FINAL REPORT
(Volume 1)

VIBRACORE SAMPLING COLLECTION AND GEOTECHNICAL TESTING IN THE ATLANTIC OCEAN OFF THE COAST OF SOUTH FLORIDA

MARTIN COUNTY SHORE PROTECTION PROJECT BORROW AREA GEOTECHNICAL INVESTIGATION

Prepared for

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By

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TABLE 1

LIST OF CORE LOCATIONS

CORE NAME	CORE LOCATION	ELEV. (NGVD)
ATM-1	773065.0 E 1048721.9 N	-36.65'
ATM-2 R1	774474.7 E 1049378.5 N	-30.45'
ATM-2 R2	774472.5 E 1049382.1 N	-31.35'
ATM-3	773361.8 E 1047758.6 N	-34.35'
ATM-4 R1	774440.7 E 1047757.1 N	-36.85'
ATM-4 R2	774427.5 E 1047761.1 N	-36.55'
ATM-5	773812.7 E 1046896.8 N	-36.80'
ATM-6 R1	775579.4 E 1047179.3 N	-29.75'
ATM-6 R2	775569.1 E 1047167.9 N	-30.00'
ATM-7	774682.8 E 1049962.5 N	-24.10'
ATM-8 R1	775130.9 E 1049119.2 N	-22.55'
ATM-8 R2	775113.5 E 1049138.7 N	-22.25'
ATM-9	774202.2 E 1048363.4 N	-36.75'
ATM-10 R1	775489.2 E 1048260.7 N	-21.15'
ATM-10 R2	775532.3 E 1048276.7 N	-21.05'
ATM-A	775467.0 E 1049908.0 N	-34.55'
ATM-B	775996.1 E 1048869.4 N	-35.10'
ATM-C	776426.1 E 1047923.2 N	-33.30'
ATM-D R1	776319.0 E 1046976.0 N	-23.10'
ATM-D R2	776310.2 E 1046982.3 N	-22.90'
ATM-E	776788.7 E 1046208.9 N	-31.50'
ATM-G R1	776493.8 E 1045407.6 N	-24.45'
ATM-G R2	776473.7 E 1045435.2 N	-24.65'

SUMMARY OF EVENTS

11/09-10/93 Vibracore and Positioning Equipment mobilized from Norwood, New Jersey to R/V Atlantic Twin in St. Augustine, Florida.

11/11-12/93 Equipment mobilized on vessel.

11/12-13/93 DGPS reference station installed atop Spoon Bill Condo located on the Southern end of Hutchinson Island.

11/14/93 The R/V Atlantic Twin arrived Fort Pierce - travelled the Intercoastal Waterway from St. Augustine due to severe offshore weather conditions.

11/15/93 Vessel sailed to work area but severe sea conditions required returning to port.

11/16/93 In port, Fort Pierce waiting on weather.

11/17/93 Sailed to work area, seas still too rough - returned to port.

11/18/93 0300 sailed to work area - cored ATM-7, ATM-2, ATM-8, ATM-1 & ATM-9. Anchored on location ATM-10 for the night.

11/19/93 Cored ATM-10, ATM-4, ATM-3, & ATM-5. ran bathemetric test line - cored ATM-6 and anchored overnight on location.

11/20/93 Cored ATM-A, ATM-B, ATM-C, ATM-D, ATM-E and ATM-G. Anchor line wrapped in screw and weather building - return to port, Fort Pierce.

11/21/93 Advised project complete, commence demobilization.

11/22/93 Complete equipment demobilization - retrieve DGPS reference station - Core samples delivered to SEA's soils laboratory in Melbourne, Florida.

11/23/93 Field crew departed area - vessel enroute to St. Augustine.

1.0 INTRODUCTION

Applied Technology and Management, Inc. contracted Alpine Ocean Seismic Survey, Inc. to conduct a borrow area geotechnical investigation offshore of Hutchinson Island, Martin County, Florida as part of the Martin County Shore Protection Project.

Sixteen vibracore samples were collected during the field work period, November 15, 1993, through November 22, 1993, to depths of 20 feet below mudline, as specified in the scope of work. Table 1 lists the location of samples and water depths. The field work included positioning of the coring vessel for the proposed vibracore site, obtaining continuous core samples by pneumatic vibration and jetting to the proposed sampled depth below mudline; field logging of vibracore samples, obtaining penetrometer records (rate of penetration of coring tube into sediment) and recording of water depths at final coring locations. The field work was conducted aboard the AOSS-owned research vessel R/V "Atlantic Twin".

Scientific Environmental Application, Inc. of Melbourne, Florida was subcontracted by AOSS to perform the geotechnical evaluation, which included the laboratory testing program and the visual identification of the vibracore samples. At completion of the field vibracore sampling program, the field records, together with the vibracore tube samples were delivered to SEA's soils laboratory in Melbourne, Florida.

It should be noted that a representative of Applied Technology and Management, Inc. came on board the coring vessel to observe the coring operations.

2.0 EQUIPMENT

2.1 Survey Vessel

The R/V Atlantic Twin, a 90' steel catamaran hull research vessel with a 7-foot draft, was used as the platform for the vibracoring operations. The vessel has ample deck space, anchoring system, hydraulic crane, deck winches and A-Frame capability for vibracore operations. The navigational equipment, with associate computer, printer and display unit, was mounted in the pilot house. The vessel has sleeping facilities to accomodate crew and vibracore staff during the survey.

2.2 Positioning System

A Trimble 4000 (DL and RL) Differential GPS Navigation System was used throughout this operation. DGPS system consists of an 8-channel satellite receiver, radio data link receiver and modem on the vessel, a 12-channel satellite receiver, radio link transceiver and modem at the base station situated on a known position. The positions obtained by the base station were compared to its known position and corrections transmitted to the mobile unit on the vessel. The corrections are then applied to raw ranges received by the vessels receiver in order to calculate a correct position. The reference station was located atop the "Spoon Bill Condo" on the South end of Hutchinson Island.

2.3 Navigational Data Acquisition and Logging System

The WGS-84 geographic positions obtained by the GPS navigational system were converted into the local Forida state plane coordinate system (NAD 27) positions, using a computer and Sextant navigation software, version 8.09. The system consists of the following components:

1) Computer, 386 w/3.5" logging disks.

2) Color video monitor (Helmsman Display).

3) Printer.

4) Sextant closure box and software.

2.4 Vibracorer

A model 271B Alpine Pneumnatic Vibracorer, configured to take cores to 20 feet in length, was used on this project. The model 271B is a self-contained, free-standing pneumatic vibracore unit. The unit consists of an air-driven vibratory hammer assembly, an aluminum H-beam which acts as the vertical guide for the vibrator, a set of four steel support pads and legs which hold the beam upright on the ocean bottom, a steel coring pipe, a cutting edge, a core retainer, a clear plastic core liner,

and the penetrometer which records time and depth of penetration of the core pipe into the ocean bottom. An air hose array provides passage of compressed air from the air compressor on deck to drive the vibracorer.

2.5 Echosounder - Raytheon DE 719B

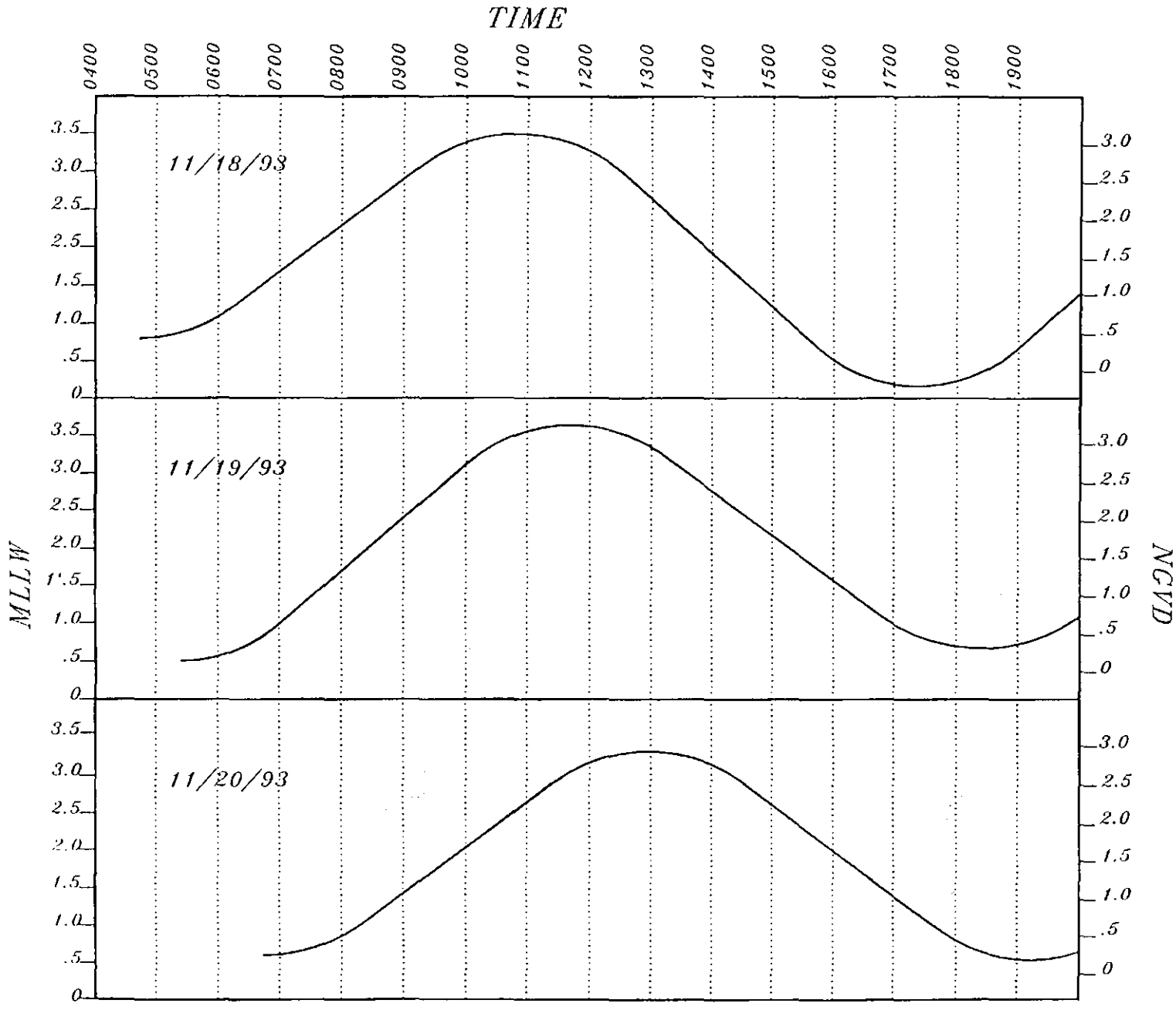
Water depths were recorded, using a Raytheon DE719B survey echosounder. The transducer for this unit operates at a frequency of 208 KHz, has a beam width of 8° and was hull-mounted.

The bathymetric data was recorded as an analog profile taken during each coring attempt.

Actual Tidal values provided by the National Oceanic and Atmospheric Administration office, Rockville, Maryland for Mayport, Florida, adjusted to Seminole Shores, were used to develope a Tide Curve. The Mean Lower Low Water (MLLW) NOS datum was corrected to NGVD 29 and applied to the analog profile, resulting in water depths corrected to NGVD. The U.S. Army C.O.E and National Ocean Service provided the variation from MLLW to NGVD 29 for the survey area. Figure 1 represents the resulting curve used to adjust the analog profile. Corrected elevations at each core location is listed in Table 1.

2.6 Personnel

Contract Manager	William T. McGuinness
Operations Manager	James F. Cole
Senior Driller	Chris Moore
Driller	Danny Spoon
Driller	Robert Cunningham
Navigator	Robert Mecarini
Shoreman	Steve Springer



TIDAL VARIATIONS

Mayport, Florida
Adjusted to:
Seminole Shores
Lat. 27° 11'
Long. 80° 09.5'
−58 min. x 0.70 at Highwater
−41 min. x 0.70 at Lowwater

Adjustment:
MLLW to NGVD
at St. Lucie Inlet

.35	NGVD	0
.14	MLW	−.21
0	MLLW	−.35

FIGURE 1

3.0 DATA PRESENTATION

FINAL VIBRACORE LOGS WITH UNIFIED SOIL CLASSIFICATION DESCRIPTIONS

Drilling Log

1. Project: Martin County Shore Protection Project	10. Size and Type of Bit
2. Location: 773065.0E 1048721.9N	11. Datum for Elevation Shown (TDM or MSL): NGVD *
3. Drilling Agency: Alpine Ocean Seismic Survey, Inc.	12. Manufacturer's Designation of Drill: Vibracore
4. Hole No. (As shown on drawing title): ATM 1	13. Total No. of Overburden Samples Taken: Disturbed / Undisturbed
5. Name of Driller: Chris Moore	14. Total No. of Core Boxes: 2
6. Direction of Hole: [X] Vertical [ ] Inclined _____ Degree from Vertical	15. Elevation Ground Water: Tidal
7. Thickness of Overburden	16. Date Hole: Started 11/18/93 / Completed 11/18/93
8. Depth Drilled into Rock	17. Elevation Top of Hole: -36.65
9. Total Depth of Hole: 16.2 ft	18. Total Core Recovery for Boring: %
	19. Signature of Inspector

Elevation (a)	Depth (b)	Legend (c)	Classification of Materials (Description) (d)	% Core Recovery (e)	Box or Sample No. (f)	Remarks (Drilling time, water loss, depth of weathering, if significant) (g)
-36.65	0	SP	Medium to coarse sand; shelly (50% carbonate shells); dark gray		1	
-37.85	1	SP	Silty, fine, gray sand; slightly shelly (10%)		2	1.2 ft
-38.65	2	SP	Medium to coarse, very shelly sand (50% carbonate shell); dark gray; scattered whole mollusk shells		3	2 ft
	3	SP	Fine, olive gray sand; poorly graded; scattered mollusk shell fragments (<10%)			
-40.65	4	GW	Shell hash/lag; 70% carbonate shell (whole to fragmented); medium to coarse, shelly sand matrix; well-graded		4	4 ft
	5	SW	Fine to coarse, very shelly (40%), olive gray to dark gray sand; very well-graded; large mollusk shell fragments			
-42.65	6	GW	Shell hash/lag; (60%–70% carbonate shells); large bivalve shells from 5.2 ft to 5.5 ft; silty, olive gray, fine sand matrix		5	6 ft
	7	SP	Fine sand; olive gray; poorly graded; scattered mollusk fragments (10%)			
		GW	Shell hash/lag; 80% carbonate shells; well-graded			
-44.65	8	SP	Brown, silty, fine sand; slightly shelly (25%); increasingly large mollusk shells toward the bottom		6	8 ft
	9	GW	Shell hash; fine, sandy matrix; well-graded; large bivalve shells abundant throughout			
-46.65	10				7	10 ft

ENG FORM 1836 Project Hole No.

*** Elevation shown is based on actual tide at Mayport and adjusted for Seminole Shores.**

Drilling Log (Cont Sheet)	Elevation Top of Hole -36.65	Hole No. ATM 1
Project ATM	Installation	Sheet of 2 Sheets

Elevation a	Depth b	Legend c	Classification of Materials (Description) d	% Core Recovery e	Box or Sample No. f	Remarks (Drilling time, water loss, depth of weathering, if significant) g
-46.65	10	GW	Shell hash; fine sandy matrix		7	10 ft
	11	Void		0%		
		SP	Medium to fine sand; tan color			
-48.65	12		Very shelly from11.8 ft to 12.7 ft		8	12 ft
		SP	Partially cemented from 13.1 ft to 13.4 ft			
	13		Medium to fine sand; tan color; partially cemented			
-50.65	14				9	14 ft
		SP	Partially to completely cemented from 14.7 ft to the bottom			
	15					
-52.65	16				10	16 ft
-52.85			Bottom 16.2 ft			
	17					
	18					
	19					
	20					
	21					

Drilling Log

1. Project: Martin County Shore Protection Project
2. Location: 774474.7E 1049378.5N
3. Drilling Agency: Alpine Ocean Seismic Survey, Inc.
4. Hole No. (As shown on drawing title): ATM 2/2R2
5. Name of Driller: Chris Moore
6. Direction of Hole: [X] Vertical [ ] Inclined _____ Degree from Vertical
7. Thickness of Overburden
8. Depth Drilled into Rock
9. Total Depth of Hole 15 ft
10. Size and Type of Bit
11. Datum for Elevation Shown (TDM or MSL): NGVD *
12. Manufacturer's Designation of Dril: Vibracore
13. Total No. of Overburden Samples Taken: Disturbed / Undisturbed
14. Total No. of Core Boxes: 2
15. Elevation Ground Water: Tidal
16. Date Hole: Started 11/18/93 / Completed 11/18/93
17. Elevation Top of Hole: -30.45
18. Total Core Recovery for Boring: %
19. Signature of Inspector

Elevation (a)	Depth (b)	Legend (c)	Classification of Materials (Description) (d)	% Core Recovery (e)	Box or Sample No. (f)	Remarks (Drilling time, water loss, depth of weathering, if significant) (g)
-30.45	0	SP	Medium to coarse, brown, shelly sand		1	
-31.65	1				2	1.2 ft
-32.45	2	SP	Medium to coarse, gray, shelly sand		3	2 ft
	3	SP	Very medium to coarse sand			
-34.45	4				4	4 ft
	5					
-36.45	6				5	6 ft
	7	SP	Large mollusk shell hash/lag at 7.2 ft to 7.4 ft			
-38.45	8				6	8 ft
	9					
-40.45	10	SP	Fine sand, shell layers		7	

* Elevation shown is based on actual tide at Mayport and adjusted for Seminole Shores.

