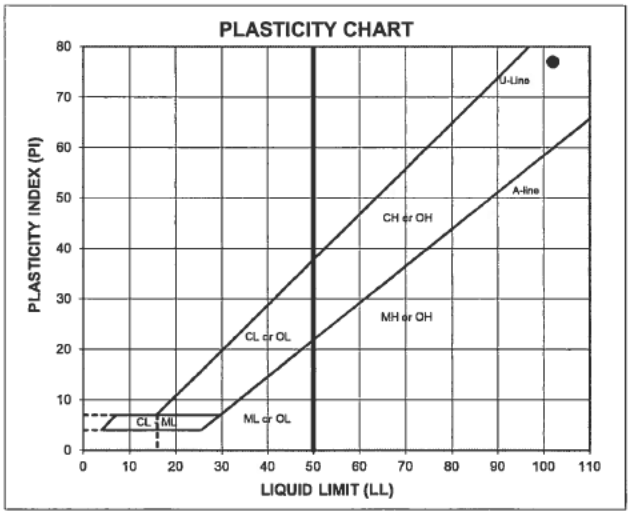
	Coarse	Fine	Coarse	Medium	Fine	Silt or Clay
COBBLES	GRAVEL		SAND			FINES

U.S. Standard Sieves Sizes and Numbers

	Particle Size (mm)	% Passing	Particle Size Classification	Percentage
12.0"	304.8	**100.0**		
3.0"	75.0	**100.0**	Cobbles	**0.0**
2.5"	63.5	**100.0**		
2.0"	50.0	**100.0**		
1.5"	37.5	**100.0**		
1.0"	25.0	**100.0**		
0.75"	19.0	**100.0**	Coarse Gravel	**0.0**
0.50"	12.7	**100.0**		
0.375"	9.5	**100.0**		
#4	4.8	**100.0**	Fine Gravel	**0.0**
#10	2.00	**99.2**	Coarse Sand	**0.8**
#20	0.85	**98.5**		
#40	0.43	**98.1**	Medium Sand	**1.2**
#60	0.25	**97.9**		
#100	0.15	**97.5**		
#200	0.075	**96.9**	Fine Sand	**1.2**

Hydrometer Analysis

(mm)	%Finer		
0.026	**96.2**		
0.016	**95.3**		
0.010	**94.3**	Fines	
0.0068	**92.5**	Silt or Clay	**96.9**
0.0049	**89.6**		
0.0025	**82.1**		
0.0011	**70.8**		



ATTERBERG LIMITS

Method -B (Dry preparation)

M_c	LL	PL	PI	LI
37.3	**102**	**25**	**77**	**0.16**

LL (oven-dried) / < 0.75 - ORGANIC (OL/OH)

DESCRIPTION: CLAY, trace fine to coarse sand; olive and brown.

USCS: CH

TECH	FT/WD
DATE	3/16/17
CHECK	DA
REVIEW	PWH
APPROVE	

FLEXIBLE WALL PERMEABILITY
ASTM D 5084
METHOD D, CONSTANT RATE OF FLOW

PROJECT TITLE	FTN/ENTERGY INDEPENDENCE/AR		Board #	8	COMMENTS
PROJECT NUMBER	1776956		Flow Pump	2	
SAMPLE ID	710S	16.0-18.5'	Flow Pump Speed	11	
SAMPLE TYPE	UD		Technician	SDM/PWM	

Sample Data, Initial				Sample Data, Final	
Height, inches	3.056	B-Value, f	1.00	Height, inches	3.075
Diameter, inches	2.866	Cell Pres.	94.0	Diameter, inches	2.875
Area, cm²	41.62	Bot. Pres.	80.0	Area, cm²	41.88
Volume, cm³	323.07	Top Pres.	80.0	Volume, cm³	327.12
Mass, g	584.47	Tot. B.P.	80.0	Mass, g	594.52
Moisture Content, %	37.27	Head, max.	182.18	Moisture Content, %	39.63
Dry Density, pcf	82.24	Head, min.	182.18	Dry Density, pcf	81.22
Spec. Gravity (assumed)	2.700	Max. Grad.	23.33	Volume Solids, cm³	157.70
Volume Solids, cm³	157.70	Min. Grad.	23.33	Volume Voids, cm³	169.42
Volume Voids, cm³	165.37			Void Ratio	1.07
Void Ratio	1.05			Saturation, %	99.6%
Saturation, %	96.0%				

WATER CONTENTS		Sample Initial	Sample Final
Wt Soil & Tare, i	g	584.47	602.73
Wt Soil & Tare, f	g	425.80	434.04
Wt Tare	g	0.00	8.33
Wt Moisture Lost	g	158.67	168.69
Wt Dry Soil	g	425.80	425.71
Water Content	%	37.27%	39.63%

DESCRIPTION: CLAY, trace fine to coarse sand; olive and brown.

Flow Pump Rate: 1.18E-05 cm³/sec

USCS: CH

TIME FUNCTIONS, SECONDS								dP				
DATE	DAY	HOUR	MIN	TEMP (°C)	dt (min)	dt,acc (min)	dt (sec)	dt,acc (sec)	Reading (psi)	Head (cm)	Gradient	Permeability (cm/sec)
03/22/17	42816	7	30	18.6	0	0	0	0	2.59	182.18	23.33	1.2E-08
03/22/17	42816	7	35	18.6	5	5	300	300	2.59	182.18	23.33	1.2E-08
03/22/17	42816	7	40	18.6	5	10	300	600	2.59	182.18	23.33	1.2E-08
03/22/17	42816	7	45	18.6	5	15	300	900	2.59	182.18	23.33	1.2E-08 *
03/22/17	42816	7	50	18.6	5	20	300	1200	2.59	182.18	23.33	1.2E-08 *
03/22/17	42816	7	55	18.6	5	25	300	1500	2.59	182.18	23.33	1.2E-08 *
03/22/17	42816	8	0	18.6	5	30	300	1800	2.59	182.18	23.33	1.2E-08 *

*TRANSCRIBED FROM ORIGINAL DATA SHEETS

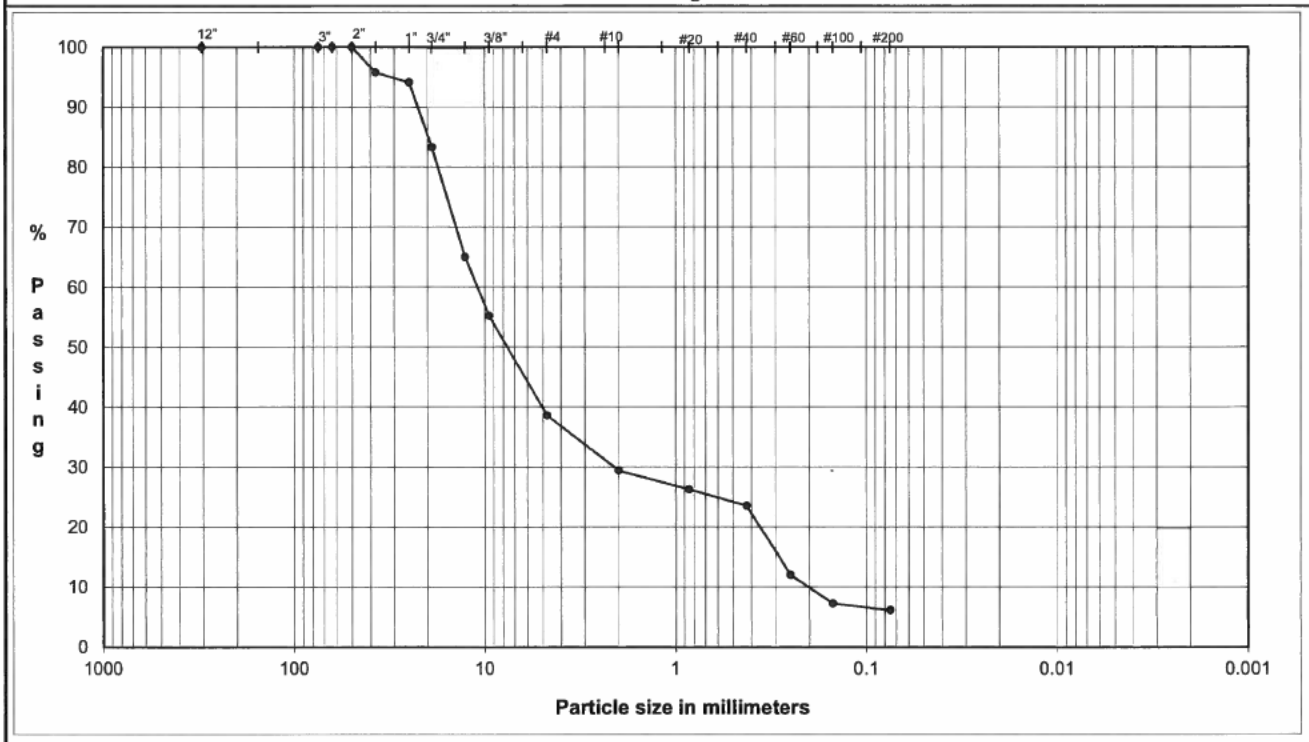
PERMEABILITY REPORTED AS ** 1.2E-08 cm/sec **

DATE	3/22/17
CHECK	
REVIEW	
APPROVE	

PARTICLE SIZE DISTRIBUTION & ATTERBERG LIMITS

ASTM D6913, D4318

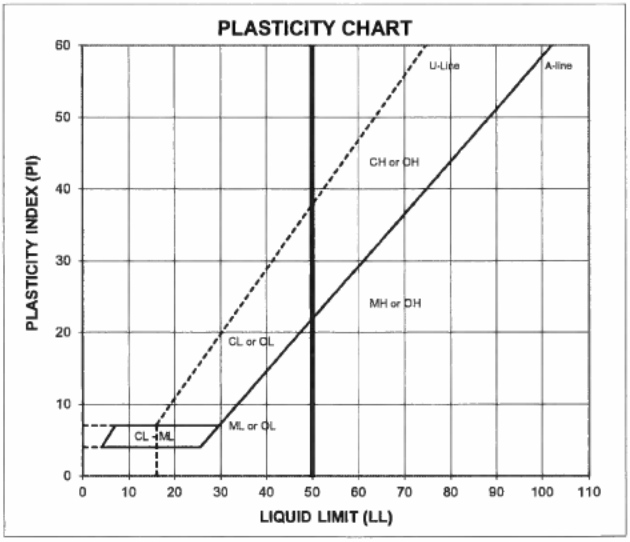
PROJECT NAME: **FTN/ENTERGY INDEPENDENCE/AR**
SAMPLE ID: **701M** Depth: **35.0-36.0'**
TYPE: **Bag**



COBBLES	Coarse	Fine	Coarse	Medium	Fine	Silt or Clay
	GRAVEL		SAND			FINES

U.S. Standard Sieves Sizes and Numbers

	Particle Size (mm)	% Passing	Particle Size Classification	Percentage
12.0"	304.8	**100.0**		
3.0"	75.0	**100.0**	Cobbles	**0.0**
2.5"	63.5	**100.0**		
2.0"	50.0	**100.0**		
1.5"	37.5	**95.8**		
1.0"	25.0	**94.1**		
0.75"	19.0	**83.2**	Coarse Gravel	**16.8**
0.50"	12.7	**65.0**		
0.375"	9.5	**55.2**		
#4	4.8	**38.6**	Fine Gravel	**44.6**
#10	2.00	**29.4**	Coarse Sand	**9.2**
#20	0.85	**26.2**		
#40	0.43	**23.5**	Medium Sand	**5.9**
#60	0.25	**12.0**		
#100	0.15	**7.2**		
#200	0.075	**6.1**	Fine Sand	**17.4**
			Fines	**6.1**



ATTERBERG LIMITS
Method -B (Dry preparation)

M_c	LL	PL	PI	LI
7.7	NP	NP	NP	NP

DESCRIPTION: sandy GRAVEL, fine to coarse, some fines; dark yellowish brown.

USCS: GW-GM

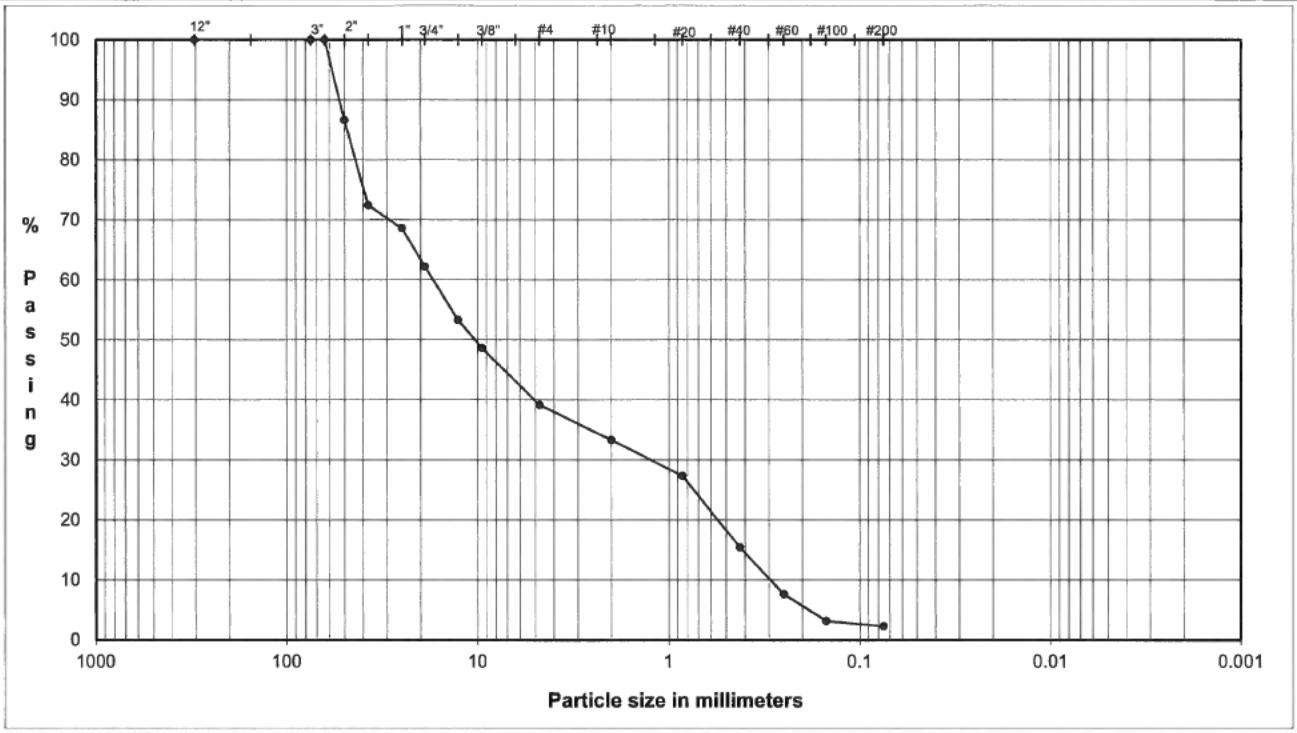
LL (oven-dried) / < 0.75 = ORGANIC (OL/OH)

