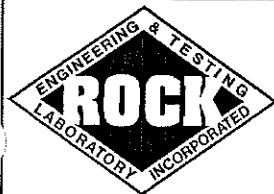


LOG OF BORING AA-44

SHEET 1 of 1



Rock Engineering & Testing Lab., Inc.
6817 Leopard St.
Corpus Christi, TX 78409
Telephone: (361) 883-4555
Fax: (361) 883-4711

CLIENT: HDR Engineering, Inc.

PROJECT: Galveston Anchorage Area C Sand Source Inv.

LOCATION: Anchorage Area C, Galveston, Texas

NUMBER: G109233

DATE(S) DRILLED: 10/16/09 - 10/16/09

DRILLING METHOD(S):

Hollow Stem Auger

GROUNDWATER INFORMATION:

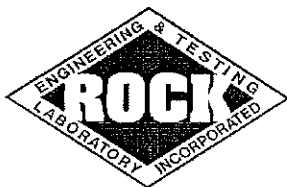
SURFACE ELEVATION: -25.72' NAVD

DESCRIPTION OF STRATUM

3233 ANCHORAGE BASIN C.G.P.J. ROCK ETL GDT 11/30/09

LOG OF BORING

SOIL SYMBOL	FIELD DATA					LABORATORY DATA						
	Elevation, Ft. [NAVD]	SAMPLE NUMBER	SAMPLES	N: BLOWS/FT P: TONS/SQ FT T: TONS/SQ FT PERCENT RECOVERY/ ROCK QUALITY DESIGNATION	MOISTURE CONTENT (%)	ATTERBERG LIMITS			DRY DENSITY POUNDS/CU.FT	COMPRESSIVE STRENGTH (TONS/SQ FT)	MINUS NO. 200 SIEVE (%)	
						LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX				
						LL	PL	PI				
	5											
	10											
	15											
	20											
	25											
		SS S-1	N= 1								3	<u>POORLY GRADED SAND</u> , with shell fragments, brown and light gray, very loose.
		SS S-2	N= 11								7	Same as above, with clay, medium.
		SS S-3	N= 1								3	Same as above, very loose.
		SS S-4	N= 1								42	<u>CLAYEY SAND</u> , bluish gray and brown, very soft.
		SS S-5	N= 2								22	<u>SILTY CLAYEY SAND</u> , bluish gray, very loose.
	35	SS S-6	N= 7									<u>POORLY GRADED SAND</u> , with clay, gray and brown, loose.
		SS S-7	N= 2								11	Same as above, very loose.
	40	SS S-8	N= 3									<u>SILTY CLAYEY SAND</u> , gray and brown, very loose.
		SS S-9	N= 1								19	Same as above.
												Boring was extended to an elevation of -43.7-feet NAVD during the drilling operations.
N - STANDARD PENETRATION TEST RESISTANCE P - POCKET PENETROMETER RESISTANCE T - POCKET TORVANE SHEAR STRENGTH												REMARKS: Boring depth and location was determined by HDR Engineering, Inc. Boring operations were performed by RETL at GPS Coord. N. 29.35432 W. 94.77529.



- Geotechnical Engineering
- Construction Materials Testing

PROJECT NAME: Galveston Anchorage Area C Sand Source Investigation

CLIENT: HDR Engineering, Inc.

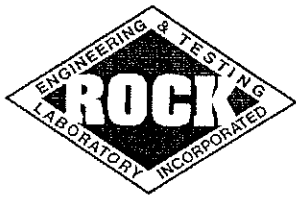
BORING ID.: AA-44

DESCRIPTION: Anchorage Area C Borrow Source Area

PERCENT SHELL BY WEIGHT (BASED ON #10 SIEVE)			
-25.72' to -27.72'	-27.72' to -29.72'	-29.72' to -31.72'	-31.72' to -33.72'
NAVD	NAVD	NAVD	NAVD
0.23	0.13	0.26	0.04

ASTM MESH	% FINER BY WEIGHT AFTER REMOVING SHELL			
	-25.72' to -27.72'	-27.72' to -29.72'	-29.72' to -31.72'	-31.72' to -33.72'
	NAVD	NAVD	NAVD	NAVD
#10	100.00	100.00	100.00	100.00
#18	99.70	99.40	99.56	99.86
#35	99.60	98.90	99.40	99.72
#60	99.20	98.00	98.90	99.18
#70	98.00	95.60	97.36	98.19
#100	32.20	48.00	33.83	81.25
#120	10.30	19.40	10.98	65.99
#170	3.20	9.51	3.83	52.33
#200	2.50	7.20	2.50	42.35
STATISTICS (EXCLUDING SHELL)				
MEDIAN GRAIN SIZE (mm)	0.18	0.17	0.18	0.08
MEAN GRAIN SIZE (mm)	0.17	0.16	0.17	N/A
SORTING (σ)	0.22	N/A	0.23	N/A

*The -#10 material was utilized as the total sample for Grain Size Distribution Curve calculations.



