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CONSTRUCTION QUALITY ASSURANCE

FINAL REPORT

PHASE IV - CELLS 4 AND 5 CONSTRUCTION ON-SITE DISPOSAL FACILITY

United States Department of Energy
Fernald Environmental Management Project
Fernald, Ohio

prepared by

GEOSYNTEC CONSULTANTS

Fernald Field Office
7400 Willey Road, MS:38
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under

Fluor Fernald, Inc.
Contract No. 95PS005028

REVISION 0
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VOLUME

APPENDIX E

Geotechnical Laboratory Test Results

Compacted Fill

GEOSYNTEC CONSULTANTS

FLUOR FERNALD

FIELD LABORATORY COMPACTION TEST / Point Proctor

(ASTM D 698 METHOD B)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO

DESCRIPTION: Phase ~~III~~ KS IV

PROJECT NO. 6Q134 TASK NO.: 04.1

MATERIAL TYPE: ~~Low Perm Clay~~ KS Compacted Fill

MATERIAL SOURCE: on-site

DATE: 12 day April month 2002 year

SAMPLE NO.: CF02-01

THIS METHOD WILL BE USED IF THE MATERIAL RETAINED ON THE NO. 3/4-in. (19-mm) SIEVE IS LESS THAN 30%, IF THE MATERIAL RETAINED ON THE NO. 4 (4.75-mm) SIEVE IS GREATER THAN 20%, AND IF THE MATERIAL RETAINED ON THE NO. 3/8-in. (9.5-mm) SIEVE IS LESS THAN 20%.
ALL MATERIAL RETAINED ON THE NO. 3/8-in. (9.5-mm) SIEVE IS DISCARDED.
USE OVERSIZE CORRECTION IF MORE THAN 5% IS DISCARDED ACCORDING TO ASTM D 4718.
USE A 4-in. DIAMETER MOLD / 5.5-lb RAMMER / 12-in. DROP / 3 LAYERS / 25 BLOWS PER LAYER.

COMPACTION OF SOIL

QA ID: KS

	WATER ADDED	(ml)	1332				
A	WT. OF SOIL & MOLD	(grams)	6042.0				
B	WT. OF MOLD	(grams)	4204.5				
C	WT. OF SOIL = A − B	(grams)	1837.5				
D	WET UNIT WT.(1) = C X 0.066	(pcf)	121.3				
E	DRY UNIT WT. = D / [1 + (K/100)]	(pcf)	107.3				

NOTE: IF CALIBRATED MOLD OF 1/30 FT^3 IS USED, THE WET DENSITY IS CALCULATED FROM THE WEIGHT OF SOIL, THE VOLUME OF THE MOLD AND THE CONVERSION FROM GRAMS TO POUNDS (I.E., CONVERSION FACTOR = (30 / 453.6) = 0.066). THE MOLD MUST BE CALIBRATED TO VERIFY A CAPACITY OF 1/30 ± 0.0005 FT^3 ON INTERVALS NOT TO EXCEED 1000 TIMES THAT THE MOLD IS FILLED.

MOISTURE CONTENT – ASTM D 2216

QA ID: KS

	TARE NO.		91~~2~~ KS				
F	WT. OF TARE	(grams)	8.2				
G	WT. OF WET SOIL & TARE	(grams)	238.1				
H	WT. OF DRY SOIL & TARE	(grams)	211.4				
I	WT. OF WATER = G − H	(grams)	26.7				
J	WT. DRY SOIL = H − F	(grams)	203.2		Close match to OSDF-9		
K	MOISTURE CONTENT = (I/J) X 100	(%)	13.1				

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FLUOR DANIEL FERNALD

FIELD LABORATORY COMPACTION TEST (ASTM D 698 METHOD B) 1-Point

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO

DESCRIPTION: Phase IV

MATERIAL TYPE: Compacted Fill

PROJECT NO.: 6Q1341 TASK NO.: 04.1

DATE: 24 day April month 2002 year

SAMPLE NO.: CF02-2

THIS METHOD WILL BE USED IF THE MATERIAL RETAINED ON THE NO. 3/4-in. (19-mm) SIEVE IS LESS THAN 30%, IF THE MATERIAL RETAINED ON THE NO. 4 (4.75-mm) SIEVE IS GREATER THAN 20%, AND IF THE MATERIAL RETAINED ON THE NO. 3/8-in. (9.5-mm) SIEVE IS LESS THAN 20%.
ALL MATERIAL RETAINED ON THE NO. 3/8-in. (9.5-mm) SIEVE IS DISCARDED.
USE OVERSIZE CORRECTION IF MORE THAN 5% IS DISCARDED ACCORDING TO ASTM D 4718.
USE A 4-in. DIAMETER MOLD / 5.5-lb RAMMER / 12-in. DROP / 3 LAYERS / 25 BLOWS PER LAYER.

COMPACTION OF SOIL

1-Pt.

QA ID: KS

	WATER ADDED	(ml)	—				
A	WT. OF SOIL & MOLD	(grams)	6155.4				
B	WT. OF MOLD	(grams)	4204.5				
C	WT. OF SOIL = A − B	(grams)	1950.9				
D	WET UNIT WT.(1) = C X 0.066	(pcf)	128.8				
E	DRY UNIT WT. = D / [1 + (K/100)]	(pcf)	115.9				

NOTE: IF CALIBRATED MOLD OF 1/30 FT^3 IS USED, THE WET DENSITY IS CALCULATED FROM THE WEIGHT OF SOIL, THE VOLUME OF THE MOLD AND THE CONVERSION FROM GRAMS TO POUNDS (I.E., CONVERSION FACTOR = (30 / 453.6) = 0.066). THE MOLD MUST BE CALIBRATED TO VERIFY A CAPACITY OF 1/30 ± 0.0005 FT^3 ON INTERVALS NOT TO EXCEED 1000 TIMES THAT THE MOLD IS FILLED.

MOISTURE CONTENT – ASTM D 2216

QA ID: KS

	TARE NO.		676				
F	WT. OF TARE	(grams)	8.2				
G	WT. OF WET SOIL & TARE	(grams)	289.2				
H	WT. OF DRY SOIL & TARE	(grams)	261.1				
I	WT. OF WATER = G − H	(grams)	28.1				
J	WT. DRY SOIL = H − F	(grams)	252.9		Close Match to OSDF 19		
K	MOISTURE CONTENT = (I/J) X 100	(%)	11.1				

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FLUOR DANIEL FERNALD

FIELD LABORATORY COMPACTION TEST (ASTM D 698 METHOD B)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO

DESCRIPTION: Phase II

MATERIAL TYPE: Clay and Top Soil mixture one Point

PROJECT NO.: 6Q134 TASK NO.: 04.1

DATE: 26 day April month 2002 year

SAMPLE NO.: CF 02-3

THIS METHOD WILL BE USED IF THE MATERIAL RETAINED ON THE NO. 3/4-in. (19-mm) SIEVE IS LESS THAN 30%, IF THE MATERIAL RETAINED ON THE NO. 4 (4.75-mm) SIEVE IS GREATER THAN 20%, AND IF THE MATERIAL RETAINED ON THE NO. 3/8-in. (9.5-mm) SIEVE IS LESS THAN 20%.
ALL MATERIAL RETAINED ON THE NO. 3/8-in. (9.5-mm) SIEVE IS DISCARDED.
USE OVERSIZE CORRECTION IF MORE THAN 5% IS DISCARDED ACCORDING TO ASTM D 4718.
USE A 4-in. DIAMETER MOLD / 5.5-lb RAMMER / 12-in. DROP / 3 LAYERS / 25 BLOWS PER LAYER.

COMPACTION OF SOIL

QA ID: _____

			13.29	13.02			
	WATER ADDED	(ml)	Ø	Ø			
A	WT. OF SOIL & MOLD	(grams)	6028.3	5902.9			
B	WT. OF MOLD	(grams)	4204.5	4204.5			
C	WT. OF SOIL = A - B	(grams)	1823.8	1701.4			
D	WET UNIT WT.(1) = C X 0.066	(pcf)	120.4	112.3			
E	DRY UNIT WT. = D / [1 + (K/100)]	(pcf)	105.6 ~~118.7~~	101.7			

NOTE: IF CALIBRATED MOLD OF 1/30 FT^3 IS USED, THE WET DENSITY IS CALCULATED FROM THE WEIGHT OF SOIL, THE VOLUME OF THE MOLD AND THE CONVERSION FROM GRAMS TO POUNDS (I.E., CONVERSION FACTOR = (30 / 453.6) = 0.066). THE MOLD MUST BE CALIBRATED TO VERIFY A CAPACITY OF 1/30 ± 0.0005 FT^3 ON INTERVALS NOT TO EXCEED 1000 TIMES THAT THE MOLD IS FILLED.

MOISTURE CONTENT - ASTM D 2216

QA ID: _____

	TARE NO.		#227	#227			
F	WT. OF TARE	(grams)	8.3	8.3			
G	WT. OF WET SOIL & TARE	(grams)	458.3	363.5			
H	WT. OF DRY SOIL & TARE	(grams)	403.0	330.1			
I	WT. OF WATER = G - H	(grams)	55.3	33.4			
J	WT. DRY SOIL = H - F	(grams)	394.7	321.8	Close match to OSDF-2		
K	MOISTURE CONTENT = (I/J) X 100	(%)	14.01	10.4			

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FLUOR FERNALD

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ATTERBERG LIMITS TEST

(ASTM D 4318)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO PROJECT NO.: 62134 TASK NO.: 04.1

DESCRIPTION: Phase IV DATE: 02 day May month 2002 year

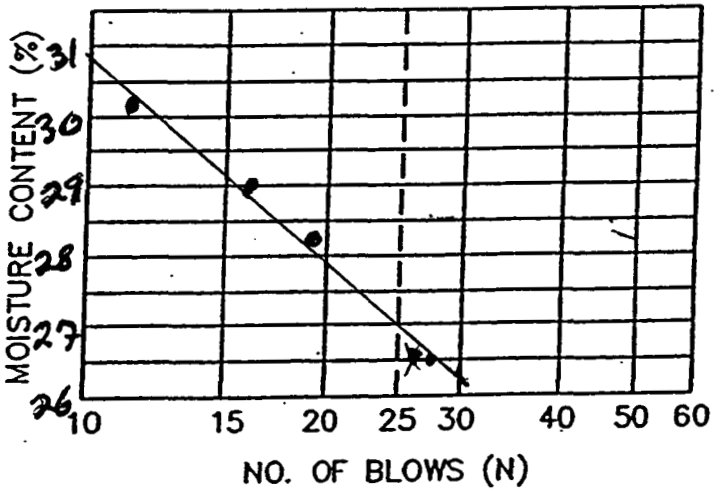
MATERIAL TYPE: Grn. Tall Compacted Fill MATERIAL SOURCE: Borrow Area SAMPLE NO.: CF-02-04

LIQUID LIMIT DETERMINATION

QA ID: DLE

	TARE NO.		1.3	2.5	1.9	2.3
A	WT. OF TARE	(grams)	28.64	28.42	28.56	31.20
B	WT. OF WET SOIL & TARE	(grams)	52.83	51.63	51.80	54.46
C	WT. OF DRY SOIL & TARE	(grams)	47.22	46.41	46.67	49.59
D	WT. OF WATER = B-C	(grams)	5.61	5.22	5.13	4.87
E	WT. OF DRY SOIL = C-A	(grams)	18.58	17.99	18.11	18.39
F	MOISTURE CONTENT = (D/E)X100	(%)	30.2	29.0	28.3	26.5
N	NUMBER OF BLOWS		12	16	19	27

DRYING TARE NO.



CURING TARE NO.

PLASTIC LIMIT DETERMINATION

QA ID: DLE

	TARE NO.		2.8	1.2		
A	WT. OF TARE	(grams)	28.47	28.50		
B	WT. OF WET SOIL & TARE	(grams)	37.53	38.31		
C	WT. OF DRY SOIL & TARE	(grams)	36.39	37.09		
D	WT. OF WATER = B-C	(grams)	1.14	1.22		
E	WT. OF DRY SOIL = C-A	(grams)	7.92	8.59		
	MOISTURE CONTENT = (D/E)X100	(%)	14.39	14.20		

LIQUID LIMIT (LL) = ~~28~~ 27 PLASTIC LIMIT (PL) = 14 PLASTICITY INDEX (PI) = ~~14~~ 13

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GEOSYNTEC CONSULTANTS

FLUOR FERNALD

PARTICLE SIZE ANALYSIS—SIEVE METHOD (ASTM D 422)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO — PROJECT NO.: GQ134 TASK NO.: 041

DESCRIPTION: ~~PHASE III~~ Phase IV — DATE: 01 day May month 2001 year

MATERIAL TYPE: ~~Low Perm Clay~~ Compacted Fill — SAMPLE NO.: CF 02.04

SOIL SAMPLE SIZE	+3/8 = 1732.6	MOISTURE = 547.5	Total 21626.3	TOTAL = ~~21078.8~~
	-3/8 = 19346.2			

APPROXIMATE MINIMUM WT. OF SAMPLE (PASSING NO. 10 SIEVE) (grams)	SAND	FINE GRAIN
	115	65

	+3/8 BEFORE WASH	-3/8 BEFORE WASH	+3/8 AFTER WASH	-3/8 AFTER WASH
TARE NO.	L-44	L-7	L-44	L-7
WT. OF DRY SAMPLE PLUS TARE (grams)	1923.7	714.5	1872.8	371.8
WT. OF TARE (grams)	191.1	193.2	191.1	193.2
WT. OF DRY SAMPLE (grams)	1732.6	521.3	1681.7	178.6

SIEVE ANALYSIS — QA ID: DLE

SIEVE NO.	DIAMETER (mm)	WT. RETAINED (grams)	% RETAINED	% FINER		PROJECT SPECIFICATIONS
3 in	76.2	Ø	Ø	100		
2 in	50.8	Ø	Ø	100		100
1 1/2in	38.1	206.6	1.0	99.0		
1 in	25.4	612.8	2.8	97.2		
3/4 in	19.1	996.5	4.6	95.4		90-100
1/2 in	12.7	1475.7	6.8	93.2		
3/8 in	9.53	1681.7	7.8	92.2		
No. 4	4.75	20.2	3.9	96.1	88.6	
No. 10	2.00	48.6	9.3	90.7	83.6	
No. 20	0.850	76.9	14.8	85.2	78.6	
No. 40	0.425	103.5	19.9	80.1	73.9	
No. 60	0.250	127.3	24.4	75.6	69.7	
No. 100	0.125	150.5	28.9	71.1	65.6	
No. 200	0.075	177.1	34.0	66.0	60.9	50-100
PAN	—	178.6	—	—		

Total Sample 21078.8 gm + 547.5 = 21626.3

48.2 LB − 1.2948 = 46.92

COMMENTS:

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*%FINER = 100 − Σ% RETAINED

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FLUOR DANIEL FERNALD

FIELD LABORATORY COMPACTION TEST (ASTM D 698 METHOD B)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO

PROJECT NO.: GQ1341 TASK NO.: 04.1

DESCRIPTION: Phase IV

DATE: 2 day May month 2002 year

MATERIAL TYPE: Gray Clay / Compacted Fill

SAMPLE NO.: CF02-4

THIS METHOD WILL BE USED IF THE MATERIAL RETAINED ON THE NO. 3/4-in. (19-mm) SIEVE IS LESS THAN 30%, IF THE MATERIAL RETAINED ON THE NO. 4 (4.75-mm) SIEVE IS GREATER THAN 20%, AND IF THE MATERIAL RETAINED ON THE NO. 3/8-in. (9.5-mm) SIEVE IS LESS THAN 20%.
ALL MATERIAL RETAINED ON THE NO. 3/8-in. (9.5-mm) SIEVE IS DISCARDED.
USE OVERSIZE CORRECTION IF MORE THAN 5% IS DISCARDED ACCORDING TO ASTM D 4718.
USE A 4-in. DIAMETER MOLD / 5.5-lb RAMMER / 12-in. DROP / 3 LAYERS / 25 BLOWS PER LAYER.

13.

COMPACTION OF SOIL

QA ID: KS

				4% 13.47	6% 13.73	8% 13.91	~~10%~~ 13.85
	WATER ADDED	(ml)		4%	6%	8%	10%
A	WT. OF SOIL & MOLD	(grams)		6110.0	6227.9	6309.6	6282.4
B	WT. OF MOLD	(grams)	4204.5	4204.5	4204.5	4204.5	4204.5
C	WT. OF SOIL = A - B	(grams)		1905.5	2023.4	2105.1	2077.9
D	WET UNIT WT.(1) = C X 0.066	(pcf)		125.8	133.5	138.9	137.1
E	DRY UNIT WT. = D / [1 + (K/100)]	(pcf)		117.2	121.1	124.0	120.5

NOTE: IF CALIBRATED MOLD OF 1/30 FT^3 IS USED, THE WET DENSITY IS CALCULATED FROM THE WEIGHT OF SOIL, THE VOLUME OF THE MOLD AND THE CONVERSION FROM GRAMS TO POUNDS (I.E., CONVERSION FACTOR = (30 / 453.6) = 0.066). THE MOLD MUST BE CALIBRATED TO VERIFY A CAPACITY OF 1/30 ± 0.0005 FT^3 ON INTERVALS NOT TO EXCEED 1000 TIMES THAT THE MOLD IS FILLED.

MOISTURE CONTENT - ASTM D 2216

QA ID: _____

	TARE NO.			227	676	103	630
F	WT. OF TARE	(grams)		8.3	8.3	8.3	8.1
G	WT. OF WET SOIL & TARE	(grams)		397.4	387.2	417.7	355.0
H	WT. OF DRY SOIL & TARE	(grams)		371.0	352.0	373.7	313.0
I	WT. OF WATER = G - H	(grams)		26.4	35.2	44.0	42.0
J	WT. DRY SOIL = H - F	(grams)		362.7	343.7	365.4	304.9
K	MOISTURE CONTENT = (I/J) X 100	(%)		7.3	10.2	12.0	13.8

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FLUOR FERNALD

CORRECTION OF UNIT WEIGHT AND WATER CONTENT FOR SOILS CONTAINING OVERSIZE PARTICLES *(ASTM D 4718)*

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO PROJECT NO. GA134 TASK NO. 04.1

DESCRIPTION: Phase IV DATE: 3 day May month 2002 year

MATERIAL TYPE: Compacted Fill CF02-4

Weight of Total Sample	=	21626.3
Weight of Oversize Fraction	=	1681.7
Weight of Finer Fraction (- 3/8)	=	19944.6
Percentage of Oversize Fraction	= (P_C)	7.8
Percentage of Finer Fraction (- 3/8)	= (P_F)	92.2
Specific Gravity (Assumed)	= (G_M)	2.72

(W_F) =	Water Content - 3/8 , as decimal	=	0.12
(W_C) =	Water Content + 3/8 , as decimal	=	0.015
(δ_F) =	Dry Density of finer fraction	=	124.0
(δ_W) =	Unit Weight of Water	=	62.4

$$C_W=(W_F P_F)+(W_C P_C)$$

$$C_W = 11.2\%$$

$$C\delta_D=100\delta_F G_M \delta_W/(\delta_F P_C)+(G_M \delta_W P_F)$$

$$C_{\delta D} = 126.7 \text{ pcf}$$

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FLUOR FERNALD

MOISTURE-DENSITY RELATIONSHIP

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

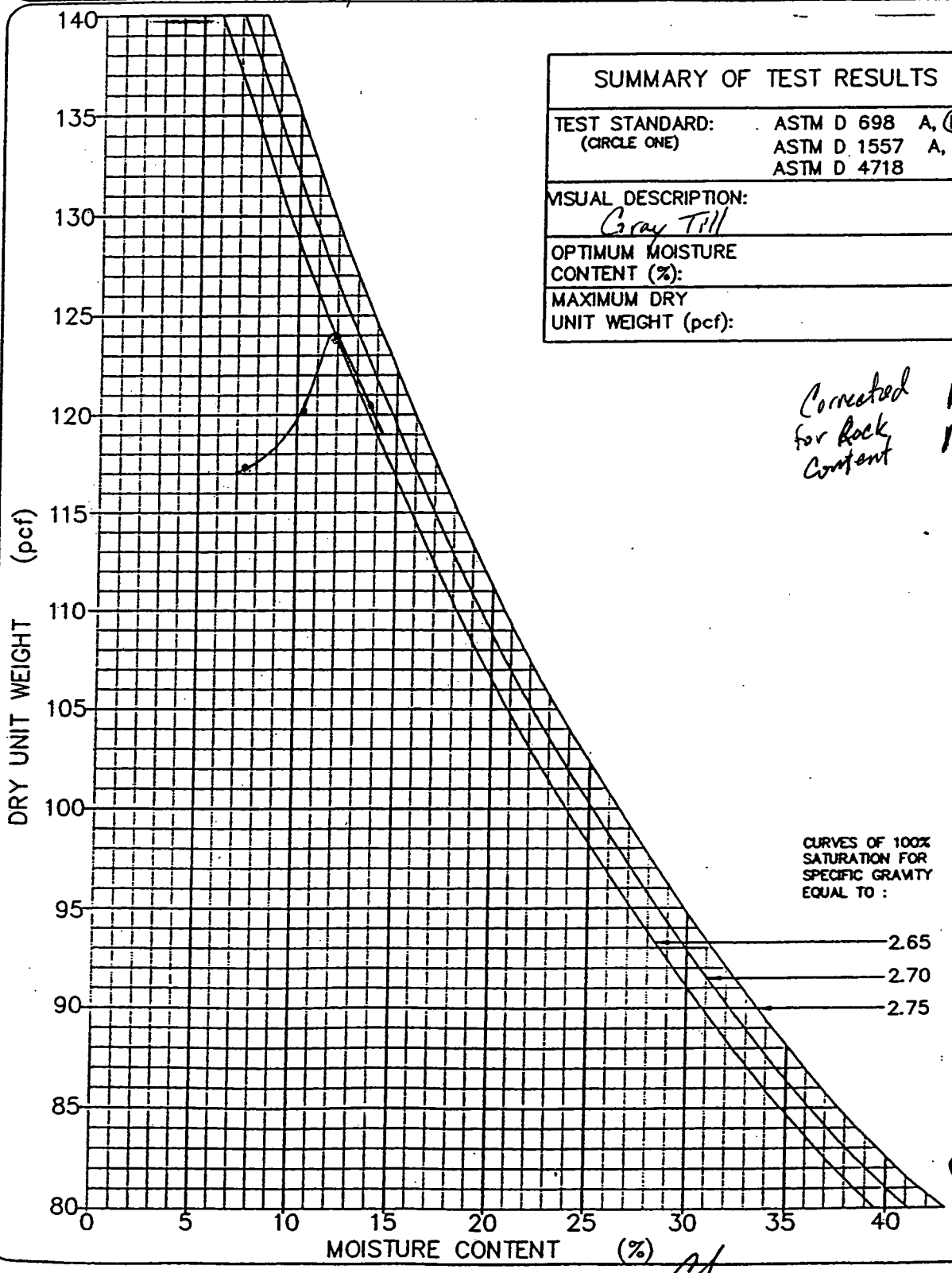
LOCATION: FERNALD, OHIO PROJECT NO.: GQ1341 TASK NO.: 04.1

DESCRIPTION: Phase IV DATE: 3 day May month 2002 year

MATERIAL TYPE: Gray Clay MATERIAL SOURCE: borrow area SAMPLE NO.: CF02-4

SUMMARY OF TEST RESULTS		QA ID
TEST STANDARD: (CIRCLE ONE)	ASTM D 698 A, (B) C ASTM D 1557 A, B, C ASTM D 4718	CL
VISUAL DESCRIPTION: Gray Till		CL/KS
OPTIMUM MOISTURE CONTENT (%):		12.0
MAXIMUM DRY UNIT WEIGHT (pcf):		124.0

Corrected for Rock Content 126.7 pcf 11.2%



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FLUOR FERNALD

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ATTERBERG LIMITS TEST

(ASTM D 4318)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO PROJECT NO. GQ1341 TASK NO.: 04.1

DESCRIPTION: Phase IV DATE: 14 day May month 2002 year

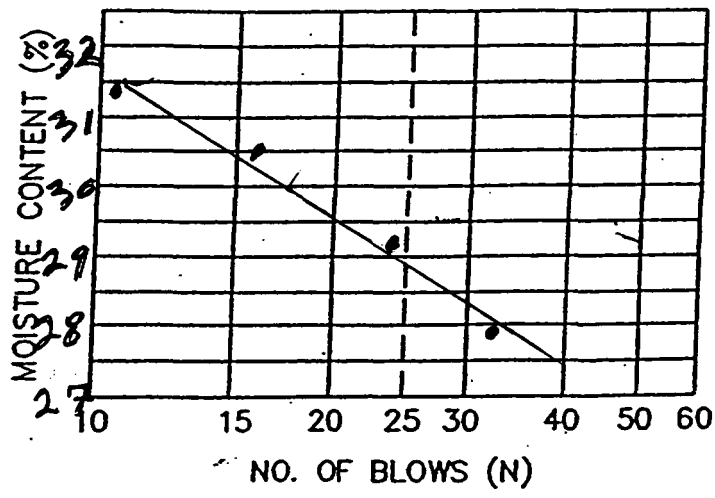
MATERIAL TYPE: Compacted Fill MATERIAL SOURCE: Borrow Area SAMPLE NO. CF-02-05

LIQUID LIMIT DETERMINATION

QA ID: DLE

	TARE NO.		1.5	2.4	1.6	3.1
A	WT. OF TARE	(grams)	28.61	27.39	28.87	28.39
B	WT. OF WET SOIL & TARE	(grams)	52.09	50.31	48.41	51.89
C	WT. OF DRY SOIL & TARE	(grams)	46.48	44.95	43.99	46.76
D	WT. OF WATER = B-C	(grams)	5.61	5.36	4.42	5.13
E	WT. OF DRY SOIL = C-A	(grams)	17.87	17.56	15.12	18.37
F	MOISTURE CONTENT = (D/E)X100	(%)	31.4	30.5	29.2	27.9
N	NUMBER OF BLOWS		11	16	24	32

DRYING TARE NO.



CURING TARE NO.

PLASTIC LIMIT DETERMINATION

QA ID: DLE

	TARE NO.		B-16	A-244		
A	WT. OF TARE	(grams)	3.41	3.38		
B	WT. OF WET SOIL & TARE	(grams)	18.13	17.25		
C	WT. OF DRY SOIL & TARE	(grams)	16.14	15.36		
D	WT. OF WATER = B-C	(grams)	1.99	1.89		
E	WT. OF DRY SOIL = C-A	(grams)	12.73	11.98		
F	MOISTURE CONTENT = (D/E)X100	(%)	15.6	15.8		

LIQUID LIMIT (LL) = 29 PLASTIC LIMIT (PL) = 16 PLASTICITY INDEX (PI) = 13

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FLUOR FERNALD

PARTICLE SIZE ANALYSIS—SIEVE METHOD (ASTM D 422)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO PROJECT NO.: GQ134 TASK NO.: 04.1

DESCRIPTION: PHASE III DATE: 03 day May month 2002 year

MATERIAL TYPE: Low Perm Clay/Compacted Fill SAMPLE NO.: CF-02-05

SOIL SAMPLE SIZE	+3/8 = 1309.3	MOISTURE = 403.3	TOTAL = 20358.6
	-3/8 = 18646.0		

APPROXIMATE MINIMUM WT. OF SAMPLE (PASSING NO. 10 SIEVE) (grams)	SAND	FINE GRAIN
	115	65

	+3/8 BEFORE WASH	-3/8 BEFORE WASH	+3/8 AFTER WASH	-3/8 AFTER WASH
TARE NO.	L-7	L-6	L-7	L-6
WT. OF DRY SAMPLE PLUS TARE (grams)	1503.2	785.3	1437.9	406.5
WT. OF TARE (grams)	193.4	198.6	193.4	198.6
WT. OF DRY SAMPLE (grams)	1309.8	586.7	1244.5	207.9

SIEVE ANALYSIS QA ID: _____

SIEVE NO.	DIAMETER (mm)	WT. RETAINED (grams)	% RETAINED	% FINER		PROJECT SPECIFICATIONS
3 in	76.2	0	0	100		
2 in	50.8	0	0	100		100
1 1/2in	38.1	128.6	.6	99.4		
1 in	25.4	443.4	2.2	97.8		
3/4 in	19.1	657.6	3.2	96.8		90-100
1/2 in	12.7	1038.5	5.1	94.9		
3/8 in	9.53	1244.5	6.1	93.9		
No. 4	4.75	25.3	4.3	95.7	89.9	
No. 10	2.00	58.3	9.9	90.1	84.6	
No. 20	0.850	87.5	14.9	85.1	79.9	
No. 40	0.425	116.7	19.9	80.1	75.2	
No. 60	0.250	142.0	24.2	75.8	71.2	
No. 100	0.125	172.7	29.4	70.6	66.3	
No. 200	0.075	206.0	35.1	64.9	60.9	50-100
PAN	—	207.9	—	—		

COMMENTS:

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%FINER = 100 − Σ% RETAINED

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FLUOR FERNALD

MOISTURE–DENSITY RELATIONSHIP

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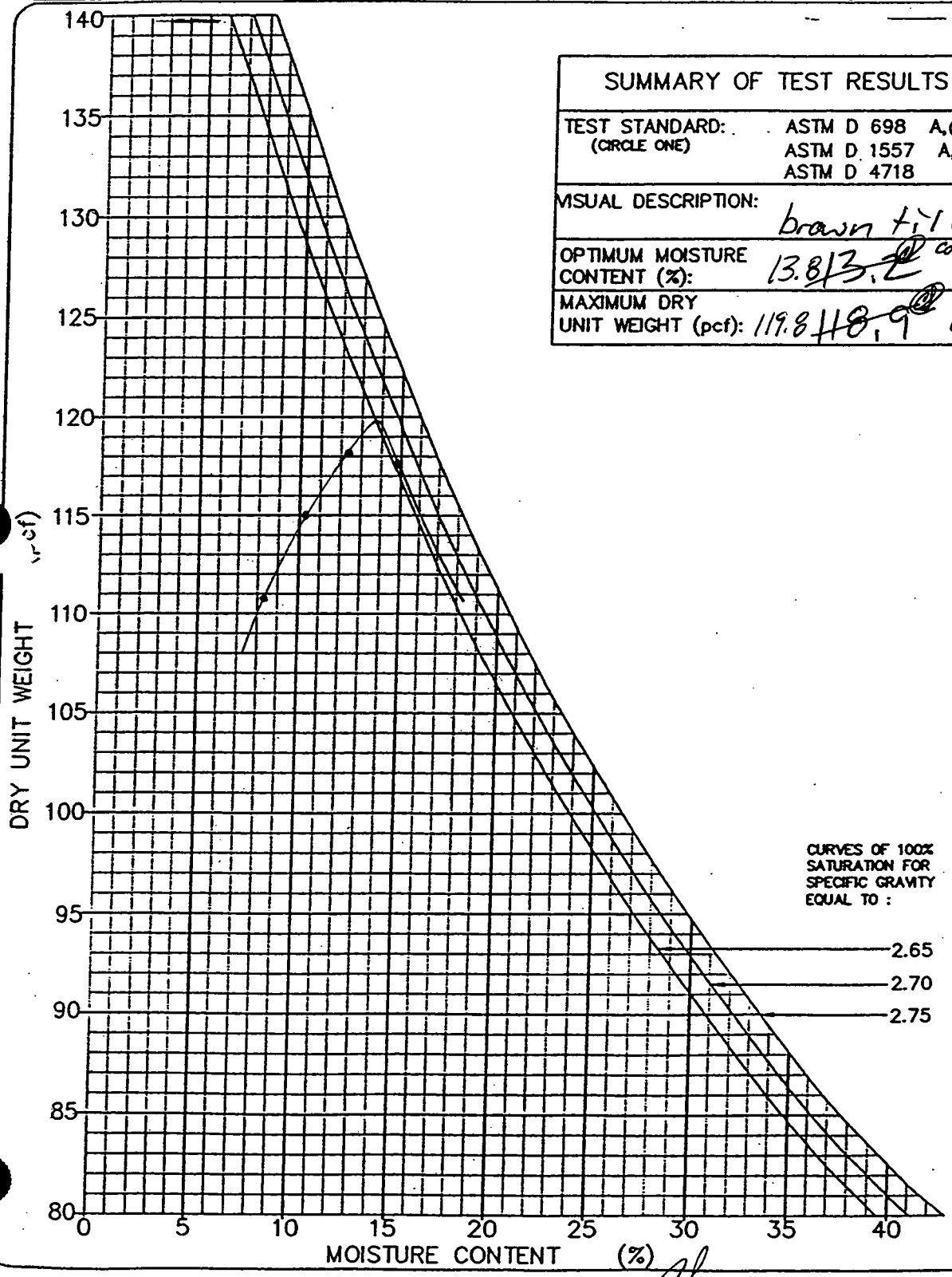
PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO PROJECT NO.: 621341 TASK NO.: 04.1

DESCRIPTION: Phase IV DATE: 10 day May month 2002 year

MATERIAL TYPE: brn till MATERIAL SOURCE: Cell 4 Const. SAMPLE NO.: CF02-5

SUMMARY OF TEST RESULTS		QA ID
TEST STANDARD: (CIRCLE ONE)	ASTM D 698 A, (B) C ASTM D 1557 A, B, C ASTM D 4718	KS
VISUAL DESCRIPTION:	brown till	KS
OPTIMUM MOISTURE CONTENT (%):	13.8 / ~~13.2~~ corrected 13.0	KS
MAXIMUM DRY UNIT WEIGHT (pcf):	119.8 / ~~118.9~~ 122.0	KS



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FLUOR DANIEL FERNALD

FIELD LABORATORY COMPACTION TEST (ASTM D 698 METHOD B)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO

PROJECT NO.: 6Q1341 TASK NO.: 04.1

DESCRIPTION: Phase IV

DATE: 8 day May month 2002 year

MATERIAL TYPE: brown fill

SAMPLE NO.: CFØZ-5

THIS METHOD WILL BE USED IF THE MATERIAL RETAINED ON THE NO. 3/4-in. (19-mm) SIEVE IS LESS THAN 30%, IF THE MATERIAL RETAINED ON THE NO. 4 (4.75-mm) SIEVE IS GREATER THAN 20%, AND IF THE MATERIAL RETAINED ON THE NO. 3/8-in. (9.5-mm) SIEVE IS LESS THAN 20%.
ALL MATERIAL RETAINED ON THE NO. 3/8-in. (9.5-mm) SIEVE IS DISCARDED.
USE OVERSIZE CORRECTION IF MORE THAN 5% IS DISCARDED ACCORDING TO ASTM D 4718.
USE A 4-in. DIAMETER MOLD / 5.5-lb RAMMER / 12-in. DROP / 3 LAYERS / 25 BLOWS PER LAYER.

COMPACTION OF SOIL

QA ID: KS

			6% 13.28	8% 13.50	10% 13.70	12% 13.79	
	WATER ADDED	(ml)					
A	WT. OF SOIL & MOLD	(grams)	6023.8	6123.6	6214.3	6255.1	
B	WT. OF MOLD	(grams)	4204.5	4204.5	4204.5	4204.5	4204.5
C	WT. OF SOIL = A - B	(grams)	1819.3	1919.1	2009.8	2050.6	
D	WET UNIT WT.(1) = C X 0.066	(pcf)	120.1	126.7	132.7	135.3	
E	DRY UNIT WT. = D / [1 + (K/100)]	(pcf)	110.9	115.0	118.1	117.8	

NOTE: IF CALIBRATED MOLD OF 1/30 FT^3 IS USED, THE WET DENSITY IS CALCULATED FROM THE WEIGHT OF SOIL, THE VOLUME OF THE MOLD AND THE CONVERSION FROM GRAMS TO POUNDS (I.E., CONVERSION FACTOR = (30 / 453.6) = 0.066). THE MOLD MUST BE CALIBRATED TO VERIFY A CAPACITY OF 1/30 ± 0.0005 FT^3 ON INTERVALS NOT TO EXCEED 1000 TIMES THAT THE MOLD IS FILLED.

MOISTURE CONTENT - ASTM D 2216

QA ID: KS

	TARE NO.		48	308	676	227	
F	WT. OF TARE	(grams)	8.3	8.1	8.4	8.3	
G	WT. OF WET SOIL & TARE	(grams)	335.1	369.7	396.2	347.1	
H	WT. OF DRY SOIL & TARE	(grams)	310.1	336.3	353.4	303.1	
I	WT. OF WATER = G - H	(grams)	25.0	33.4	42.8	44.0	
J	WT. DRY SOIL = H - F	(grams)	301.8	328.2	345.0	294.8	
K	MOISTURE CONTENT = (I/J) X 100	(%)	8.3%	10.2	12.4	14.9	

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FLUOR FERNALD

CORRECTION OF UNIT WEIGHT AND WATER CONTENT FOR SOILS CONTAINING OVERSIZE PARTICLES

(ASTM D 4718)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO PROJECT NO. 60134 / TASK NO. 04.1

DESCRIPTION: Phase IV DATE: 14 day May month 2002 year

MATERIAL TYPE: Compacted Fill CF02-5

Weight of Total Sample	=	20,358.6
Weight of Oversize Fraction	=	1244.5
Weight of Finer Fraction (- 3/8)	=	19114.1
Percentage of Oversize Fraction	= (P_C)	6.1
Percentage of Finer Fraction (- 3/8)	= (P_F)	93.9
Specific Gravity (Assumed)	= (G_M)	2.72

(W_F) =	Water Content - 3/8 , as decimal	=	0.138
(W_C) =	Water Content + 3/8 , as decimal	=	0.013
(δ_F) =	Dry Density of finer fraction	=	118
(δ_W) =	Unit Weight of Water	=	62.4

$$C_W=(W_F P_F)+(W_C P_C)$$

$$C_W = 13.0$$

$$C\delta_D=100\delta_F G_M \delta_W/(\delta_F P_C)+(G_M \delta_W P_F)$$

$$C_{\delta D} = 122.0$$

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FLUOR DANIEL FERNALD

FIELD LABORATORY COMPACTION TEST (ASTM D 698 METHOD B)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO

PROJECT NO. 691341 TASK NO.: 04.1

DESCRIPTION: Phase II

DATE: 22 day May month 2002 year

MATERIAL TYPE: Compacted Fill

SAMPLE NO.: CF02-6

THIS METHOD WILL BE USED IF THE MATERIAL RETAINED ON THE NO. 3/4-in. (19-mm) SIEVE IS LESS THAN 30%, IF THE MATERIAL RETAINED ON THE NO. 4 (4.75-mm) SIEVE IS GREATER THAN 20%, AND IF THE MATERIAL RETAINED ON THE NO. 3/8-in. (9.5-mm) SIEVE IS LESS THAN 20%.
ALL MATERIAL RETAINED ON THE NO. 3/8-in. (9.5-mm) SIEVE IS DISCARDED.
USE OVERSIZE CORRECTION IF MORE THAN 5% IS DISCARDED ACCORDING TO ASTM D 4718.
USE A 4-in. DIAMETER MOLD / 5.5-lb RAMMER / 12-in. DROP / 3 LAYERS / 25 BLOWS PER LAYER.

COMPACTION OF SOIL

QA ID: PLE

			13.62	13.86	13.98	13.45	
	WATER ADDED	(ml)	2% 50mL	4% 100mL	6% 150mL	8% 200mL	
A	WT. OF SOIL & MOLD	(grams)	6178.0	6282.4	6341.3	6327.7	
B	WT. OF MOLD	(grams)	4204.5	4204.5	4204.5	4204.5	4204.5
C	WT. OF SOIL = A - B	(grams)	1973.5	2077.9	2136.8	2123.2	
D	WET UNIT WT.(1) = C X 0.066	(pcf)	130.3	137.1	141.0	140.1	
E	DRY UNIT WT. = D / [1 + (K/100)]	(pcf)	121.8	125.9	127.2	124.2	

NOTE: IF CALIBRATED MOLD OF 1/30 FT^3 IS USED, THE WET DENSITY IS CALCULATED FROM THE WEIGHT OF SOIL, THE VOLUME OF THE MOLD AND THE CONVERSION FROM GRAMS TO POUNDS (I.E., CONVERSION FACTOR = (30 / 453.6) = 0.066). THE MOLD MUST BE CALIBRATED TO VERIFY A CAPACITY OF 1/30 ± 0.0005 FT^3 ON INTERVALS NOT TO EXCEED 1000 TIMES THAT THE MOLD IS FILLED.

MOISTURE CONTENT - ASTM D 2216

QA ID: [illegible]

	TARE NO.		#65	#114	#630	#103	
F	WT. OF TARE	(grams)	8.2	8.4	8.1	8.3	
G	WT. OF WET SOIL & TARE	(grams)	503.0	540.0	486.6	534.4	
H	WT. OF DRY SOIL & TARE	(grams)	470.9	496.6	439.6	474.5	
I	WT. OF WATER = G - H	(grams)	32.1	43.4	47.0	59.9	
J	WT. DRY SOIL = H - F	(grams)	462.7	488.2	431.5	466.2	
K	MOISTURE CONTENT = (I/J) X 100	(%)	6.9	8.9	10.9	12.8	

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FLUOR FERNALD

CORRECTION OF UNIT WEIGHT AND WATER CONTENT FOR SOILS CONTAINING OVERSIZE PARTICLES *(ASTM D 4718)*

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO **PROJECT NO.** 6Q134 **TASK NO.** 04.1

DESCRIPTION: Phase IV **DATE:** 23 day May month 2002 year

MATERIAL TYPE: Compacted Fill CF02-6

Weight of Total Sample	=	25356.2
Weight of Oversize Fraction	=	4702.9
Weight of Finer Fraction (- 3/8)	=	~~18.5~~ 20653.3
Percentage of Oversize Fraction	= (P_C)	~~81.5~~ 18.5
Percentage of Finer Fraction (- 3/8)	= (P_F)	81.5
Specific Gravity (Assumed)	= (G_M)	2.72

(W_F) =	Water Content - 3/8 , as decimal	=	10.3
(W_C) =	Water Content + 3/8 , as decimal	=	0.015
(δ_F) =	Dry Density of finer fraction	=	128.5
(δ_W) =	Unit Weight of Water	=	62.4

$$C_W=(W_F P_F)+(W_C P_C)$$

$C_W = 8.7\%$

$$C\delta_D=100\delta_F G_M \delta_W/(\delta_F P_C)+(G_M \delta_W P_F)$$

$C_{\delta D} = 134.6$ pcf

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FLUOR FERNALD

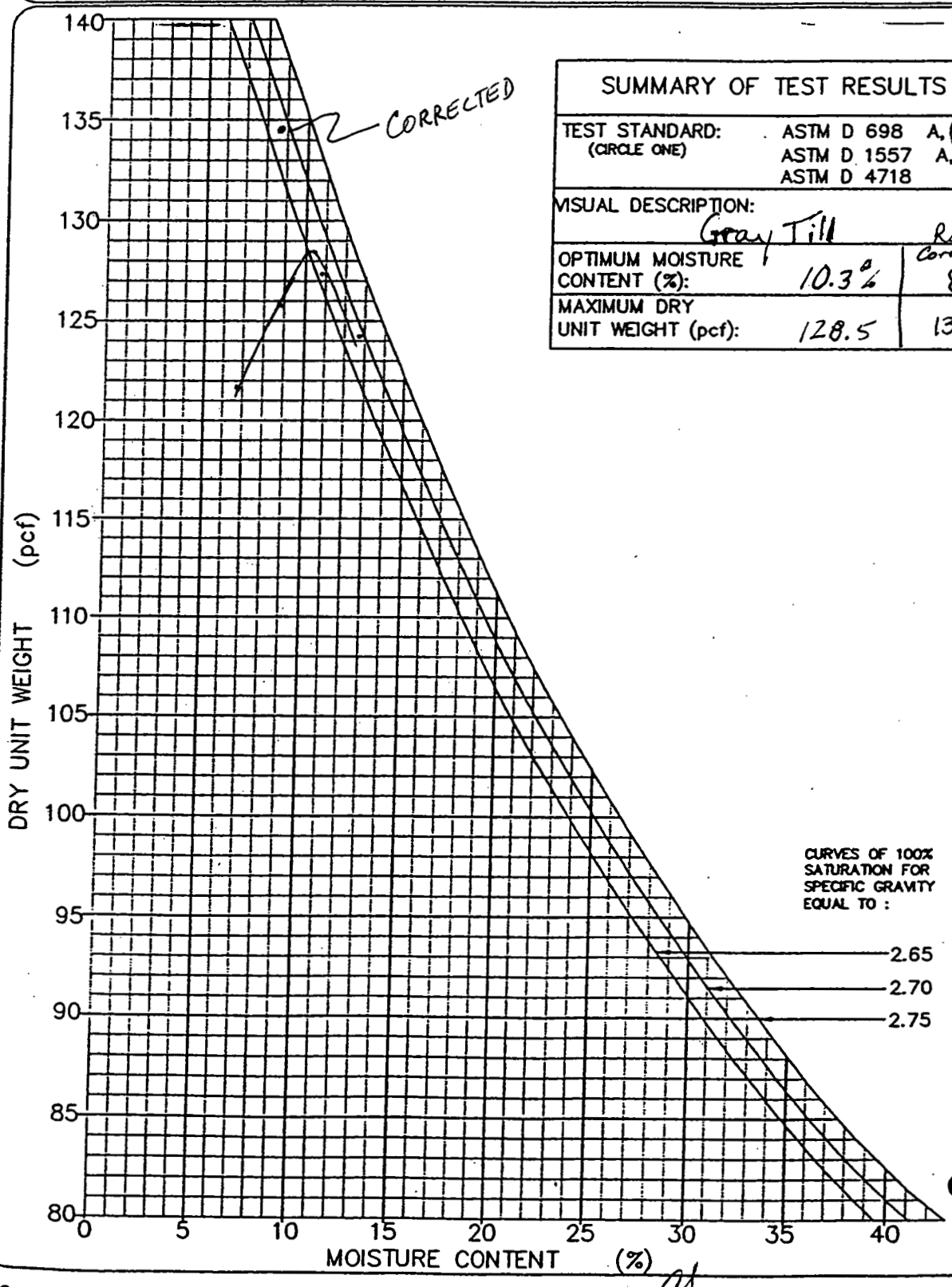
MOISTURE–DENSITY RELATIONSHIP

PROJECT: ON–SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO PROJECT NO.: GQ1341 TASK NO.: 04.1

DESCRIPTION: Phase IV DATE: 23 day May month 2002 year

MATERIAL TYPE: Compacted Fill MATERIAL SOURCE: SAMPLE NO.: CF02-6



SUMMARY OF TEST RESULTS			QA ID
TEST STANDARD: (CIRCLE ONE)	ASTM D 698 A, (B) C ASTM D 1557 A, B, C ASTM D 4718		CA
VISUAL DESCRIPTION:	Gray Till		CA
OPTIMUM MOISTURE CONTENT (%):	10.3%	Rock Corrected 8.7%	CA
MAXIMUM DRY UNIT WEIGHT (pcf):	128.5	134.6	CA

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FLUOR DANIEL FERNALD

PARTICLE SIZE ANALYSIS MECHANICAL SIEVE METHOD (ASTM D 422)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO PROJECT NO: 601341 TASK NO.: 041

DESCRIPTION: Phase IV DATE: 21 day May month 2002 year

MATERIAL TYPE: Compacted fill SAMPLE NO.: CF02-06

SOIL SAMPLE SIZE			
	+3/8	4785.3 gm	Moisture
	-3/8	20570.94 gm	

Total wt 25356.24 gm

APPROXIMATE MINIMUM WT. OF SAMPLE (PASSING NO. 10 SIEVE) (grams)	SAND	FINE GRAIN
	115	65

		+3/8 BEFORE WASH	-3/8	+3/8 AFTER WASH	-3/8
TARE NO.	1262 lbs	Big Pan = X	L-9	12" Big X Pan	L-9
WT. OF DRY SAMPLE PLUS TARE	(grams)	5724.4	823.9	5642.8	421.4
WT. OF TARE	(grams)	939.1	193.4	939.1	193.4
WT. OF DRY SAMPLE	(grams)	4785.3	630.5	4703.7	228.0

55.9 LBS = 25356.24 gm

SIEVE ANALYSIS QA ID: DLE

SIEVE NO.	DIAMETER (mm)	WT. RETAINED (grams)	% RETAINED	% FINER		PROJECT SPECIFICATIONS
4 in	100	Ø	Ø	100		100
3 in	76.2	1802.4	7.1	92.9		
2 in	50.8	2907.0	11.5	88.5		
1 1/2 in	38.1	3481.9	13.7	86.3		
1 in	25.4	3824.7	15.1	84.9		
3/4 in	19.1	3991.7	15.7	84.3		90 - 100
1/2 in	12.7	4416.3	17.4	82.6		
3/8 in	9.53	4702.9	18.5	81.5		
# 4	4.75	26.3	4.2	95.8	78.2	
# 10	2.00	60.5	9.6	90.4	73.7	
# 20	0.850	95.6	15.2	84.8	69.1	
# 40	0.425	127.0	20.1	79.9	65.1	
# 60	0.250	151.8	24.1	75.9	61.9	
# 100	0.125	189.8	30.1	69.9	57.0	
# 200	0.075	225.6	35.8	64.2	52.3	50 - 100
PAN	—	228.0	—	—		

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%FINER = 100 - Σ% RETAINED

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FLUOR FERNALD, INC.

PARTICLE SIZE DISTRIBUTION AND SOIL CLASSIFICATION TEST RESULTS (ASTM C 136/D 422) (ASTM D 2487)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO

DESCRIPTION: Phase IV

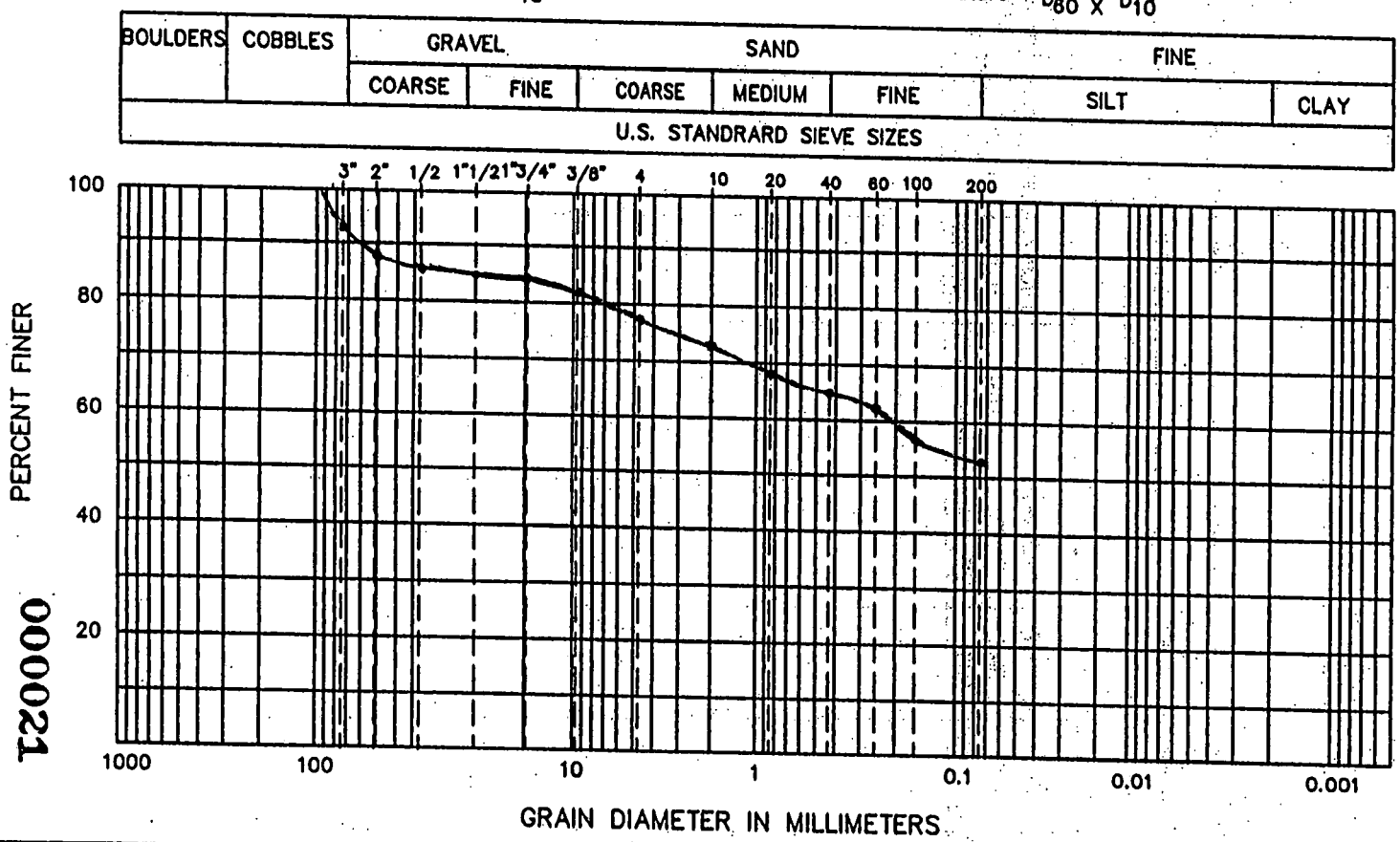
MATERIAL TYPE: Compacted Fill

PROJECT NO.: GQ1341 TASK NO.: 04.1

DATE: 23 day May month 2002 year

SAMPLE NO.: ~~CF~~ CF02-06 QA ID: cd

CURVE COEFFICIENTS: $C_{uniformity} = (\frac{D_{60}}{D_{10}}) =$ $C_{curvature} = (\frac{D_{30}^2}{D_{60} \times D_{10}}) =$



ATTERBERG LIMITS

(LL) .....

(PL) .....

(PI) .....

SIEVE RESULTS

SIEVE SIZE	% FINER
3-in.	92.9
2-in.	88.5
1 1/2-in.	86.3
1-in.	84.9
3/4-in.	84.3
1/2-in.	82.6
3/8-in.	81.5
NO. 4	78.2
NO. 10	73.7
NO. 20.	69.1
NO. 40	65.1
NO. 60	61.9
NO. 100	57.0
NO. 200	52.3

HYDROMETER RESULTS

PARTICLE DIA.	% FINER

SOIL CLASSIFICATION (ASTM D 2487):

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FLUOR FERNALD 4940

ATTERBERG LIMITS TEST (ASTM D 4318)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO PROJECT NO. 602341 TASK NO.: 04.1

DESCRIPTION: Phase IV DATE: 28 day MAY month 2002 year

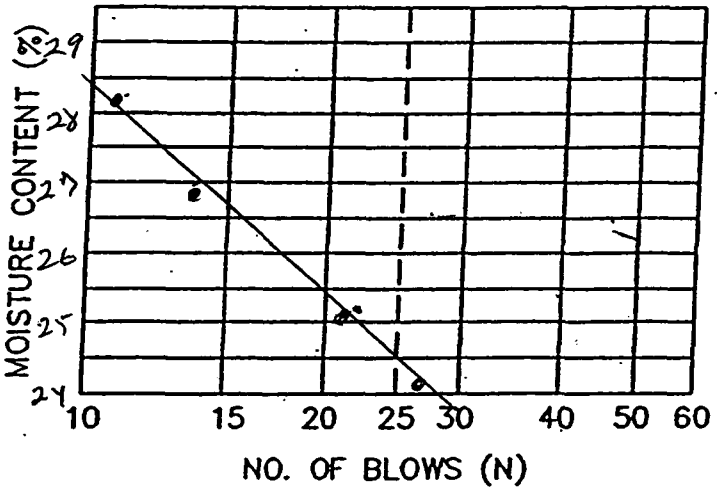
MATERIAL TYPE: Compacted F-LC MATERIAL SOURCE: Borrow Area SAMPLE NO. CF02-6

LIQUID LIMIT DETERMINATION

QA ID: DJE

	TARE NO.		1.5	2.4	3.1	1.6
A	WT. OF TARE	(grams)	28.60	27.37	28.37	28.84
B	WT. OF WET SOIL & TARE	(grams)	51.12	48.95	49.82	48.18
C	WT. OF DRY SOIL & TARE	(grams)	46.15	44.38	45.50	44.91
D	WT. OF WATER = B-C	(grams)	4.97	4.57	4.32	3.27
E	WT. OF DRY SOIL = C-A	(grams)	17.55	17.01	17.13	15.57
F	MOISTURE CONTENT = (D/E)X100	(%)	28.3	26.9	25.2	24.2
N	NUMBER OF BLOWS		11	13	22	27

DRYING TARE NO.



CURING TARE NO.

PLASTIC LIMIT DETERMINATION

QA ID: DJE

	TARE NO.		B.16	A.244		
A	WT. OF TARE	(grams)	3.40	3.37		
B	WT. OF WET SOIL & TARE	(grams)	19.96	17.59		
C	WT. OF DRY SOIL & TARE	(grams)	17.97	15.87		
D	WT. OF WATER = B-C	(grams)	1.99	1.72		
E	WT. OF DRY SOIL = C-A	(grams)	14.57	12.50		
	MOISTURE CONTENT = (D/E)X100	(%)	13.7	13.8		

LIQUID LIMIT (LL) = 25 PLASTIC LIMIT (PL) = 13.7 PLASTICITY INDEX (PI) = 11.3

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FLUOR DANIEL FERNALD

FIELD LABORATORY COMPACTION TEST (ASTM D 698 METHOD B)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO

DESCRIPTION: Phase IV — PROJECT NO. 691341 TASK NO.: 04.1

MATERIAL TYPE: Compacted S.2L — DATE: 04 day June month 2003 year

SAMPLE NO.: CF 02 - 7

THIS METHOD WILL BE USED IF THE MATERIAL RETAINED ON THE NO. 3/4-in. (19-mm) SIEVE IS LESS THAN 30%, IF THE MATERIAL RETAINED ON THE NO. 4 (4.75-mm) SIEVE IS GREATER THAN 20%, AND IF THE MATERIAL RETAINED ON THE NO. 3/8-in. (9.5-mm) SIEVE IS LESS THAN 20%.
ALL MATERIAL RETAINED ON THE NO. 3/8-in. (9.5-mm) SIEVE IS DISCARDED.
USE OVERSIZE CORRECTION IF MORE THAN 5% IS DISCARDED ACCORDING TO ASTM D 4718.
USE A 4-in. DIAMETER MOLD / 5.5-lb RAMMER / 12-in. DROP / 3 LAYERS / 25 BLOWS PER LAYER.

COMPACTION OF SOIL

				13.22	13.36	13.67	13.70
	WATER ADDED	(ml)		6%	8%	10%	12%
A	WT. OF SOIL & MOLD	(grams)		5996.6	6060.1	6200.7	6214.3
B	WT. OF MOLD	(grams)		4204.5	4204.5	4204.5	4204.5
C	WT. OF SOIL = A - B	(grams)		1792.1	1855.6	1996.2	2009.8
D	WET UNIT WT.(1) = C X 0.066	(pcf)		118.3	122.5	131.7	132.6
E	DRY UNIT WT. = D / [1 + (K/100)]	(pcf)		107.0	109.0	115.1	114.1

QA ID:

NOTE: IF CALIBRATED MOLD OF 1/30 FT³ IS USED, THE WET DENSITY IS CALCULATED FROM THE WEIGHT OF SOIL. THE VOLUME OF THE MOLD AND THE CONVERSION FROM GRAMS TO POUNDS (I.E., CONVERSION FACTOR = (30 / 453.6) = 0.066). THE MOLD MUST BE CALIBRATED TO VERIFY A CAPACITY OF 1/30 ± 0.0005 FT³ ON INTERVALS NOT TO EXCEED 1000 TIMES THAT THE MOLD IS FILLED.

MOISTURE CONTENT - ASTM D 2216

	TARE NO.		#1	#114	#110	#12	#679
F	WT. OF TARE	(grams)		8.4	8.0	8.3	8.1
G	WT. OF WET SOIL & TARE	(grams)		494.1	463.1	486.2	517.1
H	WT. OF DRY SOIL & TARE	(grams)		448.0	412.8	426.1	446.1
I	WT. OF WATER = G - H	(grams)		46.1	50.3	60.1	71.0
J	WT. DRY SOIL = H - F	(grams)		439.6	404.8	417.8	438.0
K	MOISTURE CONTENT = (I/J) X 100	(%)		10.5	12.4	14.4	16.2

QA ID:

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MOISTURE-DENSITY RELATIONSHIP

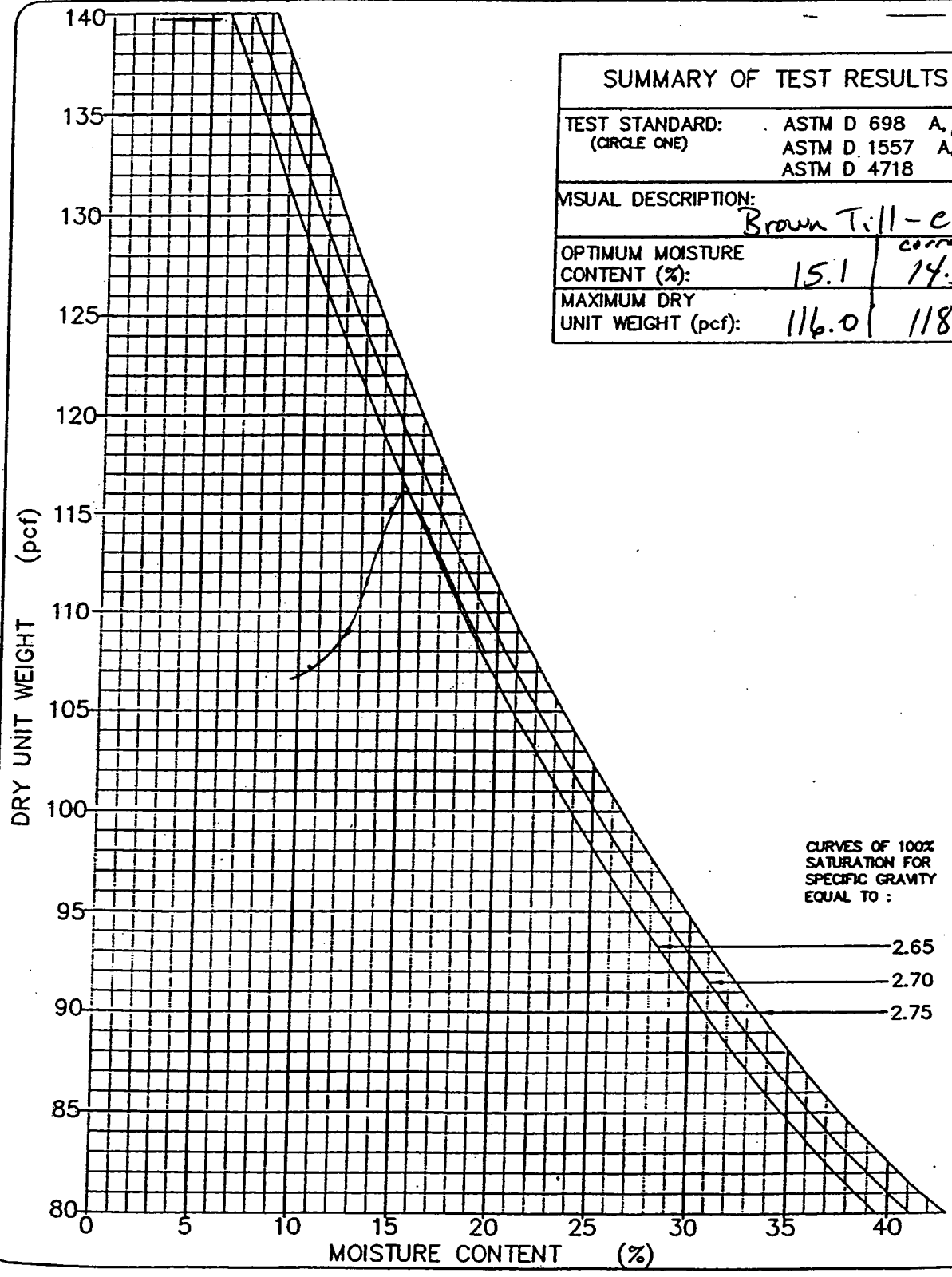
PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO PROJECT NO.: GQ1341 TASK NO.: 041

DESCRIPTION: Phase IV DATE: 6 day June month 2002 year

MATERIAL TYPE: Compacted Fill MATERIAL SOURCE: E. Borrow Area SAMPLE NO.: CF02-07

SUMMARY OF TEST RESULTS			QA ID
TEST STANDARD: (CIRCLE ONE)	ASTM D 698 A, (B) C ASTM D 1557 A, B, C ASTM D 4718		CJ
VISUAL DESCRIPTION:	Brown Till - CL		CJ
OPTIMUM MOISTURE CONTENT (%):	15.1	corrected 14.3	CJ
MAXIMUM DRY UNIT WEIGHT (pcf):	116.0	118.1	CJ



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FLUOR FERNALD

CORRECTION OF UNIT WEIGHT AND WATER CONTENT FOR SOILS CONTAINING OVERSIZE PARTICLES *(ASTM D 4718)*

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO PROJECT NO. GQ 1344 TASK NO. 04.1

DESCRIPTION: Phase IV DATE: 6 day June month 2003 year

MATERIAL TYPE: Compacted fill CF02-7

Weight of Total Sample	=	15022.3
Weight of Oversize Fraction	=	845.8
Weight of Finer Fraction (-3/8)	=	14176.5
Percentage of Oversize Fraction	= (P_C)	5.6
Percentage of Finer Fraction (-3/8)	= (P_F)	94.4
Specific Gravity (Assumed)	= (G_M)	2.72

(W_F) =	Water Content - 3/8, as decimal	=	0.151
(W_C) =	Water Content + 3/8, as decimal	=	0.015
(δ_F) =	Dry Density of finer fraction	=	116.0
(δ_W) =	Unit Weight of Water	=	62.4

$$C_W=(W_F P_F)+(W_C P_C)$$

$C_W = 14.3\%$

$$C\delta_D=100\delta_F G_M \delta_W/(\delta_F P_C)+(G_M \delta_W P_F)$$

$C_{\delta D} = 118.1$ pcf

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FLUOR FERNALD

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PARTICLE SIZE ANALYSIS—SIEVE METHOD (ASTM D 422)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO PROJECT NO.: GQ1341 TASK NO.: 04.1

DESCRIPTION: PHASE III DATE: 31 day May month 2002 year

MATERIAL TYPE: Low Perm Clay Compacted 5.2 SAMPLE NO.: CF02-7

SOIL SAMPLE SIZE	+3/8 = 845.8	MOISTURE = 219.2 gm	TOTAL = 14803.1
	-3/8 = 13957.3 + 113.1		

APPROXIMATE MINIMUM WT. OF SAMPLE (PASSING NO. 10 SIEVE) (grams)	SAND	FINE GRAIN
	115	65

15,022.3 g

		+3/8 BEFORE WASH	-3/8 BEFORE WASH	+3/8 AFTER WASH	-3/8 AFTER WASH
TARE NO.		N	LL-4	N	LL-4
WT. OF DRY SAMPLE PLUS TARE	(grams)	977.6	586.50	947.5	220.2
WT. OF TARE	(grams)	101.7	107.10	101.7	107.1
WT. OF DRY SAMPLE	(grams)	875.9	479.4	845.8	113.1

SIEVE ANALYSIS QA ID: DLE

SIEVE NO.	DIAMETER (mm)	WT. RETAINED (grams)	% RETAINED	% FINER		PROJECT SPECIFICATIONS
3 in	76.2	Ø	Ø	100		
2 in	50.8	Ø	Ø	100		100
1 1/2in	38.1	250.4	1.7	98.3		
1 in	25.4	411.8	2.7	97.3		
3/4 in	19.1	610.0	4.1	95.9		90-100
1/2 in	12.7	758.8	5.1	94.9		
3/8 in	9.53	845.8	5.6	94.4		
No. 4	4.75	14.5	3.0	97.0	91.6	
No. 10	2.00	32.9	6.9	93.1	89.9	
No. 20	0.850	49.7	10.4	89.6	84.6	
No. 40	0.425	64.5	13.5	86.5	81.7	
No. 60	0.250	77.1	16.1	83.9	79.2	
No. 100	0.125	93.2	19.4	80.6	76.1	
No. 200	0.075	111.5	23.3	76.7	72.4	50-100
PAN	—	113.1	—	—		

COMMENTS:

000026

%FINER = 100 − Σ% RETAINED

GEO SYNTEC CONSULTANTS FILE NO. 2-14-PMS CHECKED BY: CA SHEET NO. 1 OF 2

GEOSYNTEC CONSULTANTS

FLUOR FERNALD 4940

ATTERBERG LIMITS TEST (ASTM D 4318)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO PROJECT NO.: GQ341 TASK NO.: 04.1

DESCRIPTION: Phase IV DATE: 05 day June month 2002 year

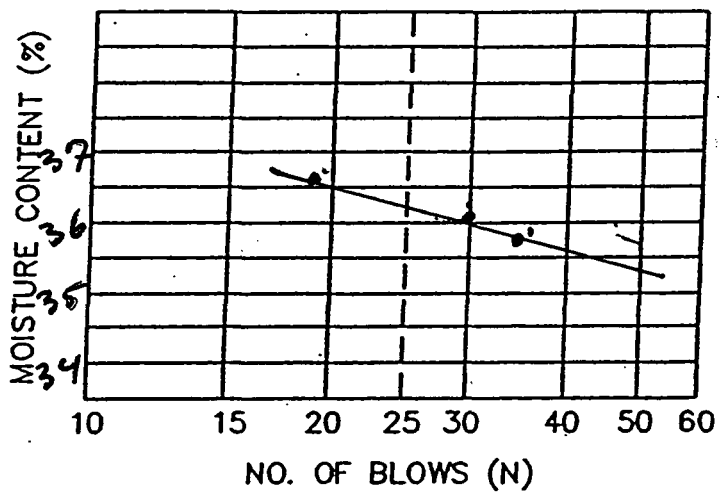
MATERIAL TYPE: Compacted Silt MATERIAL SOURCE: Borrow Area SAMPLE NO. CF02-7

LIQUID LIMIT DETERMINATION

QA ID: DLE

	TARE NO.		1.5	3.1	1.6	2.4
A	WT. OF TARE	(grams)	28.59	28.38	28.86	27.38
B	WT. OF WET SOIL & TARE	(grams)	51.85	50.09	48.04	
C	WT. OF DRY SOIL & TARE	(grams)	45.62	44.32	42.98	
D	WT. OF WATER = B-C	(grams)	6.23	5.77	5.06	
E	WT. OF DRY SOIL = C-A	(grams)	17.03	15.94	14.12	
F	MOISTURE CONTENT = (D/E)X100	(%)	36.6	36.2	35.8	
N	NUMBER OF BLOWS		19	30	35	

DRYING TARE NO.



CURING TARE NO.

PLASTIC LIMIT DETERMINATION

QA ID: DLE

	TARE NO.		A-218	A-203		
A	WT. OF TARE	(grams)	3.6	3.6		
B	WT. OF WET SOIL & TARE	(grams)	13.40	13.81		
C	WT. OF DRY SOIL & TARE	(grams)	12.81	12.33		
D	WT. OF WATER = B-C	(grams)	1.59	1.48		
E	WT. OF DRY SOIL = C-A	(grams)	9.21	8.73		
F	MOISTURE CONTENT = (D/E)X100	(%)	17.26	16.95		

LIQUID LIMIT (LL) = 36 PLASTIC LIMIT (PL) = 17 PLASTICITY INDEX (PI) = 19

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GEOSYNTEC CONSULTANTS

FLUOR FERNALD

4940

PARTICLE SIZE ANALYSIS—SIEVE METHOD

(ASTM D 422)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO

PROJECT NO.: GQ1341 TASK NO.: 04.1

DESCRIPTION: PHASE III

DATE: 5 day July month 2002 year

MATERIAL TYPE: ~~Low Perm Clay~~ compacted fill

SAMPLE NO.: CF02-8

SOIL SAMPLE SIZE	+3/8 = 2825.8	MOISTURE = 285.4	TOTAL = 24933.9
	-3/8 = 21822.7		

APPROXIMATE MINIMUM WT. OF SAMPLE (PASSING NO. 10 SIEVE) (grams)	SAND	FINE GRAIN
	115	65

50%

	9.30	+3/8 BEFORE WASH	-3/8	+3/8 AFTER WASH	-3/8
TARE NO.		X	L-4	X	L-4
WT. OF DRY SAMPLE PLUS TARE	(grams)	3764.9	752.0	3646.9	370.80
WT. OF TARE	(grams)	939.1	145.4	939.1	145.4
WT. OF DRY SAMPLE	(grams)	2825.8	606.6	2707.8	225.4

48.11

SIEVE ANALYSIS

QA ID: _____

SIEVE NO.	DIAMETER (mm)	WT. RETAINED (grams)	% RETAINED	% FINER		PROJECT SPECIFICATIONS
3 in	76.2	0	0	100		
2 in	50.8	535.0	2.1	97.9		100
1 1/2in	38.1	876.2	3.5	96.5		
1 in	25.4	1332.8	5.3	94.7		
3/4 in	19.1	1709.2	6.9	93.1		90-100
1/2 in	12.7	2393.6	9.6	90.4		
3/8 in	9.53	2702.3	10.8	89.2		
No. 4	4.75	28.33	4.7	95.3	85.0	
No. 10	2.00	67.40	11.1	88.9	79.3	
No. 20	0.850	102.67	16.9	83.1	74.1	
No. 40	0.425	132.98	21.9	78.1	69.7	
No. 60	0.250	159.18	26.4	73.6	65.7	
No. 100	0.125	190.24	31.4	68.6	61.2	
No. 200	0.075	224.56	37.0	63.0	56.2	50-100
PAN	—	225.39	—	—		

COMMENTS:

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%FINER = 100 − Σ% RETAINED

GEO SYNTEC CONSULTANTS FILE NO. 2-14-PMS

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SHEET NO. ____ OF ____

GEOSYNTEC CONSULTANTS

FLUOR FERNALD 4940

ATTERBERG LIMITS TEST (ASTM D 4318)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO PROJECT NO.: GQ1341 TASK NO.: 04.1

DESCRIPTION: Phase IV DATE: 22 day July month 2002 year

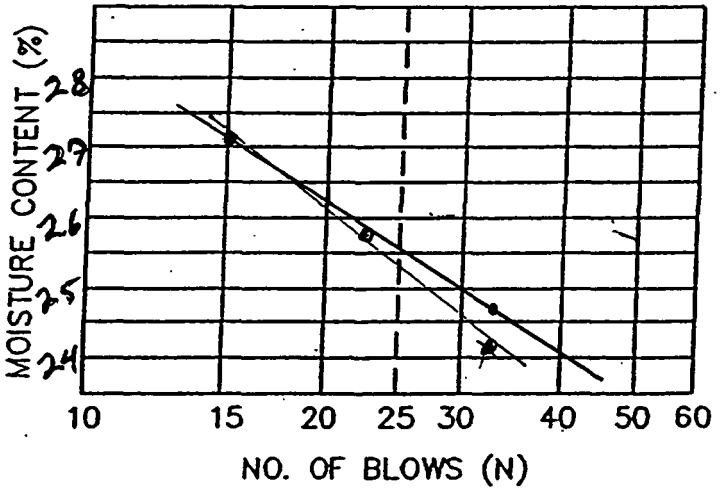
MATERIAL TYPE: Low Perm Clay MATERIAL SOURCE: Compacted Fill from Borrow Area SAMPLE NO.: CF02-8

LIQUID LIMIT DETERMINATION

QA ID: CHW

	TARE NO.		1.5	2.4	2.6	
A	WT. OF TARE	(grams)	28.61	27.39	28.55	
B	WT. OF WET SOIL & TARE	(grams)	45.55	45.41	46.01	
C	WT. OF DRY SOIL & TARE	(grams)	42.21	41.73	42.29	
D	WT. OF WATER = B-C	(grams)	3.34	3.68	3.72	
E	WT. OF DRY SOIL = C-A	(grams)	13.60	14.34	13.74	
F	MOISTURE CONTENT = (D/E)X100	(%)	24.6	25.7	27.1	
N	NUMBER OF BLOWS		32	23	15	

DRYING TARE NO.



CURING TARE NO.

PLASTIC LIMIT DETERMINATION

QA ID: DLE

	TARE NO.		A-214	A224	A214	A224
A	WT. OF TARE	(grams)	3.55	3.62	3.55	3.62
B	WT. OF WET SOIL & TARE	(grams)	18.43	18.94	18.43	18.94
C	WT. OF DRY SOIL & TARE	(grams)	17.14	16.67	16.67	17.14
D	WT. OF WATER = B-C	(grams)	1.29	2.27	1.76	1.80
E	WT. OF DRY SOIL = C-A	(grams)	13.59	13.05	13.12	13.52
F	MOISTURE CONTENT = (D/E)X100	(%)	9.5	17.4	13.4	13.3

LIQUID LIMIT (LL) = ~~25~~ 26 PLASTIC LIMIT (PL) = 13 PLASTICITY INDEX (PI) = ~~12~~ 13

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GEOSYNTEC CONSULTANTS

FLUOR DANIEL FERNALD

FIELD LABORATORY COMPACTION TEST (ASTM D 698 METHOD B)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO

PROJECT NO. 69134 TASK NO.: 04.1

DESCRIPTION: Phase II

DATE: 05 day July month 2002 year

MATERIAL TYPE: Low Perm Clay

SAMPLE NO.: CF02-8

THIS METHOD WILL BE USED IF THE MATERIAL RETAINED ON THE NO. 3/4-in. (19-mm) SIEVE IS LESS THAN 30%, IF THE MATERIAL RETAINED ON THE NO. 4 (4.75-mm) SIEVE IS GREATER THAN 20%, AND IF THE MATERIAL RETAINED ON THE NO. 3/8-in. (9.5-mm) SIEVE IS LESS THAN 20%.
ALL MATERIAL RETAINED ON THE NO. 3/8-in. (9.5-mm) SIEVE IS DISCARDED.
USE OVERSIZE CORRECTION IF MORE THAN 5% IS DISCARDED ACCORDING TO ASTM D 4718.
USE A 4-in. DIAMETER MOLD / 5.5-lb RAMMER / 12-in. DROP / 3 LAYERS / 25 BLOWS PER LAYER. 13.87

COMPACTION OF SOIL

QA ID: DCE

			13.96	13.49	13.64	13.91	
	WATER ADDED	(ml)	10%	4%	6%	8%	12%
A	WT. OF SOIL & MOLD	(grams)	6332.3	6119.1	6187.1	6309.6	6291.4
B	WT. OF MOLD	(grams)	4204.5	4204.5	4204.5	4204.5	4204.5
C	WT. OF SOIL = A − B	(grams)	2127.8	1914.6	1982.6	2105.1	2086.9
D	WET UNIT WT.(1) = C X 0.066	(pcf)	140.4	126.4	130.9	138.9	137.7
E	DRY UNIT WT. = D / [1 + (K/100)]	(pcf)	126.0	119.9	121.5	126.5	121.1

NOTE: IF CALIBRATED MOLD OF 1/30 FT^3 IS USED, THE WET DENSITY IS CALCULATED FROM THE WEIGHT OF SOIL, THE VOLUME OF THE MOLD AND THE CONVERSION FROM GRAMS TO POUNDS (I.E., CONVERSION FACTOR = (30 / 453.6) = 0.066). THE MOLD MUST BE CALIBRATED TO VERIFY A CAPACITY OF 1/30 ± 0.0005 FT^3 ON INTERVALS NOT TO EXCEED 1000 TIMES THAT THE MOLD IS FILLED.

MOISTURE CONTENT – ASTM D 2216

QA ID: _____

	TARE NO.		#97	#605	#616	#103	#52
F	WT. OF TARE	(grams)	8.1	8.3	8.2	8.3	8.1
G	WT. OF WET SOIL & TARE	(grams)	579.2	456.0	550.5	543.9	531.4
H	WT. OF DRY SOIL & TARE	(grams)	520.7	433.1	511.8	496.0	468.3
I	WT. OF WATER = G − H	(grams)	58.5	22.9	38.7	47.9	63.0
J	WT. DRY SOIL = H − F	(grams)	512.6	424.8	503.6	487.7	460.2
K	MOISTURE CONTENT = (I/J) X 100	(%)	11.4	5.4	7.7	9.8	13.7

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GEO SYNTEC CONSULTANTS FILE NO. 2-05-FLC CHECKED BY: _____ SHEET NO. 1 OF 3

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FLUOR FERNALD

CORRECTION OF UNIT WEIGHT AND WATER CONTENT FOR SOILS CONTAINING OVERSIZE PARTICLES

(ASTM D 4718)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO PROJECT NO. GQ134/ TASK NO. 04.1

DESCRIPTION: Phase IV DATE: 8 day July month 2002 year

MATERIAL TYPE: Compacted Fill CFD2-8

Weight of Total Sample	=	24933.9
Weight of Oversize Fraction	=	2702.3
Weight of Finer Fraction (- 3/8)	=	22231.6
Percentage of Oversize Fraction	= (P_C)	10.8
Percentage of Finer Fraction (- 3/8)	= (P_F)	89.2
Specific Gravity (Assumed)	= (G_M)	2.72

(W_F) =	Water Content - 3/8 , as decimal	=	0.105
(W_C) =	Water Content + 3/8 , as decimal	=	0.015
(δ_F) =	Dry Density of finer fraction	=	127.9
(δ_W) =	Unit Weight of Water	=	62.4

$$C_W=(W_F P_F)+(W_C P_C)$$

$$C_W = 9.5\%$$

$$C\delta_D=100\delta_F G_M \delta_W/(\delta_F P_C)+(G_M \delta_W P_F)$$

$$C_{\delta D} = 131.4 \text{ pcf}$$

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FLUOR FERNALD

4940

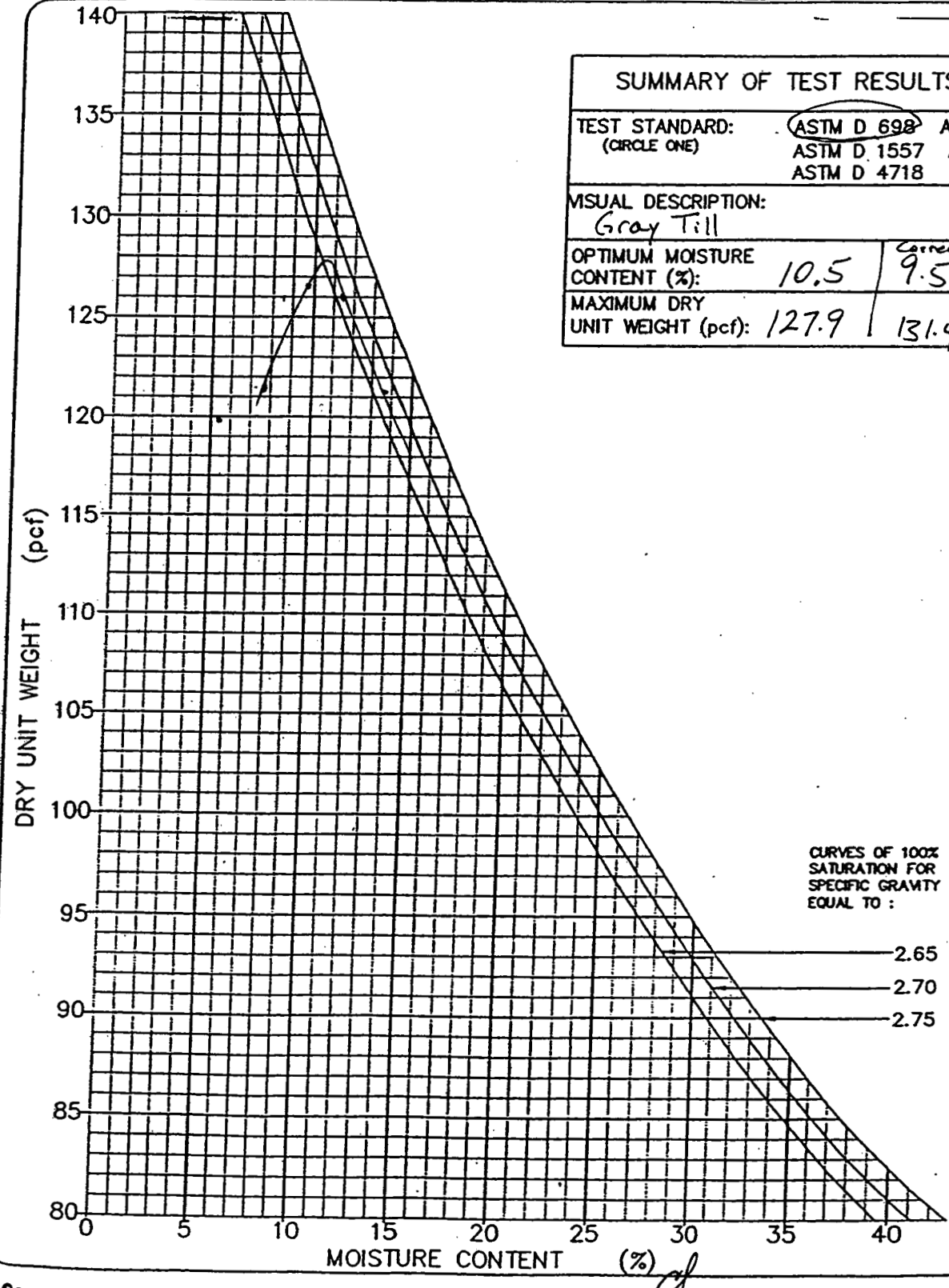
MOISTURE-DENSITY RELATIONSHIP

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO PROJECT NO.: GQ1341 TASK NO.: 04.1

DESCRIPTION: Phase IV DATE: 8 day July month 2002 year

MATERIAL TYPE: Compacted Fill MATERIAL SOURCE: Sub Area 1 SAMPLE NO.: CF02-8



SUMMARY OF TEST RESULTS			QA ID
TEST STANDARD: (CIRCLE ONE)	ASTM D 698 A, B, C ASTM D 1557 A, B, C ASTM D 4718		CJ
VISUAL DESCRIPTION: Gray Till			CJ
OPTIMUM MOISTURE CONTENT (%):	10.5	Corrected 9.5	CJ
MAXIMUM DRY UNIT WEIGHT (pcf):	127.9	131.4	CJ

000032

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FLUOR FERNALD

ATTERBERG LIMITS TEST

(ASTM D 4318)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO PROJECT NO.: 601341 TASK NO.: 04.1

DESCRIPTION: Phase IV DATE: 7 day August month 2002 year

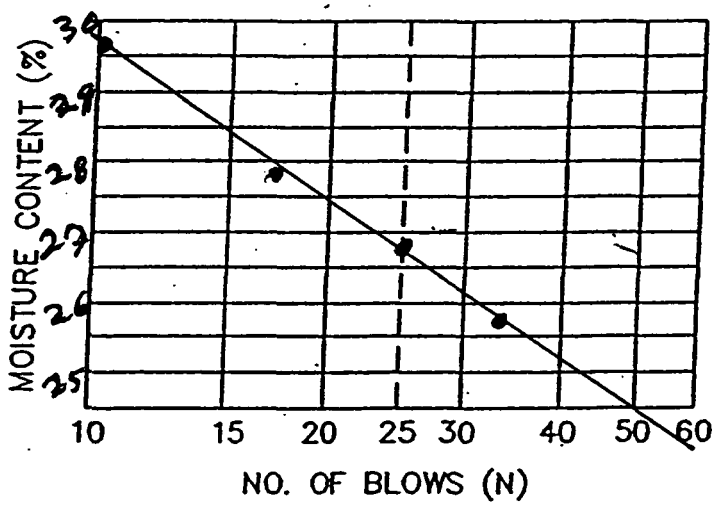
MATERIAL TYPE: Compacted fill MATERIAL SOURCE: Unscreened Borrow Area SAMPLE NO.: CF02-9

LIQUID LIMIT DETERMINATION

QA ID: CHW

	TARE NO.		1.2	1.9	2.7	2.5
A	WT. OF TARE	(grams)	28.50	28.56	28.67	28.42
B	WT. OF WET SOIL & TARE	(grams)	48.29	47.83	44.54	46.69
C	WT. OF DRY SOIL & TARE	(grams)	43.76	43.64	41.20	42.96
D	WT. OF WATER = B-C	(grams)	4.53	4.19	3.34	3.73
E	WT. OF DRY SOIL = C-A	(grams)	15.26	15.08	12.53	14.54
F	MOISTURE CONTENT = (D/E)X100	(%)	29.7	27.8	26.7	25.7
N	NUMBER OF BLOWS		10	17	25	34

DRYING TARE NO.



CURING TARE NO.

PLASTIC LIMIT DETERMINATION

QA ID: CHW

	TARE NO.		1.1	2.9		
A	WT. OF TARE	(grams)	28.76	31.46		
B	WT. OF WET SOIL & TARE	(grams)	44.56	47.49		
C	WT. OF DRY SOIL & TARE	(grams)	42.50	45.42		
D	WT. OF WATER = B-C	(grams)	2.06	2.07		
E	WT. OF DRY SOIL = C-A	(grams)	13.74	13.96		
F	MOISTURE CONTENT = (D/E)X100	(%)	15.0	14.8		

000033

LIQUID LIMIT (LL) = 27 PLASTIC LIMIT (PL) = 15 PLASTICITY INDEX (PI) = 9 12 KS

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FLUOR FERNALD

PARTICLE SIZE ANALYSIS–SIEVE METHOD 263.6 (ASTM D 422)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO — PROJECT NO.: GQ134 TASK NO.: 04.1

DESCRIPTION: PHASE III — DATE: 06 day Aug month 2002 year

MATERIAL TYPE: LOW PERM CLAY — SAMPLE NO.: CF62-9

SOIL SAMPLE SIZE	+3/8 = 712.5	MOISTURE = 348.0	TOTAL = 17896.5
	-3/8 = 16836.0	17896.5	

APPROXIMATE MINIMUM WT. OF SAMPLE (PASSING NO. 10 SIEVE) (grams)	SAND	FINE GRAIN
	115	65

	BEFORE WASH +3/8	BEFORE WASH -3/8	AFTER WASH +3/8	AFTER WASH -3/8
TARE NO.	L-44	L-6	L-44	L-6
WT. OF DRY SAMPLE PLUS TARE (grams)	904.4	786.8	871.5	367.4 ~~710.6~~
WT. OF TARE (grams)	191.9	199.1	191.9	199.1
WT. OF DRY SAMPLE (grams)	712.5	587.7	679.6	168.3

SIEVE ANALYSIS — QA ID: DLF

SIEVE NO.	DIAMETER (mm)	WT. RETAINED (grams)	% RETAINED	% FINER		PROJECT SPECIFICATIONS
3 in	76.2	0	0	100		
2 in	50.8	0	0	100		100
1 1/2in	38.1	0	0	100		
1 in	25.4	125.7	.7	99.3		
3/4 in	19.1	242.9	1.4	98.6		90-100
1/2 in	12.7	508.9	2.8	97.2		
3/8 in	9.53	679.1	3.8	96.2		
No. 4	4.75	21.0	3.6	96.4	92.7	
No. 10	2.00	46.3	7.9	92.1	88.6	
No. 20	0.850	72.3	12.3	87.7	84.4	
No. 40	0.425	94.6	16.1	83.9	80.7	
No. 60	0.250	114.5	19.5	80.5	77.4	
No. 100	0.125	139.1	23.7	76.3	73.4	
No. 200	0.075	167.8	28.6	71.4	68.7	50-100
PAN	—	168.2	—	—		

COMMENTS:

000034

%FINER = 100 − Σ% RETAINED

GEOSYNTEC CONSULTANTS FILE NO. 2-14-PMS

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SHEET NO. 1 OF 2

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FLUOR DANIEL FERNALD

FIELD LABORATORY COMPACTION TEST (ASTM D 698 METHOD B)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO

DESCRIPTION: Phase III

MATERIAL TYPE: Compacted Fill Unscreened

PROJECT NO.: 691341 TASK NO.: 04.1

DATE: 7 day August month 2002 year

SAMPLE NO.: CF02-9

THIS METHOD WILL BE USED IF THE MATERIAL RETAINED ON THE NO. 3/4-in. (19-mm) SIEVE IS LESS THAN 30%, IF THE MATERIAL RETAINED ON THE NO. 4 (4.75-mm) SIEVE IS GREATER THAN 20%, AND IF THE MATERIAL RETAINED ON THE NO. 3/8-in. (9.5-mm) SIEVE IS LESS THAN 20%.
ALL MATERIAL RETAINED ON THE NO. 3/8-in. (9.5-mm) SIEVE IS DISCARDED.
USE OVERSIZE CORRECTION IF MORE THAN 5% IS DISCARDED ACCORDING TO ASTM D 4718.
USE A 4-in. DIAMETER MOLD / 5.5-lb RAMMER / 12-in. DROP / 3 LAYERS / 25 BLOWS PER LAYER.

13.83

COMPACTION OF SOIL

QA ID: CHW

	WATER ADDED	(ml)	13.36 4%	13.45 6%	13.57 8%	13.77 10%	12%
A	WT. OF SOIL & MOLD	(grams)	6060.1	6101.0	6155.4	6246.1	6273.3
B	WT. OF MOLD	(grams)	4204.5	4204.5	4204.5	4204.5	4204.9
C	WT. OF SOIL = A - B	(grams)	1855.6	1896.5	1950.9	2041.6	2068.8
D	WET UNIT WT.(1) = C X 0.066	(pcf)	122.5	125.2	128.8	134.7	136.5
E	DRY UNIT WT. = D / [1 + (K/100)]	(pcf)	115.6	116.0	117.1	120.5	119.6

NOTE: IF CALIBRATED MOLD OF 1/30 FT^3 IS USED, THE WET DENSITY IS CALCULATED FROM THE WEIGHT OF SOIL, THE VOLUME OF THE MOLD AND THE CONVERSION FROM GRAMS TO POUNDS (I.E., CONVERSION FACTOR = (30 / 453.6) = 0.066). THE MOLD MUST BE CALIBRATED TO VERIFY A CAPACITY OF 1/30 ± 0.0005 FT^3 ON INTERVALS NOT TO EXCEED 1000 TIMES THAT THE MOLD IS FILLED.

MOISTURE CONTENT - ASTM D 2216

QA ID: CHW

	TARE NO.		#645	#114	#613	#309	#52
F	WT. OF TARE	(grams)	8.1	8.4	8.2	8.0	8.1
G	WT. OF WET SOIL & TARE	(grams)	532.5	546.1	565.7	505.4	342.8
H	WT. OF DRY SOIL & TARE	(grams)	503.0	506.7	514.9	453.0	301.5
I	WT. OF WATER = G - H	(grams)	29.5	39.4	50.8	52.4	41.3
J	WT. DRY SOIL = H - F	(grams)	494.9	498.3	506.7	445.0	293.4
K	MOISTURE CONTENT = (I/J) X 100	(%)	5.96	7.9	10.0	11.8	14.1

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FLUOR FERNALD

CORRECTION OF UNIT WEIGHT AND WATER CONTENT FOR SOILS CONTAINING OVERSIZE PARTICLES

(ASTM D 4718)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO PROJECT NO. G0/341 TASK NO. 04.1

DESCRIPTION: Phase IV DATE: 9 day Aug month 2002 year

MATERIAL TYPE: Compacted Fill CFØ2-9

Weight of Total Sample	=	17896.5
Weight of Oversize Fraction	=	679.1
Weight of Finer Fraction (- 3/8)	=	17217.4
Percentage of Oversize Fraction	= (P_C)	3.8
Percentage of Finer Fraction (- 3/8)	= (P_F)	96.2
Specific Gravity (Assumed)	= (G_M)	2.72

(W_F) =	Water Content - 3/8 , as decimal	=	0.13
(W_C) =	Water Content + 3/8 , as decimal	=	0.015
(δ_F) =	Dry Density of finer fraction	=	1220
(δ_W) =	Unit Weight of Water	=	62.4

$$C_W=(W_F P_F)+(W_C P_C)$$

$C_w = 12.6\%$

$$C\delta_D=100\delta_F G_M \delta_W/(\delta_F P_C)+(G_M \delta_W P_F)$$

$C_{\delta D} = 123.3$ pcf

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FLUOR FERNALD

MOISTURE-DENSITY RELATIONSHIP

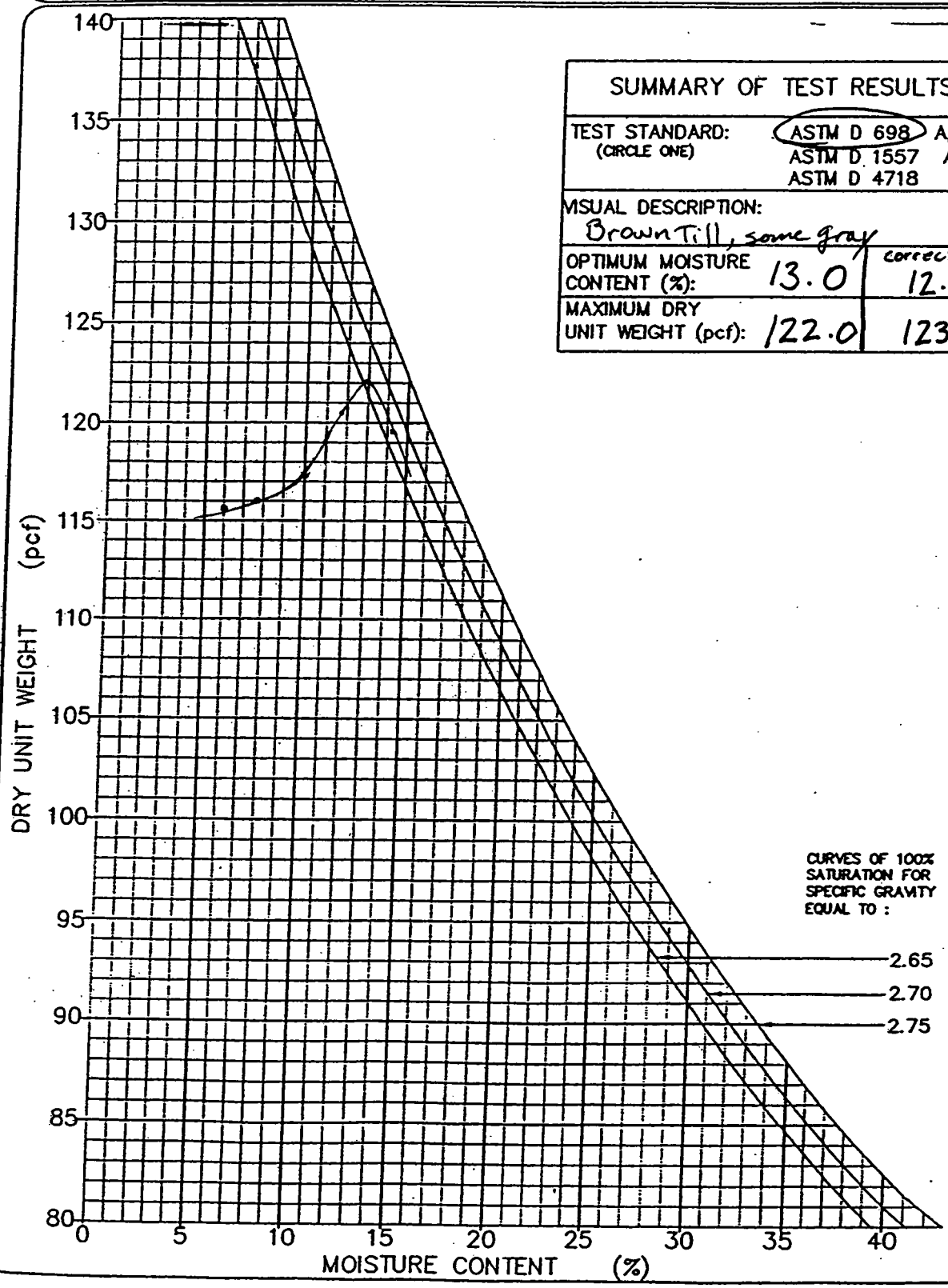
PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO PROJECT NO.: GQ1341 TASK NO.: 04.1

DESCRIPTION: Phase IV DATE: 10 day Aug month 2002 year

MATERIAL TYPE: Clay Compacted Fill MATERIAL SOURCE: East Borrow Area SAMPLE NO.: CF02-9

SUMMARY OF TEST RESULTS			QA ID
TEST STANDARD: (CIRCLE ONE)	ASTM D 698 A, (B), C ASTM D 1557 A, B, C ASTM D 4718		CJ
VISUAL DESCRIPTION: Brown Till, some gray			CJ
OPTIMUM MOISTURE CONTENT (%):	13.0	correction 12.6	CJ
MAXIMUM DRY UNIT WEIGHT (pcf):	122.0	123.3	CJ



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FLUOR FERNALD

PARTICLE SIZE ANALYSIS–SIEVE METHOD (ASTM D 422)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO PROJECT NO.: GQ134 TASK NO.: 041

DESCRIPTION: PHASE III DATE: 13 day NOV. month 2002 year

MATERIAL TYPE: [redacted] Compacted Fill SAMPLE NO.: CF 02-10

SOIL SAMPLE SIZE	+3/8 = 2627.3 gram	MOISTURE =	TOTAL = 21345.2
	-3/8 = 18717.9 gm		

APPROXIMATE MINIMUM WT. OF SAMPLE (PASSING NO. 10 SIEVE)	477.9 gm +3/8 572.3 gm -3/8 17667.7 gm (grams) sample	SAND	FINE GRAIN
		115	65

		+3/8 BEFORE WASH	-3/8 BEFORE WASH	+3/8 AFTER WASH	-3/8 AFTER WASH
TARE NO.		L-7	LL-6	L-7	LL-6
WT. OF DRY SAMPLE PLUS TARE	(grams)	2820.2	770.3	2711.2	391.6
WT. OF TARE	(grams)	192.9	198.0	192.9	198.0
WT. OF DRY SAMPLE	(grams)	2627.3	572.3	2518.3	193.6

SIEVE ANALYSIS QA ID: DLE

SIEVE NO.	DIAMETER (mm)	WT. RETAINED (grams)	% RETAINED	% FINER		PROJECT SPECIFICATIONS
3 in	76.2	0	0	100		
2 in	50.8	839.1	3.9	96.1		100
1 1/2in	38.1	1221.5	5.7	94.3		
1 in	25.4	1593.4	7.5	92.5		
3/4 in	19.1	1881.0	8.8	91.2		90-100
1/2 in	12.7	2291.0	10.7	89.3		
3/8 in	9.53	2518.3	11.8	88.2		
No. 4	4.75	24.9	4.4	95.6	84.3	
No. 10	2.00	54.6	9.5	90.5	79.8	
No. 20	0.850	82.5	14.4	85.6	75.5	
No. 40	0.425	107.6	18.8	81.2	71.6	
No. 60	0.250	135.2	23.6	76.4	67.4	
No. 100	0.125	167.2	29.2	70.8	62.4	
No. 200	0.075	193.6	33.8	66.2	58.4	50-100
PAN	—		—	—	—	

COMMENTS:

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%FINER = 100 − Σ% RETAINED

GEOSYNTEC CONSULTANTS FILE NO. 2-14-PMS CHECKED BY: CA SHEET NO. 1 OF 2

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GEOSYNTEC CONSULTANTS

FLUOR FERNALD, INC.

ATTERBERG LIMITS TEST

(ASTM D 4318)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO PROJECT NO.: GQ1341 TASK NO.: 01.1

DESCRIPTION: Phase IV DATE: 15 day Nov month 2002 year

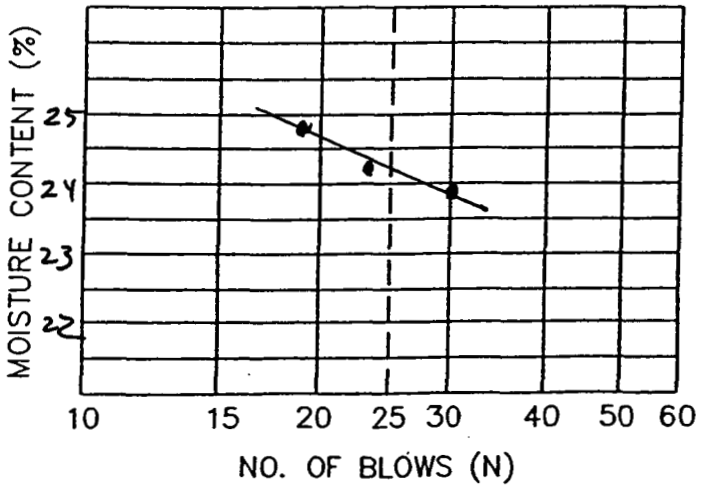
MATERIAL TYPE: Comp S-LC MATERIAL SOURCE: Borrow Area Sub Area 3 SAMPLE NO. CF02-10

LIQUID LIMIT DETERMINATION

QA ID: DLE

	TARE NO.		1.6	2.6	1.1	3.1
A	WT. OF TARE	(grams)	28.85	28.53	28.76	28.38
B	WT. OF WET SOIL & TARE	(grams)	47.37	48.36	49.59	
C	WT. OF DRY SOIL & TARE	(grams)	43.80	44.50	45.46	
D	WT. OF WATER = B−C	(grams)	3.57	3.86	4.13	
E	WT. OF DRY SOIL = C−A	(grams)	14.95	15.97	16.70	
F	MOISTURE CONTENT = (D/E)X100	(%)	23.9	24.2	24.7	
N	NUMBER OF BLOWS		30.	23	19	

DRYING TARE NO.



CURING TARE NO.

PLASTIC LIMIT DETERMINATION

QA ID: DLE

	TARE NO.		1.4	2.1		
A	WT. OF TARE	(grams)	28.56	28.23		
B	WT. OF WET SOIL & TARE	(grams)	43.15	41.37		
C	WT. OF DRY SOIL & TARE	(grams)	41.28	39.79		
D	WT. OF WATER = B−C	(grams)	1.87	1.58		
E	WT. OF DRY SOIL = C−A	(grams)	12.72	11.56		
F	MOISTURE CONTENT = (D/E)X100	(%)	14.7	13.7		

LIQUID LIMIT (LL) = 24 PLASTIC LIMIT (PL) = 14 PLASTICITY INDEX (PI) = 10

GEOSYNTEC CONSULTANTS

FLUOR FERNALD, INC.

FIELD LABORATORY COMPACTION TEST

(ASTM D 698 METHOD B)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO

DESCRIPTION: Phase IV — PROJECT NO. GQ1341 TASK NO.: 04.1

MATERIAL TYPE: Compacted fill — MATERIAL SOURCE: Borrow AREA / Sub area #3 — DATE: 15 day Nov month 2002 year — SAMPLE NO.: CF02-10

THIS METHOD WILL BE USED IF THE MATERIAL RETAINED ON THE NO. 3/4-in. (19-mm) SIEVE IS LESS THAN 30%, IF THE MATERIAL RETAINED ON THE NO. 4 (4.75-mm) SIEVE IS GREATER THAN 20%, AND IF THE MATERIAL RETAINED ON THE NO. 3/8-in. (9.5-mm) SIEVE IS LESS THAN 20%.
ALL MATERIAL RETAINED ON THE NO. 3/8-in. (9.5-mm) SIEVE IS DISCARDED.
USE OVERSIZE CORRECTION IF MORE THAN 5% IS DISCARDED ACCORDING TO ASTM D 4718.
USE A 4-in. DIAMETER MOLD / 5.5-lb RAMMER / 12-in. DROP / 3 LAYERS / 25 BLOWS PER LAYER.

COMPACTION OF SOIL

QA ID: DLE

	WATER ADDED	(ml)	13.36 4% 100mL	13.50 6% 150mL	13.75 8% 200mL	13.96 10% 250mL	13.88 12% 300mL
A	WT. OF SOIL & MOLD	(grams)	6060.1	6123.6	6237.0	6332.3	6296.0
B	WT. OF MOLD	(grams)	4204.5	4204.5	4204.5	4204.5	4204.5
C	WT. OF SOIL = A − B	(grams)	1855.6	1919.1	2032.5	2127.8	2091.5
D	WET UNIT WT.(1) = C X 0.066	(pcf)	122.5	126.7	134.1	140.4	138.0
E	DRY UNIT WT. = D / [1 + (K/100)]	(pcf)	116.8	119.0	123.1	126.7	122.0

NOTE: IF CALIBRATED MOLD OF 1/30 FT³ IS USED, THE WET DENSITY IS CALCULATED FROM THE WEIGHT OF SOIL, THE VOLUME OF THE MOLD AND THE CONVERSION FROM GRAMS TO POUNDS (I.E., CONVERSION FACTOR = (30 / 453.6) = 0.066). THE MOLD MUST BE CALIBRATED TO VERIFY A CAPACITY OF 1/30 ± 0.0005 FT³ ON INTERVALS NOT TO EXCEED 1000 TIMES THAT THE MOLD IS FILLED.

MOISTURE CONTENT — ASTM D 2216

QA ID: ____

	TARE NO.		#32	#670	#37	#650	#36
F	WT. OF TARE	(grams)	8.4	8.3	8.2	8.3	8.4
G	WT. OF WET SOIL & TARE	(grams)	472.3	505.6	561.7	513.3	576.0
H	WT. OF DRY SOIL & TARE	(grams)	450.5	475.4	516.5	464.2	510.3
I	WT. OF WATER = G − H	(grams)	21.8	30.2	45.2	49.1	65.7
J	WT. DRY SOIL = H − F	(grams)	442.1	467.1	508.3	455.9	501.9
K	MOISTURE CONTENT = (I/J) X 100	(%)	4.9	6.5	8.9	10.8	13.1

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1.049 .065 1.089 1.104

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SHEET NO. 1 OF 3

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FLUOR FERNALD

CORRECTION OF UNIT WEIGHT AND WATER CONTENT FOR SOILS CONTAINING OVERSIZE PARTICLES *(ASTM D 4718)*

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO PROJECT NO. GQ[illegible] TASK NO. 04.1

DESCRIPTION: Phase IV DATE: 18 day Nov month 2002 year

MATERIAL TYPE: Compacted Fill

Weight of Total Sample	=	21345.2
Weight of Oversize Fraction	=	2518.3
Weight of Finer Fraction (- 3/8)	=	18826.9
Percentage of Oversize Fraction	= (P_C)	11.8
Percentage of Finer Fraction (- 3/8)	= (P_F)	88.2
Specific Gravity (Assumed)	= (G_M)	~~62.4~~ ~~2.7~~ 2.72

(W_F) =	Water Content - 3/8 , as decimal	=	0.11
(W_C) =	Water Content + 3/8 , as decimal	=	0.015
(δ_F) =	Dry Density of finer fraction	=	127.0
(δ_W) =	Unit Weight of Water	=	62.5

$$C_W=(W_F P_F)+(W_C P_C)$$

C_W = 9.9%

$$C\delta_D=100\delta_F G_M \delta_W/(\delta_F P_C)+(G_M \delta_W P_F)$$

$C_{\delta D}$ = 130.9 pcf

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FLUOR FERNALD
4940

MOISTURE–DENSITY RELATIONSHIP

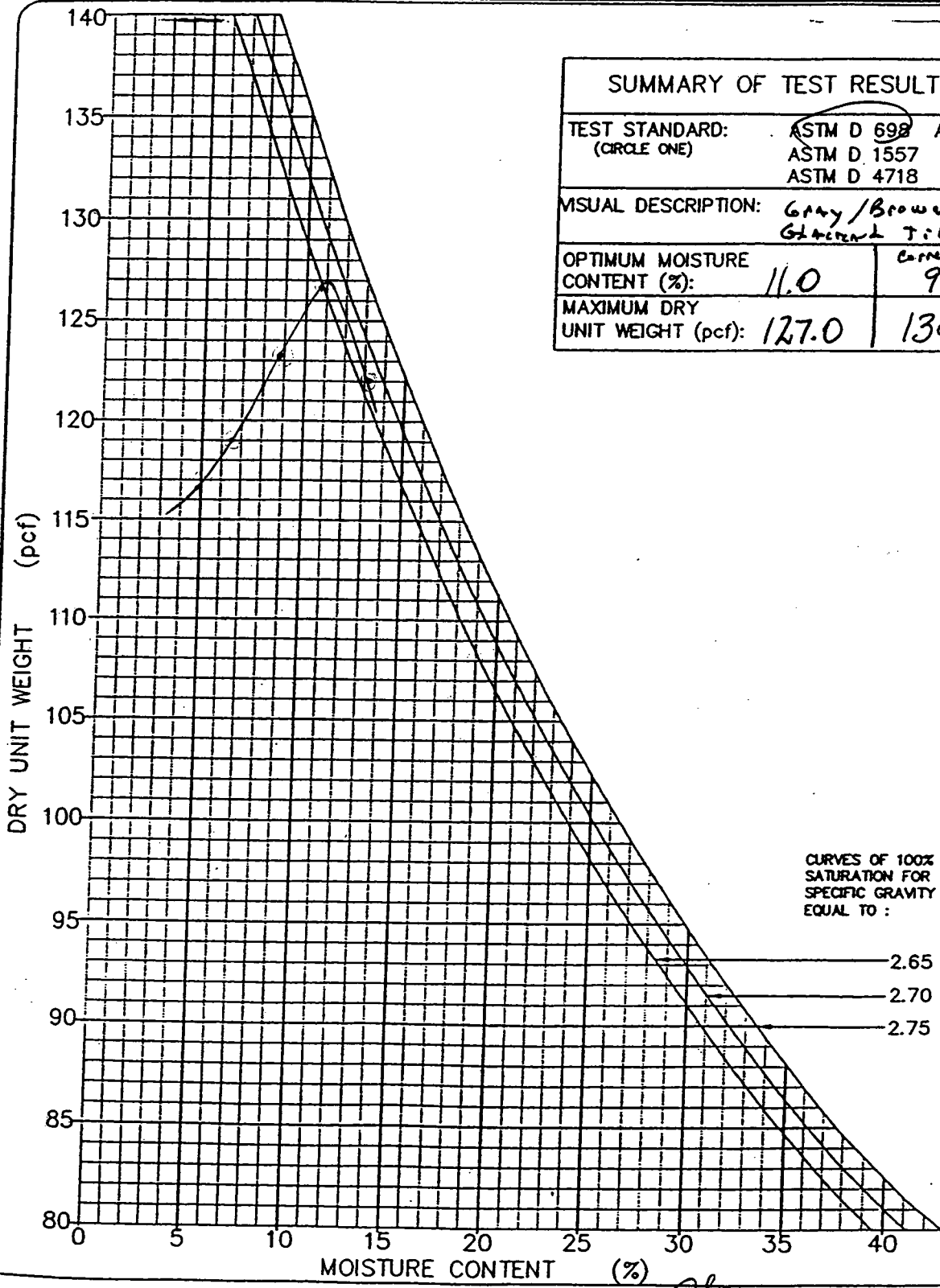
PROJECT: ON–SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO PROJECT NO. 681341 TASK NO.: 04.1

DESCRIPTION: Phase IV DATE: 16 day Nov month 2002 year

MATERIAL TYPE: Compacted Fill MATERIAL SOURCE: Borrow Area / Sub Area #3 SAMPLE NO. CF02-D

SUMMARY OF TEST RESULTS			QA ID
TEST STANDARD: (CIRCLE ONE)	ASTM D 698 A, (B) C ASTM D 1557 A, B, C ASTM D 4718		MJE
VISUAL DESCRIPTION:	Gray / Brown Glacial Till		CA
OPTIMUM MOISTURE CONTENT (%):	11.0	corrected 9.9	CA
MAXIMUM DRY UNIT WEIGHT (pcf):	127.0	130.9	CA



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35[illegible] 1.74 = 33.66 X 453.6 = 15268g of [illegible] 3/8" +3/8" = 514.6g

GEOSYNTEC CONSULTANTS

FLUOR FERNALD, INC.

FIELD LABORATORY COMPACTION TEST

(ASTM D 698 METHOD B)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO

DESCRIPTION: Phase IV Cell #4 & #5 PROJECT NO.: GQ1341 TASK NO.: 04.1

MATERIAL TYPE: COMPACTED FILL DATE: 27 day Nov month 02 year

MATERIAL SOURCE: SED. BASIN EAST OF EAST PARKING SAMPLE NO.: CF02-11

THIS METHOD WILL BE USED IF THE MATERIAL RETAINED ON THE NO. 3/4-in. (19-mm) SIEVE IS LESS THAN 30%, IF THE MATERIAL RETAINED ON THE NO. 4 (4.75-mm) SIEVE IS GREATER THAN 20%, AND IF THE MATERIAL RETAINED ON THE NO. 3/8-in. (9.5-mm) SIEVE IS LESS THAN 20%.
ALL MATERIAL RETAINED ON THE NO. 3/8-in. (9.5-mm) SIEVE IS DISCARDED.
USE OVERSIZE CORRECTION IF MORE THAN 5% IS DISCARDED ACCORDING TO ASTM D 4718.
USE A 4-in. DIAMETER MOLD / 5.5-lb RAMMER / 12-in. DROP / 3 LAYERS / 25 BLOWS PER LAYER.

COMPACTION OF SOIL

QA ID: CAW

	WATER ADDED	(ml)	8%	10%	12%	14%	
A	WT. OF SOIL & MOLD	(grams)	200ml	250ml	300ml	350ml	400ml
B	WT. OF MOLD	(grams)	5974.0	6092.0	6169.0	6214.0	
C	WT. OF SOIL = A - B	(grams)	4204.5	4204.5	4204.5	4204.5	
D	WET UNIT WT.(1) = C X 0.066	(pcf)	1769.5	1887.5	1964.5	2009.5	
E	DRY UNIT WT. = D / [1 + (K/100)]	(pcf)	116.8	124.6	129.7	132.6	
			106.3	111.1	114.0	114.3	

NOTE: IF CALIBRATED MOLD OF 1/30 FT^3 IS USED, THE WET DENSITY IS CALCULATED FROM THE WEIGHT OF SOIL, THE VOLUME OF THE MOLD AND THE CONVERSION FROM GRAMS TO POUNDS (I.E., CONVERSION FACTOR = (30 / 453.6) = 0.066). THE MOLD MUST BE CALIBRATED TO VERIFY A CAPACITY OF 1/30 ± 0.0005 FT^3 ON INTERVALS NOT TO EXCEED 1000 TIMES THAT THE MOLD IS FILLED.

MOISTURE CONTENT - ASTM D 2216

QA ID: CAW

	TARE NO.		657	664	25	52	
F	WT. OF TARE	(grams)	8.1	8.3	8.3	8.2	
G	WT. OF WET SOIL & TARE	(grams)	422.1	537.0	407.9	475.7	
H	WT. OF DRY SOIL & TARE	(grams)	384.7	479.8	359.9	411.3	
I	WT. OF WATER = G - H	(grams)	37.4	57.2	48.0	64.4	
J	WT. DRY SOIL = H - F	(grams)	376.6	471.5	351.6	403.1	
K	MOISTURE CONTENT = (I/J) X 100	(%)	9.9	12.1	13.7	16.0	

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SHEET NO. 1 OF 3

GeoSyntec Consultants

FLUOR FERNALD

4940

CORRECTION OF UNIT WEIGHT AND WATER CONTENT FOR SOILS CONTAINING OVERSIZE PARTICLES *(ASTM D 4718)*

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO PROJECT NO. GQ1341 TASK NO. 04.1

DESCRIPTION: Phase IV DATE: 2 day Dec month 2002 year

MATERIAL TYPE: Compacted fill CF02-11

Weight of Total Sample	=	15268.0 g
Weight of Oversize Fraction	=	514.6
Weight of Finer Fraction (-3/8)	=	14753.4
Percentage of Oversize Fraction	= (P_C)	3.4
Percentage of Finer Fraction (-3/8)	= (P_F)	96.6
Specific Gravity (Assumed)	= (G_M)	2.72

(W_F) =	Water Content -3/8, as decimal	=	0.15
(W_C) =	Water Content +3/8, as decimal	=	0.015
(δ_F) =	Dry Density of finer fraction	=	116.2
(δ_W) =	Unit Weight of Water	=	62.4

$$C_W=(W_F P_F)+(W_C P_C)$$

$C_\omega = 14.5\%$

$$C\delta_D=100\delta_F G_M \delta_W/(\delta_F P_C)+(G_M \delta_W P_F)$$

$C_{\delta D} = 117.4$ pcf

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FLUOR FERNALD

MOISTURE-DENSITY RELATIONSHIP

4940

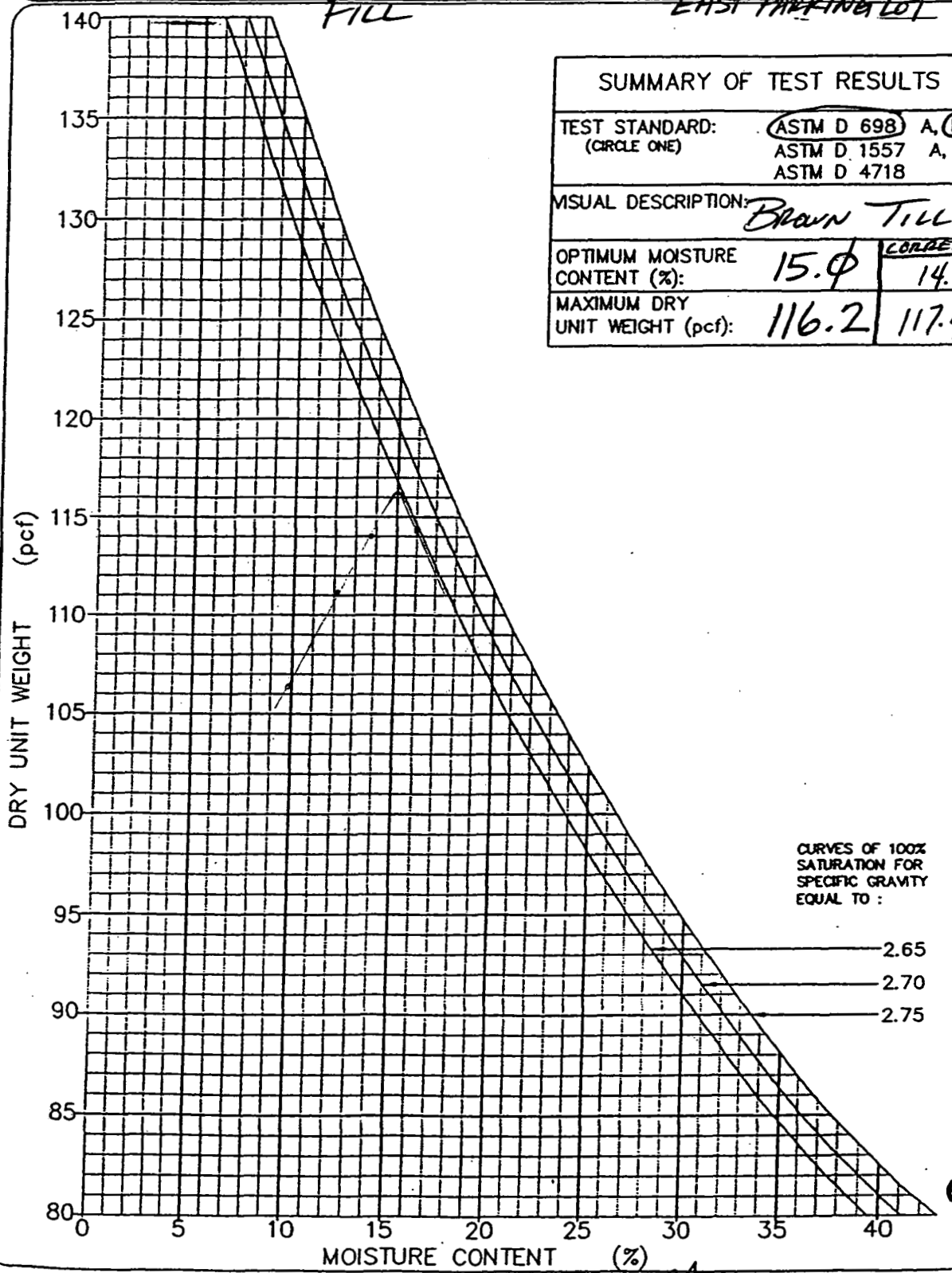
PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO PROJECT NO.: GQ1341 TASK NO.: 04.1

DESCRIPTION: PHASE IV DATE: 02 day DEC month 2002 year

MATERIAL TYPE: COMPACTED FILL MATERIAL SOURCE: SED BASIN EAST OF EAST PARKING LOT SAMPLE NO.: CF02-11

SUMMARY OF TEST RESULTS			QA ID
TEST STANDARD: (CIRCLE ONE)	ASTM D 698 A, B, C ASTM D 1557 A, B, C ASTM D 4718		CHW
VISUAL DESCRIPTION:	BROWN TILL		CHW
OPTIMUM MOISTURE CONTENT (%):	15.0	CORRECTED 14.5	CL/CHW
MAXIMUM DRY UNIT WEIGHT (pcf):	116.2	117.4	CL/CHW



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FLUOR FERNALD

FIELD LABORATORY COMPACTION TEST

(ASTM D 698 METHOD B)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO

DESCRIPTION: Phase IV

PROJECT NO.: 601341 TASK NO.: 04.1

MATERIAL TYPE: brown till, no rocks

MATERIAL SOURCE: New Sed basin excavation

DATE: 18 day Dec month 2002 year

SAMPLE NO.: IM-CF02-12

THIS METHOD WILL BE USED IF THE MATERIAL RETAINED ON THE NO. 3/4-in. (19-mm) SIEVE IS LESS THAN 30%, IF THE MATERIAL RETAINED ON THE NO. 4 (4.75-mm) SIEVE IS GREATER THAN 20%, AND IF THE MATERIAL RETAINED ON THE NO. 3/8-in. (9.5-mm) SIEVE IS LESS THAN 20%.
ALL MATERIAL RETAINED ON THE NO. 3/8-in. (9.5-mm) SIEVE IS DISCARDED.
USE OVERSIZE CORRECTION IF MORE THAN 5% IS DISCARDED ACCORDING TO ASTM D 4718.
USE A 4-in. DIAMETER MOLD / 5.5-lb RAMMER / 12-in. DROP / 3 LAYERS / 25 BLOWS PER LAYER.

COMPACTION OF SOIL

			6% 13.56	8% 13.75	10% 13.67	4% 13.34	QA ID: KS
	WATER ADDED	(ml)	150mL	200mL	250mL	100mL	
A	WT. OF SOIL & MOLD	(grams)	6150.8	6237.0	6200.7	6051.0	
B	WT. OF MOLD	(grams)	4272.2	4272.2	4272.2	4272.2	
C	WT. OF SOIL = A − B	(grams)	1878.6	1964.8	1928.5	1778.8	
D	WET UNIT WT.(1) = C X 0.066	(pcf)	124.0	129.7	127.3	117.4	
E	DRY UNIT WT. = D / [1 + (K/100)]	(pcf)	107.6	110.4	105.7	103.4	

NOTE: IF CALIBRATED MOLD OF 1/30 FT^3 IS USED, THE WET DENSITY IS CALCULATED FROM THE WEIGHT OF SOIL, THE VOLUME OF THE MOLD AND THE CONVERSION FROM GRAMS TO POUNDS (I.E., CONVERSION FACTOR = (30 / 453.6) = 0.066). THE MOLD MUST BE CALIBRATED TO VERIFY A CAPACITY OF 1/30 ± 0.0005 FT^3 ON INTERVALS NOT TO EXCEED 1000 TIMES THAT THE MOLD IS FILLED.

MOISTURE CONTENT – ASTM D 2216

							QA ID: KS
	TARE NO.		J	K2	G2	XX	
F	WT. OF TARE	(grams)	8.5	8.3	8.7	8.6	
G	WT. OF WET SOIL & TARE	(grams)	351.9	359.1	379.4	362.1	
H	WT. OF DRY SOIL & TARE	(grams)	306.6	306.9	316.7	320.1	
I	WT. OF WATER = G − H	(grams)	45.3	52.2	62.7	42.0	
J	WT. DRY SOIL = H − F	(grams)	298.1	298.6	308.0	311.5	
K	MOISTURE CONTENT = (I/J) X 100	(%)	15.2	17.5	20.4	13.5	

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SHEET NO. 1 OF 2

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FLUOR FERNALD

4940

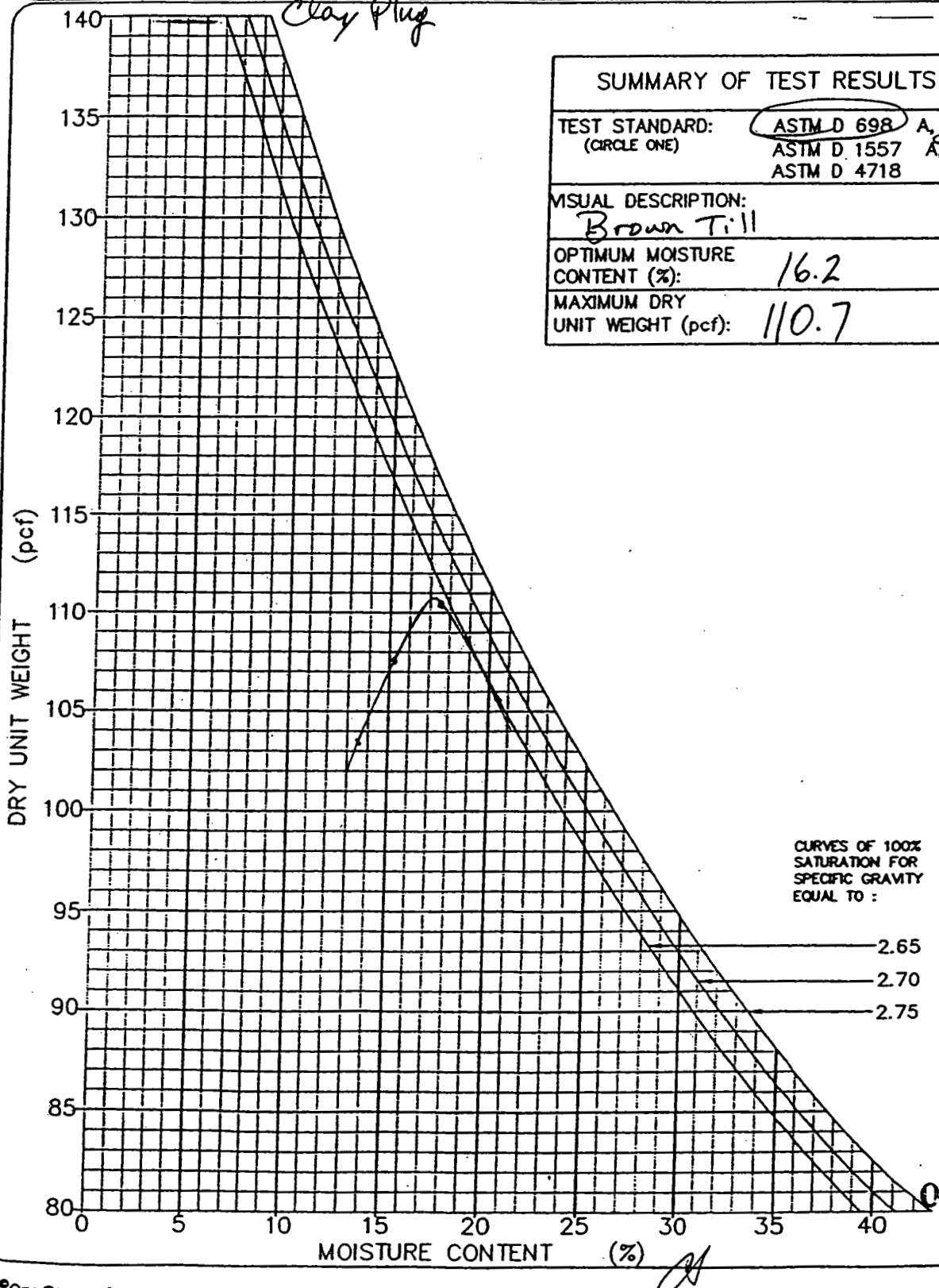
MOISTURE-DENSITY RELATIONSHIP

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO PROJECT NO.: GQ1341 TASK NO.: 04.1

DESCRIPTION: Phase IV DATE: 19 day Dec month 2002 year

MATERIAL TYPE: ~~brown till~~ Clay Plug MATERIAL SOURCE: 3rd basin excavations SAMPLE NO.: ~~DM~~ CF02-52



SUMMARY OF TEST RESULTS		QA ID
TEST STANDARD: (CIRCLE ONE)	ASTM D 698 A, B, C ASTM D 1557 A, B, C ASTM D 4718	CL
VISUAL DESCRIPTION:	Brown Till	CL
OPTIMUM MOISTURE CONTENT (%):	16.2	CL
MAXIMUM DRY UNIT WEIGHT (pcf):	110.7	CL

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GEOSYNTEC CONSULTANTS

FLUOR FERNALD

FIELD LABORATORY COMPACTION TEST

(ASTM D 698 METHOD B)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO

DESCRIPTION: Phase IV

PROJECT NO.: 6Q134 I TASK NO.: Ø4.1

MATERIAL TYPE: Gray + brown ~~clay~~ Till/Clay Plug MATERIAL SOURCE: borrow area

DATE: 18 day Dec month 2ØØ2 year

SAMPLE NO.: IM-CFØ2-13

THIS METHOD WILL BE USED IF THE MATERIAL RETAINED ON THE NO. 3/4-in. (19-mm) SIEVE IS LESS THAN 30%, IF THE MATERIAL RETAINED ON THE NO. 4 (4.75-mm) SIEVE IS GREATER THAN 20%, AND IF THE MATERIAL RETAINED ON THE NO. 3/8-in. (9.5-mm) SIEVE IS LESS THAN 20%.
ALL MATERIAL RETAINED ON THE NO. 3/8-in. (9.5-mm) SIEVE IS DISCARDED.
USE OVERSIZE CORRECTION IF MORE THAN 5% IS DISCARDED ACCORDING TO ASTM D 4718.
USE A 4-in. DIAMETER MOLD / 5.5-lb RAMMER / 12-in. DROP / 3 LAYERS / 25 BLOWS PER LAYER.

COMPACTION OF SOIL

QA ID: KS

			4% 13.44	6% 13.72	8% 13.89	1Ø% 14.02	12% 13.92
	WATER ADDED	(ml)	1ØØ mL	15Ø mL	2ØØ mL	25Ø mL	3ØØ mL
A	WT. OF SOIL & MOLD	(grams)	6Ø96.4	6223.4	63Ø5.5	6359.5	6314.1
B	WT. OF MOLD	(grams)	4272.2	4272.2	4272.2	4272.2	4272.2
C	WT. OF SOIL = A − B	(grams)	1824.2	1951.2	2Ø28.3	2Ø87.3	2Ø41.9
D	WET UNIT WT.(1) = C X 0.066	(pcf)	12Ø.4	128.8	133.9	137.8	134.8
E	DRY UNIT WT. = D / [1 + (K/100)]	(pcf)	112.9	118.4	12Ø.5	121.8	117.4

NOTE: IF CALIBRATED MOLD OF 1/30 FT^3 IS USED, THE WET DENSITY IS CALCULATED FROM THE WEIGHT OF SOIL, THE VOLUME OF THE MOLD AND THE CONVERSION FROM GRAMS TO POUNDS (I.E., CONVERSION FACTOR = (30 / 453.6) = 0.066). THE MOLD MUST BE CALIBRATED TO VERIFY A CAPACITY OF 1/30 ± 0.0005 FT^3 ON INTERVALS NOT TO EXCEED 1000 TIMES THAT THE MOLD IS FILLED.

MOISTURE CONTENT – ASTM D 2216

QA ID: KS

	TARE NO.		F	K	E2	B2	J
F	WT. OF TARE	(grams)	8.6	8.6	8.6	8.7	8.5
G	WT. OF WET SOIL & TARE	(grams)	345.8	374.1	379.9	38Ø.3	357.9
H	WT. OF DRY SOIL & TARE	(grams)	325.Ø	345.Ø	342.9	337.3	312.8
I	WT. OF WATER = G − H	(grams)	2Ø.8	29.1	37.Ø	43.Ø	45.1
J	WT. DRY SOIL = H − F	(grams)	316.4	336.4	334.3	328.6	3Ø4.3
K	MOISTURE CONTENT = (I/J) X 100	(%)	6.6	8.8	11.1	13.1	14.8

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SHEET NO. 1 OF 2

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FLUOR FERNALD

-4940

MOISTURE-DENSITY RELATIONSHIP

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO PROJECT NO.: 6Q1341 TASK NO.: Φ4.1

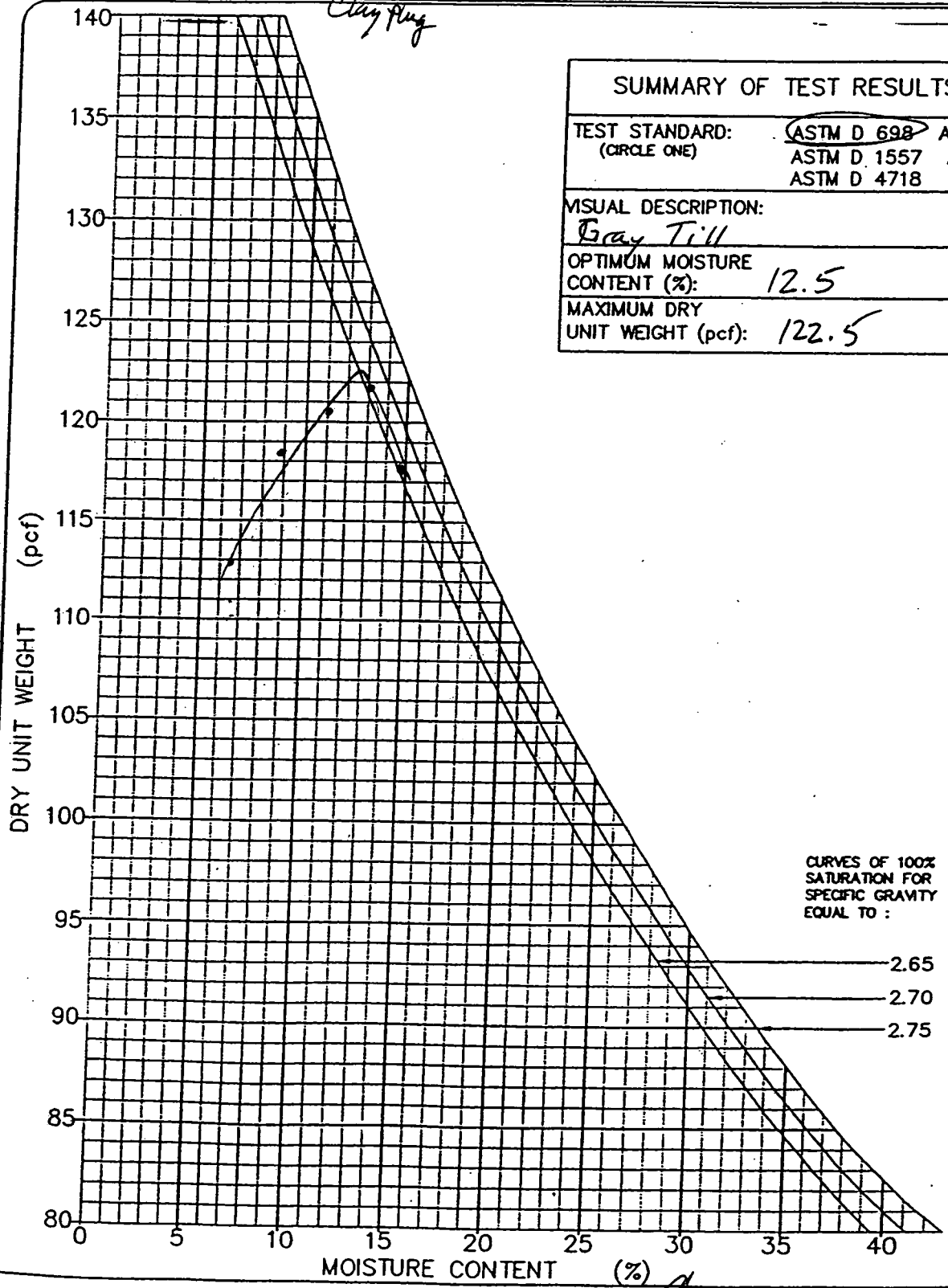
DESCRIPTION: Phase IV DATE: 19 day Dec month 2002 year

MATERIAL TYPE: Gray/brown fill MATERIAL SOURCE: borrow area SAMPLE NO.: ~~BM-~~

Clay Plug

CF02-13

SUMMARY OF TEST RESULTS		QA ID
TEST STANDARD: (CIRCLE ONE)	ASTM D 698 A, B, C ASTM D 1557 A, B, C ASTM D 4718	CA
VISUAL DESCRIPTION:	Gray Till	CA
OPTIMUM MOISTURE CONTENT (%):	12.5	CA
MAXIMUM DRY UNIT WEIGHT (pcf):	122.5	CA



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Clay Liner Material

Pre-conformance Testing Results

Test Pit	Northing	Easting	Existing Elevation (feet)	Prop. Excav. Grade (feet)	Actual Excav. Depth (feet)	Sample No.	Sample Depth	Visual Description	Moisture Content (%)	Atterbergs LL/PL/PI	% Passing # 200 sieve	% Clay Content	Soil Classification	Notes
PCP-1	477280.4	1350805.7	585.5	577	8	Grab-D	8	Gray Silty Sand (SM)	10.7	n/a	n/a	n/a		
PCP-2	477261.5	1350654.1	584.3	577	7	Bag-A	0.5	Gray CL w/sand	11	26/15/11	67.3	n/a	Sandy Lean Clay (CL)	
PCP-3	477279.6	1350515.3	583.9	577	6.5	Grab-B	2	Gray CL w/sand	13.2	n/a	n/a	n/a		
PCP-3	477279.6	1350515.3	583.9	577	6.5	Grab-C	6.5	Gray Silty Sand (SM)	13.6	n/a	n/a	n/a		
PCP-4	477441.2	1350621	584.3	576.5	7.5	Grab B	2	Gray CL w/sand	12.5	n/a	n/a	n/a		
PCP-5	477691.2	1350698.4	583.5	576	7.5	Grab-D	6	Gray CL w/sand	12.4	n/a	n/a	n/a		
PCP-6	477683.2	1350556.6	582.4	576	6.5	Grab-C	4	Gray CL w/sand	12.6	n/a	n/a	n/a		
PCP-6	477683.2	1350556.6	582.4	576	6.5	Bag-D	6	Gray CL w/sand	12.1	26/11/15	67.6	n/a	Sandy Lean Clay (CL)	
PCP-7	477641	1350444	580.7	576	5	Bag-C	4.5	Gray CL w/sand	12.5	27/15/12	66.6	n/a	Sandy Lean Clay (CL)	
PCP-11	477508.6	1350742.4	585.4	576.5	8.5	Grab-D	6	Gray CL w/sand	14.3	n/a	64.3	n/a		
PCP-26	478479.34	1350820.06	588.5	575.5	13	G	14	Gray Till	13.0	–	66.1	–	–	1
PCP-26	478479.34	1350820.06	588.5	575.5	13	H	16	Gray Till	12.7	–	–	–	–	1
PCP-26	478479.34	1350820.06	588.5	575.5	13	I	18	Gray Till	12.1	24/14/10	59.4	18.0	Sandy Lean Clay (CL)	1
PCP-27	478540.29	1350903.02	592	576	16	F	12	Gray Till	13.2	–	66.7	–	–	1
PCP-27	478540.29	1350903.02	592	576	16	G	14	Gray Till	12.6	–	–	–	–	1
PCP-27	478540.29	1350903.02	592	576	16	H	16	Gray Till	13.8	26/14/12	61.6	19.0	Sandy Lean Clay (CL)	1
PCP-29	478407.01	1350902.48	590	575.5	14.5	G	14	Gray Till	14.4	–	65.2	–	–	1
PCP-29	478407.01	1350902.48	590	575.5	14.5	H	16	Gray Till	15.3	–	–	–	–	1
PCP-29	478407.01	1350902.48	590	575.5	14.5	I	18	Gray Till	15.0	28/16/12	56.4	19.5	Sandy Lean Clay w/gravel (CL)	1
PCP-31	478712.02	1351307.90	588	576.5	11.5	E	10	Gray Till	11.8	–	–	–	–	1
PCP-31	478712.02	1351307.90	588	576.5	11.5	F	12	Gray Till	9.3	20/12/8	29.9	–	Clayey Sand w/gravel (SC)	1
PCP-32	478684.43	1351451.03	589	577	12	G	14	Gray Till	12.0	25/14/11	61.1	20.0	Sandy Lean Clay (CL)	1
PCP-32	478684.43	1351451.03	589	577	12	H	16	Gray Till	12.3	–	–	–	–	1
PCP-33	478519.27	1351391.38	592	577	15	G	14	Gray Till	10.7	–	57.3	–	–	1
PCP-33	478519.27	1351391.38	592	577	15	H	16	Gray Till	12.4	–	–	–	–	1
PCP-33	478519.27	1351391.38	592	577	15	I	18	Gray Till	11.9	25/15/10	56.5	–	Sandy Lean Clay w/gravel (CL)	1
PCP-34	478546.00	1351263.86	591.5	576.5	15	G	14	Gray Till	11.8	–	–	–	–	1
PCP-34	478546.00	1351263.86	591.5	576.5	15	H	16	Gray Till	12.3	25/14/11	59.5		Sandy Lean Clay (CL)	1
PCP-34	478546.00	1351263.86	591.5	576.5	15	I	18	Gray Till	12.7	–	–		–	1
PCP-35	478540.71	1351099.25	590.5	576	14.5	G	14	Gray Till	13.0	29/15/14	60.5	–	Sandy Lean Clay w/gravel (CL)	1
PCP-35	478540.71	1351099.25	590.5	576	14.5	H	16	Gray Till	12.8	–	–	–	–	1
PCP-35	478540.71	1351099.25	590.5	576	14.5	I	18	Gray Till	12.1	26/14/12	60.2	20.5	Sandy Lean Clay (CL)	1

Test Pit	Northing	Easting	Existing Elevation (feet)	Prop. Excav. Grade (feet)	Actual Excav. Depth (feet)	Sample No.	Sample Depth	Visual Description	Moisture Content (%)	Atterbergs LL/PL/PI	% Passing # 200 sieve	% Clay Content	Soil Classification	Notes
PCP-36	478406.13	1351057.09	593	576	17	G	14	Gray Till	13.1	–	–	–	–	1
PCP-36	478406.13	1351057.09	593	576	17	H	16	Gray Till	13.9	29/15/14	64.4	–	Sandy Lean Clay (CL)	1
PCP-36	478406.13	1351057.09	593	576	17	I	18	Gray Till	12.9	–	–	–	–	1
PCP-37	478406.82	1351227.33	595	576	19	G	14	Gray Till	13.5	–	77.0	–	–	1
PCP-37	478406.82	1351227.33	595	576	19	H	16	Gray Till	11.7	–	–	–	–	1
PCP-37	478406.82	1351227.33	595	576	19	I	18	Gray Till	14.1	26/14/12	61.3	–	Sandy Lean Clay w/gravel (CL)	1
PCP-38	478349.70	1351330.95	596	577	19	F	12	Gray Till	12.2	–	64.5	–	–	1
PCP-38	478349.70	1351330.95	596	577	19	G	14	Gray Till	10.6	21/14/7	55.3	15.0	Sandy Silty Clay w/gravel (CL-ML	1
PCP-38	478349.70	1351330.95	596	577	19	H	16	Gray Till	12.3	–	–	–	–	1
PCP-38	478349.70	1351330.95	596	577	19	I	18	Gray Till	12.8	–	64.8	–	–	1
PCP-39	478192.78	1351280.79	593	577	16	G	14	Gray Till	12.9	27/13/14	62.3	22.0	Sandy Lean Clay (CL)	1
PCP-39	478192.78	1351280.79	593	577	16	H	16	Gray Till	12.7	–	–	–	–	1
PCP-39	478192.78	1351280.79	593	577	16	I	18	Gray Till	13.5	–	62.2	–	–	1
PCP-40	478253.02	1351181.64	592	576.5	15.5	G	14	Gray Till	11.9	–	–	–	–	1
PCP-40	478253.02	1351181.64	592	576.5	15.5	H	16	Gray Till	12.6	–	55.9	–	–	1
PCP-40	478253.02	1351181.64	592	576.5	15.5	I	18	Gray Till	14.5	–	–	–	–	1
PCP-41	478252.76	1351017.49	589.5	576	13.5	F	12	Gray Till	11.8	–	–	–	–	1
PCP-41	478252.76	1351017.49	589.5	576	13.5	G	14	Gray Till	12.6	27/14/13	63.3	–	Sandy Lean Clay (CL)	1
PCP-41	478252.76	1351017.49	589.5	576	13.5	H	16	Gray Till	15.8	–	–	–	–	1
PCP-41	478252.76	1351017.49	589.5	576	13.5	I	18	Gray Till	10.8	20/13/7	45.2	13.0	Silty Clayey Sand (SC-SM)	1
PCP-42	478039.54	1351232.23	591	577	14	H	16	Gray Till	11.9	–	–	–	–	1
PCP-42	478039.54	1351232.23	591	577	14	I	18	Gray Till	13.2	24/14/10	61.6	–	Sandy Lean Clay (CL)	1
PCP-43	478082.67	1351134.41	589.5	576.5	13	G	14	Gray Till	13.5	–	–	–	–	1
PCP-43	478082.67	1351134.41	589.5	576.5	13	H	16	Gray Till	13.7	28/15/13	53.1	–	Sandy Lean Clay w/gravel (CL)	1
PCP-43	478082.67	1351134.41	589.5	576.5	13	I	18	Gray Till	13.6	–	–	–	–	1
PCP-44	478116.96	1350982.27	589	576	13	G	14	Gray Till	13.5	26/14/12	62.1	24.0	Sandy Lean Clay (CL)	1
PCP-44	478116.96	1350982.27	589	576	13	H	16	Gray Till	12.9	–	–	–	–	1
PCP-44	478116.96	1350982.27	589	576	13	I	18	Gray Till	13.7	26/14/12	63.1	–	Sandy Lean Clay (CL)	1
PCP-45	478188.77	1350885.69	586	575.5	10.5	E	10	Gray Till	13.5	30/16/14	61.1	22.0	Sandy Lean Clay w/gravel (CL)	1
PCP-45	478188.77	1350885.69	586	575.5	10.5	F	12	Gray Till	12.9	–	67.3	–	–	1
PCP-45	478188.77	1350885.69	586	575.5	10.5	G	14	Gray Till	12.6	–	–	–	–	1
PCP-46	478092.94	1350853.71	586	575.5	10.5	F	12	Gray Till	14.9	–	–	–	–	1
PCP-46	478092.94	1350853.71	586	575.5	10.5	G	14	Gray Till	12.7	27/14/13	61.4	–	Sandy Lean Clay (CL)	1

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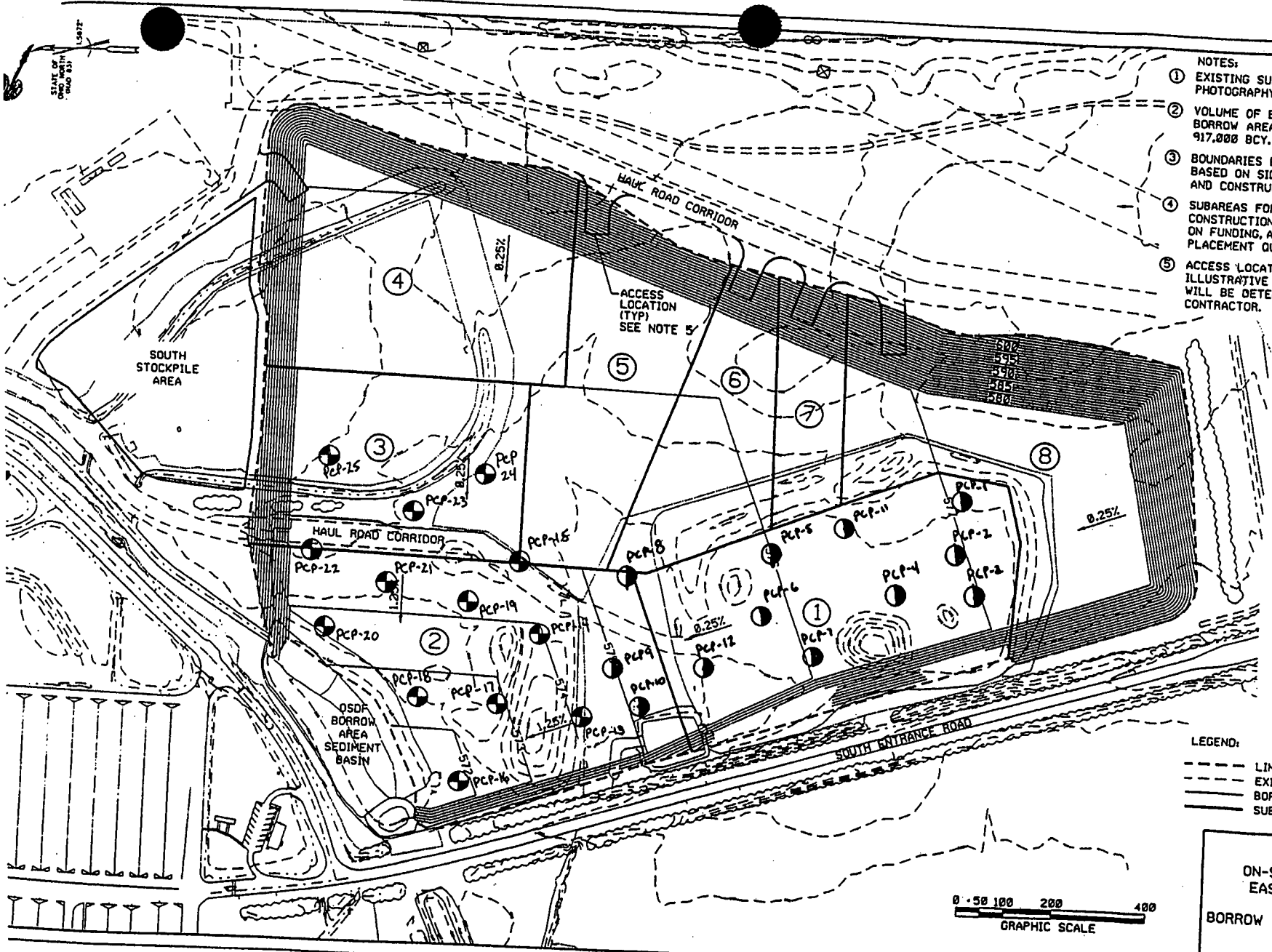
Test Pit	Northing	Easting	Existing Elevation (feet)	Prop. Excav. Grade (feet)	Actual Excav. Depth (feet)	Sample No.	Sample Depth	Visual Description	Moisture Content (%)	Atterbergs LL/PL/PI	% Passing # 200 sieve	% Clay Content	Soil Classification	Notes
PCP-47	478164.74	1350748.03	585	575	10	F	12	Gray Till	13.5	–	–	–	–	1
PCP-47	478164.74	1350748.03	585	575	10	G	14	Gray Till	13.4	26/15/11	63.3	20.5	Sandy Lean Clay (CL)	1
PCP-48	477116.26	1350960.95	597.5	577.5	20	F	12	Gray Till	13.3	–	–	–	–	1
PCP-48	477116.26	1350960.95	597.5	577.5	20	G	14	Gray Till	12.7	27/14/13	57.0	21.0	Sandy Lean Clay w/gravel (CL)	1
PCP-48	477116.26	1350960.95	597.5	577.5	20	H	16	Gray Till	13.2	–	–	–	–	1
PCP-49	476973.57	1350902.66	599	578	21	F	12	Gray Till (SM-SC)	16.3	–	–	–	–	1
PCP-49	476973.57	1350902.66	599	578	21	G	14	Gray Till	14.4	–	–	–	–	1
PCP-50	477102.54	1350826.24	594.5	577.5	17	G	14	Gray Till	12.7	–	–	–	–	1
PCP-50	477102.54	1350826.24	594.5	577.5	17	H	16	Gray Till	13.2	–	65.1	–	–	1
PCP-51	476945.17	1350757.73	596	578	18	G	14	Gray Till	13.1	–	–	–	–	1
PCP-51	476945.17	1350757.73	596	578	18	H	16	Gray Till	13.4	–	61.4	–	–	1
PCP-52	476915.69	1350624.27	595	578	17	E	10	Gray Till (ML)	14.5	–	–	–	–	1
PCP-52	476915.69	1350624.27	595	578	17	F	12	Gray Till (SM-SC)	13.2	18/13/5	59.0	15.0	Sandy Silty Clay (CL-ML)	1
PCP-53	477034.71	1350668.47	596	578	18	G	14	Gray Till	13.3	–	–	–	–	1
PCP-53	477034.71	1350668.47	596	578	18	H	16	Gray Till	13.9	–	68.0	–	–	1
PCP-54	477115.53	1350562.92	595	577.5	17.5	G	14	Gray Till	13.5	–	–	–	–	1
PCP-54	477115.53	1350562.92	595	577.5	17.5	H	16	Gray Till	14.1	28/15/13	67.8	–	Sandy Lean Clay (CL)	1
PCP-54	477115.53	1350562.92	595	577.5	17.5	I	18	Gray Till	13.3	–	–	–	–	1
PCP-55	478478.38	1350480.53	572	569	3	A	2	Gray Till	13.0	27/15/12	64.2	23.0	Sandy Lean Clay (CL)	1,2
PCP-56	478301.32	1350447.91	574	569	5	C	2	Gray Till	14.8	24/14/10	79.4	23.0	Lean Clay w/sand (CL)	1,2
PCP-57	478134.40	1350361.03	570.5	568.5	2	A	4	Gray Till	11.8	26/14/12	61.1	22.0	Sandy Lean Clay (CL)	1,2
PCP-58	478033.11	1351071.96	590	576	14	F	12	Gray Till	12.4	–	–	–	–	1
PCP-58	478033.11	1351071.96	590	576	14	G	14	Gray Till	13.6	–	40.0	–	–	1
PCP-59	477789.16	1351120.31	598.5	576.5	22	E	12	Gray Till	13.7	28/15/13	60.9	–	Sandy Lean Clay w/gravel (CL)	1
PCP-59	477789.16	1351120.31	598.5	576.5	22	F	14	Gray Till	13.2	–	–	–	–	1
PCP-59	477789.16	1351120.31	598.5	576.5	22	G	16	Gray Till	13.7	–	58.9	–	–	1
PCP-60	477678.09	1351058.08	598.5	576.5	22	F	14	Gray Till	13.9	27/15/12	66.8	25.0	Sandy Lean Clay (CL)	1
PCP-60	477678.09	1351058.08	598.5	576.5	22	G	16	Gray Till	13.8	–	–	–	–	1
PCP-62	477732.34	1350880.04	589	576	13	G	14	Gray Till	12.9	–	–	–	–	1
PCP-62	477732.34	1350880.04	589	576	13	H	16	Gray Till	12.6	24/14/10	62.2	20.5	Sandy Lean Clay (CL)	1
PCP-63	477841.01	1350848.25	587.5	576	11.5	G	14	Gray Till	11.8	–	–	–	–	1
PCP-63	477841.01	1350848.25	587.5	576	11.5	H	16	Gray Till	13.2	26/15/11	65.4	24.0	Sandy Lean Clay (CL)	1
PCP-64	477994.81	1350842.96	587	575.5	11.5	E	10	Gray Till	12.2	–	–	–	–	1

Test Pit	Northing	Easting	Existing Elevation (feet)	Prop. Excav. Grade (feet)	Actual Excav. Depth (feet)	Sample No.	Sample Depth	Visual Description	Moisture Content (%)	Atterbergs LL/PL/PI	% Passing # 200 sieve	% Clay Content	Soil Classification	Notes
PCP-64	477994.81	1350842.96	587	575.5	11.5	F	12	Gray Till	13.0	27/15/12	61.5	20.5	Sandy Lean Clay (CL)	1
PCP-65	477524.84	1350979.58	591	577	14	F	12	Gray Till	14.7	29/16/13	67.5	–	Sandy Lean Clay (CL)	1
PCP-65	477524.84	1350979.58	591	577	14	G	14	Gray Till	14.7	27/15/12	62.7	–	Sandy Lean Clay (CL)	1

Note 1: Archived samples available
Note 2: Bulk samples also tested for standard and modified compaction (ASTM D-698 and D-1557)



NOTES:

1. EXISTING SURFACE CONTOURS FROM AERIAL PHOTOGRAPHY FLOWN JANUARY, 2000.
2. VOLUME OF BORROW MATERIAL WITHIN LIMIT OF BORROW AREA EXCAVATION IS APPROXIMATELY 917,000 BCY.
3. BOUNDARIES BETWEEN SUBAREAS WILL VARY BASED ON SIDE SLOPES, ACTUAL FIELD CONDITIONS, AND CONSTRUCTION SCHEDULE.
4. SUBAREAS FOR EXCAVATION BASED ON PRELIMINARY CONSTRUCTION SCHEDULE AND MAY CHANGE BASED ON FUNDING, AND ACTUAL IMPACTED MATERIAL PLACEMENT QUANTITIES.
5. ACCESS LOCATIONS ARE SHOWN FOR GENERAL ILLUSTRATIVE PURPOSES ONLY. ACTUAL LOCATIONS WILL BE DETERMINED IN THE FIELD BY THE CONTRACTOR.

SUBAREA	APPROX. BORROW MATERIAL VOLUME (BCY)
1	89,000
2	130,000
3	120,000
4	165,000
5	105,000
6	75,000
7	45,000
8	188,000
TOTAL	917,000

TEST PIT LOCATIONS SAMPLED 22 June 2000

PROPOSED TEST PIT LOCATIONS AS OF 28 June 2001

LEGEND:

- LIMIT OF BORROW AREA
- EXISTING SURFACE CONTOURS
- BORROW AREA EXCAVATION CONTOURS
- SUBAREA BOUNDARY

FIGURE A-5
ON-SITE DISPOSAL FACILITY
EAST FIELD BORROW AREA

BORROW AREA EXCAVATION SUBAREAS

DATE: 03/22/2000

REV: 0

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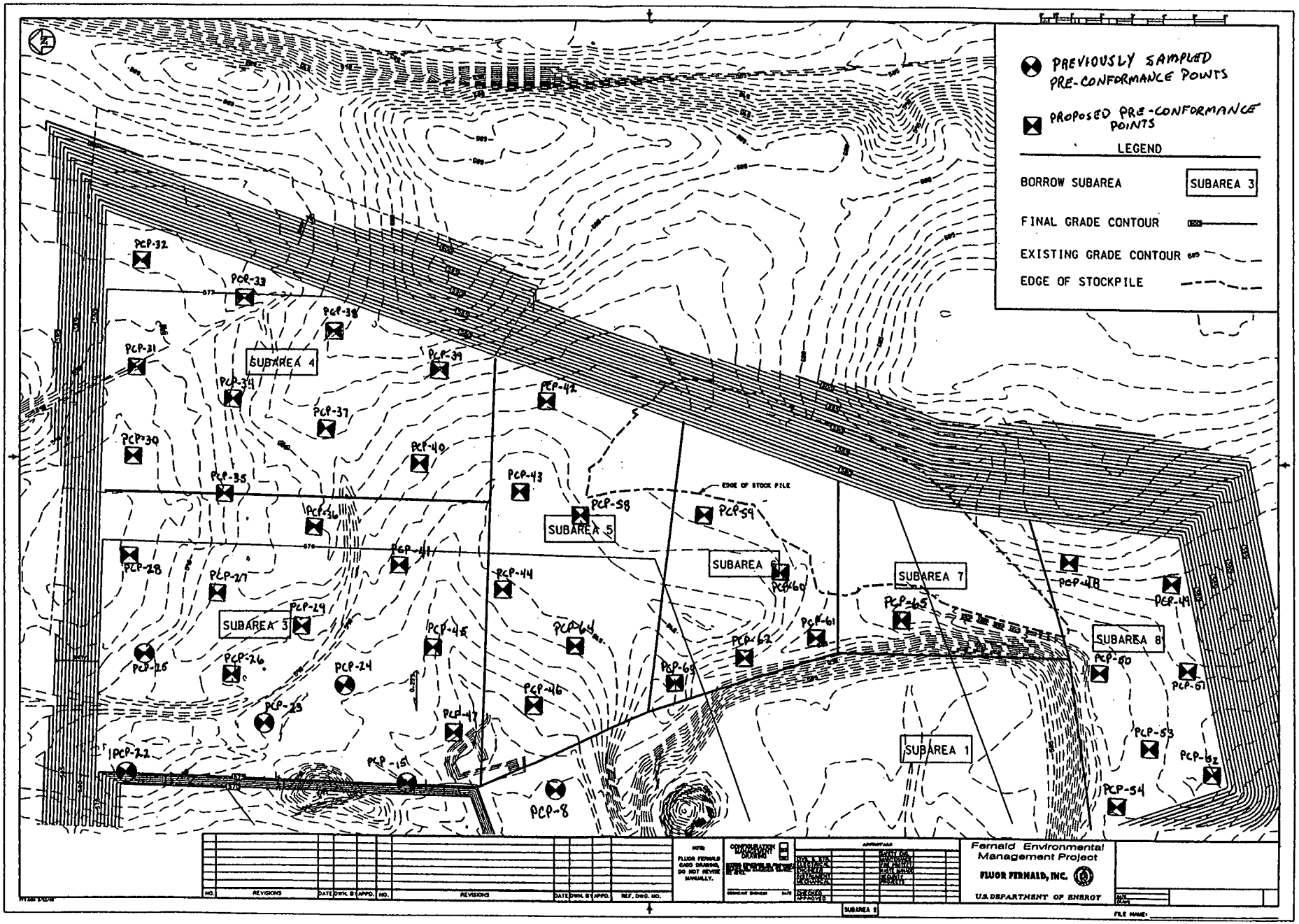
PREVIOUSLY SAMPLED PRE-CONFORMANCE POINTS
PROPOSED PRE-CONFORMANCE POINTS
LEGEND
BORROW SUBAREA
SUBAREA 3
FINAL GRADE CONTOUR
EXISTING GRADE CONTOUR
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EDGE OF STOCK PILE
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SUBAREA 3
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PCP-23
PCP-46
PCP-47
PCP-53
PCP-22
PCP-15
PCP-8
PCP-62
PCP-54
FLUOR FERNALD CADD DRAWING. DO NOT REVISE MANUALLY.
Fernald Environmental Management Project
FLUOR FERNALD, INC.
U.S. DEPARTMENT OF ENERGY
SUBAREA 8

000057

4940

Test Pit	Northing	Easting	Existing Elevation (feet)	Prop. Excav. Depth (feet)	Actual Excav. Depth (feet)	Sample No.	Sample Depth	Visual Description	Moisture Content (%)	Atterbergs LL/PL/PI	% Passing # 200 Sieve	% Clay Content	Soil Classification	Notes
PCP-66				12	2.5	A	2.5	Brown Silty Clay (CL)	17.6	43/21/22	76.3	—	CL-Lean Clay w/sand	
PCP-66				12	4.0	B	4.0	Brown Silty Clay (CL)	19.9	43/22/21	87.4	—	CL-Lean Clay	
PCP-66				12	6.5	C	6.5	Brown Silty Clay (CL)	20.8	45/22/23	95.2	—	CL-Lean Clay	
PCP-66				12	8.0	D	8.0	Brn-wht Silty Clay (CL)	19.9	31/16/15	72.2	—	CL-Lean Clay w/sand	Brown/white
PCP-66				12	10.0	E	10.0	Brn-wht Silty Clay (CL)	17.6	23/15/8	61.4	21.0	CL-Sandy Lean Clay	Brown/white
PCP-66				12	12.0	F	12.0	Brown Silty Clay (CL)	20.4	30/18/12	67.1	27.0	CL-Sandy Lean Clay	
PCP-67				12	4.5	A	4.5	Brown Silty Clay (CL)	20.7	49/24/25	84.7	—	CL-Lean Clay w/sand	
PCP-67				12	6.7	B	6.7	Brown Silty Clay (CL)	21.2	40/18/22	83.8	—	CL-Lean Clay w/sand	
PCP-67				12	8.3	C	8.3	Brwn Clayey Sand (SC)	23.1	31/11/20	54.6	26.0	CL-Sandy Lean Clay	
PCP-67				12	10.2	D	10.2	Brown Silty Clay (CL)	20.1	29/11/18	55.4	—	CL-Sandy Lean Clay	
PCP-67				12	11.9	E	11.9	Trans Silty Clay (CL)	22.4	31/17/14	59.7	—	CL-Sandy Lean Clay	
PCP-67				12	13.6	F	13.6	Trans Silty Clay (CL)	12.5	29/16/13	63.2	27.0	CL-Sandy Lean Clay	
PCP-68				12	2.0	A	2.0	Brown Silty Clay (CL)	24.0	50/24/26	89.5	—	CH-Fat Clay	
PCP-68				12	4.5	B	4.5	Brwn Clayey Sand (SC)	18.3	non-plastic	41.5	—	SM-Silty sand	
PCP-68				12	6.2	C	6.2	Brwn Clayey Sand (SC)	21.9	22/16/6	61.5	—	CL-ML-Sandy Silty Clay	
PCP-68				12	7.6	D	7.6	Brown Clayey Silt (ML)	22.7	non-plastic	93.8	—	ML-Silt	
PCP-68				12	10.3	E	10.3	Trans Silty Clay (CL)	23.7	36/20/16	96.7	49.0	CL-Lean Clay	
PCP-68				12	12.3	F	12.3	Trans Silty Clay (CL)	12.9	27/15/12	63.0	25.0	CL-Sandy Lean Clay	
PCP-69				10	3.5	A	3.5	Dk Brn Sandy Clay (CL)	21.8	52/22/30	92.7	42.0	CH-Fat Clay	Some topsoil
PCP-69				10	5.7	B	5.7	Brown Silty Clay (CL)	16.4	33/17/16	78.2	—	CL-Lean Clay w/sand	
PCP-69				10	8.2	C	8.2	Brown Silty Clay (CL)	13.6	non-plastic	91.5	21.0	ML-Silt	
PCP-69				10	10.4	D	10.4	Brown Silty Clay (CL)	19.5	non-plastic	94.2	—	ML-Silt	
PCP-70				12	3.2	A	3.2	Dk Brn Silty Clay (CL)	19.2	33/20/13	91.8	31.0	CL-Lean Clay	Some topsoil
PCP-70				12	5.3	B	5.3	Brown Silty Clay (CL)	21.1	43/20/23	94.3	—	CL-Lean Clay	
PCP-70				12	7.8	C	7.8	Brown Silty Clay (CL)	15.2	31/16/15	76.9	—	CL-Lean Clay w/sand	
PCP-70				12	10.4	D	10.4	Brown Silty Clay (CL)	21.2	24/16/8	70.4	—	CL-Lean Clay w/sand	
PCP-70				12	12.2	E	12.2	Brown Silty Clay (CL)	13.8	18/14/4	54.2	13.0	CL-ML-Sandy Silty Clay	
PCP-70				12	14.4	F	14.4	Brown Silty Clay (CL)	15.2	22/13/9	68.1	—	CL-Sandy Lean Clay	
PCP-71				10	3.1	A	3.1	Dk Brn Sandy Clay (CL)	16.1	29/16/13	60.9	—	CL-Sandy Lean Clay	Some topsoil
PCP-71				10	6.2	B	6.2	Brown Silty Clay (CL)	14.2	31/18/13	70.6	—	CL-Lean Clay w/sand	
PCP-71				10	8.4	C	8.4	Brown Silty Clay (CL)	13.2	25/16/9	59.7	20.0	CL-Sandy Lean Clay	
PCP-71				10	10.0	D	10.0	Brown Silty Clay (CL)	12.7	21/15/6	49.2	13.0	SC-SM-Silty Clayey Sand	

Conformance Testing Results

Moisture Contents

GEOSYNTEC CONSULTANTS

FLUOR FERNALD

4940

LABORATORY DETERMINATION OF MOISTURE CONTENT OF SOIL

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO PROJECT NO. 6-Q1341 TASK NO.: 04.1

DESCRIPTION: Phase III DATE: 09 day Aug month 2001 year

MATERIAL TYPE: Low Permeability Clay

OVEN METHOD (ASTM D 2216): Recommended Mass Of Moist Sample QA ID: CL

100% PASING THE NO. 10 (2-mm) SIEVE	20 grams
100% PASSING THE NO. 4 (4.75-mm) SIEVE	100 grams
100% PASSING THE NO. 3/8-in. (9.5-mm) SIEVE	500 grams
100% PASSING THE NO. 3/4-in. (19-mm) SIEVE LP01-01 LP-0L022	2.5 kilograms

	SAMPLE NO.	①	②	LP01-03	LP01-04	LP01-05
	TARE NO.	21	LL-4	304	306	303
A	WT. OF TARE	8.4	107.11	8.3	8.3	8.3
B	WT. OF WET SOIL & TARE	322.0	618.3	456.0	333.4	296.0
C	WT. OF DRY SOIL & TARE	286.82	560.1	403.4	296.0	264.2
D	WT. OF WATER = B-C	35.18	58.2	52.6	37.4	31.8
E	WT. OF DRY SOIL = C-A	278.42	553.0	395.1	287.7	255.9
	MOISTURE CONTENT = (D/E) X 100	12.6	10.5	13.3	13.0	12.4
	FIELD DENSITY TEST (FDT) NO.	—	—	—	—	—

MICROWAVE METHOD (ASTM D 4643): Recommended Mass Of Moist Sample QA ID: _____

90% PASSING THE NO. 10 (2-mm) SIEVE	100 TO 200 grams
90% PASSING THE NO. 4 (4.75-mm) SIEVE	200 TO 500 grams
90% PASSING THE 3/4-in. (19-mm) SIEVE	500 TO 1000 grams

INITIAL SETTING TO BE AT 3.0 MINUTES, CONTINUE DRYING SAMPLE AT 1.0 MINUTE SETTING UNTIL MOISTURE CONTENT VARIATION BETWEEN SETTINGS IS LESS THAN 0.1%

	SAMPLE NO.					
	TARE NO.					
A	WT. OF TARE					
B	WT. OF WET SOIL & TARE					
C	WT. OF DRY SOIL & TARE					
D	WT. OF WATER = B-C					
E	WT. OF DRY SOIL = C-A					
	MOISTURE CONTENT = (D/E) X 100					
	FIELD DENSITY TEST (FDT) NO.					

000061

GEOSYNTEC CONSULTANTS

FLUOR FERNALD

4940

LABORATORY DETERMINATION OF MOISTURE CONTENT OF SOIL

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO PROJECT NO.: GQ1341 TASK NO.: 04.1

DESCRIPTION: Phase II DATE: ____ day Aug/Sept month 2001 year

MATERIAL TYPE: Low Perm Clay

OVEN METHOD (ASTM D 2216): Recommended Mass Of Moist Sample QA ID: CL/TBY

100% PASING THE NO. 10 (2-mm) SIEVE	20 grams
100% PASSING THE NO. 4 (4.75-mm) SIEVE	100 grams
100% PASSING THE NO. 3/8-in. (9.5-mm) SIEVE	500 grams
100% PASSING THE NO. 3/4-in. (19-mm) SIEVE	2.5 kilograms

	SAMPLE NO.	LPØ1-Ø6	LP-Ø1-Ø7	LP-Ø1-Ø8	LP-Ø1-Ø9	LP-Ø1-11
	TARE NO.	228	304	31	23Ø	3Ø1
A	WT. OF TARE	8.0	8.2	8.3	8.1	8.5
B	WT. OF WET SOIL & TARE	388.7	462.8	392.7	381.9	5Ø3.5
C	WT. OF DRY SOIL & TARE	333.5	397.9	33Ø.3	318.8	427.2
D	WT. OF WATER = B-C	55.2	64.9	62.4	63.1	76.3
E	WT. OF DRY SOIL = C-A	325.5	389.7	322.Ø	31Ø.7	418.7
	MOISTURE CONTENT = (D/E) X 100	17.Ø	16.7	19.4	2Ø.3	18.2
	FIELD DENSITY TEST (FDT) NO.					

MICROWAVE METHOD (ASTM D 4643): Recommended Mass Of Moist Sample QA ID: ____

90% PASSING THE NO. 10 (2-mm) SIEVE	100 TO 200 grams
90% PASSING THE NO. 4 (4.75-mm) SIEVE	200 TO 500 grams
90% PASSING THE 3/4-in. (19-mm) SIEVE	500 TO 1000 grams

INITIAL SETTING TO BE AT 3.0 MINUTES, CONTINUE DRYING SAMPLE AT 1.0 MINUTE SETTING UNTIL MOISTURE CONTENT VARIATION BETWEEN SETTINGS IS LESS THAN 0.1%

	SAMPLE NO.					
	TARE NO.					
A	WT. OF TARE					
B	WT. OF WET SOIL & TARE					
C	WT. OF DRY SOIL & TARE					
D	WT. OF WATER = B-C					
E	WT. OF DRY SOIL = C-A					
	MOISTURE CONTENT = (D/E) X 100					
	FIELD DENSITY TEST (FDT) NO.					

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GEOSYNTEC CONSULTANTS

FLUOR FERNALD

4940

LABORATORY DETERMINATION OF MOISTURE CONTENT OF SOIL

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO PROJECT NO.: GQ134 TASK NO.: 04.1

DESCRIPTION: PHASE III DATE: 06 day SEPT month 2001 year

MATERIAL TYPE: LOW PERM CLAY

OVEN METHOD (ASTM D 2216): Recommended Mass Of Moist Sample QA ID: QTB

100% PASING THE NO. 10 (2-mm) SIEVE	20 grams
100% PASSING THE NO. 4 (4.75-mm) SIEVE	100 grams
100% PASSING THE NO. 3/8-in. (9.5-mm) SIEVE	500 grams
100% PASSING THE NO. 3/4-in. (19-mm) SIEVE	2.5 kilograms

	SAMPLE NO.	LP-01-12	LP-01-13	LP01-14	LP 01-15	LP01-16
	TARE NO.	303	301	216	28	28
A	WT. OF TARE	8.3	8.5	8.5	8.3	8.3
B	WT. OF WET SOIL & TARE	603.3	468.4	326.8	419.7	189.2
C	WT. OF DRY SOIL & TARE	509.4	398.0	273.4	367.6	163.4
D	WT. OF WATER = B-C	93.9	70.4	53.4	52.1	25.8
E	WT. OF DRY SOIL = C-A	501.1	398.5	264.9	359.3	155.1
	MOISTURE CONTENT = (D/E) X 100	18.7	17.7	20.2	14.5	16.6
	FIELD DENSITY TEST (FDT) NO.					

MICROWAVE METHOD (ASTM D 4643): Recommended Mass Of Moist Sample QA ID: _____

90% PASSING THE NO. 10 (2-mm) SIEVE	100 TO 200 grams
90% PASSING THE NO. 4 (4.75-mm) SIEVE	200 TO 500 grams
90% PASSING THE 3/4-in. (19-mm) SIEVE	500 TO 1000 grams

INITIAL SETTING TO BE AT 3.0 MINUTES, CONTINUE DRYING SAMPLE AT 1.0 MINUTE SETTING UNTIL MOISTURE CONTENT VARIATION BETWEEN SETTINGS IS LESS THAN 0.1%

	SAMPLE NO.					
	TARE NO.					
A	WT. OF TARE					
B	WT. OF WET SOIL & TARE					
C	WT. OF DRY SOIL & TARE					
D	WT. OF WATER = B-C					
E	WT. OF DRY SOIL = C-A					
	MOISTURE CONTENT = (D/E) X 100					
	FIELD DENSITY TEST (FDT) NO.					

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GEOSYNTEC CONSULTANTS

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-- 4940

LABORATORY DETERMINATION OF MOISTURE CONTENT OF SOIL

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO PROJECT NO.: GQ1341 TASK NO.: 04.1

DESCRIPTION: PHASE III DATE: 17 day Sept month 2001 year

MATERIAL TYPE: Low Perm Clay

OVEN METHOD (ASTM D 2216): Recommended Mass Of Moist Sample QA ID: TBV/DLB

100% PASING THE NO. 10 (2-mm) SIEVE	20 grams
100% PASSING THE NO. 4 (4.75-mm) SIEVE	100 grams
100% PASSING THE NO. 3/8-in. (9.5-mm) SIEVE	500 grams
100% PASSING THE NO. 3/4-in. (19-mm) SIEVE	2.5 kilograms

	SAMPLE NO.	LP-01-17	LP-01-19	LP01-20	LP-01-22	LP-01-23
	TARE NO.	230	225	J-15	204	J-40
A	WT. OF TARE	8.1	8.3	14.6	8.1	15.0
B	WT. OF WET SOIL & TARE	333.7	247.5	594.4	390.9	528.8
C	WT. OF DRY SOIL & TARE	285.8	207.3	513.9	336.6	449.0
D	WT. OF WATER = B-C	47.9	40.2	80.5	54.3	79.8
E	WT. OF DRY SOIL = C-A	277.7	199.0	499.3	328.5	434.0
F	MOISTURE CONTENT = (D/E) X 100	17.2	20.2	16.1	16.5	18.4
	FIELD DENSITY TEST (FDT) NO.					

MICROWAVE METHOD (ASTM D 4643): Recommended Mass Of Moist Sample QA ID: _____

90% PASSING THE NO. 10 (2-mm) SIEVE	100 TO 200 grams
90% PASSING THE NO. 4 (4.75-mm) SIEVE	200 TO 500 grams
90% PASSING THE 3/4-in. (19-mm) SIEVE	500 TO 1000 grams

INITIAL SETTING TO BE AT 3.0 MINUTES, CONTINUE DRYING SAMPLE AT 1.0 MINUTE SETTING UNTIL MOISTURE CONTENT VARIATION BETWEEN SETTINGS IS LESS THAN 0.1%

	SAMPLE NO.					
	TARE NO.					
A	WT. OF TARE					
B	WT. OF WET SOIL & TARE					
C	WT. OF DRY SOIL & TARE					
D	WT. OF WATER = B-C					
E	WT. OF DRY SOIL = C-A					
	MOISTURE CONTENT = (D/E) X 100					
	FIELD DENSITY TEST (FDT) NO.					

000064

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4940

LABORATORY DETERMINATION OF MOISTURE CONTENT OF SOIL

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO PROJECT NO.: 6Q1341 TASK NO.: 04.1

DESCRIPTION: PHASE III DATE: 27 day SEPT month 2001 year

MATERIAL TYPE: Low Plasm Clay

OVEN METHOD (ASTM D 2216): Recommended Mass Of Moist Sample QA ID: [illegible]

100% PASING THE NO. 10 (2-mm) SIEVE	20 grams
100% PASSING THE NO. 4 (4.75-mm) SIEVE	100 grams
100% PASSING THE NO. 3/8-in. (9.5-mm) SIEVE	500 grams
100% PASSING THE NO. 3/4-in. (19-mm) SIEVE	2.5 kilograms

	SAMPLE NO.	LP-01-24	LP-01-25	LP-01-26	LP-01-27	LP-01-28
	TARE NO.	302	206	215	230	229
A	WT. OF TARE	8.3	8.3	8.3	8.1	8.0
B	WT. OF WET SOIL & TARE	304.3	499.4	485.4	445.0	619.3
C	WT. OF DRY SOIL & TARE	259.9	424.7	414.8	392.4	534.4
D	WT. OF WATER = B-C	44.4	74.7	70.6	52.6	84.9
E	WT. OF DRY SOIL = C-A	251.6	416.4	406.5	384.3	526.4
	MOISTURE CONTENT = (D/E) X 100	17.6	17.9	17.4	13.7	16.1
	FIELD DENSITY TEST (FDT) NO.					

MICROWAVE METHOD (ASTM D 4643): Recommended Mass Of Moist Sample QA ID: _____

90% PASSING THE NO. 10 (2-mm) SIEVE	100 TO 200 grams
90% PASSING THE NO. 4 (4.75-mm) SIEVE	200 TO 500 grams
90% PASSING THE 3/4-in. (19-mm) SIEVE	500 TO 1000 grams

INITIAL SETTING TO BE AT 3.0 MINUTES, CONTINUE DRYING SAMPLE AT 1.0 MINUTE SETTING UNTIL MOISTURE CONTENT VARIATION BETWEEN SETTINGS IS LESS THAN 0.1%

	SAMPLE NO.					
	TARE NO.					
A	WT. OF TARE					
B	WT. OF WET SOIL & TARE					
C	WT. OF DRY SOIL & TARE					
D	WT. OF WATER = B-C					
E	WT. OF DRY SOIL = C-A					
	MOISTURE CONTENT = (D/E) X 100					
	FIELD DENSITY TEST (FDT) NO.					

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4940

LABORATORY DETERMINATION OF MOISTURE CONTENT OF SOIL

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO PROJECT NO.: 6Q134 TASK NO.: 04.1

DESCRIPTION: PHASE III DATE: 02 day OCT month 2001 year

MATERIAL TYPE: LOW PERM CLAY

OVEN METHOD (ASTM D 2216): Recommended Mass Of Moist Sample QA ID: TBC

100% PASING THE NO. 10 (2-mm) SIEVE	20 grams
100% PASSING THE NO. 4 (4.75-mm) SIEVE	100 grams
100% PASSING THE NO. 3/8-in. (9.5-mm) SIEVE	500 grams
100% PASSING THE NO. 3/4-in. (19-mm) SIEVE	2.5 kilograms

	SAMPLE NO.	LP-01-29	LP-01-30	LP-01-31	LP-01-32	LP01-33
	TARE NO.	2	105	302	301	230
A	WT. OF TARE	8.2	8.2	8.2	8.5	8.0
B	WT. OF WET SOIL & TARE	384.8	442.3	581.3	397.5	384.6
C	WT. OF DRY SOIL & TARE	332.6	382.4	507.7	344.7	326.6
D	WT. OF WATER = B-C	52.2	59.9	73.6	52.8	58.0
E	WT. OF DRY SOIL = C-A	324.4	374.2	499.5	336.2	318.6
	MOISTURE CONTENT = (D/E) X 100	16.1	16.0	14.7	15.7	18.2
	FIELD DENSITY TEST (FDT) NO.					

MICROWAVE METHOD (ASTM D 4643): Recommended Mass Of Moist Sample QA ID:

90% PASSING THE NO. 10 (2-mm) SIEVE	100 TO 200 grams
90% PASSING THE NO. 4 (4.75-mm) SIEVE	200 TO 500 grams
90% PASSING THE 3/4-in. (19-mm) SIEVE	500 TO 1000 grams

INITIAL SETTING TO BE AT 3.0 MINUTES, CONTINUE DRYING SAMPLE AT 1.0 MINUTE SETTING UNTIL MOISTURE CONTENT VARIATION BETWEEN SETTINGS IS LESS THAN 0.1%

	SAMPLE NO.					
	TARE NO.					
A	WT. OF TARE					
B	WT. OF WET SOIL & TARE					
C	WT. OF DRY SOIL & TARE					
D	WT. OF WATER = B-C					
E	WT. OF DRY SOIL = C-A					
	MOISTURE CONTENT = (D/E) X 100					
	FIELD DENSITY TEST (FDT) NO.					

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-- 4940

LABORATORY DETERMINATION OF MOISTURE CONTENT OF SOIL

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO PROJECT NO. 6Q1341 TASK NO.: 04.1

DESCRIPTION: PHASE III DATE: ____ day Oct month 2001 year

MATERIAL TYPE: Low Perm Clay

OVEN METHOD (ASTM D 2216): Recommended Mass Of Moist Sample QA ID: TBW/DLE

100% PASING THE NO. 10 (2-mm) SIEVE	20 grams
100% PASSING THE NO. 4 (4.75-mm) SIEVE	100 grams
100% PASSING THE NO. 3/8-in. (9.5-mm) SIEVE	500 grams
100% PASSING THE NO. 3/4-in. (19-mm) SIEVE	2.5 kilograms

	SAMPLE NO.	LP01-34	LP-01-35	LP-01-36	LP-01-37	LP-01-38
	TARE NO.	A	18	211	13	33
A	WT. OF TARE	7.9	8.4	7.9	8.3	8.1
B	WT. OF WET SOIL & TARE	574.8	544.6	564.5	310.6	331.3
C	WT. OF DRY SOIL & TARE	497.4	478.1	497.1	272.8	287.1
D	WT. OF WATER = B-C	77.4	66.5	67.4	37.8	44.2
E	WT. OF DRY SOIL = C-A	489.5	469.7	489.2	264.5	279.0
F	MOISTURE CONTENT = (D/E) X 100	15.8	14.2	13.8	14.3	15.8
	FIELD DENSITY TEST (FDT) NO.					

MICROWAVE METHOD (ASTM D 4643): Recommended Mass Of Moist Sample QA ID: ____

90% PASSING THE NO. 10 (2-mm) SIEVE	100 TO 200 grams
90% PASSING THE NO. 4 (4.75-mm) SIEVE	200 TO 500 grams
90% PASSING THE 3/4-in. (19-mm) SIEVE	500 TO 1000 grams

INITIAL SETTING TO BE AT 3.0 MINUTES, CONTINUE DRYING SAMPLE AT 1.0 MINUTE SETTING UNTIL MOISTURE CONTENT VARIATION BETWEEN SETTINGS IS LESS THAN 0.1%

	SAMPLE NO.					
	TARE NO.					
A	WT. OF TARE					
B	WT. OF WET SOIL & TARE					
C	WT. OF DRY SOIL & TARE					
D	WT. OF WATER = B-C					
E	WT. OF DRY SOIL = C-A					
F	MOISTURE CONTENT = (D/E) X 100					
	FIELD DENSITY TEST (FDT) NO.					

000067

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FLUOR FERNALD

4940

LABORATORY DETERMINATION OF MOISTURE CONTENT OF SOIL

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO PROJECT NO. 6-Q134 TASK NO. 044

DESCRIPTION: Phase III DATE: ____ day Oct month 2001 year

MATERIAL TYPE: ____

OVEN METHOD (ASTM D 2216): Recommended Mass Of Moist Sample QA ID: ____

100% PASING THE NO. 10 (2-mm) SIEVE	20 grams
100% PASSING THE NO. 4 (4.75--mm) SIEVE	100 grams
100% PASSING THE NO. 3/8-in. (9.5-mm) SIEVE	500 grams
100% PASSING THE NO. 3/4-in. (19-mm) SIEVE	2.5 kilograms

	SAMPLE NO.	LP-01-40	LP-01-41	LP-01-42	LP-01-43	LP-01-44
	TARE NO.	#27	#304	#215	24	205
A	WT. OF TARE	8.3	8.3	8.3	8.3	8.3
B	WT. OF WET SOIL & TARE	417.6	528.8	326.8	453.6	397.9
C	WT. OF DRY SOIL & TARE	366.6	455.5	283.0	390.9	353.6
D	WT. OF WATER = B-C	51.0	73.3	43.8	62.7	44.3
E	WT. OF DRY SOIL = C-A	358.3	447.2	274.7	382.6	345.3
F	MOISTURE CONTENT = (D/E) X 100	14.2	16.4	15.9	16.4	12.8
	FIELD DENSITY TEST (FDT) NO.					

MICROWAVE METHOD (ASTM D 4643): Recommended Mass Of Moist Sample QA ID: ____

90% PASSING THE NO. 10 (2-mm) SIEVE	100 TO 200 grams
90% PASSING THE NO. 4 (4.75-mm) SIEVE	200 TO 500 grams
90% PASSING THE 3/4-in. (19-mm) SIEVE	500 TO 1000 grams

INITIAL SETTING TO BE AT 3.0 MINUTES, CONTINUE DRYING SAMPLE AT 1.0 MINUTE SETTING UNTIL MOISTURE CONTENT VARIATION BETWEEN SETTINGS IS LESS THAN 0.1%

	SAMPLE NO.					
	TARE NO.					
A	WT. OF TARE					
B	WT. OF WET SOIL & TARE					
C	WT. OF DRY SOIL & TARE					
D	WT. OF WATER = B-C					
E	WT. OF DRY SOIL = C-A					
F	MOISTURE CONTENT = (D/E) X 100					
	FIELD DENSITY TEST (FDT) NO.					

000068

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FLUOR FERNALD

4940

LABORATORY DETERMINATION OF MOISTURE CONTENT OF SOIL

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO PROJECT NO.: 601341 TASK NO.: 04.1

DESCRIPTION: Phase III DATE: 11 day Oct month 2001 year

MATERIAL TYPE: Low Perm. Clay

OVEN METHOD (ASTM D 2216): Recommended Mass Of Moist Sample QA ID: DCE/TB

100% PASING THE NO. 10 (2-mm) SIEVE	20 grams
100% PASSING THE NO. 4 (4.75-mm) SIEVE	100 grams
100% PASSING THE NO. 3/8-in. (9.5-mm) SIEVE	500 grams
100% PASSING THE NO. 3/4-in. (19-mm) SIEVE	2.5 kilograms

	SAMPLE NO.	LP-01-45	LP01-46	LP01-47	LP01-48	LP-01-51
	TARE NO.	25	24	25	216	#25
A	WT. OF TARE	8.3	8.3	8.3	8.5	8.3
B	WT. OF WET SOIL & TARE	433.7	463.7	370.1	422.7	333.9
C	WT. OF DRY SOIL & TARE	380.6	401.5	328.6	356.8	286.5
D	WT. OF WATER = B-C	53.1	62.2	41.5	65.9	47.4
E	WT. OF DRY SOIL = C-A	372.3	393.2	320.3	348.3	278.2
F	MOISTURE CONTENT = (D/E) X 100	14.3	15.8	13.0	18.9	17.0
	FIELD DENSITY TEST (FDT) NO.					

MICROWAVE METHOD (ASTM D 4643): Recommended Mass Of Moist Sample QA ID: _____

90% PASSING THE NO. 10 (2-mm) SIEVE	100 TO 200 grams
90% PASSING THE NO. 4 (4.75-mm) SIEVE	200 TO 500 grams
90% PASSING THE 3/4-in. (19-mm) SIEVE	500 TO 1000 grams

INITIAL SETTING TO BE AT 3.0 MINUTES, CONTINUE DRYING SAMPLE AT 1.0 MINUTE SETTING UNTIL MOISTURE CONTENT VARIATION BETWEEN SETTINGS IS LESS THAN 0.1%

	SAMPLE NO.					
	TARE NO.					
A	WT. OF TARE					
B	WT. OF WET SOIL & TARE					
C	WT. OF DRY SOIL & TARE					
D	WT. OF WATER = B-C					
E	WT. OF DRY SOIL = C-A					
	MOISTURE CONTENT = (D/E) X 100					
	FIELD DENSITY TEST (FDT) NO.					

000069

GEOSYNTEC CONSULTANTS

FLUOR FERNALD

4940

LABORATORY DETERMINATION OF MOISTURE CONTENT OF SOIL

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO PROJECT NO.: 6Q1341 TASK NO.: Ø4.1

DESCRIPTION: Phase III DATE: ____ day ____ month ____ year

MATERIAL TYPE: Low Perm Clay

OVEN METHOD (ASTM D 2216): Recommended Mass Of Moist Sample QA ID: ____

100% PASING THE NO. 10 (2-mm) SIEVE	20 grams
100% PASSING THE NO. 4 (4.75-mm) SIEVE	100 grams
100% PASSING THE NO. 3/8-in. (9.5-mm) SIEVE	500 grams
100% PASSING THE NO. 3/4-in. (19-mm) SIEVE	2.5 kilograms

	SAMPLE NO.	LP-Ø1-53	LP-Ø1-45A	LP-Ø1-54	LP-Ø1-55	LP-Ø1-56
	TARE NO.	33	3Ø4	B	B	3Ø5
A	WT. OF TARE	8.1	8.3	13.8	13.8	8.3
B	WT. OF WET SOIL & TARE	283.3	695.Ø	353.6	4Ø7.1	371.4
C	WT. OF DRY SOIL & TARE	247.5	6Ø1.4	31Ø.7	358.9	326.5
D	WT. OF WATER = B-C	35.8	93.6	42.9	48.2	44.9
E	WT. OF DRY SOIL = C-A	239.4	593.1	~~297.Ø~~ 296.9	345.1	318.2
F	MOISTURE CONTENT = (D/E) X 100	15.Ø	15.8	14.4	14.Ø	14.1
	FIELD DENSITY TEST (FDT) NO.					

MICROWAVE METHOD (ASTM D 4643): Recommended Mass Of Moist Sample QA ID: ____

90% PASSING THE NO. 10 (2-mm) SIEVE	100 TO 200 grams
90% PASSING THE NO. 4 (4.75-mm) SIEVE	200 TO 500 grams
90% PASSING THE 3/4-in. (19-mm) SIEVE	500 TO 1000 grams

INITIAL SETTING TO BE AT 3.0 MINUTES, CONTINUE DRYING SAMPLE AT 1.0 MINUTE SETTING UNTIL MOISTURE CONTENT VARIATION BETWEEN SETTINGS IS LESS THAN 0.1%

	SAMPLE NO.					
	TARE NO.					
A	WT. OF TARE					
B	WT. OF WET SOIL & TARE					
C	WT. OF DRY SOIL & TARE					
D	WT. OF WATER = B-C					
E	WT. OF DRY SOIL = C-A					
F	MOISTURE CONTENT = (D/E) X 100					
	FIELD DENSITY TEST (FDT) NO.					

000070

GEOSYNTEC CONSULTANTS

FLUOR FERNALD

4940

LABORATORY DETERMINATION OF MOISTURE CONTENT OF SOIL

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO PROJECT NO.: _____ TASK NO.: _____

DESCRIPTION: _____ DATE: _____ day _____ month _____ year

MATERIAL TYPE: _____

OVEN METHOD (ASTM D 2216): Recommended Mass Of Moist Sample QA ID: _____

100% PASING THE NO. 10 (2-mm) SIEVE	20 grams
100% PASSING THE NO. 4 (4.75-mm) SIEVE	100 grams
100% PASSING THE NO. 3/8-in. (9.5-mm) SIEVE	500 grams
100% PASSING THE NO. 3/4-in. (19-mm) SIEVE	2.5 kilograms

	SAMPLE NO.	LPØ1-57	LPØ1-59	LPØ1-60	LP0161	LP01-62
	TARE NO.	211	31	31	228	#34
A	WT. OF TARE	8.3	8.3	8.3	8.0	8.2
B	WT. OF WET SOIL & TARE	320.0	447.5	455.4	410.8	350.0
C	WT. OF DRY SOIL & TARE	279.3	391.1	403.2	359.8	306.3
D	WT. OF WATER = B-C	40.7	56.4	52.2	51.0	43.7
E	WT. OF DRY SOIL = C-A	271.0	382.8	394.9	351.8	~~291.0~~ 298.1
F	MOISTURE CONTENT = (D/E) X 100	15.0	14.7	13.2	14.5	14.7
	FIELD DENSITY TEST (FDT) NO.					

MICROWAVE METHOD (ASTM D 4643): Recommended Mass Of Moist Sample QA ID: _____

90% PASSING THE NO. 10 (2-mm) SIEVE	100 TO 200 grams
90% PASSING THE NO. 4 (4.75-mm) SIEVE	200 TO 500 grams
90% PASSING THE 3/4-in. (19-mm) SIEVE	500 TO 1000 grams

INITIAL SETTING TO BE AT 3.0 MINUTES, CONTINUE DRYING SAMPLE AT 1.0 MINUTE SETTING UNTIL MOISTURE CONTENT VARIATION BETWEEN SETTINGS IS LESS THAN 0.1%

	SAMPLE NO.					
	TARE NO.					
A	WT. OF TARE					
B	WT. OF WET SOIL & TARE					
C	WT. OF DRY SOIL & TARE					
D	WT. OF WATER = B-C					
E	WT. OF DRY SOIL = C-A					
F	MOISTURE CONTENT = (D/E) X 100					
	FIELD DENSITY TEST (FDT) NO.					

000071

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4940

LABORATORY DETERMINATION OF MOISTURE CONTENT OF SOIL

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO PROJECT NO.: _____ TASK NO.: _____

DESCRIPTION: _____ DATE: _____ day _____ month _____ year

MATERIAL TYPE: _____

OVEN METHOD (ASTM D 2216): Recommended Mass Of Moist Sample QA ID: _____

100% PASING THE NO. 10 (2-mm) SIEVE	20 grams
100% PASSING THE NO. 4 (4.75-mm) SIEVE	100 grams
100% PASSING THE NO. 3/8-in. (9.5-mm) SIEVE	500 grams
100% PASSING THE NO. 3/4-in. (19-mm) SIEVE	2.5 kilograms

	SAMPLE NO.	LP01-63	LP-01-64	LP-01-65		
	TARE NO.	225	204	*20		
A	WT. OF TARE	8.3	8.1	8.3		
B	WT. OF WET SOIL & TARE	274.4	355.2	477.0		
C	WT. OF DRY SOIL & TARE	251.3	308.5	418.2		
D	WT. OF WATER = B-C	23.1	46.7	58.8		
E	WT. OF DRY SOIL = C-A	243.0	300.4	409.9		
F	MOISTURE CONTENT = (D/E) X 100	9.5	15.5	14.3		
	FIELD DENSITY TEST (FDT) NO.					

MICROWAVE METHOD (ASTM D 4643): Recommended Mass Of Moist Sample QA ID: _____

90% PASSING THE NO. 10 (2-mm) SIEVE	100 TO 200 grams
90% PASSING THE NO. 4 (4.75-mm) SIEVE	200 TO 500 grams
90% PASSING THE 3/4-in. (19-mm) SIEVE	500 TO 1000 grams

INITIAL SETTING TO BE AT 3.0 MINUTES, CONTINUE DRYING SAMPLE AT 1.0 MINUTE SETTING UNTIL MOISTURE CONTENT VARIATION BETWEEN SETTINGS IS LESS THAN 0.1%

	SAMPLE NO.					
	TARE NO.					
A	WT. OF TARE					
B	WT. OF WET SOIL & TARE					
C	WT. OF DRY SOIL & TARE					
D	WT. OF WATER = B-C					
E	WT. OF DRY SOIL = C-A					
	MOISTURE CONTENT = (D/E) X 100					
	FIELD DENSITY TEST (FDT) NO.					

000072

Atterberg Limits

GEOSYNTEC CONSULTANTS

FLUOR FERNALD

4940

ATTERBERG LIMITS TEST

(ASTM D 4318)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO PROJECT NO. GQ1341 TASK NO.: 04.1

DESCRIPTION: Phase III DATE: 13 day Aug month 2001 year

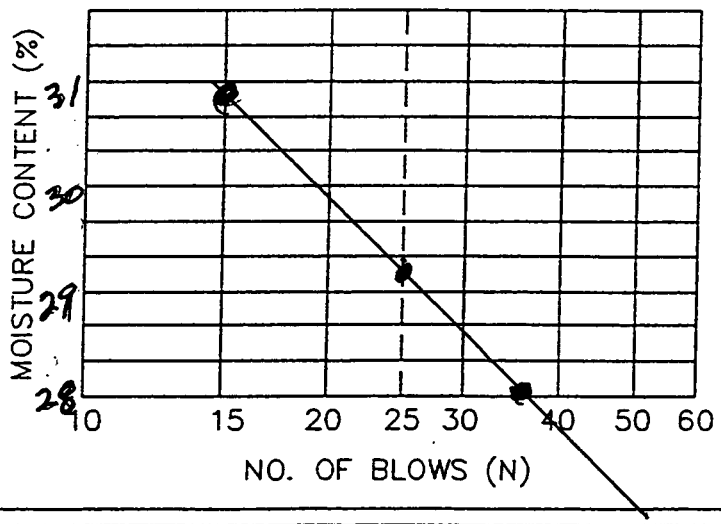
MATERIAL TYPE: Brown Clay / LP Clay MATERIAL SOURCE: Borrow Area Stockpile 01-1 SAMPLE NO. LP-01-01

LIQUID LIMIT DETERMINATION

QA ID: DLE

	TARE NO.		1.6	3.1	2.3	3.1
A	WT. OF TARE	(grams)	28.85	28.37	31.18	28.37
B	WT. OF WET SOIL & TARE	(grams)	42.21		45.64	42.90
C	WT. OF DRY SOIL & TARE	(grams)	39.28		42.36	39.47
D	WT. OF WATER = B−C	(grams)	2.93		3.28	3.43
E	WT. OF DRY SOIL = C−A	(grams)	10.43		11.18	11.10
F	MOISTURE CONTENT = (D/E)X100	(%)	28.1		29.3	30.9
N	NUMBER OF BLOWS		31	29	25	15

DRYING TARE NO.



CURING TARE NO.

PLASTIC LIMIT DETERMINATION

QA ID: DLE

	TARE NO.		1.3	2.5		
A	WT. OF TARE	(grams)	28.63	28.42		
B	WT. OF WET SOIL & TARE	(grams)	38.49	35.87		
C	WT. OF DRY SOIL & TARE	(grams)	37.14	34.84		
D	WT. OF WATER = B−C	(grams)	1.35	1.03		
E	WT. OF DRY SOIL = C−A	(grams)	8.51	6.42		
F	MOISTURE CONTENT = (D/E)X100	(%)	15.9	16.0		

000074

LIQUID LIMIT (LL) = 29.3 PLASTIC LIMIT (PL) = 16.0 PLASTICITY INDEX (PI) = 13.3

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4940

FLUOR FERNALD

ATTERBERG LIMITS TEST

(ASTM D 4318)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO PROJECT NO. GQ1341 TASK NO.: 04.1

DESCRIPTION: Phase III DATE: 13 day Aug month 2001 year

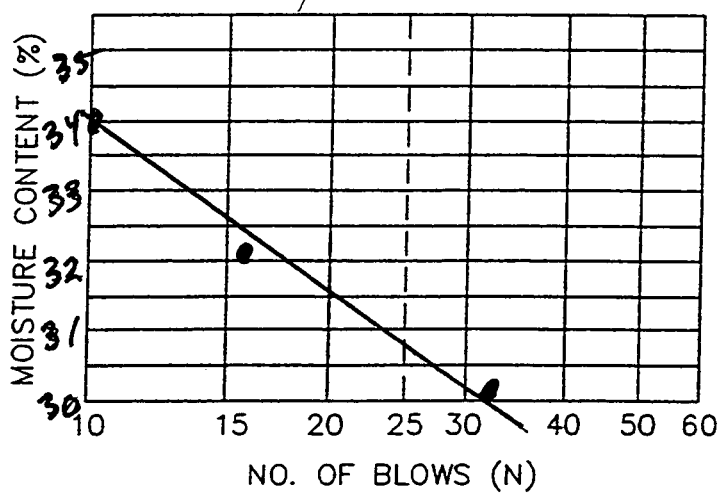
MATERIAL TYPE: LP Clay MATERIAL SOURCE: Stockpile 01-1 Borrow Area SAMPLE NO. LP-01-02

LIQUID LIMIT DETERMINATION

QA ID: DLE

	TARE NO.		2.02	3.2	1.7	1.5
A	WT. OF TARE	(grams)	27.62	27.81	28.48	28.59
B	WT. OF WET SOIL & TARE	(grams)	44.43	42.55	47.26	46.59
C	WT. OF DRY SOIL & TARE	(grams)	40.07	38.81	42.70	42.41
D	WT. OF WATER = B-C	(grams)	4.36	3.74	4.56	4.18
E	WT. OF DRY SOIL = C-A	(grams)	12.45	11.00	14.22	13.82
F	MOISTURE CONTENT = (D/E)X100	(%)	35.0	34.0	32.1	30.2
N	NUMBER OF BLOWS		10	10	16	32

DRYING TARE NO.



CURING TARE NO.

PLASTIC LIMIT DETERMINATION

QA ID: DLE

	TARE NO.		2.1	1.2		
A	WT. OF TARE	(grams)	28.24	28.49		
B	WT. OF WET SOIL & TARE	(grams)	36.59	37.23		
C	WT. OF DRY SOIL & TARE	(grams)	35.42	36.01		
D	WT. OF WATER = B-C	(grams)	1.17	1.22		
E	WT. OF DRY SOIL = C-A	(grams)	7.18	7.52		
F	MOISTURE CONTENT = (D/E)X100	(%)	16.3	16.2		

000075

LIQUID LIMIT (LL) = 30.8 PLASTIC LIMIT (PL) = 16.3 PLASTICITY INDEX (PI) = 14.5

©GEO SYNTEC CONSULTANTS FILE NO. 2-13-ALT CHECKED BY: CH SHEET NO. 1 OF 1

GEOSYNTEC CONSULTANTS

FLUOR FERNALD 4940

ATTERBERG LIMITS TEST (ASTM D 4318)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO PROJECT NO.: GG1341 TASK NO.: 041

DESCRIPTION: Phase III DATE: ____ day July month 2001 year

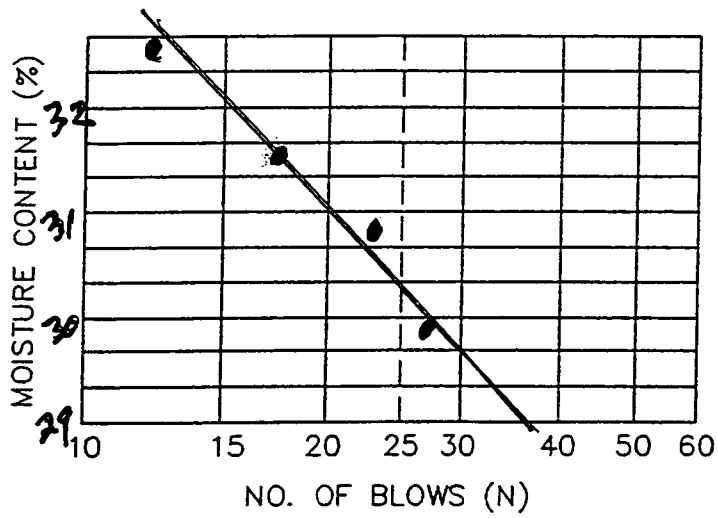
MATERIAL TYPE: LP Clay MATERIAL SOURCE: Stockpile of Borrow Area SAMPLE NO.: LP-01-03

LIQUID LIMIT DETERMINATION

QA ID: DLE

	TARE NO.		2.3	1.6	2.1	3.2
A	WT. OF TARE	(grams)	31.20	28.86	28.23	27.83
B	WT. OF WET SOIL & TARE	(grams)	49.59	47.77	49.29	47.77
C	WT. OF DRY SOIL & TARE	(grams)	45.08	43.24	44.32	43.18
D	WT. OF WATER = B-C	(grams)	4.51	4.53	4.97	4.59
E	WT. OF DRY SOIL = C-A	(grams)	13.88	14.38	16.1	~~15.39~~ 15.35
F	MOISTURE CONTENT = (D/E)X100	(%)	32.5	31.5	30.9	~~29.8~~ 29.9
N	NUMBER OF BLOWS		13	17	24	27

DRYING TARE NO.



CURING TARE NO.

PLASTIC LIMIT DETERMINATION

QA ID: DLE

	TARE NO.		23.67 1.5	3.1		
A	WT. OF TARE	(grams)	~~28.67~~	28.38		
B	WT. OF WET SOIL & TARE	(grams)	37.56	39.53		
C	WT. OF DRY SOIL & TARE	(grams)	36.32	37.99		
D	WT. OF WATER = B-C	(grams)	1.24	1.54		
E	WT. OF DRY SOIL = C-A	(grams)	7.65	9.61		
F	MOISTURE CONTENT = (D/E)X100	(%)	16.2	16.0		

000076

LIQUID LIMIT (LL) = 30.4 PLASTIC LIMIT (PL) = 16.1 PLASTICITY INDEX (PI) = 14.3

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FLUOR FERNALD

4940

ATTERBERG LIMITS TEST

(ASTM D 4318)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO PROJECT NO.: GQ1341 TASK NO.: 04.1

DESCRIPTION: Phase III DATE: 22 day Aug month 2001 year

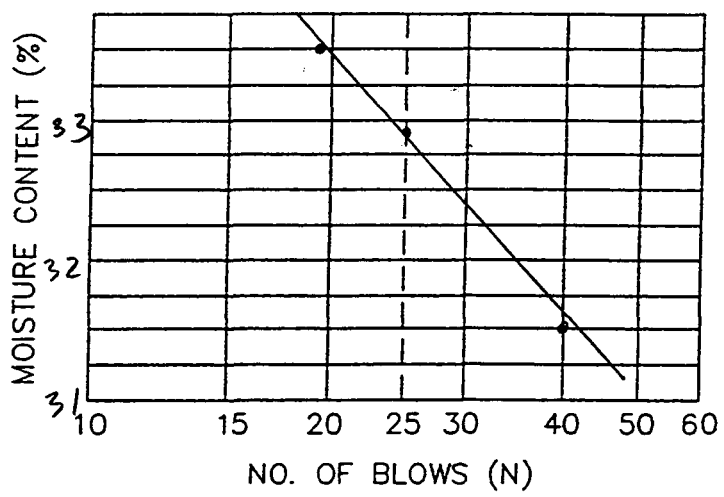
MATERIAL TYPE: L.P. Clay MATERIAL SOURCE: STOCKPILE Ø1-1 SAMPLE NO.: LPØ1-04

LIQUID LIMIT DETERMINATION

QA ID: DLE

	TARE NO.		3.2	1.6	3.1	
A	WT. OF TARE	(grams)	27.83	28.84	28.36	
B	WT. OF WET SOIL & TARE	(grams)	41.20	44.60	43.60	
C	WT. OF DRY SOIL & TARE	(grams)	38.Ø0	4Ø.70	39.80	
D	WT. OF WATER = B–C	(grams)	3.20	3.90	3.80	
E	WT. OF DRY SOIL = C–A	(grams)	10.17	11.86	11.44	
F	MOISTURE CONTENT = (D/E)X100	(%)	31.5	32.9	33.2	
N	NUMBER OF BLOWS		40	25	14	

DRYING TARE NO.



CURING TARE NO.

PLASTIC LIMIT DETERMINATION

QA ID: DLE

	TARE NO.		1.5	2.3		
A	WT. OF TARE	(grams)	28.58	31.19		
B	WT. OF WET SOIL & TARE	(grams)	43.00	44.70		
C	WT. OF DRY SOIL & TARE	(grams)	41.Ø0	42.80		
D	WT. OF WATER = B–C	(grams)	2.00	1.90		
E	WT. OF DRY SOIL = C–A	(grams)	12.42	11.61		
F	MOISTURE CONTENT = (D/E)X100	(%)	16.1	16.4		

000077

LIQUID LIMIT (LL) = 32.9 PLASTIC LIMIT (PL) = 16.3 PLASTICITY INDEX (PI) = ~~16.5~~ 17

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4940

FLUOR FERNALD

ATTERBERG LIMITS TEST

(ASTM D 4318)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO PROJECT NO. GQ1341 TASK NO.: 04.1

DESCRIPTION: Phase III DATE: 23 day Aug month 2001 year

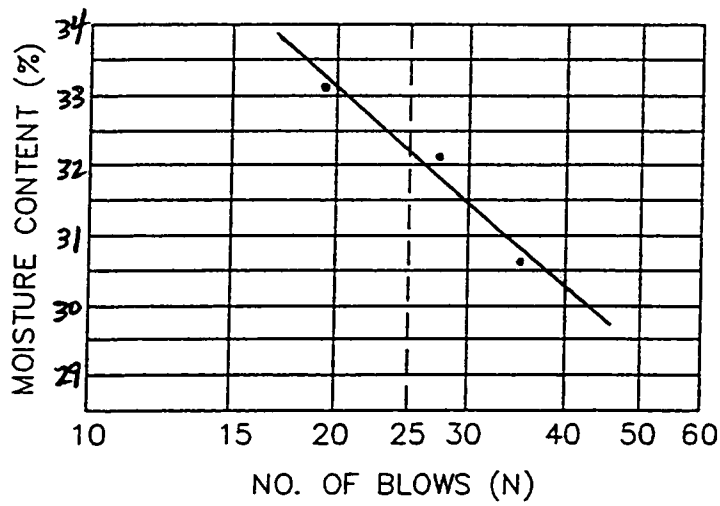
MATERIAL TYPE: LP Clay MATERIAL SOURCE: Stockpile ϕ1-1 SAMPLE NO. LP01-05

LIQUID LIMIT DETERMINATION

QA ID: DLE

	TARE NO.		1.6	3.2	2.3	
A	WT. OF TARE	(grams)	28.86	27.85	31.19	
B	WT. OF WET SOIL & TARE	(grams)	40.69	41.09	50.35	
C	WT. OF DRY SOIL & TARE	(grams)	37.92	37.87	45.59	
D	WT. OF WATER = B-C	(grams)	2.77	3.22	4.76	
E	WT. OF DRY SOIL = C-A	(grams)	9.06	10.02	14.40	
F	MOISTURE CONTENT = (D/E)X100	(%)	30.6	32.1	33.1	
N	NUMBER OF BLOWS		35	27	19	

DRYING TARE NO.



CURING TARE NO.

PLASTIC LIMIT DETERMINATION

QA ID: DLE/TBA

	TARE NO.		3.1	1.5		
A	WT. OF TARE	(grams)	28.37	28.59		
B	WT. OF WET SOIL & TARE	(grams)	37.09	37.48		
C	WT. OF DRY SOIL & TARE	(grams)	35.87	36.23		
D	WT. OF WATER = B-C	(grams)	1.22	1.25		
E	WT. OF DRY SOIL = C-A	(grams)	7.50	7.64		
F	MOISTURE CONTENT = (D/E)X100	(%)	16.3	16.4		

000078

LIQUID LIMIT (LL) = 32 PLASTIC LIMIT (PL) = 16 PLASTICITY INDEX (PI) = 16

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FLUOR FERNALD 4940

ATTERBERG LIMITS TEST

(ASTM D 4318)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO PROJECT NO.: GQ134 TASK NO.: 04.1

DESCRIPTION: PHASE III DATE: 29 day AUG month 2001 year

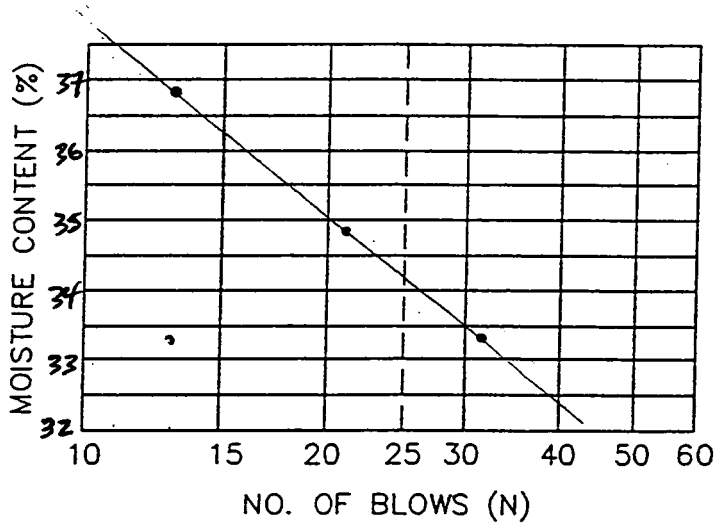
MATERIAL TYPE: Low Perm CLAY MATERIAL SOURCE: STOCKPILE 01-1 SAMPLE NO.: LP-01-06

LIQUID LIMIT DETERMINATION

QA ID: TBK

	TARE NO.		2.7	1.2	1.3	
A	WT. OF TARE	(grams)	28.67	28.50	28.62	
B	WT. OF WET SOIL & TARE	(grams)	50.59	59.43	54.96	
C	WT. OF DRY SOIL & TARE	(grams)	45.11	51.45	47.87	
D	WT. OF WATER = B-C	(grams)	5.48	7.98	7.09	
E	WT. OF DRY SOIL = C-A	(grams)	16.44	22.95	19.25	
F	MOISTURE CONTENT = (D/E)X100	(%)	33.3	34.8	36.8	
N	NUMBER OF BLOWS		31	21	13	

DRYING TARE NO.



CURING TARE NO.

PLASTIC LIMIT DETERMINATION

QA ID: TBK

	TARE NO.		2.2	2.1		
A	WT. OF TARE	(grams)	27.61	28.22		
B	WT. OF WET SOIL & TARE	(grams)	47.51	45.96		
C	WT. OF DRY SOIL & TARE	(grams)	44.77	43.49		
D	WT. OF WATER = B-C	(grams)	2.74	2.47		
E	WT. OF DRY SOIL = C-A	(grams)	17.16	15.27		
F	MOISTURE CONTENT = (D/E)X100	(%)	16.0	16.2		

000079

LIQUID LIMIT (LL) = 34 PLASTIC LIMIT (PL) = 16 PLASTICITY INDEX (PI) = 18

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4940

FLUOR FERNALD

ATTERBERG LIMITS TEST

(ASTM D 4318)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO PROJECT NO.: GQ134 TASK NO.: 04.1

DESCRIPTION: PHASE III DATE: 29 day AUG month 2001 year

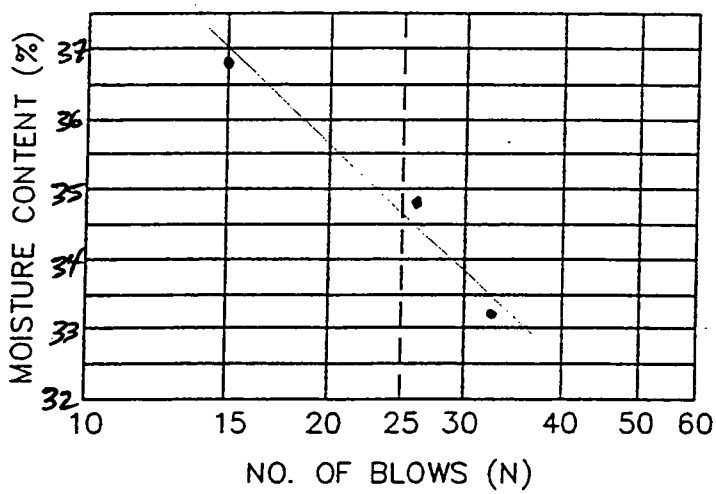
MATERIAL TYPE: LOW PERM CLAY MATERIAL SOURCE: STOCKPILE 01-2 SAMPLE NO.: LP-01-07

LIQUID LIMIT DETERMINATION

QA ID: TBW

	TARE NO.		2.5	2.4	2.8	
A	WT. OF TARE	(grams)	28.42	27.38	28.47	
B	WT. OF WET SOIL & TARE	(grams)	55.09	56.25	57.65	
C	WT. OF DRY SOIL & TARE	(grams)	48.44	48.81	49.82	
D	WT. OF WATER = B-C	(grams)	6.65	7.44	7.83	
E	WT. OF DRY SOIL = C-A	(grams)	20.02	21.43	21.35	
F	MOISTURE CONTENT = (D/E)X100	(%)	33.2	34.7	36.7	
N	NUMBER OF BLOWS		32	26	15	

DRYING TARE NO.



CURING TARE NO.

PLASTIC LIMIT DETERMINATION

QA ID: TBW

	TARE NO.		1.9	1.7		
A	WT. OF TARE	(grams)	28.55	28.48		
B	WT. OF WET SOIL & TARE	(grams)	56.02	56.57		
C	WT. OF DRY SOIL & TARE	(grams)	52.11	52.59		
D	WT. OF WATER = B-C	(grams)	3.91	3.98		
E	WT. OF DRY SOIL = C-A	(grams)	23.56	24.11		
F	MOISTURE CONTENT = (D/E)X100	(%)	16.6	16.5		

000080

LIQUID LIMIT (LL) = 35 PLASTIC LIMIT (PL) = 17 PLASTICITY INDEX (PI) = 18

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FLUOR FERNALD

4940

ATTERBERG LIMITS TEST

(ASTM D 4318)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO PROJECT NO. GQ1341 TASK NO.: 04-1

DESCRIPTION: Phase III DATE: 31 day AUG month 2001 year

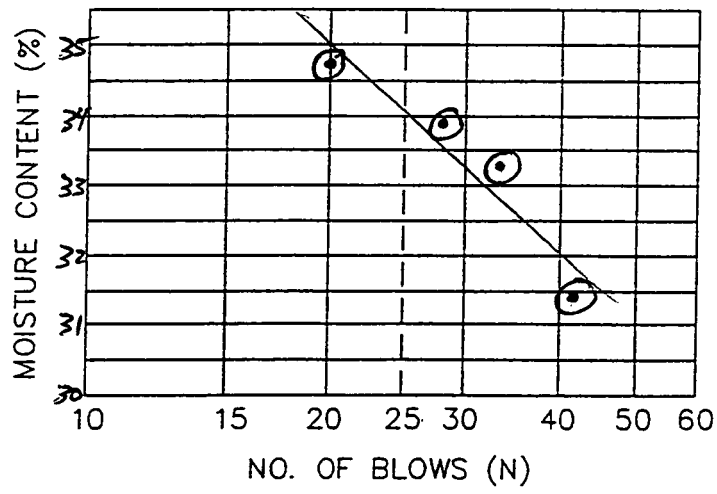
MATERIAL TYPE: LP Clay MATERIAL SOURCE: Stockpile 01-2 SAMPLE NO. LP-01-08

LIQUID LIMIT DETERMINATION

QA ID: DLE/TBC

	TARE NO.		1.2	2.4	1.7	2.5
A	WT. OF TARE	(grams)	28.49	27.37	28.48	28.42
B	WT. OF WET SOIL & TARE	(grams)	44.49	44.85	40.67	45.36
C	WT. OF DRY SOIL & TARE	(grams)	40.37	40.42	37.63	41.31
D	WT. OF WATER = B-C	(grams)	4.12	4.43	3.04	4.05
E	WT. OF DRY SOIL = C-A	(grams)	11.88	13.05	9.15	12.89
F	MOISTURE CONTENT = (D/E)X100	(%)	34.7	33.9	33.2 ~~33.3~~	31.4
N	NUMBER OF BLOWS		20	28	33	41

DRYING TARE NO.



CURING TARE NO.

PLASTIC LIMIT DETERMINATION

QA ID: DLE/TBC

	TARE NO.		1.3	2.8		
A	WT. OF TARE	(grams)	28.64	28.47		
B	WT. OF WET SOIL & TARE	(grams)	35.12	34.45		
C	WT. OF DRY SOIL & TARE	(grams)	34.24	33.65		
D	WT. OF WATER = B-C	(grams)	0.88	0.80		
E	WT. OF DRY SOIL = C-A	(grams)	5.60	5.18		
F	MOISTURE CONTENT = (D/E)X100	(%)	15.7	15.4		

000081

LIQUID LIMIT (LL) = 34 PLASTIC LIMIT (PL) = 16 PLASTICITY INDEX (PI) = 18

GEOSYNTEC CONSULTANTS

FLUOR FERNALD

4940

ATTERBERG LIMITS TEST

(ASTM D 4318)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO PROJECT NO.: 69134 1 TASK NO.: 04.1

DESCRIPTION: Phase III DATE: 31 day AUG month 2001 year

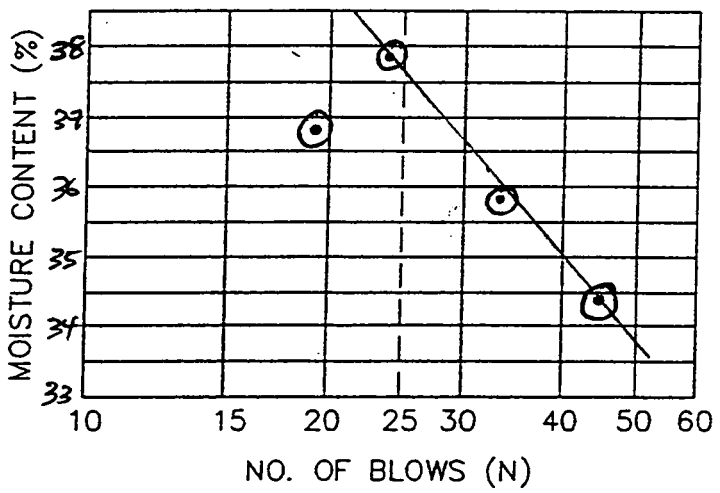
MATERIAL TYPE: LP Chn-1 MATERIAL SOURCE: Stockpile 01-2 SAMPLE NO.: LP-01-09

LIQUID LIMIT DETERMINATION

QA ID: DLE/TBL

	TARE NO.		3.2	2.7	1.9	2.2
A	WT. OF TARE	(grams)	27.82	28.67	28.53	27.62
B	WT. OF WET SOIL & TARE	(grams)	43.92	45.52	42.41	43.02
C	WT. OF DRY SOIL & TARE	(grams)	39.50	41.08	38.86	38.88
D	WT. OF WATER = B-C	(grams)	4.42	4.44	3.55	4.14
E	WT. OF DRY SOIL = C-A	(grams)	11.68	12.41	10.33	11.26
F	MOISTURE CONTENT = (D/E)X100	(%)	37.8	35.8	34.4	36.8
N	NUMBER OF BLOWS		24	33	45	19

DRYING TARE NO.



CURING TARE NO.

PLASTIC LIMIT DETERMINATION

QA ID: DLE/TBL

	TARE NO.		2.1	1.6		
A	WT. OF TARE	(grams)	28.23	28.86		
B	WT. OF WET SOIL & TARE	(grams)	36.11	37.13		
C	WT. OF DRY SOIL & TARE	(grams)	35.03	36.01		
D	WT. OF WATER = B-C	(grams)	1.08	1.12		
E	WT. OF DRY SOIL = C-A	(grams)	6.80	7.15		000082
F	MOISTURE CONTENT = (D/E)X100	(%)	15.9	15.7		

LIQUID LIMIT (LL) = 38 PLASTIC LIMIT (PL) = 16 PLASTICITY INDEX (PI) = 22

GEOSYNTEC CONSULTANTS

4940

FLUOR FERNALD

ATTERBERG LIMITS TEST

(ASTM D 4318)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO PROJECT NO.: GQ1341 TASK NO.: 041

DESCRIPTION: PHASE III DATE: 05 day SEPT month 2001 year

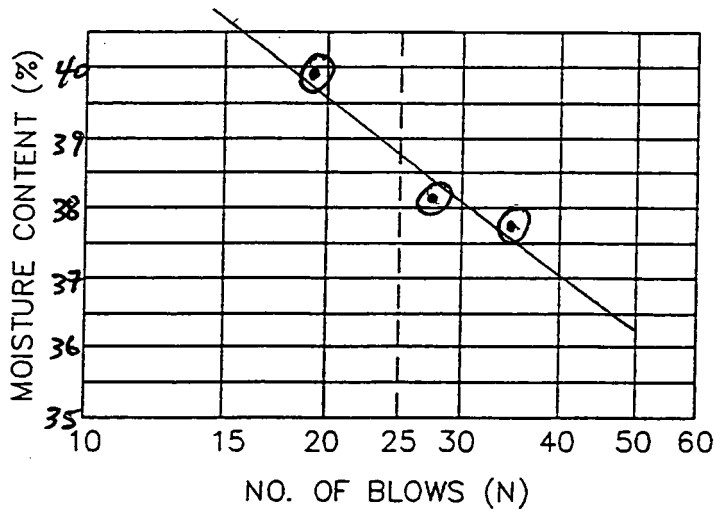
MATERIAL TYPE: LOW PERM. CLAY MATERIAL SOURCE: STOCKPILE 01-2 SAMPLE NO.: LP-01-11

LIQUID LIMIT DETERMINATION

QA ID: TBW

	TARE NO.		28	12	22	
A	WT. OF TARE	(grams)	28.48	28.60	27.65	
B	WT. OF WET SOIL & TARE	(grams)	62.54	68.89	69.28	
C	WT. OF DRY SOIL & TARE	(grams)	53.15	57.85	57.41	
D	WT. OF WATER = B-C	(grams)	9.39	11.04	11.87	
E	WT. OF DRY SOIL = C-A	(grams)	24.67	29.25	29.76	
F	MOISTURE CONTENT = (D/E)X100	(%)	38.1	37.7	39.9	
N	NUMBER OF BLOWS		27	35	19	

DRYING TARE NO.



CURING TARE NO.

PLASTIC LIMIT DETERMINATION

QA ID: TBW

	TARE NO.		32	27		
A	WT. OF TARE	(grams)	28.04	28.89		
B	WT. OF WET SOIL & TARE	(grams)	53.78	53.21		
C	WT. OF DRY SOIL & TARE	(grams)	49.88	49.52		
D	WT. OF WATER = B-C	(grams)	3.90	3.69		
E	WT. OF DRY SOIL = C-A	(grams)	21.84	20.63		000083
F	MOISTURE CONTENT = (D/E)X100	(%)	17.9	17.9		

LIQUID LIMIT (LL) = 39 PLASTIC LIMIT (PL) = 18 PLASTICITY INDEX (PI) = 21

GEOSYNTEC CONSULTANTS

4940

FLUOR FERNALD

ATTERBERG LIMITS TEST

(ASTM D 4318)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO PROJECT NO.: GQ1341 TASK NO.: 04.1

DESCRIPTION: PHASE III DATE: 12 day SEPT month 2001 year

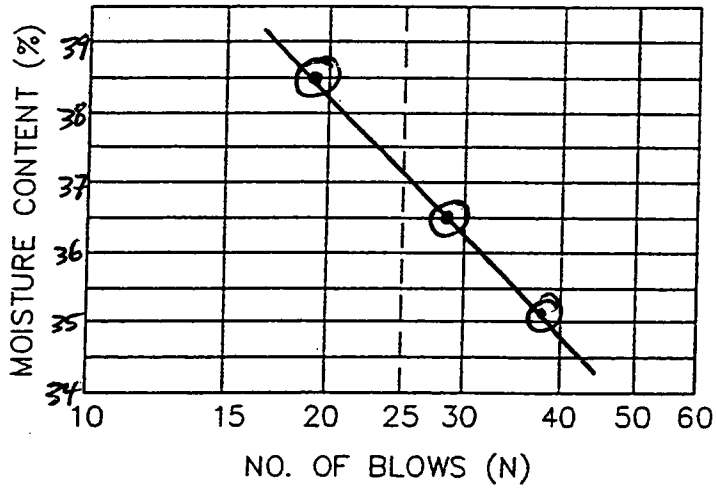
MATERIAL TYPE: LOW PERM CLAY MATERIAL SOURCE: STOCKPILE 01-2 SAMPLE NO.: LP-01-12

LIQUID LIMIT DETERMINATION

QA ID: KS/(TBM)

	TARE NO.		1.6	2.1	1.3	
A	WT. OF TARE	(grams)	28.86	28.24	28.64	
B	WT. OF WET SOIL & TARE	(grams)	KS ~~28.86~~ 38.60	38.89	37.92	
C	WT. OF DRY SOIL & TARE	(grams)	35.89	36.04	35.51	
D	WT. OF WATER = B-C	(grams)	2.71	2.85	2.41	
E	WT. OF DRY SOIL = C-A	(grams)	7.03	7.80	6.87	
F	MOISTURE CONTENT = (D/E)X100	(%)	38.5	36.5	35.1	
N	NUMBER OF BLOWS		19	28	38	

DRYING TARE NO.



CURING TARE NO.

PLASTIC LIMIT DETERMINATION

QA ID: KS/(TBM)

	TARE NO.		1.9	2.5		
A	WT. OF TARE	(grams)	28.55	28.42		
B	WT. OF WET SOIL & TARE	(grams)	43.23	45.21		
C	WT. OF DRY SOIL & TARE	(grams)	41.21	42.92		
D	WT. OF WATER = B-C	(grams)	2.02	2.29		
E	WT. OF DRY SOIL = C-A	(grams)	12.66	14.50		000084
F	MOISTURE CONTENT = (D/E)X100	(%)	16.0	15.8		

LIQUID LIMIT (LL) = 37 PLASTIC LIMIT (PL) = 16 PLASTICITY INDEX (PI) = 21

GEOSYNTEC CONSULTANTS

FLUOR FERNALD

4940

ATTERBERG LIMITS TEST

(ASTM D 4318)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO PROJECT NO.: 6Q134 TASK NO.: 04.1

DESCRIPTION: PHASE III DATE: 19 day Sept month 2001 year

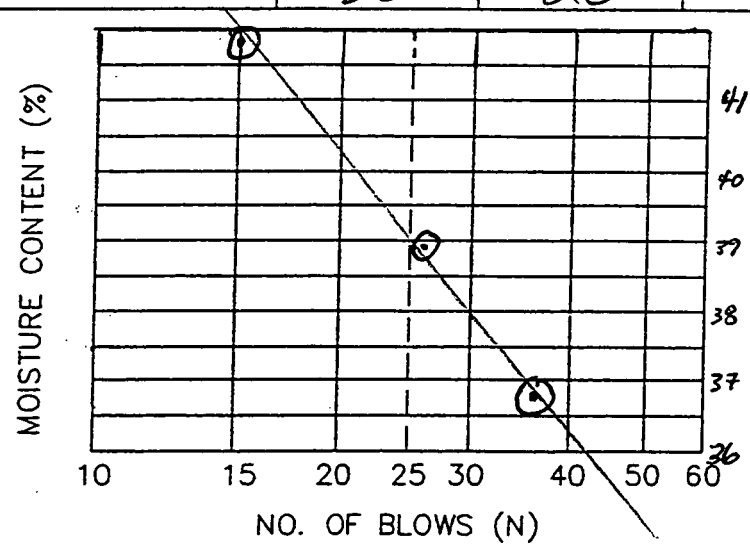
MATERIAL TYPE: LOW PERM CLAY MATERIAL SOURCE: STOCKPILE 01-3 SAMPLE NO.: LP-01-13

LIQUID LIMIT DETERMINATION

QA ID: TBD

	TARE NO.		2.1	2.2	2.3	
A	WT. OF TARE	(grams)	28.18	27.61	31.23	
B	WT. OF WET SOIL & TARE	(grams)	61.73	59.16	63.85	
C	WT. OF DRY SOIL & TARE	(grams)	52.74	50.32	54.23	
D	WT. OF WATER = B-C	(grams)	9.01	8.84	9.62	
E	WT. OF DRY SOIL = C-A	(grams)	24.56	22.71	23.00	
F	MOISTURE CONTENT = (D/E)X100	(%)	36.7	38.9	41.8	
N	NUMBER OF BLOWS		36	26	15	

DRYING TARE NO.



CURING TARE NO.

PLASTIC LIMIT DETERMINATION

QA ID: TBD

	TARE NO.		2.4	2.5		
A	WT. OF TARE	(grams)	27.42	28.44		
B	WT. OF WET SOIL & TARE	(grams)	55.15	54.90		
C	WT. OF DRY SOIL & TARE	(grams)	51.34	51.32		
D	WT. OF WATER = B-C	(grams)	3.81	3.58		
E	WT. OF DRY SOIL = C-A	(grams)	23.92	22.88		000085
F	MOISTURE CONTENT = (D/E)X100	(%)	15.9	15.6		

LIQUID LIMIT (LL) = 39 PLASTIC LIMIT (PL) = 16 PLASTICITY INDEX (PI) = 23

GEOSYNTEC CONSULTANTS

FLUOR FERNALD

4940

ATTERBERG LIMITS TEST (ASTM D 4318)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO PROJECT NO. GA1341 TASK NO.: 04.1

DESCRIPTION: Phase III DATE: 21 day Sept month 2001 year

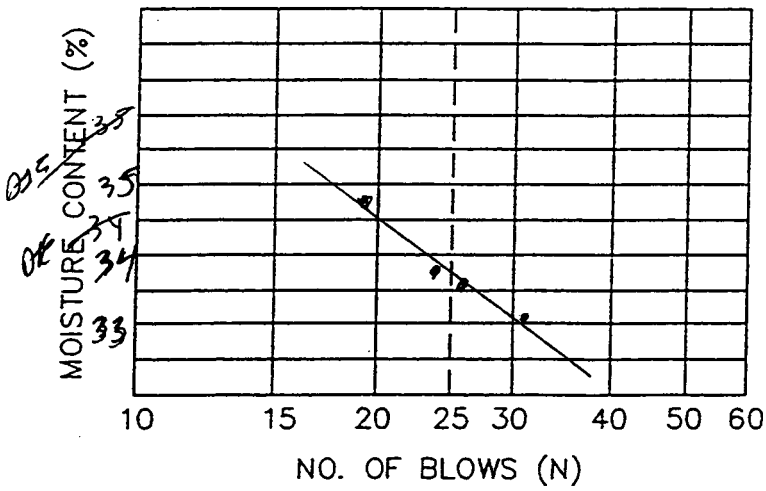
MATERIAL TYPE: Low Perm Clay MATERIAL SOURCE: Stockpile 01-3 SAMPLE NO. LP-01-14

LIQUID LIMIT DETERMINATION

QA ID: DLE

	TARE NO.		2.1	2.2	2.3	1.9
A	WT. OF TARE	(grams)	28.24	27.63	31.20	28.56
B	WT. OF WET SOIL & TARE	(grams)	47.41	45.12	49.52	45.98
C	WT. OF DRY SOIL & TARE	(grams)	42.62	40.72	44.90	41.49
D	WT. OF WATER = B-C	(grams)	4.79	4.40	4.62	4.49
E	WT. OF DRY SOIL = C-A	(grams)	14.38	13.09	13.70	12.93
F	MOISTURE CONTENT = (D/E)X100	(%)	33.3	33.6	33.7	34.7
N	NUMBER OF BLOWS		31	27	23	19

DRYING TARE NO.



CURING TARE NO.

PLASTIC LIMIT DETERMINATION

QA ID: DLE

	TARE NO.		2.4	2.5		
A	WT. OF TARE	(grams)	27.39	28.42		
B	WT. OF WET SOIL & TARE	(grams)	36.29	35.61		
C	WT. OF DRY SOIL & TARE	(grams)	35.04	34.61		
D	WT. OF WATER = B-C	(grams)	1.25	1.00		
E	WT. OF DRY SOIL = C-A	(grams)	7.65	6.19		
F	MOISTURE CONTENT = (D/E)X100	(%)	16.3	16.2		

000086

LIQUID LIMIT (LL) = 34 PLASTIC LIMIT (PL) = 16 PLASTICITY INDEX (PI) = 18

GEOSYNTEC CONSULTANTS

4940

FLUOR FERNALD

ATTERBERG LIMITS TEST (ASTM D 4318)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO PROJECT NO.: 6Q1341 TASK NO.: 04.1

DESCRIPTION: PHASE III DATE: ____ day ____ month ____ year

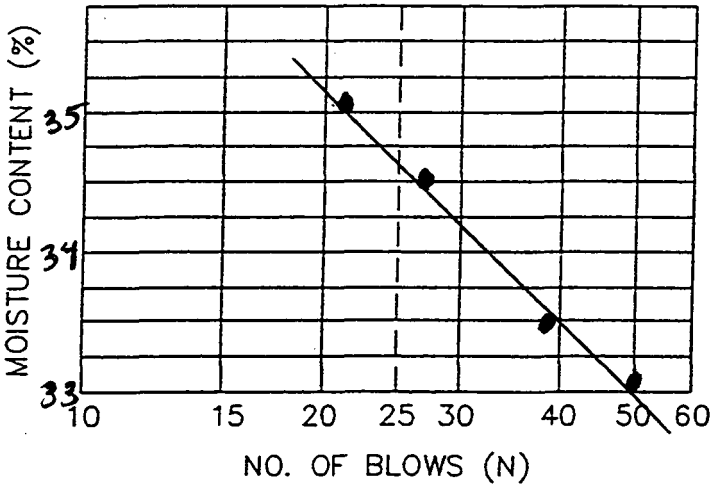
MATERIAL TYPE: LOW PERM CLAY MATERIAL SOURCE: STOCKPILE 01-3 SAMPLE NO.: LP-01-15

LIQUID LIMIT DETERMINATION

QA ID: ____

	TARE NO.		3.2	2.8	1.5	3.1
A	WT. OF TARE	(grams)	27.82	28.45	28.61	28.38
B	WT. OF WET SOIL & TARE	(grams)	44.80	46.85	50.59	48.41
C	WT. OF DRY SOIL & TARE	(grams)	40.58	42.24	44.97	43.21
D	WT. OF WATER = B-C	(grams)	4.22	4.61	5.62	5.20
E	WT. OF DRY SOIL = C-A	(grams)	12.76	13.79	16.36	14.83
F	MOISTURE CONTENT = (D/E)X100	(%)	33.07	33.43	34.35	35.06
N	NUMBER OF BLOWS		50	39	28	22

DRYING TARE NO.



CURING TARE NO.

PLASTIC LIMIT DETERMINATION

QA ID: ____

	TARE NO.		1.8	2.9		
A	WT. OF TARE	(grams)	28.81	31.46		
B	WT. OF WET SOIL & TARE	(grams)	39.36	40.85		
C	WT. OF DRY SOIL & TARE	(grams)	37.90	39.59		
D	WT. OF WATER = B-C	(grams)	1.46	1.26		
E	WT. OF DRY SOIL = C-A	(grams)	9.09	8.13		
F	MOISTURE CONTENT = (D/E)X100	(%)	16.06	15.50		

000087

LIQUID LIMIT (LL) = 34.3 PLASTIC LIMIT (PL) = 15.8 PLASTICITY INDEX (PI) = 18.8

GEOSYNTEC CONSULTANTS

4940

FLUOR FERNALD

ATTERBERG LIMITS TEST (ASTM D 4318)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO PROJECT NO.: GQ134 TASK NO.: 04.1

DESCRIPTION: PHASE III DATE: 21 day SEPT month 2001 year

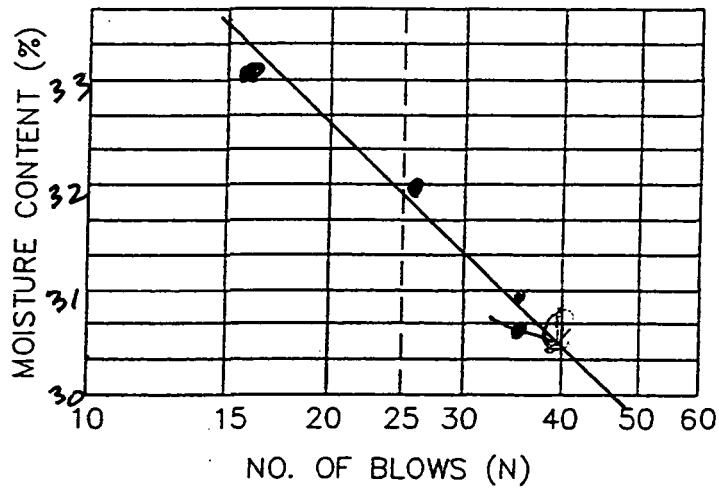
MATERIAL TYPE: Low Permeability CLAY MATERIAL SOURCE: STOCKPILE 01-3 SAMPLE NO.: LP-01-16

LIQUID LIMIT DETERMINATION

QA ID: DLE

	TARE NO.		2.1	3.2	1.4	2.8
A	WT. OF TARE	(grams)	28.24	27.83	28.54	28.49
B	WT. OF WET SOIL & TARE	(grams)	43.15	47.97	50.15	
C	WT. OF DRY SOIL & TARE	(grams)	39.63	43.10	44.78	
D	WT. OF WATER = B−C	(grams)	3.52	4.87	5.37	
E	WT. OF DRY SOIL = C−A	(grams)	11.39	15.27	16.24	
F	MOISTURE CONTENT = (D/E)X100	(%)	30.9	32.0	33.1 ~~33.06~~	
N	NUMBER OF BLOWS		35	26	17	

DRYING TARE NO.



CURING TARE NO.

PLASTIC LIMIT DETERMINATION

QA ID: DLE

	TARE NO.		2.2	1.5		
A	WT. OF TARE	(grams)	27.63	28.60		
B	WT. OF WET SOIL & TARE	(grams)	~~37.94~~ 37.79	37.89		
C	WT. OF DRY SOIL & TARE	(grams)	36.33	36.59		
D	WT. OF WATER = B−C	(grams)	1.38	1.30		
E	WT. OF DRY SOIL = C−A	(grams)	8.70	7.99		
F	MOISTURE CONTENT = (D/E)X100	(%)	15.9	16.3		

000088

LIQUID LIMIT (LL) = 31.9 PLASTIC LIMIT (PL) = 16.1 PLASTICITY INDEX (PI) = 16

GEOSYNTEC CONSULTANTS

4940

FLUOR FERNALD

ATTERBERG LIMITS TEST

(ASTM D 4318)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO PROJECT NO. 66134 TASK NO.: 04.1

DESCRIPTION: Phase III DATE: 21 day Sept month 2001 year

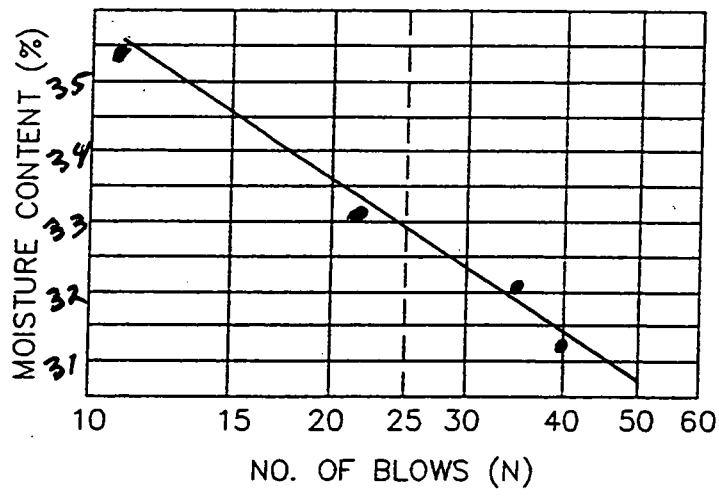
MATERIAL TYPE: Low Perm Clay MATERIAL SOURCE: Stock Pile 01-17 SAMPLE NO. LP-01-17

LIQUID LIMIT DETERMINATION

QA ID: DLE

	TARE NO.		2.7	1.8	2.5	3.1
A	WT. OF TARE	(grams)	28.66	28.79	28.42	28.37
B	WT. OF WET SOIL & TARE	(grams)	50.06	45.16	46.12	43.62
C	WT. OF DRY SOIL & TARE	(grams)	44.46	41.08	41.90	39.91
D	WT. OF WATER = B-C	(grams)	5.60	4.08	4.22	3.71
E	WT. OF DRY SOIL = C-A	(grams)	15.80	12.29	13.48	11.54
F	MOISTURE CONTENT = (D/E)X100	(%)	35.4	33.2	31.3	32.1
N	NUMBER OF BLOWS		11	22	40	35

DRYING TARE NO.



CURING TARE NO.

PLASTIC LIMIT DETERMINATION

QA ID: DLE

6.39

	TARE NO.		1.7	2.4		
A	WT. OF TARE	(grams)	28.47	27.37		
B	WT. OF WET SOIL & TARE	(grams)	34.86	33.86		
C	WT. OF DRY SOIL & TARE	(grams)	33.94	32.94		
D	WT. OF WATER = B-C	(grams)	.92	.92		
E	WT. OF DRY SOIL = C-A	(grams)	5.47	5.56		
F	MOISTURE CONTENT = (D/E)X100	(%)	16.8	16.5		

000089

LIQUID LIMIT (LL) = 33 PLASTIC LIMIT (PL) = 16.7 PLASTICITY INDEX (PI) = 16.

GEOSYNTEC CONSULTANTS

4940

FLUOR FERNALD

ATTERBERG LIMITS TEST (ASTM D 4318)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO PROJECT NO. GQ 1341 TASK NO.: 04.1

DESCRIPTION: Phase III DATE: 27 day Sept month 2001 year

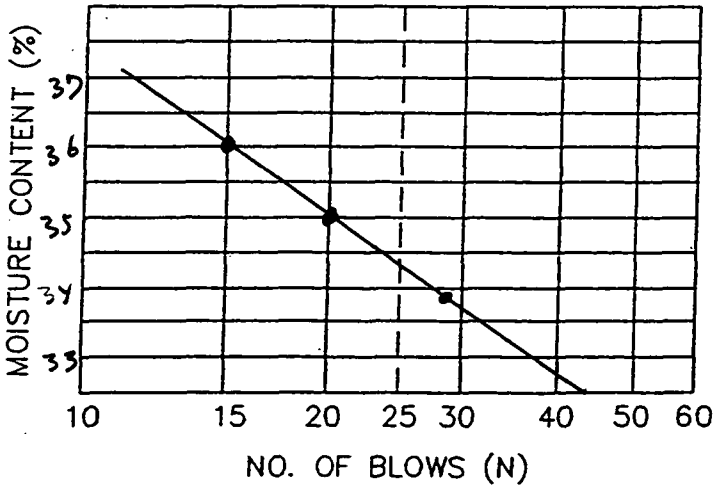
MATERIAL TYPE: Low Pecn Clay MATERIAL SOURCE: Stockpile 01-2 SAMPLE NO. LP-01-19

LIQUID LIMIT DETERMINATION

QA ID: DLE

	TARE NO.		2.1	1.0	3.2	
A	WT. OF TARE	(grams)	28.23	28.79	27.83	
B	WT. OF WET SOIL & TARE	(grams)	42.52	45.72	42.60	
C	WT. OF DRY SOIL & TARE	(grams)	38.73	41.33	38.86	
D	WT. OF WATER = B-C	(grams)	3.79	4.39	3.74	
E	WT. OF DRY SOIL = C-A	(grams)	10.5	12.54	11.03	
F	MOISTURE CONTENT = (D/E)X100	(%)	36.1	35.0	33.9	
N	NUMBER OF BLOWS		15	20	28	

DRYING TARE NO.



CURING TARE NO.

PLASTIC LIMIT DETERMINATION

QA ID: DLE

	TARE NO.		1.9	2.2		
A	WT. OF TARE	(grams)	28.54	27.63		
B	WT. OF WET SOIL & TARE	(grams)	36.82	36.52		
C	WT. OF DRY SOIL & TARE	(grams)	35.64	35.26		
D	WT. OF WATER = B-C	(grams)	1.18	1.26		
E	WT. OF DRY SOIL = C-A	(grams)	7.10	7.63		
F	MOISTURE CONTENT = (D/E)X100	(%)	16.62	16.51		

000090

LIQUID LIMIT (LL) = 34.4 PLASTIC LIMIT (PL) = 16.6 PLASTICITY INDEX (PI) = ~~17.8~~ 17.8

GEOSYNTEC CONSULTANTS

4940

FLUOR FERNALD

ATTERBERG LIMITS TEST

(ASTM D 4318)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO PROJECT NO. 601341 TASK NO.: 04.1

DESCRIPTION: Phase III DATE: 27 day Sept. month 2001 year

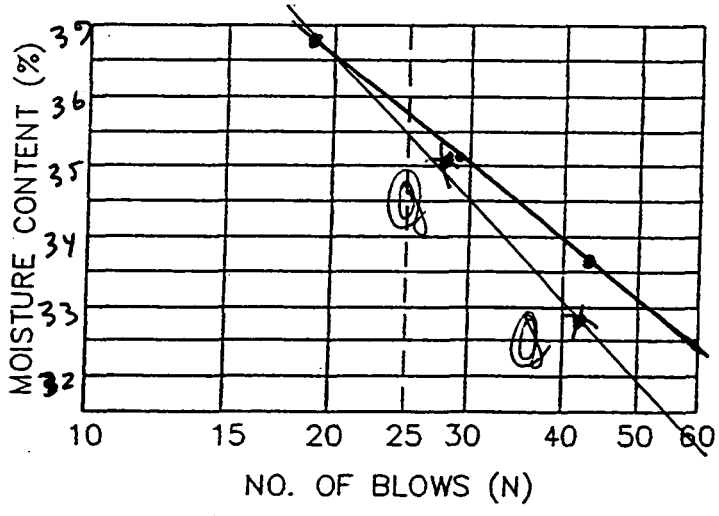
MATERIAL TYPE: Low Plasticity Clay MATERIAL SOURCE: Stockpile 01-3 SAMPLE NO. LP-01-20

LIQUID LIMIT DETERMINATION

QA ID: DLE

	TARE NO.		2.8	1.7	2.4	
A	WT. OF TARE	(grams)	28.46	28.46	27.37	
B	WT. OF WET SOIL & TARE	(grams)	43.06	46.18	42.71	
C	WT. OF DRY SOIL & TARE	(grams)	39.38	41.58	38.58	
D	WT. OF WATER = B−C	(grams)	3.68	4.60	4.13	
E	WT. OF DRY SOIL = C−A	(grams)	10.92	13.10	11.21	
F	MOISTURE CONTENT = (D/E)X100	(%)	33.7	35.1	36.8	
N	NUMBER OF BLOWS		42	28	18	

DRYING TARE NO.



CURING TARE NO.

PLASTIC LIMIT DETERMINATION

QA ID: DLE

	TARE NO.		1.4	2.3		
A	WT. OF TARE	(grams)	28.51	31.19		
B	WT. OF WET SOIL & TARE	(grams)	35.66	39.01		
C	WT. OF DRY SOIL & TARE	(grams)	34.63	37.90		
D	WT. OF WATER = B−C	(grams)	1.03	1.11		
E	WT. OF DRY SOIL = C−A	(grams)	6.12	6.71		
F	MOISTURE CONTENT = (D/E)X100	(%)	16.8	16.5		

000091

LIQUID LIMIT (LL) = ~~35.5~~ 36 PLASTIC LIMIT (PL) = 16.7 PLASTICITY INDEX (PI) = 18.8

GEOSYNTEC CONSULTANTS

FLUOR FERNALD

4940

ATTERBERG LIMITS TEST (ASTM D 4318)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO PROJECT NO.: 6Q1341 TASK NO.: 04.1

DESCRIPTION: PHASE III DATE: 03 day Oct month 2001 year

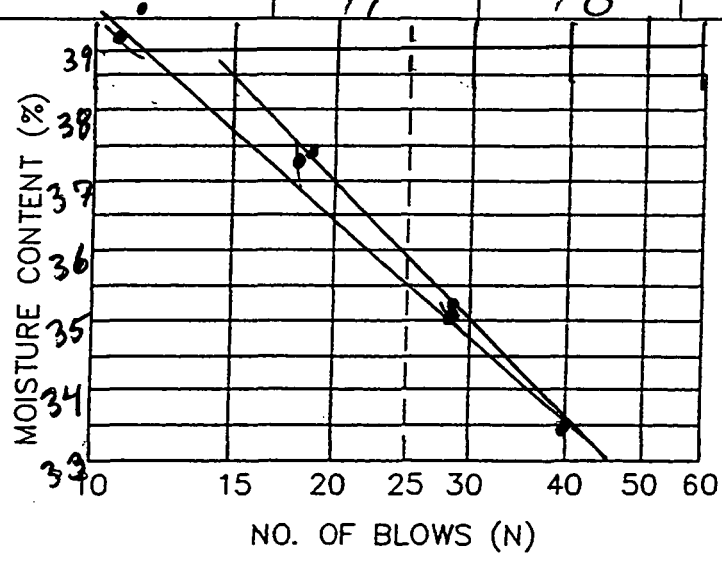
MATERIAL TYPE: Low Perm Clay MATERIAL SOURCE: Stockpile 01-4 SAMPLE NO. LP-01-22

LIQUID LIMIT DETERMINATION

QA ID: DCE

	TARE NO.		2.8	1.4	3.2	2.2
A	WT. OF TARE	(grams)	28.46	28.50	27.82	27.63
B	WT. OF WET SOIL & TARE	(grams)	47.47	46.02	43.91	46.67
C	WT. OF DRY SOIL & TARE	(grams)	42.08	41.25	39.71	41.89
D	WT. OF WATER = B-C	(grams)	5.39	4.77	4.20	4.78
E	WT. OF DRY SOIL = C-A	(grams)	13.62	12.75	11.89	14.26
F	MOISTURE CONTENT = (D/E)X100	(%)	39.6	37.4	35.3	33.5
N	NUMBER OF BLOWS		11	18	27	40

DRYING TARE NO.



CURING TARE NO.

PLASTIC LIMIT DETERMINATION

QA ID: _____

	TARE NO.		2.3	1.9		
A	WT. OF TARE	(grams)	31.18	28.55		
B	WT. OF WET SOIL & TARE	(grams)	40.03	37.86		
C	WT. OF DRY SOIL & TARE	(grams)	38.75	36.41		
D	WT. OF WATER = B-C	(grams)	1.28	1.35		
E	WT. OF DRY SOIL = C-A	(grams)	7.57	7.86		
F	MOISTURE CONTENT = (D/E)X100	(%)	16.9	17.2		

000092

LIQUID LIMIT (LL) = ~~35.5~~ 36 PLASTIC LIMIT (PL) = 17.0 PLASTICITY INDEX (PI) = ~~18.5~~ 19

ATTERBERG LIMITS

ASTM D 4318

4940

PROJECT NAME:	GEOSYNTEC/FLUOR FERNALD/OH
PROJECT NUMBER:	013-3175
SAMPLE ID:	LP01-22 - SAMPLE DEPTH: -
SAMPLE TYPE:	Bag

SAMPLE PREPARATION

Wet or Dry: Dry

Minus #40 Sieve: Yes

PLASTIC LIMIT DETERMINATION

Number of Blows			
Weight of Wet Soil & Tare (gm)	21.57	21.73	18.68
Weight of Dry Soil & Tare (gm)	20.20	20.24	17.66
Weight of Tare (gm)	11.73	11.28	11.30
Weight of Water (gm)	1.37	1.49	1.02
Weight of Dry Soil (gm)	8.47	8.96	6.36
Water Content %	16.17	16.63	16.04

LIQUID LIMIT DETERMINATION

34	29	24	16
21.52	21.53	21.36	21.39
17.05	16.96	16.66	16.61
4.28	4.33	4.27	4.18
4.47	4.57	4.70	4.78
12.77	12.63	12.39	12.43
35.00	36.18	37.93	38.46

As-Rec'd Moisture

625.91
534.92
0.00
90.99
534.92
17.01

PLASTIC LIMIT (PL): 16

LIQUID LIMIT (LL): 37

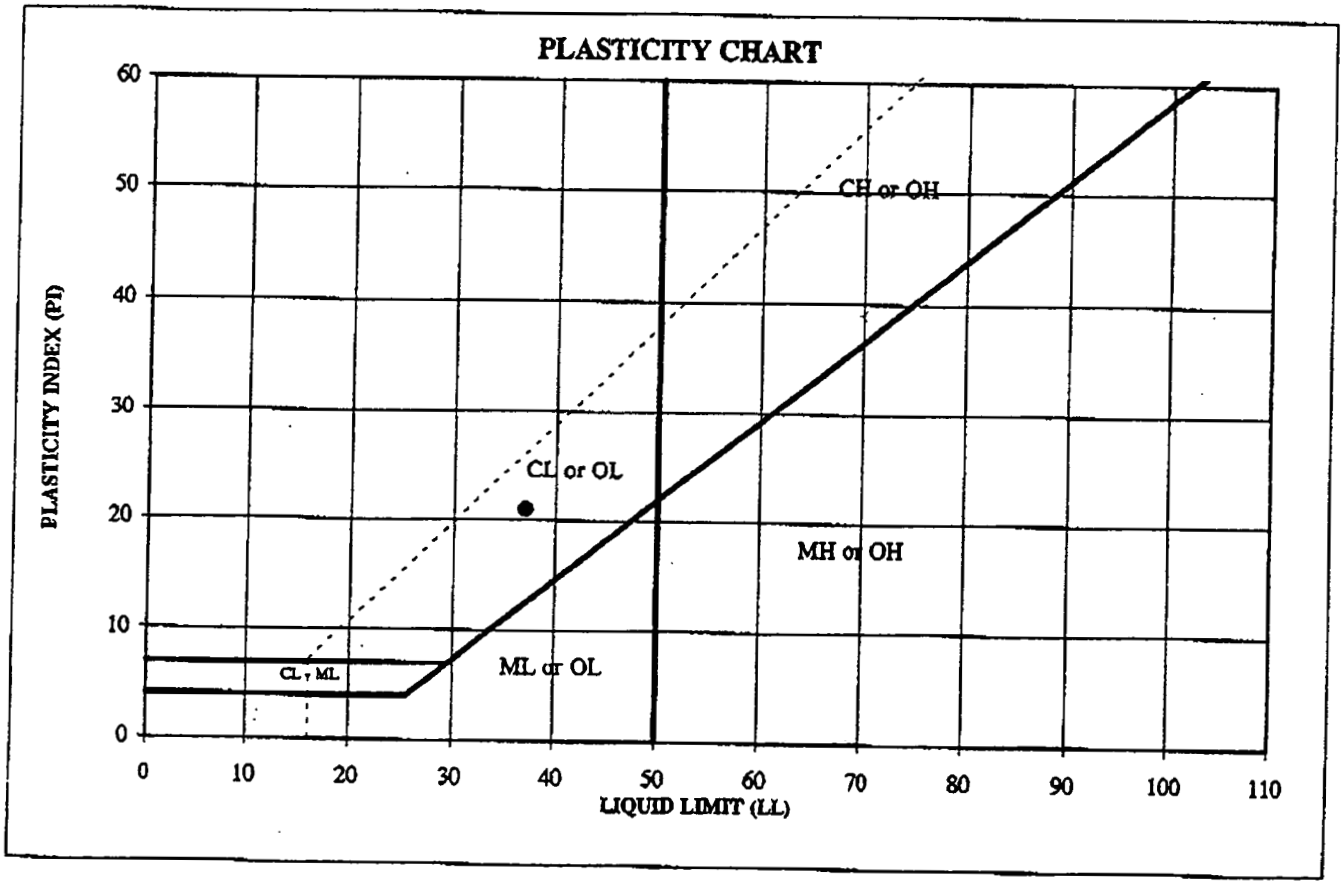
PLASTICITY INDEX (PI): 21

LIQUIDITY INDEX (LI): 0.03

NOTE:

DESCRIPTION: Dark Yellowish Brown, SILTY CLAY, some coarse to fine sand, little fine gravel.

USCS: CL



000093

TECH: DH
DATE: 10/24/01
CHECK:
REVIEW:

Golder Associates Inc.

GEOSYNTEC CONSULTANTS

4940

FLUOR FERNALD

ATTERBERG LIMITS TEST (ASTM D 4318)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO PROJECT NO. 6Q1341 TASK NO.: 04.1

DESCRIPTION: Phase III DATE: 03 day Oct month 2001 year

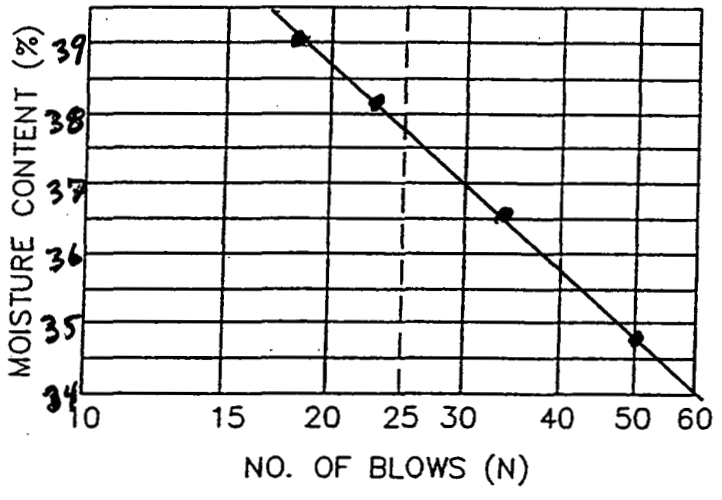
MATERIAL TYPE: Low Perm Clay MATERIAL SOURCE: Stockpile 01-4 SAMPLE NO. 48-01-23

LIQUID LIMIT DETERMINATION

QA ID: DCE

	TARE NO.		2.4	1.8	3.1	2.9
A	WT. OF TARE	(grams)	27.36	28.79	28.39	31.46
B	WT. OF WET SOIL & TARE	(grams)	41.68	44.44	50.73	48.45
C	WT. OF DRY SOIL & TARE	(grams)	37.99	40.25	44.56	43.68
D	WT. OF WATER = B-C	(grams)	3.69	4.19	6.17	4.77
E	WT. OF DRY SOIL = C-A	(grams)	10.63	11.46	16.17	12.22
F	MOISTURE CONTENT = (D/E)X100	(%)	34.7	36.6	38.2	39.0
N	NUMBER OF BLOWS		50	34	23	18

DRYING TARE NO.



CURING TARE NO.

PLASTIC LIMIT DETERMINATION

QA ID: _____

	TARE NO.		1.7	2.1		
A	WT. OF TARE	(grams)	28.47	28.22		
B	WT. OF WET SOIL & TARE	(grams)	37.00	37.08		
C	WT. OF DRY SOIL & TARE	(grams)	35.74	35.80		
D	WT. OF WATER = B-C	(grams)	1.26	1.28		
E	WT. OF DRY SOIL = C-A	(grams)	7.27	7.58		
F	MOISTURE CONTENT = (D/E)X100	(%)	17.3	16.9		

000094

LIQUID LIMIT (LL) = 37.7 PLASTIC LIMIT (PL) = 17.1 PLASTICITY INDEX (PI) = ~~20.6~~ 21

GEOSYNTEC CONSULTANTS

4940

FLUOR FERNALD

ATTERBERG LIMITS TEST

(ASTM D 4318)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO PROJECT NO. G91341 TASK NO.: 041

DESCRIPTION: Phase III DATE: 03 day Oct month 2001 year

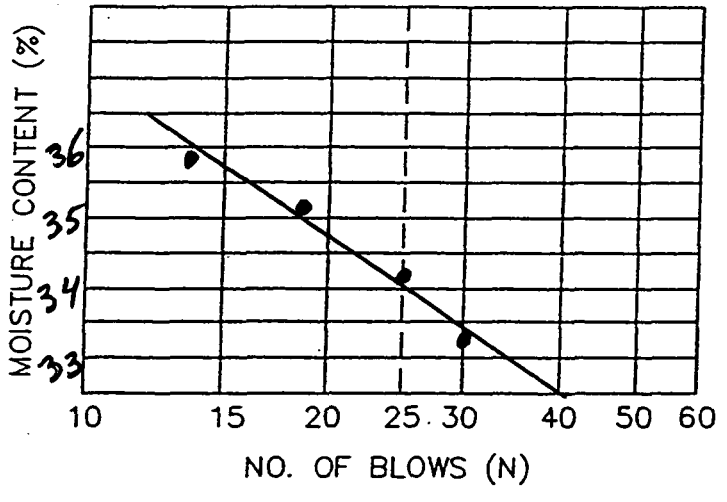
MATERIAL TYPE: Low Perm Clay MATERIAL SOURCE: Stockpile 01-41 SAMPLE NO. LP-01-24

LIQUID LIMIT DETERMINATION

QA ID: DLE

	TARE NO.		1.2	2.7	1.1	2.6
A	WT. OF TARE	(grams)	28.49	28.69	28.76	28.55
B	WT. OF WET SOIL & TARE	(grams)	47.47	49.12	47.81	49.59
C	WT. OF DRY SOIL & TARE	(grams)	42.47	43.81	42.96	44.33
D	WT. OF WATER = B-C	(grams)	5.00	5.31	4.85	5.26
E	WT. OF DRY SOIL = C-A	(grams)	13.98	15.12	14.2	15.78
F	MOISTURE CONTENT = (D/E)X100	(%)	35.8	35.1	34.2	33.3
N	NUMBER OF BLOWS		13	18	25	30

DRYING TARE NO.



CURING TARE NO.

PLASTIC LIMIT DETERMINATION

QA ID: _____

	TARE NO.		2.5	1.3		
A	WT. OF TARE	(grams)	28.43	28.62		
B	WT. OF WET SOIL & TARE	(grams)	36.52	37.60		
C	WT. OF DRY SOIL & TARE	(grams)	35.39	36.34		
D	WT. OF WATER = B-C	(grams)	1.13	1.26		
E	WT. OF DRY SOIL = C-A	(grams)	6.96	7.72		
F	MOISTURE CONTENT = (D/E)X100	(%)	16.2	16.3		

000095

LIQUID LIMIT (LL) = 34 PLASTIC LIMIT (PL) = 16.3 PLASTICITY INDEX (PI) = 17.7

GEOSYNTEC CONSULTANTS

4940

FLUOR FERNALD

ATTERBERG LIMITS TEST (ASTM D 4318)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO PROJECT NO. GQ1341 TASK NO.: 041

DESCRIPTION: Phase III DATE: ____ day Oct month 2001 year

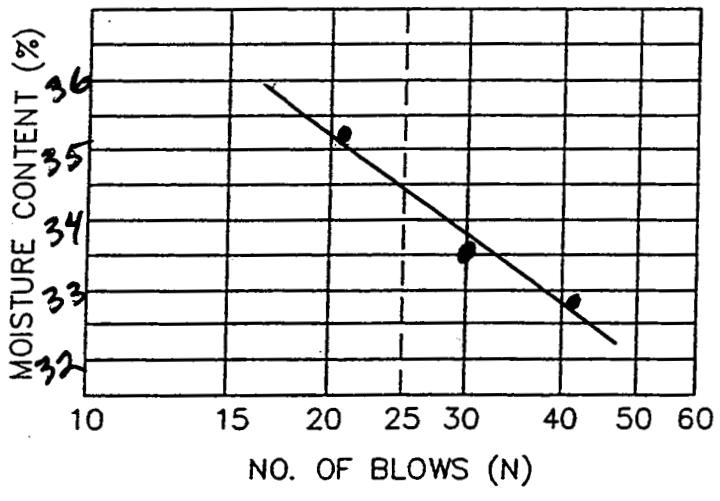
MATERIAL TYPE: Low Perm Clay MATERIAL SOURCE: Stockpile #1-3 SAMPLE NO. LP-01-25

LIQUID LIMIT DETERMINATION

QA ID: DLE

	TARE NO.		1.5	1.6	3.9	~~3.5~~
A	WT. OF TARE	(grams)	28.58	28.86	21.00	~~21.18~~
B	WT. OF WET SOIL & TARE	(grams)	45.02	46.90	38.19	
C	WT. OF DRY SOIL & TARE	(grams)	40.89	42.43	33.72	
D	WT. OF WATER = B–C	(grams)	4.13	4.47	4.47	
E	WT. OF DRY SOIL = C–A	(grams)	12.31	13.57	12.72	
F	MOISTURE CONTENT = (D/E)X100	(%)	33.6 ~~33.5~~	32.9	35.1	
N	NUMBER OF BLOWS		30	41	22	

DRYING TARE NO.



CURING TARE NO.

PLASTIC LIMIT DETERMINATION

QA ID: DLE

	TARE NO.		3.8	4.3		
A	WT. OF TARE	(grams)	21.05	21.35		
B	WT. OF WET SOIL & TARE	(grams)	28.20	28.85		
C	WT. OF DRY SOIL & TARE	(grams)	27.20	27.80		
D	WT. OF WATER = B–C	(grams)	1.00	1.05		
E	WT. OF DRY SOIL = C–A	(grams)	6.15	6.45		
F	MOISTURE CONTENT = (D/E)X100	(%)	16.26	16.27		

000096

LIQUID LIMIT (LL) = ~~34.5~~ 34 PLASTIC LIMIT (PL) = 16.3 PLASTICITY INDEX (PI) = 18.2

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FLUOR FERNALD

4940

ATTERBERG LIMITS TEST (ASTM D 4318)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO PROJECT NO. GQ1341 TASK NO. 04.1

DESCRIPTION: Phase III DATE: 5 day Oct month 2001 year

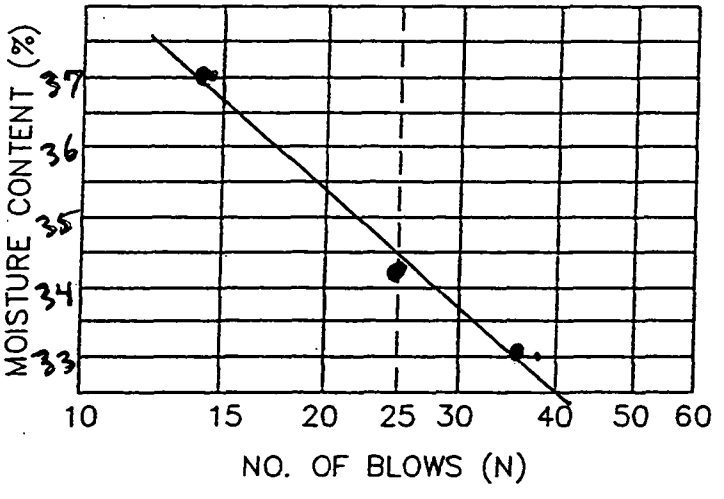
MATERIAL TYPE: Low Perm Clay MATERIAL SOURCE Stockpile 01-4 SAMPLE NO. LP-01-26

LIQUID LIMIT DETERMINATION

QA ID: DLE

	TARE NO.		4.0	3.3	4.1	3.7
A	WT. OF TARE	(grams)	21.11	21.44	21.07	21.29
B	WT. OF WET SOIL & TARE	(grams)	39.95	42.66	37.10	
C	WT. OF DRY SOIL & TARE	(grams)	34.86	37.24	33.12	
D	WT. OF WATER = B-C	(grams)	5.09	5.42	3.98	
E	WT. OF DRY SOIL = C-A	(grams)	13.75	15.80	12.05	
F	MOISTURE CONTENT = (D/E)X100	(%)	37.0	34.3	33.0	
N	NUMBER OF BLOWS		14	25	38	

DRYING TARE NO.



CURING TARE NO.

PLASTIC LIMIT DETERMINATION

QA ID: DLE

	TARE NO.		4.2	3.8		
A	WT. OF TARE	(grams)	21.19	21.08		
B	WT. OF WET SOIL & TARE	(grams)	30.14	31.06		
C	WT. OF DRY SOIL & TARE	(grams)	28.89	29.67		
D	WT. OF WATER = B-C	(grams)	1.25	1.39		
E	WT. OF DRY SOIL = C-A	(grams)	7.70	8.59		
F	MOISTURE CONTENT = (D/E)X100	(%)	16.2	16.2		

000097

LIQUID LIMIT (LL) = ~~34.5~~ 35 PLASTIC LIMIT (PL) = ~~16.2~~ 16 PLASTICITY INDEX (PI) = ~~18.3~~ 19

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FLUOR FERNALD 4940

ATTERBERG LIMITS TEST

(ASTM D 4318)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO PROJECT NO. 69 1341 TASK NO.: 04.1

DESCRIPTION: Phase III DATE: 5 day Oct month 2001 year

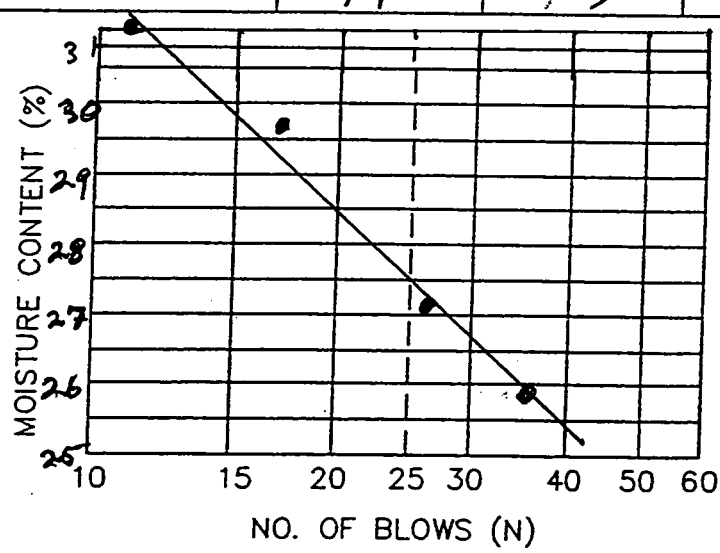
MATERIAL TYPE: Low Perm Clay MATERIAL SOURCE: Stockpile 01-4 SAMPLE NO. LP-01-27

LIQUID LIMIT DETERMINATION

QA ID: DLE

	TARE NO.		3.2	1.6	2.8	1.1
A	WT. OF TARE	(grams)	27.83	28.86	28.46	28.77
B	WT. OF WET SOIL & TARE	(grams)	45.85	47.71	45.08	44.18
C	WT. OF DRY SOIL & TARE	(grams)	41.53	43.39	41.53	41.02
D	WT. OF WATER = B-C	(grams)	4.32	4.32	3.55	3.16
E	WT. OF DRY SOIL = C-A	(grams)	13.70	14.53	13.07	12.25
F	MOISTURE CONTENT = (D/E)X100	(%)	31.5	29.7	27.2	25.8
N	NUMBER OF BLOWS		11	17	26	36

DRYING TARE NO.



CURING TARE NO.

PLASTIC LIMIT DETERMINATION

QA ID: DLE

	TARE NO.		2.6	1.5		
A	WT. OF TARE	(grams)	28.55	28.60		
B	WT. OF WET SOIL & TARE	(grams)	38.75	39.61		
C	WT. OF DRY SOIL & TARE	(grams)	37.40	38.17		
D	WT. OF WATER = B-C	(grams)	1.35	1.44		
E	WT. OF DRY SOIL = C-A	(grams)	8.85	9.57		
F	MOISTURE CONTENT = (D/E)X100	(%)	15.3	15.0		

000098

LIQUID LIMIT (LL) = ~~27.5~~ 28 PLASTIC LIMIT (PL) = ~~15.2~~ 15 PLASTICITY INDEX (PI) = ~~12.3~~ 13

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GEOSYNTEC CONSULTANTS

4940

FLUOR FERNALD

ATTERBERG LIMITS TEST (ASTM D 4318)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO PROJECT NO. GQ1341 TASK NO.: 04.1

DESCRIPTION: Phase III DATE: 5 day Oct month 2001 year

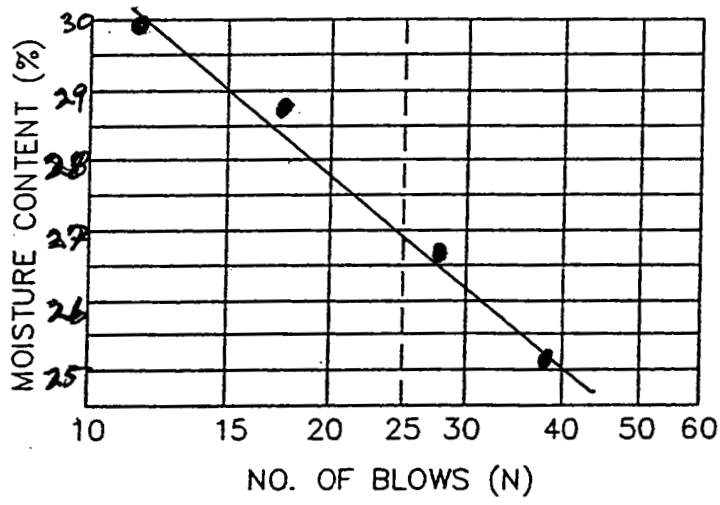
MATERIAL TYPE: Low Perm Clay MATERIAL SOURCE: Stockpile 01-4 SAMPLE NO. LP-01-28

LIQUID LIMIT DETERMINATION

QA ID: DLE

	TARE NO.		2.4	1.8	3.1	1.9
A	WT. OF TARE	(grams)	27.39	28.79	28.38	28.55
B	WT. OF WET SOIL & TARE	(grams)	43.29	45.42	46.35	45.13
C	WT. OF DRY SOIL & TARE	(grams)	39.63	41.71	42.56	41.79
D	WT. OF WATER = B-C	(grams)	3.66	3.71	3.79	3.34
E	WT. OF DRY SOIL = C-A	(grams)	12.26	12.92	14.18	13.24
F	MOISTURE CONTENT = (D/E)X100	(%)	29.90	28.7	26.7	25.2
N	NUMBER OF BLOWS		12	17	27	39

DRYING TARE NO.



CURING TARE NO.

PLASTIC LIMIT DETERMINATION

QA ID: DLE

	TARE NO.		1.4	2.9		
A	WT. OF TARE	(grams)	28.50	31.46		
B	WT. OF WET SOIL & TARE	(grams)	36.34	39.10		
C	WT. OF DRY SOIL & TARE	(grams)	35.28	38.06		
D	WT. OF WATER = B-C	(grams)	1.06	1.04		
E	WT. OF DRY SOIL = C-A	(grams)	6.78	6.60		
F	MOISTURE CONTENT = (D/E)X100	(%)	15.6	15.8		

000099

LIQUID LIMIT (LL) = ~~26.9~~ 27 PLASTIC LIMIT (PL) = ~~15.7~~ 16 PLASTICITY INDEX (PI) = ~~11.2~~ 11

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GEOSYNTEC CONSULTANTS

4940

FLUOR FERNALD

ATTERBERG LIMITS TEST (ASTM D 4318)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO PROJECT NO. GO1341 TASK NO. 04.1

DESCRIPTION: Phase III DATE: 5 day Oct. month 2001 year

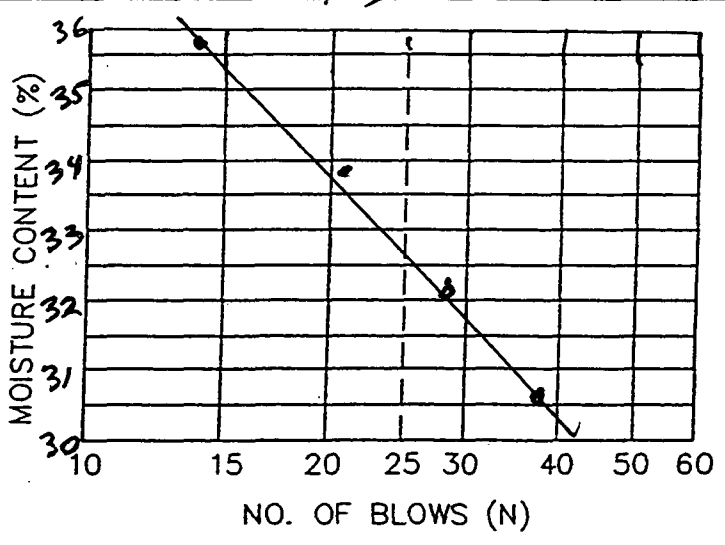
MATERIAL TYPE: Low Perm. Clay MATERIAL SOURCE: Stock pile 01-5 SAMPLE NO. LP-01-29

LIQUID LIMIT DETERMINATION

QA ID: DAE

	TARE NO.		2.5	1.2	2.2	1.3
A	WT. OF TARE	(grams)	28.42	28.49	27.63	28.64
B	WT. OF WET SOIL & TARE	(grams)	47.52	46.31	46.70	46.72
C	WT. OF DRY SOIL & TARE	(grams)	42.51	41.81	42.05	42.48
D	WT. OF WATER = B-C	(grams)	5.01	4.50	4.65	4.24
E	WT. OF DRY SOIL = C-A	(grams)	14.09	13.32	14.42	13.84
F	MOISTURE CONTENT = (D/E)X100	(%)	35.6	33.8	32.2	30.6
N	NUMBER OF BLOWS		13	21	28	38

DRYING TARE NO.



CURING TARE NO.

PLASTIC LIMIT DETERMINATION

QA ID: DAE

	TARE NO.		2.7	1.7		
A	WT. OF TARE	(grams)	28.67	28.47		
B	WT. OF WET SOIL & TARE	(grams)	37.69	37.97		
C	WT. OF DRY SOIL & TARE	(grams)	36.46	36.67		
D	WT. OF WATER = B-C	(grams)	1.23	1.30		
E	WT. OF DRY SOIL = C-A	(grams)	7.79	8.20		
F	MOISTURE CONTENT = (D/E)X100	(%)	15.8	15.9		

000100

LIQUID LIMIT (LL) = ~~32.6~~ 33 PLASTIC LIMIT (PL) = ~~15.9~~ 16 PLASTICITY INDEX (PI) = ~~16.7~~ 17

GEOSYNTEC CONSULTANTS

4940

FLUOR FERNALD

ATTERBERG LIMITS TEST

(ASTM D 4318)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO PROJECT NO. 6-Q1341 TASK NO.: Ø41

DESCRIPTION: Phase III DATE: Ø8 day Oct month 2001 year

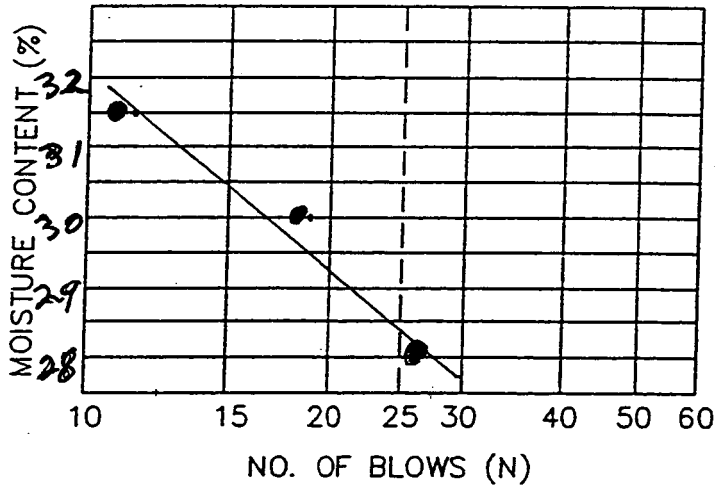
MATERIAL TYPE: Low Perm Clay MATERIAL SOURCE: Stockpile Ø1-5 SAMPLE NO. LP-01-30

LIQUID LIMIT DETERMINATION

QA ID: DLE

	TARE NO.		2.4	3.1	1.8	
A	WT. OF TARE	(grams)	27.38	28.38	28.79	
B	WT. OF WET SOIL & TARE	(grams)	46.12	44.92	45.42	
C	WT. OF DRY SOIL & TARE	(grams)	41.63	41.10	41.78	
D	WT. OF WATER = B-C	(grams)	4.49	3.82	3.64	
E	WT. OF DRY SOIL = C-A	(grams)	14.25	12.72	12.99	
F	MOISTURE CONTENT = (D/E)X100	(%)	31.5	30.0	28.0	
N	NUMBER OF BLOWS		11	18	26	

DRYING TARE NO.



CURING TARE NO.

