

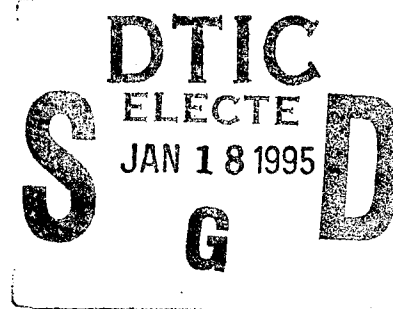


**US Army Corps
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Technical Report GL-94-39
November 1994

In Situ Shear Wave Measurements for Evaluating Dynamic Soil Properties at the Bannister Federal Complex, Kansas City, Missouri

by José L. Llopis, Thomas B. Kean II



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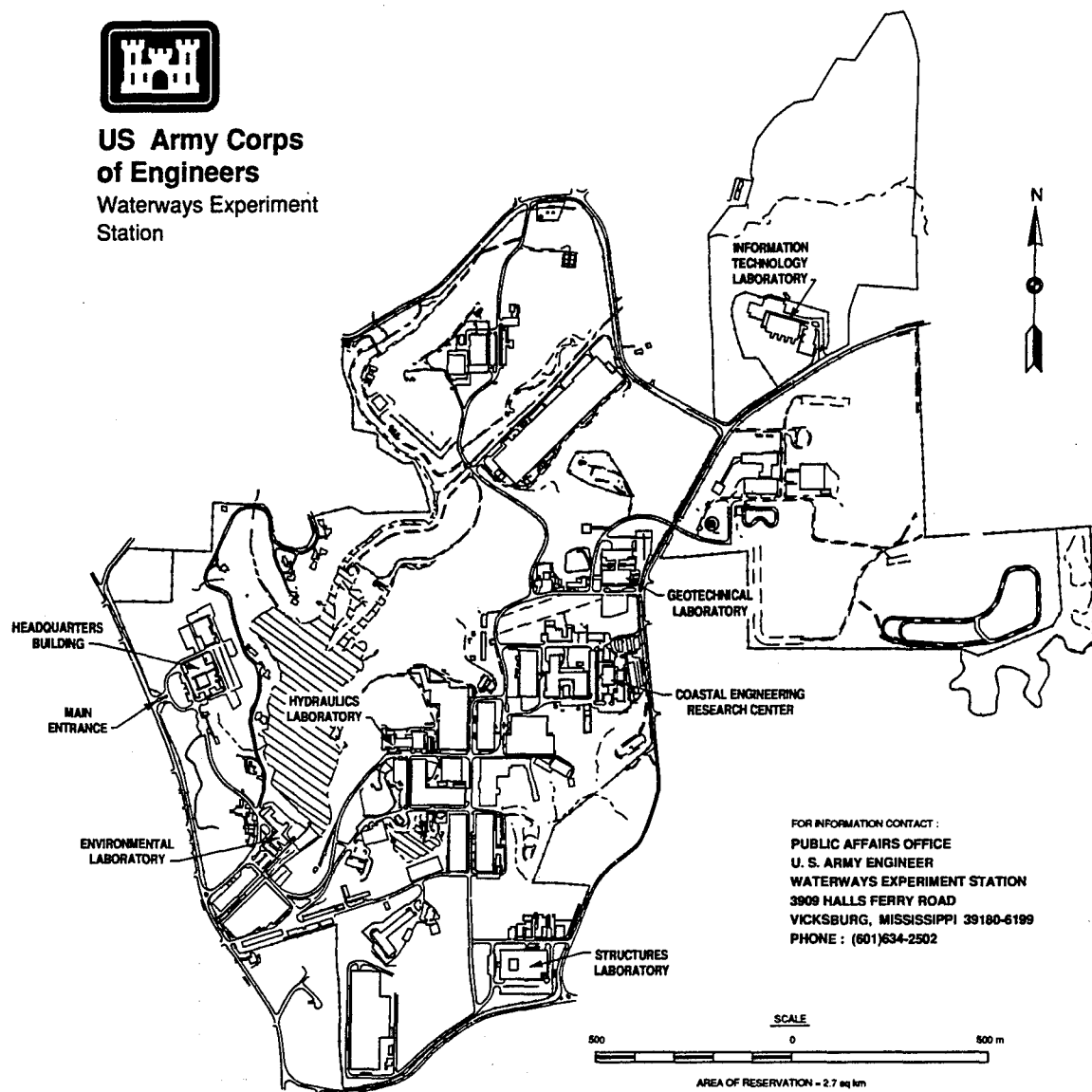
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Waterways Experiment Station Cataloging-in-Publication Data

Llopis, José L.

In situ shear wave measurements for evaluating dynamic soil properties at the Bannister Federal Complex, Kansas City, Missouri / by José L. Llopis, Thomas B. Kean II ; prepared for U.S. Department of Energy, Kansas City Area Office.

271 p. : ill. ; 28 cm. -- (Technical report ; GL-94-39)

Includes bibliographic references.

1. Soil dynamics -- Missouri -- Kansas City. 2. Shear waves -- Measurement. 3. Soils -- Missouri -- Kansas City -- Testing. 4. Soil penetration test. I. Kean, Thomas B. II. United States. Army. Corps of Engineers. III. U.S. Army Engineer Waterways Experiment Station. IV. Geotechnical Laboratory (U.S.) V. United States. Dept. of Energy. Kansas City Area Office. VI. Title. VII. Series: Technical report (U.S. Army Engineer Waterways Experiment Station) ; GL-94-39.

TA7 W34 no.GL-94-39

Contents

Preface	iv
Conversion Factors, Non-SI to SI Units of Measurement	v
1-Introduction	1
2-Test Principles and Field Procedures	3
Crosshole S-wave tests	3
Soil sampling and testing	4
Seismic cone penetrometer tests	5
3-Test Results and Interpretation	7
Field and laboratory soils tests	7
Crosshole S-wave tests	10
Seismic cone penetrometer tests	11
4-Summary	12
References	14
Figures 1-27	
Appendix A: Survey Results	A1
Appendix B: Boring Logs	B1
Appendix C: Laboratory Soil Test Results	C1
Appendix D: Seismic Cone Penetrometer Test Results	D1
SF 298	

Preface

A subsurface site investigation was conducted and supervised by personnel of the U.S. Army Engineer Waterways Experiment Station (WES), at the Bannister Federal Complex, Kansas City, Missouri, during the period 25 June to 1 July 1994. The work was funded under MIPR KC-94-114 dated 12 May 1994.

Mr. José L. Llopis of the Engineering Geophysics Branch (EGB), Earthquake Engineering and Geosciences Division (EEGD), Geotechnical Laboratory (GL), WES, was the project engineer. The crosshole S-wave velocity field investigation was performed by Messrs. José L. Llopis and Thomas B. Kean II, EGB. The S-wave crosshole test borings were installed by personnel of the U.S. Army Engineer District, Kansas City, (CEMRK) during 23 May to 1 June 1994. Crosshole borings and seismic cone penetrometer test (SCPT) push locations were surveyed by CEMRK personnel. Mr. Steve Jirousek was the CEMRK project geologist. The SCPT's were performed by Mr. Spencer A. Vandehey, Vandehey Soil Exploration, Banks, Oregon. Messrs. Raymond Meis and Mark Drury were the U.S. Department of Energy, Kansas City Area Office, and Allied-Signal Aerospace Corporation project managers, respectively.

The work was performed under the direct supervision of Mr. Joseph R. Curro, Jr., Chief, EGB, and under the general supervision of Drs. A. G. Franklin, Chief, EEGD, and William F. Marcuson III, Chief, GL.

At the time of publication of this report, Director of WES was Dr. Robert W. Whalin. Commander was COL Bruce K. Howard, EN.

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Conversion Factors, Non-SI to SI Units of Measurement

Non-SI units of measurement used in this report can be converted to SI units as follows:

Multiply	By	To Obtain
degrees (angle)	0.01745329	radians
feet	0.3048	meters
feet per second	0.3048	meters per second
gallons	3.785412	cubic decimeters
inches	2.54	centimeters
inches per second	2.54	centimeters per second
miles (US statute)	1.609347	kilometers
pounds (force)	4.448222	newtons
tons per square foot	95.76052	kilopascals

1 Introduction

Current computerized seismic wave propagation analysis procedures for building foundations require that values of shear-wave (S-wave) propagation velocities as a function of depth be determined. The S-wave velocities are used in conjunction with conventional field sampling and laboratory testing to provide soil property information for a dynamic analysis of buildings and their foundations.

The Bannister Federal Complex (BFC) is located in southern Kansas City, MO, at 2000 East 95th Street, as shown in Figure 1. The BFC is a Federal facility that consists chiefly of one large main building along with an assemblage of smaller surrounding structures. The main building has approximate dimensions of 900 by 1600 ft and is occupied by the U.S. General Services Administration (GSA), the U.S. Marine Corps, and the U.S. Department of Energy (DOE). The DOE administers a manufacturing facility in the eastern portion of the main building which is operated, under contract, by the Allied-Signal Aerospace Corporation.

The DOE concerns about the potential damaging effects on manufacturing facilities and processes by seismic loadings has prompted a dynamic analysis to be initiated. At the request of the DOE the U.S. Army Engineer Waterways Experiment Station (WES) conducted a subsurface site investigation to characterize in situ S-wave velocities and other physical properties related to the foundation in the vicinity of the main building at the BFC. The information acquired from this investigation will be used in a dynamic analysis to determine the effects of seismic loadings on the main building and to aid in designing any needed structural modifications.

The WES/DOE finalized test program consisted of crosshole S-wave, seismic cone penetrometer testing (SCPT), and laboratory soil analysis which would provide the data necessary to complete an analysis of the building's response to earthquake loadings. The location of the crosshole sets and SCPT pushes are shown in Figure 2. The crosshole and SCPT push locations shown in Figure 2 are approximate locations. The surveyed crosshole and SCPT push coordinates and elevations are given in Appendix A.

The BFC is located on flood plain deposits of Indian Creek which flows easterly south of the plant. This creek joins the Blue River southeast of the plant with the resulting flow bordering the east property line. Previous studies have indicated that the site is underlain by approximately 40 ft of clay alluvium and which is also underlain by a basal clay-gravel layer. Underlying the clay-gravel layer is a shaly bedrock of the Pleasonton Group. The site is predominantly level with the exception being the bluff line on the northern portion of the site.

2 Test Principles and Procedures

Crosshole S-wave tests

The purpose of running crosshole tests was to determine horizontal S-wave velocities as a function of depth. An advantage of the crosshole test as opposed to surface seismic refraction test is its ability to detect low velocity layers underlying or sandwiched between layers of higher velocity. One shortcoming of the crosshole method is that boreholes are required for testing. Thus, crosshole tests seismic tests are more costly than a surface seismic refraction test. However, the crosshole technique is considered to be more definitive and accurate than the surface seismic refraction test for measuring S-wave velocities. Basically, the testing consists of measuring the arrival time of an S-wave that has traveled from a source in one borehole to a detector in another borehole(s) at the same elevation. This procedure is then repeated for the next test elevation. Knowing the distance between borings and the time the S-waves take to travel across this distance the velocity can be computed (distance divided by time).

Two crosshole sets were used for crosshole testing and their locations are shown in Figure 2. Each crosshole set consisted of three in-line borings spaced approximately 10 ft apart. Borings D-40, D-41, and D-42 which were used for the crosshole set located in the northeast parking lot were drilled to depths of approximately 52 ft, whereas borings D-43, D-44, and D-45 used for the crosshole set in the southeastern parking lot were drilled to approximate depths of 57 ft. The borings were designed to penetrate approximately 10 ft of bedrock. The crosshole borings, with a diameter of 6.25 in., were cased with a 4-in. inside diameter (ID) Schedule 40 polyvinyl chloride (PVC) casing and the bottom capped. The annular space between the casing and the walls of the boring were grouted with a material that approximated the density of the surrounding in situ material. In this case, a mixture obtained by mixing 10 lbs. of bentonite and 10 lbs. of portland cement to approximately 7.5 gal. of water was used. The cap at the bottom of the boring consisted of a one-way valve that was fitted for a tremie pipe attachment. The tremie pipe was placed through the inside of the casing and attached to the bottom check valve. Grouting was carried out in one continuous operation by pumping grout through the tremie pipe, filling the

annular space between the drilled hole and the casing, from the bottom of the borehole to the surface.

Borehole deviation (drift) surveys were conducted to determine the precise vertical alignment of each boring. Figure 3 shows the deviation probe and instrumentation used to conduct the borehole deviation surveys. The incremental borehole deviation for each elevation along with the total deviation for the boring are indicated on the control panel. Accurate reduction of data from the crosshole tests requires knowledge of the drift of each boring so that a straight-line distance between borings at each test depth can be established.

S-wave velocity measurements were obtained by placing an S-wave source in the center hole (source hole) of each crosshole set and detectors, at the same elevation, in the two outer boreholes (receiver holes). The detectors consisted of a triaxial array of geophones, or velocity transducers, (two mounted horizontally at 90 deg. to each other, and one vertically oriented) in one container. The container housing the geophones was clamped firmly to the casing wall by means of an expanding pneumatic piston. A downhole vibrator was used as a source of vertically polarized S-waves. The S-wave testing procedure consisted of lowering the vibrator in the borehole to a selected test elevation and clamping the vibrator firmly to the sidewalls of casing also with an expanding pneumatic piston. When the vibrator was in position, the operator tested a range of frequencies (50 to 250 Hz) and selected one that propagated well (one with a high amplitude) through the transmitting medium. The time required for the S-wave to travel from source to receiver hole was recorded using a portable, 24-channel seismograph with data-enhancement capability. This procedure was repeated at 5-ft depth intervals from a depth of 5 ft to the bottom of the borehole. Figure 4 illustrates the crosshole S-wave technique. An analysis of the crosshole data obtained at each test elevation was made with the aid of the computer program CROSSHOLE developed at WES (Butler, Skoglund and Landers 1978). Further information regarding geophysical testing and interpretation procedures used in this study is given in Engineer Manual EM 110-1-1802 (Department of the Army 1979).

Soil sampling and testing

Standard penetration tests (SPT's) were conducted at 5 ft intervals in borings D-40 and D-43, the center borings of the northeast and southeast parking lot crosshole sets, respectively. The SPT blow counts, or N-value, can be used to relate engineering behavior of soils to widely published correlations. The SPT's were conducted in strict compliance to ASTM Designation: D 1586-84. For this investigation refusal was defined as 50 blows per foot.

Soil samples were collected from borings D-40 and D-43 at 5-ft. intervals. The samples were placed in jars, sealed and sent to the U.S. Army Engineer

Missouri River Division Laboratory for further visual examination and classification. Soil tests included grain-size distribution, natural water content, Atterberg limits, and soil classification according to the Unified Soil Classification System (USCS) for each soil sample. Laboratory testing was performed between 12 and 14 July 1994. The laboratory tests were performed in accordance to procedures described in Engineer Manual EM 1110-2-1906 (Department of the Army 1970).

Field logs of each boring were prepared by the drill crew. The logs include visual classifications of the materials encountered during drilling as well as the driller's interpretation of the subsurface conditions between samples. Also recorded on the logs are the SPT blow counts and soil sample locations.

Seismic cone penetrometer test

The cone penetrometer test (CPT) was originally developed in Europe as a rapid and cost-effective means of determining soil stratigraphy and soil strength parameters. It is now used extensively for off-shore and on-shore geotechnical applications. The cone used for this investigation, besides having the capability to determine soil stratigraphy and soil strength parameters also allowed S-wave velocity measurements to be made.

The SCPT used for this investigation utilized a drill-rig-mounted hydraulically-powered push apparatus, to force the instrumented cone penetrometer into the soil media. The electric cone had a 60° cone tip with a 1.4-in. diameter, and included two load cells to simultaneously measure tip penetration resistance and skin, or sleeve, friction as the cone was advanced. The cone penetrometer was pushed at a rate of approximately 0.79 in/sec. Steel rods, 3.28 ft long, were used to push the cone penetrometer into the soil. Tip resistance, sleeve friction, and cone inclination measurements were taken at 0.33-ft. depth increments. A cable prethreaded through the center of the hollow push rods, connected the cone to the data acquisition system at the ground surface. Each SCPT was pushed to refusal. Because of the soil's lack of lateral support on the cone rods and concern over bending the rods refusal was arbitrarily set to a tip resistance value in excess of 100 to 125 Tsf. These measurements provide a continuous record of soil resistance to penetration which can be used to characterize the soil media in detail. The cone data can be interpreted to give a good continuous prediction of soil type and shear strength (Robertson and Campanella 1983). Full details of the design of an electronic cone are given by Campanella and Robertson, 1981.

Also embedded into the cone body is a small horizontally oriented geophone which allows S-wave velocity measurements to be taken. The downhole S-wave test was conducted by pushing the cone at an approximate rate of 0.79 in/sec to a depth of 4.59 ft and stopping further advancement. A horizontally polarized S-wave was then generated on the ground surface by striking the end of a steel beam, that was weighted down by the rear drill-rig levelling pads, with a switched sledgehammer. The geophone in the cone

body was positioned so that its axis was oriented parallel to the long axis of the steel beam (signal source) in order to detect the horizontal component of the shear wave arrival. The time the S-wave took to travel from the ground surface to the cone was measured and recorded. The cone was then pushed 3.28 ft. using the previous push rate, stopped and another S-wave measurement taken. This procedure was repeated at 3.28-ft intervals until refusal was encountered. The downhole S-wave technique is illustrated in Figure 5.

The S-wave arrival times for each test increment were plotted versus distance from the S-wave source (slant distance) as shown in Figure 6. Best fit straight line segments were then drawn through the plotted points. The slopes of the line segments correspond to the S-wave velocity for that particular depth range.

The cone was pushed at thirteen locations around the facility and their approximate locations are shown in Figure 2. The surveyed SCPT push locations and elevations are given in Appendix A. The SCPT push locations were selected to provide representative S-wave and stratigraphic information of the site. SCPT push locations 1 and 5 were located adjacent to the crosshole sets in the northeast and southeast lots, respectively. The purpose for these two pushes was to compare the downhole and crosshole derived S-wave velocities.

The SCPT is used to determine the velocity of horizontally polarized S-waves propagating vertically through the soil whereas, the crosshole test is used to determine the velocity of vertically polarized S-waves propagating horizontally through the soil. The combined use of these two methods may be used to determine the presence of possible velocity anisotropy. Velocity anisotropy many times can be measured in materials where the S-wave signal has to cross discontinuities such as bedding and fracture planes. For example consider a material that contains numerous beds whose thicknesses are thin relative to the distance between crosshole borings. In this case it would be expected that the downhole-measured S-wave velocities would be less than those measured using the crosshole method.

3 Test Results and Interpretation

Field and laboratory soils tests

The logs of the six boreholes drilled for the two crosshole tests are presented in Appendix B. The logs for the northeast parking lot, borings D-40, D-41, and D-42, show very similar results and indicate a silty lean clay from the near surface to a depth of approximately of 40 ft where a basal clay-gravel layer approximately 1 to 5 ft thick is encountered. The basal clay-gravel layer consists of fine to coarse, semi-rounded to angular limestone gravel in a clay matrix. Beneath the clay gravel at an average depth of 42 ft is the Pleasonton Group bedrock. The bedrock as described in the boring logs is soft to moderately hard shaly siltstone with a greenish-gray to light brown color.

The logs for the southeast parking lot (borings D-43, D-44, and D-45) indicate the same general stratigraphy as that recorded for the northeast lot with the exception being that the basal clay gravel layer and top of bedrock were encountered at approximate depths of 44 and 46 ft, respectively.

The boring logs indicate that in general, the N-values for the silty clays encountered at a depth of 5 ft had values ranging between 15 and 17 blows/ft and decreased to values ranging between 4 and 8 blows/ft below a depth of 10 ft. One anomalously high N-value of 18 blows/ft at a depth of 30 ft in boring D-40 is noted.

Summary tables of the soil laboratory analysis results for the northeast and southeast parking lots are given in Tables 1 and 2, respectively. Detailed laboratory results including grain size curves are presented in Appendix C. Most of the soil samples tested were classified either as a lean or sandy clay, CL, according to the USCS. Samples S-1 and S-6, obtained from boring D-40 (northeast lot), were classified as fat clay, CH, while sample S-8 was visually classified as clayey sandy gravel.

Table 1
Summary of Laboratory Soils Testing - Boring D-40 - Northeast Parking Lot

Sample	Depth, ft	Nat W%	LL	PL	PI	I _L	% Retained on #200 Sieve	% Passing #200 Sieve	Blow Count	Classification
S-1	5.0-6.5	25.0	54	16	38	0.24	6.6	93.4	17	Very dark gray fat clay, CH
S-2	10.0-10.9	31.5	48	16	32	0.48	7.2	92.8	4	Dark gray and dark brown sandy clay, CL
S-3	15.0-16.5	29.0	43	18	25	0.44	8.2	91.8	8	Dark brown sandy clay, CL
S-4	20.0-21.5	30.6	39	15	24	0.65	7.8	92.2	4	Very dark gray lean clay, CL
S-5	25.0-26.4	31.5	40	18	22	0.61	7.7	92.3	5	Very dark gray lean clay, CL
S-6	30.0-31.5	26.6	53	19	34	0.22	5.8	94.2	18	Mottled gray and rust fat clay with some sand, CH
S-7	35.0-36.5	24.6	41	16	25	0.34	25.5	74.5	8	Mottled gray and rust sandy clay, CL
S-8	40.0-40.3		30	15	15					Dark brown clayey sandy gravel Note: Specimen too small for 4-point Atterberg.

LL - Liquid Limit
 PL - Plastic Limit
 PI - Plasticity Index
 I_L - Liquidity Index

*Note: Field measured blow counts

Table 2

Summary of Laboratory Soils Testing - Boring D-43 - Southeast Parking Lot

Sample	Depth, ft	Nat W%	LL	PL	PI	I_L	% Retained on #200 Sieve	% Passing #200 Sieve	* Blow Count	Classification
S-1	5.0-6.5	26.0	45	17	28	0.32	7.3	92.7	15	Dark brown lean clay, CL
S-2	10.0-11.5	26.8	38	17	21	0.47	7.2	92.8	7	Dark brown lean clay, CL
S-3	15.0-16.5	26.7	38	17	21	0.46	5.9	94.1	5	Dark brown lean clay, CL
S-4	20.0-21.5	27.2	35	16	19	0.59	5.7	94.3	4	Dark brown lean clay, CL
S-5	25.0-26.3	32.3	42	18	24	0.60	4.7	95.3	5	Dark brown sandy clay, CL
S-6	30.0-31.5	34.9	42	17	25	0.72	4.2	95.8	4	Very dark gray lean clay, CL
S-7	35.0-36.3	28.5	46	17	29	0.40	8.0	92.0	5	Very dark gray lean clay, CL
S-8	40.0-41.5	30.4	41	16	25	0.58	8.2	91.8	7	Very dark gray lean clay, CL
S-9	45.0-45.4		33	16	17				50	Dark brown gravelly sandy clay, CL Note: Specimen too small for needed sieve analysis. Visual classification with atterberg limits.
S-10	?		26	13	13					Gray highly weathered shale. Lean clay, CL

LL - Liquid Limit

PL - Plastic Limit

PI - Plasticity Index

I_L - Liquidity Index

*Note: Field measured blow counts

Crosshole S-wave tests

The plotted results from program CROSSHOLE for the S-wave tests conducted in the crosshole sets located in the northeast and southeast parking lots are presented in Figures 7 and 8, respectively. The S-wave velocities and depth to interfaces agree very well for the two S-wave tests conducted in the northeast parking lot boring set. The velocities for the materials between depths of 5 and 37 ft ranged between approximately 400 and 725 fps and correspond to the clay soils. Between approximate depths of 37 and 41 ft a velocity of 1900 fps is indicated. This velocity corresponds to the depth at which a clay gravel material is indicated in the boring logs however, because of the likelihood of a refracted arrival caused by the proximity of the bedrock surface, it is likely that this velocity corresponds to a signal travelling both through bedrock and the clay gravel. The bedrock in this area had a velocity of approximately 2050 fps.

The velocities for the clay materials found between depths of 5 and 44 ft in the southeast parking lot borings ranged between approximately 500 and 725 fps. Bedrock in this area had a velocity of approximately 1750 fps which is approximately 300 fps slower than the bedrock velocity measured at the northeast parking lot. The 1750 fps bedrock velocity measured at the southeast lot may correspond to perhaps a softer or slightly more weathered bedrock than found at the northeast lot.

The S-wave data for both crosshole sets is presented in Figure 9. The figure illustrates the close velocity agreement of the clayey materials between both crosshole sets. The figure also indicates that the depth to bedrock was approximately 7 ft greater in the southeast boring set than in the northeast set. An S-wave velocity profile for the alluvium and bedrock was constructed based on the crosshole results and is presented in Table 3.

Table 3 Average Crosshole S-wave Velocities		
Depth Range, ft	Average S-wave Velocity, fps	Material
5 to 12	475	Clay - Alluvium
12 to 21	600	Clay - Alluvium
21 to (37-46) bedrock	700	Clay - Alluvium
(37-46) to ?	1900	Shaly Siltstone - Bedrock

Seismic cone penetrometer tests

Complete SCPT results which include, for each push, separate plots of tip resistance, sleeve friction, friction ratio, cone inclination, and predicted N-value versus depth are presented in Appendix D. Also, presented for each push, are tabulated values of tip resistance, sleeve friction, friction ratio, cone inclination, and the interpreted soil type for each 3.94-in. push interval. The interpreted equivalent N-values and soil classifications were derived from the interactive computer program CPTINTR1 (Greig 1986). The interpretation methods used in CPTINTR1 for estimating equivalent N-values and the soil type are given in Robertson et al. 1983 and Robertson and Campanella 1983.

The plots of tip resistance versus depth commonly show values of less than 10 Tsf throughout the push with the exception of the upper 5 to 7 ft which at times have values in excess of 100 Tsf. Some of the pushes also indicated zones, some as thick as 5 ft, exhibiting higher tip resistance values between depths of 15 and 30 ft.

The sleeve friction versus depth plots basically exhibited the same pattern as the tip resistance plots. Recorded friction values generally showed values less than 0.25 Tsf for the majority of the push. Most of the pushes indicated higher sleeve friction values in upper 5 to 7 ft. Also, as was the case with the tip resistance plots, the sleeve friction plots also indicated zones with higher friction values between depths of 15 and 30 ft.

The plot of equivalent N-values versus depth also indicated fairly consistent values of less than 10 blows/ft throughout the SCPT push. These values agree very well with the SPT values obtained in the two crosshole borings. Again, as was previously displayed in the tip resistance and friction plots, some of the SCPT pushes exhibited higher N-values for the near surface soils and for zones, up to approximately 5 ft thick, between depths of 15 and 30 ft.

The downhole S-wave results, displayed as arrival time versus slant distance, for SCPT pushes 1 through 13 are presented in Figures 10 through 22, respectively. The interpreted downhole S-wave velocity profiles for the SCPT pushes along the east, south, west, and north side of the main building are presented in Figures 23 through 26, respectively. Each figure shows the velocity profiles corresponding to pushes collected along each side of the building. The velocities for the clay materials range between 350 and 775 fps. Two of the pushes, P-8 and P-11, appear to have partially penetrated the clay-gravel layer and the velocity for this layer is approximately 1100 fps.

Figure 27 shows a comparison of the downhole and crosshole S-wave velocities for the northeast and southeast parking lots. The results of the downhole S-waves obtained near the location of the crosshole borings agree very well with the crosshole S-waves. No evidence of any velocity anisotropy was observed i.e., vertically and horizontally propagating S-waves had similar velocities.

4 Summary

This report documents the results of an in situ geophysical investigation conducted in the vicinity of the main building at the Bannister Federal Complex, Kansas City, MO. The purpose of the investigation was to determine the soil and bedrock S-wave velocities of the site. The S-wave values will be used to perform a dynamic analysis of the main building and its foundation.

Laboratory tests on soil samples taken from crosshole borings indicated that the alluvial material across the site is basically a lean clay and according to the USCS a CL. Underlying the clay is a basal clay-gravel layer consisting of fine to coarse, semi-rounded to angular limestone gravel in a clay matrix. The bedrock belongs to the Pleasonton Group and is encountered at an approximate depth of 40 ft. The bedrock is described in the boring logs as a soft to moderately hard shaly siltstone with a greenish-gray to light brown color.

The SCPT was used to collect S-wave velocities, tip resistance and sleeve friction measurements at 13 locations around the main building. Tip resistance and sleeve friction measurements were used to make soil classification and N-values interpretations. The SCPT results indicated the presence of approximately 5-ft thick zones, between depths of 15 and 30 ft that showed slightly higher tip resistance and sleeve friction values. SCPT S-wave results in the alluvium indicated values which increased with depth, ranging between 350 and 775 fps. Two of the pushes, P-8 and P-11, appear to have partially penetrated the clay-gravel layer and the velocity for this layer is approximately 1100 fps.

Averaged crosshole S-wave results indicate values ranging between 475 and 700 fps for the clay materials. The S-wave velocities showed an increase with depth. The average S-wave velocity for the shaly siltstone (bedrock) was 1900 fps.

There was very good agreement between the S-wave results obtained from the SCPT and crosshole tests. Based on these results, if further S-wave measurements of the alluvial materials are needed it is recommended that they be collected using the SCPT. For the alluvial soils found at this site, S-waves

can be collected more economically using the SCPT rather than the crosshole method. However, if further rock velocities are needed it is recommended they be measured using the crosshole method.

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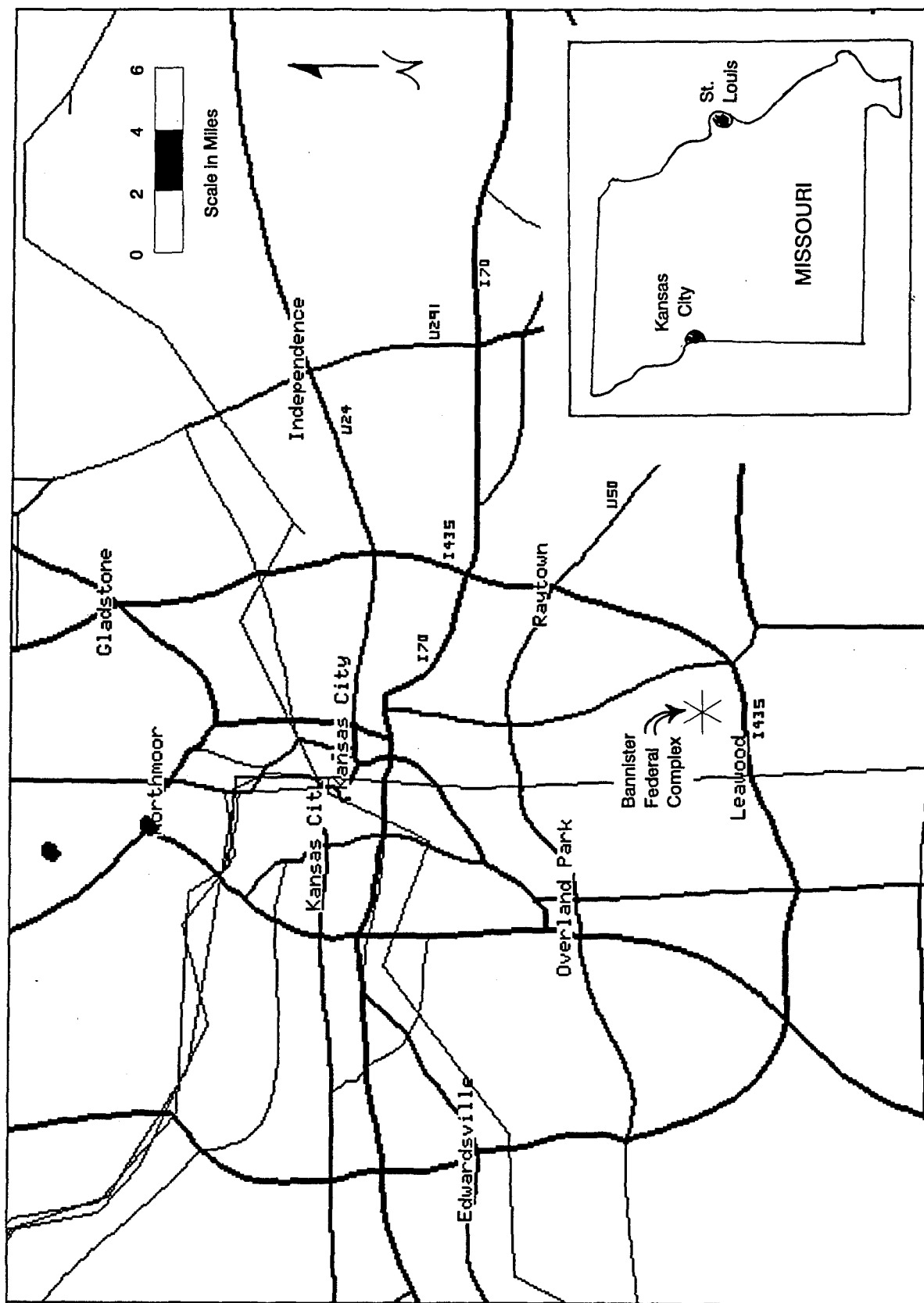


Figure 1. Locality map

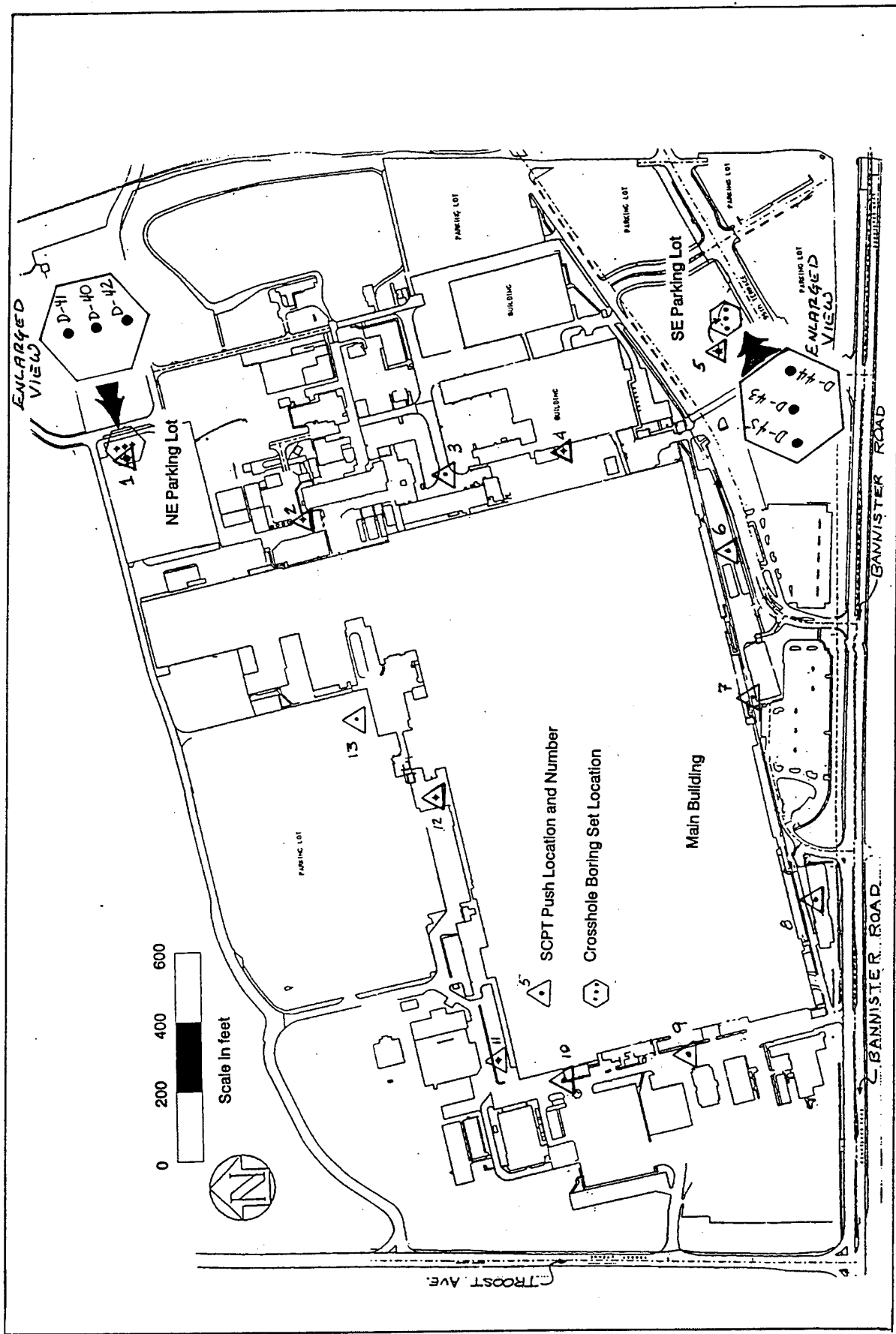
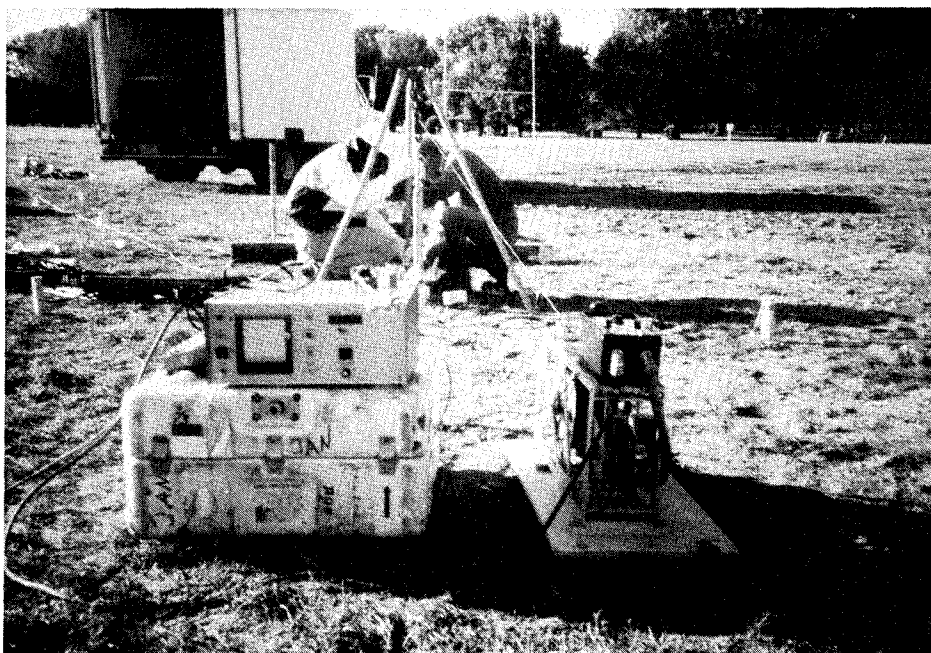