Drilling Log (Cont Sheet)	Elevation Top of Hole -30.45	Hole No. ATM 2/2R2
Project ATM	Installation	Sheet 2 of 2 Sheets

Elevation a	Depth b	Legend c	Classification of Materials (Description) d	% Core Recovery e	Box or Sample No. f	Remarks (Drilling time, water loss, depth of weathering, if signficant) g
-40.45	10	SP	Fine, gray sand; shells sparse, poorly graded; local intervals of coarse shelly sand		7	10 ft
	11					
			Bottom ATM 2			
			Top ATM 2/2R2			
	11				8	11 ft
-42.35		SP	Medium to coarse sand; very shelly, brown sand			
	12					
-44.35	13				9	13 ft
	14					
		SP	Fine, gray, shelly sand; shell layers			
-46.35	15				10	15 ft
		SW	Fine to coarse shelly sand			
-47.35	16		Bottom 16 ft			
	17					
	18					
	19					
	20					

Drilling Log

1 of 2 Sheets

1. Project: Martin County Shore Protection Project
2. Location: 773361.8E 1047758.6N
3. Drilling Agency: Alpine Ocean Seismic Survey, Inc.
4. Hole No. (As shown on drawing title): ATM 3
5. Name of Driller: Chris Moore
6. Direction of Hole: [X] Vertical [ ] Inclined _____ Degree from Vertical
7. Thickness of Overburden
8. Depth Drilled into Rock
9. Total Depth of Hole: 16 ft
10. Size and Type of Bit
11. Datum for Elevation Shown (TDM or MSL): NGVD *
12. Manufacturer's Designation of Dril: Vibracore
13. Total No. of Overburden Samples Taken: Disturbed / Undisturbed
14. Total No. of Core Boxes: 2
15. Elevation Ground Water: Tidal
16. Date Hole: Started 11/19/93 / Completed 11/19/93
17. Elevation Top of Hole: -34.35
18. Total Core Recovery for Boring: %
19. Signature of Inspector

Elevation (a)	Depth (b)	Legend (c)	Classification of Materials (Description) (d)	% Core Recovery (e)	Box or Sample No. (f)	Remarks (Drilling time, water loss, depth of weathering, if significant) (g)
	0	Void		0%		Void 0.0 ft–0.15 ft
-34.85	1	SP	Silty, fine, dark olive gray sand interbedded with medium to coarse shelly, brown sand; well-graded		1	0.5 ft
		SP	Shelly (50%), medium to coarse sand; well-graded; distinct brown			
-36.35	2	SP	Fine to medium sand; mostly poorly graded; only slightly shelly (<10%); dark olive gray color; some interbeds of coarse, shelly sands (dark gray)		2	2 ft
	3	SP	Very shelly, medium to coarse sand; dark gray; carbonate shells (50%); fine, poorly graded, olive sand at 3.0 ft and 3.2 ft; olive green clay (inorganic) at 3.3 ft			
-38.35	4	GW	Coarse shell hash/lag; large mollusk shells scattered throughout; sandy matrix; carbonate shells (75%)		3	4 ft
	5	GW	White, silty, fine sand matrix from 4.5 ft to 4.8 ft			
-40.35	6				4	6 ft
	7	GW	Coarse shell hash/lag; large mollusk shells scattered throughout; significant muddy, silty, fine sand matrix (20%); well-graded			
-42.35	8	SW	Partially solidified, silty, fine, tan sand; very shelly; well-graded		5	8 ft
	9	SP	Partially solidified, fine, tan sand; less shelly (<5%); only few scattered mollusk shells; poorly graded			
-44.35	10				6	10 ft

ENG FORM 1836 Project Hole No.

*** Elevation shown is based on actual tide at Mayport and adjusted for Seminole Shores.**

Drilling Log (Cont Sheet)	Elevation Top of Hole -34.35	Hole No. ATM 3
Project ATM	Installation	Sheet 2 of 2 Sheets

Elevation a	Depth b	Legend c	Classification of Materials (Description) d	% Core Recovery e	Box or Sample No. f	Remarks (Drilling time, water loss, depth of weathering, if significant) g
-44.35	10	SP	Medium to fine, tan sand		6	10 ft
	11	Void		0%		
		SW				
-46.35	12		White color from12.4 ft to 12.9 ft		7	12 ft
	13		Very shelly; well graded (40% shells) from 13.0 ft to 13.3 ft			
			Very shelly from 13.5 ft to 14.2 ft			
-48.35	14				8	14 ft
		SW	Very shelly from 14.7 ft to 15.3 ft			
	15					
-50.35	16		White color; some silt from 15.6 ft to 16.0 ft		9	16 ft
			Bottom 16.0 ft			
	17					
	18					
	19					
	20					
	21					

Drilling Log

1. Project: Martin County Shore Protection Project
2. Location: 773440.7E 1047757.1N
3. Drilling Agency: Alpine Ocean Seismic Survey, Inc.
4. Hole No. (As shown on drawing title): ATM 4/4R2
5. Name of Driller: Chris Moore
6. Direction of Hole: [x] Vertical [ ] Inclined _____ Degree from Vertical
7. Thickness of Overburden
8. Depth Drilled into Rock
9. Total Depth of Hole: 14.7 ft
10. Size and Type of Bit
11. Datum for Elevation Shown (TDM or MSL): NGVD *
12. Manufacturer's Designation of Drill: Vibracore
13. Total No. of Overburden Samples Taken: Disturbed | Undisturbed
14. Total No. of Core Boxes: 2
15. Elevation Ground Water: Tidal
16. Date Hole: Started 11/19/93 | Completed 11/19/93
17. Elevation Top of Hole: -36.85
18. Total Core Recovery for Boring: %
19. Signature of Inspector

Elevation (a)	Depth (b)	Legend (c)	Classification of Materials (Description) (d)	% Core Recovery (e)	Box or Sample No. (f)	Remarks (Drilling time, water loss, depth of weathering, if significant) (g)
-36.85	0	SP	Medium to coarse sand; very shelly (60% carbonate shells); large whole mollusk shells scattered; well-graded		1	
	1					
-38.85	2	SP	Medium to coarse, shelly sand; large mollusk shells common throughout; dark gray color		2	2 ft
	3					
-40.85	4				3	4 ft
		SP	Fine sand; shell fragments			
	5	Void		Void 0%		
		GW	Shell lag; fine sand			
-42.85	6	SW	Interbedded fine, gray sand and coarse, shelly sand (shells up to 60%); well-graded; olive gray to dark gray; large mollusk shells		4	6 ft
	7					
-44.85	8				5	8 ft
	9	GW	Shell lag and silty gray–olive sand			
		SW	Very shelly, medium to fine, gray sand			
	10					

* Elevation shown is based on actual tide at Mayport and adjusted for Seminole Shores.

Drilling Log (Cont Sheet)	Elevation Top of Hole -36.85	Hole No. ATM 4/4R2
Project ATM	Installation	Sheet 2 of 2 Sheets

Elevation a	Depth b	Legend c	Classification of Materials (Description) d	% Core Recovery e	Box or Sample No. f	Remarks (Drilling time, water loss, depth of weathering, if significant) g
-46.85	10	SW	Gray to white, fine sand and shell; partially cemented below 10.8 ft; most of sediment cemented; fine, silty (20%), white sand; shelly from 13.0 ft to 13.4 ft and from 13.7 ft to 13.9 ft		6	Pleistocene "bedrock"
	11					
-48.85	12	SW			7	12 ft
	13					
-50.85	14		Bottom ATM 4		8	14 ft
	15		Top ATM 4R2			
-50.55	14	GW	Semi-solidified shell lag; large bivalve fragments; well-graded; silty, white, fine sand matrix		9	14 ft
	15	SW	Cemented, fine to medium white/ tan, silty sand; shells up to 50%; less shelly from 15.9 ft to 16.3 ft; well-graded throughout			
-52.55	16				10	16 ft
-53.55	17	SP	Silty, fine, white sand; poorly graded; only slightly shelly (<10%); not solidified		11	17 ft
	18	SW	Cemented, shelly, silty, fine, white sand (shells 20%); well-graded			
-54.85	19		Bottom 18.3 ft			

Drilling Log

1. Project: Martin County Shore Protection Project
2. Location: 773812.7E 1046896.8N
3. Drilling Agency: Alpine Ocean Seismic Survey, Inc.
4. Hole No. (As shown on drawing title): ATM 5
5. Name of Driller: Chris Moore
6. Direction of Hole: [x] Vertical [ ] Inclined _____ Degree from Vertical
7. Thickness of Overburden
8. Depth Drilled into Rock
9. Total Depth of Hole: 17 ft
10. Size and Type of Bit
11. Datum for Elevation Shown (TDM or MSL): NGVD *
12. Manufacturer's Designation of Drill: Vibracore
13. Total No. of Overburden Samples Taken: Disturbed / Undisturbed
14. Total No. of Core Boxes: 2
15. Elevation Ground Water: Tidal
16. Date Hole: Started 11/19/93 / Completed 11/19/93
17. Elevation Top of Hole: -36.8
18. Total Core Recovery for Boring: %
19. Signature of Inspector

Elevation (a)	Depth (b)	Legend (c)	Classification of Materials (Description) (d)	% Core Recovery (e)	Box or Sample No. (f)	Remarks (Drilling time, water loss, depth of weathering, if significant) (g)
-36.8	0	Void		0%		
-37.8	1	SP	Fine, dark olive gray sand; scattered mollusk shell fragments (<5%); poorly graded		1	
-38.8	2	SW	Fine, silty, dark olive gray sand interbedded with coarse shelly sand (40% carbonate shells); well-graded		2	2 ft
	3	SP	Shelly, medium to coarse sand; very well-graded; dark gray; shell lag at 2.8 ft to 3.0 ft			
-40.8	4	GW	Shell hash/lag; very large bivalve shells (whole) from 3.8 ft to 4.5 ft; well-graded; matrix is silty, fine olive gray sand (20% at top)		3	4 ft
	5	SP	Fine, tan sand; slightly shelly (30%)			
-42.8	6	SP	Fine, olive gray, shelly sand; shells highly fragmented		4	6 ft
	7	SP	Fine, tan sand interbedded with olive gray, shelly sand			
-44.8	8	SP	Fine sand; shells <10%; color gray at top grades to gray-white at bottom		5	8 ft
	9	SP	Partially cemented, fine, tan sand; mostly poorly graded; shelly horizons from 10.6 ft to 12 ft			
-46.8	10				6	10 ft

* Elevation shown is based on actual tide at Mayport and adjusted for Seminole Shores.

Drilling Log (Cont Sheet)	Elevation Top of Hole -36.8	Hole No. ATM 5
Project ATM	Installation	Sheet 2 of 2 Sheets

Elevation	Depth	Legend	Classification of Materials (Description)	% Core Recovery	Box or Sample No.	Remarks (Drilling time, water loss, depth of weathering, if significant)
a	b	c	d	e	f	g
-46.8	10	SP	Partially cemented, fine, tan sand; mostly poorly graded; shelly layers 10.6 ft to 12.0 ft		6	10 ft
	11					
-48.8	12		Very silty 12.0 ft to 13.3. ft (40%)		7	12 ft
		SP				
	13		Very shelly (30%–50%) from 13.3 ft to 15.0 ft mostly			
-50.8	14				8	14 ft
	15					
		SP	Mostly cemented below 15.5 ft			
-52.8	16				9	16 ft
-53.8	17		Bottom 17 ft			
	18					
	19					
	20					
	21					

Drilling Log

1 of 2 Sheets

1. Project	Martin County Shore Protection Project
2. Location	775579.4E 1047179.3N
3. Drilling Agency	Alpine Ocean Seismic Survey, Inc.
4. Hole No. (As shown on drawing title)	ATM 6/6R2
5. Name of Driller	Chris Moore
6. Direction of Hole	[x] Vertical [ ] Inclined _____ Degree from Vertical
7. Thickness of Overburden	
8. Depth Drilled into Rock	
9. Total Depth of Hole	18 ft
10. Size and Type of Bit	
11. Datum for Elevation Shown (TDM or MSL)	NGVD *
12. Manufacturer's Designation of Dril	Vibracore
13. Total No. of Overburden Samples Taken	Disturbed / Undisturbed
14. Total No. of Core Boxes	2
15. Elevation Ground Water	Tidal
16. Date Hole	Started 11/19/93 / Completed 11/19/93
17. Elevation Top of Hole	-29.75
18. Total Core Recovery for Boring	%
19. Signature of Inspector	

Elevation (a)	Depth (b)	Legend (c)	Classification of Materials (Description) (d)	% Core Recovery (e)	Box or Sample No. (f)	Remarks (Drilling time, water loss, depth of weathering, if significant) (g)
-29.75	0	SP	Medium to coarse sand; very shelly (50% carbonate); shells highly fragmented; well-graded; distinct brown color		1	
	1					
-31.75	2				2	2 ft
	3					
-33.75	4	SP	Fine sand; poorly graded; olive gray; <5% carbonate shells		3	4 ft
		SW	Fine to coarse sand; very well-graded; olive to dark gray; 10% carbonate shells; shells mostly fragmented; 10% silt			
	5	SP	Very shelly (60% carbonate shells); medium to coarse, dark gray sand			
		GW	Shell lag (75% carbonate shells); increasingly silty; olive gray, fine sand matrix toward bottom			
-35.75	6				4	6 ft
		SP	Dark brownish gray, very shelly, medium to coarse sand (40% carbonate shells); scattered whole bivalve shells; mostly highly fragmented shells; some silt; well-graded			
	7					
		SP	Distinct brownish, very shelly, medium to coarse sand; very well-graded; scattered large whole to fragmented mollusk/echimid fragments			
-37.75	8				5	8 ft
	9	SP	50% shells below 8–9 ft (color change to dark gray)			
-39.75	10					

ENG FORM 1836 Project Hole No.

*** Elevation shown is based on actual tide at Mayport and adjusted for Seminole Shores.**

Drilling Log (Cont Sheet)	Elevation Top of Hole -29.75	Hole No. ATM 6/6R2
Project ATM	Installation	Sheet of 2 Sheets 2

Elevation a	Depth b	Legend c	Classification of Materials (Description) d	% Core Recovery e	Box or Sample No. f	Remarks (Drilling time, water loss, depth of weathering, if signficant) g
-39.75	10	SW	Large bivalve shells (whole) from 10.7 ft to 13.0 ft; very shelly (75%) below 10.7 ft; almost a shell lag (gravel) toward bottom; brownish gray colory; very well-graded		6	10 ft
-41.75	11					
	12	SW			7	12 ft
-42.75	13		Bottom ATM 6		8	13 ft
	13		Top ATM 6R2		9	13 ft
-43.0	14	SP	Olive gray, fine sand; poorly graded; scattered mollusk shell fragments (5%)			
-45.0	15	SW	Shelly, fine sand; very well-graded; shells highly fragmented		10	15 ft
-46.0	16		Bottom 16.0 ft			
	17					
	18					
	19					
	1919					

Drilling Log | 1 of 2 Sheets

1. Project: Martin County Shore Protection Project	10. Size and Type of Bit
2. Location: 774682.8E 1049962.5N	11. Datum for Elevation Shown (TDM or MSL): NGVD *
3. Drilling Agency: Alpine Ocean Seismic Survey, Inc.	12. Manufacturer's Designation of Dril: Vibracore
4. Hole No. (As shown on drawing title): ATM 7	13. Total No. of Overburden Samples Taken: Disturbed / Undisturbed
5. Name of Driller: Chris Moore	14. Total No. of Core Boxes: 2
6. Direction of Hole: [x] Vertical [ ] Inclined ____ Degree from Vertical	15. Elevation Ground Water: Tidal
7. Thickness of Overburden	16. Date Hole: Started 11/18/93 / Completed 11/18/93
8. Depth Drilled Into Rock	17. Elevation Top of Hole: -24.1
9. Total Depth of Hole: 16 ft	18. Total Core Recovery for Boring: %
	19. Signature of Inspector

Elevation (a)	Depth (b)	Legend (c)	Classification of Materials (Description) (d)	% Core Recovery (e)	Box or Sample No. (f)	Remarks (Drilling time, water loss, depth of weathering, if signficant) (g)
-24.1	0	SP	Sand, medium to coarse, gray shelly; shells fragmented Brown at top grades to gray at 2 ft		1	
-25.1	1				2	1 ft
-26.1	2				3	2 ft
	3					
-28.1	4				4	4 ft
	5					
-30.1	6	SP	Sand, medium to coarse, brown/ gray, shelly; shells fragmented		5	6 ft
	7					
-32.1	8				6	8 ft
	9	SP	Sand, fine, light gray; no shells			
-34.1	10	GW	Shell hash (gravel), some medium to coarse sand, fragmented to whole mollusk shells, well-graded; coarse at the top, finer; brown color at bottom		7	10 ft

ENG FORM 1836 Project Hole No.

*** Elevation shown is based on actual tide at Mayport and adjusted for Seminole Shores.**

Drilling Log (Cont Sheet)	Elevation Top of Hole 24.1	Hole No. ATM 7
Project ATM	Installation	Sheet 2 of 2 Sheets

Elevation a	Depth b	Legend c	Classification of Materials (Description) d	% Core Recovery e	Box or Sample No. f	Remarks (Drilling time, water loss, depth of weathering, if signficant) g
-34.1	10	SP	Sand, medium to coarse, dark gray, shelly; shells fragmented; increase in fine sand at 11 ft		7	10 ft
	11					
-36.1	12				8	12 ft
	13	GW	Shell hash, some medium to coarse sand; well-graded; fragmented to whole mollusk shells			
-38.1	14	SP	Sand, very fine, gray, scattered mollusk fragments (rare), poorly graded (SP)		9	14 ft
	15					
-40.1	16				10	16 ft
	17		Bottom 16 ft			
	18					
	19					
	20					
	21					

Drilling Log

1. Project: Martin County Shore Protection Project
2. Location: 775130.9E 1049119.2N
3. Drilling Agency: Alpine Ocean Seismic Survey, Inc.
4. Hole No. (As shown on drawing title): ATM 8/8R2
5. Name of Driller: Chris Moore
6. Direction of Hole: [x] Vertical [ ] Inclined _____ Degree from Vertical
7. Thickness of Overburden
8. Depth Drilled Into Rock
9. Total Depth of Hole: 17.7 ft
10. Size and Type of Bit
11. Datum for Elevation Shown (TDM or MSL): NGVD *
12. Manufacturer's Designation of Drill: Vibracore
13. Total No. of Overburden Samples Taken: Disturbed / Undisturbed
14. Total No. of Core Boxes: 2
15. Elevation Ground Water: Tidal
16. Date Hole: Started 11/18/93 Completed 11/18/93
17. Elevation Top of Hole: 22.55
18. Total Core Recovery for Boring: %
19. Signature of Inspector

Elevation (a)	Depth (b)	Legend (c)	Classification of Materials (Description) (d)	% Core Recovery (e)	Box or Sample No. (f)	Remarks (Drilling time, water loss, depth of weathering, if significant) (g)
-22.55	0	SP	Sand, medium to coarse, very shelly; shells highly fragmented; sand well-graded (SW); black to brown		1	
	1				2	1 ft
-24.55	2				2	2 ft
	3		Sand, medium to coarse, very shelly; shells highly fragmented; sand well-graded; black to brown; scattered large mollusk shells			
-26.55	4				3	4 ft
	5	SP				
-28.55	6				4	6 ft
	7		Sand, medium to coarse, very shelly; shells highly fragmented; scattered large mollusk shells (whole); sand well-graded (SW); black			
-30.55	8	SP			5	8 ft
	9					
-32.55	10				6	10 ft

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ENG FORM 1836 Project Hole No.

* Elevation shown is based on actual tide at Mayport and adjusted for Seminole Shores.