PLASTIC LIMIT DETERMINATION

QA ID: DLE

	TARE NO.		2.5	1.2		
A	WT. OF TARE	(grams)	28.42	28.49		
B	WT. OF WET SOIL & TARE	(grams)	38.92	36.09		
C	WT. OF DRY SOIL & TARE	(grams)	37.48	35.04		
D	WT. OF WATER = B-C	(grams)	1.44	1.05		
E	WT. OF DRY SOIL = C-A	(grams)	9.06	6.55		
F	MOISTURE CONTENT = (D/E)X100	(%)	15.9	16.0		

000101

LIQUID LIMIT (LL) = ~~28.4~~ 28 TBL PLASTIC LIMIT (PL) = 16 PLASTICITY INDEX (PI) = ~~12.4~~ 12 TBL

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GEOSYNTEC CONSULTANTS

FLUOR FERNALD 4940

ATTERBERG LIMITS TEST (ASTM D 4318)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO PROJECT NO. GQ1311 TASK NO.: 44.1

DESCRIPTION: Phase III DATE: 08 day Oct month 2001 year

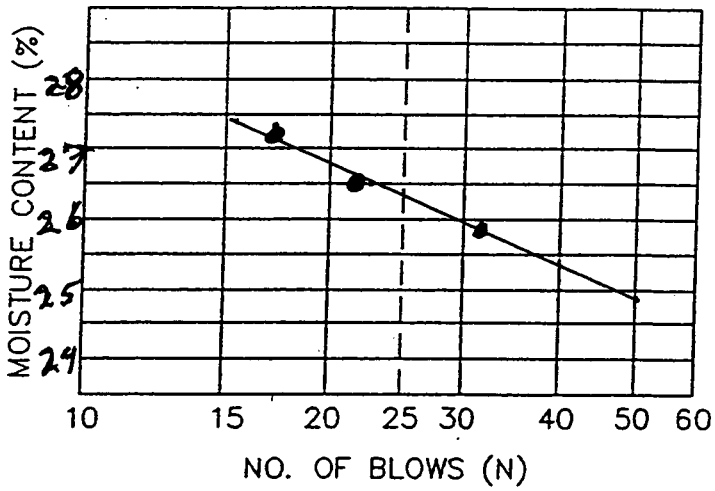
MATERIAL TYPE: Low Perm Clay MATERIAL SOURCE: Stockpile 01-5 SAMPLE NO. LP-01-31

LIQUID LIMIT DETERMINATION

QA ID: DLE

	TARE NO.		1.6	2.8	1.3	2.9
A	WT. OF TARE	(grams)	28.87	28.46	28.63	31.45
B	WT. OF WET SOIL & TARE	(grams)	46.23	49.35	48.70	
C	WT. OF DRY SOIL & TARE	(grams)	42.66	44.98	44.39	
D	WT. OF WATER = B-C	(grams)	3.57	4.37	4.31	
E	WT. OF DRY SOIL = C-A	(grams)	13.79	16.52	15.76	
F	MOISTURE CONTENT = (D/E)X100	(%)	25.9	26.5	27.3	
N	NUMBER OF BLOWS		31	22	17	

DRYING TARE NO.



CURING TARE NO.

PLASTIC LIMIT DETERMINATION

QA ID: DLE

	TARE NO.		2.1	1.1		
A	WT. OF TARE	(grams)	28.23	28.77		
B	WT. OF WET SOIL & TARE	(grams)	36.21	37.75		
C	WT. OF DRY SOIL & TARE	(grams)	35.17	36.58		
D	WT. OF WATER = B-C	(grams)	1.04	1.17		
E	WT. OF DRY SOIL = C-A	(grams)	6.94	7.81		
F	MOISTURE CONTENT = (D/E)X100	(%)	15.0	15.0		

000102

LIQUID LIMIT (LL) = ~~26.4~~ 26 PLASTIC LIMIT (PL) = 15.0 PLASTICITY INDEX (PI) = ~~11.4~~ 11

©GEOSYNTEC CONSULTANTS FILE NO. 2-13-ALT CHECKED BY: TBR SHEET NO. 1 OF 1

GEOSYNTEC CONSULTANTS

FLUOR FERNALD 4940

ATTERBERG LIMITS TEST

(ASTM D 4318)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO PROJECT NO. 6Q1341 TASK NO.: 04.1

DESCRIPTION: Phase III DATE: 09 day Oct month 2001 year

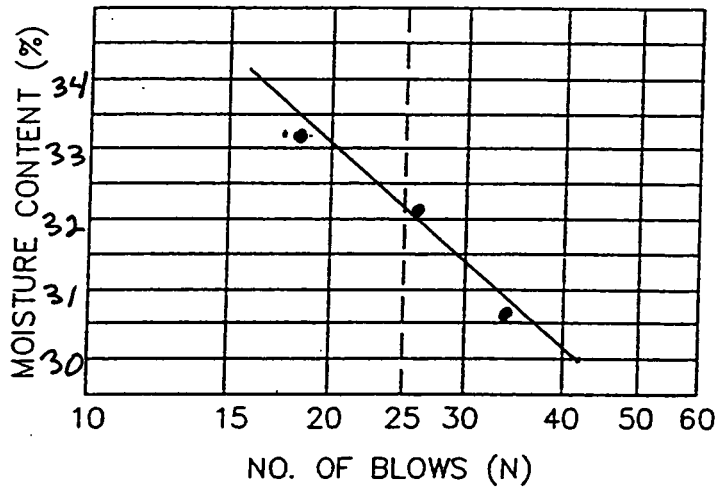
MATERIAL TYPE: Low Perm Clay MATERIAL SOURCE: Stockpile 01-5 SAMPLE NO. LP-01-32

LIQUID LIMIT DETERMINATION

QA ID: DLE

	TARE NO.		1.5	2.7	3.2	1.4
A	WT. OF TARE	(grams)	28.60	28.68	27.83	28.50
B	WT. OF WET SOIL & TARE	(grams)	45.09	48.84	47.62	
C	WT. OF DRY SOIL & TARE	(grams)	41.23	43.94	42.69	
D	WT. OF WATER = B-C	(grams)	3.86	4.90	4.93	
E	WT. OF DRY SOIL = C-A	(grams)	12.63	15.26	14.86	
F	MOISTURE CONTENT = (D/E)X100	(%)	30.6	32.1	33.2	
N	NUMBER OF BLOWS		34	26	17	15

DRYING TARE NO.



CURING TARE NO.

PLASTIC LIMIT DETERMINATION

QA ID: DLE

	TARE NO.		1.9	2.6		
A	WT. OF TARE	(grams)	28.55	28.55		
B	WT. OF WET SOIL & TARE	(grams)	40.29	37.78		
C	WT. OF DRY SOIL & TARE	(grams)	38.66	36.51		
D	WT. OF WATER = B-C	(grams)	1.63	1.27		
E	WT. OF DRY SOIL = C-A	(grams)	10.11	7.96		
	MOISTURE CONTENT = (D/E)X100	(%)	16.1	16.0		

000103

LIQUID LIMIT (LL) = ~~32.1~~ 32 PLASTIC LIMIT (PL) = 16.0 PLASTICITY INDEX (PI) = 16.0

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GEOSYNTEC CONSULTANTS

FLUOR FERNALD 4940

ATTERBERG LIMITS TEST (ASTM D 4318)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO PROJECT NO. 6Q1341 TASK NO.: 04.1

DESCRIPTION: Phase III DATE: 09 day Oct month 2001 year

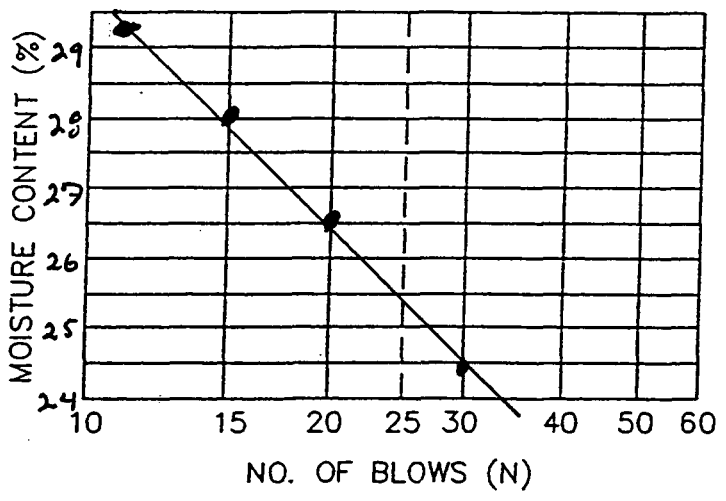
MATERIAL TYPE: Low Perm Clay MATERIAL SOURCE: Stockpile 01-6 SAMPLE NO. LP-01-3 3

LIQUID LIMIT DETERMINATION

QA ID: DLE

	TARE NO.		1.4	2.9	1.6	2.4
A	WT. OF TARE	(grams)	28.50	31.46	28.86	27.38
B	WT. OF WET SOIL & TARE	(grams)	47.09	50.60	45.42	47.08
C	WT. OF DRY SOIL & TARE	(grams)	42.88	46.41	41.95	43.22
D	WT. OF WATER = B-C	(grams)	4.21	4.19	3.47	3.86
E	WT. OF DRY SOIL = C-A	(grams)	14.38	14.95	13.09	15.84
F	MOISTURE CONTENT = (D/E)X100	(%)	29.3	28.0	26.5	24.4
N	NUMBER OF BLOWS		11	15	20	30

DRYING TARE NO.



CURING TARE NO.

PLASTIC LIMIT DETERMINATION

QA ID: DLE

	TARE NO.		2.3	1.8		
A	WT. OF TARE	(grams)	31.19	28.80		
B	WT. OF WET SOIL & TARE	(grams)	41.16	39.48		
C	WT. OF DRY SOIL & TARE	(grams)	39.88	38.11		
D	WT. OF WATER = B-C	(grams)	1.28	1.37		
E	WT. OF DRY SOIL = C-A	(grams)	8.69	9.31		
F	MOISTURE CONTENT = (D/E)X100	(%)	14.7	14.7		

000104

LIQUID LIMIT (LL) = ~~25.5~~ 26 PLASTIC LIMIT (PL) = ~~14.7~~ 15 PLASTICITY INDEX (PI) = ~~10.8~~ 11

GEOSYNTEC CONSULTANTS

FLUOR FERNALD

4940

ATTERBERG LIMITS TEST

(ASTM D 4318)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO PROJECT NO. 691341 TASK NO.: 04.1

DESCRIPTION: Phase III DATE: 15 day Oct month 2001 year

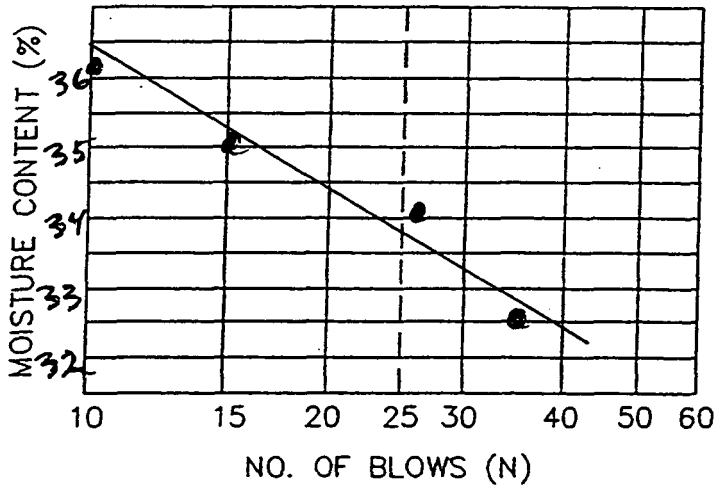
MATERIAL TYPE: Low Perm Clay MATERIAL SOURCE: Stockpile 01-06 SAMPLE NO.: P-01-34

LIQUID LIMIT DETERMINATION

QA ID: DLE

	TARE NO.		1.7	2.9	1.1	2.7
A	WT. OF TARE	(grams)	28.48	31.46	28.78	28.68
B	WT. OF WET SOIL & TARE	(grams)	43.71	47.44	45.37	43.72
C	WT. OF DRY SOIL & TARE	(grams)	39.65	43.30	41.15	40.06
D	WT. OF WATER = B-C	(grams)	4.06	4.14	4.22	3.71
E	WT. OF DRY SOIL = C-A	(grams)	11.17	11.84	12.37	11.38
F	MOISTURE CONTENT = (D/E)X100	(%)	36.3	35.0	34.1	32.6
N	NUMBER OF BLOWS		10	15	27	35

DRYING TARE NO.



CURING TARE NO.

PLASTIC LIMIT DETERMINATION

QA ID: DLE

	TARE NO.		1.9	2.8		
A	WT. OF TARE	(grams)	28.54	28.46		
B	WT. OF WET SOIL & TARE	(grams)	36.74	34.67		
C	WT. OF DRY SOIL & TARE	(grams)	35.54	33.77		
D	WT. OF WATER = B-C	(grams)	1.20	.90		000105
E	WT. OF DRY SOIL = C-A	(grams)	7.00	5.31		
F	MOISTURE CONTENT = (D/E)X100	(%)	17.1	16.9		

LIQUID LIMIT (LL) = 33.7 PLASTIC LIMIT (PL) = 17 PLASTICITY INDEX (PI) = 16.7

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4940

FLUOR FERNALD

ATTERBERG LIMITS TEST

(ASTM D 4318)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO PROJECT NO. 6Q1341 TASK NO.: 04.1

DESCRIPTION: Phase III DATE: 15 day Oct month 2001 year

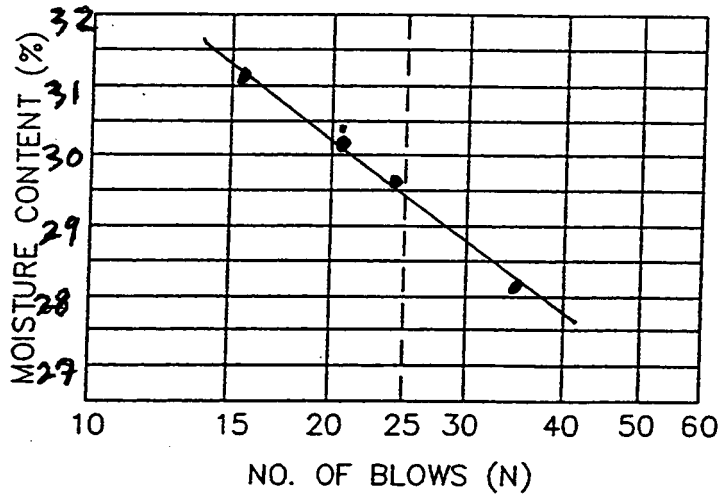
MATERIAL TYPE: Low Perm Clay MATERIAL SOURCE: Stockpile 01-6 SAMPLE NO. LP-01-35

LIQUID LIMIT DETERMINATION

QA ID: DLE

	TARE NO.		1.6	2.3	1.4	2.6
A	WT. OF TARE	(grams)	28.86	31.19	28.49	28.54
B	WT. OF WET SOIL & TARE	(grams)	44.88	47.33	47.69	44.05
C	WT. OF DRY SOIL & TARE	(grams)	41.36	43.64	43.23	40.37
D	WT. OF WATER = B-C	(grams)	3.52	3.69	4.46	3.68
E	WT. OF DRY SOIL = C-A	(grams)	12.50	12.45	14.74	11.83
F	MOISTURE CONTENT = (D/E)X100	(%)	28.2	29.6	30.3	31.1
N	NUMBER OF BLOWS		35	24	21	16

DRYING TARE NO.



CURING TARE NO.

PLASTIC LIMIT DETERMINATION

QA ID: DLE

	TARE NO.		2.4	1.8		
A	WT. OF TARE	(grams)	27.38	28.79		
B	WT. OF WET SOIL & TARE	(grams)	35.66	37.52		
C	WT. OF DRY SOIL & TARE	(grams)	34.54	36.31		
D	WT. OF WATER = B-C	(grams)	1.12	1.21		
E	WT. OF DRY SOIL = C-A	(grams)	7.16	7.52		
F	MOISTURE CONTENT = (D/E)X100	(%)	15.6	16.1		

000106

LIQUID LIMIT (LL) = 29.5 PLASTIC LIMIT (PL) = 15.9 PLASTICITY INDEX (PI) = 13.6

GEOSYNTEC CONSULTANTS

4940

FLUOR FERNALD

ATTERBERG LIMITS TEST

(ASTM D 4318)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO PROJECT NO. GQ1341 TASK NO.: 04.1

DESCRIPTION: Phase III DATE: 15 day Oct month 2001 year

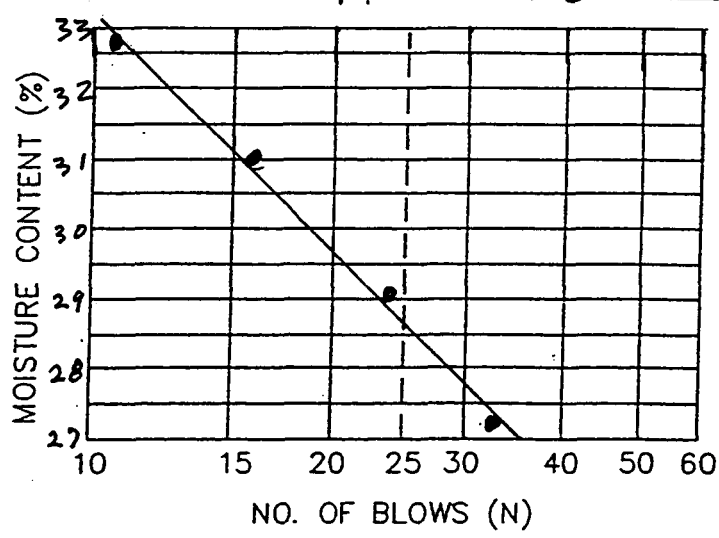
MATERIAL TYPE: Low Porm Clay MATERIAL SOURCE: Stockpile 01-6 SAMPLE NO. LP-01-36

LIQUID LIMIT DETERMINATION

QA ID: PFE

	TARE NO.		2.1	1.2	3.1	2.2
A	WT. OF TARE	(grams)	28.22	28.48	28.38	27.63
B	WT. OF WET SOIL & TARE	(grams)	47.93	47.30	45.14	43.83
C	WT. OF DRY SOIL & TARE	(grams)	43.07	42.84	41.36	40.37
D	WT. OF WATER = B-C	(grams)	4.86	4.46	3.78	3.46
E	WT. OF DRY SOIL = C-A	(grams)	14.85	14.36	12.98	12.74
F	MOISTURE CONTENT = (D/E)X100	(%)	32.7	31.0	29.1	27.2
N	NUMBER OF BLOWS		11	16	24	33

DRYING TARE NO.



CURING TARE NO.

PLASTIC LIMIT DETERMINATION

QA ID: DLE

	TARE NO.		2.5	1.5		
A	WT. OF TARE	(grams)	28.42	28.60		
B	WT. OF WET SOIL & TARE	(grams)	38.00	39.70		
C	WT. OF DRY SOIL & TARE	(grams)	36.72	38.20		
D	WT. OF WATER = B-C	(grams)	1.28	1.50		
E	WT. OF DRY SOIL = C-A	(grams)	8.30	9.60		
F	MOISTURE CONTENT = (D/E)X100	(%)	15.4	15.6		

000107

LIQUID LIMIT (LL) = 28.6 PLASTIC LIMIT (PL) = 15.5 PLASTICITY INDEX (PI) = 13.1

GEOSYNTEC CONSULTANTS

4940

FLUOR FERNALD

ATTERBERG LIMITS TEST

(ASTM D 4318)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO PROJECT NO. GQ1341 TASK NO.: 041

DESCRIPTION: Phase IV DATE: 15 day Oct month 2001 year

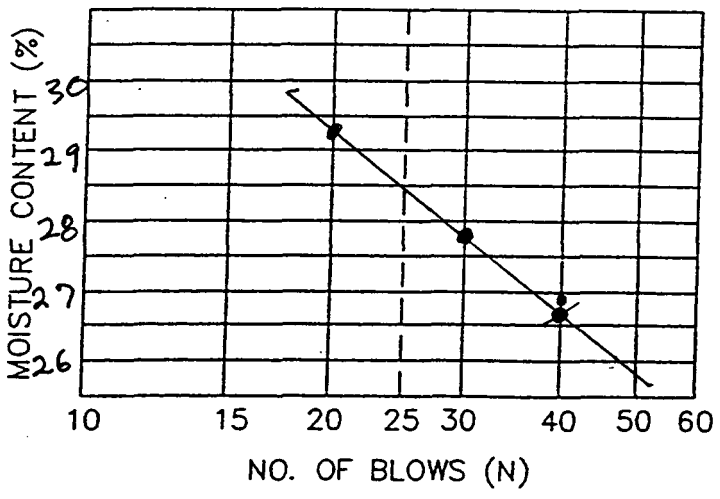
MATERIAL TYPE: Low Poorm Clay MATERIAL SOURCE: Stockpile 01-6 SAMPLE NO. LP-01-37

LIQUID LIMIT DETERMINATION

QA ID: DLE

	TARE NO.		3.2	1.3	4.0	3.3
A	WT. OF TARE	(grams)	27.82	28.64	21.13	21.45
B	WT. OF WET SOIL & TARE	(grams)	47.51	49.10	43.18	
C	WT. OF DRY SOIL & TARE	(grams)	43.05	44.65	38.50	
D	WT. OF WATER = B-C	(grams)	4.46	4.45	~~4.62~~ 4.68	
E	WT. OF DRY SOIL = C-A	(grams)	15.23	16.01	17.37	
F	MOISTURE CONTENT = (D/E)X100	(%)	29.3	27.8	~~26.6~~ 26.9	
N	NUMBER OF BLOWS		20	30	40	

DRYING TARE NO.



CURING TARE NO.

PLASTIC LIMIT DETERMINATION

QA ID: DLE

	TARE NO.		3.8	4.1		
A	WT. OF TARE	(grams)	21.07	21.06		
B	WT. OF WET SOIL & TARE	(grams)	30.80	34.22		
C	WT. OF DRY SOIL & TARE	(grams)	29.49	32.41		
D	WT. OF WATER = B-C	(grams)	1.31	1.81		
E	WT. OF DRY SOIL = C-A	(grams)	8.42	11.35		
F	MOISTURE CONTENT = (D/E)X100	(%)	~~50.80~~ 15.6	15.9		

000108

QUID LIMIT (LL) = 28.5 PLASTIC LIMIT (PL) = 15.8 PLASTICITY INDEX (PI) = 12.7

GEOSYNTEC CONSULTANTS

FLUOR FERNALD

4940

ATTERBERG LIMITS TEST

(ASTM D 4318)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO PROJECT NO. GB1341 TASK NO.: 04.1

DESCRIPTION: Phase III DATE: 15 day Oct month 2001 year

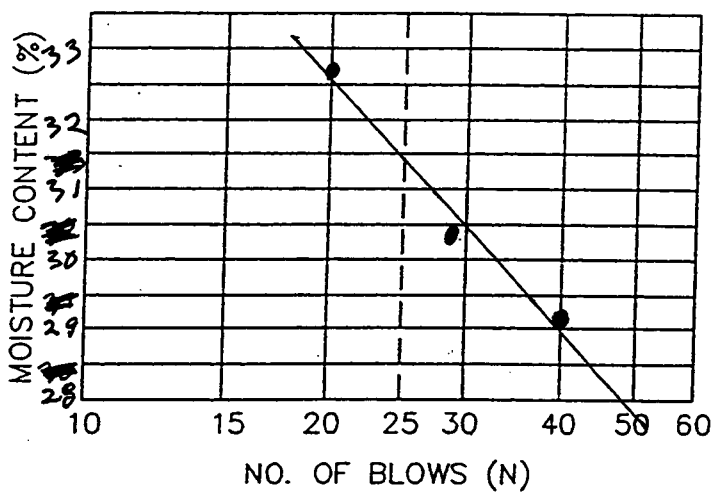
MATERIAL TYPE: Low Perm. Clay MATERIAL SOURCE: Stockpile 01-5 SAMPLE NO. LP-01-38

LIQUID LIMIT DETERMINATION

QA ID: DLE

	TARE NO.		3.3	3.6	3.4	
A	WT. OF TARE	(grams)	21.44	21.41	21.40	
B	WT. OF WET SOIL & TARE	(grams)	44.06	39.81	40.01	
C	WT. OF DRY SOIL & TARE	(grams)	38.80	35.65	35.42	
D	WT. OF WATER = B-C	(grams)	5.26	4.16	4.59	
E	WT. OF DRY SOIL = C-A	(grams)	17.36	14.24	14.02	
F	MOISTURE CONTENT = (D/E)X100	(%)	30.3	29.2	32.7	
N	NUMBER OF BLOWS		29	40	20	

DRYING TARE NO.



CURING TARE NO.

PLASTIC LIMIT DETERMINATION

QA ID: DLE

	TARE NO.		3.9	3.5		
A	WT. OF TARE	(grams)	21.00	21.19		
B	WT. OF WET SOIL & TARE	(grams)	31.04	33.11		
C	WT. OF DRY SOIL & TARE	(grams)	29.64	31.44		
D	WT. OF WATER = B-C	(grams)	1.40	1.67		
E	WT. OF DRY SOIL = C-A	(grams)	8.64	10.25		
F	MOISTURE CONTENT = (D/E)X100	(%)	16.2	16.3		

000109

LIQUID LIMIT (LL) = 31.5 PLASTIC LIMIT (PL) = 16.3 PLASTICITY INDEX (PI) = 15.2

GEOSYNTEC CONSULTANTS

4940

FLUOR FERNALD

ATTERBERG LIMITS TEST

(ASTM D 4318)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO PROJECT NO. GQ1341 TASK NO. 04.1

DESCRIPTION: Phase III DATE: ____ day Oct month 2001 year

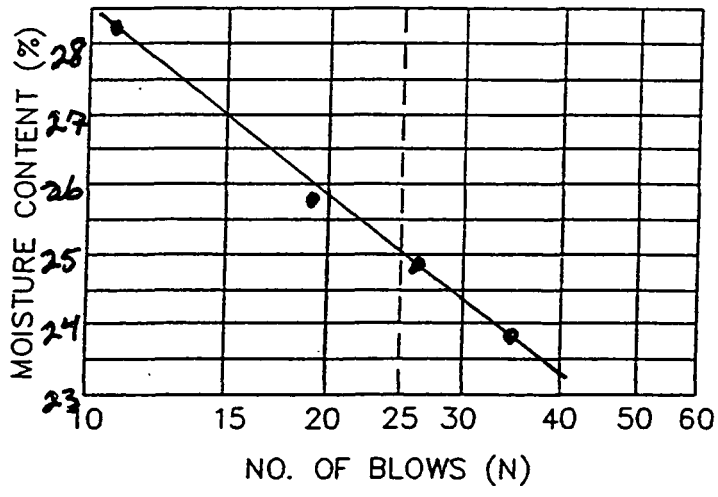
MATERIAL TYPE: Low Perm Clay MATERIAL SOURCE: Stockpile 01-7 SAMPLE NO. LP01-40

LIQUID LIMIT DETERMINATION

QA ID: DLE

	TARE NO.		2.2	3.1	1.3	1.1
A	WT. OF TARE	(grams)	27.63	28.38	28.63	28.78
B	WT. OF WET SOIL & TARE	(grams)	47.48	48.21	49.45	49.17
C	WT. OF DRY SOIL & TARE	(grams)	43.11	44.14	45.30	43.64
D	WT. OF WATER = B-C	(grams)	4.37	4.07	4.15	3.53
E	WT. OF DRY SOIL = C-A	(grams)	15.48	15.76	16.67	14.86
F	MOISTURE CONTENT = (D/E)X100	(%)	28.2	25.8	24.9	23.8
N	NUMBER OF BLOWS		12	19	26	35

DRYING TARE NO.



CURING TARE NO.

PLASTIC LIMIT DETERMINATION

QA ID: DLE

	TARE NO.		2.1	1.7		
A	WT. OF TARE	(grams)	28.23	28.48		
B	WT. OF WET SOIL & TARE	(grams)	37.63	39.20		
C	WT. OF DRY SOIL & TARE	(grams)	36.40	37.82		
D	WT. OF WATER = B-C	(grams)	1.23	1.38		
E	WT. OF DRY SOIL = C-A	(grams)	8.17	9.34		
F	MOISTURE CONTENT = (D/E)X100	(%)	15.1	14.8		

000110

LIQUID LIMIT (LL) = 25 PLASTIC LIMIT (PL) = 15.0 PLASTICITY INDEX (PI) = 10

GEOSYNTEC CONSULTANTS

FLUOR FERNALD

4940

ATTERBERG LIMITS TEST

(ASTM D 4318)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO PROJECT NO. 6Q1341 TASK NO.: 04.1

DESCRIPTION: Phase III DATE: 18 day Oct month 2001 year

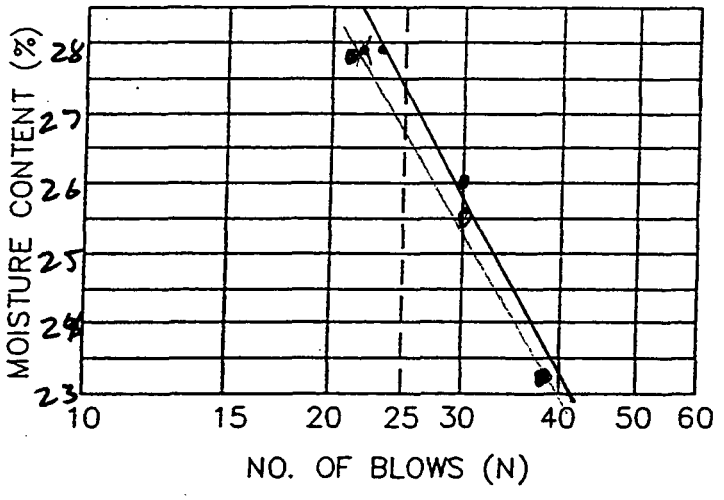
MATERIAL TYPE: Low Perm Clay MATERIAL SOURCE: Stockpile 01-7 SAMPLE NO.: 2P-01-41

LIQUID LIMIT DETERMINATION

QA ID: DCE

	TARE NO.		3.2	1.2	1.1	
A	WT. OF TARE	(grams)	27.83	28.50	28.78	
B	WT. OF WET SOIL & TARE	(grams)	46.50	46.94	45.00	
C	WT. OF DRY SOIL & TARE	(grams)	42.43	43.48	41.65	
D	WT. OF WATER = B-C	(grams)	4.07	3.46	3.35	
E	WT. OF DRY SOIL = C-A	(grams)	14.60	14.98	12.87	
F	MOISTURE CONTENT = (D/E)X100	(%)	27.9	23.1	26.0	
N	NUMBER OF BLOWS		23	38	30	

DRYING TARE NO.



CURING TARE NO.

PLASTIC LIMIT DETERMINATION

QA ID: DCE

	TARE NO.		2.9	1.4		
A	WT. OF TARE	(grams)	31.46	28.49		
B	WT. OF WET SOIL & TARE	(grams)	41.19	39.61		
C	WT. OF DRY SOIL & TARE	(grams)	39.93	38.16		
D	WT. OF WATER = B-C	(grams)	1.26	1.45		
E	WT. OF DRY SOIL = C-A	(grams)	8.47	9.67		
F	MOISTURE CONTENT = (D/E)X100	(%)	14.9	15.0		

000111

LIQUID LIMIT (LL) = ~~26.8~~ 27 PLASTIC LIMIT (PL) = 15 PLASTICITY INDEX (PI) = ~~11.8~~ 12

GEOSYNTEC CONSULTANTS

FLUOR FERNALD

4940

ATTERBERG LIMITS TEST

(ASTM D 4318)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO PROJECT NO.: GQ1341 TASK NO.: 04.1

DESCRIPTION: Phase III DATE: ____ day Oct month 2001 year

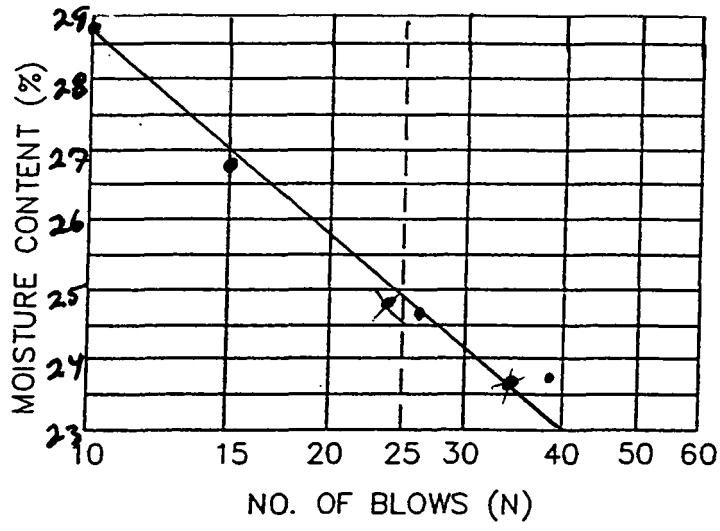
MATERIAL TYPE: Low Perm Clay MATERIAL SOURCE: Stockpile 01-07 SAMPLE NO. LP01-92

LIQUID LIMIT DETERMINATION

QA ID: DLE

	TARE NO.		1.2	3.2	2.7	1.5
A	WT. OF TARE	(grams)	28.51	27.83	28.68	28.60
B	WT. OF WET SOIL & TARE	(grams)	48.20	47.96	41.56	47.30
C	WT. OF DRY SOIL & TARE	(grams)	43.79	43.70	39.02	43.72
D	WT. OF WATER = B-C	(grams)	4.41	4.26	2.54	3.58
E	WT. OF DRY SOIL = C-A	(grams)	15.28	15.87	10.34	15.12
F	MOISTURE CONTENT = (D/E)X100	(%)	28.9	26.8	24.6	23.7
N	NUMBER OF BLOWS		10	15	26	38

DRYING TARE NO.



CURING TARE NO.

PLASTIC LIMIT DETERMINATION

QA ID: DLE

	TARE NO.		1.7	2.2		
A	WT. OF TARE	(grams)	28.48	27.65		
B	WT. OF WET SOIL & TARE	(grams)	38.23	35.13		
C	WT. OF DRY SOIL & TARE	(grams)	36.97	34.15		
D	WT. OF WATER = B-C	(grams)	1.26	0.98		
E	WT. OF DRY SOIL = C-A	(grams)	8.49	6.50		
F	MOISTURE CONTENT = (D/E)X100	(%)	14.8	15.1		

000112

LIQUID LIMIT (LL) = 25 PLASTIC LIMIT (PL) = 15 PLASTICITY INDEX (PI) = 10

GEOSYNTEC CONSULTANTS

FLUOR FERNALD 4940

ATTERBERG LIMITS TEST

(ASTM D 4318)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO PROJECT NO. GQ1341 TASK NO. 04.1

DESCRIPTION: Phase III DATE: ____ day Oct month 2000 year

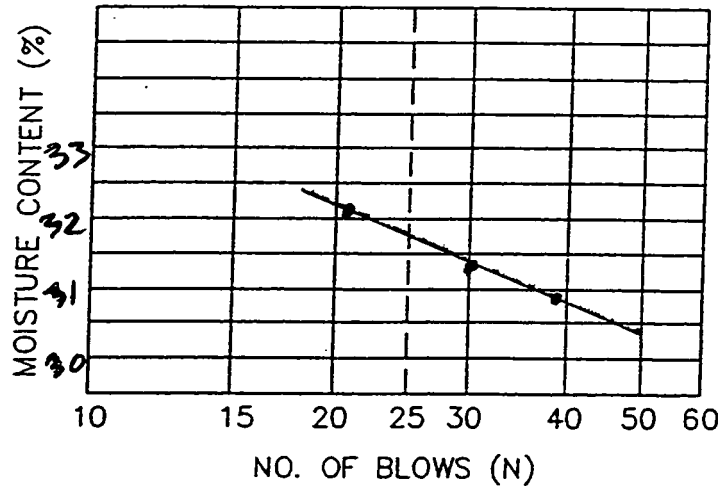
MATERIAL TYPE: Low Perm Clay MATERIAL SOURCE Stockpile 01-7 SAMPLE NO. LP-01-43

LIQUID LIMIT DETERMINATION

QA ID: DLE

	TARE NO.		2.2	3.1	1.6	~~12.1~~
A	WT. OF TARE	(grams)	27.64	28.39	28.85	~~28.23~~
B	WT. OF WET SOIL & TARE	(grams)	48.27	46.39	50.01	
C	WT. OF DRY SOIL & TARE	(grams)	43.26	42.15	44.96	
D	WT. OF WATER = B-C	(grams)	5.01	4.24	5.05	
E	WT. OF DRY SOIL = C-A	(grams)	15.62	13.76	16.11	
F	MOISTURE CONTENT = (D/E)X100	(%)	32.1	30.8	31.3	
N	NUMBER OF BLOWS		21	39	30	

DRYING TARE NO.



CURING TARE NO.

PLASTIC LIMIT DETERMINATION

QA ID: DLE

	TARE NO.		1.7	2.7		
A	WT. OF TARE	(grams)	28.48	28.68		
B	WT. OF WET SOIL & TARE	(grams)	38.04	36.98		
C	WT. OF DRY SOIL & TARE	(grams)	36.74	35.85		
D	WT. OF WATER = B-C	(grams)	1.3 ~~1.36~~	1.13		
E	WT. OF DRY SOIL = C-A	(grams)	8.26 ~~8.26~~	7.17		
F	MOISTURE CONTENT = (D/E)X100	(%)	15.7 ~~16.5~~	15.8		

000113

LIQUID LIMIT (LL) = 31.8 PLASTIC LIMIT (PL) = ~~16.2~~ 16 PLASTICITY INDEX (PI) = ~~15.6~~ 16

GEOSYNTEC CONSULTANTS

FLUOR FERNALD 49 40

ATTERBERG LIMITS TEST

(ASTM D 4318)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO PROJECT NO 6Q1341 TASK NO.: 04.1

DESCRIPTION: Phase III DATE: ____ day Oct month 2001 year

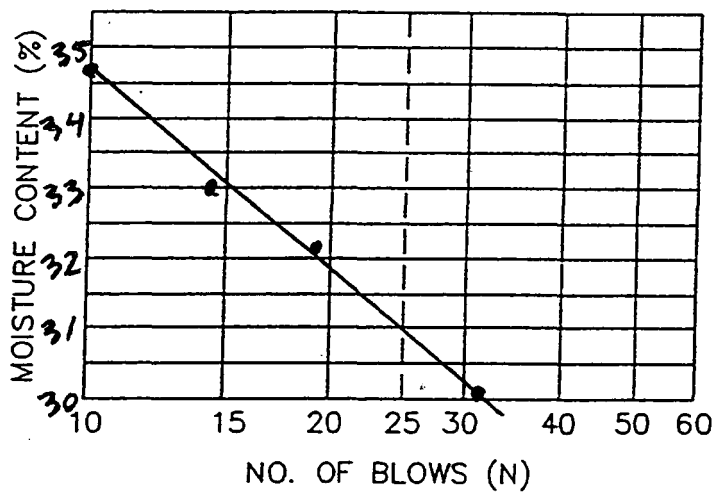
MATERIAL TYPE: Low Perm Clay MATERIAL SOURCE: Stockpile 01-6 SAMPLE NO. LP-01-44

LIQUID LIMIT DETERMINATION

QA ID: DLE

	TARE NO.		1.9	2.4	1.3	2.1
A	WT. OF TARE	(grams)	28.53	27.37	28.64	28.23
B	WT. OF WET SOIL & TARE	(grams)	46.53	47.90	46.76	48.91
C	WT. OF DRY SOIL & TARE	(grams)	43.39	42.81	43.87	44.13
D	WT. OF WATER = B-C	(grams)	5.14	5.09	4.89	4.78
E	WT. OF DRY SOIL = C-A	(grams)	14.86	15.44	15.23	15.90
F	MOISTURE CONTENT = (D/E)X100	(%)	34.6	33.0	32.1	30.1
N	NUMBER OF BLOWS		10	14	18	31

DRYING TARE NO.



CURING TARE NO.

PLASTIC LIMIT DETERMINATION

QA ID: DLE

	TARE NO.		1.5	2.8		
A	WT. OF TARE	(grams)	28.60	28.47		
B	WT. OF WET SOIL & TARE	(grams)	37.91	38.62		
C	WT. OF DRY SOIL & TARE	(grams)	36.64	37.22		
D	WT. OF WATER = B-C	(grams)	1.27	1.40		
E	WT. OF DRY SOIL = C-A	(grams)	8.04	8.75		
F	MOISTURE CONTENT = (D/E)X100	(%)	15.8	16.0		

000114

LIQUID LIMIT (LL) = 31 PLASTIC LIMIT (PL) = 15.9 PLASTICITY INDEX (PI) = 15.1

4940

GEOSYNTEC CONSULTANTS

FLUOR FERNALD

ATTERBERG LIMITS TEST

(ASTM D 4318)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO PROJECT NO. 6G1341 TASK NO.: 04.1

DESCRIPTION: Phase III DATE: 18 day Oct month 2001 year

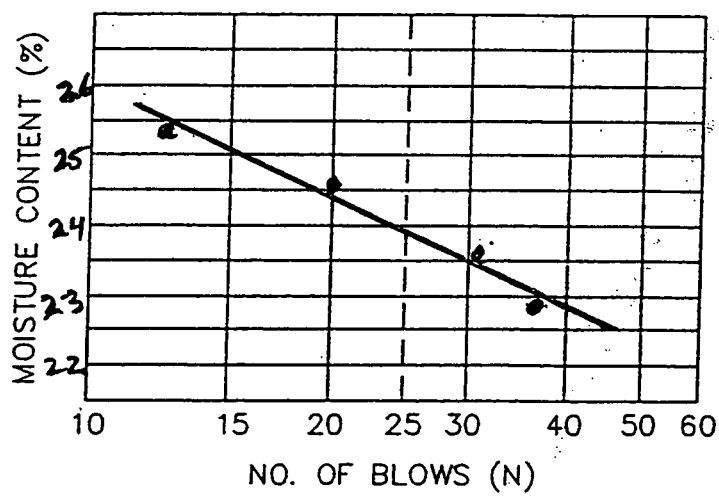
MATERIAL TYPE: Low Perm Clay MATERIAL SOURCE: Stockpile 01-7 SAMPLE NO.: LP-01-45

LIQUID LIMIT DETERMINATION

QA ID: DLE

	TARE NO.		1.1	3.1	1.6	2.6
A	WT. OF TARE	(grams)	28.79	28.38	28.86	28.54
B	WT. OF WET SOIL & TARE	(grams)	47.74	46.92	49.54	45.42
C	WT. OF DRY SOIL & TARE	(grams)	43.90	43.26	45.71	42.19
D	WT. OF WATER = B-C	(grams)	3.84	3.66	3.83	3.23
E	WT. OF DRY SOIL = C-A	(grams)	15.11	14.88	16.85	13.65
F	MOISTURE CONTENT = (D/E)X100	(%)	25.4	24.6	22.7	23.7
N	NUMBER OF BLOWS		13	20	36	31

DRYING TARE NO.



CURING TARE NO.

PLASTIC LIMIT DETERMINATION

QA ID: DLE

	TARE NO.		2.1	1.4		
A	WT. OF TARE	(grams)	28.23	28.50		
B	WT. OF WET SOIL & TARE	(grams)	36.13	37.73		
C	WT. OF DRY SOIL & TARE	(grams)	35.12	36.55		
D	WT. OF WATER = B-C	(grams)	1.01	1.18		
E	WT. OF DRY SOIL = C-A	(grams)	6.89	8.05		
F	MOISTURE CONTENT = (D/E)X100	(%)	14.7	14.7		

000115

QUID LIMIT (LL) = 24 PLASTIC LIMIT (PL) = ~~14.7~~ 15 (TBC) PLASTICITY INDEX (PI) = ~~9.3~~ 9 (TBC)

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GEOSYNTEC CONSULTANTS

FLUOR FERNALD

4940

ATTERBERG LIMITS TEST

(ASTM D 4318)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO PROJECT NO.: 6Q1341 TASK NO.: 04.1

DESCRIPTION: Phase III DATE: 25 day Oct month 2001 year

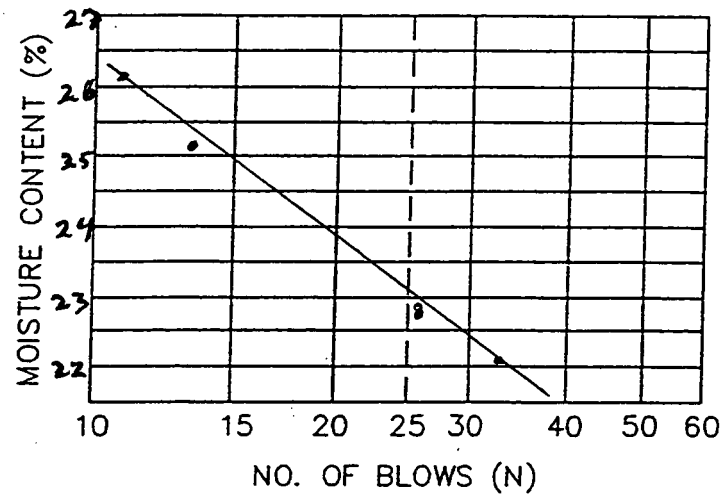
MATERIAL TYPE: Low Plasm Clay MATERIAL SOURCE: Stockpile 01-7 SAMPLE NO. LP-01-45 Re Run

LIQUID LIMIT DETERMINATION

QA ID: DLE

	TARE NO.		2.5	1.9	3.1	2.3
A	WT. OF TARE	(grams)	28.42	28.53	28.38	31.19
B	WT. OF WET SOIL & TARE	(grams)	50.17	49.37	49.75	52.21
C	WT. OF DRY SOIL & TARE	(grams)	45.65	45.19	45.79	48.39
D	WT. OF WATER = B-C	(grams)	4.52	4.18	3.96	3.82
E	WT. OF DRY SOIL = C-A	(grams)	17.23	16.66	17.41	17.20
F	MOISTURE CONTENT = (D/E)X100	(%)	26.2	25.1	KS 22.7	22.2
N	NUMBER OF BLOWS		11	13	26	34

DRYING TARE NO.



CURING TARE NO.

PLASTIC LIMIT DETERMINATION

QA ID: DLE

	TARE NO.		1.8	2.4		
A	WT. OF TARE	(grams)	28.78	27.37		
B	WT. OF WET SOIL & TARE	(grams)	37.28	37.44		
C	WT. OF DRY SOIL & TARE	(grams)	36.18	36.16		
D	WT. OF WATER = B-C	(grams)	1.10	1.28		
E	WT. OF DRY SOIL = C-A	(grams)	7.40	8.79		
F	MOISTURE CONTENT = (D/E)X100	(%)	14.9	14.6		

000116

LIQUID LIMIT (LL) = 23.2 PLASTIC LIMIT (PL) = 14.8 PLASTICITY INDEX (PI) = 8.4

ATTERBERG LIMITS

ASTM D 4318

4940

PROJECT NAME: GEOSYNTEC/FLUOR FERNALD/OH
PROJECT NUMBER: 013-3175
SAMPLE ID: LP01-45 - SAMPLE DEPTH: -
SAMPLE TYPE: Bag

SAMPLE PREPARATION

Wet or Dry: Dry

Minus #40 Sieve: Yes

PLASTIC LIMIT DETERMINATION

Number of Blows			
Weight of Wet Soil & Tare (gm)	21.72	22.81	21.80
Weight of Dry Soil & Tare (gm)	20.52	21.55	20.61
Weight of Tare (gm)	10.98	11.28	11.35
Weight of Water (gm)	1.20	1.26	1.19
Weight of Dry Soil (gm)	9.54	10.27	9.26
Water Content %	12.58	12.27	12.85

LIQUID LIMIT DETERMINATION

30	23	19	15
22.05	21.04	21.40	21.08
18.93	18.06	18.75	17.98
4.15	4.14	6.48	4.13
3.12	2.98	2.65	3.10
14.78	13.92	12.27	13.85
21.11	21.41	21.60	22.38

NATURAL MOISTURE

PLASTIC LIMIT (PL): 13

LIQUID LIMIT (LL): 21

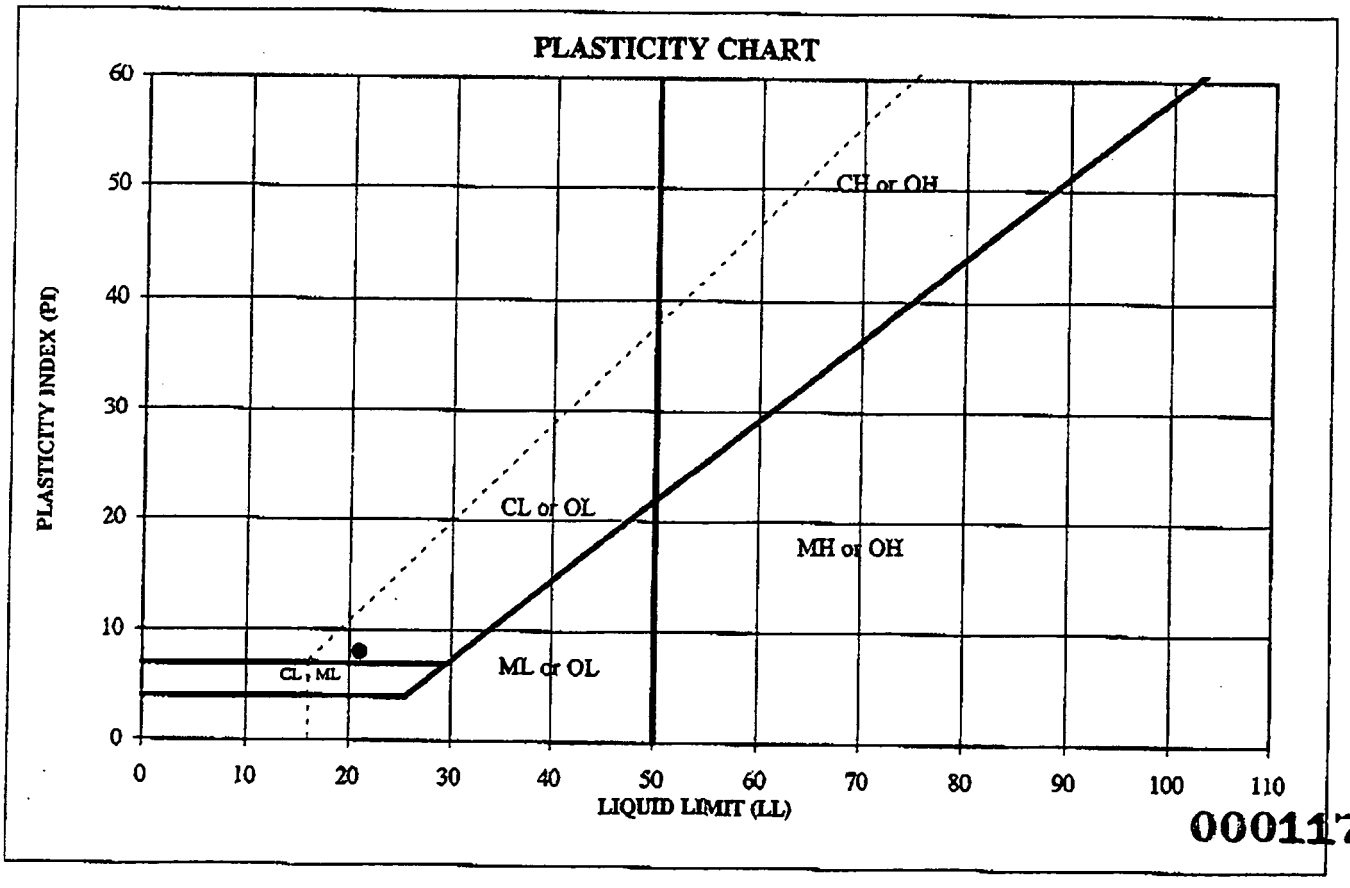
PLASTICITY INDEX (PI): 8

LIQUIDITY INDEX (LI):

NOTE:

DESCRIPTION: Dark Yellowish Brown, SILTY CLAY, and coarse to fine sand, little fine gravel.

USCS: CL



000117

TECH: TJ
DATE: 10/28/01
CHECK:
REVIEW:

Golder Associates Inc.

GEOSYNTEC CONSULTANTS

FLUOR FERNALD

4940

ATTERBERG LIMITS TEST

(ASTM D 4318)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO PROJECT NO. 6Q134/ TASK NO.: 04.1

DESCRIPTION: Phase III DATE: ____ day 11/00 month 2001 year

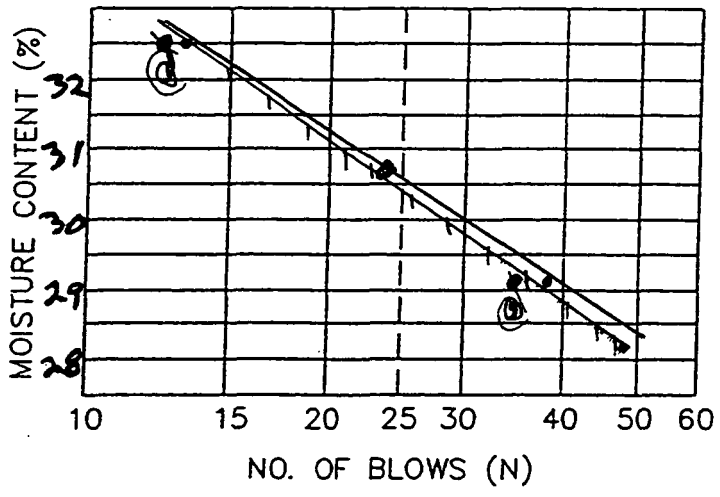
MATERIAL TYPE: Low Perm Clay MATERIAL SOURCE: Stockpile 01-7 SAMPLE NO. 2P-115-A

LIQUID LIMIT DETERMINATION

QA ID: DLE

	TARE NO.		1.6	3.1	1.3	
A	WT. OF TARE	(grams)	28.87	28.38	28.64	
B	WT. OF WET SOIL & TARE	(grams)	48.19	43.91	47.97	
C	WT. OF DRY SOIL & TARE	(grams)	43.45	40.26	43.61	
D	WT. OF WATER = B-C	(grams)	4.74	3.65	4.36	
E	WT. OF DRY SOIL = C-A	(grams)	14.58	11.88	14.97	
F	MOISTURE CONTENT = (D/E)X100	(%)	32.5	30.7	29.1	
N	NUMBER OF BLOWS		13	24	37	

DRYING TARE NO.



CURING TARE NO.

PLASTIC LIMIT DETERMINATION

QA ID: KS/DLE

	TARE NO.		2.5	1.9		
A	WT. OF TARE	(grams)	28.43	28.55		
B	WT. OF WET SOIL & TARE	(grams)	34.53	35.97		
C	WT. OF DRY SOIL & TARE	(grams)	33.69	34.93		
D	WT. OF WATER = B-C	(grams)	~~0.89~~ 0.84	1.04		
E	WT. OF DRY SOIL = C-A	(grams)	~~5.26~~ 5.26	6.38		
	MOISTURE CONTENT = (D/E)X100	(%)	~~16.9~~ 16.0	16.3		

000118

LIQUID LIMIT (LL) = ~~30.7~~ 30. PLASTIC LIMIT (PL) = ~~16.6~~ 16 PLASTICITY INDEX (PI) = ~~13.8~~ 14

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GEOSYNTEC CONSULTANTS

4940

FLUOR FERNALD

ATTERBERG LIMITS TEST

(ASTM D 4318)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO PROJECT NO. 6Q1341 TASK NO.: 04.1

DESCRIPTION: Phase III DATE: 26 day Oct month 2001 year

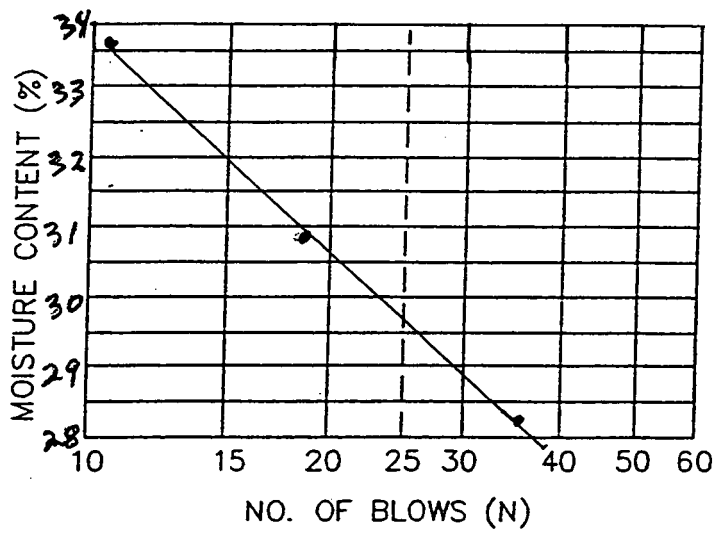
MATERIAL TYPE: Low Perm Clay MATERIAL SOURCE: Stockpile 01-8 SAMPLE NO.: LP01-46

LIQUID LIMIT DETERMINATION

QA ID: DCE

	TARE NO.		2.4	1.8	3.1	2.3
A	WT. OF TARE	(grams)	27.38	28.79	28.38	31.19
B	WT. OF WET SOIL & TARE	(grams)	47.56	50.62	47.22	
C	WT. OF DRY SOIL & TARE	(grams)	42.49	45.47	43.06	
D	WT. OF WATER = B-C	(grams)	5.07	5.15	4.16	
E	WT. OF DRY SOIL = C-A	(grams)	15.11	16.68	14.68	
F	MOISTURE CONTENT = (D/E)X100	(%)	33.6	30.9	28.3	
N	NUMBER OF BLOWS		21	18	36	

DRYING TARE NO.



CURING TARE NO.

PLASTIC LIMIT DETERMINATION

QA ID: DLE

	TARE NO.		1.9	2.5		
A	WT. OF TARE	(grams)	28.56	28.42		
B	WT. OF WET SOIL & TARE	(grams)	38.24	37.31		
C	WT. OF DRY SOIL & TARE	(grams)	36.90	36.09		
D	WT. OF WATER = B-C	(grams)	1.34	1.22		
E	WT. OF DRY SOIL = C-A	(grams)	8.34	7.67		
F	MOISTURE CONTENT = (D/E)X100	(%)	16.1	15.9		

000119

LIQUID LIMIT (LL) = 29.7 PLASTIC LIMIT (PL) = 16.0 PLASTICITY INDEX (PI) = 13.7

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6541.3

GEOSYNTEC CONSULTANTS

4940

FLUOR FERNALD

ATTERBERG LIMITS TEST

(ASTM D 4318)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO PROJECT NO. GQ1341 TASK NO.: Ø41

DESCRIPTION: Phase III DATE: 26 day Oct month 2001 year

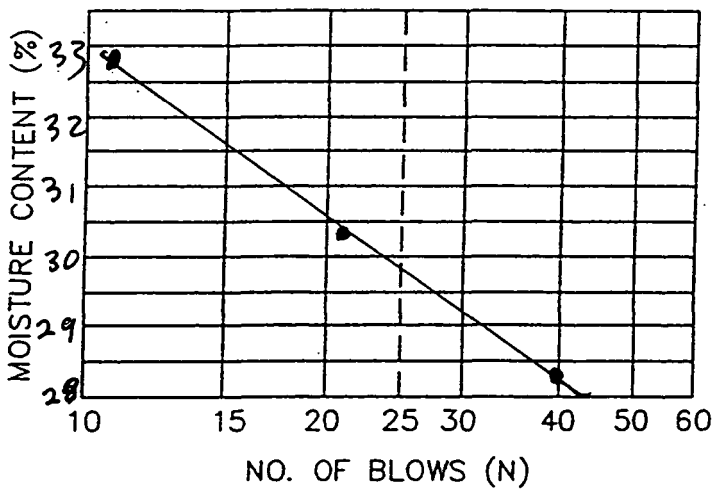
MATERIAL TYPE: Low Perm Clay MATERIAL SOURCE: Stockpile 01-8 SAMPLE NO.: LP.01-47

LIQUID LIMIT DETERMINATION

QA ID: DLE

	TARE NO.		3.2	2.9	2-8	
A	WT. OF TARE	(grams)	27.83	31.45	28.47	
B	WT. OF WET SOIL & TARE	(grams)	48.14	55.95	46.30	
C	WT. OF DRY SOIL & TARE	(grams)	43.14	50.24	42.37	
D	WT. OF WATER = B–C	(grams)	5.00	5.71	3.93	
E	WT. OF DRY SOIL = C–A	(grams)	15.31	18.79	13.90	
F	MOISTURE CONTENT = (D/E)X100	(%)	32.7	30.4	28.3	
N	NUMBER OF BLOWS		11	21	40	

DRYING TARE NO.



CURING TARE NO.

PLASTIC LIMIT DETERMINATION

QA ID: DZE

	TARE NO.		1.1	2.3		
A	WT. OF TARE	(grams)	28.78	31.20		
B	WT. OF WET SOIL & TARE	(grams)	38.92	40.60		
C	WT. OF DRY SOIL & TARE	(grams)	37.56	39.34		
D	WT. OF WATER = B–C	(grams)	1.36	1.26		000120
E	WT. OF DRY SOIL = C–A	(grams)	8.78	8.14		
F	MOISTURE CONTENT = (D/E)X100	(%)	15.5	15.5		

LIQUID LIMIT (LL) = 29.4 PLASTIC LIMIT (PL) = 15.5 PLASTICITY INDEX (PI) = 14.4

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FLUOR FERNALD

ATTERBERG LIMITS TEST

(ASTM D 4318)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO PROJECT NO. 60134 1 TASK NO.: 04.1

DESCRIPTION: Phase III DATE: ____ day Oct month 2001 year

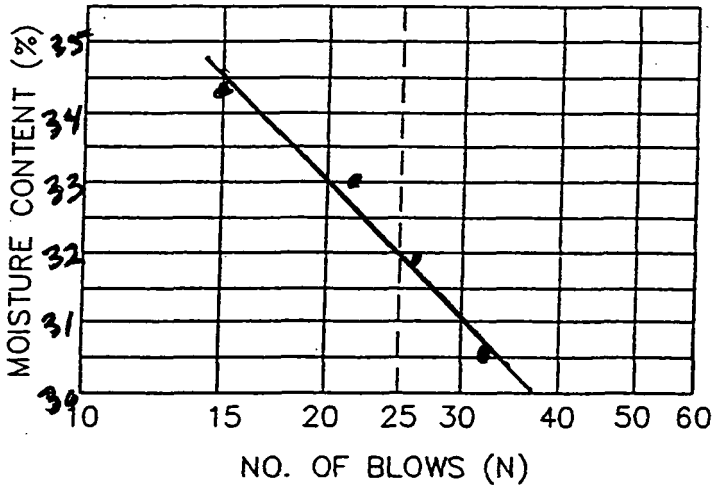
MATERIAL TYPE: Low Perm Clay MATERIAL SOURCE: Stockpile 01-8 SAMPLE NO. LP-01-48

LIQUID LIMIT DETERMINATION

QA ID: DLE

	TARE NO.		3.2	2.7	1.6	2.4
A	WT. OF TARE	(grams)	27.82	28.68	28.86	27.38
B	WT. OF WET SOIL & TARE	(grams)	44.07	49.06	46.62	46.84
C	WT. OF DRY SOIL & TARE	(grams)	40.27	44.13	42.21	41.86
D	WT. OF WATER = B-C	(grams)	3.80	4.93	4.41	4.98
E	WT. OF DRY SOIL = C-A	(grams)	12.45	15.45	13.35	14.49
F	MOISTURE CONTENT = (D/E)X100	(%)	30.5	31.9	33.0	34.4
N	NUMBER OF BLOWS		31	26	23	15

DRYING TARE NO.



CURING TARE NO.

PLASTIC LIMIT DETERMINATION

QA ID: DLE

	TARE NO.		2.5	1.9		
A	WT. OF TARE	(grams)	28.42	28.55		
B	WT. OF WET SOIL & TARE	(grams)	37.40	35.58		
C	WT. OF DRY SOIL & TARE	(grams)	36.16	34.60		
D	WT. OF WATER = B-C	(grams)	1.24	0.98		
E	WT. OF DRY SOIL = C-A	(grams)	7.74	6.05		
F	MOISTURE CONTENT = (D/E)X100	(%)	16.0	16.2		

000121

LIQUID LIMIT (LL) = 32 PLASTIC LIMIT (PL) = 16.1 PLASTICITY INDEX (PI) = 15.9

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4940

FLUOR FERNALD

ATTERBERG LIMITS TEST

(ASTM D 4318)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO PROJECT NO. GQ1341 TASK NO.: 04.1

DESCRIPTION: Phase III DATE: 30 day Oct month 2001 year

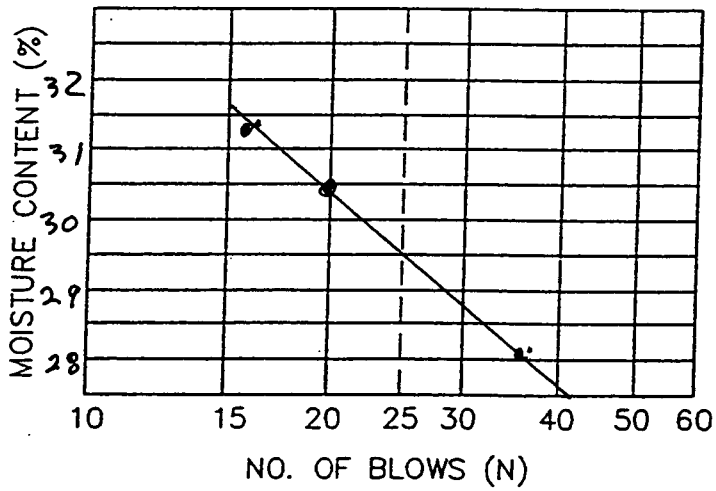
MATERIAL TYPE: Low Perm Clay MATERIAL SOURCE: Stockpile 01-8 SAMPLE NO. LP-01-51

LIQUID LIMIT DETERMINATION

QA ID: DLE

	TARE NO.		2.7	1.6	2.4	
A	WT. OF TARE	(grams)	28.68	28.86	27.88	
B	WT. OF WET SOIL & TARE	(grams)	47.39	45.66	45.55	
C	WT. OF DRY SOIL & TARE	(grams)	43.29	41.73	41.22	
D	WT. OF WATER = B-C	(grams)	4.10	3.93	4.33	
E	WT. OF DRY SOIL = C-A	(grams)	14.61	12.87	13.84	
F	MOISTURE CONTENT = (D/E)X100	(%)	28.1	30.5	31.3	
N	NUMBER OF BLOWS		37	20	16	

DRYING TARE NO.



CURING TARE NO.

PLASTIC LIMIT DETERMINATION

QA ID: DLE

	TARE NO.		2.5	1.9		
A	WT. OF TARE	(grams)	28.42	28.55		
B	WT. OF WET SOIL & TARE	(grams)	38.73	37.80		
C	WT. OF DRY SOIL & TARE	(grams)	37.30	36.52		
D	WT. OF WATER = B-C	(grams)	1.43	1.28		
E	WT. OF DRY SOIL = C-A	(grams)	8.88	7.97		
F	MOISTURE CONTENT = (D/E)X100	(%)	16.1	16.1		

000122

LIQUID LIMIT (LL) = ~~29~~ 30 PLASTIC LIMIT (PL) = ~~16.1~~ 16 PLASTICITY INDEX (PI) = ~~13.4~~ 14

GEOSYNTEC CONSULTANTS

4940

FLUOR FERNALD

ATTERBERG LIMITS TEST (ASTM D 4318)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO PROJECT NO.: GQ1341 TASK NO.: 041

DESCRIPTION: Phase III DATE: 01 day Nov month 2001 year

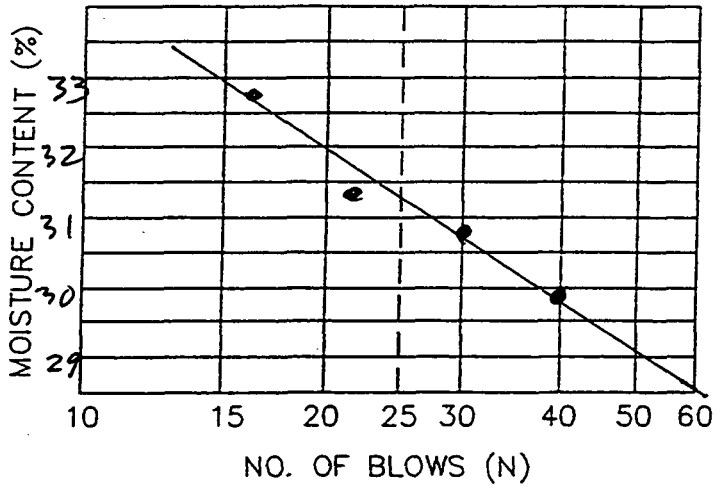
MATERIAL TYPE: Low Perm Clay MATERIAL SOURCE: Stockpile 01-8 SAMPLE NO.: LP-01-53

LIQUID LIMIT DETERMINATION

QA ID: DLE

	TARE NO.		1.7	2.7	1.3	2.3
A	WT. OF TARE	(grams)	28.48	28.68	28.64	31.19
B	WT. OF WET SOIL & TARE	(grams)	46.68	53.71	49.18	50.61
C	WT. OF DRY SOIL & TARE	(grams)	42.17	47.68	44.33	46.14
D	WT. OF WATER = B-C	(grams)	4.51	6.03	4.85	4.47
E	WT. OF DRY SOIL = C-A	(grams)	13.69	19.00	15.69	14.95
F	MOISTURE CONTENT = (D/E)X100	(%)	32.9	31.7	30.9	29.9
N	NUMBER OF BLOWS		17	21	30	40

DRYING TARE NO.



CURING TARE NO.

PLASTIC LIMIT DETERMINATION

QA ID: DLE

	TARE NO.		2.2	1.1		
A	WT. OF TARE	(grams)	27.63	28.77		
B	WT. OF WET SOIL & TARE	(grams)	35.81	37.07		
C	WT. OF DRY SOIL & TARE	(grams)	34.72	35.91		
D	WT. OF WATER = B-C	(grams)	1.09	1.16		
E	WT. OF DRY SOIL = C-A	(grams)	7.09	7.14		
F	MOISTURE CONTENT = (D/E)X100	(%)	15.4 ~~15.3~~	16.2		

000123

LIQUID LIMIT (LL) = 31.7 PLASTIC LIMIT (PL) = 16 PLASTICITY INDEX (PI) = 15

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4940

FLUOR FERNALD

ATTERBERG LIMITS TEST

(ASTM D 4318)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO PROJECT NO. GQ1341 TASK NO.: 04.1

DESCRIPTION: Phase III DATE: 3 day Nov month 2001 year

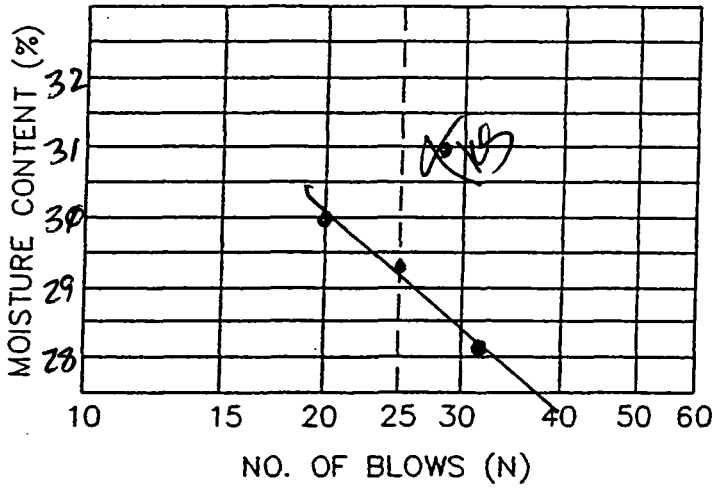
MATERIAL TYPE: Low Perm Clay MATERIAL SOURCE: Stockpile 01-8 SAMPLE NO. LP-01-54

LIQUID LIMIT DETERMINATION

QA ID: DZE

	TARE NO.		1.1	2.7	3.2	2.4
A	WT. OF TARE	(grams)	28.78	28.68	27.83	27.38
B	WT. OF WET SOIL & TARE	(grams)	47.99	48.76	46.28	
C	WT. OF DRY SOIL & TARE	(grams)	43.76	44.20	43.56	
D	WT. OF WATER = B-C	(grams)	4.23	4.56	4.72	
E	WT. OF DRY SOIL = C-A	(grams)	14.98	15.53	15.73	
F	MOISTURE CONTENT = (D/E)X100	(%)	28.2	29.4	30.0	
N	NUMBER OF BLOWS		31	25	20	

DRYING TARE NO.



CURING TARE NO.

PLASTIC LIMIT DETERMINATION

QA ID: DZE/KS

	TARE NO.		2.2	1.4		
A	WT. OF TARE	(grams)	27.63	28.50		
B	WT. OF WET SOIL & TARE	(grams)	36.52	37.19		
C	WT. OF DRY SOIL & TARE	(grams)	35.28	36.00		
D	WT. OF WATER = B-C	(grams)	1.24	1.19		
E	WT. OF DRY SOIL = C-A	(grams)	7.65	7.5		
F	MOISTURE CONTENT = (D/E)X100	(%)	16.2	15.9		

000124

LIQUID LIMIT (LL) = 29.3 PLASTIC LIMIT (PL) = 16.1 PLASTICITY INDEX (PI) = 13.2

GEOSYNTEC CONSULTANTS

4940

FLUOR FERNALD

ATTERBERG LIMITS TEST

(ASTM D 4318)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO PROJECT NO.: 69341 TASK NO.: 04.1

DESCRIPTION: Phase III DATE: 15 day Nov month 2001 year

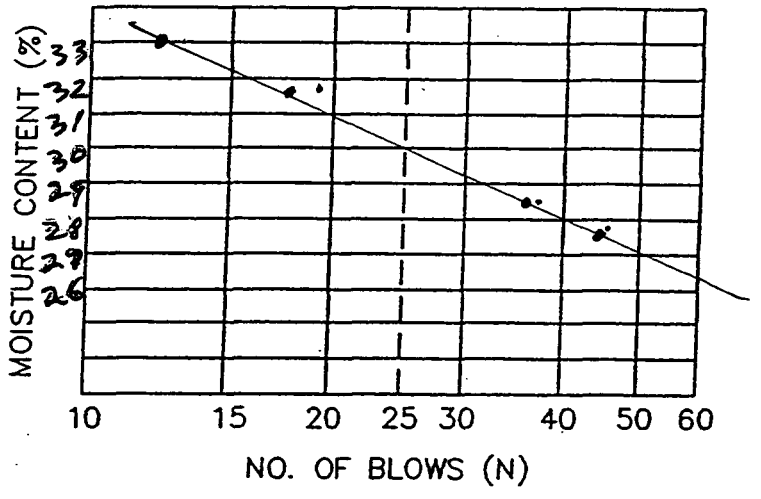
MATERIAL TYPE: Low Perm Clay MATERIAL SOURCE: Stockpile 01-9 SAMPLE NO.: LP 01-55

LIQUID LIMIT DETERMINATION

QA ID: DLE

	TARE NO.		2.7	1.9	1.1	2.9
A	WT. OF TARE	(grams)	28.69	28.54	28.77	31.45
B	WT. OF WET SOIL & TARE	(grams)	59.02	49.99	49.82	51.02
C	WT. OF DRY SOIL & TARE	(grams)	51.56	44.81	45.15	46.76
D	WT. OF WATER = B-C	(grams)	7.52	5.18	4.67	4.26
E	WT. OF DRY SOIL = C-A	(grams)	22.81	16.27	16.38	15.31
F	MOISTURE CONTENT = (D/E)X100	(%)	33.0	31.8	28.5	27.8
N	NUMBER OF BLOWS		13	18	36	41

DRYING TARE NO.



CURING TARE NO.

PLASTIC LIMIT DETERMINATION

QA ID: DLE

	TARE NO.		1.6	2.1		
A	WT. OF TARE	(grams)	28.86	28.24		
B	WT. OF WET SOIL & TARE	(grams)	38.00	36.95		
C	WT. OF DRY SOIL & TARE	(grams)	36.76	35.77		
D	WT. OF WATER = B-C	(grams)	1.24	1.18		
E	WT. OF DRY SOIL = C-A	(grams)	7.90	7.53		
F	MOISTURE CONTENT = (D/E)X100	(%)	15.7	15.7		

000125

LIQUID LIMIT (LL) = 30 PLASTIC LIMIT (PL) = 15.7 PLASTICITY INDEX (PI) = 14.3

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4940

FLUOR FERNALD

ATTERBERG LIMITS TEST

(ASTM D 4318)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO PROJECT NO.: GQ1341 TASK NO.: 04.1

DESCRIPTION: PHASE III DATE: 14 day NOV. month 2001 year

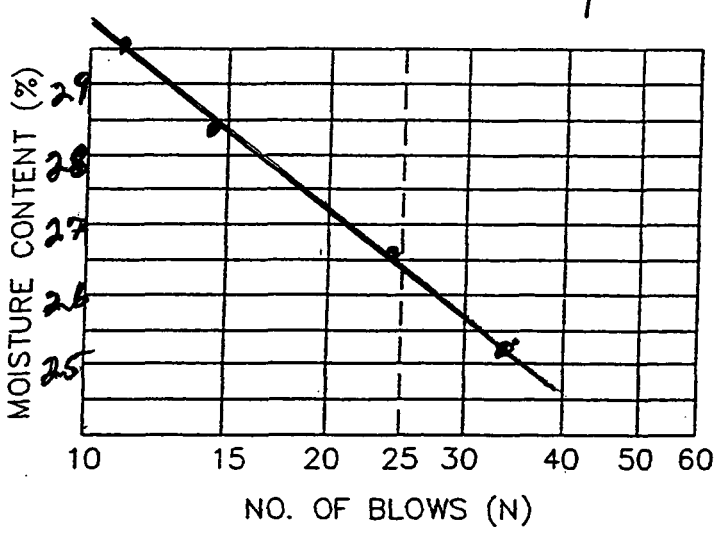
MATERIAL TYPE: LOW PERM CLAY MATERIAL SOURCE: STOCKPILE 01-9 SAMPLE NO.: LP-01-SE

LIQUID LIMIT DETERMINATION

QA ID: DLE

	TARE NO.		2.9	1.1	2.1	3.2
A	WT. OF TARE	(grams)	31.46	28.77	28.23	27.82
B	WT. OF WET SOIL & TARE	(grams)	51.21	50.67	46.12	44.65
C	WT. OF DRY SOIL & TARE	(grams)	46.71	45.82	42.36	41.25
D	WT. OF WATER = B-C	(grams)	4.50	4.85	3.76	3.40
E	WT. OF DRY SOIL = C-A	(grams)	15.25	17.05	14.13	13.43
F	MOISTURE CONTENT = (D/E)X100	(%)	29.5	28.4	26.6	25.3
N	NUMBER OF BLOWS		11	14	24	34

DRYING TARE NO.



CURING TARE NO.

PLASTIC LIMIT DETERMINATION

QA ID: DLE

	TARE NO.		1.6	1.9		
A	WT. OF TARE	(grams)	28.86	28.54		
B	WT. OF WET SOIL & TARE	(grams)	39.56	39.18		
C	WT. OF DRY SOIL & TARE	(grams)	38.15	37.77		
D	WT. OF WATER = B-C	(grams)	1.41	1.41		
E	WT. OF DRY SOIL = C-A	(grams)	9.29	9.23		
F	MOISTURE CONTENT = (D/E)X100	(%)	15.2	15.3		

000126

LIQUID LIMIT (LL) = 26.5 PLASTIC LIMIT (PL) = 15.3 PLASTICITY INDEX (PI) = 11.2

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FLUOR FERNALD

ATTERBERG LIMITS TEST (ASTM D 4318)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO PROJECT NO.: GQ1341 TASK NO.: 04.1

DESCRIPTION: PHASE III DATE: 14 day NOV month 2001 year

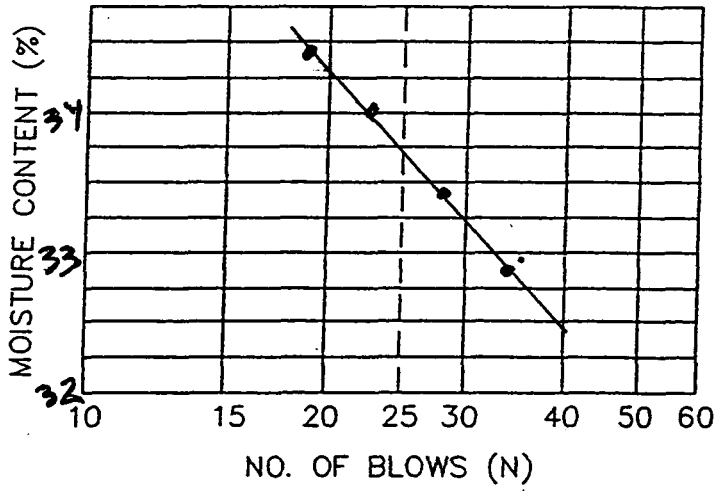
MATERIAL TYPE: Low Perm Clay MATERIAL SOURCE: STOCKPILE 01-9 SAMPLE NO.: LP-01-57

LIQUID LIMIT DETERMINATION

QA ID: DLE

	TARE NO.		2.7	1.8	2.5	3.1
A	WT. OF TARE	(grams)	28.68	28.80	28.41	26.38
B	WT. OF WET SOIL & TARE	(grams)	47.05	46.47	48.56	48.09
C	WT. OF DRY SOIL & TARE	(grams)	42.50	42.05	43.45	43.05
D	WT. OF WATER = B-C	(grams)	4.55	4.42	5.11	5.04
E	WT. OF DRY SOIL = C-A	(grams)	13.82	13.35	15.03	14.67
F	MOISTURE CONTENT = (D/E)X100	(%)	32.9	33.1	34.0	34.4
N	NUMBER OF BLOWS		34	28	23	19

DRYING TARE NO.



CURING TARE NO.

PLASTIC LIMIT DETERMINATION

QA ID: DLE

	TARE NO.		1.4	2.3		
A	WT. OF TARE	(grams)	28.49	31.19		
B	WT. OF WET SOIL & TARE	(grams)	38.79	41.60		
C	WT. OF DRY SOIL & TARE	(grams)	37.41	40.18		
D	WT. OF WATER = B-C	(grams)	1.38	1.42		
E	WT. OF DRY SOIL = C-A	(grams)	8.92	8.99		
F	MOISTURE CONTENT = (D/E)X100	(%)	15.5	15.8		

000127

LIQUID LIMIT (LL) = 33.7 PLASTIC LIMIT (PL) = 15.7 PLASTICITY INDEX (PI) = 18

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FLUOR FERNALD 4940

ATTERBERG LIMITS TEST

(ASTM D 4318)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO PROJECT NO. GQ1341 TASK NO.: 04.1

DESCRIPTION: Phase III DATE: 15 day Nov month 2001 year

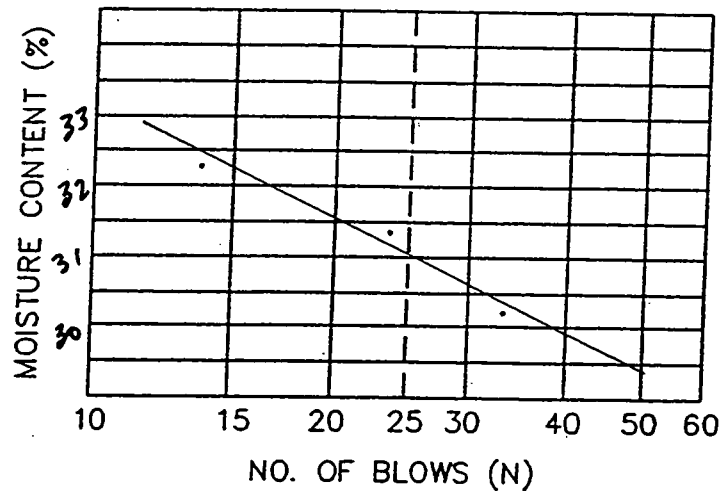
MATERIAL TYPE: Low Perm Clay MATERIAL SOURCE: Stockpile 01-9 SAMPLE NO.: LP-01-59

LIQUID LIMIT DETERMINATION

QA ID: DLE

	TARE NO.		1.2	2.8	1.5	
A	WT. OF TARE	(grams)	28.50	28.46	28.59	
B	WT. OF WET SOIL & TARE	(grams)	47.35	45.78	46.10	
C	WT. OF DRY SOIL & TARE	(grams)	42.75	41.64	42.04	
D	WT. OF WATER = B−C	(grams)	4.60	4.14	4.06	
E	WT. OF DRY SOIL = C−A	(grams)	14.25	13.18	13.45	
F	MOISTURE CONTENT = (D/E)X100	(%)	32.3	31.4	30.2	
N	NUMBER OF BLOWS		13	23	32	

DRYING TARE NO.



CURING TARE NO.

PLASTIC LIMIT DETERMINATION

QA ID: DLE

	TARE NO.		2.2	1.7		
A	WT. OF TARE	(grams)	27.63	28.49		
B	WT. OF WET SOIL & TARE	(grams)	33.85	35.22		
C	WT. OF DRY SOIL & TARE	(grams)	33.02	34.33		
D	WT. OF WATER = B−C	(grams)	0.83	0.89		
E	WT. OF DRY SOIL = C−A	(grams)	5.39	5.84		
F	MOISTURE CONTENT = (D/E)X100	(%)	15.4	15.3		

000128

LIQUID LIMIT (LL) = 31 PLASTIC LIMIT (PL) = 15 PLASTICITY INDEX (PI) = 16

GEOSYNTEC CONSULTANTS

4940

FLUOR FERNALD

ATTERBERG LIMITS TEST

(ASTM D 4318)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO PROJECT NO.: GQ1341 TASK NO.: 041

DESCRIPTION: Phase III DATE: 15 day Nov month 2001 year

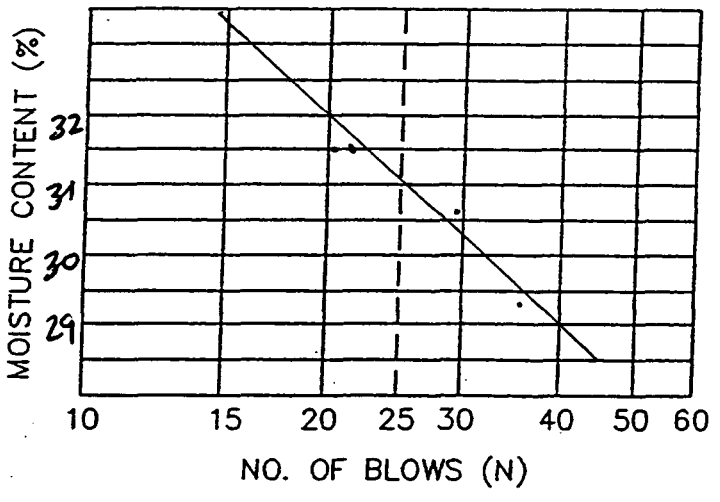
MATERIAL TYPE: Low Perm Clay MATERIAL SOURCE: Stockpile 01.9 SAMPLE NO.: LP-01-60

LIQUID LIMIT DETERMINATION

QA ID: DLE

	TARE NO.		2.7	1.1	3.1	~~1.6~~
A	WT. OF TARE	(grams)	28.68	28.75	28.37	~~28.85~~
B	WT. OF WET SOIL & TARE	(grams)	45.57	42.85	49.60	
C	WT. OF DRY SOIL & TARE	(grams)	41.52	39.55	44.79	
D	WT. OF WATER = B−C	(grams)	4.05	3.30	4.81	
E	WT. OF DRY SOIL = C−A	(grams)	12.84	10.80	16.42	
F	MOISTURE CONTENT = (D/E)X100	(%)	31.5	30.6	29.3	
N	NUMBER OF BLOWS		21	29	35	

DRYING TARE NO.



CURING TARE NO.

PLASTIC LIMIT DETERMINATION

QA ID: DLE

	TARE NO.		2.5	1.4		
A	WT. OF TARE	(grams)	28.41	28.49		
B	WT. OF WET SOIL & TARE	(grams)	35.45	37.22		
C	WT. OF DRY SOIL & TARE	(grams)	34.52	36.04		
D	WT. OF WATER = B−C	(grams)	0.93	1.18		
E	WT. OF DRY SOIL = C−A	(grams)	6.11	7.55		
F	MOISTURE CONTENT = (D/E)X100	(%)	15.2	15.6		

000129

LIQUID LIMIT (LL) = 31 PLASTIC LIMIT (PL) = 15 PLASTICITY INDEX (PI) = 16

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4940

FLUOR FERNALD

ATTERBERG LIMITS TEST

(ASTM D 4318)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO PROJECT NO.: 691341 TASK NO.: 04.1

DESCRIPTION: Phase III DATE: 15 day Nov month 2001 year

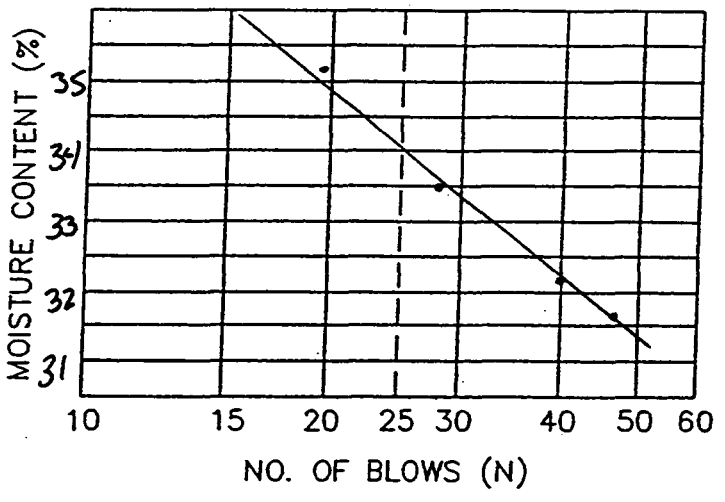
MATERIAL TYPE: Low Perm Clay MATERIAL SOURCE: Stockpile 01-10 SAMPLE NO.: LP-01-61

LIQUID LIMIT DETERMINATION

QA ID: DCE

	TARE NO.		1.3	2.1	1.8	3.2
A	WT. OF TARE	(grams)	28.63	28.23	28.78	27.87
B	WT. OF WET SOIL & TARE	(grams)	46.22	47.59	47.61	47.17
C	WT. OF DRY SOIL & TARE	(grams)	42.00	42.88	42.89	42.15
D	WT. OF WATER = B-C	(grams)	4.22	4.71	4.72	5.02
E	WT. OF DRY SOIL = C-A	(grams)	13.37	14.65	14.11	14.28
F	MOISTURE CONTENT = (D/E)X100	(%)	31.6	32.2	33.5	35.2
N	NUMBER OF BLOWS		47	40	27	19

DRYING TARE NO.



CURING TARE NO.

PLASTIC LIMIT DETERMINATION

QA ID: DCE

	TARE NO.		2.3	1.6		
A	WT. OF TARE	(grams)	31.18	28.85		
B	WT. OF WET SOIL & TARE	(grams)	40.77	38.92		
C	WT. OF DRY SOIL & TARE	(grams)	39.50	37.58		
D	WT. OF WATER = B-C	(grams)	1.27	1.34		
E	WT. OF DRY SOIL = C-A	(grams)	8.32	8.73		
F	MOISTURE CONTENT = (D/E)X100	(%)	15.3	15.3		

000130

LIQUID LIMIT (LL) = 34 PLASTIC LIMIT (PL) = 15 PLASTICITY INDEX (PI) = 19

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FLUOR FERNALD

4940

ATTERBERG LIMITS TEST

(ASTM D 4318)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO PROJECT NO. 6Q1341 TASK NO.: 04.1

DESCRIPTION: Phase III DATE: 26 day Nov month 2001 year

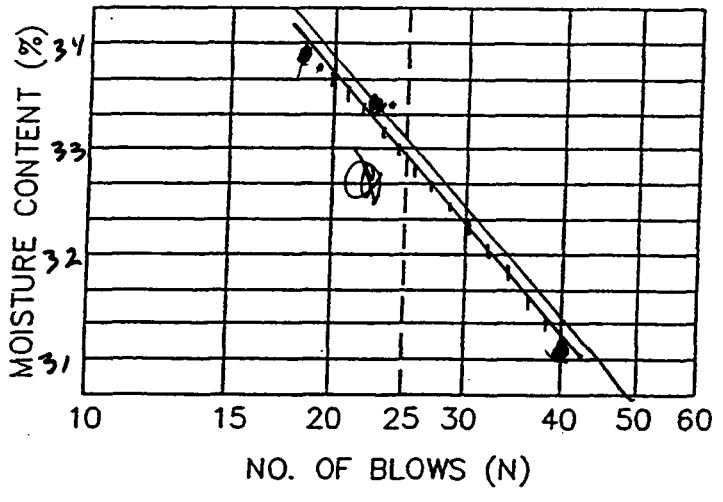
MATERIAL TYPE: Low Plastic Clay MATERIAL SOURCE: Stockpile 01.10 SAMPLE NO.: LP.01.62

LIQUID LIMIT DETERMINATION

QA ID: DCB

	TARE NO.		1.7	2.1	1.1	
A	WT. OF TARE	(grams)	28.50	28.24	28.78	
B	WT. OF WET SOIL & TARE	(grams)	48.92	49.44	47.97	
C	WT. OF DRY SOIL & TARE	(grams)	44.07	44.13	42.98	
D	WT. OF WATER = B-C	(grams)	4.85	5.31	4.79	
E	WT. OF DRY SOIL = C-A	(grams)	15.57	15.89	14.20	
F	MOISTURE CONTENT = (D/E)X100	(%)	31.1	33.4	33.7	
N	NUMBER OF BLOWS		40	23	18	

DRYING TARE NO.



CURING TARE NO.

PLASTIC LIMIT DETERMINATION

QA ID: DCB

	TARE NO.		2.5	1.6		
A	WT. OF TARE	(grams)	28.43	28.87		
B	WT. OF WET SOIL & TARE	(grams)	35.81	36.17		
C	WT. OF DRY SOIL & TARE	(grams)	34.81	35.18		
D	WT. OF WATER = B-C	(grams)	1.00	0.99		
E	WT. OF DRY SOIL = C-A	(grams)	6.38	6.31		
F	MOISTURE CONTENT = (D/E)X100	(%)	15.7	15.7		

000131

LIQUID LIMIT (LL) = 33 PLASTIC LIMIT (PL) = 15.7 PLASTICITY INDEX (PI) = 17.3

GEOSYNTEC CONSULTANTS

4940

FLUOR FERNALD

ATTERBERG LIMITS TEST

(ASTM D 4318)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO PROJECT NO. 60134 TASK NO.: 04.1

DESCRIPTION: Phase III DATE: 20 day Nov month 2001 year

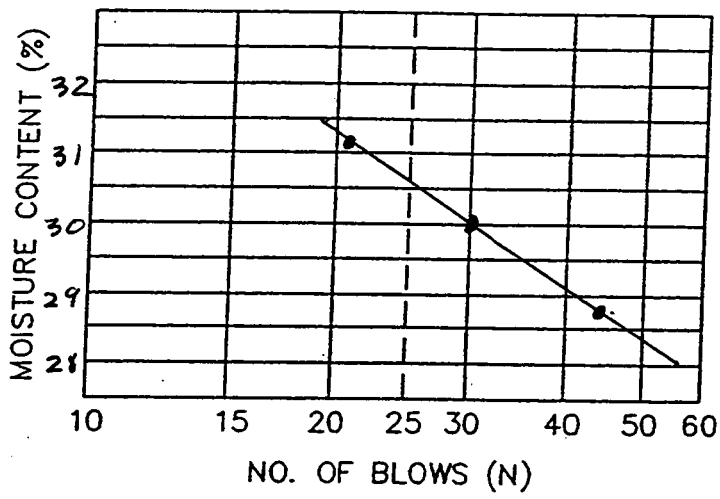
MATERIAL TYPE: Low Perm Clay MATERIAL SOURCE: Stockpile 01-9 SAMPLE NO. 18-01-63

LIQUID LIMIT DETERMINATION

QA ID: DLE

	TARE NO.		3.2	1.7	2.1	
A	WT. OF TARE	(grams)	27.83	28.48	28.24	
B	WT. OF WET SOIL & TARE	(grams)	45.35	45.91	47.18	
C	WT. OF DRY SOIL & TARE	(grams)	41.19	41.89	42.95	
D	WT. OF WATER = B-C	(grams)	4.16 ✓	4.02 ✓	4.23 ✓	
E	WT. OF DRY SOIL = C-A	(grams)	13.36 ✓	13.41 ✓	14.71 ✓	
F	MOISTURE CONTENT = (D/E)X100	(%)	31.1 ✓	30.0 ✓	28.8 ✓	
N	NUMBER OF BLOWS		21	30	45	

DRYING TARE NO.



CURING TARE NO.

PLASTIC LIMIT DETERMINATION

QA ID: DLE

	TARE NO.		1.6	2.5		
A	WT. OF TARE	(grams)	28.86	28.42		
B	WT. OF WET SOIL & TARE	(grams)	36.73	37.88		
C	WT. OF DRY SOIL & TARE	(grams)	35.65	36.60		
D	WT. OF WATER = B-C	(grams)	1.08 ✓	1.28 ✓		
E	WT. OF DRY SOIL = C-A	(grams)	6.79 ✓	8.18 ✓		
F	MOISTURE CONTENT = (D/E)X100	(%)	15.9 ✓	15.6 ✓		

000132

LIQUID LIMIT (LL) = ~~36~~ 31 (TBM) PLASTIC LIMIT (PL) = ~~15.8~~ 16 (TBM) PLASTICITY INDEX (PI) = ~~20.2~~ 15 (TBM)

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FLUOR FERNALD

ATTERBERG LIMITS TEST

(ASTM D 4318)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO PROJECT NO. GB1341 TASK NO.: 04.1

DESCRIPTION: Phase III DATE: ____ day Nov month 2001 year

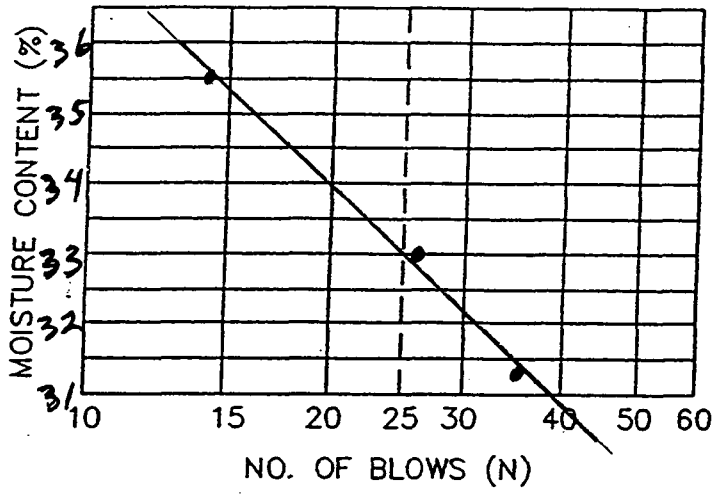
MATERIAL TYPE: Low Perm Clay MATERIAL SOURCE: Stockpile 01-10 SAMPLE NO.: LP-01-64

LIQUID LIMIT DETERMINATION

QA ID: DCE

	TARE NO.		1.6	2.3	3.2	1.1
A	WT. OF TARE	(grams)	28.86	31.20	27.87	26.77
B	WT. OF WET SOIL & TARE	(grams)	46.33	52.15	47.98	
C	WT. OF DRY SOIL & TARE	(grams)	41.75	46.95	43.19	
D	WT. OF WATER = B-C	(grams)	4.58	5.20	4.79	
E	WT. OF DRY SOIL = C-A	(grams)	12.89	15.75	15.32	
F	MOISTURE CONTENT = (D/E)X100	(%)	35.5	33.0	31.3	
N	NUMBER OF BLOWS		14	26	37	

DRYING TARE NO.



CURING TARE NO.

PLASTIC LIMIT DETERMINATION

QA ID: DCE

	TARE NO.		1.4	2.5		
A	WT. OF TARE	(grams)	28.50	28.42		
B	WT. OF WET SOIL & TARE	(grams)	36.52	35.89		
C	WT. OF DRY SOIL & TARE	(grams)	35.40	34.85		
D	WT. OF WATER = B-C	(grams)	1.12	1.04		
E	WT. OF DRY SOIL = C-A	(grams)	6.90	6.43		
F	MOISTURE CONTENT = (D/E)X100	(%)	16.2	16.2		

000133

LIQUID LIMIT (LL) = 33 PLASTIC LIMIT (PL) = 16.2 PLASTICITY INDEX (PI) = 16.8

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4940

FLUOR FERNALD

ATTERBERG LIMITS TEST

(ASTM D 4318)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO PROJECT NO. GQ1341 TASK NO.: 09.1

DESCRIPTION: Phase III DATE: 26 day Nov month 2001 year

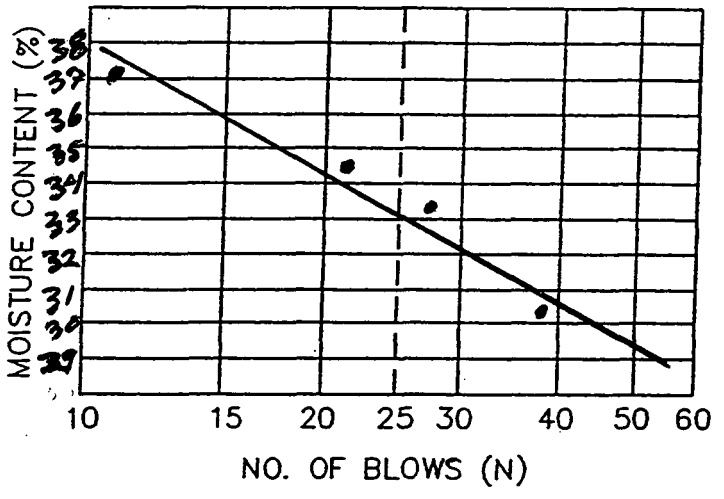
MATERIAL TYPE: MATERIAL SOURCE: stockpile 01-10 SAMPLE NO. LP01-65

LIQUID LIMIT DETERMINATION

QA ID: DLE

	TARE NO.		2.8	3.1	1.5	2.2
A	WT. OF TARE	(grams)	28.47	28.38	28.60	27.63
B	WT. OF WET SOIL & TARE	(grams)	49.89	47.81	47.31	49.34
C	WT. OF DRY SOIL & TARE	(grams)	44.11	42.83	42.97	43.90
D	WT. OF WATER = B-C	(grams)	5.78	4.98	4.34	5.44
E	WT. OF DRY SOIL = C-A	(grams)	15.64	14.45	14.37	16.27
F	MOISTURE CONTENT = (D/E)X100	(%)	37.0	34.5	30.2	33.4
N	NUMBER OF BLOWS		11	22	39	27

DRYING TARE NO.



CURING TARE NO.

PLASTIC LIMIT DETERMINATION

QA ID: DLE

	TARE NO.		1.4	2.3		
A	WT. OF TARE	(grams)	28.49	31.19		
B	WT. OF WET SOIL & TARE	(grams)	38.07	39.32		
C	WT. OF DRY SOIL & TARE	(grams)	36.76	38.20		
D	WT. OF WATER = B-C	(grams)	1.31	1.12		
E	WT. OF DRY SOIL = C-A	(grams)	8.27	7.01		
F	MOISTURE CONTENT = (D/E)X100	(%)	15.80	16.06		

000134

LIQUID LIMIT (LL) = 33 PLASTIC LIMIT (PL) = 15.9 PLASTICITY INDEX (PI) = 17.1

GEOSYNTEC CONSULTANTS

FLUOR FERNALD 4940

ATTERBERG LIMITS TEST (ASTM D 4318)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO PROJECT NO. GQ1341 TASK NO.: 04.1

DESCRIPTION: Phase IV DATE: 28 day June month 2002 year

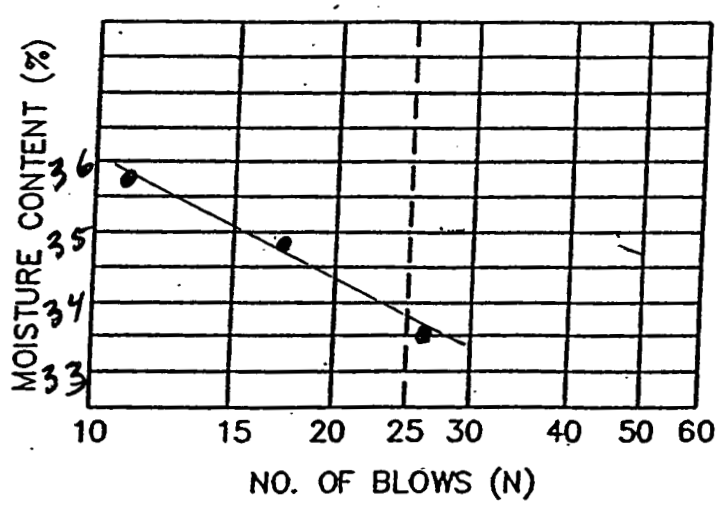
MATERIAL TYPE: Low Perm Clay MATERIAL SOURCE: Borrow Area SAMPLE NO.: LP02-1

LIQUID LIMIT DETERMINATION

QA ID: DZE

	TARE NO.		3.1	2.4	1.5	
A	WT. OF TARE	(grams)	28.39	27.39	28.60	
B	WT. OF WET SOIL & TARE	(grams)	49.93	53.51	52.76	
C	WT. OF DRY SOIL & TARE	(grams)	44.26	46.76	46.70	
D	WT. OF WATER = B-C	(grams)	5.67	6.75	6.06	
E	WT. OF DRY SOIL = C-A	(grams)	15.87	19.37	18.1	
F	MOISTURE CONTENT = (D/E)X100	(%)	35.7	34.8	33.5	
N	NUMBER OF BLOWS		12	17	26	

DRYING TARE NO.



CURING TARE NO.

PLASTIC LIMIT DETERMINATION

QA ID: DZE

	TARE NO.		A218	A203		
A	WT. OF TARE	(grams)	3.58	3.58		
B	WT. OF WET SOIL & TARE	(grams)	17.66	14.57		
C	WT. OF DRY SOIL & TARE	(grams)	15.54	12.98		
D	WT. OF WATER = B-C	(grams)	2.12	1.59		
E	WT. OF DRY SOIL = C-A	(grams)	11.96	9.40		000135
F	MOISTURE CONTENT = (D/E)X100	(%)	17.7	16.9		

LIQUID LIMIT (LL) = 34 PLASTIC LIMIT (PL) = 17 PLASTICITY INDEX (PI) = 17

GEOSYNTEC CONSULTANTS

FLUOR FERNALD 4940

ATTERBERG LIMITS TEST

(ASTM D 4318)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO PROJECT NO. 60134/ TASK NO.: 04.1

DESCRIPTION: Phase IV DATE: 27 day June month 2002 year

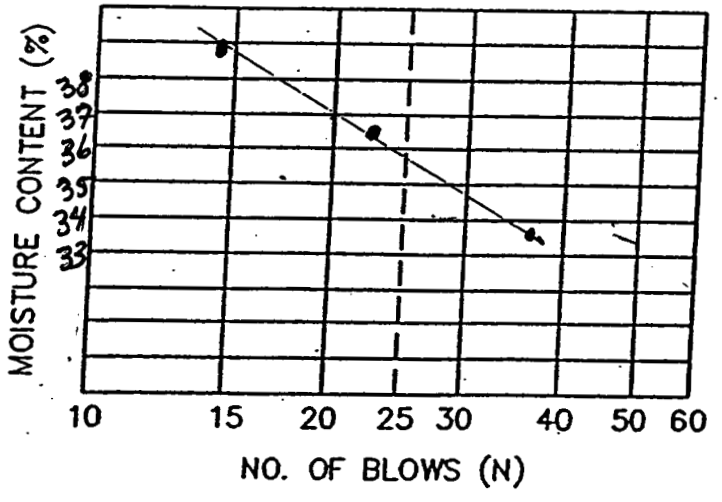
MATERIAL TYPE: Low Perm Clay MATERIAL SOURCE: Borrow Area SAMPLE NO. 1P02-2

LIQUID LIMIT DETERMINATION

QA ID: DLE

	TARE NO.		1.3	2.7	1.8	
A	WT. OF TARE	(grams)	28.64	28.67	28.81	
B	WT. OF WET SOIL & TARE	(grams)	50.39	51.06	51.26	
C	WT. OF DRY SOIL & TARE	(grams)	44.30	45.07	45.57	
D	WT. OF WATER = B-C	(grams)	6.09	5.99	5.69	
E	WT. OF DRY SOIL = C-A	(grams)	15.66	16.40	16.76	
F	MOISTURE CONTENT = (D/E)X100	(%)	38.9	36.5	33.9	
N	NUMBER OF BLOWS		14	23	32	

DRYING TARE NO.



CURING TARE NO.

PLASTIC LIMIT DETERMINATION

QA ID: DLE

	TARE NO.		A223	A221		
A	WT. OF TARE	(grams)	3.69	3.53		
B	WT. OF WET SOIL & TARE	(grams)	16.38	15.49		
C	WT. OF DRY SOIL & TARE	(grams)	14.43	13.68		
D	WT. OF WATER = B-C	(grams)	1.95	1.81		
E	WT. OF DRY SOIL = C-A	(grams)	10.83	10.15		
	MOISTURE CONTENT = (D/E)X100	(%)	18.00	17.8		

000136

LIQUID LIMIT (LL) = 36 PLASTIC LIMIT (PL) = 18 PLASTICITY INDEX (PI) = 18

GEOSYNTEC CONSULTANTS

4940

FLUOR FERNALD

ATTERBERG LIMITS TEST

(ASTM D 4318)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO PROJECT NO. G-Q1341 TASK NO. 04.1

DESCRIPTION: Phase IV DATE: 03 day July month 2002 year

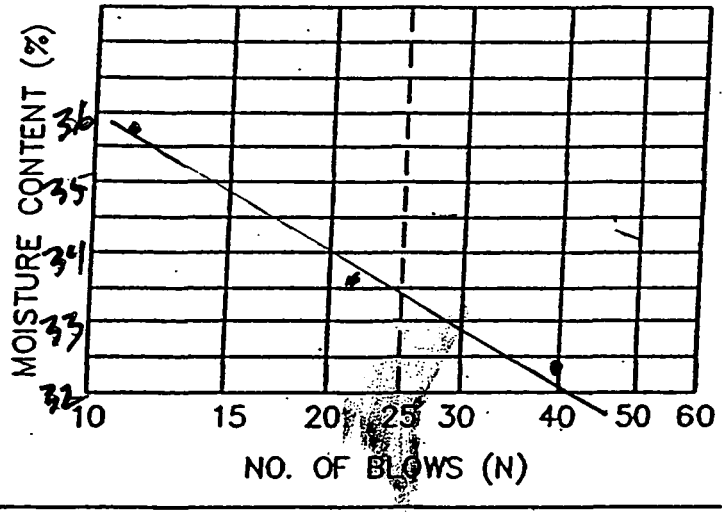
MATERIAL TYPE: LP Clay MATERIAL SOURCE: Borrow Area SAMPLE NO. LP02.3

LIQUID LIMIT DETERMINATION

QA ID: DLE / CW

	TARE NO.		1.3	1.5	2.7	
A	WT. OF TARE	(grams)	28.64	28.61	28.67	
B	WT. OF WET SOIL & TARE	(grams)	46.23	45.62	48.09	
C	WT. OF DRY SOIL & TARE	(grams)	41.59	41.35	43.30	
D	WT. OF WATER = B-C	(grams)	4.64	4.27	4.79	
E	WT. OF DRY SOIL = C-A	(grams)	12.95	12.74	14.63	
F	MOISTURE CONTENT = (D/E)X100	(%)	35.83	33.51	32.74	
N	NUMBER OF BLOWS		12	22	40	

DRYING TARE NO.



CURING TARE NO.

PLASTIC LIMIT DETERMINATION

QA ID: DLE

	TARE NO.		A218	A203		
A	WT. OF TARE	(grams)	3.58	3.59		
B	WT. OF WET SOIL & TARE	(grams)	15.36	17.20		
C	WT. OF DRY SOIL & TARE	(grams)	13.67	15.23		
D	WT. OF WATER = B-C	(grams)	1.69	1.97		
E	WT. OF DRY SOIL = C-A	(grams)	10.09	11.64		
	MOISTURE CONTENT = (D/E)X100	(%)	16.7	16.9		

000137

LIQUID LIMIT (LL) = 33 PLASTIC LIMIT (PL) = 17 PLASTICITY INDEX (PI) = 16

GEOSYNTEC CONSULTANTS

FLUOR FERNALD

4940

ATTERBERG LIMITS TEST

(ASTM D 4318)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO PROJECT NO.: GQ1341 TASK NO.: 04.1

DESCRIPTION: Phase IV DATE: 03 day July month 2002 year

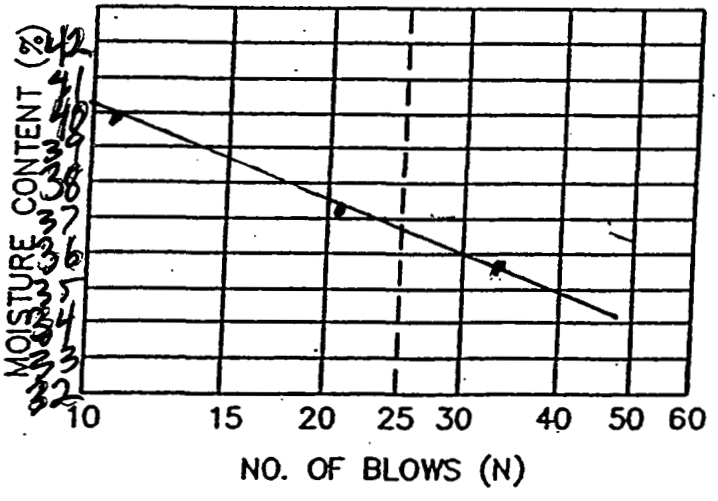
MATERIAL TYPE: LP Clay MATERIAL SOURCE: Borrow Area SAMPLE NO.: LP02-4

LIQUID LIMIT DETERMINATION

QA ID: CK

	TARE NO.		1.8	3.1	2.4	
A	WT. OF TARE	(grams)	28.81	28.38	27.39	
B	WT. OF WET SOIL & TARE	(grams)	50.42	45.86	48.65	
C	WT. OF DRY SOIL & TARE	(grams)	44.25	41.12	43.06	
D	WT. OF WATER = B-C	(grams)	6.17	4.74	5.59	
E	WT. OF DRY SOIL = C-A	(grams)	15.44	12.74	15.67	
F	MOISTURE CONTENT = (D/E)X100	(%)	39.96	37.21	35.67	
N	NUMBER OF BLOWS		11	21	33	

DRYING TARE NO.



CURING TARE NO.

PLASTIC LIMIT DETERMINATION

QA ID: CK

	TARE NO.		A 223	A 221		
A	WT. OF TARE	(grams)	3.57	3.48		
B	WT. OF WET SOIL & TARE	(grams)	15.98	13.27		
C	WT. OF DRY SOIL & TARE	(grams)	14.23	11.91		
D	WT. OF WATER = B-C	(grams)	1.75	1.36		
E	WT. OF DRY SOIL = C-A	(grams)	10.66	8.43		
	MOISTURE CONTENT = (D/E)X100	(%)	16.4	16.1		

000138

LIQUID LIMIT (LL) = 37 PLASTIC LIMIT (PL) = 16 PLASTICITY INDEX (PI) = 21

GEOSYNTEC CONSULTANTS

4940

FLUOR FERNALD

ATTERBERG LIMITS TEST

(ASTM D 4318)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO PROJECT NO. 6Q1341 TASK NO.: 09.1

DESCRIPTION: Phase IV DATE: 05 day July month 2002 year

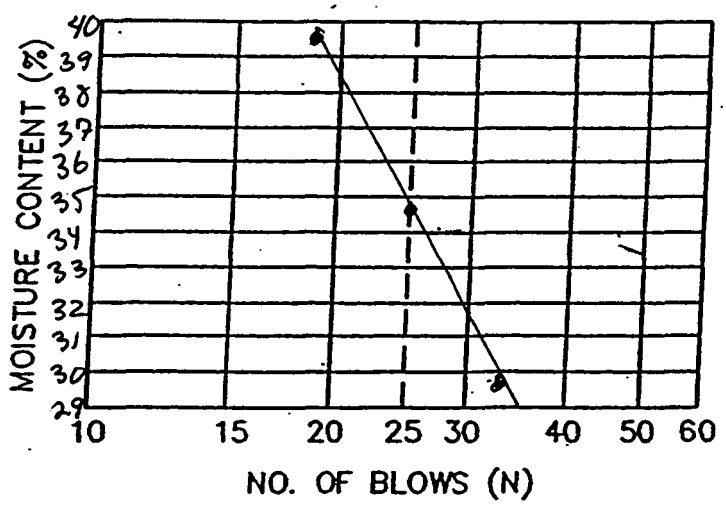
MATERIAL TYPE: Low Perm Clay MATERIAL SOURCE: Borrow Area SAMPLE NO.: LP-02-5

LIQUID LIMIT DETERMINATION

QA ID: CW/DLF

	TARE NO.		1.6	2.6	1.9	
A	WT. OF TARE	(grams)	28.87	28.55	28.56	
B	WT. OF WET SOIL & TARE	(grams)	48.59	49.09	47.74	
C	WT. OF DRY SOIL & TARE	(grams)	43.00	43.79	43.42	
D	WT. OF WATER = B-C	(grams)	5.59	5.3	4.32	
E	WT. OF DRY SOIL = C-A	(grams)	14.13	15.24	14.86	
F	MOISTURE CONTENT = (D/E)X100	(%)	39.56	34.77	29.07	
N	NUMBER OF BLOWS		18	25	33	

DRYING TARE NO.



CURING TARE NO.

PLASTIC LIMIT DETERMINATION

QA ID: CW/DLF

	TARE NO.		A208	A-210		
A	WT. OF TARE	(grams)	3.58	3.54		
B	WT. OF WET SOIL & TARE	(grams)	15.22	19.39		
C	WT. OF DRY SOIL & TARE	(grams)	13.52	17.16		
D	WT. OF WATER = B-C	(grams)	1.70	2.23		
E	WT. OF DRY SOIL = C-A	(grams)	9.94	13.62		
	MOISTURE CONTENT = (D/E)X100	(%)	17.10	16.4		

000139

LIQUID LIMIT (LL) = 35 PLASTIC LIMIT (PL) = 17 PLASTICITY INDEX (PI) = 18

4940

GEOSYNTEC CONSULTANTS

FLUOR FERNALD

ATTERBERG LIMITS TEST

(ASTM D 4318)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO PROJECT NO. 6Q1341 TASK NO.: 041

DESCRIPTION: Phase IV DATE: 09 day July month 2002 year

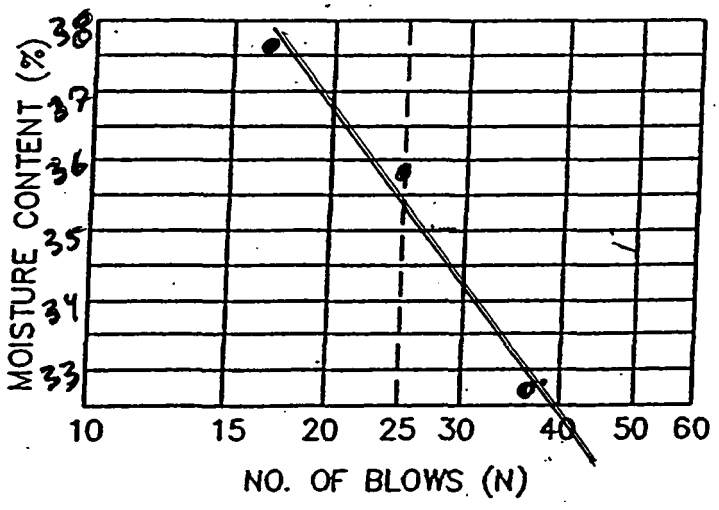
MATERIAL TYPE: Low Perm Clay MATERIAL SOURCE: Borrow Area SAMPLE NO. LP02.5

LIQUID LIMIT DETERMINATION

QA ID: DLE

	TARE NO.		1.3	1.5	2.6	
A	WT. OF TARE	(grams)	28.64	28.61	28.55	
B	WT. OF WET SOIL & TARE	(grams)	52.07	52.85	51.96	
C	WT. OF DRY SOIL & TARE	(grams)	46.22	46.45	45.58	
D	WT. OF WATER = B–C	(grams)	5.85	6.40	6.40	
E	WT. OF DRY SOIL = C–A	(grams)	17.58	17.84	17.03	
F	MOISTURE CONTENT = (D/E)X100	(%)	33.3	35.9	37.6	
N	NUMBER OF BLOWS		38	25	16	

DRYING TARE NO.



CURING TARE NO.

PLASTIC LIMIT DETERMINATION

QA ID: DLE

	TARE NO.		A220	A213		
A	WT. OF TARE	(grams)	3.46	3.46		
B	WT. OF WET SOIL & TARE	(grams)	14.56	14.10		
C	WT. OF DRY SOIL & TARE	(grams)	12.95	12.55		
D	WT. OF WATER = B–C	(grams)	1.61	1.55		
E	WT. OF DRY SOIL = C–A	(grams)	9.49	9.09		
	MOISTURE CONTENT = (D/E)X100	(%)	17.0	17.1		

000140

LIQUID LIMIT (LL) = 35 PLASTIC LIMIT (PL) = 17 PLASTICITY INDEX (PI) = 18

GEOSYNTEC CONSULTANTS

FLUOR FERNALD 4940

ATTERBERG LIMITS TEST (ASTM D 4318)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO PROJECT NO. 6Q1341 TASK NO.: 04.1

DESCRIPTION: Phase IV DATE: 10 day July month 2002 year

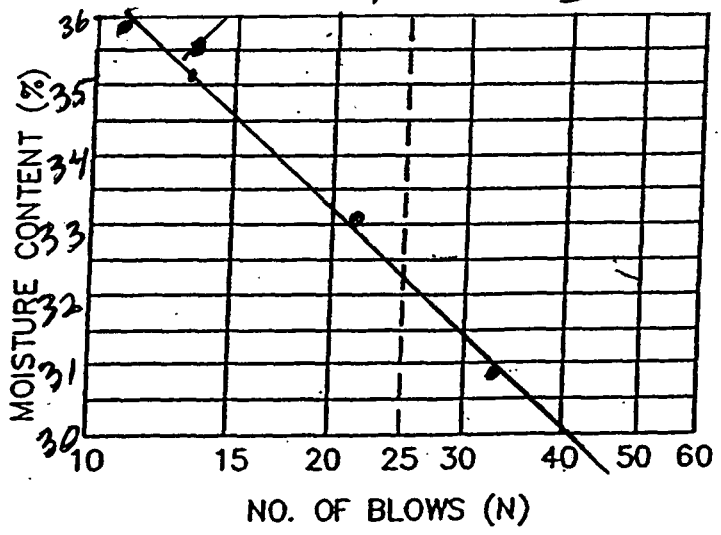
MATERIAL TYPE: Low Plasm Clay MATERIAL SOURCE: Borrow Area SAMPLE NO. 4P02-6

LIQUID LIMIT DETERMINATION

QA ID: DLE

	TARE NO.		1.9	3.1	2.6	1.3
A	WT. OF TARE	(grams)	28.56	28.38	28.55	28.62
B	WT. OF WET SOIL & TARE	(grams)	50.81	50.12	51.28	48.69
C	WT. OF DRY SOIL & TARE	(grams)	44.95	44.47	45.63	43.97
D	WT. OF WATER = B-C	(grams)	5.86	5.65	5.65	4.72
E	WT. OF DRY SOIL = C-A	(grams)	16.39	16.09	17.08	15.35
F	MOISTURE CONTENT = (D/E)X100	(%)	35.8	35.1	33.1	30.7
N	NUMBER OF BLOWS		11	13	22	33

DRYING TARE NO.



CURING TARE NO.

PLASTIC LIMIT DETERMINATION

QA ID: DLE

	TARE NO.		2.4	1.5		
A	WT. OF TARE	(grams)	27.39	28.61		
B	WT. OF WET SOIL & TARE	(grams)	38.54	39.94		
C	WT. OF DRY SOIL & TARE	(grams)	36.88	38.34		
D	WT. OF WATER = B-C	(grams)	1.66	1.60		
	WT. OF DRY SOIL = C-A	(grams)	9.49	9.73		
F	MOISTURE CONTENT = (D/E)X100	(%)	~~16.4~~ 17	16.4		

000141

LIQUID LIMIT (LL) = 32 PLASTIC LIMIT (PL) = ~~16~~ 17 PLASTICITY INDEX (PI) = ~~16~~ 15

GEOSYNTEC CONSULTANTS

FLUOR FERNALD 4940

ATTERBERG LIMITS TEST

(ASTM D 4318)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO PROJECT NO. GQ1341 TASK NO.: 04.1

DESCRIPTION: Phase IV DATE: 09 day July month 2002 year

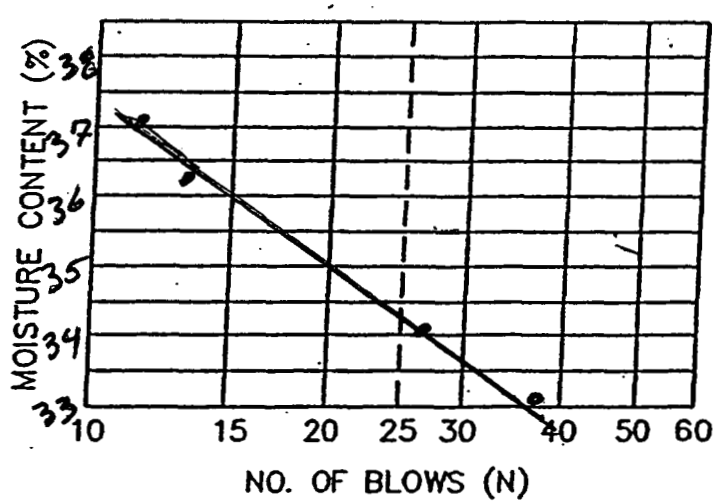
MATERIAL TYPE: Low Penn Clay MATERIAL SOURCE: Borrow Area SAMPLE NO. P02-7

LIQUID LIMIT DETERMINATION

QA ID: DLE

	TARE NO.		1.6	2.7	3.1	1.9
A	WT. OF TARE	(grams)	28.87	28.67	28.38	28.56
B	WT. OF WET SOIL & TARE	(grams)	51.11	50.88	48.42	49.61
C	WT. OF DRY SOIL & TARE	(grams)	45.09	44.96	43.32	44.38
D	WT. OF WATER = B-C	(grams)	6.02	5.92	5.10	5.23
E	WT. OF DRY SOIL = C-A	(grams)	16.22	16.29	14.94	15.82
F	MOISTURE CONTENT = (D/E)X100	(%)	37.1	36.3	34.1	33.1
N	NUMBER OF BLOWS		12	13	22	38

DRYING TARE NO.



CURING TARE NO.

PLASTIC LIMIT DETERMINATION

QA ID: DLE

	TARE NO.		A-217	A-222		
A	WT. OF TARE	(grams)	3.61	3.55		
B	WT. OF WET SOIL & TARE	(grams)	13.51	14.64		
C	WT. OF DRY SOIL & TARE	(grams)	12.05	13.02		
D	WT. OF WATER = B-C	(grams)	1.46	1.62		
E	WT. OF DRY SOIL = C-A	(grams)	8.44	9.47		
	MOISTURE CONTENT = (D/E)X100	(%)	17.3	17.1		

000142

LIQUID LIMIT (LL) = 34 PLASTIC LIMIT (PL) = 17.2 PLASTICITY INDEX (PI) = 17

GEOSYNTEC CONSULTANTS

FLUOR FERNALD 4940

ATTERBERG LIMITS TEST

(ASTM D 4318)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO PROJECT NO: 6-Q134/ TASK NO.: 04.1

DESCRIPTION: Phase IV DATE: 17 day July month 2002 year

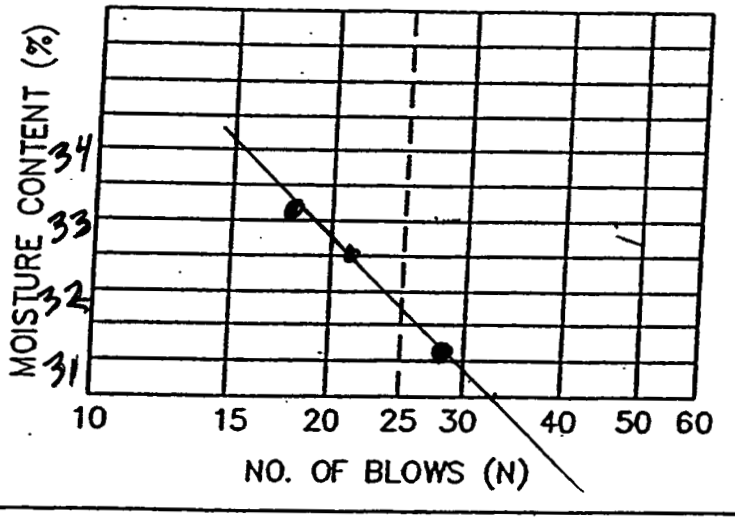
MATERIAL TYPE: Low Perm Clay MATERIAL SOURCE: Stockpile 02-1 SAMPLE NO.: LP02-8

LIQUID LIMIT DETERMINATION

QA ID: DLE

	TARE NO.		1.5	3.1	2.8	
A	WT. OF TARE	(grams)	28.61	28.38	28.46	
B	WT. OF WET SOIL & TARE	(grams)	47.33	50.79	48.62	
C	WT. OF DRY SOIL & TARE	(grams)	42.89	45.28	43.60	
D	WT. OF WATER = B-C	(grams)	4.44	5.49	5.02	
E	WT. OF DRY SOIL = C-A	(grams)	14.28	16.90	15.14	
F	MOISTURE CONTENT = (D/E)X100	(%)	31.1	32.5	33.2	
N	NUMBER OF BLOWS		28	21	18	

DRYING TARE NO.



CURING TARE NO.

PLASTIC LIMIT DETERMINATION

QA ID: DLE

	TARE NO.		A 220	A 222		
A	WT. OF TARE	(grams)	3.45	3.54		
B	WT. OF WET SOIL & TARE	(grams)	16.40	17.98		
C	WT. OF DRY SOIL & TARE	(grams)	14.61	15.98		
D	WT. OF WATER = B-C	(grams)	1.79	2.00		
E	WT. OF DRY SOIL = C-A	(grams)	11.16	12.44		
	MOISTURE CONTENT = (D/E)X100	(%)	16.0	16.1		

000143

LIQUID LIMIT (LL) = 32 PLASTIC LIMIT (PL) = 16 PLASTICITY INDEX (PI) = 16

GEOSYNTEC CONSULTANTS

FLUOR FERNALD

4940

ATTERBERG LIMITS TEST

(ASTM D 4318)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO PROJECT NO. GQ134 TASK NO.: 04.1

DESCRIPTION: Phase IV DATE: 17 day Feb month 2002 year

MATERIAL TYPE: Low Pen CLAY MATERIAL SOURCE: Stockpile 02-2 SAMPLE NO.: LP02.9

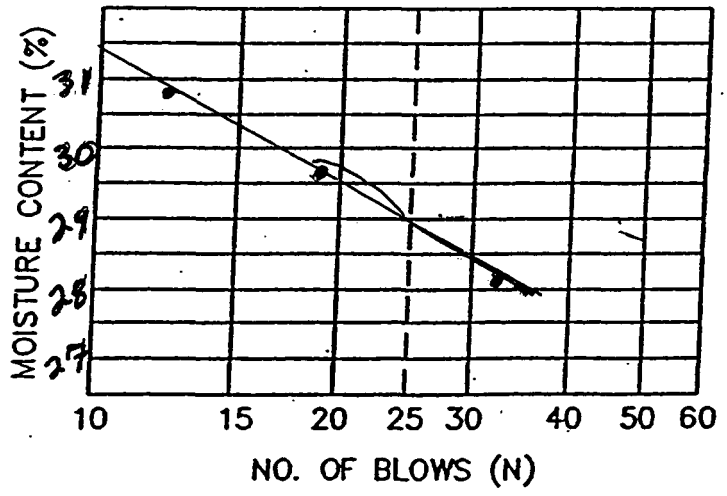
LIQUID LIMIT DETERMINATION

QA ID: 12 LE

	TARE NO.		1.3	1.9	2.5	
A	WT. OF TARE	(grams)	28.64	28.56	28.42	
B	WT. OF WET SOIL & TARE	(grams)	54.52	49.50	48.15	
C	WT. OF DRY SOIL & TARE	(grams)	48.42	44.72	43.81	
D	WT. OF WATER = B-C	(grams)	6.10	4.78	4.34	
E	WT. OF DRY SOIL = C-A	(grams)	19.78	16.16	15.39	
F	MOISTURE CONTENT = (D/E)X100	(%)	30.8	29.6	28.2	
N	NUMBER OF BLOWS		13	19	32	

DRYING TARE NO.

CURING TARE NO.



PLASTIC LIMIT DETERMINATION

QA ID: PLE

	TARE NO.		A-217	A 213		
A	WT. OF TARE	(grams)	3.59	3.46		
B	WT. OF WET SOIL & TARE	(grams)	14.74	21.14		
C	WT. OF DRY SOIL & TARE	(grams)	13.18	18.69		
D	WT. OF WATER = B-C	(grams)	1.56	2.45		
E	WT. OF DRY SOIL = C-A	(grams)	9.59	15.23		
	MOISTURE CONTENT = (D/E)X100	(%)	16.3 ~~16.6~~	16.1		

000144

LIQUID LIMIT (LL) = 29 PLASTIC LIMIT (PL) = 16 PLASTICITY INDEX (PI) = 13

GEOSYNTEC CONSULTANTS

FLUOR FERNALD

4940

ATTERBERG LIMITS TEST

(ASTM D 4318)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO PROJECT NO. 6Q341 TASK NO.: 04.1

DESCRIPTION: Phase IV DATE: 17 day July month 2002 year

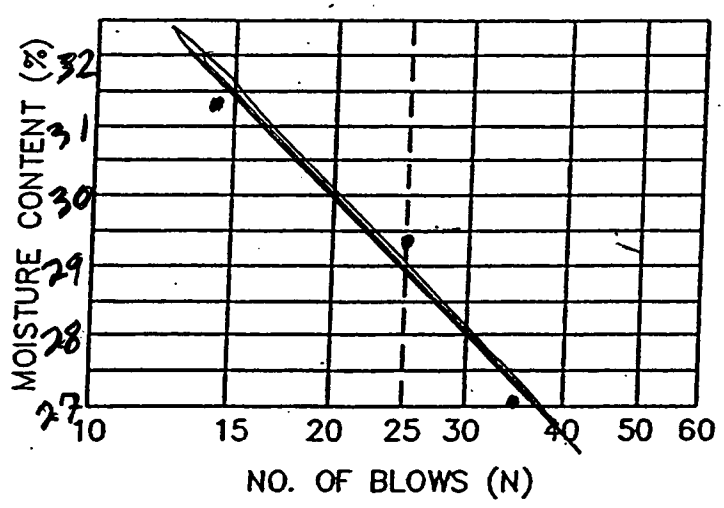
MATERIAL TYPE: Low Perm Clay MATERIAL SOURCE: Stockpile 02-2 SAMPLE NO. LP02-9

LIQUID LIMIT DETERMINATION

QA ID: DLE

	TARE NO.		1.6	2.7	1.8	
A	WT. OF TARE	(grams)	28.86	28.69	28.76	
B	WT. OF WET SOIL & TARE	(grams)	46.42	49.91	48.83	
C	WT. OF DRY SOIL & TARE	(grams)	42.69	45.08	44.04	
D	WT. OF WATER = B-C	(grams)	3.73	4.83	4.79	
E	WT. OF DRY SOIL = C-A	(grams)	13.83	16.41	15.28	
F	MOISTURE CONTENT = (D/E)X100	(%)	27.0	29.4	31.3	
N	NUMBER OF BLOWS		35	25	14	

DRYING TARE NO.



CURING TARE NO.

PLASTIC LIMIT DETERMINATION

QA ID: DLE

	TARE NO.		A219	A202		
A	WT. OF TARE	(grams)	3.59	3.58		
B	WT. OF WET SOIL & TARE	(grams)	13.60	13.98		
C	WT. OF DRY SOIL & TARE	(grams)	12.21	12.57		
D	WT. OF WATER = B-C	(grams)	1.39	1.41		
E	WT. OF DRY SOIL = C-A	(grams)	8.62	8.99		
	MOISTURE CONTENT = (D/E)X100	(%)	16.1	15.7		

000145

LIQUID LIMIT (LL) = 29 PLASTIC LIMIT (PL) = 16 PLASTICITY INDEX (PI) = 13

GEOSYNTEC CONSULTANTS

4940

FLUOR FERNALD

ATTERBERG LIMITS TEST

(ASTM D 4318)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO PROJECT NO. GQ1341 TASK NO.: 04-1

DESCRIPTION: Phase IV DATE: 22 day July month 2002 year

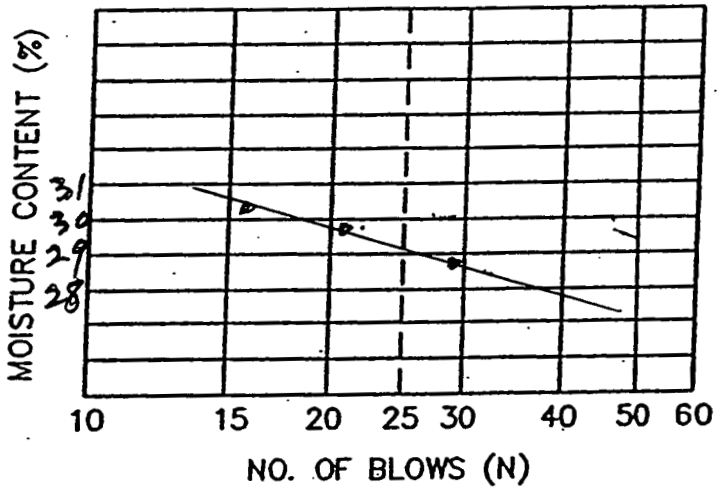
MATERIAL TYPE: Low Perm Clay MATERIAL SOURCE: Stockpile 02-2 SAMPLE NO.: LP02-10

LIQUID LIMIT DETERMINATION

QA ID: DLE

	TARE NO.		2.8	3.1	1.8	
A	WT. OF TARE	(grams)	28.46	28.38	26.78	
B	WT. OF WET SOIL & TARE	(grams)	47.66	50.37	49.29	
C	WT. OF DRY SOIL & TARE	(grams)	43.19	45.31	44.71	
D	WT. OF WATER = B-C	(grams)	4.47	5.06	4.58	
E	WT. OF DRY SOIL = C-A	(grams)	14.73	16.93	15.93	
F	MOISTURE CONTENT = (D/E)X100	(%)	30.3	29.9	28.9 28.8	
N	NUMBER OF BLOWS		16	21	28	

DRYING TARE NO.



CURING TARE NO.

PLASTIC LIMIT DETERMINATION

QA ID: DLE

	TARE NO.		A202	A219		
A	WT. OF TARE	(grams)	3.58	3.59		
B	WT. OF WET SOIL & TARE	(grams)	17.67	18.23		
C	WT. OF DRY SOIL & TARE	(grams)	15.78	16.25		
D	WT. OF WATER = B-C	(grams)	1.89	1.98		
E	WT. OF DRY SOIL = C-A	(grams)	12.20	12.66		
	MOISTURE CONTENT = (D/E)X100	(%)	15.5	15.6		

000146

LIQUID LIMIT (LL) = 29 PLASTIC LIMIT (PL) = 16 PLASTICITY INDEX (PI) = 13

GEOSYNTEC CONSULTANTS

FLUOR FERNALD

4940

ATTERBERG LIMITS TEST

(ASTM D 4318)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO PROJECT NO. 6Q134 TASK NO.: 041

DESCRIPTION: Phase IV DATE: 22 day July month 2002 year

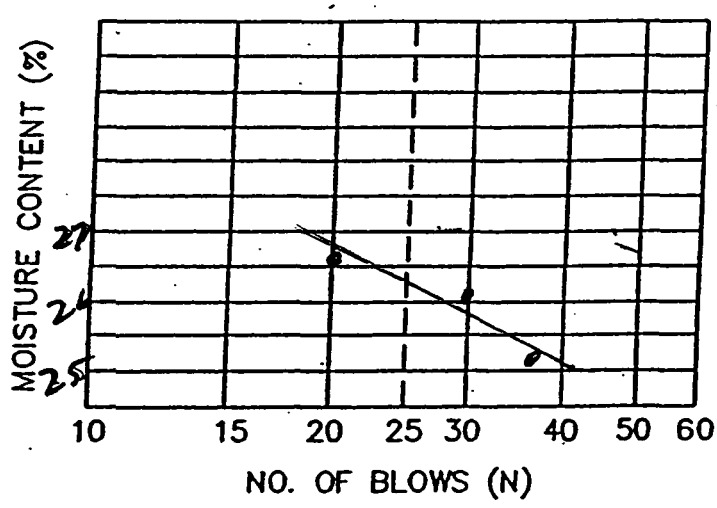
MATERIAL TYPE: Low Perm Clay MATERIAL SOURCE: Stockpile 02-2 SAMPLE NO. LP02-11

LIQUID LIMIT DETERMINATION

QA ID: DLE

	TARE NO.		1.4	2.7	1.9	
A	WT. OF TARE	(grams)	28.50	28.68	28.54	
B	WT. OF WET SOIL & TARE	(grams)	46.85	51.41	48.60	
C	WT. OF DRY SOIL & TARE	(grams)	43.00	46.71	44.57	
D	WT. OF WATER = B-C	(grams)	3.85	4.70	4.03	
E	WT. OF DRY SOIL = C-A	(grams)	14.50	18.03	16.03	
F	MOISTURE CONTENT = (D/E)X100	(%)	26.6	26.1	25.1	
N	NUMBER OF BLOWS		20	30	36	

DRYING TARE NO.



CURING TARE NO.

PLASTIC LIMIT DETERMINATION

QA ID: DLE

	TARE NO.		A-222	A-213		
A	WT. OF TARE	(grams)	3.54	3.47		
B	WT. OF WET SOIL & TARE	(grams)	15.69	14.18		
C	WT. OF DRY SOIL & TARE	(grams)	14.10	12.80		
D	WT. OF WATER = B-C	(grams)	1.59	1.38		
E	WT. OF DRY SOIL = C-A	(grams)	10.56	9.33		000147
	MOISTURE CONTENT = (D/E)X100	(%)	15.1	14.8		

LIQUID LIMIT (LL) = 26 PLASTIC LIMIT (PL) = 15 PLASTICITY INDEX (PI) = 11

GEOSYNTEC CONSULTANTS

FLUOR FERNALD 4940

ATTERBERG LIMITS TEST

(ASTM D 4318)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO PROJECT NO. 6-0134 TASK NO.: 04.1

DESCRIPTION: Phase IV DATE: 22 day July month 2002 year

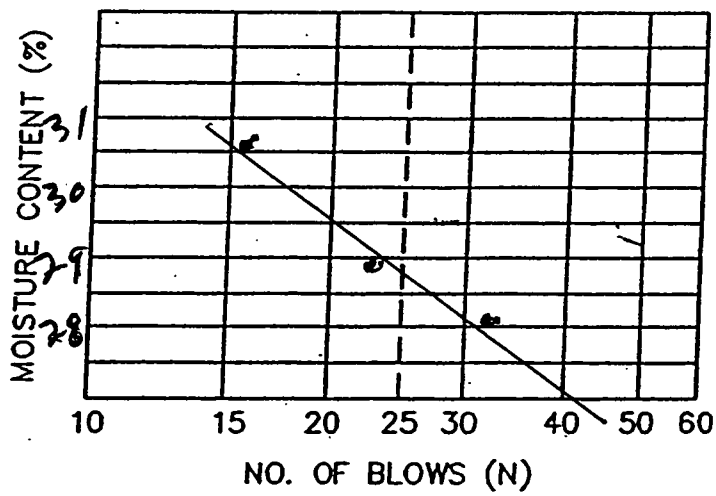
MATERIAL TYPE: Low Penn Clay MATERIAL SOURCE: Stockpile 02-2 SAMPLE NO. SP02-12

LIQUID LIMIT DETERMINATION

QA ID: CHW

	TARE NO.		1.3	2.5	3.2	
A	WT. OF TARE	(grams)	28.64	28.42	27.82	
B	WT. OF WET SOIL & TARE	(grams)	50.58	47.53	45.53	
C	WT. OF DRY SOIL & TARE	(grams)	45.77	43.25	41.37	
D	WT. OF WATER = B-C	(grams)	4.81	4.28	4.16	
E	WT. OF DRY SOIL = C-A	(grams)	17.13	14.83	13.55	
F	MOISTURE CONTENT = (D/E)X100	(%)	28.1	28.9	30.7	
N	NUMBER OF BLOWS		32	23	16	

DRYING TARE NO.



CURING TARE NO.

PLASTIC LIMIT DETERMINATION

QA ID: DLE

	TARE NO.		A220	A217		
A	WT. OF TARE	(grams)	3.46	3.60		
B	WT. OF WET SOIL & TARE	(grams)	17.05	19.24		
C	WT. OF DRY SOIL & TARE	(grams)	15.28	17.21		
D	WT. OF WATER = B-C	(grams)	1.77	2.03		
E	WT. OF DRY SOIL = C-A	(grams)	11.82	13.61		
	MOISTURE CONTENT = (D/E)X100	(%)	14.97	14.92		

000148

LIQUID LIMIT (LL) = 29 PLASTIC LIMIT (PL) = 15 PLASTICITY INDEX (PI) = 14

GEOSYNTEC CONSULTANTS

FLUOR FERNALD

4940

ATTERBERG LIMITS TEST

(ASTM D 4318)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO PROJECT NO. GQ1341 TASK NO.: 04.1

DESCRIPTION: Phase IV DATE: 22 day July month 2002 year

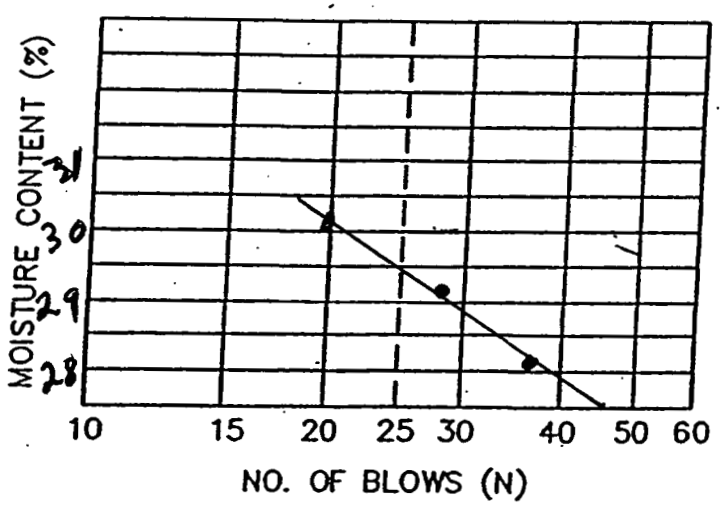
MATERIAL TYPE: Low Perm Clay MATERIAL SOURCE: Stockpile 02-2 SAMPLE NO.: LP02-13

LIQUID LIMIT DETERMINATION

QA ID: DLE

	TARE NO.		1.6	2.1	1.7	
A	WT. OF TARE	(grams)	28.87	28.24	28.49	
B	WT. OF WET SOIL & TARE	(grams)	48.28	47.81	48.73	
C	WT. OF DRY SOIL & TARE	(grams)	44.02	43.39	44.02	
D	WT. OF WATER = B-C	(grams)	4.26	4.42	4.71	
E	WT. OF DRY SOIL = C-A	(grams)	15.15	15.15	15.53	
F	MOISTURE CONTENT = (D/E)X100	(%)	28.1	29.2	30.3	
N	NUMBER OF BLOWS		37	28	20	

DRYING TARE NO.



CURING TARE NO.

PLASTIC LIMIT DETERMINATION

QA ID: DLE

	TARE NO.		A201	A-209		
A	WT. OF TARE	(grams)	3.541	3.46		
B	WT. OF WET SOIL & TARE	(grams)	13.93	14.82		
C	WT. OF DRY SOIL & TARE	(grams)	12.50	13.28		
D	WT. OF WATER = B-C	(grams)	1.43	1.54		
E	WT. OF DRY SOIL = C-A	(grams)	8.96	9.82		
	MOISTURE CONTENT = (D/E)X100	(%)	16.0	15.7		

000149

LIQUID LIMIT (LL) = 29 PLASTIC LIMIT (PL) = 16 PLASTICITY INDEX (PI) = 13

GEOSYNTEC CONSULTANTS

FLUOR FERNALD

4940

ATTERBERG LIMITS TEST

(ASTM D 4318)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO PROJECT NO. 6Q1341 TASK NO.: 04.1

DESCRIPTION: Phase IV DATE: 22 day July month 2002 year

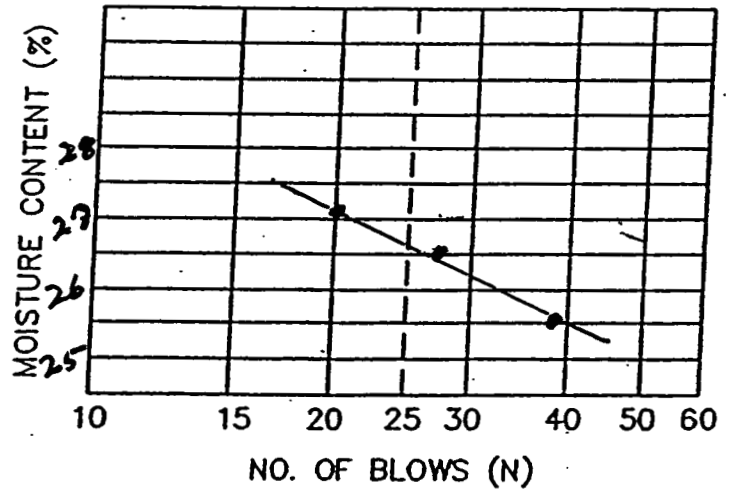
MATERIAL TYPE: Low Perm Clay MATERIAL SOURCE: Stockpile 02-3 SAMPLE NO. P02-14

LIQUID LIMIT DETERMINATION

QA ID: DLE

	TARE NO.		4.0	3.6	4.4	
A	WT. OF TARE	(grams)	21.11	21.44	21.34	
B	WT. OF WET SOIL & TARE	(grams)	42.76	41.49	42.53	
C	WT. OF DRY SOIL & TARE	(grams)	38.15	37.29	38.23	
D	WT. OF WATER = B-C	(grams)	4.61	4.20	4.30	
E	WT. OF DRY SOIL = C-A	(grams)	17.04	15.85	16.89	
F	MOISTURE CONTENT = (D/E)X100	(%)	27.1	26.5	25.5	
N	NUMBER OF BLOWS		20	27	39	

DRYING TARE NO.



CURING TARE NO.

PLASTIC LIMIT DETERMINATION

QA ID: DLE

	TARE NO.		A-208	A-210		
A	WT. OF TARE	(grams)	3.57	3.53		
B	WT. OF WET SOIL & TARE	(grams)	17.89	15.65		
C	WT. OF DRY SOIL & TARE	(grams)	15.99	14.02		
D	WT. OF WATER = B-C	(grams)	1.90	1.63		
E	WT. OF DRY SOIL = C-A	(grams)	12.42	10.49		
	MOISTURE CONTENT = (D/E)X100	(%)	15.3	15.5		

000150

LIQUID LIMIT (LL) = 27 PLASTIC LIMIT (PL) = 15 PLASTICITY INDEX (PI) = 12

GEOSYNTEC CONSULTANTS

4940

FLUOR FERNALD

ATTERBERG LIMITS TEST

(ASTM D 4318)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO PROJECT NO. GQ1341 TASK NO.: 04.1

DESCRIPTION: Phase IV DATE: 22 day JULY month 2002 year

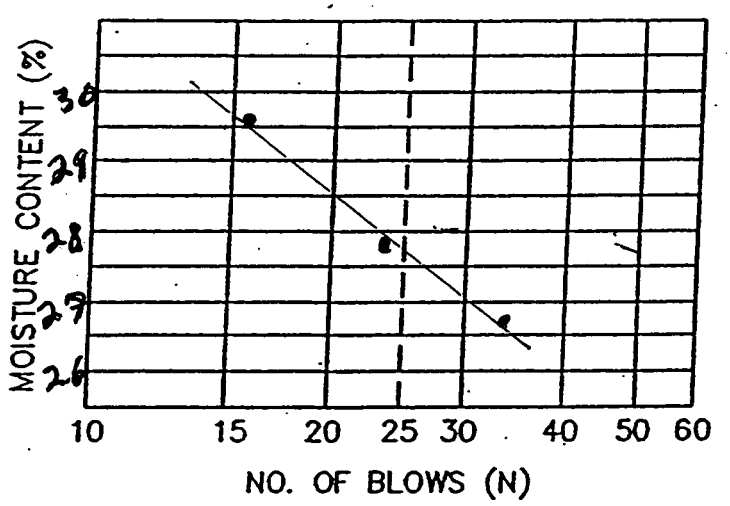
MATERIAL TYPE: Low Perm Clay MATERIAL SOURCE: Borrow Area SAMPLE NO.: SK02-15

LIQUID LIMIT DETERMINATION

QA ID: CHW

	TARE NO.		1.1	2.3	2.9	
A	WT. OF TARE	(grams)	28.76	31.20	31.46	
B	WT. OF WET SOIL & TARE	(grams)	44.76	49.94	48.69	
C	WT. OF DRY SOIL & TARE	(grams)	41.39	45.88	44.75	
D	WT. OF WATER = B-C	(grams)	3.37	4.06	3.94	
E	WT. OF DRY SOIL = C-A	(grams)	12.63	14.68	13.29	
F	MOISTURE CONTENT = (D/E)X100	(%)	26.7	27.7	29.6	
N	NUMBER OF BLOWS		34	24	16	

DRYING TARE NO.



CURING TARE NO.

PLASTIC LIMIT DETERMINATION

QA ID: DLE

	TARE NO.		A203	A218		
A	WT. OF TARE	(grams)	3.60	3.58		
B	WT. OF WET SOIL & TARE	(grams)	20.28	16.91		
C	WT. OF DRY SOIL & TARE	(grams)	18.04	15.14		
D	WT. OF WATER = B-C	(grams)	2.24	1.77		000151
E	WT. OF DRY SOIL = C-A	(grams)	14.44	11.56		
	MOISTURE CONTENT = (D/E)X100	(%)	15.5	15.3		

LIQUID LIMIT (LL) = 28 PLASTIC LIMIT (PL) = 15 PLASTICITY INDEX (PI) = 13

GEOSYNTEC CONSULTANTS

FLUOR FERNALD

4940

ATTERBERG LIMITS TEST

(ASTM D 4318)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO PROJECT NO.: 6021341 TASK NO.: 04.1

DESCRIPTION: Phase IV DATE: 26 day July month 2002 year

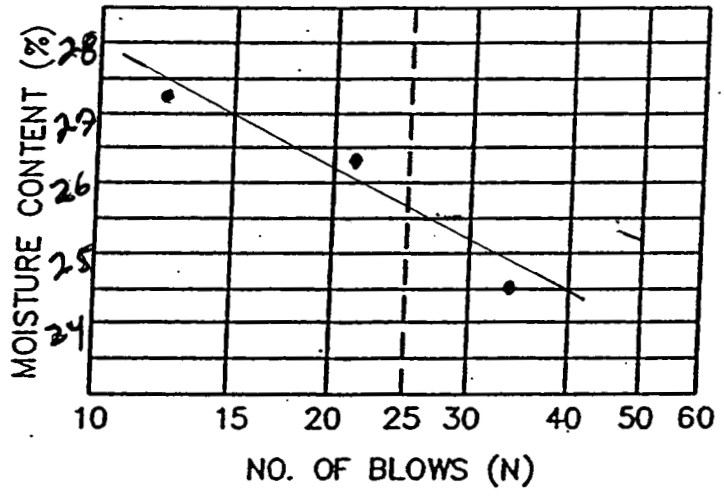
MATERIAL TYPE: Low Perm Clay MATERIAL SOURCE: Stockpile 02-3 SAMPLE NO.: LP02-16

LIQUID LIMIT DETERMINATION

QA ID: KS

	TARE NO.		1.8	2.3	3.2	
A	WT. OF TARE	(grams)	28.81	31.20	27.82	
B	WT. OF WET SOIL & TARE	(grams)	39.12	41.05	40.95	
C	WT. OF DRY SOIL & TARE	(grams)	36.91	38.96	38.37	
D	WT. OF WATER = B-C	(grams)	2.21	2.09	2.58	
E	WT. OF DRY SOIL = C-A	(grams)	8.1	7.76	10.55	
F	MOISTURE CONTENT = (D/E)X100	(%)	27.3	26.9	24.5	
N	NUMBER OF BLOWS		13	22	34	

DRYING TARE NO.



CURING TARE NO.

PLASTIC LIMIT DETERMINATION

QA ID: KS/DJE

	TARE NO.		2.9	2.7		
A	WT. OF TARE	(grams)	31.46	28.67		
B	WT. OF WET SOIL & TARE	(grams)	44.34	40.73		
C	WT. OF DRY SOIL & TARE	(grams)	42.67	39.17		
D	WT. OF WATER = B-C	(grams)	1.67	1.56		
E	WT. OF DRY SOIL = C-A	(grams)	11.21	10.50		
	MOISTURE CONTENT = (D/E)X100	(%)	14.9	14.9		

000152

LIQUID LIMIT (LL) = 26 PLASTIC LIMIT (PL) = 15 PLASTICITY INDEX (PI) = 11

GEOSYNTEC CONSULTANTS

FLUOR FERNALD 4940

ATTERBERG LIMITS TEST

(ASTM D 4318)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO PROJECT NO.: 6Q134L TASK NO.: Ø4.1

DESCRIPTION: Phase IV DATE: 25 day July month 2ØØ2 year

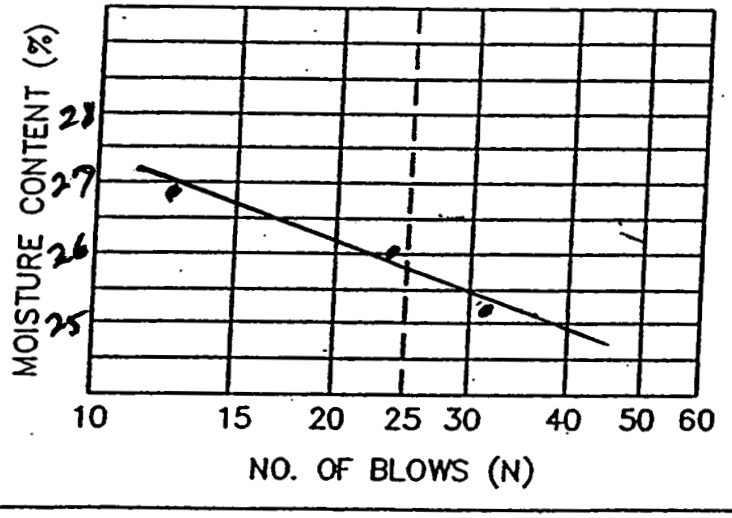
MATERIAL TYPE: Low Perm Clay MATERIAL SOURCE: Stockpile Ø2-3 SAMPLE NO.: LPØ2-17

LIQUID LIMIT DETERMINATION

QA ID: KS

	TARE NO.		1.8	2.9	2.3	
A	WT. OF TARE	(grams)	28.81	31.46	31.2Ø	
B	WT. OF WET SOIL & TARE	(grams)	37.19	44.33	43.33	
C	WT. OF DRY SOIL & TARE	(grams)	35.42	41.67	40.89	
D	WT. OF WATER = B−C	(grams)	1.77	2.66	2.44	
E	WT. OF DRY SOIL = C−A	(grams)	6.61	10.21	9.69	
F	MOISTURE CONTENT = (D/E)X100	(%)	26.8	26.1 ~~26.Ø~~	25.2	
N	NUMBER OF BLOWS		13	24	31	

DRYING TARE NO.



CURING TARE NO.

PLASTIC LIMIT DETERMINATION

QA ID: KS/DLE

	TARE NO.		2.7	3.2		
A	WT. OF TARE	(grams)	28.67	27.82		
B	WT. OF WET SOIL & TARE	(grams)	43.14	4Ø.44		
C	WT. OF DRY SOIL & TARE	(grams)	41.18	38.74		
D	WT. OF WATER = B−C	(grams)	1.96	1.7Ø		
E	WT. OF DRY SOIL = C−A	(grams)	12.51	1Ø.92		
	MOISTURE CONTENT = (D/E)X100	(%)	15.7	15.6		

000153

LIQUID LIMIT (LL) = 26 PLASTIC LIMIT (PL) = 16 PLASTICITY INDEX (PI) = 10

GEOSYNTEC CONSULTANTS

4940

FLUOR FERNALD

ATTERBERG LIMITS TEST

(ASTM D 4318)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO PROJECT NO.: GQ134 TASK NO.: Ø4.1

DESCRIPTION: Phase IV DATE: 27 day JULY month 2002 year

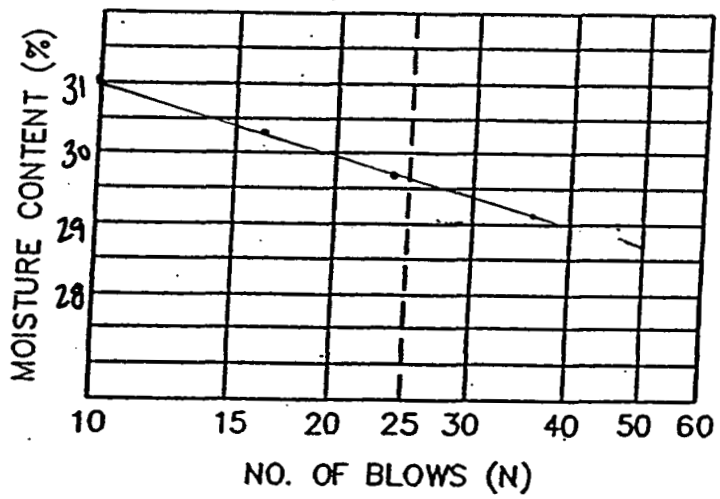
MATERIAL TYPE: LP Clay MATERIAL SOURCE: Ø2-3 Stockpile SAMPLE NO.: LPØ2-19

LIQUID LIMIT DETERMINATION

QA ID: CHW

	TARE NO.		2.9	2.7	2.5	
A	WT. OF TARE	(grams)	31.46	28.67	28.42	
B	WT. OF WET SOIL & TARE	(grams)	48.98	46.99	45.7Ø	
C	WT. OF DRY SOIL & TARE	(grams)	44.91	42.8Ø	41.8Ø	
D	WT. OF WATER = B-C	(grams)	4.07	4.19	3.9Ø	
E	WT. OF DRY SOIL = C-A	(grams)	13.45	14.13	13.38	
F	MOISTURE CONTENT = (D/E)X100	(%)	30.3	29.7	29.1	
N	NUMBER OF BLOWS		16	24	35	

DRYING TARE NO.



CURING TARE NO.

PLASTIC LIMIT DETERMINATION

QA ID: _____

	TARE NO.		1.8	2.3		
A	WT. OF TARE	(grams)	28.81	31.2Ø		
B	WT. OF WET SOIL & TARE	(grams)	40.3Ø	43.13		
C	WT. OF DRY SOIL & TARE	(grams)	38.75	41.55		
D	WT. OF WATER = B-C	(grams)	1.55	1.58		
E	WT. OF DRY SOIL = C-A	(grams)	9.94	10.35		
	MOISTURE CONTENT = (D/E)X100	(%)	15.6	15.3		

000154

LIQUID LIMIT (LL) = 30 PLASTIC LIMIT (PL) = 15 PLASTICITY INDEX (PI) = 15

GEOSYNTEC CONSULTANTS

FLUOR FERNALD 4940

ATTERBERG LIMITS TEST

(ASTM D 4318)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO PROJECT NO.: GQ1341 TASK NO.: 04.1

DESCRIPTION: Phase IV DATE: 27 day JULY month 2002 year

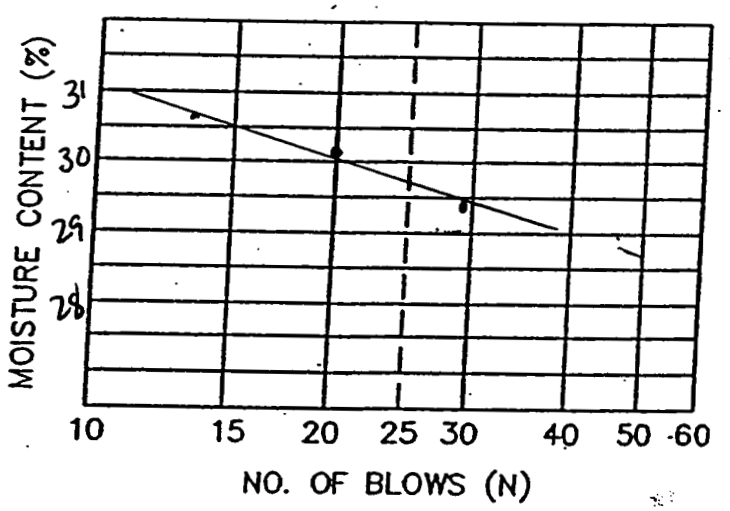
MATERIAL TYPE: LP Clay MATERIAL SOURCE: 02-3 Stockpile SAMPLE NO.: LP02-21

LIQUID LIMIT DETERMINATION

QA ID: CHW

	TARE NO.		3.2	2.4	1.7	
A	WT. OF TARE	(grams)	27.82	27.39	28.49	
B	WT. OF WET SOIL & TARE	(grams)	45.75	45.53	45.57	
C	WT. OF DRY SOIL & TARE	(grams)	41.68	41.33	41.57	
D	WT. OF WATER = B-C	(grams)	4.07	4.20	4.00	
E	WT. OF DRY SOIL = C-A	(grams)	13.86	13.94	13.08	
F	MOISTURE CONTENT = (D/E)X100	(%)	29.4	30.1	30.6	
N	NUMBER OF BLOWS		CHW ~~43~~ 29	20	13	

DRYING TARE NO.



CURING TARE NO.

PLASTIC LIMIT DETERMINATION

QA ID: _____

	TARE NO.		1.6	2.2		
A	WT. OF TARE	(grams)	28.87	27.63		
B	WT. OF WET SOIL & TARE	(grams)	42.37	38.88		
C	WT. OF DRY SOIL & TARE	(grams)	40.53	37.35		
D	WT. OF WATER = B-C	(grams)	1.84	1.53		
E	WT. OF DRY SOIL = C-A	(grams)	11.66	9.72		000155
	MOISTURE CONTENT = (D/E)X100	(%)	15.8	15.7		

LIQUID LIMIT (LL) = 30 PLASTIC LIMIT (PL) = 16 PLASTICITY INDEX (PI) = 14

GEOSYNTEC CONSULTANTS

FLUOR FERNALD 4940

ATTERBERG LIMITS TEST

(ASTM D 4318)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO PROJECT NO.: GQ 1341 TASK NO.: 04.1

DESCRIPTION: Phase IV DATE: 31 day July month 2002 year

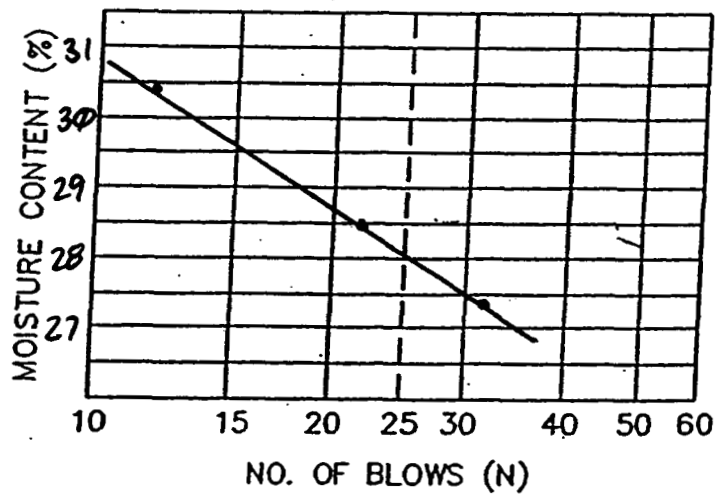
MATERIAL TYPE: Low Perm Clay MATERIAL SOURCE: Stockpile 02-3 SAMPLE NO.: LP02-22

LIQUID LIMIT DETERMINATION

QA ID: KS

	TARE NO.		1.8	2.2	1.6	
A	WT. OF TARE	(grams)	28.81	27.63	28.87	
B	WT. OF WET SOIL & TARE	(grams)	42.91	39.25	42.66	
C	WT. OF DRY SOIL & TARE	(grams)	39.62	36.67	39.69	
D	WT. OF WATER = B-C	(grams)	3.29	2.58	2.97	
E	WT. OF DRY SOIL = C-A	(grams)	10.81	9.04	10.82	
F	MOISTURE CONTENT = (D/E)X100	(%)	30.4	28.5	27.4	
N	NUMBER OF BLOWS		12	22	31	

DRYING TARE NO.



CURING TARE NO.

PLASTIC LIMIT DETERMINATION

QA ID: KS

	TARE NO.		2.3	2.5		
A	WT. OF TARE	(grams)	31.20	28.42		
B	WT. OF WET SOIL & TARE	(grams)	44.47	42.57		
C	WT. OF DRY SOIL & TARE	(grams)	42.61	40.60		
D	WT. OF WATER = B-C	(grams)	1.86	1.97		
E	WT. OF DRY SOIL = C-A	(grams)	11.41	12.18		
	MOISTURE CONTENT = (D/E)X100	(%)	16.3	16.2		

000156

LIQUID LIMIT (LL) = 28 PLASTIC LIMIT (PL) = 16 PLASTICITY INDEX (PI) = 12

Sieve Analyses

GEOSYNTEC CONSULTANTS

FLUOR DANIEL FERNALD

4940

PARTICLE SIZE ANALYSIS MECHANICAL SIEVE METHOD (ASTM D 422)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO PROJECT NO: GQ1341 TASK NO.: 04.1

DESCRIPTION: Phase III DATE: 9 day Aug month 2001 year

MATERIAL TYPE: Brown Till, Stockpile 01-1 SAMPLE NO.: LP01-01

SOIL SAMPLE SIZE 39,167.7g ~~37,893.1g~~

APPROXIMATE MINIMUM WT. OF SAMPLE (PASSING NO. 10 SIEVE) (grams)	SAND	FINE GRAIN
	115	65

		+3/8	BEFORE WASH +3/8		+3/8 AFTER WASH -3/8	
TARE NO.		L-2	N		L-2	N
WT. OF DRY SAMPLE PLUS TARE	(grams)	274.9	~~101.6~~ 637.8		1156.2	274.5
WT. OF TARE	(grams)	192.0	101.6		192.0	101.6
WT. OF DRY SAMPLE	(grams)	82	536.2		964.2	172.9

SIEVE ANALYSIS QA ID:

SIEVE NO.	DIAMETER (mm)	WT. RETAINED (grams)	% RETAINED	% FINER		PROJECT SPECIFICATIONS
2"	50.0	Ø	Ø	100		100
1½"	37.5	Ø	Ø	100		
1"	25.0	Ø	Ø	100		
¾"	19.0	218.5	~~5.6~~ 0.6	99.4		90 To 100
½"	12.5	~~608~~ 614.7	1.6	98.4		
3/8"	9.5	964.2	2.5	97.5		
#4	4.75	25.2	4.7	95.3	93.0	
10	2.0	48.9	9.1	90.9	88.6	
20	0.850	71.3	13.3	86.7	84.6	
40	0.425	91.5	17.1	82.9	80.9	
60	0.250	109.2	20.4	79.6	77.7	
100	0.150	131.4	~~24.6~~ 24.5	75.5	73.6	
200	0.075	160.6	30.0	70.0	68.3	50 To 100
PAN		172.6	—	—	—	

000158

%FINER = 100 − Σ% RETAINED

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GEOSYNTEC CONSULTANTS

FLUOR DANIEL FERNALD

PARTICLE SIZE DISTRIBUTION AND SOIL CLASSIFICATION TEST RESULTS

(ASTM C 136/D 422) (ASTM D 2487)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO

PROJECT NO.: GQ134 TASK NO.: 04.1

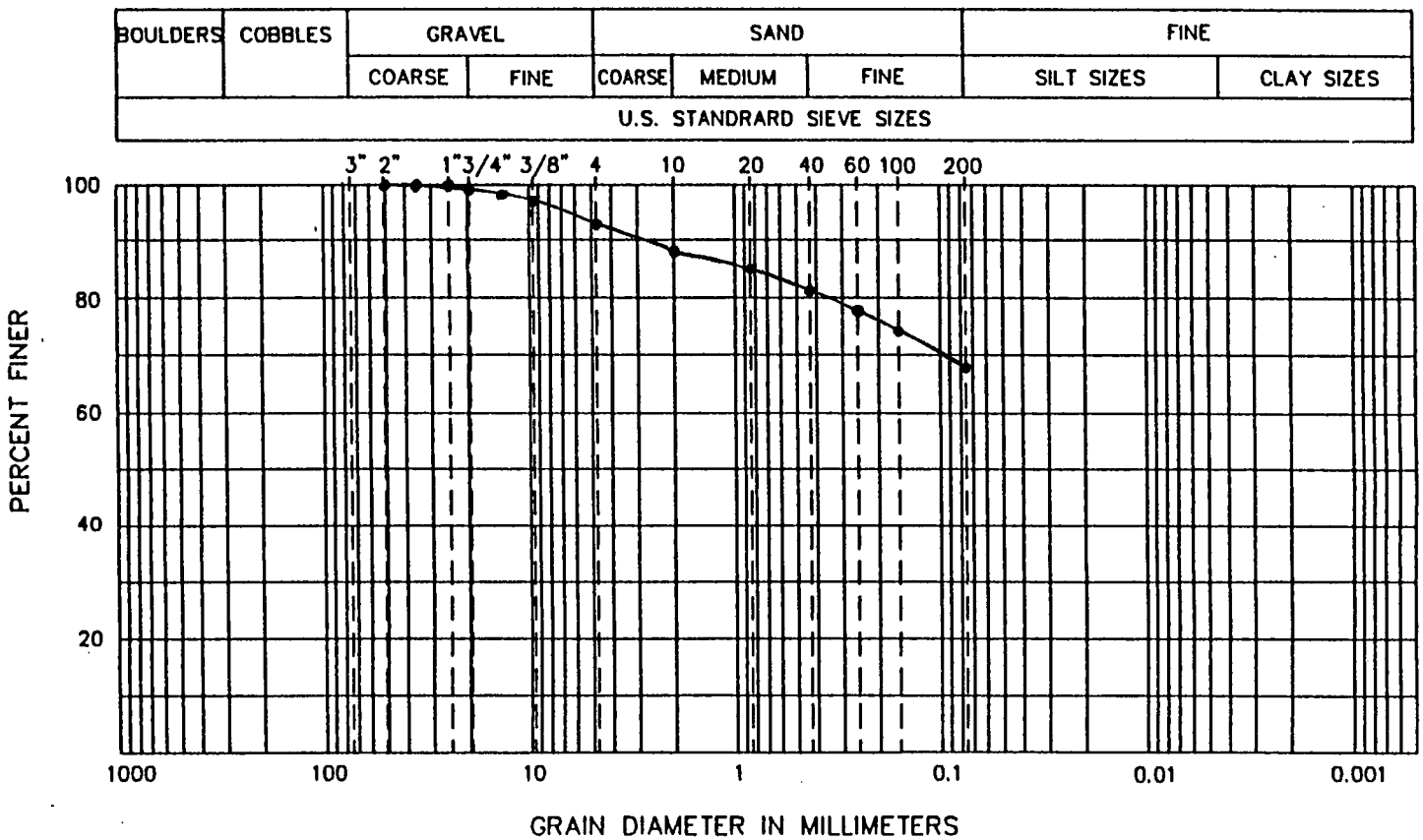
DESCRIPTION: PHASE III

DATE: 23 day AUG month 2001 year

MATERIAL TYPE: LOW PERM. CLAY

SAMPLE NO.: LP-01-01 QA ID: (TEN)

CURVE COEFFICIENTS: (C_u) ..... (C_c) .....



4940

ATTERBERG LIMITS

(LL) 29

(PL) 16

(PI) 13

SIEVE RESULTS

SIEVE SIZE	% FINER
3-in.	
2-in.	100
1 1/2-in.	100
1-in.	100
3/4-in.	99.4
1/2-in.	98.4
3/8-in.	97.5
NO. 4	93.0
NO. 10	88.6
NO. 20	84.6
NO. 40	80.9
NO. 60	77.7
NO. 100	73.6
NO. 200	68.3

HYDROMETER RESULTS

PARTICLE DIA. (mm)	% FINER
0.050	~~78~~ 66
0.020	~~66~~ 56
0.005	~~37~~ 31
0.002	~~26~~ 22
0.001	

SOIL CLASSIFICATION (ASTM D 2487): SANDY LEAN CLAY (CL)

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SHEET NO. 2 OF 2

000459

GeoTesting Express, Inc.

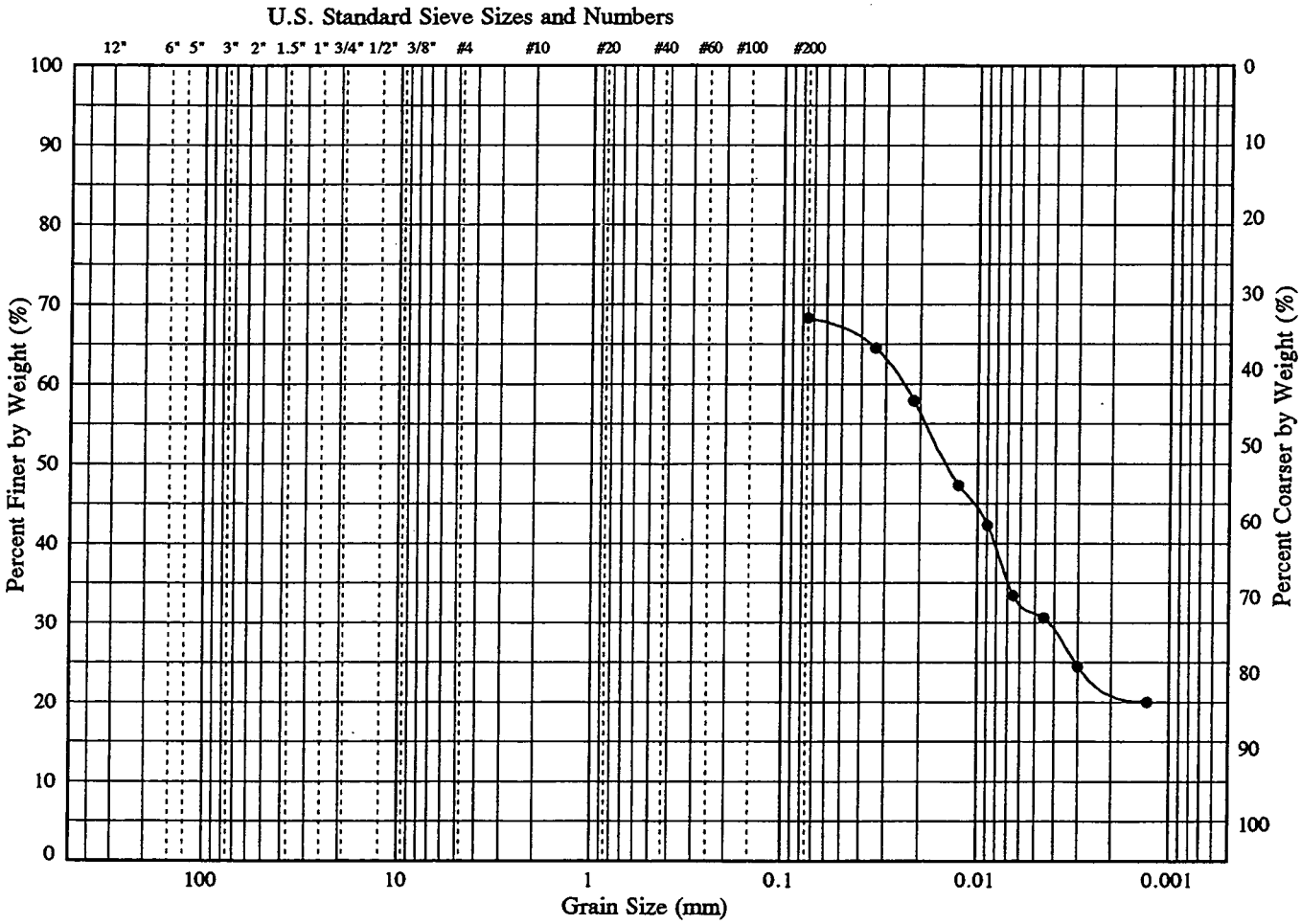
Geotechnical and Geosynthetic Testing Services

Sample ID: LP01-01
Project Name: FLUOR FERNALD
Project No.: GTX-G0076

4940

PARTICLE SIZE DISTRIBUTION AND PHYSICAL PROPERTIES

ASTM C136, D422, D2487, D3042 AND D4318



Boulders	Cobbles	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
		Gravel		Sand			Fines	

Sample ID	LP01-01	Liquid Limit (%)	Soil Fractions	Gravel (%)	
Lab Sample No.	5417	Plastic Limit (%)		Sand (%)	
Sample Depth (ft)		Plasticity Index		Fines (%)	68.3
Soil Classification:				Silt (%)	46.0
-				Clay (%)	22.3
				Coeff. Uniformity (Cu)	
				Coeff. Curvature (Cc)	

Percent Passing U.S. Standard Sieve Sizes and Numbers														Hydrometer Analysis				
3"	2"	1.5"	1"	3/4"	1/2"	3/8"	#4	#10	#20	#40	#60	#100	#200					
Percent Finer Than Sieve Sizes (mm)														Percent Finer Than (mm)				
75	50	37.5	25	19	12.5	9.5	4.75	2.00	0.850	0.425	0.250	0.150	0.075	0.050	0.020	0.005	0.002	0.001
													68	66	56	31	22	

Note(s):

000160

SD 8/23/01 SS 8/23/01

GEOSYNTEC CONSULTANTS

FLUOR DANIEL FERNALD

PARTICLE SIZE ANALYSIS MECHANICAL SIEVE METHOD (ASTM D 422)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF) 4940

LOCATION: FERNALD, OHIO PROJECT NO: GQ1341 TASK NO.: 04

DESCRIPTION: Phase III DATE: 13 day Aug month 2001 year

MATERIAL TYPE: Brown Till/Stockpile 01-1 SAMPLE NO.: LP-01-02

SOIL SAMPLE SIZE 669.2 Stone 21076.5 Soil / 21745.7 grams 47.94 LB's Total wt

APPROXIMATE MINIMUM WT. OF SAMPLE (PASSING NO. 10 SIEVE) (grams)	SAND	FINE GRAIN
	115	65

	BEFORE WASH +3/8	BEFORE WASH -3/8	AFTER WASH	AFTER WASH
TARE NO.	L-3	L-4	L-3	L-4
WT. OF DRY SAMPLE PLUS TARE (grams)	860	960.4	742.8	291.04
WT. OF TARE (grams)	190.8	146.6	190.8	146.60
WT. OF DRY SAMPLE (grams)	669.2	813.8	552.0	144.44

SIEVE ANALYSIS QA ID: DLE

SIEVE NO.	DIAMETER (mm)	WT. RETAINED (grams)	% RETAINED	% FINER		PROJECT SPECIFICATIONS
2"	50.0	0	0	100		100
1 1/2"	37.5	0	0	100		
1"	25.0	0	0	100		
3/4"	19.0	193.7	0.9	99.1		90 To 100
1/2"	12.5	432.8	2.0	98.0		
3/8"	9.5	552.0	2.5	97.5		
#4	4.75	10.05	1.2	98.8	96.3	
10	2.0	30.65	3.8	96.2	93.8	
20	0.850	53.61	6.6	93.4	91.1	
40	0.425	74.98	9.2	90.8	88.5	
60	0.250	93.60	11.5	88.5	86.3	
100	0.150	116.07	14.3	85.7	~~87.9~~ 83.6	
200	0.075	142.63	17.5	82.5	~~84.6~~ 80.4	50 To 100
PAN		144.40	17.7	82.3	~~84.4~~	

000161

%FINER = 100 − Σ% RETAINED

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GEOSYNTEC CONSULTANTS

FLUOR DANIEL FERNALD

PARTICLE SIZE DISTRIBUTION AND SOIL CLASSIFICATION TEST RESULTS

(ASTM C 136/D 422) (ASTM D 2487)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO

PROJECT NO.: GQ134 TASK NO.: 04.1

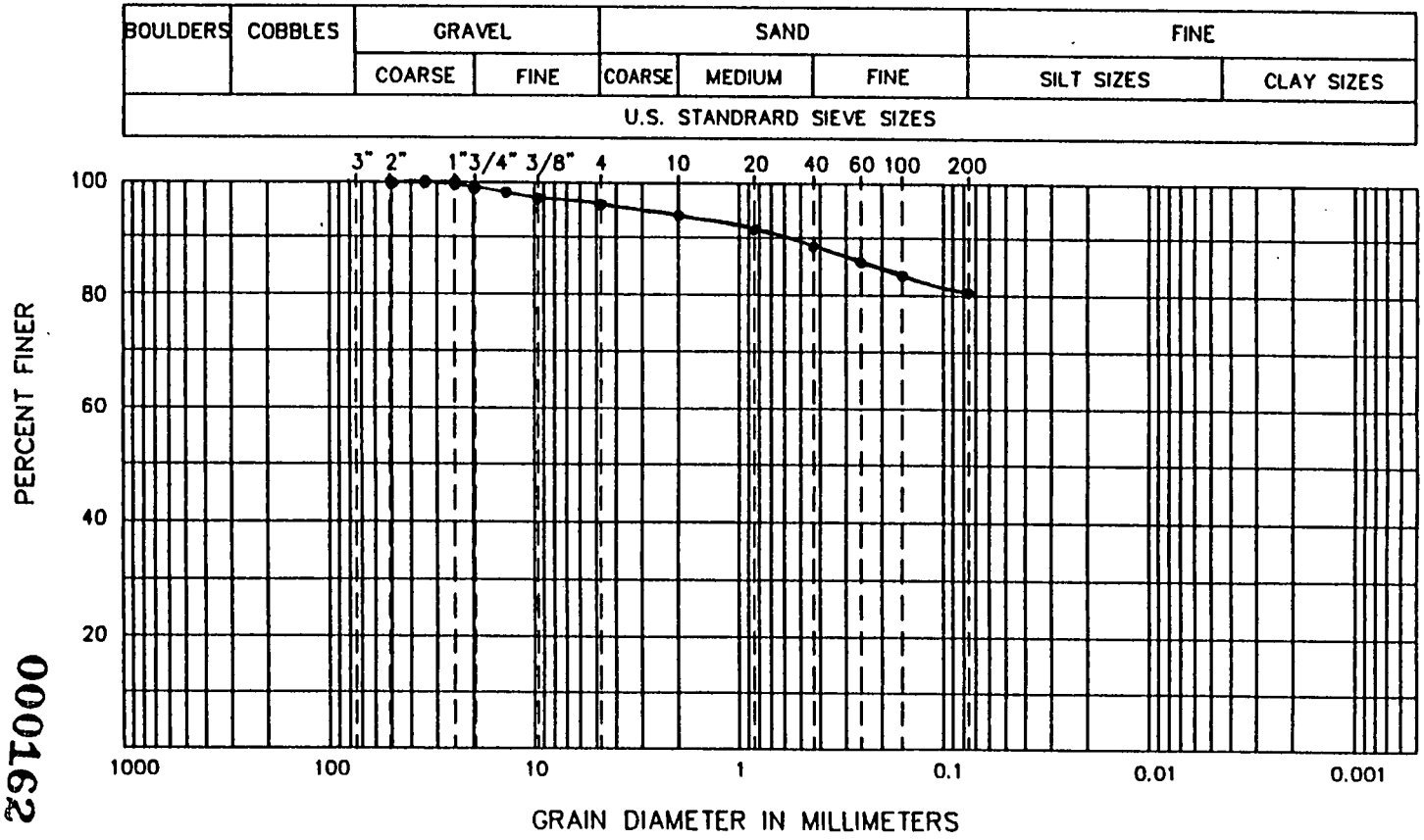
DESCRIPTION: PHASE III

DATE: 23 day AUG month 2001 year

MATERIAL TYPE: Low Perm. CLAY

SAMPLE NO.: LP-01-02 QA ID: TBM

CURVE COEFFICIENTS: (C_u) ..... (C_c) .....



ATTERBERG LIMITS

(LL) 31

(PL) 16

(PI) 15

SIEVE RESULTS

SIEVE SIZE	% FINER
3-in.	
2-in.	100
1 1/2-in.	100
1-in.	100
3/4-in.	99.1
1/2-in.	98.0
3/8-in.	97.5
NO. 4	96.3
NO. 10	93.8
NO. 20	91.1
NO. 40	88.5
NO. 60	86.3
NO. 100	83.6
NO. 200	80.4

HYDROMETER RESULTS

PARTICLE DIA.	% FINER
0.05	79
0.02	69
0.005	38
0.002	29

SOIL CLASSIFICATION (ASTM D 2487): LEAN CLAY WITH SAND (CL)

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CHECKED BY: [illegible]

SHEET NO. 2 OF 2

000162

4940

GeoTesting Express, Inc.

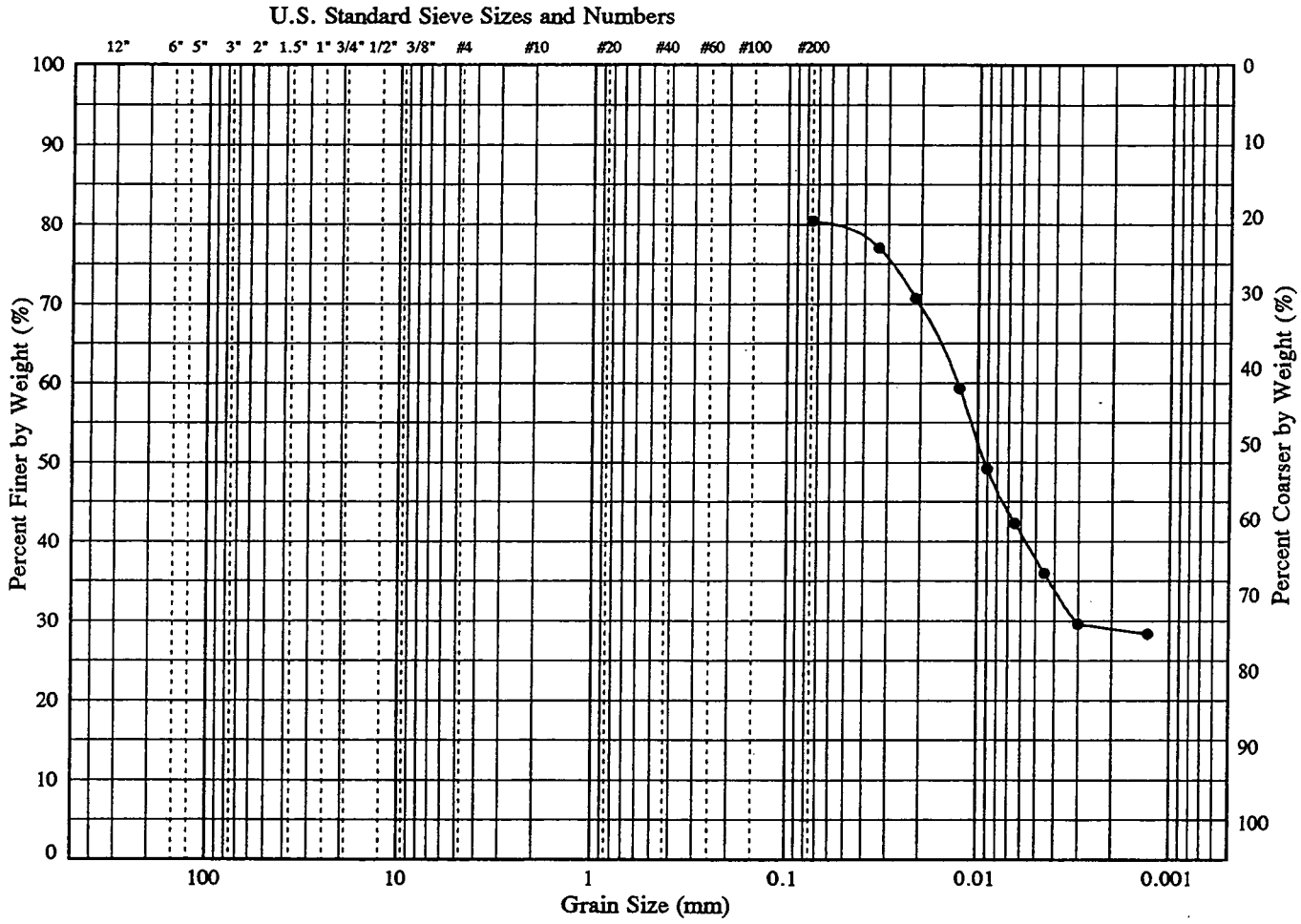
Geotechnical and Geosynthetic Testing Services

Sample ID: LP01-02
Project Name: FLUOR FERNALD
Project No.: GTX-G0076

PARTICLE SIZE DISTRIBUTION AND PHYSICAL PROPERTIES

ASTM C136, D422, D2487, D3042 AND D4318

4940



Boulders	Cobbles	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
		Gravel		Sand			Fines	

Sample ID	LP01-02	Liquid Limit (%)	Soil Fractions	Gravel (%)	
Lab Sample No.	5418	Plastic Limit (%)		Sand (%)	
Sample Depth (ft)		Plasticity Index		Fines (%)	80.4
Soil Classification:				Silt (%)	51.4
-				Clay (%)	29.0
				Coeff. Uniformity (Cu)	
				Coeff. Curvature (Cc)	

Percent Passing U.S. Standard Sieve Sizes and Numbers														Hydrometer Analysis				
3"	2"	1.5"	1"	3/4"	1/2"	3/8"	#4	#10	#20	#40	#60	#100	#200					
Percent Finer Than Sieve Sizes (mm)														Percent Finer Than (mm)				
75	50	37.5	25	19	12.5	9.5	4.75	2.00	0.850	0.425	0.250	0.150	0.075	0.050	0.020	0.005	0.002	0.001
													80	79	69	38	29	

Note(s):

000163

SD 8/23/01

SS 8/23/01

4940

GEOSYNTEC CONSULTANTS

FLUOR DANIEL FERNALD

PARTICLE SIZE ANALYSIS MECHANICAL SIEVE METHOD (ASTM D 422)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO — PROJECT NO: GQ1341 TASK NO.: 04.1

DESCRIPTION: Phase III — DATE: 16 day Aug month 2001 year

MATERIAL TYPE: L.P. Clay — SAMPLE NO.: LP-01-03

SOIL SAMPLE SIZE 3879.76 Store 35907.16 3879.76 39786.86 grams 87.71 LBS

APPROXIMATE MINIMUM WT. OF SAMPLE (PASSING NO. 10 SIEVE) (grams)	SAND	FINE GRAIN
	115	65

		+3/8 BEFORE WASH	-3/8	+3/8 AFTER WASH	-3/8
TARE NO.		AA-1	L-3	AA-1	L-3
WT. OF DRY SAMPLE PLUS TARE	(grams)	4064.26	762.9	3837.8	360.6
WT. OF TARE	(grams)	184.50	190.8	184.5	190.8
WT. OF DRY SAMPLE	(grams)	3879.76	572.1	3653.3	169.8

SIEVE ANALYSIS — QA ID: CL

SIEVE NO.	DIAMETER (mm)	WT. RETAINED (grams)	% RETAINED	% FINER		PROJECT SPECIFICATIONS
2"	50.0	Ø	Ø	100		100
1½"	37.5	Ø	Ø	100		
1"	25.0	126.2	0.3	99.7		
¾"	19.0	1050.4	2.6	97.4		90 To 100
½"	12.5	2895.2	7.3	92.7		
⅜"	9.5	3653.3	9.2	90.8		
#4	4.75	19.6	3.4	96.6	87.7	
10	2.0	40.1	7.0	93.0	84.5	
20	0.850	61.8	10.8	89.2	81.0	
40	0.425	84.4	14.8	85.2	77.4	
60	0.250	103.9	18.2	81.8	74.3	
100	0.150	127.6	22.3	77.7	70.6	
200	0.075	158.0	27.6	72.4	65.7	50 To 100
PAN		169.4	—	—		

000164

%FINER = 100 − Σ% RETAINED

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GEOSYNTEC CONSULTANTS

FLUOR DANIEL FERNALD

PARTICLE SIZE DISTRIBUTION AND SOIL CLASSIFICATION TEST RESULTS

(ASTM C 136/D 422) (ASTM D 2487)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO

PROJECT NO.: GQ134 TASK NO.: 04.1

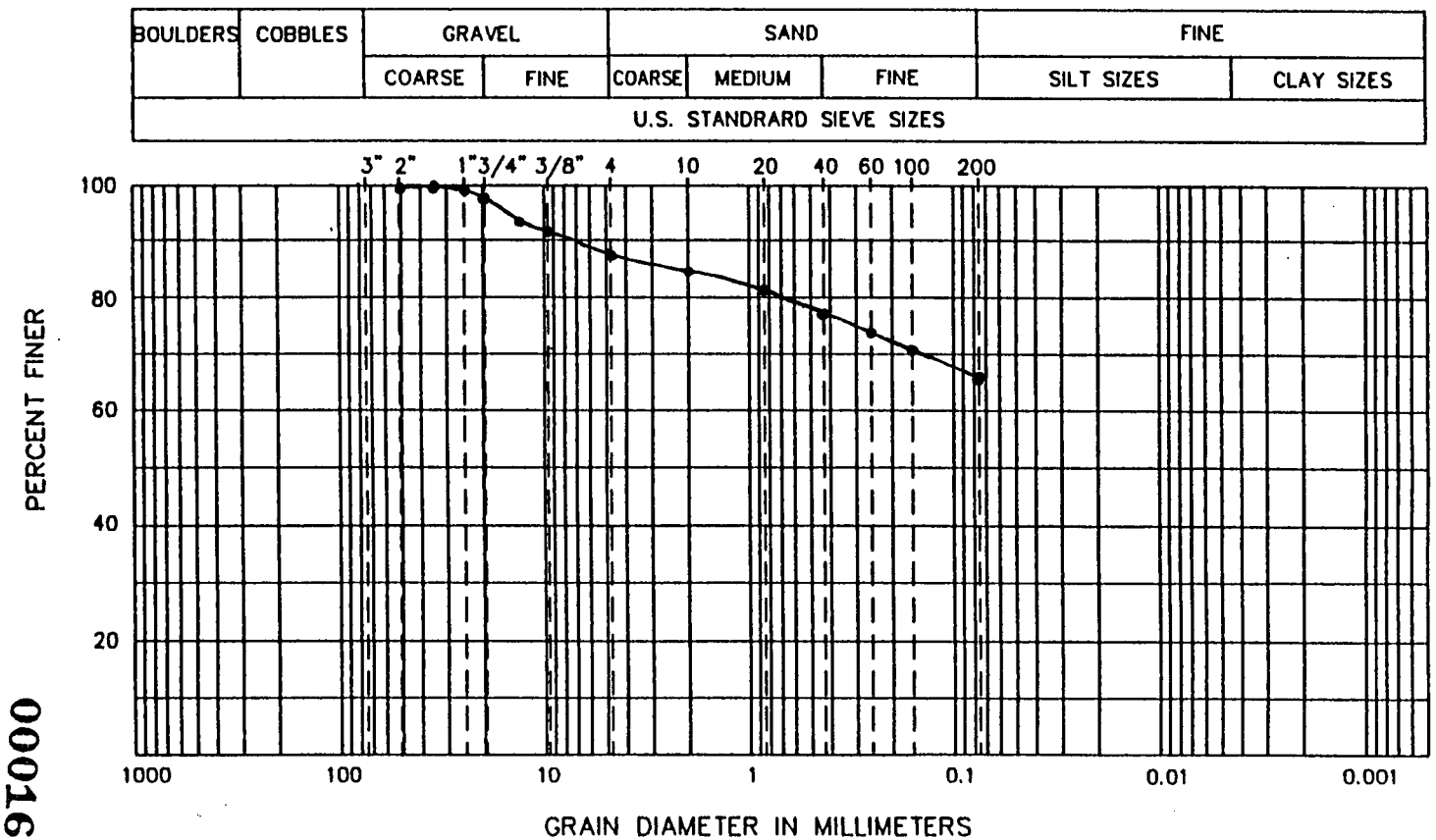
DESCRIPTION: PHASE III

DATE: 23 day AUG month 2001 year

MATERIAL TYPE: LOW PERM. CLAY

SAMPLE NO.: LP-01-03 QA ID: (TBD)

CURVE COEFFICIENTS: (C_u) ..... (C_c) .....



ATTERBERG LIMITS

(LL) 30

(PL) 16

(PI) 14

SIEVE RESULTS

SIEVE SIZE	% FINER
3-in.	
2-in.	100
1 1/2-in.	100
1-in.	99.7
3/4-in.	97.4
1/2-in.	92.7
3/8-in.	90.8
NO. 4	87.7
NO. 10	84.5
NO. 20	81.0
NO. 40	77.4
NO. 60	74.3
NO. 100	70.6
NO. 200	65.7

HYDROMETER RESULTS

PARTICLE DIA.	% FINER
0.050	64
0.020	55
0.005	28
0.002	20
0.001	18

SOIL CLASSIFICATION (ASTM D 2487): SANDY LEAN CLAY (CL)

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CHECKED BY: [illegible]

SHEET NO. 2 OF 2

000165

4940

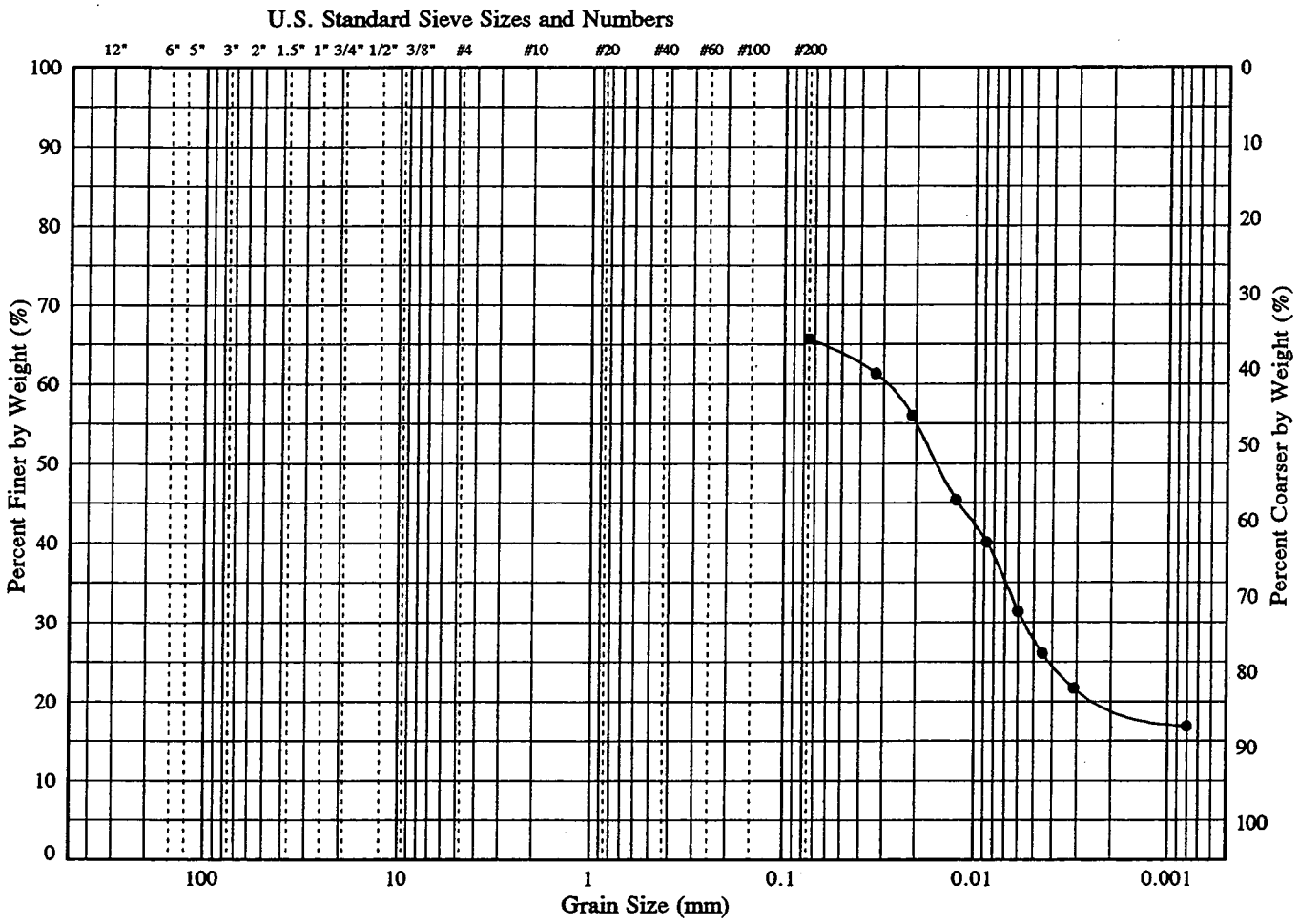
GeoTesting Express, Inc.

Geotechnical and Geosynthetic Testing Services

Sample ID: LP01-03 4940
Project Name: FLUOR FERNALD
Project No.: GTX-G0076

PARTICLE SIZE DISTRIBUTION AND PHYSICAL PROPERTIES

ASTM C136, D422, D2487, D3042 AND D4318



Boulders	Cobbles	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
		Gravel		Sand			Fines	

Sample ID	LP01-03	Liquid Limit (%)	Soil Fractions	Gravel (%)	
Lab Sample No.	5497	Plastic Limit (%)		Sand (%)	
Sample Depth (ft)		Plasticity Index		Fines (%)	65.7
Soil Classification:				Silt (%)	45.6
-				Clay (%)	20.1
				Coeff. Uniformity (Cu)	
				Coeff. Curvature (Cc)	

Percent Passing U.S. Standard Sieve Sizes and Numbers														Hydrometer Analysis				
3"	2"	1.5"	1"	3/4"	1/2"	3/8"	#4	#10	#20	#40	#60	#100	#200					
Percent Finer Than Sieve Sizes (mm)														Percent Finer Than (mm)				
75	50	37.5	25	19	12.5	9.5	4.75	2.00	0.850	0.425	0.250	0.150	0.075	0.050	0.020	0.005	0.002	0.001
													66	64	55	28	20	18

Note(s):

000166

SS 8/27/01

SO 8/27/01

GEOSYNTEC CONSULTANTS

FLUOR DANIEL FERNALD

PARTICLE SIZE ANALYSIS MECHANICAL SIEVE METHOD (ASTM D 422)

4940

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO PROJECT NO: 6Q1341 TASK NO.: 04.1

DESCRIPTION: Phase III DATE: 20 day Aug month 2001 year

MATERIAL TYPE: Low Form Clay SAMPLE NO.: LP-01-04

SOIL SAMPLE SIZE +3/8 393.1 stone Total wt 49.9 LBS 22637.4 gram

APPROXIMATE MINIMUM WT. OF SAMPLE (PASSING NO. 10 SIEVE) (grams)	SAND	FINE GRAIN
	115	65

		+3/8 BEFORE WASH	-3/8	+3/8 AFTER WASH	-3/8
TARE NO.		L-4	LL-4	L-4	LL-4
WT. OF DRY SAMPLE PLUS TARE	(grams)	539.7	576.7	502.1	229.0
WT. OF TARE	(grams)	146.6	107.2	146.6	107.2
WT. OF DRY SAMPLE	(grams)	393.1	469.5	355.5	121.8

SIEVE ANALYSIS QA ID: TBY

SIEVE NO.	DIAMETER (mm)	WT. RETAINED (grams)	% RETAINED	% FINER		PROJECT SPECIFICATIONS
2"	50.0	0	0	100		100
1½"	37.5	0	0	100		
1"	25.0	0	0	100		
¾"	19.0	63.6	0.3	99.7		90 To 100
½"	12.5	225.8	1.0	99.0		
⅜"	9.5	355.5	1.6	98.4		
#4	4.75	2.63	0.6	99.4	97.8	
10	2.0	14.7	3.1	96.9	95.3	
20	0.850	32.7	7.0	93.0	91.5	
40	0.425	50.4	10.7	89.3	87.8	
60	0.250	65.6	14.0	86.0	84.7	
100	0.150	85.9	18.3	81.7	80.4	
200	0.075	112.0	23.9	76.1	74.9	50 To 100
PAN		121.8				

000167

%FINER = 100 − Σ% RETAINED

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GEOSYNTEC CONSULTANTS

FLUOR DANIEL FERNALD

PARTICLE SIZE DISTRIBUTION AND SOIL CLASSIFICATION TEST RESULTS

(ASTM C 136/D 422) (ASTM D 2487)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO

PROJECT NO.: GQ134 TASK NO.: 04.1

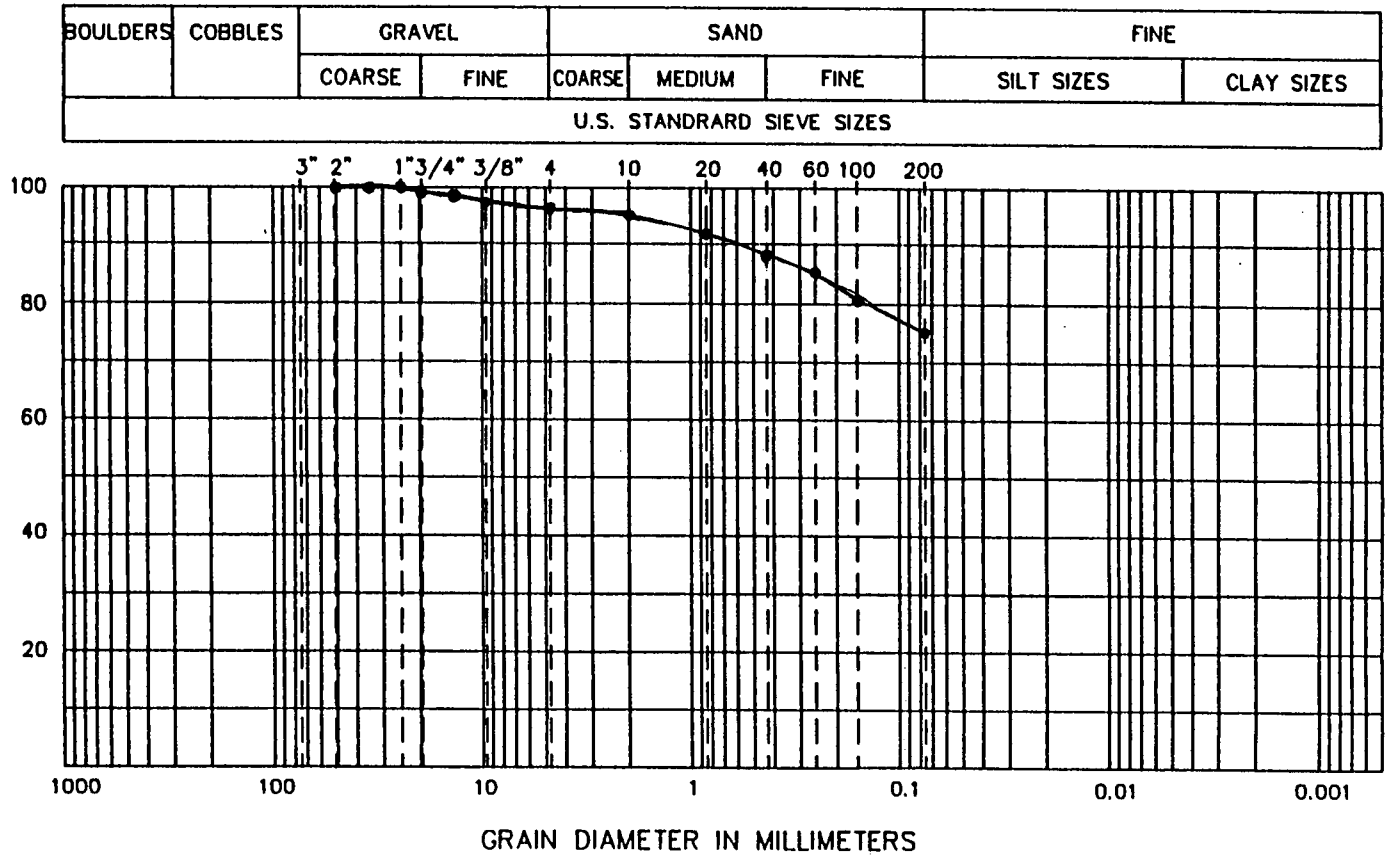
DESCRIPTION: PHASE III

DATE: 23 day AUG month 2001 year

MATERIAL TYPE: LOW PERM. CLAY

SAMPLE NO.: LP-01-04 QA ID: TBD

CURVE COEFFICIENTS: (C_u) ..... (C_c) .....



ATTERBERG LIMITS

(LL) 33

(PL) 16

(PI) 17

SIEVE RESULTS

SIEVE SIZE	% FINER
3-in.	
2-in.	100
1 1/2-in.	100
1-in.	100
3/4-in.	99.7
1/2-in.	99.0
3/8-in.	98.4
NO. 4	97.8
NO. 10	95.3
NO. 20	91.5
NO. 40	87.8
NO. 60	84.7
NO. 100	80.4
NO. 200	74.9

HYDROMETER RESULTS

PARTICLE DIA.	% FINER
0.050	74
0.020	64
0.005	33
0.002	25
0.001	22

SOIL CLASSIFICATION (ASTM D 2487): LEAN CLAY WITH SAND (CL)

©GEOSYNTEC CONSULTANTS FILE NO. 2-16-PSD

CHECKED BY: [illegible]

SHEET NO. 2 OF 2

0001168

4940

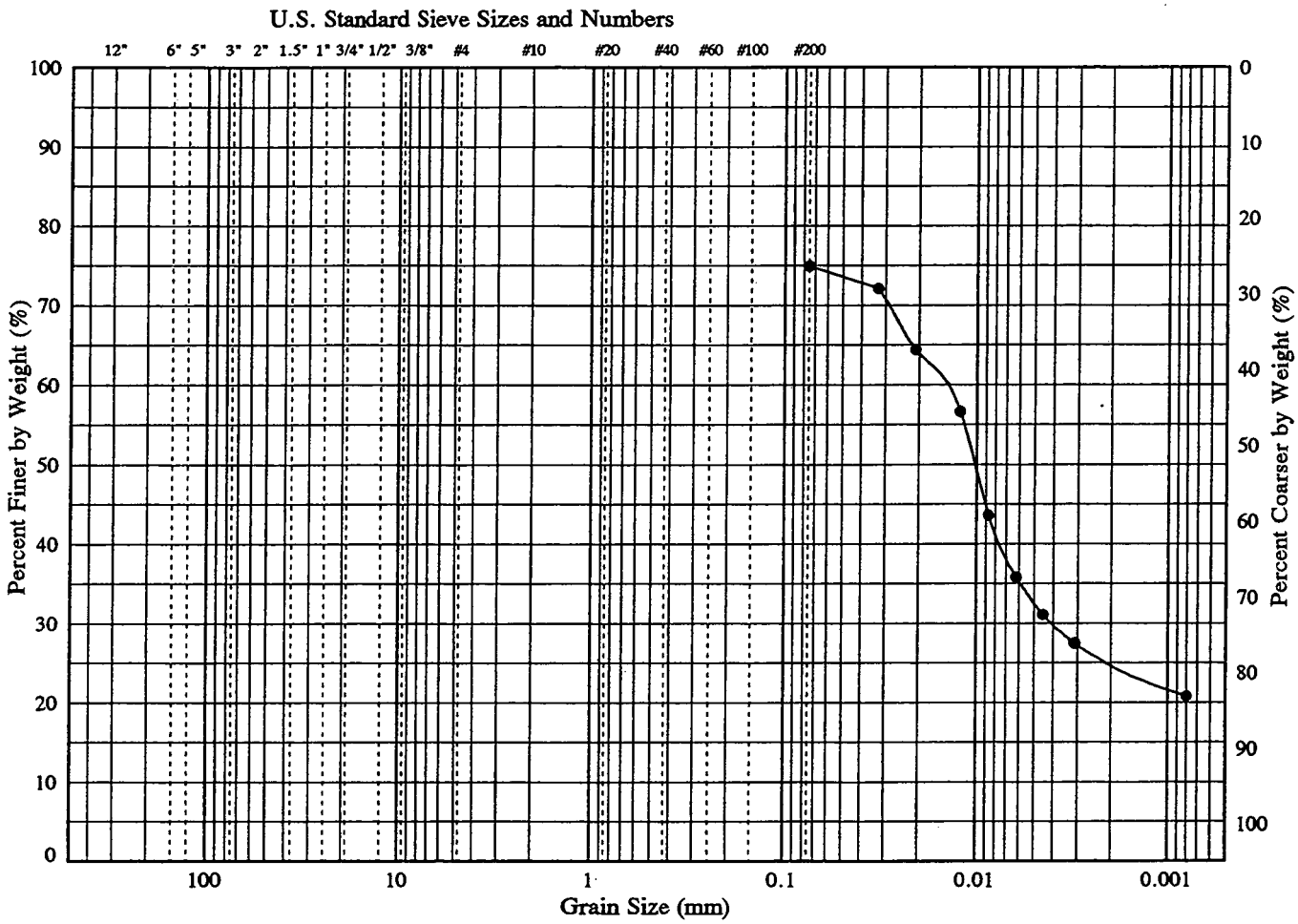
GeoTesting Express, Inc.

Geotechnical and Geosynthetic Testing Services

Sample ID: LP01-04
Project Name: FLUOR FERNALD
Project No.: GTX-G0076

PARTICLE SIZE DISTRIBUTION AND PHYSICAL PROPERTIES

ASTM C136, D422, D2487, D3042 AND D4318



Boulders	Cobbles	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
		Gravel		Sand			Fines	

Sample ID	LP01-04	Liquid Limit (%)	Soil Fractions	Gravel (%)	
Lab Sample No.	5498	Plastic Limit (%)		Sand (%)	
Sample Depth (ft)		Plasticity Index		Fines (%)	74.9
Soil Classification:				Silt (%)	49.6
-				Clay (%)	25.3
				Coeff. Uniformity (Cu)	
				Coeff. Curvature (Cc)	

Percent Passing U.S. Standard Sieve Sizes and Numbers														Hydrometer Analysis				
3"	2"	1.5"	1"	3/4"	1/2"	3/8"	#4	#10	#20	#40	#60	#100	#200					
Percent Finer Than Sieve Sizes (mm)														Percent Finer Than (mm)				
75	50	37.5	25	19	12.5	9.5	4.75	2.00	0.850	0.425	0.250	0.150	0.075	0.050	0.020	0.005	0.002	0.001
													75	74	64	33	25	22

Note(s):

000169

50 8/27/01 SS 6/27/01

GEOSYNTEC CONSULTANTS

FLUOR DANIEL FERNALD

PARTICLE SIZE ANALYSIS MECHANICAL SIEVE METHOD (ASTM D 422)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO PROJECT NO: 6Q1341 TASK NO.: 04.

DESCRIPTION: Phase III DATE: 20 day AUG month 2001 year

MATERIAL TYPE: Low Perm. Clay Liner SAMPLE NO.: LP-01-05

SOIL SAMPLE SIZE +3/8 = 67[illegible]g BUCKET #1 (-3/8) = 42.92 lbs = 19,468.5g BUCKET #2 (-3/8) = 39.83 lbs = 18,066.9g TOTAL SAMPLE = 38,206.6g

APPROXIMATE MINIMUM WT. OF SAMPLE (PASSING NO. 10 SIEVE) (grams)	SAND	FINE GRAIN
	115	65

	+3/8 BEFORE WASH	-3/8	+3/8 AFTER WASH	-3/8
TARE NO.	L-5	LL-4	L-5	LL-4
WT. OF DRY SAMPLE PLUS TARE (grams)	777.8	732.9	730.4	277.5
WT. OF TARE (grams)	106.4	107.1	106.4	107.1
WT. OF DRY SAMPLE (grams)	671.4	625.8	624.0	170.4

SIEVE ANALYSIS QA ID: TBW

SIEVE NO.	DIAMETER (mm)	WT. RETAINED (grams)	% RETAINED	% FINER		PROJECT SPECIFICATIONS
2"	50.0	0	0	100		100
1 1/2"	37.5	0	0	100		
1"	25.0	0	0	100		
3/4"	19.0	110.5	0.3	99.7		90 To 100
1/2"	12.5	428.0	1.1	98.9		
3/8"	9.5	619.3	1.6	98.4		
#4	4.75	11.6	1.9	98.1	96.6	
10	2.0	33.7	5.4	94.6	93.1	
20	0.850	60.0	9.6	90.4	89.0	
40	0.425	86.1	13.8	86.2	84.9	
60	0.250	107.7	17.2	82.8	81.5	
100	0.150	133.0	21.3	78.7	77.5	
200	0.075	165.0	26.4	73.6	72.5	50 To 100
PAN		170.4				

000170

%FINER = 100 − Σ% RETAINED

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GEOSYNTEC CONSULTANTS

FLUOR DANIEL FERNALD

PARTICLE SIZE DISTRIBUTION AND SOIL CLASSIFICATION TEST RESULTS

(ASTM C 136/D 422) (ASTM D 2487)

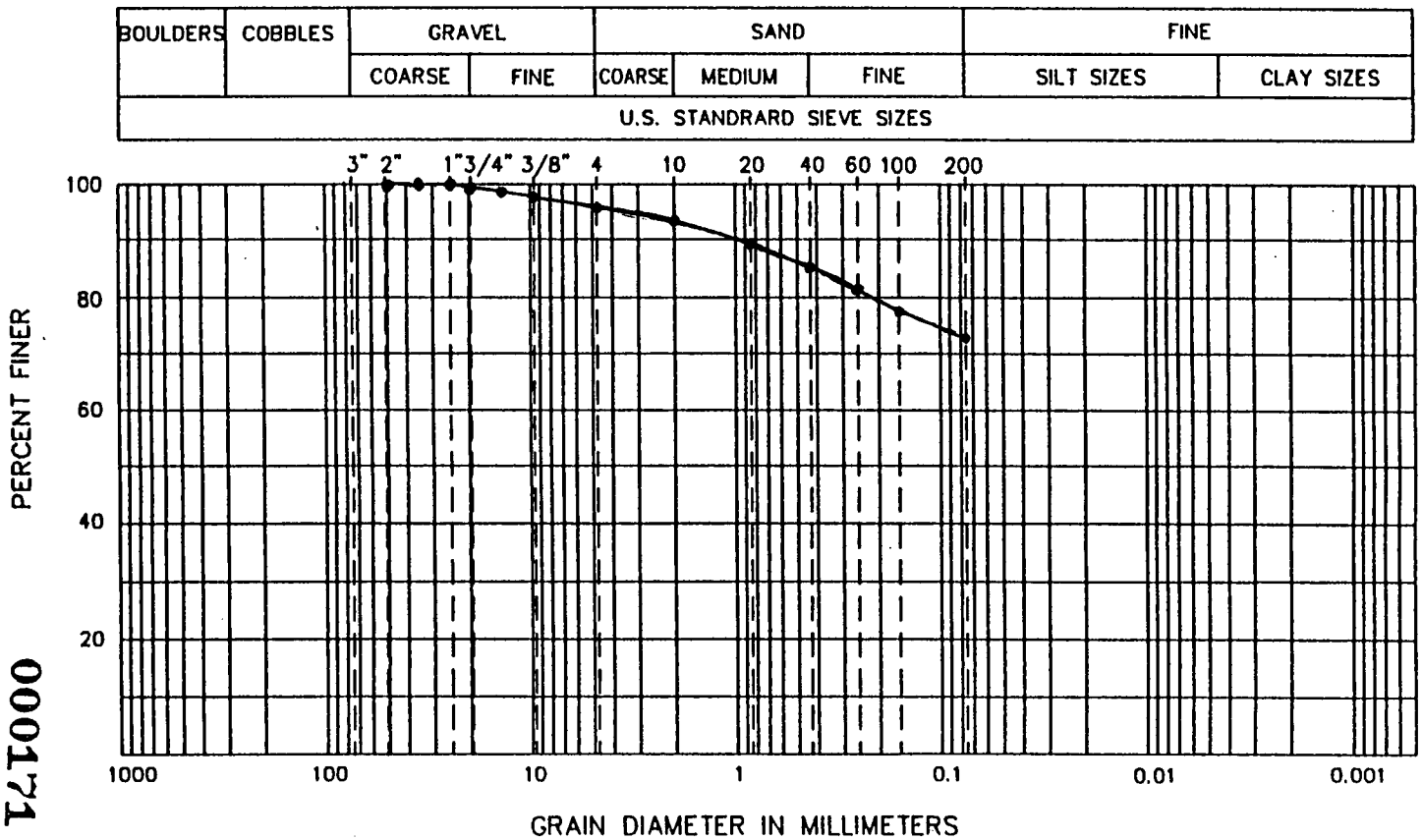
PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO — PROJECT NO. GQ1341 TASK NO.: 04.1

DESCRIPTION: PHASE III — DATE: 23 day AUG month 2001 year

MATERIAL TYPE: Low Perm. CLAY — SAMPLE NO.: LP-01-05 QA ID: TBD

CURVE COEFFICIENTS: (C_u) ..... (C_c) .....



ATTERBERG LIMITS

(LL) 32

(PL) 16

(PI) 16

SIEVE RESULTS

SIEVE SIZE	% FINER
3-in.	
2-in.	100
1 1/2-in.	100
1-in.	100
3/4-in.	99.7
1/2-in.	98.9
3/8-in.	98.4
NO. 4	96.6
NO. 10	93.1
NO. 20	89.0
NO. 40	84.9
NO. 60	81.5
NO. 100	77.5
NO. 200	72.5

HYDROMETER RESULTS

PARTICLE DIA.	% FINER
0.050	70
0.020	60
0.005	32
0.002	23
0.001	22

SOIL CLASSIFICATION (ASTM D 2487): LEAN CLAY WITH SAND (CL)

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SHEET NO. 2 OF 2

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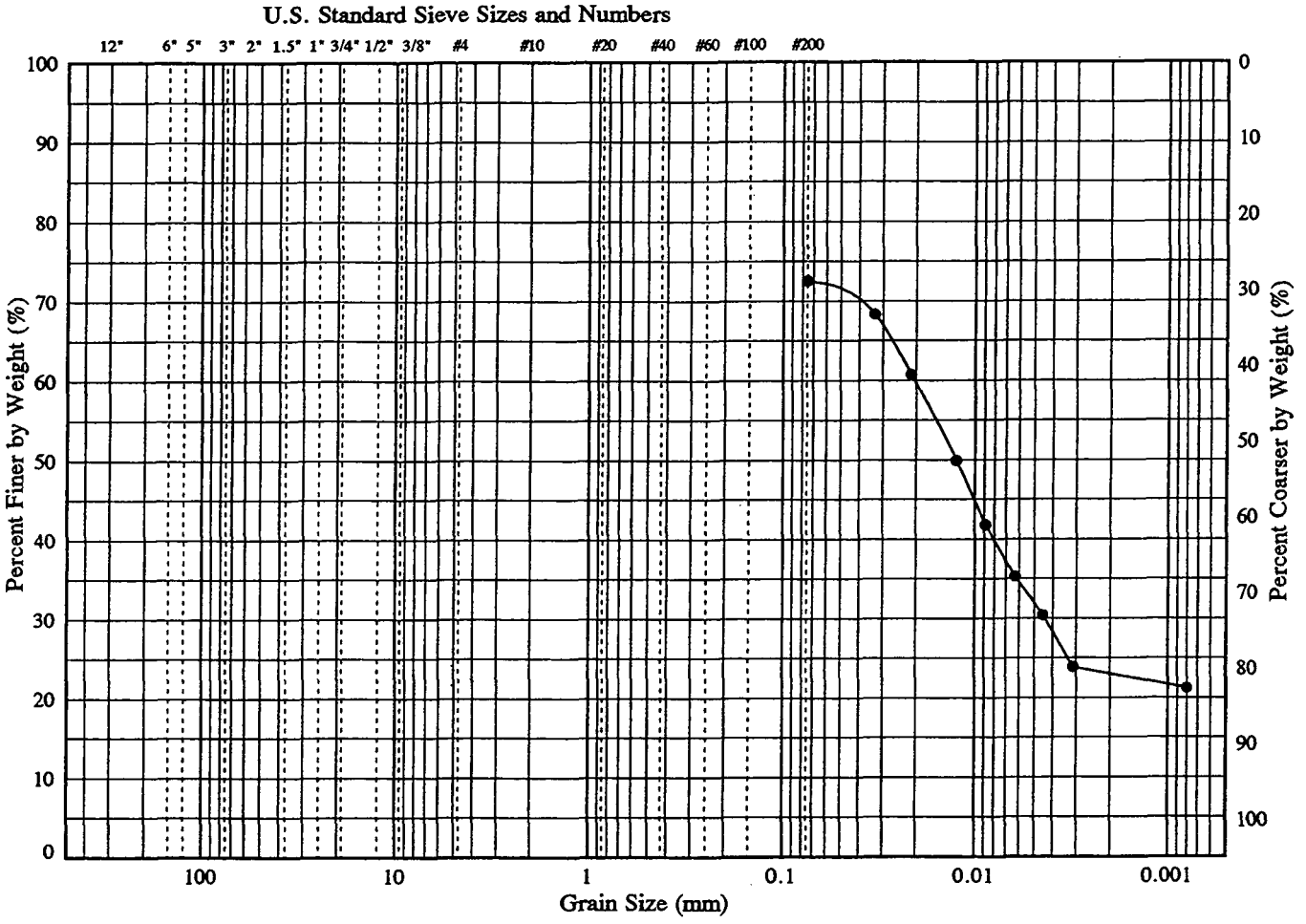
GeoTesting Express, Inc.

Geotechnical and Geosynthetic Testing Services

Sample ID: LP01-05
Project Name: FLUOR FERNALD
Project No.: GTX-G0076

PARTICLE SIZE DISTRIBUTION AND PHYSICAL PROPERTIES

ASTM C136, D422, D2487, D3042 AND D4318



Boulders	Cobbles	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
		Gravel		Sand			Fines	

Sample ID	LP01-05	Liquid Limit (%)	Soil Fractions	Gravel (%)	
Lab Sample No.	5499	Plastic Limit (%)		Sand (%)	
Sample Depth (ft)		Plasticity Index		Fines (%)	72.5
Soil Classification:				Silt (%)	49.5
-				Clay (%)	23.0
				Coeff. Uniformity (Cu)	
				Coeff. Curvature (Cc)	

Percent Passing U.S. Standard Sieve Sizes and Numbers														Hydrometer Analysis				
3"	2"	1.5"	1"	3/4"	1/2"	3/8"	#4	#10	#20	#40	#60	#100	#200					
Percent Finer Than Sieve Sizes (mm)														Percent Finer Than (mm)				
75	50	37.5	25	19	12.5	9.5	4.75	2.00	0.850	0.425	0.250	0.150	0.075	0.050	0.020	0.005	0.002	0.001
													73	70	60	32	23	22

Note(s):

000172

SD 8/22/01 SS 8/27/01

GEOSYNTEC CONSULTANTS

FLUOR DANIEL FERNALD

PARTICLE SIZE ANALYSIS MECHANICAL SIEVE METHOD (ASTM D 422)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO — PROJECT NO: GQ1341 TASK NO.: 04.1

DESCRIPTION: Phase III — DATE: 23 day AUG month 2001 year

MATERIAL TYPE: LOW PERM. CLAY — SAMPLE NO.: LP-01-06

SOIL SAMPLE SIZE +3/8 ≈ 212g -3/8 = 44.39 lbs = 20,135.3g — TOTAL SAMPLE = 20,347.3g

APPROXIMATE MINIMUM WT. OF SAMPLE (PASSING NO. 10 SIEVE) (grams)	SAND	FINE GRAIN
	115	65

		+3/8 BEFORE WASH	-3/8 BEFORE WASH	+3/8 AFTER WASH	-3/8 AFTER WASH
TARE NO.		LL-44	L-3	LL-44	L-3
WT. OF DRY SAMPLE PLUS TARE	(grams)	400.7	1014.2	384.0	434.0
WT. OF TARE	(grams)	191.9	190.9	191.9	190.9
WT. OF DRY SAMPLE	(grams)	208.8	823.3	192.1	243.1

SIEVE ANALYSIS — QA ID: BW

SIEVE NO.	DIAMETER (mm)	WT. RETAINED (grams)	% RETAINED	% FINER		PROJECT SPECIFICATIONS
2"	50.0	0	0	100		100
1 1/2"	37.5	0	0	100		
1"	25.0	0	0	100		
3/4"	19.0	0	0	100		90 To 100
1/2"	12.5	94.7	0.5	99.5		
3/8"	9.5	192.1	0.9	99.1		
#4	4.75	20.8	2.5	97.5	96.6	
10	2.0	47.7	5.8	94.2	93.4	
20	0.850	76.0	9.2	90.8	90.0	
40	0.425	111.1	13.5	86.5	85.7	
60	0.250	143.2	17.4	82.6	81.9	
100	0.150	181.3	22.0	78.0	77.3	
200	0.075	230.2	28.0	72.0	71.4	50 To 100
PAN	—	243.1	—	—	—	

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%FINER = 100 − Σ% RETAINED

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SHEET NO. 1 OF 2

GEOSYNTEC CONSULTANTS

FLUOR DANIEL FERNALD

PARTICLE SIZE DISTRIBUTION AND SOIL CLASSIFICATION TEST RESULTS

(ASTM C 136/D 422) (ASTM D 2487)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO

DESCRIPTION: PHASE III

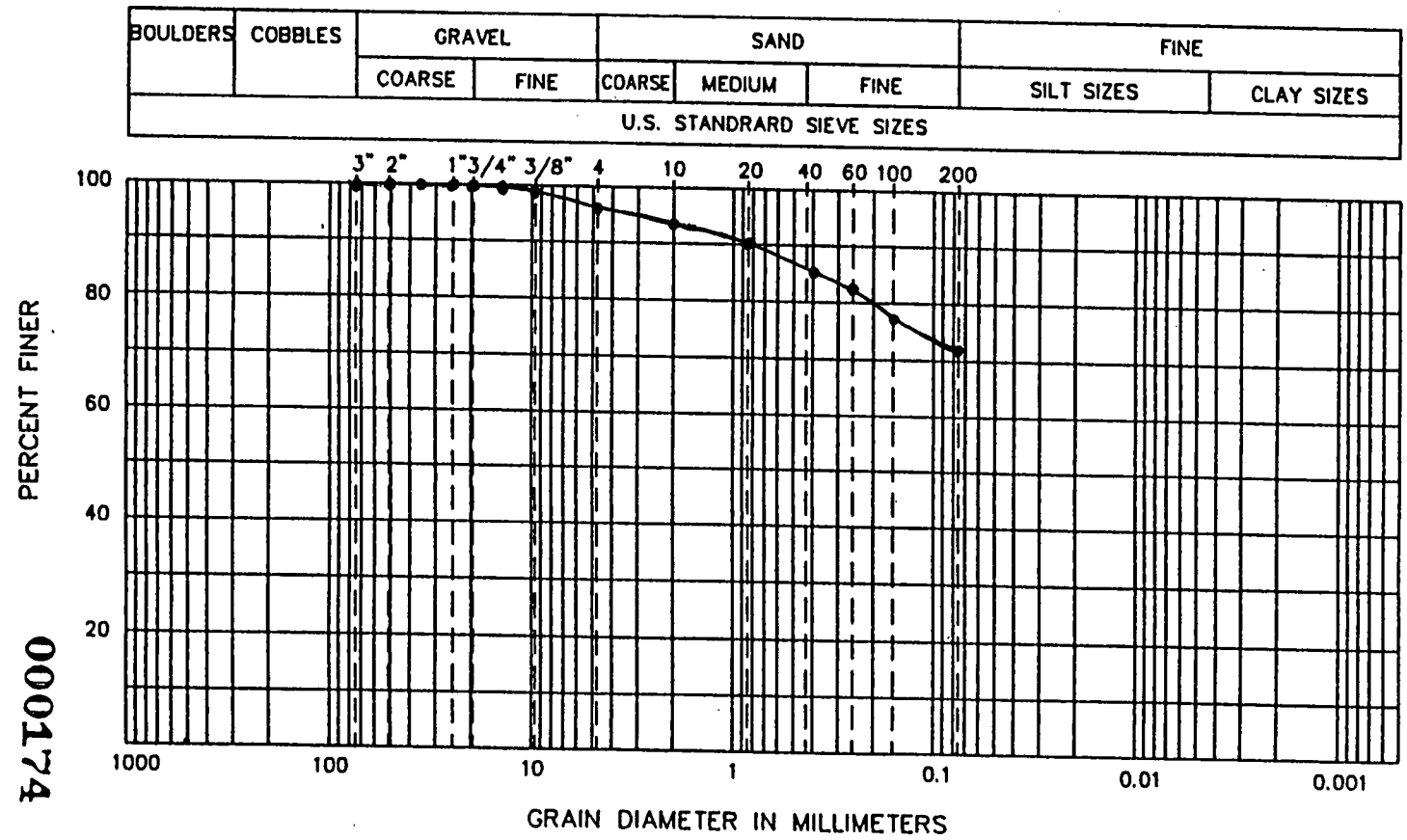
MATERIAL TYPE: LOW PERM. CLAY

PROJECT NO.: GQ134 TASK NO.: 04.1

DATE: 06 day SEPT month 2001 year

SAMPLE NO.: LP-01-06 QA ID: (TBC)

CURVE COEFFICIENTS: (C_u) ..... (C_c) .....



ATTERBERG LIMITS

(LL) 34

(PL) 16

(PI) 18

SIEVE RESULTS

SIEVE SIZE	% FINER
3-in.	100
2-in.	100
1 1/2-in.	100
1-in.	100
3/4-in.	100
1/2-in.	99.5
3/8-in.	99.1
NO. 4	96.6
NO. 10	93.4
NO. 20	90.0
NO. 40	85.7
NO. 60	81.9
NO. 100	77.3
NO. 200	71.4

HYDROMETER RESULTS

PARTICLE DIA.	% FINER
0.050	~~62~~ 68
0.020	58
0.005	39
0.002	29
0.001	

SOIL CLASSIFICATION (ASTM D 2487): LEAN CLAY WITH SAND (CL)

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SHEET NO. 2 OF 2

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ASTM GRAIN SIZE ANALYSIS
ASTM C117, C136, D421, D422, D1140 and D2217

PROJECT TITLE	GEOSYNTEC/FLUOR FERNALD/OH	SAMPLE ID	LP01-06
PROJECT NO.	013-3175	SAMPLE TYPE	Bag
		SAMPLE DEPTH	-

AS RECEIVED WATER CONTENT

Tare No.		
Wt. Wet Soil & Tare (gm)	(W1)	
Wt. Dry Soil & Tare (gm)	(W2)	
Weight of Tare (gm)	(W3)	
Weight of Water (gm)	(W4=W1-W2)	
Weight of Dry Soil (gm)	(W5=W2-W3)	
Moisture Content (%)	(W4/W5)*100	

Hygroscopic Moisture For Sieve Sample

Wet Soil & Tare (gm)	71.70
Dry Soil & Tare (gm)	66.42
Tare Weight (gm)	3.16
Moisture Content (%)	8.35

Total Weight of Sample Used For Sieve Analysis Corrected For Hygroscopic Moisture

Weight + Tare, Before Separating On The #4 Sieve (gm)		
Tare Weight (gm)		
Total Weight (gm)		(W6)

Plus #4 Material Sieve

TARE WEIGHT 0.00

	(Wt+Tare)	(((Wt-Tare)/W6)*100)	%PASSING		
12.0"				12.0"	cobbles
3.0"				3.0"	coarse gravel
2.5"				2.5"	coarse gravel
2.0"				2.0"	coarse gravel
1.5"				1.5"	coarse gravel
1.0"				1.0"	coarse gravel
0.75"				0.75"	fine gravel
0.50"				0.50"	fine gravel
0.375"				0.375"	fine gravel
#4				#4	coarse sand

HYDROMETER ANALYSIS

Specific Gravity	(assumed)	2.700
Specific Gravity	(tested)	
Amount Dispersing Agent (ml)		125.00
Type Dispersion Device		Mechanical
Length of Dispersion Period		1 Minute

Weight of Sample Used For Hydrometer Test

Weight of Sample Wet or Dry (gm)	58.22
Calculated Dry Wt. used in test (gm)	53.74
Hydrometer Bulb Number	624378
% Pass #4 Sieve For Whole Sample	100.00

TARE WEIGHT 0.00

HYDROMETER BACKSIEVE (Percent Passing #10 - #200 Sieves)

	(Wt+Tare)	Cumul Wt. Retained	% PASSING		
#10				#10	medium sand
#20				#20	medium sand
#40				#40	fine sand
#60				#60	fine sand
#100				#100	fine sand
#200			71.4	#200	fines

NOTE: Client provided the percent passing #200 sieve.

HYDROMETER CALCULATIONS

DATE	TIME	ET (min)	READING R	TEMP T	TEMP.COR. K	HYD.COR. Cc	READING C	EFFECTIVE LENGTH	A
09/03/2001	10:46								
09/03/2001	10:48	2.00	41.0	22.50	0.013	6.50	34.50	10.7	0.99
09/03/2001	10:51	5.00	38.0	22.50	0.013	6.50	31.50	11.2	0.99
09/03/2001	11:01	15.00	35.5	22.50	0.013	6.50	29.00	11.5	0.99
09/03/2001	11:16	30.00	32.0	22.50	0.013	6.50	25.50	12.2	0.99
09/03/2001	11:46	60.00	29.0	22.50	0.013	6.50	22.50	12.7	0.99
09/03/2001	14:56	250.00	24.0	22.50	0.013	6.50	17.50	13.5	0.99
09/04/2001	10:46	1440.00	21.0	22.50	0.013	6.50	14.50	14.0	0.99

GRAIN SIZE PERCENTAGES

Particle Diameter	% PASSING		
0.0303	63.6	% COBBLES	
0.0196	58.0	% COARSE GRAVEL	
0.0115	53.4	% FINE GRAVEL	
0.0084	47.0	% COARSE SAND	
0.0060	41.5	% MEDIUM SAND	
0.0030	32.2	% FINE SAND	
0.0013	26.7	% FINES	
		% TOTAL SAMPLE	

Description: Dark Yellowish Brown, SILTY CLAY, some coarse to fine sand.

USCS: (CL)

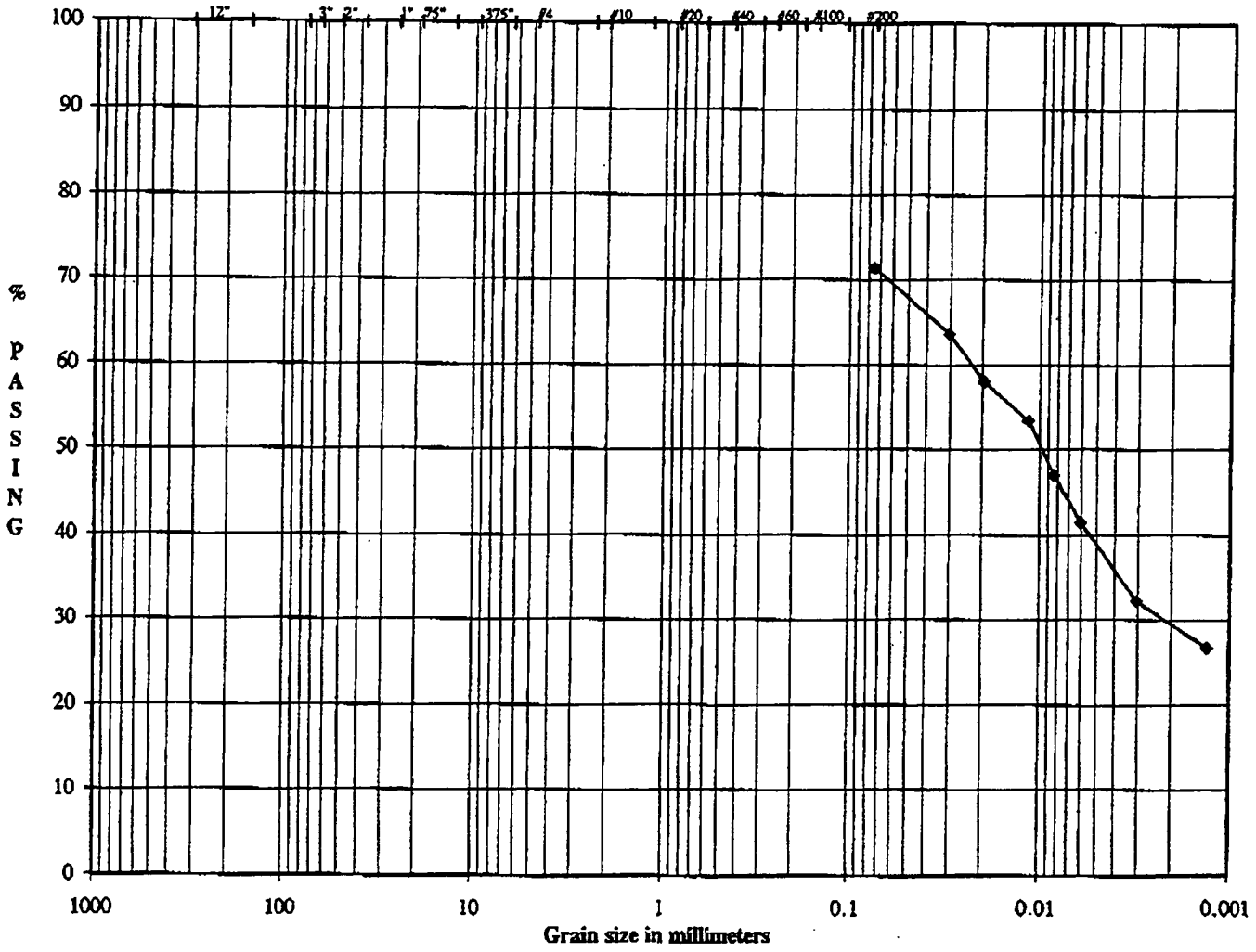
	LL
	PL
	PI

000175

TECH	TJ
DATE	08/31/2001
CHECK	BK
REVIEW	PWM

4940

PARTICLE SIZE DISTRIBUTION ASTM D 421 AND D 422
US STANDARD SIEVE OPENING SIZES



Boulders	Cobbles	Coarse	Fine	Cor	Med	Fine	SILT OR CLAY
		Gravel		SAND			FINES

SAMPLE ID	LP01-06
SAMPLE TYPE	Bag
SAMPLE DEPTH	-

LL	
PL	
PI	

DESCRIPTION	Dark Yellowish Brown, SILTY CLAY, some coarse to fine sand.
USCS	(CL)

000176

GEOSYNTEC/FLUOR FERNALD/OH
013-3175

TECH	TJ
DATE	08/31/2001
CHECK	BAS
REVIEW	PW/TR

GEOSYNTEC CONSULTANTS

FLUOR DANIEL FERNALD

PARTICLE SIZE ANALYSIS MECHANICAL SIEVE METHOD (ASTM D 422)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO PROJECT NO: 6Q1341 TASK NO.: 04.

DESCRIPTION: Phase III DATE: 27 day AUG month 2001 year

MATERIAL TYPE: Low Perm. Clay SAMPLE NO.: LP-01-07

SOIL SAMPLE SIZE +3/8" = 1038.6g -3/8" = 41.62 lb + 40.63 lb = 82.25 lb = 37,308.6g TOTAL SAMPLE = 38,347.2g

APPROXIMATE MINIMUM WT. OF SAMPLE (PASSING NO. 10 SIEVE) (grams)	SAND	FINE GRAIN
	115	65

	+3/8 BEFORE WASH	-3/8	+3/8 AFTER WASH	-3/8
TARE NO.	L-2	L-1	L-2	L-1
WT. OF DRY SAMPLE PLUS TARE (grams)	1230.8	1069.1	1140.0	377.1
WT. OF TARE (grams)	192.2	192.8	192.2	192.8
WT. OF DRY SAMPLE (grams)	1038.6	876.3	947.8	184.3

SIEVE ANALYSIS QA ID: TBW

SIEVE NO.	DIAMETER (mm)	WT. RETAINED (grams)	% RETAINED	% FINER		PROJECT SPECIFICATIONS
2"	50.0	0	0	100		100
1 1/2"	37.5	0	0	100		
1"	25.0	0	0	100		
3/4"	19.0	129.7	0.3	99.7		90 To 100
1/2"	12.5	632.3	1.6	98.4		
3/8"	9.5	947.2	2.5	97.5		
#4	4.75	23.6	2.7	97.3	94.9	
10	2.0	40.3	4.6	95.4	93.0	
20	0.850	59.7	6.8	93.2	90.9	
40	0.425	83.4	9.5	90.5	88.2	
60	0.250	106.2	12.1	87.9	85.7	
100	0.150	136.9	15.6	84.4	82.3	
200	0.075	178.6	20.4	79.6	77.6	50 To 100
PAN		184.3				

000177

%FINER = 100 − Σ% RETAINED

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GEOSYNTEC CONSULTANTS

FLUOR DANIEL FERNALD

PARTICLE SIZE DISTRIBUTION AND SOIL CLASSIFICATION TEST RESULTS

(ASTM C 136/D 422) (ASTM D 2487)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO

DESCRIPTION: PHASE III

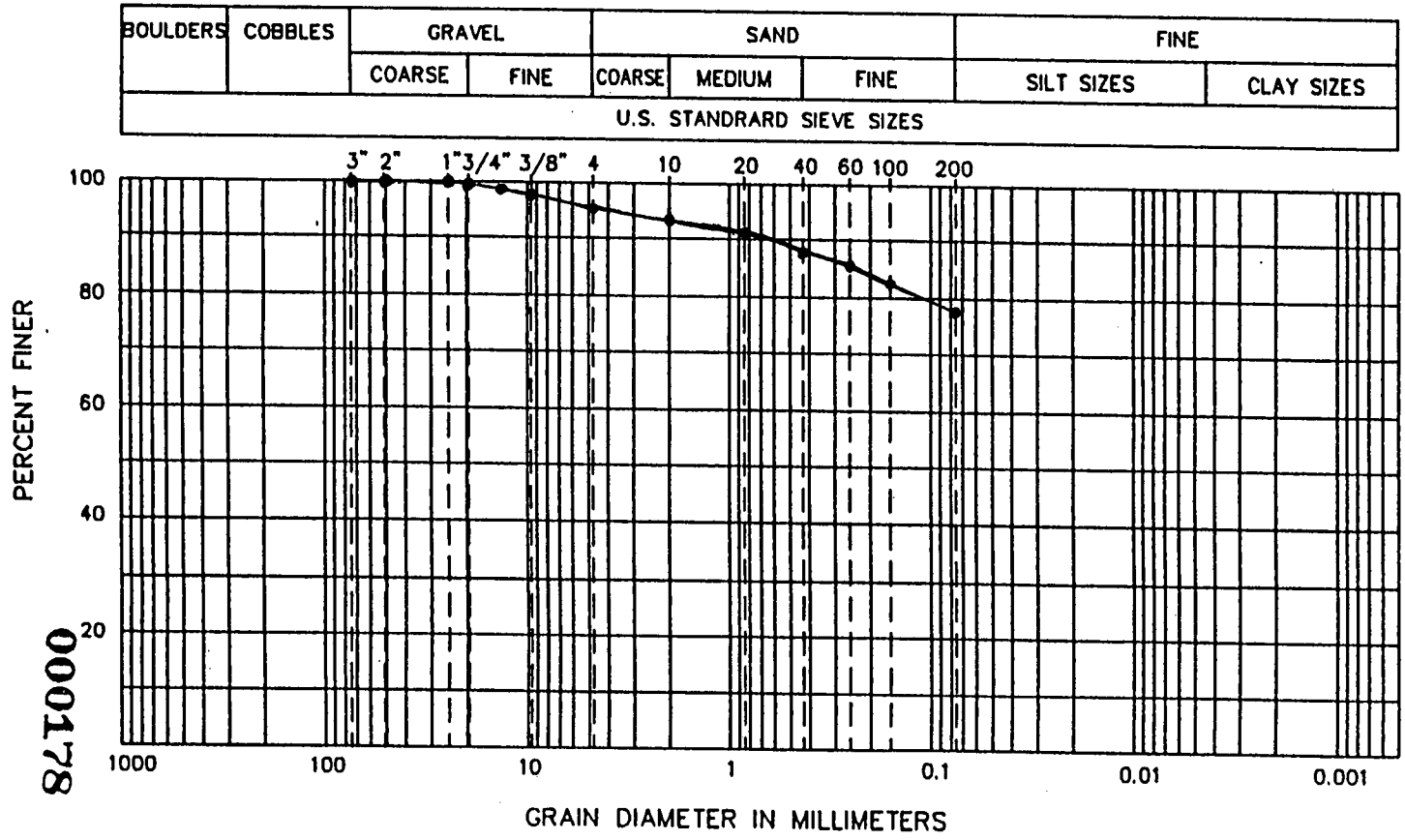
MATERIAL TYPE: LOW PERM. CLAY

PROJECT NO.: GQ1341 TASK NO.: 04.1

DATE: 06 day SEPT month 2001 year

SAMPLE NO.: LP-01-07 QA ID: (TBD)

CURVE COEFFICIENTS: (C_u) ..... (C_c) .....



ATTERBERG LIMITS

(LL) 35

(PL) 17

(PI) 18

SIEVE RESULTS

SIEVE SIZE	% FINER
3-in.	100
2-in.	100
1 1/2-in.	100
1-in.	100
3/4-in.	99.7
1/2-in.	98.4
3/8-in.	97.5
NO. 4	94.9
NO. 10	93.0
NO. 20	90.9
NO. 40	88.2
NO. 60	85.7
NO. 100	82.3
NO. 200	77.6

HYDROMETER RESULTS

PARTICLE DIA.	% FINER
0.050	71
0.020	59
0.005	39
0.002	30

SOIL CLASSIFICATION (ASTM D 2487): LEAN CLAY WITH SAND (CL)

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SHEET NO. 2 OF 2

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GEOSYNTEC CONSULTANTS

FLUOR DANIEL FERNALD

PARTICLE SIZE ANALYSIS MECHANICAL SIEVE METHOD (ASTM D 422)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO PROJECT NO: 6Q1341 TASK NO.: 04.1

DESCRIPTION: Phase III DATE: 30 day AUG month 2001 year

MATERIAL TYPE: Low Perm CLAY SAMPLE NO.: LP-01-08

SOIL SAMPLE SIZE +3/8 = 499.2 -3/8 = 42.51 lbs = 19,282.5g 19,781.7g

APPROXIMATE MINIMUM WT. OF SAMPLE (PASSING NO. 10 SIEVE) (grams)	SAND	FINE GRAIN
	115	65

	BEFORE WASH -3/8		AFTER WASH -3/8	
TARE NO.	X	N	X	N
WT. OF DRY SAMPLE PLUS TARE (grams)		966.4		279.7
WT. OF TARE (grams)		101.7		101.7
WT. OF DRY SAMPLE (grams)		864.7		178.0

SIEVE ANALYSIS QA ID: TBK

SIEVE NO.	DIAMETER (mm)	WT. RETAINED (grams)	% RETAINED	% FINER		PROJECT SPECIFICATIONS
2"	50.0	Ø	Ø	100		100
1 1/2"	37.5	Ø	Ø	100		
1"	25.0	Ø	Ø	100		
3/4"	19.0	58.4	0.3	99.7		90 To 100
1/2"	12.5	264.7	1.3	98.7		
3/8"	9.5	394.0	2.0	98.0		
#4	4.75	14.9	1.7	98.3	96.3	
10	2.0	35.1	4.1	95.9	94.0	
20	0.850	55.4	6.4	93.6	91.7	
40	0.425	78.2	9.0	91.0	89.1	
60	0.250	101.2	11.7	88.3	86.5	
100	0.150	132.4	15.3	84.7	83.0	
200	0.075	174.7	20.2	79.8	78.2	50 To 100
PAN	—	178.0	—			

000179

%FINER = 100 - Σ% RETAINED

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GEOSYNTEC CONSULTANTS

FLUOR DANIEL FERNALD

PARTICLE SIZE DISTRIBUTION AND SOIL CLASSIFICATION TEST RESULTS

(ASTM C 136/D 422) (ASTM D 2487)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO

PROJECT NO.: GQ1341 TASK NO.: 04.1

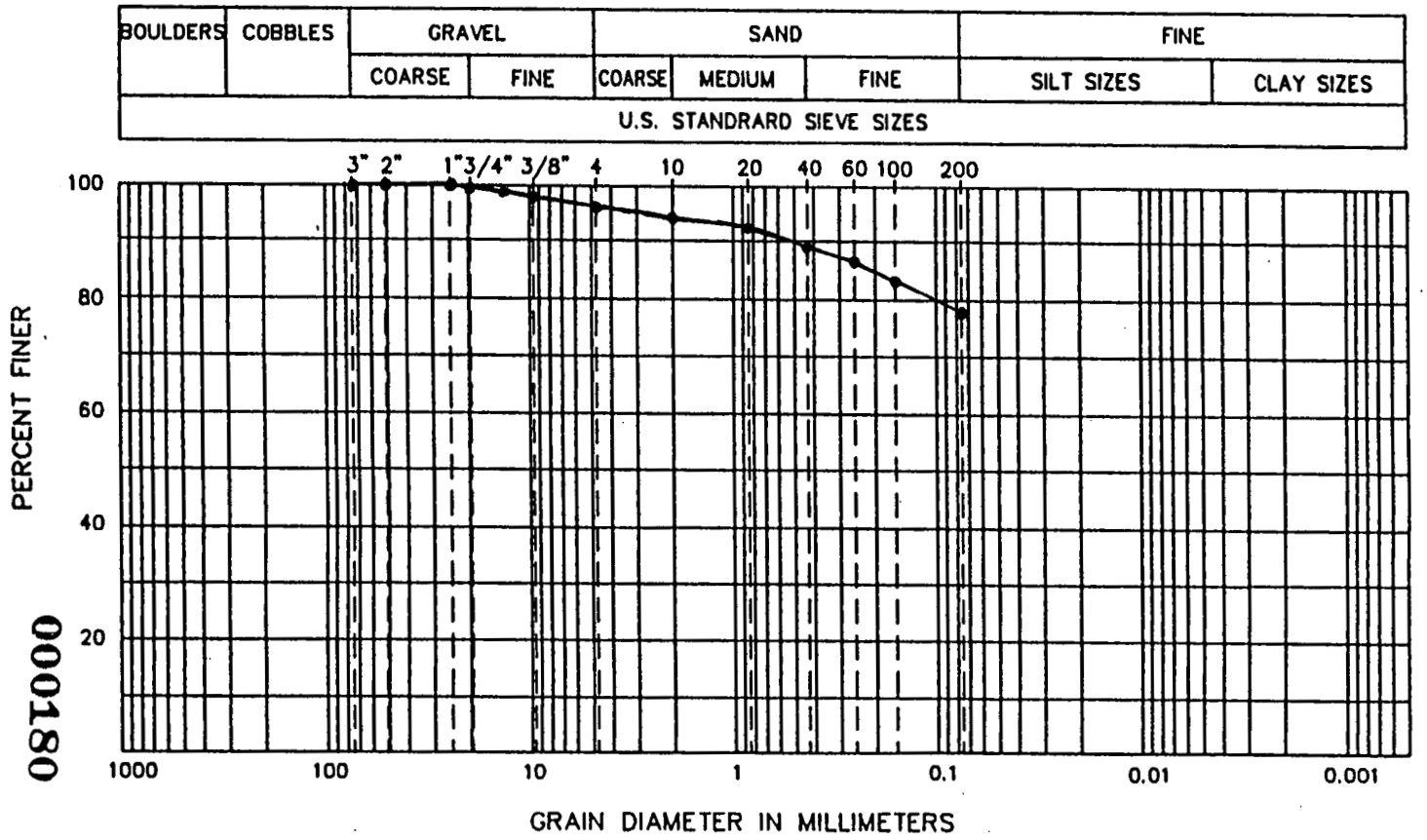
DESCRIPTION: PHASE III

DATE: 06 day SEPT month 2001 year

MATERIAL TYPE: Low Perm. CLAY

SAMPLE NO.: LP-01-08 QA ID: (TBD)

CURVE COEFFICIENTS: (C_u) ..... (C_c) .....



ATTERBERG LIMITS

(LL) 34

(PL) 16

(PI) 18

SIEVE RESULTS

SIEVE SIZE	% FINER
3-in.	100
2-in.	100
1 1/2-in.	100
1-in.	100
3/4-in.	99.7
1/2-in.	98.7
3/8-in.	98.0
NO. 4	96.3
NO. 10	94.0
NO. 20	91.7
NO. 40	89.1
NO. 60	86.5
NO. 100	83.0
NO. 200	78.2

HYDROMETER RESULTS

PARTICLE DIA.	% FINER
0.050	72
0.020	60
0.005	39
0.002	30

SOIL CLASSIFICATION (ASTM D 2487): LEAN CLAY WITH SAND (CL)

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GEOSYNTEC CONSULTANTS

FLUOR DANIEL FERNALD

PARTICLE SIZE ANALYSIS MECHANICAL SIEVE METHOD (ASTM D 422)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO PROJECT NO: 6Q1341 TASK NO.: 04.1

DESCRIPTION: Phase III DATE: 29 day AUG month 2001 year

MATERIAL TYPE: Low Perm CLAY SAMPLE NO.: LP-01-09

SOIL SAMPLE SIZE +3/8 = 525.6g -3/8 = 83.20 lbs = 37,739.5g TOTAL SAMPLE = 38,265.1g

APPROXIMATE MINIMUM WT. OF SAMPLE (PASSING NO. 10 SIEVE) (grams)	SAND	FINE GRAIN
	115	65

	+3/8 BEFORE WASH	-3/8	+3/8 AFTER WASH	-3/8
TARE NO.	L-44	L-1	L-44	L-1
WT. OF DRY SAMPLE PLUS TARE (grams)	717.4	778.2	689.0	301.8
WT. OF TARE (grams)	191.8	192.7	191.8	192.7
WT. OF DRY SAMPLE (grams)	525.6	585.5	497.2	109.1

SIEVE ANALYSIS QA ID: TBW

SIEVE NO.	DIAMETER (mm)	WT. RETAINED (grams)	% RETAINED	% FINER		PROJECT SPECIFICATIONS
2"	50.0	0	0	100		100
1 1/2"	37.5	0	0	100		
1"	25.0	0	0	100		
3/4"	19.0	101.0	0.3	99.7		90 To 100
1/2"	12.5	324.7	0.8	99.2		
3/8"	9.5	493.4	1.3	98.7		
#4	4.75	5.1	0.9	99.1	97.8	
10	2.0	13.9	2.4	97.6	96.4	
20	0.850	28.2	4.8	95.2	93.9	
40	0.425	46.2	7.9	92.1	90.9	
60	0.250	61.5	10.5	89.5	88.3	
100	0.150	81.1	13.9	86.1	85.0	
200	0.075	106.5	18.2	81.8	80.7	50 To 100
PAN		109.1				

000181

%FINER = 100 − Σ% RETAINED

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GEOSYNTEC CONSULTANTS

FLUOR DANIEL FERNALD

PARTICLE SIZE DISTRIBUTION AND SOIL CLASSIFICATION TEST RESULTS

(ASTM C 136/D 422) (ASTM D 2487)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO

DESCRIPTION: PHASE III

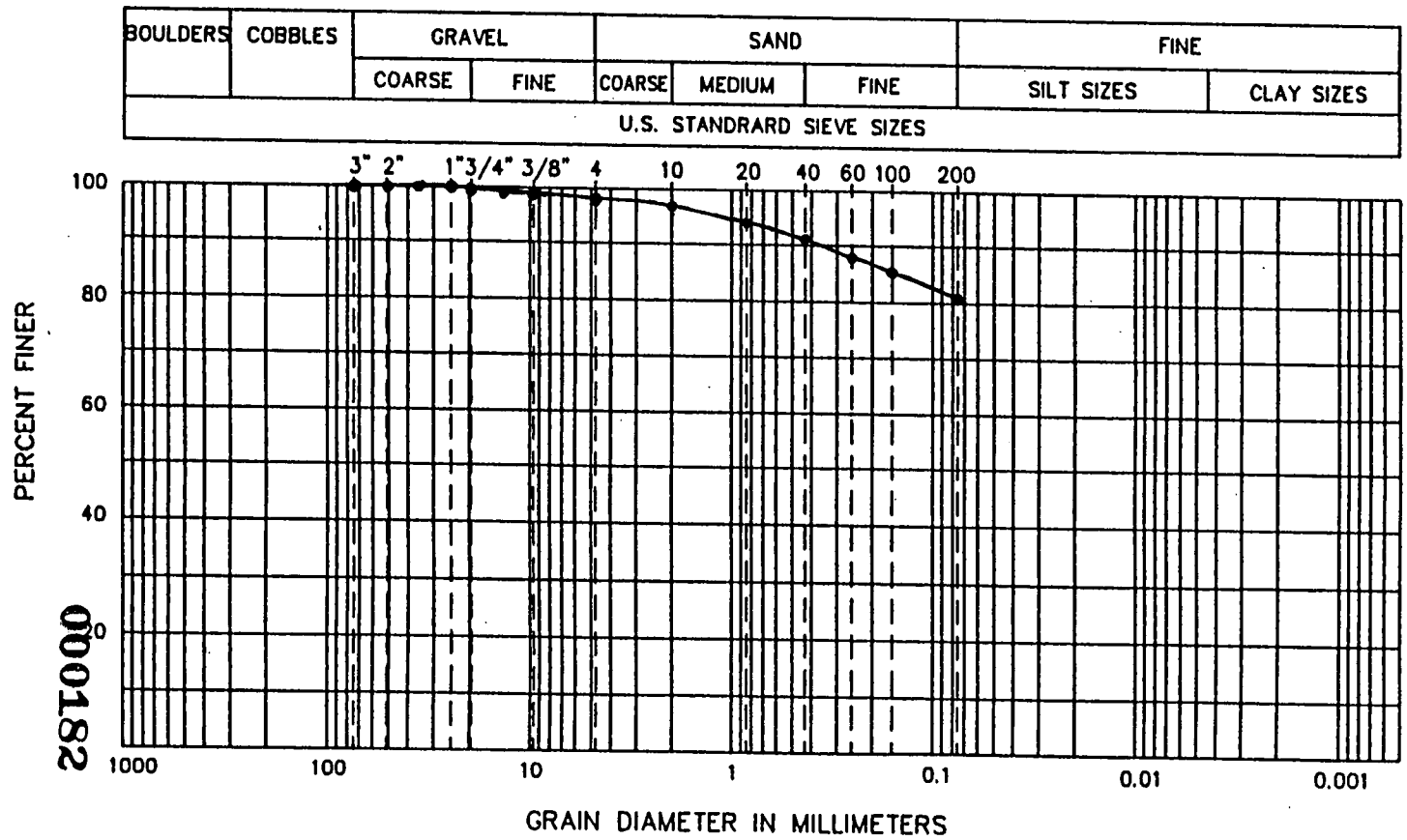
MATERIAL TYPE: LOW PERM. CLAY

PROJECT NO.: GQ1341 TASK NO.: 04.1

DATE: 06 day SEPT month 2001 year

SAMPLE NO.: LP-01-09 QA ID: TBD

CURVE COEFFICIENTS: (C_u) ..... (C_c) .....



ATTERBERG LIMITS

(LL) 38

(PL) 16

(PI) 22

SIEVE RESULTS

SIEVE SIZE	% FINER
3-in.	100
2-in.	100
1 1/2-in.	100
1-in.	100
3/4-in.	99.7
1/2-in.	99.2
3/8-in.	98.7
NO. 4	97.8
NO. 10	96.4
NO. 20	93.9
NO. 40	90.9
NO. 60	88.3
NO. 100	85.0
NO. 200	80.7

HYDROMETER RESULTS

PARTICLE DIA.	% FINER
0.050	79
0.020	65
0.005	41
0.002	33

SOIL CLASSIFICATION (ASTM D 2487): LEAN CLAY WITH SAND (CL)

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GEOSYNTEC CONSULTANTS

FLUOR DANIEL FERNALD

PARTICLE SIZE ANALYSIS MECHANICAL SIEVE METHOD (ASTM D 422)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO PROJECT NO: GQ1341 TASK NO.: 04.1

DESCRIPTION: Phase III DATE: 31 day AUG month 2001 year

MATERIAL TYPE: Low Perm CLAY SAMPLE NO.: LP-01-11

SOIL SAMPLE SIZE +3/8 = 196.0g -3/8 = 50.64 lbs = 22,970.3g TOTAL SAMPLE = 23,166.3g

APPROXIMATE MINIMUM WT. OF SAMPLE (PASSING NO. 10 SIEVE) (grams)	SAND	FINE GRAIN
	115	65

	+3/8 BEFORE WASH	-3/8	+3/8 AFTER WASH	-3/8
TARE NO.	L-3	L-5	L-3	L-5
WT. OF DRY SAMPLE PLUS TARE (grams)	386.7	834.8	374.1	229.3
WT. OF TARE (grams)	190.7	106.4	190.7	106.4
WT. OF DRY SAMPLE (grams)	196.0	728.4	183.4	122.9

SIEVE ANALYSIS QA ID: TBW

SIEVE NO.	DIAMETER (mm)	WT. RETAINED (grams)	% RETAINED	% FINER		PROJECT SPECIFICATIONS
2"	50.0	0	0	100		100
1 1/2"	37.5	0	0	100		
1"	25.0	20.6	0.1	99.9		
3/4"	19.0	48.8	0.2	99.8		90 To 100
1/2"	12.5	108.1	0.5	99.5		
3/8"	9.5	182.0	0.8	99.2		
#4	4.75	7.8	1.1	98.9	98.1	
10	2.0	25.7	3.5	96.5	95.7	
20	0.850	40.4	5.5	94.5	93.7	
40	0.425	56.0	7.7	92.3	91.6	
60	0.250	71.3	9.8	90.2	89.5	
100	0.150	92.2	12.7	87.3	86.6	
200	0.075	120.5	16.5	83.5	82.8	50 To 100
PAN		122.9				

000183

%FINER = 100 − Σ% RETAINED

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GEOSYNTEC CONSULTANTS

FLUOR DANIEL FERNALD

PARTICLE SIZE DISTRIBUTION AND SOIL CLASSIFICATION TEST RESULTS

(ASTM C 136/D 422) (ASTM D 2487)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO

DESCRIPTION: PHASE III

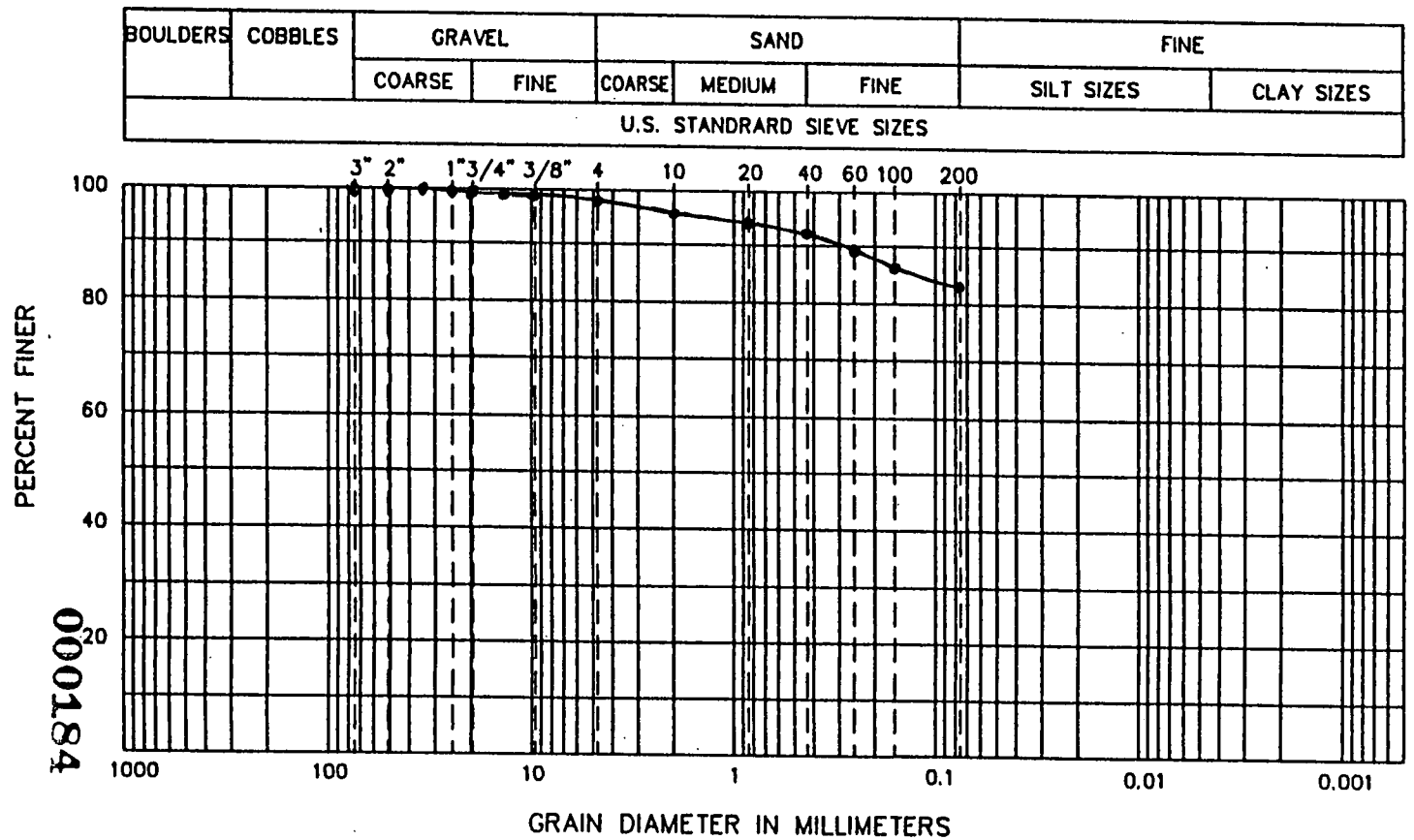
MATERIAL TYPE: LOW PERM. CLAY

PROJECT NO.: GQ1341 TASK NO.: 04.1

DATE: 06 day SEPT month 2001 year

SAMPLE NO.: LP-01-11 QA ID: (TBC)

CURVE COEFFICIENTS: (C_u) ..... (C_c) .....



ATTERBERG LIMITS

(LL) 39

(PL) 18

(PI) 21

SIEVE RESULTS

SIEVE SIZE	% FINER
3-in.	100
2-in.	100
1 1/2-in.	100
1-in.	99.9
3/4-in.	99.8
1/2-in.	99.5
3/8-in.	99.2
NO. 4	98.1
NO. 10	95.7
NO. 20	93.7
NO. 40	91.6
NO. 60	89.5
NO. 100	86.6
NO. 200	82.8

HYDROMETER RESULTS

PARTICLE DIA.	% FINER
0.050	78
0.020	63
0.005	40
0.002	32

SOIL CLASSIFICATION (ASTM D 2487): LEAN CLAY WITH SAND (CL)

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GEOSYNTEC CONSULTANTS

FLUOR FERNALD

PARTICLE SIZE ANALYSIS–SIEVE METHOD (ASTM D 422)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO — PROJECT NO.: GQ134 TASK NO.: 04.1

DESCRIPTION: PHASE III — DATE: 10 day SEPT month 2001 year

MATERIAL TYPE: LOW PERM CLAY — SAMPLE NO.: LP-01-12

SOIL SAMPLE SIZE {+3/8" = 692.0 g} HYDRO SAMPLE = 971.0 g {-3/8" = 97.4 lb = 44,203.3 g} TOTAL SAMPLE = 45,866.3 g

APPROXIMATE MINIMUM WT. OF SAMPLE (PASSING NO. 10 SIEVE) (grams)	SAND	FINE GRAIN
	115	65

	+3/8 BEFORE WASH	-3/8 BEFORE WASH	+3/8 AFTER WASH	-3/8 AFTER WASH
TARE NO.	L-4	N	L-4	N
WT. OF DRY SAMPLE PLUS TARE (grams)	838.6	889.5	804.8	249.8
WT. OF TARE (grams)	146.6	101.9	146.6	101.9
WT. OF DRY SAMPLE (grams)	692.0	787.6	658.2	147.9

SIEVE ANALYSIS — QA ID: TBW

SIEVE NO.	DIAMETER (mm)	WT. RETAINED (grams)	% RETAINED	% FINER		PROJECT SPECIFICATIONS
3 in	76.2	0	0	100		
2 in	50.8	0	0	100		
1 1/2in	38.1	0	0	100		
1 in	25.4	30.5	0.1	99.9		
3/4 in	19.1	121.2	0.3	99.7		
1/2 in	12.7	413.3	0.9	99.1		
3/8 in	9.53	654.6	1.4	98.6		
No. 4	4.75	9.3	1.2	98.8	97.4	
No. 10	2.00	25.7	3.3	96.7	95.4	
No. 20	0.850	46.8	5.9	94.1	92.7	
No. 40	0.425	67.5	8.6	91.4	90.1	
No. 60	0.250	86.1	10.9	89.1	87.8	
No. 100	0.125	111.0	14.1	85.9	84.7	
No. 200	0.075	145.4	18.5	81.5	80.4	
PAN	—	147.9	—	—		

COMMENTS:

000185

%FINER = 100 − Σ% RETAINED

GEOSYNTEC CONSULTANTS

FLUOR DANIEL FERNALD

PARTICLE SIZE DISTRIBUTION AND SOIL CLASSIFICATION TEST RESULTS

(ASTM C 136/D 422) (ASTM D 2487)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO

PROJECT NO.: 6Q1341 TASK NO.: 04.1

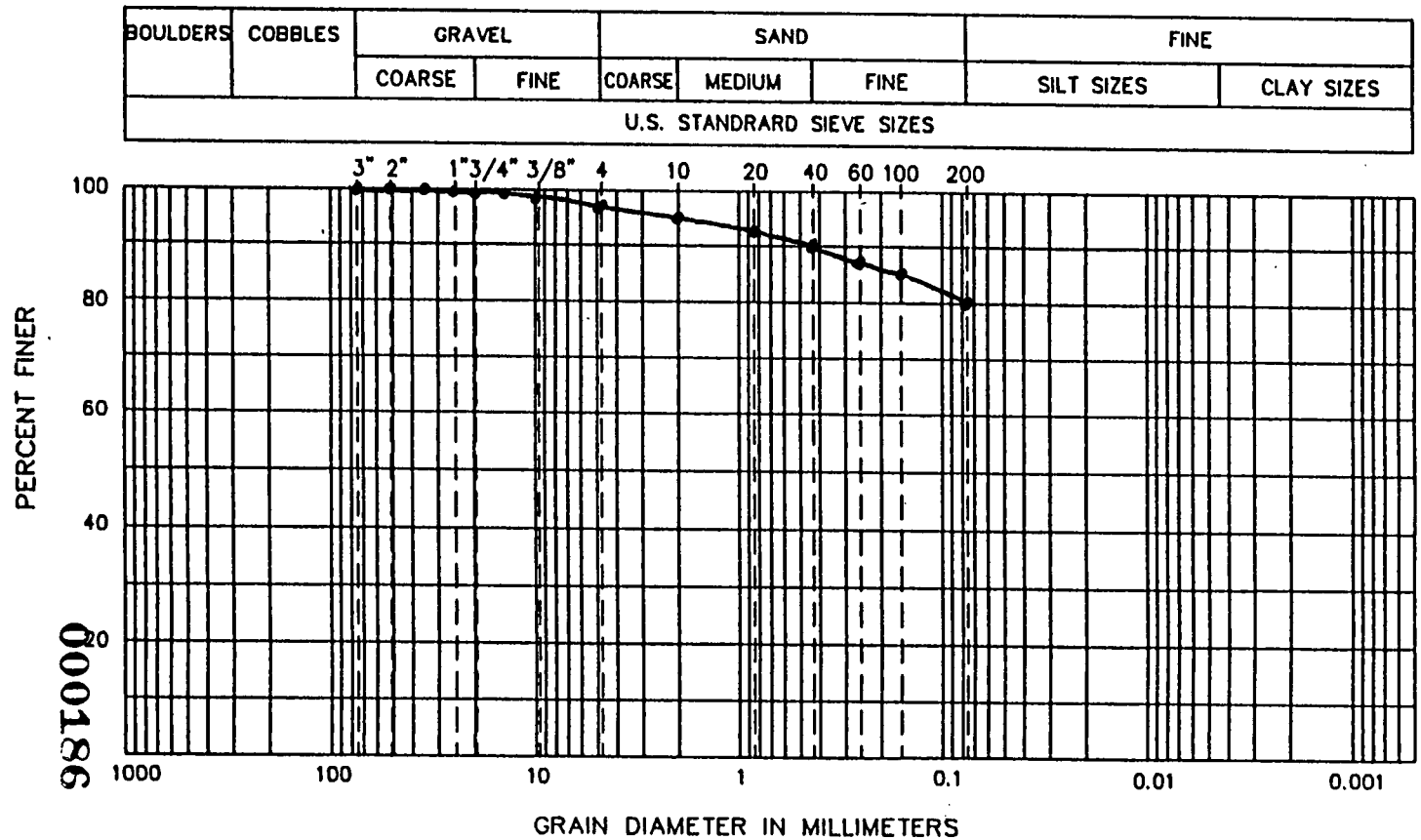
DESCRIPTION: Phase III

DATE: 16 day Oct month 2001 year

MATERIAL TYPE: Low perm. Clay

SAMPLE NO.: LP-01-12 QA ID: KS

CURVE COEFFICIENTS: (C_u) ..... (C_c) .....



ATTERBERG LIMITS

(LL) 37

(PL) 16

(PI) 21

SIEVE RESULTS

SIEVE SIZE	% FINER
3-in.	100
2-in.	100
1 1/2-in.	100
1-in.	99.9
3/4-in.	99.7
1/2-in.	99.1
3/8-in.	98.6
NO. 4	97.4
NO. 10	95.4
NO. 20	92.7
NO. 40	90.1
NO. 60	87.8
NO. 100	84.7
NO. 200	80.4

HYDROMETER RESULTS

PARTICLE DIA.	% FINER
0.056	76
0.020	64
0.005	39
0.002	31

SOIL CLASSIFICATION (ASTM D 2487): Lean Clay with Sand (CL)

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GEOSYNTEC CONSULTANTS

FLUOR FERNALD

PARTICLE SIZE ANALYSIS–SIEVE METHOD (ASTM D 422)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO PROJECT NO.: G01341 TASK NO.: 04.1

DESCRIPTION: Phase III DATE: 15 day Sept month 2001 year

MATERIAL TYPE: LOW PERM Clay SAMPLE NO.: LP-01-13

SOIL SAMPLE SIZE +3/8: 1,728 g ~~-3/8 = 36469.4 ~~ ~~33969.4~~ ~~38,197.4 g~~ 38,197.4 g

APPROXIMATE MINIMUM WT. OF SAMPLE (PASSING NO. 10 SIEVE) (grams)	SAND	FINE GRAIN
36469.4	115	65

		BEFORE WASH +3/8	BEFORE WASH -3/8	AFTER WASH +3/8	AFTER WASH -3/8
TARE NO.		L-3	N	L-3	N
WT. OF DRY SAMPLE PLUS TARE	(grams)	1918.5	623.5	1831.4	191.7
WT. OF TARE	(grams)	190.5	101.6	190.5	101.6
WT. OF DRY SAMPLE	(grams)	1728.0	521.9	1640.9	90.1

SIEVE ANALYSIS QA ID: TBD/CS

SIEVE NO.	DIAMETER (mm)	WT. RETAINED (grams)	% RETAINED	% FINER		PROJECT SPECIFICATIONS
3 in	76.2	0	0	100		
2 in	50.8	0	0	100		
1 1/2in	38.1	0	0	100		
1 in	25.4	694.1	1.8	98.2		
3/4 in	19.1	1083.1	2.8	97.2		
1/2 in	12.7	1416.1	3.7	96.3		
3/8 in	9.53	1617.8	4.2	95.8		
No. 4	4.75	6.0	1.1	98.9	94.7	
No. 10	2.00	13.7	2.6	97.4	93.3	
No. 20	0.850	22.7	4.3	95.7	91.6	
No. 40	0.425	34.9	6.7	93.3	89.4	
No. 60	0.250	47.6	9.1	90.9	87.1	
No. 100	0.125	64.8	12.4	87.6	83.9	
No. 200	0.075	86.8	16.6	83.4	79.9	
PAN	—	90.1	—	—	—	

COMMENTS: 000187

%FINER = 100 − Σ% RETAINED

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GEOSYNTEC CONSULTANTS

FLUOR DANIEL FERNALD

PARTICLE SIZE DISTRIBUTION AND SOIL CLASSIFICATION TEST RESULTS

(ASTM C 136/D 422) (ASTM D 2487)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO

DESCRIPTION: Phase III

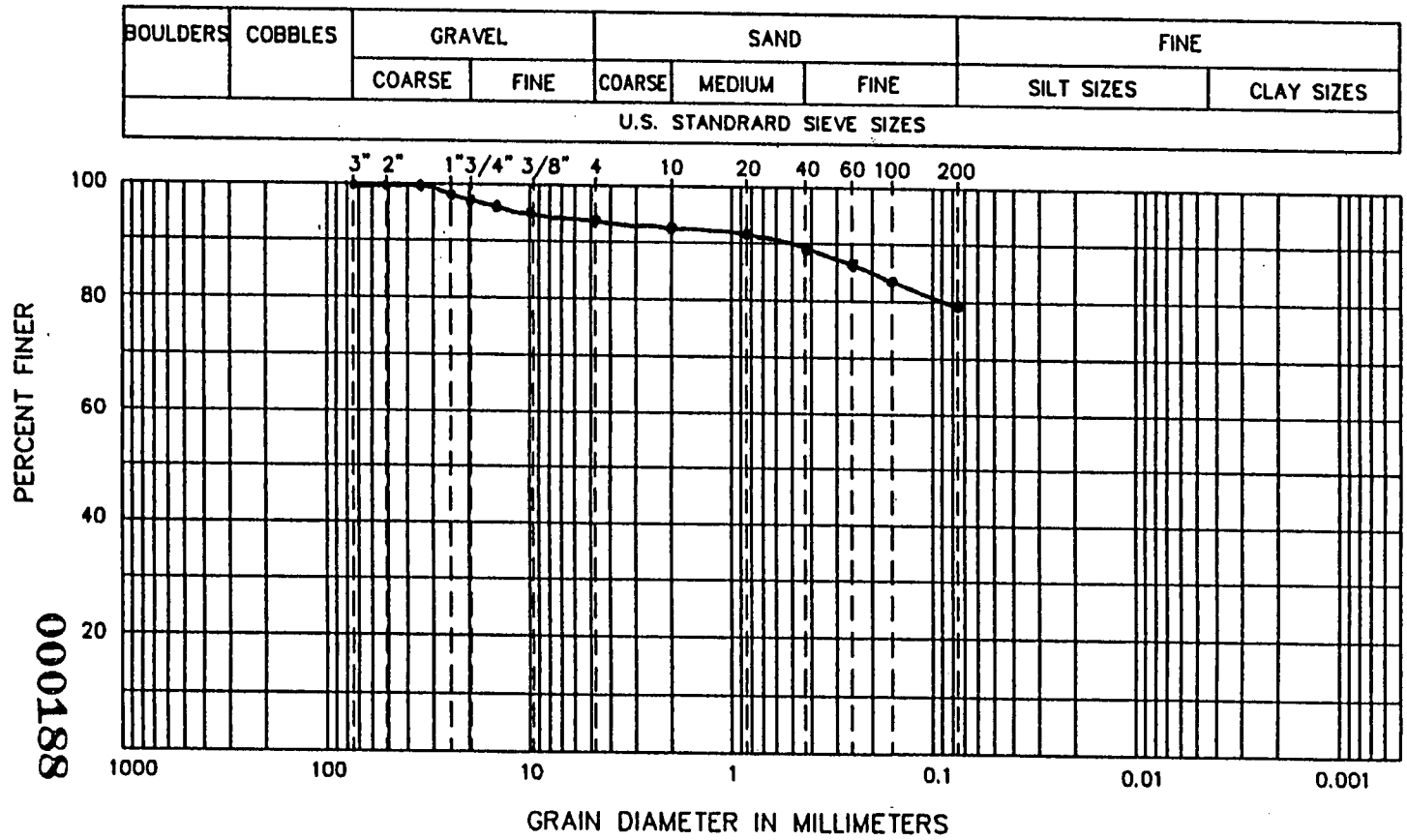
MATERIAL TYPE: Low. Perm. Clay

PROJECT NO.: 6Q1341 TASK NO.: 04.1

DATE: 16 day Oct month 2001 year

SAMPLE NO.: LP-01-13 QA ID: KS

CURVE COEFFICIENTS: (C_u) ..... (C_c) .....