Figure 2. SCPT and crosshole boring locations



a. Deviation probe being lowered into boring



b. Surface control unit and winch

Figure 3. Borehole deviation tool

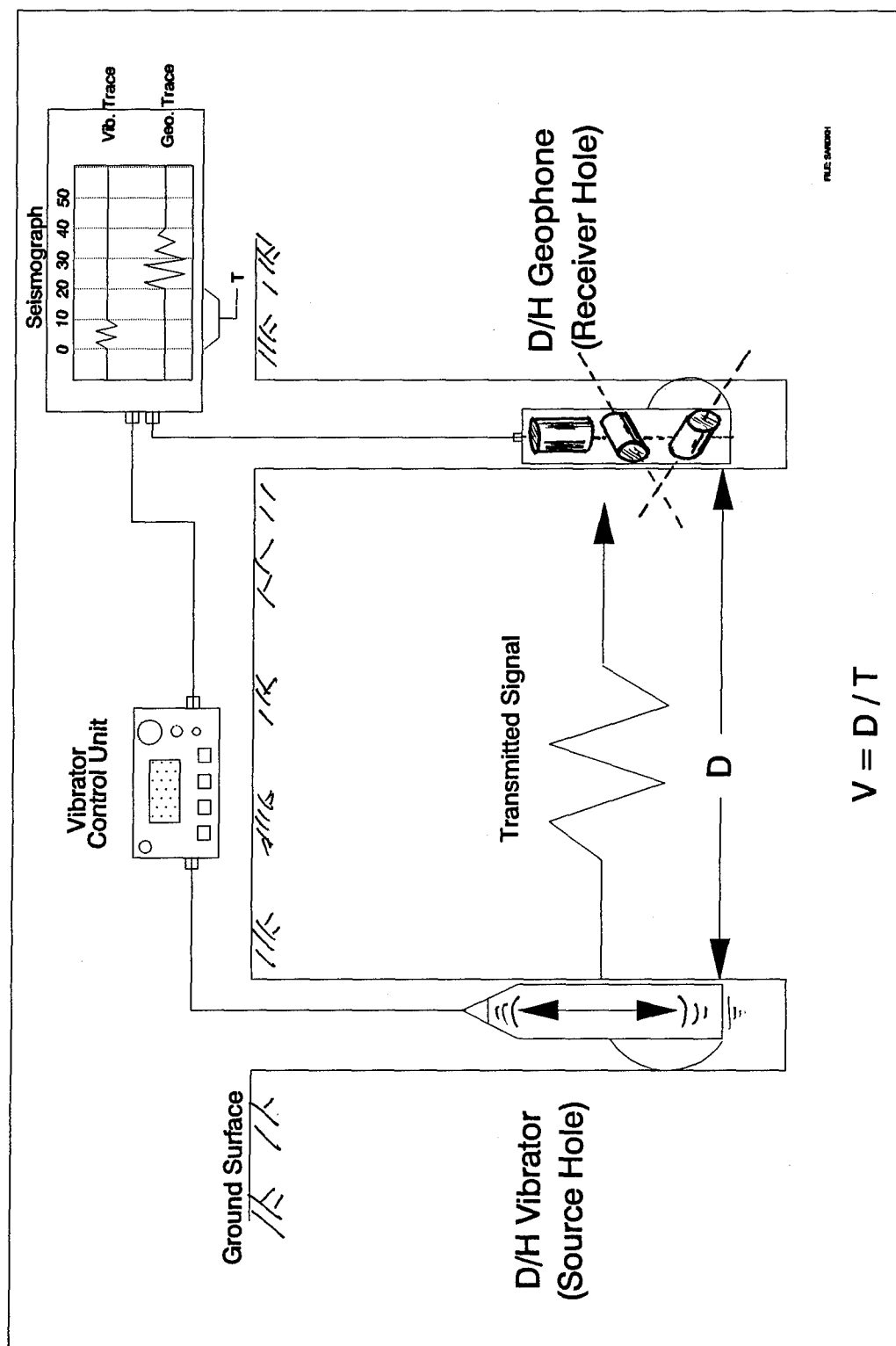


Figure 4. Crosshole S-wave testing setup

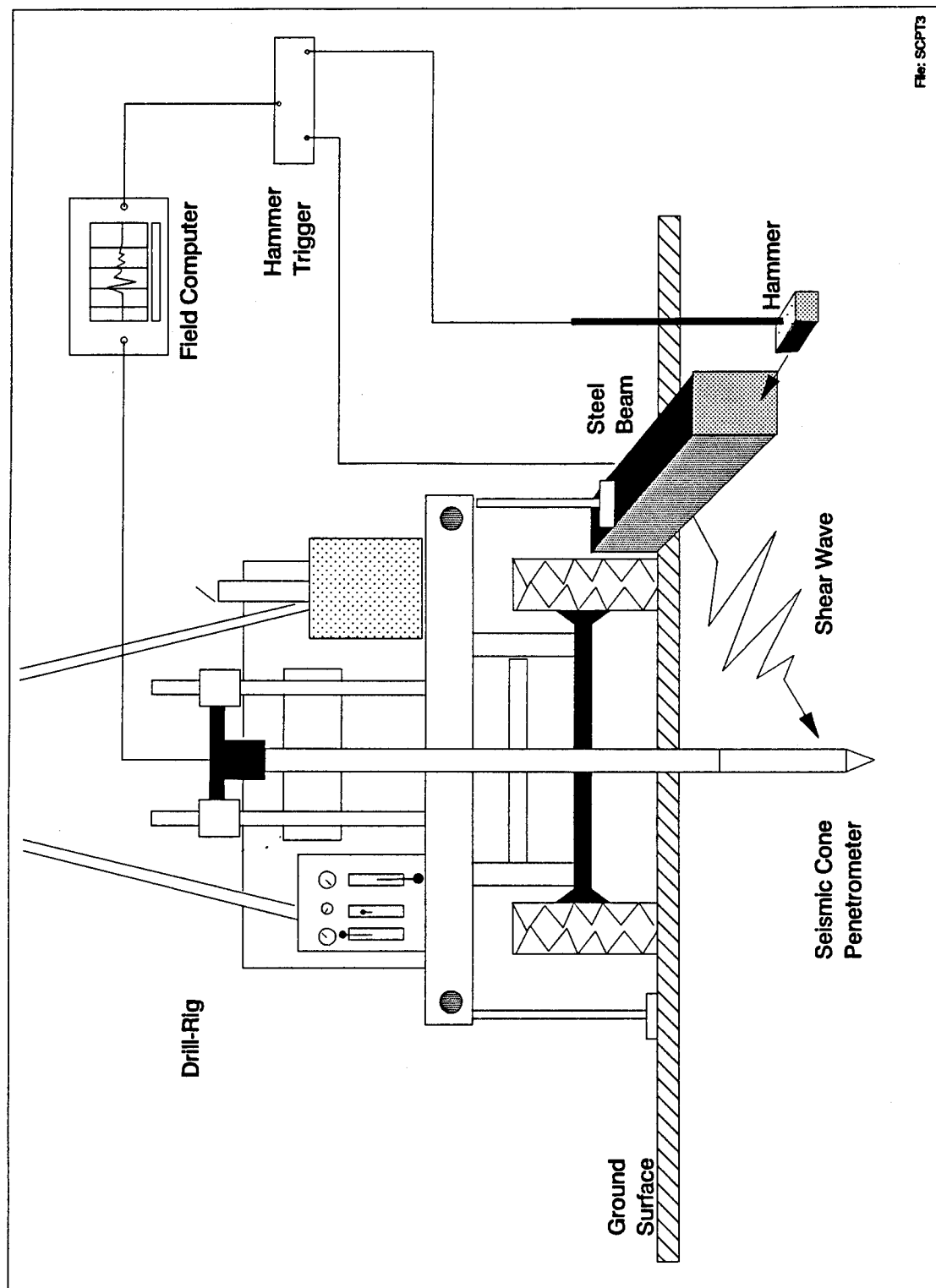


Figure 5. SCPT S-wave setup

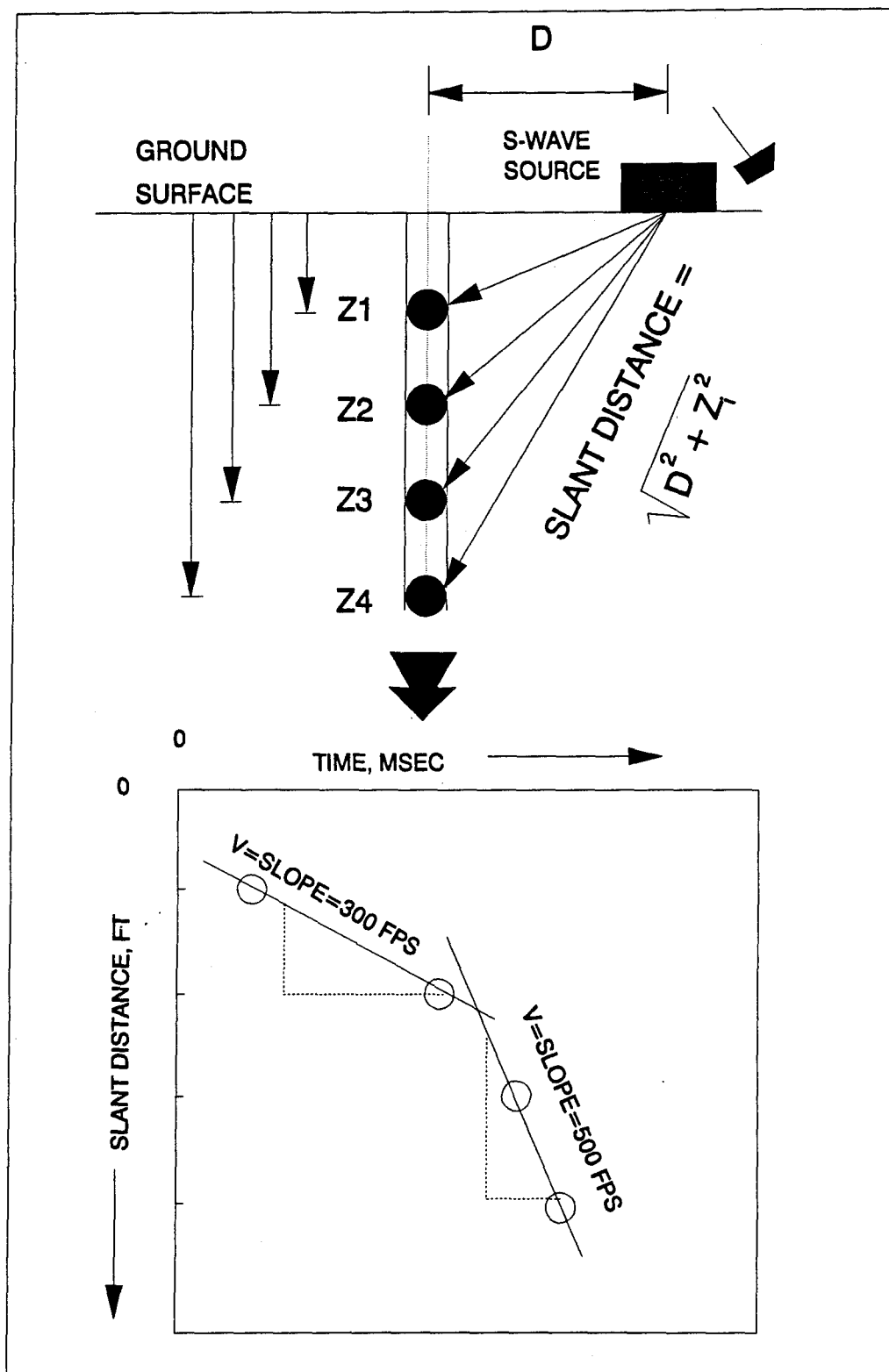


Figure 6. SCPT S-wave velocity determination

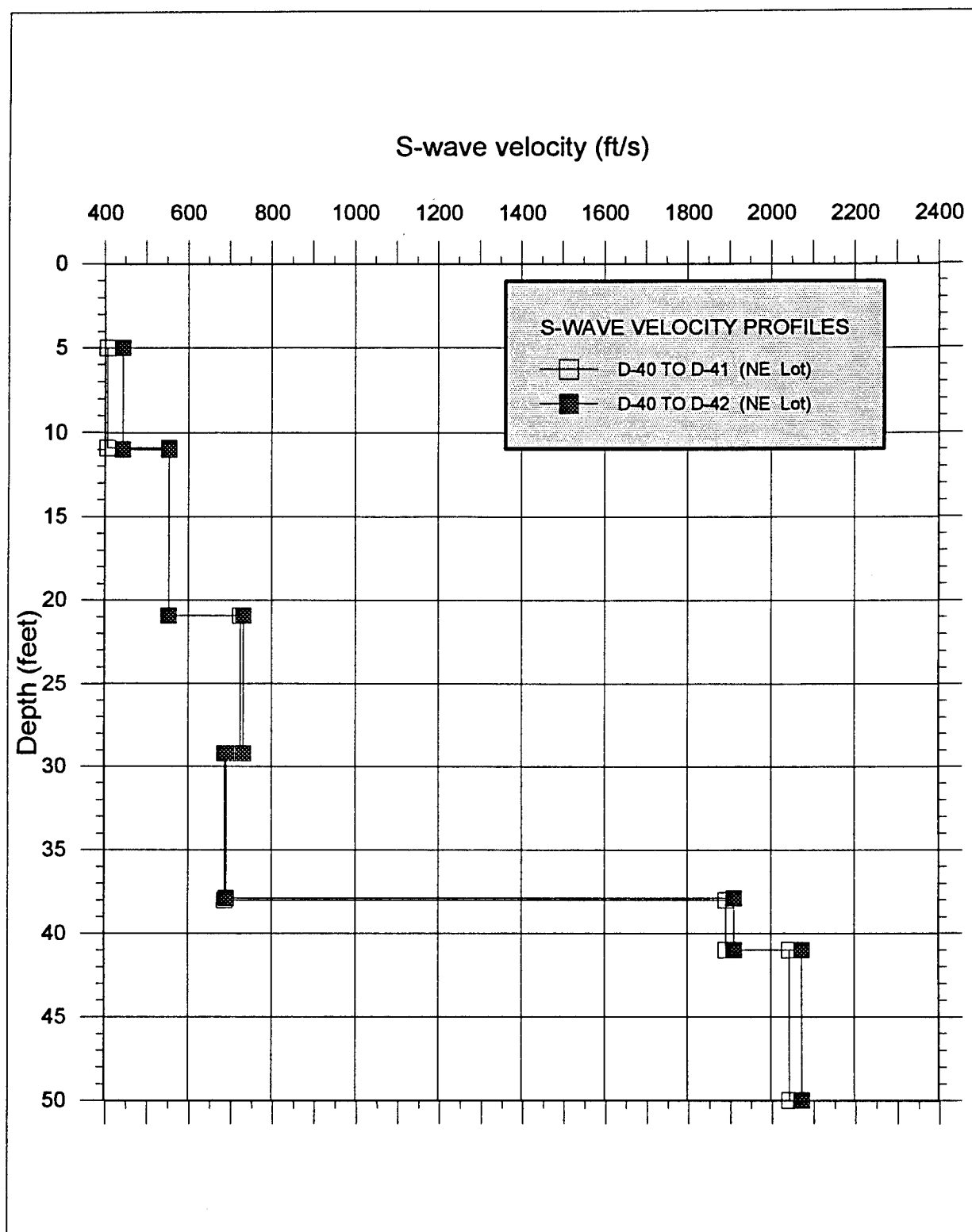


Figure 7. Crosshole S-wave results, northeast parking lot

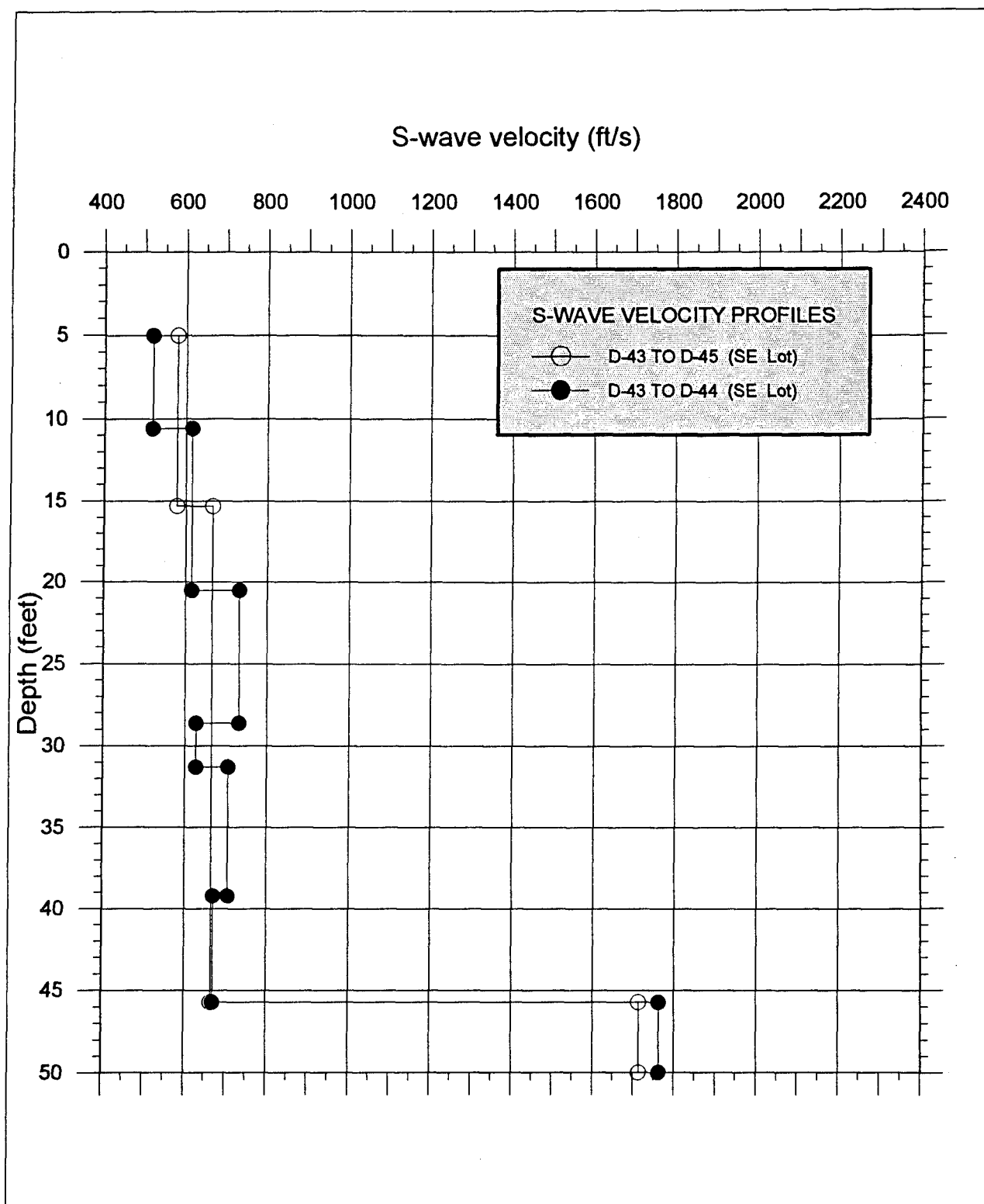


Figure 8. Crosshole S-wave results, southeast parking lot

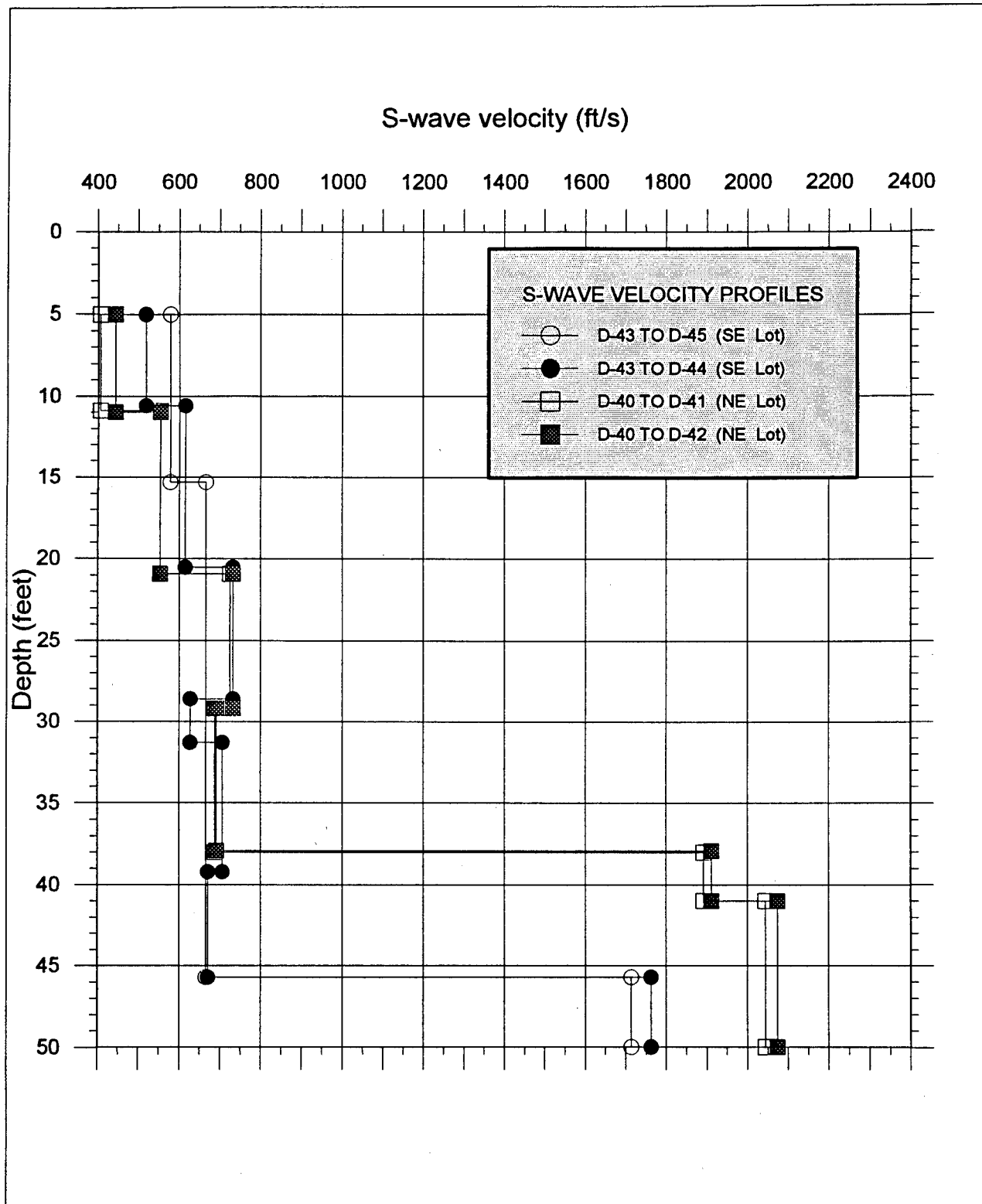


Figure 9. Superimposed crosshole S-wave results

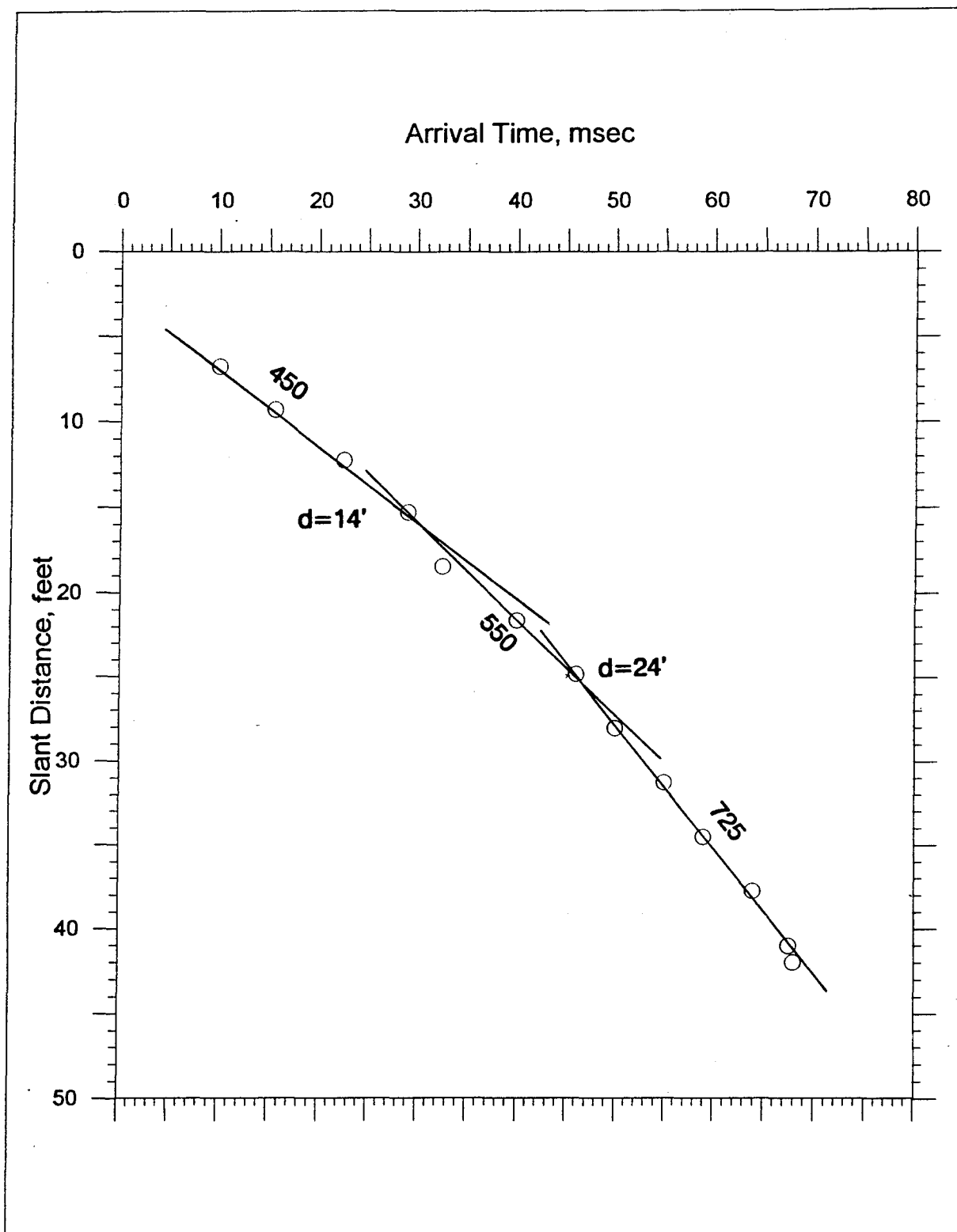


Figure 10. SCPT P-1 S-wave results

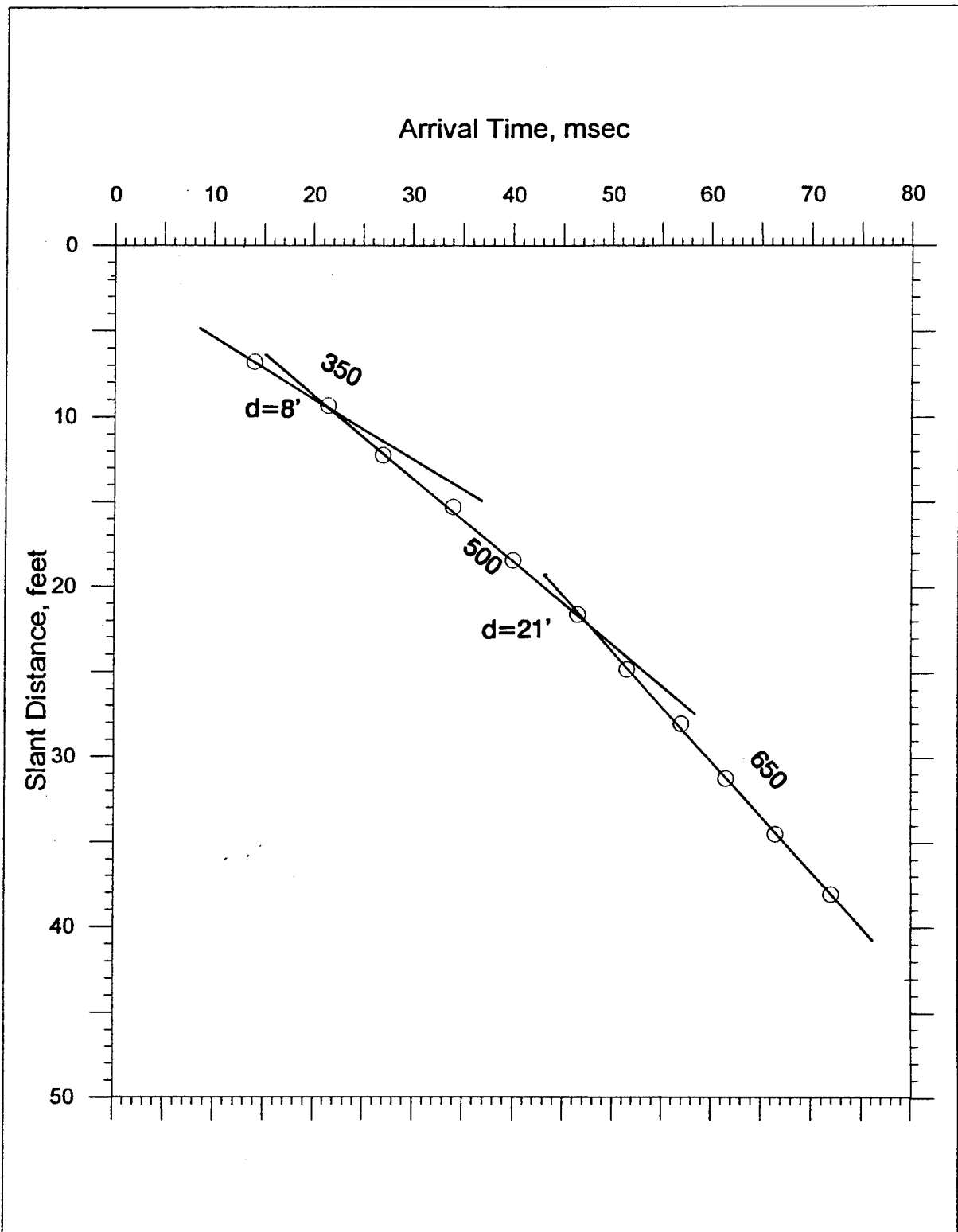


Figure 11. SCPT P-2 S-wave results

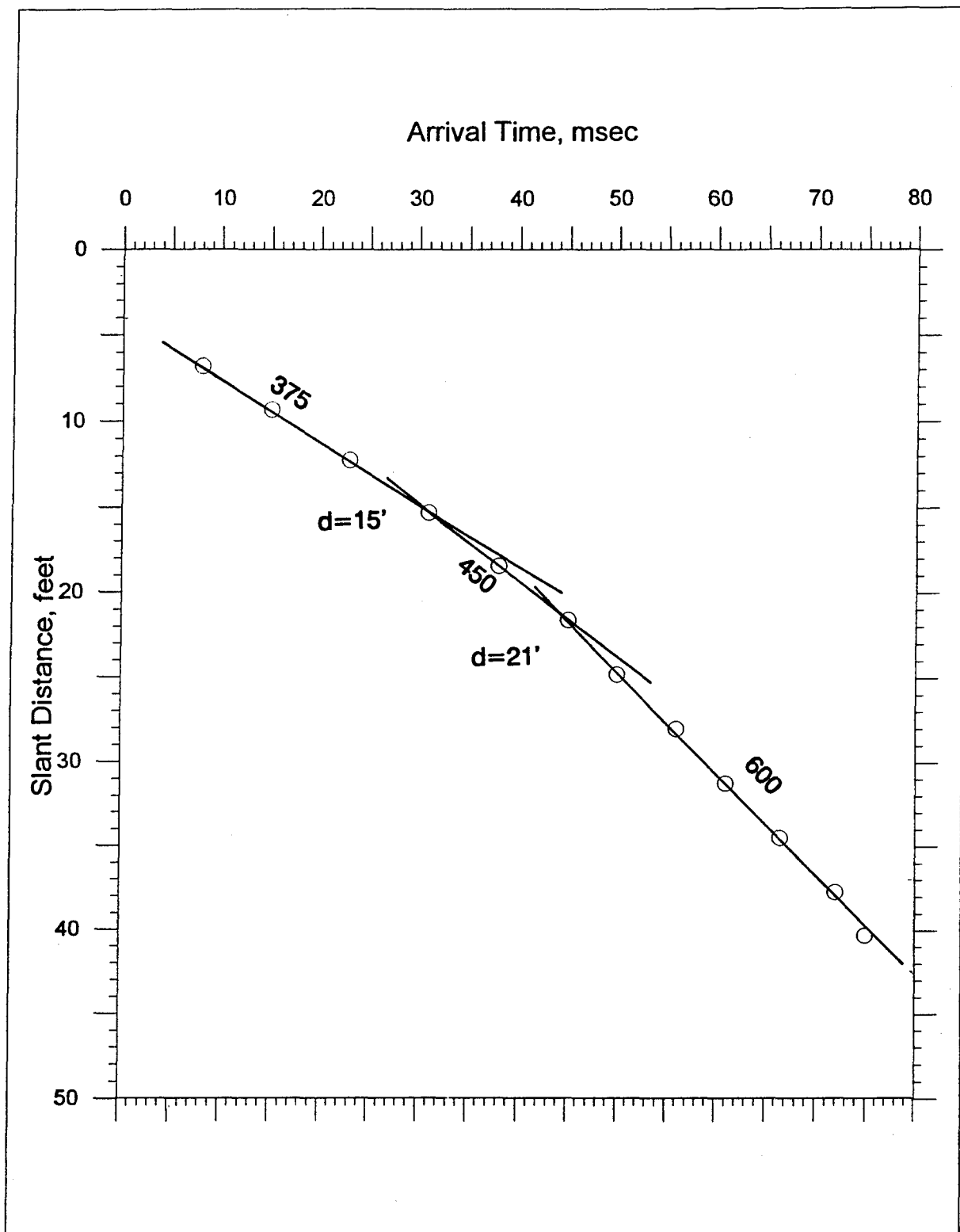


Figure 12. SCPT P-3 S-wave results

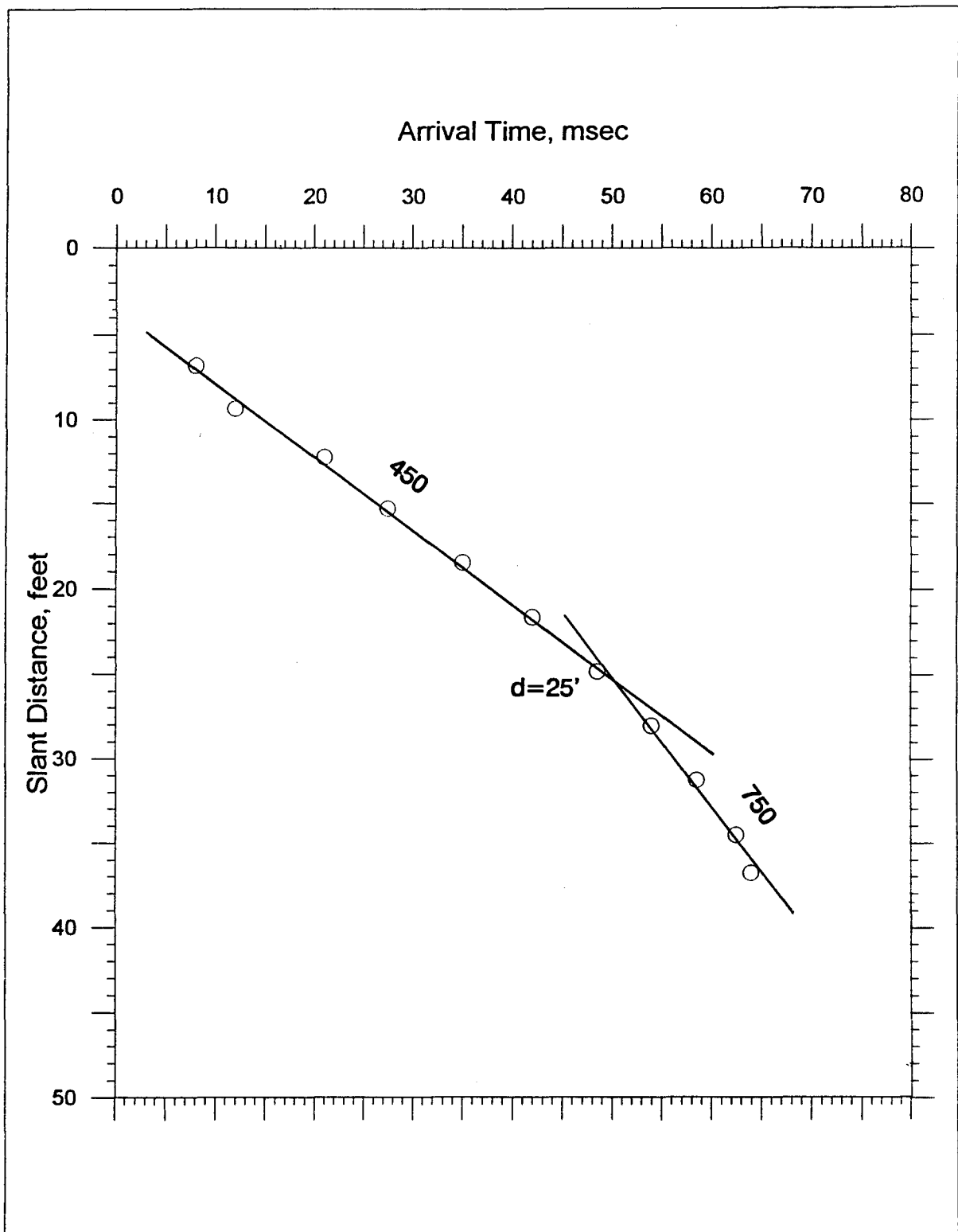


Figure 13. SCPT P-4 S-wave results

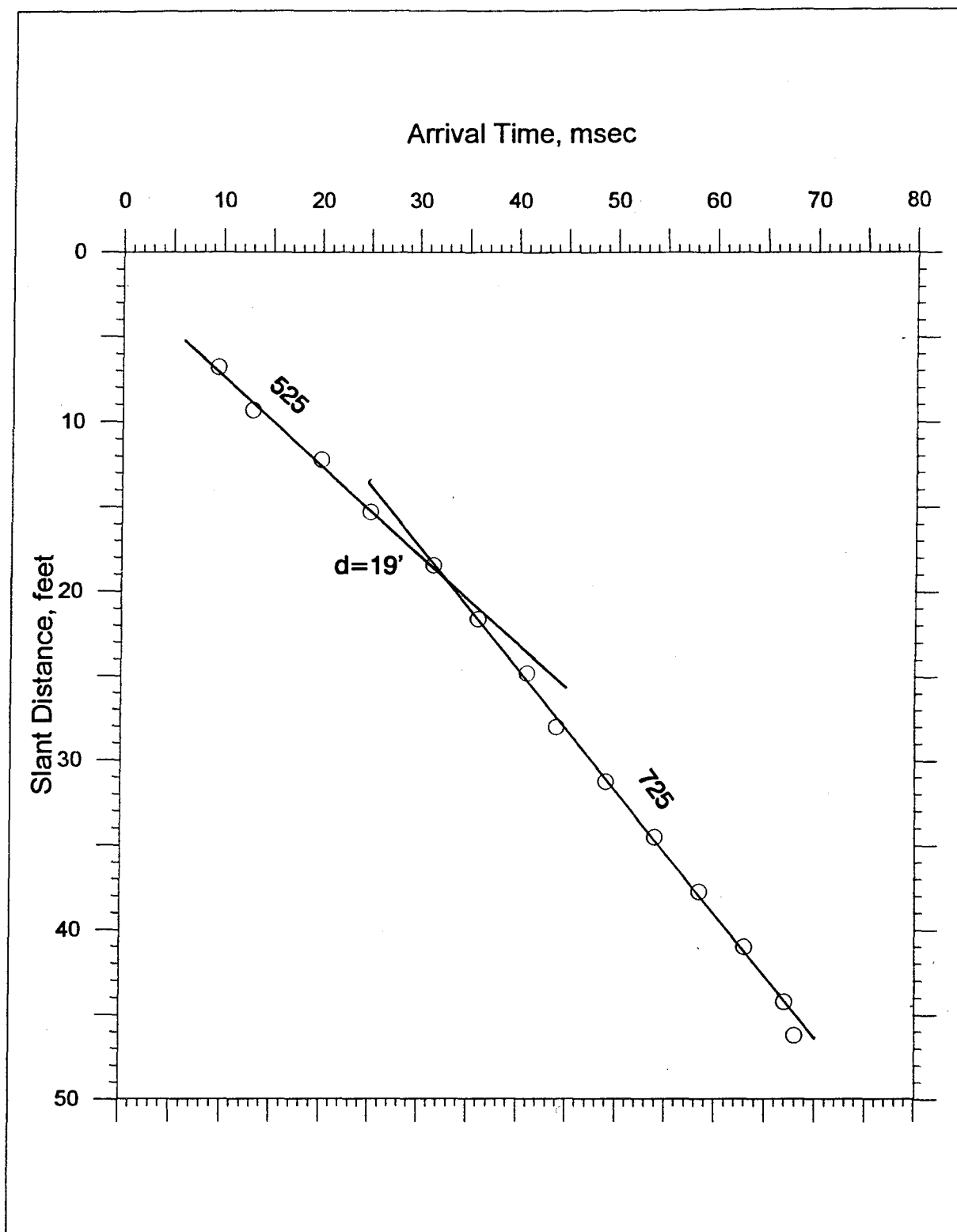


Figure 14. SCPT P-5 S-wave results

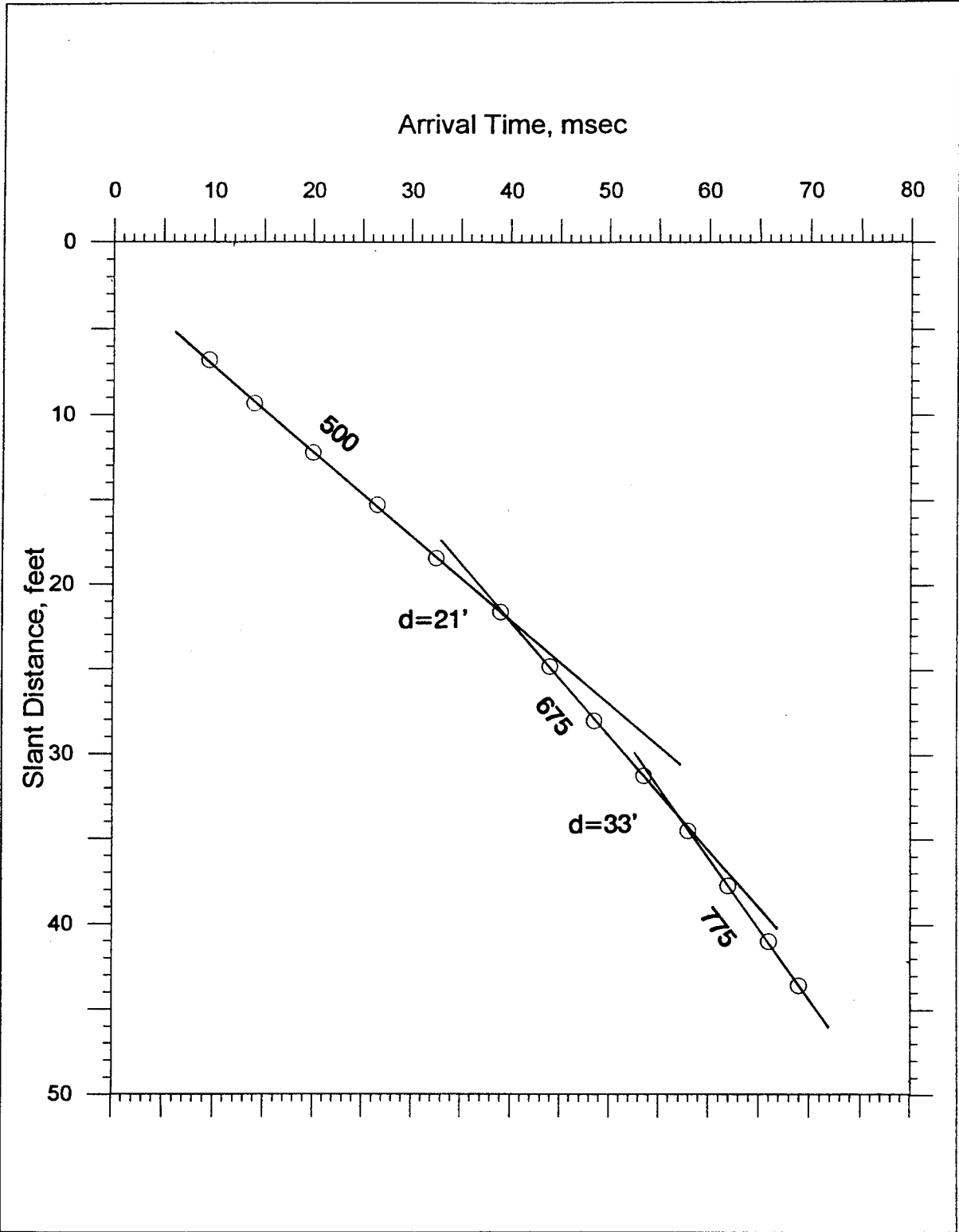


Figure 15. SCPT P-6 S-wave results

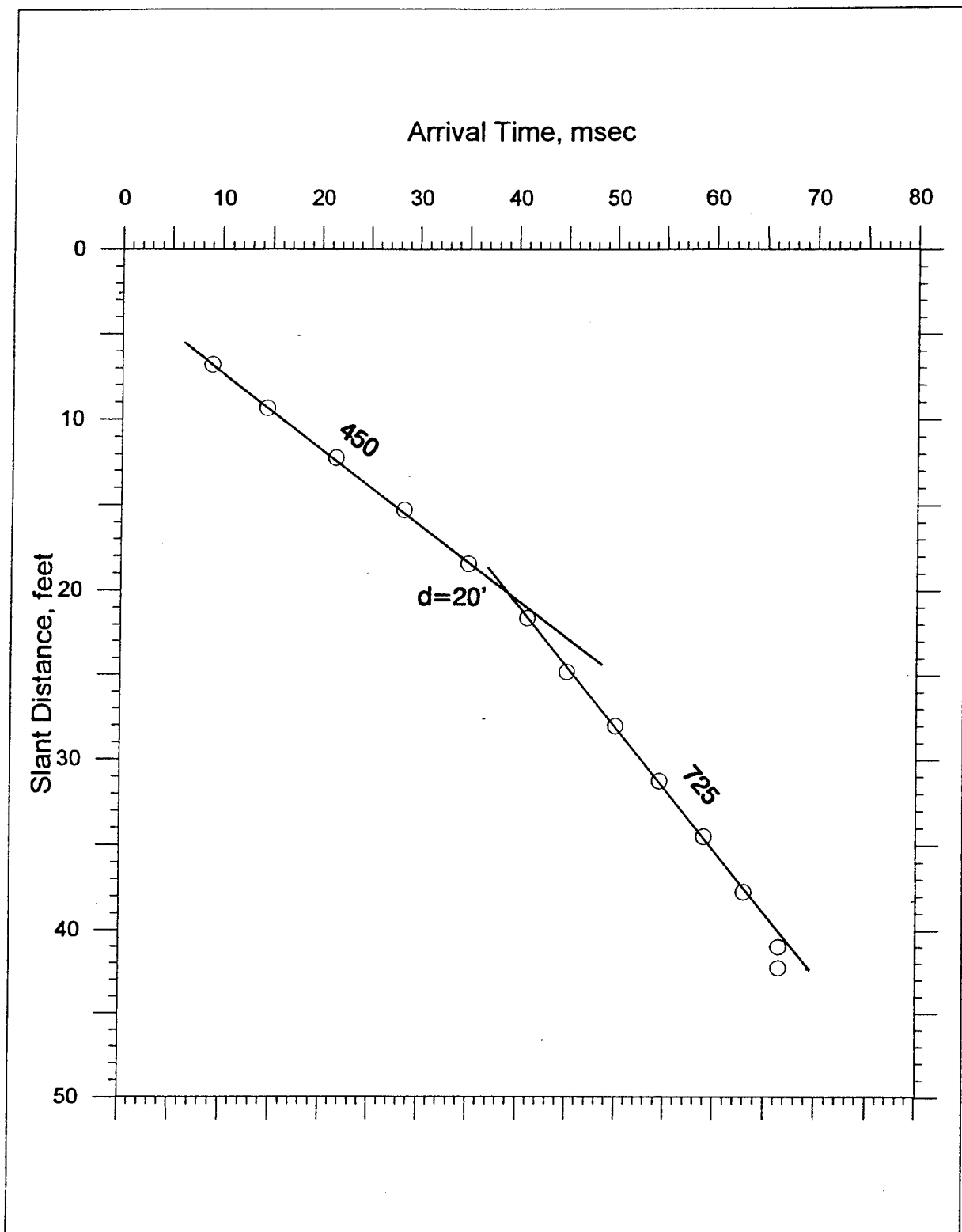


Figure 16. SCPT P-7 S-wave results

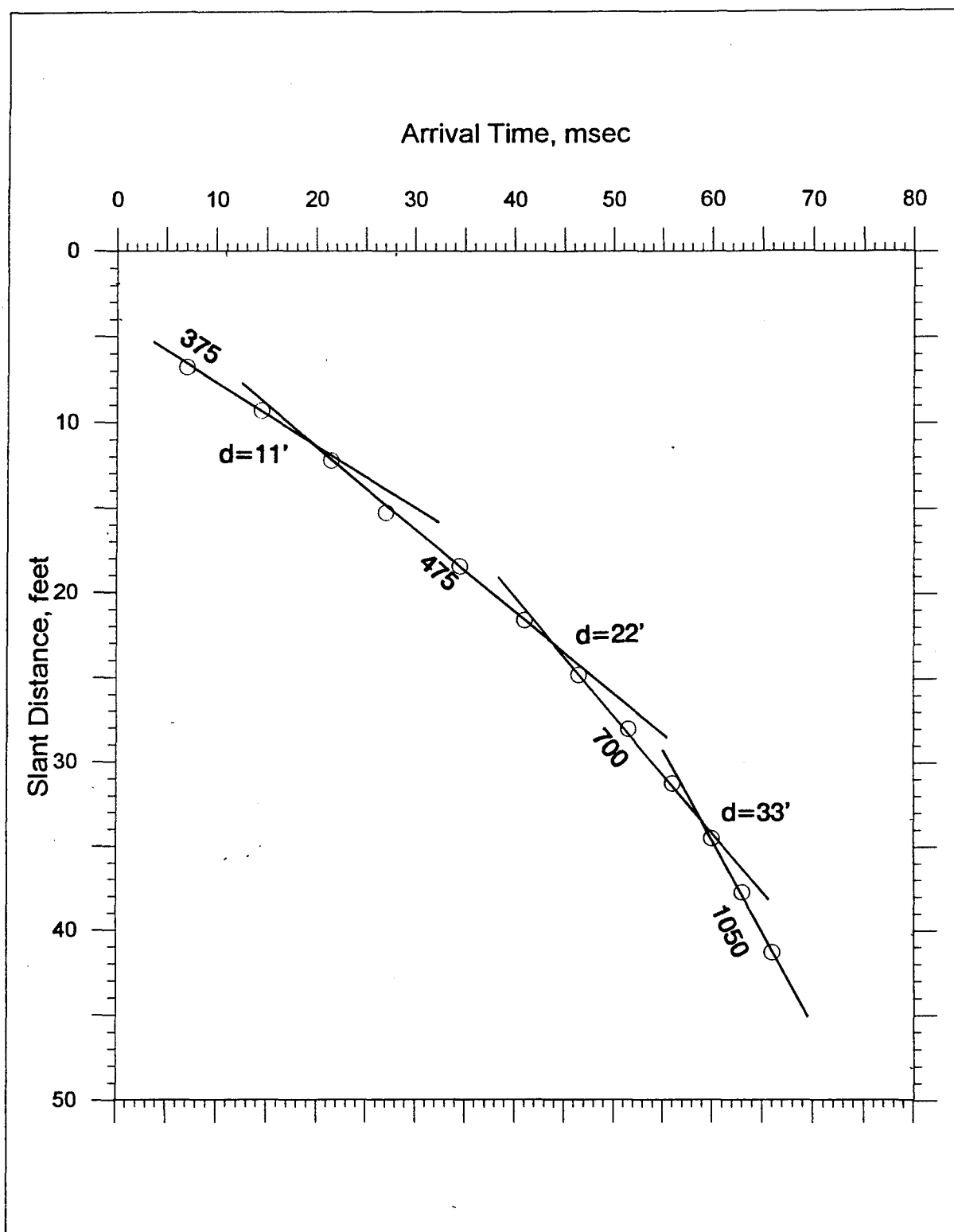


Figure 17. SCPT P-8 S-wave results

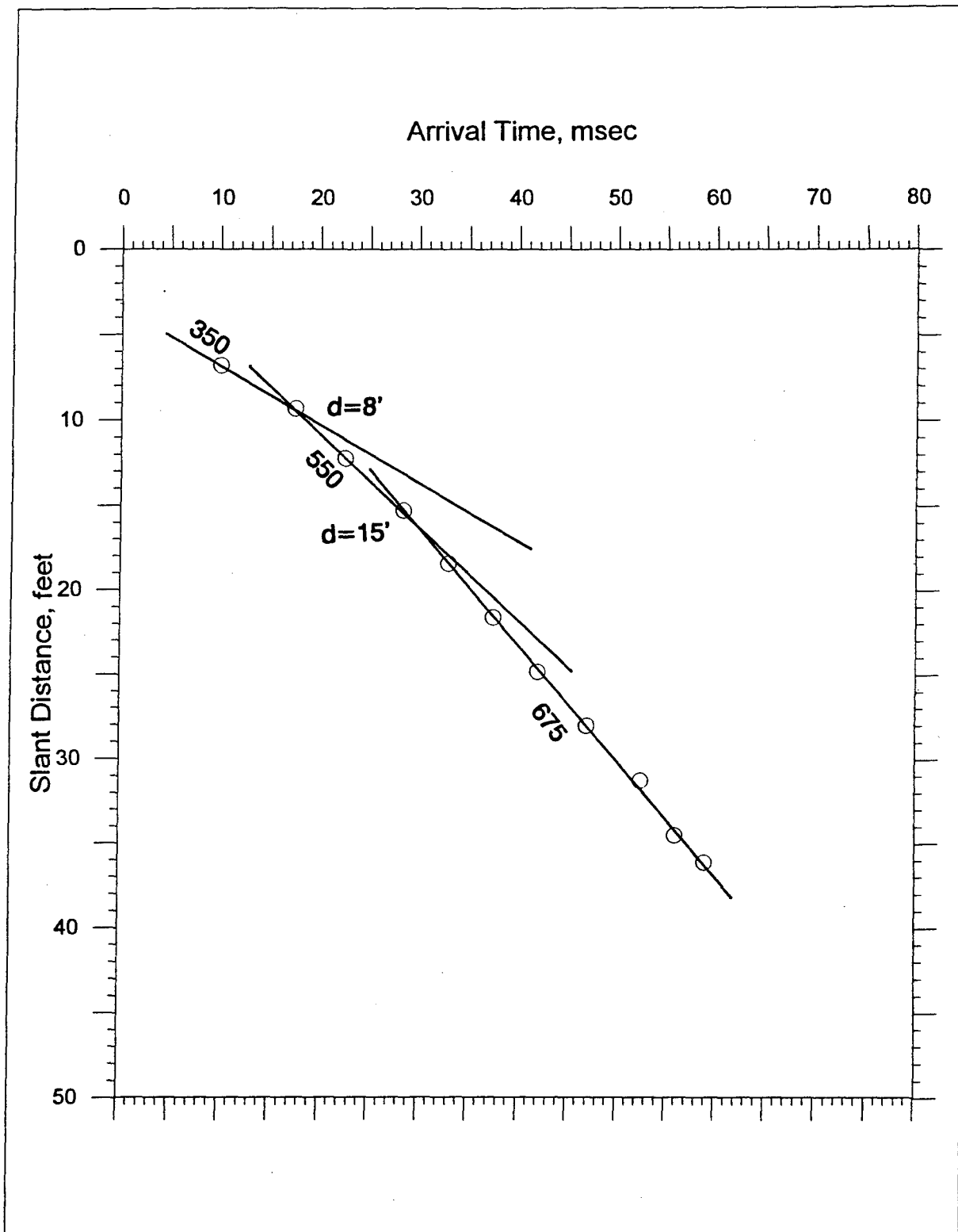


Figure 18. SCPT P-9 S-wave results

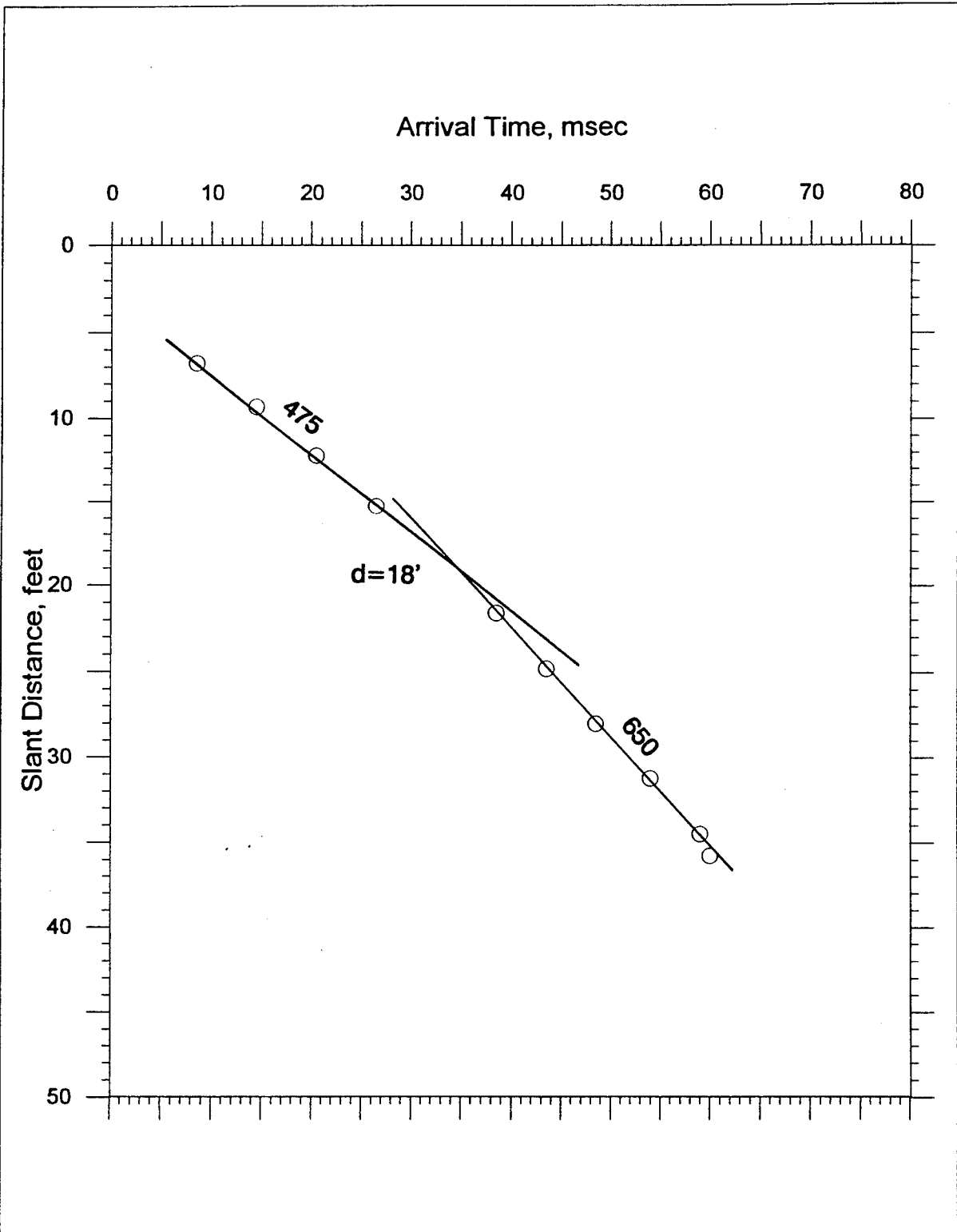


Figure 19. SCPT P-10 S-wave results

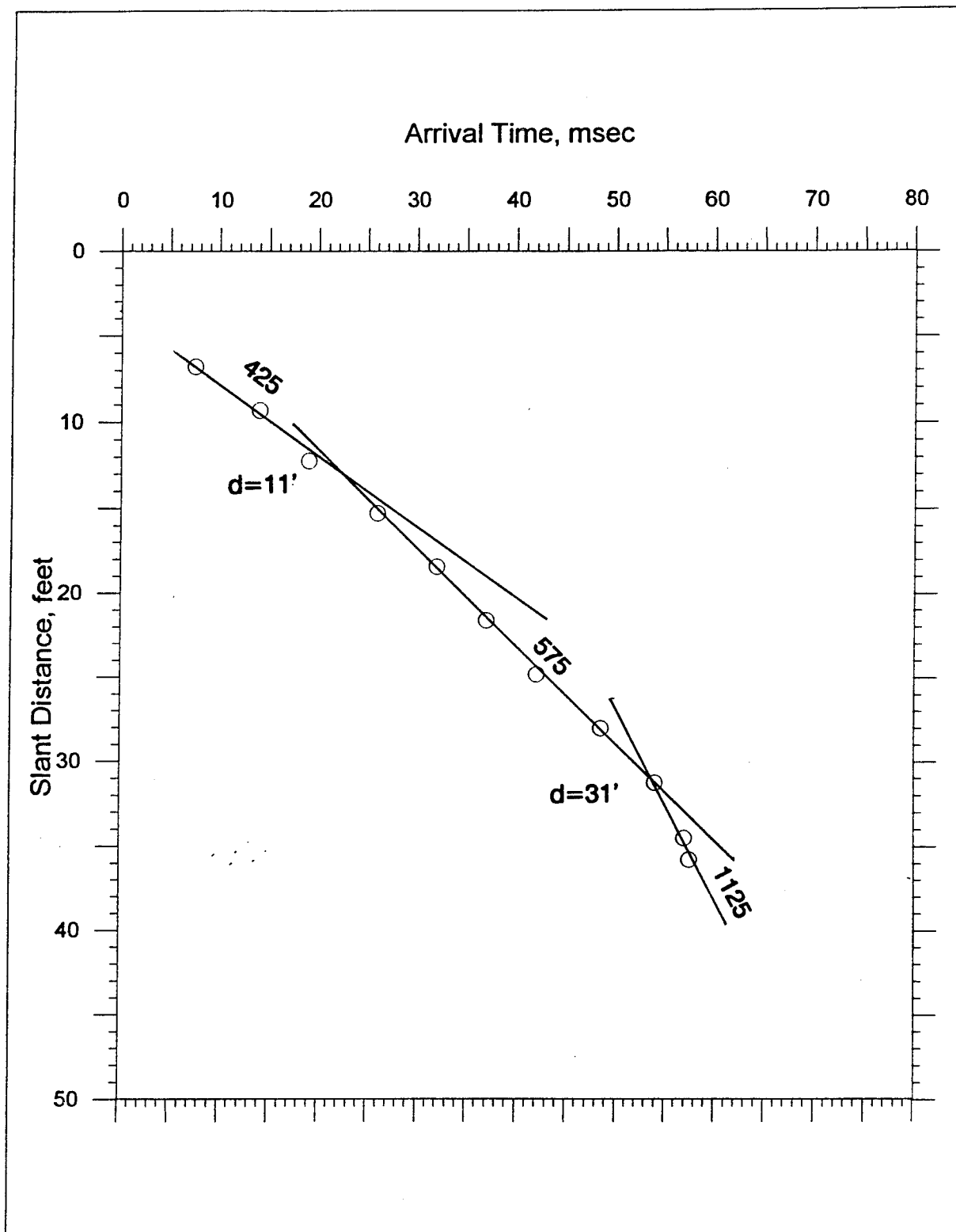


Figure 20. SCPT P-11 S-wave results

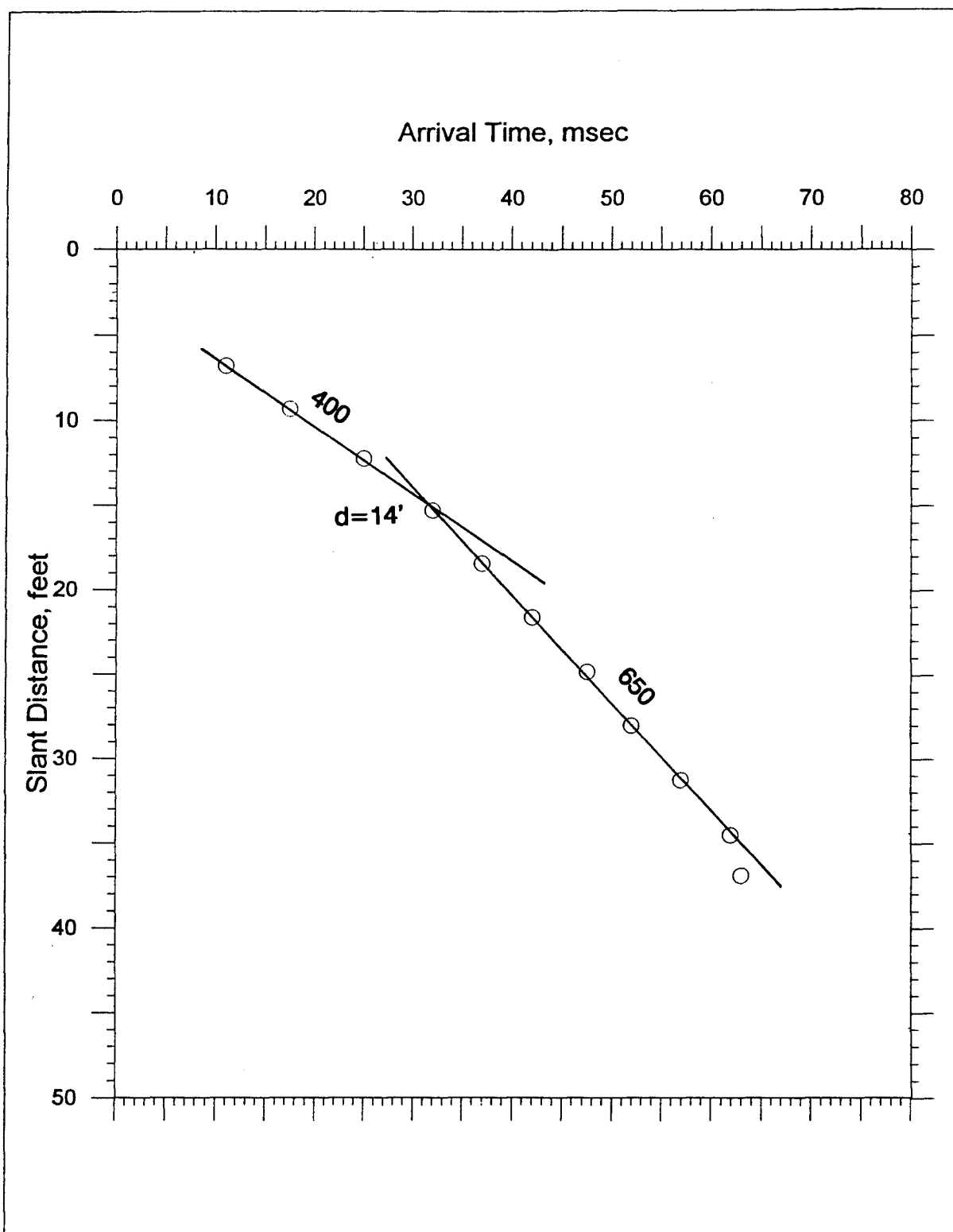


Figure 21. SCPT P-12 S-wave results

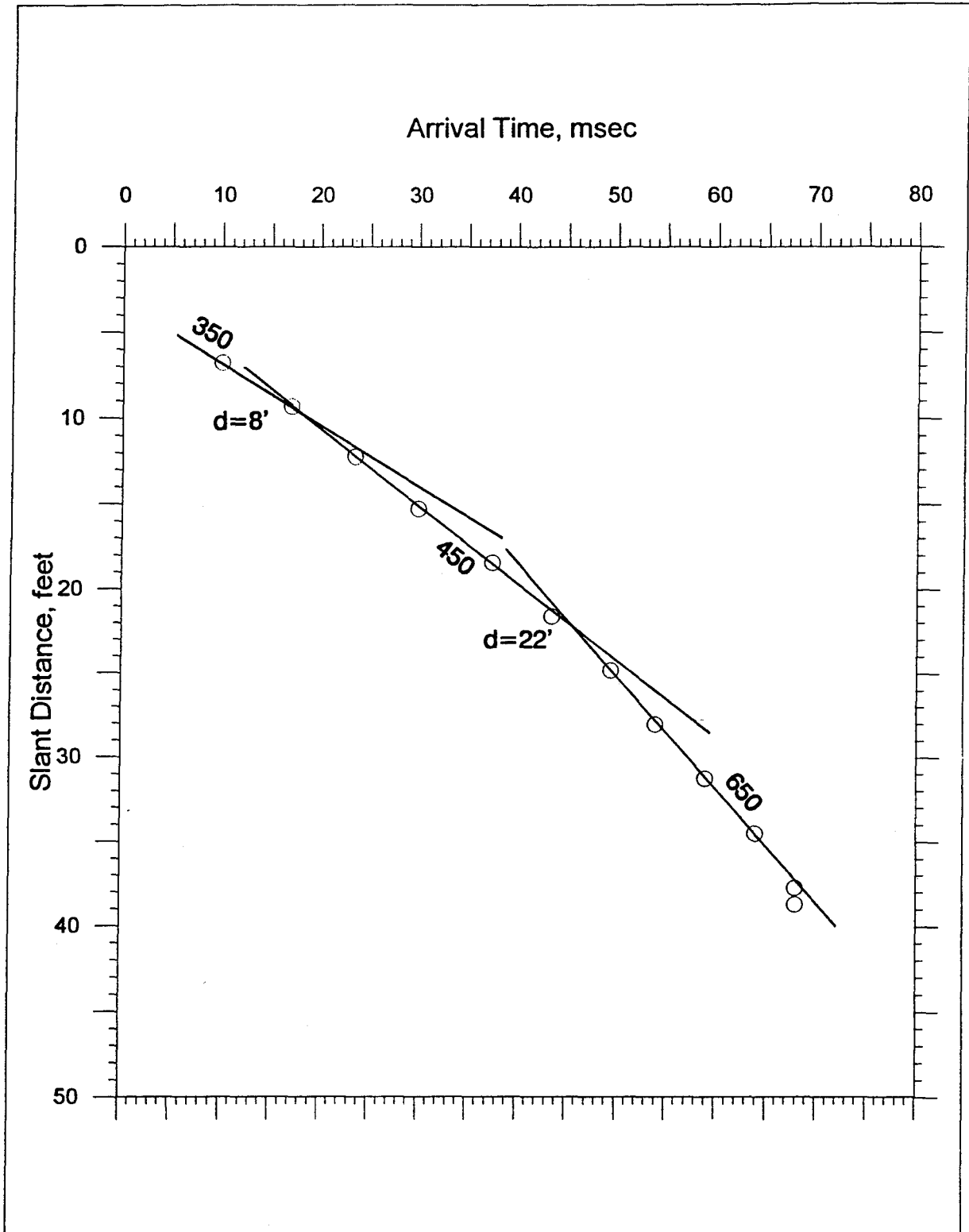


Figure 22. SCPT P-13 S-wave results

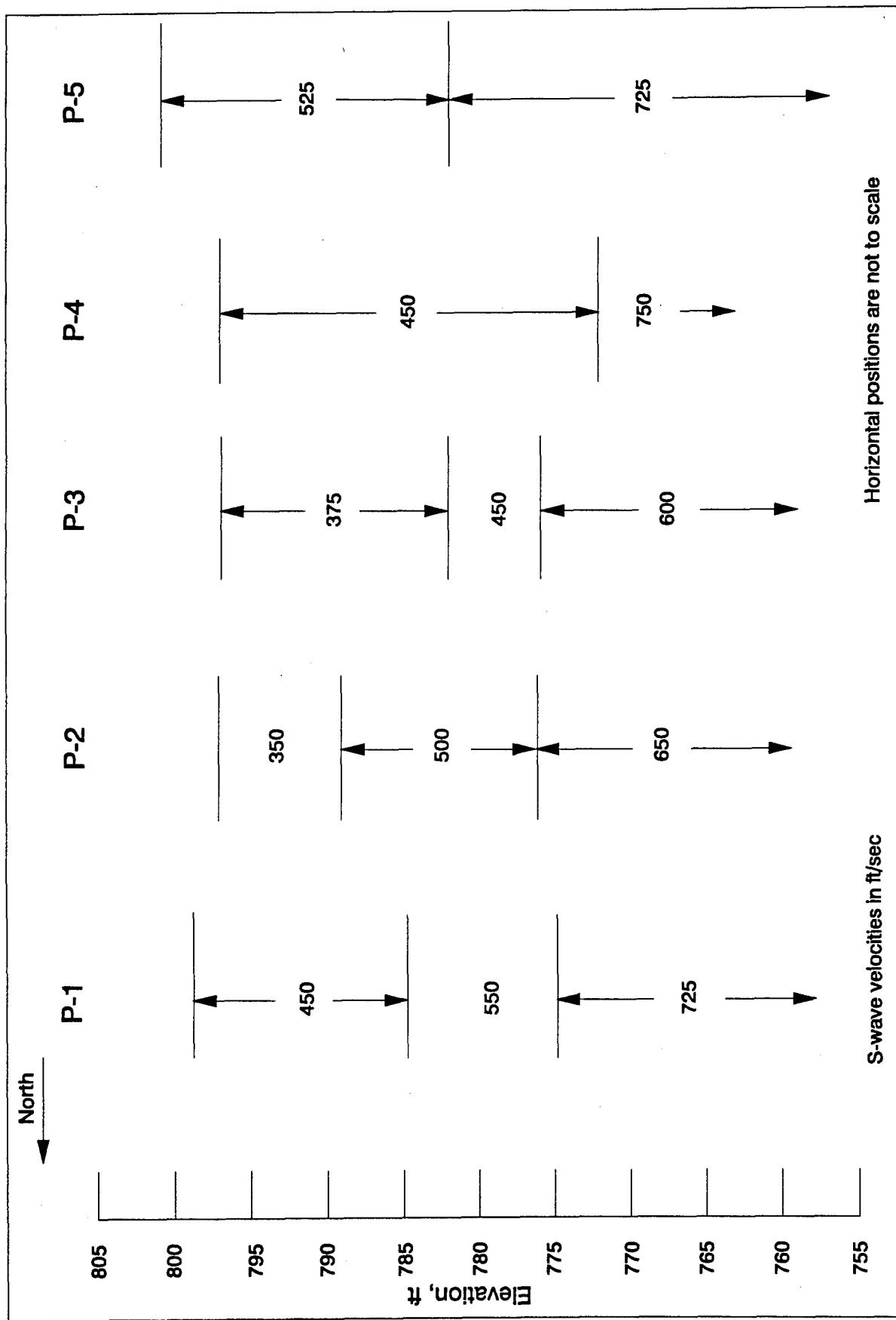


Figure 23. SCPT S-wave results, east side of main building

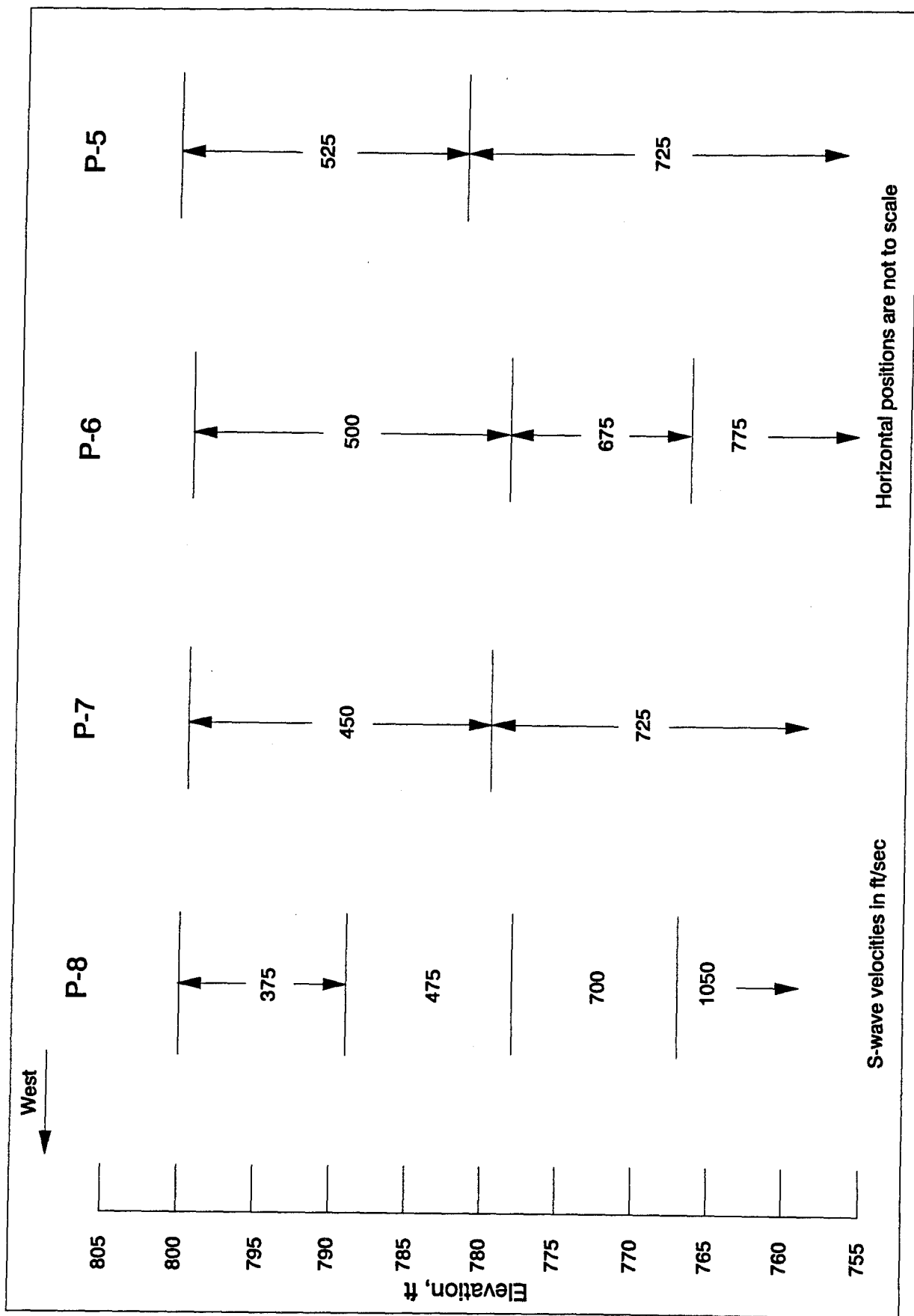


Figure 24. SCPT S-wave results, south side of main building

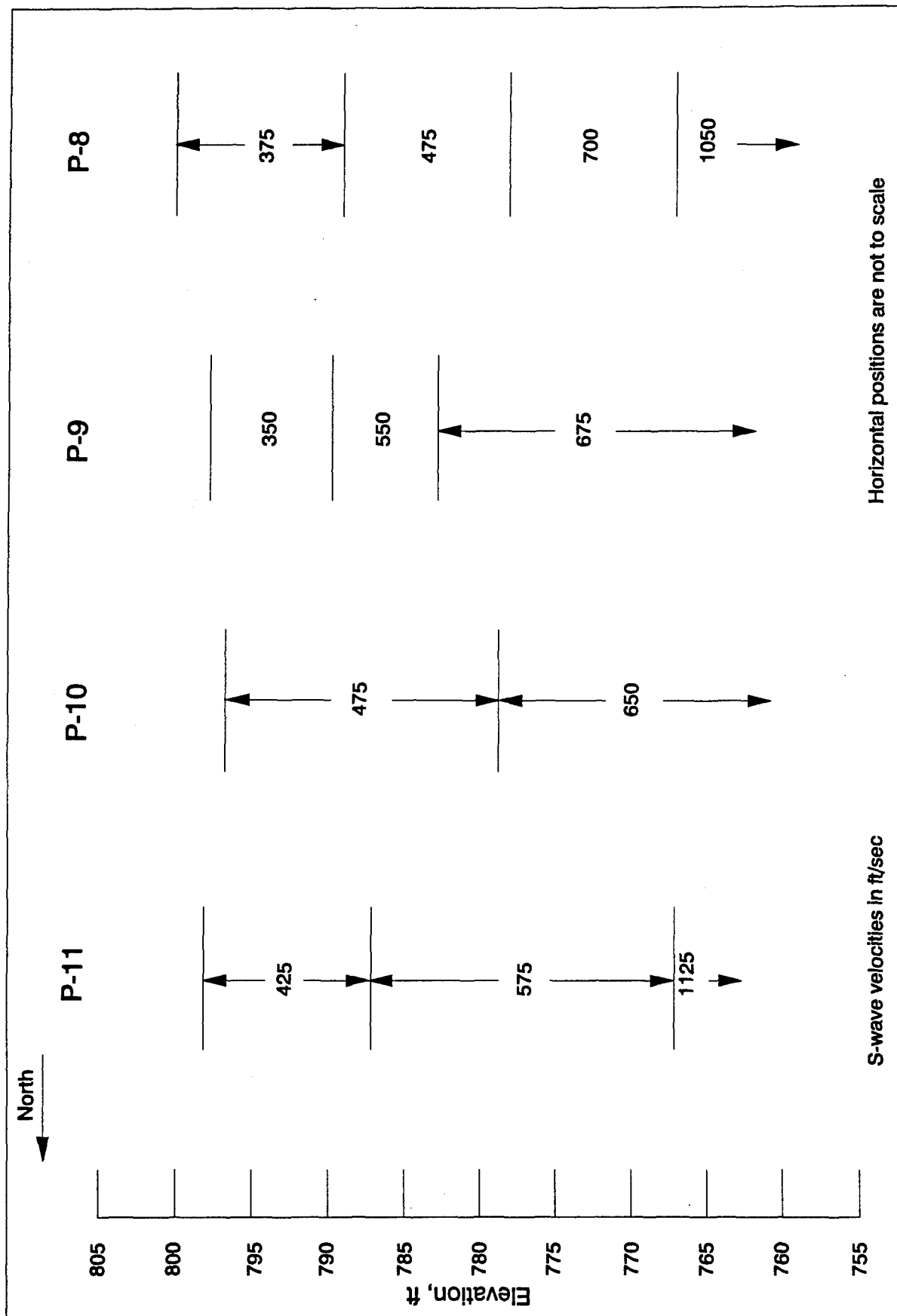


Figure 25. SCPT S-wave results, west side of main building

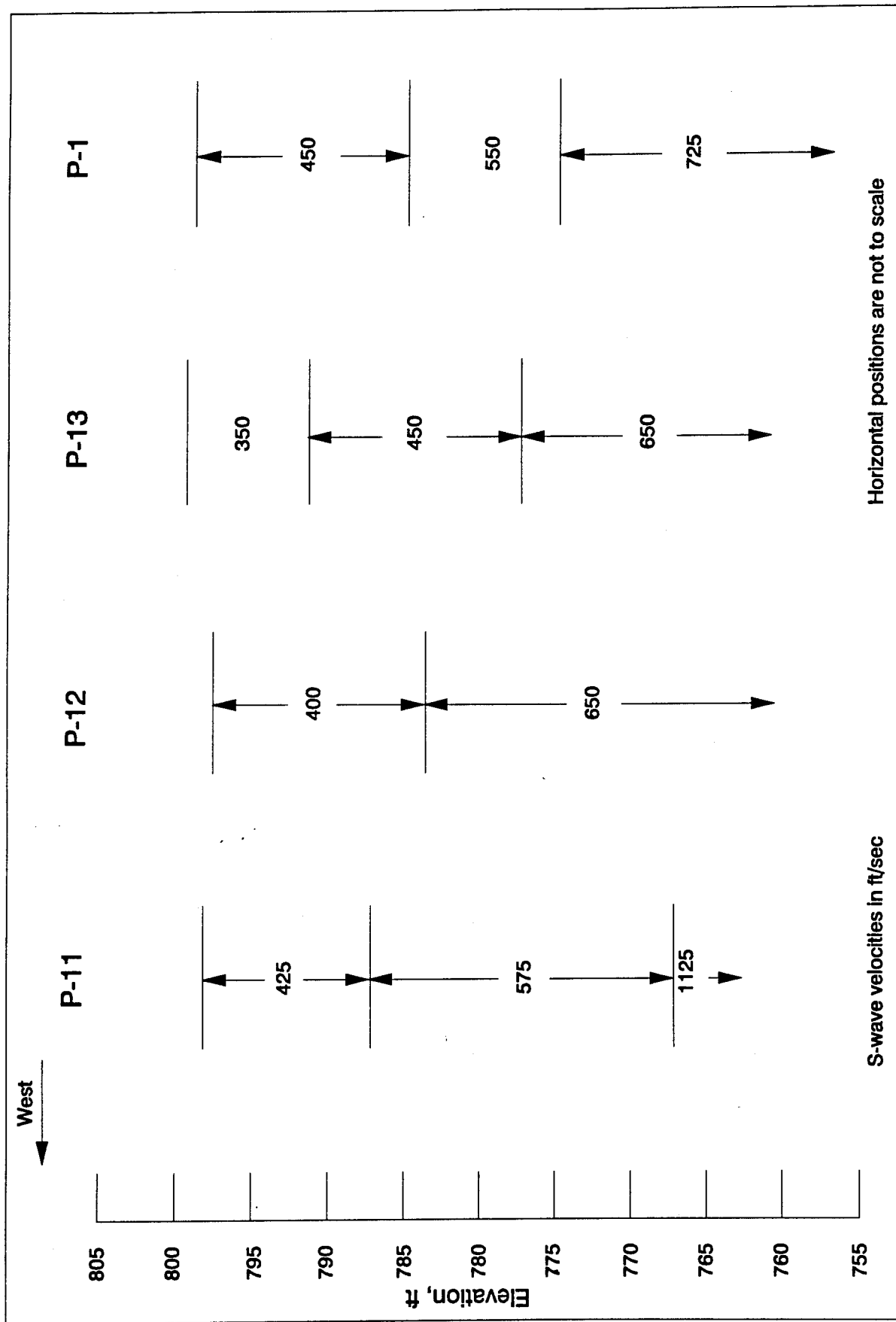


Figure 26. SCPT S-wave results, north side of main building

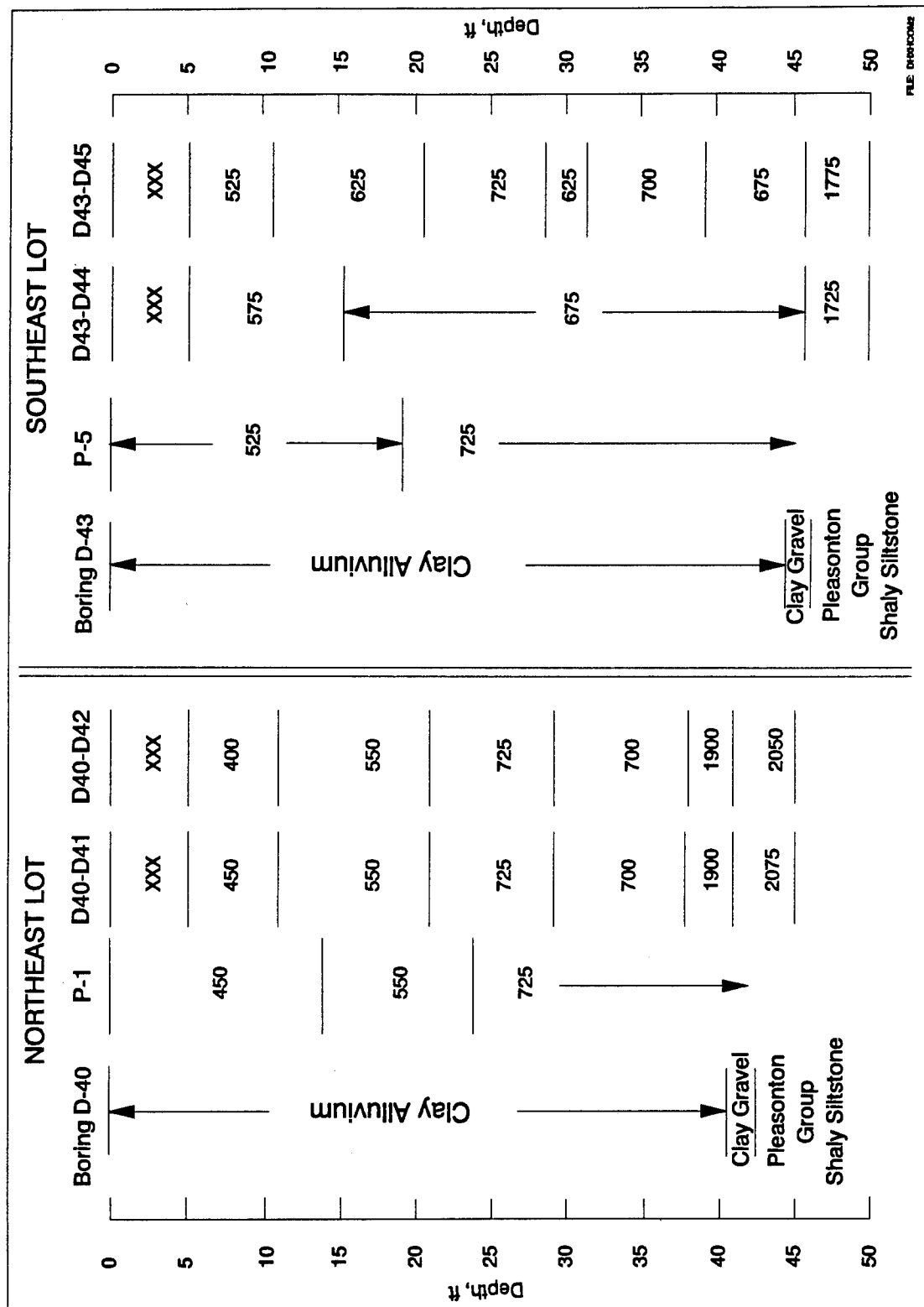


Figure 27. Crosshole and SCPT S-wave velocity profile comparisons

Appendix A

Survey Results

S-wave Crosshole Borings and SCPT Push Coordinates and Elevations			
Northing	Easting	Elevation, ft	Description
1017812.34	2769663.61	798.74	Boring D-41
1017802.89	2769666.03	798.79	Boring D-40
1017792.91	2769667.71	798.84	Boring D-42
1017806.83	2769661.52	798.69	SCPT 1
1017184.82	2769385.27	797.09	SCPT 2
1016673.20	2769489.31	796.89	SCPT 3
1016207.41	2769567.16	796.82	SCPT 4
1015560.94	2769876.10	800.64	Boring D-45
1015563.01	2769885.64	800.75	Boring D-43
1015565.58	2769895.69	800.85	Boring D-44
1015566.53	2769887.41	800.79	SCPT 5
1015710.58	2769177.31	799.59	SCPT 6
1015644.80	2768644.24	799.69	SCPT 7
1015472.91	2767847.79	799.98	SCPT 8
1015937.87	2767368.18	797.64	SCPT 9
1016386.73	2767271.46	796.62	SCPT 10
1016634.91	2767361.29	798.07	SCPT 11
1016834.36	2768356.42	797.59	SCPT 12
1017111.23	2768673.77	799.16	SCPT 13

Note: Northings and Eastings based on points #3 and #4 as shown on map by George Butler and Associates, DWG. #17810-V1 dated 2/1/93 and provided by Mr. Mark Drury, Allied-Signal Corporation. Elevations based on data stamped on brass caps.

Appendix B

Boring Logs

Boring D-41

Northeast Parking Lot

Hole No. 15-41

DRILLING LOG		DIVISION MBO	INSTALLATION KCO	SHEET 1 OF 7 SHEETS
1. PROJECT Kinnister Federal Complex Science		10. SIZE AND TYPE OF BIT 9" Hollow Stem Auger / 6 1/4" Rock Bit		
2. LOCATION (Coordinate or Section) See Sketch		11. DAYUM FOR ELEVATION SHOWN (FBN - 1981) MSL		
3. DRILLING AGENCY Corp of Engineers		12. MANUFACTURER'S DESIGNATION OF DRILL Feilin 1500		
4. HOLE NO. (As shown on drawing title and file number) 15-41		13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN DISTURBED - 0 - UNDISTURBED - 0 -		
5. NAME OF DRILLER M. Conrey		14. TOTAL NUMBER CORE BOXES 0 -		
6. DIRECTION OF HOLE ☒ VERTICAL ☐ INCLINED _____ DEG. FROM VERT.		15. ELEVATION GROUND WATER Not Determined		
7. THICKNESS OF OVERBURDEN 43.3		16. DATE HOLE STARTED 5-26-94 COMPLETED 5-27-94		
8. DEPTH DRILLED INTO ROCK 42 10.7		17. ELEVATION TOP OF HOLE NA		
9. TOTAL DEPTH OF HOLE 54.0		18. TOTAL CORE RECOVERY FOR BORING -		
		19. SIGNATURE OF INSPECTOR C. Skinnis		

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVER- ERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water used, depth of weathering, etc., if significant) g
			ASPHALT			9" Hollow Stem Augers
			CRUSHED STONE (road base) Limestone (2" max. dia.) Top of Natural Groundwater			Log from cuttings Place 2.6' y" 50-40 PVC Surface Casing Fill annulus w/ Betonite and cold-patch asphalt
	1		SILTY LEAN CLAY STIFF MOIST VERY DARK BROWN/BLACK high silt content	D-2.6 R-0.0		
	2					
	3					
	4					
	5		SILTY LEAN CLAY STIFF MOIST GRAYISH BROWN			2.6 6 1/4" Rock Bit 3 1/2" Drill Rods Drill Fluids: Betonite muds 150 gal. H ₂ O 50 lbs. Betonite Viscosity: 33 sec/gt. Log from Cuttings Gravity Feed
	6					
	7					
	8					
	9		SILTY LEAN CLAY STIFF MOIST BROWNISH GRAY Gray mottling			

DRILLING LOG			DIVISION	INSTALLATION	Hole No. <u>NS-41</u> SHEET <u>2</u> OF 7 SHEETS	
1. PROJECT <u>Bannister Federal Complex Seismic</u>			10. SIZE AND TYPE OF BIT			
2. LOCATION (Coordinates or Station)			11. DAYTON FOR ELEVATION KNOWN (YEN or SEA)			
3. DRILLING AGENCY			12. MANUFACTURER'S DESIGNATION OF DRILL			
4. HOLE NO. (As shown on drawing title and the number)			13. TOTAL NO. OF OVER- BURDEN SAMPLES TAKEN		DISTURBED UNDISTURBED	
5. NAME OF DRILLER			14. TOTAL NUMBER CORE BOXES			
6. DIRECTION OF HOLE ☐ VERTICAL ☐ INCLINED DEG. FROM VERT.			15. ELEVATION GROUND WATER			
7. THICKNESS OF OVERBURDEN			16. DATE HOLE		STARTED COMPLETED	
8. DEPTH DRILLED INTO ROCK			17. ELEVATION TOP OF HOLE			
9. TOTAL DEPTH OF HOLE			18. TOTAL CORE RECOVERY FOR BORING			
			19. SIGNATURE OF INSPECTOR <u>[Signature]</u>			
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, etc., if significant) g
	11		(Same as above) SILTY LEAN CLAY MOIST STIFF/MEDIUM BROWNISH GRAY gray mottling sand-size grit (medium)			6 1/4" Rock Bit Sealed Gravity feed Log from Cuttings Rapid Rotation fast Advance
	12					
	13					
	14					
	15					
	16					
	17					
	18					
	19					Add 10 gal. H ₂ O to sump. Viscosity 33.5 sec./qt.
	20					

Hole No. NS-41

DRILLING LOG		DIVISION		INSTALLATION		SHEET 3 OF 7 SHEETS	
1. PROJECT Banner Federal Complex Site				10. SIZE AND TYPE OF BIT			
2. LOCATION (Coordinates or Section)				11. DAY ON FOR ELEVATION SHOWN (TBM or HSL)			
3. DRILLING AGENCY				12. MANUFACTURER'S DESIGNATION OF DRILL			
4. HOLE NO. (As shown on drawing title and site number) NS-41				13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN		DISTURBED UNDISTURBED	
5. NAME OF DRILLER				14. TOTAL NUMBER CORE BOXES			
6. DIRECTION OF HOLE ☐ VERTICAL ☐ INCLINED _____ DEG. FROM VERT.				15. ELEVATION GROUND WATER		16. DATE HOLE STARTED COMPLETED	
7. THICKNESS OF OVERBURDEN				17. ELEVATION TOP OF HOLE			
8. DEPTH DRILLED INTO ROCK				18. TOTAL CORE RECOVERY FOR BORING			
9. TOTAL DEPTH OF HOLE				19. SIGNATURE OF INSPECTOR [Signature]			
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, etc., if significant) g	
	21		(Same as above) SILTY LEAN CLAY STIFF MOIST BROWNISH GRAY gray mottling 21.0'			6 1/4" Rock Bit (cont'd) Gravity Feed Dog from Cuttings	
	22		SILTY LEAN CLAY MOIST MEDIUM DARK BROWNISH GRAY gray mottling sand-size grit (medium)			rapid rotation rapid advance use buckets 25'	
	23						
	24						
	25					use bucket ↑	
	26						
	27		27.0' SILTY LEAN CLAY MOIST MEDIUM BLUISH GRAY sand-size grit (medium fine) small gravel-size particles				
	28						
	29						
	30						

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PROJECT Banner Federal Complex HOLE NO. NS-41

DRILLING LOG			DIVISION		INSTALLATION		Hole No. <u>115-41</u> SHEET <u>4</u> OF <u>7</u> SHEETS	
1. PROJECT <u>Bannister Federal Complex Seismic</u>					10. SIZE AND TYPE OF BIT			
2. LOCATION (Coordinates or Station)					11. DATUM FOR ELEVATION BROWN (TBM or BBL)			
3. DRILLING AGENCY					12. MANUFACTURER'S DESIGNATION OF DRILL			
4. HOLE NO. (As shown on drawing title and site number) <u>115-41</u>					13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN		13. DISTURBED ☐ UNDISTURBED ☐	
5. NAME OF DRILLER					14. TOTAL NUMBER CORE BOXES			
6. DIRECTION OF HOLE ☐ VERTICAL ☐ INCLINED _____ DEG. FROM VERT.					15. ELEVATION GROUND WATER		16. DATE HOLE STARTED _____ COMPLETED _____	
7. THICKNESS OF OVERBURDEN					17. ELEVATION TOP OF HOLE			
8. DEPTH DRILLED INTO ROCK					18. TOTAL CORE RECOVERY FOR BORING _____ %			
9. TOTAL DEPTH OF HOLE					19. SIGNATURE OF INSPECTOR <u>C. W. [Signature]</u>			
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, etc., if significant) g		
	31		(Same as above) SILTY LEAN CLAY moist MEDIUM BLUISH GRAY sand-size grit small gravel-size particles			6 1/4" Rock Bit Gravity Feed Log from Cuttings Rapid Rotation Quick Advance		
	32		32.0' Silty lean clay moist MEDIUM LIGHT GRAYISH BROWN high silt content			Add 10 gal. H ₂ O to Sump.		
	33					Large cuttings coming up boring. +2" dia		
	34							
	35							
	36							
	37							
	38		38.0' CLAY GRAVEL MEDIUM SATURATED YELLOWISH BROWN fine to coarse gravel 30-40% clay limestone gravel angular			add 10 gal. to Sump.		
	39							
	40							

DRILLING LOG		DIVISION		INSTALLATION		Hole No. <u>NS-41</u>	
1. PROJECT <u>Bannister Federal Complex Station</u>				10. SIZE AND TYPE OF BIT			
2. LOCATION (Coordinate or Station)				11. DAYTIME FOR ELEVATION SHOWN (TSM or MSL)			
3. DRILLING AGENCY				12. MANUFACTURER'S DESIGNATION OF DRILL			
4. HOLE NO. (As shown on drawing title and file number) <u>NS-41</u>				13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN		13. DISTURBED ☐ UNDISTURBED ☐	
5. NAME OF DRILLER				14. TOTAL NUMBER CORE BOXES			
6. DIRECTION OF HOLE ☐ VERTICAL ☐ INCLINED _____ DEG. FROM VERT.				15. ELEVATION GROUND WATER			
7. THICKNESS OF OVERBURDEN <u>43.3</u>				16. DATE HOLE ☐ STARTED ☐ COMPLETED			
8. DEPTH DRILLED INTO ROCK <u>10.7</u>				17. ELEVATION TOP OF HOLE			
9. TOTAL DEPTH OF HOLE <u>54.0</u>				18. TOTAL CORE RECOVERY FOR BORING			
				19. SIGNATURE OF INSPECTOR <u>C. J. [Signature]</u>			
ELEVATION	DEPTH	LEGEND	CLASSIFICATION OF MATERIALS (Description)	% CORE RECOVERY	BOX OR SAMPLE NO.	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant)	
			(same as above) CLAY GRAVEL MEDIUM SATURATED YELLOWISH BROWN fine to coarse gravel w/ 30-40% clay limestone gravel angular 41.6'			6 1/4" Rock Bit Gravity feed Log from Cuttings	
			GRAVEL DENSE SATURATED BROWN fine to coarse gravel angular to rounded (limestone) +/- 10% clay TOP OF BEDROCK 43.3			Rig Chatter → Add 15 gal. to sump. Top of bedrock approx. 43.3', drillations cuttings	
			PLEASANTON GROUP SHALY SILTSTONE SOFT/MODERATELY HARD PARTING/BANDED VERY FINE GRAINED LIGHT GREENISH GRAY occasional fine sand < 10% micaceous siltstone w/ 10-20% shale			END DAY 5/26/94 Begin Day 5/27/94 6 1/4" Rock bit Velocity 34 sec/ft pull down pressure 150 psi slow rotation slow advance rate 3 in/ft rig chatter →	

Hole No. NS-41

DRILLING LOG		DIVISION		INSTALLATION		SHEET <u>C</u> OF 7 SHEETS	
1. PROJECT <u>Barringer Field Complex</u>				10. SIZE AND TYPE OF BIT			
2. LOCATION (Coordinates or Station)				11. DATUM FOR ELEVATION (SHOW TYPE or B.S.)			
3. DRILLING AGENCY				12. MANUFACTURER'S DESIGNATION OF DRILL			
4. HOLE NO. (As shown on drawing title and file number) <u>NS-41</u>				13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN		DISTURBED ☐ UNDISTURBED ☐	
5. NAME OF DRILLER				14. TOTAL NUMBER CORE BOXES			
6. DIRECTION OF HOLE ☐ VERTICAL ☐ INCLINED _____ DEG. FROM VERT.				15. DATE HOLE		STARTED _____ COMPLETED _____	
7. THICKNESS OF OVERBURDEN				16. ELEVATION GROUND WATER			
8. DEPTH DRILLED INTO ROCK				17. ELEVATION TOP OF HOLE			
9. TOTAL DEPTH OF HOLE				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, etc., if significant) g
50			(SAME AS ABOVE) PLEASANTON GROUP SHALY SILTSTONE SOFT MODERATELY HARD PARTING/BANDING VERY FINE GRAINED LIGHT GREENISH GRAY occ. fine sand < 40% mud & roots Siltstone w/ 10-20% shale			6 1/2" bit (only) pull down pressure 150 psi rigid bit
51						
52						
53						
54						
55	540		540' B.A.H. No Refusal	540	540	540
56						GW level undetermined w/ this drilling method 538' per 4" Sch 40 PVC casing set in hole 50 lbs cement 50 lbs barite w/ 37.5 gal H ₂ O dry mixed then wet mixed & tamped to ground surface Air monitoring while drilling (no hits) insulation string 15.7
57						
58						
59						
60						

Scale 1" = 100'

Sketch map details: GSA Parking lot, North arrow pointing up, hole NS-41 at center, 47' distance to another point, D-40, NS-42, and a 15.7' distance to a feature labeled '15.7'.

