prepared for:

Delaware Solid Waste Authority
1128 S. Bradford Street
Dover, Delaware 19903

Volume 6: Geotechnical Characterization Report: Appendix R

Cherry Island Landfill Expansion Project Wilmington, Delaware

prepared by:

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Project No. ME0250
April 2003 -
Revised September 2003
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DUFFIELD ASSOCIATES

SUMMARY REPORT

DELAWARE SOLID WASTE AUTHORITY
CHERRY ISLAND LANDFILL EXPANSION
DATA COLLECTION FROM THE
U.S. ARMY CORPS OF ENGINEERS

DAI Project No. 4685.GC
Task 7.6.1

June 2002

Prepared for:

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Prepared by:

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Peter G. Kearney
Geotechnical Engineer

Deirdre S. Smith, P.E.
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Guy F. Marcozzi, P.E.
Director of Project Management

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I. INTRODUCTION

The following report summarizes Duffield Associates' review of the available information at the U.S. Army Corps of Engineer's Philadelphia District (USACE) office regarding historical development and use of the Edgemoor Dredged Material Disposal Area, a majority of which is located beneath the present-day site of the Delaware Solid Waste Authority (DSWA) Cherry Island Landfill. The Edgemoor Disposal Area was one of two adjoining areas located at the Cherry Island site, the other being the Wilmington Harbor Disposal Area, utilized by the USACE for the disposal of dredged materials. Both areas are depicted on Figure 1, which is based on a photogrammetric survey provided by the USACE. This review has been performed in general accordance with Task 7.6.1 of Duffield Associates' agreement with GeoSyntec Consultants.

The purpose of this task is to document the USACE's past development and use of Cherry Island site, or more specifically the former Edgemoor Dredged Material Disposal Area. Files and records were reviewed at the USACE's office on April 2, April 3, and April 19, 2002. A majority of the files pertaining to the area could not be located by the USACE or have been purged. However, the available information provides substantial insight into the site's former development. Review for this task included the personal files of the USACE's Operations Project Manager, the subsurface investigation and laboratory testing records of the Geotechnical Section, and the Philadelphia District's library. The Operations files included two summaries of the Edgemoor Disposal Area, maps and drawings, and dredging contract information from 1976 to 1991. The records of the Geotechnical Section included Standard Penetration Test (SPT) boring logs, field vane shear test sheets, and individual laboratory testing results. The District's library has copies of the Annual Reports of the Chief of Engineers for the USACE, which dated back as far as 1884. The Annual Reports summarize the improvement of the rivers and harbors within the Wilmington and subsequently the Philadelphia Districts for Congress. This data was utilized as the basis of this report. In addition, while the documents reviewed for this report accurately depict the development of the Cherry Island Area as pertaining to the activities of the USACE, they did not discuss the industrial development of the Port of Wilmington and other areas along the Christina or Delaware Rivers in any detail, which may have had subsequent affects on the development of the Edgemoor Disposal Area. Information pertaining to the industrial based activities at or near the Port of Wilmington was summarized by Duffield Associates for the USACE in a report titled, "Hazardous, Toxic, and Radioactive Waste Evaluation, Wilmington Harbor, Wilmington, Delaware," and dated May 2000.

II. SITE DEVELOPMENT HISTORY

Over time the USACE has developed several areas in Delaware near the confluence of the Christina River and Delaware River for the disposal of dredged materials from both the Delaware River and the Christina River. These areas include the Edgemoor Disposal Area, the Pigeon Point Disposal Area, and the Wilmington Harbor South Disposal Area.

steeply sloped with a top-of-slope elevation of approximately 8 feet. The more upland portions of the area ranged in elevation from approximately 12 to 15 feet.

At some point prior to 1910, a timber bulkhead was constructed in the Delaware River from approximately the present location of the DuPont Edgemoor Facility (Edgemoor Road) to north of the Shellpot Creek (see Figure 1). Over time the timber bulkhead apparently deteriorated and in 1910 the USACE was authorized to repair and extend the bulkhead (Operations Summary, 1967). The extension was to be a "training dike" (hereafter referred to as the Edgemoor Dike) constructed of dredged and transported "heavy materials," such as gravel, boulders, and blasted rock from the Tinicium, Chester, and Marcus Hook Ranges of the Delaware River improvement or dredging/deepening (Operations Summary, 1967). The indicated intention of the Edgemoor Dike construction was to alter the hydraulic characteristics of the Delaware River in order to reduce the amount of dredging necessary to maintain the authorized navigable depth. The dike was indicated to be approximately 5,500 feet long, extending southward from the Shellpot Creek, presumably to the mouth of the Christina River, creating approximately 300 acres of area between the dike and the existing shoreline for subsequent dredged material disposal (Operations Summary, 1967). This created area roughly corresponds to the present DuPont Landfill (south of the Shellpot Creek), the polishing ponds of the City of Wilmington, and a majority of Phases III, IV, and V of the Cherry Island Landfill. Review of documents and aerial photographs taken in 1927 indicated that extensive construction of the Edgemoor Dike did not taken place until after 1927. The estimated location of the Edgemoor Dike is shown on Figure 1.

Photocopied portions of original concept drawings from 1923 to 1927 for the proposed Edgemoor Dike were located during document review. However, the quality of the photocopies was very poor, leaving little detail. Detailed observation appears to indicate that the foundation for the dike was to be constructed with "heavy materials," placed with bottom dump scows to an elevation of -8 feet MLW, while the apparent "mud line" was shown as -13 feet (Operations Summary, 1967). Although the full cross section of the dike was not photocopied, it appears as if the foundation width of the dike was proposed to be approximately 106 feet and the dike settlement was estimated to displace approximately 50% of the net volume of the dike. The dike was to be constructed with 2:1 side slopes, a top of dike width of 6 feet, and a top of dike height of elevation 12 feet MLW. The data reviewed also suggests that the USACE had to place significantly more material to complete the dike construction than was originally estimated (Operations Summary, 1967). Considering the dike configuration, length, and estimated settlement, the volume of material needed to construct the dike is estimated to be approximately 400,000 cubic yards. According to the 1967 Operation Summary, by 1929 the USACE had placed approximately 947,800 cubic yards of material along the dike alignment or immediately behind it in order to construct the embankment. In addition, the stone from the original northern jetty of the Christina River was removed and utilized to construct the "shoreward" arm of the Edgemoor Dike which connected the dike to land along the northern shore of the Christina River. The original northern jetty location is approximated in Figure 1.

borings EBB-11 through EBB-15. Copies of the original USACE logs for test borings EBB-1through EBB-10 and EBB-16 through EBB-32 have been included in Appendix B. In addition, the approximate test boring locations have been included on Figure 1. Location coordinates for these borings were either not recorded or the locations were recorded in the Corps of Engineers' Delaware River Grid System, for which the USACE has not been able to supply a conversion to a current horizontal datum. Therefore, the locations for the test borings were estimated by Duffield Associates based on information provided on a copy of a USACE test boring location plan from 1985 and approximated in Delaware State Plane Coordinates (NAD 83), based on a known location in both coordinate systems. In addition, logs from test borings EEB-39 through EEB-44, performed by the USACE in 1995 at the Wilmington Harbor North Disposal Area, have also been included in Appendix B and their locations are also shown on Figure 1.

Performance of most of the USACE's test borings included continuous SPT sampling with collection of both disturbed and undisturbed samples. Vane shear testing was performed in some of the borings and copies of the original vane shear test sheets are included in Appendix C of this report. In addition, the results of the vane shear test were recorded on the boring logs where the test was performed. Review and use of the vane shear test results should consider that specific details about the manner in which the vane shear tests were performed, which may significantly affect the results of the test, were not recorded. Some of the soil shear strengths reported appeared to be inconsistent with the SPT N-values reported and contemporary evaluations of similar soil conditions at the site.

In addition to the SPT testing, the USACE installed 11 piezometers at the Edgemoor Disposal Area between 1972 and 1974. Piezometers EBL-1 through EBL-6 were installed in 1972 and EBL-7 through EBL-11 were installed in 1974. The piezometer logs have been included in Appendix D. Unfortunately, specific location and ground surface information was not recorded on any of the piezometer installation sheets. However, the approximate location and ground surface elevation of piezometers EBL-2, EBL-3, EBL-7, EBL-8, EBL-9, and EBL-10 were estimated from a dike raising construction drawing dated 1980. The approximate locations of the piezometers have been included in Figure 1. For the remaining piezometers, it is assumed that the piezometers would have been installed outside the limits of the containment dike existing at the time of installation. Review of existing topographic information from 1976 and location of unknown piezometers on a 1985 test boring location plan suggests that the ground surface elevation would have been approximately 30 to 35 feet Christina River Datum (CRD). Because various datum were utilized at the site over the years, a list of approximate datum conversions has been included in Appendix E.

It appears that the USACE has also performed geotechnical laboratory testing on undisturbed samples taken during the various evaluations. As discussed earlier, the USACE reportedly performed SPT borings at the Edgemoor Disposal Area during 1967, 1972, 1974, and 1984. According to the records reviewed, laboratory testing was only performed on samples gathered during the 1967 and 1984 evaluations. Fairly extensive testing was performed on undisturbed samples gathered during the 1967 evaluation.

documents from 1970, 1974, and 1976 indicate that the location, dimensions, and height of the new dike was specified, but there were no references to method of soil placement, lift thickness or a compaction criteria. The absence of these references suggests that the construction was not performed with engineering control. Generally, dikes were constructed from materials available from within the disposal area. No reference to "ditching," for the purposes of creating drier soils near the surface, appear on a USACE construction documents for the Edgemoor Disposal Area until 1980.

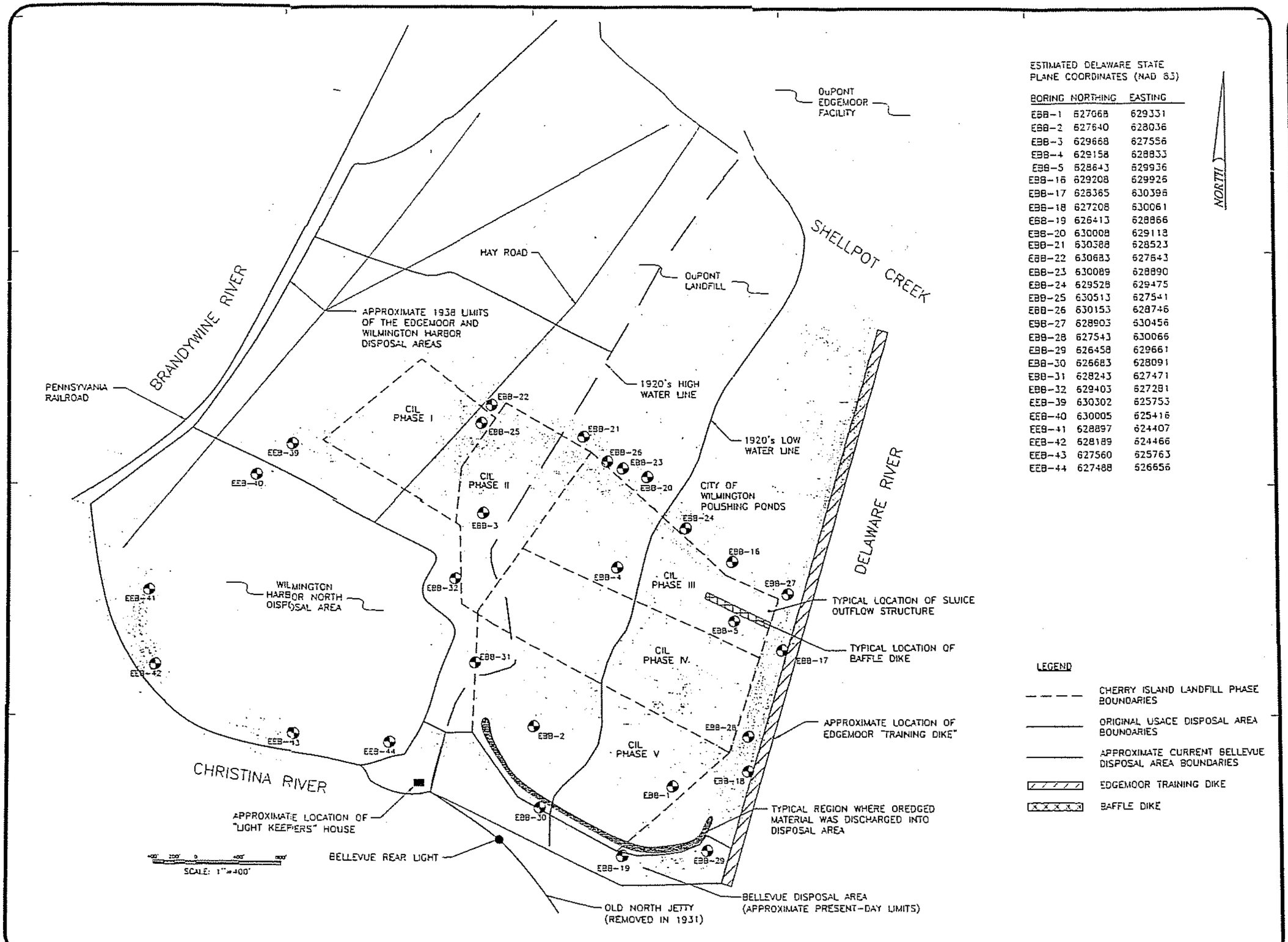
Based on Duffield Associates experience with the USACE in designing containment dikes for other dredged disposal areas, the USACE typically uses an undrained shear strength value of c = 350 to 400 psf to model their conventionally constructed dikes in slope stability analysis. This strength recommendation seems to indicate that the USACE expects generally low strength, highly variable soils in dike construction. Given this current practice for the USACE, there is nothing to indicate an expectation for greater soil strengths in the old dike locations from past construction.

Review of the Operations Manager's files indicated that a majority of the USACE dredging contract documents between 1976 and 1989 for the Edgemoor Disposal Area contained sketches of the disposal area, which indicated the approximate location for discharge pipes from the dredging operation and location of the sluice outlet structure. Typically, the dredged material discharge area was located along the southern boundary of the disposal area along the Christina River. The sluice structure was generally located in the northeast corner of the disposal area. An interior "baffle dike" was constructed south of the sluice structure, from the existing containment dike along the Delaware River west into the interior of the area. The baffle dike was constructed in order to increase the path along which the dredged material fluid flowed, allowing a longer detention time. The approximate location of the discharge areas, sluice structure, and baffle dike are included on Figure 1.