ATTERBERG LIMITS

(LL) 39

(PL) 16

(PI) 23

SIEVE RESULTS

SIEVE SIZE	% FINER
3-in.	100
2-in.	100
1 1/2-in.	100
1-in.	98.2
3/4-in.	97.2
1/2-in.	96.3
3/8-in.	95.8
NO. 4	94.7
NO. 10	93.3
NO. 20	91.6
NO. 40	89.4
NO. 60	87.1
NO. 100	83.9
NO. 200	79.9

HYDROMETER RESULTS

PARTICLE DIA.	% FINER
0.005	77
0.002	62
0.005	40
0.002	32

SOIL CLASSIFICATION (ASTM D 2487): Lean Clay with Sand (CL)

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000188

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GEOSYNTEC CONSULTANTS

FLUOR FERNALD

PARTICLE SIZE ANALYSIS–SIEVE METHOD (ASTM D 422)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO PROJECT NO.: G21341 TASK NO.: 04.1

DESCRIPTION: Phase III DATE: 15 day Sept month 2001 year

MATERIAL TYPE: Low Perm Clay SAMPLE NO.: LP-01-14

SOIL SAMPLE SIZE +3/8 = 876.7g ~~21,094.5~~ 18594.5g ~~21,971.2g~~ 19471.2

APPROXIMATE MINIMUM WT. OF SAMPLE (PASSING NO. 10 SIEVE) (grams)	SAND	FINE GRAIN
	115	65

		+3/8 BEFORE WASH	-3/8 BEFORE WASH	+3/8 AFTER WASH	-3/8 AFTER WASH
TARE NO.		L-4	K	L-4	K
WT. OF DRY SAMPLE PLUS TARE	(grams)	1023.1	693.6	941.4	254.1
WT. OF TARE	(grams)	146.4	101.5	146.4	101.5
WT. OF DRY SAMPLE	(grams)	876.7	592.1	795.0	152.6

SIEVE ANALYSIS QA ID: TBW/CS

SIEVE NO.	DIAMETER (mm)	WT. RETAINED (grams)	% RETAINED	% FINER		PROJECT SPECIFICATIONS
3 in	76.2	0	0	100		
2 in	50.8	0	0	100		
1 1/2in	38.1	0	0	100		
1 in	25.4	90.0	0.5	99.5		
3/4 in	19.1	194.0	1.0	99.0		
1/2 in	12.7	538.3	2.8	97.2		
3/8 in	9.53	764.4	3.9	96.1		
No. 4	4.75	27.6	4.7	95.3	91.6	
No. 10	2.00	51.6	8.7	91.3	87.7	
No. 20	0.850	70.0	11.8	88.2	84.7	
No. 40	0.425	87.7	14.8	85.2	81.9	
No. 60	0.250	104.2	17.6	82.4	79.2	
No. 100	0.125	124.5	21.0	79.0	75.9	
No. 200	0.075	151.0	25.5	74.5	71.6	
PAN	—	152.6	—	—		

COMMENTS:

000189

%FINER = 100 − Σ% RETAINED

GEOSYNTEC CONSULTANTS

FLUOR DANIEL FERNALD

PARTICLE SIZE DISTRIBUTION AND SOIL CLASSIFICATION TEST RESULTS

(ASTM C 136/D 422) (ASTM D 2487)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO

PROJECT NO.: 6Q1341 TASK NO.: 041

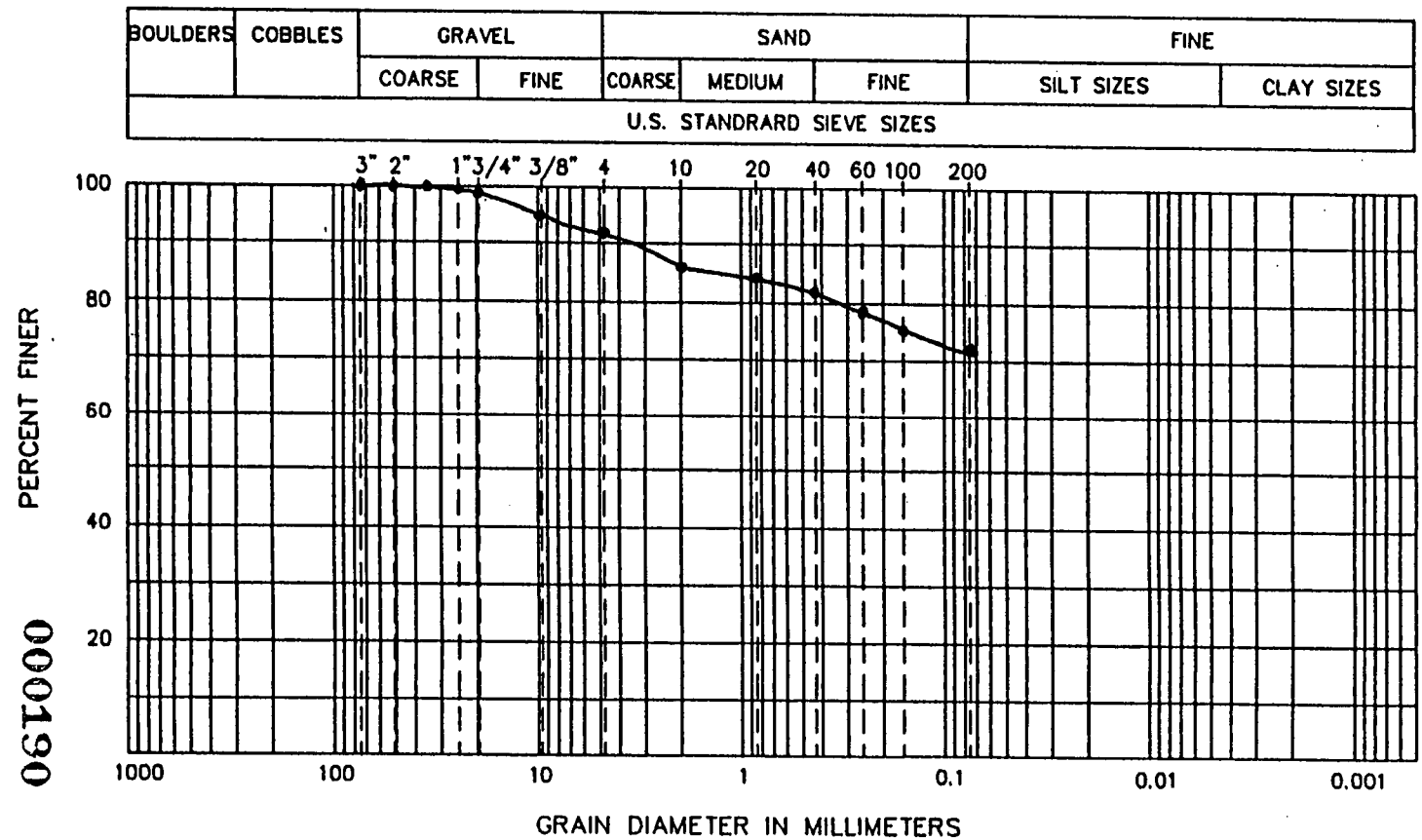
DESCRIPTION: Phase III

DATE: 16 day Oct month 2001 year

MATERIAL TYPE: Low perm. Clay

SAMPLE NO.: LP-01-14 QA ID: KS

CURVE COEFFICIENTS: (C_u) ..... (C_c) .....



ATTERBERG LIMITS

(LL) 34

(PL) 16

(PI) 18

SIEVE RESULTS

SIEVE SIZE	% FINER
3-in.	100
2-in.	100
1 1/2-in.	100
1-in.	99.5
3/4-in.	99.0
1/2-in.	97.2
3/8-in.	96.1
NO. 4	91.6
NO. 10	87.7
NO. 20	84.7
NO. 40	81.9
NO. 60	79.2
NO. 100	75.9
NO. 200	71.6

HYDROMETER RESULTS

PARTICLE DIA.	% FINER
0.050	70
0.020	59
0.005	36
0.002	29

SOIL CLASSIFICATION (ASTM D 2487): Lean Clay with Sand (CL)

000190

4940

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GEOSYNTEC CONSULTANTS

FLUOR FERNALD

PARTICLE SIZE ANALYSIS—SIEVE METHOD (ASTM D 422)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO — PROJECT NO.: 6Q134 TASK NO.: 04.1

DESCRIPTION: PHASE III — DATE: 17 day SEPT month 2001 year

MATERIAL TYPE: Low Perm. Clay — SAMPLE NO.: LP-01-15

SOIL SAMPLE SIZE +3/8" = 1301.5 g; -3/8" = 45.19 lbs + 42.16 lbs = 87.35 lbs = 39,623.0 g — TOTAL SAMPLE = 40,923.5 g

APPROXIMATE MINIMUM WT. OF SAMPLE (PASSING NO. 10 SIEVE) (grams)	SAND	FINE GRAIN
	115	65

	+3/8 BEFORE WASH	-3/8	+3/8 AFTER WASH	-3/8
TARE NO.	L-44	L-2	L-44	L-2
WT. OF DRY SAMPLE PLUS TARE (grams)	1493.5	871.4	1380.1	342.5
WT. OF TARE (grams)	192.0	191.8	192.0	191.8
WT. OF DRY SAMPLE (grams)	1301.5	679.6	1188.1	150.7

SIEVE ANALYSIS — QA ID: [illegible]

SIEVE NO.	DIAMETER (mm)	WT. RETAINED (grams)	% RETAINED	% FINER		PROJECT SPECIFICATIONS
3 in	76.2	0	0	100		
2 in	50.8	0	0	100		
1 1/2in	38.1	0	0	100		
1 in	25.4	265.7	0.6	99.4		
3/4 in	19.1	464.2	1.1	98.9		
1/2 in	12.7	916.2	2.2	97.8		
3/8 in	9.53	1168.9	2.9	97.1		
No. 4	4.75	10.7	1.6	98.4	95.6	
No. 10	2.00	33.7	5.0	95.0	92.3	
No. 20	0.850	55.1	8.1	91.9	89.2	
No. 40	0.425	75.6	11.1	88.9	86.3	
No. 60	0.250	93.9	13.8	86.2	83.7	
No. 100	0.125	117.5	17.3	82.7	80.3	
No. 200	0.075	147.9	21.8	78.2	76.0	
PAN	—	150.7	—	—		

000191

COMMENTS:

%FINER = 100 − Σ% RETAINED

GEOSYNTEC CONSULTANTS

FLUOR DANIEL FERNALD

PARTICLE SIZE DISTRIBUTION AND SOIL CLASSIFICATION TEST RESULTS

(ASTM C 136/D 422) (ASTM D 2487)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO

PROJECT NO.: GQ1341 TASK NO.: 04.1

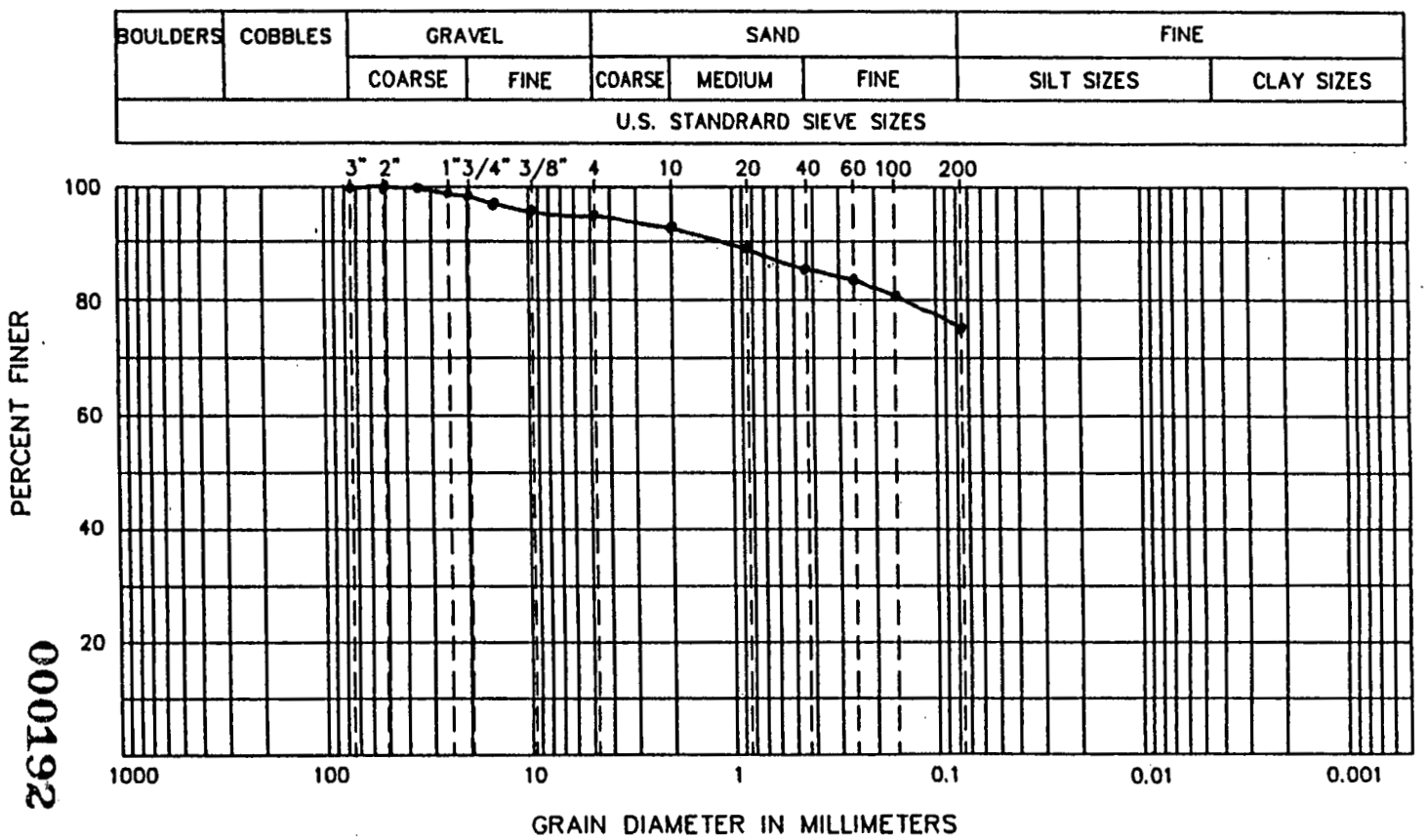
DESCRIPTION: Phase III

DATE: 16 day Oct month 2001 year

MATERIAL TYPE: Low perm. Clay

SAMPLE NO.: LP-01-15 QA ID: KS

CURVE COEFFICIENTS: (C_u) ..... (C_c) .....



ATTERBERG LIMITS

(LL) 34

(PL) 16

(PI) 19

SIEVE RESULTS

SIEVE SIZE	% FINER
3-in.	100
2-in.	100
1 1/2-in.	100
1-in.	99.4
3/4-in.	98.9
1/2-in.	97.8
3/8-in.	97.1
NO. 4	95.6
NO. 10	92.3
NO. 20	89.2
NO. 40	86.3
NO. 60	83.7
NO. 100	80.3
NO. 200	76.0

HYDROMETER RESULTS

PARTICLE DIA.	% FINER
0.050	73
0.020	60
0.005	40
0.002	30

SOIL CLASSIFICATION (ASTM D 2487): Lean Clay w/ Sand (CL)

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SHEET NO. 2 OF 2

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GEOSYNTEC CONSULTANTS

FLUOR FERNALD

PARTICLE SIZE ANALYSIS–SIEVE METHOD (ASTM D 422)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO — PROJECT NO.: 6Q134 TASK NO.: 04.1

DESCRIPTION: PHASE III — DATE: 18 day SEPT month 2001 year

MATERIAL TYPE: LOW PERM CLAY — SAMPLE NO.: LP-01-16

SOIL SAMPLE SIZE {+3/8" = 332.6g} {-3/8" = 613.0g (HAT) + 626.7 (SIEVE) = 1,239.7g} TOTAL SAMPLE = 19,172.0g -3/8" (BUCKET) = 38.80 lbs = 17,599.7g

APPROXIMATE MINIMUM WT. OF SAMPLE (PASSING NO. 10 SIEVE) (grams)	SAND	FINE GRAIN
	115	65

	BEFORE WASH +3/8	BEFORE WASH -3/8	AFTER WASH +3/8	AFTER WASH -3/8
TARE NO.	L-5	L-7	L-5	L-7
WT. OF DRY SAMPLE PLUS TARE (grams)	439.0	821.0	411.5	344.3
WT. OF TARE (grams)	106.4	194.3	106.4	194.3
WT. OF DRY SAMPLE (grams)	332.6	626.7	305.1	150.0

SIEVE ANALYSIS — QA ID: TBC

SIEVE NO.	DIAMETER (mm)	WT. RETAINED (grams)	% RETAINED	% FINER		PROJECT SPECIFICATIONS
3 in	76.2	0	0	100		
2 in	50.8	0	0	100		
1 1/2in	38.1	0	0	100		
1 in	25.4	93.2	0.5	99.5		
3/4 in	19.1	116.3	0.6	99.4		
1/2 in	12.7	223.4	1.2	98.8		
3/8 in	9.53	295.0	1.5	98.5		
No. 4	4.75	15.9	2.5	97.5	96.0	
No. 10	2.00	42.5	6.8	93.2	91.8	
No. 20	0.850	67.1	10.7	89.3	88.0	
No. 40	0.425	85.4	13.6	86.4	85.1	
No. 60	0.250	101.2	16.1	83.9	82.6	
No. 100	0.125	122.1	19.5	80.5	79.3	
No. 200	0.075	149.1	23.8	76.2	75.1	
PAN	—	150.0	—	—		

COMMENTS:

000193

%FINER = 100 − Σ% RETAINED

GEOSYNTEC CONSULTANTS

FLUOR DANIEL FERNALD

PARTICLE SIZE DISTRIBUTION AND SOIL CLASSIFICATION TEST RESULTS

(ASTM C 136/D 422) (ASTM D 2487)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO

PROJECT NO.: 6Q1341 TASK NO.: 04.1

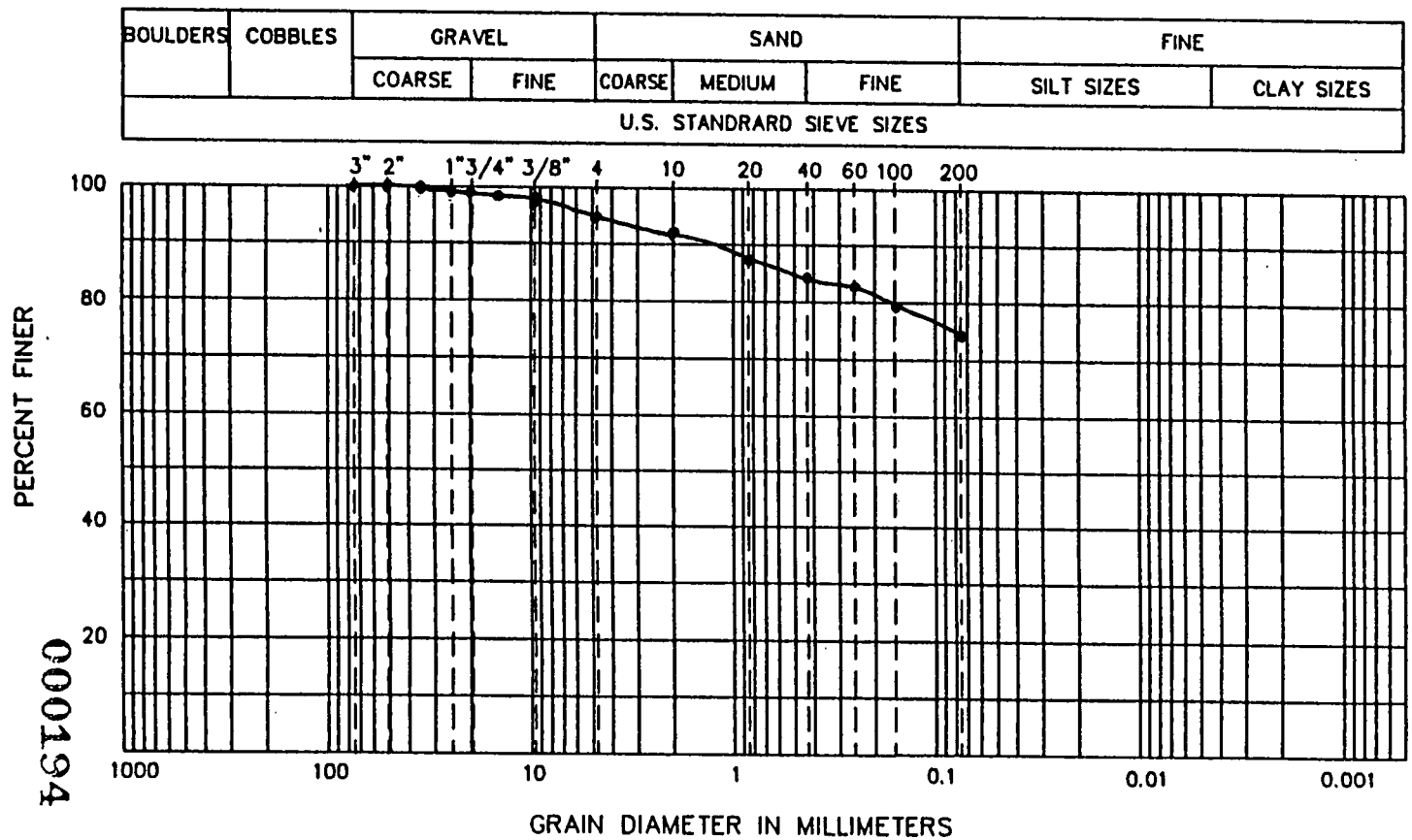
DESCRIPTION: Phase III

DATE: 16 day Oct month 2001 year

MATERIAL TYPE: Low perm. clay

SAMPLE NO.: LP-01-16 QA ID: KS

CURVE COEFFICIENTS: (C_u) ..... (C_c) .....



ATTERBERG LIMITS

(LL) 32

(PL) 16

(PI) 16

SIEVE RESULTS

SIEVE SIZE	% FINER
3-in.	100
2-in.	100
1 1/2-in.	100
1-in.	99.5
3/4-in.	99.4
1/2-in.	98.8
3/8-in.	98.5
NO. 4	96.0
NO. 10	91.8
NO. 20	88.0
NO. 40	85.1
NO. 60	82.6
NO. 100	79.3
NO. 200	75.1

HYDROMETER RESULTS

PARTICLE DIA.	% FINER
0.050	73
0.020	60
0.005	39
0.002	29

SOIL CLASSIFICATION (ASTM D 2487): Lean Clay with Sand (CL)

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SHEET NO. 2 OF 2

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GEOSYNTEC CONSULTANTS

FLUOR FERNALD

PARTICLE SIZE ANALYSIS—SIEVE METHOD (ASTM D 422)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO — PROJECT NO.: 6Q134 TASK NO.: 04.1

DESCRIPTION: PHASE III — DATE: 18 day SEPT month 2001 year

MATERIAL TYPE: LOW PERM CLAY — SAMPLE NO.: LP-01-17

SOIL SAMPLE SIZE {+3/8" = 782.7g} {-3/8" = 602.7g (AIT) + 800.7 (SIEVE) = 1403.4g} TOTAL SAMPLE = 36,614.3g -3/8" (BUCKETS) = 75.90 lbs = 34,428.2g

APPROXIMATE MINIMUM WT. OF SAMPLE (PASSING NO. 10 SIEVE) (grams)	SAND	FINE GRAIN
	115	65

	+3/8 BEFORE WASH	-3/8 BEFORE WASH	+3/8 AFTER WASH	-3/8 AFTER WASH
TARE NO.	L-1	L-2	L-1	L-2
WT. OF DRY SAMPLE PLUS TARE (grams)	975.4	992.9	869.2	358.5
WT. OF TARE (grams)	192.7	192.2	192.7	192.2
WT. OF DRY SAMPLE (grams)	782.7	800.7	676.5	166.3

SIEVE ANALYSIS — QA ID: TBC

SIEVE NO.	DIAMETER (mm)	WT. RETAINED (grams)	% RETAINED	% FINER		PROJECT SPECIFICATIONS
3 in	76.2	0	0	100		
2 in	50.8	0	0	100		
1 1/2in	38.1	0	0	100		
1 in	25.4	199.7	0.5	99.5		
3/4 in	19.1	242.8	0.7	99.3		
1/2 in	12.7	475.6	1.3	98.7		
3/8 in	9.53	628.5	1.7	98.3		
No. 4	4.75	9.3	1.2	98.8	97.2	
No. 10	2.00	33.6	4.2	95.8	94.2	
No. 20	0.850	62.0	7.7	92.3	90.7	
No. 40	0.425	86.3	10.8	89.2	87.7	
No. 60	0.250	106.6	13.3	86.7	85.2	
No. 100	0.125	132.2	16.5	83.5	82.1	
No. 200	0.075	164.7	20.6	79.4	78.1	
PAN	—	166.3	—	—		

COMMENTS:

000195

%FINER = 100 − Σ% RETAINED

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FLUOR DANIEL FERNALD

PARTICLE SIZE DISTRIBUTION AND SOIL CLASSIFICATION TEST RESULTS

(ASTM C 136/D 422) (ASTM D 2487)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO

DESCRIPTION: Phase III

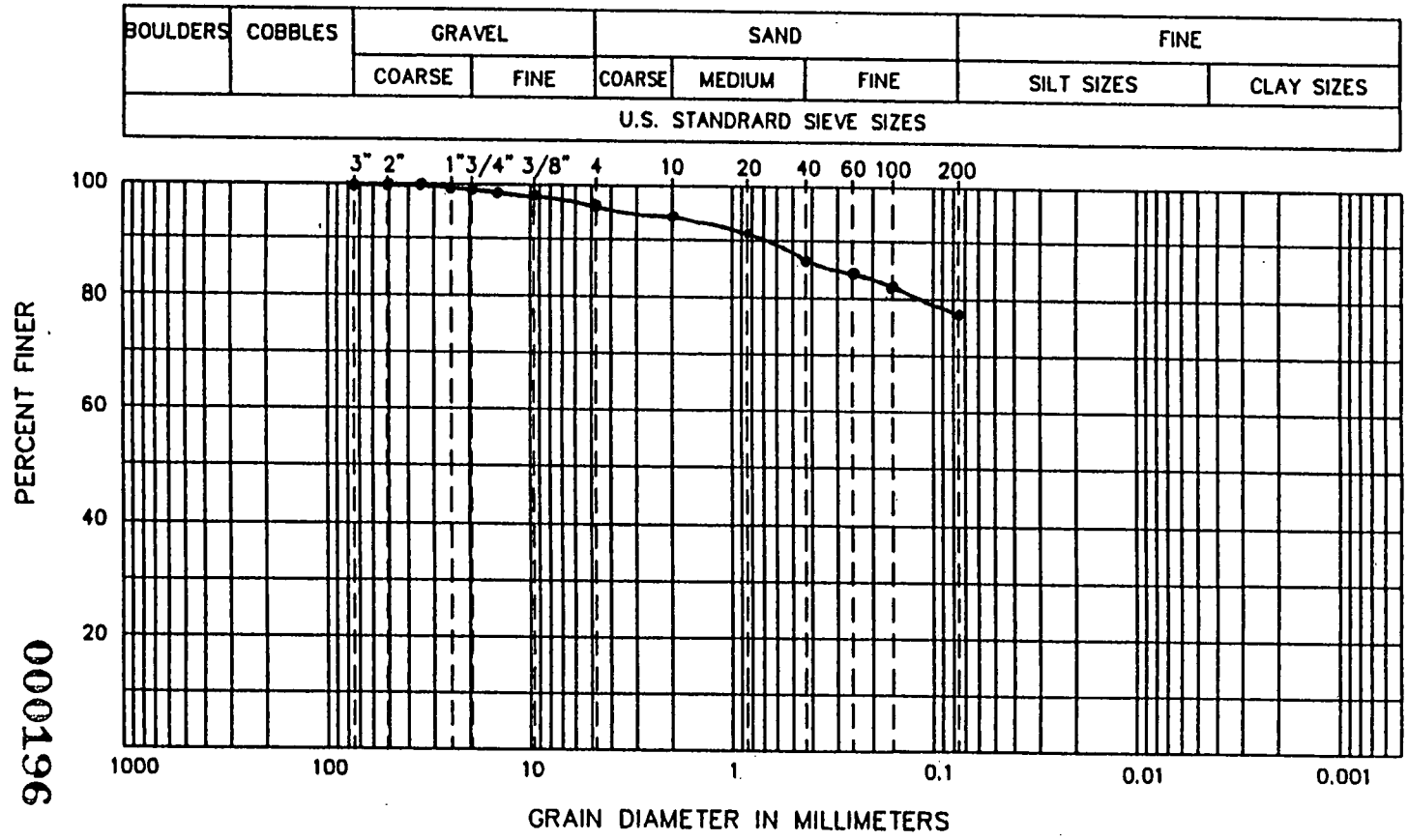
MATERIAL TYPE: Low Perm. Clay

PROJECT NO.: 6Q1341 TASK NO.: 04.1

DATE: 16 day Oct month 2000 year

SAMPLE NO.: LP-01-17 QA ID: KS

CURVE COEFFICIENTS: (C_u) ..... (C_c) .....



ATTERBERG LIMITS

(LL) 33

(PL) 17

(PI) 16

SIEVE RESULTS

SIEVE SIZE	% FINER
3-in.	100
2-in.	100
1 1/2-in.	100
1-in.	99.5
3/4-in.	99.3
1/2-in.	98.7
3/8-in.	98.3
NO. 4	97.2
NO. 10	94.2
NO. 20	90.7
NO. 40	87.7
NO. 60	85.2
NO. 100	82.1
NO. 200	78.1

HYDROMETER RESULTS

PARTICLE DIA.	% FINER
0.050	78
0.020	65
0.005	40
0.002	31

SOIL CLASSIFICATION (ASTM D 2487): Lean Clay with Sand (CL)

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SHEET NO. 2 OF 2

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GEOSYNTEC CONSULTANTS

FLUOR FERNALD

PARTICLE SIZE ANALYSIS–SIEVE METHOD (ASTM D 422)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO — PROJECT NO.: GQ1341 TASK NO.: 04.1

DESCRIPTION: PHASE III — DATE: 20 day SEPT month 2001 year

MATERIAL TYPE: Low Perm CLAY — SAMPLE NO.: LP-01-19

SOIL SAMPLE SIZE: +3/8 = 412.7g; -3/8 = 45.66lbs = 20,711.4g; MOISTURE SAMPLE = 199.0g; TOTAL SAMPLE = 21,323.1g

APPROXIMATE MINIMUM WT. OF SAMPLE (PASSING NO. 10 SIEVE) (grams)	SAND	FINE GRAIN
	115	65

		+3/8 BEFORE WASH	-3/8 BEFORE WASH	+3/8 AFTER WASH	-3/8 AFTER WASH
TARE NO.		LL-4	L-4	LL-4	L-4
WT. OF DRY SAMPLE PLUS TARE	(grams)	519.8	646.4	440.9	247.86
WT. OF TARE	(grams)	107.1	146.4	107.1	146.4
WT. OF DRY SAMPLE	(grams)	412.7	500.0	333.8	101.46

SIEVE ANALYSIS — QA ID: DLF

SIEVE NO.	DIAMETER (mm)	WT. RETAINED (grams)	% RETAINED	% FINER		PROJECT SPECIFICATIONS
3 in	76.2	Ø	Ø	100		
2 in	50.8	Ø	Ø	100		
1 1/2in	38.1	Ø	Ø	100		
1 in	25.4	27.42	0.13	99.9		
3/4 in	19.1	34.85	0.16	99.8		
1/2 in	12.7	180.78	0.85	99.2		
3/8 in	9.53	333.6	1.56	98.7	98.4	
No. 4	4.75	9.20	1.84	98.2	96.9	96.6
No. 10	2.00	22.59	4.52	95.5	94.3	94.0
No. 20	0.850	35.56	7.11	92.9	91.7	91.4
No. 40	0.425	48.60	9.72	90.3	89.1	88.9
No. 60	0.250	60.78	12.16	87.8	86.7	86.5
No. 100	0.125	77.69	15.54	84.5	83.4	83.1
No. 200	0.075	100.13	20.03	80.0	79.0	78.7
PAN	—	101.60	—	—		

COMMENTS:

000197

%FINER = 100 − Σ% RETAINED

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GEOSYNTEC CONSULTANTS

FLUOR DANIEL FERNALD

PARTICLE SIZE DISTRIBUTION AND SOIL CLASSIFICATION TEST RESULTS

(ASTM C 136/D 422) (ASTM D 2487)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO

DESCRIPTION: Phase III

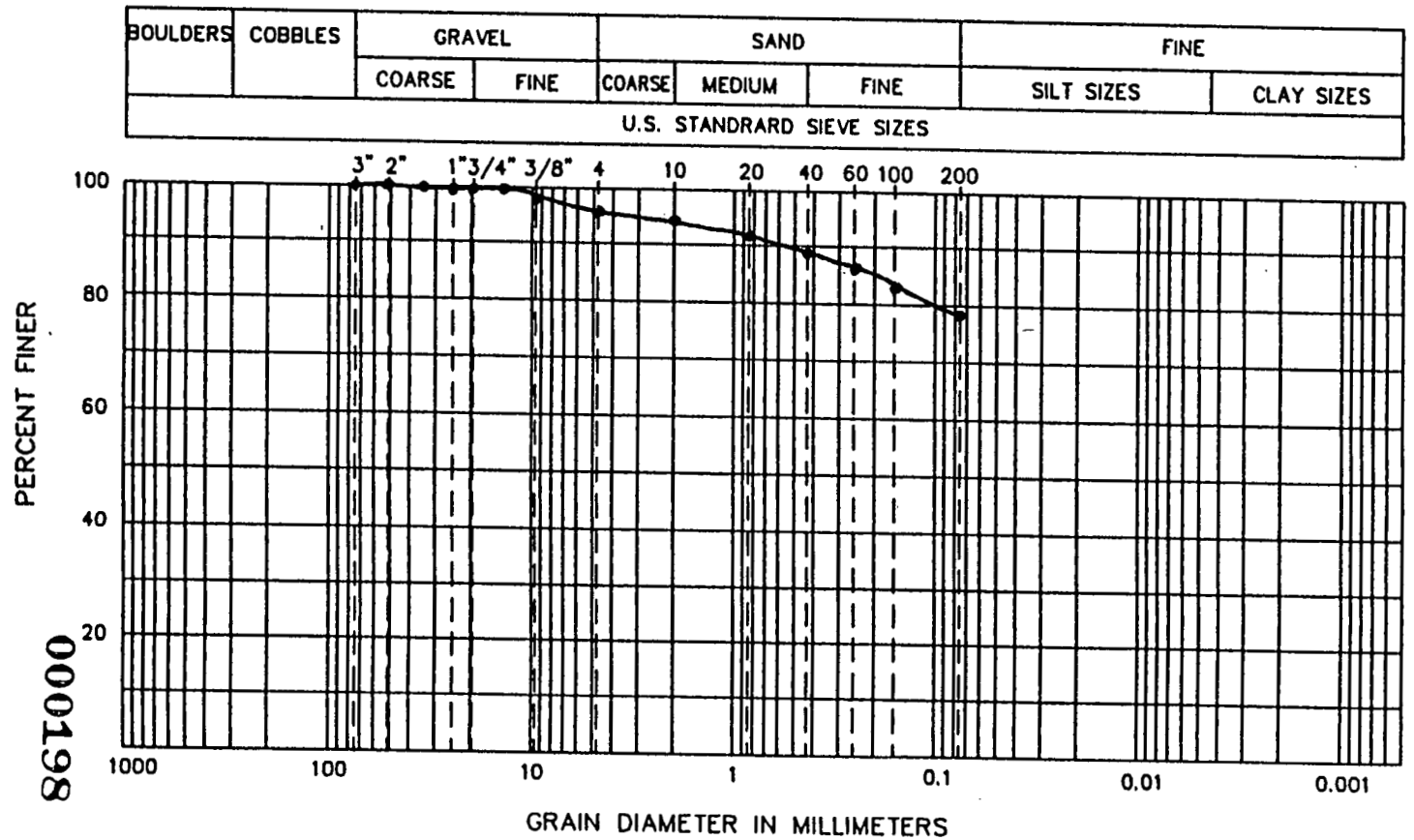
MATERIAL TYPE: Low Perm. Clay

PROJECT NO.: 6Q1341 TASK NO.: 04.1

DATE: 16 day Oct month 2001 year

SAMPLE NO.: LP-01-19 QA ID: KS

CURVE COEFFICIENTS: (C_u) ..... (C_c) .....



ATTERBERG LIMITS

(LL) 34

(PL) 17

(PI) 17

SIEVE RESULTS

SIEVE SIZE	% FINER
3-in.	100
2-in.	100
1 1/2-in.	100
1-in.	99.9
3/4-in.	99.8
1/2-in.	99.2
3/8-in.	98.4
NO. 4	96.6
NO. 10	94.0
NO. 20	91.4
NO. 40	88.9
NO. 60	86.5
NO. 100	83.1
NO. 200	78.7

HYDROMETER RESULTS

PARTICLE DIA.	% FINER
0.050	73
0.020	62
0.005	40
0.002	31

SOIL CLASSIFICATION (ASTM D 2487): Lean Clay with Sand (CL)

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GEOSYNTEC CONSULTANTS

FLUOR FERNALD

PARTICLE SIZE ANALYSIS—SIEVE METHOD (ASTM D 422)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO PROJECT NO.: CQ1341 TASK NO.: 04.1

DESCRIPTION: PHASE III DATE: 24 day Sept month 2001 year

MATERIAL TYPE: Low Perm CLAY SAMPLE NO.: KP-01-20

SOIL SAMPLE SIZE [+3/8 = 194.9g] [MOISTURE SAMPLE = 499.3g] [TOTAL = 17,423.0g]
[-3/8 = 36.88 lbs = 16,728.8g]

APPROXIMATE MINIMUM WT. OF SAMPLE (PASSING NO. 10 SIEVE) (grams)	SAND	FINE GRAIN
	115	65

		+3/8 BEFORE WASH	-3/8	+3/8 AFTER WASH	-3/8
TARE NO.		LL-4	N	LL-4	
WT. OF DRY SAMPLE PLUS TARE	(grams)	301.86	680.5	263.0	303.7
WT. OF TARE	(grams)	107.01	101.6	107.0	
WT. OF DRY SAMPLE	(grams)	194.85	578.9	156.0	

SIEVE ANALYSIS QA ID: [illegible]

SIEVE NO.	DIAMETER (mm)	WT. RETAINED (grams)	% RETAINED	% FINER		PROJECT SPECIFICATIONS
3 in	76.2	Ø	Ø	100		
2 in	50.8	Ø	Ø	100		
1 1/2in	38.1	Ø	Ø	100		
1 in	25.4	Ø	Ø	100		
3/4 in	19.1	Ø	Ø	100		
1/2 in	12.7	48.7	.3	99.7		
3/8 in	9.53	156.0	.9	99.1		
No. 4	4.75	20.5	3.5	96.5	95.6	
No. 10	2.00	68.5	11.8	88.2	87.4	
No. 20	0.850	97.0	16.8	83.2	82.5	
No. 40	0.425	120.5	20.8	79.2	78.5	
No. 60	0.250	140.6	24.3	75.7	75.0	
No. 100	0.125	167.9	29.0	71.0	70.4	
No. 200	0.075	201.4	34.8	65.9	64.6	
PAN	—	202.5	—	—		

COMMENTS:

000199

%FINER = 100 − Σ% RETAINED

GEOSYNTEC CONSULTANTS

FLUOR DANIEL FERNALD

PARTICLE SIZE DISTRIBUTION AND SOIL CLASSIFICATION TEST RESULTS

(ASTM C 136/D 422) (ASTM D 2487)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO

DESCRIPTION: Phase III

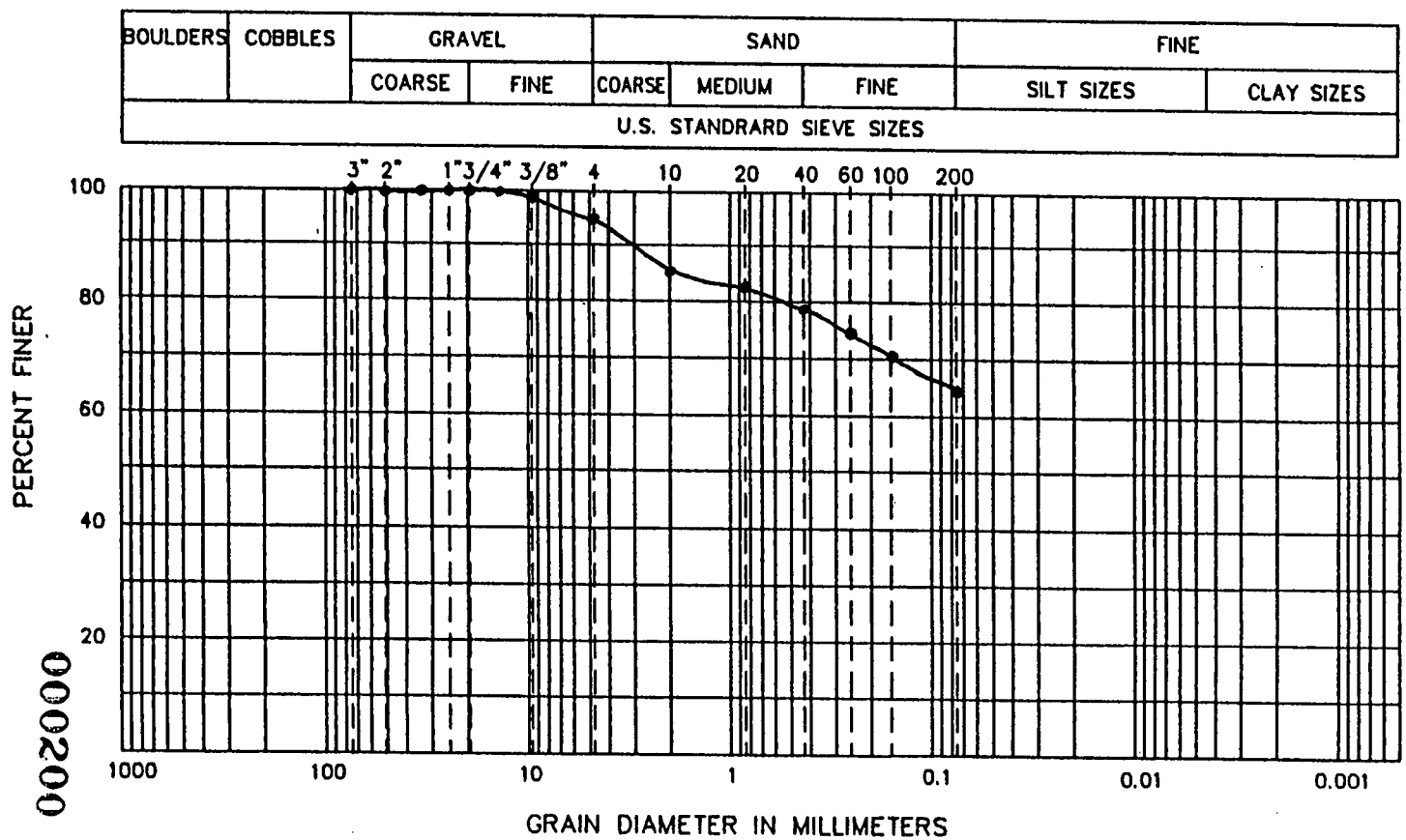
MATERIAL TYPE: Low Perm. Clay

PROJECT NO.: 6Q1341 TASK NO.: 04.1

DATE: 16 day Oct month 2001 year

SAMPLE NO.: LP-01-20 QA ID: KS

CURVE COEFFICIENTS: (C_u) ..... (C_c) .....



ATTERBERG LIMITS

(LL) 36

(PL) 17

(PI) 19

SIEVE RESULTS

SIEVE SIZE	% FINER
3-in.	100
2-in.	100
1 1/2-in.	100
1-in.	100
3/4-in.	100
1/2-in.	99.7
3/8-in.	99.1
NO. 4	95.6
NO. 10	87.4
NO. 20	82.5
NO. 40	78.5
NO. 60	75.0
NO. 100	70.4
NO. 200	64.6

HYDROMETER RESULTS

PARTICLE DIA.	% FINER
0.050	72
0.020	54
0.005	38
0.002	30

SOIL CLASSIFICATION (ASTM D 2487): Lean Clay w/ Sand (CL)

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GEOSYNTEC CONSULTANTS

FLUOR FERNALD

PARTICLE SIZE ANALYSIS–SIEVE METHOD (ASTM D 422)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO PROJECT NO.: 6Q1341 TASK NO.: 04.1

DESCRIPTION: Phase III DATE: 28 day Sept month 2001 year

MATERIAL TYPE: Low Farm Clay SAMPLE NO.: LP-01-22

SOIL SAMPLE SIZE: +3/8" = 790.0g (MOISTURE = 328.5g) -3/8" = 75.62 lbs = 34,301.2g TOTAL = 35,419.7g

APPROXIMATE MINIMUM WT. OF SAMPLE (PASSING NO. 10 SIEVE) 3/8 Based on 606.9 (grams)	SAND	FINE GRAIN
	115	65

	+3/8 BEFORE WASH	-3/8	+3/8 AFTER WASH	-3/8
TARE NO.	K	K	K	
WT. OF DRY SAMPLE PLUS TARE (grams)	891.5	684.6	846.6	290.1
WT. OF TARE (grams)	101.5	101.5	101.5	
WT. OF DRY SAMPLE (grams)	790.0	583.1	745.1	

SIEVE ANALYSIS QA ID: CA

SIEVE NO.	DIAMETER (mm)	WT. RETAINED (grams)	% RETAINED	% FINER		PROJECT SPECIFICATIONS
3 in	76.2	Ø	Ø	100		
2 in	50.8	Ø	Ø	100		
1 1/2in	38.1	86.1	0.2	99.8		
1 in	25.4	135.0	0.4	99.6		
3/4 in	19.1	239.1	0.7	99.3		
1/2 in	12.7	513.1	1.4	98.6		
3/8 in	9.53	745.1	2.1	97.9		
No. 4	4.75	24.0	4.1	95.9	93.9	
No. 10	2.00	44.7	7.7	92.3	90.4	
No. 20	0.850	65.2	11.2	88.8	86.9	
No. 40	0.425	92.3	15.8	84.2	82.4	
No. 60	0.250	117.8	20.2	79.8	78.1	
No. 100	0.125	148.6	25.5	74.5	72.9	
No. 200	0.075	180.9	31.0	69.0	67.5	
PAN	—	188.8	—	—		

COMMENTS: 000201

%FINER = 100 − Σ% RETAINED

GEOSYNTEC CONSULTANTS

FLUOR DANIEL FERNALD

PARTICLE SIZE DISTRIBUTION AND SOIL CLASSIFICATION TEST RESULTS

(ASTM C 136/D 422) (ASTM D 2487)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO

DESCRIPTION: Phase III

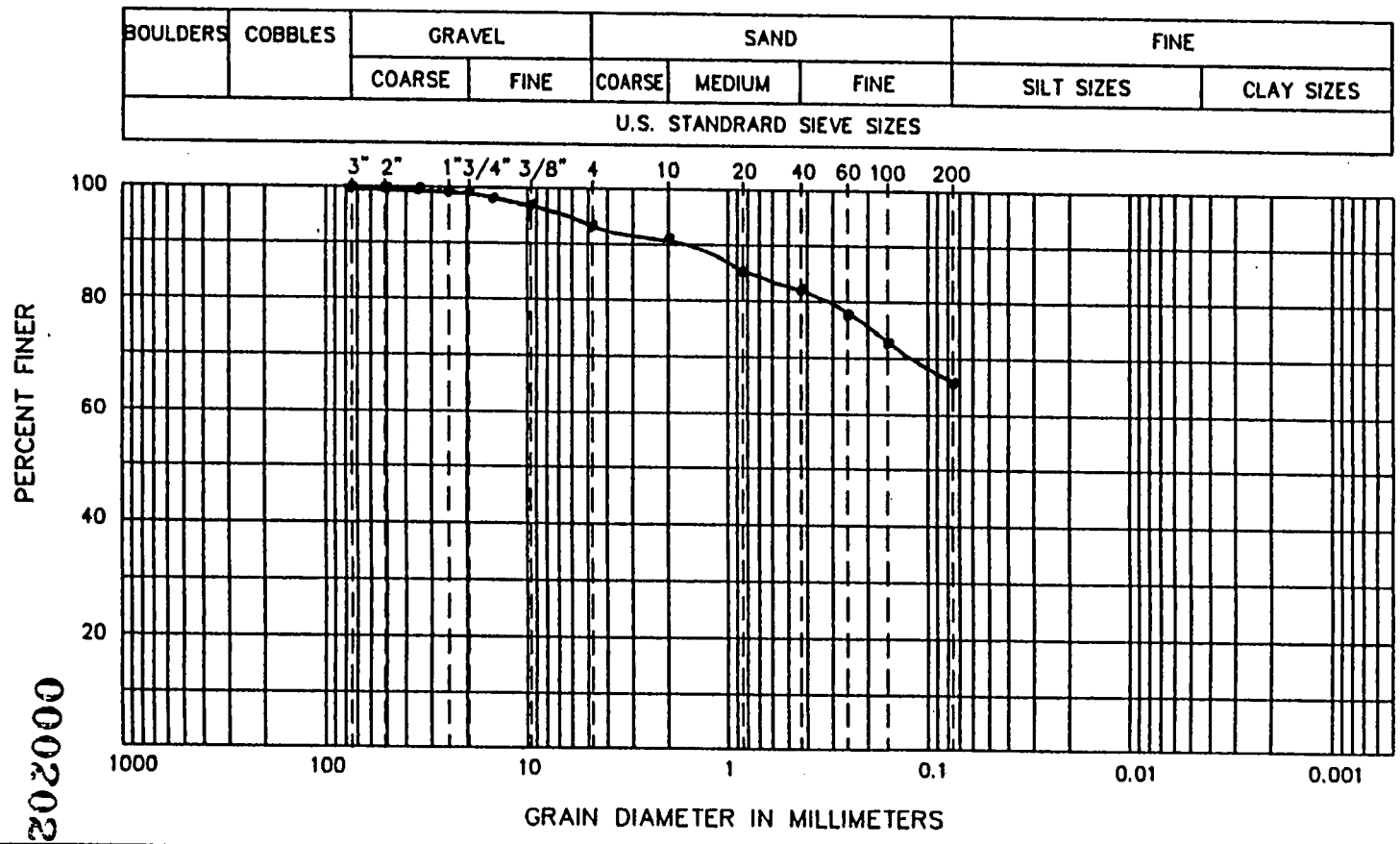
MATERIAL TYPE: Low Perm. Clay

PROJECT NO.: 601341 TASK NO.: 04.1

DATE: 16 day Oct month 2001 year

SAMPLE NO.: LP-01-22 QA ID: KS

CURVE COEFFICIENTS: (C_u) ..... (C_c) .....



ATTERBERG LIMITS

(LL) 36

(PL) 17

(PI) 19

SIEVE RESULTS

SIEVE SIZE	% FINER
3-in.	100
2-in.	100
1 1/2-in.	99.8
1-in.	99.6
3/4-in.	99.3
1/2-in.	98.6
3/8-in.	97.9
NO. 4	93.9
NO. 10	90.4
NO. 20	86.9
NO. 40	82.4
NO. 60	78.1
NO. 100	72.9
NO. 200	67.5

HYDROMETER RESULTS

PARTICLE DIA.	% FINER
0.050	71
0.020	59
0.005	38
0.002	30

SOIL CLASSIFICATION (ASTM D 2487): Sandy Lean Clay (CL)

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GEOSYNTEC CONSULTANTS

FLUOR FERNALD

PARTICLE SIZE ANALYSIS–SIEVE METHOD (ASTM D 422)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO — PROJECT NO.: 6Q1341 TASK NO.: 04.1

DESCRIPTION: PHASE III — DATE: 01 day OCT month 2001 year

MATERIAL TYPE: LOW PERM CLAY — SAMPLE NO.: LP-01-23

SOIL SAMPLE SIZE: +3/8 = 967.0g; -3/8 = 48.0 lbs = 21,795.5g; MOISTURE SAMPLE = 434.0g; TOTAL = 23,196.5g

APPROXIMATE MINIMUM WT. OF SAMPLE (PASSING NO. 10 SIEVE) (grams)	SAND	FINE GRAIN
	115	65

	BEFORE WASH +3/8	BEFORE WASH -3/8	AFTER WASH +3/8	AFTER WASH -3/8
TARE NO.	K	N	K	
WT. OF DRY SAMPLE PLUS TARE (grams)	1068.6	709.2	1005.3	
WT. OF TARE (grams)	101.6	101.7	101.6	
WT. OF DRY SAMPLE (grams)	967.0	607.5	903.7	

SIEVE ANALYSIS — QA ID: [illegible]

SIEVE NO.	DIAMETER (mm)	WT. RETAINED (grams)	% RETAINED	% FINER		PROJECT SPECIFICATIONS
3 in	76.2	0		100		
2 in	50.8	0		100		
1 1/2in	38.1	100.96	0.4	99.6		
1 in	25.4	303.70	1.3	98.7		
3/4 in	19.1	524.3	2.3	97.7		
1/2 in	12.7	741.7	3.2	96.8		
3/8 in	9.53	903.9	3.9	96.1		
No. 4	4.75	4.0	0.7	99.3	95.5	
No. 10	2.00	15.1	0.25	97.5	93.7	
No. 20	0.850	33.5	5.5	94.5	90.8	
No. 40	0.425	51.1	8.4	91.6	88.0	
No. 60	0.250	66.2	10.9	89.1	85.6	
No. 100	0.125	86.9	14.3	85.7	82.4	
No. 200	0.075	111.4	18.3	81.7	78.5	
PAN	—	113.7	—	—		

COMMENTS:

000203

%FINER = 100 − Σ% RETAINED

GEOSYNTEC CONSULTANTS

FLUOR DANIEL FERNALD

PARTICLE SIZE DISTRIBUTION AND SOIL CLASSIFICATION TEST RESULTS

(ASTM C 136/D 422) (ASTM D 2487)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO

DESCRIPTION: Phase III

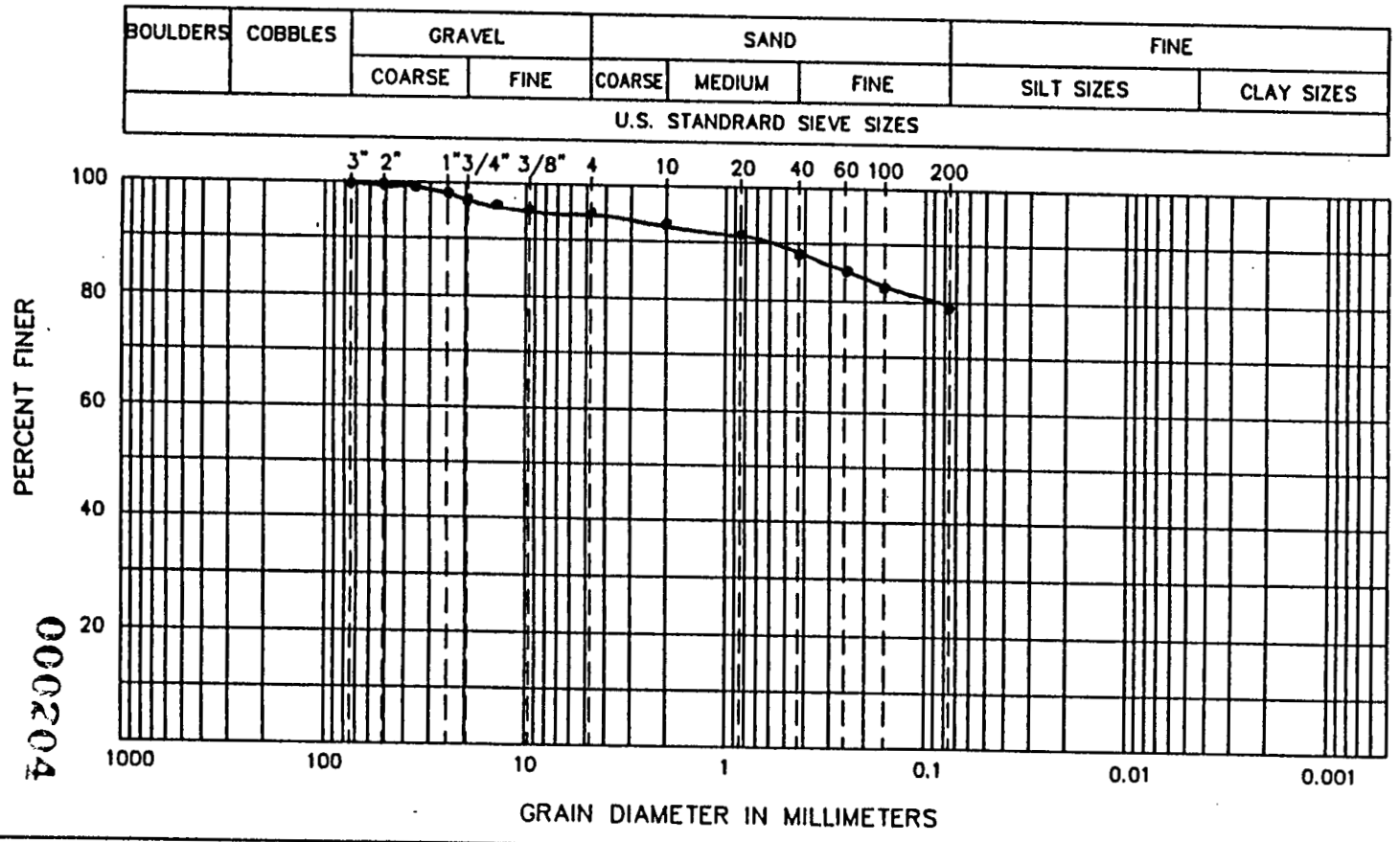
MATERIAL TYPE: low Perm. Clay

PROJECT NO.: 6Q1341 TASK NO.: 04.1

DATE: 16 day Oct month 2001 year

SAMPLE NO.: LP-01-23 QA ID: KS

CURVE COEFFICIENTS: (C_u) ..... (C_c) .....



ATTERBERG LIMITS

(LL) 38

(PL) 17

(PI) 21

SIEVE RESULTS

SIEVE SIZE	% FINER
3-in.	100
2-in.	100
1 1/2-in.	99.6
1-in.	98.7
3/4-in.	97.7
1/2-in.	96.8
3/8-in.	96.1
NO. 4	95.5
NO. 10	93.7
NO. 20	90.8
NO. 40	88.0
NO. 60	85.6
NO. 100	82.4
NO. 200	78.5

HYDROMETER RESULTS

PARTICLE DIA.	% FINER
0.050	75
0.020	61
0.005	40
0.002	32

SOIL CLASSIFICATION (ASTM D 2487): Lean Clay with Sand (CL)

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SHEET NO. 2 OF 2

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GEOSYNTEC CONSULTANTS

FLUOR FERNALD

PARTICLE SIZE ANALYSIS–SIEVE METHOD (ASTM D 422)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO PROJECT NO. GQ1341 TASK NO.: 69.1

DESCRIPTION: Phase III DATE: 28 day Sept month 2001 year

MATERIAL TYPE: Low Perm Clay stockpile 01-4 SAMPLE NO.: LP-01-24

SOIL SAMPLE SIZE: +3/8" = 1,191.0g | -3/8 SIEVE = 1,331.8g | MOISTURE = 251.6g | TOTAL = 39,599.4g
-3/8" = 78.92 lbs = 35,798.1g BUCKETS | ATTERBERG = 1,026.9g

APPROXIMATE MINIMUM WT. OF SAMPLE (PASSING NO. 10 SIEVE) (grams)	SAND	FINE GRAIN
	115	65

	+3/8 BEFORE WASH	-3/8	+3/8 AFTER WASH	-3/8
TARE NO.	N	L-7	N	L-7
WT. OF DRY SAMPLE PLUS TARE (grams)	1292.7	1525.8	1219.8	473.1
WT. OF TARE (grams)	101.7	194.0	101.7	194.0
WT. OF DRY SAMPLE (grams)	1191.0	1331.8	1118.1	279.1

SIEVE ANALYSIS QA ID: A

SIEVE NO.	DIAMETER (mm)	WT. RETAINED (grams)	% RETAINED	% FINER		PROJECT SPECIFICATIONS
3 in	76.2	Ø	Ø	100		
2 in	50.8	Ø	Ø	100		
1 1/2in	38.1	Ø	Ø	100		
1 in	25.4	332.0	0.8	99.2		
3/4 in	19.1	633.5	1.6	98.4		
1/2 in	12.7	927.5	2.3	97.7		
3/8 in	9.53	1118.0	2.8	97.2		
No. 4	4.75	34.8	2.6	97.4	94.6	
No. 10	2.00	79.0	5.9	94.1	91.4	
No. 20	0.850	116.8	8.8	91.2	88.7	
No. 40	0.425	160.2	12.0	88.0	85.5	
No. 60	0.250	180.9	13.6	86.4	84.0	
No. 100	0.125	223.4	16.8	83.2	80.9	
No. 200	0.075	276.0	20.7	79.3	77.0	
PAN	—	279.1	—	—		

COMMENTS:

000205

%FINER = 100 − Σ% RETAINED

A

GEOSYNTEC CONSULTANTS

FLUOR DANIEL FERNALD

PARTICLE SIZE DISTRIBUTION AND SOIL CLASSIFICATION TEST RESULTS

(ASTM C 136/D 422) (ASTM D 2487)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO

PROJECT NO.: 6Q1341 TASK NO.: 04.1

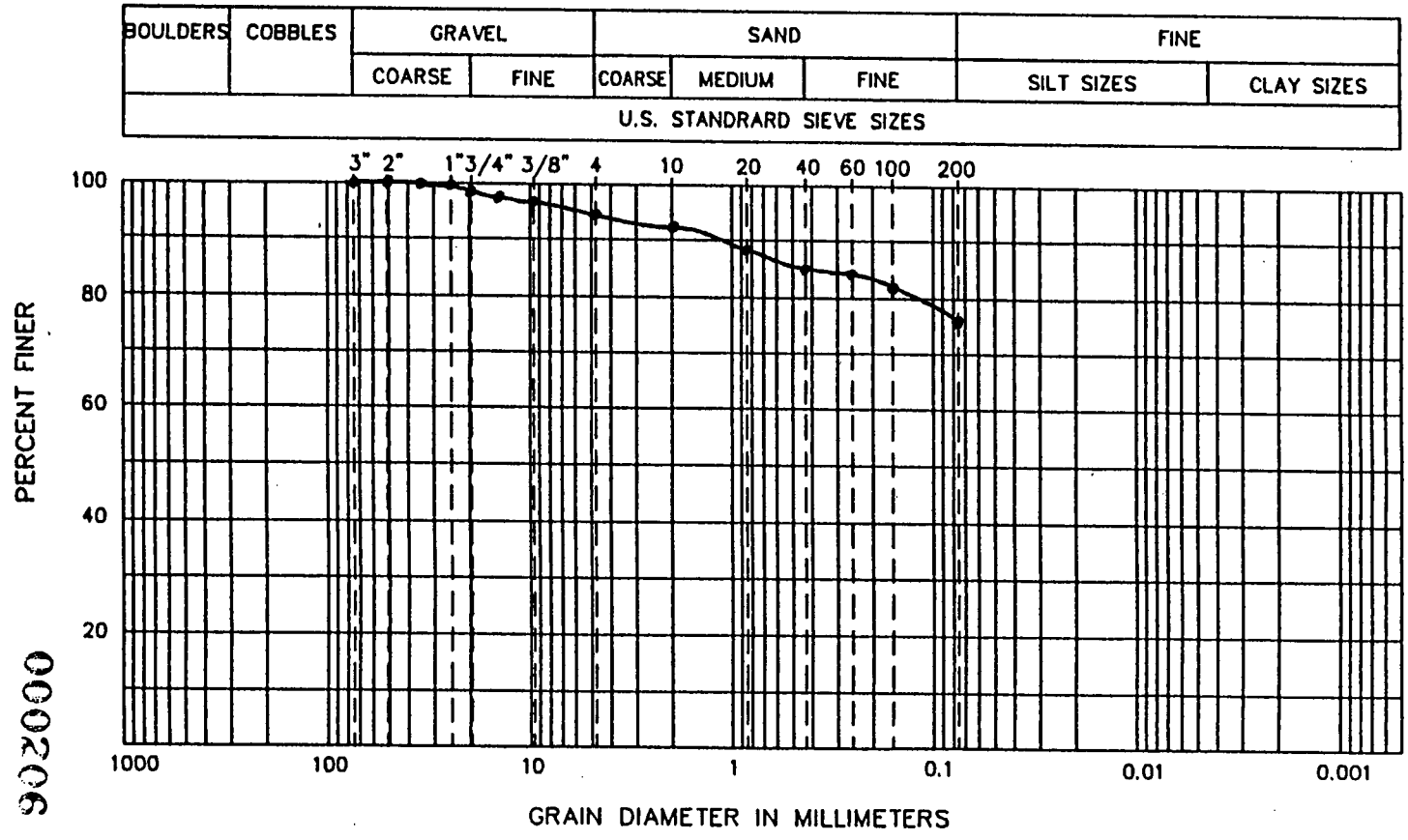
DESCRIPTION: Phase III

DATE: 16 day Oct month 2001 year

MATERIAL TYPE: Low perm. clay

SAMPLE NO.: LP-01-24 QA ID: KS

CURVE COEFFICIENTS: (C_u) ..... (C_c) .....



ATTERBERG LIMITS

(LL) 34

(PL) 16

(PI) 18

SIEVE RESULTS

SIEVE SIZE	% FINER
3-in.	100
2-in.	100
1 1/2-in.	100
1-in.	99.2
3/4-in.	98.4
1/2-in.	97.7
3/8-in.	97.2
NO. 4	94.6
NO. 10	91.4
NO. 20	88.7
NO. 40	85.5
NO. 60	84.0
NO. 100	80.9
NO. 200	77.0

HYDROMETER RESULTS

PARTICLE DIA.	% FINER
0.050	75
0.020	61
0.005	39
0.002	31

SOIL CLASSIFICATION (ASTM D 2487): Lean Clay with Sand (CL)

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GEOSYNTEC CONSULTANTS

FLUOR FERNALD

PARTICLE SIZE ANALYSIS—SIEVE METHOD (ASTM D 422)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO PROJECT NO.: 6Q1341 TASK NO.: 04.1

DESCRIPTION: Phase III DATE: 01 day Oct month 2001 year

MATERIAL TYPE: Low Perm Clay SAMPLE NO.: LP-01-25

SOIL SAMPLE SIZE -3/8 Sieve - 1186.2 +3/8 - 2194.5 -3/8 - 42042.4 moisture sample - 416.4 Atterberg - 887.2 Total - 46726.7

APPROXIMATE MINIMUM WT. OF SAMPLE (PASSING NO. 10 SIEVE) (grams)	SAND	FINE GRAIN
	115	65

	+3/8 BEFORE WASH	-3/8 BEFORE WASH	+3/8 AFTER WASH	-3/8 AFTER WASH
TARE NO.	L-2	L-1	L-2	
WT. OF DRY SAMPLE PLUS TARE (grams)	2386.3	1378.9	2242.5	
WT. OF TARE (grams)	191.8	192.7	191.8	
WT. OF DRY SAMPLE (grams)	2194.5	1186.2	2050.7	

SIEVE ANALYSIS QA ID: KS

SIEVE NO.	DIAMETER (mm)	WT. RETAINED (grams)	% RETAINED	% FINER		PROJECT SPECIFICATIONS
3 in	76.2	—	0	100		
2 in	50.8	—	0	100		
1 1/2in	38.1	326.5	0.7	99.3		
1 in	25.4	901.7	1.9	98.1		
3/4 in	19.1	1230.4	2.6	97.4		
1/2 in	12.7	1788.5	3.8	96.2		
3/8 in	9.53	2050.7	4.4	95.6		
No. 4	4.75	22.0	1.9	98.1	93.8	
No. 10	2.00	55.2	4.7	95.3	91.2	
No. 20	0.850	90.2	7.6	92.4	88.3	
No. 40	0.425	123.0	10.4	89.6	85.7	
No. 60	0.250	152.2	12.8	87.2	83.3	
No. 100	0.125	189.8	16.0	84.0	80.3	
No. 200	0.075	238.0	20.0	80.0	76.4	
PAN	—	242.2	—	—		

COMMENTS:

000207

%FINER = 100 − Σ% RETAINED

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GEOSYNTEC CONSULTANTS

FLUOR DANIEL FERNALD

PARTICLE SIZE DISTRIBUTION AND SOIL CLASSIFICATION TEST RESULTS

(ASTM C 136/D 422) (ASTM D 2487)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO

PROJECT NO.: 60/341 TASK NO.: 04.1

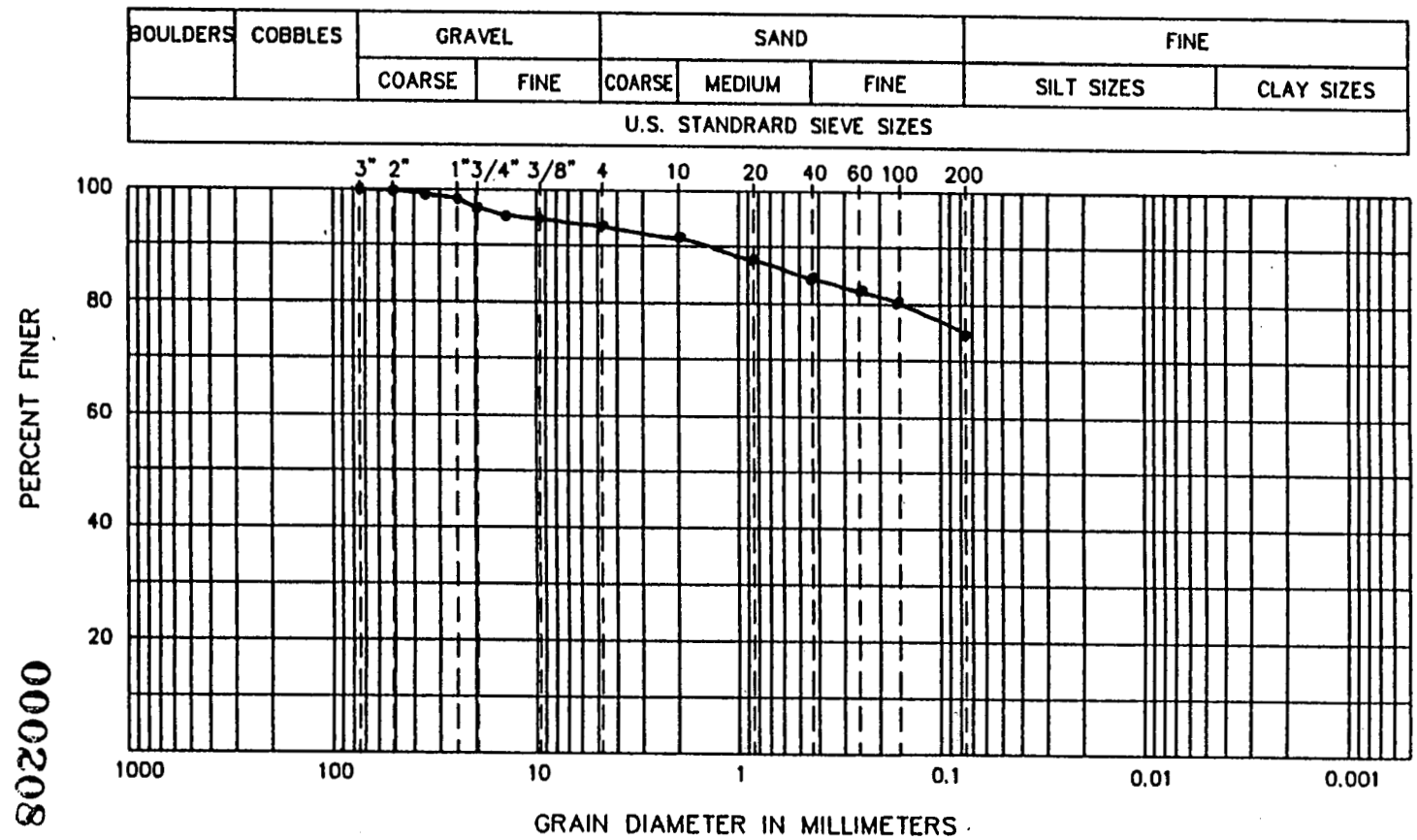
DESCRIPTION: Phase III

DATE: 16 day Oct month 2000 year

MATERIAL TYPE: Low perm. Clay

SAMPLE NO.: LP-01-25 QA ID: KS

CURVE COEFFICIENTS: (C_u) ..... (C_c) .....



ATTERBERG LIMITS

(LL) 34

(PL) 16

(PI) 18

SIEVE RESULTS

SIEVE SIZE	% FINER
3-in.	100
2-in.	100
1 1/2-in.	99.3
1-in.	98.1
3/4-in.	97.4
1/2-in.	96.2
3/8-in.	95.6
NO. 4	93.8
NO. 10	91.2
NO. 20	88.3
NO. 40	85.7
NO. 60	83.3
NO. 100	80.3
NO. 200	76.4

HYDROMETER RESULTS

PARTICLE DIA.	% FINER
0.050	73
0.020	60
0.005	40
0.002	31

SOIL CLASSIFICATION (ASTM D 2487): Lean Clay with Sand (CL)

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GEOSYNTEC CONSULTANTS

FLUOR FERNALD

PARTICLE SIZE ANALYSIS—SIEVE METHOD (ASTM D 422)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO — PROJECT NO.: GQ1341 TASK NO.: 041

DESCRIPTION: PHASE III — DATE: 01 day OCT month 2001 year

MATERIAL TYPE: LOW PERM. CLAY — SAMPLE NO.: LP-01-26

SOIL SAMPLE SIZE: +3/8" = 1862.7g; -3/8" = 51.23 lbs = 23,237.9g; MOISTURE SAMPLE = 406.5g; TOTAL = 24,907.1g

APPROXIMATE MINIMUM WT. OF SAMPLE (PASSING NO. 10 SIEVE) (grams)	SAND	FINE GRAIN
	115	65

	BEFORE WASH +3/8	BEFORE WASH -3/8	AFTER WASH +3/8	AFTER WASH -3/8
TARE NO.	L-4	L-3	L-4	L-3
WT. OF DRY SAMPLE PLUS TARE (grams)	1409.1	813.5	1328.5	338.46
WT. OF TARE (grams)	146.4	190.4	146.4	190.38
WT. OF DRY SAMPLE (grams)	1262.7	623.1	1182.1	148.08

SIEVE ANALYSIS — QA ID: DLE/TBW

SIEVE NO.	DIAMETER (mm)	WT. RETAINED (grams)	% RETAINED	% FINER		PROJECT SPECIFICATIONS
3 in	76.2	0	0	100		
2 in	50.8	0	0	100		
1 1/2in	38.1	0	0	100		
1 in	25.4	259.6	1.0	99.0		
3/4 in	19.1	548.7	2.2	97.8		
1/2 in	12.7	910.6	3.7	96.3		
3/8 in	9.53	1180.7	4.7	95.3		
No. 4	4.75	15.48	2.5	97.5	92.9	
No. 10	2.00	30.08	4.8	95.2	90.7	
No. 20	0.850	49.79	8.0	92.0	87.7	
No. 40	0.425	71.30	11.4	88.6	84.4	
No. 60	0.250	90.42	14.5	85.5	81.5	
No. 100	0.125	116.69	18.7	81.3	77.5	
No. 200	0.075	146.39	23.5	76.5	72.9	
PAN	—	148.04	—	—		

COMMENTS:

000209

%FINER = 100 − Σ% RETAINED

GEOSYNTEC CONSULTANTS

FLUOR DANIEL FERNALD

PARTICLE SIZE DISTRIBUTION AND SOIL CLASSIFICATION TEST RESULTS

(ASTM C 136/D 422) (ASTM D 2487)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO

PROJECT NO.: 6Q1341 TASK NO.: 04.1

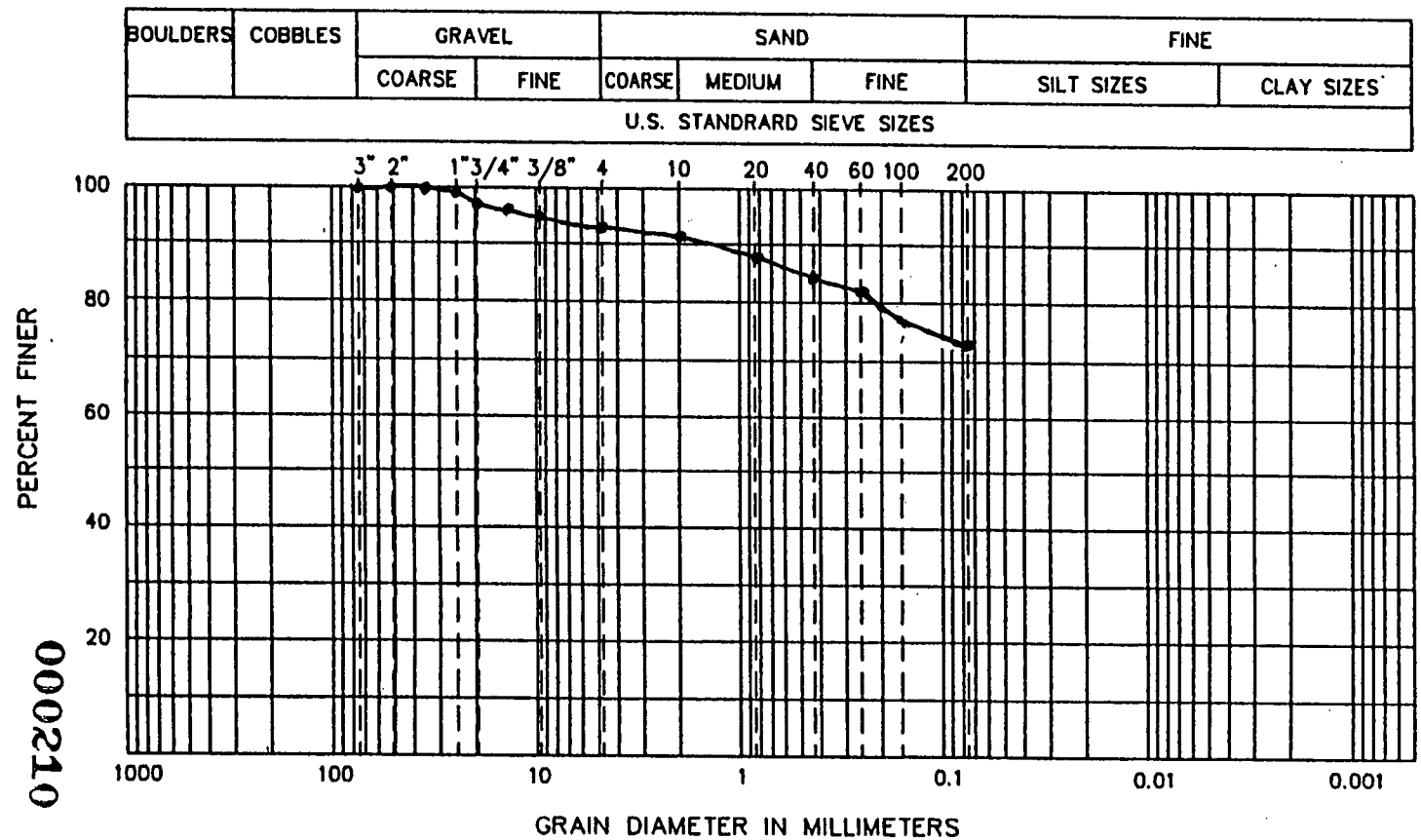
DESCRIPTION: Phase III

DATE: 16 day Oct month 2001 year

MATERIAL TYPE: Low perm. Clay

SAMPLE NO.: LP-01-26 QA ID: KS

CURVE COEFFICIENTS: (C_u) ..... (C_c) .....



ATTERBERG LIMITS

(LL) 35

(PL) 16

(PI) 19

SIEVE RESULTS

SIEVE SIZE	% FINER
3-in.	100
2-in.	100
1 1/2-in.	100
1-in.	99.0
3/4-in.	97.8
1/2-in.	96.3
3/8-in.	95.3
NO. 4	92.9
NO. 10	90.7
NO. 20	87.7
NO. 40	84.4
NO. 60	81.5
NO. 100	77.5
NO. 200	72.9

HYDROMETER RESULTS

PARTICLE DIA.	% FINER
0.050	72
0.020	~~76~~ 59
0.005	41
0.002	30

SOIL CLASSIFICATION (ASTM D 2487): Lean Clay with Sand (CL)

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GEOSYNTEC CONSULTANTS

FLUOR FERNALD

PARTICLE SIZE ANALYSIS–SIEVE METHOD (ASTM D 422)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO — PROJECT NO.: GQ134 TASK NO.: 04.1

DESCRIPTION: PHASE III — DATE: 01 day OCT month 2001 year

MATERIAL TYPE: LOW PERM CLAY — SAMPLE NO.: LP-01-27

SOIL SAMPLE SIZE: +3/8" = 1077.1 g; -3/8 = 81.3 lb = 36877.7 g; mixture 384.3 g; TOTAL = 38,339.1 g

APPROXIMATE MINIMUM WT. OF SAMPLE (PASSING NO. 10 SIEVE) (grams)	SAND	FINE GRAIN
	115	65

	BEFORE WASH +3/8	BEFORE WASH -3/8	AFTER WASH +3/8	AFTER WASH -3/8
TARE NO.	L-44	L-4	L-44	L-4
WT. OF DRY SAMPLE PLUS TARE (grams)	1268.9	721.3	1162.2	300.24
WT. OF TARE (grams)	191.8	146.4	191.8	146.40
WT. OF DRY SAMPLE (grams)	1077.1	574.9	970.4	153.84

SIEVE ANALYSIS — QA ID: DLE 7/04

SIEVE NO.	DIAMETER (mm)	WT. RETAINED (grams)	% RETAINED	% FINER		PROJECT SPECIFICATIONS
3 in	76.2	0	0	100		
2 in	50.8	0	0	100		
1 1/2in	38.1	0	0	100		
1 in	25.4	42.9	0.1	99.9		
3/4 in	19.1	211.4	0.6	99.4		
1/2 in	12.7	593.5	1.5	98.5		
3/8 in	9.53	970.0	2.5	97.5		
No. 4	4.75	139.9	2.4	97.6	95.1	
No. 10	2.00	39.62	6.9	93.1	90.8	
No. 20	0.850	63.94	11.1	88.9	86.7	
No. 40	0.425	84.62	14.7	85.3	83.1	
No. 60	0.250	100.94	17.6	82.4	80.4	
No. 100	0.125	122.99	21.4	78.6	76.6	
No. 200	0.075	152.40	26.5	73.5	71.7	
PAN	—	153.84	—	—		

COMMENTS:

000211

%FINER = 100 − Σ% RETAINED

GEO SYNTEC CONSULTANTS FILE NO. 2-14-PMS — CHECKED BY: — SHEET NO. 1 OF 2

GEOSYNTEC CONSULTANTS

FLUOR DANIEL FERNALD

PARTICLE SIZE DISTRIBUTION AND SOIL CLASSIFICATION TEST RESULTS

(ASTM C 136/D 422) (ASTM D 2487)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO

DESCRIPTION: Phase III

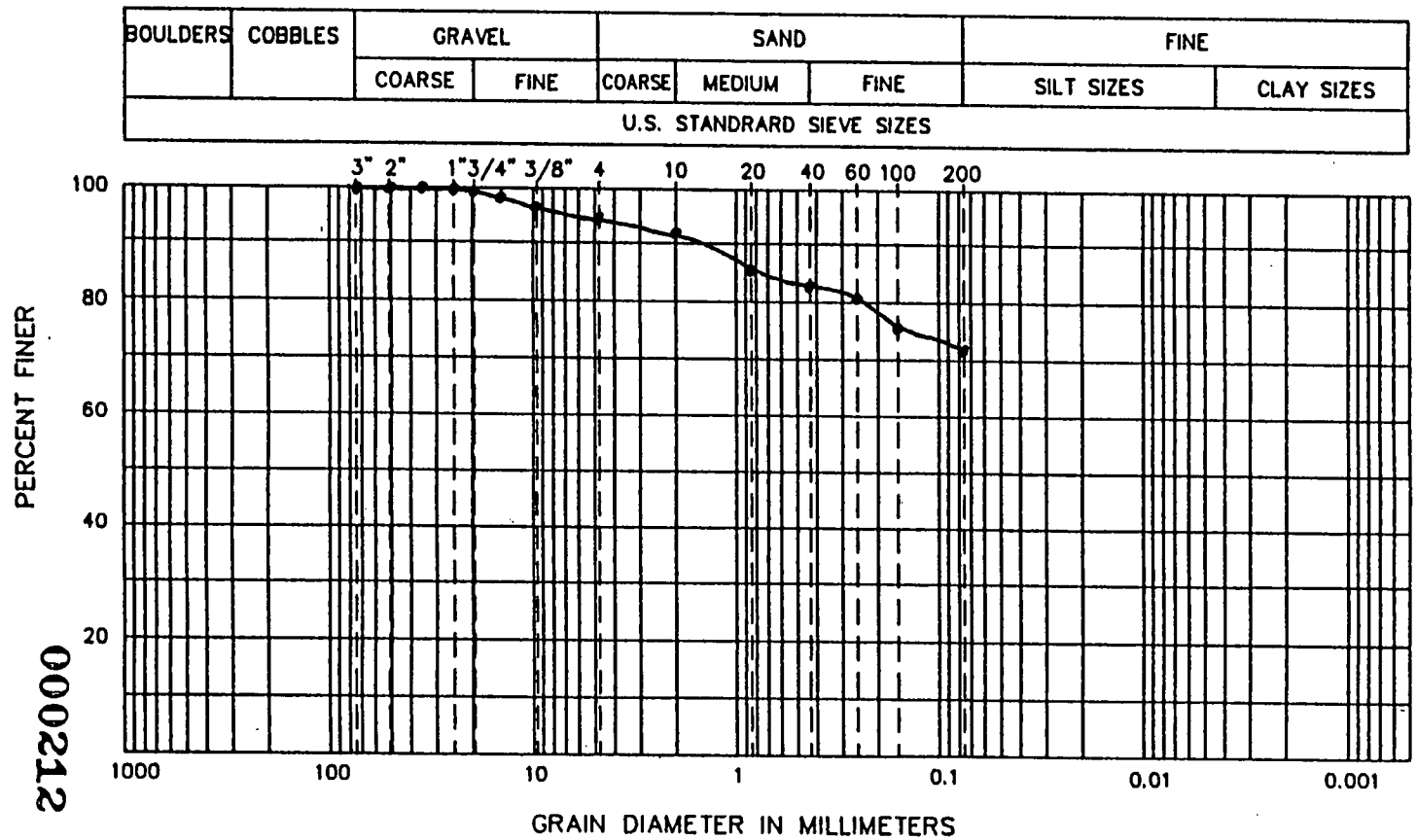
MATERIAL TYPE: Low perm. Clay

PROJECT NO.: GQ1341 TASK NO.: 04.1

DATE: 16 day Oct month 2001 year

SAMPLE NO.: LP-01-27 QA ID: KS

CURVE COEFFICIENTS: (C_u) ..... (C_c) .....



ATTERBERG LIMITS

(LL) 28

(PL) 15

(PI) 13

SIEVE RESULTS

SIEVE SIZE	% FINER
3-in.	100
2-in.	100
1 1/2-in.	100
1-in.	99.9
3/4-in.	99.4
1/2-in.	98.5
3/8-in.	97.5
NO. 4	95.1
NO. 10	90.8
NO. 20	86.7
NO. 40	83.1
NO. 60	80.4
NO. 100	76.6
NO. 200	71.7

HYDROMETER RESULTS

PARTICLE DIA.	% FINER
0.060	~~75~~ 76
0.020	58
0.005	35
0.002	25

SOIL CLASSIFICATION (ASTM D 2487): Lean Clay with Sand (CL)

000212

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GEOSYNTEC CONSULTANTS

FLUOR FERNALD

PARTICLE SIZE ANALYSIS–SIEVE METHOD (ASTM D 422)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO PROJECT NO. 6Q1341 TASK NO.: 04.1

DESCRIPTION: Phase III DATE: ____ day Oct month 2007 year

MATERIAL TYPE: Low Perm Clay SAMPLE NO.: LP-01-28

SOIL SAMPLE SIZE +3/8 stone = 788.0g MOISTURE = 526.4g
-3/8 = 56.76lbs = 25,610.3g
TOTAL = 26,924.7g

APPROXIMATE MINIMUM WT. OF SAMPLE (PASSING NO. 10 SIEVE) (grams)	SAND	FINE GRAIN
	115	65

		+3/8 BEFORE WASH	-3/8 BEFORE WASH	+3/8 AFTER WASH	-3/8 AFTER WASH
TARE NO.		L-1	L-1	~~931.0~~ L-1	K
WT. OF DRY SAMPLE PLUS TARE	(grams)	980.5	891.8	931.0	~~298.15~~ 293.30
WT. OF TARE	(grams)	192.5	192.5	192.5	101.5
WT. OF DRY SAMPLE	(grams)	788.0	699.3	738.5	173.8

SIEVE ANALYSIS QA ID: TBW/DLE

SIEVE NO.	DIAMETER (mm)	WT. RETAINED (grams)	% RETAINED	% FINER		PROJECT SPECIFICATIONS
3 in	76.2	Ø	Ø	100		
2 in	50.8	Ø	Ø	100		
1 1/2in	38.1	Ø	Ø	100		
1 in	25.4	155.6	0.6	99.4		
3/4 in	19.1	333.6	1.2	98.8		
1/2 in	12.7	576.0	2.1	97.9		
3/8 in	9.53	738.4	2.7	97.3		
No. 4	4.75	10.25	1.5	98.5	95.9	
No. 10	2.00	28.55	4.1	95.9	93.3	
No. 20	0.850	52.73	7.5	92.5	90.0	
No. 40	0.425	77.06	11.0	89.0	86.6	
No. 60	0.250	98.01	14.0	86.0	83.7	
No. 100	0.125	127.96	18.3	81.7	79.5	
No. 200	0.075	171.00	24.5	75.5	73.5	
PAN	—	173.79	—	—	—	

COMMENTS:

000213

%FINER = 100 − Σ% RETAINED

GEO SYNTEC CONSULTANTS FILE NO. 2-14-PMS CHECKED BY: [signature] SHEET NO. 1 OF 2

GEOSYNTEC CONSULTANTS

FLUOR DANIEL FERNALD

PARTICLE SIZE DISTRIBUTION AND SOIL CLASSIFICATION TEST RESULTS

(ASTM C 136/D 422) (ASTM D 2487)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO

DESCRIPTION: Phase III

MATERIAL TYPE: Low Perm. Clay

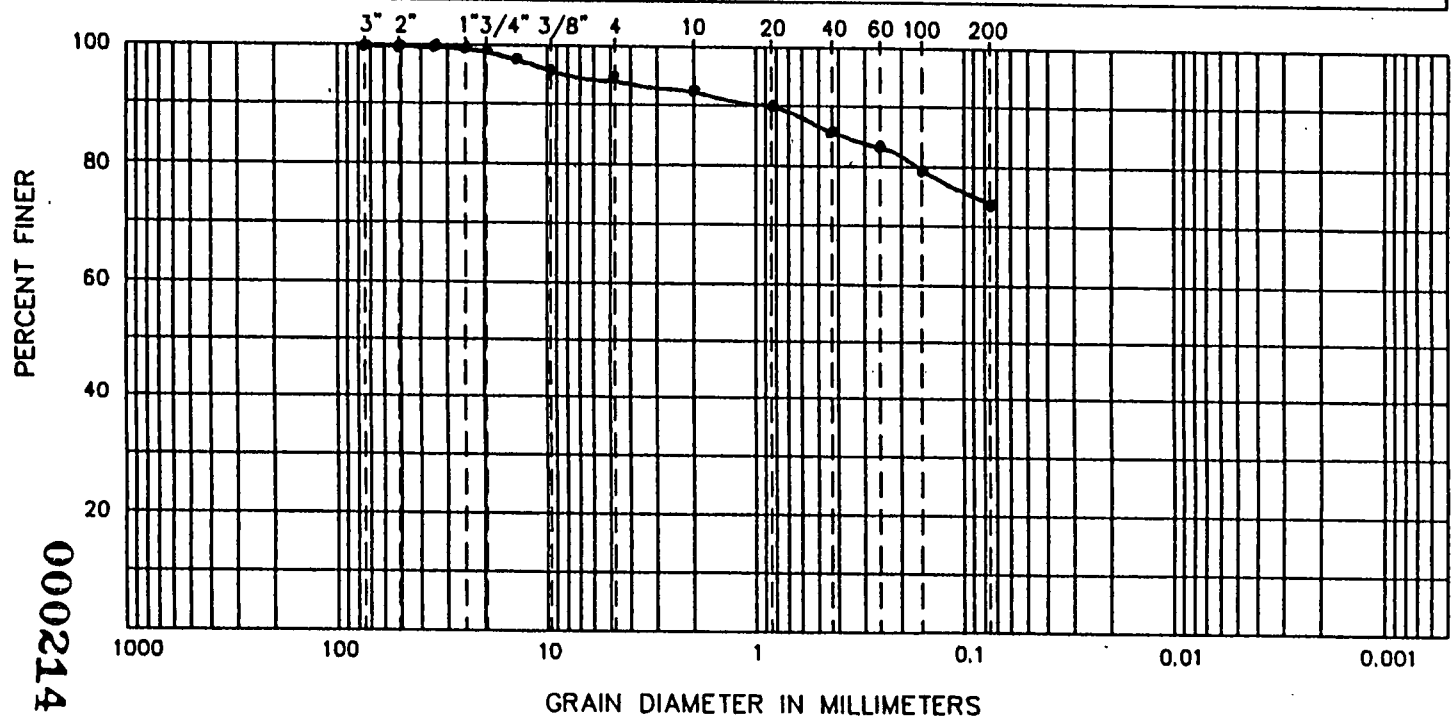
PROJECT NO.: 6Q1341 TASK NO.: 04.1

DATE: 16 day Oct month 2001 year

SAMPLE NO.: LP-01-28 QA ID: KS

CURVE COEFFICIENTS: (C_u) ..... (C_c) .....

BOULDERS	COBBLES	GRAVEL		SAND			FINE	
		COARSE	FINE	COARSE	MEDIUM	FINE	SILT SIZES	CLAY SIZES
U.S. STANDRARD SIEVE SIZES								



ATTERBERG LIMITS

(LL) 27

(PL) 16

(PI) 11

SIEVE RESULTS

SIEVE SIZE	% FINER
3-in.	100
2-in.	100
1 1/2-in.	100
1-in.	99.4
3/4-in.	98.8
1/2-in.	97.9
3/8-in.	97.3
NO. 4	95.9
NO. 10	93.3
NO. 20	90.0
NO. 40	86.6
NO. 60	83.7
NO. 100	79.5
NO. 200	73.5

HYDROMETER RESULTS

PARTICLE DIA.	% FINER
0.050	71
0.020	56
0.005	36
0.002	25

SOIL CLASSIFICATION (ASTM D 2487): Lean Clay with Sand (CL)

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SHEET NO. 2 OF 2

000214

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GEOSYNTEC CONSULTANTS

FLUOR FERNALD

PARTICLE SIZE ANALYSIS–SIEVE METHOD (ASTM D 422)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO — PROJECT NO. 6Q1341 TASK NO.: 04.1

DESCRIPTION: Phase III — DATE: ____ day Oct month 2001 year

MATERIAL TYPE: Low Perm Clay — SAMPLE NO.: LP-01-29

SOIL SAMPLE SIZE: +3/8 Stone = 1671.9 gmm; -3/8 = 99.67 lbs = 45,210.3g; MOISTURE = 324.4g; TOTAL = 47,206.6g

APPROXIMATE MINIMUM WT. OF SAMPLE (PASSING NO. 10 SIEVE) (grams)	SAND	FINE GRAIN
	115	65

	+3/8 BEFORE WASH	-3/8 BEFORE WASH	+3/8 AFTER WASH	-3/8 AFTER WASH
TARE NO.	K	K	K	K
WT. OF DRY SAMPLE PLUS TARE (grams)	1773.4	852.4	1663.9	288.15
WT. OF TARE (grams)	101.5	101.5	101.5	101.50
WT. OF DRY SAMPLE (grams)	1671.9	750.9	1562.4	186.65

SIEVE ANALYSIS — QA ID: DLE/TBD

SIEVE NO.	DIAMETER (mm)	WT. RETAINED (grams)	% RETAINED	% FINER		PROJECT SPECIFICATIONS
3 in	76.2	Ø	Ø	100		
2 in	50.8	Ø	Ø	100		
1 1/2in	38.1	254.8	0.5	99.5		
1 in	25.4	553.5	1.2	98.8		
3/4 in	19.1	836.1	1.8	98.2		
1/2 in	12.7	1292.1	2.7	97.3		
3/8 in	9.53	1561.5	3.3	96.7		
No. 4	4.75	9.95	1.3	98.7	95.4	
No. 10	2.00	32.33	4.3	95.7	92.5	
No. 20	0.850	60.86	8.1	91.9	88.9	
No. 40	0.425	89.38	11.9	88.1	85.2	
No. 60	0.250	113.86	15.2	84.8	82.0	
No. 100	0.125	145.34	19.4	80.6	70.0	
No. 200	0.075	183.35	24.4	75.6	73.1	
PAN	—	186.65	—	—		

COMMENTS:

%FINER = 100 − Σ% RETAINED

GEOSYNTEC CONSULTANTS

FLUOR DANIEL FERNALD

PARTICLE SIZE DISTRIBUTION AND SOIL CLASSIFICATION TEST RESULTS

(ASTM C 136/D 422) (ASTM D 2487)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO

PROJECT NO.: 6Q1341 TASK NO.: 04.1

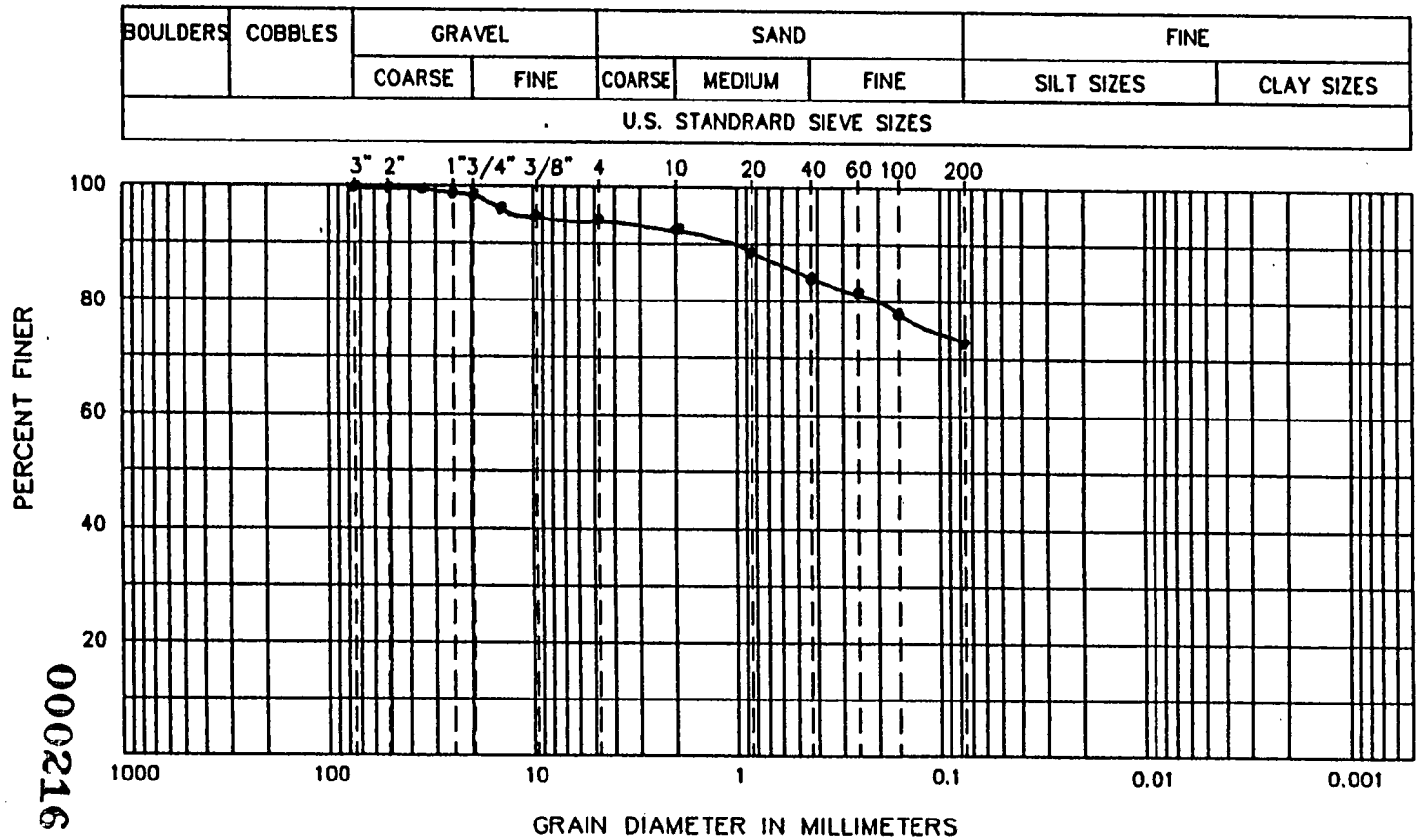
DESCRIPTION: Phase III

DATE: 16 day Oct month 2001 year

MATERIAL TYPE: Low Perm. Clay

SAMPLE NO.: LP-01-29 QA ID: KS

CURVE COEFFICIENTS: (C_u) ..... (C_c) .....



ATTERBERG LIMITS

(LL) 33

(PL) 16

(PI) 17

SIEVE RESULTS

SIEVE SIZE	% FINER
3-in.	100
2-in.	100
1 1/2-in.	99.5
1-in.	98.8
3/4-in.	98.2
1/2-in.	97.3
3/8-in.	96.7
NO. 4	95.4
NO. 10	92.5
NO. 20	88.9
NO. 40	85.2
NO. 60	82.0
NO. 100	78.0
NO. 200	73.1

HYDROMETER RESULTS

PARTICLE DIA.	% FINER
0.050	74
0.020	58
0.005	40
0.002	29

SOIL CLASSIFICATION (ASTM D 2487): Lean Clay with Sand (CL)

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SHEET NO. 2 OF 2

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GEOSYNTEC CONSULTANTS

FLUOR FERNALD

PARTICLE SIZE ANALYSIS–SIEVE METHOD (ASTM D 422)

PROJECT: ON–SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO — PROJECT NO.: GQ134 TASK NO.: 04.1

DESCRIPTION: PHASE III — DATE: 02 day OCT month 2001 year

MATERIAL TYPE: LOW PERM CLAY — SAMPLE NO.: LP-01-30

SOIL SAMPLE SIZE: +3/8 = 456.3 g | MOISTURE = 344.2 g | -3/8 = 35.72 lbs = 16,202.6 g | TOTAL = 17,033.1 g

APPROXIMATE MINIMUM WT. OF SAMPLE (PASSING NO. 10 SIEVE) (grams)	SAND	FINE GRAIN
	115	65

	BEFORE WASH +3/8	BEFORE WASH -3/8	AFTER WASH +3/8	AFTER WASH -3/8
TARE NO.	L-44	L-7	L-44	K
WT. OF DRY SAMPLE PLUS TARE (grams)	648.1	933.6	580.9	288.33
WT. OF TARE (grams)	191.8	194.0	191.8	101.50
WT. OF DRY SAMPLE (grams)	456.3	739.6	389.1	186.83

SIEVE ANALYSIS — QA ID: _____

SIEVE NO.	DIAMETER (mm)	WT. RETAINED (grams)	% RETAINED	% FINER		PROJECT SPECIFICATIONS
3 in	76.2	0	0	100		
2 in	50.8	0	0	100		
1 1/2in	38.1	0	0	100		
1 in	25.4	0	0	100		
3/4 in	19.1	55.6	0.3	99.7		
1/2 in	12.7	186.2	1.1	98.9		
3/8 in	9.53	389.0	2.3	97.7		
No. 4	4.75	29.37	4.0	96.0	93.8	
No. 10	2.00	61.04	8.3	91.7	89.6	
No. 20	0.850	80.69	10.9	89.1	87.0	
No. 40	0.425	100.85	13.6	86.4	84.4	
No. 60	0.250	119.73	16.2	83.8	81.9	
No. 100	0.125	147.33	19.9	80.1	78.2	
No. 200	0.075	184.84	25.0	75.0	73.3	
PAN	—	186.83	—	—		

COMMENTS:

000217

%FINER = 100 − Σ% RETAINED

GEOSYNTEC CONSULTANTS

FLUOR DANIEL FERNALD

PARTICLE SIZE DISTRIBUTION AND SOIL CLASSIFICATION TEST RESULTS

(ASTM C 136/D 422) (ASTM D 2487)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO

PROJECT NO.: 6Q1341 TASK NO.: 04.1

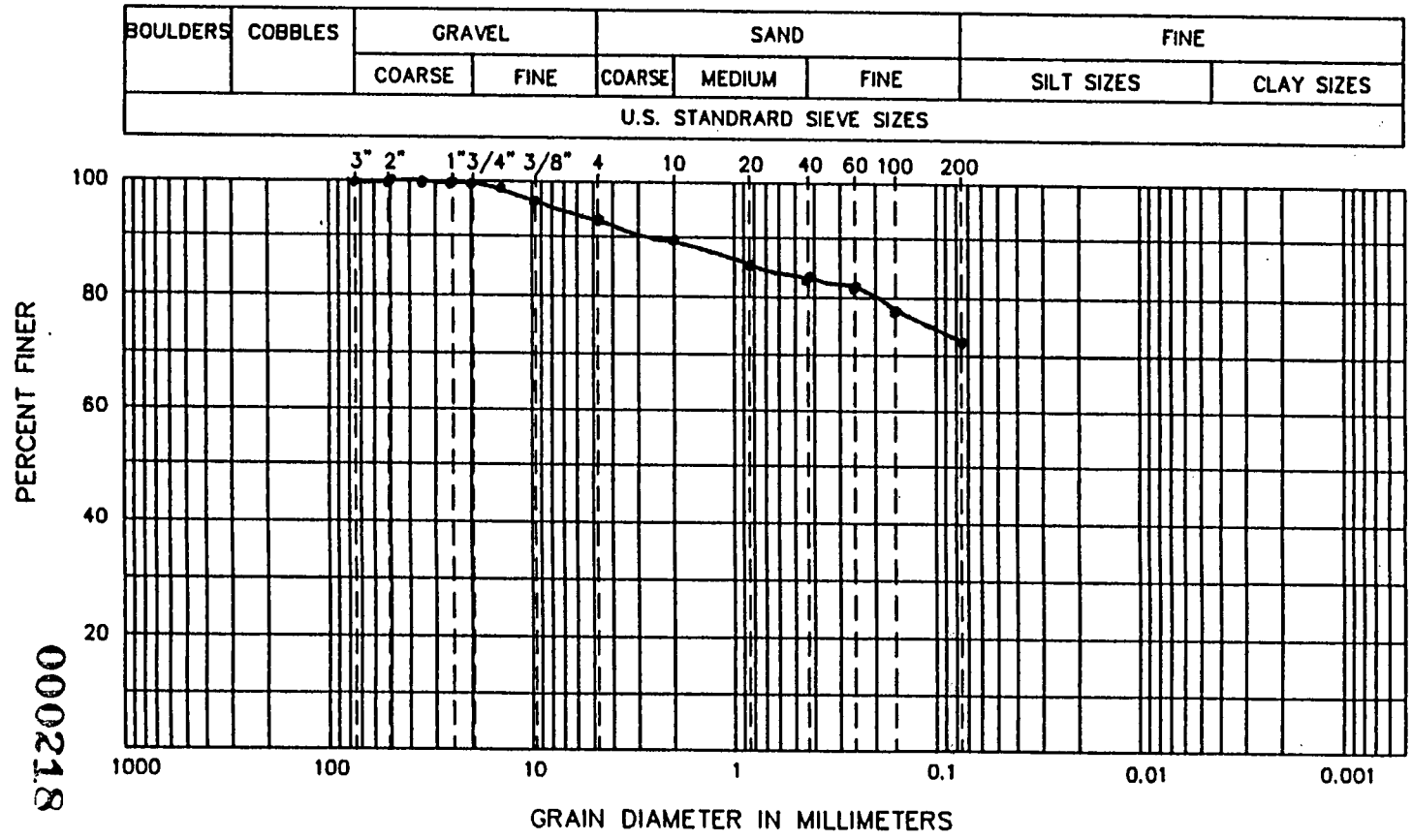
DESCRIPTION: Phase III

DATE: 16 day Oct month 2000 year

MATERIAL TYPE: Low. perm. Clay

SAMPLE NO.: LP-01-30 QA ID: KS

CURVE COEFFICIENTS: (C_u) ..... (C_c) .....



ATTERBERG LIMITS

(LL) 28

(PL) 16

(PI) 12

SIEVE RESULTS

SIEVE SIZE	% FINER
3-in.	100
2-in.	100
1 1/2-in.	100
1-in.	100
3/4-in.	99.7
1/2-in.	98.9
3/8-in.	97.7
NO. 4	93.8
NO. 10	89.6
NO. 20	87.0
NO. 40	84.4
NO. 60	81.9
NO. 100	78.2
NO. 200	73.3

HYDROMETER RESULTS

PARTICLE DIA.	% FINER
0.050	72
0.020	58
0.005	36
0.002	24

SOIL CLASSIFICATION (ASTM D 2487): Lean Clay with Sand (CL)

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GEOSYNTEC CONSULTANTS

FLUOR FERNALD

PARTICLE SIZE ANALYSIS–SIEVE METHOD (ASTM D 422)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO — PROJECT NO.: 60134 TASK NO.: 04.1

DESCRIPTION: PHASE III — DATE: 03 day OCT month 2001 year

MATERIAL TYPE: Low Perm Clay — SAMPLE NO.: LP-01-31

SOIL SAMPLE SIZE: +3/8" = 2084.0g | MOISTURE = 499.5g | -3/8" = 94.92lbs = 43,055.7g | TOTAL = 45,639.2g

APPROXIMATE MINIMUM WT. OF SAMPLE (PASSING NO. 10 SIEVE) (grams)	SAND	FINE GRAIN
	115	65

	BEFORE WASH +3/8	BEFORE WASH -3/8	AFTER WASH +3/8	AFTER WASH -3/8
TARE NO.	N	L-1	N	L-1
WT. OF DRY SAMPLE PLUS TARE (grams)	2185.7	981.80	1890.6	407.7
WT. OF TARE (grams)	101.7	192.47	101.7	192.47
WT. OF DRY SAMPLE (grams)	2084.0	789.33	1788.9	215.23

SIEVE ANALYSIS — QA ID: TBC/DATE

SIEVE NO.	DIAMETER (mm)	WT. RETAINED (grams)	% RETAINED	% FINER		PROJECT SPECIFICATIONS
3 in	76.2	Ø	Ø	100		
2 in	50.8	Ø	Ø	100		
1 1/2in	38.1	Ø	Ø	100		
1 in	25.4	173.45	.4	99.6		
3/4 in	19.1	676.0	1.5	98.5		
1/2 in	12.7	1398.7	3.1	96.9		
3/8 in	9.53	1782.8	3.9	96.1		
No. 4	4.75	23.70	3.0	97.0	93.2	
No. 10	2.00	52.07	6.6	93.4	89.8	
No. 20	0.850	78.91	10.0	90.0	86.5	
No. 40	0.425	106.43	13.5	86.5	83.1	
No. 60	0.250	131.36	16.6	83.4	80.1	
No. 100	0.125	163.18	20.7	79.3	76.2	
No. 200	0.075	210.10	26.6	73.4	70.5	
PAN	—	215.23	—	—		

COMMENTS:

%FINER = 100 − Σ% RETAINED

GEOSYNTEC CONSULTANTS

FLUOR DANIEL FERNALD

PARTICLE SIZE DISTRIBUTION AND SOIL CLASSIFICATION TEST RESULTS

(ASTM C 136/D 422) (ASTM D 2487)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO

PROJECT NO.: GQ1341 TASK NO.: 04.1

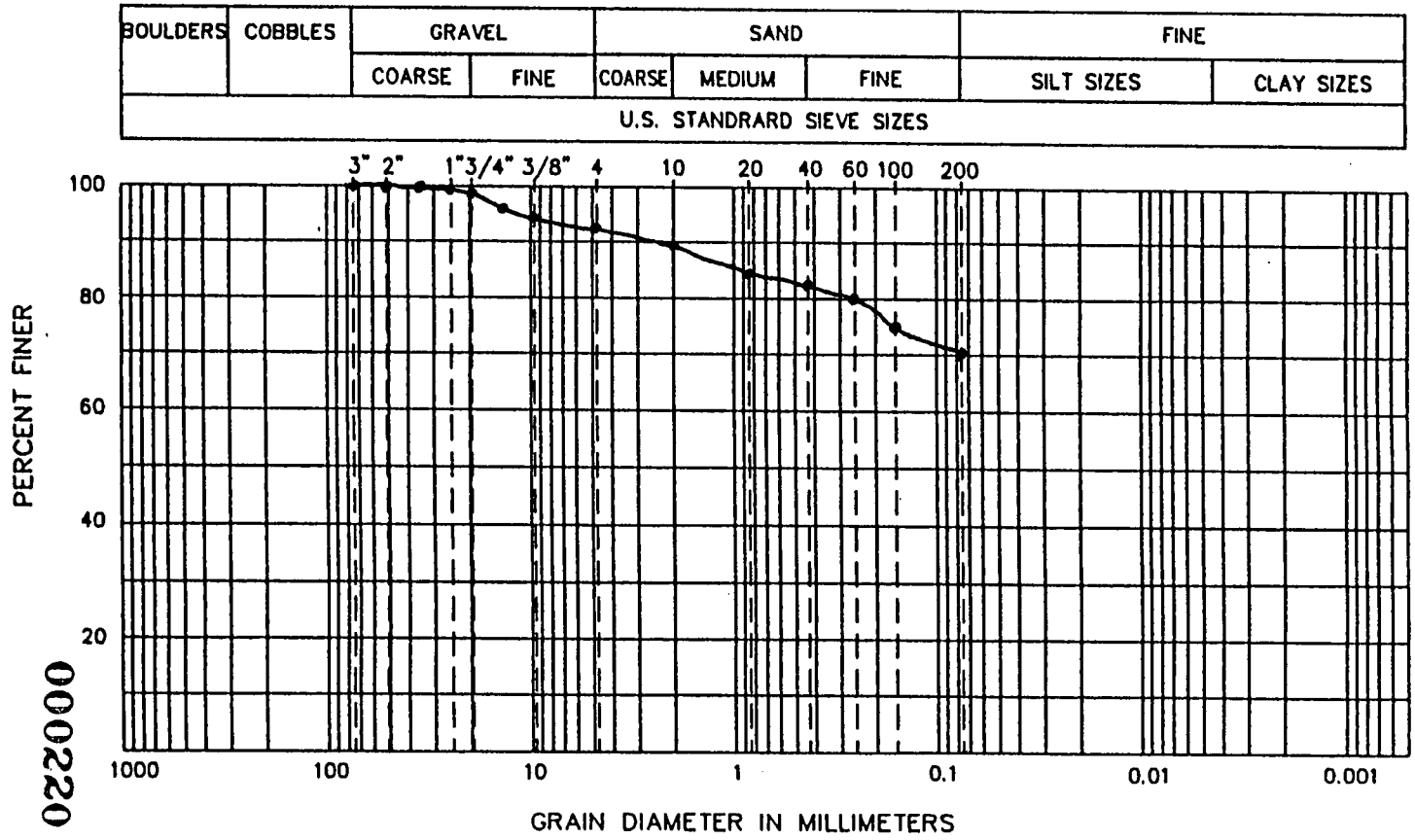
DESCRIPTION: Phase III

DATE: 16 day Oct month 2001 year

MATERIAL TYPE: Low Perm. Clay

SAMPLE NO.: LP-01-31 QA ID: KS

CURVE COEFFICIENTS: (C_u) ..... (C_c) .....



ATTERBERG LIMITS

(LL) 26

(PL) 15

(PI) 11

SIEVE RESULTS

SIEVE SIZE	% FINER
3-in.	100
2-in.	100
1 1/2-in.	100
1-in.	99.6
3/4-in.	98.5
1/2-in.	96.9
3/8-in.	96.1
NO. 4	93.2
NO. 10	89.8
NO. 20	86.5
NO. 40	83.1
NO. 60	80.1
NO. 100	76.2
NO. 200	70.5

HYDROMETER RESULTS

PARTICLE DIA.	% FINER
0.050	69
0.020	49
0.005	33
0.002	23

SOIL CLASSIFICATION (ASTM D 2487): Lean Clay with Sand (CL)

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GEOSYNTEC CONSULTANTS

FLUOR FERNALD

PARTICLE SIZE ANALYSIS—SIEVE METHOD (ASTM D 422)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO — PROJECT NO.: 6Q134 TASK NO.: 04.1

DESCRIPTION: PHASE III — DATE: 04 day OCT month 2001 year

MATERIAL TYPE: Low Perm CLAY — SAMPLE NO.: LP-01-32

SOIL SAMPLE SIZE: +3/8 = 1116.7g; -3/8 = 47.71lbs = 21,641.3g; TOTAL = 22,758.0g

APPROXIMATE MINIMUM WT. OF SAMPLE (PASSING NO. 10 SIEVE) (grams)	SAND	FINE GRAIN
	115	65

	+3/8 BEFORE WASH	-3/8 BEFORE WASH	+3/8 AFTER WASH	-3/8 AFTER WASH
TARE NO.	[illegible]	L-7	L-4-[illegible]	L-7
WT. OF DRY SAMPLE PLUS TARE (grams)	1310.4	1039.1	1174.0	383.9[illegible]
WT. OF TARE (grams)	193.7	194.0	146.4	194.0[illegible]
WT. OF DRY SAMPLE (grams)	1116.7	845.1	1027.6	189.9[illegible]

SIEVE ANALYSIS — QA ID: DLE/TBM

SIEVE NO.	DIAMETER (mm)	WT. RETAINED (grams)	% RETAINED	% FINER		PROJECT SPECIFICATIONS
3 in	76.2	Ø	Ø	100		
2 in	50.8	Ø	Ø	100		
1 1/2in	38.1	Ø	Ø	100		
1 in	25.4	461.6	2.0	98.0		
3/4 in	19.1	630.2	2.8	97.2		
1/2 in	12.7	865.7	3.8	96.2		
3/8 in	9.53	1019.8	4.5	95.5		
No. 4	4.75	7.01	0.8	99.2	94.7	
No. 10	2.00	29.52	3.5	96.5	92.2	
No. 20	0.850	59.06	7.0	93.0	88.8	
No. 40	0.425	88.03	10.4	89.6	85.6	
No. 60	0.250	114.05	13.5	86.5	82.6	
No. 100	0.125	141.80	17.1	82.9	79.1	
No. 200	0.075	186.77	22.1	77.9	74.4	
PAN	—	189.90	—	—		

000221

COMMENTS:

%FINER = 100 − Σ% RETAINED

GEOSYNTEC CONSULTANTS

FLUOR DANIEL FERNALD

PARTICLE SIZE DISTRIBUTION AND SOIL CLASSIFICATION TEST RESULTS

(ASTM C 136/D 422) (ASTM D 2487)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO

PROJECT NO.: GQ1341 TASK NO.: 04.1

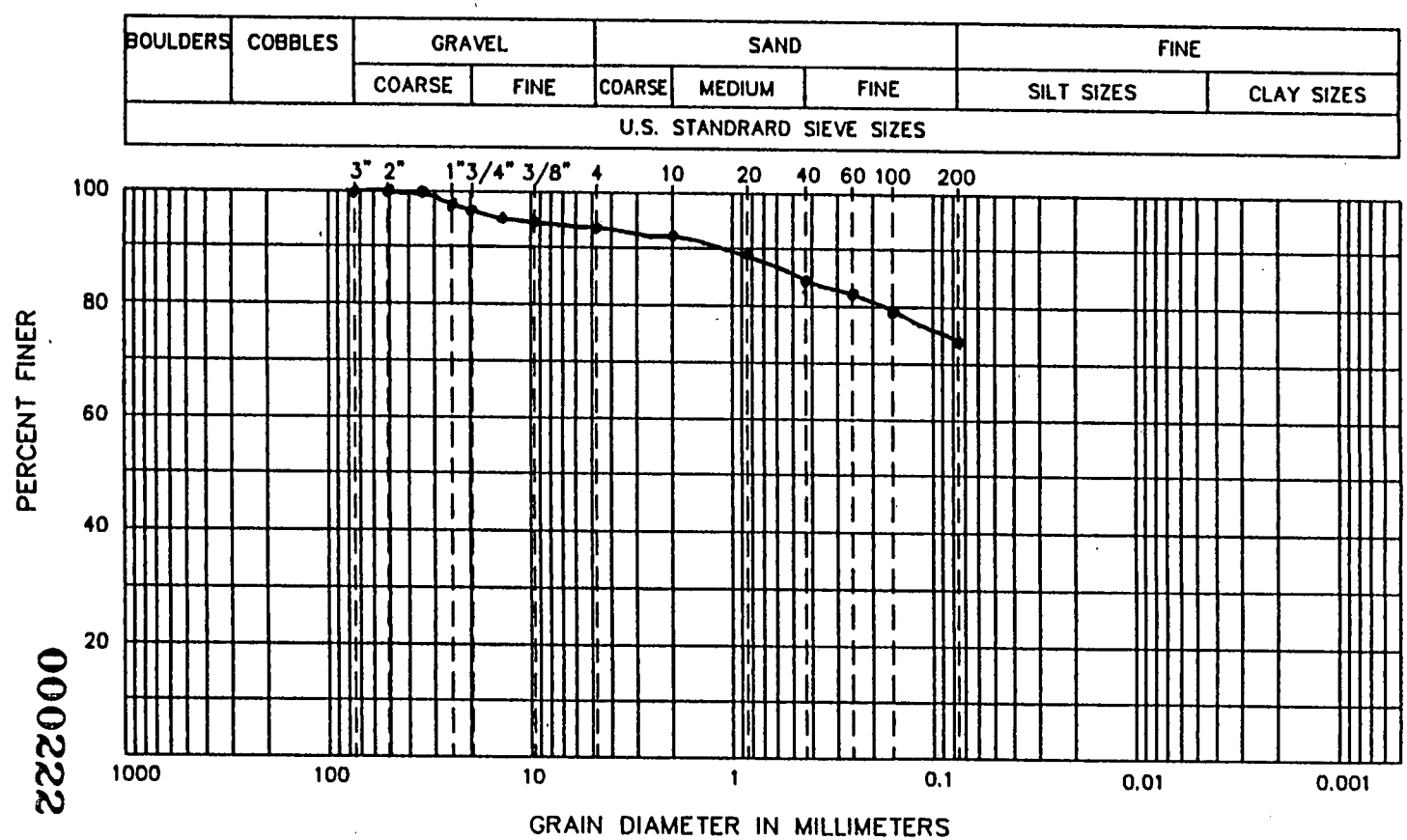
DESCRIPTION: Phase III

DATE: 16 day Oct month 2001 year

MATERIAL TYPE: Low perm. Clay

SAMPLE NO.: LP-01-32 QA ID: KS

CURVE COEFFICIENTS: (C_u) ..... (C_c) .....



ATTERBERG LIMITS

(LL) 32

(PL) 16

(PI) 16

SIEVE RESULTS

SIEVE SIZE	% FINER
3-in.	100
2-in.	100
1 1/2-in.	100
1-in.	98.0
3/4-in.	97.2
1/2-in.	96.2
3/8-in.	95.5
NO. 4	94.7
NO. 10	92.2
NO. 20	88.8
NO. 40	85.6
NO. 60	82.6
NO. 100	79.1
NO. 200	74.4

HYDROMETER RESULTS

PARTICLE DIA.	% FINER
0.050	70
0.010	65
0.005	38
0.002	25

SOIL CLASSIFICATION (ASTM D 2487): Lean Clay with Sand (CL)

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SHEET NO. 2 OF 2

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GEOSYNTEC CONSULTANTS

FLUOR FERNALD

PARTICLE SIZE ANALYSIS—SIEVE METHOD (ASTM D 422)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO PROJECT NO.: GQ1341 TASK NO.: 04.1

DESCRIPTION: PHASE III DATE: 04 day OCT month 2001 year

MATERIAL TYPE: Low Perm CLAY SAMPLE NO.: LP-01-33

SOIL SAMPLE SIZE +3/8 = 2650.5g; -3/8 = 81.96 lbs = 37,177.1g TOTAL = 39,827.6

APPROXIMATE MINIMUM WT. OF SAMPLE (PASSING NO. 10 SIEVE) (grams)	SAND	FINE GRAIN
	115	65

	BEFORE WASH +3/8	BEFORE WASH -3/8	AFTER WASH +3/8	AFTER WASH -3/8
TARE NO.	L-7	L-1	L-7	L-1
WT. OF DRY SAMPLE PLUS TARE (grams)	2844.5	1211.7	2626.9	505.00
WT. OF TARE (grams)	194.0	192.7	194.0	192.70
WT. OF DRY SAMPLE (grams)	2650.5	1019.0	2432.9	312.3

SIEVE ANALYSIS QA ID: DLE/KS

SIEVE NO.	DIAMETER (mm)	WT. RETAINED (grams)	% RETAINED	% FINER		PROJECT SPECIFICATIONS
3 in	76.2	0	0	100		
2 in	50.8	0	0	100		
1 1/2in	38.1	178.1	0.4	99.6		
1 in	25.4	594.2	1.5	98.5		
3/4 in	19.1	1013.0	2.5	97.5		
1/2 in	12.7	1863.6	4.7	95.3		
3/8 in	9.53	2413.2	6.1	93.9		
No. 4	4.75	31.91	3.1	96.9	91.0	
No. 10	2.00	79.91	7.8	92.2	86.5	
No. 20	0.850	126.72	12.4	87.6	82.2	
No. 40	0.425	166.87	16.4	83.6	78.5	
No. 60	0.250	201.57	19.8	80.2	75.3	
No. 100	0.125	246.00	24.1	75.9	71.2	
No. 200	0.075	305.60	30.0	70.0	65.7	
PAN	—	312.30	—	—	—	

COMMENTS:

000223

%FINER = 100 − Σ% RETAINED

GEOSYNTEC CONSULTANTS

FLUOR DANIEL FERNALD

PARTICLE SIZE DISTRIBUTION AND SOIL CLASSIFICATION TEST RESULTS

(ASTM C 136/D 422) (ASTM D 2487)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO

PROJECT NO.: 6Q1341 TASK NO.: 04.1

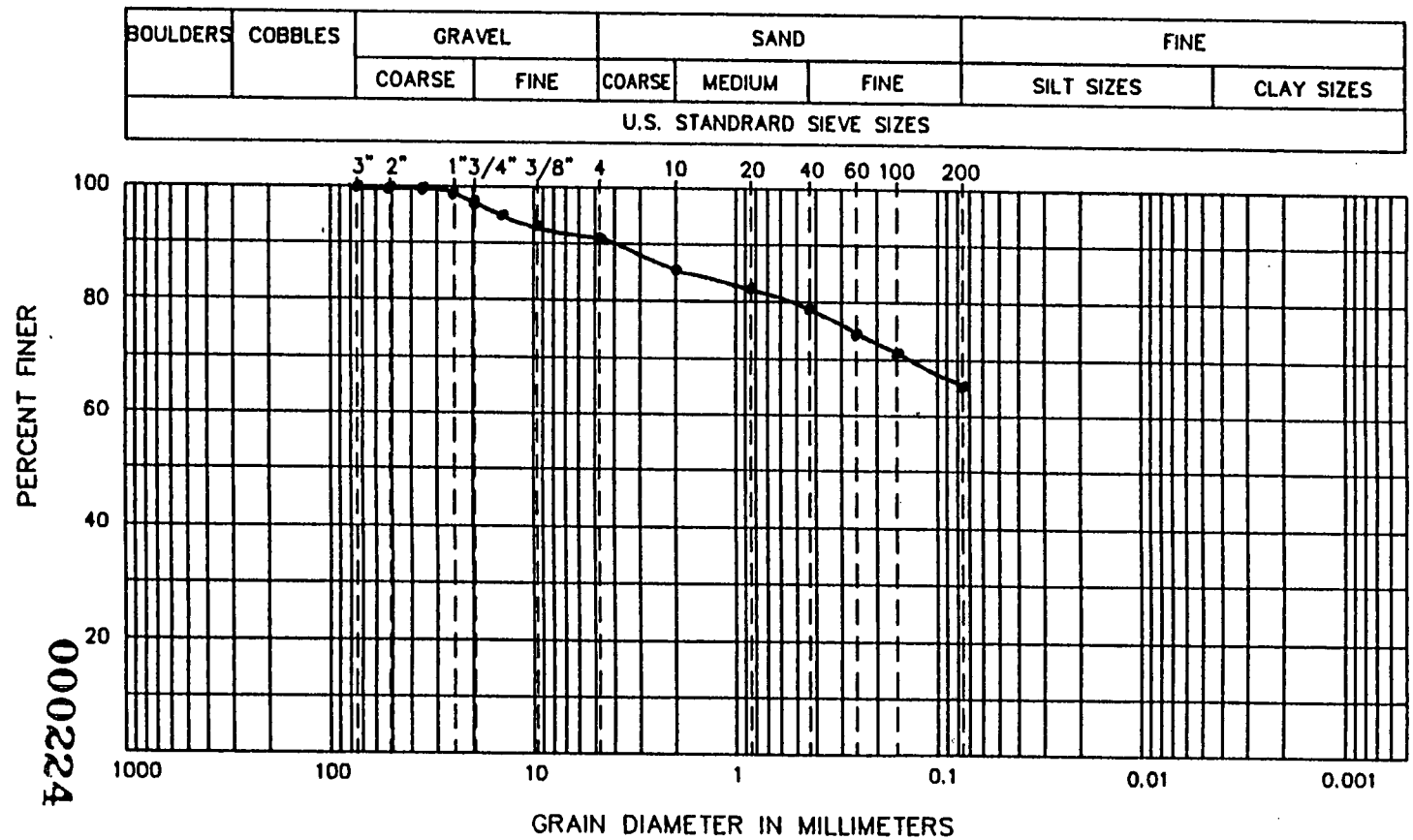
DESCRIPTION: Phase III

DATE: 16 day Oct month 2001 year

MATERIAL TYPE: Low perm. Clay

SAMPLE NO.: LP-01-33 QA ID: KS

CURVE COEFFICIENTS: (C_u) ..... (C_c) .....



ATTERBERG LIMITS

(LL) 26

(PL) 15

(PI) 11

SIEVE RESULTS

SIEVE SIZE	% FINER
3-in.	100
2-in.	100
1 1/2-in.	99.6
1-in.	98.5
3/4-in.	97.5
1/2-in.	95.3
3/8-in.	93.9
NO. 4	91.0
NO. 10	86.5
NO. 20	82.2
NO. 40	78.5
NO. 60	75.3
NO. 100	71.2
NO. 200	65.7

HYDROMETER RESULTS

PARTICLE DIA.	% FINER
0.050	65
0.020	49
0.005	31
0.002	22

SOIL CLASSIFICATION (ASTM D 2487): Sandy lean Clay (CL)

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SHEET NO. 2 OF 2

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GEOSYNTEC CONSULTANTS

FLUOR FERNALD

PARTICLE SIZE ANALYSIS—SIEVE METHOD (ASTM D 422)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO — PROJECT NO.: QR341 TASK NO.: 04.1

DESCRIPTION: PHASE III — DATE: 08 day OCT month 2001 year

MATERIAL TYPE: LOW PERM CLAY — SAMPLE NO.: LP-01-34

SOIL SAMPLE SIZE: +3/8 = 537.1g | MOISTURE = 489.5g | -3/8 = 47.39 lbs = 21,496.1g | TOTAL = 22,522.7g

APPROXIMATE MINIMUM WT. OF SAMPLE (PASSING NO. 10 SIEVE) (grams)	SAND	FINE GRAIN
	115	65

	+3/8 BEFORE WASH	-3/8 BEFORE WASH	+3/8 AFTER WASH	-3/8 AFTER WASH
TARE NO.	L-1	N	L-1	N
WT. OF DRY SAMPLE PLUS TARE (grams)	729.6	730.4	713.1	262.9
WT. OF TARE (grams)	192.5	101.7	192.5	101.7
WT. OF DRY SAMPLE (grams)	537.1	628.7	520.6	161.2

SIEVE ANALYSIS — QA ID: DLE

SIEVE NO.	DIAMETER (mm)	WT. RETAINED (grams)	% RETAINED	% FINER		PROJECT SPECIFICATIONS
3 in	76.2	Ø	Ø	100		
2 in	50.8	Ø	Ø	100		
1 1/2in	38.1	165.6	~~5.2~~ .7	99.3		
1 in	25.4	165.6	~~5.2~~ .7	99.3		
3/4 in	19.1	208.7	.9	99.1		
1/2 in	12.7	359.4	1.6	98.4		
3/8 in	9.53	515.2	2.3	97.7		
No. 4	4.75	18.1	2.9	97.1	94.9	
No. 10	2.00	40.7	6.5	93.5	91.3	
No. 20	0.850	63.1	10.0	90.0	~~89.7~~ 81.9	
No. 40	0.425	86.7	13.8	86.2	84.2	
No. 60	0.250	107.1	17.0	83.0	81.1	
No. 100	0.125	133.2	21.2	78.8	77.0	
No. 200	0.075	160.5	25.5	74.5	72.8	
PAN	—	161.2	—	—		

COMMENTS:

000225

%FINER = 100 − Σ% RETAINED

GEO SYNTEC CONSULTANTS FILE NO. 2-14-PMS

CHECKED BY: [illegible]

SHEET NO. 1 OF 2

GEOSYNTEC CONSULTANTS

FLUOR DANIEL FERNALD

PARTICLE SIZE DISTRIBUTION AND SOIL CLASSIFICATION TEST RESULTS

(ASTM C 136/D 422) (ASTM D 2487)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO

PROJECT NO.: GQ1341 TASK NO.: 04.1

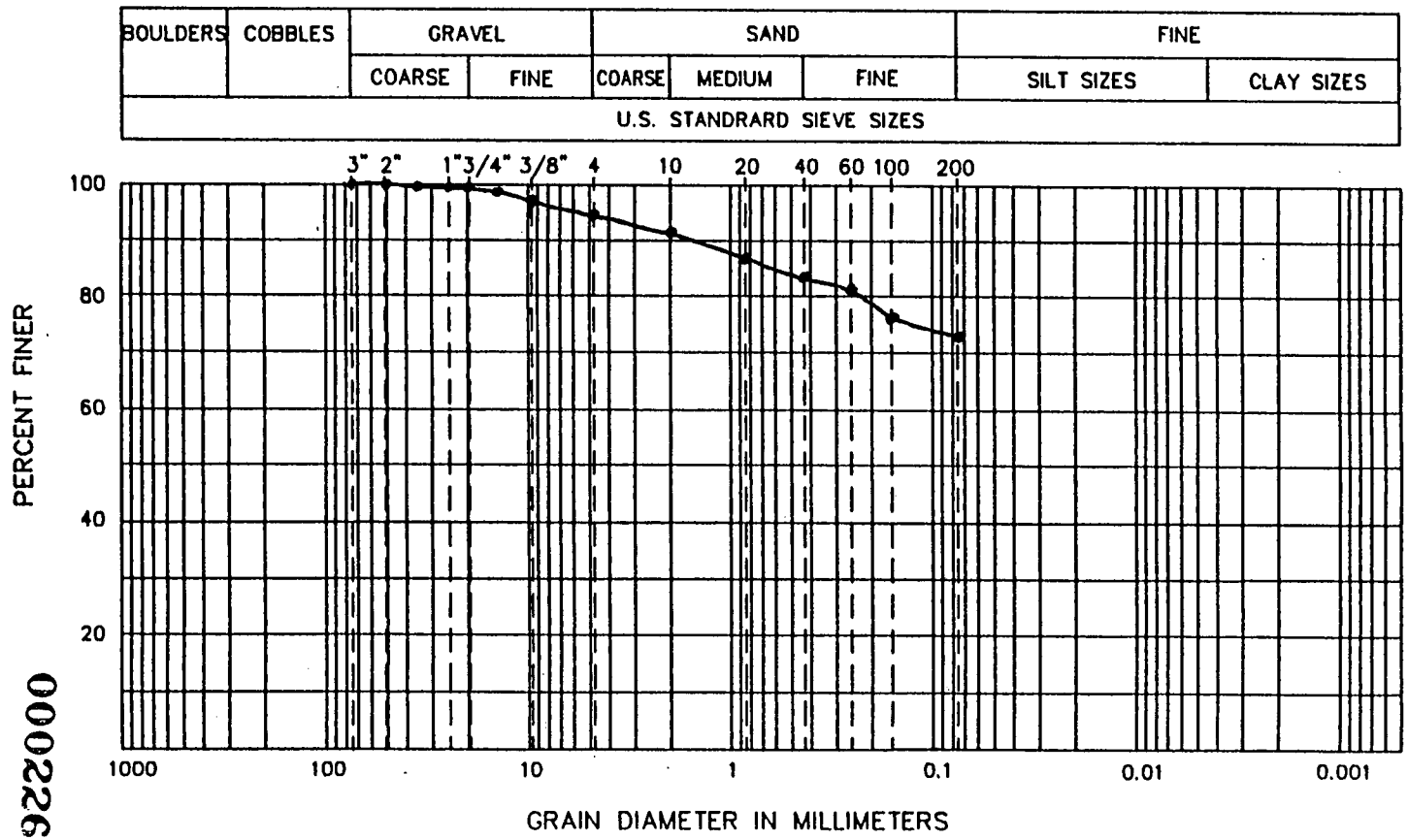
DESCRIPTION: Phase III

DATE: 16 day Oct month 2001 year

MATERIAL TYPE: Low Perm. Clay

SAMPLE NO.: LP-01-34 QA ID: KS

CURVE COEFFICIENTS: (C_u) ..... (C_c) .....



ATTERBERG LIMITS

(LL) 34

(PL) 17

(PI) 17

SIEVE RESULTS

SIEVE SIZE	% FINER
3-in.	100
2-in.	100
1 1/2-in.	99.3
1-in.	99.3
3/4-in.	99.1
1/2-in.	98.4
3/8-in.	97.7
NO. 4	94.9
NO. 10	91.3
NO. 20	87.9
NO. 40	84.2
NO. 60	81.1
NO. 100	77.0
NO. 200	72.8

HYDROMETER RESULTS

PARTICLE DIA.	% FINER
0.050	75
0.020	58
0.005	38
0.002	28

SOIL CLASSIFICATION (ASTM D 2487): Lean Clay with Sand (CL)

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GEOSYNTEC CONSULTANTS

FLUOR FERNALD

PARTICLE SIZE ANALYSIS–SIEVE METHOD (ASTM D 422)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO PROJECT NO.: 60134 TASK NO.: 041

DESCRIPTION: PHASE III DATE: 09 day OCT month 2001 year

MATERIAL TYPE: Low Perm CLAY SAMPLE NO.: LP-01-35

SOIL SAMPLE SIZE				TOTAL = 38,003.3g
	+3/8 = 1880.3g	MOISTURE = 469.7g	ATT = 1014.7g	
	-3/8 = 74.86 lbs = 33956.5g		SIEVE = 682.1g	

APPROXIMATE MINIMUM WT. OF SAMPLE (PASSING NO. 10 SIEVE) (grams)	SAND	FINE GRAIN
	115	65

	BEFORE WASH +3/8	BEFORE WASH -3/8	AFTER WASH +3/8	AFTER WASH -3/8
TARE NO.	L-7	L-3	L-7	L-3
WT. OF DRY SAMPLE PLUS TARE (grams)	2074.2	872.9	1965.6	366.0
WT. OF TARE (grams)	193.9	190.8	193.9	190.8
WT. OF DRY SAMPLE (grams)	1880.3	682.1g	1771.7	175.2

SIEVE ANALYSIS QA ID: TBD/DLE

SIEVE NO.	DIAMETER (mm)	WT. RETAINED (grams)	% RETAINED	% FINER		PROJECT SPECIFICATIONS
3 in	76.2	0	0	100		
2 in	50.8	0	0	100		
1 1/2in	38.1	87.3	0.2	99.8		
1 in	25.4	525.8	1.4	98.6		
3/4 in	19.1	836.9	2.2	97.8		
1/2 in	12.7	1418.6	3.7	96.3		
3/8 in	9.53	1754.5	4.6	95.4		
No. 4	4.75	13.1	1.9	98.1	93.6	
No. 10	2.00	37.7	5.5	94.5	90.1	
No. 20	0.850	63.8	9.4	90.6	86.5	
No. 40	0.425	88.5	13.0	87.0	83.0	
No. 60	0.250	109.2	16.0	84.0	80.1	
No. 100	0.125	135.7	19.9	80.1	76.4	
No. 200	0.075	172.0	25.2	74.8	71.3	
PAN	—	175.2	—	—		

COMMENTS: 000227

%FINER = 100 − Σ% RETAINED

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FLUOR DANIEL FERNALD

PARTICLE SIZE DISTRIBUTION AND SOIL CLASSIFICATION TEST RESULTS

(ASTM C 136/D 422) (ASTM D 2487)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO

PROJECT NO.: GQ1341 TASK NO.: 04.1

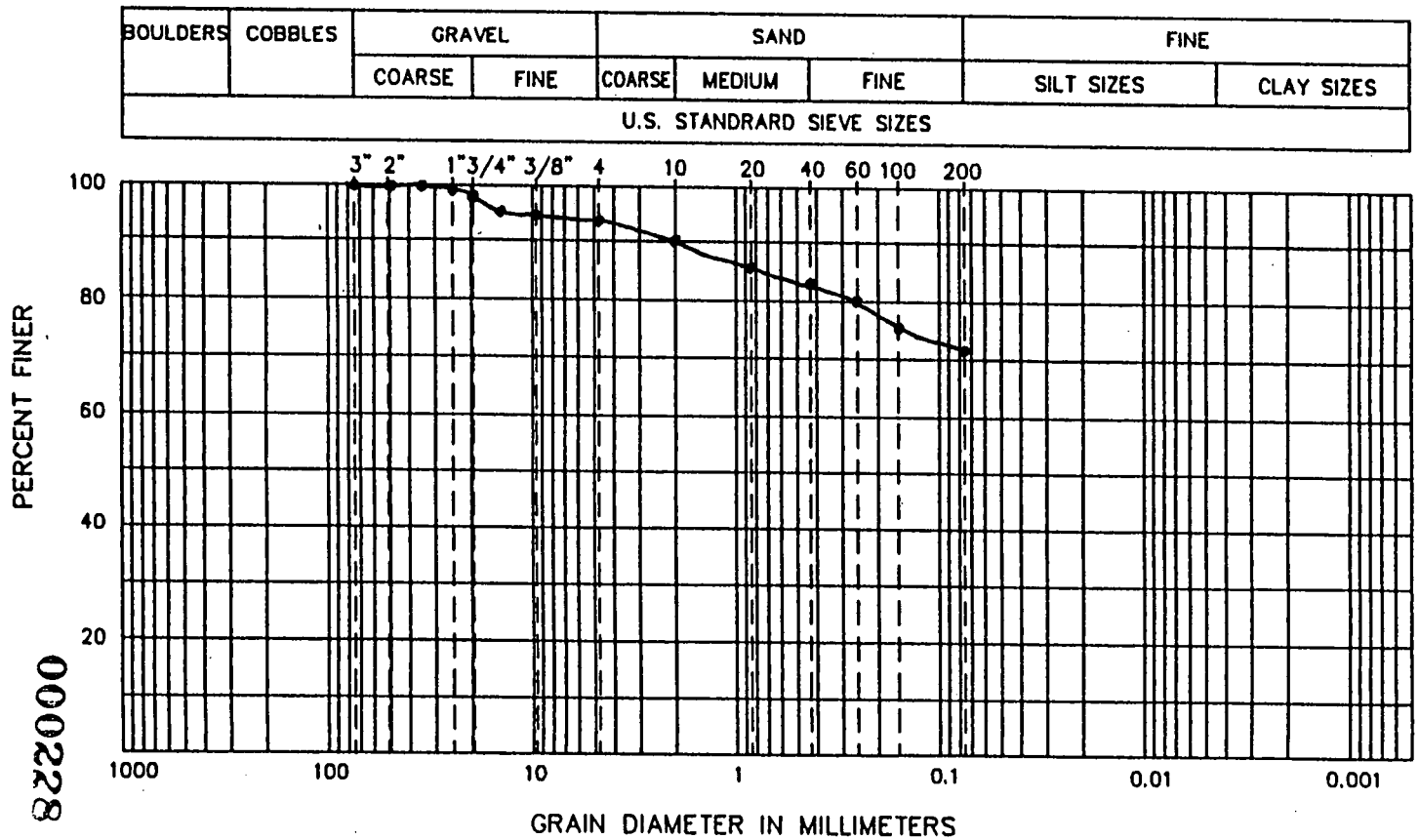
DESCRIPTION: Phase III

DATE: 16 day Oct month 2000 year

MATERIAL TYPE: Low perm. Clay

SAMPLE NO.: LP-01-35 QA ID: KS

CURVE COEFFICIENTS: (C_u) ..... (C_c) .....



ATTERBERG LIMITS

(LL) 30

(PL) 16

(PI) 14

SIEVE RESULTS

SIEVE SIZE	% FINER
3-in.	100
2-in.	100
1 1/2-in.	99.8
1-in.	98.6
3/4-in.	97.8
1/2-in.	96.3
3/8-in.	95.4
NO. 4	93.6
NO. 10	90.1
NO. 20	86.5
NO. 40	83.0
NO. 60	80.1
NO. 100	76.4
NO. 200	71.3

HYDROMETER RESULTS

PARTICLE DIA.	% FINER
0.050	69
0.020	55
0.005	35
0.002	26

SOIL CLASSIFICATION (ASTM D 2487): Lean Clay with Sand (CL)

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GEOSYNTEC CONSULTANTS

FLUOR FERNALD

PARTICLE SIZE ANALYSIS–SIEVE METHOD (ASTM D 422)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO — PROJECT NO. 601341 — TASK NO. 041

DESCRIPTION: Phase III — DATE: 10 day Oct month 2001 year

MATERIAL TYPE: Low Peem Clay — SAMPLE NO.: LP-01-36

SOIL SAMPLE SIZE: +3/8 stone = 6330 gm; -3/8 = 37.94 lbs = 17,209.6 g; MOISTURE = 489.2 g; MT = 709.2 g; SIEVE = 672.2 g; TOTAL = 19,713.2 g

APPROXIMATE MINIMUM WT. OF SAMPLE (PASSING NO. 10 SIEVE) (grams)	SAND	FINE GRAIN
	115	65

	+3/8 BEFORE WASH	-3/8	+3/8 AFTER WASH	-3/8
TARE NO.	N	L-44	N	L44
WT. OF DRY SAMPLE PLUS TARE (grams)	734.7	864.0	703.2	377.9
WT. OF TARE (grams)	101.7	191.8	101.7	191.8
WT. OF DRY SAMPLE (grams)	633.0	672.2	601.5	186.1

SIEVE ANALYSIS — QA ID TDO/DLE

SIEVE NO.	DIAMETER (mm)	WT. RETAINED (grams)	% RETAINED	% FINER		PROJECT SPECIFICATIONS
3 in	76.2	0	0	100		
2 in	50.8	0	0	100		
1 1/2in	38.1	0	0	100		
1 in	25.4	26.3	0.1	99.9		
3/4 in	19.1	142.7	0.7	99.3		
1/2 in	12.7	388.6	2.0	98.0		
3/8 in	9.53	593.5	3.0	97.0		
No. 4	4.75	22.3	3.3	96.7	93.8	
No. 10	2.00	51.3	7.6	92.4	89.6	
No. 20	0.850	77.0	11.5	88.5	~~85.9~~ 84.3	85.9
No. 40	0.425	100.0	14.9	85.1	82.6	
No. 60	0.250	119.9	17.8	82.2	79.7	
No. 100	0.125	146.9	21.9	78.1	75.8	
No. 200	0.075	182.8	27.2	72.8	70.6	
PAN	—	186.1	—	—		

COMMENTS:

000229

%FINER = 100 − Σ% RETAINED

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FLUOR DANIEL FERNALD

PARTICLE SIZE DISTRIBUTION AND SOIL CLASSIFICATION TEST RESULTS

(ASTM C 136/D 422) (ASTM D 2487)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO

PROJECT NO.: GQ1341 TASK NO.: 04.1

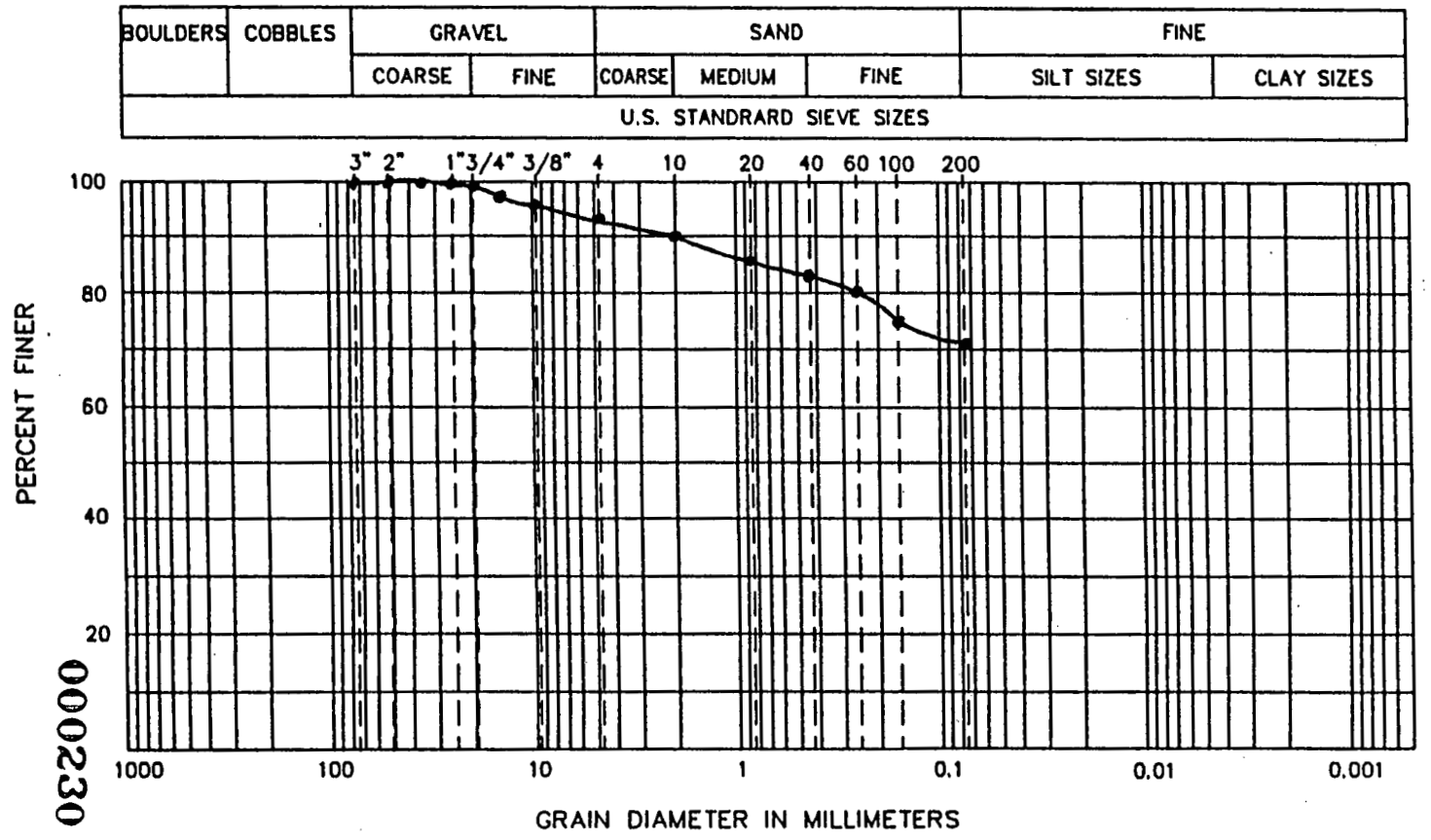
DESCRIPTION: Phase III

DATE: 16 day Oct month 2001 year

MATERIAL TYPE: Low perm. Clay

SAMPLE NO.: LP-01-36 QA ID: KS

CURVE COEFFICIENTS: (C_u) ..... (C_c) .....



ATTERBERG LIMITS

(LL) 29

(PL) 16

(PI) 13

SIEVE RESULTS

SIEVE SIZE	% FINER
3-in.	100
2-in.	100
1 1/2-in.	100
1-in.	99.9
3/4-in.	99.3
1/2-in.	98.0
3/8-in.	97.0
NO. 4	93.8
NO. 10	89.6
NO. 20	85.9
NO. 40	82.6
NO. 60	79.7
NO. 100	75.8
NO. 200	70.6

HYDROMETER RESULTS

PARTICLE DIA.	% FINER
0.050	69
0.020	51
0.005	35
0.002	26

SOIL CLASSIFICATION (ASTM D 2487): Lean Clay with Sand (CL)

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FLUOR FERNALD

PARTICLE SIZE ANALYSIS–SIEVE METHOD (ASTM D 422)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO — PROJECT NO.: GP134 TASK NO.: 04.1

DESCRIPTION: PHASE III — DATE: 09 day OCT month 2001 year

MATERIAL TYPE: LOW PERM CLAY — SAMPLE NO.: LP-01-37

SOIL SAMPLE SIZE: +3/8 = 1612.8g | MOISTURE = 264.5g | AIT = 788.6g | -3/8 = 64.84lbs = 29,411.4g | SIEVE = 558.0g | TOTAL = 32,635.3g

APPROXIMATE MINIMUM WT. OF SAMPLE (PASSING NO. 10 SIEVE) (grams)	SAND	FINE GRAIN
	115	65

	+3/8 BEFORE WASH	-3/8	+3/8 AFTER WASH	-3/8
TARE NO.	L-1	LL-4	L-1	LL-4
WT. OF DRY SAMPLE PLUS TARE (grams)	1805.5	665.1	1669.1	261.6
WT. OF TARE (grams)	192.7	107.1	192.7	107.1
WT. OF DRY SAMPLE (grams)	1612.8	558.0	1476.4	154.5

SIEVE ANALYSIS — QA ID: TBW/DLE

SIEVE NO.	DIAMETER (mm)	WT. RETAINED (grams)	% RETAINED	% FINER		PROJECT SPECIFICATIONS
3 in	76.2	0	0	100		
2 in	50.8	0	0	100		
1 1/2in	38.1	0	0	100		
1 in	25.4	177.5	0.5	99.5		
3/4 in	19.1	386.0	1.2	98.8		
1/2 in	12.7	1072.3	3.3	96.7		
3/8 in	9.53	1439.8	4.4	95.6		
No. 4	4.75	19.0	3.4	96.6	92.3	
No. 10	2.00	44.4	8.0	92.0	88.0	
No. 20	0.850	66.3	11.9	88.1	84.2	
No. 40	0.425	86.2	15.4	84.6	80.8	
No. 60	0.250	102.9	18.4	81.6	78.0	
No. 100	0.125	127.9	22.9	77.1	73.7	
No. 200	0.075	153.5	27.5	72.5	69.3	
PAN	—	154.5	—	—		

COMMENTS:

000231

%FINER = 100 − Σ% RETAINED

GEOSYNTEC CONSULTANTS

FLUOR DANIEL FERNALD

PARTICLE SIZE DISTRIBUTION AND SOIL CLASSIFICATION TEST RESULTS

(ASTM C 136/D 422) (ASTM D 2487)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO

PROJECT NO.: GQ1341 TASK NO.: 04.1

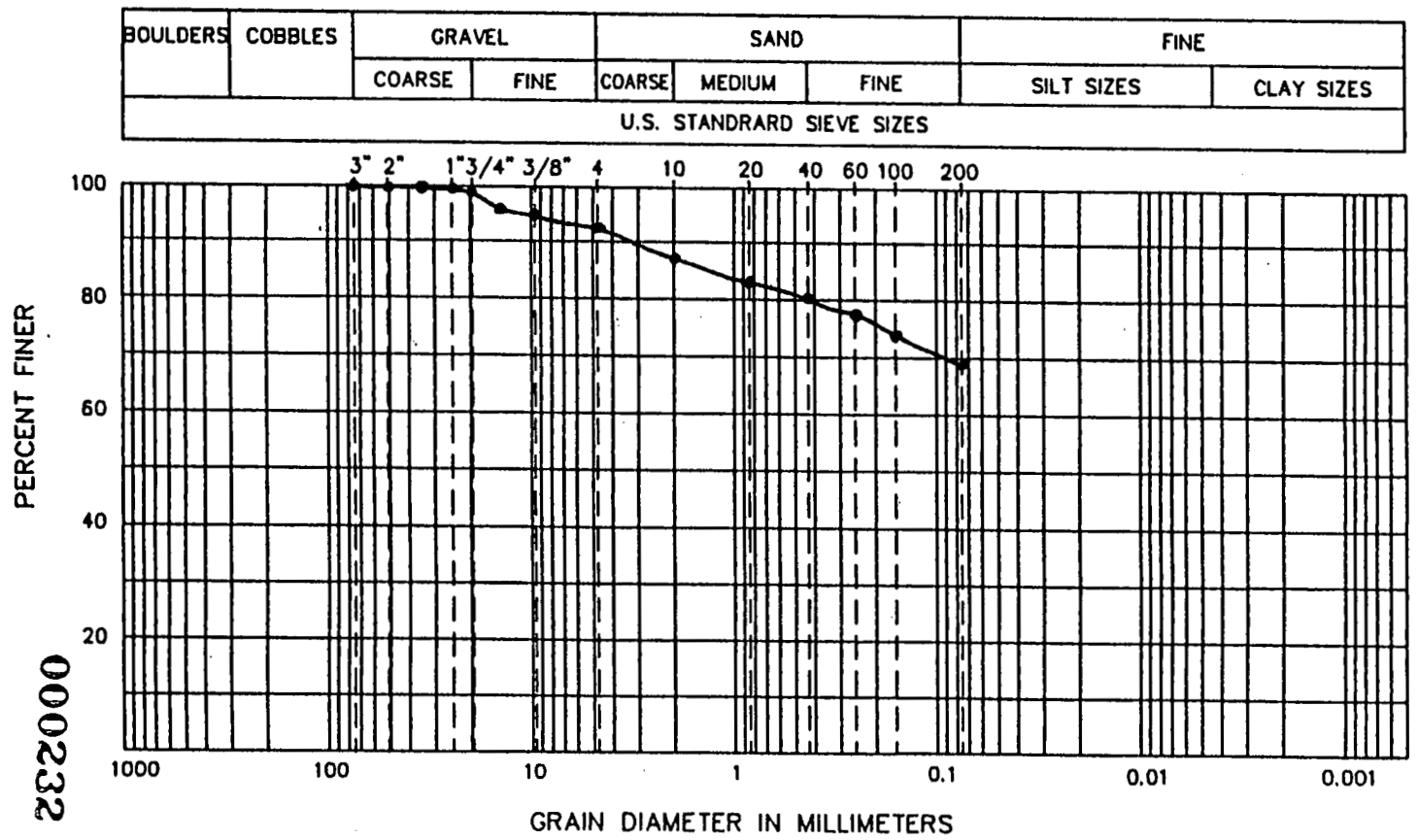
DESCRIPTION: Phase III

DATE: 16 day Oct month 2001 year

MATERIAL TYPE: Low Perm. Clay

SAMPLE NO.: LP-01-37 QA ID: KS

CURVE COEFFICIENTS: (C_u) ..... (C_c) .....



ATTERBERG LIMITS

(LL) 29

(PL) 16

(PI) 13

SIEVE RESULTS

SIEVE SIZE	% FINER
3-in.	100
2-in.	100
1 1/2-in.	100
1-in.	99.5
3/4-in.	98.8
1/2-in.	96.7
3/8-in.	95.6
NO. 4	92.3
NO. 10	88.0
NO. 20	84.2
NO. 40	80.8
NO. 60	78.0
NO. 100	73.7
NO. 200	69.3

HYDROMETER RESULTS

PARTICLE DIA.	% FINER
0.050	68
0.020	52
0.005	34
0.002	25

SOIL CLASSIFICATION (ASTM D 2487): Sandy lean clay (CL)

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FLUOR FERNALD

PARTICLE SIZE ANALYSIS—SIEVE METHOD (ASTM D 422)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO — PROJECT NO.: GQ134 TASK NO.: 04.1

DESCRIPTION: PHASE III — DATE: 09 day OCT month 2001 year

MATERIAL TYPE: LOW PERM CLAY — SAMPLE NO.: LP-01-38

SOIL SAMPLE SIZE: +3/8 = 730.5g | MOISTURE = 279.0g | ATT = 937.4g | TOTAL = 32,684.3g
-3/8 = 66.33lbs = 30,087.3g | SIEVE = 650.1g

APPROXIMATE MINIMUM WT. OF SAMPLE (PASSING NO. 10 SIEVE) (grams)	SAND	FINE GRAIN
	115	65

	BEFORE WASH +3/8	BEFORE WASH -3/8	AFTER WASH +3/8	AFTER WASH -3/8
TARE NO.	K	L-5	K	L-5
WT. OF DRY SAMPLE PLUS TARE (grams)	832.0	756.5	801.7	264.6
WT. OF TARE (grams)	101.5	106.4	101.5	106.4
WT. OF DRY SAMPLE (grams)	730.5	650.1	700.2	158.2

SIEVE ANALYSIS — QA ID: TBO/DLE

SIEVE NO.	DIAMETER (mm)	WT. RETAINED (grams)	% RETAINED	% FINER		PROJECT SPECIFICATIONS
3 in	76.2	0	0	100		
2 in	50.8	0	0	100		
1 1/2in	38.1	0	0	100		
1 in	25.4	107.0	0.3	99.7		
3/4 in	19.1	212.4	0.6	99.4		
1/2 in	12.7	511.9	1.6	98.4		
3/8 in	9.53	693.3	2.1	97.9		
No. 4	4.75	14.4	2.2	97.8	95.7	
No. 10	2.00	37.5	5.8	94.2	92.3	
No. 20	0.850	64.3	9.9	90.1	88.2	
No. 40	0.425	87.6	13.5	86.5	84.7	
No. 60	0.250	106.1	16.3	83.7	81.9	
No. 100	0.125	129.3	19.9	80.1	78.4	
No. 200	0.075	157.6	24.2	75.8	74.2	
PAN	—	158.2	—	—		

COMMENTS:

000233

%FINER = 100 − Σ% RETAINED

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FLUOR DANIEL FERNALD

PARTICLE SIZE DISTRIBUTION AND SOIL CLASSIFICATION TEST RESULTS

(ASTM C 136/D 422) (ASTM D 2487)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO

DESCRIPTION: Phase III

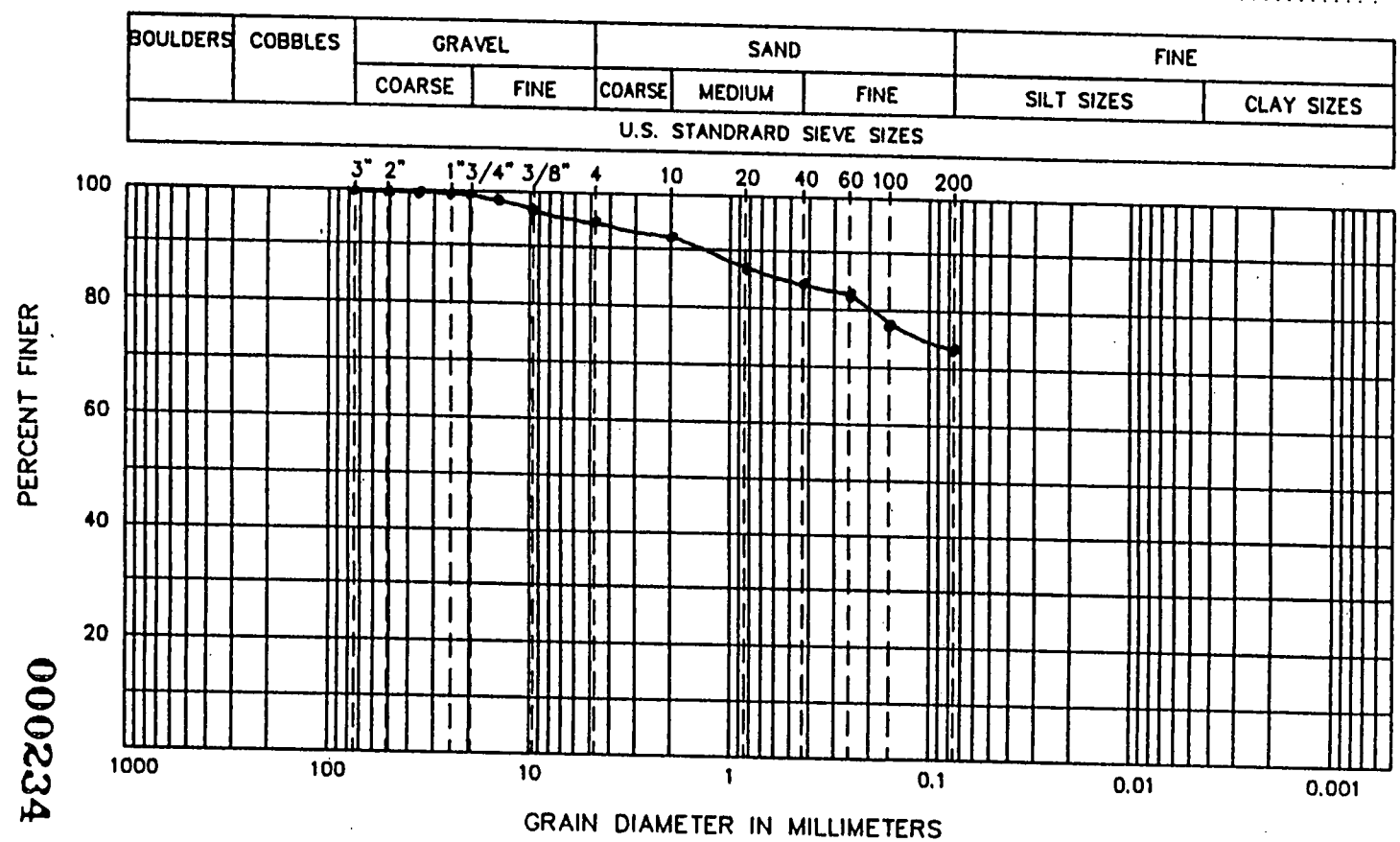
MATERIAL TYPE: Low perm. Clay

PROJECT NO.: GQ1341 TASK NO.: 04.1

DATE: 16 day Oct month 2001 year

SAMPLE NO.: LP-01-38 QA ID: KS

CURVE COEFFICIENTS: (C_u) ..... (C_c) .....



ATTERBERG LIMITS

(LL) 32

(PL) 16

(PI) 15

SIEVE RESULTS

SIEVE SIZE	% FINER
3-in.	100
2-in.	100
1 1/2-in.	100
1-in.	99.7
3/4-in.	99.4
1/2-in.	98.4
3/8-in.	97.9
NO. 4	95.7
NO. 10	92.3
NO. 20	88.2
NO. 40	84.7
NO. 60	81.9
NO. 100	78.4
NO. 200	74.2

HYDROMETER RESULTS

PARTICLE DIA.	% FINER
0.050	72
0.020	54
0.005	38
0.002	27

SOIL CLASSIFICATION (ASTM D 2487): Lean Clay with Sand (CL)

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FLUOR FERNALD

PARTICLE SIZE ANALYSIS–SIEVE METHOD (ASTM D 422)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO — PROJECT NO.: 6Q134 — TASK NO.: 04.1

DESCRIPTION: PHASE III — DATE: 11 day OCT month 2001 year

MATERIAL TYPE: Low Perm CLAY — SAMPLE NO.: LP-01-40

SOIL SAMPLE SIZE: +3/8 = 1297.8g | MOISTURE = 358.3g | -3/8 = 87.42 Lbs = 39653.7 grams | TOTAL = 41,309.8g

APPROXIMATE MINIMUM WT. OF SAMPLE (PASSING NO. 10 SIEVE) (grams)	SAND	FINE GRAIN
	115	65

	+3/8 BEFORE WASH	-3/8	+3/8 AFTER WASH	-3/8
TARE NO.	L-4	L-2	L-4	L-2
WT. OF DRY SAMPLE PLUS TARE (grams)	1444.2	895.7	1286.5	404.4
WT. OF TARE (grams)	146.4	191.8	146.4	191.8
WT. OF DRY SAMPLE (grams)	1297.8	703.9	1140.1	212.6

SIEVE ANALYSIS — QA ID: DLE/MBR

SIEVE NO.	DIAMETER (mm)	WT. RETAINED (grams)	% RETAINED	% FINER		PROJECT SPECIFICATIONS
3 in	76.2	0	0	100		
2 in	50.8	0	0	100		100
1 1/2in	38.1	0	0	100		
1 in	25.4	148.6	0.4	99.6		
3/4 in	19.1	327.7	0.8	99.2		90 - 100
1/2 in	12.7	799.2	1.9	98.1		
3/8 in	9.53	1138.4	2.8	97.2		
No. 4	4.75	25.7	3.7	96.3	93.6	
No. 10	2.00	55.2	7.8	92.2	89.6	
No. 20	0.850	85.6	12.2	87.8	85.3	
No. 40	0.425	115.3	16.4	83.6	81.3	
No. 60	0.250	139.8	19.9	80.1	77.9	
No. 100	0.125	169.4	24.1	75.9	73.8	
No. 200	0.075	208.8	29.7	70.3	68.3	50/100
PAN	—	212.6	—	—	—	

COMMENTS:

000235

%FINER = 100 − Σ% RETAINED

GEOSYNTEC CONSULTANTS

FLUOR DANIEL FERNALD

PARTICLE SIZE DISTRIBUTION AND SOIL CLASSIFICATION TEST RESULTS

(ASTM C 136/D 422) (ASTM D 2487)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO

DESCRIPTION: Phase III

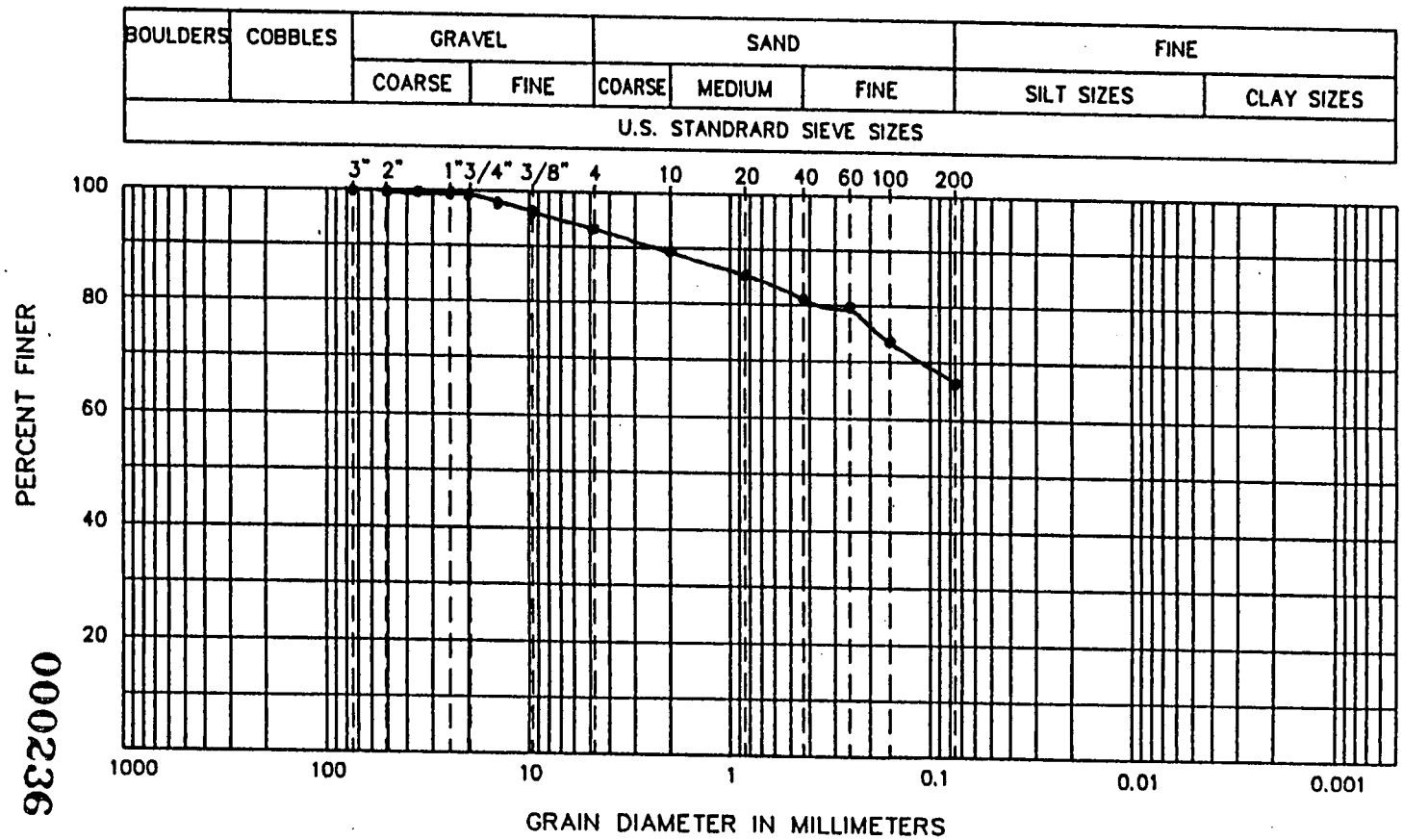
MATERIAL TYPE: Low Perm. Clay

PROJECT NO.: GQ1341 TASK NO.: 04.1

DATE: 16 day Oct month 2000 year

SAMPLE NO.: LP-01-40 QA ID: KS

CURVE COEFFICIENTS: (C_u) ..... (C_c) .....



ATTERBERG LIMITS

(LL) 25

(PL) 15

(PI) 10

SIEVE RESULTS

SIEVE SIZE	% FINER
3-in.	100
2-in.	100
1 1/2-in.	100
1-in.	99.6
3/4-in.	99.2
1/2-in.	98.1
3/8-in.	97.2
NO. 4	93.6
NO. 10	89.6
NO. 20	85.3
NO. 40	81.3
NO. 60	77.9
NO. 100	73.8
NO. 200	68.3

HYDROMETER RESULTS

PARTICLE DIA.	% FINER
0.050	68
0.020	52
0.005	30
0.002	22

SOIL CLASSIFICATION (ASTM D 2487): Lean Clay with Sand (CL)

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GEOSYNTEC CONSULTANTS

FLUOR FERNALD

PARTICLE SIZE ANALYSIS—SIEVE METHOD (ASTM D 422)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO PROJECT NO.: GQ134 TASK NO.: 04.1

DESCRIPTION: PHASE III DATE: 15 day OCT month 2001 year

MATERIAL TYPE: LOW PERM CLAY SAMPLE NO.: LP-01-41

SOIL SAMPLE SIZE [+3/8 = 1207.0g | MOISTURE = 447.2g] [-3/8 = 53.09 lbs = 24,081.6g] TOTAL = 25,735.8g

APPROXIMATE MINIMUM WT. OF SAMPLE (PASSING NO. 10 SIEVE) (grams)	SAND	FINE GRAIN
	115	65

		BEFORE WASH +3/8	BEFORE WASH -3/8	AFTER WASH +3/8	AFTER WASH -3/8
TARE NO.		L-3	L-44	L-3	L-44
WT. OF DRY SAMPLE PLUS TARE	(grams)	1397.4	815.0	1345.3	352.13
WT. OF TARE	(grams)	190.4	191.8	190.4	191.8
WT. OF DRY SAMPLE	(grams)	1207.0	623.2	1154.9	160.33

SIEVE ANALYSIS QA ID: DLB

SIEVE NO.	DIAMETER (mm)	WT. RETAINED (grams)	% RETAINED	% FINER		PROJECT SPECIFICATIONS
3 in	76.2	0	0	100		
2 in	50.8	0	0	100		100
1 1/2in	38.1	0	0	100		
1 in	25.4	218.9	0.9	99.1		
3/4 in	19.1	464.8	1.8	98.2		90-100
1/2 in	12.7	914.5	3.6	96.4		
3/8 in	9.53	1154.07	4.5	95.5		
No. 4	4.75	15.08	2.41	97.6	93.2	
No. 10	2.00	35.00	5.61	94.4	90.2	
No. 20	0.850	57.21	9.18	91.0 ~~90.8~~	~~86.7~~ 86.9	
No. 40	0.425	80.18	12.86	87.3 ~~87.1~~	~~83.2~~ 83.4	
No. 60	0.250	103.85	16.66	83.6 ~~83.3~~	~~79.6~~ 79.8	
No. 100	0.125	135.15	21.68	78.6 ~~78.3~~	~~74.8~~ 75.1	
No. 200	0.075	160.06	25.68	74.7 ~~74.3~~	~~71.0~~ 71.3	50-100
PAN	—	160.31	—	—		

COMMENTS:

000237

%FINER = 100 − Σ% RETAINED

GEOSYNTEC CONSULTANTS

FLUOR DANIEL FERNALD

PARTICLE SIZE DISTRIBUTION AND SOIL CLASSIFICATION TEST RESULTS

(ASTM C 136/D 422) (ASTM D 2487)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO

DESCRIPTION: Phase III

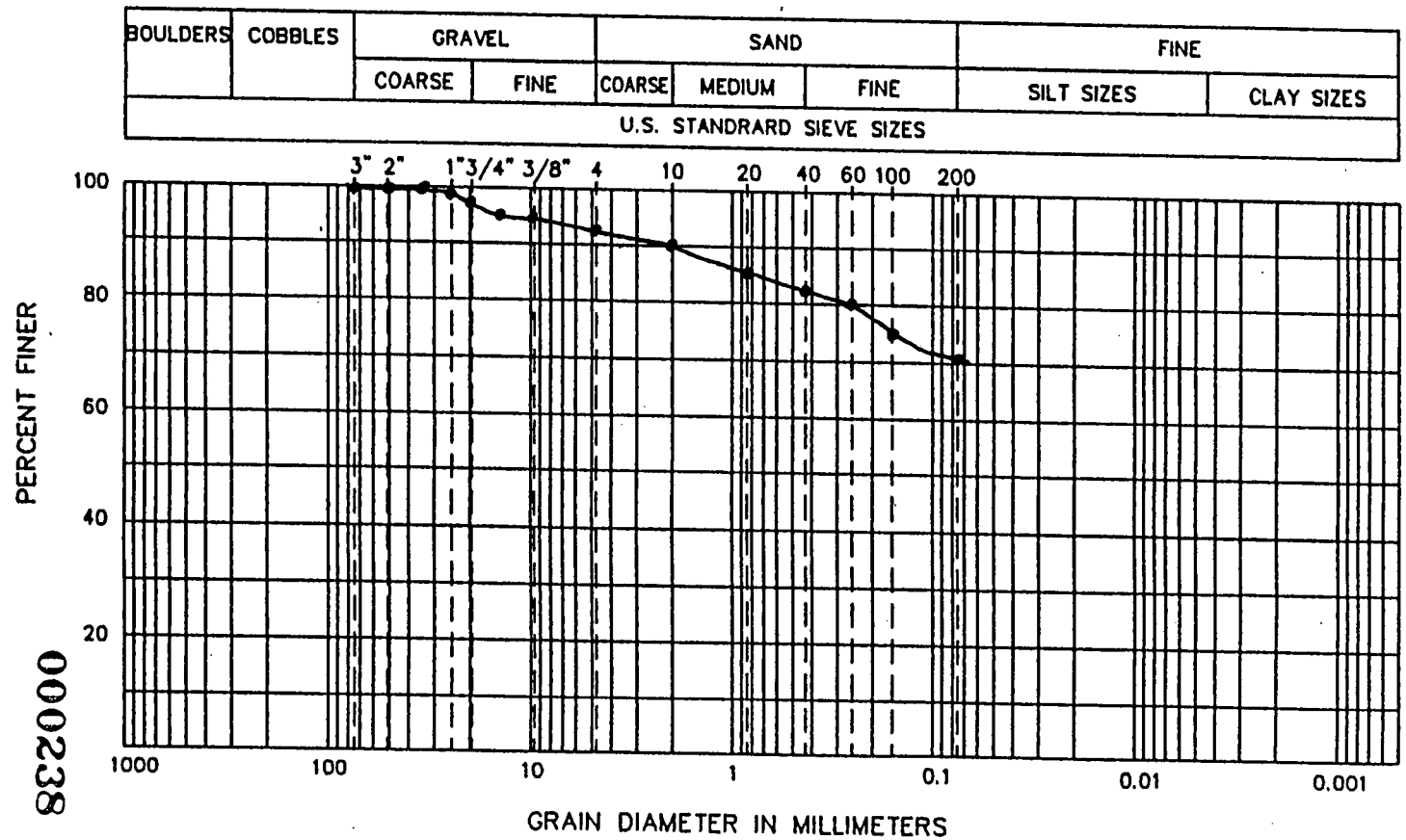
MATERIAL TYPE: Low Perm. Clay

PROJECT NO.: GQ1341 TASK NO.: 04.1

DATE: 16 day Oct month 2001 year

SAMPLE NO.: LP-01-41 QA ID: KS

CURVE COEFFICIENTS: (C_u) ..... (C_c) .....



ATTERBERG LIMITS

(LL) 27

(PL) 15

(PI) 12

SIEVE RESULTS

SIEVE SIZE	% FINER
3-in.	100
2-in.	100
1 1/2-in.	100
1-in.	99.1
3/4-in.	98.2
1/2-in.	96.4
3/8-in.	95.5
NO. 4	93.2
NO. 10	90.2
NO. 20	86.9
NO. 40	83.4
NO. 60	79.8
NO. 100	75.1
NO. 200	71.3

HYDROMETER RESULTS

PARTICLE DIA.	% FINER
0.050	69
0.020	54
0.005	35
0.002	25

SOIL CLASSIFICATION (ASTM D 2487):

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FLUOR FERNALD

PARTICLE SIZE ANALYSIS—SIEVE METHOD (ASTM D 422)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO — PROJECT NO.: GQ1341 TASK NO.: 041

DESCRIPTION: PHASE III — DATE: 15 day OCT month 2001 year

MATERIAL TYPE: LOW PERM CLAY — SAMPLE NO.: LP-01-42

SOIL SAMPLE SIZE: +3/8 = 728.8 g | MOISTURE = 274.7g | -3/8 = 42.48 lbs = 19,268.9g | TOTAL = 20,272.4g

APPROXIMATE MINIMUM WT. OF SAMPLE (PASSING NO. 10 SIEVE) (grams)	SAND	FINE GRAIN
	115	65

		+3/8 BEFORE WASH	-3/8 BEFORE WASH	+3/8 AFTER WASH	-3/8 AFTER WASH
TARE NO.		L-44	L-3	L-44	L-3
WT. OF DRY SAMPLE PLUS TARE	(grams)	920.5	809.7	868.8	359.13
WT. OF TARE	(grams)	191.7	190.4	191.7	190.40
WT. OF DRY SAMPLE	(grams)	728.8	619.3	677.1	168.73

SIEVE ANALYSIS — QA ID: _____

SIEVE NO.	DIAMETER (mm)	WT. RETAINED (grams)	% RETAINED	% FINER		PROJECT SPECIFICATIONS
3 in	76.2	0	0	100		
2 in	50.8	0	0	100		100
1 1/2in	38.1	0	0	100		
1 in	25.4	45.80	0.2	99.8		
3/4 in	19.1	151.1	0.7	99.3		90-100
1/2 in	12.7	454.4	2.2	97.8		
3/8 in	9.53	677.1	3.3	96.7		
No. 4	4.75	12.21	1.97	98.03	94.8	
No. 10	2.00	30.55	4.93	95.07	91.9	
No. 20	0.850	54.14	8.74	91.26	88.2	
No. 40	0.425	78.99	12.75	87.25	84.4	
No. 60	0.250	101.29	16.36	83.64	80.9	
No. 100	0.125	131.23	21.19	78.81	76.2	
No. 200	0.075	167.30	27.0	73.0	70.6	50-100
PAN	—	168.69	—	—	—	

COMMENTS:

000239

%FINER = 100 − Σ% RETAINED

GEOSYNTEC CONSULTANTS

FLUOR DANIEL FERNALD

PARTICLE SIZE DISTRIBUTION AND SOIL CLASSIFICATION TEST RESULTS

(ASTM C 136/D 422) (ASTM D 2487)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO

DESCRIPTION: Phase III

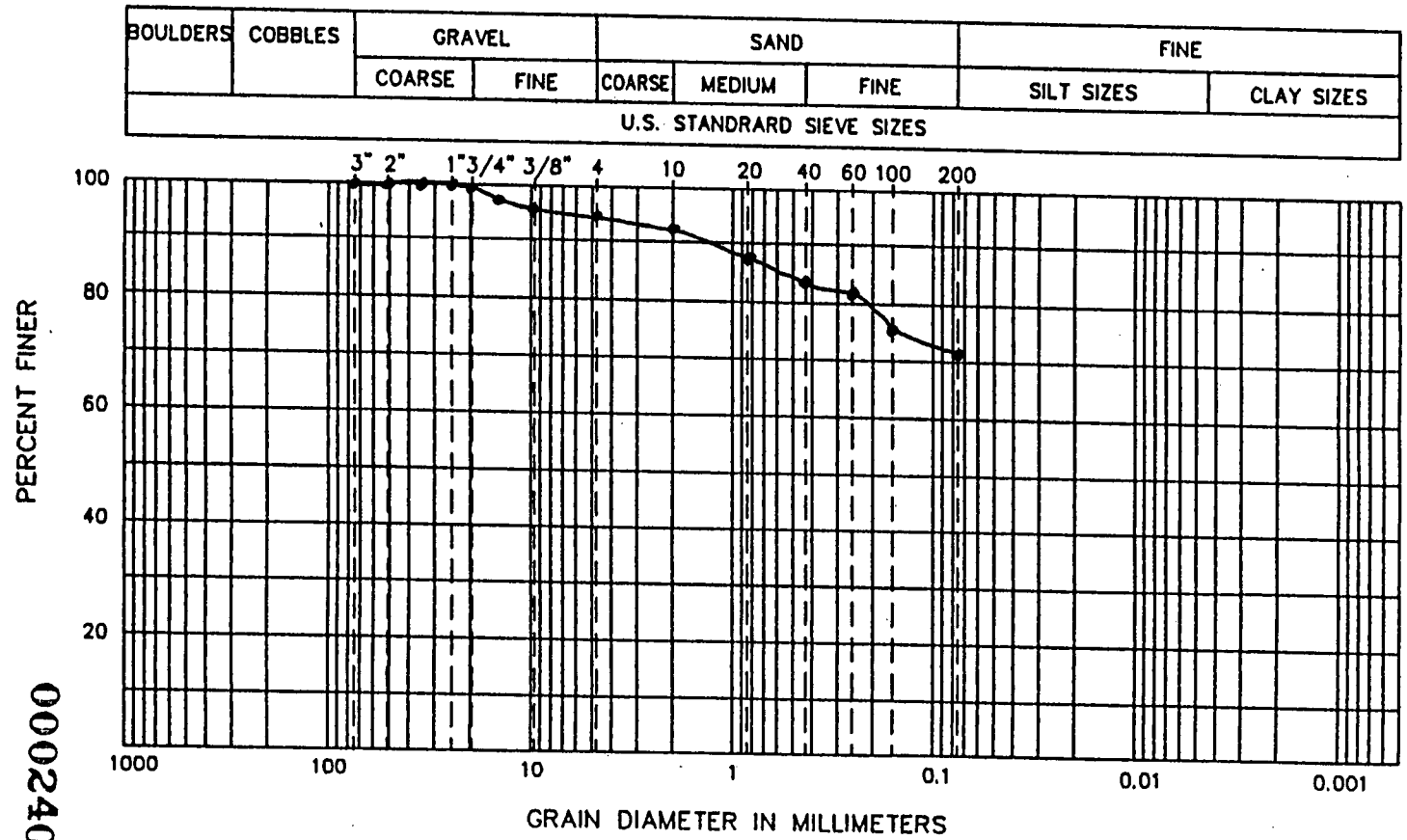
MATERIAL TYPE: Low perm. Clay

PROJECT NO.: GQ1341 TASK NO.: 04.1

DATE: 16 day Oct month 2001 year

SAMPLE NO.: LP-01-42 QA ID: KS

CURVE COEFFICIENTS: (C_u) ..... (C_c) .....



ATTERBERG LIMITS

(LL) 25

(PL) 15

(PI) 10

SIEVE RESULTS

SIEVE SIZE	% FINER
3-in.	100
2-in.	100
1 1/2-in.	100
1-in.	99.8
3/4-in.	99.3
1/2-in.	97.8
3/8-in.	96.7
NO. 4	94.8
NO. 10	91.9
NO. 20	88.2
NO. 40	84.4
NO. 60	80.9
NO. 100	76.2
NO. 200	70.6

HYDROMETER RESULTS

PARTICLE DIA.	% FINER
0.050	70
0.020	52
0.005	35
0.002	25

SOIL CLASSIFICATION (ASTM D 2487): Lean Clay (CL)

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FLUOR FERNALD

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PARTICLE SIZE ANALYSIS–SIEVE METHOD (ASTM D 422)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO PROJECT NO.: GQ134 TASK NO.: 04.1

DESCRIPTION: PHASE III DATE: 16 day OCT month 2001 year

MATERIAL TYPE: LOW PERM CLAY SAMPLE NO.: LP-01-43

SOIL SAMPLE SIZE	+3/8 = 1999.9 g	MOISTURE = 382.6 g	TOTAL = 40,317.1 g
	-3/8 = 83.63 lbs = 37,934.6 g		

APPROXIMATE MINIMUM WT. OF SAMPLE (PASSING NO. 10 SIEVE) (grams)	SAND	FINE GRAIN
	115	65

		+3/8 BEFORE WASH	-3/8 BEFORE WASH	+3/8 AFTER WASH	-3/8 AFTER WASH
TARE NO.		L-1	L-2	L-1	L-2
WT. OF DRY SAMPLE PLUS TARE	(grams)	2192.6	876.1	1934.2	372.1
WT. OF TARE	(grams)	192.7	191.8	192.7	191.8
WT. OF DRY SAMPLE	(grams)	1999.9	684.3	1741.5	180.3

SIEVE ANALYSIS QA ID: _____

SIEVE NO.	DIAMETER (mm)	WT. RETAINED (grams)	% RETAINED	% FINER		PROJECT SPECIFICATIONS
3 in	76.2	Ø	Ø	100		
2 in	50.8	Ø	Ø	100		100
1 1/2in	38.1	Ø	Ø	100		
1 in	25.4	337.4	0.8	99.2		
3/4 in	19.1	671.6	1.7	98.3		90-100
1/2 in	12.7	1335.6	3.3	96.7		
3/8 in	9.53	1739.5	4.3	95.7		
No. 4	4.75	23.2	3.4	96.6 ~~92.4~~	92.4	
No. 10	2.00	53.2	7.8	92.2	88.2	
No. 20	0.850	77.5	11.3	88.7	84.8	
No. 40	0.425	100.1	14.6	85.4	81.7	
No. 60	0.250	120.6	17.6	82.4	78.8	
No. 100	0.125	147.4	21.5	78.5	75.1	
No. 200	0.075	178.6	26.1	73.9	70.7	50-100
PAN	—	179.9	—	—		

COMMENTS:

000241

%FINER = 100 − Σ% RETAINED

GEOSYNTEC CONSULTANTS

FLUOR DANIEL FERNALD

PARTICLE SIZE DISTRIBUTION AND SOIL CLASSIFICATION TEST RESULTS

(ASTM C 136/D 422) (ASTM D 2487)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO

DESCRIPTION: Phase III

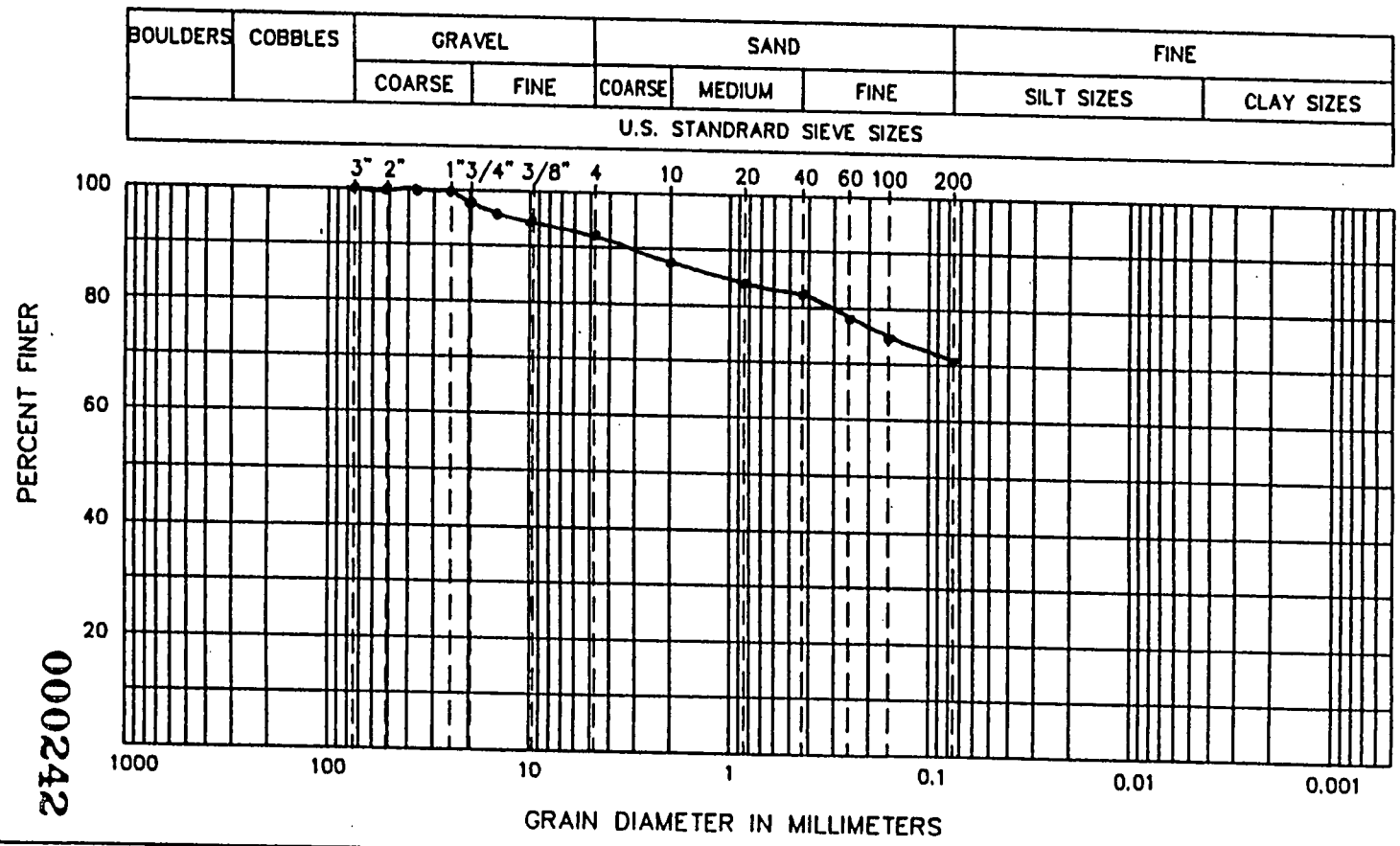
MATERIAL TYPE: Low Perm Clay

PROJECT NO.: 6Q1341 TASK NO.: 04.1

DATE: 30 day Oct month 2000 year

SAMPLE NO.: LP-01-43 QA ID: KS

CURVE COEFFICIENTS: (C_u) ..... (C_c) .....



ATTERBERG LIMITS

(LL) 32

(PL) 16

(PI) 16

SIEVE RESULTS

SIEVE SIZE	% FINER
3-in.	100
2-in.	100
1 1/2-in.	100
1-in.	99.2
3/4-in.	98.3
1/2-in.	96.7
3/8-in.	95.7
NO. 4	92.4
NO. 10	88.2
NO. 20	84.8
NO. 40	81.7
NO. 60	78.8
NO. 100	75.1
NO. 200	70.7

HYDROMETER RESULTS

PARTICLE DIA.	% FINER
0.050	68
0.020	55
0.005	38
0.002	30

SOIL CLASSIFICATION (ASTM D 2487): Lean Clay w/ Sand (CL)

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GEOSYNTEC CONSULTANTS

FLUOR FERNALD

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PARTICLE SIZE ANALYSIS—SIEVE METHOD (ASTM D 422)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO PROJECT NO.: GQ1341 TASK NO.: 041

DESCRIPTION: PHASE III DATE: 17 day OCT month 2001 year

MATERIAL TYPE: Low Perm CLAY SAMPLE NO.: LP-01-44

SOIL SAMPLE SIZE	+3/8 = 1061.0g	MOISTURE = 345.3g	TOTAL = 21,704.9g
	-3/8 = 44.75lbs = 20,298.6g		

APPROXIMATE MINIMUM WT. OF SAMPLE (PASSING NO. 10 SIEVE) (grams)	SAND	FINE GRAIN
	115	65

		+3/8 BEFORE WASH	-3/8 BEFORE WASH	+3/8 AFTER WASH	-3/8 AFTER WASH
TARE NO.		L-7	L-3	L-7	L-3
WT. OF DRY SAMPLE PLUS TARE	(grams)	1254.9	922.8	1117.1	389.5
WT. OF TARE	(grams)	193.9	190.4	193.9	190.4
WT. OF DRY SAMPLE	(grams)	1061.0	732.4	923.2	199.1

SIEVE ANALYSIS QA ID: DLF

SIEVE NO.	DIAMETER (mm)	WT. RETAINED (grams)	% RETAINED	% FINER		PROJECT SPECIFICATIONS
3 in	76.2	0	0	100		
2 in	50.8	0	0	100		100
1 1/2in	38.1	107.3	.5	99.5		
1 in	25.4	244.6	1.1	98.9		
3/4 in	19.1	394.6	1.8	98.2		90-100
1/2 in	12.7	721.9	3.3	96.7		
3/8 in	9.53	922.0	4.2	95.8		
No. 4	4.75	32.8	4.5	95.5	91.9	
No. 10	2.00	61.3	8.4	91.6	87.8	
No. 20	0.850	85.1	11.6	88.4	84.7	
No. 40	0.425	109.3	14.9	85.1	81.5	
No. 60	0.250	132.2	18.1	81.9	78.5	
No. 100	0.125	161.2	22.0	78.0	74.7	
No. 200	0.075	196.8	26.9	73.1	70.0	50-100
PAN	—	199.1	—	—		

COMMENTS:

000243

%FINER = 100 − Σ% RETAINED

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GEOSYNTEC CONSULTANTS

FLUOR DANIEL FERNALD

PARTICLE SIZE DISTRIBUTION AND SOIL CLASSIFICATION TEST RESULTS

(ASTM C 136/D 422) (ASTM D 2487)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO

DESCRIPTION: Phase III

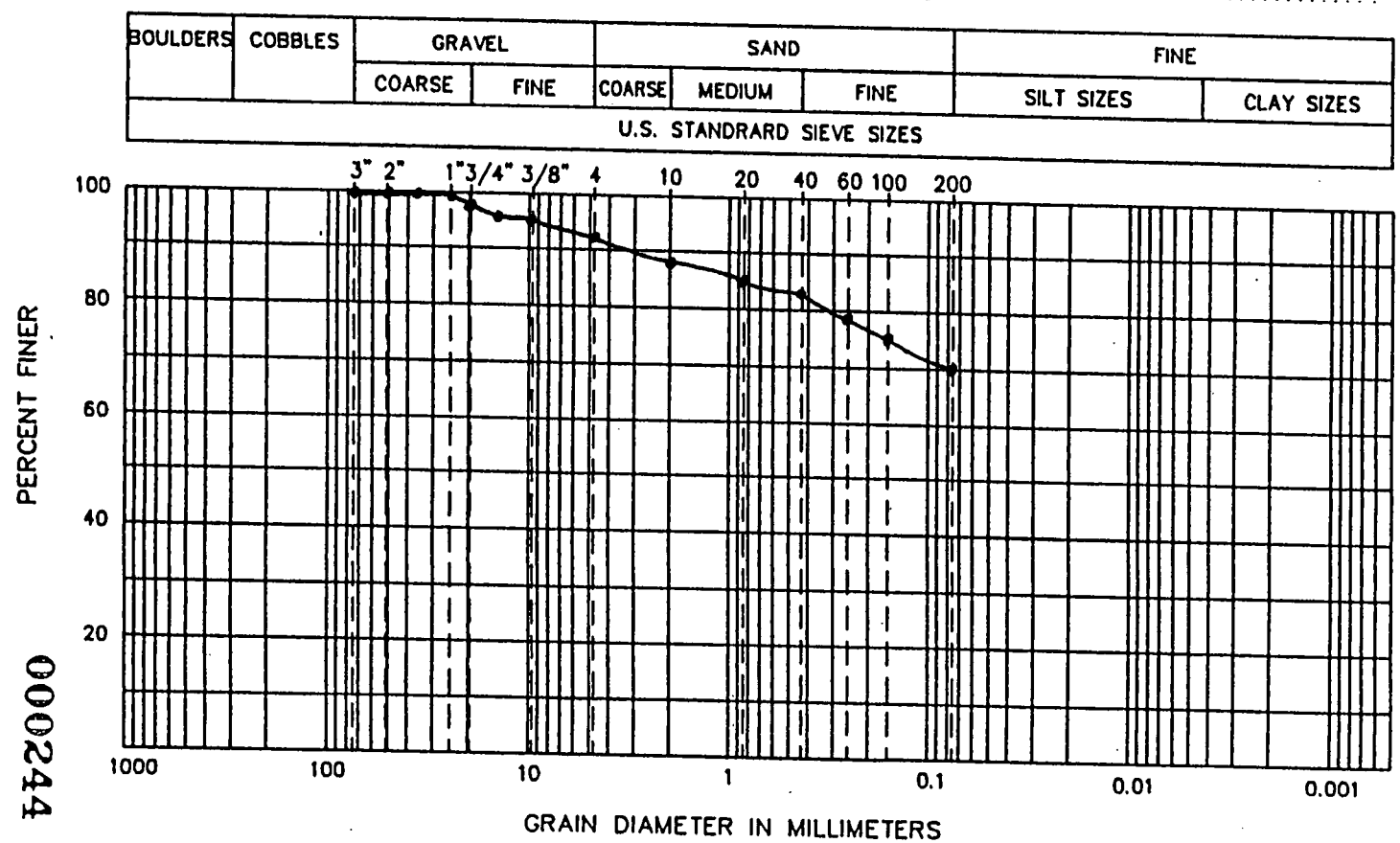
MATERIAL TYPE: Low Perm Clay

PROJECT NO.: 6Q 1341 TASK NO.: 04.1

DATE: 30 day Oct month 2001 year

SAMPLE NO.: LP-01-44 QA ID: KS

CURVE COEFFICIENTS: (C_u) ..... (C_c) .....



ATTERBERG LIMITS

(LL) 31

(PL) 16

(PI) 15

SIEVE RESULTS

SIEVE SIZE	% FINER
3-in.	100
2-in.	100
1 1/2-in.	99.5
1-in.	98.9
3/4-in.	98.2
1/2-in.	96.7
3/8-in.	95.8
NO. 4	91.9
NO. 10	87.8
NO. 20	84.7
NO. 40	81.5
NO. 60	78.5
NO. 100	74.7
NO. 200	70.0

HYDROMETER RESULTS

PARTICLE DIA.	% FINER
0.050	69
0.020	55
0.005	35
0.002	28

SOIL CLASSIFICATION (ASTM D 2487): Gravelly lean clay w/ Sand (CL)

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FLUOR FERNALD

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PARTICLE SIZE ANALYSIS—SIEVE METHOD (ASTM D 422)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO PROJECT NO.: GQ1341 TASK NO.: 04.1

DESCRIPTION: PHASE III DATE: 18 day Oct month 2001 year

MATERIAL TYPE: Low Perm CLAY SAMPLE NO.: LP-01-45

SOIL SAMPLE SIZE: +3/8 = 1939.2 gm; -3/8 = 95.3 lbs = 43,228.1 gr; MOISTURE = 425.4 gm; TOTAL = 45,592.7 gr

APPROXIMATE MINIMUM WT. OF SAMPLE (PASSING NO. 10 SIEVE) (grams)	SAND	FINE GRAIN
	115	65

		+3/8 BEFORE WASH	-3/8 BEFORE WASH	+3/8 AFTER WASH	-3/8 AFTER WASH
TARE NO.		L-44	K	L44	K
WT. OF DRY SAMPLE PLUS TARE	(grams)	2130.9	956.4	2002.1	369.9
WT. OF TARE	(grams)	191.7	101.5	191.7	101.5
WT. OF DRY SAMPLE	(grams)	1939.2	854.9	1810.4	268.4

SIEVE ANALYSIS QA ID: PLE

SIEVE NO.	DIAMETER (mm)	WT. RETAINED (grams)	% RETAINED	% FINER		PROJECT SPECIFICATIONS
3 in	76.2	Ø	Ø	100		
2 in	50.8	Ø	Ø	100		100
1 1/2in	38.1	Ø	Ø	100		
1 in	25.4	105.8	.2	99.8		
3/4 in	19.1	479.8	1.1	98.9		90-100
1/2 in	12.7	1185.8	2.6	97.4		
3/8 in	9.53	1810.3	4.0	96.0		
No. 4	4.75	33.2	3.9	96.1	92.3	
No. 10	2.00	79.0	9.2	90.8	87.2	
No. 20	0.850	117.6	13.8	86.2	82.8	
No. 40	0.425	153.4	17.9	82.1	~~78.8~~ ← 78.8 OTE	
No. 60	0.250	185.2	21.7	78.3	75.2	
No. 100	0.125	226.2	26.5	73.5	70.6	
No. 200	0.075	267.4	31.3	68.7	66.0	50-100
PAN	—	268.4	—	—	—	

COMMENTS:

000245

%FINER = 100 − Σ% RETAINED

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GEOSYNTEC CONSULTANTS

FLUOR DANIEL FERNALD

PARTICLE SIZE DISTRIBUTION AND SOIL CLASSIFICATION TEST RESULTS

(ASTM C 136/D 422) (ASTM D 2487)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO

DESCRIPTION: Phase III

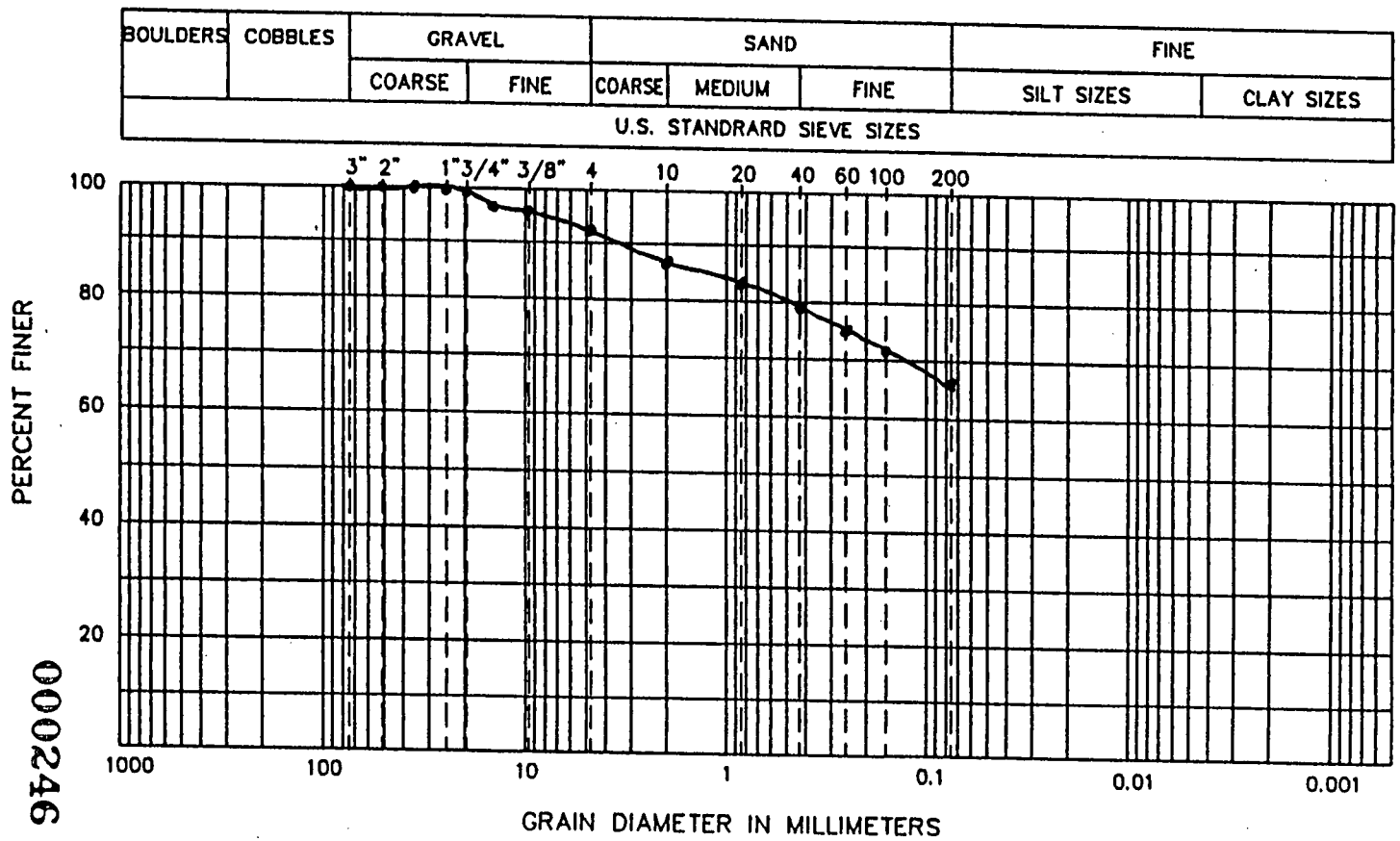
MATERIAL TYPE: Low Perm Clay

PROJECT NO.: 6Q1341 TASK NO.: 04.1

DATE: 30 day Oct month 2001 year

SAMPLE NO.: LP01-45 QA ID: KS

CURVE COEFFICIENTS: (C_u) ..... (C_c) .....



ATTERBERG LIMITS

(LL) 24

(PL) 15

(PI) 9

SIEVE RESULTS

SIEVE SIZE	% FINER
3-in.	100
2-in.	100
1 1/2-in.	100
1-in.	99.8
3/4-in.	98.9
1/2-in.	97.4
3/8-in.	96.0
NO. 4	92.3
NO. 10	87.2
NO. 20	82.8
NO. 40	78.8
NO. 60	75.2
NO. 100	70.6
NO. 200	66.0

HYDROMETER RESULTS

PARTICLE DIA.	% FINER
0.050	65
0.020	49
0.005	28
0.002	20

SOIL CLASSIFICATION (ASTM D 2487): Gravelly lean Clay w/ Sand (CL)

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FLUOR FERNALD

4940

PARTICLE SIZE ANALYSIS—SIEVE METHOD (ASTM D 422)

39086

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO PROJECT NO.: GQ1341 TASK NO.: 04.1

DESCRIPTION: PHASE III DATE: 24 day Oct month 2001 year

MATERIAL TYPE: LOW PERM CLAY SAMPLE NO.: LP-01-46

SOIL SAMPLE SIZE	+3/8 = 1406.0 g	MOISTURE = 393.2 g	TOTAL = 39080.6 gm
	-3/8 = 82.19 lbs = 37281.9 g		

APPROXIMATE MINIMUM WT. OF SAMPLE (PASSING NO. 10 SIEVE) (grams)	SAND	FINE GRAIN
	115	65

		+3/8 BEFORE WASH	-3/8 BEFORE WASH	+3/8 AFTER WASH	-3/8 AFTER WASH
TARE NO.		L-3	L-2	L-3	L-2
WT. OF DRY SAMPLE PLUS TARE	(grams)	1596.4	833.4	1458.8	345.3
WT. OF TARE	(grams)	190.4	191.8	190.4	191.8
WT. OF DRY SAMPLE	(grams)	1406.0	641.6	1268.4	153.5

SIEVE ANALYSIS QA ID: _____

SIEVE NO.	DIAMETER (mm)	WT. RETAINED (grams)	% RETAINED	% FINER		PROJECT SPECIFICATIONS
3 in	76.2	0	0	100		
2 in	50.8	0	0	100		100
1 1/2in	38.1	0	0	100		
1 in	25.4	178.5	.5	99.5		
3/4 in	19.1	477.6	1.2	98.8		90-100
1/2 in	12.7	933.4	2.4	97.6		
3/8 in	9.53	1268.4	3.2	96.8		
No. 4	4.75	16.9	2.6	97.4	94.3	
No. 10	2.00	35.3	5.5	94.5	91.5	
No. 20	0.850	57.5	9.0	91.0	88.1	
No. 40	0.425	79.1	12.3	87.7	84.9	
No. 60	0.250	98.7	15.4	84.6	81.9	
No. 100	0.125	123.9	19.3	80.7	78.1	
No. 200	0.075	153.0	23.8	76.2	73.8	50-100
PAN	—	153.5	—	—		

COMMENTS:

000247

%FINER = 100 − Σ% RETAINED

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FLUOR DANIEL FERNALD

PARTICLE SIZE DISTRIBUTION AND SOIL CLASSIFICATION TEST RESULTS

(ASTM C 136/D 422) (ASTM D 2487)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO

DESCRIPTION: Phase III

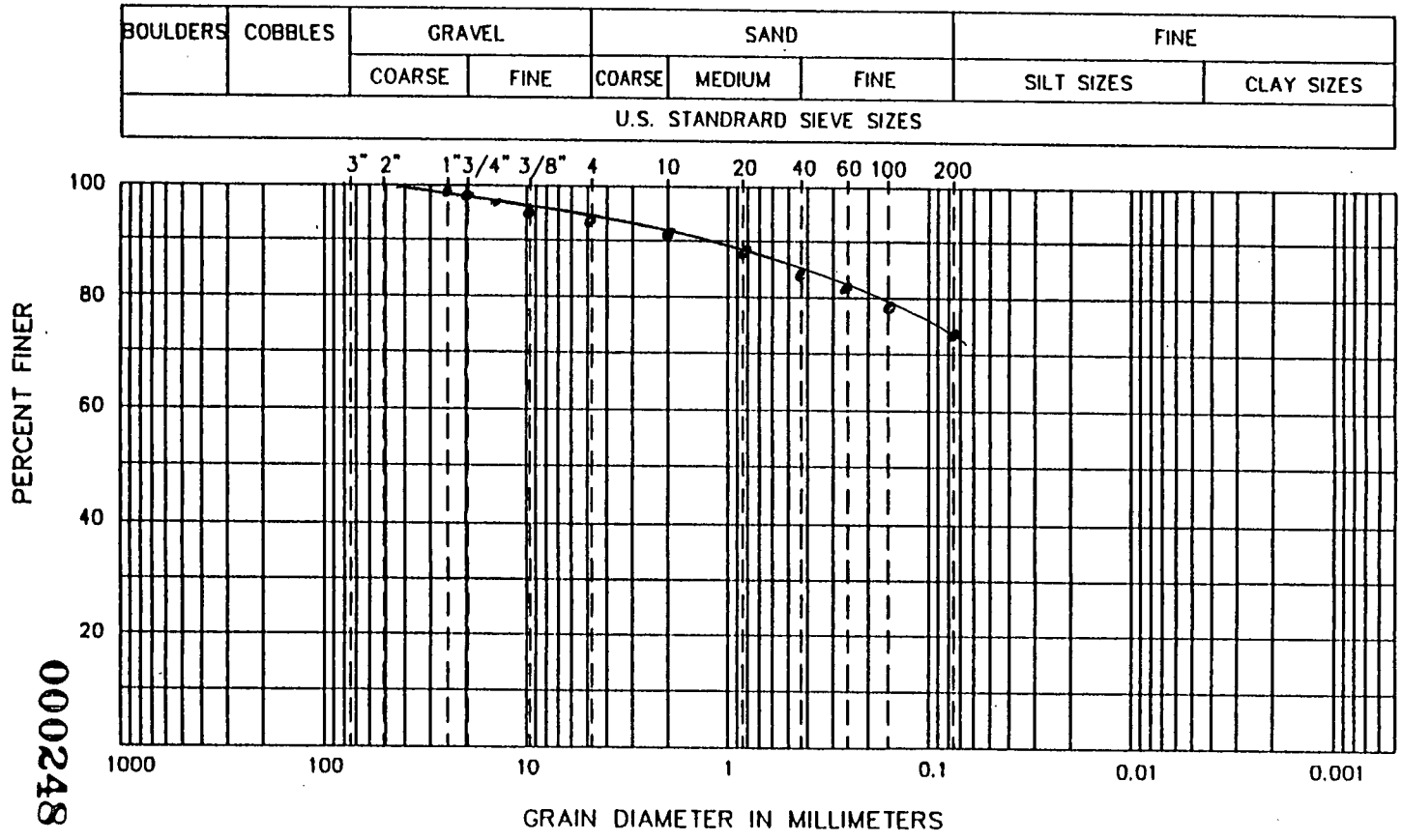
MATERIAL TYPE: Low Perm Clay

PROJECT NO. 6Q1341 TASK NO.: 04.1

DATE: 24 day Oct. month 2001 year

SAMPLE NO.: LP-01-46 QA ID: DLE

CURVE COEFFICIENTS: (C_u) ..... (C_c) .....



ATTERBERG LIMITS

(LL) 30

(PL) 16

(PI) 14

SIEVE RESULTS

SIEVE SIZE	% FINER
3-in.	100
2-in.	100
1 1/2-in.	100
1-in.	99.5
3/4-in.	98.8
1/2-in.	97.6
3/8-in.	96.8
NO. 4	94.3
NO. 10	91.5
NO. 20	88.1
NO. 40	84.9
NO. 60	81.9
NO. 100	78.1
NO. 200	73.6

HYDROMETER RESULTS

PARTICLE DIA.	% FINER
0.050	70
0.020	69
0.005	35
0.002	25

SOIL CLASSIFICATION (ASTM D 2487):

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LB's

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FLUOR FERNALD

~~22.57~~ 42.40

PARTICLE SIZE ANALYSIS—SIEVE METHOD (ASTM D 422)

42.6

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO PROJECT NO.: GQ1341 TASK NO.: 04.1

DESCRIPTION: PHASE III DATE: ____ day Oct month 2001 year

MATERIAL TYPE: LOW PERM CLAY SAMPLE NO.: LP-01-47

44.52 - 1.89

SOIL SAMPLE SIZE	+3/8 = 320.8 gram.	MOISTURE = 320.3 gr	44.01 LBS	TOTAL =
	-3/8 = 42.6 LBS +19337.0 gr		~~+19964.5~~	19964.5

APPROXIMATE MINIMUM WT. OF SAMPLE (PASSING NO. 10 SIEVE)	19323.4 gr (grams)	SAND	FINE GRAIN
		115	65

		+3/8 BEFORE WASH	-3/8 BEFORE WASH	+3/8 AFTER WASH	-3/8 AFTER WASH
TARE NO.		L-4	L-1	L-4	L-1
WT. OF DRY SAMPLE PLUS TARE	(grams)	467.2	715.0	446.9	324.9
WT. OF TARE	(grams)	146.4	192.4	146.4	192.4
WT. OF DRY SAMPLE	(grams)	320.8	522.6	300.5	132.5

SIEVE ANALYSIS QA ID: ____

SIEVE NO.	DIAMETER (mm)	WT. RETAINED (grams)	% RETAINED	% FINER		PROJECT SPECIFICATIONS
3 in	76.2	Ø	Ø	100		
2 in	50.8	Ø	Ø	100		100
1 1/2in	38.1	Ø	Ø	100		
1 in	25.4	20.3	0.10	99.9		
3/4 in	19.1	90.2	0.5	99.5		90-100
1/2 in	12.7	215.9	1.1	98.9		
3/8 in	9.53	300.5	1.5	98.5		
No. 4	4.75	22.1	4.2	95.8	94.4	
No. 10	2.00	43.3	8.3	91.7	90.3	
No. 20	0.850	58.0	11.1	88.9	87.6	
No. 40	0.425	73.6	14.1	85.9	84.6	
No. 60	0.250	89.1	17.0	83.0	81.8	
No. 100	0.125	112.0	~~23.3~~ 21.4	~~76.7~~ 78.6	~~75.5~~ 77.4	
No. 200	0.075	132.0	25.3	74.7	73.6	50-100
PAN	—	132.5	—	—	—	

COMMENTS:

000249

%FINER = 100 - Σ% RETAINED

GEO SYNTEC CONSULTANTS FILE NO. 2-14-PMS CHECKED BY: ____ SHEET NO. 1 OF 2

GEOSYNTEC CONSULTANTS

FLUOR DANIEL FERNALD

PARTICLE SIZE DISTRIBUTION AND SOIL CLASSIFICATION TEST RESULTS

(ASTM C 136/D 422) (ASTM D 2487)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO

PROJECT NO. GQ1341 TASK NO.: 04.1

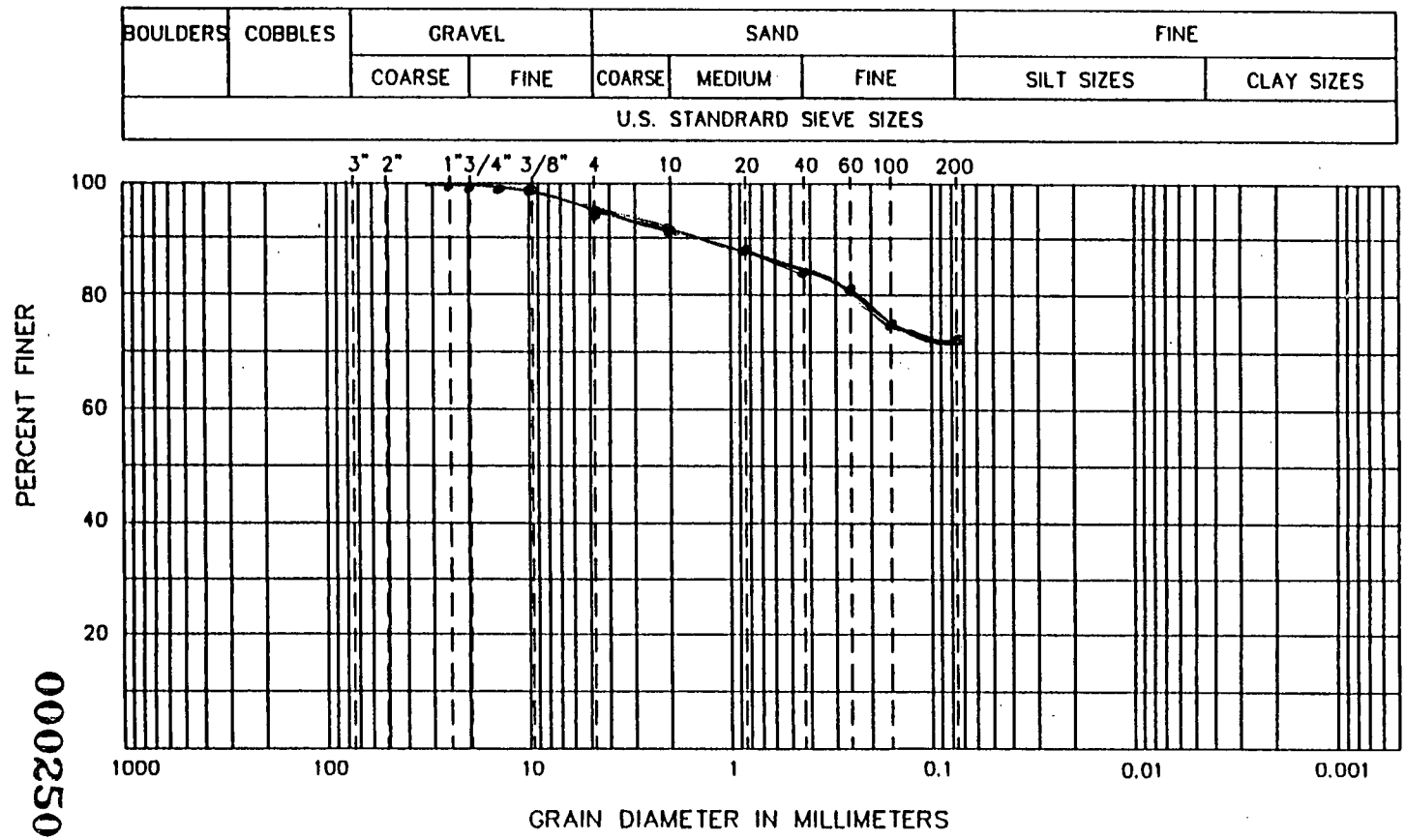
DESCRIPTION: Phase III

DATE: 24 day Oct month 2001 year

MATERIAL TYPE: Low Perm Clay

SAMPLE NO.: LP-01.47 QA ID: DLE

CURVE COEFFICIENTS: (C_u) ..... (C_c) .....



ATTERBERG LIMITS

(LL) 30

(PL) 16

(PI) 14

SIEVE RESULTS

SIEVE SIZE	% FINER
3-in.	100
2-in.	100
1 1/2-in.	100
1-in.	99.9
3/4-in.	99.5
1/2-in.	98.9
3/8-in.	98.5
NO. 4	94.4
NO. 10	90.3
NO. 20	87.6
NO. 40	84.6
NO. 60	81.8
NO. 100	75.5
NO. 200	73.6

HYDROMETER RESULTS

PARTICLE DIA.	% FINER
0.050	72
0.020	58
0.005	37
0.002	25

SOIL CLASSIFICATION (ASTM D 2487):

000250

4940

GEOSYNTEC CONSULTANTS

FLUOR FERNALD

4940

PARTICLE SIZE ANALYSIS—SIEVE METHOD (ASTM D 422)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO PROJECT NO.: GQ1341 TASK NO.: 04.1

DESCRIPTION: PHASE III DATE: 29 day Oct. month 2001 year

MATERIAL TYPE: LOW PERM CLAY SAMPLE NO.: LP-01-48

SOIL SAMPLE SIZE	+3/8 = 778.1 gm	MOISTURE = 348.3 gm	~~80.96 lb's~~ Backouts	TOTAL = 37849.9
	-3/8 = 80.96 Lb's = 36723.5	83.44 LB's total wt		

APPROXIMATE MINIMUM WT. OF SAMPLE (PASSING NO. 10 SIEVE) (grams)	SAND	FINE GRAIN
	115	65

		+3/8 BEFORE WASH	-3/8 BEFORE WASH	+3/8 AFTER WASH	-3/8 AFTER WASH
TARE NO.		L-44	K	L-44	K
WT. OF DRY SAMPLE PLUS TARE	(grams)	969.9	775.2	927.2	259.42
WT. OF TARE	(grams)	191.8	101.46	191.8	101.46
WT. OF DRY SAMPLE	(grams)	778.1	673.74	735.4	157.96

SIEVE ANALYSIS QA ID: _____

SIEVE NO.	DIAMETER (mm)	WT. RETAINED (grams)	% RETAINED	% FINER		PROJECT SPECIFICATIONS
3 in	76.2	Ø	Ø	100		
2 in	50.8	Ø	Ø	100		100
1 1/2in	38.1	Ø	Ø	100		
1 in	25.4	Ø	Ø	100		
3/4 in	19.1	99.8	.3	99.7		90-100
1/2 in	12.7	418.4	1.1	98.9		
3/8 in	9.53	735.4	1.9	98.1		
No. 4	4.75	27.4	4.1	95.9	94.1	
No. 10	2.00	49.7	7.4	92.6	90.8	
No. 20	0.850	69.3	10.3	89.7	88.0	
No. 40	0.425	89.1	13.2	86.8	85.2	
No. 60	0.250	106.5	15.8	84.2	82.6	
No. 100	0.125	129.1	19.2	80.8	79.3	
No. 200	0.075	156.74	23.3	76.7	75.2	50-100
PAN	—	157.9	—	—		

COMMENTS:

000251

%FINER = 100 − Σ% RETAINED

GEOSYNTEC CONSULTANTS

FLUOR DANIEL FERNALD

PARTICLE SIZE DISTRIBUTION AND SOIL CLASSIFICATION TEST RESULTS

(ASTM C 136/D 422) (ASTM D 2487)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO

PROJECT NO. 6Q1341 TASK NO.: 04.1

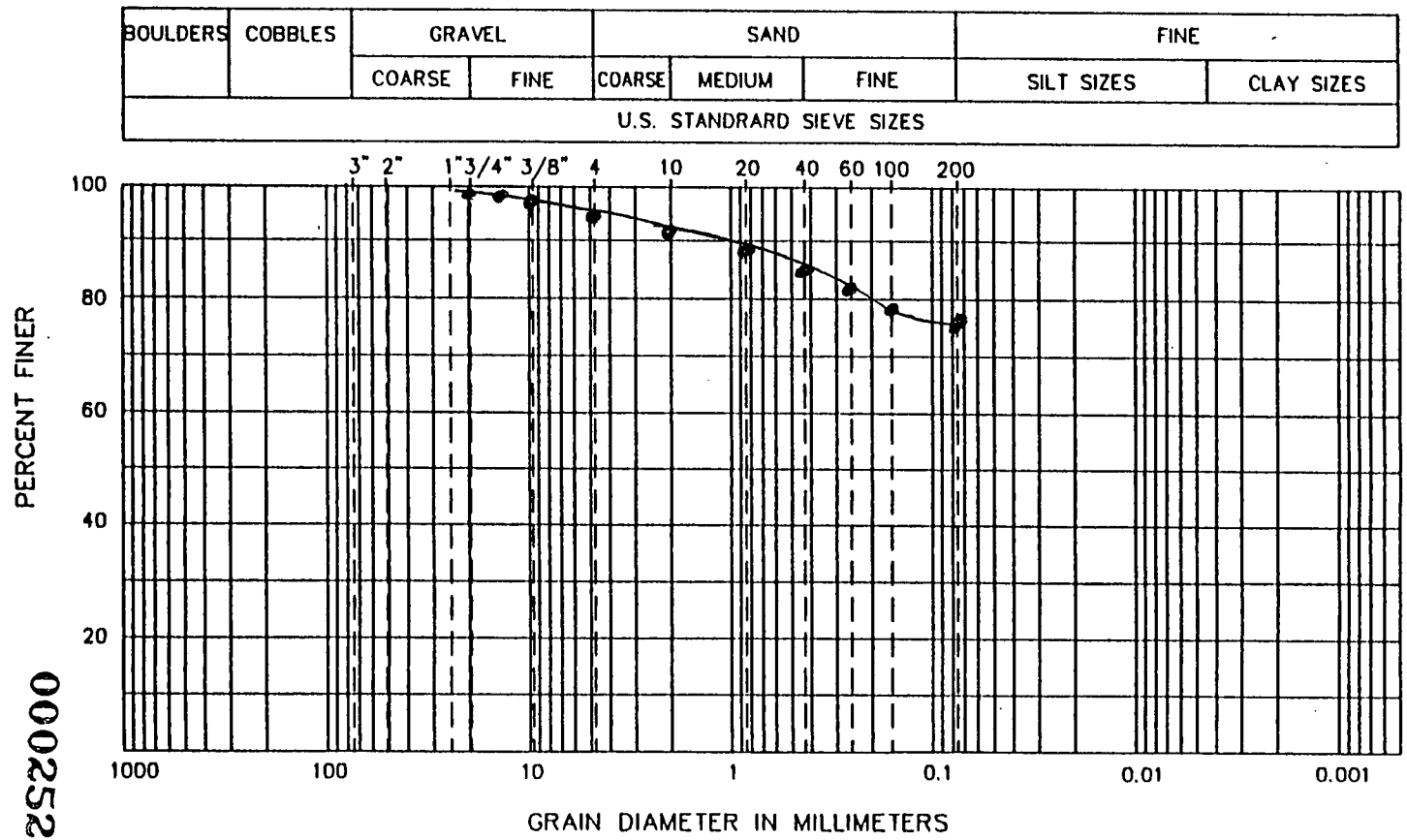
DESCRIPTION: Phase III

DATE: 29 day Oct month 2001 year

MATERIAL TYPE: Low Perm Clay

SAMPLE NO.: LP-01-48 QA ID: DLF

CURVE COEFFICIENTS: (C_u) ..... (C_c) .....



ATTERBERG LIMITS

(LL) 32

(PL) 16

(PI) 16

SIEVE RESULTS

SIEVE SIZE	% FINER
3-in.	100
2-in.	100
1 1/2-in.	100
1-in.	100
3/4-in.	99.7
1/2-in.	98.9
3/8-in.	98.1
NO. 4	94.1
NO. 10	90.8
NO. 20	88.0
NO. 40	85.2
NO. 60	82.6
NO. 100	79.3
NO. 200	75.2

HYDROMETER RESULTS

PARTICLE DIA.	% FINER
0.050	75
0.020	59
0.005	35
0.002	25

SOIL CLASSIFICATION (ASTM D 2487):

002052

4940

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GEOSYNTEC CONSULTANTS

FLUOR FERNALD

4940

PARTICLE SIZE ANALYSIS–SIEVE METHOD (ASTM D 422)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO PROJECT NO.: GQ134 TASK NO.: 04.1

DESCRIPTION: PHASE III DATE: 29 day Oct month 2001 year

MATERIAL TYPE: LOW PERM CLAY SAMPLE NO.: LP-01-51

SOIL SAMPLE SIZE	+3/8 = 630.3 gm	MOISTURE = 278.2 gm	TOTAL = 15561.1 gm
	-3/8 = 14652.6 gm		

APPROXIMATE MINIMUM WT. OF SAMPLE (PASSING NO. 10 SIEVE)	32.3 LBS Partial WT (grams)	SAND	FINE GRAIN
		115	65

		+3/8 BEFORE WASH	-3/8 BEFORE WASH	+3/8 AFTER WASH	-3/8 AFTER WASH
TARE NO.		L-3	L-4	L-3	L-4
WT. OF DRY SAMPLE PLUS TARE	(grams)	820.8	713.2	772.0	278.5
WT. OF TARE	(grams)	190.5	146.4	190.5	146.4
WT. OF DRY SAMPLE	(grams)	630.3	566.8	581.5	132.1

SIEVE ANALYSIS QA ID: DCE

SIEVE NO.	DIAMETER (mm)	WT. RETAINED (grams)	% RETAINED	% FINER		PROJECT SPECIFICATIONS
3 in	76.2	0	0	100		
2 in	50.8	0	0	100		100
1 1/2in	38.1	0	0	100		
1 in	25.4	121.8	0.8	99.2		
3/4 in	19.1	192.4	1.2	98.8		90-100
1/2 in	12.7	460.0	3.0	97.0		
3/8 in	9.53	581.5	3.7	96.3		
No. 4	4.75	9.1	1.6	98.4	94.8	
No. 10	2.00	26.5	4.7	95.3	91.8	
No. 20	0.850	48.2	8.5	91.5	88.1	
No. 40	0.425	67.4	11.9	88.1	84.8	
No. 60	0.250	84.4	14.9	85.1	82.0	
No. 100	0.125	106.1	18.7	81.3	78.3	
No. 200	0.075	131.2	23.1	76.9	74.1	50-100
PAN	—	132.1	—	—		

COMMENTS:

000253

%FINER = 100 − Σ% RETAINED

GEOSYNTEC CONSULTANTS

FLUOR DANIEL FERNALD

PARTICLE SIZE DISTRIBUTION AND SOIL CLASSIFICATION TEST RESULTS

(ASTM C 136/D 422) (ASTM D 2487)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO

PROJECT NO. 621341 TASK NO.: 04.1

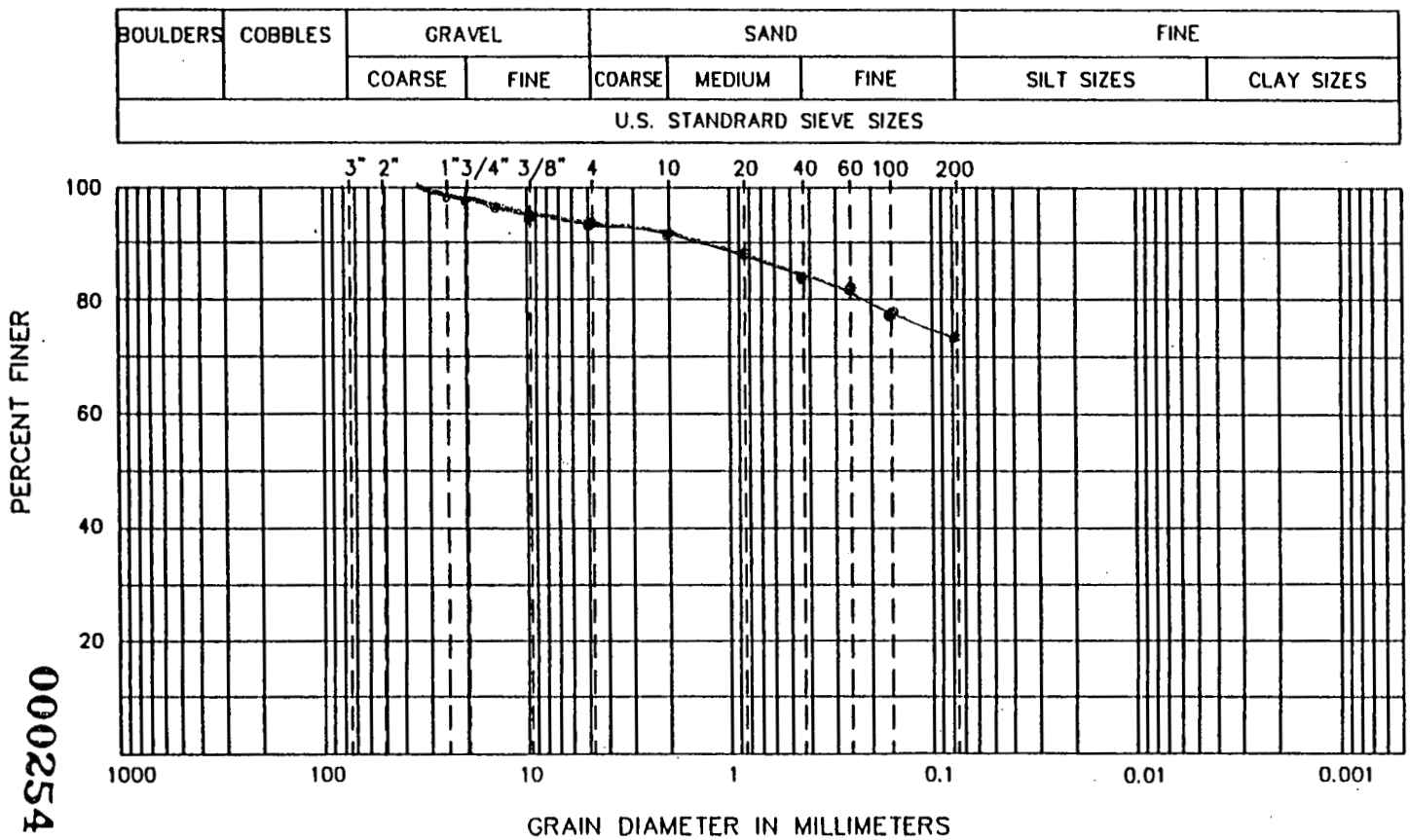
DESCRIPTION: Phase III

DATE: 29 day Oct month 2001 year

MATERIAL TYPE: Low Perm Clay

SAMPLE NO.: LP-01.51 QA ID: DLE

CURVE COEFFICIENTS: (C_u) ..... (C_c) .....



ATTERBERG LIMITS

(LL) 30

(PL) 16

(PI) 14

SIEVE RESULTS

SIEVE SIZE	% FINER
3-in.	100
2-in.	100
1 1/2-in.	100
1-in.	99.2
3/4-in.	98.8
1/2-in.	97.0
3/8-in.	96.3
NO. 4	94.8
NO. 10	91.8
NO. 20	88.1
NO. 40	84.8
NO. 60	82.0
NO. 100	78.3
NO. 200	74.1

HYDROMETER RESULTS

PARTICLE DIA.	% FINER
0.050	70
0.020	58
0.005	35
0.002	25

SOIL CLASSIFICATION (ASTM D 2487):

000254

4940

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GEOSYNTEC CONSULTANTS

4940

FLUOR FERNALD

PARTICLE SIZE ANALYSIS–SIEVE METHOD (ASTM D 422)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO — PROJECT NO.: GQ134 — TASK NO.: 04.1

DESCRIPTION: PHASE III — DATE: 30 day Oct month 2001 year

MATERIAL TYPE: LOW PERM CLAY — SAMPLE NO.: LP-01-53

SOIL SAMPLE SIZE	+3/8 = 1350.0 gram	MOISTURE = 239.4 gm	TOTAL = 36585.8 gram
	-3/8 = 527.7 + 361.5 gm	80.6565 LBS	

APPROXIMATE MINIMUM WT. OF SAMPLE (PASSING NO. 10 SIEVE)	SAND	FINE GRAIN
1W Bucket's 75.72 LBS = 34346.6 (grams)	115 674.1 gm	65

		+3/8 BEFORE WASH	-3/8 BEFORE WASH	+3/8 AFTER WASH	-3/8 AFTER WASH
TARE NO.		L-1	L-4	L-1	L-4
WT. OF DRY SAMPLE PLUS TARE	(grams)	1305.0	674.1 ~~446.4~~	1209.9	291.2
WT. OF TARE	(grams)	192.4	146.4	192.4	146.4
WT. OF DRY SAMPLE	(grams)	1112.6	527.7	1017.5	144.8

SIEVE ANALYSIS — QA ID: DCE

SIEVE NO.	DIAMETER (mm)	WT. RETAINED (grams)	% RETAINED	% FINER		PROJECT SPECIFICATIONS
3 in	76.2	Ø	Ø	100		
2 in	50.8	Ø	Ø	100		1ØØ
1 1/2in	38.1	76.4	0.2	99.8		
1 in	25.4	214.5	0.6	99.4		
3/4 in	19.1	299.8	0.8	99.2		9Ø-1ØØ
1/2 in	12.7	681.3	1.9	98.1		
3/8 in	9.53	1017.1	2.8	~~97.5~~	97.2	
No. 4	4.75	15.7	3.0	97.0	~~94.6~~	94.3
No. 10	2.00	38.1	7.2	92.8	~~90.5~~	90.2
No. 20	0.850	58.6	11.1	88.9	~~86.7~~	86.4
No. 40	0.425	76.9	14.6	85.4	~~83.3~~	83.1
No. 60	0.250	92.5	17.5	82.5	~~80.4~~	80.2
No. 100	0.125	113.2	21.5	78.5	~~76.5~~	76.4
No. 200	0.075	143.9	27.3	72.7	~~70.9~~	70.5Ø-1ØØ
PAN	—	144.8	—	—		

COMMENTS:

000255

%FINER = 100 − Σ% RETAINED

GEO SYNTEC CONSULTANTS FILE NO. 2-14-PMS — CHECKED BY: — SHEET NO. 1 OF 2

GEOSYNTEC CONSULTANTS

FLUOR DANIEL FERNALD

PARTICLE SIZE DISTRIBUTION AND SOIL CLASSIFICATION TEST RESULTS

(ASTM C 136/D 422) (ASTM D 2487)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO

DESCRIPTION: Phase III

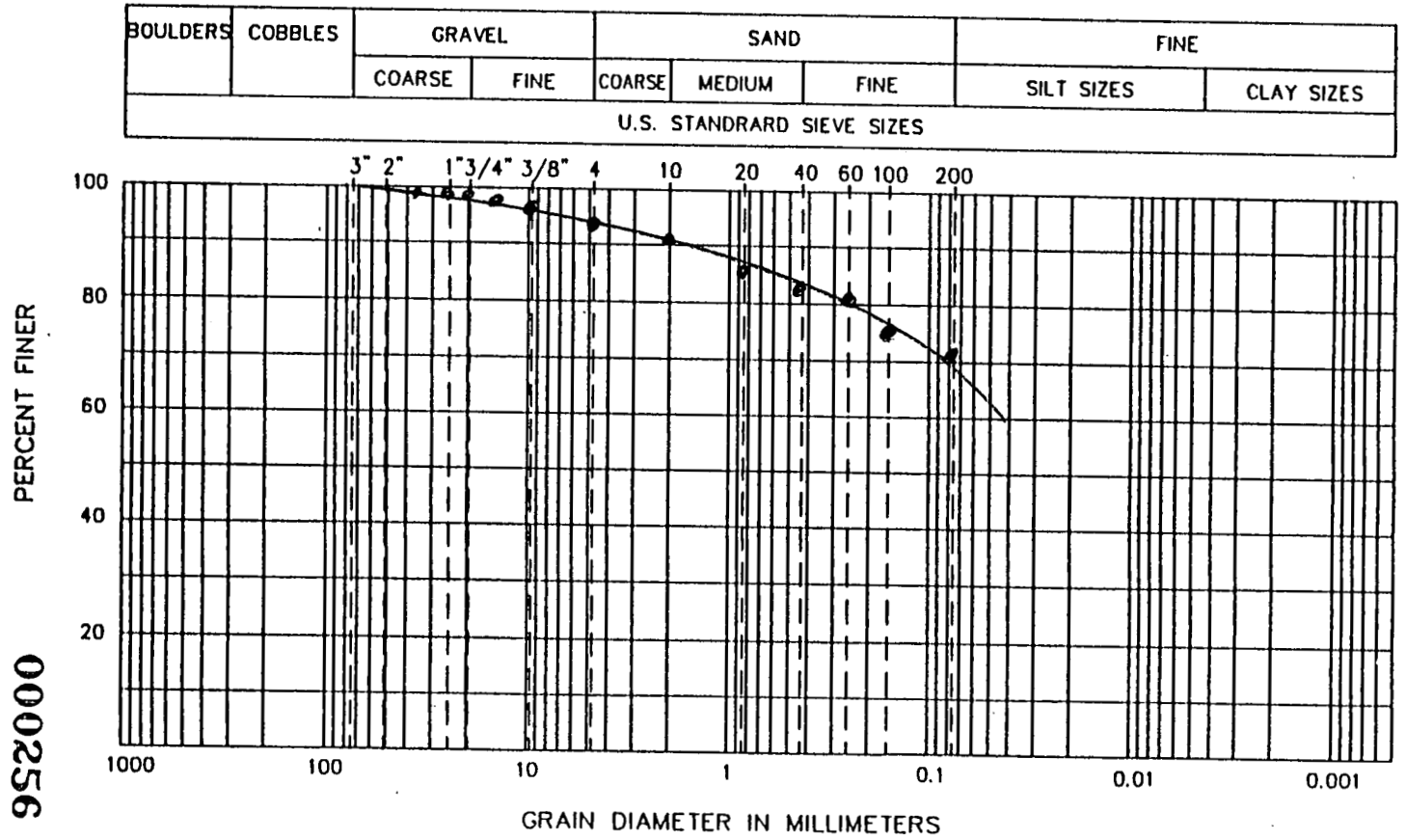
MATERIAL TYPE: Low Perm Clay

PROJECT NO. GA 1341 TASK NO.: 04.1

DATE: 30 day Oct month 2001 year

SAMPLE NO.: LP-01-53 QA ID: DLE

CURVE COEFFICIENTS: (C_u) ..... (C_c) .....



ATTERBERG LIMITS

(LL) 31

(PL) 15

(PI) 16

SIEVE RESULTS

SIEVE SIZE	% FINER
3-in.	100
2-in.	100
1 1/2-in.	99.8
1-in.	99.4
3/4-in.	99.2
1/2-in.	98.1
3/8-in.	97.5
NO. 4	94.6
NO. 10	90.5
NO. 20	86.7
NO. 40	83.3
NO. 60	80.4
NO. 100	76.5
NO. 200	70.9

HYDROMETER RESULTS

PARTICLE DIA.	% FINER
0.050	68
0.020	56
0.005	35
0.002	27

SOIL CLASSIFICATION (ASTM D 2487):

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CHECKED BY:

SHEET NO. 2 OF 2

000256

4940

4940

GEOSYNTEC CONSULTANTS

FLUOR FERNALD

PARTICLE SIZE ANALYSIS–SIEVE METHOD (ASTM D 422)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO PROJECT NO.: GQ1341 TASK NO.: 04.1

DESCRIPTION: PHASE III DATE: 2 day Nov month 2001 year

MATERIAL TYPE: Low Perm CLAY SAMPLE NO.: LP-01.54

SOIL SAMPLE SIZE	+3/8 = 2055.0 gram	MOISTURE = 296.96 gm	TOTAL = 24120.22 gm
	-3/8 = 21768.264 gm		

APPROXIMATE MINIMUM WT. OF SAMPLE (PASSING NO. 10 SIEVE) (grams)	SAND	FINE GRAIN
Both Bucket total wt. 21768.26 47.9945	115	65

		+3/8 BEFORE WASH	-3/8	+3/8 AFTER WASH	-3/8
TARE NO.		K	~~82~~ L-1	K	L-1
WT. OF DRY SAMPLE PLUS TARE	(grams)	2156.5	821.7	2048.7	384.3
WT. OF TARE	(grams)	101.5	192.7	101.5	192.7
WT. OF DRY SAMPLE	(grams)	2055.0	629.0	1947.2	191.6

SIEVE ANALYSIS QA ID: _____

SIEVE NO.	DIAMETER (mm)	WT. RETAINED (grams)	% RETAINED	% FINER		PROJECT SPECIFICATIONS
3 in	76.2	Ø	Ø	100		
2 in	50.8	Ø	Ø	100		1ØØ
1 1/2in	38.1	173.5	.7	99.3		
1 in	25.4	786.6	3.2	96.8		
3/4 in	19.1	1151.5	4.8	95.2		9Ø-1ØØ
1/2 in	12.7	1672.4	6.9	93.1		
3/8 in	9.53	1947.0	8.1	91.9		
No. 4	4.75	36.1	5.7	94.3	86.7	
No. 10	2.00	66.5	10.6	89.4	82.2	
No. 20	0.850	92.4	14.7	85.3	78.4	
No. 40	0.425	115.3	18.3	81.7	75.1	
No. 60	0.250	134.3	21.4	78.6	72.2	
No. 100	0.125	159.9	25.4	74.6	68.6	
No. 200	0.075	190.5	30.3	69.7	64.1	5Ø-1ØØ
PAN	—	191.6	—	—		

COMMENTS:

000257

%FINER = 100 − Σ% RETAINED

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GEOSYNTEC CONSULTANTS

FLUOR FERNALD, INC.

PARTICLE SIZE DISTRIBUTION AND SOIL CLASSIFICATION TEST RESULTS (ASTM C 136/D 422) (ASTM D 2487)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO

DESCRIPTION: Phase III

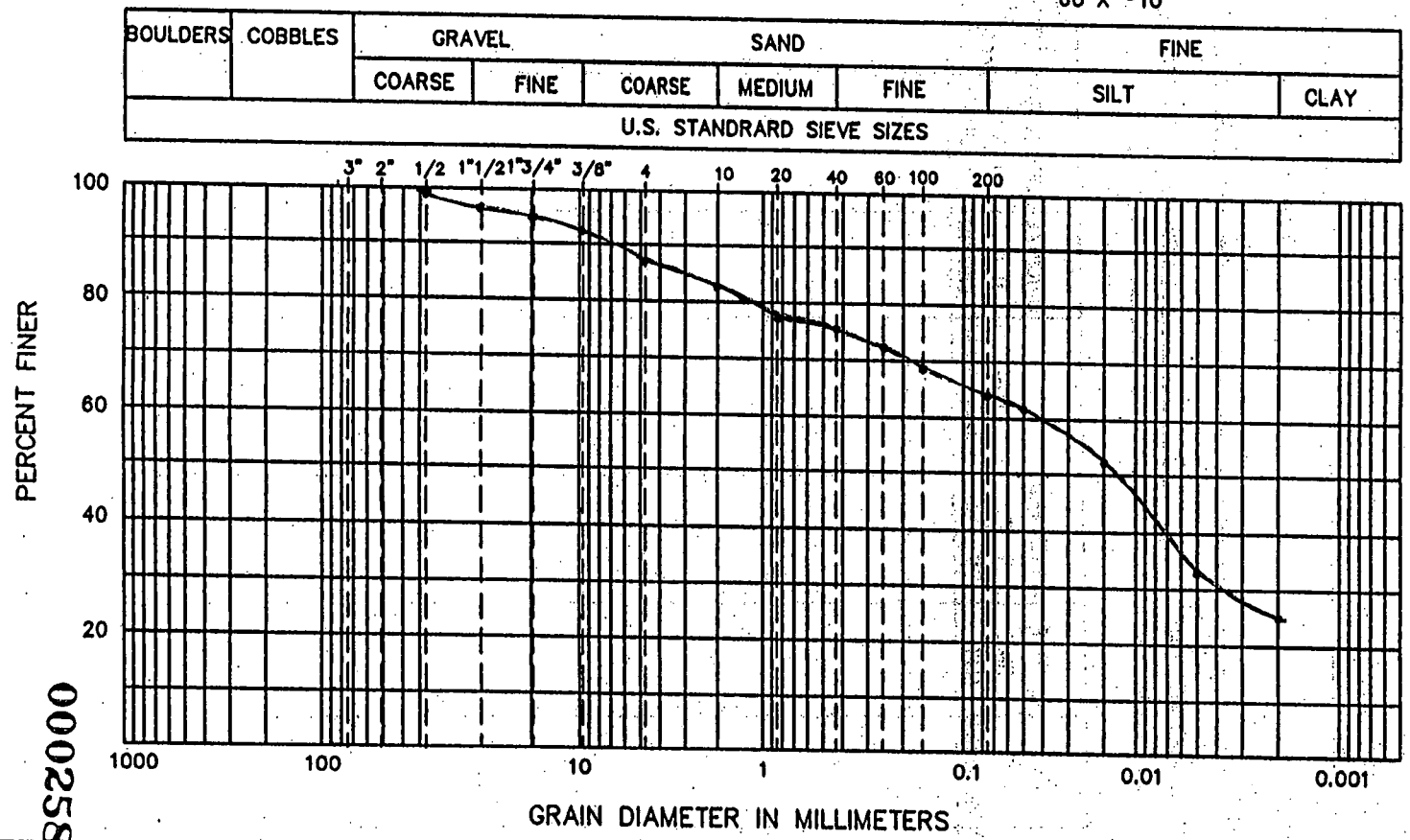
MATERIAL TYPE: Low Perm Clay

PROJECT NO.: G01341 TASK NO.: 04.1

DATE: 7 day Nov month 2002 year

SAMPLE NO.: LP01-54 QA ID: CL

CURVE COEFFICIENTS: $C_{uniformity} = (\frac{D_{60}}{D_{10}}) =$ $C_{curvature} = (\frac{D_{30}^2}{D_{60} \times D_{10}}) =$



ATTERBERG LIMITS

(LL) 29

(PL) 16

(PI) 13

SIEVE RESULTS

SIEVE SIZE	% FINER
3-In.	100
2-In.	100
1 1/2-In.	99.3
1-In.	96.8
3/4-In.	95.2
1/2-In.	93.1
3/8-In.	91.9
NO. 4	86.7
NO. 10	82.2
NO. 20.	78.4
NO. 40	75.1
NO. 60	72.2
NO. 100	68.6
NO. 200	64.1

HYDROMETER RESULTS

PARTICLE DIA.	% FINER
0.05	62
0.02	52
0.005	33
0.002	25.5

SOIL CLASSIFICATION (ASTM D 2487): Sandy Lean Clay (CL)

©GEO SYNTEC CONSULTANTS FILE NO. 2-16-PSD

CHECKED BY: CL

000258

4940

GEOSYNTEC CONSULTANTS

4940

FLUOR FERNALD

PARTICLE SIZE ANALYSIS–SIEVE METHOD (ASTM D 422)

PROJECT: ON–SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO — PROJECT NO.: GQ134 TASK NO.: 04.1

DESCRIPTION: PHASE III — DATE: 6 day NOV month 2001 year

MATERIAL TYPE: LOW PERM CLAY — SAMPLE NO.: LP-01-55

SOIL SAMPLE SIZE	+3/8 = 2673.6	MOISTURE = 358.9	TOTAL = 42337.1g
	-3/8 = 39304.6		

APPROXIMATE MINIMUM WT. OF SAMPLE (PASSING NO. 10 SIEVE) (grams)	SAND	FINE GRAIN
	115	65

		+3/8 BEFORE WASH	-3/8 BEFORE WASH	+3/8 AFTER WASH	-3/8 AFTER WASH
TARE NO.		L-2	L-2	L-2	L-2
WT. OF DRY SAMPLE PLUS TARE	(grams)	2865.5	960.8 ~~699.9~~	2682.3	~~289.4~~ 404.1
WT. OF TARE	(grams)	191.9	191.9 ~~192.7~~	191.9	~~192.7~~ 191.9
WT. OF DRY SAMPLE	(grams)	2673.6	~~768.9~~ ~~506.3~~	2490.4	~~96.7~~ 212.

SIEVE ANALYSIS — QA ID: TBW

SIEVE NO.	DIAMETER (mm)	WT. RETAINED (grams)	% RETAINED	% FINER		PROJECT SPECIFICATIONS
3 in	76.2	0	0	100		
2 in	50.8	0	0	100		100
1 1/2in	38.1	0	0	100		
1 in	25.4	312.6	0.7	99.3		
3/4 in	19.1	853.7	2.0	98.0		90-100
1/2 in	12.7	1860.3	4.4	95.6		
3/8 in	9.53	2430.6	5.7	94.3		
No. 4	4.75	32.1	4.2	95.8	90.4	
No. 10	2.00	66.3	8.6	91.4	86.2	
No. 20	0.850	94.3	12.3	87.7	82.7	
No. 40	0.425	120.5	15.7	84.3	79.5	
No. 60	0.250	143.7	18.7	81.3	76.7	
No. 100	0.125	173.3	22.5	77.5	73.0	
No. 200	0.075	210.8	27.4	72.6	68.4	50-100
PAN	—	212.2	—	—		

COMMENTS:

000259

%FINER = 100 − Σ% RETAINED

GEO SYNTEC CONSULTANTS FILE NO. 2-14-PMS — CHECKED BY: [illegible] — SHEET NO. 1 OF 2

GEOSYNTEC CONSULTANTS

FLUOR FERNALD, INC.

PARTICLE SIZE DISTRIBUTION AND SOIL CLASSIFICATION TEST RESULTS (ASTM C 136/D 422) (ASTM D 2487)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO

DESCRIPTION: Phase III

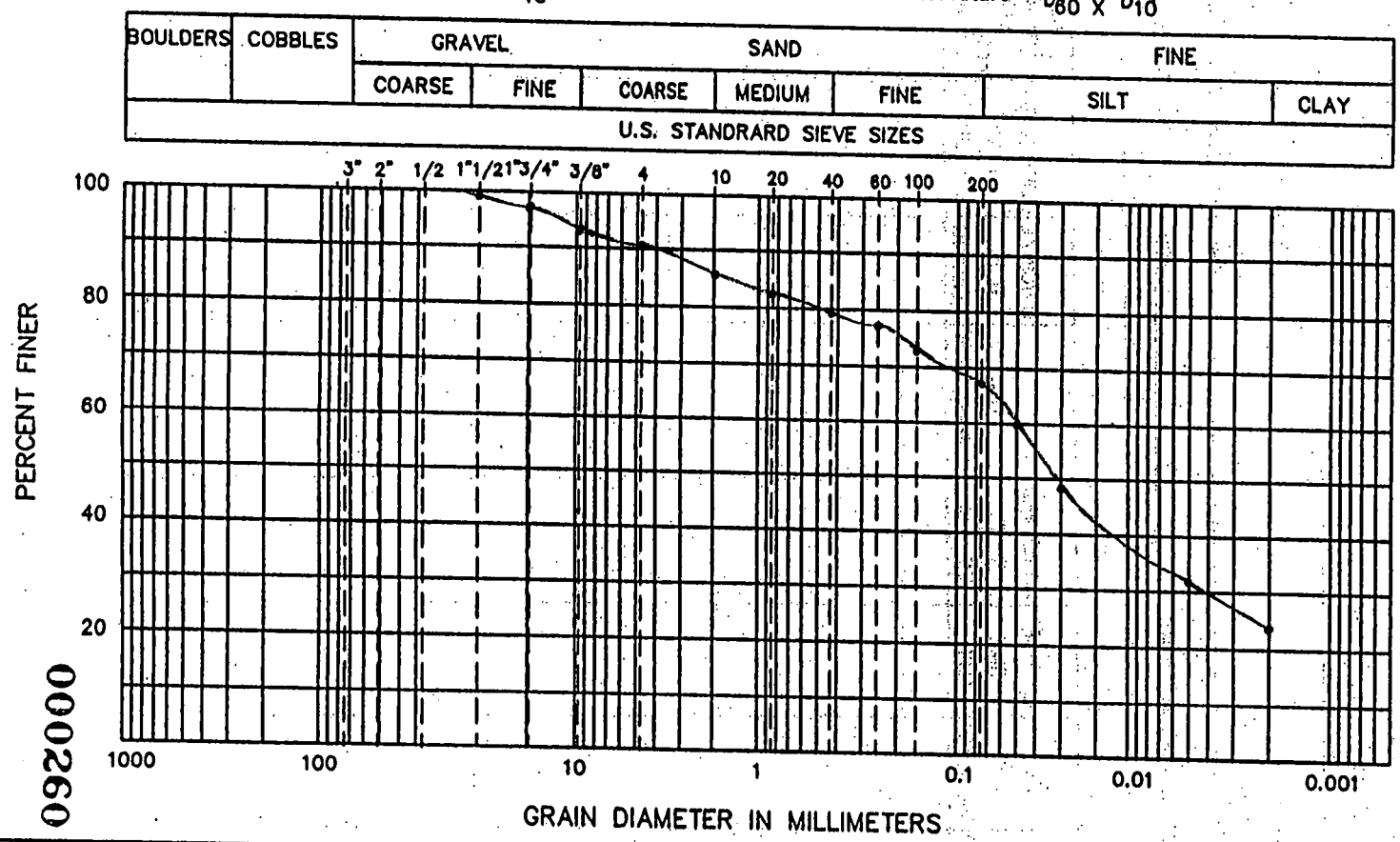
MATERIAL TYPE: Low Perm Clay

PROJECT NO.: GQ1341 TASK NO.: 04.1

DATE: 6 day Nov month 2002 year

SAMPLE NO.: LPØ1-55 QA ID: CL

CURVE COEFFICIENTS: $C_{uniformity} = (\frac{D_{60}}{D_{10}}) =$ $C_{curvature} = (\frac{D_{30}^2}{D_{60} \times D_{10}}) =$



ATTERBERG LIMITS

(LL) 30

(PL) 16

(PI) 14

SIEVE RESULTS

SIEVE SIZE	% FINER
3-in.	100
2-in.	100
1 1/2-in.	100
1-in.	99.3
3/4-in.	98.0
1/2-in.	95.6
3/8-in.	94.3
NO. 4	90.4
NO. 10	86.2
NO. 20.	82.7
NO. 40	79.5
NO. 60	76.7
NO. 100	73.0
NO. 200	68.4

HYDROMETER RESULTS

PARTICLE DIA.	% FINER
0.05	60
0.02	49
0.005	31
0.002	24

SOIL CLASSIFICATION (ASTM D 2487): Sandy Lean Clay (CL)

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GEOSYNTEC CONSULTANTS

FLUOR FERNALD

4940

PARTICLE SIZE ANALYSIS–SIEVE METHOD (ASTM D 422)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO PROJECT NO.: GQ1341 TASK NO.: 041

DESCRIPTION: PHASE III DATE: 06 day NOV month 2001 year

MATERIAL TYPE: LOW PERM CLAY SAMPLE NO.: LP-01-56

SOIL SAMPLE SIZE	+3/8 = 446.1g	MOISTURE = 318.2g	TOTAL = 20,309.9g
	-3/8 = 43.09 lbs = 19,545.6g		

APPROXIMATE MINIMUM WT. OF SAMPLE (PASSING NO. 10 SIEVE) (grams)	SAND	FINE GRAIN
	115	65

		+3/8 BEFORE WASH	-3/8 BEFORE WASH	+3/8 AFTER WASH	-3/8 AFTER WASH
TARE NO.		L-3	N	L-3	N
WT. OF DRY SAMPLE PLUS TARE	(grams)	636.5	782.5	602.5	331.4
WT. OF TARE	(grams)	190.4	101.6	190.4	101.6
WT. OF DRY SAMPLE	(grams)	446.1	680.9	412.1	229.8

SIEVE ANALYSIS QA ID: TBU

SIEVE NO.	DIAMETER (mm)	WT. RETAINED (grams)	% RETAINED	% FINER		PROJECT SPECIFICATIONS
3 in	76.2	0	0	100		
2 in	50.8	0	0	100		100
1 1/2in	38.1	0	0	100		
1 in	25.4	0	0	100		
3/4 in	19.1	94.6	0.5	99.5		90-100
1/2 in	12.7	269.2	1.3	98.7		
3/8 in	9.53	407.0	2.0	98.0		
No. 4	4.75	21.6	3.2	96.8	94.9	
No. 10	2.00	73.1	10.7	89.3	87.5	
No. 20	0.850	111.2	16.3	83.7	82.0	
No. 40	0.425	138.1	20.3	79.7	78.1	
No. 60	0.250	159.9	23.5	76.5	75.0	
No. 100	0.125	189.6	27.8	72.2	70.7	
No. 200	0.075	227.7	33.4	66.6	65.2	50-100
PAN	—	229.8	—	—	—	

COMMENTS:

000261

%FINER = 100 − Σ% RETAINED

GEO SYNTEC CONSULTANTS FILE NO. 2-14-PMS CHECKED BY: SHEET NO. 1 OF 2

GEOSYNTEC CONSULTANTS

FLUOR FERNALD, INC.

PARTICLE SIZE DISTRIBUTION AND SOIL CLASSIFICATION TEST RESULTS (ASTM C 136/D 422) (ASTM D 2487)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO

DESCRIPTION: Phase III

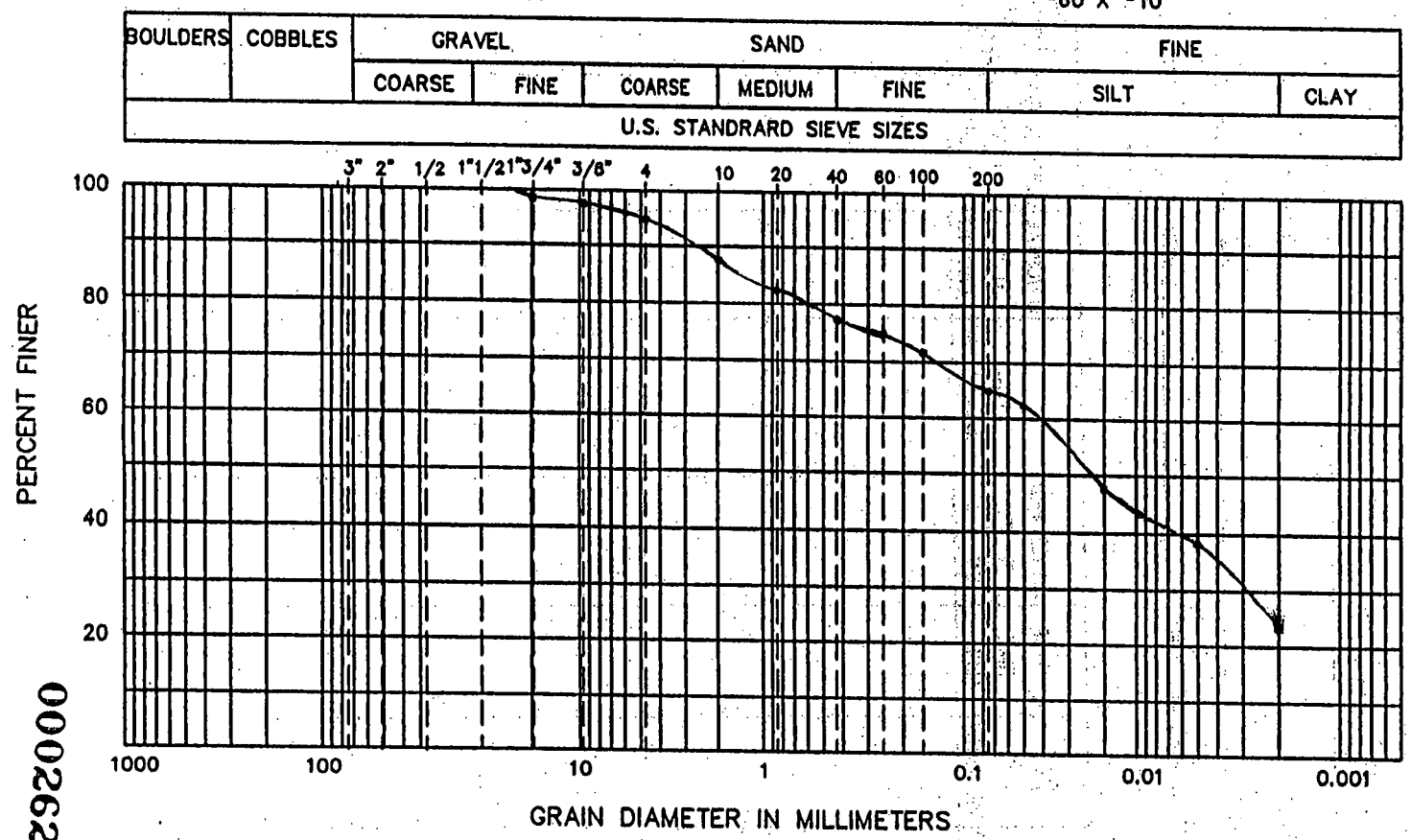
MATERIAL TYPE: Low Perm Clay

PROJECT NO.: G91341 TASK NO.: 04.1

DATE: 6 day Nov month 2002 year

SAMPLE NO.: LP01-56 QA ID: CJ

CURVE COEFFICIENTS: $C_{uniformity} = \left(\frac{D_{60}}{D_{10}}\right) =$ $C_{curvature} = \left(\frac{D_{30}^2}{D_{60} \times D_{10}}\right) =$



ATTERBERG LIMITS

(LL) 27

(PL) 15

(PI) 12

SIEVE RESULTS

SIEVE SIZE	% FINER
3-In.	100
2-In.	100
1 1/2-In.	100
1-In.	100
3/4-In.	99.5
1/2-In.	98.7
3/8-In.	98.0
NO. 4	94.9
NO. 10	87.5
NO. 20.	82.0
NO. 40	78.1
NO. 60	75.0
NO. 100	70.7
NO. 200	65.2

HYDROMETER RESULTS

PARTICLE DIA.	% FINER
0.05	62
0.02	48
0.005	39
0.002	23

SOIL CLASSIFICATION (ASTM D 2487): Sandy Lean Clay

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PARTICLE SIZE ANALYSIS–SIEVE METHOD (ASTM D 422)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO PROJECT NO.: GQ134 TASK NO.: 041

DESCRIPTION: PHASE III DATE: 09 day Nov month 2001 year

MATERIAL TYPE: LOW PERM CLAY SAMPLE NO.: LP-01-57

SOIL SAMPLE SIZE	+3/8 = 1409.4g	MOISTURE = 271.0g	TOTAL = 39,088.8g
	-3/8 = 82.47 lbs = 37,408.4g		

APPROXIMATE MINIMUM WT. OF SAMPLE (PASSING NO. 10 SIEVE) (grams)	SAND	FINE GRAIN
	115	65

	+3/8 BEFORE WASH	-3/8 BEFORE WASH	+3/8 AFTER WASH	-3/8 AFTER WASH
TARE NO.	N	K	N	K
WT. OF DRY SAMPLE PLUS TARE (grams)	1511.0	1020.6	1441.7	347.6
WT. OF TARE (grams)	101.6	101.5	101.6	101.5
WT. OF DRY SAMPLE (grams)	1409.4	919.1	1340.1	246.1

SIEVE ANALYSIS QA ID: _____

SIEVE NO.	DIAMETER (mm)	WT. RETAINED (grams)	% RETAINED	% FINER		PROJECT SPECIFICATIONS
3 in	76.2	0	0	100		
2 in	50.8	0	0	100		100
1 1/2in	38.1	100.8	.3	99.7		
1 in	25.4	357.3	.9	99.1		
3/4 in	19.1	524.9	1.3	98.7		90-100
1/2 in	12.7	1101.0	2.8	97.2		
3/8 in	9.53	1339.9	3.4	96.6		
No. 4	4.75	41.0	4.5	95.5	92.3	
No. 10	2.00	72.4	7.9	92.1	89.0	
No. 20	0.850	103.6	11.3	88.7	85.7	
No. 40	0.425	135.7	14.8	85.2	82.3	
No. 60	0.250	164.7	17.9	82.1	79.3	
No. 100	0.125	203.6	22.2	77.8	75.2	
No. 200	0.075	244.8	26.6	73.4	70.9	50-100
PAN	—	246.1	—	—		

COMMENTS:

000263

%FINER = 100 − Σ% RETAINED

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GEOSYNTEC CONSULTANTS

FLUOR FERNALD, INC.

PARTICLE SIZE DISTRIBUTION AND SOIL CLASSIFICATION TEST RESULTS (ASTM C 136/D 422) (ASTM D 2487)

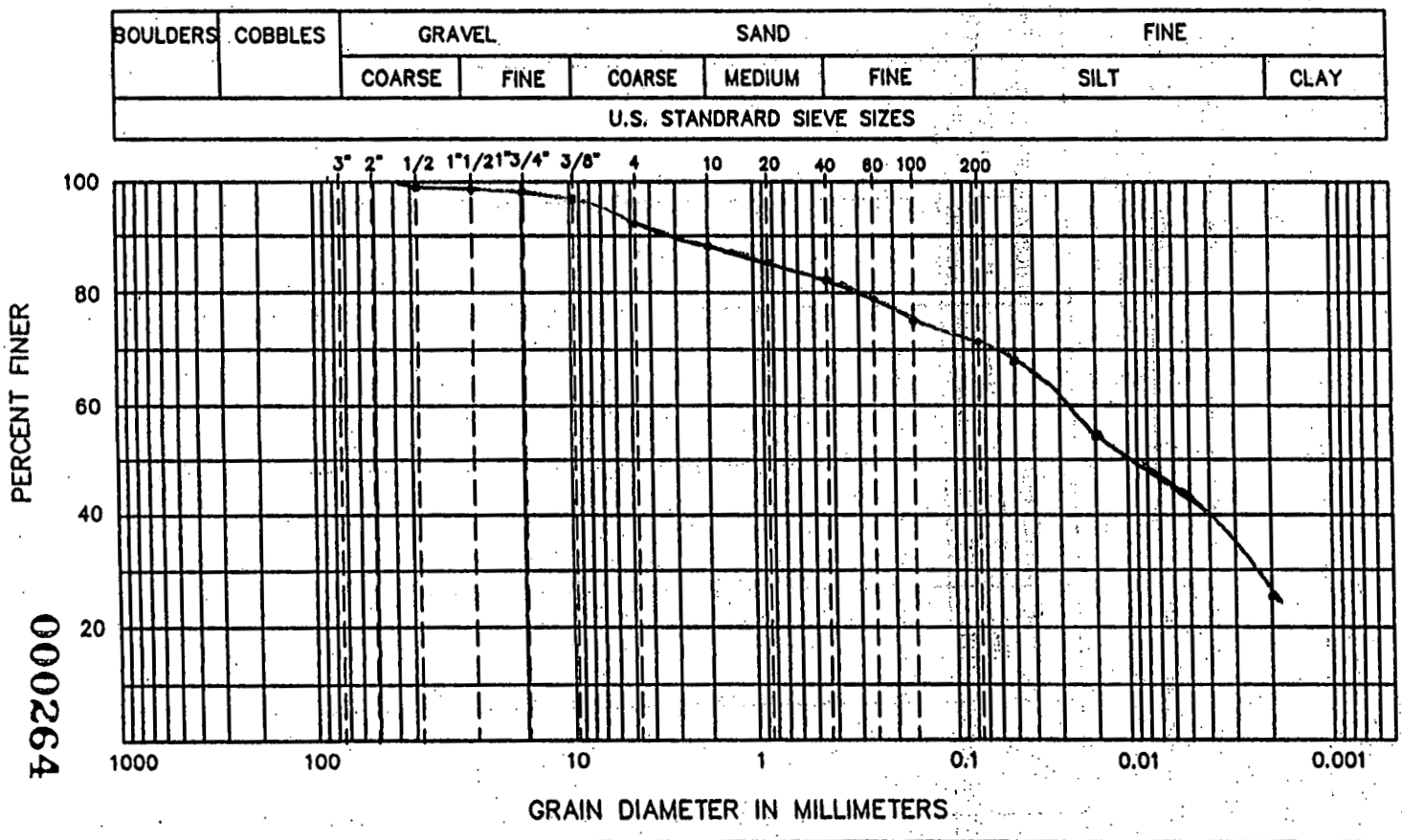
PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO — PROJECT NO.: GQ1341 TASK NO.: 04.1

DESCRIPTION: Phase III — DATE: 9 day Nov month 2002 year

MATERIAL TYPE: Low Perm Clay — SAMPLE NO.: LP01-57 QA ID: CJ

CURVE COEFFICIENTS: $C_{uniformity} = \left(\frac{D_{60}}{D_{10}}\right) =$ $C_{curvature} = \left(\frac{D_{30}^2}{D_{60} \times D_{10}}\right) =$



ATTERBERG LIMITS

(LL) 34

(PL) 16

(PI) 18

SIEVE RESULTS

SIEVE SIZE	% FINER
3-in.	100
2-in.	100
1 1/2-in.	99.7
1-in.	99.1
3/4-in.	98.7
1/2-in.	97.2
3/8-in.	96.6
NO. 4	92.3
NO. 10	89.0
NO. 20.	85.7
NO. 40	82.3
NO. 60	79.3
NO. 100	75.2
NO. 200	70.9

HYDROMETER RESULTS

PARTICLE DIA.	% FINER
0.05	68
0.02 ~~0.002~~	54
0.005	34
0.002	25.5

SOIL CLASSIFICATION (ASTM D 2487): Lean Clay w/Sand (CL)

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GEOSYNTEC CONSULTANTS

FLUOR FERNALD

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PARTICLE SIZE ANALYSIS–SIEVE METHOD (ASTM D 422)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO PROJECT NO.: GQ134 TASK NO.: 041

DESCRIPTION: PHASE III DATE: ____ day Nov month 2001 year

MATERIAL TYPE: LOW PERM CLAY SAMPLE NO.: LP-01-59

SOIL SAMPLE SIZE	+3/8 = 1290.5 grams	MOISTURE = 382.8 g	TOTAL = 21091.9
	-3/8 = 42.81 LB'S = 19418.6 g	21091.9	

APPROXIMATE MINIMUM WT. OF SAMPLE (PASSING NO. 10 SIEVE) (grams)	SAND	FINE GRAIN
	115	65

		+3/8 BEFORE WASH	-3/8 BEFORE WASH	+3/8 AFTER WASH	-3/8 AFTER WASH
TARE NO.		K	N	K	N
WT. OF DRY SAMPLE PLUS TARE	(grams)	1392.0	734.0	1349.0	274.3
WT. OF TARE	(grams)	101.5	101.6	101.5	101.6
WT. OF DRY SAMPLE	(grams)	1290.5	632.4	1247.5	172.7

SIEVE ANALYSIS QA ID: DLE

SIEVE NO.	DIAMETER (mm)	WT. RETAINED (grams)	% RETAINED	% FINER		PROJECT SPECIFICATIONS
3 in	76.2	0	0	100		
2 in	50.8	0	0	100		100
1 1/2in	38.1	97.3	.5	99.5		
1 in	25.4	301.6	1.4	98.6		
3/4 in	19.1	688.6	3.3	96.7		90-100
1/2 in	12.7	1050.6	5.0	95.0		
3/8 in	9.53	1249.4	5.9	94.1		
No. 4	4.75	15.3	2.4	97.6	91.8	
No. 10	2.00	37.7	6.0	94.0	88.5	
No. 20	0.850	64.0	10.1	89.9	84.6	
No. 40	0.425	87.0	13.8	86.2	81.1	
No. 60	0.250	106.6	16.9	83.1	78.2	
No. 100	0.125	132.8	21.0	79.0	74.3	
No. 200	0.075	165.8	26.2	73.8	69.4	50-100
PAN	—	172.5	—	—		

COMMENTS:

000265

%FINER = 100 − Σ% RETAINED

GEOSYNTEC CONSULTANTS

FLUOR DANIEL FERNALD

PARTICLE SIZE DISTRIBUTION AND SOIL CLASSIFICATION TEST RESULTS

(ASTM C 136/D 422) (ASTM D 2487)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO

PROJECT NO. 6Q134/ TASK NO.: 04-1

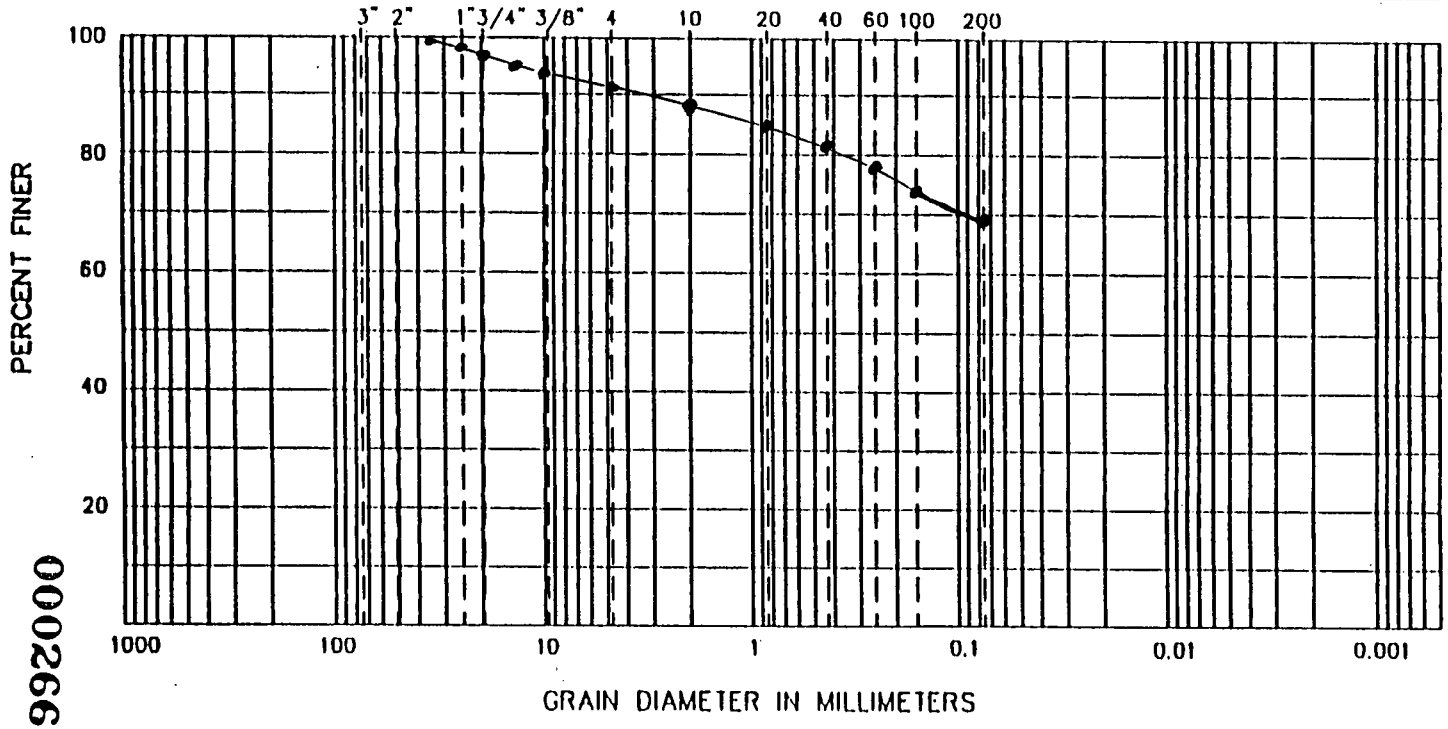
DESCRIPTION: Phase III

DATE: 14 day Nov month 2001 year

MATERIAL TYPE: Low Perm Clay Stock Pile 01-9

SAMPLE NO.: LP-01-59 QA ID: DLE

CURVE COEFFICIENTS: (C_u) ..... (C_c) .....



ATTERBERG LIMITS

(LL) 31

(PL) 15

(PI) 16

SIEVE RESULTS

SIEVE SIZE	% FINER
3-in.	100
2-in.	100
1 1/2-in.	99.5
1-in.	98.6
3/4-in.	96.7
1/2-in.	95.0
3/8-in.	94.1
NO. 4	91.8
NO. 10	88.5
NO. 20	84.6
NO. 40	81.1
NO. 60	78.2
NO. 100	74.3
NO. 200	69.4

HYDROMETER RESULTS

PARTICLE DIA.	% FINER
0.050	65
0.020	54
0.005	33
0.002	26

SOIL CLASSIFICATION (ASTM D 2487):

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SHEET NO. 2 OF 2

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FLUOR FERNALD

PARTICLE SIZE ANALYSIS—SIEVE METHOD (ASTM D 422)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO PROJECT NO.: GQ1341 TASK NO.: 04.1

DESCRIPTION: PHASE III DATE: ____ day Nov month 2001 year

MATERIAL TYPE: Low Perm CLAY SAMPLE NO.: LP-01-60

SOIL SAMPLE SIZE | +3/8 = 1600.5 gm | MOISTURE = 394.9 gm | TOTAL = 41935.3
| -3/8 = 39939.9 gm 88.05 LB |

APPROXIMATE MINIMUM WT. OF SAMPLE (PASSING NO. 10 SIEVE) (grams)	SAND	FINE GRAIN
	115	65

	+3/8 BEFORE WASH	-3/8 BEFORE WASH	+3/8 AFTER WASH	-3/8 AFTER WASH
TARE NO.	L-1	N	L-1	N
WT. OF DRY SAMPLE PLUS TARE (grams)	1792.9	926.9	1712.0	310.4
WT. OF TARE (grams)	192.4	101.6	192.4	101.6
WT. OF DRY SAMPLE (grams)	1600.5	825.3	1519.6	208.8

SIEVE ANALYSIS QA ID: DLG

SIEVE NO.	DIAMETER (mm)	WT. RETAINED (grams)		% RETAINED	% FINER		PROJECT SPECIFICATIONS
3 in	76.2	0		0	100		
2 in	50.8	0		0	100		100
1 1/2in	38.1	100.3		.2	99.8		
1 in	25.4	326.3		.8	99.2		
3/4 in	19.1	634.3		1.5	98.5		90-100
1/2 in	12.7	1201.4		2.9	97.1		
3/8 in	9.53	1519.2		3.6	96.4		
No. 4	4.75	17.8	~~119.4~~ DLE	2.2	97.8	94.3	
No. 10	2.00	52.6	~~154.2~~ DLE	6.4	93.6	90.2	
No. 20	0.850	83.9	~~185.5~~ DLE	10.2	89.8	86.6	
No. 40	0.425	111.9	~~213.5~~ DLE	13.6	86.4	83.3	
No. 60	0.250	136.3	~~237.9~~ DLE	16.5	83.5	80.5	
No. 100	0.125	168.9	~~270.2~~ DLE	20.4	79.6	76.7	
No. 200	0.075	206.9	~~308.5~~ DLE	25.1	74.9	72.2	50-100
PAN	—	208.8	~~310.4~~ DLE	—	—		

COMMENTS:

000267

%FINER = 100 − Σ% RETAINED

GEOSYNTEC CONSULTANTS

FLUOR DANIEL FERNALD

PARTICLE SIZE DISTRIBUTION AND SOIL CLASSIFICATION TEST RESULTS

(ASTM C 136/D 422) (ASTM D 2487)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO

PROJECT NO. 6Q134 TASK NO.: 04.1

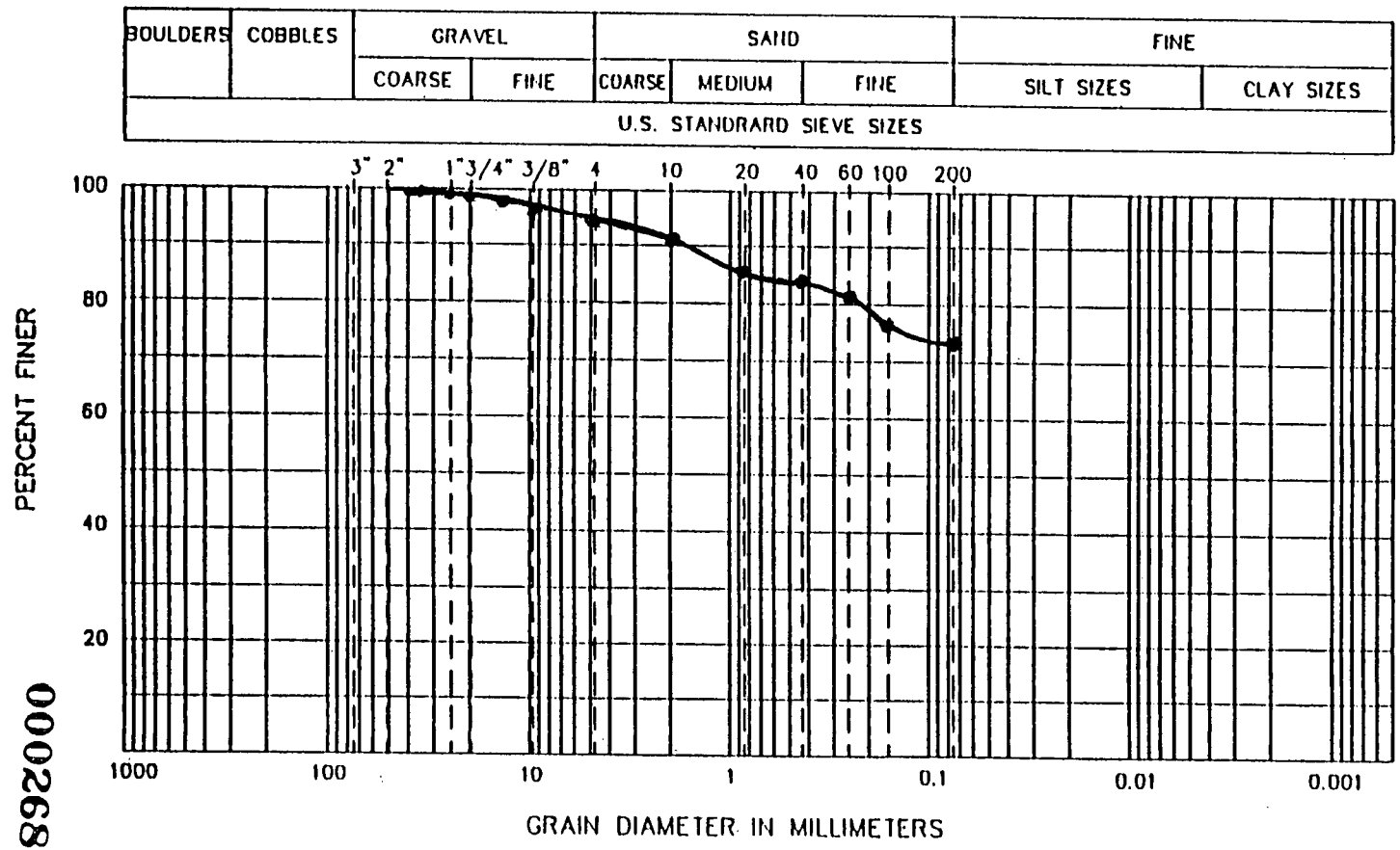
DESCRIPTION: Phase III

DATE: 14 day Nov month 2001 year

MATERIAL TYPE: Low Permeability Clay Stockpile 01-9

SAMPLE NO.: LP-01-6 QA ID: DLE

CURVE COEFFICIENTS: (C_u) ..... (C_c) .....