Hole No. US-41

DRILLING LOG		DIVISION	INSTALLATION	SHEET
1. PROJECT <u>Bannish 7nd Corridor Seismic</u>		<u>MCD</u>	<u>ECA</u>	<u>7</u> OF 7 SHEETS
2. LOCATION (Coordinates or Station) <u>See Station Map</u>		10. SIZE AND TYPE OF BIT <u>9 1/2" double fluted</u>		
3. DRILLING AGENCY <u>C.C.E</u>		11. DATUM FOR ELEVATION SHOWN (TBM or MSL) <u>MSL</u>		
4. HOLE NO. (As shown on drawing title and file number) <u>US-41</u>		12. MANUFACTURER'S DESIGNATION OF DRILL <u>Franklin 1500</u>		
5. NAME OF DRILLER <u>M. Cooney</u>		13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN		
6. DIRECTION OF HOLE ☒ VERTICAL ☐ INCLINED _____ DEG. FROM VERT.		14. TOTAL NUMBER CORE BOXES <u>0</u>		
7. THICKNESS OF OVERBURDEN <u>43.3</u>		15. ELEVATION GROUND WATER <u>Not determinable</u>		
8. DEPTH DRILLED INTO ROCK <u>0.7</u>		16. DATE HOLE STARTED <u>5-26-94</u> COMPLETED <u>5-28-94</u>		
9. TOTAL DEPTH OF HOLE <u>54.0</u>		17. ELEVATION TOP OF HOLE <u>N/A</u>		
		18. TOTAL CORE RECOVERY FOR BORING <u>0</u>		
		19. SIGNATURE OF INSPECTOR <u>C. P. [Signature]</u>		

ELEVATION	DEPTH	LEGEND	CLASSIFICATION OF MATERIALS (Description)	% CORE RECOVERY	BOX OR SAMPLE NO.	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant)

Boring D-40

Northeast Parking Lot

Hole No. **D-40**

DRILLING LOG		DIVISION MRO		INSTALLATION KCO		SHEET 2 OF 7 SHEETS	
1. PROJECT Bannister Federal Complex				10. SIZE AND TYPE OF BIT 1 1/2" Hollow Stem Auger 1/4"			
2. LOCATION (Coordinate or Station) See Sketch - Page 6				11. DAY ON FOR ELEVATION SHOWN (TBM or BSL) MSL			
3. DRILLING AGENCY C.O.E.				12. MANUFACTURER'S DESIGNATION OF DRILL Failing 1500			
4. HOLE NO. (As shown on drawing sheet and site marked) D-40				13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN		14. TOTAL NUMBER CORE BOXES	
5. NAME OF DRILLER				15. ELEVATION GROUND WATER		16. DATE HOLE	
6. DIRECTION OF HOLE ☒ VERTICAL ☐ INCLINED _____ DEG. FROM VERT.				17. ELEVATION TOP OF HOLE 0A		18. TOTAL CORE RECOVERY FOR BORING	
7. THICKNESS OF OVERBURDEN				19. SIGNATURE OF INSPECTOR <i>[Signature]</i>		20. TOTAL DEPTH OF HOLE	
8. DEPTH DRILLED INTO ROCK							
ELEVATION	DEPTH	LEGEND	CLASSIFICATION OF MATERIALS (Description)	1. CORE RECOVERY	2. BOX OR SAMPLE NO.	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant)	
			(same as above) SILTY LEAN CLAY MEDIUM MOIST YELLOWISH BROWN gray mottling occasional fine limestone gravel	D-1.5 R-1.9	J-2 10.9	SPT-2 1 3/8" Split Spoon C.O. Stewart Old Rope - 2 wraps D-Rods Clean out w/rock bit	
	11			11.5		11.5	
	12					6 1/4" Rock bit Log from cuttings Gravity feed	
	13						
	14						
	15		SILTY LEAN CLAY STIFF MOIST BROWN red and gray mottling	15.0	15.0	15.0	
	16			D-1.5 R-1.5	J-3	SPT-3 1 3/8" Split Spoon C.O. Stewart Old Rope - 2 wraps D-Rods Clean out w/rock bit Settled 0.3' by wt. of tools	
	17			16.5	16.5	16.5	
	18					6 1/4" Rock bit Log from cuttings Gravity feed	
	19					Add 10 gal H ₂ O to sup	
	20		SILTY LEAN CLAY MEDIUM MOIST DARK GRAY occ. fine gravel - limestone/siltstone				

Hole No. **D-40**

DRILLING LOG		DIVISION mro	INSTALLATION KCO	SHEET 3 OF 7 SHEETS
1. PROJECT Bannister Federal Complex Seismic			10. SIZE AND TYPE OF BIT 1 1/2" Hollow Stem Auger 1 1/2" Rock Bit	
2. LOCATION (Coordinates or Section) See Sketch - Page 6			11. DATUM FOR ELEVATION SHOWN (TYP. = MSL) MSL	
3. DRILLING AGENCY C.O.C.			12. MANUFACTURER'S DESIGNATION OF DRILL Trilene 1500	
4. HOLE NO. (As shown on drawing title and site number) D-40			13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN DISTURBED _____ UNDISTURBED _____	
5. NAME OF DRILLER			14. TOTAL NUMBER CORE BOXES	
6. DIRECTION OF HOLE ☒ VERTICAL ☐ INCLINED _____ DEG. FROM VERT.			15. ELEVATION GROUND WATER	
7. THICKNESS OF OVERBURDEN			16. DATE HOLE STARTED _____ COMPLETED _____	
8. DEPTH DRILLED INTO ROCK			17. ELEVATION TOP OF HOLE NA	
9. TOTAL DEPTH OF HOLE			18. TOTAL CORE RECOVERY FOR BORING 1	
19. SIGNATURE OF INSPECTOR M. J. Stewart				

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, etc., if significant) g
	21		(Same as above) SILTY LEAN CLAY MEDIUM MOIST DARK GRAY occ. fine limestone / siltstone gravel	D-15 D-15	J-4	SPT-4 13 1/8" Split Spoon 2 C.O. Stewart Old Rope - 2 wraps 2 D-Rods Clean out w/ rock bit 2
	22					
	23					
	24					
	25			25.0	25.0	25.0
	26			D-15 D-14	J-5	SPT-5 13 1/8" Split Spoon 2 C.O. Stewart Old Rope - 2 wraps 2 D-Rods Clean out w/ rock bit 3
	27			26.5	26.4	26.5
	28					6 1/4" Rock bit Log from cuttings Gravity feed
	29					mud viscosity 30 sec. / qt.
	30		SILTY LEAN CLAY VERY STIFF MOIST BLUSH GRAY notably high silt content			

Hole No. D-40

DRILLING LOG		DIVISION		INSTALLATION		SHEET 4 OF 7 SHEETS	
1. PROJECT Barnister Federal Complex Seismic		MRO		ECO		Aug 1964	
2. LOCATION (Coordinates or Station) See Sketch - Page 6				10. SIZE AND TYPE OF BIT (4 1/2" Split Spoon)		11. DAYTIME FOR ELEVATION SHOWN (T.M. or S.M.)	
3. DRILLING AGENCY C.O.E.				12. MANUFACTURER'S DESIGNATION OF DRILL failing 1500			
4. HOLE NO. (As shown on drawing title and this number) D-40				13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN		DISTURBED UNDISTURBED	
5. NAME OF DRILLER				14. TOTAL NUMBER CORE BOXES			
6. DIRECTION OF HOLE ☒ VERTICAL ☐ INCLINED _____ DEG. FROM VERT.				15. ELEVATION GROUND WATER			
7. THICKNESS OF OVERBURDEN				16. DATE HOLE STARTED _____ COMPLETED _____			
8. DEPTH DRILLED INTO ROCK				17. ELEVATION TOP OF HOLE NA			
9. TOTAL DEPTH OF HOLE				18. TOTAL CORE RECOVERY FOR BORING		%	
				19. SIGNATURE OF INSPECTOR C. Stewart			
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, etc., if significant)	
	31		(Same As Above) SILTY LEAN CLAY VERY STIFF MOIST BLuish GRAY not staining high silt content heavy rust staining	0-15 R-15	0-6	SPT-6 13/8" Split Spoon 6 C.O. Stewart old Rope - 2 wraps 8 D-Rods clean out w/rock bit 10	
	32			31.5	4.5	31.5	
	33					6 1/4" R.C. bit Log from Cuttings Gravel, sand Add 10 gal H ₂ O	
	34						
	35		SILTY LEAN CLAY STIFF MOIST LIGHT GRAY not staining high silt content occ. gravel < 1/2" (medium) heavy rust (concretion)	0-15 R-15	0-7	SPT-7 13/8" Split Spoon 2 C.O. Stewart old Rope - 2 wraps 4 D-Rods clean out w/rock bit 4 settled 0.1' by weight of rods	
	36			33.0	22.0	35.0	
	37					6 1/4" R.C. bit Gravel, sand Log from Cuttings	
	38						
	39						

Hole No. D-40

DRILLING LOG		DIVISION		INSTALLATION		SHEET 5 OF 5 SHEETS	
1. PROJECT Bannister Federal Complex Seismic		MRO		KCO		Hole No. D-40	
2. LOCATION (Coordinates or Station) See Sketch - Page 6				10. SIZE AND TYPE OF BIT Hollow Stem Auger / 6" bit			
3. DRILLING AGENCY C.O.F.				11. DATE FOR ELEVATION MEASUREMENT MSL			
4. HOLE NO. (As shown on drawing Note and also number) D-40				12. MANUFACTURER'S DESIGNATION OF DRILL Failing 1500			
5. NAME OF DRILLER				13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN		DISTURBED UNDISTURBED	
6. DIRECTION OF HOLE ☒ VERTICAL ☐ INCLINED _____ DEG. FROM VERT.				14. TOTAL NUMBER CORE BOXES			
7. THICKNESS OF OVERBURDEN				15. ELEVATION GROUND WATER			
8. DEPTH DRILLED INTO ROCK				16. DATE HOLE STARTED COMPLETED			
9. TOTAL DEPTH OF HOLE				17. ELEVATION TOP OF HOLE 11.1			
				18. TOTAL CORE RECOVERY FOR BORING			
				19. SIGNATURE OF INSPECTOR [Signature]			
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, etc., if significant) g	
			(Same as above) SILTY LEAN CLAY 40.3		J-8 10.3	SPT-8 1 3/4" Split Spoon 5	
			CLAY GRAVEL MEDIUM SATURATED GRAYISH BROWN fine to coarse gravel w/ 20-30% clay limestone gravel, semi-rounded TOP OF BEDROCK 41.9	D-1.5 R-0.3 91.5		C.O. Seibert Old Rope - 2 wraps 5 N-Rods Clean out w/ rock bit 41.5 spoon stuck 3 GRAVEL	
			PLEASANTON GROUP SHALY SILTSTONE SOFT TO MODERATELY HARD PARTING VERY FINE GRAIN GREENISH GRAY micaceous SILTSTONE w/ 10-20% shale occ. hard zones			6 1/4" Rock Bit Log from cuttings Top of bedrock as per driller, drill action, and cuttings. Feed pressure 200 psi.	
						Rig chatter →	

Hole No. D-40

DRILLING LOG				DIVISION		INSTALLATION		SHEET 6 OF 7 SHEETS	
1. PROJECT Bannister Federal Complex Savings				MRO		KCO		10. SIZE AND TYPE OF BIT 9" (Hole) 52m Auger 1 1/4" Red Bit	
2. LOCATION (Coordinate or Station) Hole No. - 1-20-50								11. DATUM FOR ELEVATION SHOWN (TBM or MSL) MSL	
3. DRILLING AGENCY C.O.C.								12. MANUFACTURER'S DESIGNATION OF DRILL Tailors 1500	
4. HOLE NO. (As shown on drawing title and file number) D-40								13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN DISTURBED UNDISTURBED	
5. NAME OF DRILLER								14. TOTAL NUMBER CORE BOXES	
6. DIRECTION OF HOLE ☒ VERTICAL ☐ INCLINED _____ DEG. FROM VERT.								15. ELEVATION GROUND WATER	
7. THICKNESS OF OVERBURDEN								16. DATE MOLE STARTED COMPLETED	
8. DEPTH DRILLED INTO ROCK								17. ELEVATION TOP OF HOLE NA	
9. TOTAL DEPTH OF HOLE								18. TOTAL CORE RECOVERY FOR BORING	
								19. SIGNATURE OF INSPECTOR J. Harris	
ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, motor loss, depth of weathering, etc., if significant) g			
	51		(Same as above) PLEASANTON GROUP SHALY SILTSTONE SOFT TO MODERATELY HARD PARTING VERY FINE GRAIN GREENISH GRAY micaceous siltstone w/10-20% shale occ. hard zones			6 1/4" Red Bit Log from cuttings			
	52	520	520	520	520	520			
			8.0 ft. 52.0' No Refuel			- GW level undetermined within drilling method - 51.8' 4" sch 410' A.C. casing set in bore - 50 lbs cement & 50 lbs bentonite w/ 1375' H ₂ O - dry mixed slurry to ground in casing - Air Monitoring while drilling (no birds) - insulation diagram pg. 7 GSA Lot			
*not to scale									

Hole No. D-40

DRILLING LOG		DIVISION		INSTALLATION		SHEET 7 OF 7 SHEETS	
1. PROJECT		mro		ECO		10. SIZE AND TYPE OF BIT 4" 4-1/2" 5-1/2" 6-1/2" 8-1/2" 10-1/2" 12-1/2" 14-1/2" 16-1/2" 18-1/2" 20-1/2" 22-1/2" 24-1/2" 26-1/2" 28-1/2" 30-1/2" 32-1/2" 34-1/2" 36-1/2" 38-1/2" 40-1/2" 42-1/2" 44-1/2" 46-1/2" 48-1/2" 50-1/2" 52-1/2" 54-1/2" 56-1/2" 58-1/2" 60-1/2" 62-1/2" 64-1/2" 66-1/2" 68-1/2" 70-1/2" 72-1/2" 74-1/2" 76-1/2" 78-1/2" 80-1/2" 82-1/2" 84-1/2" 86-1/2" 88-1/2" 90-1/2" 92-1/2" 94-1/2" 96-1/2" 98-1/2" 100-1/2"	
2. LOCATION (Coordinates or Station)		See sketch - page 10		11. DATUM FOR ELEVATION BROWN (TBM or MSL)		MSL	
3. DRILLING AGENCY		C.O.E.		12. MANUFACTURER'S DESIGNATION OF DRILL		Fairing 1500	
4. HOLE NO. (As shown on drawing title and site number)		D-40		13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN		DISTURBED 0 UNDISTURBED 0	
5. NAME OF DRILLER		D. Maguire		14. TOTAL NUMBER CORE BOXES		0	
6. DIRECTION OF HOLE		VERTICAL ☒ INCLINED ☐ DEG. FROM VERT.		15. ELEVATION GROUND WATER		Not Available	
7. THICKNESS OF OVERBURDEN		41.4		16. DATE HOLE		STARTED 5-31-54 COMPLETED 5-31-54	
8. DEPTH DRILLED INTO ROCK		10.1		17. ELEVATION TOP OF HOLE		DA	
9. TOTAL DEPTH OF HOLE		52.0		18. TOTAL CORE RECOVERY FOR BORING		%	
				19. SIGNATURE OF INSPECTOR		C. J. Van der ...	
ELEVATION	DEPTH	LEGEND	CLASSIFICATION OF MATERIALS (Description)	% CORE RECOVERY	BOX OR SAMPLE NO.	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant)	
			6" 1/4" steel plate			Ground level	
			Asphalt			Road base	
			2.0'			23' top of casing	
			2.0'			85' top of grout	
			2.0'			Bottom of surface casing.	
			2.0'			3" Sch 40 PVC surface casing.	
			2.0'			20' joints.	
			11.0'			4" Sch 40 PVC Casing	
			25'			Annulus backfilled w/ 50% cement, 50% betonite grout	
			30'			30 lbs. cement, 50 lbs. betonite, 37.5 gal. H ₂ O dry mixed, then water added and mixed. Tremied from bottom of hole through one-way ball valve.	
			48.8			6 1/4" boring diameter	
			51.8			B.O.H. 520'	
			51.8			6 1/4" boring	

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PROJECT Dannerster Federal Complex Seismic HOLE NO. D-40

Boring D-42

Northeast Parking Lot

Hole No. **N3-42**

DRILLING LOG		DIVISION	INSTALLATION	SHEET 1 OF 7 SHEETS
1. PROJECT Bannister Federal Complex		MRO	KCO	
2. LOCATION (Coordinates or Station) See Sketch Pg. 6			10. SIZE AND TYPE OF BIT 9" Hollow Stem Auger 1 1/2"	
3. DRILLING AGENCY Corp of Engineers			11. DATUM FOR ELEVATION SHOWN (FSM or MSL) MSL	
4. HOLE NO. (As shown on drawing title and file number) N3-42			12. MANUFACTURER'S DESIGNATION OF DRILL Failing 1532	
5. NAME OF DRILLER D. McGuire			13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN	14. TOTAL NUMBER CORE BOXES
6. DIRECTION OF HOLE ☒ VERTICAL ☐ INCLINED _____ DEG. FROM VERT.			0	0
7. THICKNESS OF OVERBURDEN 42.0'			15. ELEVATION GROUND WATER Not determinable	
8. DEPTH DRILLED INTO ROCK 11.6'			16. DATE HOLE 6-1-94	17. ELEVATION TOP OF HOLE NA
9. TOTAL DEPTH OF HOLE 53.6'			18. TOTAL CORE RECOVERY FOR BORING -	19. SIGNATURE OF INSPECTOR [Signature]

ELEVATION	DEPTH	LEGEND	CLASSIFICATION OF MATERIALS (Description)	% CORE RECOVERY	BOX OR SAMPLE NO.	REMARKS (Drilling fluid, water loss, depth of weathering, etc., if significant)
			ASPHALT			
			CRUSHED STONE (roadbase) Limestone (2" max. dia) TOP OF NATURAL GROUND			9" Hollow Stem Auger Log from Cuttings Place 2.6' 3" SCH-40 PVC Surface Casing Fill annulus w/bentonite and cold-patch asphalt
1			SILTY LEAN CLAY STILL MOIST VERY DARK BROWN BLACK	0-2.6 8-0.0		
2			high silt content			
3					2.6	2.6
4						6 1/4" Rock Bit 3 1/2" Drill Rods Drill Fluids: Bentonite Muds 150 gal. H ₂ O 50 lbs. bentonite
5			SILTY LEAN CLAY VERY still MOIST GRAYISH BROWN			Viscosity: 28 Sec. 1/4t.
6						Log from Cuttings Gravity Feed
7						
8						
9			SILTY LEAN CLAY MEDIUM MOIST LIGHT GRAYISH BROWN GRAY mottling occ. fine gravel (limbs) occ. sand sized particles			

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MAR 71

PROJECT
Bannister Federal Complex

HOLE NO.
N3-42

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DRILLING LOG			DIVISION	INSTALLATION	Hole No.	SHEET
1. PROJECT Dannister Federal Complex, Tennessee			MRD	KCD	NS-42	2
2. LOCATION (Coordinates or Station) Sketch Pg. 6				10. SIZE AND TYPE OF BIT 6" Hollow Stem	MSL	OF 7 SHEETS
3. DRILLING AGENCY C.O.F.				11. DAY OF ELEVATION BROWN (TBM or MSL)	MSL	67
4. HOLE NO. (As shown on drawing title and site map) NS-42				12. MANUFACTURER'S DESIGNATION OF DRILL		
5. NAME OF DRILLER D. Marquis				13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN	DISTURBED -0-	UNDISTURBED -0-
6. DIRECTION OF HOLE ☒ VERTICAL ☐ INCLINED _____ DEG. FROM VERT.				14. TOTAL NUMBER CORE BOXES	-0-	
7. THICKNESS OF OVERBURDEN				15. ELEVATION GROUND WATER	Not determinable	
8. DEPTH DRILLED INTO ROCK				16. DATE HOLE	STARTED COMPLETED	
9. TOTAL DEPTH OF HOLE				17. ELEVATION TOP OF HOLE	NA	
				18. TOTAL CORE RECOVERY FOR BORING	-	1
				19. SIGNATURE OF INSPECTOR		
ELEVATION	DEPTH	LEGEND	CLASSIFICATION OF MATERIALS (Description)	% CORE RECOVERY	BOX OR SAMPLE NO.	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant)
	11		(SAME AS ABOVE) SILTY LEAN CLAY MEDIUM MOIST LIGHT GRAY/BROWN gray mottling occ. fine gravel (limestone) occ. sand sized particles			6 1/4" Rockbit Log from cuttings Gravelly Ford Rapid Rotation Rapid Advance
	12					
	13					
	14					
	15					
	16					
	17		17.0 SILTY LEAN CLAY MEDIUM MOIST Brown gray mottling occ. sand, rice particles			Add 10 gal. H ₂ O to pump →
	18					
	19					
	20					

Hole No. NS-42

DRILLING LOG		DIVISION MRD	INSTALLATION KCO	SHEET 3 OF 7 SHEETS		
1. PROJECT Bannister Federal Complex Expansion		10. SIZE AND TYPE OF BITTING: 10" (10" / 10" Rock)				
2. LOCATION (Coordinates or Station) See sketch		11. DATUM FOR ELEVATION SHOWN (TBM or MSL) MSL				
3. DRILLING AGENCY C.O.F.		12. MANUFACTURER'S DESIGNATION OF DRILL				
4. HOLE NO. (As shown on drawing title and this number) NS-42		13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN DISTURBED: 0-0 UNDISTURBED: 0-0				
5. NAME OF DRILLER		14. TOTAL NUMBER CORE BOXES 0-0				
6. DIRECTION OF HOLE ☒ VERTICAL ☐ INCLINED _____ DEG. FROM VERT.		15. ELEVATION GROUND WATER Not determinable				
7. THICKNESS OF OVERBURDEN		16. DATE HOLE STARTED _____ COMPLETED _____				
8. DEPTH DRILLED INTO ROCK		17. ELEVATION TOP OF HOLE NA				
9. TOTAL DEPTH OF HOLE		18. TOTAL CORE RECOVERY FOR BORING -				
		19. SIGNATURE OF INSPECTOR J. J. [Signature]				
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, etc., if significant) g
			(SAME AS ABOVE) SILTY LEAN CLAY MEDIUM MOIST BROWN gray mottling occ. sand size pebbles 21.0			6 1/4" Kerbit (cont)
	21		SILTY LEAN CLAY MEDIUM MOIST DARK GRAY occ. fine limonite (high)			Log from cuttings
	22					Gravelly sand
	23					Repeat Relation
	24					Repeat Relation
	25					
	26					
	27					
	28		SILTY LEAN CLAY VERY STIFF MOIST BLuish GRAY rust staining high silt content	28.0		Add 10 gal. H ₂ O to pump →
	29					
	30					

Hole No. NS-42

DRILLING LOG		Division	INSTALLATION	SHEET
		MRO	KCD	4 OF 7 SHEETS
1. PROJECT Dannister Federal Complex, Seismic			10. SIZE AND TYPE OF BIT 9" Hollow Stem Auger 11/4" C&T	
2. LOCATION (Coordinates or Station) See Sketch			11. DATUM FOR ELEVATION SHOWN (FSM or MSL) MSL	
3. DRILLING AGENCY C.O.F.			12. MANUFACTURER'S DESIGNATION OF DRILL	
4. HOLE NO. (As shown on drawing title and site number) NS-42			13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN - 0 -	
5. NAME OF DRILLER			14. TOTAL NUMBER CORE BOXES - 0 -	
6. DIRECTION OF HOLE ☒ VERTICAL ☐ INCLINED _____ DEG. FROM VERT.			15. ELEVATION GROUND WATER Not determinable	
7. THICKNESS OF OVERBURDEN			16. DATE HOLE STARTED _____ COMPLETED _____	
8. DEPTH DRILLED INTO ROCK			17. ELEVATION TOP OF HOLE NA	
9. TOTAL DEPTH OF HOLE			18. TOTAL CORE RECOVERY FOR BORING -	
			19. SIGNATURE OF INSPECTOR <i>[Signature]</i>	

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, etc., if significant) g
	31		(Same as above) SILTY LEAN CLAY VERY STIFF MOIST BLuish GRAY rust staining high silt content			6 1/4" Rock bit Grinn's Ford
	32					Log from cuttings Rapid Rotation moderate advance
	33					
	33.0		SILTY LEAN CLAY STIFF MOIST LIGHT GRAY high silt content rust staining occ. gravel 20% (medium)			
	34					
	35					
	36					
	37					
	38					Add 10 gal. H ₂ O to pump →
	39					
	40					

Hole No. NJ-42

DRILLING LOG		DIVISION	INSTALLATION	SHEETS		
1. PROJECT <u>Bannister Federal Complex Seismic</u>		<u>M&D</u>	<u>K20</u>	OF 7 SHEETS		
2. LOCATION (Coordinate or Station) <u>See Sketch</u>		10. SIZE AND TYPE OF BIT <u>3 1/2" Hollow Stem Auger 1 1/4" Bit</u>				
3. DRILLING AGENCY <u>C.O.E.</u>		11. DATUM FOR ELEVATION SHOWN (FSM or MSL) <u>MSL</u>				
4. HOLE NO. (As shown on drawing and the number) <u>NJ-42</u>		12. MANUFACTURER'S DESIGNATION OF DRILL				
5. NAME OF DRILLER		13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN				
6. DIRECTION OF HOLE ☒ VERTICAL ☐ INCLINED _____ DEG. FROM VERT.		14. TOTAL NUMBER CORE BOXES <u>0</u>				
7. THICKNESS OF OVERBURDEN		15. ELEVATION GROUND WATER <u>Not determinable</u>				
8. DEPTH DRILLED INTO ROCK		16. DATE HOLE STARTED _____ COMPLETED _____				
9. TOTAL DEPTH OF HOLE		17. ELEVATION TOP OF HOLE <u>NA</u>				
		18. TOTAL CORE RECOVERY FOR BORING <u>1</u>				
		19. SIGNATURE OF INSPECTOR <u>[Signature]</u>				
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 weathered, etc., if significant) g
	41		Same as above SILTY LEAN CLAY STIFF MOIST LIGHT GRAY high silt content mottled staining occ. gravel 2-10% (medium)			6 1/4" Rock bit Log from C-4133 Rig Chatter →
	42		CLAY GRAVEL MEDIUM SATURATED GRAYISH (Brown) fine to coarse gravel w/ 20-30% clay limestone gravel. (6 in. - 10 in. dia) Bricks Top of Bricks			↓ Pullover
	43		PLEASANTON GROUP SHALY SILTSTONE SOFT TO MODERATELY HARD PARTING VERY FINE GRAIN LIGHT BROWN weathered micaceous occ. fine sand			Tap at bottom as per driller, drillation, & cuttings
	44		PLEASANTON GROUP SHALY SILTSTONE SOFT TO MODERATELY HARD PARTING VERY FINE GRAIN GRAY micaceous Siltstone w/ 10-20% occ. hard zones shale			Drawdown Pressure 400 P.S.I.
	45					
	46					
	47					Rig Chatter →
	48					
	49					Rig Chatter →
	50					

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MAR 71

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PROJECT

Bannister Federal Complex

HOLE NO.

NJ-42

Hole No. NS-42

DRILLING LOG		DIVISION		INSTALLATION		SHEET	
PROJECT		m R O		K C O		6 OF 7 SHEETS	
1. PROJECT		Bannister Federal Complex		10. SIZE AND TYPE OF BIT		9" Hollow Stem Auger 1 1/4"	
2. LOCATION (Coordinates or Section)		See sketch		11. DATUM FOR ELEVATION SHOWN (FSM = MSL)		MSL	
3. DRILLING AGENCY		C. O. E.		12. MANUFACTURER'S DESIGNATION OF DRILL			
4. HOLE NO. (As shown on drawing title and this number)		NS-42		13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN		DISTURBED - 0 - UNDISTURBED - 0 -	
5. NAME OF DRILLER				14. TOTAL NUMBER CORE BOXES		- 0 -	
6. DIRECTION OF HOLE		VERTICAL ☒ INCLINED ☐ DEG. FROM VERT.		15. ELEVATION GROUND WATER		Not determinable	
7. THICKNESS OF OVERBURDEN				16. DATE HOLE		STARTED ☐ COMPLETED ☐	
8. DEPTH DRILLED INTO ROCK				17. ELEVATION TOP OF HOLE		NA	
9. TOTAL DEPTH OF HOLE				18. TOTAL CORE RECOVERY FOR BORING		-	
				19. SIGNATURE OF INSPECTOR		J. J. Minnick	
ELEVATION	DEPTH	LEGEND	CLASSIFICATION OF MATERIALS (Description)	% CORE RECOVERY	BOX OR SAMPLE NO.	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant)	
51			(Same as above) PLEASANTON GROUP SHALY SILTSTONE SET TO MODERATELY HARD PARTING VERY FINE GRAINED G.S.A. micaceous siltstone w/10-20% shale occ. hard zones			6 1/4" Rock Bit Log from cutting 400 P.S.I. pull down pressure	
52							
53	53.0		B. O. H. 53.0' NO RESIDUAL	53.0	53.0	Groundwater table undeterminable with this drilling method.	
54						52.8' 4" SCH 40' P.V.C. casing section set in boring. 50 lbs. cement + 50 lbs. bentonite w/37.5 gal. H ₂ O dry mixed and tremied to grout casing.	
55						- Air monitoring while drilling. No hits.	
56						- Installation diagram pg. 7.	
57						G.S.A. LOT	
58							
59							

ENG FORM 1836
MAR 71 PREVIOUS EDITIONS ARE OBSOLETE.PROJECT
Bannister Federal Complex
HOLE NO.
NS-42

Hole No. NS-42

DRILLING LOG		DIVISION		INSTALLATION		SHEET	
PROJECT		<u>MRO</u>		<u>KCO</u>		<u>7</u> of <u>7</u> SHEETS	
1. PROJECT		<u>Barrister Federal Complex, Windsor</u>		10. SIZE AND TYPE OF BIT <u>1 1/2" H.S. Auger 16" bit</u>		11. DATUM FOR ELEVATION <u>MSL</u>	
2. LOCATION (Coordinate or Station)		<u>See Sketch Pg. 6</u>		12. MANUFACTURER'S DESIGNATION OF DRILL		<u>7-1/2" 1500</u>	
3. DRILLING AGENCY		<u>C.O.E.</u>		13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN		DISTURBED <u>0</u> UNDISTURBED <u>0</u>	
4. HOLE NO. (As shown on drawing title and file number)		<u>NS-42</u>		14. TOTAL NUMBER CORE BOXES		<u>0</u>	
5. NAME OF DRILLER		<u>D. Margolis</u>		15. ELEVATION GROUND WATER		<u>Not determinable</u>	
6. DIRECTION OF HOLE		☒ VERTICAL ☐ INCLINED <u> </u> DEG. FROM VERT.		16. DATE HOLE		STARTED <u>6-1-94</u> COMPLETED <u>6-1-94</u>	
7. THICKNESS OF OVERBURDEN		<u>42.0'</u>		17. ELEVATION TOP OF HOLE		<u>NA</u>	
8. DEPTH DRILLED INTO ROCK		<u>11.0'</u>		18. TOTAL CORE RECOVERY FOR BORING		<u> </u> %	
9. TOTAL DEPTH OF HOLE		<u>53.0'</u>		19. SIGNATURE OF INSPECTOR		<u>D. Margolis</u>	
ELEVATION	DEPTH	LEGEND	CLASSIFICATION OF MATERIALS (Description)	% CORE RECOVERY	BOX OR SAMPLE NO.	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant)	
			<u>1/4" steel plate</u>			<u>Ground Level</u>	
			<u>car</u>			<u>Asphalt</u>	
			<u>0.3'</u>			<u>Base</u>	
			<u>0.7'</u>			<u>2.0'</u>	
			<u>2.6'</u>			<u>0.3' top of casing</u>	
			<u>2.6'</u>			<u>0.5' top of grout</u>	
			<u>2.6'</u>			<u>Bottom of surface casing, 8" JCH 40 PVC surface casing.</u>	
			<u>2.6'</u>			<u>4" JCH 40 P.V.C. casing</u>	
			<u>2.6'</u>			<u>26.0'</u>	
			<u>32.0'</u>			<u>Anulus backfilled w/50% cement, 50% betonite gravel. 50 lbs cement, 50 lbs betonite, 37.5 gal. H2O dry mixed, then water added and mixed. Tremled from bottom of hole through one-way ball valve.</u>	
			<u>49.8'</u>			<u>6 1/4" boring diameter</u>	
			<u>53.0'</u>			<u>3.0" H. 53.0' 6 1/4" boring * NOT TO SCALE</u>	

ENG FORM 1836
MAR 71 PREVIOUS EDITIONS ARE OBSOLETE.PROJECT
Barrister Federal Complex NS-42

HOLE NO.

Boring D-45

Southeast Parking Lot

PROJECT	HOLE NO.
Bonnie to Ted Cooper	NS-415

DRILLING LOG			DIVISION	INSTALLATION		Hole No. <u>NS 45</u> SHEET <u>2</u> OF 7 SHEETS	
1. PROJECT <u>Barruda Ind. Complex</u>			10. SIZE AND TYPE OF BIT		11. DAYUM FOR ELEVATION SHOWN (TBM or BBL)		
2. LOCATION (Coordinates or Station)			12. MANUFACTURER'S DESIGNATION OF DRILL		13. TOTAL NO. OF OVER- BURDEN SAMPLES TAKEN		
3. DRILLING AGENCY			14. TOTAL NUMBER CORE BOXES		15. ELEVATION GROUND WATER		
4. HOLE NO. (As shown on drawing and No. and file number)			16. DATE HOLE		17. ELEVATION TOP OF HOLE		
5. NAME OF DRILLER			18. TOTAL CORE RECOVERY FOR BORING		19. SIGNATURE OF INSPECTOR		
6. DIRECTION OF HOLE ☐ VERTICAL ☐ INCLINED _____ DEG. FROM VERT.			19. SIGNATURE OF INSPECTOR		20. SIGNATURE OF INSPECTOR		
7. THICKNESS OF OVERBURDEN			20. SIGNATURE OF INSPECTOR		21. SIGNATURE OF INSPECTOR		
8. DEPTH DRILLED INTO ROCK			21. SIGNATURE OF INSPECTOR		22. SIGNATURE OF INSPECTOR		
9. TOTAL DEPTH OF HOLE			22. SIGNATURE OF INSPECTOR		23. SIGNATURE OF INSPECTOR		
ELEVATION	DEPTH	LEGEND	CLASSIFICATION OF MATERIALS (Description)	% CORE RECOVER- ERY	BOX OR SAMPLE NO.	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant)	
	10		(Same as above) SILTY LEAN CLAY MEDIUM MOIST BROWN occ. mottling occ. dk. brown spots			6 1/4" R. & B. (Cont)	
	11					Generally sand from 10'	
	12					Add 50-100 →	
	13					Cullings are large pieces ~ 3 d.a.	
	14					Log from Cullings	
	15					Viscosity 45.5 sec/ft →	
	16					Add 10 gpt H ₂ O →	
	17						
	18						
	19						
	20						

DRILLING LOG			DIVISION		INSTALLATION		Hole No. <u>NS-45</u> SHEET <u>3</u> OF 7 SHEETS	
1. PROJECT <u>Brandside Federal Center</u>			10. SIZE AND TYPE OF BIT		11. DATUM FOR ELEVATION SHOWN (TBM or BSL)			
2. LOCATION (Coordinates or Station)			12. MANUFACTURER'S DESIGNATION OF DRILL		13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN			
3. DRILLING AGENCY			14. TOTAL NUMBER CORE BOXES		15. ELEVATION GROUND WATER			
4. HOLE NO. (As shown on drawing title and site marking) <u>NS-45</u>			16. DATE HOLE		STARTED		COMPLETED	
5. NAME OF DRILLER			17. ELEVATION TOP OF HOLE		18. TOTAL CORE RECOVERY FOR BORING			
6. DIRECTION OF HOLE ☐ VERTICAL ☐ INCLINED _____ DEG. FROM VERT.			19. SIGNATURE OF INSPECTOR		20. SIGNATURE OF INSPECTOR			
7. THICKNESS OF OVERBURDEN			21. TOTAL DEPTH OF HOLE		22. SIGNATURE OF INSPECTOR			
8. DEPTH DRILLED INTO ROCK			23. SIGNATURE OF INSPECTOR		24. SIGNATURE OF INSPECTOR			
9. TOTAL DEPTH OF HOLE			25. SIGNATURE OF INSPECTOR		26. SIGNATURE OF INSPECTOR			
ELEVATION	DEPTH	LEGEND	CLASSIFICATION OF MATERIALS (Description)	% CORE RECOVERY	BOX OR SAMPLE NO.	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant)		
20			(Same as Above) SILTY LEAN CLAY MEDIUM MOIST BROWN occ. dark brown spots			6 1/4" Lubbit (cont) gusty sand rapid rotation Large cuttings removed ~ 23" dia. Long fine cuttings		
21								
22								
23								
24								
25								
26								
27								
28								
29								
30								
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100								

DRILLING LOG		DIVISION		INSTALLATION		Hole No. <u>NS 45</u> SHEET <u>4</u> OF 7 SHEETS	
1. PROJECT <u>Barnish 7-1 Corridor</u>				10. SIZE AND TYPE OF BIT			
2. LOCATION (Coordinates or Station)				11. DATUM FOR ELEVATION BROWN (TBM or BBL)			
3. DRILLING AGENCY				12. MANUFACTURER'S DESIGNATION OF DRILL			
4. HOLE NO. (As shown on drawing title and file number) <u>NS 45</u>				13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN		DISTURBED ☐ UNDISTURBED ☐	
5. NAME OF DRILLER				14. TOTAL NUMBER CORE BOXES			
6. DIRECTION OF HOLE ☐ VERTICAL ☐ INCLINED _____ DEG. FROM VERT.				15. ELEVATION GROUND WATER			
7. THICKNESS OF OVERBURDEN				16. DATE HOLE		STARTED ☐ COMPLETED ☐	
8. DEPTH DRILLED INTO ROCK				17. ELEVATION TOP OF HOLE			
9. TOTAL DEPTH OF HOLE				18. TOTAL CORE RECOVERY FOR BORING			
				19. SIGNATURE OF INSPECTOR <u>(Signature)</u>			
ELEVATION	DEPTH	LEGEND	CLASSIFICATION OF MATERIALS (Description)	% CORE RECOVERY	BOX OR SAMPLE NO.	REMARKS (Drifting, chum, water loss, depth of weathering, etc., if significant)	
	30		(Same as Above) SILTY LEAN CLAY MEDIUM MOIST BROWN GRAY occ. fine to medium sand			0 1/4" Rock bit (CWD)	
	31		SILTY LEAN CLAY MEDIUM MOIST DARK GRAY high silt content moderately plastic from large cuttings			gravel, sand Large pebbles rounded 1 3/4" dia rapid rotation rapid advance Log from cuttings.	
	32						
	33						
	34						
	35						
	36						
	37						
	38						
	39						
	40					Med viscosity 35 sec/st	

Hole No. NS-45

DRILLING LOG		DIVISION		LOCALITY		SHEET 5 OF 7 SHEETS	
1. PROJECT Bannock Fed. Cooper				10. SIZE AND TYPE OF BIT			
2. LOCATION (Coordinates or Station)				11. DATUM FOR ELEVATION BROWN (TBM or BNC)			
3. DRILLING AGENCY				12. MANUFACTURER'S DESIGNATION OF DRILL			
4. HOLE NO. (As shown on drawing title and file number) NS-45				13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN		14. TOTAL NUMBER CORE BOXES	
5. NAME OF DRILLER				15. ELEVATION GROUND WATER		16. DATE HOLE	
6. DIRECTION OF HOLE ☐ VERTICAL ☐ INCLINED _____ DEG. FROM VERT.				17. ELEVATION TOP OF HOLE		18. TOTAL CORE RECOVERY FOR BORING	
7. THICKNESS OF OVERBURDEN				19. SIGNATURE OF INSPECTOR		20. SIGNATURE OF DRILLER	
8. DEPTH DRILLED INTO ROCK				21. SIGNATURE OF DRILLER			
9. TOTAL DEPTH OF HOLE				22. SIGNATURE OF DRILLER			
ELEVATION	DEPTH	LEGEND	CLASSIFICATION OF MATERIALS (Description)	1. CORE RECOVERY	2. CORE SAMPLE NO.	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant)	
40			(SAME AS ABOVE) SILTY LEAN CLAY STIFF MOIST DARK GRAY high silt content moderately plastic from large cuttings			C 1/4" R 1/16" (Red)	
41						Coarsely Sand Log from cuttings	
42							
43			43.0 COARSELY LEAN CLAY MEDIUM TO MODERATELY MOIST DARK GRAY clay w/ 20-30% silt 4/38				
44			CLAY, GRAVEL DENSE SATURATED LIGHT GRAY fine to medium sand 10-20% finer (siltstone)			Top of bedrock as per driller, change in drill bit cuttings	
45			Top of Bed Rock 45.0 [MEASANTON GROUP] SHALEY SILTSTONE SOFT / MODERATELY HARD PARTING VERY FINE GRAINED / DENSE GREEN GRAY occ. fine sand < 10% siltstone w/ 10-20% silt (gray) shale siltstone seams throughout			300 p.s.i. pull down pressure	
46							
47							
48							
49							
50							

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(TRANSLUCENT)

PROJECT Bannock Fed Cooper HOLE NO. NS-45

Boring D-43

Southeast Parking Lot

Hole No. D-43

DRILLING LOG		DIVISION <u>MRO</u>	INSTALLATION <u>YCD</u>	SHEET 1 OF 7 SHEETS
1. PROJECT <u>Barramatta Federal Complex Seismic</u>		10. SIZE AND TYPE OF BIT <u>9" dia. 6 1/2" Rockbit</u>		
2. LOCATION (Continuation of Section) <u>See sketch page 6</u>		11. DATUM FOR ELEVATION KNOWN (TBM or BSL) <u>MSL</u>		
3. DRILLING AGENCY <u>COE</u>		12. MANUFACTURER'S DESIGNATION OF DRILL <u>7-1/2" 1500</u>		
4. HOLE NO. (As shown on drawing title and site number) <u>D-43</u>		13. TOTAL NO. OF OVER-BOURDEN SAMPLES TAKEN <u>10</u>		UNDISTURBED <u>0</u>
5. NAME OF DRILLER <u>M. Cooney</u>		14. TOTAL NUMBER CORE BOXES <u>0</u>		15. ELEVATION GROUND WATER <u>151.11</u>
6. DIRECTION OF HOLE ☒ VERTICAL ☐ INCLINED <u> </u> DEG. FROM VERT.		16. DATE HOLE <u>5-24-94</u>		COMPLETED <u>5-25-94</u>
7. THICKNESS OF OVERBURDEN <u>45.4</u>		17. ELEVATION TOP OF HOLE <u>N/A</u>		
8. DEPTH DRILLED INTO ROCK <u>11.6</u>		18. TOTAL CORE RECOVERY FOR BORING <u> </u>		
9. TOTAL DEPTH OF HOLE <u>57.0</u>		19. SIGNATURE OF INSPECTOR <u>(Signature)</u>		

ELEVATION	DEPTH	LEGEND	CLASSIFICATION OF MATERIALS (Description)	% CORE RECOVERY	BOX OR SAMPLE NO.	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant)
0	0		Enter Asphalt			9" hollow Stem Augers
			25'			62570.
1			Crushed Stone Embedment medium 2" top of bedding 1.1'			Placed 2.3' 8" x 40 P.C. pipe (under casing)
			SILTY LEAN CLAY STIFF MOIST GRAY BROWN occ. sand particles (climatic) angle			Fill material horizontal red metal asphalt
2						23'
3						6 1/4" Rockbit 3 1/2" d. 11 inch Drill fluid Bentonite Slurry 150 gal H ₂ O and 75 lb bentonite 31 5/8 ft velocity Log from cuttings gravelly sand slow advance
4				5.0	5.0	
5			5.5'	D-15		SPT-1 blow 1 1/8" split spoon 3
6			SILTY LEAN CLAY STIFF MOIST GRAY BROWN mottled	12-15	J-1	C.O. Castor oil - per ASTM drops 140 lb blow cleaned out Rockbit
7			7.0'			6 1/4" Rockbit 3 1/2" d. 11 inch
8			SILTY LEAN CLAY MEDIUM MOIST BROWN mottled grayish tarnish roots			Log from cuttings gravelly sand
9						
10						

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MAR 71

PROJECT Barramatta Federal Complex HOLE NO. D-43

Hole No. D-43

DRILLING LOG		DIVISION		INSTALLATION		SHEET 2 OF 7 SHEETS	
1. PROJECT <u>Bannock Fed Center</u>				10. SIZE AND TYPE OF BIT			
2. LOCATION (Coordinate or Station)				11. DATUM FOR ELEVATION SHOWN (TBM or B.M.)			
3. DRILLING AGENCY				12. MANUFACTURER'S DESIGNATION OF DRILL			
4. HOLE NO. (As shown on drawing title and file number) <u>D-43</u>				13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN		DISTURBED UNDISTURBED	
5. NAME OF DRILLER				14. TOTAL NUMBER CORE BOXES			
6. DIRECTION OF HOLE ☐ VERTICAL ☐ INCLINED _____ DEG. FROM VERT.				15. ELEVATION GROUND WATER		16. DATE HOLE STARTED COMPLETED	
7. THICKNESS OF OVERBURDEN				17. ELEVATION TOP OF HOLE			
8. DEPTH DRILLED INTO ROCK				18. TOTAL CORE RECOVERY FOR BORING			
9. TOTAL DEPTH OF HOLE				19. SIGNATURE OF INSPECTOR			
ELEVATION	DEPTH	LEGEND	CLASSIFICATION OF MATERIALS (Description)	1. CORE RECOVERY	2. BOX OR SAMPLE NO.	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant)	
10			(Same as above) SILTY LEAN CLAY MEDIUM MOIST BROWN Silty mottles rust stains	100	100	100	None
				0.15		SPT-2	2
				R-15	J-2	1 3/8" split spoon	
						C.O.D. roller 2 wraps	3
						old rope	
						cleansed Roll bit	4
				11.5	11.5	11.5	
						6 1/4" Roll bit	
						Mod Universal	
						31 cu ft	
						Log from cuttings	
						gravelly sand	
						very quickly	
						of hard rotation	
						quick end	
				13.5			
			SILTY LEAN CLAY MEDIUM MOIST BROWN low plasticity occ. dark brown spots				
				15.0	15.0	15.0	
				D-15		SPT-3	1
				R-15	J-3	1 3/8" split spoon	
						C.O.D. roller 2 wraps	2
						old rope	
						cleansed Roll bits	
				16.5	16.5	16.5	
						6 1/4" Roll bit	
						Log from cuttings	
						gravelly sand	
				18.5			
			SILTY LEAN CLAY MEDIUM MOIST LIGHT GRAY high silt content				
				20.0	20.0	20.0	

Hole No. 0-43

DRILLING LOG		DIVISION		INSTALLATION		SHEET 3 OF 7 SHEETS	
1. PROJECT Barnhart Fed. Cooper				10. SIZE AND TYPE OF BIT			
2. LOCATION (Coordinate or Section)				11. EXPOSURE ELEVATION SHOWN (TBM or MRL)			
3. DRILLING AGENCY				12. MANUFACTURER'S DESIGNATION OF DRILL			
4. HOLE NO. (As shown on drawing title and file number) 0-43				13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN		DISTURBED UNDISTURBED	
5. NAME OF DRILLER				14. TOTAL NUMBER CORE BOXES			
6. DIRECTION OF HOLE ☐ VERTICAL ☐ INCLINED _____ DEG. FROM VERT.				15. ELEVATION GROUND WATER			
7. THICKNESS OF OVERBURDEN				16. DATE HOLE		STARTED COMPLETED	
8. DEPTH DRILLED INTO ROCK				17. ELEVATION TOP OF HOLE			
9. TOTAL DEPTH OF HOLE				18. TOTAL CORE RECOVERY FOR BORING			
				19. SIGNATURE OF INSPECTOR			
ELEVATION	DEPTH	LEGEND	CLASSIFICATION OF MATERIALS (Description)	% CORE RECOVERY	BOX OR SAMPLE NO.	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant)	
20			(SAME AS ABOVE) SILTY LEAN CLAY MEDIUM, MOIST, LGNT GRAY	20.0	200	SPT-4 blows 1 7/8" split spoon	
21			SILTY LEAN CLAY MEDIUM MOIST BROWN mottled gray dark spots organic	0-15 R-15	J-4	C.O.D. cutn. 2 jumps old tape clean mud & Rk bit	
22				21.5	21.5	21.5 6 1/4" Rk bit Log from cuttings Mud Ue. 32 in ft gravelly sand	
23							
24							
25			SILTY LEAN CLAY MEDIUM MOIST GRAY mottled gray occ. mud sand C102	25.0	25.0	25.0 SPT-5 blows 1 7/8" split spoon	
26				0-15 R-13	J-5	C.O.D. cutn. 2 jumps old tape clean mud & Rk bit	
27				26.3	26.3	26.3 6 1/4" Rk bit Log from cuttings gravelly sand	
28				26.5	26.5	26.5	
29			SILTY LEAN CLAY MEDIUM MOIST DARK GRAY Low plastic occ. mud stains	28.5	28.5	28.5	
30				30.0	30.0	30.0	

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PROJECT
Barnhart Federal CooperHOLE NO.
0-43

Hole No. D-43

DRILLING LOG		DIVISION		INSTALLATION		SHEET 4 OF 7 SHEETS	
1. PROJECT <u>Bannock Feed Complex</u>				10. SIZE AND TYPE OF BIT			
2. LOCATION (Coordinates or Station)				11. DAYUM FOR ELEVATION BROWN (TBM or MBL)			
3. DRILLING AGENCY				12. MANUFACTURER'S DESIGNATION OF DRILL			
4. HOLE NO. (As shown on drawing title and file number) <u>D 43</u>				13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN		DISTURBED UNDISTURBED	
5. NAME OF DRILLER				14. TOTAL NUMBER CORE BOXES			
6. DIRECTION OF HOLE ☐ VERTICAL ☐ INCLINED _____ DEG. FROM VERT.				15. ELEVATION GROUND WATER			
7. THICKNESS OF OVERBURDEN				16. DATE HOLE STARTED COMPLETED			
8. DEPTH DRILLED INTO ROCK				17. ELEVATION TOP OF HOLE			
9. TOTAL DEPTH OF HOLE				18. TOTAL CORE RECOVERY FOR BORING			
				19. SIGNATURE OF INSPECTOR			
ELEVATION	DEPTH	LEGEND	CLASSIFICATION OF MATERIALS (Description)	S CORE RECOVERY	BOX OR SAMPLE NO.	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant)	
	30		(SAME AS ABOVE)	100	30	SPT-6 blows	
			SILTY CLAY	D-1.5		1 1/8" split spoon	
			MEDIUM	2-1.5	5-6	C.O. D. Factor 2 blows	
	31		MOIST			oblique	
			DARK GRAY			Cleaned w/ Rockbit	
			Low plasticity				
			G.C. - not visible	3/5	3/5	3/5	
	32					6 1/4" Rockbit	
						Log from cuttings	
						Mud on rock	
	33					31 sq ft	
						Gravity feed	
	34						
	35			25.0	35.0	35.0	
				D-1.5		SPT-7 blows	
				2-1.5	5-7	1 1/8" split spoon	
	36					C.O. D. Factor 2 blows	
					3/5	oblique	
				36.5	36.5	Cleaned w/ Rockbit	
	37					6 1/4" Rockbit	
						Log from cuttings	
	38					Gravity feed	
						quick rotation	
	39						
	40			40.0	40.0	40.0	

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PROJECT Bannock Feed Complex HOLE NO. D-43

Hole No. D-43

DRILLING LOG		DIVISION		INSTALLATION		SHEET 5 OF 7 SHEETS	
1. PROJECT Barnstable 7th Complex				10. SIZE AND TYPE OF BIT			
2. LOCATION (Coordinates or Station)				11. DATUM FOR ELEVATION SHOWN (TBM or BBL)			
3. DRILLING AGENCY				12. MANUFACTURER'S DESIGNATION OF DRILL			
4. HOLE NO. (As shown on drawing title and site number) D-43				13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN		DISTURBED UNDISTURBED	
5. NAME OF DRILLER				14. TOTAL RUBBER CORE BOXES			
6. DIRECTION OF HOLE ☐ VERTICAL ☐ INCLINED _____ DEG. FROM VERT.				15. ELEVATION GROUND WATER			
7. THICKNESS OF OVERBURDEN				16. DATE HOLE		STARTED COMPLETED	
8. DEPTH DRILLED INTO ROCK				17. ELEVATION TOP OF HOLE			
9. TOTAL DEPTH OF HOLE				18. TOTAL CORE RECOVERY FOR BORING			
19. SIGNATURE OF INSPECTOR				20. SIGNATURE OF OPERATOR			

ELEVATION	DEPTH	LEGEND	CLASSIFICATION OF MATERIALS (Description)	S. CORE RECOVERY	BOX OR SAMPLE NO.	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant)
40			(SAME AS ABOVE)	1/20	400	SPT-8 blows
			SILTY LEAN CLAY	D-15	5-8	1 3/8" split spm 2
			MEDIUM	D-15		C.O. R. McGinnis jumps 3
			MOIST			old logs
			DARK GRAY			clean out cut 4
			very plastic	415	415	415
			occ. sand string			6 1/4" Rock bit
						Log from cuttings
						gravel, sand
						Mud viscosity 35 cP
						Right
						Ris Check
			CLAY, GRAVEL	45.0	45.0	45.0
			DENSE			SPT-9 blows 6
			SATURATED	D-08	5-9	1 1/8" split spm
			GRAY/WHITE	R-27	5-10	C.O. R. McGinnis jumps 3
			fine brown limestone gravel 2 1/2" diam			old logs
			or. siltstone gravel 45.4'	45.7	45.7	SPT-10
			Top of BED ROCK			SP-1000 radial Eddy 5-25-94
			Contains some PLEASANTON GROUP	45.8		45.8
			SHALEY SILTSTONE			Top of Bedrock as per
			PARA SOFT			geotechnical sample
			PARTING			6 1/4" Rock bit
			GREEN GRAY			Log from cuttings
			Siltstone w/ 20-30% shale			Begin log 5-25-94
			occ. sand			100 psi mud pump pressure
			occ. fine sand			Mud viscosity 30
			allowing to wash shale			31 cP
			Siltstone			Represented in fluid water
						Drilling time from 46' to 57' 40 min.

Hole No. D-43

DRILLING LOG		DIVISION	INSTALLATION	SHEET		
				OF 7 SHEETS		
1. PROJECT Planner 7rd Compter		Sismic	KCO	7		
2. LOCATION (Coordinates or Station) See Station D-6			10. SIZE AND TYPE OF BIT 7 1/2" dia. 11 1/2" long	11. DATE FOR ELEVATION KNOWN (Year or Month)		
3. DRILLING AGENCY C.O.F.			12. MANUFACTURER'S DESIGNATION OF DRILL 7 1/2" 1500	13. TOTAL NO. OF OVER- BURDEN SAMPLES TAKEN		
4. HOLE NO. (As shown on drawing sheet and file number)		D-43	14. TOTAL NUMBER CORE BOXES	15. ELEVATION GROUND WATER		
5. NAME OF DRILLER M. Cooper			16. DATE HOLE	17. ELEVATION TOP OF HOLE		
6. DIRECTION OF HOLE ☒ VERTICAL ☐ INCLINED		DES. FROM VERT.	STARTED	COMPLETED		
7. THICKNESS OF OVERBURDEN		45.4	5-24-94	5-25-94		
8. DEPTH DRILLED INTO ROCK		11.6	18. TOTAL CORE RECOVERY FOR BORING			
9. TOTAL DEPTH OF HOLE		57.0	19. SIGNATURE OF INSPECTOR			
ELEVATION	DEPTH	LEGEND	CLASSIFICATION OF MATERIALS (Description)	1. CORE RECOV. ERY	BOX OR SAMPLE NO.	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant)

ENG FORM 1836
MAR 71

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PROJECT

Planner 7rd Compter

HOLE NO.

D-43

Boring D-44

Southeast Parking Lot

Hole No. NS-44

DRILLING LOG		DIVISION	INSTALLATION	SHEET 1 OF 7 SHEETS	
1. PROJECT <u>Bannister 7-1 Complex (Sismic)</u>		<u>MED</u>	<u>KCO</u>	10. SIZE AND TYPE OF BIT <u>6 1/4" R.L.B.</u>	
2. LOCATION (Coordinate or Station) <u>See sketch</u>				11. DAY FOR ELEVATION SHOWN (TBM or B.S.) <u>94</u>	
3. DRILLING AGENCY <u>C.O.E</u>				12. MANUFACTURER'S DESIGNATION OF DRILL <u>Trilby 1500</u>	
4. HOLE NO. (As shown on drawing title and file number) <u>NS-44</u>				13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN DISTURBED <u>0</u> UNDISTURBED <u>0</u>	
5. NAME OF DRILLER <u>M. Cooney</u>				14. TOTAL NUMBER CORE BOXES <u>0</u>	
6. DIRECTION OF HOLE ☒ VERTICAL ☐ INCLINED _____ DEG. FROM VERT.				15. ELEVATION GROUND WATER <u>220' +/- 1 ft.</u>	
7. THICKNESS OF OVERBURDEN <u>46.7</u>				16. DATE HOLE STARTED <u>5-23-94</u> COMPLETED <u>5-24-94</u>	
8. DEPTH DRILLED INTO ROCK <u>10.3</u>				17. ELEVATION TOP OF HOLE <u>N/A</u>	
9. TOTAL DEPTH OF HOLE <u>57.0</u>				18. TOTAL CORE RECOVERY FOR BORING <u>100%</u>	
				19. SIGNATURE OF INSPECTOR <u>[Signature]</u>	

ELEVATION	DEPTH	LEGEND	CLASSIFICATION OF MATERIALS (Description)	% CORE RECOVERY	BOX OR SAMPLE NO.	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant)
0			Asphalt			9" hollow stem auger 605" in
1			Crushed Stone (Base) Limestone 2" max. diameter Top of subgrade			plus 2.6' 8" c. 40 PVC pipe surrounding 1" thick w/ hardener cold joint asphalt
2			Silty tan clay Stiff Moist Gray/Brown Occ. sand (limestone) Angular			2.6
3						6 1/4" R.L.B. 33" d. H.W.S. Drilled 16' Borehole dry 150 g. H ₂ O 25 lb. water 33 sec. viscosity Log from cuttings
4						
5						
6						
7						
8						
9			Silty tan clay Moist Moist Brown etc. gray, sand			
10						

DRILLING LOG			DIVISION		INSTALLATION		Hole No. <u>NS-44</u> SHEET <u>2</u> OF <u>7</u> SHEETS	
1. PROJECT <u>Bannock Fed. Complex Service</u>			10. SIZE AND TYPE OF BIT		11. DATUM FOR ELEVATION KNOWN (TBM or BBL)			
2. LOCATION (Coordinates or Station)			12. MANUFACTURER'S DESIGNATION OF DRILL		13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN			
3. DRILLING AGENCY			14. TOTAL NUMBER CORE BOXES		15. ELEVATION GROUND WATER			
4. HOLE NO. (As shown on drawing title and file number) <u>NS-44</u>			16. DATE HOLE		STARTED		COMPLETED	
5. NAME OF DRILLER			17. ELEVATION TOP OF HOLE		18. TOTAL CORE RECOVERY FOR BORING			
6. DIRECTION OF HOLE ☐ VERTICAL ☐ INCLINED _____ DEG. FROM VERT.			19. SIGNATURE OF INSPECTOR <u>P. J. ...</u>		20. SIGNATURE OF INSPECTOR <u>P. J. ...</u>			
7. THICKNESS OF OVERBURDEN			21. ELEVATION TOP OF HOLE		22. TOTAL CORE RECOVERY FOR BORING			
8. DEPTH DRILLED INTO ROCK			23. ELEVATION TOP OF HOLE		24. TOTAL CORE RECOVERY FOR BORING			
9. TOTAL DEPTH OF HOLE			25. ELEVATION TOP OF HOLE		26. TOTAL CORE RECOVERY FOR BORING			
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, etc., if significant) g		
	10		(Same As Above) SILTY LEAN CLAY MEDIUM MOIST BROWN occ. gray mott			6 1/4" E. bit (ca.)		
	11					Long iron cuttings		
	12							
	13					Unusually 335 cu/ft ←		
	14					Drilling action satisfactory		
	15					Large cuttings placed off boring occ.		
	16					Add 10 gal H ₂ O to soup		
	17					Lossing increase due to blocking off by cuttings		
	18							
	19							
	20							

Hole No. NS-44

DRILLING LOG		DIVISION		INSTALLATION		SHEET 3 OF 7 SHEETS	
1. PROJECT Bannister Feed Complex Sewer				10. SIZE AND TYPE OF BIT			
2. LOCATION (Coordinates or Station)				11. DATUM FOR ELEVATION SHOWN (TEN or HIG)			
3. DRILLING AGENCY				12. MANUFACTURER'S DESIGNATION OF DRILL			
4. HOLE NO. (As shown on drawing title and file number) NS-44				13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN		DISTURBED UNDISTURBED	
5. NAME OF DRILLER				14. TOTAL NUMBER CORE BOXES		15. ELEVATION GROUND WATER	
6. DIRECTION OF HOLE ☐ VERTICAL ☐ INCLINED _____ DEG. FROM VERT.				16. DATE HOLE		STARTED COMPLETED	
7. THICKNESS OF OVERBURDEN				17. ELEVATION TOP OF HOLE			
8. DEPTH DRILLED INTO ROCK				18. TOTAL CORE RECOVERY FOR BORING			
9. TOTAL DEPTH OF HOLE				19. SIGNATURE OF INSPECTOR			
ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVER- ERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g	
	20		(Same As Above) Silty lean Clay MEDIUM Moist Brown			6 1/4" Rebar (cont) Viscosity 23 cm/gt	
	21					sandy sand Log by cuttings	
	22						
	23	?	230'			H ₂ O level 220' while drilling	
	24		SILTY LEAN CLAY MEDIUM / SOFT SATURATED BROWNISH GRAY ORGANIC occ. SAND & gravel sized pebbles occ. red staining			sandy sand (penetrated very quick) cuttings decreased in size hole is clean from blockage	
	25					H ₂ O level figured by materials encountered Sandy, sandy clay & silt adhered beyond this pt.	
	26						
	27						
	28						
	29						
	30						

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MAR 71PROJECT
Bannister Feed ComplexHOLE NO.
NS-44

Hole No. NS-44

DRILLING LOG		DIVISION	INSTALLATION		SHEET <u>5</u> OF 7 SHEETS	
1. PROJECT <u>Branford Ind. Complex - Maine</u>			10. SIZE AND TYPE OF BIT			
2. LOCATION (Coordinates or Station)			11. DATUM FOR ELEVATION SHOWN (TBM or BSL)			
3. DRILLING AGENCY			12. MANUFACTURER'S DESIGNATION OF DRILL			
4. HOLE NO. (As shown on drawing sheet and file number)			13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN		DISTURBED	UNDISTURBED
5. NAME OF DRILLER			14. TOTAL NUMBER CORE BOXES			
6. DIRECTION OF HOLE ☐ VERTICAL ☐ INCLINED _____ DEG. FROM VERT.			15. ELEVATION GROUND WATER			
7. THICKNESS OF OVERBURDEN			16. DATE HOLE		STARTED	COMPLETED
8. DEPTH DRILLED INTO ROCK			17. ELEVATION TOP OF HOLE			
9. TOTAL DEPTH OF HOLE			18. TOTAL CORE RECOVERY FOR BORING			
			19. SIGNATURE OF INSPECTOR			
ELEVATION	DEPTH	LEGEND	CLASSIFICATION OF MATERIALS (Description)	% CORE RECOVERY	BOX OR SAMPLE NO.	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant)
40			(SAME AS ABOVE) SILTY LEAN CLAY MEDIUM SATURATED DARK GRAY			6 1/4" Ratchet (end) uncertainty <u>30</u> c/gt Log from collings gravelly sand
41				10.5		
42						
43			GRAVELLY CLAY MEDIUM SATURATED GRAY Lean clay w/ 10-20% fine coarse gravel (angular) max diameter 1"			
44				44.0		
45			CLAY GRAVEL LOOSE SATURATED GRAY fine to coarse gravel (angular) w/ 10-20% clay max diameter 2-3"			
46						gravelly sand slipped adjustment
47			Top of Bedrock 44.7' PILGRIM F.M. SILTY SHALE SOFT PARTING DENSE GRAY (light) occ. zones of light colored chert w/ 20-40% H			pull down pressure + 300 psi slow advance
48						
49						
50						

Hole No. NS-44

DRILLING LOG		DIVISION		INSTALLATION		SHEET	
PROJECT		KCD MRD		KCD MRD		6	
2. LOCATION (Coordinate or Station)		See Well		MSL		OF 7 SHEETS	
3. DRILLING AGENCY		C.O.E		MANUFACTURER'S DESIGNATION OF DRILL		1	
4. HOLE NO. (As shown on drawing plate and file number)		NS-44		12. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN		DISTURBED	
5. NAME OF DRILLER		M. Coony		13. TOTAL NUMBER CORE BOXES		UNDISTURBED	
6. DIRECTION OF HOLE		☒ VERTICAL ☐ INCLINED		14. ELEVATION GROUND WATER		230' while drilling	
7. THICKNESS OF OVERBURDEN		86.7		15. DATE HOLE		STARTED 5-23-94 COMPLETED 5-24-94	
8. DEPTH DRILLED INTO ROCK		10.3		16. ELEVATION TOP OF HOLE		N/A	
9. TOTAL DEPTH OF HOLE		570		17. TOTAL CORE RECOVERY FOR BORING		1	
10. SIGNATURE OF INSPECTOR		P. J. H. [Signature]		18. SIGNATURE OF INSPECTOR		P. J. H. [Signature]	
ELEVATION	DEPTH	LEGEND	CLASSIFICATION OF MATERIALS (Description)	% CORE RECOVERY	BOX OR SAMPLE NO.	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant)	
50			(Same as Above) Planar top			6 1/4" Rul. 6.7	
51			SILTY SHALE			Viscosity 34 sec/cP	
			SOFT			pressure 300 psi	
			PARTING			Add 15g H ₂ O	
			DENSE / VERY FINE GRAINED			Log from cuttings	
			GRAY (L&L)			slow feed rate	
			occ. zone of high silt content			~ 1' per 3 min.	
			occ. c. H ₂ O lenses			feed rate ~ 1 1/4 min	
			Silt rock increased depth			2 g cutter	
			530'			End day 5-23-94	
			SHALEY SILTSTONE			clean cuttings	
			MODERATELY HARD / SOFT				
			PARTING / Banded				
			VERY FINE GRAINED				
			LIGHT GRAY				
			occ. shale lenses				
			570	570	570	570	
			570 B.O.H. No Refusal			H ₂ O lost / Assumed to be 22' while drilling	
			SE VLP Lot			Backfill with 4" PVC pipe the	
			N 80° E			make fill hole 20' x 20' and backfill	
			78'			ground ~ 100 ft.	
			pad			Air conditioning will have no hits.	
			74 ft			Installation diagram on PD-7	
			74 ft			50 lbs cement ~ 50 lbs	
						bentonite dry mixed then mixed	
						w/ 275 gal. H ₂ O then poured	
						through the bottom of the casing.	

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MAR 71

PROJECT Bannister Field Complex HOLE NO. NS-44

Appendix C

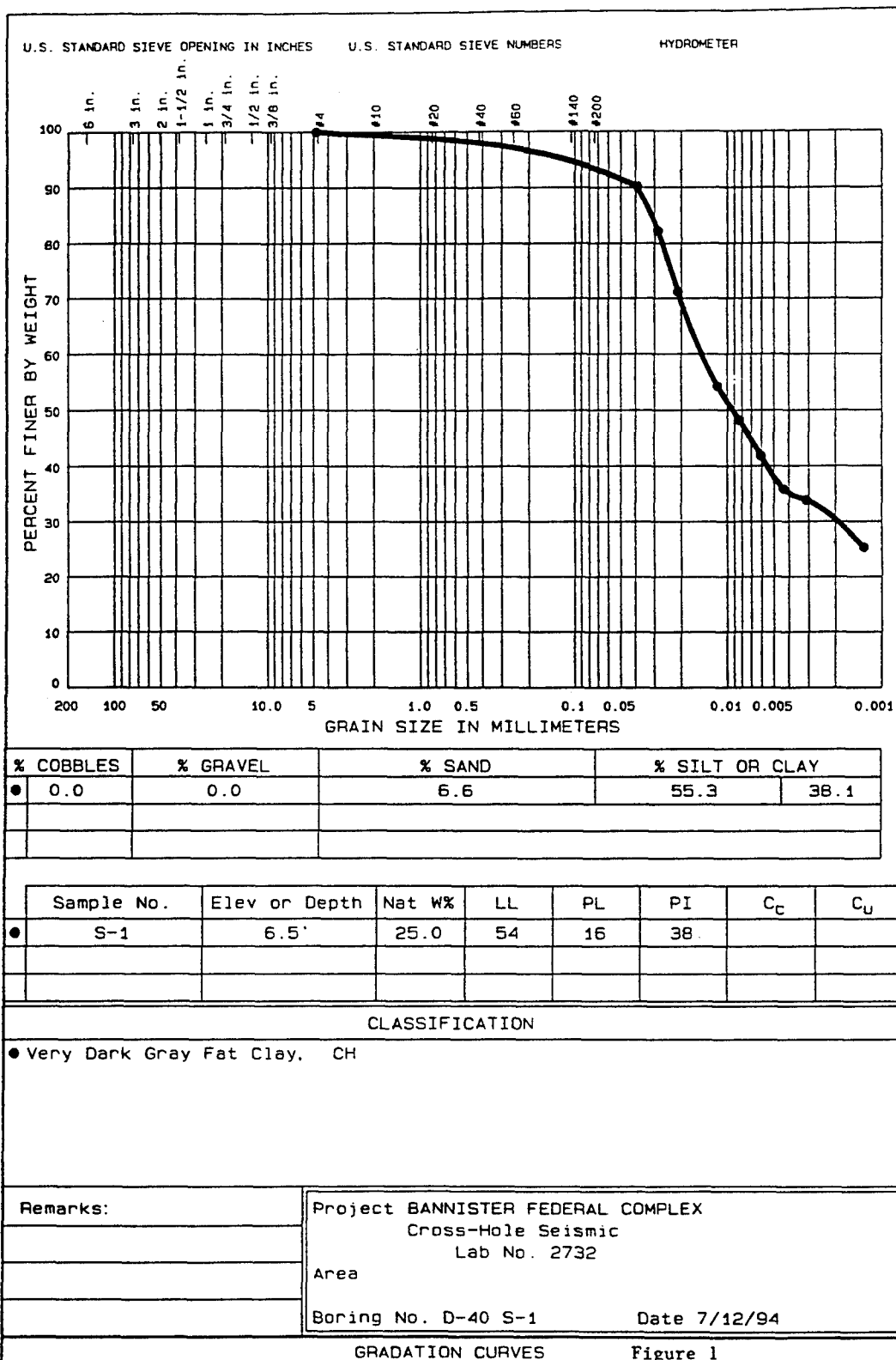
Laboratory Soil Tests Results

Boring D-40

Northeast Parking Lot

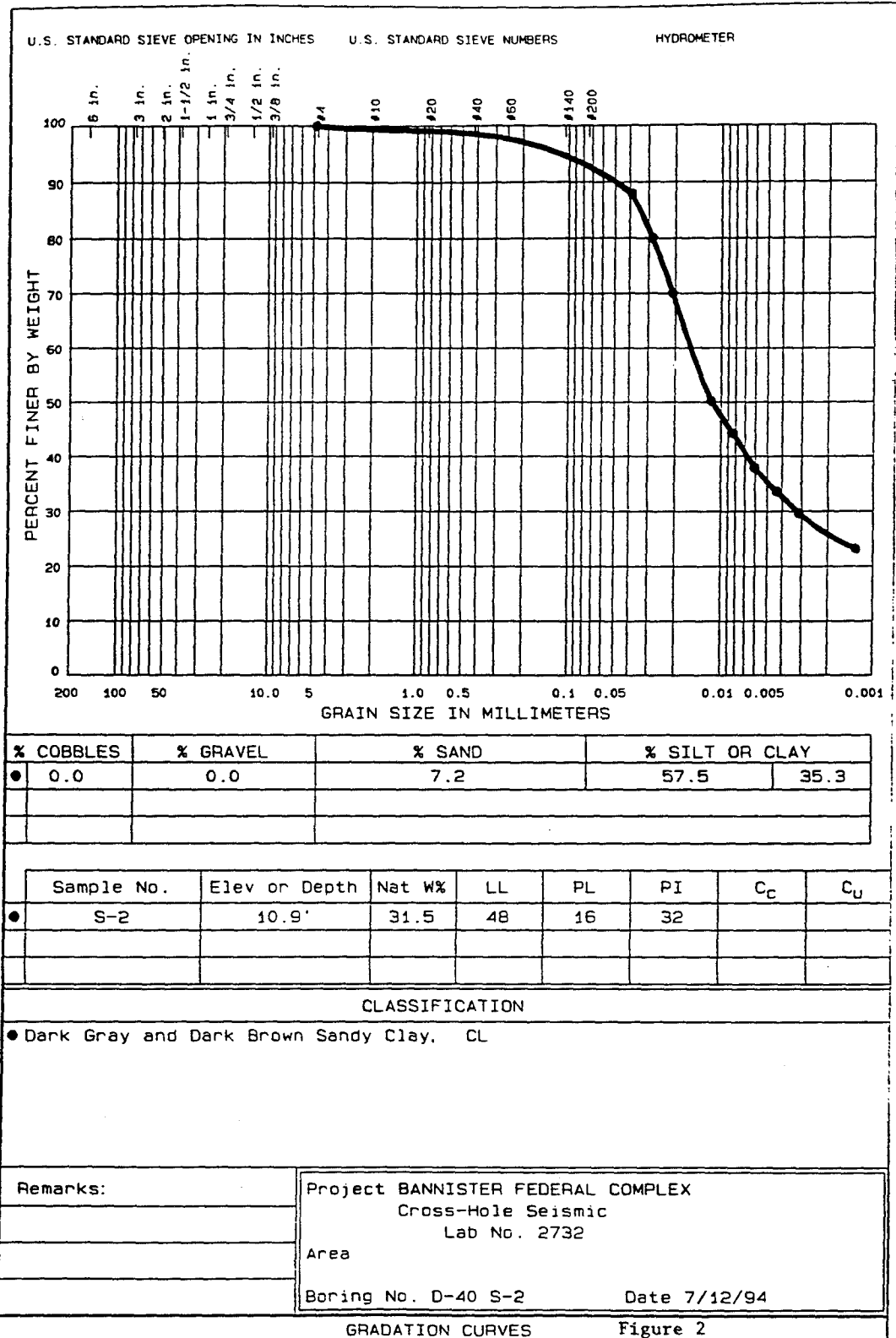
W.O. No. ban40-1
 Req. No. KC 94-124
 Contract No.

CORPS OF ENGINEERS, MISSOURI RIVER DIVISION LAB
 420 SOUTH 18th STREET - OMAHA, NE 68102-2586



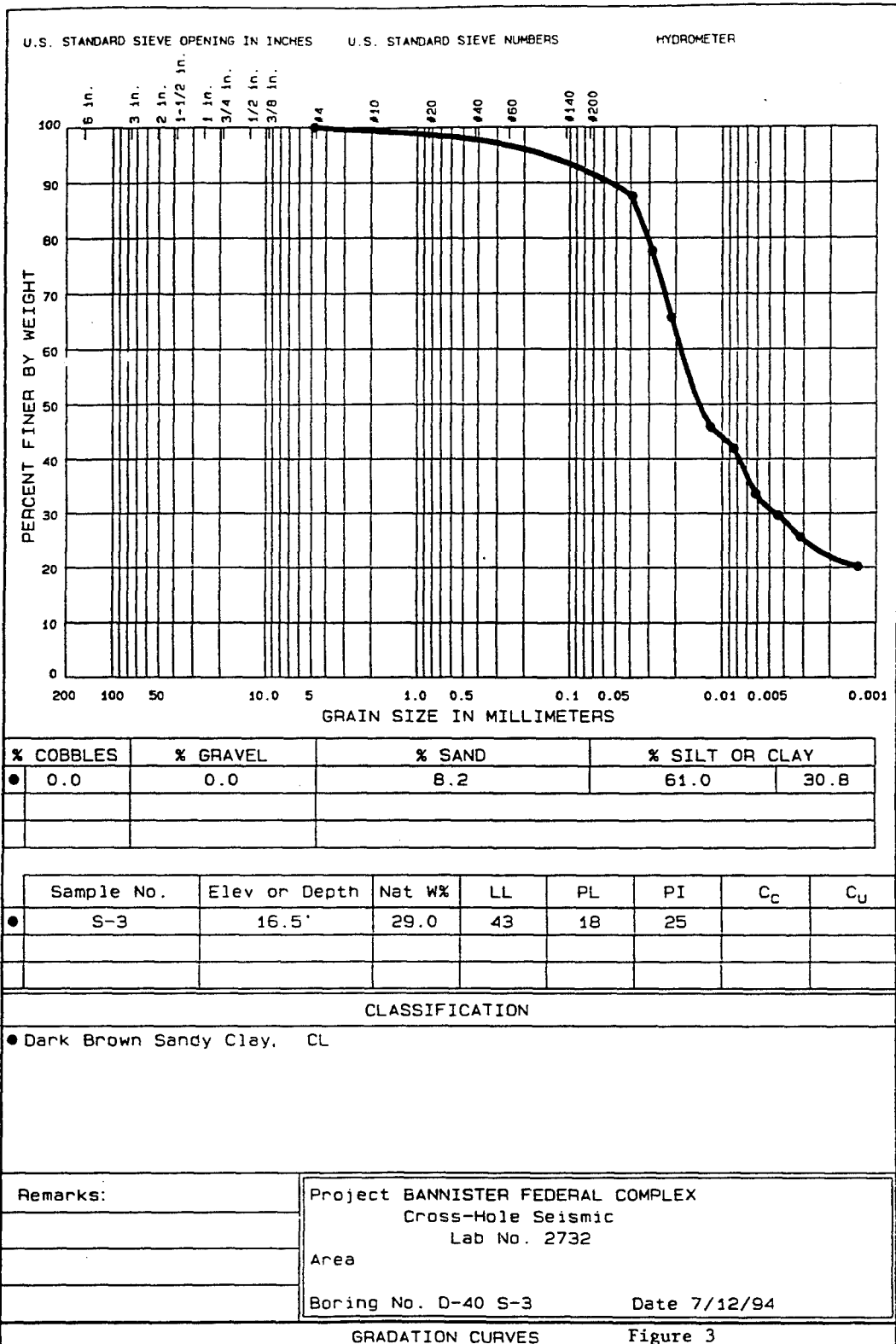
W.O. No. ban40-2
 Req. No. KC 94-124
 Contract No.

CORPS OF ENGINEERS, MISSOURI RIVER DIVISION LAB
 420 SOUTH 18th STREET - OMAHA, NE 68102-2586



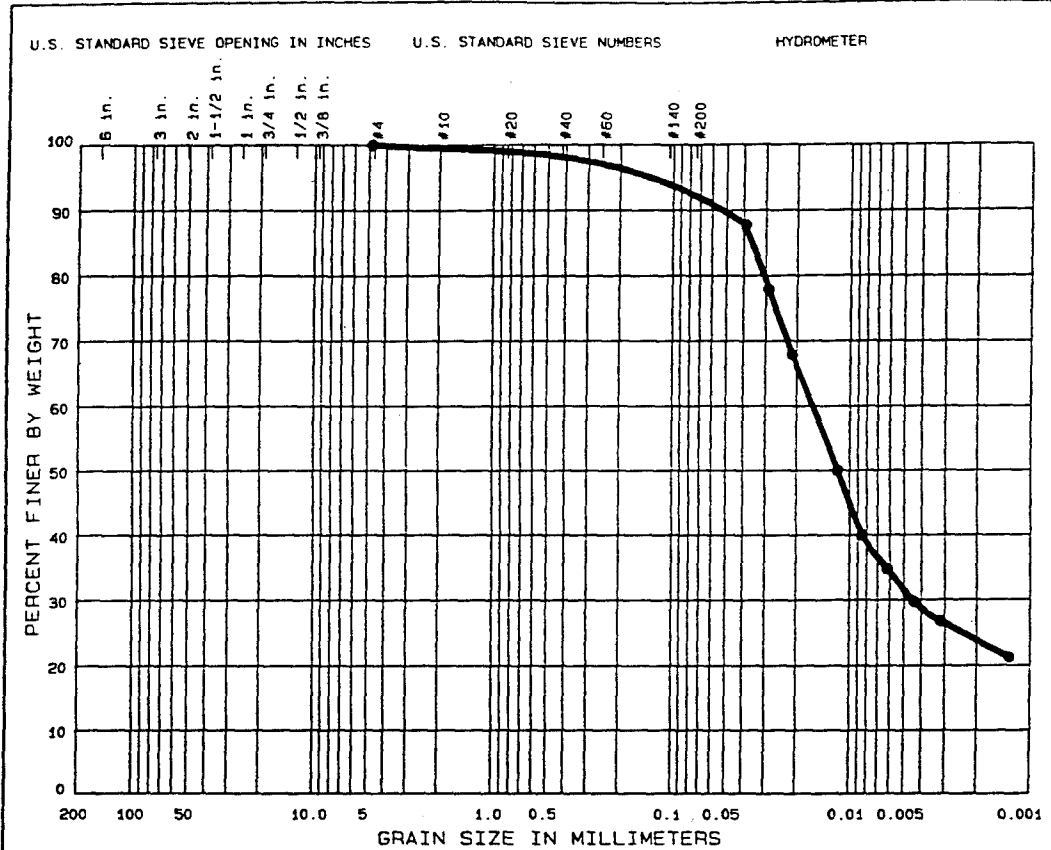
W.O. No. ban40-3
 Req. No. KC 94-124
 Contract No.

CORPS OF ENGINEERS, MISSOURI RIVER DIVISION LAB
 120 SOUTH 18th STREET - OMAHA, NE 68102-2586



W.O. No. ban40-4
 Req. No. KC 94-124
 Contract No.