Intuitively, coarse-grained deposits would be expected in the areas where the dredged discharge pipes were located, because larger (heavier) particles tend to fall out of suspension from the fluid column first. However, this theory is not supported by the data available. Review of bottom sampling data provided by the USACE in their dredging contracts indicates that the materials sampled were described as "mud." Bottom samples were apparently taken with a Henwood & Sprague Harpoon Sampler. Apparent density of the materials samples ranged between 1200 and 1300 grams per liter (approximately 75 and 81 pounds per cubic foot). Consequently, it appears that the material dredged from the Christina River did not contain appreciable quantities of coarse-grained materials to observe large deposits of sandy material in the areas where the dredged material discharge pipes were apparently placed. However, based on Duffield Associates experience at the Wilmington Harbor South Disposal Area, coarser silt-sized particles were observed in larger quantities near the location where dredged material is pumped into the area. Considering that both areas were utilized for disposal of the maintenance dredged material from the Christina River, it is assumed that the same conditions existed at the Edgemoor Disposal Area.

The information provided in this report is based on the limited data available from the USACE at the time of Duffield Associates review, as well as Duffield Associates' interpretation of this data. The interpretation of the information is based according to generally accepted soil and foundation engineering standards. These data and conclusions should only be viewed in the context of the scope defined in this report.

FIGURES



ESTIMATED DELAWARE STATE PLANE COORDINATES (NAD 83)

BORING	NORTHING	EASTING
EBB-1	627068	629331
EBB-2	627640	628036
EBB-3	629668	627556
EBB-4	629158	628833
EBB-5	628643	629936
EBB-16	629208	629926
EBB-17	628365	630396
EBB-18	627208	630061
EBB-19	626413	628866
EBB-20	630008	629118
EBB-21	630388	628523
EBB-22	630683	627643
EBB-23	630089	628890
EBB-24	629528	629475
EBB-25	630513	627541
EBB-26	630153	628746
EBB-27	628903	630456
EBB-28	627543	630066
EBB-29	626458	629661
EBB-30	626683	628091
EBB-31	628243	627471
EBB-32	629403	627281
EEB-39	630302	625753
EEB-40	630005	625416
EEB-41	628897	624407
EEB-42	628189	624466
EEB-43	627560	625763
EEB-44	627488	626656

LEGEND

- CHERRY ISLAND LANDFILL PHASE BOUNDARIES
- ORIGINAL USACE DISPOSAL AREA BOUNDARIES
- APPROXIMATE CURRENT BELLEVUE DISPOSAL AREA BOUNDARIES
- EDGEMOOR TRAINING DIKE
- BAFFLE DIKE

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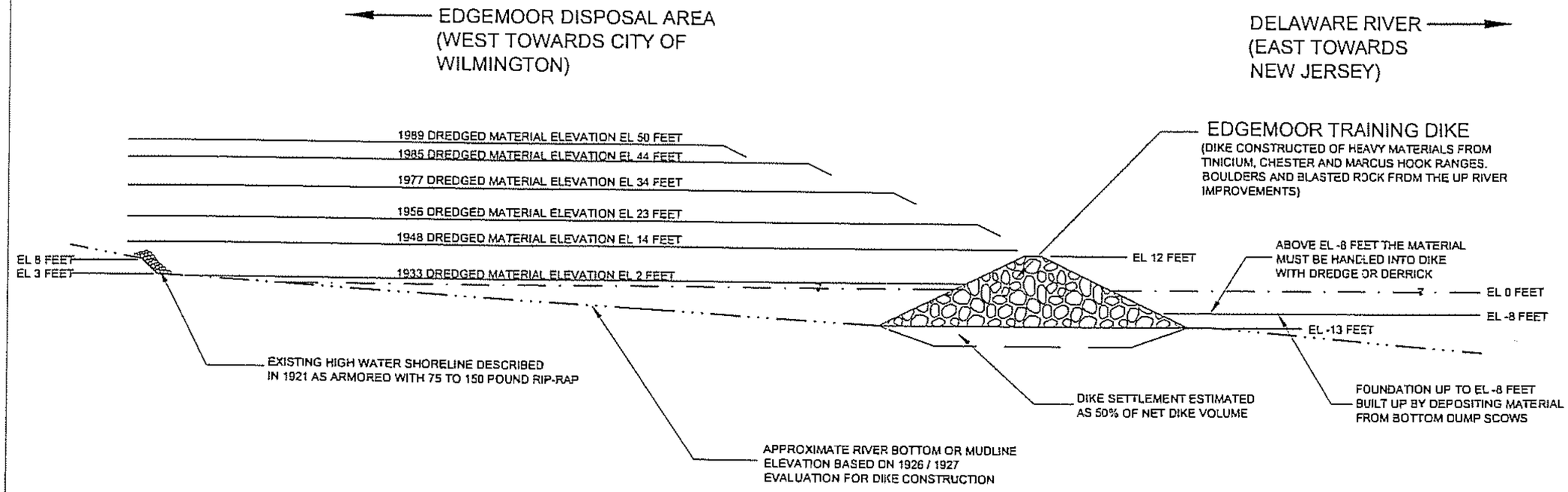
No.	REVISION	Cor. by	Date	DESIGNED BY:	CHECKED BY:
				PGK	GPM
				DRAWN BY:	FILE NAME:
				IDE	DSWA1DCW

FIGURE 1: APPROXIMATE LOCATION PLAN
DSWA CHERRY ISLAND LANDFILL EXPANSION
EDGEMOOR AND WILMIGNTON HARBOR DREDGED MATERIAL DIPOSAL AREAS
WILMINGTON - NEW CASTLE COUNTY - DELAWARE

DATE: 06 JUNE 2002
SCALE: 1"=400'
W.O. NO. 4685.GC.16
SHEET: 1 OF 2



NOTES:

1) EDGEMOOR DIKE CROSS SECTION, NOTES, AND DETAILS BASED ON PHOTOCOPIED PORTIONS OF ORIGINAL SKETCHES AND NOTES FROM VARIOUS EVALUATIONS PERFORMED BY THE USACE DURING APPROXIMATELY 1922 TO 1927. PHOTOCOPIED PORTIONS WERE INCLUDED IN THE 1967 AND 1983 USACE OPERATIONS SUMMARIES. THIS DRAWING WAS CREATED TO DISPLAY WHAT THE LAND CROSS SECTION AT THE EDGEMOOR DISPOSAL FACILITY MAY HAVE LOOKED LIKE WHEN THE EDEMOOR DIKE WAS CONSTRUCTED AND ITS SUBSEQUENT DEVELOPMENT. THIS DRAWING SHOULD BE USED FOR PERSEPECTIVE ONLY AND SHOULD NOT BE ASSUMED COMPLETE OR ACCURATE.

2) ALL ELEVATIONS ARE APPROXIMATE AND UNCORRECTED FOR VARIOUS DATUMS USED AT THE SITE OVER TIME.

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DESIGNED BY: PGK
DRAWN BY: PGK
CHECKED BY: DSS
FILE: B4685GC16-02

FIGURE 2: EDGEMOOR DISPOSAL AREA CROSS SECTION
DSWA CHERRY ISLAND LANDFILL EXPANSION
DATA SUMMARY THE FROM U.S. ARMY CORPS OF ENGINEERS
DSWA CHERRY ISLAND LANDFILL
WILMINGTON, DELAWARE

DATE: 06 JUNE 2002
SCALE: NTS
W.O. NO. 4685.GC
SHEET: FIGURE 2

APPENDIX A

USACE DOCUMENT REVIEW: TIMELINE OF DEVELOPMENT OF THE EDGEMOOR DREDGED MATERIAL DISPOSAL AREA

USACE DOCUMENT REVIEW TIMELINE OF DEVELOPMENT OF
EDGEMOOR DREDGED MATERIAL DISPOSAL AREA
FOR THE DSWA CHERRY ISAND LANDFILL EXPANSION

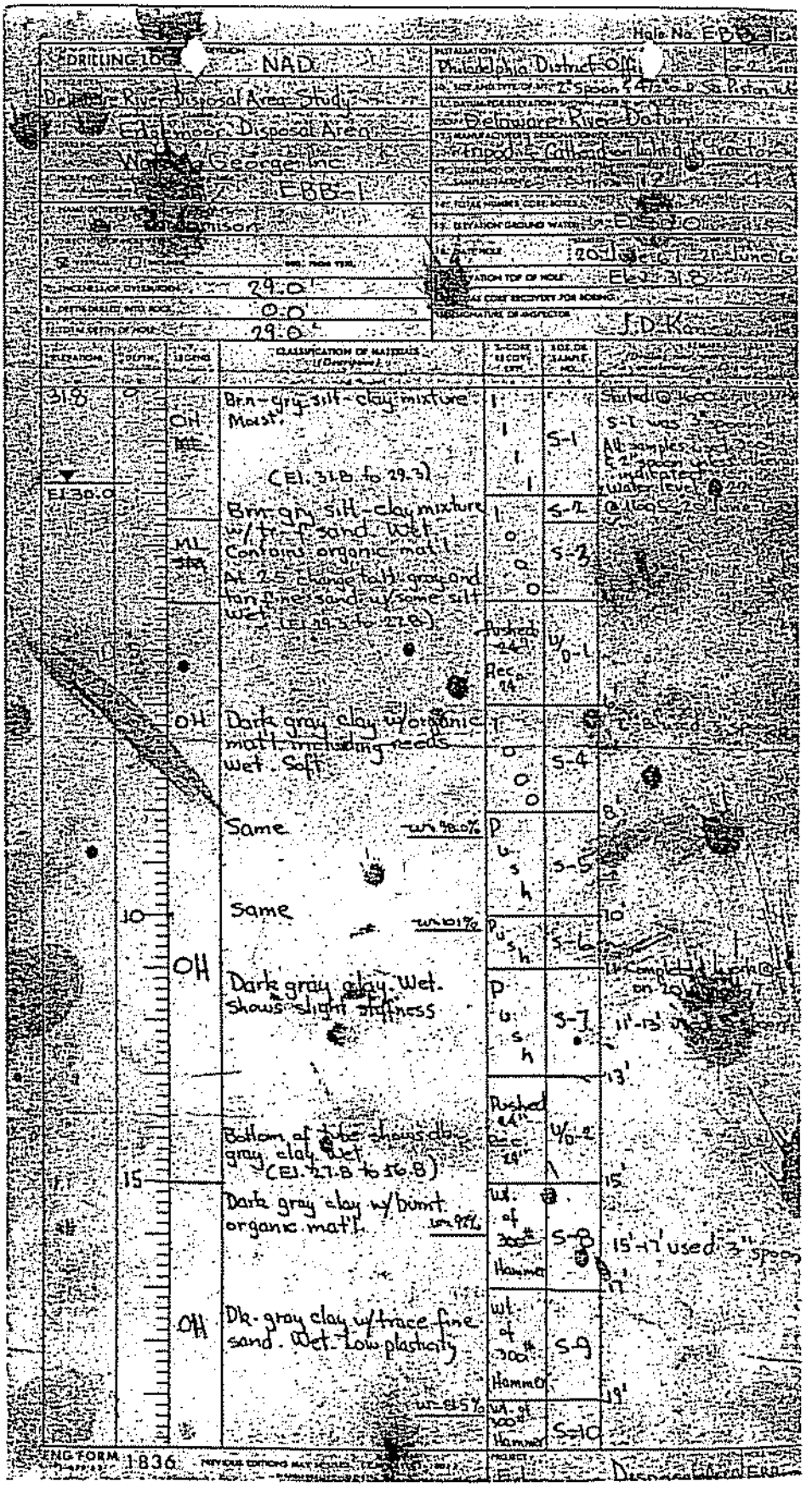
WILMINGTON, DELAWARE

Time Period	Summary of Events	Reference
1836	Earliest record of the Federal Government performing work at Wilmington Harbor. The type of work was not indicated in the reference.	1940 Annual Report of the Chief of Engineers
1870	The original Wilmington Harbor project from 1836 was adopted by the Rivers and Harbors Act of July 11, 1870, and modified according to the same Act on March 3, 1881, and July 5, 1884. The type of work authorized was not described.	1940 Annual Report of the Chief of Engineers
1896	Congress authorized major improvements to Wilmington Harbor after the adoption of the Rivers and Harbors Act of June 3, 1896, and March 3, 1899. Authorized scope of work included dredging the Christina River at Wilmington Harbor to a depth of 21 feet. Previously the depth of the Christina River at the confluence with the Delaware River was approximately 8½ feet MLW.	1940 Annual Report of the Chief of Engineers
1910	Congress authorizes repairs to and the extension of an existing timber bulkhead located in the Delaware River north of the Shellpot Creek. The original construction date of the timber bulkhead was not located in the documents reviewed.	1967 Operations Summary
1912	Congress authorizes the USACE to perform maintenance dredging at Wilmington Harbor. The USACE was apparently authorized to purchase a dredging equipment and to coostruct a wharf and depot for support of the maintenance operations.	1940 Annual Report of the Chief of Engineers and 1967 Operations Summary
1915	276,000 cubic yards of "heavy materials" were apparently placed in a "cross bank" between the existing timber bulkhead and the Delaware River shoreline along the northern side of the Shellpot Creek.	1967 Operations Summary
1922	Congress authorizes the USACE to dredge Wilmington Harbor to a depth of 25 feet (Unknown act of Congress authorized on September 22, 1922). Survey of U.S. property for Bellevue light keeper on July 28, 1922, indicated that ground surface elevation of area immediately upland of original high-water shoreline was approximately 8 feet (no datum noted). Shoreline was drawn as armored shoreline, with armoring described as 75 to 150 pound rip-rap. Area below armoring was noted as "reed marsh" leading to "mud flats" towards Delaware River. No elevations were noted for these areas.	1967 Operations Summary 1922 Survey Drawing
1923	Marine terminal completed by the Harbor Commission of Wilmington. Facility included warehouses and railway directly connected to the City of Wilmington.	1940 Annual Report of the Chief of Engineers
1925	Congress authorizes the City of Wilmington to construct a new south jetty at Wilmington Harbor or Port of Wilmington (unknown act of Congress authorized on March 3, 1925).	1967 Operations Summary
1926 - 1930	Extension of the existing timber bulkhead between the Shellpot Creek and the Christina River, originally authorized in 1910, begins. Construction consists of placing 947,800 cubic yards of "heavy	1967 Operations Summary