- Geotechnical Engineering
- Construction Materials Testing

PROJECT NAME: Galveston Anchorage Area C Sand Source Investigation

CLIENT: HDR Engineering, Inc.

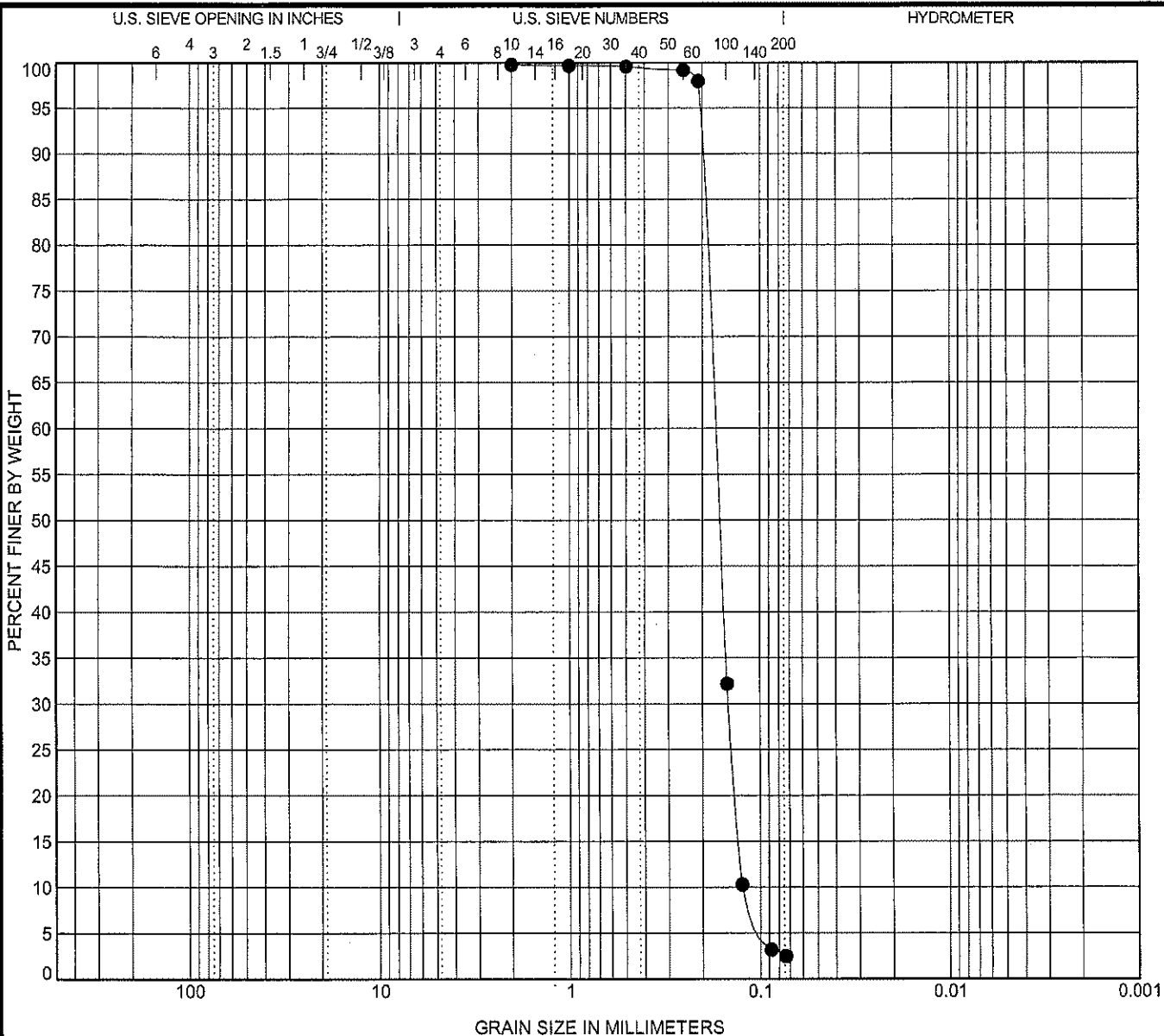
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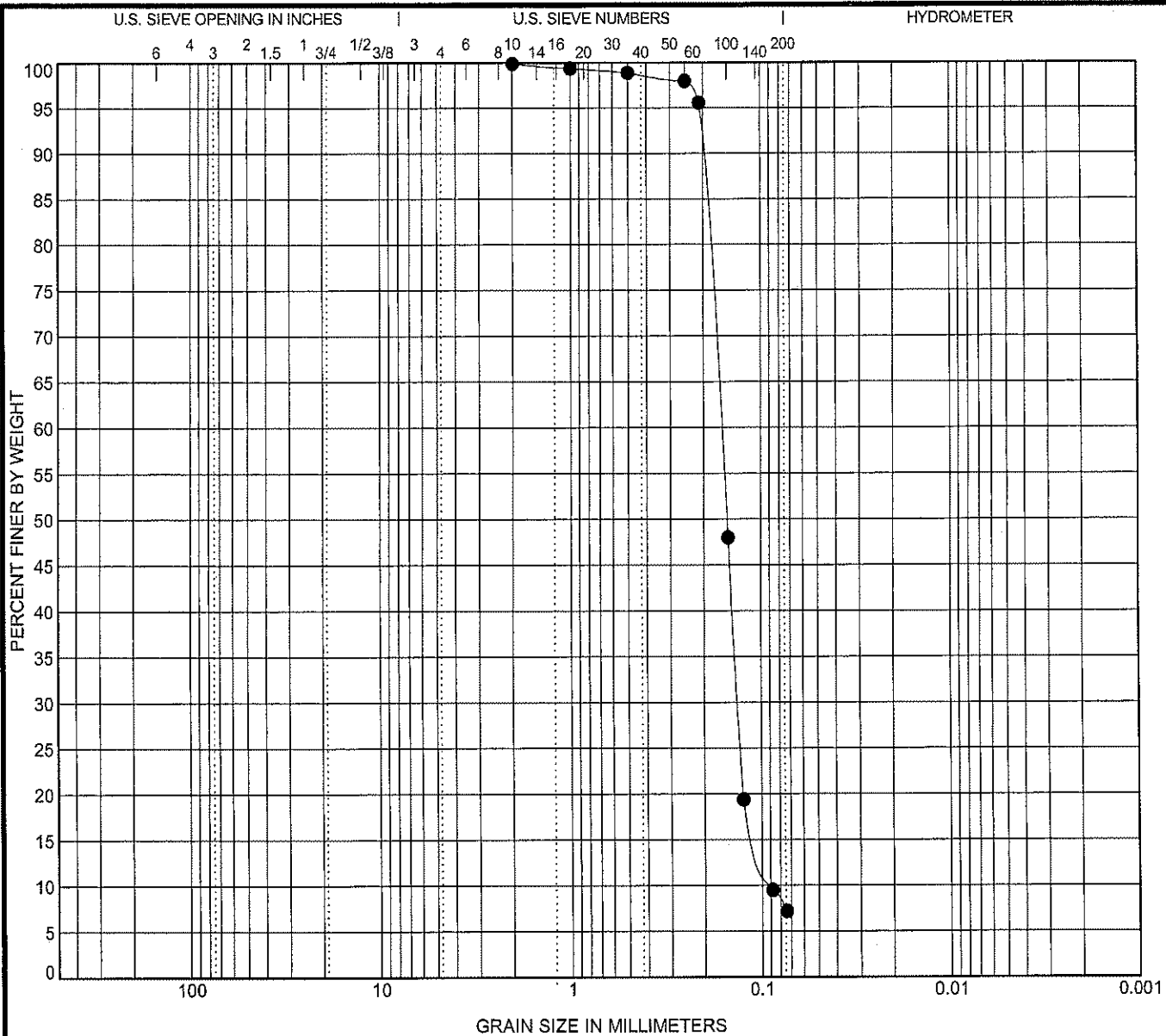
DESCRIPTION: Anchorage Area C Borrow Source Area

