Sun Company, Inc. (R&M)

PHASE I
STABILIZATION MEASURES
WORK PLAN

MIDDLE CREEK ABATEMENT PROJECT
MARCUS HOOK, PENNSYLVANIA

March 1993

VOLUME 3a - APPENDICIES

Brown & Root Braun
and
Halliburton NUS
CORPORATION

VOLUME 3

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Summary of
Geotechnical Laboratory Test Data
for Soil Borings

SUMMARY OF LABORATORY TEST DATA

SAMPLE IDENTIFICATION					GRAIN SIZE DISTRIBUTION				PLASTICITY						VOLUMETRIC ANALYSIS			COMPACTION						SHEAR STRENGTH			CONSOLIDATION				
BORING NUMBER	SAMPLE NUMBER	DEPTH (FT.)	Stratum	SOIL GROUP (USC SYSTEM)	GRAVEL (%)	SAND (%)	SILT (%)	CLAY & COLLOIDS (%)	LIQUID LIMIT - W_L (%)	PLASTIC LIMIT - W_P (%)	PLASTICITY INDEX - I_P (%)	LIQUIDITY INDEX - I_L	SPECIFIC GRAVITY - G	MOISTURE CONTENT - W (%)	DRY UNIT WEIGHT - γ_d (PCF)	VOID RATIO - e	DEGREE OF SATURATION - S_r (%)	Organic - %	pH	σ_3 TSF	$\sigma_1 - \sigma_3$ - TSF	Strain - %	TYPE OF TEST	ANGLE OF INTERNAL FRICTION - ϕ (DEGREES)	COHESION - C (TSF)	UNCONFINED COMPRESSIVE STRENGTH - q_u (TSF)	OVERBURDEN STRESS - p_o (TSF)	PRECONSOLIDATION STRESS - p_c (TSF)	COMPRESSION INDEX - C_c	SWELLING INDEX - C_s	
37-2	S-4,5,6	6-10[7]	F		23	56	21							30																		
37-3	S-7	14'-16'	IA										†2.67	17.8	113.9	0.46	100															
37-4	S-5	8'-10'	F		–	41	59				N/P			18.1																		
37-6	S-5	8'-10'	IB	ML					27	22	5	1.0	†2.70	26.9	107.8	0.56	30	2.7														
37-7	U-1	10'-12'	F	ML					29	28	1	-6.6		21.5																		
37-9	S-6	10'-12'	IA/IC										†2.70	23.0	104.4	0.61	100	1.6														
	S-9	18[6]-20	2		–	51	31	18																								
	S-10	23[6]-25	3										†2.70	24.9	90.9	0.85	79															
37-11	S-6	12'-14'	IA										†2.70	23.0	106.5	0.58	100					10.8	UC	–	0.89	1.78						
37-12	S-8	14'-16'	2								N/P		†2.70	17.7	124.9	0.35	100	0.9														
37-14	S-7	12'-14'	IB	OL					48	40	8	1.6		52.5				26.3														
37-16	S-5	8'-10'	IB											77.1				26.0														
	S-6	10'-12'	IA										†2.70	21.3	105.9	0.59	98															
37-17	U-1	25'-27'	IC/2		5	84	11				N/P		†2.67	30.4	88.8	0.88	93		5.7													
37-18	S-7	12'-14'	IA										†2.67	19.6	111.3	0.50	100															
37-19	S-6	10'-12'	IB	OH					228	160	68	0.5	†2.30	195.9	25.6	4.62	98	51.7														

† ASSUMED VALUE
‡ REMOLDED SPECIMEN

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Sun Oil - MCAP
Marcus Hook, Pa.

FILE NO. ML3626-20

SUMMARY OF LABORATORY TEST DATA

SAMPLE IDENTIFICATION					GRAIN SIZE DISTRIBUTION				PLASTICITY						VOLUMETRIC ANALYSIS			COMPACTION						SHEAR STRENGTH			CONSOLIDATION			
BORING NUMBER	SAMPLE NUMBER	DEPTH (FT.)	Stratum	SOIL GROUP (USC SYSTEM)	GRAVEL (%)	SAND (%)	SILT (%)	CLAY & COLLOIDS (%)	LIQUID LIMIT - w_L (%)	PLASTIC LIMIT - w_P (%)	PLASTICITY INDEX - I_P (%)	LIQUIDITY INDEX - I_L	SPECIFIC GRAVITY - G	MOISTURE CONTENT - w (%)	DRY UNIT WEIGHT - γ_d (PCF)	VOID RATIO - e	DEGREE OF SATURATION - S_r (%)	Organic - %	pH	σ_3 TSF	$\sigma_1 - \sigma_3$ - TSF	Strain - %	TYPE OF TEST	ANGLE OF INTERNAL FRICTION - ϕ (DEGREES)	COHESION - C (TSF)	UNCONFINED COMPRESSIVE STRENGTH - q_u (TSF)	OVERBURDEN STRESS - p_o (TSF)	PRECONSOLIDATION STRESS - p_c (TSF)	COMPRESSION INDEX - C_c	SWELLING INDEX - C_s
38-1	U-1	15'-17'	IB	OH					178	90	88	0.2	2.50+	110.9	38.2	3.08	90	30.7				6.3	UC	–	0.3	0.59				
38-3	U-1	15'-17'	IB	OH					118	63	55	0.5	2.55+	91.0	49.0	2.25	100	32.1		0.5	0.34	10.7	Q	0	0.2					
38-4	S-5	8'-10'	F										2.67+	17.1	128.5	0.30	52													
	U-1	15'-17'	IB	OH					80	41	39	0.8	2.60+	73.1	57.4	1.83	100	15.2	6.8	0.5	0.30	12.5	Q	0	0.15					
38-5	S-5	13'6"-15	IB										2.35+	137.3	34.1	3.30	98	33.3				10.7	UC	–	0.31	0.62				
38-5	S-6	18'6"-20	IB	OH									2.30	104.8	52.9	1.72	100	35.6									1.0	1.4	0.97	0.17
38-6	S-4	8'-10'	IA										2.70+	23.8	102.9	0.64	100													
38-7	U-1	10'-12'	F		2	25	56	17					2.70	21.5	104.5	0.61	94	0.5	7.1								0.7	2.0	0.11	0.01
													2.70+	20.4	107.1	0.57	96					8.9	UC	–	0.23	0.46				

↑ ASSUMED VALUE
+ REMOLDED SPECIMEN

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Marcus Hook, Pa.

FILE NO. ML3626-20
TABLE NO. I.-2

SUMMARY OF LABORATORY TEST DATA

SAMPLE IDENTIFICATION					GRAIN SIZE DISTRIBUTION				PLASTICITY						VOLUMETRIC ANALYSIS			COMPACTION						SHEAR STRENGTH			CONSOLIDATION			
BORING NUMBER	SAMPLE NUMBER	DEPTH (FT.)	Stratum	SOIL GROUP (USC SYSTEM)	GRAVEL (%)	SAND (%)	SILT (%)	CLAY & COLLOIDS (%)	LIQUID LIMIT-w_L (%)	PLASTIC LIMIT-w_P (%)	PLASTICITY INDEX-I_P(%)	LIQUIDITY INDEX-I_L	SPECIFIC GRAVITY-G	MOISTURE CONTENT-w (%)	DRY UNIT WEIGHT-γ_d (PCF)	VOID RATIO-e	DEGREE OF SATURATION-S_r(%)	Organic - %	pH	σ_3 TSF	$\sigma_1-\sigma_3$ - TSF	Strain - %	TYPE OF TEST	ANGLE OF INTERNAL FRICTION-ϕ (DEGREES)	COHESION-C (TSF)	UNCONFINED COMPRESSIVE STRENGTH-q_u (TSF)	OVERBURDEN STRESS-p_o (TSF)	PRECONSOLIDATION STRESS-p_c (TSF)	COMPRESSION INDEX-C_c	SWELLING INDEX-C_s
38-7	S-10/11																														
38-9	S-7	13'-40'	2		18	61	21							14.5					6.8												
33-18	S-6/8/9												2.67†	8.6*	127.8*	0.31	76			0.5	2.92	3.6	S	40	0					
													2.67†	8.5*	129.2*	0.29	78			1.0	4.85	4.5	S							
38-8	S-4	6'-8'	1B										2.65†	54.2	61.0	1.71	84														
	S-10	23'-25'	2/3										2.67†	13.7	123.0	0.36	100					14.3	UC	-	1.51	3.02				
38-9	S-5	8'-10'	1B										2.65†	39.6	65.4	1.53	69														
33-9	S-8	18'-25'	2/3		23	48	29							11.5					6.4												
33-10	S-7																														
38-10	S-5	8'-10'	1A										2.60†	66.2	61.6	1.64	100														
38-11	U-1	10'-12'	1A	ML	-	10	68	22	32	25	7	0.1	2.73	25.7	91.6	0.86	82	1.1	5.5								0.6	1.5	0.20	0.02
													2.68†	23.6	100.9	0.66	96			0.5	2.04	5.4	S	22	0.5					
													2.68†	23.5	101.0	0.66	96			1.0	2.69	9.8	S							
33-12	S-6/7																														
33-13	S-6/7/8	18-25	2		32	56	12							12.9																	

(CONTINUED ON NEXT SHEET)

† ASSUMED VALUE
* REMOLDED SPECIMEN

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Sun Oil - MCAP
Marcus Hook, Pa.

FILE NO. ML3626-20
TABLE NO. I-2

SUMMARY OF LABORATORY TEST DATA

Sample Identification					Grain Size Distribution				Plasticity						Volumetric Analysis			Compaction						Shear Strength			Consolidation				
Boring Number	Sample Number	Depth (Ft.)	Stratum	Soil Group (USC System)	Gravel (%)	Sand (%)	Silt (%)	Clay & Colloids (%)	Liquid Limit - w_L (%)	Plastic Limit - w_P (%)	Plasticity Index - I_P (%)	Liquidity Index - I_L	Specific Gravity - G	Moisture Content - w (%)	Dry Unit Weight - γ_d (pcf)	Void Ratio - e	Degree of Saturation - S_r (%)	Organic - %	pH	σ_3 TSF	$\sigma_1 - \sigma_3$ - TSF	Strain - %	Type of Test	Angle of Internal Friction - ϕ (Degrees)	Cohesion - c (TSF)	Unconfined Compressive Strength - q_u (TSF)	Overburden Stress - p_o (TSF)	Preconsolidation Stress - p_c (TSF)	Compression Index - C_c	Swelling Index - C_s	
33-14	S-7	18'-25'	2										2.67	8.3	130.5	0.28	80			0.5	2.99	2.5	S	47	0						
													2.67	7.8	130.5	0.28	75			1.0	5.63	2.9	S								
33-13	S-3	4'-6'	1A										2.70	23.1	106.4	0.58	100														
	S-5	8'-10'	1A										2.68	14.1	120.1	0.39	96	0.8				3.6	UC	–	2.48	4.95					
33-14	S-4	13'-15'	1A										2.70	20.2	104.9	0.61	89	0.6													
33-15	S-5	8'-10'	1A	ML					30	23	7	-1.0	2.70	16.2	120.2	0.40	100														
33-16	S-8,9,10	18'-35'	2		31	56	13							11.7																	
33-17	S-8,9	18'-30'	2		35	57	8							12.0																	
33-19	S-6,7,8,9,10	13'-38'	2		39	47	14							12.5					6.5												
33-20	S-7,8,9,10		2										2.67	7.2	130.9	0.27	70			0.5	3.04	2.1	S	47	0						
													2.67	7.2	131.3	0.27	71			1.0	5.67	2.5	S								
33-20	U-1	10'-12'	1A	ML	–	6	75	19	29	24	5	-0.4	2.69	22.2	98.0	0.71	84	0.3	5.0								0.6	2.1	0.11	0.01	
													2.70	21.1	103.6	0.63	91					6.2	UC	–	0.60	1.19					
	S-6	13'-15'	1A	ML CL					28	21	7	0.3		22.8																	
33-22	S-3,4	6'-10'	2		29	30	41							29.1																	

↑ ASSUMED VALUE
✚ REMOLDED SPECIMEN

SITE engineers, inc.

DRAWN: S.F. DATE: 4-1-92
CHECKED: [illegible] DATE: 4/25/92

Sun Oil - MCAP
Marcus Hook, Pa.

FILE NO. ML3626-20

SUMMARY OF LABORATORY TEST DATA

SAMPLE IDENTIFICATION					GRAIN SIZE DISTRIBUTION				PLASTICITY						VOLUMETRIC ANALYSIS			COMPACTION						SHEAR STRENGTH			CONSOLIDATION				
BORING NUMBER	SAMPLE NUMBER	DEPTH (FT.)	Stratum	SOIL GROUP (USC SYSTEM)	GRAVEL (%)	SAND (%)	SILT (%)	CLAY & COLLOIDS (%)	LIQUID LIMIT - W_L (%)	PLASTIC LIMIT - W_P (%)	PLASTICITY INDEX - I_P (%)	LIQUIDITY INDEX - I_L	SPECIFIC GRAVITY - G	MOISTURE CONTENT - W (%)	DRY UNIT WEIGHT - γ_d (PCF)	VOID RATIO - e	DEGREE OF SATURATION - S_r (%)	Organic - %	pH	σ_3 TSF	$\sigma_1 - \sigma_3$ - TSF	Strain - %	TYPE OF TEST	ANGLE OF INTERNAL FRICTION - ϕ (DEGREES)	COHESION - C (TSF)	UNCONFINED COMPRESSIVE STRENGTH - q_u (TSF)	OVERBURDEN STRESS - p_o (TSF)	PRECONSOLIDATION STRESS - p_c (TSF)	COMPRESSION INDEX - C_c	SWELLING INDEX - C_s	
31-23	S-5	8'-10'	IA	CL ML					27	21	6	-0.3	†2.68	19.5	111.4	0.50	100					9.0	UC	–	1.08	2.15					
	S-9	28'-30'	IC											105.9				53.4													
	S-10	33'-35'	3										†2.67	19.5	114.1	0.46	100														
38-24	S-6	13'-15'	IA										†2.70	19.4	105.7	0.60	87														
38-25	S-6	13'-15'	IA										†2.70	27.1	100.8	0.67	100														
38-26	S-6	13'-15'	IA										†2.68	22.8	109.0	0.54	100					15.0	UC	–	0.44	0.88					
39-28	S-5	8'-10'	IA										†2.70	21.3	105.7	0.60	96														
	S-6	13'-15'	IA										†2.68	23.3	108.2	0.55	100					15.0	UC	–	0.83	1.66					
39-29	S-4	8'-10'	IA	ML					28	26	2	-1.7	†2.70	22.6	102.7	0.64	95														
	S-6	18'-25'	2		39	51	10							10.0																	
	S-8B	28'-30'	IC										†2.65	50.0	64.6	1.56	85	31.8													

† ASSUMED VALUE
✱ REMOLDED SPECIMEN

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DRAWN: S.F. DATE: 4-1-92
CHECKED: [illegible] DATE: 4/25/92

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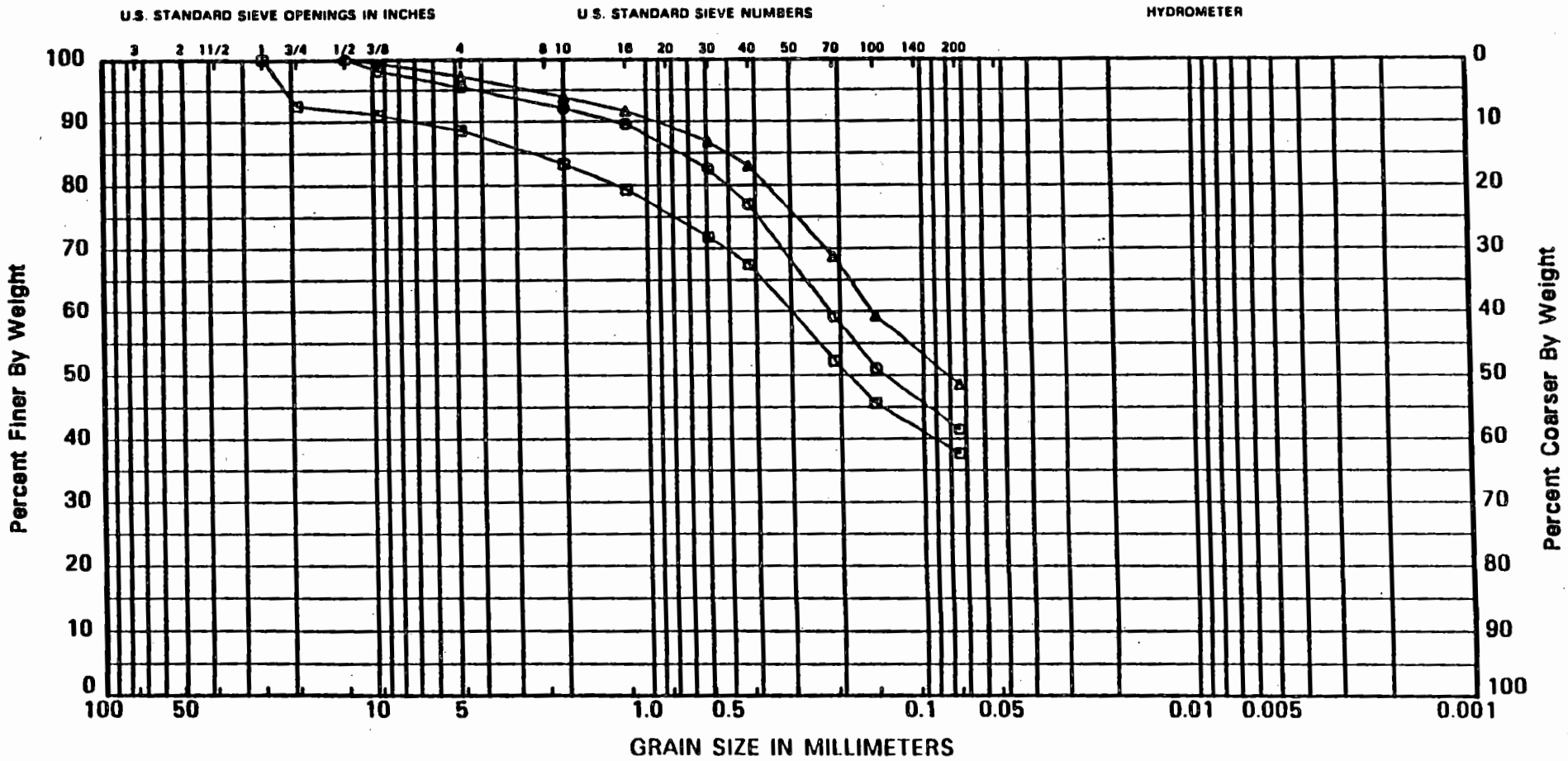
Marcus Hook, Pa.