Time Period	Summary of Events	Reference
	pipeline dredge for placement in the Edgemoor and Wilmington Harbor Areas. Prior to direct pipeline placement, material was either bottom scow dredged or clamshell dredge and dumped in the "Edgemoor Re-handling Basin" in the Delaware River at the mouth of the Shellpot Creek. The material was then re-handled by pipeline dredge into the Edgemoor Disposal Areas. A survey of the Edgemoor Disposal Area in 1948 shows that the fill elevation within the disposal area ranged between 11 and 14 feet with the dike elevation at approximately 16 feet (Corps of Engineers Datum). In addition, all containment dike construction was reportedly performed by the government until 1954. There was no reference in the reviewed documents as to source of dredged material (i.e., Port of Wilmington or Delaware River).	1938 USACE Real Estate drawing revised in 1948.
1956 - 1967	During this period approximately 7 million cubic yards of dredged material was pipeline dredged from Wilmington Harbor to the Edgemoor Disposal Area. Two embankment failures were observed in the Edgemoor Disposal Area on August 27, 1967, and September 10, 1967. The location or magnitude of the failures was not included in the records, but they were noted as two distinct areas. Dike construction was reported as performed by "contractors" with the exception of that performed in 1965, when the construction was contracted by the USACE's Fort Mifflin Resident Engineer. At some time following 1955, ownership of the northern most portion of the Edgemoor Disposal Area, bounded to the north by the Shellpot Creek and to the south by the apparent 12th Street sewer line easement, was transferred to E.I. DuPont DeNemours Company. The approximate fill elevatioo in 1956 was recorded as 23 feet CRD. The highest reported containment dike elevation in 1956 was approximately 33 feet CRD. The highest containment dike elevation in 1967 was recorded as approximately 39 feet CRD. Coogress authorizes the USACE to dredge Wilmington Harbor to a depth of 35 feet (Unknown act of Congress authorized oo July 14, 1960).	1967 Operations Summary
1968 - 1976	Very little data was available regarding this time period. It appears that the northern-most dike of the Edgemoor Disposal Area (which is the present-day limits of the Cherry Island Laodfill) was constructed in 1970 when approximately 88 acres of the area to the north was developed into the polishing ponds for the City of Wilmingtoo Sewage Plant.	1970 USACE Real Estate Drawing showing property to be relinquished
1977 - 1989	Fairly good records were kept of the USACE's estimated dredged material quantities for this period. About 4 or 5 dredging cycles were disposed of in either the Edgemoor Area or the Wilmington Harbor Area, while dike construction wns being performed at the other area. The Edgemoor Area was used during the following time periods: • Oct. 1977 - Sept. 1978: 2 cycles, approx. 2 million cubic yards • July 1981 - Aug. 1983: 5 cycles, approx. 2.4 million cubic yards • July 1987 - Nov. 1989: 3 cycles, approx. 1.4 million cubic yards	Disposition forms, and drawings for dredging cootracts from USACE Operations records

APPENDIX B

COPIES OF
USACE TEST BORING LOGS
(EBB-1 - EBB-10, EBB-16 - EBB-32,
EBB-39 – EEB-44)



Hole No. EBB-1

DRILLING LOG	DIVISION NAD
	INSTALLATION Philadelphia District Offi
Delaware River Disposal Area Study	10. SIZE AND TYPE OF BIT 2" Spoon & 4½" O.D. Sa. Piston W
Edgemoor Disposal Area	11. DATUM FOR ELEVATION SHOWN (TBM or MSL) Delaware River Datum
Warren George Inc.	12. MANUFACTURER'S DESIGNATION OF DRILL Tripod & Cathead on light duty tractor
EBB-1	13. TOTAL NUMBER CORE BOXES 4
Jamison	14. ELEVATION GROUND WATER El. 30.0
15. DIRECTION OF HOLE VERTICAL INCLINED DEG. FROM VERT.	16. DATE HOLE 20 June 61 - 21 June 6
17. THICKNESS OF OVERBURDEN 29.0'	18. ELEVATION TOP OF HOLE El. 31.8
18. DEPTH DRILLED INTO ROCK 0.0	19. TOTAL CORE RECOVERY FOR BORING
19. TOTAL DEPTH OF HOLE 29.0'	20. SIGNATURE OF INSPECTOR J.D. Ka

ELEVATION	DEPTH	LEGEND	CLASSIFICATION OF MATERIALS (Description)	% CORE RECOVERY	SIZE OF SAMPLE NO.	REMARKS
31.8	0	OH	Brn-gry silt-clay mixture. Moist. (El. 31.8 to 29.3)	1 1 1 1	S-1	Started @ 1600 S-1 was 3" spoon. All samples used 300# & 2" spoon unless otherwise indicated. Water level @ 22
El. 30.0		ML	Brn-gry silt-clay mixture w/ tr. f. sand. Wet. Contains organic mat'l. At 2.5 change to lt. gray and tan fine sand w/ some silt wet. (El. 29.3 to 27.8)	1 0 0 0	S-2 S-3	@ 1605 20 June
	5			Pushed 24" Rec. 24"	U/D-1	
		OH	Dark gray clay w/ organic mat'l. including reeds. Wet. Soft.	1 0 0 0	S-4	6' 8'
			Same w=98.0%	Push	S-5	
	10		Same w=101%	Push	S-6	10'
		OH	Dark gray clay. Wet. Shows slight stiffness	Push	S-7	11' Completed work @ on 20 June 67 11'-13' used 3" spoon 13'
			Bottom of tube shows dk. gray clay. Wet. (El. 27.8 to 16.8)	Pushed 24" Rec. 24"	U/D-2	
	15		Dark gray clay w/ burnt organic mat'l. w=92%	Wt. of 300# Hammer	S-8	15' 15'-17' used 3" spoon 17'
		OH	Dk. gray clay w/ trace fine sand. Wet. Low plasticity w=81.5%	Wt. of 300# Hammer	S-9	19'
				Wt. of 300# Hammer	S-10	

ENG FORM 1836 PREVIOUS EDITIONS MAY BE USED. TEMPORARY FORM

PROJECT Disposal Area ERR

Hole No. EBB-2

DRILLING LOG

DIVISION	NAD
INSTALLATION	Philadelphia District Office
SHEET	1 of 2 SHEETS
1. PROJECT	Delaware River Disposal Area Study
2. LOCATION (Coordinates or Station)	Edgemoor
3. DRILLING AGENCY	Warren George, Inc.
4. HOLE NO. (As shown on drawing title and file number)	EBB-2
5. NAME OF DRILLER	J. Jamison
6. DIRECTION OF HOLE	☒ VERTICAL ☐ INCLINED ___ DEG. FROM VERT.
7. THICKNESS OF OVERBURDEN	30.0
8. DEPTH DRILLED INTO ROCK	0.0
9. TOTAL DEPTH OF HOLE	30.0
10. SIZE AND TYPE OF BIT	2" Spoon 4½" O.D. Sta. Tube
11. DATUM FOR ELEVATION SHOWN (TBM or MSL)	Delaware River Datum
12. MANUFACTURER'S DESIGNATION OF DRILL	Light duty tractor w/ cathead & tripod
13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN	DISTURBED 10 / UNDISTURBED 4
14. TOTAL NUMBER CORE BOXES	—
15. ELEVATION GROUND WATER	El. 31.7
16. DATE HOLE	STARTED 16 June '67 / COMPLETED 20 June '67
17. ELEVATION TOP OF HOLE	Elev. 33.5
18. TOTAL CORE RECOVERY FOR BORING	
19. SIGNATURE OF INSPECTOR	J.D. Kane

ELEVATION	DEPTH	LEGEND	CLASSIFICATION OF MATERIALS (Description)	% CORE RECOVERY	BOX OR SAMPLE NO.	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant)
33.5	0		Brown silt changing to light brown f. sandy silt. Dry to moist. w=20.5%	1 1 1 1	S-1	Started @ 0940. Used 300# hammer, 18" ch
El. 31.8						2'
		~~Mtz~~ OH	Light brown and gray silt w/ trace f. sand. Sample contains roots and red (possibly iron staining) specks throughout.	1 0 1 1	S-2	4'
	5		No recovery in spoon. Sides of vane show wet brown sandy silt.	Push	S=247 V-1	5' 5.5'
			Brown silt-clay mixture (El. 33.5 to 27.0)			6'
			Dark gray CLAY w/ pockets of organic material. Soft. Wet. w=82.5%	Push	S-3	At 7.5' a thin burnt seam of organic mat'l may indicate previous elevation of area prior to refilling
		OH	Same	Push	S=103 V-2	8' 9' 9.5'
	10					10'
			Same @ bottom of tube	Pushed 24" Rec. 24"	U/D-1	12'
		OH	Same. Not as soft. Low plasticity w=76%	Push	S-5	14' S-6 poor recover only about 8 inches
	15		Dark gray clay w/ organic matter. Soft. Wet	Push	S-6	At 15.5' another thin seam of burnt organic material.
						16' Completed work @ 1615 16 June '67 @ 16' dep
			Bottom of tube shows dk gray soft wet clay w/ burnt organic matter	Pushed 24" Rec. 24"	U/D-2	No work 19 June '67 - RA Started 0800 on 20 June water level @ 22 inches & appeared to be under light pressure with bubbling & rising effect. Level raised 1 inch in 5 minutes
	20		Dark and light gray clay w/ occ. pockets of organic mat'l. (El. 27.0 to 13.5) w=84%	Push	S-7	18'

ENG FORM 1836 1 APR 63 PREVIOUS EDITIONS MAY BE USED (EM 1110-1-1801)

PROJECT: Edgemoor Disposal Area | HOLE NO. EBB-

Hole No. EBB-3

DRILLING LOG	DIVISION NAD	INSTALLATION Philadelphia District L. fice	SHEET 1 of 2 SHEETS
1. PROJECT Delaware River Disposal Area Study		10. SIZE AND TYPE OF BIT 2" & 3" Spoon, 4½" O.D. Sta. Pistol	
2. LOCATION (Coordinates or Station) Edgemoor		11. DATUM FOR ELEVATION SHOWN (TBM or MSL) Delaware River Datum	
3. DRILLING AGENCY Warren George Inc.		12. MANUFACTURER'S DESIGNATION OF DRILL Tripod & Cathead on tractor	
4. HOLE NO. (As shown on drawing title and file number) EBB-3		13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN: DISTURBED 12; UNDISTURBED 4	
5. NAME OF DRILLER J. Jamison		14. TOTAL NUMBER CORE BOXES —	
6. DIRECTION OF HOLE ☒ VERTICAL ☐ INCLINED ___ DEG. FROM VERT.		15. ELEVATION GROUND WATER El. 29.3	
		16. DATE HOLE: STARTED 23 June '67; COMPLETED 24 June '67	
7. THICKNESS OF OVERBURDEN 30.0		17. ELEVATION TOP OF HOLE El. 30.3	
8. DEPTH DRILLED INTO ROCK 0.0		18. TOTAL CORE RECOVERY FOR BORING —	
9. TOTAL DEPTH OF HOLE 30.0		19. SIGNATURE OF INSPECTOR J.D. Kanes	

ELEVATION	DEPTH	LEGEND	CLASSIFICATION OF MATERIALS (Description)	% CORE RECOVERY	BOX OR SAMPLE NO.	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant)
El. 29.3		OH	Brn. silt w/heavy amt. of reeds & root matter. Wet. soft. w=80.5%	1 1 1 1	S-1 3" Spoon	Started @ 1400. Used 300# hammer. 2'
			Brn & gray silty clay w/little organic matter. Wet. Soft	wt. of 300# Hammer	S-2	4'
	5		Bottom of tube shows dk. gray clay w/brn. organic mat'l., wet, soft	Pushed 24" Rec. 24"	U/D-1	6'
		OH	Dark gray wet, soft clay w/burnt organic mat'l. w=131%	wt. of 300# Hammer	S-3	8'
			Dark gray clay w/trace organic mat'l. Wet. Soft	P U S h	S-4 V-1 S=214	9' 9.5' 10'
	10		Same as above w=96.5%	wt of 300# Hammer	S-5	12'
			Bottom of tube appears to be same material as sample S-6	Pushed 24" Rec. 19½"	U/D-2	U/D-2 sample slid in tube when inverted for waxing. 14'
	15		Gray-brn. lumpy silt w/some organic mat'l. Entire sample consists of small lumps easily broken down. Wet.	0 0 7 4	S-6 3" Spoon	16'
		GM ML	Gry. & brn. sandy gravel w/ largest pc. of rounded gravel at 2". At 12.0 changes to dk. gry. silty sand w/fines increasing w/depth	7 4 1 0	S-7 S-8	17' 18' Using chopping bit & water, it was diff. to advance hole in gravelly area.
			Bottom of tube shows dk. gray clay w/organic mat'l	Pushed 24" Rec. 17"	U/D-3	20'

ENG FORM 1836 1 APR 63 PREVIOUS EDITIONS MAY BE USED (EM 1110-1-1801)

PROJECT: Edgemoor Disposal Area

HOLE NO.

Hole No. EBB – 4

DRILLING LOG	DIVISION NAD	INSTALLATION Philadelphia Distric Office	SHEET 1 OF 2 SHEETS
1. PROJECT Delaware River Disposal Area Study		10. SIZE AND TYPE OF BIT 2" & 3" Spoon, 4½" O.D. Sta. Pistol	
2. LOCATION (Coordinates or Station) Edgemoor		11. DATUM FOR ELEVATION SHOWN (TBM or MSL) Delaware River Datum	
3. DRILLING AGENCY Warren George, Inc.		12. MANUFACTURER'S DESIGNATION OF DRILL Tripod & Cathead on tractor	
4. HOLE NO. (As shown on drawing title and file number) EBB-4		13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN	DISTURBED 12 / UNDISTURBED 3
5. NAME OF DRILLER J. Jamison		14. TOTAL NUMBER CORE BOXES —	
6. DIRECTION OF HOLE ☒ VERTICAL ☐ INCLINED ____ DEG. FROM VERT.		15. ELEVATION GROUND WATER El. 29.3	
		16. DATE HOLE	STARTED 22 June 67 / COMPLETED 23 June 67
7. THICKNESS OF OVERBURDEN 30.0		17. ELEVATION TOP OF HOLE El. 30.3	
8. DEPTH DRILLED INTO ROCK 0.0		18. TOTAL CORE RECOVERY FOR BORING —	
9. TOTAL DEPTH OF HOLE 30.0		19. SIGNATURE OF INSPECTOR J.D. Kane	

ELEVATION	DEPTH	LEGEND	CLASSIFICATION OF MATERIALS (Description)	% CORE RECOVERY	BOX OR SAMPLE NO.	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant)
30.3 ▼ El. 29.3	0	ML	Brn.-gry silt-clay mixture w/large amount of root matter. Wet. Soft. w=109%	1 1 1 2	S-1 3" spoon	Started @ 1230 Water Level @ 1' depth.
		OL	Gry.-brn clay w/organic mat'l. throughout sample wet. Low plasticity	1 wt. of 300# Hammer	S-2	Note: The three U/D samples from this bore hole have aluminum caps
	5		No recovery in spoon. Material on vanes indicates same as above. (El. 30.3 to 24.3)	Push	S-3 / V-1 (S=169)	
		OH	Dark gray clay w/occ. seams of burnt organic mat'l. Wet. Soft. Increase in plasticity w=124%	Push	S-4	
			Dark gray clay @ bottom of tube	Pushed 24" Rec. 24"	U/D-1	
	10	OH	Dark gray clay. Wet. Soft High plasticity	Push	S-5 (S=110) / V-2 3" spoon	
			Same as above w=139%	Push	S-6	
	15		Dark gray clay w/burnt reeds spaced throughout sample. Wet. Soft w=100%	Push	S-7 3" spoon	
			Same including reeds @ bottom of tube. (El. 24.3 to 12.3)	Pushed 24" Rec. 24"	U/D-2	
10.3	20	OL	Dark gray clay w/thin lenses of lighter gray clay. w=51.1%	wt. of 300# Hammer	S-8	