Drilling Log (Cont Sheet)	Elevation Top of Hole 22.55	Hole No. ATM 8/8R2
Project ATM	Installation	Sheet of 2 Sheets 2

Elevation a	Depth b	Legend c	Classification of Materials (Description) d	% Core Recovery e	Box or Sample No. f	Remarks (Drilling time, water loss, depth of weathering, if signficant) g
-32.55	10	SP	Medium to coarse sand, shelly; shells highly fragmented; scattered large mollusk shells; sand color—brown to black		6	10 ft
	11	SP	Fine to medium sand; poorly graded; well-graded at bottom, gray scattered mollusk shells (whole). (less shelly)			
-34.55	12		Bottom ATM 8		7	12 ft
	11		Top ATM 8R2			
-33.25		SP	Medium to coarse sand; very shelly; shells highly fragmented		8	11 ft
-34.25	12				9	12 ft
		SP	Fine sand; poorly graded; gray; scattered mollusk shells (whole); some silt			
	13	SW	Medium to coarse sand; well-graded; very shelly; shells highly fragmented			
-36.25	14	SP	Fine sand; some gray; poorly graded; scattered mollusk shells		10	14 ft
	15					
		GW	Shell lag; well-graded; many large mollusk shells (bivalves)		11	16 ft
-38.25	16	SW	Medium to coarse sand; well-graded; very shelly; shells highly fragmented; dark gray to black color			
	17	SP	Fine sand; some silt (<10%); gray; poorly graded; slightly shelly; scattered whole mollusk shells			
-39.95					12	17.7 ft
	18		Bottom 17.7 ft			
	19					

Drilling Log

1. Project: Martin County Shore Protection Project
2. Location: 774202.2E 1048363.4N
3. Drilling Agency: Alpine Ocean Seismic Survey, Inc.
4. Hole No. (As shown on drawing title): ATM 9
5. Name of Driller: Chris Moore
6. Direction of Hole: [X] Vertical [ ] Inclined _____ Degree from Vertical
7. Thickness of Overburden
8. Depth Drilled Into Rock
9. Total Depth of Hole: 19.2 ft
10. Size and Type of Bit
11. Datum for Elevation Shown (TDM or MSL): NGVD *
12. Manufacturer's Designation of Drill: Vibracore
13. Total No. of Overburden Samples Taken: Disturbed / Undisturbed
14. Total No. of Core Boxes: 2
15. Elevation Ground Water: Tidal
16. Date Hole: Started 11/18/93 / Completed 11/18/93
17. Elevation Top of Hole: 36.75
18. Total Core Recovery for Boring: %
19. Signature of Inspector

Elevation (a)	Depth (b)	Legend (c)	Classification of Materials (Description) (d)	% Core Recovery (e)	Box or Sample No. (f)	Remarks (Drilling time, water loss, depth of weathering, if signficant) (g)
-36.75	0	SP	Medium to coarse sand; very shelly; distinct brown color until 0.7 ft; brownish gray below 0.7 ft; scattered large mollusk shells throughout		1	
	1					
-38.75	2	SP	Some interbedded silty, gray sand (local)		2	2 ft
	3	SP	Very shelly 3.4 ft to 3.6 ft			
-40.75	4		Very shelly 4.2 ft to 4.9 ft (70% carbonate shells); large bivalve shells (whole); dark gray color		3	4 ft
	5	CL	Clay; inorganic; olive gray (4.9 ft to 5.1 ft)			
-42.75	6	SP	Very shelly; medium to coarse sand; well graded; large mollusk shells abundant (whole); increasingly fine olive gray sand below 6.6 ft		4	6 ft
	7	GW	Shell lag; significant fine, silty, olive gray matrix (30%); well-graded			
		SP	Very shelly, medium to coarse, dark gray sand (70% carbonate)			
-44.75	8	SP	Very fine, silty (20%) sand; white; mottled with black shell fragments		5	8 ft
		GW	Shell layers interbedded with olive gray clay toward bottom; well-graded			
	9	SW	Shelly, fine sand			
			Void	Void 0%		
	10					

* Elevation shown is based on actual tide at Mayport and adjusted for Seminole Shores.

Drilling Log (Cont Sheet)	Elevation Top of Hole 36.75	Hole No. ATM 9
Project ATM	Installation	Sheet of 2 2 Sheets

Elevation a	Depth b	Legend c	Classification of Materials (Description) d	% Core Recovery e	Box or Sample No. f	Remarks (Drilling time, water loss, depth of weathering, if significant) g
-46.75	10	Void		Void 0%		
		GW	Coarse mollusk shell lag (75%); interbeds of olive gray and white, silty, fine sand (matrix); very well-graded throughout; shells fragmented to whole		6	11 ft
-47.75	11					
					7	12 ft
-48.75	12					
	13	SP	Fine, white sand; slightly shelly; black fragments			
-50.75	14				8	14 ft
		Void		Void 0%		
	15	GW	Shell lag mixed with fine sand, shell fragments, and whole shells			
-52.75	16	SP	Shelly, fine, olive gray sand		9	16 ft
		SW	Cemented shell and fine, white sand shells; highly fragmented			
	17					
-54.75	18				10	18 ft
		SW				
	19					
-55.95			Bottom 19.2 ft			
	20					
	21					

Drilling Log

1 of 2 Sheets

1. Project: Martin County Shore Protection Project
2. Location: 775489.2E 1048260.1N
3. Drilling Agency: Alpine Ocean Seismic Survey, Inc.
4. Hole No. (As shown on drawing title): ATM 10/10R2
5. Name of Driller: Chris Moore
6. Direction of Hole: [x] Vertical [ ] Inclined _____ Degree from Vertical
7. Thickness of Overburden
8. Depth Drilled into Rock
9. Total Depth of Hole: 12.7 ft
10. Size and Type of Bit
11. Datum for Elevation Shown (TDM or MSL): NGVD *
12. Manufacturer's Designation of Dril: Vibracore
13. Total No. of Overburden Samples Taken — Disturbed — Undisturbed
14. Total No. of Core Boxes: 2
15. Elevation Ground Water: Tidal
16. Date Hole — Started: 11/19/93 — Completed: 11/19/93
17. Elevation Top of Hole: -21.15
18. Total Core Recovery for Boring: %
19. Signature of Inspector

Elevation (a)	Depth (b)	Legend (c)	Classification of Materials (Description) (d)	% Core Recovery (e)	Box or Sample No. (f)	Remarks (Drilling time, water loss, depth of weathering, if significant) (g)
-21.15	0	SP	Medium to coarse sand, angular; black to brown; very shelly; shells highly fragmented		1	
	1					
	2	SP				
-23.85					2	2.7 ft
	3					
-25.15	4		Graduated contact		3	4 ft
	5	SP	Medium sand; coarse below 5.0 ft; less shelly at top; very shelly toward bottom; gray; shells highly fragmented			
-27.15	6		Sharp contact		4	6 ft
-28.15	7	SP	Fine to medium sand; less shelly; poorly graded; gray; increasingly coarse and shelly toward 8.5 ft		5	7 ft
-29.15	8		Graduated contact		6	8 ft
	9	SP	Medium to coarse sand; very shelly; color change to brown at 8.9 ft			
-31.15	10				7	

ENG FORM 1836 — Project — Hole No.

* Elevation shown is based on actual tide at Mayport and adjusted for Seminole Shores.

Drilling Log (Cont Sheet)	Elevation Top of Hole -21.15	Hole No. ATM 10/10R2
Project ATM	Installation	Sheet 2 of 2 Sheets

Elevation a	Depth b	Legend c	Classification of Materials (Description) d	% Core Recovery e	Box or Sample No. f	Remarks (Drilling time, water loss, depth of weathering, if signficant) g
-31.15	10	SP	Medium to fine, gray sand; shell fragments and shell layers			
	11					
-33.15	12	SW	Fine, gray sand mixed with coarse shell		8	12 ft
-33.85			Bottom ATM 10			
			Top ATM 10/10R2			
-32.05	11	SW	Medium to coarse sand; shelly (40% carbonate); well graded; gray; interbedded fine sands; shells highly fragemented		9	11 ft
	12					
	13					
-34.45		SP	Fine sand, poorly graded; gray; interbedded coarse, shelly sand at 14.2 ft to 14.4 ft; slight coarsening in sand at 14.8 ft; 10% silt		10	13.4 ft
-35.05	14				11	14 ft
	15		Interbed of coarse, black sand at 15.0 ft to 16.0 ft			
-37.05	16	SP	Interbed of coarse, shelly sand at 16.0 ft to 17.0 ft		12	16 ft 20% carbonate at 16.0 ft to 17.0 ft
-38.05	17	SP	Interbed of large mollusk fragments; shelly sand at 17.2 ft to 17.4 ft			
-39.05	18				13	18 ft
			Bottom 18.4 ft			
	19					

Drilling Log

1. Project: Martin County Shore Protection Project
2. Location: 775467.0E 1049908.0N
3. Drilling Agency: Alpine Ocean Seismic Survey, Inc.
4. Hole No. (As shown on drawing title): ATM A
5. Name of Driller: Chris Moore
6. Direction of Hole: [x] Vertical [ ] Inclined _____ Degree from Vertical
7. Thickness of Overburden
8. Depth Drilled into Rock
9. Total Depth of Hole: 16.3 ft
10. Size and Type of Bit
11. Datum for Elevation Shown (TDM or MSL): NGVD *
12. Manufacturer's Designation of Drill: Vibracore
13. Total No. of Overburden Samples Taken: Disturbed / Undisturbed
14. Total No. of Core Boxes: 2
15. Elevation Ground Water: Tidal
16. Date Hole: Started 11/20/93 / Completed 11/20/93
17. Elevation Top of Hole: 34.55
18. Total Core Recovery for Boring: %
19. Signature of Inspector

Elevation (a)	Depth (b)	Legend (c)	Classification of Materials (Description) (d)	% Core Recovery (e)	Box or Sample No. (f)	Remarks (Drilling time, water loss, depth of weathering, if significant) (g)
-34.55	0	SP	Medium to coarse sand; very shelly; shells highly fragmented; brown color		1	
-35.55	1				2	1.3 ft
-36.55	2				3	2 ft
	3	GW	Shell hash; whole to broken shell fragments; some coarse sand; well graded			
-38.55	4	SP	Medium to fine, gray sand; layers of coarse shelly sand		4	4 ft
	5	SP	Medium to coarse shelly sand			
-40.55	6				5	6 ft
-41.55	7	GW	Shell hash; large, whole to fragmented mollusk shells; well-graded (80% carbonates); some coarse sand; dark gray		6	7 ft
-42.55	8	SP	Fine sand; poorly graded; scattered mollusk shells; some interbeds of coarse shelly sand; gray color		7	8 ft
	9					
-44.55	10	SW	Coarse, shelly sand; dark gray; becomes very shelly at 9.9 ft; well graded		8	10 ft

* Elevation shown is based on actual tide at Mayport and adjusted for Seminole Shores.

Drilling Log (Cont Sheet)	Elevation Top of Hole -34.55	Hole No. ATM A
Project ATM	Installation	Sheet 2 of 2 Sheets

Elevation a	Depth b	Legend c	Classification of Materials (Description) d	% Core Recovery e	Box or Sample No. f	Remarks (Drilling time, water loss, depth of weathering, if significant) g
-44.55	10	SW	Coarse, shelly sand; dark gray; well graded; poorly graded, gray sand layer at 10.8 ft to 11.0 ft		8	10 ft
	11					
-46.55	12	SP	Poorly graded; scattered bivalve shells; large shells at 12.8 ft; some interbedded coarse, shelly sand from 12 ft to 12.5 ft; dark gray		9	12 ft
	13					
-48.55	14	SW	Solidified, fine shelly sand; silty (30%); 30% carbonate shells; well-graded; interbedded with coarse, shelly hash; color change to white at 14.6 ft		10	14 ft
	15					
-50.55	16	SW	Hard, white, calcareous, shelly, fine sand (marl?); 50% carbonate at bottom		11	16 ft
-50.85			Bottom 16.3 ft			
	17					
	18					
	19					
	20					
	21					

Drilling Log

1 of 2 Sheets

1. Project: Martin County Shore Protection Project
2. Location: 775996.1E 1048869.4N
3. Drilling Agency: Alpine Ocean Seismic Survey, Inc.
4. Hole No. (As shown on drawing title): ATM B
5. Name of Driller: Chris Moore
6. Direction of Hole: [x] Vertical [ ] Inclined _____ Degree from Vertical
7. Thickness of Overburden
8. Depth Drilled into Rock
9. Total Depth of Hole: 17.3 ft
10. Size and Type of Bit
11. Datum for Elevation Shown (TDM or MSL): NGVD *
12. Manufacturer's Designation of Drill: Vibracore
13. Total No. of Overburden Samples Taken: Disturbed / Undisturbed
14. Total No. of Core Boxes: 2
15. Elevation Ground Water: Tidal
16. Date Hole: Started 11/20/93 / Completed 11/20/93
17. Elevation Top of Hole: 35.1
18. Total Core Recovery for Boring: %
19. Signature of Inspector

Elevation (a)	Depth (b)	Legend (c)	Classification of Materials (Description) (d)	% Core Recovery (e)	Box or Sample No. (f)	Remarks (Drilling time, water loss, depth of weathering, if signficant) (g)
-35.1	0	SP	Medium to coarse, brown sand; very shelly		1	
	1		Gray, fine sand; fewer shells			
-37.1	2				2	2.3 ft
	3	SP				
-39.1	4				3	4 ft
	5	SP	Medium to coarse, dark gray sand; shell layers from 5.2 ft to 5.5 ft and 5.6 ft to 6.2 ft (large mollusk and echinoid fragments and some whole shells)			
-41.1	6				4	6 ft
		SP	Fine to medium sand; gray; poorly graded; interbedded with coarse shelly sands; increasingly shelly toward bottom			
	7	SW	Coarse, shelly sand; dark gray; 60% carbonate shells; well-graded; shells fragmented			
-43.1	8				5	8 ft
		SP	Fine to medium sand; muddy gray; poorly graded; scattered mollusk shells to 8.8 ft; very shelly from 8.4 ft to 8.8 ft; shells are rare below 8.8 ft; silt 20%–30%; fine sand below 8.8 ft			
	9	SM				
-45.1	10				6	10 ft

ENG FORM 1836 Project Hole No.

*** Elevation shown is based on actual tide at Mayport and adjusted for Seminole Shores.**

Drilling Log (Cont Sheet)	Elevation Top of Hole -35.1	Hole No. ATM B
Project ATM	Installation	Sheet 2 of 2 Sheets

Elevation a	Depth b	Legend c	Classification of Materials (Description) d	% Core Recovery e	Box or Sample No. f	Remarks (Drilling time, water loss, depth of weathering, if significant) g
-45.1	10	SP	Fine sand; mollusk shells rare; poorly graded; muddy gray color		6	10 ft
	11					
-47.1	12				7	12 ft
	13	SM	Mudd fine sand; shell layers from 14.0 ft to 14.3 ft			
-49.1	14				8	14 ft
		CL	Clay; dark muddy brown; no shells			
	15	GW	Shell lag; shells mostly whole; some fine sand to silt as matrix; well-graded; carbonate 80%			
-51.1	16	SP	Fine sand; poorly graded; interbedded with coarse, shelly sand; muddy gray		9	16 ft
		SW	Cemented fine sand and mollusk shells			Pleistocene "bedrock"
	17					
-52.4			Bottom 17.3 ft			
	18					
	19					
	20					
	21					

Drilling Log

1. Project: Martin County Shore Protection Project
2. Location: 776426.1E 1047923.2N
3. Drilling Agency: Alpine Ocean Seismic Survey, Inc.
4. Hole No. (As shown on drawing title): ATM C
5. Name of Driller: Chris Moore
6. Direction of Hole: [x] Vertical [ ] Inclined _____ Degree from Vertical
7. Thickness of Overburden
8. Depth Drilled into Rock
9. Total Depth of Hole: 15 ft
10. Size and Type of Bit
11. Datum for Elevation Shown (TDM or MSL): NGVD *
12. Manufacturer's Designation of Drill: Vibracore
13. Total No. of Overburden Samples Taken: Disturbed / Undisturbed
14. Total No. of Core Boxes: 2
15. Elevation Ground Water: Tidal
16. Date Hole: Started 11/20/93 / Completed 11/20/93
17. Elevation Top of Hole: -33.3
18. Total Core Recovery for Boring: %
19. Signature of Inspector

Elevation (a)	Depth (b)	Legend (c)	Classification of Materials (Description) (d)	% Core Recovery (e)	Box or Sample No. (f)	Remarks (Drilling time, water loss, depth of weathering, if significant) (g)
-33.3	0	SP	Medium to coarse, very shelly sand; fragmented; brown color	Void	1	
	1					
-35.3	2				2	2 ft
	3					
-37.3	4	SP	Fine sand; poorly graded; mollusk shells rare (<10% carbonate shells); interbedded with medium to coarse shelly sand locally; gray color		3	4 ft
	5	SP	Increasing medium to coarse, shelly sand (dark gray) from 5.7 ft to 6.4 ft; interbeds			
-39.3	6				4	6 ft
	7	SP	Medium to coarse, very shelly sand; dark gray; carbonate shells			
-41.3	8	SP	Fine sand; poorly graded; interbedded medium sand; shell layer at 7.9 ft to 8.0 ft; interbedded coarse, shelly sand from 8.0 ft to 8.5 ft		5	
	9	SW	Fine to coarse, well-graded sand; gray; mollusk shells abundant (up to 60% carbonates); shells nearly whole; interbedded fine sand from 9.5 ft to 9.7 ft			
-43.3	10				6	10 ft

* Elevation shown is based on actual tide at Mayport and adjusted for Seminole Shores.

Drilling Log (Cont Sheet)	Elevation Top of Hole -33.3	Hole No. ATM C
Project ATM	Installation	Sheet 2 of 2 Sheets

Elevation a	Depth b	Legend c	Classification of Materials (Description) d	% Core Recovery e	Box or Sample No. f	Remarks (Drilling time, water loss, depth of weathering, if signficant) g
-43.3	10	SW			6	10 ft
		SP	Fine sand; gray; poorly graded; <10% carbonate shells			
	11	SW	Coarse, shelly sand; carbonate shells; large, nearly whole mollusk shells; well-graded; gray color			
		SP	Fine sand; gray; scattered mollusk shells; fragmented; poorly graded; muddy gray			
-45.3	12				7	12 ft
		SP	Silty, fine sand; gray; poorly graded; scattered mollusk shells			
	13					
		SP	Large mollusk shells at 13.6 ft to 14.0 ft			
-47.3	14				8	14 ft
		GW	Shell hash/lag; shells decreasing to 40% at bottom; fine to coarse sand matrix; well-graded; brownish color			
-48.3	15		Bottom 15 ft			
	16					
	17					
	18					
	19					
	20					
	21					

Drilling Log

1 of 2 Sheets

1. Project: Martin County Shore Protection Project
2. Location: 776319.0E 1046976.0N
3. Drilling Agency: Alpine Ocean Seismic Survey, Inc.
4. Hole No. (As shown on drawing title): ATM D/DR2
5. Name of Driller: Chris Moore
6. Direction of Hole: [X] Vertical [ ] Inclined _____ Degree from Vertical
7. Thickness of Overburden
8. Depth Drilled into Rock
9. Total Depth of Hole: 14 ft
10. Size and Type of Bit
11. Datum for Elevation Shown (TDM or MSL): NGVD *
12. Manufacturer's Designation of Dril: Vibracore
13. Total No. of Overburden Samples Taken: Disturbed / Undisturbed
14. Total No. of Core Boxes: 2
15. Elevation Ground Water: Tidal
16. Date Hole: Started 11/20/93 / Completed 11/20/93
17. Elevation Top of Hole: -23.1
18. Total Core Recovery for Boring: %
19. Signature of Inspector

Elevation (a)	Depth (b)	Legend (c)	Classification of Materials (Description) (d)	% Core Recovery (e)	Box or Sample No. (f)	Remarks (Drilling time, water loss, depth of weathering, if signficant) (g)
-23.1	0	SP	Medium to coarse, shelly sand; brown		1	
	1					
-25.1	2				2	2 ft
	3					
-27.1	4	SP			3	4 ft
	5		Medium to coarse, shelly sand			
-29.1	6				4	6 ft
	7		Medium to coarse, gray, shelly sand			
-31.1	8				5	8 ft
	9					
-33.1	10				6	10 ft

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ENG FORM 1836 — Project — Hole No.

* Elevation shown is based on actual tide at Mayport and adjusted for Seminole Shores.