PERCENT SHELL BY WEIGHT (BASED ON #10 SIEVE)		
-33.72' to -35.72' NAVD	-37.72' to -39.72' NAVD	-41.72' to -43.72' NAVD
0.06	1.05	0.79

ASTM MESH	% FINER BY WEIGHT AFTER REMOVING SHELL		
	-33.72' to -35.72' NAVD	-37.72' to -39.72' NAVD	-41.72' to -43.72' NAVD
#10	100.00	100.00	100.00
#18	99.73	97.70	98.76
#35	99.44	96.01	98.14
#60	98.80	91.54	96.95
#70	97.36	82.34	94.97
#100	62.95	34.44	58.54
#120	39.47	20.30	35.83
#170	26.26	13.40	24.17
#200	21.51	11.02	19.82
STATISTICS (EXCLUDING SHELL)			
MEDIAN GRAIN SIZE (mm)	0.14	0.18	0.14
MEAN GRAIN SIZE (mm)	N/A	0.16	N/A
SORTING (σ)	N/A	N/A	N/A

*The -#10 material was utilized as the total sample for Grain Size Distribution Curve calculations.





COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

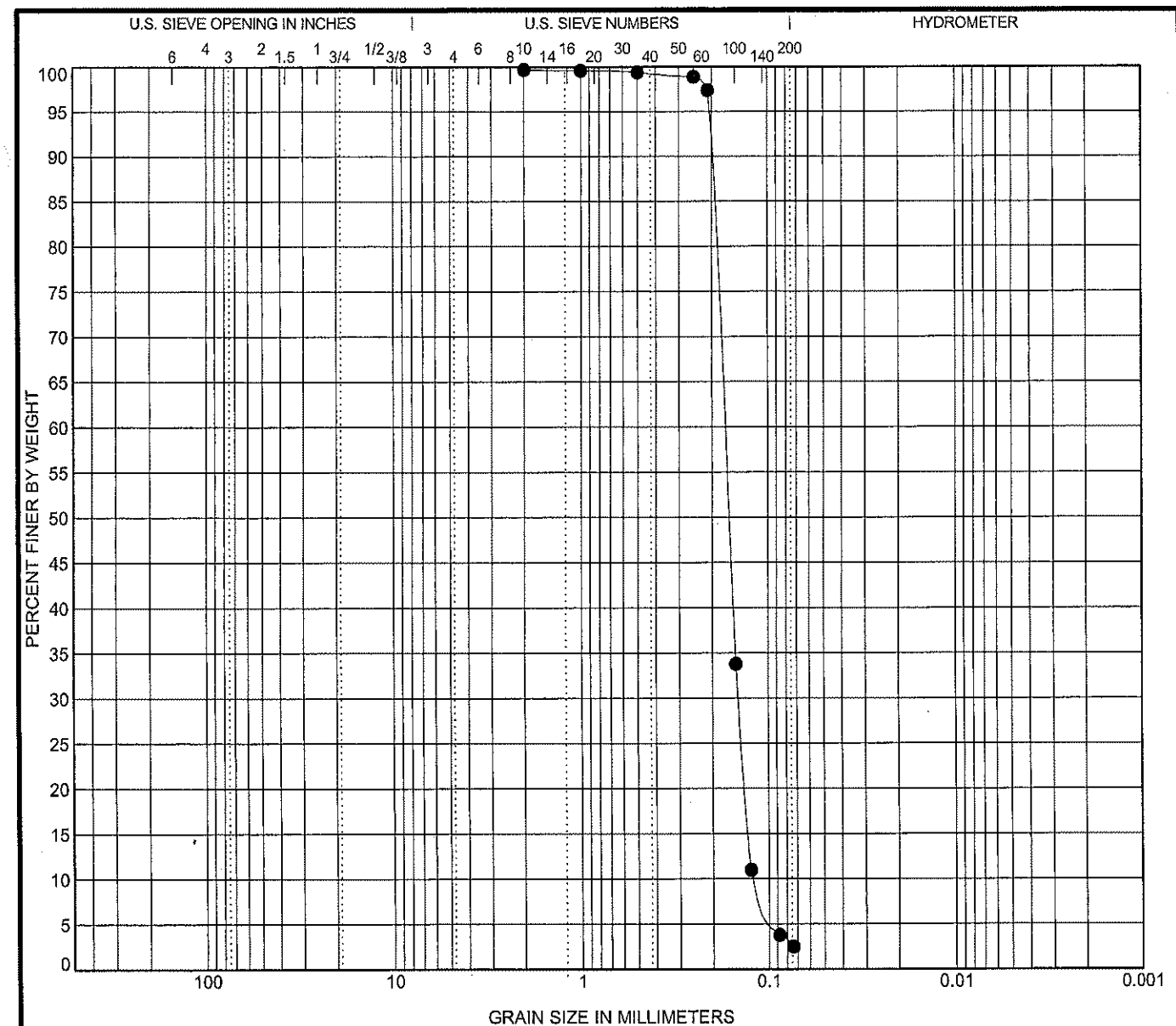
Specimen ID		Depth	Classification					LL	PL	PI	Cc	Cu
●	AA-44	(-27.72' to -29.72' NAVD)	AA-44 (-27.72' to -29.72' NAVD)								1.22	1.81
Specimen ID		Depth	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay		
●	AA-44	(-27.72' to -29.72' NAVD)	2	0.162	0.133	0.09	0.0					



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Corpus Christi, TX 78409
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Fax: (361) 883-4711

GRAIN SIZE DISTRIBUTION

Project: Galveston Anchorage Area C Sand Source Inv.
Location: Anchorage Area C, Galveston, Texas
Number: G109233



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Specimen ID	Depth	Classification	LL	PL	PI	Cc	Cu
● AA-44	(-29.72' to -31.72' NAVD)	AA-44 (-29.72' to -31.72' NAVD)				1.02	1.44