ENG FORM 1836 1 APR 63 PREVIOUS EDITIONS MAY BE USED (EIR 1110-1-1801) PROJECT

Hole No. EBB-5

DRILLING LOG	DIVISION NAD	INSTALLATION Philadelphia District Office	SHEET 1 OF 2 SHEETS
1. PROJECT Delaware River Disposal Area		10. SIZE AND TYPE OF BIT 2" & 3" Spoons, 4½" O.D. Std-Pist	
2. LOCATION (Coordinates or Station) Edgemoor Disposal Area		11. DATUM FOR ELEVATION SHOWN (TBM or MSL) Delaware River Datum	
3. DRILLING AGENCY Warren George Inc.		12. MANUFACTURER'S DESIGNATION OF DRILL Tripod & Cathead attached to tracto	
4. HOLE NO. (As shown on drawing title and file number) EBB-5		13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN	DISTURBED 12 / UNDISTURBED 6
5. NAME OF DRILLER J. Jamison		14. TOTAL NUMBER CORE BOXES —	
6. DIRECTION OF HOLE ☒ VERTICAL ☐ INCLINED ___ DEG. FROM VERT.		15. ELEVATION GROUND WATER El. 29.3	
		16. DATE HOLE	STARTED 21 June 67 / COMPLETED 22 June 67
7. THICKNESS OF OVERBURDEN 36.0		17. ELEVATION TOP OF HOLE El. 29.8	
8. DEPTH DRILLED INTO ROCK —		18. TOTAL CORE RECOVERY FOR BORING —	
9. TOTAL DEPTH OF HOLE 36.0		19. SIGNATURE OF INSPECTOR J.D. Kane	

ELEVATION	DEPTH	LEGEND	CLASSIFICATION OF MATERIALS (Description)	% CORE RECOVERY	BOX OR SAMPLE NO.	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant)
El. 29.3	0	OL	Brn. & gry silty clay w/organic mat'l. Wet. Soft. Sample appears lumpy, Almost a peat w=110%	0 0 0	S-1	Started @1330 Water level @0.5' @ 13[illegible] 21 June '67 0'-2' used 3" spoon
		OH	Bottom of tube shows same as above	Pushed 24" Rec. 24"	U/D-1	2'
	5		Same (El. 29.8 to 23.8)	P u s h	S-2	4' 4'-6' used 3" spoon
			Dark gray clay w/burnt organic mat'l. Wet. Soft w=118.5%	P u s h	S-3	6'
			Dark gray clay w/burnt organic mat'l & reeds. Wet. Soft.	P u s h	S-4	8'
	10	OH	Bottom of tube shows same as above	Pushed 24" Rec. 24"	U/D-2	10'
			Dark gray clay w/organic mat'l. (almost a peat) Wet. Soft. w=62.0%	P u s h	S-5	12' 12'-14' used 3" spoon
	15		Same as above to 15.8' where the dark gray clay is somewhat stiffer and not as wet w=85.0% (El. 23.8 to 14.0)	P u s h	S-6	14'
			Bottom of tube shows dk. gray micaceous clay.	Pushed 24" Rec. 24"	U/D-3	16'
	20		Dark gray micaceous clay w/organic mat'l including reeds. Wet. Soft.	P u s h	S-7	18' 20'

ENG FORM 1836 1 APR 62 PREVIOUS EDITIONS MAY BE USED (EM 1110-1-1905) PROJECT Edgemoor Disposal Area HOLE NO.

Hole No. EBB-6

DRILLING LOG	DIVISION NAD	INSTALLATION Philadelphia District Office	SHEET 1 of 2 SHEETS
1. PROJECT Delaware River Disposal Area Study		10. SIZE AND TYPE OF BIT 2" & 3" Spoon 4½" o.d. Sta. Pd. T.	
2. LOCATION (Coordinates or Station) Edgemoor Disposal Area		11. DATUM FOR ELEVATION SHOWN (TBM or MSL) Delaware River Datum	
3. DRILLING AGENCY Warren George, Inc.		12. MANUFACTURER'S DESIGNATION OF DRILL Tripod & Cathead on tractor	
4. HOLE NO. (As shown on drawing title and file number) EBB-6		13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN	DISTURBED 11 / UNDISTURBED 4
5. NAME OF DRILLER J. Jamison		14. TOTAL NUMBER CORE BOXES —	
6. DIRECTION OF HOLE ☒ VERTICAL ☐ INCLINED ___ DEG. FROM VERT.		15. ELEVATION GROUND WATER El. 26.0	
		16. DATE HOLE	STARTED 26 June '67 / COMPLETED 26 June '67
7. THICKNESS OF OVERBURDEN 31.0		17. ELEVATION TOP OF HOLE El. 26.6	
8. DEPTH DRILLED INTO ROCK 0.0		18. TOTAL CORE RECOVERY FOR BORING —	
9. TOTAL DEPTH OF HOLE 31.0		19. SIGNATURE OF INSPECTOR J.D. Kane	

ELEVATION	DEPTH	LEGEND	CLASSIFICATION OF MATERIALS (Description)	% CORE RECOVERY	BOX OR SAMPLE NO.	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant)
26.6 El. 26.0	0	ML-OL	Brn.-gry silt clay mixture w/trace of root matter. Wet Soft & lumpy. w=78.6%	1 0 0 1	S-1 3" Spoon	0 Started @ 0800 water level @ 0.6' @ 0811 26 June '67
		OH	Same. Increase in amount of clay w/depth. Wet. Soft (El. 26.6 to 22.6)	Push	S-2	2'
	5	OH	Bottom of tube shows dk. gray clay. Wet. Soft. High plasticity	Pushed 24" Rec. 24"	U/D-1	4'
		OH	Dark gray clay w/organic mat'l. Wet. Soft. Slightly lumpy	Push	S-3 3" Spoon	6'
		OH	Same as above w=99.5%	Push	S-4	8'
	10	OH	Same as above w=102.5%	Push	S-5 3" Spoon	10'
		OH	Bottom of tube shows dk. gray clay w/reeds. Wet. Soft	Pushed 24" Rec. 24"	U/D-2	12'
	15	OH	Dark gray clay w/large amt. of organic mat'l. Wet. At 16' small gravel pieces are imbedded in sample (El. 22.6 to 10.6)	Push	S-6 3" Spoon	14'
		SP	Dark gray m-f sand w/few small gravel pieces. Wet. Loose (El. 10.6 to 7.6)	0 0 0 4	S-7 3" Spoon	16'
	20		Pieces of wood	3 2 1 0	S-8	18' S-8 poor recovery (above) Contains pieces of wood in trap and apparently gravel wash from above

ENG FORM 1836 1 APR 63 PREVIOUS EDITIONS MAY BE USED (EM 1110-1-1801) PROJECT HOLE NO.

Hole No. EBB-7

DRILLING LOG	DIVISION NAD	INSTALLATION Philadelphia District Office	SHEET 1 OF 2 SHEETS
1. PROJECT Delaware River Disposal Area Study		10. SIZE AND TYPE OF BIT 2" & 3" Spoon, 4½" O.D. Sta. Pist. T	
2. LOCATION (Coordinates or Station) Edgemoor Disposal Area		11. DATUM FOR ELEVATION SHOWN (TBM or MSL) Delaware River Datum	
3. DRILLING AGENCY Warren George, Inc.		12. MANUFACTURER'S DESIGNATION OF DRILL Tripod & Cathead on tractor	
4. HOLE NO. (As shown on drawing title and file number) EBB-7		13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN	DISTURBED 12 / UNDISTURBED 4
5. NAME OF DRILLER J. Jamison		14. TOTAL NUMBER CORE BOXES —	
6. DIRECTION OF HOLE ☒ VERTICAL ☐ INCLINED ____ DEG. FROM VERT.		15. ELEVATION GROUND WATER El. 25.2	
		16. DATE HOLE	STARTED 26 June 67 / COMPLETED 27 June 67
7. THICKNESS OF OVERBURDEN 31.0		17. ELEVATION TOP OF HOLE El. 26.2	
8. DEPTH DRILLED INTO ROCK 0.0		18. TOTAL CORE RECOVERY FOR BORING —	
9. TOTAL DEPTH OF HOLE 31.0		19. SIGNATURE OF INSPECTOR J.D. Kane	

ELEVATION	DEPTH	LEGEND	CLASSIFICATION OF MATERIALS (Description)	% CORE RECOVERY	BOX OR SAMPLE NO.	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant)
26.2	0	ML	Brn.-gry. silt-clay mixture w/organic mat'l including roots.	O O I O	S-1 3" spoon	Started @ 1630 Water Level @ 1.0'
El. 25.2						2'
		OL	Same. More cohesive w/depth w=100.5% (El. 26.2 to 22.2)	P U S h	S-2	S-2 poor recovery Only 2" of mat'l.
						4'
	5		Gray clay w/ brn. organic mat'l. Wet. Soft	P U S h	S-3 V-1 S=66	5.5'
						6'
			Bottom of tube shows dk. gray clay w/organic mat'l including reeds.	Pushed 24" Rec. 24"	U/D-1	
						8'
		OH	Dark gray clay w/organic mat'l including burnt reeds. Wet. Soft	P U S h	S-4 3" spoon	
	10		Same. Wet. Soft	P U S h	S-5	10' S-5 Used 2" spoon & got poor recovery Went back w/ 3" spoon & got full recovery
						12'
			No recovery in spoon from 12'-14'. Material from sides of vane (S-6) indicate dk. gry. clay w/reeds. Wet. Soft w=117%	P U S h	S-6 V-2 S=130	13' On future contract the 3" spoon should be specified when sampling in disposal areas. 13.5'
						14' Completed work @ 1945 on 26 June 67 @ 14'
	15		Dark gray clay w/heavy concentration of reeds. Wet. Soft w=95.0%	P U S h	S-7	
						16'
				No Sample		Hole advanced from 16' to 17' w/ chopper bit without sampling
						17'
				Pushed 24" ~~Rec~~ Rec. 24"	U/D-2	
						19'
	20		Dark gray clay w/organic mat'l. Wet. Soft	P U S h		

ENG FORM 1836 1 APR 63 PREVIOUS EDITIONS MAY BE USED (ZM 1110-1-1801) PROJECT HOLE NO.

Hole No. EBB-8

DRILLING LOG — DIVISION: NAD

1. PROJECT: Delaware River Disposal Area Study
2. LOCATION (Coordinates or Station): Edgemoor Disposal Area
3. DRILLING AGENT: Warren George Inc.
4. HOLE NO. (As shown on drawing title and file number): EBB-8
5. NAME OF DRILLER: J. Jamison
6. DIRECTION OF HOLE: 90° VERTICAL; INCLINED ___ DEG. FROM VERT.
7. THICKNESS OF OVERBURDEN: 30.0
8. DEPTH DRILLED INTO ROCK: 0.0
9. TOTAL DEPTH OF HOLE: 30.0

INSTALLATION: Philadelphia District Office — SHEET 1 OF 2 SHEETS
10. SIZE AND TYPE OF BIT: 2" & 3" Spoon & 4½" I.D. Sta. Auger
11. DATUM FOR ELEVATION SHOWN (T.B.M. or M.S.L.): Delaware River Datum
12. MANUFACTURER'S DESIGNATION OF DRILL: Tripod & Cathead on tractor
13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN: DISTURBED 10; UNDISTURBED 5
14. TOTAL NUMBER CORE BOXES: —
15. ELEVATION GROUND WATER: El. 25.0
16. DATE HOLE: STARTED 27 June 67; COMPLETED 28 Jun 67
17. ELEVATION TOP OF HOLE: El. 26.8
18. TOTAL CORE RECOVERY FOR BORING: ___
19. SIGNATURE OF INSPECTOR: J. D. Kane

ELEVATION	DEPTH	LEGEND	CLASSIFICATION OF MATERIALS (Description)	% CORE RECOVERY	SIZE OR SAMPLE NO.	REMARKS (Drilling time, water loss, weathering, etc., if significant)
26.8	0					Started @ 0900 26 J
		OL	Brn-gry. silt & clay mixture with organic matl. including reeds. Moist. w=70.7%	1 0 1 2	S-1 3" Spoon	Water level @ 20.0'
El. 25.0 ▽						2'
	4		Same, less organic matl. than above. Wet. (El. 26.8 to 22.8)	1 0 0 0	S-2	4'
	5	OH	Dark gray clay. Wet. Soft @ bottom of tube.	Pushed 24" Rec. 23.5"	U/D-1	
			Same w=82.8%	P		6'
				U S h	S-3 3" Spoon	8'
			Dark gray clay, wet. Soft at 9.5 burnt reeds.	P U S h	S-4	Burnt reeds indicate fill
	10					10'
			Bottom of tube indicates dk. gray clay w/ burnt reeds. wet. Soft	Pushed 24" Rec. 24"	U/D-2	12'
			Same. Dk. gray clay. wet. Soft w=66.5%	P U S h	S-5 3" Spoon	S-5 poor recovery. 14'
			Dark gray clay. Wet. Soft. w=86.2%	P U S h	S-6	
	15					16'
		OH	Bottom of tube indicates dk. gray clay w/ reeds.. Wet. Soft	Pushed 24" Rec.	U/D-3	
						18'
			Dark gray wet soft. clay.	P U S h	S-7 3" Spoon	
	20		(El. 22.8 to 6.8)			20'

ENG FORM 1836 — PREVIOUS EDITIONS MAY BE USED (EM 1110-1-1901)

Hole No. EBB-9

DRILLING LOG — DIVISION: NAD — INSTALLATION: Philadelphia District Office — SHEET 1 of 2 sheets

1. PROJECT	Delaware River Disposal Area Study
2. LOCATION (Coordinates or Station)	Edgemoor Disposal Area
3. DRILLING AGENCY	Warren George, Inc.
4. HOLE NO. (As shown on drawing title and file number)	EBB-9
5. NAME OF DRILLER	J. Jamison
6. DIRECTION OF HOLE	☒ VERTICAL ☐ INCLINED ____ DEG. FROM VERT.
7. THICKNESS OF OVERBURDEN	26.0
8. DEPTH DRILLED INTO ROCK	0.0
9. TOTAL DEPTH OF HOLE	26.0
10. SIZE AND TYPE OF BIT	2"&3" Spoon, 4½" o.d. Sta. Aug
11. DATUM FOR ELEVATION SHOWN (TBM or MSL)	Delaware River Datum
12. MANUFACTURER'S DESIGNATION OF DRILL	Tripod & Cathead on tractor
13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN	DISTURBED: 9 — UNDISTURBED: 4
14. TOTAL NUMBER CORE BOXES	
15. ELEVATION GROUND WATER	El. 15.0
16. DATE HOLE	STARTED 1 July 1967 — COMPLETED 1 July 196
17. ELEVATION TOP OF HOLE	El. 18.5
18. TOTAL CORE RECOVERY FOR BORING	
19. SIGNATURE OF INSPECTOR	J.D. Kane