FILE NO. ML3626-20

Grain Size Curves: Soft Sediment

Job No. 0401-1068
February 10, 1992

GRAIN SIZE CURVES



GRAVEL		SAND			SILT or CLAY
Coarse	Fine	Coarse	Medium	Fine	

CURVE	BORING NO	PENETRATION, Ft	MATERIAL
○○○	D1S	0 0	Sludge
△△△	D1D	0 0	Sludge
□□□	B4S	0 0	Sludge

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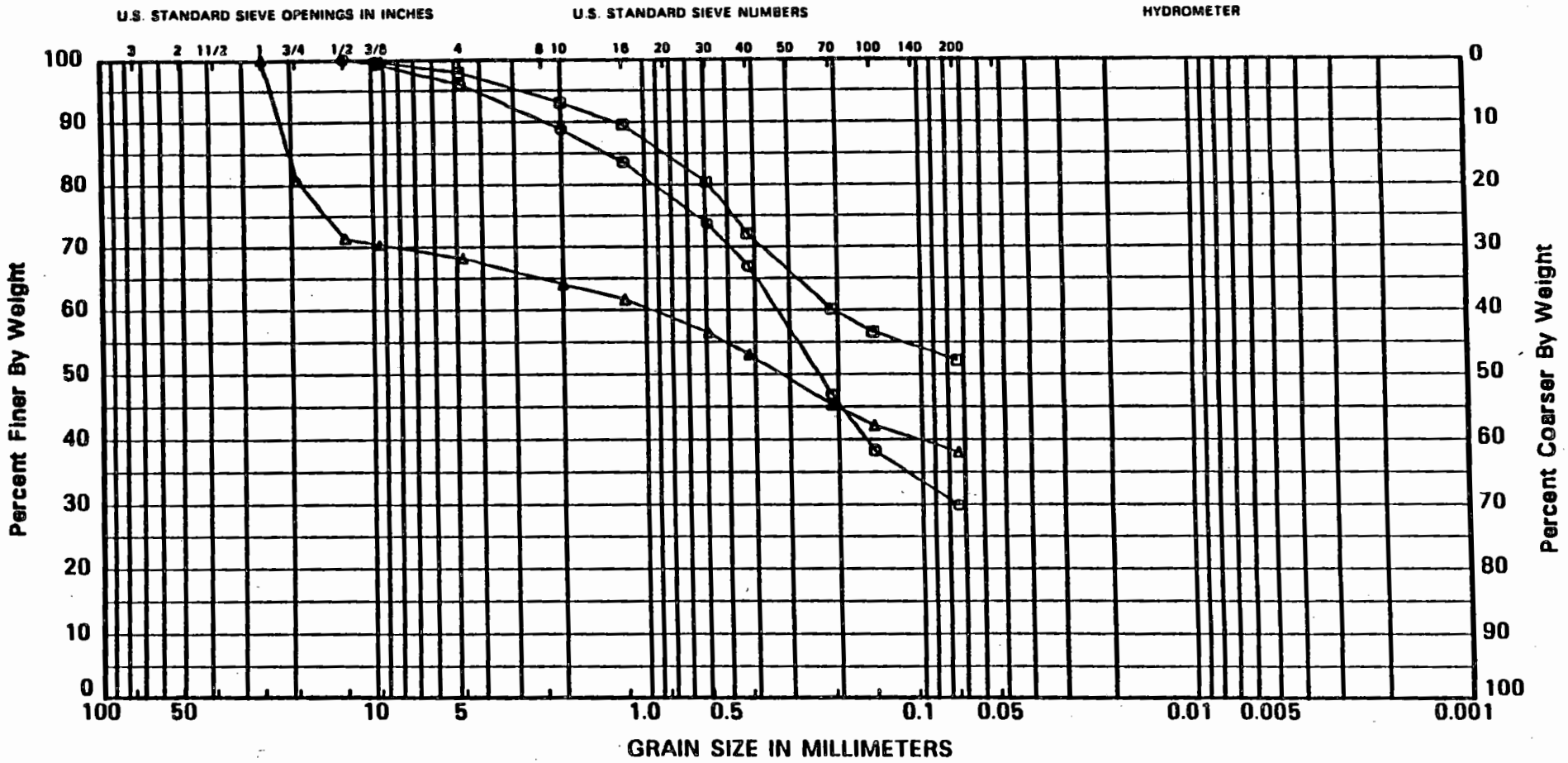
PLATE 4

Job No. 0401-1068
February 10, 1992

McClelland consultants

GRAIN SIZE CURVES

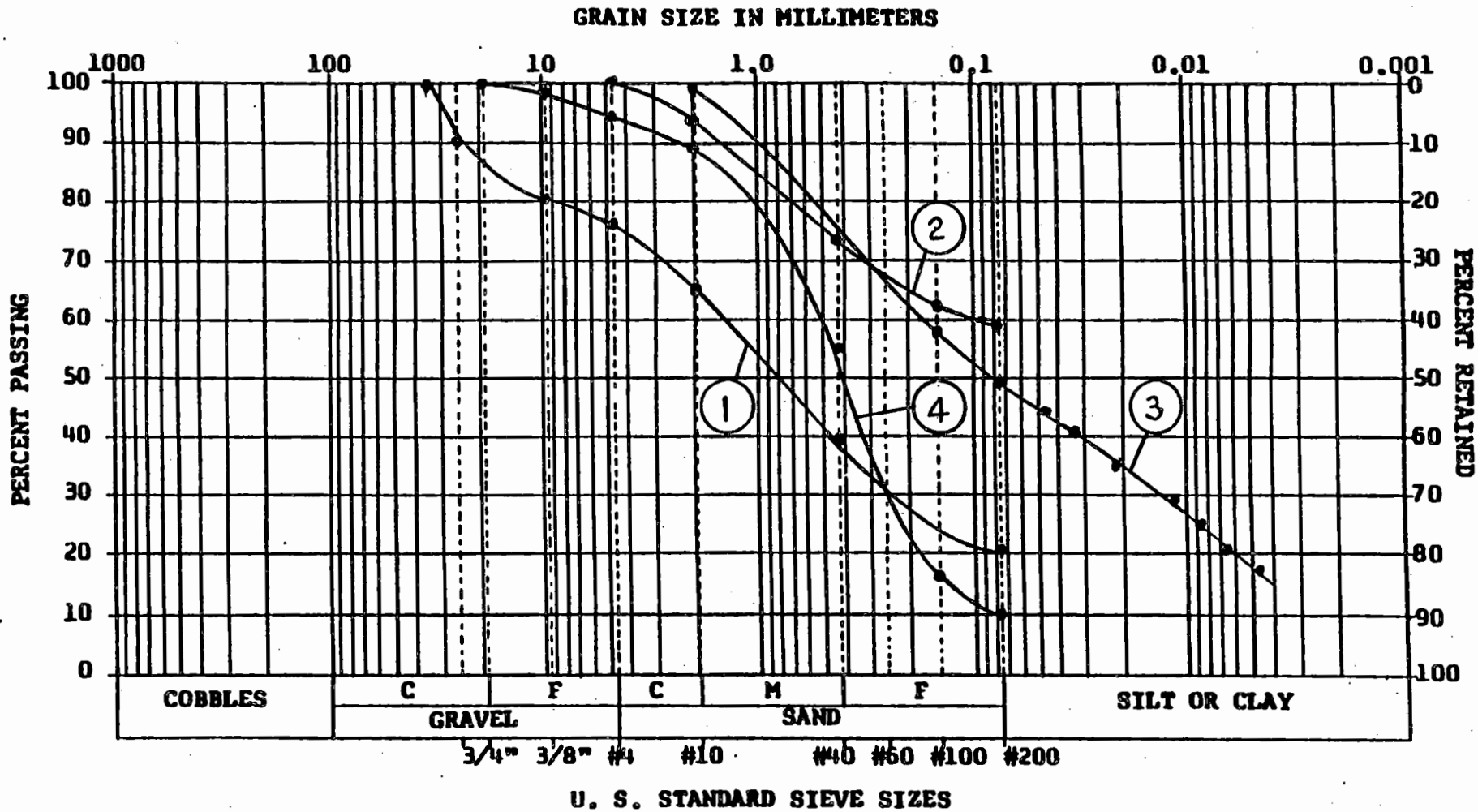


GRAVEL		SAND			SILT or CLAY
Coarse	Fine	Coarse	Medium	Fine	

CURVE	BORING NO.	PENETRATION, Ft.	MATERIAL
○○○	B4D	0 0	Sludge
△△△	F1S	0 0	Sludge
□□□	F2D	0 0	Sludge

PLATE 5

Grain Size Curves: Soils Borings



BORING	SAMPLE	DEPTH	CURVE	CLASSIFICATION	USC	w_L	I_p
B-37-2	S-4,5,6	6'-10'	1	Gray Medium to Fine to Coarse Sand, Some Gravel, Some Silt			
B-37-4	S-5	8'-10'	2	Brown and Gray Medium to Fine to Coarse Sandy Silt			N/P
B-37-9	S-9	18-20	3	Brown and Gray Silt, Fine and Medium Sand, Some Clay			
B-37-17	U-1	25'-27'	4	Gray Fine to Medium to Coarse Sand, Trace of Silt, Trace Gravel			N/P

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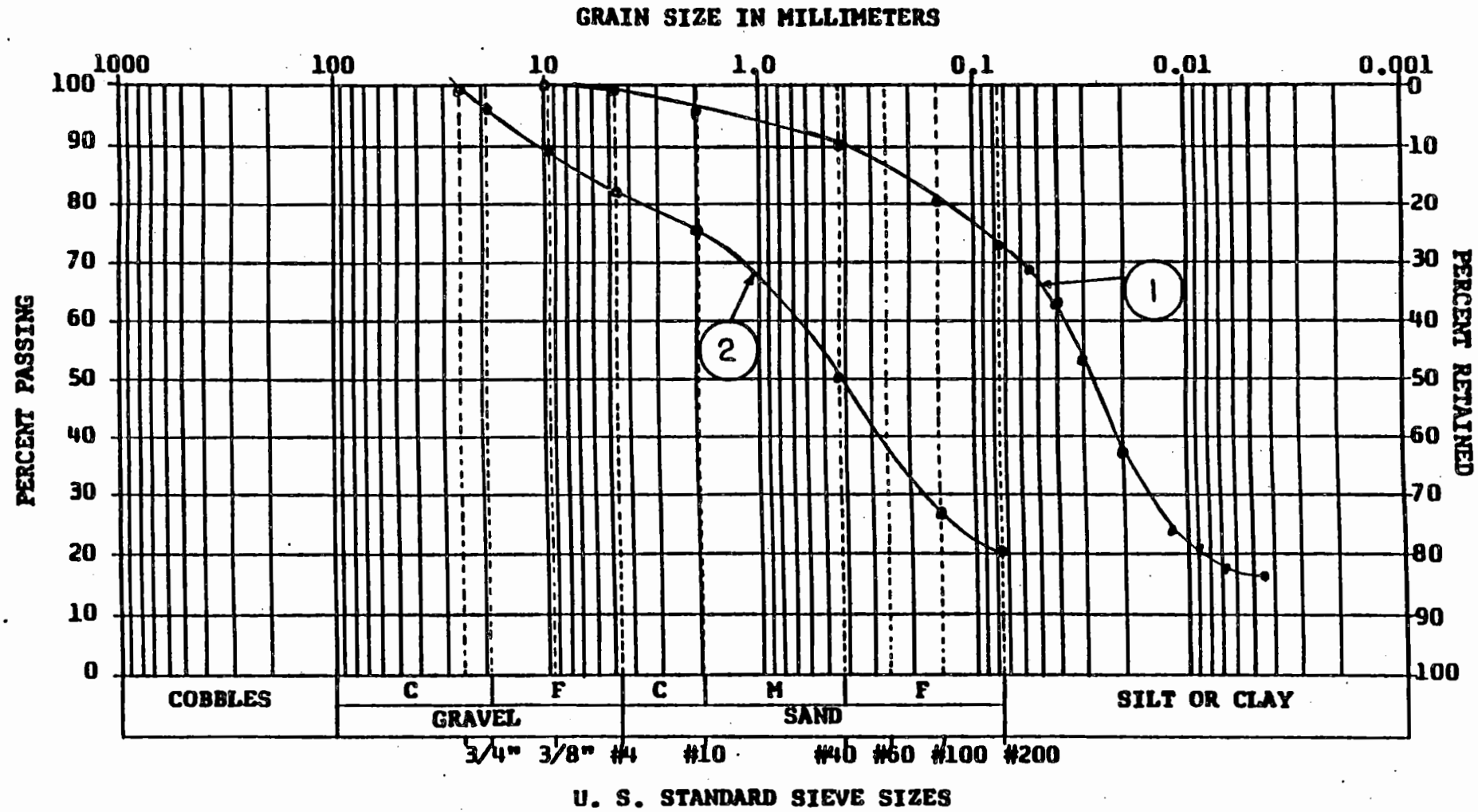
GRADATION CURVES
UNIFIED SOIL CLASSIFICATION

PROJECT SUN OIL -MCAP
LOCATION MARCUS HOOK, PA.
File # ML3626-20 Date 4-23-92 Plate #L-1



BORING	SAMPLE	DEPTH	CURVE	CLASSIFICATION	USC	w_L	I_p
B-38-7	U-1	10'-12'	1	Brown and Light Gray Silt Some Fine to Medium to Coarse Sand, Some			
				Clay, Trace of Gravel			
B-38-7	S-10,11	13.6'-40'	2	Brown Fine to Medium to Coarse Sand, Some Silt, Some Gravel			
-9	S-7						
1A	S-6,7,8,9						