CORPS OF ENGINEERS, MISSOURI RIVER DIVISION LAB
 120 SOUTH 18th STREET - OMAHA, NE 68102-2586



% COBBLES	% GRAVEL	% SAND	% SILT OR CLAY	
0.0	0.0	7.8	60.6	31.6

Sample No.	Elev or Depth	Nat W%	LL	PL	PI	C _c	C _u
S-4	21.5'	30.6	39	15	24		

CLASSIFICATION

• Very Dark Gray Lean Clay, CL

Remarks:

Project BANNISTER FEDERAL COMPLEX
 Cross-Hole Seismic
 Lab No. 2732

Area

Boring No. D-40 S-4

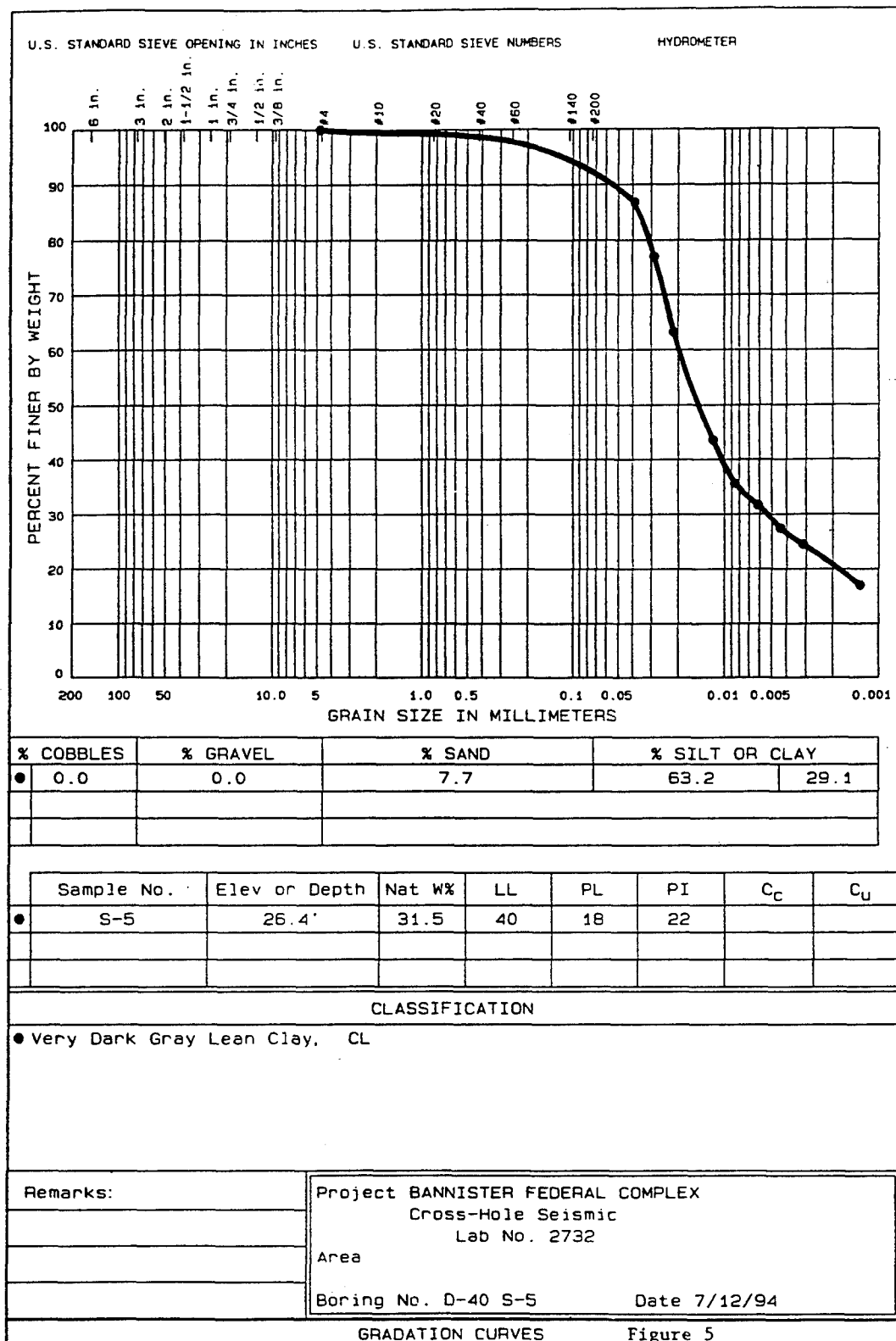
Date 7/15/94

GRADATION CURVES

Figure 4

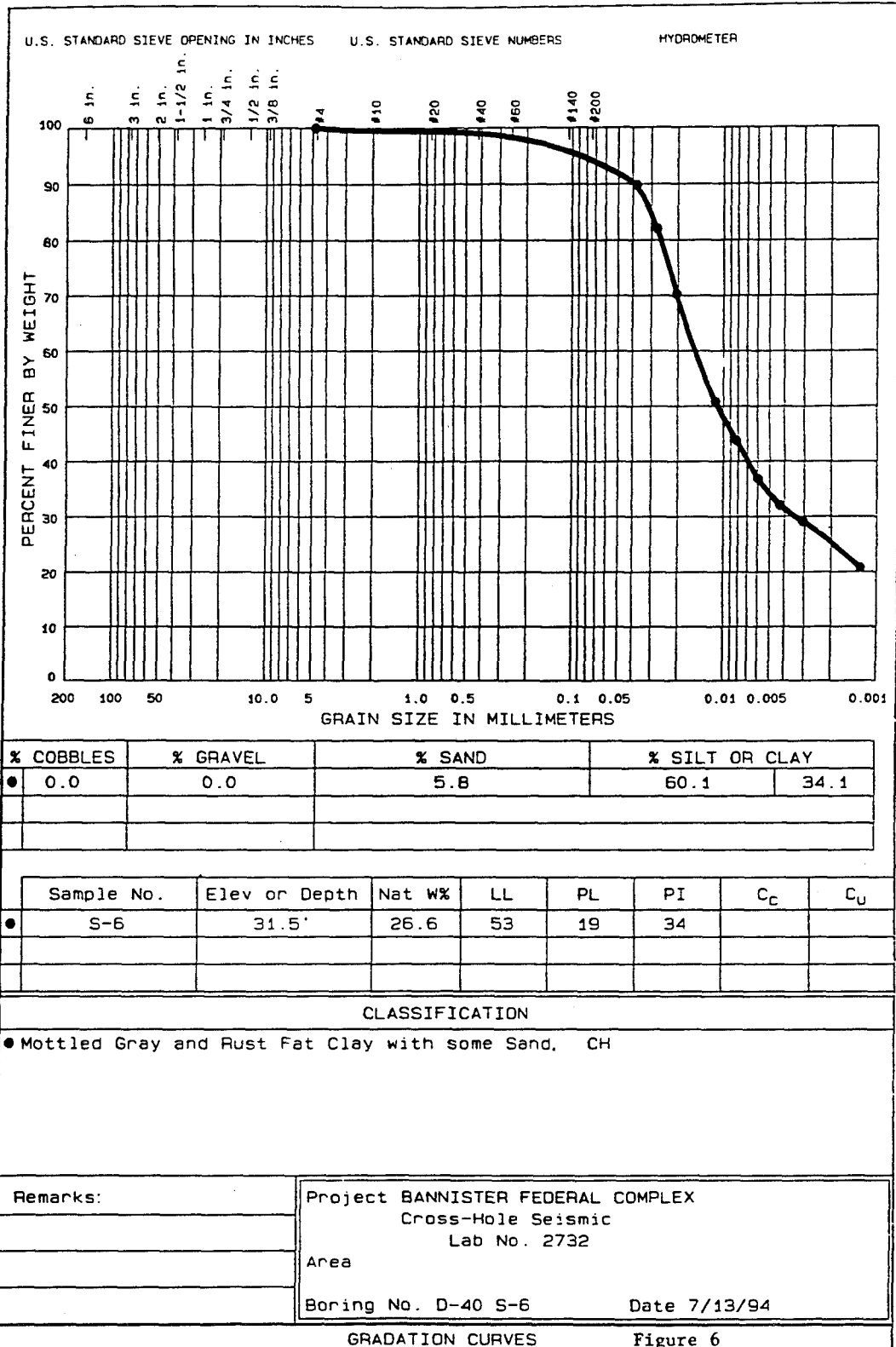
W.O. No. ban40-5
 Req. No. KC 94-124
 Contract No.

CORPS OF ENGINEERS, MISSOURI RIVER DIVISION LAB
 420 SOUTH 18th STREET - OMAHA, NE 68102-2586



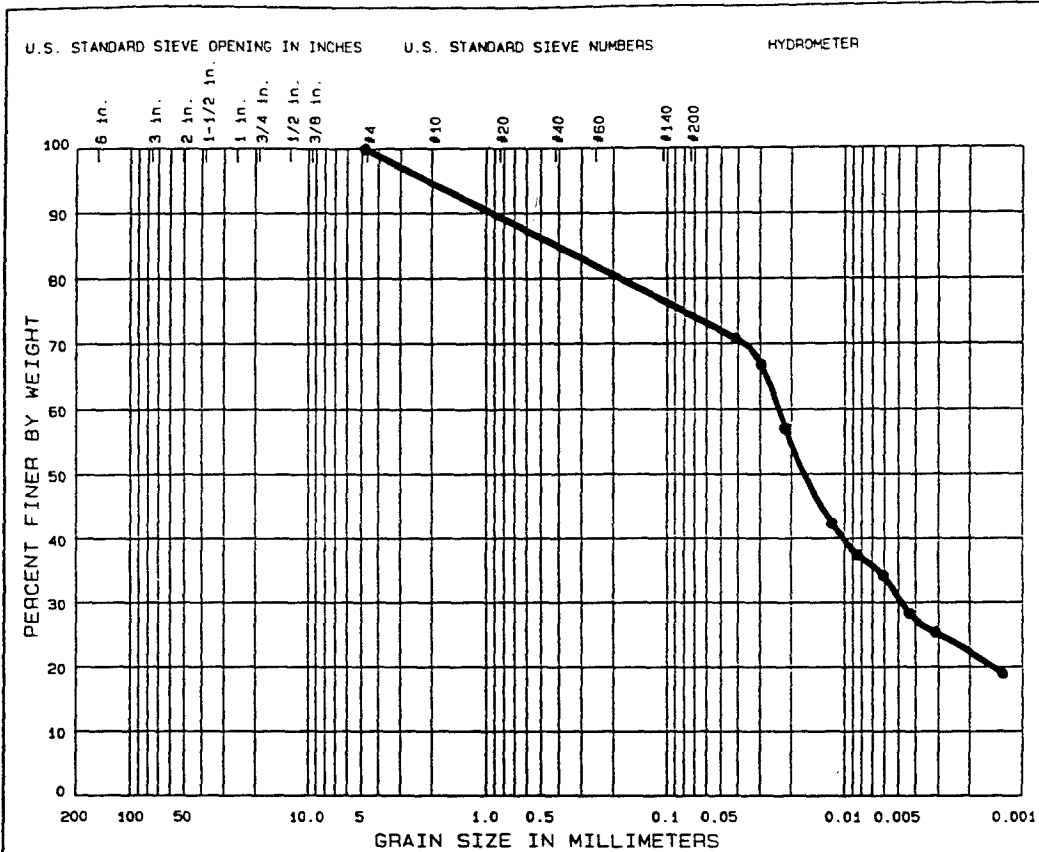
W.O. No. ban40-6
 Req. No. KC 94-124
 Contract No.

CORPS OF ENGINEERS, MISSOURI RIVER DIVISION LAB
 120 SOUTH 18th STREET - OMAHA, NE 68102-2586



W.O. No. ban40-7
 Req. No. KC 94-124
 Contract No.

CORPS OF ENGINEERS, MISSOURI RIVER DIVISION LAB
 420 SOUTH 18th STREET - OMAHA, NE 68102-2586



% COBBLES	% GRAVEL	% SAND	% SILT OR CLAY	
0.0	0.0	25.5	43.7	30.8

Sample No.	Elev or Depth	Nat W%	LL	PL	PI	C _c	C _u
S-7	36.5'	24.6	41	16	25		

CLASSIFICATION

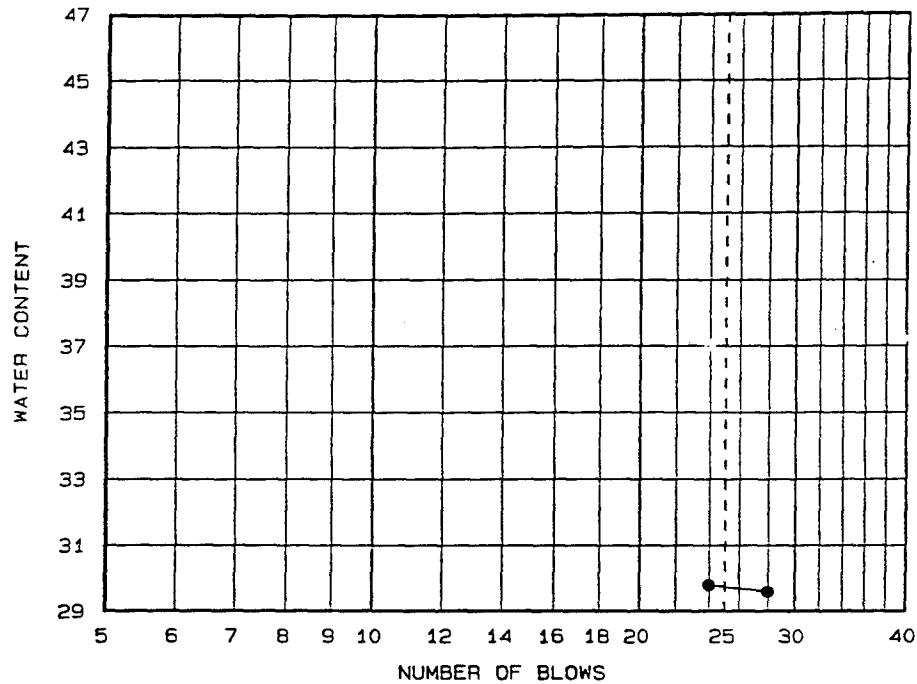
● Mottled Gray and Rust Sandy Clay, CL

Remarks:	Project BANNISTER FEDERAL COMPLEX
	Cross-Hole Seismic
	Lab No. 2732
	Area
	Boring No. D-40 S-7
	Date 7/12/94

GRADATION CURVES

Figure 7

LIQUID AND PLASTIC LIMITS TEST REPORT



Location + Description	LL	PL	PI	-200	ASTM D 2487-85
● D-40 S-8 Clayey Sandy Gravel	30	15	15		

Project No.: 2732
 Project: BANNISTER FEDERAL COMPLEX
 Cross-Hole Seismic
 Client: Kansas City District
 Location: D-40 S-8

Date: 7/12/94

Remarks:
 Dark Brown
 Specimen too small for
 4-point Atterberg

LIQUID AND PLASTIC LIMITS TEST REPORT

COE - MISSOURI RIVER DIV. LAB

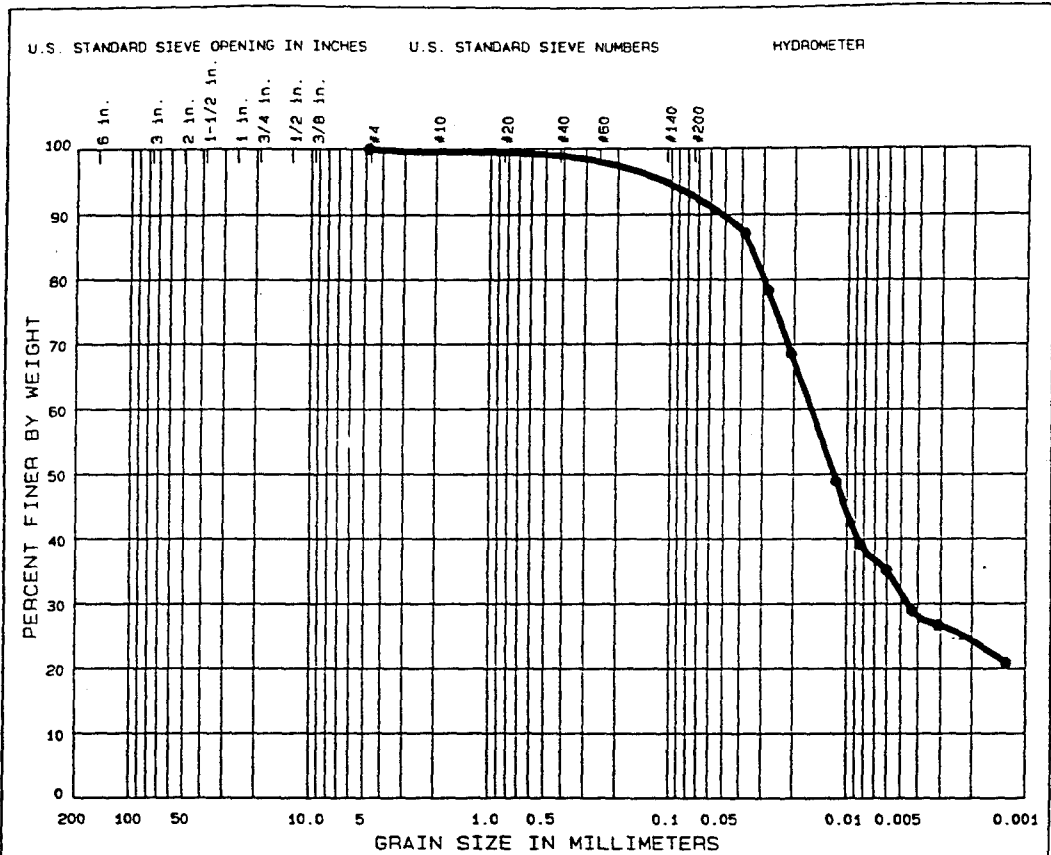
Fig. No. 8

Boring D-43

Southeast Parking Lot

W.O. No. ban43-1
 Req. No. KC 94-124
 Contract No.

CORPS OF ENGINEERS, MISSOURI RIVER DIVISION LAB
 420 SOUTH 18th STREET - OMAHA, NE 68102-2586



% COBBLES	% GRAVEL	% SAND	% SILT OR CLAY	
0.0	0.0	7.3	61.0	31.7

Sample No.	Elev or Depth	Nat W%	LL	PL	PI	C _c	C _u
S-1	6.5'	26.0	45	17	28		

CLASSIFICATION

• Dark Brown Lean Clay. CL

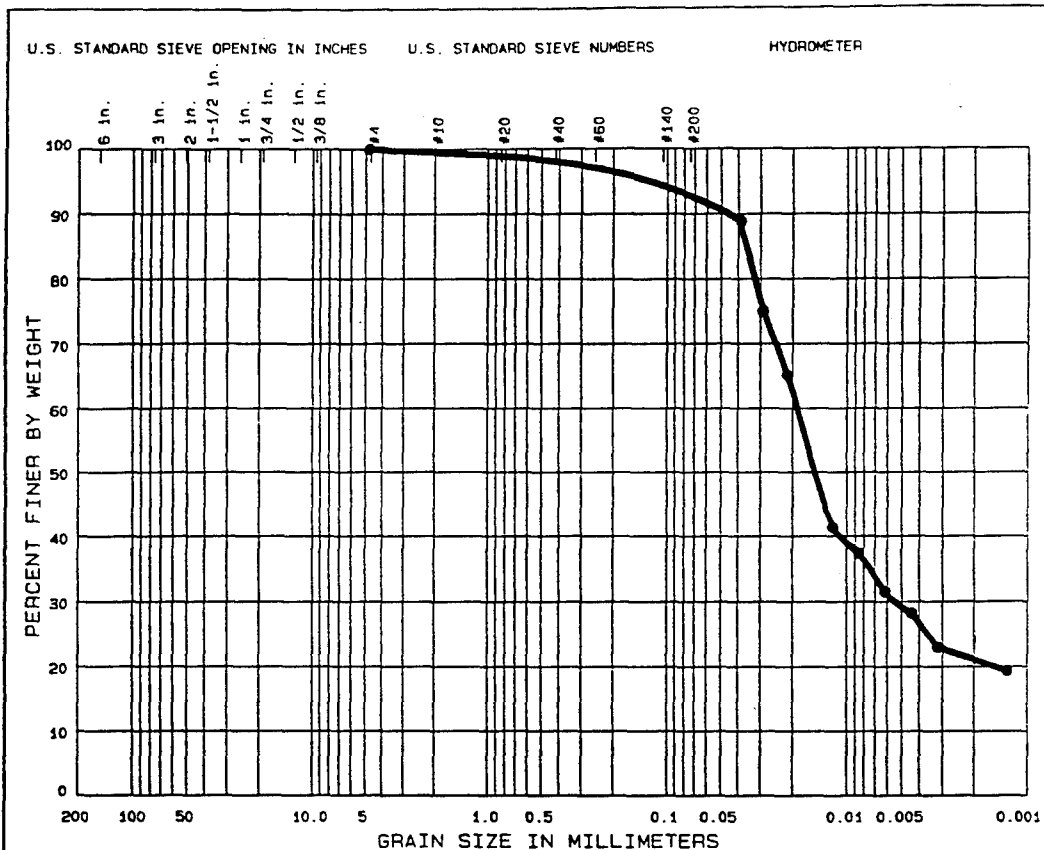
Remarks:	Project BANNISTER FEDERAL COMPLEX
	Cross-Hole Seismic
	Lab No. 2732
	Area
	Boring No. D-43 S-1
	Date 7/15/94

GRADATION CURVES

Figure 9

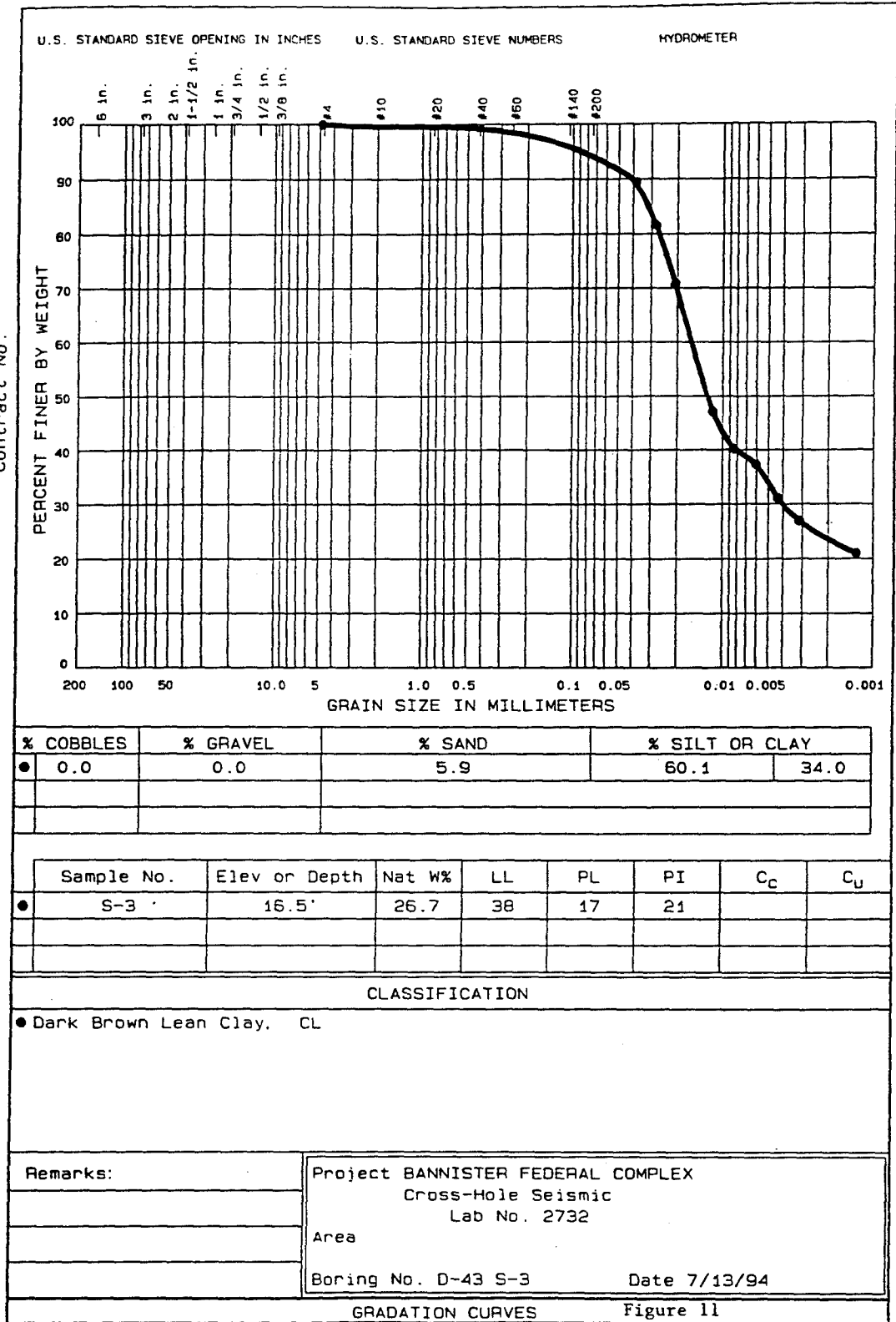
W.O. No. ban43-2
 Reg. No. KC 94-124
 Contract No.

CORPS OF ENGINEERS, MISSOURI RIVER DIVISION LAB
 420 SOUTH 18th STREET - OMAHA, NE 68102-2586



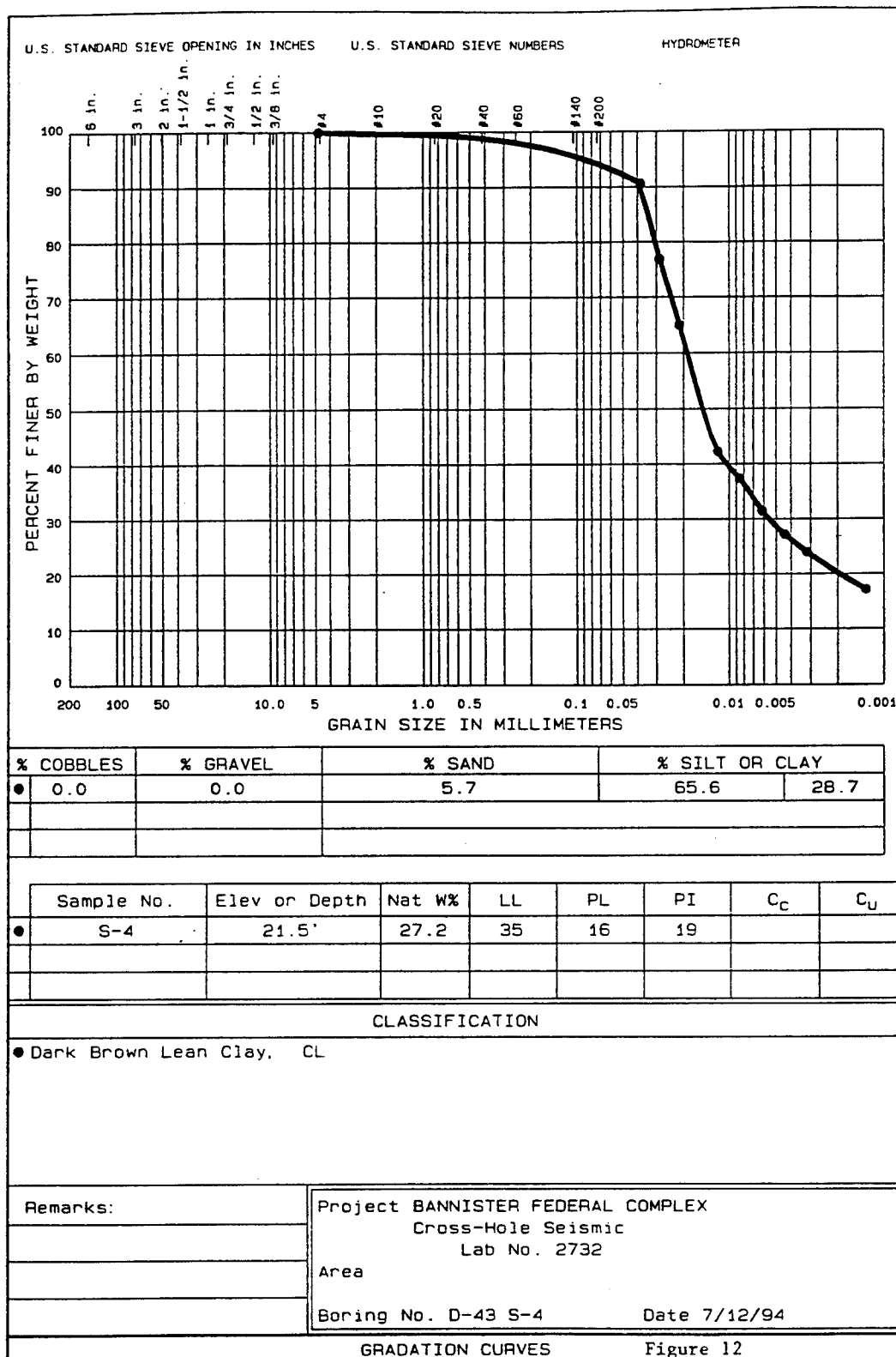
W.O. No. ban43-3
 Req. No. KC 94-124
 Contract No.

CORPS OF ENGINEERS, MISSOURI RIVER DIVISION LAB
 420 SOUTH 18th STREET - OMAHA, NE 68102-2586



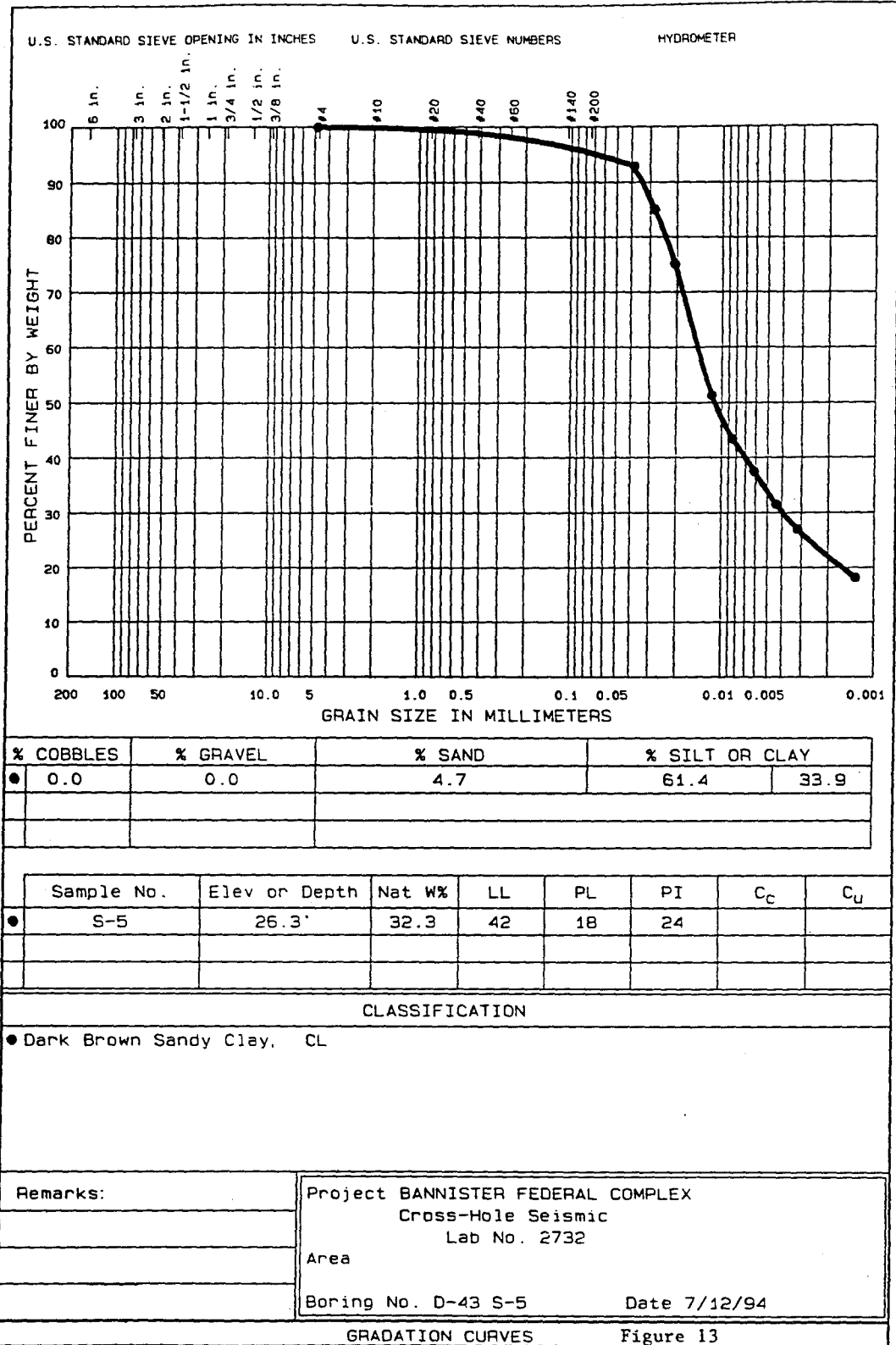
W.O. No. ban43-4
 Req. No. KC 94-124
 Contract No.

CORPS OF ENGINEERS, MISSOURI RIVER DIVISION LAB
 420 SOUTH 18th STREET - OMAHA, NE 68102-2586



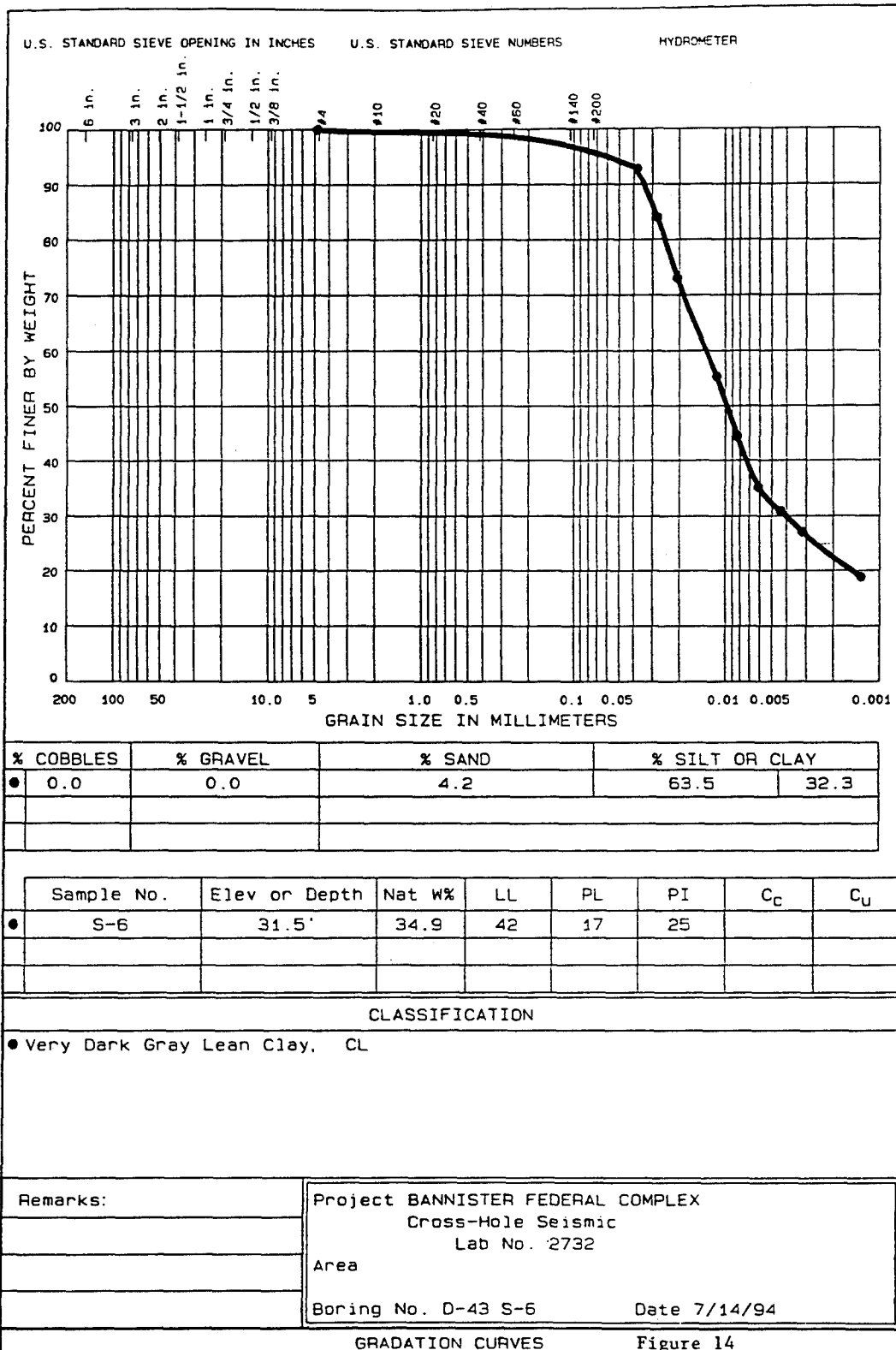
CORPS OF ENGINEERS, MISSOURI RIVER DIVISION LAB
420 SOUTH 18th STREET - OMAHA, NE 68102-2586

W.O. No. ban43-5
Req. No. KC 94-124
Contract No.



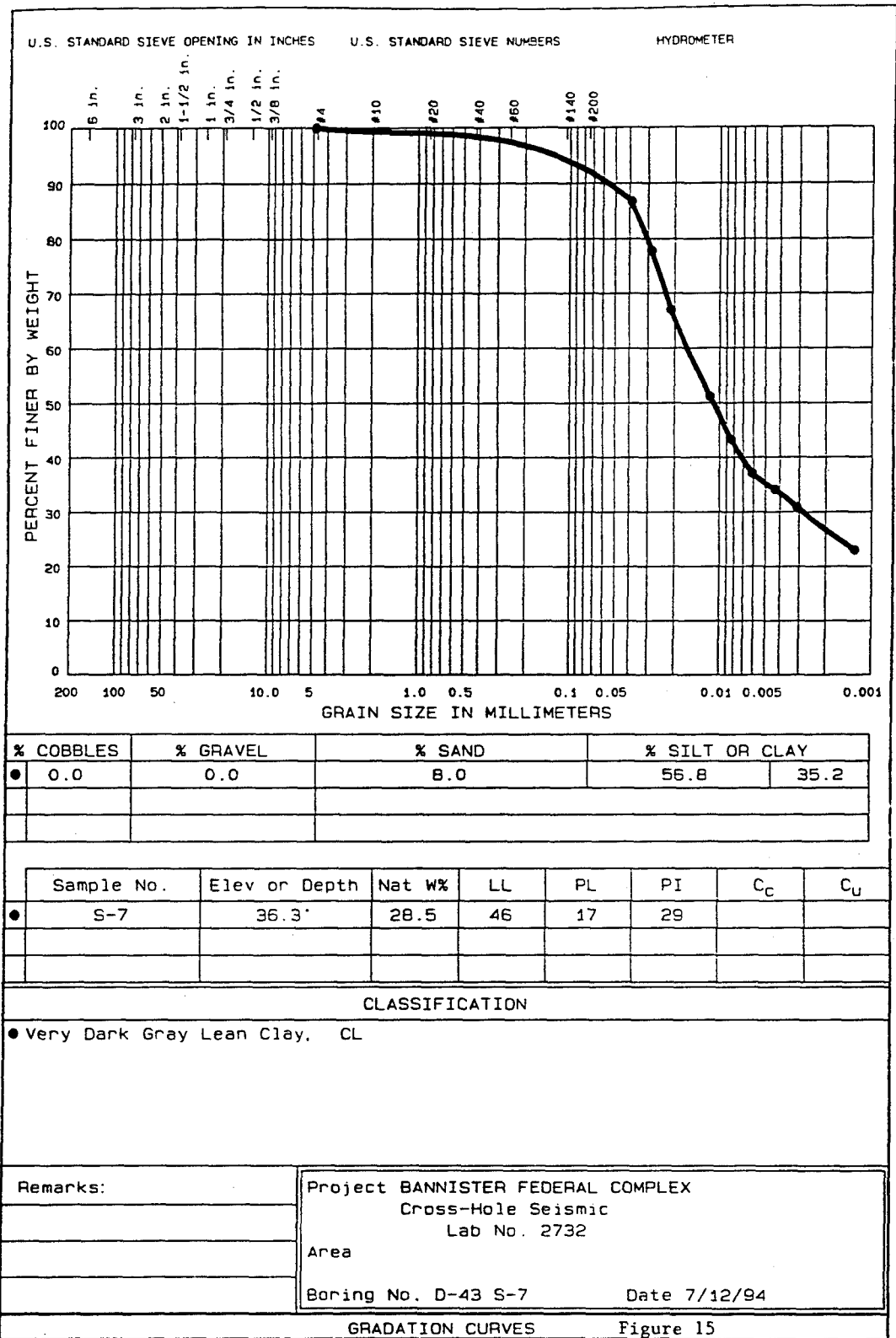
W.O. No. ban43-6
 Req. No. KC 94-124
 Contract No.

CORPS OF ENGINEERS, MISSOURI RIVER DIVISION LAB
 420 SOUTH 18th STREET - OMAHA, NE 68102-2586



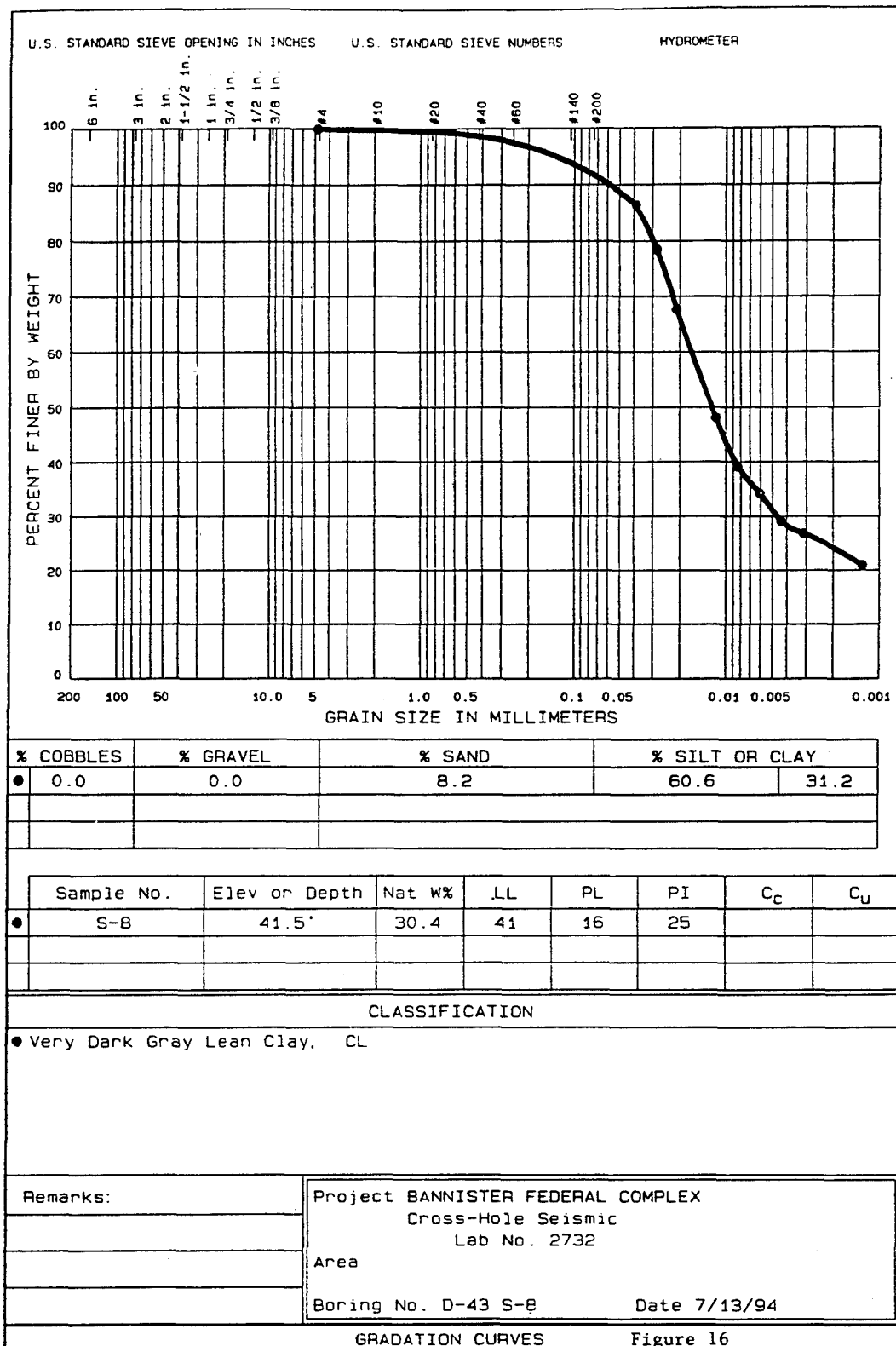
W.O. No. ban43-7
 Req. No. KC 94-124
 Contract No.

CORPS OF ENGINEERS, MISSOURI RIVER DIVISION LAB
 420 SOUTH 18th STREET - OMAHA, NE 68102-2586

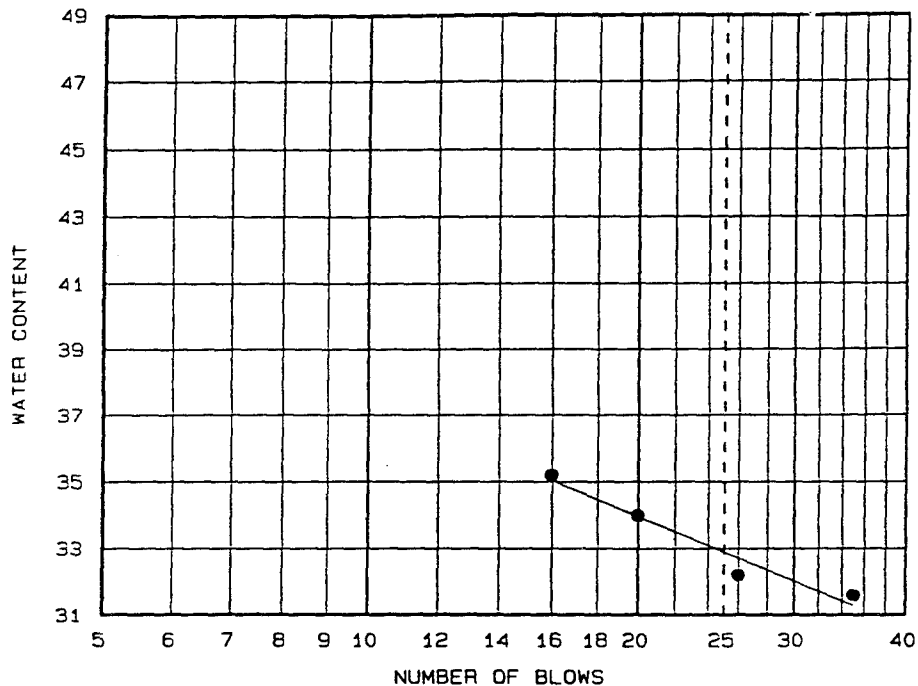


W.O. No. ban43-8
 Req. No. KC 94-124
 Contract No.

CORPS OF ENGINEERS, MISSOURI RIVER DIVISION LAB
 420 SOUTH 18th STREET - OMAHA, NE 68102-2586



LIQUID AND PLASTIC LIMITS TEST REPORT



Location + Description	LL	PL	PI	-200	ASTM D 2487-85
● Gravelly Sandy Clay, CL	33	16	17		

Project No.: 2732
 Project: BANNISTER FEDERAL COMPLEX
 Cross-Hole Seismic
 Client: Kansas City District
 Location: D-43 S-9

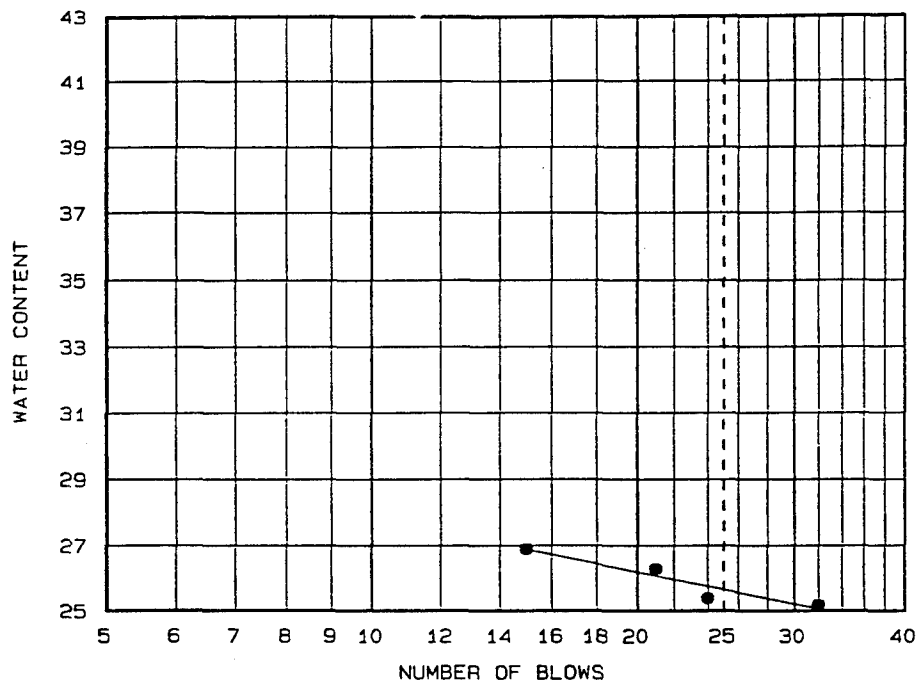
Date: 7/14/94

LIQUID AND PLASTIC LIMITS TEST REPORT
COE - MISSOURI RIVER DIV. LAB

Remarks:
 Dark Brown
 Specimen too small for
 needed sieve analysis
 Visual classification
 with atterberg limits

Fig. No. 17

LIQUID AND PLASTIC LIMITS TEST REPORT



Location + Description	LL	PL	PI	-200	ASTM D 2487-85
● D-43 S-10 Highly Weathered Shale	26	13	13	90	CL, Lean clay

Project No.: 2732
 Project: BANNISTER FEDERAL COMPLEX
 Cross-Hole Seismic
 Client: Kansas City District
 Location: D-43 S-10

Date: 7/12/94

Remarks:
 Gray

LIQUID AND PLASTIC LIMITS TEST REPORT
COE - MISSOURI RIVER DIV. LAB

Fig. No. 18

Appendix D

Seismic Cone

Penetrometer Test Results

SCPT P-1

Vandehey Soil Expl.

Operator : S.VAN

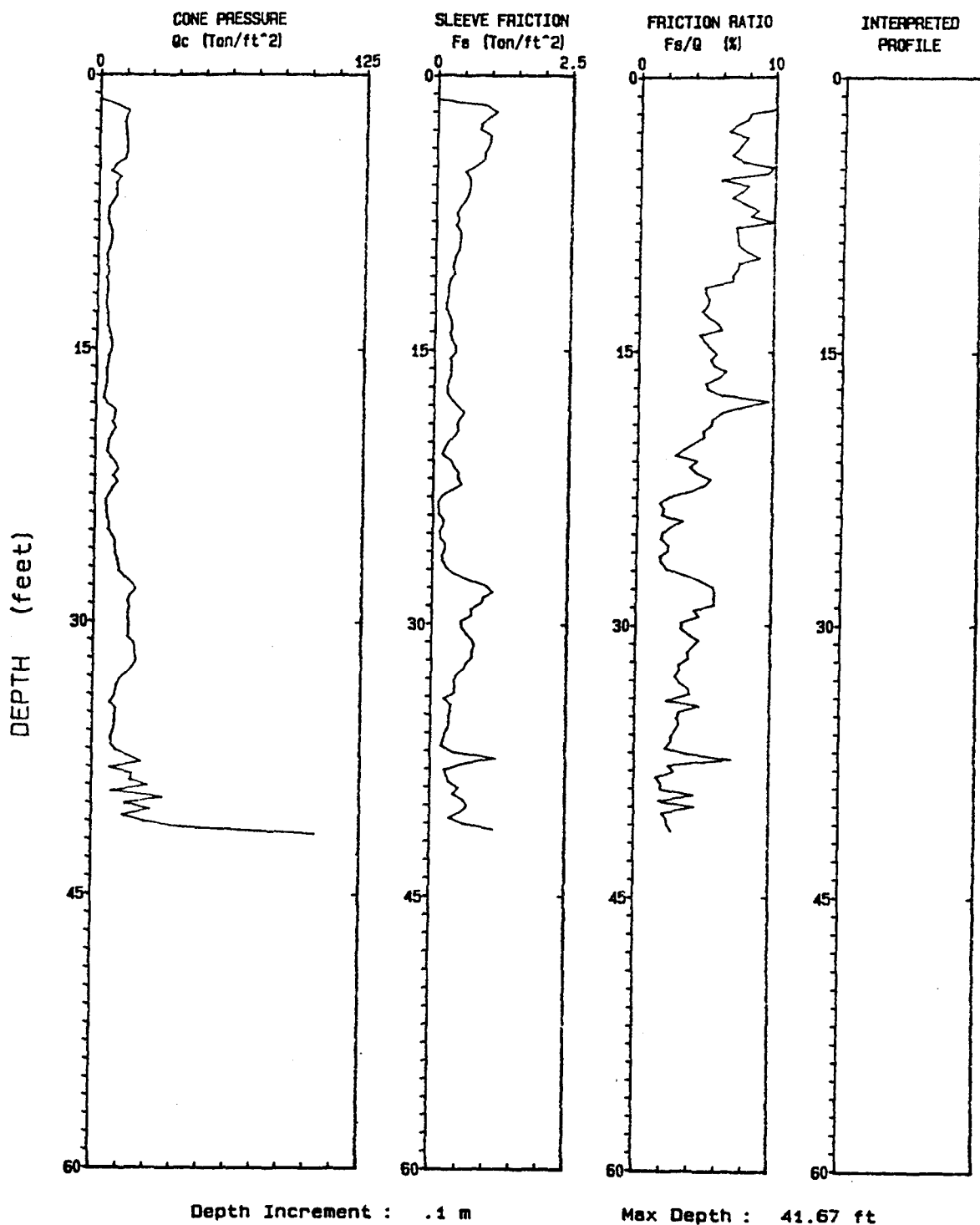
Sounding : SND-91 Pg 1 / 1

Client : WES

CPT Date : 06-26-94 19:20

Location : P-1/BDC-KC MO

Job No. : DACW39-94-M-5062



SOUNDING DATA IN FILE SND-91 06-26-94 19:20

OPERATOR : S.VAN

LOCATION : P-1/BFC-KC MO

CLIENT : WES

JOB No. : DACW39-94-M-5062

Vandehey Soil Exploration

40695 Nw Pacific Ave. Banks, Oregon. 97106 (503) 324 3261

DEPTH meters	DEPTH feet	TIP Qc tsf	FRICTION Fs tsf	FR RATIO Fs/Qc %	INC I deg	INTERPRETED SOIL TYPE
0.10	0.3	0.0	0.000	?	0.1	?
0.20	0.7	0.0	0.000	?	0.1	?
0.30	1.0	0.0	0.000	?	0.1	?
0.40	1.3	0.0	0.000	?	0.1	?
0.50	1.6	8.2	0.905	11.04	0.1	organic material
0.60	2.0	13.6	1.093	8.06	0.1	clay
0.70	2.3	12.1	0.946	7.81	0.1	clay
0.80	2.6	11.6	0.805	6.97	0.1	clay
0.90	3.0	12.1	0.783	6.45	0.1	clay
1.00	3.3	12.5	0.982	7.91	0.1	clay
1.10	3.6	13.0	0.978	7.50	0.1	clay
1.20	3.9	13.0	0.933	7.18	0.1	clay
1.30	4.3	13.0	0.878	6.73	0.1	clay
1.40	4.6	11.6	0.876	7.57	0.1	clay
1.50	4.9	7.3	0.723	9.86	0.1	clay
1.60	5.2	5.5	0.521	9.39	0.1	clay
1.70	5.6	10.2	0.604	5.90	0.1	clay
1.80	5.9	7.9	0.631	8.01	0.1	clay
1.90	6.2	8.0	0.598	7.44	0.1	clay
2.00	6.6	8.4	0.563	6.77	0.1	clay
2.10	6.9	6.5	0.507	7.83	0.1	clay
2.20	7.2	4.9	0.431	8.85	0.1	organic material
2.30	7.5	4.5	0.374	8.26	0.1	organic material
2.40	7.9	4.1	0.413	10.03	0.1	organic material
2.50	8.2	5.0	0.354	7.09	0.0	clay
2.60	8.5	6.2	0.444	7.21	0.0	clay
2.70	8.9	6.3	0.453	7.22	0.0	clay
2.80	9.2	5.9	0.439	7.38	0.0	clay
2.90	9.5	5.3	0.428	8.02	0.0	clay
3.00	9.8	4.0	0.358	8.97	0.0	organic material
3.10	10.2	4.6	0.334	7.32	0.0	organic material
3.20	10.5	4.3	0.311	7.24	0.0	clay
3.30	10.8	5.0	0.344	6.86	0.0	clay
3.40	11.2	3.9	0.270	6.88	0.0	clay
3.50	11.5	4.9	0.235	4.80	0.0	clay
3.60	11.8	4.7	0.231	4.87	0.0	clay
3.70	12.1	4.3	0.221	5.15	0.0	clay
3.80	12.5	3.9	0.196	4.98	0.0	clay
3.90	12.8	4.2	0.193	4.63	0.0	clay
4.00	13.1	5.1	0.262	5.12	0.0	clay

Soil interpretation reference: Robertson & Campanella-1983, based on 60% hammer efficiency and .2 m sliding data average

DEPTH meters	DEPTH feet	TIP Qc tsf	FRICTION Fs tsf	FR RATIO Fs/Qc %	INC I deg	INTERPRETED SOIL TYPE
4.10	13.5	5.3	0.305	5.79	0.0	clay
4.20	13.8	5.1	0.310	6.08	0.0	clay
4.30	14.1	6.1	0.271	4.43	0.0	clay
4.40	14.4	6.5	0.318	4.86	0.0	clay
4.50	14.8	7.4	0.390	5.24	0.0	clay
4.60	15.1	6.9	0.395	5.74	0.0	clay
4.70	15.4	5.5	0.250	5.29	0.0	clay
4.80	15.7	5.3	0.292	5.51	0.0	clay
4.90	16.1	4.6	0.296	6.41	0.0	clay
5.00	16.4	4.9	0.286	5.87	0.0	clay
5.10	16.7	4.9	0.241	4.91	0.0	clay
5.20	17.1	4.6	0.236	5.12	0.0	clay
5.30	17.4	4.1	0.252	6.19	0.0	clay
5.40	17.7	3.5	0.342	9.70	0.0	organic material
5.50	18.0	5.8	0.446	7.64	0.0	clay
5.60	18.4	9.1	0.547	6.01	0.0	clay
5.70	18.7	8.6	0.467	5.40	0.0	clay
5.80	19.0	7.9	0.420	5.32	0.0	clay
5.90	19.4	9.6	0.453	4.73	0.0	clay
6.00	19.7	7.7	0.371	4.82	0.0	clay
6.10	20.0	6.2	0.257	4.12	0.0	clay
6.20	20.3	5.8	0.196	3.38	0.0	clay
6.30	20.7	5.5	0.154	2.78	0.0	clay
6.40	21.0	7.4	0.323	4.36	0.0	clay
6.50	21.3	9.9	0.375	3.79	0.0	clay
6.60	21.7	10.8	0.464	4.30	0.0	clay
6.70	22.0	8.4	0.448	5.34	0.0	clay
6.80	22.3	10.6	0.518	4.88	0.0	clay
6.90	22.6	8.1	0.324	4.00	0.0	clay
7.00	23.0	6.7	0.154	2.31	0.0	silty clay to clay
7.10	23.3	5.0	0.084	1.67	0.0	silty clay to clay
7.20	23.6	5.3	0.105	1.98	0.0	silty clay to clay
7.30	23.9	5.5	0.097	1.77	0.0	silty clay to clay
7.40	24.3	5.6	0.194	3.36	0.0	clay
7.50	24.6	6.6	0.153	2.39	0.0	silty clay to clay
7.60	24.9	6.5	0.121	1.88	0.0	silty clay to clay
7.70	25.3	8.2	0.146	1.77	0.0	silty clay to clay
7.80	25.6	9.9	0.232	2.34	0.0	silty clay to clay
7.90	25.9	9.7	0.218	2.24	0.0	clayey silt to silty clay
8.00	26.2	9.8	0.165	1.68	0.0	clayey silt to silty clay
8.10	26.6	10.6	0.199	1.88	0.0	clayey silt to silty clay
8.20	26.9	11.4	0.253	2.22	0.0	clayey silt to silty clay
8.30	27.2	11.7	0.412	3.51	0.0	silty clay to clay
8.40	27.6	14.4	0.674	4.68	0.0	clay
8.50	27.9	17.9	1.001	5.60	0.0	clay
8.60	28.2	15.5	1.123	5.75	0.0	clay
8.70	28.5	16.6	0.938	5.65	0.0	clay
8.80	28.9	15.7	0.902	5.76	0.0	clay
8.90	29.2	16.7	0.711	4.26	0.0	clay
9.00	29.5	15.7	0.721	4.59	0.0	clay

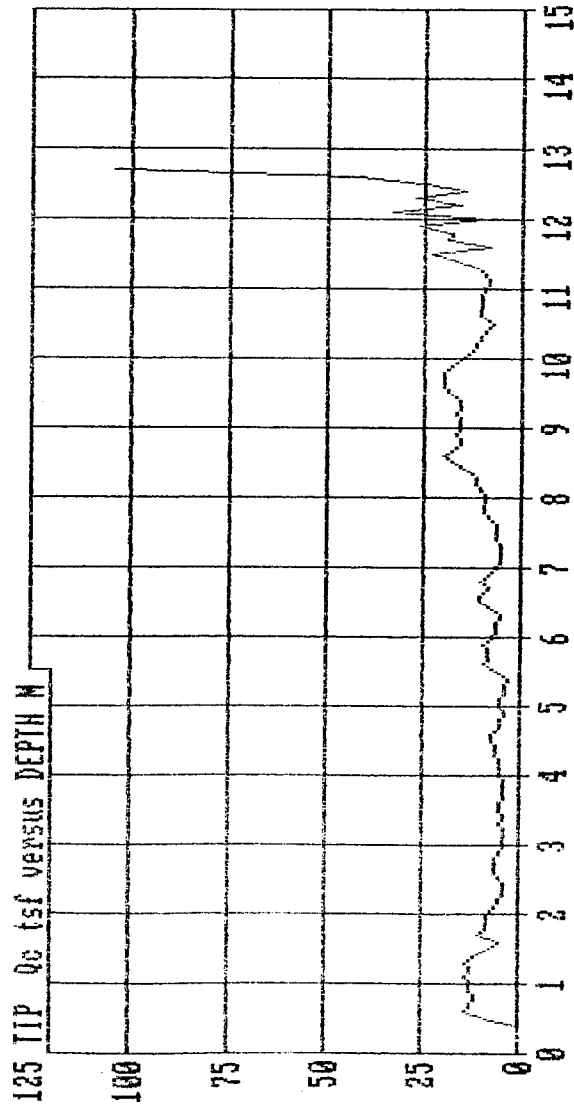
Soil interpretation reference: Robertson & Campanella-1983, based on 60% hammer efficiency and .2 m sliding data average

DEPTH meters	DEPTH feet	TIP Qc tsf	FRICTION Fs tsf	FR RATIO Fs/Qc %	INC I deg	INTERPRETED SOIL TYPE
9.10	29.9	15.6	0.521	3.30	0.0	silty clay to clay
9.20	30.2	16.4	0.546	3.33	0.0	silty clay to clay
9.30	30.5	16.1	0.635	3.95	0.0	silty clay to clay
9.40	30.8	16.0	0.743	4.65	0.0	clay
9.50	31.2	15.0	0.793	5.18	0.0	clay
9.60	31.5	19.6	0.740	3.76	0.0	silty clay to clay
9.70	31.8	19.2	0.752	3.92	0.0	silty clay to clay
9.80	32.2	19.9	0.625	3.14	0.0	clayey silt to silty clay
9.90	32.5	18.0	0.576	3.20	0.0	clayey silt to silty clay
10.00	32.8	15.6	0.452	2.91	0.0	clayey silt to silty clay
10.10	33.1	12.2	0.405	3.30	0.0	silty clay to clay
10.20	33.5	11.0	0.430	3.91	0.0	clay
10.30	33.8	10.4	0.417	3.99	0.0	clay
10.40	34.1	9.8	0.229	2.33	0.0	silty clay to clay
10.50	34.4	7.8	0.372	4.77	0.0	clay
10.60	34.8	10.8	0.348	3.22	0.0	clay
10.70	35.1	10.3	0.317	3.07	0.0	silty clay to clay
10.80	35.4	10.2	0.331	3.25	0.0	silty clay to clay
10.90	35.8	10.0	0.295	2.94	0.0	silty clay to clay
11.00	36.1	9.2	0.245	2.65	0.0	silty clay to clay
11.10	36.4	8.3	0.218	2.63	0.0	silty clay to clay
11.20	36.7	8.9	0.204	2.28	0.0	silty clay to clay
11.30	37.1	11.4	0.445	3.89	0.0	clay
11.40	37.4	16.8	1.209	7.18	0.0	clay
11.50	37.7	22.9	0.573	2.51	0.0	silty clay to clay
11.60	38.1	8.5	0.247	2.91	0.0	clayey silt to silty clay
11.70	38.4	18.3	0.295	1.61	0.0	clayey silt to silty clay
11.80	38.7	17.8	0.354	1.98	0.0	sandy silt to clayey silt
11.90	39.0	26.2	0.525	2.00	0.0	clayey silt to silty clay
12.00	39.4	9.5	0.417	4.41	0.0	clayey silt to silty clay
12.10	39.7	33.3	0.610	1.83	0.0	clayey silt to silty clay
12.20	40.0	15.5	0.692	4.45	0.0	clayey silt to silty clay
12.30	40.4	27.3	0.560	2.05	0.0	clayey silt to silty clay
12.40	40.7	14.5	0.350	2.41	0.0	clayey silt to silty clay
12.50	41.0	24.5	0.614	2.49	0.0	clayey silt to silty clay
12.60	41.3	42.3	1.172	2.77	0.0	?
12.70	41.7	104.6	?	?	0.0	?