ELEVATION	DEPTH	LEGEND	CLASSIFICATION OF MATERIALS (Description)	% CORE RECOV. / RQD	BOX OR SAMPLE NO.	REMARKS (Drilling time, water loss, depth of weathering, etc. if significant)
18.5	0					Started @ 0800
		ML	Brn. silt w/ trace of gry. clay & little root matter. Moist w=85%	1 / 0 / 1 / 1	S-1 3" spoon	2'
El. 15.0		OL	Same w/ increase in clay content w/depth. Moist to wet.	1 / 0 / 1 / 1	S-2 3" spoon	Water level @ 42" @ 1
	5		Bottom of tube shows same as above (El. 10.5 to 13.5)	Pushed 24" Rec. 9"	U/D-1	4' 6'
		CL & SP	Stratified dk. gray clay & brn. f. sand. Wet. At 7.0' burnt reeds (El. 13.5 to 11.5)	1 / 1 / 2 / 2	S-3 3" spoon	7' 8'
		SP	Dk. gry m-f sand w/few small gravel pieces. Wet.	3 / 3 / 3 / 1	S-4	Poor recovery in 2" spoon from 8' to 10' This matl. combined w/ matl. from 7' to 8'
	10	SP	Dk. gry. and brn. m-f sand. Wet			10'
			Dk. gry m-f Sand. Wet w=32.6%	0 / 2 / 1 / 1	S-5 3" spoon	12'
			At 12' material appears to be changing to Blk. sandy clay (El. 11.5 to 6.5)			
		OL	Bottom of tube shows dk. gry clay w/tr. root matter wet. Slight stiffness (El. 6.5 to 3.5)	Pushed 24" Rec. 24"	U/D-2	14'
	15		Dark gray clay to dk. gry m-f sand w/little organic matl. Trace (El. 3.5 to 2.5)	0 / 0 / 1 / 1	S-6 3" spoon	16'
		SP				
		OL	Dark gray silty clay. Not as wet nor as soft as above	P / u / s / h	S-7	18'
			Bottom of tube show dk gray clay. Slight stiffness. Wet	Pushed 24" Rec. 24"	U/D-3	
	20		(El. 2.5 to -1.5)			20'

ENG FORM 1836 — PREVIOUS EDITIONS MAY BE USED — PROJECT — HOLE NO.

Hole No. EBB-10

DRILLING LOG	DIVISION NAD	INSTALLATION Philadelphia District Office	SHEET 1 OF 2 SHEETS
1. PROJECT Delaware River Disposal Area Study		10. SIZE AND TYPE OF BIT 2" & 3" Spoons & 4½" Sta. Dist.	
2. LOCATION (Coordinates or Station) Edgemoor Disposal Area		11. DATUM FOR ELEVATION SHOWN (TBM or MSL) Delaware River Datum	
3. DRILLING AGENCY Warren George, Inc.		12. MANUFACTURER'S DESIGNATION OF DRILL Tripod & Cathead on tractor	
4. HOLE NO. (As shown on drawing title and file number) EBB-10		13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN: DISTURBED 17; UNDISTURBED 1	
5. NAME OF DRILLER J. Jamison		14. TOTAL NUMBER CORE BOXES —	
6. DIRECTION OF HOLE ☒ VERTICAL ☐ INCLINED ____ DEG. FROM VERT.		15. ELEVATION GROUND WATER EL. 14.7	
		16. DATE HOLE: STARTED 29 June 1967; COMPLETED 29 Jun 67	
7. THICKNESS OF OVERBURDEN 25.0		17. ELEVATION TOP OF HOLE El. 18.2	
8. DEPTH DRILLED INTO ROCK 0.0		18. TOTAL CORE RECOVERY FOR BORING —	
9. TOTAL DEPTH OF HOLE 25.0		19. SIGNATURE OF INSPECTOR J.D. Kane	

ELEVATION	DEPTH	LEGEND	CLASSIFICATION OF MATERIALS (Description)	% CORE RECOVERY	BOX OR SAMPLE NO.	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant)
18.2	0	OL	Brn. silt w/tr. gry. clay and organic mat'l. Moist. w=70.0%	1 2 1 2	S-1; S-2 3" spoon	Started @ 0830 ft. Water Level @ 41.0' This area appears firm than all previous areas.
			w=75.5%			2'
		ML	Brn. silt (almost topsoil) Moist.	1 0 0 1	S-3	Poor recovery w/2" spoon from 2½' to 4' Filled sample w/augered mat'l
EL 14.7						4'
	5	OL	Brn. silt w/some gray clay and organic mat'l, Moist to wet. w=63.7%	1 2 2 1	S-4; S-5 3" spoon	5'
						6'
			Gry. clay w/tr. brn. silt & organic mat'l. Wet	wt. of 300# Hammer	S-6 (S=614); V-1; S-7	7' 7.5' 8'
			Bottom of tube shows gray m-f sand	Pushed 24" Rec. 23.5"	V/D-1	
	10	SP	Brn. & gry. c-f sand w/ few small gravel pieces w=43.8%	1 2 3 5	S-8 & S-9 3" spoon	10' 12'
				3 1 0 1		No Recovery in 2" spoon from 12' to 14'
	15	OL	Dark gray [w/occ. lt. gray streaks] clay. Wet. Slight stiffness. Micaceous	5 1 0 1	S-10 (S=651); V-2; S-11	14' 16'
			Dark gray clay w/organic mat'l, including burnt reeds Wet w=49.2%	1 1	S-12	
		SP	Dark gray m-f sand w/ small organic mat'l w=37.0%	4 5	S-13	18'
		OL	Dark gray clay. Wet. Slight stiffness	1 1	S-14	
	20	SP	Blk & gray c-f sand w/tr. clay and small gravel pieces wet w=42.0%	2 4	S-15	

ENG FORM 1836 PREVIOUS EDITIONS MAY BE USED. (EM 1110-1-1801) PROJECT HOLE NO.

Hole No. EBB-16

DRILLING LOG — DIVISION NAD — INSTALLATION PDO — SHEET 1 OF 2 SHEETS

1. PROJECT: Edgemoor D.A. Del.
2. LOCATION (Coordinates or Station)
3. DRILLING AGENCY: S&H
4. HOLE NO. (As shown on drawing title and title number): EBB-16
5. NAME OF DRILLER: O. Higbee
6. DIRECTION OF HOLE: ☒ VERTICAL ☐ INCLINED _____ DEG. FROM VERT.
7. THICKNESS OF OVERBURDEN: 57.0
8. DEPTH DRILLED INTO ROCK: —
9. TOTAL DEPTH OF HOLE: 57.0'
10. SIZE AND TYPE OF BIT: 3¼" OD Sampler 300 lb
11. DATUM FOR ELEVATION SHOWN (USM or MSL)
12. MANUFACTURER'S DESIGNATION OF DRILL: S&H 40c-skid
13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN: DISTURBED 12 — UNDISTURBED —
14. TOTAL NUMBER CORE BOXES
15. ELEVATION GROUND WATER: @ surface
16. DATE HOLE: STARTED 12 May 76 — COMPLETED 14 May 76
17. ELEVATION TOP OF HOLE: 33.0 from SKETCH 2 Engrs.
18. TOTAL CORE RECOVERY FOR BORING
19. SIGNATURE OF INSPECTOR: RGL

ELEVATION	DEPTH	LEGEND	CLASSIFICATION OF MATERIALS (Description)	% CORE RECOVERY	BOX OR SAMPLE NO.	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant)
	2	GP	GRAVEL, sandy, loose up to 1" in size grading into SAND c-f @ 4.0'	3-4 7-10	S-1	
	4	SP				
	6			19-32	S-2	
	8	OH	CLAY, dk-gry, silty, org. w/ some contamination of gravel from above.	10-4		
	10			WOH	S-3	Vane test #1 Undl. 220 psf @ 32° remold 50 psf @ 38°
	12		Same but no contamination			
	14					
	16		Same	WOH	S-4	
	18					
	20			1-0		
	22		Same	0-1	S-5	
	24					
	26		Same	WOH	S-6	Vane test #2 Undl. 400 psf @ 54° remold 180 psf @ 22°
	28			1-1		
	30					
	32		Same	0-1 1-1	S-7	
	34					
	36	OL	SILT, clk-gry, clayey w/ hairline layers of sand, silty, v.f. gry and brn peaty material.	1-2 1-1	S-8	
	38					
	40					

ENG FORM 1836 MAR 71 PREVIOUS EDITIONS ARE OBSOLETE. — PROJECT Edgemoor — HOLE NO. EBB-16

Hole No. EBB-17

DRILLING LOG — VISION NAD — INSTALLATION PDD — SHEET 1 OF 2 SHEETS

1. PROJECT: Edgemoor D.A. Del.
2. LOCATION (Coordinates or Station)
3. DRILLING AGENCY: S&H
4. HOLE NO. (As shown on drawing title and file number): EBB-17
5. NAME OF DRILLER: O. Higbee
6. DIRECTION OF HOLE: ☒ VERTICAL ☐ INCLINED _____ DEG. FROM VERT.
7. THICKNESS OF OVERBURDEN: 70.0
8. DEPTH DRILLED INTO ROCK: —
9. TOTAL DEPTH OF HOLE: 70.0
10. SIZE AND TYPE OF BIT
11. DATUM FOR ELEVATION SHOWN (USM or USGS)
12. MANUFACTURER'S DESIGNATION OF DRILL: 40C-Skid
13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN: DISTURBED 15 | UNDISTURBED —
14. TOTAL NUMBER CORE BOXES
15. ELEVATION GROUND WATER: @ Surface
16. DATE HOLE: STARTED 17 May 76 | COMPLETED 19 May 76
17. ELEVATION TOP OF HOLE
18. TOTAL CORE RECOVERY FOR BORING
19. SIGNATURE OF INSPECTOR: RCL

ELEVATION	DEPTH	LEGEND	CLASSIFICATION OF MATERIALS (Description)	% CORE RECOVERY	BOX OR SAMPLE NO.	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant)
	2	ML	SILT, dk-brn, some roots & veg. matter, moist	1-6 9-13	S-1	Standard penetration 2" OD x 140 # hammer unles otherwise noted.
	6	OH	CLAY, silty, dk-gry, org. and SILT, slightly stratified, plastic	1-0 0-1	S-2	
	10		same but no stratification	0-0 2-2	S-3	Vane test #1 Und. 650psf @ 32° remold 170psf @ 52°
	16		same, sl. plastic	0-0 2-1	S-4	3½" OD spoon & 300# hammer
	20		same	0-0 2-3	S-5	
	26		same	1-2 2-2	S-6	Vane test #2 Und. 780psf @ 46° remold. 210psf @ 36° 5"6 taken w/ 3½" spoon & 300# hammer
	30		same	1-0 1-0	S-7	
	36	OL ↑ ML	SILT, gry & clayey SILT, dk-gry org. Interbed.	1-2 1-4	S-8	18 May 76
	40					

ENG FORM 1836 MAR 71 PREVIOUS EDITIONS ARE OBSOLETE. PROJECT Edgemoor D.A. HOLE NO. EBB-17

Hole No. EBB-1B

DRILLING LOG — DIVISION NAD — INSTALLATION PDO — SHEET 1 OF 2 SHEETS

1. PROJECT: Edgemoor D.A. Del.	10. SIZE AND TYPE OF BIT: standard penetr.
2. LOCATION (Coordinates or Station)	11. DATUM FOR ELEVATION SHOWN (MSL or MLW)
3. DRILLING AGENCY: S&H	12. MANUFACTURER'S DESIGNATION OF DRILL
4. HOLE NO. (As shown on drawing title and file number): EBB-1B	13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN: DISTURBED 18 / UNDISTURBED —
5. NAME OF DRILLER: O. Higbee	14. TOTAL NUMBER CORE BOXES
6. DIRECTION OF HOLE: ☒ VERTICAL ☐ INCLINED ____ DEG. FROM VERT.	15. ELEVATION GROUND WATER
7. THICKNESS OF OVERBURDEN: 67.0'	16. DATE HOLE: STARTED 20May 76 / COMPLETED 24May 76
8. DEPTH DRILLED INTO ROCK: —	17. ELEVATION TOP OF HOLE
9. TOTAL DEPTH OF HOLE: 67.0'	18. TOTAL CORE RECOVERY FOR BORING
	19. SIGNATURE OF INSPECTOR: RGL

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)
	2	ML	SILT, clayey brn to gry some veg., tr. of org. moist	1-3 / 12-10	S-1	
	4	OH	CLAY, silty dk-gry, org. plastic, soft	4-1 / 1-0	S-2	
	8					
	10		same w/less than trace of veg.	WOH	S-3	Vane test #1 Und. 500psf @ 12° remold. 100psf @ 18°
	12					
	14					
	16	OL	SILT, clayey, dk-gry, org less plastic than above	0-0 / 1-3	S-4	
	18					
	20	OH	CLAY, org. dk-gry w/some dec. veg. At 21'. Thinly stratified dk gry (brn in color.	1-1 / 2-3	S-5	
	22					
	24					
	26		CLAY, dk-gry, org, w/occ. v. thin layers of sand silty v. fine, tr of mica.	1-1 / 2-2	S-6	Vane test #2 Und. 800psf @ 18° remold. 110psf @ 18°
	28					
	30	SP	SAND, f-c, gry, loose some OL contamination	8-13 / 11-6	S-7	
	32			Bailing	S-7A	
	34		same b wt f to v. coarse lt. gry			
	36	OL	SILT, clayey, dk-gry, org. sl. plastic	1-3	S-8	
		SM	SAND, silty, dk-gry, f-m.	11-13	S8A	
	38	SP/SM	Interbedded org. CLAY and Sand f-v.c. occ. pebbles, loose	BAILER	S-9	
	40					

ENG FORM 1836 MAR 71 — PREVIOUS EDITIONS ARE OBSOLETE. — PROJECT — HOLE NO. EBB-1B

Hole No. EBB-19

DRILLING LOG | VISION NAD | INSTALLATION , PDO | SHEET 1 OF 3 SHEETS

1. PROJECT: Edgemoor D.A., Del.
2. LOCATION (Coordinates or Station)
3. DRILLING AGENCY: S&H
4. HOLE NO. (As shown on drawing title and File number): EBB-19
5. NAME OF DRILLER
6. DIRECTION OF HOLE: ☒ VERTICAL ☐ INCLINED ____ DEG. FROM VERT.
7. THICKNESS OF OVERBURDEN: 92.0
8. DEPTH DRILLED INTO ROCK: —
9. TOTAL DEPTH OF HOLE: 92.0
10. SIZE AND TYPE OF BIT: standard
11. DATUM FOR ELEVATION SHOWN (USM or MSL)
12. MANUFACTURER'S DESIGNATION OF DRILL: 40-C-skid
13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN: DISTURBED ____ UNDISTURBED ____
14. TOTAL NUMBER CORE BOXES
15. ELEVATION GROUND WATER: -3.6 below surf.
16. DATE HOLE: STARTED 24 May 76 COMPLETED 27 May 76
17. ELEVATION TOP OF HOLE: 134'
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)
	0	SP & GP	Thin veneer of brn silt underlain by loose sands & gravel, crushed	5-16 22-21	S-1	Piezometer EL B-11
	4		Sand & GRAVEL, loose, wet	1-2 1-1	S-2	G.W - 3.5' on 24 May 76
	8	OH	CLAY, silty, org, dk-gry w/less than trace of sand, fine in layers.	WOH	S-3	25 May 76 Vane test #1 Und. 300psf @ 16° remold 90psf @ 16°
	12					
	16		Same w/some wood fragments	WOH	S-4	
	20		Same w/some layers of sand & small gravel			
	24	OL	SILT, clayey, org. dk-gry w/some elec. vegetation sl. plastic	1-1 1-2	S-5	Used 3½" spoon in sampling S-5 in order to clean possible gravel in the casing left after boring.
	28	OH	CLAY, silty, org, dk-gry plastic w/some v. thin layers of SM v.f., occ. elec. veg.	3-2 4-5	S-6	Vane test #2 Und. 700psf @ 44° Remold: 130psf @ 52°
	32	OL	SILT, clayey, mg. dk-gry some to tr. of elec. veg.	1-1 3-5	S-7	
	36		Same but no veget.			
	40		Same w/less than trace of v. thin gry v.f. SM (hairline)	1-2 4-3	S-8	26 May 76

Cement grout | Bentonite | Concrete plug

ENG FORM 1836 MAR 71 PREVIOUS EDITIONS ARE OBSOLETE. | PROJECT | HOLE NO.