Drilling Log (Cont Sheet)	Elevation Top of Hole -23.1	Hole No. ATM D/DR2
Project ATM	Installation	Sheet 2 of 2 Sheets

Elevation a	Depth b	Legend c	Classification of Materials (Description) d	% Core Recovery e	Box or Sample No. f	Remarks (Drilling time, water loss, depth of weathering, if significant) g
-33.1	10	SP	Fine sand; poorly graded; less shelly (18%); gray		6	
	11	SW	Fine to coarse sand; very shelly; shellys highly fragmented; brown at top grades into gray at bottom; very shelly (70% carbonate) from 11.9 ft to 12.1 ft			
-35.1	12				7	12 ft
		SW	Medium to coarse sand; dark gray; very shelly (50%); shell lag at 12.7 ft (large shells)			
	13	SP	Fine sand; poorly graded; gray; only scattered mollusk shells (<10%); interbedded; local coarse, shelly sand			
-37.1	14				8	14 ft
			Bottom ATM D			
-34.9	12		Top ATM DR2		9	12 ft
		SP	Fine to medium, shelly sand			
	13					
-36.9	14				10	14 ft
		SP	Fine to medium, gray sand; some coarse sand and shells			
	15					
-38.9	16	SW	Fine to medium sand; some coarse, shelly sand; shell lag at 16.6 ft		11	16 ft
	17	SP	Fine to medium shelly sand			
-40.3	18		Bottom 17.4 ft			

Drilling Log

1. Project: Martin County Shore Protection Project
2. Location: 776788.7E 1046208.9N
3. Drilling Agency: Alpine Ocean Seismic Survey, Inc.
4. Hole No. (As shown on drawing title): ATM E
5. Name of Driller: Chris Moore
6. Direction of Hole: [x] Vertical [ ] Inclined _____ Degree from Vertical
7. Thickness of Overburden
8. Depth Drilled into Rock
9. Total Depth of Hole: 16 ft
10. Size and Type of Bit
11. Datum for Elevation Shown (TDM or MSL): NGVD *
12. Manufacturer's Designation of Drill: Vibracore
13. Total No. of Overburden Samples Taken: Disturbed / Undisturbed
14. Total No. of Core Boxes: 2
15. Elevation Ground Water: Tidal
16. Date Hole: Started 11/20/93 / Completed 11/20/93
17. Elevation Top of Hole: -31.5
18. Total Core Recovery for Boring: %
19. Signature of Inspector

Elevation (a)	Depth (b)	Legend (c)	Classification of Materials (Description) (d)	% Core Recovery (e)	Box or Sample No. (f)	Remarks (Drilling time, water loss, depth of weathering, if significant) (g)
-31.5	0	SP	Medium to coarse sand; very shelly carbonate shells (50%); highly fragmented; well-graded; distinct brown color		1	
	1					
-33.5	2				2	2 ft
	3	SP	Medium to coarse, shelly sand			
-35.5	4		Dark gray from 4.6 ft to 4.9 ft		3	4 ft
	5	SP	Fine sand; only slightly shelly (<10%); poorly graded; gray; interbedded local coarse, shelly sands; some silt (10%)			
-37.5	6				4	6 ft
	7	SW	Fine to coarse sand; slightly shelly (15%); large mollusk/echinoid fragments—sand dollars; very well-graded; dark gray			
-39.5	8	SP	Fine sand (silt 20%); olive gray; scattered mollusk shells (fragmented <5%); very poorly graded		5	8 ft
	9					
-41.5	10				6	10 ft

ENG FORM 1836 Project Hole No.

*** Elevation shown is based on actual tide at Mayport and adjusted for Seminole Shores.**

Drilling Log (Cont Sheet)	Elevation Top of Hole -31.5	Hole No. ATM E
Project ATM	Installation	Sheet 2 of 2 Sheets

Elevation a	Depth b	Legend c	Classification of Materials (Description) d	% Core Recovery e	Box or Sample No. f	Remarks (Drilling time, water loss, depth of weathering, if significant) g
-41.5	10	SP	Olive gray, fine to medium sand		6	10 ft
	11					
-43.5	12	SP	Olive gray, very fine to medium sand		7	12 ft
	13					
-45.3	14	GW	Shell lag; silty, fine sand matrix; carbonate shells		8	14 ft
		SP	Olive gray, fine sand; poorly graded; interbedded silt and coarse, shelly sand			
	15					
		GW	Coarse shell lag; silty, fine sand matrix; shells			
-47.3	16		Bottom 16 ft		9	16 ft
	17					
	18					
	19					
	20					
	21					

Drilling Log

1 of 2 Sheets

1. Project: Martin County Shore Protection Project
2. Location: 776493.8E 1045407.6N
3. Drilling Agency: Alpine Ocean Seismic Survey, Inc.
4. Hole No. (As shown on drawing title): ATM G/GR2
5. Name of Driller: Chris Moore
6. Direction of Hole: [X] Vertical [ ] Inclined _____ Degree from Vertical
7. Thickness of Overburden
8. Depth Drilled into Rock
9. Total Depth of Hole: 9.3 ft
10. Size and Type of Bit
11. Datum for Elevation Shown (TOM or MSL): NGVD *
12. Manufacturer's Designation of Drill: Vibracore
13. Total No. of Overburden Samples Taken: Disturbed / Undisturbed
14. Total No. of Core Boxes: 2
15. Elevation Ground Water: Tidal
16. Date Hole: Started 11/20/93 / Completed 11/20/93
17. Elevation Top of Hole: -24.45
18. Total Core Recovery for Boring: %
19. Signature of Inspector

Elevation (a)	Depth (b)	Legend (c)	Classification of Materials (Description) (d)	% Core Recovery (e)	Box or Sample No. (f)	Remarks (Drilling time, water loss, depth of weathering, if signficant) (g)
-24.45	0	SW	Very shelly, medium to coarse sand; very well-graded; distinct brown color; shells highly fragmented		1	
	1	SW	Color change to dark gray from 1.6 ft to 2.9 ft; some silt			
-26.45	2				2	2 ft
	3	SW	Color change to brownish gray below 3.5 ft; no silt; very shelly			
-28.45	4				3	4 ft
	5	SW	Medium to coarse sand; some silt and shell fragments			
-30.45	6				4	6 ft
	7	SW	Dark gray, shelly (40%), fine to coarse sand; well-graded			
-32.45	8				5	8 ft
	9	SW	Very shelly, dark brownish gray, fine to coarse sand; very well-graded; shells fragmented (50% carbonate shells)			
		SP	Gray, fine sand; poorly graded; carbonate shells (5%)		6	9.3 ft
-33.75	10		Bottom Run 1 9.3 ft			

* Elevation shown is based on actual tide at Mayport and adjusted for Seminole Shores.

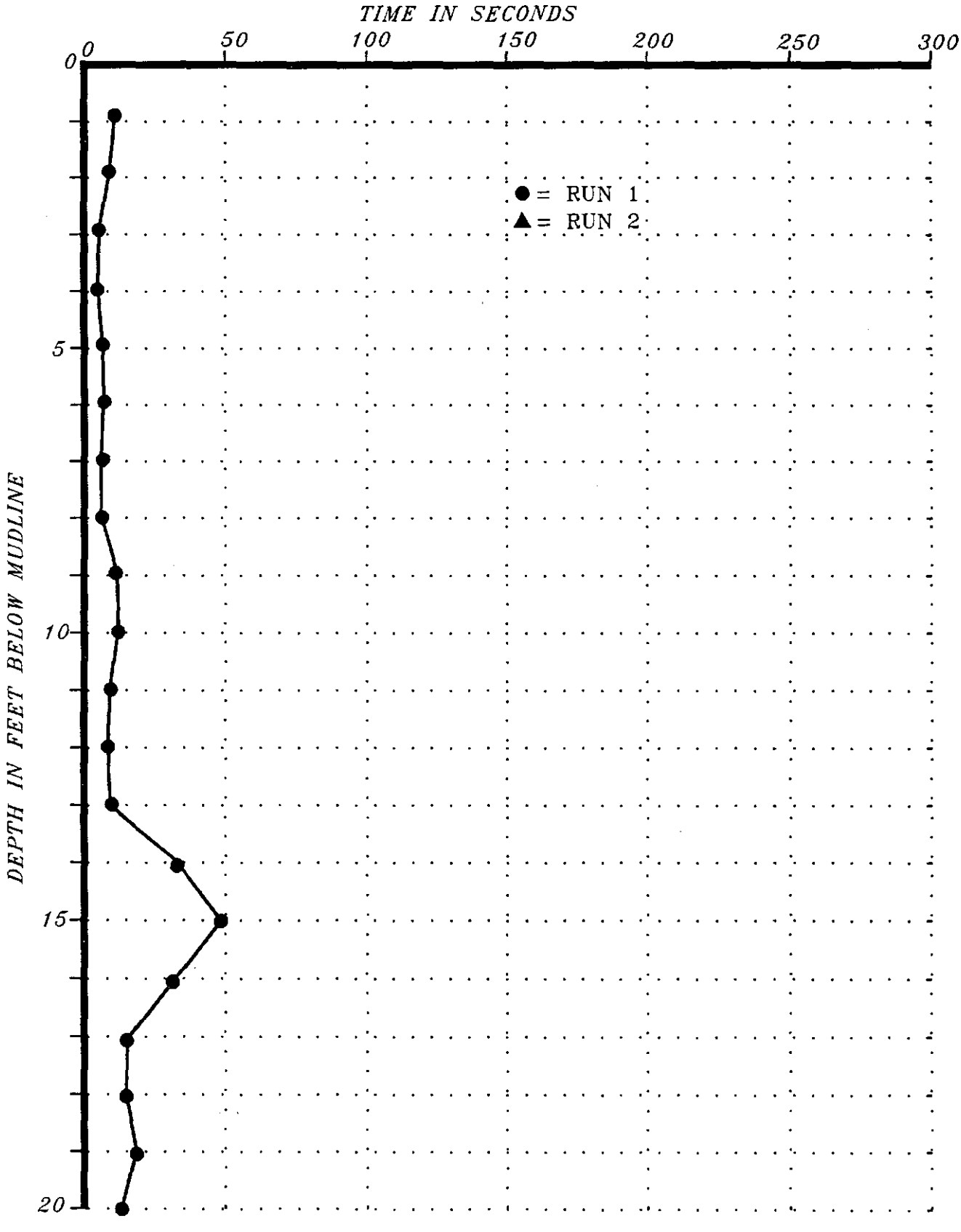
Drilling Log (Cont Sheet)	Elevation Top of Hole -24.65	Hole No. ATM GR2
Project ATM	Installation	Sheet 2 of 2 Sheets

Elevation a	Depth b	Legend c	Classification of Materials (Description) d	% Core Recovery e	Box or Sample No. f	Remarks (Drilling time, water loss, depth of weathering, if significant) g
-33.65	9	SW	Medium to coarse, very shelly (40%), brownish sand; some silt; very well graded; shells highly fragmented		7	Begin Run 2 at 9.0 ft
	10	SP	Light, tannish gray, fine sand; poorly graded; shells <5%; interbedded coarse, dark gray, shelly sand			
-35.65	11				8	11 ft
		SW	Dark gray, coarse, shelly sand; well-graded			
	12	SW	Olive gray, fine sand; poorly graded; shells <5%; interbedded dark gray, coarse, shelly sand (especially toward bottom)			
-37.65	13				9	13 ft
		SW	Dark gray, coarse, shelly (40%) sand; well-graded			
		SP	Olive gray, fine sand; poorly graded; <5% carbonate shells; interbedded, dark gray, coarse, shelly sand (toward bottom)			
	14					
-39.65	15				10	15 ft
		SW	Very shelly, medium to coarse sand; well-graded; shells highly fragmented; large whole bivalve shells scattered from 15.2 ft to 16.2 ft (brownish gray color)			
-40.65	16				11	16 ft
	17		Shells, shell clasts from 16.3 ft to 17.4 ft (brownish gray)			
		SW				
	18		Very large clasts (shell fragments) below 17.4 ft; very shelly; brown			
-43.65	19	SW			12	19 ft
-43.95			Bottom 19.3 ft			
	20					

PENETRATION GRAPHS

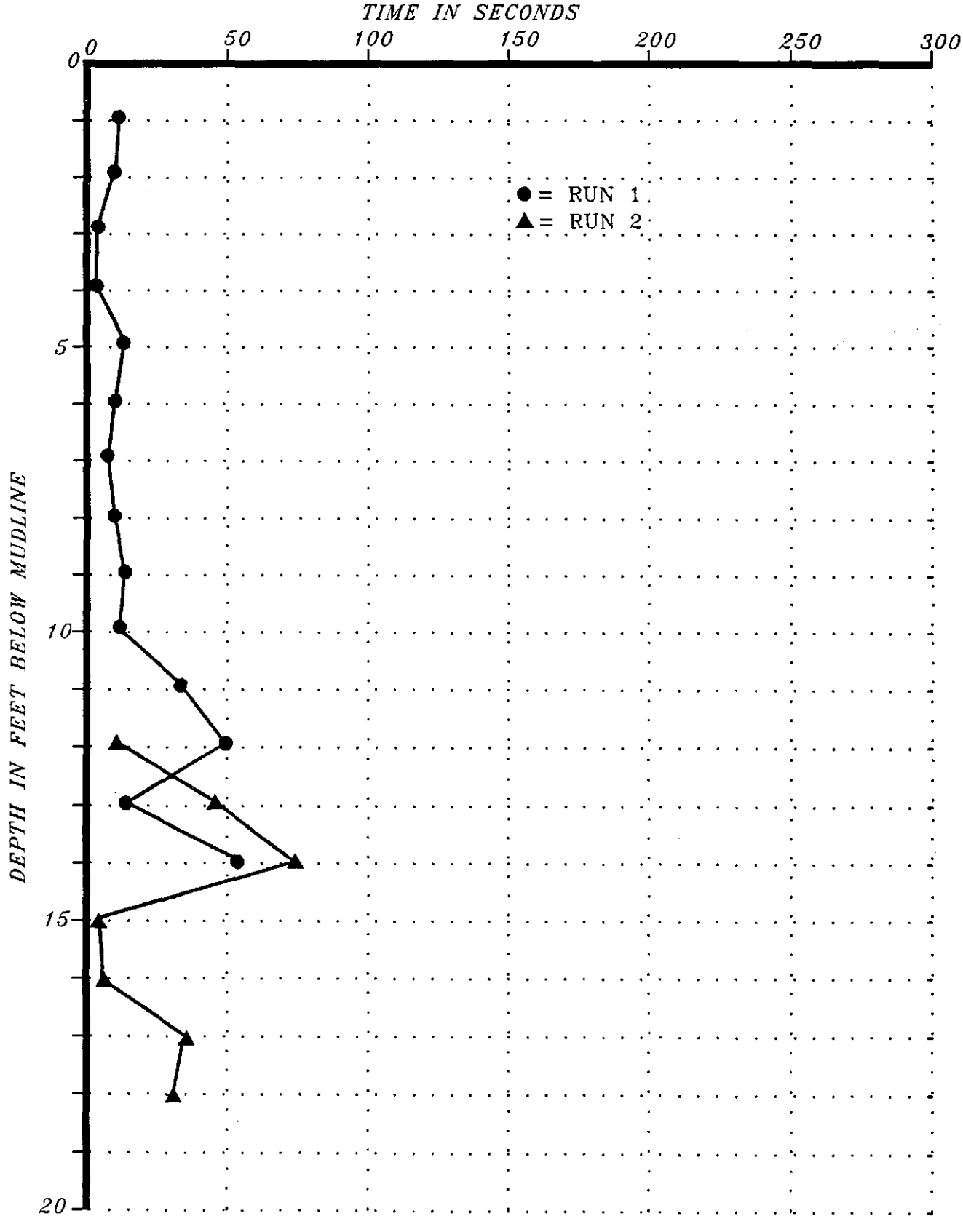
PENETRATION GRAPH

CORE NO. ATM-1 *LOCATION: EAST* 773065 *NORTH* 1048721.9
DATE: 11/18/93 *TIME:* 1644 *WATER DEPTH:* 36.65 *FT.*
REMARKS: Total Penetration 20', Total Recovery 16.2'



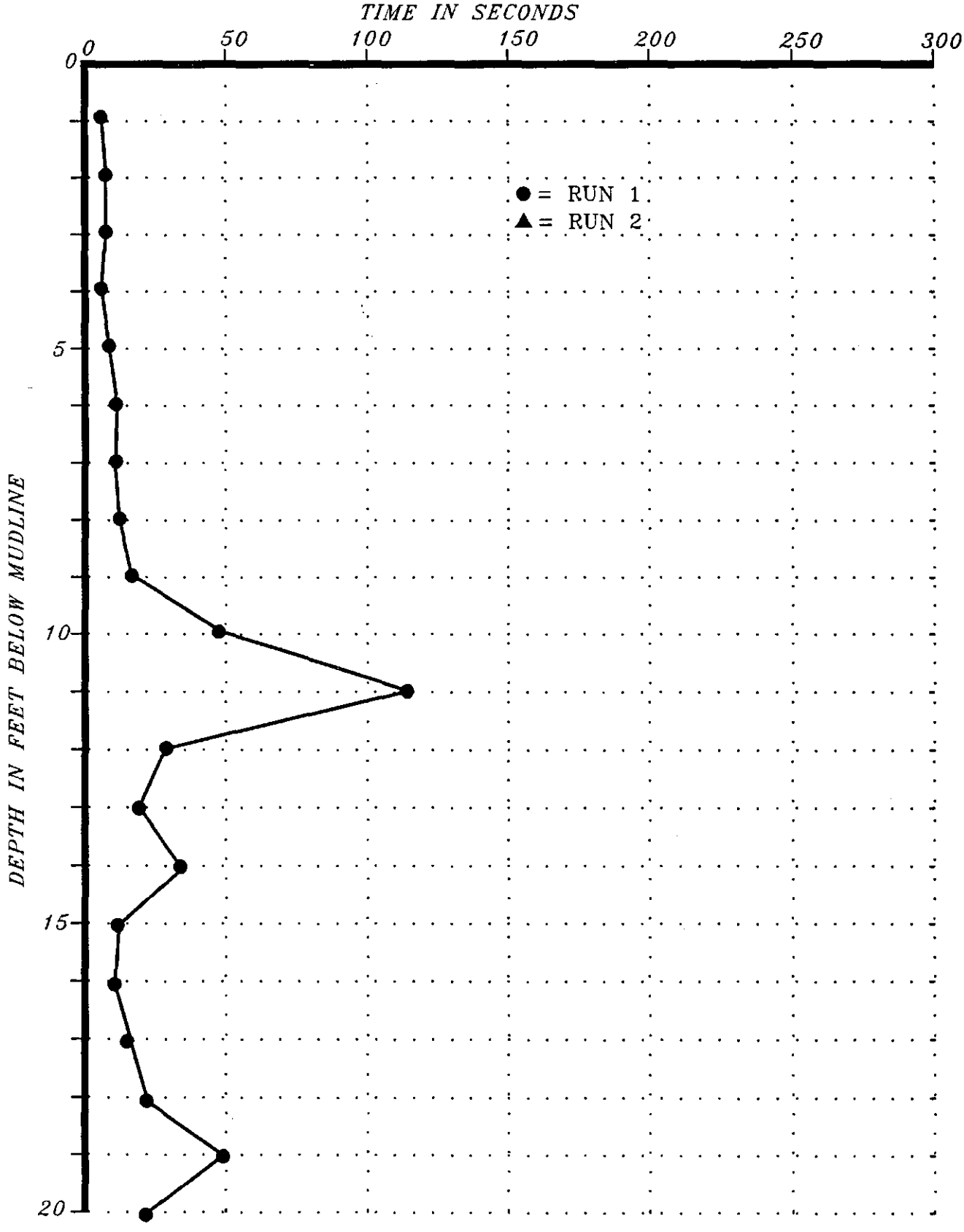
PENETRATION GRAPH

CORE NO. ATM-2 *LOCATION: EAST* 774474.7 *NORTH* 1049378.5
DATE: 11/18/93 *TIME:* 1131 *WATER DEPTH:* 30.45 *FT.*
REMARKS: Total Penetration 18', Total Recovery 16.5'