ATTERBERG LIMITS

(LL) 31

(PL) 15

(PI) 16

SIEVE RESULTS

SIEVE SIZE	% FINER
3-In.	100
2-In.	100
1 1/2-In.	99.8
1-In.	99.2
3/4-In.	98.5
1/2-In.	97.1
3/8-In.	96.4
NO. 4	94.3
NO. 10	90.2
NO. 20	86.6
NO. 40	83.3
NO. 60	80.5
NO. 100	76.7
NO. 200	72.2

HYDROMETER RESULTS

PARTICLE DIA.	% FINER
0.050	72
0.020	59
0.005	39
0.002	27

SOIL CLASSIFICATION (ASTM D 2487):

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SHEET NO. 2 OF 2

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GEOSYNTEC CONSULTANTS

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PARTICLE SIZE ANALYSIS–SIEVE METHOD (ASTM D 422)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO PROJECT NO.: GQ1341 TASK NO.: 04.1

DESCRIPTION: PHASE III DATE: 15 day Nov month 2001 year

MATERIAL TYPE: Low Perm CLAY SAMPLE NO.: LP-01-61

SOIL SAMPLE SIZE	+3/8 = 1562.0 g	MOISTURE = 351.8 grams	TOTAL = 36999.76 gm
	-3/8 = 35085.96 gm	81.569 LB's	

APPROXIMATE MINIMUM WT. OF SAMPLE (PASSING NO. 10 SIEVE) (grams)	SAND	FINE GRAIN
	115	65

		+3/8 BEFORE WASH	-3/8	+3/8 AFTER WASH	-3/8
TARE NO.		L-1	K	L-1	K
WT. OF DRY SAMPLE PLUS TARE	(grams)	1754.4	1153.5	1687.6	361.10
WT. OF TARE	(grams)	192.4	101.5	192.4	101.50
WT. OF DRY SAMPLE	(grams)	1562.0	1052.0	1495.2	259.60

SIEVE ANALYSIS QA ID: _____

SIEVE NO.	DIAMETER (mm)	WT. RETAINED (grams)	% RETAINED	% FINER		PROJECT SPECIFICATIONS
3 in	76.2	0	0	100		
2 in	50.8	0	0	100		100
1 1/2in	38.1	0	0	100		
1 in	25.4	346.1	.9	99.1		
3/4 in	19.1	674.1	1.7	98.3		90-100
1/2 in	12.7	1204.7	3.3	96.7		
3/8 in	9.53	1494.5	4.0	96.0		
No. 4	4.75	35.1	3.3	96.7	92.8	
No. 10	2.00	75.8	~~6.1~~ 7.2	~~93.9~~ 92.8	~~90.1~~ 89.0	
No. 20	0.850	109.5	10.4	89.6	86.0	
No. 40	0.425	142.5	13.5	86.5	83.0	
No. 60	0.250	172.8	16.4	83.6	80.3	
No. 100	0.125	211.0	20.1	79.9	76.7	
No. 200	0.075	257.0	24.4	75.6	72.6	50-100
PAN	—	259.6	—	—		

COMMENTS:

000269

%FINER = 100 − Σ% RETAINED

GEO SYNTEC CONSULTANTS FILE NO. 2-14-PMS CHECKED BY: _____ SHEET NO. 1 OF 2

GEOSYNTEC CONSULTANTS

FLUOR FERNALD, INC.

PARTICLE SIZE DISTRIBUTION AND SOIL CLASSIFICATION TEST RESULTS (ASTM C 136/D 422) (ASTM D 2487)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO

DESCRIPTION: Phase III

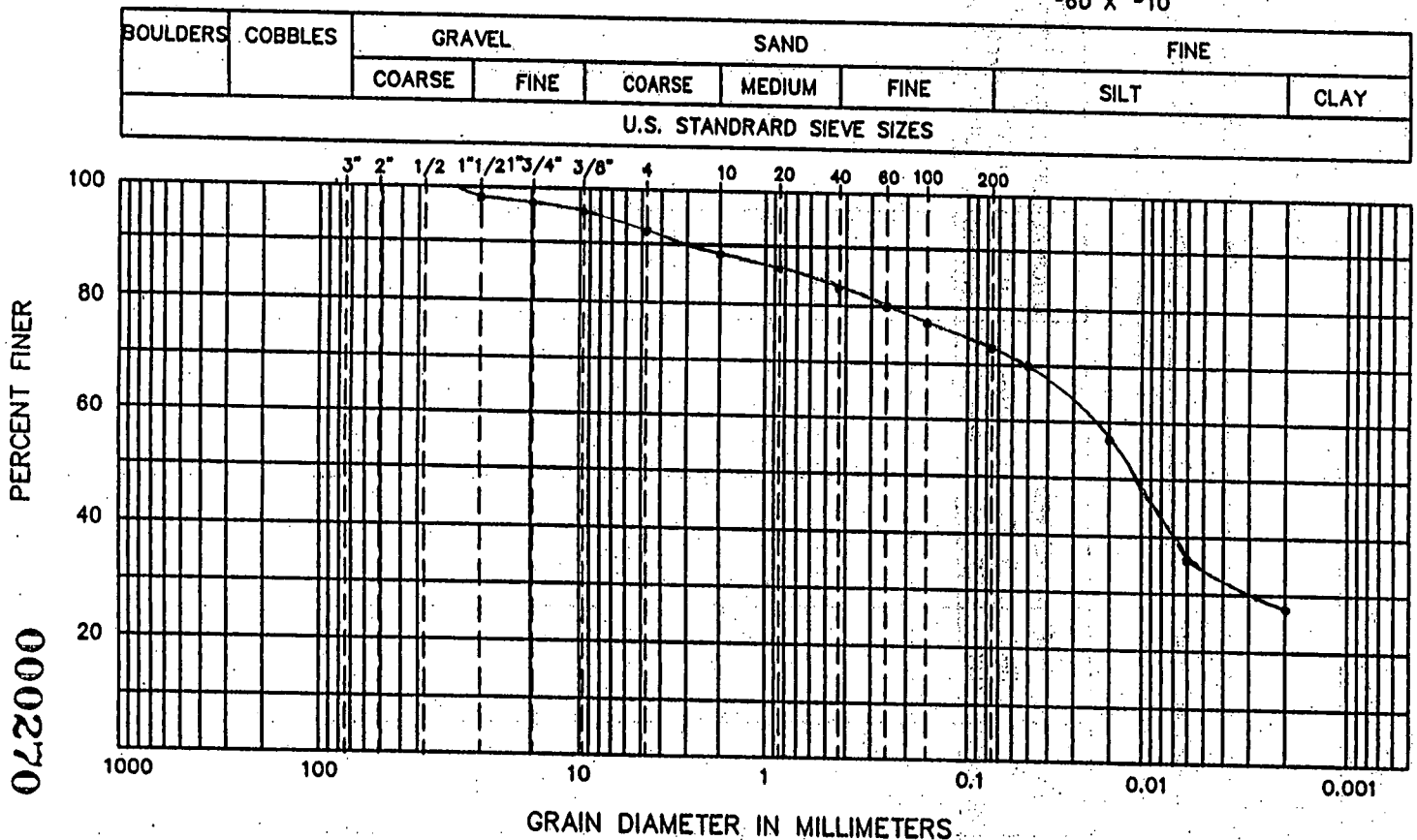
MATERIAL TYPE: Low Perm Clay

PROJECT NO.: GQ1341 TASK NO.: 04.1

DATE: 15 day Nov month 2002 year

SAMPLE NO.: LPØ1-61 QA ID: [illegible]

CURVE COEFFICIENTS: $C_{uniformity} = (\frac{D_{60}}{D_{10}}) =$ $C_{curvature} = (\frac{D_{30}^2}{D_{60} \times D_{10}}) =$



ATTERBERG LIMITS

(LL) 34

(PL) 15

(PI) 19

SIEVE RESULTS

SIEVE SIZE	% FINER
3-In.	100
2-In.	100
1 1/2-In.	100
1-In.	99.1
3/4-In.	98.3
1/2-In.	96.7
3/8-In.	96.0
NO. 4	92.8
NO. 10	89.0
NO. 20.	86.0
NO. 40	83.0
NO. 60	80.3
NO. 100	76.7
NO. 200	72.6

HYDROMETER RESULTS

PARTICLE DIA.	% FINER
0.05	70
0.02	57
0.005	36
0.002	28

SOIL CLASSIFICATION (ASTM D 2487): Lean Clay w/sand (CL)

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CHECKED BY: [illegible]

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GEOSYNTEC CONSULTANTS

FLUOR FERNALD

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PARTICLE SIZE ANALYSIS—SIEVE METHOD (ASTM D 422)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO — PROJECT NO.: GQ134 TASK NO.: 04.1

DESCRIPTION: PHASE III — DATE: 20 day Nov month 2001 year

MATERIAL TYPE: LOW PERM CLAY — SAMPLE NO.: LP-01-62

SOIL SAMPLE SIZE	+3/8 = 407.3 grams	MOISTURE = 298.0 gr	TOTAL = 19724.8
	-3/8 = 19019.45 grams	19724.75	

APPROXIMATE MINIMUM WT. OF SAMPLE (PASSING NO. 10 SIEVE) (grams)	SAND	FINE GRAIN
	115	65

		+3/8 BEFORE WASH	-3/8 BEFORE WASH	+3/8 AFTER WASH	-3/8 AFTER WASH
TARE NO.		K	L-1	K	L-1
WT. OF DRY SAMPLE PLUS TARE	(grams)	508.8	812.5	482.3	351.3
WT. OF TARE	(grams)	101.5	192.4	101.5	192.4
WT. OF DRY SAMPLE	(grams)	407.3	620.1	380.8	158.9

SIEVE ANALYSIS — QA ID: DLE

SIEVE NO.	DIAMETER (mm)	WT. RETAINED (grams)	% RETAINED	% FINER		PROJECT SPECIFICATIONS
3 in	76.2	0	0	100		
2 in	50.8	0	0	100		100
1 1/2in	38.1	0	0	100		
1 in	25.4	24.1	.1	99.9		
3/4 in	19.1	110.4	.6	99.4		90-100
1/2 in	12.7	277.9	1.4	98.6		
3/8 in	9.53	380.5	1.9	98.1		
No. 4	4.75	25.4	4.1	95.9	94.1	
No. 10	2.00	51.1	8.2	91.8	90.0	
No. 20	0.850	69.9	11.3	88.7	87.0	
No. 40	0.425	88.9	14.3	85.7	84.0	
No. 60	0.250	106.7	17.2	82.8	81.2	
No. 100	0.125	130.0	21.0	79.0	77.5	
No. 200	0.075	158.0	25.5	74.5	73.1	50-100
PAN	—	158.9	—	—		

COMMENTS:

000271

%FINER = 100 − Σ% RETAINED

GEO SYNTEC CONSULTANTS FILE NO. 2-14-PMS — CHECKED BY: TBY — SHEET NO. ____ OF ____

GEOSYNTEC CONSULTANTS

FLUOR DANIEL FERNALD

PARTICLE SIZE DISTRIBUTION AND SOIL CLASSIFICATION TEST RESULTS

(ASTM C 136/D 422) (ASTM D 2487)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO

PROJECT NO. 601341 TASK NO.: 04.1

DESCRIPTION: Phase III

DATE: 20 day Nov month 2001 year

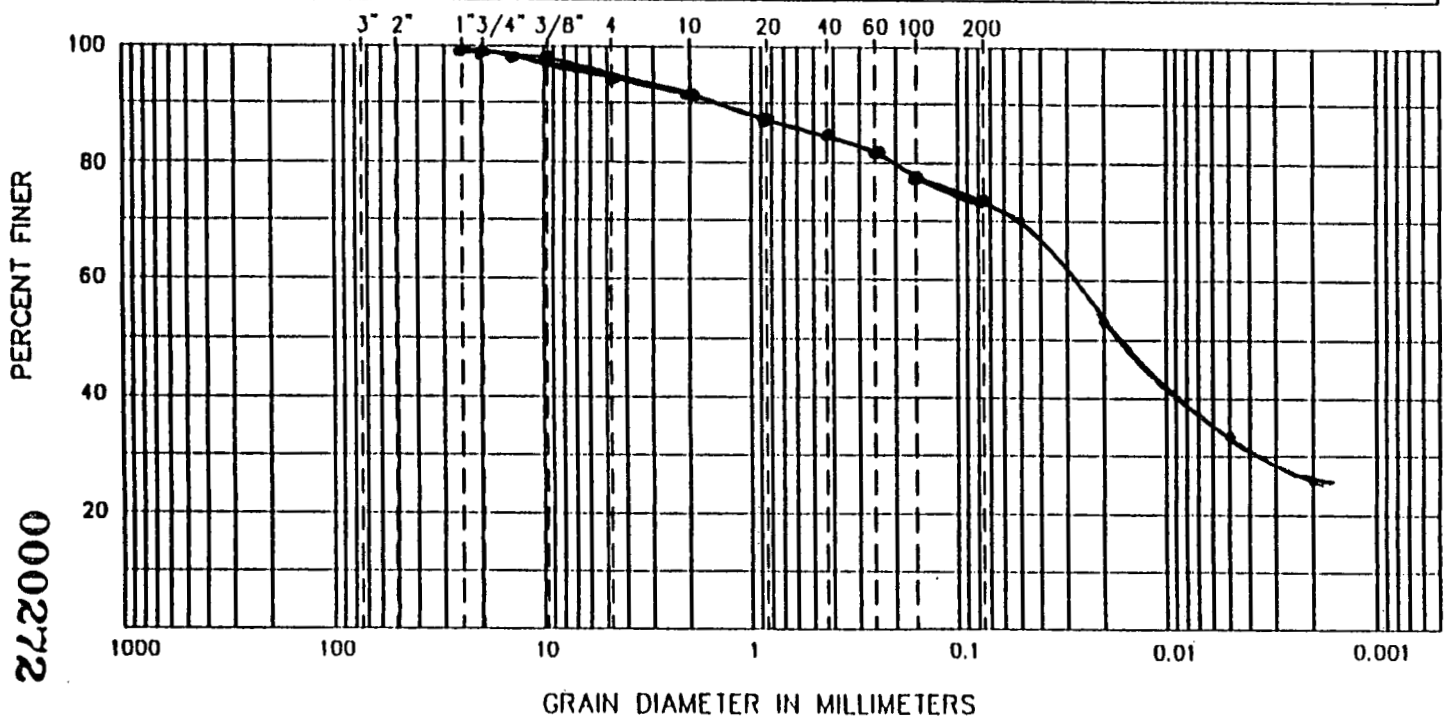
MATERIAL TYPE: Low Perm Clay

SAMPLE NO.: LP-01-62 QA ID: DLF

CURVE COEFFICIENTS: (C_u) ..... (C_c) .....

BOULDERS	COBBLES	GRAVEL		SAND			FINE	
		COARSE	FINE	COARSE	MEDIUM	FINE	SILT SIZES	CLAY SIZES

U.S. STANDRARD SIEVE SIZES



ATTERBERG LIMITS

(LL) 33

(PL) 16

(PI) 17

SIEVE RESULTS

SIEVE SIZE	% FINER
3-in.	100
2-in.	100
1 1/2-in.	100
1-in.	99.9
3/4-in.	99.9
1/2-in.	98.6
3/8-in.	98.1
NO. 4	94.1
NO. 10	90.1
NO. 20	87.0
NO. 40	84.1
NO. 60	81.2
NO. 100	77.6
NO. 200	73.1

HYDROMETER RESULTS

PARTICLE DIA.	% FINER
0.05	70
0.02	53
0.005	34
0.002	26

SOIL CLASSIFICATION (ASTM D 2487): Lean Clay w/ Sand (CL)

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GEOSYNTEC CONSULTANTS

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FLUOR FERNALD

PARTICLE SIZE ANALYSIS—SIEVE METHOD (ASTM D 422)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO PROJECT NO.: GQ1341 TASK NO.: 04.1

DESCRIPTION: PHASE III DATE: 16 day NOV month 2001 year

MATERIAL TYPE: LOW PERM CLAY SAMPLE NO.: LP-01-63

SOIL SAMPLE SIZE	+3/8 = 1196.0 gr.	MOISTURE = 2430 gr.	TOTAL = 23825.1
	-3/8 = 23582.1	(51.988 LBS)	

APPROXIMATE MINIMUM WT. OF SAMPLE (PASSING NO. 10 SIEVE) (grams)	SAND	FINE GRAIN
	115	65

		+3/8 BEFORE WASH	-3/8 BEFORE WASH	+3/8 AFTER WASH	-3/8 AFTER WASH
TARE NO.		L-1	L-2	L-1	L-2
WT. OF DRY SAMPLE PLUS TARE	(grams)	1389.2	702.3	1325.8	324.4
WT. OF TARE	(grams)	192.4	191.8	192.4	191.8
WT. OF DRY SAMPLE	(grams)	1196.8	510.5	1133.4	132.6

SIEVE ANALYSIS QA ID: [illegible]

SIEVE NO.	DIAMETER (mm)	WT. RETAINED (grams)	% RETAINED	% FINER		PROJECT SPECIFICATIONS
3 in	76.2	0	0	100		
2 in	50.8	0	0	100		100
1 1/2in	38.1	0	0	100		
1 in	25.4	359.3	1.5	98.5		
3/4 in	19.1	648.0	2.7	97.3		90-100
1/2 in	12.7	981.2	4.1	95.9		
3/8 in	9.53	1133.1	4.8	95.2		
No. 4	4.75	19.9	3.9	96.1	91.5	
No. 10	2.00	41.0	8.0	92.0	87.6	
No. 20	0.850	59.3	11.6	88.4	84.2	
No. 40	0.425	75.7	14.8	85.2	81.1	
No. 60	0.250	90.3	17.7	82.4	78.3	
No. 100	0.125	109.8	21.5	78.5	74.7	
No. 200	0.075	132.2	25.9	74.1	70.5	50-100
PAN	—	132.6	—	—	—	

COMMENTS:

000273

*%FINER = 100 − Σ% RETAINED

GEO SYNTEC CONSULTANTS FILE NO. 2-14-PMS CHECKED BY: [illegible] SHEET NO. 1 OF 2

GEOSYNTEC CONSULTANTS

FLUOR DANIEL FERNALD

PARTICLE SIZE DISTRIBUTION AND SOIL CLASSIFICATION TEST RESULTS

(ASTM C 136/D 422) (ASTM D 2487)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO

PROJECT NO. 681341 TASK NO.: 04.1

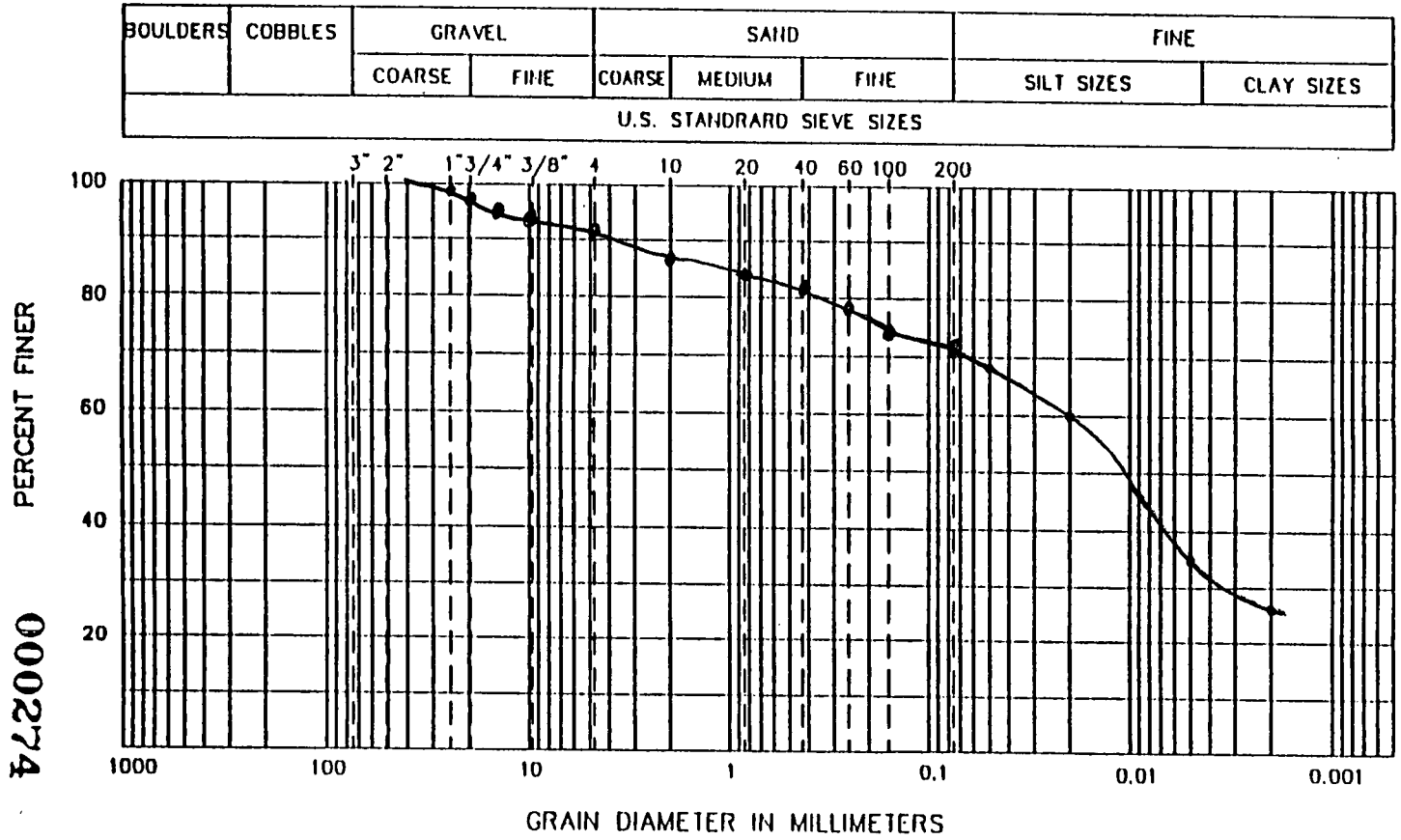
DESCRIPTION: Phase III

DATE: 16 day Nov. month 2001 year

MATERIAL TYPE: Low Perm Clay

SAMPLE NO.: LP-01-63 QA ID: DLE

CURVE COEFFICIENTS: (C_u) ..... (C_c) .....



ATTERBERG LIMITS

(LL) 31

(PL) 16

(PI) 15

SIEVE RESULTS

SIEVE SIZE	% FINER
3-In.	100
2-In.	100
1 1/2-In.	100
1-In.	98.5
3/4-In.	97.3
1/2-In.	95.9
3/8-In.	95.2
NO. 4	91.5
NO. 10	87.6
NO. 20	84.2
NO. 40	81.1
NO. 60	78.3
NO. 100	74.7
NO. 200	70.5

HYDROMETER RESULTS

PARTICLE DIA.	% FINER
0.05	69
0.02	60
0.005	35
0.002	26

SOIL CLASSIFICATION (ASTM D 2487): Lean Clay w/ Sand

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CHECKED BY: [illegible]

SHEET NO. 2 OF 2

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GEOSYNTEC CONSULTANTS

FLUOR FERNALD

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PARTICLE SIZE ANALYSIS—SIEVE METHOD (ASTM D 422)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO PROJECT NO.: GQ134 TASK NO.: 04.1

DESCRIPTION: PHASE III DATE: 16 day Nov month 2001 year

MATERIAL TYPE: Low Perm CLAY SAMPLE NO.: LP-01-64

SOIL SAMPLE SIZE	+3/8 = 704.9 gr	MOISTURE = 300.4 gr	TOTAL = 36749.0 gm
	-3/8 = 35943.7	78.80 Nucleat: 35743.7	

APPROXIMATE MINIMUM WT. OF SAMPLE (PASSING NO. 10 SIEVE) (grams)	SAND	FINE GRAIN
	115	65

	+3/8 BEFORE WASH	-3/8 BEFORE WASH	+3/8 AFTER WASH	-3/8 AFTER WASH
TARE NO.	K	L-4	K	L-4
WT. OF DRY SAMPLE PLUS TARE (grams)	806.4	716.3	764.5	313.6
WT. OF TARE (grams)	101.5	146.4	101.5	146.4
WT. OF DRY SAMPLE (grams)	704.9	569.9	663.0	167.2

SIEVE ANALYSIS QA ID: DLF

SIEVE NO.	DIAMETER (mm)	WT. RETAINED (grams)	% RETAINED	% FINER		PROJECT SPECIFICATIONS
3 in	76.2	0	0	100		
2 in	50.8	0	0	100		100
1 1/2in	38.1	0	0	100		
1 in	25.4	183.4	.50	99.5		
3/4 in	19.1	250.1	.70	99.3		90-100
1/2 in	12.7	479.0	1.30	98.7		
3/8 in	9.53	663.0	1.80	98.2		
No. 4	4.75	11.9	2.1	97.9	96.1	
No. 10	2.00	43.2	7.6	92.4	90.7	
No. 20	0.850	75.2	13.2	86.8	85.2	
No. 40	0.425	100.1	17.6	82.4	80.9	
No. 60	0.250	118.6	20.8	79.2	77.8	
No. 100	0.125	143.0	25.1	74.9	73.6	
No. 200	0.075	165.7	29.1	70.9	69.6	50-100
PAN	—	167.2	—	—		

COMMENTS:

000275

%FINER = 100 − Σ% RETAINED

GEO SYNTEC CONSULTANTS FILE NO. 2-14-PMS CHECKED BY: CH SHEET NO. 1 OF 2

GEOSYNTEC CONSULTANTS

FLUOR DANIEL FERNALD

PARTICLE SIZE DISTRIBUTION AND SOIL CLASSIFICATION TEST RESULTS

(ASTM C 136/D 422) (ASTM D 2487)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO

DESCRIPTION: Phase III

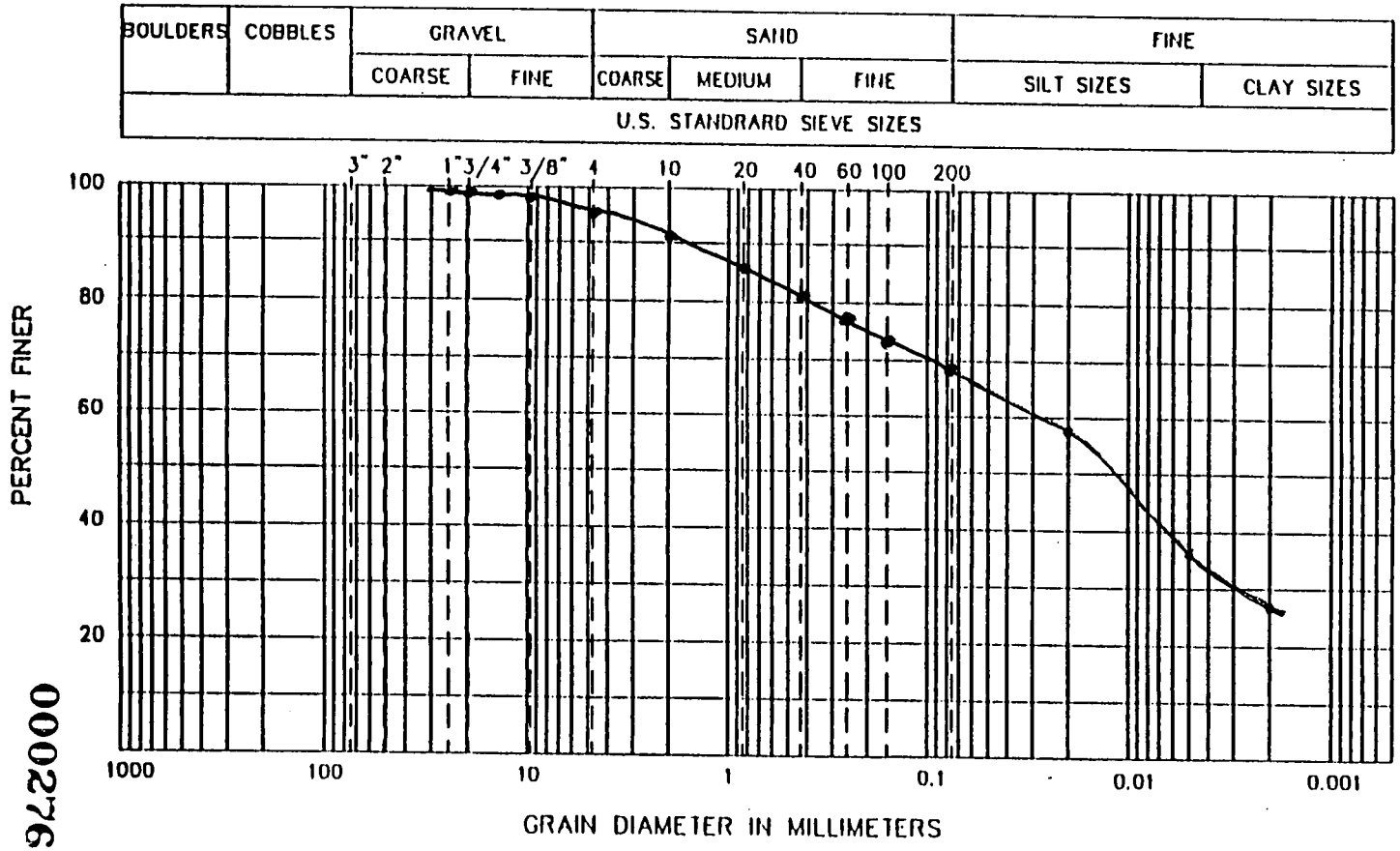
MATERIAL TYPE: Low Perm Clay

PROJECT NO. GQ1341 TASK NO.: 04.1

DATE: 20 day Nov month 2001 year

SAMPLE NO.: LP-01.64 QA ID: DLE

CURVE COEFFICIENTS: (C_U) ..... (C_C) .....



ATTERBERG LIMITS

(LL) 33

(PL) 16

(PI) 17

SIEVE RESULTS

SIEVE SIZE	% FINER
3-In.	100
2-In.	100
1 1/2-In.	100
1-In.	99.5
3/4-In.	99.3
1/2-In.	98.7
3/8-In.	98.2
NO. 4	96.1
NO. 10	90.7
NO. 20	85.2
NO. 40	80.9
NO. 60	77.8
NO. 100	73.6
NO. 200	69.6

HYDROMETER RESULTS

PARTICLE DIA.	% FINER
0.05	—
0.02	58
0.005	36
0.002	27

SOIL CLASSIFICATION (ASTM D 2487): Sandy Lean Clay (CL)

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SHEET NO. 2 OF 2

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GEOSYNTEC CONSULTANTS

FLUOR FERNALD

PARTICLE SIZE ANALYSIS—SIEVE METHOD (ASTM D 422)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO — PROJECT NO.: GQ1341 TASK NO.: 04.1

DESCRIPTION: PHASE III — DATE: 20 day NOV month 2001 year

MATERIAL TYPE: LOW PERM CLAY — SAMPLE NO.: LP-01-65

SOIL SAMPLE SIZE	+3/8 = 586.7 gram	MOISTURE = 409.9 gr	TOTAL = 21404.1 gr
	-3/8 = 20407.5 gr	21404.1 gr	

APPROXIMATE MINIMUM WT. OF SAMPLE (PASSING NO. 10 SIEVE) (grams)	SAND	FINE GRAIN
	115	65

		+3/8 BEFORE WASH	-3/8 BEFORE WASH	+3/8 AFTER WASH	-3/8 AFTER WASH
TARE NO.		L-1	L-1	L-1	L-1
WT. OF DRY SAMPLE PLUS TARE	(grams)	779.1	803.6	748.4	355.80
WT. OF TARE	(grams)	192.4	192.4	192.4	192.40
WT. OF DRY SAMPLE	(grams)	586.7	611.2	556.0	163.4

SIEVE ANALYSIS — QA ID: _____

SIEVE NO.	DIAMETER (mm)	WT. RETAINED (grams)	% RETAINED	% FINER		PROJECT SPECIFICATIONS
3 in	76.2	0	0	100		
2 in	50.8	0	0	100		100
1 1/2in	38.1	0	0	100		
1 in	25.4	0	0	100		
3/4 in	19.1	113.8	.5	99.5		90-100
1/2 in	12.7	407.2	1.9	98.1		
3/8 in	9.53	556.0	2.6	97.4		
No. 4	4.75	27.3	4.5	95.5	93.0	
No. 10	2.00	56.3	9.2	90.8	88.4	
No. 20	0.850	74.8	12.2	87.8	85.5	
No. 40	0.425	93.4	15.3	84.7	82.5	
No. 60	0.250	113.0	18.5	81.5	79.4	
No. 100	0.125	137.2	22.4	77.6	75.6	
No. 200	0.075	161.4	26.4	73.6	71.7	50-100
PAN	—	163.4	—	—		

COMMENTS:

000277

%FINER = 100 − Σ% RETAINED

GEO SYNTEC CONSULTANTS FILE NO. 2-14-PMS

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SHEET NO. 1 OF 2

GEOSYNTEC CONSULTANTS

FLUOR DANIEL FERNALD

PARTICLE SIZE DISTRIBUTION AND SOIL CLASSIFICATION TEST RESULTS

(ASTM C 136/D 422) (ASTM D 2487)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO

DESCRIPTION: Phase III

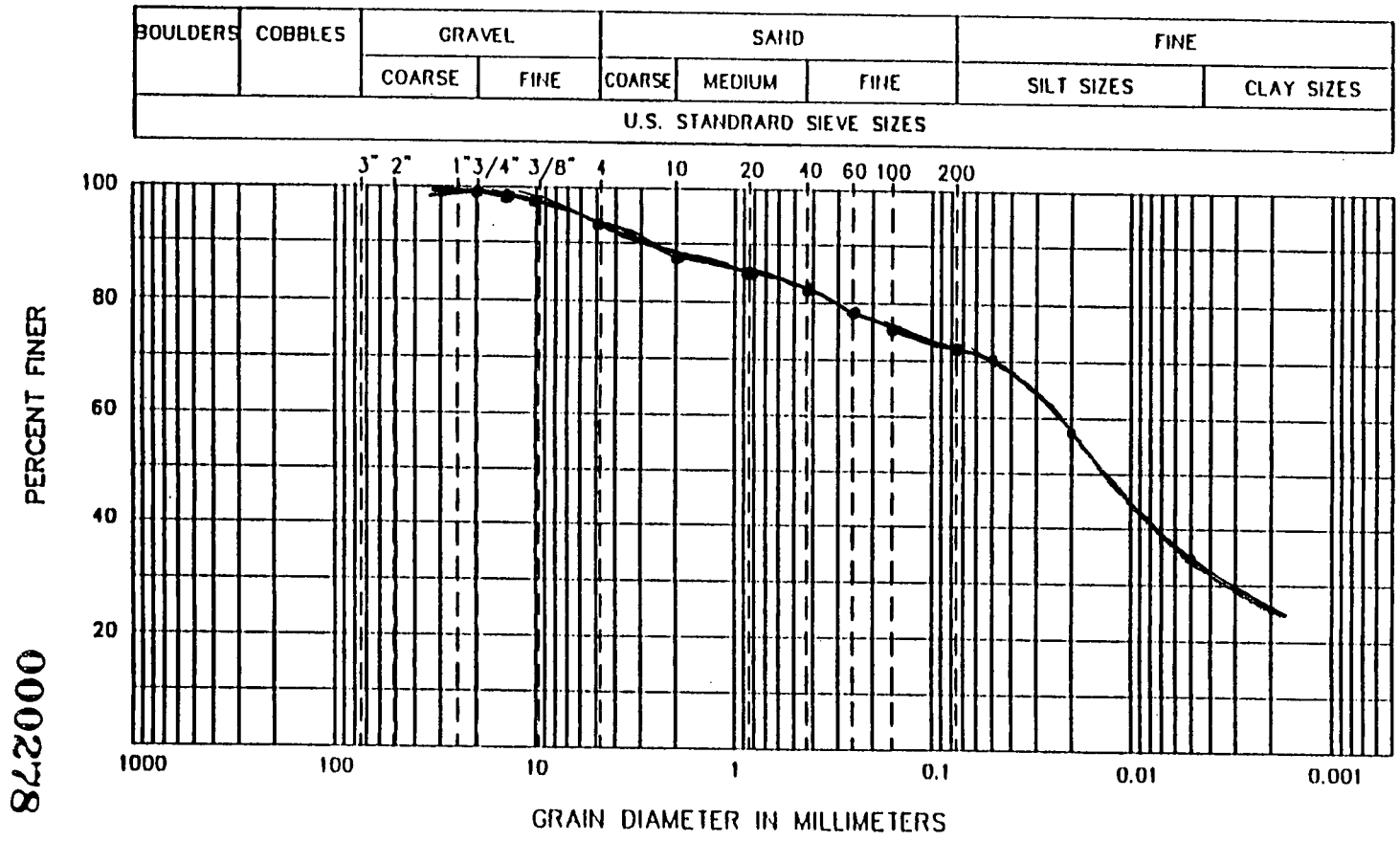
MATERIAL TYPE: Low Perm Clay

PROJECT NO. GQ1341 TASK NO.: 04.1

DATE: 21 day Nov month 2001 year

SAMPLE NO.: LP-01-65 QA ID: DLE

CURVE COEFFICIENTS: (C_u) ..... (C_c) .....



ATTERBERG LIMITS

(LL) 33

(PL) 16

(PI) 17

SIEVE RESULTS

SIEVE SIZE	% FINER
3-In.	100
2-In.	100
1 1/2-In.	100
1-In.	100
3/4-In.	99.5
1/2-In.	98.1
3/8-In.	97.4
NO. 4	93.0
NO. 10	88.4
NO. 20	85.5
NO. 40	82.5
NO. 60	79.4
NO. 100	75.6
NO. 200	71.7

HYDROMETER RESULTS

PARTICLE DIA.	% FINER
0.05	70
0.02	58
0.005	35
0.002	26

SOIL CLASSIFICATION (ASTM D 2487): Lean Clay w/Sand (CL)

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SHEET NO. 2 OF 2

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GEOSYNTEC CONSULTANTS

FLUOR FERNALD

PARTICLE SIZE ANALYSIS–SIEVE METHOD (ASTM D 422)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO — PROJECT NO.: GQ1341 TASK NO.: 041

DESCRIPTION: PHASE III — DATE: 25 day June month 2002 year

MATERIAL TYPE: Low Perm CLAY — SAMPLE NO.: LP02-1

359 52.8 - 8 Total cylinder wts

SOIL SAMPLE SIZE	+3/8 = 1443.7gm	MOISTURE = 377.8	TOTAL = 39054.7
	-3/8 = 35952.8 + 577.6 + 702.9		

APPROXIMATE MINIMUM WT. OF SAMPLE (PASSING NO. 10 SIEVE) (grams)	SAND	FINE GRAIN
	115	65

	+3/8 BEFORE WASH	-3/8 BEFORE WASH	+3/8 AFTER WASH	-3/8 AFTER WASH
TARE NO.	L-9	L-44	L-9	L-44
WT. OF DRY SAMPLE PLUS TARE (grams)	1637.3	894.83	1572.3	322.35
WT. OF TARE (grams)	193.6	191.93	193.6	191.93
WT. OF DRY SAMPLE (grams)	1443.7	702.9	1378.7	130.42 ~~702.9~~

SIEVE ANALYSIS — QA ID: DJE

SIEVE NO.	DIAMETER (mm)	WT. RETAINED (grams)	% RETAINED	% FINER		PROJECT SPECIFICATIONS
3 in	76.2	0	0	100		
2 in	50.8	0	0	100		100
1 1/2in	38.1	281.9 ~~281.9~~ DJE	.7	99.3		
1 in	25.4	514.1	1.3	98.7		
3/4 in	19.1	681.8	1.7	98.3		90-100
1/2 in	12.7	1118.6	2.9	97.1		
3/8 in	9.53	1378.6	3.5	96.5		
No. 4	4.75	15.0	2.1	97.9	94.5	
No. 10	2.00	35.7	5.1	94.9	91.6	
No. 20	0.850	53.7	7.6	92.4	89.2	
No. 40	0.425	70.4	10.0	90.0	86.9	
No. 60	0.250	85.5	12.2	87.8	84.7	
No. 100	0.125	105.5	15.0	85.0	82.0	
No. 200	0.075	129.7	18.5	81.5	78.6	50-100
PAN	—	130.4	—	—		

COMMENTS:

000279

%FINER = 100 − Σ% RETAINED

GEO SYNTEC CONSULTANTS FILE NO. 2-14-PMS — CHECKED BY: [illegible] — SHEET NO. 1 OF 2

GEOSYNTEC CONSULTANTS

FLUOR FERNALD, INC.

PARTICLE SIZE DISTRIBUTION AND SOIL CLASSIFICATION TEST RESULTS (ASTM C 136/D 422) (ASTM D 2487)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO

DESCRIPTION: Phase IV

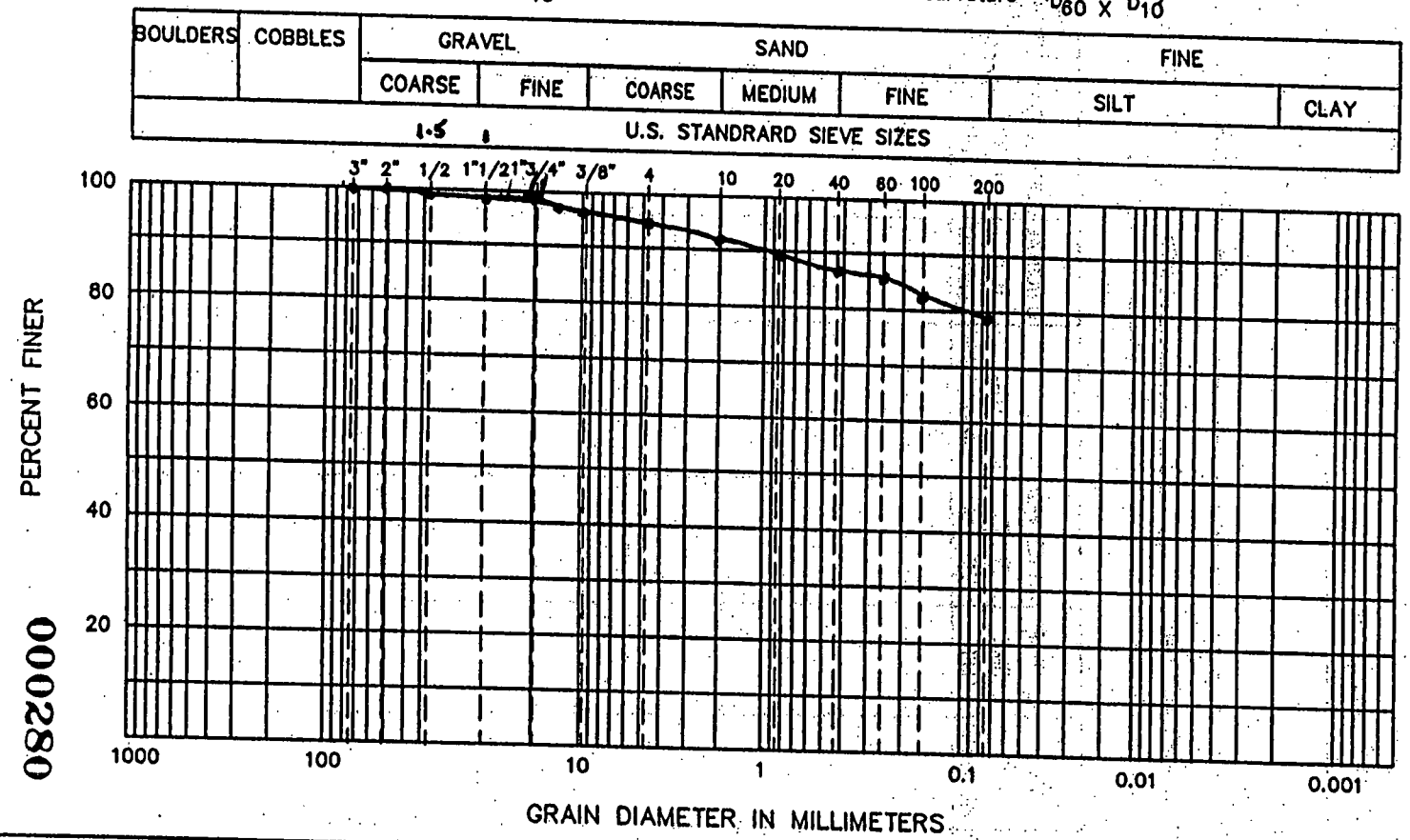
MATERIAL TYPE: Low Perm. Clay

PROJECT NO.: GQ1341 TASK NO.: 04.1

DATE: 19 day July month 2002 year

SAMPLE NO.: LP02-1 QA ID: KS

CURVE COEFFICIENTS: $C_{uniformity} = \left(\frac{D_{60}}{D_{10}}\right) =$ $C_{curvature} = \left(\frac{D_{30}^2}{D_{60} \times D_{10}}\right) =$



ATTERBERG LIMITS

(LL) 34

(PL) 17

(PI) 17

SIEVE RESULTS

SIEVE SIZE	% FINER
3-in.	100
2-in.	100
1 1/2-in.	99.3
1-in.	98.7
3/4-in.	98.3
1/2-in.	KS ~~98.1~~ 97.1
3/8-in.	96.5
NO. 4	94.5
NO. 10	91.6
NO. 20.	89.2
NO. 40	86.9
NO. 60	84.7
NO. 100	82.0
NO. 200	78.6

HYDROMETER RESULTS

PARTICLE DIA.	% FINER
0.05	73.0
0.02	60.0
0.005	38.0
0.002	29.0

SOIL CLASSIFICATION (ASTM D 2487): CL

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CHECKED BY:

SHEET NO. ____ OF ____

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ASTM GRAIN SIZE ANALYSIS
ASTM C117, C136, D421, D422, D1140 and D2217

PROJECT TITLE	GEOSYNTEC/FLUOR FERNALD/OH	SAMPLE ID	LP02 - 1
PROJECT NO.	023-3313	SAMPLE TYPE	Bag
		SAMPLE DEPTH	-

AS RECEIVED WATER CONTENT

Tare No.		
Wt. Wet Soil & Tare (gm)	(W1)	
Wt. Dry Soil & Tare (gm)	(W2)	
Weight of Tare (gm)	(W3)	
Weight of Water (gm)	(W4=W1-W2)	
Weight of Dry Soil (gm)	(W5=W2-W3)	
Moisture Content (%)	(W4/W5)*100	

Hygroscopic Moisture For Sieve Sample

Wet Soil & Tare (gm)	50.36
Dry Soil & Tare (gm)	49.60
Tare Weight (gm)	3.21
Moisture Content (%)	1.64

Total Weight of Sample Used For Sieve Analysis Corrected For Hygroscopic Moisture

Weight + Tare, Before Separating On The #4 Sieve (gm)	817.30	
Tare Weight (gm)	235.84	
Total Weight (gm)	572.09	(W6)

Plus #4 Material Sieve

TARE WEIGHT 0.00

	(Wt+Tare)	((Wt-Tare)/W6)*100)	%PASSING		
12.0"				12.0"	cobbles
3.0"				3.0"	coarse gravel
2.5"				2.5"	coarse gravel
2.0"				2.0"	coarse gravel
1.5"				1.5"	coarse gravel
1.0"				1.0"	coarse gravel
0.75"				0.75"	fine gravel
0.50"				0.50"	fine gravel
0.375"				0.375"	fine gravel
#4			94.5	#4	coarse sand

NOTE: Client provided the percent passing #4 sieve.

HYDROMETER ANALYSIS

Specific Gravity	(assumed)	2.720
Specific Gravity	(tested)	
Amount Dispersing Agent (ml)		125.00
Type Dispersion Device		Mechanical
Length of Dispersion Period		1 Minute

Weight of Sample Used For Hydrometer Test

Weight of Sample Wet or Dry (gm)	53.80
Calculated Dry Wt. used in test (gm)	52.93
Hydrometer Bulb Number	704004
% Pass #4 Sieve For Whole Sample	94.50

TARE WEIGHT 0.00

HYDROMETER BACKSIEVE (Percent Passing #10 - #200 Sieves)

	(Wt+Tare)	Cumul Wt. Retained	% PASSING		
#10	0.74	0.74	93.2	#10	medium sand
#20	2.14	2.14	90.7	#20	medium sand
#40	3.69	3.69	87.9	#40	fine sand
#60	5.43	5.43	84.8	#60	fine sand
#100	7.42	7.42	81.3	#100	fine sand
#200	9.91	9.91	76.8	#200	fines

HYDROMETER CALCULATIONS

DATE 7/3/02	TIME 9:05	ET (min)	READING R	TEMP T	TEMP.COR. K	HYD.COR. Cc	READING C	EFFECTIVE LENGTH	A
7/3/02	9:07	2.00	46.0	22.50	0.013	7.00	39.00	9.9	0.99
7/3/02	9:10	5.00	41.0	22.50	0.013	7.00	34.00	10.7	0.99
7/3/02	9:20	15.00	36.0	22.50	0.013	7.00	29.00	11.5	0.99
7/3/02	9:35	30.00	32.0	22.50	0.013	7.00	25.00	12.2	0.99
7/3/02	10:05	60.00	29.0	22.50	0.013	7.00	22.00	12.7	0.99
7/3/02	13:15	250.00	25.0	22.50	0.013	7.00	18.00	13.3	0.99
7/4/02	9:05	1440.00	22.0	22.50	0.013	7.00	15.00	13.8	0.99

GRAIN SIZE PERCENTAGES

Particle Diameter	% PASSING		
0.0291	68.9		
0.0192	60.1	% GRAVEL	5.50
0.0115	51.3	% COARSE SAND	1.32
0.0084	44.2	% MEDIUM SAND	5.27
0.0060	38.9	% FINE SAND	11.10
0.0030	31.8	% FINES	76.81
0.0013	26.5	% TOTAL SAMPLE	100.00

Description: Yellowish Brown, SILTY CLAY, some medium to fine sand, little gravel.

USCS: (CL)

-	LL
-	PL
-	PI

TECH	TJ
DATE	7/2/02
CHECK	
REVIEW	

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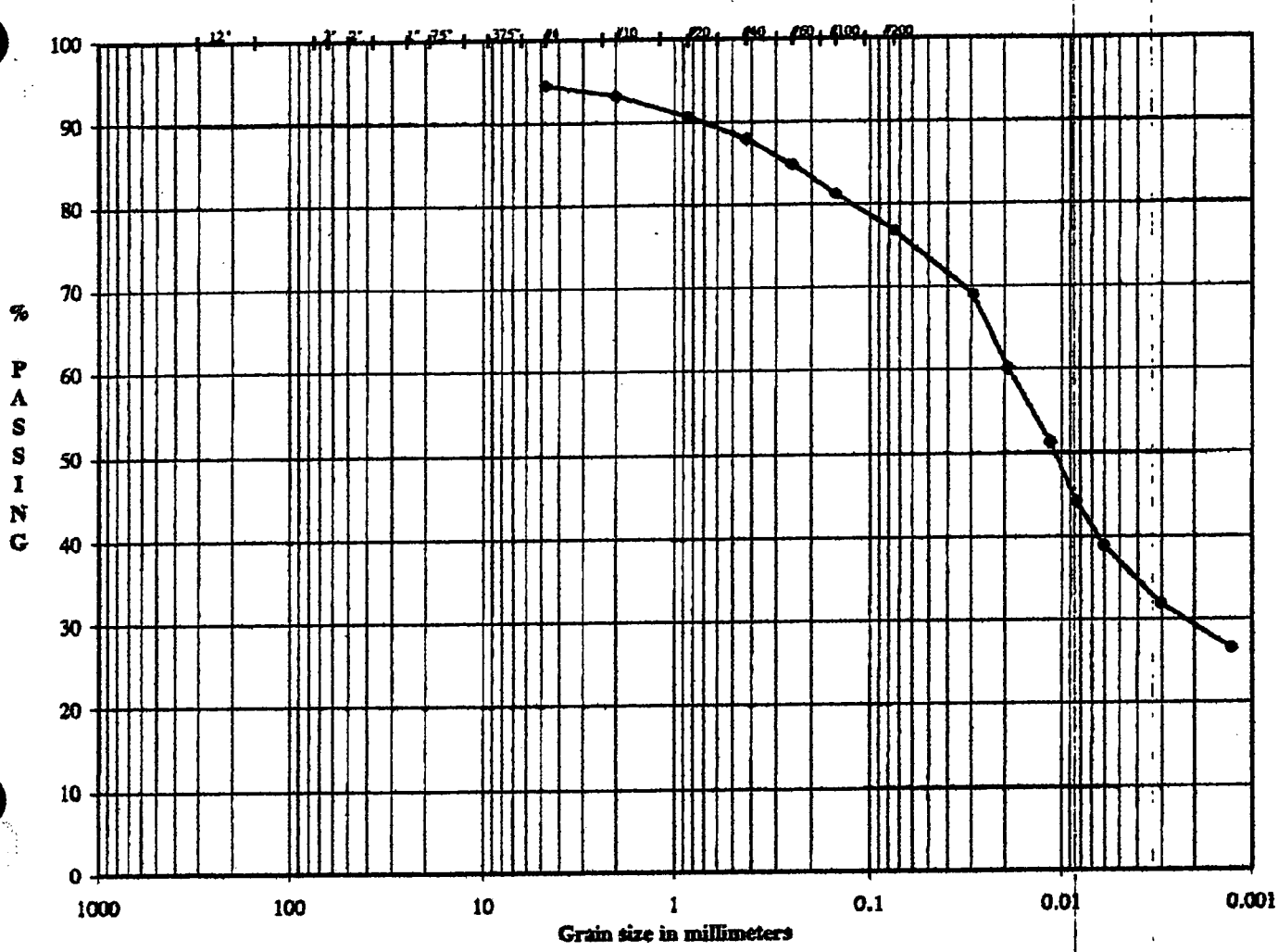
PARTICLE SIZE DISTRIBUTION ASTM D 421 AND D 422
US STANDARD SIEVE OPENING SIZES



Boulders	Cobbles	Coarse	Fine	Cor	Med	Fine	SILT OR CLAY
		Gravel		SAND			FINES

SAMPLE ID	LP02 - 1
SAMPLE TYPE	Bag
SAMPLE DEPTH	-

LL	-
PL	-
PI	-

DESCRIPTION	Yellowish Brown, SILTY CLAY, some medium to fine sand, little gravel.
USCS	(CL)

GEOSYNTEC/FLUOR FERNALD/OH
023-3313

TECH	TJ
DATE	7/2/02
CHECK	
REVIEW	

313.4

4940

GEOSYNTEC CONSULTANTS

FLUOR FERNALD

PARTICLE SIZE ANALYSIS—SIEVE METHOD

(ASTM D 422)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO — PROJECT NO.: GQ134 TASK NO.: 04.1

DESCRIPTION: PHASE III — DATE: 26 day June month 2002 year

MATERIAL TYPE: Low Perm CLAY — SAMPLE NO.: LP02-2

SOIL SAMPLE SIZE: +3/8 = 491.8 | MOISTURE = 303.6 gm | -3/8 = 6243 + 570.0 + 19876.75 | TOTAL = 21866.5 gm

APPROXIMATE MINIMUM WT. OF SAMPLE (PASSING NO. 10 SIEVE) (grams)	SAND	FINE GRAIN
	115	65

	+3/8 BEFORE WASH	-3/8 BEFORE WASH	+3/8 AFTER WASH	-3/8 AFTER WASH
TARE NO.	K	L-44	K	L-44
WT. OF DRY SAMPLE PLUS TARE (grams)	593.3	816.2	567.1	313.40
WT. OF TARE (grams)	101.5	191.9	101.5	191.9
WT. OF DRY SAMPLE (grams)	491.8	624.3	465.6	121.5

SIEVE ANALYSIS — QA ID: _____

SIEVE NO.	DIAMETER (mm)	WT. RETAINED (grams)	% RETAINED	% FINER		PROJECT SPECIFICATIONS
3 in	76.2	Ø	Ø	Ø		
2 in	50.8	Ø	Ø	Ø		100
1 1/2in	38.1	Ø	Ø	Ø		
1 in	25.4	149.7	.7	99.3		
3/4 in	19.1	219.2	1.0	99.0		90-100
1/2 in	12.7	381.2	1.7	98.3		
3/8 in	9.53	465.6	2.1	97.9		
No. 4	4.75	13.3	2.1	97.9	95.8	
No. 10	2.00	29.9	4.8	95.2	93.2	
No. 20	0.850	46.6	7.5	92.5	90.6	
No. 40	0.425	62.8	10.1	89.9	88.0	
No. 60	0.250	77.7	12.4	87.6	85.8	
No. 100	0.125	97.9	15.7	84.3	82.5	
No. 200	0.075	121.3	19.4	80.6	78.9	50-100
PAN	—	121.5	—	—		

COMMENTS:

000283

%FINER = 100 − Σ% RETAINED

©GEO SYNTEC CONSULTANTS FILE NO. 2-14-PMS

CHECKED BY: _____

SHEET NO. 1 OF 2

GEOSYNTEC CONSULTANTS

FLUOR FERNALD, INC.

PARTICLE SIZE DISTRIBUTION AND SOIL CLASSIFICATION TEST RESULTS (ASTM C 136/D 422) (ASTM D 2487)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO

DESCRIPTION: Phase IV

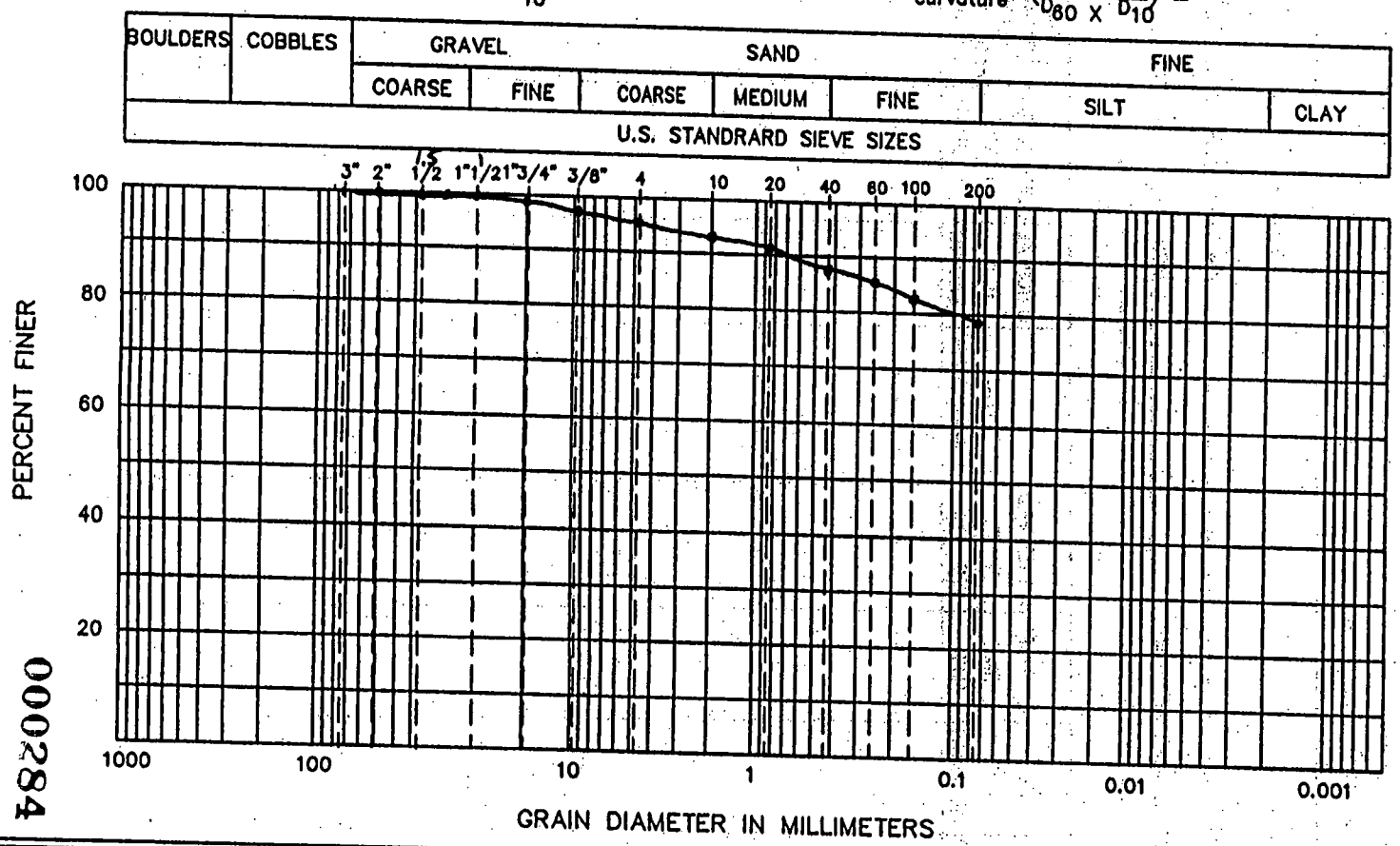
MATERIAL TYPE: Low Perm. Clay

PROJECT NO.: 6Q1341 TASK NO.: 04.1

DATE: 19 day July month 2002 year

SAMPLE NO.: 4P02-2 QA ID: KS

CURVE COEFFICIENTS: $C_{uniformity} = (\frac{D_{60}}{D_{10}}) =$ $C_{curvature} = (\frac{D_{30}^2}{D_{60} \times D_{10}}) =$



ATTERBERG LIMITS

(LL) 36

(PL) 18

(PI) 18

SIEVE RESULTS

SIEVE SIZE	% FINER
3-in.	100
2-in.	100
1 1/2-in.	100
1-in.	99.3
3/4-in.	99.0
1/2-in.	98.3
3/8-in.	97.9
NO. 4	95.8
NO. 10	93.2
NO. 20.	90.6
NO. 40	88.0
NO. 60	85.8
NO. 100	82.5
NO. 200	78.9

HYDROMETER RESULTS

PARTICLE DIA.	% FINER
0.05	75.0
0.02	69.0
0.005	40.0
0.002	32.0

SOIL CLASSIFICATION (ASTM D 2487): CL

©GEO SYNTEC CONSULTANTS FILE NO. 2-16-PSD

CHECKED BY:

SHEET NO. OF

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ASTM GRAIN SIZE ANALYSIS
ASTM C117, C136, D421, D422, D1140 and D2217

PROJECT TITLE	GEOSYNTEC/FLUOR FERNALD/OH	SAMPLE ID	LP02 - 2
PROJECT NO.	023-3313	SAMPLE TYPE	Bag
		SAMPLE DEPTH	-

AS RECEIVED WATER CONTENT

Tare No.		
Wt. Wet Soil & Tare (gm)	(W1)	
Wt. Dry Soil & Tare (gm)	(W2)	
Weight of Tare (gm)	(W3)	
Weight of Water (gm)	(W4=W1-W2)	
Weight of Dry Soil (gm)	(W5=W2-W3)	
Moisture Content (%)	(W4/W5)*100	

Hygroscopic Moisture For Sieve Sample

Wet Soil & Tare (gm)	50.41
Dry Soil & Tare (gm)	50.00
Tare Weight (gm)	3.21
Moisture Content (%)	0.88

Total Weight of Sample Used For Sieve Analysis Corrected For Hygroscopic Moisture

Weight + Tare, Before Separating On The #4 Sieve (gm)	798.65	
Tare Weight (gm)	233.78	
Total Weight (gm)	559.96	(W6)

Plus #4 Material Sieve

TARE WEIGHT 0.00

	(Wt+Tare)	(((Wt-Tare)/W6)*100)	%PASSING		
12.0"				12.0"	cobbles
3.0"				3.0"	coarse gravel
2.5"				2.5"	coarse gravel
2.0"				2.0"	coarse gravel
1.5"				1.5"	coarse gravel
1.0"				1.0"	coarse gravel
0.75"				0.75"	fine gravel
0.50"				0.50"	fine gravel
0.375"				0.375"	fine gravel
#4			95.8	#4	coarse sand

NOTE: Client provided the percent passing #4 sieve.

HYDROMETER ANALYSIS

Specific Gravity	(assumed)	2.720
Specific Gravity	(tested)	
Amount Dispersing Agent (ml)		125.00
Type Dispersion Device		Mechanical
Length of Dispersion Period		1 Minute

Weight of Sample Used For Hydrometer Test

Weight of Sample Wet or Dry (gm)	53.62
Calculated Dry Wt. used in test (gm)	53.15
Hydrometer Bulb Number	704004
% Pass #4 Sieve For Whole Sample	95.80

TARE WEIGHT 0.00

HYDROMETER BACKSIEVE (Percent Passing #10 - #200 Sieves)

	(Wt+Tare)	Cumul Wt. Retained	% PASSING		
#10	1.48	1.48	93.1	#10	medium sand
#20	3.07	3.07	90.3	#20	medium sand
#40	4.56	4.56	87.6	#40	fine sand
#60	6.07	6.07	84.9	#60	fine sand
#100	7.85	7.85	81.7	#100	fine sand
#200	10.08	10.08	77.6	#200	fines

HYDROMETER CALCULATIONS

DATE	TIME	ET (min)	READING R	TEMP T	TEMP.COR. K	HYD.COR. Cc	READING C	EFFECTIVE LENGTH	A
7/3/02	9:07								
7/3/02	9:09	2.00	48.0	22.50	0.013	7.00	41.00	9.6	0.99
7/3/02	9:12	5.00	45.0	22.50	0.013	7.00	38.00	10.1	0.99
7/3/02	9:22	15.00	37.0	22.50	0.013	7.00	30.00	11.4	0.99
7/3/02	9:37	30.00	33.0	22.50	0.013	7.00	26.00	12.0	0.99
7/3/02	10:07	60.00	30.0	22.50	0.013	7.00	23.00	12.5	0.99
7/3/02	13:17	250.00	26.0	22.50	0.013	7.00	19.00	13.2	0.99
7/4/02	9:07	1440.00	23.0	22.50	0.013	7.00	16.00	13.7	0.99

GRAIN SIZE PERCENTAGES

Particle Diameter	% PASSING		
0.0287	73.2		
0.0186	67.8	% GRAVEL	4.20
0.0114	53.5	% COARSE SAND	2.67
0.0083	46.4	% MEDIUM SAND	5.55
0.0060	41.0	% FINE SAND	9.95
0.0030	33.9	% FINES	77.63
0.0013	28.5	% TOTAL SAMPLE	100.00

Description: Yellowish Brown. SILTY CLAY. some coarse to fine sand, little gravel.

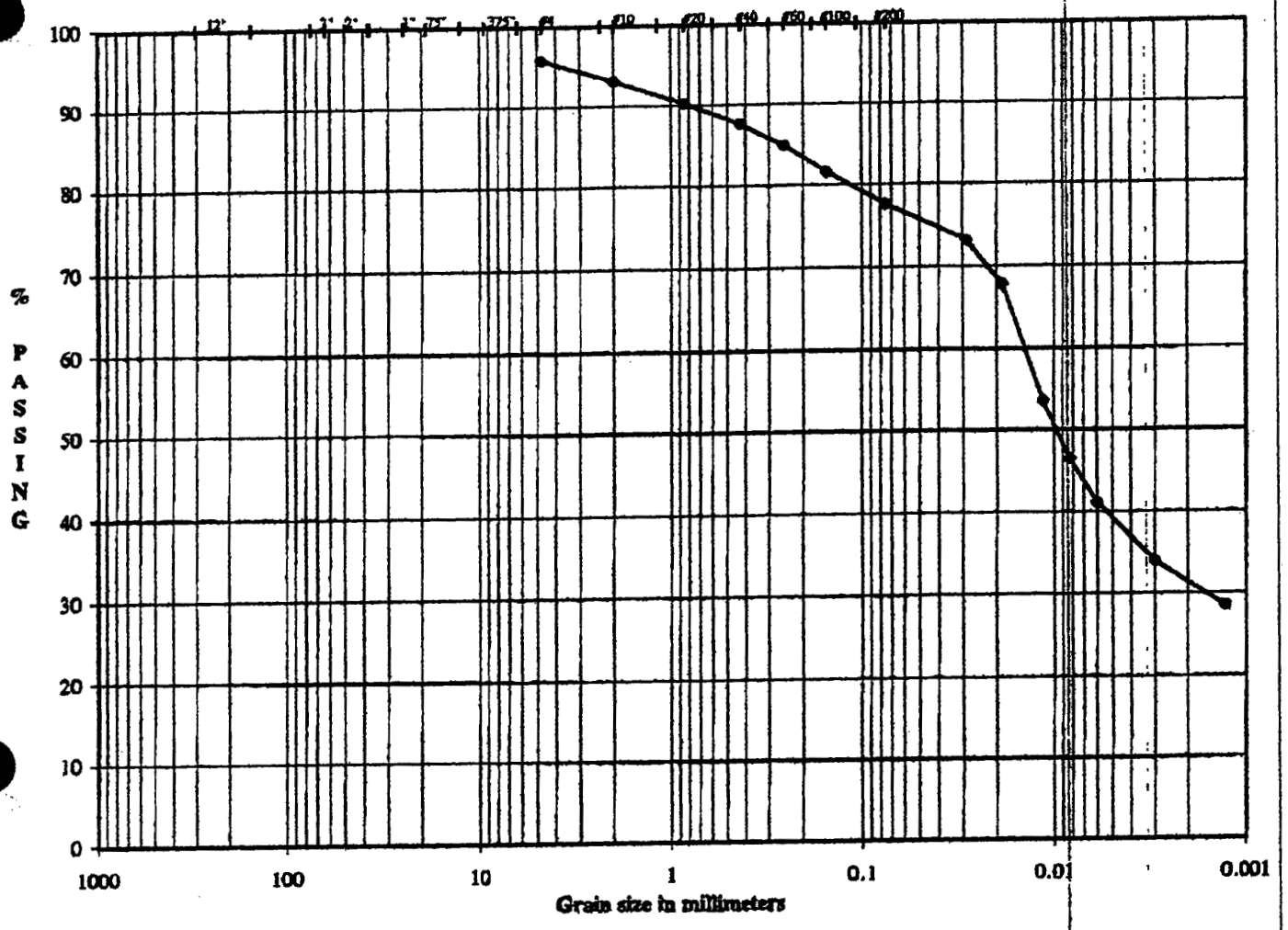
USCS: (CL)

-	LL
-	PL
-	PI

TECH	TJ
DATE	7/2/02
CHECK	
REVIEW	

PARTICLE SIZE DISTRIBUTION ASTM D 421 AND D 422
US STANDARD SIEVE OPENING SIZES

4940



Boulders	Cobbles	Coarse	Fine	Cor	Med	Fine	SILT OR CLAY
		Gravel		SAND			FINES

SAMPLE ID	LP02 - 2
SAMPLE TYPE	Bag
SAMPLE DEPTH	-

LL	-
PL	-
PI	-

DESCRIPTION	Yellowish Brown, SILTY CLAY, some coarse to fine sand, little gravel.
USCS	(CL)

GEOSYNTEC/FLUOR FERNALD/OH
023-3313

TECH	TJ
DATE	7/2/02
CHECK	
REVIEW	

41658.1 91.8385 Lb's

4940

GEOSYNTEC CONSULTANTS

FLUOR FERNALD

PARTICLE SIZE ANALYSIS—SIEVE METHOD

(ASTM D 422)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO

PROJECT NO.: GQ1341 TASK NO.: 04.1

DESCRIPTION: PHASE III

DATE: 29 day June month 2002 year

MATERIAL TYPE: LOW PERM CLAY

SAMPLE NO.: LP02-3

SOIL SAMPLE SIZE	+3/8 = 1617.4	MOISTURE = 323.0	TOTAL = 41658.1
	-3/8 = 571.9 + 626.1 + 38519.7		

APPROXIMATE MINIMUM WT. OF SAMPLE (PASSING NO. 10 SIEVE) (grams)	SAND	FINE GRAIN
	115	65

		+3/8 BEFORE WASH	-3/8 BEFORE WASH	+3/8 AFTER WASH	-3/8 AFTER WASH
TARE NO.		K ~~L-4048~~	L-44	K	L-44
WT. OF DRY SAMPLE PLUS TARE	(grams)	1718.9	817.9	1614.4	335.4
WT. OF TARE	(grams)	101.5	191.8	101.5	191.8
WT. OF DRY SAMPLE	(grams)	1617.4	626.1	1542.9	143.6

SIEVE ANALYSIS

QA ID: _____

SIEVE NO.	DIAMETER (mm)	WT. RETAINED (grams)	% RETAINED	% FINER		PROJECT SPECIFICATIONS
3 in	76.2	0	0	100		100
2 in	50.8	0	0	100		100
1 1/2in	38.1	316.6	0.8	99.2		
1 in	25.4	524.0	1.3	98.7		
3/4 in	19.1	875.4	2.1	97.9		90-100
1/2 in	12.7	1359.4	3.3	96.7		
3/8 in	9.53	1542.7	3.7	96.3		
No. 4	4.75	10.4	1.7	98.3	99.7	
No. 10	2.00	34.1	5.4	94.6	91.1	
No. 20	0.850	56.9	9.1	90.9	89.5	
No. 40	0.425	77.5	12.4	87.6	84.4	
No. 60	0.250	95.1	15.2	84.8	81.7	
No. 100	0.125	117.3	18.7	81.3	78.3	
No. 200	0.075	142.7	22.8	77.2	74.3	50-100
PAN	—	143.6	—	—		

COMMENTS:

000287

%FINER = 100 − Σ% RETAINED

GEO SYNTEC CONSULTANTS FILE NO. 2-14-PMS

CHECKED BY: _____

SHEET NO. 1 OF 2

9.7 gm

84.92 Lb's = 7

1.89 =

38.79

40.68 -

46.13 -

48.07 - .84 =

GEOSYNTEC CONSULTANTS

FLUOR FERNALD, INC.

PARTICLE SIZE DISTRIBUTION AND SOIL CLASSIFICATION TEST RESULTS (ASTM C 136/D 422) (ASTM D 2487)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO

DESCRIPTION: Phase IV

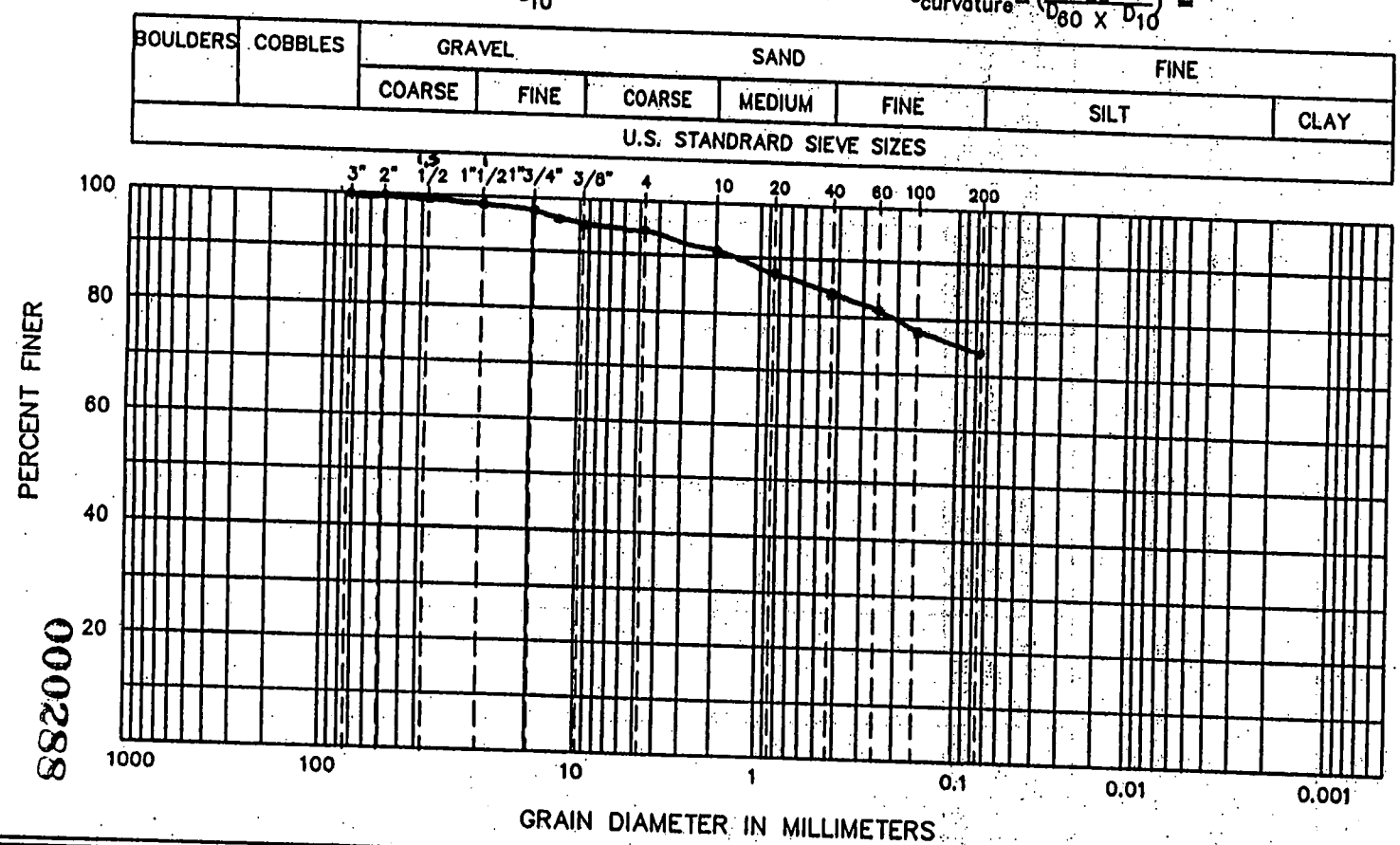
MATERIAL TYPE: Low Perm Clay

PROJECT NO.: GQ1341 TASK NO.: 04.1

DATE: 24 day July month 2002 year

SAMPLE NO.: LP02-3 QA ID: KS

CURVE COEFFICIENTS: $C_{uniformity} = \left(\frac{D_{60}}{D_{10}}\right) =$ $C_{curvature} = \left(\frac{D_{30}^2}{D_{60} \times D_{10}}\right) =$



ATTERBERG LIMITS

(LL) 33

(PL) 17

(PI) 16

SIEVE RESULTS

SIEVE SIZE	% FINER
3-in.	100
2-in.	100
1 1/2-in.	99.2
1-in.	98.7
3/4-in.	97.9
1/2-in.	96.7
3/8-in.	96.3
NO. 4	94.7
NO. 10	91.1
NO. 20.	87.5
NO. 40	84.4
NO. 60	81.7
NO. 100	78.3
NO. 200	74.3

HYDROMETER RESULTS

PARTICLE DIA.	% FINER
0.05	72
0.02	59
0.005	38
0.002	30

SOIL CLASSIFICATION (ASTM D 2487): CL

©GEO SYNTEC CONSULTANTS FILE NO. 2-16-PSD

CHECKED BY:

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4940

ASTM GRAIN SIZE ANALYSIS
ASTM C117, C136, D421, D422, D1140 and D2217

4940

PROJECT TITLE	GEOSYNTEC/FLUOR FERNALD/OH	SAMPLE ID	LP02 - 3
PROJECT NO.	023-3313	SAMPLE TYPE	Bag
		SAMPLE DEPTH	-

AS RECEIVED WATER CONTENT

Tare No.		
Wt. Wet Soil & Tare (gm)	(W1)	
Wt. Dry Soil & Tare (gm)	(W2)	
Weight of Tare (gm)	(W3)	
Weight of Water (gm)	(W4=W1-W2)	
Weight of Dry Soil (gm)	(W5=W2-W3)	
Moisture Content (%)	(W4/W5)*100	

Hygroscopic Moisture For Sieve Sample

Wet Soil & Tare (gm)	50.36
Dry Soil & Tare (gm)	49.55
Tare Weight (gm)	3.24
Moisture Content (%)	1.75

Total Weight of Sample Used For Sieve Analysis Corrected For Hygroscopic Moisture

Weight + Tare, Before Separating On The #4 Sieve (gm)	806.05	
Tare Weight (gm)	234.47	
Total Weight (gm)	561.75	(W6)

Plus #4 Material Sieve

TARE WEIGHT 0.00

	(Wt+Tare)	(((Wt-Tare)/W6)*100)	%PASSING		
12.0"				12.0"	cobbles
3.0"				3.0"	coarse gravel
2.5"				2.5"	coarse gravel
2.0"				2.0"	coarse gravel
1.5"				1.5"	coarse gravel
1.0"				1.0"	coarse gravel
0.75"				0.75"	fine gravel
0.50"				0.50"	fine gravel
0.375"				0.375"	fine gravel
#4			94.7	#4	coarse sand

NOTE: Client provided the percent passing #4 sieve.

HYDROMETER ANALYSIS

Specific Gravity	(assumed)	2.720
Specific Gravity	(tested)	
Amount Dispersing Agent (ml)		125.00
Type Dispersion Device		Mechanical
Length of Dispersion Period		1 Minute

Weight of Sample Used For Hydrometer Test

Weight of Sample Wet or Dry (gm)	53.21
Calculated Dry Wt. used in test (gm)	52.30
Hydrometer Bulb Number	704004
% Pass #4 Sieve For Whole Sample	94.70

TARE WEIGHT 0.00

HYDROMETER BACKSIEVE (Percent Passing #10 - #200 Sieves)

	(Wt+Tare)	Cumul Wt. Retained	% PASSING		
#10	1.48	1.48	92.0	#10	medium sand
#20	3.08	3.08	89.1	#20	medium sand
#40	4.56	4.56	86.4	#40	fine sand
#60	6.10	6.10	83.7	#60	fine sand
#100	7.89	7.89	80.4	#100	fine sand
#200	10.08	10.08	76.4	#200	fines

HYDROMETER CALCULATIONS

DATE	TIME	ET (min)	READING R	TEMP T	TEMP.COR. K	HYD.COR. Cc	READING C	EFFECTIVE LENGTH	A
7/3/02	9:09								
7/3/02	9:11	2.00	45.0	22.50	0.013	7.00	38.00	10.1	0.99
7/3/02	9:14	5.00	40.0	22.50	0.013	7.00	33.00	10.9	0.99
7/3/02	9:24	15.00	34.5	22.50	0.013	7.00	27.50	11.9	0.99
7/3/02	9:39	30.00	31.0	22.50	0.013	7.00	24.00	12.4	0.99
7/3/02	10:09	60.00	29.0	22.50	0.013	7.00	22.00	12.7	0.99
7/3/02	13:19	250.00	25.0	22.50	0.013	7.00	18.00	13.3	0.99
7/4/02	9:09	1440.00	22.0	22.50	0.013	7.00	15.00	13.8	0.99

GRAIN SIZE PERCENTAGES

Particle Diameter	% PASSING
0.0294	68.1
0.0193	59.2
0.0117	49.3
0.0084	43.0
0.0060	39.4
0.0030	32.3
0.0013	26.9

% GRAVEL	5.30
% COARSE SAND	2.68
% MEDIUM SAND	5.58
% FINE SAND	10.00
% FINES	76.45
% TOTAL SAMPLE	100.00

Description: Yellowish Brown, SILTY CLAY, some coarse to fine sand, little gravel.

USCS: (CL)

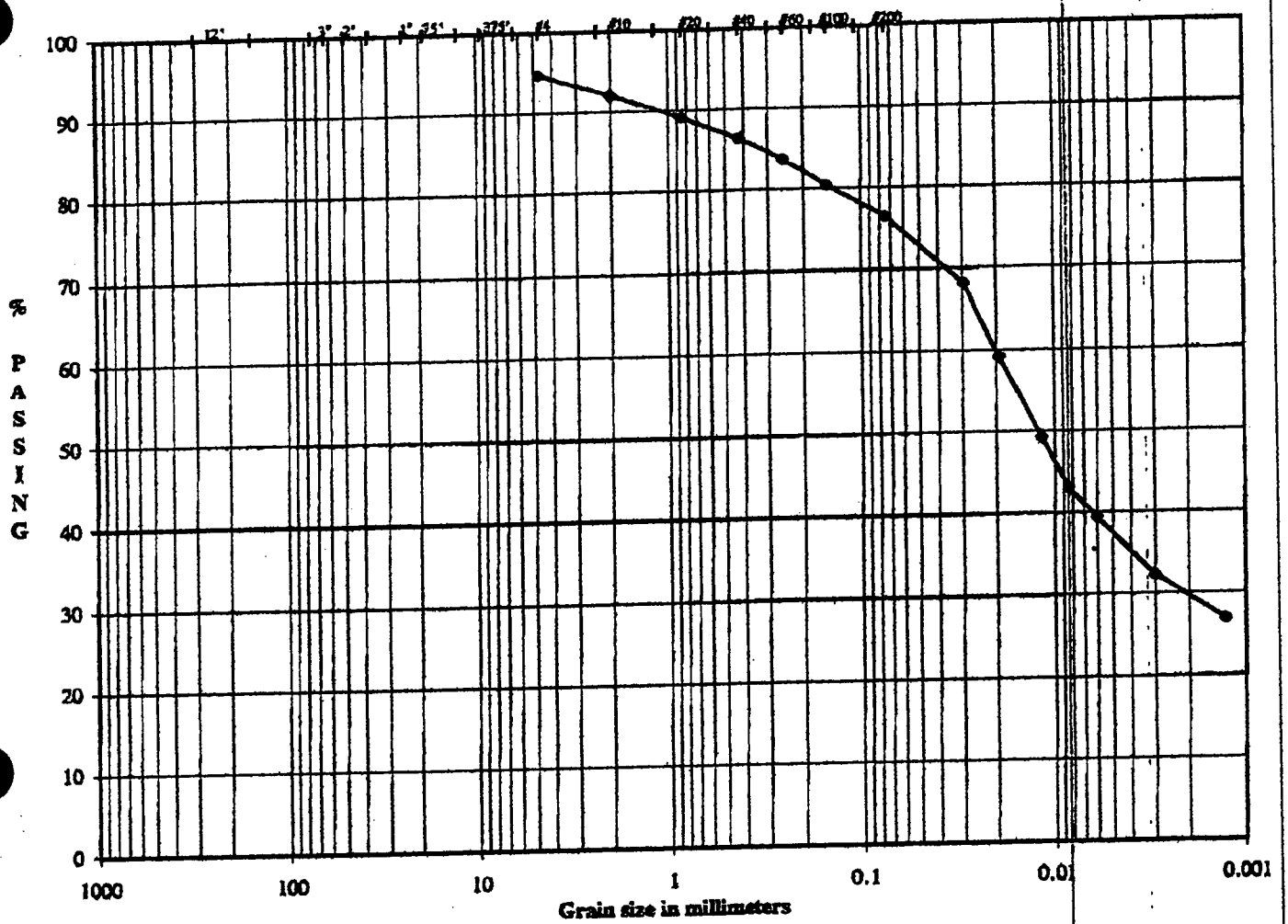
-	LL
-	PL
-	PI

TECH	TJ
DATE	7/2/02
CHECK	
REVIEW	

000289

4940

PARTICLE SIZE DISTRIBUTION ASTM D 421 AND D 422
US STANDARD SIEVE OPENING SIZES



Boulders	Cobbles	Coarse	Fine	Cor	Med	Fine	SILT OR CLAY
		Gravel		SAND			FINES

SAMPLE ID	LP02 - 3
SAMPLE TYPE	Bag
SAMPLE DEPTH	-

LL	-
PL	-
PI	-

DESCRIPTION	Yellowish Brown, SILTY CLAY, some coarse to fine sand, little gravel.
USCS	(CL)

GEOSYNTEC/FLUOR FERNALD/OH
023-3313

TECH	TI
DATE	7/2/02
CHECK	
REVIEW	

GEOSYNTEC CONSULTANTS

FLUOR FERNALD

PARTICLE SIZE ANALYSIS—SIEVE METHOD

(ASTM D 422)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO

PROJECT NO.: GQ1341 TASK NO.: 04.1

DESCRIPTION: PHASE III

DATE: 01 day JULY month 2002 year

MATERIAL TYPE: LOW PERM CLAY

SAMPLE NO.: LP02-4

SOIL SAMPLE SIZE	+3/8 = 271.1	MOISTURE = 270.8	TOTAL = 23507.7
	-3/8 = 22965.77		

APPROXIMATE MINIMUM WT. OF SAMPLE (PASSING NO. 10 SIEVE) (grams)	SAND	FINE GRAIN
	115	65

	+3/8 BEFORE WASH	-3/8 BEFORE WASH	+3/8 AFTER WASH	-3/8 AFTER WASH
TARE NO.	LL-4	L-9	L-9	L-9
WT. OF DRY SAMPLE PLUS TARE (grams)	377.9	863.5	455.6	325.9
WT. OF TARE (grams)	106.8	193.4	193.4	193.4
WT. OF DRY SAMPLE (grams)	271.1	670.1	262.2	159.5

SIEVE ANALYSIS

QA ID: AJE

SIEVE NO.	DIAMETER (mm)	WT. RETAINED (grams)	% RETAINED	% FINER		PROJECT SPECIFICATIONS
3 in	76.2	0	0	100		
2 in	50.8	0	0	100		100
1 1/2in	38.1	0	0	100		
1 in	25.4	24.7	0.1	99.9		
3/4 in	19.1	66.5	0.3	~~99.9~~ 99.7		90-100
1/2 in	12.7	201.0	0.9	99.1		
3/8 in	9.53	262.1	1.1	98.9		
No. 4	4.75	15.1	2.3	97.7	96.6	
No. 10	2.00	34.4	5.1	94.9	93.9	
No. 20	0.850	54.6	8.1	91.9	90.9	
No. 40	0.425	77.7	11.6	88.4	87.4	
No. 60	0.250	99.4	14.8	85.2	84.3	
No. 100	0.125	125.5	18.7	81.3	80.4	
No. 200	0.075	155.9	23.3	76.7	75.8	50-100
PAN	—					

COMMENTS:

000291

%FINER = 100 − Σ% RETAINED

GEO SYNTEC CONSULTANTS FILE NO. 2-14-PMS

CHECKED BY:

SHEET NO. OF

GEOSYNTEC CONSULTANTS

FLUOR FERNALD, INC.

PARTICLE SIZE DISTRIBUTION AND SOIL CLASSIFICATION TEST RESULTS (ASTM C 136/D 422) (ASTM D 2487)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO

DESCRIPTION: Phase IV

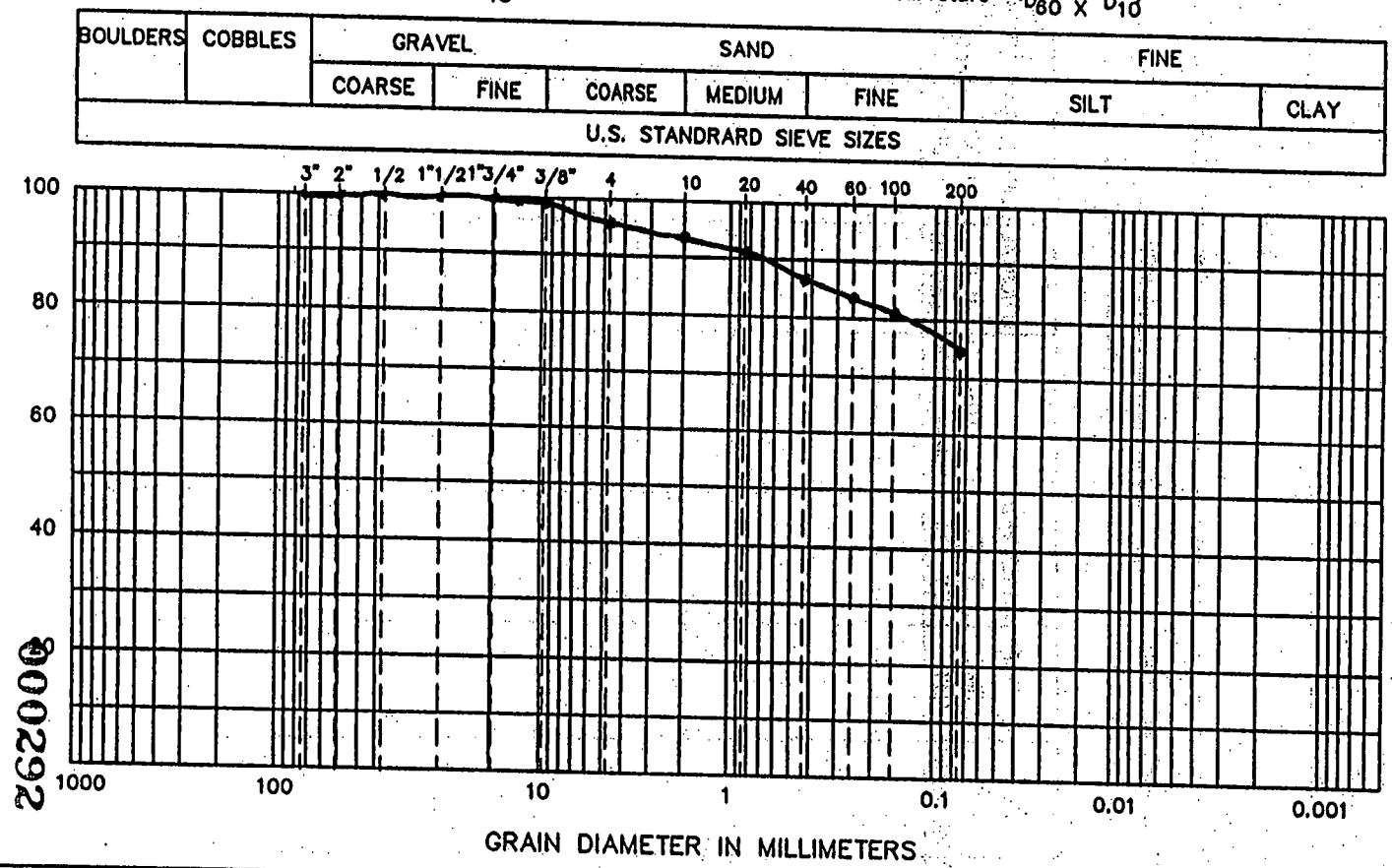
MATERIAL TYPE: Low Perm Clay

PROJECT NO.: 6Q1341 TASK NO.: 04.1

DATE: 24 day July month 2002 year

SAMPLE NO.: LP02-4 QA ID: KS

CURVE COEFFICIENTS: $C_{uniformity} = (\frac{D_{60}}{D_{10}}) =$ $C_{curvature} = (\frac{D_{30}^2}{D_{60} \times D_{10}}) =$



ATTERBERG LIMITS

(LL) 37

(PL) 16

(PI) 21

SIEVE RESULTS

SIEVE SIZE	% FINER
3-in.	100
2-in.	100
1 1/2-in.	100
1-in.	99.9
3/4-in.	99.7
1/2-in.	99.1
3/8-in.	98.9
NO. 4	96.6
NO. 10	93.9
NO. 20.	90.9
NO. 40	87.4
NO. 60	84.3
NO. 100	80.4
NO. 200	75.8

HYDROMETER RESULTS

PARTICLE DIA.	% FINER
0.005	75
0.002	58
0.005	38
0.002	30

SOIL CLASSIFICATION (ASTM D 2487): CL

©GEO SYNTEC CONSULTANTS FILE NO. 2-16-PSD

CHECKED BY: _____

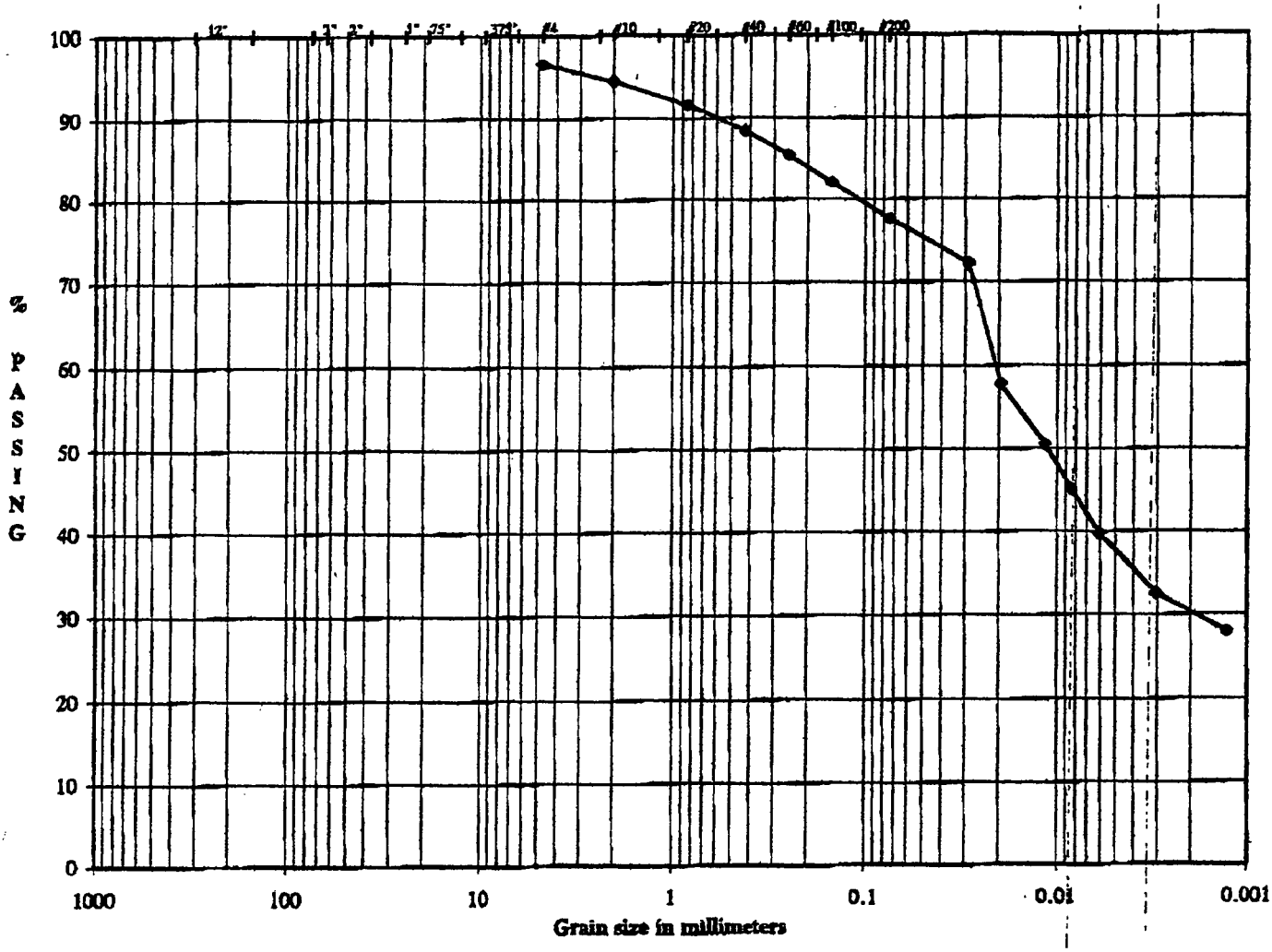
SHEET NO. ____ OF ____

000292

4940

PARTICLE SIZE DISTRIBUTION ASTM D 421 AND D 422
US STANDARD SIEVE OPENING SIZES

4940



Boulders	Cobbles	Coarse	Fine	Cor	Med	Fine	SILT OR CLAY
		Gravel		SAND			FINES

SAMPLE ID	LP02 - 4
SAMPLE TYPE	Bag
SAMPLE DEPTH	-

LL	-
PL	-
PI	-

DESCRIPTION	Yellowish Brown, SILTY CLAY, some coarse to fine sand, trace gravel.
USCS	(CL)

GEOSYNTEC/FLUOR FERNALD/OH
023-3313

TECH	TJ
DATE	7/11/02
CHECK	[illegible]
REVIEW	[illegible]

000293

ASTM GRAIN SIZE ANALYSIS
ASTM C117, C136, D421, D422, D1140 and D2217

4940

PROJECT TITLE	GEOSYNTEC/FLUOR FERNALD/OH	SAMPLE ID	LP02 - 4
PROJECT NO.	023-3313	SAMPLE TYPE	Bag
		SAMPLE DEPTH	-

AS RECEIVED WATER CONTENT

Tare No.		
Wt. Wet Soil & Tare (gm)	(W1)	
Wt. Dry Soil & Tare (gm)	(W2)	
Weight of Tare (gm)	(W3)	
Weight of Water (gm)	(W4=W1-W2)	
Weight of Dry Soil (gm)	(W5=W2-W3)	
Moisture Content (%)	(W4/W5)*100	

Hygroscopic Moisture For Sieve Sample

Wet Soil & Tare (gm)	50.26
Dry Soil & Tare (gm)	47.54
Tare Weight (gm)	3.24
Moisture Content (%)	6.14

Total Weight of Sample Used For Sieve Analysis Corrected For Hygroscopic Moisture

Weight + Tare, Before Separating On The #4 Sieve (gm)	843.60	
Tare Weight (gm)	242.51	
Total Weight (gm)	566.22	(W6)

Plus #4 Material Sieve

TARE WEIGHT 0.00

	(W1+Tare)	(((W1-Tare)/W6)*100)	%PASSING		
12.0"				12.0"	cobbles
3.0"				3.0"	coarse gravel
2.5"				2.5"	coarse gravel
2.0"				2.0"	coarse gravel
1.5"				1.5"	coarse gravel
1.0"				1.0"	coarse gravel
0.75"				0.75"	fine gravel
0.50"				0.50"	fine gravel
0.375"				0.375"	fine gravel
#4			96.6	#4	coarse sand

NOTE: Client provided the percent passing #4 sieve.

HYDROMETER ANALYSIS

Specific Gravity	(assumed)	2.720
Specific Gravity	(tested)	
Amount Dispersing Agent (ml)		125.00
Type Dispersion Device		Mechanical
Length of Dispersion Period		1 Minute

Weight of Sample Used For Hydrometer Test

Weight of Sample Wet or Dry (gm)	56.23
Calculated Dry Wt. used in test (gm)	52.98
Hydrometer Bulb Number	704004
% Pass #4 Sieve For Whole Sample	96.60

TARE WEIGHT 0.00

HYDROMETER BACKSIEVE (Percent Passing #10 - #200 Sieves)

	(W1+Tare)	Cumul Wt. Retained	% PASSING		
#10	1.16	1.16	94.5	#10	medium sand
#20	2.73	2.73	91.6	#20	medium sand
#40	4.49	4.49	88.4	#40	fine sand
#60	6.11	6.11	85.5	#60	fine sand
#100	7.97	7.97	82.1	#100	fine sand
#200	10.42	10.42	77.6	#200	fines

HYDROMETER CALCULATIONS

DATE 7/12/02	TIME 9:00	ET (min)	READING R	TEMP T	TEMP.COR. K	HYD.COR. Cc	READING C	EFFECTIVE LENGTH	A
7/12/02	9:02	2.00	47.0	22.50	0.013	7.00	40.00	9.7	0.99
7/12/02	9:05	5.00	39.0	22.50	0.013	7.00	32.00	11.1	0.99
7/12/02	9:15	15.00	35.0	22.50	0.013	7.00	28.00	11.7	0.99
7/12/02	9:30	30.00	32.0	22.50	0.013	7.00	25.00	12.2	0.99
7/12/02	10:00	60.00	29.0	22.50	0.013	7.00	22.00	12.7	0.99
7/12/02	13:10	250.00	25.0	22.50	0.013	7.00	18.00	13.3	0.99
7/13/02	9:00	1440.00	22.5	22.00	0.013	7.00	15.50	13.8	0.99

GRAIN SIZE PERCENTAGES

Particle Diameter	% PASSING		
0.0258	72.2		
0.0195	57.8	% GRAVEL	3.40
0.0116	50.5	% COARSE SAND	2.12
0.0084	45.1	% MEDIUM SAND	6.07
0.0060	39.7	% FINE SAND	10.81
0.0030	32.5	% FINES	77.60
0.0013	28.0	% TOTAL SAMPLE	100.00

Description Yellowish Brown, SILTY CLAY, some coarse to fine sand, trace gravel.

USCS (CL)

-	LL
-	PL
-	PI

TECH	TJ
DATE	7/11/02
CHECK	
REVIEW	

000294

44614.2

4940

GEOSYNTEC CONSULTANTS

FLUOR FERNALD

PARTICLE SIZE ANALYSIS—SIEVE METHOD (ASTM D 422)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO PROJECT NO.: GQ1341 TASK NO.: 04.1

DESCRIPTION: PHASE III DATE: 5 day July month 2002 year

MATERIAL TYPE: LOW PERM CLAY SAMPLE NO.: LP02-5

SOIL SAMPLE SIZE	+3/8 = 965.6	MOISTURE = 270.8	TOTAL = 44614.2
	-3/8 = 43377.8		

APPROXIMATE MINIMUM WT. OF SAMPLE (PASSING NO. 10 SIEVE) (grams)	SAND	FINE GRAIN
	115	65

	+3/8 BEFORE WASH	-3/8 BEFORE WASH	+3/8 AFTER WASH	-3/8 AFTER WASH
TARE NO.	N	L-3	N	L-3
WT. OF DRY SAMPLE PLUS TARE (grams)	1067.2	796.2	976.8	325.5
WT. OF TARE (grams)	101.60	190.8	101.6	190.8
WT. OF DRY SAMPLE (grams)	965.60	605.4	875.2	134.7

SIEVE ANALYSIS QA ID: DLE

SIEVE NO.	DIAMETER (mm)	WT. RETAINED (grams)	% RETAINED	% FINER		PROJECT SPECIFICATIONS
3 in	76.2	Ø	Ø	100		
2 in	50.8	Ø	Ø	100		100
1 1/2in	38.1	Ø	Ø	100		
1 in	25.4	213.9	.5	99.5		
3/4 in	19.1	376.8	.8	99.2		90-100
1/2 in	12.7	700.8	1.6	98.4		
3/8 in	9.53	874.9	2.2	~~97.8~~	98.0	
No. 4	4.75	12.6	2.1	97.9	~~95.7~~	96.0
No. 10	2.00	31.6	5.2	94.8	~~92.7~~	~~92.9~~ 92.9
No. 20	0.850	51.0	8.4	91.6	~~89.6~~	89.8
No. 40	0.425	70.8	11.7	88.3	~~86.4~~	86.6
No. 60	0.250	88.2	14.6	85.4	~~83.5~~	83.8
No. 100	0.125	110.2	18.2	81.8	~~80.0~~	80.2
No. 200	0.075	133.8	22.1	77.9	~~76.2~~ 76.4	50-100
PAN	—	134.6	—	—		

COMMENTS:

000295

%FINER = 100 − Σ% RETAINED

GEO SYNTEC CONSULTANTS FILE NO. 2-14-PMS CHECKED BY: SHEET NO. ____ OF ____

GEOSYNTEC CONSULTANTS

FLUOR FERNALD, INC.

PARTICLE SIZE DISTRIBUTION AND SOIL CLASSIFICATION TEST RESULTS (ASTM C 136/D 422) (ASTM D 2487)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO

DESCRIPTION: Phase IV

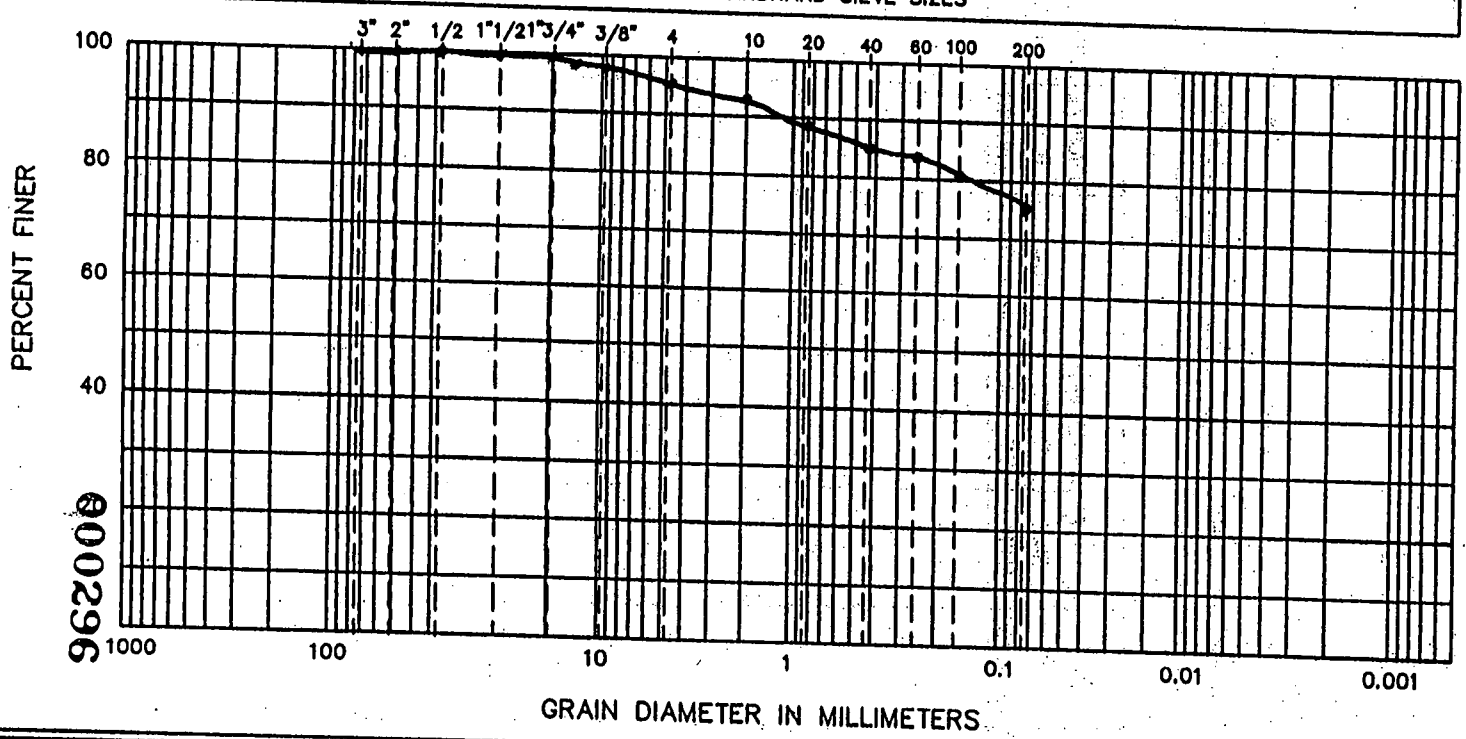
MATERIAL TYPE: Low Perm Clay

PROJECT NO.: 6Q1341 TASK NO.: 04.1

DATE: 24 day July month 2002 year

SAMPLE NO.: LP02-5 QA ID: KS

CURVE COEFFICIENTS: $C_{uniformity} = (\frac{D_{60}}{D_{10}}) =$ $C_{curvature} = (\frac{D_{30}^2}{D_{60} \times D_{10}}) =$



ATTERBERG LIMITS

(LL) 35

(PL) 17

(PI) 18

SIEVE RESULTS

SIEVE SIZE	% FINER
3-in.	100
2-in.	100
1 1/2-in.	100
1-in.	99.5
3/4-in.	99.2
1/2-in.	98.4
3/8-in.	98.0
NO. 4	96.0
NO. 10	92.9
NO. 20.	89.8
NO. 40	86.6
NO. 60	83.8
NO. 100	80.2
NO. 200	76.4

HYDROMETER RESULTS

PARTICLE DIA.	% FINER
0.05	74
0.02	59
0.005	39
0.002	30

SOIL CLASSIFICATION (ASTM D 2487): CL

©GEO SYNTEC CONSULTANTS FILE NO. 2-16-PSD

CHECKED BY:

SHEET NO.

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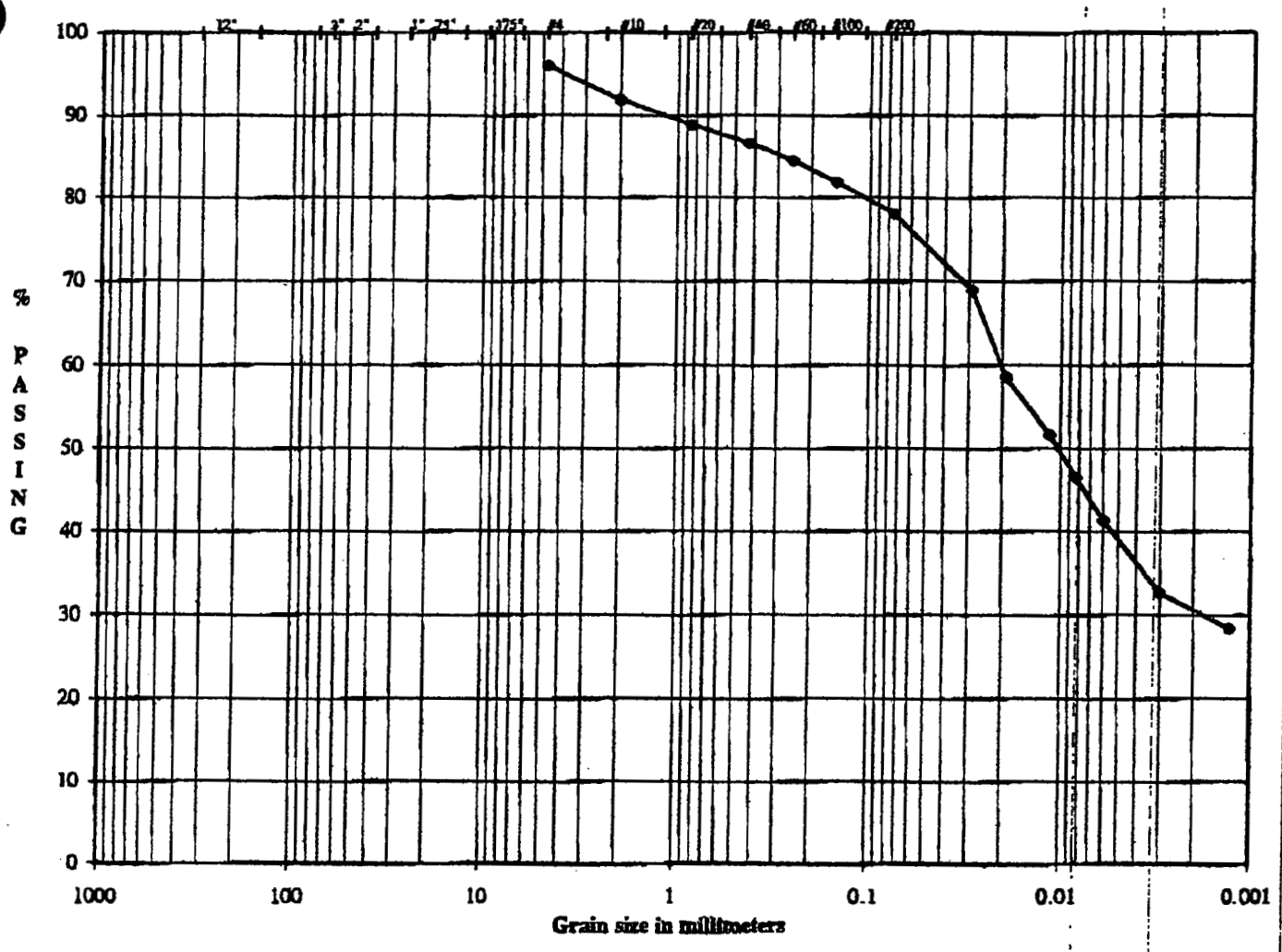
PARTICLE SIZE DISTRIBUTION ASTM D 421 AND D 422
US STANDARD SIEVE OPENING SIZES

4940



Boulders	Cobbles	Coarse	Fine	Cor	Med	Fine	SILT OR CLAY
		Gravel		SAND			FINES

SAMPLE ID	LP02 - 5
SAMPLE TYPE	Bag
SAMPLE DEPTH	-

LL	-
PL	-
PI	-

DESCRIPTION	Yellowish Brown, SILTY CLAY, some coarse to fine sand, trace gravel.
USCS	(CL)

GEOSYNTEC/FLUOR FERNALD/OH
023-3313

TECH	TJ
DATE	7/12/02
CHECK	[illegible]
REVIEW	[illegible]

297

4940

ASTM GRAIN SIZE ANALYSIS
ASTM C117, C136, D421, D422, D1140 and D2217

PROJECT TITLE: GEOSYNTEC/FLUOR FERNALD/OH
PROJECT NO.: 823-3313

SAMPLE ID: LP02 - 5
SAMPLE TYPE: Bag
SAMPLE DEPTH: -

AS RECEIVED WATER CONTENT

Tare No.		
Wt. Wet Soil & Tare (gm)	(W1)	
Wt. Dry Soil & Tare (gm)	(W2)	
Weight of Tare (gm)	(W3)	
Weight of Water (gm)	(W4=W1-W2)	
Weight of Dry Soil (gm)	(W5=W2-W3)	
Moisture Content (%)	(W4/W5)*100	

Hygroscopic Moisture For Sieve Sample

Wet Soil & Tare (gm)	49.54
Dry Soil & Tare (gm)	47.13
Tare Weight (gm)	3.22
Moisture Content (%)	5.49

Total Weight of Sample Used For Sieve Analysis Corrected For Hygroscopic Moisture

Weight + Tare, Before Separating On The #4 Sieve (gm)	854.74	
Tare Weight (gm)	242.45	
Total Weight (gm)	580.43	(W6)

Plus #4 Material Sieve

TARE WEIGHT: 0.00

	(Wt+Tare)	((Wt-Tare)/W6)*100)	%PASSING		
12.0"				12.0"	cobbles
3.0"				3.0"	coarse gravel
2.5"				2.5"	coarse gravel
2.0"				2.0"	coarse gravel
1.5"				1.5"	coarse gravel
1.0"				1.0"	coarse gravel
0.75"				0.75"	fine gravel
0.50"				0.50"	fine gravel
0.375"				0.375"	fine gravel
#4			96.0	#4	coarse sand

NOTE: Client provided the percent passing #4 sieve.

HYDROMETER ANALYSIS

Specific Gravity	(assumed)	2.720
Specific Gravity	(tested)	
Amount Dispersing Agent (ml)		125.00
Type Dispersion Device		Mechanical
Length of Dispersion Period		1 Minute

Weight of Sample Used For Hydrometer Test

Weight of Sample Wet or Dry (gm)	58.23
Calculated Dry Wt. used in test (gm)	55.20
Hydrometer Bulb Number	704004
% Pass #4 Sieve For Whole Sample	96.00

TARE WEIGHT: 0.00

HYDROMETER BACKSIEVE (Percent Passing #10 - #200 Sieves)

	(Wt+Tare)	Cumul Wt. Retained	% PASSING		
#10	2.40	2.40	91.8	#10	medium sand
#20	4.10	4.10	88.9	#20	medium sand
#40	5.41	5.41	86.6	#40	fine sand
#60	6.62	6.62	84.5	#60	fine sand
#100	8.11	8.11	81.9	#100	fine sand
#200	10.30	10.30	78.1	#200	fines

HYDROMETER CALCULATIONS

DATE	TIME	ET (min)	READING R	TEMP T	TEMP.COR. K	HYD.COR. Cc	READING C	EFFECTIVE LENGTH	A
7/12/02	9:02								
7/12/02	9:04	2.00	47.0	22.50	0.013	7.00	40.00	9.7	0.99
7/12/02	9:07	5.00	41.0	22.50	0.013	7.00	34.00	10.7	0.99
7/12/02	9:17	15.00	37.0	22.50	0.013	7.00	30.00	11.4	0.99
7/12/02	9:32	30.00	34.0	22.50	0.013	7.00	27.00	11.9	0.99
7/12/02	10:02	60.00	31.0	22.50	0.013	7.00	24.00	12.4	0.99
7/12/02	13:12	250.00	26.0	22.50	0.013	7.00	19.00	13.2	0.99
7/13/02	9:02	1440.00	23.5	22.00	0.013	7.00	16.50	13.7	0.99

GRAIN SIZE PERCENTAGES

Particle Diameter	% PASSING
0.0288	68.9
0.0192	58.5
0.0114	51.7
0.0083	46.5
0.0060	41.3
0.0030	32.7
0.0013	28.4

% GRAVEL	4.00
% COARSE SAND	4.17
% MEDIUM SAND	5.23
% FINE SAND	8.50
% FINES	78.09
% TOTAL SAMPLE	100.00

Description: Yellowish Brown, SILTY CLAY, some coarse to fine sand, trace gravel.

USCS: (CL)

-	LL
-	PL
-	PI

TECH	TJ
DATE	7/12/02
CHECK	
REVIEW	

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4940

GEOSYNTEC CONSULTANTS

FLUOR FERNALD

PARTICLE SIZE ANALYSIS—SIEVE METHOD (ASTM D 422)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO — PROJECT NO.: GQ1341 TASK NO.: 04.1

DESCRIPTION: PHASE III — DATE: 03 day July month 2002 year

MATERIAL TYPE: LOW PERM CLAY — SAMPLE NO.: LP02-6

SOIL SAMPLE SIZE	+3/8 = 794.4	MOISTURE = 322.5	TOTAL = 20694.3
	-3/8 = 19577.4 grams		

APPROXIMATE MINIMUM WT. OF SAMPLE (PASSING NO. 10 SIEVE) (grams)	SAND	FINE GRAIN
	115	65

	+3/8 BEFORE WASH	-3/8 BEFORE WASH	+3/8 AFTER WASH	-3/8 AFTER WASH
TARE NO.	LL-9	L-7	LL-9	L-7
WT. OF DRY SAMPLE PLUS TARE (grams)	901.1	799.4	854.4	348.8
WT. OF TARE (grams)	106.7	194.0	106.7	194.0
WT. OF DRY SAMPLE (grams)	794.4	605.7	747.7	154.8

SIEVE ANALYSIS — QA ID: DLE

SIEVE NO.	DIAMETER (mm)	WT. RETAINED (grams)	% RETAINED	% FINER		PROJECT SPECIFICATIONS
3 in	76.2	Ø	Ø	100		
2 in	50.8	Ø	Ø	100		1ØØ
1 1/2in	38.1	Ø	Ø	100		
1 in	25.4	139.6	.7	99.3		
3/4 in	19.1	388.7	1.9	98.1		9Ø-1ØØ
1/2 in	12.7	635.6	3.1	96.9		
3/8 in	9.53	747.7	3.6	96.4		
No. 4	4.75	15.3	2.5	97.5	94.0	
No. 10	2.00	38.9	6.4	93.6	90.2	
No. 20	0.850	60.3	10.0	90.0	86.8	
No. 40	0.425	81.7	13.5	86.5	83.4	
No. 60	0.250	101.1	16.7	83.3	80.3	
No. 100	0.125	125.6	20.7	79.3	76.4	
No. 200	0.075	153.6	25.4	74.6	71.9	5Ø-1ØØ
PAN	—	154.8	—	—		

COMMENTS:

000299

%FINER = 100 − Σ% RETAINED

GEO SYNTEC CONSULTANTS FILE NO. 2-14-PMS — CHECKED BY: — SHEET NO. ___ OF ___

GEOSYNTEC CONSULTANTS

FLUOR FERNALD, INC.

PARTICLE SIZE DISTRIBUTION AND SOIL CLASSIFICATION TEST RESULTS (ASTM C 136/D 422) (ASTM D 2487)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO

DESCRIPTION: Phase IV

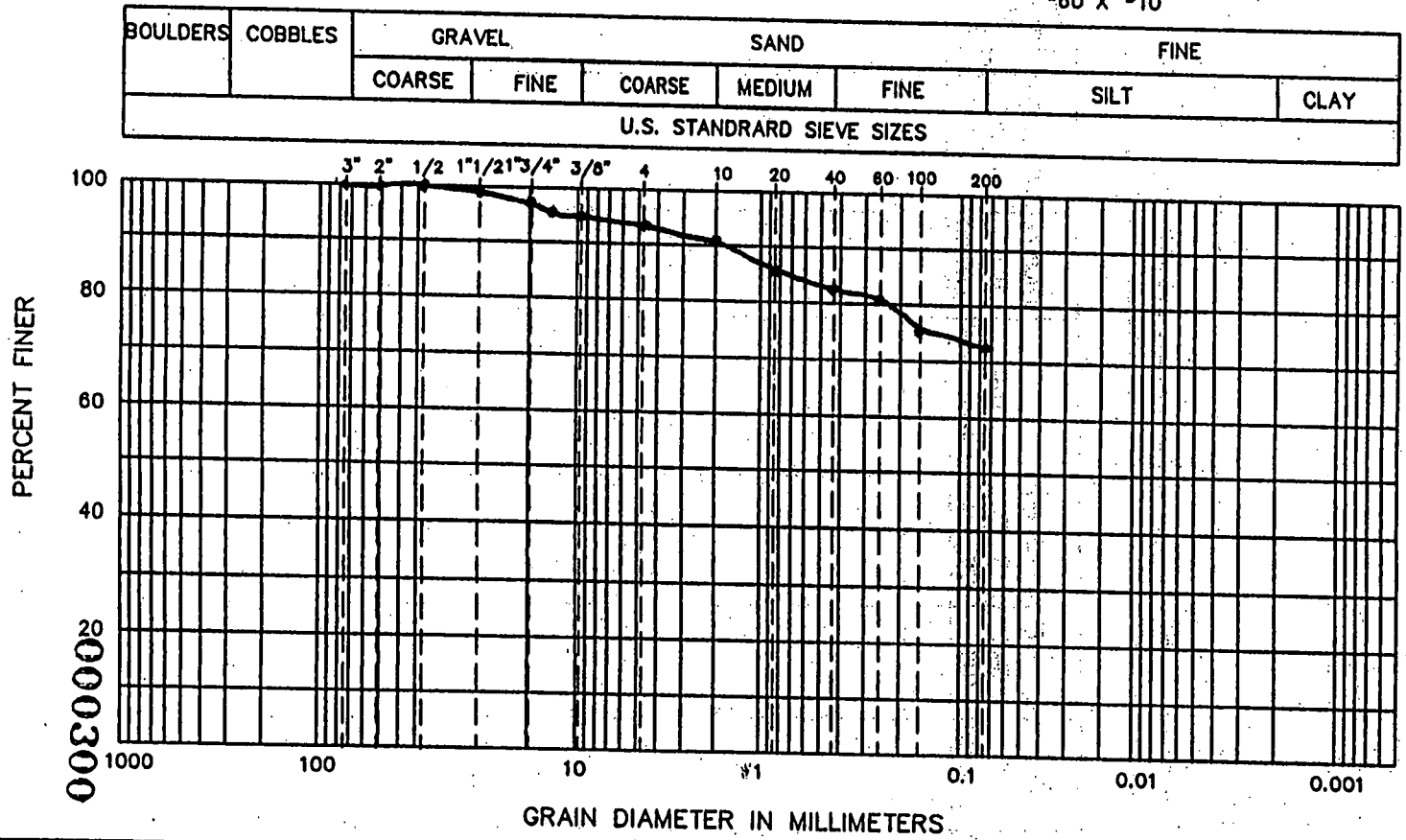
MATERIAL TYPE: Low Perm Clay

PROJECT NO.: GQ1341 TASK NO.: 04.1

DATE: 24 day July month 2002 year

SAMPLE NO.: LP02-6 QA ID: KS

CURVE COEFFICIENTS: $C_{uniformity} = (\frac{D_{60}}{D_{10}}) =$ $C_{curvature} = (\frac{D_{30}^2}{D_{60} \times D_{10}}) =$



ATTERBERG LIMITS

(LL) 32

(PL) 17

(PI) 15

SIEVE RESULTS

SIEVE SIZE	% FINER
3-in.	100
2-in.	100
1 1/2-in.	100
1-in.	99.3
3/4-in.	98.1
1/2-in.	96.9
3/8-in.	96.4
NO. 4	94.0
NO. 10	90.2
NO. 20.	86.8
NO. 40	83.4
NO. 60	80.3
NO. 100	76.4
NO. 200	71.9

HYDROMETER RESULTS

PARTICLE DIA.	% FINER
0.05	70
0.02	59
0.005	39
0.002	31

SOIL CLASSIFICATION (ASTM D 2487): CL

©GEO SYNTEC CONSULTANTS FILE NO. 2-16-PSD

CHECKED BY:

SHEET NO. OF

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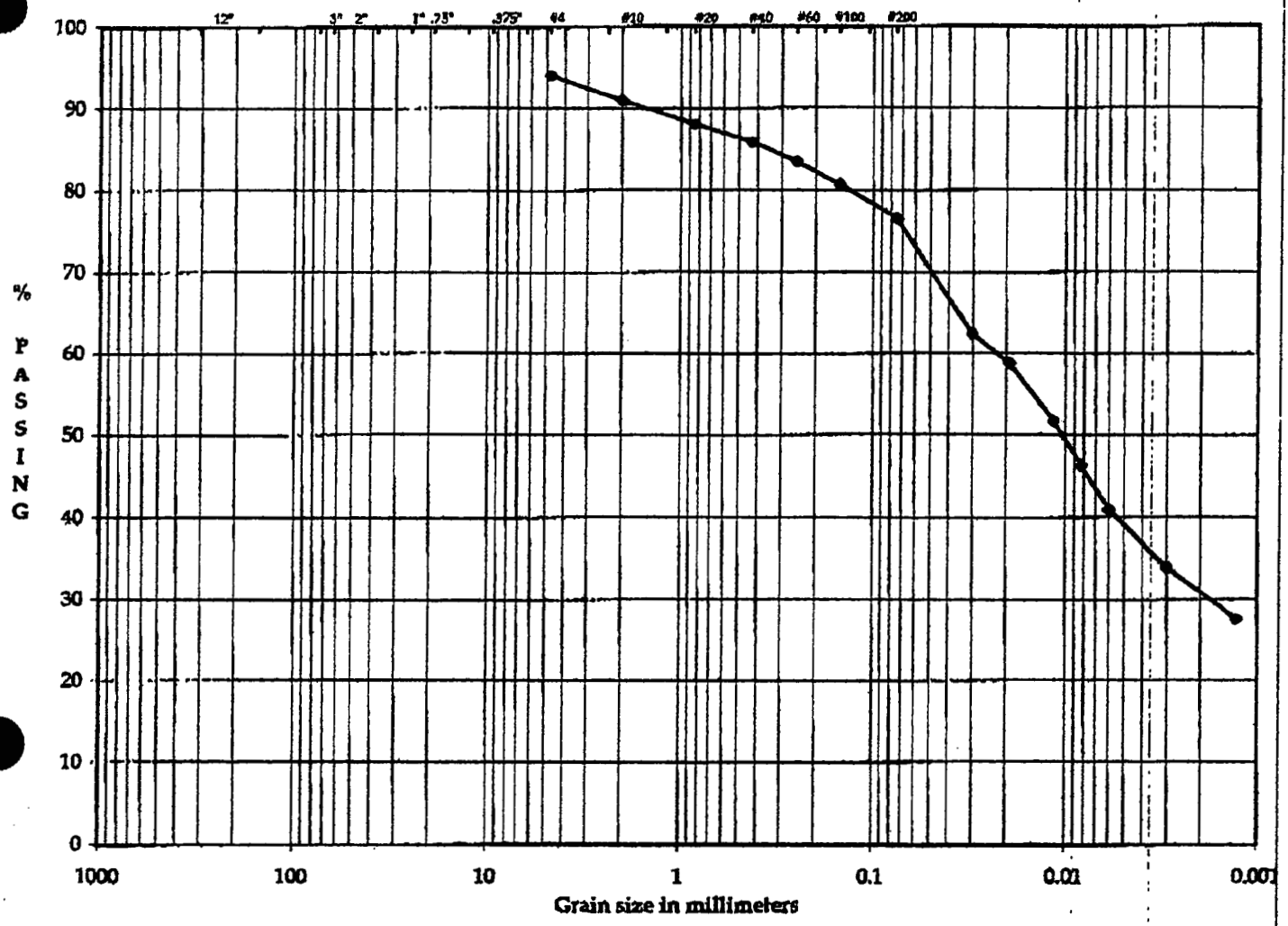
PARTICLE SIZE DISTRIBUTION ASTM D 421 AND D 422
US STANDARD SIEVE OPENING SIZES

4940



Boulders	Cobbles	Coarse	Fine	Cor	Med	Fine	SILT OR CLAY
		Gravel		SAND			FINES

SAMPLE ID	LP02 - 6
SAMPLE TYPE	Bag
SAMPLE DEPTH	-

LL	-
PL	-
PI	-

DESCRIPTION	Yellowish Brown, SILTY CLAY, some coarse to fine sand, little gravel.
USCS	(CL)

GEOSYNTEC/FLUOR FERNALD/OH
023-3313

TECH	TJ
DATE	7/11/02
CHECK	BS
REVIEW	

ASTM GRAIN SIZE ANALYSIS
ASTM C117, C136, D421, D422, D1140 and D2217

4940

PROJECT TITLE	GEOSYNTEC/FLUOR FERNALD/OH	SAMPLE ID	LP02 - 6
PROJECT NO.	023-3513	SAMPLE TYPE	Bag
		SAMPLE DEPTH	-

AS RECEIVED WATER CONTENT

Tare No.		
Wt. Wet Soil & Tare (gm)	(W1)	
Wt. Dry Soil & Tare (gm)	(W2)	
Weight of Tare (gm)	(W3)	
Weight of Water (gm)	(W4=W1-W2)	
Weight of Dry Soil (gm)	(W5=W2-W3)	
Moisture Content (%)	(W4/W5)*100	

Hygroscopic Moisture For Sieve Sample

Wet Soil & Tare (gm)	49.52
Dry Soil & Tare (gm)	46.82
Tare Weight (gm)	3.24
Moisture Content (%)	6.20

Total Weight of Sample Used For Sieve Analysis Corrected For Hygroscopic Moisture

Weight + Tare, Before Separating On The #4 Sieve (gm)	846.53	
Tare Weight (gm)	236.33	
Total Weight (gm)	574.60	(W6)

Plus #4 Material Sieve

TARE WEIGHT 0.00

	(Wt+Tare)	(((Wt-Tare)/W6)*100)	%PASSING		
12.0"				12.0"	cobbles
3.0"				3.0"	coarse gravel
2.5"				2.5"	coarse gravel
2.0"				2.0"	coarse gravel
1.5"				1.5"	coarse gravel
1.0"				1.0"	coarse gravel
0.75"				0.75"	fine gravel
0.50"				0.50"	fine gravel
0.375"				0.375"	fine gravel
#4			94.0	#4	coarse sand

NOTE: Client provided the percent passing #4 sieve.

HYDROMETER ANALYSIS

Specific Gravity	(assumed)	2.720
Specific Gravity	(tested)	
Amount Dispersing Agent (ml)		125.00
Type Dispersion Device		Mechanical
Length of Dispersion Period		1 Minute

Weight of Sample Used For Hydrometer Test

Weight of Sample Wet or Dry (gm)	55.45
Calculated Dry Wt. used in test (gm)	52.22
Hydrometer Bulb Number	704004
% Pass #4 Sieve For Whole Sample	94.00

TARE WEIGHT 0.00

HYDROMETER BACKSIEVE (Percent Passing #10 - #200 Sieves)

	(Wt+Tare)	Cumul Wt. Retained	% PASSING		
#10	1.70	1.70	90.9	#10	medium sand
#20	3.31	3.31	88.0	#20	medium sand
#40	4.55	4.55	85.8	#40	fine sand
#60	5.84	5.84	83.5	#60	fine sand
#100	7.41	7.41	80.7	#100	fine sand
#200	9.64	9.64	76.6	#200	fines

HYDROMETER CALCULATIONS

DATE 7/12/02	TIME 9:04	ET (min)	READING R	TEMP T	TEMP.COR. K	HYD.COR. Cc	READING C	EFFECTIVE LENGTH	A
7/12/02	9:06	2.00	42.0	22.50	0.013	7.00	35.00	10.6	0.99
7/12/02	9:09	5.00	40.0	22.50	0.013	7.00	33.00	10.9	0.99
7/12/02	9:19	15.00	36.0	22.50	0.013	7.00	29.00	11.5	0.99
7/12/02	9:34	30.00	33.0	22.50	0.013	7.00	26.00	12.0	0.99
7/12/02	10:04	60.00	30.0	22.50	0.013	7.00	23.00	12.5	0.99
7/12/02	13:14	250.00	26.0	22.50	0.013	7.00	19.00	13.2	0.99
7/13/02	9:04	1440.00	22.5	22.00	0.013	7.00	15.50	13.8	0.99

GRAIN SIZE PERCENTAGES

Particle Diameter	% PASSING		
0.0302	62.4		
0.0193	58.8	% GRAVEL	6.00
0.0115	51.7	% COARSE SAND	3.06
0.0083	46.3	% MEDIUM SAND	5.13
0.0060	41.0	% FINE SAND	9.16
0.0030	33.9	% FINES	76.65
0.0013	27.6	% TOTAL SAMPLE	100.00

Description: Yellowish Brown, SILTY CLAY, some coarse to fine sand, little gravel.

USCS: (CL)

-	LL
-	PL
-	PI

000302

TECH	TJ
DATE	7/11/02
CHECK	
REVIEW	

GEOSYNTEC CONSULTANTS

FLUOR FERNALD

4940

PARTICLE SIZE ANALYSIS–SIEVE METHOD

(ASTM D 422)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO — PROJECT NO.: G0134 TASK NO.: 04.1

DESCRIPTION: PHASE III — DATE: 05 day Jul month 2002 year

MATERIAL TYPE: Low Poem CLAY — SAMPLE NO.: LP02-7

99.87 LBS

SOIL SAMPLE SIZE	+3/8 = 1705.2 gm	MOISTURE = 199.6 gm	TOTAL = 45300.7
	-3/8 = 43395.9		

APPROXIMATE MINIMUM WT. OF SAMPLE (PASSING NO. 10 SIEVE) (grams)	SAND	FINE GRAIN
	115	65

	+3/8 BEFORE WASH	-3/8 BEFORE WASH	+3/8 AFTER WASH	-3/8 AFTER WASH
TARE NO.	L-9	L-2	L-9	L-2
WT. OF DRY SAMPLE PLUS TARE (grams)	1898.6	825.9	1755.8	342.8
WT. OF TARE (grams)	193.4	191.8	193.4	191.8
WT. OF DRY SAMPLE (grams)	1705.2	634.1	1562.4	151.0

SIEVE ANALYSIS — QA ID: _____

SIEVE NO.	DIAMETER (mm)	WT. RETAINED (grams)	% RETAINED	% FINER		PROJECT SPECIFICATIONS
3 in	76.2	Ø	Ø	100		
2 in	50.8	Ø	Ø	100		100
1 1/2in	38.1	Ø	Ø	100		
1 in	25.4	409.8	.90	99.1		
3/4 in	19.1	825.4	1.8	98.2		90-100
1/2 in	12.7	1288.5	2.8	97.2	~~97.5~~ @	
3/8 in	9.53	1562.2	3.4	96.6		
No. 4	4.75	13.2	2.1	97.9	94.6	
No. 10	2.00	30.1	4.7	95.3	92.1	
No. 20	0.850	50.7	8.0	92.0	88.9	
No. 40	0.425	74.3	11.7	88.3	85.3	
No. 60	0.250	95.1	15.0	85.0	82.1	
No. 100	0.125	120.6	19.0	81.0	78.2	
No. 200	0.075	149.6	23.6	76.4	~~71.3~~ 73.8 @	50-100
PAN	—	151.0	—	—		

COMMENTS: 45300.7

000303

%FINER = 100 − Σ% RETAINED

GEOSYNTEC CONSULTANTS FILE NO. 2-14-PMS

CHECKED BY: _____ SHEET NO. ____ OF ____

GEOSYNTEC CONSULTANTS

FLUOR FERNALD, INC.

PARTICLE SIZE DISTRIBUTION AND SOIL CLASSIFICATION TEST RESULTS (ASTM C 136/D 422) (ASTM D 2487)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO

DESCRIPTION: Phase IV

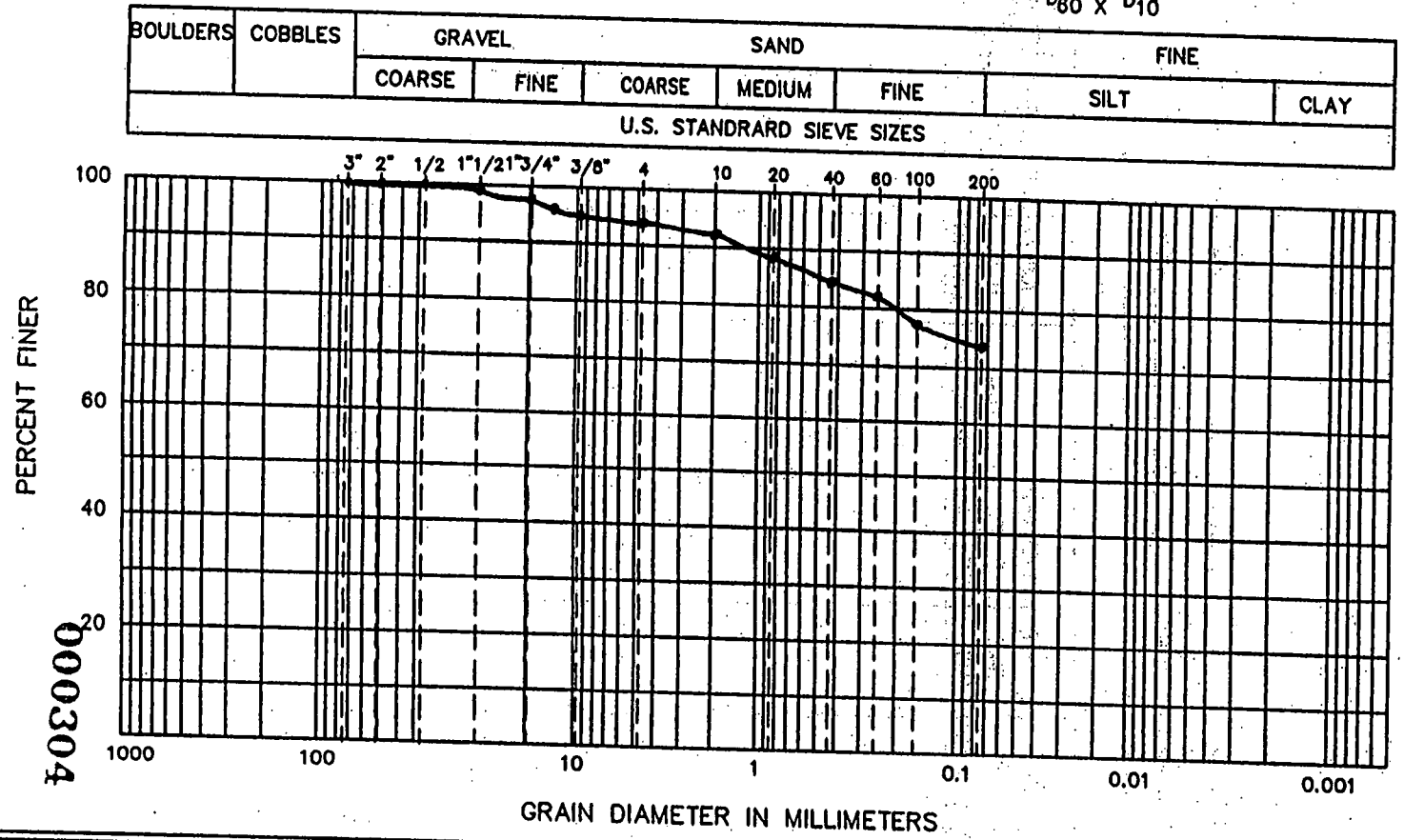
MATERIAL TYPE: Low Perm Clay

PROJECT NO.: 6Q1341 TASK NO.: 04.1

DATE: 24 day July month 2002 year

SAMPLE NO.: 4P02-7 QA ID: KS

CURVE COEFFICIENTS: $C_{uniformity} = \left(\frac{D_{60}}{D_{10}}\right) =$ $C_{curvature} = \left(\frac{D_{30}^2}{D_{60} \times D_{10}}\right) =$



ATTERBERG LIMITS

(LL) 34

(PL) 17

(PI) 17

SIEVE RESULTS

SIEVE SIZE	% FINER
3-in.	100
2-in.	100
1 1/2-in.	100
1-in.	99.1
3/4-in.	98.2
1/2-in.	97.2
3/8-in.	96.6
NO. 4	94.6
NO. 10	92.1
NO. 20.	88.9
NO. 40	85.3
NO. 60	82.1
NO. 100	78.2
NO. 200	73.8

HYDROMETER RESULTS

PARTICLE DIA.	% FINER
0.005	74
0.002	61
0.0005	39
0.0002	31

SOIL CLASSIFICATION (ASTM D 2487): CL

©GEO SYNTEC CONSULTANTS FILE NO. 2-16-PSD

CHECKED BY:

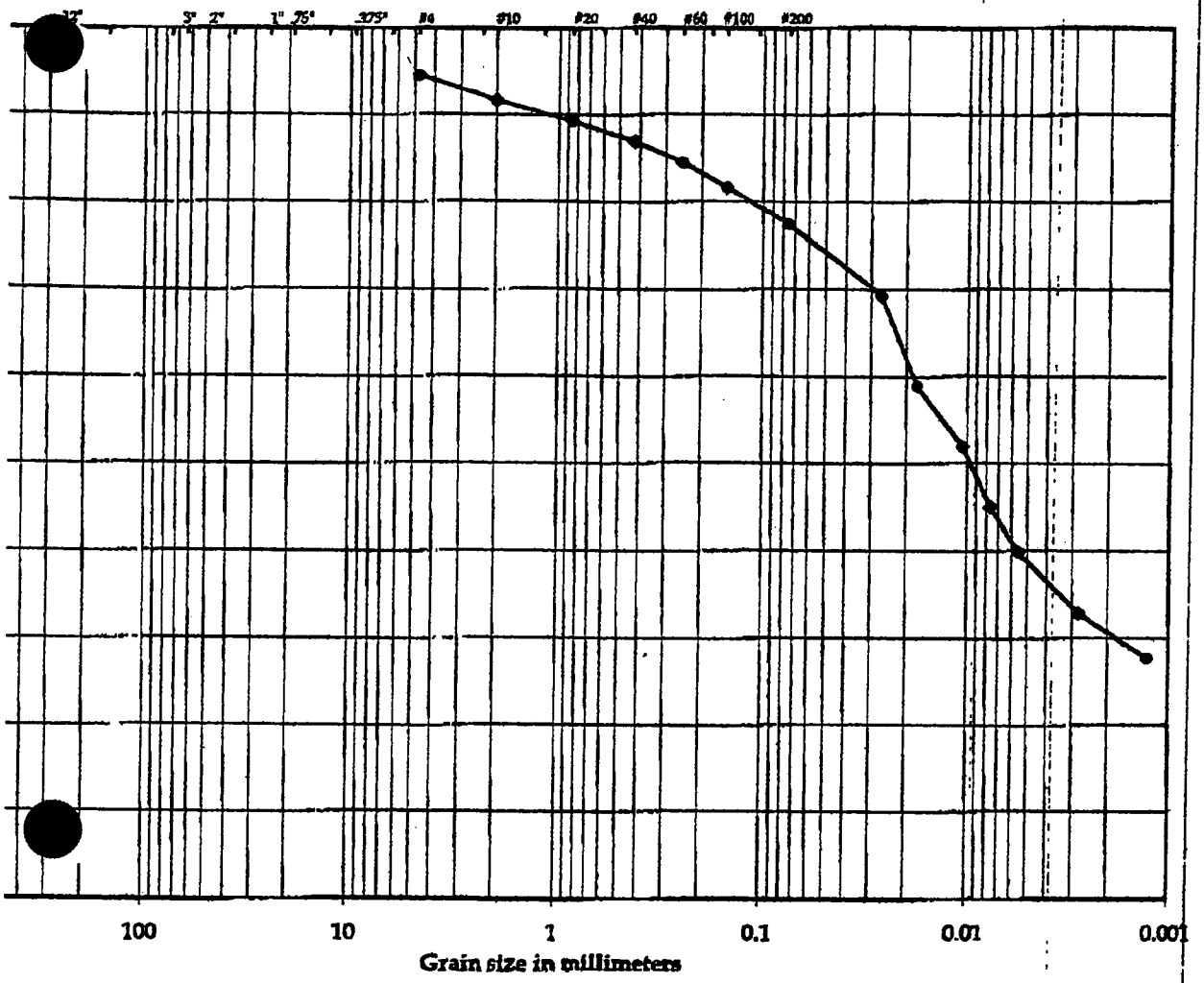
SHEET NO.

000304

4940

PARTICLE SIZE DISTRIBUTION ASTM D 421 AND D 422
US STANDARD SIEVE OPENING SIZES

4940



		Coarse	Fine	Cor	Med	Fine	SILT OR CLAY
ders	Cobbles	Gravel		SAND			FINES

SAMPLE ID	LP02 - 7
SAMPLE TYPE	Bag
AMPLE DEPTH	-

LL	-
PL	-
PI	-

DESCRIPTION: Yellowish Brown, SILTY CLAY, some coarse to fine sand, little gravel.

USCS: (CL)

SYNTEC/FLUOR FERNALD/OH

TECH	TJ
DATE	7/11/02
CHECK	BS
REVIEW	

Golder Associates Inc.

000305

ASTM GRAIN SIZE ANALYSIS
ASTM C117, C136, D421, D422, D1140 and D2217

4940

.OJECT TITLE	GEOSYNTEC/FLUOR FERNALD/OH	SAMPLE ID	LP02-7
)JECT NO.	023-3313	SAMPLE TYPE	Bag
		SAMPLE DEPTH	-

AS RECEIVED WATER CONTENT

Tare No.		
Wt. Wet Soil & Tare (gm)	(W1)	
Wt. Dry Soil & Tare (gm)	(W2)	
Weight of Tare (gm)	(W3)	
Weight of Water (gm)	(W4=W1-W2)	
Weight of Dry Soil (gm)	(W5=W2-W3)	
Moisture Content (%)	(W4/W5)*100	

Hygroscopic Moisture For Sieve Sample

Wet Soil & Tare (gm)	49.82
Dry Soil & Tare (gm)	48.05
Tare Weight (gm)	3.19
Moisture Content (%)	3.95

Total Weight of Sample Used For Sieve Analysis Corrected For Hygroscopic Moisture

Weight + Tare, Before Separating On The #4 Sieve (gm)	849.15	
Tare Weight (gm)	242.46	
Total Weight (gm)	583.66	(W6)

Plus #4 Material Sieve

TARE WEIGHT 0.00

	(Wt+Tare)	(((Wt-Tare)/W6)*100)	%PASSING		
12.0"				12.0"	cobbles
3.0"				3.0"	coarse gravel
2.5"				2.5"	coarse gravel
2.0"				2.0"	coarse gravel
1.5"				1.5"	coarse gravel
1.0"				1.0"	coarse gravel
0.75"				0.75"	fine gravel
0.50"				0.50"	fine gravel
0.375"				0.375"	fine gravel
#4			94.6	#4	coarse sand

NOTE: Client provided the percent passing #4 sieve.

HYDROMETER ANALYSIS

Specific Gravity	(assumed)	2.720
Specific Gravity	(tested)	
Amount Dispersing Agent (ml)		125.00
Dispersion Device		Mechanical
Length of Dispersion Period		1 Minute

Weight of Sample Used For Hydrometer Test

Weight of Sample Wet or Dry (gm)	56.23
Calculated Dry Wt. used in test (gm)	54.10
Hydrometer Bulb Number	704004
% Pass #4 Sieve For Whole Sample	94.60

TARE WEIGHT 0.00

HYDROMETER BACKSIEVE (Percent Passing #10 - #200 Sieves)

	(Wt+Tare)	Cumul Wt. Retained	% PASSING		
#10	1.67	1.67	91.7	#10	medium sand
#20	3.11	3.11	89.2	#20	medium sand
#40	4.42	4.42	86.9	#40	fine sand
#60	5.75	5.75	84.5	#60	fine sand
#100	7.42	7.42	81.6	#100	fine sand
#200	9.77	9.77	77.5	#200	fines

HYDROMETER CALCULATIONS

DATE	TIME	ET (min)	READING R	TEMP T	TEMP.COR. K	HYD.COR. Cc	READING C	EFFECTIVE LENGTH	A
7/12/02	9:06								
7/12/02	9:08	2.00	47.0	41.00	0.012	7.00	40.00	9.7	0.99
7/12/02	9:11	5.00	41.0	41.00	0.012	7.00	34.00	10.7	0.99
7/12/02	9:21	15.00	37.0	41.00	0.012	7.00	30.00	11.4	0.99
7/12/02	9:36	30.00	33.0	41.00	0.012	7.00	26.00	12.0	0.99
7/12/02	10:06	60.00	30.0	41.00	0.012	7.00	23.00	12.5	0.99
7/12/02	13:16	250.00	26.0	41.00	0.012	7.00	19.00	13.2	0.99
7/13/02	9:06	1440.00	23.0	22.00	0.013	7.00	16.00	13.7	0.99

GRAIN SIZE PERCENTAGES

Particle Diameter	% PASSING		
0.0266	69.3		
0.0177	58.9	% GRAVEL	5.40
0.0105	51.9	% COARSE SAND	2.92
0.0077	45.0	% MEDIUM SAND	4.81
0.0055	39.8	% FINE SAND	9.36
0.0028	32.9	% FINES	77.51
0.0013	27.7	% TOTAL SAMPLE	100.00

Description: Yellowish Brown, SILTY CLAY, some coarse to fine sand, little gravel.

USCS: (CL)

-	LL
-	PL
-	PI

000306

TECH	T
DATE	7/11/02
CHECK	
REVIEW	

36116.8

GEOSYNTEC CONSULTANTS

FLUOR FERNALD

4940

PARTICLE SIZE ANALYSIS–SIEVE METHOD

(ASTM D 422)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO

600 A Hardy

650 -3/8 sand

DESCRIPTION: PHASE III

PROJECT NO.: GQ1341 TASK NO.: 04.1

MATERIAL TYPE: Low Perm Clay

DATE: 11 day July month 2002 year

SAMPLE NO.: LP02.8

SOIL SAMPLE SIZE	+3/8 = 884.5	MOISTURE = 334.1	3733.1	TOTAL = 37340.4
	-3/8 = 36116.8			

32500.0

2366.8

APPROXIMATE MINIMUM WT. OF SAMPLE (PASSING NO. 10 SIEVE) (grams)	SAND	FINE GRAIN
	115	63 44806.6 gm

	+3/8 BEFORE WASH	-3/8 BEFORE WASH	+3/8 AFTER WASH	-3/8 AFTER WASH
TARE NO.	L.8	N	L.8	N
WT. OF DRY SAMPLE PLUS TARE (grams)	1077.7	731.3	1029.3	247.9
WT. OF TARE (grams)	193.2	101.6	193.2	101.6
WT. OF DRY SAMPLE (grams)	884.5	629.7	836.1	146.3

SIEVE ANALYSIS

QA ID: DLE

98.8 LBS

SIEVE NO.	DIAMETER (mm)	WT. RETAINED (grams)	% RETAINED	% FINER		PROJECT SPECIFICATIONS
3 in	76.2	Ø	Ø	100		
2 in	50.8	Ø	Ø	100		100
1 1/2in	38.1	Ø	Ø	100		
1 in	25.4	225.2	.5	99.5		
3/4 in	19.1	394.7	.9	99.1		90-100
1/2 in	12.7	631.7	1.4	98.6		
3/8 in	9.53	836.1	1.9	~~98.3~~	98.1	
No. 4	4.75	9.8	1.6	98.4	~~96.7~~	96.6
No. 10	2.00	29.6	4.7	95.3	~~93.7~~	93.5
No. 20	0.850	51.5	8.2	91.8	~~90.2~~	90.1
No. 40	0.425	74.3	11.8	88.2	~~86.7~~	86.6
No. 60	0.250	94.1	14.9	85.1	~~83.7~~	83.5
No. 100	0.125	117.4	18.6	81.4	~~80.0~~	79.8
No. 200	0.075	144.3	22.9	77.1	~~75.8~~	50-100
PAN	—	146.0	—	—	75.6	

COMMENTS:

000307

%FINER = 100 − Σ% RETAINED

GEO SYNTEC CONSULTANTS FILE NO. 2-14-PMS

CHECKED BY: CL

SHEET NO. 1 OF 2

PARTICLE SIZE DISTRIBUTION AND SOIL CLASSIFICATION TEST RESULTS (ASTM C 136/D 422) (ASTM D 2487)

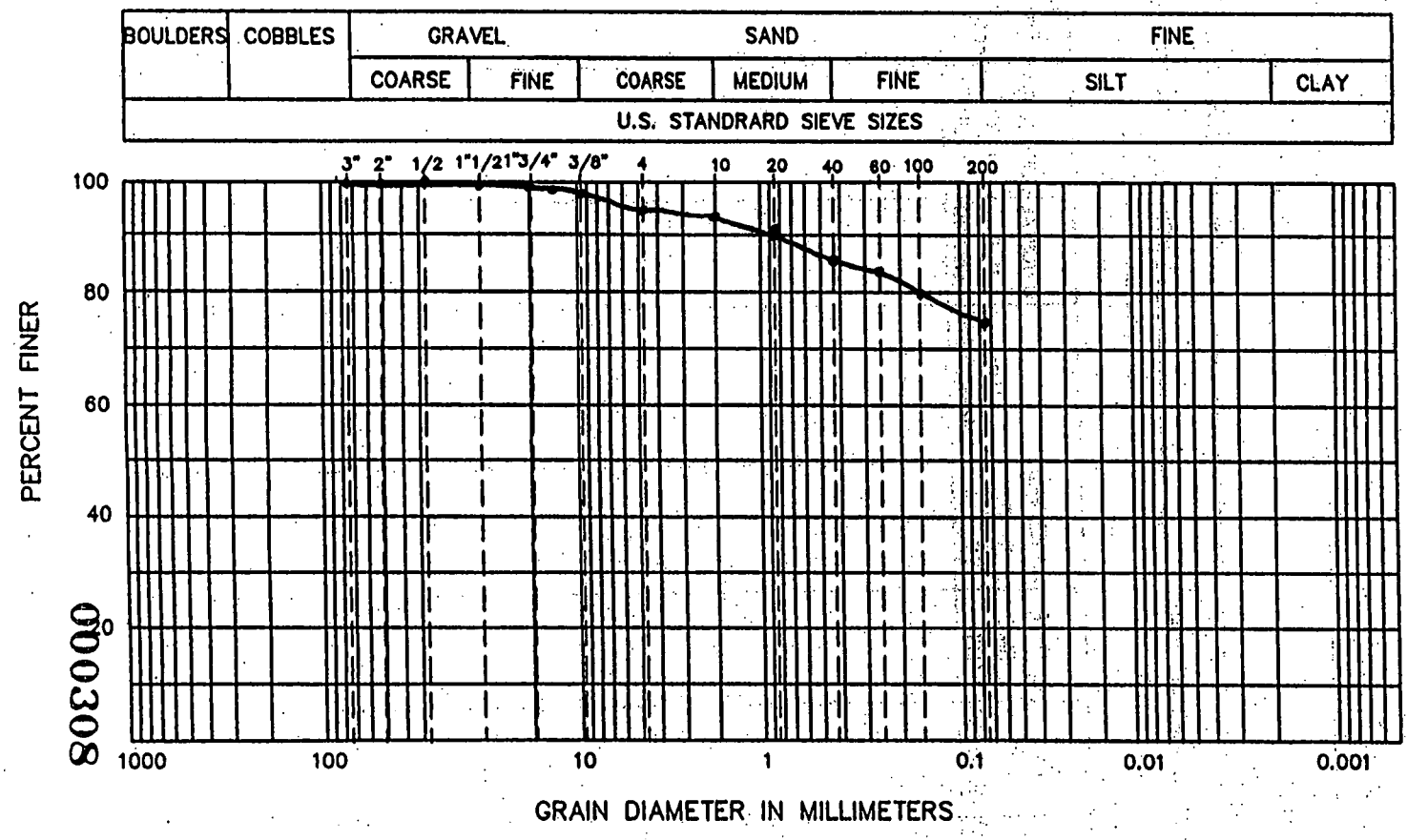
PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO — PROJECT NO.: 6Q1341 TASK NO.: 04.1

DESCRIPTION: Phase IV — DATE: 24 day July month 2002 year

MATERIAL TYPE: Low Perm Clay — SAMPLE NO.: LP02-8 QA ID: KS

CURVE COEFFICIENTS: $C_{uniformity} = \left(\frac{D_{60}}{D_{10}}\right) =$ $C_{curvature} = \left(\frac{D_{30}^2}{D_{60} \times D_{10}}\right) =$



ATTERBERG LIMITS

(LL) 32

(PL) 16

(PI) 16

SIEVE RESULTS

SIEVE SIZE	% FINER
3-in.	100
2-in.	100
1 1/2-in.	100
1-in.	99.5
3/4-in.	99.1
1/2-in.	98.6
3/8-in.	98.1
NO. 4	96.6
NO. 10	93.5
NO. 20.	90.1
NO. 40	86.6
NO. 60	83.5
NO. 100	79.8
NO. 200	75.6

HYDROMETER RESULTS

PARTICLE DIA.	% FINER
0.05	75
0.02	62
0.005	38
0.002	31

SOIL CLASSIFICATION (ASTM D 2487):

©GEO SYNTEC CONSULTANTS FILE NO. 2-16-PSD CHECKED BY: SHEET NO. OF

000308

TECH DATE CHECK REVIEW

4940

26 P. 3

4940

ASTM GRAIN SIZE ANALYSIS
ASTM C117, C136, D421, D422, D1140 and D2217

PROJECT TITLE	GEOSYNTEC/FLUOR FERNALD/OH	SAMPLE ID	LP02 - 8
PROJECT NO.	023-3313	SAMPLE TYPE	Bag
		SAMPLE DEPTH	-

AS RECEIVED WATER CONTENT

Tare No.		
Wt. Wet Soil & Tare (gm)	(W1)	
Wt. Dry Soil & Tare (gm)	(W2)	
Weight of Tare (gm)	(W3)	
Weight of Water (gm)	(W4=W1-W2)	
Weight of Dry Soil (gm)	(W5=W2-W3)	
Moisture Content (%)	(W4/W5)*100	

Hygroscopic Moisture For Sieve Sample

Wet Soil & Tare (gm)	50.28
Dry Soil & Tare (gm)	48.68
Tare Weight (gm)	3.26
Moisture Content (%)	3.52

Total Weight of Sample Used For Sieve Analysis Corrected For Hygroscopic Moisture

Weight + Tare, Before Separating On The #4 Sieve (gm)	762.67	
Tare Weight (gm)	242.33	
Total Weight (gm)	502.63	(W6)

Plus #4 Material Sieve

TARE WEIGHT 0.00

	(Wt+Tare)	(((Wt-Tare)/W6)*100)	%PASSING		
12.0"				12.0"	cobbles
3.0"				3.0"	coarse gravel
2.5"				2.5"	coarse gravel
2.0"				2.0"	coarse gravel
1.5"				1.5"	coarse gravel
1.0"				1.0"	coarse gravel
0.75"				0.75"	fine gravel
0.50"				0.50"	fine gravel
0.375"				0.375"	fine gravel
#4			98.1	#4	coarse sand

NOTE: Client provided the percent passing #4 sieve.

HYDROMETER ANALYSIS

Specific Gravity	(assumed)	2.720
Specific Gravity	(tested)	
Amount Dispersing Agent (ml)		125.00
Type Dispersion Device		Mechanical
Length of Dispersion Period		1 Minute

Weight of Sample Used For Hydrometer Test

Weight of Sample Wet or Dry (gm)	55.82
Calculated Dry Wt. used in test (gm)	53.92
Hydrometer Bulb Number	704004
% Pass #4 Sieve For Whole Sample	98.10

TARE WEIGHT 0.00

HYDROMETER BACKSIEVE (Percent Passing #10 - #200 Sieves)

	(Wt+Tare)	Cumul Wt. Retained	% PASSING		
#10	1.18	1.18	96.0	#10	medium sand
#20	2.70	2.70	93.2	#20	medium sand
#40	4.26	4.26	90.3	#40	fine sand
#60	5.89	5.89	87.4	#60	fine sand
#100	7.74	7.74	84.0	#100	fine sand
#200	10.08	10.08	79.8	#200	fines

HYDROMETER CALCULATIONS

DATE 7/20/02	TIME 10:15	ET (min)	READING R	TEMP T	TEMP.COR. K	HYD.COR. Cc	READING C	EFFECTIVE LENGTH	A
7/20/02	10:17	2.00	46.0	22.00	0.013	7.00	39.00	9.9	0.99
7/20/02	10:20	5.00	41.5	22.00	0.013	7.00	34.50	10.7	0.99
7/20/02	10:30	15.00	36.5	22.00	0.013	7.00	29.50	11.5	0.99
7/20/02	10:45	30.00	33.0	22.00	0.013	7.00	26.00	12.0	0.99
7/20/02	11:15	60.00	29.0	22.00	0.013	7.00	22.00	12.7	0.99
7/20/02	14:25	250.00	25.5	22.00	0.013	7.00	18.50	13.3	0.99
7/21/02	10:15	1440.00	22.5	22.00	0.013	7.00	15.50	13.8	0.99

GRAIN SIZE PERCENTAGES

Particle Diameter	% PASSING
0.0291	70.2
0.0192	62.1
0.0115	53.1
0.0083	46.8
0.0060	39.6
0.0030	33.2
0.0013	27.9

% GRAVEL	1.90
% COARSE SAND	2.15
% MEDIUM SAND	5.60
% FINE SAND	10.59
% FINES	79.76
% TOTAL SAMPLE	100.00

Description: Yellowish Brown, SILTY CLAY, some coarse to fine sand, trace gravel.

USCS: (CL)

-	LL
-	PL
-	PI

000309

TECH	TJ/JH
DATE	7/19/02
CHECK	[illegible]
REVIEW	[illegible]

GEOSYNTEC CONSULTANTS

FLUOR FERNALD

4940

PARTICLE SIZE ANALYSIS—SIEVE METHOD

(ASTM D 422)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO — PROJECT NO.: GQ134 TASK NO.: 04.1

DESCRIPTION: PHASE III — DATE: 12 day July month 2002 year

MATERIAL TYPE: Low Perm CLAY — SAMPLE NO.: LP02-9

46.20 LBS

SOIL SAMPLE SIZE	+3/8 = 880.2 gr	MOISTURE = 238.0 gr	TOTAL = 22074.5
	-3/8 = 20956.3 gr	22074.5	

APPROXIMATE MINIMUM WT. OF SAMPLE (PASSING NO. 10 SIEVE) (grams)	SAND	FINE GRAIN
	115	65 1 in over

	+3/8 BEFORE WASH	-3/8 BEFORE WASH	+3/8 AFTER WASH	-3/8 AFTER WASH
TARE NO.	L-4	L-1	L-4	L-1
WT. OF DRY SAMPLE PLUS TARE (grams)	1025.6	962.5	957.5	447.5
WT. OF TARE (grams)	145.4	192.4	145.4	192.4
WT. OF DRY SAMPLE (grams)	880.2	770.1	812.1	255.1

SIEVE ANALYSIS

QA ID: DKE

SIEVE NO.	DIAMETER (mm)	WT. RETAINED (grams)	% RETAINED	% FINER		PROJECT SPECIFICATIONS
3 in	76.2	Ø	Ø	100		
2 in	50.8	Ø	Ø	100		100
1 1/2in	38.1	89.5	0.4	99.6		
1 in	25.4	245.4	1.1	98.9		
3/4 in	19.1	371.8	1.7	98.3		90-100
1/2 in	12.7	669.5	3.0	97.0		
3/8 in	9.53	811.2	3.7	96.3		
No. 4	4.75	18.4	2.4	97.6	94.0	
No. 10	2.00	51.6	6.7	93.6	~~90.1~~ 89.9	
No. 20	0.850	97.7	12.7	87.3	84.1	
No. 40	0.425	145.2	18.9	81.1	78.1	
No. 60	0.250	179.8	23.3	76.7	73.9	
No. 100	0.125	215.3	28.0	72.0	69.3	
No. 200	0.075	251.6	32.7	67.3	64.8	50-100
PAN	—	255.0	—	—		

COMMENTS:

000310

%FINER = 100 − Σ% RETAINED

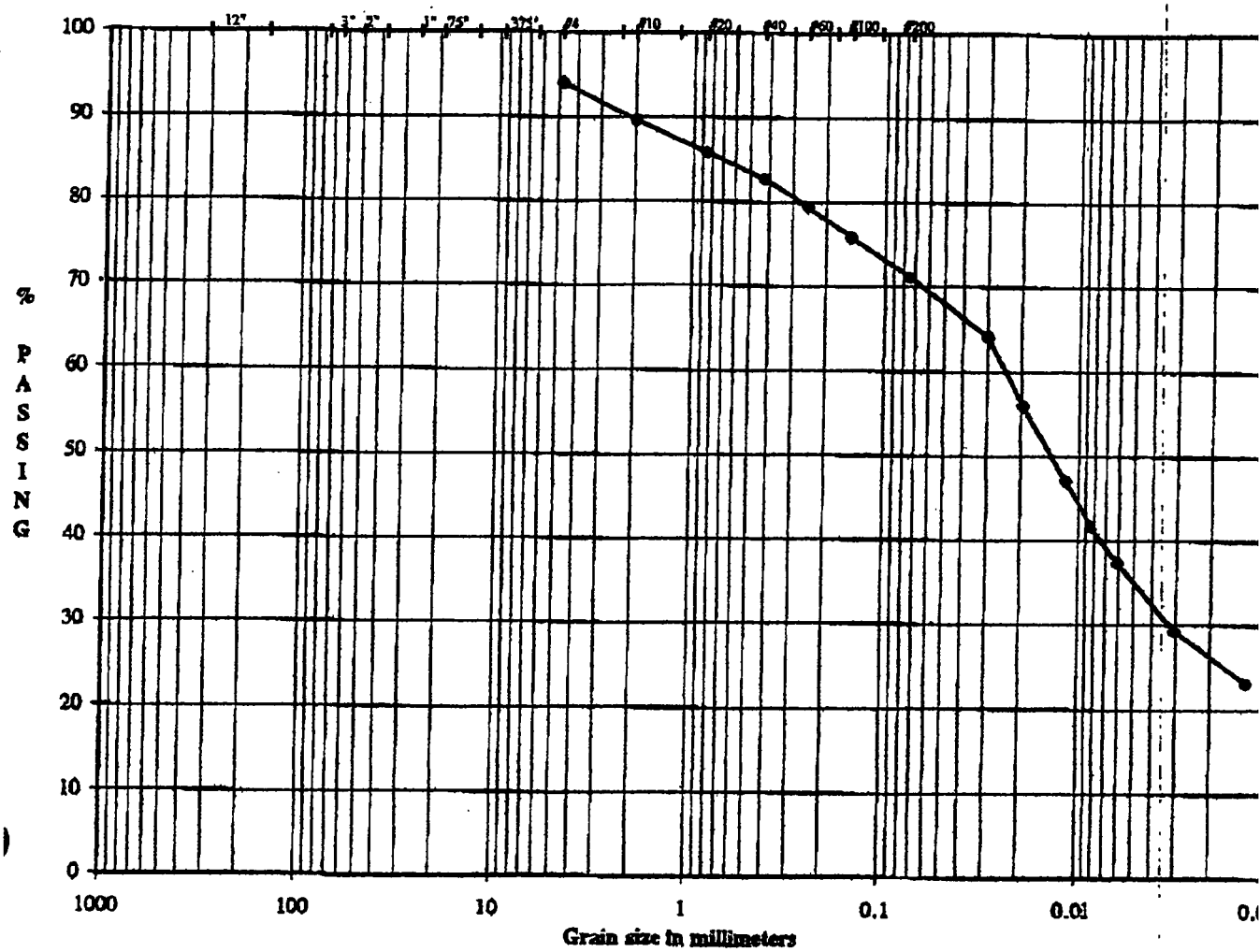
GEO SYNTEC CONSULTANTS FILE NO. 2-14-PMS

CHECKED BY:

SHEET NO. 1 OF 2

PARTICLE SIZE DISTRIBUTION ASTM D 421 AND D 422
US STANDARD SIEVE OPENING SIZES

4940



Boulders	Cobbles	Coarse	Fine	Cor	Med	Fine	SILT OR CLAY
		Gravel		SAND			FINES

SAMPLE ID	LP02 - 9
SAMPLE TYPE	Bag
SAMPLE DEPTH	-

LL	-
PL	-
PI	-

DESCRIPTION	Yellowish Brown, SILTY CLAY, some coarse to fine sand, little gravel.
USCS	(CL)

GEOSYNTEC/FLUOR FERNALD/OH
023-3313

000311

TECH	
DATE	
CHECK	
REVIEW	

GEOSYNTEC CONSULTANTS

FLUOR FERNALD, INC.

PARTICLE SIZE DISTRIBUTION AND SOIL CLASSIFICATION TEST RESULTS (ASTM C 136/D 422) (ASTM D 2487)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO

DESCRIPTION: Phase IV

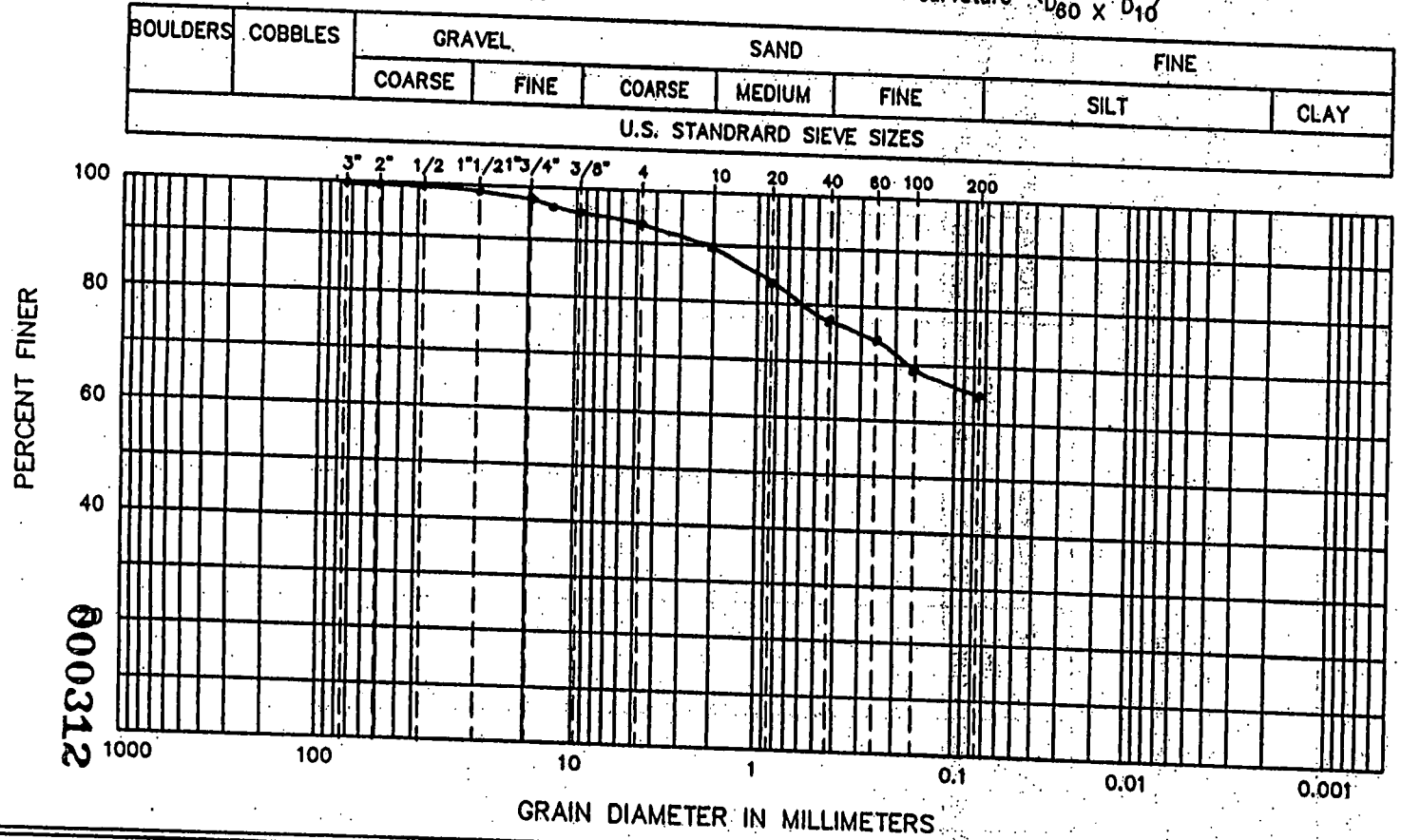
MATERIAL TYPE: Low Perm Clay

PROJECT NO.: 6Q1341 TASK NO.: 04.1

DATE: 24 day July month 2002 year

SAMPLE NO.: LP02-9 QA ID: KS

CURVE COEFFICIENTS: $C_{uniformity} = \left(\frac{D_{60}}{D_{10}}\right) =$ $C_{curvature} = \left(\frac{D_{30}^2}{D_{60} \times D_{10}}\right) =$



ATTERBERG LIMITS

(LL) 29

(PL) 16

(PI) 13

SIEVE RESULTS

SIEVE SIZE	% FINER
3-in.	100
2-in.	100
1 1/2-in.	99.6
1-in.	98.9
3/4-in.	98.3
1/2-in.	97.0
3/8-in.	96.3
NO. 4	94.0
NO. 10	89.9
NO. 20.	84.1
NO. 40	78.1
NO. 60	73.9
NO. 100	69.3
NO. 200	64.8

HYDROMETER RESULTS

PARTICLE DIA.	% FINER
0.05	68
0.02	57
0.005	35
0.002	27

SOIL CLASSIFICATION (ASTM D 2487): CL

©GEO SYNTEC CONSULTANTS FILE NO. 2-16-PSD

CHECKED BY:

SHEET NO. ____ OF

000312

4940

ASTM GRAIN SIZE ANALYSIS
ASTM C117, C136, D421, D422, D1140 and D2217

4940

PROJECT TITLE: GEOSYNTEC/FLUOR FERNALD/OH
PROJECT NO.: 023-3313

SAMPLE ID: LP02 - 9
SAMPLE TYPE: Bag
SAMPLE DEPTH: -

AS RECEIVED WATER CONTENT

Tare No.		
Wt. Wet Soil & Tare (gm)	(W1)	
Wt. Dry Soil & Tare (gm)	(W2)	
Weight of Tare (gm)	(W3)	
Weight of Water (gm)	(W4=W1-W2)	
Weight of Dry Soil (gm)	(W5=W2-W3)	
Moisture Content (%)	(W4/W5)*100	

Hygroscopic Moisture For Sieve Sample

Wet Soil & Tare (gm)	50.27
Dry Soil & Tare (gm)	48.69
Tare Weight (gm)	3.19
Moisture Content (%)	3.47

Total Weight of Sample Used For Sieve Analysis Corrected For Hygroscopic Moisture

Weight + Tare, Before Separating On The #4 Sieve (gm)	749.42	
Tare Weight (gm)	242.43	
Total Weight (gm)	489.98	(W6)

Plus #4 Material Sieve

TARE WEIGHT: 0.00

	(Wt+Tare)	((Wt-Tare)/W6)*100)	%PASSING		
12.0"				12.0"	cobbles
3.0"				3.0"	coarse gravel
2.5"				2.5"	coarse gravel
2.0"				2.0"	coarse gravel
1.5"				1.5"	coarse gravel
1.0"				1.0"	coarse gravel
0.75"				0.75"	fine gravel
0.50"				0.50"	fine gravel
0.375"				0.375"	fine gravel
#4			94.0	#4	coarse sand

NOTE: Client provided the percent passing #4 sieve.

HYDROMETER ANALYSIS

Specific Gravity	(assumed)	2.720
Specific Gravity	(tested)	
Amount Dispersing Agent (ml)		125.00
Type Dispersion Device		Mechanical
Length of Dispersion Period		1 Minute

Weight of Sample Used For Hydrometer Test

Weight of Sample Wet or Dry (gm)	54.15
Calculated Dry Wt. used in test (gm)	52.33
Hydrometer Bulb Number	704004
% Pass #4 Sieve For Whole Sample	94.00

TARE WEIGHT: 0.00

HYDROMETER BACKSIEVE (Percent Passing #10 - #200 Sieves)

	(Wt+Tare)	Cumul Wt. Retained	% PASSING		
#10	2.43	2.43	89.6	#10	medium sand
#20	4.50	4.50	85.9	#20	medium sand
#40	6.26	6.26	82.8	#40	fine sand
#60	8.12	8.12	79.4	#60	fine sand
#100	10.12	10.12	75.8	#100	fine sand
#200	12.72	12.72	71.2	#200	fines

HYDROMETER CALCULATIONS

DATE	TIME	ET (min)	READING R	TEMP T	TEMP.COR. K	HYD.COR. Cc	READING C	EFFECTIVE LENGTH	A
7/20/02	10:17								
7/20/02	10:19	2.00	43.0	22.00	0.013	7.00	36.00	10.4	0.99
7/20/02	10:22	5.00	38.5	22.00	0.013	7.00	31.50	11.2	0.99
7/20/02	10:32	15.00	33.5	22.00	0.013	7.00	26.50	12.0	0.99
7/20/02	10:47	30.00	30.5	22.00	0.013	7.00	23.50	12.5	0.99
7/20/02	11:17	60.00	28.0	22.00	0.013	7.00	21.00	12.9	0.99
7/20/02	14:27	250.00	23.5	22.00	0.013	7.00	16.50	13.7	0.99
7/21/02	10:17	1440.00	20.0	22.00	0.013	7.00	13.00	14.2	0.99

GRAIN SIZE PERCENTAGES

Particle Diameter	% PASSING
0.0299	64.0
0.0196	56.0
0.0117	47.1
0.0085	41.8
0.0061	37.3
0.0031	29.3
0.0013	23.1

% GRAVEL	6.00
% COARSE SAND	4.36
% MEDIUM SAND	6.88
% FINE SAND	11.60
% FINES	71.15
% TOTAL SAMPLE	100.00

Description: Yellowish Brown, SILTY CLAY, some coarse to fine sand, little gravel.

USCS: (CL)

-	LL
-	PL
-	PI

TECH	TJ/JE
DATE	7/19/02
CHECK	DSS
REVIEW	[illegible]

000313

GEOSYNTEC CONSULTANTS

FLUOR FERNALD

PARTICLE SIZE ANALYSIS–SIEVE METHOD (ASTM D 422)

Total of 105.6 lbs

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO — PROJECT NO.: GQ1341 TASK NO.: 04.1

DESCRIPTION: PHASE III — DATE: 13 day July month 2002 year

MATERIAL TYPE: LOW PERM CLAY — SAMPLE NO.: LP02-10

SOIL SAMPLE SIZE	+3/8 = 2368.6 gm	MOISTURE = 337.6 gm	TOTAL = 47900.5
	-3/8 = 1250 gm + 43944.3	= 47900.5	

APPROXIMATE MINIMUM WT. OF SAMPLE (PASSING NO. 10 SIEVE) (grams)	SAND	FINE GRAIN
	115	65

	+3/8 BEFORE WASH	-3/8 BEFORE WASH	+3/8 AFTER WASH	-3/8 AFTER WASH
TARE NO.	L-6	L-4	L-6	L-4
WT. OF DRY SAMPLE PLUS TARE (grams)	2567.1	639.9	2463.7	308.1
WT. OF TARE (grams)	198.5	145.4	198.5	145.4
WT. OF DRY SAMPLE (grams)	2368.6	494.5	2265.2	162.7

SIEVE ANALYSIS — QA ID: DLG

SIEVE NO.	DIAMETER (mm)	WT. RETAINED (grams)	% RETAINED	% FINER		PROJECT SPECIFICATIONS
3 in	76.2	Ø	Ø	100		
2 in	50.8	Ø	Ø	100		100
1 1/2in	38.1	185.2	0.4	99.6		
1 in	25.4	931.5	1.9	98.1		
3/4 in	19.1	1367.4	2.9	97.1		90-100
1/2 in	12.7	1949.8	~~3.4~~ 4.1	~~96.6~~ 95.9		
3/8 in	9.53	2259.3	4.7	95.3		
No. 4	4.75	17.3	3.5	96.5	92.0	
No. 10	2.00	39.0	7.9	92.1	87.8	
No. 20	0.850	64.2	13.0	87.0	82.9	
No. 40	0.425	88.4	17.9	82.1	78.2	
No. 60	0.250	109.1	22.1	77.9	74.2	
No. 100	0.125	134.2	27.1	72.9	69.5	
No. 200	0.075	162.2	32.8	67.2	64.0	50-100
PAN	—	162.7	—	—	—	

COMMENTS:

000314

%FINER = 100 − Σ% RETAINED

GEOSYNTEC CONSULTANTS

FLUOR FERNALD, INC.

PARTICLE SIZE DISTRIBUTION AND SOIL CLASSIFICATION TEST RESULTS (ASTM C 136/D 422) (ASTM D 2487)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO

DESCRIPTION: Phase IV

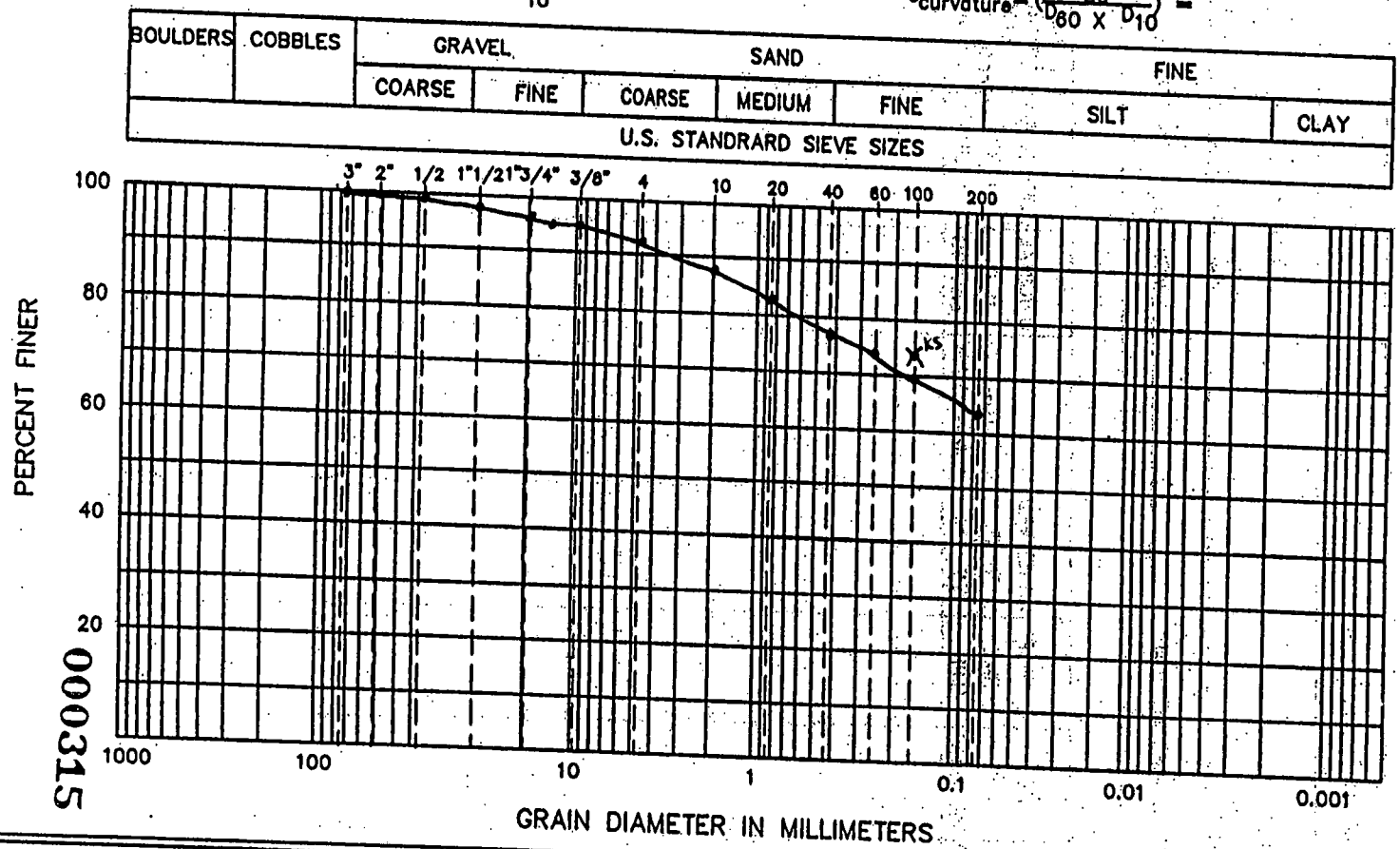
MATERIAL TYPE: Low Perm Clay

PROJECT NO.: 6Q1341 TASK NO.: 04.1

DATE: 24 day July month 2002 year

SAMPLE NO.: LP02-10 QA ID: KS

CURVE COEFFICIENTS: $C_{uniformity} = \left(\frac{D_{60}}{D_{10}}\right) =$ $C_{curvature} = \left(\frac{D_{30}^2}{D_{60} \times D_{10}}\right) =$



ATTERBERG LIMITS

(LL) 29

(PL) 16

(PI) 13

SIEVE RESULTS

SIEVE SIZE	% FINER
3-in.	100
2-in.	100
1 1/2-in.	99.6
1-in.	98.1
3/4-in.	97.1
1/2-in.	95.9
3/8-in.	95.3
NO. 4	92.0
NO. 10	87.8
NO. 20.	82.9
NO. 40	78.2
NO. 60	74.2
NO. 100	69.5
NO. 200	64.0

HYDROMETER RESULTS

PARTICLE DIA.	% FINER
0.05	68
0.02	58
0.005	35
0.002	27

SOIL CLASSIFICATION (ASTM D 2487): CL

©GEOSYNTEC CONSULTANTS FILE NO. 2-16-PSD

CHECKED BY:

SHEET NO. ____ OF

000315

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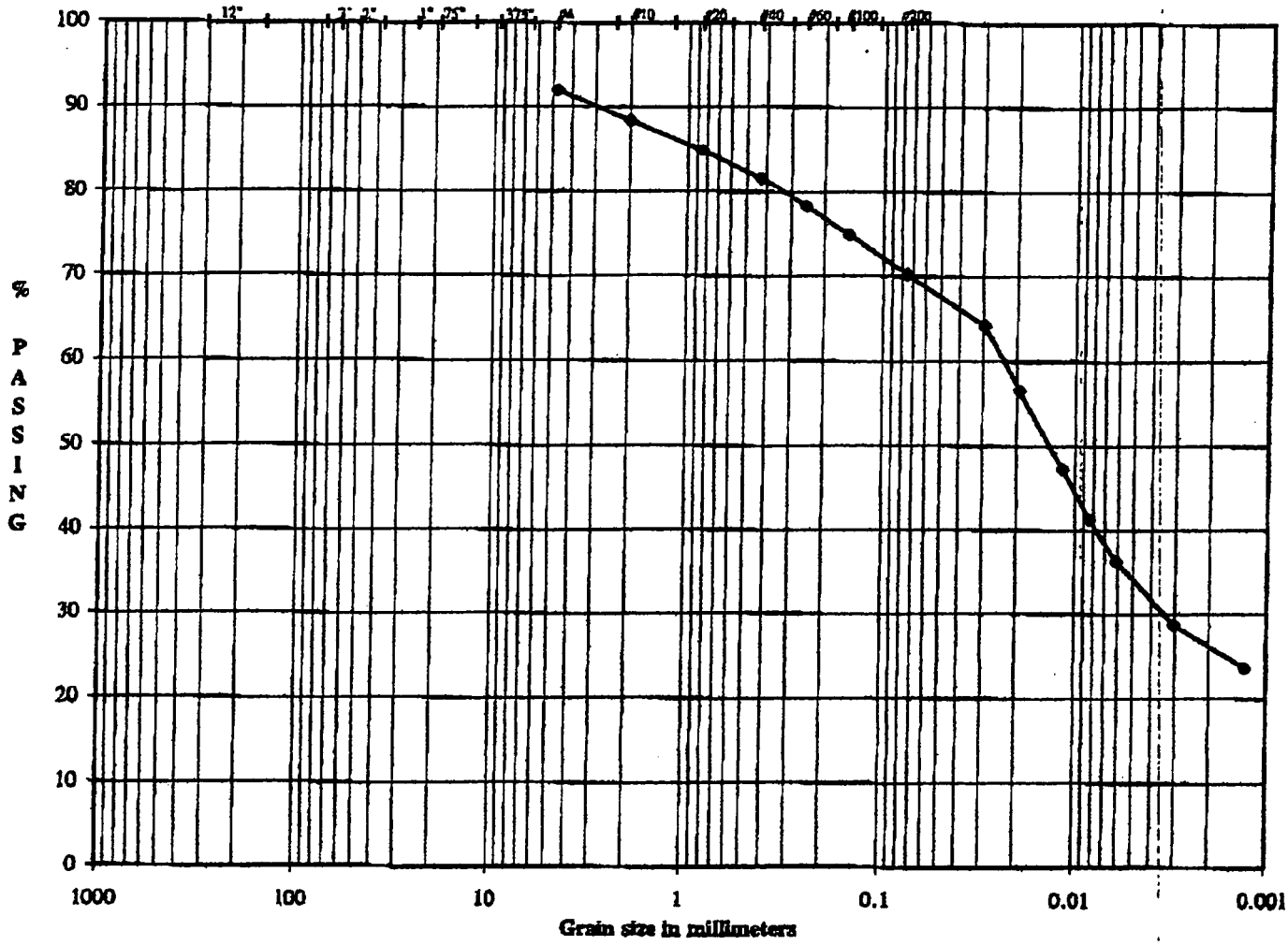
4940

PARTICLE SIZE DISTRIBUTION ASTM D 421 AND D 422
US STANDARD SIEVE OPENING SIZES



Boulders	Cobbles	Coarse	Fine	Cor	Med	Fine	SILT OR CLAY
		Gravel		SAND			FINES

SAMPLE ID	LF02 - 10
SAMPLE TYPE	Bag
SAMPLE DEPTH	-

LL	-
PL	-
PI	-

DESCRIPTION	Yellowish Brown, SILTY CLAY, some coarse to fine sand, little gravel.
USCS	(CL)

GEOSYNTEC/FLUOR FERNALD/OH
023-3313

TECH	TJ/JH
DATE	7/19/02
CHECK	BSK
REVIEW	[illegible]

000316

Golder Associates Inc.

4940

ASTM GRAIN SIZE ANALYSIS
ASTM C117, C136, D421, D422, D1140 and D2217

PROJECT TITLE: GEOSYNTEC/FLUOR FERNALD/OH
PROJECT NO.: 023-3313

SAMPLE ID: LP02-10
SAMPLE TYPE: Bag
SAMPLE DEPTH: -

AS RECEIVED WATER CONTENT

Tare No.		
Wt. Wet Soil & Tare (gm)	(W1)	
Wt. Dry Soil & Tare (gm)	(W2)	
Weight of Tare (gm)	(W3)	
Weight of Water (gm)	(W4=W1-W2)	
Weight of Dry Soil (gm)	(W5=W2-W3)	
Moisture Content (%)	(W4/W5)*100	

Hygroscopic Moisture For Sieve Sample

Wet Soil & Tare (gm)	50.61
Dry Soil & Tare (gm)	47.74
Tare Weight (gm)	3.22
Moisture Content (%)	6.45

Total Weight of Sample Used For Sieve Analysis Corrected For Hygroscopic Moisture

Weight + Tare, Before Separating On The #4 Sieve (gm)	780.60	
Tare Weight (gm)	242.27	
Total Weight (gm)	505.73	(W6)

Plus #4 Material Sieve

TARE WEIGHT: 0.00

	(Wt+Tare)	((Wt-Tare)/W6)*100	%PASSING		
12.0"				12.0"	cobbles
3.0"				3.0"	coarse gravel
2.5"				2.5"	coarse gravel
2.0"				2.0"	coarse gravel
1.5"				1.5"	coarse gravel
1.0"				1.0"	coarse gravel
0.75"				0.75"	fine gravel
0.50"				0.50"	fine gravel
0.375"				0.375"	fine gravel
#4			92.0	#4	coarse sand

NOTE: Client provided the percent passing #4 sieve.

HYDROMETER ANALYSIS

Specific Gravity	(assumed)	2.720
Specific Gravity	(tested)	
Amount Dispersing Agent (ml)		125.00
Type Dispersion Device		Mechanical
Length of Dispersion Period		1 Minute

Weight of Sample Used For Hydrometer Test

Weight of Sample Wet or Dry (gm)	57.43
Calculated Dry Wt. used in test (gm)	53.95
Hydrometer Bulb Number	704004
% Pass #4 Sieve For Whole Sample	92.00

TARE WEIGHT: 0.00

HYDROMETER BACKSIEVE (Percent Passing #10 - #200 Sieves)

	(Wt+Tare)	Correct Wt. Retained	% PASSING		
#10	2.11	2.11	88.4	#10	medium sand
#20	4.14	4.14	84.9	#20	medium sand
#40	6.14	6.14	81.5	#40	fine sand
#60	8.02	8.02	78.3	#60	fine sand
#100	10.06	10.06	74.8	#100	fine sand
#200	12.78	12.78	70.2	#200	fines

HYDROMETER CALCULATIONS

DATE	TIME	ET (min)	READING R	TEMP T	TEMP.COR. K	HYD.COR. Cc	READING C	EFFECTIVE LENGTH	A
7/20/02	10:19								
7/20/02	10:21	2.00	45.0	22.00	0.013	7.00	38.00	10.1	0.99
7/20/02	10:24	5.00	40.5	22.00	0.013	7.00	33.50	10.9	0.99
7/20/02	10:34	15.00	35.0	22.00	0.013	7.00	28.00	11.7	0.99
7/20/02	10:49	30.00	31.5	22.00	0.013	7.00	24.50	12.4	0.99
7/20/02	11:19	60.00	28.5	22.00	0.013	7.00	21.50	12.9	0.99
7/20/02	14:29	250.00	24.0	22.00	0.013	7.00	17.00	13.5	0.99
7/21/02	10:19	1440.00	21.0	22.00	0.013	7.00	14.00	14.0	0.99

GRAIN SIZE PERCENTAGES

Particle Diameter	% PASSING
0.0294	64.2
0.0193	56.6
0.0116	47.3
0.0084	41.4
0.0061	36.3
0.0030	28.7
0.0013	23.6

% GRAVEL	8.00
% COARSE SAND	3.60
% MEDIUM SAND	6.87
% FINE SAND	11.32
% FINES	70.21
% TOTAL SAMPLE	100.00

Description: Yellowish Brown, SILTY CLAY, some coarse to fine sand, little gravel.

USCS: (CL)

-	LL
-	PL
-	PI

TECH	TJ/JH
DATE	7/19/02
CHECK	
REVIEW	

000317

GEOSYNTEC CONSULTANTS

4940

FLUOR FERNALD

PARTICLE SIZE ANALYSIS–SIEVE METHOD (ASTM D 422)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO — PROJECT NO.: GQ134 TASK NO.: 04.1

DESCRIPTION: PHASE III — DATE: 15 day July month 2002 year

MATERIAL TYPE: Low Perm CLAY — SAMPLE NO.: LP 02-11

SOIL SAMPLE SIZE	+3/8 = 1030.4	MOISTURE = 346.9	TOTAL = 21888.1 gm
	-3/8 = 666.0 gr + 600 gr + 19250.8 gm	48.25 LB's	

APPROXIMATE MINIMUM WT. OF SAMPLE (PASSING NO. 10 SIEVE) (grams)	SAND	FINE GRAIN
	115	65

		+3/8 BEFORE WASH	-3/8 BEFORE WASH	+3/8 AFTER WASH	-3/8 AFTER WASH
TARE NO.		L-1	L-3	L-1	L-3
WT. OF DRY SAMPLE PLUS TARE	(grams)	838.2	784.5	988.0	378.5
WT. OF TARE	(grams)	192.2	189.7	192.2	189.7
WT. OF DRY SAMPLE	(grams)	1030.4	594.8	795.8	188.8

SIEVE ANALYSIS — QA ID: PLE

SIEVE NO.	DIAMETER (mm)	WT. RETAINED (grams)	% RETAINED	% FINER		PROJECT SPECIFICATIONS
3 in	76.2	Ø	Ø	100		
2 in	50.8	Ø	Ø	100		100
1 1/2in	38.1	Ø	Ø	100		
1 in	25.4	288.1	1.3	98.7		
3/4 in	19.1	378.7	1.7	98.3		90-100
1/2 in	12.7	618.9	2.8	97.2		
3/8 in	9.53	795.8	3.6	96.4		
No. 4	4.75	22.4	3.8	96.2	92.7	
No. 10	2.00	52.5	8.8	91.2	87.9	
No. 20	0.850	82.4	13.9	86.1	83.0	
No. 40	0.425	109.1	18.3	81.7	78.6	
No. 60	0.250	130.8	22.0	78.0	75.2	
No. 100	0.125	157.4	26.5	73.5	70.9	
No. 200	0.075	187.1	31.5	66.5	66.0	50-100
PAN	—	188.8	—	—		

COMMENTS:

000318

%FINER = 100 − Σ% RETAINED

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SHEET NO. 1 OF 2

GEOSYNTEC CONSULTANTS

FLUOR FERNALD, INC.

PARTICLE SIZE DISTRIBUTION AND SOIL CLASSIFICATION TEST RESULTS (ASTM C 136/D 422) (ASTM D 2487)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO

DESCRIPTION: Phase IV

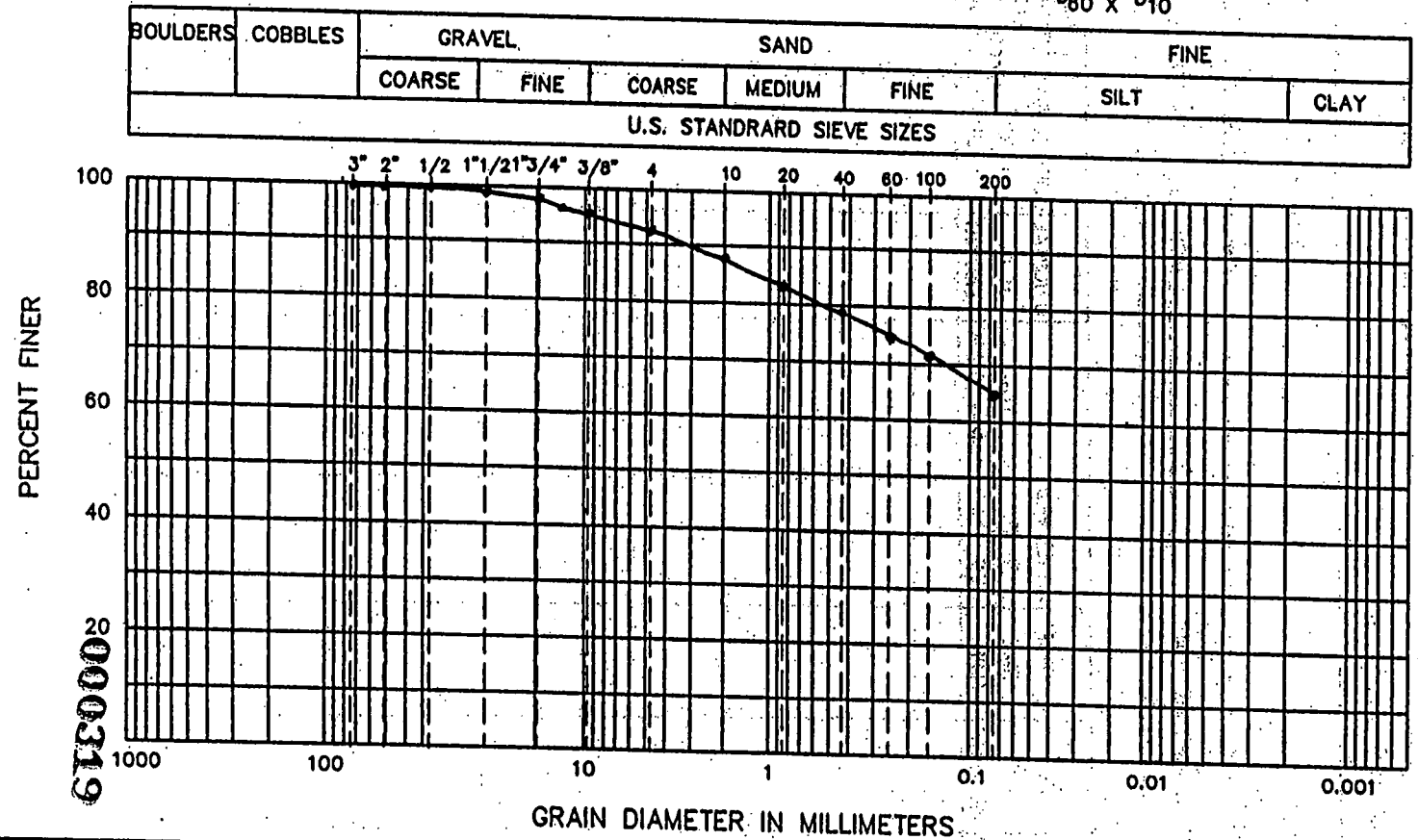
MATERIAL TYPE: Low Perm Clay

PROJECT NO.: GQ1341 TASK NO.: 04.1

DATE: 24 day July month 2002 year

SAMPLE NO.: LP02-11 QA ID: KS

CURVE COEFFICIENTS: $C_{uniformity} = (\frac{D_{60}}{D_{10}}) =$ $C_{curvature} = (\frac{D_{30}^2}{D_{60} \times D_{10}}) =$



ATTERBERG LIMITS

(LL) 26

(PL) 15

(PI) 11

SIEVE RESULTS

SIEVE SIZE	% FINER
3-in.	100
2-in.	100
1 1/2-in.	100
1-in.	98.7
3/4-in.	98.3
1/2-in.	97.2
3/8-in.	96.4
NO. 4	92.7
NO. 10	87.9
NO. 20.	83.0
NO. 40	78.8
NO. 60	75.2
NO. 100	70.9
NO. 200	66.0

HYDROMETER RESULTS

PARTICLE DIA.	% FINER
0.05	63
0.02	53
0.005	32
0.002	24

SOIL CLASSIFICATION (ASTM D 2487): CL

©GEOSYNTEC CONSULTANTS FILE NO. 2-16-PSD

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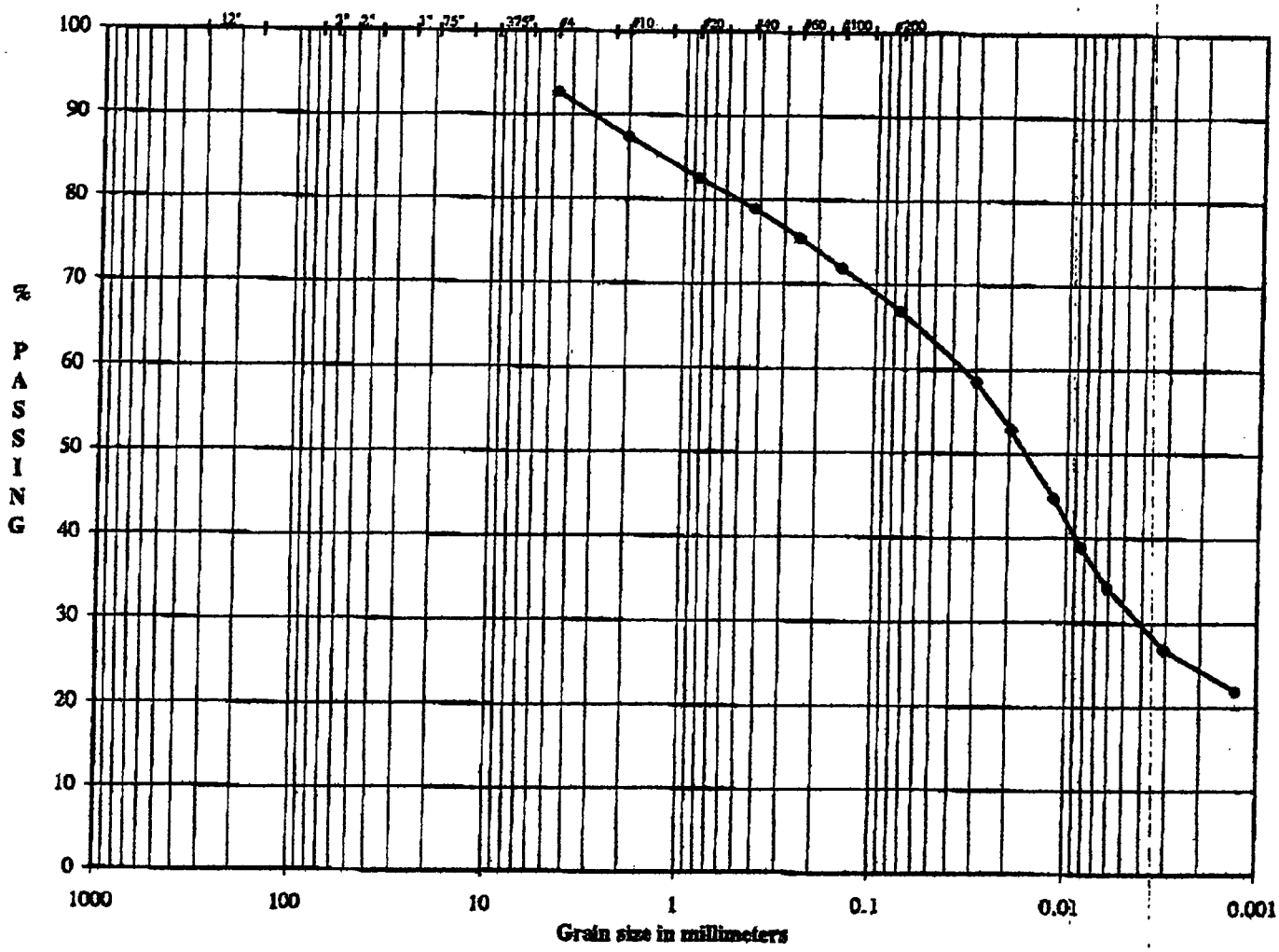
SHEET NO. ____ OF ____

000319

4940

PARTICLE SIZE DISTRIBUTION ASTM D 421 AND D 422
US STANDARD SIEVE OPENING SIZES

4940



Boulders	Cobbles	Coarse	Fine	Cor	Med	Fine	SILT OR CLAY
		Gravel		SAND			FINES

SAMPLE ID	LP02 - 11
SAMPLE TYPE	Bag
SAMPLE DEPTH	-

LL	-
PL	-
PI	-

DESCRIPTION	Yellowish Brown, SILTY CLAY, some coarse to fine sand, little gravel.
USCS	(CL)

000320

GEOSYNTEC/FLUOR FERNALD/OH
023-3313

TECH	TJ/H
DATE	7/19/02
CHECK	
REVIEW	

4940

ASTM GRAIN SIZE ANALYSIS
ASTM C117, C136, D421, D422, D1140 and D2217

PROJECT TITLE	GEOSYNTEC/FLUOR FERNALD/OH	SAMPLE ID	LP02 - 11
PROJECT NO.	623-3313	SAMPLE TYPE	Bag
		SAMPLE DEPTH	-

AS RECEIVED WATER CONTENT

Tare No.		
Wt. Wet Soil & Tare (gm)	(W1)	
Wt. Dry Soil & Tare (gm)	(W2)	
Weight of Tare (gm)	(W3)	
Weight of Water (gm)	(W4=W1-W2)	
Weight of Dry Soil (gm)	(W5=W2-W3)	
Moisture Content (%)	(W4/W5)*100	

Hygroscopic Moisture For Sieve Sample

Wet Soil & Tare (gm)	50.29
Dry Soil & Tare (gm)	48.49
Tare Weight (gm)	3.23
Moisture Content (%)	3.98

Total Weight of Sample Used For Sieve Analysis Corrected For Hygroscopic Moisture

Weight + Tare, Before Separating On The #4 Sieve (gm)	774.67	
Tare Weight (gm)	242.30	
Total Weight (gm)	512.01	(W6)

Plus #4 Material Sieve

TARE WEIGHT 0.00

	(Wt+Tare)	((Wt-Tare)/W6)*100	%PASSING		
12.0"				12.0"	cobbles
3.0"				3.0"	coarse gravel
2.5"				2.5"	coarse gravel
2.0"				2.0"	coarse gravel
1.5"				1.5"	coarse gravel
1.0"				1.0"	coarse gravel
0.75"				0.75"	fine gravel
0.50"				0.50"	fine gravel
0.375"				0.375"	fine gravel
#4			92.7	#4	coarse sand

NOTE: Client provided the percent passing #4 sieve.

HYDROMETER ANALYSIS

Specific Gravity	(assumed)	2.720
Specific Gravity	(tested)	
Amount Dispersing Agent (ml)		125.00
Type Dispersion Device		Mechanical
Length of Dispersion Period		1 Minute

Weight of Sample Used For Hydrometer Test

Weight of Sample Wet or Dry (gm)	58.69
Calculated Dry Wt. used in test (gm)	56.45
Hydrometer Bulb Number	704004
% Pass #4 Sieve For Whole Sample	92.70

TARE WEIGHT 0.00

HYDROMETER BACKSIEVE (Percent Passing #10 - #200 Sieves)

	(Wt+Tare)	Cumul Wt. Retained	% PASSING		
#10	3.25	3.25	87.4	#10	medium sand
#20	6.18	6.18	82.6	#20	medium sand
#40	8.41	8.41	78.9	#40	fine sand
#60	10.50	10.50	75.5	#60	fine sand
#100	12.67	12.67	71.9	#100	fine sand
#200	15.74	15.74	66.9	#200	fines

HYDROMETER CALCULATIONS

DATE	TIME	ET (min)	READING R	TEMP T	TEMP.COR. K	HYD.COR. Cc	READING C	EFFECTIVE LENGTH	A
7/20/02	10:21								
7/20/02	10:23	2.00	43.0	22.00	0.013	7.00	36.00	10.4	0.99
7/20/02	10:26	5.00	39.5	22.00	0.013	7.00	32.50	11.1	0.99
7/20/02	10:36	15.00	34.5	22.00	0.013	7.00	27.50	11.9	0.99
7/20/02	10:51	30.00	31.0	22.00	0.013	7.00	24.00	12.4	0.99
7/20/02	11:21	60.00	28.0	22.00	0.013	7.00	21.00	12.9	0.99
7/20/02	14:31	250.00	23.5	22.00	0.013	7.00	16.50	13.7	0.99
7/21/02	10:21	1440.00	20.5	22.00	0.013	7.00	13.50	14.2	0.99

GRAIN SIZE PERCENTAGES

Particle Diameter	% PASSING		
0.0299	58.5		
0.0196	52.8	% GRAVEL	7.30
0.0117	44.7	% COARSE SAND	5.34
0.0084	39.0	% MEDIUM SAND	8.47
0.0061	34.1	% FINE SAND	12.04
0.0031	26.8	% FINES	66.85
0.0013	21.9	% TOTAL SAMPLE	100.00

Description: Yellowish Brown, SILTY CLAY, some coarse to fine sand, little gravel.

USCS: (CL)

-	LL
-	PL
-	PI

000321

TECH	TI/JH
DATE	7/19/02
CHECK	BS
REVIEW	[illegible]

39.58
1.73
37.85

4940

GEOSYNTEC CONSULTANTS

FLUOR FERNALD

PARTICLE SIZE ANALYSIS–SIEVE METHOD (ASTM D 422)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

82.18 lbs

LOCATION: FERNALD, OHIO PROJECT NO.: GQ134 TASK NO.: 04.1

DESCRIPTION: PHASE III DATE: 16 day July month 2002 year

MATERIAL TYPE: LOW PERM CLAY SAMPLE NO.: LP02.12

41.97
1.89
37.85
40.08
77.93

SOIL SAMPLE SIZE	+3/8 = 1616.8 gram	MOISTURE = 297.7 gm	TOTAL = 3726.3.5
	-3/8 = 3534.9.0 gram		

APPROXIMATE MINIMUM WT. OF SAMPLE (PASSING NO. 10 SIEVE) (grams)	SAND	FINE GRAIN
	115 in oven	65

	+3/8 BEFORE WASH	-3/8 BEFORE WASH	+3/8 AFTER WASH	-3/8 AFTER WASH
TARE NO.	L-9	L-4	L-9	L-4
WT. OF DRY SAMPLE PLUS TARE (grams)	1810.3	783.9	1701.2	322.9
WT. OF TARE (grams)	193.4	145.4	193.4	145.4
WT. OF DRY SAMPLE (grams)	1616.8	638.5	1507.8	177.5

SIEVE ANALYSIS QA ID: DLE

SIEVE NO.	DIAMETER (mm)	WT. RETAINED (grams)	% RETAINED	% FINER		PROJECT SPECIFICATIONS
3 in	76.2	Ø	Ø	100		
2 in	50.8	Ø	Ø	100		100
1 1/2in	38.1	Ø	Ø	100		
1 in	25.4	327.9	.9	99.1		
3/4 in	19.1	606.2	1.6	98.4		90-100
1/2 in	12.7	1135.3	3.0	97.0		
3/8 in	9.53	1507.0	4.0	96.0		
No. 4	4.75	21.5	3.4	96.6	92.7	
No. 10	2.00	48.5	7.6	92.4	88.7	
No. 20	0.850	75.9	11.8	88.2	84.5	
No. 40	0.425	101.4	15.9	84.1	80.7	
No. 60	0.250	123.7	19.4	80.6	77.4	
No. 100	0.125	149.7	23.4	76.6	73.5	
No. 200	0.075	177.3	27.8	72.2	69.3	50-100
PAN	—	177.5	—	—		

Although on oven

COMMENTS:

000322

%FINER = 100 − Σ% RETAINED

GEO SYNTEC CONSULTANTS FILE NO. 2-14-PMS CHECKED BY: SHEET NO. 1 OF 2

GEOSYNTEC CONSULTANTS

FLUOR FERNALD, INC.

PARTICLE SIZE DISTRIBUTION AND SOIL CLASSIFICATION TEST RESULTS (ASTM C 136/D 422) (ASTM D 2487)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO

DESCRIPTION: Phase IV

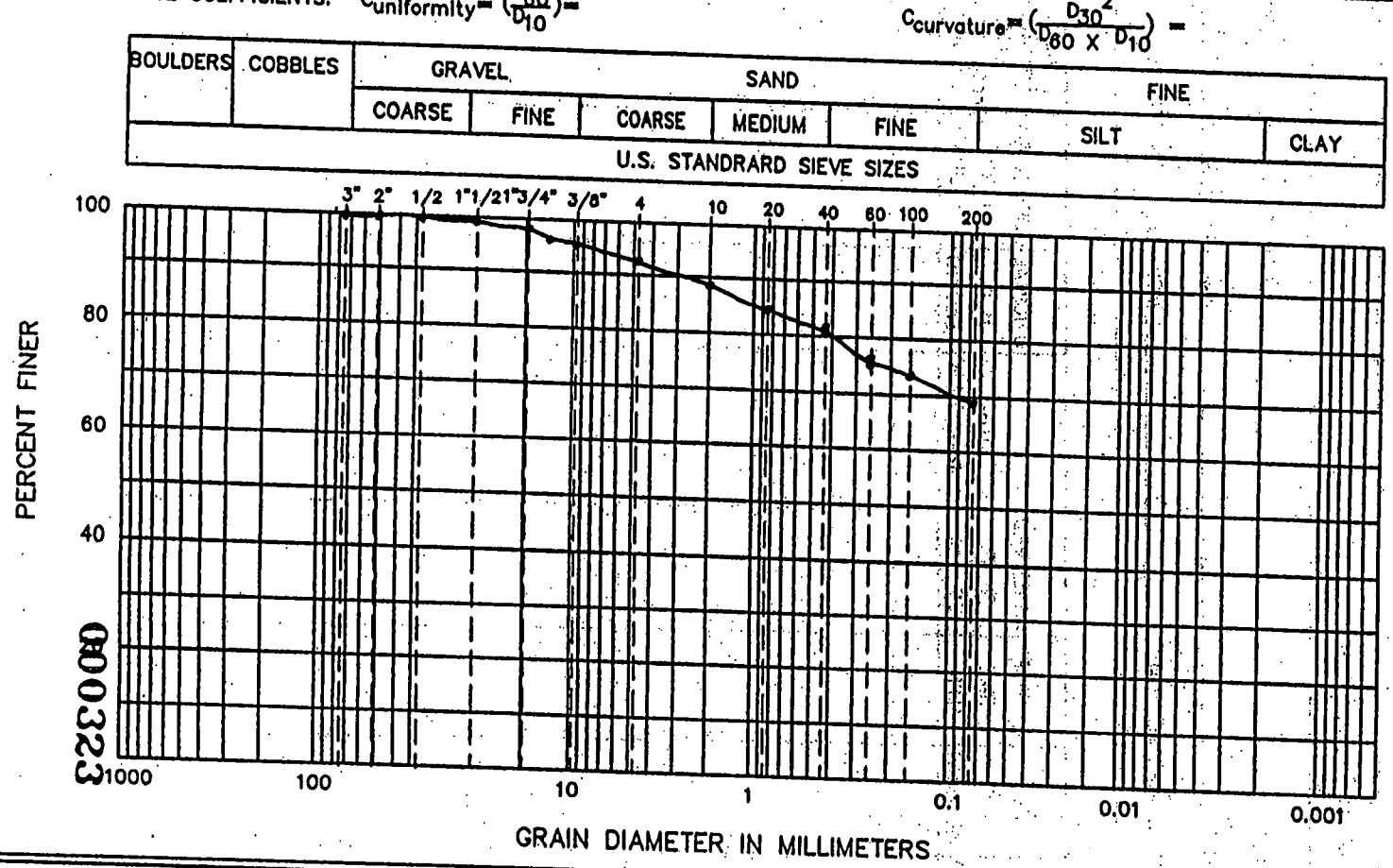
MATERIAL TYPE: Low Perm Clay

PROJECT NO.: 6Q1341 TASK NO.: 04.1

DATE: 24 day July month 2002 year

SAMPLE NO.: LP02-12 QA ID: KS

CURVE COEFFICIENTS: $C_{uniformity} = \left(\frac{D_{60}}{D_{10}}\right) =$ $C_{curvature} = \left(\frac{D_{30}^2}{D_{60} \times D_{10}}\right) =$



ATTERBERG LIMITS

(LL) 29

(PL) 15

(PI) 14

SIEVE RESULTS

SIEVE SIZE	% FINER
3-in.	100
2-in.	100
1 1/2-in.	100
1-in.	99.1
3/4-in.	98.4
1/2-in.	97.0
3/8-in.	96.0
NO. 4	92.7
NO. 10	88.7
NO. 20.	84.5
NO. 40	80.7
NO. 60	77.4
NO. 100	73.5
NO. 200	69.3

HYDROMETER RESULTS

PARTICLE DIA.	% FINER
0.05	68
0.02	57
0.005	33
0.002	26

SOIL CLASSIFICATION (ASTM D 2487): CL

©GEOSYNTEC CONSULTANTS FILE NO. 2-16-PSD

CHECKED BY:

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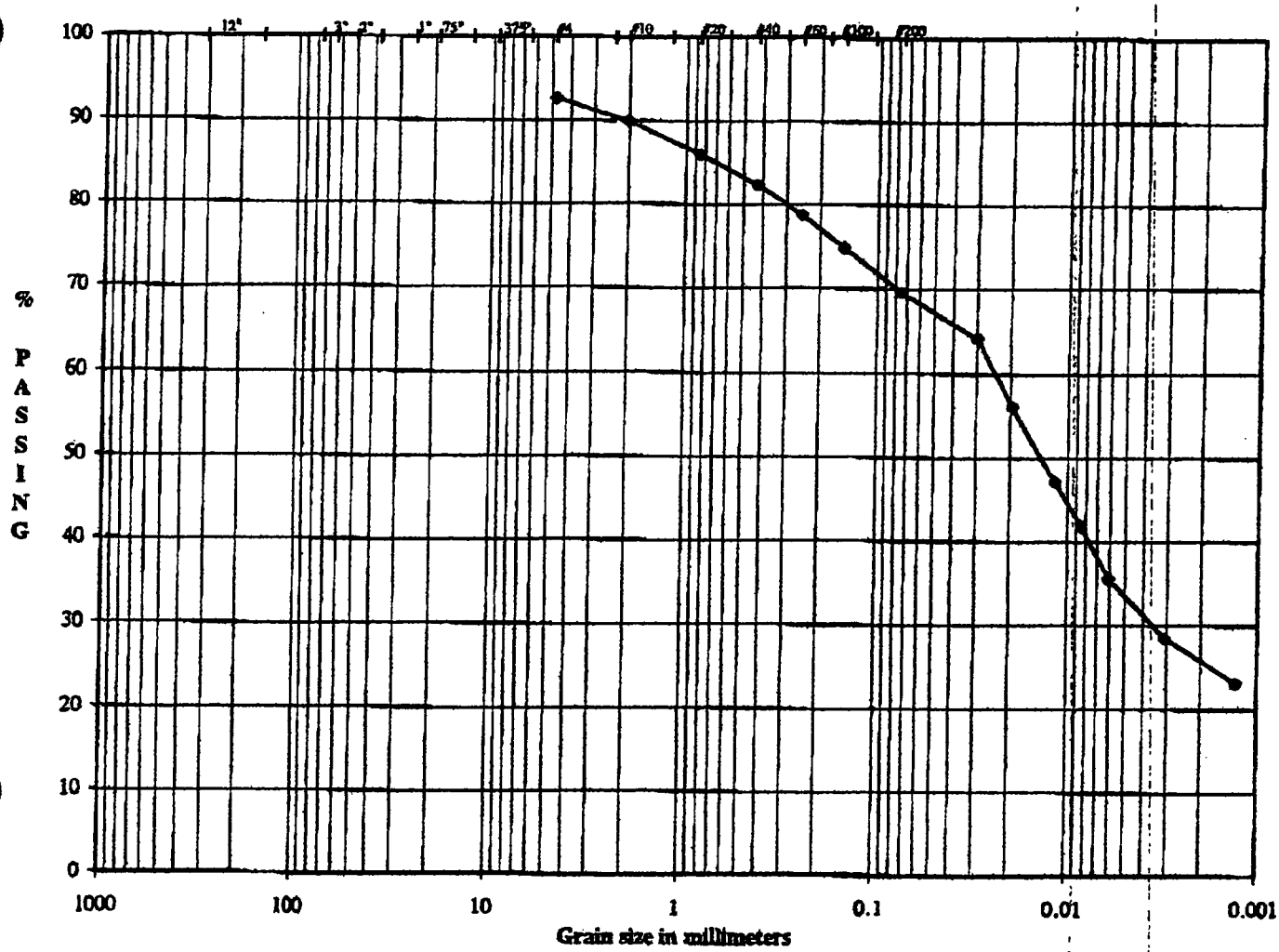
000323

4940

PARTICLE SIZE DISTRIBUTION ASTM D 421 AND D 422
US STANDARD SIEVE OPENING SIZES

4940



Boulders	Cobbles	Coarse	Fine	Cor	Med	Fine	SILT OR CLAY
		Gravel		SAND			FINES

SAMPLE ID	LP02 - 12
SAMPLE TYPE	Bag
SAMPLE DEPTH	-

LL	-
PL	-
PI	-

DESCRIPTION	Yellowish Brown, SILTY CLAY, some coarse to fine sand, little gravel.
USCS	(CL)

000324

GEOSYNTEC/FLUOR FERNALD/OH
023-3313

TECH	TJ/JH
DATE	7/19/02
CHECK	BS
REVIEW	AWG

ASTM GRAIN SIZE ANALYSIS
ASTM C117, C136, D421, D422, D1140 and D2217

4940

PROJECT TITLE	GEOSYNTEC/FLUOR FERNALD/OH	SAMPLE ID	LP02 - 12
PROJECT NO.	023-3313	SAMPLE TYPE	Bag
		SAMPLE DEPTH	-

AS RECEIVED WATER CONTENT

Tare No.		
Wt. Wet Soil & Tare (gm)	(W1)	
Wt. Dry Soil & Tare (gm)	(W2)	
Weight of Tare (gm)	(W3)	
Weight of Water (gm)	(W4=W1-W2)	
Weight of Dry Soil (gm)	(W5=W2-W3)	
Moisture Content (%)	(W4/W5)*100	

Hygroscopic Moisture For Sieve Sample

Wet Soil & Tare (gm)	50.29
Dry Soil & Tare (gm)	48.70
Tare Weight (gm)	3.22
Moisture Content (%)	3.50

Total Weight of Sample Used For Sieve Analysis Corrected For Hygroscopic Moisture

Weight + Tare, Before Separating On The #4 Sieve (gm)	787.12	
Tare Weight (gm)	292.25	
Total Weight (gm)	478.15	(W6)

Plus #4 Material Sieve

TARE WEIGHT 0.00

	(Wt+Tare)	((Wt-Tare)/W6)*100)	%PASSING		
12.0"				12.0"	cobbles
3.0"				3.0"	coarse gravel
2.5"				2.5"	coarse gravel
2.0"				2.0"	coarse gravel
1.5"				1.5"	coarse gravel
1.0"				1.0"	coarse gravel
0.75"				0.75"	fine gravel
0.50"				0.50"	fine gravel
0.375"				0.375"	fine gravel
#4			92.7	#4	coarse sand

NOTE: Client provided the percent passing #4 sieve.

HYDROMETER ANALYSIS

Specific Gravity	(assumed)	2.720
Specific Gravity	(tested)	
Amount Dispersing Agent (ml)		125.00
Type Dispersion Device		Mechanical
Length of Dispersion Period		1 Minute

Weight of Sample Used For Hydrometer Test

Weight of Sample Wet or Dry (gm)	53.32
Calculated Dry Wt. used in test (gm)	51.52
Hydrometer Bulb Number	704004
% Pass #4 Sieve For Whole Sample	92.70

TARE WEIGHT 0.00

HYDROMETER BACKSIEVE (Percent Passing #10 - #200 Sieves)

	(Wt+Tare)	Cumul Wt. Retained	% PASSING		
#10	1.54	1.54	89.9	#10	medium sand
#20	3.74	3.74	86.8	#20	medium sand
#40	5.80	5.80	82.3	#40	fine sand
#60	7.72	7.72	78.8	#60	fine sand
#100	9.93	9.93	74.5	#100	fine sand
#200	12.88	12.88	69.5	#200	fines

HYDROMETER CALCULATIONS

DATE 7/20/02	TIME 10:23	ET (min)	READING R	TEMP T	TEMP.COR. K	HYD.COR. Ce	READING C	EFFECTIVE LENGTH	A
7/20/02	10:25	2.00	43.0	22.00	0.013	7.00	36.00	10.4	0.99
7/20/02	10:28	5.00	38.5	22.00	0.013	7.00	31.50	11.2	0.99
7/20/02	10:38	15.00	33.5	22.00	0.013	7.00	26.50	12.0	0.99
7/20/02	10:53	30.00	30.5	22.00	0.013	7.00	23.50	12.5	0.99
7/20/02	11:23	60.00	27.0	22.00	0.013	7.00	20.00	13.0	0.99
7/20/02	14:33	250.00	23.0	22.00	0.013	7.00	16.00	13.7	0.99
7/21/02	10:23	1440.00	20.0	22.00	0.013	7.00	13.00	14.2	0.99

GRAIN SIZE PERCENTAGES

Particle Diameter	% PASSING		
0.0299	64.1		
0.0196	56.1	% GRAVEL	7.30
0.0117	47.2	% COARSE SAND	2.77
0.0085	41.9	% MEDIUM SAND	7.67
0.0061	35.6	% FINE SAND	12.74
0.0031	28.5	% FINES	69.52
0.0013	23.2	% TOTAL SAMPLE	100.00

Description: Yellowish Brown, SILTY CLAY, some coarse to fine sand, little gravel.

USCS: (CL)

-	LL
-	PL
-	PI

000325

TECH	TJ/JE
DATE	7/19/02
CHECK	
REVIEW	

Bucket sample
53.50
-1.73
51.77

4940

GEOSYNTEC CONSULTANTS

FLUOR FERNALD

PARTICLE SIZE ANALYSIS–SIEVE METHOD (ASTM D 422)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO — PROJECT NO.: GQ134 TASK NO.: 041

DESCRIPTION: PHASE III — DATE: 19 day July month 2002 year

MATERIAL TYPE: LOW PERM CLAY — SAMPLE NO.: LP02-13

SOIL SAMPLE SIZE	+3/8 = 1186.2 gm	MOISTURE = 356.7	TOTAL = 25025.8
	-3/8 = 23482.9		

25025.8

APPROXIMATE MINIMUM WT. OF SAMPLE (PASSING NO. 10 SIEVE) (grams)	SAND	FINE GRAIN
	115	65

	+3/8 BEFORE WASH	-3/8 BEFORE WASH	+3/8 AFTER WASH	-3/8 AFTER WASH
TARE NO.	L-3	L-1	L-3	L-1
WT. OF DRY SAMPLE PLUS TARE (grams)	1376.1	760.9	1305.2	343.0
WT. OF TARE (grams)	189.9	192.4	189.9	192.4
WT. OF DRY SAMPLE (grams)	1186.2	568.5	1115.3	150.6

SIEVE ANALYSIS — QA ID: DCE

SIEVE NO.	DIAMETER (mm)	WT. RETAINED (grams)	% RETAINED	% FINER		PROJECT SPECIFICATIONS
3 in	76.2	Ø	Ø	100		
2 in	50.8	Ø	Ø	100		1ØØ
1 1/2in	38.1	102.0	0.4	99.6		
1 in	25.4	497.8	2.Ø	98.0		
3/4 in	19.1	652.6	2.6	97.4		9Ø-1ØØ
1/2 in	12.7	964.7	3.9	96.1		
3/8 in	9.53	1115.1	4.5	95.5		
No. 4	4.75	21.5	3.8	96.2	91.9	
No. 10	2.00	39.8	7.0	93.Ø	88.8	
No. 20	0.850	56.0	9.9	9Ø.Ø	86.0	
No. 40	0.425	73.2	12.9	87.1	83.2	
No. 60	0.250	94.2	16.6	83.4	79.6	
No. 100	0.125	122.9	21.6	78.4	74.9	
No. 200	0.075	149.7	26.3	73.7	70.4	5Ø-1ØØ
PAN	—	150.4	—	—		

COMMENTS:

000326

%FINER = 100 − Σ% RETAINED

GEOSYNTEC CONSULTANTS FILE NO. 2-14-PMS

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SHEET NO. 1 OF 2

GEOSYNTEC CONSULTANTS

FLUOR FERNALD, INC.

PARTICLE SIZE DISTRIBUTION AND SOIL CLASSIFICATION TEST RESULTS (ASTM C 136/D 422) (ASTM D 2487)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO

DESCRIPTION: Phase IV

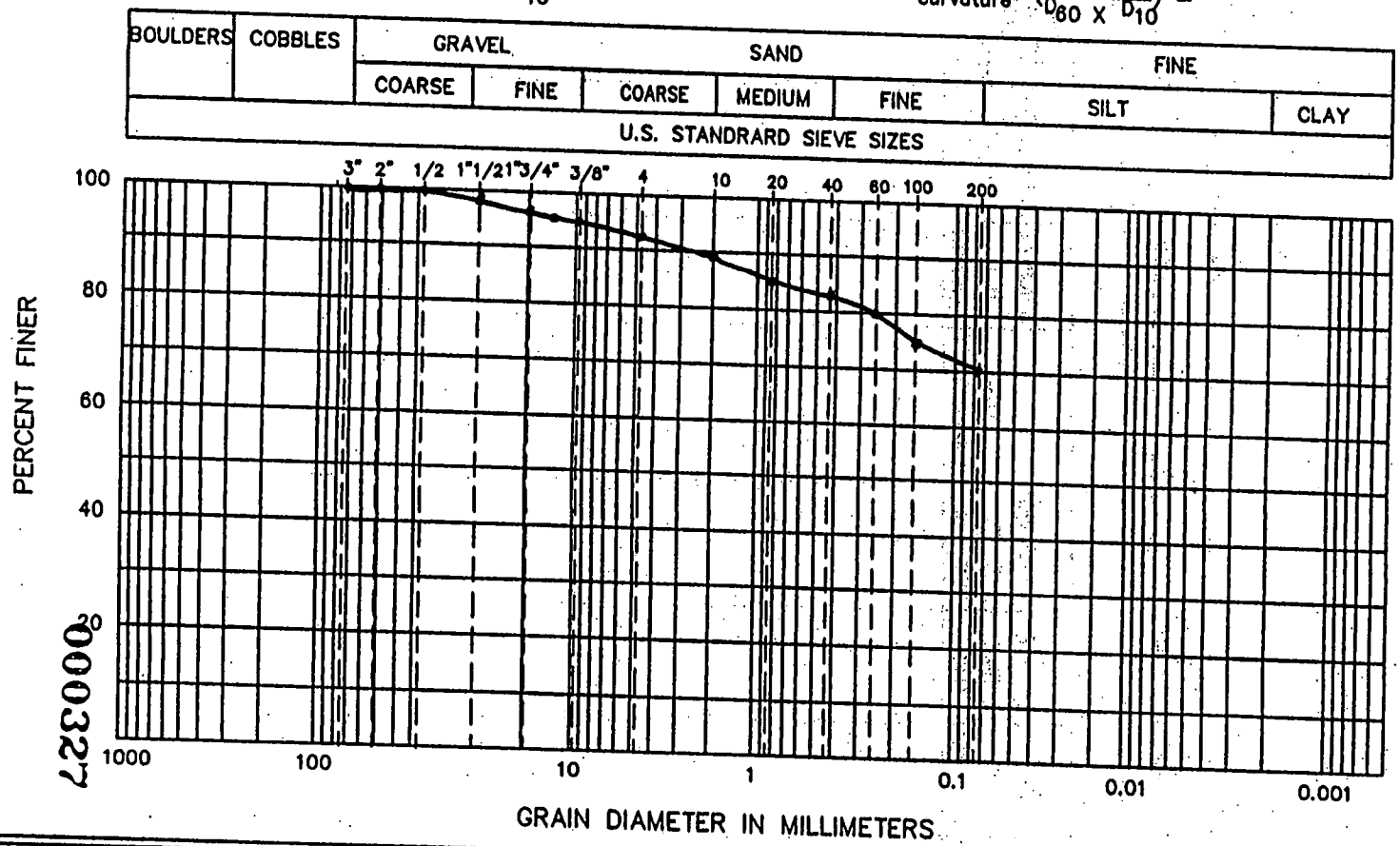
MATERIAL TYPE: Low Perm Clay

PROJECT NO.: 6Q134L TASK NO.: Ø4.1

DATE: 3Ø day July month 2ØØ2 year

SAMPLE NO.: LPØ2-13 QA ID: KS

CURVE COEFFICIENTS: $C_{uniformity} = \left(\frac{D_{60}}{D_{10}}\right) =$ $C_{curvature} = \left(\frac{D_{30}^2}{D_{60} \times D_{10}}\right) =$



ATTERBERG LIMITS

(LL) 29

(PL) 16

(PI) 13

SIEVE RESULTS

SIEVE SIZE	% FINER
3-in.	1ØØ
2-in.	1ØØ
1 1/2-in.	99.6
1-in.	98.Ø
3/4-in.	97.4
1/2-in.	96.1
3/8-in.	95.5
NO. 4	91.9
NO. 10	88.8
NO. 20.	86.Ø
NO. 40	83.2
NO. 60	79.6
NO. 100	74.9
NO. 200	7Ø.4

HYDROMETER RESULTS

PARTICLE DIA.	% FINER
Ø.Ø5	69
Ø.Ø2	59
Ø.ØØ5	34
Ø.ØØ2	26

SOIL CLASSIFICATION (ASTM D 2487): CL

©GEO SYNTEC CONSULTANTS FILE NO. 2-16-PSD

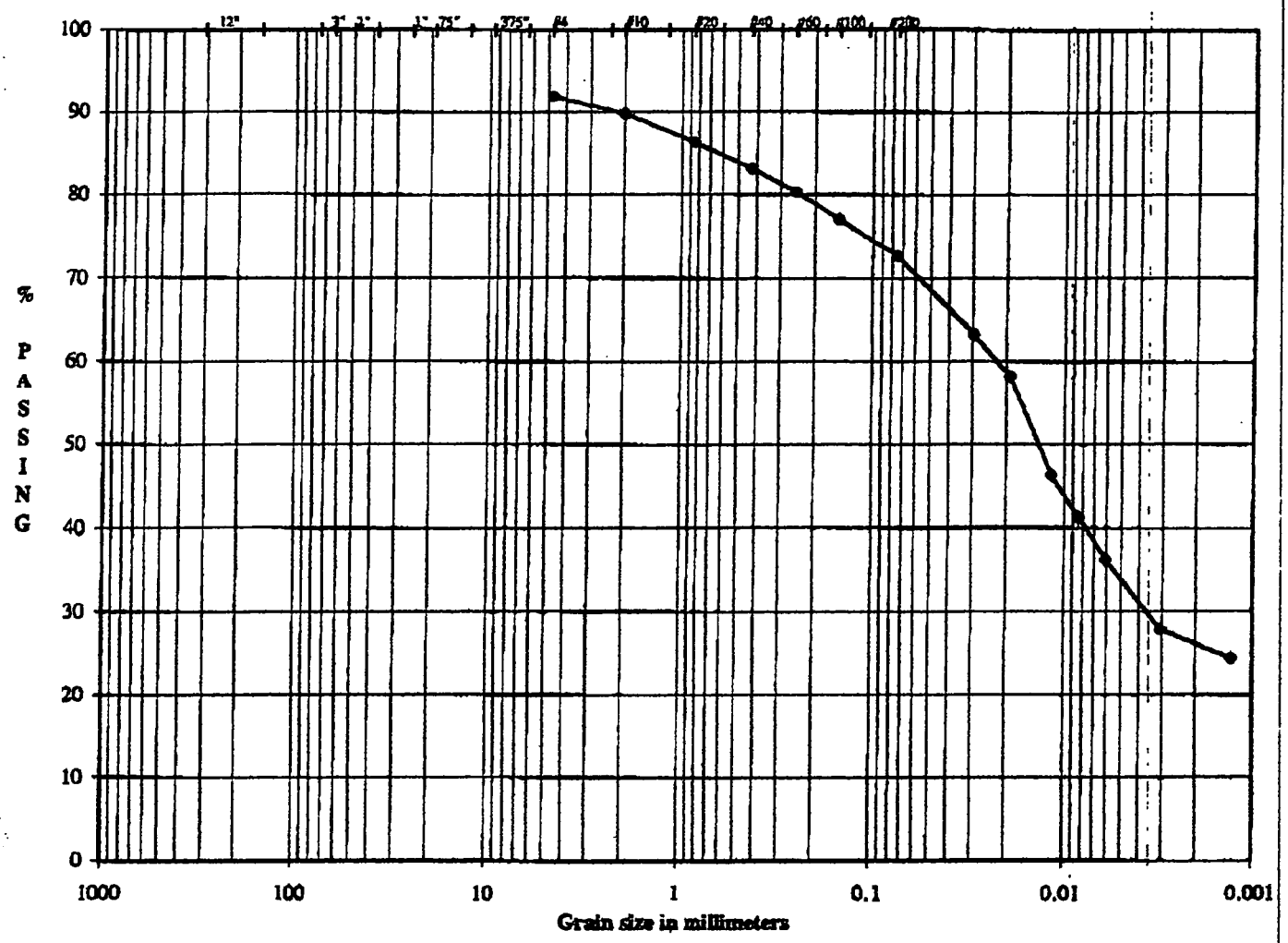
CHECKED BY:

0000327

4940

PARTICLE SIZE DISTRIBUTION ASTM D 421 AND D 422
US STANDARD SIEVE OPENING SIZES

4940



Boulders	Cobbles	Coarse	Fine	Cor	Med	Fine	SILT OR CLAY
		Gravel		SAND			FINES

SAMPLE ID	LP02 - 13
SAMPLE TYPE	Bag
SAMPLE DEPTH	-

LL	-
PL	-
PI	-

DESCRIPTION	Yellowish Brown, SILTY CLAY, some coarse to fine sand, little gravel.
USCS	(CL)

GEOSYNTEC/FLUOR FERNALD/OH
023-3313

TECH	TJ
DATE	7/24/02
CHECK	BS
REVIEW	[illegible]

006328

ASTM GRAIN SIZE ANALYSIS
ASTM C117, C136, D421, D422, D1140 and D2217

4940

PROJECT TITLE	GEOSYNTEC/FLUOR FERNALD/OH	SAMPLE ID	LP02 - 13
PROJECT NO.	023-3313	SAMPLE TYPE	Bag
		SAMPLE DEPTH	-

AS RECEIVED WATER CONTENT

Tare No.		
Wt. Wet Soil & Tare (gm)	(W1)	
Wt. Dry Soil & Tare (gm)	(W2)	
Weight of Tare (gm)	(W3)	
Weight of Water (gm)	(W4=W1-W2)	
Weight of Dry Soil (gm)	(W5=W2-W3)	
Moisture Content (%)	(W4/W5)*100	

Hygroscopic Moisture For Sieve Sample

Wet Soil & Tare (gm)	50.45
Dry Soil & Tare (gm)	48.18
Tare Weight (gm)	3.19
Moisture Content (%)	5.05

Total Weight of Sample Used For Sieve Analysis Corrected For Hygroscopic Moisture

Weight + Tare, Before Separating On The #4 Sieve (gm)	836.40	
Tare Weight (gm)	236.25	
Total Weight (gm)	571.32	(W6)

Plus #4 Material Sieve

TARE WEIGHT 0.00

	(Wt+Tare)	((Wt-Tare)/W6)*100)	%PASSING		
12.0"				12.0"	cobbles
3.0"				3.0"	coarse gravel
2.5"				2.5"	coarse gravel
2.0"				2.0"	coarse gravel
1.5"				1.5"	coarse gravel
1.0"				1.0"	coarse gravel
0.75"				0.75"	fine gravel
0.50"				0.50"	fine gravel
0.375"				0.375"	fine gravel
#4			91.9	#4	coarse sand

NOTE: Client provided the percent passing #4 sieve.

HYDROMETER ANALYSIS

Specific Gravity	(assumed)	2.720
Specific Gravity	(tested)	
Amount Dispersing Agent (ml)		125.00
Type Dispersion Device		Mechanical
Length of Dispersion Period		1 Minute

Weight of Sample Used For Hydrometer Test

Weight of Sample Wet or Dry (gm)	56.66
Calculated Dry Wt. used in test (gm)	53.94
Hydrometer Bulb Number	704004
% Pass #4 Sieve For Whole Sample	91.90

TARE WEIGHT 0.00

HYDROMETER BACKSIEVE (Percent Passing #10 - #200 Sieves)

	(Wt+Tare)	Cumul Wt. Retained	% PASSING		
#10	1.24	1.24	89.8	#10	medium sand
#20	3.28	3.28	86.3	#20	medium sand
#40	5.17	5.17	83.1	#40	fine sand
#60	6.81	6.81	80.3	#60	fine sand
#100	8.73	8.73	77.0	#100	fine sand
#200	11.28	11.28	72.7	#200	fines

HYDROMETER CALCULATIONS

DATE 7/25/02	TIME 9:35	ET (min)	READING R	TEMP T	TEMP.COR. K	HYD.COR. Cc	READING C	EFFECTIVE LENGTH	A
7/25/02	9:37	2.00	45.0	22.50	0.013	7.50	37.50	10.2	0.99
7/25/02	9:40	5.00	42.0	22.50	0.013	7.50	34.50	10.7	0.99
7/25/02	9:50	15.00	35.0	22.50	0.013	7.50	27.50	11.9	0.99
7/25/02	10:05	30.00	32.0	22.50	0.013	7.50	24.50	12.4	0.99
7/25/02	10:35	60.00	29.0	22.50	0.013	7.50	21.50	12.9	0.99
7/25/02	13:45	250.00	24.0	22.50	0.013	7.50	16.50	13.7	0.99
7/26/02	9:35	1440.00	22.0	22.50	0.013	7.50	14.50	14.0	0.99

GRAIN SIZE PERCENTAGES

Particle Diameter	% PASSING
0.0296	63.3
0.0192	58.2
0.0117	46.4
0.0084	41.3
0.0061	36.3
0.0031	27.8
0.0013	24.5

% GRAVEL	8.10
% COARSE SAND	2.11
% MEDIUM SAND	6.70
% FINE SAND	10.41
% FINES	72.68
% TOTAL SAMPLE	100.00

Description: Yellowish Brown, SILTY CLAY, some coarse to fine sand, little gravel.

USCS: (CL)

-	LL
-	PL
-	PI

TECH	TJ
DATE	7/24/02
CHECK	[illegible]
REVIEW	[illegible]

000329

GEOSYNTEC CONSULTANTS

FLUOR FERNALD

4940

PARTICLE SIZE ANALYSIS—SIEVE METHOD

(ASTM D 422)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO

PROJECT NO.: GQ134 TASK NO.: 04.1

DESCRIPTION: PHASE III

DATE: 19 day July month 2002 year

MATERIAL TYPE: LOW PERM CLAY

SAMPLE NO.: LP02-14

SOIL SAMPLE SIZE	+3/8 = 3386.5	MOISTURE = 407.3	TOTAL = 44359.3
	-3/8 = 40565.5		

APPROXIMATE MINIMUM WT. OF SAMPLE (PASSING NO. 10 SIEVE) (grams)	SAND	FINE GRAIN
	115	65

	+3/8 BEFORE WASH	-3/8 BEFORE WASH	+3/8 AFTER WASH	-3/8 AFTER WASH
TARE NO.	SB-1	L-6	SB-1	L-6
WT. OF DRY SAMPLE PLUS TARE (grams)	3672.1	810.8	3495.9	397.8
WT. OF TARE (grams)	285.6	199.1	285.6	199.1
WT. OF DRY SAMPLE (grams)	3386.5	611.7	3210.3	198.7

SIEVE ANALYSIS

QA ID: DLE

SIEVE NO.	DIAMETER (mm)	WT. RETAINED (grams)	% RETAINED	% FINER		PROJECT SPECIFICATIONS
3 in	76.2	Ø	Ø	100		
2 in	50.8	Ø	Ø	100		100
1 1/2in	38.1	150.1	0.3	99.7		
1 in	25.4	1013.4	2.3	97.7		
3/4 in	19.1	1692.0	3.8	96.2		90-100
1/2 in	12.7	2784.1	6.3	93.7		
3/8 in	9.53	3208.6	7.2	92.8		
No. 4	4.75	30.1	4.9	95.1	88.3	
No. 10	2.00	57.3	9.4	90.6	84.1	
No. 20	0.850	85.7	14.0	86.0	79.8	
No. 40	0.425	112.1	18.3	81.7	75.8	
No. 60	0.250	138.0	22.6	77.4	71.8	
No. 100	0.125	168.3	27.5	72.5	67.3	
No. 200	0.075	197.3	32.3	67.7	62.8	50-100
PAN	—	198.6	—	—		

COMMENTS:

000330

%FINER = 100 − Σ% RETAINED

GEO SYNTEC CONSULTANTS FILE NO. 2-14-PMS

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SHEET NO. 1 OF 2

GEOSYNTEC CONSULTANTS

FLUOR FERNALD, INC.

PARTICLE SIZE DISTRIBUTION AND SOIL CLASSIFICATION TEST RESULTS (ASTM C 136/D 422) (ASTM D 2487)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO

DESCRIPTION: Phase IV

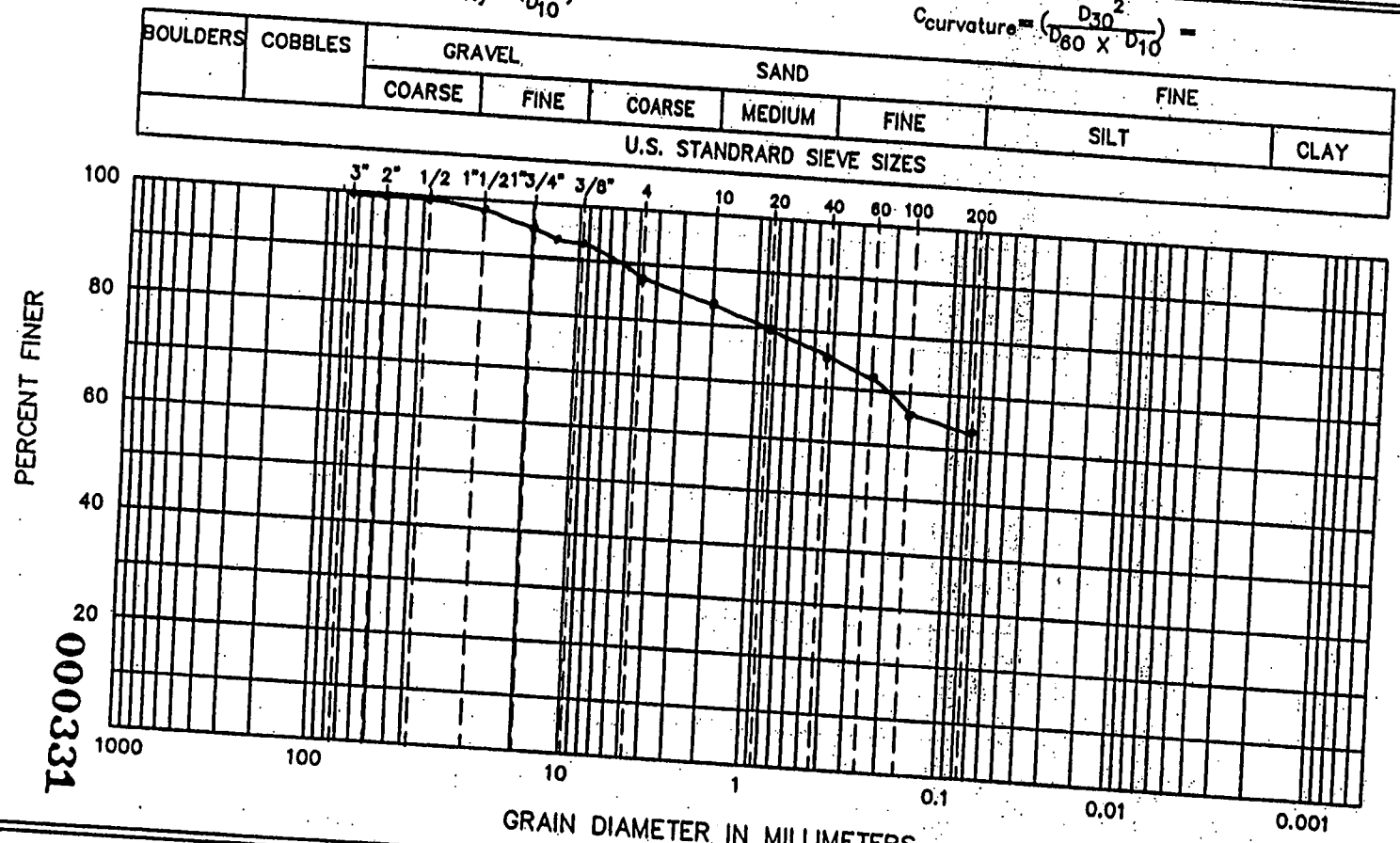
MATERIAL TYPE: Low Perm Clay

PROJECT NO.: 6Q1341 TASK NO.: Φ4.1

DATE: 3Φ day July month 2ΦΦ2 year

SAMPLE NO.: LPΦ2-14 QA ID: LCS

CURVE COEFFICIENTS: $C_{uniformity} = \left(\frac{D_{60}}{D_{10}}\right) =$ $C_{curvature} = \left(\frac{D_{30}^2}{D_{60} \times D_{10}}\right) =$



ATTERBERG LIMITS

(LL) 27

(PL) 15

(PI) 12

SIEVE RESULTS

SIEVE SIZE	% FINER
3-in.	1ΦΦ
2-in.	1ΦΦ
1 1/2-in.	99.7
1-in.	97.7
3/4-in.	96.2
1/2-in.	93.7
3/8-in.	92.8
NO. 4	88.3
NO. 10	84.1
NO. 20.	79.8
NO. 40	75.8
NO. 60	71.8
NO. 100	67.3
NO. 200	62.8

HYDROMETER RESULTS

PARTICLE DIA.	% FINER
Φ.Φ5	62
Φ.Φ2	51
Φ.ΦΦ5	29
Φ.ΦΦ2	22

SOIL CLASSIFICATION (ASTM D 2487): CL

©GEO SYNTEC CONSULTANTS FILE NO. 2-16-PSD

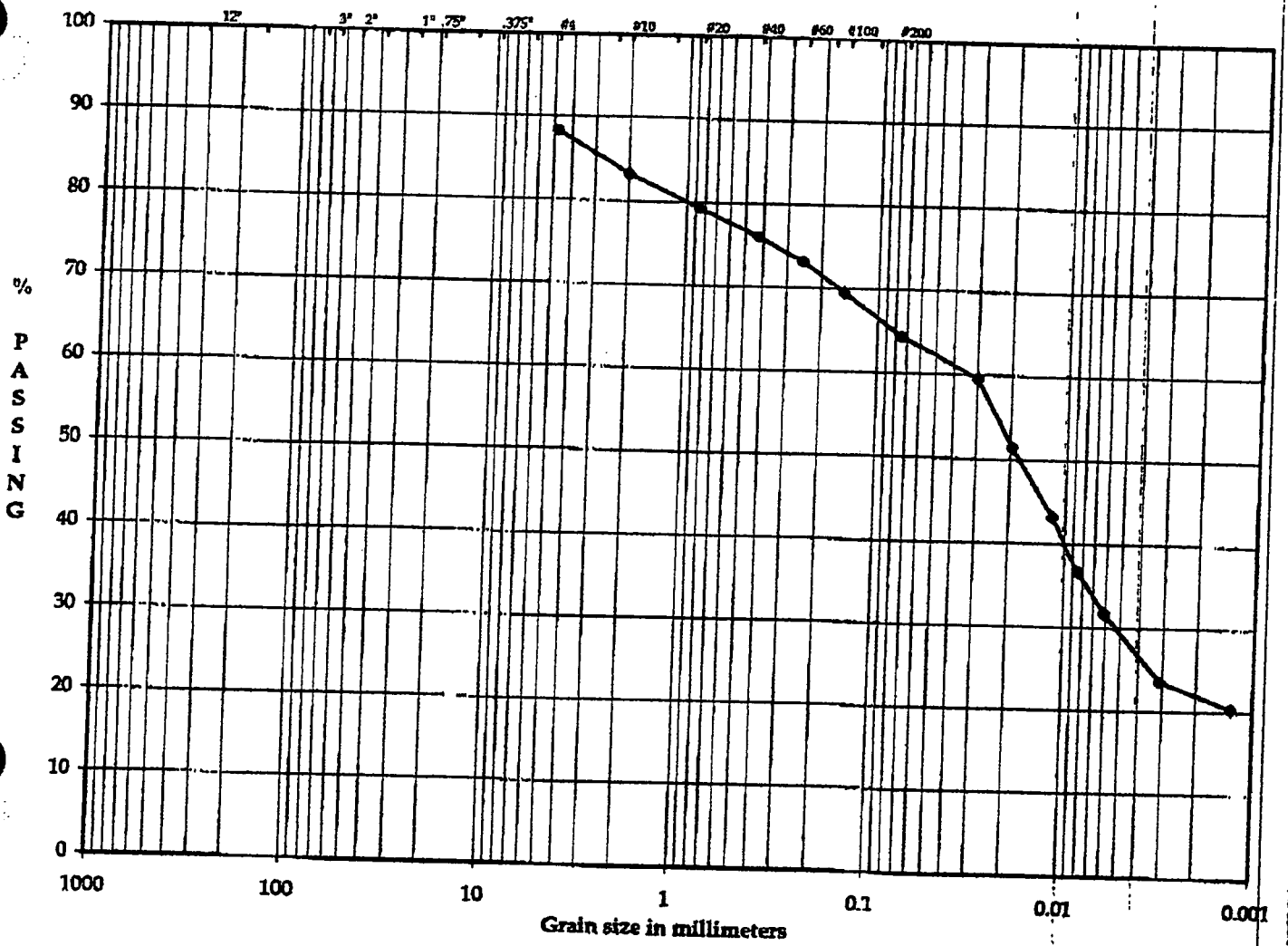
CHECKED BY:

000331

4940

4940

PARTICLE SIZE DISTRIBUTION ASTM D 421 AND D 422
US STANDARD SIEVE OPENING SIZES



Boulders	Cobbles	Coarse	Fine	Cor	Med	Fine	SILT OR CLAY
		Gravel		SAND			FINES

SAMPLE ID	LP02 - 14
SAMPLE TYPE	Bag
SAMPLE DEPTH	-

LL	-
PL	-
PI	-

DESCRIPTION	Yellowish Brown, SILTY CLAY, some coarse to fine sand, little gravel.
USCS	(CL)

000332

GEOSYNTEC/FLUOR FERNALD/OH
023-3313

TECH	TJ
DATE	7/24/02
CHECK	[illegible]
REVIEW	[illegible]

ASTM GRAIN SIZE ANALYSIS
ASTM C117, C136, D421, D422, D1140 and D2217

4940

PROJECT TITLE	GEOSYNTEC/FLUOR FERNALD/OH
PROJECT NO.	023-3313
SAMPLE ID	LP02 - 14
SAMPLE TYPE	Bag
SAMPLE DEPTH	-

AS RECEIVED WATER CONTENT

Tare No.		
Wt. Wet Soil & Tare (gm)	(W1)	
Wt. Dry Soil & Tare (gm)	(W2)	
Weight of Tare (gm)	(W3)	
Weight of Water (gm)	(W4=W1-W2)	
Weight of Dry Soil (gm)	(W5=W2-W3)	
Moisture Content (%)	(W4/W5)*100	

Hygroscopic Moisture For Sieve Sample

Wet Soil & Tare (gm)	50.44
Dry Soil & Tare (gm)	47.48
Tare Weight (gm)	3.21
Moisture Content (%)	6.69

Total Weight of Sample Used For Sieve Analysis Corrected For Hygroscopic Moisture

Weight + Tare, Before Separating On The #4 Sieve (gm)	843.60	
Tare Weight (gm)	242.30	
Total Weight (gm)	563.62	(W6)

Plus #4 Material Sieve

TARE WEIGHT 0.00

	(Wt+Tare)	((Wt-Tare)/W6)*100	%PASSING		
12.0"				12.0"	cobbles
3.0"				3.0"	coarse gravel
2.5"				2.5"	coarse gravel
2.0"				2.0"	coarse gravel
1.5"				1.5"	coarse gravel
1.0"				1.0"	coarse gravel
0.75"				0.75"	fine gravel
0.50"				0.50"	fine gravel
0.375"				0.375"	fine gravel
#4			88.3	#4	coarse sand

NOTE: Client provided the percent passing #4 sieve.

HYDROMETER ANALYSIS

Specific Gravity	(assumed)	2.720
Specific Gravity	(tested)	
Amount Dispersing Agent (ml)		125.00
Dispersion Device		Mechanical
Length of Dispersion Period		1 Minute

Weight of Sample Used For Hydrometer Test

Weight of Sample Wet or Dry (gm)	57.15
Calculated Dry Wt. used in test (gm)	53.57
Hydrometer Bulb Number	704004
% Pass #4 Sieve For Whole Sample	88.30

TARE WEIGHT 0.00

HYDROMETER BACKSIEVE (Percent Passing #10 - #200 Sieves)

	(Wt+Tare)	Cumul Wt. Retained	% PASSING		
#10	3.07	3.07	83.2	#10	medium sand
#20	5.49	5.49	79.3	#20	medium sand
#40	7.42	7.42	76.1	#40	fine sand
#60	9.18	9.18	73.2	#60	fine sand
#100	11.39	11.39	69.5	#100	fine sand
#200	14.45	14.45	64.5	#200	fines

HYDROMETER CALCULATIONS

DATE	TIME	ET (min)	READING R	TEMP T	TEMP.COR. K	HYD.COR. Cc	READING C	EFFECTIVE LENGTH	A
7/25/02	9:37								
7/25/02	9:39	2.00	44.0	22.50	0.013	7.50	36.50	10.4	0.99
7/25/02	9:42	5.00	39.0	22.50	0.013	7.50	31.50	11.2	0.99
7/25/02	9:52	15.00	34.0	22.50	0.013	7.50	26.50	12.0	0.99
7/25/02	10:07	30.00	30.0	22.50	0.013	7.50	22.50	12.7	0.99
7/25/02	10:37	60.00	27.0	22.50	0.013	7.50	19.50	13.2	0.99
7/25/02	13:47	250.00	22.0	22.50	0.013	7.50	14.50	14.0	0.99
7/26/02	9:37	1440.00	20.0	22.50	0.013	7.50	12.50	14.3	0.99

GRAIN SIZE PERCENTAGES

Particle Diameter	% PASSING
0.0299	59.6
0.0196	51.4
0.0117	43.2
0.0085	36.7
0.0061	31.8
0.0031	23.7
0.0013	20.4

% GRAVEL	11.70
% COARSE SAND	5.06
% MEDIUM SAND	7.17
% FINE SAND	11.59
% FINES	64.48
% TOTAL SAMPLE	100.00

Description: Yellowish Brown, SILTY CLAY, some coarse to fine sand, little gravel.

USCS: (CL)

-	LL
-	PL
-	PI

000333

TECH	T
DATE	7/24/02
CHECK	BSC
REVIEW	[illegible]

GEOSYNTEC CONSULTANTS

4940

FLUOR FERNALD

PARTICLE SIZE ANALYSIS–SIEVE METHOD

(ASTM D 422)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO — PROJECT NO.: GQ134 TASK NO.: 04.1

DESCRIPTION: PHASE III — DATE: 19 day July month 2002 year

MATERIAL TYPE: LOW PERM CLAY — SAMPLE NO.: LP02.15

SOIL SAMPLE SIZE	+3/8 = 858.5 gm	MOISTURE = 295.2 gm	TOTAL = 20100.6 gm
	-3/8 = 18946.9 gm	20100.6	

APPROXIMATE MINIMUM WT. OF SAMPLE (PASSING NO. 10 SIEVE) (grams)	SAND	FINE GRAIN
	115	65

	+3/8 BEFORE WASH	-3/8 BEFORE WASH	+3/8 AFTER WASH	-3/8 AFTER WASH
TARE NO.	N	L-9	N	L-9
WT. OF DRY SAMPLE PLUS TARE (grams)	960.2	796.6	908.5	377.3
WT. OF TARE (grams)	101.7	193.4	101.7	193.4
WT. OF DRY SAMPLE (grams)	858.5	603.2	806.9	183.9

SIEVE ANALYSIS — QA ID: DLE

SIEVE NO.	DIAMETER (mm)	WT. RETAINED (grams)	% RETAINED	% FINER		PROJECT SPECIFICATIONS
3 in	76.2	Ø	Ø	100		
2 in	50.8	Ø	Ø	100		100
1 1/2in	38.1	228.1	1.1	98.9		
1 in	25.4	283.7	1.4	98.6		
3/4 in	19.1	378.3	1.9	98.1		90-100
1/2 in	12.7	796.3	3.5	96.5		
3/8 in	9.53	806.7	4.0	96.0		
No. 4	4.75	12.6	2.1	97.9	94.0	
No. 10	2.00	37.8	6.3	93.7	90.0	
No. 20	0.850	65.5	10.9	89.1	85.5	
No. 40	0.425	93.2	15.5	84.5	81.1	
No. 60	0.250	118.5	19.6	80.4	77.2	
No. 100	0.125	148.6	24.6	75.4	72.4	
No. 200	0.075	182.5	30.3	69.7	66.9	50-100
PAN	—	183.9	—	—		

COMMENTS:

000334

%FINER = 100 − Σ% RETAINED

GEO SYNTEC CONSULTANTS FILE NO. 2-14-PMS

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SHEET NO. 1 OF 2

189469

43.50
1.23
41.77

GEOSYNTEC CONSULTANTS

FLUOR FERNALD, INC.

PARTICLE SIZE DISTRIBUTION AND SOIL CLASSIFICATION TEST RESULTS (ASTM C 136/D 422) (ASTM D 2487)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO

DESCRIPTION: Phase IV

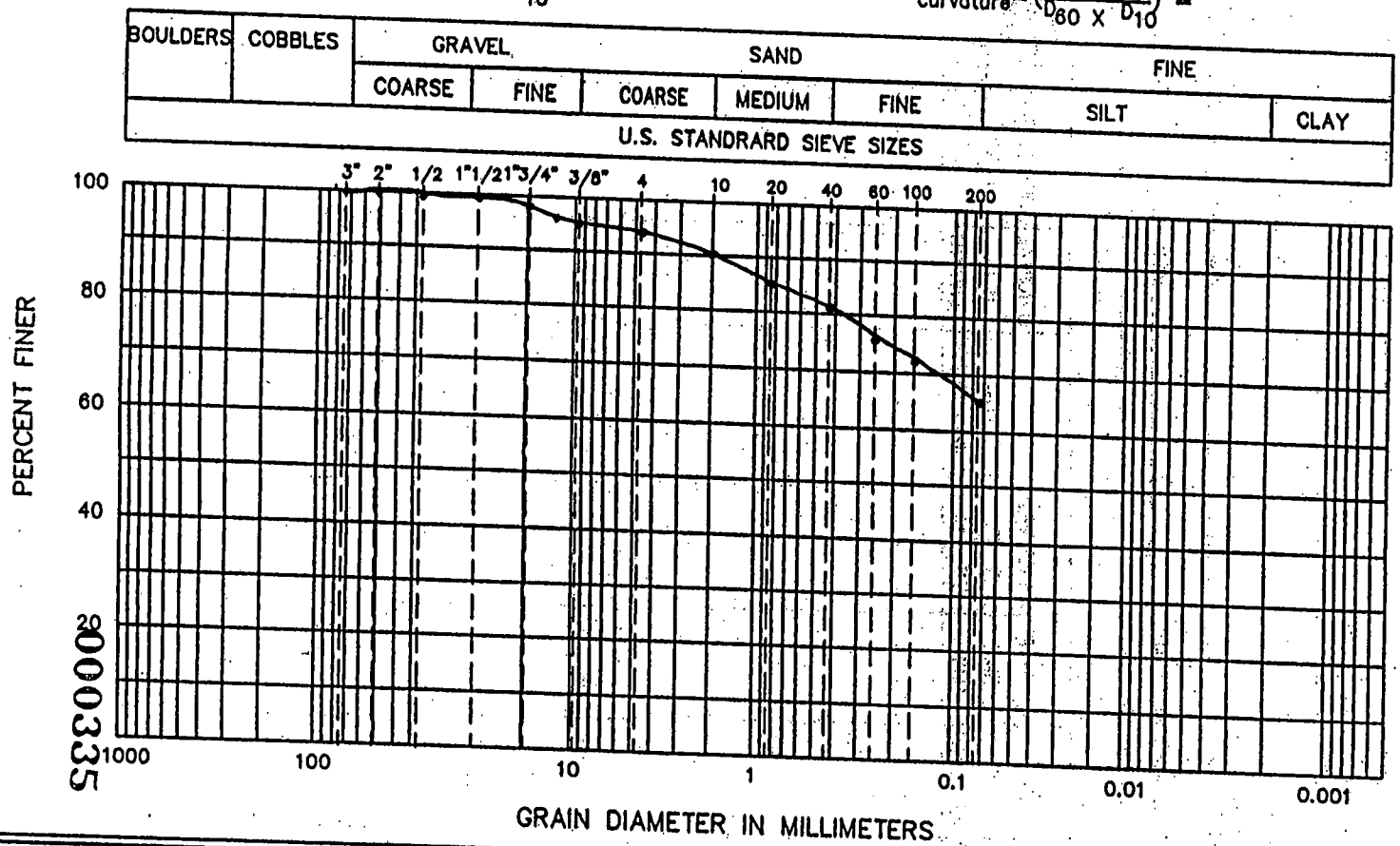
PROJECT NO.: 6Q1341 TASK NO.: 04.1

MATERIAL TYPE: Low Perm Clay

DATE: 30 day July month 2002 year

SAMPLE NO.: LP02-15 QA ID: KS

CURVE COEFFICIENTS: $C_{uniformity} = \left(\frac{D_{60}}{D_{10}}\right) =$ $C_{curvature} = \left(\frac{D_{30}^2}{D_{60} \times D_{10}}\right) =$



ATTERBERG LIMITS

(LL) 28

(PL) 15

(PI) 13

SIEVE RESULTS

SIEVE SIZE	% FINER
3-in.	100
2-in.	100
1 1/2-in.	98.9
1-in.	98.6
3/4-in.	98.1
1/2-in.	96.5
3/8-in.	96.0
NO. 4	94.0
NO. 10	90.0
NO. 20.	85.5
NO. 40	81.1
NO. 60	77.2
NO. 100	72.4
NO. 200	66.9

HYDROMETER RESULTS

PARTICLE DIA.	% FINER
0.05	66
0.02	54
0.005	31
0.002	22

SOIL CLASSIFICATION (ASTM D 2487): CL

©GEO SYNTEC CONSULTANTS FILE NO. 2-16-PSD

CHECKED BY:

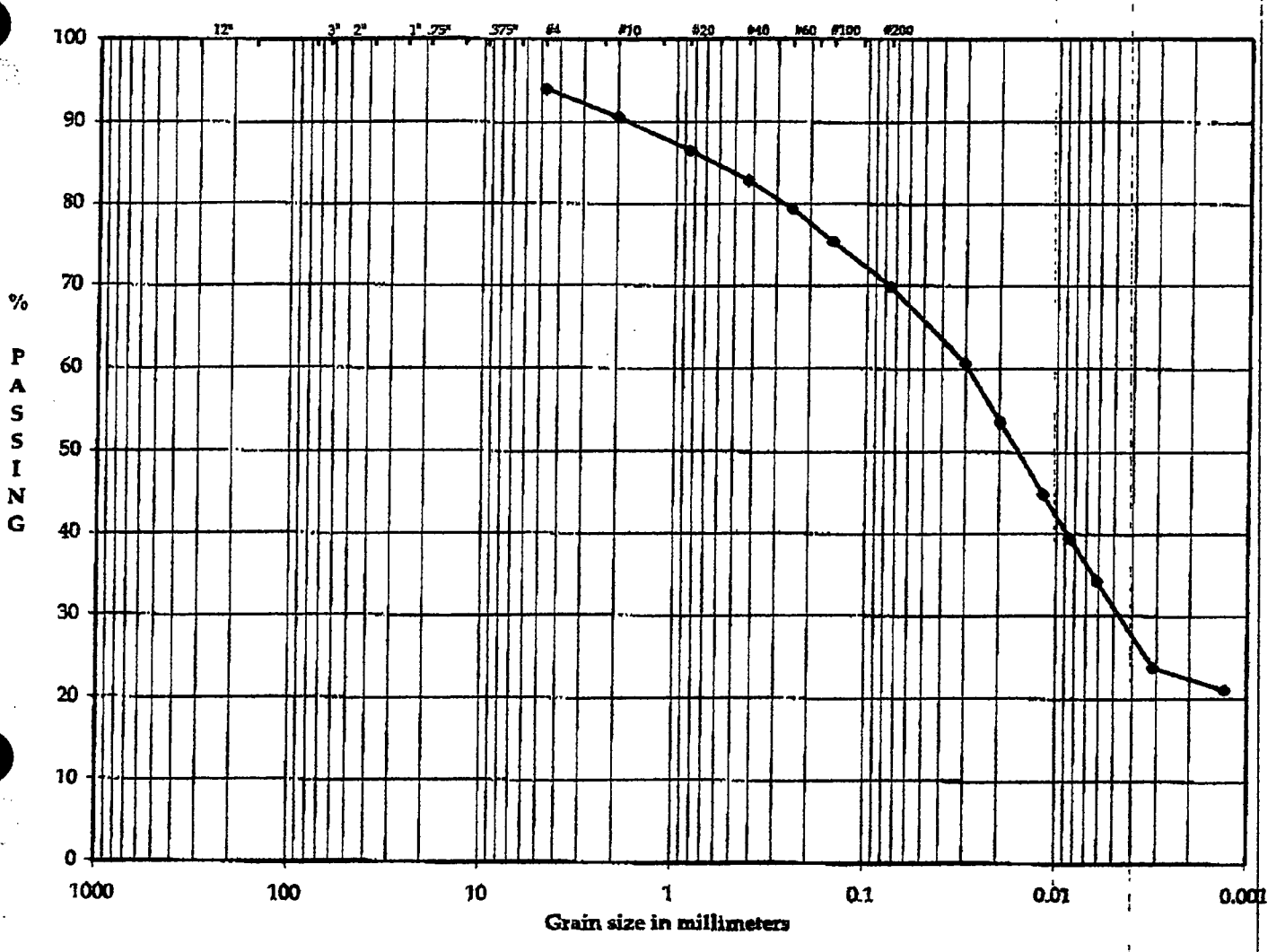
SHEET NO. ____ OF ____

0000335

4940

PARTICLE SIZE DISTRIBUTION ASTM D 421 AND D 422
US STANDARD SIEVE OPENING SIZES

4940



Boulders	Cobbles	Coarse	Fine	Cor	Med	Fine	SILT OR CLAY
		Gravel		SAND			FINES

SAMPLE ID	LP02 - 15
SAMPLE TYPE	Bag
SAMPLE DEPTH	-

LL	-
PL	-
PI	-

DESCRIPTION	Yellowish Brown, SILTY CLAY, some coarse to fine sand, little gravel.
USCS	(CL)

000336

GEOSYNTEC/FLUOR FERNALD/OH
023-3313

TECH	TJ
DATE	7/24/02
CHECK	[illegible]
REVIEW	[illegible]

4940

ASTM GRAIN SIZE ANALYSIS
ASTM C117, C136, D421, D422, D1140 and D2217

PROJECT TITLE	GEOSYNTEC/FLUOR FERNALD/OH	SAMPLE ID	LP02 - 15
PROJECT NO.	023-3313	SAMPLE TYPE	Bag
		SAMPLE DEPTH	-

AS RECEIVED WATER CONTENT

Tare No.		
Wt. Wet Soil & Tare (gm)	(W1)	
Wt. Dry Soil & Tare (gm)	(W2)	
Weight of Tare (gm)	(W3)	
Weight of Water (gm)	(W4=W1-W2)	
Weight of Dry Soil (gm)	(W5=W2-W3)	
Moisture Content (%)	(W4/W5)*100	

Hygroscopic Moisture For Sieve Sample

Wet Soil & Tare (gm)	50.33
Dry Soil & Tare (gm)	47.37
Tare Weight (gm)	3.23
Moisture Content (%)	6.71

Total Weight of Sample Used For Sieve Analysis Corrected For Hygroscopic Moisture

Weight + Tare, Before Separating On The #4 Sieve (gm)	836.50	
Tare Weight (gm)	235.66	
Total Weight (gm)	563.08	(W6)

Plus #4 Material Sieve

TARE WEIGHT 0.00

	(Wt+Tare)	((Wt-Tare)/W6)*100)	%PASSING		
12.0"				12.0"	cobbles
3.0"				3.0"	coarse gravel
2.5"				2.5"	coarse gravel
2.0"				2.0"	coarse gravel
1.5"				1.5"	coarse gravel
1.0"				1.0"	coarse gravel
0.75"				0.75"	fine gravel
0.50"				0.50"	fine gravel
0.375"				0.375"	fine gravel
#4			94.0	#4	coarse sand

NOTE: Client provided the percent passing #4 sieve.

HYDROMETER ANALYSIS

Specific Gravity	(assumed)	2.720
Specific Gravity	(tested)	
Amount Dispersing Agent (ml)		125.00
Type Dispersion Device		Mechanical
Length of Dispersion Period		1 Minute

Weight of Sample Used For Hydrometer Test

Weight of Sample Wet or Dry (gm)	56.49
Calculated Dry Wt. used in test (gm)	52.94
Hydrometer Bulb Number	70H004
% Pass #4 Sieve For Whole Sample	94.00

TARE WEIGHT 0.00

HYDROMETER BACKSIEVE (Percent Passing #10 - #200 Sieves)

	(Wt+Tare)	Cumul Wt. Retained	% PASSING		
#10	1.93	1.93	90.6	#10	medium sand
#20	4.19	4.19	86.6	#20	medium sand
#40	6.27	6.27	82.9	#40	fine sand
#60	8.21	8.21	79.4	#60	fine sand
#100	10.47	10.47	75.4	#100	fine sand
#200	13.59	13.59	69.9	#200	fines

HYDROMETER CALCULATIONS

DATE 7/25/02	TIME 9:39	ET (min)	READING R	TEMP T	TEMP.COR. K	HYD.COR. Cc	READING C	EFFECTIVE LENGTH	A
7/25/02	9:41	2.00	42.0	22.50	0.013	7.50	34.50	10.7	0.99
7/25/02	9:44	5.00	38.0	22.50	0.013	7.50	30.50	11.4	0.99
7/25/02	9:54	15.00	33.0	22.50	0.013	7.50	25.50	12.2	0.99
7/25/02	10:09	30.00	30.0	22.50	0.013	7.50	22.50	12.7	0.99
7/25/02	10:39	60.00	27.0	22.50	0.013	7.50	19.50	13.2	0.99
7/25/02	13:49	250.00	21.0	22.50	0.013	7.50	13.50	14.2	0.99
7/26/02	9:39	1440.00	19.5	22.50	0.013	7.50	12.00	14.3	0.99

GRAIN SIZE PERCENTAGES

Particle Diameter	% PASSING		
0.0309	60.6		
0.0199	53.6	% GRAVEL	6.00
0.0118	44.8	% COARSE SAND	3.43
0.0085	39.6	% MEDIUM SAND	7.71
0.0061	34.3	% FINE SAND	13.00
0.0031	23.7	% FINES	69.87
0.0013	21.1	% TOTAL SAMPLE	100.00

Description: Yellowish Brown, SILTY CLAY, some coarse to fine sand, little gravel.

USCS: (CL)

-	LL
-	PL
-	PI

000337

TECH	TJ
DATE	7/24/02
CHECK	BJS
REVIEW	[illegible]

Golder Associates Inc.

38076.0

4940

GEOSYNTEC CONSULTANTS

FLUOR FERNALD

PARTICLE SIZE ANALYSIS—SIEVE METHOD (ASTM D 422)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO — PROJECT NO.: GQ1341 TASK NO.: 04.1

DESCRIPTION: PHASE III — DATE: 19 day July month 2002 year

MATERIAL TYPE: LOW PERM CLAY — SAMPLE NO.: LP02-16

SOIL SAMPLE SIZE: +3/8 = 1817.2; −3/8 = 35879.8; MOISTURE = 379.0; TOTAL = 38076.0

APPROXIMATE MINIMUM WT. OF SAMPLE (PASSING NO. 10 SIEVE) (grams)	SAND	FINE GRAIN
	115	65

		+3/8 BEFORE WASH	−3/8 BEFORE WASH	+3/8 AFTER WASH	−3/8 AFTER WASH
TARE NO.		L-4	LL-4	L-4	LL-4
WT. OF DRY SAMPLE PLUS TARE	(grams)	2008.3	812.5	1873.8	345.2
WT. OF TARE	(grams)	191.1	145.4	191.1	145.4
WT. OF DRY SAMPLE	(grams)	1817.2	667.1	1682.7	199.8

SIEVE ANALYSIS — QA ID: DLE

SIEVE NO.	DIAMETER (mm)	WT. RETAINED (grams)	% RETAINED	% FINER		PROJECT SPECIFICATIONS
3 in	76.2	Ø	Ø	100		
2 in	50.8	Ø	Ø	100		100
1 1/2in	38.1	105.9	0.3	99.7		
1 in	25.4	498.3	1.3	98.7		
3/4 in	19.1	821.6	2.2	97.8		90-100
1/2 in	12.7	1372.3	3.6	96.4		
3/8 in	9.53	1676.2	4.4	95.6		
No. 4	4.75	12.9	1.9	98.1	93.8	
No. 10	2.00	41.3	6.2	93.8	89.7	
No. 20	0.850	74.3	11.1	88.9	85.0	
No. 40	0.425	105.4	15.8	84.2	80.5	
No. 60	0.250	131.5	19.7	80.3	76.8	
No. 100	0.125	162.3	24.3	75.7	72.4	
No. 200	0.075	199.0	29.8	70.2	67.1	50-100
PAN	—	199.7	—	—		

COMMENTS:

000338

%FINER = 100 − Σ% RETAINED

©GEO SYNTEC CONSULTANTS FILE NO. 2-14-PMS

CHECKED BY: CA

SHEET NO. 1 OF 2

50.73
89
48.84
2" Bucket
31.99
-1.73
30.26
48.84
79.10

GEOSYNTEC CONSULTANTS

FLUOR FERNALD, INC.

PARTICLE SIZE DISTRIBUTION AND SOIL CLASSIFICATION TEST RESULTS (ASTM C 136/D 422) (ASTM D 2487)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO

DESCRIPTION: Phase IV

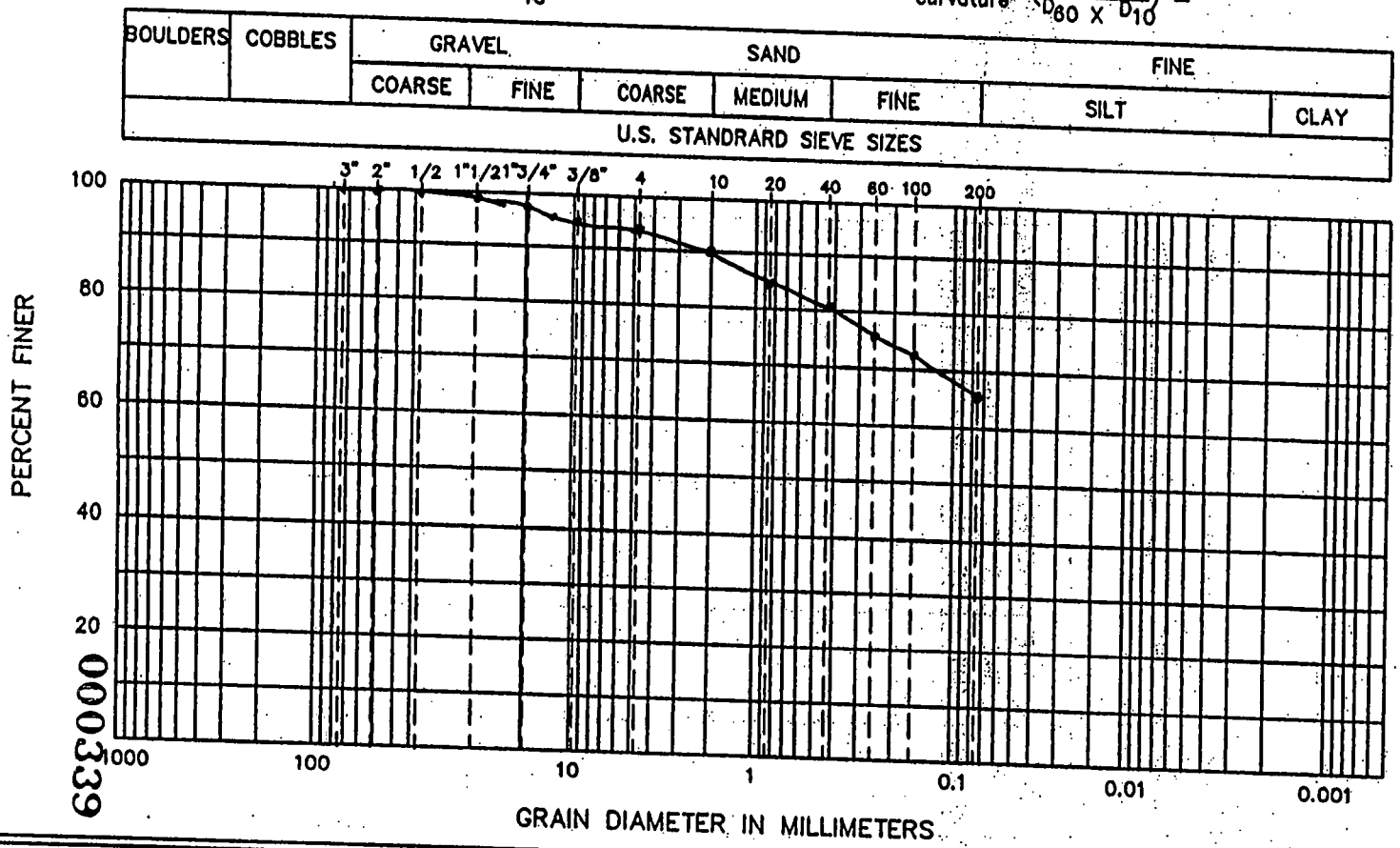
MATERIAL TYPE: Low Perm Clay

PROJECT NO.: 6Q1341 TASK NO.: 04.1

DATE: 30 day July month 2002 year

SAMPLE NO.: 4002-16 QA ID: KS

CURVE COEFFICIENTS: $C_{uniformity} = (\frac{D_{60}}{D_{10}}) =$ $C_{curvature} = (\frac{D_{30}^2}{D_{60} \times D_{10}}) =$



ATTERBERG LIMITS

(LL) 26

(PL) 15

(PI) 11

SIEVE RESULTS

SIEVE SIZE	% FINER
3-in.	100
2-in.	100
1 1/2-in.	99.7
1-in.	98.7
3/4-in.	97.8
1/2-in.	96.4
3/8-in.	95.6
NO. 4	93.8
NO. 10	89.7
NO. 20.	85.0
NO. 40	80.5
NO. 60	76.8
NO. 100	72.4
NO. 200	67.1

HYDROMETER RESULTS

PARTICLE DIA.	% FINER
0.05	64
0.02	52
0.005	30
0.002	21

SOIL CLASSIFICATION (ASTM D 2487): CL

©GEOSYNTEC CONSULTANTS FILE NO. 2-16-PSD

CHECKED BY:

SHEET NO. ____ OF ____

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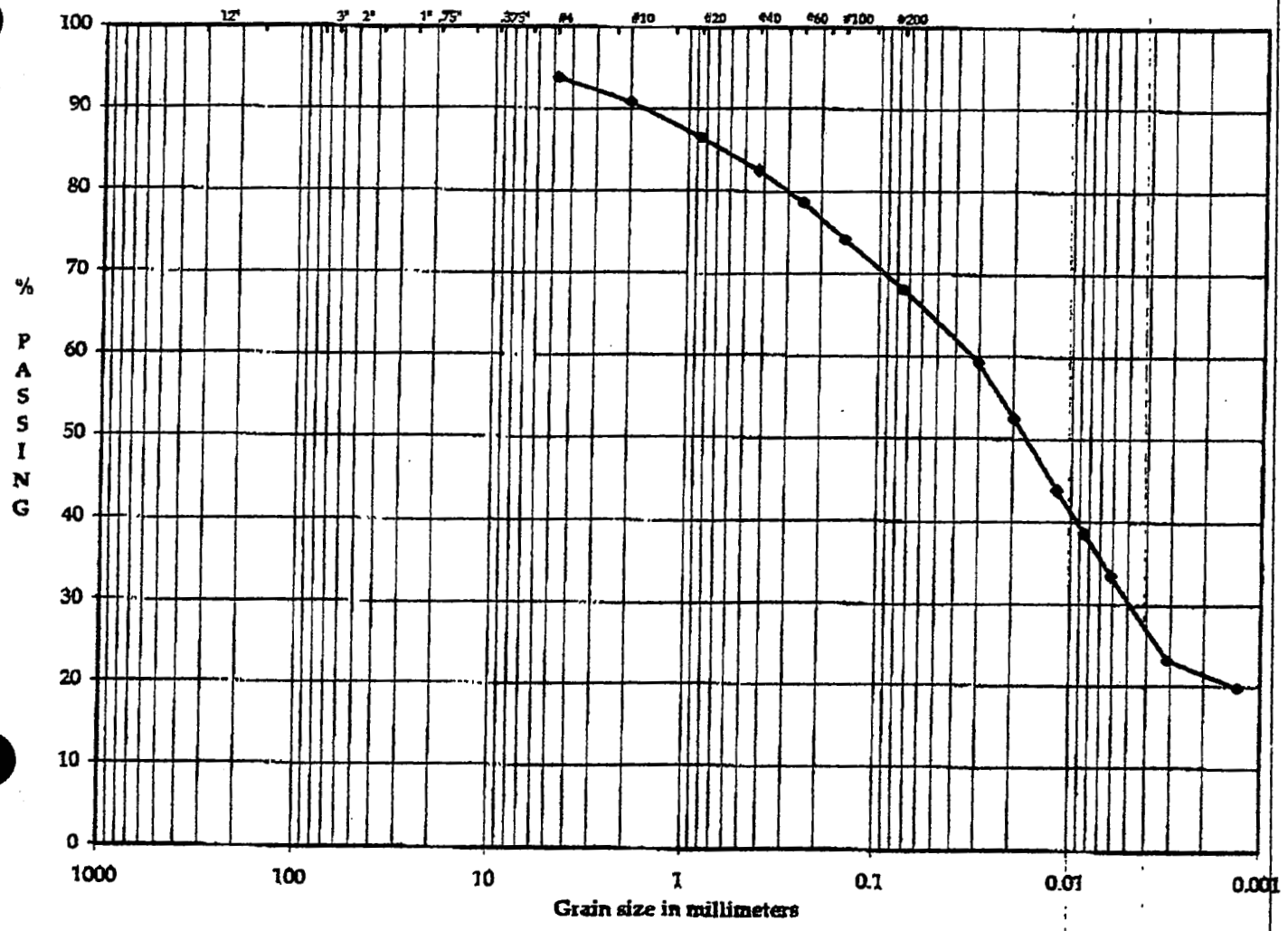
4940.