TECH	FT/WD
DATE	3/28/17
CHECK	
REVIEW	PWH
APPROVE	

PARTICLE SIZE DISTRIBUTION & ATTERBERG LIMITS

ASTM D6913, D4318

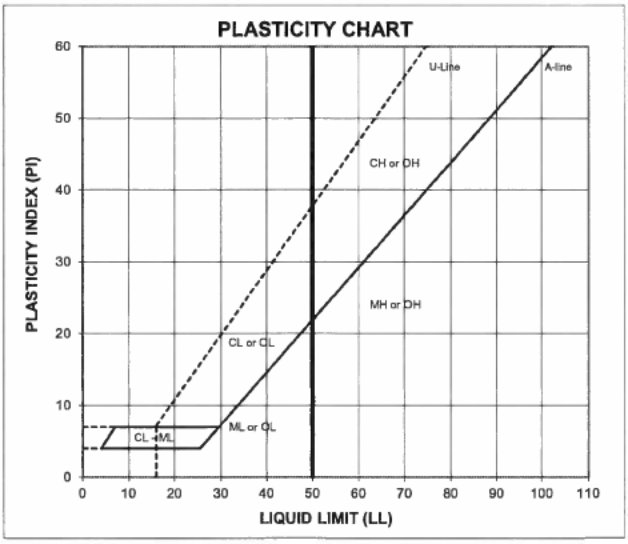
PROJECT NAME: **FTN/ENTERGY INDEPENDENCE/AR**
SAMPLE ID: **701D** Depth: **70.0-71.0'**
TYPE: **Bag**



COBBLES	GRAVEL		SAND			FINES
	Coarse	Fine	Coarse	Medium	Fine	Silt or Clay

U.S. Standard Sieves Sizes and Numbers

	Particle Size (mm)	% Passing	Particle Size Classification	Particle Size Percentage
12.0"	304.8	**100.0**		
3.0"	75.0	**100.0**	Cobbles	**0.0**
2.5"	63.5	**100.0**		
2.0"	50.0	**86.6**		
1.5"	37.5	**72.4**		
1.0"	25.0	**68.6**		
0.75"	19.0	**62.2**	Coarse Gravel	**37.8**
0.50"	12.7	**53.3**		
0.375"	9.5	**48.6**		
#4	4.8	**39.2**	Fine Gravel	**23.0**
#10	2.00	**33.3**	Coarse Sand	**5.8**
#20	0.85	**27.3**		
#40	0.43	**15.4**	Medium Sand	**17.9**
#60	0.25	**7.6**		
#100	0.15	**3.1**		
#200	0.075	**2.3**	Fine Sand	**13.1**
			Fines	**2.3**



DESCRIPTION: GRAVEL and SAND, fine to coarse, fine to coarse sand; dark yellowish brown.

USCS: GP

ATTERBERG LIMITS
Method -B (Dry preparation)

M_c	LL	PL	PI	LI
8.6	-	-	-	-

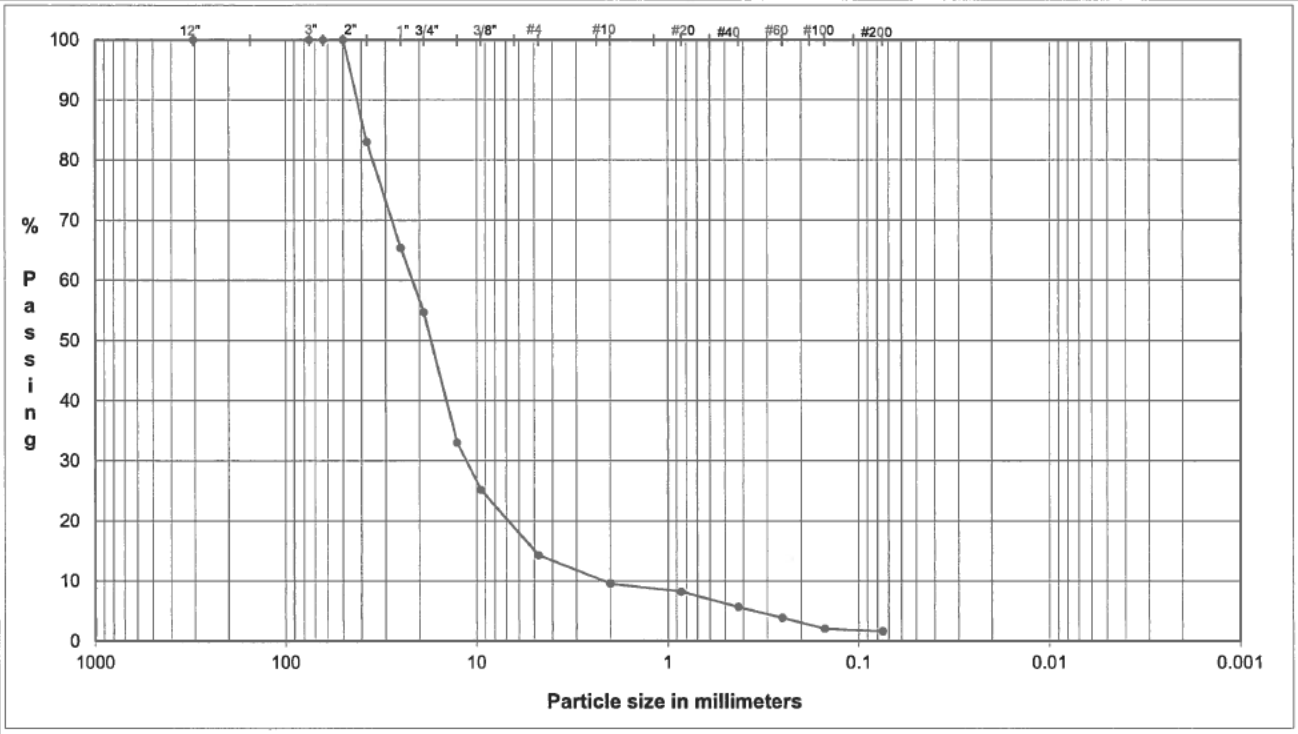
LL (oven-dried) / < 0.75 = ORGANIC (OL/OH)

TECH	JS/TJ
DATE	3/31/17
CHECK	
REVIEW	
APPROVE	

PARTICLE SIZE DISTRIBUTION & ATTERBERG LIMITS

ASTM D6913, D4318

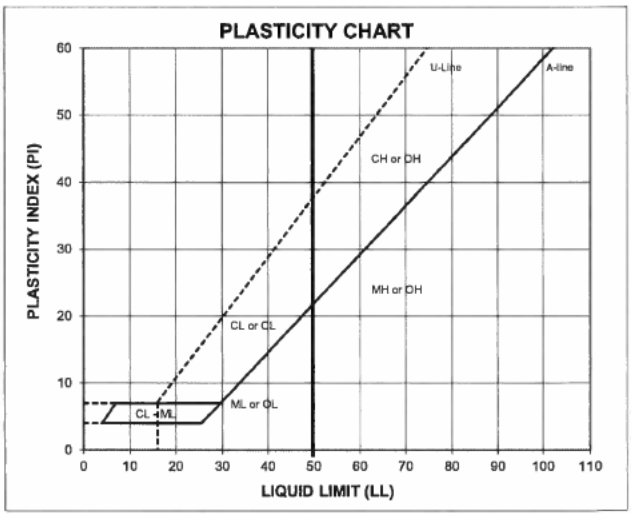
PROJECT NAME: **FTN/ENTERGY INDEPENDENCE/AR**
SAMPLE ID: **701D** - Depth: **115.0-116.0'**
TYPE: **Bag**



COBBLES	GRAVEL		SAND			FINES
	Coarse	Fine	Coarse	Medium	Fine	Silt or Clay

U.S. Standard Sieves Sizes and Numbers

	Particle Size (mm)	% Passing	Particle Size Classification	Percentage
12.0"	304.8	**100.0**		
3.0"	75.0	**100.0**	Cobbles	**0.0**
2.5"	63.5	**100.0**		
2.0"	50.0	**100.0**		
1.5"	37.5	**83.0**		
1.0"	25.0	**65.4**		
0.75"	19.0	**54.7**	Coarse Gravel	**45.3**
0.50"	12.7	**33.0**		
0.375"	9.5	**25.1**		
#4	4.8	**14.3**	Fine Gravel	**40.4**
#10	2.0	**9.6**	Coarse Sand	**4.7**
#20	0.85	**8.2**		
#40	0.43	**5.7**	Medium Sand	**3.9**
#60	0.25	**3.9**		
#100	0.15	**2.1**		
#200	0.075	**1.6**	Fine Sand	**4.1**
			Fines	**1.6**



ATTERBERG LIMITS
Method -B (Dry preparation)

M_c	LL	PL	PI	LI
6.6	**NP**	**NP**	**NP**	**NP**

DESCRIPTION: sandy GRAVEL, fine to coarse, fine to coarse sand, trace fines; dark gray.

USCS: GW

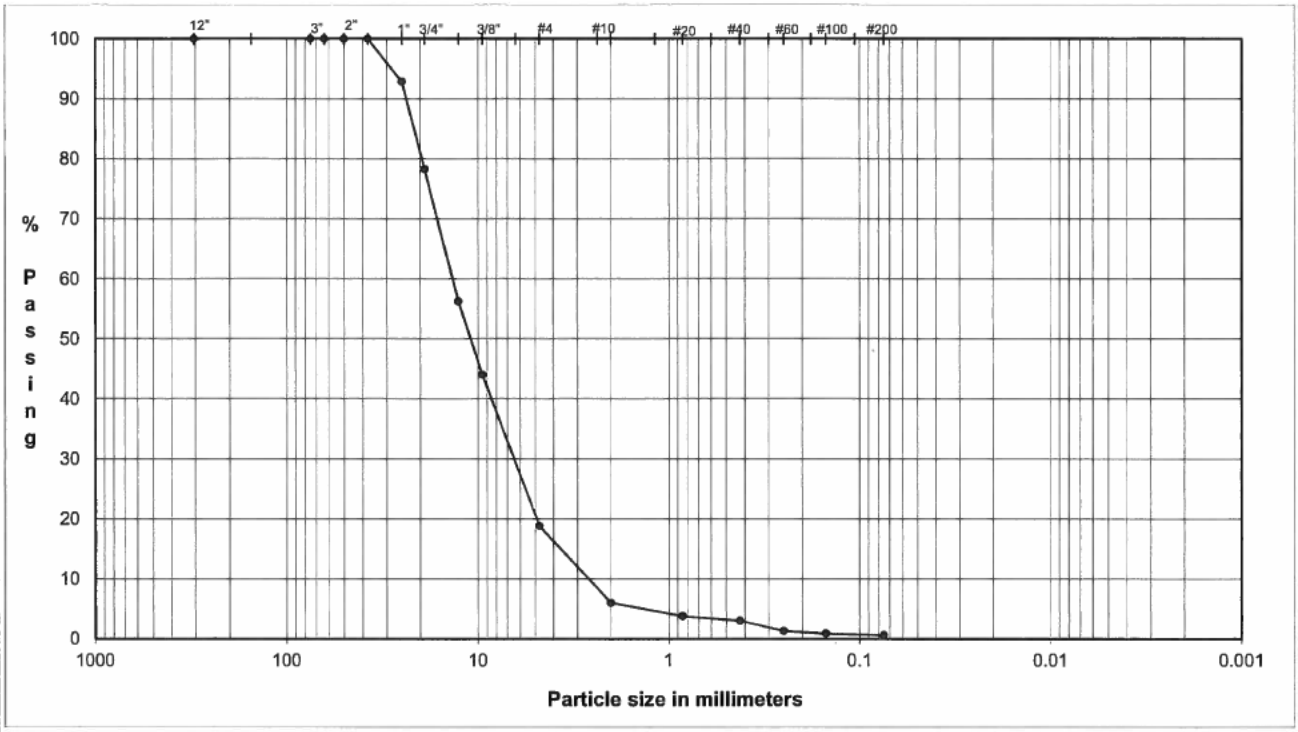
LL (oven-dried) / < 0.75 = ORGANIC (OL/OH)

TECH	FT/DA/WD
DATE	3/28/17
CHECK	
REVIEW	
APPROVE	

PARTICLE SIZE DISTRIBUTION & ATTERBERG LIMITS

ASTM D6913, D4318

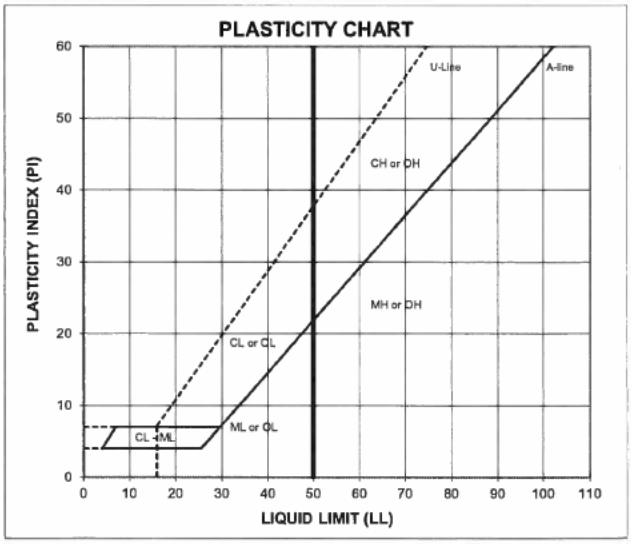
PROJECT NAME: **FTN/ENTERGY INDEPENDENCE/AR**
SAMPLE ID: **703M** Depth: **36.0-46.0'**
TYPE: **Bag**



COBBLES	GRAVEL		SAND			FINES
	Coarse	Fine	Coarse	Medium	Fine	Silt or Clay

U.S. Standard Sieves Sizes and Numbers

	Particle Size (mm)	% Passing	Particle Size Classification	Particle Size Percentage
12.0"	304.8	**100.0**		
3.0"	75.0	**100.0**	Cobbles	**0.0**
2.5"	63.5	**100.0**		
2.0"	50.0	**100.0**		
1.5"	37.5	**100.0**		
1.0"	25.0	**92.9**		
0.75"	19.0	**78.3**	Coarse Gravel	**21.7**
0.50"	12.7	**56.2**		
0.375"	9.5	**44.0**		
#4	4.8	**18.8**	Fine Gravel	**59.5**
#10	2.00	**6.0**	Coarse Sand	**12.8**
#20	0.85	**3.8**		
#40	0.43	**3.0**	Medium Sand	**3.0**
#60	0.25	**1.3**		
#100	0.15	**0.9**		
#200	0.075	**0.6**	Fine Sand	**2.3**
			Fines	**0.6**



DESCRIPTION: sandy GRAVEL, fine to coarse, fine to coarse sand, trace fines; yellowish brown.