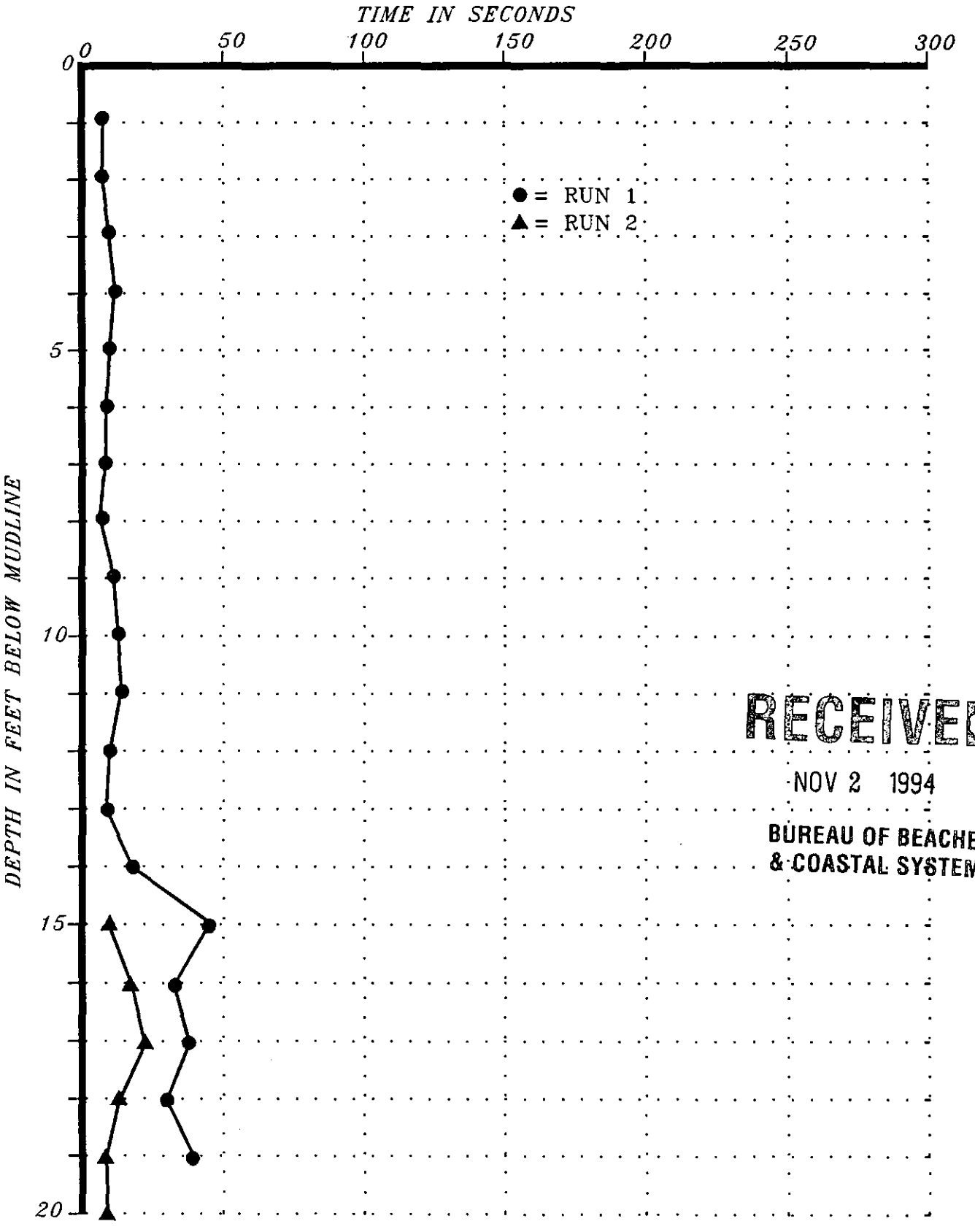
PENETRATION GRAPH

CORE NO. ATM-3 *LOCATION: EAST* 773361.8 *NORTH* 1047758.6
DATE: 11/19/93 *TIME:* 1101 *WATER DEPTH:* 34.35 *FT.*
REMARKS: Total Penetration 20', Total Recovery 16'



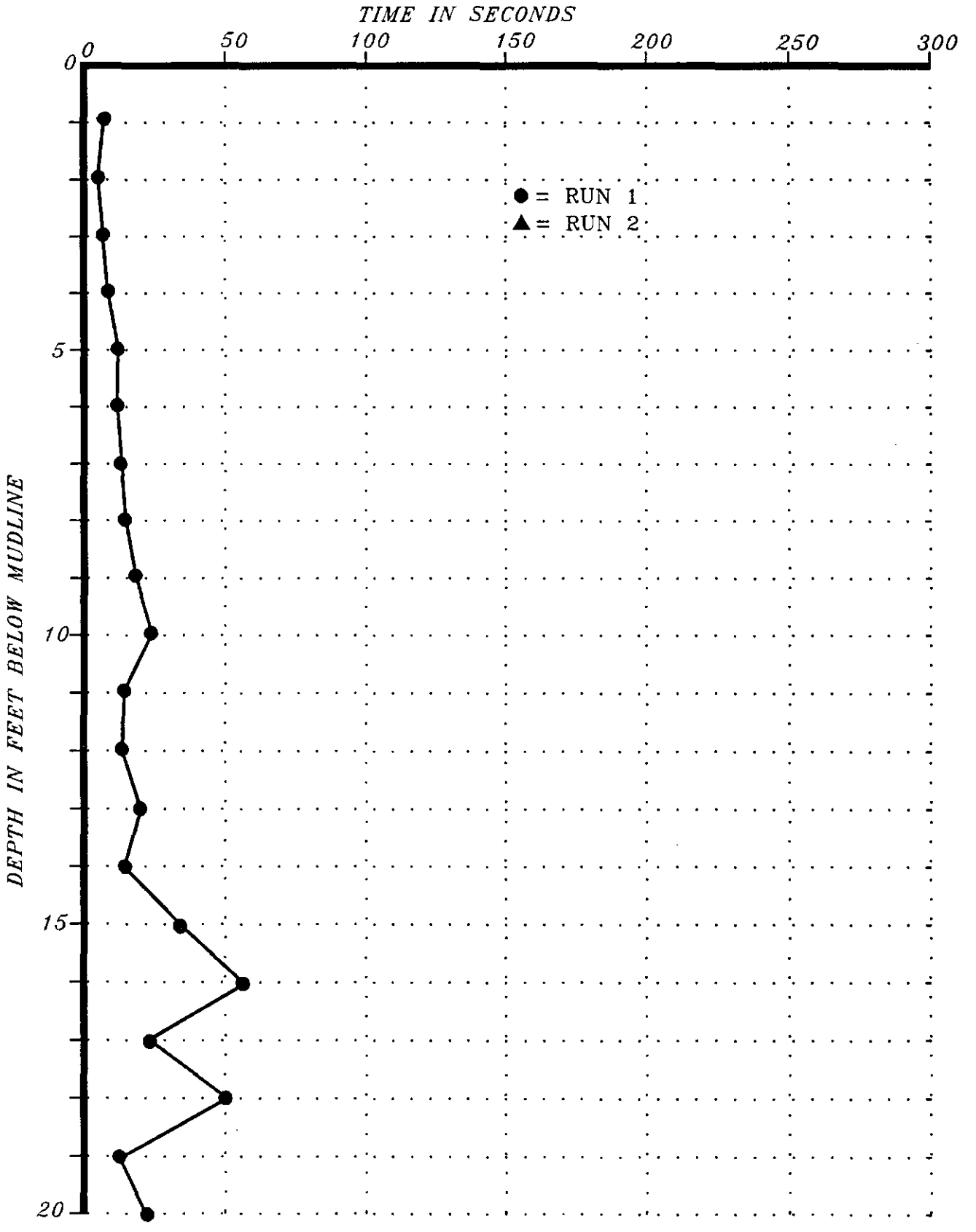
PENETRATION GRAPH

CORE NO. ATM-4 *LOCATION: EAST* 774427.5 *NORTH* 1047761.1
DATE: 11/19/93 *TIME:* 0950 *WATER DEPTH:* 36.85 *FT.*
REMARKS: Total Penetration 20', Total Recovery 18.3'



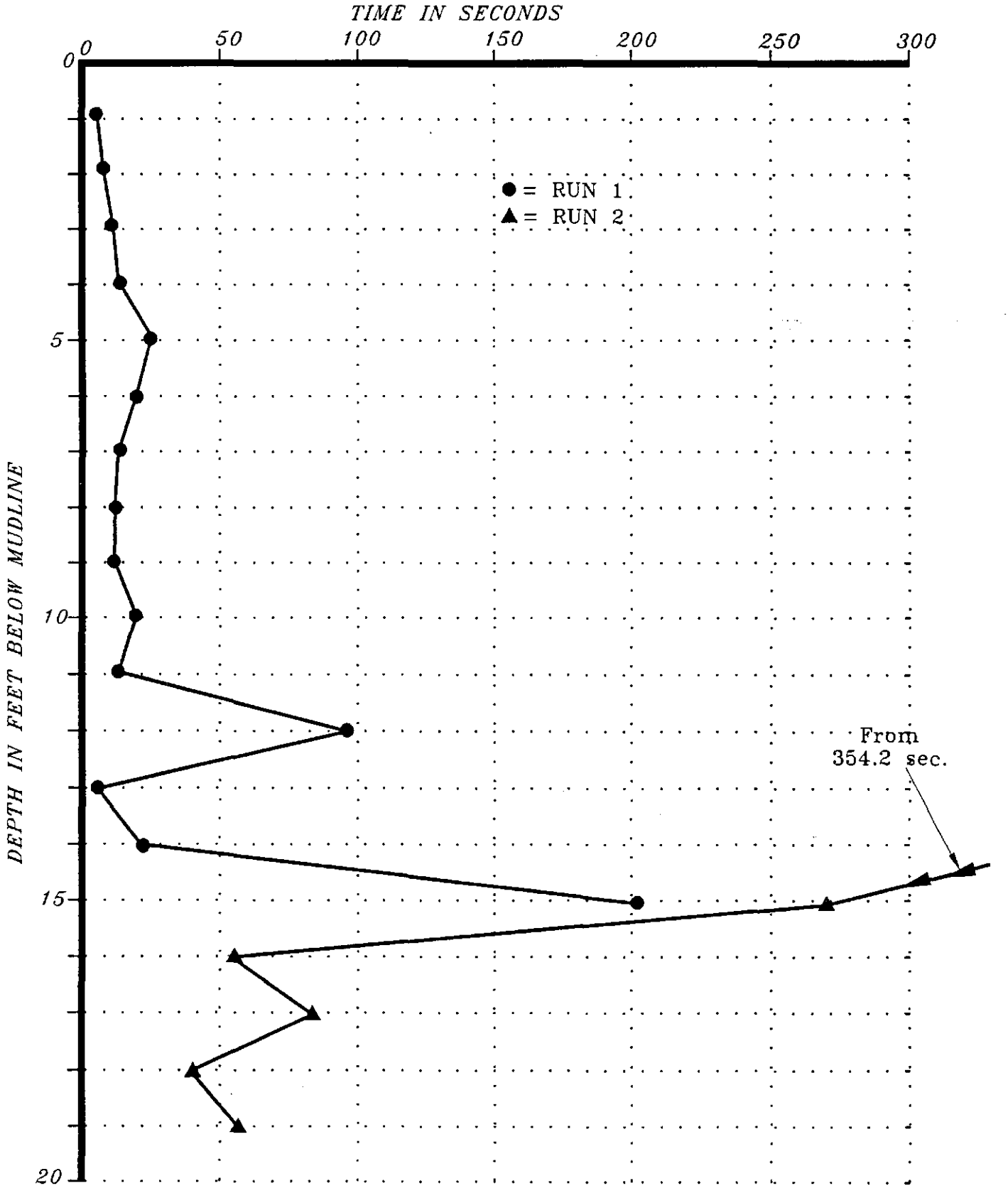
PENETRATION GRAPH

CORE NO. ATM-5 *LOCATION: EAST* 773812.7 *NORTH* 1046896.8
DATE: 11/19/93 *TIME:* 1209 *WATER DEPTH:* 36.8 *FT.*
REMARKS: Total Penetration 19', Total Recovery 17'



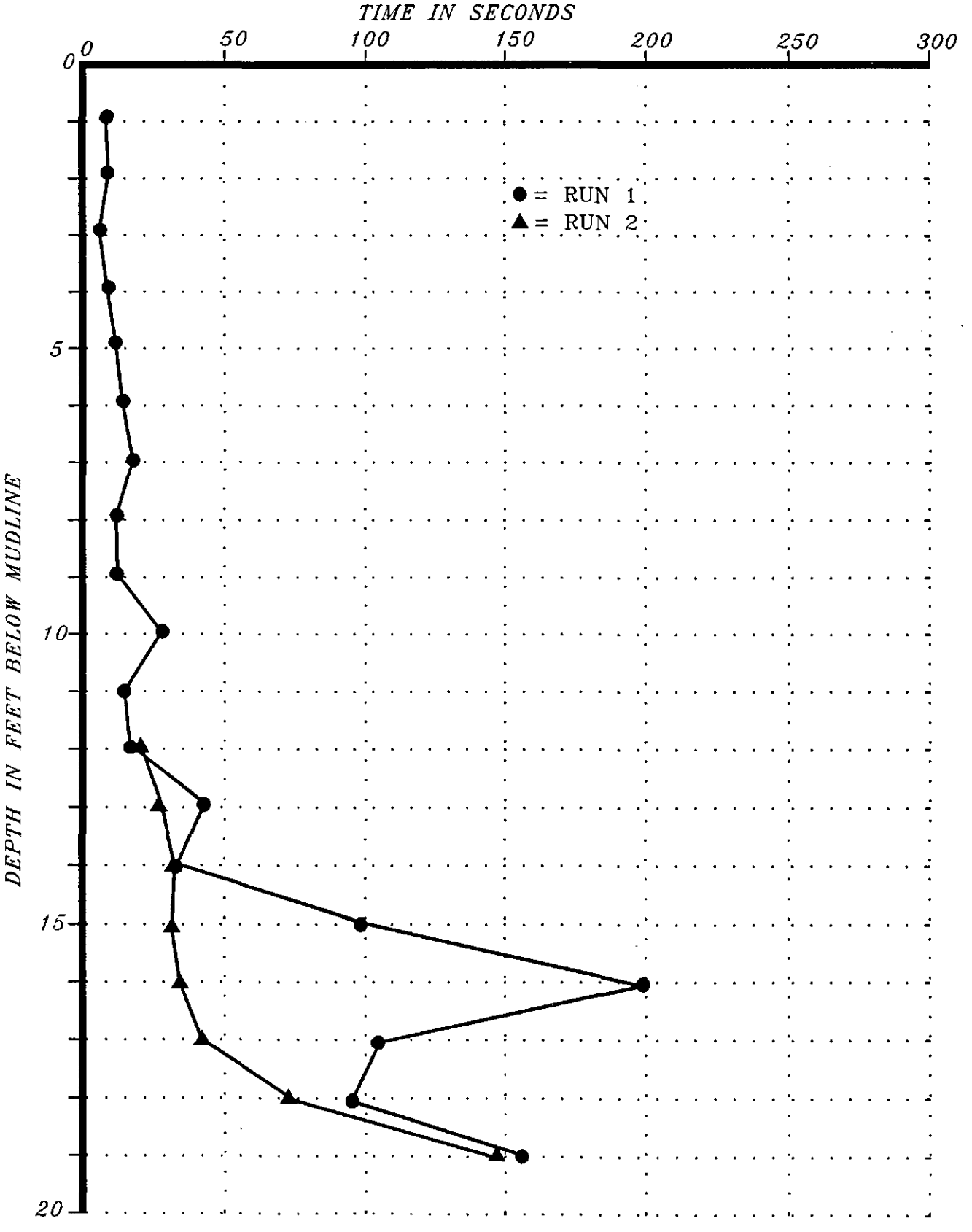
PENETRATION GRAPH

CORE NO. ATM-6 *LOCATION: EAST* 775579.4 *NORTH* 1047179.3
DATE: 11/19/93 *TIME:* 1645 *WATER DEPTH:* 29.75 *FT.*
REMARKS: Total Penetration 19', Total Recovery 16'



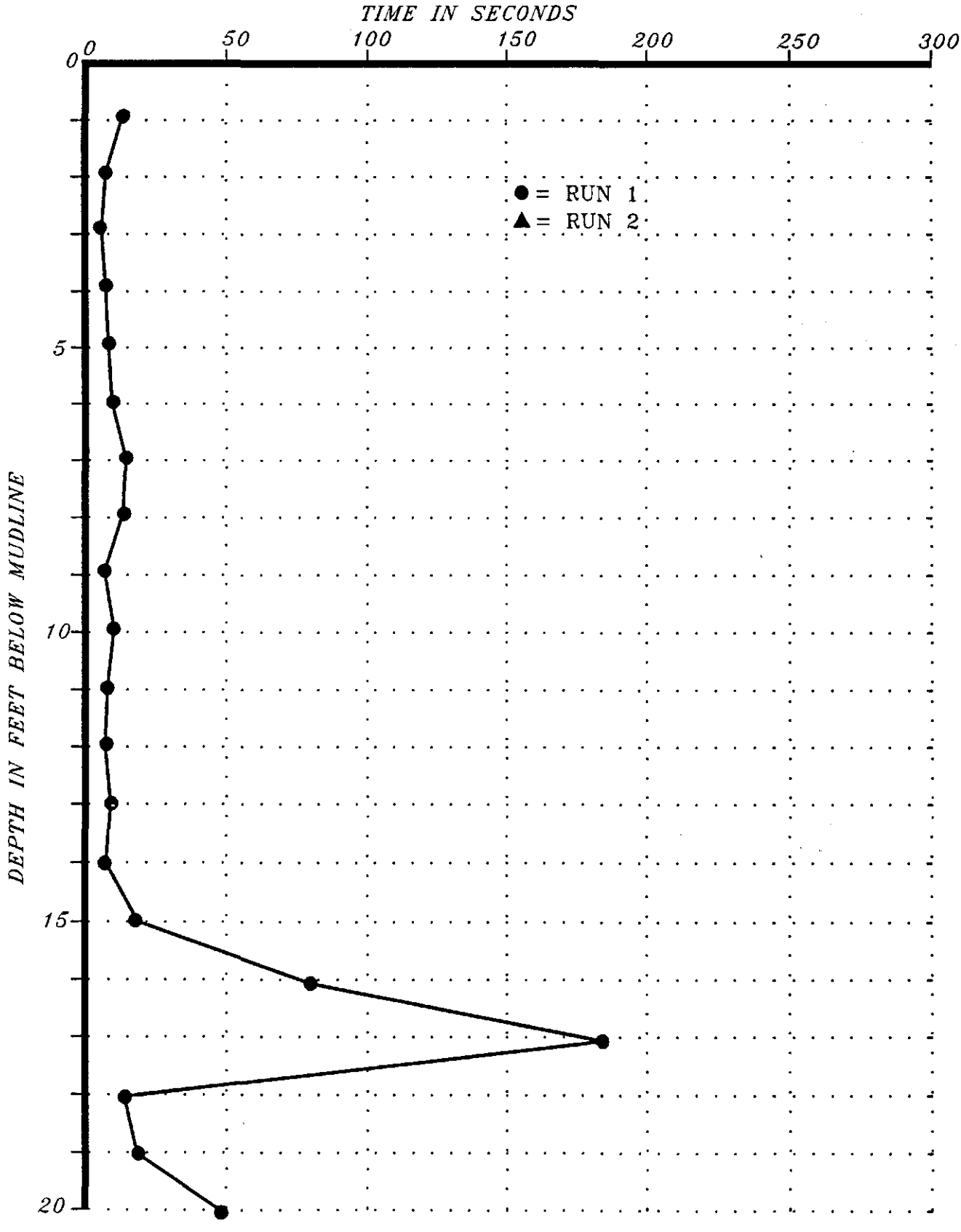
PENETRATION GRAPH

CORE NO. ATM-8 *LOCATION: EAST* 775130.9 *NORTH* 1049119.2
DATE: 11/18/93 *TIME:* 1408 *WATER DEPTH:* 22.55 *FT.*
REMARKS: Total Penetration: 19', Total Recovery 17.7'