PARTICLE SIZE DISTRIBUTION ASTM D 421 AND D 422
US STANDARD SIEVE OPENING SIZES

4940



Boulders	Cobbles	Coarse	Fine	Cor	Med	Fine	SILT OR CLAY
		Gravel		SAND			FINES

SAMPLE ID	LP02 - 16
SAMPLE TYPE	Bag
SAMPLE DEPTH	-

LL	-
PL	-
PI	-

DESCRIPTION	Yellowish Brown, SILTY CLAY, some coarse to fine sand, little gravel.
USCS	(CL)

000340

GEOSYNTEC/FLUOR FERNALD/OH
023-3313

TECH	TJ
DATE	7/24/02
CHECK	GM
REVIEW	PUM

ASTM GRAIN SIZE ANALYSIS
ASTM C117, C136, D421, D422, D1140 and D2217

4940

PROJECT TITLE	GEOSYNTEC/FLUOR FERNALD/OH	SAMPLE ID	LP02 - 16
PROJECT NO.	023-3313	SAMPLE TYPE	Bag
		SAMPLE DEPTH	-

AS RECEIVED WATER CONTENT

Tare No.		
Wt. Wet Soil & Tare (gm)	(W1)	
Wt. Dry Soil & Tare (gm)	(W2)	
Weight of Tare (gm)	(W3)	
Weight of Water (gm)	(W4=W1-W2)	
Weight of Dry Soil (gm)	(W5=W2-W3)	
Moisture Content (%)	(W4/W5)*100	

Hygroscopic Moisture For Sieve Sample

Wet Soil & Tare (gm)	50.44
Dry Soil & Tare (gm)	48.14
Tare Weight (gm)	3.22
Moisture Content (%)	5.12

Total Weight of Sample Used For Sieve Analysis Corrected For Hygroscopic Moisture

Weight + Tare, Before Separating On The #4 Sieve (gm)	842.05	
Tare Weight (gm)	242.22	
Total Weight (gm)	570.61	(W6)

Plus #4 Material Sieve

TARE WEIGHT 0.00

	(Wt+Tare)	(((Wt-Tare)/W6)*100)	%PASSING		
12.0"				12.0"	cobbles
3.0"				3.0"	coarse gravel
2.5"				2.5"	coarse gravel
2.0"				2.0"	coarse gravel
1.5"				1.5"	coarse gravel
1.0"				1.0"	coarse gravel
0.75"				0.75"	fine gravel
0.50"				0.50"	fine gravel
0.375"				0.375"	fine gravel
#4			93.8	#4	coarse sand

NOTE: Client provided the percent passing #4 sieve.

HYDROMETER ANALYSIS

Specific Gravity	(assumed)	2.720
Specific Gravity	(tested)	
Amount Dispersing Agent (ml)		125.00
Type Dispersion Device		Mechanical
Length of Dispersion Period		1 Minute

Weight of Sample Used For Hydrometer Test

Weight of Sample Wet or Dry (gm)	56.76
Calculated Dry Wt. used in test (gm)	54.00
Hydrometer Bulb Number	704004
% Pass #4 Sieve For Whole Sample	93.80

TARE WEIGHT 0.00

HYDROMETER BACKSIEVE (Percent Passing #10 - #200 Sieves)

	(Wt+Tare)	Cumul Wt. Retained	% PASSING		
#10	1.73	1.73	90.8	#10	medium sand
#20	4.22	4.22	86.5	#20	medium sand
#40	6.50	6.50	82.5	#40	fine sand
#60	8.73	8.73	78.6	#60	fine sand
#100	11.27	11.27	74.2	#100	fine sand
#200	14.75	14.75	68.2	#200	fines

HYDROMETER CALCULATIONS

DATE 7/25/02	TIME 9:41	ET (min)	READING R	TEMP T	TEMP.COR. K	HYD.COR. Cc	READING C	EFFECTIVE LENGTH	A
7/25/02	9:43	2.00	42.0	22.50	0.013	7.50	34.50	10.7	0.99
7/25/02	9:46	5.00	38.0	22.50	0.013	7.50	30.50	11.4	0.99
7/25/02	9:56	15.00	33.0	22.50	0.013	7.50	25.50	12.2	0.99
7/25/02	10:11	30.00	30.0	22.50	0.013	7.50	22.50	12.7	0.99
7/25/02	10:41	60.00	27.0	22.50	0.013	7.50	19.50	13.2	0.99
7/25/02	13:51	250.00	21.0	22.50	0.013	7.50	13.50	14.2	0.99
7/26/02	9:41	1440.00	19.0	22.50	0.013	7.50	11.50	14.5	0.99

GRAIN SIZE PERCENTAGES

Particle Diameter	% PASSING
0.0303	59.3
0.0198	52.5
0.0118	43.9
0.0085	38.7
0.0061	33.5
0.0031	23.2
0.0013	19.8

% GRAVEL	6.20
% COARSE SAND	3.01
% MEDIUM SAND	8.29
% FINE SAND	14.33
% FINES	68.18
% TOTAL SAMPLE	100.00

Description: Yellowish Brown, SILTY CLAY, some coarse to fine sand, little gravel.

USCS (CL)

-	LL
-	PL
-	PI

000341

TECH	T
DATE	7/29/02
CHECK	
REVIEW	

24587.7

GEOSYNTEC CONSULTANTS

FLUOR FERNALD 4940

51.35

PARTICLE SIZE ANALYSIS–SIEVE METHOD (ASTM D 422)

23294

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO PROJECT NO.: GQ134 TASK NO.: 04.1

DESCRIPTION: PHASE III DATE: 22 day July month 2002 year

MATERIAL TYPE: Low Perm CLAY SAMPLE NO.: LP02-17

SOIL SAMPLE SIZE	+3/8 = 852.5 gm	MOISTURE = 442.8 gm	TOTAL = 24587.7
	-3/8 = 23292.4		

APPROXIMATE MINIMUM WT. OF SAMPLE (PASSING NO. 10 SIEVE) (grams)	SAND	FINE GRAIN
	115	65

		+3/8 BEFORE WASH	-3/8 BEFORE WASH	+3/8 AFTER WASH	-3/8 AFTER WASH
TARE NO.		K	L-9	K	L-9
WT. OF DRY SAMPLE PLUS TARE	(grams)	954.0	832.5	896.9	398.7
WT. OF TARE	(grams)	101.5	193.4	101.5	193.4
WT. OF DRY SAMPLE	(grams)	852.5	639.1	795.4	205.3

SIEVE ANALYSIS QA ID: KS

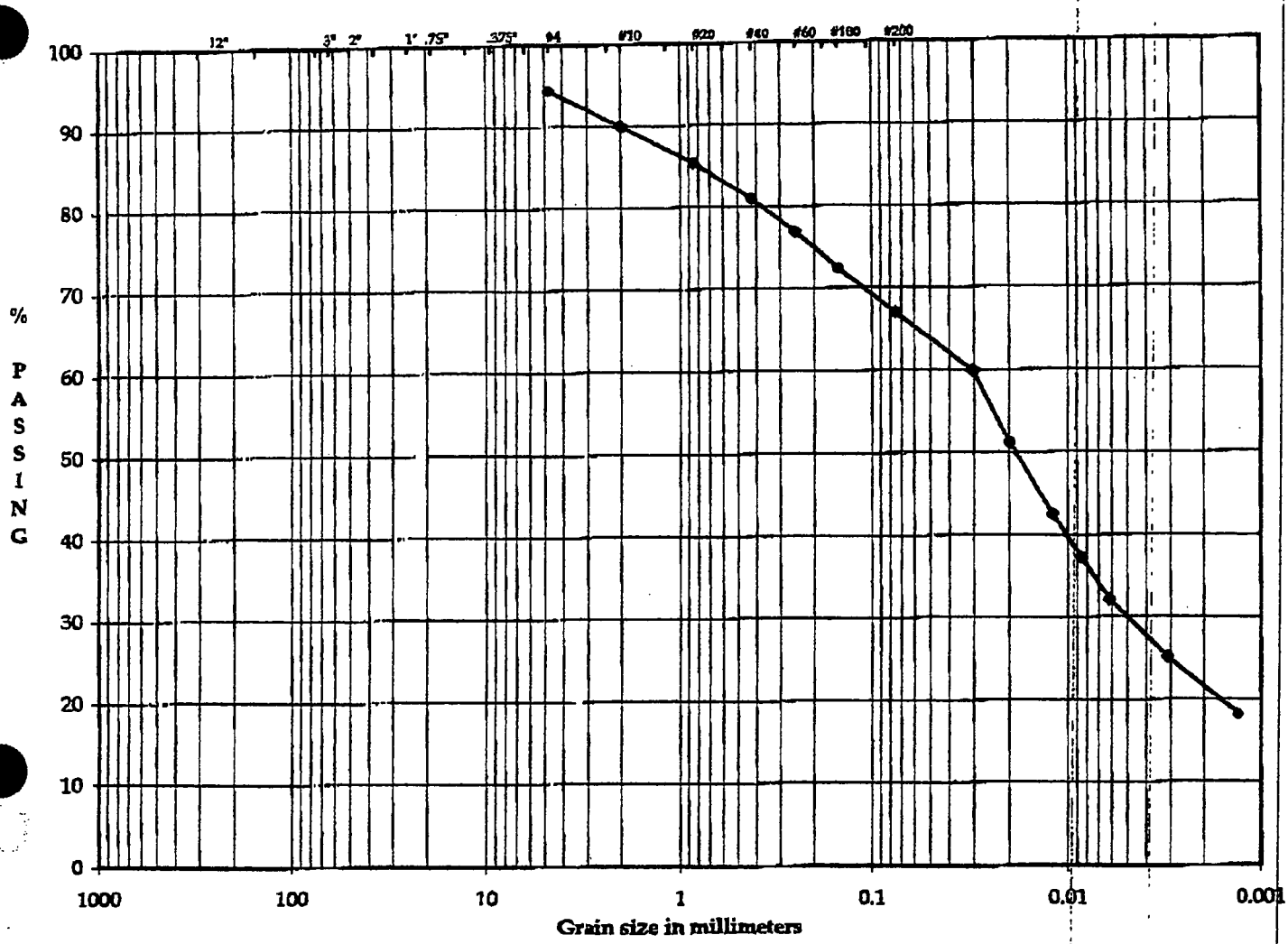
SIEVE NO.	DIAMETER (mm)	WT. RETAINED (grams)	% RETAINED	% FINER		PROJECT SPECIFICATIONS
3 in	76.2	Ø	Ø	100		
2 in	50.8	Ø	Ø	100		100
1 1/2in	38.1	80.2	0.3	99.7		
1 in	25.4	203.7	0.8	99.2		
3/4 in	19.1	232.1	0.9	99.1		90-100
1/2 in	12.7	576.2	2.3	97.7		
3/8 in	9.53	795.1	3.2	96.8		
No. 4	4.75	15.3	2.4	97.6	94.4	
No. 10	2.00	48.0	7.5	92.5	89.5	
No. 20	0.850	82.1	12.8	87.2	84.3	
No. 40	0.425	113.3	17.7	82.3	79.6	
No. 60	0.250	139.5	21.8	78.2	75.6	
No. 100	0.125	170.7	26.7	73.3	70.9	
No. 200	0.075	204.6	32.0	68.0	65.8	50-100
PAN	—	205.7	—	—		

COMMENTS: 000342

%FINER = 100 − Σ% RETAINED

4940

PARTICLE SIZE DISTRIBUTION ASTM D 421 AND D 422
US STANDARD SIEVE OPENING SIZES



Boulders	Cobbles	Coarse	Fine	Cor	Med	Fine	SILT OR CLAY
		Gravel		SAND			FINES

SAMPLE ID	LP02 - 17
SAMPLE TYPE	Bag
SAMPLE DEPTH	-

LL	-
PL	-
PI	-

DESCRIPTION	Yellowish Brown, SILTY CLAY, some coarse to fine sand, little gravel.
USCS	(CL)

000343

GEOSYNTEC/FLUOR FERNALD/OH
023-3313

TECH	TJ
DATE	7/30/02
CHECK	BSS
REVIEW	[illegible]

ASTM GRAIN SIZE ANALYSIS
ASTM C117, C136, D421, D422, D1140 and D2217

4940

PROJECT TITLE	GEOSYNTEC/FLUOR FERNALD/OH	SAMPLE ID	LP02 - 17
PROJECT NO.	023-3313	SAMPLE TYPE	Bag
		SAMPLE DEPTH	-

AS RECEIVED WATER CONTENT

Tare No.		
Wt. Wet Soil & Tare (gm)	(W1)	
Wt. Dry Soil & Tare (gm)	(W2)	
Weight of Tare (gm)	(W3)	
Weight of Water (gm)	(W4=W1-W2)	
Weight of Dry Soil (gm)	(W5=W2-W3)	
Moisture Content (%)	(W4/W5)*100	

Hygroscopic Moisture For Sieve Sample

Wet Soil & Tare (gm)	50.32
Dry Soil & Tare (gm)	48.36
Tare Weight (gm)	3.23
Moisture Content (%)	4.34

Total Weight of Sample Used For Sieve Analysis Corrected For Hygroscopic Moisture

Weight + Tare, Before Separating On The #4 Sieve (gm)	742.89	
Tare Weight (gm)	243.36	
Total Weight (gm)	478.74	(W6)

Plus #4 Material Sieve

TARE WEIGHT 0.00

	(Wt+Tare)	((Wt-Tare)/W6)*100)	%PASSING		
12.0"				12.0"	cobbles
3.0"				3.0"	coarse gravel
2.5"				2.5"	coarse gravel
2.0"				2.0"	coarse gravel
1.5"				1.5"	coarse gravel
1.0"				1.0"	coarse gravel
0.75"				0.75"	fine gravel
0.50"				0.50"	fine gravel
0.375"				0.375"	fine gravel
#4			94.4	#4	coarse sand

NOTE: Client provided the percent passing #4 sieve.

HYDROMETER ANALYSIS

Specific Gravity	(assumed)	2.720
Specific Gravity	(tested)	
Amount Dispersing Agent (ml)		125.00
Type Dispersion Device		Mechanical
Length of Dispersion Period		1 Minute

Weight of Sample Used For Hydrometer Test

Weight of Sample Wet or Dry (gm)	56.21
Calculated Dry Wt. used in test (gm)	53.87
Hydrometer Bulb Number	704004
% Pass #4 Sieve For Whole Sample	94.40

TARE WEIGHT 0.00

HYDROMETER BACKSIEVE (Percent Passing #10 - #200 Sieves)

	(Wt+Tare)	Cumul Wt. Retained	% PASSING		
#10	2.54	2.54	89.9	#10	medium sand
#20	5.14	5.14	85.4	#20	medium sand
#40	7.66	7.66	81.0	#40	fine sand
#60	9.98	9.98	76.9	#60	fine sand
#100	12.55	12.55	72.4	#100	fine sand
#200	15.63	15.63	67.0	#200	fines

HYDROMETER CALCULATIONS

DATE 7/31/02	TIME 9:30	ET (min)	READING R	TEMP T	TEMP.COR. K	HYD.COR. Cc	READING C	EFFECTIVE LENGTH	A
7/31/02	9:32	2.00	42.0	22.50	0.013	7.50	34.50	10.7	0.99
7/31/02	9:35	5.00	37.0	22.50	0.013	7.50	29.50	11.5	0.99
7/31/02	9:45	15.00	32.0	22.50	0.013	7.50	24.50	12.4	0.99
7/31/02	10:00	30.00	29.0	22.50	0.013	7.50	21.50	12.9	0.99
7/31/02	10:30	60.00	26.0	22.50	0.013	7.50	18.50	13.3	0.99
7/31/02	13:40	250.00	22.0	22.50	0.013	7.50	14.50	14.0	0.99
8/1/02	9:30	1440.00	18.0	22.50	0.013	7.50	10.50	14.7	0.99

GRAIN SIZE PERCENTAGES

Particle Diameter	% PASSING		
0.0503	59.9		
0.0199	51.2	% GRAVEL	5.60
0.0119	42.5	% COARSE SAND	4.45
0.0086	37.3	% MEDIUM SAND	8.97
0.0062	32.1	% FINE SAND	13.97
0.0031	25.2	% FINES	67.01
0.0013	18.2	% TOTAL SAMPLE	100.00

Description: Yellowish Brown, SILTY CLAY, some coarse to fine sand, little gravel

USCS: (CL)

-	LL
-	PL
-	PI

000344

TECH	TJ
DATE	7/30/02
CHECK	[illegible]
REVIEW	[illegible]

GEOSYNTEC CONSULTANTS

FLUOR FERNALD, INC.

PARTICLE SIZE DISTRIBUTION AND SOIL CLASSIFICATION TEST RESULTS (ASTM C 136/D 422) (ASTM D 2487)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO

DESCRIPTION: Phase IV

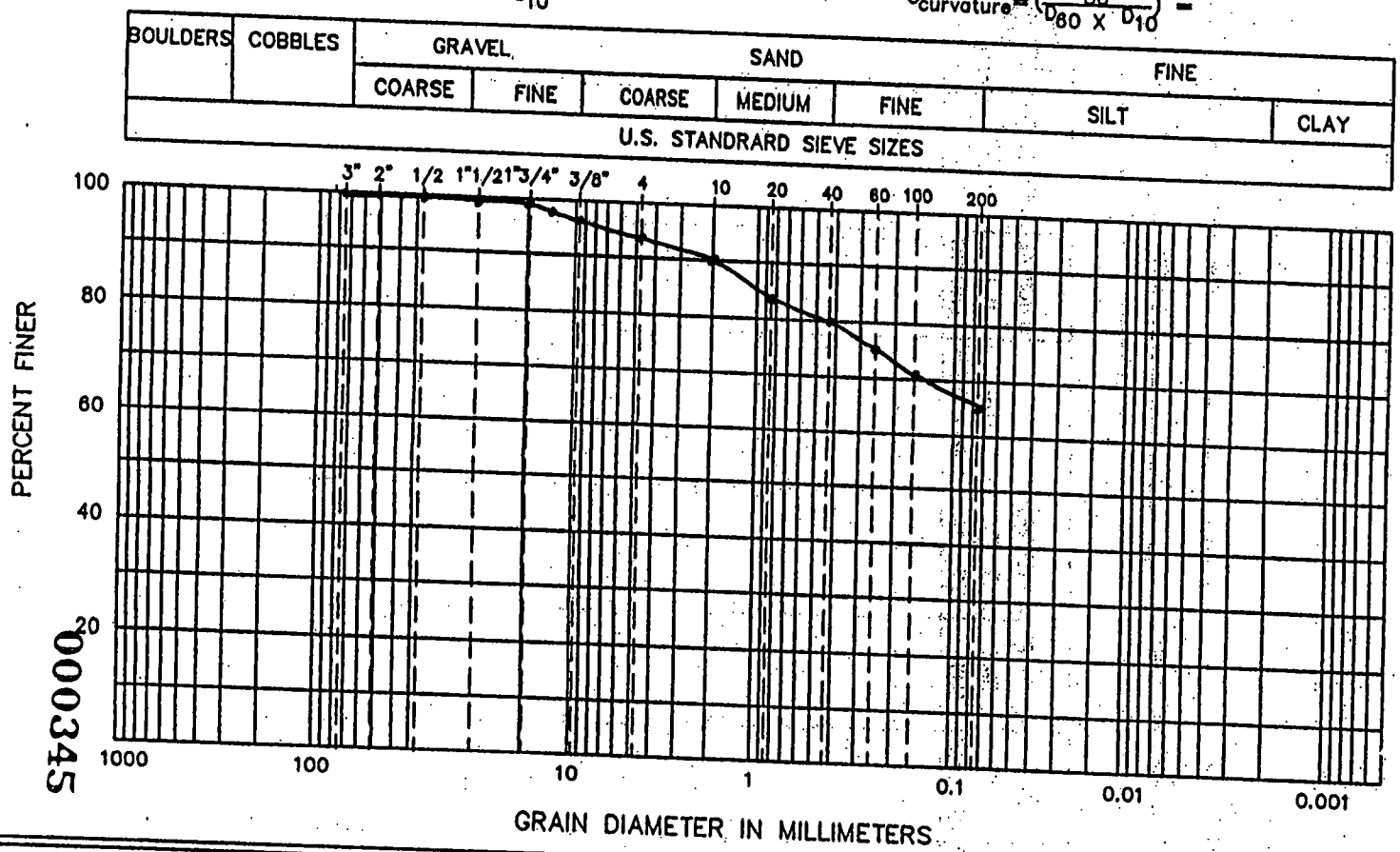
PROJECT NO.: GQ1341 TASK NO.: 04.1

MATERIAL TYPE: Low Perm Clay

DATE: 30 day July month 2002 year

SAMPLE NO.: LP02-17 QA ID: KS

CURVE COEFFICIENTS: $C_{uniformity} = (\frac{D_{60}}{D_{10}}) =$ $C_{curvature} = (\frac{D_{30}^2}{D_{60} \times D_{10}}) =$



ATTERBERG LIMITS

(LL) 26

(PL) 16

(PI) 10

SIEVE RESULTS

SIEVE SIZE	% FINER
3-in.	100
2-in.	100
1 1/2-in.	99.7
1-in.	99.2
3/4-in.	99.1
1/2-in.	97.7
3/8-in.	96.8
NO. 4	94.4
NO. 10	89.5
NO. 20.	84.3
NO. 40	79.6
NO. 60	75.6
NO. 100	70.9
NO. 200	65.8

HYDROMETER RESULTS

PARTICLE DIA.	% FINER
0.05	
0.02	
0.005	
0.002	

SOIL CLASSIFICATION (ASTM D 2487):

©GEO SYNTEC CONSULTANTS FILE NO. 2-16-PSD

CHECKED BY:

SHEET NO. OF

0003345

4940

GEOSYNTEC CONSULTANTS

FLUOR FERNALD

4940

PARTICLE SIZE ANALYSIS–SIEVE METHOD (ASTM D 422)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO PROJECT NO.: GQ1341 TASK NO.: 04.1

DESCRIPTION: PHASE III DATE: 27 day July month 2002 year

MATERIAL TYPE: Low Perm CLAY SAMPLE NO.: LP02-19

SOIL SAMPLE SIZE	+3/8 = 984.5	MOISTURE = 4105.8 g	TOTAL = 40005.3
	-3/8 = 38615.0	40065.3	

APPROXIMATE MINIMUM WT. OF SAMPLE (PASSING NO. 10 SIEVE) (grams)	SAND	FINE GRAIN
	115	65

		+3/8 BEFORE WASH	-3/8 BEFORE WASH	+3/8 AFTER WASH	-3/8 AFTER WASH
TARE NO.		L-6	LL-4	L-6	LL-4
WT. OF DRY SAMPLE PLUS TARE	(grams)	1183.0	790.9	1129.3	340.0
WT. OF TARE	(grams)	198.5	145.4	198.5	145.4
WT. OF DRY SAMPLE	(grams)	984.5	645.5	930.8	194.6

SIEVE ANALYSIS QA ID: DLE

SIEVE NO.	DIAMETER (mm)	WT. RETAINED (grams)	% RETAINED	% FINER		PROJECT SPECIFICATIONS
3 in	76.2	Ø	Ø	100		
2 in	50.8	Ø	Ø	100		100
1 1/2in	38.1	Ø	Ø	100		
1 in	25.4	142.9	.4	99.6		
3/4 in	19.1	225.2	.6	99.4		90-100
1/2 in	12.7	667.7	1.7	98.3		
3/8 in	9.53	929.4	2.3	97.7		
No. 4	4.75	23.4	3.6	96.4	94.2	
No. 10	2.00	53.5	8.3	91.7	89.6	
No. 20	0.850	85.8	13.3	86.7	84.7	
No. 40	0.425	114.5	17.7	82.3	80.4	
No. 60	0.250	136.9	21.2	78.8	77.0	
No. 100	0.125	163.3	25.3	74.7	73.0	
No. 200	0.075	192.8	29.9	70.1	68.5	50-100
PAN	—	194.6	—	—		

COMMENTS:

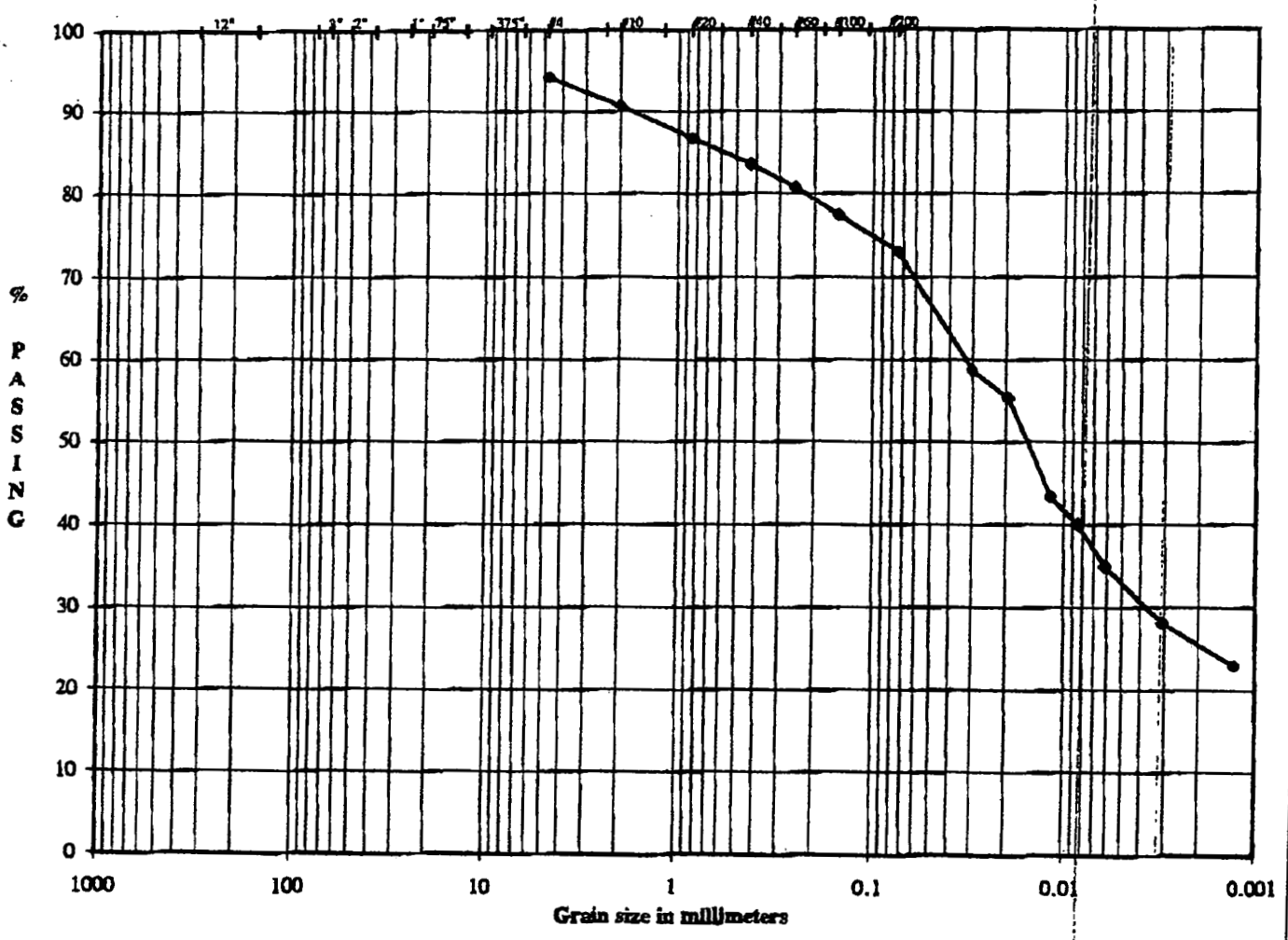
000346

%FINER = 100 − Σ% RETAINED

GEOSYNTEC CONSULTANTS FILE NO. 2-14-PMS CHECKED BY: SHEET NO. 1 OF 2

4940

PARTICLE SIZE DISTRIBUTION ASTM D 421 AND D 422
US STANDARD SIEVE OPENING SIZES



Boulders	Cobbles	Coarse	Fine	Cor	Med	Fine	SILT OR CLAY
		Gravel		SAND			FINES

SAMPLE ID	LP02 - 19
SAMPLE TYPE	Bag
SAMPLE DEPTH	-

LL	-
PL	-
PI	-

DESCRIPTION	Yellowish Brown, SILTY CLAY, some coarse to fine sand, little gravel.
USCS	(CL)

GEOSYNTEC/FLUOR FERNALD/OH
023-3313

TECH	TJ
DATE	7/30/02
CHECK	[illegible]
REVIEW	[illegible]

000347

ASTM GRAIN SIZE ANALYSIS
ASTM C117, C136, D421, D422, D1140 and D2217

4940

PROJECT TITLE	GEOSYNTEC/FLUOR FERNALD/OH	SAMPLE ID	LP02 - 19
PROJECT NO.	023-3313	SAMPLE TYPE	Bag
		SAMPLE DEPTH	-

AS RECEIVED WATER CONTENT

Tare No.		
Wt. Wet Soil & Tare (gm)	(W1)	
Wt. Dry Soil & Tare (gm)	(W2)	
Weight of Tare (gm)	(W3)	
Weight of Water (gm)	(W4=W1-W2)	
Weight of Dry Soil (gm)	(W5=W2-W3)	
Moisture Content (%)	(W4/W5)*100	

Hygroscopic Moisture For Sieve Sample

Wet Soil & Tare (gm)	50.97
Dry Soil & Tare (gm)	49.44
Tare Weight (gm)	3.21
Moisture Content (%)	3.31

Total Weight of Sample Used For Sieve Analysis Corrected For Hygroscopic Moisture

Weight + Tare, Before Separating On The #4 Sieve (gm)	812.92	
Tare Weight (gm)	316.69	
Total Weight (gm)	480.33	(W6)

Plus #4 Material Sieve

TARE WEIGHT 0.00

	(Wt+Tare)	((Wt-Tare)/W6)*100)	%PASSING		
12.0"				12.0"	cobbles
3.0"				3.0"	coarse gravel
2.5"				2.5"	coarse gravel
2.0"				2.0"	coarse gravel
1.5"				1.5"	coarse gravel
1.0"				1.0"	coarse gravel
0.75"				0.75"	fine gravel
0.50"				0.50"	fine gravel
0.375"				0.375"	fine gravel
#4			94.2	#4	coarse sand

NOTE: Client provided the percent passing #4 sieve.

HYDROMETER ANALYSIS

Specific Gravity	(assumed)	2.720
Specific Gravity	(tested)	
Amount Dispersing Agent (ml)		125.00
Type Dispersion Device		Mechanical
Length of Dispersion Period		1 Minute

Weight of Sample Used For Hydrometer Test

Weight of Sample Wet or Dry (gm)	56.54
Calculated Dry Wt. used in test (gm)	54.73
Hydrometer Bulb Number	704004
% Pass #4 Sieve For Whole Sample	94.20

TARE WEIGHT 0.00

HYDROMETER BACKSIEVE (Percent Passing #10 - #200 Sieves)

	(Wt+Tare)	Cumul Wt. Retained	% PASSING		
#10	2.03	2.03	90.7	#10	medium sand
#20	4.36	4.36	86.7	#20	medium sand
#40	6.20	6.20	83.5	#40	fine sand
#60	7.84	7.84	80.7	#60	fine sand
#100	9.76	9.76	77.4	#100	fine sand
#200	12.27	12.27	73.1	#200	fines

HYDROMETER CALCULATIONS

DATE	TIME	ET (min)	READING R	TEMP T	TEMP.COR. K	HYD.COR. Cc	READING C	EFFECTIVE LENGTH	A
7/31/02	9:32								
7/31/02	9:34	2.00	42.0	22.50	0.013	7.50	34.50	10.7	0.99
7/31/02	9:37	5.00	40.0	22.50	0.013	7.50	32.50	11.1	0.99
7/31/02	9:47	15.00	33.0	22.50	0.013	7.50	25.50	12.2	0.99
7/31/02	10:02	30.00	31.0	22.50	0.013	7.50	23.50	12.5	0.99
7/31/02	10:32	60.00	28.0	22.50	0.013	7.50	20.50	13.0	0.99
7/31/02	13:42	250.00	24.0	22.50	0.013	7.50	16.50	13.7	0.99
8/1/02	9:32	1440.00	21.0	22.50	0.013	7.50	13.50	14.2	0.99

GRAIN SIZE PERCENTAGES

Particle Diameter	% PASSING
0.0303	58.8
0.0195	55.4
0.0118	43.5
0.0065	40.0
0.0061	34.9
0.0031	28.1
0.0013	23.0

% GRAVEL	5.80
% COARSE SAND	3.49
% MEDIUM SAND	7.18
% FINE SAND	10.45
% FINES	73.08
% TOTAL SAMPLE	100.00

Description: Yellowish Brown, SILTY CLAY, some coarse to fine sand, little gravel.

USCS: (CL)

-	LL
-	PL
-	PI

TECH	TJ
DATE	7/30/02
CHECK	
REVIEW	

000348

GEOSYNTEC CONSULTANTS

FLUOR FERNALD, INC.

PARTICLE SIZE DISTRIBUTION AND SOIL CLASSIFICATION TEST RESULTS (ASTM C 136/D 422) (ASTM D 2487)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO

DESCRIPTION: Phase IV

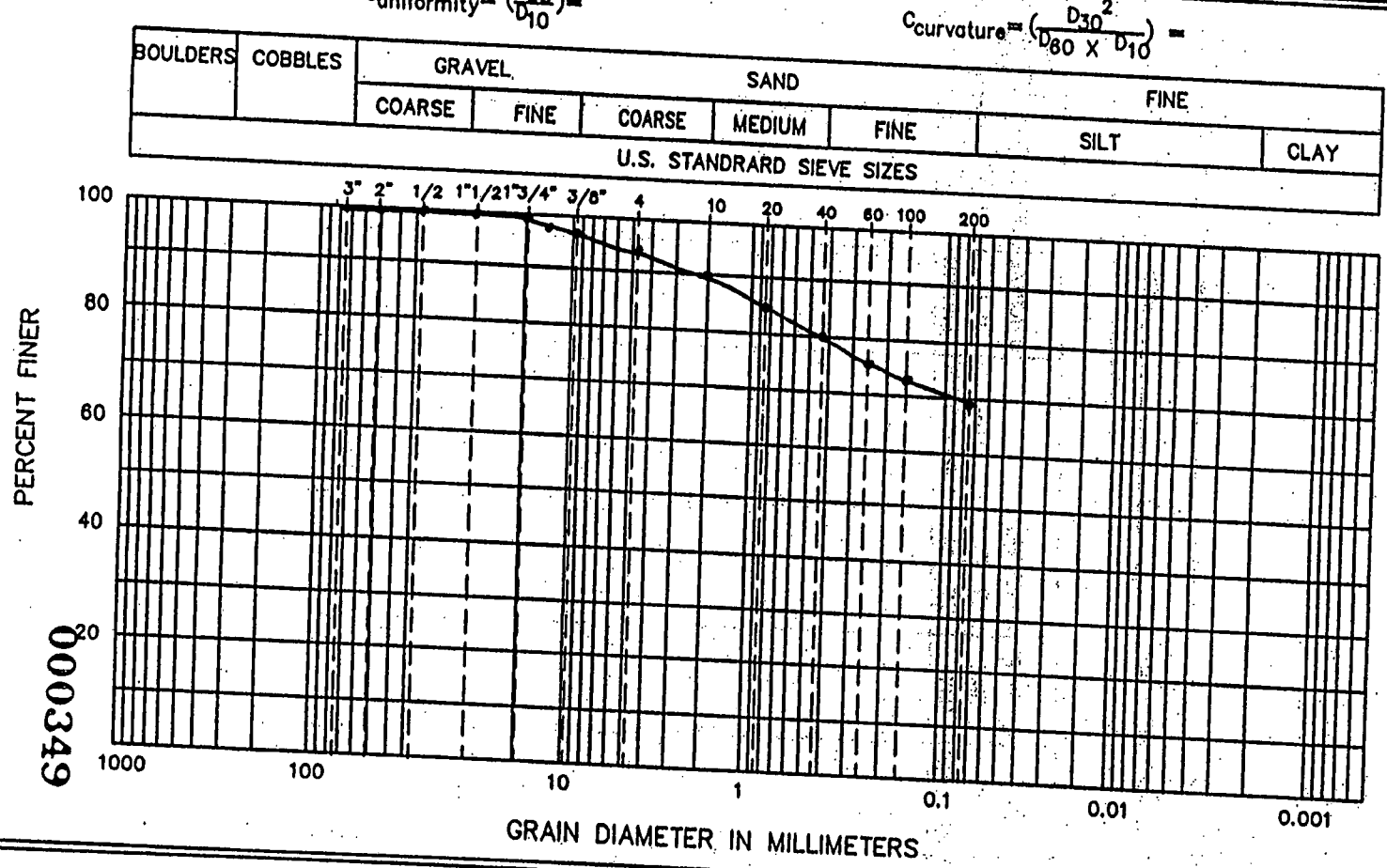
MATERIAL TYPE: Low Perm Clay

PROJECT NO.: 6Q1341 TASK NO.: 04.1

DATE: 30 day July month 2002 year

SAMPLE NO.: LP02-19 QA ID: KS

CURVE COEFFICIENTS: $C_{uniformity} = (\frac{D_{60}}{D_{10}}) =$ $C_{curvature} = (\frac{D_{30}^2}{D_{60} \times D_{10}}) =$



ATTERBERG LIMITS

(LL) 30

(PL) 15

(PI) 15

SIEVE RESULTS

SIEVE SIZE	% FINER
3-in.	100
2-in.	100
1 1/2-in.	100
1-in.	99.6
3/4-in.	99.4
1/2-in.	98.3
3/8-in.	97.7
NO. 4	94.2
NO. 10	89.6
NO. 20.	84.7
NO. 40	80.4
NO. 60	77.0
NO. 100	73.0
NO. 200	68.5

HYDROMETER RESULTS

PARTICLE DIA.	% FINER
0.05	
0.02	
0.005	
0.002	

SOIL CLASSIFICATION (ASTM D 2487):

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CHECKED BY:

SHEET NO. OF

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GEOSYNTEC CONSULTANTS

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FLUOR FERNALD

PARTICLE SIZE ANALYSIS—SIEVE METHOD (ASTM D 422)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO — PROJECT NO.: GQ134 TASK NO.: 04.1

DESCRIPTION: PHASE III — DATE: 27 day July month 2002 year

MATERIAL TYPE: LOW PERM CLAY — SAMPLE NO.: LP02-21

SOIL SAMPLE SIZE	+3/8 = 1145.0 g	MOISTURE = 492.3 g	TOTAL = 21065.0 g
	-3/8 = 19,427.7 g		

APPROXIMATE MINIMUM WT. OF SAMPLE (PASSING NO. 10 SIEVE) (grams)	SAND	FINE GRAIN
	115	65

	+3/8 BEFORE WASH	-3/8 BEFORE WASH	+3/8 AFTER WASH	-3/8 AFTER WASH
TARE NO.	L-1	L-5	L-1	L-5
WT. OF DRY SAMPLE PLUS TARE (grams)	1637.4	682.6	1469.7	277.8
WT. OF TARE (grams)	192.4	106.4	192.4	106.4
WT. OF DRY SAMPLE (grams)	1145.0	580.7	1277.3	171.4

SIEVE ANALYSIS — QA ID: PLE

SIEVE NO.	DIAMETER (mm)	WT. RETAINED (grams)	% RETAINED	% FINER		PROJECT SPECIFICATIONS
3 in	76.2	0.0	0	100		
2 in	50.8	0.0	0	100		100
1 1/2in	38.1	0.0	0	100		
1 in	25.4	391.4	1.9	98.1		
3/4 in	19.1	631.0	3.0	97.0		90-100
1/2 in	12.7	1024.6	4.9	95.1		
3/8 in	9.53	1269.5	6.0	94.0		
No. 4	4.75	200	3.4	96.6	90.8	
No. 10	2.00	51.2	8.8	91.2	85.7	
No. 20	0.850	76.4	13.2	86.8	81.6	
No. 40	0.425	98.6	17.0	83.0	78.0	
No. 60	0.250	117.7	20.3	79.7	74.9	
No. 100	0.125	142.1	24.5	75.5	70.9	
No. 200	0.075	170.0	29.3	70.7	66.5	50-100
PAN	—	171.3	—	—		

COMMENTS:

000350

%FINER = 100 − Σ% RETAINED

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SHEET NO. 1 OF 2

PARTICLE SIZE DISTRIBUTION ASTM D 421 AND D 422
US STANDARD SIEVE OPENING SIZES

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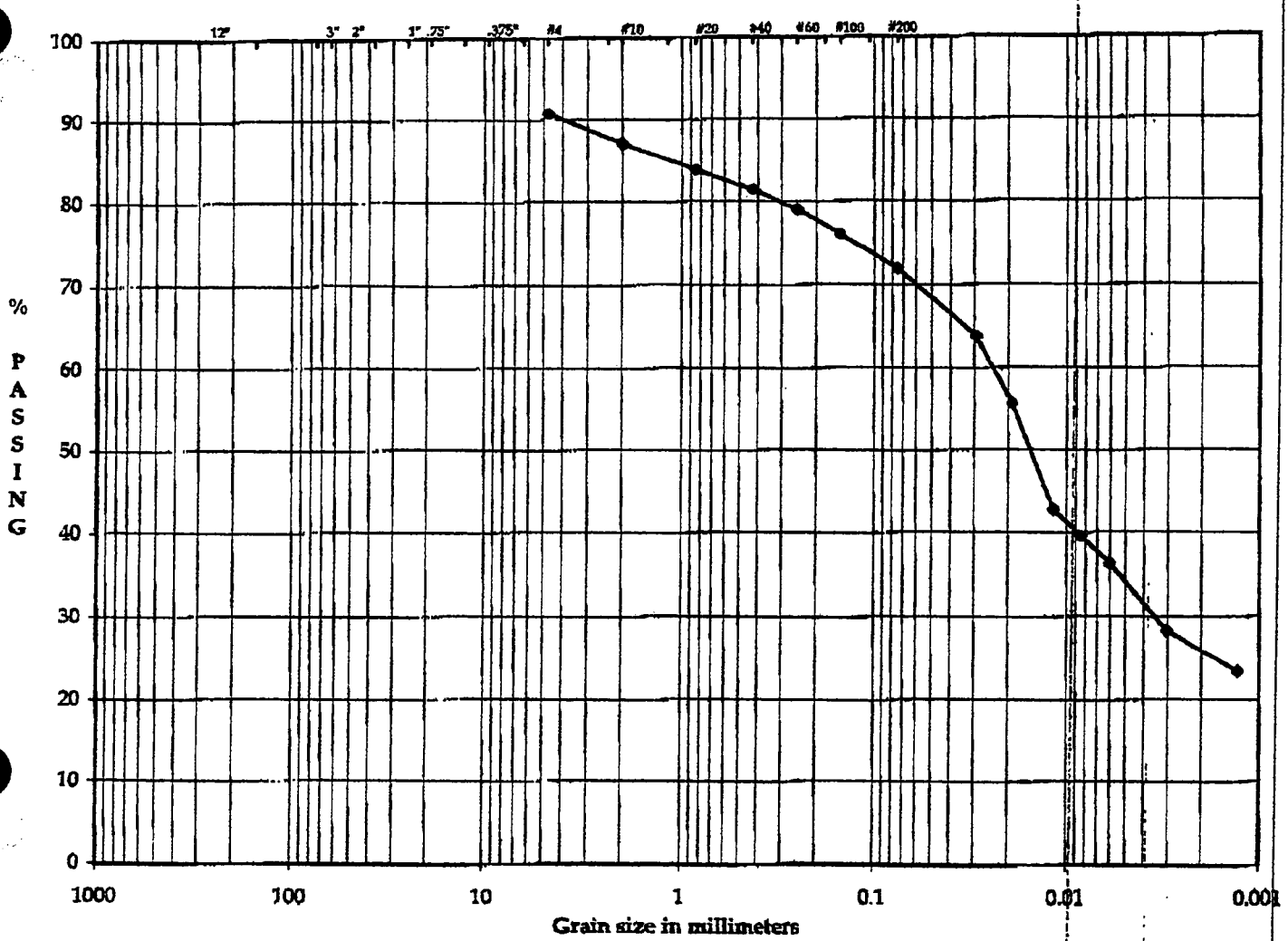

Boulders	Cobbles	Coarse	Fine	Cor	Med	Fine	SILT OR CLAY
		Gravel		SAND			FINES

SAMPLE ID	LP02 - 21
SAMPLE TYPE	Bag
SAMPLE DEPTH	-

LL	-
PL	-
PI	-

DESCRIPTION	Yellowish Brown, SILTY CLAY, some coarse to fine sand, little gravel.
USCS	(CL)

000351

GEOSYNTEC/FLUOR FERNALD/OH
023-3313

TECH	TJ.
DATE	7/30/02
CHECK	[illegible]
REVIEW	[illegible]

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ASTM GRAIN SIZE ANALYSIS
ASTM C117, C136, D421, D422, D1140 and D2217

PROJECT TITLE	GEOSYNTEC/FLUOR FERNALD/OH	SAMPLE ID	LP02 - 21
PROJECT NO.	023-3313	SAMPLE TYPE	Bag
		SAMPLE DEPTH	-

AS RECEIVED WATER CONTENT

Tare No.		
Wt. Wet Soil & Tare (gm)	(W1)	
Wt. Dry Soil & Tare (gm)	(W2)	
Weight of Tare (gm)	(W3)	
Weight of Water (gm)	(W4=W1-W2)	
Weight of Dry Soil (gm)	(W5=W2-W3)	
Moisture Content (%)	(W4/W5)*100	

Hygroscopic Moisture For Sieve Sample

Wet Soil & Tare (gm)	50.29
Dry Soil & Tare (gm)	48.67
Tare Weight (gm)	3.21
Moisture Content (%)	3.56

Total Weight of Sample Used For Sieve Analysis Corrected For Hygroscopic Moisture

Weight + Tare, Before Separating On The #4 Sieve (gm)	735.69	
Tare Weight (gm)	236.01	
Total Weight (gm)	482.49	(W6)

Plus #4 Material Sieve

TARE WEIGHT 0.00

	(Wt+Tare)	(((Wt-Tare)/W6)*100)	%PASSING		
12.0"				12.0"	cobbles
3.0"				3.0"	coarse gravel
2.5"				2.5"	coarse gravel
2.0"				2.0"	coarse gravel
1.5"				1.5"	coarse gravel
1.0"				1.0"	coarse gravel
0.75"				0.75"	fine gravel
0.50"				0.50"	fine gravel
0.375"				0.375"	fine gravel
#4			90.8	#4	coarse sand

NOTE: Client provided the percent passing #4 sieve.

HYDROMETER ANALYSIS

Specific Gravity	(assumed)	2.720
Specific Gravity	(tested)	
Amount Dispersing Agent (ml)		125.00
Type Dispersion Device		Mechanical
Length of Dispersion Period		1 Minute

Weight of Sample Used For Hydrometer Test

Weight of Sample Wet or Dry (gm)	57.65
Calculated Dry Wt. used in test (gm)	55.67
Hydrometer Bulb Number	704004
% Pass #4 Sieve For Whole Sample	90.80

TARE WEIGHT 0.00

HYDROMETER BACKSIEVE (Percent Passing #10 - #200 Sieves)

	(Wt+Tare)	Cumul Wt. Retained	% PASSING		
#10	2.31	2.31	87.0	#10	medium sand
#20	4.24	4.24	83.9	#20	medium sand
#40	5.75	5.75	81.4	#40	fine sand
#60	7.23	7.23	79.0	#60	fine sand
#100	9.05	9.05	76.0	#100	fine sand
#200	11.56	11.56	71.9	#200	fines

HYDROMETER CALCULATIONS

DATE 7/31/02	TIME 9:34	ET (min)	READING R	TEMP T	TEMP.COR. K	HYD.COR. Cc	READING C	EFFECTIVE LENGTH	A
7/31/02	9:36	2.00	47.0	22.50	0.013	7.50	39.50	9.9	0.99
7/31/02	9:39	5.00	42.0	22.50	0.013	7.50	34.50	10.7	0.99
7/31/02	9:49	15.00	34.0	22.50	0.013	7.50	26.50	12.0	0.99
7/31/02	10:04	30.00	32.0	22.50	0.013	7.50	24.50	12.4	0.99
7/31/02	10:34	60.00	30.0	22.50	0.013	7.50	22.50	12.7	0.99
7/31/02	13:44	250.00	25.0	22.50	0.013	7.50	17.50	13.5	0.99
8/1/02	9:34	1440.00	22.0	22.50	0.013	7.50	14.50	14.0	0.99

GRAIN SIZE PERCENTAGES

Particle Diameter	% PASSING
0.0291	63.8
0.0192	55.7
0.0117	42.8
0.0084	39.6
0.0060	36.3
0.0030	28.3
0.0013	23.4

% GRAVEL	9.20
% COARSE SAND	3.77
% MEDIUM SAND	5.61
% FINE SAND	9.48
% FINES	71.94
% TOTAL SAMPLE	100.00

Description: Yellowish Brown, SILTY CLAY, some coarse to fine sand, little gravel.

USCS: (CL)

-	LL
-	PL
-	PI

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TECH	TJ
DATE	7/30/02
CHECK	BEI
REVIEW	[illegible]

GEOSYNTEC CONSULTANTS

FLUOR FERNALD, INC.

PARTICLE SIZE DISTRIBUTION AND SOIL CLASSIFICATION TEST RESULTS (ASTM C 136/D 422) (ASTM D 2487)

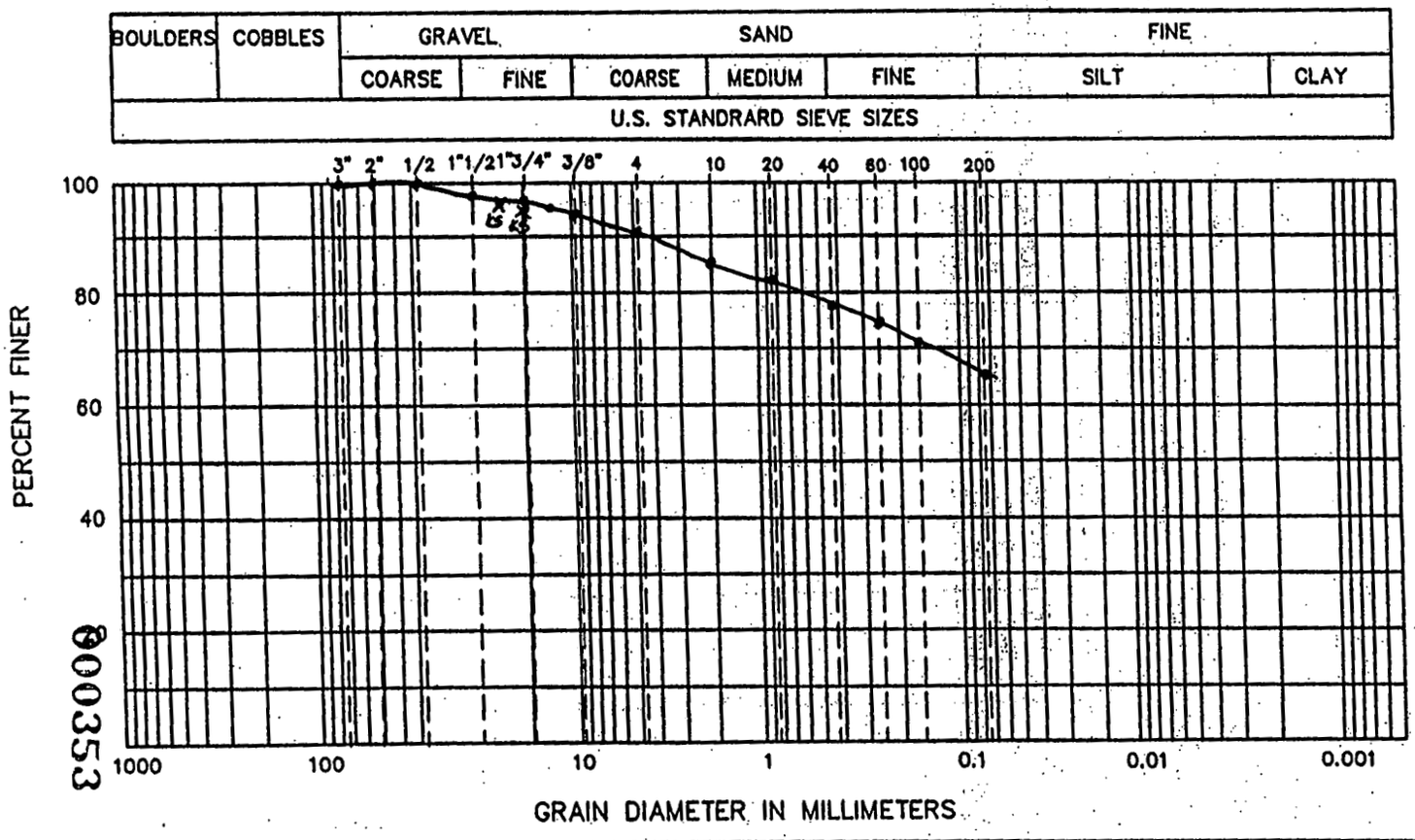
PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO — PROJECT NO.: 6Q1341 TASK NO.: 04.1

DESCRIPTION: Phase IV — DATE: 30 day July month 2002 year

MATERIAL TYPE: Low Perm Clay — SAMPLE NO.: LP02-21 QA ID: KS

CURVE COEFFICIENTS: $C_{uniformity} = (\frac{D_{60}}{D_{10}}) =$ $C_{curvature} = (\frac{D_{30}^2}{D_{60} \times D_{10}}) =$



ATTERBERG LIMITS

(LL) 30

(PL) 16

(PI) 14

SIEVE RESULTS

SIEVE SIZE	% FINER
3-in.	100
2-in.	100
1 1/2-in.	100
1-in.	98.1
3/4-in.	97.0
1/2-in.	95.1
3/8-in.	94.0
NO. 4	90.8
NO. 10	85.7
NO. 20.	81.6
NO. 40	78.0
NO. 60	74.9
NO. 100	70.9
NO. 200	66.5

HYDROMETER RESULTS

PARTICLE DIA.	% FINER
0.05	
0.02	
0.005	
0.002	

SOIL CLASSIFICATION (ASTM D 2487):

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GEOSYNTEC CONSULTANTS

FLUOR FERNALD

PARTICLE SIZE ANALYSIS–SIEVE METHOD (ASTM D 422)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO — PROJECT NO.: GQ1341 TASK NO.: 041

DESCRIPTION: PHASE III — DATE: 29 day Jul. month 2002 year

MATERIAL TYPE: LOW PERM CLAY — SAMPLE NO.: LP02-22

SOIL SAMPLE SIZE: +3/8 = 22840 gm; -3/8 = 44,239.6 g; MOISTURE = 293.9 gm; TOTAL = 46817.5

APPROXIMATE MINIMUM WT. OF SAMPLE (PASSING NO. 10 SIEVE) (grams)	SAND	FINE GRAIN
	115	65

	+3/8 BEFORE WASH	-3/8 BEFORE WASH	+3/8 AFTER WASH	-3/8 AFTER WASH
TARE NO.	N	L-2	N	L-2
WT. OF DRY SAMPLE PLUS TARE (grams)	2385.6	759.3	2123.9	361.5
WT. OF TARE (grams)	101.6	191.3	101.6	191.3
WT. OF DRY SAMPLE (grams)	2284.0	569.0	2022.3	170.2

SIEVE ANALYSIS — QA ID: AC

SIEVE NO.	DIAMETER (mm)	WT. RETAINED (grams)	% RETAINED	% FINER		PROJECT SPECIFICATIONS
3 in	76.2	Ø	Ø	100		
2 in	50.8	Ø	Ø	100		100
1 1/2in	38.1	68.1	Ø.1	99.9		
1 in	25.4	558.8	1.2	98.8		
3/4 in	19.1	967.5	2.1	97.9		90-100
1/2 in	12.7	1610.3	3.4	96.6		
3/8 in	9.53	2021.4	4.3	95.7		
No. 4	4.75	17.3	3.0	97.0	92.8	
No. 10	2.00	42.9	7.5	92.5	88.5	
No. 20	0.850	69.5	12.2	87.8	84.0	
No. 40	0.425	94.6	16.6	83.4	79.8	
No. 60	0.250	115.3	20.3	79.7	76.3	
No. 100	0.125	140.3	24.7	75.3	72.1	
No. 200	0.075	169.5	29.8	70.2	~~76.2~~ 67.2	50-100
PAN	—	170.1	—	—		

COMMENTS:

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%FINER = 100 − Σ% RETAINED

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SHEET NO. 1 of 2

PARTICLE SIZE DISTRIBUTION ASTM D 421 AND D 422
US STANDARD SIEVE OPENING SIZES

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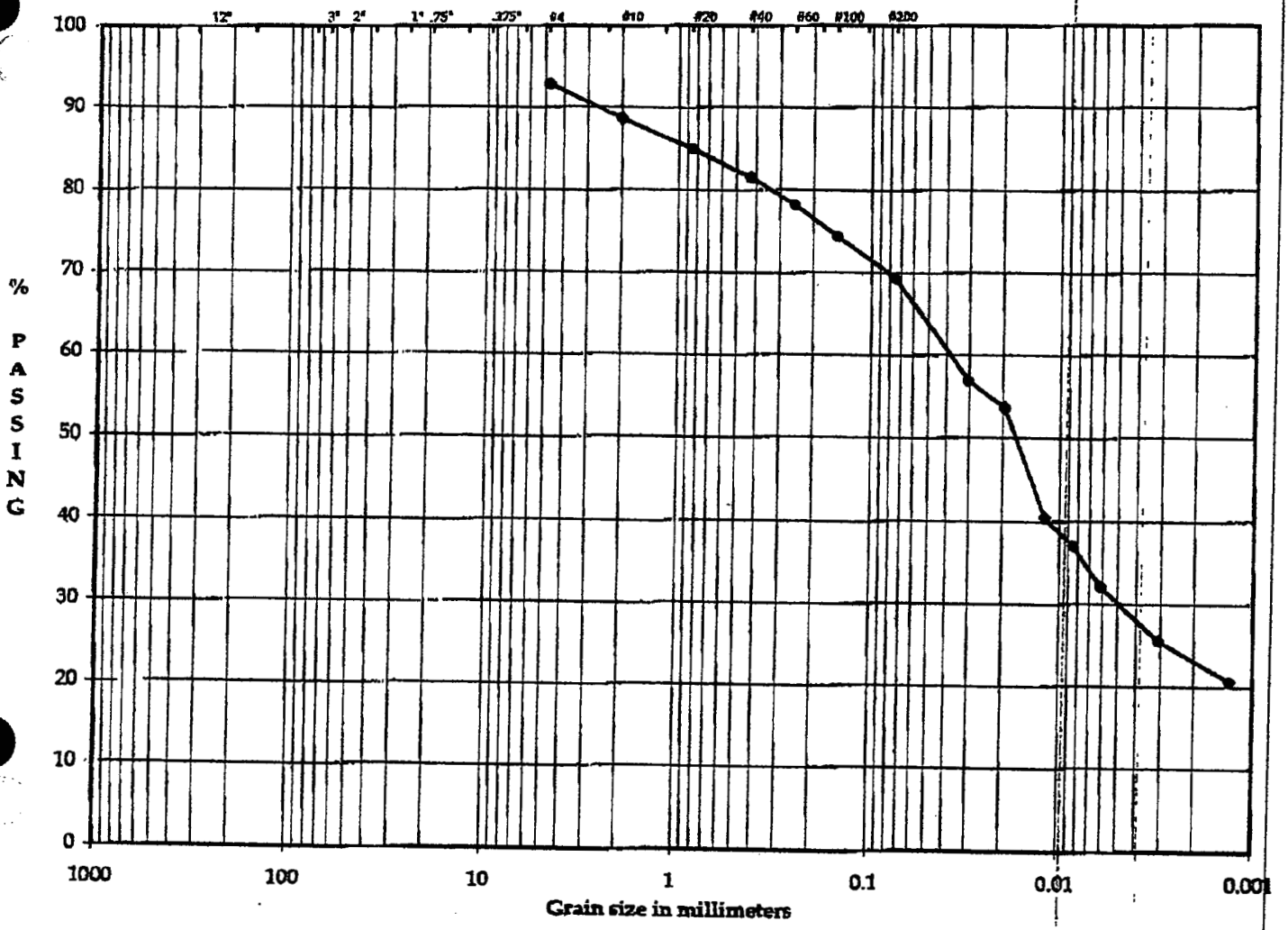

Boulders	Cobbles	Coarse	Fine	Cor	Med	Fine	SILT OR CLAY
		Gravel		SAND			FINES

SAMPLE ID	LP02 - 22
SAMPLE TYPE	Bag
SAMPLE DEPTH	-

LL	-
PL	-
PI	-

DESCRIPTION	Yellowish Brown SILTY CLAY, some coarse to fine sand, little gravel.
USCS	(CL)

000355

GEOSYNTEC/FLUOR FERNALD/OH
023-3313

TECH	TJ
DATE	7/30/02
CHECK	[illegible]
REVIEW	[illegible]

ASTM GRAIN SIZE ANALYSIS
ASTM C117, C136, D421, D422, D1140 and D2217

4940

PROJECT TITLE	GEOSYNTEC/FLUOR FERNALD/OH	SAMPLE ID	LP02 - 22
PROJECT NO.	023-3313	SAMPLE TYPE	Bag
		SAMPLE DEPTH	-

AS RECEIVED WATER CONTENT

Tare No.		
Wt. Wet Soil & Tare (gm)	(W1)	
Wt. Dry Soil & Tare (gm)	(W2)	
Weight of Tare (gm)	(W3)	
Weight of Water (gm)	(W4=W1-W2)	
Weight of Dry Soil (gm)	(W5=W2-W3)	
Moisture Content (%)	(W4/W5)*100	

Hygroscopic Moisture For Sieve Sample

Wet Soil & Tare (gm)	50.21
Dry Soil & Tare (gm)	47.59
Tare Weight (gm)	3.27
Moisture Content (%)	5.91

Total Weight of Sample Used For Sieve Analysis Corrected For Hygroscopic Moisture

Weight + Tare, Before Separating On The #4 Sieve (gm)	734.24	
Tare Weight (gm)	234.67	
Total Weight (gm)	471.69	(W6)

Plus #4 Material Sieve

TARE WEIGHT 0.00

	(Wt+Tare)	(((Wt-Tare)/W6)*100)	%PASSING		
12.0"				12.0"	cobbles
3.0"				3.0"	coarse gravel
2.5"				2.5"	coarse gravel
2.0"				2.0"	coarse gravel
1.5"				1.5"	coarse gravel
1.0"				1.0"	coarse gravel
0.75"				0.75"	fine gravel
0.50"				0.50"	fine gravel
0.375"				0.375"	fine gravel
#4			92.8	#4	coarse sand

NOTE: Client provided the percent passing #4 sieve.

HYDROMETER ANALYSIS

Specific Gravity	(assumed)	2.720
Specific Gravity	(tested)	
Amount Dispersing Agent (ml)		125.00
Type Dispersion Device		Mechanical
Length of Dispersion Period		1 Minute

Weight of Sample Used For Hydrometer Test

Weight of Sample Wet or Dry (gm)	58.98
Calculated Dry Wt. used in test (gm)	55.69
Hydrometer Bulb Number	704004
% Pass #4 Sieve For Whole Sample	92.80

TARE WEIGHT 0.00

HYDROMETER BACKSIEVE (Percent Passing #10 - #200 Sieves)

	(Wt+Tare)	Cumul Wt. Retained	% PASSING		
#10	2.50	2.50	88.6	#10	medium sand
#20	4.68	4.68	85.0	#20	medium sand
#40	6.81	6.81	81.5	#40	fine sand
#60	8.72	8.72	78.3	#60	fine sand
#100	11.00	11.00	74.5	#100	fine sand
#200	14.05	14.05	69.4	#200	fines

HYDROMETER CALCULATIONS

DATE 7/31/02	TIME 9:36	ET (min)	READING R	TEMP T	TEMP.COR. K	HYD.COR. Cc	READING C	EFFECTIVE LENGTH	A
7/31/02	9:38	2.00	42.0	22.50	0.013	7.50	34.50	10.7	0.99
7/31/02	9:41	5.00	40.0	22.50	0.013	7.50	32.50	11.1	0.99
7/31/02	9:51	15.00	32.0	22.50	0.013	7.50	24.50	12.4	0.99
7/31/02	10:06	30.00	30.0	22.50	0.013	7.50	22.50	12.7	0.99
7/31/02	10:36	60.00	27.0	22.50	0.013	7.50	19.50	13.2	0.99
7/31/02	13:46	250.00	23.0	22.50	0.013	7.50	15.50	13.8	0.99
8/1/02	9:36	1440.00	20.0	22.50	0.013	7.50	12.50	14.3	0.99

GRAIN SIZE PERCENTAGES

Particle Diameter	% PASSING
0.0203	56.9
0.0195	53.6
0.0119	40.4
0.0085	37.1
0.0061	32.2
0.0031	25.6
0.0013	20.6

% GRAVEL	7.20
% COARSE SAND	4.17
% MEDIUM SAND	7.18
% FINE SAND	12.06
% FINES	69.39
% TOTAL SAMPLE	100.00

Description: Yellowish Brown, SILTY CLAY, some coarse to fine sand, little gravel.

USCS: (CL)

-	LL
-	PL
-	PI

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TECH	TJ
DATE	7/30/02
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REVIEW	

Proctor Compaction

GEOSYNTEC CONSULTANTS

FLUOR FERNALD, INC.

PARTICLE SIZE DISTRIBUTION AND SOIL CLASSIFICATION TEST RESULTS (ASTM C 136/D 422) (ASTM D 2487)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO

DESCRIPTION: Phase IV

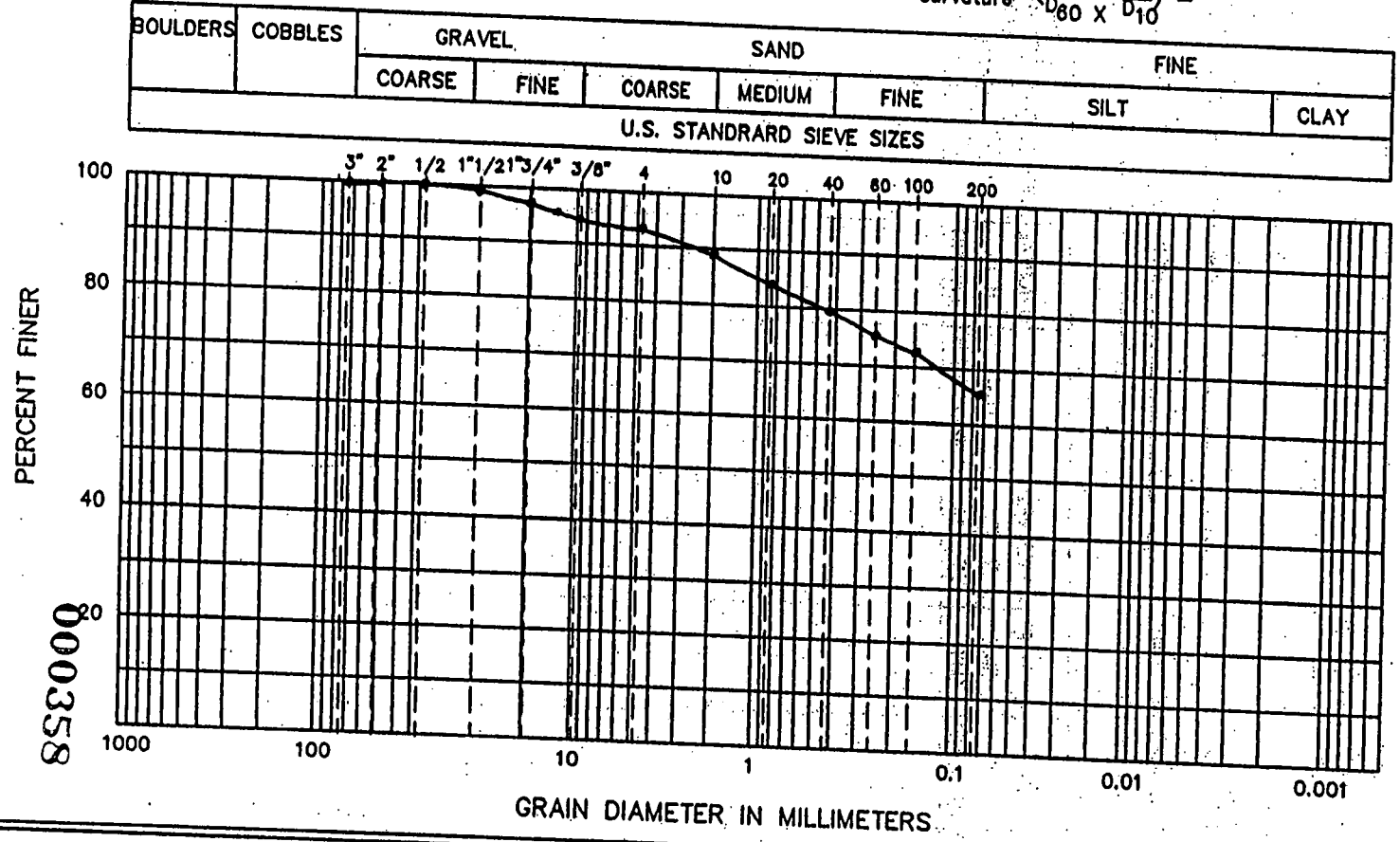
MATERIAL TYPE: Low Perm Clay

PROJECT NO.: GQ1341 TASK NO.: 04.1

DATE: 30 day July month 2002 year

SAMPLE NO.: LP02-22 QA ID: KS

CURVE COEFFICIENTS: $C_{uniformity} = \left(\frac{D_{60}}{D_{10}}\right) =$ $C_{curvature} = \left(\frac{D_{30}^2}{D_{60} \times D_{10}}\right) =$



ATTERBERG LIMITS

(LL) .....

(PL) .....

(PI) .....

SIEVE RESULTS

SIEVE SIZE	% FINER
3-in.	100
2-in.	100
1 1/2-in.	99.9
1-in.	98.8
3/4-in.	97.9
1/2-in.	96.6
3/8-in.	95.7
NO. 4	92.8
NO. 10	88.5
NO. 20	84.0
NO. 40	79.8
NO. 60	76.3
NO. 100	72.1
NO. 200	67.2

HYDROMETER RESULTS

PARTICLE DIA.	% FINER
0.005	
0.002	
0.0005	
0.0002	

SOIL CLASSIFICATION (ASTM D 2487):

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GEOSYNTEC CONSULTANTS

FLUOR FERNALD

FIELD LABORATORY COMPACTION TEST

(ASTM D 698 METHOD B)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO

PROJECT NO. 60134.1 TASK NO.: 64.1

DESCRIPTION: Phase III

DATE: 10 day Aug month 2001 year

MATERIAL TYPE: Brown till MATERIAL SOURCE: LP01-01 STOCKPILE SAMPLE NO.: LP-01-01

THIS METHOD WILL BE USED IF THE MATERIAL RETAINED ON THE NO. 3/4-in. (19-mm) SIEVE IS LESS THAN 30%, IF THE MATERIAL RETAINED ON THE NO. 4 (4.75-mm) SIEVE IS GREATER THAN 20%, AND IF THE MATERIAL RETAINED ON THE NO. 3/8-in. (9.5-mm) SIEVE IS LESS THAN 20%.
ALL MATERIAL RETAINED ON THE NO. 3/8-in. (9.5-mm) SIEVE IS DISCARDED.
USE OVERSIZE CORRECTION IF MORE THAN 5% IS DISCARDED ACCORDING TO ASTM D 4718.
USE A 4-in. DIAMETER MOLD / 5.5-lb RAMMER / 12-in. DROP / 3 LAYERS / 25 BLOWS PER LAYER.

13.41

COMPACTION OF SOIL

QA ID: DLE

				13.63	13.82	13.82	
	WATER ADDED	(ml)		150 mL 6%	200 mL 8%	250 mL 10%	50 mL 2%
A	WT. OF SOIL & MOLD	(grams)		6182.6	6268.8	6268.8	6082.8
B	WT. OF MOLD	(grams)		4208.8	4208.8	4208.8	4208.8
C	WT. OF SOIL = A − B	(grams)		1973.8	2060.0	2060.0	1874.0
D	WET UNIT WT.(1) = C X 0.066	(pcf)		130.3	136.0	136.0	123.7
E	DRY UNIT WT. = D / [1 + (K/100)]	(pcf)		118.4	121.1	119.2	116.5

NOTE: IF CALIBRATED MOLD OF 1/30 FT^3 IS USED, THE WET DENSITY IS CALCULATED FROM THE WEIGHT OF SOIL, THE VOLUME OF THE MOLD AND THE CONVERSION FROM GRAMS TO POUNDS (I.E., CONVERSION FACTOR = (30 / 453.6) = 0.066). THE MOLD MUST BE CALIBRATED TO VERIFY A CAPACITY OF 1/30 ± 0.0005 FT^3 ON INTERVALS NOT TO EXCEED 1000 TIMES THAT THE MOLD IS FILLED.

MOISTURE CONTENT – ASTM D 2216

QA ID: DLE/CA

	TARE NO.			#301	#303	#302	#230
F	WT. OF TARE	(grams)		8.5	8.3	8.3	8.0
G	WT. OF WET SOIL & TARE	(grams)		458.4	507.5	492.5	468.4
H	WT. OF DRY SOIL & TARE	(grams)		417.3	452.8	432.7	441.5
I	WT. OF WATER = G − H	(grams)		41.1	54.7	59.8	26.9
J	WT. DRY SOIL = H − F	(grams)		408.8	444.5	424.4	433.5
K	MOISTURE CONTENT = (I/J) X 100	(%)		10.1	12.3	14.1	6.2

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GEOSYNTEC CONSULTANTS

FLUOR DANIEL FERNALD

CORRECTION OF UNIT WEIGHT AND WATER CONTENT FOR SOILS CONTAINING OVERSIZE PARTICLES . *(ASTM D 4718)*

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO PROJECT NO: GQ0409 TASK NO.: 04

DESCRIPTION: Phase III DATE: 14 day Aug month 2001 year

MATERIAL TYPE: Low Perm Clay LP01-01 STANDARD

Weight of Total Sample	=	39167.7 g
Weight of Oversize Fraction	=	964.2
Weight of Finer Fraction (-3/8)	=	38203.5
Percentage of Oversize Fraction	= (P_C)	2.5
Percentage of Finer Fraction (-3/8)	= (P_F)	97.5
Specific Gravity (Assumed)	= (G_M)	2.72

(W_F)	=	Water Content -3/8, as decimal	=	0.13
(W_C)	=	Water Content +3/8, as decimal	=	0.015
(δ_F)	=	Dry Density of finer fraction	=	122.1
(δ_W)	=	Unit Weight of Water	=	62.4

$$C_W=(W_F P_F)+(W_C P_C)$$

$C_w = 12.7\ \%$

$$C\delta_D=100\delta_F G_M \delta_W/(\delta_F P_C)+(G_M \delta_W P_F)$$

000360

$C_d = 122.9$ pcf

GEOSYNTEC CONSULTANTS

FLUOR FERNALD

4940

MOISTURE-DENSITY RELATIONSHIP

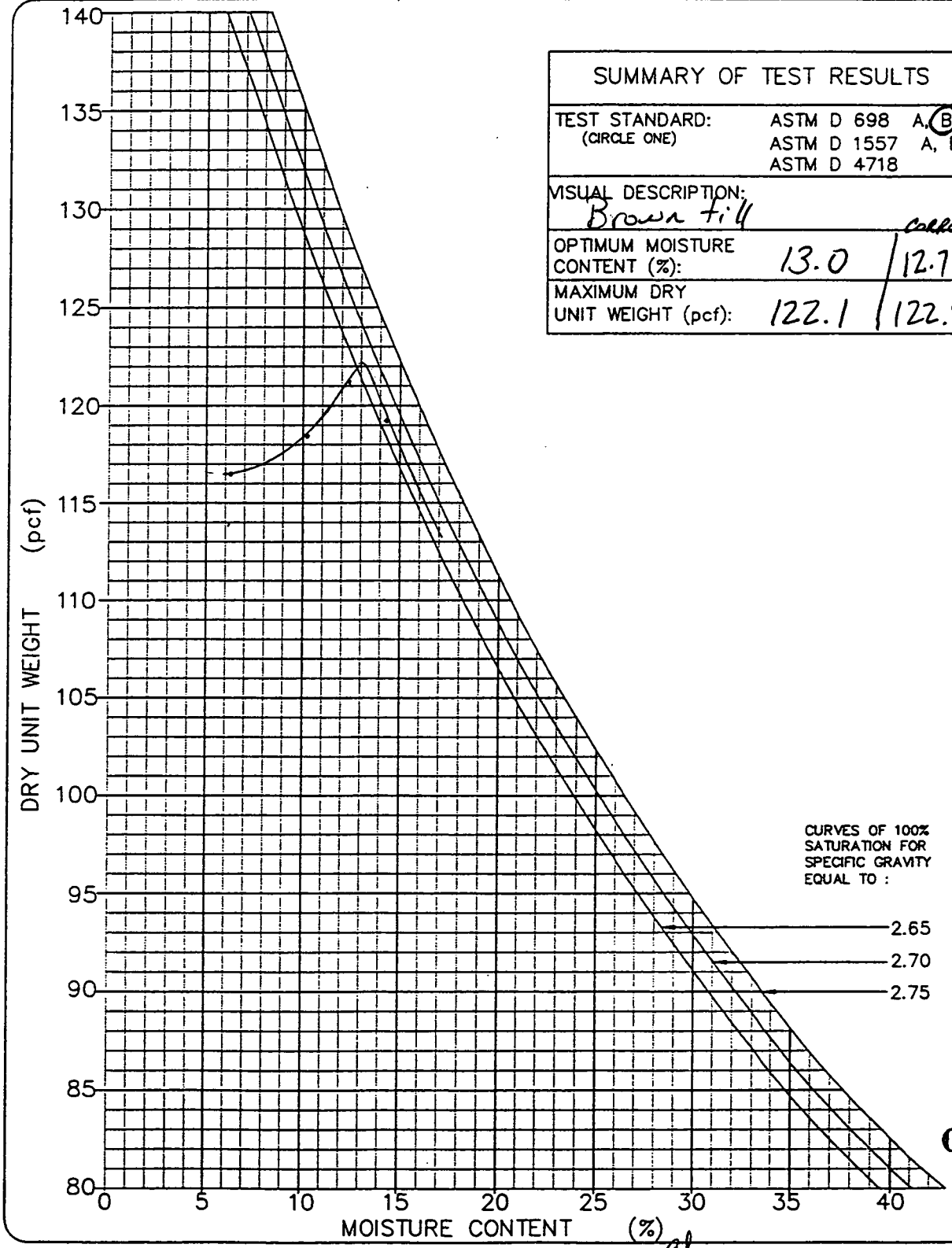
PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO PROJECT NO.: 60134 TASK NO.: 041

DESCRIPTION: ~~Low Perm Clay~~ Phase III DATE: 13 day Aug month 2001 year

MATERIAL TYPE: Low Perm Clay MATERIAL SOURCE: Stockpile 01-1 SAMPLE NO.: 2001-01

SUMMARY OF TEST RESULTS			QA ID
TEST STANDARD: (CIRCLE ONE)	ASTM D 698 A, (B) C ASTM D 1557 A, B, C ASTM D 4718		
VISUAL DESCRIPTION: Brown fill			
OPTIMUM MOISTURE CONTENT (%):	13.0	CORRECTED 12.7	
MAXIMUM DRY UNIT WEIGHT (pcf):	122.1	122.9	~~122.1~~



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FLUOR DANIEL FERNALD

FIELD LABORATORY COMPACTION TEST (ASTM D 1557 METHOD B) mod.-Sieved

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO

PROJECT NO. 6Q134 TASK NO.: 041

DESCRIPTION: Phase III

DATE: 10 day Aug month 2001 year

MATERIAL TYPE: Brown Till

SAMPLE NO.: LP-01-01

THIS METHOD WILL BE USED IF THE MATERIAL RETAINED ON THE NO. 4-in. (4.75-mm) SIEVE IS GREATER THAN 20%, AND THE MATERIAL RETAINED ON THE NO. 3/8-in. (9.5-mm) SIEVE IS LESS THAN 20%.
ALL MATERIAL RETAINED ON THE NO. 3/8-in. (9.5-mm) SIEVE IS DISCARDED.
USE OVERSIZE CORRECTION IF MORE THAN 5% IS DISCARDED ACCORDING TO ASTM D 4718.
USE A 4-in. DIAMETER MOLD / 10-lb RAMMER / 18-in. DROP / 5 LAYERS / 25 BLOWS PER LAYER.

COMPACTION OF SOIL

QA ID: DLE

			13.71	14.01	14.11	14.04	
	WATER ADDED	(ml)	2%	100 ml 4%	150 ml 6%	200 ml 8%	
A	WT. OF SOIL & MOLD	(grams)	~~6313.71~~ 6318.9	6354.9	6400.3	6368.5	
B	WT. OF MOLD	(grams)	4208.8	4208.8	4208.8	4208.8	4208.8
C	WT. OF SOIL = A - B	(grams)	2010.1	2146.1	2191.5	2159.7	
D	WET UNIT WT.(1) = C X 0.066	(pcf)	132.7	141.6	144.6	142.5	
E	DRY UNIT WT. = D / [1 + (K/100)]	(pcf)	124.8	131.1	131.5	127.9	

NOTE: IF CALIBRATED MOLD OF 1/30 FT^3 IS USED, THE WET DENSITY IS CALCULATED FROM THE WEIGHT OF SOIL, THE VOLUME OF THE MOLD AND THE CONVERSION FROM GRAMS TO POUNDS (I.E., CONVERSION FACTOR = (30 / 453.6) = 0.066). THE MOLD MUST BE CALIBRATED TO VERIFY A CAPACITY OF 1/30 ± 0.0005 FT^3 ON INTERVALS NOT TO EXCEED 1000 TIMES THAT THE MOLD IS FILLED.

MOISTURE CONTENT - ASTM D 2216

QA ID: DLE/CL

	TARE NO.		302	#305	#304	#306	
F	WT. OF TARE	(grams)	8.3	8.2	8.3	8.3	
G	WT. OF WET SOIL & TARE	(grams)	433.7	459.9	493.3	478.6	
H	WT. OF DRY SOIL & TARE	(grams)	408.3	426.4	449.1	430.2	
I	WT. OF WATER = G - H	(grams)	25.4	33.5	44.2	48.4	
J	WT. DRY SOIL = H - F	(grams)	400.0	418.2	440.8	421.9	
K	MOISTURE CONTENT = (I/J) X 100	(%)	6.35	8.0	10.0	11.5	

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GEOSYNTEC CONSULTANTS

FLUOR DANIEL FERNALD

CORRECTION OF UNIT WEIGHT AND WATER CONTENT FOR SOILS CONTAINING OVERSIZE PARTICLES

(ASTM D 4718)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO PROJECT NO: GQ0409 TASK NO.: 04

DESCRIPTION: Phase III DATE: 14 day Aug month 2001 year

MATERIAL TYPE: LOW PERM Clay LP01-01 Modified

Weight of Total Sample	=	39167.7 g
Weight of Oversize Fraction	=	964.2
Weight of Finer Fraction (-3/8)	=	38203.5
Percentage of Oversize Fraction	= (P_C)	2.5
Percentage of Finer Fraction (-3/8)	= (P_F)	97.5
Specific Gravity (Assumed)	= (G_M)	2.72

(W_F)	=	Water Content -3/8, as decimal	=	~~0.013~~ 0.089
(W_C)	=	Water Content +3/8, as decimal	=	0.015
(δ_F)	=	Dry Density of finer fraction	=	~~122.1~~ 133.1
(δ_W)	=	Unit Weight of Water	=	62.4

$$C_W=(W_F P_F)+(W_C P_C)$$

C_W = ~~0.087~~ 8.7%

$$C\delta_D=100\delta_F G_M \delta_W/(\delta_F P_C)+(G_M \delta_W P_F)$$

C_d = 133.8 pcf

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FLUOR DANIEL FERNALD

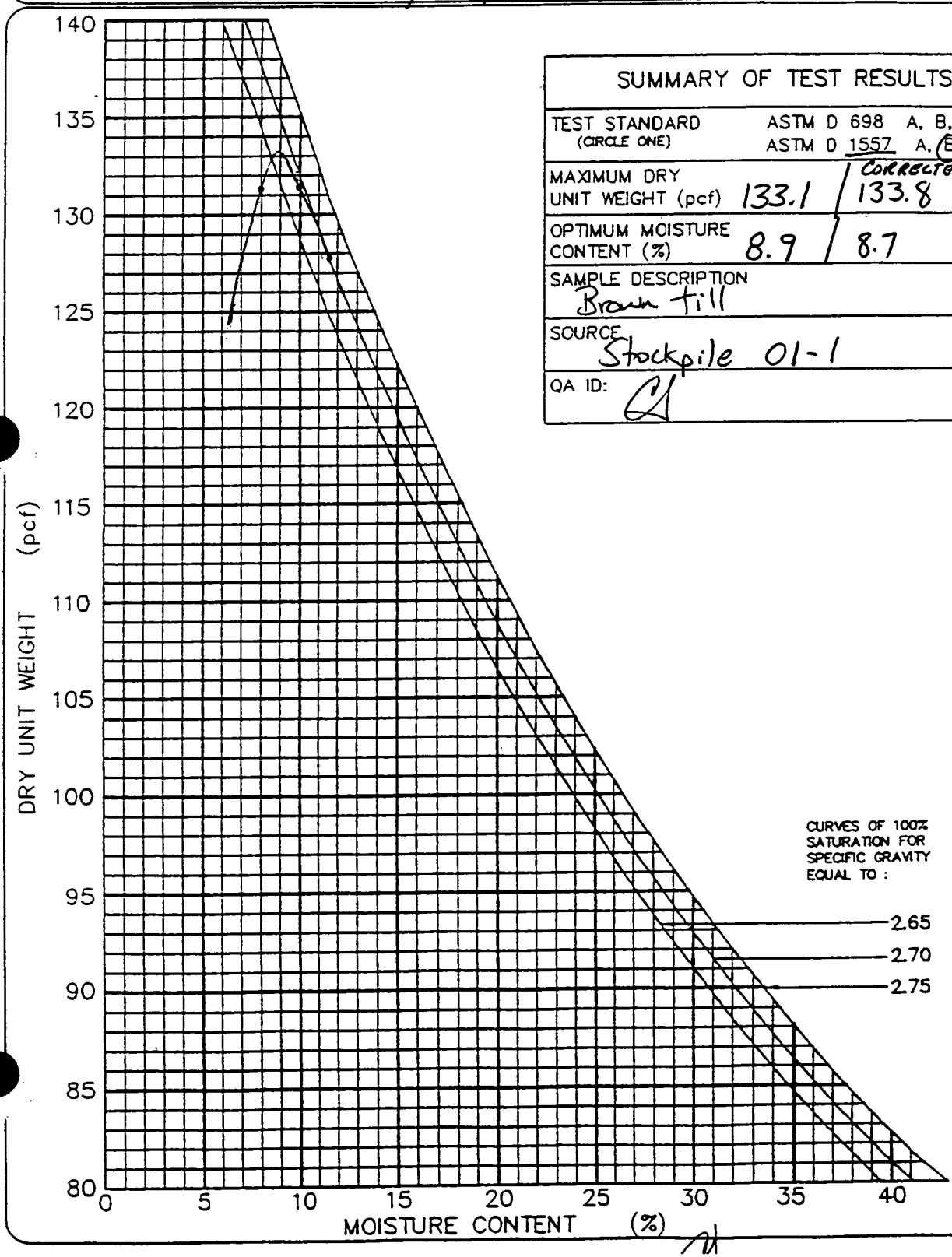
MOISTURE–DENSITY RELATIONSHIP

PROJECT: ON–SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO PROJECT NO: GQ1341 TASK NO.: 041

DESCRIPTION: Phase III DATE: 13 day Aug month 2001 year

MATERIAL TYPE: Brown till / clay Low Perm. SAMPLE NO.: L PJ-01-01



SUMMARY OF TEST RESULTS		
TEST STANDARD (CIRCLE ONE)	ASTM D 698 A, B, C ASTM D 1557 A, (B), C	
MAXIMUM DRY UNIT WEIGHT (pcf)	133.1	CORRECTED 133.8
OPTIMUM MOISTURE CONTENT (%)	8.9	8.7
SAMPLE DESCRIPTION	Brown till	
SOURCE	Stockpile 01-1	
QA ID:		

000364

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FLUOR FERNALD

FIELD LABORATORY COMPACTION TEST

(ASTM D 698 METHOD B)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO

PROJECT NO.: C20134 TASK NO.: 04

DESCRIPTION: Phase III

DATE: 11 day Aug month 2001 year

MATERIAL TYPE: Clay - Low Perm. MATERIAL SOURCE: Stockpile 01-[illegible] SAMPLE NO.: LP01-02

THIS METHOD WILL BE USED IF THE MATERIAL RETAINED ON THE NO. 3/4-in. (19-mm) SIEVE IS LESS THAN 30%, IF THE MATERIAL RETAINED ON THE NO. 4 (4.75-mm) SIEVE IS GREATER THAN 20%, AND IF THE MATERIAL RETAINED ON THE NO. 3/8-in. (9.5-mm) SIEVE IS LESS THAN 20%.
ALL MATERIAL RETAINED ON THE NO. 3/8-in. (9.5-mm) SIEVE IS DISCARDED.
USE OVERSIZE CORRECTION IF MORE THAN 5% IS DISCARDED ACCORDING TO ASTM D 4718.
USE A 4-in. DIAMETER MOLD / 5.5-lb RAMMER / 12-in. DROP / 3 LAYERS / 25 BLOWS PER LAYER.

COMPACTION OF SOIL

QA ID: [illegible]

			13.76	13.92	13.81	13.60	
	WATER ADDED	(ml)	6%	8%	10%	4%	
A	WT. OF SOIL & MOLD	(grams)	6241.5	6314.1	6264.2	6169.0	
B	WT. OF MOLD	(grams)	4208.8	4208.8	4208.8	4208.8	
C	WT. OF SOIL = A - B	(grams)	2032.7	2105.3	2055.4	1960.2	
D	WET UNIT WT.(1) = C X 0.066	(pcf)	134.2	138.9	135.7	129.4	
E	DRY UNIT WT. = D / [1 + (K/100)]	(pcf)	121.2	123.0	118.2	118.8	

NOTE: IF CALIBRATED MOLD OF 1/30 FT^3 IS USED, THE WET DENSITY IS CALCULATED FROM THE WEIGHT OF SOIL, THE VOLUME OF THE MOLD AND THE CONVERSION FROM GRAMS TO POUNDS (I.E., CONVERSION FACTOR = (30 / 453.6) = 0.066). THE MOLD MUST BE CALIBRATED TO VERIFY A CAPACITY OF 1/30 ± 0.0005 FT^3 ON INTERVALS NOT TO EXCEED 1000 TIMES THAT THE MOLD IS FILLED.

MOISTURE CONTENT - ASTM D 2216

QA ID: DLE

	TARE NO.		230	301	306	303	
F	WT. OF TARE	(grams)	8.1	8.5	8.3	8.3	
G	WT. OF WET SOIL & TARE	(grams)	350.8	371.9	336.2	449.2	
H	WT. OF DRY SOIL & TARE	(grams)	317.7	330.3	293.9	413.2	
I	WT. OF WATER = G - H	(grams)	33.1	41.6	42.3	36.0	
J	WT. DRY SOIL = H - F	(grams)	309.6	321.8	285.6	404.9	
K	MOISTURE CONTENT = (I/J) X 100	(%)	10.7	12.9	14.8	8.9	
			1.107	1.129	1.148	1.089	

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SHEET NO. 1 OF 3

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FLUOR DANIEL FERNALD

CORRECTION OF UNIT WEIGHT AND WATER CONTENT FOR SOILS CONTAINING OVERSIZE PARTICLES . *(ASTM D 4718)*

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO PROJECT NO: GQ0409 TASK NO.: 04.1

DESCRIPTION: Phase III DATE: 14 day Aug month 2001 year

MATERIAL TYPE: Low Perm Clay LP01-02 STD

Weight of Total Sample	=	21745.7 g
Weight of Oversize Fraction	=	552.0
Weight of Finer Fraction (-3/8)	=	21193.7
Percentage of Oversize Fraction	= (P_C)	2.5
Percentage of Finer Fraction (-3/8)	= (P_F)	97.5
Specific Gravity (Assumed)	= (G_M)	2.72

(W_F) =	Water Content -3/8, as decimal	=	0.125
(W_C) =	Water Content +3/8, as decimal	=	0.015
(δ_F) =	Dry Density of finer fraction	=	123.4
(δ_W) =	Unit Weight of Water	=	62.4

$$C_W=(W_F P_F)+(W_C P_C)$$

$C_w = 12.2\ \%$

$$C\delta_D=100\delta_F G_M \delta_W/(\delta_F P_C)+(G_M \delta_W P_F)$$

$C_d = 124.3$ pcf

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FLUOR DANIEL FERNALD

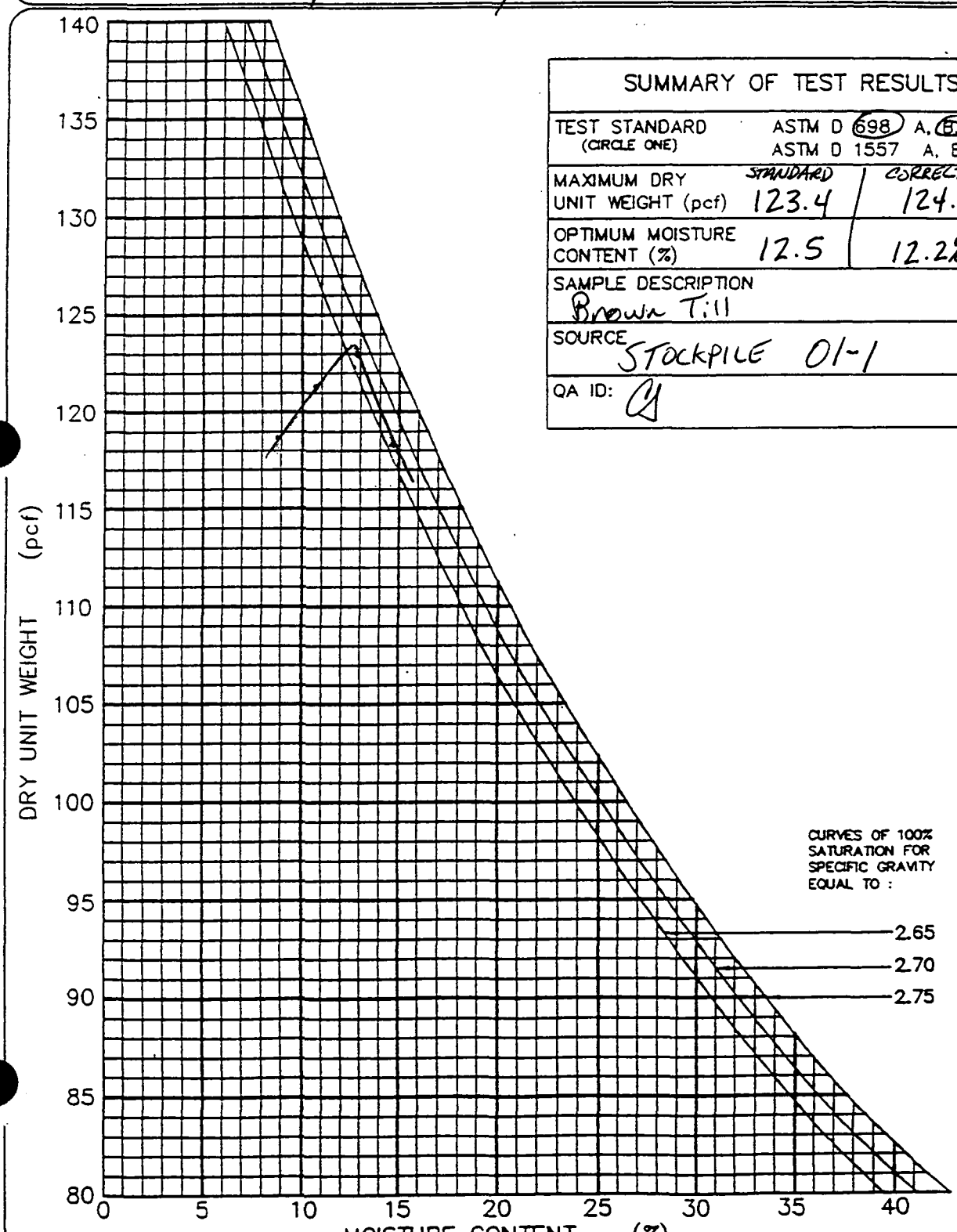
MOISTURE–DENSITY RELATIONSHIP

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO PROJECT NO: GQ1341 TASK NO.: 041

DESCRIPTION: Phase III DATE: 13 day Aug month 2001 year

MATERIAL TYPE: Clay Low-Perm / Brown till SAMPLE NO.: JLP-01-02



SUMMARY OF TEST RESULTS		
TEST STANDARD (CIRCLE ONE)	ASTM D (698) A, (B), C ASTM D 1557 A, B, C	
MAXIMUM DRY UNIT WEIGHT (pcf)	STANDARD 123.4	CORRECTED 124.3
OPTIMUM MOISTURE CONTENT (%)	12.5	12.2%
SAMPLE DESCRIPTION Brown Till		
SOURCE STOCKPILE 01-1		
QA ID: CJ		

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FLUOR FERNALD

FIELD LABORATORY COMPACTION TEST

(ASTM D 698 METHOD B)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO

PROJECT NO.: GQ1341 TASK NO.: 04.1

DESCRIPTION: Phase III

DATE: 16 day Aug month 2001 year

MATERIAL TYPE: Low Perm Clay MATERIAL SOURCE: Stockpile 01-1 SAMPLE NO.: LP01-03

THIS METHOD WILL BE USED IF THE MATERIAL RETAINED ON THE NO. 3/4-in. (19-mm) SIEVE IS LESS THAN 30%, IF THE MATERIAL RETAINED ON THE NO. 4 (4.75-mm) SIEVE IS GREATER THAN 20%, AND IF THE MATERIAL RETAINED ON THE NO. 3/8-in. (9.5-mm) SIEVE IS LESS THAN 20%.
ALL MATERIAL RETAINED ON THE NO. 3/8-in. (9.5-mm) SIEVE IS DISCARDED.
USE OVERSIZE CORRECTION IF MORE THAN 5% IS DISCARDED ACCORDING TO ASTM D 4718.
USE A 4-in. DIAMETER MOLD / 5.5-lb RAMMER / 12-in. DROP / 3 LAYERS / 25 BLOWS PER LAYER.

COMPACTION OF SOIL

QA ID: [illegible]

			13.86	13.90	13.64	13.87	
	WATER ADDED	(ml)	6%	8%	4%	10%	
A	WT. OF SOIL & MOLD	(grams)	6286.9	6305.0	6187.1	6291.4	
B	WT. OF MOLD	(grams)	4208.8	4208.8	4208.8	4208.8	
C	WT. OF SOIL = A − B	(grams)	2078.1	2096.2	1978.3	2082.6	
D	WET UNIT WT.(1) = C X 0.066	(pcf)	137.2	138.4	130.6	137.5	
E	DRY UNIT WT. = D / [1 + (K/100)]	(pcf)	123.2	121.1	119.0	120.0	

NOTE: IF CALIBRATED MOLD OF 1/30 FT^3 IS USED, THE WET DENSITY IS CALCULATED FROM THE WEIGHT OF SOIL, THE VOLUME OF THE MOLD AND THE CONVERSION FROM GRAMS TO POUNDS (I.E., CONVERSION FACTOR = (30 / 453.6) = 0.066). THE MOLD MUST BE CALIBRATED TO VERIFY A CAPACITY OF 1/30 ± 0.0005 FT^3 ON INTERVALS NOT TO EXCEED 1000 TIMES THAT THE MOLD IS FILLED.

MOISTURE CONTENT – ASTM D 2216

QA ID: [illegible]

	TARE NO.		305	33 ~~101~~	304	31	
F	WT. OF TARE	(grams)	8.3	8.1 ~~8.3~~	8.2	8.3	
G	WT. OF WET SOIL & TARE	(grams)	381.5	357.6 ~~370.9~~	264.1	336.0	
H	WT. OF DRY SOIL & TARE	(grams)	343.5	315.9 ~~325.8~~	~~341.9~~ 241.4	~~294.5~~ 294.5	
I	WT. OF WATER = G − H	(grams)	38.0	41.7 ~~45.1~~	22.7	41.5	
J	WT. DRY SOIL = H − F	(grams)	335.2	307.8 ~~317.5~~	233.2	286.2	
K	MOISTURE CONTENT = (I/J) X 100	(%)	11.3	13.5 ~~14.2~~	9.7	14.5	

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SHEET NO. 1 OF 3

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FLUOR FERNALD

CORRECTION OF UNIT WEIGHT AND WATER CONTENT FOR SOILS CONTAINING OVERSIZE PARTICLES *(ASTM D 4718)*

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO PROJECT NO. G2134 TASK NO. 04.1

DESCRIPTION: Phase III DATE: 17 day Aug month 2001 year

MATERIAL TYPE: LDW Farm Clay LP02-03 STANDARD

Weight of Total Sample	=	39786.9
Weight of Oversize Fraction	=	3653.3
Weight of Finer Fraction (- 3/8)	=	36,133.6
Percentage of Oversize Fraction	= (P_C)	9.2
Percentage of Finer Fraction (- 3/8)	= (P_F)	90.8
Specific Gravity (Assumed)	= (G_M)	2.72

(W_F) =	Water Content - 3/8 , as decimal	=	~~12.1~~ 0.121
(W_C) =	Water Content + 3/8 , as decimal	=	0.015
(δ_F) =	Dry Density of finer fraction	=	124.0
(δ_W) =	Unit Weight of Water	=	62.4

$$C_W=(W_F P_F)+(W_C P_C)$$

$C_w = 11.1$

$$C\delta_D=100\delta_F G_M \delta_W/(\delta_F P_C)+(G_M \delta_W P_F)$$

$C_{\delta D} = 127.1$

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FLUOR FERNALD

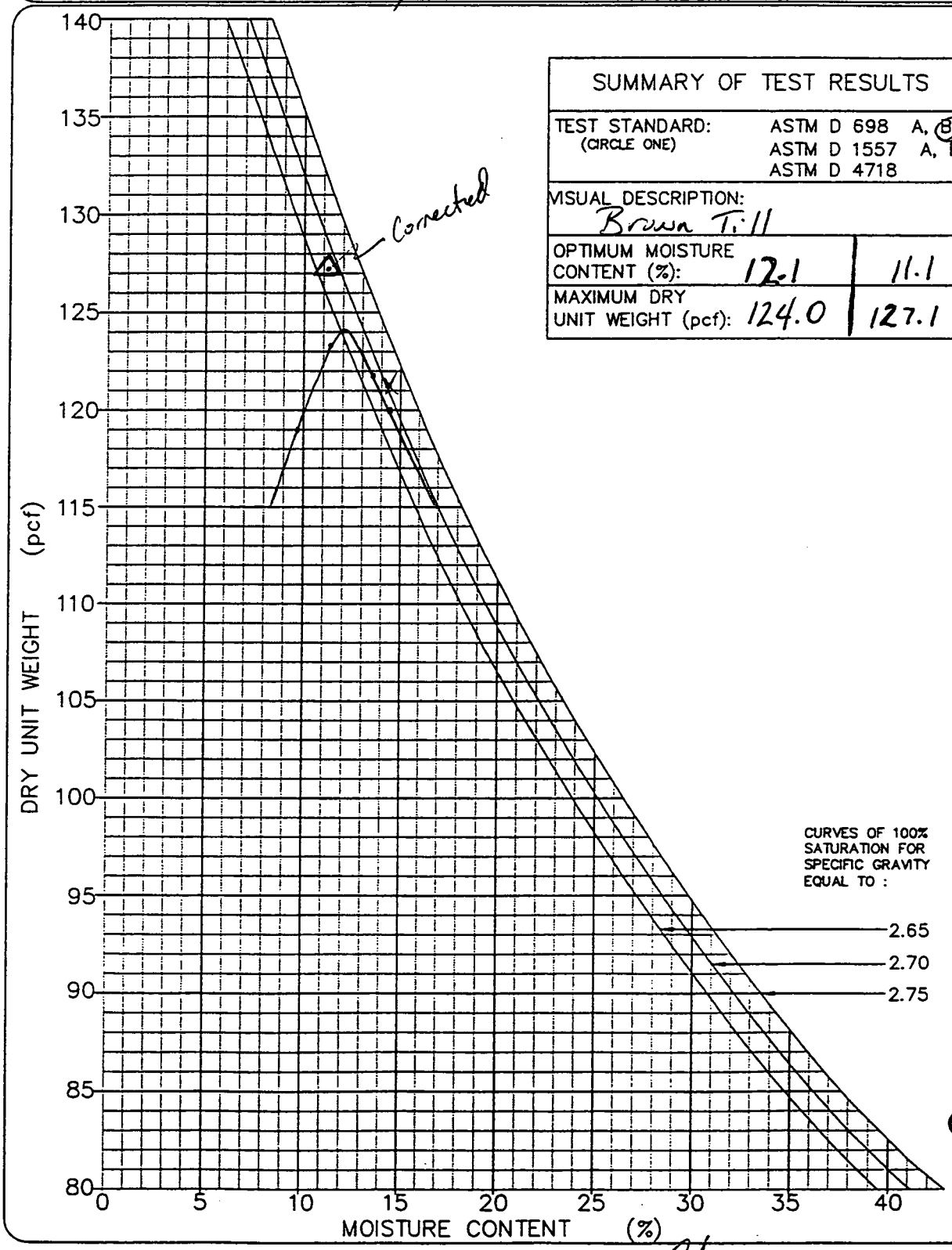
MOISTURE–DENSITY RELATIONSHIP

PROJECT: ON–SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO PROJECT NO.: G01341 TASK NO.: 04.1

DESCRIPTION: Phase III DATE: 16 day Aug month 2001 year

MATERIAL TYPE: Low Perm Clay MATERIAL SOURCE: STOCKPILE 01-1 SAMPLE NO.: LP01-03



SUMMARY OF TEST RESULTS			QA ID
TEST STANDARD: (CIRCLE ONE)	ASTM D 698 A, (B) C ASTM D 1557 A, B, C ASTM D 4718		CS
VISUAL DESCRIPTION: Brown Till			CS
OPTIMUM MOISTURE CONTENT (%):	12.1	11.1	CS
MAXIMUM DRY UNIT WEIGHT (pcf):	124.0	127.1	CS

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FLUOR FERNALD

FIELD LABORATORY COMPACTION TEST

(ASTM D 1557 METHOD B)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO PROJECT NO.: GQ1341 TASK NO.: 04.1

DESCRIPTION: PHASE III DATE: 16 day AUG month 2001 year

MATERIAL TYPE: LOW PERM. CLAY LINER MATERIAL SOURCE: STOCKPILE 01-1 SAMPLE NO.: LP-01-03

THIS METHOD WILL BE USED IF THE MATERIAL RETAINED ON THE NO. 4-in. (4.75-mm) SIEVE IS GREATER THAN 20%, AND THE MATERIAL RETAINED ON THE NO. 3/8-in. (9.5-mm) SIEVE IS LESS THAN 20%.
ALL MATERIAL RETAINED ON THE NO. 3/8-in. (9.5-mm) SIEVE IS DISCARDED.
USE OVERSIZE CORRECTION IF MORE THAN 5% IS DISCARDED ACCORDING TO ASTM D 4718.
USE A 4-in. DIAMETER MOLD / 10-lb RAMMER / 18-in. DROP / 5 LAYERS / 25 BLOWS PER LAYER.

COMPACTION OF SOIL QA ID: TBW

			13.91 lbs.	14.11 lbs	14.11 lbs.	13.98 lbs	13.57 lbs
	WATER ADDED	(ml)	+2%	+4%	+6%	+8%	+0%
A	WT. OF SOIL & MOLD	(grams)	6309.6	6400.3	6400.3	6341.3	6155.4
B	WT. OF MOLD	(grams)	4208.8	4208.8	4208.8	4208.8	4208.8
C	WT. OF SOIL = A − B	(grams)	2100.8	2191.5	2191.5	2132.5	1946.6
D	WET UNIT WT.(1) = C X 0.066	(pcf)	138.7	144.6	144.6	140.7	128.5
E	DRY UNIT WT. = D / [1 + (K/100)]	(pcf)	129.1	131.7	130.5	125.0	122.0

NOTE: IF CALIBRATED MOLD OF 1/30 FT^3 IS USED, THE WET DENSITY IS CALCULATED FROM THE WEIGHT OF SOIL, THE VOLUME OF THE MOLD AND THE CONVERSION FROM GRAMS TO POUNDS (I.E., CONVERSION FACTOR = (30 / 453.6) = 0.066). THE MOLD MUST BE CALIBRATED TO VERIFY A CAPACITY OF 1/30 ± 0.0005 FT^3 ON INTERVALS NOT TO EXCEED 1000 TIMES THAT THE MOLD IS FILLED.

MOISTURE CONTENT – ASTM D 2216 QA ID: TBW

	TARE NO.		28	225	2	204	228
F	WT. OF TARE	(grams)	8.3	8.3	8.2	8.3	8.0
G	WT. OF WET SOIL & TARE	(grams)	510.9	486.4	530.2	532.5	504.3
H	WT. OF DRY SOIL & TARE	(grams)	476.2	443.6	479.2	473.7	482.8
I	WT. OF WATER = G − H	(grams)	34.7	42.8	51.0	58.8	21.5
J	WT. DRY SOIL = H − F	(grams)	467.9	435.3	471.0	465.4	474.8
K	MOISTURE CONTENT = (I/J) X 100	(%)	7.4	9.8	10.8	12.6	4.5

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GeoSyntec Consultants

FLUOR FERNALD

CORRECTION OF UNIT WEIGHT AND WATER CONTENT FOR SOILS CONTAINING OVERSIZE PARTICLES *(ASTM D 4718)*

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO **PROJECT NO.** GQ134 **TASK NO.** 04.1

DESCRIPTION: Phase III **DATE:** 17 day Aug month 2001 year

MATERIAL TYPE: Low Perm Clay LP01-03 Modified

Weight of Total Sample	=	39786.9
Weight of Oversize Fraction	=	3653.3
Weight of Finer Fraction (- 3/8)	=	36,133.6
Percentage of Oversize Fraction	= (P_C)	9.2
Percentage of Finer Fraction (- 3/8)	= (P_F)	90.8
Specific Gravity (Assumed)	= (G_M)	2.72

(W_F)	=	Water Content - 3/8 , as decimal	=	9.8
(W_C)	=	Water Content + 3/8 , as decimal	=	0.015
(δ_F)	=	Dry Density of finer fraction	=	131.7
(δ_W)	=	Unit Weight of Water	=	62.4

$$C_W=(W_F P_F)+(W_C P_C)$$

$C_W = 9.0\%$

$$C\delta_D=100\delta_F G_M \delta_W/(\delta_F P_C)+(G_M \delta_W P_F)$$

$C_{\delta D} = 134.5$ pcf

GEOSYNTEC CONSULTANTS

FLUOR FERNALD

4940

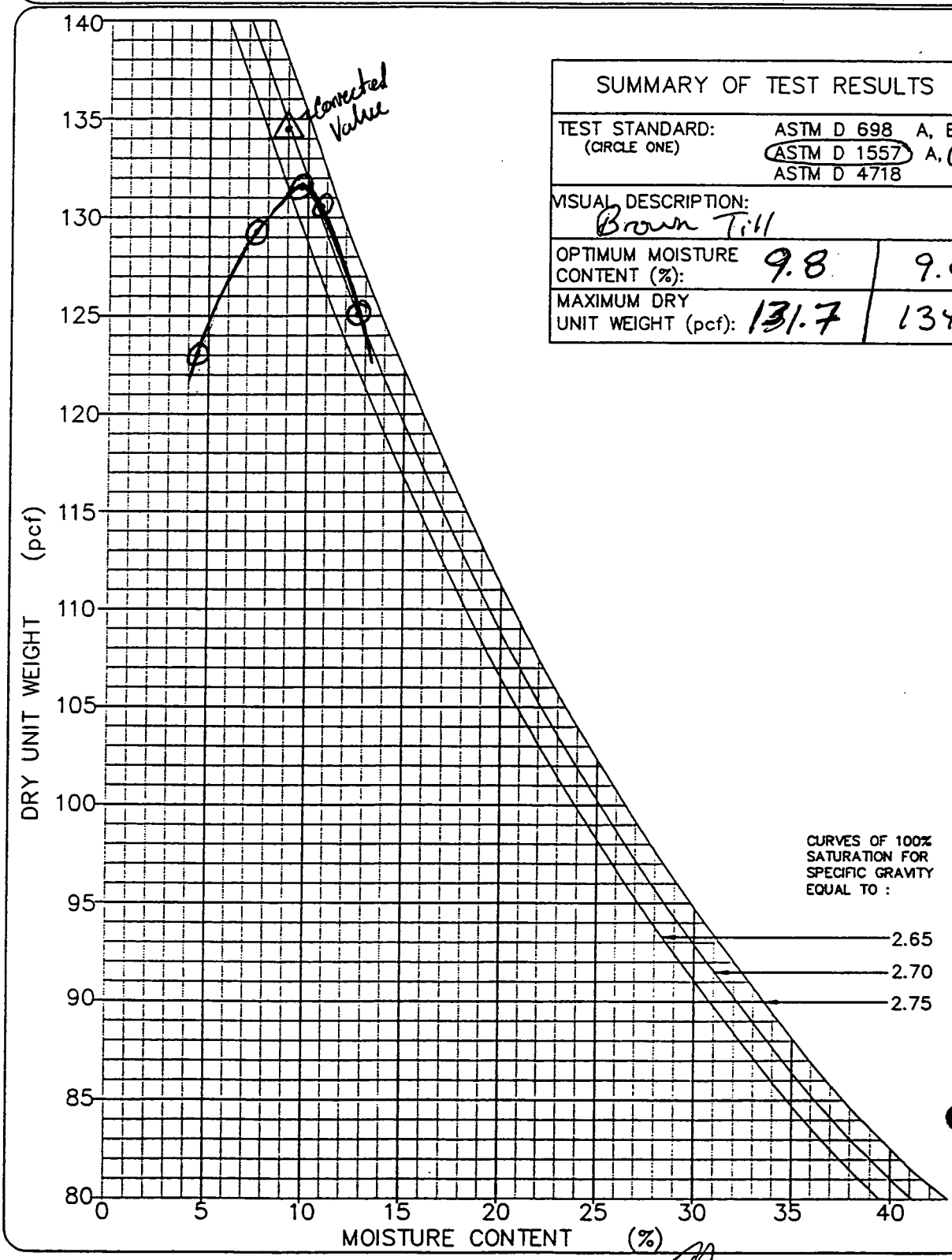
MOISTURE-DENSITY RELATIONSHIP

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO PROJECT NO.: GQ134 TASK NO.: 04.1

DESCRIPTION: PHASE III DATE: 17 day AUG month 2001 year

MATERIAL TYPE: LOW PERM. CLAY LINER MATERIAL SOURCE: STOCKPILE 01-1 SAMPLE NO.: LP-01-03



SUMMARY OF TEST RESULTS			QA ID
TEST STANDARD: (CIRCLE ONE)	ASTM D 698 A, B, C ASTM D 1557 A, B, C ASTM D 4718		TBW
VISUAL DESCRIPTION: Brown Till			
OPTIMUM MOISTURE CONTENT (%):	9.8	9.0	TBW
MAXIMUM DRY UNIT WEIGHT (pcf):	131.7	134.5	TBW

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GEOSYNTEC CONSULTANTS

FLUOR FERNALD

FIELD LABORATORY COMPACTION TEST

(ASTM D 698 METHOD B)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO

PROJECT NO.: GQ1341 TASK NO.: 04.1

DESCRIPTION: PHASE III

DATE: 20 day AUG month 2001 year

MATERIAL TYPE: LOW PERM. CLAY LINER MATERIAL SOURCE: STOCKPILE 01-1 SAMPLE NO.: LP-01-04

THIS METHOD WILL BE USED IF THE MATERIAL RETAINED ON THE NO. 3/4-in. (19-mm) SIEVE IS LESS THAN 30%, IF THE MATERIAL RETAINED ON THE NO. 4 (4.75-mm) SIEVE IS GREATER THAN 20%, AND IF THE MATERIAL RETAINED ON THE NO. 3/8-in. (9.5-mm) SIEVE IS LESS THAN 20%.
ALL MATERIAL RETAINED ON THE NO. 3/8-in. (9.5-mm) SIEVE IS DISCARDED.
USE OVERSIZE CORRECTION IF MORE THAN 5% IS DISCARDED ACCORDING TO ASTM D 4718.
USE A 4-in. DIAMETER MOLD / 5.5-lb RAMMER / 12-in. DROP / 3 LAYERS / 25 BLOWS PER LAYER.

COMPACTION OF SOIL — QA ID: TBW

			13.31 lbs	13.60 lbs	13.73	13.73	13.62 lbs
	WATER ADDED	(ml)	+2%	+4%	+6%	+8%	+10%
A	WT. OF SOIL & MOLD	(grams)	6037.4	6169.0	6227.9	6227.9	6178.0
B	WT. OF MOLD	(grams)	4208.8	4208.8	4208.8	4208.8	4208.8
C	WT. OF SOIL = A − B	(grams)	1828.6	1960.2	2019.1	2019.1	1969.2
D	WET UNIT WT.(1) = C X 0.066	(pcf)	120.7	129.4	133.3	133.3	129.9
E	DRY UNIT WT. = D / [1 + (K/100)]	(pcf)	109.2	114.7	115.8	114.0	109.3

NOTE: IF CALIBRATED MOLD OF 1/30 FT^3 IS USED, THE WET DENSITY IS CALCULATED FROM THE WEIGHT OF SOIL, THE VOLUME OF THE MOLD AND THE CONVERSION FROM GRAMS TO POUNDS (I.E., CONVERSION FACTOR = (30 / 453.6) = 0.066). THE MOLD MUST BE CALIBRATED TO VERIFY A CAPACITY OF 1/30 ± 0.0005 FT^3 ON INTERVALS NOT TO EXCEED 1000 TIMES THAT THE MOLD IS FILLED.

MOISTURE CONTENT — ASTM D 2216 — QA ID: TBY

	TARE NO.		306	303	228	301	230
F	WT. OF TARE	(grams)	8.3	8.3	8.0	8.4	8.1
G	WT. OF WET SOIL & TARE	(grams)	505.9	511.8	491.3	552.8	472.9
H	WT. OF DRY SOIL & TARE	(grams)	458.7	454.6	427.8	473.9	399.2
I	WT. OF WATER = G − H	(grams)	47.2	57.2	63.5	78.9	73.7
J	WT. DRY SOIL = H − F	(grams)	450.4	446.3	419.8	465.5	391.1
K	MOISTURE CONTENT = (I/J) X 100	(%)	10.5	12.8	15.1	16.9	18.8

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GeoSyntec Consultants

FLUOR FERNALD

CORRECTION OF UNIT WEIGHT AND WATER CONTENT FOR SOILS CONTAINING OVERSIZE PARTICLES *(ASTM D 4718)*

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO **PROJECT NO.** G0134 **TASK NO.** 04.1

DESCRIPTION: Phase III **DATE:** 21 day Aug month 2001 year

MATERIAL TYPE: Low Perm Clay LPØ1-04 STD

Weight of Total Sample	=	22627.4
Weight of Oversize Fraction	=	355.5
Weight of Finer Fraction (- 3/8)	=	22271.9
Percentage of Oversize Fraction	= (P_C)	1.6
Percentage of Finer Fraction (- 3/8)	= (P_F)	98.4
Specific Gravity (Assumed)	= (G_M)	2.72

(W_F)	=	Water Content - 3/8 , as decimal	=	0.145
(W_C)	=	Water Content + 3/8 , as decimal	=	0.015
(δ_F)	=	Dry Density of finer fraction	=	116.3
(δ_W)	=	Unit Weight of Water	=	62.4

$$C_W=(W_F P_F)+(W_C P_C)$$

$C_W = 14.3\%$

$$C\delta_D=100\delta_F G_M \delta_W/(\delta_F P_C)+(G_M \delta_W P_F)$$

$C_{\delta D} = 116.9$ pcf

4940

GEOSYNTEC CONSULTANTS

FLUOR DANIEL FERNALD

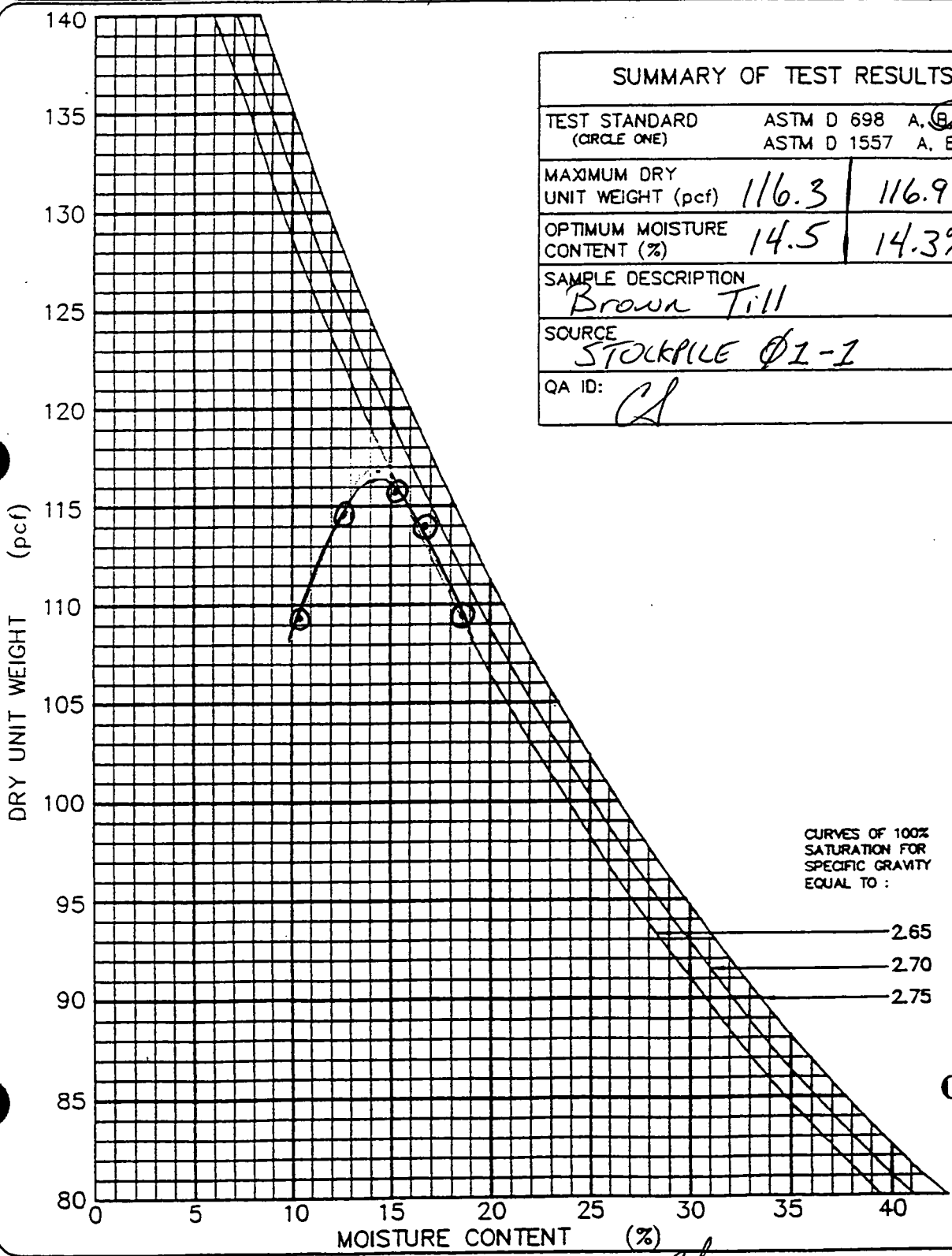
MOISTURE–DENSITY RELATIONSHIP

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO — PROJECT NO: GQ1341 TASK NO.: 04.1

DESCRIPTION: Phase III — DATE: 21 day Aug month 2001 year

MATERIAL TYPE: Low Perm Clay — SAMPLE NO.: LPØ1-Ø4



SUMMARY OF TEST RESULTS		
TEST STANDARD (CIRCLE ONE)	ASTM D 698 A, B, C ASTM D 1557 A, B, C	
MAXIMUM DRY UNIT WEIGHT (pcf)	116.3	116.9
OPTIMUM MOISTURE CONTENT (%)	14.5	14.3%
SAMPLE DESCRIPTION	Brown Till	
SOURCE	STOCKPILE Ø1-1	
QA ID:	CA	

000376

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GEOSYNTEC CONSULTANTS

FLUOR FERNALD

FIELD LABORATORY COMPACTION TEST

(ASTM D 698 METHOD B)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO PROJECT NO.: GQ134 TASK NO.: 04.1

DESCRIPTION: PHASE III DATE: 21 day AUG month 2001 year

MATERIAL TYPE: LOW PERM. CLAY LINER MATERIAL SOURCE: STOCKPILE 01-1 SAMPLE NO.: LP-01-05

THIS METHOD WILL BE USED IF THE MATERIAL RETAINED ON THE NO. 3/4-in. (19-mm) SIEVE IS LESS THAN 30%, IF THE MATERIAL RETAINED ON THE NO. 4 (4.75-mm) SIEVE IS GREATER THAN 20%, AND IF THE MATERIAL RETAINED ON THE NO. 3/8-in. (9.5-mm) SIEVE IS LESS THAN 20%.
ALL MATERIAL RETAINED ON THE NO. 3/8-in. (9.5-mm) SIEVE IS DISCARDED.
USE OVERSIZE CORRECTION IF MORE THAN 5% IS DISCARDED ACCORDING TO ASTM D 4718.
USE A 4-in. DIAMETER MOLD / 5.5-lb RAMMER / 12-in. DROP / 3 LAYERS / 25 BLOWS PER LAYER.

COMPACTION OF SOIL QA ID: JBW

			13.17 lbs	13.38 lbs	13.57 lbs	13.79 lbs	13.6 lb
	WATER ADDED	(ml)	+4%	+6%	+8%	+10%	+12%
A	WT. OF SOIL & MOLD	(grams)	5973.9	6069.2	6155.4	6255.1	6200.7
B	WT. OF MOLD	(grams)	4208.8	4208.8	4208.8	4208.8	4208.8
C	WT. OF SOIL = A − B	(grams)	1765.1	1860.4	1946.6	2046.3	1991.9
D	WET UNIT WT.(1) = C X 0.066	(pcf)	116.5	122.8	128.5	135.1	131.5
E	DRY UNIT WT. = D / [1 + (K/100)]	(pcf)	107.1	110.7	114.2	117.6	112.0

NOTE: IF CALIBRATED MOLD OF 1/30 FT^3 IS USED, THE WET DENSITY IS CALCULATED FROM THE WEIGHT OF SOIL, THE VOLUME OF THE MOLD AND THE CONVERSION FROM GRAMS TO POUNDS (I.E., CONVERSION FACTOR = (30 / 453.6) = 0.066). THE MOLD MUST BE CALIBRATED TO VERIFY A CAPACITY OF 1/30 ± 0.0005 FT^3 ON INTERVALS NOT TO EXCEED 1000 TIMES THAT THE MOLD IS FILLED.

MOISTURE CONTENT – ASTM D 2216 QA ID: JBW

	TARE NO.		33	301	306	225	230
F	WT. OF TARE	(grams)	8.1	8.5	8.3	8.3	8.1
G	WT. OF WET SOIL & TARE	(grams)	509.2	578.5	544.1	476.9	495.9
H	WT. OF DRY SOIL & TARE	(grams)	468.6	522.4	484.4	416.3	423.7
I	WT. OF WATER = G − H	(grams)	40.6	56.1	59.7	60.6	72.2
J	WT. DRY SOIL = H − F	(grams)	460.5	513.9	476.1	408.0	415.6
K	MOISTURE CONTENT = (I/J) X 100	(%)	8.8	10.9	12.5	14.9	17.4

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GeoSyntec Consultants

FLUOR FERNALD

CORRECTION OF UNIT WEIGHT AND WATER CONTENT FOR SOILS CONTAINING OVERSIZE PARTICLES *(ASTM D 4718)*

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO **PROJECT NO.** 62134 **TASK NO.** 04.1

DESCRIPTION: Phase III **DATE:** 23 day Aug month 2001 year

MATERIAL TYPE: LT LP01-05 STD

Weight of Total Sample	=	38206.6
Weight of Oversize Fraction	=	619.3
Weight of Finer Fraction (- 3/8)	=	37587.3
Percentage of Oversize Fraction	= (P_C)	1.6
Percentage of Finer Fraction (- 3/8)	= (P_F)	98.4
Specific Gravity (Assumed)	= (G_M)	2.72

(W_F)	=	Water Content - 3/8 , as decimal	=	0.145
(W_C)	=	Water Content + 3/8 , as decimal	=	0.015
(δ_F)	=	Dry Density of finer fraction	=	118.0
(δ_W)	=	Unit Weight of Water	=	62.4

$$C_W=(W_F P_F)+(W_C P_C)$$

$$C_W = 14.3\%$$

$$C\delta_D=100\delta_F G_M \delta_W/(\delta_F P_C)+(G_M \delta_W P_F)$$

$$C_{\delta D} = 118.6 \text{ pcf}$$

000378

GEOSYNTEC CONSULTANTS

FLUOR DANIEL FERNALD

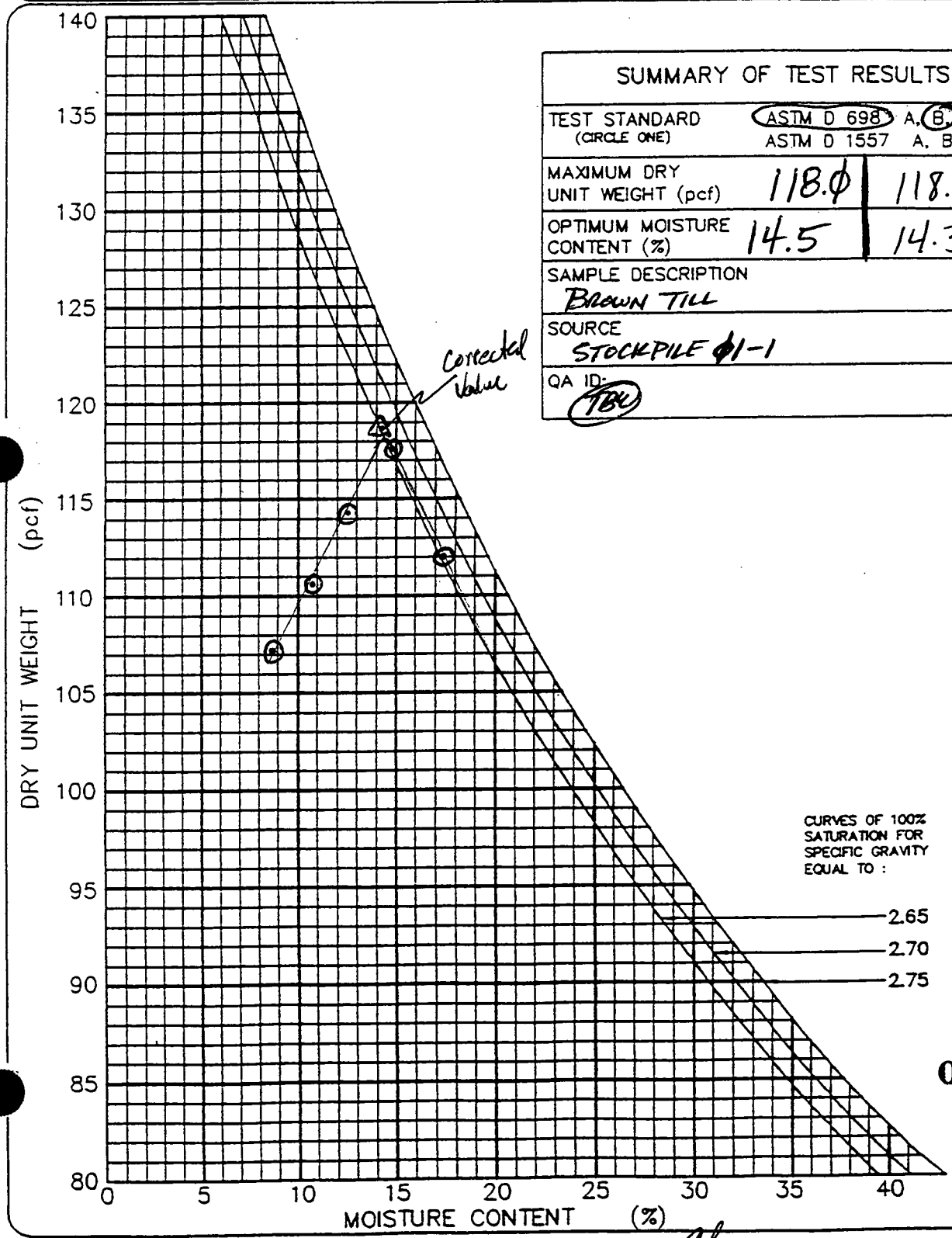
MOISTURE–DENSITY RELATIONSHIP

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO — PROJECT NO: GQ1341 TASK NO.: 04.1

DESCRIPTION: PHASE III — DATE: 22 day AUG month 2001 year

MATERIAL TYPE: LOW PERM. CLAY LINER — SAMPLE NO.: LP-01-05



SUMMARY OF TEST RESULTS		
TEST STANDARD (CIRCLE ONE)	ASTM D 698 A, B, C ASTM D 1557 A, B, C	
MAXIMUM DRY UNIT WEIGHT (pcf)	118.0	118.6
OPTIMUM MOISTURE CONTENT (%)	14.5	14.3
SAMPLE DESCRIPTION	BROWN TILL	
SOURCE	STOCKPILE 01-1	
QA ID:	TBU	

000379

GEO SYNTEC CONSULTANTS FILE NO. 2-12-MDR — CHECKED BY: CJ — SHEET NO. 3 OF 3

GEOSYNTEC CONSULTANTS

FLUOR FERNALD

FIELD LABORATORY COMPACTION TEST

(ASTM D 1557 METHOD B)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO

PROJECT NO.: 6Q134 TASK NO.: 04.1

DESCRIPTION: PHASE III

DATE: 22 day AUG month 2001 year

MATERIAL TYPE: LOW PERM. CLAY LINER MATERIAL SOURCE: STOCKPILE 01-1 SAMPLE NO.: LP01-05

THIS METHOD WILL BE USED IF THE MATERIAL RETAINED ON THE NO. 4-in. (4.75-mm) SIEVE IS GREATER THAN 20%, AND THE MATERIAL RETAINED ON THE NO. 3/8-in. (9.5-mm) SIEVE IS LESS THAN 20%.
ALL MATERIAL RETAINED ON THE NO. 3/8-in. (9.5-mm) SIEVE IS DISCARDED.
USE OVERSIZE CORRECTION IF MORE THAN 5% IS DISCARDED ACCORDING TO ASTM D 4718.
USE A 4-in. DIAMETER MOLD / 10-lb RAMMER / 18-in. DROP / 5 LAYERS / 25 BLOWS PER LAYER.

COMPACTION OF SOIL — QA ID: [illegible]

			13.94	14.08	13.96	13.80	13.72
	WATER ADDED	(ml)	4%	6%	8%	2%	2%
A	WT. OF SOIL & MOLD	(grams)	6323.2	6386.7	6332.3	6259.7	6223.4
B	WT. OF MOLD	(grams)	4208.8	4208.8	4208.8	4208.8	4208.8
C	WT. OF SOIL = A − B	(grams)	2114.4	2177.9	2123.5	2050.9	2014.6
D	WET UNIT WT.(1) = C X 0.066	(pcf)	139.6	143.7	140.2	135.4	133.0
E	DRY UNIT WT. = D / [1 + (K/100)]	(pcf)	127.8	129.2	123.9	126.5	124.7

NOTE: IF CALIBRATED MOLD OF 1/30 FT^3 IS USED, THE WET DENSITY IS CALCULATED FROM THE WEIGHT OF SOIL, THE VOLUME OF THE MOLD AND THE CONVERSION FROM GRAMS TO POUNDS (I.E., CONVERSION FACTOR = (30 / 453.6) = 0.066). THE MOLD MUST BE CALIBRATED TO VERIFY A CAPACITY OF 1/30 ± 0.0005 FT^3 ON INTERVALS NOT TO EXCEED 1000 TIMES THAT THE MOLD IS FILLED.

MOISTURE CONTENT — ASTM D 2216 — QA ID: [illegible]

	TARE NO.		101	31	303	28	305
F	WT. OF TARE	(grams)	8.3	8.3	8.3	8.3	8.3
G	WT. OF WET SOIL & TARE	(grams)	359.0	404.0	440.9	384.5	620.7
H	WT. OF DRY SOIL & TARE	(grams)	329.5	364.0	390.5	359.9	582.9
I	WT. OF WATER = G − H	(grams)	29.5	40.0	50.4	24.6	37.8
J	WT. DRY SOIL = H − F	(grams)	321.2	355.7	382.2	351.6	574.6
K	MOISTURE CONTENT = (I/J) X 100	(%)	9.2	11.2	13.2	7.0	6.6

000380

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GeoSyntec Consultants

FLUOR FERNALD

CORRECTION OF UNIT WEIGHT AND WATER CONTENT FOR SOILS CONTAINING OVERSIZE PARTICLES *(ASTM D 4718)*

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO PROJECT NO. G9134 TASK NO. 04.1

DESCRIPTION: Phase III DATE: 27 day Aug month 2001 year

MATERIAL TYPE: Clay Liner low Perm LP Ø1-05 MOD

Weight of Total Sample	=	38206.6
Weight of Oversize Fraction	=	619.3
Weight of Finer Fraction (- 3/8)	=	37587.3
Percentage of Oversize Fraction	= (P_C)	1.6
Percentage of Finer Fraction (- 3/8)	= (P_F)	98.4
Specific Gravity (Assumed)	= (G_M)	2.72

(W_F)	=	Water Content - 3/8 , as decimal	=	0.11
(W_C)	=	Water Content + 3/8 , as decimal	=	0.015
(δ_F)	=	Dry Density of finer fraction	=	129.5
(δ_W)	=	Unit Weight of Water	=	62.4

$$C_W=(W_F P_F)+(W_C P_C)$$

$C_w = 10.8\%$

$$C\delta_D=100\delta_F G_M \delta_W/(\delta_F P_C)+(G_M \delta_W P_F)$$

$C_{\gamma D} = 130.0$ pcf

000381

GEOSYNTEC CONSULTANTS

FLUOR DANIEL FERNALD

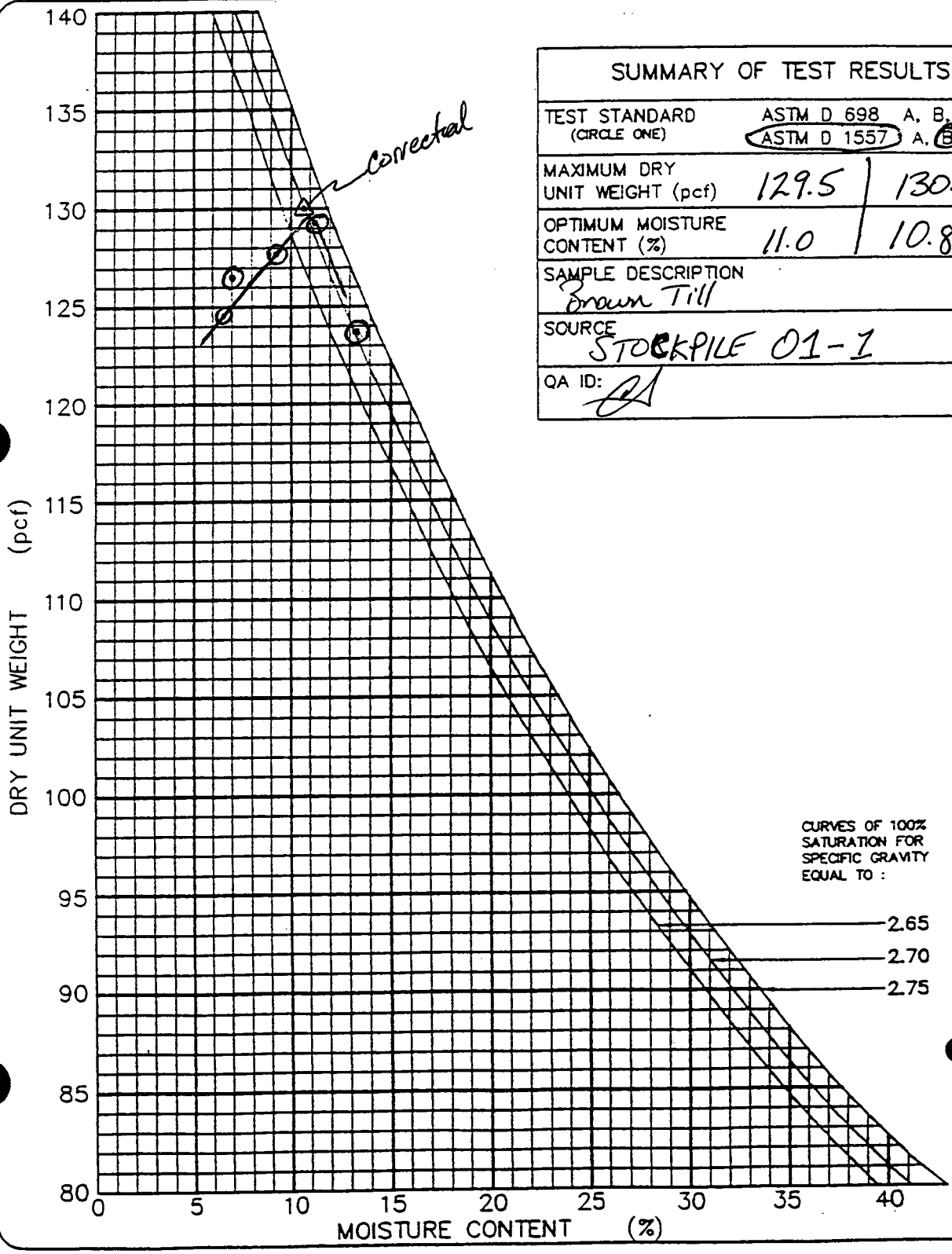
MOISTURE–DENSITY RELATIONSHIP

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO — PROJECT NO: GQ134 — TASK NO.: 04.1

DESCRIPTION: PHASE III — DATE: 22 day AUG month 2001 year

MATERIAL TYPE: Low Perm. Clay Liner — SAMPLE NO.: LP-01-05



SUMMARY OF TEST RESULTS		
TEST STANDARD (CIRCLE ONE)	ASTM D 698 A, B, C ASTM D 1557 A, B, C	
MAXIMUM DRY UNIT WEIGHT (pcf)	129.5	130.0
OPTIMUM MOISTURE CONTENT (%)	11.0	10.8
SAMPLE DESCRIPTION	Brown Till	
SOURCE	STOCKPILE 01-1	
QA ID:		

000382

GEOSYNTEC CONSULTANTS

FLUOR FERNALD

FIELD LABORATORY COMPACTION TEST

(ASTM D 1557 METHOD B)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO PROJECT NO.: 601341 TASK NO.: 04.1

DESCRIPTION: Phase III DATE: 27 day Aug month 2001 year

MATERIAL TYPE: Brown till (LP. CLAY) MATERIAL SOURCE: Stockpile 01-1 SAMPLE NO.: LP-01-06

THIS METHOD WILL BE USED IF THE MATERIAL RETAINED ON THE NO. 4-in. (4.75-mm) SIEVE IS GREATER THAN 20%, AND THE MATERIAL RETAINED ON THE NO. 3/8-in. (9.5-mm) SIEVE IS LESS THAN 20%.
ALL MATERIAL RETAINED ON THE NO. 3/8-in. (9.5-mm) SIEVE IS DISCARDED.
USE OVERSIZE CORRECTION IF MORE THAN 5% IS DISCARDED ACCORDING TO ASTM D 4718.
USE A 4-in. DIAMETER MOLD / 10-lb RAMMER / 18-in. DROP / 5 LAYERS / 25 BLOWS PER LAYER.

COMPACTION OF SOIL

QA ID: KS/TBW

			4%	6%	8%	13.70 lbs	13.57 lb
	WATER ADDED	(ml)	100	150	200	+10%	+12%
A	WT. OF SOIL & MOLD	(grams)	5983.0	6055.6	6200.7	6214.3	6155.4
B	WT. OF MOLD	(grams)	4208.8	4208.8	4208.8	4208.8	4208.8
C	WT. OF SOIL = A - B	(grams)	1774.2	1846.8	1991.9	2005.5	1946.6
D	WET UNIT WT.(1) = C X 0.066	(pcf)	117.1	121.9	131.5	132.4	128.5
E	DRY UNIT WT. = D / [1 + (K/100)]	(pcf)	105.8	108.4	115.0	113.4	108.3

NOTE: IF CALIBRATED MOLD OF 1/30 FT^3 IS USED, THE WET DENSITY IS CALCULATED FROM THE WEIGHT OF SOIL, THE VOLUME OF THE MOLD AND THE CONVERSION FROM GRAMS TO POUNDS (I.E., CONVERSION FACTOR = (30 / 453.6) = 0.066). THE MOLD MUST BE CALIBRATED TO VERIFY A CAPACITY OF 1/30 ± 0.0005 FT^3 ON INTERVALS NOT TO EXCEED 1000 TIMES THAT THE MOLD IS FILLED.

MOISTURE CONTENT - ASTM D 2216

QA ID: TBW/KS

	TARE NO.		101	303	204	228	304
F	WT. OF TARE	(grams)	8.3	8.3	8.2	8.0	8.3
G	WT. OF WET SOIL & TARE	(grams)	315.9	355.5	393.8	569.1	547.5
H	WT. OF DRY SOIL & TARE	(grams)	286.2	316.9	345.5	488.5	463.0
I	WT. OF WATER = G - H	(grams)	29.7	38.6	48.3	80.6	84.5
J	WT. DRY SOIL = H - F	(grams)	277.9	308.6	337.3	480.5	454.7
K	MOISTURE CONTENT = (I/J) X 100	(%)	10.7	12.5	14.3	16.8	18.6

000383

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FLUOR FERNALD

CORRECTION OF UNIT WEIGHT AND WATER CONTENT FOR SOILS CONTAINING OVERSIZE PARTICLES *(ASTM D 4718)*

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO **PROJECT NO.** G0134 **TASK NO.** 041

DESCRIPTION: Phase III **DATE:** 28 day Aug month 2001 year

MATERIAL TYPE: Low Perm Clay

Weight of Total Sample	=	20347.3
Weight of Oversize Fraction	=	192.1
Weight of Finer Fraction (- 3/8)	=	20155.2
Percentage of Oversize Fraction	= (P_C)	0.9
Percentage of Finer Fraction (- 3/8)	= (P_F)	99.1
Specific Gravity (Assumed)	= (G_M)	2.72

(W_F)	=	Water Content - 3/8 , as decimal	=	0.15
(W_C)	=	Water Content + 3/8 , as decimal	=	0.015
(δ_F)	=	Dry Density of finer fraction	=	116.5
(δ_W)	=	Unit Weight of Water	=	62.4

$$C_W=(W_F P_F)+(W_C P_C)$$

$C_w = 14.9$

$$C\delta_D=100\delta_F G_M \delta_W/(\delta_F P_C)+(G_M \delta_W P_F)$$

$C_{\delta D} = 116.8$

GEOSYNTEC CONSULTANTS

FLUOR DANIEL FERNALD

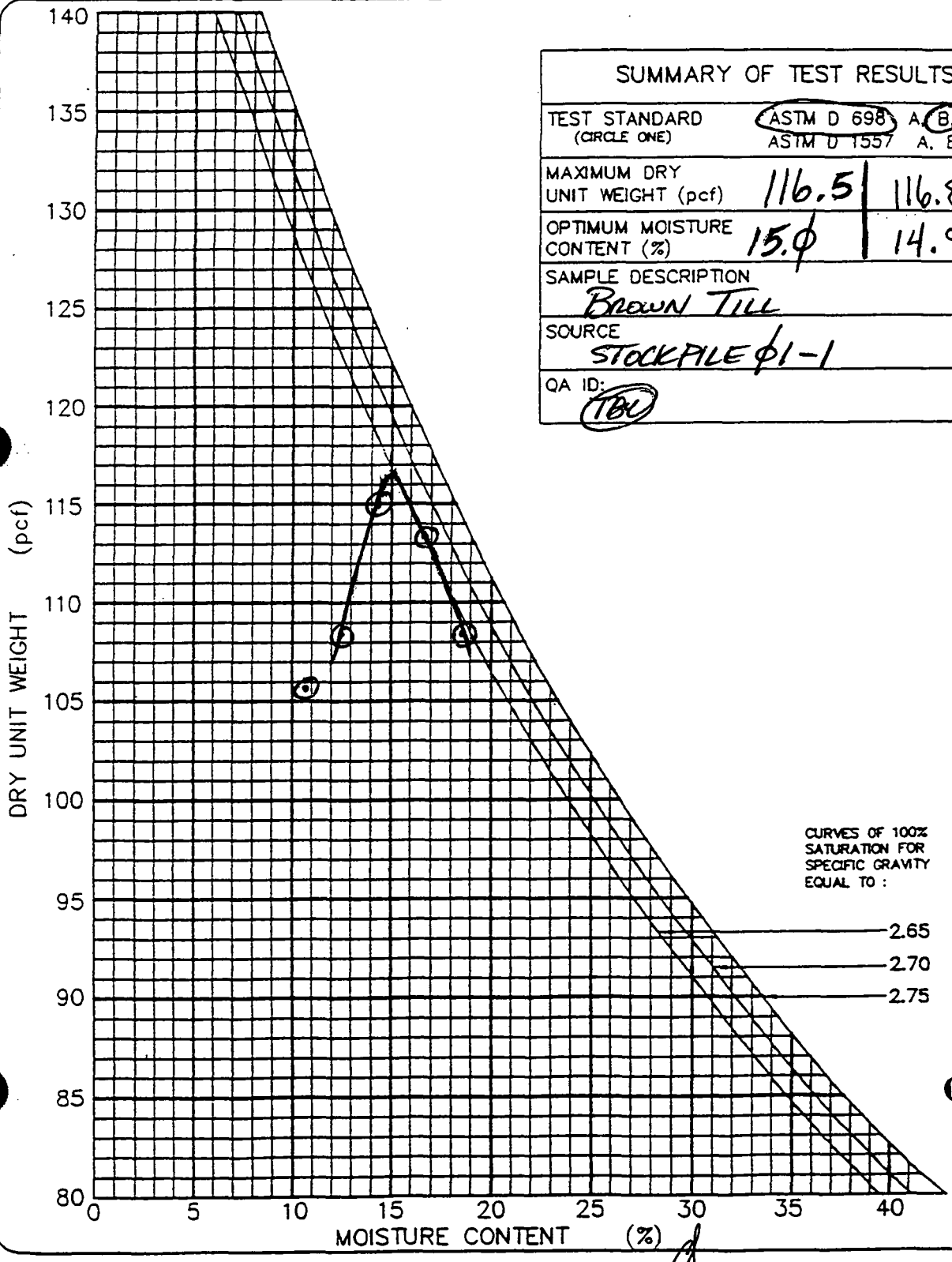
MOISTURE–DENSITY RELATIONSHIP

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO — PROJECT NO: GQ1341 — TASK NO.: 04.1

DESCRIPTION: PHASE III — DATE: 28 day AUG month 2001 year

MATERIAL TYPE: LOW PERM. CLAY — SAMPLE NO.: LP-01-06



SUMMARY OF TEST RESULTS		
TEST STANDARD (CIRCLE ONE)	ASTM D 698 A. B. C ASTM D 1557 A. B. C	
MAXIMUM DRY UNIT WEIGHT (pcf)	116.5	116.8
OPTIMUM MOISTURE CONTENT (%)	15.0	14.9
SAMPLE DESCRIPTION	BROWN TILL	
SOURCE	STOCKPILE 01-1	
QA ID:	TBL	

000385

GEOSYNTEC CONSULTANTS

FLUOR FERNALD

FIELD LABORATORY COMPACTION TEST

(ASTM D 698 METHOD B)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO — PROJECT NO.: GQ134 TASK NO.: 04.1

DESCRIPTION: PHASE III — DATE: 28 day AUG month 2001 year

MATERIAL TYPE: LOW PERM. CLAY — MATERIAL SOURCE: STOCKPILE 01-2 — SAMPLE NO.: LP-01-07

THIS METHOD WILL BE USED IF THE MATERIAL RETAINED ON THE NO. 3/4-in. (19-mm) SIEVE IS LESS THAN 30%, IF THE MATERIAL RETAINED ON THE NO. 4 (4.75-mm) SIEVE IS GREATER THAN 20%, AND IF THE MATERIAL RETAINED ON THE NO. 3/8-in. (9.5-mm) SIEVE IS LESS THAN 20%.
ALL MATERIAL RETAINED ON THE NO. 3/8-in. (9.5-mm) SIEVE IS DISCARDED.
USE OVERSIZE CORRECTION IF MORE THAN 5% IS DISCARDED ACCORDING TO ASTM D 4718.
USE A 4-in. DIAMETER MOLD / 5.5-lb RAMMER / 12-in. DROP / 3 LAYERS / 25 BLOWS PER LAYER.

COMPACTION OF SOIL — QA ID: 184

			13.04 lbs	13.23 lbs	13.52	13.74	13.65
	WATER ADDED	(ml)	+4%	+6%	+8%	+10%	+12%
A	WT. OF SOIL & MOLD	(grams)	5914.9	6001.1	6132.7	6232.5	6191.6
B	WT. OF MOLD	(grams)	4208.8	4208.8	4208.8	4208.8	4208.8
C	WT. OF SOIL = A − B	(grams)	1706.1	1792.3	1923.9	2023.7	1982.8
D	WET UNIT WT.(1) = C X 0.066	(pcf)	112.6	118.3	127.0	133.6	130.9
E	DRY UNIT WT. = D / [1 + (K/100)]	(pcf)	102.3	106.0	111.2	115.5	111.4

NOTE: IF CALIBRATED MOLD OF 1/30 FT^3 IS USED, THE WET DENSITY IS CALCULATED FROM THE WEIGHT OF SOIL, THE VOLUME OF THE MOLD AND THE CONVERSION FROM GRAMS TO POUNDS (I.E., CONVERSION FACTOR = (30 / 453.6) = 0.066). THE MOLD MUST BE CALIBRATED TO VERIFY A CAPACITY OF 1/30 ± 0.0005 FT^3 ON INTERVALS NOT TO EXCEED 1000 TIMES THAT THE MOLD IS FILLED.

MOISTURE CONTENT — ASTM D 2216 — QA ID: _____

	TARE NO.		305	8	304	303	228
F	WT. OF TARE	(grams)	8.2	8.3	8.3	8.2	8.0
G	WT. OF WET SOIL & TARE	(grams)	555.9	464.7	548.5	576.6	563.7
H	WT. OF DRY SOIL & TARE	(grams)	505.7	417.2	481.2	499.6	480.9
I	WT. OF WATER = G − H	(grams)	50.2	47.5	67.3	77.0	82.8
J	WT. DRY SOIL = H − F	(grams)	497.5	408.9	472.9	491.4	472.9
K	MOISTURE CONTENT = (I/J) X 100	(%)	10.1	11.6	14.2	15.7	17.5

000389

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GeoSyntec Consultants

FLUOR FERNALD

CORRECTION OF UNIT WEIGHT AND WATER CONTENT FOR SOILS CONTAINING OVERSIZE PARTICLES *(ASTM D 4718)*

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO **PROJECT NO.** G21341 **TASK NO.** 04.1

DESCRIPTION: Phase III **DATE:** 29 day Aug month 2001 year

MATERIAL TYPE: Low Perm Clay LP01-07 std.

Weight of Total Sample	=	38347.2 g
Weight of Oversize Fraction	=	947.2
Weight of Finer Fraction (- 3/8)	=	37400
Percentage of Oversize Fraction	= (P_C)	2.5
Percentage of Finer Fraction (- 3/8)	= (P_F)	97.5
Specific Gravity (Assumed)	= (G_M)	2.72

(W_F) =	Water Content - 3/8 , as decimal	=	0.15
(W_C) =	Water Content + 3/8 , as decimal	=	0.015
(δ_F) =	Dry Density of finer fraction	=	116.5
(δ_W) =	Unit Weight of Water	=	62.4

$$C_W=(W_F P_F)+(W_C P_C)$$

$$C_\omega = 14.7$$

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$$C\delta_D=100\delta_F G_M \delta_W/(\delta_F P_C)+(G_M \delta_W P_F)$$

$$C_{\delta D} = 117.4$$

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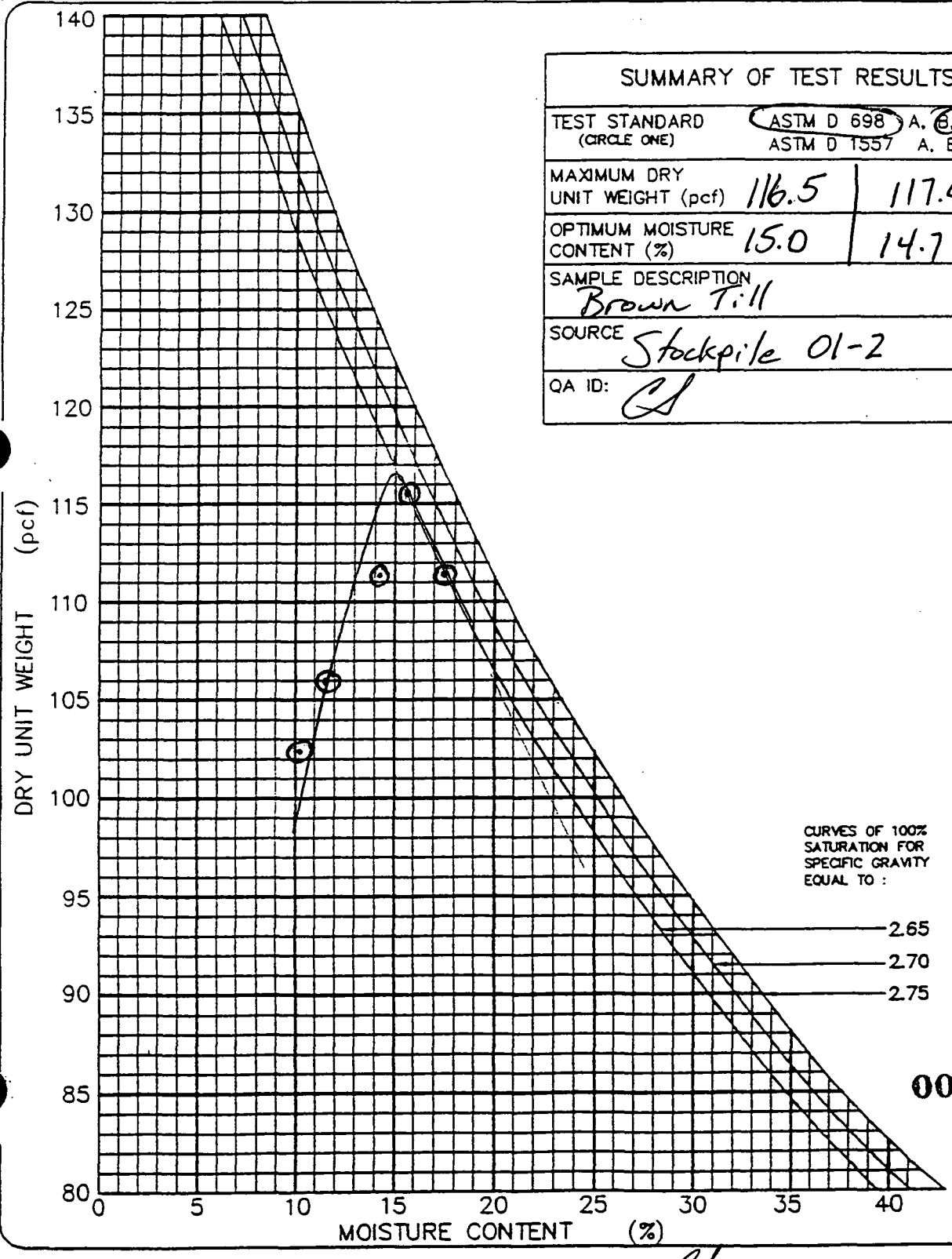
MOISTURE–DENSITY RELATIONSHIP

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO — PROJECT NO: GQ 1341 TASK NO.: 04.1

DESCRIPTION: PHASE III — DATE: 29 day AUG month 2001 year

MATERIAL TYPE: Low Perm. CLAY — SAMPLE NO.: LP-01-07



SUMMARY OF TEST RESULTS		
TEST STANDARD (CIRCLE ONE)	ASTM D 698 A. B. C ASTM D 1557 A. B. C	
MAXIMUM DRY UNIT WEIGHT (pcf)	116.5	117.4
OPTIMUM MOISTURE CONTENT (%)	15.0	14.7
SAMPLE DESCRIPTION	Brown Till	
SOURCE	Stockpile 01-2	
QA ID:	CS	

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CHECKED BY: CS

SHEET NO 3 OF 3

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FLUOR FERNALD

FIELD LABORATORY COMPACTION TEST

(ASTM D 1557 METHOD B)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO

PROJECT NO.: GQ1341 TASK NO.: 04.1

DESCRIPTION: PHASE III

DATE: 28 day AUG month 2001 year

MATERIAL TYPE: LOW PERM. CLAY MATERIAL SOURCE: STOCKPILE 01-2 SAMPLE NO.: LP-01-07

THIS METHOD WILL BE USED IF THE MATERIAL RETAINED ON THE NO. 4-in. (4.75-mm) SIEVE IS GREATER THAN 20%, AND THE MATERIAL RETAINED ON THE NO. 3/8-in. (9.5-mm) SIEVE IS LESS THAN 20%.
ALL MATERIAL RETAINED ON THE NO. 3/8-in. (9.5-mm) SIEVE IS DISCARDED.
USE OVERSIZE CORRECTION IF MORE THAN 5% IS DISCARDED ACCORDING TO ASTM D 4718.
USE A 4-in. DIAMETER MOLD / 10-lb RAMMER / 18-in. DROP / 5 LAYERS / 25 BLOWS PER LAYER.

COMPACTION OF SOIL — QA ID: TBW

			13.60 lbs	13.85 lbs	13.99	13.91	13.80
	WATER ADDED	(ml)	+2%	+4%	+6%	+8%	+10%
A	WT. OF SOIL & MOLD	(grams)	6169.0	6282.4	6345.9	6309.6	6259.7
B	WT. OF MOLD	(grams)	4208.8	4208.8	4208.8	4208.8	4208.8
C	WT. OF SOIL = A − B	(grams)	1960.2	2073.6	2137.1	2100.8	2050.9
D	WET UNIT WT.(1) = C X 0.066	(pcf)	129.4	136.9	141.0	138.7	135.4
E	DRY UNIT WT. = D / [1 + (K/100)]	(pcf)	120.4	125.0	126.5	121.6	117.1

NOTE: IF CALIBRATED MOLD OF 1/30 FT^3 IS USED, THE WET DENSITY IS CALCULATED FROM THE WEIGHT OF SOIL, THE VOLUME OF THE MOLD AND THE CONVERSION FROM GRAMS TO POUNDS (I.E., CONVERSION FACTOR = (30 / 453.6) = 0.066). THE MOLD MUST BE CALIBRATED TO VERIFY A CAPACITY OF 1/30 ± 0.0005 FT^3 ON INTERVALS NOT TO EXCEED 1000 TIMES THAT THE MOLD IS FILLED.

MOISTURE CONTENT — ASTM D 2216 — QA ID: TBW

	TARE NO.		225	306	301	33	204
F	WT. OF TARE	(grams)	8.3	8.3	8.5	8.1	8.1
G	WT. OF WET SOIL & TARE	(grams)	659.8	646.8	622.0	595.8	569.1
H	WT. OF DRY SOIL & TARE	(grams)	614.6	591.3	558.6	523.3	493.2
I	WT. OF WATER = G − H	(grams)	45.2	55.5	63.4	72.5	75.9
J	WT. DRY SOIL = H − F	(grams)	606.3	583.0	550.1	515.2	485.1
K	MOISTURE CONTENT = (I/J) X 100	(%)	7.5	9.5	11.5	14.1	15.6

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FLUOR FERNALD

CORRECTION OF UNIT WEIGHT AND WATER CONTENT FOR SOILS CONTAINING OVERSIZE PARTICLES *(ASTM D 4718)*

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO **PROJECT NO.** G21341 **TASK NO.** 04.1

DESCRIPTION: Phase III **DATE:** 29 day Aug month 2001 year

MATERIAL TYPE: Low Perm Clay LP01-07 mod

Weight of Total Sample	=	38347.2g
Weight of Oversize Fraction	=	947.2
Weight of Finer Fraction (- 3/8)	=	~~28 37400~~
Percentage of Oversize Fraction	= (P_C)	92.5
Percentage of Finer Fraction (- 3/8)	= (P_F)	97.5
Specific Gravity (Assumed)	= (G_M)	2.72

(W_F)	=	Water Content - 3/8 , as decimal	=	0.109
(W_C)	=	Water Content + 3/8 , as decimal	=	0.015
(δ_F)	=	Dry Density of finer fraction	=	127.3
(δ_W)	=	Unit Weight of Water	=	62.4

$$C_W=(W_F P_F)+(W_C P_C)$$

$$C_W = 10.7\%$$

$$C\delta_D=100\delta_F G_M \delta_W/(\delta_F P_C)+(G_M \delta_W P_F)$$

$$C_{\delta D} = 128.1$$

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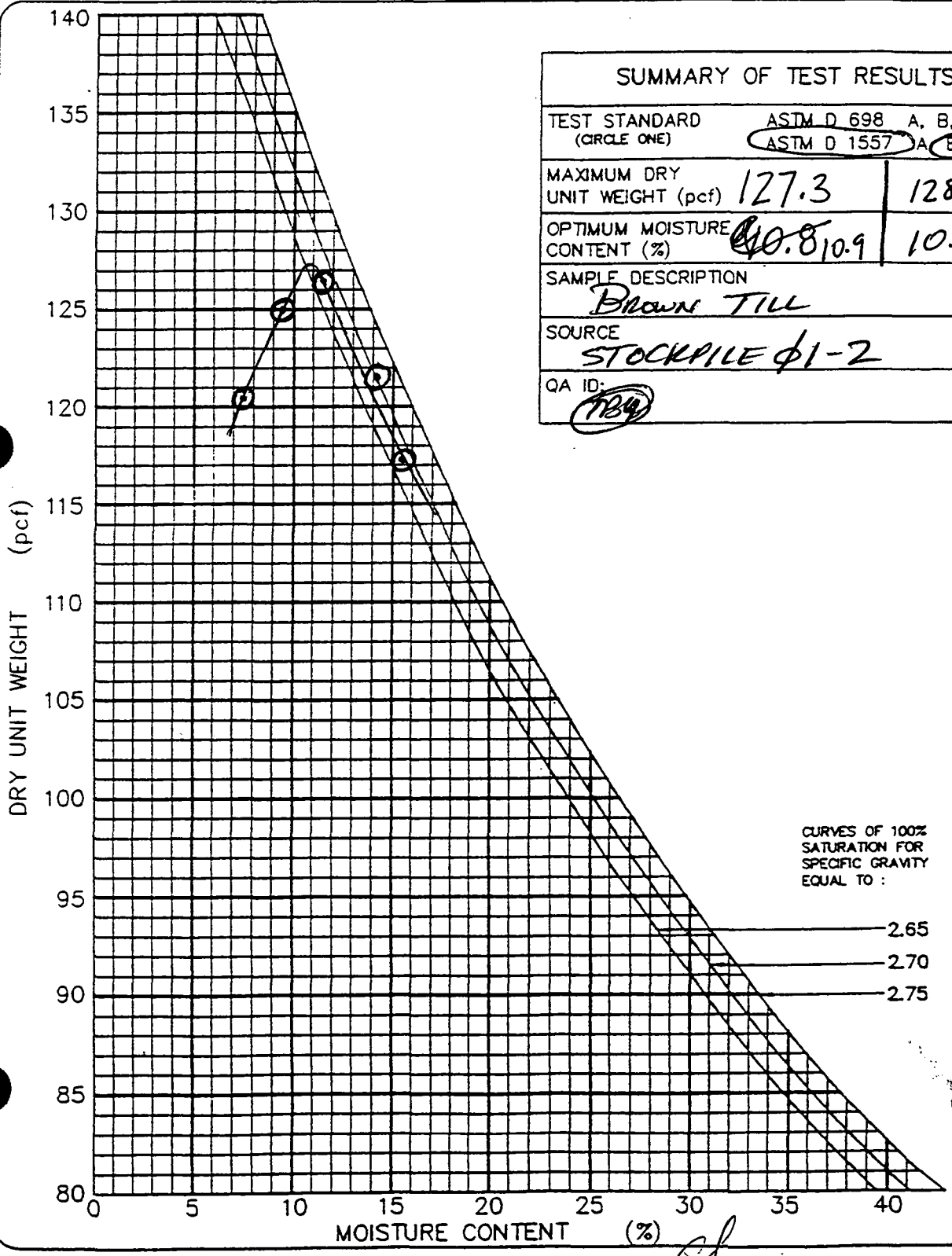
MOISTURE–DENSITY RELATIONSHIP

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO PROJECT NO: GQ1341 TASK NO.: 04.1

DESCRIPTION: PHASE III DATE: 29 day AUG month 2001 year

MATERIAL TYPE: Low Perm. Clay SAMPLE NO.: LP-01-07



SUMMARY OF TEST RESULTS		
TEST STANDARD (CIRCLE ONE)	ASTM D 698 A, B, C ASTM D 1557 A B C	
MAXIMUM DRY UNIT WEIGHT (pcf)	127.3	128.1
OPTIMUM MOISTURE CONTENT (%)	~~10.8~~ 10.9	10.7
SAMPLE DESCRIPTION	Brown Till	
SOURCE	STOCKPILE 01-2	
QA ID:	TBA	

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SHEET NO. 3 OF 3

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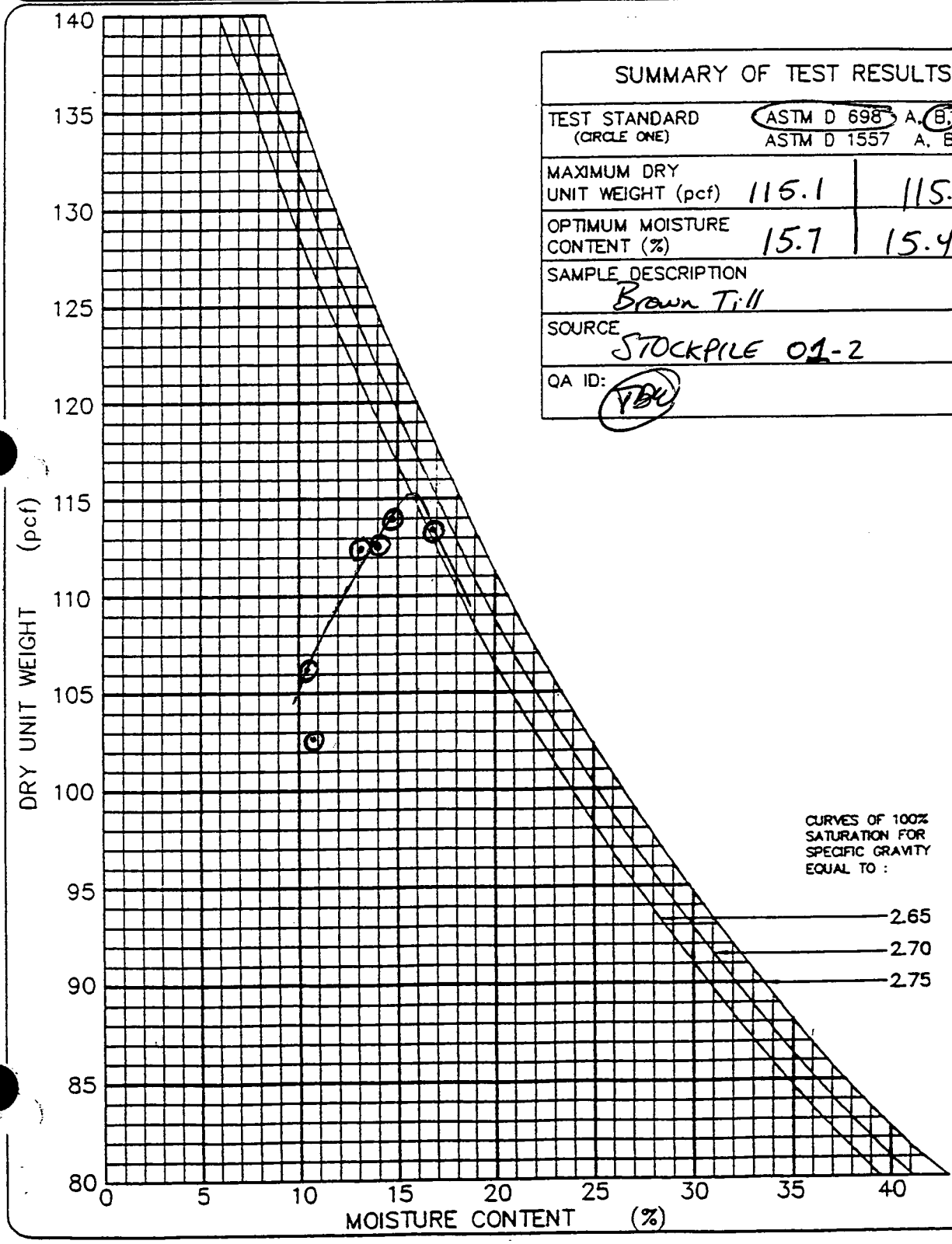
MOISTURE-DENSITY RELATIONSHIP

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO — PROJECT NO: GQ134 TASK NO.: 04.1

DESCRIPTION: PHASE III — DATE: 30 day AUG month 2001 year

MATERIAL TYPE: LOW PERM CLAY — SAMPLE NO.: LP-01-08



SUMMARY OF TEST RESULTS		
TEST STANDARD (CIRCLE ONE)	ASTM D 698 A, B, C	ASTM D 1557 A, B, C
MAXIMUM DRY UNIT WEIGHT (pcf)	115.1	115.8
OPTIMUM MOISTURE CONTENT (%)	15.7	15.4
SAMPLE DESCRIPTION	Brown Till	
SOURCE	STOCKPILE 01-2	
QA ID:	TBW	

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SHEET NO. 3 OF 3

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FLUOR FERNALD

FIELD LABORATORY COMPACTION TEST

(ASTM D 698 METHOD B)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO — PROJECT NO.: GQ1341 TASK NO.: 04.1

DESCRIPTION: PHASE III — DATE: 29 day AUG month 2001 year

MATERIAL TYPE: Low Perm. CLAY — MATERIAL SOURCE: STOCKPILE 01-2 — SAMPLE NO.: LP-01-08

THIS METHOD WILL BE USED IF THE MATERIAL RETAINED ON THE NO. 3/4-in. (19-mm) SIEVE IS LESS THAN 30%, IF THE MATERIAL RETAINED ON THE NO. 4 (4.75-mm) SIEVE IS GREATER THAN 20%, AND IF THE MATERIAL RETAINED ON THE NO. 3/8-in. (9.5-mm) SIEVE IS LESS THAN 20%.
ALL MATERIAL RETAINED ON THE NO. 3/8-in. (9.5-mm) SIEVE IS DISCARDED.
USE OVERSIZE CORRECTION IF MORE THAN 5% IS DISCARDED ACCORDING TO ASTM D 4718.
USE A 4-in. DIAMETER MOLD / 5.5-lb RAMMER / 12-in. DROP / 3 LAYERS / 25 BLOWS PER LAYER.

COMPACTION OF SOIL — QA ID: [illegible] 13.76

			13.19 lbs	13.08	13.57	13.65	
	WATER ADDED	(ml)	+4%	+6%	+8%	+10%	+12%
A	WT. OF SOIL & MOLD	(grams)	5983.0	5933.1	6155.4	6191.6	6214.3
B	WT. OF MOLD	(grams)	4208.8	4208.8	4208.8	4208.8	4208.8
C	WT. OF SOIL = A − B	(grams)	1774.2	1724.3	1946.6	1982.8	2005.5
D	WET UNIT WT.(1) = C X 0.066	(pcf)	117.1	113.8	128.5	130.9	132.4
E	DRY UNIT WT. = D / [1 + (K/100)]	(pcf)	106.1	102.7	112.7	114.0	113.3

NOTE: IF CALIBRATED MOLD OF 1/30 FT^3 IS USED, THE WET DENSITY IS CALCULATED FROM THE WEIGHT OF SOIL, THE VOLUME OF THE MOLD AND THE CONVERSION FROM GRAMS TO POUNDS (I.E., CONVERSION FACTOR = (30 / 453.6) = 0.066). THE MOLD MUST BE CALIBRATED TO VERIFY A CAPACITY OF 1/30 ± 0.0005 FT^3 ON INTERVALS NOT TO EXCEED 1000 TIMES THAT THE MOLD IS FILLED.

MOISTURE CONTENT — ASTM D 2216 — QA ID: _____

	TARE NO.		302	8	101	212	305
F	WT. OF TARE	(grams)	8.2	8.3	8.3	8.3	8.3
G	WT. OF WET SOIL & TARE	(grams)	470.4	503.7	521.6	519.7	616.8
H	WT. OF DRY SOIL & TARE	(grams)	426.7	455.3	458.7	453.6	529.0
I	WT. OF WATER = G − H	(grams)	43.7	48.4	62.9	66.1	87.8
J	WT. DRY SOIL = H − F	(grams)	418.5	447.0	450.4	445.3	520.7
K	MOISTURE CONTENT = (I/J) X 100	(%)	10.4	10.8	14.0	14.8	16.9

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FIELD LABORATORY COMPACTION TEST

(ASTM D 698 METHOD B)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO

PROJECT NO.: GQ134 TASK NO.: 04.1

DESCRIPTION: PHASE III

DATE: 30 day AUG month 2001 year

MATERIAL TYPE: Low Perm. CLAY MATERIAL SOURCE: STOCKPILE 01-2 SAMPLE NO.: LP-01-08

THIS METHOD WILL BE USED IF THE MATERIAL RETAINED ON THE NO. 3/4-in. (19-mm) SIEVE IS LESS THAN 30%, IF THE MATERIAL RETAINED ON THE NO. 4 (4.75-mm) SIEVE IS GREATER THAN 20%, AND IF THE MATERIAL RETAINED ON THE NO. 3/8-in. (9.5-mm) SIEVE IS LESS THAN 20%.
ALL MATERIAL RETAINED ON THE NO. 3/8-in. (9.5-mm) SIEVE IS DISCARDED.
USE OVERSIZE CORRECTION IF MORE THAN 5% IS DISCARDED ACCORDING TO ASTM D 4718.
USE A 4-in. DIAMETER MOLD / 5.5-lb RAMMER / 12-in. DROP / 3 LAYERS / 25 BLOWS PER LAYER.

COMPACTION OF SOIL 13.53 lbs QA ID: TBN

	WATER ADDED	(ml)	@ ~12%				
A	WT. OF SOIL & MOLD	(grams)	6137.2				
B	WT. OF MOLD	(grams)	4208.8				
C	WT. OF SOIL = A − B	(grams)	1928.4				
D	WET UNIT WT.(1) = C X 0.066	(pcf)	127.3				
E	DRY UNIT WT. = D / [1 + (K/100)]	(pcf)	112.5				

NOTE: IF CALIBRATED MOLD OF 1/30 FT^3 IS USED, THE WET DENSITY IS CALCULATED FROM THE WEIGHT OF SOIL, THE VOLUME OF THE MOLD AND THE CONVERSION FROM GRAMS TO POUNDS (I.E., CONVERSION FACTOR = (30 / 453.6) = 0.066). THE MOLD MUST BE CALIBRATED TO VERIFY A CAPACITY OF 1/30 ± 0.0005 FT^3 ON INTERVALS NOT TO EXCEED 1000 TIMES THAT THE MOLD IS FILLED.

MOISTURE CONTENT – ASTM D 2216 QA ID: _____

	TARE NO.		33				
F	WT. OF TARE	(grams)	8.1				
G	WT. OF WET SOIL & TARE	(grams)	583.4				
H	WT. OF DRY SOIL & TARE	(grams)	516.8				
I	WT. OF WATER = G − H	(grams)	66.6				
J	WT. DRY SOIL = H − F	(grams)	508.7				
K	MOISTURE CONTENT = (I/J) X 100	(%)	13.1				

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FLUOR FERNALD

CORRECTION OF UNIT WEIGHT AND WATER CONTENT FOR SOILS CONTAINING OVERSIZE PARTICLES *(ASTM D 4718)*

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO **PROJECT NO.** G0134 **TASK NO.** 04.1

DESCRIPTION: Phase III **DATE:** 4 day Sept month 2001 year

MATERIAL TYPE: Low Perm Clay LP08- LP02-08 Std & prod

Weight of Total Sample	=	19,781.7 g
Weight of Oversize Fraction	=	394.0
Weight of Finer Fraction (-3/8)	=	19387.7
Percentage of Oversize Fraction	= (P_C)	2.0
Percentage of Finer Fraction (-3/8)	= (P_F)	98.0
Specific Gravity (Assumed)	= (G_M)	2.72

(W_F)	=	Water Content - 3/8, as decimal	=	0.157
(W_C)	=	Water Content + 3/8, as decimal	=	0.015
(δ_F)	=	Dry Density of finer fraction	=	115.1
(δ_W)	=	Unit Weight of Water	=	62.4

$$C_W=(W_F P_F)+(W_C P_C)$$

C_W = 15.4%

$$C\delta_D=100\delta_F G_M \delta_W/(\delta_F P_C)+(G_M \delta_W P_F)$$

$C_{\delta D}$ = 115.8 pcf

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FIELD LABORATORY COMPACTION TEST

(ASTM D 698 METHOD B)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO

PROJECT NO.: GQ1341 TASK NO.: 04.1

DESCRIPTION: PHASE III

DATE: 30 day AUG month 2001 year

MATERIAL TYPE: LOW PERM. CLAY MATERIAL SOURCE: STOCKPILE 01-2 SAMPLE NO.: LP-01-09

THIS METHOD WILL BE USED IF THE MATERIAL RETAINED ON THE NO. 3/4-in. (19-mm) SIEVE IS LESS THAN 30%, IF THE MATERIAL RETAINED ON THE NO. 4 (4.75-mm) SIEVE IS GREATER THAN 20%, AND IF THE MATERIAL RETAINED ON THE NO. 3/8-in. (9.5-mm) SIEVE IS LESS THAN 20%.
ALL MATERIAL RETAINED ON THE NO. 3/8-in. (9.5-mm) SIEVE IS DISCARDED.
USE OVERSIZE CORRECTION IF MORE THAN 5% IS DISCARDED ACCORDING TO ASTM D 4718.
USE A 4-in. DIAMETER MOLD / 5.5-lb RAMMER / 12-in. DROP / 3 LAYERS / 25 BLOWS PER LAYER.

COMPACTION OF SOIL — QA ID: TBL

			13.52 lbs	13.68 lbs	13.62 lbs	13.22	
	WATER ADDED	(ml)	+4%	+6%	+8%	+2%	
A	WT. OF SOIL & MOLD	(grams)	6132.7	6205.2	6178.0	5996.6	
B	WT. OF MOLD	(grams)	4208.8	4208.8	4208.8	4208.8	
C	WT. OF SOIL = A − B	(grams)	1923.9	1996.4	1969.2	1787.8	
D	WET UNIT WT.(1) = C X 0.066	(pcf)	127.0	131.8	130.0	118.0	
E	DRY UNIT WT. = D / [1 + (K/100)]	(pcf)	110.5	112.6	109.7	104.8	

NOTE: IF CALIBRATED MOLD OF 1/30 FT^3 IS USED, THE WET DENSITY IS CALCULATED FROM THE WEIGHT OF SOIL, THE VOLUME OF THE MOLD AND THE CONVERSION FROM GRAMS TO POUNDS (I.E., CONVERSION FACTOR = (30 / 453.6) = 0.066). THE MOLD MUST BE CALIBRATED TO VERIFY A CAPACITY OF 1/30 ± 0.0005 FT^3 ON INTERVALS NOT TO EXCEED 1000 TIMES THAT THE MOLD IS FILLED.

MOISTURE CONTENT — ASTM D 2216 — QA ID: TBL

	TARE NO.		306	230	304	303	
F	WT. OF TARE	(grams)	8.3	8.0	8.3	8.3	
G	WT. OF WET SOIL & TARE	(grams)	487.1	571.3	590.4	540.0	
H	WT. OF DRY SOIL & TARE	(grams)	425.0	489.2	499.4	480.4	
I	WT. OF WATER = G − H	(grams)	62.1	82.1	91.0	59.6	
J	WT. DRY SOIL = H − F	(grams)	416.7	481.2	491.1	472.1	
K	MOISTURE CONTENT = (I/J) X 100	(%)	14.9	17.1	18.5	12.6	

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CORRECTION OF UNIT WEIGHT AND WATER CONTENT FOR SOILS CONTAINING OVERSIZE PARTICLES *(ASTM D 4718)*

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO PROJECT NO. G01341 TASK NO. 04.1

DESCRIPTION: Phase III DATE: 4 day Sept month 2001 year

MATERIAL TYPE: LOW PERM CLAY LP-09 STD

Weight of Total Sample	=	38,265.1 g
Weight of Oversize Fraction	=	493.4
Weight of Finer Fraction (- 3/8)	=	37771.7
Percentage of Oversize Fraction	= (P_C)	1.3 %
Percentage of Finer Fraction (- 3/8)	= (P_F)	98.7 %
Specific Gravity (Assumed)	= (G_M)	2.72

(W_F)	=	Water Content - 3/8 , as decimal	=	~~0.0~~ 0.163
(W_C)	=	Water Content + 3/8 , as decimal	=	0.015
(δ_F)	=	Dry Density of finer fraction	=	113.4
(δ_W)	=	Unit Weight of Water	=	62.4

$$C_W=(W_F P_F)+(W_C P_C)$$

$C_W = 16.1\ \%$

$$C\delta_D=100\delta_F G_M \delta_W/(\delta_F P_C)+(G_M \delta_W P_F)$$

$C_{\delta D} = 113.9$ pcf

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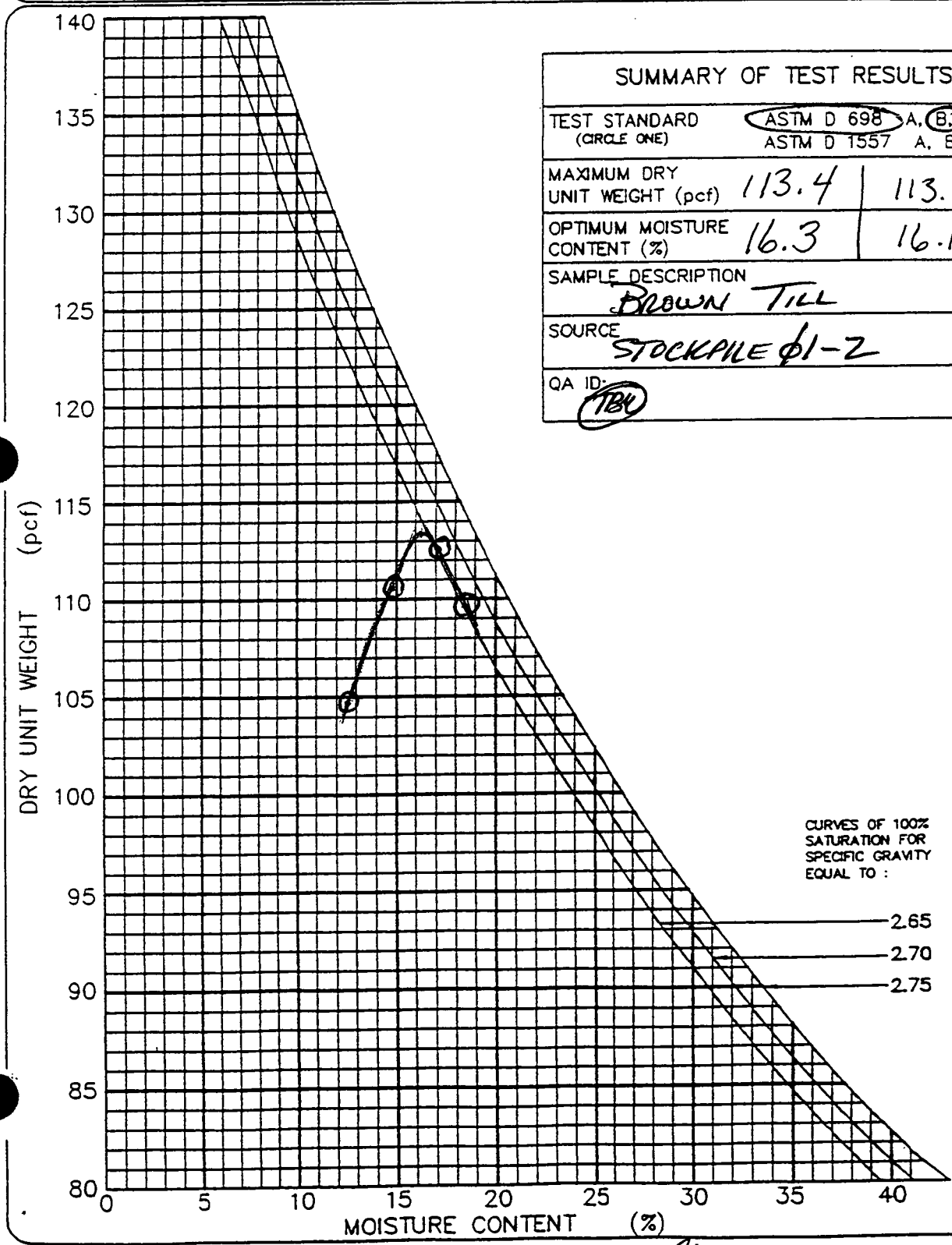
'OISTURE–DENSITY RELATIONSHIP

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO PROJECT NO: GQ134 TASK NO.: 04.1

DESCRIPTION: PHASE III DATE: 31 day AUG month 2001 year

MATERIAL TYPE: LOW PERM. CLAY SAMPLE NO.: LP-01-09



SUMMARY OF TEST RESULTS		
TEST STANDARD (CIRCLE ONE)	ASTM D 698 A, B, C ASTM D 1557 A, B, C	
MAXIMUM DRY UNIT WEIGHT (pcf)	113.4	113.9
OPTIMUM MOISTURE CONTENT (%)	16.3	16.1
SAMPLE DESCRIPTION	BROWN TILL	
SOURCE	STOCKPILE 01-2	
QA ID:	TBU	

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FLUOR FERNALD

FIELD LABORATORY COMPACTION TEST

(ASTM D 1557 METHOD B)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO — PROJECT NO.: GQ134 TASK NO.: 04.1

DESCRIPTION: PHASE III — DATE: 30 day AUG month 2001 year

MATERIAL TYPE: Low Perm. CLAY — MATERIAL SOURCE: STOCKPILE 01-2 — SAMPLE NO.: LP-01-09

THIS METHOD WILL BE USED IF THE MATERIAL RETAINED ON THE NO. 4-in. (4.75-mm) SIEVE IS GREATER THAN 20%, AND THE MATERIAL RETAINED ON THE NO. 3/8-in. (9.5-mm) SIEVE IS LESS THAN 20%.
ALL MATERIAL RETAINED ON THE NO. 3/8-in. (9.5-mm) SIEVE IS DISCARDED.
USE OVERSIZE CORRECTION IF MORE THAN 5% IS DISCARDED ACCORDING TO ASTM D 4718.
USE A 4-in. DIAMETER MOLD / 10-lb RAMMER / 18-in. DROP / 5 LAYERS / 25 BLOWS PER LAYER.

COMPACTION OF SOIL			13.51 lbs	13.70 lbs	13.87 lbs	13.73 lbs	QA ID: TBW
	WATER ADDED	(ml)	+0%	+2%	+4%	+6%	
A	WT. OF SOIL & MOLD	(grams)	6128.1	6214.3	6291.4	6227.9	
B	WT. OF MOLD	(grams)	4208.8	4208.8	4208.8	4208.8	
C	WT. OF SOIL = A − B	(grams)	1919.3	2005.5	2082.6	2019.1	
D	WET UNIT WT.(1) = C X 0.066	(pcf)	126.7	132.4	137.5	133.3	
E	DRY UNIT WT. = D / [1 + (K/100)]	(pcf)	118.1	120.9	119.7	114.0	

NOTE: IF CALIBRATED MOLD OF 1/30 FT^3 IS USED, THE WET DENSITY IS CALCULATED FROM THE WEIGHT OF SOIL, THE VOLUME OF THE MOLD AND THE CONVERSION FROM GRAMS TO POUNDS (I.E., CONVERSION FACTOR = (30 / 453.6) = 0.066). THE MOLD MUST BE CALIBRATED TO VERIFY A CAPACITY OF 1/30 ± 0.0005 FT^3 ON INTERVALS NOT TO EXCEED 1000 TIMES THAT THE MOLD IS FILLED.

MOISTURE CONTENT − ASTM D 2216							QA ID: TBW
	TARE NO.		228	225	28	204	
F	WT. OF TARE	(grams)	8.0	8.3	8.2	8.2	
G	WT. OF WET SOIL & TARE	(grams)	630.9	601.2	548.7	543.0	
H	WT. OF DRY SOIL & TARE	(grams)	588.5	549.6	479.1	465.7	
I	WT. OF WATER = G − H	(grams)	42.4	51.6	69.6	77.3	
J	WT. DRY SOIL = H − F	(grams)	580.5	541.3	470.9	457.5	
K	MOISTURE CONTENT = (I/J) X 100	(%)	7.3	9.5	14.8	16.9	

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GEO SYNTEC CONSULTANTS FILE NO. 2-09-FLC — CHECKED BY: [illegible] — SHEET NO. 1 OF 3

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FLUOR FERNALD

CORRECTION OF UNIT WEIGHT AND WATER CONTENT FOR SOILS CONTAINING OVERSIZE PARTICLES *(ASTM D 4718)*

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO **PROJECT NO.** 6Q34 **TASK NO.** 04.1

DESCRIPTION: Phase III **DATE:** 5 day Sept month 2001 year

MATERIAL TYPE: Low Perm Clay LP07-09 mod

Weight of Total Sample	=	38265.1
Weight of Oversize Fraction	=	493.4
Weight of Finer Fraction (- 3/8)	=	37771.7
Percentage of Oversize Fraction	= (P_C)	1.3
Percentage of Finer Fraction (- 3/8)	= (P_F)	98.7
Specific Gravity (Assumed)	= (G_M)	2.72

(W_F)	=	Water Content - 3/8 , as decimal	=	0.123
(W_C)	=	Water Content + 3/8 , as decimal	=	0.015
(δ_F)	=	Dry Density of finer fraction	=	124.0
(δ_W)	=	Unit Weight of Water	=	62.4

$$C_W=(W_F P_F)+(W_C P_C)$$

$C_W = 12.2\%$

$$C\delta_D=100\delta_F G_M \delta_W/(\delta_F P_C)+(G_M \delta_W P_F)$$

$C_{\delta D} = 124.4$ pcf

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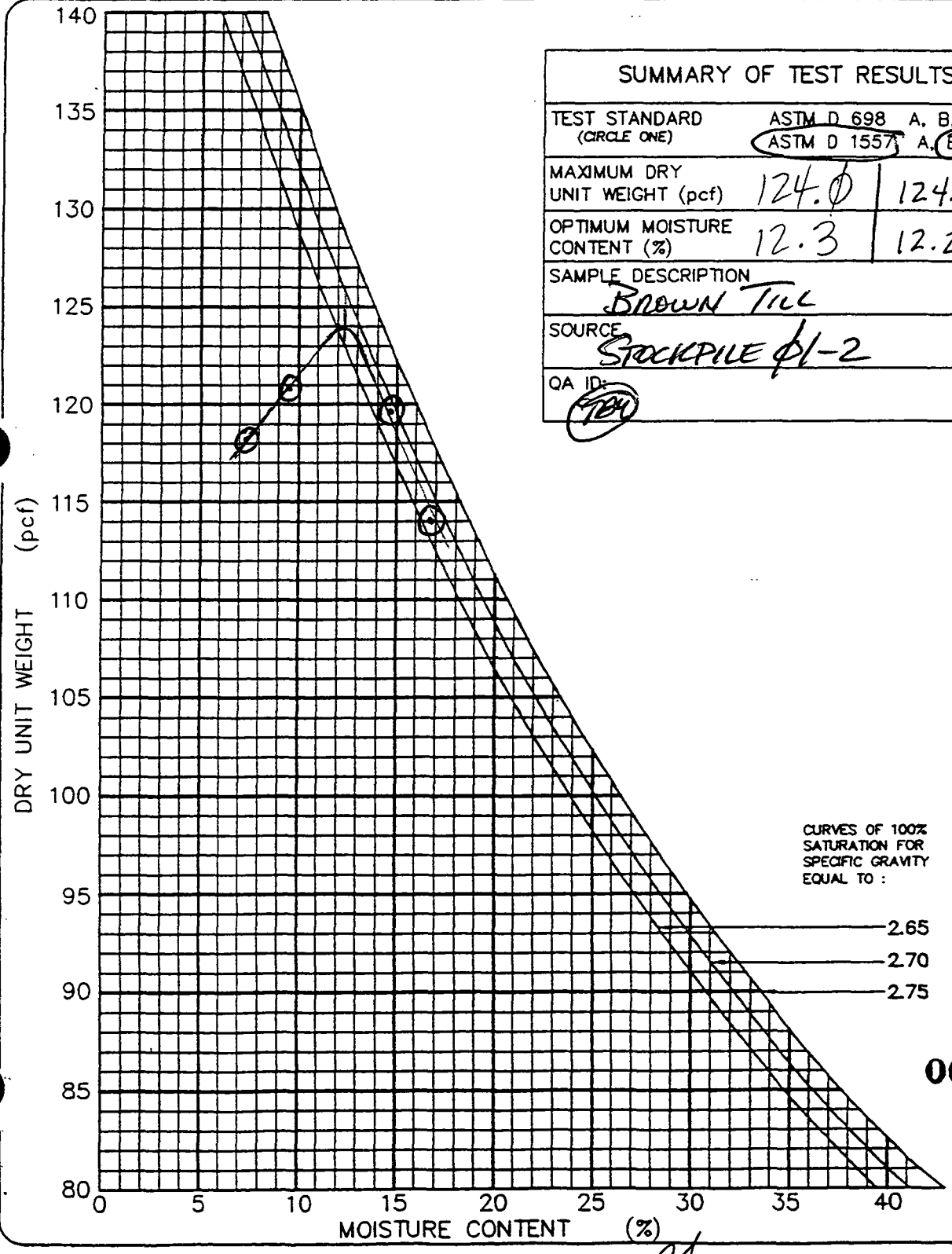
MOISTURE–DENSITY RELATIONSHIP

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO PROJECT NO: GQ1341 TASK NO.: 04.1

DESCRIPTION: PHASE III DATE: 31 day AUG month 2001 year

MATERIAL TYPE: LOW PERM CLAY SAMPLE NO.: LP-01-09



SUMMARY OF TEST RESULTS		
TEST STANDARD (CIRCLE ONE)	ASTM D 698 A, B, C ASTM D 1557 A, B, C	
MAXIMUM DRY UNIT WEIGHT (pcf)	124.0	124.4
OPTIMUM MOISTURE CONTENT (%)	12.3	12.2
SAMPLE DESCRIPTION	BROWN TILL	
SOURCE	STOCKPILE 01-2	
QA ID:	TBM	

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FLUOR FERNALD

FIELD LABORATORY COMPACTION TEST

(ASTM D 698 METHOD B)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO

PROJECT NO.: GQ134 TASK NO.: 04.1

DESCRIPTION: PHASE III

DATE: 05 day SEPT month 2001 year

MATERIAL TYPE: LOW PERM. CLAY MATERIAL SOURCE: STOCKPILE 01-2 SAMPLE NO.: LP-01-11

THIS METHOD WILL BE USED IF THE MATERIAL RETAINED ON THE NO. 3/4-in. (19-mm) SIEVE IS LESS THAN 30%, IF THE MATERIAL RETAINED ON THE NO. 4 (4.75-mm) SIEVE IS GREATER THAN 20%, AND IF THE MATERIAL RETAINED ON THE NO. 3/8-in. (9.5-mm) SIEVE IS LESS THAN 20%.
ALL MATERIAL RETAINED ON THE NO. 3/8-in. (9.5-mm) SIEVE IS DISCARDED.
USE OVERSIZE CORRECTION IF MORE THAN 5% IS DISCARDED ACCORDING TO ASTM D 4718.
USE A 4-in. DIAMETER MOLD / 5.5-lb RAMMER / 12-in. DROP / 3 LAYERS / 25 BLOWS PER LAYER.

COMPACTION OF SOIL — QA ID: TBK

			13.00 lbs	13.26 lbs	13.56 lbs	13.70	13.62 lb
	WATER ADDED	(ml)	+4%	+6%	+8%	+10%	+12%
A	WT. OF SOIL & MOLD	(grams)	5896.8	6014.7	6150.8	6214.3	6178.0
B	WT. OF MOLD	(grams)	4208.8	4208.8	4208.8	4208.8	4208.8
C	WT. OF SOIL = A − B	(grams)	1688.0	1805.9	1942.0	2005.5	1969.2
D	WET UNIT WT.(1) = C X 0.066	(pcf)	111.4	119.2	128.2	132.4	130.0
E	DRY UNIT WT. = D / [1 + (K/100)]	(pcf)	101.2	106.0	112.3	113.8	110.0

NOTE: IF CALIBRATED MOLD OF 1/30 FT^3 IS USED, THE WET DENSITY IS CALCULATED FROM THE WEIGHT OF SOIL, THE VOLUME OF THE MOLD AND THE CONVERSION FROM GRAMS TO POUNDS (I.E., CONVERSION FACTOR = (30 / 453.6) = 0.066). THE MOLD MUST BE CALIBRATED TO VERIFY A CAPACITY OF 1/30 ± 0.0005 FT^3 ON INTERVALS NOT TO EXCEED 1000 TIMES THAT THE MOLD IS FILLED.

MOISTURE CONTENT — ASTM D 2216 — QA ID: TBK

	TARE NO.		305	306	212	303	230
F	WT. OF TARE	(grams)	8.3	8.3	8.3	8.4	8.1
G	WT. OF WET SOIL & TARE	(grams)	488.5	534.4	493.8	565.6	556.4
H	WT. OF DRY SOIL & TARE	(grams)	444.6	475.9	433.3	487.6	472.1
I	WT. OF WATER = G − H	(grams)	43.9	58.5	60.5	78.0	84.3
J	WT. DRY SOIL = H − F	(grams)	436.3	467.6	425.0	479.2	464.0
K	MOISTURE CONTENT = (I/J) X 100	(%)	10.1	12.5	14.2	16.3	18.2

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CORRECTION OF UNIT WEIGHT AND WATER CONTENT FOR SOILS CONTAINING OVERSIZE PARTICLES *(ASTM D 4718)*

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO **PROJECT NO.** G0134 **TASK NO.** 04.1

DESCRIPTION: Phase III **DATE:** 6 day Sept month 2001 year

MATERIAL TYPE: Low Perm Clay CP01-11 std

Weight of Total Sample	=	23166.3 g
Weight of Oversize Fraction	=	182 g
Weight of Finer Fraction (- 3/8)	=	22984.3
Percentage of Oversize Fraction	= (P_C)	0.8
Percentage of Finer Fraction (- 3/8)	= (P_F)	99.2
Specific Gravity (Assumed)	= (G_M)	2.72

(W_F)	=	Water Content - 3/8 , as decimal	=	0.155
(W_C)	=	Water Content + 3/8 , as decimal	=	0.015
(δ_F)	=	Dry Density of finer fraction	=	115.0
(δ_W)	=	Unit Weight of Water	=	62.4

$$C_W=(W_F P_F)+(W_C P_C)$$

$$C_w = 15.4$$

$$C\delta_D=100\delta_F G_M \delta_W/(\delta_F P_C)+(G_M \delta_W P_F)$$

$$C_{\delta D} = 115.3$$

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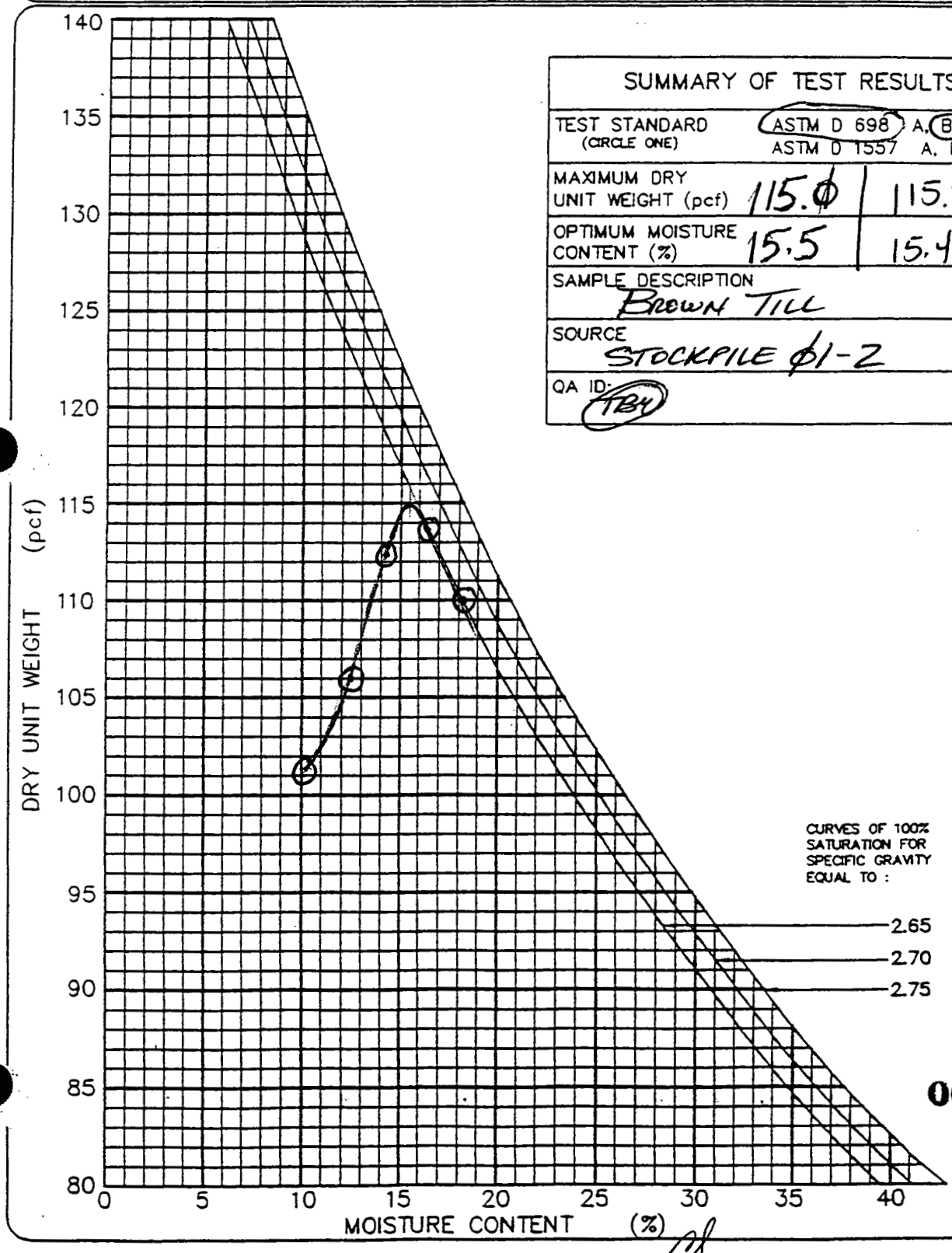
MOISTURE–DENSITY RELATIONSHIP

PROJECT: ON–SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO — PROJECT NO: GQ/341 TASK NO.: 04.1

DESCRIPTION: PHASE III — DATE: 06 day SEPT month 2001 year

MATERIAL TYPE: Low Perm CLAY — SAMPLE NO.: LP-01-11



SUMMARY OF TEST RESULTS		
TEST STANDARD (CIRCLE ONE)	ASTM D 698 A, B, C ASTM D 1557 A, B, C	
MAXIMUM DRY UNIT WEIGHT (pcf)	115.0	115.3
OPTIMUM MOISTURE CONTENT (%)	15.5	15.4
SAMPLE DESCRIPTION	BROWN TILL	
SOURCE	STOCKPILE 01-2	
QA ID:	TBY	

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FLUOR FERNALD

FIELD LABORATORY COMPACTION TEST

(ASTM D 698 METHOD B)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO

PROJECT NO.: GQ134 TASK NO.: 04.1

DESCRIPTION: PHASE III

DATE: 11 day SEPT month 2001 year

MATERIAL TYPE: LOW PERM CLAY MATERIAL SOURCE: STOCKPILE 01-2 SAMPLE NO.: LP-01-12

THIS METHOD WILL BE USED IF THE MATERIAL RETAINED ON THE NO. 3/4-in. (19-mm) SIEVE IS LESS THAN 30%, IF THE MATERIAL RETAINED ON THE NO. 4 (4.75-mm) SIEVE IS GREATER THAN 20%, AND IF THE MATERIAL RETAINED ON THE NO. 3/8-in. (9.5-mm) SIEVE IS LESS THAN 20%.
ALL MATERIAL RETAINED ON THE NO. 3/8-in. (9.5-mm) SIEVE IS DISCARDED.
USE OVERSIZE CORRECTION IF MORE THAN 5% IS DISCARDED ACCORDING TO ASTM D 4718.
USE A 4-in. DIAMETER MOLD / 5.5-lb RAMMER / 12-in. DROP / 3 LAYERS / 25 BLOWS PER LAYER.

10%

COMPACTION OF SOIL — QA ID: TBC

			13.18 lbs	13.33 lbs	13.47 lbs	13.64 lbs		13.63
	WATER ADDED	(ml)	+4%	+6%	+8%	+10%	+12%	
A	WT. OF SOIL & MOLD	(grams)	5978.4	6046.5	6110.0	6187.1	6182.6	6206
B	WT. OF MOLD	(grams)	4208.8	4208.8	4208.8	4208.8	4208.8	4208
C	WT. OF SOIL = A − B	(grams)	1769.6	1837.7	1901.2	1978.3	1973.8	1996.
D	WET UNIT WT.(1) = C X 0.066	(pcf)	116.8	121.3	125.5	130.6	130.2	131.8
E	DRY UNIT WT. = D / [1 + (K/100)]	(pcf)	104.6	107.1	110.3	110.6	110.2	112.4

NOTE: IF CALIBRATED MOLD OF 1/30 FT^3 IS USED, THE WET DENSITY IS CALCULATED FROM THE WEIGHT OF SOIL, THE VOLUME OF THE MOLD AND THE CONVERSION FROM GRAMS TO POUNDS (I.E., CONVERSION FACTOR = (30 / 453.6) = 0.066). THE MOLD MUST BE CALIBRATED TO VERIFY A CAPACITY OF 1/30 ± 0.0005 FT^3 ON INTERVALS NOT TO EXCEED 1000 TIMES THAT THE MOLD IS FILLED.

MOISTURE CONTENT — ASTM D 2216 — QA ID: TBC

	TARE NO.		212	230	306	305	33	21
F	WT. OF TARE	(grams)	8.3	8.1	8.3	8.3	8.1	8.4
G	WT. OF WET SOIL & TARE	(grams)	531.3	543.8	541.9	531.3	539.2	419.6
H	WT. OF DRY SOIL & TARE	(grams)	476.7	481.4	477.1	451.0	457.5	359.
I	WT. OF WATER = G − H	(grams)	54.6	62.4	64.8	80.3	81.7	60.
J	WT. DRY SOIL = H − F	(grams)	468.4	473.3	468.8	442.7	449.4	350.
K	MOISTURE CONTENT = (I/J) X 100	(%)	11.7	13.2	13.8	18.1	18.2	17.3

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FLUOR FERNALD

CORRECTION OF UNIT WEIGHT AND WATER CONTENT FOR SOILS CONTAINING OVERSIZE PARTICLES *(ASTM D 4718)*

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO **PROJECT NO.** 6W134 **TASK NO.** 04.1

DESCRIPTION: Phase III **DATE:** ____ day ____ month ____ year

MATERIAL TYPE: LOW PERM Clay

Weight of Total Sample	=	45,866.3
Weight of Oversize Fraction	=	654.6
Weight of Finer Fraction (- 3/8)	=	45211.7
Percentage of Oversize Fraction	= (P_C)	1.4
Percentage of Finer Fraction (- 3/8)	= (P_F)	98.6
Specific Gravity (Assumed)	= (G_M)	2.72

(W_F)	=	Water Content - 3/8 , as decimal	=	0.16
(W_C)	=	Water Content + 3/8 , as decimal	=	0.015
(δ_F)	=	Dry Density of finer fraction	=	114.0
(δ_W)	=	Unit Weight of Water	=	62.4

$$C_W=(W_F P_F)+(W_C P_C)$$

$$C_W = 15.8$$

$$C\delta_D=100\delta_F G_M \delta_W/(\delta_F P_C)+(G_M \delta_W P_F)$$

$$C_{\delta D} = 114.5$$

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FLUOR DANIEL FERNALD

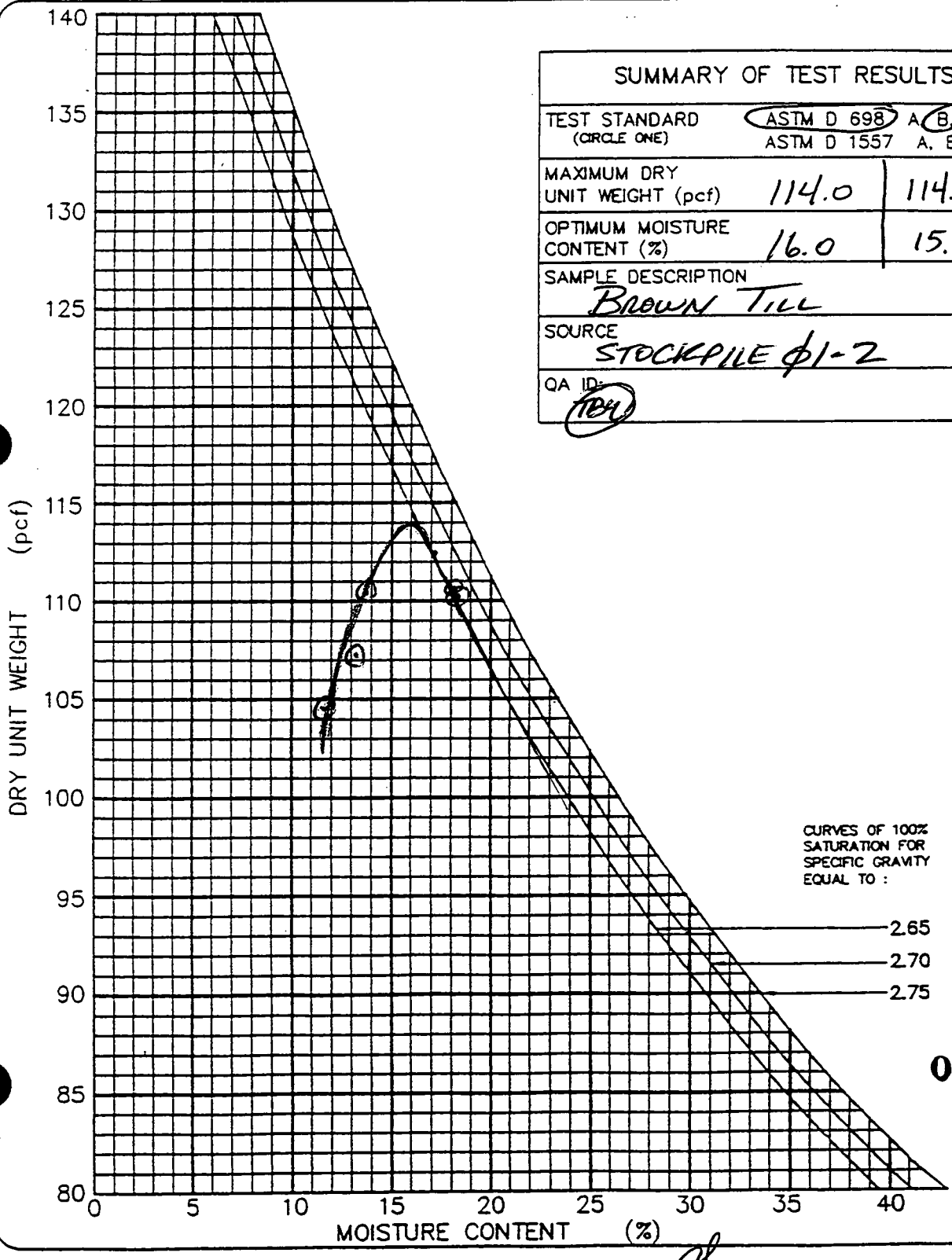
MOISTURE–DENSITY RELATIONSHIP

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO PROJECT NO: GQ1341 TASK NO.: 04.1

DESCRIPTION: PHASE III DATE: 13 day SEPT month 2001 year

MATERIAL TYPE: LOW PERM CLAY SAMPLE NO.: LP-01-12



SUMMARY OF TEST RESULTS		
TEST STANDARD (CIRCLE ONE)	ASTM D 698 A B C	
	ASTM D 1557 A, B, C	
MAXIMUM DRY UNIT WEIGHT (pcf)	114.0	114.5
OPTIMUM MOISTURE CONTENT (%)	16.0	15.8
SAMPLE DESCRIPTION	BROWN TILL	
SOURCE	STOCKPILE 01-2	
QA ID:	TBM	

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FLUOR FERNALD

FIELD LABORATORY COMPACTION TEST

(ASTM D 1557 METHOD B)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO

PROJECT NO.: GQ1341 TASK NO.: 04.1

DESCRIPTION: PHASE III

DATE: 11 day SEPT month 2001 year

MATERIAL TYPE: LOW PERM CLAY MATERIAL SOURCE: STOCKPILE 01-2 SAMPLE NO.: LP-01-12

THIS METHOD WILL BE USED IF THE MATERIAL RETAINED ON THE NO. 4-in. (4.75-mm) SIEVE IS GREATER THAN 20%, AND THE MATERIAL RETAINED ON THE NO. 3/8-in. (9.5-mm) SIEVE IS LESS THAN 20%.
ALL MATERIAL RETAINED ON THE NO. 3/8-in. (9.5-mm) SIEVE IS DISCARDED.
USE OVERSIZE CORRECTION IF MORE THAN 5% IS DISCARDED ACCORDING TO ASTM D 4718.
USE A 4-in. DIAMETER MOLD / 10-lb RAMMER / 18-in. DROP / 5 LAYERS / 25 BLOWS PER LAYER.

COMPACTION OF SOIL — QA ID: TBK

			13.61 lbs	13.96 lbs	13.95 lbs	13.80		
	WATER ADDED	(ml)	+2%	+4%	+6%	+8%	13.74 3% omit	13.36 +0%
A	WT. OF SOIL & MOLD	(grams)	6173.5	6332.3	6327.7	6259.7	6232.5	6060.1
B	WT. OF MOLD	(grams)	4208.8	4208.8	4208.8	4208.8	4208.8	4208.8
C	WT. OF SOIL = A − B	(grams)	1964.7	2123.5	2118.9	2050.9	2023.7	1851.3
D	WET UNIT WT.(1) = C X 0.066	(pcf)	129.7	140.1	139.8	135.4	133.6	122.2
E	DRY UNIT WT. = D / [1 + (K/100)]	(pcf)	120.3	126.0	123.6	117.0	123.8	116.9

NOTE: IF CALIBRATED MOLD OF 1/30 FT^3 IS USED, THE WET DENSITY IS CALCULATED FROM THE WEIGHT OF SOIL, THE VOLUME OF THE MOLD AND THE CONVERSION FROM GRAMS TO POUNDS (I.E., CONVERSION FACTOR = (30 / 453.6) = 0.066). THE MOLD MUST BE CALIBRATED TO VERIFY A CAPACITY OF 1/30 ± 0.0005 FT^3 ON INTERVALS NOT TO EXCEED 1000 TIMES THAT THE MOLD IS FILLED.

MOISTURE CONTENT — ASTM D 2216 — QA ID: TBK

	TARE NO.		228	302	8	101	303	303
F	WT. OF TARE	(grams)	8.0	8.3	8.3	8.3	8.3 omit	8.3
G	WT. OF WET SOIL & TARE	(grams)	600.7	643.5	660.1	542.7	385.3	627.3
H	WT. OF DRY SOIL & TARE	(grams)	558.0	579.3	584.2	470.2	357.6	600.4
I	WT. OF WATER = G − H	(grams)	42.7	64.2	75.9	72.5	27.7	26.9
J	WT. DRY SOIL = H − F	(grams)	550.0	571.0	575.9	461.9	349.3	592.1
K	MOISTURE CONTENT = (I/J) X 100	(%)	7.8	11.2	13.2	15.7	7.9	4.5

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FLUOR FERNALD

CORRECTION OF UNIT WEIGHT AND WATER CONTENT FOR SOILS CONTAINING OVERSIZE PARTICLES *(ASTM D 4718)*

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO **PROJECT NO.** G2134 **TASK NO.** 04.1

DESCRIPTION: Phase III **DATE:** ~~Sept~~ 14 **day** Sept **month** 2001 **year**

MATERIAL TYPE: Low Perm Clay LP01-12 mod

Weight of Total Sample	=	45866.3
Weight of Oversize Fraction	=	654.6
Weight of Finer Fraction (- 3/8)	=	45211.7
Percentage of Oversize Fraction	= (P_C)	1.4
Percentage of Finer Fraction (- 3/8)	= (P_F)	98.6
Specific Gravity (Assumed)	= (G_M)	2.72

(W_F)	=	Water Content - 3/8 , as decimal	=	0.113
(W_C)	=	Water Content + 3/8 , as decimal	=	0.015
(δ_F)	=	Dry Density of finer fraction	=	126.0
(δ_W)	=	Unit Weight of Water	=	62.4

$$C_W=(W_F P_F)+(W_C P_C)$$

$C_W = 11.2\%$

$$C\delta_D=100\delta_F G_M \delta_W/(\delta_F P_C)+(G_M \delta_W P_F)$$

$C_{\delta_D} = 126.5$ pcf

000409

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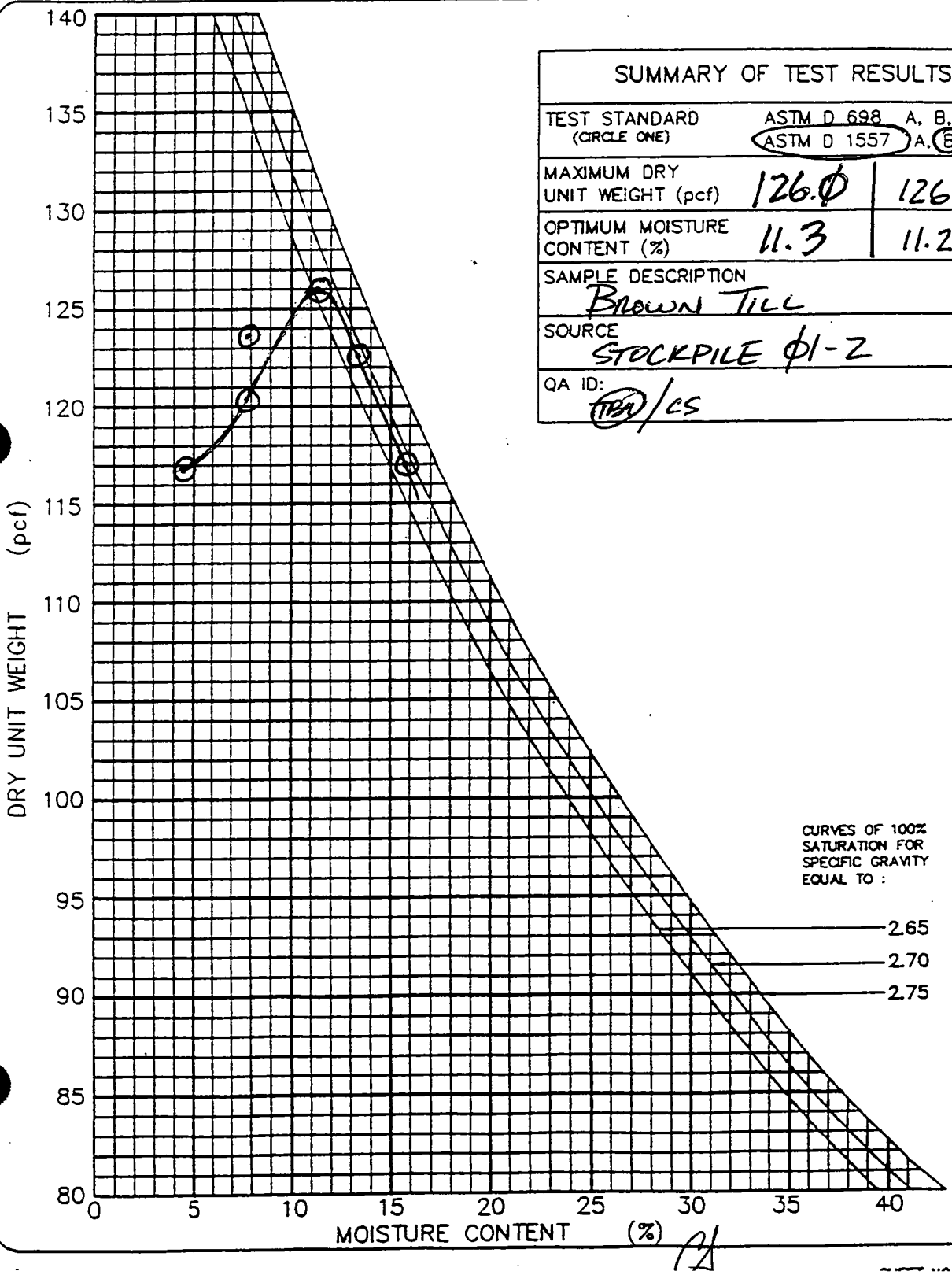
MOISTURE–DENSITY RELATIONSHIP

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO — PROJECT NO: GQ1341 TASK NO.: 04.1

DESCRIPTION: PHASE III — DATE: 18 day SEPT month 2001 year

MATERIAL TYPE: LOW PERM CLAY — SAMPLE NO.: LP-01-12



SUMMARY OF TEST RESULTS		
TEST STANDARD (CIRCLE ONE)	ASTM D 698 A, B, C ASTM D 1557 A, B, C	
MAXIMUM DRY UNIT WEIGHT (pcf)	126.0	126.5
OPTIMUM MOISTURE CONTENT (%)	11.3	11.2
SAMPLE DESCRIPTION	BROWN TILL	
SOURCE	STOCKPILE 01-2	
QA ID:	TBA/CS	

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GEOSYNTEC CONSULTANTS

FLUOR FERNALD

FIELD LABORATORY COMPACTION TEST

(ASTM D 698 METHOD B)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO — PROJECT NO.: GQ1341 TASK NO.: 04.1

DESCRIPTION: PHASE III. — DATE: 17 day SEPT month 2001 year

MATERIAL TYPE: LOW PERM. CLAY — MATERIAL SOURCE: STOCKPILE 01-3 — SAMPLE NO.: LP-01-13

THIS METHOD WILL BE USED IF THE MATERIAL RETAINED ON THE NO. 3/4-in. (19-mm) SIEVE IS LESS THAN 30%, IF THE MATERIAL RETAINED ON THE NO. 4 (4.75-mm) SIEVE IS GREATER THAN 20%, AND IF THE MATERIAL RETAINED ON THE NO. 3/8-in. (9.5-mm) SIEVE IS LESS THAN 20%.
ALL MATERIAL RETAINED ON THE NO. 3/8-in. (9.5-mm) SIEVE IS DISCARDED.
USE OVERSIZE CORRECTION IF MORE THAN 5% IS DISCARDED ACCORDING TO ASTM D 4718.
USE A 4-in. DIAMETER MOLD / 5.5-lb RAMMER / 12-in. DROP / 3 LAYERS / 25 BLOWS PER LAYER.

COMPACTION OF SOIL — QA ID: TBW

			13.05 lbs	13.26 lbs	13.47 lbs	13.64 lbs	13.66 lbs
	WATER ADDED	(ml)	+4%	+6%	+8%	10%	+13%
A	WT. OF SOIL & MOLD	(grams)	5919.5	6014.7	6110.0	6187.1	6196.2
B	WT. OF MOLD	(grams)	4208.8	4208.8	4208.8	4208.8	4208.8
C	WT. OF SOIL = A − B	(grams)	1710.7	1805.9	1901.2	1978.3	1987.4
D	WET UNIT WT.(1) = C X 0.066	(pcf)	112.9	119.2	125.5	130.6	131.2
E	DRY UNIT WT. = D / [1 + (K/100)]	(pcf)	103.6	107.1	110.8	113.5	111.3

NOTE: IF CALIBRATED MOLD OF 1/30 FT^3 IS USED, THE WET DENSITY IS CALCULATED FROM THE WEIGHT OF SOIL, THE VOLUME OF THE MOLD AND THE CONVERSION FROM GRAMS TO POUNDS (I.E., CONVERSION FACTOR = (30 / 453.6) = 0.066). THE MOLD MUST BE CALIBRATED TO VERIFY A CAPACITY OF 1/30 ± 0.0005 FT^3 ON INTERVALS NOT TO EXCEED 1000 TIMES THAT THE MOLD IS FILLED.

MOISTURE CONTENT — ASTM D 2216 — QA ID: TBW

	TARE NO.		306	204	305	212	33
F	WT. OF TARE	(grams)	8.3	8.1	8.3	8.3	8.1
G	WT. OF WET SOIL & TARE	(grams)	632.6	531.1	599.9	560.4	593.2
H	WT. OF DRY SOIL & TARE	(grams)	581.3	477.9	530.4	488.0	504.2
I	WT. OF WATER = G − H	(grams)	51.3	53.2	69.5	72.4	89.0
J	WT. DRY SOIL = H − F	(grams)	573.0	469.8	522.1	479.7	496.1
K	MOISTURE CONTENT = (I/J) X 100	(%)	9.0	11.3	13.3	15.1	17.9

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FLUOR FERNALD

CORRECTION OF UNIT WEIGHT AND WATER CONTENT FOR SOILS CONTAINING OVERSIZE PARTICLES *(ASTM D 4718)*

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO **PROJECT NO.** GQ134/ **TASK NO.** 04.1

DESCRIPTION: Phase III **DATE:** 19 day Sept month 2001 year

MATERIAL TYPE: Low Perm Clay LP01-13 STD

Weight of Total Sample	=	38197.4
Weight of Oversize Fraction	=	167.8
Weight of Finer Fraction (-3/8)	=	36579.6
Percentage of Oversize Fraction	= (P_C)	4.2
Percentage of Finer Fraction (-3/8)	= (P_F)	95.8
Specific Gravity (Assumed)	= (G_M)	2.72

(W_F)	=	Water Content -____, as decimal	=	0.16
(W_C)	=	Water Content +____, as decimal	=	0.015
(δ_F)	=	Dry Density of finer fraction	=	115.0
(δ_W)	=	Unit Weight of Water	=	62.4

$$C_W=(W_F P_F)+(W_C P_C)$$

$C_W = 15.4\%$

$$C\delta_D=100\delta_F G_M \delta_W/(\delta_F P_C)+(G_M \delta_W P_F)$$

$C_{\delta D} = 116.6$ pcf

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FLUOR FERNALD

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MOISTURE-DENSITY RELATIONSHIP

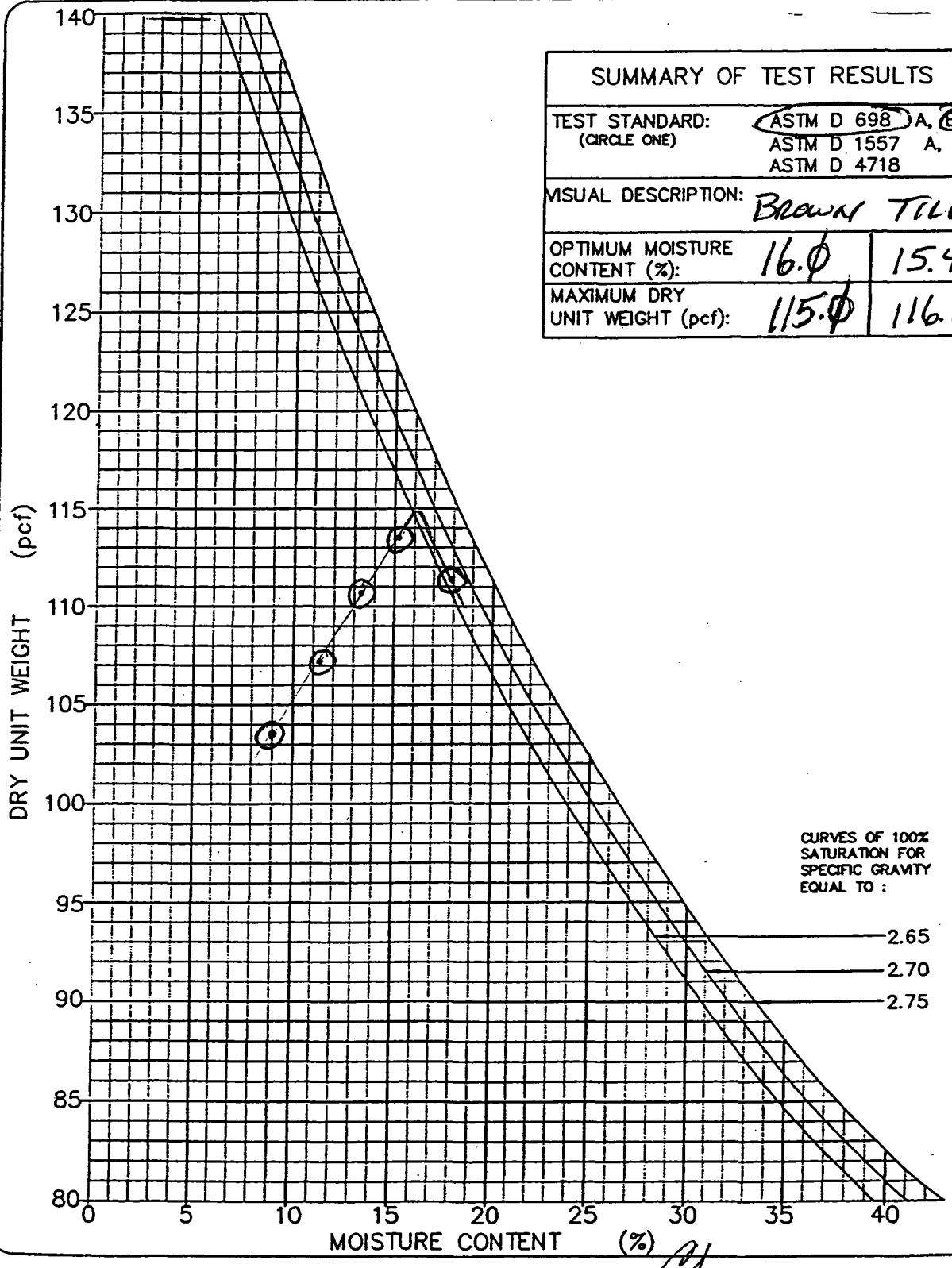
PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO PROJECT NO.: GQ1341 TASK NO.: 04.1

DESCRIPTION: PHASE III DATE: 18 day SEPT month 2001 year

MATERIAL TYPE: LOW PERM CLAY MATERIAL SOURCE: STOCKPILE 01-3 SAMPLE NO.: LP-01-13

SUMMARY OF TEST RESULTS			QA ID
TEST STANDARD: (CIRCLE ONE)	ASTM D 698 A, B, C ASTM D 1557 A, B, C ASTM D 4718		TBW
VISUAL DESCRIPTION:	BROWN TILL		TBW
OPTIMUM MOISTURE CONTENT (%):	16.0	15.4	CJ
MAXIMUM DRY UNIT WEIGHT (pcf):	115.0	116.6	CJ



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GEOSYNTEC CONSULTANTS

FLUOR FERNALD

FIELD LABORATORY COMPACTION TEST

(ASTM D 1557 METHOD B)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO

PROJECT NO.: GQ134 TASK NO.: 04.1

DESCRIPTION: PHASE III

DATE: 20 day SEPT month 2001 year

MATERIAL TYPE: LOW PERM. CLAY MATERIAL SOURCE: STOCKPILE 01-3 SAMPLE NO.: LP-01-13

THIS METHOD WILL BE USED IF THE MATERIAL RETAINED ON THE NO. 4-in. (4.75-mm) SIEVE IS GREATER THAN 20%, AND THE MATERIAL RETAINED ON THE NO. 3/8-in. (9.5-mm) SIEVE IS LESS THAN 20%.
ALL MATERIAL RETAINED ON THE NO. 3/8-in. (9.5-mm) SIEVE IS DISCARDED.
USE OVERSIZE CORRECTION IF MORE THAN 5% IS DISCARDED ACCORDING TO ASTM D 4718.
USE A 4-in. DIAMETER MOLD / 10-lb RAMMER / 18-in. DROP / 5 LAYERS / 25 BLOWS PER LAYER.

COMPACTION OF SOIL			13.62 lbs	13.70 lbs	13.96	13.95	QA ID: TBC
	WATER ADDED	(ml)	+2%	+4%	+6%	+8%	
A	WT. OF SOIL & MOLD	(grams)	6178.0	6214.3	6332.3	6327.7	
B	WT. OF MOLD	(grams)	4208.8	4208.8	4208.8	4208.8	
C	WT. OF SOIL = A − B	(grams)	1969.2	2005.5	2123.5	2118.9	
D	WET UNIT WT.(1) = C X 0.066	(pcf)	130.0	132.4	140.1	139.8	
E	DRY UNIT WT. = D / [1 + (K/100)]	(pcf)	121.7	122.3	126.4	123.9	

NOTE: IF CALIBRATED MOLD OF 1/30 FT^3 IS USED, THE WET DENSITY IS CALCULATED FROM THE WEIGHT OF SOIL, THE VOLUME OF THE MOLD AND THE CONVERSION FROM GRAMS TO POUNDS (I.E., CONVERSION FACTOR = (30 / 453.6) = 0.066). THE MOLD MUST BE CALIBRATED TO VERIFY A CAPACITY OF 1/30 ± 0.0005 FT^3 ON INTERVALS NOT TO EXCEED 1000 TIMES THAT THE MOLD IS FILLED.

MOISTURE CONTENT – ASTM D 2216							QA ID: TBC/DLE
	TARE NO.		305	230	306	212	
F	WT. OF TARE	(grams)	8.3	8.1	8.3	8.3	
G	WT. OF WET SOIL & TARE	(grams)	665.4	650.2	590.7	549.2	
H	WT. OF DRY SOIL & TARE	(grams)	623.5	600.8	534.0	487.8	
I	WT. OF WATER = G − H	(grams)	41.9	49.4	56.7	61.4	
J	WT. DRY SOIL = H − F	(grams)	615.2	592.7	525.7	479.5	
K	MOISTURE CONTENT = (I/J) X 100	(%)	6.8	8.3	10.8	12.8	

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FLUOR FERNALD

CORRECTION OF UNIT WEIGHT AND WATER CONTENT FOR SOILS CONTAINING OVERSIZE PARTICLES *(ASTM D 4718)*

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO **PROJECT NO.** 60134 **TASK NO.** 04.1

DESCRIPTION: Phase III **DATE:** 21 day Sept month 2001 year

MATERIAL TYPE: Low Perm Clay LP01-13 MOD

Weight of Total Sample	=	38,197.4 g
Weight of Oversize Fraction	=	1617.8
Weight of Finer Fraction (- 3/8)	=	36579.6
Percentage of Oversize Fraction	= (P_C)	4.2
Percentage of Finer Fraction (- 3/8)	= (P_F)	95.8
Specific Gravity (Assumed)	= (G_M)	2.72

(W_F)	=	Water Content - 3/8 , as decimal	=	0.11
(W_C)	=	Water Content + 3/8 , as decimal	=	0.015
(δ_F)	=	Dry Density of finer fraction	=	126.9
(δ_W)	=	Unit Weight of Water	=	62.4

$$C_W=(W_F P_F)+(W_C P_C)$$

$C_w = 10.6\%$

$$C\delta_D=100\delta_F G_M \delta_W/(\delta_F P_C)+(G_M \delta_W P_F)$$

$C_{\delta D} = 128.3$

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FLUOR FERNALD

4940

MOISTURE-DENSITY RELATIONSHIP

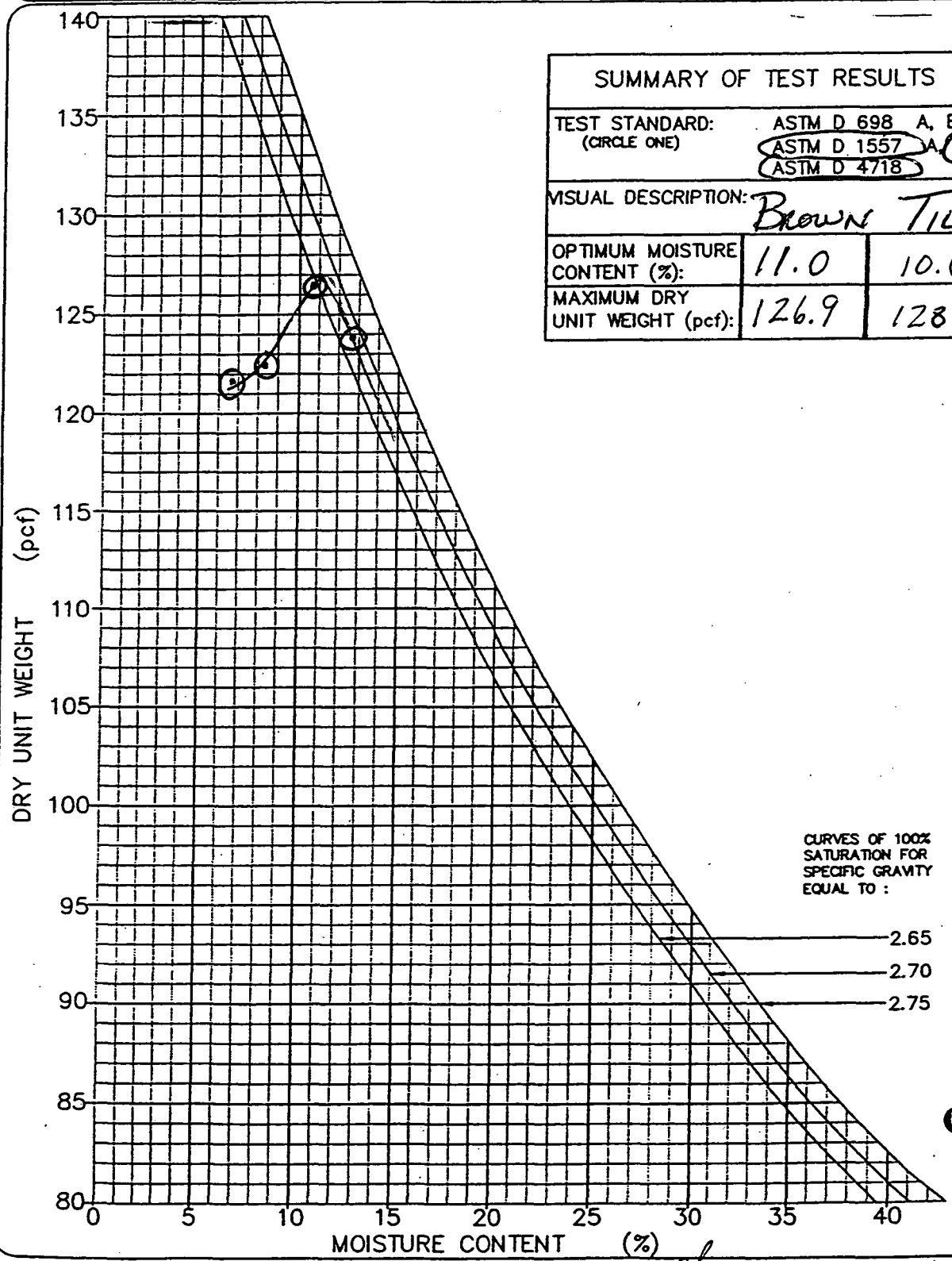
PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO PROJECT NO.: GQ134 TASK NO.: 04.1

DESCRIPTION: PHASE III DATE: 21 day SEPT month 2001 year

MATERIAL TYPE: LOW PERM CLAY MATERIAL SOURCE: STOCKPILE 01-3 SAMPLE NO.: LP-01-13

SUMMARY OF TEST RESULTS			QA ID
TEST STANDARD: (CIRCLE ONE)	ASTM D 698 A, B, C ASTM D 1557 A, B, C ASTM D 4718		TBU
VISUAL DESCRIPTION:	BROWN TILL		TBU
OPTIMUM MOISTURE CONTENT (%):	11.0	10.6	
MAXIMUM DRY UNIT WEIGHT (pcf):	126.9	128.3	



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FLUOR FERNALD

FIELD LABORATORY COMPACTION TEST

(ASTM D 698 METHOD B)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO — PROJECT NO.: GQ1344 TASK NO.: 04.1

DESCRIPTION: PHASE III — DATE: 18 day SEPT month 2001 year

MATERIAL TYPE: LOW PERM CLAY — MATERIAL SOURCE: STOCKPILE 01-3 — SAMPLE NO.: LP-01-14

THIS METHOD WILL BE USED IF THE MATERIAL RETAINED ON THE NO. 3/4-in. (19-mm) SIEVE IS LESS THAN 30%, IF THE MATERIAL RETAINED ON THE NO. 4 (4.75-mm) SIEVE IS GREATER THAN 20%, AND IF THE MATERIAL RETAINED ON THE NO. 3/8-in. (9.5-mm) SIEVE IS LESS THAN 20%.
ALL MATERIAL RETAINED ON THE NO. 3/8-in. (9.5-mm) SIEVE IS DISCARDED.
USE OVERSIZE CORRECTION IF MORE THAN 5% IS DISCARDED ACCORDING TO ASTM D 4718.
USE A 4-in. DIAMETER MOLD / 5.5-lb RAMMER / 12-in. DROP / 3 LAYERS / 25 BLOWS PER LAYER.

COMPACTION OF SOIL — QA ID: TBD

			13.40 lbs	13.60 lbs	13.78 lbs	13.71 lbs	
	WATER ADDED	(ml)	+5%	+7%	+9%	+12%	
A	WT. OF SOIL & MOLD	(grams)	6078.2	6169.0	6250.6	6218.9	
B	WT. OF MOLD	(grams)	4208.8	4208.8	4208.8	4208.8	
C	WT. OF SOIL = A − B	(grams)	1869.4	1960.2	2041.8	2010.1	
D	WET UNIT WT.(1) = C X 0.066	(pcf)	123.4	129.4	134.8	132.7	
E	DRY UNIT WT. = D / [1 + (K/100)]	(pcf)	111.4	114.9	117.5	113.5	

NOTE: IF CALIBRATED MOLD OF 1/30 FT^3 IS USED, THE WET DENSITY IS CALCULATED FROM THE WEIGHT OF SOIL, THE VOLUME OF THE MOLD AND THE CONVERSION FROM GRAMS TO POUNDS (I.E., CONVERSION FACTOR = (30 / 453.6) = 0.066). THE MOLD MUST BE CALIBRATED TO VERIFY A CAPACITY OF 1/30 ± 0.0005 FT^3 ON INTERVALS NOT TO EXCEED 1000 TIMES THAT THE MOLD IS FILLED.

MOISTURE CONTENT — ASTM D 2216 — QA ID: TBD

	TARE NO.		1	24	206	227	
F	WT. OF TARE	(grams)	8.3	8.2	8.3	8.4	
G	WT. OF WET SOIL & TARE	(grams)	596.5	565.7	513.8	561.3	
H	WT. OF DRY SOIL & TARE	(grams)	539.3	503.4	449.2	481.4	
I	WT. OF WATER = G − H	(grams)	57.2	62.3	64.6	79.9	
J	WT. DRY SOIL = H − F	(grams)	531.0	495.2	440.9	473.0	
K	MOISTURE CONTENT = (I/J) X 100	(%)	10.8	12.6	14.7	16.9	

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FLUOR FERNALD

CORRECTION OF UNIT WEIGHT AND WATER CONTENT FOR SOILS CONTAINING OVERSIZE PARTICLES *(ASTM D 4718)*

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO **PROJECT NO.** GQ134 **TASK NO.** 04.1

DESCRIPTION: Phase III **DATE:** 19 day Sept month 2001 year

MATERIAL TYPE: Low Perm Clay LPØ1-14STD

Weight of Total Sample	=	19471.2
Weight of Oversize Fraction	=	764.4
Weight of Finer Fraction (- 3/8)	=	18706.8
Percentage of Oversize Fraction	= (P_C)	3.9
Percentage of Finer Fraction (- 3/8)	= (P_F)	96.1
Specific Gravity (Assumed)	= (G_M)	62.4

(W_F)	=	Water Content - 3/8 , as decimal	=	~~118.0~~ 0.145
(W_C)	=	Water Content + 3/8 , as decimal	=	0.015
(δ_F)	=	Dry Density of finer fraction	=	118.0
(δ_W)	=	Unit Weight of Water	=	62.4

$$C_W=(W_F P_F)+(W_C P_C)$$

$$C_W = 14.0$$

$$C\delta_D=100\delta_F G_M \delta_W/(\delta_F P_C)+(G_M \delta_W P_F)$$

$$C_{\delta D} = 119.4 \text{ pcf}$$

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FLUOR FERNALD

MOISTURE-DENSITY RELATIONSHIP

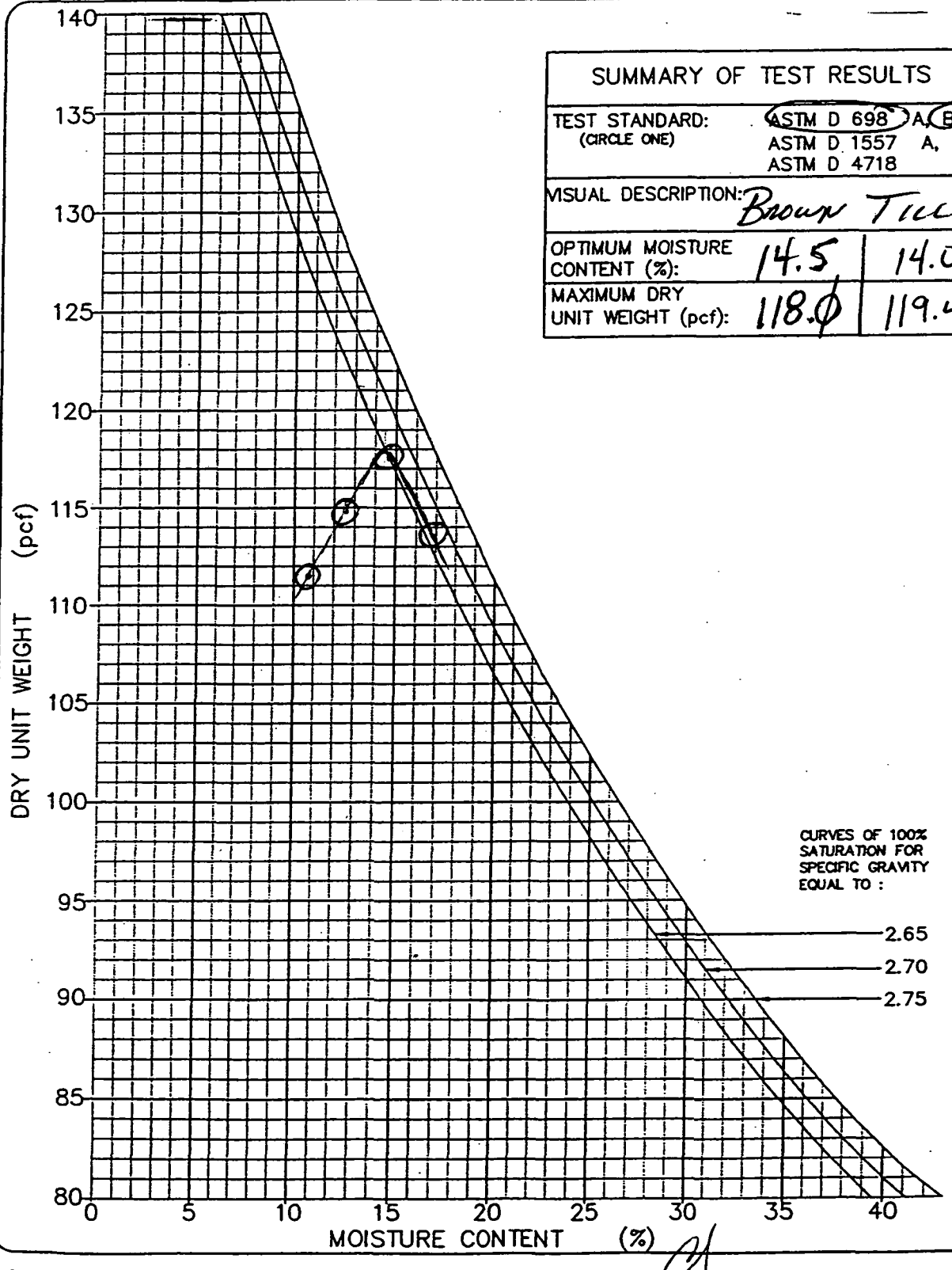
PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO PROJECT NO.: GQ134 TASK NO.: 04.1

DESCRIPTION: PHASE III DATE: 19 day SEPT month 2001 year

MATERIAL TYPE: LOW PERM CLAY MATERIAL SOURCE: STOCKPILE 01-3 SAMPLE NO.: LP-0114

SUMMARY OF TEST RESULTS			QA ID
TEST STANDARD: (CIRCLE ONE)	ASTM D 698 A, B, C ASTM D 1557 A, B, C ASTM D 4718		TBK
VISUAL DESCRIPTION:	BROWN TILL		TBK
OPTIMUM MOISTURE CONTENT (%):	14.5	14.0	
MAXIMUM DRY UNIT WEIGHT (pcf):	118.0	119.4	



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FLUOR FERNALD

FIELD LABORATORY COMPACTION TEST

(ASTM D 698 METHOD B)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO

PROJECT NO.: 6Q134 TASK NO.: 04.1

DESCRIPTION: PHASE III

DATE: 20 day SEPT month 2001 year

MATERIAL TYPE: LOW PERM. CLAY MATERIAL SOURCE: STOCKPILE 01-3 SAMPLE NO.: LP-01-15

THIS METHOD WILL BE USED IF THE MATERIAL RETAINED ON THE NO. 3/4-in. (19-mm) SIEVE IS LESS THAN 30%, IF THE MATERIAL RETAINED ON THE NO. 4 (4.75-mm) SIEVE IS GREATER THAN 20%, AND IF THE MATERIAL RETAINED ON THE NO. 3/8-in. (9.5-mm) SIEVE IS LESS THAN 20%.
ALL MATERIAL RETAINED ON THE NO. 3/8-in. (9.5-mm) SIEVE IS DISCARDED.
USE OVERSIZE CORRECTION IF MORE THAN 5% IS DISCARDED ACCORDING TO ASTM D 4718.
USE A 4-in. DIAMETER MOLD / 5.5-lb RAMMER / 12-in. DROP / 3 LAYERS / 25 BLOWS PER LAYER.

COMPACTION OF SOIL — QA ID: [illegible]

			13.32 lbs	13.70 lbs	13.76 lbs	13.65 lbs
	WATER ADDED	(ml)	+6%	+8%	+10%	+12%
A	WT. OF SOIL & MOLD	(grams)	6042.0	6214.3	6241.5	6191.6
B	WT. OF MOLD	(grams)	4208.8	4208.8	4208.8	4208.8
C	WT. OF SOIL = A − B	(grams)	1833.2	2005.5	2032.7	1982.8
D	WET UNIT WT.(1) = C X 0.066	(pcf)	120.0	132.4	134.2	130.9
E	DRY UNIT WT. = D / [1 + (K/100)]	(pcf)	109.1	117.0	116.6	111.4

NOTE: IF CALIBRATED MOLD OF 1/30 FT^3 IS USED, THE WET DENSITY IS CALCULATED FROM THE WEIGHT OF SOIL, THE VOLUME OF THE MOLD AND THE CONVERSION FROM GRAMS TO POUNDS (I.E., CONVERSION FACTOR = (30 / 453.6) = 0.066). THE MOLD MUST BE CALIBRATED TO VERIFY A CAPACITY OF 1/30 ± 0.0005 FT^3 ON INTERVALS NOT TO EXCEED 1000 TIMES THAT THE MOLD IS FILLED.

MOISTURE CONTENT — ASTM D 2216 — QA ID: [illegible]

	TARE NO.		303	204	26	215
F	WT. OF TARE	(grams)	8.3	8.1	8.3	8.3
G	WT. OF WET SOIL & TARE	(grams)	548.6	528.7	574.3	555.0
H	WT. OF DRY SOIL & TARE	(grams)	495.4	468.4	500.5	473.7
I	WT. OF WATER = G − H	(grams)	53.2	60.3	73.8	81.3
J	WT. DRY SOIL = H − F	(grams)	487.1	460.3	492.2	465.4
K	MOISTURE CONTENT = (I/J) X 100	(%)	10.9	13.1	15.0	17.5

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FLUOR FERNALD

CORRECTION OF UNIT WEIGHT AND WATER CONTENT FOR SOILS CONTAINING OVERSIZE PARTICLES *(ASTM D 4718)*

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO **PROJECT NO.** GQ134 **TASK NO.** 04.1

DESCRIPTION: Phase III **DATE:** 21 day Sep month 2001 year

MATERIAL TYPE: Low Perm Clay LP01-15 STD

Weight of Total Sample	=	40,923.5 g
Weight of Oversize Fraction	=	1168.9
Weight of Finer Fraction (- 3/8)	=	39754.6
Percentage of Oversize Fraction	= (P_C)	2.9
Percentage of Finer Fraction (- 3/8)	= (P_F)	97.1
Specific Gravity (Assumed)	= (G_M)	2.72

(W_F) =	Water Content - 3/8 , as decimal	=	0.14
(W_C) =	Water Content + 3/8 , as decimal	=	0.015
(δ_F) =	Dry Density of finer fraction	=	118.1
(δ_W) =	Unit Weight of Water	=	62.4

$$C_W=(W_F P_F)+(W_C P_C)$$

$$C_w = 13.6\%$$

$$C\delta_D=100\delta_F G_M \delta_W/(\delta_F P_C)+(G_M \delta_W P_F)$$

$$C_{\delta D} = 119.1 \text{ pcf}$$

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FLUOR FERNALD

4940

MOISTURE-DENSITY RELATIONSHIP

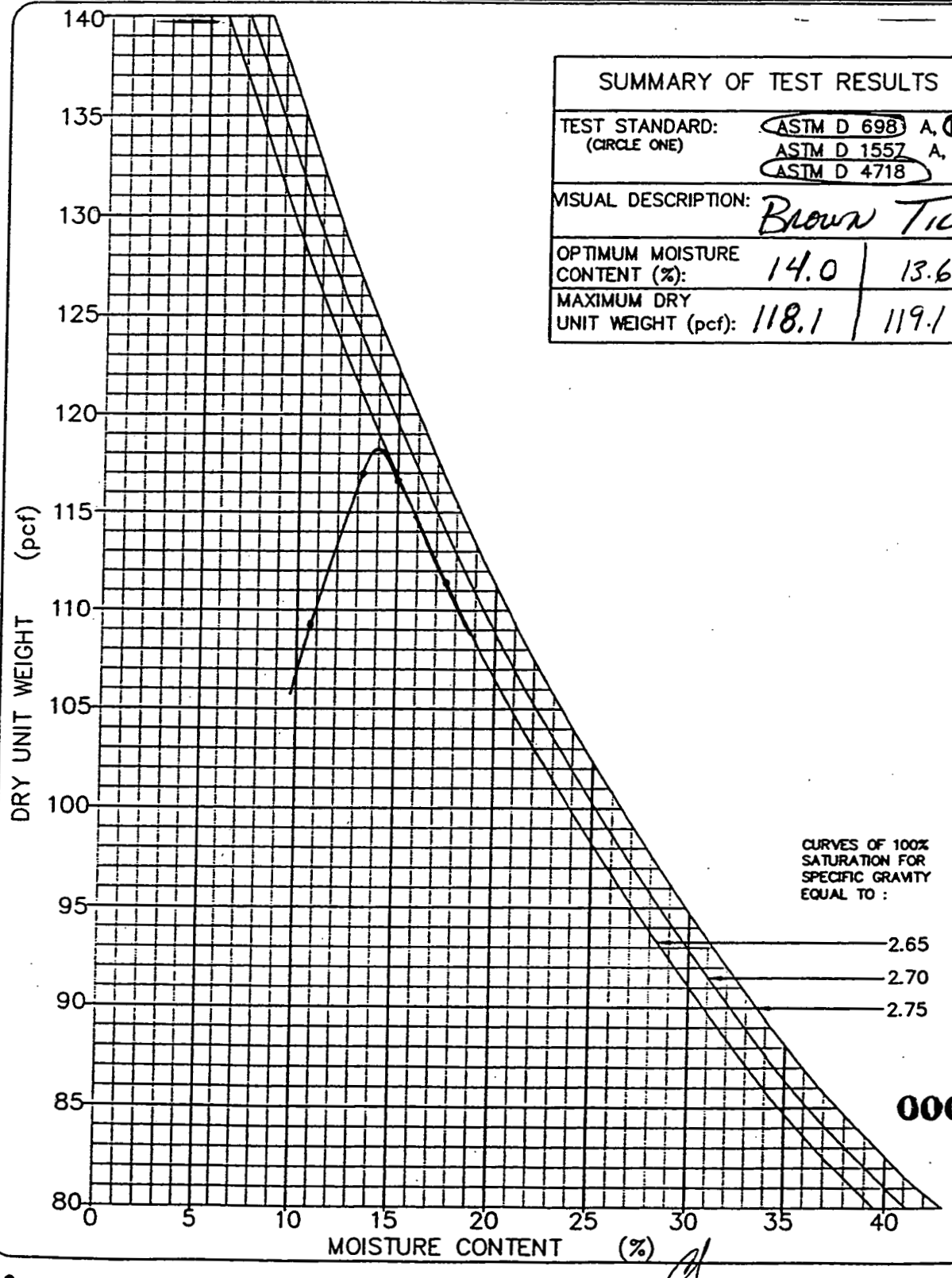
PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO PROJECT NO.: 6Q134 TASK NO.: 04.1

DESCRIPTION: PHASE III DATE: ____ day ____ month ____ year

MATERIAL TYPE: Low Plasm CLAY MATERIAL SOURCE: STOCKPILE 01-3 SAMPLE NO.: LP-01-15

SUMMARY OF TEST RESULTS			QA ID
TEST STANDARD: (CIRCLE ONE)	ASTM D 698 A, B, C ASTM D 1557 A, B, C ASTM D 4718		TBY
VISUAL DESCRIPTION:	Brown Till		TBY
OPTIMUM MOISTURE CONTENT (%):	14.0	13.6	CL
MAXIMUM DRY UNIT WEIGHT (pcf):	118.1	119.1	CL



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FLUOR FERNALD

FIELD LABORATORY COMPACTION TEST

(ASTM D 1557 METHOD B)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO

PROJECT NO.: GQ134 TASK NO.: 04.1

DESCRIPTION: PHASE III

DATE: 20 day SEPT month 2001 year

MATERIAL TYPE: LOW PERM CLAY MATERIAL SOURCE: STOCKPILE 01-3 SAMPLE NO.: LP-01-15

THIS METHOD WILL BE USED IF THE MATERIAL RETAINED ON THE NO. 4-in. (4.75-mm) SIEVE IS GREATER THAN 20%, AND THE MATERIAL RETAINED ON THE NO. 3/8-in. (9.5-mm) SIEVE IS LESS THAN 20%.
ALL MATERIAL RETAINED ON THE NO. 3/8-in. (9.5-mm) SIEVE IS DISCARDED.
USE OVERSIZE CORRECTION IF MORE THAN 5% IS DISCARDED ACCORDING TO ASTM D 4718.
USE A 4-in. DIAMETER MOLD / 10-lb RAMMER / 18-in. DROP / 5 LAYERS / 25 BLOWS PER LAYER.

COMPACTION OF SOIL

QA ID: 784

			13.94 lbs	14.05 lbs	13.96 lbs	13.74 lbs	
	WATER ADDED	(ml)	+4%	+6%	+8%	+2%	
A	WT. OF SOIL & MOLD	(grams)	6323.2	6373.1	6332.3	6232.5	
B	WT. OF MOLD	(grams)	4208.8	4208.8	4208.8	4208.8	
C	WT. OF SOIL = A − B	(grams)	2114.4	2164.3	2123.5	2023.7	
D	WET UNIT WT.(1) = C X 0.066	(pcf)	139.5	142.8	140.1	133.6	
E	DRY UNIT WT. = D / [1 + (K/100)]	(pcf)	128.0	128.8	124.0	124.7	

NOTE: IF CALIBRATED MOLD OF 1/30 FT^3 IS USED, THE WET DENSITY IS CALCULATED FROM THE WEIGHT OF SOIL, THE VOLUME OF THE MOLD AND THE CONVERSION FROM GRAMS TO POUNDS (I.E., CONVERSION FACTOR = (30 / 453.6) = 0.066). THE MOLD MUST BE CALIBRATED TO VERIFY A CAPACITY OF 1/30 ± 0.0005 FT^3 ON INTERVALS NOT TO EXCEED 1000 TIMES THAT THE MOLD IS FILLED.

MOISTURE CONTENT — ASTM D 2216

QA ID: 784

	TARE NO.		229	234	24	1	
F	WT. OF TARE	(grams)	8.0	8.3	8.3	8.2	
G	WT. OF WET SOIL & TARE	(grams)	570.4	611.4	558.9	667.8	
H	WT. OF DRY SOIL & TARE	(grams)	523.9	552.2	495.4	623.8	
I	WT. OF WATER = G − H	(grams)	46.5	59.2	63.5	44.0	
J	WT. DRY SOIL = H − F	(grams)	515.9	543.9	487.1	615.6	
K	MOISTURE CONTENT = (I/J) X 100	(%)	9.0	10.9	13.0	7.1	

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FLUOR FERNALD

CORRECTION OF UNIT WEIGHT AND WATER CONTENT FOR SOILS CONTAINING OVERSIZE PARTICLES *(ASTM D 4718)*

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO **PROJECT NO.** GQ1341 **TASK NO.** 041

DESCRIPTION: Phase III **DATE:** 21 day Sept month 2001 year

MATERIAL TYPE: Low Perm Clay LPØ1-15 MOD

Weight of Total Sample	=	40,923.5 g
Weight of Oversize Fraction	=	1168.9
Weight of Finer Fraction (-3/8)	=	39754.6
Percentage of Oversize Fraction	= (P_C)	2.9
Percentage of Finer Fraction (-3/8)	= (P_F)	97.1
Specific Gravity (Assumed)	= (G_M)	2.72

(W_F)	=	Water Content -3/8, as decimal	=	0.10
(W_C)	=	Water Content +3/8, as decimal	=	0.015
(δ_F)	=	Dry Density of finer fraction	=	129.7
(δ_W)	=	Unit Weight of Water	=	62.4

$$C_W=(W_F P_F)+(W_C P_C)$$

$$C_W = 9.8\%$$

$$C\delta_D=100\delta_F G_M \delta_W/(\delta_F P_C)+(G_M \delta_W P_F)$$

$$C_{\delta D} = 130.6 \text{ pcf}$$

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FLUOR FERNALD

4940

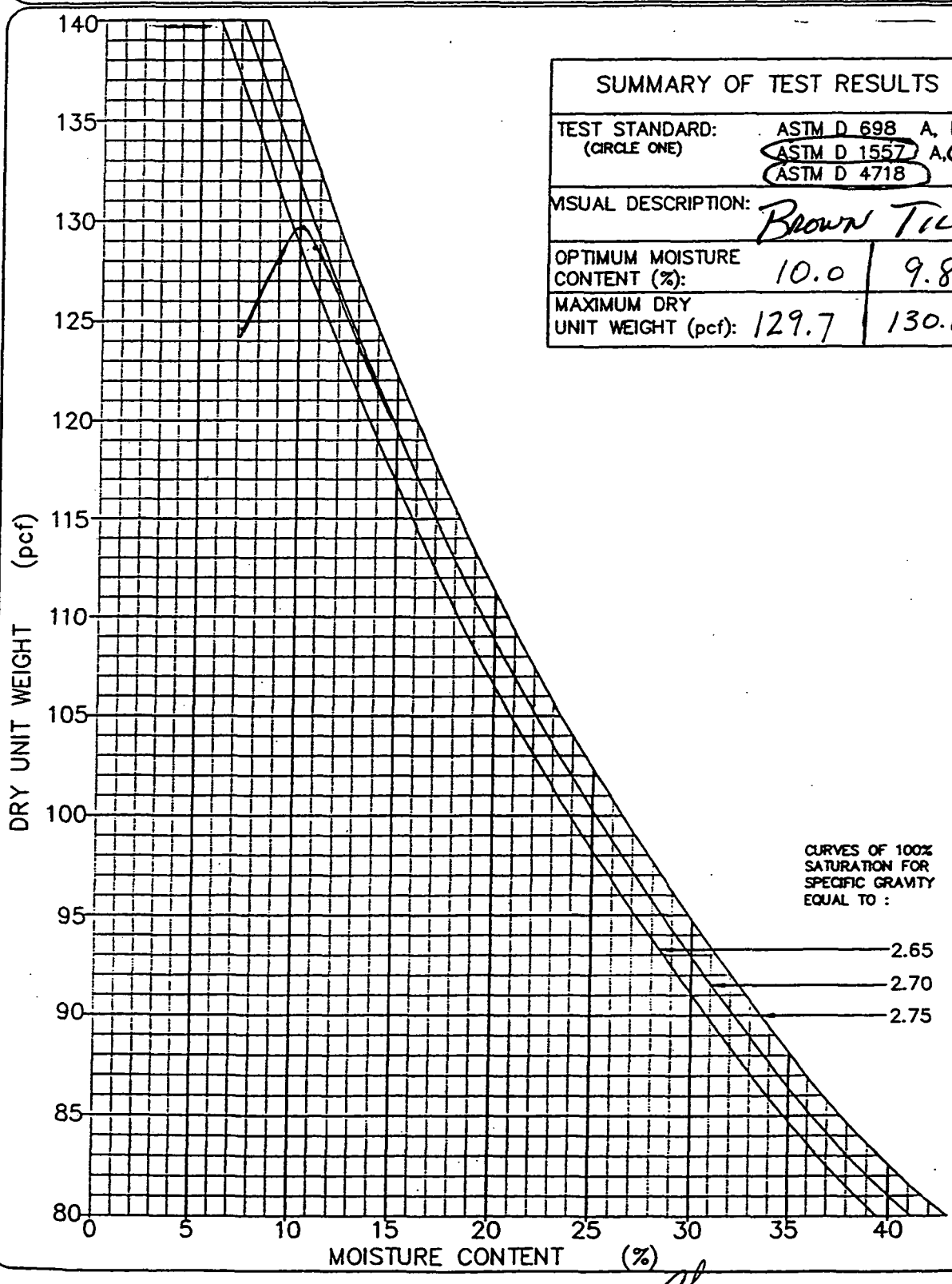
MOISTURE-DENSITY RELATIONSHIP

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO PROJECT NO.: GQ134 TASK NO.: 04.1

DESCRIPTION: PHASE III DATE: 20 day Sept month 2001 year

MATERIAL TYPE: Low Perm CLAY MATERIAL SOURCE: STOCKPILE 01-B SAMPLE NO.: LP-01-15



SUMMARY OF TEST RESULTS			QA ID
TEST STANDARD: (CIRCLE ONE)	ASTM D 698 A, B, C ASTM D 1557 A, B, C ASTM D 4718		TBV
VISUAL DESCRIPTION:	BROWN TILL		TBV
OPTIMUM MOISTURE CONTENT (%):	10.0	9.8	CA
MAXIMUM DRY UNIT WEIGHT (pcf):	129.7	130.6	CA

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FLUOR FERNALD

FIELD LABORATORY COMPACTION TEST

(ASTM D 698 METHOD B)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO

PROJECT NO.: GQ134 TASK NO.: 041

DESCRIPTION: PHASE III

DATE: 21 day SEPT month 2001 year

MATERIAL TYPE: LOW PERM CLAY MATERIAL SOURCE: STOCKPILE 01-3 SAMPLE NO.: LP-01-16

THIS METHOD WILL BE USED IF THE MATERIAL RETAINED ON THE NO. 3/4-in. (19-mm) SIEVE IS LESS THAN 30%, IF THE MATERIAL RETAINED ON THE NO. 4 (4.75-mm) SIEVE IS GREATER THAN 20%, AND IF THE MATERIAL RETAINED ON THE NO. 3/8-in. (9.5-mm) SIEVE IS LESS THAN 20%.
ALL MATERIAL RETAINED ON THE NO. 3/8-in. (9.5-mm) SIEVE IS DISCARDED.
USE OVERSIZE CORRECTION IF MORE THAN 5% IS DISCARDED ACCORDING TO ASTM D 4718.
USE A 4-in. DIAMETER MOLD / 5.5-lb RAMMER / 12-in. DROP / 3 LAYERS / 25 BLOWS PER LAYER.

COMPACTION OF SOIL

QA ID: DLE

				13.48	13.67	13.74	13.67
	WATER ADDED	(ml)		+ 6%	+ 8%	+ 10%	+ 12%
A	WT. OF SOIL & MOLD	(grams)		6114.5	6200.7	6232.5	6200.7
B	WT. OF MOLD	(grams)	4208.8	4208.8	4208.8	4208.8	4208.8
C	WT. OF SOIL = A − B	(grams)		1905.7	1991.9	2023.7	1991.9
D	WET UNIT WT.(1) = C X 0.066	(pcf)		125.8	131.5	133.6	131.5
E	DRY UNIT WT. = D / [1 + (K/100)]	(pcf)		114.2	117.6	116.8 ~~119.5~~	112.8

NOTE: IF CALIBRATED MOLD OF 1/30 FT^3 IS USED, THE WET DENSITY IS CALCULATED FROM THE WEIGHT OF SOIL, THE VOLUME OF THE MOLD AND THE CONVERSION FROM GRAMS TO POUNDS (I.E., CONVERSION FACTOR = (30 / 453.6) = 0.066). THE MOLD MUST BE CALIBRATED TO VERIFY A CAPACITY OF 1/30 ± 0.0005 FT^3 ON INTERVALS NOT TO EXCEED 1000 TIMES THAT THE MOLD IS FILLED.

MOISTURE CONTENT – ASTM D 2216

QA ID: DLE

	TARE NO.			#212	#230	#305	#1
F	WT. OF TARE	(grams)		8.3	8.0	8.3	8.3
G	WT. OF WET SOIL & TARE	(grams)		510.2	559.5	507.1	520.8
H	WT. OF DRY SOIL & TARE	(grams)		463.7	501.1	447.2	447.9
I	WT. OF WATER = G − H	(grams)		46.5	58.4	~~59.9~~ 62.9	72.9
J	WT. DRY SOIL = H − F	(grams)		455.4	493.1	435.9	439.6
K	MOISTURE CONTENT = (I/J) X 100	(%)		10.2	11.8	14.4 ~~13.7~~ 14.2	16.6

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FLUOR FERNALD

CORRECTION OF UNIT WEIGHT AND WATER CONTENT FOR SOILS CONTAINING OVERSIZE PARTICLES *(ASTM D 4718)*

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO **PROJECT NO.** 6Q134 **/TASK NO.** 04.1

DESCRIPTION: Phase III **DATE:** 24 day Sept month 2001 year

MATERIAL TYPE: IT LP01-16 STD

Weight of Total Sample	=	19,172 g
Weight of Oversize Fraction	=	295.0
Weight of Finer Fraction (- 3/8)	=	18,877
Percentage of Oversize Fraction	= (P_C)	1.5
Percentage of Finer Fraction (- 3/8)	= (P_F)	98.5
Specific Gravity (Assumed)	= (G_M)	2.72

(W_F)	=	Water Content - 3/8 , as decimal	=	0.13
(W_C)	=	Water Content + 3/8 , as decimal	=	0.015
(δ_F)	=	Dry Density of finer fraction	=	120.0
(δ_W)	=	Unit Weight of Water	=	62.4

$$C_W=(W_F P_F)+(W_C P_C)$$

$C_w = 12.8\%$

000427

$$C\delta_D=100\delta_F G_M \delta_W/(\delta_F P_C)+(G_M \delta_W P_F)$$

$C_{\delta D} = 120.5$ pcf

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FLUOR FERNALD

MOISTURE–DENSITY RELATIONSHIP

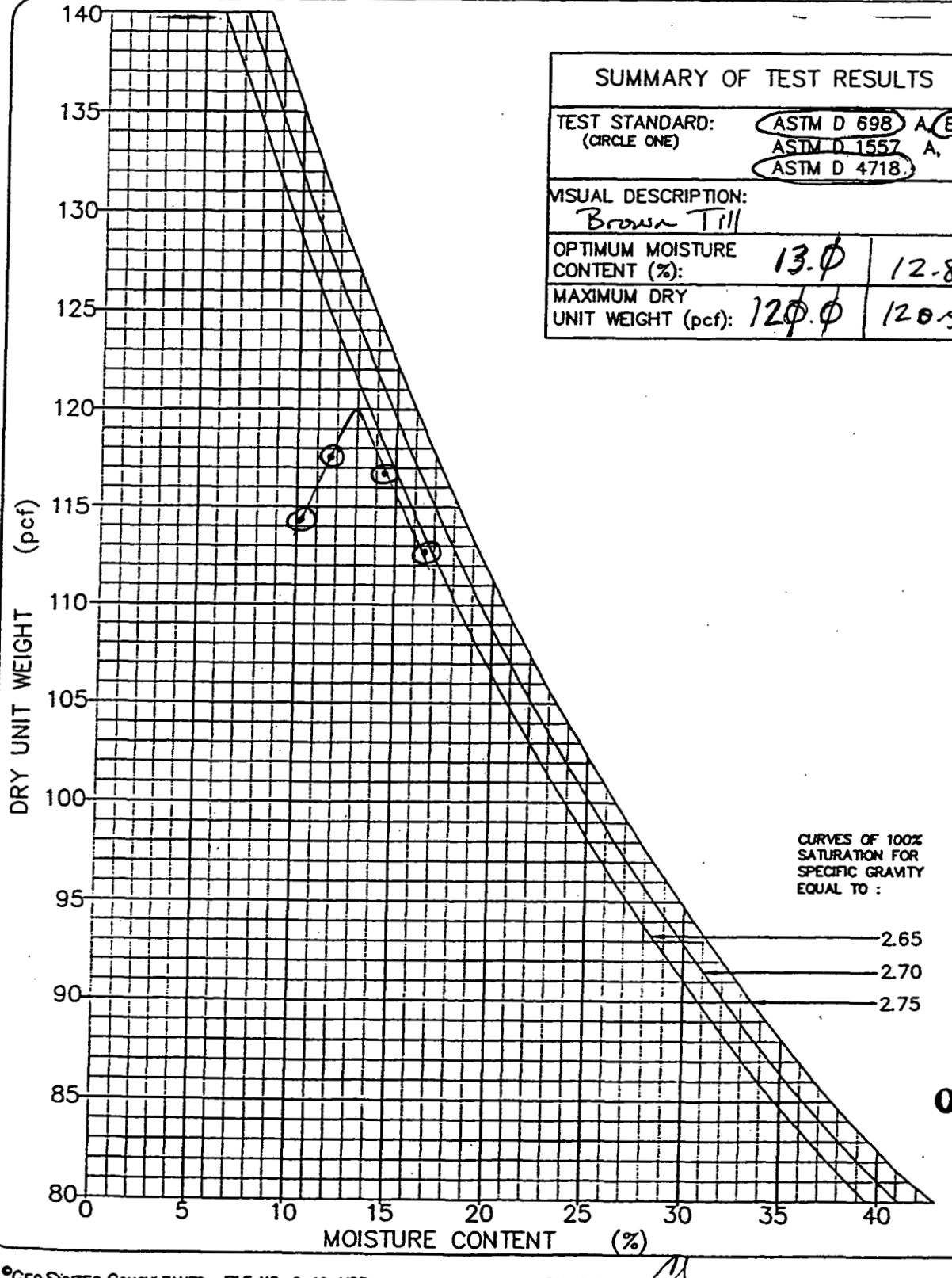
PROJECT: ON–SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO PROJECT NO.: GQ134 TASK NO.: 04.1

DESCRIPTION: PHASE III DATE: 24 day SEPT month 2001 year

MATERIAL TYPE: Low Perm CLAY MATERIAL SOURCE: STOCKPILE 01-3 SAMPLE NO.: LP-0116

SUMMARY OF TEST RESULTS			QA ID
TEST STANDARD: (CIRCLE ONE)	ASTM D 698 A, B, C ASTM D 1557 A, B, C ASTM D 4718		TBC
VISUAL DESCRIPTION: Brown Till			
OPTIMUM MOISTURE CONTENT (%):	13.0	12.8	TBY/
MAXIMUM DRY UNIT WEIGHT (pcf):	120.0	120.5	TBY/



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GEOSYNTEC CONSULTANTS

FLUOR FERNALD

FIELD LABORATORY COMPACTION TEST

(ASTM D 698 METHOD B)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO

PROJECT NO.: 6Q134 TASK NO.: 04.1

DESCRIPTION: PHASE III

DATE: 21 day Sept month 2001 year

MATERIAL TYPE: LOW PERM CLAY MATERIAL SOURCE: STOCKPILE 01-3 SAMPLE NO.: LP-01-17

THIS METHOD WILL BE USED IF THE MATERIAL RETAINED ON THE NO. 3/4-in. (19-mm) SIEVE IS LESS THAN 30%, IF THE MATERIAL RETAINED ON THE NO. 4 (4.75-mm) SIEVE IS GREATER THAN 20%, AND IF THE MATERIAL RETAINED ON THE NO. 3/8-in. (9.5-mm) SIEVE IS LESS THAN 20%.
ALL MATERIAL RETAINED ON THE NO. 3/8-in. (9.5-mm) SIEVE IS DISCARDED.
USE OVERSIZE CORRECTION IF MORE THAN 5% IS DISCARDED ACCORDING TO ASTM D 4718.
USE A 4-in. DIAMETER MOLD / 5.5-lb RAMMER / 12-in. DROP / 3 LAYERS / 25 BLOWS PER LAYER.

COMPACTION OF SOIL

QA ID: DJE

	WATER ADDED	(ml)		13.34 + 6%	13.57 8%	13.77 10%	13.66 12%
A	WT. OF SOIL & MOLD	(grams)		6051.0	6155.4	6223.4	6196.2
B	WT. OF MOLD	(grams)	4208.8	4208.8	4208.8	4208.8	4208.8
C	WT. OF SOIL = A − B	(grams)		1842.2	1946.6	2014.6	1987.4
D	WET UNIT WT.(1) = C X 0.066	(pcf)		121.6	128.5	133.0	131.2
E	DRY UNIT WT. = D / [1 + (K/100)]	(pcf)		109.8	114.3	116.0	111.9

NOTE: IF CALIBRATED MOLD OF 1/30 FT^3 IS USED, THE WET DENSITY IS CALCULATED FROM THE WEIGHT OF SOIL, THE VOLUME OF THE MOLD AND THE CONVERSION FROM GRAMS TO POUNDS (I.E., CONVERSION FACTOR = (30 / 453.6) = 0.066). THE MOLD MUST BE CALIBRATED TO VERIFY A CAPACITY OF 1/30 ± 0.0005 FT^3 ON INTERVALS NOT TO EXCEED 1000 TIMES THAT THE MOLD IS FILLED.