USCS: GW

ATTERBERG LIMITS
Method -B (Dry preparation)

M_c	LL	PL	PI	LI
6.1	-	-	-	-

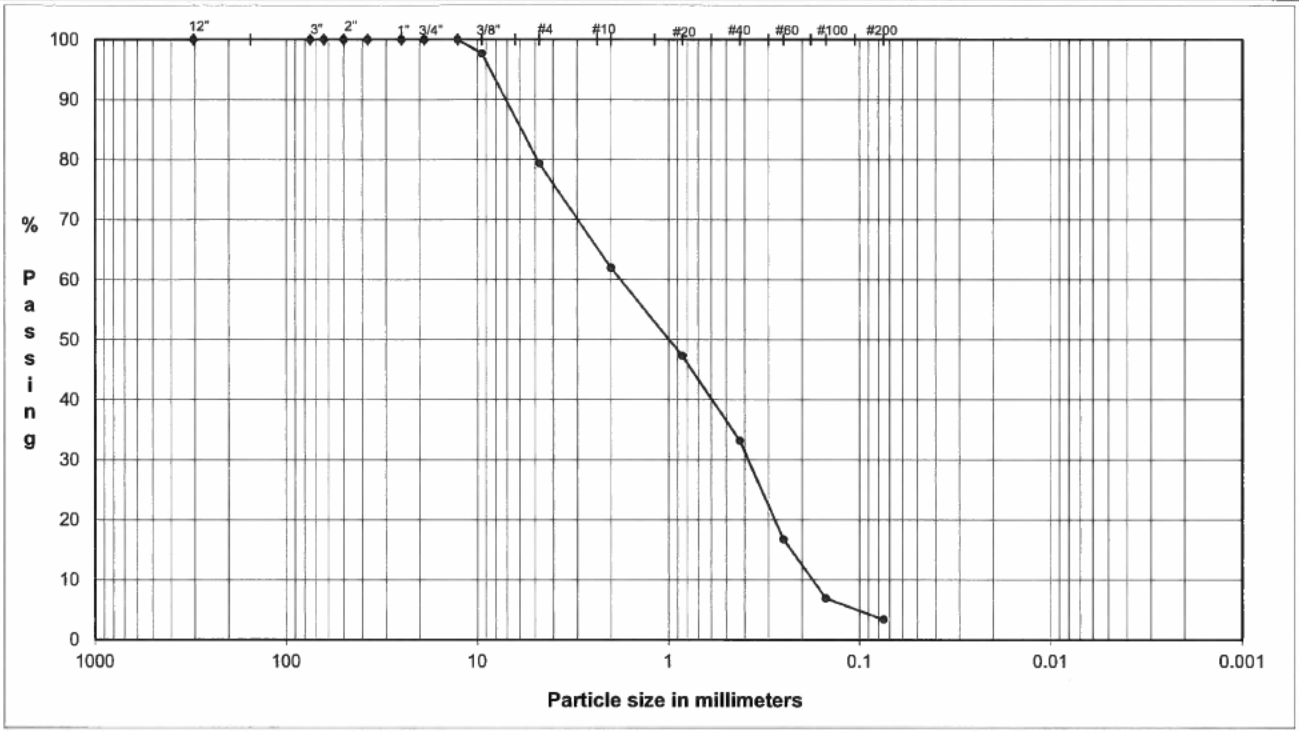
LL (oven-dried) / < 0.75 = ORGANIC (OL/OH)

TECH	FT
DATE	3/28/17
CHECK	DJ
REVIEW	MWM
APPROVE	

PARTICLE SIZE DISTRIBUTION & ATTERBERG LIMITS

ASTM D6913, D4318

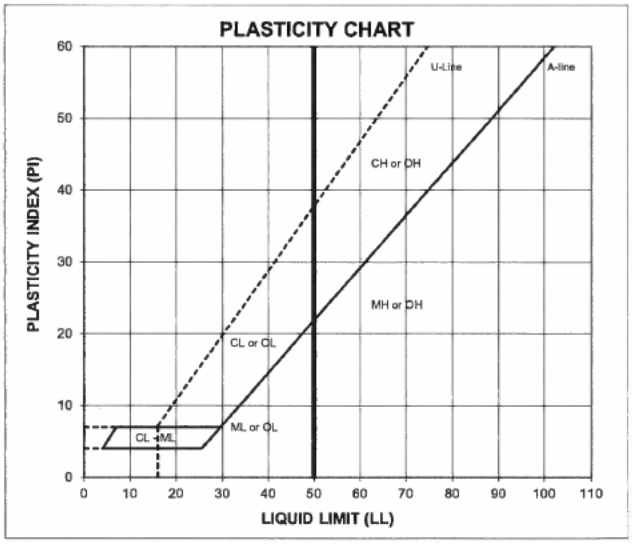
PROJECT NAME: **FTN/ENTERGY INDEPENDENCE/AR**
SAMPLE ID: **703M** Depth: **56.0-57.0'**
TYPE: **Bag**



COBBLES	Coarse	Fine	Coarse	Medium	Fine	Silt or Clay
	GRAVEL		SAND			FINES

U.S. Standard Sieves Sizes and Numbers

	Particle Size (mm)	% Passing	Particle Size Classification	Percentage
12.0"	304.8	**100.0**		
3.0"	75.0	**100.0**	Cobbles	**0.0**
2.5"	63.5	**100.0**		
2.0"	50.0	**100.0**		
1.5"	37.5	**100.0**		
1.0"	25.0	**100.0**		
0.75"	19.0	**100.0**	Coarse Gravel	**0.0**
0.50"	12.7	**100.0**		
0.375"	9.5	**97.7**		
#4	4.8	**79.4**	Fine Gravel	**20.6**
#10	2.00	**62.0**	Coarse Sand	**17.4**
#20	0.85	**47.3**		
#40	0.43	**33.2**	Medium Sand	**28.8**
#60	0.25	**16.7**		
#100	0.15	**6.9**		
#200	0.075	**3.4**	Fine Sand	**29.8**
			Fines	**3.4**



DESCRIPTION: gravelly SAND, fine to coarse, fine gravel, trace fines; dark yellowish brown.

USCS: SP

ATTERBERG LIMITS
Method -B (Dry preparation)

M_c	LL	PL	PI	LI
10.7	**NP**	**NP**	**NP**	**NP**

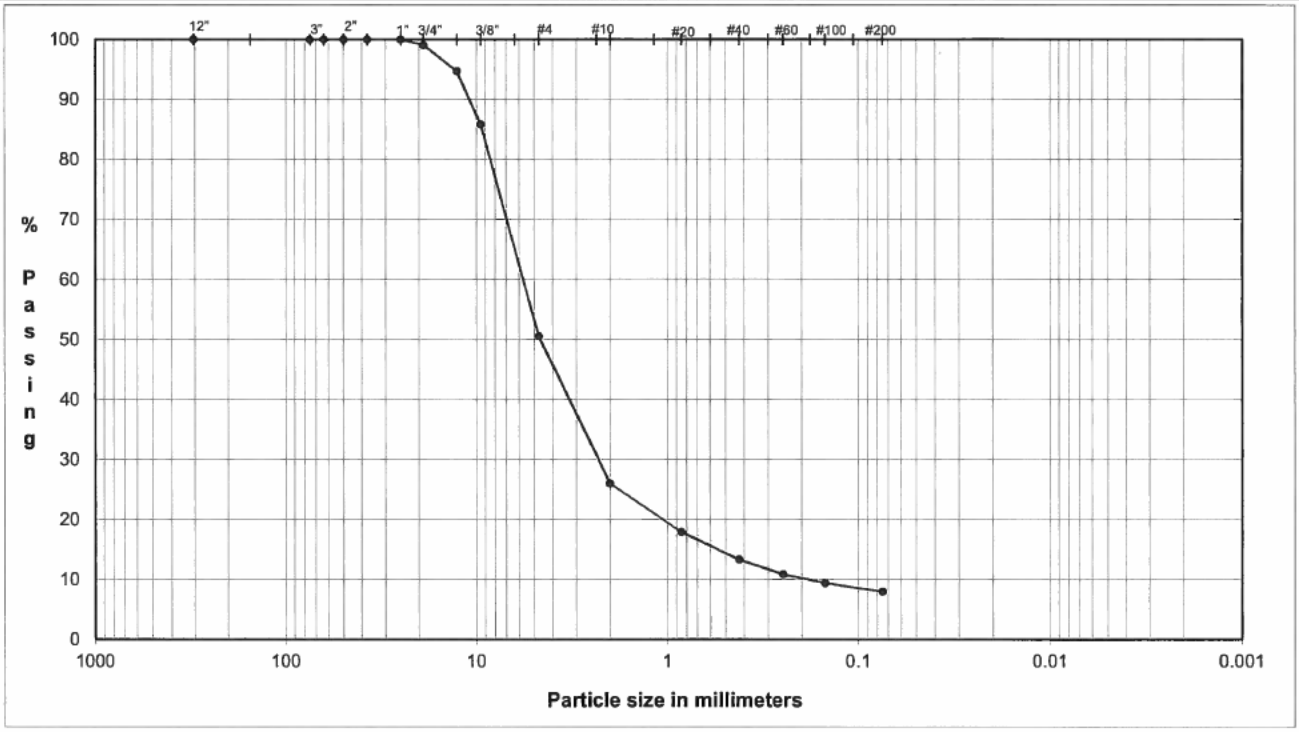
LL (oven-dried) / LL (not dried) < 0.75 = ORGANIC (OL/OH)

TECH	FT/TJ/WD
DATE	3/28/17
CHECK	
REVIEW	
APPROVE	

PARTICLE SIZE DISTRIBUTION & ATTERBERG LIMITS

ASTM D6913, D4318

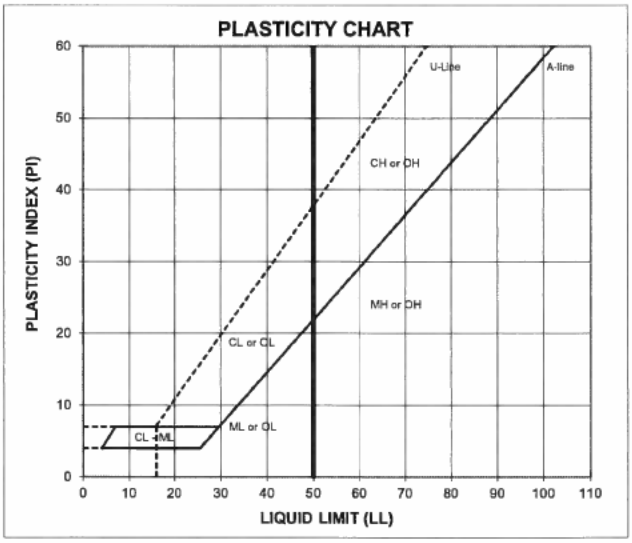
PROJECT NAME: **FTN/ENTERGY INDEPENDENCE/AR**
SAMPLE ID: **703M** Depth: **57.0-59.0'**
TYPE: **Bag**



COBBLES	GRAVEL		SAND			FINES
	Coarse	Fine	Coarse	Medium	Fine	Silt or Clay

U.S. Standard Sieves Sizes and Numbers

	Particle Size (mm)	% Passing	Particle Size Classification	Percentage
12.0"	304.8	**100.0**		
3.0"	75.0	**100.0**	Cobbles	**0.0**
2.5"	63.5	**100.0**		
2.0"	50.0	**100.0**		
1.5"	37.5	**100.0**		
1.0"	25.0	**100.0**		
0.75"	19.0	**99.1**	Coarse Gravel	**0.9**
0.50"	12.7	**94.7**		
0.375"	9.5	**85.9**		
#4	4.8	**50.5**	Fine Gravel	**48.6**
#10	2.00	**26.0**	Coarse Sand	**24.5**
#20	0.85	**17.9**		
#40	0.43	**13.3**	Medium Sand	**12.7**
#60	0.25	**10.9**		
#100	0.15	**9.4**		
#200	0.075	**8.0**	Fine Sand	**5.3**
			Fines	**8.0**



ATTERBERG LIMITS

Method -B (Dry preparation)

M_c	LL	PL	PI	LI
7.9	-	-	-	-

DESCRIPTION: GRAVEL and SAND, fine to coarse, fine to coarse sand, some fines; yellowish brown.

USCS: (GP-GM)

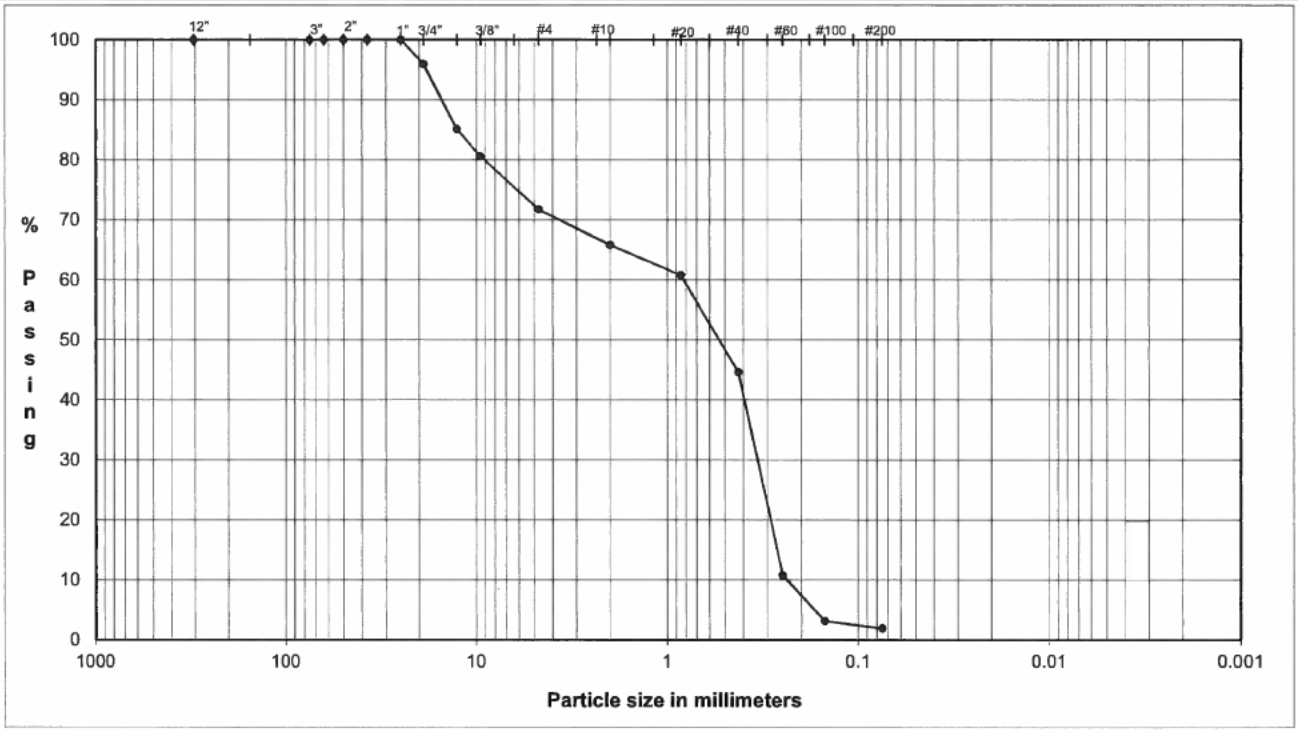
LL (oven-dried) / < 0.75 = ORGANIC (OL/OH)