Hole No. EBB-19

DRILLING LOG

DIVISION

INSTALLATION

SHEET 3 OF 3 SHEETS

1. PROJECT	10. SIZE AND TYPE OF BIT
2. LOCATION (Coordinates or Station)	11. DATUM FOR ELEVATION SHOWN (USGS or MSL)
3. DRILLING AGENCY	12. MANUFACTURER'S DESIGNATION OF DRILL
4. HOLE NO. (As shown on drawing title and file number) EBB-19	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 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
	80	ML	SILT, micaceous, brn to gry sandy; sand v. f. grained	9-16	S-17	
	82			18-32		
	84	SP	SAND w/some fine Gravel			
		SP/SM	SAND v. fine, some silt	10-28	S-18	
	86	SP	SAND, f-m, gry	50-63		28 May 76
		GP	Gravel, sandy up to 1", comp			
	88					
	90		SAND, gravelly m-c "Trace Gravel up to 1", brn-yel.	20-29	S-19	
				32-37		
	92		Bottom of hole - 92.0'			

ENG FORM 1836 MAR 71 PREVIOUS EDITIONS ARE OBSOLETE.

PROJECT

HOLE NO. EBB-19

Hole No. EBB-2 c

DRILLING LOG	DIVISION NAD	INSTALLATION PDO	SHEET 2 OF 3 SHEETS

1. PROJECT Edge Moor Disposal Area	10. SIZE AND TYPE OF BIT
2. LOCATION (Coordinates or Station)	11. DATUM FOR ELEVATION SHOWN (TBM or MSL)
3. DRILLING AGENCY	12. MANUFACTURER'S DESIGNATION OF DRILL
4. HOLE NO. (As shown on drawing title and file number) EBB-20	13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN — DISTURBED — UNDISTURBED
5. NAME OF DRILLER	14. TOTAL NUMBER CORE BOXES
6. DIRECTION OF HOLE ☐ VERTICAL ☐ INCLINED ____ DIR. 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 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
	20	OH	Dk. gry plastic CLAY w/some silt and very thin layers of carbonized vegetation v. soft. wet	WOR WOH WOH WOH	20.0 S-5 22.0	4" casing to 25'
	22			WASH		
	24				25.0	
	26	OL	Dk gry Clayey SILT w/ 0.3' layer of carbonized vegetation 26.2-26.5 sl. plastic, soft. wet	WOH	S-6 27.0	VANESHEAR Test #2 25'-27' und. 500psfc 8° remold 420psfc 22° 4" casing to 30'
	28			WASH		
	30	OH	Dk. gry org. plastic CLAY w/pkts of carbonized vegetation and very thin lt. gry silt partings to 31.6' med. grg. SILT 31.6' to 32' wet	1 3 2 3	30.0 S-7 32.0	G.W @ 1.7' @ 0730 5-28-76 4" casing to 35
	32			WASH		
	34	CL ± ML			35.0	
	36		Layers of dk. gry CLAY w/tr of micaceous silt and dk gry to med. gry SILT w/tr of clay. Layers 2' to 5" thick wet to v. wet.	WOH WOH 1 2	S-8 37.0	4" casing to 40'
	38			WASH		
	40				40.0	

ENG FORM 1836 1 APR 63 PREVIOUS EDITIONS MAY BE USED (EM 1110-1-1802) PROJECT HOLE NO.

Hole No. EBB-21

DRILLING LOG

1. DIVISION: NAD
2. INSTALLATION: PDO
3. SHEET 1 OF 1 SHEETS
4. PROJECT: Edgemoor D.A. Del.
5. LOCATION (Coordinates or Station)
6. DRILLING AGENCY: S & H
7. HOLE NO. (As shown on drawing title and file number): EBB-21
8. NAME OF DRILLER: O. Higbee
9. DIRECTION OF HOLE: ☒ VERTICAL ☐ INCLINED _____ DEG. FROM VERT.
10. DATE HOLE: STARTED 1 June 76; COMPLETED 3 June 76
11. ELEVATION TOP OF HOLE: 32.0 (from mag STITCH II)
12. TOTAL CORE RECOVERY FOR BORING: %
13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN: DISTURBED; UNDISTURBED
14. TOTAL NUMBER CORE BOXES
15. ELEVATION GROUND WATER
16. DATE HOLE
17. ELEVATION TOP OF HOLE
18. TOTAL CORE RECOVERY FOR BORING
19. SIGNATURE OF INSPECTOR: RGL
20. SIZE AND TYPE OF BIT: 2" OD 140# hammer
21. DATUM FOR ELEVATION SHOWN (TBM or MSL)
22. MANUFACTURER'S DESIGNATION OF DRILL: 40e skid
23. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN
24. TOTAL NUMBER CORE BOXES
25. ELEVATION GROUND WATER
26. DATE HOLE
27. ELEVATION TOP OF HOLE
28. TOTAL CORE RECOVERY FOR BORING
29. SIGNATURE OF INSPECTOR
30. TOTAL DEPTH OF HOLE: 40.0
31. THICKNESS OF OVERBURDEN: 40.0'
32. DEPTH DRILLED INTO ROCK: NIL'

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					
	2	OH	DK-gry silty org. CLAY v. soft, wet.	W_{OR}	S-1	Water e surface
	4					
	6		same	Push	S-2	
	8					
	10		same but moist & slightly less plastic	Push	S-3	3 June 76 Vane test #1 Und. 200 psf e 58° Remold 175 psf e 64°
	12					
	14					
	16	OL	DK-gry org. clayey silt, moist, crumbly	Push	S-4	
	18					
	20					
	22	OH	DK-gry silty org. CLAY plastic, moist, some decayed vegetation e 21.8'-22.0'	Push	S-5	
	24					
	26		same but no veget.	Push	S-6	Vane test #2 Und. 210 psf e 14° Remold 200 psf e 64°
	28					
	30	SM	Gry Sand, silty, fine			
	32	OL	Gry org. SILT w/ some veget. less than trace of clay, moist.	W_{OH}	S-7	
	34					
	36		Same w/ scattered dec. veget. and occ. v. thin layer of v.f. silty sand.	1-2 2-3	S-8	
	38					
	40		same but more veg. & more clayey	W_{OR}	S-9	Vane test #3 Und 300 psf @ 46° Remold 50 psf @ 74°

ENG FORM 1836 MAR 71 PREVIOUS EDITIONS ARE OBSOLETE.

PROJECT

HOLE NO. EBB-

(TRANSLUCENT)

H-- No. EBB-22

DRILLING LOG	VISION	INSTALLATION	SHEET 2 OF 2 SHEETS

1. PROJECT	10. SIZE AND TYPE OF BIT
2. LOCATION (Coordinates or Station)	11. DATUM FOR ELEVATION SHOWN (TBM or MSL)
3. DRILLING AGENCY	12. MANUFACTURER'S DESIGNATION OF DRILL
4. HOLE NO. (As shown on drawing title and file number) EBB-22	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 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
	40	ML	SILT, clayey, gry	1-3 6-9	S-9	
	42	Pt	Peat			
	44	ML	SILT, clayey, gry w/some to much veget. scattered throughout.	3-4 6-7	S-10	
	46					
	48					
	50	Pt	Peat	3-5 8-9	S-11	
	52	ML	SILT, stratified, brn, some sand & tr of veg.			
	54					
	56	SP/SM	SAND, fine, micaceous w/some gry silt layers & scattered small pebbles	25-33 59-50%	S-12	S-12; probably pushing gravel ahead of spoon.
			Bottom of hole - 56.6'			

ENG FORM 1836 MAR 73 PREVIOUS EDITIONS ARE OBSOLETE. (TRANSLUCENT)

PROJECT Edgemoor D.A

HOLE NO. EBB-2

's No.

DRILLING LOG | DIVISION | INSTALLATION | SHEET 2 OF 2 SHEETS

1. PROJECT: Edgemoor Disposal Area, Del.
2. LOCATION (Coordinates or Station)
3. DRILLING AGENCY
4. HOLE NO. (As shown on drawing title and file number): EBB-23
5. NAME OF DRILLER
6. DIRECTION OF HOLE: ☐ VERTICAL ☐ INCLINED _____ DEG. FROM VERT.
7. THICKNESS OF OVERBURDEN
8. DEPTH DRILLED INTO ROCK
9. TOTAL DEPTH OF HOLE
10. SIZE AND TYPE OF BIT
11. DATUM FOR ELEVATION SHOWN (TSM or MSL)
12. MANUFACTURER'S DESIGNATION OF DRILL
13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN | DISTURBED | UNDISTURBED
14. TOTAL NUMBER CORE BOXES
15. ELEVATION GROUND WATER
16. DATE HOLE | STARTED | COMPLETED
17. ELEVATION TOP 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)
	40					
	42	ML	SILT, dk. gray, w/some v. fine mic. sand, soft, moist	2-2 2-2	S-8	V.S. #7 (41.0'-41.5') Und. 551 #/0' Rem. 105 #/0'
	44					
	46	ML	SILT, dk. gray, w/some clay & v. fine sand, soft, moist.	1-2 1-2	S-9	V.S. #8 (46.0'-46.5') Und. 859 #/0' Rem. 311 #/0'
	48					
	50	ML	SILT, dk. gray, w/lenses v. fine mic. sand, soft, moist.	1-2 2-2	S-10	V.S. #9 (51.0'-51.5') Und. 870+ #/0' Rem. 451 #/0'
	52		Bottom of Hole -52.0'			

ENG FORM 1836 PREVIOUS EDITIONS ARE OBSOLETE. | PROJECT | HOLE NO.

le No.

DRILLING LOG | DIVISION | INSTALLATION | SHEET 2 OF 2 SHEETS

1. PROJECT
2. LOCATION (Coordinates or Station)
3. DRILLING AGENCY
4. HOLE NO. (As shown on drawing title and file number) EBB-24
5. NAME OF DRILLER
6. DIRECTION OF HOLE ☐ VERTICAL ☐ INCLINED _____ DEG. FROM VERT.
7. THICKNESS OF OVERBURDEN
8. DEPTH DRILLED INTO ROCK
9. TOTAL DEPTH OF HOLE
10. SIZE AND TYPE OF BIT
11. DATUM FOR ELEVATION SHOWN (TBM or MSL)
12. MANUFACTURER'S DESIGNATION OF DRILL
13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN | DISTURBED | UNDISTURBED
14. TOTAL NUMBER CORE BOXES
15. ELEVATION GROUND WATER
16. DATE HOLE | STARTED | COMPLETED
17. ELEVATION TOP 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
	40					
	41	ML		1-2	S-8A	V.S. #7 (41.0'-41.5')
	42	SM-ML	SILT-SAND, v. fine, dk. gry, moist, org. odor, loose	2-2	S-8B	Und. 455 #/0' Rem. 68 #/0'
	44					
	46	ML	SILT w/ lenses of v. fine sand, dk gray, moist, loose.	1-1 2-2	S-9	V.S. # 8 (46.0'-46.5') Und. 543 #/0' Rem. 0 #/0'
	48					
	50		SILT w/ org. matter, dk. gry, moist, medium stiff	2-4 4-4	S-10	V.S. # 9 (51.0'-51.5') Und. #81 #/0' Rem. .66 #/0'
	52		Bottom of hole - 52.0'			

ENG FORM 1836 MAR 71 PREVIOUS EDITIONS ARE OBSOLETE.

PROJECT Fla. - Miss. Disp. Area | HOLE NO. EBB-2

Hole No. EBB-2

DRILLING LOG | Division NAD | Installation PDO | Sheet 2 of 2 Sheets

1. Project: Edgemoor D.A.
2. Location (Coordinates or Station)
3. Drilling Agency
4. Hole No. (As shown on drawing title and file number): EBB-2.5
5. Name of Driller
6. Direction of Hole: ☐ Vertical ☐ Inclined _____ Deg. from vert.
7. Thickness of Overburden
8. Depth Drilled into Rock
9. Total Depth of Hole
10. Size and Type of Bit
11. Datum for Elevation Shown (USM or NGS)
12. Manufacturer's Designation of Drill
13. Total No. of Overburden Samples Taken | Disturbed | Undisturbed
14. Total Number Core Boxes
15. Elevation Ground Water
16. Date Hole | Started | Completed
17. Elevation Top 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)
7.6'	40			0-0	S-18	Vane Shear Test #:
			Grey silt w/ little organics, soft to med. density.	1-2	40'-42'	Undisturbed = 138
	42			1-1	S-19	Remolded = 326
			trace of fine sand from 42' - 46'	1-4	42'-44'	
	44			3-2	S-20	
				2-4	44'-46'	
	46	MH		4-4	S-21	
				3-3	46'-48'	NO RECOVERY
	48			1-0	S-22	
				4-4	48'-50'	
	50			2-4	S-23	
			dry material, lots of org.	3-4	50'-52'	
	52			2-4	S-24	
		OH	Dull yellow organic material w/ some grey silt	5-7	52'-54'	
	54					
			Grey silt w/ organics soft to med. density.	2-2	S-25	
	56			3-6	54'-56'	
		MH/OH		3-4	S-26	
	58		thick in organic matter from 58.3' to 59.0'	3-5	56'-58'	
				4-4	S-27	
-12.4'	60			4-6	58'-60'	
			Bottom of Hole = 60.0'			

ENG FORM 1836 MAR 71 — PREVIOUS EDITIONS ARE OBSOLETE.