MOISTURE CONTENT – ASTM D 2216

QA ID: DLE

	TARE NO.		#3 Sample	#33	#234	#24	#225
F	WT. OF TARE	(grams)	8.1	8.1	8.3	8.3	8.3
G	WT. OF WET SOIL & TARE	(grams)		476.8	491.2	495.9	542.6
H	WT. OF DRY SOIL & TARE	(grams)		431.6	437.8	433.5	464.0
I	WT. OF WATER = G − H	(grams)		45.2	53.4	62.4	78.6
J	WT. DRY SOIL = H − F	(grams)		423.5	429.5	425.2	455.7
K	MOISTURE CONTENT = (I/J) X 100	(%)		10.7	12.4	14.7	17.2
				1.107	1.124	1.147	1.172

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SHEET NO. 1 OF 3

GeoSyntec Consultants

FLUOR FERNALD

CORRECTION OF UNIT WEIGHT AND WATER CONTENT FOR SOILS CONTAINING OVERSIZE PARTICLES *(ASTM D 4718)*

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO PROJECT NO. 6Q134 / TASK NO. 04.1

DESCRIPTION: Phase III DATE: 24 day Sept month 2001 year

MATERIAL TYPE: IT LP01-17 STD

Weight of Total Sample	=	36,614.3
Weight of Oversize Fraction	=	628.5
Weight of Finer Fraction (- 3/8)	=	35985.8
Percentage of Oversize Fraction	= (P_C)	1.7
Percentage of Finer Fraction (- 3/8)	= (P_F)	98.3
Specific Gravity (Assumed)	= (G_M)	2.72

(W_F)	=	Water Content - 3/8 , as decimal	=	0.140
(W_C)	=	Water Content + 3/8 , as decimal	=	0.015
(δ_F)	=	Dry Density of finer fraction	=	117.0
(δ_W)	=	Unit Weight of Water	=	62.4

$$C_W=(W_F P_F)+(W_C P_C)$$

C_w = 13.8 %

$$C\delta_D=100\delta_F G_M \delta_W/(\delta_F P_C)+(G_M \delta_W P_F)$$

$C_{\delta D}$ = 117.6 pcf

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FLUOR FERNALD

4940

MOISTURE-DENSITY RELATIONSHIP

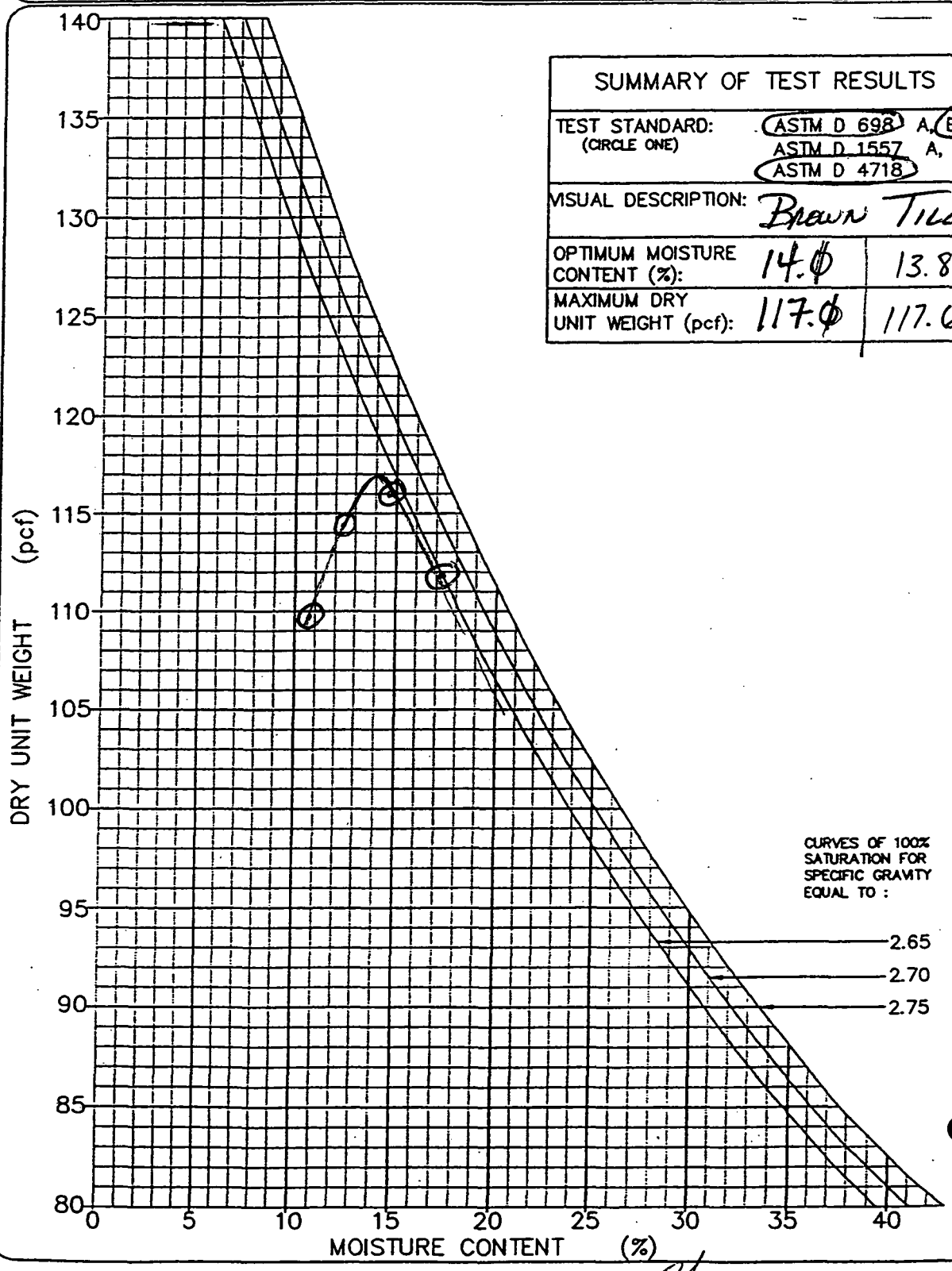
PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO PROJECT NO.: GQ1341 TASK NO.: 04.1

DESCRIPTION: PHASE III DATE: 24 day SEPT month 2001 year

MATERIAL TYPE: Low Perm CLAY MATERIAL SOURCE: STOCKPILE 01-3 SAMPLE NO.: LP-01-17

SUMMARY OF TEST RESULTS			QA ID
TEST STANDARD: (CIRCLE ONE)	ASTM D 698 A, B, C ASTM D 1557 A, B, C ASTM D 4718		TBY
VISUAL DESCRIPTION:	Brown Till		TBY
OPTIMUM MOISTURE CONTENT (%):	14.0	13.8	TBY/CS
MAXIMUM DRY UNIT WEIGHT (pcf):	117.0	117.6	TBY/CS



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FLUOR FERNALD

FIELD LABORATORY COMPACTION TEST

(ASTM D 1557 METHOD B)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO

PROJECT NO.: GQ134 TASK NO.: Ø4.1

DESCRIPTION: PHASE III

DATE: 21 day Sept month 2001 year

MATERIAL TYPE: LOW PERM. CLAY MATERIAL SOURCE: STOCKPILE Ø1-3 SAMPLE NO.: LP-Ø1-17

THIS METHOD WILL BE USED IF THE MATERIAL RETAINED ON THE NO. 4-in. (4.75-mm) SIEVE IS GREATER THAN 20%, AND THE MATERIAL RETAINED ON THE NO. 3/8-in. (9.5-mm) SIEVE IS LESS THAN 20%.
ALL MATERIAL RETAINED ON THE NO. 3/8-in. (9.5-mm) SIEVE IS DISCARDED.
USE OVERSIZE CORRECTION IF MORE THAN 5% IS DISCARDED ACCORDING TO ASTM D 4718.
USE A 4-in. DIAMETER MOLD / 10-lb RAMMER / 18-in. DROP / 5 LAYERS / 25 BLOWS PER LAYER.

COMPACTION OF SOIL

QA ID: TBW/DLE

			13.79	13.95 lbs	13.95 lbs	13.84	
	WATER ADDED	(ml)	+4%	+6%	+8%	+10%	
A	WT. OF SOIL & MOLD	(grams)	6255.1	6327.7	6327.7	6277.8	
B	WT. OF MOLD	(grams)	4208.8	4208.8	4208.8	4208.8	
C	WT. OF SOIL = A − B	(grams)	2046.3	2118.9	2118.9	2069.0	
D	WET UNIT WT.(1) = C X 0.066	(pcf)	135.1	139.8	139.8	136.6	
E	DRY UNIT WT. = D / [1 + (K/100)]	(pcf)	124.1	126.1	123.6	~~117.0~~ 119.1	

NOTE: IF CALIBRATED MOLD OF 1/30 FT^3 IS USED, THE WET DENSITY IS CALCULATED FROM THE WEIGHT OF SOIL, THE VOLUME OF THE MOLD AND THE CONVERSION FROM GRAMS TO POUNDS (I.E., CONVERSION FACTOR = (30 / 453.6) = 0.066). THE MOLD MUST BE CALIBRATED TO VERIFY A CAPACITY OF 1/30 ± 0.0005 FT^3 ON INTERVALS NOT TO EXCEED 1000 TIMES THAT THE MOLD IS FILLED.

MOISTURE CONTENT – ASTM D 2216

QA ID: DLE

	TARE NO.		#306	#204	#303	#215	
F	WT. OF TARE	(grams)	8.3	8.1	8.3	8.3	
G	WT. OF WET SOIL & TARE	(grams)	368.2	344.2	425.2	399.1	
H	WT. OF DRY SOIL & TARE	(grams)	338.9	311.2	376.8	348.9	
I	WT. OF WATER = G − H	(grams)	29.3	33.0	48.4	50.2	
J	WT. DRY SOIL = H − F	(grams)	330.6	303.1	368.5	~~298~~ 340.6	
K	MOISTURE CONTENT = (I/J) X 100	(%)	8.9	10.9	13.1	~~16.8~~ 14.7	
			1.089	1.109	1.131	1.168	

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FLUOR FERNALD

CORRECTION OF UNIT WEIGHT AND WATER CONTENT FOR SOILS CONTAINING OVERSIZE PARTICLES *(ASTM D 4718)*

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO **PROJECT NO.** 60134 **/TASK NO.** 04.1

DESCRIPTION: Phase III **DATE:** 24 **day** Sept **month** 2001 **year**

MATERIAL TYPE: IT LP01-17 MOD

Weight of Total Sample	=	36,614.3
Weight of Oversize Fraction	=	628.5
Weight of Finer Fraction (- 3/8)	=	35985.8
Percentage of Oversize Fraction	= (P_C)	1.7
Percentage of Finer Fraction (- 3/8)	= (P_F)	98.3
Specific Gravity (Assumed)	= (G_M)	2.72

(W_F)	=	Water Content - 3/8 , as decimal	=	0.115
(W_C)	=	Water Content + 3/8 , as decimal	=	0.015
(δ_F)	=	Dry Density of finer fraction	=	127.0
(δ_W)	=	Unit Weight of Water	=	62.4

$$C_W=(W_F P_F)+(W_C P_C)$$

$C_w = 11.3$

$$C\delta_D=100\delta_F G_M \delta_W/(\delta_F P_C)+(G_M \delta_W P_F)$$

$C_{\delta D} = 127.6$

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FLUOR FERNALD

4940

MOISTURE-DENSITY RELATIONSHIP

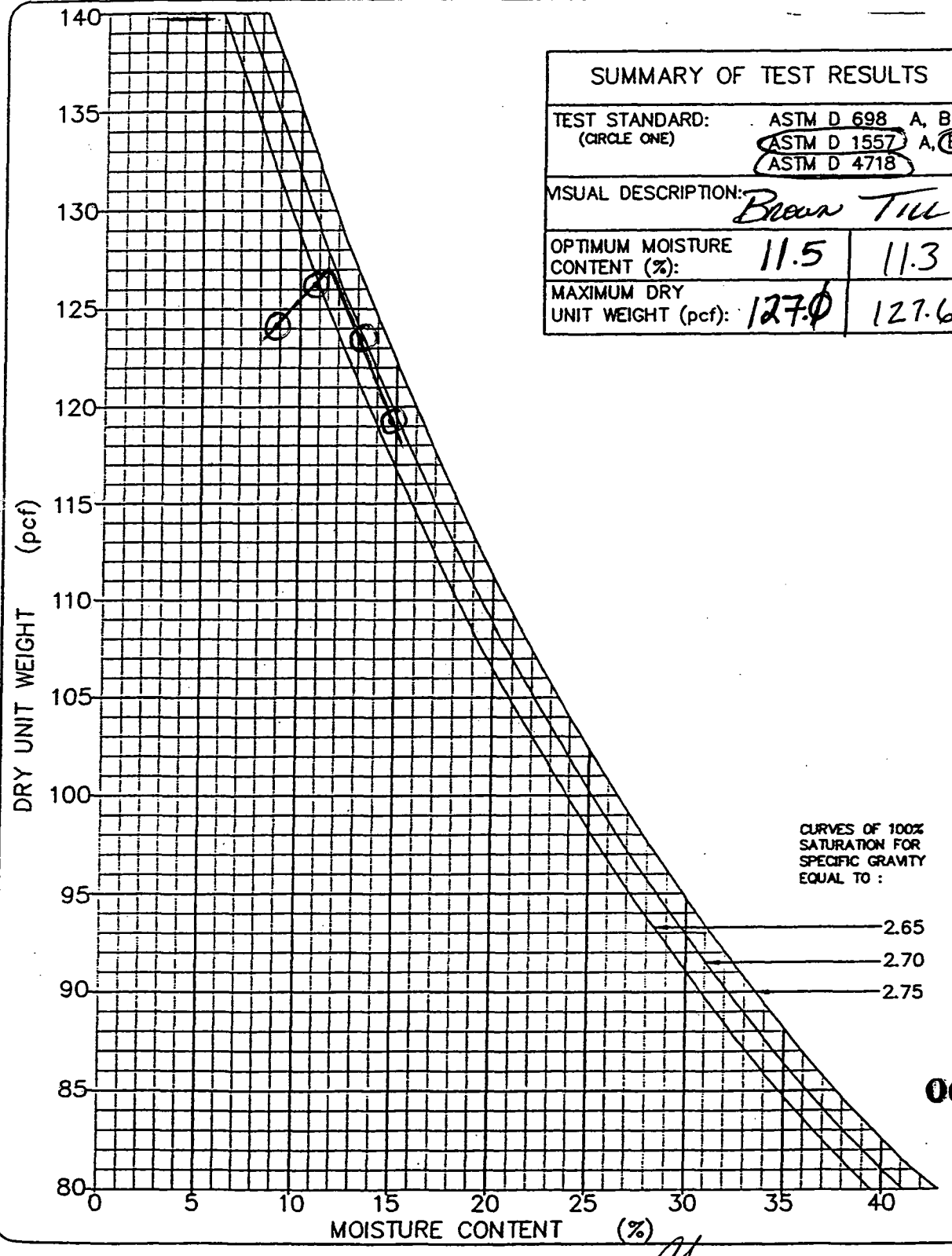
PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO PROJECT NO.: GQ134 TASK NO.: 04.1

DESCRIPTION: PHASE III DATE: 24 day SEPT month 2001 year

MATERIAL TYPE: LOW PERM CLAY MATERIAL SOURCE: STOCKPILE 01-3 SAMPLE NO.: LP-01-17

SUMMARY OF TEST RESULTS			QA ID
TEST STANDARD: (CIRCLE ONE)	ASTM D 698 A, B, C ASTM D 1557 A, B, C ASTM D 4718		TBW
VISUAL DESCRIPTION:	BROWN TILL		TBW
OPTIMUM MOISTURE CONTENT (%):	11.5	11.3	TBY/CS
MAXIMUM DRY UNIT WEIGHT (pcf):	127.0	127.6	TBY/CS



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FLUOR FERNALD

FIELD LABORATORY COMPACTION TEST

(ASTM D 698 METHOD B)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO — PROJECT NO. 6Q1341 TASK NO.: 04.1

DESCRIPTION: Phase III — DATE: 25 day Sept month 2001 year

MATERIAL TYPE: L-P-Clay — MATERIAL SOURCE: Stockpile ~~01~~-2 — SAMPLE NO.: LP-01-19

THIS METHOD WILL BE USED IF THE MATERIAL RETAINED ON THE NO. 3/4-in. (19-mm) SIEVE IS LESS THAN 30%, IF THE MATERIAL RETAINED ON THE NO. 4 (4.75-mm) SIEVE IS GREATER THAN 20%, AND IF THE MATERIAL RETAINED ON THE NO. 3/8-in. (9.5-mm) SIEVE IS LESS THAN 20%.
ALL MATERIAL RETAINED ON THE NO. 3/8-in. (9.5-mm) SIEVE IS DISCARDED.
USE OVERSIZE CORRECTION IF MORE THAN 5% IS DISCARDED ACCORDING TO ASTM D 4718.
USE A 4-in. DIAMETER MOLD / 5.5-lb RAMMER / 12-in. DROP / 3 LAYERS / 25 BLOWS PER LAYER.

COMPACTION OF SOIL

QA ID: ~~DLE~~

				13.47	13.58	13.70	13.66
	WATER ADDED	(ml)		6%	8%	10%	12%
A	WT. OF SOIL & MOLD	(grams)		6110.0	6159.9	6214.3	6196.2
B	WT. OF MOLD	(grams)	4208.8	4208.8	4208.8	4208.8	4208.8
C	WT. OF SOIL = A − B	(grams)		1901.2	1951.1	2005.5	1987.4
D	WET UNIT WT.(1) = C X 0.066	(pcf)		125.5	128.8	132.4	131.2
E	DRY UNIT WT. = D / [1 + (K/100)]	(pcf)		112.7	113.7	114.4	111.2

NOTE: IF CALIBRATED MOLD OF 1/30 FT^3 IS USED, THE WET DENSITY IS CALCULATED FROM THE WEIGHT OF SOIL, THE VOLUME OF THE MOLD AND THE CONVERSION FROM GRAMS TO POUNDS (I.E., CONVERSION FACTOR = (30 / 453.6) = 0.066). THE MOLD MUST BE CALIBRATED TO VERIFY A CAPACITY OF 1/30 ± 0.0005 FT^3 ON INTERVALS NOT TO EXCEED 1000 TIMES THAT THE MOLD IS FILLED.

MOISTURE CONTENT – ASTM D 2216

QA ID: TBY

	TARE NO.		11	#206	#8	#229	#302
F	WT. OF TARE	(grams)		8.3	8.3	8.0	8.3
G	WT. OF WET SOIL & TARE	(grams)		479.3	588.0	466.1	510.0
H	WT. OF DRY SOIL & TARE	(grams)		431.0	519.8	404.0	439.6
I	WT. OF WATER = G − H	(grams)		48.3	68.2	62.1	76.4
J	WT. DRY SOIL = H − F	(grams)		422.7	511.5	396.0	425.3
K	MOISTURE CONTENT = (I/J) X 100	(%)		11.4	13.3	15.7	18.0
				1.114	1.133	1.157	1.180

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SHEET NO. 1 OF 3

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FLUOR FERNALD

CORRECTION OF UNIT WEIGHT AND WATER CONTENT FOR SOILS CONTAINING OVERSIZE PARTICLES *(ASTM D 4718)*

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO **PROJECT NO.** GQ1341 **TASK NO.** 04.1

DESCRIPTION: Phase III **DATE:** 26 day Sept month 2001 year

MATERIAL TYPE: Low Perm Clay LP01-19 STD

Weight of Total Sample	=	21323.1
Weight of Oversize Fraction	=	333.6
Weight of Finer Fraction (- 3/8)	=	20989.5
Percentage of Oversize Fraction	= (P_C)	1.6
Percentage of Finer Fraction (- 3/8)	= (P_F)	98.4
Specific Gravity (Assumed)	= (G_M)	2.72

(W_F)	=	Water Content -____, as decimal	=	0.157
(W_C)	=	Water Content +____, as decimal	=	0.015
(δ_F)	=	Dry Density of finer fraction	=	114.4
(δ_W)	=	Unit Weight of Water	=	62.4

$$C_W=(W_F P_F)+(W_C P_C)$$

$$C_w = 15.5\%$$

$$C\delta_D=100\delta_F G_M \delta_W/(\delta_F P_C)+(G_M \delta_W P_F)$$

$$C_{\delta D} = 115.0$$

GEOSYNTEC CONSULTANTS

FLUOR FERNALD

49 40

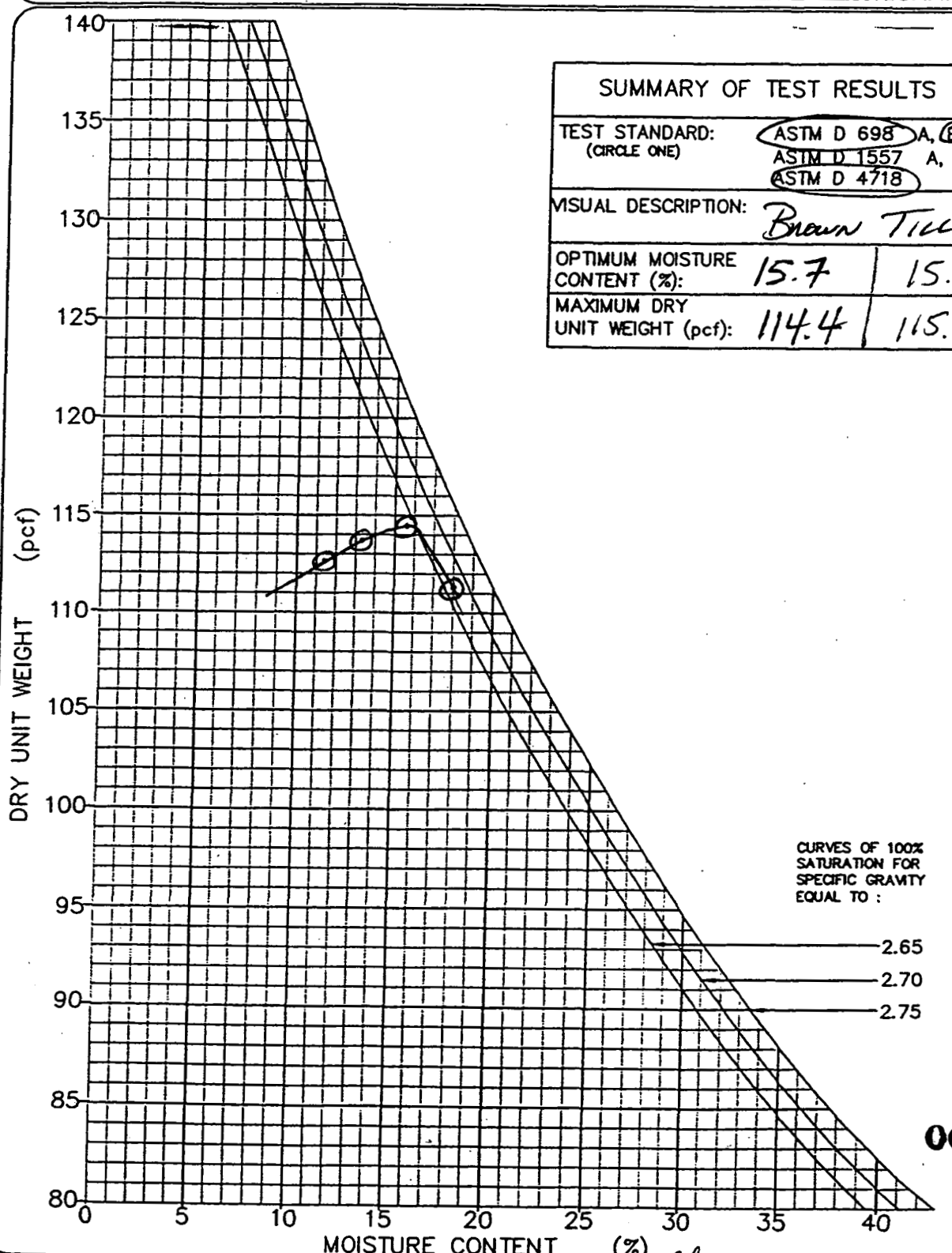
MOISTURE–DENSITY RELATIONSHIP

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO PROJECT NO.: GQ134 TASK NO.: 04.1

DESCRIPTION: PHASE III DATE: 26 day SEPT month 2001 year

MATERIAL TYPE: LOW PERM CLAY MATERIAL SOURCE: STOCKPILE 01-2 SAMPLE NO.: LP-01-19



SUMMARY OF TEST RESULTS			QA ID
TEST STANDARD: (CIRCLE ONE)	ASTM D 698 A, (B) C ASTM D 1557 A, B, C ASTM D 4718		DLE / TBW
VISUAL DESCRIPTION:	Brown Till		TBW
OPTIMUM MOISTURE CONTENT (%):	15.7	15.5	TBY/CS
MAXIMUM DRY UNIT WEIGHT (pcf):	114.4	115.0	TBY/CS

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GEOSYNTEC CONSULTANTS

FLUOR FERNALD

FIELD LABORATORY COMPACTION TEST

(ASTM D 698 METHOD B)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO

PROJECT NO. 6Q1341 TASK NO.: 04.1

DESCRIPTION: Phase III

DATE: 25 day Sept. month 2001 year

MATERIAL TYPE: LP Clay

MATERIAL SOURCE: Stockpile 01-3

SAMPLE NO.: LP-01-20

THIS METHOD WILL BE USED IF THE MATERIAL RETAINED ON THE NO. 3/4-in. (19-mm) SIEVE IS LESS THAN 30%, IF THE MATERIAL RETAINED ON THE NO. 4 (4.75-mm) SIEVE IS GREATER THAN 20%, AND IF THE MATERIAL RETAINED ON THE NO. 3/8-in. (9.5-mm) SIEVE IS LESS THAN 20%.
ALL MATERIAL RETAINED ON THE NO. 3/8-in. (9.5-mm) SIEVE IS DISCARDED.
USE OVERSIZE CORRECTION IF MORE THAN 5% IS DISCARDED ACCORDING TO ASTM D 4718.
USE A 4-in. DIAMETER MOLD / 5.5-lb RAMMER / 12-in. DROP / 3 LAYERS / 25 BLOWS PER LAYER.

13.77

COMPACTION OF SOIL

QA ID: DLE

				13.33	13.53	13.73	
	WATER ADDED	(ml)		6%	8%	10%	12%
A	WT. OF SOIL & MOLD	(grams)		6046.5	6137.2	6227.9	6246.1
B	WT. OF MOLD	(grams)	4208.8	4208.8	4208.8	4208.8	4208.8
C	WT. OF SOIL = A − B	(grams)		1837.7	1928.4	2019.1	2037.3
D	WET UNIT WT.(1) = C X 0.066	(pcf)		121.3	127.3	133.3	134.5
E	DRY UNIT WT. = D / [1 + (K/100)]	(pcf)		111.4	114.6	118.2	116.9

NOTE: IF CALIBRATED MOLD OF 1/30 FT^3 IS USED, THE WET DENSITY IS CALCULATED FROM THE WEIGHT OF SOIL, THE VOLUME OF THE MOLD AND THE CONVERSION FROM GRAMS TO POUNDS (I.E., CONVERSION FACTOR = (30 / 453.6) = 0.066). THE MOLD MUST BE CALIBRATED TO VERIFY A CAPACITY OF 1/30 ± 0.0005 FT^3 ON INTERVALS NOT TO EXCEED 1000 TIMES THAT THE MOLD IS FILLED.

MOISTURE CONTENT – ASTM D 2216

QA ID: DYE

	TARE NO.			#306	#33	#215	#24
F	WT. OF TARE	(grams)		8.3	8.1	8.3	8.3
G	WT. OF WET SOIL & TARE	(grams)		517.9	558.0	606.9	479.9
H	WT. OF DRY SOIL & TARE	(grams)		476.4	503.2	538.8	417.9
I	WT. OF WATER = G − H	(grams)		41.5	54.8	68.1	62.0
J	WT. DRY SOIL = H − F	(grams)		468.1	495.1	530.5	409.6
K	MOISTURE CONTENT = (I/J) X 100	(%)		8.9	11.1	12.8	15.1
				1.089	1.111	1.128	1.151

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SHEET NO. 1 OF 3

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FLUOR FERNALD

CORRECTION OF UNIT WEIGHT AND WATER CONTENT FOR SOILS CONTAINING OVERSIZE PARTICLES *(ASTM D 4718)*

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO **PROJECT NO.** GQ134/ **TASK NO.** 04.1

DESCRIPTION: Phase II **DATE:** 26 day Sept month 2001 year

MATERIAL TYPE: Low Perm Clay LP01-20 STD

Weight of Total Sample	=	17423.0
Weight of Oversize Fraction	=	156.0
Weight of Finer Fraction (- 3/8)	=	17267
Percentage of Oversize Fraction	= (P_C)	0.9
Percentage of Finer Fraction (- 3/8)	= (P_F)	99.1
Specific Gravity (Assumed)	= (G_M)	2.72

(W_F) =	Water Content - 3/8 , as decimal	=	0.136
(W_C) =	Water Content + 3/8 , as decimal	=	0.015
(δ_F) =	Dry Density of finer fraction	=	120.0
(δ_W) =	Unit Weight of Water	=	62.4

$$C_W=(W_F P_F)+(W_C P_C)$$

$$C_W = 13.5\ \%$$

$$C\delta_D=100\delta_F G_M \delta_W/(\delta_F P_C)+(G_M \delta_W P_F)$$

$$C_{\delta D} = 120.3 \text{ pcf}$$

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MOISTURE-DENSITY RELATIONSHIP

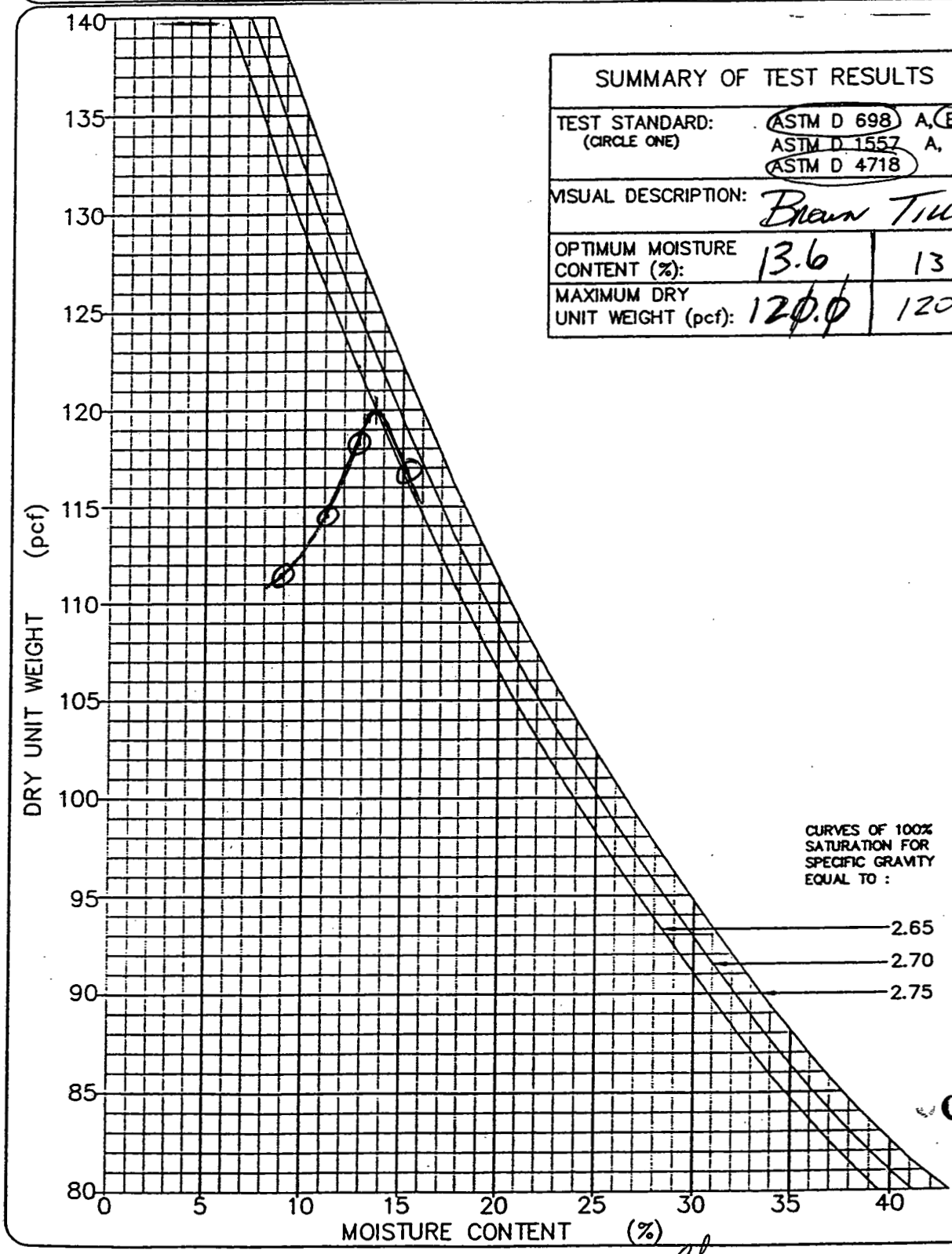
PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO PROJECT NO.: GQ134 TASK NO.: 04.1

DESCRIPTION: PHASE III DATE: 26 day SEPT month 2001 year

MATERIAL TYPE: Low Perm CLAY MATERIAL SOURCE: STOCKPILE 01-3 SAMPLE NO.: LP-01-20

SUMMARY OF TEST RESULTS			QA ID
TEST STANDARD: (CIRCLE ONE)	ASTM D 698 A, B, C ASTM D 1557 A, B, C ASTM D 4718		DLE/TBY
VISUAL DESCRIPTION:	Brown Till		DLE/TBY
OPTIMUM MOISTURE CONTENT (%):	13.6	13.5	TBY/CJ
MAXIMUM DRY UNIT WEIGHT (pcf):	120.0	120.3	TBY/CJ



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FIELD LABORATORY COMPACTION TEST

(ASTM D 698 METHOD B)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO

PROJECT NO.: 6Q1341 TASK NO.: 04.1

DESCRIPTION: Phase III

DATE: 28 day Sept. month 2001 year

MATERIAL TYPE: Low Perm Clay MATERIAL SOURCE: Stockpile 01-4 SAMPLE NO.: LP 01-22

THIS METHOD WILL BE USED IF THE MATERIAL RETAINED ON THE NO. 3/4-in. (19-mm) SIEVE IS LESS THAN 30%, IF THE MATERIAL RETAINED ON THE NO. 4 (4.75-mm) SIEVE IS GREATER THAN 20%, AND IF THE MATERIAL RETAINED ON THE NO. 3/8-in. (9.5-mm) SIEVE IS LESS THAN 20%.
ALL MATERIAL RETAINED ON THE NO. 3/8-in. (9.5-mm) SIEVE IS DISCARDED.
USE OVERSIZE CORRECTION IF MORE THAN 5% IS DISCARDED ACCORDING TO ASTM D 4718.
USE A 4-in. DIAMETER MOLD / 5.5-lb RAMMER / 12-in. DROP / 3 LAYERS / 25 BLOWS PER LAYER. 13.67

COMPACTION OF SOIL

QA ID: OZE

				13.17	13.40	13.69	
	WATER ADDED	(ml)		4%	6%	8%	10%
A	WT. OF SOIL & MOLD	(grams)		5973.9	6078.2	6209.8	6200.7
B	WT. OF MOLD	(grams)		4208.8	4208.8	4208.8	4208.8
C	WT. OF SOIL = A − B	(grams)		1765.1	1869.4	2001.0	1991.6
D	WET UNIT WT.(1) = C X 0.066	(pcf)		116.5	123.4	132.1	~~131.4~~ 131.5
E	DRY UNIT WT. = D / [1 + (K/100)]	(pcf)		105.4	109.9	115.3	112.7

NOTE: IF CALIBRATED MOLD OF 1/30 FT^3 IS USED, THE WET DENSITY IS CALCULATED FROM THE WEIGHT OF SOIL, THE VOLUME OF THE MOLD AND THE CONVERSION FROM GRAMS TO POUNDS (I.E., CONVERSION FACTOR = (30 / 453.6) = 0.066). THE MOLD MUST BE CALIBRATED TO VERIFY A CAPACITY OF 1/30 ± 0.0005 FT^3 ON INTERVALS NOT TO EXCEED 1000 TIMES THAT THE MOLD IS FILLED.

MOISTURE CONTENT — ASTM D 2216

QA ID: _____

	TARE NO.			#204	#8	#229	#1
F	WT. OF TARE	(grams)		8.1	8.3	8.1	8.3
G	WT. OF WET SOIL & TARE	(grams)		538.6	550.8	529.7	506.4
H	WT. OF DRY SOIL & TARE	(grams)		488.1	491.6	463.4	435.4
I	WT. OF WATER = G − H	(grams)		50.5	59.2	66.3	71.0
J	WT. DRY SOIL = H − F	(grams)		480.0	483.3	455.3	427.1
K	MOISTURE CONTENT = (I/J) X 100	(%)		10.5	12.2	14.6	16.6

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CORRECTION OF UNIT WEIGHT AND WATER CONTENT FOR SOILS CONTAINING OVERSIZE PARTICLES *(ASTM D 4718)*

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO **PROJECT NO.** GQ134 **TASK NO.** 04.1

DESCRIPTION: Phase III **DATE:** 2 day Oct month 2001 year

MATERIAL TYPE: Low Perm Clay LP01-22 STD

Weight of Total Sample	=	35419.7
Weight of Oversize Fraction	=	745.1
Weight of Finer Fraction (- 3/8)	=	34674.6
Percentage of Oversize Fraction	= (P_C)	2.1
Percentage of Finer Fraction (- 3/8)	= (P_F)	97.9
Specific Gravity (Assumed)	= (G_M)	2.72

(W_F) =	Water Content - 3/8, as decimal	=	0.149
(W_C) =	Water Content + 3/8, as decimal	=	0.015
(δ_F) =	Dry Density of finer fraction	=	116.0
(δ_W) =	Unit Weight of Water	=	62.4

$$C_W=(W_F P_F)+(W_C P_C)$$

$C_W = 14.6\%$

$$C\delta_D=100\delta_F G_M \delta_W/(\delta_F P_C)+(G_M \delta_W P_F)$$

$C_{\delta D} = 116.8$ pcf

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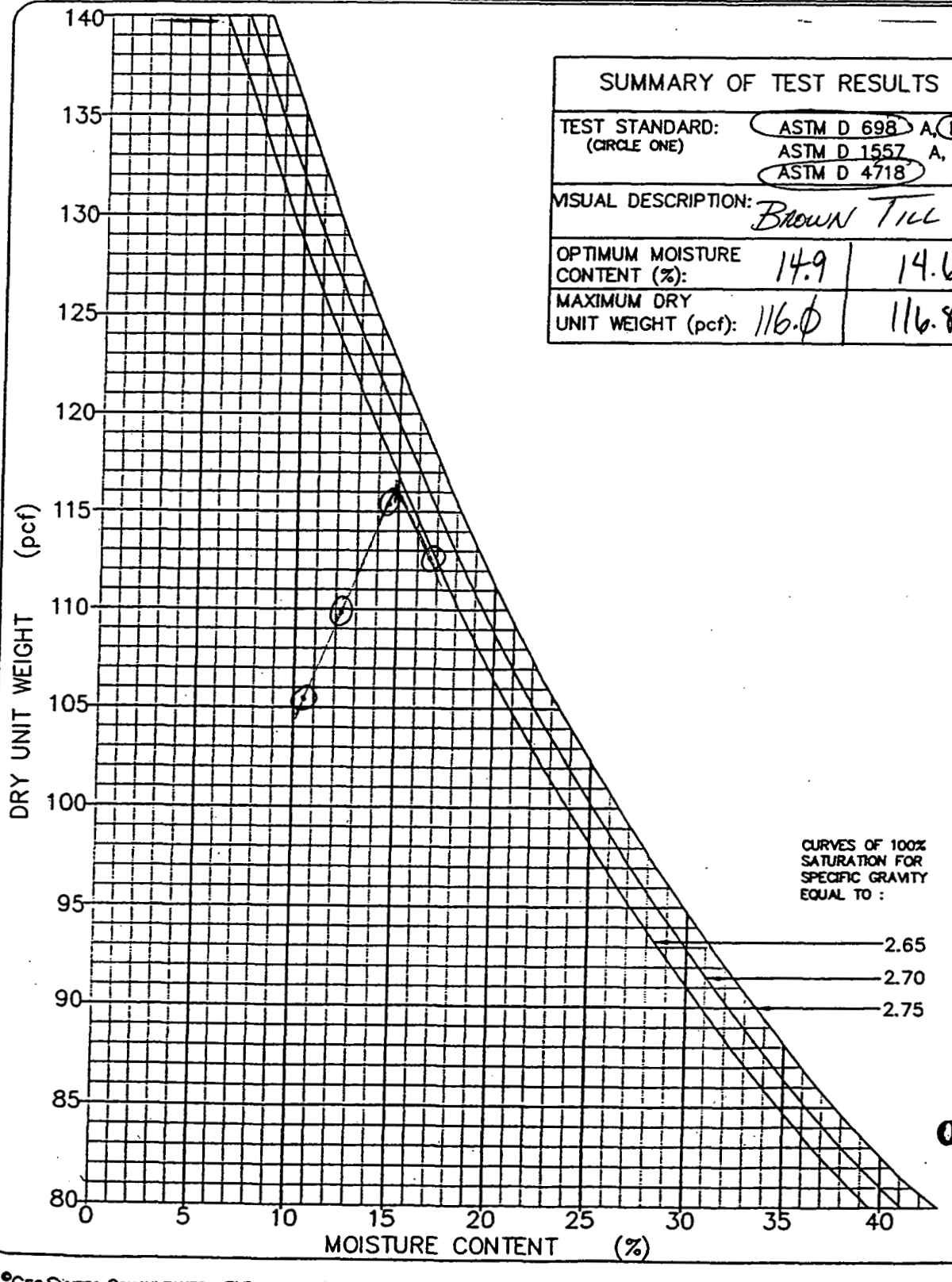
MOISTURE–DENSITY RELATIONSHIP

PROJECT: ON–SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO PROJECT NO.: GQ1341 TASK NO.: 04.1

DESCRIPTION: PHASE III DATE: 01 day OCT month 2001 year

MATERIAL TYPE: Low Perm CLAY MATERIAL SOURCE: STOCKPILE 01-4 SAMPLE NO.: LP-01-22



SUMMARY OF TEST RESULTS			QA ID
TEST STANDARD: (CIRCLE ONE)	ASTM D 698 A, B, C ASTM D 1557 A, B, C ASTM D 4718		TBU
VISUAL DESCRIPTION:	BROWN TILL		TBU
OPTIMUM MOISTURE CONTENT (%):	14.9	14.6	TBU
MAXIMUM DRY UNIT WEIGHT (pcf):	116.0	116.8	TBU

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FLUOR FERNALD

FIELD LABORATORY COMPACTION TEST

(ASTM D 1557 METHOD B)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO

PROJECT NO.: GQ134 TASK NO.: 04.1

DESCRIPTION: PHASE III

DATE: 28 day SEPT month 2001 year

MATERIAL TYPE: LOW PERM CLAY MATERIAL SOURCE: STOCKPILE 01-4 SAMPLE NO.: LP-01-22

THIS METHOD WILL BE USED IF THE MATERIAL RETAINED ON THE NO. 4-in. (4.75-mm) SIEVE IS GREATER THAN 20%, AND THE MATERIAL RETAINED ON THE NO. 3/8-in. (9.5-mm) SIEVE IS LESS THAN 20%.
ALL MATERIAL RETAINED ON THE NO. 3/8-in. (9.5-mm) SIEVE IS DISCARDED.
USE OVERSIZE CORRECTION IF MORE THAN 5% IS DISCARDED ACCORDING TO ASTM D 4718.
USE A 4-in. DIAMETER MOLD / 10-lb RAMMER / 18-in. DROP / 5 LAYERS / 25 BLOWS PER LAYER.

COMPACTION OF SOIL — QA ID: TBW/DLE

			13.66 lbs	13.94 lbs	14.01 lbs	13.89 lbs	
	WATER ADDED	(ml)	+2%	+4%	+6%	+8%	
A	WT. OF SOIL & MOLD	(grams)	6196.2	6323.2	6354.9	6300.5	
B	WT. OF MOLD	(grams)	4208.8	4208.8	4208.8	4208.8	
C	WT. OF SOIL = A - B	(grams)	1987.4	2114.4	2146.1	2091.7	
D	WET UNIT WT.(1) = C X 0.066	(pcf)	131.2	139.5	141.6	138.1	
E	DRY UNIT WT. = D / [1 + (K/100)]	(pcf)	121.8	126.7	126.4	121.2	

NOTE: IF CALIBRATED MOLD OF 1/30 FT^3 IS USED, THE WET DENSITY IS CALCULATED FROM THE WEIGHT OF SOIL, THE VOLUME OF THE MOLD AND THE CONVERSION FROM GRAMS TO POUNDS (I.E., CONVERSION FACTOR = (30 / 453.6) = 0.066). THE MOLD MUST BE CALIBRATED TO VERIFY A CAPACITY OF 1/30 ± 0.0005 FT^3 ON INTERVALS NOT TO EXCEED 1000 TIMES THAT THE MOLD IS FILLED.

MOISTURE CONTENT — ASTM D 2216 — QA ID: TBW/DLE

	TARE NO.		#303	#305	#206	#302	
F	WT. OF TARE	(grams)	8.3	8.3	8.3	8.3	
G	WT. OF WET SOIL & TARE	(grams)	641.0	509.7	577.4	634.1	
H	WT. OF DRY SOIL & TARE	(grams)	596.0	463.5	516.1	557.7	
I	WT. OF WATER = G - H	(grams)	45.0	46.2	61.3	76.4	
J	WT. DRY SOIL = H - F	(grams)	587.7	455.2	507.8	549.4	
K	MOISTURE CONTENT = (I/J) X 100	(%)	7.7	10.1	12.1	13.9	

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CORRECTION OF UNIT WEIGHT AND WATER CONTENT FOR SOILS CONTAINING OVERSIZE PARTICLES *(ASTM D 4718)*

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO PROJECT NO. GQ1341 TASK NO. 04.1

DESCRIPTION: Phase III DATE: 2 day Oct month 2001 year

MATERIAL TYPE: Low Perm Clay LP01-22 mod

Weight of Total Sample	=	35419.7
Weight of Oversize Fraction	=	745.1
Weight of Finer Fraction (- 3/8)	=	34,674.6
Percentage of Oversize Fraction	= (P_C)	2.1
Percentage of Finer Fraction (- 3/8)	= (P_F)	97.9
Specific Gravity (Assumed)	= (G_M)	2.72

(W_F)	=	Water Content - 3/8 , as decimal	=	0.110
(W_C)	=	Water Content + 3/8 , as decimal	=	0.015
(δ_F)	=	Dry Density of finer fraction	=	128.0
(δ_W)	=	Unit Weight of Water	=	62.4

$$C_W=(W_F P_F)+(W_C P_C)$$

$C_w = 10.8\ \%$

$$C\delta_D=100\delta_F G_M \delta_W/(\delta_F P_C)+(G_M \delta_W P_F)$$

$C_{\delta D} = 128.7$

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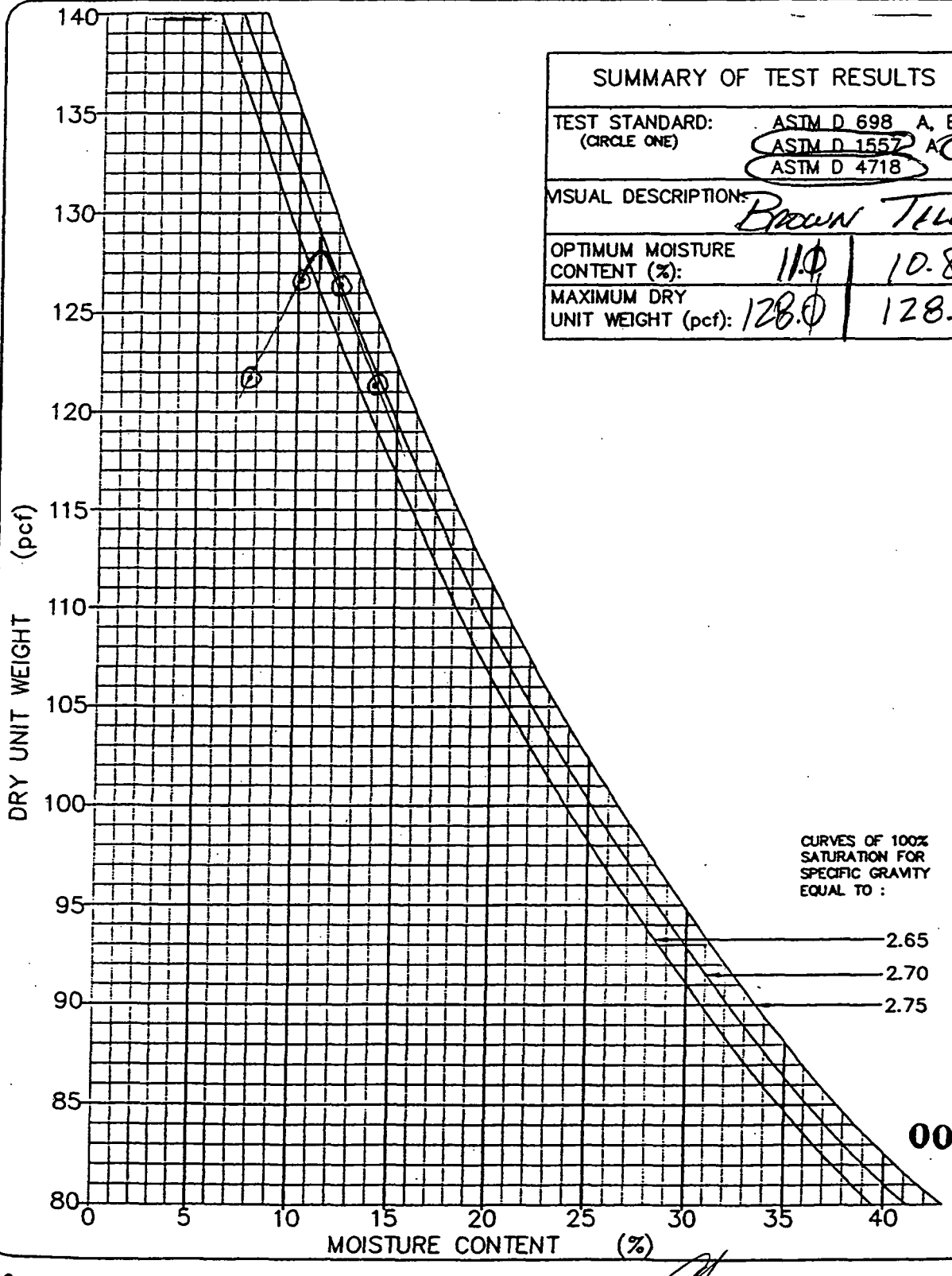
MOISTURE-DENSITY RELATIONSHIP

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO PROJECT NO.: GQ1341 TASK NO.: 04.1

DESCRIPTION: PHASE III DATE: 01 day OCT month 2001 year

MATERIAL TYPE: Low PERM CLAY MATERIAL SOURCE: STOCKPILE 01-4 SAMPLE NO.: LP-01-22



SUMMARY OF TEST RESULTS			QA ID
TEST STANDARD: (CIRCLE ONE)	ASTM D 698 A, B, C ASTM D 1557 A, B, C ASTM D 4718		TBK DLE
VISUAL DESCRIPTION:	BROWN TILL		TBK
OPTIMUM MOISTURE CONTENT (%):	11.0	10.8	CL
MAXIMUM DRY UNIT WEIGHT (pcf):	128.0	128.7	CL

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FLUOR FERNALD

FIELD LABORATORY COMPACTION TEST

(ASTM D 698 METHOD B)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO

PROJECT NO. 6Q1341 TASK NO.: 04.1

DESCRIPTION: Phase III

DATE: 04 day OCT month 2001 year

MATERIAL TYPE: Low Perm Clay MATERIAL SOURCE: STOCKPILE 01-4 SAMPLE NO.: LP-01-23

THIS METHOD WILL BE USED IF THE MATERIAL RETAINED ON THE NO. 3/4-in. (19-mm) SIEVE IS LESS THAN 30%, IF THE MATERIAL RETAINED ON THE NO. 4 (4.75-mm) SIEVE IS GREATER THAN 20%, AND IF THE MATERIAL RETAINED ON THE NO. 3/8-in. (9.5-mm) SIEVE IS LESS THAN 20%.
ALL MATERIAL RETAINED ON THE NO. 3/8-in. (9.5-mm) SIEVE IS DISCARDED.
USE OVERSIZE CORRECTION IF MORE THAN 5% IS DISCARDED ACCORDING TO ASTM D 4718.
USE A 4-in. DIAMETER MOLD / 5.5-lb RAMMER / 12-in. DROP / 3 LAYERS / 25 BLOWS PER LAYER.

COMPACTION OF SOIL

QA ID: TBW

			13.29 lbs	13.36 lbs	13.62 lbs	13.58	13.18 lbs
	WATER ADDED	(ml)	+6%	+8%	+10%	+12%	+4%
A	WT. OF SOIL & MOLD	(grams)	6028.3	6060.1	6178.0	6159.9	5978.4
B	WT. OF MOLD	(grams)	4208.8	4208.8	4208.8	4208.8	4208.8
C	WT. OF SOIL = A − B	(grams)	1819.5	1851.3	1969.2	1951.1	1769.6
D	WET UNIT WT.(1) = C X 0.066	(pcf)	120.1	122.2	130.0	128.8	116.8
E	DRY UNIT WT. = D / [1 + (K/100)]	(pcf)	107.3	107.9	112.6	108.2	106.2

NOTE: IF CALIBRATED MOLD OF 1/30 FT^3 IS USED, THE WET DENSITY IS CALCULATED FROM THE WEIGHT OF SOIL, THE VOLUME OF THE MOLD AND THE CONVERSION FROM GRAMS TO POUNDS (I.E., CONVERSION FACTOR = (30 / 453.6) = 0.066). THE MOLD MUST BE CALIBRATED TO VERIFY A CAPACITY OF 1/30 ± 0.0005 FT^3 ON INTERVALS NOT TO EXCEED 1000 TIMES THAT THE MOLD IS FILLED.

MOISTURE CONTENT — ASTM D 2216

QA ID: DLE TBW

	TARE NO.		#302	#234	#31	#26	#105
F	WT. OF TARE	(grams)	8.3	8.3	8.3	8.3	8.2
G	WT. OF WET SOIL & TARE	(grams)	528.0	520.7	532.4	547.3	570.0
H	WT. OF DRY SOIL & TARE	(grams)	472.5	460.9	462.4	461.0	519.0
I	WT. OF WATER = G − H	(grams)	55.5	59.8	70.0	86.3	51.0
J	WT. DRY SOIL = H − F	(grams)	464.2	452.6	454.1	452.7	510.8
K	MOISTURE CONTENT = (I/J) X 100	(%)	12.0	13.2	15.4	19.1	10.0

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FLUOR FERNALD

CORRECTION OF UNIT WEIGHT AND WATER CONTENT FOR SOILS CONTAINING OVERSIZE PARTICLES *(ASTM D 4718)*

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO **PROJECT NO** 60134 **TASK NO.** 04.1

DESCRIPTION: PHASE III **DATE:** 05 day OCT month 2001 year

MATERIAL TYPE: LOW PERM CLAY (LP-01-23)

Weight of Total Sample	=	23,196.5 g
Weight of Oversize Fraction	=	903.9 g
Weight of Finer Fraction (- 3/8)	=	22,292.6 g
Percentage of Oversize Fraction	= (P_C)	3.9
Percentage of Finer Fraction (- 3/8)	= (P_F)	96.1
Specific Gravity (Assumed)	= (G_M)	2.72

(W_F)	=	Water Content - 3/8, as decimal	=	0.163
(W_C)	=	Water Content + -3/8, as decimal	=	0.015
(δ_F)	=	Dry Density of finer fraction	=	114.0
(δ_W)	=	Unit Weight of Water	=	62.4

$$C_W=(W_F P_F)+(W_C P_C) = \boxed{15.7\%M}$$

$$C\delta_D=100\delta_F G_M \delta_W/(\delta_F P_C)+(G_M \delta_W P_F) = \boxed{115.5 \text{ pcf}}$$

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FLUOR FERNALD

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MOISTURE-DENSITY RELATIONSHIP

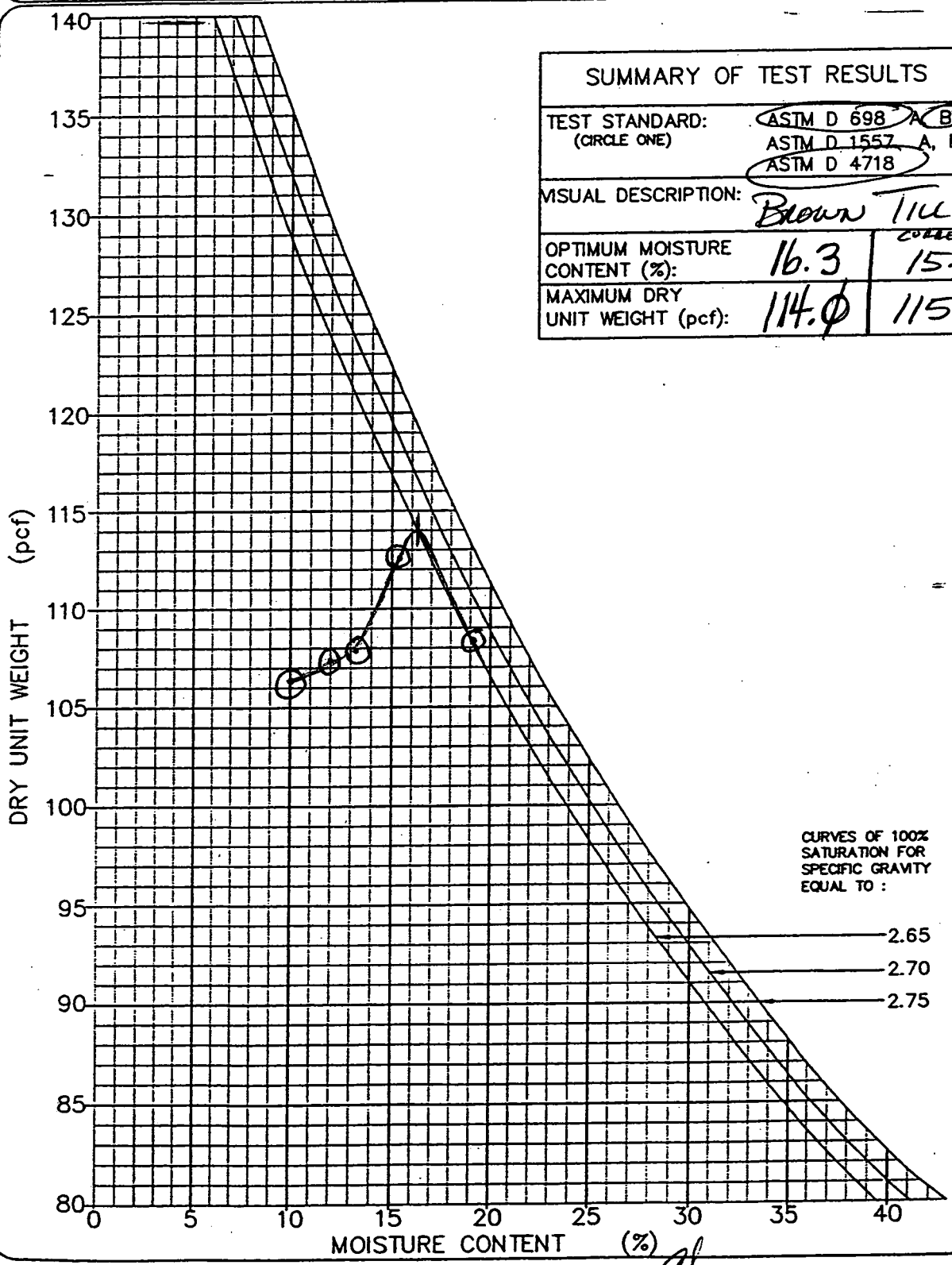
PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO PROJECT NO.: GQ134 TASK NO.: 04.1

DESCRIPTION: PHASE III DATE: 05 day OCT month 2001 year

MATERIAL TYPE: Low Perm Clay MATERIAL SOURCE: STOCKPILE 01-4 SAMPLE NO.: LP-01-23

SUMMARY OF TEST RESULTS			QA ID
TEST STANDARD: (CIRCLE ONE)	ASTM D 698 A B C ASTM D 1557 A, B, C ASTM D 4718		TBW
VISUAL DESCRIPTION:	Brown Till		TBW
OPTIMUM MOISTURE CONTENT (%):	16.3	15.7 (COMPACTED)	TBW
MAXIMUM DRY UNIT WEIGHT (pcf):	114.0	115.5	TBW



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FLUOR FERNALD

FIELD LABORATORY COMPACTION TEST

(ASTM D 698 METHOD B)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO

PROJECT NO. 6Q134 TASK NO.: 04.1

DESCRIPTION: Phase III

DATE: 04 day Oct month 2001 year

MATERIAL TYPE: Low Perm Clay MATERIAL SOURCE: Stockpile 01-4 SAMPLE NO.: LP-01-24

THIS METHOD WILL BE USED IF THE MATERIAL RETAINED ON THE NO. 3/4-in. (19-mm) SIEVE IS LESS THAN 30%, IF THE MATERIAL RETAINED ON THE NO. 4 (4.75-mm) SIEVE IS GREATER THAN 20%, AND IF THE MATERIAL RETAINED ON THE NO. 3/8-in. (9.5-mm) SIEVE IS LESS THAN 20%.
ALL MATERIAL RETAINED ON THE NO. 3/8-in. (9.5-mm) SIEVE IS DISCARDED.
USE OVERSIZE CORRECTION IF MORE THAN 5% IS DISCARDED ACCORDING TO ASTM D 4718.
USE A 4-in. DIAMETER MOLD / 5.5-lb RAMMER / 12-in. DROP / 3 LAYERS / 25 BLOWS PER LAYER. 1378

COMPACTION OF SOIL

				1343	1356	1382	QA ID: 042
	WATER ADDED	(ml)		6%	8%	12%	14%
A	WT. OF SOIL & MOLD	(grams)		6091.8	6150.8	6268.8	6250.6
B	WT. OF MOLD	(grams)		4273.5	4273.5	4273.5	4273.5
C	WT. OF SOIL = A − B	(grams)		1818.3	1877.3	1995.3	1977.1
D	WET UNIT WT.(1) = C X 0.066	(pcf)		120.0	123.9	131.7	130.5
E	DRY UNIT WT. = D / [1 + (K/100)]	(pcf)		108.6	110.7	115.1	109.9

NOTE: IF CALIBRATED MOLD OF 1/30 FT^3 IS USED, THE WET DENSITY IS CALCULATED FROM THE WEIGHT OF SOIL, THE VOLUME OF THE MOLD AND THE CONVERSION FROM GRAMS TO POUNDS (I.E., CONVERSION FACTOR = (30 / 453.6) = 0.066). THE MOLD MUST BE CALIBRATED TO VERIFY A CAPACITY OF 1/30 ± 0.0005 FT^3 ON INTERVALS NOT TO EXCEED 1000 TIMES THAT THE MOLD IS FILLED.

MOISTURE CONTENT – ASTM D 2216

							QA ID: DCE
	TARE NO.			#206	#33	#18	#13
F	WT. OF TARE	(grams)		8.3	8.1	8.5	8.3
G	WT. OF WET SOIL & TARE	(grams)		527.1	497.2	423.1	480.8
H	WT. OF DRY SOIL & TARE	(grams)		477.7	444.9	370.9	406.3
I	WT. OF WATER = G − H	(grams)		49.4	52.3	52.2	74.5
J	WT. DRY SOIL = H − F	(grams)		469.4	436.8	362.4	398.0
K	MOISTURE CONTENT = (I/J) X 100	(%)		10.5	12.0	14.4	18.7

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FLUOR FERNALD

CORRECTION OF UNIT WEIGHT AND WATER CONTENT FOR SOILS CONTAINING OVERSIZE PARTICLES *(ASTM D 4718)*

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO PROJECT NO. 60134 TASK NO. 04.1

DESCRIPTION: PHASE III DATE: 05 day OCT month 2001 year

MATERIAL TYPE: LOW PERM CLAY (LP-01-24)

Weight of Total Sample	=	39,599.4 g
Weight of Oversize Fraction	=	1,118.0 g
Weight of Finer Fraction (- 3/8)	=	38,481.4 g
Percentage of Oversize Fraction	= (P_C)	2.82
Percentage of Finer Fraction (- 3/8)	= (P_F)	97.18
Specific Gravity (Assumed)	= (G_M)	2.72

(W_F) =	Water Content - 3/8 , as decimal	=	0.152
(W_C) =	Water Content + 3/8 , as decimal	=	0.015
(δ_F) =	Dry Density of finer fraction	=	116.4
(δ_W) =	Unit Weight of Water	=	62.4

$$C_W=(W_F P_F)+(W_C P_C) = \boxed{14.8}$$

$$C\delta_D=100\delta_F G_M \delta_W/(\delta_F P_C)+(G_M \delta_W P_F) = \boxed{117.4}$$

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MOISTURE-DENSITY RELATIONSHIP

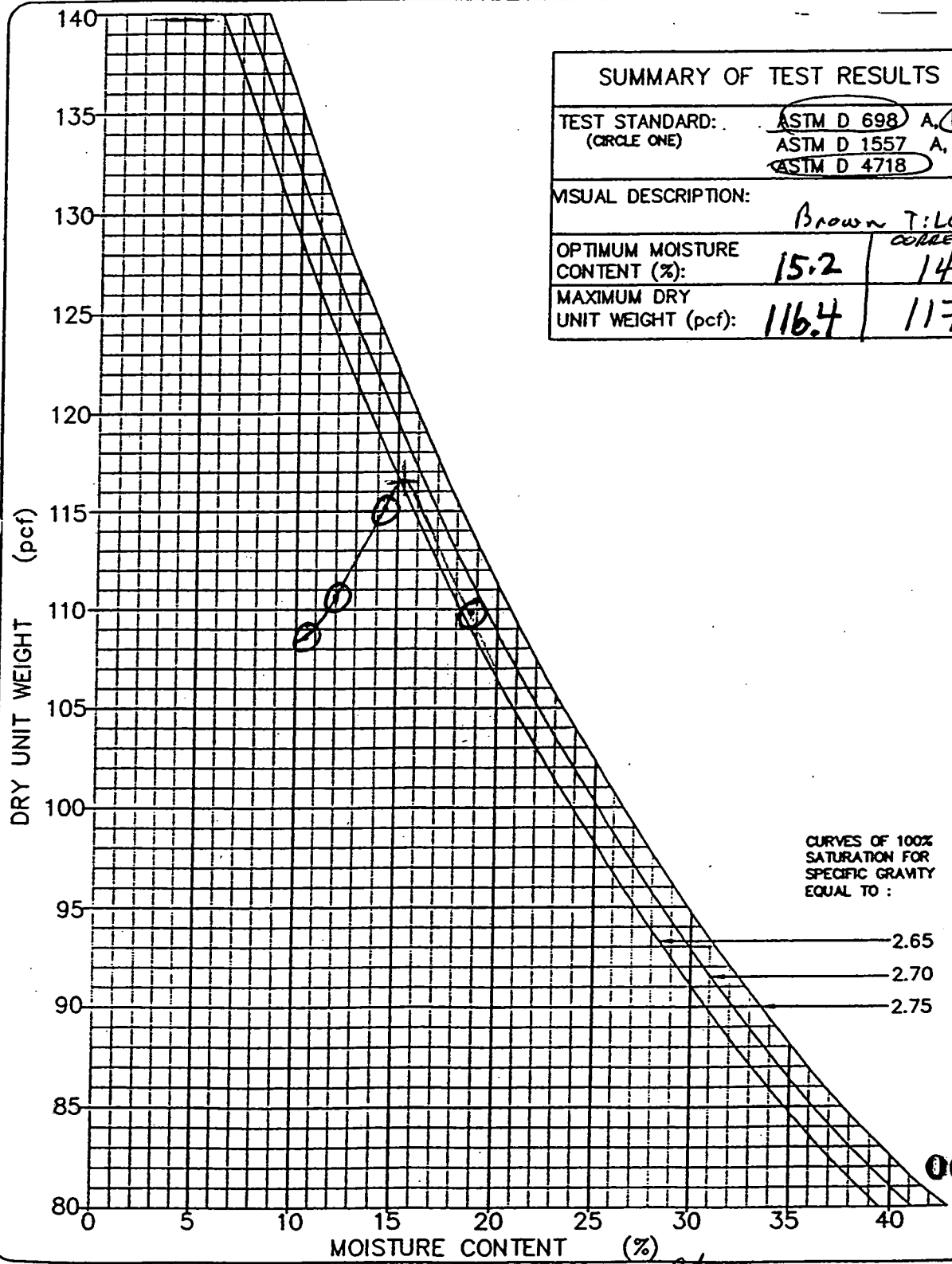
PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO PROJECT NO. 6B134 TASK NO.: 041

DESCRIPTION: Phase III DATE: 05 day Oct month 2001 year

MATERIAL TYPE: Low Perm Clay MATERIAL SOURCE: Stockpile 01-4 SAMPLE NO. LP-01-24

SUMMARY OF TEST RESULTS			QA ID
TEST STANDARD: (CIRCLE ONE)	ASTM D 698 A, B C ASTM D 1557 A, B, C ASTM D 4718		TBW / DJE
VISUAL DESCRIPTION:	Brown Tilc		TBW
OPTIMUM MOISTURE CONTENT (%):	15.2	CORRECTED 14.8	TBW
MAXIMUM DRY UNIT WEIGHT (pcf):	116.4	117.4	TBW



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FLUOR FERNALD

FIELD LABORATORY COMPACTION TEST

(ASTM D 1557 METHOD B)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO

PROJECT NO.: GQ134 TASK NO.: 04.1

DESCRIPTION: PHASE III

DATE: 03 day OCT month 2001 year

MATERIAL TYPE: LOW PERM CLAY MATERIAL SOURCE: STOCKPILE 01-4 SAMPLE NO.: LP-01-24

THIS METHOD WILL BE USED IF THE MATERIAL RETAINED ON THE NO. 4-in. (4.75-mm) SIEVE IS GREATER THAN 20%, AND THE MATERIAL RETAINED ON THE NO. 3/8-in. (9.5-mm) SIEVE IS LESS THAN 20%.
ALL MATERIAL RETAINED ON THE NO. 3/8-in. (9.5-mm) SIEVE IS DISCARDED.
USE OVERSIZE CORRECTION IF MORE THAN 5% IS DISCARDED ACCORDING TO ASTM D 4718.
USE A 4-in. DIAMETER MOLD / 10-lb RAMMER / 18-in. DROP / 5 LAYERS / 25 BLOWS PER LAYER.

COMPACTION OF SOIL — QA ID: KS/TBY

			13.63 lbs	13.87 lbs	13.97 lbs	13.89 lbs	
	WATER ADDED	(ml)	+4%	+6%	+8%	+10%	
A	WT. OF SOIL & MOLD	(grams)	6182.6	6291.4	6336.8	6300.5	
B	WT. OF MOLD	(grams)	4208.8	4208.8	4208.8	4208.8	
C	WT. OF SOIL = A − B	(grams)	1973.8	2082.6	2128.0	2091.7	
D	WET UNIT WT.(1) = C X 0.066	(pcf)	130.3	137.5	140.4	138.1	
E	DRY UNIT WT. = D / [1 + (K/100)]	(pcf)	120.6	125.2	125.6	121.1	

NOTE: IF CALIBRATED MOLD OF 1/30 FT^3 IS USED, THE WET DENSITY IS CALCULATED FROM THE WEIGHT OF SOIL, THE VOLUME OF THE MOLD AND THE CONVERSION FROM GRAMS TO POUNDS (I.E., CONVERSION FACTOR = (30 / 453.6) = 0.066). THE MOLD MUST BE CALIBRATED TO VERIFY A CAPACITY OF 1/30 ± 0.0005 FT^3 ON INTERVALS NOT TO EXCEED 1000 TIMES THAT THE MOLD IS FILLED.

MOISTURE CONTENT – ASTM D 2216 — QA ID: _____

	TARE NO.		306	230	229	8	
F	WT. OF TARE	(grams)	8.3	8.1	8.0	8.3	
G	WT. OF WET SOIL & TARE	(grams)	345.3	340.2	318.7	540.7	
H	WT. OF DRY SOIL & TARE	(grams)	320.2	310.5	285.8	475.5	
I	WT. OF WATER = G − H	(grams)	25.1	29.7	32.9	65.2	
J	WT. DRY SOIL = H − F	(grams)	311.9	302.4	277.8	467.2	
K	MOISTURE CONTENT = (I/J) X 100	(%)	8.0	9.8	11.8	14.0	

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FLUOR FERNALD

CORRECTION OF UNIT WEIGHT AND WATER CONTENT FOR SOILS CONTAINING OVERSIZE PARTICLES *(ASTM D 4718)*

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO **PROJECT NO.** GQ1341 **TASK NO.** 04.1

DESCRIPTION: Phase III **DATE:** 4 day Oct month 2001 year

MATERIAL TYPE: Low Perm Clay LP01-24 MOD

Weight of Total Sample	=	39599.4
Weight of Oversize Fraction	=	1118.0
Weight of Finer Fraction (- 3/8)	=	38,481.4
Percentage of Oversize Fraction	= (P_C)	2.8
Percentage of Finer Fraction (- 3/8)	= (P_F)	97.2
Specific Gravity (Assumed)	= (G_M)	2.72

(W_F)	=	Water Content - 3/8 , as decimal	=	0.108
(W_C)	=	Water Content + 3/8 , as decimal	=	0.015
(δ_F)	=	Dry Density of finer fraction	=	127.6
(δ_W)	=	Unit Weight of Water	=	62.4

$$C_W=(W_F P_F)+(W_C P_C)$$

$C_W = 10.5\%$

$$C\delta_D=100\delta_F G_M \delta_W/(\delta_F P_C)+(G_M \delta_W P_F)$$

$C_{\delta D} = 128.5$ pcf

000454

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FLUOR FERNALD

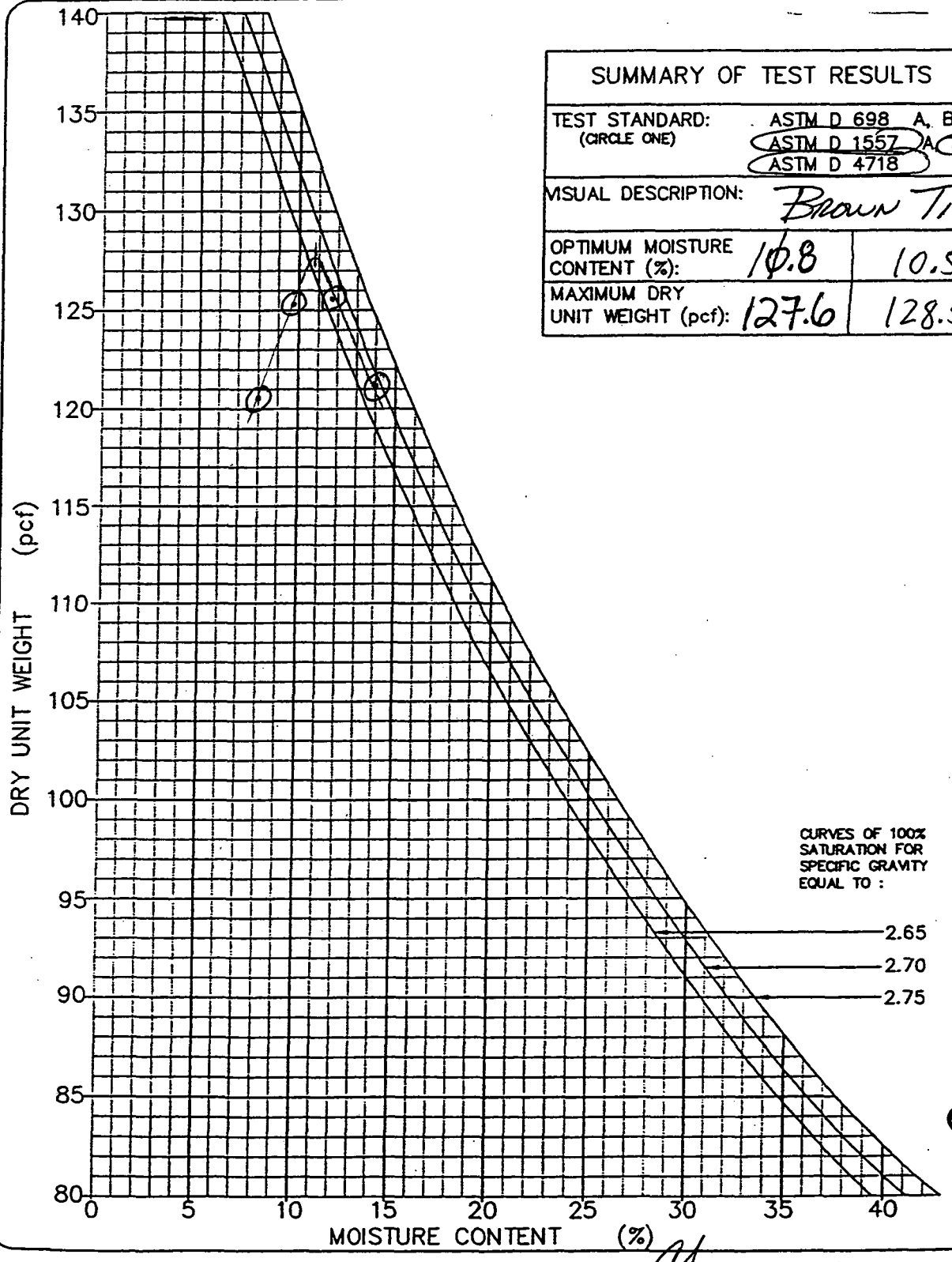
MOISTURE–DENSITY RELATIONSHIP

PROJECT: ON–SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO PROJECT NO.: GQ1341 TASK NO.: 04.1

DESCRIPTION: PHASE III DATE: 04 day OCT month 2001 year

MATERIAL TYPE: LOW PERM CLAY MATERIAL SOURCE: STOCKPILE 01-4 SAMPLE NO.: LP-01-24



SUMMARY OF TEST RESULTS			QA ID
TEST STANDARD: (CIRCLE ONE)	ASTM D 698 A, B, C ASTM D 1557 A, B, C ASTM D 4718		TBY
VISUAL DESCRIPTION:	BROWN TILL		TBY
OPTIMUM MOISTURE CONTENT (%):	10.8	10.5	TBY/CA
MAXIMUM DRY UNIT WEIGHT (pcf):	127.6	128.5	TBY/CA

000455

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FLUOR FERNALD

FIELD LABORATORY COMPACTION TEST

(ASTM D 698 METHOD B)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO

PROJECT NO. 6Q1341 TASK NO.: 04.1

DESCRIPTION: Phase III

DATE: 02 day OCT month 2001 year

MATERIAL TYPE: Low Perm Clay MATERIAL SOURCE: STOCKPILE 01-3 SAMPLE NO.: LP-01-25

THIS METHOD WILL BE USED IF THE MATERIAL RETAINED ON THE NO. 3/4-in. (19-mm) SIEVE IS LESS THAN 30%, IF THE MATERIAL RETAINED ON THE NO. 4 (4.75-mm) SIEVE IS GREATER THAN 20%, AND IF THE MATERIAL RETAINED ON THE NO. 3/8-in. (9.5-mm) SIEVE IS LESS THAN 20%.
ALL MATERIAL RETAINED ON THE NO. 3/8-in. (9.5-mm) SIEVE IS DISCARDED.
USE OVERSIZE CORRECTION IF MORE THAN 5% IS DISCARDED ACCORDING TO ASTM D 4718.
USE A 4-in. DIAMETER MOLD / 5.5-lb RAMMER / 12-in. DROP / 3 LAYERS / 25 BLOWS PER LAYER.

13.67

COMPACTION OF SOIL

QA ID: DLE

				13.21	13.49	13.71	
	WATER ADDED	(ml)		+ 6%	8%	10%	12%
A	WT. OF SOIL & MOLD	(grams)		5992.1	6119.1	6218.8	6200.7
B	WT. OF MOLD	(grams)	4208.8	4208.8	4208.8	4208.8	4208.8
C	WT. OF SOIL = A − B	(grams)		1783.3	1910.3	2010.0	1991.9
D	WET UNIT WT.(1) = C X 0.066	(pcf)		117.7	126.1	132.7	131.5
E	DRY UNIT WT. = D / [1 + (K/100)]	(pcf)		106.6	112.3	116.2	111.7

NOTE: IF CALIBRATED MOLD OF 1/30 FT^3 IS USED, THE WET DENSITY IS CALCULATED FROM THE WEIGHT OF SOIL, THE VOLUME OF THE MOLD AND THE CONVERSION FROM GRAMS TO POUNDS (I.E., CONVERSION FACTOR = (30 / 453.6) = 0.066). THE MOLD MUST BE CALIBRATED TO VERIFY A CAPACITY OF 1/30 ± 0.0005 FT^3 ON INTERVALS NOT TO EXCEED 1000 TIMES THAT THE MOLD IS FILLED.

MOISTURE CONTENT – ASTM D 2216

QA ID: _____

	TARE NO.			#31	#215	#303	#204
F	WT. OF TARE	(grams)		8.2	8.3	8.3	8.1
G	WT. OF WET SOIL & TARE	(grams)		462.5	534.2	553.0	502.9
H	WT. OF DRY SOIL & TARE	(grams)		419.8	476.7	485.3	428.6
I	WT. OF WATER = G − H	(grams)		42.7	57.5	67.7	74.3
J	WT. DRY SOIL = H − F	(grams)		411.6	468.4	477.0	420.5
K	MOISTURE CONTENT = (I/J) X 100	(%)		10.4	12.3	14.2	17.7

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FLUOR FERNALD

CORRECTION OF UNIT WEIGHT AND WATER CONTENT FOR SOILS CONTAINING OVERSIZE PARTICLES *(ASTM D 4718)*

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO PROJECT NO GR134/ TASK NO. 04.1

DESCRIPTION: Phase III DATE: 3 day Oct month 2001 year

MATERIAL TYPE: Low Perm Clay LP01-25

Weight of Total Sample	=	46,726.7
Weight of Oversize Fraction	=	2,050.7
Weight of Finer Fraction (- 3/8)	=	44,676
Percentage of Oversize Fraction	= (P_C)	4.4
Percentage of Finer Fraction (- 3/8)	= (P_F)	95.6
Specific Gravity (Assumed)	= (G_M)	2.72

(W_F) =	Water Content - 3/8 , as decimal	=	~~14.9~~ 0.149
(W_C) =	Water Content + 3/8 , as decimal	=	0.015
(δ_F) =	Dry Density of finer fraction	=	117.3
(δ_W) =	Unit Weight of Water	=	62.4

$$C_W=(W_F P_F)+(W_C P_C)$$

$C_w = 14.3$

$$C\delta_D=100\delta_F G_M \delta_W/(\delta_F P_C)+(G_M \delta_W P_F)$$

$C_{\delta D} = 118.9$

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FLUOR FERNALD

4940

MOISTURE-DENSITY RELATIONSHIP

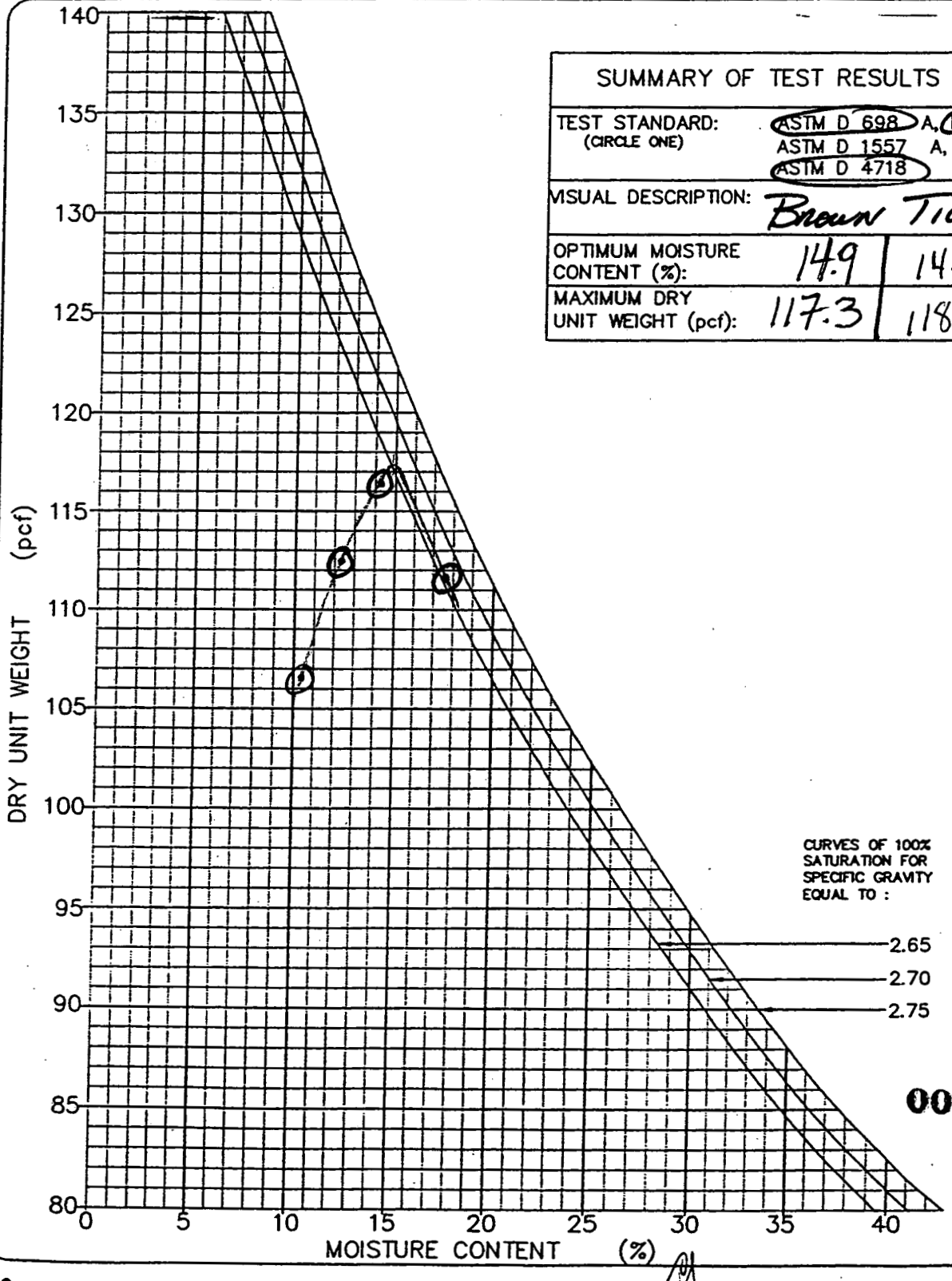
PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO PROJECT NO.: GQ134 TASK NO.: 041

DESCRIPTION: PHASE III DATE: 03 day OCT month 2001 year

MATERIAL TYPE: LOW PERM CLAY MATERIAL SOURCE: STOCKPILE 01-3 SAMPLE NO.: LP-01-25

SUMMARY OF TEST RESULTS			QA ID
TEST STANDARD: (CIRCLE ONE)	ASTM D 698 A, B, C ASTM D 1557 A, B, C ASTM D 4718		TBD/ DLE
VISUAL DESCRIPTION:	BROWN TILL		TBD
OPTIMUM MOISTURE CONTENT (%):	14.9	14.3	CA
MAXIMUM DRY UNIT WEIGHT (pcf):	117.3	118.9	CA



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FLUOR FERNALD

FIELD LABORATORY COMPACTION TEST

(ASTM D 1557 METHOD B)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO PROJECT NO.: GQ1341 TASK NO.: 04.1

DESCRIPTION: PHASE III DATE: ____ day OCT month 2001 year

MATERIAL TYPE: LOW PERM CLAY MATERIAL SOURCE: STOCKPILE 01-3 SAMPLE NO.: LP-01-25

THIS METHOD WILL BE USED IF THE MATERIAL RETAINED ON THE NO. 4-in. (4.75-mm) SIEVE IS GREATER THAN 20%, AND THE MATERIAL RETAINED ON THE NO. 3/8-in. (9.5-mm) SIEVE IS LESS THAN 20%.
ALL MATERIAL RETAINED ON THE NO. 3/8-in. (9.5-mm) SIEVE IS DISCARDED.
USE OVERSIZE CORRECTION IF MORE THAN 5% IS DISCARDED ACCORDING TO ASTM D 4718.
USE A 4-in. DIAMETER MOLD / 10-lb RAMMER / 18-in. DROP / 5 LAYERS / 25 BLOWS PER LAYER.

COMPACTION OF SOIL — QA ID: TBY

			13.74 lbs	13.92 lbs	13.99 lbs	13.91 lbs	
	WATER ADDED	(ml)	+4%	+6%	+8%	+10%	
A	WT. OF SOIL & MOLD	(grams)	6232.5	6314.1	6345.9	6309.6	
B	WT. OF MOLD	(grams)	4208.8	4208.8	4208.8	4208.8	
C	WT. OF SOIL = A − B	(grams)	2023.7	2105.3	2137.1	2100.8	
D	WET UNIT WT.(1) = C X 0.066	(pcf)	133.6	139.0	141.0	138.7	
E	DRY UNIT WT. = D / [1 + (K/100)]	(pcf)	123.4	126.3	125.9	122.1	

NOTE: IF CALIBRATED MOLD OF 1/30 FT^3 IS USED, THE WET DENSITY IS CALCULATED FROM THE WEIGHT OF SOIL, THE VOLUME OF THE MOLD AND THE CONVERSION FROM GRAMS TO POUNDS (I.E., CONVERSION FACTOR = (30 / 453.6) = 0.066). THE MOLD MUST BE CALIBRATED TO VERIFY A CAPACITY OF 1/30 ± 0.0005 FT^3 ON INTERVALS NOT TO EXCEED 1000 TIMES THAT THE MOLD IS FILLED.

MOISTURE CONTENT – ASTM D 2216 — QA ID: TBY

	TARE NO.		#30[redacted]	#301	#303	#215	
F	WT. OF TARE	(grams)	8.3	8.5	8.3	8.3	
G	WT. OF WET SOIL & TARE	(grams)	590.4	696.2	624.2	497.1	
H	WT. OF DRY SOIL & TARE	(grams)	546.3	633.7	558.0	438.6	
I	WT. OF WATER = G − H	(grams)	44.1	62.5	66.2	58.5	
J	WT. DRY SOIL = H − F	(grams)	538.0	625.2	549.7	430.3	
K	MOISTURE CONTENT = (I/J) X 100	(%)	8.2	10.0	12.0	13.6	

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FLUOR FERNALD

CORRECTION OF UNIT WEIGHT AND WATER CONTENT FOR SOILS CONTAINING OVERSIZE PARTICLES *(ASTM D 4718)*

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO **PROJECT NO.** GQ1341 **TASK NO.** 04.1

DESCRIPTION: Phase III **DATE:** 4 day Oct month 2001 year

MATERIAL TYPE: Low Perm Clay LPØ1-25 Mod

Weight of Total Sample	=	46726.7
Weight of Oversize Fraction	=	2050.7
Weight of Finer Fraction (- 3/8)	=	44676
Percentage of Oversize Fraction	= (P_C)	4.4
Percentage of Finer Fraction (- 3/8)	= (P_F)	95.6
Specific Gravity (Assumed)	= (G_M)	2.72

(W_F) =	Water Content - 3/8 , as decimal	=	0.11
(W_C) =	Water Content + 3/8 , as decimal	=	0.015
(δ_F) =	Dry Density of finer fraction	=	127.5
(δ_W) =	Unit Weight of Water	=	62.4

$$C_W=(W_F P_F)+(W_C P_C)$$

$C_w = 10.6$

$$C\delta_D=100\delta_F G_M \delta_W/(\delta_F P_C)+(G_M \delta_W P_F)$$

$C_{\delta D} = 128.9$

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FLUOR FERNALD

4940

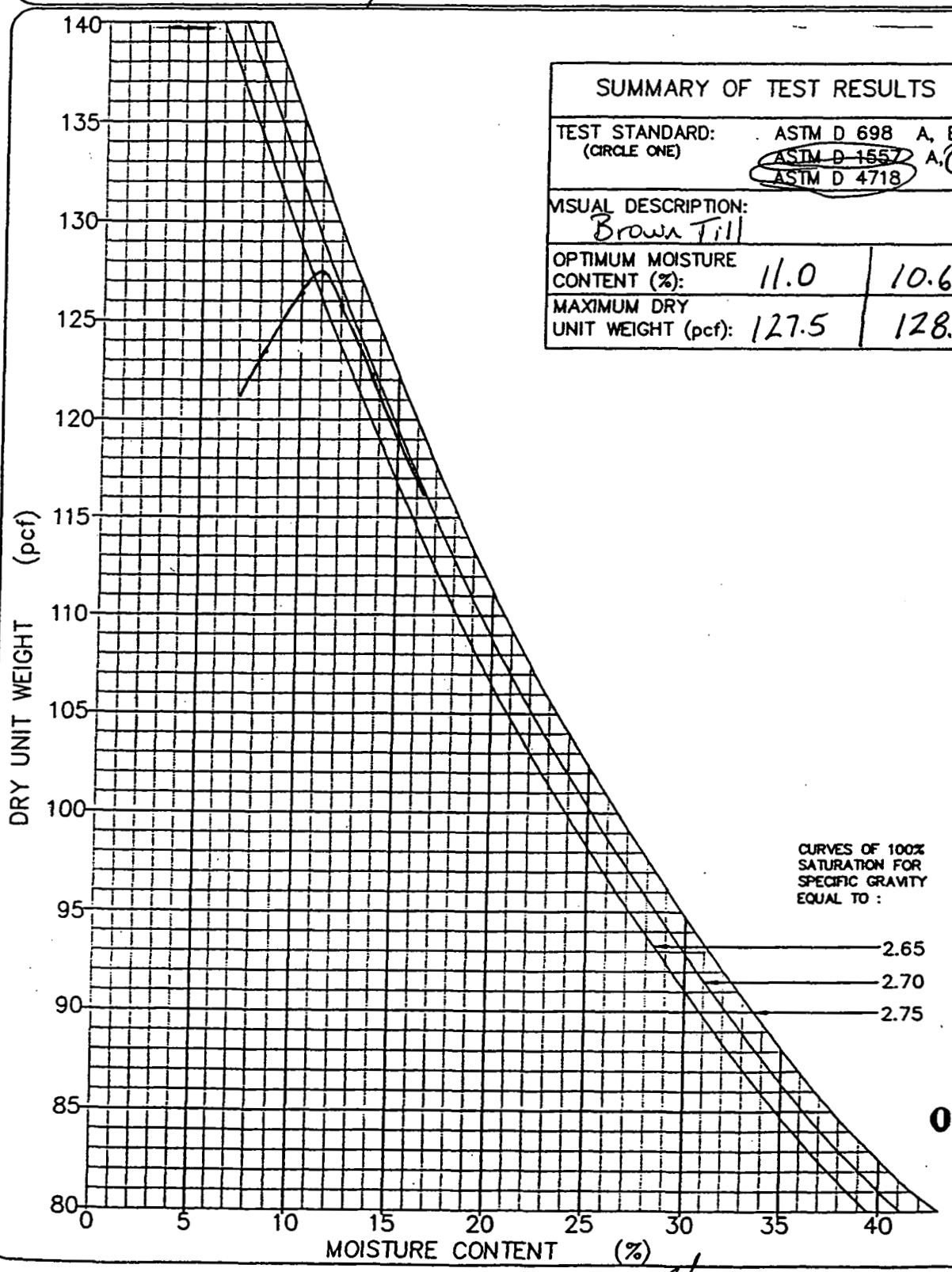
MOISTURE-DENSITY RELATIONSHIP

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO PROJECT NO.: GQ1341 TASK NO.: 04.1

DESCRIPTION: Phase III DATE: 4 day Oct month 2001 year

MATERIAL TYPE: Low Perm Clay MATERIAL SOURCE: STOCKPILE Ø1-3 SAMPLE NO.: LPØ1-25



SUMMARY OF TEST RESULTS			QA ID
TEST STANDARD: (CIRCLE ONE)	ASTM D 698 A, B, C ~~ASTM D 1557~~ A, (B) C ASTM D 4718		CA
VISUAL DESCRIPTION: Brown Till			CA
OPTIMUM MOISTURE CONTENT (%):	11.0	10.6	CA
MAXIMUM DRY UNIT WEIGHT (pcf):	127.5	128.9	CA

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FLUOR FERNALD

FIELD LABORATORY COMPACTION TEST

(ASTM D 698 METHOD B)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO

PROJECT NO. 6Q1341 TASK NO.: 04.1

DESCRIPTION: Phase III

DATE: 05 day Oct month 2001 year

MATERIAL TYPE: Low Perm Clay MATERIAL SOURCE: Stockpile 01-4 SAMPLE NO.: LP-01-26

THIS METHOD WILL BE USED IF THE MATERIAL RETAINED ON THE NO. 3/4-in. (19-mm) SIEVE IS LESS THAN 30%, IF THE MATERIAL RETAINED ON THE NO. 4 (4.75-mm) SIEVE IS GREATER THAN 20%, AND IF THE MATERIAL RETAINED ON THE NO. 3/8-in. (9.5-mm) SIEVE IS LESS THAN 20%.
ALL MATERIAL RETAINED ON THE NO. 3/8-in. (9.5-mm) SIEVE IS DISCARDED.
USE OVERSIZE CORRECTION IF MORE THAN 5% IS DISCARDED ACCORDING TO ASTM D 4718.
USE A 4-in. DIAMETER MOLD / 5.5-lb RAMMER / 12-in. DROP / 3 LAYERS / 25 BLOWS PER LAYER.

1362

COMPACTION OF SOIL

QA ID: DLE

			13.65	13.13	13.32	13.50	
	WATER ADDED	(ml)	12%	4%	6%	8%	10%
A	WT. OF SOIL & MOLD	(grams)	6191.6	5955.8	6041.9	6123.6	6178.0
B	WT. OF MOLD	(grams)	4208.8	4208.8	4208.8	4208.8	4208.8
C	WT. OF SOIL = A − B	(grams)	1982.8	1747.0	1833.1	1914.8	1969.2
D	WET UNIT WT.(1) = C X 0.066	(pcf)	130.9	115.3	121.0	126.4	130.0
E	DRY UNIT WT. = D / [1 + (K/100)]	(pcf)	111.5	105.4	108.6	112.0	113.7

NOTE: IF CALIBRATED MOLD OF 1/30 FT^3 IS USED, THE WET DENSITY IS CALCULATED FROM THE WEIGHT OF SOIL, THE VOLUME OF THE MOLD AND THE CONVERSION FROM GRAMS TO POUNDS (I.E., CONVERSION FACTOR = (30 / 453.6) = 0.066). THE MOLD MUST BE CALIBRATED TO VERIFY A CAPACITY OF 1/30 ± 0.0005 FT^3 ON INTERVALS NOT TO EXCEED 1000 TIMES THAT THE MOLD IS FILLED.

MOISTURE CONTENT – ASTM D 2216

QA ID: DLE

	TARE NO.		#104-A	#24	#102	#1	#21
F	WT. OF TARE	(grams)	8.3	8.3	8.2	8.3	8.4
G	WT. OF WET SOIL & TARE	(grams)	547.8	508.0	502.7	504.2	528.9
H	WT. OF DRY SOIL & TARE	(grams)	467.8	465.2	452.0	447.7	463.7
I	WT. OF WATER = G − H	(grams)	80.0	42.8	50.7	56.5	65.2
J	WT. DRY SOIL = H − F	(grams)	459.5	456.9	443.8	439.4	455.3
K	MOISTURE CONTENT = (I/J) X 100	(%)	17.4	9.4	11.4	12.9	14.3

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FLUOR FERNALD

4940

MOISTURE–DENSITY RELATIONSHIP

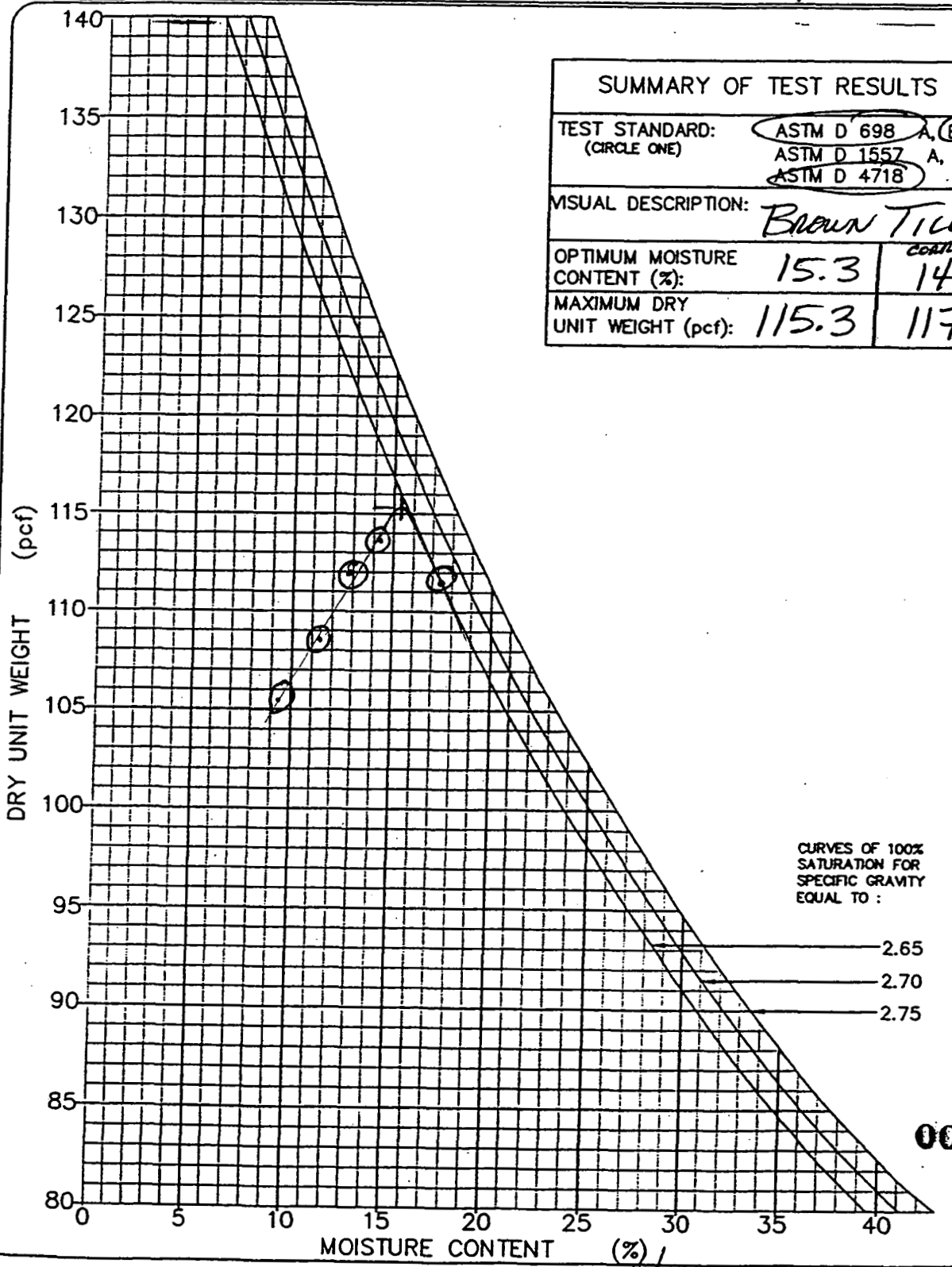
PROJECT: ON–SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO PROJECT NO.: 6Q1341 TASK NO.: 04.1

DESCRIPTION: PHASE III DATE: 08 day OCT month 2001 year

MATERIAL TYPE: LOW PERM CLAY MATERIAL SOURCE: STOCKPILE 01-4 SAMPLE NO.: LP-01-26

SUMMARY OF TEST RESULTS			QA ID
TEST STANDARD: (CIRCLE ONE)	ASTM D 698 A, B, C ASTM D 1557 A, B, C ASTM D 4718		TBN DLE
VISUAL DESCRIPTION:	BROWN TILL		TBN
OPTIMUM MOISTURE CONTENT (%):	15.3	CORRECTED 14.6	TBN
MAXIMUM DRY UNIT WEIGHT (pcf):	115.3	117.1	TBN



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FLUOR FERNALD

CORRECTION OF UNIT WEIGHT AND WATER CONTENT FOR SOILS CONTAINING OVERSIZE PARTICLES *(ASTM D 4718)*

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO **PROJECT NO.** GQ134 **TASK NO.** 04.1

DESCRIPTION: PHASE III **DATE:** 08 **day** OCT **month** 2001 **year**

MATERIAL TYPE: Low Perm CLAY LP-01-26 STD

Weight of Total Sample	=	24,907.1 g
Weight of Oversize Fraction	=	1,180.7 g
Weight of Finer Fraction (- 3/8)	=	23,726.4 g
Percentage of Oversize Fraction	= (P_C)	4.7
Percentage of Finer Fraction (- 3/8)	= (P_F)	95.3
Specific Gravity (Assumed)	= (G_M)	2.72

(W_F) =	Water Content - 3/8 , as decimal	=	0.153
(W_C) =	Water Content + 3/8 , as decimal	=	0.015
(δ_F) =	Dry Density of finer fraction	=	115.3
(δ_W) =	Unit Weight of Water	=	62.4

$$C_W=(W_F P_F)+(W_C P_C) = \boxed{14.6\ \%M}$$

$$C\delta_D=100\delta_F G_M \delta_W/(\delta_F P_C)+(G_M \delta_W P_F) = \boxed{117.1\ pcf}$$

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FLUOR FERNALD

FIELD LABORATORY COMPACTION TEST

(ASTM D 698 METHOD B)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO

DESCRIPTION: Phase III

PROJECT NO. 6Q134 TASK NO.: 04.1

DATE: 04 day OCT month 2001 year

MATERIAL TYPE: Low Perm Clay

MATERIAL SOURCE: STOCKPILE 01-4

SAMPLE NO.: LP-01-27

THIS METHOD WILL BE USED IF THE MATERIAL RETAINED ON THE NO. 3/4-in. (19-mm) SIEVE IS LESS THAN 30%, IF THE MATERIAL RETAINED ON THE NO. 4 (4.75-mm) SIEVE IS GREATER THAN 20%, AND IF THE MATERIAL RETAINED ON THE NO. 3/8-in. (9.5-mm) SIEVE IS LESS THAN 20%.
ALL MATERIAL RETAINED ON THE NO. 3/8-in. (9.5-mm) SIEVE IS DISCARDED.
USE OVERSIZE CORRECTION IF MORE THAN 5% IS DISCARDED ACCORDING TO ASTM D 4718.
USE A 4-in. DIAMETER MOLD / 5.5-lb RAMMER / 12-in. DROP / 3 LAYERS / 25 BLOWS PER LAYER.

COMPACTION OF SOIL

QA ID: YRB

			13.55 lbs	13.80	13.86	13.39	
	WATER ADDED	(ml)	+6%	+8%	+10%	+4%	
A	WT. OF SOIL & MOLD	(grams)	6146.3	6259.7	6286.9	6073.7	
B	WT. OF MOLD	(grams)	4208.8	4208.8	4208.8	4208.8	
C	WT. OF SOIL = A − B	(grams)	1937.5	2050.9	2078.1	1864.9	
D	WET UNIT WT.(1) = C X 0.066	(pcf)	127.9	135.4	137.2	123.1	
E	DRY UNIT WT. = D / [1 + (K/100)]	(pcf)	116.3	120.0	120.8	114.4	

NOTE: IF CALIBRATED MOLD OF 1/30 FT^3 IS USED, THE WET DENSITY IS CALCULATED FROM THE WEIGHT OF SOIL, THE VOLUME OF THE MOLD AND THE CONVERSION FROM GRAMS TO POUNDS (I.E., CONVERSION FACTOR = (30 / 453.6) = 0.066). THE MOLD MUST BE CALIBRATED TO VERIFY A CAPACITY OF 1/30 ± 0.0005 FT^3 ON INTERVALS NOT TO EXCEED 1000 TIMES THAT THE MOLD IS FILLED.

MOISTURE CONTENT – ASTM D 2216

QA ID: TBY

	TARE NO.		#212	#216	#101	#228	
F	WT. OF TARE	(grams)	8.3	8.4	8.3	8.0	
G	WT. OF WET SOIL & TARE	(grams)	553.5	574.2	624.3	579.1	
H	WT. OF DRY SOIL & TARE	(grams)	504.1	514.0	550.9	538.9	
I	WT. OF WATER = G − H	(grams)	49.4	60.2	73.4	40.2	
J	WT. DRY SOIL = H − F	(grams)	495.8	505.6	542.6	530.9	
K	MOISTURE CONTENT = (I/J) X 100	(%)	10.0	11.9	13.5	7.6	

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FLUOR FERNALD

CORRECTION OF UNIT WEIGHT AND WATER CONTENT FOR SOILS CONTAINING OVERSIZE PARTICLES

(ASTM D 4718)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO PROJECT NO. 6Q134 TASK NO. 041

DESCRIPTION: Phase III DATE: 05 day Oct month 2001 year

MATERIAL TYPE: Low Perm Clay LP-01-27 (STO)

Weight of Total Sample	=	38,339.1 g
Weight of Oversize Fraction	=	970.0 g
Weight of Finer Fraction (- 3/8)	=	37,369.1
Percentage of Oversize Fraction	= (P_C)	2.5
Percentage of Finer Fraction (- 3/8)	= (P_F)	97.5
Specific Gravity (Assumed)	= (G_M)	2.72

(W_F)	=	Water Content - 3/8 , as decimal	=	0.125
(W_C)	=	Water Content + 3/8 , as decimal	=	0.015
(δ_F)	=	Dry Density of finer fraction	=	122.7
(δ_W)	=	Unit Weight of Water	=	62.4

$$C_W=(W_F P_F)+(W_C P_C) = \boxed{12.2\% M}$$

$$C\delta_D=100\delta_F G_M \delta_W/(\delta_F P_C)+(G_M \delta_W P_F) = \boxed{123.6 \text{ pcf}}$$

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FLUOR FERNALD 40

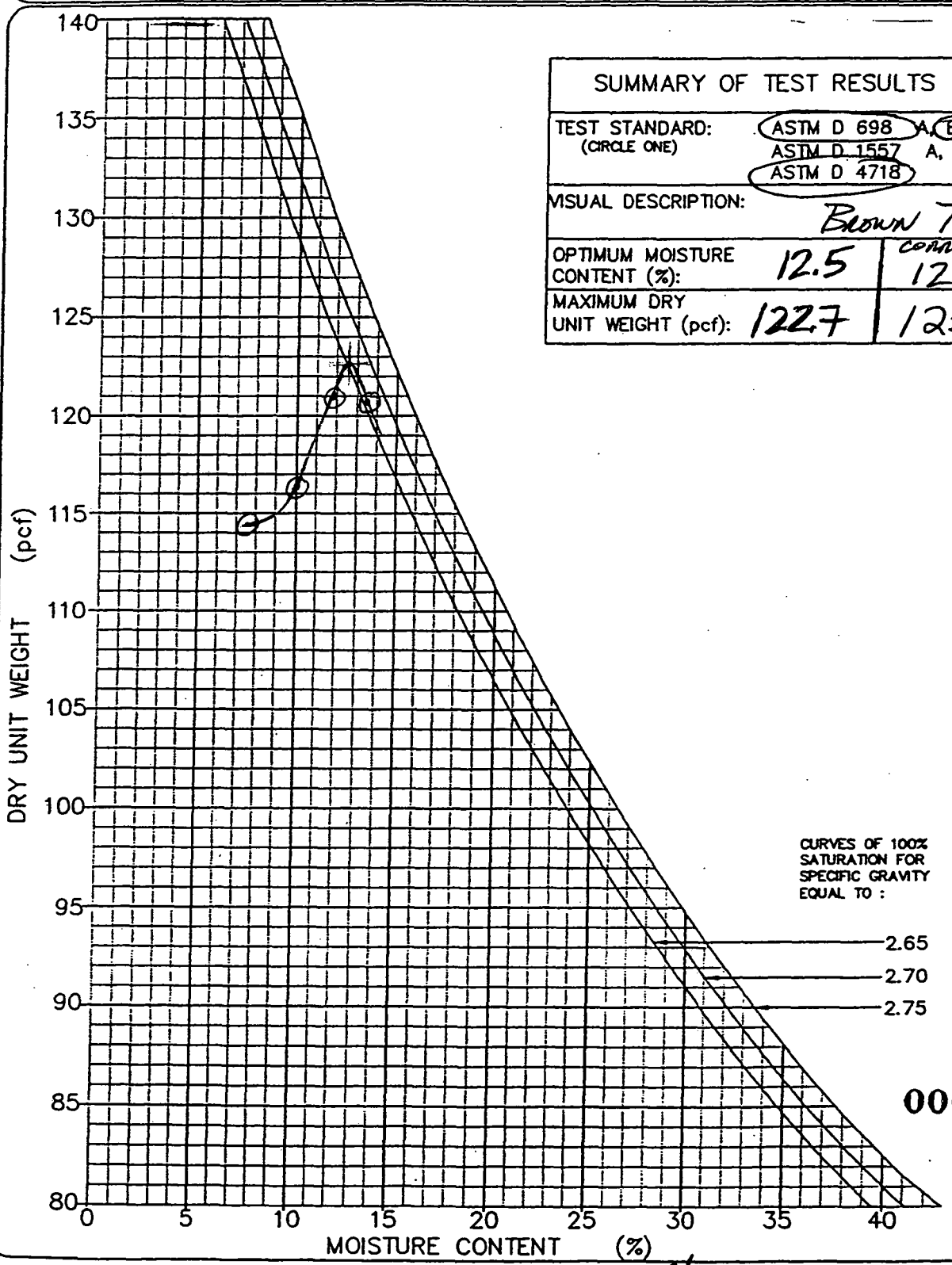
MOISTURE-DENSITY RELATIONSHIP

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO PROJECT NO.: GQ1341 TASK NO.: 04.1

DESCRIPTION: PHASE III DATE: 05 day OCT month 2001 year

MATERIAL TYPE: Low Plasm CLAY MATERIAL SOURCE: STOCKPILE 01-4 SAMPLE NO.: LP 01-27



SUMMARY OF TEST RESULTS			QA ID
TEST STANDARD: (CIRCLE ONE)	ASTM D 698 A, B, C ASTM D 1557 A, B, C ASTM D 4718		TBC
VISUAL DESCRIPTION:	BROWN TILL		TBC
OPTIMUM MOISTURE CONTENT (%):	12.5	CORRECTED 12.2	TBC
MAXIMUM DRY UNIT WEIGHT (pcf):	122.7	123.6	TBC

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GEOSYNTEC CONSULTANTS

FLUOR FERNALD

FIELD LABORATORY COMPACTION TEST

(ASTM D 1557 METHOD B)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO

PROJECT NO.: GQ134 TASK NO.: 04.1

DESCRIPTION: PHASE III

DATE: 04 day OCT month 2001 year

MATERIAL TYPE: LOW PERM CLAY MATERIAL SOURCE: STOCKPILE 01-4 SAMPLE NO.: LP-01-27

THIS METHOD WILL BE USED IF THE MATERIAL RETAINED ON THE NO. 4-in. (4.75-mm) SIEVE IS GREATER THAN 20%, AND THE MATERIAL RETAINED ON THE NO. 3/8-in. (9.5-mm) SIEVE IS LESS THAN 20%.
ALL MATERIAL RETAINED ON THE NO. 3/8-in. (9.5-mm) SIEVE IS DISCARDED.
USE OVERSIZE CORRECTION IF MORE THAN 5% IS DISCARDED ACCORDING TO ASTM D 4718.
USE A 4-in. DIAMETER MOLD / 10-lb RAMMER / 18-in. DROP / 5 LAYERS / 25 BLOWS PER LAYER.

COMPACTION OF SOIL — QA ID: TBK

			13.97 lbs	14.10 lbs	14.01 lbs	13.93	
	WATER ADDED	(ml)	+4%	+6%	8%	2%	
A	WT. OF SOIL & MOLD	(grams)	6336.8	6395.8	6354.9	6227.9	
B	WT. OF MOLD	(grams)	4208.8	4208.8	4208.8	4208.8	
C	WT. OF SOIL = A − B	(grams)	2128.0	2187.0	2146.1	2019.1	
D	WET UNIT WT.(1) = C X 0.066	(pcf)	140.4	144.3	141.6	133.3	
E	DRY UNIT WT. = D / [1 + (K/100)]	(pcf)	129.6	131.0	126.0	125.6	

NOTE: IF CALIBRATED MOLD OF 1/30 FT^3 IS USED, THE WET DENSITY IS CALCULATED FROM THE WEIGHT OF SOIL, THE VOLUME OF THE MOLD AND THE CONVERSION FROM GRAMS TO POUNDS (I.E., CONVERSION FACTOR = (30 / 453.6) = 0.066). THE MOLD MUST BE CALIBRATED TO VERIFY A CAPACITY OF 1/30 ± 0.0005 FT^3 ON INTERVALS NOT TO EXCEED 1000 TIMES THAT THE MOLD IS FILLED.

MOISTURE CONTENT — ASTM D 2216 — QA ID: TBK

	TARE NO.		#27	#11	#104-A	A	
F	WT. OF TARE	(grams)	8.2	8.1	8.3	7.9	
G	WT. OF WET SOIL & TARE	(grams)	670.0	652.7	586.8	639.4	
H	WT. OF DRY SOIL & TARE	(grams)	618.8	593.2	523.1	603.0	
I	WT. OF WATER = G − H	(grams)	51.2	59.5	63.7	36.4	
J	WT. DRY SOIL = H − F	(grams)	610.6	585.1	514.8	595.1	
K	MOISTURE CONTENT = (I/J) X 100	(%)	8.4	10.2	12.4	6.1	

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FLUOR FERNALD

CORRECTION OF UNIT WEIGHT AND WATER CONTENT FOR SOILS CONTAINING OVERSIZE PARTICLES *(ASTM D 4718)*

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO **PROJECT NO.** 6Q134 **TASK NO.** 04.1

DESCRIPTION: PHASE III **DATE:** 05 day OCT month 2001 year

MATERIAL TYPE: Low Plum CLAY LP-01-27 (MOD)

Weight of Total Sample	=	38,339.1 g
Weight of Oversize Fraction	=	970.0 g
Weight of Finer Fraction (- 3/8)	=	37,369.1 g
Percentage of Oversize Fraction	= (P_C)	2.5
Percentage of Finer Fraction (- 3/8)	= (P_F)	97.5
Specific Gravity (Assumed)	= (G_M)	2.72

(W_F) =	Water Content - 3/8 , as decimal	=	0.098
(W_C) =	Water Content + 3/8 , as decimal	=	0.015
(δ_F) =	Dry Density of finer fraction	=	131.9
(δ_W) =	Unit Weight of Water	=	62.4

$$C_W=(W_F P_F)+(W_C P_C) = \boxed{9.6\%M}$$

$$C\delta_D=100\delta_F G_M \delta_W/(\delta_F P_C)+(G_M \delta_W P_F) = \boxed{132.6\ pcf}$$

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FLUOR FERNALD

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MOISTURE-DENSITY RELATIONSHIP

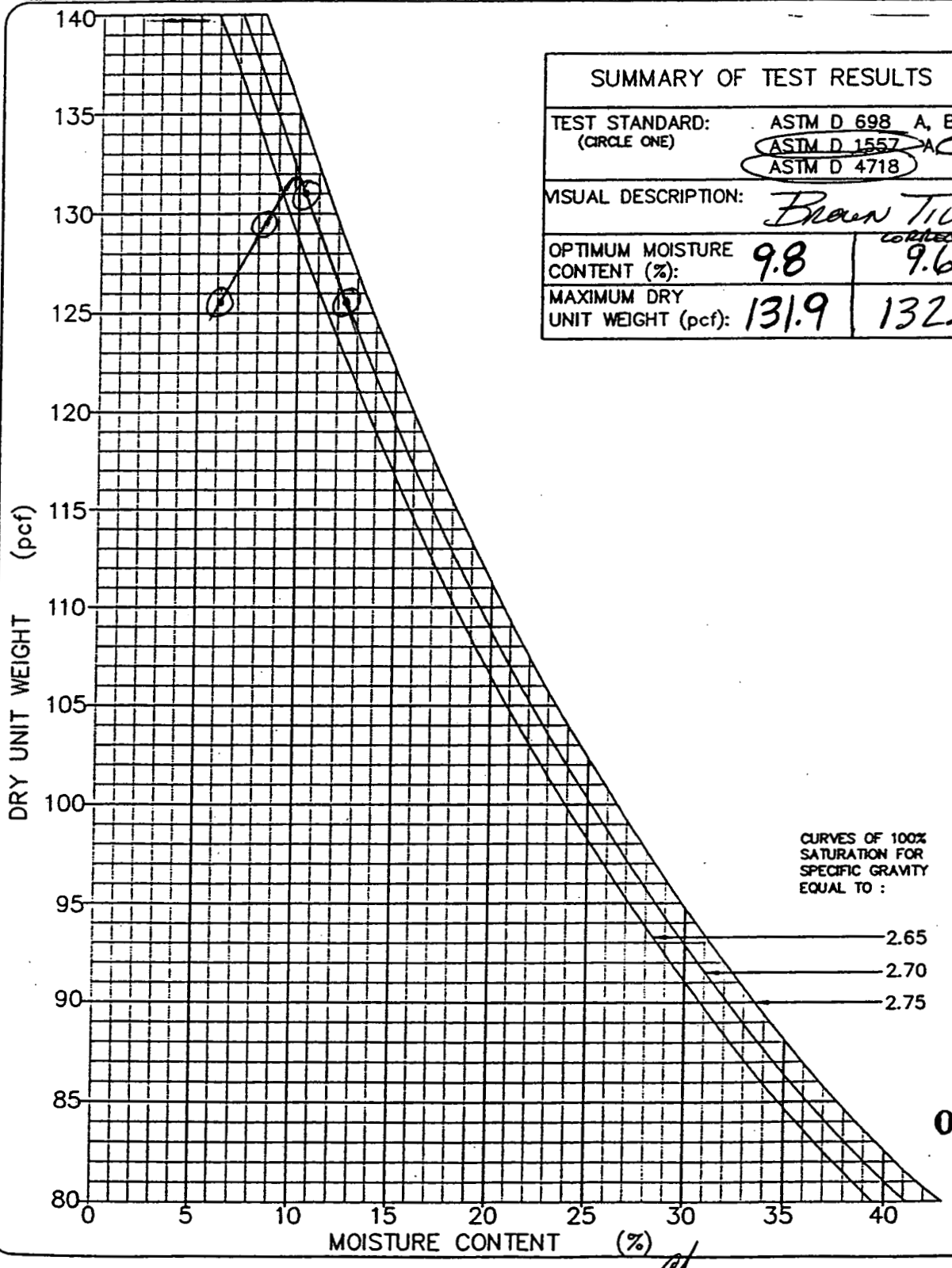
PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO PROJECT NO.: GQ134 TASK NO.: 04.1

DESCRIPTION: PHASE III DATE: 05 day OCT month 2001 year

MATERIAL TYPE: LOW PERM CLAY MATERIAL SOURCE: STOCKPILE 01-4 SAMPLE NO.: LP-01-27

SUMMARY OF TEST RESULTS			QA ID
TEST STANDARD: (CIRCLE ONE)	ASTM D 698 A, B, C ASTM D 1557 A, B, C ASTM D 4718		TBV
VISUAL DESCRIPTION:	BROWN TILL		TBV
OPTIMUM MOISTURE CONTENT (%):	9.8	CORRECTED 9.6	TBV
MAXIMUM DRY UNIT WEIGHT (pcf):	131.9	132.6	TBV



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GEOSYNTEC CONSULTANTS

FLUOR FERNALD

FIELD LABORATORY COMPACTION TEST

(ASTM D 698 METHOD B)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO

PROJECT NO. 6Q1341 TASK NO.: 04.1

DESCRIPTION: Phase III

DATE: 04 day OCT month 2001 year

MATERIAL TYPE: Low Perm Clay MATERIAL SOURCE: STOCKPILE 01-4 SAMPLE NO.: LP-01-28

THIS METHOD WILL BE USED IF THE MATERIAL RETAINED ON THE NO. 3/4-in. (19-mm) SIEVE IS LESS THAN 30%, IF THE MATERIAL RETAINED ON THE NO. 4 (4.75-mm) SIEVE IS GREATER THAN 20%, AND IF THE MATERIAL RETAINED ON THE NO. 3/8-in. (9.5-mm) SIEVE IS LESS THAN 20%.
ALL MATERIAL RETAINED ON THE NO. 3/8-in. (9.5-mm) SIEVE IS DISCARDED.
USE OVERSIZE CORRECTION IF MORE THAN 5% IS DISCARDED ACCORDING TO ASTM D 4718.
USE A 4-in. DIAMETER MOLD / 5.5-lb RAMMER / 12-in. DROP / 3 LAYERS / 25 BLOWS PER LAYER.

COMPACTION OF SOIL

QA ID: DLB

				13.69	13.82	13.99	13.88
	WATER ADDED	(ml)		6%	8%	10%	12%
A	WT. OF SOIL & MOLD	(grams)		6209.8	6268.8	6345.9	6296.0
B	WT. OF MOLD	(grams)		4273.5	4273.5	4273.5	4273.5
C	WT. OF SOIL = A − B	(grams)		1936.3	1995.3	2072.4	2022.5
D	WET UNIT WT.(1) = C X 0.066	(pcf)		127.8	131.7	136.8	133.5
E	DRY UNIT WT. = D / [1 + (K/100)]	(pcf)		116.9	118.8	120.5	115.1

NOTE: IF CALIBRATED MOLD OF 1/30 FT^3 IS USED, THE WET DENSITY IS CALCULATED FROM THE WEIGHT OF SOIL, THE VOLUME OF THE MOLD AND THE CONVERSION FROM GRAMS TO POUNDS (I.E., CONVERSION FACTOR = (30 / 453.6) = 0.066). THE MOLD MUST BE CALIBRATED TO VERIFY A CAPACITY OF 1/30 ± 0.0005 FT^3 ON INTERVALS NOT TO EXCEED 1000 TIMES THAT THE MOLD IS FILLED.

MOISTURE CONTENT – ASTM D 2216

QA ID: _____

	TARE NO.			#227	#25	#225	#28
F	WT. OF TARE	(grams)		8.3	8.3	8.3	8.3
G	WT. OF WET SOIL & TARE	(grams)		489.6	504.2	501.3	516.2
H	WT. OF DRY SOIL & TARE	(grams)		448.4	455.7	442.8	446.2
I	WT. OF WATER = G − H	(grams)		41.2	48.5	58.5	70.0
J	WT. DRY SOIL = H − F	(grams)		440.1	447.4	434.5	437.9
K	MOISTURE CONTENT = (I/J) X 100	(%)		9.4	10.8	13.5	16.0

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GeoSyntec Consultants

FLUOR FERNALD

CORRECTION OF UNIT WEIGHT AND WATER CONTENT FOR SOILS CONTAINING OVERSIZE PARTICLES *(ASTM D 4718)*

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO PROJECT NO. 6R134 TASK NO. 04.1

DESCRIPTION: PHASE III DATE: 05 day OCT month 2001 year

MATERIAL TYPE: LOW PERM CLAY (LP-01-28)

Weight of Total Sample	=	26924.7 g
Weight of Oversize Fraction	=	738.4 g
Weight of Finer Fraction (- 3/8)	=	26186.3
Percentage of Oversize Fraction	= (P_C)	2.742463
Percentage of Finer Fraction (- 3/8)	= (P_F)	97.25754
Specific Gravity (Assumed)	= (G_M)	2.72

(W_F) =	Water Content - -3/8 , as decimal	=	0.129
(W_C) =	Water Content + 3/8 , as decimal	=	0.015
(δ_F) =	Dry Density of finer fraction	=	121.5
(δ_W) =	Unit Weight of Water	=	62.4

$$C_W=(W_F P_F)+(W_C P_C) = 12.6$$

$$C\delta_D=100\delta_F G_M \delta_W/(\delta_F P_C)+(G_M \delta_W P_F) = 122.5$$

GEOSYNTEC CONSULTANTS

FLUOR FERNALD 49 40

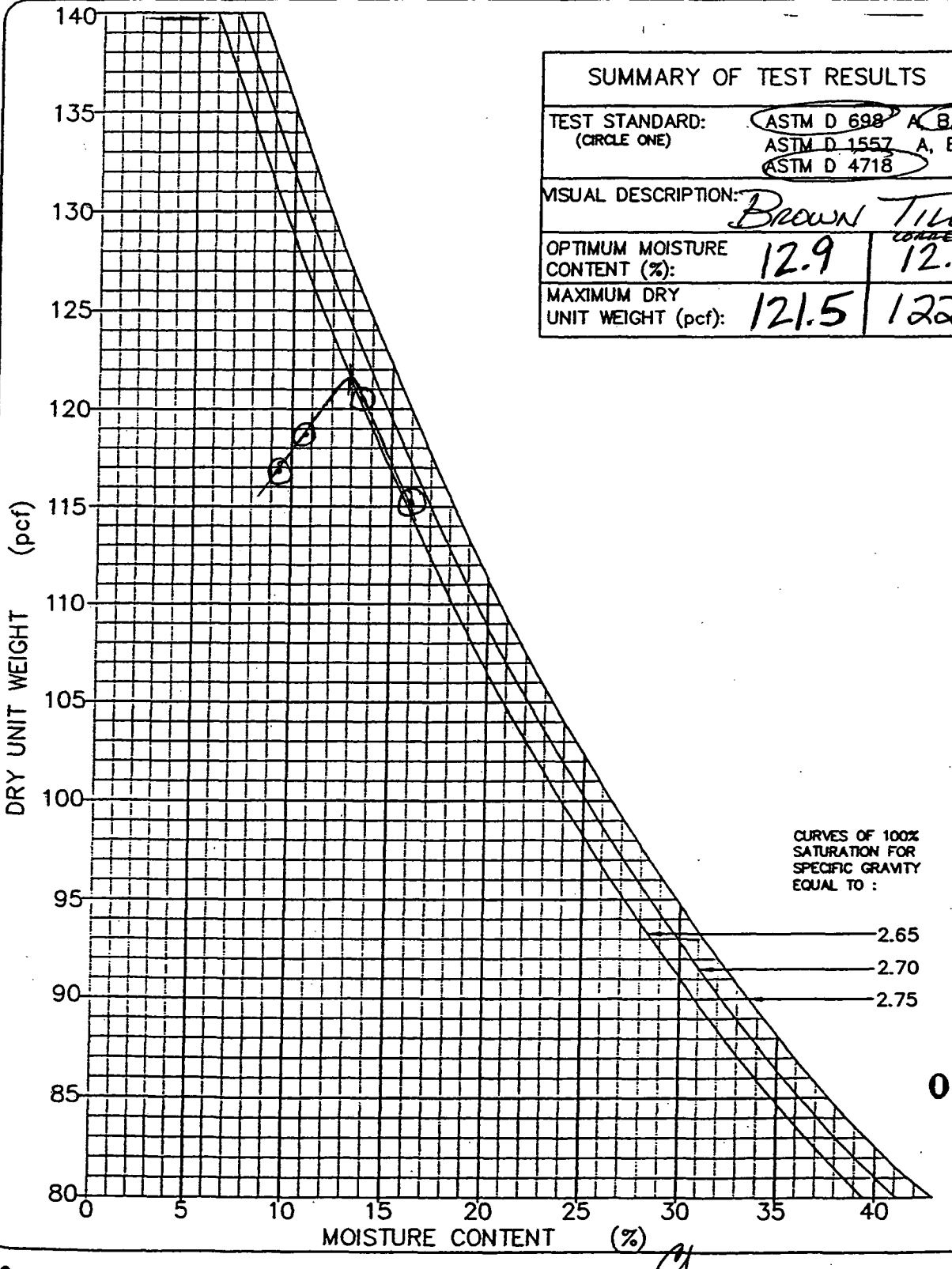
MOISTURE-DENSITY RELATIONSHIP

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO PROJECT NO.: GQ134 TASK NO.: 04.1

DESCRIPTION: PHASE III DATE: 05 day OCT month 2001 year

MATERIAL TYPE: LOW PERM CLAY MATERIAL SOURCE: STOCKPILE 01-4 SAMPLE NO.: LP-01-28



SUMMARY OF TEST RESULTS			QA ID
TEST STANDARD: (CIRCLE ONE)	ASTM D 698 A, B, C ASTM D 1557 A, B, C ASTM D 4718		TBU PLE
VISUAL DESCRIPTION:	BROWN TILL		TBU
OPTIMUM MOISTURE CONTENT (%):	12.9	CORRECTED 12.6	TBU
MAXIMUM DRY UNIT WEIGHT (pcf):	121.5	122.5	TBU

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GEOSYNTEC CONSULTANTS

FLUOR FERNALD

FIELD LABORATORY COMPACTION TEST

(ASTM D 698 METHOD B)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO

PROJECT NO. 6Q1341 TASK NO.: 04.1

DESCRIPTION: Phase III

DATE: 06 day OCT month 2001 year

MATERIAL TYPE: Low Perm Clay MATERIAL SOURCE: STOCKPILE 01-5 SAMPLE NO.: LP-01-29

THIS METHOD WILL BE USED IF THE MATERIAL RETAINED ON THE NO. 3/4-in. (19-mm) SIEVE IS LESS THAN 30%, IF THE MATERIAL RETAINED ON THE NO. 4 (4.75-mm) SIEVE IS GREATER THAN 20%, AND IF THE MATERIAL RETAINED ON THE NO. 3/8-in. (9.5-mm) SIEVE IS LESS THAN 20%.
ALL MATERIAL RETAINED ON THE NO. 3/8-in. (9.5-mm) SIEVE IS DISCARDED.
USE OVERSIZE CORRECTION IF MORE THAN 5% IS DISCARDED ACCORDING TO ASTM D 4718.
USE A 4-in. DIAMETER MOLD / 5.5-lb RAMMER / 12-in. DROP / 3 LAYERS / 25 BLOWS PER LAYER.

COMPACTION OF SOIL

QA ID: KS/DLF

			13.12	13.30	13.55	13.72	
	WATER ADDED	(ml)	4%	6%	8%	10%	
A	WT. OF SOIL & MOLD	(grams)	5951.2	6032.9	6146.3	6223.4	
B	WT. OF MOLD	(grams)	4208.8	4208.8	4208.8	4208.8	
C	WT. OF SOIL = A − B	(grams)	1742.4	1824.1	1937.5	2014.6	
D	WET UNIT WT.(1) = C X 0.066	(pcf)	115.0	120.4	127.9	133.0	
E	DRY UNIT WT. = D / [1 + (K/100)]	(pcf)	105.2	108.5	112.4	114.5	

NOTE: IF CALIBRATED MOLD OF 1/30 FT^3 IS USED, THE WET DENSITY IS CALCULATED FROM THE WEIGHT OF SOIL, THE VOLUME OF THE MOLD AND THE CONVERSION FROM GRAMS TO POUNDS (I.E., CONVERSION FACTOR = (30 / 453.6) = 0.066). THE MOLD MUST BE CALIBRATED TO VERIFY A CAPACITY OF 1/30 ± 0.0005 FT^3 ON INTERVALS NOT TO EXCEED 1000 TIMES THAT THE MOLD IS FILLED.

MOISTURE CONTENT — ASTM D 2216

QA ID: KS/DLF

	TARE NO.		21	1	230	229	
F	WT. OF TARE	(grams)	8.4	8.3	8.1	8.1	
G	WT. OF WET SOIL & TARE	(grams)	340.8	353.9	358.3	343.4	
H	WT. OF DRY SOIL & TARE	(grams)	312.5	319.9	315.8	296.8	
I	WT. OF WATER = G − H	(grams)	28.3	34.0	42.5	46.6	
J	WT. DRY SOIL = H − F	(grams)	304.1	311.6	307.7	288.7	
K	MOISTURE CONTENT = (I/J) X 100	(%)	9.3	10.9	13.8	16.1	

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FLUOR FERNALD

CORRECTION OF UNIT WEIGHT AND WATER CONTENT FOR SOILS CONTAINING OVERSIZE PARTICLES *(ASTM D 4718)*

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO **PROJECT NO.** 6Q134 **TASK NO.** 04.1

DESCRIPTION: PHASE III **DATE:** 08 **day** OCT **month** 2001 **year**

MATERIAL TYPE: Low Perm CLAY (LP-01-29) STD

Weight of Total Sample	=	47,206.6 g
Weight of Oversize Fraction	=	1,561.5 g
Weight of Finer Fraction (- 3/8)	=	45,645.1 g
Percentage of Oversize Fraction	= (P_C)	3.3
Percentage of Finer Fraction (- 3/8)	= (P_F)	96.7
Specific Gravity (Assumed)	= (G_M)	2.72

(W_F) =	Water Content - 3/8 , as decimal	=	0.157
(W_C) =	Water Content + 3/8 , as decimal	=	0.015
(δ_F) =	Dry Density of finer fraction	=	115.2
(δ_W) =	Unit Weight of Water	=	62.4

$$C_W=(W_F P_F)+(W_C P_C) = \boxed{15.2\% M}$$

$$C\delta_D=100\delta_F G_M \delta_W/(\delta_F P_C)+(G_M \delta_W P_F) = \boxed{116.4 \text{ pcf}}$$

GEOSYNTEC CONSULTANTS

FLUOR FERNALD

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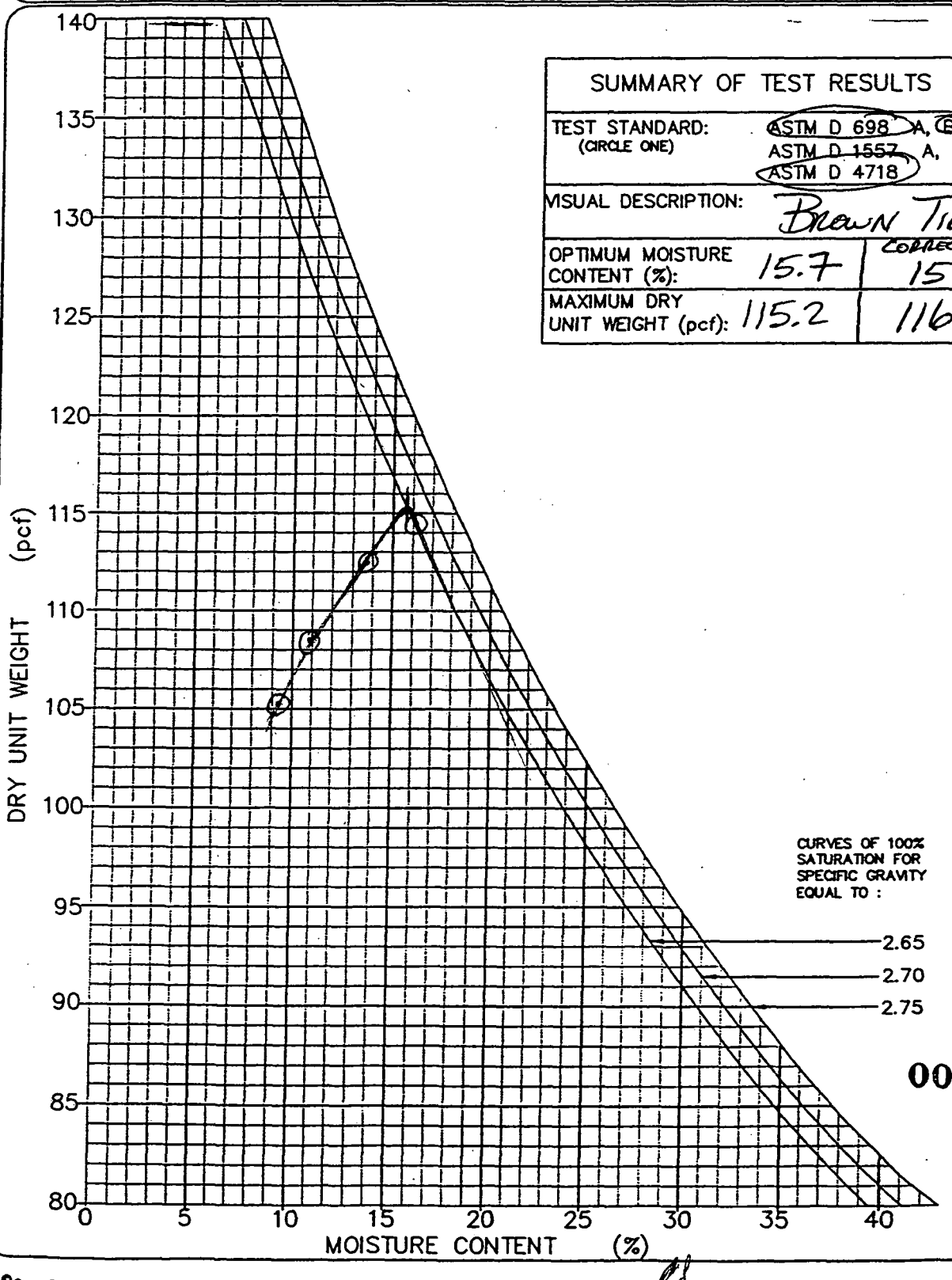
MOISTURE–DENSITY RELATIONSHIP

PROJECT: ON–SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO PROJECT NO.: 6Q134 TASK NO.: 041

DESCRIPTION: PHASE III DATE: 08 day OCT month 2001 year

MATERIAL TYPE: LOW PERM CLAY MATERIAL SOURCE: STOCKPILE 01-5 SAMPLE NO.: LP-01-29



SUMMARY OF TEST RESULTS			QA ID
TEST STANDARD: (CIRCLE ONE)	ASTM D 698 A, B, C ASTM D 1557 A, B, C ASTM D 4718		TBW/KS
VISUAL DESCRIPTION:	BROWN TILL		TBW
OPTIMUM MOISTURE CONTENT (%):	15.7	CORRECTED 15.2	TBW
MAXIMUM DRY UNIT WEIGHT (pcf):	115.2	116.4	TBW

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GEOSYNTEC CONSULTANTS

FLUOR FERNALD

FIELD LABORATORY COMPACTION TEST

(ASTM D 1557 METHOD B)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO

PROJECT NO.: GQ1341 TASK NO.: 04.1

DESCRIPTION: PHASE III

DATE: 05 day OCT month 2001 year

MATERIAL TYPE: LOW PERM CLAY MATERIAL SOURCE: STOCKPILE 01-5 SAMPLE NO.: LP-01-29

THIS METHOD WILL BE USED IF THE MATERIAL RETAINED ON THE NO. 4-in. (4.75-mm) SIEVE IS GREATER THAN 20%, AND THE MATERIAL RETAINED ON THE NO. 3/8-in. (9.5-mm) SIEVE IS LESS THAN 20%.
ALL MATERIAL RETAINED ON THE NO. 3/8-in. (9.5-mm) SIEVE IS DISCARDED.
USE OVERSIZE CORRECTION IF MORE THAN 5% IS DISCARDED ACCORDING TO ASTM D 4718.
USE A 4-in. DIAMETER MOLD / 10-lb RAMMER / 18-in. DROP / 5 LAYERS / 25 BLOWS PER LAYER.

COMPACTION OF SOIL

QA ID: TBC

			13.92 lbs	14.06	13.95 lbs	13.76 lbs	
	WATER ADDED	(ml)	4%	6%	8%	2%	
A	WT. OF SOIL & MOLD	(grams)	6314.1	6377.6	6327.7	6241.5	
B	WT. OF MOLD	(grams)	4208.8	4208.8	4208.8	4208.8	
C	WT. OF SOIL = A − B	(grams)	2105.3	2168.8	2118.9	2032.7	
D	WET UNIT WT.(1) = C X 0.066	(pcf)	139.0	143.1	139.8	134.2	
E	DRY UNIT WT. = D / [1 + (K/100)]	(pcf)	127.1	128.6	123.2	124.8	

NOTE: IF CALIBRATED MOLD OF 1/30 FT^3 IS USED, THE WET DENSITY IS CALCULATED FROM THE WEIGHT OF SOIL, THE VOLUME OF THE MOLD AND THE CONVERSION FROM GRAMS TO POUNDS (I.E., CONVERSION FACTOR = (30 / 453.6) = 0.066). THE MOLD MUST BE CALIBRATED TO VERIFY A CAPACITY OF 1/30 ± 0.0005 FT^3 ON INTERVALS NOT TO EXCEED 1000 TIMES THAT THE MOLD IS FILLED.

MOISTURE CONTENT – ASTM D 2216

QA ID: TBC

	TARE NO.		#27	#8	#215	#303	
F	WT. OF TARE	(grams)	8.2	8.3	8.3	8.3	
G	WT. OF WET SOIL & TARE	(grams)	648.4	658.9	582.8	634.3	
H	WT. OF DRY SOIL & TARE	(grams)	593.6	593.0	514.4	590.7	
I	WT. OF WATER = G − H	(grams)	54.8	65.9	68.4	43.6	
J	WT. DRY SOIL = H − F	(grams)	585.4	584.7	506.1	582.4	
K	MOISTURE CONTENT = (I/J) X 100	(%)	9.4	11.3	13.5	7.5	

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GEOSYNTEC CONSULTANTS

FLUOR FERNALD

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MOISTURE–DENSITY RELATIONSHIP

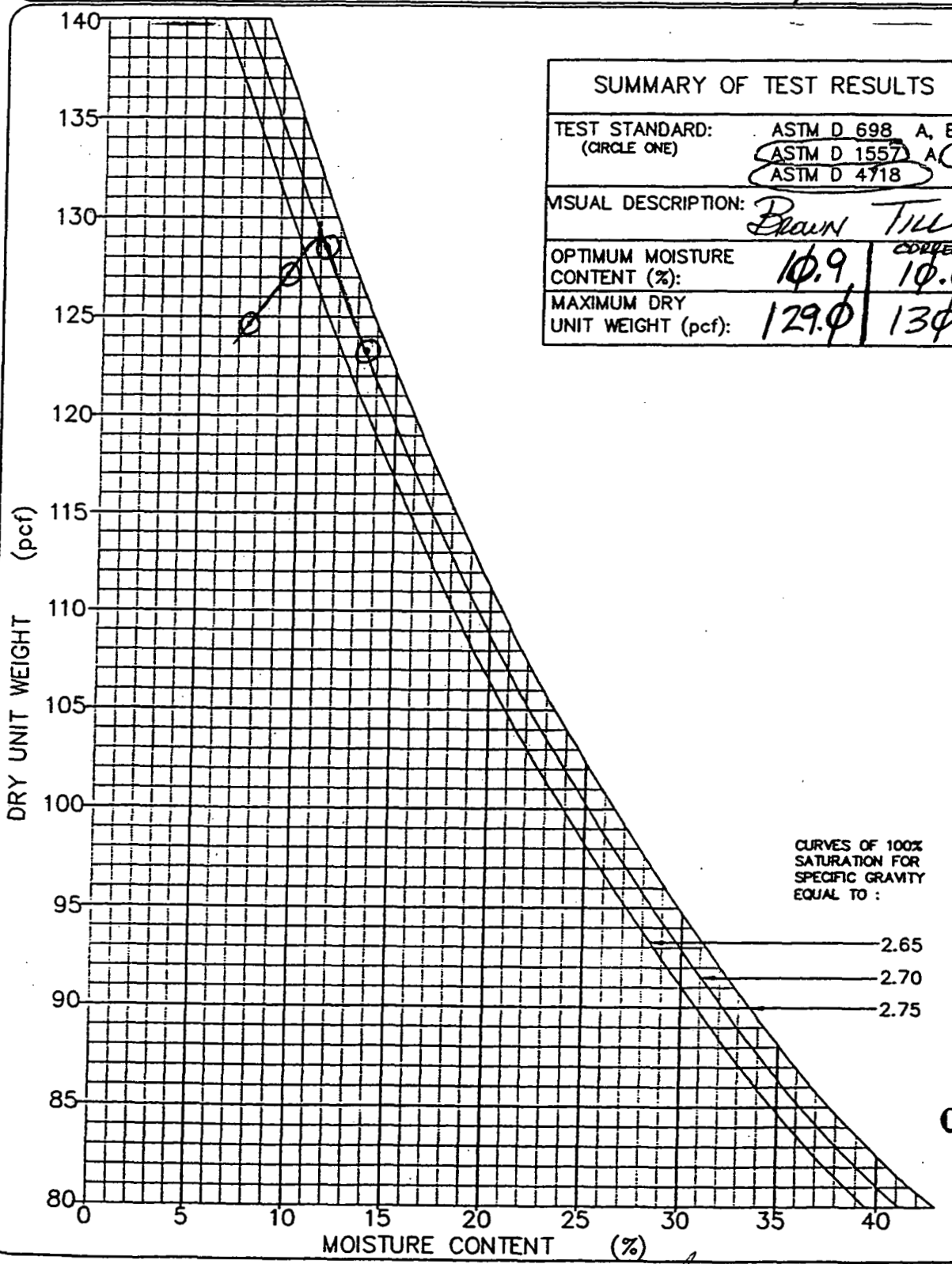
PROJECT: ON–SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO PROJECT NO.: 6Q134 TASK NO.: 04.1

DESCRIPTION: PHASE III DATE: ____ day Oct month 2001 year

MATERIAL TYPE: Low Plasm CLAY MATERIAL SOURCE: STOCKPILE 01-5 SAMPLE NO.: LP-01-29

SUMMARY OF TEST RESULTS			QA ID
TEST STANDARD: (CIRCLE ONE)	ASTM D 698 A, B, C ASTM D 1557 A, B, C ASTM D 4718		TBW
VISUAL DESCRIPTION:	Brown Till		TBW
OPTIMUM MOISTURE CONTENT (%):	10.9	CORRECTED 10.6	TBW
MAXIMUM DRY UNIT WEIGHT (pcf):	129.0	130.0	TBW



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FLUOR FERNALD

CORRECTION OF UNIT WEIGHT AND WATER CONTENT FOR SOILS CONTAINING OVERSIZE PARTICLES *(ASTM D 4718)*

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO **PROJECT NO.** 6Q134 **TASK NO.** 04.1

DESCRIPTION: PHASE III **DATE:** 08 day OCT month 2001 year

MATERIAL TYPE: LOW PERM CLAY LP-01-29 MODIFIED

Weight of Total Sample	=	47,206.6 g
Weight of Oversize Fraction	=	1,561.5 g
Weight of Finer Fraction (- 3/8)	=	45,645.1 g
Percentage of Oversize Fraction	= (P_C)	3.3
Percentage of Finer Fraction (- 3/8)	= (P_F)	96.7
Specific Gravity (Assumed)	= (G_M)	2.72

(W_F) =	Water Content - 3/8 , as decimal	=	0.109
(W_C) =	Water Content + 3/8 , as decimal	=	0.015
(δ_F) =	Dry Density of finer fraction	=	129.0
(δ_W) =	Unit Weight of Water	=	62.4

$$C_W=(W_F P_F)+(W_C P_C) = \boxed{10.6\ \%M}$$

$$C\delta_D=100\delta_F G_M \delta_W/(\delta_F P_C)+(G_M \delta_W P_F) = \boxed{130.0\ pcf}$$

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FLUOR FERNALD

FIELD LABORATORY COMPACTION TEST

(ASTM D 698 METHOD B)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO

PROJECT NO. 6-Q134 TASK NO.: 04.1

DESCRIPTION: Phase III

DATE: 08 day Oct month 2001 year

MATERIAL TYPE: Low Perm Clay MATERIAL SOURCE: STOCKPILE 01-5 SAMPLE NO.: LP-01-30

THIS METHOD WILL BE USED IF THE MATERIAL RETAINED ON THE NO. 3/4-in. (19-mm) SIEVE IS LESS THAN 30%, IF THE MATERIAL RETAINED ON THE NO. 4 (4.75-mm) SIEVE IS GREATER THAN 20%, AND IF THE MATERIAL RETAINED ON THE NO. 3/8-in. (9.5-mm) SIEVE IS LESS THAN 20%.
ALL MATERIAL RETAINED ON THE NO. 3/8-in. (9.5-mm) SIEVE IS DISCARDED.
USE OVERSIZE CORRECTION IF MORE THAN 5% IS DISCARDED ACCORDING TO ASTM D 4718.
USE A 4-in. DIAMETER MOLD / 5.5-lb RAMMER / 12-in. DROP / 3 LAYERS / 25 BLOWS PER LAYER. 13.90

COMPACTION OF SOIL

QA ID: DLE

				13.65	13.94	13.98	
	WATER ADDED	(ml)		6%	8%	10%	12%
A	WT. OF SOIL & MOLD	(grams)		6191.6	6323.2	6341.3	6305.0
B	WT. OF MOLD	(grams)	4273.5	4273.5	4273.5	4273.5	4273.5
C	WT. OF SOIL = A − B	(grams)		1918.1	2049.7	2067.8	2031.5
D	WET UNIT WT.(1) = C X 0.066	(pcf)		126.6	135.3	136.5	134.1
E	DRY UNIT WT. = D / [1 + (K/100)]	(pcf)		115.3	121.0	120.4	115.8

NOTE: IF CALIBRATED MOLD OF 1/30 FT^3 IS USED, THE WET DENSITY IS CALCULATED FROM THE WEIGHT OF SOIL, THE VOLUME OF THE MOLD AND THE CONVERSION FROM GRAMS TO POUNDS (I.E., CONVERSION FACTOR = (30 / 453.6) = 0.066). THE MOLD MUST BE CALIBRATED TO VERIFY A CAPACITY OF 1/30 ± 0.0005 FT^3 ON INTERVALS NOT TO EXCEED 1000 TIMES THAT THE MOLD IS FILLED.

MOISTURE CONTENT – ASTM D 2216

QA ID: DLE

	TARE NO.			#27	#304	#102	#24
F	WT. OF TARE	(grams)		8.2	8.3	8.2	8.3
G	WT. OF WET SOIL & TARE	(grams)		581.3	477.6	552.1	549.7
H	WT. OF DRY SOIL & TARE	(grams)		530.1	427.9	488.2	475.7
I	WT. OF WATER = G − H	(grams)		51.2	49.7	63.9	74.0
J	WT. DRY SOIL = H − F	(grams)		521.9	419.6	480.0	467.4
K	MOISTURE CONTENT = (I/J) X 100	(%)		9.8	11.8	13.3	15.8

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FLUOR FERNALD

CORRECTION OF UNIT WEIGHT AND WATER CONTENT FOR SOILS CONTAINING OVERSIZE PARTICLES *(ASTM D 4718)*

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO **PROJECT NO.** 60134 **TASK NO.** 04.1

DESCRIPTION: PHASE III **DATE:** 09 day OCT month 2001 year

MATERIAL TYPE: LP-01-30 STD

Weight of Total Sample	=	17,033.1g
Weight of Oversize Fraction	=	389.0g
Weight of Finer Fraction (- 3/8)	=	16,644.1g
Percentage of Oversize Fraction	= (P_C)	2.3
Percentage of Finer Fraction (- 3/8)	= (P_F)	97.7
Specific Gravity (Assumed)	= (G_M)	272

(W_F)	=	Water Content - 3/8 , as decimal	=	0.124
(W_C)	=	Water Content + 3/8 , as decimal	=	0.015
(δ_F)	=	Dry Density of finer fraction	=	122.5
(δ_W)	=	Unit Weight of Water	=	62.4

$$C_W=(W_F P_F)+(W_C P_C) = \boxed{12.2\% M}$$

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$$C\delta_D=100\delta_F G_M \delta_W/(\delta_F P_C)+(G_M \delta_W P_F) = \boxed{123.3 pcf}$$

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FLUOR FERNALD

4940

MOISTURE-DENSITY RELATIONSHIP

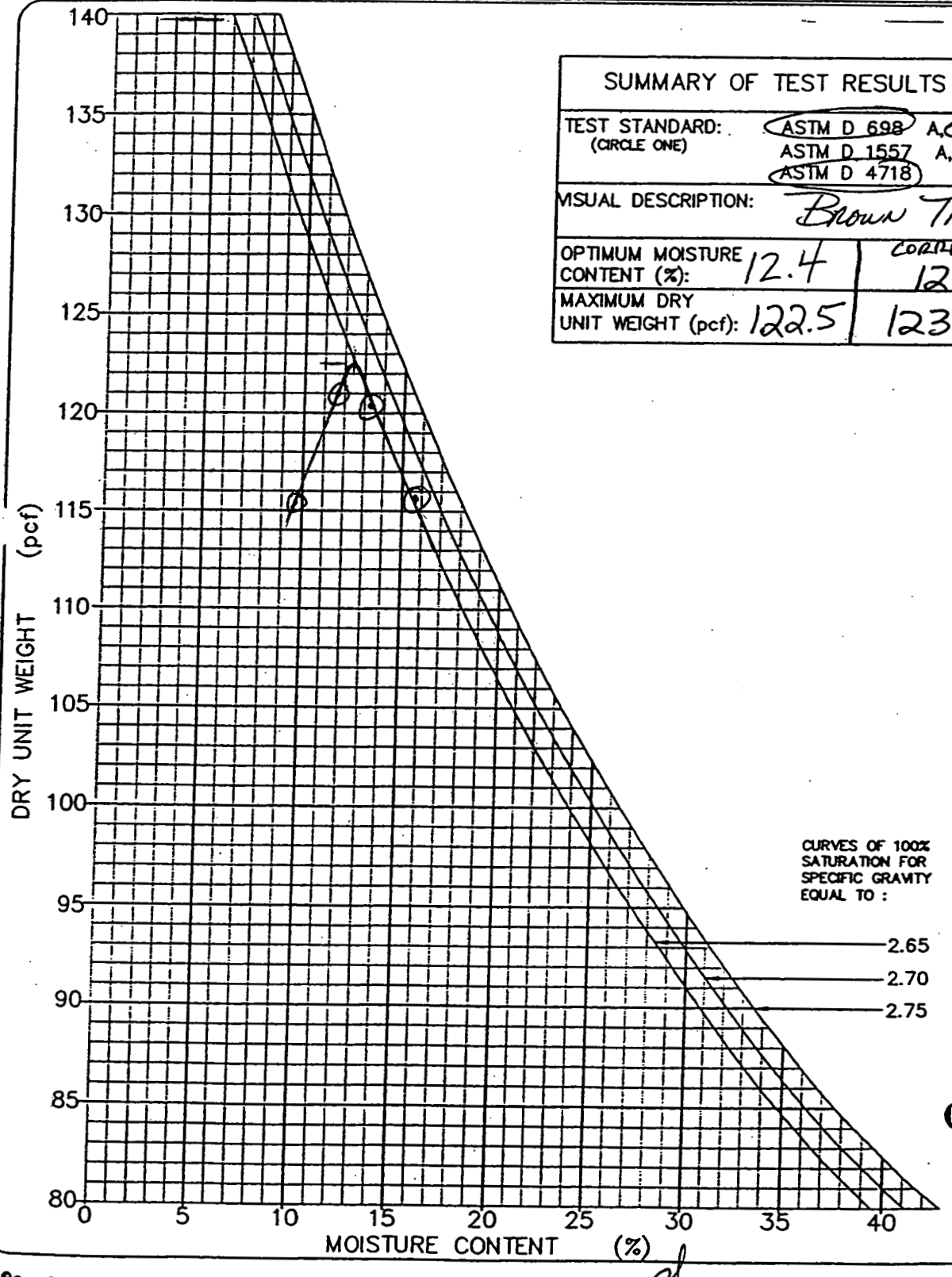
PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO PROJECT NO.: GQ1341 TASK NO.: 04.1

DESCRIPTION: PHASE III DATE: 09 day OCT month 2001 year

MATERIAL TYPE: Low Perm CLAY MATERIAL SOURCE: STOCKPILE 01-5 SAMPLE NO.: LP 01-30

SUMMARY OF TEST RESULTS			QA ID
TEST STANDARD: (CIRCLE ONE)	ASTM D 698 A, B, C ASTM D 1557 A, B, C ASTM D 4718		DLE
VISUAL DESCRIPTION:	BROWN TILL		
OPTIMUM MOISTURE CONTENT (%):	12.4	CORRECTED 12.2	
MAXIMUM DRY UNIT WEIGHT (pcf):	122.5	123.3	



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GEOSYNTEC CONSULTANTS

FLUOR FERNALD

FIELD LABORATORY COMPACTION TEST

(ASTM D 698 METHOD B)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO

PROJECT NO. 6Q1341 TASK NO.: 04.1

DESCRIPTION: Phase III

DATE: 08 day OCT month 2001 year

MATERIAL TYPE: Low Perm Clay MATERIAL SOURCE: STOCKPILE 01-5 SAMPLE NO.: LP-01-31

THIS METHOD WILL BE USED IF THE MATERIAL RETAINED ON THE NO. 3/4-in. (19-mm) SIEVE IS LESS THAN 30%, IF THE MATERIAL RETAINED ON THE NO. 4 (4.75-mm) SIEVE IS GREATER THAN 20%, AND IF THE MATERIAL RETAINED ON THE NO. 3/8-in. (9.5-mm) SIEVE IS LESS THAN 20%.
ALL MATERIAL RETAINED ON THE NO. 3/8-in. (9.5-mm) SIEVE IS DISCARDED.
USE OVERSIZE CORRECTION IF MORE THAN 5% IS DISCARDED ACCORDING TO ASTM D 4718.
USE A 4-in. DIAMETER MOLD / 5.5-lb RAMMER / 12-in. DROP / 3 LAYERS / 25 BLOWS PER LAYER.

COMPACTION OF SOIL

QA ID: DLE

			13.51	13.77	14.09	13.92	
	WATER ADDED	(ml)	4%	6%	8%	10%	
A	WT. OF SOIL & MOLD	(grams)	6128.1	6246.1	6368.5	6314.1	
B	WT. OF MOLD	(grams)	4273.5	4273.5	4273.5	4273.5	4273.5
C	WT. OF SOIL = A − B	(grams)	1854.6	1972.6	2095.0	2040.6	
D	WET UNIT WT.(1) = C X 0.066	(pcf)	122.4	130.2	138.3	134.7	
E	DRY UNIT WT. = D / [1 + (K/100)]	(pcf)	113.4	118.6	123.6	117.3	

NOTE: IF CALIBRATED MOLD OF 1/30 FT^3 IS USED, THE WET DENSITY IS CALCULATED FROM THE WEIGHT OF SOIL, THE VOLUME OF THE MOLD AND THE CONVERSION FROM GRAMS TO POUNDS (I.E., CONVERSION FACTOR = (30 / 453.6) = 0.066). THE MOLD MUST BE CALIBRATED TO VERIFY A CAPACITY OF 1/30 ± 0.0005 FT^3 ON INTERVALS NOT TO EXCEED 1000 TIMES THAT THE MOLD IS FILLED.

MOISTURE CONTENT — ASTM D 2216

QA ID: DLE

	TARE NO.		#206	#204	#34	#11	
F	WT. OF TARE	(grams)	8.3	8.1	8.2	8.1	
G	WT. OF WET SOIL & TARE	(grams)	505.8	530.4	525.1	593.1	
H	WT. OF DRY SOIL & TARE	(grams)	469.1	483.9	470.3	517.6	
I	WT. OF WATER = G − H	(grams)	36.7	46.5	54.8	75.5	
J	WT. DRY SOIL = H − F	(grams)	460.8	475.8	462.1	509.5	
K	MOISTURE CONTENT = (I/J) X 100	(%)	8.0	9.8	11.9	14.8	

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FLUOR FERNALD

CORRECTION OF UNIT WEIGHT AND WATER CONTENT FOR SOILS CONTAINING OVERSIZE PARTICLES *(ASTM D 4718)*

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO **PROJECT NO.** 6QB4 **TASK NO.** 04.1

DESCRIPTION: PHASE III **DATE:** 09 **day** OCT **month** 2001 **year**

MATERIAL TYPE: LOW PERM CLAY (LP-01-31) STD

Weight of Total Sample	=	45,639.2g
Weight of Oversize Fraction	=	1,782.8g
Weight of Finer Fraction (- 3/8)	=	43,856.4g
Percentage of Oversize Fraction	= (P_C)	3.9
Percentage of Finer Fraction (- 3/8)	= (P_F)	96.1
Specific Gravity (Assumed)	= (G_M)	2.72

(W_F)	=	Water Content - 3/8 , as decimal	=	0.116
(W_C)	=	Water Content + 3/8 , as decimal	=	0.015
(δ_F)	=	Dry Density of finer fraction	=	124.0
(δ_W)	=	Unit Weight of Water	=	62.4

$$C_W=(W_F P_F)+(W_C P_C)= \boxed{11.2\ \%M}$$

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$$C\delta_D=100\delta_F G_M \delta_W/(\delta_F P_C)+(G_M \delta_W P_F)= \boxed{125.3\ pcf}$$

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FLUOR FERNALD

4940

MOISTURE-DENSITY RELATIONSHIP

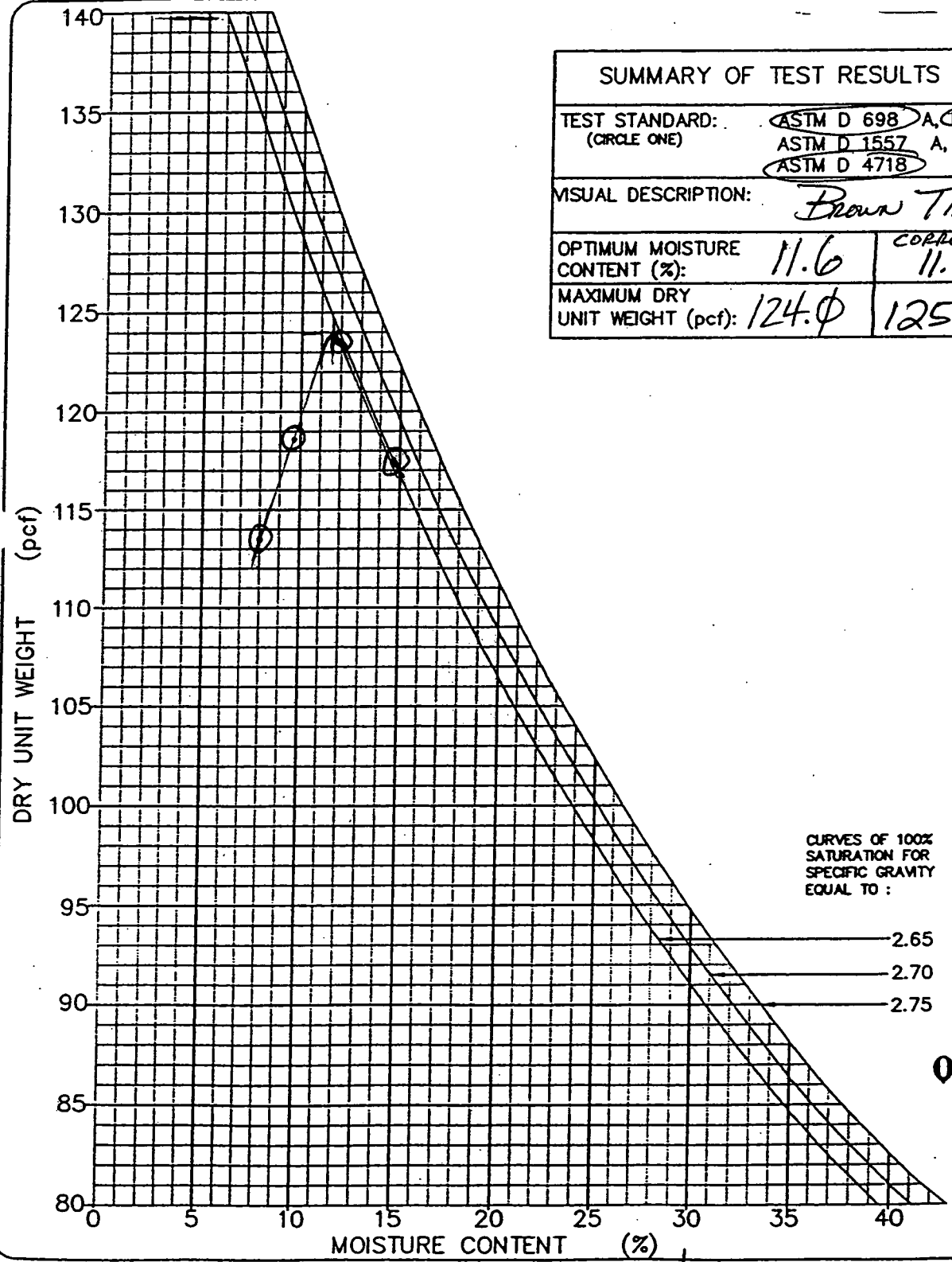
PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO PROJECT NO.: 6QB4 TASK NO.: 04.1

DESCRIPTION: PHASE III DATE: 09 day OCT month 2001 year

MATERIAL TYPE: Low Perm CLAY MATERIAL SOURCE: STOCKPILE 01-5 SAMPLE NO.: LP01-31

SUMMARY OF TEST RESULTS			QA ID
TEST STANDARD: (CIRCLE ONE)	ASTM D 698 A, B, C ASTM D 1557 A, B, C ASTM D 4718		DLE/ TBW
VISUAL DESCRIPTION:	Brown Till		TBW
OPTIMUM MOISTURE CONTENT (%):	11.6	CORRECTED 11.2	TBW
MAXIMUM DRY UNIT WEIGHT (pcf):	124.0	125.3	TBW



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FLUOR FERNALD

FIELD LABORATORY COMPACTION TEST

(ASTM D 1557 METHOD B)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO

PROJECT NO.: 6Q134 TASK NO.: 04.1

DESCRIPTION: PHASE III

DATE: 08 day OCT month 2001 year

MATERIAL TYPE: Low Plasm CLAY MATERIAL SOURCE: STOCKPILE 01-5 SAMPLE NO.: LP-01-31

THIS METHOD WILL BE USED IF THE MATERIAL RETAINED ON THE NO. 4-in. (4.75-mm) SIEVE IS GREATER THAN 20%, AND THE MATERIAL RETAINED ON THE NO. 3/8-in. (9.5-mm) SIEVE IS LESS THAN 20%.
ALL MATERIAL RETAINED ON THE NO. 3/8-in. (9.5-mm) SIEVE IS DISCARDED.
USE OVERSIZE CORRECTION IF MORE THAN 5% IS DISCARDED ACCORDING TO ASTM D 4718.
USE A 4-in. DIAMETER MOLD / 10-lb RAMMER / 18-in. DROP / 5 LAYERS / 25 BLOWS PER LAYER.

COMPACTION OF SOIL — QA ID: [illegible]

			14.02 lbs	14.12 lbs	13.98 lb	13.78 lbs	
	WATER ADDED	(ml)	+4%	+6%	+8%	+2%	
A	WT. OF SOIL & MOLD	(grams)	6359.5	6404.8	6341.3	6250.6	
B	WT. OF MOLD	(grams)	4208.8	4208.8	4208.8	4208.8	
C	WT. OF SOIL = A − B	(grams)	2150.7	2196.0	2132.5	2041.8	
D	WET UNIT WT.(1) = C X 0.066	(pcf)	141.9	144.9	140.7	134.8	
E	DRY UNIT WT. = D / [1 + (K/100)]	(pcf)	130.6	131.9	125.0	126.7	

NOTE: IF CALIBRATED MOLD OF 1/30 FT^3 IS USED, THE WET DENSITY IS CALCULATED FROM THE WEIGHT OF SOIL, THE VOLUME OF THE MOLD AND THE CONVERSION FROM GRAMS TO POUNDS (I.E., CONVERSION FACTOR = (30 / 453.6) = 0.066). THE MOLD MUST BE CALIBRATED TO VERIFY A CAPACITY OF 1/30 ± 0.0005 FT^3 ON INTERVALS NOT TO EXCEED 1000 TIMES THAT THE MOLD IS FILLED.

MOISTURE CONTENT — ASTM D 2216 — QA ID: [illegible]

	TARE NO.		#1	#21	#229	#A	
F	WT. OF TARE	(grams)	8.3	8.4	8.0	7.9	
G	WT. OF WET SOIL & TARE	(grams)	626.9	573.8	596.1	605.1	
H	WT. OF DRY SOIL & TARE	(grams)	577.6	522.8	530.3	569.5	
I	WT. OF WATER = G − H	(grams)	49.3	51.0	65.8	35.6	
J	WT. DRY SOIL = H − F	(grams)	569.3	514.4	522.3	561.6	
K	MOISTURE CONTENT = (I/J) X 100	(%)	8.7	9.9	12.6	6.3	

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FLUOR FERNALD

CORRECTION OF UNIT WEIGHT AND WATER CONTENT FOR SOILS CONTAINING OVERSIZE PARTICLES *(ASTM D 4718)*

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO PROJECT NO. 60134 TASK NO. 04.1

DESCRIPTION: PHASE III DATE: 09 day OCT month 2001 year

MATERIAL TYPE: Low Perm CLAY EP-01-31 MOD

Weight of Total Sample	=	45,639.2 g
Weight of Oversize Fraction	=	1,782.8 g
Weight of Finer Fraction (- 3/8)	=	43,856.4 g
Percentage of Oversize Fraction	= (P_C)	3.9
Percentage of Finer Fraction (- 3/8)	= (P_F)	96.1
Specific Gravity (Assumed)	= (G_M)	2.72

(W_F) =	Water Content - 3/8 , as decimal	=	0.096
(W_C) =	Water Content + 3/8 , as decimal	=	0.015
(δ_F) =	Dry Density of finer fraction	=	132.0
(δ_W) =	Unit Weight of Water	=	62.4

$$C_W=(W_F P_F)+(W_C P_C) = \boxed{9.3\% M}$$

000487

$$C\delta_D=100\delta_F G_M \delta_W/(\delta_F P_C)+(G_M \delta_W P_F) = \boxed{133.2 \text{ pcf}}$$

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FLUOR FERNALD

4940

MOISTURE–DENSITY RELATIONSHIP

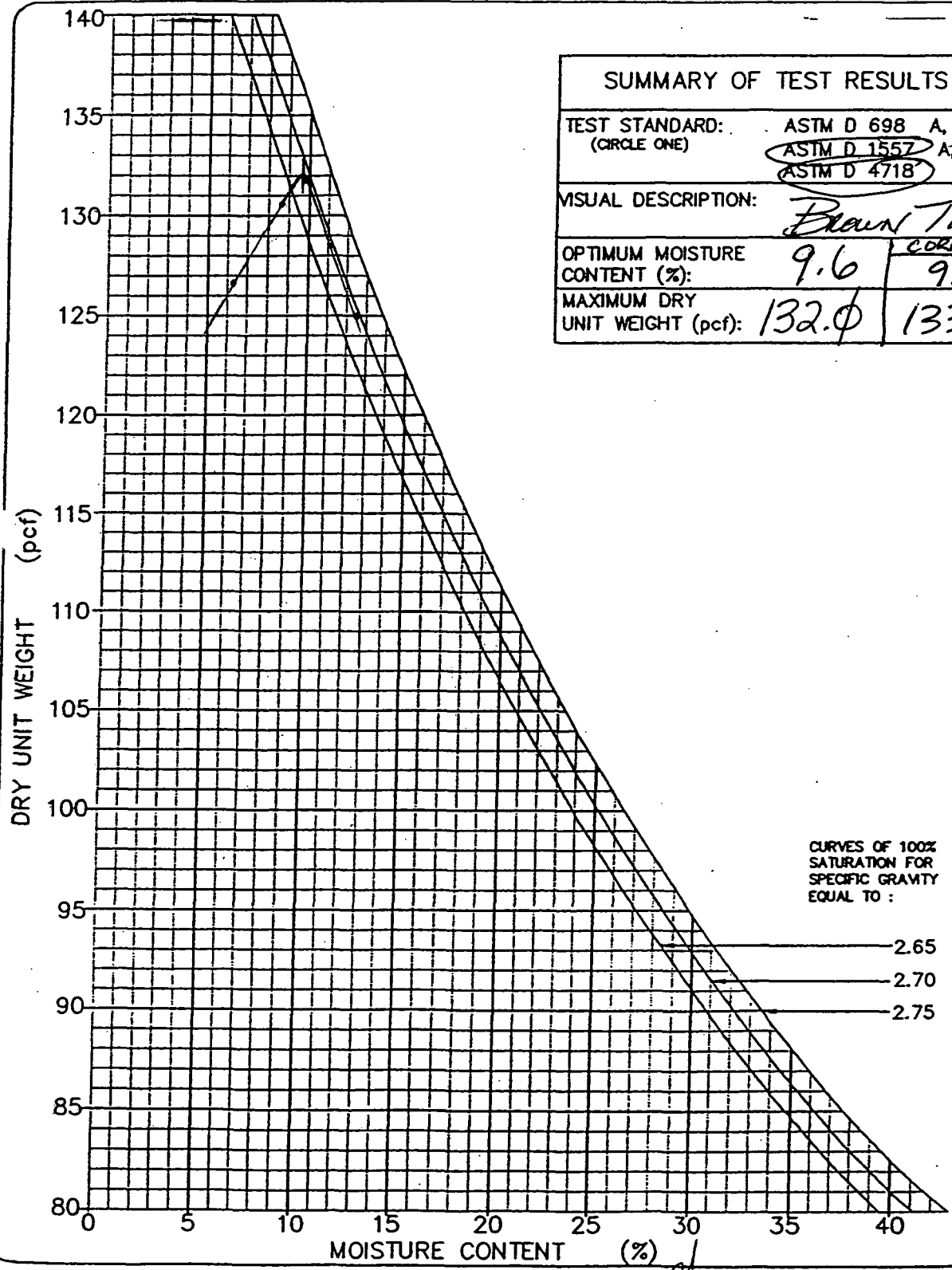
PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO PROJECT NO.: 60134 TASK NO.: 041

DESCRIPTION: PHASE III DATE: 09 day OCT month 2001 year

MATERIAL TYPE: LOW PERM CLAY MATERIAL SOURCE: STOCKPILE 01-5 SAMPLE NO.: LP-01-31

SUMMARY OF TEST RESULTS			QA ID
TEST STANDARD: (CIRCLE ONE)	ASTM D 698 A, B, C ASTM D 1557 A, B, C ASTM D 4718		TBR
VISUAL DESCRIPTION:	BROWN TILL		TBR
OPTIMUM MOISTURE CONTENT (%):	9.6	CORRECTED 9.3	TBR
MAXIMUM DRY UNIT WEIGHT (pcf):	132.0	133.2	TBR



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FLUOR FERNALD

FIELD LABORATORY COMPACTION TEST

(ASTM D 698 METHOD B)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO

PROJECT NO. 6Q134L TASK NO.: 04.1

DESCRIPTION: Phase III

DATE: 08 day OCT month 2001 year

MATERIAL TYPE: Low Perm Clay MATERIAL SOURCE: STOCKPILE 01-5 SAMPLE NO.: LP-01-32

THIS METHOD WILL BE USED IF THE MATERIAL RETAINED ON THE NO. 3/4-in. (19-mm) SIEVE IS LESS THAN 30%, IF THE MATERIAL RETAINED ON THE NO. 4 (4.75-mm) SIEVE IS GREATER THAN 20%, AND IF THE MATERIAL RETAINED ON THE NO. 3/8-in. (9.5-mm) SIEVE IS LESS THAN 20%.
ALL MATERIAL RETAINED ON THE NO. 3/8-in. (9.5-mm) SIEVE IS DISCARDED.
USE OVERSIZE CORRECTION IF MORE THAN 5% IS DISCARDED ACCORDING TO ASTM D 4718.
USE A 4-in. DIAMETER MOLD / 5.5-lb RAMMER / 12-in. DROP / 3 LAYERS / 25 BLOWS PER LAYER.

COMPACTION OF SOIL

QA ID: TBC

			13.50 lbs	13.77 lbs	13.75 lbs	13.28 lbs	
	WATER ADDED	(ml)	6%	8%	10%	4%	
A	WT. OF SOIL & MOLD	(grams)	6123.6	6246.1	6237.0	6023.8	
B	WT. OF MOLD	(grams)	4208.8	4208.8	4208.8	4208.8	
C	WT. OF SOIL = A − B	(grams)	1914.8	2037.3	2028.2	1815.0	
D	WET UNIT WT.(1) = C X 0.066	(pcf)	126.4	134.5	133.9	119.8	
E	DRY UNIT WT. = D / [1 + (K/100)]	(pcf)	112.7	117.6	115.2	109.2	

NOTE: IF CALIBRATED MOLD OF 1/30 FT^3 IS USED, THE WET DENSITY IS CALCULATED FROM THE WEIGHT OF SOIL, THE VOLUME OF THE MOLD AND THE CONVERSION FROM GRAMS TO POUNDS (I.E., CONVERSION FACTOR = (30 / 453.6) = 0.066). THE MOLD MUST BE CALIBRATED TO VERIFY A CAPACITY OF 1/30 ± 0.0005 FT^3 ON INTERVALS NOT TO EXCEED 1000 TIMES THAT THE MOLD IS FILLED.

MOISTURE CONTENT – ASTM D 2216

QA ID: TBC

	TARE NO.		#205	#231	#232	#103	
F	WT. OF TARE	(grams)	8.3	8.1	8.2	8.3	
G	WT. OF WET SOIL & TARE	(grams)	558.1	568.4	561.1	543.5	
H	WT. OF DRY SOIL & TARE	(grams)	498.8	498.0	484.1	496.4	
I	WT. OF WATER = G − H	(grams)	59.3	70.4	77.0	47.1	
J	WT. DRY SOIL = H − F	(grams)	490.5	489.9	475.9	488.1	
K	MOISTURE CONTENT = (I/J) X 100	(%)	12.1	14.4	16.2	9.6	

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FLUOR FERNALD

CORRECTION OF UNIT WEIGHT AND WATER CONTENT FOR SOILS CONTAINING OVERSIZE PARTICLES *(ASTM D 4718)*

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO **PROJECT NO.** GQ134 **TASK NO.** 04.1

DESCRIPTION: PHASE III **DATE:** 09 day OCT month 2001 year

MATERIAL TYPE: Low Perm Clay ELP-01-32 STD

Weight of Total Sample	=	22,758.0 g
Weight of Oversize Fraction	=	1,019.8 g
Weight of Finer Fraction (- 3/8)	=	21,738.2 g
Percentage of Oversize Fraction	= (P_C)	4.5
Percentage of Finer Fraction (- 3/8)	= (P_F)	95.5
Specific Gravity (Assumed)	= (G_M)	2.72

(W_F)	=	Water Content - 3/8, as decimal	=	0.149
(W_C)	=	Water Content + 3/8, as decimal	=	0.015
(δ_F)	=	Dry Density of finer fraction	=	118.1
(δ_W)	=	Unit Weight of Water	=	62.4

$$C_W=(W_F P_F)+(W_C P_C) = \boxed{14.39\% M}$$

$$C\delta_D=100\delta_F G_M \delta_W/(\delta_F P_C)+(G_M \delta_W P_F) = \boxed{119.7 \text{ pcf}}$$

GEOSYNTEC CONSULTANTS

FLUOR FERNALD

4940

MOISTURE-DENSITY RELATIONSHIP

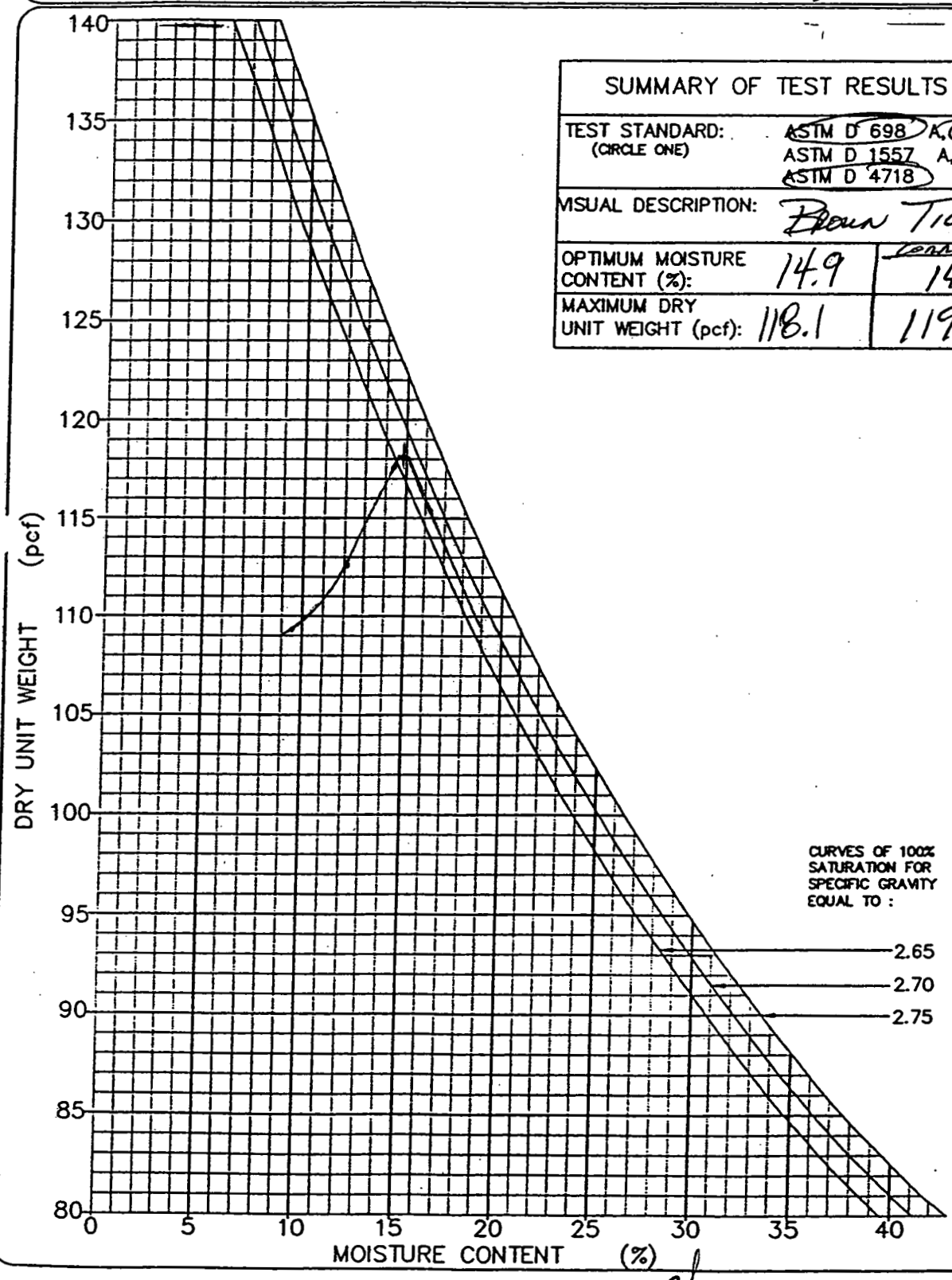
PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO PROJECT NO.: 6Q134 TASK NO.: 04.1

DESCRIPTION: PHASE III DATE: 09 day OCT month 2001 year

MATERIAL TYPE: Low Perm CLAY MATERIAL SOURCE: STOCKPILE 01-5 SAMPLE NO.: LP-01-32

SUMMARY OF TEST RESULTS			QA ID
TEST STANDARD: (CIRCLE ONE)	ASTM D 698 A, B, C ASTM D 1557 A, B, C ASTM D 4718		TBR
VISUAL DESCRIPTION:	Brown Till		TBR
OPTIMUM MOISTURE CONTENT (%):	14.9	CORRECTED 14.3	TBR
MAXIMUM DRY UNIT WEIGHT (pcf):	118.1	119.7	TBR



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FLUOR FERNALD

FIELD LABORATORY COMPACTION TEST

(ASTM D 1557 METHOD B)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO

PROJECT NO.: GQ134 TASK NO.: 04.1

DESCRIPTION: PHASE III

DATE: 08 day OCT month 2001 year

MATERIAL TYPE: Low Perm CLAY MATERIAL SOURCE: STOCKPILE 01-6 SAMPLE NO.: LP-01-33

THIS METHOD WILL BE USED IF THE MATERIAL RETAINED ON THE NO. 4-in. (4.75-mm) SIEVE IS GREATER THAN 20%, AND THE MATERIAL RETAINED ON THE NO. 3/8-in. (9.5-mm) SIEVE IS LESS THAN 20%.
ALL MATERIAL RETAINED ON THE NO. 3/8-in. (9.5-mm) SIEVE IS DISCARDED.
USE OVERSIZE CORRECTION IF MORE THAN 5% IS DISCARDED ACCORDING TO ASTM D 4718.
USE A 4-in. DIAMETER MOLD / 10-lb RAMMER / 18-in. DROP / 5 LAYERS / 25 BLOWS PER LAYER.

COMPACTION OF SOIL — QA ID: TMC

			14.01 lbs	14.13 lbs	14.05 lbs	13.77 lbs	
	WATER ADDED	(ml)	+4%	+6%	+8%	+2%	
A	WT. OF SOIL & MOLD	(grams)	6354.9	6409.4	6373.1	6246.1	
B	WT. OF MOLD	(grams)	4208.8	4208.8	4208.8	4208.8	
C	WT. OF SOIL = A − B	(grams)	2146.1	2200.6	2164.3	2037.3	
D	WET UNIT WT.(1) = C X 0.066	(pcf)	141.6	145.2	142.8	134.5	
E	DRY UNIT WT. = D / [1 + (K/100)]	(pcf)	131.3	132.0	128.2	127.3	

NOTE: IF CALIBRATED MOLD OF 1/30 FT^3 IS USED, THE WET DENSITY IS CALCULATED FROM THE WEIGHT OF SOIL, THE VOLUME OF THE MOLD AND THE CONVERSION FROM GRAMS TO POUNDS (I.E., CONVERSION FACTOR = (30 / 453.6) = 0.066). THE MOLD MUST BE CALIBRATED TO VERIFY A CAPACITY OF 1/30 ± 0.0005 FT^3 ON INTERVALS NOT TO EXCEED 1000 TIMES THAT THE MOLD IS FILLED.

MOISTURE CONTENT — ASTM D 2216 — QA ID: _____

	TARE NO.		#303	#215	#8	#104-A	
F	WT. OF TARE	(grams)	8.3	8.3	8.3	8.3	
G	WT. OF WET SOIL & TARE	(grams)	651.7	603.0	625.8	626.5	
H	WT. OF DRY SOIL & TARE	(grams)	604.7	549.0	562.7	593.4	
I	WT. OF WATER = G − H	(grams)	47.0	54.0	63.1	33.1	
J	WT. DRY SOIL = H − F	(grams)	596.4	540.7	554.4	585.1	
K	MOISTURE CONTENT = (I/J) X 100	(%)	7.9	10.0	11.4	5.7	

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FLUOR FERNALD

CORRECTION OF UNIT WEIGHT AND WATER CONTENT FOR SOILS CONTAINING OVERSIZE PARTICLES *(ASTM D 4718)*

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO PROJECT NO. GQ134 TASK NO. 04.1

DESCRIPTION: PHASE III DATE: 09 day OCT month 2001 year

MATERIAL TYPE: Low Perm CLAY (LP-01-33) MOD

Weight of Total Sample	=	39,827.6g
Weight of Oversize Fraction	=	2,413.2g
Weight of Finer Fraction (- 3/8)	=	37,414.4g
Percentage of Oversize Fraction	= (P_C)	6.1
Percentage of Finer Fraction (- 3/8)	= (P_F)	93.9
Specific Gravity (Assumed)	= (G_M)	2.72

(W_F)	=	Water Content - 3/8 , as decimal	=	0.092
(W_C)	=	Water Content + 3/8 , as decimal	=	0.015
(δ_F)	=	Dry Density of finer fraction	=	133.6
(δ_W)	=	Unit Weight of Water	=	62.4

$$C_W=(W_F P_F)+(W_C P_C)= \boxed{8.7\ \%M}$$

$$C\delta_D=100\delta_F G_M \delta_W/(\delta_F P_C)+(G_M \delta_W P_F) = \boxed{135.3\ pcf}$$

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FLUOR FERNALD

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MOISTURE-DENSITY RELATIONSHIP

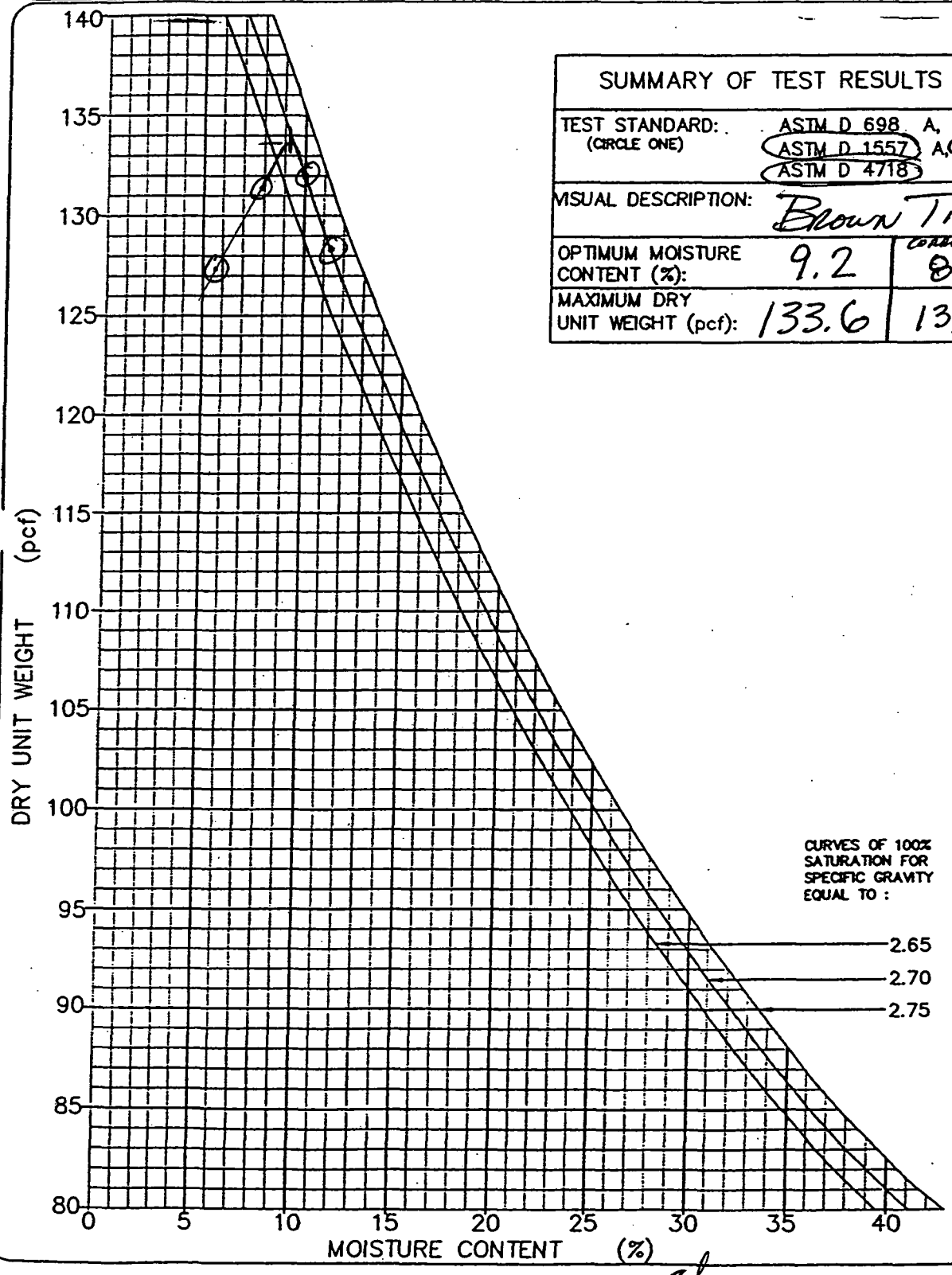
PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO PROJECT NO.: GQ1341 TASK NO.: 04.1

DESCRIPTION: PHASE III DATE: 09 day OCT month 2001 year

MATERIAL TYPE: Low Perm CLAY MATERIAL SOURCE: STOCKPILE 01-6 SAMPLE NO.: LP 01-33

SUMMARY OF TEST RESULTS			QA ID
TEST STANDARD: (CIRCLE ONE)	ASTM D 698 A, B, C ASTM D 1557 A, B, C ASTM D 4718		TBW
VISUAL DESCRIPTION:	BROWN TILL		TBW
OPTIMUM MOISTURE CONTENT (%):	9.2	CORRECTED 8.7	TBW
MAXIMUM DRY UNIT WEIGHT (pcf):	133.6	135.3	TBW



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FLUOR FERNALD

FIELD LABORATORY COMPACTION TEST

(ASTM D 698 METHOD B)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO

PROJECT NO. 6Q134L TASK NO.: 04.1

DESCRIPTION: Phase III

DATE: 09 day Oct month 2001 year

MATERIAL TYPE: Low Perm Clay MATERIAL SOURCE: STOCKPILE 01-6 SAMPLE NO.: LP-01-33

THIS METHOD WILL BE USED IF THE MATERIAL RETAINED ON THE NO. 3/4-in. (19-mm) SIEVE IS LESS THAN 30%, IF THE MATERIAL RETAINED ON THE NO. 4 (4.75-mm) SIEVE IS GREATER THAN 20%, AND IF THE MATERIAL RETAINED ON THE NO. 3/8-in. (9.5-mm) SIEVE IS LESS THAN 20%.
ALL MATERIAL RETAINED ON THE NO. 3/8-in. (9.5-mm) SIEVE IS DISCARDED.
USE OVERSIZE CORRECTION IF MORE THAN 5% IS DISCARDED ACCORDING TO ASTM D 4718.
USE A 4-in. DIAMETER MOLD / 5.5-lb RAMMER / 12-in. DROP / 3 LAYERS / 25 BLOWS PER LAYER.

COMPACTION OF SOIL

QA ID: TBC

			13.59 lbs	13.83 lbs	13.89 lbs	13.42	
	WATER ADDED	(ml)	+6%	+8%	+10%	+4%	
A	WT. OF SOIL & MOLD	(grams)	6164.4	6273.3	6300.5	6087.3	
B	WT. OF MOLD	(grams)	4208.8	4208.8	4208.8	4208.8	
C	WT. OF SOIL = A − B	(grams)	1955.6	2064.5	2091.7	1878.5	
D	WET UNIT WT.(1) = C X 0.066	(pcf)	129.1	136.3	138.1	124.0	
E	DRY UNIT WT. = D / [1 + (K/100)]	(pcf)	117.7	121.8	121.3	115.2	

NOTE: IF CALIBRATED MOLD OF 1/30 FT^3 IS USED, THE WET DENSITY IS CALCULATED FROM THE WEIGHT OF SOIL. THE VOLUME OF THE MOLD AND THE CONVERSION FROM GRAMS TO POUNDS (I.E., CONVERSION FACTOR = (30 / 453.6) = 0.066). THE MOLD MUST BE CALIBRATED TO VERIFY A CAPACITY OF 1/30 ± 0.0005 FT^3 ON INTERVALS NOT TO EXCEED 1000 TIMES THAT THE MOLD IS FILLED.

MOISTURE CONTENT – ASTM D 2216

QA ID: TBC

	TARE NO.		#105	#26	#31	#234	
F	WT. OF TARE	(grams)	8.2	8.2	8.3	8.3	
G	WT. OF WET SOIL & TARE	(grams)	560.7	603.6	609.3	510.8	
H	WT. OF DRY SOIL & TARE	(grams)	512.0	540.4	536.4	475.3	
I	WT. OF WATER = G − H	(grams)	48.7	63.2	72.9	35.5	
J	WT. DRY SOIL = H − F	(grams)	503.8	532.2	528.1	467.0	
K	MOISTURE CONTENT = (I/J) X 100	(%)	9.7	11.9	13.8	7.6	

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FLUOR FERNALD

CORRECTION OF UNIT WEIGHT AND WATER CONTENT FOR SOILS CONTAINING OVERSIZE PARTICLES

(ASTM D 4718)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO

PROJECT NO. GQ134 TASK NO. 04.1

DESCRIPTION: PHASE III

DATE: 10 day OCT month 2001 year

MATERIAL TYPE: LOW PERM CLAY

LP-01-33

STO

Weight of Total Sample	=	39,827.6 g
Weight of Oversize Fraction	=	2,413.2 g
Weight of Finer Fraction (- 3/8)	=	37,414.4 g
Percentage of Oversize Fraction	= (P_C)	6.1
Percentage of Finer Fraction (- 3/8)	= (P_F)	93.9
Specific Gravity (Assumed)	= (G_M)	2.72

(W_F)	=	Water Content - 3/8 , as decimal	=	0.131
(W_C)	=	Water Content + 3/8 , as decimal	=	0.015
(δ_F)	=	Dry Density of finer fraction	=	122.2
(δ_W)	=	Unit Weight of Water	=	62.4

$$C_W=(W_F P_F)+(W_C P_C) = \boxed{12.4\% M}$$

$$C\delta_D=100\delta_F G_M \delta_W/(\delta_F P_C)+(G_M \delta_W P_F) = \boxed{124.3 \text{ pcf}}$$

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FLUOR FERNALD

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MOISTURE-DENSITY RELATIONSHIP

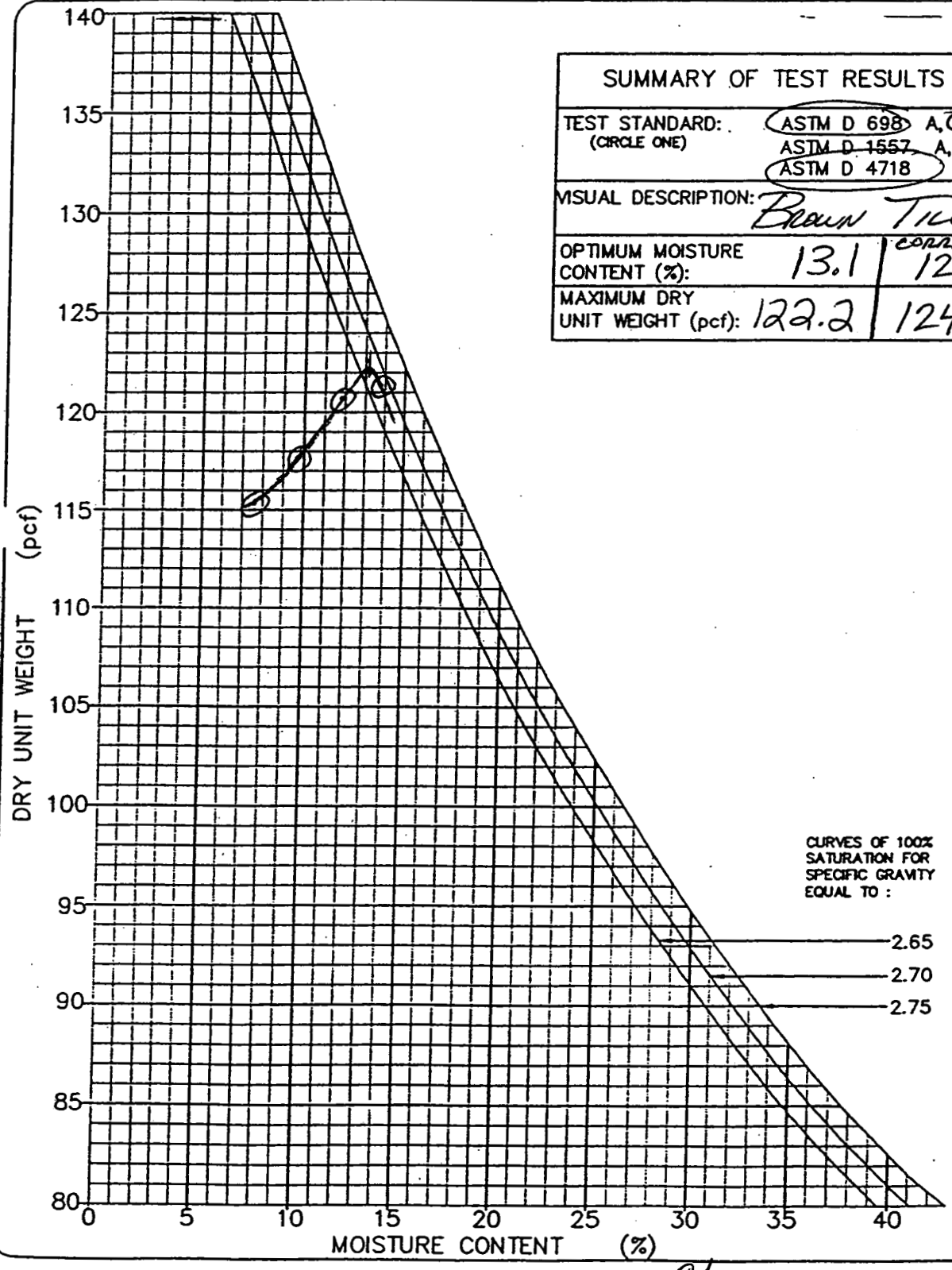
PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO PROJECT NO.: GQ134 TASK NO.: 04.1

DESCRIPTION: PHASE III DATE: 10 day OCT month 2001 year

MATERIAL TYPE: Low Plasm CLAY MATERIAL SOURCE: STOCKPILE 01-6 SAMPLE NO.: LP-01-33

SUMMARY OF TEST RESULTS			QA ID
TEST STANDARD: (CIRCLE ONE)	ASTM D 698 A, B, C ~~ASTM D 1557~~ A, B, C ASTM D 4718		TBC
VISUAL DESCRIPTION:	BROWN TILL		TBC
OPTIMUM MOISTURE CONTENT (%):	13.1	CORRECTED 12.4	TBC
MAXIMUM DRY UNIT WEIGHT (pcf):	122.2	124.3	TBC



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GEOSYNTEC CONSULTANTS

FLUOR FERNALD

FIELD LABORATORY COMPACTION TEST

(ASTM D 698 METHOD B)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO

PROJECT NO. 6Q134 TASK NO.: 04.1

DESCRIPTION: Phase III

DATE: 09 day OCT month 2001 year

MATERIAL TYPE: Low Perm Clay MATERIAL SOURCE: STOCKPILE 01-6 SAMPLE NO.: CP-01-34

THIS METHOD WILL BE USED IF THE MATERIAL RETAINED ON THE NO. 3/4-in. (19-mm) SIEVE IS LESS THAN 30%, IF THE MATERIAL RETAINED ON THE NO. 4 (4.75-mm) SIEVE IS GREATER THAN 20%, AND IF THE MATERIAL RETAINED ON THE NO. 3/8-in. (9.5-mm) SIEVE IS LESS THAN 20%.
ALL MATERIAL RETAINED ON THE NO. 3/8-in. (9.5-mm) SIEVE IS DISCARDED.
USE OVERSIZE CORRECTION IF MORE THAN 5% IS DISCARDED ACCORDING TO ASTM D 4718.
USE A 4-in. DIAMETER MOLD / 5.5-lb RAMMER / 12-in. DROP / 3 LAYERS / 25 BLOWS PER LAYER.

13.71

COMPACTION OF SOIL

QA ID: DLE

				13.24	13.48	13.68	
	WATER ADDED	(ml)		6%	8%	10%	12%
A	WT. OF SOIL & MOLD	(grams)		6005.7	6114.5	6205.2	6218.9
B	WT. OF MOLD	(grams)		4208.8	4208.8	4208.8	4208.8
C	WT. OF SOIL = A − B	(grams)		1796.9	1905.7	1996.4	2010.1
D	WET UNIT WT.(1) = C X 0.066	(pcf)		118.6	125.8	131.8	132.7
E	DRY UNIT WT. = D / [1 + (K/100)]	(pcf)		108.7	113.1	116.6	115.4

NOTE: IF CALIBRATED MOLD OF 1/30 FT^3 IS USED, THE WET DENSITY IS CALCULATED FROM THE WEIGHT OF SOIL, THE VOLUME OF THE MOLD AND THE CONVERSION FROM GRAMS TO POUNDS (I.E., CONVERSION FACTOR = (30 / 453.6) = 0.066). THE MOLD MUST BE CALIBRATED TO VERIFY A CAPACITY OF 1/30 ± 0.0005 FT^3 ON INTERVALS NOT TO EXCEED 1000 TIMES THAT THE MOLD IS FILLED.

MOISTURE CONTENT – ASTM D 2216

QA ID: _____

	TARE NO.			#28	#302	#225	#25
F	WT. OF TARE	(grams)		8.3	8.3	8.3	8.3
G	WT. OF WET SOIL & TARE	(grams)		453.8	512.4	543.4	533.2
H	WT. OF DRY SOIL & TARE	(grams)		416.8	461.4	481.7	464.8
I	WT. OF WATER = G − H	(grams)		37.0	51.0	61.7	68.4
J	WT. DRY SOIL = H − F	(grams)		408.5	453.1	473.4	456.5
K	MOISTURE CONTENT = (I/J) X 100	(%)		9.1	11.3	13.0	15.0

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FLUOR FERNALD

CORRECTION OF UNIT WEIGHT AND WATER CONTENT FOR SOILS CONTAINING OVERSIZE PARTICLES

(ASTM D 4718)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO PROJECT NO. 6013H TASK NO. 04.1

DESCRIPTION: PHASE III DATE: 10 day OCT month 2001 year

MATERIAL TYPE: Low Perm CLAY LP-01-34

Weight of Total Sample	=	22,522.7g
Weight of Oversize Fraction	=	515.2g
Weight of Finer Fraction (- 3/8)	=	22,007.5g
Percentage of Oversize Fraction	= (P_C)	2.3
Percentage of Finer Fraction (- 3/8)	= (P_F)	97.7
Specific Gravity (Assumed)	= (G_M)	2.72

(W_F) =	Water Content - 3/8, as decimal	=	0.138
(W_C) =	Water Content + 3/8, as decimal	=	0.015
(δ_F) =	Dry Density of finer fraction	=	118.0
(δ_W) =	Unit Weight of Water	=	62.4

$$C_W=(W_F P_F)+(W_C P_C)= \boxed{13.5\%M}$$

$$C\delta_D=100\delta_F G_M \delta_W/(\delta_F P_C)+(G_M \delta_W P_F)= \boxed{118.8\ pcf}$$

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FLUOR FERNALD 49 40

MOISTURE-DENSITY RELATIONSHIP

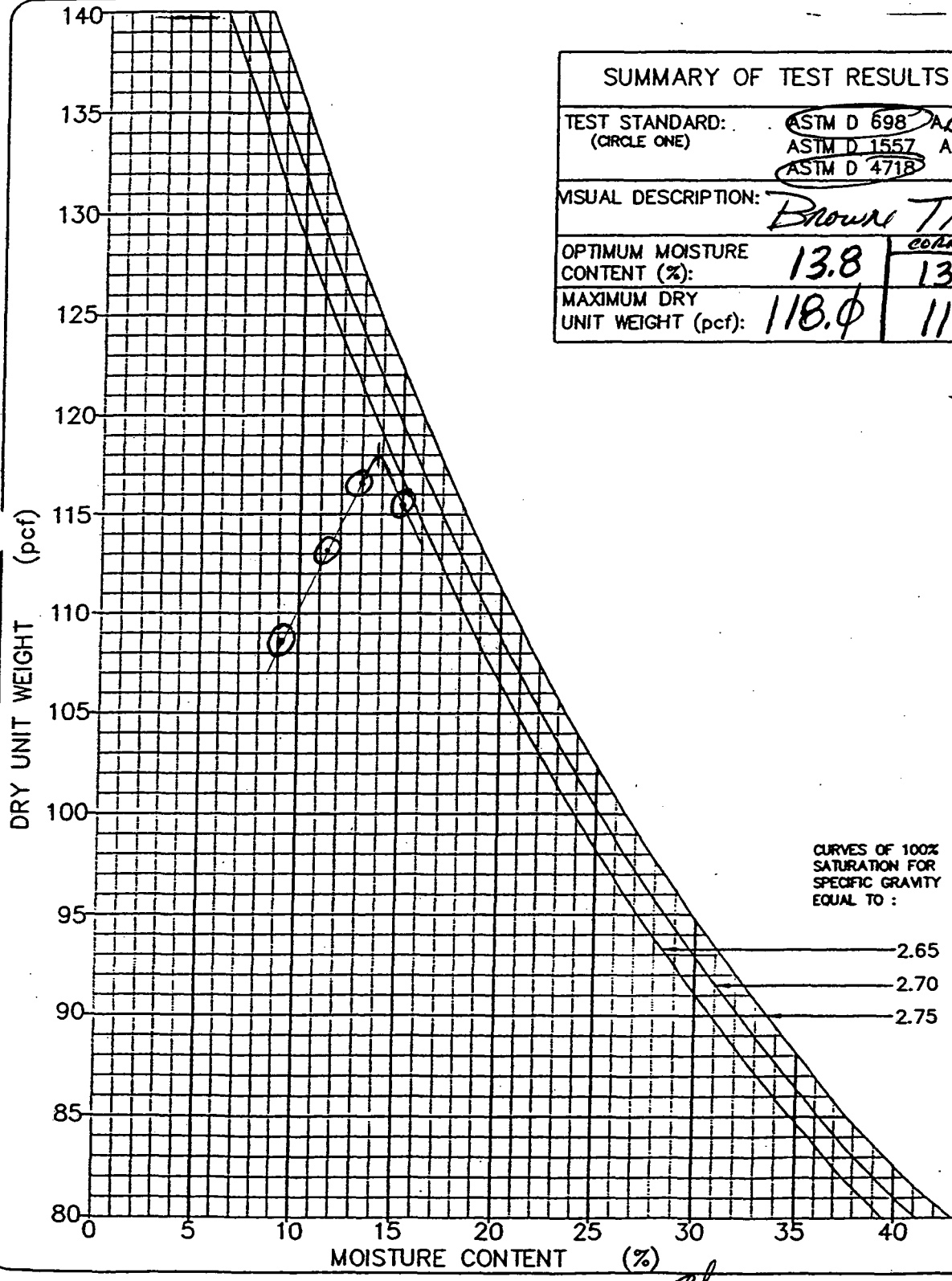
PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO PROJECT NO.: GQ134 TASK NO.: 04.1

DESCRIPTION: PHASE III DATE: 10 day OCT month 2001 year

MATERIAL TYPE: LOW PERM CLAY MATERIAL SOURCE: STOCKPILE 01-6 SAMPLE NO.: LP 01-34

SUMMARY OF TEST RESULTS			QA ID
TEST STANDARD: (CIRCLE ONE)	ASTM D 698 A, B, C ASTM D 1557 A, B, C ASTM D 4718		TBC DLE
VISUAL DESCRIPTION:	BROWN TILL		TBC
OPTIMUM MOISTURE CONTENT (%):	13.8	CORRECTED 13.5	TBC
MAXIMUM DRY UNIT WEIGHT (pcf):	118.0	118.8	TBC



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FLUOR FERNALD

FIELD LABORATORY COMPACTION TEST

(ASTM D 698 METHOD B)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO

PROJECT NO. 6Q134 TASK NO.: 04.1

DESCRIPTION: Phase III

DATE: 11 day OCT month 2001 year

MATERIAL TYPE: Low Perm Clay MATERIAL SOURCE: STOCKPILE 01-6 SAMPLE NO.: LP-01-35

THIS METHOD WILL BE USED IF THE MATERIAL RETAINED ON THE NO. 3/4-in. (19-mm) SIEVE IS LESS THAN 30%, IF THE MATERIAL RETAINED ON THE NO. 4 (4.75-mm) SIEVE IS GREATER THAN 20%, AND IF THE MATERIAL RETAINED ON THE NO. 3/8-in. (9.5-mm) SIEVE IS LESS THAN 20%.
ALL MATERIAL RETAINED ON THE NO. 3/8-in. (9.5-mm) SIEVE IS DISCARDED.
USE OVERSIZE CORRECTION IF MORE THAN 5% IS DISCARDED ACCORDING TO ASTM D 4718.
USE A 4-in. DIAMETER MOLD / 5.5-lb RAMMER / 12-in. DROP / 3 LAYERS / 25 BLOWS PER LAYER.

COMPACTION OF SOIL

QA ID: DLE

			13.48	13.72	13.80	13.81	
	WATER ADDED	(ml)	4%	6%	8%	10%	
A	WT. OF SOIL & MOLD	(grams)	6114.5	6223.4	6259.7	6264.2	
B	WT. OF MOLD	(grams)	4208.8	4208.8	4208.8	4208.8	4208.8
C	WT. OF SOIL = A − B	(grams)	1905.7	2014.6	2050.9	2055.4	
D	WET UNIT WT.(1) = C X 0.066	(pcf)	125.8	133.0	135.4	135.7	
E	DRY UNIT WT. = D / [1 + (K/100)]	(pcf)	115.5	119.6	119.5	117.4	

NOTE: IF CALIBRATED MOLD OF 1/30 FT^3 IS USED, THE WET DENSITY IS CALCULATED FROM THE WEIGHT OF SOIL, THE VOLUME OF THE MOLD AND THE CONVERSION FROM GRAMS TO POUNDS (I.E., CONVERSION FACTOR = (30 / 453.6) = 0.066). THE MOLD MUST BE CALIBRATED TO VERIFY A CAPACITY OF 1/30 ± 0.0005 FT^3 ON INTERVALS NOT TO EXCEED 1000 TIMES THAT THE MOLD IS FILLED.

MOISTURE CONTENT – ASTM D 2216

QA ID: DLE

	TARE NO.		#304	#8	104-A	#215	
F	WT. OF TARE	(grams)	8.3	8.3	8.3	8.3	
G	WT. OF WET SOIL & TARE	(grams)	550.4	500.9	582.0	550.9	
H	WT. OF DRY SOIL & TARE	(grams)	506.0	451.4	514.7	477.6	
I	WT. OF WATER = G − H	(grams)	44.4	49.5	67.3	73.2	
J	WT. DRY SOIL = H − F	(grams)	497.7	443.1	506.4	469.3	
K	MOISTURE CONTENT = (I/J) X 100	(%)	8.9	11.2	13.3	15.6	

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FLUOR FERNALD

CORRECTION OF UNIT WEIGHT AND WATER CONTENT FOR SOILS CONTAINING OVERSIZE PARTICLES *(ASTM D 4718)*

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO **PROJECT NO.** GQ 134 **TASK NO.** 04.1

DESCRIPTION: Phase III **DATE:** 15 day Oct month 2001 year

MATERIAL TYPE: Low Perm Clay LP01-35 STD

Weight of Total Sample	=	38,003.3
Weight of Oversize Fraction	=	1754.5
Weight of Finer Fraction (- 3/8)	=	36248.8
Percentage of Oversize Fraction	= (P_C)	4.6
Percentage of Finer Fraction (- 3/8)	= (P_F)	95.4
Specific Gravity (Assumed)	= (G_M)	2.72

(W_F)	=	Water Content - 3/8 , as decimal	=	0.13
(W_C)	=	Water Content + 3/8 , as decimal	=	0.015
(δ_F)	=	Dry Density of finer fraction	=	121.6
(δ_W)	=	Unit Weight of Water	=	62.4

$$C_W=(W_F P_F)+(W_C P_C)$$

$C_w = 12.5\%$

$$C\delta_D=100\delta_F G_M \delta_W/(\delta_F P_C)+(G_M \delta_W P_F)$$

$C_{\delta D} = 123.2$

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FLUOR FERNALD

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MOISTURE-DENSITY RELATIONSHIP

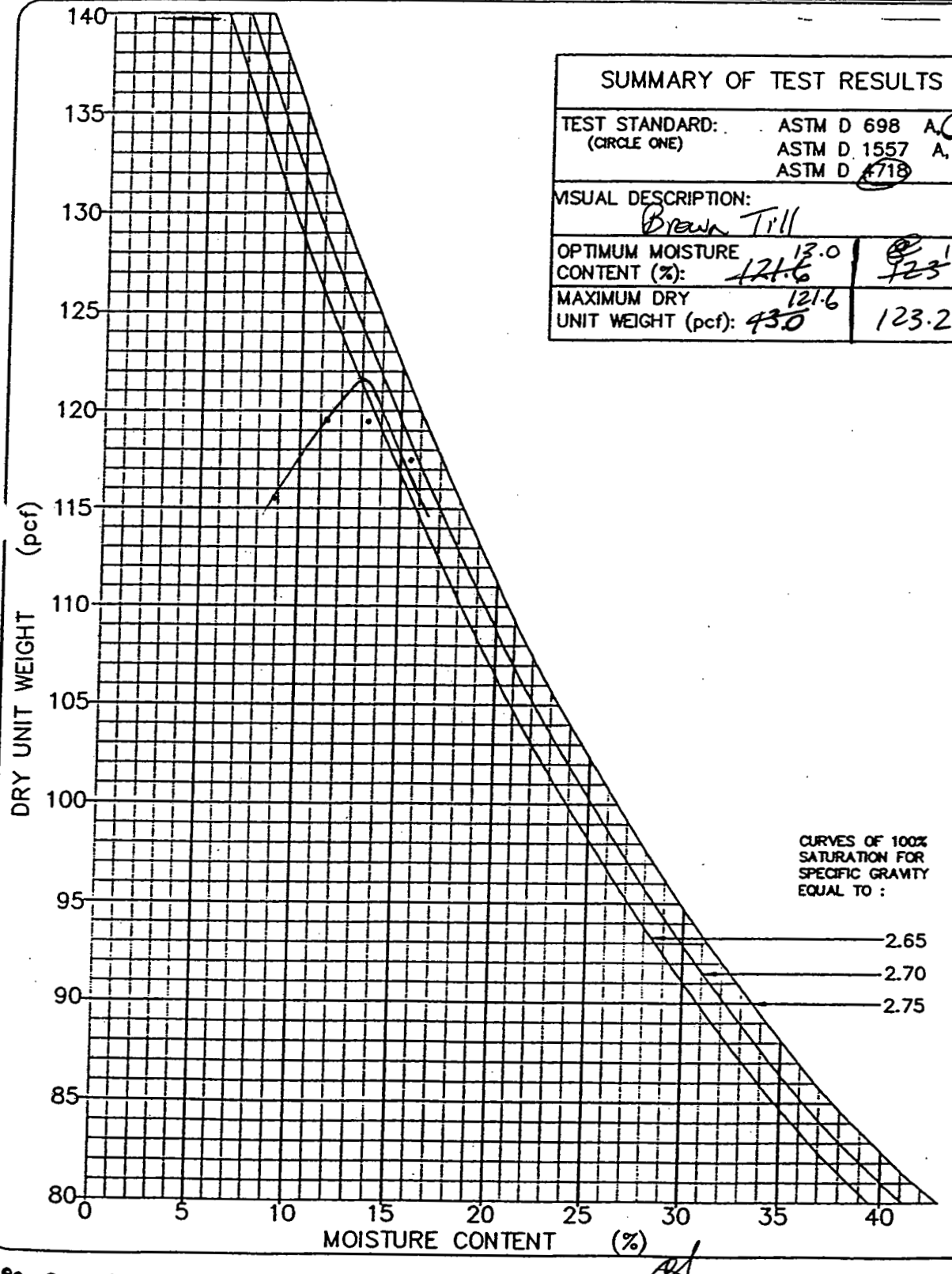
PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO PROJECT NO.: GQ1341 TASK NO.: 04.1

DESCRIPTION: Phase III DATE: 15 day Oct month 2001 year

MATERIAL TYPE: LOW PERM CLAY MATERIAL SOURCE: STOCKPILE 01-6 SAMPLE NO.: LP01-35

SUMMARY OF TEST RESULTS		QA ID
TEST STANDARD: (CIRCLE ONE) ASTM D 698 A, B, C; ASTM D 1557 A, B, C; ASTM D 4718		CL
VISUAL DESCRIPTION: Brown Till		CL
OPTIMUM MOISTURE CONTENT (%): ~~121.6~~ 13.0	~~123~~ 12.5	CL
MAXIMUM DRY UNIT WEIGHT (pcf): ~~43.0~~ 121.6	123.2	CL



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FLUOR FERNALD

FIELD LABORATORY COMPACTION TEST

(ASTM D 1557 METHOD B)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO — PROJECT NO.: GQ134 TASK NO.: 04.1

DESCRIPTION: PHASE III — DATE: 11 day OCT month 2001 year

MATERIAL TYPE: LOW PERM CLAY — MATERIAL SOURCE: STOCKPILE 01-6 — SAMPLE NO.: LP-01-35

THIS METHOD WILL BE USED IF THE MATERIAL RETAINED ON THE NO. 4-in. (4.75-mm) SIEVE IS GREATER THAN 20%, AND THE MATERIAL RETAINED ON THE NO. 3/8-in. (9.5-mm) SIEVE IS LESS THAN 20%.
ALL MATERIAL RETAINED ON THE NO. 3/8-in. (9.5-mm) SIEVE IS DISCARDED.
USE OVERSIZE CORRECTION IF MORE THAN 5% IS DISCARDED ACCORDING TO ASTM D 4718.
USE A 4-in. DIAMETER MOLD / 10-lb RAMMER / 18-in. DROP / 5 LAYERS / 25 BLOWS PER LAYER.

COMPACTION OF SOIL — QA ID: TBY

			13.98 lbs	14.20 lbs	14.23 lbs	14.07 lbs	
	WATER ADDED	(ml)	2%	+4%	+6%	+8%	
A	WT. OF SOIL & MOLD	(grams)	6341.3	6441.1	6454.7	6382.2	
B	WT. OF MOLD	(grams)	4273.5	4273.5	4273.5	4273.5	
C	WT. OF SOIL = A − B	(grams)	2067.8	2167.6	2181.2	2108.7	
D	WET UNIT WT.(1) = C X 0.066	(pcf)	136.5	143.1	144.0	139.2	
E	DRY UNIT WT. = D / [1 + (K/100)]	(pcf)	127.2	130.8	129.3	122.8	

NOTE: IF CALIBRATED MOLD OF 1/30 FT^3 IS USED, THE WET DENSITY IS CALCULATED FROM THE WEIGHT OF SOIL, THE VOLUME OF THE MOLD AND THE CONVERSION FROM GRAMS TO POUNDS (I.E., CONVERSION FACTOR = (30 / 453.6) = 0.066). THE MOLD MUST BE CALIBRATED TO VERIFY A CAPACITY OF 1/30 ± 0.0005 FT^3 ON INTERVALS NOT TO EXCEED 1000 TIMES THAT THE MOLD IS FILLED.

MOISTURE CONTENT — ASTM D 2216 — QA ID: TBY

	TARE NO.		#33	#1	#A	#26	
F	WT. OF TARE	(grams)	8.1	8.3	7.9	8.3	
G	WT. OF WET SOIL & TARE	(grams)	595.2	648.3	564.0	592.5	
H	WT. OF DRY SOIL & TARE	(grams)	555.4	593.4	507.2	523.7	
I	WT. OF WATER = G − H	(grams)	39.8	54.9	56.8	68.8	
J	WT. DRY SOIL = H − F	(grams)	547.3	585.1	499.3	515.4	
K	MOISTURE CONTENT = (I/J) X 100	(%)	7.3	9.4	11.4	13.3	

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FLUOR FERNALD

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CORRECTION OF UNIT WEIGHT AND WATER CONTENT FOR SOILS CONTAINING OVERSIZE PARTICLES *(ASTM D 4718)*

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO PROJECT NO. GQ134 TASK NO. 04.1

DESCRIPTION: Phase III DATE: 15 day Oct month 2001 year

MATERIAL TYPE: LOW PERM Clay LP01-35 MOD

Weight of Total Sample	=	38,003.3
Weight of Oversize Fraction	=	1754.5
Weight of Finer Fraction (- 3/8)	=	36248.8
Percentage of Oversize Fraction	= (P_C)	4.6
Percentage of Finer Fraction (- 3/8)	= (P_F)	95.4
Specific Gravity (Assumed)	= (G_M)	2.72

(W_F) =	Water Content - 3/8 , as decimal	=	0.10
(W_C) =	Water Content + 3/8 , as decimal	=	0.015
(δ_F) =	Dry Density of finer fraction	=	130.2
(δ_W) =	Unit Weight of Water	=	62.4

$$C_W=(W_F P_F)+(W_C P_C)$$

C_W = ~~12.3%~~ 9.6% (CS)

$$C\delta_D=100\delta_F G_M \delta_W/(\delta_F P_C)+(G_M \delta_W P_F)$$

$C_{\delta D}$ = ~~123.9~~ pcf 131.6% (CS)

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2 of 3

GEOSYNTEC CONSULTANTS

FLUOR FERNALD

4940

MOISTURE-DENSITY RELATIONSHIP

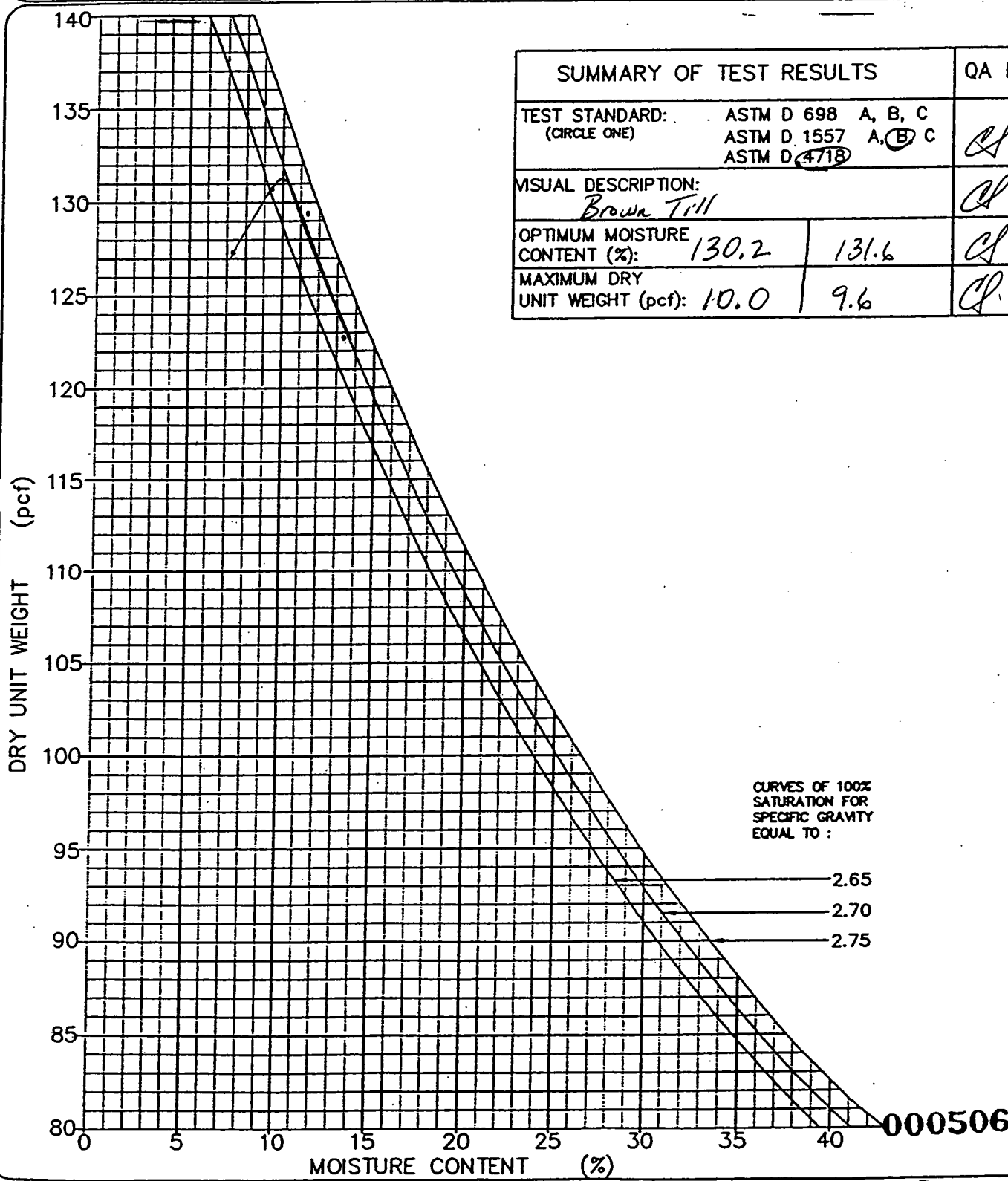
PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO PROJECT NO.: GQ1341 TASK NO.: 04.1

DESCRIPTION: Phase III DATE: 15 day Oct month 2001 year

MATERIAL TYPE: Low Perm Clay MATERIAL SOURCE: STOCKPILE Ø1-6 SAMPLE NO.: LPØ1-35

SUMMARY OF TEST RESULTS			QA ID
TEST STANDARD: (CIRCLE ONE)	ASTM D 698 A, B, C ASTM D 1557 A, (B) C ASTM D (4718)		CA
VISUAL DESCRIPTION: Brown Till			CA
OPTIMUM MOISTURE CONTENT (%):	130.2	131.6	CA
MAXIMUM DRY UNIT WEIGHT (pcf):	10.0	9.6	CA



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GEOSYNTEC CONSULTANTS

FLUOR FERNALD

FIELD LABORATORY COMPACTION TEST

(ASTM D 698 METHOD B)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO

PROJECT NO. 6Q134 TASK NO.: 04.1

DESCRIPTION: Phase III

DATE: 11 day Oct month 2001 year

MATERIAL TYPE: Low Perm Clay MATERIAL SOURCE: STOCKPILE 01-6 SAMPLE NO.: LP-01-36

THIS METHOD WILL BE USED IF THE MATERIAL RETAINED ON THE NO. 3/4-in. (19-mm) SIEVE IS LESS THAN 30%, IF THE MATERIAL RETAINED ON THE NO. 4 (4.75-mm) SIEVE IS GREATER THAN 20%, AND IF THE MATERIAL RETAINED ON THE NO. 3/8-in. (9.5-mm) SIEVE IS LESS THAN 20%.
ALL MATERIAL RETAINED ON THE NO. 3/8-in. (9.5-mm) SIEVE IS DISCARDED.
USE OVERSIZE CORRECTION IF MORE THAN 5% IS DISCARDED ACCORDING TO ASTM D 4718.
USE A 4-in. DIAMETER MOLD / 5.5-lb RAMMER / 12-in. DROP / 3 LAYERS / 25 BLOWS PER LAYER.

COMPACTION OF SOIL

QA ID: PCF

			13.43	13.62	13.78	13.84	
	WATER ADDED	(ml)	4%	6%	8%	10%	
A	WT. OF SOIL & MOLD	(grams)	6091.8	6178.0	6250.6	6277.8	
B	WT. OF MOLD	(grams)	4208.8	4208.8	4208.8	4208.8	
C	WT. OF SOIL = A − B	(grams)	1883.0	1969.2	2041.8	2069.0	
D	WET UNIT WT.(1) = C X 0.066	(pcf)	124.3	130.0	134.8	136.6	
E	DRY UNIT WT. = D / [1 + (K/100)]	(pcf)	115.4	117.8	120.7	119.7	

NOTE: IF CALIBRATED MOLD OF 1/30 FT^3 IS USED, THE WET DENSITY IS CALCULATED FROM THE WEIGHT OF SOIL, THE VOLUME OF THE MOLD AND THE CONVERSION FROM GRAMS TO POUNDS (I.E., CONVERSION FACTOR = (30 / 453.6) = 0.066). THE MOLD MUST BE CALIBRATED TO VERIFY A CAPACITY OF 1/30 ± 0.0005 FT^3 ON INTERVALS NOT TO EXCEED 1000 TIMES THAT THE MOLD IS FILLED.

MOISTURE CONTENT – ASTM D 2216

QA ID: DLG/CS

	TARE NO.		#232	#27	#231	#103	
F	WT. OF TARE	(grams)	8.2	8.2	8.0	8.3	
G	WT. OF WET SOIL & TARE	(grams)	532.6	503.4	535.3	526.9	
H	WT. OF DRY SOIL & TARE	(grams)	495.2	457.0	480.1	463.0	
I	WT. OF WATER = G − H	(grams)	37.4	46.4	55.2	63.9	
J	WT. DRY SOIL = H − F	(grams)	487.0	448.8	472.1	454.7	
K	MOISTURE CONTENT = (I/J) X 100	(%)	7.7	10.3	11.7	14.1	

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FLUOR FERNALD

CORRECTION OF UNIT WEIGHT AND WATER CONTENT FOR SOILS CONTAINING OVERSIZE PARTICLES *(ASTM D 4718)*

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO **PROJECT NO.** G01341 **TASK NO.** 04.1

DESCRIPTION: Phase III **DATE:** 15 day Oct month 2001 year

MATERIAL TYPE: LOW PERM Clay LPP1-36 STD

Weight of Total Sample	=	19,713.2
Weight of Oversize Fraction	=	593.5
Weight of Finer Fraction (- 3/8)	=	19119.7
Percentage of Oversize Fraction	= (P_C)	3.0
Percentage of Finer Fraction (- 3/8)	= (P_F)	97.0
Specific Gravity (Assumed)	= (G_M)	2.72

(W_F)	=	Water Content - 3/8 , as decimal	=	0.128
(W_C)	=	Water Content + 3/8 , as decimal	=	0.015
(δ_F)	=	Dry Density of finer fraction	=	122.3
(δ_W)	=	Unit Weight of Water	=	62.4

$$C_W=(W_F P_F)+(W_C P_C)$$

$C_W = 12.5\%$

$$C\delta_D=100\delta_F G_M \delta_W/(\delta_F P_C)+(G_M \delta_W P_F)$$

$C_{\delta D} = 123.3$ pcf

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FLUOR FERNALD

4940

MOISTURE–DENSITY RELATIONSHIP

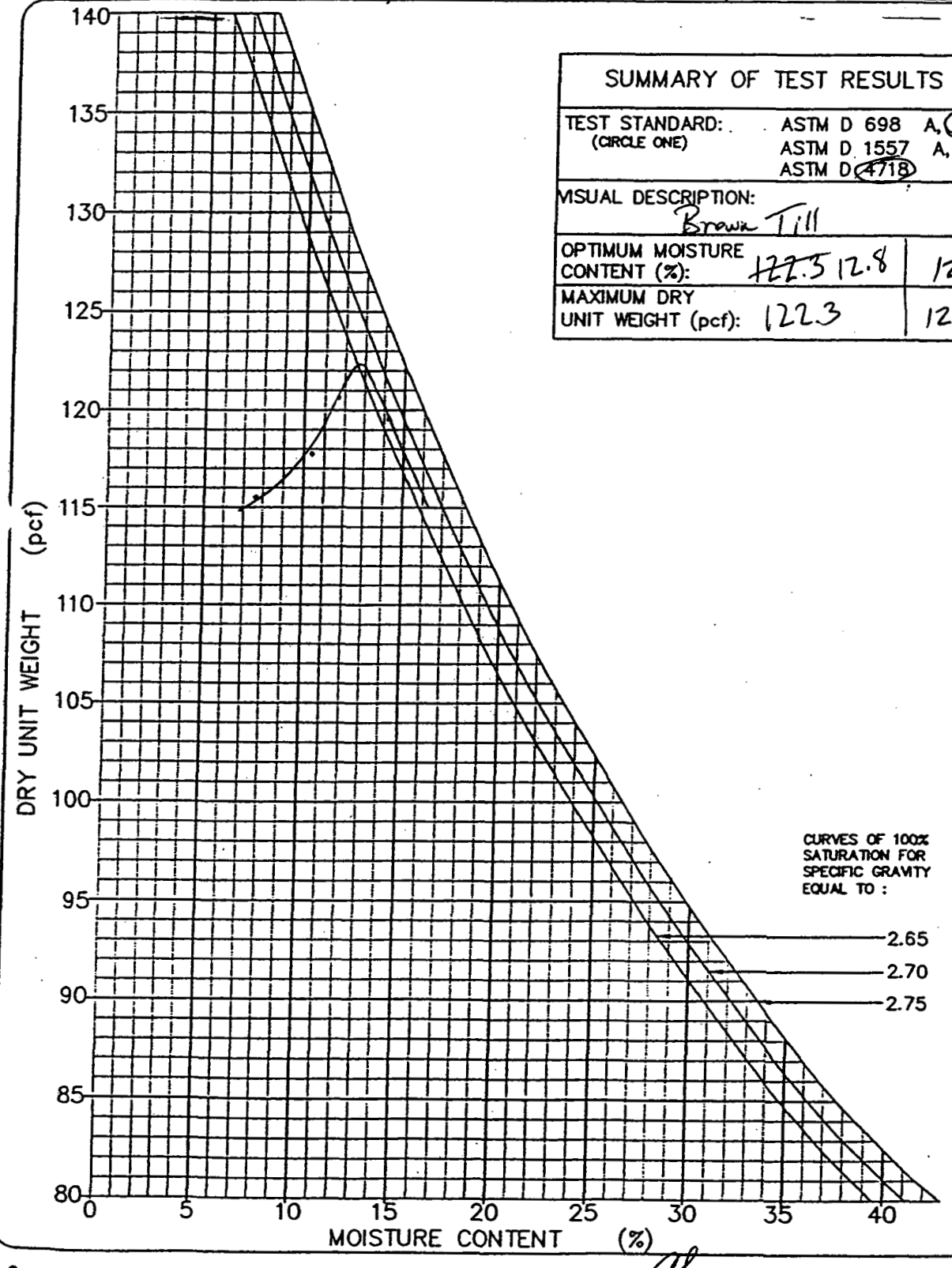
PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO PROJECT NO.: GQ1341 TASK NO.: 04.1

DESCRIPTION: Phase III DATE: 11 day Oct month 2001 year

MATERIAL TYPE: Low Perm Clay MATERIAL SOURCE: Stockpile 01-6 SAMPLE NO.: LP01-36

SUMMARY OF TEST RESULTS			QA ID
TEST STANDARD: (CIRCLE ONE)	ASTM D 698 A, (B) C ASTM D 1557 A, B, C ASTM D (4718)		CL
VISUAL DESCRIPTION: Brown Till			CL
OPTIMUM MOISTURE CONTENT (%):	~~12.5~~ 12.8	12.5	CL
MAXIMUM DRY UNIT WEIGHT (pcf):	122.3	123.3	CL



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GEOSYNTEC CONSULTANTS

FLUOR FERNALD

FIELD LABORATORY COMPACTION TEST

(ASTM D 698 METHOD B)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO

PROJECT NO. 6Q1341 TASK NO.: 04.1

DESCRIPTION: Phase III

DATE: 11 day OCT month 2001 year

MATERIAL TYPE: Low Perm Clay MATERIAL SOURCE: STOCKPILE 01-6 SAMPLE NO.: LP-01-37

THIS METHOD WILL BE USED IF THE MATERIAL RETAINED ON THE NO. 3/4-in. (19-mm) SIEVE IS LESS THAN 30%, IF THE MATERIAL RETAINED ON THE NO. 4 (4.75-mm) SIEVE IS GREATER THAN 20%, AND IF THE MATERIAL RETAINED ON THE NO. 3/8-in. (9.5-mm) SIEVE IS LESS THAN 20%.
ALL MATERIAL RETAINED ON THE NO. 3/8-in. (9.5-mm) SIEVE IS DISCARDED.
USE OVERSIZE CORRECTION IF MORE THAN 5% IS DISCARDED ACCORDING TO ASTM D 4718.
USE A 4-in. DIAMETER MOLD / 5.5-lb RAMMER / 12-in. DROP / 3 LAYERS / 25 BLOWS PER LAYER.

13.80

COMPACTION OF SOIL

QA ID: DLE

				13.34	13.58	13.83	
	WATER ADDED	(ml)		4%	6%	8%	10%
A	WT. OF SOIL & MOLD	(grams)		6051.0	6159.9	6273.3	6259.7
B	WT. OF MOLD	(grams)		4208.8	4208.8	4208.8	4208.8
C	WT. OF SOIL = A − B	(grams)		1842.2	1951.1	2064.5	2050.9
D	WET UNIT WT.(1) = C X 0.066	(pcf)		121.6	128.8	136.3	135.4
E	DRY UNIT WT. = D / [1 + (K/100)]	(pcf)		113.3	117.9	122.4	119.4

NOTE: IF CALIBRATED MOLD OF 1/30 FT^3 IS USED, THE WET DENSITY IS CALCULATED FROM THE WEIGHT OF SOIL, THE VOLUME OF THE MOLD AND THE CONVERSION FROM GRAMS TO POUNDS (I.E., CONVERSION FACTOR = (30 / 453.6) = 0.066). THE MOLD MUST BE CALIBRATED TO VERIFY A CAPACITY OF 1/30 ± 0.0005 FT^3 ON INTERVALS NOT TO EXCEED 1000 TIMES THAT THE MOLD IS FILLED.

MOISTURE CONTENT − ASTM D 2216

QA ID: _____

	TARE NO.			#34	#206	#11	#204
F	WT. OF TARE	(grams)		8.3	8.3	8.1	8.1
G	WT. OF WET SOIL & TARE	(grams)		455.3	502.4	461.7	530.2
H	WT. OF DRY SOIL & TARE	(grams)		425.0	460.8	415.5	468.5
I	WT. OF WATER = G − H	(grams)		30.3	41.6	46.2	61.7
J	WT. DRY SOIL = H − F	(grams)		416.7	452.5	407.4	460.4
K	MOISTURE CONTENT = (I/J) X 100	(%)		7.3	9.2	11.3	13.4

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GeoSyntec Consultants

FLUOR FERNALD

CORRECTION OF UNIT WEIGHT AND WATER CONTENT FOR SOILS CONTAINING OVERSIZE PARTICLES *(ASTM D 4718)*

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO PROJECT NO. GQ1341 TASK NO. 04.1

DESCRIPTION: PHASE III DATE: 15 day Oct month 2001 year

MATERIAL TYPE: Low Perm CLAY LP-01-37 STD

Weight of Total Sample	=	32,635.3 g
Weight of Oversize Fraction	=	1,439.8 g
Weight of Finer Fraction (- 3/8)	=	31,195.5 g
Percentage of Oversize Fraction	= (P_C)	4.4
Percentage of Finer Fraction (- 3/8)	= (P_F)	95.6
Specific Gravity (Assumed)	= (G_M)	2.72

(W_F)	=	Water Content - 3/8 , as decimal	=	0.118
(W_C)	=	Water Content + 3/8 , as decimal	=	0.015
(δ_F)	=	Dry Density of finer fraction	=	123.0
(δ_W)	=	Unit Weight of Water	=	62.4

$$C_W=(W_F P_F)+(W_C P_C) = \boxed{11.3\% M}$$

$$C\delta_D=100\delta_F G_M \delta_W/(\delta_F P_C)+(G_M \delta_W P_F) = \boxed{124.5 \text{ pcf}}$$

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FLUOR FERNALD

4940

MOISTURE-DENSITY RELATIONSHIP

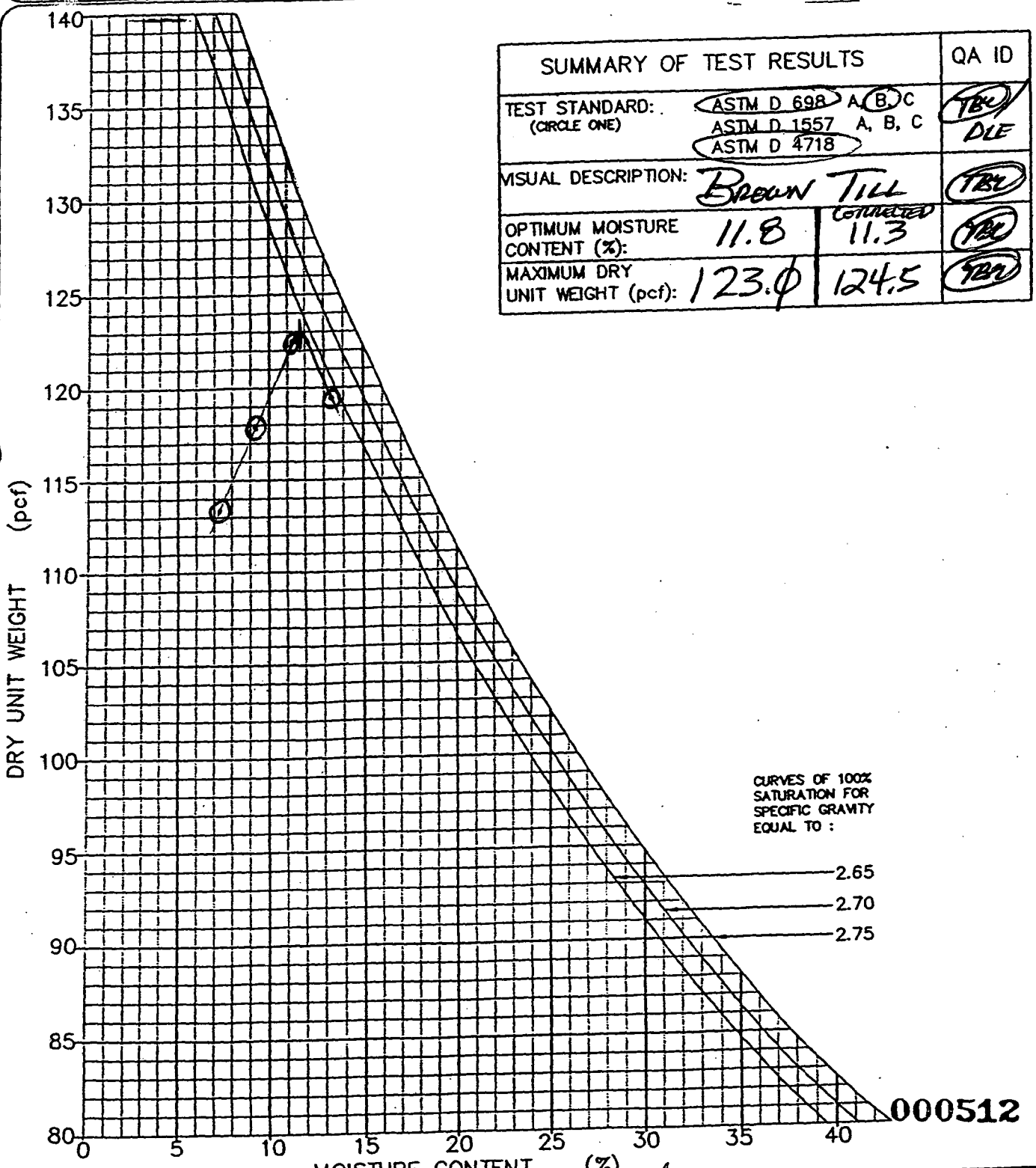
PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO PROJECT NO.: GQ1341 TASK NO.: 04.1

DESCRIPTION: PHASE III DATE: 15 day OCT month 2001 year

MATERIAL TYPE: LOW PERM CLAY MATERIAL SOURCE: STOCKPILE 01-6 SAMPLE NO.: LP-01-37

SUMMARY OF TEST RESULTS			QA ID
TEST STANDARD: (CIRCLE ONE)	ASTM D 698 A, B, C ASTM D 1557 A, B, C ASTM D 4718		TBC DLE
VISUAL DESCRIPTION:	BROWN TILL		TBC
OPTIMUM MOISTURE CONTENT (%):	11.8	CORRECTED 11.3	TBC
MAXIMUM DRY UNIT WEIGHT (pcf):	123.0	124.5	TBC



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GEOSYNTEC CONSULTANTS

FLUOR FERNALD

FIELD LABORATORY COMPACTION TEST

(ASTM D 1557 METHOD B)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO

PROJECT NO.: 6Q134 TASK NO.: 04.1

DESCRIPTION: PHASE III

DATE: 11 day OCT month 2001 year

MATERIAL TYPE: LOW PERM CLAY MATERIAL SOURCE: STOCKPILE 01-6 SAMPLE NO.: LP-01-37

THIS METHOD WILL BE USED IF THE MATERIAL RETAINED ON THE NO. 4-in. (4.75-mm) SIEVE IS GREATER THAN 20%, AND THE MATERIAL RETAINED ON THE NO. 3/8-in. (9.5-mm) SIEVE IS LESS THAN 20%.
ALL MATERIAL RETAINED ON THE NO. 3/8-in. (9.5-mm) SIEVE IS DISCARDED.
USE OVERSIZE CORRECTION IF MORE THAN 5% IS DISCARDED ACCORDING TO ASTM D 4718.
USE A 4-in. DIAMETER MOLD / 10-lb RAMMER / 18-in. DROP / 5 LAYERS / 25 BLOWS PER LAYER.

COMPACTION OF SOIL — QA ID: TBC

			14.05 lbs	14.24 lbs	14.20 lbs	13.85 lbs	
	WATER ADDED	(ml)	+4%	+6%	+8%	+2%	
A	WT. OF SOIL & MOLD	(grams)	6373.1	6459.3	6441.1	6282.4	
B	WT. OF MOLD	(grams)	4273.5	4273.5	4273.5	4273.5	
C	WT. OF SOIL = A − B	(grams)	2099.6	2185.8	2167.6	2008.9	
D	WET UNIT WT.(1) = C X 0.066	(pcf)	138.6	144.3	143.1	132.6	
E	DRY UNIT WT. = D / [1 + (K/100)]	(pcf)	128.7	131.5	128.3	125.7	

NOTE: IF CALIBRATED MOLD OF 1/30 FT^3 IS USED, THE WET DENSITY IS CALCULATED FROM THE WEIGHT OF SOIL, THE VOLUME OF THE MOLD AND THE CONVERSION FROM GRAMS TO POUNDS (I.E., CONVERSION FACTOR = (30 / 453.6) = 0.066). THE MOLD MUST BE CALIBRATED TO VERIFY A CAPACITY OF 1/30 ± 0.0005 FT^3 ON INTERVALS NOT TO EXCEED 1000 TIMES THAT THE MOLD IS FILLED.

MOISTURE CONTENT — ASTM D 2216 — QA ID: TBC

	TARE NO.		#13	#28	#207	#20	
F	WT. OF TARE	(grams)	8.2	8.3	8.4	8.3	
G	WT. OF WET SOIL & TARE	(grams)	580.0	602.7	592.8	586.0	
H	WT. OF DRY SOIL & TARE	(grams)	539.4	550.2	532.3	556.1	
I	WT. OF WATER = G − H	(grams)	40.6	52.5	60.5	29.9	
J	WT. DRY SOIL = H − F	(grams)	531.2	541.9	523.9	547.8	
K	MOISTURE CONTENT = (I/J) X 100	(%)	7.6	9.7	11.5	5.5	

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FLUOR FERNALD

CORRECTION OF UNIT WEIGHT AND WATER CONTENT FOR SOILS CONTAINING OVERSIZE PARTICLES *(ASTM D 4718)*

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO PROJECT NO. 60134 TASK NO. 04.1

DESCRIPTION: PHASE III DATE: 15 day OCT month 2001 year

MATERIAL TYPE: LOW PERM CLAY (LP-01-37) MOD

Weight of Total Sample	=	32,635.3g
Weight of Oversize Fraction	=	1,439.8g
Weight of Finer Fraction (- 3/8)	=	31,195.5g
Percentage of Oversize Fraction	= (P_C)	4.4
Percentage of Finer Fraction (- 3/8)	= (P_F)	95.6
Specific Gravity (Assumed)	= (G_M)	2.72

(W_F)	=	Water Content - 3/8 , as decimal	=	0.10
(W_C)	=	Water Content + 3/8 , as decimal	=	0.015
(δ_F)	=	Dry Density of finer fraction	=	132.0
(δ_W)	=	Unit Weight of Water	=	62.4

$$C_W=(W_F P_F)+(W_C P_C) = \boxed{9.6\ \%m}$$

$$C\delta_D=100\delta_F G_M \delta_W/(\delta_F P_C)+(G_M \delta_W P_F) = \boxed{133.3\ pcf}$$

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FLUOR FERNALD

4940

MOISTURE–DENSITY RELATIONSHIP

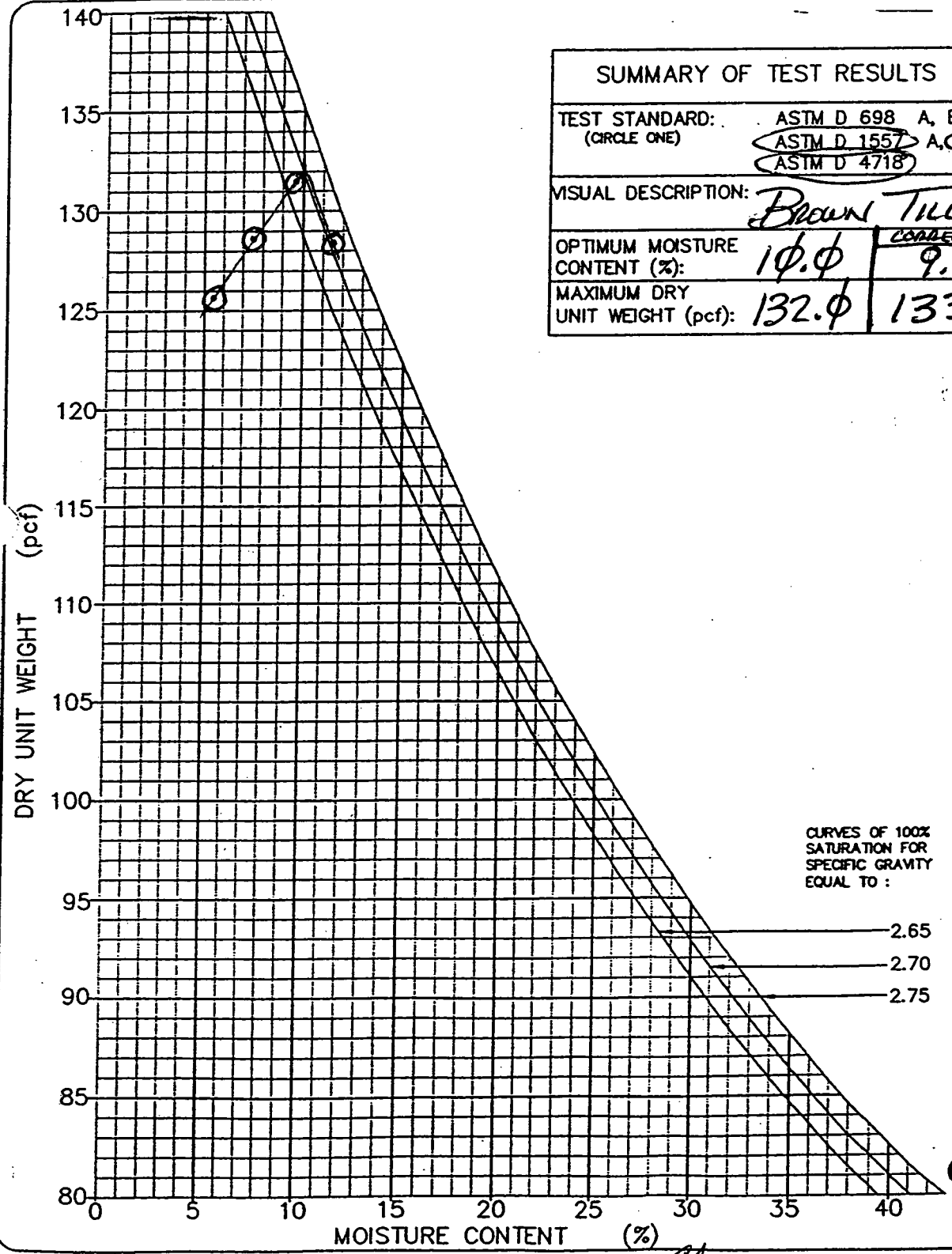
PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO PROJECT NO.: 6Q134 TASK NO.: 041

DESCRIPTION: PHASE III DATE: 15 day OCT month 2001 year

MATERIAL TYPE: LOW PERM CLAY MATERIAL SOURCE: STOCKPILE 01-6 SAMPLE NO.: LP-01-37

SUMMARY OF TEST RESULTS			QA ID
TEST STANDARD: (CIRCLE ONE)	ASTM D 698 A, B, C ASTM D 1557 A, B, C ASTM D 4718		TBC
VISUAL DESCRIPTION:	BROWN TILL		TBC
OPTIMUM MOISTURE CONTENT (%):	10.0	CORRECTED 9.6	TBC
MAXIMUM DRY UNIT WEIGHT (pcf):	132.0	133.3	TBC



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FLUOR FERNALD

FIELD LABORATORY COMPACTION TEST

(ASTM D 698 METHOD B)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO

PROJECT NO. 6Q134 TASK NO.: 04.1

DESCRIPTION: Phase III

DATE: 11 day OCT month 2001 year

MATERIAL TYPE: Low Perm Clay MATERIAL SOURCE: STOCKPILE 01-5 SAMPLE NO.: LP-01-38

THIS METHOD WILL BE USED IF THE MATERIAL RETAINED ON THE NO. 3/4-in. (19-mm) SIEVE IS LESS THAN 30%, IF THE MATERIAL RETAINED ON THE NO. 4 (4.75-mm) SIEVE IS GREATER THAN 20%, AND IF THE MATERIAL RETAINED ON THE NO. 3/8-in. (9.5-mm) SIEVE IS LESS THAN 20%.
ALL MATERIAL RETAINED ON THE NO. 3/8-in. (9.5-mm) SIEVE IS DISCARDED.
USE OVERSIZE CORRECTION IF MORE THAN 5% IS DISCARDED ACCORDING TO ASTM D 4718.
USE A 4-in. DIAMETER MOLD / 5.5-lb RAMMER / 12-in. DROP / 3 LAYERS / 25 BLOWS PER LAYER.

COMPACTION OF SOIL

QA ID: DLE

			13.33	13.54	13.78	13.78	
	WATER ADDED	(ml)	4%	6%	8%	10%	
A	WT. OF SOIL & MOLD	(grams)	6046.5	6141.7	6250.6	6250.6	
B	WT. OF MOLD	(grams)	4208.8	4208.8	4208.8	4208.8	
C	WT. OF SOIL = A − B	(grams)	1837.7	1932.9	2041.8	2041.8	
D	WET UNIT WT.(1) = C X 0.066	(pcf)	121.3	127.6	134.8	134.8	
E	DRY UNIT WT. = D / [1 + (K/100)]	(pcf)	112.5	115.8	120.0	117.8	

NOTE: IF CALIBRATED MOLD OF 1/30 FT^3 IS USED, THE WET DENSITY IS CALCULATED FROM THE WEIGHT OF SOIL, THE VOLUME OF THE MOLD AND THE CONVERSION FROM GRAMS TO POUNDS (I.E., CONVERSION FACTOR = (30 / 453.6) = 0.066). THE MOLD MUST BE CALIBRATED TO VERIFY A CAPACITY OF 1/30 ± 0.0005 FT^3 ON INTERVALS NOT TO EXCEED 1000 TIMES THAT THE MOLD IS FILLED.

MOISTURE CONTENT – ASTM D 2216

QA ID: DLE/TBY

	TARE NO.		#234	#105	#31	#307	
F	WT. OF TARE	(grams)	8.3	8.2	8.3	8.3	
G	WT. OF WET SOIL & TARE	(grams)	454.6	490.5	502.3	477.6	
H	WT. OF DRY SOIL & TARE	(grams)	422.2	445.8	448.3	418.6	
I	WT. OF WATER = G − H	(grams)	32.4	44.7	54.0	59.0	
J	WT. DRY SOIL = H − F	(grams)	413.9	437.6	440.0	410.3	
K	MOISTURE CONTENT = (I/J) X 100	(%)	7.8	10.2	12.3	14.4	

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GeoSyntec Consultants

FLUOR FERNALD

CORRECTION OF UNIT WEIGHT AND WATER CONTENT FOR SOILS CONTAINING OVERSIZE PARTICLES *(ASTM D 4718)*

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO PROJECT NO. 6Q134 TASK NO. 04.1

DESCRIPTION: PHASE III DATE: 15 day OCT month 2001 year

MATERIAL TYPE: Low Perm CLAY (LP-01-38) STD

Weight of Total Sample	=	32,684.3g
Weight of Oversize Fraction	=	693.3g
Weight of Finer Fraction (- 3/8)	=	31,991.0g
Percentage of Oversize Fraction	= (P_C)	2.1
Percentage of Finer Fraction (- 3/8)	= (P_F)	97.9
Specific Gravity (Assumed)	= (G_M)	2.72

(W_F)	=	Water Content - 3/8 , as decimal	=	0.129
(W_C)	=	Water Content + 3/8 , as decimal	=	0.015
(δ_F)	=	Dry Density of finer fraction	=	121.0
(δ_W)	=	Unit Weight of Water	=	62.4

$$C_W=(W_F P_F)+(W_C P_C) = \boxed{12.7\%M}$$

$$C\delta_D=100\delta_F G_M \delta_W/(\delta_F P_C)+(G_M \delta_W P_F) = \boxed{121.7\text{pcf}}$$

GEOSYNTEC CONSULTANTS

FLUOR FERNALD

4940

MOISTURE-DENSITY RELATIONSHIP

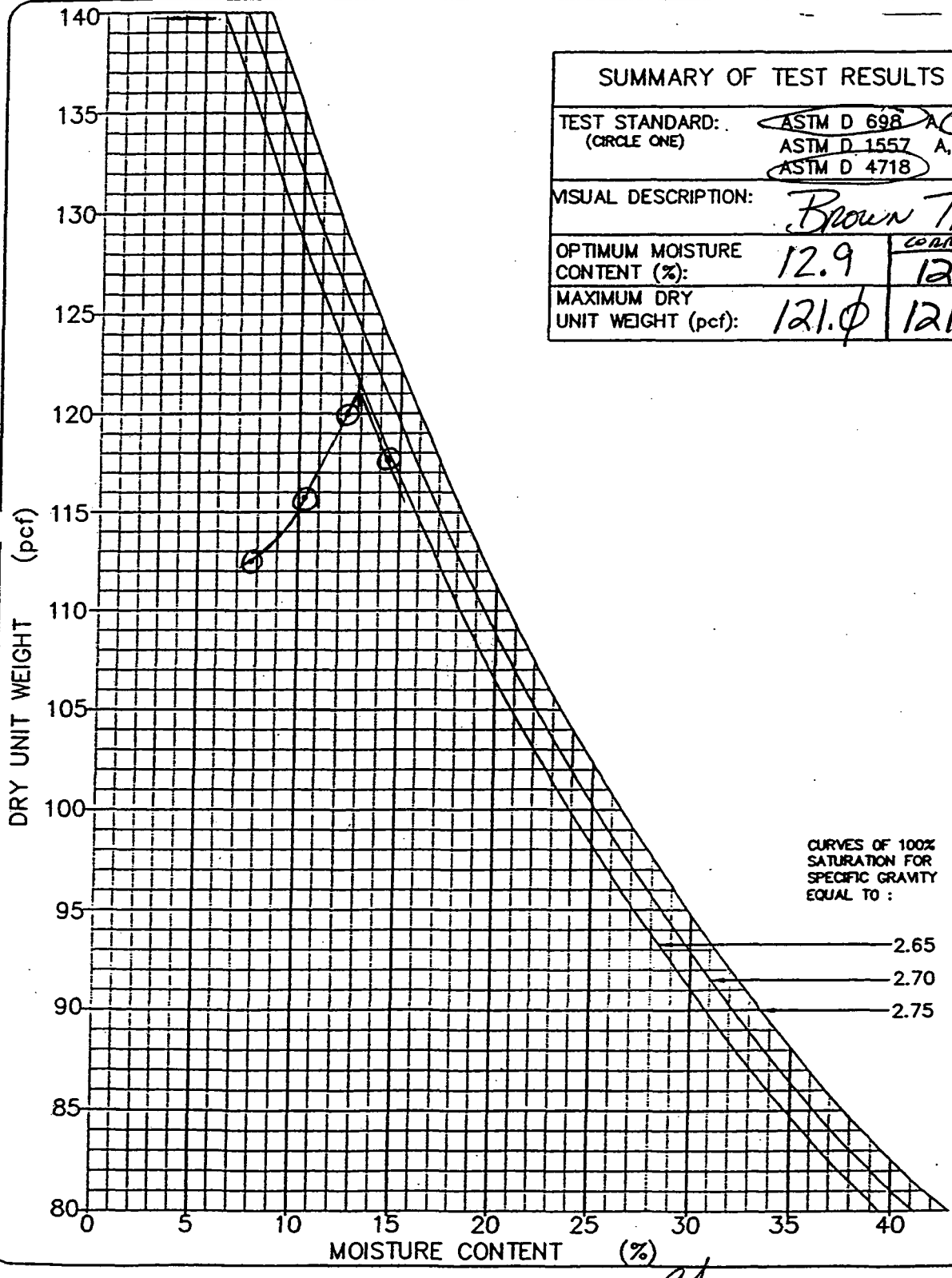
PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO PROJECT NO.: GQ1341 TASK NO.: 04.1

DESCRIPTION: PHASE III DATE: 15 day OCT month 2001 year

MATERIAL TYPE: LOW PERM CLAY MATERIAL SOURCE: STOCKPILE 01-5 SAMPLE NO.: LP-0138

SUMMARY OF TEST RESULTS			QA ID
TEST STANDARD: (CIRCLE ONE)	ASTM D 698 A B C ASTM D 1557 A, B, C ASTM D 4718		TBW / DLE
VISUAL DESCRIPTION:	BROWN TILL		TBW
OPTIMUM MOISTURE CONTENT (%):	12.9	CORRECTED 12.7	TBW
MAXIMUM DRY UNIT WEIGHT (pcf):	121.0	121.7	TBW



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FLUOR FERNALD

FIELD LABORATORY COMPACTION TEST

(ASTM D 1557 METHOD B)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO PROJECT NO.: GQ134H TASK NO.: Ø4.1

DESCRIPTION: PHASE III DATE: ____ day OCT month 2001 year

MATERIAL TYPE: LOW PERM CLAY MATERIAL SOURCE: STOCKPILE Ø1-5 SAMPLE NO.: LP-Ø1-38

THIS METHOD WILL BE USED IF THE MATERIAL RETAINED ON THE NO. 4-in. (4.75-mm) SIEVE IS GREATER THAN 20%, AND THE MATERIAL RETAINED ON THE NO. 3/8-in. (9.5-mm) SIEVE IS LESS THAN 20%.
ALL MATERIAL RETAINED ON THE NO. 3/8-in. (9.5-mm) SIEVE IS DISCARDED.
USE OVERSIZE CORRECTION IF MORE THAN 5% IS DISCARDED ACCORDING TO ASTM D 4718.
USE A 4-in. DIAMETER MOLD / 10-lb RAMMER / 18-in. DROP / 5 LAYERS / 25 BLOWS PER LAYER.

COMPACTION OF SOIL QA ID: KS/DLF

			13.98	14.13	14.15	13.76	
	WATER ADDED	(ml)	4%	6%	8%	KS/Ø7.2%	
A	WT. OF SOIL & MOLD	(grams)	6341.3	6409.4	6418.4	6241.5	
B	WT. OF MOLD	(grams)	4273.5	4273.5	4273.5	4273.5	
C	WT. OF SOIL = A − B	(grams)	2067.8	2135.9	2144.9	1968	
D	WET UNIT WT.(1) = C X 0.066	(pcf)	136.5	141.0	141.6	129.9	
E	DRY UNIT WT. = D / [1 + (K/100)]	(pcf)	126.4	128.3	125.8	122.7	

NOTE: IF CALIBRATED MOLD OF 1/30 FT^3 IS USED, THE WET DENSITY IS CALCULATED FROM THE WEIGHT OF SOIL, THE VOLUME OF THE MOLD AND THE CONVERSION FROM GRAMS TO POUNDS (I.E., CONVERSION FACTOR = (30 / 453.6) = 0.066). THE MOLD MUST BE CALIBRATED TO VERIFY A CAPACITY OF 1/30 ± 0.0005 FT^3 ON INTERVALS NOT TO EXCEED 1000 TIMES THAT THE MOLD IS FILLED.

MOISTURE CONTENT − ASTM D 2216 QA ID: KS/DLF

	TARE NO.		231	215	20	104A	
F	WT. OF TARE	(grams)	8.0	8.3	8.4	8.3	
G	WT. OF WET SOIL & TARE	(grams)	281.47	244.5	326.7	330.3	
H	WT. OF DRY SOIL & TARE	(grams)	261.3	223.3	291.1	312.3	
I	WT. OF WATER = G − H	(grams)	20.17	21.2	35.6	18.0	
J	WT. DRY SOIL = H − F	(grams)	253.3	215.0	282.7	304.0	
K	MOISTURE CONTENT = (I/J) X 100	(%)	8.0	9.9	12.6	5.9	

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1.080 1.099 1.126 1.059

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FLUOR FERNALD

CORRECTION OF UNIT WEIGHT AND WATER CONTENT FOR SOILS CONTAINING OVERSIZE PARTICLES *(ASTM D 4718)*

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO **PROJECT NO.** G9341 **TASK NO.** 04.1

DESCRIPTION: Phase III **DATE:** 18 day Oct month 2001 year

MATERIAL TYPE: Low Perm Clay LP01-38

Weight of Total Sample	=	32 684.3
Weight of Oversize Fraction	=	693.3
Weight of Finer Fraction (- 3/8)	=	31,991.0
Percentage of Oversize Fraction	= (P_C)	2.1
Percentage of Finer Fraction (- 3/8)	= (P_F)	97.9
Specific Gravity (Assumed)	= (G_M)	2.72

(W_F)	=	Water Content - 3/8 , as decimal	=	10.5
(W_C)	=	Water Content + 3/8 , as decimal	=	.015
(δ_F)	=	Dry Density of finer fraction	=	129.5
(δ_W)	=	Unit Weight of Water	=	62.4

$$C_W=(W_F P_F)+(W_C P_C)$$

$C_W = 10.3\%$

$$C\delta_D=100\delta_F G_M \delta_W/(\delta_F P_C)+(G_M \delta_W P_F)$$

$C_{\delta D} = 130.2$ pcf

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FLUOR FERNALD

4940

MOISTURE-DENSITY RELATIONSHIP

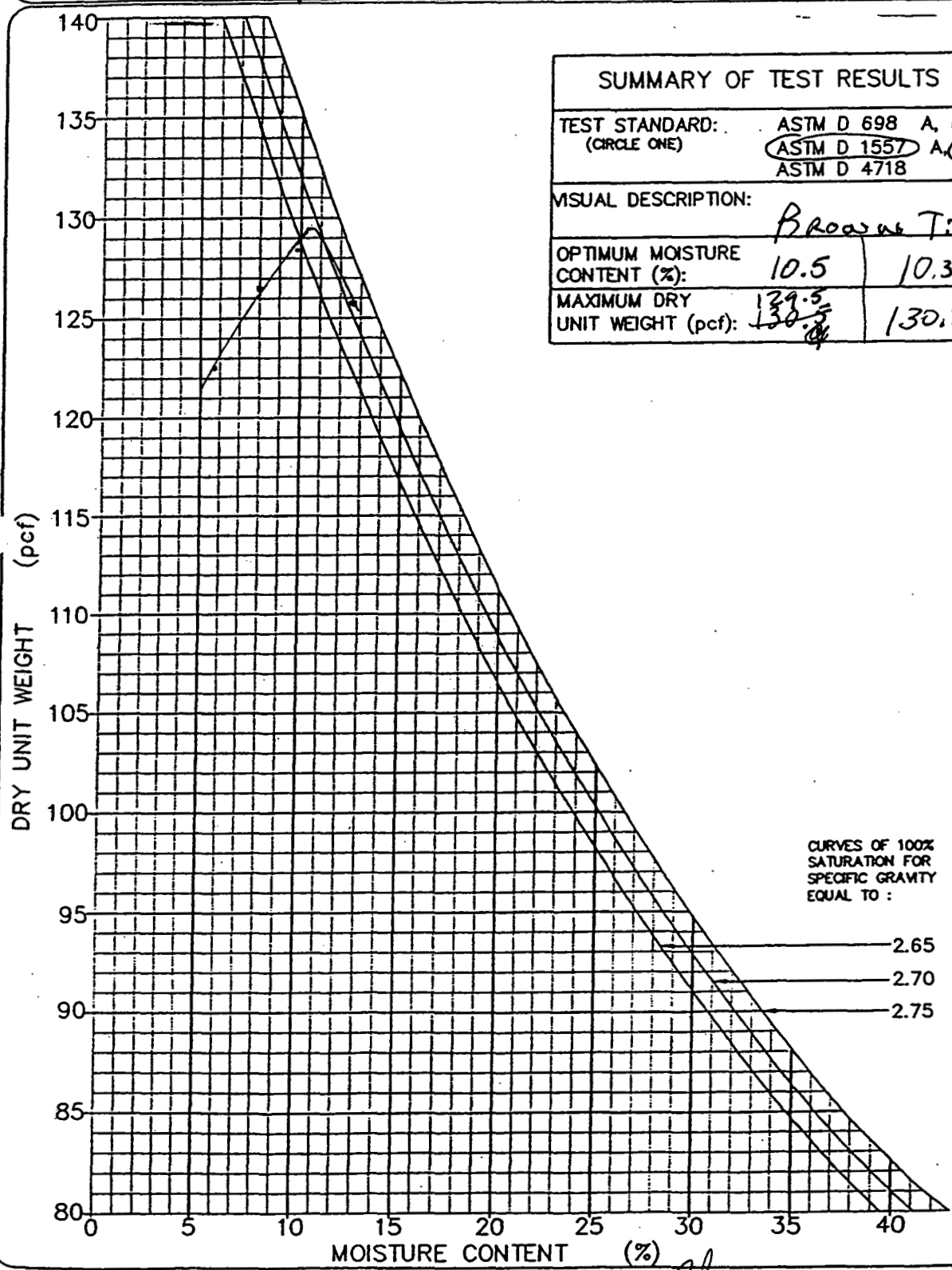
PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO PROJECT NO.: GQ1341 TASK NO.: 04.1

DESCRIPTION: Phase III DATE: 18 day Oct month 2001 year

MATERIAL TYPE: Lean clay MATERIAL SOURCE: STOCKPILE #6 SAMPLE NO.: LP01-38

SUMMARY OF TEST RESULTS			QA ID
TEST STANDARD: (CIRCLE ONE)	ASTM D 698 A, B, C ASTM D 1557 A, B, C ASTM D 4718		DLE
VISUAL DESCRIPTION:	Brown Till		DLE
OPTIMUM MOISTURE CONTENT (%):	10.5	10.3	
MAXIMUM DRY UNIT WEIGHT (pcf):	~~130.5~~ 129.5	130.2	



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FLUOR FERNALD

FIELD LABORATORY COMPACTION TEST

(ASTM D 698 METHOD B)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO

PROJECT NO. 6Q1341 TASK NO.: 041

DESCRIPTION: Phase III

DATE: 17 day OCT month 2001 year

MATERIAL TYPE: Low Perm Clay MATERIAL SOURCE: STOCKPILE 01-7 SAMPLE NO.: LP-01-40

THIS METHOD WILL BE USED IF THE MATERIAL RETAINED ON THE NO. 3/4-in. (19-mm) SIEVE IS LESS THAN 30%, IF THE MATERIAL RETAINED ON THE NO. 4 (4.75-mm) SIEVE IS GREATER THAN 20%, AND IF THE MATERIAL RETAINED ON THE NO. 3/8-in. (9.5-mm) SIEVE IS LESS THAN 20%.
ALL MATERIAL RETAINED ON THE NO. 3/8-in. (9.5-mm) SIEVE IS DISCARDED.
USE OVERSIZE CORRECTION IF MORE THAN 5% IS DISCARDED ACCORDING TO ASTM D 4718.
USE A 4-in. DIAMETER MOLD / 5.5-lb RAMMER / 12-in. DROP / 3 LAYERS / 25 BLOWS PER LAYER.

COMPACTION OF SOIL

QA ID: DUE

				13.47	13.54	13.89	13.91
	WATER ADDED	(ml)		4%	6%	8%	10%
A	WT. OF SOIL & MOLD	(grams)		6110.0	6141.7	6300.5	6309.6
B	WT. OF MOLD	(grams)		4208.8	4208.8	4208.8	4208.8
C	WT. OF SOIL = A − B	(grams)		1901.2	1932.9	2091.7	2100.8
D	WET UNIT WT.(1) = C X 0.066	(pcf)		125.5	127.6	138.0	138.7
E	DRY UNIT WT. = D / [1 + (K/100)]	(pcf)		116.6	118.0	123.5	123.2

NOTE: IF CALIBRATED MOLD OF 1/30 FT^3 IS USED, THE WET DENSITY IS CALCULATED FROM THE WEIGHT OF SOIL, THE VOLUME OF THE MOLD AND THE CONVERSION FROM GRAMS TO POUNDS (I.E., CONVERSION FACTOR = (30 / 453.6) = 0.066). THE MOLD MUST BE CALIBRATED TO VERIFY A CAPACITY OF 1/30 ± 0.0005 FT^3 ON INTERVALS NOT TO EXCEED 1000 TIMES THAT THE MOLD IS FILLED.

MOISTURE CONTENT – ASTM D 2216

QA ID: DUE

	TARE NO.			#207	#105	#206	#1
F	WT. OF TARE	(grams)		8.4	8.2	8.3	8.3
G	WT. OF WET SOIL & TARE	(grams)		483.4	456.5	458.7	475.5
H	WT. OF DRY SOIL & TARE	(grams)		449.9	423.0	411.7	423.4
I	WT. OF WATER = G − H	(grams)		33.5	33.5	47.0	52.1
J	WT. DRY SOIL = H − F	(grams)		441.5	414.8	403.4	415.1
K	MOISTURE CONTENT = (I/J) X 100	(%)		7.6	8.1	11.7	12.6
				1.076	1.081	1.117	

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FLUOR FERNALD

4940

CORRECTION OF UNIT WEIGHT AND WATER CONTENT FOR SOILS CONTAINING OVERSIZE PARTICLES *(ASTM D 4718)*

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO **PROJECT NO.** 60134 **TASK NO.** 04.1

DESCRIPTION: Phase III **DATE:** 18 day Oct month 2001 year

MATERIAL TYPE: Low Perm Clay LPØ1-40 STD

Weight of Total Sample	=	41,309.8
Weight of Oversize Fraction	=	1138.4
Weight of Finer Fraction (- 3/8)	=	40,171.4
Percentage of Oversize Fraction	= (P_C)	2.8
Percentage of Finer Fraction (- 3/8)	= (P_F)	97.2
Specific Gravity (Assumed)	= (G_M)	2.72

(W_F)	=	Water Content - 3/8 , as decimal	=	12.1
(W_C)	=	Water Content + 3/8 , as decimal	=	0.015
(δ_F)	=	Dry Density of finer fraction	=	123.9
(δ_W)	=	Unit Weight of Water	=	62.4

$$C_W=(W_F P_F)+(W_C P_C)$$

C_W = 11.8 %

$$C\delta_D=100\delta_F G_M \delta_W/(\delta_F P_C)+(G_M \delta_W P_F)$$

$C_{\delta D}$ = 124.8 pcf

000523

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FLUOR FERNALD

4940

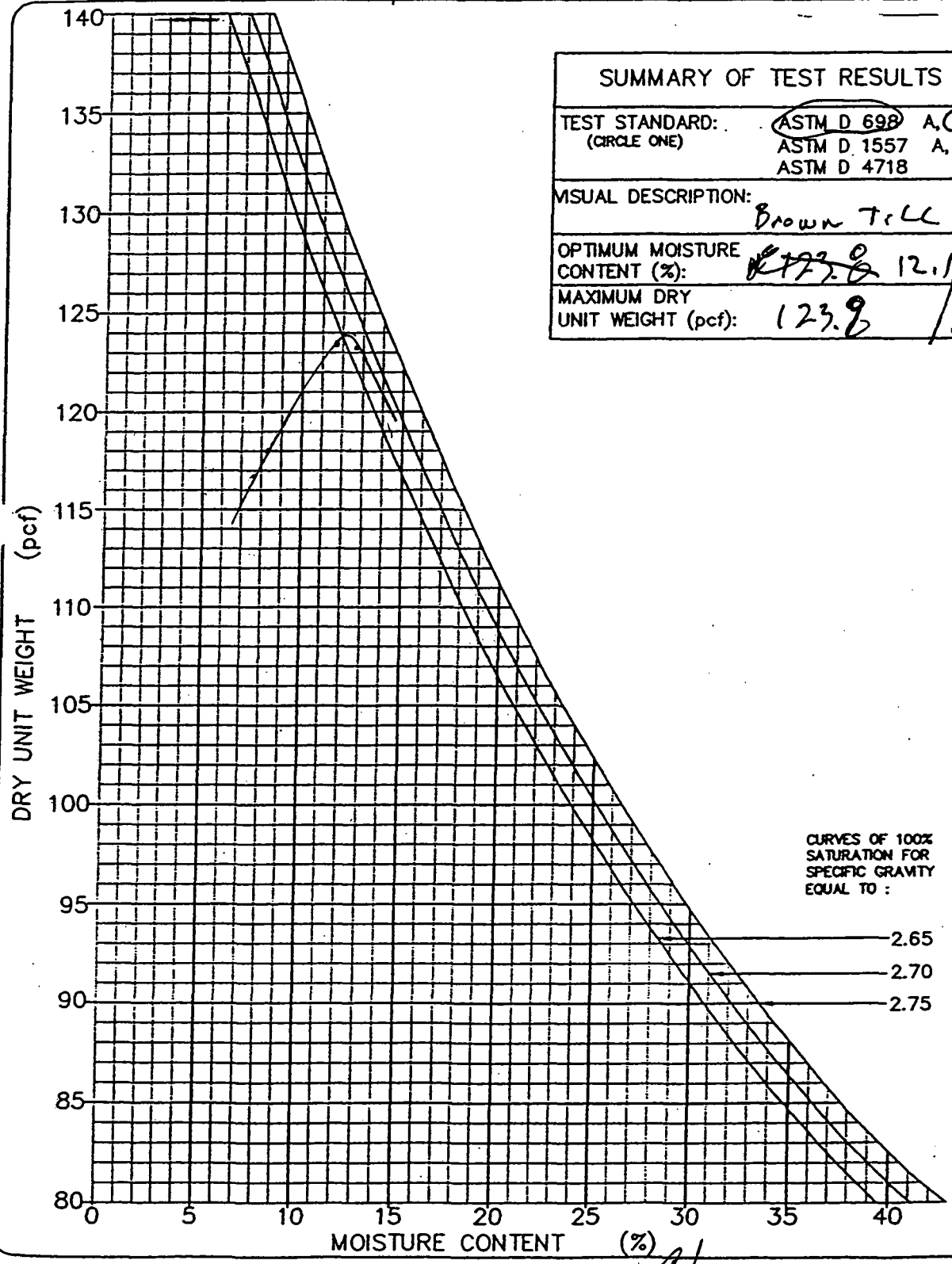
MOISTURE-DENSITY RELATIONSHIP

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO PROJECT NO. 6Q1341 TASK NO.: 04.1

DESCRIPTION: Phase III DATE: 17 day Oct month 2001 year

MATERIAL TYPE: Low Plan Clay MATERIAL SOURCE: Stockpile 01-7 SAMPLE NO. LP-01 40



SUMMARY OF TEST RESULTS			QA ID
TEST STANDARD: (CIRCLE ONE)	ASTM D 698 A, (B) C ASTM D 1557 A, B, C ASTM D 4718		DLE
VISUAL DESCRIPTION:	Brown Till		DLE
OPTIMUM MOISTURE CONTENT (%):	~~17.8~~ 12.1	11.8	DLE/CS
MAXIMUM DRY UNIT WEIGHT (pcf):	123.8	124.8	DLE/CS

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GEOSYNTEC CONSULTANTS

FLUOR FERNALD

FIELD LABORATORY COMPACTION TEST

(ASTM D 1557 METHOD B)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO

PROJECT NO.: GQ1341 TASK NO.: 04.1

DESCRIPTION: PHASE III

DATE: ____ day OCT month 2001 year

MATERIAL TYPE: LOW PERM CLAY MATERIAL SOURCE: STOCKPILE 01-7 SAMPLE NO.: LP-01-40

THIS METHOD WILL BE USED IF THE MATERIAL RETAINED ON THE NO. 4-in. (4.75-mm) SIEVE IS GREATER THAN 20%, AND THE MATERIAL RETAINED ON THE NO. 3/8-in. (9.5-mm) SIEVE IS LESS THAN 20%.
ALL MATERIAL RETAINED ON THE NO. 3/8-in. (9.5-mm) SIEVE IS DISCARDED.
USE OVERSIZE CORRECTION IF MORE THAN 5% IS DISCARDED ACCORDING TO ASTM D 4718.
USE A 4-in. DIAMETER MOLD / 10-lb RAMMER / 18-in. DROP / 5 LAYERS / 25 BLOWS PER LAYER.

COMPACTION OF SOIL

QA ID: KS/DLE

			14.00	14.23	14.12	13.85	
	WATER ADDED	(ml)	4%	6%	8%	2%	
A	WT. OF SOIL & MOLD	(grams)	6350.4	6454.7	6404.8	6282.4	
B	WT. OF MOLD	(grams)	4273.5	4273.5	4273.5	4273.5	
C	WT. OF SOIL = A − B	(grams)	2076.9	2181.2	2131.3	2008.9	
D	WET UNIT WT.(1) = C X 0.066	(pcf)	137.1	144.0	140.7	132.6	
E	DRY UNIT WT. = D / [1 + (K/100)]	(pcf)	129.3 ~~130.6~~	131.9	126.2	126.8	

NOTE: IF CALIBRATED MOLD OF 1/30 FT^3 IS USED, THE WET DENSITY IS CALCULATED FROM THE WEIGHT OF SOIL. THE VOLUME OF THE MOLD AND THE CONVERSION FROM GRAMS TO POUNDS (I.E., CONVERSION FACTOR = (30 / 453.6) = 0.066). THE MOLD MUST BE CALIBRATED TO VERIFY A CAPACITY OF 1/30 ± 0.0005 FT^3 ON INTERVALS NOT TO EXCEED 1000 TIMES THAT THE MOLD IS FILLED.