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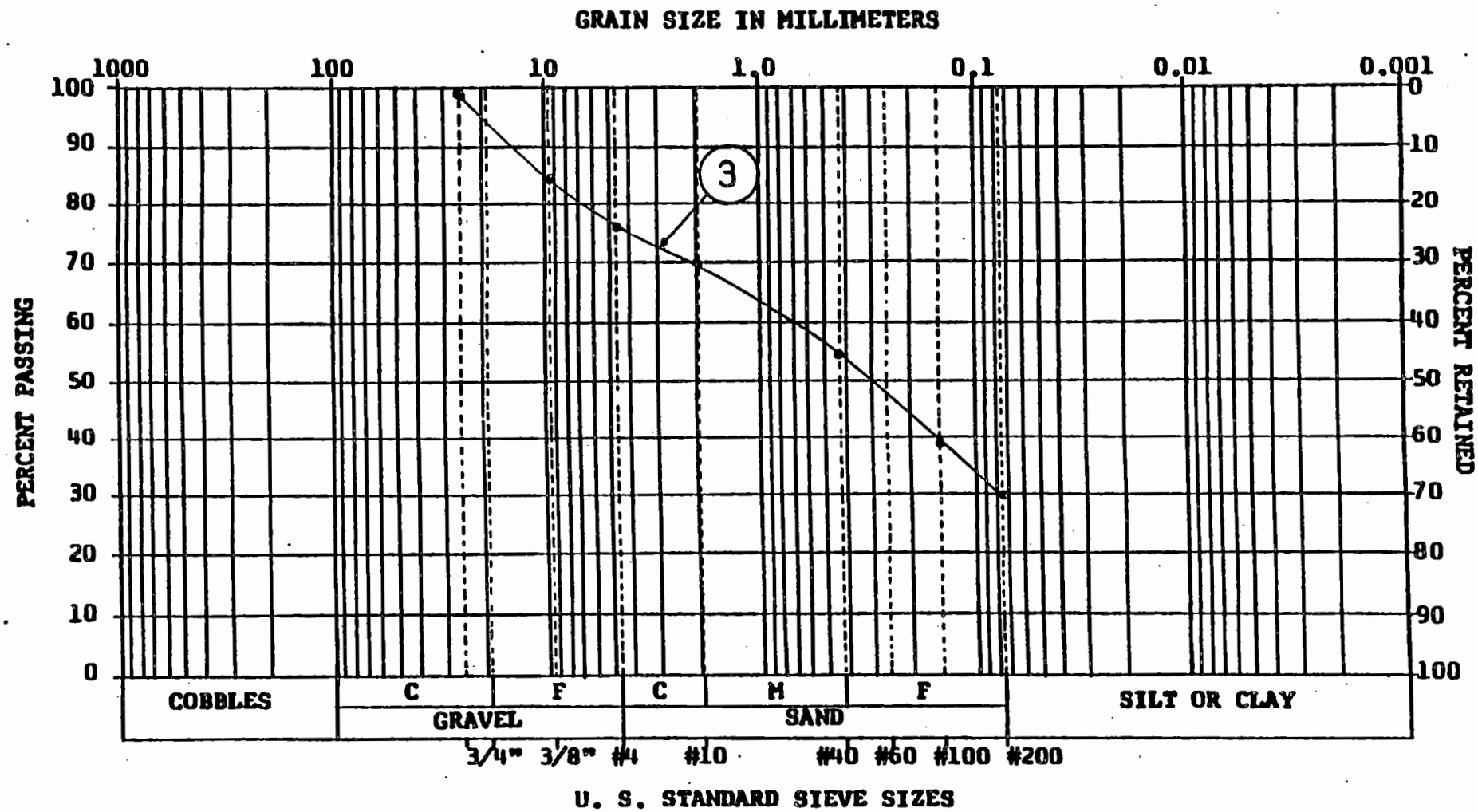
GRADATION CURVES
UNIFIED SOIL CLASSIFICATION

PROJECT SUN OIL-MCAP
LOCATION MARCUS HOOK, PA.
File # ML3626-20 Date 4-23-92 Plate #L-2



BORING	SAMPLE	DEPTH	CURVE	CLASSIFICATION	USC	w_L	I_p
B-38-7-10	S-8 S-7	18-25	3	Brown Fine to Medium to Coarse Sand, Some Silt, Some Gravel			

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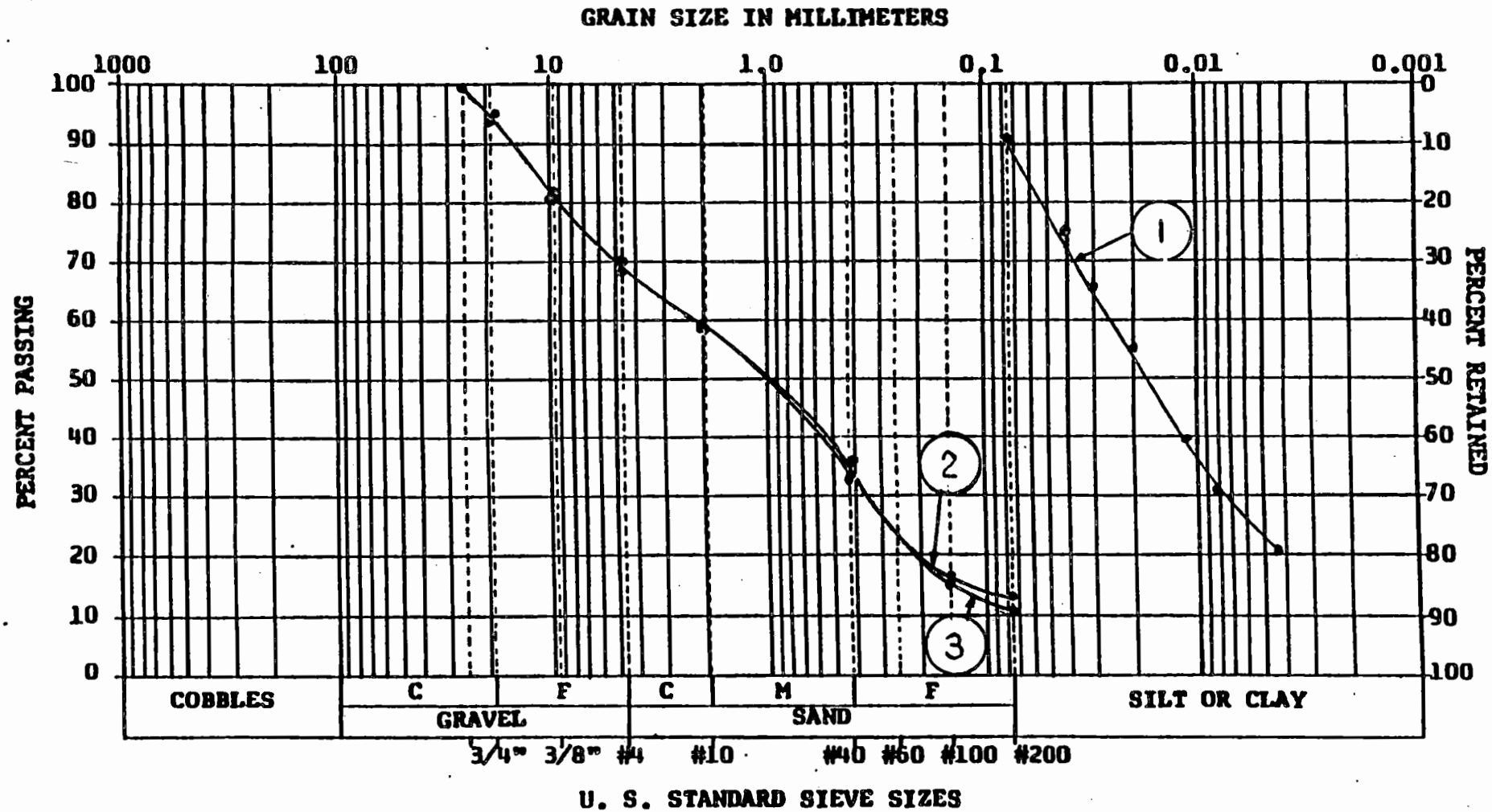
GRADATION CURVES
UNIFIED SOIL CLASSIFICATION

PROJECT SUN OIL-MCAP
LOCATION MARCUS HOOK, PA.
File #ML3626-20 Date 4-23-92 Plate #L-3



BORING	SAMPLE	DEPTH	CURVE	CLASSIFICATION	USC	W_L	I_p
B-38-11	U-1	10'-12'	1	Brown Silt Some Clay Trace of Sand	ML	32	7
B-38-12	S-6,7	18'-25'	2	Brown Gravelly Fine to Medium to Coarse Sand, Trace to Some Silt			
13	S-6,7,8						
14	S-6,7						
B-38-16	S-7,8,9,10	18'-35'	3	Brown Gravelly Medium to Fine to Coarse Sand, Trace to Some Silt			

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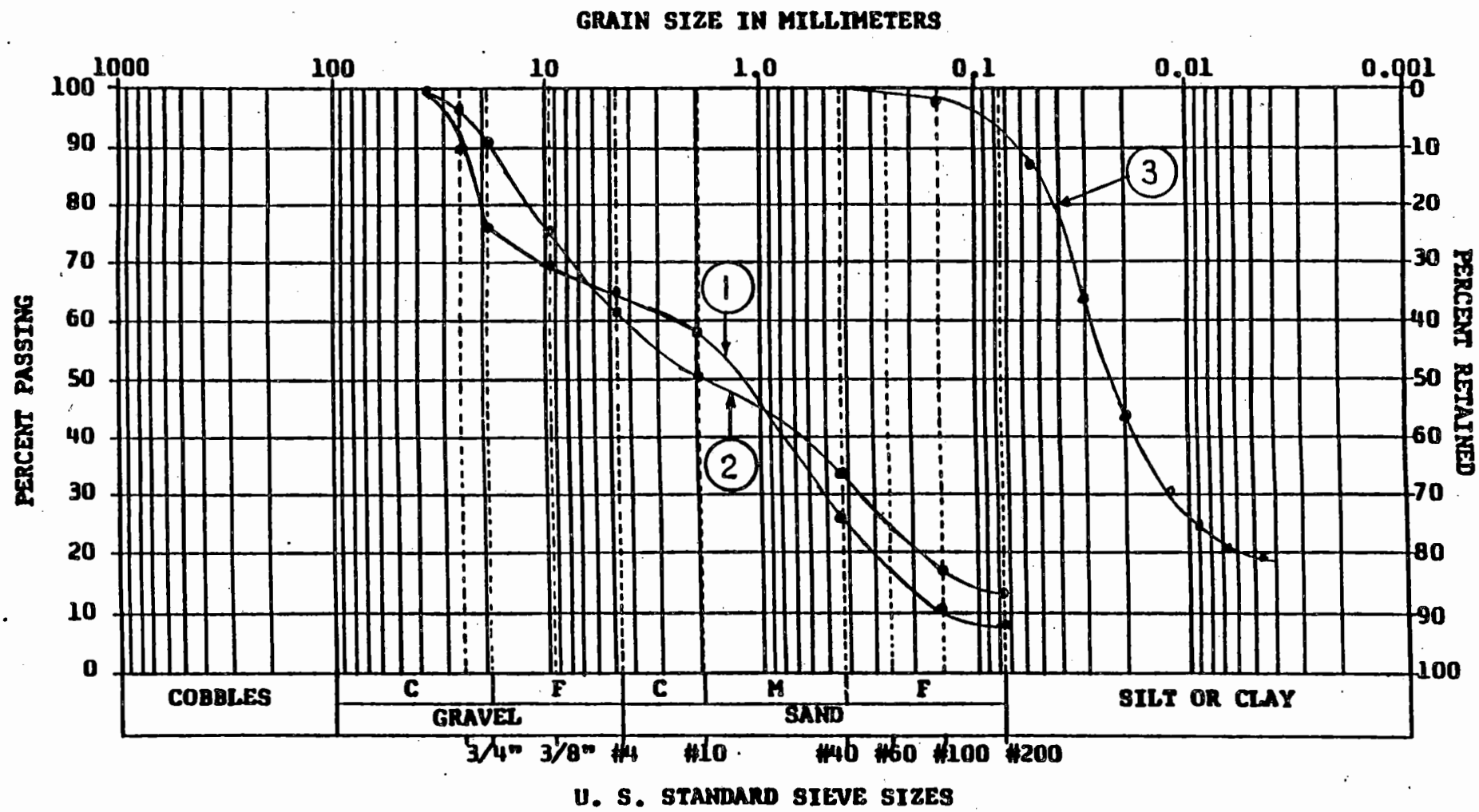
GRADATION CURVES
UNIFIED SOIL CLASSIFICATION

PROJECT SUN OIL-MCAP
LOCATION MARCUS HOOK. PA.
File # ML3626-20 Date 4-23-92 Plate #L-4



BORING	SAMPLE	DEPTH	CURVE	CLASSIFICATION	USC	w_L	I_p
B-38-17	S-7,8,9	18^6-30'	1	Brown Gravelly Medium to Fine to Coarse Sand, Trace of Silt			
B-38-19	S-6,7,8,9,10	13^6-38	2	Brown Fine to Medium to Coarse Sand and Gravel, Trace to Some Silt			
-20	S-7,8,9,10						
B-38-20	U-1	10'-12'	3	Brown Silt Some Clay, Trace of Fine Sand	ML	29	5

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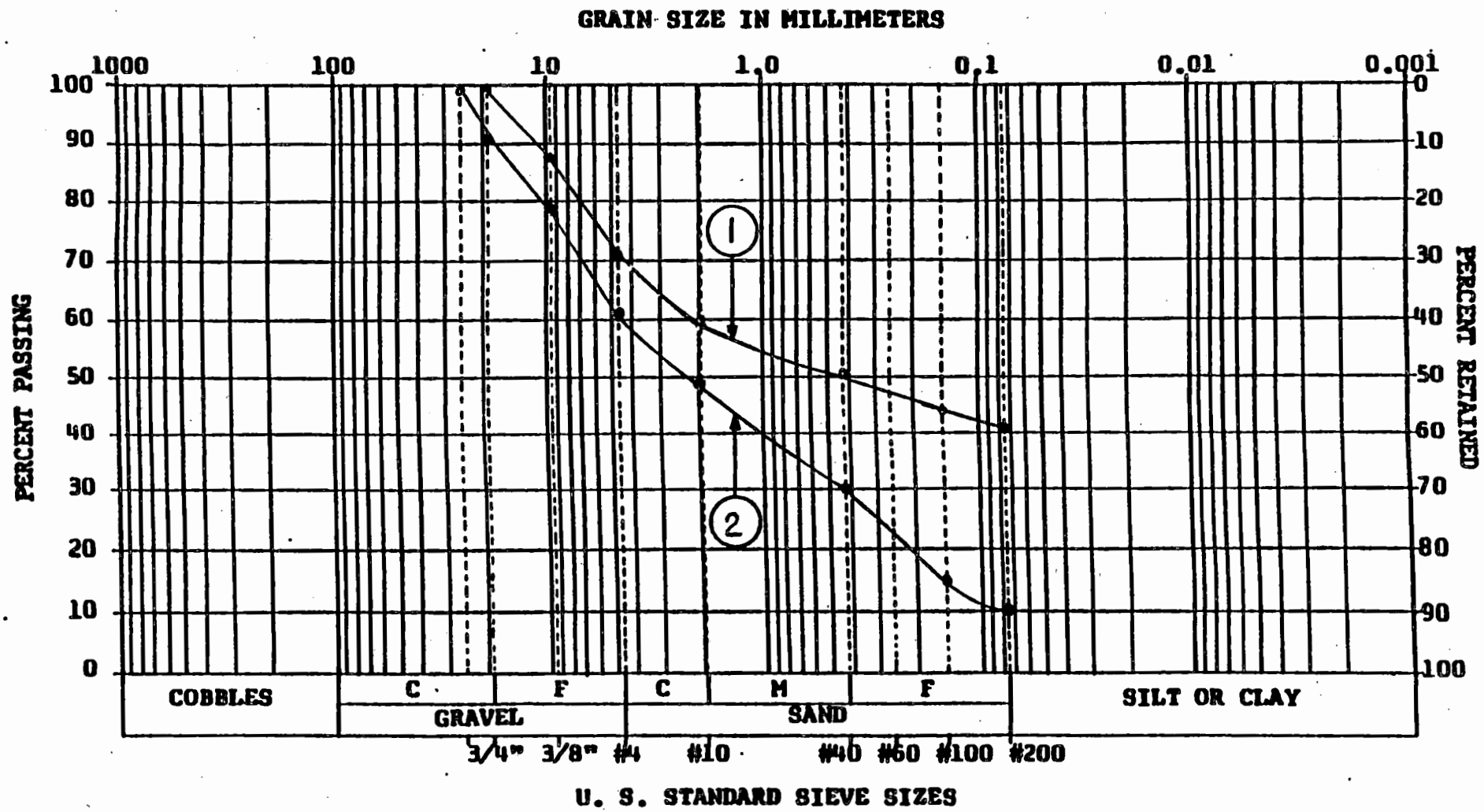
GRADATION CURVES
UNIFIED SOIL CLASSIFICATION

PROJECT SUN OIL-MCAP
LOCATION MARCUS HOOK, PA.
File # ML3626-20 Date 4-23-92 Plate # L-



BORING	SAMPLE	DEPTH	CURVE	CLASSIFICATION	USC	w_L	I_p
B-38-22	S-3,4	6'-10'	1	Brown Silt and Coarse to Fine to Medium Sand and Gravel			
B-38-29	S-6,7	18-25	2	Brown Gravelly Fine to Medium to Coarse Sand, Trace of Silt			

SITE engineers, inc.