Project: Edgemoor D.A. | Hole No. EBB-2

Hole No. EBB-2

DRILLING LOG | DIVISION NAD | INSTALLATION PDO | SHEET 2 OF 2 SHEET

1. PROJECT: Edgewood Disposal Area
2. LOCATION (Coordinates or Station)
3. DRILLING AGENCY
4. HOLE NO. (As shown on drawing title and file number): EBB-26
5. NAME OF DRILLER
6. DIRECTION OF HOLE: ☐ VERTICAL ☐ INCLINED ____ DEG. FROM VERT.
7. THICKNESS OF OVERBURDEN
8. DEPTH DRILLED INTO ROCK
9. TOTAL DEPTH OF HOLE
10. SIZE AND TYPE OF BIT
11. DATUM FOR ELEVATION SHOWN (MSL or USC)
12. MANUFACTURER'S DESIGNATION OF DRILL
13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN: DISTURBED | UNDISTURBED
14. TOTAL NUMBER CORE BOXES
15. ELEVATION GROUND WATER
16. DATE HOLE: STARTED | COMPLETED
17. ELEVATION TOP OF HOLE
18. TOTAL CORE RECOVERY FOR BORING
19. SIGNATURE OF INSPECTOR: TPA

ELEVATION	DEPTH	LEGEND	CLASSIFICATION OF MATERIALS (Description)	% CORE RECOVERY	BOX OR SAMPLE NO.	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant)
7.8'	40		Grey silt w/ little to no organics, very soft.	1-1	S-18	
				1-1	40'-42'	
	42			0-1	S-19	
				1-1	42'-44'	
	44	MH	Possible trace of fine sand from 44'-58'	1-1	S-20	
				2-0	44'-46'	
	46			100psi	US5-4	
				0% Rec	46'-48'	NO RECOVERY
	48			150psi	US5-5	
				100% Rec	48'-50'	
-2.2'	50		Bottom of Hole = 50.0'			

ENG FORM 1836 MAR 71 PREVIOUS EDITIONS ARE OBSOLETE.

PROJECT Edgewood Disposal Area | HOLE NO. EBB-26

Hole No. EBB-

DRILLING	DIVISION	INSTALLATION	SHEET
6	NAD	PVO	2 OF 2 SHEETS

1. PROJECT: Edgemoor Disposal Area
2. LOCATION (Coordinates or Station)
3. DRILLING AGENCY: Engineering Drilling
4. HOLE NO. (As shown on drawing title and file number): EBB-27
5. NAME OF DRILLER
6. DIRECTION OF HOLE: ☐ VERTICAL ☐ INCLINED ____ DEG. FROM VERT.
7. THICKNESS OF OVERBURDEN
8. DEPTH DRILLED INTO ROCK
9. TOTAL DEPTH OF HOLE
10. SIZE AND TYPE OF BIT
11. DATUM FOR ELEVATION SHOWN (TBM or MSL)
12. MANUFACTURER'S DESIGNATION OF DRILL
13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN: DISTURBED / UNDISTURBED
14. TOTAL NUMBER CORE BOXES
15. ELEVATION GROUND WATER
16. DATE HOLE: STARTED / COMPLETED
17. ELEVATION TOP OF HOLE
18. TOTAL CORE RECOVERY FOR BORING %
19. SIGNATURE OF INSPECTOR: JPA

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
7.2'	40	MH	Grey silt w/ little organics and possible trace of fine sand, medium density.	150psi	USS-4	0.3' Slipped
				85% Rec	40'-42'	
	42			2-2	S-18	0.4' Recovery
				3-3	42'-44'	
	44			4-4	S-19	
				5-5	44'-46'	
	46			2-3	S-20	
				4-4	46'-48'	
	48			175psi	USS-5	
				100% Rec	48'-50'	
	50			3-12	S-21	
-4.8'	52	SP	Grey med. size sand, med. density	11-5	50'-52'	

Bottom of Hole = 52.0'

Note: A large quantity of sandy gravel appears to have been deposited at the inside corner of dike here.

ENG FORM 1836 MAR 71 PREVIOUS EDITIONS ARE OBSOLETE.

PROJECT: Edgemoor Disposal Area | HOLE NO. EBB

Hole No. EBB-2

DRILLING UC	DIVISION NAP	INSTALLATION PDO	SHEET 1 OF 2 SHEETS
1. PROJECT: Edgemoor Disposal Area		10. SIZE AND TYPE OF BIT: 9" Tricone Diamond	
2. LOCATION (Coordinates or Station): E 103,455 N 459,930		11. DATUM FOR ELEVATION SHOWN (TBM or MSL): CRD	
3. DRILLING AGENCY: Engineering Drilling		12. MANUFACTURER'S DESIGNATION OF DRILL: Mayhew All Terrain	
4. HOLE NO. (As shown on drawing title and file number): EBB-2B		13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN: DISTURBED 22; UNDISTURBED 3	
5. NAME OF DRILLER: Ken Kutarnia		14. TOTAL NUMBER CORE BOXES: —	
6. DIRECTION OF HOLE: ☒ VERTICAL ☐ INCLINED ____ DEG. FROM VERT.		15. ELEVATION GROUND WATER: 39.7'	
7. THICKNESS OF OVERBURDEN: 50'		16. DATE HOLE: STARTED 4 June 87; COMPLETED 6 June 87	
8. DEPTH DRILLED INTO ROCK: —		17. ELEVATION TOP OF HOLE: 47.1'	
9. TOTAL DEPTH OF HOLE: 50'		18. TOTAL CORE RECOVERY FOR BORING: — %	
		19. SIGNATURE OF INSPECTOR: JPA	

ELEVATION	DEPTH	LEGEND	CLASSIFICATION OF MATERIALS (Description)	% CORE RECOVERY	BOX OR SAMPLE NO.	REMARKS (Drilling time, water loss, depth of weathered, rock, & significant)
47.1'	0		Brown to gray silt w/ organics, soft.	1-1	S-1	STD. PEN 0.3' Recovery 140# hammer
	2			1-3	0'-2'	2" split spoon
				2-2	S-2	
	4			1-1	2'-4'	1.2' Recovery
				2-2	S-3	
	6			1-2	4'-6'	
				2-1	S-4	
	8			0-1	6'-8'	
				125psi	455-1	0.4' fall at bottom
	10			80ZRec	8'-10'	
			Grey to dk. grey silt w/ little organics, very soft.	1-0	S-5	
	12			1-2	10'-12'	
				0-0	S-6	
				1-1	12'-14'	
	14		Shaft of vane is slightly bent.	0-0	S-7	Vane Shear Test #1 Undisturbed = 909psf
				0-1	14'-16'	Remolded = 130psf
	16	MH		1-0	S-8	
				1-1	16'-18'	
	18			1-0	S-9	
				0-0	18'-20'	
	20			125psi	455-2	
				652Rec	20'-22'	
	22		trace of fine sand	1-6	S-10	
				0-0	22'-24'	
	24			1-0	S-11	
				0-0	24'-26'	
	26			0-0	S-12	Vane Shear Test #2 Undisturbed = 643psf
				0-0	26'-28'	Remolded = 155psf
	28			0-0	S-13	
				1-2	28'-30'	
	30			0-0	S-14	
				0-1	30'-32'	
	32			1-1	S-15	
				1-1	32'-34'	
	34			0-1-1	S-16	Vane Shear Test #3 Undisturbed = Remolded = 195psf
					34'-36'	
	36			0-1	S-17	
				1-1	36'-38'	
	38			1-1	S-18	
7.1'	40			2-2	38'-40'	

ENG FORM 1836 MAR 71 PREVIOUS EDITIONS ARE OBSOLETE.

PROJECT Edgemoor Disposal Area HOLE NO. EBB-2

Hole No. EBB-2

DRILLING LOG	DIVISION NAD	INSTALLATION PDO	SHEET 2 OF 2 SHEETS

1. PROJECT: Edgemoor Disposal Area
2. LOCATION (Coordinates or Station)
3. DRILLING AGENCY
4. HOLE NO. (As shown on drawing title and file number): EBB-28
5. NAME OF DRILLER
6. DIRECTION OF HOLE: ☐ VERTICAL ☐ INCLINED ____ DEG. FROM VERT.
7. THICKNESS OF OVERBURDEN
8. DEPTH DRILLED INTO ROCK
9. TOTAL DEPTH OF HOLE
10. SIZE AND TYPE OF BIT
11. DATUM FOR ELEVATION SHOWN (TBM or MSL)
12. MANUFACTURER'S DESIGNATION OF DRILL
13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN: DISTURBED / UNDISTURBED
14. TOTAL NUMBER CORE BOXES
15. ELEVATION GROUND WATER
16. DATE HOLE: STARTED / COMPLETED
17. ELEVATION TOP OF HOLE
18. TOTAL CORE RECOVERY FOR BORING %
19. SIGNATURE OF INSPECTOR: JPA

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
7.1'	40	MH	Grey silt w/ very little organics, soft.	165psi 100% Rec	USS-3 40'-42'	
	42			0-1	S-19	
				2-3	42'-44'	
	44			1-8	S-20	
		SP	Sand, grey, med. to coarse, w/ trace of gravel, medium dense.	22-24	44'-46'	
	46			13-11	S-21	
	48			12-12	46'-48'	
				11-9	S-22	
-2.9'	50			6-6	48'-50'	0.7' Recovery

Bottom of Hole = 50.0'

ENG FORM 1836 MAR 71 PREVIOUS EDITIONS ARE OBSOLETE. PROJECT E1 HOLE NO. EBB

Hole No. EBB-29

DRILLING LOG	DIVISION NAD	INSTALLATION PDO	SHEET 1 OF 2 SHEETS

1. PROJECT Edgemoor Disposal Area	10. SIZE AND TYPE OF BIT 4" Tricone, Osterb
2. LOCATION (Coordinates or Station) E 103,050 N 458,845	11. DATUM FOR ELEVATION SHOWN (TBM or MSL) CRD
3. DRILLING AGENCY Engineering Drilling	12. MANUFACTURER'S DESIGNATION OF DRILL Mayhew All Terrain
4. HOLE NO. (As shown on drawing title and file number) EBB-29	13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN — DISTURBED 27 — UNDISTURBED 4
5. NAME OF DRILLER Ken Kutarnia	14. TOTAL NUMBER CORE BOXES —
6. DIRECTION OF HOLE ☒ VERTICAL ☐ INCLINED ____ DEG. FROM VERT.	15. ELEVATION GROUND WATER 36.4'
	16. DATE HOLE — STARTED 6 June 84 — COMPLETED 8 June 84
7. THICKNESS OF OVERBURDEN 62'	17. ELEVATION TOP OF HOLE 49.5'
8. DEPTH DRILLED INTO ROCK —	18. TOTAL CORE RECOVERY FOR BORING — %
9. TOTAL DEPTH OF HOLE 62'	19. SIGNATURE OF INSPECTOR JPA

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
49.5'	0	MH	Brown silt, soft to very soft	2-2 / 1-2	S-1 / 0'-2'	0.3' Recovery STD PEN 140# hammer 2" split spoon
	2			2-1 / 2-1	S-2 / 2'-4'	0.4' Recovery
	4			1-1 / 2-1	S-3 / 4'-6'	0.6' Recovery
	6			1-0 / 3-3	S-4 / 6'-8'	1.3' Recovery
	8			0-1 / 0-0	S-5 / 8'-10'	Vane Shear Test Sundisturbed = Sremolded = 155psf
	10			1-1 / 1-2	S-6 / 10'-12'	0.8' Recovery
	12			1-0 / 1-2	S-7 / 12'-14'	
	14			100psi / 100% Rec	USS-1 / 14'-16'	
	16			1-1 / 1-1	S-8 / 16'-18'	
	18			1-1 / 1-1	S-9 / 18'-20'	
	20		*Bent Vane trace of med. to coarse sand	0-0 / 0-1	S-10 / 20'-22'	Vane Shear Test #2 Sundisturbed = 1881psf Sremolded = 163psf
	22		Grey silt w/ very little organics, med. density	1-6 / 3-2	S-11 / 22'-24'	1.0' Recovery
	24	SP	Grey med. to coarse sand w/ a trace of gravel, medium density	5-5 / 5-10	S-12 / 24'-26'	0.9' Recovery
	26			4-1 / 2-1	S-13 / 26'-28'	
	28	MH	Grey silt w/ a trace of gravel	1-1 / 1-2	S-14 / 28'-30'	0.1' Recovery
	30			5-2 / 2-1	S-15 / 30'-32'	0.1' Recovery
	32		Dk. grey silt w/ organics and a possible trace of fine sand, soft to very soft.	1-3 / 2-4	S-16 / 32'-34'	
	34			160psi / 100% Rec	USS-2 / 34'-36'	
	36			1-0 / 1-2	S-17 / 36'-38'	
	38			1-0 / 1-3	S-18 / 38'-40'	
9.5	40					

ENG FORM 1836 MAR 71 PREVIOUS EDITIONS ARE OBSOLETE. PROJECT Edgemoor Disposal A HOLE NO. EBB

Hole No. EBB-

DRILLING LOG | DIVISION NAD | INSTALLATION PDO | SHEET 2 OF 2 SHEETS

1. PROJECT: Edgemoor Disposal Area
2. LOCATION (Coordinates or Station)
3. DRILLING AGENCY: Engineering Drilling
4. HOLE NO. (As shown on drawing title and Blk number): EBB-29
5. NAME OF DRILLER
6. DIRECTION OF HOLE: ☐ VERTICAL ☐ INCLINED _____ DEG. FROM VERT.
7. THICKNESS OF OVERBURDEN
8. DEPTH DRILLED INTO ROCK
9. TOTAL DEPTH OF HOLE
10. SIZE AND TYPE OF BIT
11. DATUM FOR ELEVATION SHOWN (TBM or MSL)
12. MANUFACTURER'S DESIGNATION OF DRILL
13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN | DISTURBED | UNDISTURBED
14. TOTAL NUMBER CORE BOXES
15. ELEVATION GROUND WATER
16. DATE HOLE | STARTED | COMPLETED
17. ELEVATION TOP OF HOLE
18. TOTAL CORE RECOVERY FOR BORING
19. SIGNATURE OF INSPECTOR: JPA

ELEVATION	DEPTH	LEGEND	CLASSIFICATION OF MATERIALS (Description)	% CORE RECOVERY	BOX OR SAMPLE NO.	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant)
9.5'	90		Dk. gray silt w/ little organics, soft to medium density to stiff.	7-6	S-19	
				6-9	90'-92'	
	92			2-1	S-20	
				2-3	92'-94'	
	94			150psi	U 55-3	
				100% Rec	94'-96'	
	96			1-1	S-21	
				3-3	96'-98'	
	98			1-1	S-22	
				2-3	98'-50'	
	50	MH		175psi	U 55-4	
				100% Rec	50'-52'	
	52			2-2	S-23	
				3-7	52'-54'	
	54		coarse sand at tip of spoon	2-6	S-24	1.0' Recovery
				6-8	54'-56'	
	56		Grey silt w/ some medium sand and a possible trace of gravel, stiff.	4-5	S-25	1.0' Recovery
				4-3	56'-58'	
	58			4-5	S-26	
				3-5	58'-60'	
	60			5-3	S-27	
				4-5	60'-62'	0.6' Recovery
-12.5'	62		Bottom of Hole = 62.0'			

ENG FORM 1836 MAR 71 PREVIOUS EDITIONS ARE OBSOLETE.