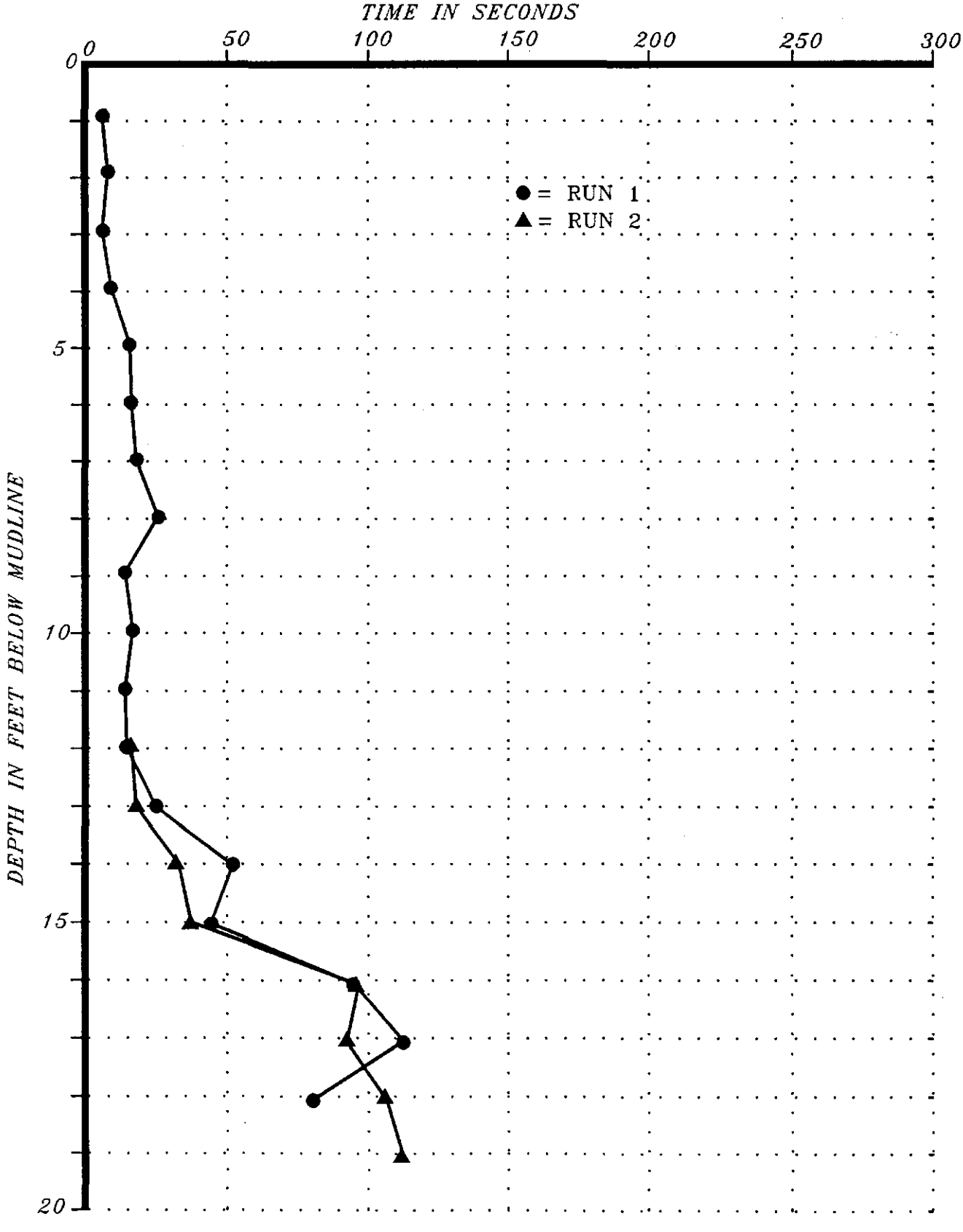
PENETRATION GRAPH

CORE NO. ATM-9 *LOCATION: EAST* 774202.2 *NORTH* 1048363.4
DATE: 11/18/93 *TIME:* 1726 *WATER DEPTH:* 36.75 *FT.*
REMARKS: Total Penetration 20', Total Recovery 19.2'



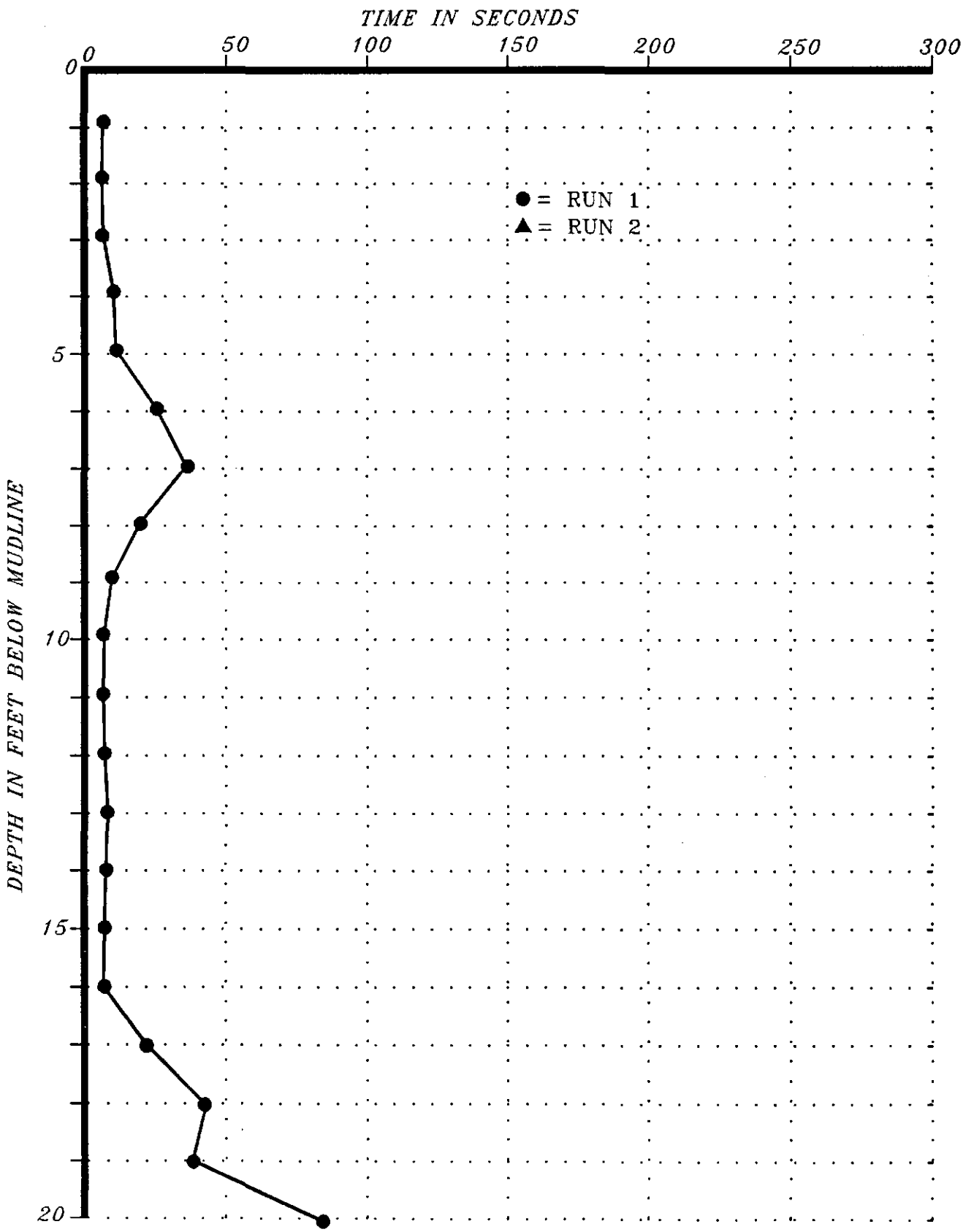
PENETRATION GRAPH

CORE NO. ATM-10 *LOCATION: EAST* 775489.2 *NORTH* 1048260.7
DATE: 11/19/93 *TIME:* 0801 *WATER DEPTH:* 21.15 *FT.*
REMARKS: Total Penetration 19', Total Recovery 18.4'



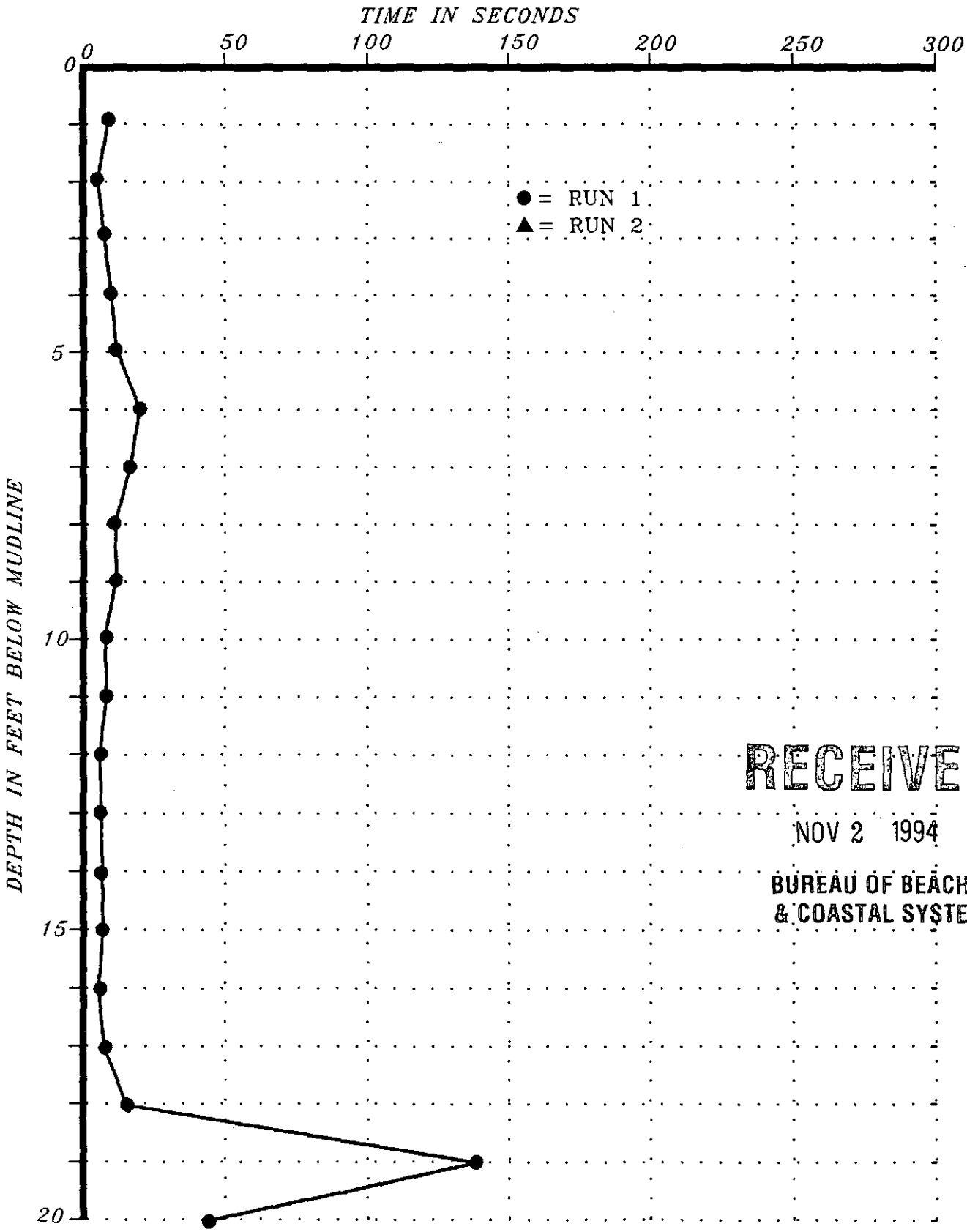
PENETRATION GRAPH

CORE NO. ATM-A *LOCATION: EAST* 775467.0 *NORTH* 1049908.0
DATE: 11/20/93 *TIME:* 0758 *WATER DEPTH:* 34.55 *FT.*
REMARKS: Total Penetration 20', Total Recovery 16.3'



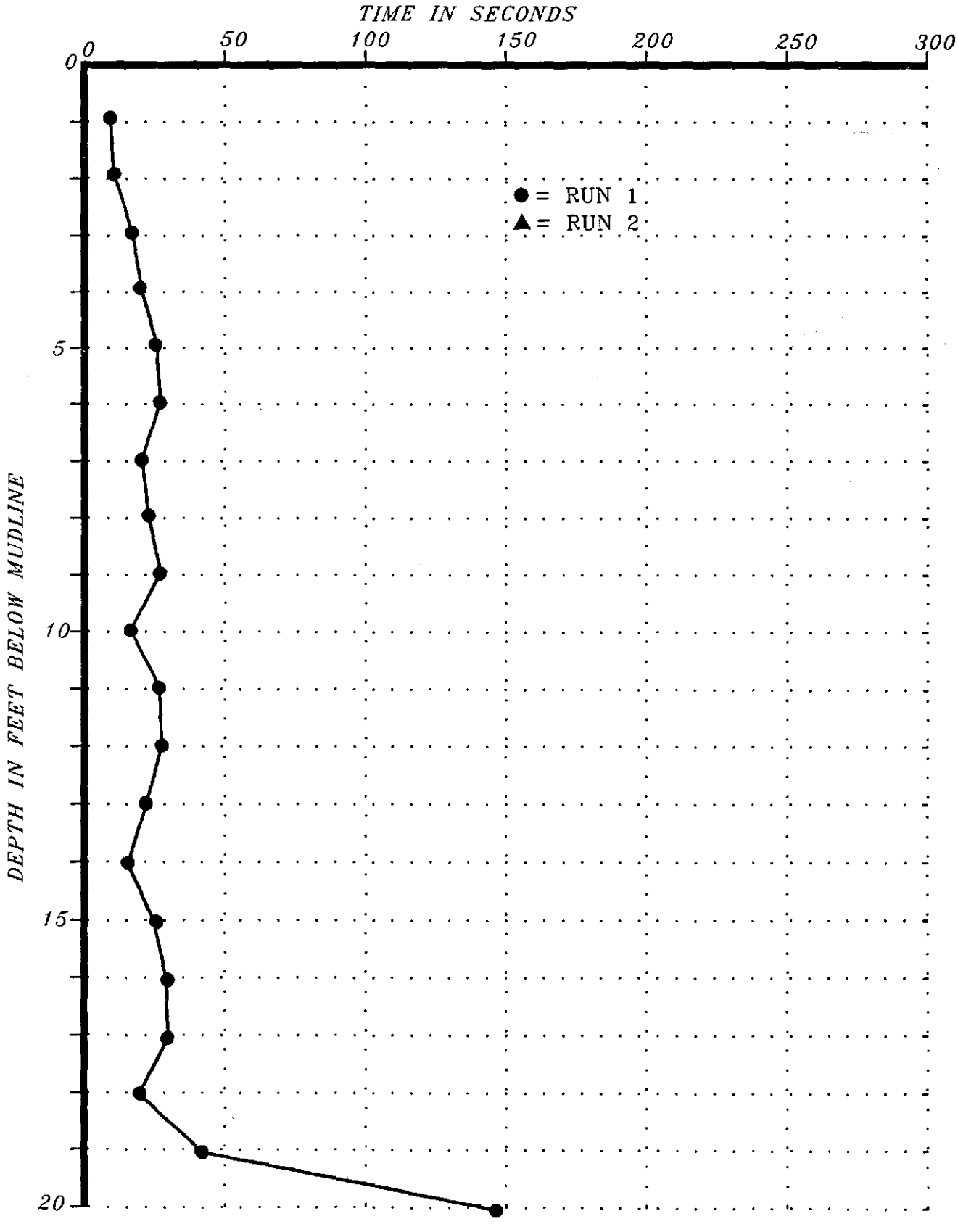
PENETRATION GRAPH

CORE NO. ATM-B *LOCATION: EAST* 775996.1 *NORTH* 1048869.4
DATE: 11/20/93 *TIME:* 0842 *WATER DEPTH:* 35.1 *FT.*
REMARKS: Total Penetration 20', Total Recovery 17.3'