GRADATION CURVES
UNIFIED SOIL CLASSIFICATION

PROJECT SUN OIL -MCAP
LOCATION MARCUS HOOK, PA.
File # ML3626-02 Date 4-23-92 Plate #

Moisture Density Curves: Soft Sediment Samples

Figure 3-1

Moisture Density Relationship
Soft Sediment Sample 9K10-D1S

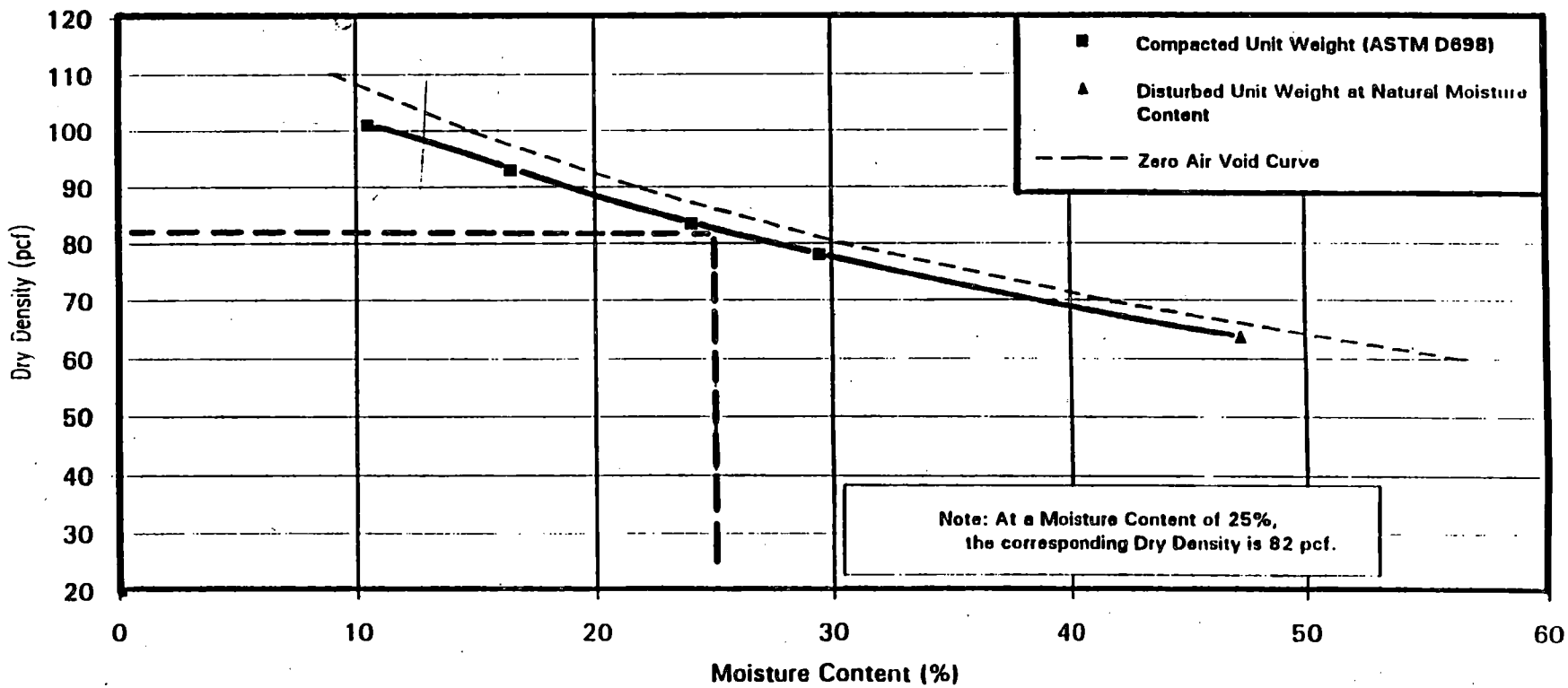


Figure 3-2

Moisture Density Relationship
Soft Sediment Sample 9K10-D1D

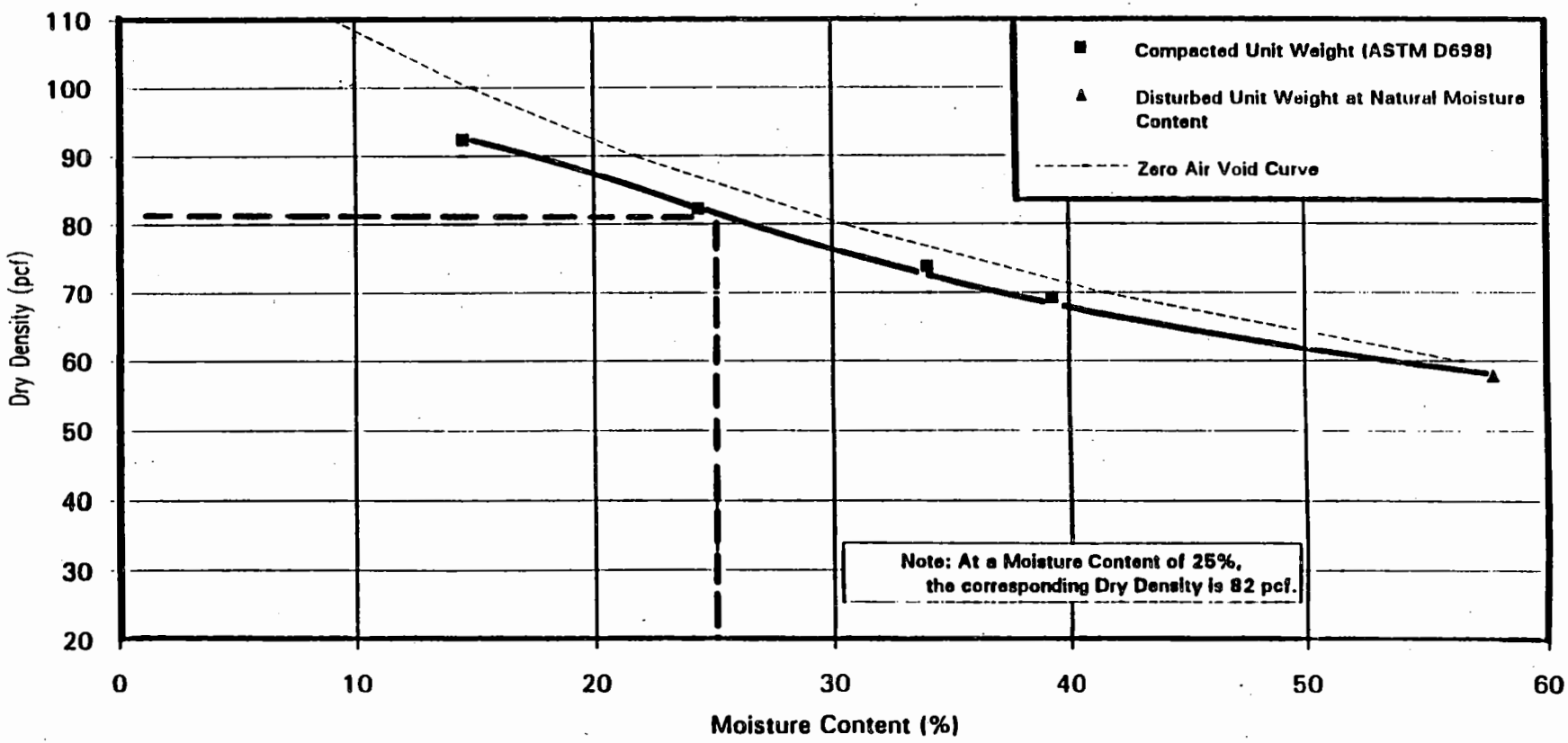


Figure 3-3

Moisture Density Relationship
Soft Sediment Sample 9K10-B4S

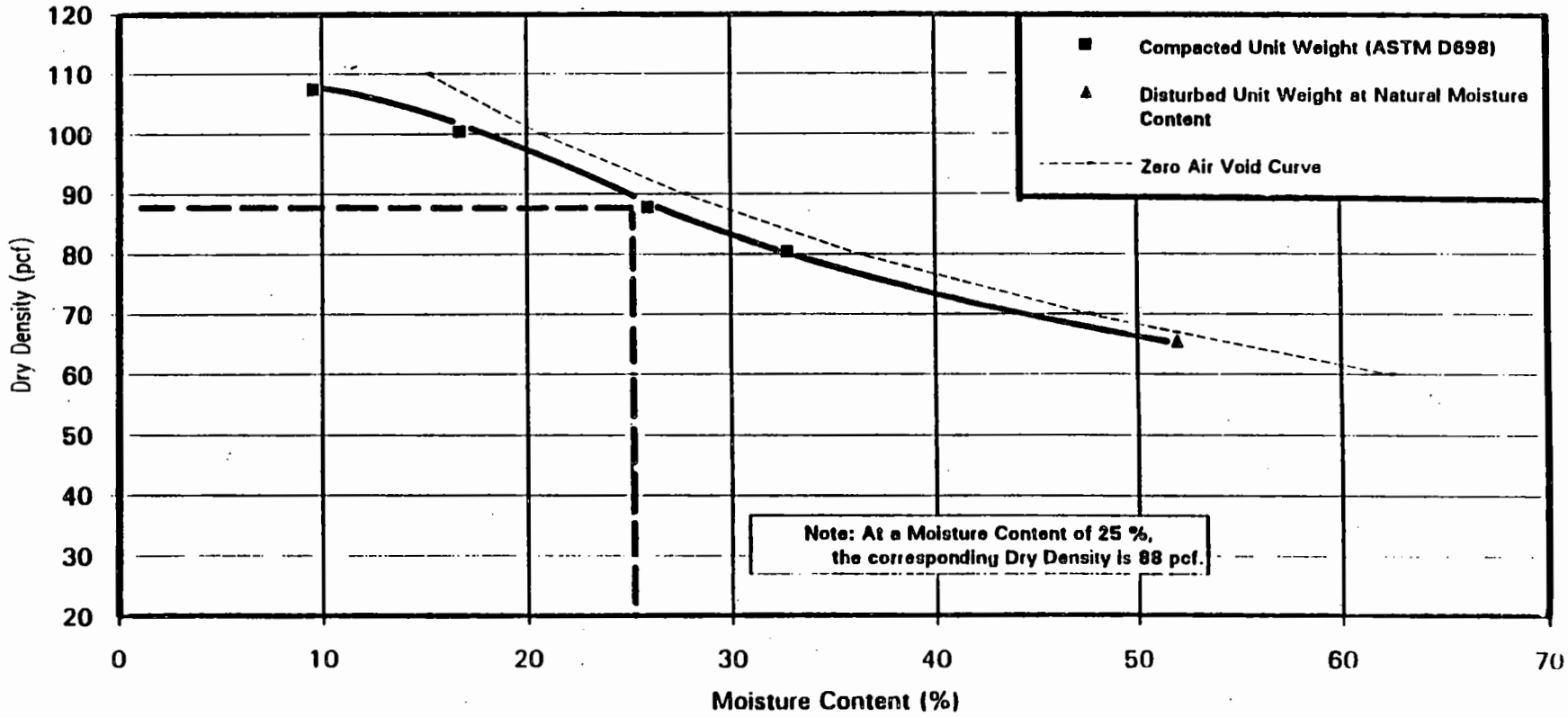


Figure 3-4

Moisture Density Relationship
Soft Sediment Sample 9K10-B4D

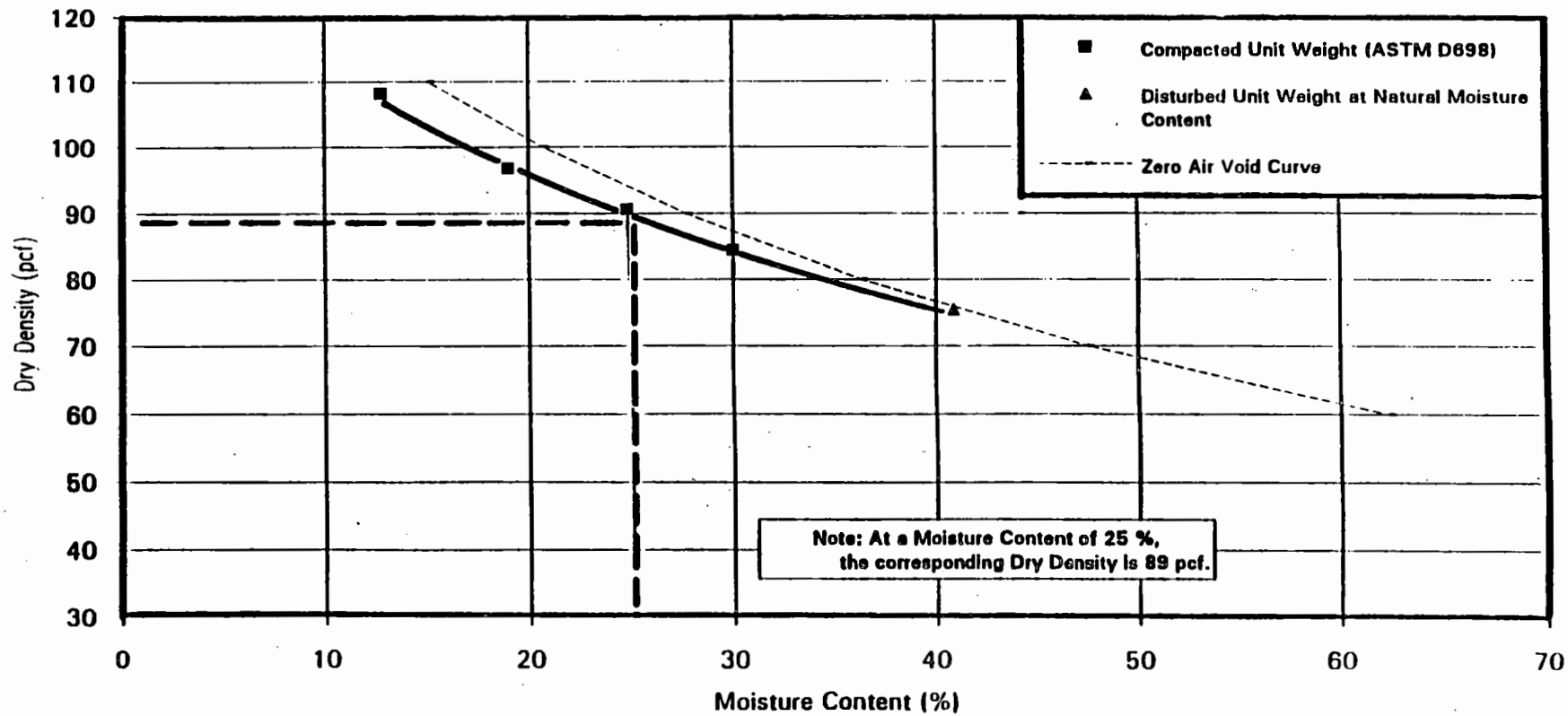
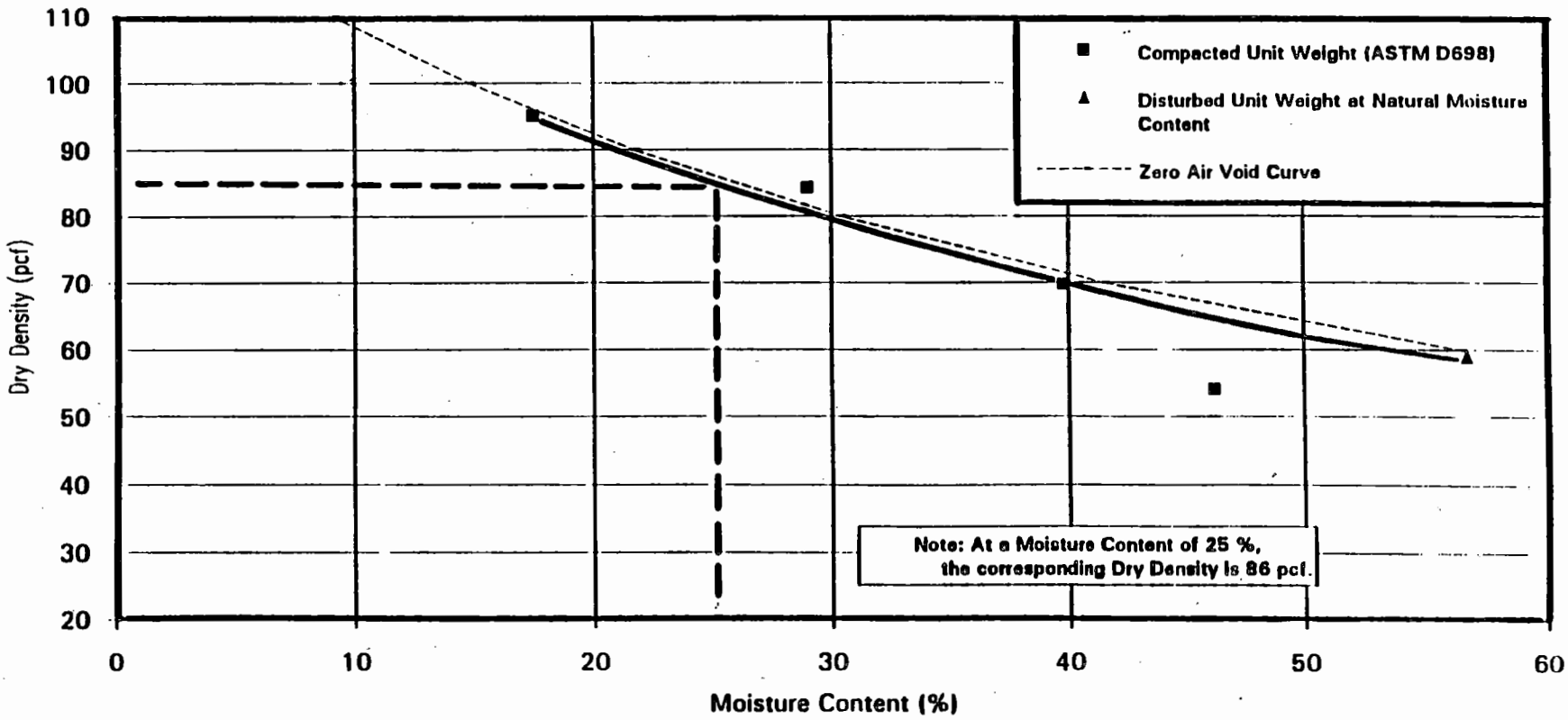