Soil interpretation reference: Robertson & Campanella-1983, based on 60% hammer efficiency and .2 m sliding data average

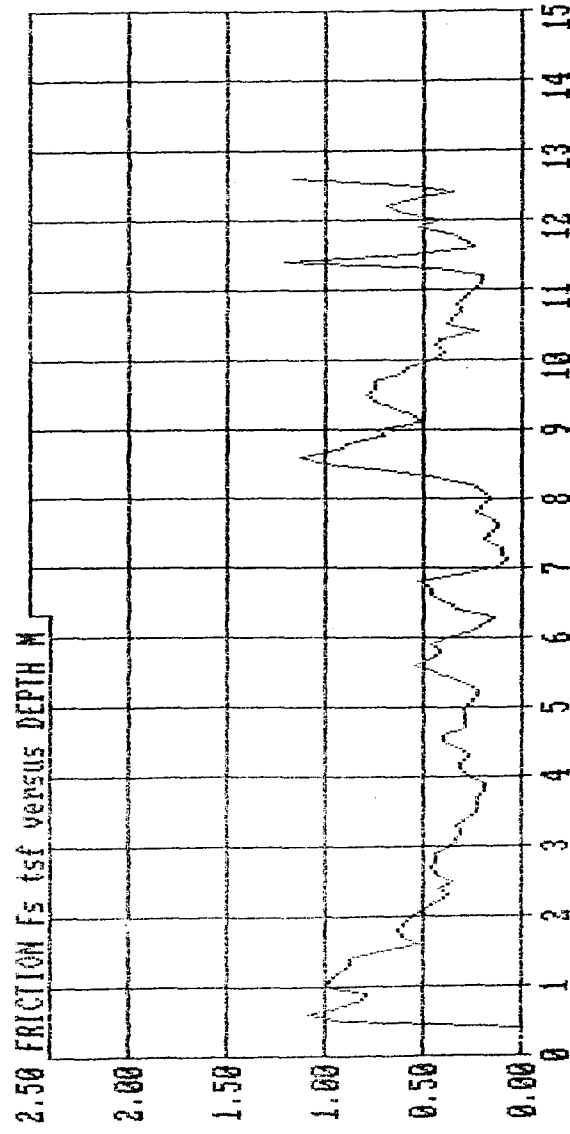
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OPERATOR : S.VAN
CLIENT : WES
LOCATION : P-1/BFC-KC MO
JOB No. : DACW39-94-M-5062

Vandehey Soil Exploration
40695 NW Pacific Ave. Banks, Oregon. 97106 (503) 324 3261



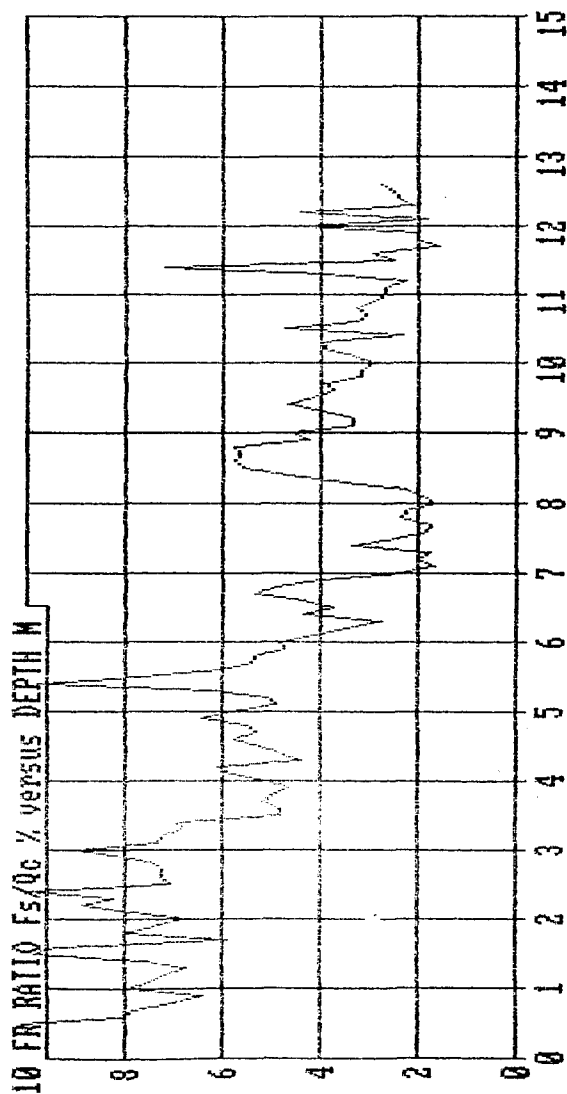
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OPERATOR : S. VAN
CLIENT : WES
LOCATION : P-1/BFC-KC MO
JOB No. : DACH39-94-M-5062

Vandehey Soil Exploration
40695 NW Pacific Ave, Banks, Oregon, 97106 (503) 324 3261



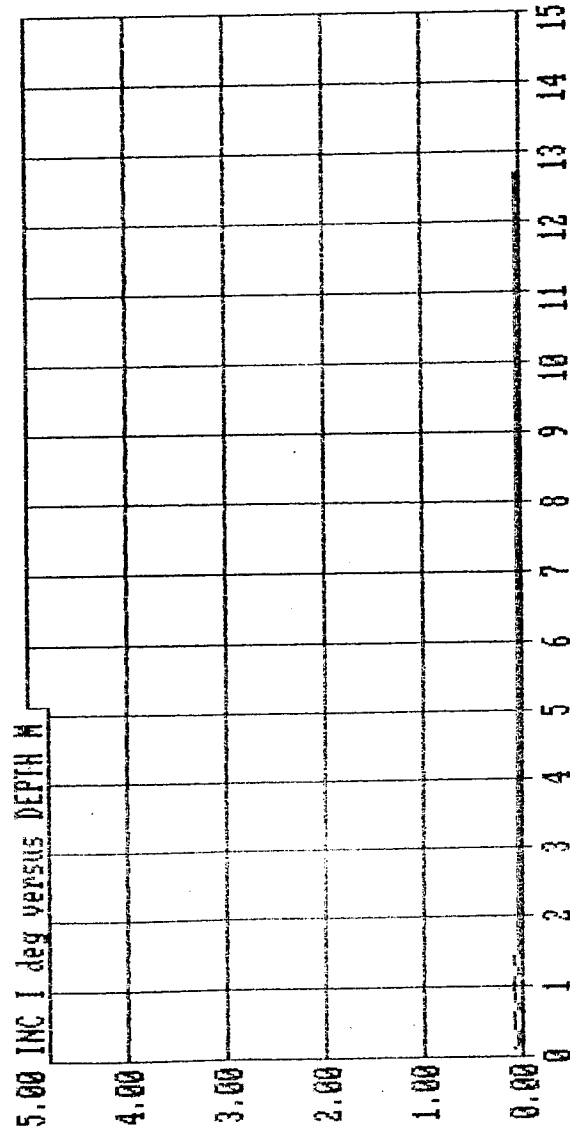
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OPERATOR : S.VAN
CLIENT : WES
LOCATION : P-1/BFC-KC MO
JOB No. : DACW39-94-M-5062

Vandehey Soil Exploration
40695 NW Pacific Ave. Banks, Oregon. 97106 (503) 324 3261



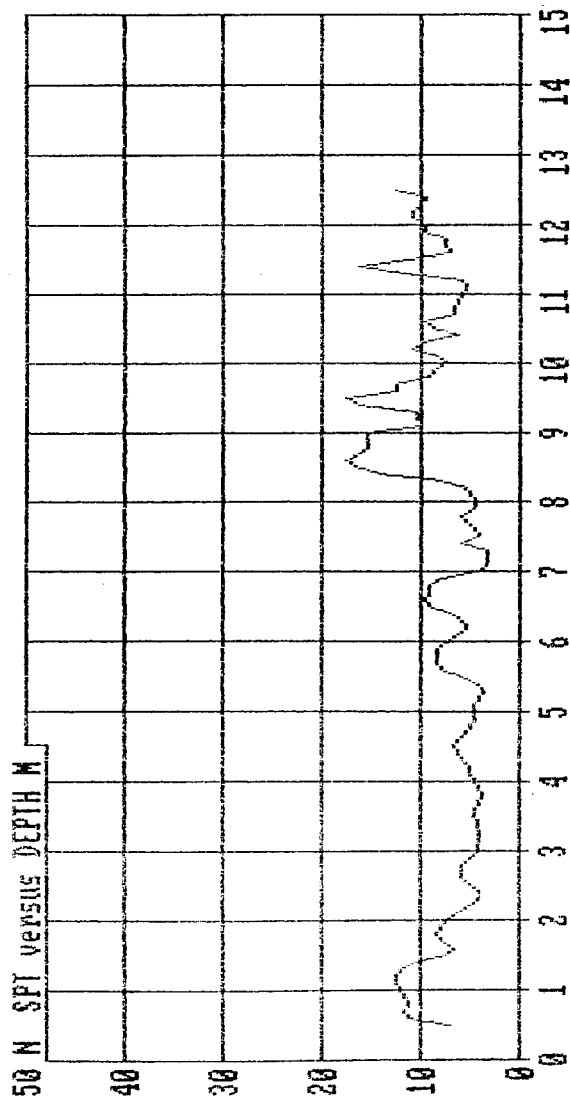
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Vandenberg Soil Exploration



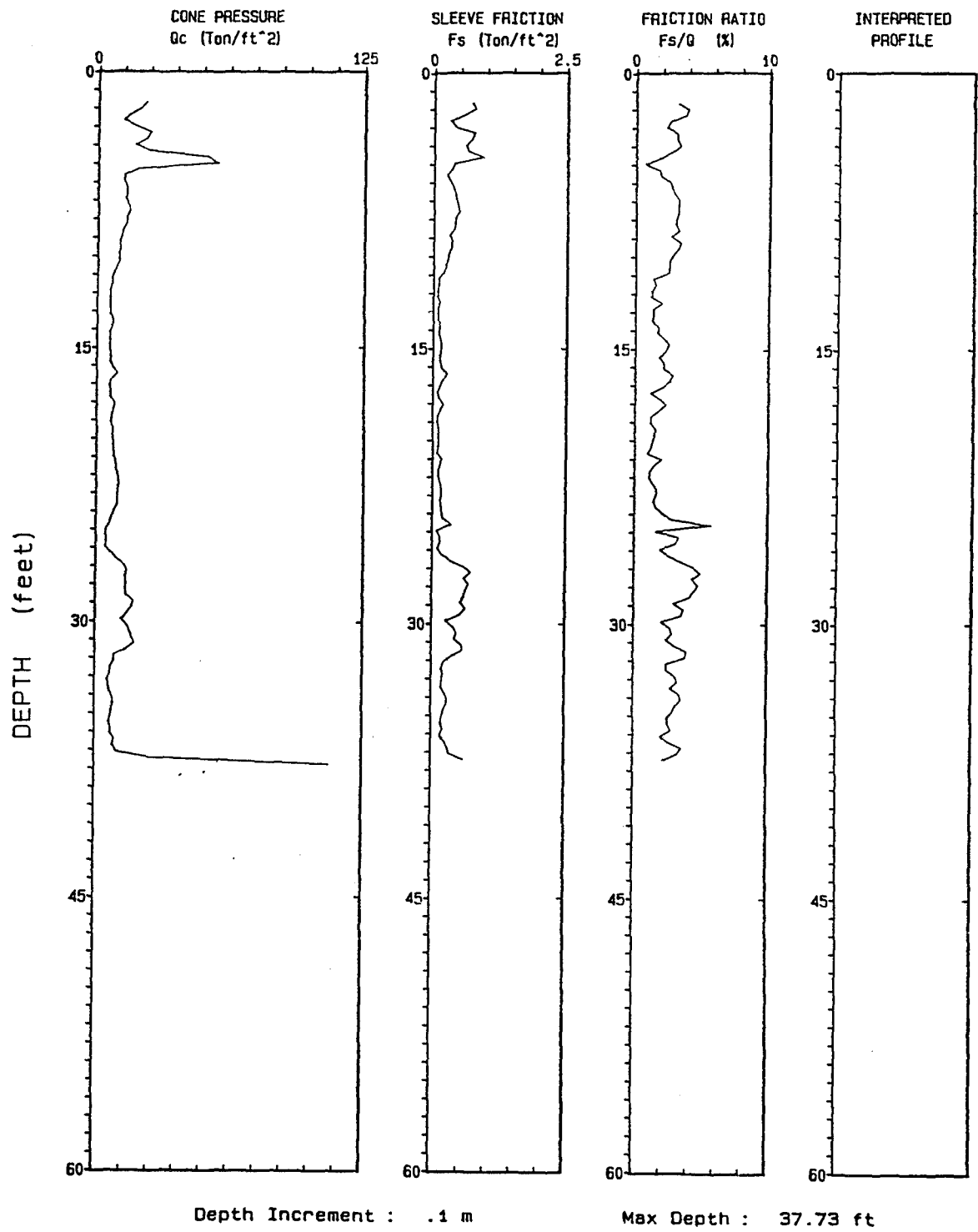
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OPERATOR : S.VAN
CLIENT : WES
LOCATION : P-1/BFC-KC MO
JOB No. : DACW39-94-M-5062

Vandehey Soil Exploration
40695 Nw Pacific Ave. Banks, Oregon. 97106 (503) 324 3261



SCPT P-2

Vandehey Soil Expl.	
Operator : S.VAN	CPT Date : 06-29-94 19:48
Sounding : SND102 Pg 1 / 1	Location : P-2/BFC-KC MO
Client : WES	Job No. : DACW39-94-M-5062



SOUNDING DATA IN FILE SMD102 06-29-94 19:48

OPERATOR : S.VAN

LOCATION : P-2/BFC-KC MO

CLIENT : WES

JOB No. : DACW39-94-M-5062

Vandehey Soil Exploration

40695 Nw Pacific Ave. Banks, Oregon. 97106 (503) 324 3261

DEPTH	DEPTH	TIP	FRICTION	FR RATIO	INC	INTERPRETED
meters	feet	Qc tsf	Fs tsf	Fs/Qc %	I deg	SOIL TYPE
0.50	1.6	22.6	0.715	3.18	0.1	?
0.56	2.0	19.7	0.772	3.91	0.1	silty clay to clay
0.70	2.3	14.8	0.543	3.67	0.1	silty clay to clay
0.86	2.8	11.7	0.296	2.52	0.1	clayey silt to silty clay
0.90	3.0	17.6	0.396	2.25	0.1	clayey silt to silty clay
1.00	3.3	24.6	0.766	3.11	0.1	clayey silt to silty clay
1.10	3.6	22.8	0.704	3.09	0.1	clayey silt to silty clay
1.20	3.9	17.6	0.589	3.35	0.1	clayey silt to silty clay
1.30	4.3	23.5	0.637	2.71	0.1	sandy silt to clayey silt
1.40	4.6	51.5	0.920	1.79	0.1	silty sand to sandy silt
1.50	4.9	56.6	0.374	0.66	0.1	silty sand to sandy silt
1.60	5.2	18.4	0.321	1.75	0.1	sandy silt to clayey silt
1.70	5.6	12.1	0.227	1.87	0.1	clayey silt to silty clay
1.80	5.9	11.7	0.295	2.53	0.1	clayey silt to silty clay
1.90	6.2	13.2	0.359	2.71	0.1	clayey silt to silty clay
2.00	6.6	13.7	0.403	2.94	0.1	silty clay to clay
2.10	6.9	12.8	0.419	3.27	0.1	silty clay to clay
2.20	7.2	14.2	0.450	3.17	0.1	silty clay to clay
2.30	7.5	14.6	0.469	3.21	0.1	silty clay to clay
2.40	7.9	13.2	0.399	3.02	0.1	silty clay to clay
2.50	8.2	13.2	0.392	2.96	0.1	silty clay to clay
2.60	8.5	11.5	0.371	3.23	0.1	silty clay to clay
2.70	8.9	10.8	0.283	2.61	0.1	silty clay to clay
2.80	9.2	9.9	0.340	3.42	0.1	silty clay to clay
2.90	9.5	10.6	0.338	3.18	0.1	silty clay to clay
3.00	9.8	9.8	0.274	2.79	0.1	silty clay to clay
3.10	10.2	10.2	0.256	2.52	0.1	silty clay to clay
3.20	10.5	8.6	0.213	2.49	0.1	silty clay to clay
3.30	10.8	7.6	0.188	2.47	0.1	silty clay to clay
3.40	11.2	6.6	0.085	1.28	0.1	silty clay to clay
3.50	11.5	6.6	0.100	1.51	0.1	sensitive fine grained
3.60	11.8	5.7	0.067	1.18	0.1	sensitive fine grained
3.70	12.1	6.1	0.072	1.19	0.1	sensitive fine grained
3.80	12.5	6.2	0.126	2.02	0.2	silty clay to clay
3.90	12.8	6.3	0.062	1.30	0.1	sensitive fine grained
4.00	13.1	6.3	0.066	1.36	0.1	sensitive fine grained
4.10	13.5	7.4	0.092	1.24	0.1	clayey silt to silty clay
4.20	13.8	7.1	0.125	1.76	0.1	silty clay to clay
4.30	14.1	5.7	0.095	1.65	0.1	silty clay to clay
4.40	14.4	6.0	0.131	2.19	0.1	silty clay to clay

Soil interpretation reference: Robertson & Campanella-1983, based on 60% hammer efficiency and .2 m sliding data average

DEPTH meters	DEPTH feet	TIP Qc tsf	FRICTION Fs tsf	FR RATIO Fs/Qc %	INC I deg	INTERPRETED SOIL TYPE
4.50	14.8	6.0	0.150	2.51	0.1	silty clay to clay
4.60	15.1	6.0	0.134	2.23	0.1	silty clay to clay
4.70	15.4	6.5	0.115	1.79	0.1	silty clay to clay
4.80	15.7	6.5	0.140	2.16	0.1	silty clay to clay
4.90	16.1	7.7	0.168	2.18	0.1	silty clay to clay
5.00	16.4	9.4	0.264	2.82	0.1	silty clay to clay
5.10	16.7	6.5	0.169	2.59	0.1	silty clay to clay
5.20	17.1	5.8	0.119	2.04	0.1	silty clay to clay
5.30	17.4	6.5	0.074	1.14	0.1	sensitive fine grained
5.40	17.7	6.2	0.115	1.84	0.1	silty clay to clay
5.50	18.0	8.3	0.193	2.32	0.1	silty clay to clay
5.60	18.4	7.7	0.133	1.74	0.1	clayey silt to silty clay
5.70	18.7	7.0	0.080	1.14	0.1	sensitive fine grained
5.80	19.0	6.6	0.079	1.19	0.1	sensitive fine grained
5.90	19.4	7.3	0.113	1.56	0.1	clayey silt to silty clay
6.00	19.7	7.4	0.106	1.44	0.1	clayey silt to silty clay
6.10	20.0	7.6	0.098	1.28	0.1	clayey silt to silty clay
6.20	20.3	7.9	0.092	1.16	0.1	clayey silt to silty clay
6.30	20.7	7.9	0.070	0.89	0.1	clayey silt to silty clay
6.40	21.0	8.2	0.167	2.03	0.1	clayey silt to silty clay
6.50	21.3	9.2	0.130	1.42	0.1	clayey silt to silty clay
6.60	21.7	9.2	0.101	1.10	0.1	clayey silt to silty clay
6.70	22.0	10.0	0.105	1.05	0.1	clayey silt to silty clay
6.80	22.3	10.5	0.140	1.34	0.1	clayey silt to silty clay
6.90	22.6	9.7	0.164	1.69	0.1	clayey silt to silty clay
7.00	23.0	10.0	0.154	1.55	0.1	clayey silt to silty clay
7.10	23.3	9.4	0.129	1.37	0.1	clayey silt to silty clay
7.20	23.6	9.6	0.155	1.61	0.1	clayey silt to silty clay
7.30	23.9	8.0	0.170	2.12	0.1	silty clay to clay
7.40	24.3	7.1	0.200	2.82	0.1	clay
7.50	24.6	6.2	0.361	5.82	0.1	clay
7.60	24.9	4.5	0.074	1.64	0.1	clay
7.70	25.3	4.3	0.143	3.35	0.1	clay
7.80	25.6	4.3	0.134	3.11	0.1	clay
7.90	25.9	4.6	0.089	1.94	0.1	clay
8.00	26.2	7.1	0.179	2.51	0.1	silty clay to clay
8.10	26.6	9.6	0.328	3.43	0.1	clay
8.20	26.9	13.0	0.579	4.44	0.1	clay
8.30	27.2	14.5	0.729	5.02	0.1	clay
8.40	27.6	13.6	0.593	4.36	0.1	clay
8.50	27.9	14.2	0.687	4.84	0.1	clay
8.60	28.2	13.8	0.517	4.48	0.1	clay
8.70	28.5	14.2	0.597	4.21	0.1	silty clay to clay
8.80	28.9	17.6	0.523	2.97	0.1	silty clay to clay
8.90	29.2	16.7	0.622	3.73	0.1	silty clay to clay
9.00	29.5	14.3	0.505	3.53	0.1	silty clay to clay
9.10	29.9	12.1	0.252	2.08	0.2	clayey silt to silty clay
9.20	30.2	14.8	0.406	2.74	0.2	clayey silt to silty clay
9.30	30.5	16.1	0.462	2.88	0.2	clayey silt to silty clay
9.40	30.8	17.1	0.416	2.43	0.2	clayey silt to silty clay

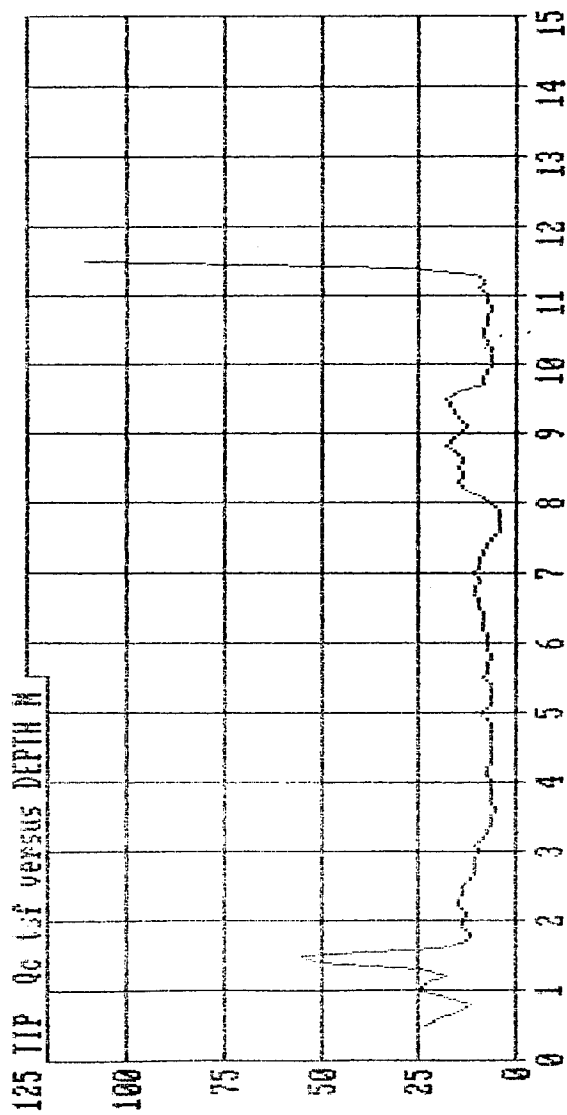
Soil interpretation reference: Robertson & Campanella-1983, based on 60% hammer efficiency and .2 m sliding data average

DEPTH meters	DEPTH feet	TIP Qc tsf	FRICTION Fs tsf	FR RATIO Fs/Qc %	INC I deg	INTERPRETED SOIL TYPE
9.50	31.2	10.2	0.560	3.08	0.2	clayey silt to silty clay
9.60	31.5	14.1	0.571	4.05	0.2	silty clay to clay
9.70	31.8	8.6	0.332	3.87	0.2	clay
9.80	32.2	8.5	0.205	2.41	0.2	silty clay to clay
9.90	32.5	6.9	0.169	2.45	0.2	silty clay to clay
10.00	32.8	6.7	0.210	3.14	0.2	clay
10.10	33.1	5.8	0.193	3.32	0.2	clay
10.20	33.5	6.4	0.177	2.75	0.2	clay
10.30	33.8	7.0	0.241	3.44	0.2	clay
10.40	34.1	8.2	0.256	3.55	0.2	clay
10.50	34.4	8.6	0.270	3.14	0.2	clay
10.60	34.8	7.5	0.223	2.93	0.2	silty clay to clay
10.70	35.1	7.2	0.191	2.59	0.2	silty clay to clay
10.80	35.4	6.5	0.166	2.57	0.2	silty clay to clay
10.90	35.9	7.4	0.208	2.82	0.2	silty clay to clay
11.00	36.1	7.2	0.144	2.00	0.2	silty clay to clay
11.10	36.4	9.1	0.243	2.68	0.2	silty clay to clay
11.20	36.7	8.5	0.303	3.65	0.2	clay
11.30	37.1	10.4	0.341	3.28	0.2	clayey silt to silty clay
11.40	37.4	26.7	0.601	2.25	0.2	?
11.50	37.7	109.9	?	?	0.2	?

Soil interpretation reference: Robertson & Campanella-1983, based on 60% hammer efficiency and .2 m sliding data average

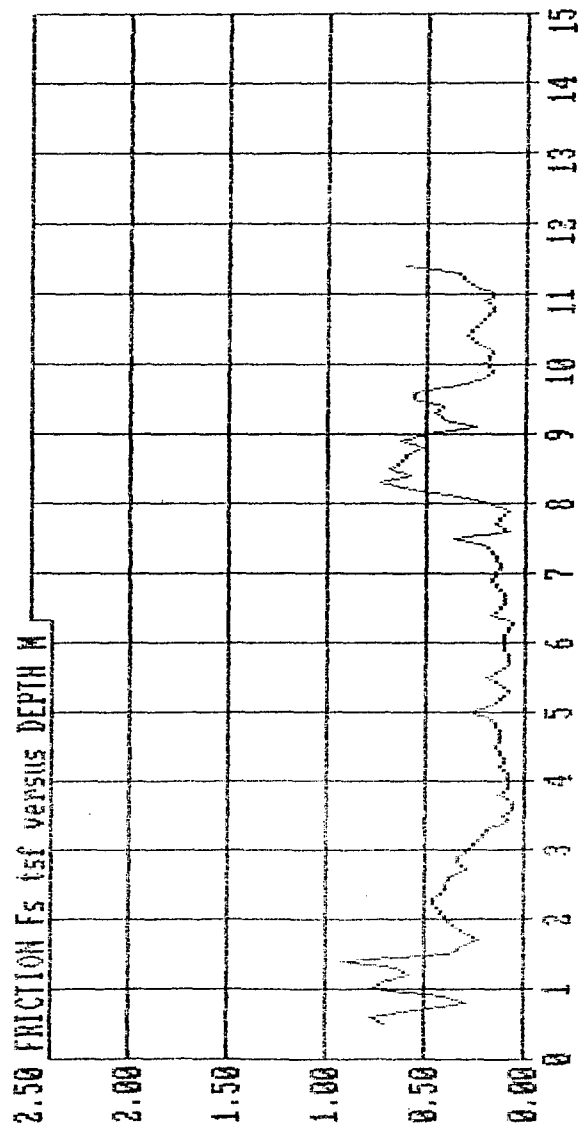
SOUNDING DATA IN FILE SND102 06-29-94 19:48
OPERATOR : S.VAN LOCATION : P-2/BFC-KC MO
CLIENT : NES JOB No. : DACW39-94-M-5062

Vandehey Soil Exploration
40695 NW Pacific Ave. Banks, Oregon. 97106 (503) 324 3261



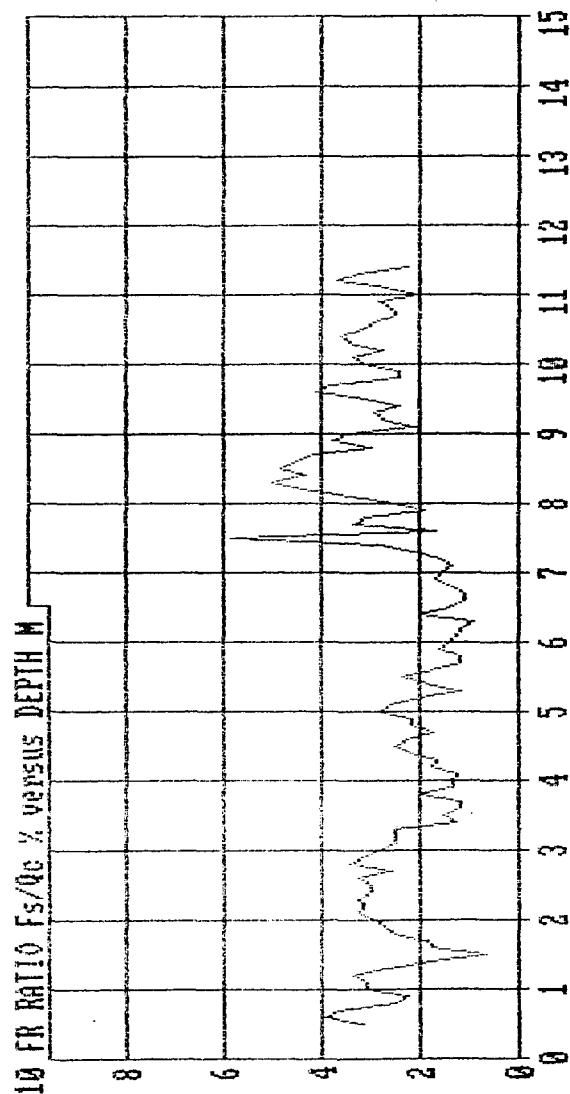
SOUNDING DATA IN FILE SND102 06-29-94 19:48
OPERATOR : S. VAN
CLIENT : WES
LOCATION : P-2/BFC-KC MO
JOB No. : DACN39-94-M-5062

Vandelay Soil Exploration
40695 NW Pacific Ave. Banks, Oregon. 97106 (503) 324 3261



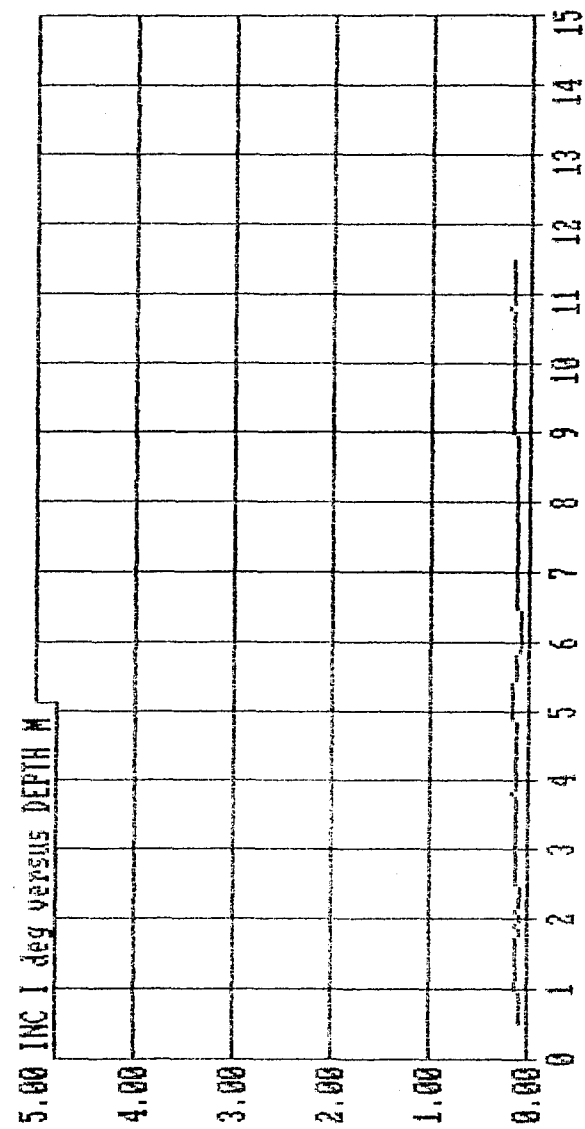
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OPERATOR : S VAN LOCATION : P-2/BFC-KC MO
CLIENT : MES JOB No. : DACW39-94-M-5062

Vandehey Soil Exploration
40695 Nw Pacific Ave. Banks, Oregon. 97106 (503) 324 3261



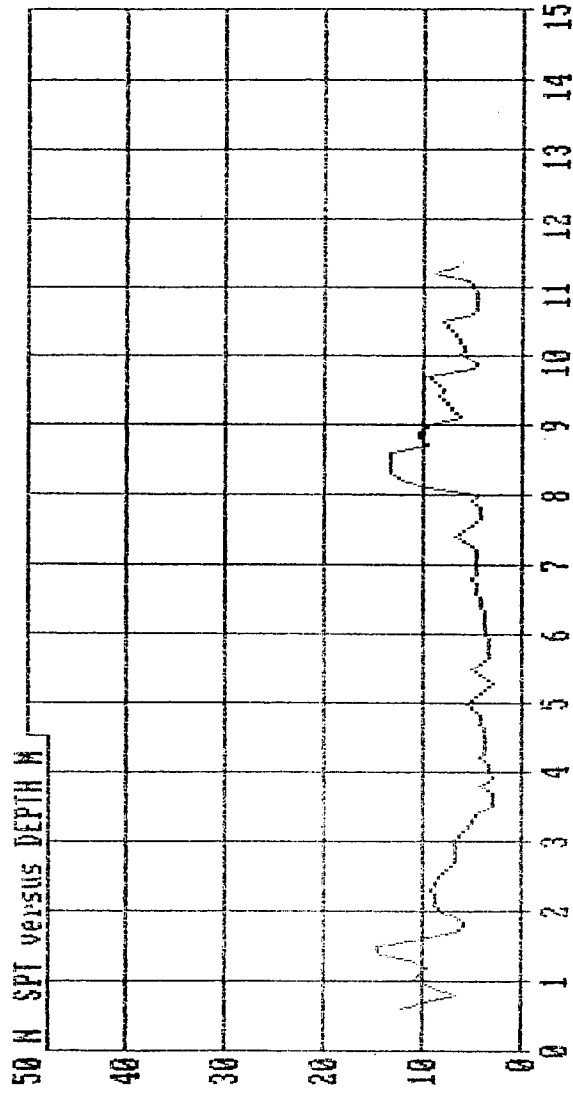
SOUNDING DATA IN FILE SND102 06-29-94 19:48
OPERATOR : S.VAN LOCATION : P-2/BFC-KC MO
CLIENT : NES JOB No. : DACH39-94-M-5062

Vandehey Soil Exploration
40695 NW Pacific Ave. Banks, Oregon. 97106 (503) 324 3261



SOUNDING DATA IN FILE SHD182 06-29-94 19:48
OPERATOR : S.VAN LOCATION : P-2/BFC-KC MO
CLIENT : WES JOB No. : DACU39-94-M-5062

Vandehey Soil Exploration
40695 Nw Pacific Ave. Banks, Oregon. 97106 (503) 324 3261



SCPT P-3

Vandehey Soil Expl.

Operator : S.VAN

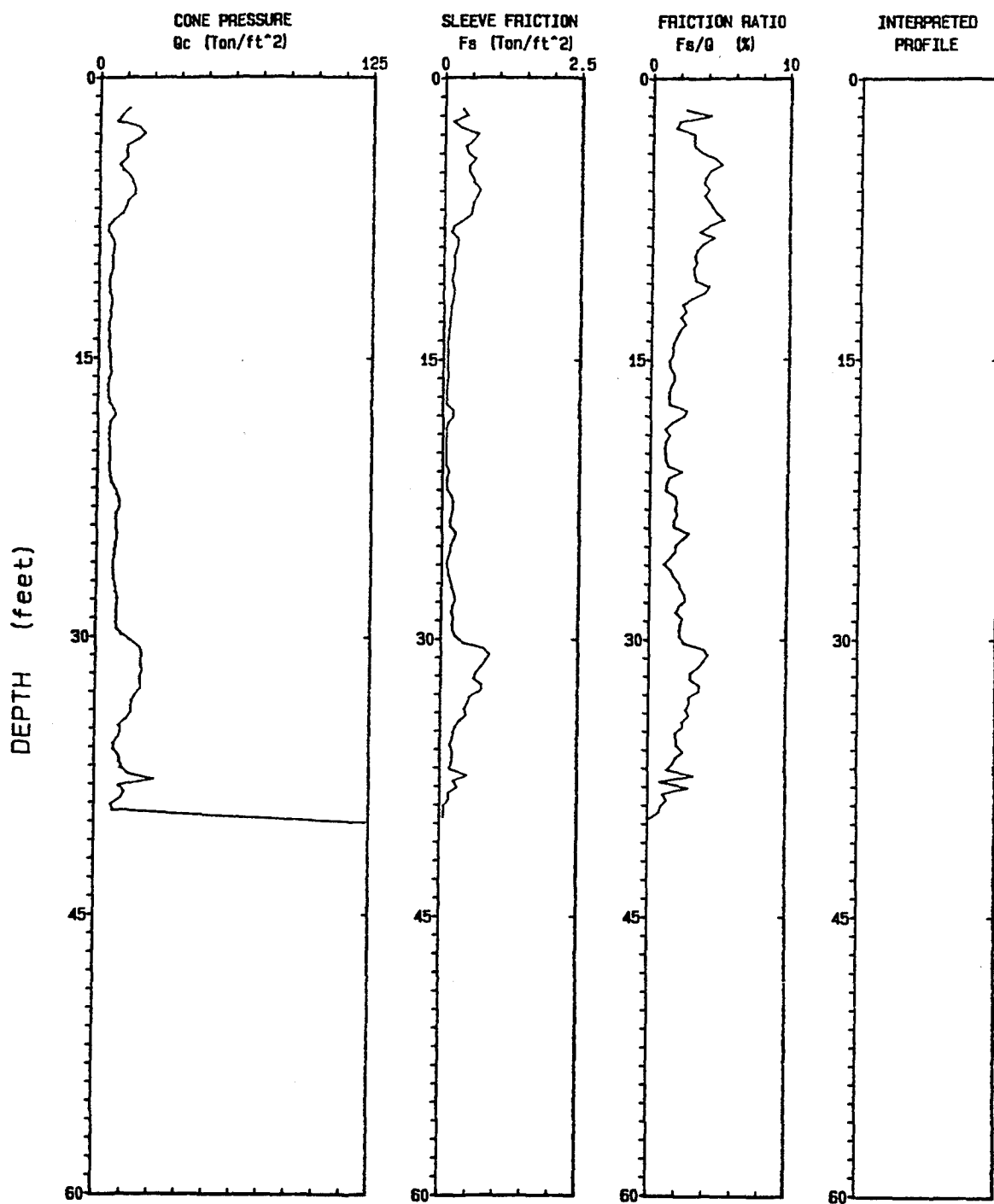
Sounding : SND106 Pg 1 / 1

Client : WES

CPT Date : 06-30-94 16:16

Location : P-3/BFC-KC MO

Job No. : DACW39-94-M-5062



Depth Increment : .1 m

Max Depth : 40.03 ft

SOUNDING DATA IN FILE SND106 06-30-94 16:16

OPERATOR : S.UAN

LOCATION : P-3/BFC-KC MO

CLIENT : WES

JOB No. : DACW39-94-M-5062

Vandehey Soil Exploration

40695 Nw Pacific Ave. Banks, Oregon. 97106 (503) 324 3261

DEPTH	DEPTH	TIP	FRICTION	FE RATIO	INC	INTERPRETED
meters	feet	Bl tsf	Fs tsf	Fs/Qc %	I deg	SOIL TYPE
0.50	1.5	13.3	0.327	2.46	0.3	
0.60	2.0	9.9	0.417	4.20	0.3	silty clay to clay
0.70	2.3	7.7	0.144	1.87	0.1	clayey silt to silty clay
0.80	2.6	17.7	0.259	1.69	0.1	clayey silt to silty clay
0.90	3.0	20.6	0.620	3.02	0.1	clayey silt to silty clay
1.00	3.3	17.2	0.504	2.93	0.1	clayey silt to silty clay
1.10	3.6	12.4	0.382	3.09	0.1	silty clay to clay
1.20	3.9	11.9	0.435	3.65	0.1	clay
1.30	4.3	12.6	0.573	4.54	0.1	clay
1.40	4.6	8.9	0.447	5.01	0.1	clay
1.50	4.9	10.7	0.444	4.14	0.1	clay
1.60	5.2	13.8	0.524	3.80	0.1	clay
1.70	5.6	15.0	0.560	3.74	0.1	silty clay to clay
1.80	5.9	16.0	0.654	4.08	0.1	silty clay to clay
1.90	6.2	16.0	0.593	3.72	0.1	silty clay to clay
2.00	6.6	12.6	0.517	4.10	0.1	clay
2.10	6.9	11.5	0.501	4.34	0.1	clay
2.20	7.2	10.2	0.473	4.65	0.1	clay
2.30	7.5	6.7	0.348	5.20	0.1	clay
2.40	7.9	4.1	0.168	4.11	0.1	clay
2.50	8.2	3.7	0.126	3.42	0.1	clay
2.60	8.5	5.7	0.253	4.46	0.1	clay
2.70	8.9	6.8	0.246	3.63	0.1	clay
2.80	9.2	6.2	0.195	3.20	0.1	clay
2.90	9.5	5.8	0.175	3.07	0.1	clay
3.00	9.8	6.2	0.202	3.24	0.1	clay
3.10	10.2	6.2	0.164	2.97	0.1	clay
3.20	10.5	5.1	0.157	3.07	0.1	clay
3.30	10.8	4.5	0.144	3.18	0.1	clay
3.40	11.2	4.4	0.181	4.14	0.1	clay
3.50	11.5	5.2	0.198	3.79	0.1	clay
3.60	11.8	5.8	0.165	2.63	0.1	clay
3.70	12.1	5.8	0.125	2.18	0.1	silty clay to clay
3.80	12.5	4.8	0.119	2.48	0.1	silty clay to clay
3.90	12.8	5.3	0.108	2.06	0.1	clay
4.00	13.1	4.2	0.102	2.44	0.1	clay
4.10	13.5	4.4	0.091	2.06	0.1	silty clay to clay
4.20	13.8	5.1	0.094	1.83	0.1	silty clay to clay
4.30	14.1	4.5	0.071	1.50	0.1	sensitive fine grained
4.40	14.4	4.5	0.067	1.50	0.1	sensitive fine grained

Soil interpretation reference: Robertson & Campanella-1983, based on 60% hammer efficiency and .2 m sliding data average

DEPTH meters	DEPTH feet	TIP Qc tsf	FRICTION Fs tsf	FR RATIO Fs/Qc %	INC I deg	INTERPRETED SOIL TYPE
4.50	14.8	5.4	0.062	1.53	0.1	sensitive fine grained
4.60	15.1	5.3	0.067	1.27	0.1	sensitive fine grained
4.70	15.4	5.1	0.071	1.39	0.1	sensitive fine grained
4.80	15.7	6.1	0.102	1.68	0.1	sensitive fine grained
4.90	16.1	4.8	0.081	1.71	0.1	sensitive fine grained
5.00	16.4	4.3	0.060	1.45	0.1	sensitive fine grained
5.10	16.7	4.2	0.055	1.29	0.1	sensitive fine grained
5.20	17.1	4.6	0.060	1.30	0.1	sensitive fine grained
5.30	17.4	5.5	0.075	1.42	0.1	silty clay to clay
5.40	17.7	7.4	0.157	2.66	0.1	silty clay to clay
5.50	18.0	7.9	0.165	2.36	0.1	silty clay to clay
5.60	18.4	5.5	0.061	1.49	0.1	silty clay to clay
5.70	18.7	5.0	0.051	1.01	0.1	sensitive fine grained
5.80	19.0	4.7	0.065	1.38	0.1	sensitive fine grained
5.90	19.4	5.1	0.055	1.09	0.1	sensitive fine grained
6.00	19.7	5.4	0.055	1.02	0.1	sensitive fine grained
6.10	20.0	5.7	0.062	1.08	0.1	sensitive fine grained
6.20	20.3	5.2	0.059	1.13	0.1	sensitive fine grained
6.30	20.7	4.9	0.064	1.29	0.1	sensitive fine grained
6.40	21.0	5.1	0.118	2.30	0.1	silty clay to clay
6.50	21.3	6.0	0.082	1.36	0.2	sensitive fine grained
6.60	21.7	6.6	0.076	1.16	0.2	sensitive fine grained
6.70	22.0	8.2	0.092	1.13	0.2	clayey silt to silty clay
6.80	22.3	9.0	0.167	1.85	0.2	clayey silt to silty clay
6.90	22.6	10.1	0.199	1.96	0.2	clayey silt to silty clay
7.00	23.0	10.0	0.182	1.81	0.2	clayey silt to silty clay
7.10	23.3	8.5	0.172	2.02	0.2	clayey silt to silty clay
7.20	23.6	8.3	0.144	1.73	0.2	clayey silt to silty clay
7.30	23.9	8.7	0.153	1.76	0.2	silty clay to clay
7.40	24.3	8.8	0.253	2.87	0.2	silty clay to clay
7.50	24.6	8.8	0.203	2.30	0.2	silty clay to clay
7.60	24.9	8.1	0.149	1.84	0.2	silty clay to clay
7.70	25.3	7.7	0.142	1.85	0.2	clayey silt to silty clay
7.80	25.6	7.7	0.111	1.45	0.2	clayey silt to silty clay
7.90	25.9	7.1	0.072	1.02	0.2	sensitive fine grained
8.00	26.2	7.1	0.108	1.52	0.2	clayey silt to silty clay
8.10	26.6	7.3	0.124	1.71	0.2	silty clay to clay
8.20	26.9	7.5	0.157	2.08	0.2	silty clay to clay
8.30	27.2	8.3	0.188	2.26	0.2	silty clay to clay
8.40	27.6	8.9	0.227	2.56	0.2	silty clay to clay
8.50	27.9	9.6	0.250	2.61	0.3	silty clay to clay
8.60	28.2	9.2	0.195	2.12	0.3	silty clay to clay
8.70	28.5	8.8	0.169	1.91	0.3	silty clay to clay
8.80	28.9	8.9	0.215	2.41	0.3	silty clay to clay
8.90	29.2	8.9	0.202	2.26	0.2	silty clay to clay
9.00	29.5	9.5	0.205	2.20	0.2	clayey silt to silty clay
9.10	29.9	11.8	0.265	2.25	0.2	clayey silt to silty clay
9.20	30.2	15.6	0.403	2.58	0.2	clayey silt to silty clay
9.30	30.5	19.6	0.786	4.02	0.2	silty clay to clay
9.40	30.8	20.7	0.886	4.28	0.2	silty clay to clay

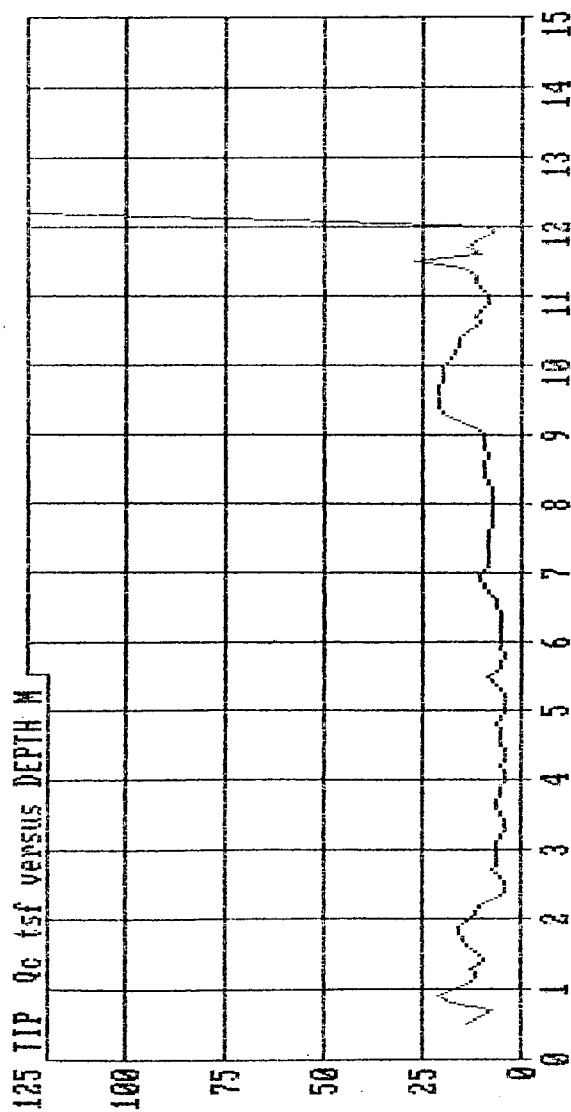
Soil interpretation reference: Robertson & Campanella-1983, based on 60% hammer efficiency and .2 m sliding data average

DEPTH meters	DEPTH feet	TIP Qc tsf	FRICTION Fs tsf	FR RATIO Fs/Qc %	INC I deg	INTERPRETED SOIL TYPE
9.50	31.2	20.6	0.810	3.93	0.3	silty clay to clay
9.60	31.5	20.4	0.732	3.59	0.3	silty clay to clay
9.70	31.8	21.2	0.634	2.99	0.3	clayey silt to silty clay
9.80	32.2	19.9	0.596	2.99	0.3	clayey silt to silty clay
9.90	32.5	20.3	0.745	3.68	0.3	silty clay to clay
10.00	32.8	20.3	0.747	3.68	0.3	silty clay to clay
10.10	33.1	18.0	0.522	2.90	0.3	clayey silt to silty clay
10.20	33.5	16.3	0.454	2.97	0.3	clayey silt to silty clay
10.30	33.8	16.1	0.451	2.69	0.3	clayey silt to silty clay
10.40	34.1	15.9	0.465	2.94	0.3	clayey silt to silty clay
10.50	34.4	13.9	0.341	2.45	0.3	clayey silt to silty clay
10.60	34.8	10.7	0.250	2.44	0.3	clayey silt to silty clay
10.70	35.1	11.5	0.215	1.91	0.3	clayey silt to silty clay
10.80	35.4	10.2	0.212	2.09	0.3	clayey silt to silty clay
10.90	35.8	8.3	0.171	2.06	0.3	silty clay to clay
11.00	36.1	8.6	0.221	2.55	0.3	silty clay to clay
11.10	36.4	10.9	0.219	2.02	0.3	clayey silt to silty clay
11.20	36.7	11.3	0.192	1.75	0.3	clayey silt to silty clay
11.30	37.1	11.8	0.165	1.40	0.3	clayey silt to silty clay
11.40	37.4	15.1	0.501	3.32	0.3	clayey silt to silty clay
11.50	37.7	27.0	0.235	0.87	0.5	sandy silt to clayey silt
11.60	38.1	10.8	0.316	2.92	0.5	clayey silt to silty clay
11.70	38.4	13.3	0.129	1.04	0.5	clayey silt to silty clay
11.80	38.7	11.6	0.155	1.34	0.5	clayey silt to silty clay
11.90	39.0	7.4	0.067	0.91	0.5	clayey silt to silty clay
12.00	39.4	8.5	0.066	0.77	0.5	silty sand to sandy silt
12.10	39.7	60.4	0.057	0.09	0.5	?
12.20	40.0	123.9	?	?	0.5	?

Soil interpretation reference: Robertson & Campanella-1983, based on 60% hammer efficiency and .2 m sliding data average

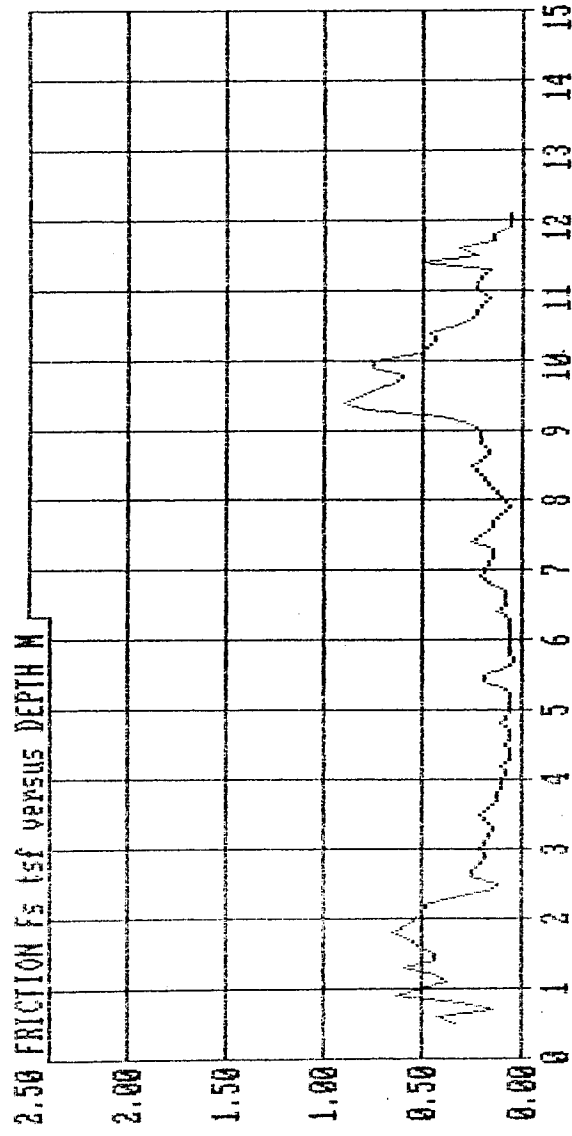
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OPERATOR : S. UAN
CLIENT : WES
LOCATION : P-3/BFC-KC M0
JOB No. : DACH39-94-M-5062

Vandehey Soil Exploration
40695 Nw Pacific Ave. Banks, Oregon. 97106 (503) 324 3261



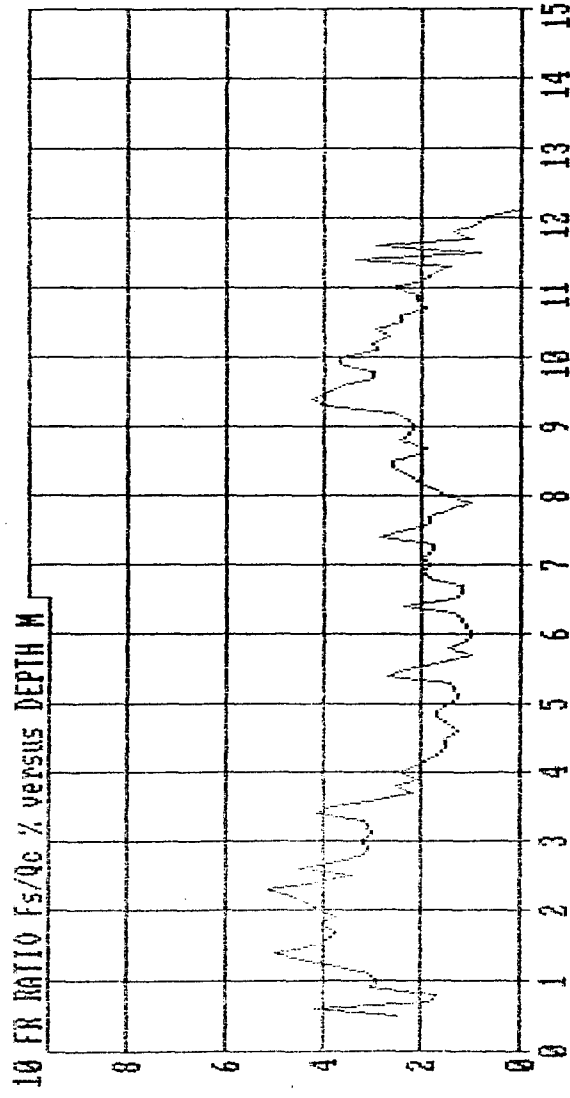
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CLIENT : WES
LOCATION : P-3/BFC-KC MO
JOB No. : DACH39-94-M-5062

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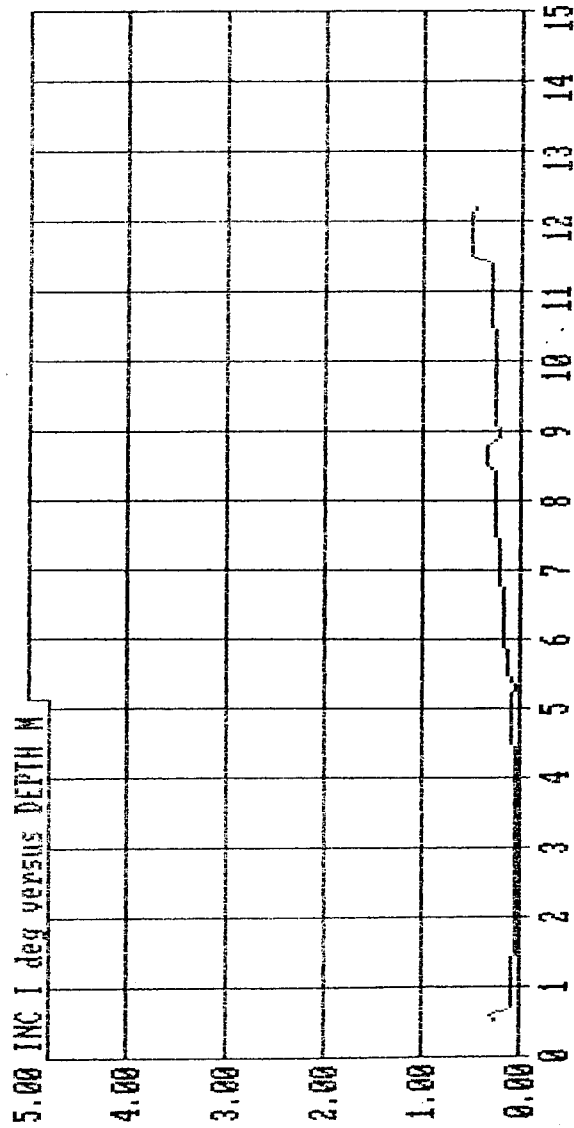
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CLIENT : WES
LOCATION : P-3/BFC-KC MO
JOB No. : DACW39-94-M-5062

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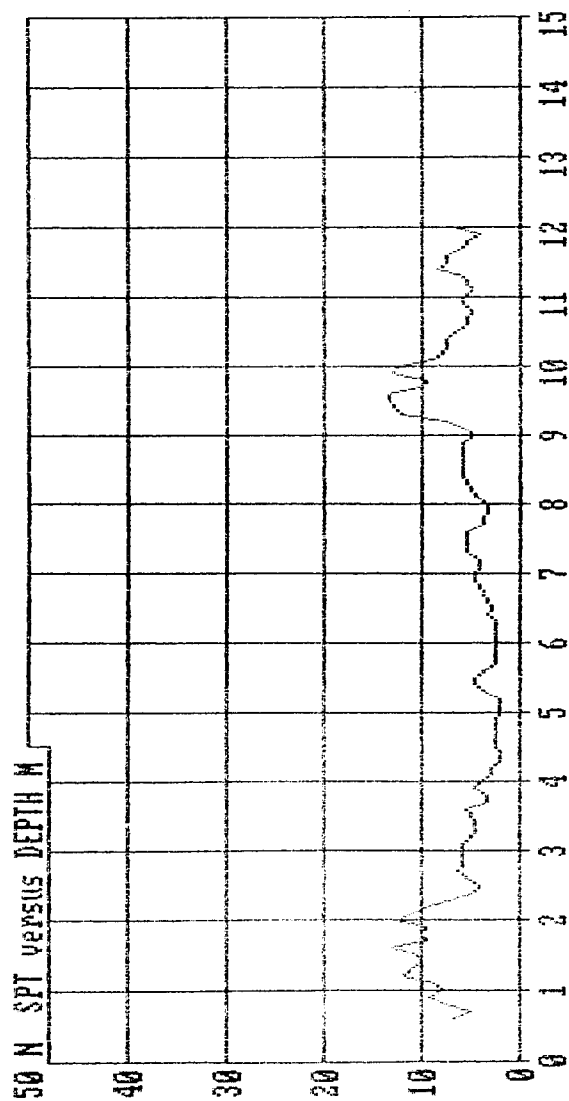
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OPERATOR : S.VAN LOCATION : P-3/BFC-KC MO
CLIENT : WES JOB No. : DACN39-94-M-5062

Vandehey Soil Exploration
40695 Nw Pacific Ave. Banks, Oregon. 97106 (503) 324 3261

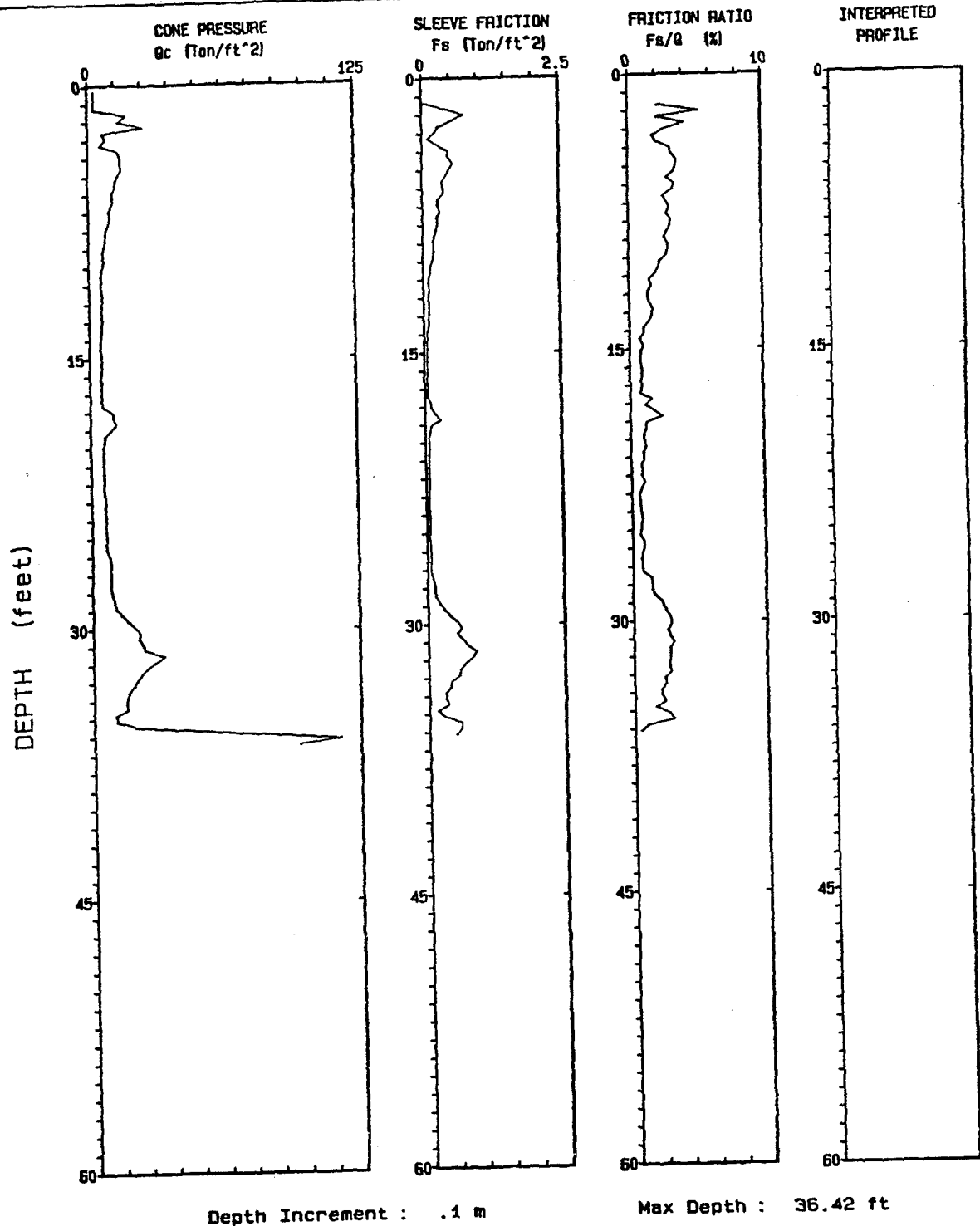


SOUNDING DATA IN FILE SND106 06-30-94 16:16
OPERATOR : S. VAN LOCATION : P-3/BFC-KC MO
CLIENT : WES JOB No. : DACW39-94-M-5062

Vandehey Soil Exploration
40695 Nw Pacific Ave. Banks, Oregon. 97106 (503) 324 3261



SCPT P-4



SOUNDING DATA IN FILE SND107 06-30-94 17:42

OPERATOR : S.VAN

LOCATION : P-4/BFC-KC MO

CLIENT : WES

JOB No. : DACW39-94-M-5062

Vandehey Soil Exploration

40695 Nw Pacific Ave. Banks, Oregon. 97106 (503) 324 3261

DEPTH meters	DEPTH feet	TIP Pc tsf	FRICTION Fs tsf	FE RATIO Fs/Qc %	INC I deg	INTERPRETED SOIL TYPE
0.10	0.3	2.9	-0.005	-0.30	0.0	?
0.20	0.7	3.0	-0.010	-0.33	0.0	?
0.30	1.0	3.0	-0.016	-0.33	0.0	?
0.40	1.3	2.8	-0.002	-0.07	0.1	sensitive fine grained
0.50	1.6	10.0	0.397	2.20	0.1	silty clay to clay
0.60	2.0	14.5	0.773	5.32	0.0	silty clay to clay
0.70	2.3	26.0	0.564	2.17	0.0	clayey silt to silty clay
0.80	2.6	6.8	0.287	4.25	0.0	silty clay to clay
0.90	3.0	8.1	0.216	2.67	0.0	clay
1.00	3.3	5.7	0.102	1.79	0.0	silty clay to clay
1.10	3.6	13.8	0.288	2.09	0.0	clayey silt to silty clay
1.20	3.9	15.3	0.473	3.09	0.0	clayey silt to silty clay
1.30	4.3	14.9	0.482	3.24	0.0	silty clay to clay
1.40	4.6	15.7	0.569	3.62	0.0	silty clay to clay
1.50	4.9	13.8	0.490	3.54	0.0	silty clay to clay
1.60	5.2	12.9	0.436	3.38	0.0	silty clay to clay
1.70	5.6	12.5	0.358	2.86	0.0	silty clay to clay
1.80	5.9	11.1	0.386	3.47	0.0	silty clay to clay
1.90	6.2	11.5	0.372	3.25	0.0	silty clay to clay
2.00	6.6	11.0	0.285	2.59	0.0	silty clay to clay
2.10	6.9	9.3	0.267	2.87	0.0	silty clay to clay
2.20	7.2	10.1	0.309	3.06	0.1	silty clay to clay
2.30	7.5	9.3	0.261	2.81	0.0	silty clay to clay
2.40	7.9	8.1	0.257	3.17	0.0	silty clay to clay
2.50	8.2	7.8	0.236	3.03	0.0	clay
2.60	8.5	7.4	0.211	2.84	0.0	silty clay to clay
2.70	8.9	6.9	0.182	2.63	0.0	silty clay to clay
2.80	9.2	6.4	0.186	2.92	0.0	clay
2.90	9.5	6.5	0.186	2.85	0.0	clay
3.00	9.8	6.6	0.184	2.76	0.0	clay
3.10	10.2	5.7	0.128	2.27	0.0	silty clay to clay
3.20	10.5	5.3	0.112	2.12	0.0	silty clay to clay
3.30	10.8	5.5	0.106	1.93	0.0	silty clay to clay
3.40	11.2	5.3	0.079	1.48	0.0	sensitive fine grained
3.50	11.5	6.0	0.099	1.65	0.0	sensitive fine grained
3.60	11.8	5.7	0.077	1.34	0.0	sensitive fine grained
3.70	12.1	5.5	0.077	1.40	0.0	sensitive fine grained
3.80	12.5	5.5	0.082	1.51	0.0	sensitive fine grained
3.90	12.8	5.7	0.098	1.72	0.0	sensitive fine grained
4.00	13.1	5.6	0.094	1.67	0.0	sensitive fine grained

Soil interpretation reference: Robertson & Campanella-1983, based on 60% hammer efficiency and .2 m sliding data average

DEPTH meters	DEPTH feet	TIP Qc tsf	FRICTION Fs tsf	FR RATIO Fs/Qc %	INC I deg	INTERPRETED SOIL TYPE
4.10	13.5	5.9	0.084	1.43	0.0	sensitive fine grained
4.20	13.8	5.0	0.050	0.99	0.0	sensitive fine grained
4.30	14.1	4.6	0.045	0.98	0.0	sensitive fine grained
4.40	14.4	4.6	0.032	0.70	0.0	sensitive fine grained
4.50	14.8	5.7	0.058	1.02	0.0	sensitive fine grained
4.60	15.1	5.6	0.040	0.75	0.0	sensitive fine grained
4.70	15.4	5.5	0.041	0.80	0.0	sensitive fine grained
4.80	15.7	5.5	0.044	0.79	0.0	sensitive fine grained
4.90	16.1	5.6	0.044	0.89	0.0	sensitive fine grained
5.00	16.4	5.9	0.045	0.95	0.0	sensitive fine grained
5.10	16.7	5.2	0.043	0.79	0.0	sensitive fine grained
5.20	17.1	5.1	0.043	0.81	0.0	sensitive fine grained
5.30	17.4	4.8	0.034	0.71	0.0	sensitive fine grained
5.40	17.7	6.1	0.037	1.59	0.0	sensitive fine grained
5.50	18.0	10.7	0.115	1.07	0.0	clayey silt to silty clay
5.60	18.4	10.7	0.164	1.72	0.0	clayey silt to silty clay
5.70	18.7	12.1	0.292	2.42	0.0	clayey silt to silty clay
5.80	19.0	9.4	0.105	1.12	0.1	clayey silt to silty clay
5.90	19.4	6.6	0.072	1.09	0.0	sensitive fine grained
6.00	19.7	6.0	0.059	0.96	0.0	sensitive fine grained
6.10	20.0	5.7	0.055	0.97	0.0	sensitive fine grained
6.20	20.3	6.0	0.068	1.13	0.0	sensitive fine grained
6.30	20.7	5.7	0.051	0.90	0.0	sensitive fine grained
6.40	21.0	5.6	0.057	1.02	0.0	sensitive fine grained
6.50	21.3	6.1	0.044	0.73	0.0	sensitive fine grained
6.60	21.7	5.6	0.045	0.80	0.0	sensitive fine grained
6.70	22.0	5.8	0.046	0.80	0.0	sensitive fine grained
6.80	22.3	6.1	0.059	0.97	0.0	sensitive fine grained
6.90	22.6	6.2	0.043	0.69	0.0	sensitive fine grained
7.00	23.0	6.5	0.037	0.56	0.0	sensitive fine grained
7.10	23.3	6.4	0.036	0.56	0.0	sensitive fine grained
7.20	23.6	6.2	0.039	0.62	0.0	sensitive fine grained
7.30	23.9	6.1	0.040	0.66	0.0	sensitive fine grained
7.40	24.3	5.2	0.046	0.70	0.0	sensitive fine grained
7.50	24.6	6.8	0.042	0.61	0.0	sensitive fine grained
7.60	24.9	6.7	0.039	0.58	0.0	sensitive fine grained
7.70	25.3	6.4	0.037	0.57	0.0	sensitive fine grained
7.80	25.6	6.8	0.059	0.86	0.0	sensitive fine grained
7.90	25.9	7.0	0.063	0.80	0.0	sensitive fine grained
8.00	26.2	8.5	0.057	0.67	0.0	sensitive fine grained
8.10	26.6	8.8	0.053	0.60	0.0	sensitive fine grained
8.20	26.9	8.5	0.056	0.69	0.0	sensitive fine grained
8.30	27.2	8.4	0.052	0.74	0.0	clayey silt to silty clay
8.40	27.6	8.4	0.113	1.35	0.0	clayey silt to silty clay
8.50	27.9	9.1	0.132	1.45	0.0	clayey silt to silty clay
8.60	28.2	9.6	0.139	1.44	0.0	clayey silt to silty clay
8.70	28.5	10.5	0.176	1.68	0.0	clayey silt to silty clay
8.80	28.9	11.3	0.239	2.12	0.0	clayey silt to silty clay
8.90	29.2	13.5	0.310	2.30	0.0	clayey silt to silty clay
9.00	29.5	16.0	0.410	2.55	0.0	clayey silt to silty clay

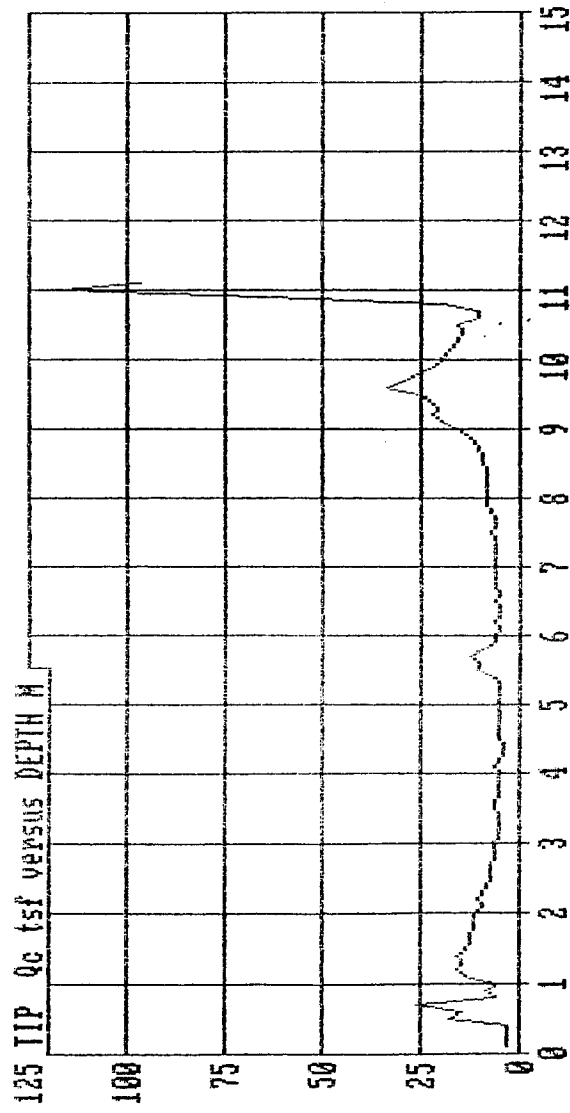
Soil interpretation reference: Robertson & Campanella-1983, based on 60% hammer efficiency and .2 m sliding data average

DEPTH meters	DEPTH feet	TIP Qc tsf	FRICTION Fs tsf	FR RATIO Fs/Qc %	INC I deg	INTERPRETED SOIL TYPE
9.10	29.9	19.5	0.563	2.78	0.0	clayey silt to silty clay
9.20	30.2	22.2	0.614	2.77	0.0	clayey silt to silty clay
9.30	30.5	21.3	0.531	2.50	0.0	clayey silt to silty clay
9.40	30.8	23.1	0.643	2.78	0.0	clayey silt to silty clay
9.50	31.2	24.6	0.735	2.99	0.0	clayey silt to silty clay
9.60	31.5	33.5	0.887	2.65	0.0	sandy silt to clayey silt
9.70	31.8	29.6	0.801	2.76	0.0	sandy silt to clayey silt
9.80	32.2	25.7	0.678	2.64	0.0	clayey silt to silty clay
9.90	32.5	22.4	0.582	2.60	0.0	clayey silt to silty clay
10.00	32.8	20.3	0.556	2.76	0.0	clayey silt to silty clay
10.10	33.1	18.5	0.417	2.26	0.0	clayey silt to silty clay
10.20	33.5	16.4	0.350	2.37	0.0	clayey silt to silty clay
10.30	33.8	15.1	0.300	1.98	0.0	clayey silt to silty clay
10.40	34.1	14.8	0.293	1.98	0.0	clayey silt to silty clay
10.50	34.4	15.4	0.350	2.28	0.0	clayey silt to silty clay
10.60	34.8	10.0	0.155	1.57	0.0	clayey silt to silty clay
10.70	35.1	10.7	0.278	2.50	0.0	clayey silt to silty clay
10.80	35.4	20.2	0.598	2.95	0.0	sandy silt to clayey silt
10.90	35.8	64.8	0.585	0.90	0.1	sand to silty sand
11.00	36.1	116.2	0.491	0.42	0.1	?
11.10	36.4	96.8	?	?	0.1	?

Soil interpretation reference: Robertson & Campanella-1983, based on 60% hammer efficiency and .2 m sliding data average

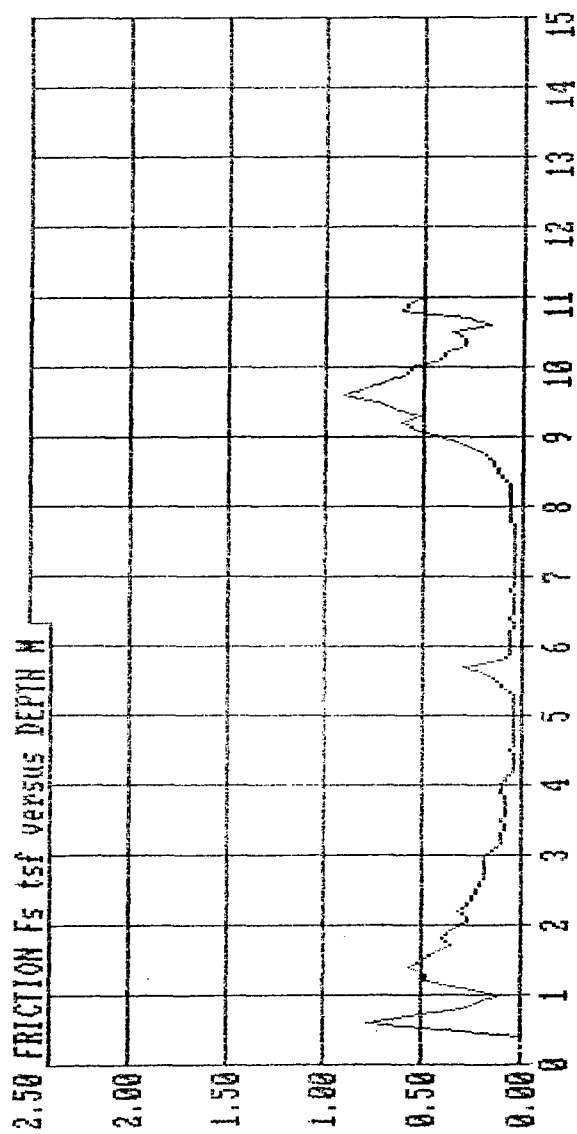
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OPERATOR : S. VAN LOCATION : P-4/BFC-KC MO
CLIENT : WES JOB No. : DACH39-94-M-5062

Vandehey Soil Exploration
40695 NW Pacific Ave. Banks, Oregon. 97106 (503) 324 3261



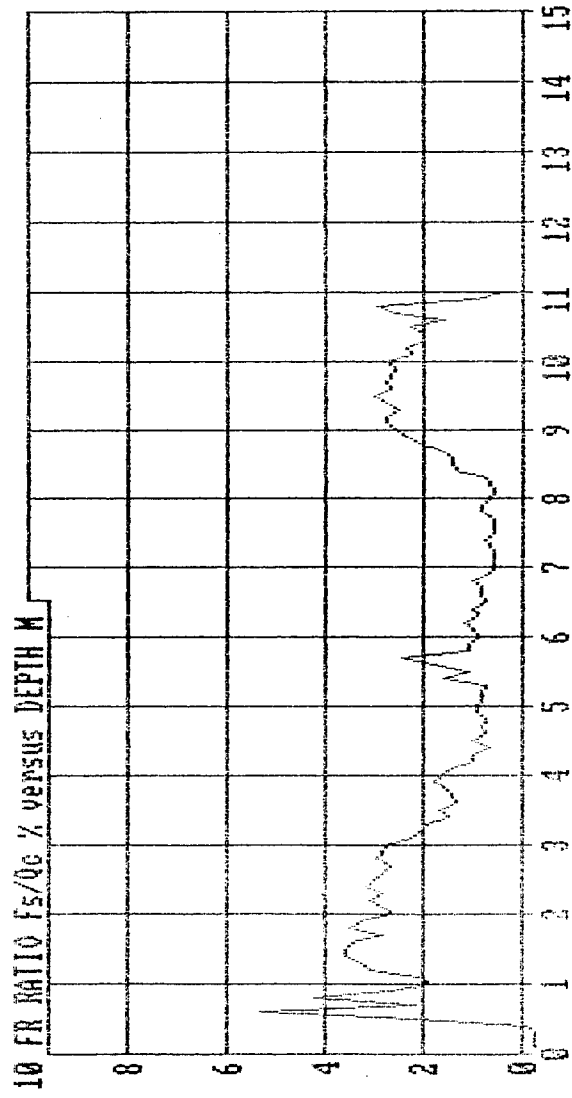
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Vandehey Soil Exploration
40695 NW Pacific Ave. Banks, Oregon. 97106 (503) 324 3261

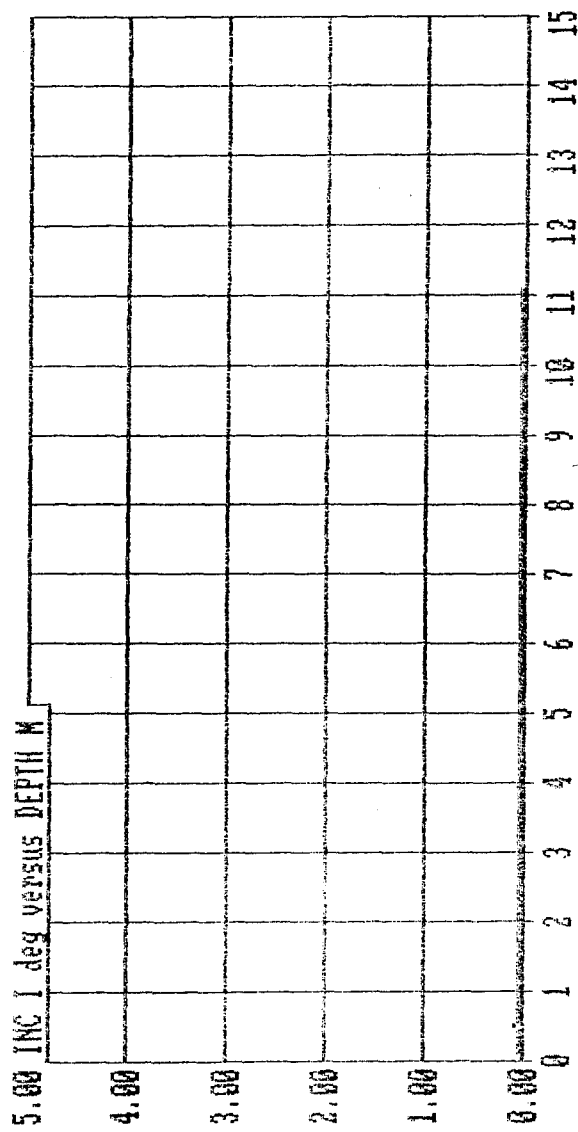


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OPERATOR : S. UNW LOCATION : P-4/BFC-KC H0
CLIENT : WES JOB No. : DACM39-94-M-5062

Vandehay Soil Exploration
40695 Nw Pacific Ave. Banks, Oregon. 97106 (503) 324 3261

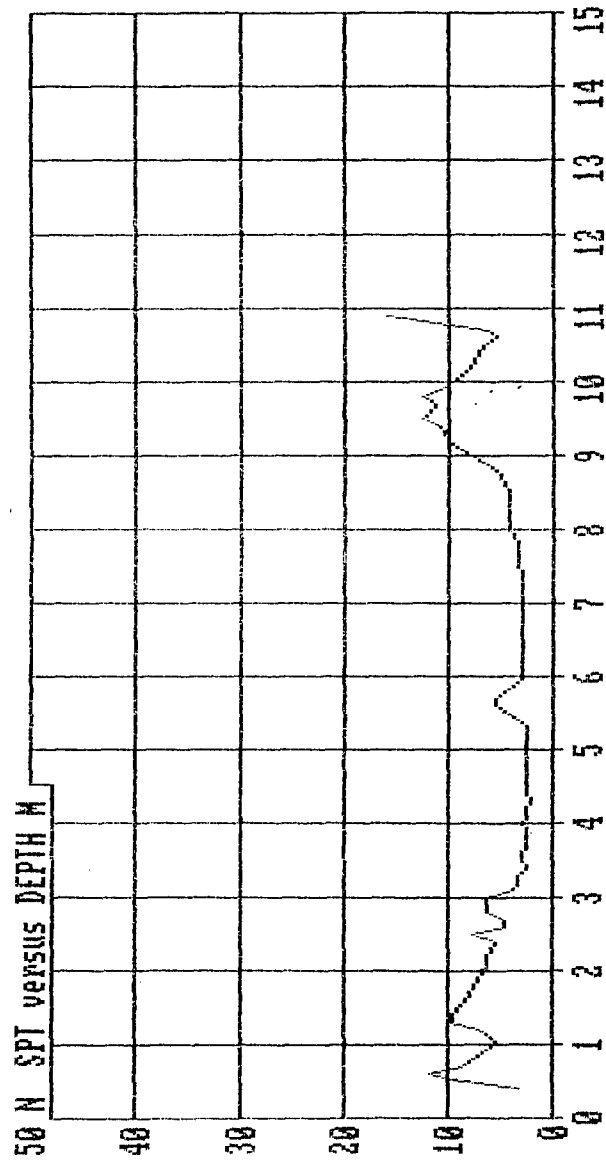


Vanderhey Soil Exploration
48695 NW Pacific Ave., Banks, Oregon, 97106 (503) 324 3261



SOUNDING DATA IN FILE SND107 06-30-94 17:42
OPERATOR : S.VAN
LOCATION : P-4/BFC-KC MO
CLIENT : WES
JOB No. : DACH39-94-M-5062

Vandehey Soil Exploration
40695 Nw Pacific Ave. Banks, Oregon. 97106 (503) 324 3261



SCPT P-5

Vandehey Soil Expl.