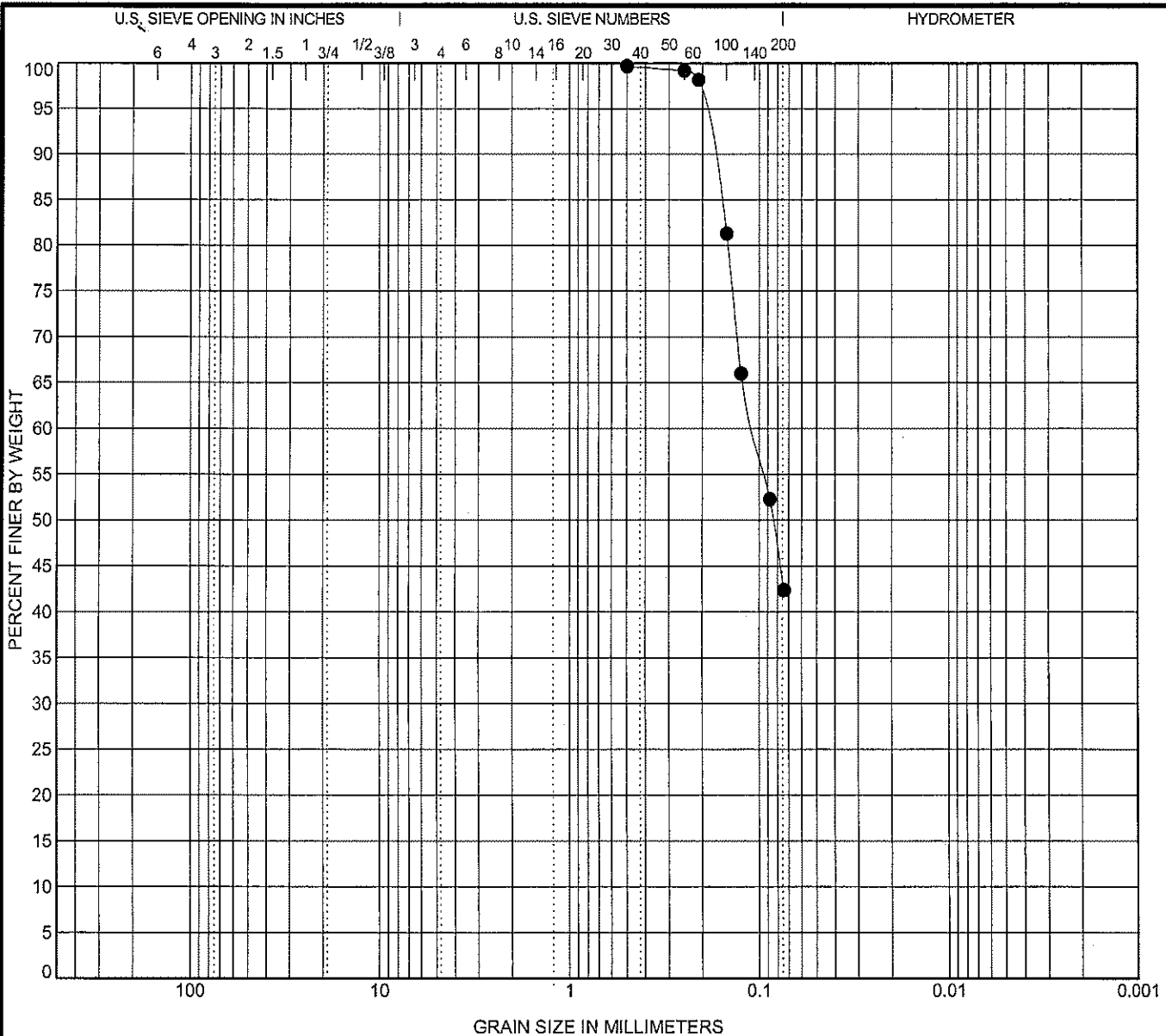
Specimen ID	Depth	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
● AA-44	(-29.72' to -31.72' NAVD)	2	0.172	0.145	0.119	0.0			



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Number: G109233



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Specimen ID	Depth	Classification	LL	PL	PI	Cc	Cu
● AA-44	(-31.72' to -33.72' NAVD)	AA-44 (-31.72' to -33.72' NAVD)					