TECH	FT
DATE	3/28/17
CHECK	
REVIEW	
APPROVE	

PARTICLE SIZE DISTRIBUTION & ATTERBERG LIMITS

ASTM D6913, D4318

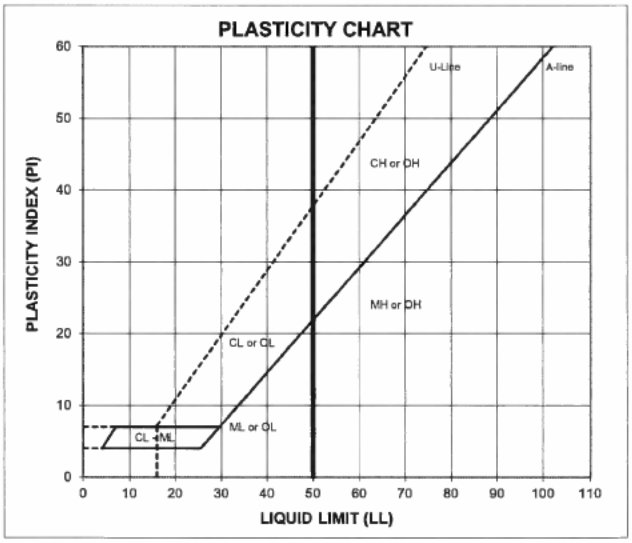
PROJECT NAME: **FTN/ENTERGY INDEPENDENCE/AR**
SAMPLE ID: **703D** Depth: **76.0-86.0'**
TYPE: **Bag**



COBBLES	Coarse GRAVEL	Fine GRAVEL	Coarse SAND	Medium SAND	Fine SAND	Silt or Clay FINES

U.S. Standard Sieves Sizes and Numbers

	Particle Size (mm)	% Passing	Particle Size Classification	Percentage
12.0"	304.8	**100.0**		
3.0"	75.0	**100.0**	Cobbles	**0.0**
2.5"	63.5	**100.0**		
2.0"	50.0	**100.0**		
1.5"	37.5	**100.0**		
1.0"	25.0	**100.0**		
0.75"	19.0	**95.9**	Coarse Gravel	**4.1**
0.50"	12.7	**85.1**		
0.375"	9.5	**80.5**		
#4	4.8	**71.7**	Fine Gravel	**24.2**
#10	2.00	**65.8**	Coarse Sand	**5.9**
#20	0.85	**60.8**		
#40	0.43	**44.6**	Medium Sand	**21.2**
#60	0.25	**10.8**		
#100	0.15	**3.1**		
#200	0.075	**1.9**	Fine Sand	**42.7**
			Fines	**1.9**



DESCRIPTION: gravelly SAND, fine to coarse, fine to coarse gravel; trace fines; brown.

USCS: SP

ATTERBERG LIMITS
Method -B (Dry preparation)

M_c	LL	PL	PI	LI
9.6	**NP**	**NP**	**NP**	**NP**

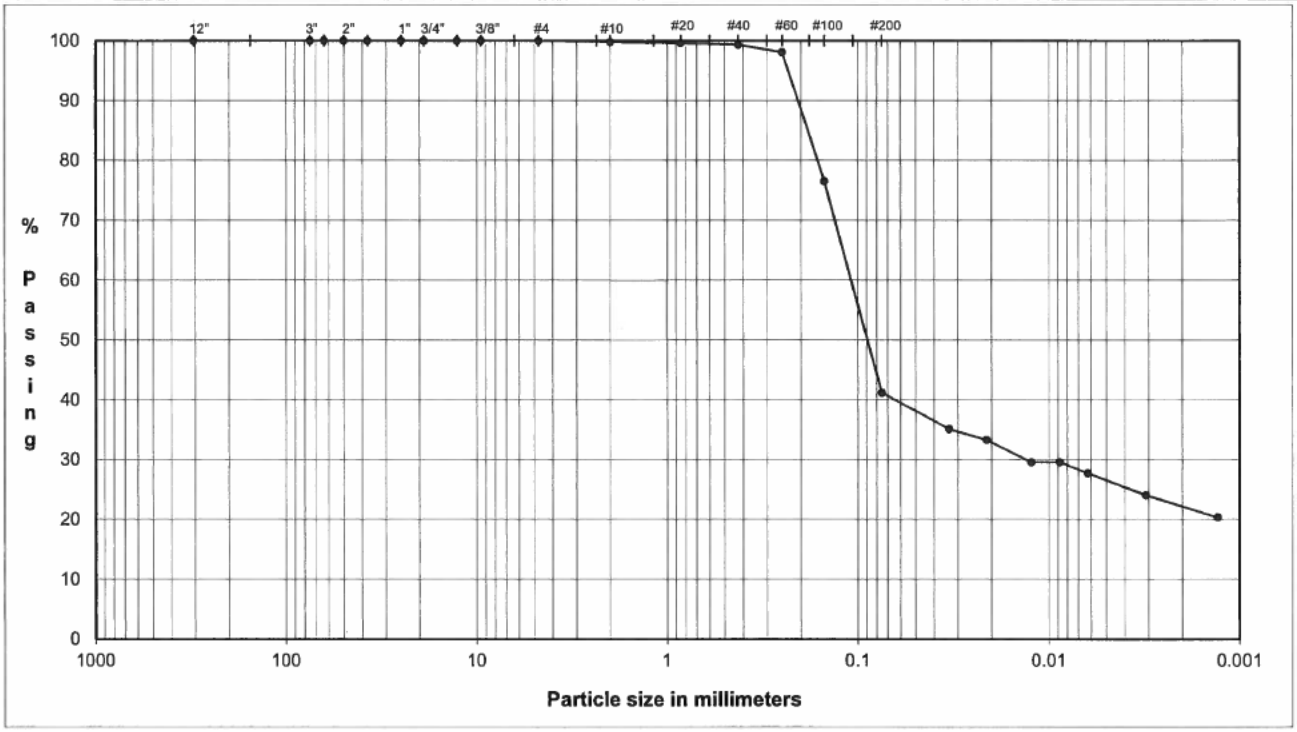
LL (oven-dried) / < 0.75 = ORGANIC (OL/OH)

TECH	FT/TJ
DATE	3/28/17
CHECK	DA
REVIEW	
APPROVE	

PARTICLE SIZE DISTRIBUTION & ATTERBERG LIMITS

ASTM D421, D422, D4318

PROJECT NAME: **FTN/ENTERGY INDEPENDENCE/AR**
SAMPLE ID: **703D** Depth: **124.0-126.0'**
TYPE: **Bag**



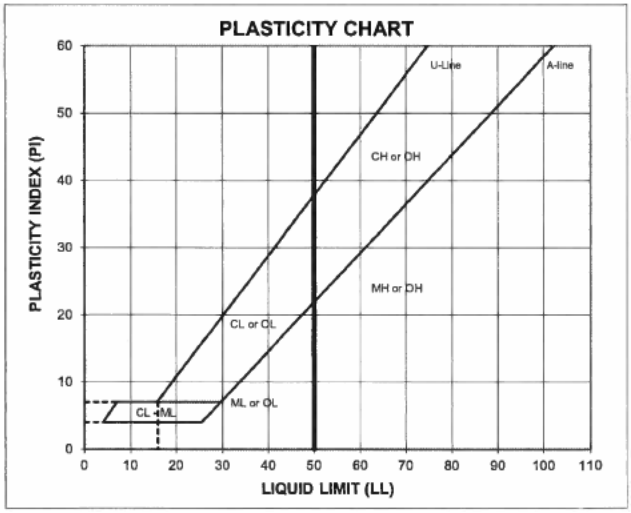
COBBLES	GRAVEL		SAND			FINES
	Coarse	Fine	Coarse	Medium	Fine	Silt or Clay

U.S. Standard Sieves Sizes and Numbers

	Particle Size (mm)	% Passing	Particle Size Classification	Percentage
12.0"	304.8	100.0		
3.0"	75.0	100.0	Cobbles	0.0
2.5"	63.5	100.0		
2.0"	50.0	100.0		
1.5"	37.5	100.0		
1.0"	25.0	100.0		
0.75"	19.0	100.0	Coarse Gravel	0.0
0.50"	12.7	100.0		
0.375"	9.5	100.0		
#4	4.8	100.0	Fine Gravel	0.0
#10	2.00	99.8	Coarse Sand	0.2
#20	0.85	99.6		
#40	0.43	99.3	Medium Sand	0.4
#60	0.25	98.1		
#100	0.15	76.5		
#200	0.075	41.2	Fine Sand	58.2

Hydrometer Analysis

(mm)	%Finer		
0.033	35.1		
0.021	33.3		
0.012	29.6	Fines	
0.0088	29.6	Silt or Clay	41.2
0.0063	27.7		
0.0031	24.0		
0.0013	20.3		



ATTERBERG LIMITS

Method -B (Dry preparation)

M_r	LL	PL	PI	LI
28.0	NP	NP	NP	NP

LL (oven-dried) / < 0.75 = ORGANIC (OL/OH)

DESCRIPTION: SAND and SILT, fine to coarse; gray.

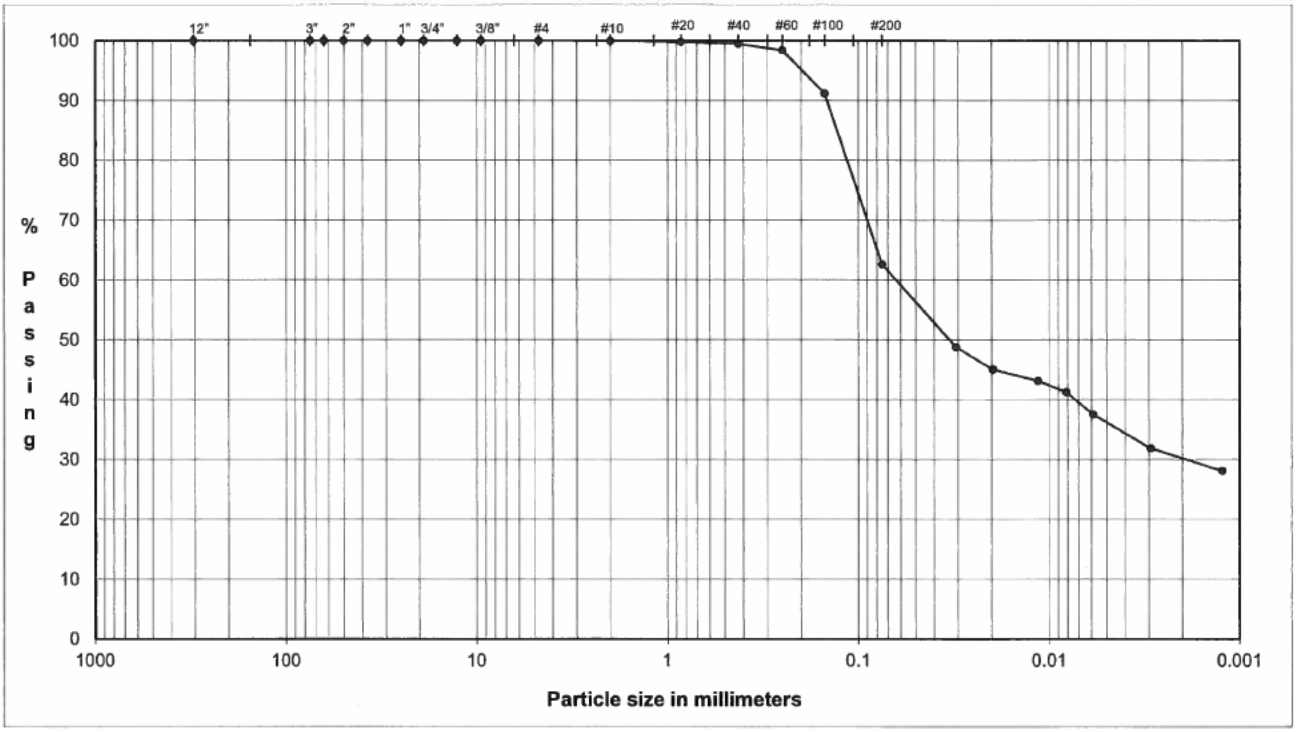
USCS: SM

TECH	WD
DATE	3/28/17
CHECK	
REVIEW	
APPROVE	

PARTICLE SIZE DISTRIBUTION & ATTERBERG LIMITS

ASTM D421, D422, D4318

PROJECT NAME: **FTN/ENTERGY INDEPENDENCE/AR**
SAMPLE ID: **703D** Depth: **134.0-136.0'**
TYPE: **Bag**



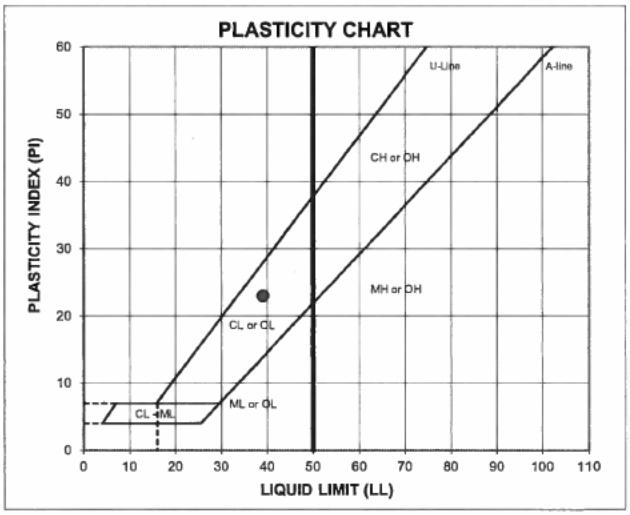
COBBLES	GRAVEL		SAND			FINES
	Coarse	Fine	Coarse	Medium	Fine	Silt or Clay

U.S. Standard Sieves Sizes and Numbers

	Particle Size (mm)	% Passing	Particle Size Classification	Percentage
12.0"	304.8	100.0		
3.0"	75.0	100.0	Cobbles	0.0
2.5"	63.5	100.0		
2.0"	50.0	100.0		
1.5"	37.5	100.0		
1.0"	25.0	100.0		
0.75"	19.0	100.0	Coarse Gravel	0.0
0.50"	12.7	100.0		
0.375"	9.5	100.0		
#4	4.8	100.0	Fine Gravel	0.0
#10	2.00	99.9	Coarse Sand	0.1
#20	0.85	99.8		
#40	0.43	99.4	Medium Sand	0.5
#60	0.25	98.3		
#100	0.15	91.1		
#200	0.075	62.6	Fine Sand	36.8

Hydrometer Analysis

(mm)	%Finer		
0.031	48.8		
0.020	45.0		
0.011	43.1	Fines	
0.0082	41.3	Silt or Clay	62.6
0.0059	37.5		
0.0029	31.9		
0.0012	28.1		



ATTERBERG LIMITS

Method -B (Dry preparation)

M_c	LL	PL	PI	LI
25.3	39	16	23	0.39

LL (oven-dried) / 0.75 = ORGANIC (OL/OH)

DESCRIPTION: SILTY CLAY and SAND, fine to coarse; gray.