Operator : S.VAN

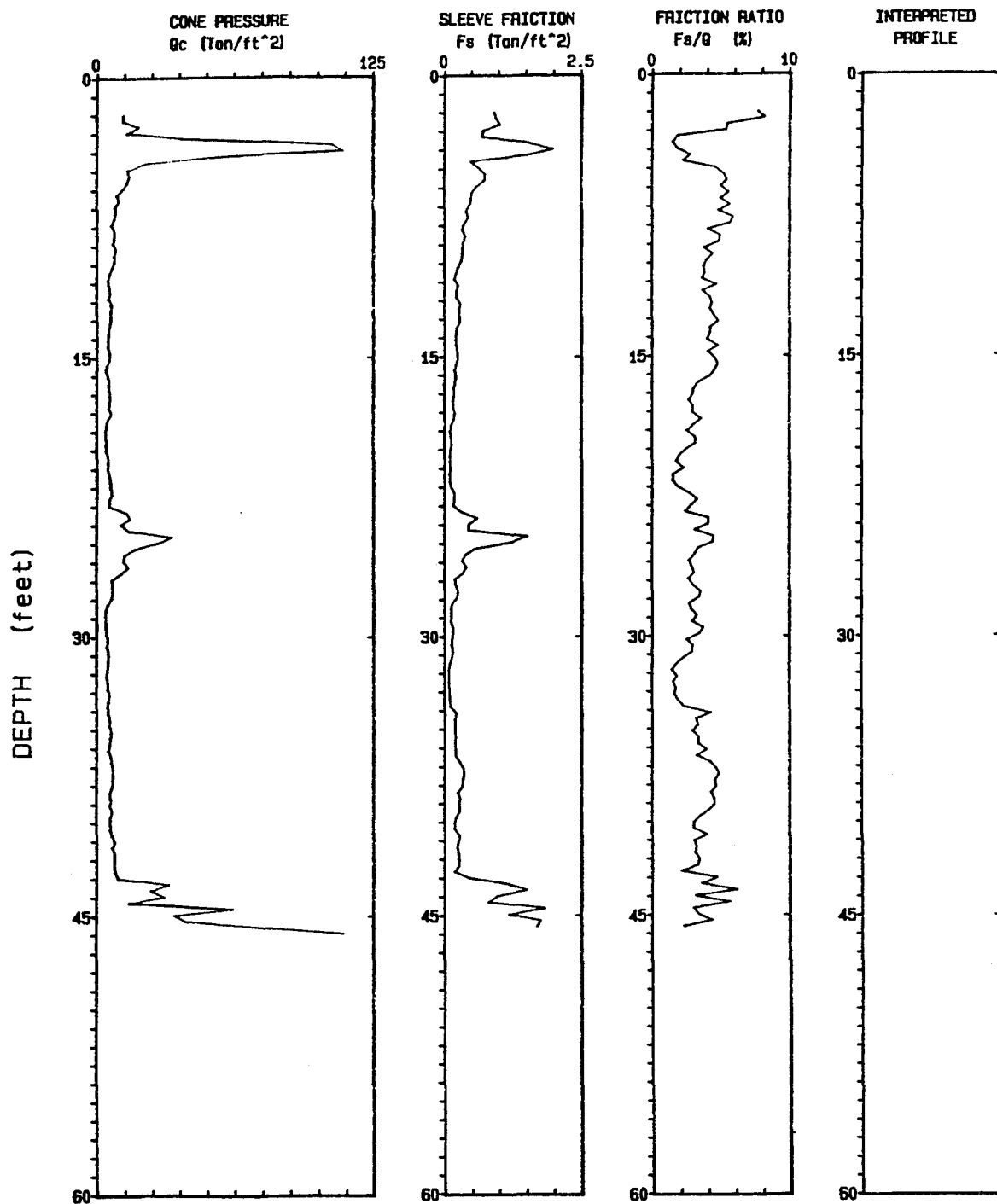
Sounding : SND-92 Pg 1 / 1

Client : WES

CPT Date : 06-27-94 15:58

Location : P5/BFC-KC MO

Job No. : DACW39-94-M-5062



Depth Increment : .1 m

Max Depth : 45.93 ft

SOUNDING DATA IN FILE SND-92 06-27-94 15:58

OPERATOR : S.VAN

LOCATION : PS/BFC-KC MO

CLIENT : WES

JOB No. : DACW39-94-M-5062

Vandehey Soil Exploration

40685 Nw Pacific Ave. Banks, Oregon. 97106 (503) 324 3261

DEPTH meters	DEPTH feet	TIP Qc tsf	FRICTION Fs tsf	FR RATIO Fs/Qc %	INC I deg	INTERPRETED SOIL TYPE
0.60	2.0	11.9	0.917	7.70	0.1	?
0.70	2.3	11.7	0.957	8.15	0.1	clay
0.80	2.6	18.9	1.022	5.41	0.1	clay
0.90	3.0	13.3	0.711	5.33	0.1	silty clay to clay
1.00	3.3	38.4	0.690	1.80	0.1	silty sand to sandy silt
1.10	3.6	106.3	1.547	1.46	0.1	silty sand to sandy silt
1.20	3.9	111.2	1.989	1.79	0.1	silty sand to sandy silt
1.30	4.3	54.9	1.508	2.75	0.1	sandy silt to clayey silt
1.40	4.6	21.8	0.483	2.22	0.1	clayey silt to silty clay
1.50	4.9	13.7	0.629	4.58	0.1	silty clay to clay
1.60	5.2	14.5	0.754	5.21	0.1	clay
1.70	5.6	13.5	0.736	5.45	0.1	clay
1.80	5.9	11.7	0.581	4.97	0.1	clay
1.90	6.2	8.9	0.497	5.57	0.1	clay
2.00	6.6	9.9	0.489	4.96	0.1	clay
2.10	6.9	8.1	0.458	5.68	0.1	clay
2.20	7.2	8.0	0.385	4.80	0.1	clay
2.30	7.5	7.4	0.435	5.87	0.1	clay
2.40	7.9	6.3	0.352	5.61	0.1	clay
2.50	8.2	7.9	0.319	4.01	0.0	clay
2.60	8.5	7.8	0.362	4.93	0.0	clay
2.70	8.9	7.1	0.340	4.81	0.0	clay
2.80	9.2	8.5	0.316	3.74	0.0	clay
2.90	9.5	7.5	0.329	4.40	0.0	clay
3.00	9.8	7.7	0.301	3.92	0.0	clay
3.10	10.2	6.6	0.245	3.70	0.0	clay
3.20	10.5	5.5	0.208	3.82	0.0	clay
3.30	10.8	4.8	0.175	3.61	0.0	clay
3.40	11.2	5.4	0.255	4.70	0.0	clay
3.50	11.5	6.0	0.218	3.64	0.0	clay
3.60	11.8	5.2	0.217	4.19	0.0	clay
3.70	12.1	6.8	0.298	4.36	0.0	clay
3.80	12.5	6.2	0.262	4.19	0.0	clay
3.90	12.8	6.1	0.274	4.51	0.0	clay
4.00	13.1	5.9	0.280	4.77	0.0	clay
4.10	13.5	5.2	0.216	4.18	0.0	clay
4.20	13.8	5.0	0.206	4.15	0.0	clay
4.30	14.1	5.0	0.197	3.95	0.0	clay
4.40	14.4	4.6	0.221	4.78	0.0	clay
4.50	14.8	5.9	0.237	4.01	0.0	clay

Soil interpretation reference: Robertson & Campanella-1983, based on 60% hammer efficiency and .2 m sliding data average

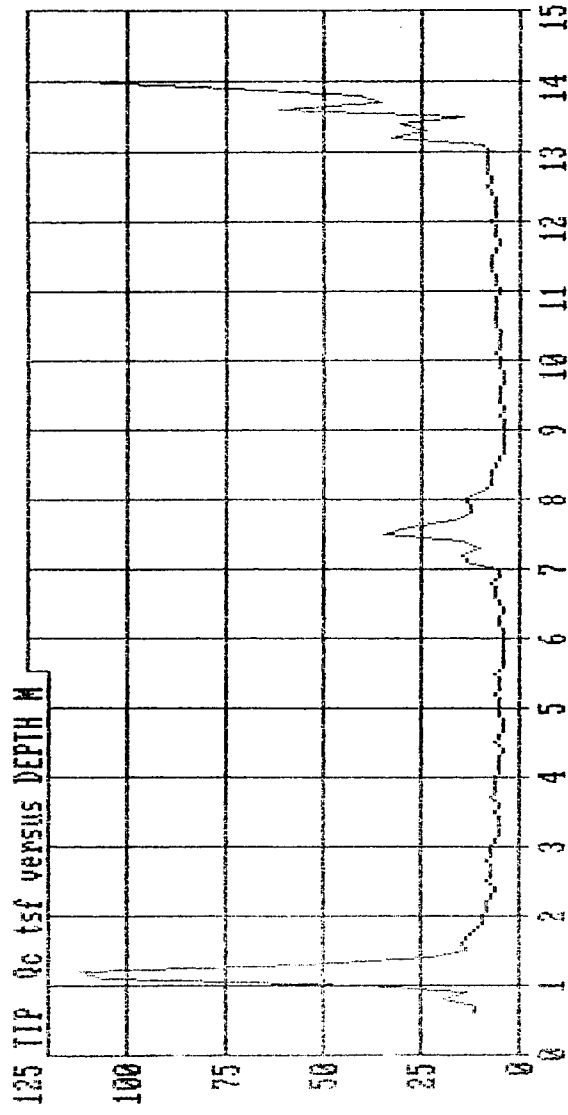
DEPTH meters	DEPTH feet	TIP Qc tst	FRICTION Fs tst	FR RATIO Fs/Qc %	INC I deg	INTERPRETED SOIL TYPE
4.60	15.1	5.5	0.248	4.54	0.0	clay
4.70	15.4	4.3	0.206	4.77	0.0	clay
4.80	15.7	4.0	0.181	4.52	0.0	clay
4.90	16.1	5.2	0.214	4.15	0.0	clay
5.00	16.4	5.6	0.184	3.30	0.0	clay
5.10	16.7	5.4	0.155	2.97	0.0	clay
5.20	17.1	6.1	0.174	2.87	0.0	clay
5.30	17.4	5.7	0.148	2.62	0.0	clay
5.40	17.7	5.3	0.155	2.97	0.0	clay
5.50	18.0	6.5	0.192	2.94	0.0	clay
5.60	18.4	4.6	0.163	3.56	0.0	clay
5.70	18.7	3.9	0.116	2.95	0.0	clay
5.80	19.0	3.8	0.095	2.50	0.0	clay
5.90	19.4	3.9	0.121	3.13	0.0	clay
6.00	19.7	4.3	0.135	3.13	0.0	clay
6.10	20.0	4.2	0.100	2.40	0.0	clay
6.20	20.3	5.1	0.098	1.92	0.0	silty clay to clay
6.30	20.7	5.1	0.086	1.69	0.0	silty clay to clay
6.40	21.0	4.7	0.105	2.26	0.0	silty clay to clay
6.50	21.3	5.6	0.083	1.48	0.0	sensitive fine grained
6.60	21.7	6.2	0.090	1.45	0.0	sensitive fine grained
6.70	22.0	6.3	0.117	1.84	0.0	silty clay to clay
6.80	22.3	6.9	0.182	2.65	0.0	silty clay to clay
6.90	22.6	5.4	0.177	3.27	0.0	clay
7.00	23.0	5.5	0.154	2.77	0.0	silty clay to clay
7.10	23.3	13.3	0.315	2.37	0.0	silty clay to clay
7.20	23.6	14.9	0.609	4.09	0.0	silty clay to clay
7.30	23.9	10.8	0.437	4.05	0.0	clay
7.40	24.3	14.3	0.437	3.06	0.0	silty clay to clay
7.50	24.6	34.0	1.525	4.45	0.0	silty clay to clay
7.60	24.9	27.9	1.216	4.36	0.0	silty clay to clay
7.70	25.3	16.8	0.551	3.27	0.0	silty clay to clay
7.80	25.6	12.3	0.371	3.02	0.0	silty clay to clay
7.90	25.9	12.0	0.318	2.65	0.0	silty clay to clay
8.00	26.2	14.2	0.408	2.88	0.0	silty clay to clay
8.10	26.6	10.7	0.325	3.04	0.0	silty clay to clay
8.20	26.9	6.9	0.180	2.60	0.0	silty clay to clay
8.30	27.2	7.2	0.216	2.98	0.0	clay
8.40	27.6	7.0	0.245	3.49	0.0	clay
8.50	27.9	6.5	0.216	3.33	0.0	clay
8.60	28.2	4.8	0.125	2.64	0.0	clay
8.70	28.5	3.7	0.106	2.84	0.0	clay
8.80	28.9	3.7	0.119	3.23	0.0	clay
8.90	29.2	3.9	0.111	2.86	0.0	clay
9.00	29.5	4.2	0.155	3.71	0.0	clay
9.10	29.9	4.4	0.149	3.40	0.0	clay
9.20	30.2	5.0	0.125	2.49	0.0	clay
9.30	30.5	4.3	0.126	2.94	0.0	clay
9.40	30.8	5.3	0.152	2.88	0.0	clay
9.50	31.2	5.3	0.117	2.21	0.0	silty clay to clay

DEPTH	DEPTH	TIP	FRICTION	FR RATIO	INC	INTERPRETED
meters	feet	Qc tsf	Fs tsf	Fs/Qc %	I deg	SOIL TYPE
9.60	31.5	5.0	0.085	1.71	0.0	silty clay to clay
9.70	31.8	4.7	0.065	1.40	0.0	sensitive fine grained
9.80	32.2	4.3	0.076	1.79	0.0	sensitive fine grained
9.90	32.5	5.0	0.075	1.51	0.0	sensitive fine grained
10.00	32.8	5.1	0.068	1.71	0.0	sensitive fine grained
10.10	33.1	5.9	0.083	1.58	0.0	silty clay to clay
10.20	33.5	5.3	0.101	1.92	0.0	silty clay to clay
10.30	33.8	4.8	0.112	2.31	0.0	clay
10.40	34.1	5.3	0.116	4.26	0.0	clay
10.50	34.4	5.8	0.181	3.12	0.0	clay
10.60	34.8	5.8	0.153	3.31	0.0	clay
10.70	35.1	6.6	0.190	2.86	0.0	clay
10.80	35.4	6.0	0.202	3.39	0.0	clay
10.90	35.8	5.7	0.188	3.28	0.0	clay
11.00	36.1	5.2	0.234	3.95	0.0	clay
11.10	36.4	6.5	0.208	3.21	0.0	clay
11.20	36.7	6.7	0.283	4.21	0.0	clay
11.30	37.1	7.5	0.345	4.63	0.0	clay
11.40	37.4	7.5	0.363	4.86	0.0	clay
11.50	37.7	7.3	0.330	4.52	0.0	clay
11.60	38.1	6.8	0.315	4.66	0.0	clay
11.70	38.4	5.6	0.238	4.24	0.0	clay
11.80	38.7	6.5	0.291	4.51	0.0	clay
11.90	39.0	5.7	0.251	4.54	0.0	clay
12.00	39.4	7.0	0.283	4.05	0.0	clay
12.10	39.7	6.1	0.209	3.44	0.0	clay
12.20	40.0	6.0	0.175	2.99	0.0	clay
12.30	40.4	6.3	0.190	3.00	0.0	clay
12.40	40.7	6.9	0.276	4.00	0.0	clay
12.50	41.0	8.3	0.248	3.00	0.0	clay
12.60	41.3	6.9	0.222	3.20	0.0	clay
12.70	41.7	8.3	0.255	3.05	0.0	clay
12.80	42.0	7.8	0.265	3.44	0.0	clay
12.90	42.3	8.0	0.259	3.25	0.0	silty clay to clay
13.00	42.7	8.5	0.180	2.12	0.0	silty clay to clay
13.10	43.0	9.7	0.460	4.73	0.0	silty clay to clay
13.20	43.3	32.7	1.179	3.61	0.0	silty clay to clay
13.30	43.6	24.3	1.509	6.20	0.0	clay
13.40	44.0	30.5	0.961	3.14	0.0	silty clay to clay
13.50	44.3	14.3	0.808	5.66	0.0	clayey silt to silty clay
13.60	44.6	62.0	1.846	2.98	0.0	clayey silt to silty clay
13.70	44.9	35.4	1.192	3.37	0.0	clayey silt to silty clay
13.80	45.3	40.3	1.764	4.37	0.0	clayey silt to silty clay
13.90	45.6	73.6	1.690	2.30	0.0	?
14.00	45.9	111.3	?	?	0.0	?

Soil interpretation reference: Robertson & Campanella-1983, based on 60% hammer efficiency and .2 * sliding data average

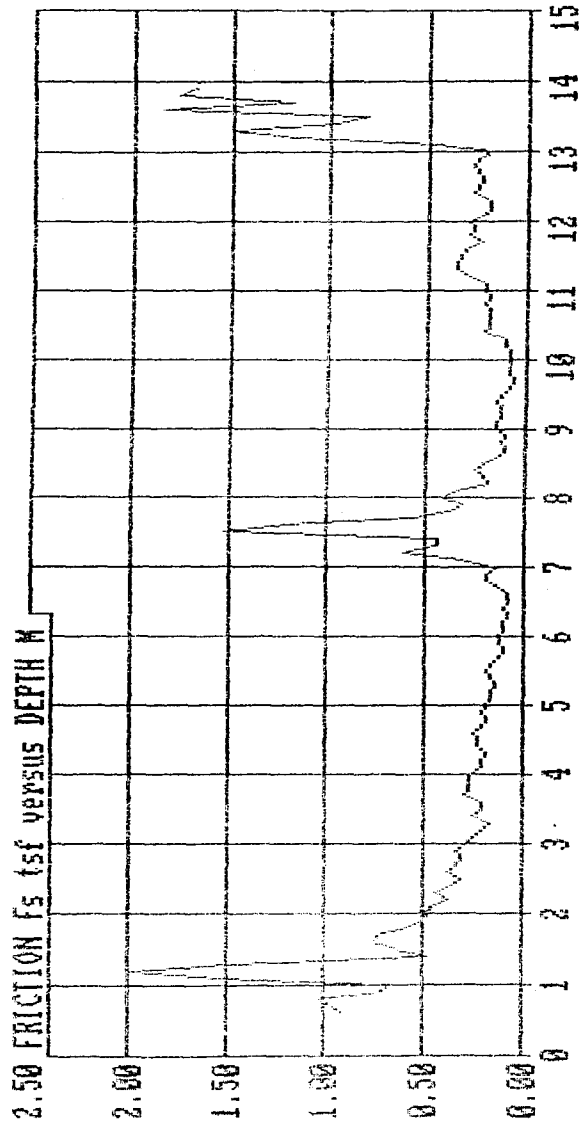
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OPERATOR : S.VAN
CLIENT : WES
LOCATION : P5/BFC-KC MO
JOB No. : DACH39-94-M-5062

Vandebey Soil Exploration
40695 NW Pacific Ave. Banks, Oregon. 97106 (503) 324 3261



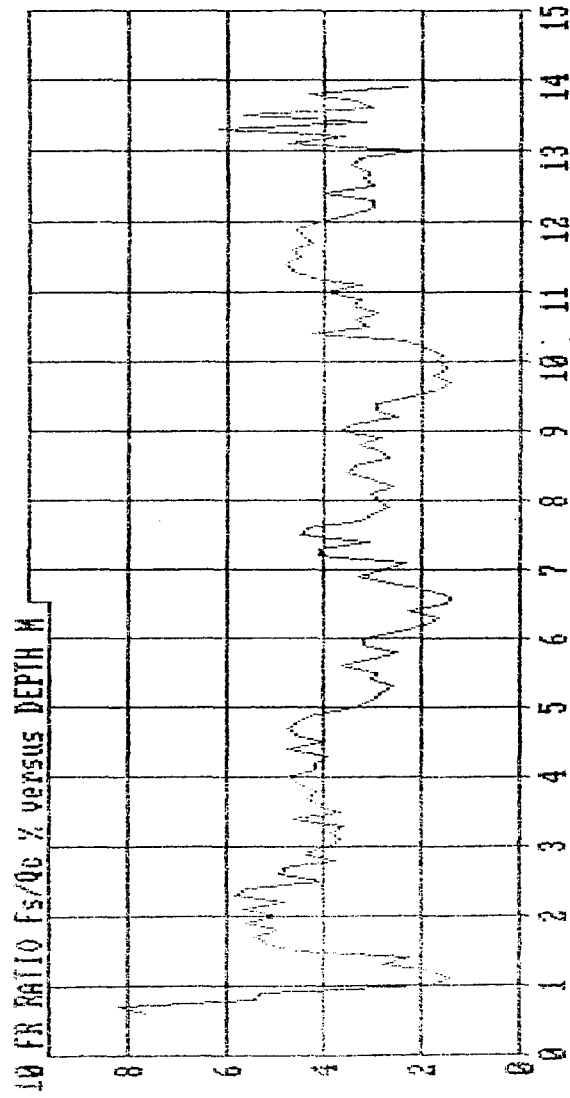
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OPERATOR : S. VAN LOCATION : P5/BFC-KC MO
CLIENT : WES JOB No. : DACH39-94-M-5062

Vandehey Soil Exploration
40695 NW Pacific Ave. Banks, Oregon. 97106 (503) 324 3261



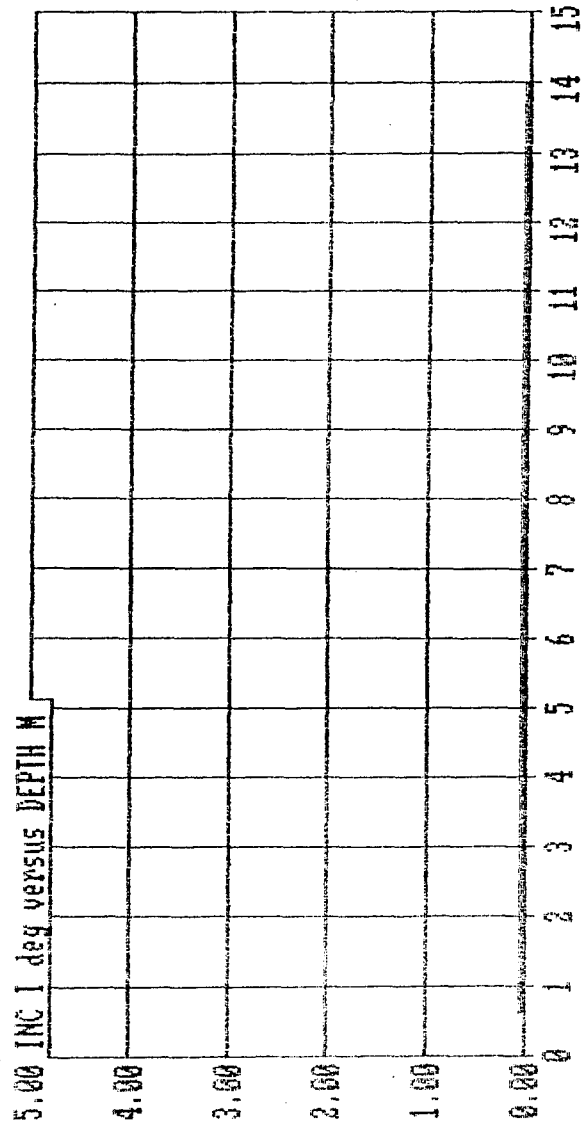
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OPERATOR : S. VAN LOCATION : P5/BFC-KC MO
CLIENT : HES JOB No. : DACN39-94-M-5862

Vandehey Soil Exploration
40695 NW Pacific Ave. Banks, Oregon. 97106 (503) 324 3261



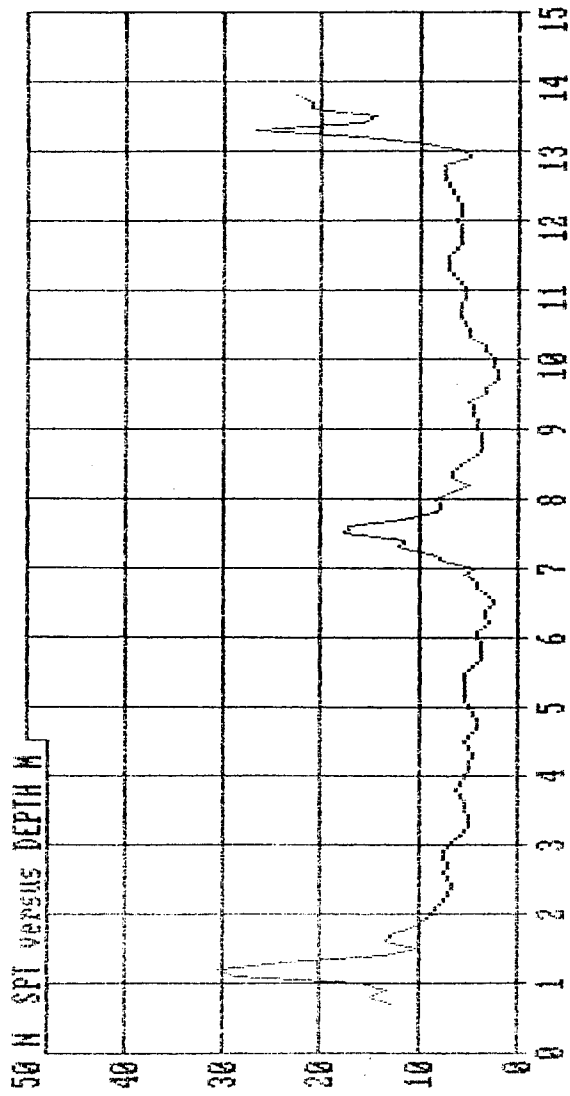
CLIENT : RES
JOB No. : DACH39-94-M-5062

40695 NW Pacific Ave., Banks, Oregon. 97106 (503) 324 3261



SOUNDING DATA IN FILE SND-92 06-27-94 15:58
OPERATOR : S.VAN
CLIENT : WES
LOCATION : P5/BFC-KC MO
JOB No. : DACW39-94-M-5062

Vandehey Soil Exploration
40695 Hw Pacific Ave. Banks, Oregon. 97106 (503) 324 3261



SCPT P-6

Vandehey Soil Expl.

Operator : S.VAN

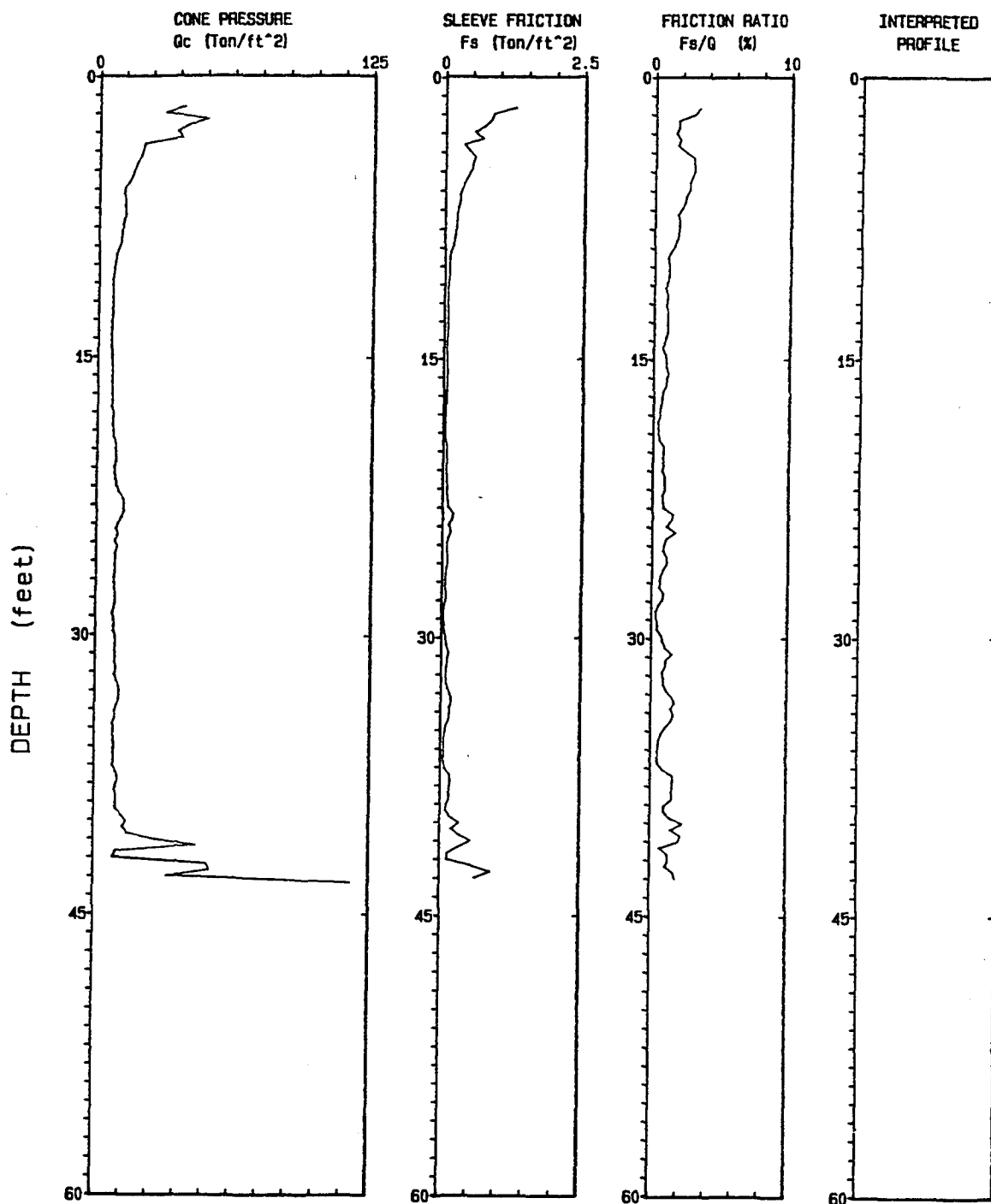
Sounding : SND100 Pg 1 / 1

Client : WES

CPT Date : 06-29-94 15:55

Location : P-6A/BFC-KC MO

Job No. : DACW39-94-M-5062



Depth Increment : .1 m

Max Depth : 43.31 ft

SOUNDING DATA IN FILE SNO100 06-29-94 15:55

OPERATOR : S.VAN

LOCATION : P-6A/BFC-KC MO

CLIENT : WES

JOB No. : DACW39-94-M-5062

Vandehey Soil Exploration

40695 Nw Pacific Ave. Banks, Oregon. 97106 (503) 324 3261

DEPTH	DEPTH	TIP	FRICTION	FP RATIO	INC	INTERPRETED
meters	feet	Qc tsf	Fs tsf	Fs/Qc %	deg	SOIL TYPE
0.50	1.6	39.2	1.258	3.21	0.1	?
0.60	2.0	30.6	0.861	2.81	0.1	sandy silt to clayey silt
0.70	2.3	49.8	0.812	1.63	0.1	sandy silt to clayey silt
0.80	2.6	40.5	0.694	1.71	0.1	silty sand to sandy silt
0.90	3.0	35.8	0.522	1.46	0.1	sandy silt to clayey silt
1.00	3.3	38.0	0.682	1.79	0.1	sandy silt to clayey silt
1.10	3.6	20.6	0.328	1.59	0.1	sandy silt to clayey silt
1.20	3.9	19.7	0.434	2.20	0.1	clayey silt to silty clay
1.30	4.3	18.8	0.537	2.85	0.1	clayey silt to silty clay
1.40	4.6	17.1	0.479	2.80	0.1	clayey silt to silty clay
1.50	4.9	16.0	0.467	2.92	0.1	clayey silt to silty clay
1.60	5.2	15.2	0.409	2.69	0.1	clayey silt to silty clay
1.70	5.6	13.7	0.344	2.50	0.1	clayey silt to silty clay
1.80	5.9	11.6	0.298	2.56	0.1	clayey silt to silty clay
1.90	6.2	11.3	0.255	2.25	0.1	clayey silt to silty clay
2.00	6.6	12.1	0.261	2.16	0.1	clayey silt to silty clay
2.10	6.9	11.9	0.231	1.94	0.1	clayey silt to silty clay
2.20	7.2	12.4	0.203	1.64	0.1	clayey silt to silty clay
2.30	7.5	11.6	0.211	1.82	0.1	clayey silt to silty clay
2.40	7.9	10.9	0.192	1.76	0.1	clayey silt to silty clay
2.50	8.2	10.7	0.188	1.76	0.1	clayey silt to silty clay
2.60	8.5	10.4	0.170	1.64	0.1	clayey silt to silty clay
2.70	8.9	9.8	0.141	1.43	0.1	clayey silt to silty clay
2.80	9.2	8.7	0.099	1.13	0.1	clayey silt to silty clay
2.90	9.5	7.8	0.071	0.91	0.1	clayey silt to silty clay
3.00	9.8	7.3	0.077	1.05	0.1	sensitive fine grained
3.10	10.2	6.8	0.072	1.05	0.1	sensitive fine grained
3.20	10.5	6.7	0.071	1.05	0.1	sensitive fine grained
3.30	10.8	6.3	0.056	0.89	0.1	sensitive fine grained
3.40	11.2	6.1	0.046	0.79	0.1	sensitive fine grained
3.50	11.5	6.8	0.066	0.97	0.0	sensitive fine grained
3.60	11.8	6.4	0.062	0.97	0.0	sensitive fine grained
3.70	12.1	6.6	0.058	0.87	0.0	sensitive fine grained
3.80	12.5	6.4	0.065	1.01	0.0	sensitive fine grained
3.90	12.8	6.4	0.063	0.98	0.0	sensitive fine grained
4.00	13.1	5.8	0.057	0.97	0.0	sensitive fine grained
4.10	13.5	6.2	0.062	1.01	0.0	sensitive fine grained
4.20	13.8	5.7	0.048	0.84	0.0	sensitive fine grained
4.30	14.1	5.9	0.041	0.70	0.0	sensitive fine grained
4.40	14.4	6.0	0.038	0.64	0.0	sensitive fine grained

Soil interpretation reference: Robertson & Campanella-1983, based on 60% hammer efficiency and .2 m sliding data average

DEPTH meters	DEPTH feet	TIP Qc tsf	FRICTION Fs tsf	FR RATIO Fs/Qc %	INC I deg	INTERPRETED SOIL TYPE
4.50	14.8	6.7	0.059	0.89	0.0	sensitive fine grained
4.60	15.1	6.6	0.062	0.94	0.0	sensitive fine grained
4.70	15.4	6.8	0.064	0.95	0.0	sensitive fine grained
4.80	15.7	6.7	0.075	1.11	0.0	sensitive fine grained
4.90	16.1	6.8	0.063	0.92	0.0	sensitive fine grained
5.00	16.4	6.6	0.061	0.91	0.0	sensitive fine grained
5.10	16.7	6.4	0.041	0.63	0.0	sensitive fine grained
5.20	17.1	6.3	0.035	0.56	0.0	sensitive fine grained
5.30	17.4	6.7	0.037	0.55	0.0	sensitive fine grained
5.40	17.7	6.4	0.025	0.45	0.0	sensitive fine grained
5.50	18.0	7.4	0.034	0.46	0.0	sensitive fine grained
5.60	18.4	7.0	0.021	0.30	0.0	sensitive fine grained
5.70	18.7	6.8	0.024	0.35	0.0	sensitive fine grained
5.80	19.0	7.4	0.026	0.35	0.0	sensitive fine grained
5.90	19.4	7.5	0.034	0.46	0.0	sensitive fine grained
6.00	19.7	8.5	0.066	0.78	0.0	sensitive fine grained
6.10	20.0	8.5	0.062	0.73	0.0	clayey silt to silty clay
6.20	20.3	8.7	0.058	0.67	0.0	clayey silt to silty clay
6.30	20.7	8.8	0.071	0.81	0.0	clayey silt to silty clay
6.40	21.0	8.2	0.054	0.66	0.0	sensitive fine grained
6.50	21.3	9.2	0.074	0.91	0.0	clayey silt to silty clay
6.60	21.7	8.8	0.075	0.85	0.0	clayey silt to silty clay
6.70	22.0	9.3	0.086	0.92	0.0	clayey silt to silty clay
6.80	22.3	10.4	0.070	0.67	0.0	sandy silt to clayey silt
6.90	22.6	12.4	0.093	0.75	0.0	sandy silt to clayey silt
7.00	23.0	12.7	0.105	0.83	0.0	sandy silt to clayey silt
7.10	23.3	12.4	0.187	1.51	0.0	clayey silt to silty clay
7.20	23.6	11.3	0.152	1.35	0.0	clayey silt to silty clay
7.30	23.9	10.0	0.105	1.04	0.0	clayey silt to silty clay
7.40	24.3	8.9	0.155	1.73	0.0	clayey silt to silty clay
7.50	24.6	9.9	0.098	0.99	0.0	clayey silt to silty clay
7.60	24.9	8.3	0.070	0.84	0.0	clayey silt to silty clay
7.70	25.3	9.8	0.076	0.78	0.0	clayey silt to silty clay
7.80	25.6	8.5	0.090	1.05	0.0	clayey silt to silty clay
7.90	25.9	8.8	0.096	1.10	0.0	clayey silt to silty clay
8.00	26.2	8.5	0.068	0.80	0.0	clayey silt to silty clay
8.10	26.6	8.5	0.050	0.59	0.0	sensitive fine grained
8.20	26.9	8.2	0.043	0.53	0.0	sensitive fine grained
8.30	27.2	8.2	0.046	0.56	0.0	sensitive fine grained
8.40	27.6	8.8	0.076	0.87	0.0	clayey silt to silty clay
8.50	27.9	9.3	0.072	0.77	0.0	clayey silt to silty clay
8.60	28.2	9.0	0.039	0.44	0.0	sensitive fine grained
8.70	28.5	8.3	0.021	0.25	0.0	sensitive fine grained
8.80	28.9	7.5	0.022	0.30	0.0	sensitive fine grained
8.90	29.2	8.5	0.035	0.42	0.0	sensitive fine grained
9.00	29.5	8.1	0.033	0.41	0.0	sensitive fine grained
9.10	29.9	8.5	0.062	0.73	0.0	sensitive fine grained
9.20	30.2	9.4	0.078	0.83	0.0	clayey silt to silty clay
9.30	30.5	9.1	0.094	1.03	0.0	clayey silt to silty clay
9.40	30.8	8.8	0.136	1.54	0.0	clayey silt to silty clay

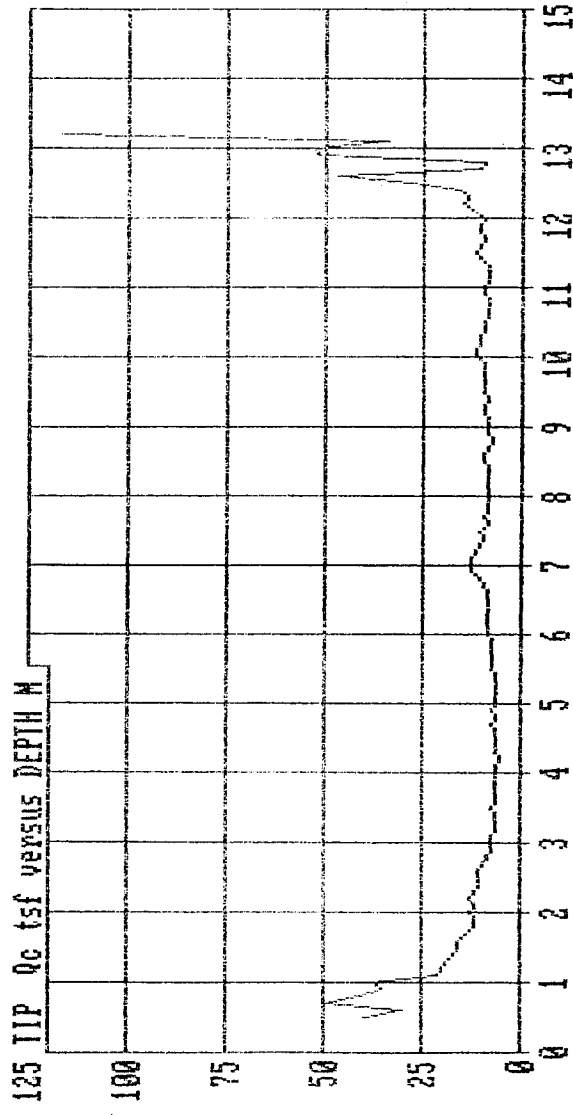
Soil interpretation reference: Robertson & Campanella-1983, based on 60% hammer efficiency and .2 m sliding data average

DEPTH meters	DEPTH feet	TIP Qc tsf	FRICTION Fs tsf	FR RATIO Fs/Qc %	INC I deg	INTERPRETED SOIL TYPE
9.50	31.2	9.2	0.055	1.03	0.0	clayey silt to silty clay
9.60	31.5	8.9	0.068	0.99	0.0	clayey silt to silty clay
9.70	31.8	9.6	0.073	0.76	0.0	clayey silt to silty clay
9.80	32.2	8.9	0.076	0.88	0.0	clayey silt to silty clay
9.90	32.5	9.9	0.088	0.89	0.0	clayey silt to silty clay
10.00	32.8	11.0	0.122	1.11	0.0	clayey silt to silty clay
10.10	33.1	11.2	0.159	1.51	0.0	clayey silt to silty clay
10.20	33.5	10.8	0.189	1.75	0.0	clayey silt to silty clay
10.30	33.8	10.0	0.147	1.46	0.0	clayey silt to silty clay
10.40	34.1	9.2	0.154	1.66	0.0	clayey silt to silty clay
10.50	34.4	9.3	0.135	1.46	0.0	clayey silt to silty clay
10.60	34.6	8.3	0.065	1.04	0.0	clayey silt to silty clay
10.70	35.1	8.7	0.065	0.75	0.0	clayey silt to silty clay
10.80	35.4	8.5	0.048	0.56	0.0	sensitive fine grained
10.90	35.8	9.0	0.046	0.51	0.0	sensitive fine grained
11.00	36.1	9.0	0.042	0.47	0.0	sensitive fine grained
11.10	36.4	8.8	0.042	0.47	0.0	sensitive fine grained
11.20	36.7	8.8	0.045	0.51	0.0	sensitive fine grained
11.30	37.1	8.4	0.075	0.88	0.0	clayey silt to silty clay
11.40	37.4	10.1	0.164	1.62	0.0	clayey silt to silty clay
11.50	37.7	10.9	0.180	1.64	0.0	clayey silt to silty clay
11.60	38.1	10.1	0.157	1.56	0.0	clayey silt to silty clay
11.70	38.4	9.3	0.141	1.51	0.0	clayey silt to silty clay
11.80	38.7	10.3	0.155	1.54	0.0	clayey silt to silty clay
11.90	39.0	10.0	0.097	0.97	0.0	clayey silt to silty clay
12.00	39.4	9.7	0.091	0.94	0.0	clayey silt to silty clay
12.10	39.7	12.6	0.181	1.44	0.0	clayey silt to silty clay
12.20	40.0	15.0	0.355	2.39	0.1	clayey silt to silty clay
12.30	40.4	13.4	0.205	1.53	0.0	clayey silt to silty clay
12.40	40.7	15.6	0.352	2.26	0.0	clayey silt to silty clay
12.50	41.0	27.9	0.569	2.03	0.0	sandy silt to clayey silt
12.60	41.3	47.1	0.334	0.71	0.0	silty sand to sandy silt
12.70	41.7	10.2	0.131	1.28	0.0	sandy silt to clayey silt
12.80	42.0	8.9	0.118	1.33	0.0	sandy silt to clayey silt
12.90	42.3	52.1	0.578	1.11	0.0	silty sand to sandy silt
13.00	42.7	53.1	0.922	1.73	0.0	silty sand to sandy silt
13.10	43.0	34.0	0.632	1.86	0.0	?
13.20	43.3	117.0	?	?	0.0	?

Soil interpretation reference: Robertson & Campanella-1983, based on 60% hammer efficiency and .2 m sliding data average

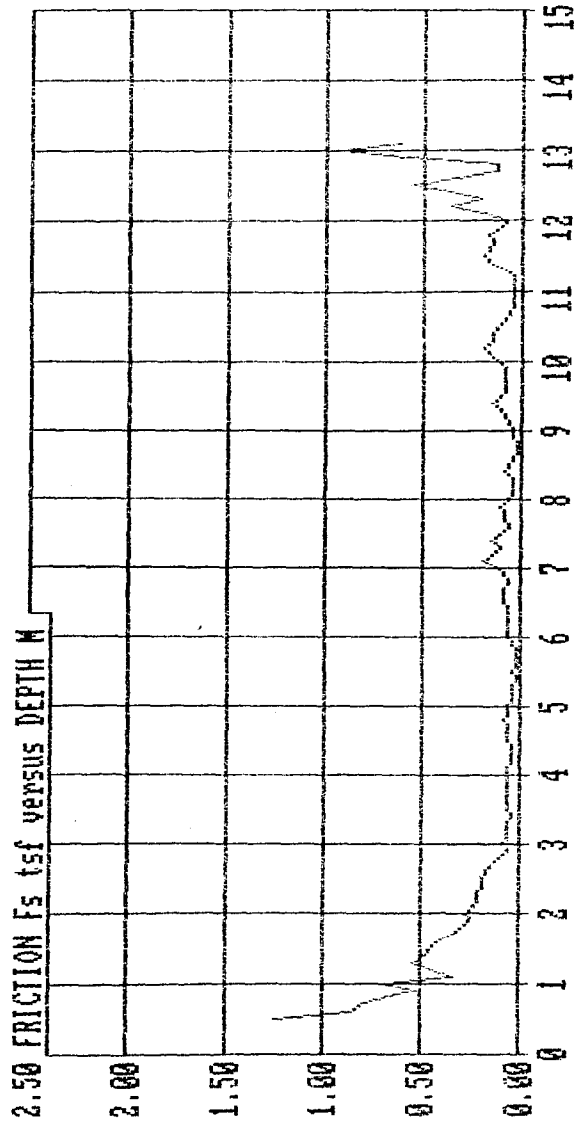
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OPERATOR : S.VAN
CLIENT : WES
LOCATION : P-6A/BFC-KC M0
JOB No. : DACW39-94-M-5062

Vandehey Soil Exploration
40695 Nw Pacific Ave, Banks, Oregon, 97106 (503) 324 3261



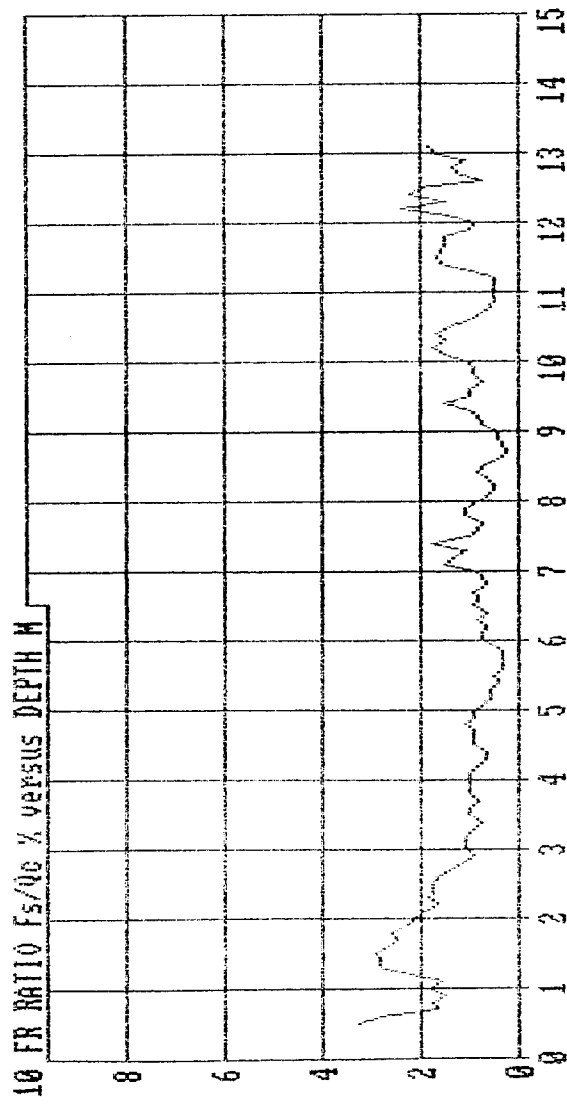
SOUNDING DATA IN FILE SND100 06-29-94 15:55
OPERATOR : S.VAN
CLIENT : WES
LOCATION : P-6A/BFC-KC MO
JOB No. : DACH39-94-M-5062

Vandehey Soil Exploration
40695 Nw Pacific Ave. Banks, Oregon. 97106 (503) 324 3261

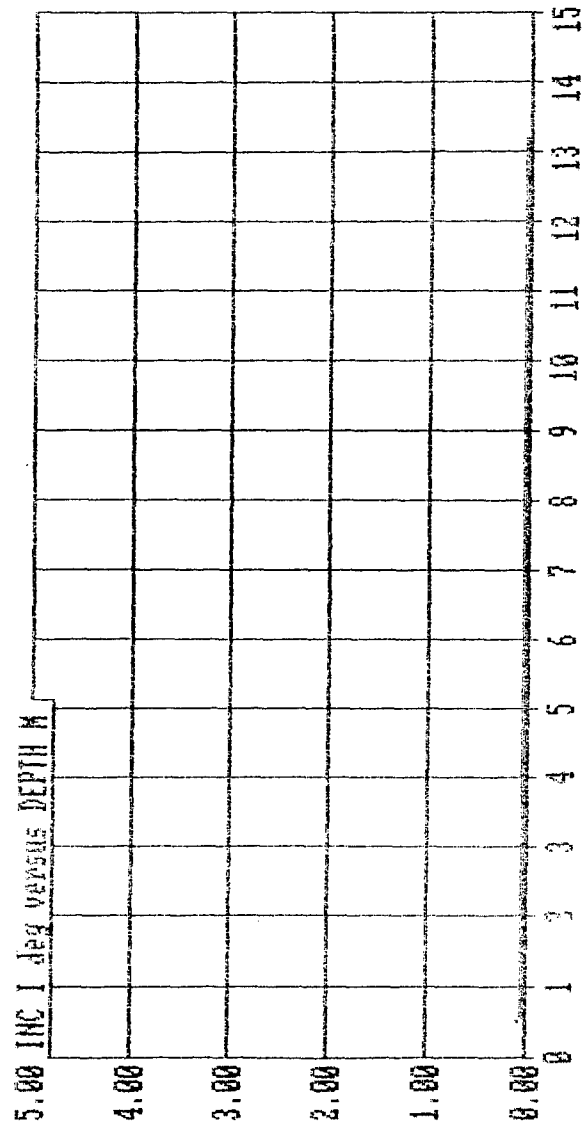


SOUNDING DATA IN FILE SHD100 06-29-94 15:55
OPERATOR : S. VAN LOCATION : P-6A/BFC-KC NO
CLIENT : WES JOB No. : DACH39-94-M-5062

Vandehy Soil Exploration
40695 NW Pacific Ave. Banks, Oregon. 97106 (503) 324 3261

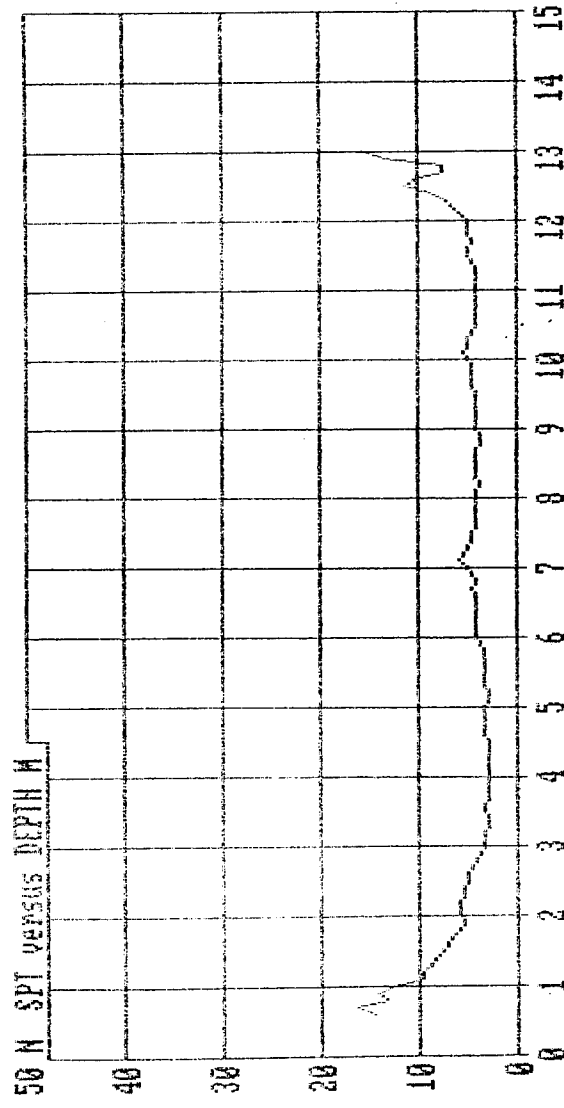


Vandenberg Soil Exploration
48695 NW Pacific Ave., Banks, Oregon, 97106 (503) 324 3261



SOUNDING DATA IN FILE SHD100 06-29-94 15:55
OPERATOR : S. VAN LOCATION : P-6A/BFC-KC MO
CLIENT : RES JOB No. : DACH39-94-M-5062

Vandehey Soil Exploration
40695 NW Pacific Ave. Banks, Oregon. 97106 (503) 324 3261



SCPT P-7

Vandehey Soil Expl.

Operator : S.VAN

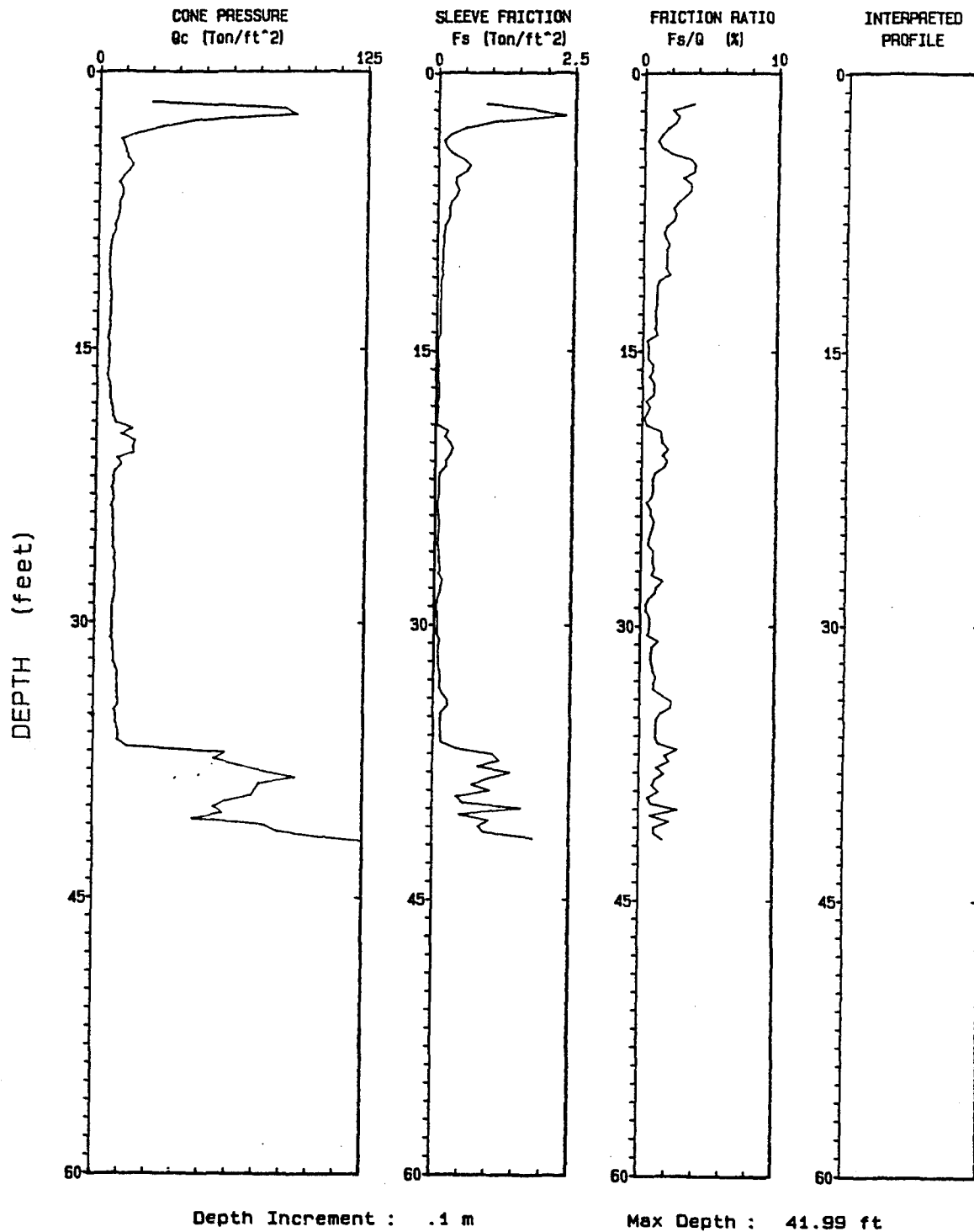
Sounding : SND101 Pg 1 / 1

Client : WES

CPT Date : 06-29-94 17:20

Location : P-7/BFC-KC MO

Job No. : DACW39-94-M-5062



SOUNDING DATA IN FILE SND101 06-29-94 17:20

OPERATOR : S.VAN

LOCATION : P-7/BFC-KC MO

CLIENT : WES

JOB No. : DACW39-94-M-5062

Vandehey Soil Exploration

40695 Nw Pacific Ave. Banks, Oregon. 97106 (503) 324 3261

DEPTH meters	DEPTH feet	TIP Qc tsf	FRICTION Fs tsf	FR RATIO Fs/Qc %	INC I deg	INTERPRETED SOIL TYPE
0.50	1.6	25.0	0.968	3.84	0.5	
0.60	2.0	86.5	1.779	2.06	0.0	sandy silt to clayey silt
0.70	2.3	91.7	2.323	2.53	0.1	sandy silt to clayey silt
0.80	2.6	44.0	0.993	2.25	0.0	sandy silt to clayey silt
0.90	3.0	29.3	0.491	1.68	0.1	sandy silt to clayey silt
1.00	3.3	17.7	0.224	1.27	0.1	sandy silt to clayey silt
1.10	3.6	10.4	0.103	0.99	0.1	sandy silt to clayey silt
1.20	3.9	11.9	0.152	1.27	0.1	clayey silt to silty clay
1.30	4.3	12.7	0.250	1.97	0.1	clayey silt to silty clay
1.40	4.6	13.2	0.456	3.46	0.1	silty clay to clay
1.50	4.9	15.6	0.589	3.77	0.1	silty clay to clay
1.60	5.2	14.0	0.517	3.68	0.1	silty clay to clay
1.70	5.6	11.3	0.323	2.85	0.1	silty clay to clay
1.80	5.9	9.2	0.320	3.49	0.1	silty clay to clay
1.90	6.2	11.0	0.382	3.46	0.1	silty clay to clay
2.00	6.6	11.0	0.328	2.97	0.1	silty clay to clay
2.10	6.9	9.5	0.240	2.51	0.1	silty clay to clay
2.20	7.2	9.5	0.204	2.16	0.1	silty clay to clay
2.30	7.5	9.3	0.222	2.38	0.1	silty clay to clay
2.40	7.9	8.6	0.187	2.18	0.1	silty clay to clay
2.50	8.2	7.4	0.123	1.67	0.0	clayey silt to silty clay
2.60	8.5	7.5	0.110	1.47	0.0	clayey silt to silty clay
2.70	8.9	6.5	0.107	1.66	0.0	silty clay to clay
2.80	9.2	5.8	0.111	1.91	0.0	silty clay to clay
2.90	9.5	5.5	0.092	1.67	0.0	silty clay to clay
3.00	9.8	5.2	0.085	1.70	0.0	sensitive fine grained
3.10	10.2	5.1	0.087	1.71	0.0	sensitive fine grained
3.20	10.5	4.9	0.081	1.67	0.0	silty clay to clay
3.30	10.8	5.2	0.103	1.98	0.0	sensitive fine grained
3.40	11.2	5.3	0.061	1.14	0.0	sensitive fine grained
3.50	11.5	5.7	0.054	0.94	0.0	sensitive fine grained
3.60	11.8	5.9	0.057	0.96	0.0	sensitive fine grained
3.70	12.1	6.2	0.057	0.92	0.0	sensitive fine grained
3.80	12.5	6.1	0.062	1.01	0.0	sensitive fine grained
3.90	12.8	6.2	0.054	0.86	0.0	sensitive fine grained
4.00	13.1	5.9	0.052	0.88	0.0	sensitive fine grained
4.10	13.5	5.4	0.052	0.96	0.0	sensitive fine grained
4.20	13.8	6.0	0.050	0.83	0.0	sensitive fine grained
4.30	14.1	5.3	0.055	1.04	0.0	sensitive fine grained
4.40	14.4	4.8	0.013	0.28	0.0	sensitive fine grained

Soil interpretation reference: Robertson & Campanella-1983, based on 60% hammer efficiency and .2 m sliding data average

DEPTH meters	DEPTH feet	TIP Qc tsf	FRICITION Fs tsf	FR RATIO Fs/Qc %	INC I deg	INTERPRETED SOIL TYPE
4.50	14.8	6.0	0.026	0.43	0.0	sensitive fine grained
4.60	15.1	5.4	0.019	0.36	0.0	sensitive fine grained
4.70	15.4	5.3	0.021	0.39	0.0	sensitive fine grained
4.80	15.7	5.5	0.042	0.76	0.0	sensitive fine grained
4.90	16.1	5.2	0.041	0.79	0.0	sensitive fine grained
5.00	16.4	4.9	0.025	0.52	0.0	sensitive fine grained
5.10	16.7	5.4	0.047	0.87	0.0	sensitive fine grained
5.20	17.1	6.1	0.046	0.78	0.0	sensitive fine grained
5.30	17.4	6.2	0.047	0.76	0.0	sensitive fine grained
5.40	17.7	6.1	0.015	0.24	0.0	sensitive fine grained
5.50	18.0	7.1	0.044	0.66	0.0	sensitive fine grained
5.60	18.4	7.5	0.024	0.32	0.0	sensitive fine grained
5.70	18.7	7.8	0.006	0.08	0.0	sensitive fine grained
5.80	19.0	8.9	0.029	0.33	0.0	sandy silt to clayey silt
5.90	19.4	16.9	0.235	1.39	0.0	sandy silt to clayey silt
6.00	19.7	11.8	0.172	1.46	0.0	sandy silt to clayey silt
6.10	20.0	18.1	0.275	1.52	0.0	sandy silt to clayey silt
6.20	20.3	16.8	0.327	1.95	0.0	sandy silt to clayey silt
6.30	20.7	17.4	0.264	1.51	0.0	clayey silt to silty clay
6.40	21.0	9.8	0.183	1.86	0.0	clayey silt to silty clay
6.50	21.3	11.6	0.187	1.61	0.0	clayey silt to silty clay
6.60	21.7	8.9	0.086	0.96	0.0	clayey silt to silty clay
6.70	22.0	7.9	0.064	0.80	0.0	clayey silt to silty clay
6.80	22.3	8.3	0.067	0.80	0.0	sensitive fine grained
6.90	22.6	7.4	0.063	0.85	0.0	sensitive fine grained
7.00	23.0	8.2	0.057	0.70	0.0	sensitive fine grained
7.10	23.3	7.7	0.029	0.37	0.0	sensitive fine grained
7.20	23.6	7.1	0.048	0.68	0.0	sensitive fine grained
7.30	23.9	8.1	0.055	0.69	0.0	sensitive fine grained
7.40	24.3	7.8	0.072	0.93	0.0	sensitive fine grained
7.50	24.6	8.2	0.064	0.78	0.0	sensitive fine grained
7.60	24.9	7.6	0.050	0.65	0.0	sensitive fine grained
7.70	25.3	7.8	0.041	0.52	0.0	sensitive fine grained
7.80	25.6	8.3	0.045	0.54	0.0	sensitive fine grained
7.90	25.9	8.3	0.076	0.91	0.0	clayey silt to silty clay
8.00	26.2	9.3	0.076	0.83	0.0	clayey silt to silty clay
8.10	26.6	8.7	0.072	0.82	0.0	clayey silt to silty clay
8.20	26.9	9.5	0.095	1.00	0.0	clayey silt to silty clay
8.30	27.2	9.0	0.074	0.82	0.0	clayey silt to silty clay
8.40	27.6	8.9	0.146	1.65	0.0	clayey silt to silty clay
8.50	27.9	9.6	0.109	1.14	0.0	clayey silt to silty clay
8.60	28.2	9.4	0.085	1.01	0.0	clayey silt to silty clay
8.70	28.5	9.0	0.045	0.54	0.0	clayey silt to silty clay
8.80	28.9	8.4	0.033	0.39	0.0	sensitive fine grained
8.90	29.2	7.9	0.035	0.44	0.0	sensitive fine grained
9.00	29.5	7.8	0.052	0.66	0.0	sensitive fine grained
9.10	29.9	7.8	0.053	0.68	0.0	sensitive fine grained
9.20	30.2	7.9	0.046	0.60	0.0	sensitive fine grained
9.30	30.5	7.7	0.041	0.54	0.0	sensitive fine grained
9.40	30.8	7.8	0.105	1.34	0.0	clayey silt to silty clay

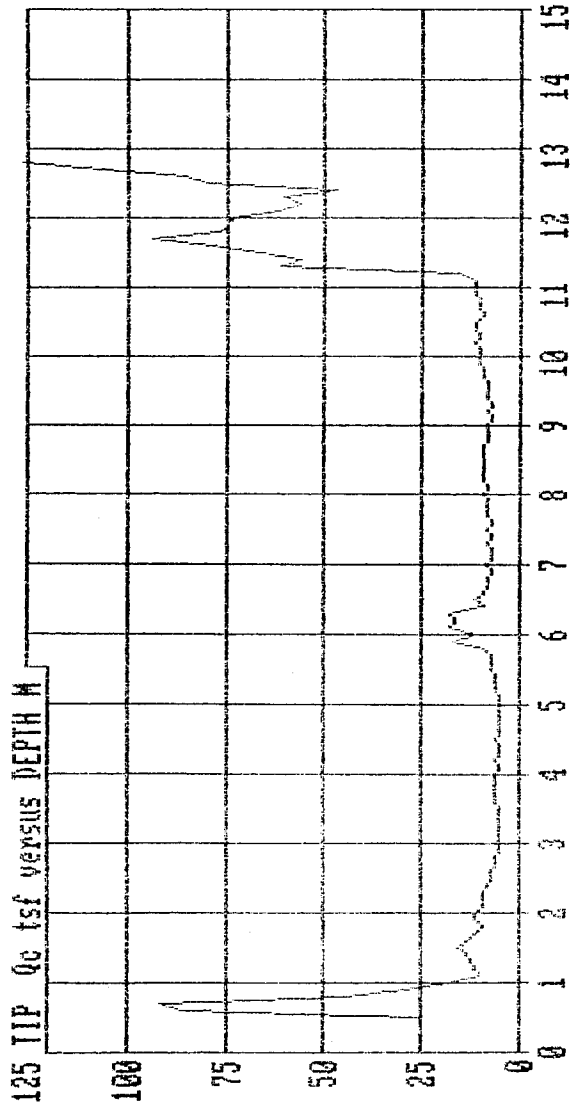
Soil interpretation reference: Robertson & Campanella-1983, based on 60% hammer efficiency and .2 m sliding data average

DEPTH meters	DEPTH feet	TIP Qc tsf	FRICTION Fs tsf	FR RATIO Fs/Qc %	INC I deg	INTERPRETED SOIL TYPE
9.50	31.2	8.8	0.074	0.84	0.0	clayey silt to silty clay
9.60	31.5	8.6	0.067	0.78	0.0	clayey silt to silty clay
9.70	31.8	9.1	0.066	0.73	0.0	clayey silt to silty clay
9.80	32.2	8.9	0.077	0.87	0.0	clayey silt to silty clay
9.90	32.5	10.0	0.095	0.95	0.0	clayey silt to silty clay
10.00	32.8	10.9	0.120	1.10	0.0	clayey silt to silty clay
10.10	33.1	10.8	0.105	1.01	0.0	clayey silt to silty clay
10.20	33.5	10.9	0.106	0.97	0.0	clayey silt to silty clay
10.30	33.8	10.6	0.171	1.61	0.0	clayey silt to silty clay
10.40	34.1	11.1	0.250	2.33	0.0	clayey silt to silty clay
10.50	34.4	11.3	0.262	2.32	0.0	clayey silt to silty clay
10.60	34.8	9.8	0.145	1.55	0.0	clayey silt to silty clay
10.70	35.1	10.2	0.121	1.19	0.0	clayey silt to silty clay
10.80	35.4	10.0	0.113	1.13	0.0	clayey silt to silty clay
10.90	35.6	10.9	0.128	1.17	0.0	clayey silt to silty clay
11.00	36.1	11.5	0.125	1.10	0.0	clayey silt to silty clay
11.10	36.4	11.2	0.157	1.40	0.0	clayey silt to silty clay
11.20	36.7	15.6	0.431	2.77	0.0	sandy silt to clayey silt
11.30	37.1	61.4	1.128	1.84	0.0	sandy silt to clayey silt
11.40	37.4	56.1	1.228	2.19	0.0	silty sand to sandy silt
11.50	37.7	67.0	0.846	1.26	0.0	silty sand to sandy silt
11.60	38.1	79.2	1.442	1.82	0.0	silty sand to sandy silt
11.70	38.4	93.8	1.027	1.09	0.0	sand to silty sand
11.80	38.7	77.1	0.731	0.95	0.0	sand to silty sand
11.90	39.0	75.1	1.067	1.42	0.0	sand to silty sand
12.00	39.4	73.5	0.437	0.59	0.1	sand to silty sand
12.10	39.7	61.7	0.565	0.92	0.1	silty sand to sandy silt
12.20	40.0	56.5	1.640	2.90	0.1	silty sand to sandy silt
12.30	40.4	50.4	0.504	0.83	0.1	silty sand to sandy silt
12.40	40.7	46.9	1.047	2.23	0.1	silty sand to sandy silt
12.50	41.0	80.0	0.854	1.07	0.1	silty sand to sandy silt
12.60	41.3	85.6	0.958	1.13	0.1	sand to silty sand
12.70	41.7	106.1	1.851	1.74	0.1	?
12.80	42.0	135.7	"	?	0.5	?

Soil interpretation reference: Robertson & Campanella-1983, based on 60% hammer efficiency and .2 m sliding data average

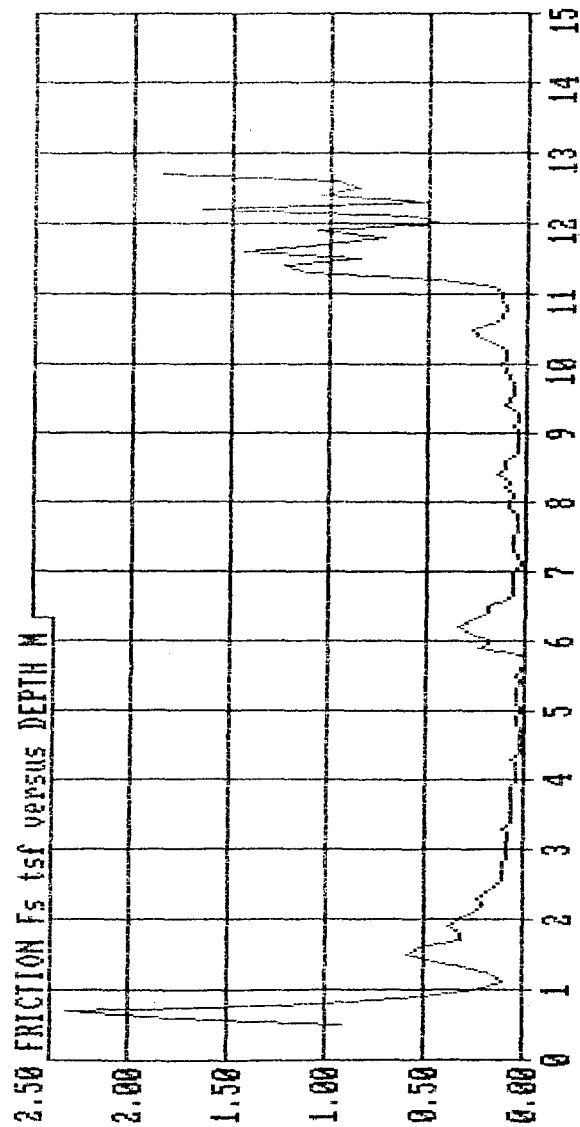
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OPERATOR : S. VAN LOCATION : P-7/BFC-KC MO
CLIENT : NES JOB No. : DACH39-94-M-5062

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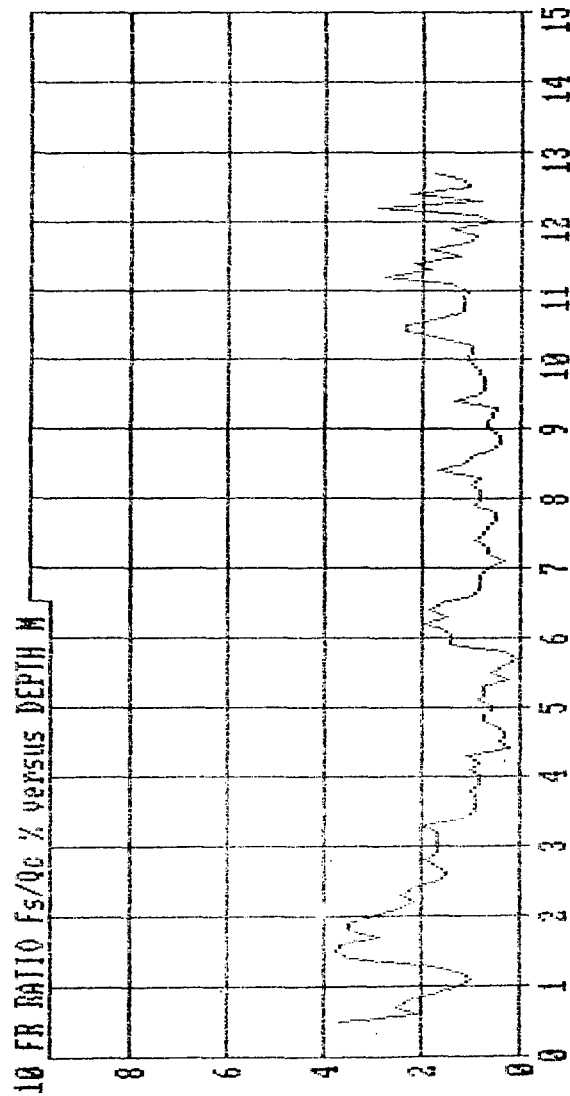
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CLIENT : NES
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JOB No. : DACH39-94-M-5062

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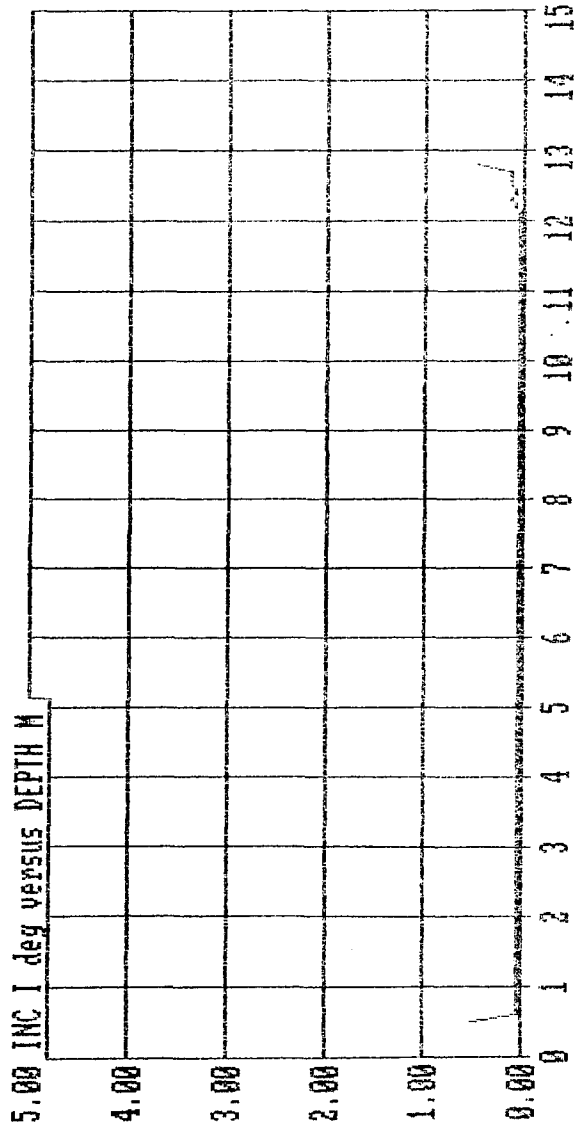
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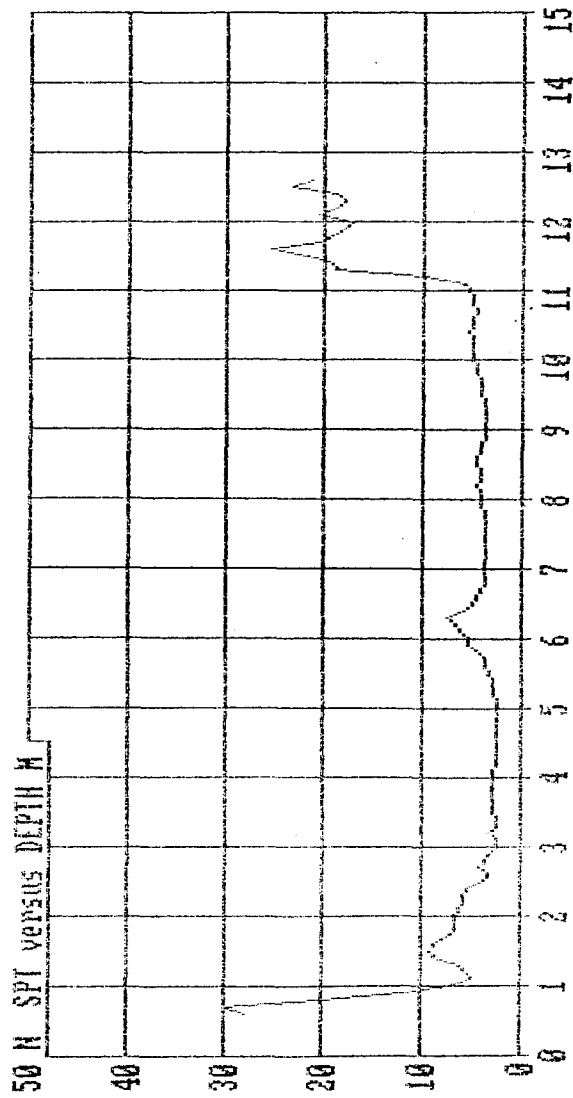
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OPERATOR : S. VAN
CLIENT : WES
LOCATION : P-7/BFC-KC MO
JOB No. : DACU39-94-M-5062

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SOUNDING DATA IN FILE SND101 06-29-94 17:20
OPERATOR : S.UAM LOCATION : P-7/BFC-KC #0
CLIENT : MES JOB No. : DACH39-94-M-5062

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SCPT P-8

Vandehey Soil Expl.