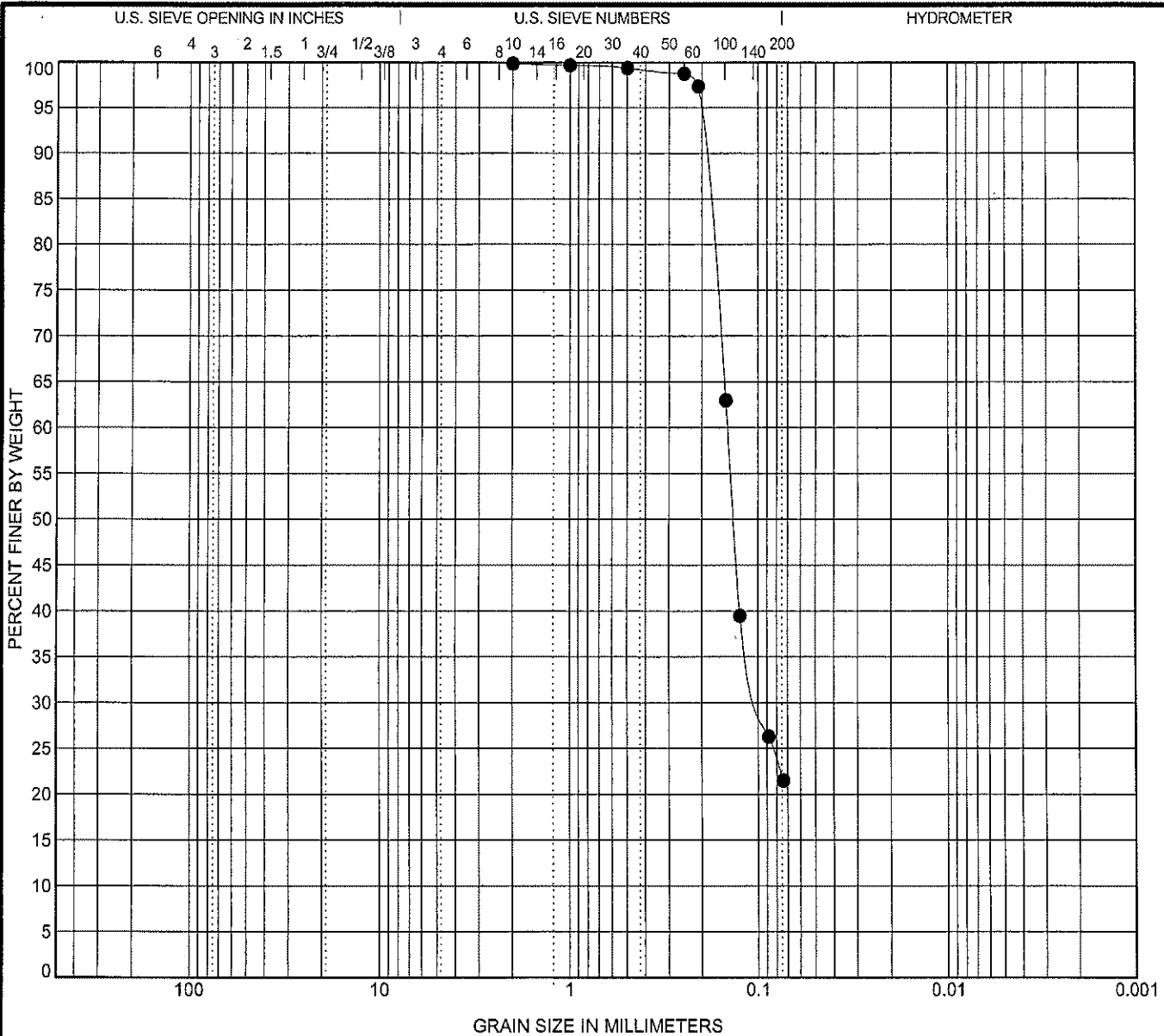
Specimen ID	Depth	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
● AA-44	(-31.72' to -33.72' NAVD)	0.5	0.107			0.0			



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COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Specimen ID	Depth	Classification	LL	PL	PI	Cc	Cu