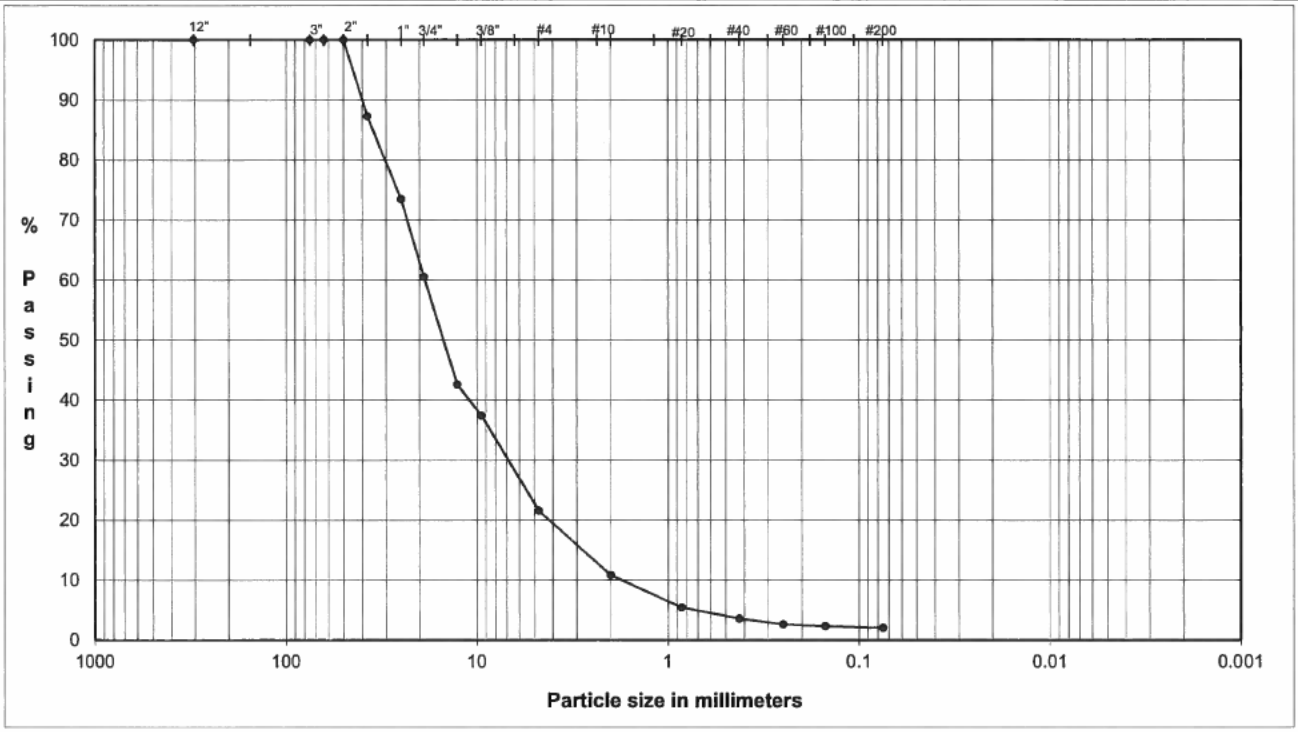
USCS: CL

TECH	FT/WD
DATE	3/28/17
CHECK	
REVIEW	
APPROVE	

PARTICLE SIZE DISTRIBUTION & ATTERBERG LIMITS

ASTM D6913, D4318

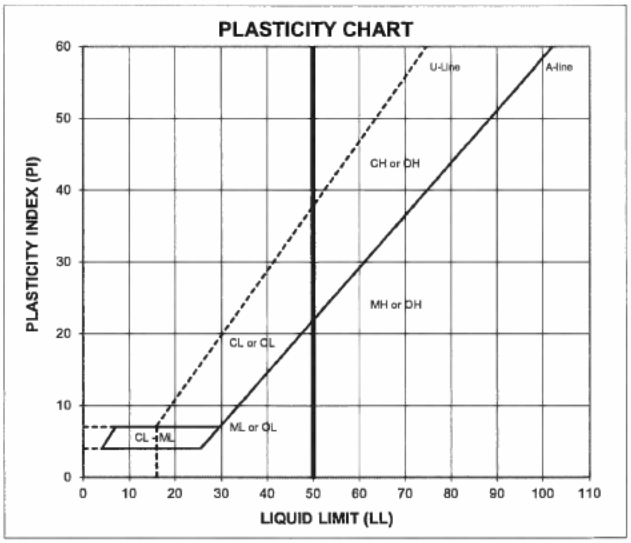
PROJECT NAME: **FTN/ENTERGY INDEPENDENCE/AR**
SAMPLE ID: **709M** Depth: **36.0-46.0'**
TYPE: **Bag**



COBBLES	Coarse GRAVEL	Fine GRAVEL	Coarse SAND	Medium SAND	Fine SAND	Silt or Clay FINES

U.S. Standard Sieves Sizes and Numbers

	Particle Size (mm)	% Passing	Particle Size Classification	Percentage
12.0"	304.8	**100.0**		
3.0"	75.0	**100.0**	Cobbles	**0.0**
2.5"	63.5	**100.0**		
2.0"	50.0	**100.0**		
1.5"	37.5	**87.3**		
1.0"	25.0	**73.5**		
0.75"	19.0	**60.5**	Coarse Gravel	**39.5**
0.50"	12.7	**42.6**		
0.375"	9.5	**37.4**		
#4	4.8	**21.5**	Fine Gravel	**39.0**
#10	2.00	**10.8**	Coarse Sand	**10.8**
#20	0.85	**5.4**		
#40	0.43	**3.5**	Medium Sand	**7.2**
#60	0.25	**2.6**		
#100	0.15	**2.3**		
#200	0.075	**2.0**	Fine Sand	**1.5**
			Fines	**2.0**



DESCRIPTION: sandy GRAVEL, fine to coarse, fine to coarse sand, trace fines; dark yellowish brown.

USCS: GW

ATTERBERG LIMITS
Method -B (Dry preparation)

M_c	LL	PL	PI	LI
5.8	-	-	-	-

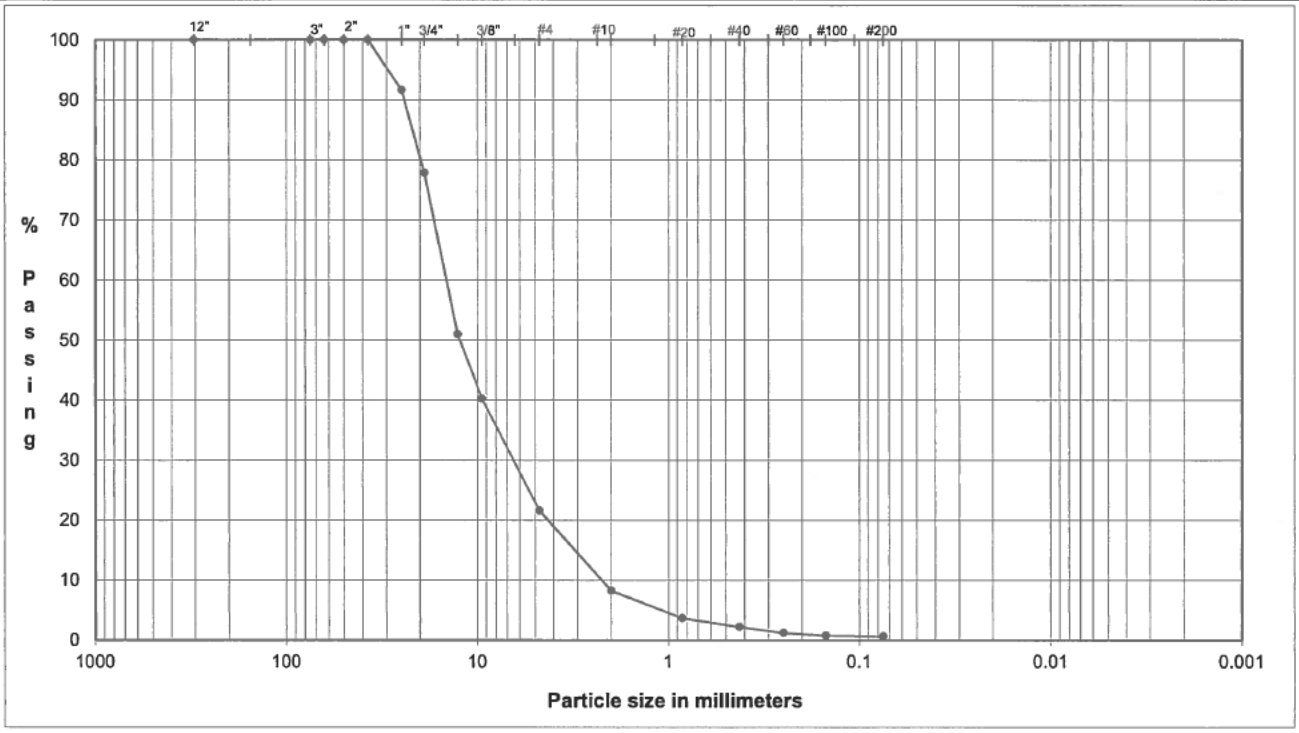
LL (oven-dried) / < 0.75 = ORGANIC (OL/OH)

TECH	FT/TJ
DATE	3/28/17
CHECK	
REVIEW	
APPROVE	

PARTICLE SIZE DISTRIBUTION & ATTERBERG LIMITS

ASTM D6913, D4318

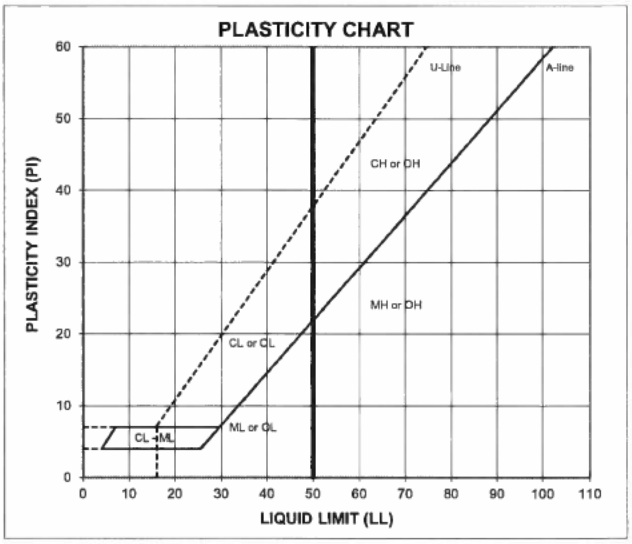
PROJECT NAME: **FTN/ENTERGY INDEPENDENCE/AR**
SAMPLE ID: **709M** Depth: **46.0-56.0'**
TYPE: **Bag**



COBBLES	GRAVEL		SAND			FINES
	Coarse	Fine	Coarse	Medium	Fine	Silt or Clay

U.S. Standard Sieves Sizes and Numbers

	Particle Size (mm)	% Passing	Particle Size Classification	Particle Size Percentage
12.0"	304.8	100.0		
3.0"	75.0	100.0	Cobbles	0.0
2.5"	63.5	100.0		
2.0"	50.0	100.0		
1.5"	37.5	100.0		
1.0"	25.0	91.6		
0.75"	19.0	77.8	Coarse Gravel	22.2
0.50"	12.7	50.9		
0.375"	9.5	40.2		
#4	4.8	21.6	Fine Gravel	56.2
#10	2.00	8.2	Coarse Sand	13.4
#20	0.85	3.6		
#40	0.43	2.2	Medium Sand	6.0
#60	0.25	1.2		
#100	0.15	0.7		
#200	0.075	0.6	Fine Sand	1.6
			Fines	0.6



DESCRIPTION: sandy GRAVEL, fine to coarse, fine to coarse sand, trace fines; dark yellowish brown.

USCS: GW

ATTERBERG LIMITS
Method -B (Dry preparation)

M_c	LL	PL	PI	LI
5.8	-	-	-	-

LL (oven-dried) / < 0.75 = ORGANIC (OL/OH)

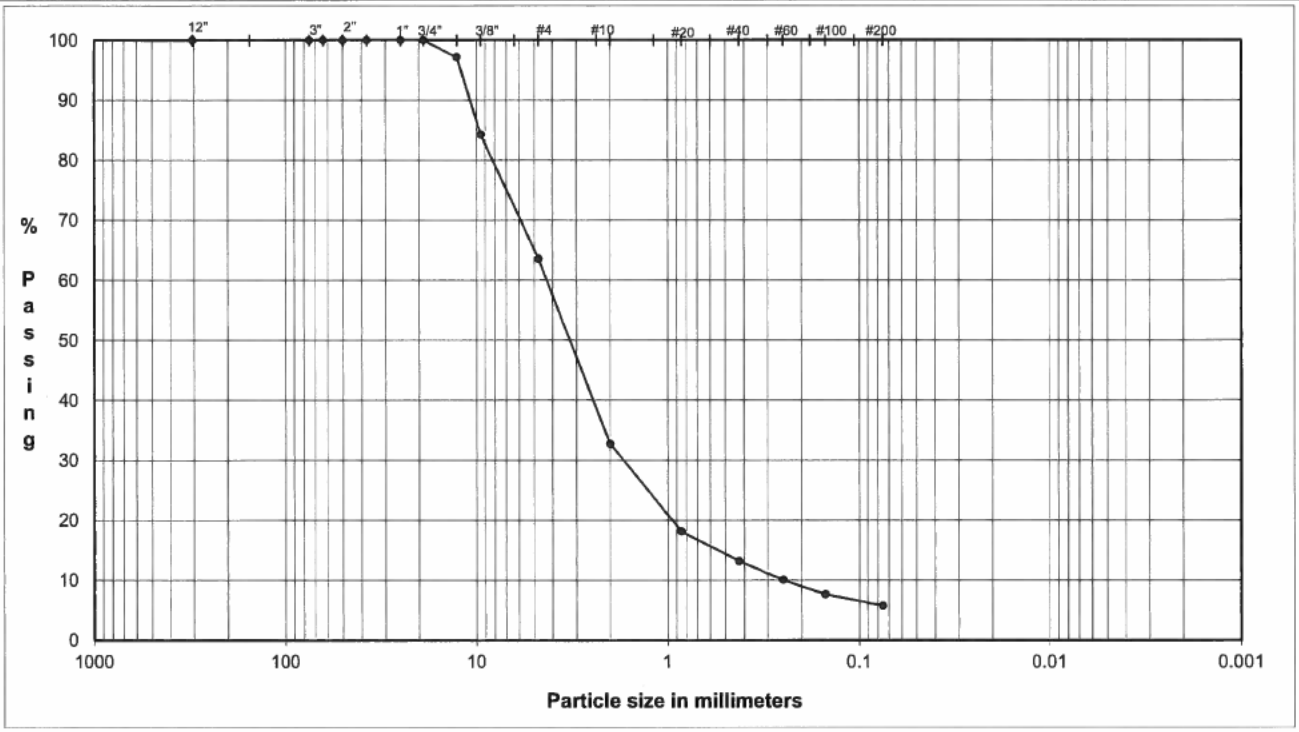
TECH	FT/TJ
DATE	3/28/17
CHECK	
REVIEW	
APPROVE	