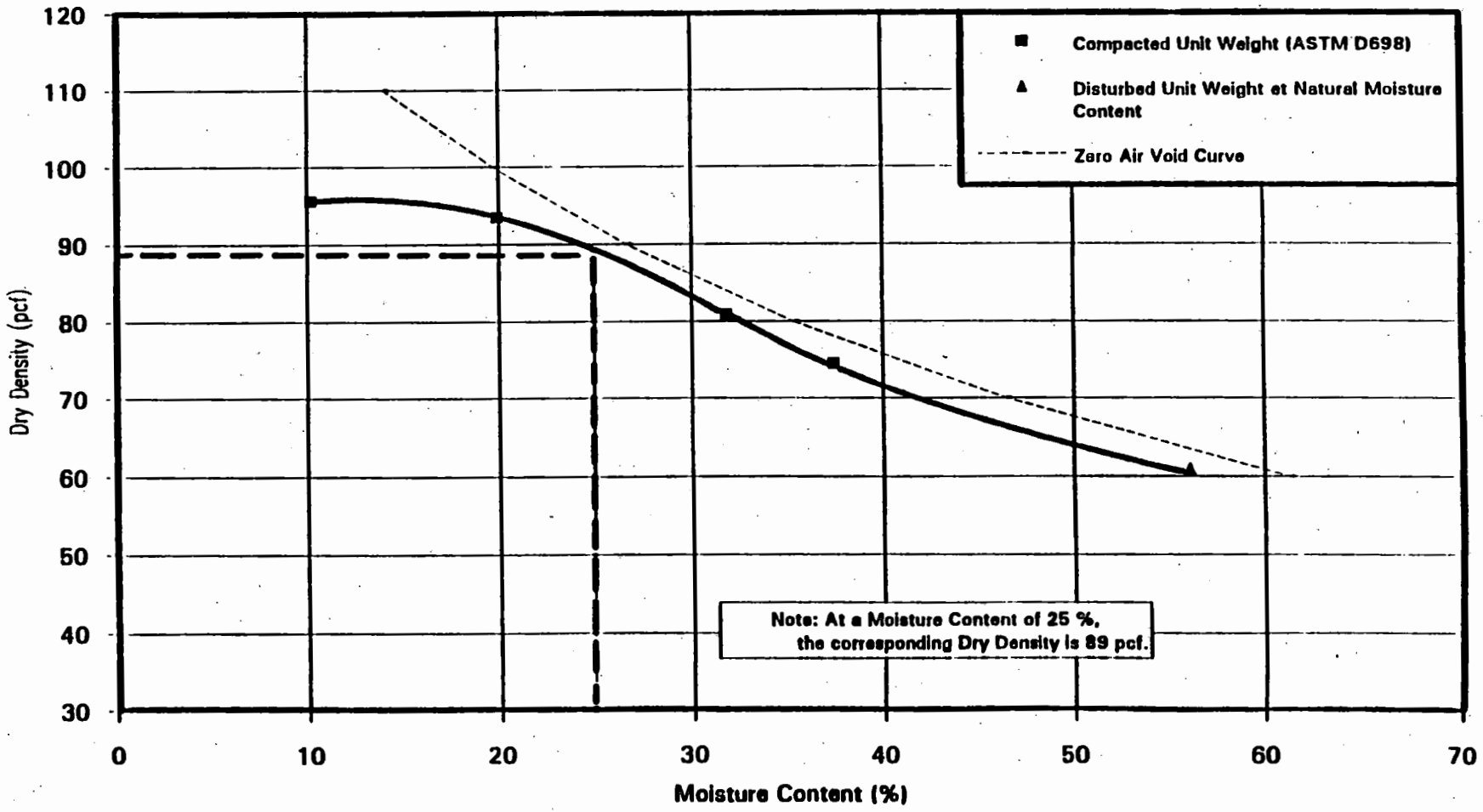
Figure 3-5

Moisture Density Relationship
Soft Sediment Sample 9K10-F1S



Figurre 3-6

Moisture Density Relationship
Soft Sediment Sample 9K10-F2D



TEST BORING LOGS

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TEST BORING LOG

PROJECT SUN OIL - MCAP
LOCATION MARCUS HOOK, PA

BORING B-37-1
G.S. ELEV. 19.9
FILE ML 3626-2C
SHEET 1 OF 1

GROUND WATER DATA			
FIRST ENCOUNTERED 5'*			
DEPTH	HOUR	DATE	ELAPSED TIME
DRY	1745	4-3	10 MIN

METHOD OF ADVANCING BORE HOLE			
a	FROM 0	TO 8'3	
b	FROM 8'3	TO 9'	
	FROM	TO	
	FROM	TO	
	FROM	TO	

DRILLER P. FLAHERTY
HELPER D. DONOUGHE
INSPECTOR
DATE STARTED 4-3-92
DATE COMPLETED 4-3-92

DEPTH	A	B	C	DESCRIPTION	REMARK
	S-1	3-4 5-10		BROWN SILTY FINE TO MEDIUM TO COARSE SAND AND FINE TO COARSE GRAVEL, BRICK FRAGMENTS (FILL)	*MOIST
	S-2	16-8 11-9	F	4'	
	S-3	3-4 8-10		BLACK SILT, SAND, TAR (FILL) 6'	SPOON REFUSAL 8'3"
	S-4	7-9 3-5	1A	GRAY-BLACK SILTY CLAY (ML/CL)	
	S-5	50/3"			
10				REFUSAL ON CUTTER HEAD AT 9'	
15					
20					
25					
30					
35					
40					
45					

FOR GENERAL NOTES SEE KEY SHEET AND LOCATION PLAN.

DRN. FEN
CKD. JD

E905 7/82

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TEST BORING LOG

PROJECT SUN OIL - MCAP
LOCATION MARCUS HOOK, PA

BORING B-37-2
G.S. ELEV. 16.7
FILE ML 3626-2(
SHEET 1 OF

GROUND WATER DATA			
FIRST ENCOUNTERED 5'			
DEPTH	HOUR	DATE	ELAPSED TIME

METHOD OF ADVANCING BORE HOLE				
a	FROM	0	TO	10'
d	FROM	10'	TO	14'6
	FROM		TO	
	FROM		TO	
	FROM		TO	

DRILLER P. FLAHERTY
HELPER D. DONOUGHE
INSPECTOR
DATE STARTED 3-18-92
DATE COMPLETED 3-18-92

DEPTH	A	B	C	DESCRIPTION	REMARK
		5-8		4" GRAVEL (FILL)	
	S-1	6-4			
		5-6		BLACK SILTY FINE TO MEDIUM	
	S-2	6-7		4' SAND AND FINE GRAVEL (FILL)	
▽		6-4			
	S-3	4-4			
		4-2	F	BLACK MEDIUM TO FINE SAND	SPOON
	S-4	2-2		AND CLAY, SOME FINE GRAVEL,	REFUSAL
		4-3		SOME SILT, TRACE BRICK	10'7
	S-5	2-2		FRAGMENTS (FILL)	12'7
10	S-6	1-50/1"			14'1
	S-7	3-50/1"			
	S-8	50/1"			
15				REFUSAL ON CUTTER HEAD AT 14'6	
20					
25					
30					
35					
40					
45					

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TEST BORING LOG

PROJECT SUN OIL - MCAP
LOCATION MARCUS HOOK, PA

BORING B-37-3
G.S. ELEV. 17.8
FILE ML 3626-2(
SHEET 1 OF 1

GROUND WATER DATA			
FIRST ENCOUNTERED			
DEPTH	HOUR	DATE	ELAPSED TIME
4'	1515	4-2	15 MIN

METHOD OF ADVANCING BORE HOLE				
d	FROM	0	TO	2'
a	FROM	2'	TO	16'
d	FROM	16'	TO	27'
	FROM		TO	
	FROM		TO	

DRILLER L. DIFOLIO
HELPER R. ELLER
INSPECTOR G. MAYNOR
DATE STARTED 4-2-92
DATE COMPLETED 4-2-92

DEPTH	A	B	C	DESCRIPTION	REMARK
				BALLAST (FILL) 2'	
▽ 5	S-1	7-6 6-5	F	BLACK FINE TO MEDIUM TO COARSE SAND, SILT, CINDERS, TAR, TRACE BRICK (FILL)	
	S-2	5-4 4-3			
	S-3	7-9 4-2		8'	
10	S-4	2-2 3-2		BROWN SILT, TRACE FINE SAND (ML/CL)	
	S-5	2-3 2-2			
	S-6	2-2 3-3	1A/ 1B	14'	
15	S-7	7-9 12-13	1A	GRAY SILT, TRACE FINE SAND (ML) 17'	
20	S-8	5-5-6	3	GRAY MICACEOUS SILT, TRACE ROCK FRAGMENTS (DECOMPOSED ROCK) (ML)	
25	S-9	5-6-7			
30				REFUSAL ON CUTTER HEAD AT 27'	
35					
40					
45					

FOR GENERAL NOTES SEE KEY SHEET AND LOCATION PLAN.

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TEST BORING LOG

PROJECT SUN OIL - MCAP
LOCATION MARCUS HOOK, PA

BORING B-37-4
G.S. ELEV. 19.2
FILE ML 3626-2(
SHEET 1 OF

GROUND WATER DATA			
FIRST ENCOUNTERED 4'			
DEPTH	HOUR	DATE	ELAPSED TIME
20'6	1500	3-23	20 MIN
6'6	1600	4-6	14 DAYS
6'	1050	4-15	23 DAYS

METHOD OF ADVANCING BORE HOLE				
a	FROM	0	TO	16'
d	FROM	16'	TO	18'6
	FROM		TO	
	FROM		TO	
	FROM		TO	

DRILLER P. FLAHERTY
HELPER D. DONOUGHE
INSPECTOR
DATE STARTED 3-23-92
DATE COMPLETED 3-23-92

DEPTH	A	B	C	DESCRIPTION	REMARK
	S-1	6-7 12-16		2' BLACK AND GRAY SILTY FINE TO MEDIUM SAND, TRACE CLAY (FILL)	
	S-2	12-18 24-30		BLACK SILT, TRACE CLAY (FILL)	INSTALLE PIEZO-METER WITH 8' SCREEN 10'6 RISER 1' STICK-UP
5	S-3	14-18 7-7			
	S-4	3-2 1-2	F	8'	
	S-5	3-2 19-12		BROWN AND BLACK SILTY CLAY, SOME FINE TO MEDIUM SAND (POSSIBLE FILL)	
10	S-6	3-3 3-4		12'	
	S-7	3-4 6-4		GRAY CLAY, SOME SILT (CL)	LEVEL C PPE
15	S-8	3-4 3-3	1A		
	S-9	50/1"		REFUSAL ON CUTTER HEAD AT 18'6	
20					
25				SLUG TEST PERFORMED 4/15/92 TIME 10:50 INITIAL READING 6' AFTER BAILING 10' TIME 12:00 FINAL READING 6'	
30					
35					
40					
45					

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TEST BORING LOG

PROJECT SUN OIL - MCAP
LOCATION MARCUS HOOK, PA

BORING B-37-5
G.S. ELEV. 20.2
FILE ML 3626-2
SHEET 1 OF

GROUND WATER DATA			
FIRST ENCOUNTERED			
DEPTH	HOUR	DATE	ELAPSED TIME
4'	1230	4-2	15 MIN

METHOD OF ADVANCING BORE HOLE			
d	FROM 0	TO 2'	
a	FROM 2'	TO 16'	
d	FROM 16'	TO 33'	
	FROM	TO	
	FROM	TO	

DRILLER L. DIFOLIO
HELPER R. ELLER
INSPECTOR G. MAYNOR
DATE STARTED 4-2-92
DATE COMPLETED 4-2-92

DEPTH	A	B	C	DESCRIPTION	REMARK
				BROWN-GRAY SAND AND CRUSHED STONE (FILL) 2'	
	S-1	3-4 5-5			
5	S-2	6-7 7-10		BLACK TO GRAY FINE TO MEDIUM SAND, FINE TO COARSE GRAVEL, COAL, TAR (FILL) 7'	
	S-3	4-4 6-8	F	BROWN CLAYEY SILT, TRACE FINE FINE SAND (FILL) 9'6	
10	S-4	5-7 9-12			
	S-5	11-19 21-22		BROWN TO BLACK SAND, GRAVEL, SILT, WOOD, COAL, BRICK (FILL) 14'	
	S-6	14-7 9-9			
15	S-7	2-2 1-2		GRAY SILTY CLAY, TRACE DECOMPOSED VEGETATION (OH) 18'	
			1B		
	U-1	24" REC			
20	S-8	7-9-9	1A	LIGHT GRAY TO GREEN CLAY, SOME SILT, TRACE FINE SAND (CL) 23'6	
25	S-9	5-7-11			
30	S-10	8-11-13	3	BROWN TO WHITE TO ORANGE BROWN SILT, TRACE ROCK FRAGMENTS, TRACE MICA FLAKES (DECOMPOSED ROCK) (ML)	
		50/0			
35				REFUSAL ON CUTTER HEAD AT 33'	
40					
45					

FOR GENERAL NOTES SEE KEY SHEET AND LOCATION PLAN.

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TEST BORING LOG

BORING B-37-8
G.S. ELEV. 18.5
FILE ML 3626-2(
SHEET 1 OF 1

PROJECT SUN OIL - MCAP
LOCATION MARCUS HOOK, PA

GROUND WATER DATA			
FIRST ENCOUNTERED 5'			
DEPTH	HOUR	DATE	ELAPSED TIME
9'	920	3-19	20 MIN

METHOD OF ADVANCING BORE HOLE			
a	FROM 0	TO 16'	
d	FROM 16'	TO 23'	
	FROM	TO	
	FROM	TO	
	FROM	TO	

DRILLER P. FLAHERTY
HELPER D. DONOUGHE
INSPECTOR
DATE STARTED 3-18-92
DATE COMPLETED 3-19-92

DEPTH	A	B	C	DESCRIPTION	REMARK
	S-1	12-30 30-15	F	GRAY BLACK SILTY FINE TO MEDIUM TO COARSE SAND AND FINE COARSE GRAVEL, SOME WOOD FRAGMENTS (FILL) 4'	
	S-2	15-16 8-6			
▽	S-3	10-5 5-8		BROWN-BLACK SILTY CLAY, TRACE FINE SAND (FILL) 8'	
	S-4	8-7 8-8			
10	S-5	5-6 6-5	1B	GRAY CLAYEY SILT, TRACE FINE SAND, TRACE ORGANIC MATTER (ML/OL) 14'	
	S-6	4-5 5-6			
	S-7	7-6 6-6			
15	S-8	8-7 9-10	1A	ORANGE-BROWN-GRAY SILT, SOME CLAY, SOME FINE SAND (ML/CL) 18'6	
20	S-9	8-10-14	3	GRAY-BLACK SILT, TRACE CLAY, TRACE FINE SAND, TRACE ROCK FRAGMENTS (DECOMPOSED ROCK) (ML)	
	S-10	50/1"			
25				REFUSAL ON CUTTER HEAD AT 23'	
30					
35					
40					
45					

FOR GENERAL NOTES SEE KEY SHEET AND LOCATION PLAN.