● AA-44	(-33.72' to -35.72' NAVD)	AA-44 (-33.72' to -35.72' NAVD)					

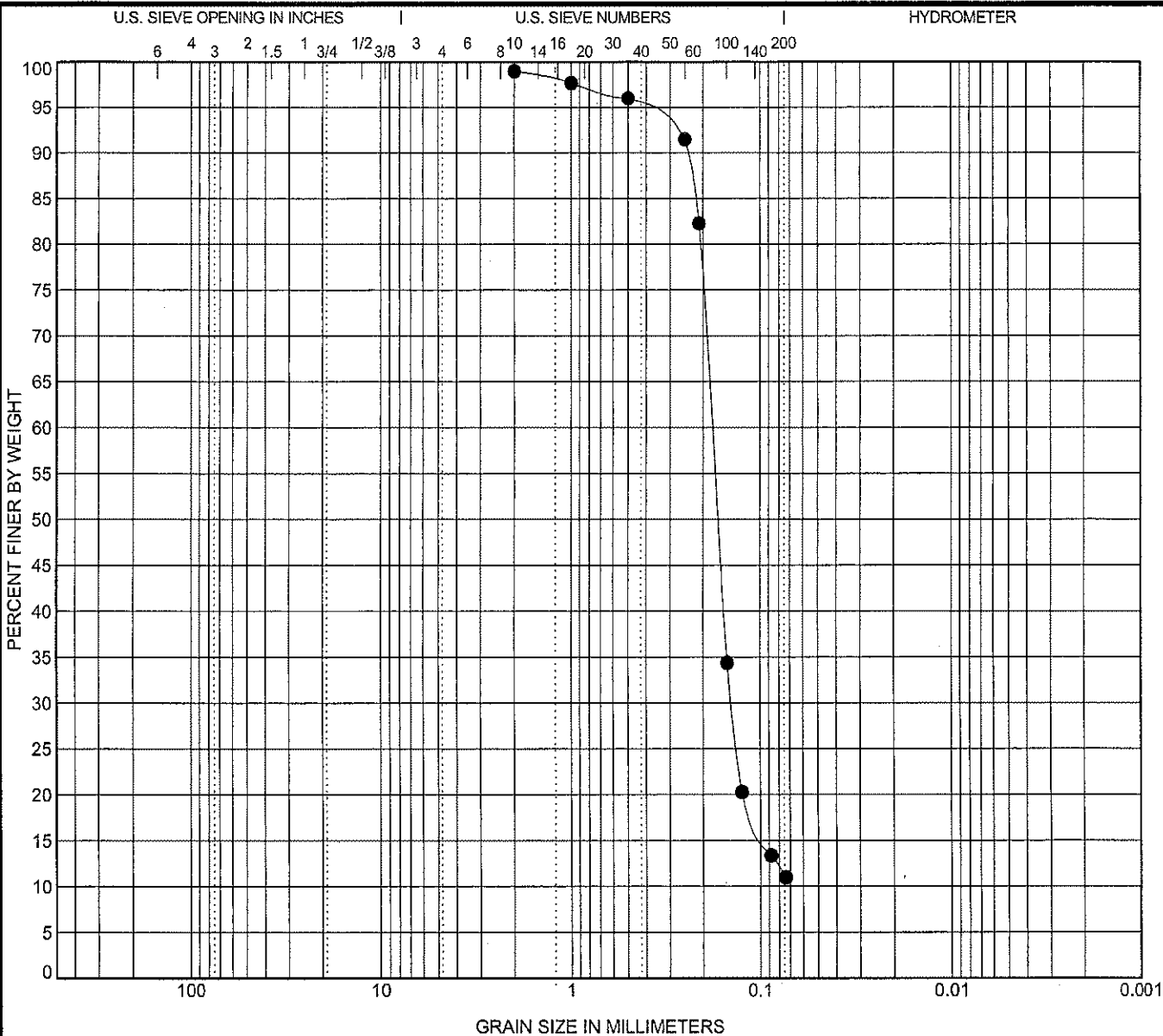
Specimen ID	Depth	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
● AA-44	(-33.72' to -35.72' NAVD)	2	0.146	0.097		0.0			