MARCH 2017 1776956

PARTICLE SIZE DISTRIBUTION & ATTERBERG LIMITS

ASTM D6913, D4318

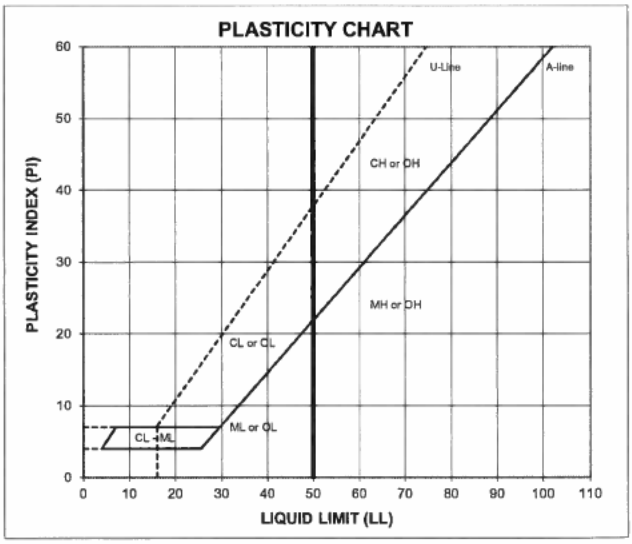
PROJECT NAME: **FTN/ENTERGY INDEPENDENCE/AR**
SAMPLE ID: **709D** Depth: **56.0-58.0'**
TYPE: **Bag**



	Coarse	Fine	Coarse	Medium	Fine	Silt or Clay
COBBLES	GRAVEL		SAND			FINES

U.S. Standard Sieves Sizes and Numbers

	Particle Size (mm)	% Passing	Particle Size Classification	Percentage
12.0"	304.8	**100.0**		
3.0"	75.0	**100.0**	Cobbles	**0.0**
2.5"	63.5	**100.0**		
2.0"	50.0	**100.0**		
1.5"	37.5	**100.0**		
1.0"	25.0	**100.0**		
0.75"	19.0	**100.0**	Coarse Gravel	**0.0**
0.50"	12.7	**97.2**		
0.375"	9.5	**84.3**		
#4	4.8	**63.6**	Fine Gravel	**36.4**
#10	2.00	**32.7**	Coarse Sand	**30.8**
#20	0.85	**18.1**		
#40	0.43	**13.2**	Medium Sand	**19.6**
#60	0.25	**10.1**		
#100	0.15	**7.6**		
#200	0.075	**5.7**	Fine Sand	**7.4**
			Fines	**5.7**



ATTERBERG LIMITS
Method -B (Dry preparation)

M_c	LL	PL	PI	LI
9.3	-	-	-	-

DESCRIPTION: SAND and GRAVEL, fine to coarse, fine to coarse gravel, some fines; yellowish brown.

USCS: (SP-SM)

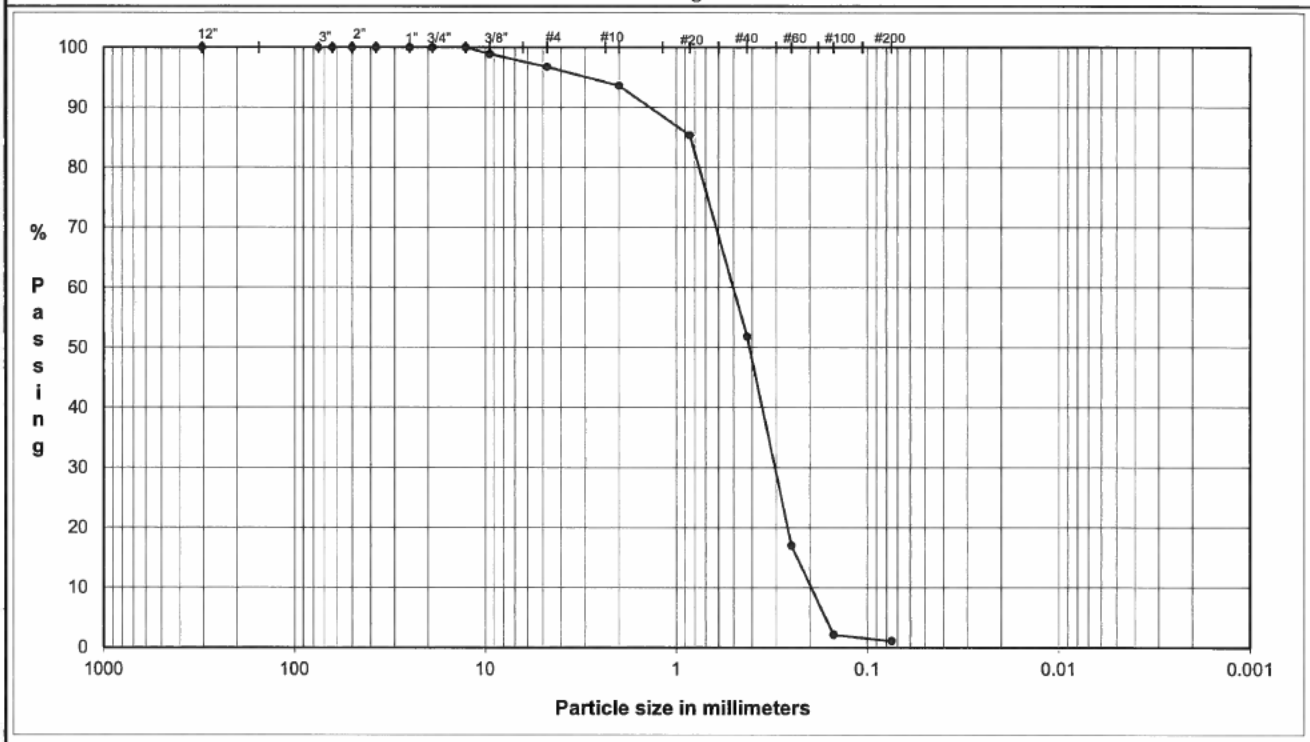
LL (oven-dried) / < 0.75 = ORGANIC (OL/OH)

TECH	FT/TJ
DATE	4/4/17
CHECK	
REVIEW	
APPROVE	

PARTICLE SIZE DISTRIBUTION & ATTERBERG LIMITS

ASTM D6913, D4318

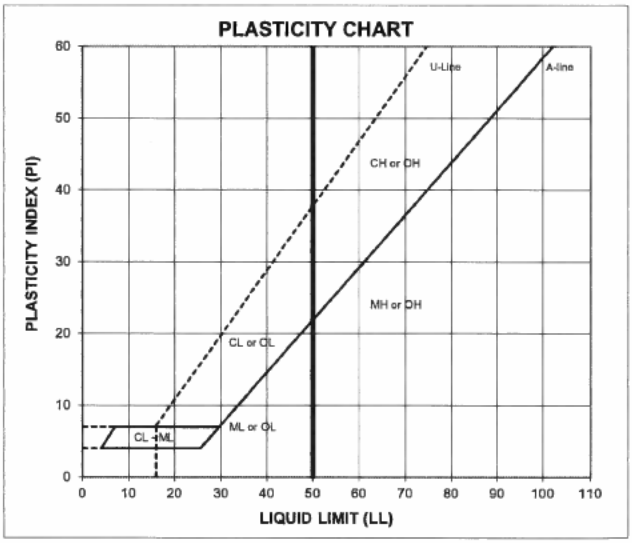
PROJECT NAME: **FTN/ENTERGY INDEPENDENCE/AR**
SAMPLE ID: **709D** Depth: **63.0-66.0'**
TYPE: **Bag**



COBBLES	Coarse	Fine	Coarse	Medium	Fine	Silt or Clay
	GRAVEL		SAND			FINES

U.S. Standard Sieves Sizes and Numbers

	Particle Size (mm)	% Passing	Particle Size Classification	Particle Size Percentage
12.0"	304.8	**100.0**		
3.0"	75.0	**100.0**	Cobbles	**0.0**
2.5"	63.5	**100.0**		
2.0"	50.0	**100.0**		
1.5"	37.5	**100.0**		
1.0"	25.0	**100.0**		
0.75"	19.0	**100.0**	Coarse Gravel	**0.0**
0.50"	12.7	**100.0**		
0.375"	9.5	**98.9**		
#4	4.8	**96.7**	Fine Gravel	**3.3**
#10	2.00	**93.6**	Coarse Sand	**3.1**
#20	0.85	**85.3**		
#40	0.43	**51.8**	Medium Sand	**41.8**
#60	0.25	**17.0**		
#100	0.15	**2.1**		
#200	0.075	**1.1**	Fine Sand	**50.7**
			Fines	**1.1**



DESCRIPTION: SAND, fine to coarse, trace fine gravel, trace fines; dark yellowish brown.

USCS: SP

ATTERBERG LIMITS
Method -B (Dry preparation)

M_c	LL	PL	PI	LI
13.8	**NP**	**NP**	**NP**	**NP**

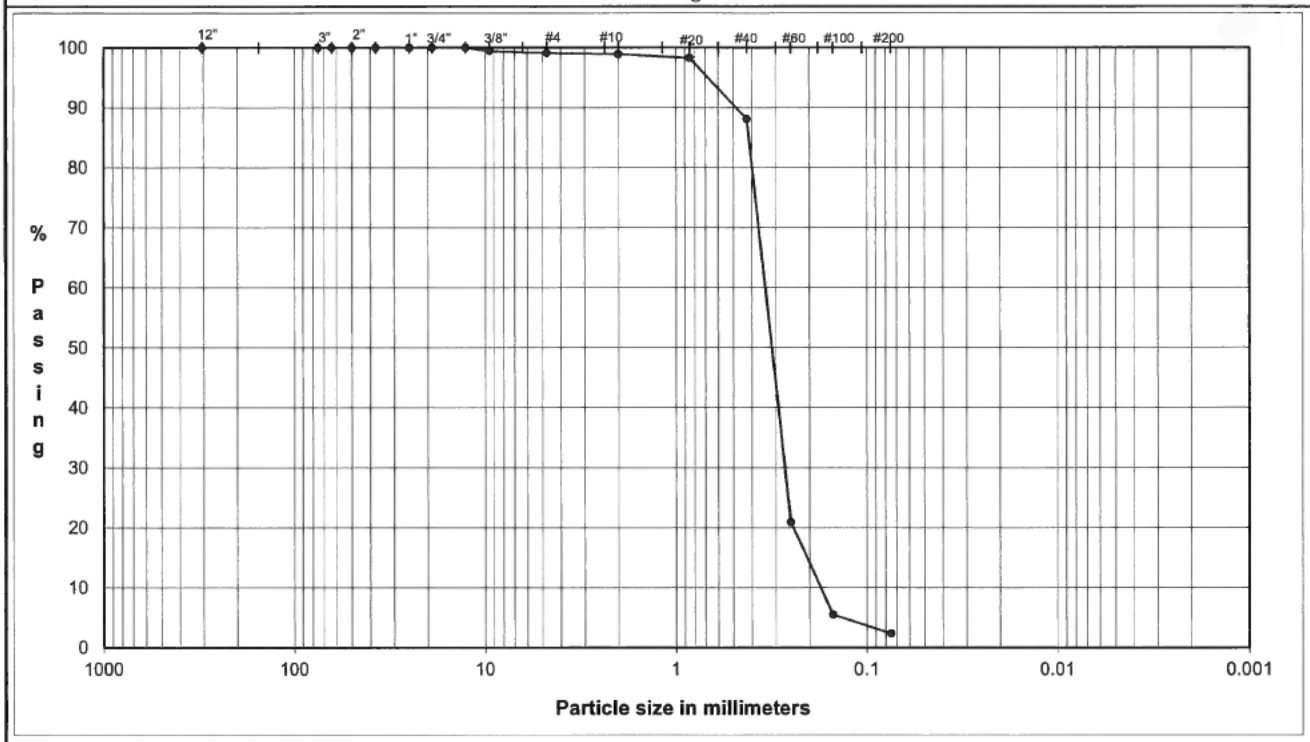
LL (oven-dried) / < 0.75 = ORGANIC (OL/OH)

TECH	FT/TJ/WD
DATE	3/28/17
CHECK	
REVIEW	
APPROVE	

PARTICLE SIZE DISTRIBUTION & ATTERBERG LIMITS

ASTM D6913, D4318

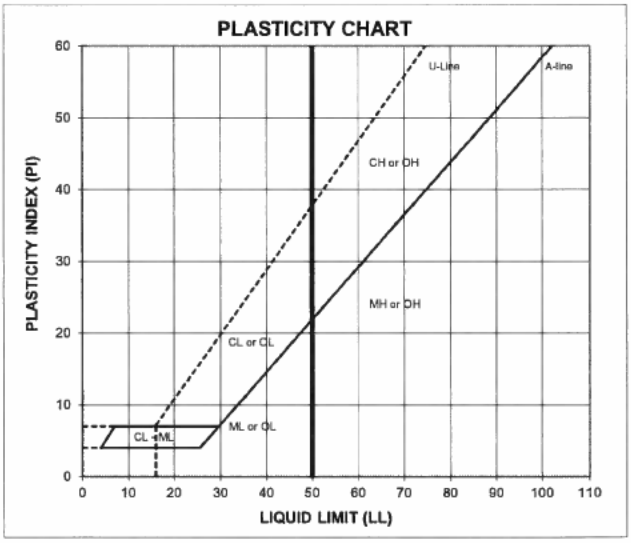
PROJECT NAME: **FTN/ENTERGY INDEPENDENCE/AR**
SAMPLE ID: **709D** Depth: **76.0-86.0'**
TYPE: **Bag**



COBBLES	Coarse GRAVEL	Fine GRAVEL	Coarse SAND	Medium SAND	Fine SAND	Silt or Clay FINES

U.S. Standard Sieves Sizes and Numbers

	Particle Size (mm)	% Passing	Particle Size Classification	Percentage
12.0"	304.8	**100.0**		
3.0"	75.0	**100.0**	Cobbles	**0.0**
2.5"	63.5	**100.0**		
2.0"	50.0	**100.0**		
1.5"	37.5	**100.0**		
1.0"	25.0	**100.0**		
0.75"	19.0	**100.0**	Coarse Gravel	**0.0**
0.50"	12.7	**100.0**		
0.375"	9.5	**99.4**		
#4	4.8	**99.1**	Fine Gravel	**0.9**
#10	2.00	**98.9**	Coarse Sand	**0.2**
#20	0.85	**98.3**		
#40	0.43	**88.1**	Medium Sand	**10.8**
#60	0.25	**20.9**		
#100	0.15	**5.4**		
#200	0.075	**2.3**	Fine Sand	**85.7**
			Fines	**2.3**



ATTERBERG LIMITS
Method -B (Dry preparation)

M_c	LL	PL	PI	LI
11.9	**NP**	**NP**	**NP**	**NP**

DESCRIPTION: SAND, fine to coarse, trace fines, trace fine gravel; light yellowish brown.