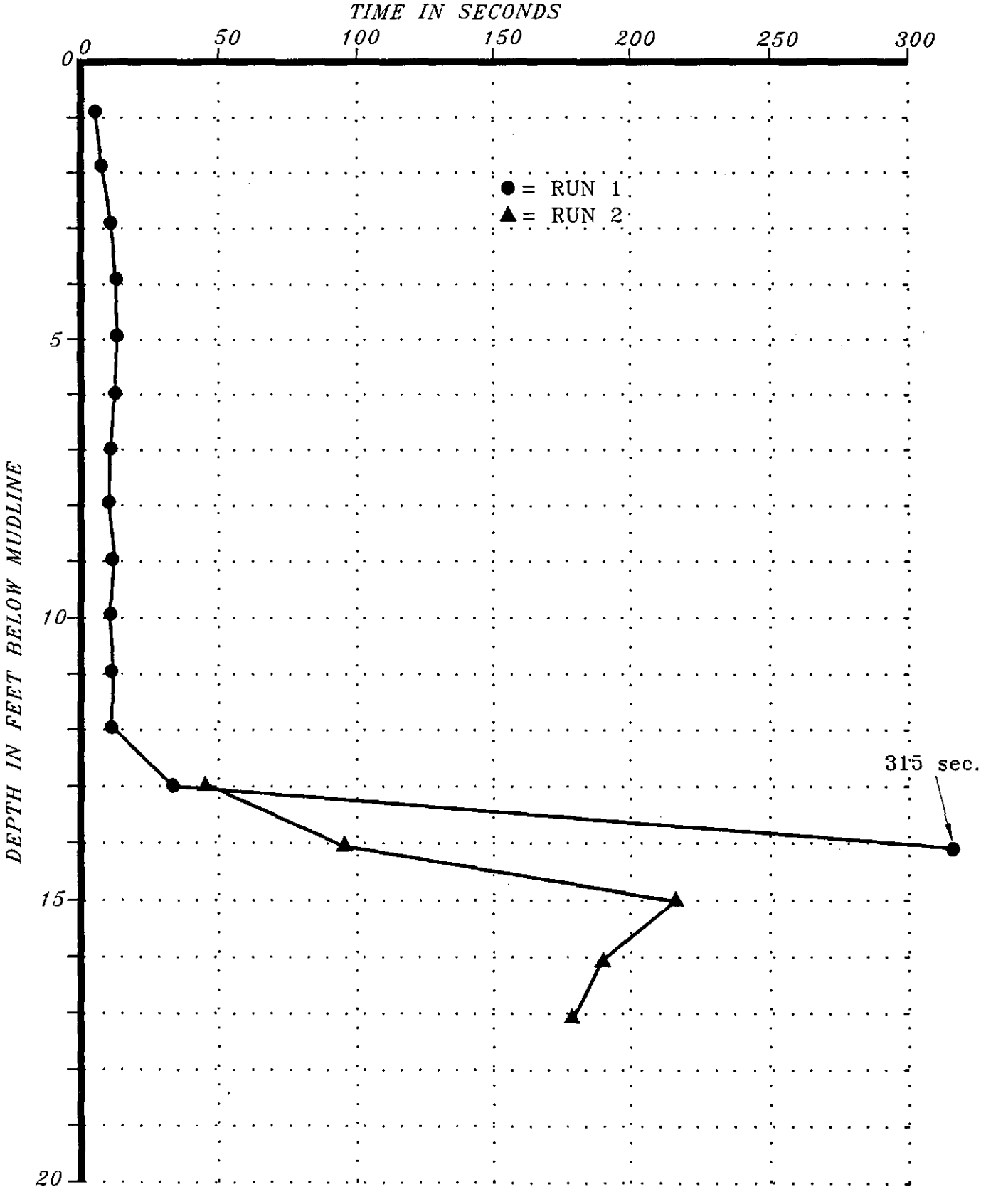
PENETRATION GRAPH

CORE NO. ATM-C *LOCATION: EAST* 776426.1 *NORTH* 1047923.2
DATE: 11/20/93 *TIME:* 1051 *WATER DEPTH:* 33.3 *FT.*
REMARKS: Total Penetration 20', Total Recovery 15'



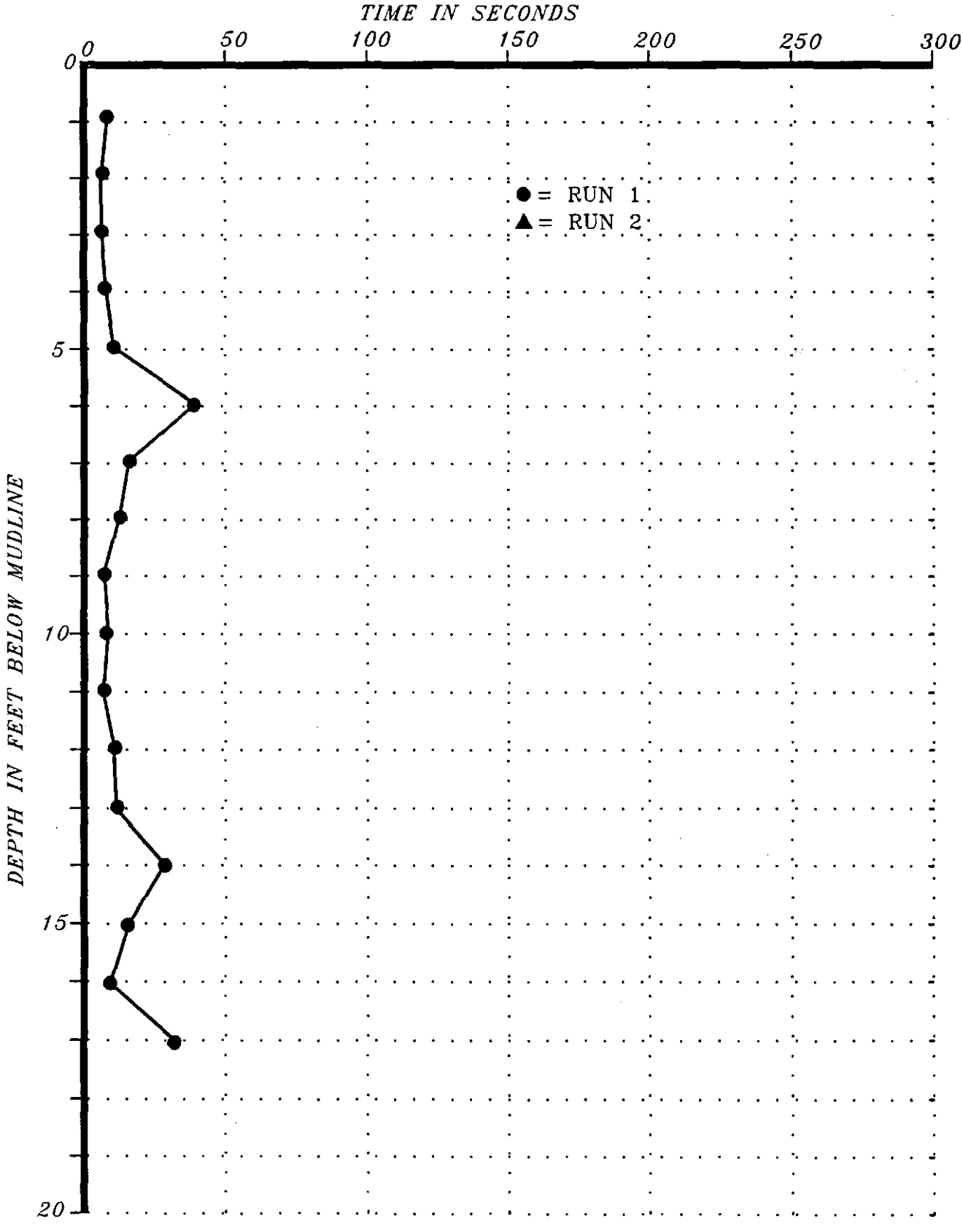
PENETRATION GRAPH

CORE NO. ATM-D *LOCATION: EAST* 776319.0 *NORTH* 1046976.0
DATE: 11/20/93 *TIME:* 1329 *WATER DEPTH:* 23.1 *FT.*
REMARKS: Total Penetration 17', Total Recovery 17'



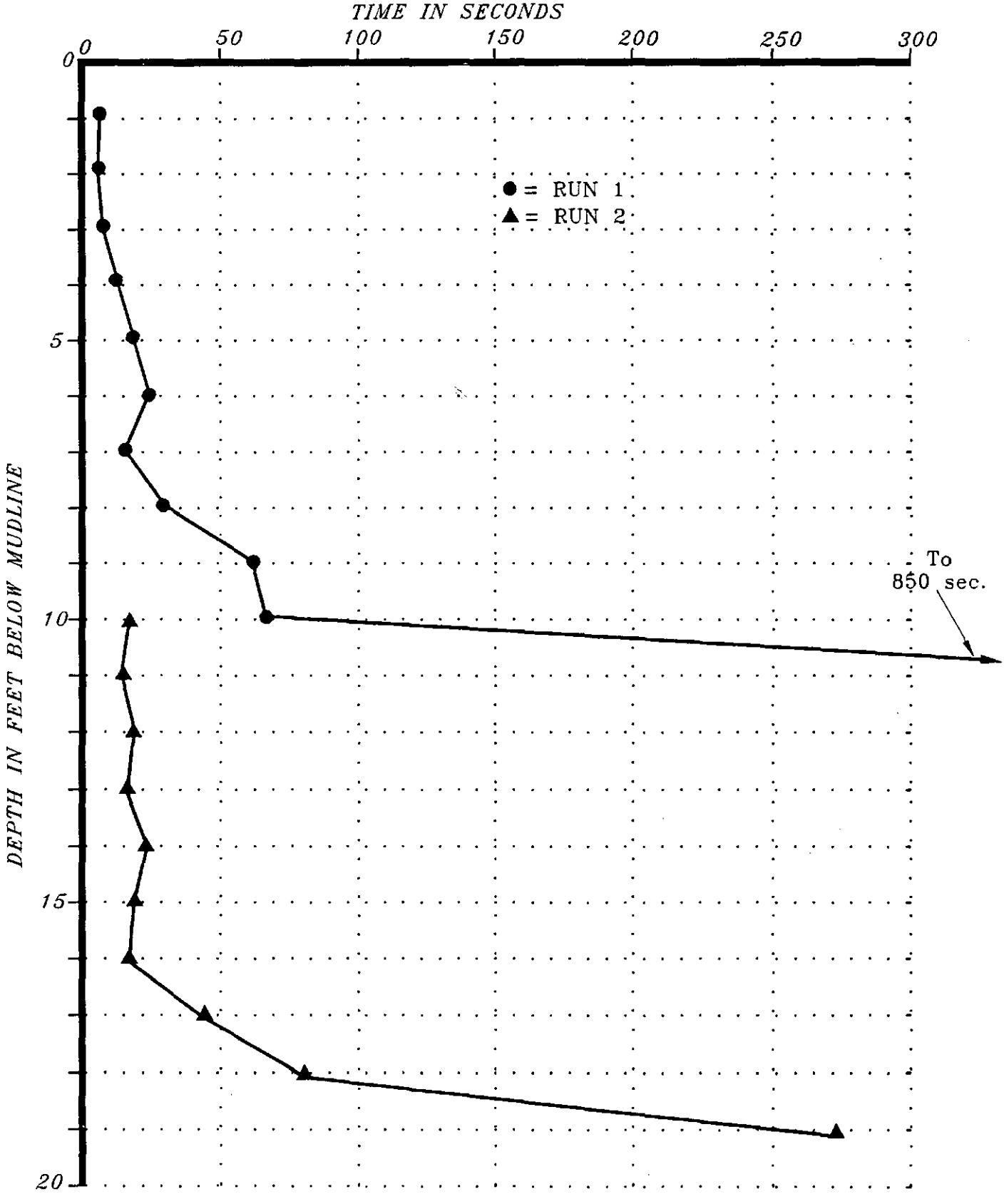
PENETRATION GRAPH

CORE NO. ATM-E *LOCATION: EAST* 776788.7 *NORTH* 1046208.9
DATE: 11/20/93 *TIME:* 1525 *WATER DEPTH:* 31.5 *FT.*
REMARKS: Total Penetratio 17', Total Recovery 16'



PENETRATION GRAPH

CORE NO. ATM-G *LOCATION: EAST* 776493.8 *NORTH* 1045407.6
DATE: 11/20/93 *TIME:* 1604 *WATER DEPTH:* 24.45 *FT.*
REMARKS: Total Penetration 19', Total Recovery 19'



APPENDIX

OPERATIONS DAILY LOGS

DAILY LOG

JOB NO. 1170 LOCATION: FT. PIERCE

CLIENT: ATL DATE: 11/15/93

INSTRUMENTATION: VIBRACORE, DGPS

TIME	
445	LEFT DOCK TO SEE IF WE COULD CORE OFFSHORE
7:53	ARRIVED IN CORING AREA TOO ROUGH HEADING BACK TO DOCK AT Ft PIERCE
10:30	AT DOCK
2400	AT DOCK

DAILY LOG

JOB NO. 1170 LOCATION: FT. PIERCE

CLIENT: ATM DATE: 11/16/93

INSTRUMENTATION: VIBRACORE & GPS

TIME	
0000	AT DOCK FOR BAD WEATHER
1000	WORKING ON NAV. RAY + JIM MY LEFT FOR MIAMI EARLIER IN THE MORNING
2000	AT DOCK

DAILY LOG

JOB NO. 1170 LOCATION: Ft. Pierce

CLIENT: ATA DATE: 11/17/93

INSTRUMENTATION: Vibracore, DGPS

TIME	
800	LEFT DOCK TO TEST SEAS
8:45	SEAS TOO ROUGH RETURNING TO DOCK
930	DOCKED STBY FOR WEATHER
2400	AT DOCK STBY WEATHER

DAILY LOG

JOB NO. 1170 LOCATION: JUPITER INLET

CLIENT: ATM DATE: 11/18/93

INSTRUMENTATION: DGPS / VIBRACORE

VIBRACORE & DGPS

TIME	
0000	AT DOCK
3:30	UNDERWAY TO WORK SITE
6:00	ON LOCATION
7:51	ATM-7 HDG 265 DEPTH 26.5 RUN 1 HEAD NOT VIBRATING
9:34	ATM-7 HDG. 170 DEPTH 27 RUN 2 FIX 2
11:31	ATM-2 HDG. 215 DEPTH 33.5 RUN 1 FIX 1
1311	ATM 2 HDG. DEPTH 33.5 RUN 2 FIX 2

DAILY LOG

JOB NO. 1170 LOCATION: JUPITER

CLIENT: ATM DATE: 11/18/93

INSTRUMENTATION: DGPS, VIBRACORE

TIME	
1408	ATM-8 DEPTH 24 HDG 165 FIX 1 RUN 1
1514	ATM-8 DEPTH 22.5 HDG FIX 2 RUN 2
1644	ATM-1 DEPTH 36.5 HDG FIX 1 RUN 1
1726	ATM 9 DEPTH 36.5 HDG 210 FIX 1 RUN 1
1800	AT ANCHOR ON ATM-10

DAILY LOG

JOB NO. 1170 LOCATION: JUPITER

CLIENT: ATM DATE: 11/19/93

INSTRUMENTATION: DGPS – VIBRACORE

TIME	
7:15	BEGINNING OPERATIONS AT ATM-10
7:35	PULLED ANCHORS RESETTING ON ATM-10
8:01	ATM-10 DEPTH 22.5 HDG 350 FIX 1 RUN 1
8:48	ATM-10 DEPTH: 23 HDG: 360 FIX 2 RUN 2
9:50	ATM-4 DEPTH 39.5 HDG FIX 2 RUN 1
10:18	ATM-4 DEPTH: 39.5 HDG 330° FIX 3 RUN 2

DAILY LOG

JOB NO. 1170 LOCATION:

CLIENT: ATM DATE: 11/18/93

INSTRUMENTATION: DGPS / VIBRACORE

TIME	
1101	ATM-3 DEPTH 37.5 HDG 300 Fix 1 RUN 1
1209	ATM-5 DEPTH: 40ft HDG. 280 FIX 1 RUN 1
1245	CLIENT ON BOARD UPON CLIENT REQUEST SHOOT BATH LINE FROM SE TO NW OF AREA - FIX INTERVAL 25M
1317	BOL BATH TEST FIX 1 25m FIX
1331	EOL BATH TEST FIX 102
1500	STILL STBY FOR CLIENT DECISION CORE LOCATIONS

DAILY LOG

JOB NO. 1170 LOCATION:

CLIENT: ATM DATE: 11/19/93

INSTRUMENTATION: DGPS / VI BRACORE

TIME	
1511	HEADING FOR SEABUOY OUTSIDE ST. LUCIE INLET TO VERIFY POSITIONING
1519	AT SEA BUOY – POSITIONING CHECKED OUT
1620	BACK ON SITE AREA. UPON CLIENT REQUEST ATM-6 WILL BE TAKEN NEXT
1625	CLIENT OFF BOAT
1645	ATM-6 DEPTH 30.5 HDG 320 FIX 1 RUN 1 REFUSAL AT 15'
1715	ATM-6 DEPTH 30.5 HDG 295 FIX 2 RUN 2 JET PUMP HOSE BLEW
1721	ATM-6 DEPTH 30.5 HDG 295 FIX 3 RUN 2 5 MIN REJECTION AT 13 FT. CUT JET AND HAD 5 MIN REJECTION AT 19 FT.

DAILY LOG

JOB NO. 1170 LOCATION:

CLIENT: ATM DATE: 11/20/93

INSTRUMENTATION: DGPS / VTBRACORE

TIME	
6:45	ANCHORS UP HEADED FOR ATM-A
758	ATM-A DEPTH: 35 ft HDG 160 FIX 1 RUN 1
842	ATM-B DEPTH 36.5 HDG 150 FIX 1 RUN 1
1051	ATM-C DEPTH 35.5 HDG 175 FIX 2 RUN 1
	STOPPING TO REPLACE LOST ANCHOR
1329	ATM-D DEPTH: 26 ft HDG 160 FIX 1 RUN 1

DAILY LOG

JOB NO. 1170 LOCATION:

CLIENT: ATM DATE: 11/20/93

INSTRUMENTATION: DGPS / VIBRACORE

TIME	
1355	ATM-D DEPTH: 25.5 HDG 160 FIX 2 RUN 2
1525	ATM-E DEPTH: 33.5 HDG 170 FIX 1 RUN 1
1604	ATM-G DEPTH: 26 HDG 160 FIX 1 RUN 1
1719	ATM-L DEPTH 25.5 HDG: 160 FIX 2 RUN 2
18:10	WRAPPED ANCHOR LINE AROUND WHEEL WHILE POSITIONING FOR ATM-H
18:25	CUT ANCHOR LINE AT WINCH FREING TO UNWRAP LINE FROM WHEEL

DAILY LOG

JOB NO. 1170 LOCATION:

CLIENT: ATM DATE: 11/21/93

INSTRUMENTATION: DGPS / UZBRACORE

TIME	
6:30	DOCKED AT HARBOR TOWN - ON STBY FOR WEATHER AND TO UNWRAP ANCHOR
	ADVISED PROJECT COMPLETE BEGIN DEMOBILIZATION

FIELD VIBRACORE LOGS

ALPINE OCEAN SEISMIC SURVEY, INC.
70 Oak Street, Norwood, New Jersey 07648
(201) 768-8000 • Telex: 135 705 • Fax: 201-768-5750

CORE LOG

Core No. 7 Date: 11/18/93 Area: JUPITER INLET Grid Position _____

Penetration 19 ft.
Recovery 16 ft.
Water Depth:
Uncorrected 27.0
Tide -3.1
Corrected 23.9
Position:
Vibration Time:
Stop 9:42
Start 9:34
Total Elapsed time _____

Coring Time	Core Description	Coring Time	Core Description
0		21	
1	COARSE SAND	22	
2	(GREY) W/SHELL	23	
3	FRAG.	24	
4		25	
5		26	
6		27	
7	COARSE DK. GREY	28	
8	SAND W/SHELL FRAG	29	
9	↓	30	
10	COARSE+M.F SAND	31	
11	GREY W/SHELL FRAG	32	
12		33	
13		34	
14		35	
15		36	
16		37	
17		38	
18		39	
19		40	
20			

Comments: _____

N/A

ALPINE OCEAN SEISMIC SURVEY, INC.
70 Oak Street, Norwood, New Jersey 07648
(201) 768-8000 • Telex: 135 705 • Fax: 201-768-5750

CORE LOG

Core No. 2 Date: 11/18/93 Area: [illegible] Grid Position _____

Penetration 14 ft.

Recovery 1.2 ft.