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GRAIN SIZE DISTRIBUTION

Project: Galveston Anchorage Area C Sand Source Inv.
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Number: G109233



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

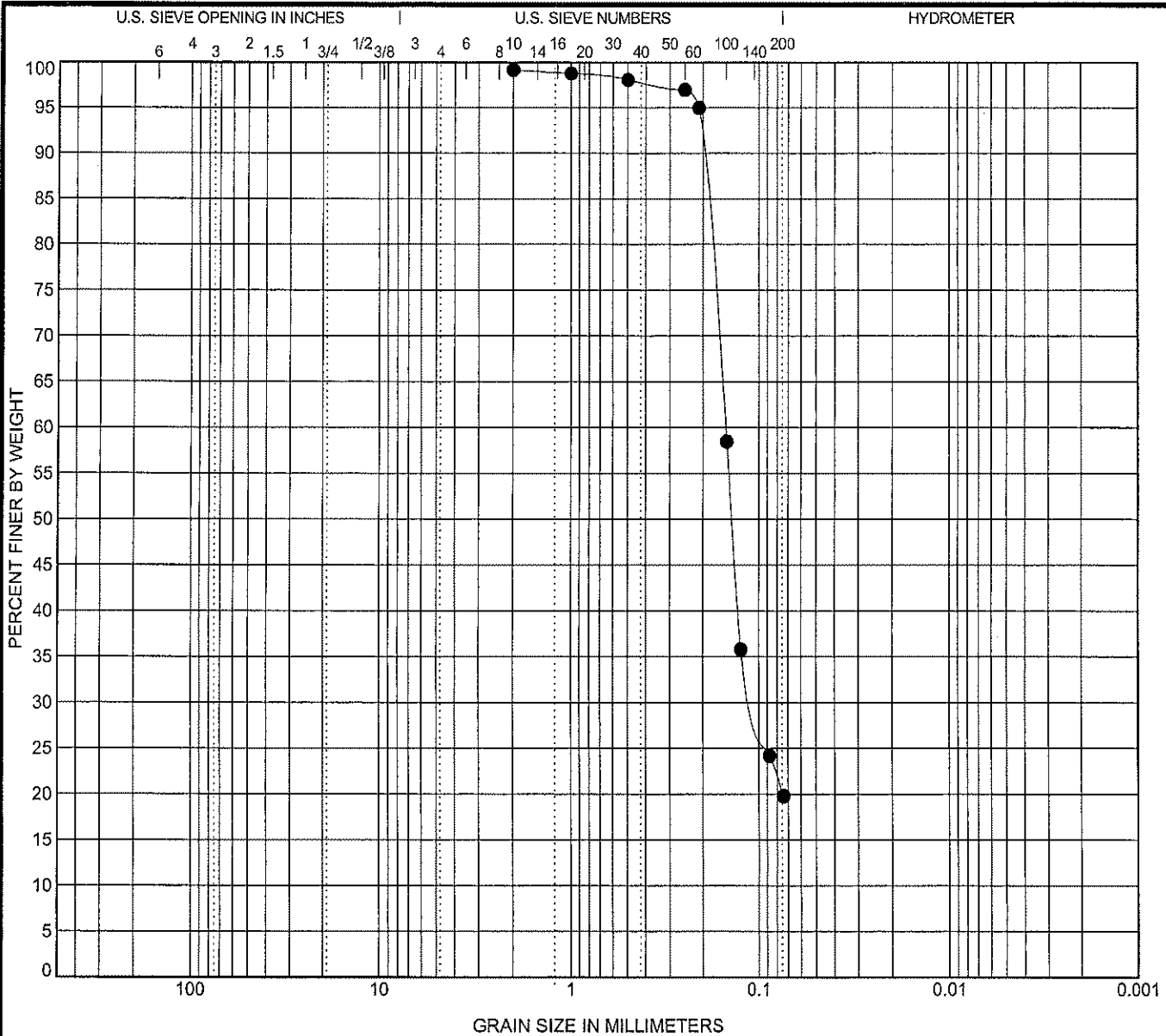
Specimen ID	Depth	Classification					LL	PL	PI	Cc	Cu
● AA-44	(-37.72' to -39.72' NAVD)	AA-44 (-37.72' to -39.72' NAVD)								1.61	2.60
Specimen ID	Depth	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay		
● AA-44	(-37.72' to -39.72' NAVD)	2	0.179	0.141		0.0					