MOISTURE CONTENT – ASTM D 2216

QA ID: KS/DLE

	TARE NO.		205	302	103	24	
F	WT. OF TARE	(grams)	8.3	8.3	8.3	8.3	
G	WT. OF WET SOIL & TARE	(grams)	303.6	293.1	341.1	308.8	
H	WT. OF DRY SOIL & TARE	(grams)	286.8	269.0	306.8	297.5	
I	WT. OF WATER = G − H	(grams)	16.8 ~~13.8~~	24.1	34.3	13.3	
J	WT. DRY SOIL = H − F	(grams)	278.5	260.7	298.5	289.2	
K	MOISTURE CONTENT = (I/J) X 100	(%)	6.0 ~~5.0~~	9.2	11.5	4.6	

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FLUOR FERNALD

CORRECTION OF UNIT WEIGHT AND WATER CONTENT FOR SOILS CONTAINING OVERSIZE PARTICLES *(ASTM D 4718)*

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO **PROJECT NO.** 60134 **TASK NO.** 04.1

DESCRIPTION: Phase III **DATE:** 18 day Oct month 2001 year

MATERIAL TYPE: Low Perm Clay LP01-40 mod

Weight of Total Sample	=	41,309.8
Weight of Oversize Fraction	=	1138.4
Weight of Finer Fraction (- 3/8)	=	40171.4
Percentage of Oversize Fraction	= (P_C)	2.8
Percentage of Finer Fraction (- 3/8)	= (P_F)	97.2
Specific Gravity (Assumed)	= (G_M)	2.72

(W_F) =	Water Content - 3/8 , as decimal	=	0.084
(W_C) =	Water Content + 3/8 , as decimal	=	0.015
(δ_F) =	Dry Density of finer fraction	=	~~128.0~~ 133.0
(δ_W) =	Unit Weight of Water	=	62.4

$$C_W=(W_F P_F)+(W_C P_C)$$

C_w = 8.2%

$$C\delta_D=100\delta_F G_M \delta_W/(\delta_F P_C)+(G_M \delta_W P_F)$$

$C_{\delta D}$ = ~~128.9~~ 133.8 pcf

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FLUOR FERNALD

4940

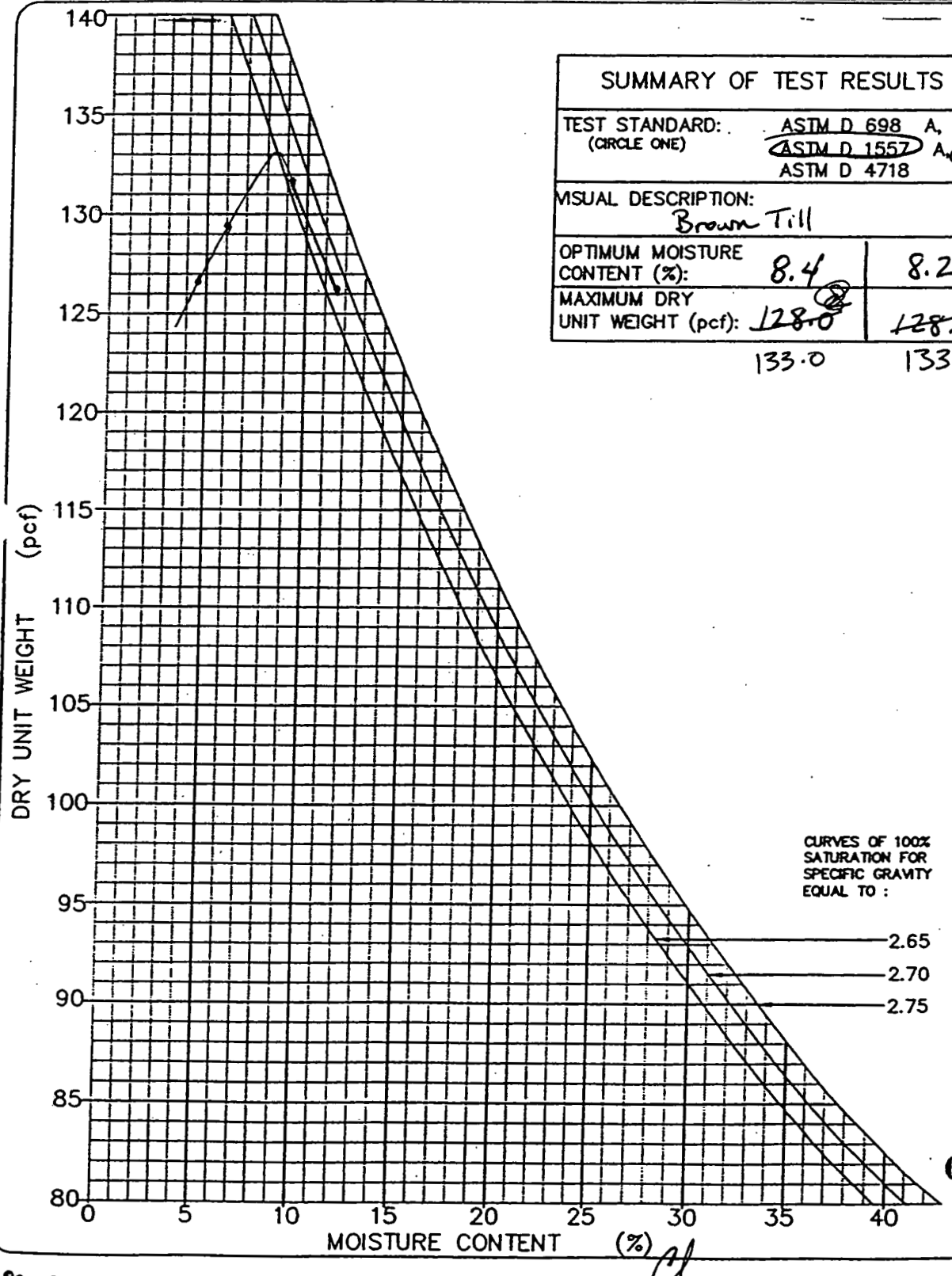
MOISTURE-DENSITY RELATIONSHIP

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO PROJECT NO.: 6Q134I TASK NO.: 04.1

DESCRIPTION: Phase III DATE: 18 day Oct month 2001 year

MATERIAL TYPE: Low Perm Clay MATERIAL SOURCE: Stockpile 01.7 SAMPLE NO. LP-01.40



SUMMARY OF TEST RESULTS			QA ID
TEST STANDARD: (CIRCLE ONE)	ASTM D 698 A, B, C ASTM D 1557 A, (B) C ASTM D 4718		DLE
VISUAL DESCRIPTION: Brown Till			CL
OPTIMUM MOISTURE CONTENT (%):	8.4	8.2	CL
MAXIMUM DRY UNIT WEIGHT (pcf):	~~128.0~~ 133.0	~~128.9~~ 133.8	CL

000527

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GEOSYNTEC CONSULTANTS

FLUOR FERNALD

FIELD LABORATORY COMPACTION TEST

(ASTM D 698 METHOD B)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO

PROJECT NO. 6Q134 TASK NO.: 04.1

DESCRIPTION: Phase III

DATE: 17 day Oct month 2001 year

MATERIAL TYPE: Low Perm Clay MATERIAL SOURCE: Stockpile 01-7 SAMPLE NO.: LP-01-41

THIS METHOD WILL BE USED IF THE MATERIAL RETAINED ON THE NO. 3/4-in. (19-mm) SIEVE IS LESS THAN 30%, IF THE MATERIAL RETAINED ON THE NO. 4 (4.75-mm) SIEVE IS GREATER THAN 20%, AND IF THE MATERIAL RETAINED ON THE NO. 3/8-in. (9.5-mm) SIEVE IS LESS THAN 20%.
ALL MATERIAL RETAINED ON THE NO. 3/8-in. (9.5-mm) SIEVE IS DISCARDED.
USE OVERSIZE CORRECTION IF MORE THAN 5% IS DISCARDED ACCORDING TO ASTM D 4718.
USE A 4-in. DIAMETER MOLD / 5.5-lb RAMMER / 12-in. DROP / 3 LAYERS / 25 BLOWS PER LAYER.

COMPACTION OF SOIL

QA ID: DLF

			13.43	13.63	13.84	13.90	
	WATER ADDED	(ml)	4%	6%	8%	10%	
A	WT. OF SOIL & MOLD	(grams)	6091.8	6182.6	6277.8	6305.0	
B	WT. OF MOLD	(grams)	4208.8	4208.8	4208.8	4208.8	
C	WT. OF SOIL = A − B	(grams)	1883.0	1973.8	2069.0	2096.2	
D	WET UNIT WT.(1) = C X 0.066	(pcf)	124.3	130.3	136.6	138.3	
E	DRY UNIT WT. = D / [1 + (K/100)]	(pcf)	116.7	120.3	123.3	123.3	

NOTE: IF CALIBRATED MOLD OF 1/30 FT^3 IS USED, THE WET DENSITY IS CALCULATED FROM THE WEIGHT OF SOIL, THE VOLUME OF THE MOLD AND THE CONVERSION FROM GRAMS TO POUNDS (I.E., CONVERSION FACTOR = (30 / 453.6) = 0.066). THE MOLD MUST BE CALIBRATED TO VERIFY A CAPACITY OF 1/30 ± 0.0005 FT^3 ON INTERVALS NOT TO EXCEED 1000 TIMES THAT THE MOLD IS FILLED.

MOISTURE CONTENT – ASTM D 2216

QA ID: DLF

	TARE NO.		#234	#31	#8	~~#5~~ 232	
F	WT. OF TARE	(grams)	8.2	8.2	8.2	8.2	
G	WT. OF WET SOIL & TARE	(grams)	419.3	418.8	444.7	502.4	
H	WT. OF DRY SOIL & TARE	(grams)	394.2	387.4	402.0	448.8	
I	WT. OF WATER = G − H	(grams)	25.1	31.4	42.7	53.6	
J	WT. DRY SOIL = H − F	(grams)	386.0	379.2	393.8	440.6	
K	MOISTURE CONTENT = (I/J) X 100	(%)	6.5	8.3	10.8	12.2	
			1.065	1.083	1.108	1.122	

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GeoSyntec Consultants

FLUOR FERNALD

CORRECTION OF UNIT WEIGHT AND WATER CONTENT FOR SOILS CONTAINING OVERSIZE PARTICLES *(ASTM D 4718)*

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO PROJECT NO. GQ1341 TASK NO. 04.1

DESCRIPTION: Phase III DATE: 18 day Oct month 2001 year

MATERIAL TYPE: Brown Till LP01-41

Weight of Total Sample	=	25,735.8
Weight of Oversize Fraction	=	1154.7
Weight of Finer Fraction (-____)	=	24,581.1
Percentage of Oversize Fraction	= (P_C)	4.5
Percentage of Finer Fraction (-____)	= (P_F)	95.5
Specific Gravity (Assumed)	= (G_M)	2.72

(W_F) =	Water Content -____, as decimal	=	0.116
(W_C) =	Water Content +____, as decimal	=	0.015
(δ_F) =	Dry Density of finer fraction	=	124.2
(δ_W) =	Unit Weight of Water	=	62.4

$$C_W=(W_F P_F)+(W_C P_C)$$

$C_w = 11.1\%$

$$C\delta_D=100\delta_F G_M \delta_W/(\delta_F P_C)+(G_M \delta_W P_F)$$

$C_{\delta D} = 125.7$ pcf

GEOSYNTEC CONSULTANTS

FLUOR FERNALD

4940

MOISTURE–DENSITY RELATIONSHIP

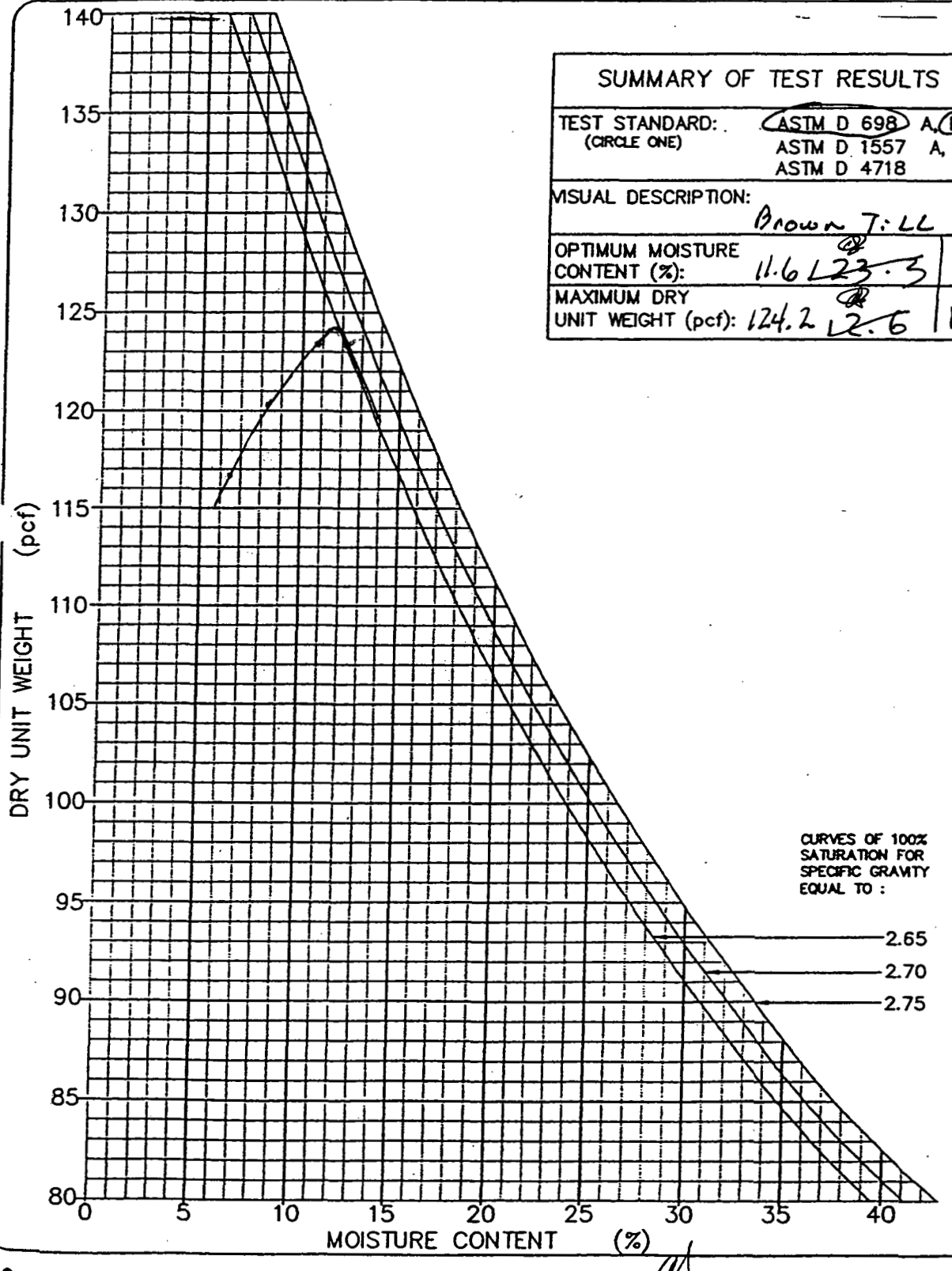
PROJECT: ON–SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO PROJECT NO.: 6Q1341 TASK NO.: 04.1

DESCRIPTION: Phase III DATE: ____ day Oct month 2001 year

MATERIAL TYPE: Low Perm Clay MATERIAL SOURCE: Stockpile 01-7 SAMPLE NO.: LP-01-41

SUMMARY OF TEST RESULTS			QA ID
TEST STANDARD: (CIRCLE ONE)	ASTM D 698 A, B, C ASTM D 1557 A, B, C ASTM D 4718		[illegible]
VISUAL DESCRIPTION:	Brown Till		DLE
OPTIMUM MOISTURE CONTENT (%):	11.6 ~~23.3~~	11.1	[illegible]
MAXIMUM DRY UNIT WEIGHT (pcf):	124.2 ~~12.6~~	125.7	[illegible]



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FLUOR FERNALD

FIELD LABORATORY COMPACTION TEST

(ASTM D 698 METHOD B)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO

DESCRIPTION: Phase III

PROJECT NO. 6Q1341 TASK NO.: 04.1

DATE: 18 day Oct month 2001 year

MATERIAL TYPE: Low Perm Clay MATERIAL SOURCE: Stockpile 01-7 SAMPLE NO.: LP-01-42

THIS METHOD WILL BE USED IF THE MATERIAL RETAINED ON THE NO. 3/4-in. (19-mm) SIEVE IS LESS THAN 30%, IF THE MATERIAL RETAINED ON THE NO. 4 (4.75-mm) SIEVE IS GREATER THAN 20%, AND IF THE MATERIAL RETAINED ON THE NO. 3/8-in. (9.5-mm) SIEVE IS LESS THAN 20%.
ALL MATERIAL RETAINED ON THE NO. 3/8-in. (9.5-mm) SIEVE IS DISCARDED.
USE OVERSIZE CORRECTION IF MORE THAN 5% IS DISCARDED ACCORDING TO ASTM D 4718.
USE A 4-in. DIAMETER MOLD / 5.5-lb RAMMER / 12-in. DROP / 3 LAYERS / 25 BLOWS PER LAYER.

COMPACTION OF SOIL

QA ID: TD

			13.38	13.55	13.88	13.83	
	WATER ADDED	(ml)	4%	6%	8%	10%	
A	WT. OF SOIL & MOLD	(grams)	6069.2	6146.3	6296.0	6273.3	
B	WT. OF MOLD	(grams)	4208.8	4208.8	4208.8	4208.8	4208.8
C	WT. OF SOIL = A − B	(grams)	1860.4	1937.5	2087.2	2064.5	
D	WET UNIT WT.(1) = C X 0.066	(pcf)	122.8	127.9	137.8	136.3	
E	DRY UNIT WT. = D / [1 + (K/100)]	(pcf)	114.2	117.0	123.4	119.4	

NOTE: IF CALIBRATED MOLD OF 1/30 FT^3 IS USED, THE WET DENSITY IS CALCULATED FROM THE WEIGHT OF SOIL, THE VOLUME OF THE MOLD AND THE CONVERSION FROM GRAMS TO POUNDS (I.E., CONVERSION FACTOR = (30 / 453.6) = 0.066). THE MOLD MUST BE CALIBRATED TO VERIFY A CAPACITY OF 1/30 ± 0.0005 FT^3 ON INTERVALS NOT TO EXCEED 1000 TIMES THAT THE MOLD IS FILLED.

MOISTURE CONTENT – ASTM D 2216

QA ID: DLE

	TARE NO.		#104A	#231	#20	#215	
F	WT. OF TARE	(grams)	8.3	8.0	8.3	8.3	
G	WT. OF WET SOIL & TARE	(grams)	406.6	444.5	455.2	453.7	
H	WT. OF DRY SOIL & TARE	(grams)	378.8	407.3	407.7	398.4	
I	WT. OF WATER = G − H	(grams)	27.8	37.2	47.5	55.3	
J	WT. DRY SOIL = H − F	(grams)	370.5	399.3	399.4	390.1	
K	MOISTURE CONTENT = (I/J) X 100	(%)	7.5	9.3	11.9	14.2	

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SHEET NO. 1 OF 3

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FLUOR FERNALD

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CORRECTION OF UNIT WEIGHT AND WATER CONTENT FOR SOILS CONTAINING OVERSIZE PARTICLES *(ASTM D 4718)*

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO PROJECT NO. GQ134 TASK NO. 04.1

DESCRIPTION: Phase III DATE: 18 day Oct month 2001 year

MATERIAL TYPE: Low Fern Clay LP01-42 STD

Weight of Total Sample	=	20272.4
Weight of Oversize Fraction	=	677.1
Weight of Finer Fraction (-3/8)	=	19595.3
Percentage of Oversize Fraction	= (P_C)	3.3
Percentage of Finer Fraction (-3/8)	= (P_F)	96.7
Specific Gravity (Assumed)	= (G_M)	2.72

(W_F) =	Water Content - 3/8, as decimal	=	0.118
(W_C) =	Water Content + 3/8, as decimal	=	0.015
(δ_F) =	Dry Density of finer fraction	=	123.2
(δ_W) =	Unit Weight of Water	=	62.4

$$C_W=(W_F P_F)+(W_C P_C)$$

$C_W = 11.5\%$

$$C\delta_D=100\delta_F G_M \delta_W/(\delta_F P_C)+(G_M \delta_W P_F)$$

$C_{\delta D} = 124.3$ pcf

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4940

MOISTURE-DENSITY RELATIONSHIP

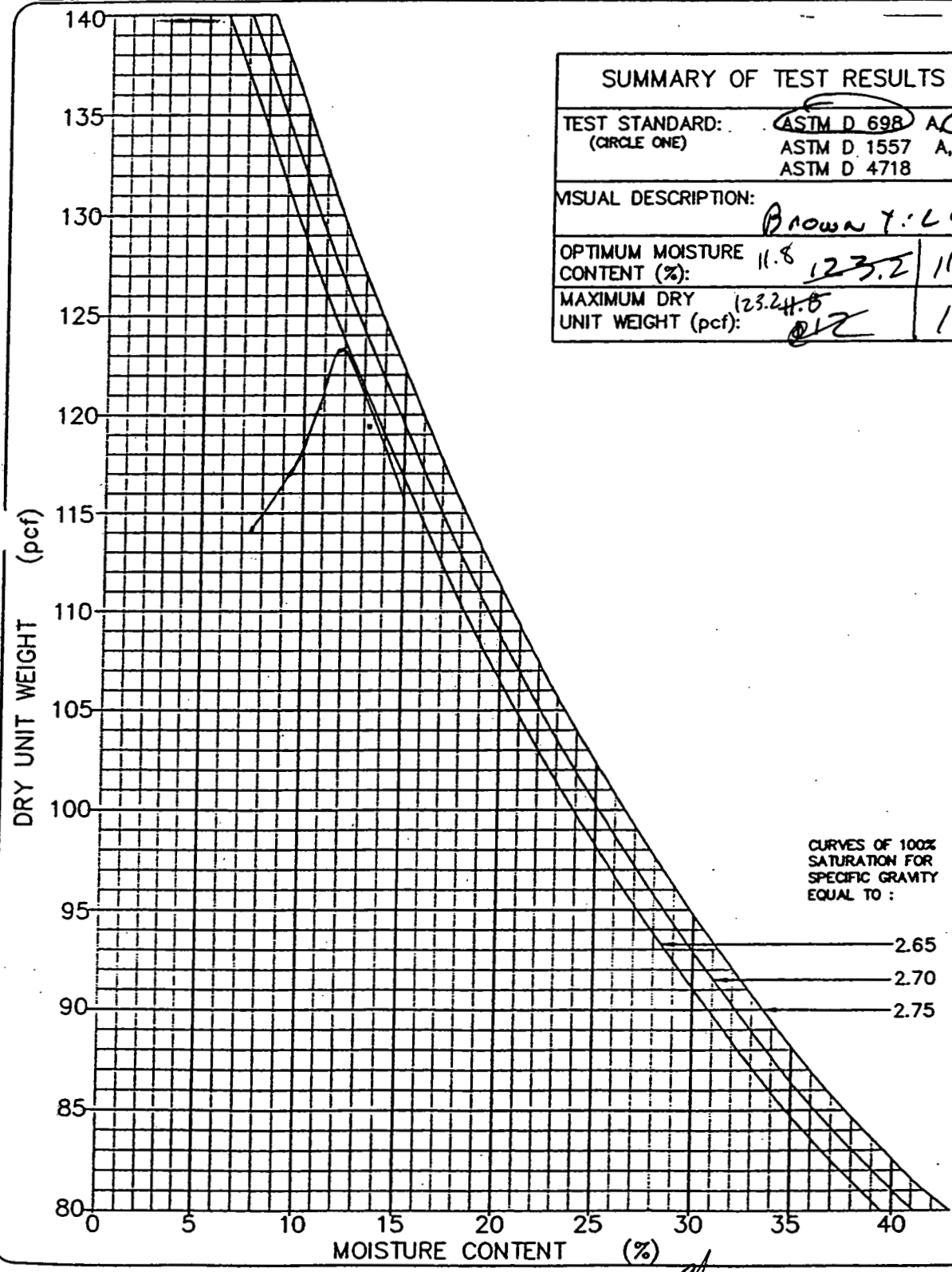
PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO PROJECT NO. 6-01341 TASK NO.: 04.1

DESCRIPTION: Phase III DATE: 18 day Oct month 2001 year

MATERIAL TYPE: Low Perm Clay MATERIAL SOURCE: Stockpile 01.7 SAMPLE NO. LP-0142

SUMMARY OF TEST RESULTS			QA ID
TEST STANDARD: (CIRCLE ONE)	ASTM D 698 A, B, C ASTM D 1557 A, B, C ASTM D 4718		DLE
VISUAL DESCRIPTION:	Brown Y.LL		DLE
OPTIMUM MOISTURE CONTENT (%):	11.8 ~~123.2~~	11.5	DLE/CS
MAXIMUM DRY UNIT WEIGHT (pcf):	123.2 ~~11.5~~	124.3	DLE/CS



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FLUOR FERNALD

FIELD LABORATORY COMPACTION TEST

(ASTM D 698 METHOD B)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO — PROJECT NO. GQ1341 TASK NO.: 04.1

DESCRIPTION: Phase III — DATE: 18 day Oct month 2001 year

MATERIAL TYPE: Low Poorm Clay — MATERIAL SOURCE: Stockpile 01-7 — SAMPLE NO.: LP-01-43

THIS METHOD WILL BE USED IF THE MATERIAL RETAINED ON THE NO. 3/4-in. (19-mm) SIEVE IS LESS THAN 30%, IF THE MATERIAL RETAINED ON THE NO. 4 (4.75-mm) SIEVE IS GREATER THAN 20%, AND IF THE MATERIAL RETAINED ON THE NO. 3/8-in. (9.5-mm) SIEVE IS LESS THAN 20%.
ALL MATERIAL RETAINED ON THE NO. 3/8-in. (9.5-mm) SIEVE IS DISCARDED.
USE OVERSIZE CORRECTION IF MORE THAN 5% IS DISCARDED ACCORDING TO ASTM D 4718.
USE A 4-in. DIAMETER MOLD / 5.5-lb RAMMER / 12-in. DROP / 3 LAYERS / 25 BLOWS PER LAYER.

13.65

COMPACTION OF SOIL

QA ID: TD/DLF

			13.20	13.56	13.67	13.78	
	WATER ADDED	(ml)	4%	6%	8%	10%	12%
A	WT. OF SOIL & MOLD	(grams)	5987.5	6150.8	6200.7	6250.6	6191.6
B	WT. OF MOLD	(grams)	4208.8	4208.8	4208.8	4208.8	4208.8
C	WT. OF SOIL = A − B	(grams)	1778.7	1942.0	1991.9	2041.8	1982.8
D	WET UNIT WT.(1) = C X 0.066	(pcf)	117.4	128.2	131.5	134.8	130.9
E	DRY UNIT WT. = D / [1 + (K/100)]	(pcf)	108.3	115.1	117.0	117.4	~~112.2~~ 112.1

NOTE: IF CALIBRATED MOLD OF 1/30 FT^3 IS USED, THE WET DENSITY IS CALCULATED FROM THE WEIGHT OF SOIL, THE VOLUME OF THE MOLD AND THE CONVERSION FROM GRAMS TO POUNDS (I.E., CONVERSION FACTOR = (30 / 453.6) = 0.066). THE MOLD MUST BE CALIBRATED TO VERIFY A CAPACITY OF 1/30 ± 0.0005 FT^3 ON INTERVALS NOT TO EXCEED 1000 TIMES THAT THE MOLD IS FILLED.

MOISTURE CONTENT — ASTM D 2216

QA ID: TD/DLF

	TARE NO.		#27	#28	#13	#204	A
F	WT. OF TARE	(grams)	8.2	8.3	8.2	8.1	7.9
G	WT. OF WET SOIL & TARE	(grams)	433.8	442.6	468.4	479.8	471.9
H	WT. OF DRY SOIL & TARE	(grams)	400.8	398.2	417.7	417.2	405.5
I	WT. OF WATER = G − H	(grams)	33.0	44.4	50.7	60.6	66.4
J	WT. DRY SOIL = H − F	(grams)	392.6	389.9	409.5	409.1	397.6
K	MOISTURE CONTENT = (I/J) X 100	(%)	8.4	11.4	12.4	14.8	16.7

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CORRECTION OF UNIT WEIGHT AND WATER CONTENT FOR SOILS CONTAINING OVERSIZE PARTICLES *(ASTM D 4718)*

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO **PROJECT NO.** GQ1341 **TASK NO.** 041

DESCRIPTION: Phase III **DATE:** 18 day Oct month 2001 year

MATERIAL TYPE: Low Perm Clay LP01-43

Weight of Total Sample	=	40,317.1g
Weight of Oversize Fraction	=	1739.5g
Weight of Finer Fraction (- 3/8)	=	38,577.6g
Percentage of Oversize Fraction	= (P_C)	4.3
Percentage of Finer Fraction (- 3/8)	= (P_F)	95.7
Specific Gravity (Assumed)	= (G_M)	2.72

(W_F) =	Water Content - 3/8 , as decimal	=	0.137
(W_C) =	Water Content + 3/8 , as decimal	=	0.015
(δ_F) =	Dry Density of finer fraction	=	119.2
(δ_W) =	Unit Weight of Water	=	62.4

$$C_W=(W_F P_F)+(W_C P_C) = \boxed{13.2\%M}$$

$$C\delta_D=100\delta_F G_M \delta_W/(\delta_F P_C)+(G_M \delta_W P_F) = \boxed{120.8pcf}$$

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FLUOR FERNALD

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MOISTURE-DENSITY RELATIONSHIP

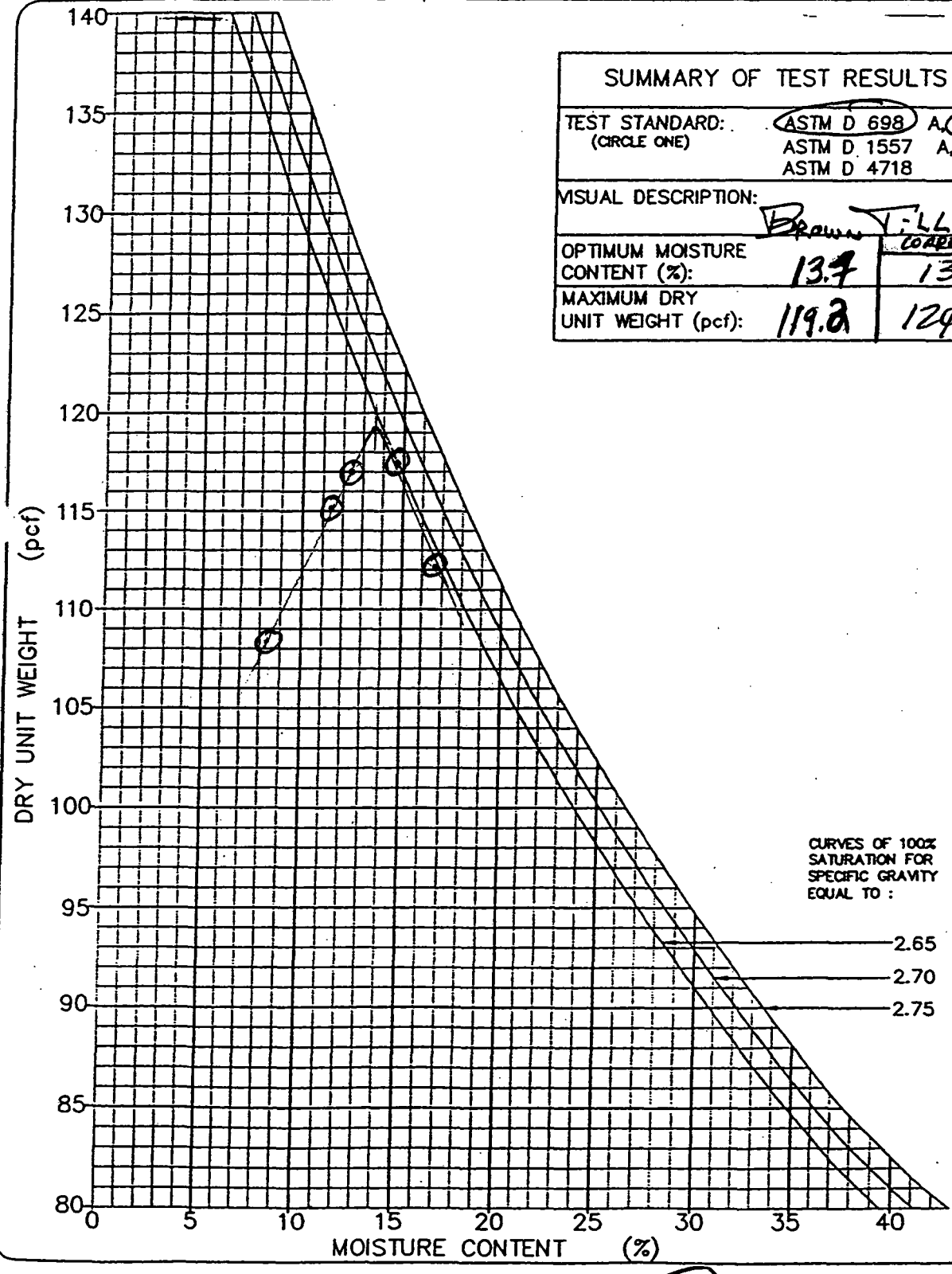
PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO PROJECT NO.: GQ1341 TASK NO.: 04.1

DESCRIPTION: PHASE III DATE: 18 day Oct month 2001 year

MATERIAL TYPE: Low Perm Clay MATERIAL SOURCE: Stockpile 01-7 SAMPLE NO.: LP-01-43

SUMMARY OF TEST RESULTS			QA ID
TEST STANDARD: (CIRCLE ONE)	ASTM D 698 A, B, C ASTM D 1557 A, B, C ASTM D 4718		DLS
VISUAL DESCRIPTION:	BROWN TILL		TBV
OPTIMUM MOISTURE CONTENT (%):	13.7	CORRECTED 13.2	TBV
MAXIMUM DRY UNIT WEIGHT (pcf):	119.2	120.8	TBV



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FLUOR FERNALD

FIELD LABORATORY COMPACTION TEST

(ASTM D 1557 METHOD B)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO — PROJECT NO. G-91341 TASK NO.: 04.1

DESCRIPTION: Phase III — DATE: 18 day Oct month 2001 year

MATERIAL TYPE: Low Perm Clay — MATERIAL SOURCE: Stockpile 01-7 — SAMPLE NO.: LP-01-43

THIS METHOD WILL BE USED IF THE MATERIAL RETAINED ON THE NO. 4-in. (4.75-mm) SIEVE IS GREATER THAN 20%, AND THE MATERIAL RETAINED ON THE NO. 3/8-in. (9.5-mm) SIEVE IS LESS THAN 20%.
ALL MATERIAL RETAINED ON THE NO. 3/8-in. (9.5-mm) SIEVE IS DISCARDED.
USE OVERSIZE CORRECTION IF MORE THAN 5% IS DISCARDED ACCORDING TO ASTM D 4718.
USE A 4-in. DIAMETER MOLD / 10-lb RAMMER / 18-in. DROP / 5 LAYERS / 25 BLOWS PER LAYER.

COMPACTION OF SOIL			13.72	13.90	14.04	13.95	QA ID: KS/DLE
	WATER ADDED	(ml)	2%	4%	6%	8%	
A	WT. OF SOIL & MOLD	(grams)	6223.4	6305.0	6368.5	6327.7	
B	WT. OF MOLD	(grams)	4208.8	4208.8	4208.8	4208.8	
C	WT. OF SOIL = A − B	(grams)	2014.6	2096.2	2159.7	2118.9	
D	WET UNIT WT.(1) = C X 0.066	(pcf)	133.0	138.3	142.5	139.8	
E	DRY UNIT WT. = D / [1 + (K/100)]	(pcf)	125.0	127.8	129.1	124.2	

NOTE: IF CALIBRATED MOLD OF 1/30 FT^3 IS USED, THE WET DENSITY IS CALCULATED FROM THE WEIGHT OF SOIL, THE VOLUME OF THE MOLD AND THE CONVERSION FROM GRAMS TO POUNDS (I.E., CONVERSION FACTOR = (30 / 453.6) = 0.066). THE MOLD MUST BE CALIBRATED TO VERIFY A CAPACITY OF 1/30 ± 0.0005 FT^3 ON INTERVALS NOT TO EXCEED 1000 TIMES THAT THE MOLD IS FILLED.

MOISTURE CONTENT − ASTM D 2216							QA ID: KS/DLE
	TARE NO.		211	18	304	33	
F	WT. OF TARE	(grams)	7.9	6.4	8.3	8.1	
G	WT. OF WET SOIL & TARE	(grams)	321.0	316.4	296.9	264.3	
H	WT. OF DRY SOIL & TARE	(grams)	302.3	293.1	269.7	235.7	
I	WT. OF WATER = G − H	(grams)	18.7	23.3	27.2	28.6	
J	WT. DRY SOIL = H − F	(grams)	294.4	284.7	261.4	227.6	
K	MOISTURE CONTENT = (I/J) X 100	(%)	6.4	8.2	10.4	12.6	

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1.061 1.082 1.104 1.126

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FLUOR FERNALD

CORRECTION OF UNIT WEIGHT AND WATER CONTENT FOR SOILS CONTAINING OVERSIZE PARTICLES *(ASTM D 4718)*

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO **PROJECT NO.** GQ1341 **TASK NO.** 04.1

DESCRIPTION: Phase III **DATE:** 18 day Oct month 2001 year

MATERIAL TYPE: LOW PERM CLAY LP01-43 MOD

Weight of Total Sample	=	40,317.1
Weight of Oversize Fraction	=	1739.5
Weight of Finer Fraction (- 3/8)	=	38577.6
Percentage of Oversize Fraction	= (P_C)	4.3
Percentage of Finer Fraction (- 3/8)	= (P_F)	95.7
Specific Gravity (Assumed)	= (G_M)	2.72

(W_F)	=	Water Content - 3/8 , as decimal	=	0.10
(W_C)	=	Water Content + 3/8 , as decimal	=	0.015
(δ_F)	=	Dry Density of finer fraction	=	129.5
(δ_W)	=	Unit Weight of Water	=	62.4

$$C_W=(W_F P_F)+(W_C P_C)$$

$C_W = 9.6\%$

$$C\delta_D=100\delta_F G_M \delta_W/(\delta_F P_C)+(G_M \delta_W P_F)$$

$C_{\delta D} = 130.8$ pcf

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4940

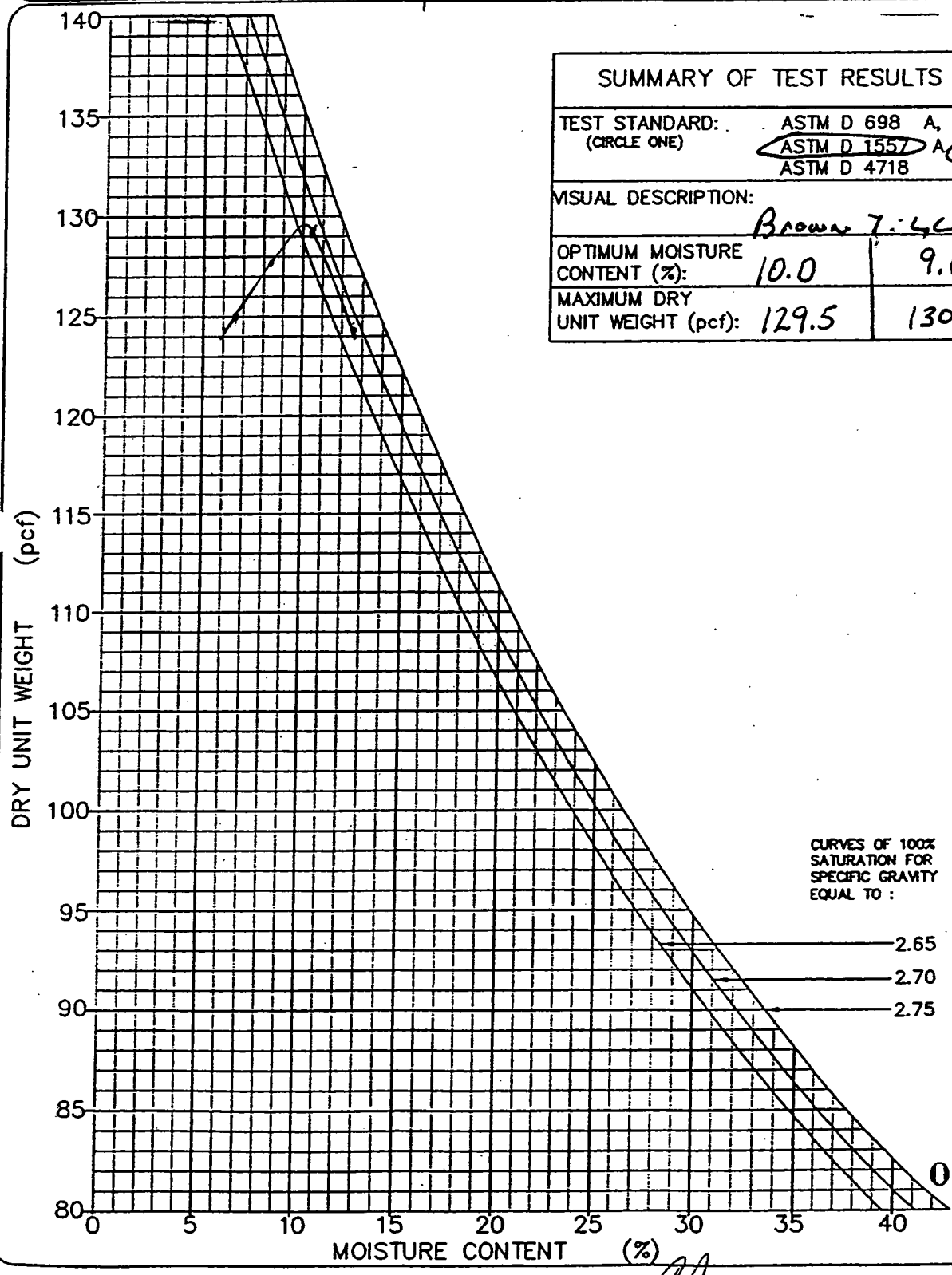
MOISTURE-DENSITY RELATIONSHIP

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO PROJECT NO.: 6Q134 TASK NO.: 04.1

DESCRIPTION: Phase II DATE: 18 day Oct month 2001 year

MATERIAL TYPE: Low Perm Clay MATERIAL SOURCE: Stockpile 01.7 SAMPLE NO.: 4P-0143



SUMMARY OF TEST RESULTS			QA ID
TEST STANDARD: (CIRCLE ONE)	ASTM D 698 A, B, C ASTM D 1557 A, B, C ASTM D 4718		DLE
VISUAL DESCRIPTION:	Brown 7.5YR		DLE
OPTIMUM MOISTURE CONTENT (%):	10.0	9.6	[illegible]
MAXIMUM DRY UNIT WEIGHT (pcf):	129.5	130.8	[illegible]

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FLUOR FERNALD

FIELD LABORATORY COMPACTION TEST

(ASTM D 698 METHOD B)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO

PROJECT NO. 6Q134L TASK NO.: 04.1

DESCRIPTION: Phase III

DATE: 18 day Oct month 2001 year

MATERIAL TYPE: Low Perm Clay MATERIAL SOURCE: Stockpile 01-6 SAMPLE NO.: LP-01-44

THIS METHOD WILL BE USED IF THE MATERIAL RETAINED ON THE NO. 3/4-in. (19-mm) SIEVE IS LESS THAN 30%, IF THE MATERIAL RETAINED ON THE NO. 4 (4.75-mm) SIEVE IS GREATER THAN 20%, AND IF THE MATERIAL RETAINED ON THE NO. 3/8-in. (9.5-mm) SIEVE IS LESS THAN 20%.
ALL MATERIAL RETAINED ON THE NO. 3/8-in. (9.5-mm) SIEVE IS DISCARDED.
USE OVERSIZE CORRECTION IF MORE THAN 5% IS DISCARDED ACCORDING TO ASTM D 4718.
USE A 4-in. DIAMETER MOLD / 5.5-lb RAMMER / 12-in. DROP / 3 LAYERS / 25 BLOWS PER LAYER.

COMPACTION OF SOIL

QA ID: TD/DAF

			13.30	13.59	13.78	1386	
	WATER ADDED	(ml)	4%	6%	8%	10%	
A	WT. OF SOIL & MOLD	(grams)	6032.9	6164.4	6250.6	6286.9	
B	WT. OF MOLD	(grams)	4208.8	4208.8	4208.8	4208.8	
C	WT. OF SOIL = A − B	(grams)	1824.1	1955.6	2041.8	2078.1	
D	WET UNIT WT.(1) = C X 0.066	(pcf)	120.4	129.1	134.8	137.1	
E	DRY UNIT WT. = D / [1 + (K/100)]	(pcf)	112.1	117.2	120.0	120.0	

NOTE: IF CALIBRATED MOLD OF 1/30 FT^3 IS USED, THE WET DENSITY IS CALCULATED FROM THE WEIGHT OF SOIL, THE VOLUME OF THE MOLD AND THE CONVERSION FROM GRAMS TO POUNDS (I.E., CONVERSION FACTOR = (30 / 453.6) = 0.066). THE MOLD MUST BE CALIBRATED TO VERIFY A CAPACITY OF 1/30 ± 0.0005 FT^3 ON INTERVALS NOT TO EXCEED 1000 TIMES THAT THE MOLD IS FILLED.

MOISTURE CONTENT – ASTM D 2216

QA ID: TD/DAF

	TARE NO.		#25	#228	#101	#216	
F	WT. OF TARE	(grams)	8.3	7.9	8.3	8.5	
G	WT. OF WET SOIL & TARE	(grams)	357.0	474.9	510.5	548.9	
H	WT. OF DRY SOIL & TARE	(grams)	333.0	431.5	455.5	455.1	
I	WT. OF WATER = G − H	(grams)	24.0	43.4	55.0	63.8	
J	WT. DRY SOIL = H − F	(grams)	324.7	423.6	447.2	446.6	
K	MOISTURE CONTENT = (I/J) X 100	(%)	7.4	10.2	12.3	14.3	
			1.074	1.102	1.123	1.143	

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FLUOR FERNALD

CORRECTION OF UNIT WEIGHT AND WATER CONTENT FOR SOILS CONTAINING OVERSIZE PARTICLES *(ASTM D 4718)*

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO PROJECT NO 601341 TASK NO. 04.1

DESCRIPTION: Phase III DATE: 18 day Oct month 2001 year

MATERIAL TYPE: Low Perm Clay LP01-44 STD

Weight of Total Sample	=	21,704.9
Weight of Oversize Fraction	=	922.0
Weight of Finer Fraction (- 3/8)	=	20782.9
Percentage of Oversize Fraction	= (P_C)	4.2
Percentage of Finer Fraction (- 3/8)	= (P_F)	95.8
Specific Gravity (Assumed)	= (G_M)	2.72

(W_F) =	Water Content - 3/8 , as decimal	=	~~13.2~~ 0.132
(W_C) =	Water Content + 3/8 , as decimal	=	0.015
(δ_F) =	Dry Density of finer fraction	=	120.8
(δ_W) =	Unit Weight of Water	=	62.4

$$C_W=(W_F P_F)+(W_C P_C)$$

$C_W = 12.7\%$

$$C\delta_D=100\delta_F G_M \delta_W/(\delta_F P_C)+(G_M \delta_W P_F)$$

$C_{\delta D} = 122.3$ pcf

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FLUOR FERNALD

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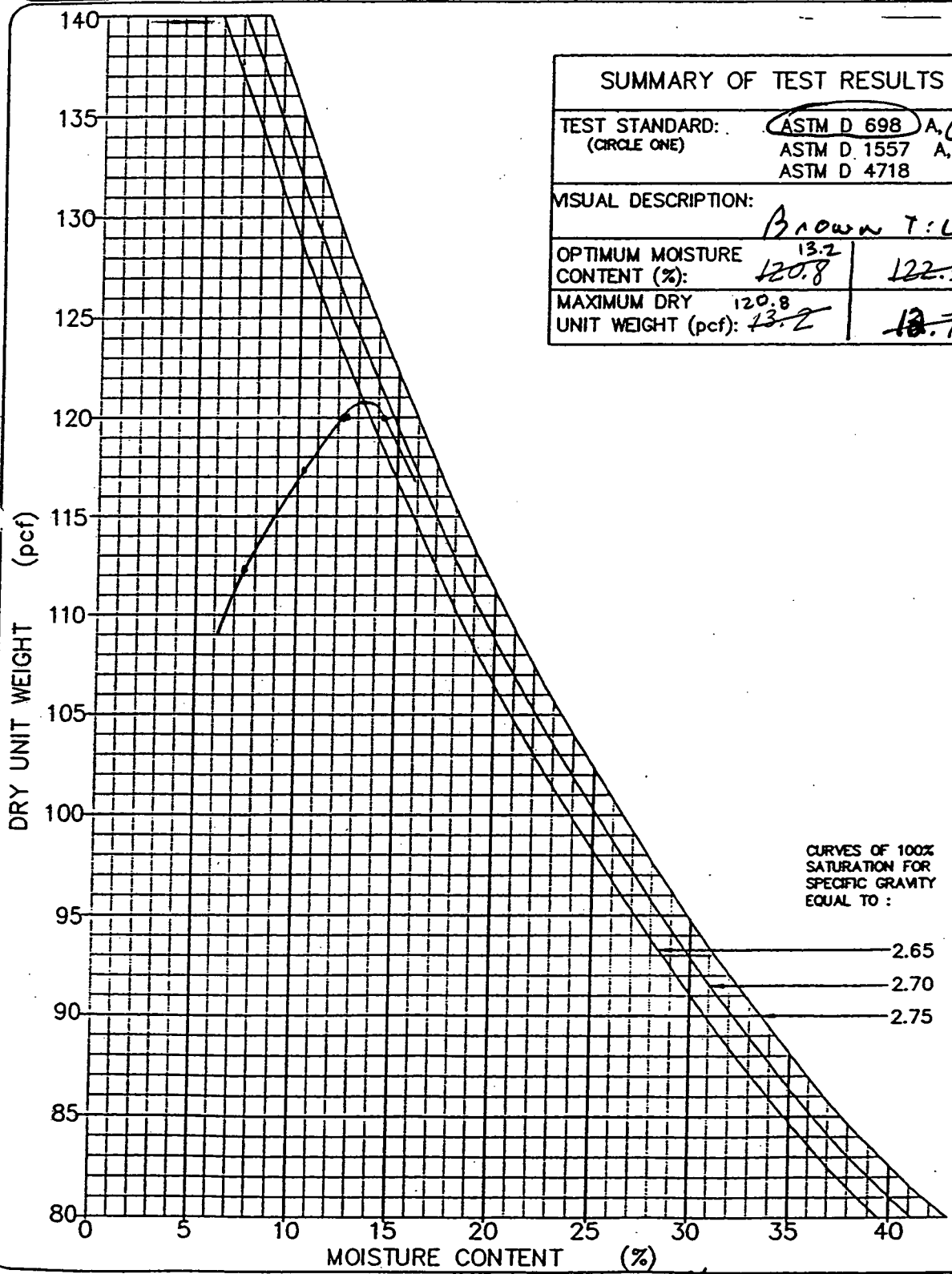
MOISTURE-DENSITY RELATIONSHIP

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO PROJECT NO. 681341 TASK NO. 04.1

DESCRIPTION: Phase III DATE: 18 day Oct month 2001 year

MATERIAL TYPE: Low Perm Clay MATERIAL SOURCE: Stockpile 01-6 SAMPLE NO. LP-01-14



SUMMARY OF TEST RESULTS			QA ID
TEST STANDARD: (CIRCLE ONE)	ASTM D 698 A, (B) C ASTM D 1557 A, B, C ASTM D 4718		DLE
VISUAL DESCRIPTION:	Brown Till		DLE
OPTIMUM MOISTURE CONTENT (%):	~~120.8~~ 13.2	~~122.3~~ 12.7	DLE/CS
MAXIMUM DRY UNIT WEIGHT (pcf):	~~13.2~~ 120.8	~~12.7~~ 122.3	DLE/CS

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FLUOR FERNALD

FIELD LABORATORY COMPACTION TEST

(ASTM D 698 METHOD B)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO

DESCRIPTION: Phase III

PROJECT NO. 6Q134 TASK NO.: 04.1

DATE: 19 day Oct month 2001 year

MATERIAL TYPE: Low Perm Clay

MATERIAL SOURCE: Stockpile 01-17

SAMPLE NO.: LP-01-45

THIS METHOD WILL BE USED IF THE MATERIAL RETAINED ON THE NO. 3/4-in. (19-mm) SIEVE IS LESS THAN 30%, IF THE MATERIAL RETAINED ON THE NO. 4 (4.75-mm) SIEVE IS GREATER THAN 20%, AND IF THE MATERIAL RETAINED ON THE NO. 3/8-in. (9.5-mm) SIEVE IS LESS THAN 20%.
ALL MATERIAL RETAINED ON THE NO. 3/8-in. (9.5-mm) SIEVE IS DISCARDED.
USE OVERSIZE CORRECTION IF MORE THAN 5% IS DISCARDED ACCORDING TO ASTM D 4718.
USE A 4-in. DIAMETER MOLD / 5.5-lb RAMMER / 12-in. DROP / 3 LAYERS / 25 BLOWS PER LAYER.

COMPACTION OF SOIL

QA ID: DLE

	WATER ADDED	(ml)		13.55	13.78	13.92	13.83
A	WT. OF SOIL & MOLD	(grams)		2%	4%	6%	8%
B	WT. OF MOLD	(grams)	4208.8	6146.3	6250.6	6314.1	6273.3
C	WT. OF SOIL = A − B	(grams)		4208.8	4208.8	4208.8	4208.8
D	WET UNIT WT.(1) = C X 0.066	(pcf)		1937.5	2041.8	2105.3	2064.5
E	DRY UNIT WT. = D / [1 + (K/100)]	(pcf)		127.9	134.8	138.9	136.3
				119.0	122.8	124.5	119.5

NOTE: IF CALIBRATED MOLD OF 1/30 FT^3 IS USED, THE WET DENSITY IS CALCULATED FROM THE WEIGHT OF SOIL. THE VOLUME OF THE MOLD AND THE CONVERSION FROM GRAMS TO POUNDS (I.E., CONVERSION FACTOR = (30 / 453.6) = 0.066). THE MOLD MUST BE CALIBRATED TO VERIFY A CAPACITY OF 1/30 ± 0.0005 FT^3 ON INTERVALS NOT TO EXCEED 1000 TIMES THAT THE MOLD IS FILLED.

MOISTURE CONTENT − ASTM D 2216

QA ID: DLE

	TARE NO.			#26	#11	#102	#21
F	WT. OF TARE	(grams)		8.3	8.1	8.2	8.3
G	WT. OF WET SOIL & TARE	(grams)		502.5	558.3	521.3	542.7
H	WT. OF DRY SOIL & TARE	(grams)		467.9	509.3	467.8	476.8
I	WT. OF WATER = G − H	(grams)		34.6	49.0	53.5	65.9
J	WT. DRY SOIL = H − F	(grams)		459.6	501.2	459.6	468.5
K	MOISTURE CONTENT = (I/J) X 100	(%)		7.5	9.8	11.6	14.1
				1.075	1.098	1.116	1.141

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SHEET NO. 1 OF 3

GeoSyntec Consultants

FLUOR FERNALD

CORRECTION OF UNIT WEIGHT AND WATER CONTENT FOR SOILS CONTAINING OVERSIZE PARTICLES

(ASTM D 4718)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO PROJECT NO. 6Q134 TASK NO. 04.1

DESCRIPTION: PHASE III DATE: 22 day OCT month 2001 year

MATERIAL TYPE: LOW PERM CLAY (LP-01-45) STD

Weight of Total Sample	=	45,592.7g
Weight of Oversize Fraction	=	1,810.3g
Weight of Finer Fraction (- 3/8)	=	43,782.4g
Percentage of Oversize Fraction	= (P_C)	4.0
Percentage of Finer Fraction (- 3/8)	= (P_F)	96.0
Specific Gravity (Assumed)	= (G_M)	2.72

(W_F) =	Water Content - 3/8 , as decimal	=	0.114
(W_C) =	Water Content + 3/8 , as decimal	=	0.015
(δ_F) =	Dry Density of finer fraction	=	125.3
(δ_W) =	Unit Weight of Water	=	62.4

$$C_W=(W_F P_F)+(W_C P_C) = \boxed{11.0\%M}$$

$$C\delta_D=100\delta_F G_M \delta_W/(\delta_F P_C)+(G_M \delta_W P_F) = \boxed{126.6\ pcf}$$

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FLUOR FERNALD

4940

MOISTURE-DENSITY RELATIONSHIP

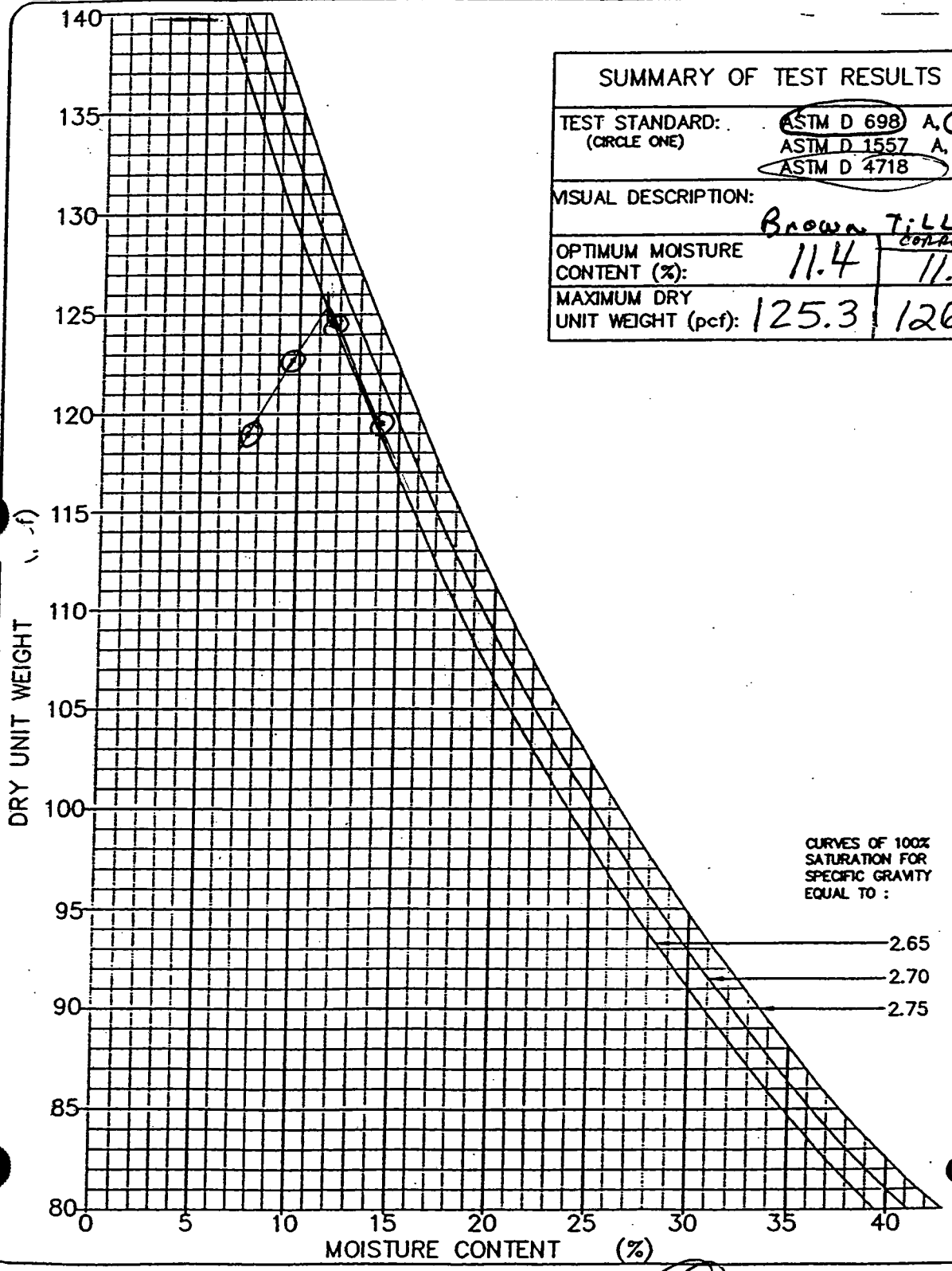
PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO PROJECT NO. 6-Q1341 TASK NO.: 04.1

DESCRIPTION: Phase III DATE: 19 day Oct month 2001 year

MATERIAL TYPE: Low Perm Clay MATERIAL SOURCE: Stockpile 01-7 SAMPLE NO. LP-01-45

SUMMARY OF TEST RESULTS			QA ID
TEST STANDARD: (CIRCLE ONE)	ASTM D 698 A, B, C ASTM D 1557 A, B, C ASTM D 4718		DLE TBU
VISUAL DESCRIPTION:	Brown Till		TBU
OPTIMUM MOISTURE CONTENT (%):	11.4	CORRECTED 11.0	TBU
MAXIMUM DRY UNIT WEIGHT (pcf):	125.3	126.6	TBU



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FLUOR FERNALD

FIELD LABORATORY COMPACTION TEST

(ASTM D 1557 METHOD B)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO

PROJECT NO 6-Q1341 TASK NO.: 04.1

DESCRIPTION: Phase III

DATE: 19 day Oct month 2001 year

MATERIAL TYPE: Low Perm Clay MATERIAL SOURCE: Stockpile 01-7 SAMPLE NO.: LP 01.45

THIS METHOD WILL BE USED IF THE MATERIAL RETAINED ON THE NO. 4-in. (4.75-mm) SIEVE IS GREATER THAN 20%, AND THE MATERIAL RETAINED ON THE NO. 3/8-in. (9.5-mm) SIEVE IS LESS THAN 20%.
ALL MATERIAL RETAINED ON THE NO. 3/8-in. (9.5-mm) SIEVE IS DISCARDED.
USE OVERSIZE CORRECTION IF MORE THAN 5% IS DISCARDED ACCORDING TO ASTM D 4718.
USE A 4-in. DIAMETER MOLD / 10-lb RAMMER / 18-in. DROP / 5 LAYERS / 25 BLOWS PER LAYER.

COMPACTION OF SOIL

QA ID: DCE

			13.83	14.02	14.15	13.98	
	WATER ADDED	(ml)	0%	2%	4%	6%	
A	WT. OF SOIL & MOLD	(grams)	6273.3	6359.5	6418.4	6341.3	
B	WT. OF MOLD	(grams)	4208.8	4208.8	4208.8	4208.8	
C	WT. OF SOIL = A − B	(grams)	2064.5	2150.7	2209.6	2132.5	
D	WET UNIT WT.(1) = C X 0.066	(pcf)	136.3	141.9	145.8	140.7	
E	DRY UNIT WT. = D / [1 + (K/100)]	(pcf)	129.3	131.6	132.7	125.6	

NOTE: IF CALIBRATED MOLD OF 1/30 FT^3 IS USED, THE WET DENSITY IS CALCULATED FROM THE WEIGHT OF SOIL, THE VOLUME OF THE MOLD AND THE CONVERSION FROM GRAMS TO POUNDS (I.E., CONVERSION FACTOR = (30 / 453.6) = 0.066). THE MOLD MUST BE CALIBRATED TO VERIFY A CAPACITY OF 1/30 ± 0.0005 FT^3 ON INTERVALS NOT TO EXCEED 1000 TIMES THAT THE MOLD IS FILLED.

MOISTURE CONTENT – ASTM D 2216

QA ID: _____

	TARE NO.		#230	#303	#229	#2	
F	WT. OF TARE	(grams)	8.1	8.3	8.0	8.2	
G	WT. OF WET SOIL & TARE	(grams)	435.8	411.3	508.7	535.1	
H	WT. OF DRY SOIL & TARE	(grams)	413.9	382.0	463.5	478.6	
I	WT. OF WATER = G − H	(grams)	21.9	29.3	45.2	56.5	
J	WT. DRY SOIL = H − F	(grams)	405.8	373.7	455.5	470.4	
K	MOISTURE CONTENT = (I/J) X 100	(%)	5.4	7.8	9.9	12.0	
			1.054	1.078	1.099	1.120	

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SHEET NO. 1 OF 3

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FLUOR FERNALD

CORRECTION OF UNIT WEIGHT AND WATER CONTENT FOR SOILS CONTAINING OVERSIZE PARTICLES *(ASTM D 4718)*

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO **PROJECT NO.** GQ134 **TASK NO.** 04.1

DESCRIPTION: PHASE III **DATE:** 22 day OCT month 2001 year

MATERIAL TYPE: Low Perm CLAY LP-01-45 MOD

Weight of Total Sample	=	45,592.7g
Weight of Oversize Fraction	=	1,810.3g
Weight of Finer Fraction (- 3/8)	=	43,782.4g
Percentage of Oversize Fraction	= (P_C)	4.0
Percentage of Finer Fraction (- 3/8)	= (P_F)	96.0
Specific Gravity (Assumed)	= (G_M)	2.72

(W_F)	=	Water Content - 3/8 , as decimal	=	0.093
(W_C)	=	Water Content + 3/8 , as decimal	=	0.015
(δ_F)	=	Dry Density of finer fraction	=	133.2
(δ_W)	=	Unit Weight of Water	=	62.4

$$C_W=(W_F P_F)+(W_C P_C) = \boxed{9.0\%M}$$

$$C\delta_D=100\delta_F G_M \delta_W/(\delta_F P_C)+(G_M \delta_W P_F) = \boxed{134.3\ pcf}$$

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FLUOR FERNALD

4940

MOISTURE-DENSITY RELATIONSHIP

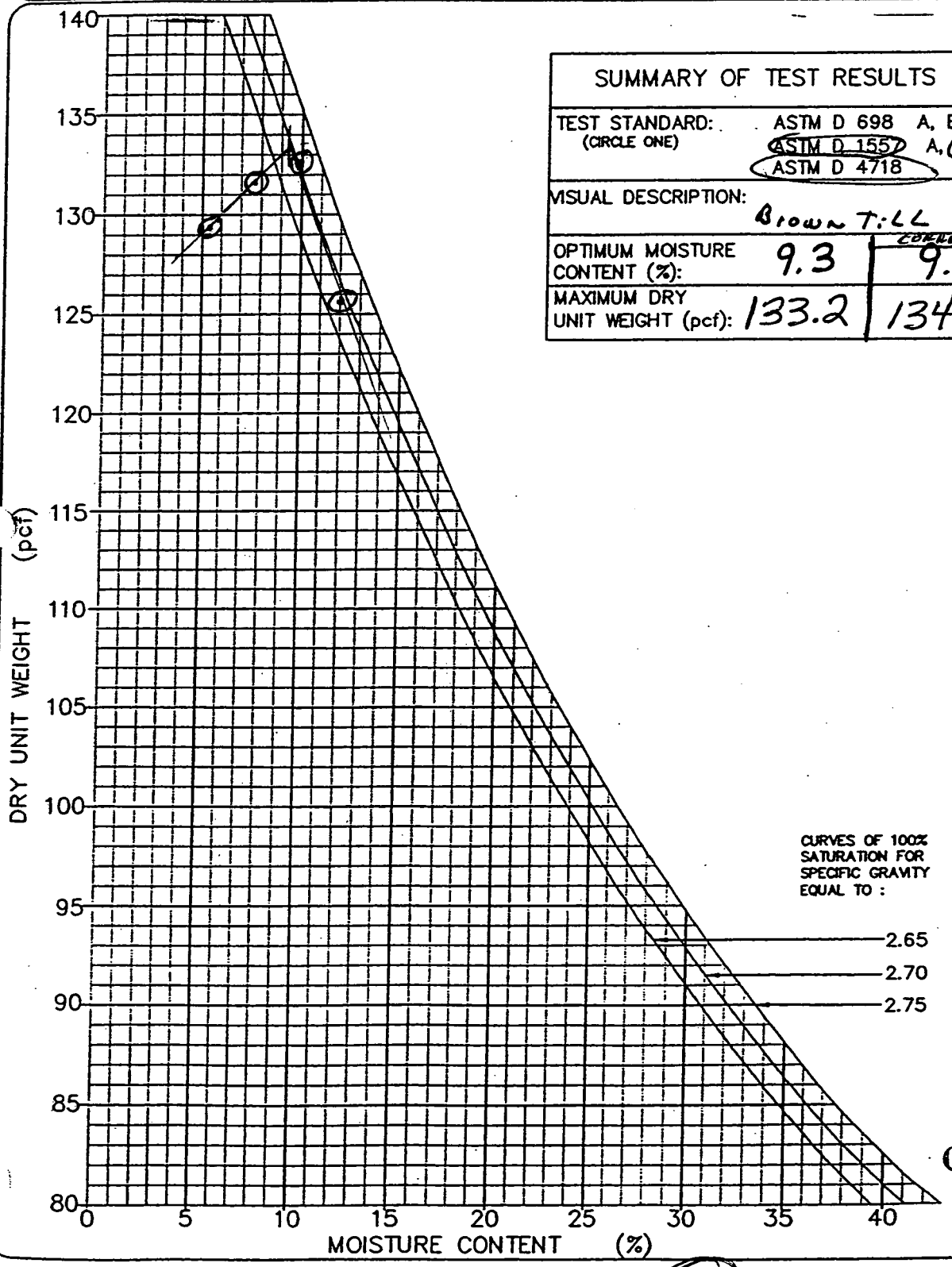
PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO PROJECT NO. 60131 TASK NO.: 04.1

DESCRIPTION: Phase III DATE: 19 day Oct month 2001 year

MATERIAL TYPE: Low Perm Clay MATERIAL SOURCE: Stockpile 01-7 SAMPLE NO.: LP-01-47

SUMMARY OF TEST RESULTS			QA ID
TEST STANDARD: (CIRCLE ONE)	ASTM D 698 A, B, C ASTM D 1557 A, B, C ASTM D 4718		DLE TBU
VISUAL DESCRIPTION:	Brown Till		TBU
OPTIMUM MOISTURE CONTENT (%):	9.3	CORRECTED 9.0	TBU
MAXIMUM DRY UNIT WEIGHT (pcf):	133.2	134.3	TBU



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FLUOR FERNALD

FIELD LABORATORY COMPACTION TEST

(ASTM D 698 METHOD B)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO

PROJECT NO. 6Q1341 TASK NO.: 04.1

DESCRIPTION: Phase III

DATE: 24 day oct month 01 year

MATERIAL TYPE: Low Perm Clay MATERIAL SOURCE: STOCKPILE 01-8 SAMPLE NO.: LP-01-46

THIS METHOD WILL BE USED IF THE MATERIAL RETAINED ON THE NO. 3/4-in. (19-mm) SIEVE IS LESS THAN 30%, IF THE MATERIAL RETAINED ON THE NO. 4 (4.75-mm) SIEVE IS GREATER THAN 20%, AND IF THE MATERIAL RETAINED ON THE NO. 3/8-in. (9.5-mm) SIEVE IS LESS THAN 20%.
ALL MATERIAL RETAINED ON THE NO. 3/8-in. (9.5-mm) SIEVE IS DISCARDED.
USE OVERSIZE CORRECTION IF MORE THAN 5% IS DISCARDED ACCORDING TO ASTM D 4718.
USE A 4-in. DIAMETER MOLD / 5.5-lb RAMMER / 12-in. DROP / 3 LAYERS / 25 BLOWS PER LAYER.

COMPACTION OF SOIL

QA ID: TD

			13.51	13.84	13.86	13.75	
	WATER ADDED	(ml)	2%	4%	6%	8%	
A	WT. OF SOIL & MOLD	(grams)	6128.1	6277.8	6286.9	6237.0	
B	WT. OF MOLD	(grams)	4208.8	4208.8	4208.8	4208.8	
C	WT. OF SOIL = A − B	(grams)	1919.3	2069.0	2078.1	2028.2	
D	WET UNIT WT.(1) = C X 0.066	(pcf)	126.7	136.6 ~~124.1~~	137.2	133.9	
E	DRY UNIT WT. = D / [1 + (K/100)]	(pcf)	115.6	122.4	120.7	115.4	

NOTE: IF CALIBRATED MOLD OF 1/30 FT^3 IS USED, THE WET DENSITY IS CALCULATED FROM THE WEIGHT OF SOIL, THE VOLUME OF THE MOLD AND THE CONVERSION FROM GRAMS TO POUNDS (I.E., CONVERSION FACTOR = (30 / 453.6) = 0.066). THE MOLD MUST BE CALIBRATED TO VERIFY A CAPACITY OF 1/30 ± 0.0005 FT^3 ON INTERVALS NOT TO EXCEED 1000 TIMES THAT THE MOLD IS FILLED.

MOISTURE CONTENT – ASTM D 2216

QA ID: DLE

	TARE NO.		#303	#230	#26	#102	
F	WT. OF TARE	(grams)	8.3	8.1	8.3	8.2	
G	WT. OF WET SOIL & TARE	(grams)	357.9	443.5	462.5	412.5	
H	WT. OF DRY SOIL & TARE	(grams)	327.3	398.2	407.6	356.6	
I	WT. OF WATER = G − H	(grams)	30.6	45.3	54.9	55.9	
J	WT. DRY SOIL = H − F	(grams)	319.0	390.1	399.3	348.4	
K	MOISTURE CONTENT = (I/J) X 100	(%)	9.6	11.6	13.7 ~~8~~	16.0	
			1.096	1.116	1.137	1.160	

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FLUOR FERNALD

CORRECTION OF UNIT WEIGHT AND WATER CONTENT FOR SOILS CONTAINING OVERSIZE PARTICLES *(ASTM D 4718)*

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO **PROJECT NO.** 60134 **TASK NO.** 041

DESCRIPTION: Phase III **DATE:** 25 day Oct month 2001 year

MATERIAL TYPE: Low Perm Clay LP01-46 STD

Weight of Total Sample	=	39080.6
Weight of Oversize Fraction	=	1264.4
Weight of Finer Fraction (- 3/8)	=	37816.2
Percentage of Oversize Fraction	= (P_C)	3.2
Percentage of Finer Fraction (- 3/8)	= (P_F)	96.8
Specific Gravity (Assumed)	= (G_M)	2.72

(W_F) =	Water Content - 3/8 , as decimal	=	~~12.2~~ 0.122
(W_C) =	Water Content + 3/8 , as decimal	=	0.015
(δ_F) =	Dry Density of finer fraction	=	123.0
(δ_W) =	Unit Weight of Water	=	62.4

$$C_W=(W_F P_F)+(W_C P_C)$$

C_W = 11.9 %

$$C\delta_D=100\delta_F G_M \delta_W/(\delta_F P_C)+(G_M \delta_W P_F)$$

$C_{\delta D}$ = 124.1 pcf

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FLUOR FERNALD

4940

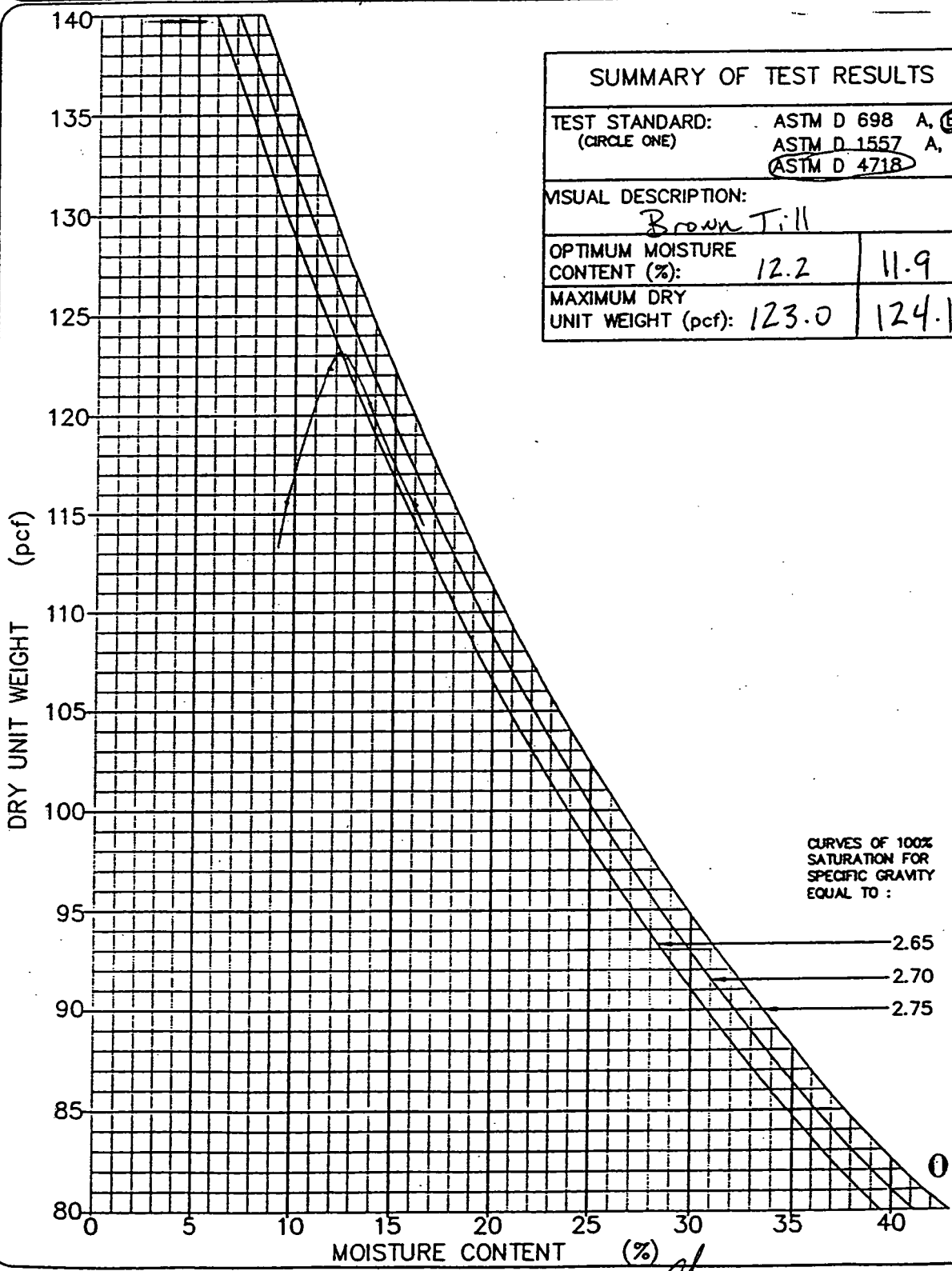
MOISTURE-DENSITY RELATIONSHIP

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO PROJECT NO.: G01341 TASK NO.: 041

DESCRIPTION: Phase III DATE: 25 day Oct month 2001 year

MATERIAL TYPE: Low Perm Clay MATERIAL SOURCE: STOCKPILE 01-8 SAMPLE NO.: LP01-46



SUMMARY OF TEST RESULTS			QA ID
TEST STANDARD: (CIRCLE ONE)	ASTM D 698 A, (B) C ASTM D 1557 A, B, C (ASTM D 4718)		DLE
VISUAL DESCRIPTION: Brown Till			DLE
OPTIMUM MOISTURE CONTENT (%):	12.2	11.9	CA
MAXIMUM DRY UNIT WEIGHT (pcf):	123.0	124.1	CA

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FLUOR FERNALD

FIELD LABORATORY COMPACTION TEST

(ASTM D 1557 METHOD B)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO

PROJECT NO.: 601341 TASK NO.: 4.1

DESCRIPTION: Phase III

DATE: 23 day oct month 01 year

MATERIAL TYPE: Low Perm Clay MATERIAL SOURCE: SAMPLE NO.: LP-01-46

THIS METHOD WILL BE USED IF THE MATERIAL RETAINED ON THE NO. 4-in. (4.75-mm) SIEVE IS GREATER THAN 20%, AND THE MATERIAL RETAINED ON THE NO. 3/8-in. (9.5-mm) SIEVE IS LESS THAN 20%.
ALL MATERIAL RETAINED ON THE NO. 3/8-in. (9.5-mm) SIEVE IS DISCARDED.
USE OVERSIZE CORRECTION IF MORE THAN 5% IS DISCARDED ACCORDING TO ASTM D 4718.
USE A 4-in. DIAMETER MOLD / 10-lb RAMMER / 18-in. DROP / 5 LAYERS / 25 BLOWS PER LAYER.

COMPACTION OF SOIL			13.82	14.04	14.04	13.93	QA ID: 110
	WATER ADDED	(ml)	0%	2%	4%	6%	
A	WT. OF SOIL & MOLD	(grams)	6268.8	6368.5	6368.5	6318.6	
B	WT. OF MOLD	(grams)	4208.8	4208.8	4208.8	4208.8	
C	WT. OF SOIL = A − B	(grams)	2060.0	2159.7	2159.7	2109.8	
D	WET UNIT WT.(1) = C X 0.066	(pcf)	136.0	142.5	142.5	139.2	
E	DRY UNIT WT. = D / [1 + (K/100)]	(pcf)	126.7	130.1	127.4	122.4	

NOTE: IF CALIBRATED MOLD OF 1/30 FT^3 IS USED, THE WET DENSITY IS CALCULATED FROM THE WEIGHT OF SOIL, THE VOLUME OF THE MOLD AND THE CONVERSION FROM GRAMS TO POUNDS (I.E., CONVERSION FACTOR = (30 / 453.6) = 0.066). THE MOLD MUST BE CALIBRATED TO VERIFY A CAPACITY OF 1/30 ± 0.0005 FT^3 ON INTERVALS NOT TO EXCEED 1000 TIMES THAT THE MOLD IS FILLED.

MOISTURE CONTENT − ASTM D 2216							QA ID:
	TARE NO.		#216	#228	#27	#13	
F	WT. OF TARE	(grams)	8.5	8.0	8.2	8.3	
G	WT. OF WET SOIL & TARE	(grams)	308.2	308.1	382.4	428.8	
H	WT. OF DRY SOIL & TARE	(grams)	287.8	281.8	342.6	378.0	
I	WT. OF WATER = G − H	(grams)	20.4	26.3	39.8	50.8	
J	WT. DRY SOIL = H − F	(grams)	279.3	273.8	334.4	369.7	
K	MOISTURE CONTENT = (I/J) X 100	(%)	7.3	9.6	11.9	13.7	

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GeoSyntec Consultants

FLUOR FERNALD 4940

CORRECTION OF UNIT WEIGHT AND WATER CONTENT FOR SOILS CONTAINING OVERSIZE PARTICLES *(ASTM D 4718)*

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO **PROJECT NO.** GQ1341 **TASK NO.** 04.1

DESCRIPTION: Phase III **DATE:** 26 **day** Oct **month** 2001 **year**

MATERIAL TYPE: Low Perm Clay LP01-46 mod

Weight of Total Sample	=	39080.6
Weight of Oversize Fraction	=	1264.4
Weight of Finer Fraction (- 3/8)	=	37816.2
Percentage of Oversize Fraction	= (P_C)	3.2
Percentage of Finer Fraction (- 3/8)	= (P_F)	96.8
Specific Gravity (Assumed)	= (G_M)	2.72

(W_F) =	Water Content - 3/8 , as decimal	=	0.101
(W_C) =	Water Content + 3/8 , as decimal	=	0.015
(δ_F) =	Dry Density of finer fraction	=	130.7
(δ_W) =	Unit Weight of Water	=	62.4

$$C_W=(W_F P_F)+(W_C P_C)$$

C_W = 9.8%

$$C\delta_D=100\delta_F G_M \delta_W/(\delta_F P_C)+(G_M \delta_W P_F)$$

$C_{\delta D}$ = 131.7 pcf

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FLUOR FERNALD

4940

MOISTURE-DENSITY RELATIONSHIP

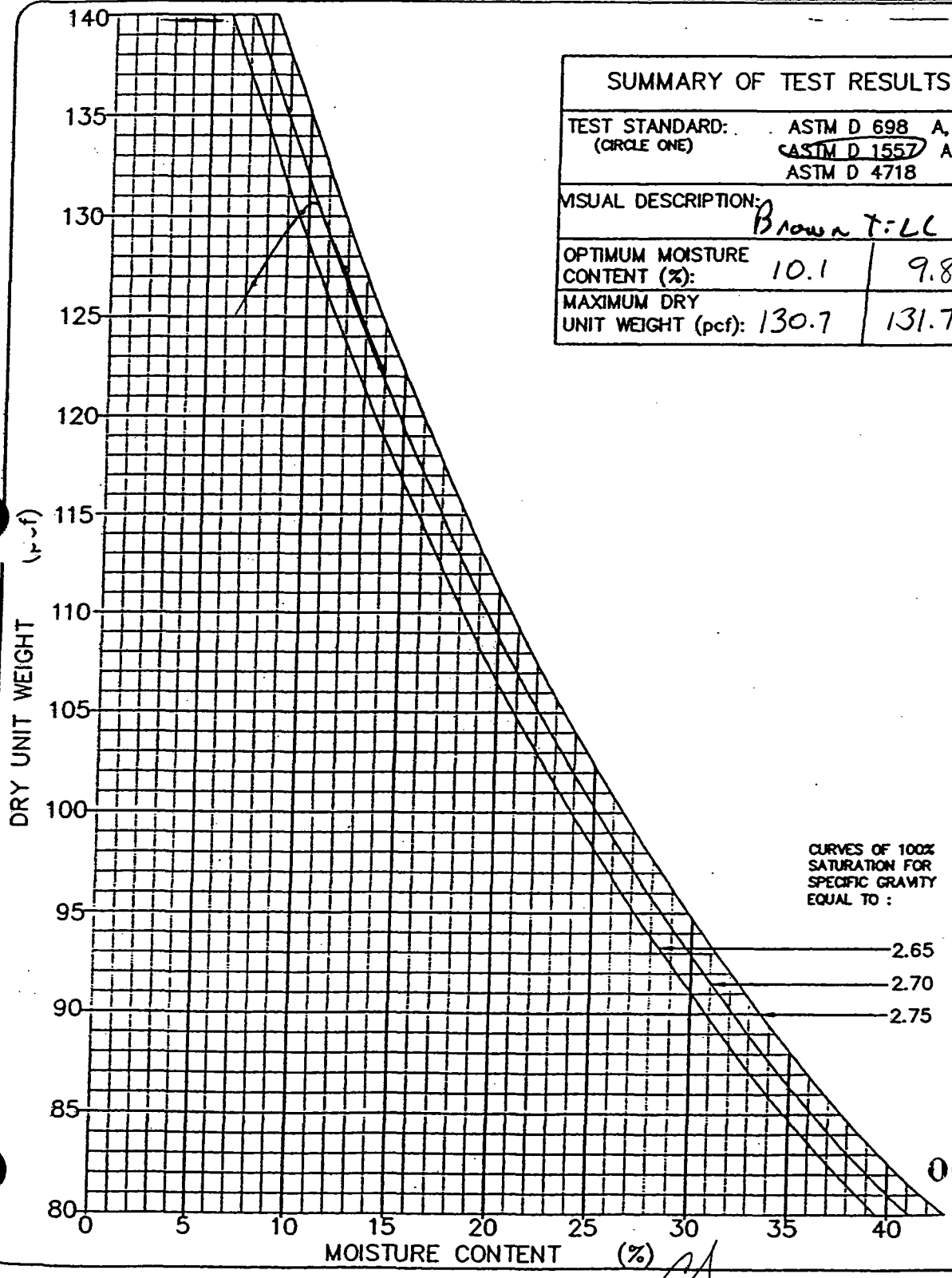
PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO PROJECT NO. GQ1341 TASK NO.: 04.1

DESCRIPTION: Phase III DATE: ____ day Oct month 2001 year

MATERIAL TYPE: Low Perm Clay MATERIAL SOURCE: Stock Pile 01-8 SAMPLE NO. LP-01-46

SUMMARY OF TEST RESULTS			QA ID
TEST STANDARD: (CIRCLE ONE)	ASTM D 698 A, B, C ASTM D 1557 A, B, C ASTM D 4718		DLE
VISUAL DESCRIPTION:	Brown Till		DLE
OPTIMUM MOISTURE CONTENT (%):	10.1	9.8	GS
MAXIMUM DRY UNIT WEIGHT (pcf):	130.7	131.7	GS



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FLUOR FERNALD

FIELD LABORATORY COMPACTION TEST

(ASTM D 698 METHOD B)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO

PROJECT NO. 6Q1341 TASK NO.: 04.1

DESCRIPTION: Phase III

DATE: 2 day Oct month 2001 year

MATERIAL TYPE: Low Perm Clay MATERIAL SOURCE: Stockpile 01-8 SAMPLE NO. LP01.47

THIS METHOD WILL BE USED IF THE MATERIAL RETAINED ON THE NO. 3/4-in. (19-mm) SIEVE IS LESS THAN 30%, IF THE MATERIAL RETAINED ON THE NO. 4 (4.75-mm) SIEVE IS GREATER THAN 20%, AND IF THE MATERIAL RETAINED ON THE NO. 3/8-in. (9.5-mm) SIEVE IS LESS THAN 20%.
ALL MATERIAL RETAINED ON THE NO. 3/8-in. (9.5-mm) SIEVE IS DISCARDED.
USE OVERSIZE CORRECTION IF MORE THAN 5% IS DISCARDED ACCORDING TO ASTM D 4718.
USE A 4-in. DIAMETER MOLD / 5.5-lb RAMMER / 12-in. DROP / 3 LAYERS / 25 BLOWS PER LAYER.

24/oct/01 → 13.75

COMPACTION OF SOIL

QA ID: TD

			13.22	13.50	13.68	13.86	
	WATER ADDED	(ml)	2%	4%	6%	8%	10%
A	WT. OF SOIL & MOLD	(grams)	5996.6	6123.6	6209.8	6286.9	6237
B	WT. OF MOLD	(grams)	4208.8	4208.8	4208.8	4208.8	4208.8
C	WT. OF SOIL = A − B	(grams)	1787.8	1914.8	2001.0	2078.1	2028.2
D	WET UNIT WT.(1) = C X 0.066	(pcf)	118.0	126.4	132.1	137.2	133.9
E	DRY UNIT WT. = D / [1 + (K/100)]	(pcf)	109.5	115.3	118.7	120.4	115.5

NOTE: IF CALIBRATED MOLD OF 1/30 FT^3 IS USED, THE WET DENSITY IS CALCULATED FROM THE WEIGHT OF SOIL. THE VOLUME OF THE MOLD AND THE CONVERSION FROM GRAMS TO POUNDS (I.E., CONVERSION FACTOR = (30 / 453.6) = 0.066). THE MOLD MUST BE CALIBRATED TO VERIFY A CAPACITY OF 1/30 ± 0.0005 FT^3 ON INTERVALS NOT TO EXCEED 1000 TIMES THAT THE MOLD IS FILLED.

MOISTURE CONTENT – ASTM D 2216

QA ID: TD/DLF

	TARE NO.		#106	#302	#103	#234	#A
F	WT. OF TARE	(grams)	8.3	8.3	8.3	8.3	7.9
G	WT. OF WET SOIL & TARE	(grams)	382.7	402.5	411.3	437.6	488.7
H	WT. OF DRY SOIL & TARE	(grams)	355.7	368.0	370.3	384.9	422.9
I	WT. OF WATER = G − H	(grams)	27.0	34.5	41.0	52.7	65.8
J	WT. DRY SOIL = H − F	(grams)	347.4	359.7	362.6	376.6	415.0
K	MOISTURE CONTENT = (I/J) X 100	(%)	7.8	9.6	11.3	14.0	15.9

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FLUOR FERNALD

4940

CORRECTION OF UNIT WEIGHT AND WATER CONTENT FOR SOILS CONTAINING OVERSIZE PARTICLES *(ASTM D 4718)*

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO **PROJECT NO.** GQ134/ **TASK NO.** 04.1

DESCRIPTION: Phase III **DATE:** 25 day Oct month 2001 year

MATERIAL TYPE: Low Perm CLAY LP01-47 STD

Weight of Total Sample	=	19964.5
Weight of Oversize Fraction	=	300.5
Weight of Finer Fraction (- 3/8)	=	19664.0
Percentage of Oversize Fraction	= (P_C)	1.5
Percentage of Finer Fraction (- 3/8)	= (P_F)	98.5
Specific Gravity (Assumed)	= (G_M)	2.72

(W_F) =	Water Content - 3/8 , as decimal	=	0.132
(W_C) =	Water Content + 3/8 , as decimal	=	0.015
(δ_F) =	Dry Density of finer fraction	=	121.2
(δ_W) =	Unit Weight of Water	=	62.4

$$C_W=(W_F P_F)+(W_C P_C)$$

$C_w = 12.0\%$

$$C\delta_D=100\delta_F G_M \delta_W/(\delta_F P_C)+(G_M \delta_W P_F)$$

$C_{\delta D} = 123.5$ pcf

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FLUOR FERNALD

4940

MOISTURE-DENSITY RELATIONSHIP

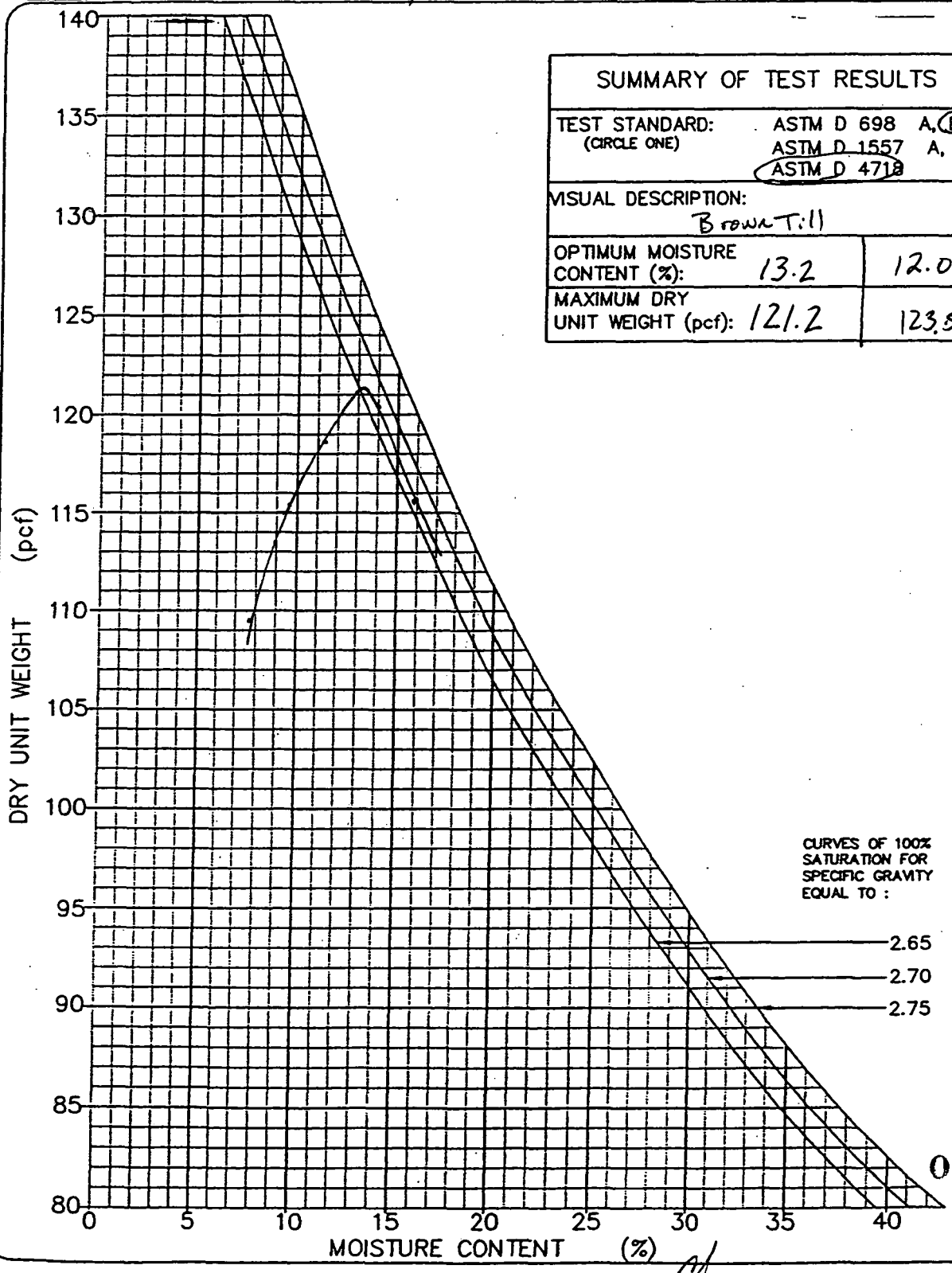
PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO PROJECT NO.: GQ1341 TASK NO.: 04.1

DESCRIPTION: Phase III DATE: 25 day Oct month 2001 year

MATERIAL TYPE: Low Perm Clay MATERIAL SOURCE: STOCKPILE 01-8 SAMPLE NO.: LP01-47

SUMMARY OF TEST RESULTS			QA ID
TEST STANDARD: (CIRCLE ONE)	ASTM D 698 A, (B) C ASTM D 1557 A, B, C (ASTM D 4718)		DLE
VISUAL DESCRIPTION: Brown Till			DLE
OPTIMUM MOISTURE CONTENT (%):	13.2	12.0	CL
MAXIMUM DRY UNIT WEIGHT (pcf):	121.2	123.5	CL



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FLUOR FERNALD

FIELD LABORATORY COMPACTION TEST

(ASTM D 698 METHOD B)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO

PROJECT NO. 6Q1341 TASK NO.: 04.1

DESCRIPTION: Phase III

DATE: 25 day OCT month 01 year

MATERIAL TYPE: Low Perm Clay MATERIAL SOURCE: Stockpile 01-8 SAMPLE NO.: LP-01-48

THIS METHOD WILL BE USED IF THE MATERIAL RETAINED ON THE NO. 3/4-in. (19-mm) SIEVE IS LESS THAN 30%, IF THE MATERIAL RETAINED ON THE NO. 4 (4.75-mm) SIEVE IS GREATER THAN 20%, AND IF THE MATERIAL RETAINED ON THE NO. 3/8-in. (9.5-mm) SIEVE IS LESS THAN 20%.
ALL MATERIAL RETAINED ON THE NO. 3/8-in. (9.5-mm) SIEVE IS DISCARDED.
USE OVERSIZE CORRECTION IF MORE THAN 5% IS DISCARDED ACCORDING TO ASTM D 4718.
USE A 4-in. DIAMETER MOLD / 5.5-lb RAMMER / 12-in. DROP / 3 LAYERS / 25 BLOWS PER LAYER.

COMPACTION OF SOIL — QA ID: TO

			13.5	13.70	13.84	13.77	
	WATER ADDED	(ml)	2%	4%	6%	8%	
A	WT. OF SOIL & MOLD	(grams)	6123.6	6214.3	6277.8	6246.1	
B	WT. OF MOLD	(grams)	4208.8	4208.8	4208.8	4208.8	
C	WT. OF SOIL = A − B	(grams)	1914.8	2005.5	2069.0	2037.3	
D	WET UNIT WT.(1) = C X 0.066	(pcf)	126.4	132.4	136.6	134.5	
E	DRY UNIT WT. = D / [1 + (K/100)]	(pcf)	115.4	118.5	119.8	115.8	

NOTE: IF CALIBRATED MOLD OF 1/30 FT^3 IS USED, THE WET DENSITY IS CALCULATED FROM THE WEIGHT OF SOIL, THE VOLUME OF THE MOLD AND THE CONVERSION FROM GRAMS TO POUNDS (I.E., CONVERSION FACTOR = (30 / 453.6) = 0.066). THE MOLD MUST BE CALIBRATED TO VERIFY A CAPACITY OF 1/30 ± 0.0005 FT^3 ON INTERVALS NOT TO EXCEED 1000 TIMES THAT THE MOLD IS FILLED.

MOISTURE CONTENT — ASTM D 2216 — QA ID: TO/DLB

	TARE NO.		#207	#205	~~#20~~	#33	
F	WT. OF TARE	(grams)	8.3	8.3	8.3	8.1	
G	WT. OF WET SOIL & TARE	(grams)	452.5	581.5	366.8	412.0	
H	WT. OF DRY SOIL & TARE	(grams)	413.9	521.6	322.8	356.0	
I	WT. OF WATER = G − H	(grams)	38.6	59.9	44.0	56.0	
J	WT. DRY SOIL = H − F	(grams)	405.6	513.3	314.5	347.9	
K	MOISTURE CONTENT = (I/J) X 100	(%)	9.5	11.7	14.0	16.1	
			1.095	1.117	1.14	1.161	

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GeoSyntec Consultants

FLUOR FERNALD

4940

CORRECTION OF UNIT WEIGHT AND WATER CONTENT FOR SOILS CONTAINING OVERSIZE PARTICLES

(ASTM D 4718)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO PROJECT NO. G0131 TASK NO. 04.1

DESCRIPTION: Phase III DATE: 28 day Oct month 2001 year

MATERIAL TYPE: Low Perm Clay LP01-48 STD

Weight of Total Sample	=	37849.9
Weight of Oversize Fraction	=	735.4
Weight of Finer Fraction (- 3/8)	=	37114.5
Percentage of Oversize Fraction	= (P_C)	1.9
Percentage of Finer Fraction (- 3/8)	= (P_F)	98.1
Specific Gravity (Assumed)	= (G_M)	2.72

(W_F)	=	Water Content - 3/8 , as decimal	=	0.135
(W_C)	=	Water Content + 3/8 , as decimal	=	~~0.015~~ 0.015
(δ_F)	=	Dry Density of finer fraction	=	120.3
(δ_W)	=	Unit Weight of Water	=	62.4

$$C_W=(W_F P_F)+(W_C P_C)$$

$C_W = 13.3$

$$C\delta_D=100\delta_F G_M \delta_W/(\delta_F P_C)+(G_M \delta_W P_F)$$

$C_{\delta D} = 121.0$

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GEOSYNTEC CONSULTANTS

FLUOR FERNALD

4940

MOISTURE-DENSITY RELATIONSHIP

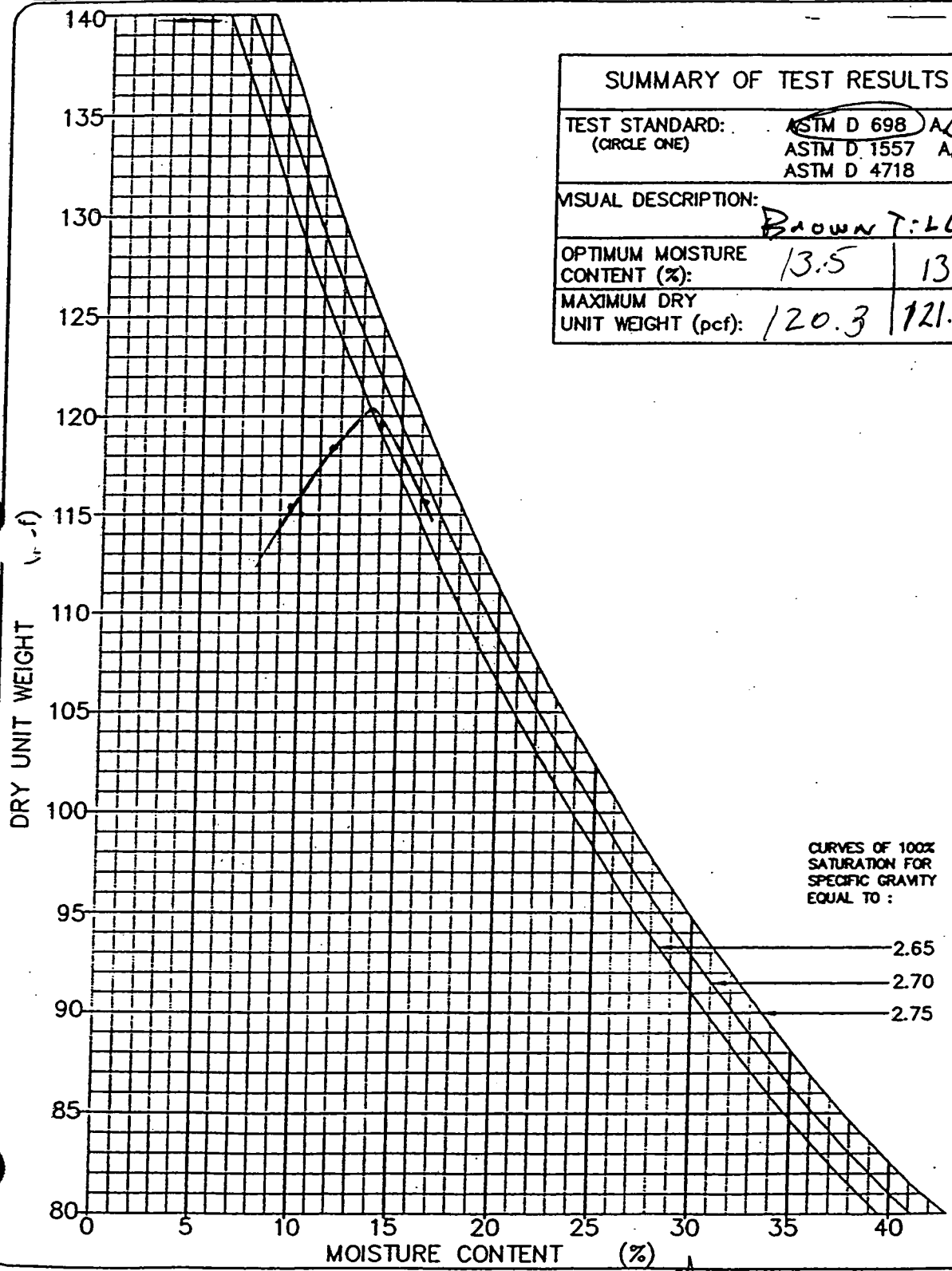
PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO PROJECT NO. 601341 TASK NO.: 041

DESCRIPTION: Phase III DATE: 26 day Oct month 2001 year

MATERIAL TYPE: Low Perm Clay MATERIAL SOURCE: Stockpile 01-8 SAMPLE NO. LP-01-48

SUMMARY OF TEST RESULTS			QA ID
TEST STANDARD: (CIRCLE ONE)	ASTM D 698 A, B, C ASTM D 1557 A, B, C ASTM D 4718		DLE
VISUAL DESCRIPTION:	Brown Tilt		DLE
OPTIMUM MOISTURE CONTENT (%):	13.5	13.2	CA
MAXIMUM DRY UNIT WEIGHT (pcf):	120.3	121.0	CA



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GEOSYNTEC CONSULTANTS

FLUOR FERNALD

FIELD LABORATORY COMPACTION TEST

(ASTM D 1557 METHOD B)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO

PROJECT NO.: GQ1341 TASK NO.: 4.1

DESCRIPTION: Phase III

DATE: 25 day Oct month 01 year

MATERIAL TYPE: Low Perm Clay MATERIAL SOURCE: Stockpile 01-8 SAMPLE NO.: LP-01-48

THIS METHOD WILL BE USED IF THE MATERIAL RETAINED ON THE NO. 4-in. (4.75-mm) SIEVE IS GREATER THAN 20%, AND THE MATERIAL RETAINED ON THE NO. 3/8-in. (9.5-mm) SIEVE IS LESS THAN 20%.
ALL MATERIAL RETAINED ON THE NO. 3/8-in. (9.5-mm) SIEVE IS DISCARDED.
USE OVERSIZE CORRECTION IF MORE THAN 5% IS DISCARDED ACCORDING TO ASTM D 4718.
USE A 4-in. DIAMETER MOLD / 10-lb RAMMER / 18-in. DROP / 5 LAYERS / 25 BLOWS PER LAYER.

COMPACTION OF SOIL

QA ID: 90

			13.79	13.98	14.04	13.96	
	WATER ADDED	(ml)	0 %	2 %	4 %	6 %	%
A	WT. OF SOIL & MOLD	(grams)	6255.1	6341.3	6368.5	6332.3	
B	WT. OF MOLD	(grams)	4208.8	4208.8	4208.8	4208.8	4208.8
C	WT. OF SOIL = A − B	(grams)	2046.3	2132.5	2159.7	2123.5	
D	WET UNIT WT.(1) = C X 0.066	(pcf)	135.1	140.7	142.5	140.2	
E	DRY UNIT WT. = D / [1 + (K/100)]	(pcf)	125.7	128.3	127.9	123.5	

NOTE: IF CALIBRATED MOLD OF 1/30 FT^3 IS USED, THE WET DENSITY IS CALCULATED FROM THE WEIGHT OF SOIL, THE VOLUME OF THE MOLD AND THE CONVERSION FROM GRAMS TO POUNDS (I.E., CONVERSION FACTOR = (30 / 453.6) = 0.066). THE MOLD MUST BE CALIBRATED TO VERIFY A CAPACITY OF 1/30 ± 0.0005 FT^3 ON INTERVALS NOT TO EXCEED 1000 TIMES THAT THE MOLD IS FILLED.

MOISTURE CONTENT – ASTM D 2216

QA ID: 7A/DCS

	TARE NO.		#11	#211	#21	#215	
F	WT. OF TARE	(grams)	8.1	7.9	8.4	8.3	
G	WT. OF WET SOIL & TARE	(grams)	391.9	341.8	492.7	425.2	
H	WT. OF DRY SOIL & TARE	(grams)	365.1	312.3	443.2	375.7	
I	WT. OF WATER = G − H	(grams)	26.8	29.5	49.5	49.5	
J	WT. DRY SOIL = H − F	(grams)	357.0	304.4	434.8	367.4	
K	MOISTURE CONTENT = (I/J) X 100	(%)	7.5	9.7	11.4	13.5	
			1.075	1.097	1.114	1.135	

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GeoSyntec Consultants

FLUOR FERNALD

4940

CORRECTION OF UNIT WEIGHT AND WATER CONTENT FOR SOILS CONTAINING OVERSIZE PARTICLES *(ASTM D 4718)*

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO PROJECT NO. 60134 TASK NO. 04.1

DESCRIPTION: Phase III DATE: 29 day Oct month 2001 year

MATERIAL TYPE: Low Perm Clay LP01-48 MOD

Weight of Total Sample	=	37849.9
Weight of Oversize Fraction	=	735.4
Weight of Finer Fraction (- 3/8)	=	37114.5
Percentage of Oversize Fraction	= (P_C)	1.9
Percentage of Finer Fraction (- 3/8)	= (P_F)	98.1
Specific Gravity (Assumed)	= (G_M)	2.72

(W_F) =	Water Content - 3/8 , as decimal	=	0.104
(W_C) =	Water Content + 3/8 , as decimal	=	0.015
(δ_F) =	Dry Density of finer fraction	=	129.0
(δ_W) =	Unit Weight of Water	=	62.4

$$C_W=(W_F P_F)+(W_C P_C)$$

$C_W = 10.2\%$

$$C\delta_D=100\delta_F G_M \delta_W/(\delta_F P_C)+(G_M \delta_W P_F)$$

$C_{\delta D} = 129.6$ pcf

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GEOSYNTEC CONSULTANTS

FLUOR FERNALD

4940

MOISTURE–DENSITY RELATIONSHIP

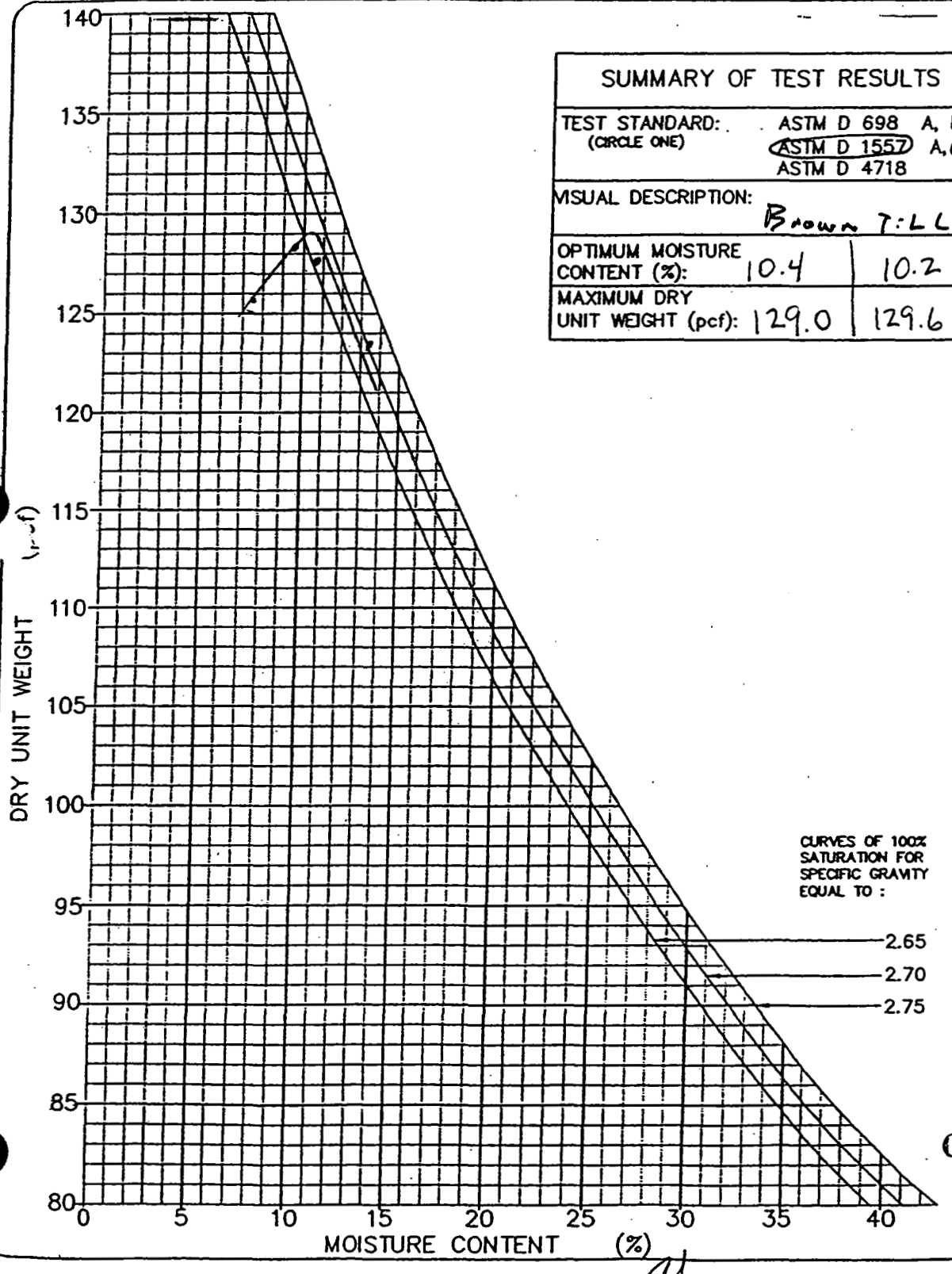
PROJECT: ON–SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO PROJECT NO. GQ1341 TASK NO.: 04.1

DESCRIPTION: Phase III DATE: 26 day Oct month 2001 year

MATERIAL TYPE: Low Perm Clay MATERIAL SOURCE: Stockpile 01-8 SAMPLE NO. LP-01-48

SUMMARY OF TEST RESULTS			QA ID
TEST STANDARD: (CIRCLE ONE)	ASTM D 698 A, B, C ASTM D 1557 A, B, C ASTM D 4718		DLE
VISUAL DESCRIPTION:	Brown T:LL		DLE
OPTIMUM MOISTURE CONTENT (%):	10.4	10.2	CA
MAXIMUM DRY UNIT WEIGHT (pcf):	129.0	129.6	CA



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FLUOR FERNALD

FIELD LABORATORY COMPACTION TEST

(ASTM D 698 METHOD B)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO

DESCRIPTION: Phase III

PROJECT NO. 6Q134 TASK NO.: 04.1

DATE: 29 day Oct month 2001 year

MATERIAL TYPE: Low Perm Clay

MATERIAL SOURCE: Stockpile 01-8

SAMPLE NO.: LP-01-51

THIS METHOD WILL BE USED IF THE MATERIAL RETAINED ON THE NO. 3/4-in. (19-mm) SIEVE IS LESS THAN 30%, IF THE MATERIAL RETAINED ON THE NO. 4 (4.75-mm) SIEVE IS GREATER THAN 20%, AND IF THE MATERIAL RETAINED ON THE NO. 3/8-in. (9.5-mm) SIEVE IS LESS THAN 20%.
ALL MATERIAL RETAINED ON THE NO. 3/8-in. (9.5-mm) SIEVE IS DISCARDED.
USE OVERSIZE CORRECTION IF MORE THAN 5% IS DISCARDED ACCORDING TO ASTM D 4718.
USE A 4-in. DIAMETER MOLD / 5.5-lb RAMMER / 12-in. DROP / 3 LAYERS / 25 BLOWS PER LAYER.

COMPACTION OF SOIL

QA ID: DLB/KS

			13.33	13.56	13.71	13.99	
	WATER ADDED	(ml)	4%	6%	8%	10%	
A	WT. OF SOIL & MOLD	(grams)	6046.5	6150.8	6218.9	6255.1	
B	WT. OF MOLD	(grams)	4208.8	4208.8	4208.8	4208.8	
C	WT. OF SOIL = A − B	(grams)	1837.7	1942.0	2010.1	2046.3	
D	WET UNIT WT.(1) = C X 0.066	(pcf)	121.3	128.2	132.7	135.1	
E	DRY UNIT WT. = D / [1 + (K/100)]	(pcf)	111.8	115.3	117.2	116.6	

NOTE: IF CALIBRATED MOLD OF 1/30 FT^3 IS USED, THE WET DENSITY IS CALCULATED FROM THE WEIGHT OF SOIL, THE VOLUME OF THE MOLD AND THE CONVERSION FROM GRAMS TO POUNDS (I.E., CONVERSION FACTOR = (30 / 453.6) = 0.066). THE MOLD MUST BE CALIBRATED TO VERIFY A CAPACITY OF 1/30 ± 0.0005 FT^3 ON INTERVALS NOT TO EXCEED 1000 TIMES THAT THE MOLD IS FILLED.

MOISTURE CONTENT – ASTM D 2216

QA ID: DLB/KS

	TARE NO.		#234	#1	#231	#304	
F	WT. OF TARE	(grams)	8.3	8.3	8.0	8.3	
G	WT. OF WET SOIL & TARE	(grams)	317.8	451.3	432.1	349.0	
H	WT. OF DRY SOIL & TARE	(grams)	293.5	406.8	382.6	302.3	
I	WT. OF WATER = G − H	(grams)	24.3	44.5	49.5	46.7	
J	WT. DRY SOIL = H − F	(grams)	285.2	398.5	374.6	294.0	
K	MOISTURE CONTENT = (I/J) X 100	(%)	8.5	11.2	13.2	15.9	

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SHEET NO. 1 OF 3

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FLUOR FERNALD

4940

CORRECTION OF UNIT WEIGHT AND WATER CONTENT FOR SOILS CONTAINING OVERSIZE PARTICLES *(ASTM D 4718)*

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO **PROJECT NO.** GQ1341 **TASK NO.** 04.1

DESCRIPTION: Phase III **DATE:** 29 day Oct month 2001 year

MATERIAL TYPE: LOW PERM Clay LP01-51 STD

Weight of Total Sample	=	15561.1
Weight of Oversize Fraction	=	581.5
Weight of Finer Fraction (- 3/8)	=	14979.6
Percentage of Oversize Fraction	= (P_C)	3.7
Percentage of Finer Fraction (- 3/8)	= (P_F)	96.3
Specific Gravity (Assumed)	= (G_M)	2.72

(W_F) =	Water Content - 3/8 , as decimal	=	0.145
(W_C) =	Water Content + 3/8 , as decimal	=	0.015
(δ_F) =	Dry Density of finer fraction	=	118.5
(δ_W) =	Unit Weight of Water	=	62.4

$$C_W=(W_F P_F)+(W_C P_C)$$

$C_W = 14.0$

$$C\delta_D=100\delta_F G_M \delta_W/(\delta_F P_C)+(G_M \delta_W P_F)$$

$C_{\delta D} = 119.9$

000565

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GEOSYNTEC CONSULTANTS

FLUOR FERNALD

4940

MOISTURE–DENSITY RELATIONSHIP

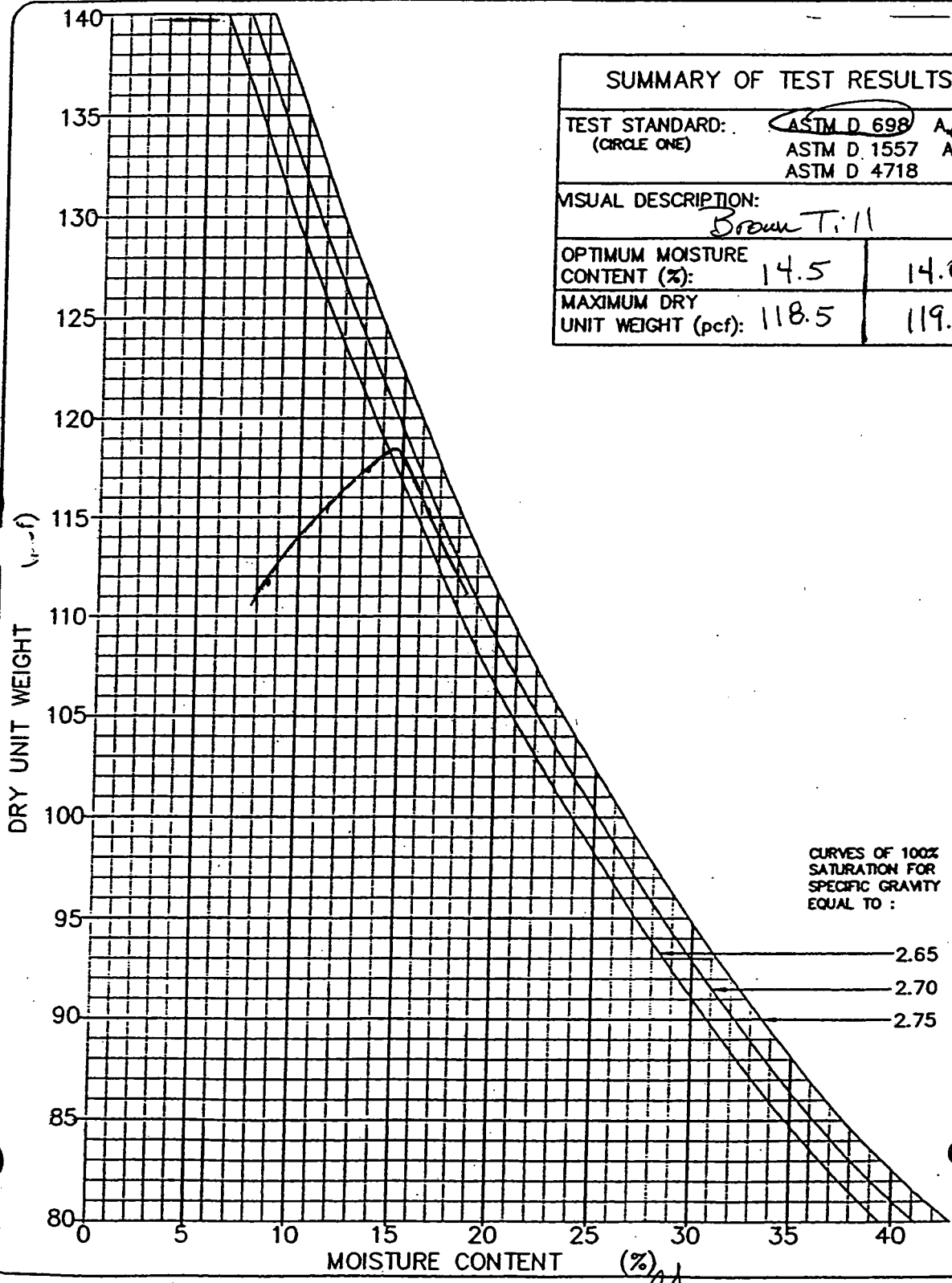
PROJECT: ON–SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO PROJECT NO.: 6Q1341 TASK NO.: Ø41

DESCRIPTION: Phase III DATE: 29 day Oct month 2001 year

MATERIAL TYPE: Low Perm Clay MATERIAL SOURCE: Stockp. 4c or 8 SAMPLE NO. 2P-01-51

SUMMARY OF TEST RESULTS			QA ID
TEST STANDARD: (CIRCLE ONE)	ASTM D 698 A, B, C ASTM D 1557 A, B, C ASTM D 4718		DLE
VISUAL DESCRIPTION:	Brown Till		
OPTIMUM MOISTURE CONTENT (%):	14.5	14.0	
MAXIMUM DRY UNIT WEIGHT (pcf):	118.5	119.9	



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GEOSYNTEC CONSULTANTS

FLUOR FERNALD

FIELD LABORATORY COMPACTION TEST

(ASTM D 698 METHOD B)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO

PROJECT NO. 6Q134 TASK NO.: 04.1

DESCRIPTION: Phase III

DATE: 31 day Oct month 2001 year

MATERIAL TYPE: Low Perm Clay MATERIAL SOURCE: Stockpile 01-8 SAMPLE NO.: LP-01-53

THIS METHOD WILL BE USED IF THE MATERIAL RETAINED ON THE NO. 3/4-in. (19-mm) SIEVE IS LESS THAN 30%, IF THE MATERIAL RETAINED ON THE NO. 4 (4.75-mm) SIEVE IS GREATER THAN 20%, AND IF THE MATERIAL RETAINED ON THE NO. 3/8-in. (9.5-mm) SIEVE IS LESS THAN 20%.
ALL MATERIAL RETAINED ON THE NO. 3/8-in. (9.5-mm) SIEVE IS DISCARDED.
USE OVERSIZE CORRECTION IF MORE THAN 5% IS DISCARDED ACCORDING TO ASTM D 4718.
USE A 4-in. DIAMETER MOLD / 5.5-lb RAMMER / 12-in. DROP / 3 LAYERS / 25 BLOWS PER LAYER.

COMPACTION OF SOIL

			13.34	13.57	13.75	13.72	QA ID: KS
	WATER ADDED	(ml)	4%	6%	8%	10%	
A	WT. OF SOIL & MOLD	(grams)	6051.0	6155.4	6237	6223.4	
B	WT. OF MOLD	(grams)	4208.8	4208.8	4208.8	4208.8	4208.8
C	WT. OF SOIL = A − B	(grams)	1842.2	1946.6	2028.2	2014.6	
D	WET UNIT WT.(1) = C X 0.066	(pcf)	121.6	128.5	133.9	133.0	
E	DRY UNIT WT. = D / [1 + (K/100)]	(pcf)	111.3	115.3	117.9	114.7	

NOTE: IF CALIBRATED MOLD OF 1/30 FT^3 IS USED, THE WET DENSITY IS CALCULATED FROM THE WEIGHT OF SOIL, THE VOLUME OF THE MOLD AND THE CONVERSION FROM GRAMS TO POUNDS (I.E., CONVERSION FACTOR = (30 / 453.6) = 0.066). THE MOLD MUST BE CALIBRATED TO VERIFY A CAPACITY OF 1/30 ± 0.0005 FT^3 ON INTERVALS NOT TO EXCEED 1000 TIMES THAT THE MOLD IS FILLED.

MOISTURE CONTENT – ASTM D 2216

							QA ID: KS/DA
	TARE NO.		127	305	228	104-A	
F	WT. OF TARE	(grams)	8.3	8.3	8.0	8.3	
G	WT. OF WET SOIL & TARE	(grams)	374.0	367.9	360.7	330.1	
H	WT. OF DRY SOIL & TARE	(grams)	343.2	331.0	318.7	285.8	
I	WT. OF WATER = G − H	(grams)	30.8	36.9	42.0	44.3	
J	WT. DRY SOIL = H − F	(grams)	334.9	322.7	310.7	277.5	
K	MOISTURE CONTENT = (I/J) X 100	(%)	9.2	11.4	13.5	16.0	

000567

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GeoSyntec Consultants

FLUOR FERNALD 49 40

CORRECTION OF UNIT WEIGHT AND WATER CONTENT FOR SOILS CONTAINING OVERSIZE PARTICLES

(ASTM D 4718)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO PROJECT NO. GQ1341 TASK NO. 04.1

DESCRIPTION: Phase III DATE: 1 day Nov month 2001 year

MATERIAL TYPE: Low Perm Clay LPØ1-53 STD

Weight of Total Sample	=	36585.8
Weight of Oversize Fraction	=	1017.1
Weight of Finer Fraction (- 3/8)	=	35568.7
Percentage of Oversize Fraction	= (P_C)	2.8
Percentage of Finer Fraction (- 3/8)	= (P_F)	97.2
Specific Gravity (Assumed)	= (G_M)	2.72

(W_F)	=	Water Content - 3/8 , as decimal	=	0.141
(W_C)	=	Water Content + 3/8 , as decimal	=	0.015
(δ_F)	=	Dry Density of finer fraction	=	118.2
(δ_W)	=	Unit Weight of Water	=	62.4

$$C_W=(W_F P_F)+(W_C P_C)$$

$C_W = 13.7\%$

$$C\delta_D=100\delta_F G_M \delta_W/(\delta_F P_C)+(G_M \delta_W P_F)$$

$C_{\delta D} = 119.2$ pcf

000568

GEOSYNTEC CONSULTANTS

FLUOR FERNALD

4940

MOISTURE-DENSITY RELATIONSHIP

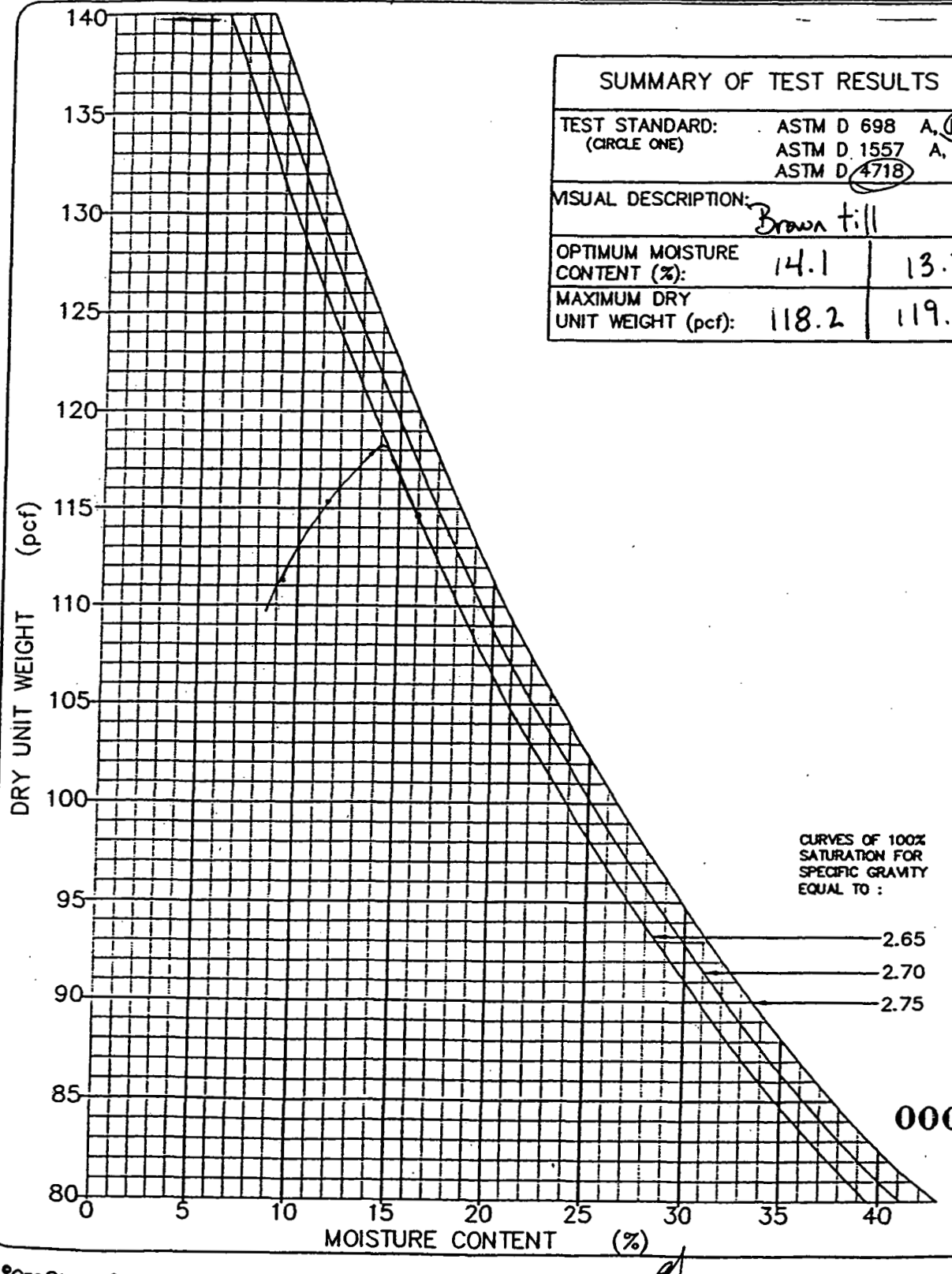
PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO PROJECT NO.: GQ1341 TASK NO.: 04.1

DESCRIPTION: Phase III DATE: 1 day Nov month 2001 year

MATERIAL TYPE: Low Perm Clay MATERIAL SOURCE: Stockpile Ø1-B SAMPLE NO.: LPØ1-53

SUMMARY OF TEST RESULTS			QA ID
TEST STANDARD: (CIRCLE ONE)	ASTM D 698 A, (B) C ASTM D 1557 A, B, C ASTM D (4718)		GA
VISUAL DESCRIPTION:	Brown till		GA
OPTIMUM MOISTURE CONTENT (%):	14.1	13.7	GA
MAXIMUM DRY UNIT WEIGHT (pcf):	118.2	119.2	GA



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FLUOR FERNALD

FIELD LABORATORY COMPACTION TEST

(ASTM D 1557 METHOD B)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO

PROJECT NO. 6Q134 TASK NO.: 04.1

DESCRIPTION: Phase III

DATE: 01 day Nov. month 2001 year

MATERIAL TYPE: Low Perm Clay MATERIAL SOURCE: Stock Pile 01-8 SAMPLE NO.: LP-01-53

THIS METHOD WILL BE USED IF THE MATERIAL RETAINED ON THE NO. 4-in. (4.75-mm) SIEVE IS GREATER THAN 20%, AND THE MATERIAL RETAINED ON THE NO. 3/8-in. (9.5-mm) SIEVE IS LESS THAN 20%.
ALL MATERIAL RETAINED ON THE NO. 3/8-in. (9.5-mm) SIEVE IS DISCARDED.
USE OVERSIZE CORRECTION IF MORE THAN 5% IS DISCARDED ACCORDING TO ASTM D 4718.
USE A 4-in. DIAMETER MOLD / 10-lb RAMMER / 18-in. DROP / 5 LAYERS / 25 BLOWS PER LAYER.

COMPACTION OF SOIL

QA ID: KS/DCF

			13.83	13.97	14.06	13.90	13.62
	WATER ADDED	(ml)	2%	4%	6%	8%	0%
A	WT. OF SOIL & MOLD	(grams)	6273.3	6336.8	6377.6	6305.0	6178.0
B	WT. OF MOLD	(grams)	4208.8	4208.8	4208.8	4208.8	4208.8
C	WT. OF SOIL = A − B	(grams)	2064.5	2128.0	2168.8	2096.2	1969.2
D	WET UNIT WT.(1) = C X 0.066	(pcf)	136.3	140.4	143.1	138.3	130.0
E	DRY UNIT WT. = D / [1 + (K/100)]	(pcf)	~~113.6~~ 127.3	128.8	128.4	122.3	123.2

NOTE: IF CALIBRATED MOLD OF 1/30 FT^3 IS USED, THE WET DENSITY IS CALCULATED FROM THE WEIGHT OF SOIL, THE VOLUME OF THE MOLD AND THE CONVERSION FROM GRAMS TO POUNDS (I.E., CONVERSION FACTOR = (30 / 453.6) = 0.066). THE MOLD MUST BE CALIBRATED TO VERIFY A CAPACITY OF 1/30 ± 0.0005 FT^3 ON INTERVALS NOT TO EXCEED 1000 TIMES THAT THE MOLD IS FILLED.

MOISTURE CONTENT — ASTM D 2216

QA ID: KS/DCF

	TARE NO.		212	301	233	34	#24
F	WT. OF TARE	(grams)	8.3	8.5	8.4	8.2	8.4
G	WT. OF WET SOIL & TARE	(grams)	300.4	275.3	234.0	332.4	278.5
H	WT. OF DRY SOIL & TARE	(grams)	281.1	253.2	210.7	294.7	264.5
I	WT. OF WATER = G − H	(grams)	19.3	22.1	23.3	37.7	14.0
J	WT. DRY SOIL = H − F	(grams)	272.8	244.7	202.3	286.5	256.1
K	MOISTURE CONTENT = (I/J) X 100	(%)	7.1	9.0	11.5	13.2	5.5

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FLUOR FERNALD

4940

CORRECTION OF UNIT WEIGHT AND WATER CONTENT FOR SOILS CONTAINING OVERSIZE PARTICLES

(ASTM D 4718)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO

PROJECT NO. 6034 TASK NO. 04.1

DESCRIPTION: PHASE III

DATE: 02 day Nov month 2001 year

MATERIAL TYPE: LOW PERM CLAY

SLP-01-53 MOD

Weight of Total Sample	=	36,585.8 g
Weight of Oversize Fraction	=	1,017.1 g
Weight of Finer Fraction (- 3/8)	=	35,568.7 g
Percentage of Oversize Fraction	= (P_C)	2.8
Percentage of Finer Fraction (- 3/8)	= (P_F)	97.2
Specific Gravity (Assumed)	= (G_M)	2.72

(W_F)	=	Water Content - 3/8 , as decimal	=	0.100
(W_C)	=	Water Content + 3/8 , as decimal	=	0.015
(δ_F)	=	Dry Density of finer fraction	=	130.5
(δ_W)	=	Unit Weight of Water	=	62.4

$$C_W=(W_F P_F)+(W_C P_C) = \boxed{9.8\% M}$$

$$C\delta_D=100\delta_F G_M \delta_W/(\delta_F P_C)+(G_M \delta_W P_F) = \boxed{131.3 \text{ pcf}}$$

000571

2 of 3

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FLUOR FERNALD

4940

MOISTURE-DENSITY RELATIONSHIP

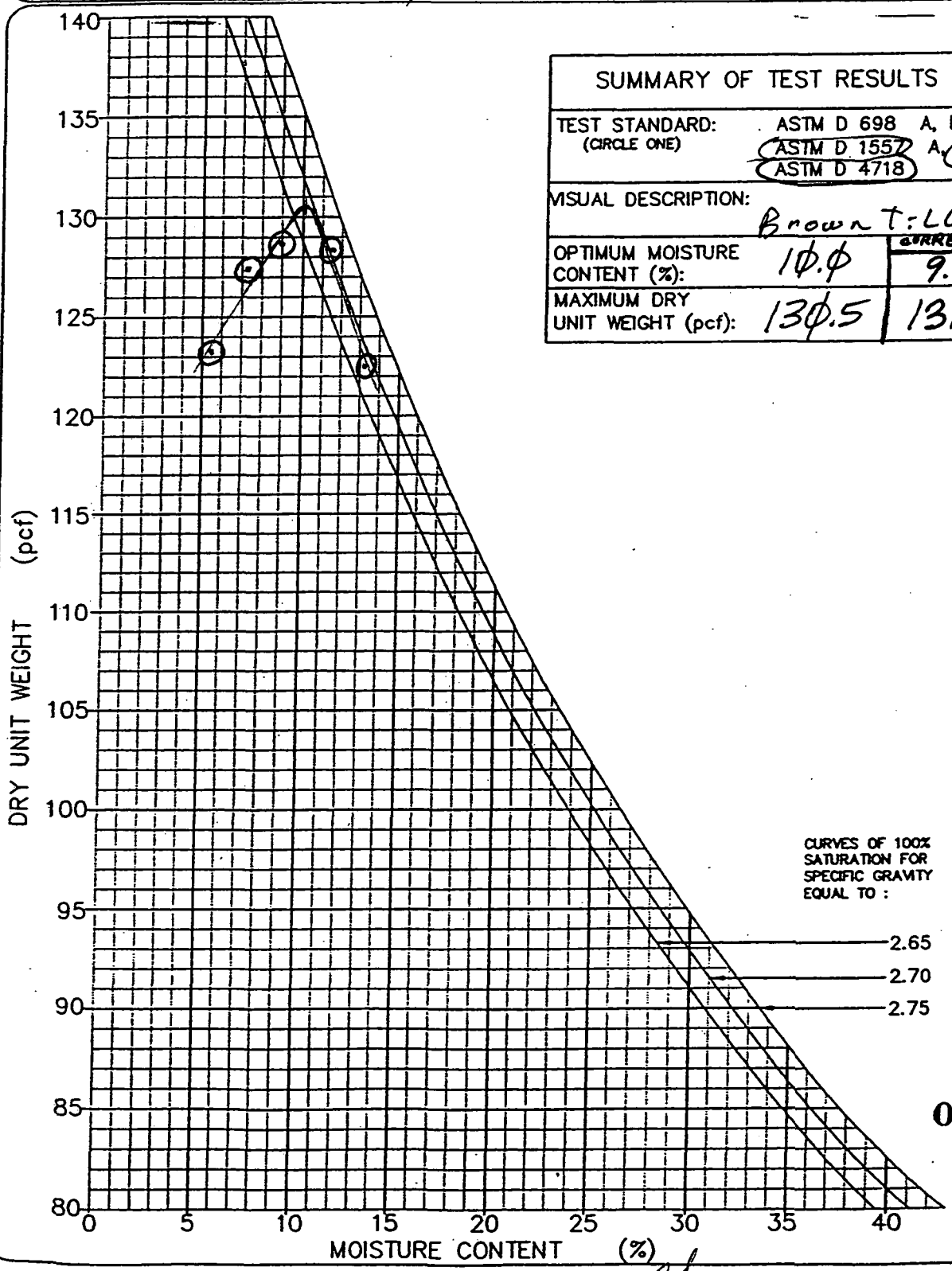
PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO PROJECT NO. 6Q1341 TASK NO.: 041

DESCRIPTION: Phase III DATE: 02 day Nov month 2001 year

MATERIAL TYPE: Low Perm Clay MATERIAL SOURCE: Stockpile 01-8 SAMPLE NO.: P.01.S3

SUMMARY OF TEST RESULTS			QA ID
TEST STANDARD: (CIRCLE ONE)	ASTM D 698 A, B, C ASTM D 1557 A, B, C ASTM D 4718		KS
VISUAL DESCRIPTION:	Brown T-LL		KS
OPTIMUM MOISTURE CONTENT (%):	10.0	CORRECTED 9.8	TBM
MAXIMUM DRY UNIT WEIGHT (pcf):	130.5	131.3	TBM



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FLUOR FERNALD

FIELD LABORATORY COMPACTION TEST

(ASTM D 698 METHOD B)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO

DESCRIPTION: Phase III

PROJECT NO. 6Q134 TASK NO.: 04.1

DATE: 2 day Nov month 2001 year

MATERIAL TYPE: Low Perm Clay

MATERIAL SOURCE: Stockpile 01-8

SAMPLE NO.: LP-01-54

THIS METHOD WILL BE USED IF THE MATERIAL RETAINED ON THE NO. 3/4-in. (19-mm) SIEVE IS LESS THAN 30%, IF THE MATERIAL RETAINED ON THE NO. 4 (4.75-mm) SIEVE IS GREATER THAN 20%, AND IF THE MATERIAL RETAINED ON THE NO. 3/8-in. (9.5-mm) SIEVE IS LESS THAN 20%.
ALL MATERIAL RETAINED ON THE NO. 3/8-in. (9.5-mm) SIEVE IS DISCARDED.
USE OVERSIZE CORRECTION IF MORE THAN 5% IS DISCARDED ACCORDING TO ASTM D 4718.
USE A 4-in. DIAMETER MOLD / 5.5-lb RAMMER / 12-in. DROP / 3 LAYERS / 25 BLOWS PER LAYER.

COMPACTION OF SOIL

QA ID: DLE/KS

			13.88	13.83	13.38	13.59	13.84
	WATER ADDED	(ml)	10%	12%	4%	6%	8%
A	WT. OF SOIL & MOLD	(grams)	6296.0	6273.3	6069.2	6164.4	6277.0
B	WT. OF MOLD	(grams)	4208.8	4208.8	4208.8	4208.8	4208.8
C	WT. OF SOIL = A − B	(grams)	2087.2	2064.5	1860.4	1955.6	2069
D	WET UNIT WT.(1) = C X 0.066	(pcf)	137.8	136.3	122.8	129.1	136.6
E	DRY UNIT WT. = D / [1 + (K/100)]	(pcf)	~~123.2~~ 123.1	118.2	114.6	118.3	121.9

NOTE: IF CALIBRATED MOLD OF 1/30 FT^3 IS USED, THE WET DENSITY IS CALCULATED FROM THE WEIGHT OF SOIL, THE VOLUME OF THE MOLD AND THE CONVERSION FROM GRAMS TO POUNDS (I.E., CONVERSION FACTOR = (30 / 453.6) = 0.066). THE MOLD MUST BE CALIBRATED TO VERIFY A CAPACITY OF 1/30 ± 0.0005 FT^3 ON INTERVALS NOT TO EXCEED 1000 TIMES THAT THE MOLD IS FILLED.

MOISTURE CONTENT – ASTM D 2216

QA ID: KS

	TARE NO.		#1	31	#11	#234	#231
F	WT. OF TARE	(grams)	8.2	8.3	8.1	8.3	8.0
G	WT. OF WET SOIL & TARE	(grams)	506.4	411.8	543.0	542.7	514.4
H	WT. OF DRY SOIL & TARE	(grams)	~~449.0~~ 453.4	358.3	507.3	499.3	459.9
I	WT. OF WATER = G − H	(grams)	53.0	53.5	35.7	44.4	54.5
J	WT. DRY SOIL = H − F	(grams)	445.2	350.0	499.2	490.0	451.9
K	MOISTURE CONTENT = (I/J) X 100	(%)	11.9	15.3	7.2	9.1	12.1

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FLUOR FERNALD

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CORRECTION OF UNIT WEIGHT AND WATER CONTENT FOR SOILS CONTAINING OVERSIZE PARTICLES *(ASTM D 4718)*

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO PROJECT NO. GQ1341 TASK NO. 04.1

DESCRIPTION: Phase III DATE: 7 day Nov month 2001 year

MATERIAL TYPE: Low Perm Clay LP01-54 STD

Weight of Total Sample	=	24120.2
Weight of Oversize Fraction	=	1947.0
Weight of Finer Fraction (- 3/8)	=	22173.2
Percentage of Oversize Fraction	= (P_C)	8.1
Percentage of Finer Fraction (- 3/8)	= (P_F)	91.9
Specific Gravity (Assumed)	= (G_M)	2.72

(W_F) =	Water Content - 3/8 , as decimal	=	0.126
(W_C) =	Water Content + 3/8 , as decimal	=	0.015
(δ_F) =	Dry Density of finer fraction	=	124.1
(δ_W) =	Unit Weight of Water	=	62.4

$$C_W=(W_F P_F)+(W_C P_C)$$

$$C_w = (0.126)(91.9) + (0.015)(8.1) = 11.7\ \%$$

$$C\delta_D=100\delta_F G_M \delta_W/(\delta_F P_C)+(G_M \delta_W P_F)$$

000574

$$C_{\delta D} = \frac{(100)(124.1)(2.72)(62.4)}{(124.1)(8.1)+(62.4)(2.72)(91.9)} = \cancel{129}\ 126.9 \text{ pcf}$$

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FLUOR FERNALD

4940

MOISTURE-DENSITY RELATIONSHIP

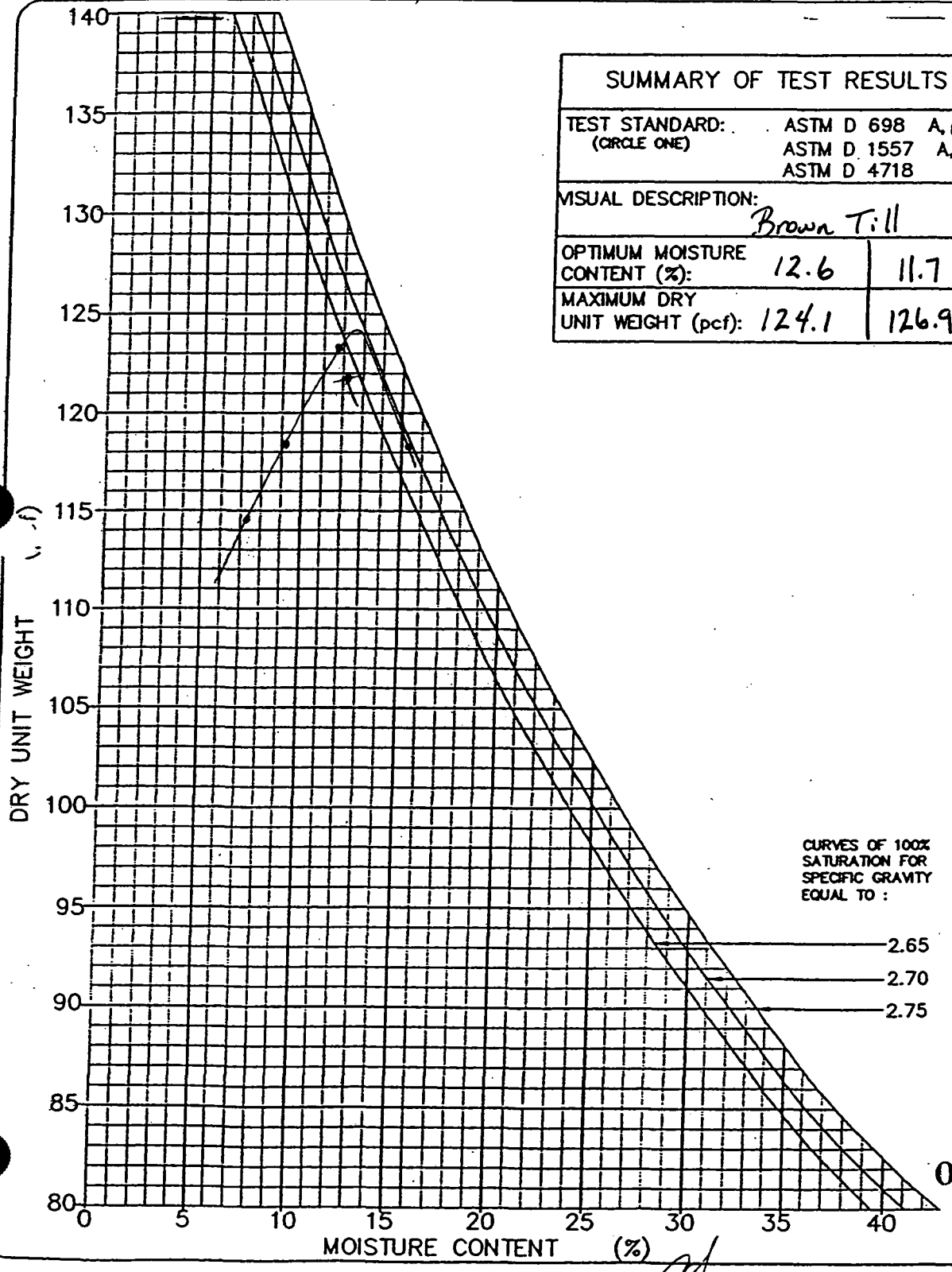
PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO PROJECT NO.: 6Q1341 TASK NO.: 04.1

DESCRIPTION: Phase III DATE: 3 day Nov month 2001 year

MATERIAL TYPE: Low Perm Clay MATERIAL SOURCE: Stockpile 01-8 SAMPLE NO.: CP-01-54

SUMMARY OF TEST RESULTS			QA ID
TEST STANDARD: (CIRCLE ONE)	ASTM D 698 A, (B), C ASTM D 1557 A, B, C ASTM D 4718		CA
VISUAL DESCRIPTION:	Brown Till		CA
OPTIMUM MOISTURE CONTENT (%):	12.6	11.7	CA
MAXIMUM DRY UNIT WEIGHT (pcf):	124.1	126.9	CA



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FLUOR FERNALD

FIELD LABORATORY COMPACTION TEST

(ASTM D 698 METHOD B)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO

DESCRIPTION: Phase III

PROJECT NO. 6Q134 TASK NO.: 04.1

DATE: 5 day Nov month 2001 year

MATERIAL TYPE: Low Perm Clay MATERIAL SOURCE: Stockpile 01-9 SAMPLE NO.: LP-01-55

THIS METHOD WILL BE USED IF THE MATERIAL RETAINED ON THE NO. 3/4-in. (19-mm) SIEVE IS LESS THAN 30%, IF THE MATERIAL RETAINED ON THE NO. 4 (4.75-mm) SIEVE IS GREATER THAN 20%, AND IF THE MATERIAL RETAINED ON THE NO. 3/8-in. (9.5-mm) SIEVE IS LESS THAN 20%.
ALL MATERIAL RETAINED ON THE NO. 3/8-in. (9.5-mm) SIEVE IS DISCARDED.
USE OVERSIZE CORRECTION IF MORE THAN 5% IS DISCARDED ACCORDING TO ASTM D 4718.
USE A 4-in. DIAMETER MOLD / 5.5-lb RAMMER / 12-in. DROP / 3 LAYERS / 25 BLOWS PER LAYER.

COMPACTION OF SOIL

QA ID: KS

			13.32	13.54	13.82	13.78	
	WATER ADDED	(ml)	4%	6%	8%	10%	
A	WT. OF SOIL & MOLD	(grams)	6042.0	6141.7	6268.8	6250.6	
B	WT. OF MOLD	(grams)	4208.8	4208.8	4208.8	4208.8	
C	WT. OF SOIL = A − B	(grams)	1833.2	1932.9	2060.0	2041.8	
D	WET UNIT WT.(1) = C X 0.066	(pcf)	121.0	127.6	136.0	134.8	
E	DRY UNIT WT. = D / [1 + (K/100)]	(pcf)	111.3	115.4	120.2	117.0	

NOTE: IF CALIBRATED MOLD OF 1/30 FT^3 IS USED, THE WET DENSITY IS CALCULATED FROM THE WEIGHT OF SOIL, THE VOLUME OF THE MOLD AND THE CONVERSION FROM GRAMS TO POUNDS (I.E., CONVERSION FACTOR = (30 / 453.6) = 0.066). THE MOLD MUST BE CALIBRATED TO VERIFY A CAPACITY OF 1/30 ± 0.0005 FT^3 ON INTERVALS NOT TO EXCEED 1000 TIMES THAT THE MOLD IS FILLED.

MOISTURE CONTENT — ASTM D 2216

QA ID: KS

	TARE NO.		227	11	231	234	
F	WT. OF TARE	(grams)	8.3	8.7	8.0	8.3	
G	WT. OF WET SOIL & TARE	(grams)	402.9	359.8	387.3	344.6	
H	WT. OF DRY SOIL & TARE	(grams)	371.4	326.2	343.4	300.4	
I	WT. OF WATER = G − H	(grams)	31.5	33.6	43.9	44.2	
J	WT. DRY SOIL = H − F	(grams)	363.1	318.1	335.4	292.1	
K	MOISTURE CONTENT = (I/J) X 100	(%)	8.7	10.6	13.1	15.1	

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FLUOR FERNALD

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CORRECTION OF UNIT WEIGHT AND WATER CONTENT FOR SOILS CONTAINING OVERSIZE PARTICLES

(ASTM D 4718)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO PROJECT NO. 6Q134 TASK NO. 04.1

DESCRIPTION: PHASE III DATE: 06 day NOV month 2001 year

MATERIAL TYPE: LOW PERM CLAY LP-01-55 STD

Weight of Total Sample	=	42,337.1g
Weight of Oversize Fraction	=	2,430.6g
Weight of Finer Fraction (- 3/8)	=	39,906.5g
Percentage of Oversize Fraction	= (P_C)	5.7
Percentage of Finer Fraction (- 3/8)	= (P_F)	94.3
Specific Gravity (Assumed)	= (G_M)	2.72

(W_F) =	Water Content - 3/8, as decimal	=	0.134
(W_C) =	Water Content + 3/8, as decimal	=	0.015
(δ_F) =	Dry Density of finer fraction	=	120.6
(δ_W) =	Unit Weight of Water	=	62.4

$$C_W=(W_F P_F)+(W_C P_C) = \boxed{12.72\%}$$

$$C\delta_D=100\delta_F G_M \delta_W/(\delta_F P_C)+(G_M \delta_W P_F) = \boxed{122.6 \text{ pcf}}$$

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SHEET No 2 OF 3

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FLUOR FERNALD

MOISTURE-DENSITY RELATIONSHIP

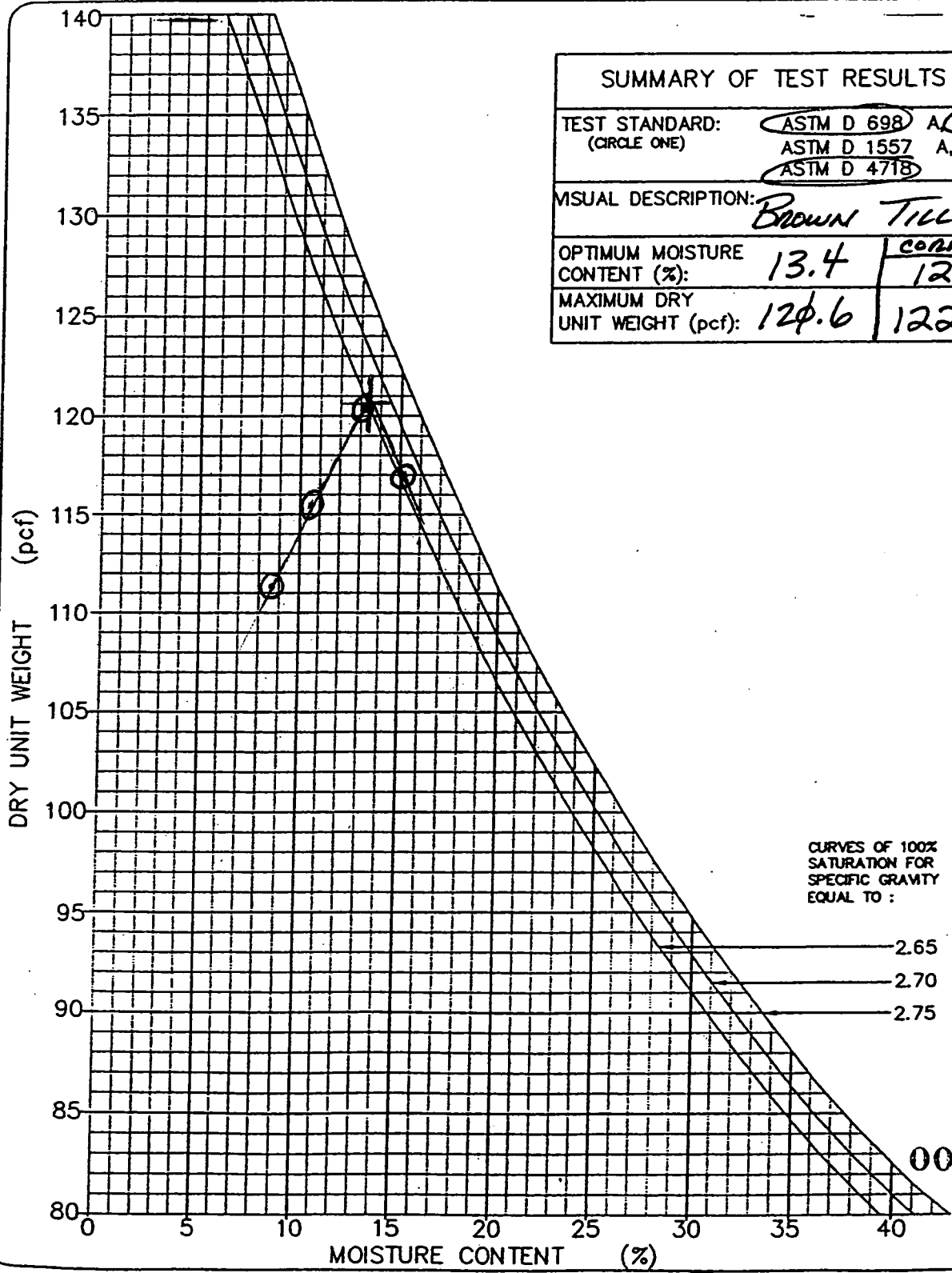
PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO PROJECT NO.: GQ1341 TASK NO.: 041

DESCRIPTION: PHASE III DATE: 06 day NOV month 2001 year

MATERIAL TYPE: LOW PERM CLAY MATERIAL SOURCE: STOCKPILE 01-9 SAMPLE NO.: LP-01-55

SUMMARY OF TEST RESULTS			QA ID
TEST STANDARD: (CIRCLE ONE)	ASTM D 698 A, B, C ASTM D 1557 A, B, C ASTM D 4718		KS
VISUAL DESCRIPTION:	BROWN TILL		KS
OPTIMUM MOISTURE CONTENT (%):	13.4	CORRECTED 12.7	TBL
MAXIMUM DRY UNIT WEIGHT (pcf):	120.6	122.6	TBL



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FLUOR FERNALD

FIELD LABORATORY COMPACTION TEST

(ASTM D 1557 METHOD B)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO

PROJECT NO.: 60134 TASK NO.: 04.1

DESCRIPTION: PHASE III

DATE: 09 day Nov month 2001 year

MATERIAL TYPE: LOW PERM CLAY MATERIAL SOURCE: STOCKPILE 01-9 SAMPLE NO.: LP-01-55

THIS METHOD WILL BE USED IF THE MATERIAL RETAINED ON THE NO. 4-in. (4.75-mm) SIEVE IS GREATER THAN 20%, AND THE MATERIAL RETAINED ON THE NO. 3/8-in. (9.5-mm) SIEVE IS LESS THAN 20%.
ALL MATERIAL RETAINED ON THE NO. 3/8-in. (9.5-mm) SIEVE IS DISCARDED.
USE OVERSIZE CORRECTION IF MORE THAN 5% IS DISCARDED ACCORDING TO ASTM D 4718.
USE A 4-in. DIAMETER MOLD / 10-lb RAMMER / 18-in. DROP / 5 LAYERS / 25 BLOWS PER LAYER.

COMPACTION OF SOIL — QA ID: TBU

			13.83 lbs	14.05 lbs	14.11 lbs	13.98 lbs	
	WATER ADDED	(ml)	+2%	+4%	+6%	+8%	
A	WT. OF SOIL & MOLD	(grams)	6273.3	6373.1	6400.3	6341.3	
B	WT. OF MOLD	(grams)	4208.8	4208.8	4208.8	4208.8	
C	WT. OF SOIL = A − B	(grams)	2064.5	2164.3	2191.5	2132.5	
D	WET UNIT WT.(1) = C X 0.066	(pcf)	136.3	142.8	144.6	140.7	
E	DRY UNIT WT. = D / [1 + (K/100)]	(pcf)	127.7	131.0	130.2	124.6	

NOTE: IF CALIBRATED MOLD OF 1/30 FT^3 IS USED, THE WET DENSITY IS CALCULATED FROM THE WEIGHT OF SOIL, THE VOLUME OF THE MOLD AND THE CONVERSION FROM GRAMS TO POUNDS (I.E., CONVERSION FACTOR = (30 / 453.6) = 0.066). THE MOLD MUST BE CALIBRATED TO VERIFY A CAPACITY OF 1/30 ± 0.0005 FT^3 ON INTERVALS NOT TO EXCEED 1000 TIMES THAT THE MOLD IS FILLED.

MOISTURE CONTENT — ASTM D 2216 — QA ID: TBU

	TARE NO.		#11	#232	#211	#34	
F	WT. OF TARE	(grams)	8.0	8.2	7.9	8.2	
G	WT. OF WET SOIL & TARE	(grams)	557.5	632.0	582.6	567.5	
H	WT. OF DRY SOIL & TARE	(grams)	523.0	580.7	525.3	503.5	
I	WT. OF WATER = G − H	(grams)	34.5	51.3	57.3	64.0	
J	WT. DRY SOIL = H − F	(grams)	515.0	572.5	517.4	495.3	
K	MOISTURE CONTENT = (I/J) X 100	(%)	6.7	9.0	11.1	12.9	

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FLUOR FERNALD

CORRECTION OF UNIT WEIGHT AND WATER CONTENT FOR SOILS CONTAINING OVERSIZE PARTICLES *(ASTM D 4718)*

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO PROJECT NO. GQ134 TASK NO. 04.1

DESCRIPTION: PHASE III DATE: 12 day NOV month 2001 year

MATERIAL TYPE: LOW PERM CLAY (LP-01-55 MOD)

Weight of Total Sample	=	42,337.1g
Weight of Oversize Fraction	=	2,430.6g
Weight of Finer Fraction (- 3/8)	=	39,906.5g
Percentage of Oversize Fraction	= (P_C)	5.7
Percentage of Finer Fraction (- 3/8)	= (P_F)	94.3
Specific Gravity (Assumed)	= (G_M)	2.72

(W_F)	=	Water Content - 3/8, as decimal	=	0.100
(W_C)	=	Water Content + 3/8, as decimal	=	0.015
(δ_F)	=	Dry Density of finer fraction	=	132.3
(δ_W)	=	Unit Weight of Water	=	62.4

$$C_W=(W_F P_F)+(W_C P_C) = \boxed{9.5\%M}$$

$$C\delta_D=100\delta_F G_M \delta_W/(\delta_F P_C)+(G_M \delta_W P_F) = \boxed{134.0 pcf}$$

GEOSYNTEC CONSULTANTS

FLUOR FERNALD

4940

MOISTURE-DENSITY RELATIONSHIP

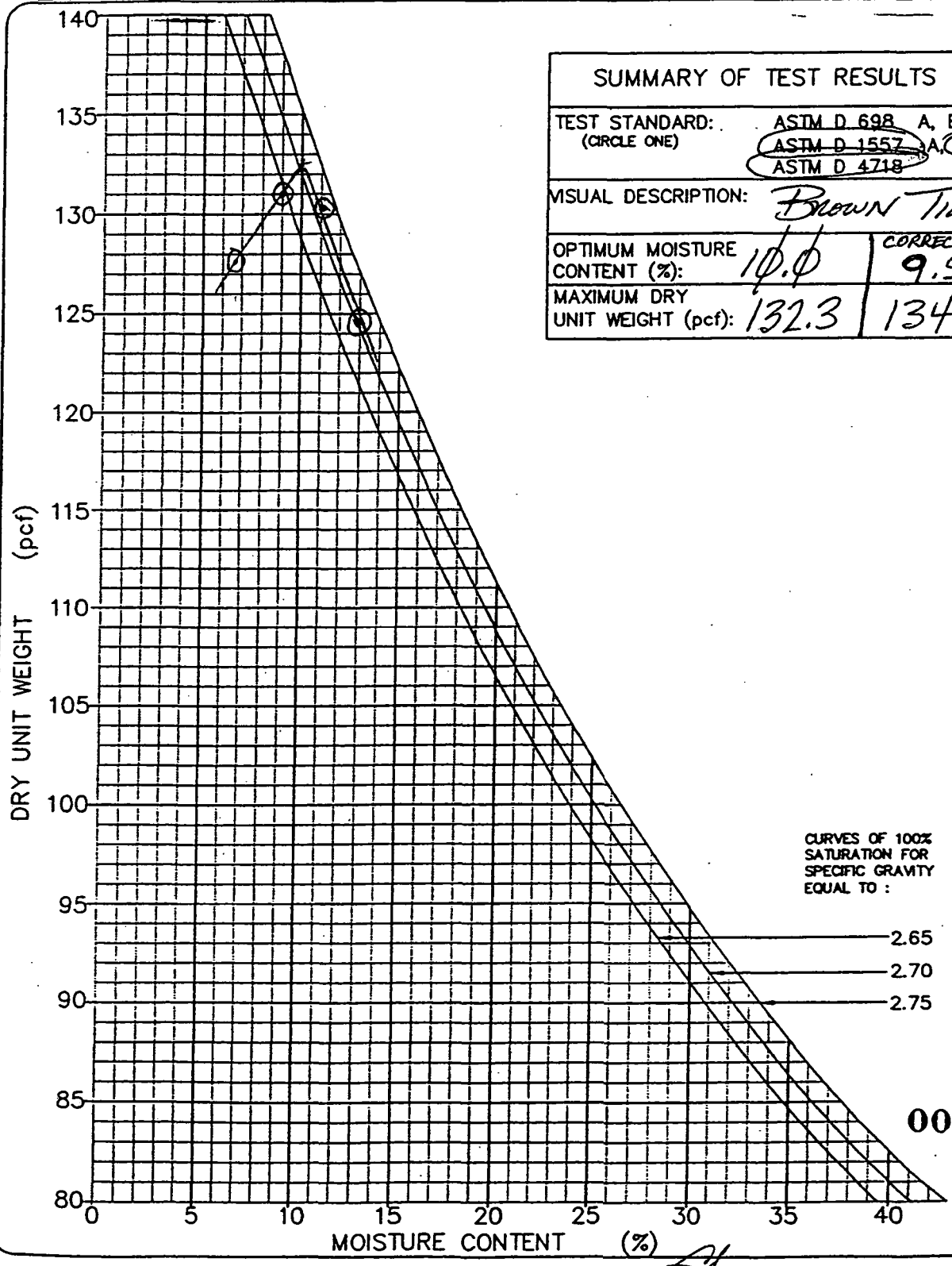
PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO PROJECT NO.: GQ134 TASK NO.: 04.1

DESCRIPTION: PHASE III DATE: 12 day NOV month 2001 year

MATERIAL TYPE: LOW PERM CLAY MATERIAL SOURCE: STOCKPILE 01-9 SAMPLE NO.: LP-01-55

SUMMARY OF TEST RESULTS			QA ID
TEST STANDARD: (CIRCLE ONE)	ASTM D 698 A, B, C ASTM D 1557 A, B, C ASTM D 4718		TBD
VISUAL DESCRIPTION:	BROWN TILL		TBD
OPTIMUM MOISTURE CONTENT (%):	10.0	CORRECTED 9.5	TBD
MAXIMUM DRY UNIT WEIGHT (pcf):	132.3	134.0	TBD



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FLUOR FERNALD

FIELD LABORATORY COMPACTION TEST

(ASTM D 698 METHOD B)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO

DESCRIPTION: Phase III

PROJECT NO. 6Q134 TASK NO.: 04.1

DATE: 13 day Nov month 2001 year

MATERIAL TYPE: Low Perm Clay

MATERIAL SOURCE: STOCKPILE Ø1-9

SAMPLE NO.: LP-Ø1-56

THIS METHOD WILL BE USED IF THE MATERIAL RETAINED ON THE NO. 3/4-in. (19-mm) SIEVE IS LESS THAN 30%, IF THE MATERIAL RETAINED ON THE NO. 4 (4.75-mm) SIEVE IS GREATER THAN 20%, AND IF THE MATERIAL RETAINED ON THE NO. 3/8-in. (9.5-mm) SIEVE IS LESS THAN 20%.
ALL MATERIAL RETAINED ON THE NO. 3/8-in. (9.5-mm) SIEVE IS DISCARDED.
USE OVERSIZE CORRECTION IF MORE THAN 5% IS DISCARDED ACCORDING TO ASTM D 4718.
USE A 4-in. DIAMETER MOLD / 5.5-lb RAMMER / 12-in. DROP / 3 LAYERS / 25 BLOWS PER LAYER.

13.75

COMPACTION OF SOIL

QA ID: DLE

	WATER ADDED	(ml)		13.43 6%	13.74 8%	13.88 10%	12%
A	WT. OF SOIL & MOLD	(grams)		6091.8	6232.5	6296.0	6237.0
B	WT. OF MOLD	(grams)	4208.8	4208.8	4208.8	4208.8	4208.8
C	WT. OF SOIL = A - B	(grams)		1883.0	2023.7	2087.2	2028.2
D	WET UNIT WT.(1) = C X 0.066	(pcf)		124.3	133.6	137.8	133.9
E	DRY UNIT WT. = D / [1 + (K/100)]	(pcf)		114.3	121.2	122.Ø	116.6

NOTE: IF CALIBRATED MOLD OF 1/30 FT^3 IS USED, THE WET DENSITY IS CALCULATED FROM THE WEIGHT OF SOIL, THE VOLUME OF THE MOLD AND THE CONVERSION FROM GRAMS TO POUNDS (I.E., CONVERSION FACTOR = (30 / 453.6) = 0.066). THE MOLD MUST BE CALIBRATED TO VERIFY A CAPACITY OF 1/30 ± 0.0005 FT^3 ON INTERVALS NOT TO EXCEED 1000 TIMES THAT THE MOLD IS FILLED.

MOISTURE CONTENT - ASTM D 2216

QA ID: DLE

	TARE NO.			#33	#205	#1	#215
F	WT. OF TARE	(grams)		8.1	8.3	8.3	8.3
G	WT. OF WET SOIL & TARE	(grams)		497.4	541.6	539.1	582.5
H	WT. OF DRY SOIL & TARE	(grams)		458.1	492.3	478.4	508.3
I	WT. OF WATER = G - H	(grams)		39.3	49.3	60.7	74.2
J	WT. DRY SOIL = H - F	(grams)		450.Ø	484.Ø	470.1	500.Ø
K	MOISTURE CONTENT = (I/J) X 100	(%)		8.7	10.2	12.9	14.8

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SHEET NO. 1 OF 3

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4940

FLUOR FERNALD

CORRECTION OF UNIT WEIGHT AND WATER CONTENT FOR SOILS CONTAINING OVERSIZE PARTICLES

(ASTM D 4718)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO PROJECT NO. GQB4 TASK NO. 04.1

DESCRIPTION: PHASE III DATE: 14 day NOV month 2001 year

MATERIAL TYPE: LOW PERM CLAY LP-01-56 STD

Weight of Total Sample	=	20,309.9
Weight of Oversize Fraction	=	407.0
Weight of Finer Fraction (- 3/8)	=	19,902.9
Percentage of Oversize Fraction	= (P_C)	2.0
Percentage of Finer Fraction (- 3/8)	= (P_F)	98.0
Specific Gravity (Assumed)	= (G_M)	2.72

(W_F) =	Water Content - 3/8 , as decimal	=	0.114
(W_C) =	Water Content + 3/8 , as decimal	=	0.015
(δ_F) =	Dry Density of finer fraction	=	124.5
(δ_W) =	Unit Weight of Water	=	62.4

$$C_W=(W_F P_F)+(W_C P_C) = \boxed{11.2\%M}$$

$$C\delta_D=100\delta_F G_M \delta_W/(\delta_F P_C)+(G_M \delta_W P_F) = \boxed{125.2 \text{ pcf}}$$

000583

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FLUOR FERNALD

4940

MOISTURE-DENSITY RELATIONSHIP

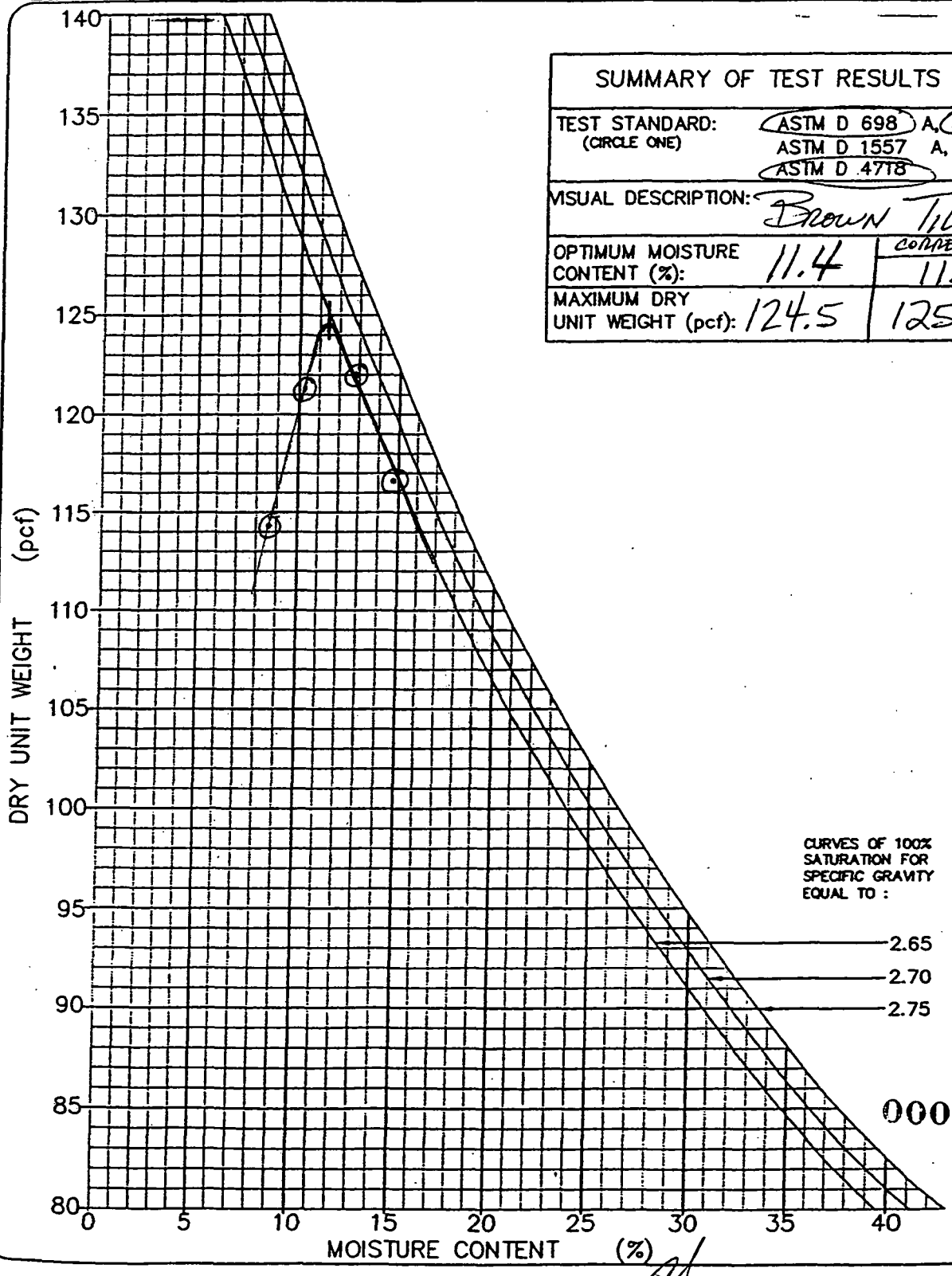
PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO PROJECT NO.: GQ 1341 TASK NO.: 04.1

DESCRIPTION: PHASE III DATE: 14 day NOV month 2001 year

MATERIAL TYPE: LOW PERM CLAY MATERIAL SOURCE: STOCKPILE 01-9 SAMPLE NO.: LP-01-56

SUMMARY OF TEST RESULTS			QA ID
TEST STANDARD: (CIRCLE ONE)	ASTM D 698 A, B, C ASTM D 1557 A, B, C ASTM D 4718		DJF TBC
VISUAL DESCRIPTION:	BROWN TILL		TBC
OPTIMUM MOISTURE CONTENT (%):	11.4	CORRECTED 11.2	TBC
MAXIMUM DRY UNIT WEIGHT (pcf):	124.5	125.2	TBC



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FLUOR FERNALD

FIELD LABORATORY COMPACTION TEST

(ASTM D 698 METHOD B)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO

DESCRIPTION: Phase III

PROJECT NO. 6Q1341 TASK NO.: 04.1

DATE: 12 day Nov month 2001 year

MATERIAL TYPE: Low Perm Clay

MATERIAL SOURCE: Stockpile 01-9

SAMPLE NO.: LP-01.57

THIS METHOD WILL BE USED IF THE MATERIAL RETAINED ON THE NO. 3/4-in. (19-mm) SIEVE IS LESS THAN 30%, IF THE MATERIAL RETAINED ON THE NO. 4 (4.75-mm) SIEVE IS GREATER THAN 20%, AND IF THE MATERIAL RETAINED ON THE NO. 3/8-in. (9.5-mm) SIEVE IS LESS THAN 20%.
ALL MATERIAL RETAINED ON THE NO. 3/8-in. (9.5-mm) SIEVE IS DISCARDED.
USE OVERSIZE CORRECTION IF MORE THAN 5% IS DISCARDED ACCORDING TO ASTM D 4718.
USE A 4-in. DIAMETER MOLD / 5.5-lb RAMMER / 12-in. DROP / 3 LAYERS / 25 BLOWS PER LAYER.

COMPACTION OF SOIL

QA ID: KS

	WATER ADDED	(ml)	13.16 4%	13.27 6%	13.56 8%	13.80 10%	13.70 12%
A	WT. OF SOIL & MOLD	(grams)	5969.4	6019.3	6150.8	6259.7	6214.3
B	WT. OF MOLD	(grams)	4208.8	4208.8	4208.8	4208.8	4208.8
C	WT. OF SOIL = A − B	(grams)	1760.6	1810.5	1942.0	2050.9	2005.5
D	WET UNIT WT.(1) = C X 0.066	(pcf)	116.2	119.5	128.2	135.4	132.4
E	DRY UNIT WT. = D / [1 + (K/100)]	(pcf)	107.6	108.5	114.3	118.7	114.1

NOTE: IF CALIBRATED MOLD OF 1/30 FT^3 IS USED, THE WET DENSITY IS CALCULATED FROM THE WEIGHT OF SOIL, THE VOLUME OF THE MOLD AND THE CONVERSION FROM GRAMS TO POUNDS (I.E., CONVERSION FACTOR = (30 / 453.6) = 0.066). THE MOLD MUST BE CALIBRATED TO VERIFY A CAPACITY OF 1/30 ± 0.0005 FT^3 ON INTERVALS NOT TO EXCEED 1000 TIMES THAT THE MOLD IS FILLED.

MOISTURE CONTENT – ASTM D 2216

QA ID: KS

	TARE NO.		#33	#215	#20	#205	#1
F	WT. OF TARE	(grams)	8.1	8.3	8.3	8.3	8.3
G	WT. OF WET SOIL & TARE	(grams)	365.4	353.3	353.7	450.5	361.9
H	WT. OF DRY SOIL & TARE	(grams)	339.1	321.6	316.2	396.1	313.2
I	WT. OF WATER = G − H	(grams)	26.3	31.7	37.5	54.4	48.7
J	WT. DRY SOIL = H − F	(grams)	331.0	313.3	307.9	387.8	304.9
K	MOISTURE CONTENT = (I/J) X 100	(%)	7.9	10.1	12.2	14.0	16.0

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FLUOR FERNALD

CORRECTION OF UNIT WEIGHT AND WATER CONTENT FOR SOILS CONTAINING OVERSIZE PARTICLES *(ASTM D 4718)*

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO PROJECT NO. GQ134/TASK NO. 04.1

DESCRIPTION: Phase III DATE: 13 day Nov month 2001 year

MATERIAL TYPE: Low Perm Clay LPØ1-57

Weight of Total Sample	=	39,088.8
Weight of Oversize Fraction	=	1339.9
Weight of Finer Fraction (- 3/8)	=	37748.9
Percentage of Oversize Fraction	= (P_C)	3.4
Percentage of Finer Fraction (- 3/8)	= (P_F)	96.6
Specific Gravity (Assumed)	= (G_M)	2.72

(W_F) =	Water Content - 3/8 , as decimal	=	0.139
(W_C) =	Water Content + 3/8 , as decimal	=	0.015
(δ_F) =	Dry Density of finer fraction	=	118.8
(δ_W) =	Unit Weight of Water	=	62.4

$$C_W=(W_F P_F)+(W_C P_C)$$

$C_W = 13.5$

$$C\delta_D=100\delta_F G_M \delta_W/(\delta_F P_C)+(G_M \delta_W P_F)$$

$C_{\delta D} = 120.0$

000586

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FLUOR FERNALD

4940

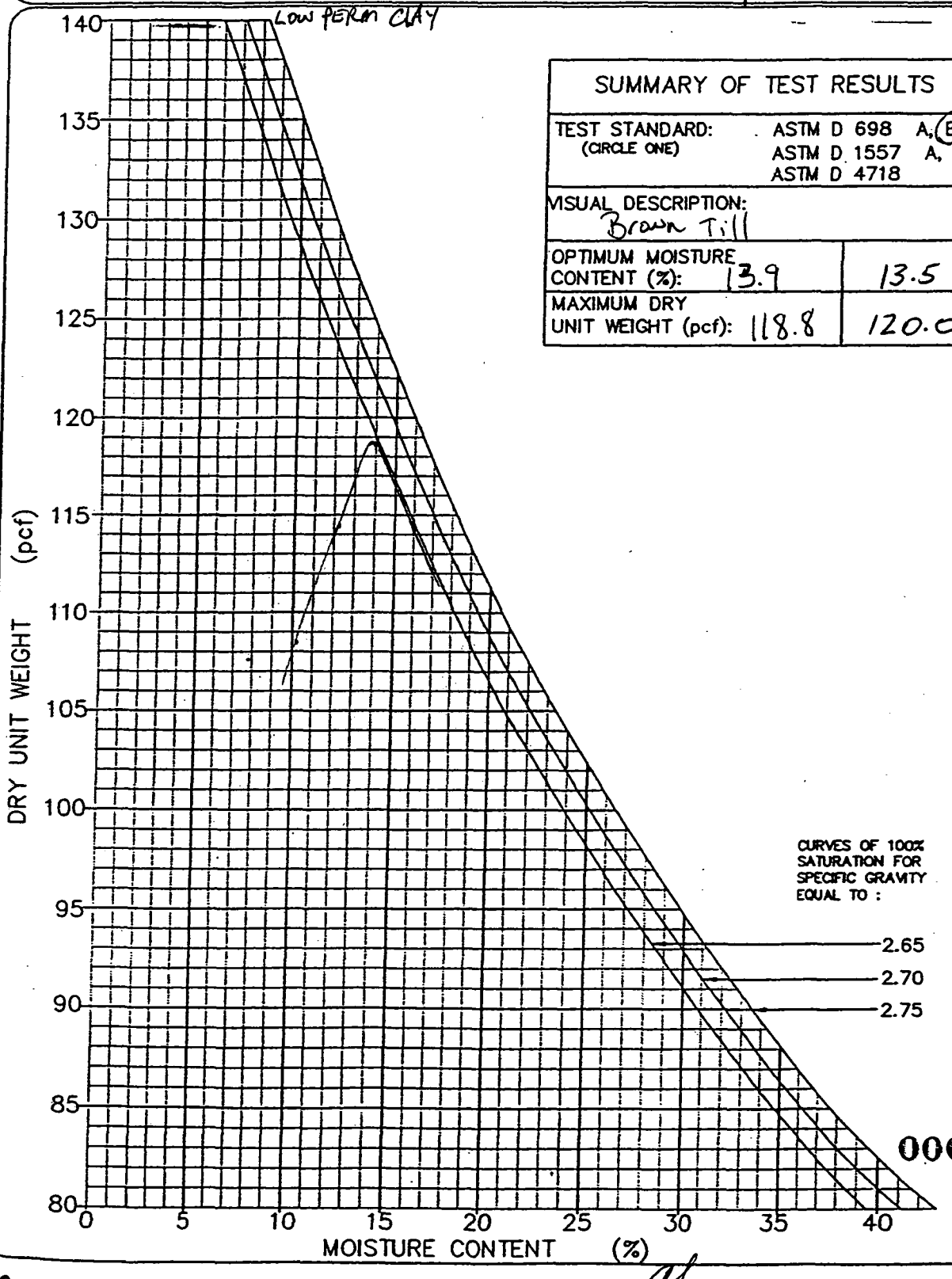
MOISTURE-DENSITY RELATIONSHIP

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO PROJECT NO.: GQ1341 TASK NO.: 04.1

DESCRIPTION: Phase III DATE: 13 day Nov month 2001 year

MATERIAL TYPE: Brown Till MATERIAL SOURCE: Stockpile 01-9 SAMPLE NO.: LP01-57



SUMMARY OF TEST RESULTS		QA ID
TEST STANDARD: (CIRCLE ONE) ASTM D 698 A, (B) C; ASTM D 1557 A, B, C; ASTM D 4718		KS
VISUAL DESCRIPTION: Brown Till		CL
OPTIMUM MOISTURE CONTENT (%): 13.9	13.5	CL
MAXIMUM DRY UNIT WEIGHT (pcf): 118.8	120.0	CL

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FLUOR FERNALD

FIELD LABORATORY COMPACTION TEST

(ASTM D 1557 METHOD B)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO

PROJECT NO.: GQ1341 TASK NO.: 041

DESCRIPTION: PHASE III

DATE: 13 day NOV month 2001 year

MATERIAL TYPE: LOW FORM CLAY MATERIAL SOURCE: STOCKPILE 01-9 SAMPLE NO.: LP-01-57

THIS METHOD WILL BE USED IF THE MATERIAL RETAINED ON THE NO. 4-in. (4.75-mm) SIEVE IS GREATER THAN 20%, AND THE MATERIAL RETAINED ON THE NO. 3/8-in. (9.5-mm) SIEVE IS LESS THAN 20%.
ALL MATERIAL RETAINED ON THE NO. 3/8-in. (9.5-mm) SIEVE IS DISCARDED.
USE OVERSIZE CORRECTION IF MORE THAN 5% IS DISCARDED ACCORDING TO ASTM D 4718.
USE A 4-in. DIAMETER MOLD / 10-lb RAMMER / 18-in. DROP / 5 LAYERS / 25 BLOWS PER LAYER.

COMPACTION OF SOIL — QA ID: TBH

			13.80 lbs	14.03 lbs	13.99 lbs	13.58 lbs	
	WATER ADDED	(ml)	+4%	+6%	+8%	+2%	
A	WT. OF SOIL & MOLD	(grams)	6259.7	6364.0	6345.9	6159.9	
B	WT. OF MOLD	(grams)	4208.8	4208.8	4208.8	4208.8	
C	WT. OF SOIL = A − B	(grams)	2050.9	2155.2	2137.1	1951.1	
D	WET UNIT WT.(1) = C X 0.066	(pcf)	135.4	142.2	141.0	128.8	
E	DRY UNIT WT. = D / [1 + (K/100)]	(pcf)	125.4	129.2	125.6	121.6	

NOTE: IF CALIBRATED MOLD OF 1/30 FT^3 IS USED, THE WET DENSITY IS CALCULATED FROM THE WEIGHT OF SOIL, THE VOLUME OF THE MOLD AND THE CONVERSION FROM GRAMS TO POUNDS (I.E., CONVERSION FACTOR = (30 / 453.6) = 0.066). THE MOLD MUST BE CALIBRATED TO VERIFY A CAPACITY OF 1/30 ± 0.0005 FT^3 ON INTERVALS NOT TO EXCEED 1000 TIMES THAT THE MOLD IS FILLED.

MOISTURE CONTENT — ASTM D 2216 — QA ID: TBH

	TARE NO.		#211	#234	#305	#232	
F	WT. OF TARE	(grams)	7.9	8.3	8.3	8.2	
G	WT. OF WET SOIL & TARE	(grams)	571.0	556.4	530.9	630.2	
H	WT. OF DRY SOIL & TARE	(grams)	529.5	506.2	473.5	595.5	
I	WT. OF WATER = G − H	(grams)	41.5	50.2	57.4	34.7	
J	WT. DRY SOIL = H − F	(grams)	521.6	497.9	465.2	587.3	
K	MOISTURE CONTENT = (I/J) X 100	(%)	8.0	10.1	12.3	5.9	

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FLUOR FERNALD

CORRECTION OF UNIT WEIGHT AND WATER CONTENT FOR SOILS CONTAINING OVERSIZE PARTICLES

(ASTM D 4718)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO PROJECT NO. 6Q134 TASK NO. 04.1

DESCRIPTION: PHASE III DATE: 14 day Nov month 2001 year

MATERIAL TYPE: Low Perm CLAY LP-04-57 MOD

Weight of Total Sample	=	39,088.8g
Weight of Oversize Fraction	=	1,339.9g
Weight of Finer Fraction (- 3/8)	=	37,748.9g
Percentage of Oversize Fraction	= (P_C)	3.4
Percentage of Finer Fraction (- 3/8)	= (P_F)	96.6
Specific Gravity (Assumed)	= (G_M)	2.72

(W_F) =	Water Content - 3/8 , as decimal	=	0.105
(W_C) =	Water Content + 3/8 , as decimal	=	0.015
(δ_F) =	Dry Density of finer fraction	=	129.7
(δ_W) =	Unit Weight of Water	=	62.4

$$C_W=(W_F P_F)+(W_C P_C) = \boxed{10.2\%M}$$

$$C\delta_D=100\delta_F G_M \delta_W/(\delta_F P_C)+(G_M \delta_W P_F) = \boxed{130.8pcF}$$

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FLUOR FERNALD

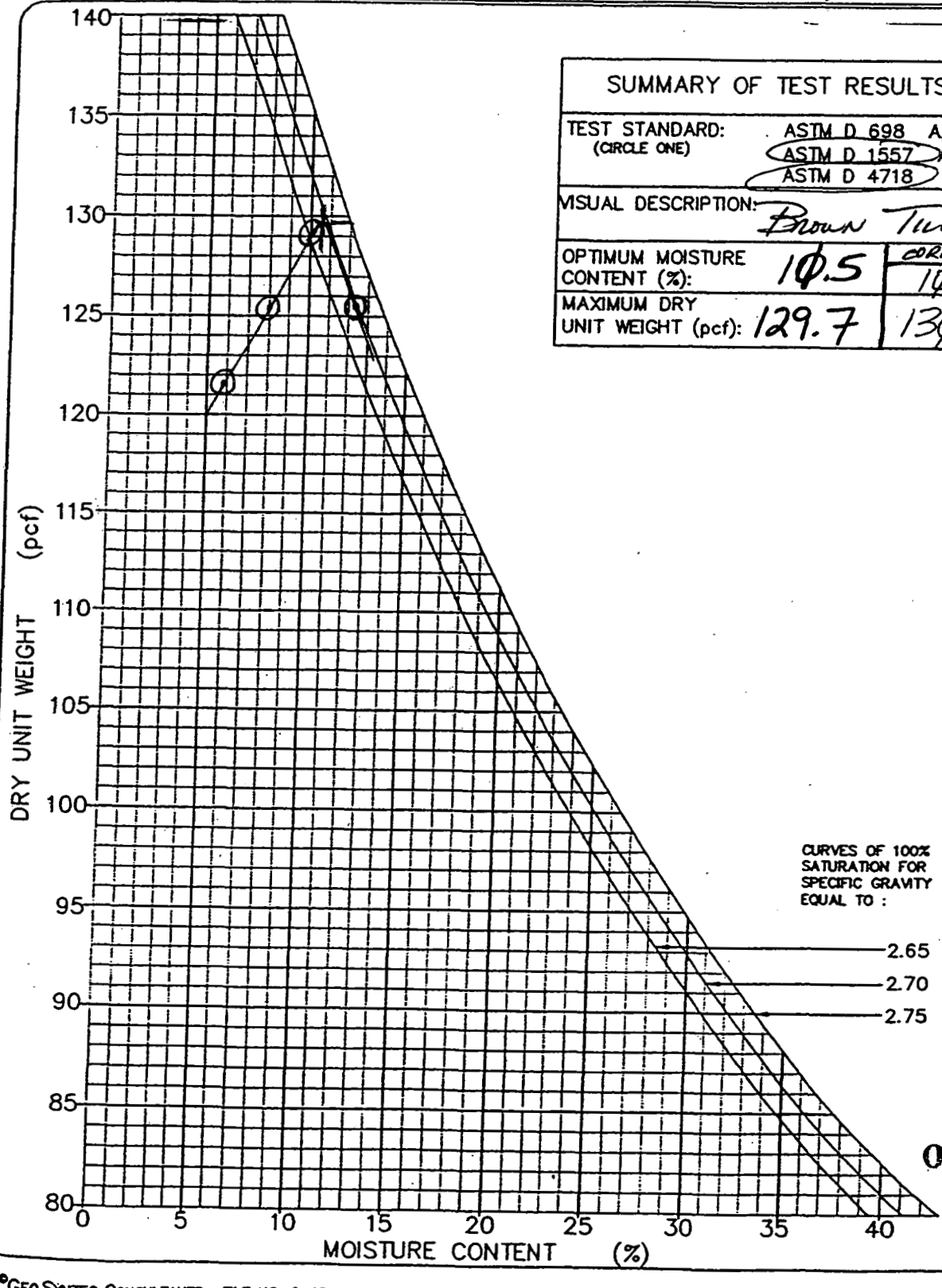
MOISTURE–DENSITY RELATIONSHIP

PROJECT: ON–SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO PROJECT NO.: GQ134 TASK NO.: 04.1

DESCRIPTION: PHASE III DATE: 14 day Nov month 2001 year

MATERIAL TYPE: Low Perm Clay MATERIAL SOURCE: STOCKPILE 01-9 SAMPLE NO.: LP-01-57



SUMMARY OF TEST RESULTS			QA ID
TEST STANDARD: (CIRCLE ONE)	ASTM D 698 A, B, C ASTM D 1557 A, B, C ASTM D 4718		TBW
VISUAL DESCRIPTION:	Brown Till		TBW
OPTIMUM MOISTURE CONTENT (%):	10.5	CORRECTED 10.2	TBW
MAXIMUM DRY UNIT WEIGHT (pcf):	129.7	130.8	TBW

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FLUOR FERNALD

FIELD LABORATORY COMPACTION TEST

(ASTM D 698 METHOD B)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO

DESCRIPTION: Phase III

PROJECT NO. 6Q134 TASK NO.: 04.1

MATERIAL TYPE: Low Perm Clay

MATERIAL SOURCE: STOCKPILE 01-9

DATE: 13 day Nov month 2001 year

SAMPLE NO.: LP-01-59

THIS METHOD WILL BE USED IF THE MATERIAL RETAINED ON THE NO. 3/4-in. (19-mm) SIEVE IS LESS THAN 30%, IF THE MATERIAL RETAINED ON THE NO. 4 (4.75-mm) SIEVE IS GREATER THAN 20%, AND IF THE MATERIAL RETAINED ON THE NO. 3/8-in. (9.5-mm) SIEVE IS LESS THAN 20%.
ALL MATERIAL RETAINED ON THE NO. 3/8-in. (9.5-mm) SIEVE IS DISCARDED.
USE OVERSIZE CORRECTION IF MORE THAN 5% IS DISCARDED ACCORDING TO ASTM D 4718.
USE A 4-in. DIAMETER MOLD / 5.5-lb RAMMER / 12-in. DROP / 3 LAYERS / 25 BLOWS PER LAYER.

13.75

COMPACTION OF SOIL

	WATER ADDED	(ml)	13.04 lbs 4%	13.30 lbs +6%	13.44 lbs +8%	13.64 lbs +10%	QA ID: TBW +12%
A	WT. OF SOIL & MOLD	(grams)	5914.9	6032.9	6096.4	6187.1	6237.0
B	WT. OF MOLD	(grams)	4208.8	4208.8	4208.8	4208.8	4208.8
C	WT. OF SOIL = A − B	(grams)	1706.1	1824.1	1887.6	1978.3	2028.2
D	WET UNIT WT.(1) = C X 0.066	(pcf)	112.6	120.4	124.6	130.6	133.9
E	DRY UNIT WT. = D / [1 + (K/100)]	(pcf)	105.6	110.6	112.8	116.2	116.8

NOTE: IF CALIBRATED MOLD OF 1/30 FT^3 IS USED, THE WET DENSITY IS CALCULATED FROM THE WEIGHT OF SOIL, THE VOLUME OF THE MOLD AND THE CONVERSION FROM GRAMS TO POUNDS (I.E., CONVERSION FACTOR = (30 / 453.6) = 0.066). THE MOLD MUST BE CALIBRATED TO VERIFY A CAPACITY OF 1/30 ± 0.0005 FT^3 ON INTERVALS NOT TO EXCEED 1000 TIMES THAT THE MOLD IS FILLED.

MOISTURE CONTENT – ASTM D 2216

QA ID: _____

	TARE NO.		#28	#30	#227	#212	#20
F	WT. OF TARE	(grams)	8.3	8.7	8.3	8.3	8.3
G	WT. OF WET SOIL & TARE	(grams)	509.7	520.4	498.2	575.2	562.4
H	WT. OF DRY SOIL & TARE	(grams)	478.5	478.6	451.8	512.7	491.9
I	WT. OF WATER = G − H	(grams)	31.2	41.8	46.4	62.5	70.5
J	WT. DRY SOIL = H − F	(grams)	470.2	469.9	443.5	504.4	483.6
K	MOISTURE CONTENT = (I/J) X 100	(%)	6.6	8.9	10.5	12.4	14.6

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FLUOR FERNALD

CORRECTION OF UNIT WEIGHT AND WATER CONTENT FOR SOILS CONTAINING OVERSIZE PARTICLES *(ASTM D 4718)*

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO PROJECT NO. GQ1341 TASK NO. 04.1

DESCRIPTION: Phase III DATE: 15 day Nov month 2001 year

MATERIAL TYPE: Low Perm Clay

Weight of Total Sample	=	20991.9
Weight of Oversize Fraction	=	1247.4
Weight of Finer Fraction (- 3/8)	=	19844.5
Percentage of Oversize Fraction	= (P_C)	5.9
Percentage of Finer Fraction (- 3/8)	= (P_F)	94.1
Specific Gravity (Assumed)	= (G_M)	2.72

(W_F) =	Water Content - 3/8 , as decimal	=	0.135
(W_C) =	Water Content + 3/8 , as decimal	=	0.015
(δ_F) =	Dry Density of finer fraction	=	117.9
(δ_W) =	Unit Weight of Water	=	62.4

$$C_W=(W_F P_F)+(W_C P_C)$$

$C_w = 12.8\%$

$$C\delta_D=100\delta_F G_M \delta_W/(\delta_F P_C)+(G_M \delta_W P_F)$$

$\gamma_d = 120.1$ pcf

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FLUOR FERNALD

4940

MOISTURE-DENSITY RELATIONSHIP

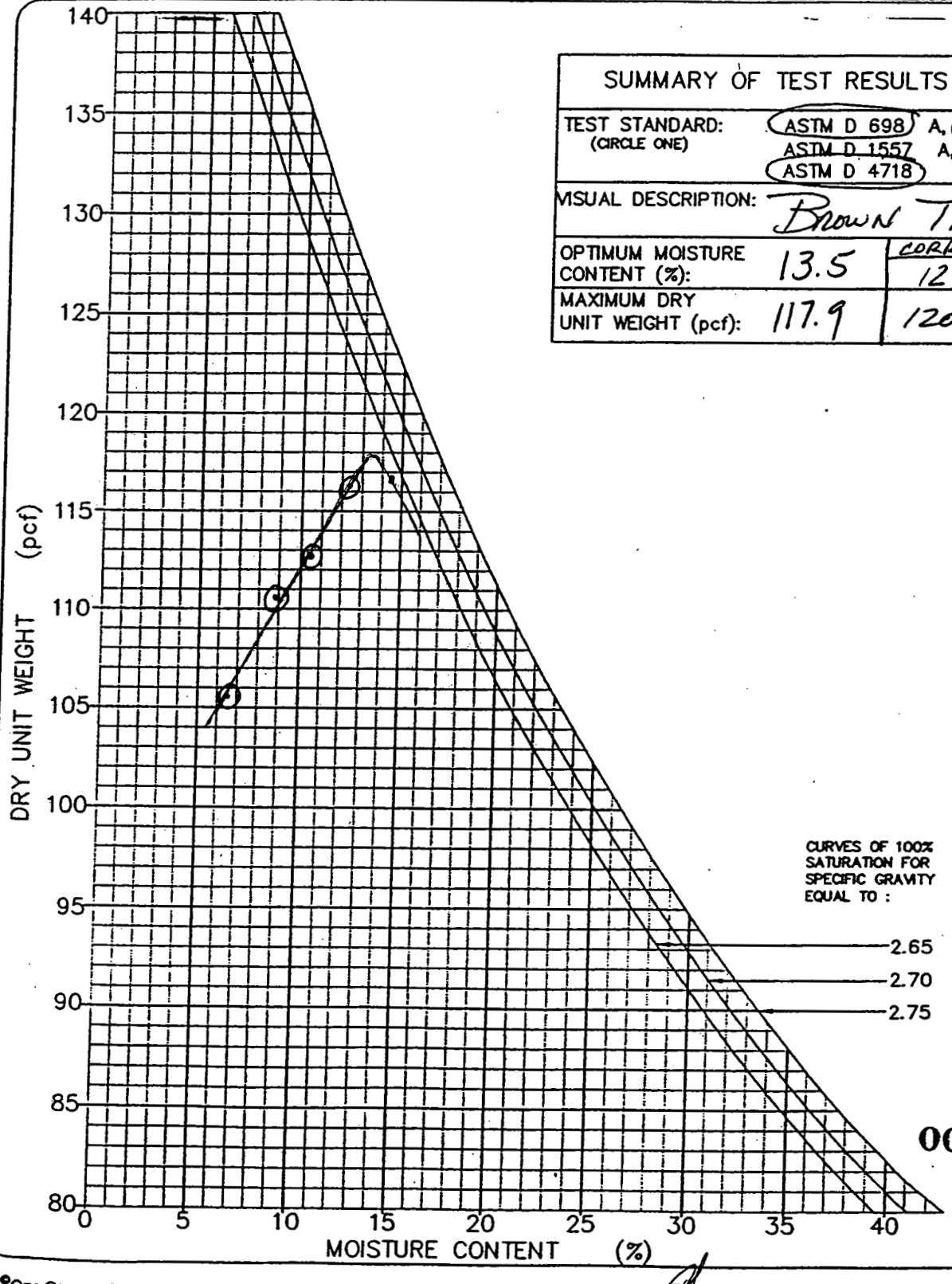
PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO PROJECT NO.: GQ134 TASK NO.: 04.1

DESCRIPTION: PHASE III DATE: 14 day Nov month 2001 year

MATERIAL TYPE: LOW PERM CLAY MATERIAL SOURCE: STOCKPILE 01-9 SAMPLE NO.: LP-01-59

SUMMARY OF TEST RESULTS			QA ID
TEST STANDARD: (CIRCLE ONE)	ASTM D 698 A, B, C ASTM D 1557 A, B, C ASTM D 4718		TBV
VISUAL DESCRIPTION:	BROWN TILL		TBV
OPTIMUM MOISTURE CONTENT (%):	13.5	CORRECTED 12.8	TBV
MAXIMUM DRY UNIT WEIGHT (pcf):	117.9	120.1	TBV



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FLUOR FERNALD

FIELD LABORATORY COMPACTION TEST

(ASTM D 1557 METHOD B)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO

PROJECT NO.: GQ134 TASK NO.: 04.1

DESCRIPTION: PHASE III

DATE: 15 day Nov month 2001 year

MATERIAL TYPE: LOW PERM CLAY MATERIAL SOURCE: STOCKPILE 01-9 SAMPLE NO.: LP-01-60

THIS METHOD WILL BE USED IF THE MATERIAL RETAINED ON THE NO. 4-in. (4.75-mm) SIEVE IS GREATER THAN 20%, AND THE MATERIAL RETAINED ON THE NO. 3/8-in. (9.5-mm) SIEVE IS LESS THAN 20%.
ALL MATERIAL RETAINED ON THE NO. 3/8-in. (9.5-mm) SIEVE IS DISCARDED.
USE OVERSIZE CORRECTION IF MORE THAN 5% IS DISCARDED ACCORDING TO ASTM D 4718.
USE A 4-in. DIAMETER MOLD / 10-lb RAMMER / 18-in. DROP / 5 LAYERS / 25 BLOWS PER LAYER.

COMPACTION OF SOIL

			13.80 lbs	14.02 lbs	14.03 lbs	13.95 lbs	QA ID 180
	WATER ADDED	(ml)	+2%	+4%	+6%	+8%	
A	WT. OF SOIL & MOLD	(grams)	6259.7	6359.5	6364.0	6327.7	
B	WT. OF MOLD	(grams)	4208.8	4208.8	4208.8	4208.8	
C	WT. OF SOIL = A − B	(grams)	2050.9	2150.7	2155.2	2118.9	
D	WET UNIT WT.(1) = C X 0.066	(pcf)	135.4	141.9	142.2	139.8	
E	DRY UNIT WT. = D / [1 + (K/100)]	(pcf)	126.5	130.2	127.9	123.4	

NOTE: IF CALIBRATED MOLD OF 1/30 FT^3 IS USED, THE WET DENSITY IS CALCULATED FROM THE WEIGHT OF SOIL, THE VOLUME OF THE MOLD AND THE CONVERSION FROM GRAMS TO POUNDS (I.E., CONVERSION FACTOR = (30 / 453.6) = 0.066). THE MOLD MUST BE CALIBRATED TO VERIFY A CAPACITY OF 1/30 ± 0.0005 FT^3 ON INTERVALS NOT TO EXCEED 1000 TIMES THAT THE MOLD IS FILLED.

MOISTURE CONTENT — ASTM D 2216

QA ID: 180

	TARE NO.		#11	#20	#18	#105	
F	WT. OF TARE	(grams)	8.1	8.3	8.4	8.2	
G	WT. OF WET SOIL & TARE	(grams)	615.3	550.6	542.5	517.6	
H	WT. OF DRY SOIL & TARE	(grams)	575.5	505.7	488.8	457.9	
I	WT. OF WATER = G − H	(grams)	39.8	44.9	53.7	59.7	
J	WT. DRY SOIL = H − F	(grams)	567.4	497.4	480.4	449.7	
K	MOISTURE CONTENT = (I/J) X 100	(%)	7.0	9.9	11.2	13.3	

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FLUOR FERNALD 4940

CORRECTION OF UNIT WEIGHT AND WATER CONTENT FOR SOILS CONTAINING OVERSIZE PARTICLES

(ASTM D 4718)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO PROJECT NO. 6Q134 TASK NO. 04.1

DESCRIPTION: PHASE III DATE: 16 day NOV month 2001 year

MATERIAL TYPE: LOW PERM CLAY LP-01-60 MOD

Weight of Total Sample	=	41,935.3g
Weight of Oversize Fraction	=	1519.2g
Weight of Finer Fraction (- 3/8)	=	40,416.1g
Percentage of Oversize Fraction	= (P_C)	3.6
Percentage of Finer Fraction (- 3/8)	= (P_F)	96.4
Specific Gravity (Assumed)	= (G_M)	2.72

(W_F) =	Water Content - 3/8, as decimal	=	0.098
(W_C) =	Water Content + 3/8, as decimal	=	0.015
(δ_F) =	Dry Density of finer fraction	=	131.5
(δ_W) =	Unit Weight of Water	=	62.4

$$C_W=(W_F P_F)+(W_C P_C) = \boxed{9.5\%M}$$

$$C\delta_D=100\delta_F G_M \delta_W/(\delta_F P_C)+(G_M \delta_W P_F) = \boxed{132.6\,pcf}$$

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GEOSYNTEC CONSULTANTS

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FLUOR FERNALD

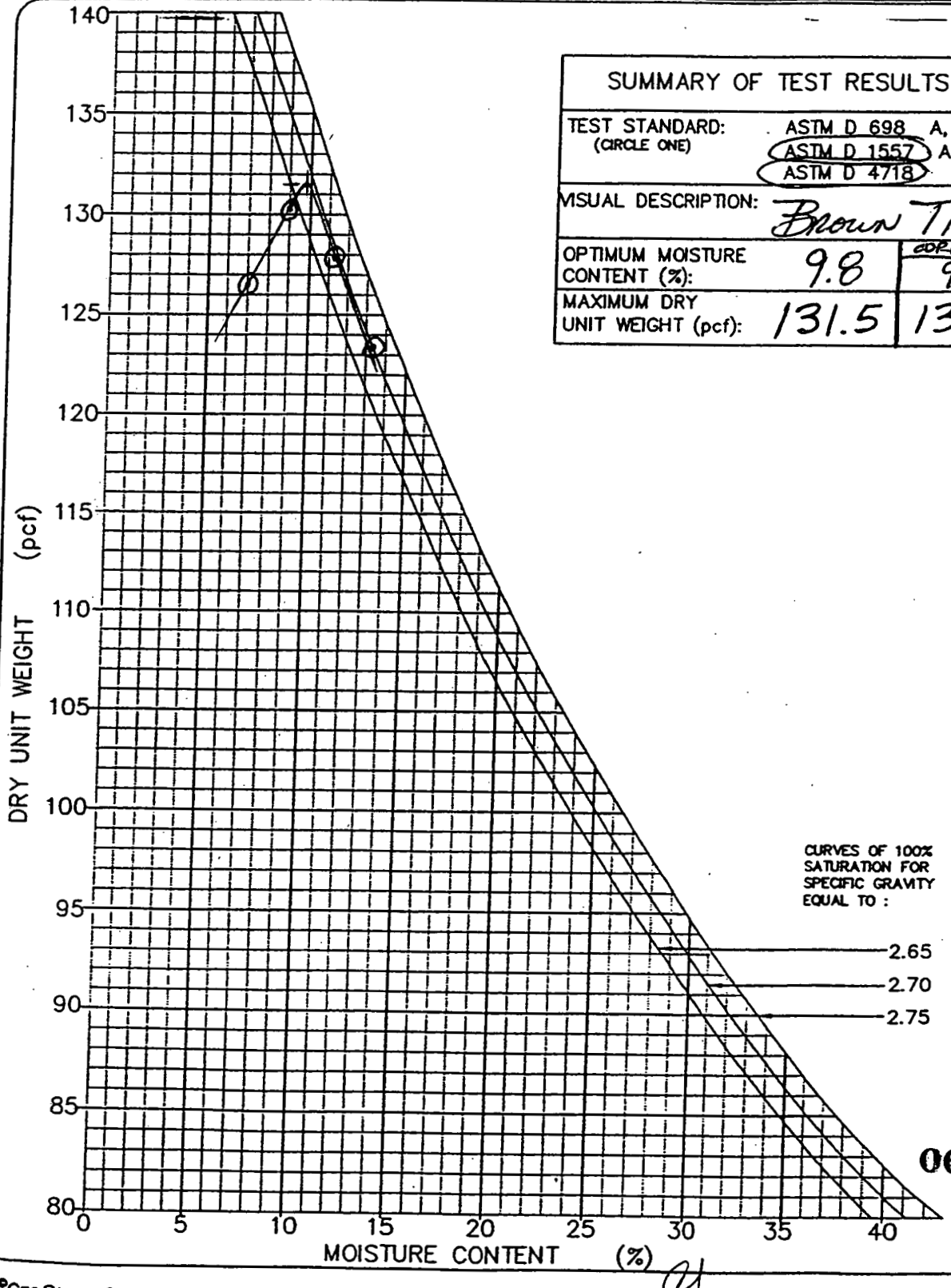
MOISTURE–DENSITY RELATIONSHIP

PROJECT: ON–SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO PROJECT NO.: GQ134 TASK NO.: 04.1

DESCRIPTION: PHASE III DATE: 16 day NOV month 2001 year

MATERIAL TYPE: LOW PERM CLAY MATERIAL SOURCE: STOCKPILE 01-9 SAMPLE NO.: LP-01-LG



SUMMARY OF TEST RESULTS			QA ID
TEST STANDARD: (CIRCLE ONE)	ASTM D 698 A, B, C ASTM D 1557 A, B, C ASTM D 4718		TBU
VISUAL DESCRIPTION:	BROWN TILL		TBU
OPTIMUM MOISTURE CONTENT (%):	9.8	CORRECTED 9.5	TBU
MAXIMUM DRY UNIT WEIGHT (pcf):	131.5	132.6	TBU

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FLUOR FERNALD

FIELD LABORATORY COMPACTION TEST

(ASTM D 698 METHOD B)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO

DESCRIPTION: Phase III

PROJECT NO. 6Q134 TASK NO.: 04.1

DATE: 16 day Nov month 2001 year

MATERIAL TYPE: Low Perm Clay

MATERIAL SOURCE: Stockpile 01-9

SAMPLE NO.: LP-01-60

THIS METHOD WILL BE USED IF THE MATERIAL RETAINED ON THE NO. 3/4-in. (19-mm) SIEVE IS LESS THAN 30%, IF THE MATERIAL RETAINED ON THE NO. 4 (4.75-mm) SIEVE IS GREATER THAN 20%, AND IF THE MATERIAL RETAINED ON THE NO. 3/8-in. (9.5-mm) SIEVE IS LESS THAN 20%.
ALL MATERIAL RETAINED ON THE NO. 3/8-in. (9.5-mm) SIEVE IS DISCARDED.
USE OVERSIZE CORRECTION IF MORE THAN 5% IS DISCARDED ACCORDING TO ASTM D 4718.
USE A 4-in. DIAMETER MOLD / 5.5-lb RAMMER / 12-in. DROP / 3 LAYERS / 25 BLOWS PER LAYER.

COMPACTION OF SOIL

QA ID: DLE

			13.50	13.76	13.85	13.79	
	WATER ADDED	(ml)	4%	6%	8%	10%	
A	WT. OF SOIL & MOLD	(grams)	6123.6	6241.5	6282.4	6255.1	
B	WT. OF MOLD	(grams)	4208.8	4208.8	4208.8	4208.8	4208.8
C	WT. OF SOIL = A − B	(grams)	1914.8	2032.7	2073.6	2046.3	
D	WET UNIT WT.(1) = C X 0.066	(pcf)	126.4	134.2	136.9	135.1	
E	DRY UNIT WT. = D / [1 + (K/100)]	(pcf)	115.4	119.9	120.3	117.3	

NOTE: IF CALIBRATED MOLD OF 1/30 FT^3 IS USED, THE WET DENSITY IS CALCULATED FROM THE WEIGHT OF SOIL. THE VOLUME OF THE MOLD AND THE CONVERSION FROM GRAMS TO POUNDS (I.E., CONVERSION FACTOR = (30 / 453.6) = 0.066). THE MOLD MUST BE CALIBRATED TO VERIFY A CAPACITY OF 1/30 ± 0.0005 FT^3 ON INTERVALS NOT TO EXCEED 1000 TIMES THAT THE MOLD IS FILLED.

MOISTURE CONTENT – ASTM D 2216

QA ID: DLE

	TARE NO.		#306	#21	#231	#104-A	
F	WT. OF TARE	(grams)	8.3	8.4	8.0	8.3	
G	WT. OF WET SOIL & TARE	(grams)	429.8	477.4	536.2	551.3	
H	WT. OF DRY SOIL & TARE	(grams)	393.3	427.6	472.2	480.1	
I	WT. OF WATER = G − H	(grams)	36.5	49.8	64.0	71.2	
J	WT. DRY SOIL = H − F	(grams)	385.0	419.2	464.2	471.8	
K	MOISTURE CONTENT = (I/J) X 100	(%)	9.5	11.9	13.8	15.1	

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SHEET NO. 1 OF 3

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FLUOR FERNALD

CORRECTION OF UNIT WEIGHT AND WATER CONTENT FOR SOILS CONTAINING OVERSIZE PARTICLES

(ASTM D 4718)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO PROJECT NO. 6Q134 TASK NO. 04.1

DESCRIPTION: PHASE III DATE: 19 day Nov month 2001 year

MATERIAL TYPE: Low Perm Clay LD-01-60 STD

Weight of Total Sample	=	41,935.3g
Weight of Oversize Fraction	=	1,519.2g
Weight of Finer Fraction (- 3/8)	=	40,416.1g
Percentage of Oversize Fraction	= (P_C)	3.6
Percentage of Finer Fraction (- 3/8)	= (P_F)	96.4
Specific Gravity (Assumed)	= (G_M)	2.72

(W_F) =	Water Content - 3/8 , as decimal	=	0.130
(W_C) =	Water Content + 3/8 , as decimal	=	0.015
(δ_F) =	Dry Density of finer fraction	=	121.7
(δ_W) =	Unit Weight of Water	=	62.4

$$C_W=(W_F P_F)+(W_C P_C) = \boxed{12.67\%}$$

$$C\delta_D=100\delta_F G_M \delta_W/(\delta_F P_C)+(G_M \delta_W P_F) = \boxed{123.0 \text{ pcf}}$$

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FLUOR FERNALD

MOISTURE-DENSITY RELATIONSHIP

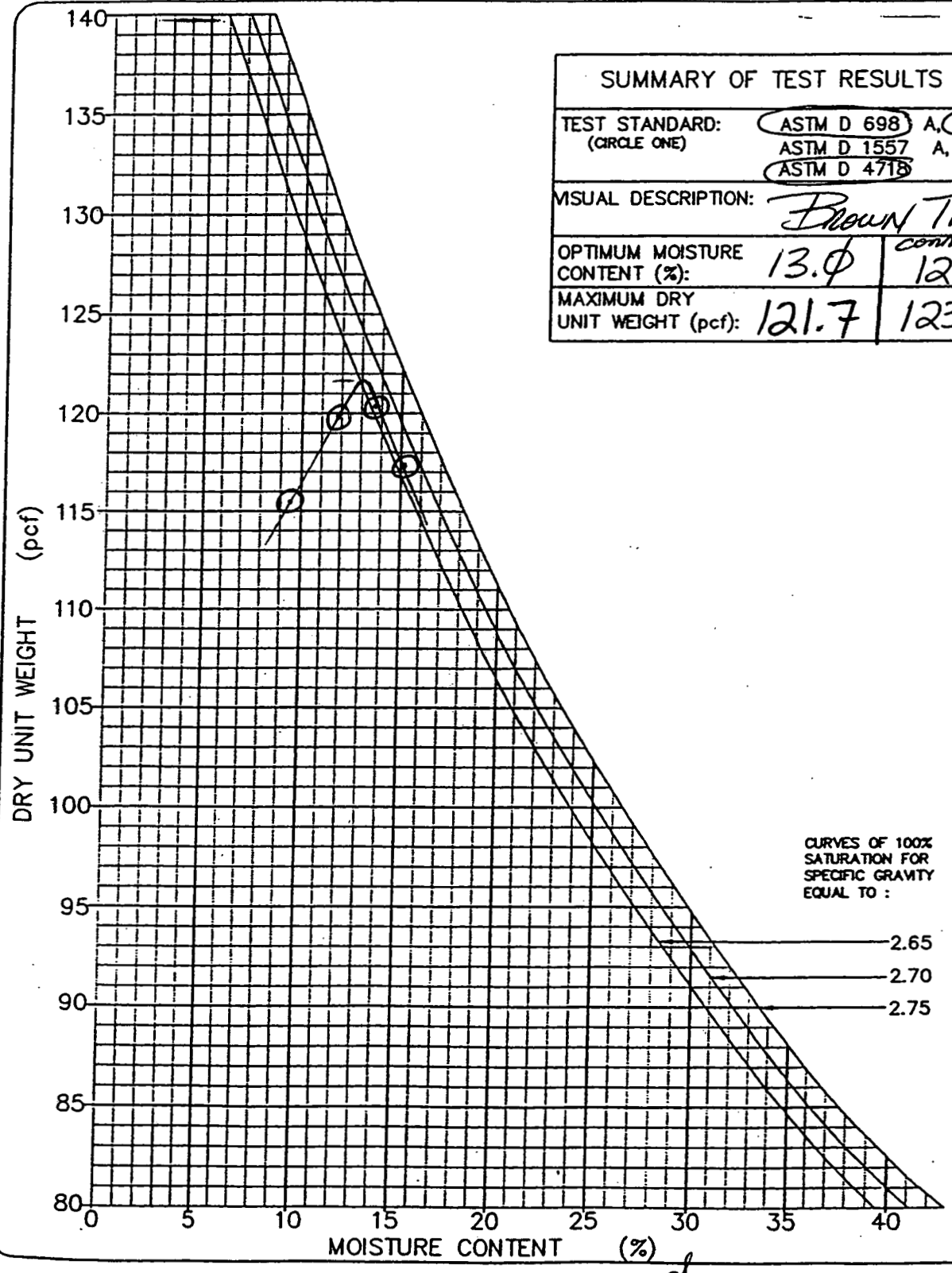
PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO PROJECT NO.: GQ134 TASK NO.: 04.1

DESCRIPTION: PHASE III DATE: 19 day Nov month 2001 year

MATERIAL TYPE: LOW PERM CLAY MATERIAL SOURCE: STOCKPILE 01-9 SAMPLE NO.: LP-01-60

SUMMARY OF TEST RESULTS			QA ID
TEST STANDARD: (CIRCLE ONE)	ASTM D 698 A, B, C ASTM D 1557 A, B, C ASTM D 4718		DLE TBW
VISUAL DESCRIPTION:	BROWN TILL		TBW
OPTIMUM MOISTURE CONTENT (%):	13.0	CORRECTED 12.6	TBW
MAXIMUM DRY UNIT WEIGHT (pcf):	121.7	123.0	TBW



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FLUOR FERNALD

FIELD LABORATORY COMPACTION TEST

(ASTM D 698 METHOD B)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO

DESCRIPTION: Phase III

PROJECT NO. 6-Q1341 TASK NO.: 04.1

DATE: 16 day Nov month 2001 year

MATERIAL TYPE: Low Perm Clay

MATERIAL SOURCE: Stockpile 01-10

SAMPLE NO.: LP-01-61

THIS METHOD WILL BE USED IF THE MATERIAL RETAINED ON THE NO. 3/4-in. (19-mm) SIEVE IS LESS THAN 30%, IF THE MATERIAL RETAINED ON THE NO. 4 (4.75-mm) SIEVE IS GREATER THAN 20%, AND IF THE MATERIAL RETAINED ON THE NO. 3/8-in. (9.5-mm) SIEVE IS LESS THAN 20%.
ALL MATERIAL RETAINED ON THE NO. 3/8-in. (9.5-mm) SIEVE IS DISCARDED.
USE OVERSIZE CORRECTION IF MORE THAN 5% IS DISCARDED ACCORDING TO ASTM D 4718.
USE A 4-in. DIAMETER MOLD / 5.5-lb RAMMER / 12-in. DROP / 3 LAYERS / 25 BLOWS PER LAYER.

COMPACTION OF SOIL

QA ID: DAE

			13.32	13.54	13.79	13.85	
	WATER ADDED	(ml)	4%	6%	8%	10%	
A	WT. OF SOIL & MOLD	(grams)	6042.0	6141.7	6255.1	6282.4	
B	WT. OF MOLD	(grams)	4208.8	4208.8	4208.8	4208.8	
C	WT. OF SOIL = A − B	(grams)	1833.2	1932.9	2046.3	2073.6	
D	WET UNIT WT.(1) = C X 0.066	(pcf)	121.0	127.6	135.1	136.9	
E	DRY UNIT WT. = D / [1 + (K/100)]	(pcf)	111.6	115.0	119.7	119.4	

NOTE: IF CALIBRATED MOLD OF 1/30 FT^3 IS USED, THE WET DENSITY IS CALCULATED FROM THE WEIGHT OF SOIL, THE VOLUME OF THE MOLD AND THE CONVERSION FROM GRAMS TO POUNDS (I.E., CONVERSION FACTOR = (30 / 453.6) = 0.066). THE MOLD MUST BE CALIBRATED TO VERIFY A CAPACITY OF 1/30 ± 0.0005 FT^3 ON INTERVALS NOT TO EXCEED 1000 TIMES THAT THE MOLD IS FILLED.

MOISTURE CONTENT – ASTM D 2216

QA ID: DAE

	TARE NO.		#34	#304	#24	#8	
F	WT. OF TARE	(grams)	8.2	8.3	8.3	8.3	
G	WT. OF WET SOIL & TARE	(grams)	414.7	470.6	514.7	532.0	
H	WT. OF DRY SOIL & TARE	(grams)	383.1	425.2	457.3	465.2	
I	WT. OF WATER = G − H	(grams)	31.6	45.4	57.4	66.8	
J	WT. DRY SOIL = H − F	(grams)	374.9	416.9	449.0	456.9	
K	MOISTURE CONTENT = (I/J) X 100	(%)	8.4	10.9	12.8	14.6	

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FLUOR FERNALD

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CORRECTION OF UNIT WEIGHT AND WATER CONTENT FOR SOILS CONTAINING OVERSIZE PARTICLES *(ASTM D 4718)*

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO PROJECT NO. 6Q134 TASK NO. 04.1

DESCRIPTION: PHASE III DATE: 19 day Nov month 2001 year

MATERIAL TYPE: Low Perm CLAY LP-01-61' STD

Weight of Total Sample	=	36,999.8 g
Weight of Oversize Fraction	=	1,494.5 g
Weight of Finer Fraction (- 3/8)	=	35,505.3 g
Percentage of Oversize Fraction	= (P_C)	4.0
Percentage of Finer Fraction (- 3/8)	= (P_F)	96.0
Specific Gravity (Assumed)	= (G_M)	2.72

(W_F) =	Water Content - 3/8 , as decimal	=	0.136
(W_C) =	Water Content + 3/8 , as decimal	=	0.015
(δ_F) =	Dry Density of finer fraction	=	121.4
(δ_W) =	Unit Weight of Water	=	62.4

$$C_W=(W_F P_F)+(W_C P_C) = \boxed{13.1\ \%M}$$

$$C\delta_D=100\delta_F G_M \delta_W/(\delta_F P_C)+(G_M \delta_W P_F) = \boxed{122.8\ pcf}$$

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FLUOR FERNALD

MOISTURE-DENSITY RELATIONSHIP

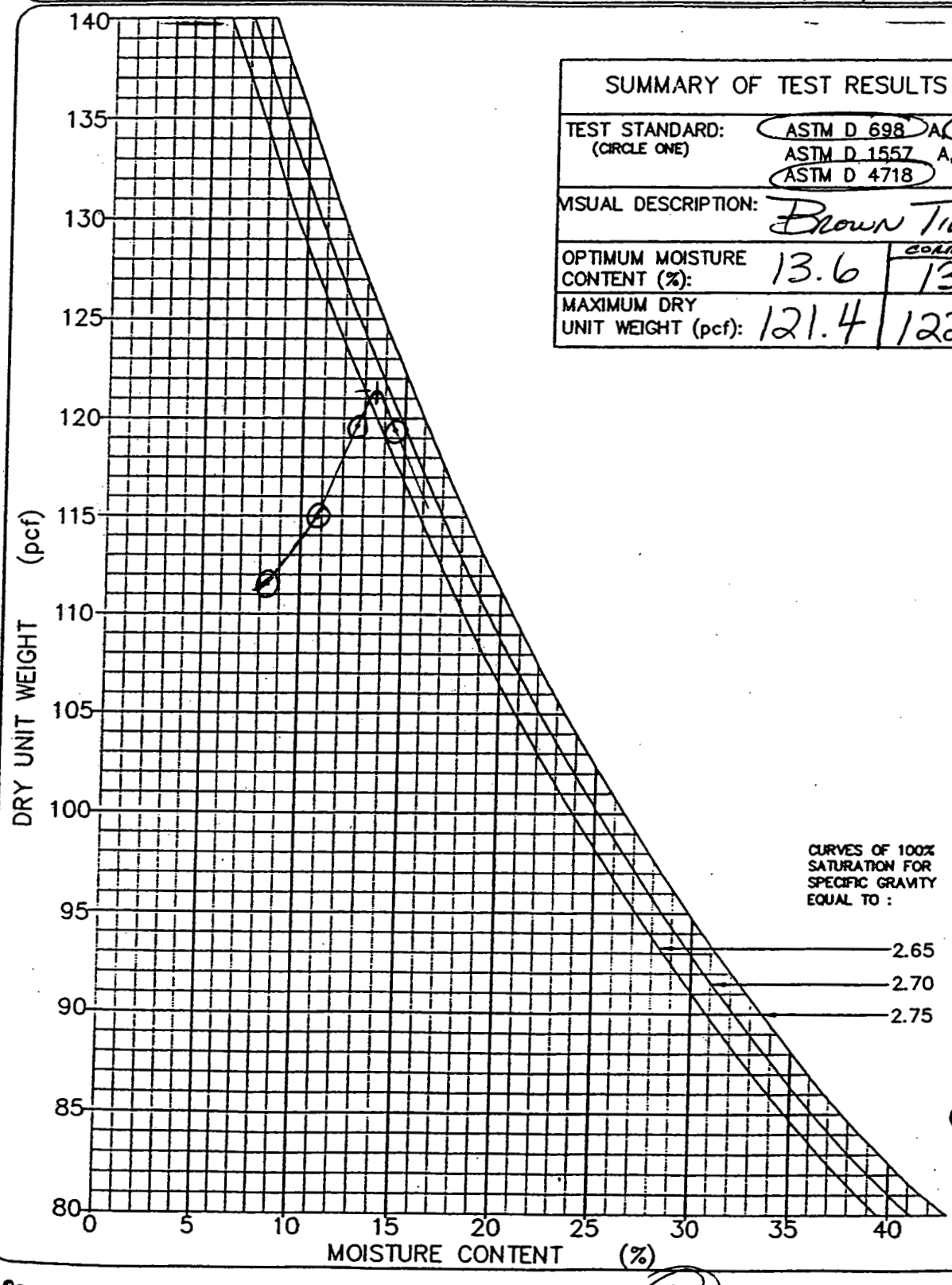
PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO PROJECT NO.: GQ134 TASK NO.: 04.1

DESCRIPTION: PHASE III DATE: 19 day Nov month 2001 year

MATERIAL TYPE: Low Beam Clay MATERIAL SOURCE: STOCKPILE 01-10 SAMPLE NO.: LP-01-61

SUMMARY OF TEST RESULTS			QA ID
TEST STANDARD: (CIRCLE ONE)	ASTM D 698 A, B, C ASTM D 1557 A, B, C ASTM D 4718		DLE TBW
VISUAL DESCRIPTION:	Brown Till		TBW
OPTIMUM MOISTURE CONTENT (%):	13.6	CORRECTED 13.1	TBW
MAXIMUM DRY UNIT WEIGHT (pcf):	121.4	122.8	TBW



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FLUOR FERNALD

FIELD LABORATORY COMPACTION TEST

(ASTM D 1557 METHOD B)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO

PROJECT NO.: GQ1344 TASK NO.: 04.1

DESCRIPTION: PHASE III

DATE: 16 day Nov month 2001 year

MATERIAL TYPE: Low Perm Clay MATERIAL SOURCE: STOCKPILE 01-10 SAMPLE NO.: LP-01-61

THIS METHOD WILL BE USED IF THE MATERIAL RETAINED ON THE NO. 4-in. (4.75-mm) SIEVE IS GREATER THAN 20%, AND THE MATERIAL RETAINED ON THE NO. 3/8-in. (9.5-mm) SIEVE IS LESS THAN 20%.
ALL MATERIAL RETAINED ON THE NO. 3/8-in. (9.5-mm) SIEVE IS DISCARDED.
USE OVERSIZE CORRECTION IF MORE THAN 5% IS DISCARDED ACCORDING TO ASTM D 4718.
USE A 4-in. DIAMETER MOLD / 10-lb RAMMER / 18-in. DROP / 5 LAYERS / 25 BLOWS PER LAYER.

COMPACTION OF SOIL — QA ID: [illegible]

			13.69 lbs	13.93 lbs	14.08 lbs	14.02 lbs	
	WATER ADDED	(ml)	+2%	+4%	+6%	+8%	
A	WT. OF SOIL & MOLD	(grams)	6209.8	6318.6	6386.7	6359.5	
B	WT. OF MOLD	(grams)	4208.8	4208.8	4208.8	4208.8	
C	WT. OF SOIL = A − B	(grams)	2010	2109.8	2177.9	2150.7	
D	WET UNIT WT.(1) = C X 0.066	(pcf)	132.1	139.3	143.7	141.9	
E	DRY UNIT WT. = D / [1 + (K/100)]	(pcf)	124.1	128.1	130.0	126.0	

NOTE: IF CALIBRATED MOLD OF 1/30 FT^3 IS USED, THE WET DENSITY IS CALCULATED FROM THE WEIGHT OF SOIL. THE VOLUME OF THE MOLD AND THE CONVERSION FROM GRAMS TO POUNDS (I.E., CONVERSION FACTOR = (30 / 453.6) = 0.066). THE MOLD MUST BE CALIBRATED TO VERIFY A CAPACITY OF 1/30 ± 0.0005 FT^3 ON INTERVALS NOT TO EXCEED 1000 TIMES THAT THE MOLD IS FILLED.

MOISTURE CONTENT — ASTM D 2216 — QA ID: [illegible]

	TARE NO.		#20	#18	#105	#11	
F	WT. OF TARE	(grams)	8.3	8.4	8.2	8.1	
G	WT. OF WET SOIL & TARE	(grams)	583.6	516.0	615.2	550.5	
H	WT. OF DRY SOIL & TARE	(grams)	548.8	475.4	557.3	489.7	
I	WT. OF WATER = G − H	(grams)	34.8	40.6	57.9	60.8	
J	WT. DRY SOIL = H − F	(grams)	540.5	467.0	549.1	481.6	
K	MOISTURE CONTENT = (I/J) X 100	(%)	6.4	8.7	10.5	12.6	

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FLUOR FERNALD 4940

CORRECTION OF UNIT WEIGHT AND WATER CONTENT FOR SOILS CONTAINING OVERSIZE PARTICLES *(ASTM D 4718)*

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO PROJECT NO. 6034 TASK NO. 04.1

DESCRIPTION: PHASE III DATE: 19 day Nov month 2001 year

MATERIAL TYPE: Low Perm CLAY LP-01-61 MOD

Weight of Total Sample	=	36,999.8g
Weight of Oversize Fraction	=	1,494.5g
Weight of Finer Fraction (- 3/8)	=	35,505.3g
Percentage of Oversize Fraction	= (P_C)	4.0
Percentage of Finer Fraction (- 3/8)	= (P_F)	96.0
Specific Gravity (Assumed)	= (G_M)	2.72

(W_F) =	Water Content - 3/8, as decimal	=	0.104
(W_C) =	Water Content + 3/8, as decimal	=	0.015
(δ_F) =	Dry Density of finer fraction	=	131.0
(δ_W) =	Unit Weight of Water	=	62.4

$$C_W=(W_F P_F)+(W_C P_C) = \boxed{10.0\%M}$$

$$C\delta_D=100\delta_F G_M \delta_W/(\delta_F P_C)+(G_M \delta_W P_F) = \boxed{132.2 pcf}$$

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FLUOR FERNALD

MOISTURE–DENSITY RELATIONSHIP

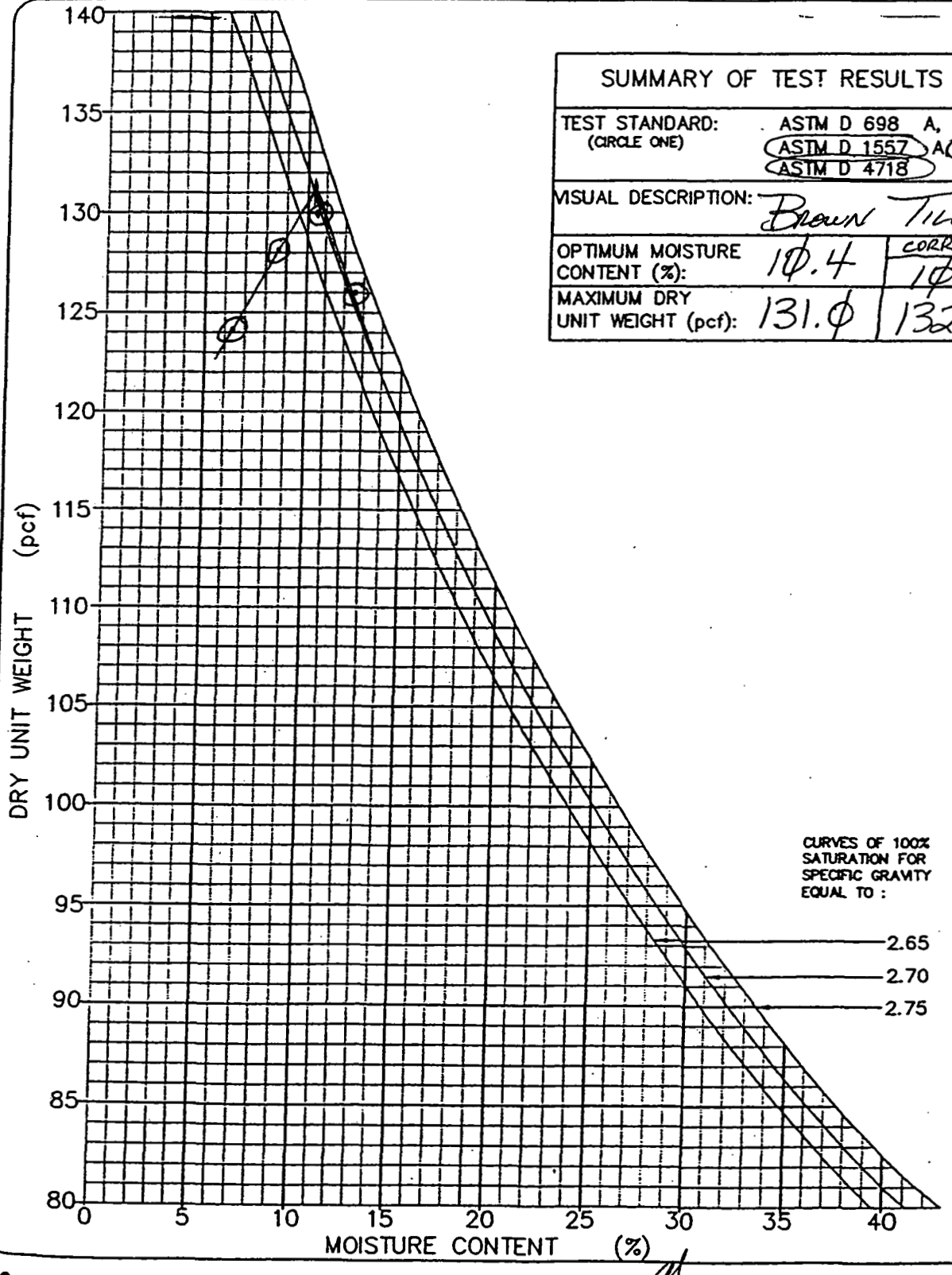
PROJECT: ON–SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO PROJECT NO.: GQ134 TASK NO.: 04.1

DESCRIPTION: PHASE III DATE: 19 day Nov month 2001 year

MATERIAL TYPE: Low Perm Clay MATERIAL SOURCE: STOCKPILE 01-10 SAMPLE NO.: LP-01-61

SUMMARY OF TEST RESULTS			QA ID
TEST STANDARD: (CIRCLE ONE)	ASTM D 698 A, B, C ASTM D 1557 A, B, C ASTM D 4718		TBW
VISUAL DESCRIPTION:	Brown Till		TBW
OPTIMUM MOISTURE CONTENT (%):	10.4	CORRECTED 10.0	TBW
MAXIMUM DRY UNIT WEIGHT (pcf):	131.0	132.2	TBW



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FLUOR FERNALD

FIELD LABORATORY COMPACTION TEST

(ASTM D 698 METHOD B)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO

DESCRIPTION: Phase III

PROJECT NO. 6Q134I TASK NO.: 04.1

DATE: 19 day Nov month 2001 year

MATERIAL TYPE: Low Perm Clay

MATERIAL SOURCE: Stockpile 01-10

SAMPLE NO.: LP-01-62

THIS METHOD WILL BE USED IF THE MATERIAL RETAINED ON THE NO. 3/4-in. (19-mm) SIEVE IS LESS THAN 30%, IF THE MATERIAL RETAINED ON THE NO. 4 (4.75-mm) SIEVE IS GREATER THAN 20%, AND IF THE MATERIAL RETAINED ON THE NO. 3/8-in. (9.5-mm) SIEVE IS LESS THAN 20%.
ALL MATERIAL RETAINED ON THE NO. 3/8-in. (9.5-mm) SIEVE IS DISCARDED.
USE OVERSIZE CORRECTION IF MORE THAN 5% IS DISCARDED ACCORDING TO ASTM D 4718.
USE A 4-in. DIAMETER MOLD / 5.5-lb RAMMER / 12-in. DROP / 3 LAYERS / 25 BLOWS PER LAYER.

COMPACTION OF SOIL

QA ID: KS/DLE

	WATER ADDED	(ml)	13.23 4%	13.54 6%	13.76 8%	13.78 10%	
A	WT. OF SOIL & MOLD	(grams)	6001.1	6141.7	6241.5	6250.6	
B	WT. OF MOLD	(grams)	4208.8	4208.8	4208.8	4208.8	
C	WT. OF SOIL = A − B	(grams)	1792.3	1932.9	2032.7	2041.8	
D	WET UNIT WT.(1) = C X 0.066	(pcf)	118.3	127.6	134.2	134.8	
E	DRY UNIT WT. = D / [1 + (K/100)]	(pcf)	108.7	114.5	118.2	116.9	

NOTE: IF CALIBRATED MOLD OF 1/30 FT^3 IS USED, THE WET DENSITY IS CALCULATED FROM THE WEIGHT OF SOIL, THE VOLUME OF THE MOLD AND THE CONVERSION FROM GRAMS TO POUNDS (I.E., CONVERSION FACTOR = (30 / 453.6) = 0.066). THE MOLD MUST BE CALIBRATED TO VERIFY A CAPACITY OF 1/30 ± 0.0005 FT^3 ON INTERVALS NOT TO EXCEED 1000 TIMES THAT THE MOLD IS FILLED.

MOISTURE CONTENT – ASTM D 2216

QA ID: KS

	TARE NO.		233	225	204	227	
F	WT. OF TARE	(grams)	8.4	8.3	8.1	8.3	
G	WT. OF WET SOIL & TARE	(grams)	315.4	324.0	346.7	397.8	
H	WT. OF DRY SOIL & TARE	(grams)	290.4	291.6	371.2	346.3	
I	WT. OF WATER = G − H	(grams)	25.0	32.4	35.5	51.5	
J	WT. DRY SOIL = H − F	(grams)	282.0	283.3	263.1	338.0	
K	MOISTURE CONTENT = (I/J) X 100	(%)	8.9	11.4	13.5	15.2	

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FLUOR FERNALD

CORRECTION OF UNIT WEIGHT AND WATER CONTENT FOR SOILS CONTAINING OVERSIZE PARTICLES *(ASTM D 4718)*

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO PROJECT NO. GQ134 TASK NO. 04.1

DESCRIPTION: PHASE III DATE: 20 day Nov month 2000 year

MATERIAL TYPE: Low Perm Clay LP-01-62 STD

Weight of Total Sample	=	19,724.8 g
Weight of Oversize Fraction	=	380.5 g
Weight of Finer Fraction (- 3/8)	=	19,344.3 g
Percentage of Oversize Fraction	= (P_C)	1.9
Percentage of Finer Fraction (- 3/8)	= (P_F)	98.1
Specific Gravity (Assumed)	= (G_M)	2.72

(W_F) =	Water Content - 3/8 , as decimal	=	0.141
(W_C) =	Water Content + 3/8 , as decimal	=	0.015
(δ_F) =	Dry Density of finer fraction	=	119.3
(δ_W) =	Unit Weight of Water	=	62.4

$$C_W=(W_F P_F)+(W_C P_C) = \boxed{13.97\%M}$$

$$C\delta_D=100\delta_F G_M \delta_W/(\delta_F P_C)+(G_M \delta_W P_F) = \boxed{120.0\ pcf}$$

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FLUOR FERNALD

MOISTURE-DENSITY RELATIONSHIP

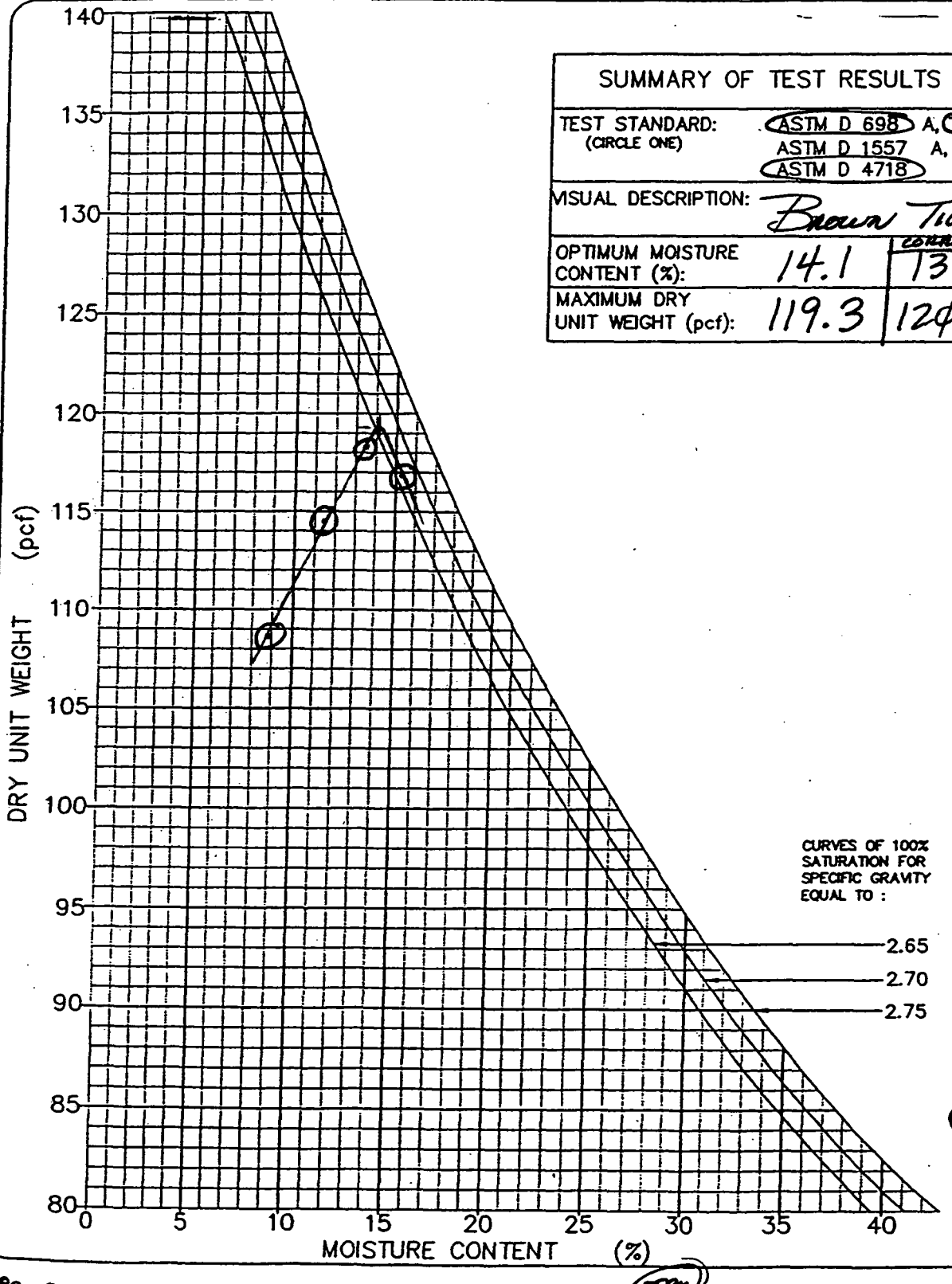
PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO PROJECT NO.: 6Q134 TASK NO.: 04.1

DESCRIPTION: PHASE III DATE: 20 day Nov month 2001 year

MATERIAL TYPE: LOW PERM CLAY MATERIAL SOURCE: STOCKPILE 01-10 SAMPLE NO.: LP-01-62

SUMMARY OF TEST RESULTS			QA ID
TEST STANDARD: (CIRCLE ONE)	ASTM D 698 A, (B) C ASTM D 1557 A, B, C ASTM D 4718		KS TBW
VISUAL DESCRIPTION:	BROWN TILL		TBW
OPTIMUM MOISTURE CONTENT (%):	14.1	CORRECTED 13.9	TBW
MAXIMUM DRY UNIT WEIGHT (pcf):	119.3	120.0	TBW



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FLUOR FERNALD

FIELD LABORATORY COMPACTION TEST

(ASTM D 698 METHOD B)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO

DESCRIPTION: Phase III

PROJECT NO. 6Q134 TASK NO.: 04.1

DATE: 19 day Nov month 2001 year

MATERIAL TYPE: Low Perm Clay

MATERIAL SOURCE: Stockpiles 01-09

SAMPLE NO.: LP-01-63

THIS METHOD WILL BE USED IF THE MATERIAL RETAINED ON THE NO. 3/4-in. (19-mm) SIEVE IS LESS THAN 30%, IF THE MATERIAL RETAINED ON THE NO. 4 (4.75-mm) SIEVE IS GREATER THAN 20%, AND IF THE MATERIAL RETAINED ON THE NO. 3/8-in. (9.5-mm) SIEVE IS LESS THAN 20%.
ALL MATERIAL RETAINED ON THE NO. 3/8-in. (9.5-mm) SIEVE IS DISCARDED.
USE OVERSIZE CORRECTION IF MORE THAN 5% IS DISCARDED ACCORDING TO ASTM D 4718.
USE A 4-in. DIAMETER MOLD / 5.5-lb RAMMER / 12-in. DROP / 3 LAYERS / 25 BLOWS PER LAYER.

COMPACTION OF SOIL

QA ID: KS/DLF

			13.37	13.68	13.79	13.75	
	WATER ADDED	(ml)	4%	6%	8% omit	10%	
A	WT. OF SOIL & MOLD	(grams)	6064.6	6205.2	6255.1	6237.0	
B	WT. OF MOLD	(grams)	4208.8	4208.8	4208.8	4208.8	
C	WT. OF SOIL = A − B	(grams)	1855.8	1996.4	2046.3	2028.2	
D	WET UNIT WT.(1) = C X 0.066	(pcf)	122.5	131.8	135.1	133.9	
E	DRY UNIT WT. = D / [1 + (K/100)]	(pcf)	112.0	118.1	119.6	115.9	

NOTE: IF CALIBRATED MOLD OF 1/30 FT^3 IS USED, THE WET DENSITY IS CALCULATED FROM THE WEIGHT OF SOIL, THE VOLUME OF THE MOLD AND THE CONVERSION FROM GRAMS TO POUNDS (I.E., CONVERSION FACTOR = (30 / 453.6) = 0.066). THE MOLD MUST BE CALIBRATED TO VERIFY A CAPACITY OF 1/30 ± 0.0005 FT^3 ON INTERVALS NOT TO EXCEED 1000 TIMES THAT THE MOLD IS FILLED.

MOISTURE CONTENT — ASTM D 2216

QA ID: KS

	TARE NO.		1	205	33	232	
F	WT. OF TARE	(grams)	8.3	8.2	8.1 omit	8.2	
G	WT. OF WET SOIL & TARE	(grams)	361.2	386.9	412.1	408.3	
H	WT. OF DRY SOIL & TARE	(grams)	331.0	347.5	365.9	354.5	
I	WT. OF WATER = G − H	(grams)	30.2	39.4	46.2	53.8	
J	WT. DRY SOIL = H − F	(grams)	322.7	339.3	357.8	346.3	
K	MOISTURE CONTENT = (I/J) X 100	(%)	9.4	11.6	12.9	15.5	

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SHEET NO. 1 OF 4

GEOSYNTEC CONSULTANTS

FLUOR FERNALD

FIELD LABORATORY COMPACTION TEST

(ASTM D 698 METHOD B)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO

DESCRIPTION: Phase III

PROJECT NO. 6Q134I TASK NO.: 04.1

DATE: 26 day Nov month 2001 year

MATERIAL TYPE: Low Perm Clay MATERIAL SOURCE: Stockpile 01-09 SAMPLE NO.: LP-01.63

THIS METHOD WILL BE USED IF THE MATERIAL RETAINED ON THE NO. 3/4-in. (19-mm) SIEVE IS LESS THAN 30%, IF THE MATERIAL RETAINED ON THE NO. 4 (4.75-mm) SIEVE IS GREATER THAN 20%, AND IF THE MATERIAL RETAINED ON THE NO. 3/8-in. (9.5-mm) SIEVE IS LESS THAN 20%.
ALL MATERIAL RETAINED ON THE NO. 3/8-in. (9.5-mm) SIEVE IS DISCARDED.
USE OVERSIZE CORRECTION IF MORE THAN 5% IS DISCARDED ACCORDING TO ASTM D 4718.
USE A 4-in. DIAMETER MOLD / 5.5-lb RAMMER / 12-in. DROP / 3 LAYERS / 25 BLOWS PER LAYER.

COMPACTION OF SOIL

QA ID: DLE

			13.84	13.77			
	WATER ADDED	(ml)	8%	12%			
A	WT. OF SOIL & MOLD	(grams)	6277.8	6223.4			
B	WT. OF MOLD	(grams)	4208.8	4208.8			
C	WT. OF SOIL = A − B	(grams)	2069.0	2014.6			
D	WET UNIT WT.(1) = C X 0.066	(pcf)	136.6	133.0			
E	DRY UNIT WT. = D / [1 + (K/100)]	(pcf)	120.8 ~~120.4~~	113.9			

NOTE: IF CALIBRATED MOLD OF 1/30 FT^3 IS USED, THE WET DENSITY IS CALCULATED FROM THE WEIGHT OF SOIL, THE VOLUME OF THE MOLD AND THE CONVERSION FROM GRAMS TO POUNDS (I.E., CONVERSION FACTOR = (30 / 453.6) = 0.066). THE MOLD MUST BE CALIBRATED TO VERIFY A CAPACITY OF 1/30 ± 0.0005 FT^3 ON INTERVALS NOT TO EXCEED 1000 TIMES THAT THE MOLD IS FILLED.

MOISTURE CONTENT – ASTM D 2216

QA ID: DLE

	TARE NO.		#1	#205			
F	WT. OF TARE	(grams)	8.3	8.3			
G	WT. OF WET SOIL & TARE	(grams)	439.3	595.4			
H	WT. OF DRY SOIL & TARE	(grams)	389.7	510.8			
I	WT. OF WATER = G − H	(grams)	49.6	84.6			
J	WT. DRY SOIL = H − F	(grams)	381.4	502.5			
K	MOISTURE CONTENT = (I/J) X 100	(%)	13.0	16.8			

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FLUOR FERNALD

CORRECTION OF UNIT WEIGHT AND WATER CONTENT FOR SOILS CONTAINING OVERSIZE PARTICLES *(ASTM D 4718)*

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO PROJECT NO. GQ134 TASK NO. 04.1

DESCRIPTION: PHASE III DATE: 21 day Nov month 2001 year

MATERIAL TYPE: Low Perm Clay

LP-01-63 STD

Weight of Total Sample	=	23825.1
Weight of Oversize Fraction	=	1133.1
Weight of Finer Fraction (- 3/8)	=	22692.0
Percentage of Oversize Fraction	= (P_C)	4.8
Percentage of Finer Fraction (- 3/8)	= (P_F)	95.2
Specific Gravity (Assumed)	= (G_M)	2.72

(W_F) =	Water Content - 3/8 , as decimal	=	0.132
(W_C) =	Water Content + 3/8 , as decimal	=	0.015
(δ_F) =	Dry Density of finer fraction	=	120.9
(δ_W) =	Unit Weight of Water	=	62.4

$$C_W=(W_F P_F)+(W_C P_C)$$

$C_w = 12.6\%$

$$C\delta_D=100\delta_F G_M \delta_W/(\delta_F P_C)+(G_M \delta_W P_F)$$

$C_{\delta D} = 122.6$ pcf

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FLUOR FERNALD

4940

MOISTURE-DENSITY RELATIONSHIP

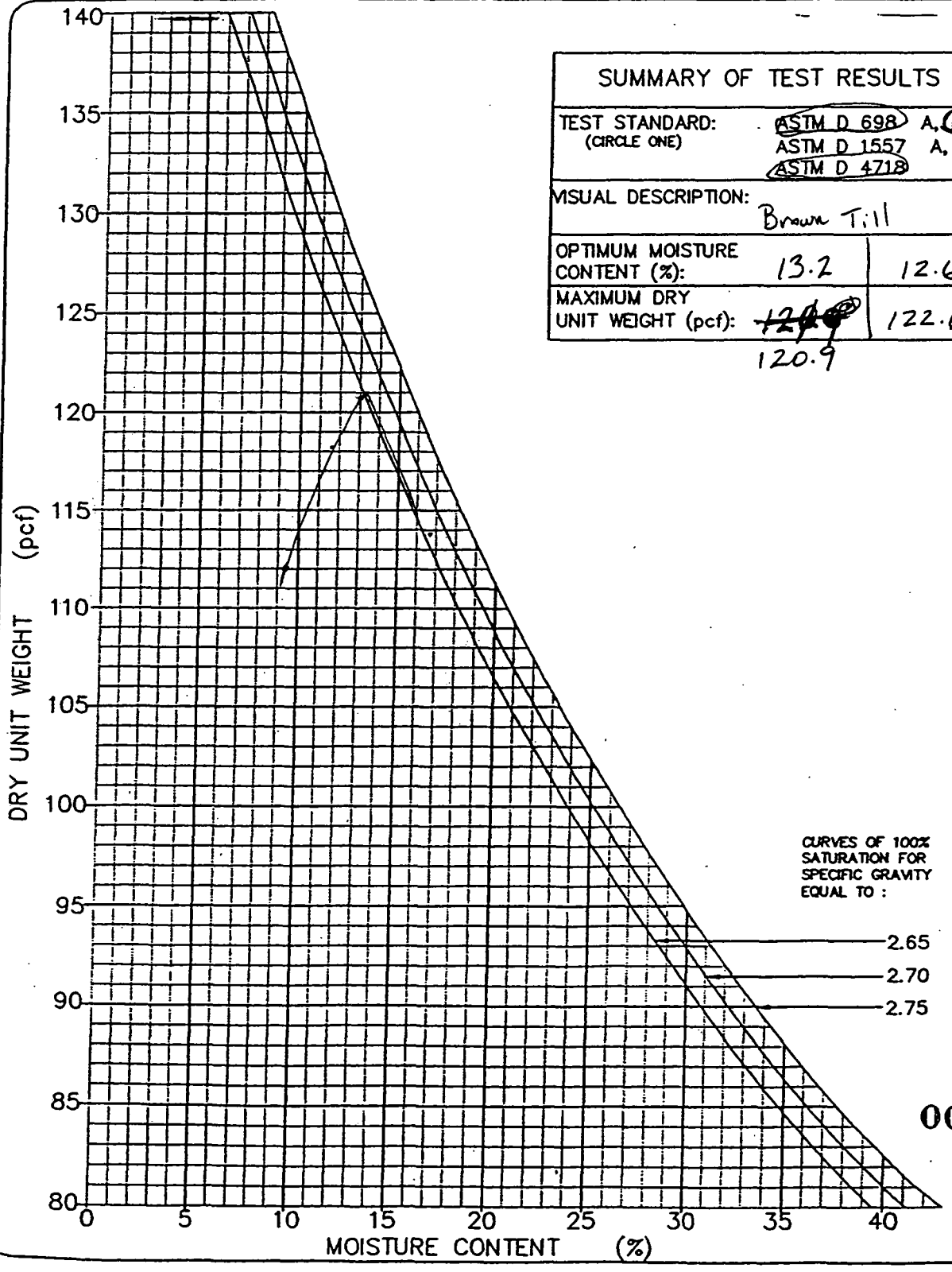
PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO PROJECT NO.: GQ1341 TASK NO.: 04.1

DESCRIPTION: Phase III DATE: 26 day Nov month 2001 year

MATERIAL TYPE: Low Perm Clay MATERIAL SOURCE: Stockpile Ø1-9 SAMPLE NO.: LPØ1-63

SUMMARY OF TEST RESULTS			QA ID
TEST STANDARD: (CIRCLE ONE)	ASTM D 698 A, (B) C ASTM D 1557 A, B, C ASTM D 4718		
VISUAL DESCRIPTION:	Brown Till		
OPTIMUM MOISTURE CONTENT (%):	13.2	12.6	
MAXIMUM DRY UNIT WEIGHT (pcf):	~~120.9~~ 120.9	122.6	



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FLUOR FERNALD

FIELD LABORATORY COMPACTION TEST

(ASTM D 698 METHOD B)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO

DESCRIPTION: Phase III — PROJECT NO. 6Q134 — TASK NO.: 04.1

MATERIAL TYPE: Low Perm Clay — DATE: 21 day Nov month 2001 year

MATERIAL SOURCE: Stockpile 01-10 — SAMPLE NO.: LP-01-64

THIS METHOD WILL BE USED IF THE MATERIAL RETAINED ON THE NO. 3/4-in. (19-mm) SIEVE IS LESS THAN 30%, IF THE MATERIAL RETAINED ON THE NO. 4 (4.75-mm) SIEVE IS GREATER THAN 20%, AND IF THE MATERIAL RETAINED ON THE NO. 3/8-in. (9.5-mm) SIEVE IS LESS THAN 20%.
ALL MATERIAL RETAINED ON THE NO. 3/8-in. (9.5-mm) SIEVE IS DISCARDED.
USE OVERSIZE CORRECTION IF MORE THAN 5% IS DISCARDED ACCORDING TO ASTM D 4718.
USE A 4-in. DIAMETER MOLD / 5.5-lb RAMMER / 12-in. DROP / 3 LAYERS / 25 BLOWS PER LAYER.

COMPACTION OF SOIL

	WATER ADDED	(ml)		13.22	13.55	13.80	13.79
A	WT. OF SOIL & MOLD	(grams)		4%	6%	8%	10%
B	WT. OF MOLD	(grams)	4208.8	5996.6	6146.3	6259.7	6255.1
C	WT. OF SOIL = A − B	(grams)		4208.8	4208.8	4208.8	4208.8
D	WET UNIT WT.(1) = C X 0.066	(pcf)		1787.8	1937.5	2050.9	2046.3
E	DRY UNIT WT. = D / [1 + (K/100)]	(pcf)		118.0	127.9	135.4	135.1
				108.2	114.7	119.2	118.9 ~~117.9~~

QA ID: DLE

NOTE: IF CALIBRATED MOLD OF 1/30 FT³ IS USED, THE WET DENSITY IS CALCULATED FROM THE WEIGHT OF SOIL. THE VOLUME OF THE MOLD AND THE CONVERSION FROM GRAMS TO POUNDS (I.E., CONVERSION FACTOR = (30 / 453.6) = 0.066). THE MOLD MUST BE CALIBRATED TO VERIFY A CAPACITY OF 1/30 ± 0.0005 FT³ ON INTERVALS NOT TO EXCEED 1000 TIMES THAT THE MOLD IS FILLED.

MOISTURE CONTENT — ASTM D 2216

	TARE NO.			#28	#234	#33	#305
F	WT. OF TARE	(grams)		8.2	8.3	8.1	8.3
G	WT. OF WET SOIL & TARE	(grams)		400.0	530.0	509.0	495.0
H	WT. OF DRY SOIL & TARE	(grams)		367.3	476.2	448.9	429.5
I	WT. OF WATER = G − H	(grams)		32.7	53.8	60.1	65.5
J	WT. DRY SOIL = H − F	(grams)		359.1	467.9	440.8	421.2
K	MOISTURE CONTENT = (I/J) X 100	(%)		9.1	11.5	13.6	15.6

QA ID: DLE

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SHEET NO. 1 OF 2

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FLUOR FERNALD

CORRECTION OF UNIT WEIGHT AND WATER CONTENT FOR SOILS CONTAINING OVERSIZE PARTICLES *(ASTM D 4718)*

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO PROJECT NO. G0134 TASK NO. 04.1

DESCRIPTION: Phase III DATE: 26 day Nov month 2001 year

MATERIAL TYPE: Low Perm Clay LP01-64 STD

Weight of Total Sample	=	36749.0
Weight of Oversize Fraction	=	663.0
Weight of Finer Fraction (- 3/8)	=	36086.0
Percentage of Oversize Fraction	= (P_C)	1.8
Percentage of Finer Fraction (- 3/8)	= (P_F)	98.2
Specific Gravity (Assumed)	= (G_M)	2.72

(W_F) =	Water Content - 3/8 , as decimal	=	0.14
(W_C) =	Water Content + 3/8 , as decimal	=	0.015
(δ_F) =	Dry Density of finer fraction	=	120.1
(δ_W) =	Unit Weight of Water	=	62.4

$$C_W=(W_F P_F)+(W_C P_C)$$

$C_w = 13.8\%$

$$C\delta_D=100\delta_F G_M \delta_W/(\delta_F P_C)+(G_M \delta_W P_F)$$

$C_{\delta D} = 120.1$ pcf

000614

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FLUOR FERNALD

4940

MOISTURE–DENSITY RELATIONSHIP

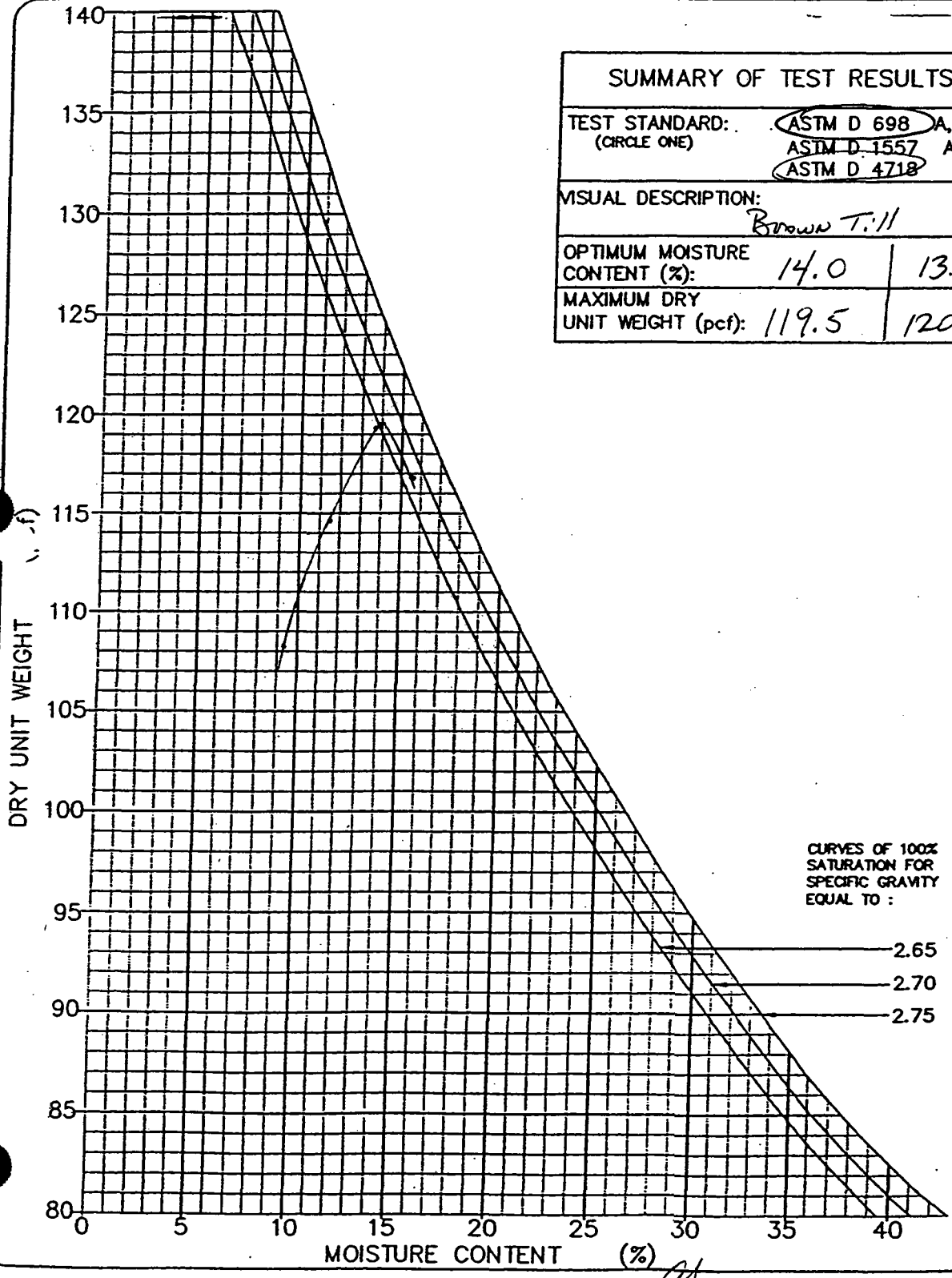
PROJECT: ON–SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO PROJECT NO.: 6-01341 TASK NO.: 041

DESCRIPTION: Phase III DATE: 26 day Nov. month 2001 year

MATERIAL TYPE: Low Perm Clay MATERIAL SOURCE: Stockpile 01-16 SAMPLE NO. LP-0164

SUMMARY OF TEST RESULTS			QA ID
TEST STANDARD: (CIRCLE ONE)	ASTM D 698 A, B, C ASTM D 1557 A, B, C ASTM D 4718		DLE
VISUAL DESCRIPTION:	Brown Till		CA
OPTIMUM MOISTURE CONTENT (%):	14.0	13.8	CA
MAXIMUM DRY UNIT WEIGHT (pcf):	119.5	120.1	CA



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FLUOR FERNALD

FIELD LABORATORY COMPACTION TEST

(ASTM D 1557 METHOD B)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO

PROJECT NO.: GQ1341 TASK NO.: 04.1

DESCRIPTION: PHASE III

DATE: 20 day Nov month 2001 year

MATERIAL TYPE: LOW PERM CLAY MATERIAL SOURCE: STOCKPILE 01-10 SAMPLE NO.: LP-01-64

THIS METHOD WILL BE USED IF THE MATERIAL RETAINED ON THE NO. 4-in. (4.75-mm) SIEVE IS GREATER THAN 20%, AND THE MATERIAL RETAINED ON THE NO. 3/8-in. (9.5-mm) SIEVE IS LESS THAN 20%.
ALL MATERIAL RETAINED ON THE NO. 3/8-in. (9.5-mm) SIEVE IS DISCARDED.
USE OVERSIZE CORRECTION IF MORE THAN 5% IS DISCARDED ACCORDING TO ASTM D 4718.
USE A 4-in. DIAMETER MOLD / 10-lb RAMMER / 18-in. DROP / 5 LAYERS / 25 BLOWS PER LAYER.

COMPACTION OF SOIL

QA ID: TBC

			13.74 lbs	13.91 lbs	14.08 lbs	13.97 lbs	
	WATER ADDED	(ml)	+2%	+4%	+6%	+8%	
A	WT. OF SOIL & MOLD	(grams)	6232.5	6309.6	6386.7	6336.8	
B	WT. OF MOLD	(grams)	4208.8	4208.8	4208.8	4208.8	
C	WT. OF SOIL = A − B	(grams)	2023.7	2100.8	2177.9	2128.0	
D	WET UNIT WT.(1) = C X 0.066	(pcf)	133.6	138.7	143.7	140.4	
E	DRY UNIT WT. = D / [1 + (K/100)]	(pcf)	124.3	127.0	129.0	124.0	

NOTE: IF CALIBRATED MOLD OF 1/30 FT^3 IS USED, THE WET DENSITY IS CALCULATED FROM THE WEIGHT OF SOIL, THE VOLUME OF THE MOLD AND THE CONVERSION FROM GRAMS TO POUNDS (I.E., CONVERSION FACTOR = (30 / 453.6) = 0.066). THE MOLD MUST BE CALIBRATED TO VERIFY A CAPACITY OF 1/30 ± 0.0005 FT^3 ON INTERVALS NOT TO EXCEED 1000 TIMES THAT THE MOLD IS FILLED.

MOISTURE CONTENT — ASTM D 2216

QA ID: TBC

	TARE NO.		#227	#233	#225	#212	
F	WT. OF TARE	(grams)	8.2	8.4	8.3	8.3	
G	WT. OF WET SOIL & TARE	(grams)	563.5	587.5	538.3	543.0	
H	WT. OF DRY SOIL & TARE	(grams)	525.0	538.9	484.1	480.3	
I	WT. OF WATER = G − H	(grams)	38.5	48.6	54.2	62.7	
J	WT. DRY SOIL = H − F	(grams)	516.8	530.5	475.8	472.0	
K	MOISTURE CONTENT = (I/J) X 100	(%)	7.4	9.2	11.4	13.3	
			1.074	1.092	1.114	1.133	

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FLUOR FERNALD

CORRECTION OF UNIT WEIGHT AND WATER CONTENT FOR SOILS CONTAINING OVERSIZE PARTICLES *(ASTM D 4718)*

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO PROJECT NO. 60134 TASK NO. 04.1

DESCRIPTION: PHASE III DATE: 21 day Nov month 2001 year

MATERIAL TYPE: LOW PERM CLAY

LP-01-64 MOD

Weight of Total Sample	=	36,749.0 g
Weight of Oversize Fraction	=	663.0 g
Weight of Finer Fraction (- 3/8)	=	36,086.0 g
Percentage of Oversize Fraction	= (P_C)	1.8
Percentage of Finer Fraction (- 3/8)	= (P_F)	98.2
Specific Gravity (Assumed)	= (G_M)	2.72

(W_F) =	Water Content - 3/8, as decimal	=	0.110
(W_C) =	Water Content + 3/8, as decimal	=	0.015
(δ_F) =	Dry Density of finer fraction	=	129.3
(δ_W) =	Unit Weight of Water	=	62.4

$$C_W=(W_F P_F)+(W_C P_C) = \boxed{10.87\%}$$

$$C\delta_D=100\delta_F G_M \delta_W/(\delta_F P_C)+(G_M \delta_W P_F) = \boxed{129.9 \text{ pcf}}$$

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FLUOR FERNALD

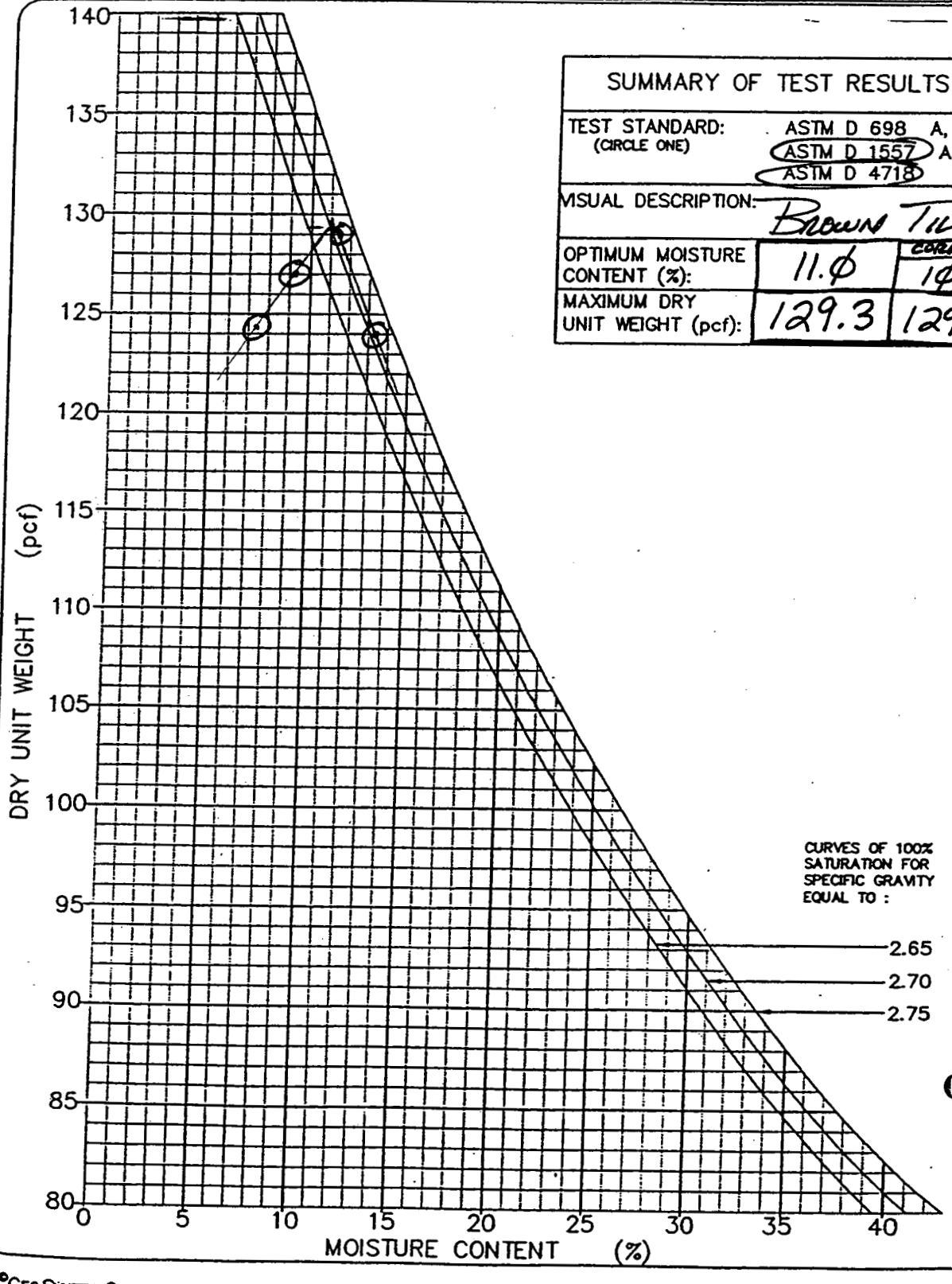
MOISTURE–DENSITY RELATIONSHIP

PROJECT: ON–SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO PROJECT NO.: GQ134 TASK NO.: 04.1

DESCRIPTION: PHASE III DATE: 21 day Nov month 2001 year

MATERIAL TYPE: LOW PERM CLAY MATERIAL SOURCE: STOCKPILE 01-10 SAMPLE NO.: LP-01-64



SUMMARY OF TEST RESULTS			QA ID
TEST STANDARD: (CIRCLE ONE)	ASTM D 698 A, B, C ASTM D 1557 A, B, C ASTM D 4718		TBC
VISUAL DESCRIPTION:	BROWN TILL		TBC
OPTIMUM MOISTURE CONTENT (%):	11.0	CORRECTED 10.8	TBC
MAXIMUM DRY UNIT WEIGHT (pcf):	129.3	129.9	TBC

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FLUOR FERNALD

FIELD LABORATORY COMPACTION TEST

(ASTM D 698 METHOD B)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO

DESCRIPTION: Phase III — PROJECT NO. 6Q134 — TASK NO.: 04.1

MATERIAL TYPE: Low Perm Clay — MATERIAL SOURCE: Stockpile 01-10 — DATE: 27 day Nov month 2001 year — SAMPLE NO. LP-01-65

THIS METHOD WILL BE USED IF THE MATERIAL RETAINED ON THE NO. 3/4-in. (19-mm) SIEVE IS LESS THAN 30%, IF THE MATERIAL RETAINED ON THE NO. 4 (4.75-mm) SIEVE IS GREATER THAN 20%, AND IF THE MATERIAL RETAINED ON THE NO. 3/8-in. (9.5-mm) SIEVE IS LESS THAN 20%.
ALL MATERIAL RETAINED ON THE NO. 3/8-in. (9.5-mm) SIEVE IS DISCARDED.
USE OVERSIZE CORRECTION IF MORE THAN 5% IS DISCARDED ACCORDING TO ASTM D 4718.
USE A 4-in. DIAMETER MOLD / 5.5-lb RAMMER / 12-in. DROP / 3 LAYERS / 25 BLOWS PER LAYER.

COMPACTION OF SOIL

	WATER ADDED	(ml)		13.30	13.62	13.80	13.73
A	WT. OF SOIL & MOLD	(grams)		4%	6%	8%	10%
B	WT. OF MOLD	(grams)		6032.9	6178.0	6259.7	6227.9
C	WT. OF SOIL = A − B	(grams)		4208.8	4208.8	4208.8	4208.8
D	WET UNIT WT.(1) = C X 0.066	(pcf)		1824.1	1969.2	2050.9	2019.1
E	DRY UNIT WT. = D / [1 + (K/100)]	(pcf)		120.4	130.0	135.4	133.3
				109.7	116.0	118.5	114.5 ~~113.7~~

QA ID: DLE

NOTE: IF CALIBRATED MOLD OF 1/30 FT³ IS USED, THE WET DENSITY IS CALCULATED FROM THE WEIGHT OF SOIL, THE VOLUME OF THE MOLD AND THE CONVERSION FROM GRAMS TO POUNDS (I.E., CONVERSION FACTOR = (30 / 453.6) = 0.066). THE MOLD MUST BE CALIBRATED TO VERIFY A CAPACITY OF 1/30 ± 0.0005 FT³ ON INTERVALS NOT TO EXCEED 1000 TIMES THAT THE MOLD IS FILLED.

MOISTURE CONTENT – ASTM D 2216

	TARE NO.			#227	#34	#105	#21
F	WT. OF TARE	(grams)		8.3	8.2	8.2	8.3
G	WT. OF WET SOIL & TARE	(grams)		506.7	503.9	588.3	513.6
H	WT. OF DRY SOIL & TARE	(grams)		462.4	450.5	515.9	442.4
I	WT. OF WATER = G − H	(grams)		44.3	53.4	72.4	71.2
J	WT. DRY SOIL = H − F	(grams)		454.1	442.3	507.7	~~414.1~~ 434.2
K	MOISTURE CONTENT = (I/J) X 100	(%)		9.8	12.1	14.3	~~17.2~~ 16.4

QA ID: DLE

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SHEET NO. 1 OF 3

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FLUOR FERNALD

CORRECTION OF UNIT WEIGHT AND WATER CONTENT FOR SOILS CONTAINING OVERSIZE PARTICLES

(ASTM D 4718)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO PROJECT NO. GQ134 TASK NO. 04.1

DESCRIPTION: Phase III DATE: 27 day Nov month 2001 year

MATERIAL TYPE: Low Perm Clay

Weight of Total Sample	=	21409.1
Weight of Oversize Fraction	=	556.0
Weight of Finer Fraction (- 3/8)	=	20848.1
Percentage of Oversize Fraction	= (P_C)	2.6
Percentage of Finer Fraction (- 3/8)	= (P_F)	97.4
Specific Gravity (Assumed)	= (G_M)	2.72

(W_F) =	Water Content - 3/8 , as decimal	=	0.14
(W_C) =	Water Content + 3/8 , as decimal	=	0.015
(δ_F) =	Dry Density of finer fraction	=	118.8
(δ_W) =	Unit Weight of Water	=	62.4

$$C_W=(W_F P_F)+(W_C P_C)$$

C_w = 13.7 %

$$C\delta_D=100\delta_F G_M \delta_W/(\delta_F P_C)+(G_M \delta_W P_F)$$

$C_{\delta D}$ = 119.7 pcf

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FLUOR FERNALD

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MOISTURE-DENSITY RELATIONSHIP

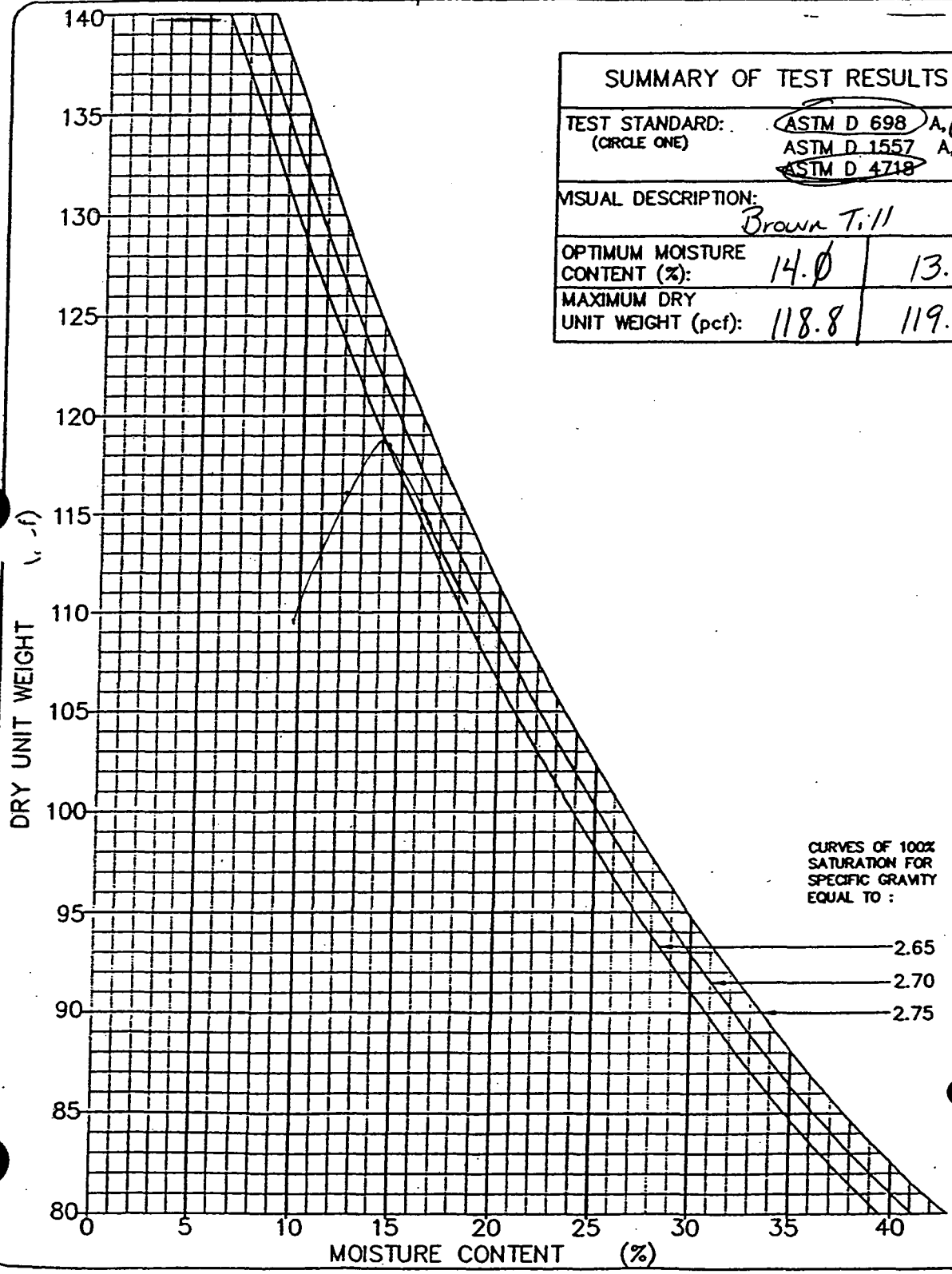
PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO PROJECT NO. GQ1341 TASK NO.: 04.1

DESCRIPTION: Phase III DATE: 27 day Nov month 2001 year

MATERIAL TYPE: Low Perm Clay MATERIAL SOURCE: Stockpile 01-16 SAMPLE NO.: LP-01.65

SUMMARY OF TEST RESULTS			QA ID
TEST STANDARD: (CIRCLE ONE)	ASTM D 698 A, B, C ASTM D 1557 A, B, C ASTM D 4718		DJE
VISUAL DESCRIPTION:	Brown Till		CL
OPTIMUM MOISTURE CONTENT (%):	14.0	13.7	CL
MAXIMUM DRY UNIT WEIGHT (pcf):	118.8	119.7	CL



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FLUOR DANIEL FERNALD

FIELD LABORATORY COMPACTION TEST (ASTM D 698 METHOD B)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO

DESCRIPTION: Phase II

MATERIAL TYPE: Low Perm Clay

PROJECT NO. 6Q1341 TASK NO.: 04.1

DATE: 25 day June month 2002 year

SAMPLE NO.: LP02-1

THIS METHOD WILL BE USED IF THE MATERIAL RETAINED ON THE NO. 3/4-in. (19-mm) SIEVE IS LESS THAN 30%, IF THE MATERIAL RETAINED ON THE NO. 4 (4.75-mm) SIEVE IS GREATER THAN 20%, AND IF THE MATERIAL RETAINED ON THE NO. 3/8-in. (9.5-mm) SIEVE IS LESS THAN 20%.
ALL MATERIAL RETAINED ON THE NO. 3/8-in. (9.5-mm) SIEVE IS DISCARDED.
USE OVERSIZE CORRECTION IF MORE THAN 5% IS DISCARDED ACCORDING TO ASTM D 4718.
USE A 4-in. DIAMETER MOLD / 5.5-lb RAMMER / 12-in. DROP / 3 LAYERS / 25 BLOWS PER LAYER.