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TEST BORING LOG

PROJECT SUN OIL - MCAP
LOCATION MARCUS HOOK, PA

BORING B-37-7
G.S. ELEV. 18.2
FILE ML 3626-2
SHEET 1 OF

GROUND WATER DATA			
FIRST ENCOUNTERED			
DEPTH	HOUR	DATE	ELAPSED TIME
9'	1000	4-2	15 MIN

METHOD OF ADVANCING BORE HOLE				
d	FROM	0	TO	1'
a	FROM	1'	TO	11'
d	FROM	11'	TO	25'
	FROM		TO	
	FROM		TO	

DRILLER L. DIFOLIO
HELPER R. ELLER
INSPECTOR G. MAYNOR
DATE STARTED 4-2-92
DATE COMPLETED 4-2-92

DEPTH	A	B	C	DESCRIPTION	REMAR
	S-1	7-9 11-6	F	BROWN TO BLACK FINE TO MEDIUM TO COARSE SAND, SILT, FINE GRAVEL, TAR, BRICK, WOOD, COAL (FILL)	SHELBY TUBE 10-12 ADJACENT TO B-37-7
5	S-2	5-6 15-13			
	S-3	22-11 14-11			
	S-4	11-7 2-2			
10	S-5	20-3 3-3			
	U-1			13'6	
15	S-6	4-5-6	1A	BROWN TO ORANGE-BROWN CLAY AND SILT, TRACE FINE SAND (ML/CL)	
				19'	
20	S-7	3-11-14	2	BROWN TO ORANGE-BROWN SILTY COARSE TO MEDIUM TO FINE SAND AND FINE TO COARSE GRAVEL (SM/GM)	
25	S-8	13-27 40-50/0			
				END OF BORING AT 25'	
30					
35					
40					
45					

FOR GENERAL NOTES SEE KEY SHEET AND LOCATION PLAN.

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TEST BORING LOG

PROJECT SUN OIL - MCAP
LOCATION MARCUS HOOK, PA

BORING B-37-8
G.S. ELEV. 14.0
FILE ML 3626-2C
SHEET 1 OF 1

GROUND WATER DATA			
FIRST ENCOUNTERED 6'			
DEPTH	HOUR	DATE	ELAPSED TIME
C	A	V E	D
8'	1230	4-2	10 MIN

METHOD OF ADVANCING BORE HOLE			
a	FROM 0	TO 16'	
d	FROM 16'	TO 28'9	
	FROM	TO	
	FROM	TO	
	FROM	TO	

DRILLER P. FLAHERTY
HELPER D. DONOUGHE
INSPECTOR
DATE STARTED 4-2-92
DATE COMPLETED 4-2-92

DEPTH	A	B	C	DESCRIPTION	REMARK
	S-1	5-18 8-8		2" CRUSHED STONE (FILL)	
	S-2	5-7 3-2		BROWN-BLACK SILTY FINE TO MEDIUM SAND AND FINE TO COARSE GRAVEL, CINDERS, METAL (FILL) 2'	
5	S-3	16-25 27-30	F	BLACK SILT, TRACE FINE SAND, TRACE CINDERS (FILL)	
	S-4	20-10 5-3			
10	S-5	2-2 2-3		10'	
	S-6	1-1 1-3	1B	GRAY-BLACK SILT AND CLAY, SOME DECOMPOSED VEGETATION (OH) 12'	
	S-7	6-8 7-10			
15	S-8	6-9 11-15	1A	GRAY SILT, TRACE TO SOME FINE SAND (ML) 18'6	
20	S-9	7-7-9		GRAY-BROWN SILTY CLAY, TRACE FINE SAND (ML/CL) 23'6	
25	S-10	10-12-16	3	GRAY-TAN-BLACK SILTY DECOMPOSED ROCK (ML) 28'6	
	S-11	50/3"		GRAY DECOMPOSED ROCK	
30				SPLIT SPOON REFUSAL AT 28'9	
35					
40					
45					

FOR GENERAL NOTES SEE KEY SHEET AND LOCATION PLAN.

DRN. FEN
CKD. JD

E905 7/82

SITE engineers, inc.

TEST BORING LOG

PROJECT SUN OIL - MCAP
LOCATION MARCUS HOOK, PA

BORING B-37-9
G.S. ELEV. 13.5
FILE ML 3626-20
SHEET 1 OF 1

GROUND WATER DATA			
FIRST ENCOUNTERED 5'			
DEPTH	HOUR	DATE	ELAPSED TIME
4'	1030	3-20	25 MIN

METHOD OF ADVANCING BORE HOLE			
a	FROM 0	TO	16'
d	FROM 16'	TO	35'
	FROM	TO	
	FROM	TO	
	FROM	TO	

DRILLER P. FLAHERTY
HELPER D. DONOUGHE
INSPECTOR
DATE STARTED 3-19-92
DATE COMPLETED 3-20-92

DEPTH	A	B	C	DESCRIPTION	REMARKS
	S-1	3-4 5-15	F	GRAY-BLACK SILT, SOME CLAY, TRACE RUBBER, TRACE STEEL, TRACE GRAVEL (FILL)	
2'	S-2	8-8 6-3		BLACK SILT, TRACE CLAY, TRACE RUBBER, TRACE STEEL (FILL)	
4'	S-3	2-3 3-2		GRAY CLAYEY SILT, SOME TRASH AND ORGANIC MATTER (FILL)	
5	S-4	3-3 3-5			
	S-5	6-5 5-5			
10	S-6	7-8 10-10	1A/1B	GRAY CLAYEY SILT, TRACE FINE SAND, TRACE ORGANIC MATTER (ML/CL)	
14'	S-7	8-10 12-12			
15	S-8	20-36 40-43		BROWN FINE TO MEDIUM SAND AND FINE TO COARSE GRAVEL, SOME SILT, TRACE CLAY (SM/GM)	
18'6					
20	S-9	2-2-4	2	BROWN SILTY FINE SAND, SOME CLAY (SM)	
23'6					
25	S-10	3-3-5			
30	S-11	7-9-13	3	GRAY MICACEOUS SILT, TRACE ROCK FRAGMENTS (DECOMPOSED ROCK) (ML)	
35	S-12	11-26-40			
				END OF BORING AT 35'	
40					
45					

FOR GENERAL NOTES SEE KEY SHEET AND LOCATION PLAN.

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SITE engineers, inc.

TEST BORING LOG

PROJECT SUN OIL - MCAP
LOCATION MARCUS HOOK, PA

BORING B-37-10
G.S. ELEV. 12.6
FILE ML 3626-2(
SHEET 1 OF 1

GROUND WATER DATA			
FIRST ENCOUNTERED 2'			
DEPTH	HOUR	DATE	ELAPSED TIME
4'6	1530	3-19	20 MIN

METHOD OF ADVANCING BORE HOLE			
a	FROM 0	TO 16'	
d	FROM 16'	TO 30'	
	FROM	TO	
	FROM	TO	
	FROM	TO	

DRILLER P. FLAHERTY
HELPER D. DONOUGHE
INSPECTOR
DATE STARTED 3-19-92
DATE COMPLETED 3-19-92

DEPTH	A	B	C	DESCRIPTION	REMARK
	S-1	13-23 36-46	F	2" GRAVEL (FILL)	
	S-2	40- 50		BROWN-BLACK SILTY CLAY AND FINE GRAVEL, SOME BRICK FRAGMENTS (FILL)	
5	S-3	17- 50			
	S-4	50/0		8'	
10	S-5	50	1A	8'6 BLACK LIGNITIC MASS WITH WHITE CRYSTALS (FILL)	
	S-6	4-4 9-9		GRAY-BLACK SILT, TRACE FINE SAND, TRACE CLAY (ML)	
	S-7	7-12 20-25			
15	S-8	20-24 24-25		18'6	
20	S-9	30-30-20	2	ORANGE-BROWN FINE TO MEDIUM SAND AND FINE TO COARSE GRAVEL, TRACE SILT (SW/GW)	
				23'6	
25	S-10	23-26-23		GRAY-BROWN FINE TO MEDIUM SAND AND COARSE GRAVEL, SOME CLAY, SOME SILT (SM/GM)	
				28'6	
30	S-11	21-11-20	3	GRAY MICACEOUS SILT, TRACE CLAY, TRACE ROCK FRAGMENTS (ML)	
35				END OF BORING AT 30'	
40					
45					

FOR GENERAL NOTES SEE KEY SHEET AND LOCATION PLAN.

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TEST BORING LOG

PROJECT SUN OIL - MCAP
LOCATION MARCUS HOOK, PA

BORING B-37-11
G.S. ELEV. 10.8
FILE ML 3626-2C
SHEET 1 OF 1

GROUND WATER DATA			
FIRST ENCOUNTERED 6'			
DEPTH	HOUR	DATE	ELAPSED TIME
6'6	1600	4-2	20 MIN

METHOD OF ADVANCING BORE HOLE				
a	FROM	0	TO	2'
b	FROM	2'	TO	4'
a	FROM	4'	TO	16'
d	FROM	16'	TO	30'
	FROM		TO	

DRILLER P. FLAHERTY
HELPER D. DONOUGHE
INSPECTOR
DATE STARTED 4-2-92
DATE COMPLETED 4-2-92

DEPTH	A	B	C	DESCRIPTION	REMARK
	S-1	1-3 4-4		CRUSHED STONE (FILL)	
				4'	
	S-2	3-6 25/0		BLACK SILTY FINE TO MEDIUM SAND AND FINE TO COARSE GRAVEL (FILL)	
5				6'	
	S-3	19-25 16-12	F		
	S-4	45-12 8-8		BLACK SILT, TRACE TO SOME FINE SAND (FILL)	
10					
	S-5	3-4 3-5		12'	
	S-6	8-8 10-19			
15	S-7	15-20 12-35	1A	GRAY-GREEN SILT, TRACE FINE SAND, TRACE CLAY (ML)	
				18'6	
20	S-8	27-20-5	2	ORANGE-BROWN FINE TO MEDIUM TO COARSE SAND AND FINE GRAVEL, SOME SILT (SM/GM)	
				23'6	
25	S-9	1-6-20	3	GRAY MICACEOUS SILTY FINE SAND (DECOMPOSED ROCK) (SM)	
30	S-10	16-18-29			
				END OF BORING AT 30'	
35					
40					
45					

FOR GENERAL NOTES SEE KEY SHEET AND LOCATION PLAN.

DRN. FEN
CKD. JP

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TEST BORING LOG

PROJECT SUN OIL - MCAP
LOCATION MARCUS HOOK, PA

BORING B-37-12
G.S. ELEV. 10.7
FILE ML 3626-2
SHEET 1 OF

GROUND WATER DATA			
FIRST ENCOUNTERED 3'			
DEPTH	HOUR	DATE	ELAPSED TIME
7'	1030	3-23	20 MIN
2'2	1600	4-6	14 DAYS
2'	1100	4-15	23 DAYS

METHOD OF ADVANCING BORE HOLE			
a	FROM 0	TO 17'6	
	FROM	TO	
	FROM	TO	
	FROM	TO	
	FROM	TO	

DRILLER P. FLAHERTY
HELPER D. DONOUGHE
INSPECTOR
DATE STARTED 3-23-92
DATE COMPLETED 3-23-92

DEPTH	A	B	C	DESCRIPTION	REMARKS
	S-1	3-3 4-1		BROWN SILTY FINE TO MEDIUM SAND AND FINE GRAVEL, TRACE CLAY (FILL)	
	S-2	3-3 2-5		2'	
5	S-3	8-11 18-16	F	BLACK SILTY CLAY AND FINE TO MEDIUM SAND AND FINE GRAVEL (FILL) 4'	
	S-4	27-4 7-7		BLACK SILT, SOME FINE TO COARSE GRAVEL, TRACE CLAY (FILL)	
10	S-5	3-2 2-1		11'	INSTALLE PIEZO-METER 8' SCREE 12' RISE 2'6 STICK-UP
	S-6	8-7 4-10	1A	GRAY CLAY, SOME SILT (CL/ML)	
	S-7	14-13 13-14		15'	
15	S-8	7-6 6-16	2	GRAY-BROWN SILTY FINE SAND, TRACE FINE GRAVEL, TRACE CLAY, TRACE ROCK FRAGMENTS (SM)	
	S-9	50/0			
20				REFUSAL ON CUTTER HEAD AT 17'6	
25				SLUG TEST PERFORMED 4/15/92 TIME 11:00 INITIAL READING 2' AFTER BAILING 2'*	
30				*COULD NOT LOWER WATER LEVEL	
35					
40					
45					

FOR GENERAL NOTES SEE KEY SHEET AND LOCATION PLAN.

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TEST BORING LOG

PROJECT SUN OIL - MCAP
LOCATION MARCUS HOOK, PA

BORING B-37-13
G.S. ELEV. 11.5
FILE ML 3626-20
SHEET 1 OF 1

GROUND WATER DATA			
FIRST ENCOUNTERED			
DEPTH	HOUR	DATE	ELAPSED TIME
4'	900	4-3	15 MIN

METHOD OF ADVANCING BORE HOLE				
d	FROM	0	TO	2'
a	FROM	2'	TO	16'
d	FROM	16'	TO	32'
	FROM		TO	
	FROM		TO	

DRILLER L. DIFOLIO
HELPER R. ELLER
INSPECTOR G. MAYNOR
DATE STARTED 4-2-92
DATE COMPLETED 4-3-92

DEPTH	A	B	C	DESCRIPTION	REMARKS
				CRUSHED STONE AND BALLAST (FILL) 2'	
	S-1	2-3 2-2			
5	S-2	2-2 1-1			
	S-3	1-1 2-3	F	GRAY TO BROWN FINE SANDY SILT, TRACE GRAVEL, TRACE BRICK, TAR (FILL)	
10	S-4	2-2 3-2			
	S-5	5-5 10-10			
	S-6	6-8 11-5		14'	
15	S-7	6-9 10-12	1A	GRAY-BROWN SILT, TRACE FINE SAND (ML) 16'	
20	S-8	17-10-9	1A/2	ORANGE-BROWN SILTY FINE TO MEDIUM SAND AND FINE TO COARSE GRAVEL (SM/GM) 19' ORANGE-BROWN SILT, TRACE FINE MEDIUM SAND, TRACE FINE TO COARSE GRAVEL (ML) 22'6	
25	S-9	11-14-17		BROWN SILTY COARSE TO MEDIUM TO FINE SAND AND FINE TO COARSE GRAVEL (SM/GM) 25'	
30	S-10	16-18-23	3	GRAY MICACEOUS SILT, TRACE ROCK FRAGMENTS (DECOMPOSED ROCK) (ML)	
35				REFUSAL ON CUTTER HEAD AT 32'	
40					
45					

FOR GENERAL NOTES SEE KEY SHEET AND LOCATION PLAN.

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TEST BORING LOG

PROJECT SUN OIL - MCAP
LOCATION MARCUS HOOK, PA

BORING B-37-14
G.S. ELEV. 12.2
FILE ML 3626-2(
SHEET 1 OF 1

GROUND WATER DATA			
FIRST ENCOUNTERED 4'			
DEPTH	HOUR	DATE	ELAPSED TIME
3'	1130	10-21	15 MIN

METHOD OF ADVANCING BORE HOLE			
a	FROM 0	TO	16'
d	FROM 16'	TO	22'6
	FROM	TO	
	FROM	TO	
	FROM	TO	

DRILLER S. PARISANO
HELPER R. ELLER
INSPECTOR
DATE STARTED 10-21-92
DATE COMPLETED 10-21-92

DEPTH	A	B	C	DESCRIPTION	REMARK
	S-1	4-24 14-16	F	BROWN FINE TO MEDIUM SAND AND FINE TO COARSE GRAVEL, TRACE SILT (FILL)	
▽	S-2	24-20 15-10			
5	S-3	10-4 4-3			
	S-4	2-1 3-5		8'	
10	S-5	3-3 3-4	1A	LIGHT BROWN CLAY, TRACE TO SOME SILT (CL)	
	S-6	2-3 2-3	1B	11'	
	S-7	2-3 3-3		BLACK SILTY CLAY, SOME ORGANIC MATTER, TRACE FINE SAND (OL)	
15	S-8	2-10 15-15		15'	
20	S-9	21-45-37	1A/2	GRAY-BROWN FINE SANDY SILT, TRACE FINE GRAVEL (SM)	
				REFUSAL ON CUTTER HEAD AT 22'6	
25					
30					
35					
40					
45					

FOR GENERAL NOTES SEE KEY SHEET AND LOCATION PLAN.