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GRAIN SIZE DISTRIBUTION

Project: Galveston Anchorage Area C Sand Source Inv.
Location: Anchorage Area C, Galveston, Texas
Number: G109233



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Specimen ID	Depth	Classification	LL	PL	PI	Cc	Cu
● AA-44	(-41.72' to -43.72' NAVD)	AA-44 (-41.72' to -43.72' NAVD)					

Specimen ID	Depth	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
● AA-44	(-41.72' to -43.72' NAVD)	2	0.151	0.105		0.0			



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GRAIN SIZE DISTRIBUTION

Project: Galveston Anchorage Area C Sand Source Inv.
 Location: Anchorage Area C, Galveston, Texas
 Number: G109233

US GRAIN SIZE G109233 ANCHORAGE BASIN C.GPJ US LAB.GDT 12/1/09



Figure 13: AA-44; Sample 6



Figure 14: AA-32; Sample 6

December 8, 2009
Attn.: Ms. Lauren Augustin
RETL Job No.: G109233

PROP. GALVESTON ANCHORAGE AREA C SAND SOURCE INVESTIGATION
Anchorage Area C, Galveston, Texas

ROCK ENGINEERING AND TESTING LABORATORY, INC.
6817 LEOPARD STREET
CORPUS CHRISTI, TX 78409
(361) 883-4555



Figure 79: AA-43; Sample 2



Figure 80: AA-44; Sample 1

December 8, 2009
Attn.: Ms. Lauren Augustin
RETL Job No.: G109233

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Anchorage Area C, Galveston, Texas

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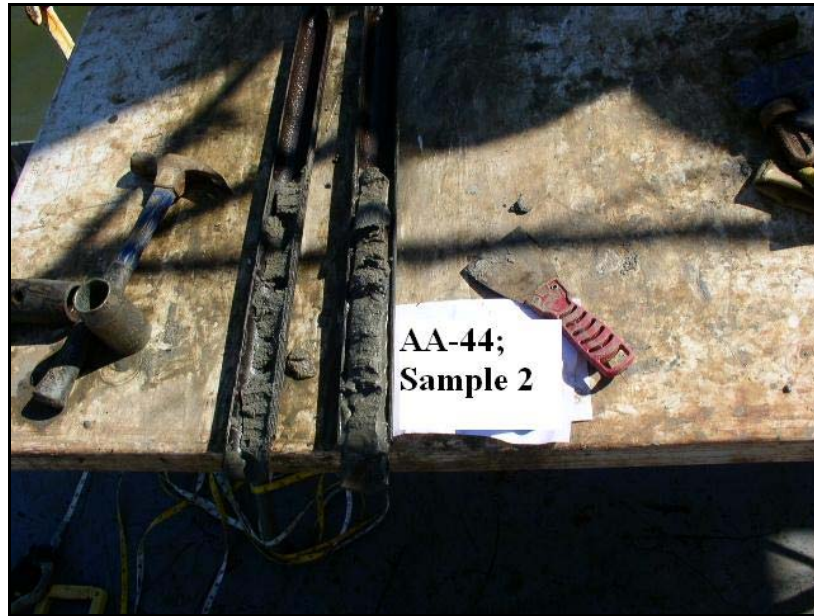


Figure 81: AA-44; Sample 2



Figure 82: AA-44; Sample 4

December 8, 2009
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RETL Job No.: G109233

PROP. GALVESTON ANCHORAGE AREA C SAND SOURCE INVESTIGATION
Anchorage Area C, Galveston, Texas

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Figure 83: AA-44; Sample 5

December 8, 2009
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6817 LEOPARD STREET
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(361) 883-4555