COMPACTION OF SOIL

QA ID: DZE

			13.63		13.51	13.68	13.92
	WATER ADDED	(ml)	12%		6%	8%	10%
A	WT. OF SOIL & MOLD	(grams)	6182.6		6128.1	6205.2	6223.4
B	WT. OF MOLD	(grams)	4204.5	4204.5	4204.5	4204.5	4204.5
C	WT. OF SOIL = A − B	(grams)	1978.1		1923.6	2000.7	2018.9
D	WET UNIT WT.(1) = C X 0.066	(pcf)	130.6		127.0	132.0	133.2
E	DRY UNIT WT. = D / [1 + (K/100)]	(pcf)	109.4		112.4	114.9 ~~114.8~~ ②	114.2 ~~114.1~~ ②

NOTE: IF CALIBRATED MOLD OF 1/30 FT^3 IS USED, THE WET DENSITY IS CALCULATED FROM THE WEIGHT OF SOIL, THE VOLUME OF THE MOLD AND THE CONVERSION FROM GRAMS TO POUNDS (I.E., CONVERSION FACTOR = (30 / 453.6) = 0.066). THE MOLD MUST BE CALIBRATED TO VERIFY A CAPACITY OF 1/30 ± 0.0005 FT^3 ON INTERVALS NOT TO EXCEED 1000 TIMES THAT THE MOLD IS FILLED.

MOISTURE CONTENT – ASTM D 2216

QA ID: [illegible]

	TARE NO.		#65		#114	#18	#616
F	WT. OF TARE	(grams)	8.1		8.4	8.4	8.2
G	WT. OF WET SOIL & TARE	(grams)	439.8		478.0	449.0	474.7
H	WT. OF DRY SOIL & TARE	(grams)	371.2		423.9	391.7	407.9
I	WT. OF WATER = G − H	(grams)	68.6		54.1	57.3	66.8
J	WT. DRY SOIL = H − F	(grams)	363.1		415.5	383.3	399.7
K	MOISTURE CONTENT = (I/J) X 100	(%)	18.9		13.02	14.9 ~~14.95~~ ②	16.71
			1.189		1.1302	1.1493	

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SHEET NO. 1 OF 3

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FLUOR FERNALD

4940

CORRECTION OF UNIT WEIGHT AND WATER CONTENT FOR SOILS CONTAINING OVERSIZE PARTICLES

(ASTM D 4718)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO PROJECT NO. G0134 TASK NO. 04.1

DESCRIPTION: Phase IV DATE: 26 day June month 2002 year

MATERIAL TYPE: Clay liner and Cap LP02-1 Standard

Weight of Total Sample	=	~~21866.5~~ 39054.7
Weight of Oversize Fraction	=	~~465.6~~ 1378.6
Weight of Finer Fraction (- 3/8)	=	~~21400.9~~ 37676.1
Percentage of Oversize Fraction	= (P_C)	~~2.1~~ 3.5
Percentage of Finer Fraction (- 3/8)	= (P_F)	~~97.9~~ 96.5
Specific Gravity (Assumed)	= (G_M)	2.72

(W_F) =	Water Content - 3/8 , as decimal	=	0.156
(W_C) =	Water Content + 3/8 , as decimal	=	0.015
(δ_F) =	Dry Density of finer fraction	=	115.8
(δ_W) =	Unit Weight of Water	=	2.72

$$C_W=(W_F P_F)+(W_C P_C)$$

~~Cw = 15.3%~~ ~~Cw = 14.9%~~

Cw = 15.1%

$$C\delta_D=100\delta_F G_M \delta_W/(\delta_F P_C)+(G_M \delta_W P_F)$$

~~Cδ = 116.6 pcf~~

Cδ = 117.1

000623

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FLUOR FERNALD

4940

MOISTURE-DENSITY RELATIONSHIP

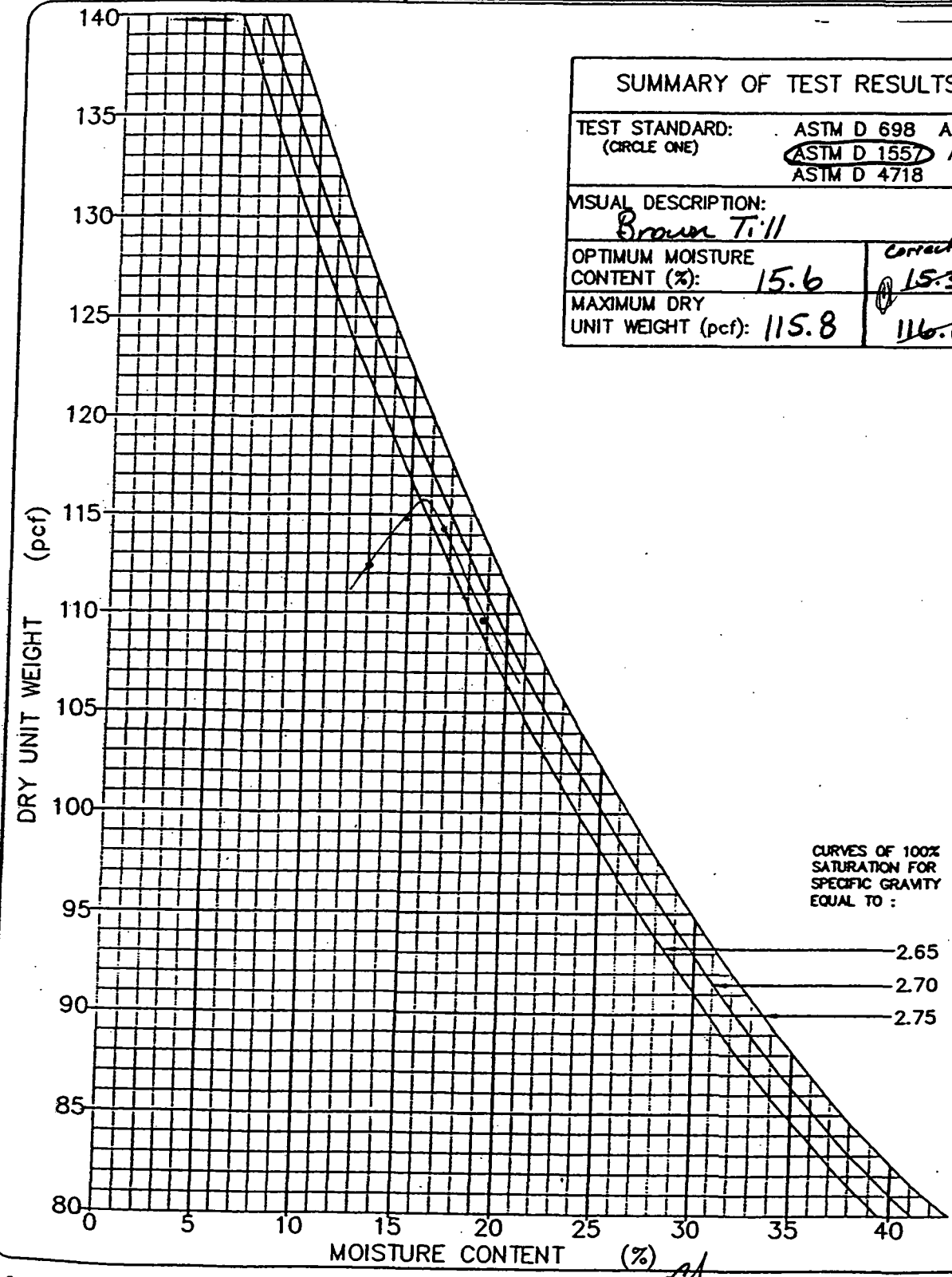
PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO PROJECT NO.: GQ1341 TASK NO.: 04.1

DESCRIPTION: Phase IV DATE: 26 day June month 2002 year

MATERIAL TYPE: Low Perm Clay MATERIAL SOURCE: STOCKPILE 02-1 SAMPLE NO.: LP02-1

SUMMARY OF TEST RESULTS		QA ID
TEST STANDARD: (CIRCLE ONE) ASTM D 698 A, B, C; ASTM D 1557 A, B, C; ASTM D 4718		CS
VISUAL DESCRIPTION: Brown Till		CS
OPTIMUM MOISTURE CONTENT (%): 15.6	Corrected 15.3 15.1	CS
MAXIMUM DRY UNIT WEIGHT (pcf): 115.8	116.6 117.1	CS



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FLUOR FERNALD

FIELD LABORATORY COMPACTION TEST

(ASTM D 1557 METHOD B)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO

DESCRIPTION: Phase III

PROJECT NO.: 6Q1341 TASK NO.: 004.1

DATE: 25 day June month 2002 year

MATERIAL TYPE: Low Perm Clay MATERIAL SOURCE: borrow area SAMPLE NO.: LP02-1

THIS METHOD WILL BE USED IF THE MATERIAL RETAINED ON THE NO. 4-in. (4.75-mm) SIEVE IS GREATER THAN 20%, AND THE MATERIAL RETAINED ON THE NO. 3/8-in. (9.5-mm) SIEVE IS LESS THAN 20%.
ALL MATERIAL RETAINED ON THE NO. 3/8-in. (9.5-mm) SIEVE IS DISCARDED.
USE OVERSIZE CORRECTION IF MORE THAN 5% IS DISCARDED ACCORDING TO ASTM D 4718.
USE A 4-in. DIAMETER MOLD / 10-lb RAMMER / 18-in. DROP / 5 LAYERS / 25 BLOWS PER LAYER.

COMPACTION OF SOIL

QA ID: K S

			2% 13.71	4% 13.90	6% 13.96	8% 13.87	
	WATER ADDED	(ml)	50%	100%	150%	200%	
A	WT. OF SOIL & MOLD	(grams)	6218.9	6305.0	6332.3	6291.4	
B	WT. OF MOLD	(grams)	4204.5	4204.5	4204.5	4204.5	
C	WT. OF SOIL = A − B	(grams)	2014.4	2100.5	2127.8	2086.9	
D	WET UNIT WT.(1) = C X 0.066	(pcf)	133.0	138.6	140.4	137.7	
E	DRY UNIT WT. = D / [1 + (K/100)]	(pcf)	122.8 ~~122.9~~	126.0 ~~125.9~~	125.1	120.5	

NOTE: IF CALIBRATED MOLD OF 1/30 FT³ IS USED, THE WET DENSITY IS CALCULATED FROM THE WEIGHT OF SOIL, THE VOLUME OF THE MOLD AND THE CONVERSION FROM GRAMS TO POUNDS (I.E., CONVERSION FACTOR = (30 / 453.6) = 0.066). THE MOLD MUST BE CALIBRATED TO VERIFY A CAPACITY OF 1/30 ± 0.0005 FT³ ON INTERVALS NOT TO EXCEED 1000 TIMES THAT THE MOLD IS FILLED.

MOISTURE CONTENT — ASTM D 2216

QA ID: DJS

	TARE NO.		103	110	616	#18	
F	WT. OF TARE	(grams)	8.3	8.0	8.2	8.4	
G	WT. OF WET SOIL & TARE	(grams)	332.9	363.3	249.2	292.1	
H	WT. OF DRY SOIL & TARE	(grams)	308.2	330.8	222.9	256.5	
I	WT. OF WATER = G − H	(grams)	24.7	32.5	26.3	35.6	
J	WT. DRY SOIL = H − F	(grams)	299.9	322.8	214.7	248.1	
K	MOISTURE CONTENT = (I/J) X 100	(%)	8.2	10.1	12.2	14.3	
			1.082	1.101	1.122	1.113	

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FLUOR FERNALD

CORRECTION OF UNIT WEIGHT AND WATER CONTENT FOR SOILS CONTAINING OVERSIZE PARTICLES (ASTM D 4718)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO PROJECT NO. GQ134 TASK NO. 04.1

DESCRIPTION: Phase IV DATE: 26 day June month 2002 year

MATERIAL TYPE: Clay liner and Cap LP02-1 modified

Weight of Total Sample	=	~~21866.5 g~~	39054.7
Weight of Oversize Fraction	=	~~465.6~~	1378.6
Weight of Finer Fraction (- 3/8)	=	~~21400.9~~	37676.1
Percentage of Oversize Fraction	= (P_C)	~~2.1~~	3.5
Percentage of Finer Fraction (- 3/8)	= (P_F)	~~97.9~~	96.5
Specific Gravity (Assumed)	= (G_M)	2.72	

(W_F) =	Water Content - 3/8 , as decimal	=	11.2
(W_C) =	Water Content + 3/8 , as decimal	=	0.015
(δ_F) =	Dry Density of finer fraction	=	127.1
(δ_W) =	Unit Weight of Water	=	62.4

$$C_W=(W_F P_F)+(W_C P_C)$$

~~$C_w = 11.0\%$~~ $C_w = 10.9\%$

$$C\delta_D=100\delta_F G_M \delta_W/(\delta_F P_C)+(G_M \delta_W P_F)$$

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~~$C_{\delta D} = 127.8$ pcf~~ $C_{\delta D} = 128.2$ pcf

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FLUOR FERNALD 4940

MOISTURE-DENSITY RELATIONSHIP

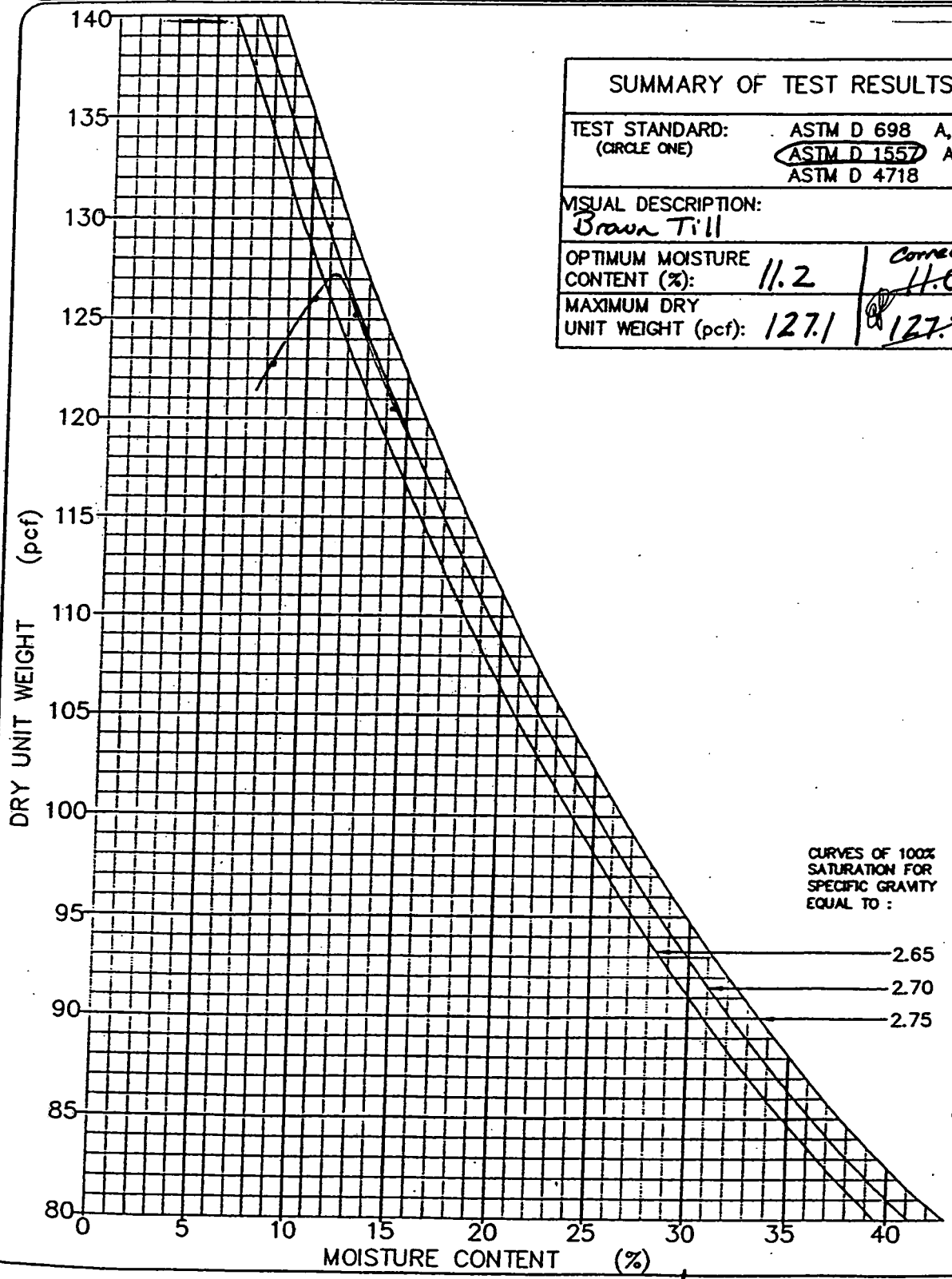
PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO PROJECT NO.: GQ1341 TASK NO.: 04.1

DESCRIPTION: Phase IV DATE: 26 day June month 2002 year

MATERIAL TYPE: Clay liner & cap MATERIAL SOURCE: STOCKPILE 02-1 SAMPLE NO.: ~~LP~~02-1

SUMMARY OF TEST RESULTS			QA ID
TEST STANDARD: (CIRCLE ONE)	ASTM D 698 A, B, C ASTM D 1557 A, B C ASTM D 4718		CJ
VISUAL DESCRIPTION: Brown Till			CJ
OPTIMUM MOISTURE CONTENT (%):	11.2	Corrected ~~11.0~~ 10.9	CJ
MAXIMUM DRY UNIT WEIGHT (pcf):	127.1	~~127.8~~ 128.2	CJ



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FLUOR DANIEL FERNALD

FIELD LABORATORY COMPACTION TEST (ASTM D 698 METHOD B)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO

DESCRIPTION: Phase II

MATERIAL TYPE: Low Perm Clay

PROJECT NO. 691341 TASK NO.: 04.1

DATE: 27 day June month 2002 year

SAMPLE NO.: LP02-2

THIS METHOD WILL BE USED IF THE MATERIAL RETAINED ON THE NO. 3/4-in. (19-mm) SIEVE IS LESS THAN 30%, IF THE MATERIAL RETAINED ON THE NO. 4 (4.75-mm) SIEVE IS GREATER THAN 20%, AND IF THE MATERIAL RETAINED ON THE NO. 3/8-in. (9.5-mm) SIEVE IS LESS THAN 20%.
ALL MATERIAL RETAINED ON THE NO. 3/8-in. (9.5-mm) SIEVE IS DISCARDED.
USE OVERSIZE CORRECTION IF MORE THAN 5% IS DISCARDED ACCORDING TO ASTM D 4718.
USE A 4-in. DIAMETER MOLD / 5.5-lb RAMMER / 12-in. DROP / 3 LAYERS / 25 BLOWS PER LAYER.

13.54

COMPACTION OF SOIL

QA ID: DLE

			13.37	13.55	13.67	13.62	
	WATER ADDED	(ml)	100 mL 4%	150 mL 6%	200 mL 8%	250 mL 10%	12%
A	WT. OF SOIL & MOLD	(grams)	6064.6	6146.3	6200.7	6178.0	6141.7
B	WT. OF MOLD	(grams)	4204.5	4204.5	4204.5	4204.5	4204.5
C	WT. OF SOIL = A - B	(grams)	1860.1	1941.8	1996.2	1973.5	1937.2
D	WET UNIT WT.(1) = C X 0.066	(pcf)	122.8	128.2	131.7	130.3	127.9
E	DRY UNIT WT. = D / [1 + (K/100)]	(pcf)	110.4	112.7	113.4	109.8	105.9

NOTE: IF CALIBRATED MOLD OF 1/30 FT^3 IS USED, THE WET DENSITY IS CALCULATED FROM THE WEIGHT OF SOIL. THE VOLUME OF THE MOLD AND THE CONVERSION FROM GRAMS TO POUNDS (I.E., CONVERSION FACTOR = (30 / 453.6) = 0.066). THE MOLD MUST BE CALIBRATED TO VERIFY A CAPACITY OF 1/30 ± 0.0005 FT^3 ON INTERVALS NOT TO EXCEED 1000 TIMES THAT THE MOLD IS FILLED.

MOISTURE CONTENT - ASTM D 2216

QA ID: DLE

	TARE NO.		#614	#614	#18	#616	#103
F	WT. OF TARE	(grams)	8.2	8.3	8.3	8.3	8.4
G	WT. OF WET SOIL & TARE	(grams)	417.7	498.7	440.1	454.2	511.1
H	WT. OF DRY SOIL & TARE	(grams)	376.3	439.1	380.1	384.1	424.4
I	WT. OF WATER = G - H	(grams)	41.4	59.6	60.0	70.1	86.7
J	WT. DRY SOIL = H - F	(grams)	368.1	430.8	371.8	375.8	416.0
K	MOISTURE CONTENT = (I/J) X 100	(%)	11.2	13.8	16.1	18.7	20.8
			1.117	1.138	1.161	1.187	

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FLUOR FERNALD

CORRECTION OF UNIT WEIGHT AND WATER CONTENT FOR SOILS CONTAINING OVERSIZE PARTICLES

(ASTM D 4718)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO PROJECT NO. 69134 TASK NO. 04.1

DESCRIPTION: Phase IV DATE: 2 day July month 2002 year

MATERIAL TYPE: Clay Liner LP02-2

Weight of Total Sample	=	21866.5
Weight of Oversize Fraction	=	465.6
Weight of Finer Fraction (- 3/8)	=	21400.9
Percentage of Oversize Fraction	= (P_C)	2.1
Percentage of Finer Fraction (- 3/8)	= (P_F)	97.9
Specific Gravity (Assumed)	= (G_M)	2.72

(W_F) =	Water Content - 3/8 , as decimal	=	0.154
(W_C) =	Water Content + 3/8 , as decimal	=	0.015
(δ_F) =	Dry Density of finer fraction	=	114.0
(δ_W) =	Unit Weight of Water	=	62.4

$$C_W=(W_F P_F)+(W_C P_C)$$

$C_W = 15.1\ \%$

$$C\delta_D=100\delta_F G_M \delta_W/(\delta_F P_C)+(G_M \delta_W P_F)$$

$C_{\delta D} = 114.8$ pcf

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FLUOR FERNALD

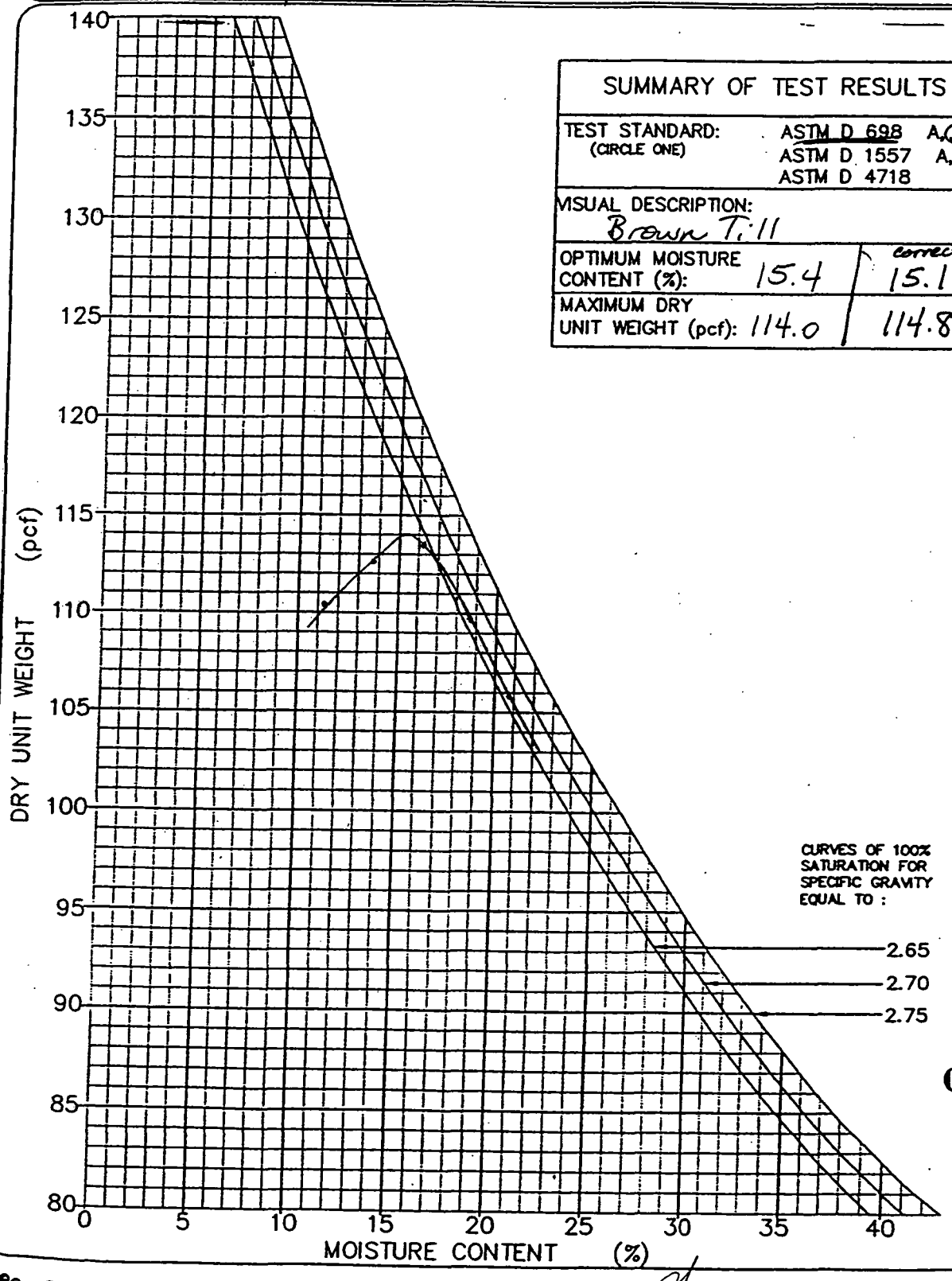
MOISTURE-DENSITY RELATIONSHIP

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO PROJECT NO.: GQ1341 TASK NO.: 04.1

DESCRIPTION: Phase IV DATE: 2 day July month 2002 year

MATERIAL TYPE: Clay Liner MATERIAL SOURCE: STOCKPILE-02-1 SAMPLE NO.: LP02-2



SUMMARY OF TEST RESULTS			QA ID
TEST STANDARD: (CIRCLE ONE)	ASTM D 698 A, (B), C ASTM D 1557 A, B, C ASTM D 4718		CL
VISUAL DESCRIPTION: Brown Till			CL
OPTIMUM MOISTURE CONTENT (%):	15.4	corrected 15.1	CL
MAXIMUM DRY UNIT WEIGHT (pcf):	114.0	114.8	CL

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FLUOR DANIEL FERNALD

FIELD LABORATORY COMPACTION TEST (ASTM D 698 METHOD B)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO

DESCRIPTION: Phase II

MATERIAL TYPE: Low Perm Clay

PROJECT NO. 691341 TASK NO.: 04.1

DATE: 01 day July month 2002 year

SAMPLE NO.: LP02-3

THIS METHOD WILL BE USED IF THE MATERIAL RETAINED ON THE NO. 3/4-in. (19-mm) SIEVE IS LESS THAN 30%, IF THE MATERIAL RETAINED ON THE NO. 4 (4.75-mm) SIEVE IS GREATER THAN 20%, AND IF THE MATERIAL RETAINED ON THE NO. 3/8-in. (9.5-mm) SIEVE IS LESS THAN 20%.
ALL MATERIAL RETAINED ON THE NO. 3/8-in. (9.5-mm) SIEVE IS DISCARDED.
USE OVERSIZE CORRECTION IF MORE THAN 5% IS DISCARDED ACCORDING TO ASTM D 4718.
USE A 4-in. DIAMETER MOLD / 5.5-lb RAMMER / 12-in. DROP / 3 LAYERS / 25 BLOWS PER LAYER.

COMPACTION OF SOIL

QA ID: DLE

	WATER ADDED	(ml)		13.60 6%	13.72 8%	13.64 10%	13.45 4%
A	WT. OF SOIL & MOLD	(grams)		6168.0	6223.4	6187.1	6100.9
B	WT. OF MOLD	(grams)	4204.5	4204.5	4204.5	4204.5	4204.5
C	WT. OF SOIL = A - B	(grams)		1964.5	2018.9	1982.6	1896.4
D	WET UNIT WT.(1) = C X 0.066	(pcf)		129.7	133.2	130.9	125.2
E	DRY UNIT WT. = D / [1 + (K/100)]	(pcf)		114.4	~~114.6~~ 114.7	~~111.1~~ 111.0	112.0

NOTE: IF CALIBRATED MOLD OF 1/30 FT^3 IS USED, THE WET DENSITY IS CALCULATED FROM THE WEIGHT OF SOIL, THE VOLUME OF THE MOLD AND THE CONVERSION FROM GRAMS TO POUNDS (I.E., CONVERSION FACTOR = (30 / 453.6) = 0.066). THE MOLD MUST BE CALIBRATED TO VERIFY A CAPACITY OF 1/30 ± 0.0005 FT^3 ON INTERVALS NOT TO EXCEED 1000 TIMES THAT THE MOLD IS FILLED.

MOISTURE CONTENT - ASTM D 2216

QA ID: DLE

	TARE NO.			#679	#630	#675	#638
F	WT. OF TARE	(grams)		8.6	8.1	8.3	8.2
G	WT. OF WET SOIL & TARE	(grams)		489.9	479.3	534.0	490.3
H	WT. OF DRY SOIL & TARE	(grams)		433.2	413.6	454.3	439.6
I	WT. OF WATER = G - H	(grams)		56.7	65.7	79.7	50.7
J	WT. DRY SOIL = H - F	(grams)		425.1	405.5	446.0	431.4
K	MOISTURE CONTENT = (I/J) X 100	(%)		13.33	16.20	17.86	11.75

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SHEET NO. 1 OF 3

13.33 16.20 17.86 11.75

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FLUOR FERNALD

CORRECTION OF UNIT WEIGHT AND WATER CONTENT FOR SOILS CONTAINING OVERSIZE PARTICLES *(ASTM D 4718)*

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO PROJECT NO. GQ1341 TASK NO. 04.1

DESCRIPTION: Phase IV DATE: 2 day July month 2002 year

MATERIAL TYPE: Clay Liner LP02-3

Weight of Total Sample	=	41658.1
Weight of Oversize Fraction	=	1542.7
Weight of Finer Fraction (- 3/8)	=	40115.4
Percentage of Oversize Fraction	= (P_C)	3.7
Percentage of Finer Fraction (- 3/8)	= (P_F)	96.3
Specific Gravity (Assumed)	= (G_M)	2.72

(W_F)	=	Water Content - 3/8 , as decimal	=	0.151
(W_C)	=	Water Content + 3/8 , as decimal	=	0.015
(δ_F)	=	Dry Density of finer fraction	=	116.3
(δ_W)	=	Unit Weight of Water	=	62.4

$$C_W=(W_F P_F)+(W_C P_C)$$

$C_W = 14.6\%$

$$C\delta_D=100\delta_F G_M \delta_W/(\delta_F P_C)+(G_M \delta_W P_F)$$

$C_{\delta D} = 117.7$ pcf

GEOSYNTEC CONSULTANTS

FLUOR FERNALD

4940

MOISTURE–DENSITY RELATIONSHIP

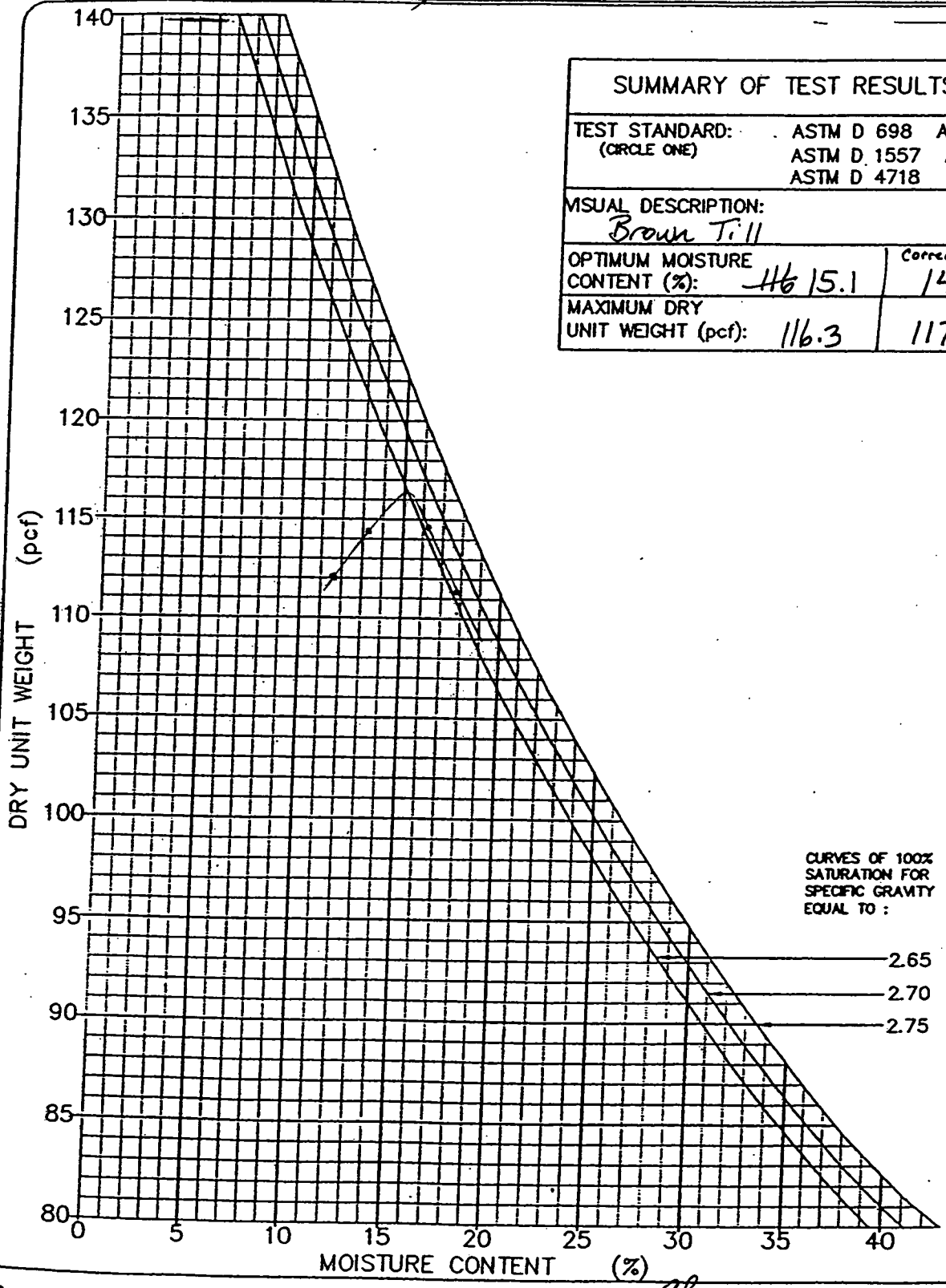
PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO PROJECT NO.: GQ1341 TASK NO.: 041

DESCRIPTION: Phase IV DATE: 2 day July month 2002 year

MATERIAL TYPE: Compacted Clay MATERIAL SOURCE: STOCKPILE 02-1 SAMPLE NO.: LP02-3

SUMMARY OF TEST RESULTS			QA ID
TEST STANDARD: (CIRCLE ONE)	ASTM D 698 A, (B) C ASTM D 1557 A, B, C ASTM D 4718		CL
VISUAL DESCRIPTION: Brown Till			CL
OPTIMUM MOISTURE CONTENT (%):	~~16~~ 15.1	Corrected 14.6	CL
MAXIMUM DRY UNIT WEIGHT (pcf):	116.3	117.7	CL



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FLUOR FERNALD

FIELD LABORATORY COMPACTION TEST

(ASTM D 1557 METHOD B)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO

PROJECT NO.: GQ1341 TASK NO.: 04.1

DESCRIPTION: Phase IV

DATE: 01 day July month 2002 year

MATERIAL TYPE: Low Perm Clay MATERIAL SOURCE: Borrow Area SAMPLE NO.: LP02-3

THIS METHOD WILL BE USED IF THE MATERIAL RETAINED ON THE NO. 4-in. (4.75-mm) SIEVE IS GREATER THAN 20%, AND THE MATERIAL RETAINED ON THE NO. 3/8-in. (9.5-mm) SIEVE IS LESS THAN 20%.
ALL MATERIAL RETAINED ON THE NO. 3/8-in. (9.5-mm) SIEVE IS DISCARDED.
USE OVERSIZE CORRECTION IF MORE THAN 5% IS DISCARDED ACCORDING TO ASTM D 4718.
USE A 4-in. DIAMETER MOLD / 10-lb RAMMER / 18-in. DROP / 5 LAYERS / 25 BLOWS PER LAYER.

COMPACTION OF SOIL

QA ID: DLE

			13.67	13.87	13.90	13.84	
	WATER ADDED	(ml)	2%	4%	6%	8%	
A	WT. OF SOIL & MOLD	(grams)	6200.7	6291.4	6305.0	6277.8	
B	WT. OF MOLD	(grams)	4204.5	4204.5	4204.5	4204.5	
C	WT. OF SOIL = A − B	(grams)	1996.2	2086.9	2100.5	2073.3	
D	WET UNIT WT.(1) = C X 0.066	(pcf)	131.7	137.7	138.6	136.8	
E	DRY UNIT WT. = D / [1 + (K/100)]	(pcf)	120.6 ~~120.5~~	123.9	121.9	~~118.6~~ 118.7	

NOTE: IF CALIBRATED MOLD OF 1/30 FT^3 IS USED, THE WET DENSITY IS CALCULATED FROM THE WEIGHT OF SOIL, THE VOLUME OF THE MOLD AND THE CONVERSION FROM GRAMS TO POUNDS (I.E., CONVERSION FACTOR = (30 / 453.6) = 0.066). THE MOLD MUST BE CALIBRATED TO VERIFY A CAPACITY OF 1/30 ± 0.0005 FT^3 ON INTERVALS NOT TO EXCEED 1000 TIMES THAT THE MOLD IS FILLED.

MOISTURE CONTENT – ASTM D 2216

QA ID: DLE

	TARE NO.		#202	#65	#230	#200	
F	WT. OF TARE	(grams)	8.2	8.2	8.3	8.2	
G	WT. OF WET SOIL & TARE	(grams)	433.5	497.5	452.7	420.1	
H	WT. OF DRY SOIL & TARE	(grams)	397.4	448.3	399.2	365.4	
I	WT. OF WATER = G − H	(grams)	36.1	49.2	53.5	54.7	
J	WT. DRY SOIL = H − F	(grams)	389.2	440.1	390.9	357.2	
K	MOISTURE CONTENT = (I/J) X 100	(%)	9.27	11.17	13.68	15.31	
			1.0927	1.1117	1.1368	1.1531	

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FLUOR FERNALD 4940

CORRECTION OF UNIT WEIGHT AND WATER CONTENT FOR SOILS CONTAINING OVERSIZE PARTICLES *(ASTM D 4718)*

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO PROJECT NO. GQ1341 TASK NO. 04.1

DESCRIPTION: Phase IV DATE: 1 day July month 2002 year

MATERIAL TYPE: Clay Liner LP02-3 MOD

Weight of Total Sample	=	41658.1
Weight of Oversize Fraction	=	1542.7
Weight of Finer Fraction (- 3/8)	=	40115.4
Percentage of Oversize Fraction	= (P_C)	3.7
Percentage of Finer Fraction (- 3/8)	= (P_F)	96.3
Specific Gravity (Assumed)	= (G_M)	2.72

(W_F) =	Water Content - 3/8 , as decimal	=	0.12
(W_C) =	Water Content + 3/8 , as decimal	=	0.015
(δ_F) =	Dry Density of finer fraction	=	124.5
(δ_W) =	Unit Weight of Water	=	62.4

$$C_W = (W_F P_F) + (W_C P_C)$$

$C_W = 11.6\%$

$$C\delta_D = 100\delta_F G_M \delta_W / (\delta_F P_C) + (G_M \delta_W P_F)$$

$C_{\delta D} = 127.4$ pcf

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FLUOR FERNALD

4940

MOISTURE-DENSITY RELATIONSHIP

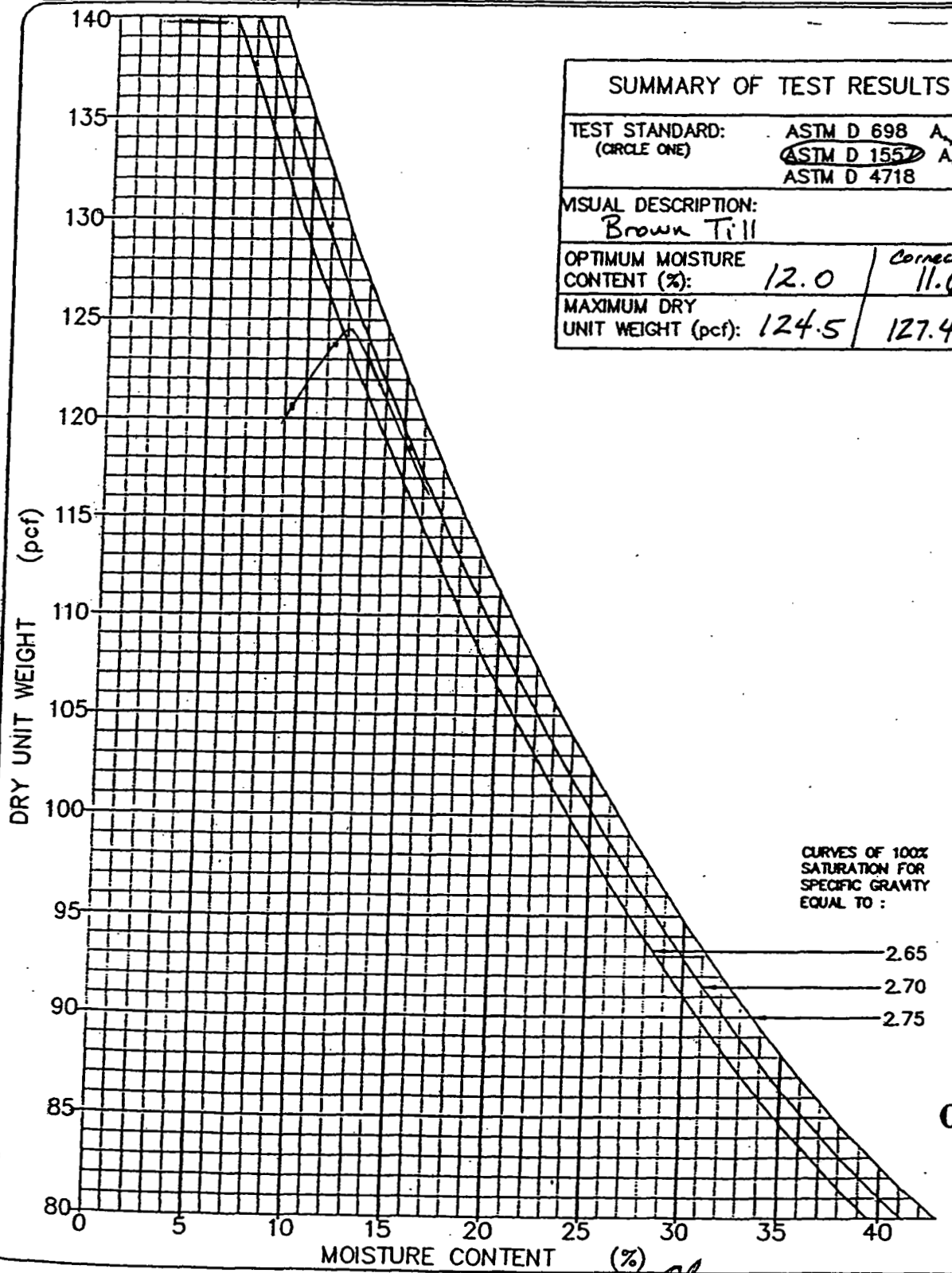
PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO PROJECT NO.: GQ1341 TASK NO.: 04.1

DESCRIPTION: Phase IV DATE: 2 day July month 2002 year

MATERIAL TYPE: Clay Liner MATERIAL SOURCE: STOCKPILE 02-1 SAMPLE NO.: LP02-3

SUMMARY OF TEST RESULTS			QA ID
TEST STANDARD: (CIRCLE ONE)	ASTM D 698 A, B, C ASTM D 1557 A, B, C ASTM D 4718		CS
VISUAL DESCRIPTION: Brown Till			CS
OPTIMUM MOISTURE CONTENT (%):	12.0	Corrected 11.6	CS
MAXIMUM DRY UNIT WEIGHT (pcf):	124.5	127.4	CS



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FLUOR DANIEL FERNALD

FIELD LABORATORY COMPACTION TEST (ASTM D 698 METHOD B)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO

DESCRIPTION: Phase IV

MATERIAL TYPE: Low Perm Clay

PROJECT NO. 69134 TASK NO.: 04.1

DATE: 02 day July month 2002 year

SAMPLE NO.: LP02-4

THIS METHOD WILL BE USED IF THE MATERIAL RETAINED ON THE NO. 3/4-in. (19-mm) SIEVE IS LESS THAN 30%, IF THE MATERIAL RETAINED ON THE NO. 4 (4.75-mm) SIEVE IS GREATER THAN 20%, AND IF THE MATERIAL RETAINED ON THE NO. 3/8-in. (9.5-mm) SIEVE IS LESS THAN 20%.
ALL MATERIAL RETAINED ON THE NO. 3/8-in. (9.5-mm) SIEVE IS DISCARDED.
USE OVERSIZE CORRECTION IF MORE THAN 5% IS DISCARDED ACCORDING TO ASTM D 4718.
USE A 4-in. DIAMETER MOLD / 5.5-lb RAMMER / 12-in. DROP / 3 LAYERS / 25 BLOWS PER LAYER.

COMPACTION OF SOIL

QA ID: DLE

			13.55	13.32	13.58	13.90	13.68
	WATER ADDED	(ml)	12%	4%	150 ml 6%	8%	10%
A	WT. OF SOIL & MOLD	(grams)	6146.3	6042.0	6159.9	6214.3	6205.2
B	WT. OF MOLD	(grams)	4204.5	4204.5	4204.5	4204.5	4204.5
C	WT. OF SOIL = A − B	(grams)	1941.8	1837.5	1955.4	2009.8	2000.7
D	WET UNIT WT.(1) = C X 0.066	(pcf)	128.2	121.3	129.1	132.6	132.0
E	DRY UNIT WT. = D / [1 + (K/100)]	(pcf)	107.6	109.1 ~~108.1~~	113.9	114.9	112.6

NOTE: IF CALIBRATED MOLD OF 1/30 FT^3 IS USED, THE WET DENSITY IS CALCULATED FROM THE WEIGHT OF SOIL, THE VOLUME OF THE MOLD AND THE CONVERSION FROM GRAMS TO POUNDS (I.E., CONVERSION FACTOR = (30 / 453.6) = 0.066). THE MOLD MUST BE CALIBRATED TO VERIFY A CAPACITY OF 1/30 ± 0.0005 FT^3 ON INTERVALS NOT TO EXCEED 1000 TIMES THAT THE MOLD IS FILLED.

MOISTURE CONTENT – ASTM D 2216

QA ID: DLE

	TARE NO.		#52	#107	#616	#605	#107
F	WT. OF TARE	(grams)	8.1	8.0	8.2	8.3	8.1
G	WT. OF WET SOIL & TARE	(grams)	512.9	509.2	477.4	498.3	567.9
H	WT. OF DRY SOIL & TARE	(grams)	432.1	459.1	422.5	432.8	485.8
I	WT. OF WATER = G − H	(grams)	80.8	50.1	54.9	65.5	82.1
J	WT. DRY SOIL = H − F	(grams)	424.0	451.1 ~~409.0~~	414.3	424.5	477.7
K	MOISTURE CONTENT = (I/J) X 100	(%)	19.1	11.1 ~~12.5~~	13.3	15.4	17.2
			1.191	1.1225	1.133	1.154	1.172

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FLUOR FERNALD

CORRECTION OF UNIT WEIGHT AND WATER CONTENT FOR SOILS CONTAINING OVERSIZE PARTICLES *(ASTM D 4718)*

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO PROJECT NO. 69134 TASK NO. 04.1

DESCRIPTION: Phase IV DATE: 8 day July month 2002 year

MATERIAL TYPE: Clay Liner LB02-4

Weight of Total Sample	=	23507.7
Weight of Oversize Fraction	=	262.1
Weight of Finer Fraction (- 3/8)	=	23245.6
Percentage of Oversize Fraction	= (P_C)	1.1
Percentage of Finer Fraction (- 3/8)	= (P_F)	98.9
Specific Gravity (Assumed)	= (G_M)	2.72

(W_F) =	Water Content - 3/8 , as decimal	=	0.150
(W_C) =	Water Content + 3/8 , as decimal	=	0.015
(δ_F) =	Dry Density of finer fraction	=	116.0
(δ_W) =	Unit Weight of Water	=	62.4

$$C_W=(W_F P_F)+(W_C P_C)$$

$C_W = 14.8\%$

$$C\delta_D=100\delta_F G_M \delta_W/(\delta_F P_C)+(G_M \delta_W P_F)$$

$C_{\delta D} = 116.4$ pcf

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FLUOR FERNALD

4940

MOISTURE-DENSITY RELATIONSHIP

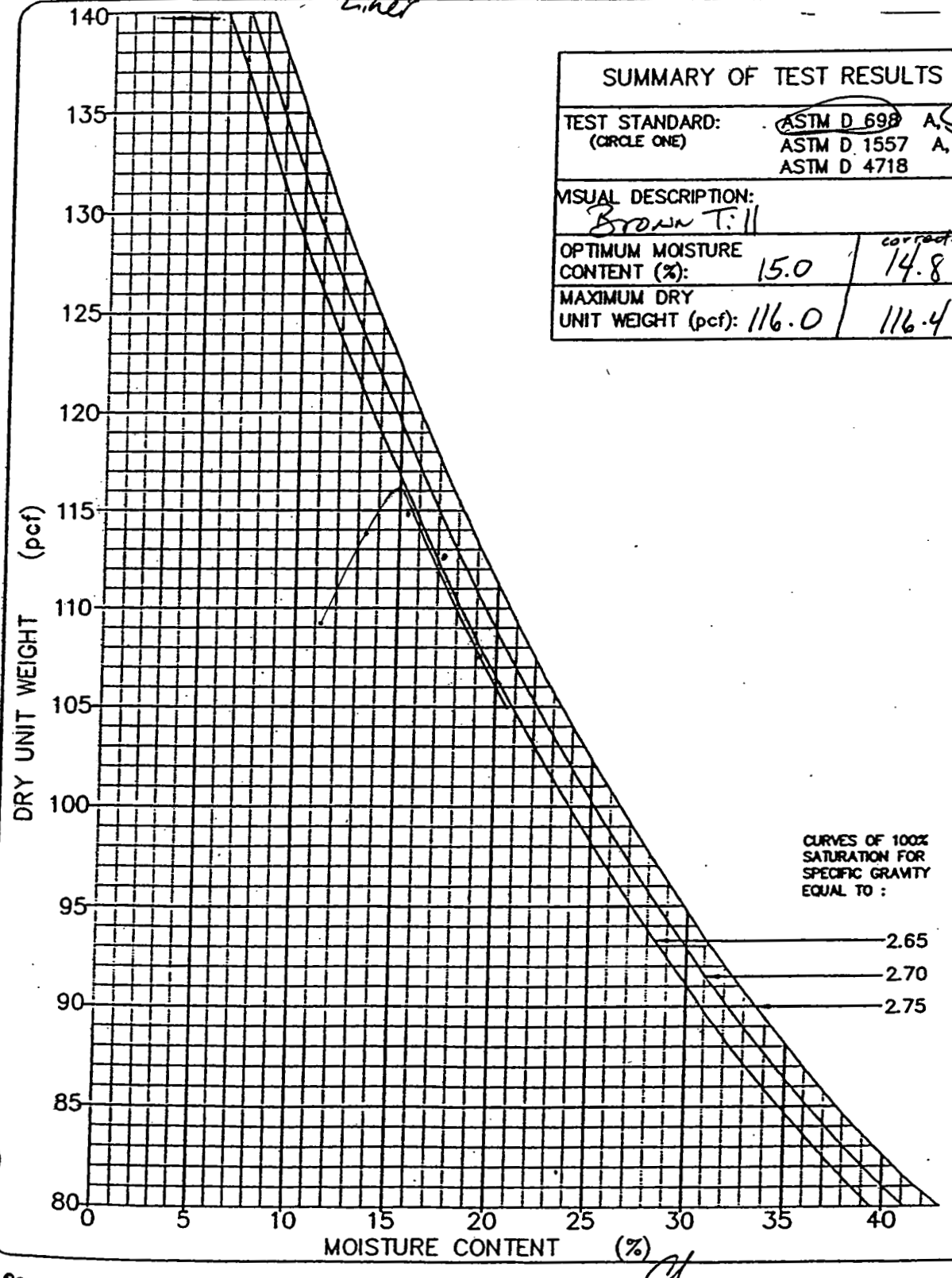
PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO PROJECT NO.: 6Q1341 TASK NO.: 04.1

DESCRIPTION: Phase IV DATE: 8 day July month 2002 year

MATERIAL TYPE: Compacted Clay Liner MATERIAL SOURCE: STOCKPILE 02-1 SAMPLE NO.: LP02-4

SUMMARY OF TEST RESULTS			QA ID
TEST STANDARD: (CIRCLE ONE)	ASTM D 698 A, B, C ASTM D 1557 A, B, C ASTM D 4718		CA
VISUAL DESCRIPTION: Brown Till			CA
OPTIMUM MOISTURE CONTENT (%):	15.0	corrected 14.8	CA
MAXIMUM DRY UNIT WEIGHT (pcf):	116.0	116.4	CA



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FLUOR DANIEL FERNALD

FIELD LABORATORY COMPACTION TEST (ASTM D 698 METHOD B)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO

DESCRIPTION: Phase IV — PROJECT NO.: 691341 TASK NO.: 04.1

MATERIAL TYPE: Low Perm Clay — DATE: 03 day July month 2002 year

SAMPLE NO.: LP025

THIS METHOD WILL BE USED IF THE MATERIAL RETAINED ON THE NO. 3/4-in. (19-mm) SIEVE IS LESS THAN 30%, IF THE MATERIAL RETAINED ON THE NO. 4 (4.75-mm) SIEVE IS GREATER THAN 20%, AND IF THE MATERIAL RETAINED ON THE NO. 3/8-in. (9.5-mm) SIEVE IS LESS THAN 20%.
ALL MATERIAL RETAINED ON THE NO. 3/8-in. (9.5-mm) SIEVE IS DISCARDED.
USE OVERSIZE CORRECTION IF MORE THAN 5% IS DISCARDED ACCORDING TO ASTM D 4718.
USE A 4-in. DIAMETER MOLD / 5.5-lb RAMMER / 12-in. DROP / 3 LAYERS / 25 BLOWS PER LAYER.

COMPACTION OF SOIL

	WATER ADDED	(ml)	13.64	13.277	13.48	13.64	13.51
			12%	4%	6%	8%	10%
A	WT. OF SOIL & MOLD	(grams)	6187.1	6019.3	6114.5	6187.1	6128.1
B	WT. OF MOLD	(grams)	4204.5	4204.5	4204.5	4204.5	4204.5
C	WT. OF SOIL = A − B	(grams)	1982.6	1814.8	1910.0	1982.6	1923.6
D	WET UNIT WT.(1) = C X 0.066	(pcf)	130.9	119.8	126.1	130.9	127.0
E	DRY UNIT WT. = D / [1 + (K/100)]	(pcf)	110.9	109.0	112.0	114.4	112.4

QA ID: DCE

NOTE: IF CALIBRATED MOLD OF 1/30 FT^3 IS USED, THE WET DENSITY IS CALCULATED FROM THE WEIGHT OF SOIL. THE VOLUME OF THE MOLD AND THE CONVERSION FROM GRAMS TO POUNDS (I.E., CONVERSION FACTOR = (30 / 453.6) = 0.066). THE MOLD MUST BE CALIBRATED TO VERIFY A CAPACITY OF 1/30 ± 0.0005 FT^3 ON INTERVALS NOT TO EXCEED 1000 TIMES THAT THE MOLD IS FILLED.

MOISTURE CONTENT – ASTM D 2216

	TARE NO.		#92	#369	#636	#14	#94
F	WT. OF TARE	(grams)	8.2	8.1	8.3	8.3	8.1
G	WT. OF WET SOIL & TARE	(grams)	537.7	501.4	455.8	514.7	546.5
H	WT. OF DRY SOIL & TARE	(grams)	456.6	457.1	405.9	451.1	484.4
I	WT. OF WATER = G − H	(grams)	81.1	44.3	49.9	63.6	62.1
J	WT. DRY SOIL = H − F	(grams)	448.4	449.0	397.6	442.8	476.3
K	MOISTURE CONTENT = (I/J) X 100	(%)	18.08	9.9	12.55	14.4	13.03
			1.1808	1.099	1.1255	1.144	

QA ID: DCE

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FLUOR DANIEL FERNALD

FIELD LABORATORY COMPACTION TEST (ASTM D 698 METHOD B)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO

PROJECT NO.: 691341 TASK NO.: 04.1

DESCRIPTION: Phase IV

DATE: 09 day July month 2002 year

MATERIAL TYPE: Low Perm Clay

SAMPLE NO.: LP02-5

THIS METHOD WILL BE USED IF THE MATERIAL RETAINED ON THE NO. 3/4-in. (19-mm) SIEVE IS LESS THAN 30%, IF THE MATERIAL RETAINED ON THE NO. 4 (4.75-mm) SIEVE IS GREATER THAN 20%, AND IF THE MATERIAL RETAINED ON THE NO. 3/8-in. (9.5-mm) SIEVE IS LESS THAN 20%.
ALL MATERIAL RETAINED ON THE NO. 3/8-in. (9.5-mm) SIEVE IS DISCARDED.
USE OVERSIZE CORRECTION IF MORE THAN 5% IS DISCARDED ACCORDING TO ASTM D 4718.
USE A 4-in. DIAMETER MOLD / 5.5-lb RAMMER / 12-in. DROP / 3 LAYERS / 25 BLOWS PER LAYER.

COMPACTION OF SOIL

QA ID: [illegible]

	WATER ADDED	(ml)	13.65 11%				
A	WT. OF SOIL & MOLD	(grams)	6191.6				
B	WT. OF MOLD	(grams)	4204.5				
C	WT. OF SOIL = A - B	(grams)	1987.1				
D	WET UNIT WT.(1) = C X 0.066	(pcf)	~~131.1~~ 131.2				
E	DRY UNIT WT. = D / [1 + (K/100)]	(pcf)	~~112.1~~ 112.2				

NOTE: IF CALIBRATED MOLD OF 1/30 FT^3 IS USED, THE WET DENSITY IS CALCULATED FROM THE WEIGHT OF SOIL, THE VOLUME OF THE MOLD AND THE CONVERSION FROM GRAMS TO POUNDS (I.E., CONVERSION FACTOR = (30 / 453.6) = 0.066). THE MOLD MUST BE CALIBRATED TO VERIFY A CAPACITY OF 1/30 ± 0.0005 FT^3 ON INTERVALS NOT TO EXCEED 1000 TIMES THAT THE MOLD IS FILLED.

MOISTURE CONTENT - ASTM D 2216

QA ID: [illegible]

	TARE NO.		#18				
F	WT. OF TARE	(grams)	8.4				
G	WT. OF WET SOIL & TARE	(grams)	427.4				
H	WT. OF DRY SOIL & TARE	(grams)	366.8				
I	WT. OF WATER = G - H	(grams)	60.6				
J	WT. DRY SOIL = H - F	(grams)	358.4				
K	MOISTURE CONTENT = (I/J) X 100	(%)	16.9				

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SHEET NO. 2 OF 4

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FLUOR FERNALD

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CORRECTION OF UNIT WEIGHT AND WATER CONTENT FOR SOILS CONTAINING OVERSIZE PARTICLES *(ASTM D 4718)*

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO PROJECT NO. 6Q134 TASK NO. 04.1

DESCRIPTION: Phase IV DATE: 10 day July month 2002 year

MATERIAL TYPE: Clay Liner LP02-5 STD

Weight of Total Sample	=	44614.2
Weight of Oversize Fraction	=	874.9
Weight of Finer Fraction (- 3/8)	=	~~43740.0~~ 43739.3
Percentage of Oversize Fraction	= (P_C)	2.0
Percentage of Finer Fraction (- 3/8)	= (P_F)	98.0
Specific Gravity (Assumed)	= (G_M)	2.72

(W_F) =	Water Content - 3/8 , as decimal	=	0.154
(W_C) =	Water Content + 3/8 , as decimal	=	0.015
(δ_F) =	Dry Density of finer fraction	=	115.6
(δ_W) =	Unit Weight of Water	=	62.4

$$C_W=(W_F P_F)+(W_C P_C)$$

$C_W = 15.1\ \%$

$$C\delta_D=100\delta_F G_M \delta_W/(\delta_F P_C)+(G_M \delta_W P_F)$$

$C_{\delta D} = 116.6$ pcf

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FLUOR FERNALD

4940

MOISTURE–DENSITY RELATIONSHIP

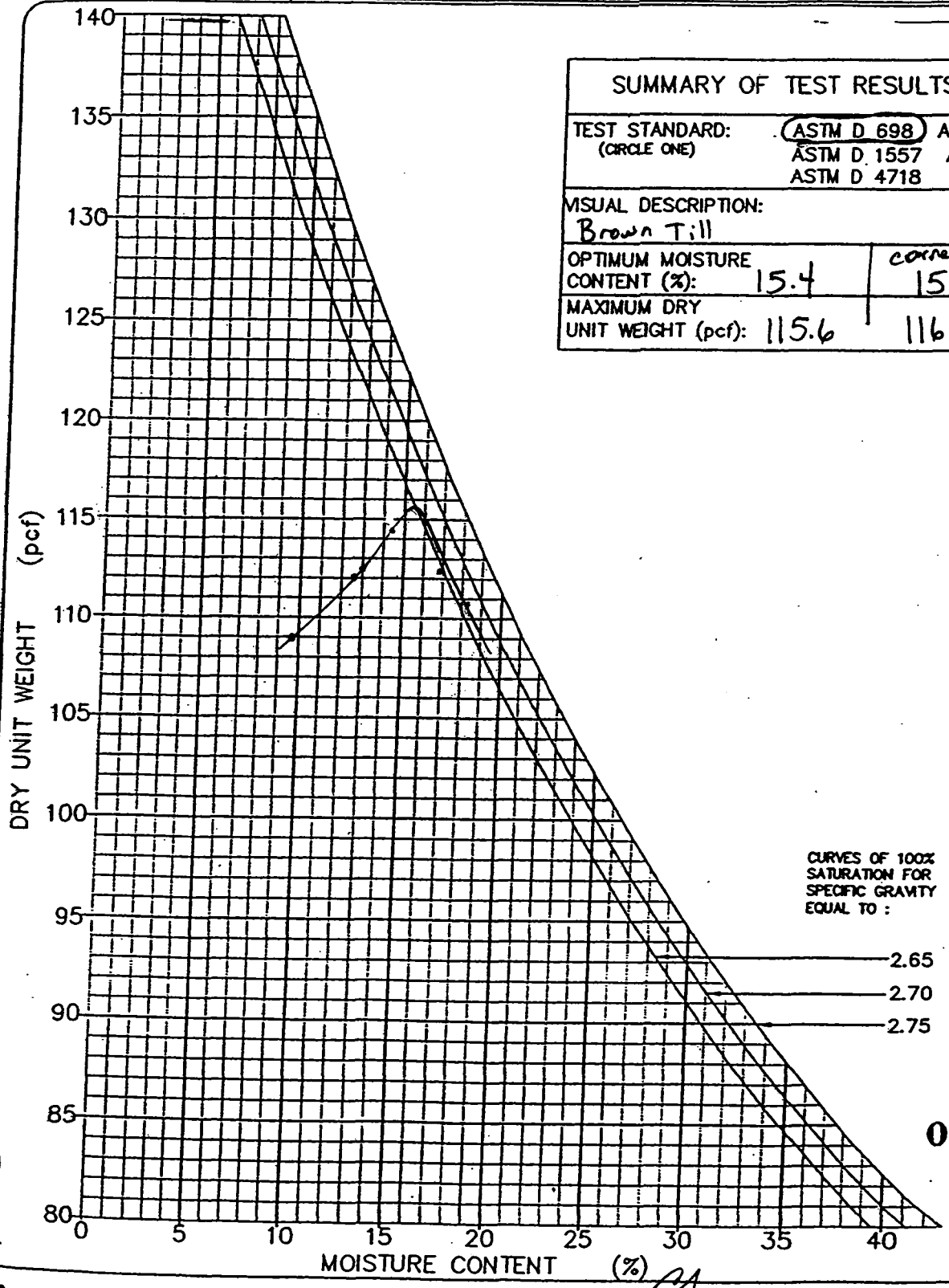
PROJECT: ON–SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO PROJECT NO.: GQ1341 TASK NO.: 04.1

DESCRIPTION: Phase IV DATE: 10 day July month 2002 year

MATERIAL TYPE: Clay Liner MATERIAL SOURCE: STOCKPILE 02-1 SAMPLE NO.: LP02-5

SUMMARY OF TEST RESULTS		QA ID
TEST STANDARD: (CIRCLE ONE) ASTM D 698 A, B, C; ASTM D 1557 A, B, C; ASTM D 4718		CA
VISUAL DESCRIPTION: Brown Till		CA
OPTIMUM MOISTURE CONTENT (%): 15.4	corrected 15.1	CA
MAXIMUM DRY UNIT WEIGHT (pcf): 115.6	116.6	CA



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FLUOR FERNALD

FIELD LABORATORY COMPACTION TEST

(ASTM D 1557 METHOD B)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO

PROJECT NO. GQ134 TASK NO.: 04.1

DESCRIPTION: Phase IV

DATE: 03 day July month 2002 year

MATERIAL TYPE: Low Penn Clay MATERIAL SOURCE: Borrow Area SAMPLE NO.: LP02-5

THIS METHOD WILL BE USED IF THE MATERIAL RETAINED ON THE NO. 4-in. (4.75-mm) SIEVE IS GREATER THAN 20%, AND THE MATERIAL RETAINED ON THE NO. 3/8-in. (9.5-mm) SIEVE IS LESS THAN 20%.
ALL MATERIAL RETAINED ON THE NO. 3/8-in. (9.5-mm) SIEVE IS DISCARDED.
USE OVERSIZE CORRECTION IF MORE THAN 5% IS DISCARDED ACCORDING TO ASTM D 4718.
USE A 4-in. DIAMETER MOLD / 10-lb RAMMER / 18-in. DROP / 5 LAYERS / 25 BLOWS PER LAYER.

13.63 c/u

COMPACTION OF SOIL

QA ID: DMC

			13.76	13.93	13.87	13.74	
	WATER ADDED	(ml)	4%	6%	8%	10%	2%
A	WT. OF SOIL & MOLD	(grams)	6241.5	6318.6	6291.4	6232.5	6182.6
B	WT. OF MOLD	(grams)	4204.5	4204.5	4204.5	4204.5	4204.5
C	WT. OF SOIL = A − B	(grams)	2037.0	2114.1	2086.9	2028.0	1978.1
D	WET UNIT WT.(1) = C X 0.066	(pcf)	134.4	139.5	137.7	133.8	130.6
E	DRY UNIT WT. = D / [1 + (K/100)]	(pcf)	122.3	124.4	120.9	114.8	126.2

NOTE: IF CALIBRATED MOLD OF 1/30 FT^3 IS USED, THE WET DENSITY IS CALCULATED FROM THE WEIGHT OF SOIL, THE VOLUME OF THE MOLD AND THE CONVERSION FROM GRAMS TO POUNDS (I.E., CONVERSION FACTOR = (30 / 453.6) = 0.066). THE MOLD MUST BE CALIBRATED TO VERIFY A CAPACITY OF 1/30 ± 0.0005 FT^3 ON INTERVALS NOT TO EXCEED 1000 TIMES THAT THE MOLD IS FILLED.

MOISTURE CONTENT — ASTM D 2216

QA ID: DMC

	TARE NO.		#607	#63	#96	#601	#103
F	WT. OF TARE	(grams)	8.2	8.2	8.2	8.2	8.3
G	WT. OF WET SOIL & TARE	(grams)	364.0	387.9	430.1	449.7	335.9
H	WT. OF DRY SOIL & TARE	(grams)	332.0	346.8	378.5	387.0	312.1
I	WT. OF WATER = G − H	(grams)	32.0	41.1	51.6	62.7	23.8
J	WT. DRY SOIL = H − F	(grams)	323.8	338.6	370.3	378.8	303.8
K	MOISTURE CONTENT = (I/J) X 100	(%)	9.88	12.1	13.9	16.55	7.8
			1.0988	1.121	1.139	1.1655	1.078

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SHEET NO. 1 OF 3

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FLUOR FERNALD 49 40

CORRECTION OF UNIT WEIGHT AND WATER CONTENT FOR SOILS CONTAINING OVERSIZE PARTICLES

(ASTM D 4718)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO PROJECT NO. GQ1341 TASK NO. 04.1

DESCRIPTION: Phase IV DATE: 10 day July month 2002 year

MATERIAL TYPE: Clay Liner LP02-5

Weight of Total Sample	=	44614.2
Weight of Oversize Fraction	=	~~605.4~~ 874.9
Weight of Finer Fraction (- 3/8)	=	43739.3
Percentage of Oversize Fraction	= (P_C)	2.0
Percentage of Finer Fraction (- 3/8)	= (P_F)	98.0
Specific Gravity (Assumed)	= (G_M)	2.72

(W_F) =	Water Content - 3/8 , as decimal	=	0.119
(W_C) =	Water Content + 3/8 , as decimal	=	0.015
(δ_F) =	Dry Density of finer fraction	=	125.0
(δ_W) =	Unit Weight of Water	=	62.4

$$C_W=(W_F P_F)+(W_C P_C)$$

$C_W = 11.7\%$

$$C\delta_D=100\delta_F G_M \delta_W/(\delta_F P_C)+(G_M \delta_W P_F)$$

$C_{\delta D} = 125.6$ pcf

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FLUOR FERNALD

4940

MOISTURE-DENSITY RELATIONSHIP

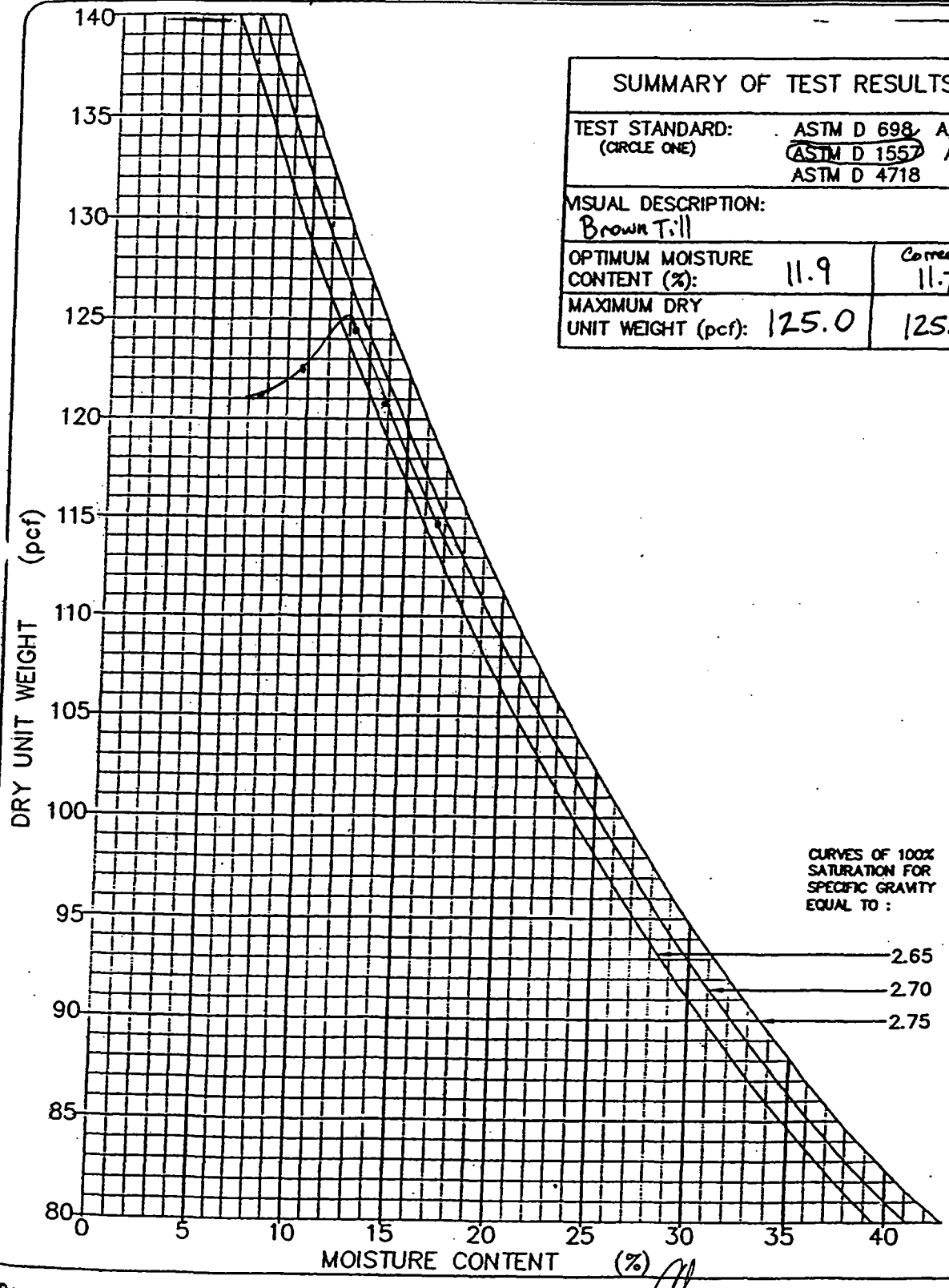
PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO PROJECT NO.: GQ1341 TASK NO.: 04.1

DESCRIPTION: Phase IV DATE: 10 day July month 2002 year

MATERIAL TYPE: Clay Liner MATERIAL SOURCE: STOCKPILE 02-1 SAMPLE NO.: LP02-5

SUMMARY OF TEST RESULTS			QA ID
TEST STANDARD: (CIRCLE ONE)	ASTM D 698 A, B, C ASTM D 1557 A, B, C ASTM D 4718		CA
VISUAL DESCRIPTION: Brown Till			CA
OPTIMUM MOISTURE CONTENT (%):	11.9	Corrected 11.7	CA
MAXIMUM DRY UNIT WEIGHT (pcf):	125.0	125.6	CA



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FLUOR DANIEL FERNALD

FIELD LABORATORY COMPACTION TEST (ASTM D 698 METHOD B)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO

DESCRIPTION: Phase IV

MATERIAL TYPE: Low Perm Clay

PROJECT NO.: 691341 TASK NO.: 04.1

DATE: 09 day July month 2002 year

SAMPLE NO.: LP02-6

THIS METHOD WILL BE USED IF THE MATERIAL RETAINED ON THE NO. 3/4-in. (19-mm) SIEVE IS LESS THAN 30%, IF THE MATERIAL RETAINED ON THE NO. 4 (4.75-mm) SIEVE IS GREATER THAN 20%, AND IF THE MATERIAL RETAINED ON THE NO. 3/8-in. (9.5-mm) SIEVE IS LESS THAN 20%.
ALL MATERIAL RETAINED ON THE NO. 3/8-in. (9.5-mm) SIEVE IS DISCARDED.
USE OVERSIZE CORRECTION IF MORE THAN 5% IS DISCARDED ACCORDING TO ASTM D 4718.
USE A 4-in. DIAMETER MOLD / 5.5-lb RAMMER / 12-in. DROP / 3 LAYERS / 25 BLOWS PER LAYER.

COMPACTION OF SOIL

QA ID: DLE

			13.35	13.53	13.74	13.66	
	WATER ADDED	(ml)	4%	6%	8%	10%	
A	WT. OF SOIL & MOLD	(grams)	6055.6	6137.2	6232.5	6196.2	
B	WT. OF MOLD	(grams)	4204.5	4204.5	4204.5	4204.5	4204.5
C	WT. OF SOIL = A − B	(grams)	1851.1	1932.7	2028.0	1991.7	
D	WET UNIT WT.(1) = C X 0.066	(pcf)	122.2	127.6	133.9	131.5	
E	DRY UNIT WT. = D / [1 + (K/100)]	(pcf)	110.1	112.7	115.9	112.1	

NOTE: IF CALIBRATED MOLD OF 1/30 FT^3 IS USED, THE WET DENSITY IS CALCULATED FROM THE WEIGHT OF SOIL, THE VOLUME OF THE MOLD AND THE CONVERSION FROM GRAMS TO POUNDS (I.E., CONVERSION FACTOR = (30 / 453.6) = 0.066). THE MOLD MUST BE CALIBRATED TO VERIFY A CAPACITY OF 1/30 ± 0.0005 FT^3 ON INTERVALS NOT TO EXCEED 1000 TIMES THAT THE MOLD IS FILLED.

MOISTURE CONTENT – ASTM D 2216

QA ID: DLE

	TARE NO.		#616	#93	#107	#52	
F	WT. OF TARE	(grams)	8.2	8.2	8.0	8.1	
G	WT. OF WET SOIL & TARE	(grams)	458.4	565.0	483.2	451.7	
H	WT. OF DRY SOIL & TARE	(grams)	413.7	500.0	419.5	386.2	
I	WT. OF WATER = G − H	(grams)	44.7	65.0	63.7	65.5	
J	WT. DRY SOIL = H − F	(grams)	405.5	491.8	411.5	378.1	
K	MOISTURE CONTENT = (I/J) X 100	(%)	11.0	13.2	15.5	17.3	

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1.110 1.132 1.155 1.173

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SHEET NO. 1 OF 3

GEOSYNTEC CONSULTANTS FILE NO. 2-05-FLC

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4940

FLUOR FERNALD

CORRECTION OF UNIT WEIGHT AND WATER CONTENT FOR SOILS CONTAINING OVERSIZE PARTICLES

(ASTM D 4718)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO PROJECT NO. G21341 TASK NO. 04.1

DESCRIPTION: Phase IV DATE: 10 day July month 2002 year

MATERIAL TYPE: Clay Liner CP02-6

Weight of Total Sample	=	20694.2
Weight of Oversize Fraction	=	747.7
Weight of Finer Fraction (- 3/8)	=	19946.5
Percentage of Oversize Fraction	= (P_C)	3.6
Percentage of Finer Fraction (- 3/8)	= (P_F)	96.4
Specific Gravity (Assumed)	= (G_M)	2.72

(W_F) =	Water Content - 3/8, as decimal	=	0.155
(W_C) =	Water Content + 3/8, as decimal	=	0.015
(δ_F) =	Dry Density of finer fraction	=	115.9
(δ_W) =	Unit Weight of Water	=	62.4

$$C_W=(W_F P_F)+(W_C P_C)$$

$C_\omega = 15.0\%$

$$C\delta_D=100\delta_F G_M \delta_W/(\delta_F P_C)+(G_M \delta_W P_F)$$

$C_{\delta D} = 117.2$ pcf

GEOSYNTEC CONSULTANTS

FLUOR FERNALD

4940

MOISTURE-DENSITY RELATIONSHIP

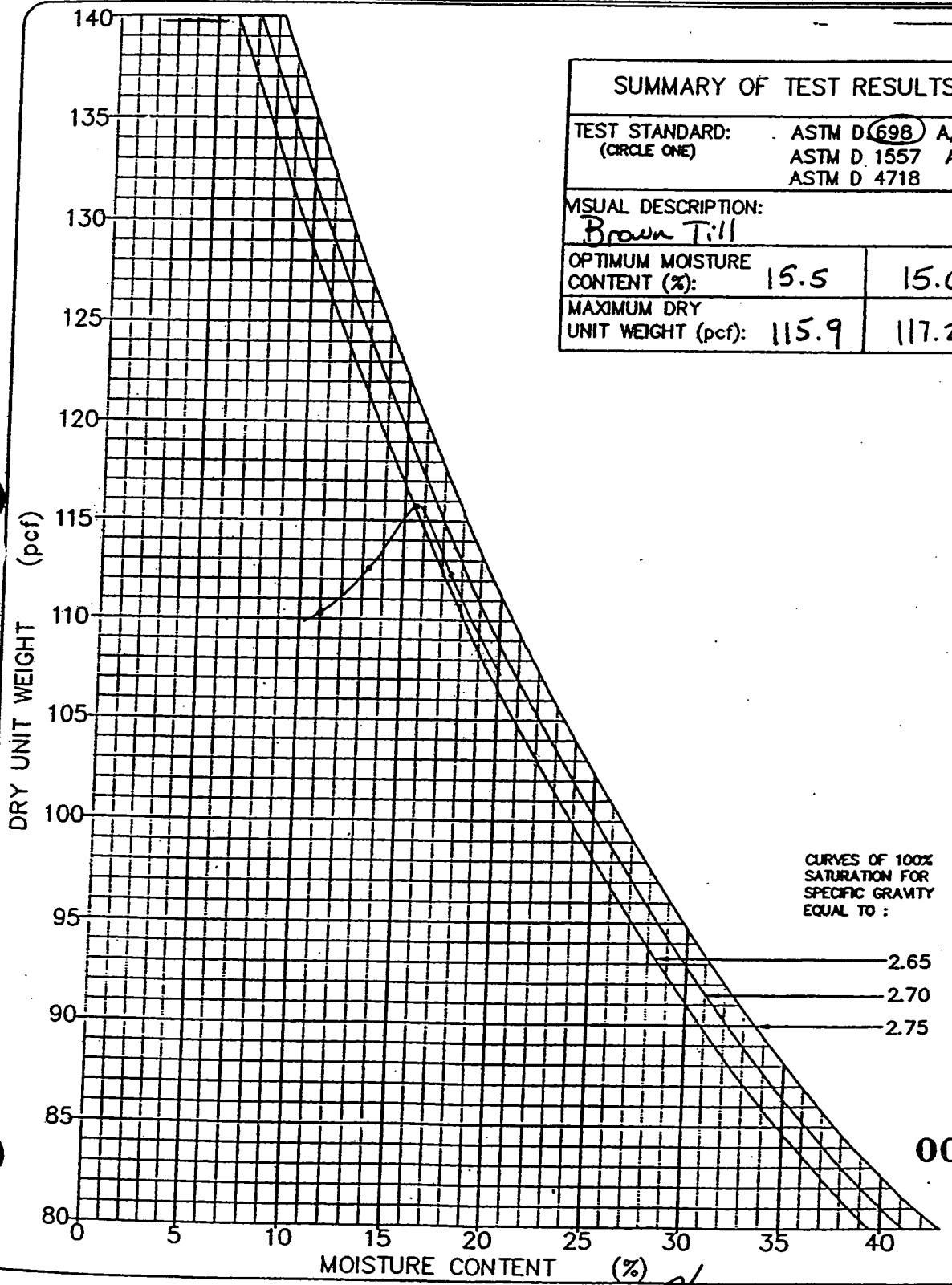
PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO PROJECT NO.: G01341 TASK NO.: 04.1

DESCRIPTION: Phase IV DATE: 09 day July month 2002 year

MATERIAL TYPE: Clay Liner MATERIAL SOURCE: STOCKPILE 02-1 SAMPLE NO.: LP02-6

SUMMARY OF TEST RESULTS			QA ID
TEST STANDARD: (CIRCLE ONE)	ASTM D 698 A, B C ASTM D 1557 A, B, C ASTM D 4718		CL
VISUAL DESCRIPTION: Brown Till			CL
OPTIMUM MOISTURE CONTENT (%):	15.5	15.0	CL
MAXIMUM DRY UNIT WEIGHT (pcf):	115.9	117.2	CL



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GEOSYNTEC CONSULTANTS

FLUOR DANIEL FERNALD

FIELD LABORATORY COMPACTION TEST (ASTM D 698 METHOD B)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO

DESCRIPTION: Phase IV

PROJECT NO. 491341 TASK NO.: 04.1

MATERIAL TYPE: Low Perm Clay

DATE: 08 day July month 2002 year

SAMPLE NO.: LP 02-7

THIS METHOD WILL BE USED IF THE MATERIAL RETAINED ON THE NO. 3/4-in. (19-mm) SIEVE IS LESS THAN 30%, IF THE MATERIAL RETAINED ON THE NO. 4 (4.75-mm) SIEVE IS GREATER THAN 20%, AND IF THE MATERIAL RETAINED ON THE NO. 3/8-in. (9.5-mm) SIEVE IS LESS THAN 20%.
ALL MATERIAL RETAINED ON THE NO. 3/8-in. (9.5-mm) SIEVE IS DISCARDED.
USE OVERSIZE CORRECTION IF MORE THAN 5% IS DISCARDED ACCORDING TO ASTM D 4718.
USE A 4-in. DIAMETER MOLD / 5.5-lb RAMMER / 12-in. DROP / 3 LAYERS / 25 BLOWS PER LAYER.

COMPACTION OF SOIL

			13.28 6%	13.41 8%	13.62 10%	13.6* 12%	13.52 QA ID: DJE/CW
	WATER ADDED	(ml)	6%	8%	10%	12%	14%
A	WT. OF SOIL & MOLD	(grams)	6023.8	6082.8	6178.0	6187.1	6132.7
B	WT. OF MOLD	(grams)	4204.5	4204.5	4204.5	4204.5	4204.5
C	WT. OF SOIL = A - B	(grams)	1819.3	1878.3	1973.5	1982.6	1928.2
D	WET UNIT WT.(1) = C X 0.066	(pcf)	120.1	124.0	130.3	130.9	127.3
E	DRY UNIT WT. = D / [1 + (K/100)]	(pcf)	107.9	108.8	112.7	111.7	~~104.6~~ 106.1

NOTE: IF CALIBRATED MOLD OF 1/30 FT^3 IS USED, THE WET DENSITY IS CALCULATED FROM THE WEIGHT OF SOIL, THE VOLUME OF THE MOLD AND THE CONVERSION FROM GRAMS TO POUNDS (I.E., CONVERSION FACTOR = (30 / 453.6) = 0.066). THE MOLD MUST BE CALIBRATED TO VERIFY A CAPACITY OF 1/30 ± 0.0005 FT^3 ON INTERVALS NOT TO EXCEED 1000 TIMES THAT THE MOLD IS FILLED.

MOISTURE CONTENT - ASTM D 2216

							QA ID: DJE
	TARE NO.		#94	#49	#607	#95	#607
F	WT. OF TARE	(grams)	8.1	8.2	8.2	8.1	8.2
G	WT. OF WET SOIL & TARE	(grams)	549.4	418.0	505.9	502.5	468.7
H	WT. OF DRY SOIL & TARE	(grams)	494.3	367.8	438.8	429.9	392.0
I	WT. OF WATER = G - H	(grams)	55.1	50.2	67.1	72.6	76.7
J	WT. DRY SOIL = H - F	(grams)	486.2	359.6	430.6	421.8	~~353.8~~ 383.8
K	MOISTURE CONTENT = (I/J) X 100	(%)	11.33	13.95	15.58	17.21	~~21.7~~ 20.0
			1.1133	1.1395	1.1558	1.1721	

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SHEET NO. 1 OF 3

GeoSyntec Consultants

FLUOR FERNALD

CORRECTION OF UNIT WEIGHT AND WATER CONTENT FOR SOILS CONTAINING OVERSIZE PARTICLES (ASTM D 4718)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO PROJECT NO. GQ134 TASK NO. 04.1

DESCRIPTION: Phase IV DATE: 11 day July month 2002 year

MATERIAL TYPE: Clay Liner LP02-7

Weight of Total Sample	=	45300.7
Weight of Oversize Fraction	=	1562.2
Weight of Finer Fraction (- 3/8)	=	43738.5
Percentage of Oversize Fraction	= (P_C)	3.4
Percentage of Finer Fraction (- 3/8)	= (P_F)	96.6
Specific Gravity (Assumed)	= (G_M)	2.72

(W_F) =	Water Content - 3/8 , as decimal	=	0.162
(W_C) =	Water Content + 3/8 , as decimal	=	0.015
(δ_F) =	Dry Density of finer fraction	=	113.8
(δ_W) =	Unit Weight of Water	=	62.4

$$C_W=(W_F P_F)+(W_C P_C)$$

$C_W = 15.7\%$

$$C\delta_D=100\delta_F G_M \delta_W/(\delta_F P_C)+(G_M \delta_W P_F)$$

$C_{\delta D} = 115.1$ pcf

GEOSYNTEC CONSULTANTS

FLUOR FERNALD

4940

MOISTURE–DENSITY RELATIONSHIP

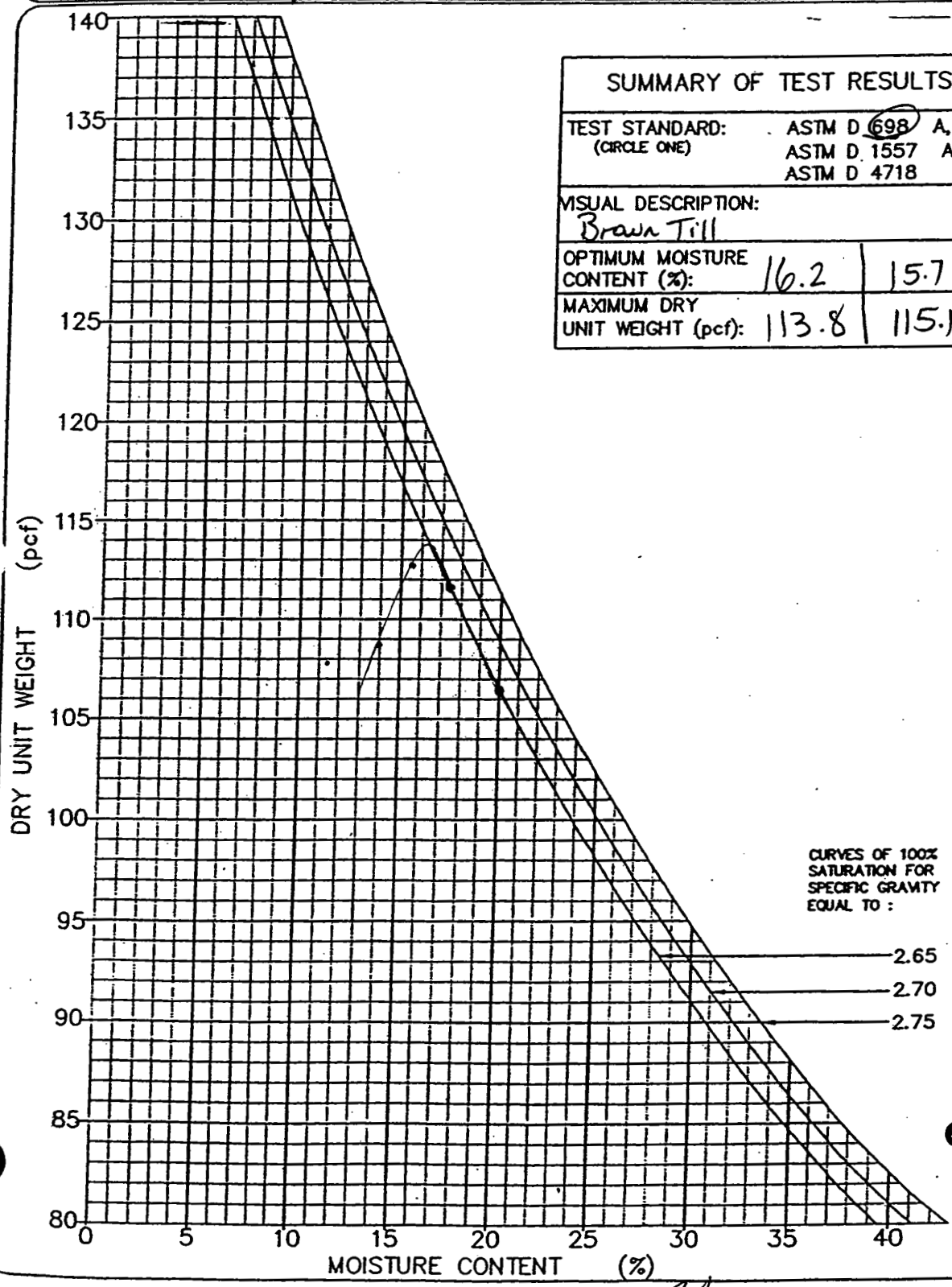
PROJECT: ON–SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO PROJECT NO.: GQ1341 TASK NO.: 04.1

DESCRIPTION: Phase IV DATE: 10 day July month 2002 year

MATERIAL TYPE: Clay Liner MATERIAL SOURCE: SAMPLE NO.: LP02-7

SUMMARY OF TEST RESULTS			QA ID
TEST STANDARD: (CIRCLE ONE)	ASTM D 698 A, B, C ASTM D 1557 A, B, C ASTM D 4718		CA
VISUAL DESCRIPTION: Brown Till			CA
OPTIMUM MOISTURE CONTENT (%):	16.2	15.7	CA
MAXIMUM DRY UNIT WEIGHT (pcf):	113.8	115.1	CA



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GEOSYNTEC CONSULTANTS

FLUOR FERNALD

FIELD LABORATORY COMPACTION TEST

(ASTM D 1557 METHOD B)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO

DESCRIPTION: Phase IV

PROJECT NO.: GQ1341 TASK NO.: 04.1

DATE: 8 day July month 2002 year

MATERIAL TYPE: Low Perm Clay MATERIAL SOURCE: on-site

SAMPLE NO.: LP02-7

THIS METHOD WILL BE USED IF THE MATERIAL RETAINED ON THE NO. 4-in. (4.75-mm) SIEVE IS GREATER THAN 20%, AND THE MATERIAL RETAINED ON THE NO. 3/8-in. (9.5-mm) SIEVE IS LESS THAN 20%.
ALL MATERIAL RETAINED ON THE NO. 3/8-in. (9.5-mm) SIEVE IS DISCARDED.
USE OVERSIZE CORRECTION IF MORE THAN 5% IS DISCARDED ACCORDING TO ASTM D 4718.
USE A 4-in. DIAMETER MOLD / 10-lb RAMMER / 18-in. DROP / 5 LAYERS / 25 BLOWS PER LAYER.

COMPACTION OF SOIL

QA ID: KS

			2% 13.51	4% 13.76	6% 13.88	13.90	
	WATER ADDED	(ml)	2%	4%	6%	8%	10% 13.80
A	WT. OF SOIL & MOLD	(grams)	6128.1	6241.5	6296.0	6305.0	6259.7
B	WT. OF MOLD	(grams)	4204.5	4204.5	4204.5	4204.5	4204.5
C	WT. OF SOIL = A − B	(grams)	1923.6	2037.0	2091.5	2100.5	2055.2
D	WET UNIT WT.(1) = C X 0.066	(pcf)	127.0	134.4	138.0	138.6	135.6
E	DRY UNIT WT. = D / [1 + (K/100)]	(pcf)	118.9	123.3	124.0	123.3	117.5

NOTE: IF CALIBRATED MOLD OF 1/30 FT^3 IS USED, THE WET DENSITY IS CALCULATED FROM THE WEIGHT OF SOIL, THE VOLUME OF THE MOLD AND THE CONVERSION FROM GRAMS TO POUNDS (I.E., CONVERSION FACTOR = (30 / 453.6) = 0.066). THE MOLD MUST BE CALIBRATED TO VERIFY A CAPACITY OF 1/30 ± 0.0005 FT^3 ON INTERVALS NOT TO EXCEED 1000 TIMES THAT THE MOLD IS FILLED.

MOISTURE CONTENT – ASTM D 2216

QA ID: DLS

	TARE NO.		#96	#63	#14	#615	97
F	WT. OF TARE	(grams)	8.2	8.3	8.3	8.2	8.2
G	WT. OF WET SOIL & TARE	(grams)	346.6	295.1	328.7	362.6	330.4
H	WT. OF DRY SOIL & TARE	(grams)	325.2	271.5	296.2	323.5	287.4
I	WT. OF WATER = G − H	(grams)	21.4	23.6	32.5	39.1	43.0
J	WT. DRY SOIL = H − F	(grams)	317.0	263.2	287.9	315.3	279.2
K	MOISTURE CONTENT = (I/J) X 100	(%)	6.8	9.0	11.3	12.4	15.4
			1.068	1.09	1.113	1.124	1.154

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SHEET NO. 1 OF 3

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FLUOR FERNALD

CORRECTION OF UNIT WEIGHT AND WATER CONTENT FOR SOILS CONTAINING OVERSIZE PARTICLES (ASTM D 4718)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO PROJECT NO. GQ1341 TASK NO. 04.1

DESCRIPTION: Phase IV DATE: 10 day July month 2002 year

MATERIAL TYPE: Clay Liner LP02-7

Weight of Total Sample	=	45300.7
Weight of Oversize Fraction	=	1562.2
Weight of Finer Fraction (- 3/8)	=	43738.5
Percentage of Oversize Fraction	= (P_C)	3.4
Percentage of Finer Fraction (- 3/8)	= (P_F)	96.6
Specific Gravity (Assumed)	= (G_M)	62.4

(W_F) =	Water Content - 3/8 , as decimal	=	10.4
(W_C) =	Water Content + 3/8 , as decimal	=	0.015
(δ_F) =	Dry Density of finer fraction	=	124.4
(δ_W) =	Unit Weight of Water	=	62.4

$$C_W=(W_F P_F)+(W_C P_C)$$

$C_w = 10.1$ %

$$C\delta_D=100\delta_F G_M \delta_W/(\delta_F P_C)+(G_M \delta_W P_F)$$

$C_{\delta D} = 125.6$ pcf

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GEOSYNTEC CONSULTANTS

FLUOR FERNALD

4940

MOISTURE-DENSITY RELATIONSHIP

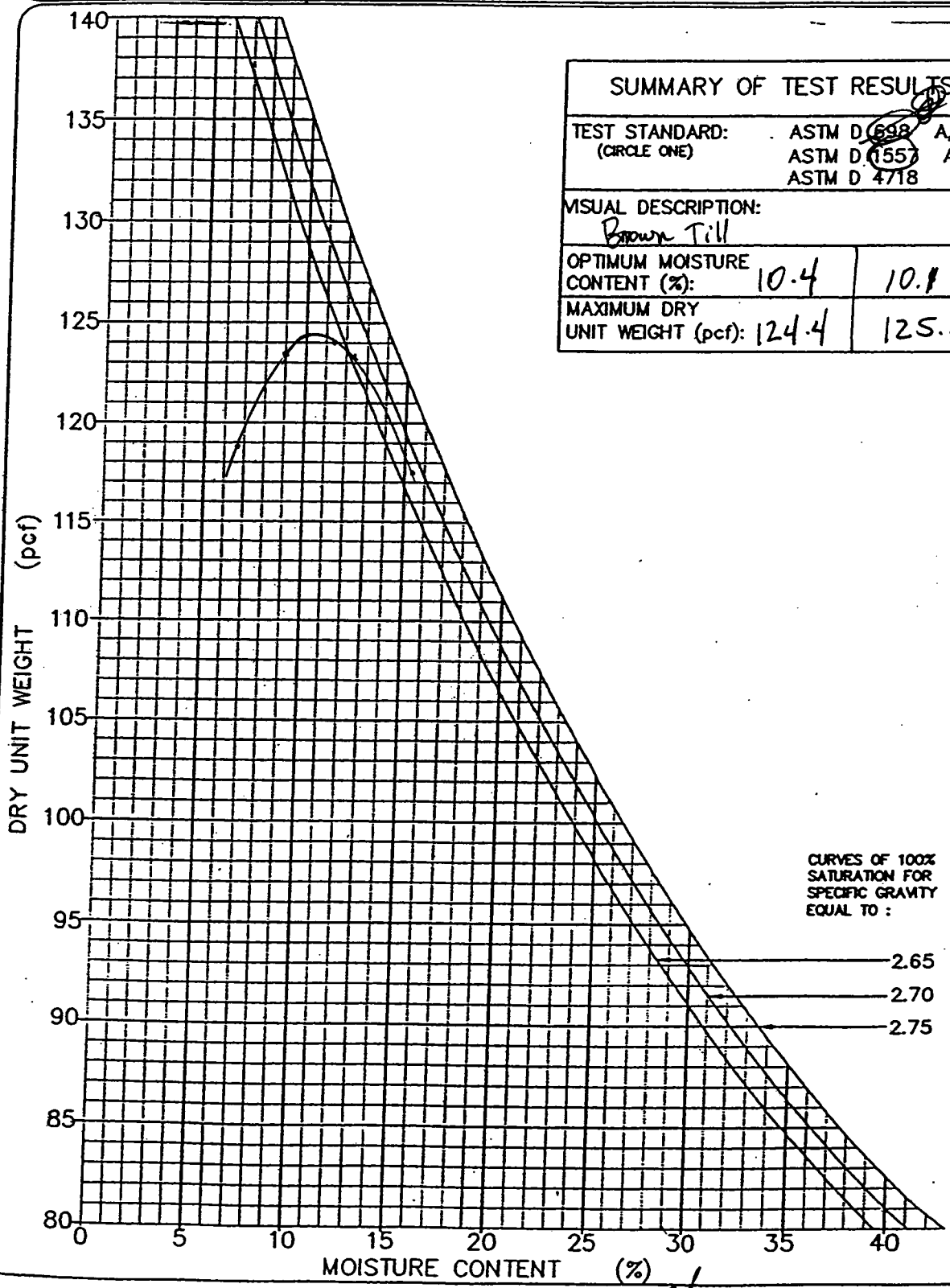
PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO PROJECT NO.: GQ1341 TASK NO.: 041

DESCRIPTION: Phase IV DATE: 10 day July month 2002 year

MATERIAL TYPE: B Clay Liner MATERIAL SOURCE: STOCKPILE Ø2-1 SAMPLE NO.: LPØ2-7

SUMMARY OF TEST RESULTS			QA ID
TEST STANDARD: (CIRCLE ONE)	ASTM D 698 A, B, C ASTM D 1557 A, B, C ASTM D 4718		CA
VISUAL DESCRIPTION: Brown Till			CA
OPTIMUM MOISTURE CONTENT (%):	10.4	10.1	CA
MAXIMUM DRY UNIT WEIGHT (pcf):	124.4	125.6	CA



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FLUOR DANIEL FERNALD

FIELD LABORATORY COMPACTION TEST (ASTM D 698 METHOD B)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO

DESCRIPTION: Phase II

MATERIAL TYPE: Low Perm Clay

PROJECT NO. 6Q1341 TASK NO.: 04.1

DATE: 12 day July month 2002 year

SAMPLE NO.: LP02-8

THIS METHOD WILL BE USED IF THE MATERIAL RETAINED ON THE NO. 3/4-in. (19-mm) SIEVE IS LESS THAN 30%, IF THE MATERIAL RETAINED ON THE NO. 4 (4.75-mm) SIEVE IS GREATER THAN 20%, AND IF THE MATERIAL RETAINED ON THE NO. 3/8-in. (9.5-mm) SIEVE IS LESS THAN 20%.
ALL MATERIAL RETAINED ON THE NO. 3/8-in. (9.5-mm) SIEVE IS DISCARDED.
USE OVERSIZE CORRECTION IF MORE THAN 5% IS DISCARDED ACCORDING TO ASTM D 4718.
USE A 4-in. DIAMETER MOLD / 5.5-lb RAMMER / 12-in. DROP / 3 LAYERS / 25 BLOWS PER LAYER.

COMPACTION OF SOIL

QA ID: LLE

	WATER ADDED	(ml)		6%	8%	10%	12%
A	WT. OF SOIL & MOLD	(grams)		6005.7	6110.0	6159.9	6185.6
B	WT. OF MOLD	(grams)	4204.5	4204.5	4204.5	4204.5	4204.5
C	WT. OF SOIL = A - B	(grams)		1801.2	1905.5	1955.4	1981.1
D	WET UNIT WT.(1) = C X 0.066	(pcf)		118.9	125.8	129.1	~~130.5~~ 130.6
E	DRY UNIT WT. = D / [1 + (K/100)]	(pcf)		108.8	112.8	113.1	112.8

13.24 13.47 13.58 13.63

NOTE: IF CALIBRATED MOLD OF 1/30 FT^3 IS USED, THE WET DENSITY IS CALCULATED FROM THE WEIGHT OF SOIL, THE VOLUME OF THE MOLD AND THE CONVERSION FROM GRAMS TO POUNDS (I.E., CONVERSION FACTOR = (30 / 453.6) = 0.066). THE MOLD MUST BE CALIBRATED TO VERIFY A CAPACITY OF 1/30 ± 0.0005 FT^3 ON INTERVALS NOT TO EXCEED 1000 TIMES THAT THE MOLD IS FILLED.

MOISTURE CONTENT - ASTM D 2216

QA ID: LLE

	TARE NO.			#98	#49	#602	#309
F	WT. OF TARE	(grams)		8.2	8.2	8.2	8.0
G	WT. OF WET SOIL & TARE	(grams)		416.0	417.1	470.8	529.4
H	WT. OF DRY SOIL & TARE	(grams)		381.3	374.9	413.5	448.2
I	WT. OF WATER = G - H	(grams)		34.7	42.2	57.3	81.2
J	WT. DRY SOIL = H - F	(grams)		373.1	366.7	405.3	450.2
K	MOISTURE CONTENT = (I/J) X 100	(%)		9.3	11.5	14.1	15.8

1.093 1.115 1.141 1.150

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SHEET NO. 1 OF 4

GEOSYNTEC CONSULTANTS

FLUOR DANIEL FERNALD

FIELD LABORATORY COMPACTION TEST (ASTM D 698 METHOD B)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO

DESCRIPTION: Phase IV

MATERIAL TYPE: Low Perm Clay

PROJECT NO. 6Q1341 TASK NO.: 04.1

DATE: 15 day July month 2002 year

SAMPLE NO.: LP 02-8

THIS METHOD WILL BE USED IF THE MATERIAL RETAINED ON THE NO. 3/4-in. (19-mm) SIEVE IS LESS THAN 30%, IF THE MATERIAL RETAINED ON THE NO. 4 (4.75-mm) SIEVE IS GREATER THAN 20%, AND IF THE MATERIAL RETAINED ON THE NO. 3/8-in. (9.5-mm) SIEVE IS LESS THAN 20%.
ALL MATERIAL RETAINED ON THE NO. 3/8-in. (9.5-mm) SIEVE IS DISCARDED.
USE OVERSIZE CORRECTION IF MORE THAN 5% IS DISCARDED ACCORDING TO ASTM D 4718.
USE A 4-in. DIAMETER MOLD / 5.5-lb RAMMER / 12-in. DROP / 3 LAYERS / 25 BLOWS PER LAYER.

COMPACTION OF SOIL

QA ID: DZ

			13.63	13.73	13.68		
	WATER ADDED	(ml)	10%	12%	13%		
A	WT. OF SOIL & MOLD	(grams)	6182.6	6227.9	6205.2		
B	WT. OF MOLD	(grams)	4204.5	4204.5	4204.5		
C	WT. OF SOIL = A − B	(grams)	1978.1	2023.4	2000.7		
D	WET UNIT WT.(1) = C X 0.066	(pcf)	130.6	133.5	132.0		
E	DRY UNIT WT. = D / [1 + (K/100)]	(pcf)	115.4	116.5	113.6		

NOTE: IF CALIBRATED MOLD OF 1/30 FT^3 IS USED, THE WET DENSITY IS CALCULATED FROM THE WEIGHT OF SOIL, THE VOLUME OF THE MOLD AND THE CONVERSION FROM GRAMS TO POUNDS (I.E., CONVERSION FACTOR = (30 / 453.6) = 0.066). THE MOLD MUST BE CALIBRATED TO VERIFY A CAPACITY OF 1/30 ± 0.0005 FT^3 ON INTERVALS NOT TO EXCEED 1000 TIMES THAT THE MOLD IS FILLED.

MOISTURE CONTENT – ASTM D 2216

QA ID: DZ

	TARE NO.		#604	#52	#604		
F	WT. OF TARE	(grams)	8.3	8.1	8.3		
G	WT. OF WET SOIL & TARE	(grams)	425.2	500.2	471.3		
H	WT. OF DRY SOIL & TARE	(grams)	376.7	437.5	406.7		
I	WT. OF WATER = G − H	(grams)	48.5	62.7	64.6		
J	WT. DRY SOIL = H − F	(grams)	368.4	429.4	398.4		
K	MOISTURE CONTENT = (I/J) X 100	(%)	13.2	14.6	16.2		
			1.132	1.146	1.162		

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GEOSYNTEC CONSULTANTS FILE NO. 2-05-FLC

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SHEET NO. 2 OF 4

GeoSyntec Consultants

FLUOR FERNALD

4940

CORRECTION OF UNIT WEIGHT AND WATER CONTENT FOR SOILS CONTAINING OVERSIZE PARTICLES

(ASTM D 4718)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO PROJECT NO. GQ1341 TASK NO. 04.1

DESCRIPTION: Phase IV DATE: 18 day July month 2002 year

MATERIAL TYPE: Clay Liner LP02-8

Weight of Total Sample	=	44806.6
Weight of Oversize Fraction	=	836.1
Weight of Finer Fraction (- 3/8)	=	43970.5
Percentage of Oversize Fraction	= (P_C)	1.87
Percentage of Finer Fraction (- 3/8)	= (P_F)	98.1
Specific Gravity (Assumed)	= (G_M)	2.72

(W_F) =	Water Content - 3/8 , as decimal	=	0.146
(W_C) =	Water Content + 3/8 , as decimal	=	0.015
(δ_F) =	Dry Density of finer fraction	=	116.5
(δ_W) =	Unit Weight of Water	=	62.4

$$C_W=(W_F P_F)+(W_C P_C)$$

$C_W = 14.4\ \%$

$$C\delta_D=100\delta_F G_M \delta_W/(\delta_F P_C)+(G_M \delta_W P_F)$$

$C_{\delta D} = 117.2$ pcf

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GEOSYNTEC CONSULTANTS

FLUOR FERNALD

MOISTURE–DENSITY RELATIONSHIP

-4940

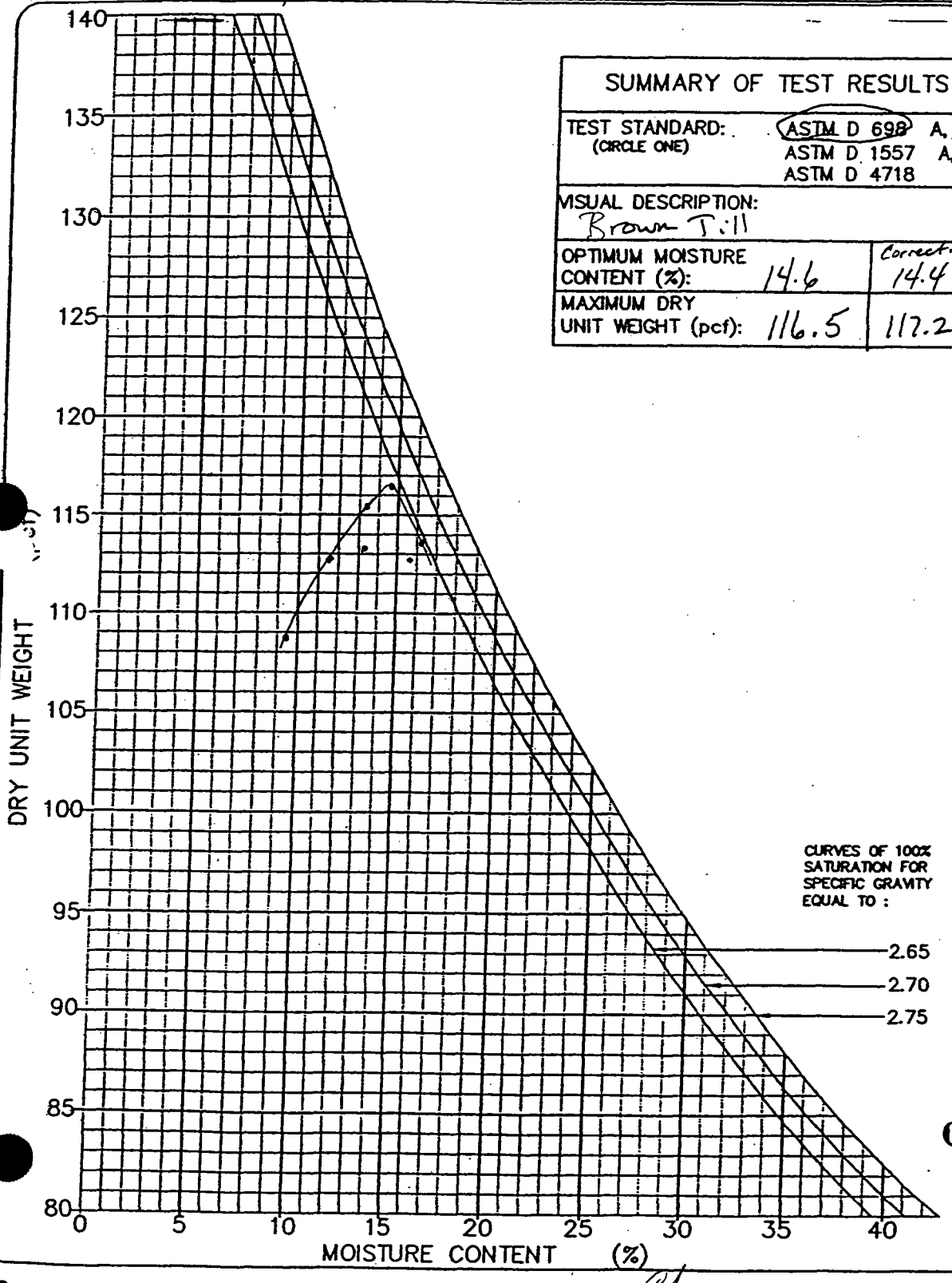
PROJECT: ON–SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO PROJECT NO.: GQ1341 TASK NO.: 04.1

DESCRIPTION: Phase IV DATE: 18 day July month 2002 year

MATERIAL TYPE: Clay Liner MATERIAL SOURCE: STOCKPILE 02-1 SAMPLE NO.: LP02-8

SUMMARY OF TEST RESULTS			QA ID
TEST STANDARD: (CIRCLE ONE)	ASTM D 698 A, B, C ASTM D 1557 A, B, C ASTM D 4718		CS
VISUAL DESCRIPTION: Brown Till			CS
OPTIMUM MOISTURE CONTENT (%):	14.6	Correction 14.4	CS
MAXIMUM DRY UNIT WEIGHT (pcf):	116.5	117.2	CS



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GEOSYNTEC CONSULTANTS

FLUOR FERNALD

FIELD LABORATORY COMPACTION TEST

(ASTM D 1557 METHOD B)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO

DESCRIPTION: Phase IV — PROJECT NO. GQ1341 TASK NO.: 041

DATE: 12 day July month 2002 year

MATERIAL TYPE: Low Perm Clay — MATERIAL SOURCE: Borrow Area — SAMPLE NO.: LP02-8

THIS METHOD WILL BE USED IF THE MATERIAL RETAINED ON THE NO. 4-in. (4.75-mm) SIEVE IS GREATER THAN 20%,
AND THE MATERIAL RETAINED ON THE NO. 3/8-in. (9.5-mm) SIEVE IS LESS THAN 20%.
ALL MATERIAL RETAINED ON THE NO. 3/8-in. (9.5-mm) SIEVE IS DISCARDED.
USE OVERSIZE CORRECTION IF MORE THAN 5% IS DISCARDED ACCORDING TO ASTM D 4718.
USE A 4-in. DIAMETER MOLD / 10-lb RAMMER / 18-in. DROP / 5 LAYERS / 25 BLOWS PER LAYER.

COMPACTION OF SOIL

QA ID: KS

			13.59 KS	13.83	13.92	13.86	
	WATER ADDED	(ml)	4%	6%	8%	10%	
A	WT. OF SOIL & MOLD	(grams)	6169.0	6273.3	6314.1	6286.9	
B	WT. OF MOLD	(grams)	4204.5	4204.5	4204.5	4204.5	4204.5
C	WT. OF SOIL = A − B	(grams)	1964.5	2068.8	2109.6	2082.4	
D	WET UNIT WT.(1) = C X 0.066	(pcf)	129.7	136.5	139.2	137.4	
E	DRY UNIT WT. = D / [1 + (K/100)]	(pcf)	121.4	124.9	125.4	121.5	

NOTE: IF CALIBRATED MOLD OF 1/30 FT^3 IS USED, THE WET DENSITY IS CALCULATED FROM THE WEIGHT OF SOIL, THE VOLUME OF THE MOLD AND THE CONVERSION FROM GRAMS TO POUNDS (I.E., CONVERSION FACTOR = (30 / 453.6) = 0.066). THE MOLD MUST BE CALIBRATED TO VERIFY A CAPACITY OF 1/30 ± 0.0005 FT^3 ON INTERVALS NOT TO EXCEED 1000 TIMES THAT THE MOLD IS FILLED.

MOISTURE CONTENT — ASTM D 2216

QA ID: [illegible]

	TARE NO.		#608	#605	#92	#601	
F	WT. OF TARE	(grams)	8.2	8.3	8.2	8.2	
G	WT. OF WET SOIL & TARE	(grams)	332.0	362.1	418.9	412.7	
H	WT. OF DRY SOIL & TARE	(grams)	311.5	332.0	378.1	366.0	
I	WT. OF WATER = G − H	(grams)	20.5	30.1	40.8	46.7	
J	WT. DRY SOIL = H − F	(grams)	303.3	323.7	369.9	357.8	
K	MOISTURE CONTENT = (I/J) X 100	(%)	6.8	9.3	11.0	13.1	
			1.068	1.093	1.110	1.131	

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GEO SYNTEC CONSULTANTS FILE NO. 2-09-FLC

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SHEET NO. 1 OF 3

GeoSyntec Consultants

FLUOR FERNALD

4940.

CORRECTION OF UNIT WEIGHT AND WATER CONTENT FOR SOILS CONTAINING OVERSIZE PARTICLES

(ASTM D 4718)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO PROJECT NO. GQ1341 TASK NO. 04.1

DESCRIPTION: Phase IV DATE: 16 day July month 2002 year

MATERIAL TYPE: Low Perm Clay Liner LP08-2 Mod

Weight of Total Sample	=	44806.6
Weight of Oversize Fraction	=	836.1
Weight of Finer Fraction (- 3/8)	=	43970.5
Percentage of Oversize Fraction	= (P_C)	1.9
Percentage of Finer Fraction (- 3/8)	= (P_F)	98.1
Specific Gravity (Assumed)	= (G_M)	2.72

(W_F) =	Water Content - 3/8 , as decimal	=	0.110
(W_C) =	Water Content + 3/8 , as decimal	=	0.015
(δ_F) =	Dry Density of finer fraction	=	125.4
(δ_W) =	Unit Weight of Water	=	62.4

$$C_W=(W_F P_F)+(W_C P_C)$$

$C_W = 10.8\%$

$$C\delta_D=100\delta_F G_M \delta_W/(\delta_F P_C)+(G_M \delta_W P_F)$$

$C_{\delta D} = 126.0$ pcf

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GEOSYNTEC CONSULTANTS

FLUOR FERNALD

4940

MOISTURE–DENSITY RELATIONSHIP

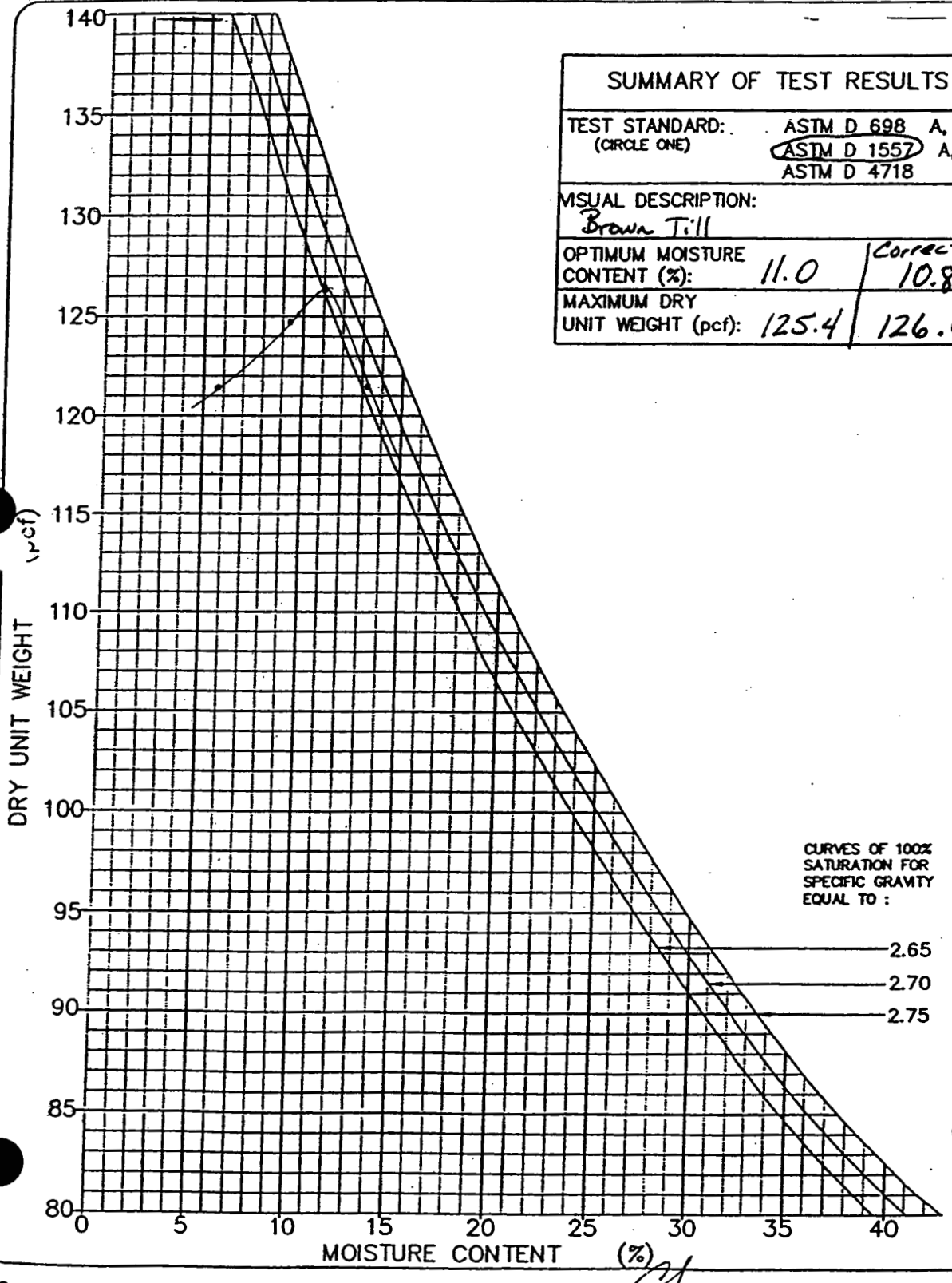
PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO PROJECT NO.: GQ1341 TASK NO.: 04.1

DESCRIPTION: Phase IV DATE: 16 day July month 2002 year

MATERIAL TYPE: Clay Liner MATERIAL SOURCE: STOCKPILE 02-1 SAMPLE NO.: LP02-8

SUMMARY OF TEST RESULTS			QA ID
TEST STANDARD: (CIRCLE ONE)	ASTM D 698 A, B, C ASTM D 1557 A, (B) C ASTM D 4718		CJ
VISUAL DESCRIPTION: Brown Till			CJ
OPTIMUM MOISTURE CONTENT (%):	11.0	Corrected 10.8	CJ
MAXIMUM DRY UNIT WEIGHT (pcf):	125.4	126.0	CJ



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GEOSYNTEC CONSULTANTS

FLUOR DANIEL FERNALD

FIELD LABORATORY COMPACTION TEST (ASTM D 698 METHOD B)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO

DESCRIPTION: Phase IV

MATERIAL TYPE: Low Perm Clay

PROJECT NO.: 69134 TASK NO.: 04.1

DATE: 13 day JUL month 02 year

SAMPLE NO.: LP-02-~~10~~ 9

THIS METHOD WILL BE USED IF THE MATERIAL RETAINED ON THE NO. 3/4-in. (19-mm) SIEVE IS LESS THAN 30%, IF THE MATERIAL RETAINED ON THE NO. 4 (4.75-mm) SIEVE IS GREATER THAN 20%, AND IF THE MATERIAL RETAINED ON THE NO. 3/8-in. (9.5-mm) SIEVE IS LESS THAN 20%.
ALL MATERIAL RETAINED ON THE NO. 3/8-in. (9.5-mm) SIEVE IS DISCARDED.
USE OVERSIZE CORRECTION IF MORE THAN 5% IS DISCARDED ACCORDING TO ASTM D 4718.
USE A 4-in. DIAMETER MOLD / 5.5-lb RAMMER / 12-in. DROP / 3 LAYERS / 25 BLOWS PER LAYER.

COMPACTION OF SOIL

QA ID: CB/DE

	WATER ADDED	(ml)	4%	6%	8%	10%	12%
A	WT. OF SOIL & MOLD	(grams)		6028.3	6155.4	6205.2	6205.2
B	WT. OF MOLD	(grams)	4204.5	4204.5	4204.5	4204.5	4204.5
C	WT. OF SOIL = A - B	(grams)		1823.8	1950.9	2000.7	2000.7
D	WET UNIT WT.(1) = C X 0.066	(pcf)		120.4	128.8	132.0	132.0
E	DRY UNIT WT. = D / [1 + (K/100)]	(pcf)	109.5	~~108.8~~ 13.29	114.7 13.57	116.4 13.68	114.1 13.68

NOTE: IF CALIBRATED MOLD OF 1/30 FT³ IS USED, THE WET DENSITY IS CALCULATED FROM THE WEIGHT OF SOIL, THE VOLUME OF THE MOLD AND THE CONVERSION FROM GRAMS TO POUNDS (I.E., CONVERSION FACTOR = (30 / 453.6) = 0.066). THE MOLD MUST BE CALIBRATED TO VERIFY A CAPACITY OF 1/30 ± 0.0005 FT³ ON INTERVALS NOT TO EXCEED 1000 TIMES THAT THE MOLD IS FILLED.

MOISTURE CONTENT - ASTM D 2216

QA ID: CB/DE

	TARE NO.			#607	#14	#97	#18
F	WT. OF TARE	(grams)		8.1	8.3	8.2	8.4
G	WT. OF WET SOIL & TARE	(grams)		379.3	416.5	444.0	418.7
H	WT. OF DRY SOIL & TARE	(grams)		345.9	371.7	392.6	363.0
I	WT. OF WATER = G - H	(grams)		33.4	44.8	51.4	55.7
J	WT. DRY SOIL = H - F	(grams)	337.8	~~312.5~~	363.4	384.4	354.6
K	MOISTURE CONTENT = (I/J) X 100	(%)		9.9 ~~10.7~~	12.3	13.4	15.7

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SHEET NO. 1 OF 3

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4940

FLUOR FERNALD

CORRECTION OF UNIT WEIGHT AND WATER CONTENT FOR SOILS CONTAINING OVERSIZE PARTICLES

(ASTM D 4718)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO PROJECT NO. 60134 TASK NO. 041

DESCRIPTION: Phase IV DATE: 16 day July month 2002 year

MATERIAL TYPE: Clay Liner CP02-9

Weight of Total Sample	=	22074.5
Weight of Oversize Fraction	=	811.2
Weight of Finer Fraction (- 3/8)	=	21263.3
Percentage of Oversize Fraction	= (P_C)	3.7
Percentage of Finer Fraction (- 3/8)	= (P_F)	96.3
Specific Gravity (Assumed)	= (G_M)	2.72

(W_F) =	Water Content - 3/8 , as decimal	=	0.141
(W_C) =	Water Content + 3/8 , as decimal	=	0.015
(δ_F) =	Dry Density of finer fraction	=	117.1
(δ_W) =	Unit Weight of Water	=	62.4

$$C_W=(W_F P_F)+(W_C P_C)$$

C_w = ~~10.7%~~ = 13.6%

$$C\delta_D=100\delta_F G_M \delta_W/(\delta_F P_C)+(G_M \delta_W P_F)$$

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$C_{\delta D}$ = ~~126.6 pcf~~ = 118.4 pcf

GEOSYNTEC CONSULTANTS

FLUOR FERNALD

4940

MOISTURE-DENSITY RELATIONSHIP

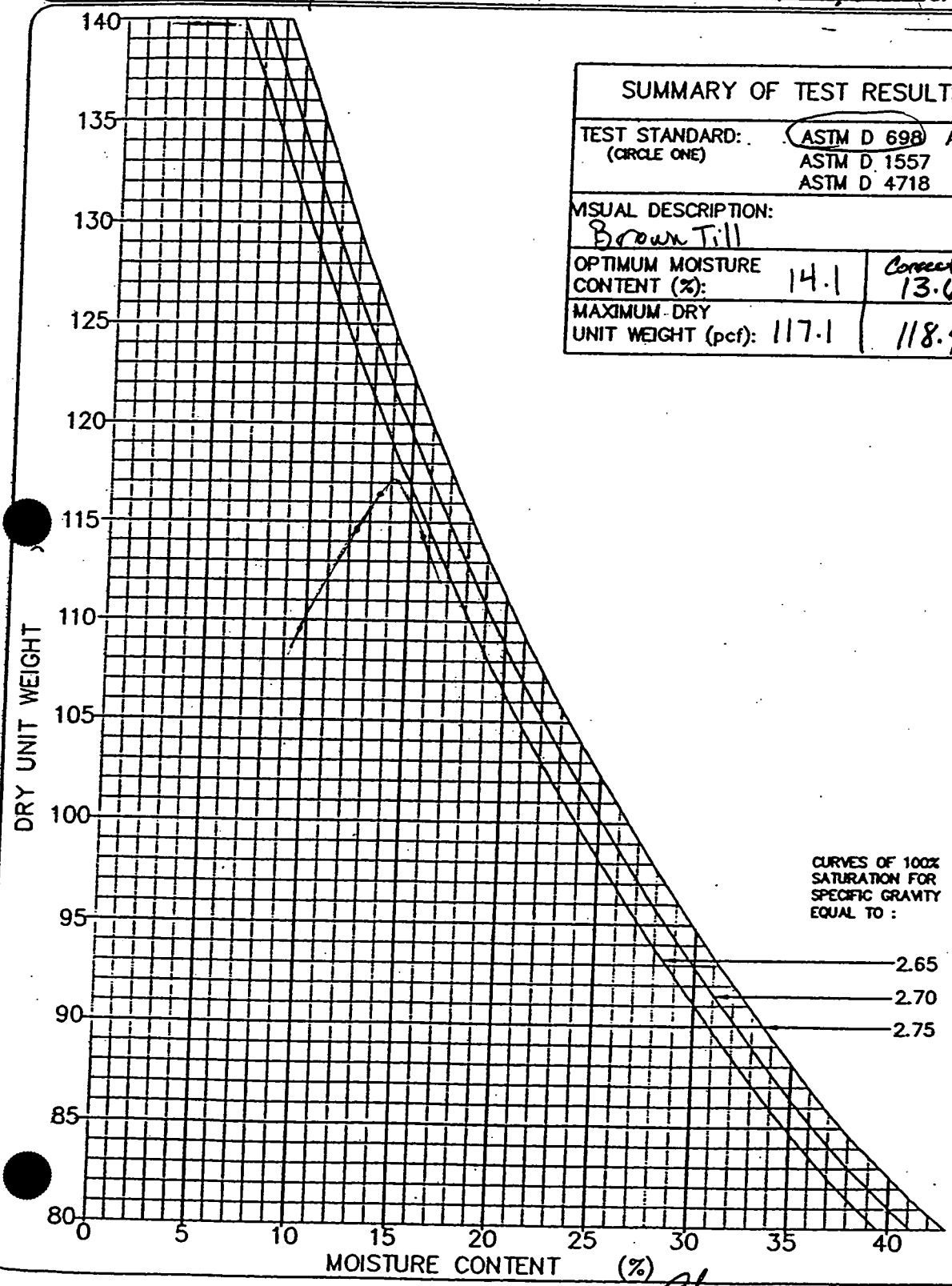
PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO PROJECT NO.: GQ1341 TASK NO.: 04.1

DESCRIPTION: Phase IV DATE: 15 day July month 2002 year

MATERIAL TYPE: Clay Liner MATERIAL SOURCE: STOCKPILE Ø2-2 SAMPLE NO.: LPØ2-

SUMMARY OF TEST RESULTS			QA ID
TEST STANDARD: (CIRCLE ONE)	ASTM D 698 A, B, C ASTM D 1557 A, B, C ASTM D 4718		GS
VISUAL DESCRIPTION: Brown Till			GS
OPTIMUM MOISTURE CONTENT (%):	14.1	Corrected 13.6	GS
MAXIMUM DRY UNIT WEIGHT (pcf):	117.1	118.4	GS



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FLUOR DANIEL FERNALD

FIELD LABORATORY COMPACTION TEST (ASTM D 698 METHOD B)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO

DESCRIPTION: Phase II

MATERIAL TYPE: Low Perm Clay

PROJECT NO. 69341 TASK NO.: 04.1

DATE: 15 day July month 2002 year

SAMPLE NO.: LP02-D

THIS METHOD WILL BE USED IF THE MATERIAL RETAINED ON THE NO. 3/4-in. (19-mm) SIEVE IS LESS THAN 30%, IF THE MATERIAL RETAINED ON THE NO. 4 (4.75-mm) SIEVE IS GREATER THAN 20%, AND IF THE MATERIAL RETAINED ON THE NO. 3/8-in. (9.5-mm) SIEVE IS LESS THAN 20%.
ALL MATERIAL RETAINED ON THE NO. 3/8-in. (9.5-mm) SIEVE IS DISCARDED.
USE OVERSIZE CORRECTION IF MORE THAN 5% IS DISCARDED ACCORDING TO ASTM D 4718.
USE A 4-in. DIAMETER MOLD / 5.5-lb RAMMER / 12-in. DROP / 3 LAYERS / 25 BLOWS PER LAYER.

COMPACTION OF SOIL

			13.46	13.73	13.77	13.66	QA ID: DJE	
	WATER ADDED	(ml)	4%	6%	8%	10%		
A	WT. OF SOIL & MOLD	(grams)	6105.5	6227.9	6246.1	6196.2		
B	WT. OF MOLD	(grams)	4204.5	4204.5	4204.5	4204.5		4204.5
C	WT. OF SOIL = A - B	(grams)	1901.0 ~~1901.0~~	2023.4	2041.6	1991.7		
D	WET UNIT WT.(1) = C X 0.066	(pcf)	125.5 ~~118.9~~	133.5	134.7	131.5		
E	DRY UNIT WT. = D / [1 + (K/100)]	(pcf)	114.5 ~~108.6~~	119.2	117.3 ~~117.1~~	112.5		

NOTE: IF CALIBRATED MOLD OF 1/30 FT^3 IS USED, THE WET DENSITY IS CALCULATED FROM THE WEIGHT OF SOIL, THE VOLUME OF THE MOLD AND THE CONVERSION FROM GRAMS TO POUNDS (I.E., CONVERSION FACTOR = (30 / 453.6) = 0.066). THE MOLD MUST BE CALIBRATED TO VERIFY A CAPACITY OF 1/30 ± 0.0005 FT^3 ON INTERVALS NOT TO EXCEED 1000 TIMES THAT THE MOLD IS FILLED.

MOISTURE CONTENT - ASTM D 2216

						#103	QA ID: DJE	
	TARE NO.		#615	#636	#95	~~#8.4~~		
F	WT. OF TARE	(grams)	8.2	8.2	8.1	8.4		
G	WT. OF WET SOIL & TARE	(grams)	411.1	485.5	508.8	464.2		
H	WT. OF DRY SOIL & TARE	(grams)	376.0	434.5	443.9	398.2		
I	WT. OF WATER = G - H	(grams)	35.1	51.0	~~65.2~~ 64.9	66.0		
J	WT. DRY SOIL = H - F	(grams)	367.8	426.3	435.8	389.8		
K	MOISTURE CONTENT = (I/J) X 100	(%)	9.5	12.0	~~15.0~~ 14.9	16.9		
			1.095	1.120	1.15	1.169		

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SHEET NO. 1 OF 3

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FLUOR FERNALD

CORRECTION OF UNIT WEIGHT AND WATER CONTENT FOR SOILS CONTAINING OVERSIZE PARTICLES

(ASTM D 4718)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO

PROJECT NO. GQ134 / TASK NO. 04.1

DESCRIPTION: Phase IV

DATE: 16 day July month 2002 year

MATERIAL TYPE: Clay Liner and Cap

LP02-10

Weight of Total Sample	=	47900.5
Weight of Oversize Fraction	=	2259.3
Weight of Finer Fraction (-3/8)	=	45641.2
Percentage of Oversize Fraction	= (P_C)	4.7
Percentage of Finer Fraction (-3/8)	= (P_F)	95.3
Specific Gravity (Assumed)	= (G_M)	2.72

(W_F) =	Water Content -3/8, as decimal	=	0.13
(W_C) =	Water Content +3/8, as decimal	=	0.015
(δ_F) =	Dry Density of finer fraction	=	121.0
(δ_W) =	Unit Weight of Water	=	62.4

$$C_W = (W_F P_F) + (W_C P_C)$$

$C_W = 12.5\%$

$$C\delta_D = 100\delta_F G_M \delta_W / (\delta_F P_C) + (G_M \delta_W P_F)$$

$C_{\delta D} = 122.7$ pcf

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GEOSYNTEC CONSULTANTS

FLUOR FERNALD 4940

MOISTURE–DENSITY RELATIONSHIP

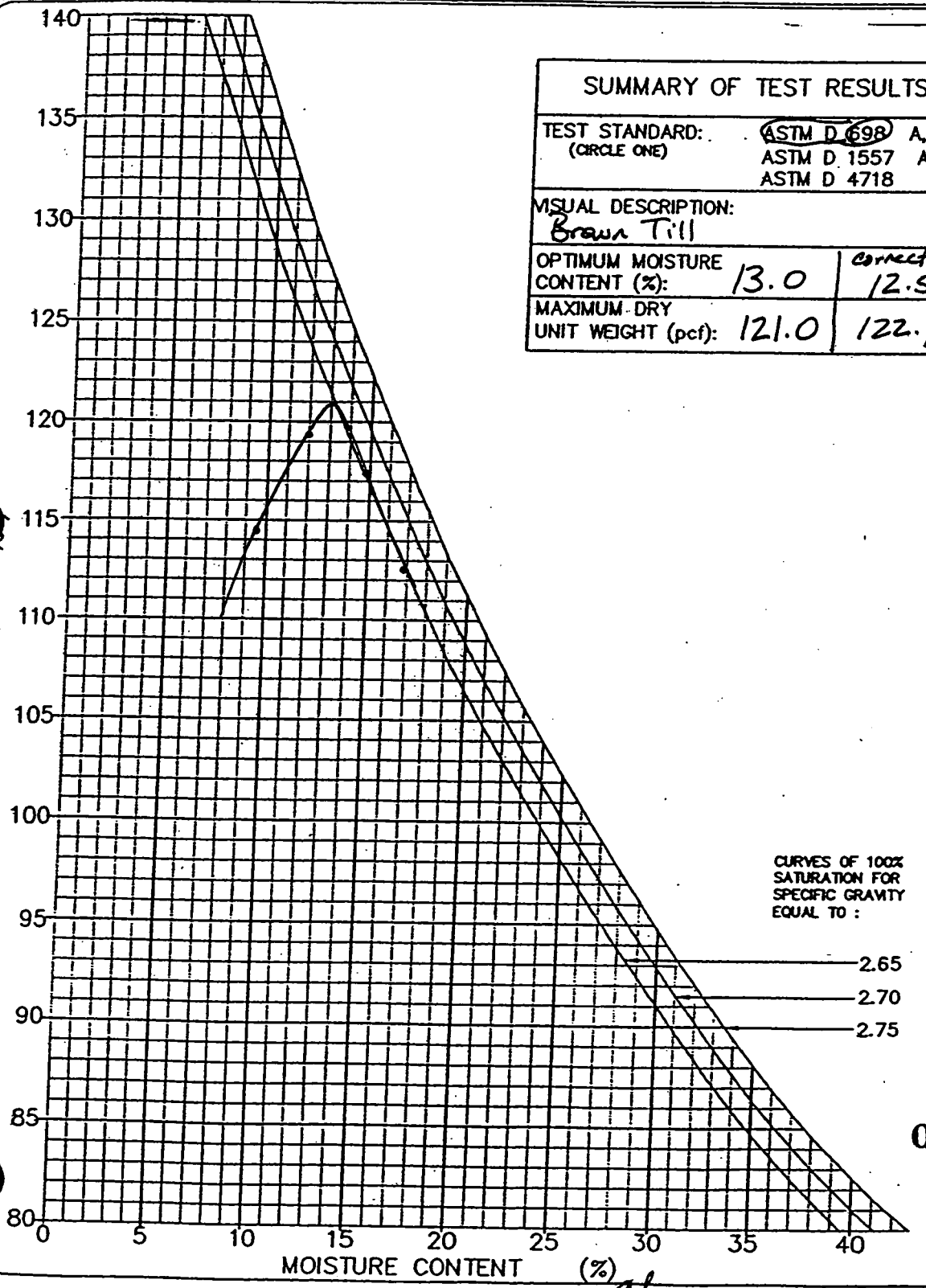
PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO PROJECT NO.: GQ1341 TASK NO.: 04.1

DESCRIPTION: Phase IV DATE: 16 day July month 2002 year

MATERIAL TYPE: Clay Liner MATERIAL SOURCE: STOCKPILE Ø2-1 SAMPLE NO.: LA02-1Ø

SUMMARY OF TEST RESULTS			QA ID
TEST STANDARD: (CIRCLE ONE)	ASTM D 698 A, B, C ASTM D 1557 A, B, C ASTM D 4718		CA
VISUAL DESCRIPTION: Brown Till			CA
OPTIMUM MOISTURE CONTENT (%):	13.0	corrected 12.5	CA
MAXIMUM DRY UNIT WEIGHT (pcf):	121.0	122.7	CA



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FLUOR FERNALD

FIELD LABORATORY COMPACTION TEST

(ASTM D 1557 METHOD B)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO

DESCRIPTION: Phase IV — PROJECT NO.: GQ1341 TASK NO.: 04.1

MATERIAL TYPE: LP-02-10 (Low Perm Clay) MATERIAL SOURCE: STOCKPILE 02-2 — DATE: 15 day July month 2002 year — SAMPLE NO.: LP02-10

THIS METHOD WILL BE USED IF THE MATERIAL RETAINED ON THE NO. 4-in. (4.75-mm) SIEVE IS GREATER THAN 20%.
AND THE MATERIAL RETAINED ON THE NO. 3/8-in. (9.5-mm) SIEVE IS LESS THAN 20%.
ALL MATERIAL RETAINED ON THE NO. 3/8-in. (9.5-mm) SIEVE IS DISCARDED.
USE OVERSIZE CORRECTION IF MORE THAN 5% IS DISCARDED ACCORDING TO ASTM D 4718.
USE A 4-in. DIAMETER MOLD / 10-lb RAMMER / 18-in. DROP / 5 LAYERS / 25 BLOWS PER LAYER.

COMPACTION OF SOIL

	WATER ADDED	(ml)	13.88	14.04	13.97	13.78	13.68
			2%	4%	6%	8%	0%
A	WT. OF SOIL & MOLD	(grams)	6295.0	6368.5	6336.6	6250.6	6205.2
B	WT. OF MOLD	(grams)	4204.5	4204.5	4204.5	4204.5	4204.5
C	WT. OF SOIL = A − B	(grams)	2091.5	2164.0	2132.3	2046.1	2000.7
D	WET UNIT WT.(1) = C X 0.066	(pcf)	138.0	142.8	140.7	135.0	132.0
E	DRY UNIT WT. = D / [1 + (K/100)]	(pcf)	127.4	128.8	124.6	117.6	123.6

QA ID: [illegible]

NOTE: IF CALIBRATED MOLD OF 1/30 FT³ IS USED, THE WET DENSITY IS CALCULATED FROM THE WEIGHT OF SOIL, THE VOLUME OF THE MOLD AND THE CONVERSION FROM GRAMS TO POUNDS (I.E., CONVERSION FACTOR = (30 / 453.6) = 0.066). THE MOLD MUST BE CALIBRATED TO VERIFY A CAPACITY OF 1/30 ± 0.0005 FT³ ON INTERVALS NOT TO EXCEED 1000 TIMES THAT THE MOLD IS FILLED.

MOISTURE CONTENT — ASTM D 2216

	TARE NO.		#96	#107	#97	#309	#92
F	WT. OF TARE	(grams)	8.1	8.0	8.2	8.0	8.2
G	WT. OF WET SOIL & TARE	(grams)	397.8	560.7	453.0	518.4	398.0
H	WT. OF DRY SOIL & TARE	(grams)	368.0	506.6	402.1	445.5	373.1
I	WT. OF WATER = G − H	(grams)	29.8	54.1	50.9	64.9	24.9
J	WT. DRY SOIL = H − F	(grams)	359.9	498.6	393.9	437.5	364.9
K	MOISTURE CONTENT = (I/J) X 100	(%)	8.3	10.9	12.9	14.8	6.8

QA ID: DLE

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1.083 1.109 1.129 1.118 1.068

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SHEET NO. 1 OF 3

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FLUOR FERNALD

CORRECTION OF UNIT WEIGHT AND WATER CONTENT FOR SOILS CONTAINING OVERSIZE PARTICLES

(ASTM D 4718)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO PROJECT NO. GQ1341 TASK NO. 04.1

DESCRIPTION: Phase IV DATE: 18 day July month 2002 year

MATERIAL TYPE: Clay Liner LP02-10 MOD

Weight of Total Sample	=	47900.5
Weight of Oversize Fraction	=	2259.3
Weight of Finer Fraction (-3/8)	=	45641.2
Percentage of Oversize Fraction	= (P_C)	4.7
Percentage of Finer Fraction (-3/8)	= (P_F)	95.3
Specific Gravity (Assumed)	= (G_M)	2.72

(W_F) =	Water Content -3/8, as decimal	=	0.10
(W_C) =	Water Content +3/8, as decimal	=	0.015
(δ_F) =	Dry Density of finer fraction	=	130.0
(δ_W) =	Unit Weight of Water	=	62.5

$$C_W=(W_F P_F)+(W_C P_C)$$

C_W = 9.6 %

$$C\delta_D=100\delta_F G_M \delta_W/(\delta_F P_C)+(G_M \delta_W P_F)$$

$C_{\delta D}$ = 131.5 pcf

GEOSYNTEC CONSULTANTS

FLUOR FERNALD 4940

MOISTURE–DENSITY RELATIONSHIP

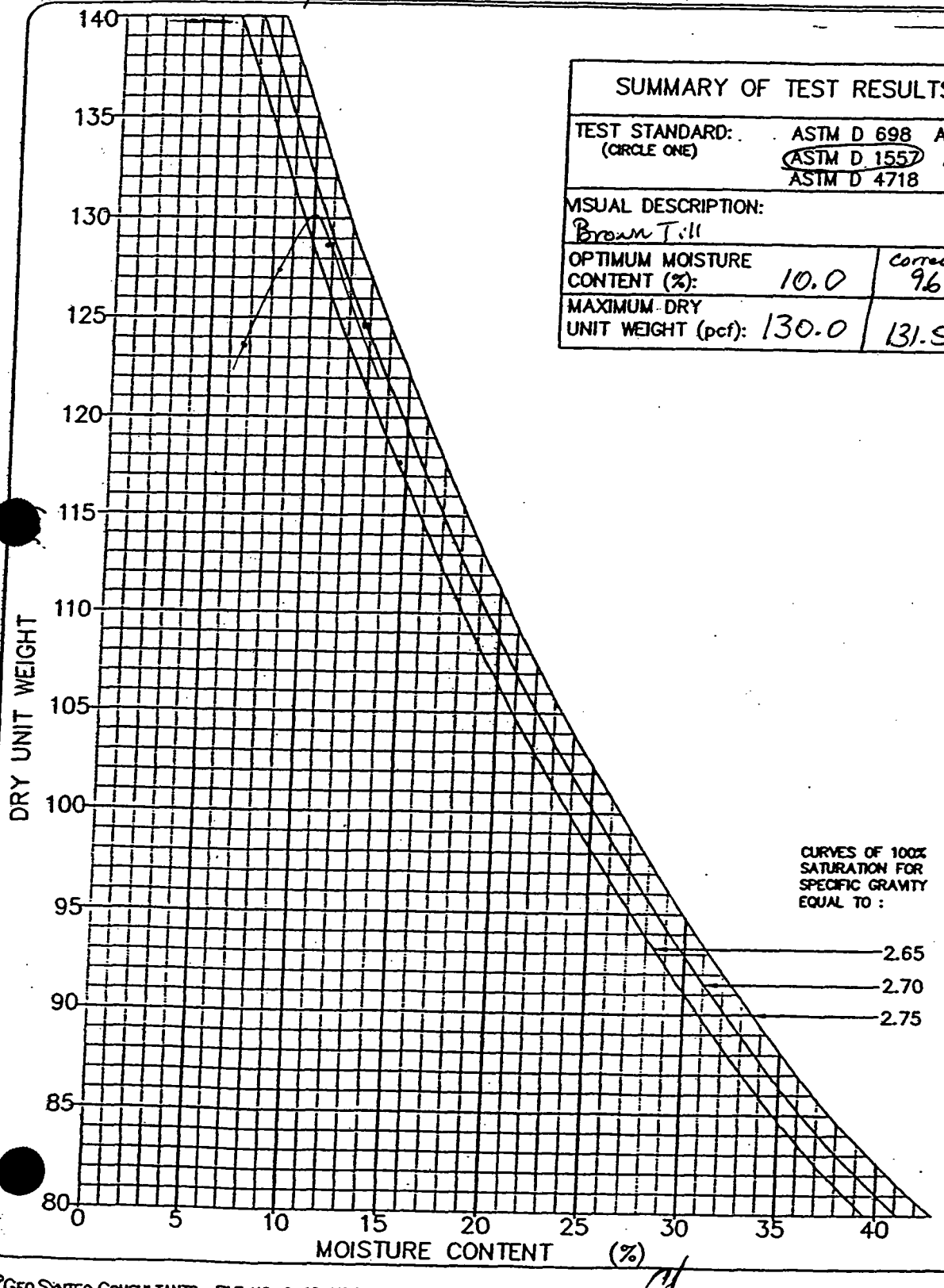
PROJECT: ON–SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO PROJECT NO.: GQ1341 TASK NO.: 04.1

DESCRIPTION: Phase IV DATE: 18 day July month 2002 year

MATERIAL TYPE: Clay Liner MATERIAL SOURCE: STOCKPILE #2-2 SAMPLE NO.: LA02-10

SUMMARY OF TEST RESULTS			QA ID
TEST STANDARD: (CIRCLE ONE)	ASTM D 698 A, B, C ASTM D 1557 A, B, C ASTM D 4718		CA
VISUAL DESCRIPTION: Brown Till			CA
OPTIMUM MOISTURE CONTENT (%):	10.0	corrected 9.6	CA
MAXIMUM DRY UNIT WEIGHT (pcf):	130.0	131.5	CA



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FLUOR DANIEL FERNALD

FIELD LABORATORY COMPACTION TEST (ASTM D 698 METHOD B)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO

DESCRIPTION: Phase IV

MATERIAL TYPE: Low Perm Clay

PROJECT NO. 6-Q131 TASK NO.: 04.1

DATE: 17 day July month 2002 year

SAMPLE NO.: LP02-11

THIS METHOD WILL BE USED IF THE MATERIAL RETAINED ON THE NO. 3/4-in. (19-mm) SIEVE IS LESS THAN 30%, IF THE MATERIAL RETAINED ON THE NO. 4 (4.75-mm) SIEVE IS GREATER THAN 20%, AND IF THE MATERIAL RETAINED ON THE NO. 3/8-in. (9.5-mm) SIEVE IS LESS THAN 20%.
ALL MATERIAL RETAINED ON THE NO. 3/8-in. (9.5-mm) SIEVE IS DISCARDED.
USE OVERSIZE CORRECTION IF MORE THAN 5% IS DISCARDED ACCORDING TO ASTM D 4718.
USE A 4-in. DIAMETER MOLD / 5.5-lb RAMMER / 12-in. DROP / 3 LAYERS / 25 BLOWS PER LAYER.

COMPACTION OF SOIL

QA ID: DLE

			13.47	13.67	13.80	13.81	13.
	WATER ADDED	(ml)	100 mL 4%	150 mL 6%	200 mL 8%	250 mL 10%	12%
A	WT. OF SOIL & MOLD	(grams)	6110.0	6200.7	6259.7	6264.2	
B	WT. OF MOLD	(grams)	4204.5	4204.5	4204.5	4204.5	4204.5
C	WT. OF SOIL = A − B	(grams)	1905.5	1996.2	2055.2	2059.7	
D	WET UNIT WT.(1) = C X 0.066	(pcf)	125.8	131.7	135.6	135.9	
E	DRY UNIT WT. = D / [1 + (K/100)]	(pcf)	115.8	119.2	120.4	118.9	

NOTE: IF CALIBRATED MOLD OF 1/30 FT^3 IS USED, THE WET DENSITY IS CALCULATED FROM THE WEIGHT OF SOIL, THE VOLUME OF THE MOLD AND THE CONVERSION FROM GRAMS TO POUNDS (I.E., CONVERSION FACTOR = (30 / 453.6) = 0.066). THE MOLD MUST BE CALIBRATED TO VERIFY A CAPACITY OF 1/30 ± 0.0005 FT^3 ON INTERVALS NOT TO EXCEED 1000 TIMES THAT THE MOLD IS FILLED.

MOISTURE CONTENT – ASTM D 2216

QA ID: DLE

	TARE NO.		#614	#202	#679	#65	
F	WT. OF TARE	(grams)	8.3	8.2	8.1	8.2	
G	WT. OF WET SOIL & TARE	(grams)	479.1	446.4	524.4	530.1	
H	WT. OF DRY SOIL & TARE	(grams)	441.7	404.9	466.7	464.9	
I	WT. OF WATER = G − H	(grams)	37.4	41.5	57.7	65.2	
J	WT. DRY SOIL = H − F	(grams)	433.4	396.7	458.6	456.7	
K	MOISTURE CONTENT = (I/J) X 100	(%)	8.6	10.5	12.6	14.3	
			1.086	1.105	1.126	1.143	

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FLUOR FERNALD 4940

CORRECTION OF UNIT WEIGHT AND WATER CONTENT FOR SOILS CONTAINING OVERSIZE PARTICLES *(ASTM D 4718)*

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO PROJECT NO. 6Q134 TASK NO. 04.1

DESCRIPTION: Phase IV DATE: 18 day July month 2002 year

MATERIAL TYPE: Clay Liner CP02-11 STD

Weight of Total Sample	=	21888.1
Weight of Oversize Fraction	=	795.8
Weight of Finer Fraction (- 3/8)	=	21092.3
Percentage of Oversize Fraction	= (P_C)	3.6
Percentage of Finer Fraction (- 3/8)	= (P_F)	96.4
Specific Gravity (Assumed)	= (G_M)	2.72

(W_F) =	Water Content - 3/8 , as decimal	=	0.123
(W_C) =	Water Content + 3/8 , as decimal	=	0.015
(δ_F) =	Dry Density of finer fraction	=	120.4
(δ_W) =	Unit Weight of Water	=	62.4

$$C_W=(W_F P_F)+(W_C P_C)$$

$$C_W = 11.9\%$$

$$C\delta_D=100\delta_F G_M \delta_W/(\delta_F P_C)+(G_M \delta_W P_F)$$

$$C_{\delta D} = 121.7 \text{ pcf}$$

000673

2 of 3

GEOSYNTEC CONSULTANTS

FLUOR FERNALD

4940

MOISTURE-DENSITY RELATIONSHIP

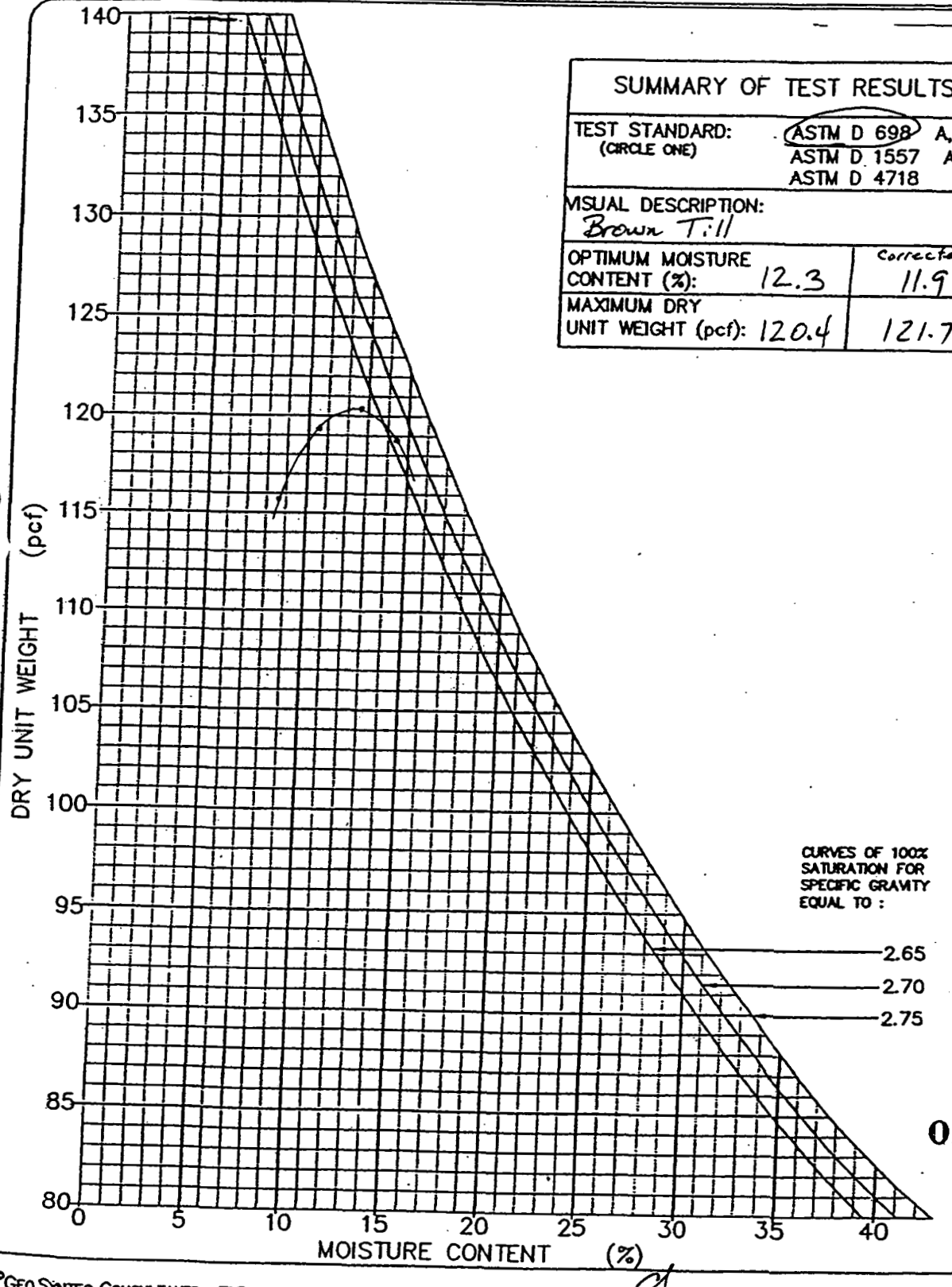
PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO PROJECT NO.: GQ1341 TASK NO.: 04.1

DESCRIPTION: Phase IV DATE: 18 day July month 2002 year

MATERIAL TYPE: Clay Liner MATERIAL SOURCE: STOCKPILE 02-2 SAMPLE NO.: LP02-11

SUMMARY OF TEST RESULTS			QA ID
TEST STANDARD: (CIRCLE ONE)	ASTM D 698 A, B, C ASTM D 1557 A, B, C ASTM D 4718		CA
VISUAL DESCRIPTION: Brown Till			CA
OPTIMUM MOISTURE CONTENT (%):	12.3	Corrected 11.9	CA
MAXIMUM DRY UNIT WEIGHT (pcf):	120.4	121.7	CA



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GEOSYNTEC CONSULTANTS

FLUOR DANIEL FERNALD

FIELD LABORATORY COMPACTION TEST (ASTM D 698 METHOD B)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO

PROJECT NO. 621341 TASK NO.: 04.1

DESCRIPTION:

DATE: 18 day July month 2002 year

MATERIAL TYPE:

SAMPLE NO.: LP02-12

THIS METHOD WILL BE USED IF THE MATERIAL RETAINED ON THE NO. 3/4-in. (19-mm) SIEVE IS LESS THAN 30%, IF THE MATERIAL RETAINED ON THE NO. 4 (4.75-mm) SIEVE IS GREATER THAN 20%, AND IF THE MATERIAL RETAINED ON THE NO. 3/8-in. (9.5-mm) SIEVE IS LESS THAN 20%.
ALL MATERIAL RETAINED ON THE NO. 3/8-in. (9.5-mm) SIEVE IS DISCARDED.
USE OVERSIZE CORRECTION IF MORE THAN 5% IS DISCARDED ACCORDING TO ASTM D 4718.
USE A 4-in. DIAMETER MOLD / 5.5-lb RAMMER / 12-in. DROP / 3 LAYERS / 25 BLOWS PER LAYER.

COMPACTION OF SOIL

QA ID: DLE

			13.29	13.54	13.74	13.77	
	WATER ADDED	(ml)	4%	6%	8%	10%	
A	WT. OF SOIL & MOLD	(grams)	6028.3	6141.7	6232.5	6246.1	
B	WT. OF MOLD	(grams)	4204.5	4204.5	4204.5	4204.5	4204.5
C	WT. OF SOIL = A − B	(grams)	1823.8	1937.2	2028.0	2041.6	
D	WET UNIT WT.(1) = C X 0.066	(pcf)	120.4	127.9	133.8	134.7	
E	DRY UNIT WT. = D / [1 + (K/100)]	(pcf)	111.8	116.3	119.6	117.5	

NOTE: IF CALIBRATED MOLD OF 1/30 FT^3 IS USED, THE WET DENSITY IS CALCULATED FROM THE WEIGHT OF SOIL, THE VOLUME OF THE MOLD AND THE CONVERSION FROM GRAMS TO POUNDS (I.E., CONVERSION FACTOR = (30 / 453.6) = 0.066). THE MOLD MUST BE CALIBRATED TO VERIFY A CAPACITY OF 1/30 ± 0.0005 FT^3 ON INTERVALS NOT TO EXCEED 1000 TIMES THAT THE MOLD IS FILLED.

MOISTURE CONTENT – ASTM D 2216

QA ID: DLE

	TARE NO.		#630	#230	#96	#675	
F	WT. OF TARE	(grams)	8.1	8.3	8.1	8.3	
G	WT. OF WET SOIL & TARE	(grams)	422.4	550.9	533.4	569.4	
H	WT. OF DRY SOIL & TARE	(grams)	393.0	502.0	477.5	497.6	
I	WT. OF WATER = G − H	(grams)	29.4	48.9	55.9	71.8	
J	WT. DRY SOIL = H − F	(grams)	384.9	493.7	469.4	489.3	
K	MOISTURE CONTENT = (I/J) X 100	(%)	7.6	9.9	11.9	14.7	

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SHEET NO. 1 OF 3

GeoSyntec Consultants

FLUOR FERNALD 4940

CORRECTION OF UNIT WEIGHT AND WATER CONTENT FOR SOILS CONTAINING OVERSIZE PARTICLES *(ASTM D 4718)*

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO PROJECT NO. GQ134 TASK NO. 04.1

DESCRIPTION: Phase IV DATE: 20 day July month 2002 year

MATERIAL TYPE: Clay Liner LP02-12 STD

Weight of Total Sample	=	37263.5
Weight of Oversize Fraction	=	1507.0
Weight of Finer Fraction (- 3/8)	=	35756.5
Percentage of Oversize Fraction	= (P_C)	4.0
Percentage of Finer Fraction (- 3/8)	= (P_F)	96.0
Specific Gravity (Assumed)	= (G_M)	2.72

(W_F) =	Water Content - 3/8 , as decimal	=	0.14
(W_C) =	Water Content + 3/8 , as decimal	=	0.015
(δ_F) =	Dry Density of finer fraction	=	121.0
(δ_W) =	Unit Weight of Water	=	62.4

$$C_W=(W_F P_F)+(W_C P_C)$$

$C_w = 13.5\ \%$

$$C\delta_D=100\delta_F G_M \delta_W/(\delta_F P_C)+(G_M \delta_W P_F)$$

$C_{\delta D} = 122.4$ pcf

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GEOSYNTEC CONSULTANTS

FLUOR FERNALD

MOISTURE-DENSITY RELATIONSHIP

4940

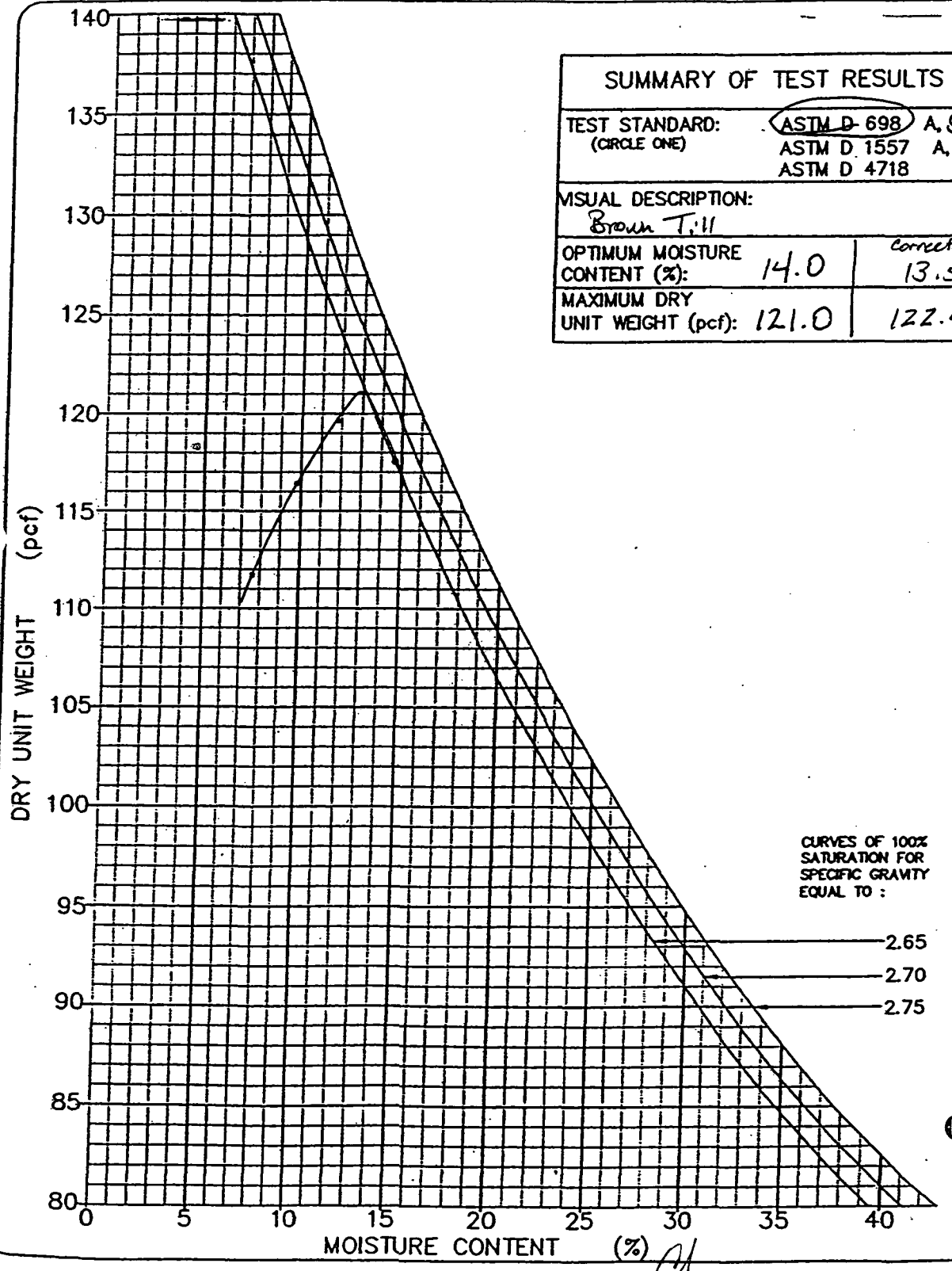
PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO PROJECT NO.: GR1341 TASK NO.: 04.1

DESCRIPTION: Phase IV DATE: 20 day July month 2002 year

MATERIAL TYPE: Clay Liner MATERIAL SOURCE: Stockpile 02-2 SAMPLE NO.: LP02-12

SUMMARY OF TEST RESULTS			QA ID
TEST STANDARD: (CIRCLE ONE)	ASTM D 698 A, B, C ASTM D 1557 A, B, C ASTM D 4718		CL
VISUAL DESCRIPTION: Brown Till			CL
OPTIMUM MOISTURE CONTENT (%):	14.0	Corrected 13.5	CL
MAXIMUM DRY UNIT WEIGHT (pcf):	121.0	122.4	CL



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GEOSYNTEC CONSULTANTS

FLUOR FERNALD

FIELD LABORATORY COMPACTION TEST

(ASTM D 1557 METHOD B)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO

DESCRIPTION: Phase IV — PROJECT NO. GQ1341 TASK NO.: 04.1

MATERIAL TYPE: Low Perm Clay — MATERIAL SOURCE: Stockpile 02-2 — DATE: 18 day July month 2002 year — SAMPLE NO. LP-02-12

THIS METHOD WILL BE USED IF THE MATERIAL RETAINED ON THE NO. 4-in. (4.75-mm) SIEVE IS GREATER THAN 20%, AND THE MATERIAL RETAINED ON THE NO. 3/8-in. (9.5-mm) SIEVE IS LESS THAN 20%.
ALL MATERIAL RETAINED ON THE NO. 3/8-in. (9.5-mm) SIEVE IS DISCARDED.
USE OVERSIZE CORRECTION IF MORE THAN 5% IS DISCARDED ACCORDING TO ASTM D 4718.
USE A 4-in. DIAMETER MOLD / 10-lb RAMMER / 18-in. DROP / 5 LAYERS / 25 BLOWS PER LAYER.

COMPACTION OF SOIL

QA ID: RLE K/S

	WATER ADDED	(ml)		13.64	13.86	14.02	13.96
A	WT. OF SOIL & MOLD	(grams)		2% 6187.1	4% 6286.9	6% 6359.5	8% 6332.3
B	WT. OF MOLD	(grams)	4204.5	4204.5	4204.5	4204.5	4204.5
C	WT. OF SOIL = A − B	(grams)		1982.5	2082.4	2155.0	2127.8
D	WET UNIT WT.(1) = C X 0.066	(pcf)		130.9	137.4	142.2	140.4
E	DRY UNIT WT. = D / [1 + (K/100)]	(pcf)		124.0	127.9	130.2	126.0

NOTE: IF CALIBRATED MOLD OF 1/30 FT^3 IS USED, THE WET DENSITY IS CALCULATED FROM THE WEIGHT OF SOIL, THE VOLUME OF THE MOLD AND THE CONVERSION FROM GRAMS TO POUNDS (I.E., CONVERSION FACTOR = (30 / 453.6) = 0.066). THE MOLD MUST BE CALIBRATED TO VERIFY A CAPACITY OF 1/30 ± 0.0005 FT^3 ON INTERVALS NOT TO EXCEED 1000 TIMES THAT THE MOLD IS FILLED.

MOISTURE CONTENT — ASTM D 2216

QA ID: RLE

	TARE NO.			92	309	107	12
F	WT. OF TARE	(grams)		8.2	8.0	8.0	8.3
G	WT. OF WET SOIL & TARE	(grams)		259.8	300.8	264.8	306.0
H	WT. OF DRY SOIL & TARE	(grams)		246.6	280.4	243.1	275.5
I	WT. OF WATER = G − H	(grams)		13.2	20.4	21.7	30.5
J	WT. DRY SOIL = H − F	(grams)		238.4	272.4	235.1	267.2
K	MOISTURE CONTENT = (I/J) X 100	(%)		5.5	7.5	9.2	11.4

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FLUOR FERNALD 4940

CORRECTION OF UNIT WEIGHT AND WATER CONTENT FOR SOILS CONTAINING OVERSIZE PARTICLES

(ASTM D 4718)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO PROJECT NO. G01341 TASK NO. 041

DESCRIPTION: Phase IV DATE: 20 day July month 2002 year

MATERIAL TYPE: Clay liner LP02-12

Weight of Total Sample	=	37263.5
Weight of Oversize Fraction	=	1507.0
Weight of Finer Fraction (- 3/8)	=	35756.5
Percentage of Oversize Fraction	= (P_C)	4.0
Percentage of Finer Fraction (- 3/8)	= (P_F)	96.0
Specific Gravity (Assumed)	= (G_M)	2.72

(W_F) =	Water Content - 3/8 , as decimal	=	0.095
(W_C) =	Water Content + 3/8 , as decimal	=	0.015
(δ_F) =	Dry Density of finer fraction	=	130.6
(δ_W) =	Unit Weight of Water	=	62.4

$$C_W=(W_F P_F)+(W_C P_C)$$

C_W = 9.2 %

$$C\delta_D=100\delta_F G_M \delta_W/(\delta_F P_C)+(G_M \delta_W P_F)$$

$C_{\delta D}$ = 131.8 pcf

000679

GEOSYNTEC CONSULTANTS

FLUOR FERNALD

4940

MOISTURE-DENSITY RELATIONSHIP

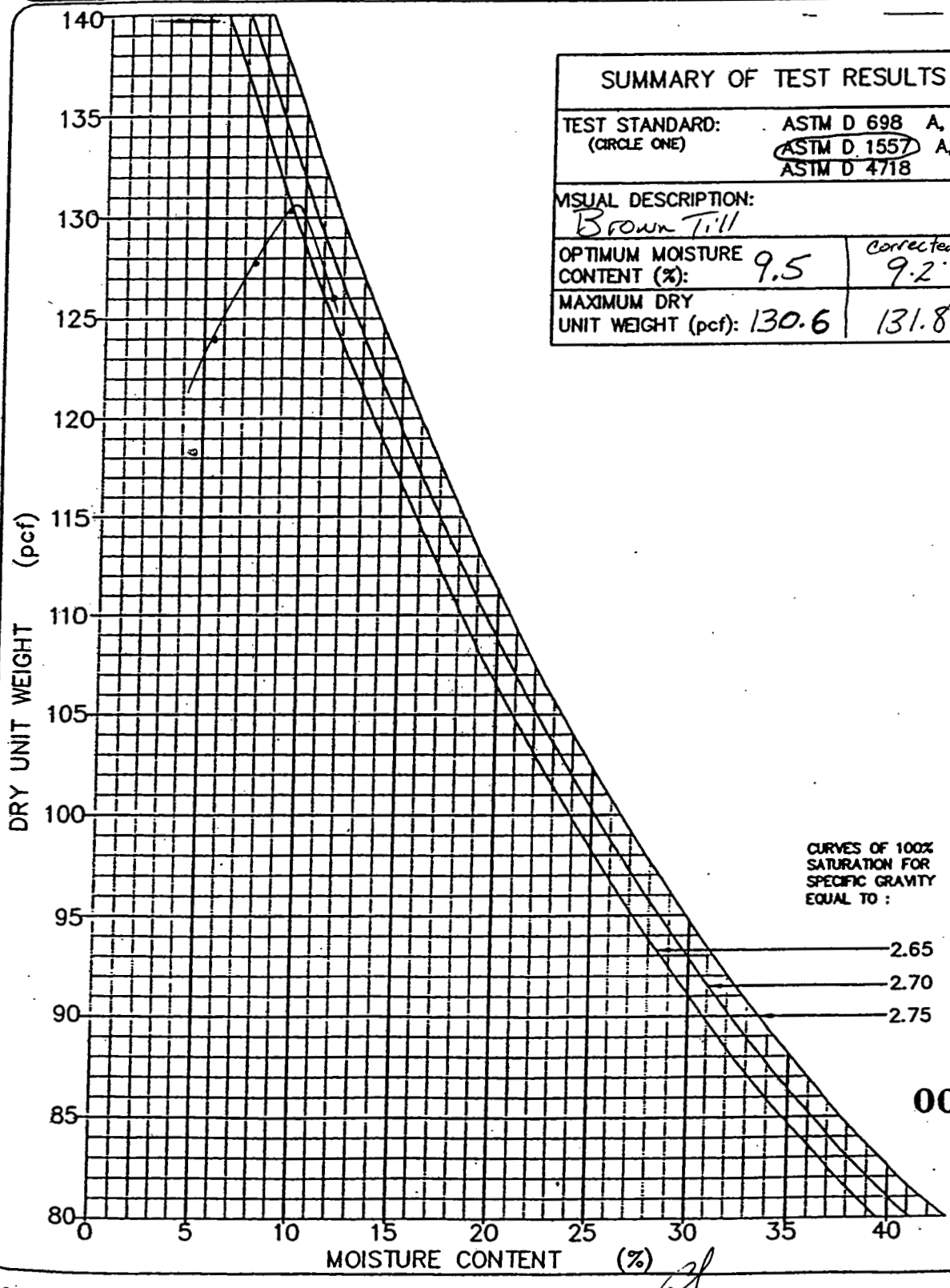
PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO PROJECT NO.: GQ1341 TASK NO.: 04.1

DESCRIPTION: Phase IV DATE: 20 day July month 2002 year

MATERIAL TYPE: Clay Liner MATERIAL SOURCE: STOCKPILE 02-2 SAMPLE NO.: LP02-12

SUMMARY OF TEST RESULTS			QA ID
TEST STANDARD: (CIRCLE ONE)	ASTM D 698 A, B, C ASTM D 1557 A, B, C ASTM D 4718		GJ
VISUAL DESCRIPTION: Brown Till			GJ
OPTIMUM MOISTURE CONTENT (%):	9.5	corrected 9.2	GJ
MAXIMUM DRY UNIT WEIGHT (pcf):	130.6	131.8	GJ



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FLUOR DANIEL FERNALD

FIELD LABORATORY COMPACTION TEST (ASTM D 698 METHOD B)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO

DESCRIPTION: Phase IV

MATERIAL TYPE: Low Perm. Clay

PROJECT NO.: GQ1341 TASK NO.: 04

DATE: 21 day July month 2002 year

SAMPLE NO.: LP02-13

THIS METHOD WILL BE USED IF THE MATERIAL RETAINED ON THE NO. 3/4-in. (19-mm) SIEVE IS LESS THAN 30%, IF THE MATERIAL RETAINED ON THE NO. 4 (4.75-mm) SIEVE IS GREATER THAN 20%, AND IF THE MATERIAL RETAINED ON THE NO. 3/8-in. (9.5-mm) SIEVE IS LESS THAN 20%.
ALL MATERIAL RETAINED ON THE NO. 3/8-in. (9.5-mm) SIEVE IS DISCARDED.
USE OVERSIZE CORRECTION IF MORE THAN 5% IS DISCARDED ACCORDING TO ASTM D 4718.
USE A 4-in. DIAMETER MOLD / 5.5-lb RAMMER / 12-in. DROP / 3 LAYERS / 25 BLOWS PER LAYER.

COMPACTION OF SOIL

QA ID: KS

			4% 13.14	6% 13.42	8% 13.68	10% 13.66	
	WATER ADDED	(ml)	100mL	150mL	200mL	250mL	
A	WT. OF SOIL & MOLD	(grams)	5960.3	6087.3	6205.2	6196.2	
B	WT. OF MOLD	(grams)	4204.5	4204.5	4204.5	4204.5	
C	WT. OF SOIL = A − B	(grams)	1755.8	1882.8	2000.7	1991.7	
D	WET UNIT WT.(1) = C X 0.066	(pcf)	115.9	124.3	132.0	131.5	
E	DRY UNIT WT. = D / [1 + (K/100)]	(pcf)	106.5	111.6	115.8	113.2	

NOTE: IF CALIBRATED MOLD OF 1/30 FT^3 IS USED, THE WET DENSITY IS CALCULATED FROM THE WEIGHT OF SOIL, THE VOLUME OF THE MOLD AND THE CONVERSION FROM GRAMS TO POUNDS (I.E., CONVERSION FACTOR = (30 / 453.6) = 0.066). THE MOLD MUST BE CALIBRATED TO VERIFY A CAPACITY OF 1/30 ± 0.0005 FT^3 ON INTERVALS NOT TO EXCEED 1000 TIMES THAT THE MOLD IS FILLED.

MOISTURE CONTENT – ASTM D 2216

QA ID: KS/DE

	TARE NO.		93	601	616	52	
F	WT. OF TARE	(grams)	8.2	8.3	8.2	8.1	
G	WT. OF WET SOIL & TARE	(grams)	313.7	352.1	339.8	337.5	
H	WT. OF DRY SOIL & TARE	(grams)	289.0	316.8	299.2	291.6	
I	WT. OF WATER = G − H	(grams)	24.7	35.3	40.6	45.9	
J	WT. DRY SOIL = H − F	(grams)	280.8	308.5	291.0	283.5	
K	MOISTURE CONTENT = (I/J) X 100	(%)	8.8	11.4	14.0	16.2	
			1.088	1.114	1.140	1.162	

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SHEET NO. 1 OF 3

GeoSyntec Consultants

FLUOR FERNALD 4940

CORRECTION OF UNIT WEIGHT AND WATER CONTENT FOR SOILS CONTAINING OVERSIZE PARTICLES *(ASTM D 4718)*

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO PROJECT NO. 60134 TASK NO. 04.1

DESCRIPTION: Phase IV DATE: 22 day July month 2002 year

MATERIAL TYPE: Clay Liner LP02-13 STD

Weight of Total Sample	=	25025.8
Weight of Oversize Fraction	=	1115.1
Weight of Finer Fraction (- 3/8)	=	23910.7
Percentage of Oversize Fraction	= (P_C)	4.5
Percentage of Finer Fraction (- 3/8)	= (P_F)	95.5
Specific Gravity (Assumed)	= (G_M)	2.72

(W_F) =	Water Content - 3/8 , as decimal	=	0.144
(W_C) =	Water Content + 3/8 , as decimal	=	0.015
(δ_F) =	Dry Density of finer fraction	=	116.0
(δ_W) =	Unit Weight of Water	=	62.4

$$C_W=(W_F P_F)+(W_C P_C)$$

C_w = 13.8%

$$C\delta_D=100\delta_F G_M \delta_W/(\delta_F P_C)+(G_M \delta_W P_F)$$

$C_{\delta D}$ = 117.7 pcf

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GEOSYNTEC CONSULTANTS

FLUOR FERNALD

4940

MOISTURE–DENSITY RELATIONSHIP

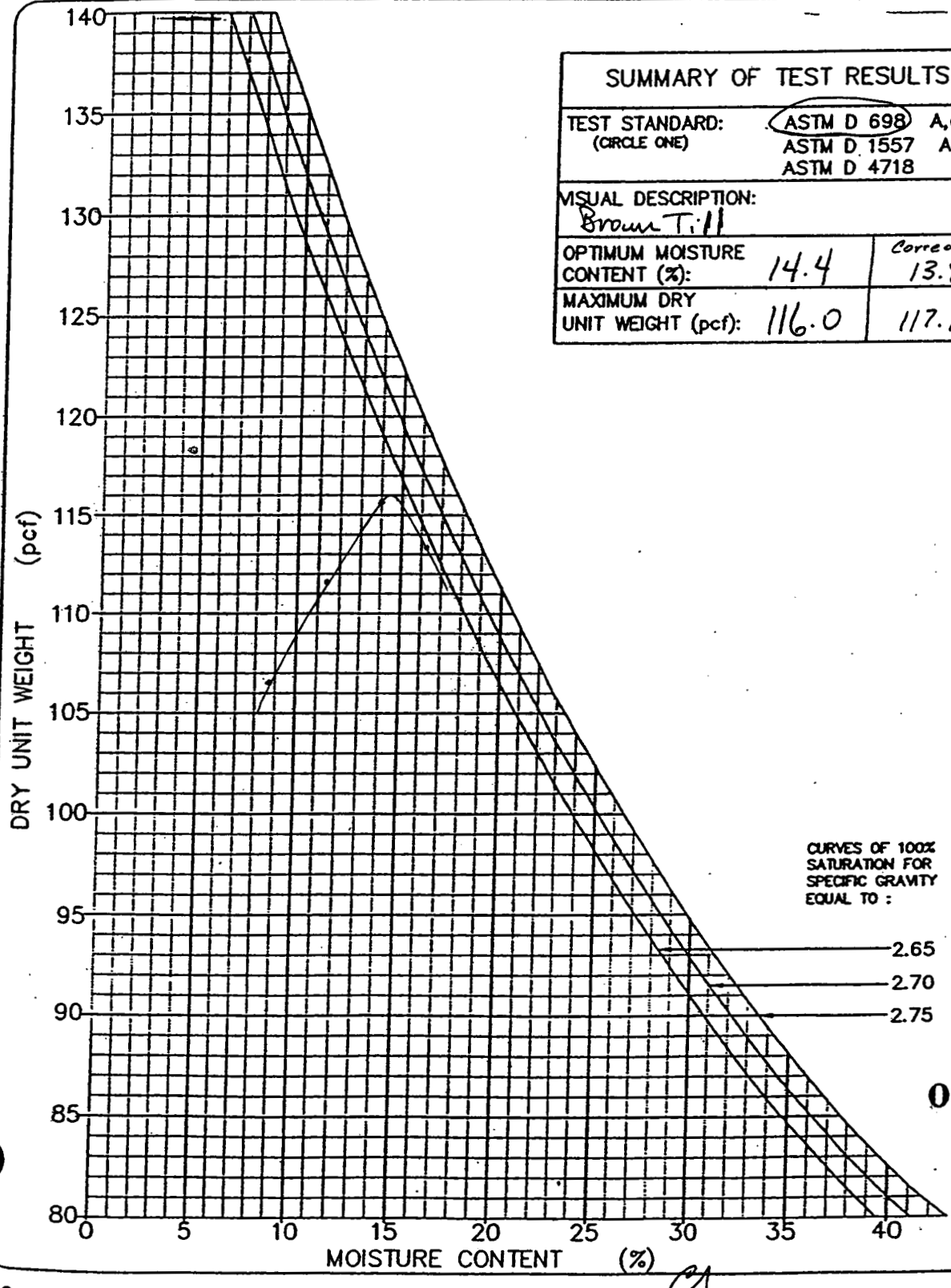
PROJECT: ON–SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO PROJECT NO.: G01341 TASK NO.: 04.1

DESCRIPTION: Phase IV DATE: 22 day July month 2002 year

MATERIAL TYPE: Clay Liner MATERIAL SOURCE: Stockpile 02-3 SAMPLE NO.: LP02-13

SUMMARY OF TEST RESULTS			QA ID
TEST STANDARD: (CIRCLE ONE)	ASTM D 698 A, B, C ASTM D 1557 A, B, C ASTM D 4718		CS
VISUAL DESCRIPTION: Brown Till			CS
OPTIMUM MOISTURE CONTENT (%):	14.4	Correction 13.8	CS
MAXIMUM DRY UNIT WEIGHT (pcf):	116.0	117.7	CS



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FLUOR DANIEL FERNALD

FIELD LABORATORY COMPACTION TEST (ASTM D 698 METHOD B)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO

DESCRIPTION: Phase II — PROJECT NO. 691341 TASK NO.: 04.1

MATERIAL TYPE: Low Perm Clay — DATE: 22 day July month 2002 year

SAMPLE NO.: LP02-14

THIS METHOD WILL BE USED IF THE MATERIAL RETAINED ON THE NO. 3/4-in. (19-mm) SIEVE IS LESS THAN 30%, IF THE MATERIAL RETAINED ON THE NO. 4 (4.75-mm) SIEVE IS GREATER THAN 20%, AND IF THE MATERIAL RETAINED ON THE NO. 3/8-in. (9.5-mm) SIEVE IS LESS THAN 20%.
ALL MATERIAL RETAINED ON THE NO. 3/8-in. (9.5-mm) SIEVE IS DISCARDED.
USE OVERSIZE CORRECTION IF MORE THAN 5% IS DISCARDED ACCORDING TO ASTM D 4718.
USE A 4-in. DIAMETER MOLD / 5.5-lb RAMMER / 12-in. DROP / 3 LAYERS / 25 BLOWS PER LAYER.

COMPACTION OF SOIL

QA ID: DCE

	WATER ADDED	(ml)		13.40	13.60	13.81	13.30
A	WT. OF SOIL & MOLD	(grams)		2%	4%	6%	8%
B	WT. OF MOLD	(grams)		6078.2	6169.0	6264.2	6259.7
C	WT. OF SOIL = A − B	(grams)		4204.5	4204.5	4204.5	4204.5
D	WET UNIT WT.(1) = C X 0.066	(pcf)		1873.7	1964.5	2059.7	2055.2
E	DRY UNIT WT. = D / [1 + (K/100)]	(pcf)		123.7	129.7	135.9	135.6
				114.5	117.7	120.8	118.6

NOTE: IF CALIBRATED MOLD OF 1/30 FT³ IS USED, THE WET DENSITY IS CALCULATED FROM THE WEIGHT OF SOIL, THE VOLUME OF THE MOLD AND THE CONVERSION FROM GRAMS TO POUNDS (I.E., CONVERSION FACTOR = (30 / 453.6) = 0.066). THE MOLD MUST BE CALIBRATED TO VERIFY A CAPACITY OF 1/30 ± 0.0005 FT³ ON INTERVALS NOT TO EXCEED 1000 TIMES THAT THE MOLD IS FILLED.

MOISTURE CONTENT – ASTM D 2216

QA ID: DLE

	TARE NO.			#92	#630	#107	#12
F	WT. OF TARE	(grams)		8.2	8.1	8.0	8.3
G	WT. OF WET SOIL & TARE	(grams)		440.6	503.1	515.6	524.7
H	WT. OF DRY SOIL & TARE	(grams)		408.4	457.4	459.2	460.0
I	WT. OF WATER = G − H	(grams)		32.2	45.7	56.4	64.7
J	WT. DRY SOIL = H − F	(grams)		400.2	449.3	451.2	451.7
K	MOISTURE CONTENT = (I/J) X 100	(%)		8.0	10.2	12.5	14.3

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GEOSYNTEC CONSULTANTS FILE NO. 2-05-FLC

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FLUOR FERNALD

CORRECTION OF UNIT WEIGHT AND WATER CONTENT FOR SOILS CONTAINING OVERSIZE PARTICLES *(ASTM D 4718)*

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO PROJECT NO. 6Q134 TASK NO. 04.1

DESCRIPTION: Phase II DATE: 23 day July month 2002 year

MATERIAL TYPE: Clay Liner CP02-14 STD

Weight of Total Sample	=	44359.3
Weight of Oversize Fraction	=	3208.6
Weight of Finer Fraction (-3/8)	=	41150.7
Percentage of Oversize Fraction	= (P_C)	7.2
Percentage of Finer Fraction (-3/8)	= (P_F)	92.8
Specific Gravity (Assumed)	= (G_M)	2.72

(W_F) =	Water Content - 3/8, as decimal	=	0.13
(W_C) =	Water Content + 3/8, as decimal	=	0.015
(δ_F) =	Dry Density of finer fraction	=	121.1
(δ_W) =	Unit Weight of Water	=	~~64~~ 62.4

$$C_W = (W_F P_F) + (W_C P_C)$$

C_W = 12.2 %

$$C\delta_D = 100\delta_F G_M \delta_W / (\delta_F P_C) + (G_M \delta_W P_F)$$

$C_{\delta D}$ = 123.7 pcf

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GEOSYNTEC CONSULTANTS

FLUOR FERNALD

4940

MOISTURE-DENSITY RELATIONSHIP

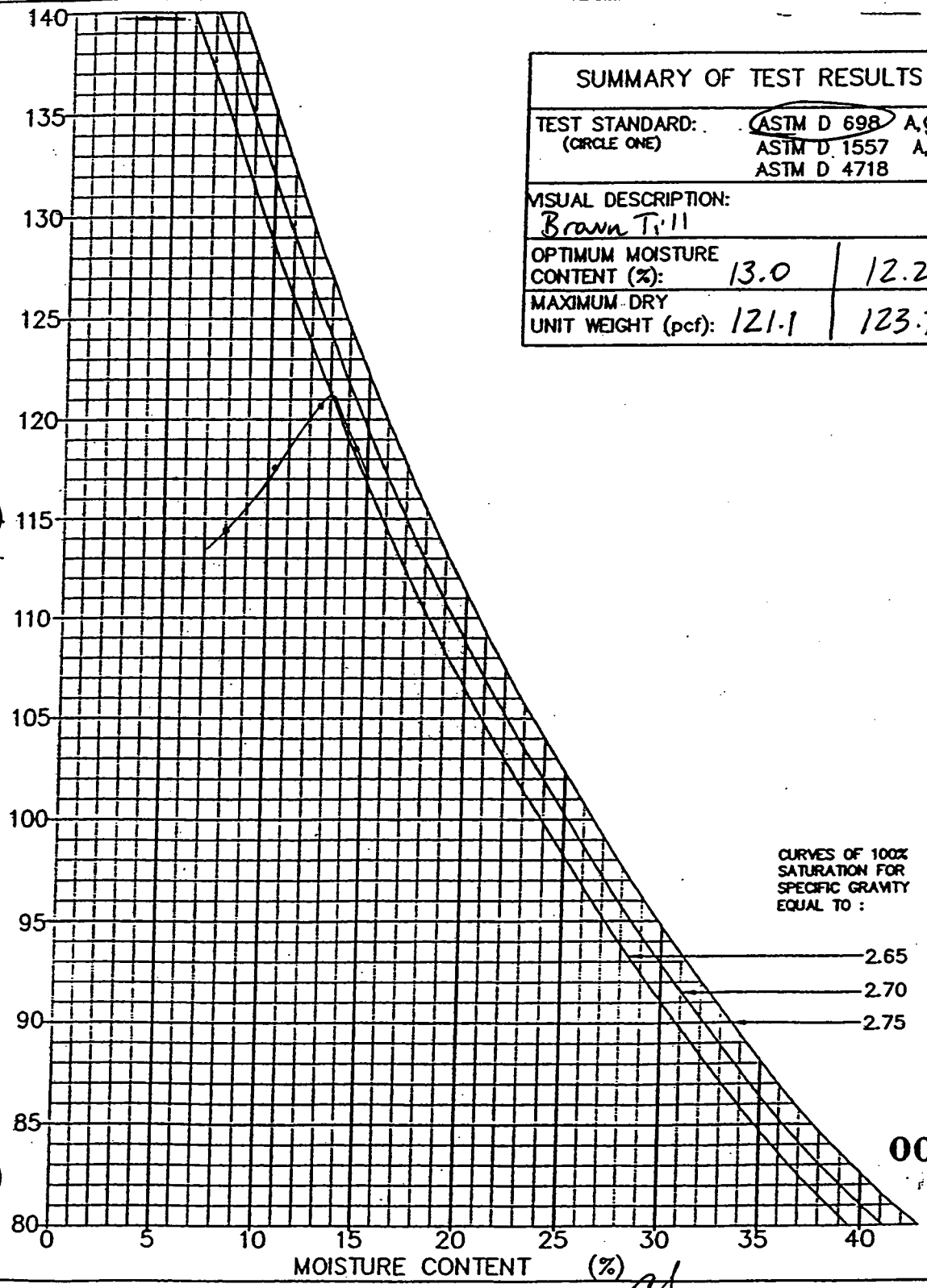
PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO PROJECT NO.: GQ1341 TASK NO.: 04.1

DESCRIPTION: Phase IV DATE: 23 day July month 2002 year

MATERIAL TYPE: Clay Liner MATERIAL SOURCE: STOCKPILE 02-3 SAMPLE NO. LP02-14

SUMMARY OF TEST RESULTS			QA ID
TEST STANDARD: (CIRCLE ONE)	ASTM D 698 A, B, C ASTM D 1557 A, B, C ASTM D 4718		CJ
VISUAL DESCRIPTION: Brown Till			CJ
OPTIMUM MOISTURE CONTENT (%):	13.0	12.2	CJ
MAXIMUM DRY UNIT WEIGHT (pcf):	121.1	123.7	CJ



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FLUOR FERNALD

FIELD LABORATORY COMPACTION TEST

(ASTM D 1557 METHOD B)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO

PROJECT NO.: GG1341 TASK NO.: 04.1

DESCRIPTION: Phase IV

DATE: 21 day July month 2002 year

MATERIAL TYPE: Low Perm Clay MATERIAL SOURCE: Stockpile 02-3 SAMPLE NO.: LP02-14

THIS METHOD WILL BE USED IF THE MATERIAL RETAINED ON THE NO. 4-in. (4.75-mm) SIEVE IS GREATER THAN 20%, AND THE MATERIAL RETAINED ON THE NO. 3/8-in. (9.5-mm) SIEVE IS LESS THAN 20%.
ALL MATERIAL RETAINED ON THE NO. 3/8-in. (9.5-mm) SIEVE IS DISCARDED.
USE OVERSIZE CORRECTION IF MORE THAN 5% IS DISCARDED ACCORDING TO ASTM D 4718.
USE A 4-in. DIAMETER MOLD / 10-lb RAMMER / 18-in. DROP / 5 LAYERS / 25 BLOWS PER LAYER.

COMPACTION OF SOIL

QA ID: KS/DLF

			2% 13.91	4% 14.02	6% 13.91	0% ~~8%~~ 13.64 KS	
	WATER ADDED	(ml)	50 mL	100 mL	150 mL	0 ~~200 mL~~ KS	
A	WT. OF SOIL & MOLD	(grams)	6309.6	6359.5	6309.6	6187.1	
B	WT. OF MOLD	(grams)	4204.5	4204.5	4204.5	4204.5	
C	WT. OF SOIL = A − B	(grams)	2105.1	2155.0	2105.1	1982.6	
D	WET UNIT WT.(1) = C X 0.066	(pcf)	138.9	142.2	138.9	130.9	
E	DRY UNIT WT. = D / [1 + (K/100)]	(pcf)	128.4	129.3	123.6	123.4	

NOTE: IF CALIBRATED MOLD OF 1/30 FT^3 IS USED, THE WET DENSITY IS CALCULATED FROM THE WEIGHT OF SOIL, THE VOLUME OF THE MOLD AND THE CONVERSION FROM GRAMS TO POUNDS (I.E., CONVERSION FACTOR = (30 / 453.6) = 0.066). THE MOLD MUST BE CALIBRATED TO VERIFY A CAPACITY OF 1/30 ± 0.0005 FT^3 ON INTERVALS NOT TO EXCEED 1000 TIMES THAT THE MOLD IS FILLED.

MOISTURE CONTENT – ASTM D 2216

QA ID: KS/DLF

	TARE NO.		94	615	95	636	
F	WT. OF TARE	(grams)	8.1	8.2	8.0	8.3	
G	WT. OF WET SOIL & TARE	(grams)	353.0	293.5	336.0	337.0	
H	WT. OF DRY SOIL & TARE	(grams)	327.0	267.6	299.7	312.5	
I	WT. OF WATER = G − H	(grams)	26.0	25.9	36.3	18.5	
J	WT. DRY SOIL = H − F	(grams)	318.9	259.4	291.7	304.2	
K	MOISTURE CONTENT = (I/J) X 100	(%)	8.2	10.0	12.4	6.1	
			1.092	1.10	1.124	1.061	

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SHEET NO. 1 OF 3

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FLUOR FERNALD

CORRECTION OF UNIT WEIGHT AND WATER CONTENT FOR SOILS CONTAINING OVERSIZE PARTICLES *(ASTM D 4718)*

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO PROJECT NO. GQ1341 TASK NO. 04.1

DESCRIPTION: Phase IV DATE: 22 day July month 2002 year

MATERIAL TYPE: Clay Liner LP02-14 MOD

Weight of Total Sample	=	44359.3
Weight of Oversize Fraction	=	3208.6
Weight of Finer Fraction (- 3/8)	=	41150.7
Percentage of Oversize Fraction	= (P_C)	7.2
Percentage of Finer Fraction (- 3/8)	= (P_F)	92.8
Specific Gravity (Assumed)	= (G_M)	2.72

(W_F) =	Water Content - 3/8 , as decimal	=	0.095
(W_C) =	Water Content + 3/8 , as decimal	=	0.015
(δ_F) =	Dry Density of finer fraction	=	130.2
(δ_W) =	Unit Weight of Water	=	62.4

$$C_W=(W_F P_F)+(W_C P_C)$$

C_w = 8.9%

$$C\delta_D=100\delta_F G_M \delta_W/(\delta_F P_C)+(G_M \delta_W P_F)$$

$C_{\delta D}$ = 132.4 pcf

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FLUOR FERNALD

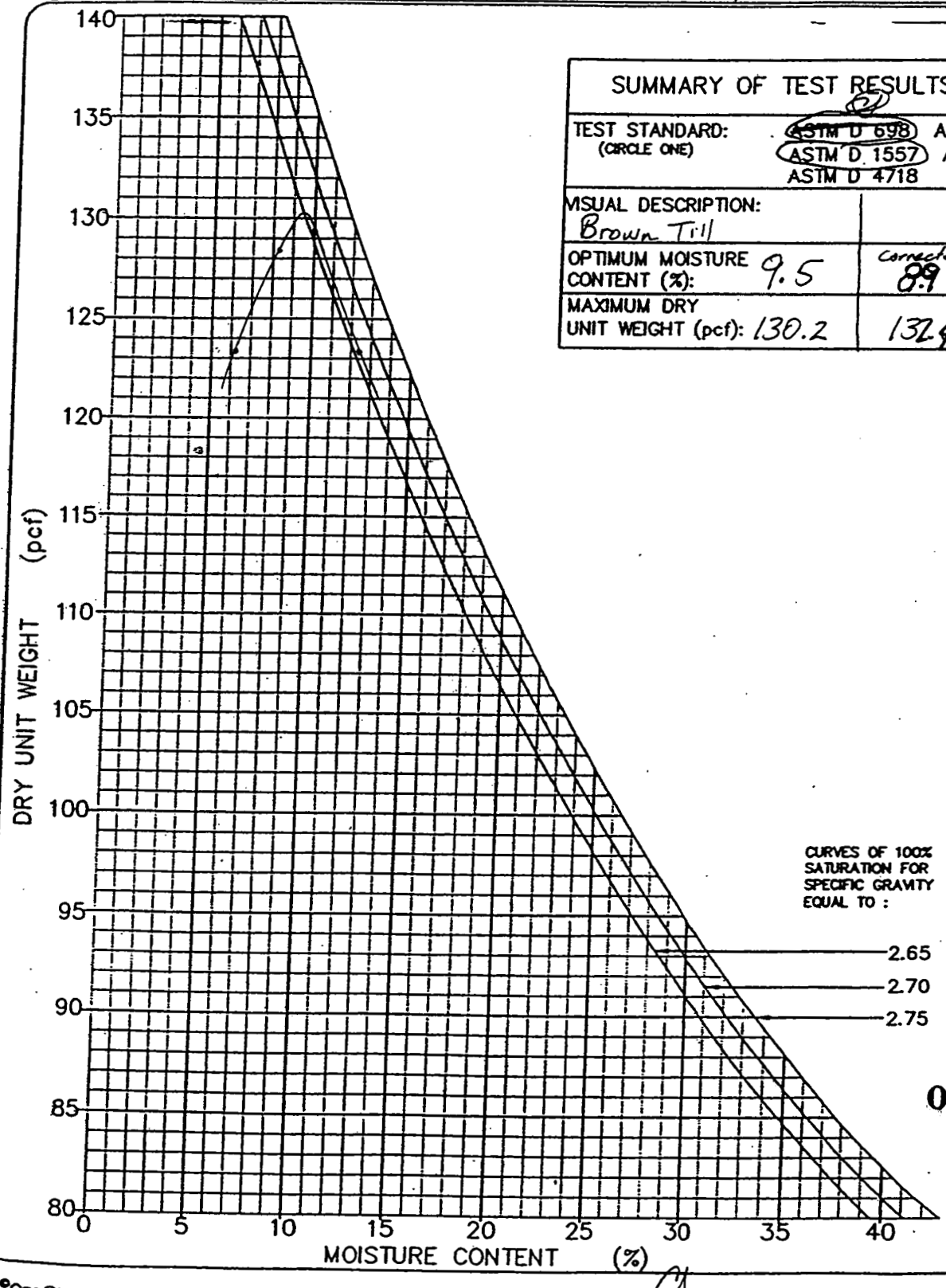
MOISTURE-DENSITY RELATIONSHIP

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO PROJECT NO.: GQ1341 TASK NO.: 04.1

DESCRIPTION: Phase III DATE: 22 day July month 2002 year

MATERIAL TYPE: Clay Liner MATERIAL SOURCE: Stockpile Ø2-3 SAMPLE NO.: ~~[illegible]~~ LPØ2-14



SUMMARY OF TEST RESULTS		QA ID
TEST STANDARD: (CIRCLE ONE) ~~ASTM D 698~~ A, ~~B~~, C; ASTM D 1557 A, (B), C; ASTM D 4718		CA
VISUAL DESCRIPTION: Brown Till		CA
OPTIMUM MOISTURE CONTENT (%): 9.5	corrected 8.9	CA
MAXIMUM DRY UNIT WEIGHT (pcf): 130.2	132.4	CA

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FLUOR DANIEL FERNALD

FIELD LABORATORY COMPACTION TEST (ASTM D 698 METHOD B)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO

DESCRIPTION: Phase IV

MATERIAL TYPE: Low Perm Clay

PROJECT NO. 691341 TASK NO.: 04.1

DATE: 22 day July month 2002 year

SAMPLE NO.: LP02-15

THIS METHOD WILL BE USED IF THE MATERIAL RETAINED ON THE NO. 3/4-in. (19-mm) SIEVE IS LESS THAN 30%, IF THE MATERIAL RETAINED ON THE NO. 4 (4.75-mm) SIEVE IS GREATER THAN 20%, AND IF THE MATERIAL RETAINED ON THE NO. 3/8-in. (9.5-mm) SIEVE IS LESS THAN 20%.
ALL MATERIAL RETAINED ON THE NO. 3/8-in. (9.5-mm) SIEVE IS DISCARDED.
USE OVERSIZE CORRECTION IF MORE THAN 5% IS DISCARDED ACCORDING TO ASTM D 4718.
USE A 4-in. DIAMETER MOLD / 5.5-lb RAMMER / 12-in. DROP / 3 LAYERS / 25 BLOWS PER LAYER.

COMPACTION OF SOIL

QA ID: DLE

			13.54	13.68	13.84	13.72	
	WATER ADDED	(ml)	2%	4%	6%	8%	
A	WT. OF SOIL & MOLD	(grams)	6141.7	6205.2	6277.8	6223.4	
B	WT. OF MOLD	(grams)	4204.5	4204.5	4204.5	4204.5	4204.5
C	WT. OF SOIL = A - B	(grams)	1937.2	2000.7	2073.3	2018.9	
D	WET UNIT WT.(1) = C X 0.066	(pcf)	127.9	132.0	136.8	133.2	
E	DRY UNIT WT. = D / [1 + (K/100)]	(pcf)	117.1	119.0	120.8	115.4	

NOTE: IF CALIBRATED MOLD OF 1/30 FT^3 IS USED, THE WET DENSITY IS CALCULATED FROM THE WEIGHT OF SOIL, THE VOLUME OF THE MOLD AND THE CONVERSION FROM GRAMS TO POUNDS (I.E., CONVERSION FACTOR = (30 / 453.6) = 0.066). THE MOLD MUST BE CALIBRATED TO VERIFY A CAPACITY OF 1/30 ± 0.0005 FT^3 ON INTERVALS NOT TO EXCEED 1000 TIMES THAT THE MOLD IS FILLED.

MOISTURE CONTENT - ASTM D 2216

QA ID: DLE

	TARE NO.		#230	#65	#679	#603	
F	WT. OF TARE	(grams)	8.4	8.2	8.1	8.2	
G	WT. OF WET SOIL & TARE	(grams)	476.3	487.2	564.4	539.6	
H	WT. OF DRY SOIL & TARE	(grams)	437.0	440.2	499.4	468.7	
I	WT. OF WATER = G - H	(grams)	39.3	47.0	65.0	70.9	
J	WT. DRY SOIL = H - F	(grams)	428.6	432.0	491.3	460.5	
K	MOISTURE CONTENT = (I/J) X 100	(%)	9.2	10.9	13.2	15.4	

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SHEET NO. 1 OF 3

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FLUOR FERNALD

CORRECTION OF UNIT WEIGHT AND WATER CONTENT FOR SOILS CONTAINING OVERSIZE PARTICLES

(ASTM D 4718)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO PROJECT NO. G01341 TASK NO. 04.1

DESCRIPTION: Phase IV DATE: 23 day July month 2002 year

MATERIAL TYPE: Clay Liner LP02-15 STD

Weight of Total Sample	=	38076.0
Weight of Oversize Fraction	=	1676.2
Weight of Finer Fraction (- 3/8)	=	36399.8
Percentage of Oversize Fraction	= (P_C)	4.4
Percentage of Finer Fraction (- 3/8)	= (P_F)	95.6
Specific Gravity (Assumed)	= (G_M)	2.72

(W_F) =	Water Content - 3/8 , as decimal	=	0.129
(W_C) =	Water Content + 3/8 , as decimal	=	0.015
(δ_F) =	Dry Density of finer fraction	=	121.2
(δ_W) =	Unit Weight of Water	=	62.4

$$C_W=(W_F P_F)+(W_C P_C)$$

C_W = 12.4%

$$C\delta_D=100\delta_F G_M \delta_W/(\delta_F P_C)+(G_M \delta_W P_F)$$

C_{SD} = 122.7 pcf

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FLUOR FERNALD

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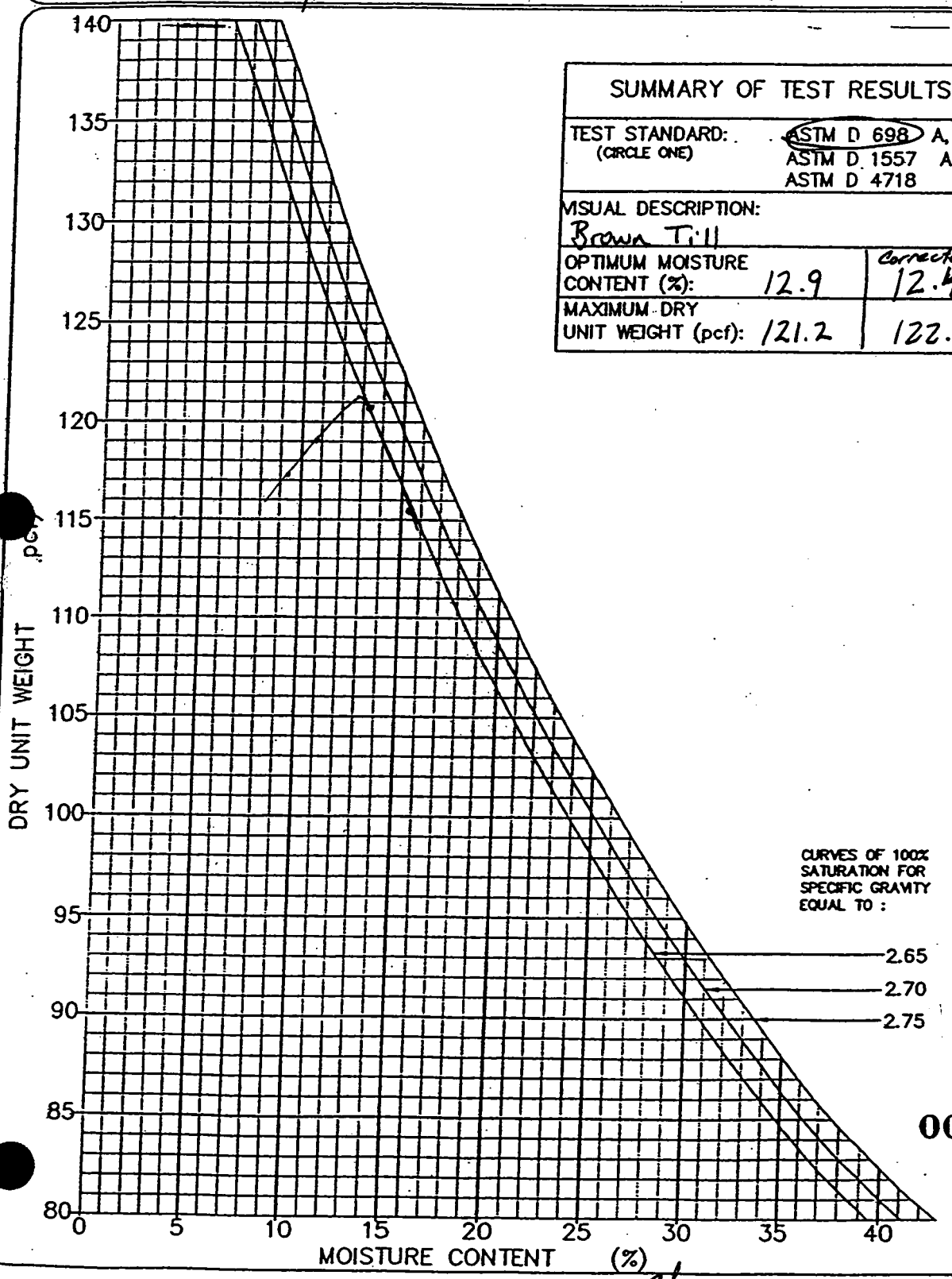
MOISTURE-DENSITY RELATIONSHIP

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO PROJECT NO.: GQ1341 TASK NO.: 041

DESCRIPTION: Phase IV DATE: 23 day July month 2002 year

MATERIAL TYPE: Clay Liner MATERIAL SOURCE: STOCKPILE SAMPLE NO. LP-02-15



SUMMARY OF TEST RESULTS			QA ID
TEST STANDARD: (CIRCLE ONE)	ASTM D 698 A, B, C ASTM D 1557 A, B, C ASTM D 4718		CS
VISUAL DESCRIPTION: Brown Till			CS
OPTIMUM MOISTURE CONTENT (%):	12.9	Corrected 12.4	CS
MAXIMUM DRY UNIT WEIGHT (pcf):	121.2	122.7	CS

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FLUOR DANIEL FERNALD

FIELD LABORATORY COMPACTION TEST (ASTM D 698 METHOD B)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO

DESCRIPTION: Phase IV

MATERIAL TYPE: Low Perm Clay

PROJECT NO. 691341 TASK NO.: 04.1

DATE: 23 day July month 2002 year

SAMPLE NO.: LP02-16

THIS METHOD WILL BE USED IF THE MATERIAL RETAINED ON THE NO. 3/4-in. (19-mm) SIEVE IS LESS THAN 30%, IF THE MATERIAL RETAINED ON THE NO. 4 (4.75-mm) SIEVE IS GREATER THAN 20%, AND IF THE MATERIAL RETAINED ON THE NO. 3/8-in. (9.5-mm) SIEVE IS LESS THAN 20%.
ALL MATERIAL RETAINED ON THE NO. 3/8-in. (9.5-mm) SIEVE IS DISCARDED.
USE OVERSIZE CORRECTION IF MORE THAN 5% IS DISCARDED ACCORDING TO ASTM D 4718.
USE A 4-in. DIAMETER MOLD / 5.5-lb RAMMER / 12-in. DROP / 3 LAYERS / 25 BLOWS PER LAYER.

COMPACTION OF SOIL

QA ID: DLE

			10% 13.67	13.29	13.41	13.71	13.79
	WATER ADDED	(ml)	250 mL	2%	4%	6%	8%
A	WT. OF SOIL & MOLD	(grams)	6200.7	6028.3	6082.8	6218.9	6255.1
B	WT. OF MOLD	(grams)	4204.5	4204.5	4204.5	4204.5	4204.5
C	WT. OF SOIL = A − B	(grams)	1996.2	~~1821.1~~ 1823.8	1878.3	2014.4	2050.6
D	WET UNIT WT.(1) = C X 0.066	(pcf)	131.8	~~120.2~~ 120.4	124.0	133.0	135.3
E	DRY UNIT WT. = D / [1 + (K/100)]	(pcf)	114.0	113.2	114.0	119.6	119.2

NOTE: IF CALIBRATED MOLD OF 1/30 FT^3 IS USED, THE WET DENSITY IS CALCULATED FROM THE WEIGHT OF SOIL, THE VOLUME OF THE MOLD AND THE CONVERSION FROM GRAMS TO POUNDS (I.E., CONVERSION FACTOR = (30 / 453.6) = 0.066). THE MOLD MUST BE CALIBRATED TO VERIFY A CAPACITY OF 1/30 ± 0.0005 FT^3 ON INTERVALS NOT TO EXCEED 1000 TIMES THAT THE MOLD IS FILLED.

MOISTURE CONTENT – ASTM D 2216

QA ID: DLE

	TARE NO.		603	#94	#636	#95	103
F	WT. OF TARE	(grams)	8.2	8.1	8.2	8.1	8.3
G	WT. OF WET SOIL & TARE	(grams)	387.2	362.3	514.5	455.8	362.3
H	WT. OF DRY SOIL & TARE	(grams)	336.0	341.2	474.0	411.0	320.0
I	WT. OF WATER = G − H	(grams)	51.2	21.1	40.5	44.8	42.3
J	WT. DRY SOIL = H − F	(grams)	327.8	333.1	465.8	402.9	311.7
K	MOISTURE CONTENT = (I/J) X 100	(%)	15.6	6.3	8.7	11.1	13.6

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SHEET NO. 1 OF 3

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FLUOR FERNALD

CORRECTION OF UNIT WEIGHT AND WATER CONTENT FOR SOILS CONTAINING OVERSIZE PARTICLES

(ASTM D 4718)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO PROJECT NO. GQ1341 TASK NO. 041

DESCRIPTION: Phase IV DATE: 23 day July month 2002 year

MATERIAL TYPE: Clay Liner LP02-16

STD

Weight of Total Sample	=	38076.0
Weight of Oversize Fraction	=	1676.2
Weight of Finer Fraction (-3/8)	=	~~4.4~~ 36399.8
Percentage of Oversize Fraction	= (P_C)	~~95.6~~ 4.4
Percentage of Finer Fraction (-3/8)	= (P_F)	95.6
Specific Gravity (Assumed)	= (G_M)	2.72

(W_F) =	Water Content -3/8, as decimal	=	0.126
(W_C) =	Water Content +3/8, as decimal	=	0.015
(δ_F) =	Dry Density of finer fraction	=	121.4
(δ_W) =	Unit Weight of Water	=	62.4

$$C_W=(W_F P_F)+(W_C P_C)$$

$C_W = 12.1\ \%$

$$C\delta_D=100\delta_F G_M \delta_W/(\delta_F P_C)+(G_M \delta_W P_F)$$

$C_{\delta D} = 122.9$ pcf

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FLUOR FERNALD

4940

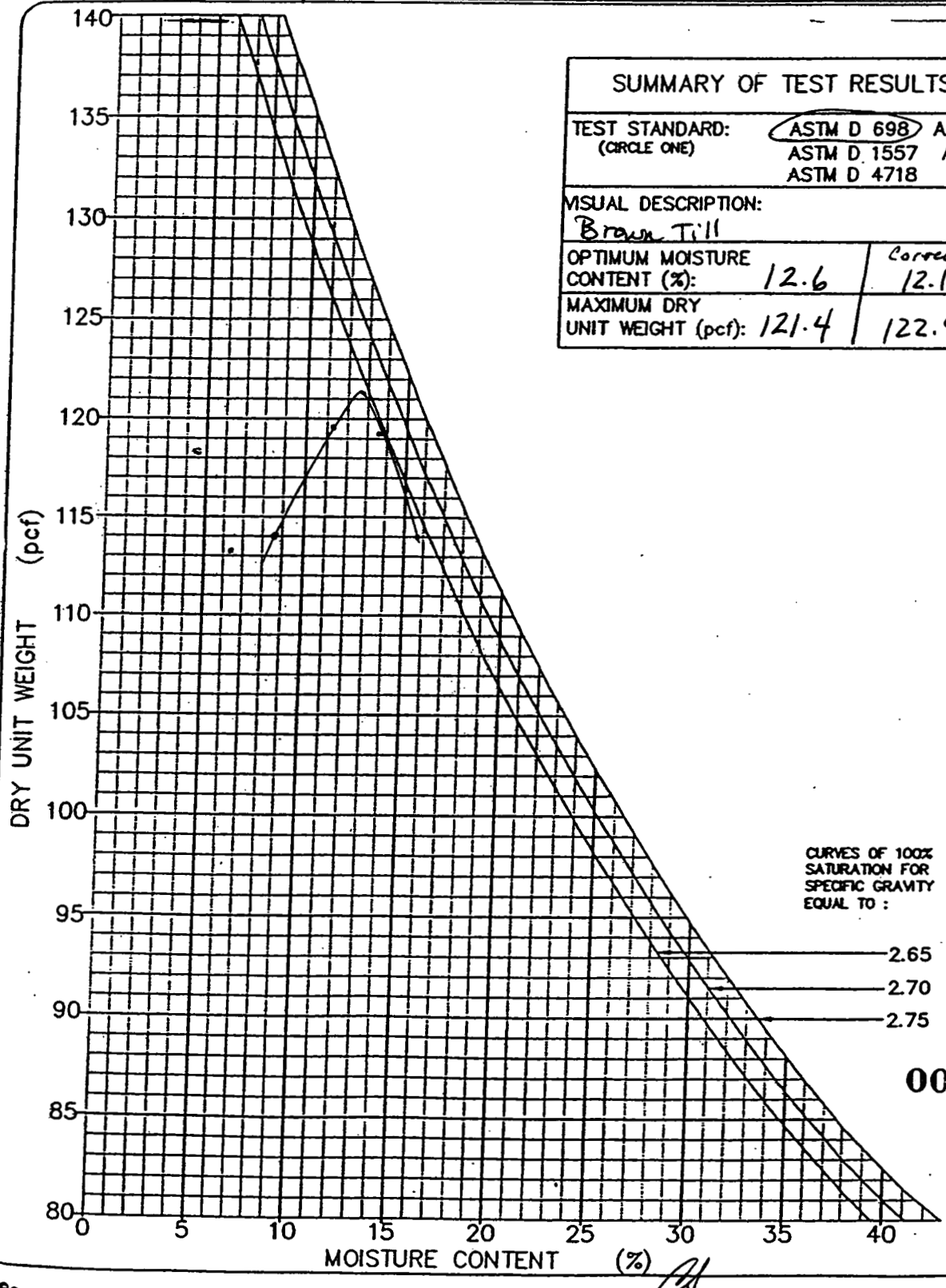
MOISTURE–DENSITY RELATIONSHIP

PROJECT: ON–SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO PROJECT NO.: GQ1341 TASK NO.: 04.1

DESCRIPTION: Phase III DATE: 23 day July month 2002 year

MATERIAL TYPE: Clay Liner MATERIAL SOURCE: STOCKPILE 03-3 SAMPLE NO.: LP02-16



SUMMARY OF TEST RESULTS			QA ID
TEST STANDARD: (CIRCLE ONE)	ASTM D 698 A, (B) C ASTM D 1557 A, B, C ASTM D 4718		CJ
VISUAL DESCRIPTION: Brown Till			CJ
OPTIMUM MOISTURE CONTENT (%):	12.6	Corrected 12.1	CJ
MAXIMUM DRY UNIT WEIGHT (pcf):	121.4	122.9	CJ

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FLUOR FERNALD

FIELD LABORATORY COMPACTION TEST

(ASTM D 1557 METHOD B)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO

DESCRIPTION: Phase IV

PROJECT NO.: GQ1341 TASK NO.: 04.1

DATE: 23 day July month 2002 year

MATERIAL TYPE: Low Perm Clay MATERIAL SOURCE: Stockpile 02-3 SAMPLE NO.: LP01-16

THIS METHOD WILL BE USED IF THE MATERIAL RETAINED ON THE NO. 4-in. (4.75-mm) SIEVE IS GREATER THAN 20%, AND THE MATERIAL RETAINED ON THE NO. 3/8-in. (9.5-mm) SIEVE IS LESS THAN 20%.
ALL MATERIAL RETAINED ON THE NO. 3/8-in. (9.5-mm) SIEVE IS DISCARDED.
USE OVERSIZE CORRECTION IF MORE THAN 5% IS DISCARDED ACCORDING TO ASTM D 4718.
USE A 4-in. DIAMETER MOLD / 10-lb RAMMER / 18-in. DROP / 5 LAYERS / 25 BLOWS PER LAYER.

COMPACTION OF SOIL

QA ID: KS

			2% 13.74	4% 13.99	6% 14.0	8% 13.50	
	WATER ADDED	(ml)	50 mL	100 mL	150 mL	0 mL	
A	WT. OF SOIL & MOLD	(grams)	6232.5	6345.9	6350.4	6123.6	
B	WT. OF MOLD	(grams)	4204.5	4204.5	4204.5	4204.5	
C	WT. OF SOIL = A − B	(grams)	2028.0	2141.4	2145.9	1919.1	
D	WET UNIT WT.(1) = C X 0.066	(pcf)	133.8	141.3	141.6	126.7	
E	DRY UNIT WT. = D / [1 + (K/100)]	(pcf)	126.1	130.0	126.8	121.5	

NOTE: IF CALIBRATED MOLD OF 1/30 FT^3 IS USED, THE WET DENSITY IS CALCULATED FROM THE WEIGHT OF SOIL, THE VOLUME OF THE MOLD AND THE CONVERSION FROM GRAMS TO POUNDS (I.E., CONVERSION FACTOR = (30 / 453.6) = 0.066). THE MOLD MUST BE CALIBRATED TO VERIFY A CAPACITY OF 1/30 ± 0.0005 FT^3 ON INTERVALS NOT TO EXCEED 1000 TIMES THAT THE MOLD IS FILLED.

MOISTURE CONTENT – ASTM D 2216

QA ID: KS

	TARE NO.		605	49	615	65	
F	WT. OF TARE	(grams)	8.3	8.2	8.2	8.2	
G	WT. OF WET SOIL & TARE	(grams)	293.0	279.4	276.0	331.8	
H	WT. OF DRY SOIL & TARE	(grams)	276.5	257.7	248.0	318.6	
I	WT. OF WATER = G − H	(grams)	16.5	21.7	28.0	13.2	
J	WT. DRY SOIL = H − F	(grams)	268.2	249.5	239.8	310.4	
K	MOISTURE CONTENT = (I/J) X 100	(%)	6.2	8.7	11.7	4.3	

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SHEET NO. 1 OF 3

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FLUOR FERNALD

CORRECTION OF UNIT WEIGHT AND WATER CONTENT FOR SOILS CONTAINING OVERSIZE PARTICLES

(ASTM D 4718)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO PROJECT NO. GQ1341 TASK NO. 04.1

DESCRIPTION: Phase IV DATE: 23 day July month 2002 year

MATERIAL TYPE: Clay Liner LP02-16 MOD

Weight of Total Sample	=	38076.0
Weight of Oversize Fraction	=	1676.2
Weight of Finer Fraction (- 3/8)	=	36399.8
Percentage of Oversize Fraction	= (P_C)	4.4
Percentage of Finer Fraction (- 3/8)	= (P_F)	95.6
Specific Gravity (Assumed)	= (G_M)	2.72

(W_F) =	Water Content - 3/8 , as decimal	=	0.095
(W_C) =	Water Content + 3/8 , as decimal	=	~~0.47~~ 0.015
(δ_F) =	Dry Density of finer fraction	=	131.1
(δ_W) =	Unit Weight of Water	=	62.4

$$C_W=(W_F P_F)+(W_C P_C)$$

$C_W = 9.1\%$

$$C\delta_D=100\delta_F G_M \delta_W/(\delta_F P_C)+(G_M \delta_W P_F)$$

$C_{\delta D} = 132.4$ pcf

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FLUOR FERNALD

4940

MOISTURE-DENSITY RELATIONSHIP

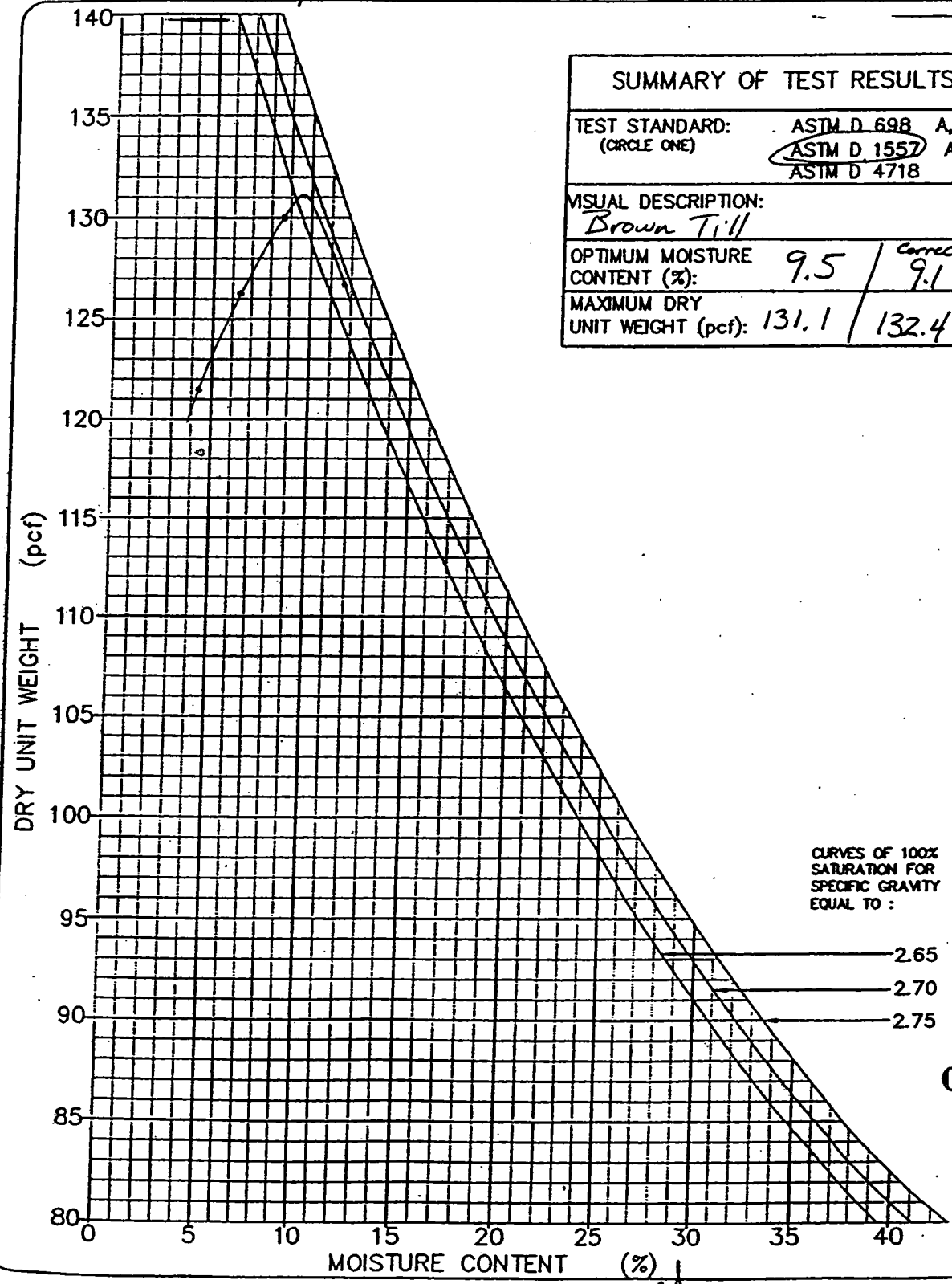
PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO PROJECT NO.: 6Q1341 TASK NO.: 04.1

DESCRIPTION: Phase IV DATE: 23 day July month 2002 year

MATERIAL TYPE: Clay Liner MATERIAL SOURCE: STOCKPILE 02-3 SAMPLE NO.: LP02-16

SUMMARY OF TEST RESULTS			QA ID
TEST STANDARD: (CIRCLE ONE)	ASTM D 698 A, B, C ASTM D 1557 A, B, C ASTM D 4718		
VISUAL DESCRIPTION: Brown Till			
OPTIMUM MOISTURE CONTENT (%):	9.5	Corrected 9.1	
MAXIMUM DRY UNIT WEIGHT (pcf):	131.1	132.4	



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FLUOR DANIEL FERNALD

FIELD LABORATORY COMPACTION TEST (ASTM D 698 METHOD B)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO

DESCRIPTION: Phase IV

PROJECT NO. 691341 TASK NO.: 04.1

MATERIAL TYPE: Low Perm Clay

DATE: 23 day July month 2002 year

SAMPLE NO.: LP02-17

THIS METHOD WILL BE USED IF THE MATERIAL RETAINED ON THE NO. 3/4-in. (19-mm) SIEVE IS LESS THAN 30%, IF THE MATERIAL RETAINED ON THE NO. 4 (4.75-mm) SIEVE IS GREATER THAN 20%, AND IF THE MATERIAL RETAINED ON THE NO. 3/8-in. (9.5-mm) SIEVE IS LESS THAN 20%.
ALL MATERIAL RETAINED ON THE NO. 3/8-in. (9.5-mm) SIEVE IS DISCARDED.
USE OVERSIZE CORRECTION IF MORE THAN 5% IS DISCARDED ACCORDING TO ASTM D 4718.
USE A 4-in. DIAMETER MOLD / 5.5-lb RAMMER / 12-in. DROP / 3 LAYERS / 25 BLOWS PER LAYER.

COMPACTION OF SOIL

			4% 13.60	6% 13.84	8% 13.79	2% 13.35	
	WATER ADDED	(ml)	100mL	150mL	200mL	50mL	QA ID: KS
A	WT. OF SOIL & MOLD	(grams)	6169.0	6277.8	6255.1	6055.6	
B	WT. OF MOLD	(grams)	4204.5	4204.5	4204.5	4204.5	
C	WT. OF SOIL = A − B	(grams)	1964.5	2073.3	2050.6	1851.1	
D	WET UNIT WT.(1) = C X 0.066	(pcf)	129.7	136.8	135.3	122.2	
E	DRY UNIT WT. = D / [1 + (K/100)]	(pcf)	118.2	~~122.3~~ 122.1	119.4	117.7	

NOTE: IF CALIBRATED MOLD OF 1/30 FT^3 IS USED, THE WET DENSITY IS CALCULATED FROM THE WEIGHT OF SOIL, THE VOLUME OF THE MOLD AND THE CONVERSION FROM GRAMS TO POUNDS (I.E., CONVERSION FACTOR = (30 / 453.6) = 0.066). THE MOLD MUST BE CALIBRATED TO VERIFY A CAPACITY OF 1/30 ± 0.0005 FT^3 ON INTERVALS NOT TO EXCEED 1000 TIMES THAT THE MOLD IS FILLED.

MOISTURE CONTENT – ASTM D 2216

	TARE NO.		230	679	630	12	QA ID: KS
F	WT. OF TARE	(grams)	8.4	8.2	8.1	8.3	
G	WT. OF WET SOIL & TARE	(grams)	388.1	331.2	371.7	314.4	
H	WT. OF DRY SOIL & TARE	(grams)	354.6	296.3	329.0	293.1	
I	WT. OF WATER = G − H	(grams)	33.5	34.9	42.7	21.3	
J	WT. DRY SOIL = H − F	(grams)	346.2	288.1	320.9	284.8	
K	MOISTURE CONTENT = (I/J) X 100	(%)	9.7	12.1	13.3	7.5	

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FLUOR FERNALD

CORRECTION OF UNIT WEIGHT AND WATER CONTENT FOR SOILS CONTAINING OVERSIZE PARTICLES

(ASTM D 4718)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO PROJECT NO. G9134 TASK NO. 04.1

DESCRIPTION: Phase IV DATE: 23 day July month 2002 year

MATERIAL TYPE: Clay Liner LP02-17

Weight of Total Sample	=	24587.7
Weight of Oversize Fraction	=	795.1
Weight of Finer Fraction (- 3/8)	=	23792.6
Percentage of Oversize Fraction	= (P_C)	3.2
Percentage of Finer Fraction (- 3/8)	= (P_F)	96.8
Specific Gravity (Assumed)	= (G_M)	2.72

(W_F)	=	Water Content - 3/8 , as decimal	=	0.120
(W_C)	=	Water Content + 3/8 , as decimal	=	0.015
(δ_F)	=	Dry Density of finer fraction	=	122.4
(δ_W)	=	Unit Weight of Water	=	62.4

$$C_W=(W_F P_F)+(W_C P_C)$$

$C_W = 11.7\%$

$$C\delta_D=100\delta_F G_M \delta_W/(\delta_F P_C)+(G_M \delta_W P_F)$$

$C_{\delta D} = 123.5$ pcf

000700

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FLUOR FERNALD

4940

MOISTURE-DENSITY RELATIONSHIP

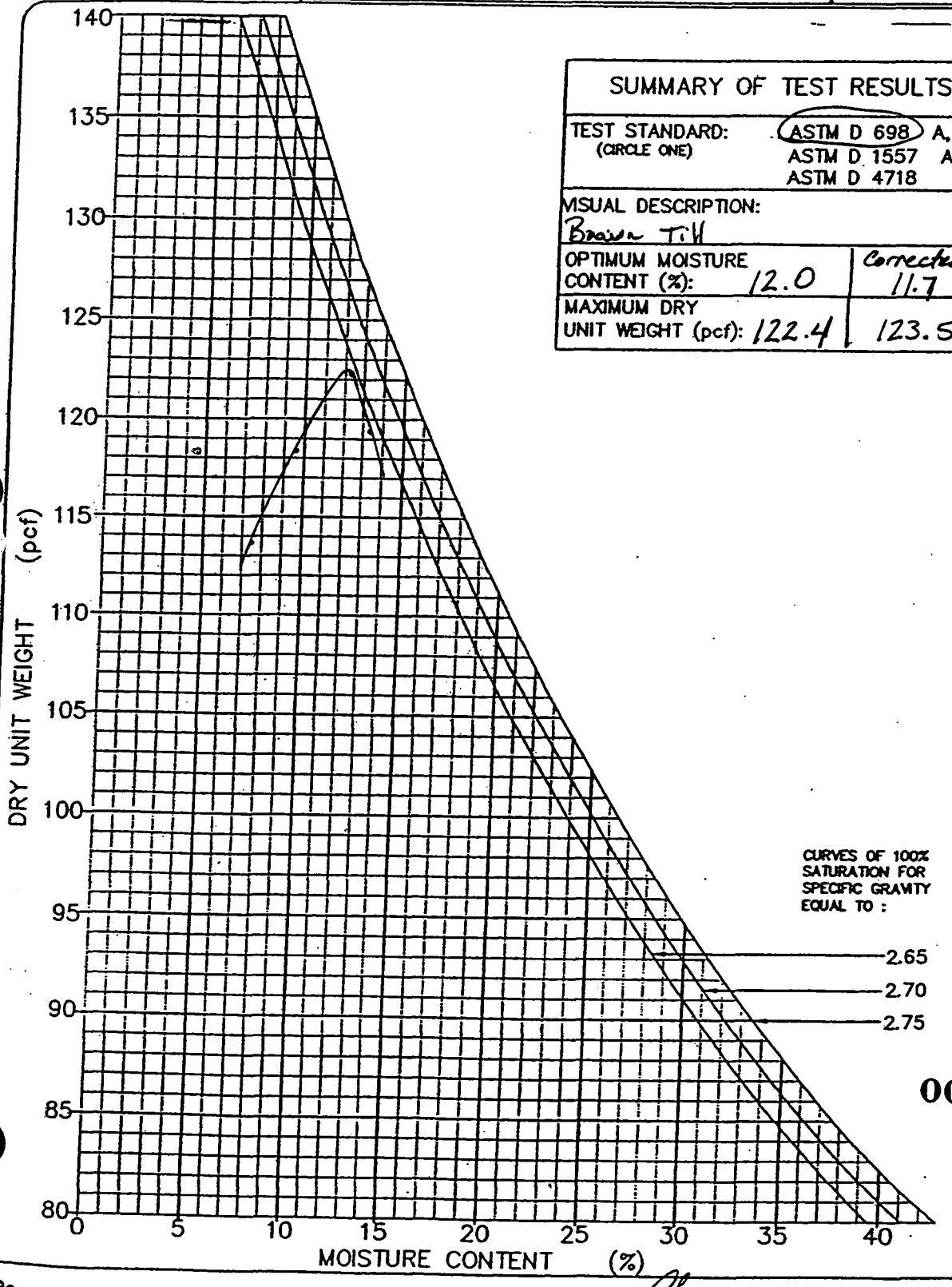
PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO PROJECT NO.: GQ1341 TASK NO.: 04.1

DESCRIPTION: Phase IV DATE: 23 day July month 2002 year

MATERIAL TYPE: Clay Liner MATERIAL SOURCE: STOCKPILE 02-3 SAMPLE NO.: LP02-17

SUMMARY OF TEST RESULTS		QA ID
TEST STANDARD: (CIRCLE ONE) ASTM D 698 A, B, C; ASTM D 1557 A, B, C; ASTM D 4718		CJ
VISUAL DESCRIPTION: Brown Till		CJ
OPTIMUM MOISTURE CONTENT (%): 12.0	Corrected 11.7	CJ
MAXIMUM DRY UNIT WEIGHT (pcf): 122.4	123.5	CJ



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GEOSYNTEC CONSULTANTS

FLUOR FERNALD, INC.

FIELD LABORATORY COMPACTION TEST

(ASTM D 698 METHOD B)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO

DESCRIPTION: Phase IV

PROJECT NO.: GQ1341 TASK NO.: 04.1

DATE: 2 day Aug month 2002 year

MATERIAL TYPE: Clay Liner MATERIAL SOURCE: Stockpile 02-3 SAMPLE NO.: LA02-19

THIS METHOD WILL BE USED IF THE MATERIAL RETAINED ON THE NO. 3/4-in. (19-mm) SIEVE IS LESS THAN 30%, IF THE MATERIAL RETAINED ON THE NO. 4 (4.75-mm) SIEVE IS GREATER THAN 20%, AND IF THE MATERIAL RETAINED ON THE NO. 3/8-in. (9.5-mm) SIEVE IS LESS THAN 20%.
ALL MATERIAL RETAINED ON THE NO. 3/8-in. (9.5-mm) SIEVE IS DISCARDED.
USE OVERSIZE CORRECTION IF MORE THAN 5% IS DISCARDED ACCORDING TO ASTM D 4718.
USE A 4-in. DIAMETER MOLD / 5.5-lb RAMMER / 12-in. DROP / 3 LAYERS / 25 BLOWS PER LAYER.

COMPACTION OF SOIL

QA ID:

			13.20	13.32	13.61	13.68	13.55
	WATER ADDED	(ml)	4%	6%	8%	10%	12%
A	WT. OF SOIL & MOLD	(grams)	5987.5	6042.0	6173.5	6205.2	6146.3
B	WT. OF MOLD	(grams)	4205.5	4205.5	4205.5	4205.5	4205.5
C	WT. OF SOIL = A − B	(grams)	1783.0	1837.5	1969.0	2000.7	1941.8
D	WET UNIT WT.(1) = C X 0.066	(pcf)	117.7	121.3	130.0	132.0	128.2
E	DRY UNIT WT. = D / [1 + (K/100)]	(pcf)	108.2	110.1	115.0	114.4	109.3

NOTE: IF CALIBRATED MOLD OF 1/30 FT^3 IS USED, THE WET DENSITY IS CALCULATED FROM THE WEIGHT OF SOIL, THE VOLUME OF THE MOLD AND THE CONVERSION FROM GRAMS TO POUNDS (I.E., CONVERSION FACTOR = (30 / 453.6) = 0.066). THE MOLD MUST BE CALIBRATED TO VERIFY A CAPACITY OF 1/30 ± 0.0005 FT^3 ON INTERVALS NOT TO EXCEED 1000 TIMES THAT THE MOLD IS FILLED.

MOISTURE CONTENT – ASTM D 2216

QA ID:

	TARE NO.		#14	636	604	#18	#605
F	WT. OF TARE	(grams)	8.2	8.3	8.3	8.3	8.3
G	WT. OF WET SOIL & TARE	(grams)	352.0	184.4	239.3	~~253.3~~ 253.7	321.5
H	WT. OF DRY SOIL & TARE	(grams)	324.1	168.2	212.7	220.9	275.4
I	WT. OF WATER = G − H	(grams)	27.9	16.2	26.6	32.8	46.1
J	WT. DRY SOIL = H − F	(grams)	315.9	159.9	240.4	212.6	267.1
K	MOISTURE CONTENT = (I/J) X 100	(%)	8.8	10.1	13.0	15.4	17.3

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FLUOR FERNALD

CORRECTION OF UNIT WEIGHT AND WATER CONTENT FOR SOILS CONTAINING OVERSIZE PARTICLES *(ASTM D 4718)*

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO PROJECT NO. G2134 TASK NO. 041

DESCRIPTION: Cta Phase IV DATE: 2 day Aug month 2002 year

MATERIAL TYPE: Clay Liner LP02-19 STD

Weight of Total Sample	=	40005.3
Weight of Oversize Fraction	=	929.4
Weight of Finer Fraction (- 3/8)	=	39075.9
Percentage of Oversize Fraction	= (P_C)	2.3
Percentage of Finer Fraction (- 3/8)	= (P_F)	97.7
Specific Gravity (Assumed)	= (G_M)	2.72

(W_F) =	Water Content - 3/8 , as decimal	=	0.141
(W_C) =	Water Content + 3/8 , as decimal	=	0.015
(δ_F) =	Dry Density of finer fraction	=	116.4
(δ_W) =	Unit Weight of Water	=	62.4

$$C_W = (W_F P_F) + (W_C P_C)$$

$C_w = 13.8\%$

$$C\delta_D = 100\delta_F G_M \delta_W / (\delta_F P_C) + (G_M \delta_W P_F)$$

$C_{\delta D} = 117.3$ pcf

000703

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FLUOR FERNALD

4940

MOISTURE–DENSITY RELATIONSHIP

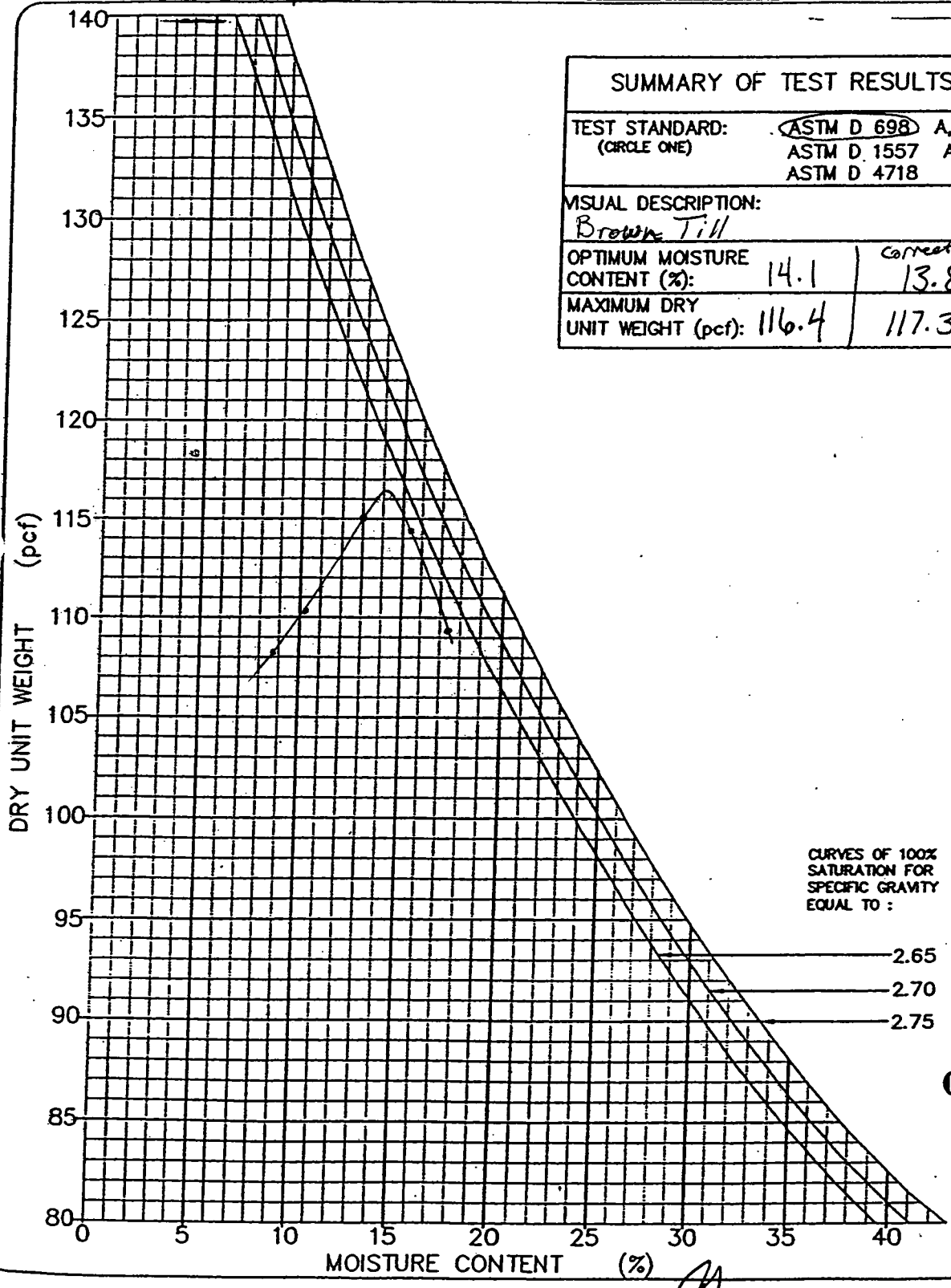
PROJECT: ON–SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO PROJECT NO.: GQ1341 TASK NO.: 04.1

DESCRIPTION: Fluor Fernald DATE: 2 day Aug month 2002 year

MATERIAL TYPE: Clay Liner MATERIAL SOURCE: Stockpile 02-3 SAMPLE NO.: LP02-19

SUMMARY OF TEST RESULTS			QA ID
TEST STANDARD: (CIRCLE ONE)	ASTM D 698 A, B, C ASTM D 1557 A, B, C ASTM D 4718		CS
VISUAL DESCRIPTION: Brown Till			CS
OPTIMUM MOISTURE CONTENT (%):	14.1	corrected 13.8	CS
MAXIMUM DRY UNIT WEIGHT (pcf):	116.4	117.3	CS



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FLUOR FERNALD

FIELD LABORATORY COMPACTION TEST

(ASTM D 1557 METHOD B)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO

DESCRIPTION: Phase IV

PROJECT NO.: GQ1341 TASK NO.: 64.1

MATERIAL TYPE: Low Plan Clay

DATE: 26 day July month 2002 year

MATERIAL SOURCE: Stockpile 02-3

SAMPLE NO.: LP02-19

THIS METHOD WILL BE USED IF THE MATERIAL RETAINED ON THE NO. 4-in. (4.75-mm) SIEVE IS GREATER THAN 20%, AND THE MATERIAL RETAINED ON THE NO. 3/8-in. (9.5-mm) SIEVE IS LESS THAN 20%.
ALL MATERIAL RETAINED ON THE NO. 3/8-in. (9.5-mm) SIEVE IS DISCARDED.
USE OVERSIZE CORRECTION IF MORE THAN 5% IS DISCARDED ACCORDING TO ASTM D 4718.
USE A 4-in. DIAMETER MOLD / 10-lb RAMMER / 18-in. DROP / 5 LAYERS / 25 BLOWS PER LAYER.

COMPACTION OF SOIL

			13.13 omit	13.58	13.91	13.90	13.8
	WATER ADDED	(ml)	2%	4%	6%	8%	10%
A	WT. OF SOIL & MOLD	(grams)	5955.8	6159.9	6309.5	6305.6	6259.7
B	WT. OF MOLD	(grams)	4204.5	4204.5	4204.5	4204.5	4264.8
C	WT. OF SOIL = A − B	(grams)	1751.3	1955.4	2105.1	2100.5	2055.2
D	WET UNIT WT.(1) = C X 0.066	(pcf)	115.9	129.1	138.9	138.6	135.6
E	DRY UNIT WT. = D / [1 + (K/100)]	(pcf)	110.0	120.7	126.2	124.4	~~128.7~~ 119.6

QA ID: JW

NOTE: IF CALIBRATED MOLD OF 1/30 FT³ IS USED, THE WET DENSITY IS CALCULATED FROM THE WEIGHT OF SOIL. THE VOLUME OF THE MOLD AND THE CONVERSION FROM GRAMS TO POUNDS (I.E., CONVERSION FACTOR = (30 / 453.6) = 0.066). THE MOLD MUST BE CALIBRATED TO VERIFY A CAPACITY OF 1/30 ± 0.0005 FT³ ON INTERVALS NOT TO EXCEED 1000 TIMES THAT THE MOLD IS FILLED.

MOISTURE CONTENT – ASTM D 2216

	TARE NO.		STD POINT RUN omit				
F	WT. OF TARE	(grams)	#608	# 607	# 97	# 63	# 606
G	WT. OF WET SOIL & TARE	(grams)	8.2	8.28	8.20	8.17	8.16
H	WT. OF DRY SOIL & TARE	(grams)	476.0	264.15	253.55	205.15	189.04
I	WT. OF WATER = G − H	(grams)	451.9	247.4	231.1	185.0	167.6
J	WT. DRY SOIL = H − F	(grams)	24.1	16.75	22.45	20.15	~~18.56~~ 21.4
K	MOISTURE CONTENT = (I/J) X 100	(%)	443.7	239.12	222.9	176.83	159.44
			5.4	7.00	10.1	11.4	~~5.4~~ 13.4

QA ID: DLE

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1.07 1.101 1.114 1.054

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SHEET NO. 1 OF 4

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FLUOR FERNALD

FIELD LABORATORY COMPACTION TEST

(ASTM D 1557 METHOD B)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO

PROJECT NO.: 681341 TASK NO.: 4.1

DESCRIPTION: PHASE IV

DATE: 30 day JULY month 02 year

MATERIAL TYPE: LOW PLASTIC CLAY MATERIAL SOURCE: STOCKPILE 02-3 SAMPLE NO.: LP02-19

THIS METHOD WILL BE USED IF THE MATERIAL RETAINED ON THE NO. 4-in. (4.75-mm) SIEVE IS GREATER THAN 20%, AND THE MATERIAL RETAINED ON THE NO. 3/8-in. (9.5-mm) SIEVE IS LESS THAN 20%.
ALL MATERIAL RETAINED ON THE NO. 3/8-in. (9.5-mm) SIEVE IS DISCARDED.
USE OVERSIZE CORRECTION IF MORE THAN 5% IS DISCARDED ACCORDING TO ASTM D 4718.
USE A 4-in. DIAMETER MOLD / 10-lb RAMMER / 18-in. DROP / 5 LAYERS / 25 BLOWS PER LAYER.

COMPACTION OF SOIL

QA ID: DLE

	WATER ADDED	(ml)	13.49 2%				
A	WT. OF SOIL & MOLD	(grams)	6119.1				
B	WT. OF MOLD	(grams)	4204.5				
C	WT. OF SOIL = A − B	(grams)	1914.6				
D	WET UNIT WT.(1) = C X 0.066	(pcf)	126.4				
E	DRY UNIT WT. = D / [1 + (K/100)]	(pcf)	120.2				

NOTE: IF CALIBRATED MOLD OF 1/30 FT^3 IS USED, THE WET DENSITY IS CALCULATED FROM THE WEIGHT OF SOIL, THE VOLUME OF THE MOLD AND THE CONVERSION FROM GRAMS TO POUNDS (I.E., CONVERSION FACTOR = (30 / 453.6) = 0.066). THE MOLD MUST BE CALIBRATED TO VERIFY A CAPACITY OF 1/30 ± 0.0005 FT^3 ON INTERVALS NOT TO EXCEED 1000 TIMES THAT THE MOLD IS FILLED.

MOISTURE CONTENT – ASTM D 2216

QA ID: DLE/RS

	TARE NO.		# 107				
F	WT. OF TARE	(grams)	7.97				
G	WT. OF WET SOIL & TARE	(grams)	236.29				
H	WT. OF DRY SOIL & TARE	(grams)	225.20				
I	WT. OF WATER = G − H	(grams)	11.1				
J	WT. DRY SOIL = H − F	(grams)	217.2				
K	MOISTURE CONTENT = (I/J) X 100	(%)	5.1				

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FLUOR FERNALD

CORRECTION OF UNIT WEIGHT AND WATER CONTENT FOR SOILS CONTAINING OVERSIZE PARTICLES *(ASTM D 4718)*

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO PROJECT NO. 6Q1341 TASK NO. 041

DESCRIPTION: Phase ~~IV~~ DATE: 31 day July month 2002 year

MATERIAL TYPE: Clay Liner LP02-19 Mod

Weight of Total Sample	=	40005.3
Weight of Oversize Fraction	=	929.4
Weight of Finer Fraction (-3/8)	=	39075.9
Percentage of Oversize Fraction	= (P_C)	2.3
Percentage of Finer Fraction (-3/8)	= (P_F)	97.7
Specific Gravity (Assumed)	= (G_M)	62.4

(W_F) =	Water Content -3/8, as decimal	=	0.106
(W_C) =	Water Content +3/8, as decimal	=	0.015
(δ_F) =	Dry Density of finer fraction	=	125.6
(δ_W) =	Unit Weight of Water	=	62.4

$$C_W=(W_F P_F)+(W_C P_C)$$

C_W = ~~9.3%~~ 10.4%

000707

$$C\delta_D=100\delta_F G_M \delta_W/(\delta_F P_C)+(G_M \delta_W P_F)$$

$C_{\delta D}$ = ~~130.3 pcf~~ 126.4 pcf

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GEOSYNTEC CONSULTANTS

FLUOR FERNALD

4940

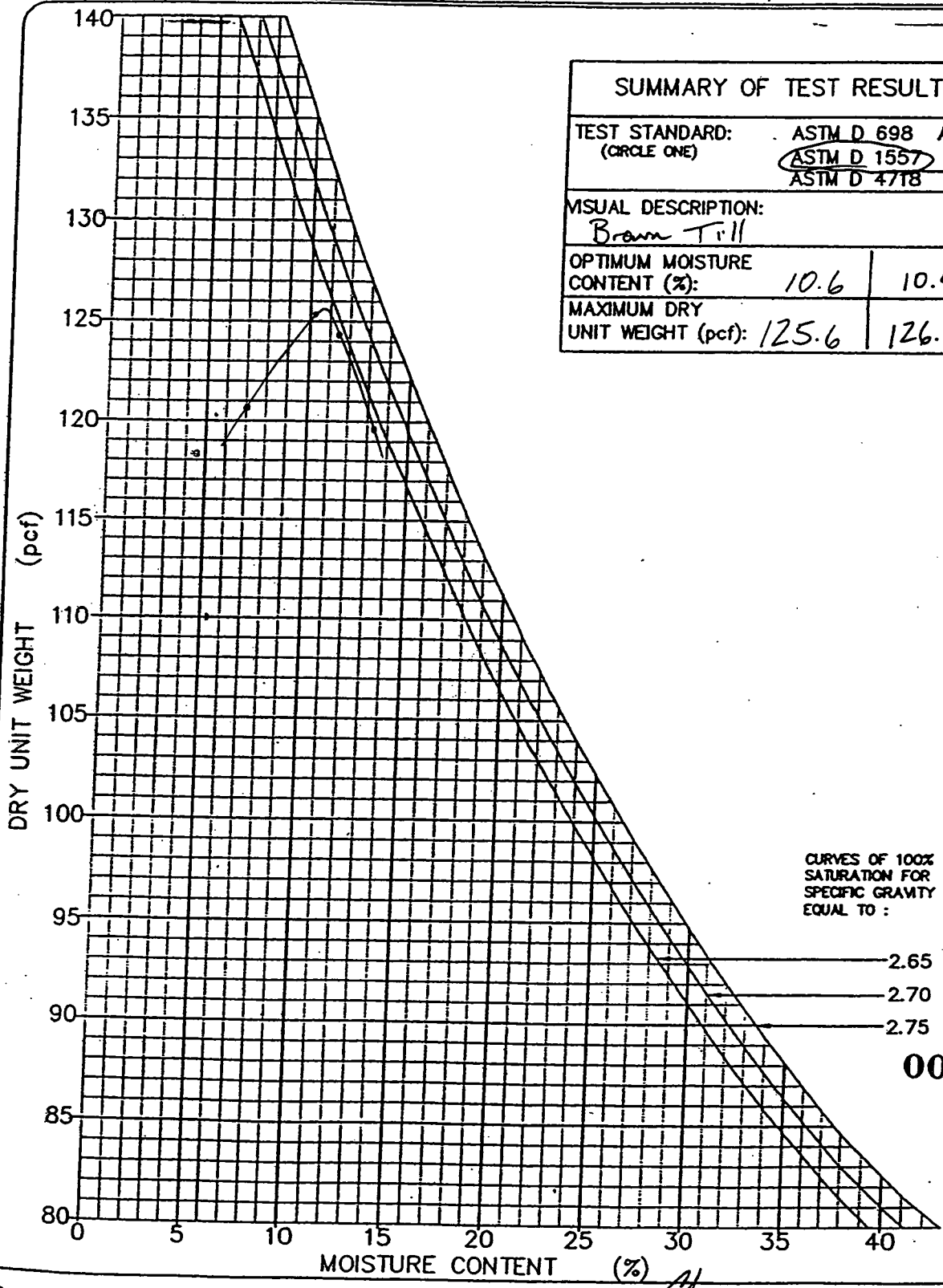
MOISTURE–DENSITY RELATIONSHIP

PROJECT: ON–SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO PROJECT NO.: GQ1341 TASK NO.: 641

DESCRIPTION: Phase IV DATE: 31 day July month 2002 year

MATERIAL TYPE: Clay Liner MATERIAL SOURCE: Stockpile 02-4 SAMPLE NO.: LP02-19



SUMMARY OF TEST RESULTS			QA ID
TEST STANDARD: (CIRCLE ONE)	ASTM D 698 A, B, C ASTM D 1557 A, B, C ASTM D 4718		CA
VISUAL DESCRIPTION: Brown Till			CA
OPTIMUM MOISTURE CONTENT (%):	10.6	10.4	CA
MAXIMUM DRY UNIT WEIGHT (pcf):	125.6	126.4	CA

000708

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GEOSYNTEC CONSULTANTS

FLUOR DANIEL FERNALD

FIELD LABORATORY COMPACTION TEST (ASTM D 698 METHOD B)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO

DESCRIPTION: PHASE IV

PROJECT NO.: 691341 TASK NO.: 04.1

MATERIAL TYPE: Clay Liner

DATE: 26 day Jun month 02 year

SAMPLE NO.: LP02-21

THIS METHOD WILL BE USED IF THE MATERIAL RETAINED ON THE NO. 3/4-in. (19-mm) SIEVE IS LESS THAN 30%, IF THE MATERIAL RETAINED ON THE NO. 4 (4.75-mm) SIEVE IS GREATER THAN 20%, AND IF THE MATERIAL RETAINED ON THE NO. 3/8-in. (9.5-mm) SIEVE IS LESS THAN 20%.
ALL MATERIAL RETAINED ON THE NO. 3/8-in. (9.5-mm) SIEVE IS DISCARDED.
USE OVERSIZE CORRECTION IF MORE THAN 5% IS DISCARDED ACCORDING TO ASTM D 4718.
USE A 4-in. DIAMETER MOLD / 5.5-lb RAMMER / 12-in. DROP / 3 LAYERS / 25 BLOWS PER LAYER.

Pan 27 Sub-4 13.71

COMPACTION OF SOIL

QA ID: JW

			13.62	13.29	13.43	13.59	
	WATER ADDED	(ml)	12%	4%	6%	8%	10%
A	WT. OF SOIL & MOLD	(grams)	6178.0	6028.3	6091.8	6164.4	6218.9
B	WT. OF MOLD	(grams)	4204.5	4204.5	4204.5	4204.5	4204.5
C	WT. OF SOIL = A − B	(grams)	1973.5	1823.8	1887.3	1959.9	2014.4
D	WET UNIT WT.(1) = C X 0.066	(pcf)	130.3	120.4	124.6	129.3	133.0
E	DRY UNIT WT. = D / [1 + (K/100)]	(pcf)	112.2	111.9	113.1	115.9	117.3

NOTE: IF CALIBRATED MOLD OF 1/30 FT^3 IS USED, THE WET DENSITY IS CALCULATED FROM THE WEIGHT OF SOIL, THE VOLUME OF THE MOLD AND THE CONVERSION FROM GRAMS TO POUNDS (I.E., CONVERSION FACTOR = (30 / 453.6) = 0.066). THE MOLD MUST BE CALIBRATED TO VERIFY A CAPACITY OF 1/30 ± 0.0005 FT^3 ON INTERVALS NOT TO EXCEED 1000 TIMES THAT THE MOLD IS FILLED.

MOISTURE CONTENT – ASTM D 2216

QA ID: JW

	TARE NO.		#629	#52	#601	#616	#97
F	WT. OF TARE	(grams)	8.1	8.1	8.2	8.2	8.2
G	WT. OF WET SOIL & TARE	(grams)	256.80	396.8	461.5	505.2	479.8
H	WT. OF DRY SOIL & TARE	(grams)	222.25	369.4	419.9	453.5	424.2
I	WT. OF WATER = G − H	(grams)	34.5	27.4	~~31.6~~ 41.6	51.7	55.6
J	WT. DRY SOIL = H − F	(grams)	214.2	~~7.6~~ 361.3	~~411.7~~ 411.7	445.3	416.0
K	MOISTURE CONTENT = (I/J) X 100	(%)	16.1	7.6	~~7.7~~ 10.1	11.6	13.4

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SHEET NO. 1 OF 3

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FLUOR FERNALD 4940

CORRECTION OF UNIT WEIGHT AND WATER CONTENT FOR SOILS CONTAINING OVERSIZE PARTICLES

(ASTM D 4718)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO PROJECT NO. GQ1341 TASK NO. 041

DESCRIPTION: Phase IV DATE: 31 day July month 2002 year

MATERIAL TYPE: Clay Liner LP02-21

STD

Weight of Total Sample	=	21065.0
Weight of Oversize Fraction	=	1269.5
Weight of Finer Fraction (- 3/8)	=	19795.5
Percentage of Oversize Fraction	= (P_C)	6.0
Percentage of Finer Fraction (- 3/8)	= (P_F)	94.0
Specific Gravity (Assumed)	= (G_M)	2.72

(W_F)	=	Water Content - 3/8 , as decimal	=	0.131
(W_C)	=	Water Content + 3/8 , as decimal	=	0.015
(δ_F)	=	Dry Density of finer fraction	=	118.0
(δ_W)	=	Unit Weight of Water	=	62.4

$$C_W=(W_F P_F)+(W_C P_C)$$

$C_w = 12.4\%$

000710

$$C\delta_D=100\delta_F G_M \delta_W/(\delta_F P_C)+(G_M \delta_W P_F)$$

$C_{\delta D} = 120.2$ pcf

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GEOSYNTEC CONSULTANTS

FLUOR FERNALD

4940

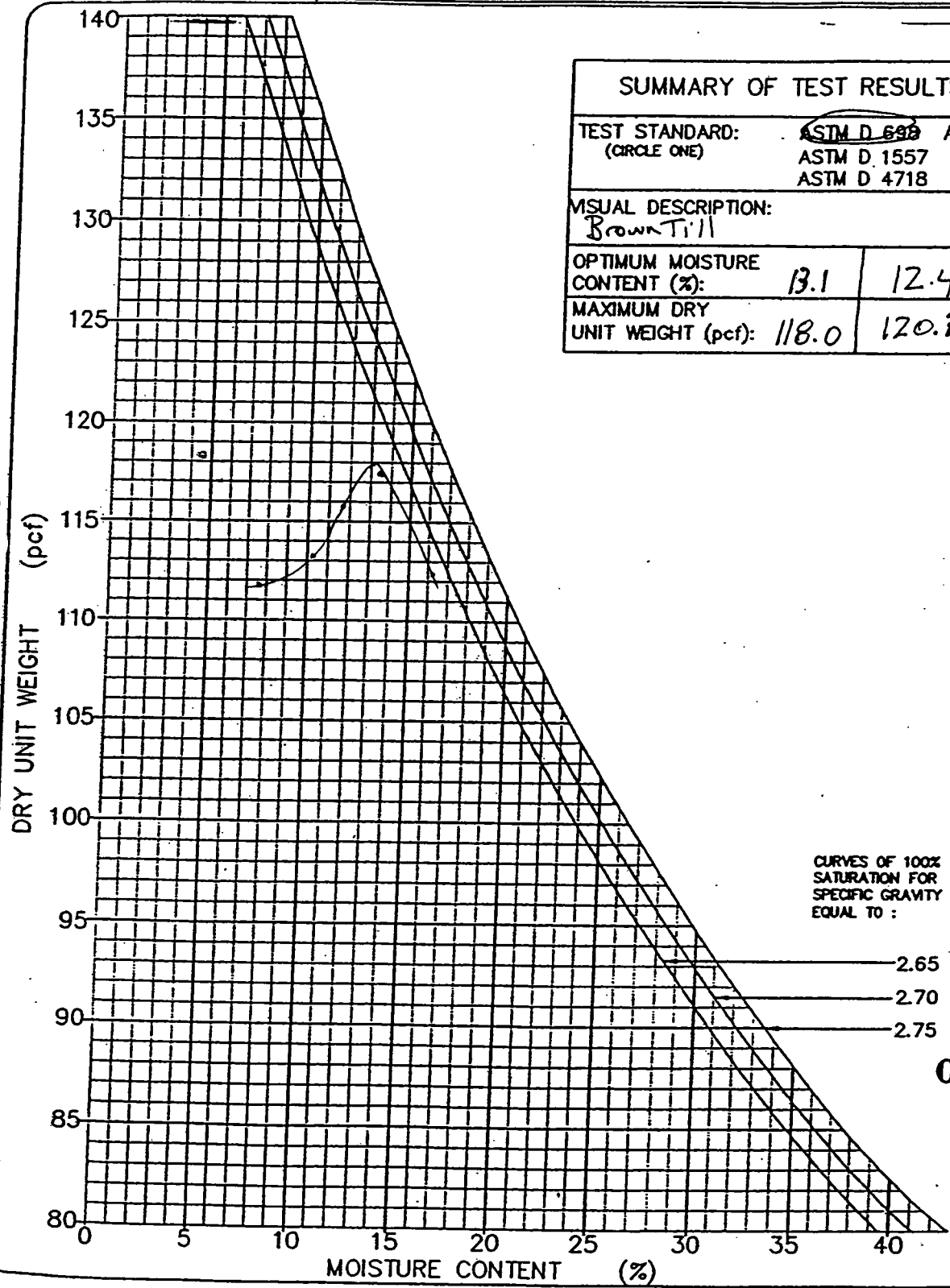
MOISTURE–DENSITY RELATIONSHIP

PROJECT: ON–SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO PROJECT NO.: GQ1341 TASK NO.: 041

DESCRIPTION: Phase IV DATE: 31 day July month 2002 year

MATERIAL TYPE: Clay Liner MATERIAL SOURCE: Stockpile 01-3 SAMPLE NO.: LP02-21



SUMMARY OF TEST RESULTS			QA ID
TEST STANDARD: (CIRCLE ONE)	~~ASTM D 698~~ A, (B) C ASTM D 1557 A, B, C ASTM D 4718		CS
VISUAL DESCRIPTION: Brown Till			CS
OPTIMUM MOISTURE CONTENT (%):	13.1	12.4	CS
MAXIMUM DRY UNIT WEIGHT (pcf):	118.0	120.7	CS

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GEOSYNTEC CONSULTANTS

FLUOR DANIEL FERNALD

FIELD LABORATORY COMPACTION TEST (ASTM D 698 METHOD B)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO

DESCRIPTION: PHASE IV

PROJECT NO.: 69134 TASK NO.: 04.1

MATERIAL TYPE: LOW PERM CLAY

DATE: 30 day JULY month 02 year

SAMPLE NO.: LP02-22

THIS METHOD WILL BE USED IF THE MATERIAL RETAINED ON THE NO. 3/4-in. (19-mm) SIEVE IS LESS THAN 30%, IF THE MATERIAL RETAINED ON THE NO. 4 (4.75-mm) SIEVE IS GREATER THAN 20%, AND IF THE MATERIAL RETAINED ON THE NO. 3/8-in. (9.5-mm) SIEVE IS LESS THAN 20%.
ALL MATERIAL RETAINED ON THE NO. 3/8-in. (9.5-mm) SIEVE IS DISCARDED.
USE OVERSIZE CORRECTION IF MORE THAN 5% IS DISCARDED ACCORDING TO ASTM D 4718.
USE A 4-in. DIAMETER MOLD / 5.5-lb RAMMER / 12-in. DROP / 3 LAYERS / 25 BLOWS PER LAYER.

COMPACTION OF SOIL

			13.5	13.57	13.73	13.63	QA ID: JW 7/29
	WATER ADDED	(ml)	4%	6%	8%	10%	6%
A	WT. OF SOIL & MOLD	(grams)	6123.6	6155.3	6227.9	6182.6	6209.8
B	WT. OF MOLD	(grams)	4204.5	4204.5 OMIT	4204.5	4204.5	4204.5
C	WT. OF SOIL = A - B	(grams)	1919.1	1950.9	2023.4	1978.1	2005.3
D	WET UNIT WT.(1) = C X 0.066	(pcf)	126.7	128.8	133.5	130.6	132.3
E	DRY UNIT WT. = D / [1 + (K/100)]	(pcf)	114.4	114.4	117.1	111.9	118.0

NOTE: IF CALIBRATED MOLD OF 1/30 FT^3 IS USED, THE WET DENSITY IS CALCULATED FROM THE WEIGHT OF SOIL, THE VOLUME OF THE MOLD AND THE CONVERSION FROM GRAMS TO POUNDS (I.E., CONVERSION FACTOR = (30 / 453.6) = 0.066). THE MOLD MUST BE CALIBRATED TO VERIFY A CAPACITY OF 1/30 ± 0.0005 FT^3 ON INTERVALS NOT TO EXCEED 1000 TIMES THAT THE MOLD IS FILLED.

MOISTURE CONTENT - ASTM D 2216

							QA ID: JW
	TARE NO.		#12	#65	#63	#97	#97
F	WT. OF TARE	(grams)	8.3	8.4	8.2	8.2	8.2
G	WT. OF WET SOIL & TARE	(grams)	291.3	229.98	207.1	269.0	281.7
H	WT. OF DRY SOIL & TARE	(grams)	263.7	205.21	182.7	231.9	252.2
I	WT. OF WATER = G - H	(grams)	27.6	24.8	24.4	37.1	29.5
J	WT. DRY SOIL = H - F	(grams)	255.4	197.0	174.5	223.7	244.0
K	MOISTURE CONTENT = (I/J) X 100	(%)	10.8	12.6	14.0	~~16.7~~ 16.6	12.1

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SHEET NO. 1 OF 3

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FLUOR FERNALD

CORRECTION OF UNIT WEIGHT AND WATER CONTENT FOR SOILS CONTAINING OVERSIZE PARTICLES (ASTM D 4718)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO PROJECT NO. G0134 / TASK NO. 04.1

DESCRIPTION: Phase IV DATE: 2 day Aug month 2002 year

MATERIAL TYPE: Clay Liner

STD

Weight of Total Sample	=	46817.5
Weight of Oversize Fraction	=	2021.4
Weight of Finer Fraction (- 3/8)	=	44796.1
Percentage of Oversize Fraction	= (P_C)	4.3
Percentage of Finer Fraction (- 3/8)	= (P_F)	95.7
Specific Gravity (Assumed)	= (G_M)	2.72

(W_F) =	Water Content - 3/8 , as decimal	=	0.130
(W_C) =	Water Content + 3/8 , as decimal	=	0.015
(δ_F) =	Dry Density of finer fraction	=	119.0
(δ_W) =	Unit Weight of Water	=	62.4

$$C_W=(W_F P_F)+(W_C P_C)$$

C_w = 12.5 %

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$$C\delta_D=100\delta_F G_M \delta_W/(\delta_F P_C)+(G_M \delta_W P_F)$$

$C_{\delta D}$ = 120.6 pcf

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MOISTURE–DENSITY RELATIONSHIP

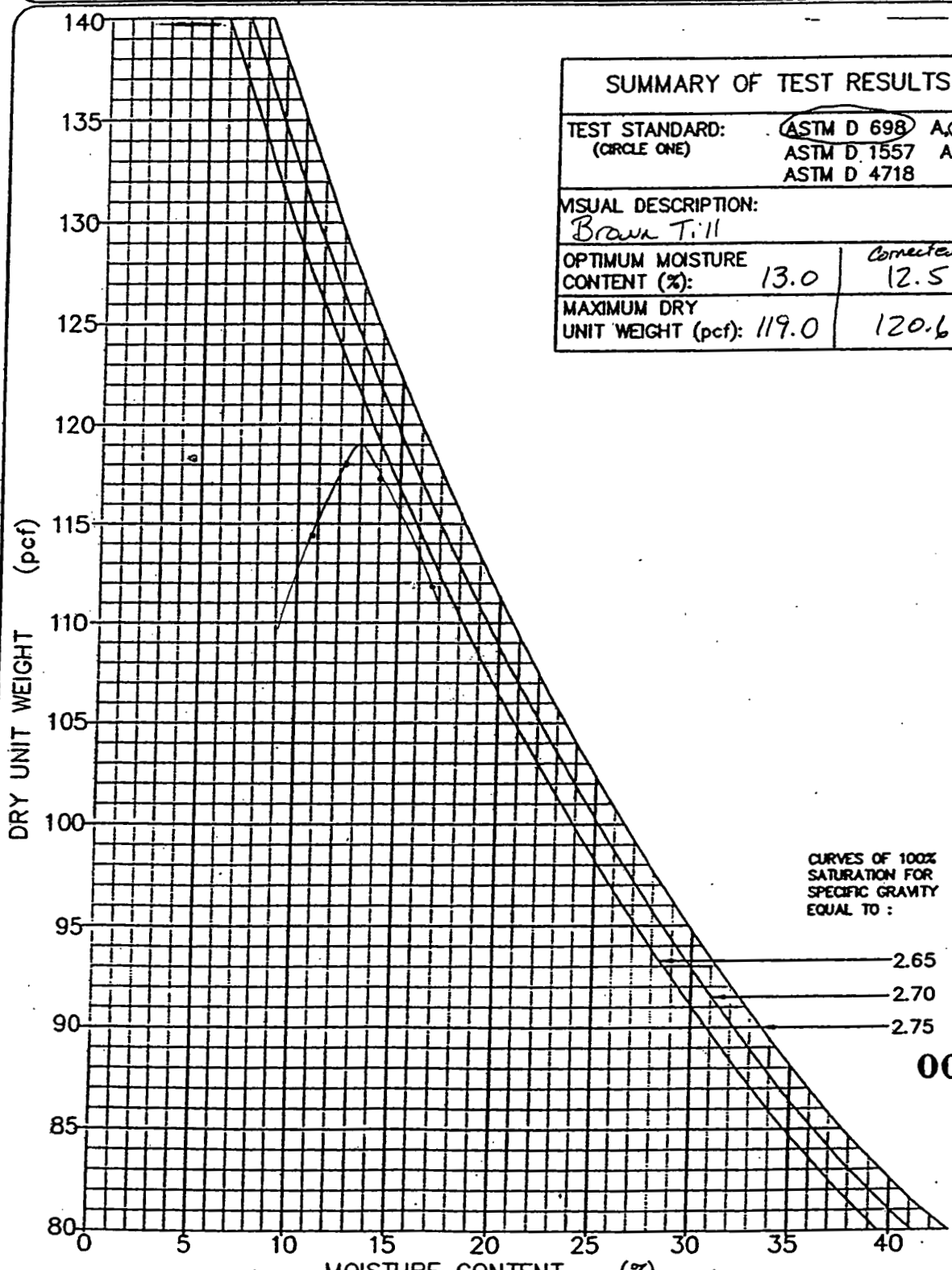
PROJECT: ON–SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO PROJECT NO.: GQ1341 TASK NO.: 04.1

DESCRIPTION: Phase IV DATE: 2 day Aug month 2002 year

MATERIAL TYPE: Clay Liner MATERIAL SOURCE: STOCKPILE 02-3 SAMPLE NO.: LA02-22

SUMMARY OF TEST RESULTS			QA ID
TEST STANDARD: (CIRCLE ONE)	ASTM D 698 A, B, C ASTM D 1557 A, B, C ASTM D 4718		CJ
VISUAL DESCRIPTION: Brown Till			CJ
OPTIMUM MOISTURE CONTENT (%):	13.0	Corrected 12.5	CJ
MAXIMUM DRY UNIT WEIGHT (pcf):	119.0	120.6	CJ



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FLUOR FERNALD

FIELD LABORATORY COMPACTION TEST

(ASTM D 1557 METHOD B)

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO

PROJECT NO.: GQ1341 TASK NO.: Ø4.1

DESCRIPTION: Phase IV

DATE: 30 day JULY month 2002 year

MATERIAL TYPE: Low Perm Clay MATERIAL SOURCE: Stockpile Ø2-2 SAMPLE NO.: LPØ2-22

THIS METHOD WILL BE USED IF THE MATERIAL RETAINED ON THE NO. 4-in. (4.75-mm) SIEVE IS GREATER THAN 20%, AND THE MATERIAL RETAINED ON THE NO. 3/8-in. (9.5-mm) SIEVE IS LESS THAN 20%.
ALL MATERIAL RETAINED ON THE NO. 3/8-in. (9.5-mm) SIEVE IS DISCARDED.
USE OVERSIZE CORRECTION IF MORE THAN 5% IS DISCARDED ACCORDING TO ASTM D 4718.
USE A 4-in. DIAMETER MOLD / 10-lb RAMMER / 18-in. DROP / 5 LAYERS / 25 BLOWS PER LAYER.

COMPACTION OF SOIL

QA ID: CHW

			14.06	13.89	13.78	13.88	13.61
	WATER ADDED	(ml)	4%	6%	8%	2%	Ø%
A	WT. OF SOIL & MOLD	(grams)	6377.6	6300.5	6250.6	6296.Ø	6173.5
B	WT. OF MOLD	(grams)	4204.5	4204.5	4204.5	4204.5	4204.5
C	WT. OF SOIL = A − B	(grams)	2173.1	2096.Ø	2046.1	2091.5	1969.Ø
D	WET UNIT WT.(1) = C X 0.066	(pcf)	143.4	138.3	135.Ø	138.Ø	130.Ø
E	DRY UNIT WT. = D / [1 + (K/100)]	(pcf)	130.0	122.7	118.0	127.7	~~130.Ø~~ 122.5

NOTE: IF CALIBRATED MOLD OF 1/30 FT^3 IS USED, THE WET DENSITY IS CALCULATED FROM THE WEIGHT OF SOIL, THE VOLUME OF THE MOLD AND THE CONVERSION FROM GRAMS TO POUNDS (I.E., CONVERSION FACTOR = (30 / 453.6) = 0.066). THE MOLD MUST BE CALIBRATED TO VERIFY A CAPACITY OF 1/30 ± 0.0005 FT^3 ON INTERVALS NOT TO EXCEED 1000 TIMES THAT THE MOLD IS FILLED.

MOISTURE CONTENT – ASTM D 2216

QA ID: CGD/DLE

	TARE NO.		# 230	#615	#608	# 14	~~#49~~
F	WT. OF TARE	(grams)	8.3	8.2	8.2	8.3	8.2
G	WT. OF WET SOIL & TARE	(grams)	237.0	546.9	185.3	470.9	402.4
H	WT. OF DRY SOIL & TARE	(grams)	215.6	486.1	163.0	436.2	379.8
I	WT. OF WATER = G − H	(grams)	21.4	60.8	22.3	34.7	22.6
J	WT. DRY SOIL = H − F	(grams)	207.3	477.9	154.8	427.9	371.6
K	MOISTURE CONTENT = (I/J) X 100	(%)	10.3	12.7	14.4	8.1	6.1

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FLUOR FERNALD

CORRECTION OF UNIT WEIGHT AND WATER CONTENT FOR SOILS CONTAINING OVERSIZE PARTICLES *(ASTM D 4718)*

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO PROJECT NO. 60134 TASK NO. 04.1

DESCRIPTION: Phase II DATE: 2 day Aug month 2002 year

MATERIAL TYPE: Clay Liner 2P02-22 MOD

Weight of Total Sample	=	46817.5
Weight of Oversize Fraction	=	2021.4
Weight of Finer Fraction (- 3/8)	=	44796.1
Percentage of Oversize Fraction	= (P_C)	4.3
Percentage of Finer Fraction (- 3/8)	= (P_F)	95.7
Specific Gravity (Assumed)	= (G_M)	2.72

(W_F)	=	Water Content - 3/8 , as decimal	=	0.097
(W_C)	=	Water Content + 3/8 , as decimal	=	~~0.097~~ 0.015
(δ_F)	=	Dry Density of finer fraction	=	130.3
(δ_W)	=	Unit Weight of Water	=	62.4

$$C_W=(W_F P_F)+(W_C P_C)$$

$C_W = 9.3$

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$$C\delta_D=100\delta_F G_M \delta_W/(\delta_F P_C)+(G_M \delta_W P_F)$$

$C_{\delta D} = 131.6$

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FLUOR FERNALD

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MOISTURE-DENSITY RELATIONSHIP

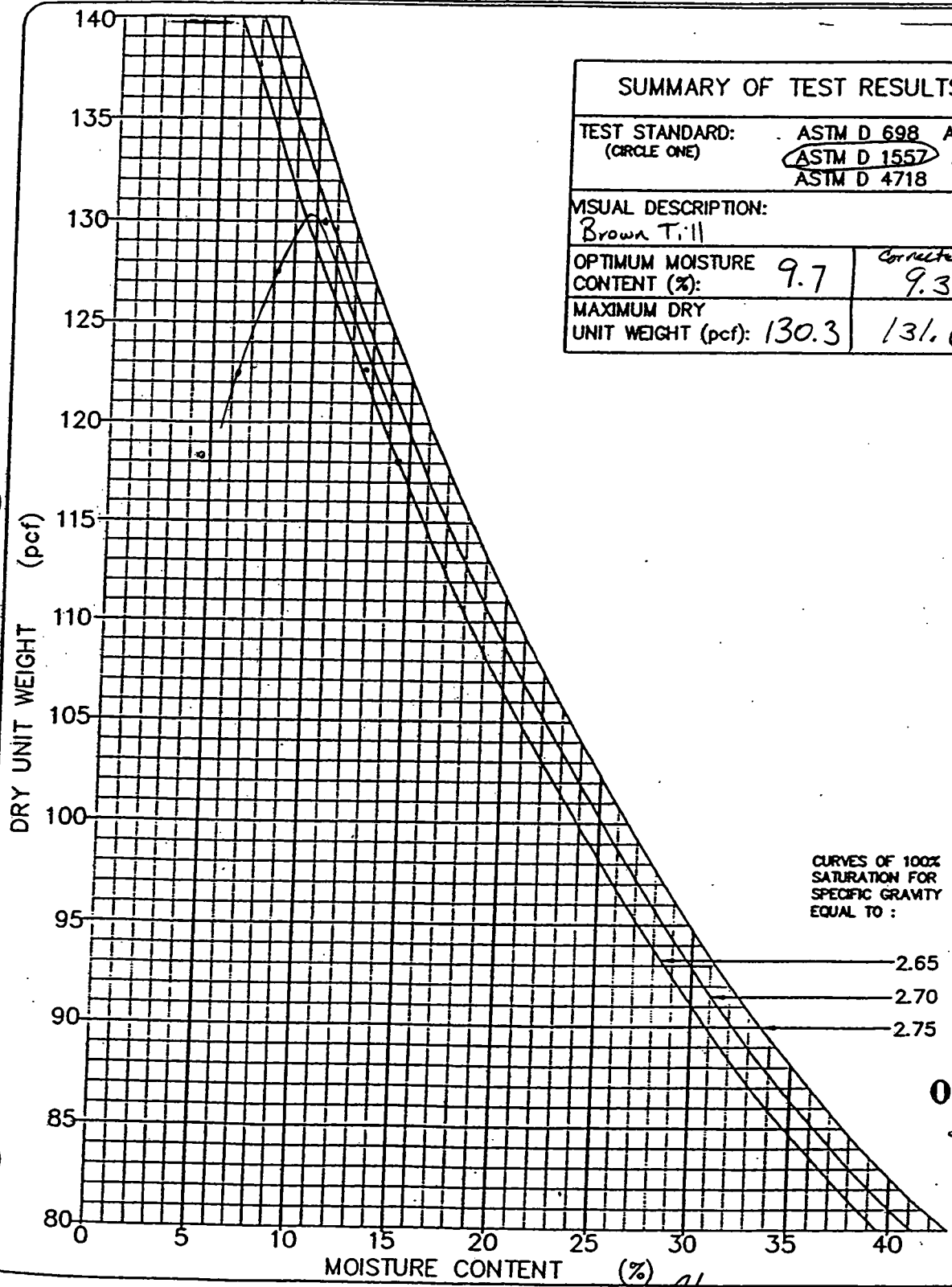
PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO PROJECT NO.: GQ1341 TASK NO.: 041

DESCRIPTION: Phase IV DATE: 2 day Aug month 2002 year

MATERIAL TYPE: Clay Liner MATERIAL SOURCE: STOCKPILE 02-3 SAMPLE NO.: L002-22

SUMMARY OF TEST RESULTS			QA ID
TEST STANDARD: (CIRCLE ONE)	ASTM D 698 A, B, C ASTM D 1557 A, B C ASTM D 4718		CJ
VISUAL DESCRIPTION: Brown Till			CJ
OPTIMUM MOISTURE CONTENT (%):	9.7	Corrected 9.3	CJ
MAXIMUM DRY UNIT WEIGHT (pcf):	130.3	131.6	CJ



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