DRN. FEN
CKD. JD

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TEST BORING LOG

PROJECT SUN OIL - MCAP
LOCATION MARCUS HOOK, PA

BORING B-37-15
G.S. ELEV. 9.3
FILE ML 3626-2(
SHEET 1 OF

GROUND WATER DATA			
FIRST ENCOUNTERED			
DEPTH	HOUR	DATE	ELAPSED TIME
2'	1100	4-3	15 MIN

METHOD OF ADVANCING BORE HOLE				
d	FROM	0	TO	1'
a	FROM	1'	TO	15'
d	FROM	15'	TO	28'
	FROM		TO	
	FROM		TO	

DRILLER L. DIFOLIO
HELPER R. ELLER
INSPECTOR
DATE STARTED 4-3-92
DATE COMPLETED 4-3-92

DEPTH	A	B	C	DESCRIPTION	REMARK
				1' STONE (FILL)	
▽	S-1	1-2 2-2	F	BLACK FINE TO MEDIUM SAND, SILT, FINE GRAVEL, WOOD (FILL)	
5	S-2	1-1 2-3			
	S-3	2-3 4-3		7'	
	S-4	9-10 10-9	1A	BROWN TO GRAY SILT, TRACE FINE SAND (ML)	
10	S-5	9-12 11-12			
	S-6	11-12 12-14		13'	
15	S-7	18-21 23-23	2	BROWN COARSE TO MEDIUM TO FINE SAND AND FINE TO COARSE GRAVEL, TRACE TO SOME SILT, (SM/GM)	
20	S-8	21-22-25		SILTY IN S-9	
25	S-9	26-31-40		25'6	
		50/0	3	BROWN MICACEOUS SILT (DECOMPOSED ROCK) (ML)	
30				REFUSAL ON CUTTER HEAD AT 28'	
35					
40					
45					

FOR GENERAL NOTES SEE KEY SHEET AND LOCATION PLAN.

DRN. FEM
CKD. JD

E905 7/82

SITE engineers, inc.

TEST BORING LOG

PROJECT SUN OIL - MCAP
LOCATION MARCUS HOOK, PA

BORING B-37-16
G.S. ELEV. 9.8
FILE ML 3626-2(
SHEET 1 OF

GROUND WATER DATA			
FIRST ENCOUNTERED 3'			
DEPTH	HOUR	DATE	ELAPSED TIME
4'	1600	3-20	20 MIN

METHOD OF ADVANCING BORE HOLE			
a	FROM 0	TO 16'	
d	FROM 16'	TO 36'6	
	FROM	TO	
	FROM	TO	
	FROM	TO	

DRILLER P. FLAHERTY
HELPER D. DONOUGHE
INSPECTOR
DATE STARTED 3-21-92
DATE COMPLETED 3-21-92

DEPTH	A	B	C	DESCRIPTION	REMARK
	S-1	7-7 11-8		3" CRUSHED STONE (FILL)	
	S-2	8-11 9-10		BLACK SILTY FINE TO MEDIUM SAND AND FINE GRAVEL (FILL) 4'	
5	S-3	30-55 21-12	F	BROWN-BLACK FINE TO MEDIUM SAND AND FINE TO COARSE GRAVEL, TRACE SILT, TRACE ORGANIC MATTER (FILL)	
	S-4	12-11 7-5		8'	
10	S-5	1-2 5-10	1B	BROWN CLAYEY SILT, SOME ORGANIC MATTER (OH) 10'	
	S-6	8-10 13-15	1A	GRAY-BROWN SILTY CLAY, TRACE FINE SAND (ML/CL) 12'	
	S-7	13-18 26-46		LIGHT BROWN FINE TO MEDIUM SAND, TRACE SILT (SP) 14'	
15	S-8	39-42 40-45	2		
20	S-9	12-18-31		ORANGE-BROWN FINE TO MEDIUM TO COARSE SAND AND FINE TO COARSE GRAVEL, TRACE SILT (SW/GW) 24'	
25	S-10	3-3-6	1A	GRAY SILTY CLAY (ML/CL) 28'6	
30	S-11	6-6-8	1A/2	GRAY FINE SANDY SILT, SOME CLAY (SM) 33'6	
35	S-12	12-15-29	3	GRAY MICACEOUS SILTY SAND, TRACE CLAY (DECOMPOSED ROCK) (ML)	
40				REFUSAL ON CUTTER HEAD AT 37'6	
45					

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TEST BORING LOG

PROJECT SUN OIL - MCAP
LOCATION MARCUS HOOK, PA

BORING B-37-17
G.S. ELEV. 11.0
FILE ML 3626-2(
SHEET 1 OF

GROUND WATER DATA			
FIRST ENCOUNTERED 6'			
DEPTH	HOUR	DATE	ELAPSED TIME
5'	1430	4-3	20 MIN

METHOD OF ADVANCING BORE HOLE			
a	FROM 0	TO	16'
d	FROM 16'	TO	30'
	FROM	TO	
	FROM	TO	
	FROM	TO	

DRILLER P. FLAHERTY
HELPER D. DONOUGHE
INSPECTOR
DATE STARTED 4-3-92
DATE COMPLETED 4-3-92

DEPTH	A	B	C	DESCRIPTION	REMARK
				3" ASPHALT	
	S-1	19-20		9" CRUSHED STONE	
		32-51		BROWN-BLACK SILTY FINE TO MEDIUM SAND AND FINE GRAVEL, CINDERS, BRICK FRAGMENTS	
	S-2	38-25			
		27-6			
▽	S-3	5-3	F	6' (FILL)	SHELBY TUBE 25'-27'
		3-3			
	S-4	1-2		BLACK FINE TO MEDIUM TO COARSE SAND AND FINE GRAVEL, TRACE SILT (FILL)	
		2-1			
10	S-5	1-2		10'	
		2-3			
	S-6	6-10		GRAY SILT, TRACE FINE SAND, TRACE CLAY (ML)	
		10-10		13'	
	S-7	13-18	1A		
		8-11		ORANGE-BROWN TO GRAY SILT, SOME CLAY, TRACE FINE SAND, TRACE ROCK FRAGMENTS (ML)	
15	S-8	17-25			
				18'6	
20	S-9	26-20-26		BROWN FINE TO MEDIUM SAND AND FINE GRAVEL, SOME SILT	
			2	23'6 (SM/GM)	
			1C	BROWN TO BLACK CLAY, SOME SILT, TRACE VEGETATION (OL)	
25	S-10	4-5-4		25'	
	U-1	14" REC	2	GRAY FINE TO MEDIUM TO COARSE SAND, TRACE TO SOME SILT, TRACE GRAVEL (SM)	
				27'	
30	S-11	12-14-18	3	GRAY WEATHERED DECOMPOSED ROCK	
				END OF BORING AT 30'	
35					
40					
45					

FOR GENERAL NOTES SEE KEY SHEET AND LOCATION PLAN.

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CKD. gp

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TEST BORING LOG

PROJECT SUN OIL - MCAP
LOCATION MARCUS HOOK, PA

BORING B-37-18
G.S. ELEV. 10.5
FILE ML 3626-2(
SHEET 1 OF

GROUND WATER DATA			
FIRST ENCOUNTERED 6'			
DEPTH	HOUR	DATE	ELAPSED TIME
5'6	930	4-3	20 MIN

METHOD OF ADVANCING BORE HOLE			
a	FROM 0	TO 16'	
d	FROM 16'	TO 30'	
	FROM	TO	
	FROM	TO	
	FROM	TO	

DRILLER P. FLAHERTY
HELPER D. DONOUGHE
INSPECTOR
DATE STARTED 4-3-92
DATE COMPLETED 4-3-92

DEPTH	A	B	C	DESCRIPTION	REMARK
	S-1	7-4 3-6	F	CRUSHED STONE AND CINDERS (FILL) 8"	
	S-2	6-4 3-3			
5	S-3	3-3 3-3		BROWN SILT AND CLAY, TRACE FINE TO MEDIUM SAND, TRACE FINE GRAVEL (FILL)	
	S-4	3-5 12-40		8'	
	S-5	28-50		GRAY SILTY CLAY, SOME WOOD FRAGMENTS (FILL)	
10	S-6	1-1 1-1		12'	
	S-7	6-7 9-12	1A		
15	S-8	27-24 23-24		GRAY-GREEN SILT, TRACE FINE SAND, TRACE CLAY (ML) 18'6	
20	S-9	9-11-12	2	GRAY FINE TO MEDIUM SAND, TRACE SILT (SP) 23'6	
25	S-10	21-24-36		ORANGE-BROWN FINE TO MEDIUM TO COARSE SAND AND FINE GRAVEL, TRACE SILT (SW/GW)	
30	S-11	26-36-28		END OF BORING AT 30'	
35					
40					
45					

FOR GENERAL NOTES SEE KEY SHEET AND LOCATION PLAN.

DRN. FEN
CKD. gD

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TEST BORING LOG

PROJECT SUN OIL - MCAP
LOCATION MARCUS HOOK, PA

BORING B-37-19
G.S. ELEV. 10.5
FILE ML 3626-2C
SHEET 1 OF 1

GROUND WATER DATA			
FIRST ENCOUNTERED 4'			
DEPTH	HOUR	DATE	ELAPSED TIME
3'	1500	3-21	5 MIN

METHOD OF ADVANCING BORE HOLE			
a	FROM 0	TO	16'
d	FROM 16'	TO	30'
	FROM	TO	
	FROM	TO	
	FROM	TO	

DRILLER S. PARISANO
HELPER R. ELLER
INSPECTOR G. MAYNOR
DATE STARTED 3-21-92
DATE COMPLETED 3-21-92

DEPTH	A	B	C	DESCRIPTION	REMARKS
	S-1	15-24 17-14	F	GRAY FINE TO MEDIUM SAND AND FINE TO COARSE GRAVEL, TRACE SILT (FILL)	
▽	S-2	12-11 10-11			
5	S-3	12-5 2-3			
	S-4	2-5 2-3			
	S-5	2-2 2-3		10'	
10	S-6	2-1 1-2	1B	BLACK SILT AND WOOD FRAGMENTS (PEAT) (OH)	
	S-7	4-2 4-5			
15	S-8	5-4 3-10		15'	
			1A	GRAY SILTY CLAY (ML/CL)	
				18'	
20	S-9	12-19-19	3	ORANGE-BROWN FINE TO MEDIUM SAND AND FINE TO COARSE GRAVEL, SOME SILT (SM/GM)	
25	S-10	24-20-14			
30	S-11	34-10-10			
				END OF BORING AT 30'	
35					
40					
45					

FOR GENERAL NOTES SEE KEY SHEET AND LOCATION PLAN.

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APPENDIX 3.1

SOFT SEDIMENT ANALYTICAL DATA

- Soft Sediment Characterization Data from Class III Permit Modification
- Soft Sediment Characterization Data from Initial Field Reconnaissance, Phase I

Soft Sediment Characterization Data from Class III Permit Modification

Toxicity characteristics constituents for waste characterization.

	EPA HW Number	Regulatory Level (mg/L)
Volatile Constituents		
Vinyl Chloride	D043	0.2
1,1-Dichloroethylene	D029	0.7
Chloroform	D022	6.0
1,2-Dichloroethane	D028	0.5
Methyl Ethyl Ketone (2-Butanone)	D035	200.0
Carbon Tetrachloride	D019	0.5
Trichloroethylene	D040	0.5
Benzene	D018	0.5
Tetrachloroethylene	D039	0.7
Chlorobenzene	D021	100.0
Semi-Volatile Organics		
Pyridine	D038	5.0
1,4-Dichlorobenzene	D027	7.5
o-Cresol	D023	200.0
m-Cresol	D024	200.0
p-Cresol	D025	200.0
Cresol	D026	200.0
Hexachloroethane	D034	3.0
Nitrobenzene	D036	2.0
Hexachlorobutadiene	D033	0.5
2,4,6-Trichlorophenol	D042	2.0
2,4,5-Trichlorophenol	D041	400.0
2,4-Dinitrotoluene	D030	0.13
Hexachlorobenzene	D032	0.13
Pentachlorophenol	D037	100.0
Metals		
Arsenic	D004	5.0
Barium	D005	100.0
Cadmium	D006	1.0
Chromium	D007	5.0
Lead	D008	5.0
Mercury	D009	0.2
Selenium	D010	1.0
Silver	D011	5.0

Table C-2. Results of Toxicity Characteristics (TC) constituents analysis for sampling sites 1 and 2. Concentrations given in mg/L.

	Site 1		Site 2	
	Wastewater (Sample 1-13)	Sludge (Sample 5)	Wastewater (Sample 2-13)	Sludge (Sample 6)
Volatile Constituents				
Vinyl Chloride	ND	ND	ND	ND
1,1-Dichloroethylene	ND	ND	ND	ND
Chloroform	ND	ND	ND	ND
1,2-Dichloroethane	ND	ND	ND	ND
Methyl Ethyl Ketone (2-Butanone)	0.25	ND	ND	ND
Carbon Tetrachloride	ND	ND	ND	ND
Trichloroethylene	ND	ND	ND	ND
Benzene	0.035J	0.037	1.0	0.15
Tetrachloroethylene	ND	ND	ND	ND
Chlorobenzene	ND	ND	ND	ND
Semi-Volatile Organics				
Pyridine	ND	ND	ND	ND
1,4-Dichlorobenzene	ND	ND	ND	ND
o-Cresol	0.26	0.20	5.0	0.037
m,p-Cresol	ND	0.33	ND	0.049
Hexachloroethane	ND	ND	ND	ND
Nitrobenzene	ND	ND	ND	ND
Hexachlorobutadiene	ND	ND	ND	ND
2,4,6-Trichlorophenol	ND	ND	ND	ND
2,4,5-Trichlorophenol	ND	ND	ND	ND
2,4-Dinitrotoluene	ND	ND	ND	ND
Hexachlorobenzene	ND	ND	ND	ND
Pentachlorophenol	ND	ND	ND	ND
Metals				
Arsenic	ND	ND	ND	ND
Barium	0.17J	0.51J	0.24J	0.45J
Cadmium	ND	ND	ND	ND
Chromium	1.7	0.39J	0.68	0.53
Lead	ND	ND	ND	ND
Mercury	0.0006J	ND	0.0004J	ND
Selenium	ND	ND	ND	ND
Silver	0.023J	ND	ND	ND

Note: ND = not detected, J=estimated quantity below Practical Quantification Limit.

Table C-3. Results of Toxicity Characteristics (TC) constituents analysis for sampling sites 3 and 4. Concentrations given in mg/L.

	Site 3		Site 4	
	Wastewater (Sample 3-13)	Sludge (Sample 7)	Wastewater (Sample 4)	Sludge (Sample 8)
Volatile Constituents				
Vinyl Chloride	ND	ND	ND	ND
1,1-Dichloroethylene	ND	ND	ND	ND
Chloroform	ND	ND	ND	ND
1,2-Dichloroethane	ND	ND	ND	ND
Methyl Ethyl Ketone (2-Butanone)	ND	ND	ND	ND
Carbon Tetrachloride	ND	ND	ND	ND
Trichloroethylene	ND	ND	ND	ND
Benzene	1.2	0.20	1.0	0.52
Tetrachloroethylene	ND	ND	ND	.0035
Chlorobenzene	ND	ND	0.015	ND
Semi-Volatile Organics				
Pyridine	ND	ND	ND	ND
1,4-Dichlorobenzene	ND	ND	ND	ND
o-Cresol	5.7	0.11	1.1	0.016
m,p-Cresol	ND	0.090	1.0	0.016
Hexachloroethane	ND	ND	ND	ND
Nitrobenzene	ND	ND	ND	ND
Hexachlorobutadiene	ND	ND	ND	ND
2,4,6-Trichlorophenol	ND	ND	ND	ND
2,4,5-Trichlorophenol	ND	ND	ND	ND
2,4-Dinitrotoluene	ND	ND	ND	ND
Hexachlorobenzene	ND	ND	ND	ND
Pentachlorophenol	ND	ND	ND	ND
Metals				
Arsenic	ND	ND	ND	ND
Barium	0.26J	.53J	0.65J	0.34J
Cadmium	ND	ND	ND	ND
Chromium	0.80	0.22J	0.11J	0.31J
Lead	ND	ND	ND	ND
Mercury	0.0013J	ND	ND	ND
Selenium	ND	ND	ND	ND
Silver	ND	0.73J	ND	ND

Note: ND = not detected, J=estimated quantity below Practical Quantification Limit.