Water Depth:

Uncorrected 33.5

Tide 3.5

Corrected 30.0

Position:

Vibration Time:

Stop 1134

Start 1131

Total Elapsed time _____

Coring Time	Core Description	Coring Time	Core Description
0		21	
1	SHELL FRAG	22	
2	W/COARSE	23	
3	GREY SAND	24	
4		25	
5		26	
6		27	
7		28	
8		29	
9		30	
10		31	
11		32	
12		33	
13		34	
14		35	
15		36	
16		37	
17		38	
18		39	
19		40	
20			

Comments:

RUN 1

PENETROMETER HAD READING INDICATING LARGER PENETRATION IN THAN - ON PULLOUT. PULLOUT 14 ft

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CORE LOG

Core No. 2 Date: 11/18/93 Area: _____ Grid Position _____

Penetration 18 ft.

Recovery 5.3 ft.

Water Depth:

Uncorrected 33.5

Tide 2.6

Corrected 30.9

Position:

_____

_____

_____

Vibration Time:

Stop 1317

Start 1314

Total Elapsed time _____

Coring Time	Core Description	Coring Time	Core Description
0		21	
1		22	
2		23	
3		24	
4		25	
5		26	
6		27	
7		28	
8	W	29	
9		30	
10		31	
11		32	
12	SHELL FRAG W/ SAND (COARSE)	33	
13		34	
14		35	
15	F TO M-F SAND	36	
16	W/ SHELL FRAG. AND WHOLE SHELLS	37	
17		38	
18		39	
19		40	
20			

Comments: RUN 2

JETTING TO 11'

TOTAL RECOVERY = 16.5

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CORE LOG

Core No. 8 Date: 11/18/93 Area: JUPITER Grid Position _____

Penetration 19 ft.
Recovery 12 ft.

Water Depth:
Uncorrected 24.0
Tide 2.0
Corrected 22.0

Position:

Vibration Time:
Stop 1424
Start 1408
Total Elapsed time _____

Coring Time	Core Description	Coring Time	Core Description
0		21	
1	SHELL FRAG.	22	
2	W/COARSE GREY SAND	23	
3		24	
4		25	
5		26	
6		27	
7		28	
8		29	
9		30	
10		31	
11	SHELLS & SHELL FRAG &	32	
12	COARSE SAND	33	
13		34	
14		35	
15		36	
16		37	
17		38	
18		39	
19		40	
20			

Comments: RUN 1

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CORE LOG

Core No. 8 Date: 11/18/93 Area: JUNEAU Grid Position _____

Penetration 19 ft.
Recovery 6.7 ft.

Water Depth:
Uncorrected 22.8
Tide 1.1
Corrected 21.7

Position:

Vibration Time:
Stop 1533
Start 1525
Total Elapsed time _____

Coring Time	Core Description
0	
1	
2	
3	
4	
5	
6	JET
7	
8	
9	
10	
11	
12	SHELL FRAG W/ COARSE SAND
13	
14	MEDIUM GREY
15	SAND W/ SHELL
16	
17	F TO M-F SAND
18	
19	
20	
21	
22	
23	
24	
25	
26	
27	
28	
29	
30	
31	
32	
33	
34	
35	
36	
37	
38	
39	
40	

Comments:

RUN 2
JET TO 11 ft
TOTAL RECOVERY: 17.7

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CORE LOG

Core No. 1 Date: 11/18/93 Area: JUPITER Grid Position

Penetration 19 ft.
Recovery 16.2 ft.

Water Depth:
Uncorrected 36.5
Tide 0.5
Corrected 36.0

Position:

Vibration Time:
Stop 1650
Start 1644
Total Elapsed time

Coring Time	Core Description	Coring Time	Core Description
0		20	
1	FINE GREY W/SOME SHELL FRAG.	21	
2	FINE GREY SAND	22	
3	W/SHELL FRAG	23	
4		24	
5		25	
6	M-C SAND W/SHELL FRAG	26	
7	M-C SAND w/	27	
8	SHELLS + SHELL FRAG.	28	
9		29	
10		30	
11		31	
12		32	
13	FINE WHITE SAND	33	
14	LIMESTONE FRAG SHELLS + SHELL FRAG	34	
15		35	
16	F M WHITE SAND W/SHELL FRAG	36	
17		37	
18		38	
19		39	
20		40	

Comments:

RUN 1

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CORE LOG

Core No. 9 Date: 11/18/93 Area: JUPITER Grid Position _____

Penetration 19 ft.
Recovery 19.2 ft.

Water Depth:
Uncorrected 36.5
Tide -.4
Corrected 36.1

Position:

Vibration Time:
Stop 1734
Start 1726
Total Elapsed time _____

Coring Time	Core Description	Coring Time	Core Description
0	GREY COARSE SAND W/SHELL FRAG. + SHELLS	21	
1		22	
2	GREY COARSE SAND	23	
3	W/SHELL FRAG.	24	
4		25	
5	GREY COARSE	26	
6	SAND W/SHELL FRAG.	27	
7	TRACE OF WHITE	28	
8	(FINE SAND/ LIMESTONE)	29	
9		30	
10	WHITE GREY SAND	31	
11	(LIMESTONE?)	32	
12	SHELL FRAG.	33	
13		34	
14		35	
15	COARSE SAND	36	
16	LIMESTONE	37	
17	SHELL FRAG.	38	
18		39	
19		40	
20			

Comments: RUN 1

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CORE LOG

Core No. 10 Date: 11/19/93 Area: JEFFREY Grid Position

Penetration 18 ft.
Recovery 12.7 ft.

Water Depth:
Uncorrected 22.5
Tide 1.2
Corrected 21.3

Position:

Vibration Time:
Stop 8:10
Start 8:01
Total Elapsed time

Coring Time	Core Description	Coring Time	Core Description
0		21	
1	COARSE SAND	22	
2	W/ SHELL FRAG.	23	
3	↓	24	
4		25	
5	MEDIUM SAND	26	
6	W/ SOME SHELL	27	
7	FRAG.	28	
8		29	
9	F-M SAND	30	
10	W/ SOME	31	
11	SHELL FRAG.	32	
12		33	
13		34	
14		35	
15		36	
16		37	
17		38	
18		39	
19		40	
20			

Comments:

RUN 1

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CORE LOG

Core No. 10 Date: 11/19/93 Area: _____ Grid Position _____

Penetration 19 ft.

Recovery 6.7 ft.

Water Depth:

Uncorrected 23

Tide -1.9

Corrected 21.1

Position:

Vibration Time:

Stop 9:03

Start 8:54

Total Elapsed time _____

Coring Time	Core Description	Coring Time	Core Description
0		21	
1		22	
2		23	
3		24	
4		25	
5	JET	26	
6		27	
7		28	
8		29	
9		30	
10		31	
11		32	
12	80% shell h./frag	33	
13	w/ fine sands	34	
14		35	
15	fine sands	36	
16	w/ H2S smell	37	
17		38	
18		39	
19		40	
20			

Comments:

RUN 2

JET TO 11

TOTAL RECOVERY 18.4'

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CORE LOG

Core No. 4 Date: 11/19/93 Area: _____ Grid Position _____

Penetration 19 ft.

Recovery 14.7 ft.

Water Depth:

Uncorrected 39.5

Tide 2.6

Corrected 36.9

Position:

Vibration Time:

Stop 9:57

Start 9:50

Total Elapsed time _____

Coring Time	Core Description	Coring Time	Core Description
0		21	
1	SHELL FRAG	22	
2	WHOLE SHELL	23	
3	COARSE SAND	24	
4		25	
5		26	
6	V- FINE SAND	27	
7	ORGANIC	28	
8	HIGH WATER CONTENT	29	
9		30	
10		31	
11	LIMESTONE COARSE	32	
12	SAND W/ SHELLS	33	
13		34	
14		35	
15		36	
16		37	
17		38	
18		39	
19		40	
20			

Comments: RUN 1

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CORE LOG

Core No. 4 Date: 11/19/93 Area: _____ Grid Position _____

Penetration 20 ft.
Recovery 4.3 ft.

Water Depth:
Uncorrected 39.5
Tide 2.9
Corrected 36.6

Position:

Vibration Time:
Stop 1023
Start 1021
Total Elapsed time ____

Coring Time	Core Description	Coring Time	Core Description
0		21	
1		22	
2		23	
3		24	
4		25	
5	JET	26	
6		27	
7		28	
8		29	
9		30	
10		31	
11		32	
12		33	
13		34	
14		35	
15	COARSE LIMESTONE	36	
16	large shell & rock at 14'	37	
17		38	
18		39	
19		40	
20			

Comments:
18'3" total recovery
RUN 2
JET TO 14
TOTAL RECOVERY = 18.3

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CORE LOG

Core No. 3 Date: 11/19/93 Area: _____ Grid Position _____

Penetration 19 ft.
Recovery 16 ft.

Water Depth:
Uncorrected 37.5
Tide 3.2
Corrected 34.3

Position:
_____
_____
_____

Vibration Time:
Stop 1108
Start 1101
Total Elapsed time _____

Coring Time	Core Description	Coring Time	Core Description
0	COARSE SAND w/ SHELL FRAG	21	
1		22	
2		23	
3		24	
4		25	
5		26	
6		27	
7	COARSE SAND	28	
8	LIMESTONE	29	
9	SHELL FRAG.	30	
10		31	
11		32	
12		33	
13	LIMESTONE	34	
14	LARGE SHELL	35	
15	FRAG.	36	
16		37	
17		38	
18		39	
19		40	
20			

Comments: _____

RUN 1

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CORE LOG

Core No. 5 Date: 11/19/93 Area: _____ Grid Position _____

Penetration 19 ft.

Recovery 17 ft.

Water Depth:

Uncorrected 40 ft

Tide 3.3

Corrected 36.7

Position:

Vibration Time:

Stop 1214

Start 1209

Total Elapsed time _____

Coring Time		Core Description	Coring Time		Core Description
	0			21	
	1	med/fine sands		22	
	2			23	
	3	med/fine sands		24	
	4	w/shell hash		25	
	5	limestone frag.		26	
	6	w/ ~1-2D, some		27	
	7	organics		28	
	8	all limestone		29	
	9	fines		30	
	10			31	
	11			32	
	12			33	
	13	limestone		34	
	14	fines w/ base		35	
	15	limestone		36	
	16			37	
	17			38	
	18			39	
	19			40	
	20				

Comments:

total recovery RUN 1.
17'
Penetrated 19'

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CORE LOG

Core No. 6 Date: 11/19/93 Area: _____ Grid Position _____

Penetration 15 ft.

Recovery 13 ft.

Water Depth:

Uncorrected 30.5

Tide .9

Corrected 29.6

Position:

Vibration Time:

Stop 1657

Start 1645

Total Elapsed time _____

Coring Time		Core Description	Coring Time		Core Description
	0			21	
	1	shell lash		22	
	2	w/ med		23	
	3	sands		24	
	4	shell lash		25	
	5	w/ med		26	
	6	sands		27	
	7	(50/50)		28	
	8			29	
	9	50/50		30	
	10	shell lash		31	
	11	& med sands		32	
	12			33	
	13			34	
	14			35	
	15			36	
	16			37	
	17			38	
	18			39	
	19			40	
	20				

Comments:

Total Recovery 13'

Penetrate 15' RUN 1

5 min REFUSAL AT 15'

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CORE LOG

Core No. 6 Date: 11/19/93 Area: _____ Grid Position _____

Penetration 19 ft.
Recovery 3 ft.

Water Depth:
Uncorrected 30.5
Tide -.7
Corrected 29.8

Position:

Vibration Time:
Stop 1746
Start 1721
Total Elapsed time _____

Coring Time	Core Description	Coring Time	Core Description
0		21	
1		22	
2		23	
3		24	
4	JET	25	
5		26	
6		27	
7		28	
8		29	
9		30	
10		31	
11		32	
12		33	
13	FINE GREY SAND	34	
14	SOME SHELL FRAG	35	
15	HIGH WATER CONT.	36	
16	FINE/COARSE SAND + SHELL FRAG.	37	
17		38	
18		39	
19		40	
20			

Comments:

RUN 2

TOTAL RECOVERY: 16 ft.

JET TO 13'

5 MIN REJECTION AT 13' WITH JET. CUT JET KEPT ON

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CORE LOG

Core No. A Date: 11/20/93 Area: _____ Grid Position _____

Penetration 19 ft.
Recovery 16.3 ft.

Water Depth:
Uncorrected 35
Tide .7
Corrected 34.3

Position:

Vibration Time:
Stop 8:03
Start 7:58
Total Elapsed time _____

Coring Time	Core Description	Coring Time	Core Description
0		20	
1	med shell hash (no sand)	21	
2		22	
3	med shell	23	
4	hash	24	
5	no: sand	25	
6		26	
7	med to	27	
8	large shell hash	28	
9	(cobble size)	29	
10		30	
11		31	
12	med/large shell hash	32	
13		33	
14	fine lime stone /	34	
15	fine shell hash	35	
16	mix	36	
17	(lime stone	37	
18	hard base	38	
19		39	
20		40	

Comments:

Total Penetration 19'
Total Recovery 16'3" RUN 1

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CORE LOG

Core No. B Date: 11/20/93 Area: _____ Grid Position _____

Penetration 20 ft.
Recovery 17.3 ft.

Water Depth:
Uncorrected 36
Tide 1.2
Corrected 34.8

Position:

Vibration Time:
Stop 849
Start 842
Total Elapsed time _____

Coring Time		Core Description	Coring Time		Core Description
	0			21	
	1	med sands		22	
	2			23	
	3			24	
	4	med sands		25	
	5	w/ @ 20%		26	
	6	shell hash (more at bottom)		27	
	7	~~H_2S odor~~		28	
	8	H_2S odor		29	
	9	mainly		30	
	10	shell hash		31	
	11	med/med		32	
	12	sands w/ shell frags		33	
	13	med sands		34	
	14	w/ shell		35	
	15	frags + larger		36	
	16	shell		37	
	17	~~limestone loose rock~~		38	
	18			39	
	19			40	
	20				

RECEIVED
NOV 2 1994
BUREAU OF BEACHES & COASTAL SYSTEMS

Comments:

Run 1
Penetration 20'
Total Recovery 17'3"

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CORE LOG

Core No. C Date: 11/20/93 Area: _____ Grid Position _____

Penetration 19 ft.

Recovery 15 ft.

Water Depth:

Uncorrected 35.5

Tide 2.5

Corrected 33.0

Position:

_____

_____

_____ _____

Vibration Time:

Stop 10:59

Start 10:51

Total Elapsed time _____

Coring Time		Core Description	Coring Time		Core Description
	0				
	1			21	
	2			22	
	3			23	
	4			24	
	5			25	
	6			26	
	7			27	
	8			28	
	9			29	
	10			30	
	11			31	
	12			32	
	13			33	
	14			34	
	15			35	
	16			36	
	17			37	
	18			38	
	19			39	
	20			40	

Comments: Run 1

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CORE LOG

Core No. D Date: 11/20/93 Area: _____ Grid Position _____

Penetration 14 ft.
Recovery 14 ft.

Water Depth:
Uncorrected 26
Tide -3.1
Corrected 22.9

Position:
_____
_____
_____ _____

Vibration Time:
Stop 1336
Start 1329
Total Elapsed time _____

Coring Time	Core Description	Coring Time	Core Description
0		21	
1		22	
2		23	
3	SHELL HASH	24	
4	W/ COARSE	25	
5	SAND	26	
6		27	
7		28	
8		29	
9	TO	30	
10		31	
11		32	
12		33	
13	Shell Hash	34	
14	(FINE) W/ COARSE SANDS	35	
15		36	
16		37	
17		38	
18		39	
19		40	
20			

Comments: RUN 1

5 MIN: REJECTION AT 13'

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CORE LOG

Core No. D Date: 11/20/93 Area: _____ Grid Position _____

Penetration 17 ft.
Recovery 5.4 ft.

Water Depth:
Uncorrected 25.5
Tide 2.9
Corrected 22.6

Position:

Vibration Time:
Stop 1442
Start 1426
Total Elapsed time _____

Coring Time	Core Description	Coring Time	Core Description
0		21	
1		22	
2		23	
3		24	
4		25	
5		26	
6		27	
7	JET	28	
8		29	
9		30	
10		31	
11		32	
12		33	
13	COARSE SHELL	34	
14	FRAG + COARSE	35	
15	SAND	36	
16		37	
17	V-F SAND	38	
18		39	
19		40	
20			

Comments:

TOTAL RECOVERY 17.4
RUN 2
JET TO 12' - 5 MIN REJECTION AT 13'
VIBRATING - HEAD ALONE AT 13'

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CORE LOG

Core No. E Date: 11/20/93 Area: _____ Grid Position _____

Penetration 17 ft.
Recovery 16 ft.

Water Depth:
Uncorrected 33.5
Tide 2.3
Corrected 31.2

Position:
_____
_____
_____

Vibration Time:
Stop 1533
Start 1525
Total Elapsed time _____

Coring Time		Core Description	Coring Time		Core Description
	0	small		21	
	1	shell hash		22	
	2	shell hash		23	
	3	w/ med/fine		24	
	4	sands		25	
	5			26	
	6	med/fine sands		27	
	7	fine sands		28	
	8	slight H_2S		29	
	9	smell		30	
	10			31	
	11			32	
	12	fine sands		33	
	13	w/ mud/clay		34	
	14	H_2S smell		35	
	15			36	
	16	large shell		37	
	17	coquina bedrock		38	
	18			39	
	19			40	
	20				

Comments: Penetration 17'
Total Recovery 16'
RUN 1

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CORE LOG

Core No. 6 Date: 11/20/93 Area: _____ Grid Position _____

Penetration 11 ft.
Recovery 9.3 ft.

Water Depth:
Uncorrected 26
Tide 1.9
Corrected 24.1

Position:

Vibration Time:
Stop 1623
Start 1604
Total Elapsed time _____

Coring Time	Core Description	Coring Time	Core Description
0		20	
1	fine shell hash	21	
2		22	
3		23	
4		24	
5		25	
6	fine shell hash	26	
7		27	
8		28	
9	very fine sand	29	
10		30	
11		31	
12		32	
13		33	
14		34	
15		35	
16		36	
17		37	
18		38	
19		39	
20		40	

Comments: 11' Penetration / 9.3' Recovery

RUN 1

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CORE LOG

Core No. G7 Date: 11/20/93 Area: _____ Grid Position _____

Penetration 19 ft.
Recovery 10¼ ft.

Water Depth:
Uncorrected 25.5
Tide 1.2
Corrected 24.3

Position:

Vibration Time:
Stop 1731
Start 1732
Total Elapsed time _____

Coring Time	Core Description	Coring Time	Core Description
0		21	
1		22	
2		23	
3		24	
4		25	
5		26	
6		27	
7		28	
8		29	
9		30	
10	shell hash	31	
11	w/ mix sand	32	
12		33	
13	fine-med	34	
14	sands	35	
15		36	
16	fine sands	37	
17	& med sand	38	
18		39	
19		40	
20			

Comments: TOTAL RECOV. 19.3

RUN 2

JET TO 9 FT.

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CORE LOG

Core No._____ Date:_____ Area:_____ Grid Position_____

Penetration _____ft.

Recovery _____ft.

Water Depth:

Uncorrected _____

Tide _____

Corrected _____

Position:

_____

_____

_____ _____

Vibration Time:

Stop _____

Start _____

Total Elapsed time _____

	Coring Time	Core Description		Coring Time	Core Description
0			21		
1			22		
2			23		
3			24		
4			25		
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