Operator : S.VAN

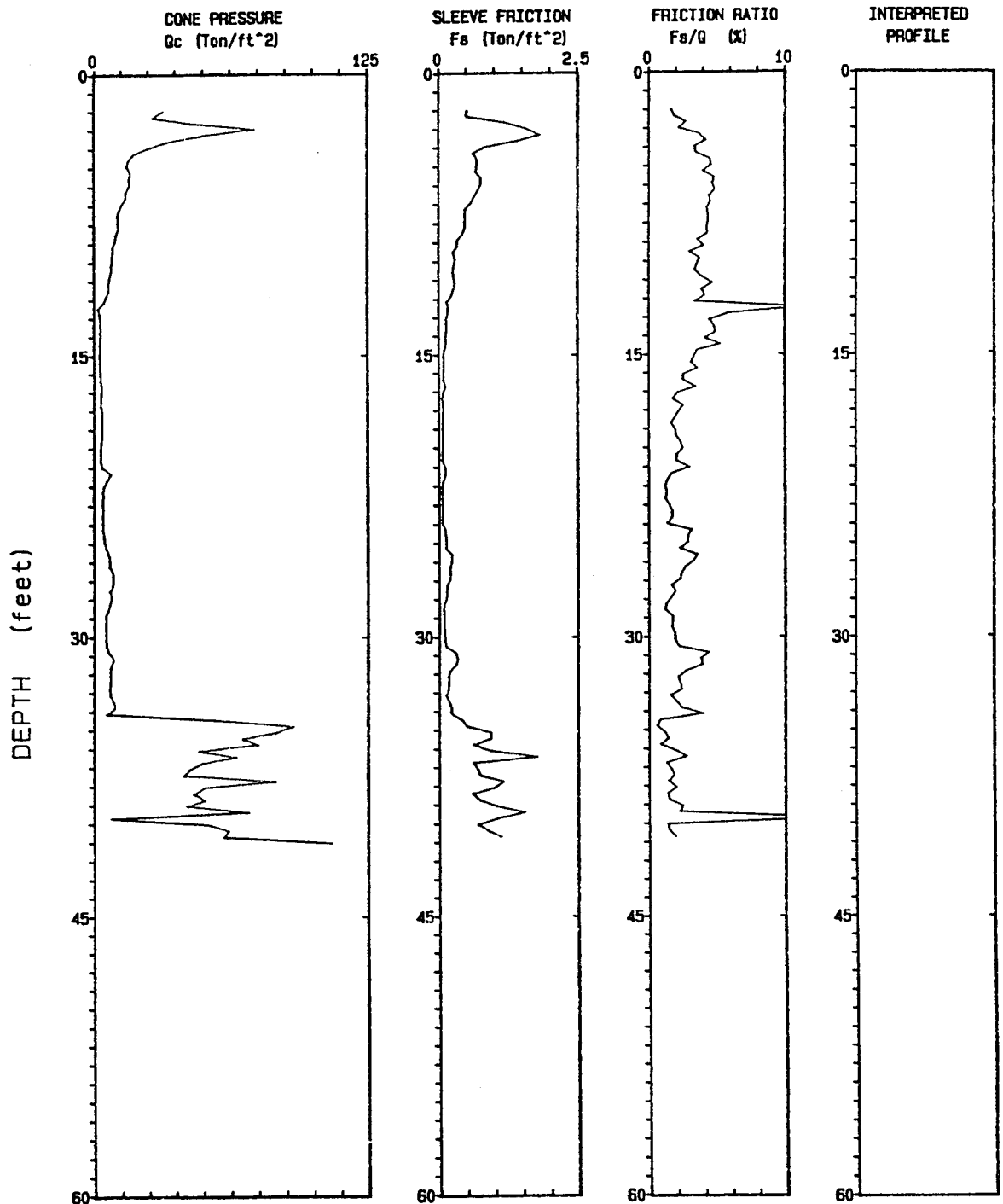
Sounding : SND-93 Pg 1 / 1

Client : WES

CPT Date : 06-27-94 18:52

Location : P-8/6FC-KC M0

Job No. : DACW39-94-M-5062



Depth Increment : .1 m

Max Depth : 41.01 ft

SOUNDING DATA IN FILE SND-93 06-27-94 18:52

OPERATOR : S.VAN

LOCATION : P-8/BFC-KC MO

CLIENT : WES

JOB No. : DACW39-94-M-5062

Vandehey Soil Exploration

40695 Nw Pacific Ave. Banks, Oregon. 97106 (503) 324 3261

DEPTH meters	DEPTH feet	TIP Qc tsf	FRICTION Fs tsf	FR RATIO Fs/Qc %	INC 1 deg	INTERPRETED SOIL TYPE
0.60	2.0	32.1	0.520	1.62	0.1	?
0.70	2.3	27.3	0.502	1.84	0.1	sandy silt to clayey silt
0.80	2.6	44.8	1.208	2.70	0.1	sandy silt to clayey silt
0.90	3.0	73.7	1.580	2.14	0.1	sandy silt to clayey silt
1.00	3.3	49.4	1.830	3.71	0.1	clayey silt to silty clay
1.10	3.6	33.8	1.419	4.19	0.1	clayey silt to silty clay
1.20	3.9	24.9	0.827	3.32	0.1	clayey silt to silty clay
1.30	4.3	18.1	0.620	3.43	0.1	silty clay to clay
1.40	4.6	15.7	0.701	4.47	0.1	clay
1.50	4.9	15.2	0.635	4.58	0.0	clay
1.60	5.2	17.0	0.668	3.94	0.1	clay
1.70	5.6	16.1	0.770	4.80	0.1	clay
1.80	5.9	16.4	0.761	4.63	0.1	clay
1.90	6.2	14.6	0.707	4.83	0.1	clay
2.00	6.6	14.5	0.638	4.39	0.1	clay
2.10	6.9	12.9	0.579	4.51	0.1	clay
2.20	7.2	11.5	0.481	4.20	0.1	clay
2.30	7.5	10.8	0.470	4.36	0.1	clay
2.40	7.9	11.0	0.474	4.33	0.1	clay
2.50	8.2	11.2	0.473	4.21	0.1	clay
2.60	8.5	9.9	0.426	4.29	0.1	clay
2.70	8.9	9.5	0.335	3.54	0.1	clay
2.80	9.2	8.2	0.329	4.02	0.1	clay
2.90	9.5	8.5	0.252	2.96	0.0	clay
3.00	9.8	8.0	0.300	3.73	0.0	clay
3.10	10.2	7.8	0.269	3.46	0.0	clay
3.20	10.5	7.5	0.253	3.37	0.0	clay
3.30	10.8	6.9	0.272	3.92	0.0	clay
3.40	11.2	6.4	0.300	4.67	0.0	clay
3.50	11.5	6.6	0.256	3.86	0.1	clay
3.60	11.8	5.4	0.224	4.11	0.1	clay
3.70	12.1	4.2	0.140	3.33	0.1	clay
3.80	12.5	1.5	0.171	11.31	0.1	organic material
3.90	12.8	2.6	0.152	5.82	0.1	organic material
4.00	13.1	2.8	0.126	4.44	0.1	clay
4.10	13.5	2.8	0.132	4.79	0.1	clay
4.20	13.8	2.7	0.133	4.94	0.0	clay
4.30	14.1	2.8	0.113	4.08	0.1	clay
4.40	14.4	2.3	0.123	5.28	0.0	clay
4.50	14.8	2.5	0.089	3.51	0.1	clay

Soil interpretation reference: Robertson & Campanella-1983, based on 60% hammer efficiency and .2 m sliding data average

DEPTH meters	DEPTH feet	TIP Qc tsf	FRICTION Fs tsf	FR RATIO Fs/Qc %	INC 1 deg	INTERPRETED SOIL TYPE
4.60	15.1	2.3	0.073	3.25	0.1	clay
4.70	15.4	2.6	0.080	3.07	0.1	clay
4.80	15.7	2.5	0.090	3.58	0.1	clay
4.90	16.1	3.0	0.073	2.45	0.1	clay
5.00	16.4	3.0	0.076	2.53	0.1	clay
5.10	16.7	3.5	0.123	3.48	0.1	clay
5.20	17.1	3.2	0.065	2.04	0.1	clay
5.30	17.4	3.0	0.051	1.71	0.1	sensitive fine grained
5.40	17.7	3.0	0.074	2.50	0.1	clay
5.50	18.0	3.8	0.081	2.13	0.0	clay
5.60	18.4	3.5	0.068	1.87	0.0	sensitive fine grained
5.70	18.7	3.5	0.056	1.59	0.0	sensitive fine grained
5.80	19.0	3.2	0.062	1.93	0.1	sensitive fine grained
5.90	19.4	3.7	0.073	1.99	0.0	clay
6.00	19.7	3.1	0.071	2.31	0.0	clay
6.10	20.0	2.8	0.068	2.46	0.0	clay
6.20	20.3	2.8	0.056	2.00	0.0	sensitive fine grained
6.30	20.7	2.7	0.054	2.06	0.0	clay
6.40	21.0	3.8	0.114	2.99	0.0	clay
6.50	21.3	7.8	0.127	1.62	0.0	silty clay to clay
6.60	21.7	5.8	0.077	1.32	0.0	sensitive fine grained
6.70	22.0	4.3	0.049	1.14	0.0	sensitive fine grained
6.80	22.3	3.8	0.050	1.31	0.0	sensitive fine grained
6.90	22.6	4.0	0.046	1.16	0.0	sensitive fine grained
7.00	23.0	3.8	0.056	1.48	0.0	sensitive fine grained
7.10	23.3	4.0	0.068	1.72	0.0	sensitive fine grained
7.20	23.6	3.8	0.064	1.67	0.0	sensitive fine grained
7.30	23.9	3.9	0.052	1.33	0.0	sensitive fine grained
7.40	24.3	3.8	0.119	3.12	0.1	clay
7.50	24.6	4.5	0.127	2.81	0.0	clay
7.60	24.9	4.8	0.135	2.83	0.0	clay
7.70	25.3	5.7	0.130	2.27	0.0	clay
7.80	25.6	6.8	0.241	3.56	0.0	clay
7.90	25.9	7.3	0.235	3.24	0.0	clay
8.00	26.2	7.3	0.193	2.63	0.0	silty clay to clay
8.10	26.6	8.8	0.207	2.36	0.0	silty clay to clay
8.20	26.9	8.8	0.197	2.23	0.0	silty clay to clay
8.30	27.2	8.4	0.136	1.62	0.0	clayey silt to silty clay
8.40	27.6	7.1	0.137	1.93	0.0	clayey silt to silty clay
8.50	27.9	8.0	0.127	1.59	0.1	clayey silt to silty clay
8.60	28.2	7.1	0.087	1.23	0.1	sensitive fine grained
8.70	28.5	6.3	0.072	1.14	0.1	sensitive fine grained
8.80	28.9	5.1	0.088	1.71	0.1	sensitive fine grained
8.90	29.2	5.3	0.091	1.72	0.1	sensitive fine grained
9.00	29.5	5.2	0.088	1.70	0.1	silty clay to clay
9.10	29.9	5.3	0.103	1.92	0.1	silty clay to clay
9.20	30.2	5.4	0.102	1.90	0.1	silty clay to clay
9.30	30.5	5.8	0.126	2.17	0.1	clay
9.40	30.8	6.8	0.299	4.39	0.1	clay
9.50	31.2	9.0	0.339	3.77	0.0	clay

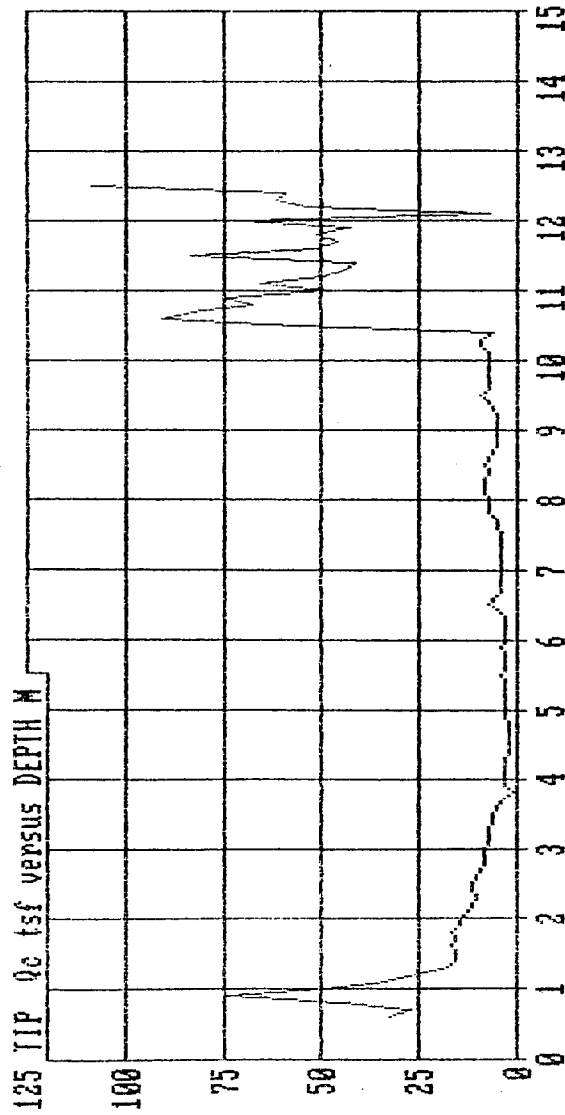
Soil interpretation reference: Robertson & Campanella-1983, based on 60% hammer efficiency and .2 m sliding data average

DEPTH meters	DEPTH feet	TIP Qc tsf	FRICTION Fs tsf	FR. RATIO Fs/Qc %	INC I deg	INTERPRETED SOIL TYPE
9.60	31.5	7.7	0.303	3.91	0.0	clay
9.70	31.8	7.2	0.191	2.67	0.0	silty clay to clay
9.80	32.2	7.6	0.160	2.09	0.0	silty clay to clay
9.90	32.5	7.4	0.167	2.26	0.0	silty clay to clay
10.00	32.8	7.0	0.167	2.40	0.0	silty clay to clay
10.10	33.1	7.5	0.116	1.54	0.0	silty clay to clay
10.20	33.5	9.0	0.179	1.99	0.0	clayey silt to silty clay
10.30	33.8	9.5	0.221	2.35	0.0	silty clay to clay
10.40	34.1	5.7	0.229	3.99	0.0	sandy silt to clayey silt
10.50	34.4	55.5	0.422	0.76	0.0	silty sand to sandy silt
10.60	34.8	91.1	0.506	0.56	0.0	sand to silty sand
10.70	35.1	83.0	0.939	1.13	0.0	sand to silty sand
10.80	35.4	68.0	0.939	1.36	0.0	silty sand to sandy silt
10.90	35.8	75.2	0.625	0.83	0.0	silty sand to sandy silt
11.00	36.1	48.3	0.944	1.96	0.0	silty sand to sandy silt
11.10	36.4	65.2	1.772	2.72	0.0	sandy silt to clayey silt
11.20	36.7	49.3	0.614	1.25	0.0	silty sand to sandy silt
11.30	37.1	43.9	0.702	1.60	0.0	silty sand to sandy silt
11.40	37.4	41.3	0.748	1.81	0.0	silty sand to sandy silt
11.50	37.7	83.2	1.162	1.40	0.0	silty sand to sandy silt
11.60	38.1	50.6	1.004	1.98	0.0	silty sand to sandy silt
11.70	38.4	45.9	0.602	1.31	0.0	silty sand to sandy silt
11.80	38.7	50.9	0.739	1.45	0.0	silty sand to sandy silt
11.90	39.0	42.9	1.047	2.44	0.0	sandy silt to clayey silt
12.00	39.4	70.8	1.551	2.19	0.0	sandy silt to clayey silt
12.10	39.7	7.7	1.047	13.57	0.0	clayey silt to silty clay
12.20	40.0	52.7	0.703	1.33	0.0	sandy silt to clayey silt
12.30	40.4	61.7	0.889	1.44	0.0	silty sand to sandy silt
12.40	40.7	59.4	1.124	1.89	0.2	?
12.50	41.0	108.7	?	?	0.2	?

Soil interpretation reference: Robertson & Campanella-1983, based on 60% hammer efficiency and .2 m sliding data average

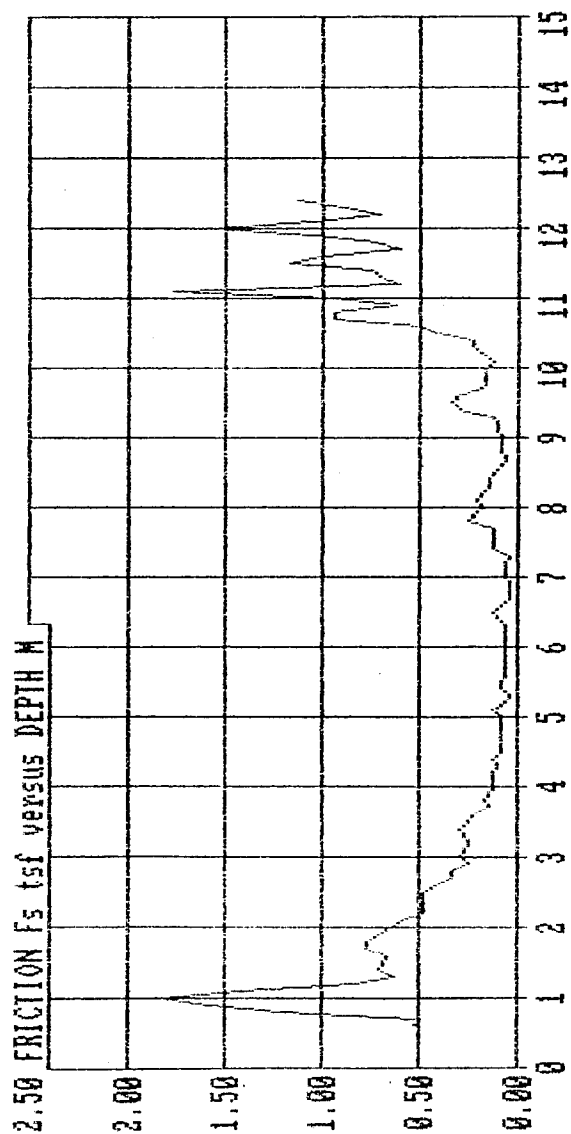
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CLIENT : WES JOB No. : DAC439-94-M-5062

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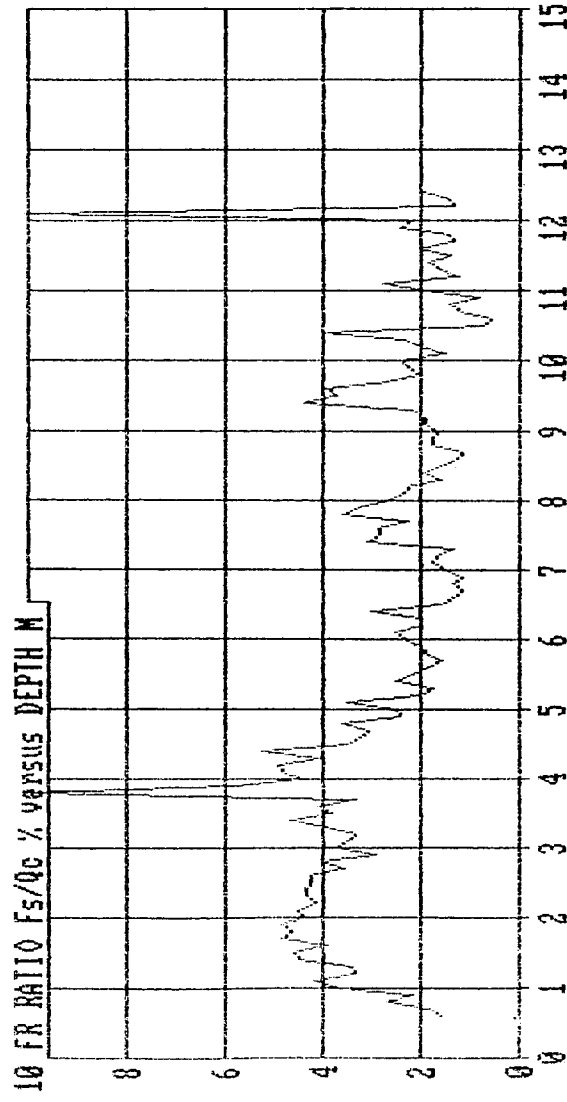
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CLIENT : WES
LOCATION : P-8/BFC-KC MO
JOB No. : DACH39-94-M-5062

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40695 NW Pacific Ave. Banks, Oregon. 97106 (503) 324 3261



SOUNDING DATA IN FILE SND-93 06-27-94 18:52
OPERATOR : S. VAN LOCATION : P-8/BFC-KC MO
CLIENT : WES JOB No. : DACU39-94-M-5062

Vandehey Soil Exploration
40695 Nw Pacific Ave. Banks, Oregon. 97106 (503) 324 3261



CLIENT : WES
JOB No. : DACH39-94-M-5062

48695 NW Pacific Ave. Banks, Oregon. 97106 (503) 324 3261



SCPT P-9

Vandehey Soil Expl.

Operator : S.VAN

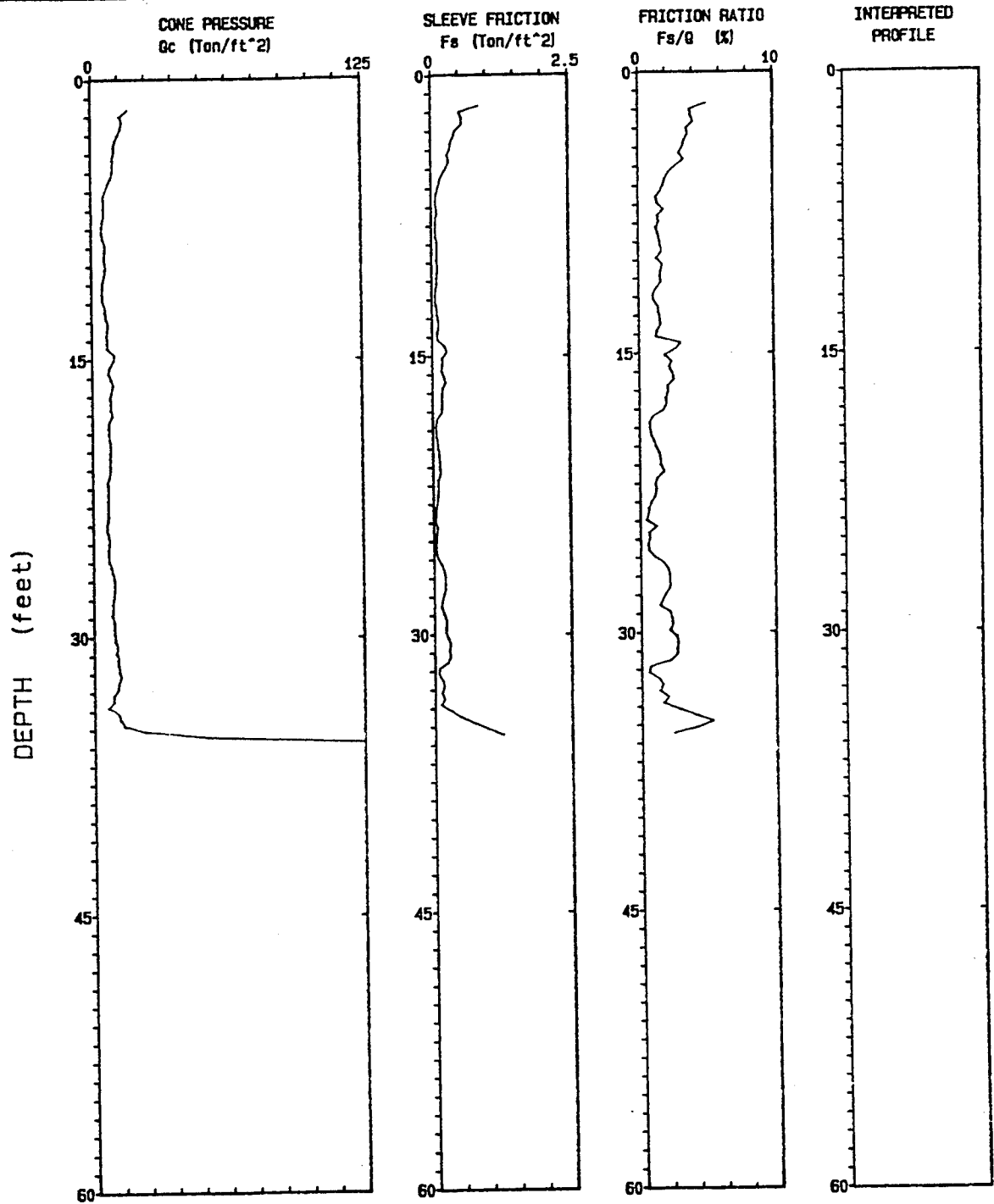
Sounding : SND-94 Pg 1 / 1

Client : WES

CPT Date : 06-27-94 21:24

Location : P-9/BFC-KC MO

Job No. : DACW39-94-M-5062



Depth Increment : .1 m

Max Depth : 35.76 ft

SOUNDING DATA IN FILE SND-94 06-27-94 21:24

OPERATOR : S.VAN

LOCATION : P-9/BFC-KC MD

CLIENT : WES

JOB No. : DACW39-94-M-5062

Vandehey Soil Exploration

40695 Nw Pacific Ave. Banks, Oregon. 97106 (503) 324 3261

DEPTH	DEPTH	TIP	FRICTION	FR RATIO	INC	INTERPRETED
meters	feet	Qc tsf	Fs tsf	Fs/Qc %	I deg	SOIL TYPE
0.50	1.6	17.3	0.870	5.04	0.0	?
0.60	2.0	13.6	0.517	3.80	0.0	clay
0.70	2.3	14.7	0.574	3.91	0.0	silty clay to clay
0.80	2.6	13.9	0.565	4.08	0.0	clay
0.90	3.0	12.6	0.446	3.54	0.0	silty clay to clay
1.00	3.3	11.1	0.408	3.67	0.0	silty clay to clay
1.10	3.6	10.6	0.357	3.38	0.0	silty clay to clay
1.20	3.9	10.6	0.343	3.24	0.0	silty clay to clay
1.30	4.3	9.9	0.236	2.98	0.0	silty clay to clay
1.40	4.6	9.9	0.335	3.37	0.0	silty clay to clay
1.50	4.9	10.0	0.272	2.73	0.0	silty clay to clay
1.60	5.2	9.0	0.200	2.22	0.0	silty clay to clay
1.70	5.6	7.7	0.151	1.96	0.0	silty clay to clay
1.80	5.9	6.6	0.120	1.82	0.0	silty clay to clay
1.90	6.2	5.5	0.089	1.62	0.0	sensitive fine grained
2.00	6.6	5.6	0.071	1.27	0.0	sensitive fine grained
2.10	6.9	5.9	0.064	1.43	0.0	sensitive fine grained
2.20	7.2	5.7	0.107	1.88	0.0	sensitive fine grained
2.30	7.5	5.1	0.071	1.39	0.0	sensitive fine grained
2.40	7.9	4.5	0.069	1.52	0.0	sensitive fine grained
2.50	8.2	4.7	0.060	1.29	0.0	sensitive fine grained
2.60	8.5	5.4	0.076	1.45	0.0	sensitive fine grained
2.70	8.9	6.5	0.100	1.56	0.0	sensitive fine grained
2.80	9.2	6.1	0.100	1.64	0.0	silty clay to clay
2.90	9.5	5.6	0.096	1.70	0.0	sensitive fine grained
3.00	9.8	6.3	0.082	1.29	0.0	sensitive fine grained
3.10	10.2	6.5	0.113	1.75	0.0	silty clay to clay
3.20	10.5	5.8	0.095	1.63	0.0	sensitive fine grained
3.30	10.8	5.0	0.078	1.54	0.0	sensitive fine grained
3.40	11.2	4.7	0.078	1.66	0.0	sensitive fine grained
3.50	11.5	4.6	0.059	1.29	0.0	sensitive fine grained
3.60	11.8	4.9	0.050	1.02	0.0	sensitive fine grained
3.70	12.1	5.9	0.060	1.02	0.0	sensitive fine grained
3.80	12.5	6.4	0.088	1.39	0.0	sensitive fine grained
3.90	12.8	6.6	0.097	1.47	0.0	sensitive fine grained
4.00	13.1	7.6	0.120	1.56	0.0	clayey silt to silty clay
4.10	13.5	7.2	0.115	1.50	0.0	clayey silt to silty clay
4.20	13.8	6.7	0.087	1.30	0.0	sensitive fine grained
4.30	14.1	7.1	0.086	1.21	0.0	silty clay to clay
4.40	14.4	7.2	0.221	3.06	0.0	silty clay to clay

Soil interpretation reference: Robertson & Campanella-1983, based on 60% hammer efficiency and .2 m sliding data average

DEPTH meters	DEPTH feet	TIP Qc tsf	FRICTION Fs tsf	FR RATIO Fs/Qc %	INC I deg	INTERPRETED SOIL TYPE
4.50	14.8	10.5	0.275	2.63	0.0	silty clay to clay
4.60	15.1	9.7	0.178	1.84	0.0	clayey silt to silty clay
4.70	15.4	7.9	0.187	2.36	0.0	silty clay to clay
4.80	15.7	7.4	0.158	2.14	0.0	silty clay to clay
4.90	16.1	8.8	0.214	2.44	0.0	silty clay to clay
5.00	16.4	9.7	0.246	2.53	0.0	silty clay to clay
5.10	16.7	8.8	0.177	2.02	0.0	silty clay to clay
5.20	17.1	8.1	0.170	2.09	0.0	silty clay to clay
5.30	17.4	8.5	0.163	1.91	0.0	silty clay to clay
5.40	17.7	8.4	0.161	1.98	0.0	clayey silt to silty clay
5.50	18.0	9.3	0.157	1.70	0.0	clayey silt to silty clay
5.60	18.4	7.6	0.071	0.93	0.0	clayey silt to silty clay
5.70	18.7	7.3	0.050	0.69	0.0	sensitive fine grained
5.80	19.0	7.4	0.056	0.75	0.0	sensitive fine grained
5.90	19.4	8.0	0.067	0.84	0.0	sensitive fine grained
6.00	19.7	8.5	0.089	1.04	0.0	clayey silt to silty clay
6.10	20.0	8.2	0.098	1.19	0.0	clayey silt to silty clay
6.20	20.3	8.0	0.115	1.44	0.0	clayey silt to silty clay
6.30	20.7	8.1	0.124	1.53	0.0	clayey silt to silty clay
6.40	21.0	8.0	0.125	1.56	0.0	clayey silt to silty clay
6.50	21.3	7.6	0.137	1.80	0.0	clayey silt to silty clay
6.60	21.7	6.8	0.084	1.24	0.0	clayey silt to silty clay
6.70	22.0	7.3	0.079	1.09	0.0	sensitive fine grained
6.80	22.3	7.0	0.084	1.19	0.0	sensitive fine grained
6.90	22.6	7.1	0.076	1.07	0.0	sensitive fine grained
7.00	23.0	6.8	0.054	0.80	0.0	sensitive fine grained
7.10	23.3	6.9	0.041	0.59	0.0	sensitive fine grained
7.20	23.6	7.0	0.039	0.56	0.0	sensitive fine grained
7.30	23.9	6.3	0.027	0.42	0.0	sensitive fine grained
7.40	24.3	6.2	0.074	1.20	0.0	sensitive fine grained
7.50	24.6	7.3	0.043	0.59	0.0	sensitive fine grained
7.60	24.9	7.4	0.050	0.68	0.0	sensitive fine grained
7.70	25.3	6.9	0.036	0.52	0.0	sensitive fine grained
7.80	25.6	6.8	0.041	0.61	0.0	sensitive fine grained
7.90	25.9	7.2	0.075	1.04	0.0	sensitive fine grained
8.00	26.2	8.4	0.143	1.70	0.0	clayey silt to silty clay
8.10	26.6	8.9	0.181	2.02	0.0	clayey silt to silty clay
8.20	26.9	9.8	0.209	2.13	0.0	clayey silt to silty clay
8.30	27.2	9.6	0.203	2.11	0.0	clayey silt to silty clay
8.40	27.6	9.6	0.205	2.15	0.0	clayey silt to silty clay
8.50	27.9	9.1	0.167	1.83	0.0	clayey silt to silty clay
8.60	28.2	8.6	0.135	1.57	0.0	clayey silt to silty clay
8.70	28.5	8.9	0.123	1.38	0.0	clayey silt to silty clay
8.80	28.9	8.4	0.177	2.12	0.0	clayey silt to silty clay
8.90	29.2	9.6	0.219	2.28	0.0	silty clay to clay
9.00	29.5	9.5	0.222	2.33	0.0	silty clay to clay
9.10	29.9	9.7	0.203	2.09	0.0	silty clay to clay
9.20	30.2	9.8	0.254	2.59	0.0	silty clay to clay
9.30	30.5	10.9	0.296	2.71	0.0	silty clay to clay
9.40	30.8	10.2	0.266	2.61	0.0	silty clay to clay

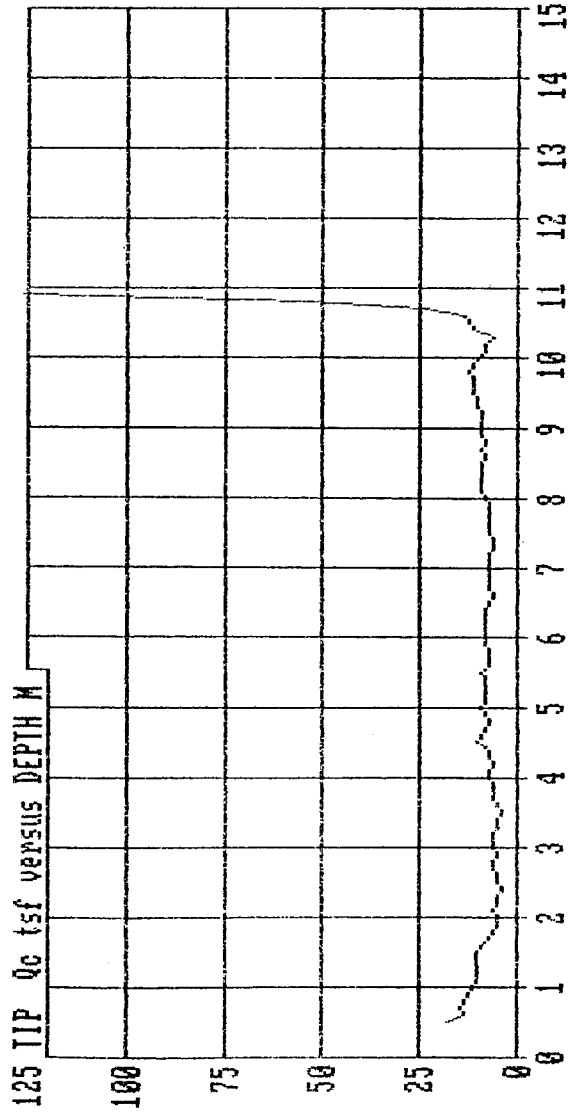
Soil interpretation reference: Robertson & Campanella-1983, based on 60% hammer efficiency and .2 m sliding data average

DEPTH meters	DEPTH feet	TIP Qc tsf	FRICTION Fs tsf	FR RATIO Fs/Qc %	INC I deg	INTERPRETED SOIL TYPE
9.50	31.2	11.3	0.292	2.59	0.0	silty clay to clay
9.60	31.5	11.1	0.234	2.11	0.0	clayey silt to silty clay
9.70	31.8	11.6	0.067	0.58	0.0	sandy silt to clayey silt
9.80	32.2	12.5	0.066	0.53	0.0	sandy silt to clayey silt
9.90	32.5	11.1	0.142	1.28	0.0	clayey silt to silty clay
10.00	32.8	10.8	0.170	1.58	0.0	clayey silt to silty clay
10.10	33.1	8.8	0.116	1.33	0.0	clayey silt to silty clay
10.20	33.5	8.8	0.174	1.99	0.0	clayey silt to silty clay
10.30	33.8	5.5	0.103	1.60	0.0	silty clay to clay
10.40	34.1	11.2	0.308	2.75	0.0	silty clay to clay
10.50	34.4	12.2	0.485	3.98	0.0	clay
10.60	34.8	13.9	0.733	5.28	0.0	clay
10.70	35.1	23.7	0.983	4.15	0.0	clayey silt to silty clay
10.80	35.4	52.8	1.249	2.37	0.0	?
10.90	35.8	142.6	?	?	0.0	?

Soil interpretation reference: Robertson & Campanella-1983, based on 60% hammer efficiency and .2 * sliding data average

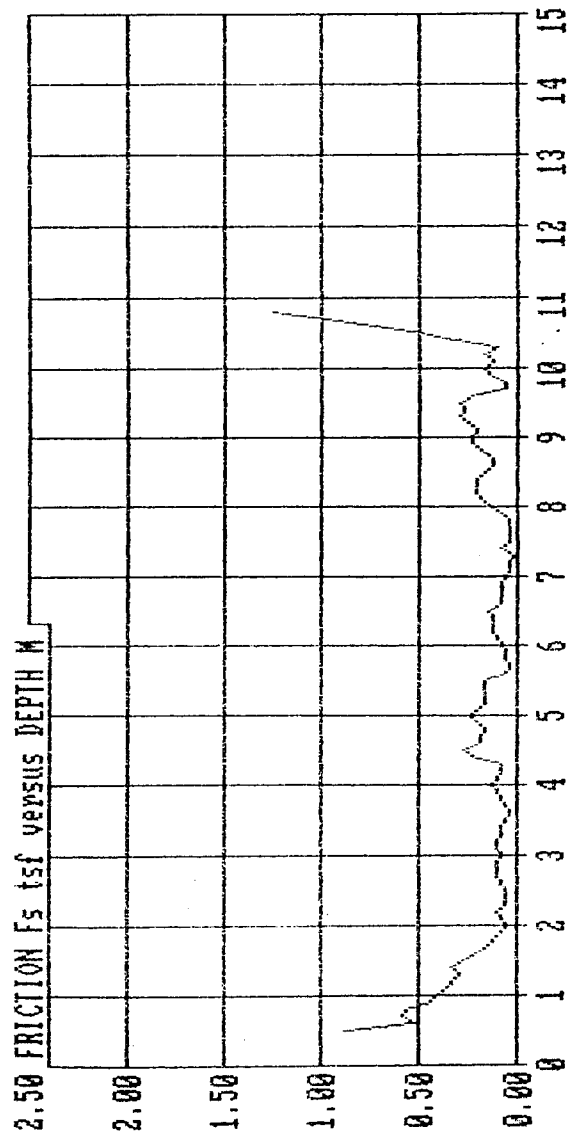
SOUNDING DATA IN FILE SHD-94 86-27-94 21:24
OPERATOR : S. VAN
CLIENT : WES
LOCATION : P-9/BFC-KC MO
JOB No. : DACN39-94-M-5062

Vandehy Soil Exploration
40695 Nw Pacific Ave. Banks, Oregon. 97106 (503) 324 3261



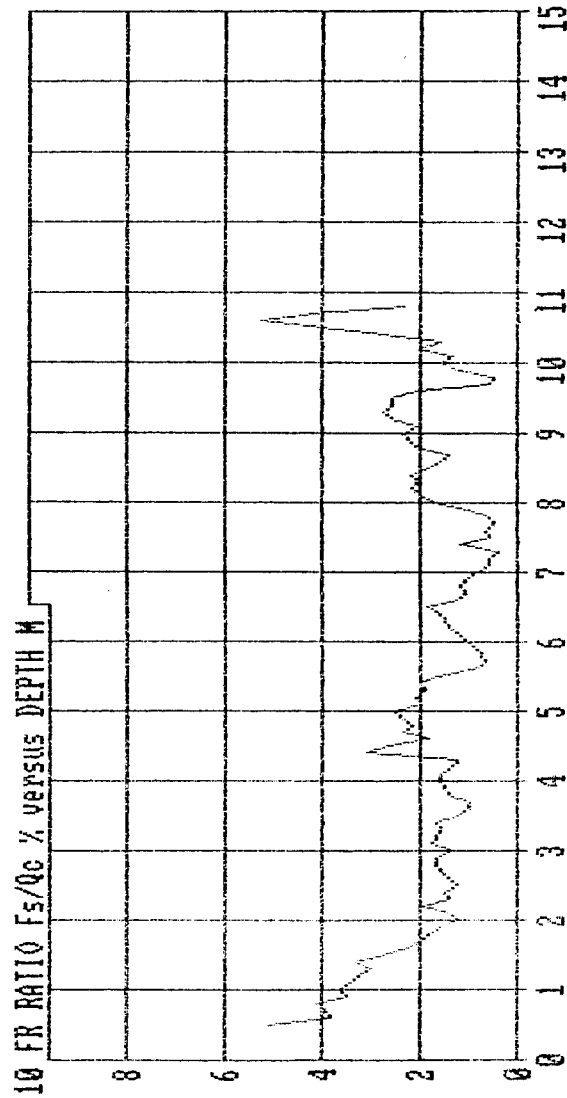
SOUNDING DATA IN FILE SHD-94 06-27-94 21:24
OPERATOR : S. VAN
CLIENT : WES
LOCATION : P-9/BFC-KC MO
JOB No. : DACH39-94-M-5062

Vandehey Soil Exploration
40695 NW Pacific Ave. Banks, Oregon. 97106 (503) 324 3261



SOUNDING DATA IN FILE SND-94 86-27-94 21:24
OPERATOR : S. VAN
CLIENT : HES
LOCATION : P-9/BFC-KC MO
JOB No. : DACH39-94-M-5062

Vandehy Soil Exploration
40695 Nw Pacific Ave. Banks, Oregon, 97106 (503) 324 3261

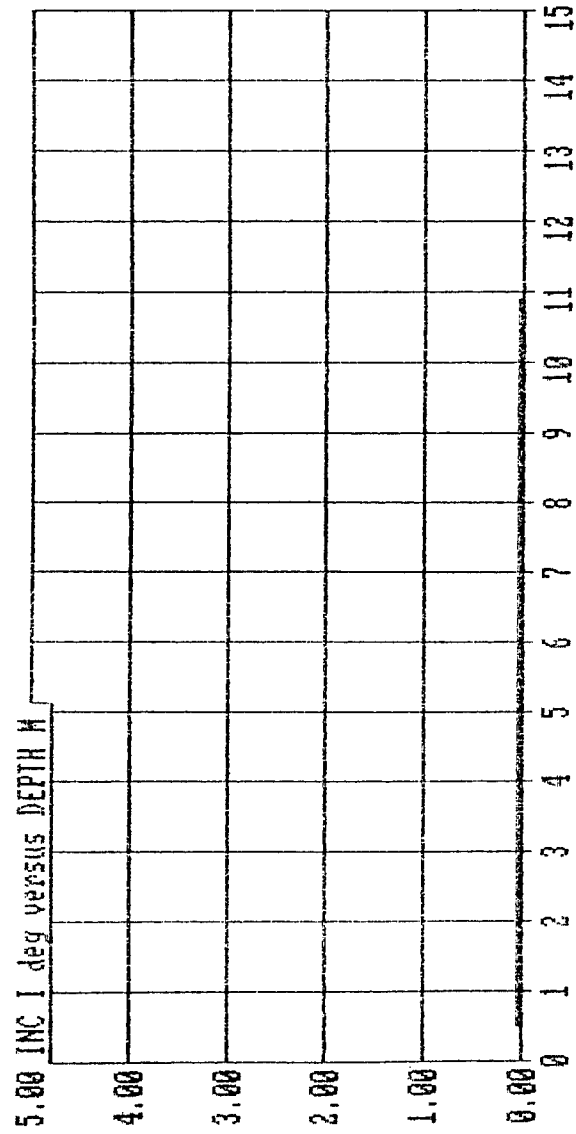


SOUNDING DATA IN FILE SHD-94 06-27-94 21:24

OPERATOR : S. VAN
LOCATION : P-9/BFC-KC MO

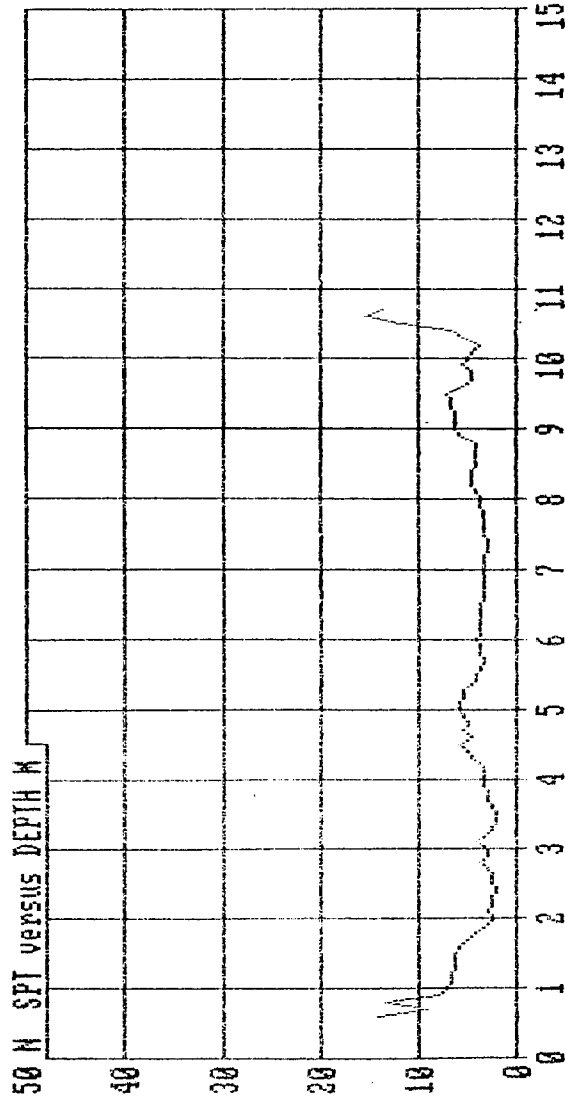
CLIENT : YES
JOB No. : DACH39-94-M-5062

Uandelemy Soil Exploration
48695 NW Pacific Ave. Banks, Oregon. 97106 (503) 324 3261



SOUNDING DATA IN FILE SHD-94 06-27-94 21:24
OPERATOR : S.VAN
LOCATION : P-9/BFC-KC MO
CLIENT : WES
JOB No. : DACH39-94-W-5062

Vandehey Soil Exploration
40695 NW Pacific Ave. Banks, Oregon. 97106 (503) 324 3261



SCPT P-10

Vandehey Soil Expl.

Operator : S.VAN

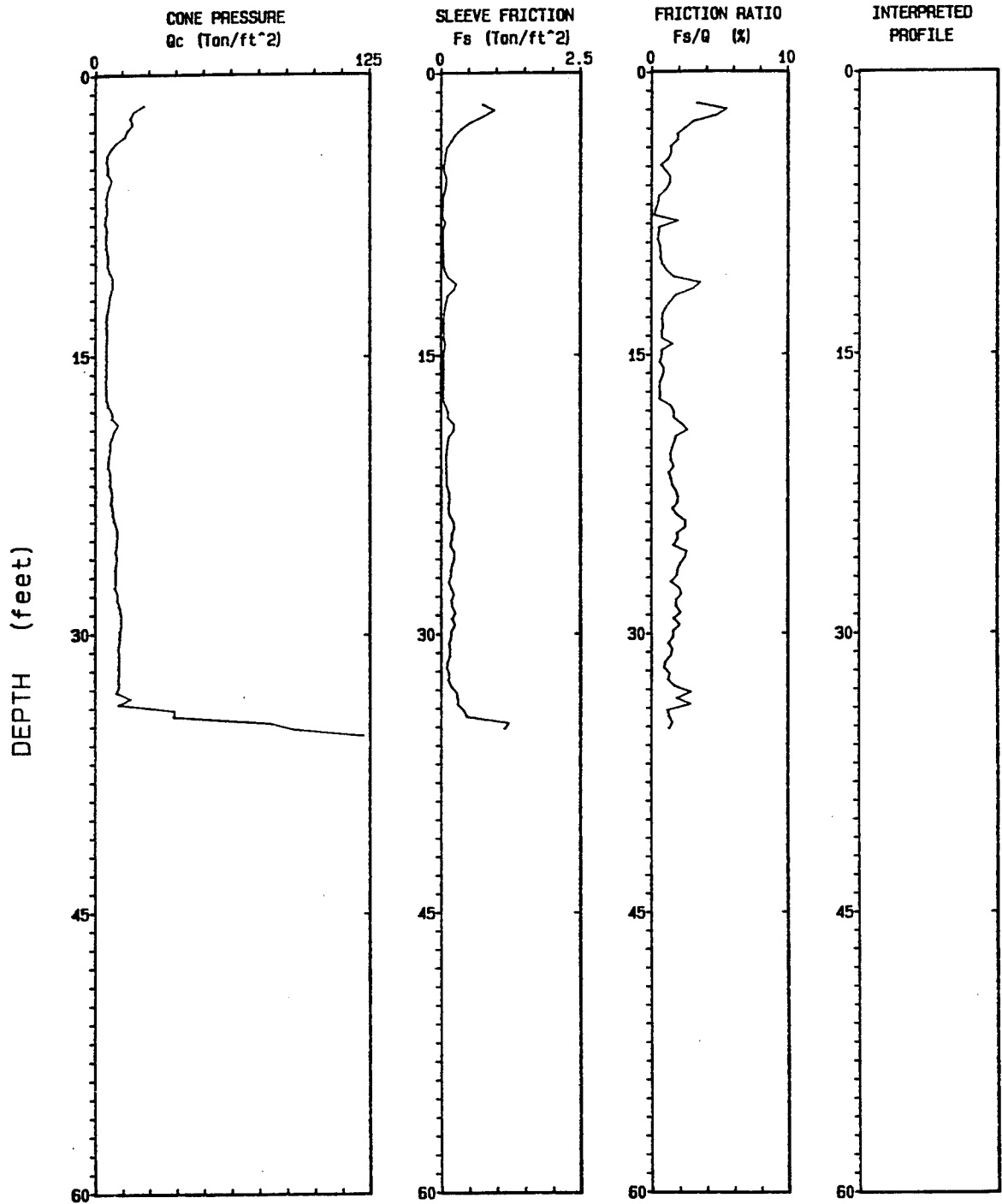
Sounding : SND-95 Pg 1 / 1

Client : WES

CPT Date : 06-28-94 16:09

Location : P-10BFC-KC MO

Job No. : DACW39-94-M-5062



Depth Increment : 0.1 m

Max Depth : 35.43 ft

SOUNDING DATA IN FILE SND-95 06-28-94 16:09

OPERATOR : S.VAN

LOCATION : P-10BFC-KC MO

CLIENT : WES

JOB No. : DACW39-94-M-5062

Vandehey Soil Exploration

40695 Nw Pacific Ave. Banks, Oregon. 97106 (503) 324 3261

DEPTH meters	DEPTH feet	TIP Qc tsf	FRICTION Fs tsf	FR RATIO Fs/Qc %	INC I deg	INTERPRETED SOIL TYPE
0.50	1.6	22.6	0.760	3.36	0.3	?
0.60	2.0	17.5	0.962	5.48	0.3	clay
0.70	2.3	16.0	0.755	4.71	0.1	clay
0.80	2.6	17.4	0.518	2.98	0.1	silty clay to clay
0.90	3.0	14.7	0.359	2.44	0.1	clayey silt to silty clay
1.00	3.3	13.4	0.245	1.83	0.1	clayey silt to silty clay
1.10	3.6	9.5	0.176	1.86	0.1	clayey silt to silty clay
1.20	3.9	7.0	0.095	1.36	0.1	clayey silt to silty clay
1.30	4.3	5.4	0.076	1.41	0.1	sensitive fine grained
1.40	4.6	5.1	0.060	1.18	0.1	sensitive fine grained
1.50	4.9	5.9	0.038	0.64	0.1	sensitive fine grained
1.60	5.2	5.6	0.060	1.06	0.1	sensitive fine grained
1.70	5.6	7.5	0.103	1.38	0.1	sensitive fine grained
1.80	5.9	6.2	0.080	1.28	0.1	sensitive fine grained
1.90	6.2	5.4	0.054	0.98	0.1	sensitive fine grained
2.00	6.6	4.8	0.023	0.47	0.1	sensitive fine grained
2.10	6.9	4.9	0.022	0.44	0.1	sensitive fine grained
2.20	7.2	5.5	0.015	0.28	0.1	sensitive fine grained
2.30	7.5	4.6	0.006	0.14	0.1	sensitive fine grained
2.40	7.9	4.2	0.081	1.94	0.1	sensitive fine grained
2.50	8.2	5.4	0.028	0.51	0.0	sensitive fine grained
2.60	8.5	4.7	0.023	0.48	0.0	sensitive fine grained
2.70	8.9	4.7	0.020	0.42	0.0	sensitive fine grained
2.80	9.2	4.8	0.030	0.63	0.0	sensitive fine grained
2.90	9.5	5.7	0.038	0.66	0.0	sensitive fine grained
3.00	9.8	5.8	0.039	0.67	0.0	sensitive fine grained
3.10	10.2	5.4	0.044	0.81	0.0	sensitive fine grained
3.20	10.5	6.5	0.074	1.13	0.0	sensitive fine grained
3.30	10.8	8.1	0.133	1.65	0.0	silty clay to clay
3.40	11.2	7.7	0.274	3.57	0.0	silty clay to clay
3.50	11.5	7.3	0.219	2.99	0.0	clay
3.60	11.8	6.3	0.109	1.73	0.0	silty clay to clay
3.70	12.1	6.1	0.084	1.37	0.0	sensitive fine grained
3.80	12.5	5.6	0.057	1.01	0.0	sensitive fine grained
3.90	12.8	5.2	0.040	0.77	0.0	sensitive fine grained
4.00	13.1	4.8	0.035	0.72	0.0	sensitive fine grained
4.10	13.5	5.0	0.043	0.85	0.0	sensitive fine grained
4.20	13.8	5.4	0.038	0.71	0.0	sensitive fine grained
4.30	14.1	5.3	0.040	0.75	0.0	sensitive fine grained
4.40	14.4	4.8	0.075	1.55	0.0	sensitive fine grained

Soil interpretation reference: Robertson & Campanella-1983, based on 60% hammer efficiency and .2" sliding data average

DEPTH meters	DEPTH feet	TIP Qc tsf	FRICTION Fs tsf	FR RATIO Fs/Qc %	INC I deg	INTERPRETED SOIL TYPE
4.50	14.8	5.2	0.037	0.71	0.0	sensitive fine grained
4.60	15.1	4.8	0.033	0.68	0.0	sensitive fine grained
4.70	15.4	5.1	0.030	0.59	0.0	sensitive fine grained
4.80	15.7	4.8	0.044	0.92	0.0	sensitive fine grained
4.90	16.1	4.9	0.040	0.81	0.0	sensitive fine grained
5.00	16.4	4.7	0.028	0.61	0.0	sensitive fine grained
5.10	16.7	4.8	0.025	0.53	0.0	sensitive fine grained
5.20	17.1	5.0	0.031	0.63	0.0	sensitive fine grained
5.30	17.4	5.2	0.031	0.59	0.0	sensitive fine grained
5.40	17.7	6.0	0.084	1.41	0.0	sensitive fine grained
5.50	18.0	7.7	0.128	1.65	0.0	clayey silt to silty clay
5.60	18.4	7.8	0.125	1.60	0.0	clayey silt to silty clay
5.70	18.7	10.5	0.232	2.21	0.0	silty clay to clay
5.80	19.0	8.5	0.224	2.62	0.0	silty clay to clay
5.90	19.4	7.6	0.133	1.76	0.0	silty clay to clay
6.00	19.7	6.6	0.107	1.62	0.0	silty clay to clay
6.10	20.0	6.8	0.098	1.46	0.0	sensitive fine grained
6.20	20.3	6.2	0.083	1.34	0.0	sensitive fine grained
6.30	20.7	5.7	0.081	1.42	0.0	sensitive fine grained
6.40	21.0	5.8	0.095	1.63	0.0	sensitive fine grained
6.50	21.3	7.0	0.087	1.24	0.0	sensitive fine grained
6.60	21.7	6.9	0.099	1.44	0.0	sensitive fine grained
6.70	22.0	6.7	0.101	1.50	0.0	clayey silt to silty clay
6.80	22.3	7.5	0.134	1.78	0.0	silty clay to clay
6.90	22.6	7.8	0.149	1.93	0.0	silty clay to clay
7.00	23.0	7.0	0.130	1.86	0.0	silty clay to clay
7.10	23.3	8.0	0.119	1.49	0.0	clayey silt to silty clay
7.20	23.6	8.2	0.155	1.89	0.0	silty clay to clay
7.30	23.9	8.9	0.221	2.49	0.0	silty clay to clay
7.40	24.3	9.8	0.240	2.44	0.0	silty clay to clay
7.50	24.6	10.3	0.189	1.83	0.0	clayey silt to silty clay
7.60	24.9	9.8	0.183	1.86	0.0	clayey silt to silty clay
7.70	25.3	9.7	0.153	1.58	0.0	clayey silt to silty clay
7.80	25.6	9.1	0.233	2.57	0.0	silty clay to clay
7.90	25.9	9.9	0.239	2.40	0.0	silty clay to clay
8.00	26.2	9.5	0.198	2.08	0.0	clayey silt to silty clay
8.10	26.6	9.1	0.169	1.87	0.0	clayey silt to silty clay
8.20	26.9	9.1	0.166	1.81	0.0	clayey silt to silty clay
8.30	27.2	9.2	0.127	1.38	0.0	clayey silt to silty clay
8.40	27.6	8.9	0.180	2.02	0.0	clayey silt to silty clay
8.50	27.9	10.5	0.230	2.20	0.0	clayey silt to silty clay
8.60	28.2	10.0	0.174	1.74	0.0	clayey silt to silty clay
8.70	28.5	11.3	0.201	1.78	0.0	clayey silt to silty clay
8.80	28.9	11.8	0.253	2.14	0.0	clayey silt to silty clay
8.90	29.2	12.2	0.192	1.58	0.0	clayey silt to silty clay
9.00	29.5	12.1	0.251	2.08	0.0	clayey silt to silty clay
9.10	29.9	11.2	0.174	1.55	0.0	clayey silt to silty clay
9.20	30.2	11.1	-0.171	1.54	0.0	clayey silt to silty clay
9.30	30.5	10.8	0.129	1.20	0.0	clayey silt to silty clay
9.40	30.8	10.4	0.159	1.53	0.0	clayey silt to silty clay

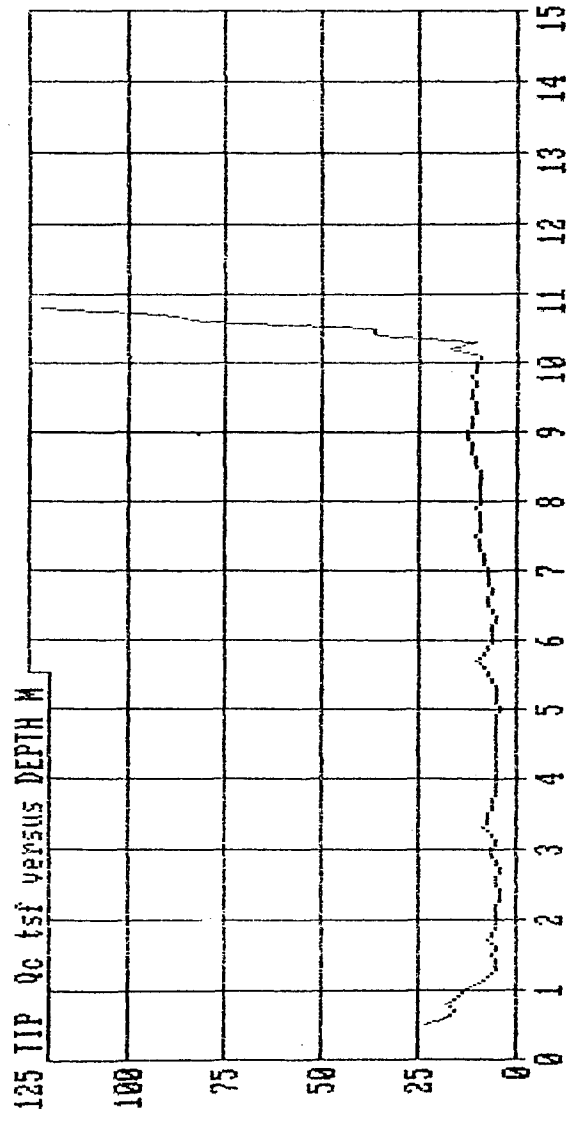
Soil interpretation reference: Robertson & Campanella-1983, based on 60% hammer efficiency and .2 m sliding data average

DEPTH meters	DEPTH feet	TIP Qc tsf	FRICTION Fs tsf	FR RATIO Fs/Qc %	INC I deg	INTERPRETED SOIL TYPE
9.50	31.2	11.1	0.153	1.37	0.1	clayey silt to silty clay
9.60	31.5	10.9	0.106	0.97	0.1	clayey silt to silty clay
9.70	31.8	10.6	0.092	0.87	0.1	clayey silt to silty clay
9.80	32.2	11.0	0.144	1.32	0.1	clayey silt to silty clay
9.90	32.5	10.5	0.123	1.17	0.1	clayey silt to silty clay
10.00	32.8	10.9	0.182	1.67	0.1	clayey silt to silty clay
10.10	33.1	9.6	0.278	2.88	0.1	clayey silt to silty clay
10.20	33.5	16.4	0.301	1.83	0.0	clayey silt to silty clay
10.30	33.8	10.7	0.305	2.86	0.0	sandy silt to clayey silt
10.40	34.1	36.8	0.415	1.13	0.0	sandy silt to clayey silt
10.50	34.4	36.6	0.474	1.30	0.0	silty sand to sandy silt
10.60	34.8	80.1	1.227	1.53	0.0	silty sand to sandy silt
10.70	35.1	91.4	1.138	1.25	0.1	?
10.80	35.4	122.2	?	?	0.1	?

Soil interpretation reference: Robertson & Campanella-1983, based on 60% hammer efficiency and .2 m sliding data average

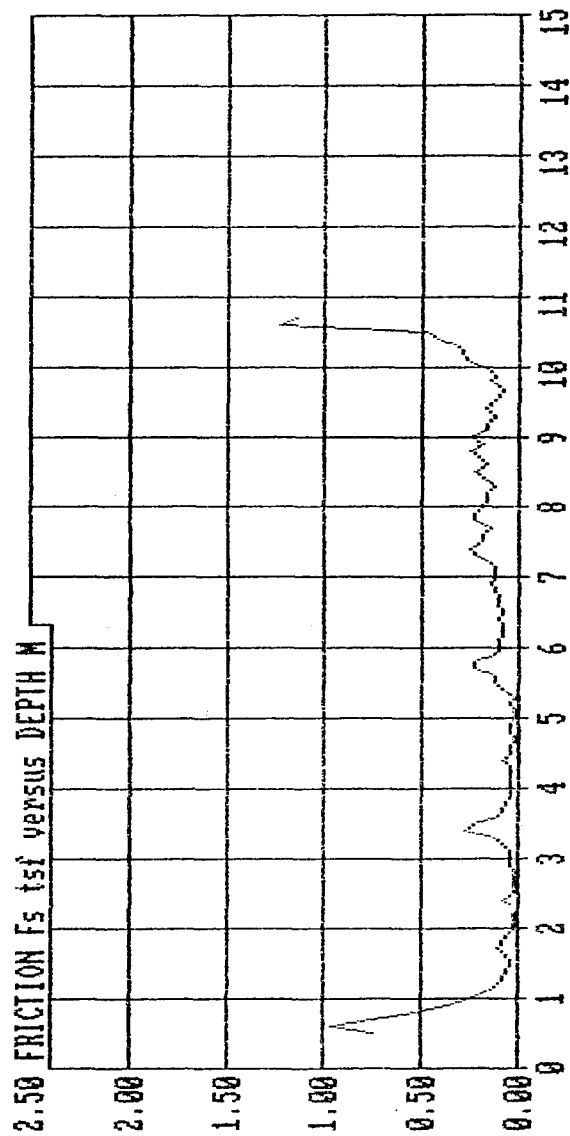
SOUNDING DATA IN FILE SND-95 06-28-94 16:09
OPERATOR : S. VAN
CLIENT : WES
JOB No. : DAC439-94-M-5062

Vandehey Soil Exploration
40695 Nw Pacific Ave. Banks, Oregon. 97106 (503) 324 3261



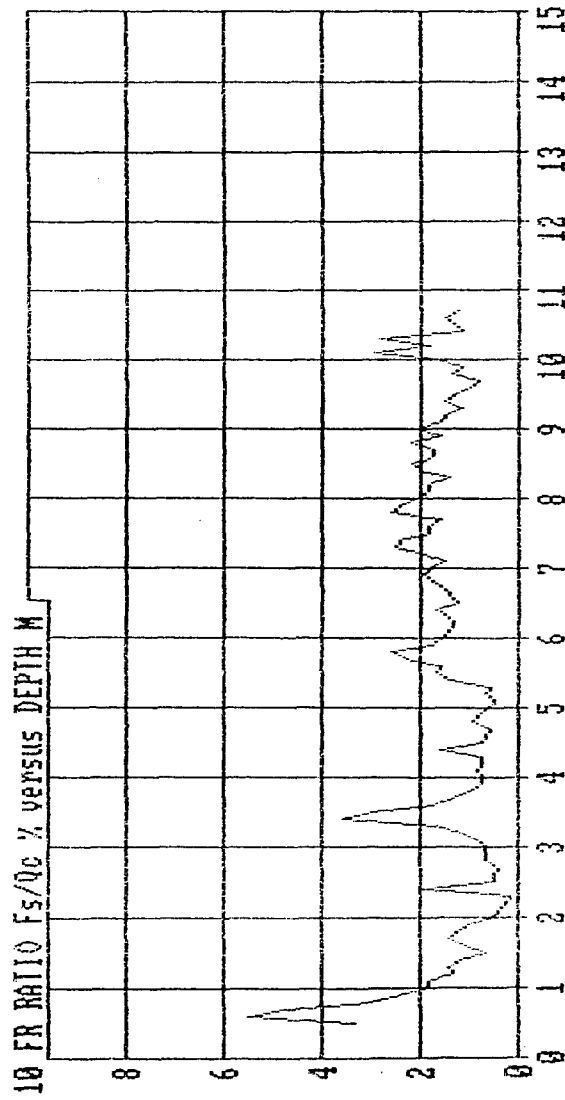
SOUNDING DATA IN FILE SND-95 06-28-94 16:09
OPERATOR : S.VAN
CLIENT : WES
LOCATION : P-10BFC-KC MO
JOB No. : DACH39-94-M-5062

Vandehey Soil Exploration
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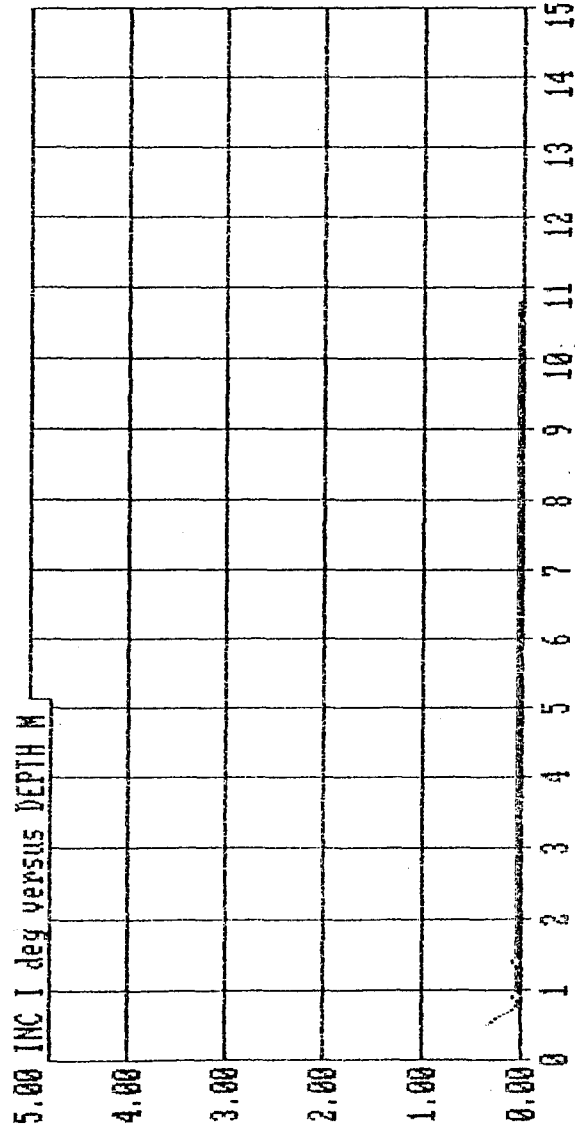
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OPERATOR : S. VAN
CLIENT : HES
LOCATION : P-10BFC-KC MO
JOB No. : DACH39-94-M-5062

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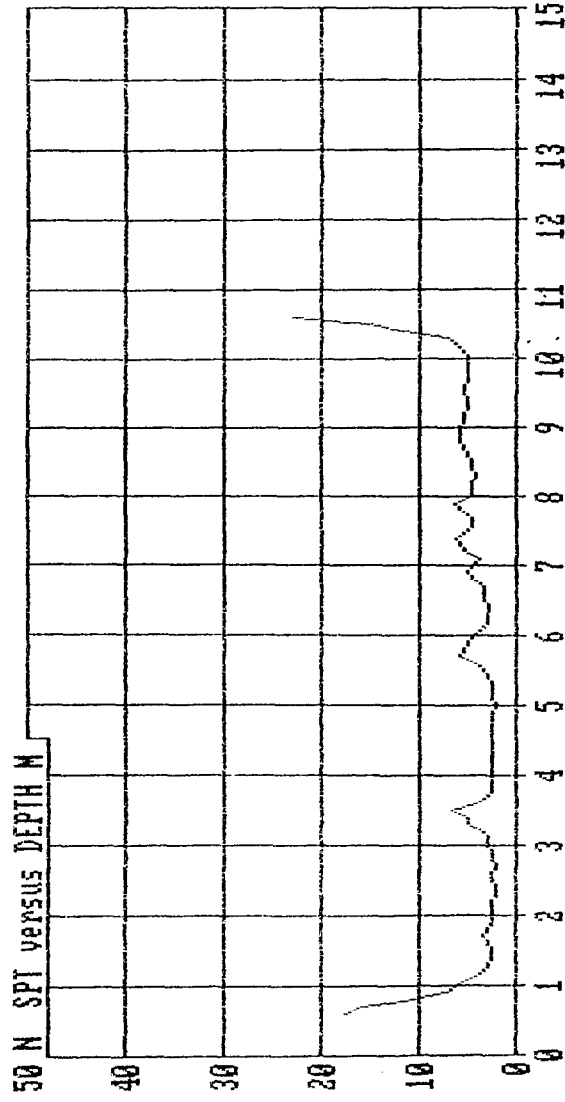
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OPERATOR : S. VAN
CLIENT : WES
LOCATION : P-10BFC-KC MO
JOB No. : DACU39-94-M-5062

Vandehey Soil Exploration
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SOUNDING DATA IN FILE SND-95 06-28-94 16:09
OPERATOR : S. VAN LOCATION : P-108FC-KC MO
CLIENT : WES JOB No. : DACU39-94-M-5062

Vandehey Soil Exploration
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SCPT P-11

Vandehey Soil Expl.