USCS: SP

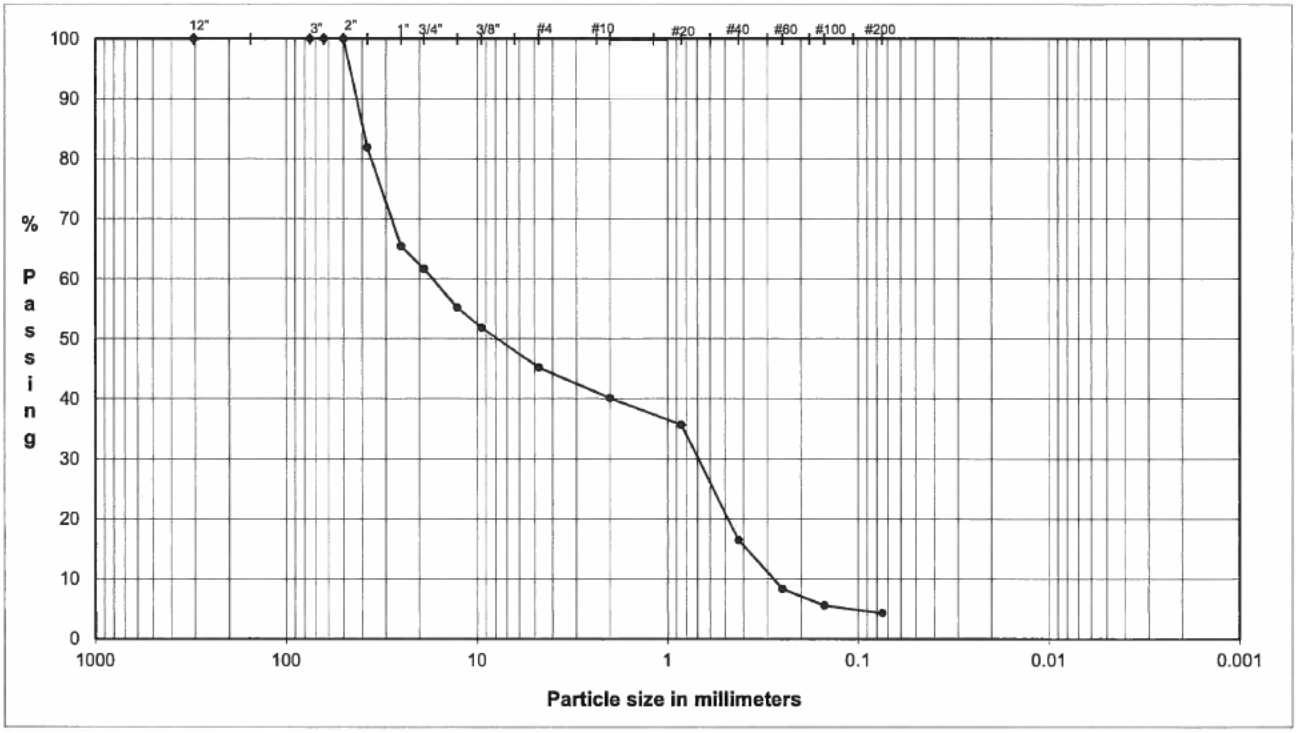
LL (oven-dried) / < 0.75 = ORGANIC (OL/OH)

TECH	FT/TJ
DATE	3/28/17
CHECK	DA
REVIEW	TWH
APPROVE	

PARTICLE SIZE DISTRIBUTION & ATTERBERG LIMITS

ASTM D6913, D4318

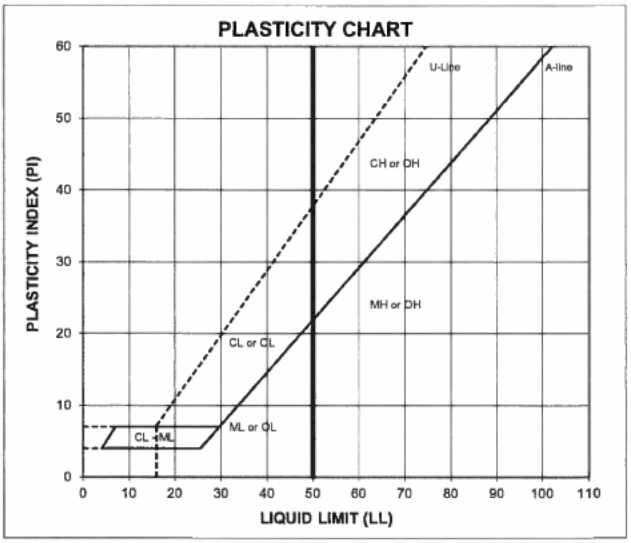
PROJECT NAME: **FTN/ENTERGY INDEPENDENCE/AR**
SAMPLE ID: **709D** Depth: **108.0-112.0'**
TYPE: **Bag**



COBBLES	GRAVEL		SAND			FINES
	Coarse	Fine	Coarse	Medium	Fine	Silt or Clay

U.S. Standard Sieves Sizes and Numbers

	Particle Size (mm)	% Passing	Particle Size Classification	Particle Size Percentage
12.0"	304.8	**100.0**		
3.0"	75.0	**100.0**	Cobbles	**0.0**
2.5"	63.5	**100.0**		
2.0"	50.0	**100.0**		
1.5"	37.5	**81.9**		
1.0"	25.0	**65.4**		
0.75"	19.0	**61.6**	Coarse Gravel	**38.4**
0.50"	12.7	**55.2**		
0.375"	9.5	**51.8**		
#4	4.8	**45.2**	Fine Gravel	**16.4**
#10	2.00	**40.1**	Coarse Sand	**5.1**
#20	0.85	**35.7**		
#40	0.43	**16.4**	Medium Sand	**23.6**
#60	0.25	**8.3**		
#100	0.15	**5.5**		
#200	0.075	**4.3**	Fine Sand	**12.2**
			Fines	**4.3**



DESCRIPTION: GRAVEL and SAND, fine to coarse, fine to coarse sand, trace fines; dark grayish brown.

USCS: GP

ATTERBERG LIMITS
Method -B (Dry preparation)

M_c	LL	PL	PI	LI
7.2	NP	NP	NP	NP

LL (oven-dried) / < 0.75 - ORGANIC (OL/OH)

TECH	FT/TJ/WD
DATE	3/28/17
CHECK	
REVIEW	
APPROVE	

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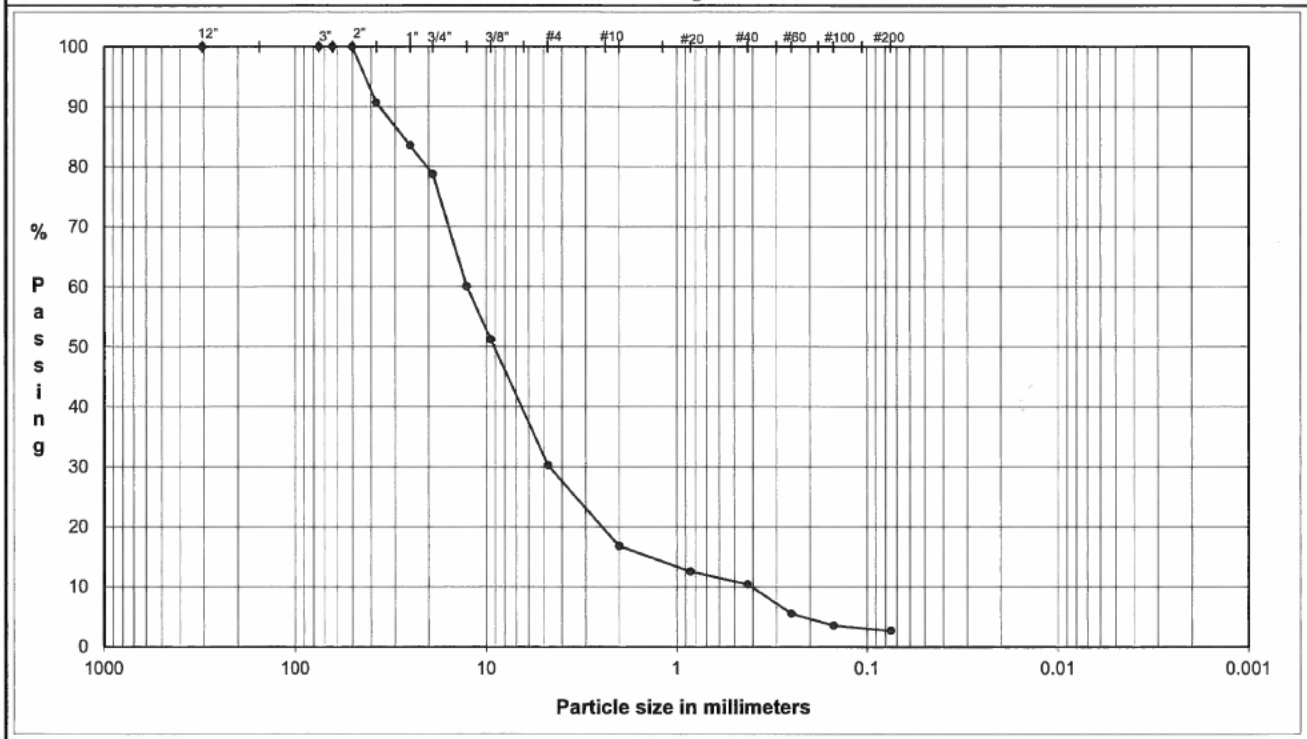
PARTICLE SIZE DISTRIBUTION & ATTERBERG LIMITS

ASTM D6913, D4318

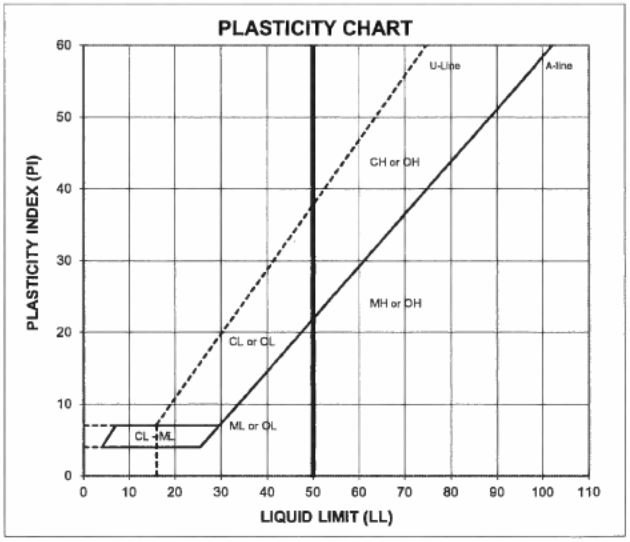
PROJECT NAME: **FTN/ENTERGY INDEPENDENCE/AR**
SAMPLE ID: **710S** Depth: **36.0-46.0'**
TYPE: **Bag**



	Coarse	Fine	Coarse	Medium	Fine	Silt or Clay
COBBLES	GRAVEL		SAND			FINES

U.S. Standard Sieves Sizes and Numbers

	Particle Size (mm)	% Passing	Particle Size Classification	Percentage
12.0"	304.8	**100.0**		
3.0"	75.0	**100.0**	Cobbles	**0.0**
2.5"	63.5	**100.0**		
2.0"	50.0	**100.0**		
1.5"	37.5	**90.7**		
1.0"	25.0	**83.5**		
0.75"	19.0	**78.7**	Coarse Gravel	**21.3**
0.50"	12.7	**60.1**		
0.375"	9.5	**51.2**		
#4	4.8	**30.2**	Fine Gravel	**48.5**
#10	2.00	**16.7**	Coarse Sand	**13.5**
#20	0.85	**12.5**		
#40	0.43	**10.3**	Medium Sand	**6.4**
#60	0.25	**5.5**		
#100	0.15	**3.5**		
#200	0.075	**2.7**	Fine Sand	**7.7**
			Fines	**2.7**



DESCRIPTION: sandy GRAVEL, fine to coarse, fine to coarse sand, trace fines; dark yellowish brown.

USCS: GP

ATTERBERG LIMITS
Method -B (Dry preparation)

M_c	LL	PL	PI	LI
7.7	NP	NP	NP	NP

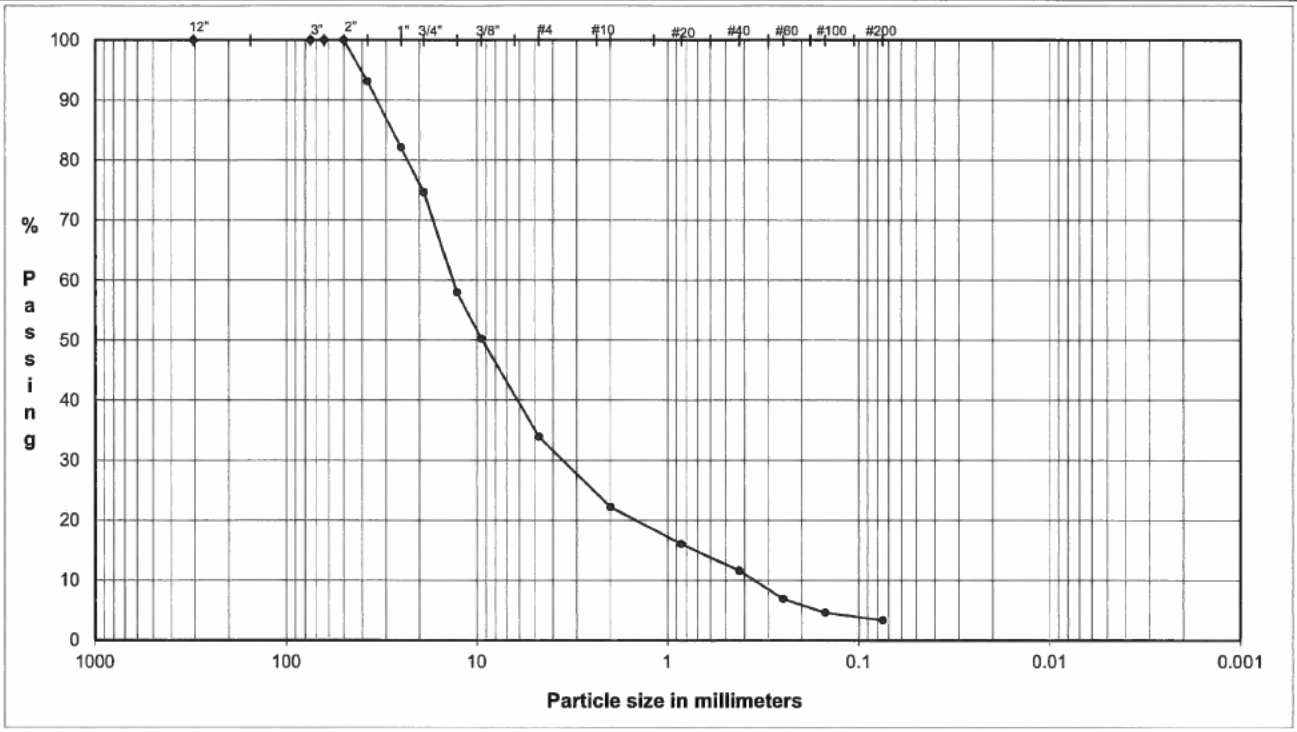
LL (oven-dried) / LL (not dried) < 0.75 = ORGANIC (OL/OH)