Table C-4. Results of modified Skinner List volatile organics and metals analysis at sampling sites 1 and 2.

	Site 1		Site 2	
	Wastewater (Sample 1-13)	Sludge (Sample 5)	Wastewater (Sample 2-13)	Sludge (Sample 6)
Volatile Organics				
	(ug/l)	(ug/kg)	(ug/l)	(ug/kg)
Carbon Disulfide	ND	ND	ND	ND
Chloroform	ND	ND	ND	ND
1,2-Dichloroethane	ND	ND	20J	ND
Methyl Ethyl Ketone (2-Butanone)	3.3J	ND	55J	ND
Benzene	70	ND	1,300	840
Toluene	40	6,500	1,100	1,800
Chlorobenzene	ND	ND	ND	ND
Ethylbenzene	68	5,400	190	2,500
Styrene	ND	ND	ND	ND
Xylene (m-,o&p)	580	32,000	1,200	12,200
Cyclohexane	4.5J	ND	110	3,700
Ethylene Dibromide	ND	ND	ND	ND
Metals				
	(ug/kg)	(ug/kg)	(ug/kg)	(ug/kg)
Antimony	ND	7,100	ND	1,300J
Arsenic	5.2J	1,100	4.6J	6,000
Barium	80J	29,000	120J	18,000J
Beryllium	ND	ND	ND	ND
Cadmium	ND	ND	ND	ND
Chromium	1,400	470,000	930	260,000
Cobalt	ND	ND	ND	ND
Copper	44J	26,000	33J	29,000
Lead	ND	120,000	ND	24,000
Nickel	ND	ND	ND	ND
Mercury	0.69J	ND	0.87J	890
Selenium	140	4,100	53	3,200
Vanadium	ND	7,300	ND	ND
Zinc	380	160,000	360	110,000

Note: ND = not detected, J=estimated quantity below Practical Quantification Limit.

Table C-5. Results of modified Skinner List semi-volatiles analysis at sampling sites 1 and 2.

	Site 1		Site 2	
	Wastewater (Sample 1-13)	Sludge (Sample 5)	Wastewater (Sample 2-13)	Sludge (Sample 6)
Base/Neutral Extractable Semi-Volatiles				
	(ug/l)	(ug/kg)	(ug/l)	(ug/kg)
Pyridine	ND	ND	ND	ND
Benzenthiol	ND	ND	ND	ND
1,3-Dichlorobenzene	ND	ND	ND	ND
1,4-Dichlorobenzene	ND	ND	ND	ND
1,2-Dichlorobenzene	ND	ND	ND	ND
Indene	ND	ND	ND	ND
Naphthalene	ND	54,000	430	110,000
Quinoline	ND	ND	25	ND
1-Methylnaphthalene	1,000	220,000	470	470,000
Dimethyl Phthalate	ND	ND	ND	ND
2-Methylnaphthalene	1,200	270,000	490	570,000
Diethyl Phthalate	ND	ND	ND	ND
Phenanthrene	280	99,000	130	160,000
Anthracene	20	13,000	11	21,000
Dibutyl Phthalate	ND	ND	ND	ND
Fluoranthene	31	97,000	ND	13,000
Pyrene	110	61,000	51	51,000
Butylbenzyl Phthalate	ND	ND	ND	ND
Benzo(a)anthracene	49	26,000	24	30,000
Bis(2-ethylhexyl) Phthalate	ND	ND	ND	ND
Fluorene	45	31,000	22	ND
Chrysene	ND	51,000	ND	47,000
Methyl Chrysene	ND	42,000	ND	66,000
Dioctyl Phthalate	ND	ND	ND	ND
Benzo(b)fluoranthene	ND	5,000	ND	11,000
Benzo(k)fluoranthene	ND	ND	ND	ND
7,12-Dimethylbenz(a) anthracene	ND	84,000	ND	ND
Benzo(a)pyrene	ND	11,000	ND	16,000
Dibenz(a,h)anthracene	ND	ND	ND	ND
Dibenz(a,h)acridine	ND	ND	ND	ND
Benzo(g,h,i)perylene	ND	ND	ND	ND
Indeno(1,2,3-c,d)pyrene	ND	ND	ND	ND

Acid Extractable Semi-Volatiles

	(ug/l)	(ug/kg)	(ug/l)	(ug/kg)
Phenol	ND	38,000	ND	ND
o-Cresol	100	ND	99,000	ND
m, p-Cresol	33,000	25,000	280,000	ND
2,4-Dimethylphenol	1,600	ND	580	ND
2,4-Dinitrophenol	ND	ND	ND	ND
4-Nitrophenol	ND	ND	ND	ND

Note: ND = not detected, J=estimated quantity below Practical Quantification Limit.

Table C-6. Results of modified Skinner List volatile organics and metals analysis at sampling sites 3 and 4.

	Site 3		Site 4	
	Wastewater (Sample 3-13)	Sludge (Sample 7)	Wastewater (Sample 4)	Sludge (Sample 8)
Volatile Organics				
	(ug/l)	(ug/kg)	(ug/kg)	(ug/kg)
Carbon Disulfide	ND	ND	ND	ND
Chloroform	ND	ND	ND	ND
1,2-Dichloroethane	21J	ND	ND	ND
Methyl Ethyl Ketone (2-Butanone)	51J	ND	ND	ND
Benzene	1,600	6,500	2,100	94,000
Toluene	1,200	8,000	2,200	ND
Chlorobenzene	ND	ND	ND	ND
Ethylbenzene	230	2,000J	390	40,000
Styrene	ND	ND	ND	ND
Xylene (m-,o&p)	1,400	27,000	4,300	129,000
Cyclohexane	100	2,600J	470J	36,000
Ethylene Dibromide	ND	ND	ND	ND
Metals				
	(ug/l)	(ug/kg)	(ug/kg)	(ug/kg)
Antimony	ND	5,100	ND	2,800
Arsenic	ND	3,700	ND	4,100
Barium	60J	87,000	3,100J	81,000
Beryllium	ND	ND	ND	ND
Cadmium	ND	ND	ND	ND
Chromium	10	430,000	20,000	500,000
Cobalt	ND	9,000	ND	8,100
Copper	28J	130,000	3,300J	110,000
Lead	ND	110,000	ND	61,000
Nickel	ND	22,000	ND	33,000
Mercury	1.6J	1,300	ND	1,700
Selenium	55	3,100	ND	2,800
Vanadium	ND	24,000	ND	25,000
Zinc	400	360,000	15,000	430,000

Note: ND = not detected, J=estimated quantity below Practical Quantification Limit.

Table C-7. Results of modified Skinner List semi-volatiles analysis at sampling sites 3 and 4.

	Site 3		Site 4	
	Wastewater (Sample 3-13)	Sludge (Sample 7)	Wastewater (Sample 4)	Sludge (Sample 8)
Base/Neutral Extractable Semi-Volatiles				
	(ug/l)	(ug/kg)	(ug/kg)	(ug/kg)
Pyridine	ND	ND	ND	ND
Benzenthiol	ND	ND	ND	ND
1,3-Dichlorobenzene	ND	ND	ND	ND
1,4-Dichlorobenzene	ND	ND	ND	ND
1,2-Dichlorobenzene	ND	ND	ND	ND
Indene	ND	ND	ND	1,100,000
Naphthalene	250	61,000	72,000	150,000
Quinoline	24	ND	ND	ND
1-Methylnaphthalene	360	310,000	210,000	280,000
Dimethyl Phthalate	ND	ND	ND	ND
2-Methylnaphthalene	390	350,000	270,000	370,000
Diethyl Phthalate	ND	ND	ND	ND
Phenanthrene	130	270,000	40,000	96,000
Anthracene	11	48,000	ND	16,000
Dibutyl Phthalate	ND	ND	ND	ND
Fluoranthene	ND	ND	ND	12,000
Pyrene	ND	120,000	410,000	29,000
Butylbenzyl Phthalate	ND	ND	ND	ND
Benzo(a)anthracene	16	41,000	46,800J	ND
Bis(2-ethylhexyl) Phthalate	ND	ND	ND	ND
Fluorene	24	94,000	19,000	52,000
Chrysene	ND	73,000	ND	18,000
Methyl Chrysene	ND	110,000	ND	21,000
Dioctyl Phthalate	ND	ND	ND	ND
Benzo(b)fluoranthene	ND	20,000	ND	ND
Benzo(k)fluoranthene	ND	ND	ND	ND
7,12-Dimethylbenz(a) anthracene	ND	210,000	ND	ND
Benzo(a)pyrene	ND	23,000	ND	7,400J
Dibenz(a,h)anthracene	ND	ND	ND	ND
Dibenz(a,h)acridine	ND	ND	ND	ND
Benzo(g,h,i)perylene	ND	ND	ND	ND
Indeno(1,2,3-c,d)pyrene	ND	ND	ND	ND

Acid Extractable Semi-Volatiles

	(ug/l)	(ug/kg)	(ug/kg)	(ug/kg)
Phenol	590,000	ND	ND	ND
o-Cresol	320,000	ND	ND	ND
m, p-Cresol	130,000	ND	ND	ND
2,4-Dimethylphenol	630	ND	ND	ND
2,4-Dinitrophenol	ND	ND	ND	ND
4-Nitrophenol	ND	ND	ND	ND

Note: ND = not detected, J=estimated quantity below Practical Quantification Limit.

Soft Sediment Characterization Data
from Initial Field Reconnaissance, Phase I

85 Benjamin Franklin Highway
Douglassville, PA 19518-0539
(215) 327-8196
PA DER Cert #06-409

ANALYTICAL RESULTS

Analytical Report

Parameter	D1S 01-0173	D1D 01-0174	B4S 01-0196	B4D 01-0197	F1S 01-0198	F2D 01-0199	P.Q.L.	Method Used
VOLATILES on TOTAL "AS RECEIVED": (mg/kg):								
Benzene	ND	0.010	0.020	ND	8.58	8.05	0.005	8240
Carbon disulfide	ND	0.035	ND	ND	ND	0.025	0.005	8240
Carbon tetrachloride	ND	ND	ND	ND	ND	ND	0.005	8240
Chlorobenzene	ND	ND	ND	ND	ND	ND	0.005	8240
Chloroform	ND	ND	ND	ND	ND	ND	0.005	8240
Cyclohexane	ND	ND	ND	ND	ND	ND	0.005	8240
1,1-Dichloroethylene	ND	ND	ND	ND	ND	ND	0.005	8240
1,2-Dichloroethane	ND	ND	ND	ND	ND	ND	0.005	8240
1,4-Dichlorobenzene	ND	ND	ND	ND	ND	ND	0.005	8240
Ethyl benzene	ND	0.115	0.120	ND	10.96	10.3	0.005	8240
Ethylene dibromide	ND	ND	ND	ND	ND	ND	0.005	8240
Methyl ethyl ketone	ND	ND	ND	ND	ND	ND	0.005	8240
Styrene	ND	ND	ND	ND	ND	ND	0.005	8240
Tetrachloroethylene	ND	ND	ND	ND	ND	ND	0.005	8240
Tetrachloroethylene	ND	ND	ND	ND	ND	ND	0.005	8240
Toluene	ND	0.010	ND	ND	14.06	12.80	0.005	8240
Trichloroethylene	ND	ND	ND	ND	ND	ND	0.005	8240
Vinyl chloride	ND	ND	ND	ND	ND	ND	0.005	8240
Xylenes	0.010	0.175	0.780	ND	116.9	110.6	0.005	8240
METALS on TOTAL "AS RECEIVED": (mg/kg):								
Antimony	24.1	15.6	31.5	3.1	45.0	26.9	1.5	6010
Arsenic	ND	ND	ND	ND	ND	ND	3.	6010
Barium	110.	73.	49.	38.	101.	89.	1.5	6010
Beryllium	0.7	ND	ND	ND	ND	ND	0.6	6010
Cadmium	1.5	1.3	ND	0.7	1.1	1.5	0.6	6010
Chromium	248.	97.	337.	99.	559.	72.	0.6	6010
Cobalt	9.	ND	ND	ND	10.	ND	6.	6010
Copper	427.	158.	49.	73.	235.	128.	1.5	6010
Lead	214.	153.	109.	89.	144.	160.	3.	6010
Mercury	3.05	1.51	0.34	1.91	1.17	0.74	0.05	6010
Nickel	29.3	12.2	10.0	9.6	32.8	23.7	1.5	6010
Selenium	ND	ND	ND	ND	ND	ND	1.5	6010
Vanadium	32.1	19.4	25.3	16.2	22.4	40.6	1.5	6010
Zinc	660.	431.	225.	170.	490.	281.	1.5	6010

ND = The compound indicated was not detected at or above the practical quantitation limit (PQL) listed for the method performed.

Analytical Report

Parameter	D1S 01-0173	D1D 01-0174	B4S 01-0196	B4D 01-0197	F1S 01-0198	F2D 01-0199	P.Q.L.	Method Used
SEMIVOLATILES on TOTAL "AS RECEIVED": (mg/kg):								
Anthracene	487.	581.	113.	64.	143.	129.	1.0	8270
Benzenthiol	ND	ND	ND	ND	ND	ND	1.0	8270
Bis(2-ethylhexyl)phthalate	ND	ND	ND	ND	ND	ND	1.0	8270
Butylbenzyl phthalate	ND	ND	ND	ND	ND	ND	1.0	8270
o-Cresol	ND	ND	ND	ND	ND	ND	1.0	8270
m-Cresol	ND	ND	ND	ND	ND	ND	1.0	8270
p-Cresol	ND	ND	ND	ND	ND	ND	1.0	8270
Dibenz(a,h)acridine	ND	ND	ND	ND	ND	ND	1.0	8270
Dibenz(a,h)anthracene	ND	ND	ND	ND	ND	ND	1.0	8270
Dibutyl phthalate	ND	ND	ND	ND	ND	ND	1.0	8270
Diethyl phthalate	ND	ND	ND	ND	ND	ND	1.0	8270
Dimethyl phthalate	ND	ND	ND	ND	ND	ND	1.0	8270
7,12-Dimethylbenz(a)-anthracene	12.	227.	ND	ND	ND	ND	1.0	8270
2,4-Dimethylphenol	ND	ND	ND	ND	ND	ND	1.0	8270
2,4-Dinitrophenol	ND	ND	ND	ND	ND	ND	1.0	8270
2,4-Dinitrotoluene	ND	ND	ND	ND	ND	ND	1.0	8270
Dioctyl phthalate	ND	ND	ND	ND	ND	ND	1.0	8270
Hexachlorobenzene	ND	ND	ND	ND	ND	ND	1.0	8270
Hexachloroethane	ND	ND	ND	ND	ND	ND	1.0	8270
Hexachloro-1,3-butadiene	ND	ND	ND	ND	ND	ND	1.0	8270
Indene	ND	ND	ND	ND	ND	ND	1.0	8270
Methyl chrysene	32.	115.	14.	35.	ND	ND	1.0	8270
Naphthalene	33.	193.	39.	18.	153.	ND	1.0	8270
2-Methylnaphthalene	363.	572.	122.	61.	265.	112.	1.0	8270
Nitrobenzene	ND	ND	ND	ND	ND	ND	1.0	8270
4-Nitrophenol	ND	ND	ND	ND	ND	ND	1.0	8270
Pentachlorophenol	ND	ND	ND	ND	ND	ND	1.0	8270
Phenanthrene	45.	64.	13.	ND	18.	ND	1.0	8270
Phenol	ND	ND	ND	ND	ND	ND	1.0	8270
Pyridine	ND	ND	ND	ND	ND	ND	1.0	8270
Quinoline	ND	ND	ND	ND	ND	ND	1.0	8270
2,4,5-Trichlorophenol	ND	ND	ND	ND	ND	ND	1.0	8270
2,4,6-Trichlorophenol	ND	ND	ND	ND	ND	ND	1.0	8270

ND = The compound indicated was not detected at or above the practical quantitation limit (PQL) listed for the method performed.

BLUE MARSH LABORATORY, INC.

Parameter	D1S 01-0173	D1D 01-0174	B4S 01-0196	B4D 01-0197	F1S 01-0198	F2D 01-0199	P.Q.L.	Method Used
MISC. on TOTAL "AS RECEIVED": (mg/kg)								
Petroleum hydrocarbons	60400.	43400.	35400.	15700.	68200.	48600.	500.	418.1
Oil & Grease	57100.	41800.	34400.	13700.	65400.	50200.	500.	9071
Total Solids	70.3%	58.4%	63.3%	67.7%	44.1%	65.1%	0.1%	ASTM
Moisture Content	29.7%	41.6%	36.7%	32.3%	55.6%	34.9%	0.1%	ASTM

ND = The compound indicated was not detected at or above the practical quantitation limit (PQL) listed for the method performed.