Operator : S.VAN

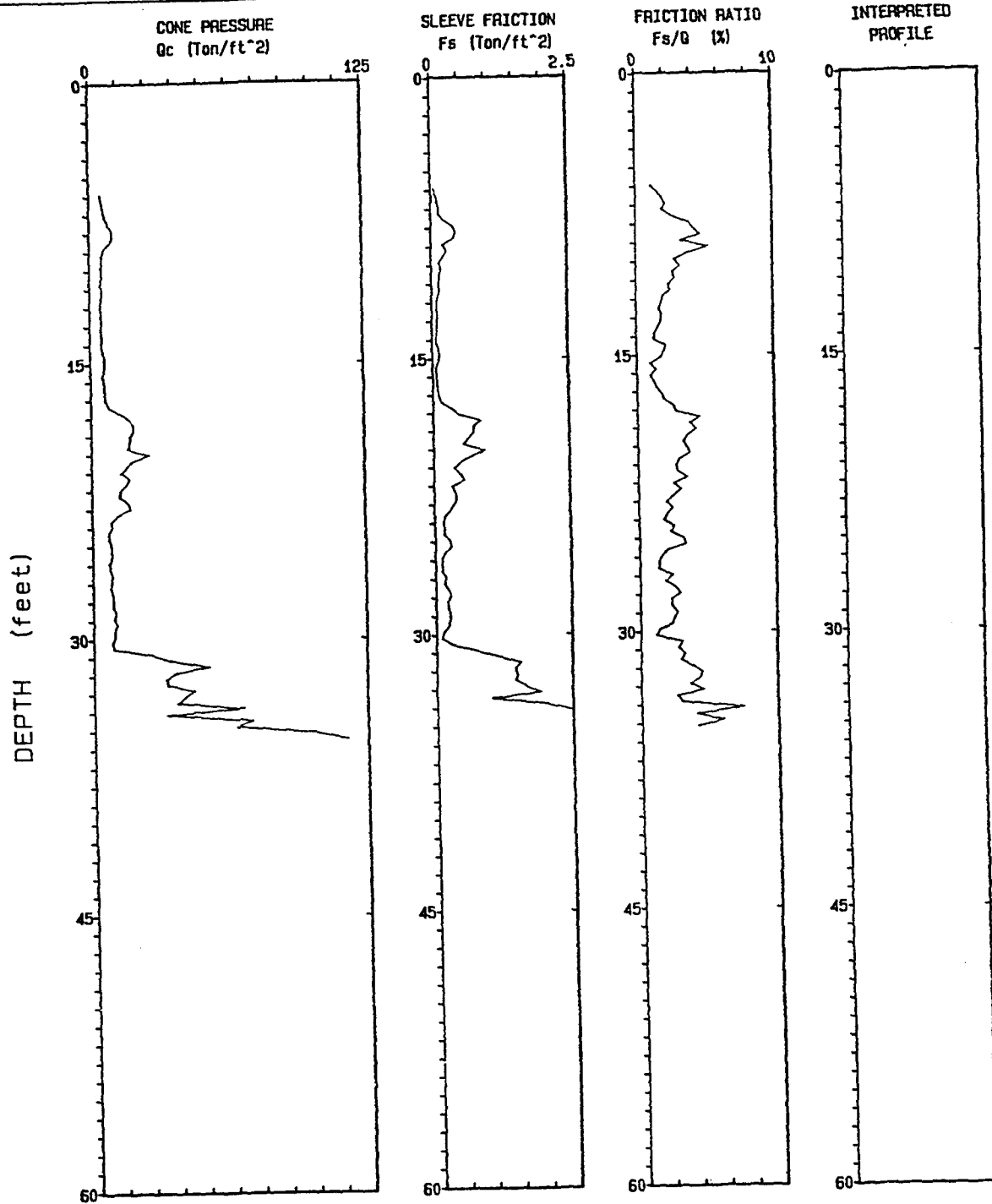
Sounding : SND-97 Pg 1 / 1

Client : WES

CPT Date : 06-28-94 19:36

Location : P-11/BFC-KC MO

Job No. : DACW39-94-M-5062



Depth Increment : .1 m

Max Depth : 35.43 ft

SOUNDING DATA IN FILE SND-97 06-28-94 19:36

OPERATOR : S.VAN

LOCATION : P-11/BFC-KC MO

CLIENT : WES

JOB No. : DACW39-94-M-5062

Vandehey Soil Exploration

40695 Nw Pacific Ave. Banks, Oregon. 97106 (503) 324 3261

DEPTH meters	DEPTH feet	TIP Qc tsf	FRICTION Fs tsf	FR RATIO Fs/Qc %	INC I deg	INTERPRETED SOIL TYPE
1.80	5.9	5.0	0.057	1.14	0.1	?
1.90	6.2	5.5	0.088	1.61	0.1	sensitive fine grained
2.00	6.6	6.1	0.117	1.92	0.1	silty clay to clay
2.10	6.9	6.8	0.148	2.18	0.0	silty clay to clay
2.20	7.2	7.5	0.143	1.92	0.0	silty clay to clay
2.30	7.5	8.8	0.241	2.74	0.1	silty clay to clay
2.40	7.9	10.7	0.415	3.89	0.0	clay
2.50	8.2	10.7	0.460	4.27	0.0	clay
2.60	8.5	8.6	0.409	4.74	0.0	clay
2.70	8.9	6.1	0.204	3.34	0.0	clay
2.80	9.2	5.4	0.290	5.34	0.0	clay
2.90	9.5	5.6	0.215	3.85	0.0	clay
3.00	9.8	5.0	0.139	2.80	0.0	clay
3.10	10.2	5.4	0.175	3.24	0.0	clay
3.20	10.5	5.4	0.146	2.69	0.0	clay
3.30	10.8	4.7	0.134	2.84	0.0	clay
3.40	11.2	5.6	0.133	2.39	0.0	clay
3.50	11.5	4.8	0.120	2.47	0.0	clay
3.60	11.8	4.9	0.095	1.95	0.0	silty clay to clay
3.70	12.1	4.7	0.086	1.83	0.0	silty clay to clay
3.80	12.5	5.0	0.083	1.66	0.0	silty clay to clay
3.90	12.8	5.2	0.098	1.87	0.0	silty clay to clay
4.00	13.1	5.2	0.094	1.80	0.0	silty clay to clay
4.10	13.5	5.3	0.082	1.55	0.0	sensitive fine grained
4.20	13.8	5.4	0.071	1.33	0.0	sensitive fine grained
4.30	14.1	5.4	0.068	1.24	0.0	sensitive fine grained
4.40	14.4	5.8	0.126	2.16	0.0	silty clay to clay
4.50	14.8	6.6	0.131	1.98	0.1	silty clay to clay
4.60	15.1	6.3	0.105	1.67	0.1	silty clay to clay
4.70	15.4	5.9	0.058	0.97	0.1	sensitive fine grained
4.80	15.7	5.1	0.075	1.45	0.1	sensitive fine grained
4.90	16.1	5.9	0.057	0.95	0.1	sensitive fine grained
5.00	16.4	6.0	0.072	1.20	0.1	sensitive fine grained
5.10	16.7	6.5	0.095	1.46	0.1	sensitive fine grained
5.20	17.1	6.7	0.121	1.80	0.0	silty clay to clay
5.30	17.4	8.2	0.163	1.98	0.1	silty clay to clay
5.40	17.7	13.1	0.344	2.63	0.1	clayey silt to silty clay
5.50	18.0	17.2	0.495	2.87	0.1	silty clay to clay
5.60	18.4	19.3	0.884	4.59	0.0	silty clay to clay
5.70	18.7	19.1	0.731	3.84	0.0	silty clay to clay

Soil interpretation reference: Robertson & Campanella-1983, based on 60% hammer efficiency and .2 m sliding data average

DEPTH meters	DEPTH feet	TIP Qc tsf	FRICTION Fs tsf	FR RATIO Fs/Qc %	INC I deg	INTERPRETED SOIL TYPE
5.80	19.0	17.2	0.733	4.26	0.0	silty clay to clay
5.90	19.4	17.6	0.639	3.64	0.0	silty clay to clay
6.00	19.7	16.7	0.554	3.32	0.0	silty clay to clay
6.10	20.0	26.1	0.944	3.62	0.0	silty clay to clay
6.20	20.3	18.3	0.690	3.77	0.0	silty clay to clay
6.30	20.7	16.1	0.483	3.00	0.0	silty clay to clay
6.40	21.0	13.5	0.377	2.79	0.0	clayey silt to silty clay
6.50	21.3	17.1	0.495	2.89	0.1	clayey silt to silty clay
6.60	21.7	15.4	0.557	3.61	0.1	silty clay to clay
6.70	22.0	12.9	0.336	2.60	0.1	silty clay to clay
6.80	22.3	12.4	0.392	3.15	0.1	clayey silt to silty clay
6.90	22.6	16.4	0.410	2.50	0.1	clayey silt to silty clay
7.00	23.0	17.5	0.356	2.04	0.1	clayey silt to silty clay
7.10	23.3	11.5	0.289	2.51	0.1	clayey silt to silty clay
7.20	23.6	8.7	0.180	2.07	0.1	clayey silt to silty clay
7.30	23.9	8.5	0.152	1.78	0.1	silty clay to clay
7.40	24.3	7.0	0.183	2.61	0.1	silty clay to clay
7.50	24.6	7.5	0.174	2.31	0.1	silty clay to clay
7.60	24.9	8.4	0.274	3.26	0.1	clay
7.70	25.3	8.6	0.291	3.36	0.1	silty clay to clay
7.80	25.6	8.7	0.171	1.97	0.1	silty clay to clay
7.90	25.9	7.3	0.116	1.59	0.1	clayey silt to silty clay
8.00	26.2	7.7	0.105	1.36	0.1	clayey silt to silty clay
8.10	26.6	8.9	0.123	1.37	0.1	clayey silt to silty clay
8.20	26.9	8.4	0.204	2.44	0.1	silty clay to clay
8.30	27.2	7.8	0.147	1.88	0.1	silty clay to clay
8.40	27.6	8.9	0.229	2.57	0.1	silty clay to clay
8.50	27.9	9.2	0.270	2.94	0.1	silty clay to clay
8.60	28.2	9.3	0.212	2.29	0.1	silty clay to clay
8.70	28.5	10.3	0.238	2.30	0.1	silty clay to clay
8.80	28.9	9.3	0.254	2.72	0.1	silty clay to clay
8.90	29.2	10.6	0.266	2.51	0.1	silty clay to clay
9.00	29.5	9.5	0.219	2.31	0.1	clayey silt to silty clay
9.10	29.9	9.5	0.129	1.35	0.1	clayey silt to silty clay
9.20	30.2	8.3	0.092	1.11	0.1	clayey silt to silty clay
9.30	30.5	9.4	0.290	3.09	0.1	clayey silt to silty clay
9.40	30.8	26.6	0.742	2.79	0.1	clayey silt to silty clay
9.50	31.2	35.3	1.139	3.23	0.1	clayey silt to silty clay
9.60	31.5	52.8	1.554	2.94	0.1	clayey silt to silty clay
9.70	31.8	37.7	1.452	3.85	0.1	clayey silt to silty clay
9.80	32.2	32.8	1.494	4.55	0.1	silty clay to clay
9.90	32.5	33.7	1.448	4.29	0.1	silty clay to clay
10.00	32.8	45.8	1.672	3.65	0.1	clayey silt to silty clay
10.10	33.1	41.3	1.922	4.65	0.1	clayey silt to silty clay
10.20	33.5	38.1	1.022	2.68	0.1	clayey silt to silty clay
10.30	33.8	68.4	2.055	3.00	0.1	clayey silt to silty clay
10.40	34.1	33.2	2.499	7.52	0.3	silty clay to clay
10.50	34.4	72.0	2.972	4.13	0.2	silty clay to clay
10.60	34.8	65.0	3.935	6.05	0.2	very stiff fine grained (*)
10.70	35.1	101.8	4.225	4.15	0.2	?

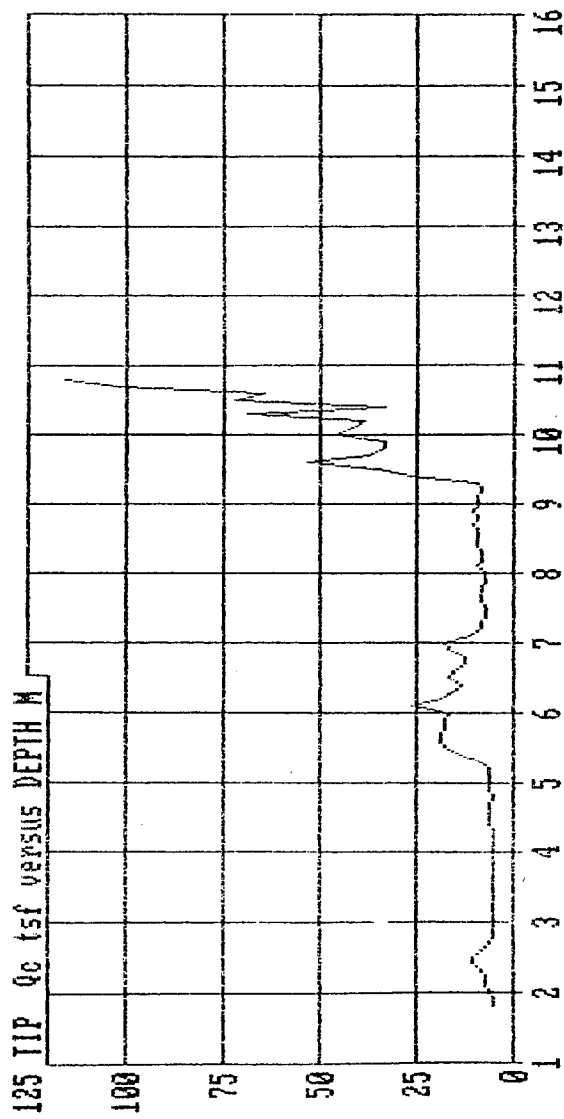
Soil interpretation reference: Robertson & Campanella-1983, based on 60% hammer efficiency and .2 m sliding data average

SND-97 : P-11/BFC-KC MO : 06-28-94 19:36 PAGE 3

DEPTH	DEPTH	TIP	FRICTION	FR RATIO	INC	INTERPRETED
meters	feet	Qc tsf	Fs tsf	Fs/Qc %	I deg	SOIL TYPE
10.80	35.4	115.6	?	?	0.2	?

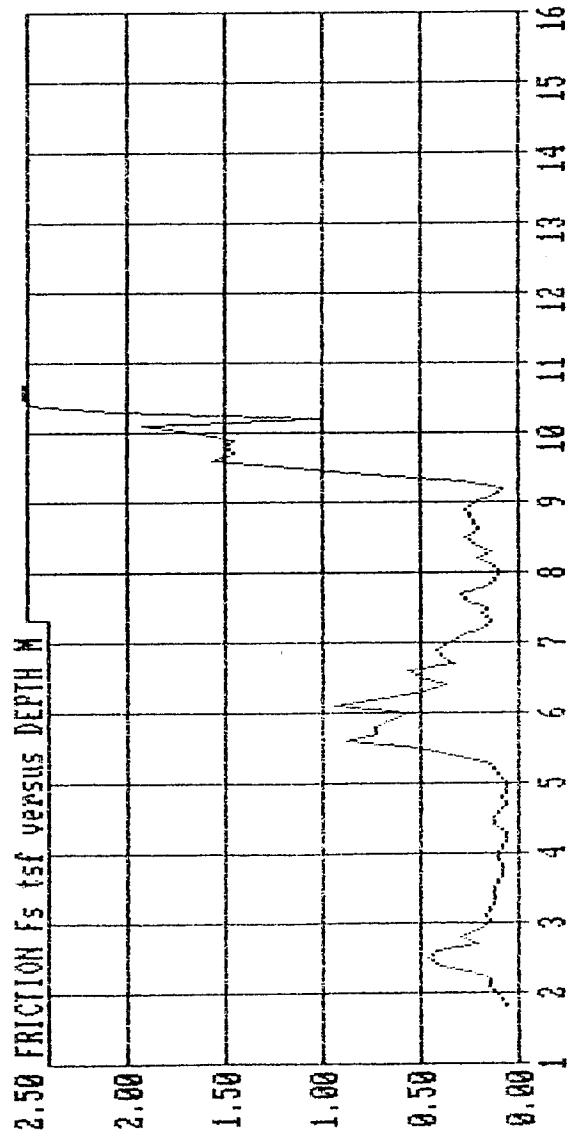
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OPERATOR : S.VAN
CLIENT : WES
LOCATION : P-11/BFC-KC MO
JOB No. : DACH39-94-M-5862

Vandehy Soil Exploration
40695 NW Pacific Ave. Banks, Oregon. 97106 (503) 324 3261



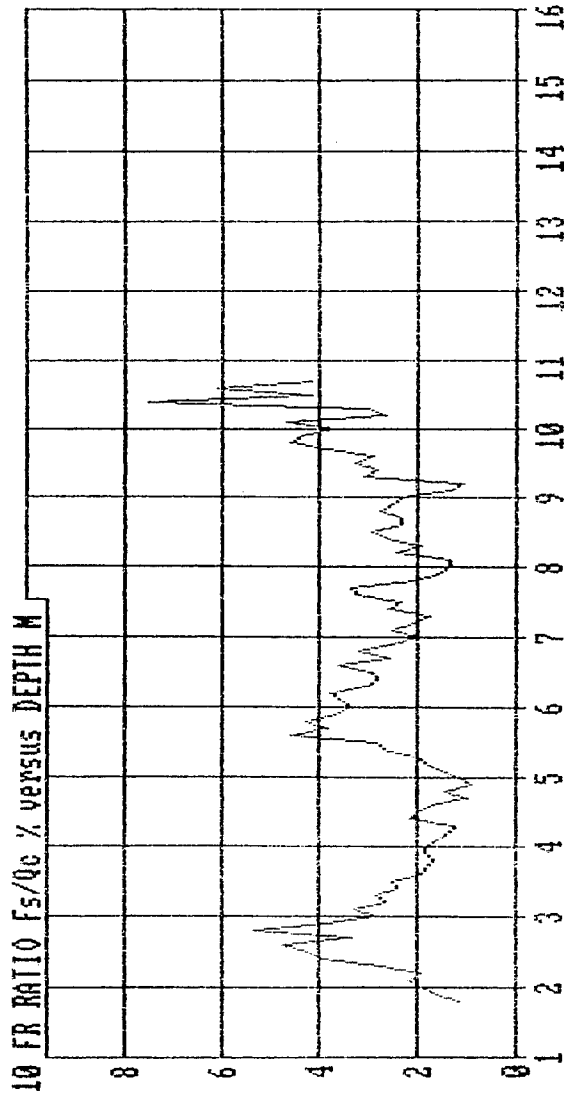
SOUNDING DATA IN FILE SND-97 06-28-94 19:36
OPERATOR : S. VAN
CLIENT : WES
LOCATION : P-11/BFC-KC MO
JOB No. : DACH39-94-M-5062

Vandehy Soil Exploration
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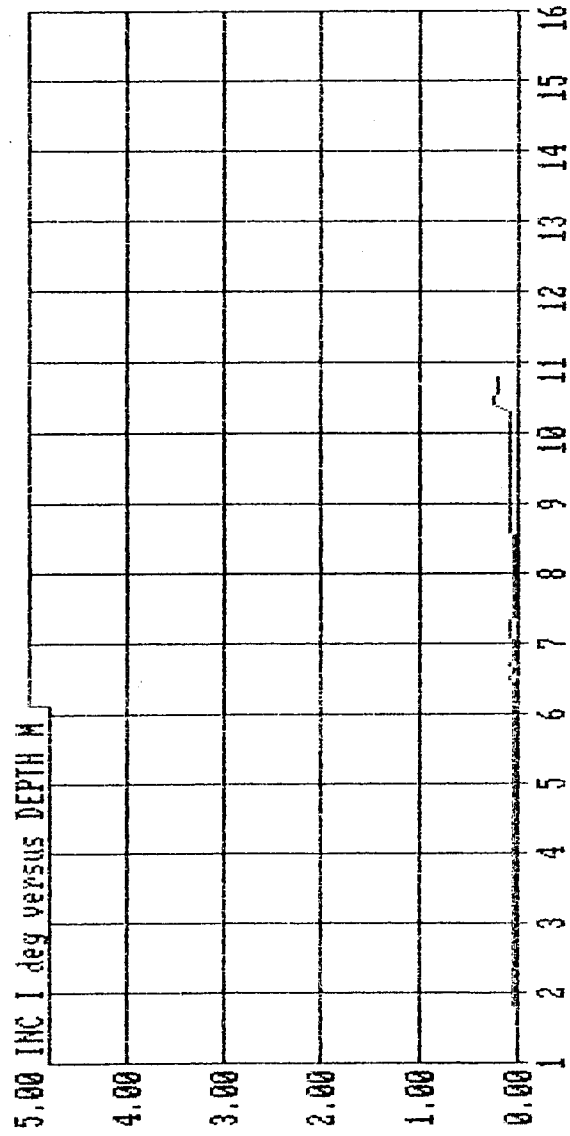
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OPERATOR : S. VAN LOCATION : P-11/BFC-KC MO
CLIENT : WES JOB No. : DACH39-94-M-5062

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40695 Nw Pacific Ave. Banks, Oregon, 97106 (503) 324 3261



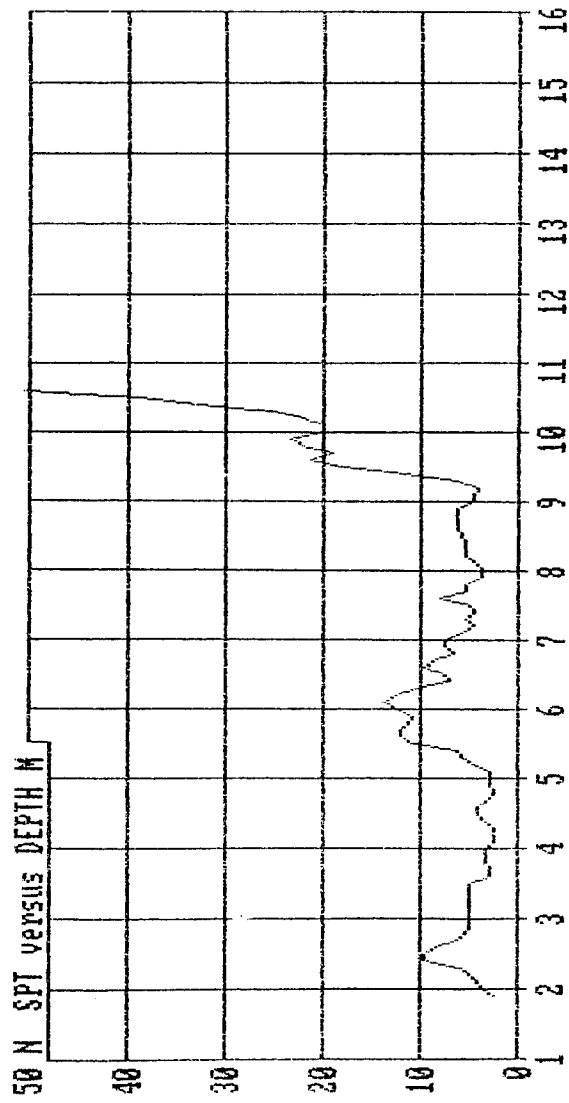
SOUNDING DATA IN FILE SND-97 06-28-94 19:36
OPERATOR : S.VAN LOCATION : P-11/BFC-KC MO
CLIENT : WES JOB No. : DACH39-94-M-5062

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SOUNDING DATA IN FILE SND-97 06-28-94 19:36
OPERATOR : S.VAN
CLIENT : WES
LOCATION : P-11/BFC-KC MO
JOB No. : DACH39-94-M-5062

Vandehey Soil Exploration
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SCPT P-12

Vandehey Soil Expl.

Operator : S.VAN

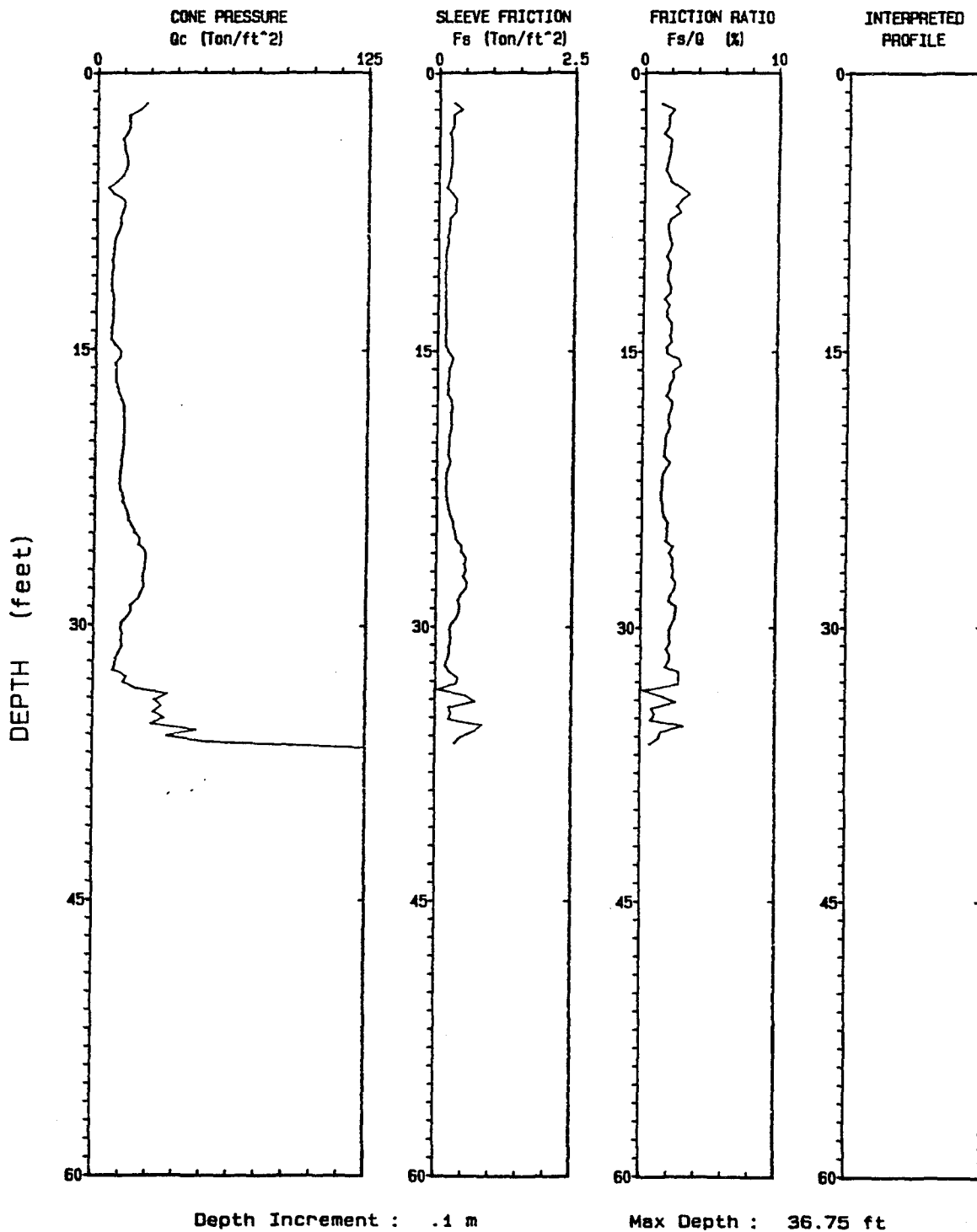
Sounding : SND109 Pg 1 / 1

Client : WES

CPT Date : 06-30-94 20:07

Location : P-12/BFC-KC-MO

Job No. : DACW39-94-M-5062



SOUNDING DATA IN FILE SND108 06-30-94 20:07

OPERATOR : S.VAN

LOCATION : P-12/BFC-KC-MO

CLIENT : WES

JOB No. : DACW39-94-M-5062

Vandehey Soil Exploration

40695 Nw Pacific Ave. Banks, Oregon. 97106 (503) 324 3261

DEPTH	DEPTH	TIP	FRICTION	FR RATIO	INC	INTERPRETED
meters	feet	Qc tsf	Fs tsf	Fs/Qc %	I deg	SOIL TYPE
0.50	1.6	22.6	0.276	1.23	0.0	?
0.60	2.0	19.6	0.421	2.15	0.0	sandy silt to clayey silt
0.70	2.3	14.6	0.253	1.73	0.1	clayey silt to silty clay
0.80	2.6	14.5	0.250	1.73	0.1	clayey silt to silty clay
0.90	3.0	14.6	0.242	1.66	0.1	clayey silt to silty clay
1.00	3.3	13.4	0.180	1.34	0.1	clayey silt to silty clay
1.10	3.6	11.6	0.230	1.99	0.1	clayey silt to silty clay
1.20	3.9	12.5	0.234	1.87	0.0	clayey silt to silty clay
1.30	4.3	12.7	0.235	1.85	0.0	clayey silt to silty clay
1.40	4.6	13.6	0.236	1.73	0.1	clayey silt to silty clay
1.50	4.9	13.9	0.226	1.62	0.1	clayey silt to silty clay
1.60	5.2	13.2	0.203	1.54	0.1	clayey silt to silty clay
1.70	5.6	11.8	0.219	1.85	0.0	clayey silt to silty clay
1.80	5.9	9.1	0.181	2.00	0.1	silty clay to clay
1.90	6.2	5.1	0.138	2.71	0.1	silty clay to clay
2.00	6.6	7.6	0.255	3.33	0.1	silty clay to clay
2.10	6.9	12.2	0.330	2.70	0.1	silty clay to clay
2.20	7.2	13.0	0.310	2.38	0.1	clayey silt to silty clay
2.30	7.5	11.7	0.317	2.71	0.1	clayey silt to silty clay
2.40	7.9	10.7	0.204	1.91	0.1	clayey silt to silty clay
2.50	8.2	11.2	0.195	1.74	0.1	clayey silt to silty clay
2.60	8.5	10.0	0.182	1.82	0.1	clayey silt to silty clay
2.70	8.9	8.5	0.169	1.95	0.1	clayey silt to silty clay
2.80	9.2	7.9	0.165	2.07	0.1	silty clay to clay
2.90	9.5	7.5	0.141	1.87	0.1	silty clay to clay
3.00	9.8	7.3	0.120	1.65	0.1	silty clay to clay
3.10	10.2	6.9	0.133	1.53	0.1	silty clay to clay
3.20	10.5	7.5	0.140	1.88	0.1	silty clay to clay
3.30	10.8	6.9	0.122	1.76	0.1	silty clay to clay
3.40	11.2	6.7	0.120	1.80	0.1	silty clay to clay
3.50	11.5	6.6	0.132	2.01	0.1	silty clay to clay
3.60	11.8	7.1	0.136	1.92	0.1	silty clay to clay
3.70	12.1	7.9	0.117	1.49	0.1	clayey silt to silty clay
3.80	12.5	7.8	0.151	1.93	0.1	clayey silt to silty clay
3.90	12.8	7.8	0.133	1.72	0.1	clayey silt to silty clay
4.00	13.1	7.6	0.134	1.77	0.1	silty clay to clay
4.10	13.5	7.6	0.151	2.11	0.1	silty clay to clay
4.20	13.8	6.8	0.140	2.05	0.1	silty clay to clay
4.30	14.1	6.8	0.133	1.95	0.1	silty clay to clay
4.40	14.4	7.2	0.153	2.13	0.1	silty clay to clay

Soil interpretation reference: Robertson & Campanella-1983, based on 60% hammer efficiency and .2 m sliding data average

DEPTH meters	DEPTH feet	TIP Qc tsf	FRICTION Fs tsf	FR RATIO Fs/Qc %	INC I deg	INTERPRETED SOIL TYPE
4.50	14.8	9.1	0.155	1.70	0.2	clayey silt to silty clay
4.60	15.1	11.6	0.210	1.81	0.2	clayey silt to silty clay
4.70	15.4	11.0	0.291	2.65	0.2	silty clay to clay
4.80	15.7	8.7	0.243	2.80	0.2	silty clay to clay
4.90	16.1	9.3	0.204	2.20	0.2	silty clay to clay
5.00	16.4	9.1	0.207	2.27	0.2	silty clay to clay
5.10	16.7	9.3	0.183	1.96	0.2	clayey silt to silty clay
5.20	17.1	10.1	0.155	1.92	0.2	clayey silt to silty clay
5.30	17.4	10.7	0.182	1.70	0.2	clayey silt to silty clay
5.40	17.7	11.8	0.251	2.21	0.4	clayey silt to silty clay
5.50	18.0	13.3	0.280	2.10	0.3	clayey silt to silty clay
5.60	18.4	13.2	0.255	1.93	0.3	clayey silt to silty clay
5.70	18.7	13.2	0.244	1.85	0.3	clayey silt to silty clay
5.80	19.0	13.3	0.268	2.02	0.5	clayey silt to silty clay
5.90	19.4	13.2	0.240	1.82	0.4	clayey silt to silty clay
6.00	19.7	13.0	0.219	1.69	0.4	clayey silt to silty clay
6.10	20.0	13.3	0.223	1.68	0.4	clayey silt to silty clay
6.20	20.3	12.9	0.210	1.63	0.5	clayey silt to silty clay
6.30	20.7	12.4	0.197	1.58	0.5	clayey silt to silty clay
6.40	21.0	12.0	0.247	2.05	0.5	clayey silt to silty clay
6.50	21.3	11.9	0.209	1.75	0.6	clayey silt to silty clay
6.60	21.7	11.6	0.174	1.50	0.6	clayey silt to silty clay
6.70	22.0	11.4	0.165	1.45	0.6	clayey silt to silty clay
6.80	22.3	11.2	0.167	1.49	0.6	clayey silt to silty clay
6.90	22.6	11.9	0.165	1.38	0.9	clayey silt to silty clay
7.00	23.0	12.7	0.175	1.38	0.9	clayey silt to silty clay
7.10	23.3	13.1	0.200	1.53	0.9	clayey silt to silty clay
7.20	23.6	14.4	0.219	1.53	0.9	clayey silt to silty clay
7.30	23.9	15.4	0.252	1.64	0.9	clayey silt to silty clay
7.40	24.3	15.6	0.303	1.52	0.9	clayey silt to silty clay
7.50	24.6	17.4	0.311	1.78	1.0	clayey silt to silty clay
7.60	24.9	18.6	0.349	1.88	1.0	sandy silt to clayey silt
7.70	25.3	21.0	0.371	1.76	1.2	sandy silt to clayey silt
7.80	25.6	20.4	0.472	2.32	1.2	sandy silt to clayey silt
7.90	25.9	23.4	0.467	2.00	1.4	sandy silt to clayey silt
8.00	26.2	23.9	0.551	2.31	1.4	sandy silt to clayey silt
8.10	26.6	23.4	0.523	2.23	1.4	sandy silt to clayey silt
8.20	26.9	23.3	0.558	2.40	1.4	clayey silt to silty clay
8.30	27.2	22.4	0.497	2.22	1.7	clayey silt to silty clay
8.40	27.6	22.4	0.572	2.56	1.7	clayey silt to silty clay
8.50	27.9	23.0	0.552	2.40	2.0	clayey silt to silty clay
8.60	28.2	21.2	0.448	2.11	2.0	clayey silt to silty clay
8.70	28.5	20.2	0.412	2.04	2.0	clayey silt to silty clay
8.80	28.9	17.0	0.446	2.62	2.2	clayey silt to silty clay
8.90	29.2	17.0	0.424	2.43	2.2	clayey silt to silty clay
9.00	29.5	15.3	0.372	2.44	2.2	clayey silt to silty clay
9.10	29.9	12.8	0.280	2.19	2.2	clayey silt to silty clay
9.20	30.2	12.2	0.246	2.02	2.7	clayey silt to silty clay
9.30	30.5	13.0	0.274	2.12	2.7	clayey silt to silty clay
9.40	30.8	12.4	0.263	2.12	2.7	clayey silt to silty clay

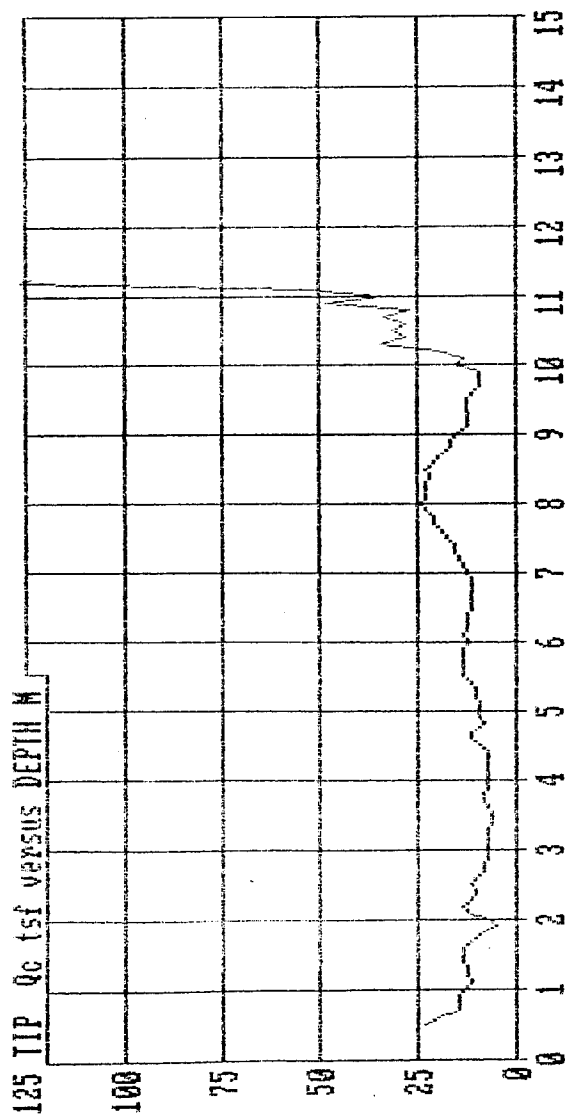
Soil interpretation reference: Robertson & Campanella-1983, based on 60% hammer efficiency and .2 s sliding data average

DEPTH	DEPTH	TIP	FRICTION	FR RATIO	INC	INTERPRETED
meters	feet	Qc tsf	Fs tsf	Fs/Qc %	I deg	SOIL TYPE
9.50	31.2	12.9	0.236	1.82	2.8	clayey silt to silty clay
9.60	31.5	11.3	0.238	2.11	2.9	clayey silt to silty clay
9.70	31.8	9.8	0.200	2.05	3.0	clayey silt to silty clay
9.80	32.2	9.8	0.175	1.79	3.0	clayey silt to silty clay
9.90	32.5	8.9	0.253	2.84	3.1	silty clay to clay
10.00	32.8	15.1	0.417	2.76	3.1	clayey silt to silty clay
10.10	33.1	13.6	0.373	2.75	3.1	clayey silt to silty clay
10.20	33.5	19.5	0.035	0.16	3.1	sandy silt to clayey silt
10.30	33.8	34.8	0.571	1.64	3.2	sandy silt to clayey silt
10.40	34.1	28.6	0.746	2.51	3.3	sandy silt to clayey silt
10.50	34.4	31.5	0.249	0.75	3.4	sandy silt to clayey silt
10.60	34.8	28.0	0.254	1.05	3.6	silty sand to sandy silt
10.70	35.1	33.1	0.243	0.73	3.9	sandy silt to clayey silt
10.80	35.4	26.9	0.871	3.23	3.8	sandy silt to clayey silt
10.90	35.8	48.0	0.717	1.49	4.0	sandy silt to clayey silt
11.00	36.1	34.7	0.460	1.32	3.9	silty sand to sandy silt
11.10	36.4	52.7	0.359	0.68	4.2	?
11.20	36.7	139.3	?	?	4.2	?

Soil interpretation reference: Robertson & Campanella-1983, based on 60% hammer efficiency and .2 m sliding data average

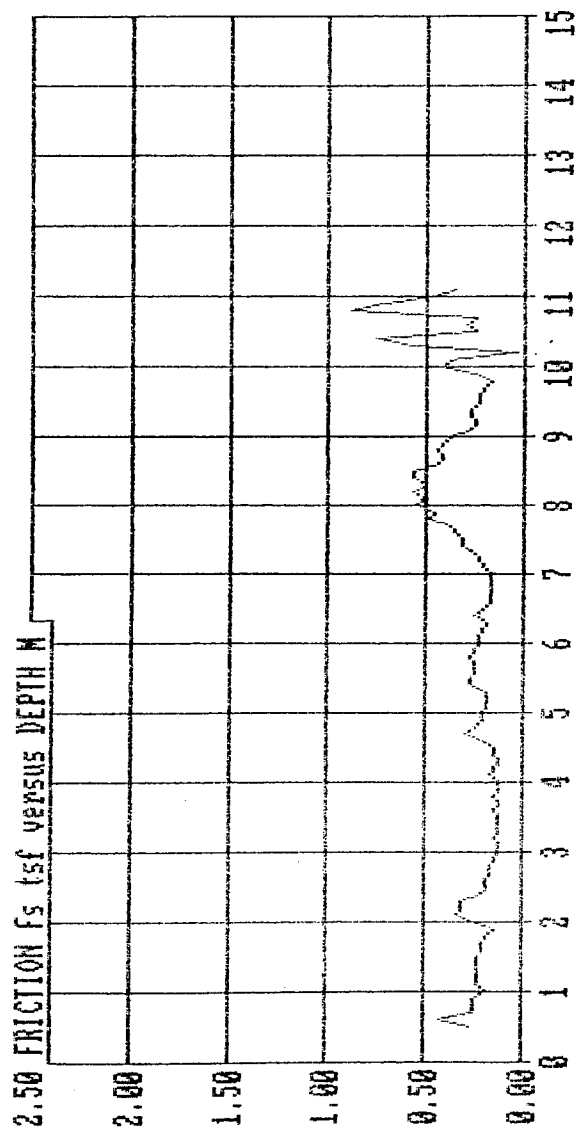
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OPERATOR : S.VAN
CLIENT : WES
LOCATION : P-12/BFC-KC-MO
JOB No. : DACH39-94-M-5062

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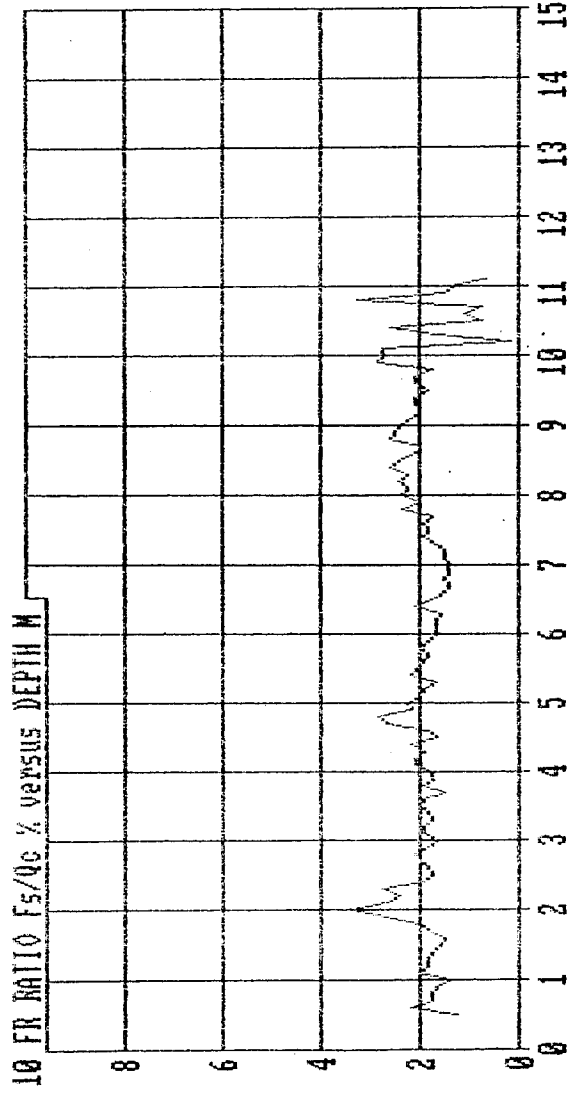
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CLIENT : WES
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JOB No. : DACH39-94-M-5862

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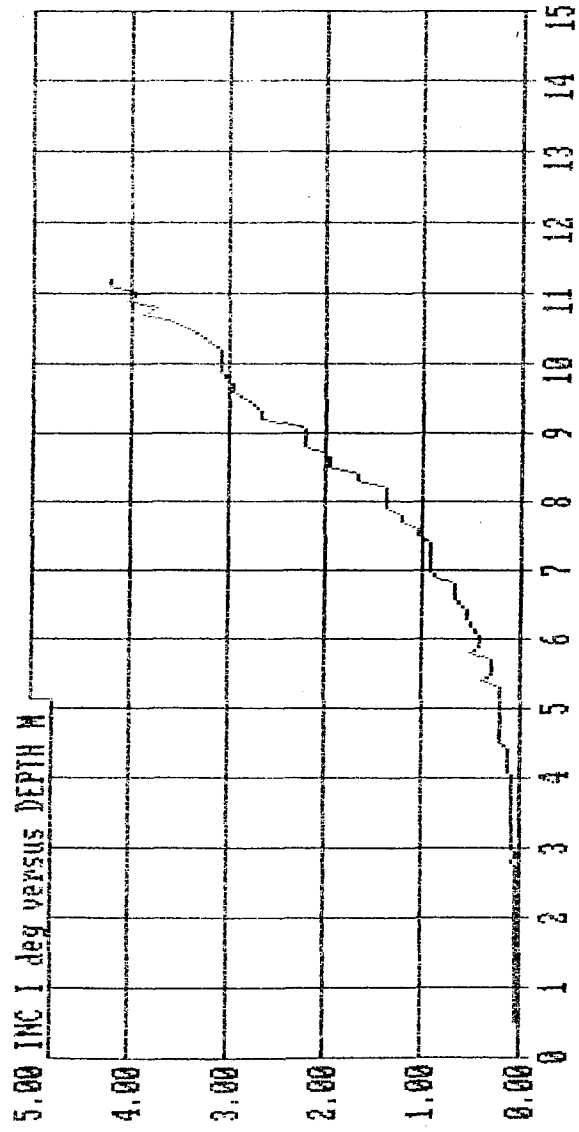
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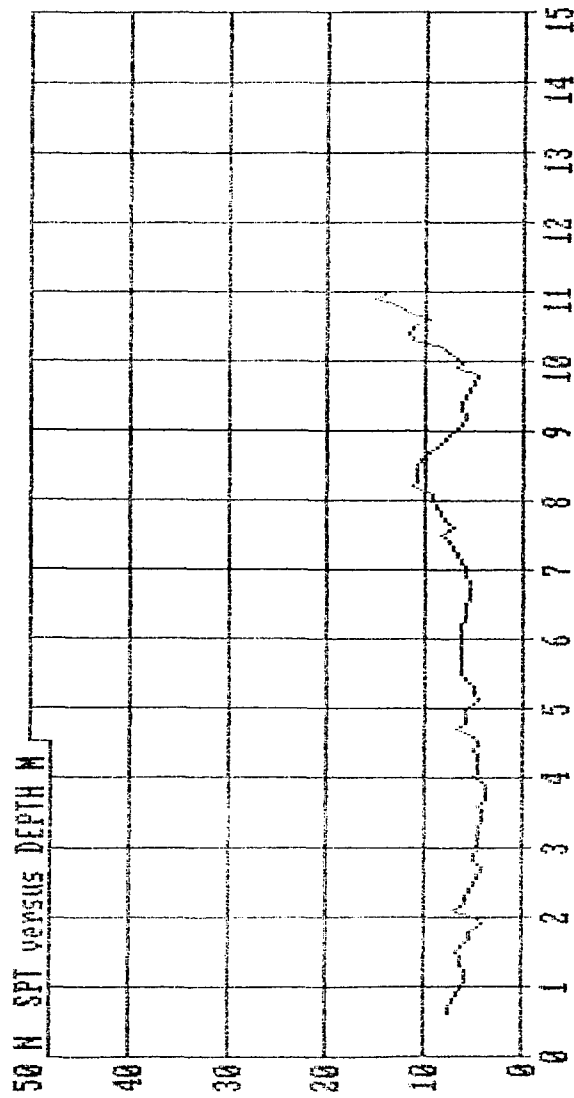
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CLIENT : WES
LOCATION : P-12/BFC-KC-MO
JOB No. : DACH39-94-M-5862

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SOUNDING DATA IN FILE SND109 06-30-94 20:07
OPERATOR : S. VAN
CLIENT : WES
LOCATION : P-12/BFC-KC-MO
JOB No. : DACH39-94-M-5062

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SCPT P-13

Vandehey Soil Expl.

Operator : S.VAN

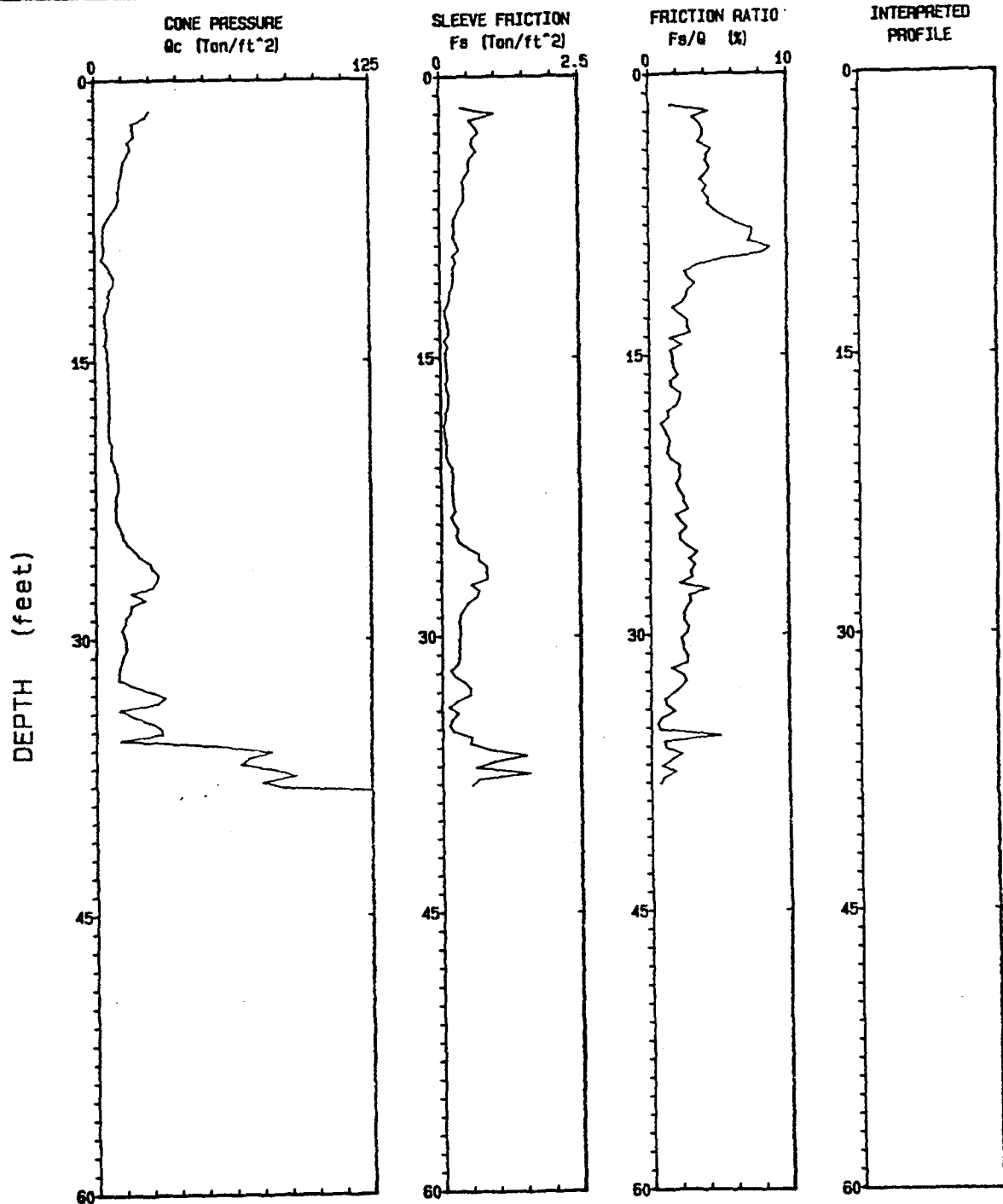
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Client : WES

CPT Date : 06-30-94 21:30

Location : P-13/BFC-KC MO

Job No. : DACW39-94-M-5062



Depth Increment : .1 m

Max Depth : 38.39 ft

SOUNDING DATA IN FILE SND110 06-30-94 21:30

OPERATOR : S.UAN

LOCATION : P-13/BFC-KC MD

CLIENT : WES

JOB No. : DACW39-94-M-5062

Vandehey Soil Exploration

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DEPTH	DEPTH	TIP	FRICTION	FR RATIO	IMC	INTERPRETED
meters	feet	Qc tsf	Fs tsf	Fs/Qc %	I deg	SOIL TYPE
0.50	1.6	24.9	0.391	1.57	0.1	?
0.60	2.0	23.1	0.990	4.29	0.0	clayey silt to silty clay
0.70	2.3	17.3	0.547	3.16	0.0	silty clay to clay
0.80	2.6	17.3	0.641	3.70	0.0	silty clay to clay
0.90	3.0	18.3	0.711	3.89	0.0	silty clay to clay
1.00	3.3	15.1	0.580	3.84	0.0	silty clay to clay
1.10	3.6	16.5	0.581	3.52	0.0	silty clay to clay
1.20	3.9	15.1	0.682	4.53	0.0	clay
1.30	4.3	13.2	0.551	4.17	0.0	clay
1.40	4.6	12.6	0.516	4.08	0.0	clay
1.50	4.9	12.3	0.537	4.38	0.0	clay
1.60	5.2	11.5	0.471	4.12	0.0	clay
1.70	5.6	11.2	0.419	3.73	0.0	clay
1.80	5.9	10.6	0.442	4.18	0.0	clay
1.90	6.2	11.1	0.432	3.89	0.0	clay
2.00	6.6	10.0	0.435	4.34	0.0	clay
2.10	6.9	8.4	0.363	4.32	0.0	clay
2.20	7.2	6.3	0.304	4.84	0.0	clay
2.30	7.5	4.6	0.249	5.40	0.0	clay
2.40	7.9	3.8	0.243	6.36	0.0	clay
2.50	8.2	3.6	0.272	7.49	0.0	organic material
2.60	8.5	3.2	0.242	7.51	0.0	organic material
2.70	8.9	4.0	0.290	7.18	0.0	organic material
2.80	9.2	3.8	0.394	8.79	0.0	organic material
2.90	9.5	2.7	0.220	8.09	0.0	organic material
3.00	9.8	5.6	0.281	5.01	0.0	clay
3.10	10.2	6.9	0.236	3.43	0.1	clay
3.20	10.5	6.6	0.219	2.55	0.1	silty clay to clay
3.30	10.8	6.5	0.237	2.81	0.1	silty clay to clay
3.40	11.2	6.5	0.214	3.28	0.1	clay
3.50	11.5	5.9	0.162	2.74	0.1	clay
3.60	11.8	6.2	0.166	2.67	0.1	clay
3.70	12.1	5.5	0.128	2.35	0.1	silty clay to clay
3.80	12.5	4.2	0.069	1.63	0.1	silty clay to clay
3.90	12.8	4.3	0.095	2.22	0.1	clay
4.00	13.1	4.7	0.130	2.78	0.1	clay
4.10	13.5	5.4	0.151	2.86	0.1	clay
4.20	13.8	5.1	0.148	2.93	0.1	clay
4.30	14.1	4.0	0.060	1.49	0.1	silty clay to clay
4.40	14.4	5.5	0.126	2.31	0.1	silty clay to clay

Soil interpretation reference: Robertson & Campanella-1983, based on 60% hammer efficiency and .2 m sliding data average

DEPTH meters	DEPTH feet	TIP Qc tsf	FRICTION Fs tsf	FR RATIO Fs/Qc %	INC I deg	INTERPRETED SOIL TYPE
4.50	14.8	5.6	0.084	1.50	0.1	silty clay to clay
4.60	15.1	5.9	0.100	1.70	0.1	sensitive fine grained
4.70	15.4	5.8	0.095	1.65	0.1	silty clay to clay
4.80	15.7	5.9	0.102	1.75	0.1	silty clay to clay
4.90	16.1	6.1	0.124	2.03	0.1	silty clay to clay
5.00	16.4	6.0	0.089	1.48	0.1	silty clay to clay
5.10	16.7	6.4	0.100	1.57	0.1	silty clay to clay
5.20	17.1	6.4	0.142	2.22	0.1	silty clay to clay
5.30	17.4	6.0	0.126	2.10	0.1	silty clay to clay
5.40	17.7	6.2	0.117	1.89	0.1	silty clay to clay
5.50	18.0	6.2	0.082	1.29	0.1	sensitive fine grained
5.60	18.4	5.5	0.079	1.35	0.1	sensitive fine grained
5.70	18.7	5.9	0.045	0.76	0.1	sensitive fine grained
5.80	19.0	6.0	0.064	1.07	0.1	sensitive fine grained
5.90	19.4	6.5	0.081	1.25	0.1	sensitive fine grained
6.00	19.7	7.5	0.113	1.50	0.1	clayey silt to silty clay
6.10	20.0	7.2	0.091	1.26	0.1	clayey silt to silty clay
6.20	20.3	7.2	0.089	1.24	0.1	clayey silt to silty clay
6.30	20.7	8.7	0.134	1.54	0.1	clayey silt to silty clay
6.40	21.0	9.3	0.204	2.20	0.0	clayey silt to silty clay
6.50	21.3	10.3	0.220	2.13	0.0	clayey silt to silty clay
6.60	21.7	10.1	0.217	2.16	0.0	clayey silt to silty clay
6.70	22.0	10.2	0.187	1.83	0.0	clayey silt to silty clay
6.80	22.3	9.3	0.194	2.08	0.0	clayey silt to silty clay
6.90	22.6	8.8	0.210	2.39	0.0	silty clay to clay
7.00	23.0	8.9	0.217	2.44	0.0	silty clay to clay
7.10	23.3	9.2	0.247	2.69	0.0	silty clay to clay
7.20	23.6	9.2	0.165	1.79	0.0	clayey silt to silty clay
7.30	23.9	10.6	0.231	2.18	0.0	clayey silt to silty clay
7.40	24.3	11.6	0.303	2.62	0.0	clayey silt to silty clay
7.50	24.6	12.7	0.261	2.06	0.0	clayey silt to silty clay
7.60	24.9	14.5	0.313	2.16	0.0	clayey silt to silty clay
7.70	25.3	17.6	0.471	2.66	0.0	clayey silt to silty clay
7.80	25.6	20.2	0.685	3.39	0.0	clayey silt to silty clay
7.90	25.9	24.6	0.690	2.80	0.0	clayey silt to silty clay
8.00	26.2	25.8	0.827	3.21	0.0	clayey silt to silty clay
8.10	26.6	28.6	0.820	2.87	0.0	clayey silt to silty clay
8.20	26.9	27.9	0.840	3.01	0.0	clayey silt to silty clay
8.30	27.2	25.7	0.536	2.09	0.0	clayey silt to silty clay
8.40	27.6	16.4	0.694	4.24	0.0	clayey silt to silty clay
8.50	27.9	22.5	0.624	2.78	0.0	clayey silt to silty clay
8.60	28.2	16.2	0.471	2.90	0.0	clayey silt to silty clay
8.70	28.5	15.6	0.395	2.54	0.0	clayey silt to silty clay
8.80	28.9	13.4	0.318	2.38	0.0	clayey silt to silty clay
8.90	29.2	12.9	0.309	2.39	0.0	clayey silt to silty clay
9.00	29.5	11.5	0.311	2.71	0.0	clayey silt to silty clay
9.10	29.9	12.9	0.332	2.58	0.0	clayey silt to silty clay
9.20	30.2	13.7	0.297	2.16	0.0	clayey silt to silty clay
9.30	30.5	13.7	0.317	2.32	0.0	clayey silt to silty clay
9.40	30.8	12.4	0.297	2.40	0.0	clayey silt to silty clay

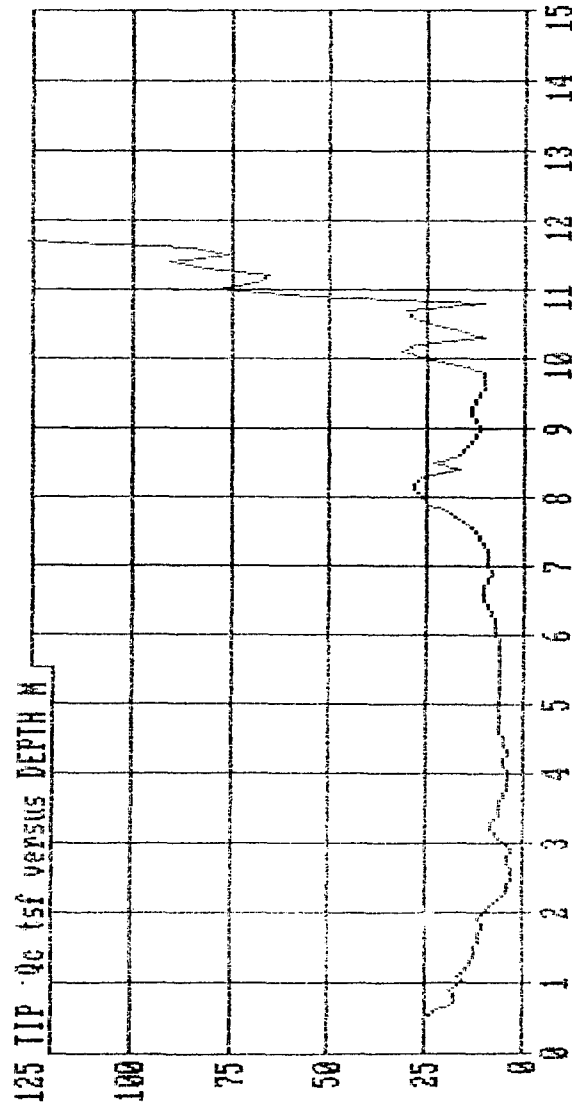
Soil interpretation reference: Robertson & Campanella-1983, based on 60% hammer efficiency and .2 m sliding data average

DEPTH meters	DEPTH feet	TIP Qc tsf	FRICTION Fs tsf	FR RATIO Fs/Qc %	INC I deg	INTERPRETED SOIL TYPE
9.50	31.2	11.5	0.307	2.68	0.0	silty clay to clay
9.60	31.5	10.6	0.271	2.56	0.0	clayey silt to silty clay
9.70	31.8	10.1	0.153	1.51	0.0	clayey silt to silty clay
9.80	32.2	9.9	0.235	2.37	0.0	clayey silt to silty clay
9.90	32.5	16.1	0.411	2.54	0.0	clayey silt to silty clay
10.00	32.8	24.6	0.517	2.10	0.0	sandy silt to clayey silt
10.10	33.1	31.4	0.506	1.61	0.0	sandy silt to clayey silt
10.20	33.5	27.7	0.253	0.95	0.1	sandy silt to clayey silt
10.30	33.8	10.6	0.126	1.19	0.1	sandy silt to clayey silt
10.40	34.1	16.5	0.287	1.74	0.1	sandy silt to clayey silt
10.50	34.4	24.2	0.174	0.72	0.1	sandy silt to clayey silt
10.60	34.8	29.1	0.124	0.43	0.1	silty sand to sandy silt
10.70	35.1	29.9	0.193	0.65	0.2	sandy silt to clayey silt
10.80	35.4	10.8	0.539	4.99	0.2	sandy silt to clayey silt
10.90	35.8	55.3	0.510	0.92	0.4	silty sand to sandy silt
11.00	36.1	79.6	0.867	1.09	0.3	silty sand to sandy silt
11.10	36.4	69.2	1.530	2.21	0.4	silty sand to sandy silt
11.20	36.7	65.7	0.946	1.44	0.3	silty sand to sandy silt
11.30	37.1	81.3	0.616	0.76	0.4	sand to silty sand
11.40	37.4	90.7	1.594	1.76	0.8	silty sand to sandy silt
11.50	37.7	75.9	0.656	0.86	0.9	sand to silty sand
11.60	38.1	85.4	0.541	0.63	1.0	?
11.70	38.4	174.7	?	?	1.0	?

Soil interpretation reference: Robertson & Campanella-1983, based on 60% hammer efficiency and .2 m sliding data average

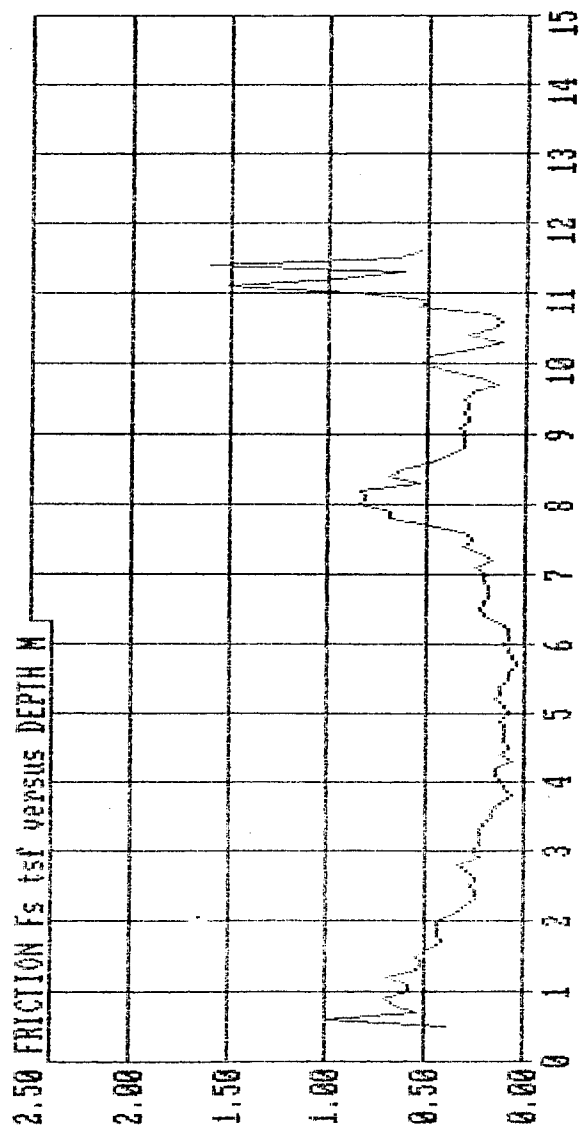
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CLIENT : WES JOB No. : DACH39-94-M-5062

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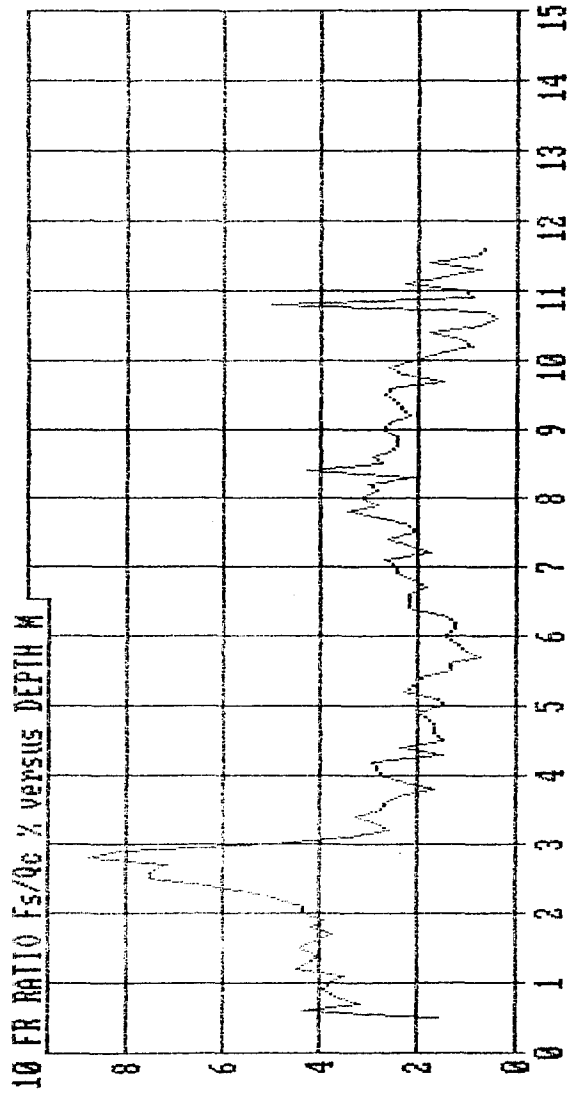
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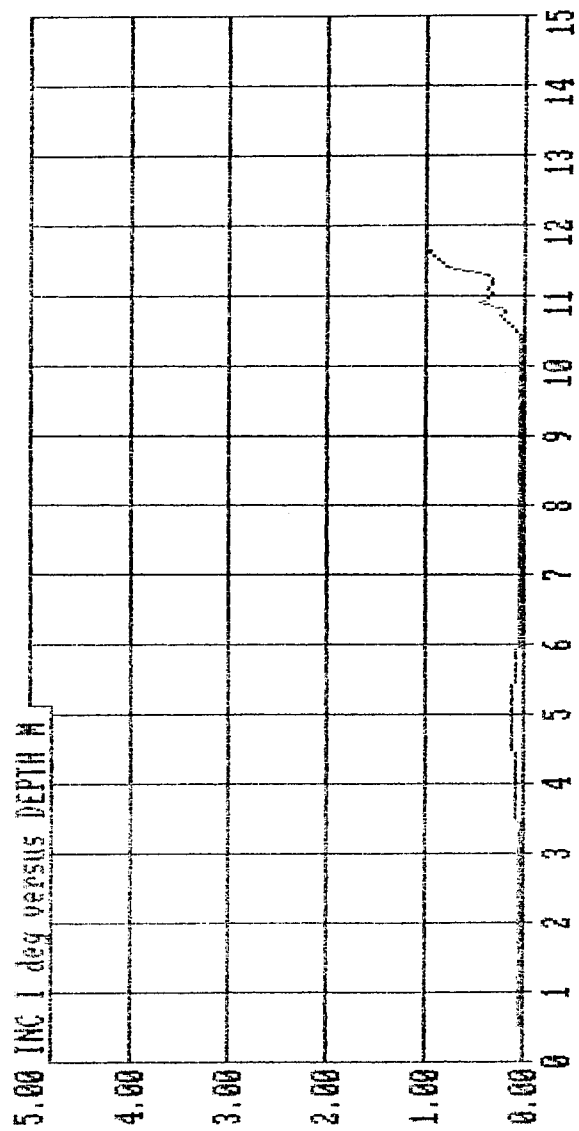
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CLIENT : WES JOB No. : DACM39-94-M-5062

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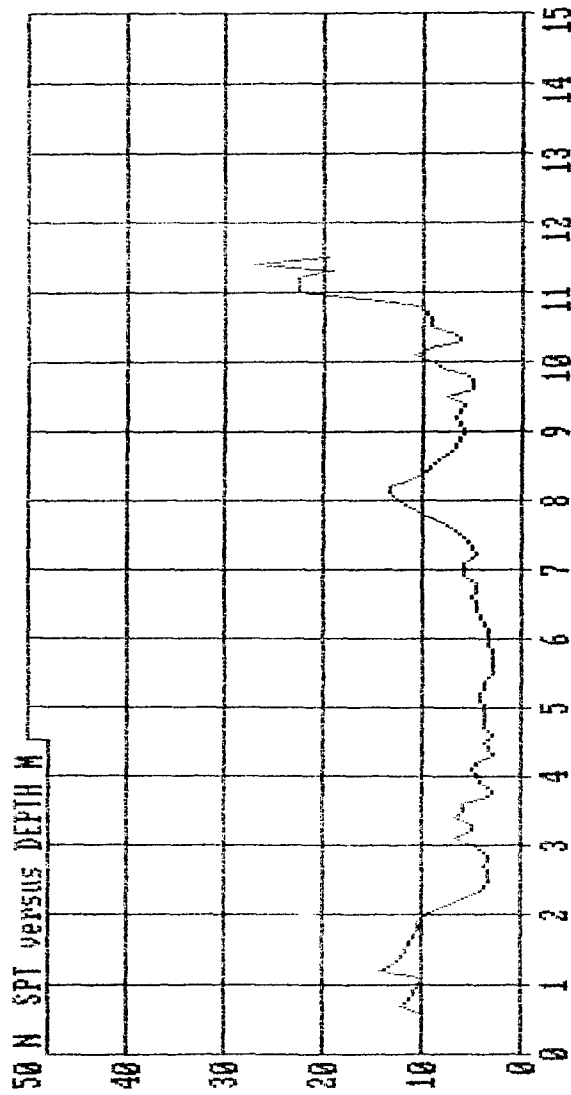
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CLIENT : WES
LOCATION : P-13/BFC-KC MO
JOB No. : DACH39-94-M-5062

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1. AGENCY USE ONLY (Leave blank)		2. REPORT DATE November 1994		3. REPORT TYPE AND DATES COVERED Final report	
4. TITLE AND SUBTITLE In Situ Shear Wave Measurements for Evaluating Dynamic Soil Properties at the Bannister Federal Complex, Kansas City, Missouri				5. FUNDING NUMBERS MIPR KC-94-114	
6. AUTHOR(S) José L. Llopis and Thomas B. Kean II					
7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES) U.S. Army Engineer Waterways Experiment Station 3909 Halls Ferry Road Vicksburg, MS 39180-6199				8. PERFORMING ORGANIZATION REPORT NUMBER Technical Report GL-94-39	
9. SPONSORING / MONITORING AGENCY NAME(S) AND ADDRESS(ES) U.S. Department of Energy, Kansas City Area Office 2000 East 95th Street Kansas City, MO 64131-3095				10. SPONSORING / MONITORING AGENCY REPORT NUMBER	
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13. ABSTRACT (Maximum 200 words) An in situ geophysical investigation consisting of crosshole and downhole shear wave (S-wave) seismic cone penetrometer tests (SCPT) was performed at the Bannister Federal Complex (BFC) located in Kansas City, Missouri. The SCPT was also used to collect cone tip resistance and sleeve friction data to aid in characterizing the soils at the site. The results of the SCPT were used to provide a continuous prediction of soil type and N-values. The main purpose of the investigation was to determine the S-wave velocities of the soil and bedrock in the vicinity of the main building at the BFC. This information will be used to perform a dynamic analysis of the building and its foundation. The results of the dynamic analysis will be used to determine if any building design modifications are required. The S-wave velocities measured for the clay materials (alluvium) using the crosshole and SCPT methods agreed very well. The S-wave velocities in the clay material increased with depth and ranged between 350 and 775 fps. A 1- to 5-ft. thick basal clay-gravel, which overlies bedrock, showed a velocity of approximately 1,100 fps. The Pleasonton Group bedrock found at the site is a hard shaly siltstone and is encountered at a depth of approximately 40 ft. The bedrock exhibited an S-wave velocity of approximately 1,900 fps and was measured using the crosshole S-wave method.					
14. SUBJECT TERMS See reverse.				15. NUMBER OF PAGES 271	
				16. PRICE CODE	
17. SECURITY CLASSIFICATION OF REPORT UNCLASSIFIED	18. SECURITY CLASSIFICATION OF THIS PAGE UNCLASSIFIED	19. SECURITY CLASSIFICATION OF ABSTRACT	20. LIMITATION OF ABSTRACT		

14. (Concluded).

Bannister Federal Complex
Crosshole
Geophysics

Pleasanton Group
Seismic Cone Penetrometer Test
Shear waves