TECH	JS/WD
DATE	3/28/17
CHECK	DA
REVIEW	TWA
APPROVE	

PARTICLE SIZE DISTRIBUTION & ATTERBERG LIMITS

ASTM D6913, D4318

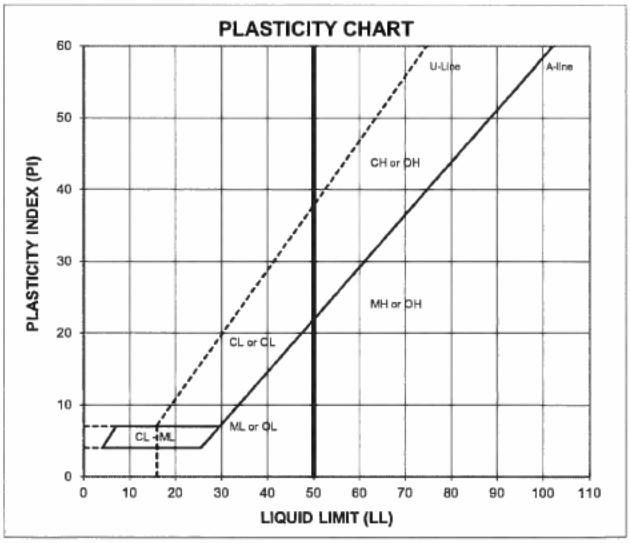
PROJECT NAME: **FTN/ENTERGY INDEPENDENCE/AR**
SAMPLE ID: **710M** Depth: **55.0-65.0'**
TYPE: **Bag**



COBBLES	GRAVEL		SAND			FINES
	Coarse	Fine	Coarse	Medium	Fine	Silt or Clay

U.S. Standard Sieves Sizes and Numbers

	Particle Size (mm)	% Passing	Particle Size Classification	Particle Size Percentage
12.0"	304.8	**100.0**		
3.0"	75.0	**100.0**	Cobbles	**0.0**
2.5"	63.5	**100.0**		
2.0"	50.0	**100.0**		
1.5"	37.5	**93.1**		
1.0"	25.0	**82.1**		
0.75"	19.0	**74.6**	Coarse Gravel	**25.4**
0.50"	12.7	**58.0**		
0.375"	9.5	**50.3**		
#4	4.8	**33.9**	Fine Gravel	**40.8**
#10	2.00	**22.2**	Coarse Sand	**11.7**
#20	0.85	**16.0**		
#40	0.43	**11.6**	Medium Sand	**10.6**
#60	0.25	**6.9**		
#100	0.15	**4.6**		
#200	0.075	**3.3**	Fine Sand	**8.3**
			Fines	**3.3**



ATTERBERG LIMITS
Method -B (Dry preparation)

M_c	LL	PL	PI	LI
6.4	NP	NP	NP	NP

DESCRIPTION: sandy GRAVEL, fine to coarse, fine to coarse sand, trace fines; yellowish brown.

USCS: GW

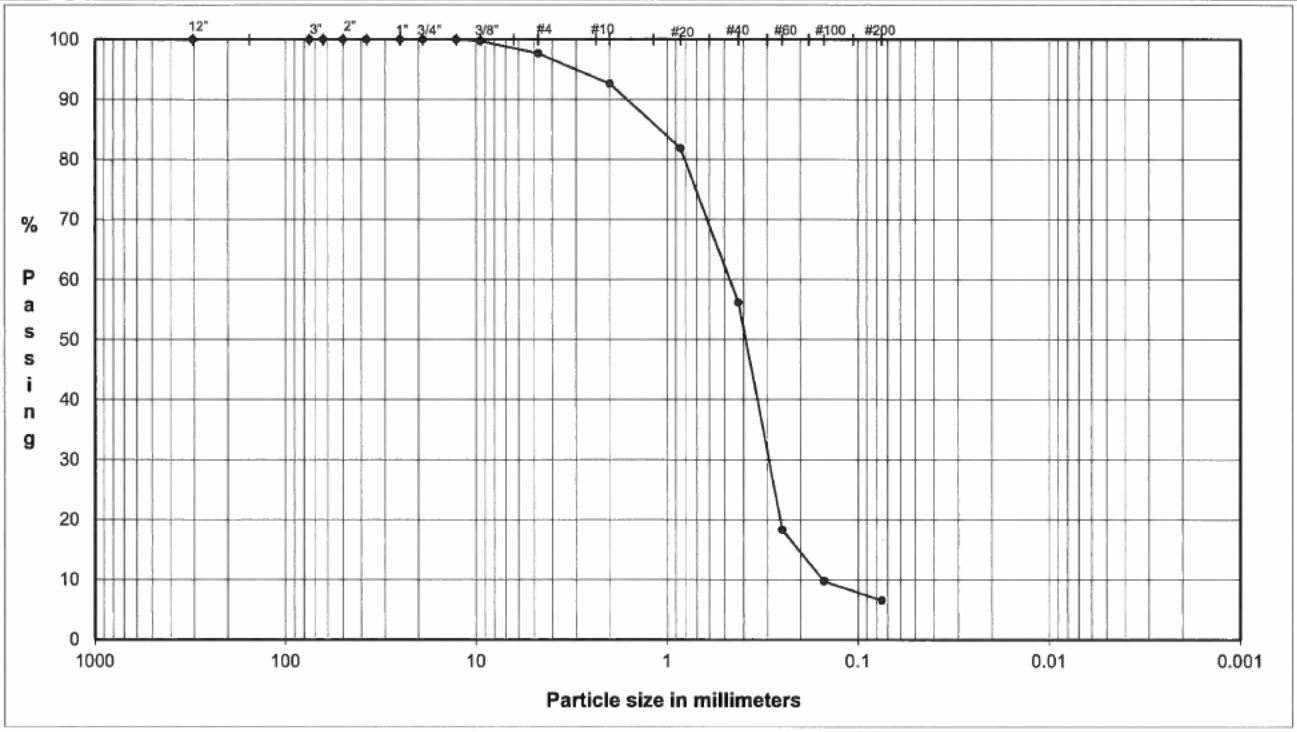
LL (oven-dried) / < 0.75 = ORGANIC (OL/OH)

TECH	FT/TJ/WD
DATE	3/28/17
CHECK	DH
REVIEW	TWH
APPROVE	

PARTICLE SIZE DISTRIBUTION & ATTERBERG LIMITS

ASTM D6913, D4318

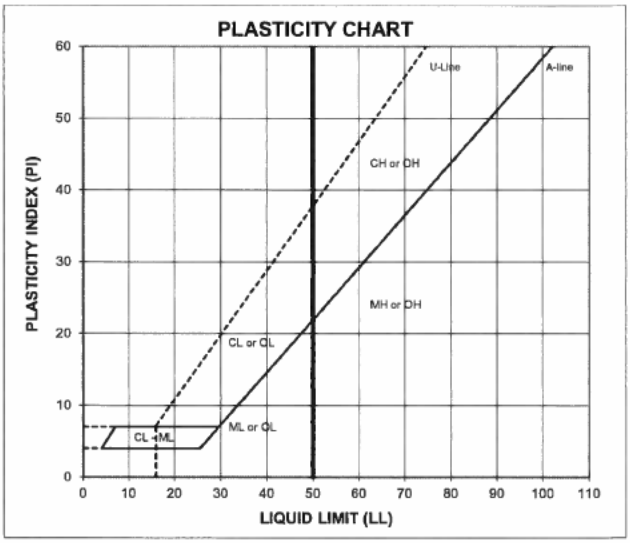
PROJECT NAME: **FTN/ENTERGY INDEPENDENCE/AR**
SAMPLE ID: **710D** Depth: **96.0-99.5'**
TYPE: **Bag**



COBBLES	GRAVEL		SAND			FINES
	Coarse	Fine	Coarse	Medium	Fine	Silt or Clay

U.S. Standard Sieves Sizes and Numbers

	Particle Size (mm)	% Passing	Particle Size Classification	Particle Size Percentage
12.0"	304.8	**100.0**		
3.0"	75.0	**100.0**	Cobbles	**0.0**
2.5"	63.5	**100.0**		
2.0"	50.0	**100.0**		
1.5"	37.5	**100.0**		
1.0"	25.0	**100.0**		
0.75"	19.0	**100.0**	Coarse Gravel	**0.0**
0.50"	12.7	**100.0**		
0.375"	9.5	**99.7**		
#4	4.8	**97.7**	Fine Gravel	**2.3**
#10	2.00	**92.6**	Coarse Sand	**5.0**
#20	0.85	**81.8**		
#40	0.43	**56.2**	Medium Sand	**36.4**
#60	0.25	**18.3**		
#100	0.15	**9.7**		
#200	0.075	**6.5**	Fine Sand	**49.7**
			Fines	**6.5**



DESCRIPTION: SAND, fine to coarse, some fines, trace fine gravel; dark gray.

USCS: SP-SM

ATTERBERG LIMITS
Method -B (Dry preparation)

M_c	LL	PL	PI	LI
10.4	**NP**	**NP**	**NP**	**NP**

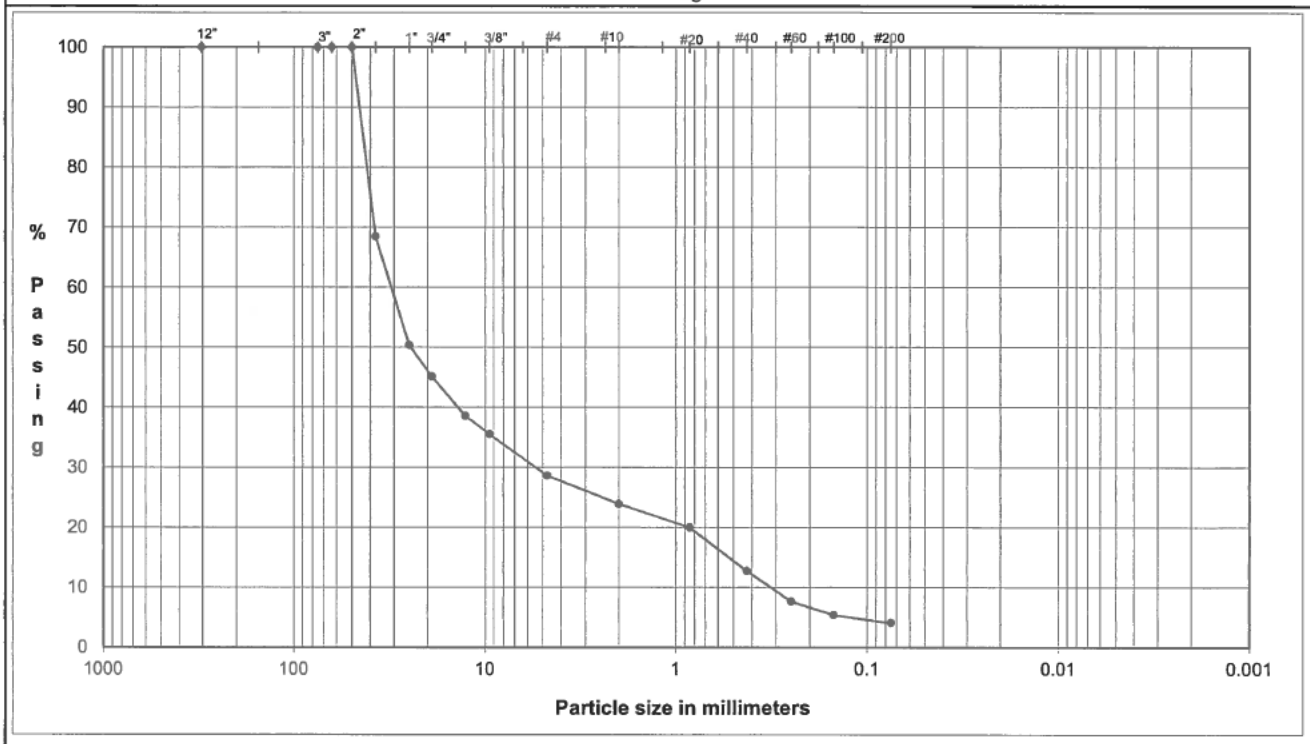
LL (oven-dried) / < 0.75 = ORGANIC (OL/OH)

TECH	FT/TJ/WD
DATE	3/28/17
CHECK	DA
REVIEW	
APPROVE	

PARTICLE SIZE DISTRIBUTION & ATTERBERG LIMITS

ASTM D6913, D4318

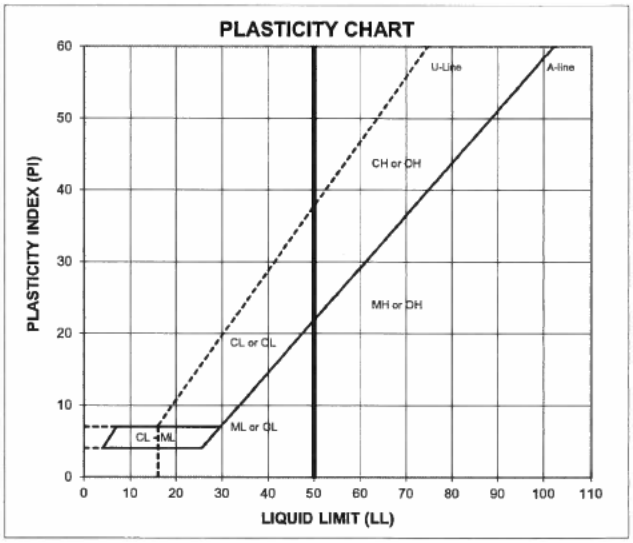
PROJECT NAME: **FTN/ENTERGY INDEPENDENCE/AR**
SAMPLE ID: **710D** Depth: **99.5-103.0'**
TYPE: **Bag**



COBBLES	Coarse	Fine	Coarse	Medium	Fine	Silt or Clay
	GRAVEL		SAND			FINES

U.S. Standard Sieves Sizes and Numbers

	Particle Size (mm)	% Passing	Particle Size Classification	Percentage
12.0"	304.8	**100.0**		
3.0"	75.0	**100.0**	Cobbles	**0.0**
2.5"	63.5	**100.0**		
2.0"	50.0	**100.0**		
1.5"	37.5	**68.5**		
1.0"	25.0	**50.3**		
0.75"	19.0	**45.1**	Coarse Gravel	**54.9**
0.50"	12.7	**38.6**		
0.375"	9.5	**35.5**		
#4	4.8	**28.6**	Fine Gravel	**16.5**
#10	2.00	**23.9**	Coarse Sand	**4.7**
#20	0.85	**20.0**		
#40	0.43	**12.7**	Medium Sand	**11.2**
#60	0.25	**7.6**		
#100	0.15	**5.4**		
#200	0.075	**4.1**	Fine Sand	**8.6**
			Fines	**4.1**



DESCRIPTION: sandy GRAVEL, fine to coarse, fine to coarse sand; black.

USCS: GW

ATTERBERG LIMITS
Method -B (Dry preparation)

M_c	LL	PL	PI	LI
5.2	-	-	-	-

LL (oven-dried) / LL (not dried) < 0.75 = ORGANIC (OL/OH)

TECH	FT/TJ
DATE	3/28/17
CHECK	DA
REVIEW	TWH
APPROVE	