PROJECT: Edgemoor Disposal Area | HOLE NO. EBB-

Hole No. EBB-31

DRILLING LOG	DIVISION NAD	INSTALLATION PDO	SHEET 1 OF 2 SHEETS
1. PROJECT Edgemoor Disposal Area		10. SIZE AND TYPE OF BIT 4" Tricone, Osterbe	
2. LOCATION (Coordinates or Station) E 101,480 N 459,250		11. DATUM FOR ELEVATION SHOWN (TBM or MSL) CRD	
3. DRILLING AGENCY Engineering Drilling		12. MANUFACTURER'S DESIGNATION OF DRILL Mayhew All Terrain	
4. HOLE NO. (As shown on drawing title and file number) EBB-30		13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN: DISTURBED 25; UNDISTURBED 5	
5. NAME OF DRILLER Ken Kutarnia		14. TOTAL NUMBER CORE BOXES —	
6. DIRECTION OF HOLE ☒ VERTICAL ☐ INCLINED ____ DEG. FROM VERT.		15. ELEVATION GROUND WATER —	
7. THICKNESS OF OVERBURDEN 60		16. DATE HOLE: STARTED 8 June 84; COMPLETED 9 June 84	
8. DEPTH DRILLED INTO ROCK —		17. ELEVATION TOP OF HOLE 46.5'	
9. TOTAL DEPTH OF HOLE 60		18. TOTAL CORE RECOVERY FOR BORING — %	
		19. SIGNATURE OF INSPECTOR JPA	

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 signific.) g
46.5'	0		Brown silt, soft to medium density.	2-2	S-1	SPT-PEN.
	2			2-1	0'-2'	0.4' Recovery 14" hammer 2" split sp
				2-2	S-2	
	4			2-3	2'-4'	1.0' Recovery
				1-1	S-3	
	6			0-0	4'-6'	1.0' Recovery
			rust colored organics	1-1	S-4	
	8			3-4	6'-8'	
				175psi	455-1	
	10			100%Rec	8'-10'	
			rust colored organics	1-0	S-5	
	12			1-1	10'-12'	
			trace of fine to coarse sand from 12' to 14'; organic material to 90'	0-1	S-6	
	14			2-3	12'-14'	
				1-4	S-7	
	16			6-6	14'-16'	
				1-1	S-8	
	18	MH	occasional gravel from 18' to 29'	1-1	16'-18'	
				1-2	S-9	
	20			2-1	18'-20'	0.2' Recovery
				1-1	S-10	* 3" split spoon
	22			2-1	20'-22'	
				275psi	455-2	
	24			90%Rec	22'-24'	
				1-2	S-11	
	26			2-3	24'-26'	
				1-1	S-12	
	28			2-2	26'-28'	0.2' Recovery
				2-1	S-13	
	30			2-2	28'-30'	3" split spoon
				1-0	S-14	Vane Shear Test** undisturbed = 1002psf remolded = 350psf
	32			0-0	30'-32'	
				1-0	S-15	
	34			0-0	32'-34'	
				1-1	S-16	
	36			2-3	34'-36'	less than 0.1' Reco
				2-1	S-17	
	38			2-3	36'-38'	
				200psi	455-3	
6.5'	40		trace of fine sand	100%Rec	38'-40'	

ENG FORM 1836 MAR 71 PREVIOUS EDITIONS ARE OBSOLETE.

PROJECT — HOLE NO. —

Hole No. EBB-3

DRILLING LOG	DIVISION NAD	INSTALLATION PDO	SHEET 2 OF 2 SHEETS
1. PROJECT Edgemoor Disposal Area		10. SIZE AND TYPE OF BIT 4" Tricone → Oakwell	
2. LOCATION (Coordinates or Station)		11. DATUM FOR ELEVATION SHOWN (MSL or MLLW)	
3. DRILLING AGENCY		12. MANUFACTURER'S DESIGNATION OF DRILL	
4. HOLE NO. (As shown on drawing title and file number) EBB-30		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 JPA	

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
6.5'	40		Grey silt w/ organics, very soft to medium density.	2-2	S-18	
				2-3	90'-92'	
	42			1-0	S-19	
				2-2	92'-94'	
	44			0-0	S-20	
				1-2	44'-96'	
	46		trace of very fine sand to Bottom.	150psi	455-4	0.4' slipped out of bottom of tube
				80%Rec	96'-98'	
	48			0-1	S-21	
	50	MH		9-3	98'-50'	
				1-0	S-22	
	52			0-1	50'-52'	
				1-0	S-23	
	54			0-0	52'-54'	
				150psi	455-5	
	56			100%Rec	54'-56'	
				1-3	S-24	
	58			3-3	56'-58'	
				0-0	S-25	
-13.5'	60			0-1	58'-60'	
			Bottom of Hole = 60.0'			

Hole No. EBB-31

DRILLING JC	DIVISION NAD	INSTALLATION NAF	SHEET 1 OF 2 SHEETS
1. PROJECT: EDGEMOOR DA		10. SIZE AND TYPE OF BIT: 4" Tricone, Outerbarrel	
2. LOCATION (Coordinates or Stations): E 100,860 N 960,630		11. DATUM FOR ELEVATION SHOWN (TBM or MSL): CRD	
3. DRILLING AGENCY: ENGINEERING DRILLING		12. MANUFACTURER'S DESIGNATION OF DRILL: MAYHEW ALL-TERRAIN	
4. HOLE NO. (As shown on drawing title and file number): EBB-31		13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN: DISTURBED 24; UNDISTURBED 3	
5. NAME OF DRILLER: KEN KUTARNIA		14. TOTAL NUMBER CORE BOXES: —	
6. DIRECTION OF HOLE: ☒ VERTICAL ☐ INCLINED ____ DEG. FROM VERT.		15. ELEVATION GROUND WATER: —	
7. THICKNESS OF OVERBURDEN: 60'		16. DATE HOLE: STARTED 12 JUNE 84; COMPLETED 14 JUNE 84	
8. DEPTH DRILLED INTO ROCK: —		17. ELEVATION TOP OF HOLE: 32.57	
9. TOTAL DEPTH OF HOLE: 60'		18. TOTAL CORE RECOVERY FOR BORING: — %	
		19. SIGNATURE OF INSPECTOR: Robert Pinell	

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 applicable) g
	2	MH	BROWNISH GRAY SILT SOME REEDS NOTED	2-2 / 2-1	S-1 0-2'	SAMPLE TAKEN WITH 140# HAMMER, 2"ϕ SPOON, AND 30 IN DROP UNLESS OTHERWISE NOTED
	4			1-1 / 1-1	S-2 2-4'	
	6			WOH-0-1	S-3 4-6'	PIECE OF SHEET PLASTIC FOUND IN SAMPLE
	8			150 PSI / 100% REC	UD-1 6-8'	
	10		BROWNISH GRAY SILT, TRACE OF FINE SAND LENS AND SEAMS, TRACE OF ORGANICS.	WOH-2-3	S-4 8-10'	
	12			1-2-4-7	S-5 10-12'	
	14			2-2-1-3	S-6 12-14'	
	16			2-1 / 2-2	S-7 14-16'	
	18		DARK GRAY SILT		VS-1 16-18'	$S_{UNDISTURBED}$ = 1725 PSF; $S_{REMOLDED}$ = 466 PSF
	20			WOH-0-0	S-8 18-20	APPEARS STIFFER THAN BLOWS SHOW.
	22			WOH-0-1	S-9 20-22	
	24	ML	DARK GRAY SANDY SILT	125 PSI / 100% REC	UD-2 22-24	
	26			1-0 / 2-2	S-10 24-26	
	28			0-0 / 0-1	S-11 26-28	
	30	MH	DARK GRAY SILT, TRACE OF ORGANICS	0-0 / 0-4	VS-2 28-30	$S_{UNDISTURBED}$ = 1377 PSF; $S_{REMOLDED}$ = 130 PSF
	32			1-1 / 1-1	S-12 30-32	
	34			1-0 / 0-0	S-13 32-34	
	36			150 PSI	UD-3 34-36	
	38			1-0 / 3-2	S-14 36-38	
	40			1-0 / 2-3	S-15 38-40	

ENG FORM 1836 MAR 71 PREVIOUS EDITIONS ARE OBSOLETE.

PROJECT EDGEMOOR DA | HOLE NO. EBB-31

Hole No. EBB-31

DRILLING _ IG	DIVISION NAD	INSTALLATION NAI	SHEET 2 OF 2 SHEETS

1. PROJECT EDGEMOOR DA	10. SIZE AND TYPE OF BIT
2. LOCATION (Coordinates or Station)	11. DATUM FOR ELEVATION SHOWN (TBM or MSL)
3. DRILLING AGENCY	12. MANUFACTURER'S DESIGNATION OF DRILL
4. HOLE NO. (As shown on drawing title and file 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
	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 RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
		MH	DARK GRAY SILT, TRACE OF ORGANICS	1-0 2-2	S-16 40-42	
	42			1-0 3-4	VS-3 42-44	BENT LOWER ¾ of 2 FINS USED 3" SPMD 140# HAMMER
	44		0.1' THICK SEAM OF VERY FINE SAND TOWARD TOP OF S-17	1-0 1-3	S-17 44-46	$S_{UNDISTURBED}$ = 1212 PSF $S_{REMOLDED}$ = 186 PSF
	46		DARK GRAY SILT, TRACE OF ORGANICS, SOME THIN LENS AND SEAMS OF VERY FINE SAND AND PEAT	0-1 1-2	S-18 46-48	
	48			0-3 1-2	S-19 48-50	
	50		DARK GRAY SILT, TRACE OF ORGANICS	1-0 2-2	S-20 50-52	
	52			0-0 0-2	S-21 52-54	
	54			0-1 2-3	S-22 54-56	
	56			1-1 2-2	S-23 56-58	
	58			0-1 2-3	S-24 58-60	
	60		BOTTOM OF HOLE 60'			

ENG FORM 1836 MAR 71 PREVIOUS EDITIONS ARE OBSOLETE. PROJECT EDGEMOOR DA HOLE NO. EBB-

File No. EBB-32

DRILLING LOG	DIVISION NAD	INSTALLATION NAP	SHEET 1 OF 2 SHEETS
1. PROJECT EDGEMOOR DA		10. SIZE AND TYPE OF BIT 4" Tricone, Osterb	
2. LOCATION (Coordinates or Station) E 100,670 N 461,790		11. DATUM FOR ELEVATION SHOWN (TBM or MSL) CRD	
3. DRILLING AGENCY ENGINEERING DRILLING		12. MANUFACTURER'S DESIGNATION OF DRILL MAYHEW ALL TERRAIN	
4. HOLE NO. (As shown on drawing title and file number) EBB-32		13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN	DISTURBED 22 / UNDISTURBED 4
5. NAME OF DRILLER KEN KUTARNIA		14. TOTAL NUMBER CORE BOXES —	
6. DIRECTION OF HOLE ☒ VERTICAL ☐ INCLINED ____ DEG. FROM VERT.		15. ELEVATION GROUND WATER —	
		16. DATE HOLE	STARTED 15 JUNE 84 / COMPLETED 19 JUNE 84
7. THICKNESS OF OVERBURDEN 60'		17. ELEVATION TOP OF HOLE 48.0	
8. DEPTH DRILLED INTO ROCK —		18. TOTAL CORE RECOVERY FOR BORING — %	
9. TOTAL DEPTH OF HOLE 60'		19. SIGNATURE OF INSPECTOR Robert Pricott	

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
	0–2	MH	BROWN SILT	2-2 / 2-3	S-1 / 0-2	SPT UNLESS OTHERWISE NOTED; DRY
	2–4			1-1 / 1-1	S-2 / 2-4	DRY
	4–6			1-1 / 1-3	S-3 / 4-6	MOIST
	6–8			1-3 / 3-4	S-4 / 6-8	
	8–10			225 PSI / 95% RC	UD-1 / 8-10	
	10–12			1-1 / 2-4	S-5 / 10-12	
	12–14		DARK GRAY SILT, TRACE OF ORGANICS (REEDS)	1-1 / 1-2	S-6 / 12-14	
	14–16			1-1 / 1-2	S-7 / 14-16	
	16–18		DARK GRAY SILT	0-0 / 1-1	VS-1 / 16-18	S UNDISTURBED = 886 PSF; S REMOLDED = 140 PSF
	18–20			1-0 / 0-0	S-8 / 18-20	VANE STRAIGHTED IN FIELD BY INSPECTOR.
	20–22		DARK GRAY SILT, TRACE OF ORGANICS.	1-1 / 1-2	S-9 / 20-22	
	22–24			0-0 / 1-2	S-10 / 22-24	
	24–26			125 PSI / 100% RC	UD-2 / 24-26	
	26–28			1-1 / 2-2	S-11 / 26-28	
	28–30			0-0 / 0-1	S-12 / 28-30	
	30–32			1-0-0 / 0-0	VS-2 / 30-32.5	S UNDISTURBED = 790 PSF; S REMOLDED = 187 PSF
	32–34			0-1-1	S-13 / 32.5-34	
	34–36			0-1 / 1-2	S-14 / 34-36	
	36–38			1-0 / 0-0	S-15 / 36-38	
	38–40		DARK GRAY SILT	150 PSI / 100% RC	UD-3 / 38-40	PRESSURE VARIED UP & DOWN DRIVING SAMPLING.

ENG FORM 1836 MAR 71 PREVIOUS EDITIONS ARE OBSOLETE.

PROJECT EDGEMOOR DA | HOLE NO. EBB-32

File No. EBB-32

DRILLING LOG — DIVISION NAD — INSTALLATION NAP — SHEET 2 OF 2 SHEETS

1. PROJECT: EDGEMOOR DA
2. LOCATION (Coordinates or Station)
3. DRILLING AGENCY
4. HOLE NO. (As shown on drawing title and file number): EBB-32
5. NAME OF DRILLER
6. DIRECTION OF HOLE: ☐ VERTICAL ☐ INCLINED ____ DEG. FROM VERT.
7. THICKNESS OF OVERBURDEN
8. DEPTH DRILLED INTO ROCK
9. TOTAL DEPTH OF HOLE
10. SIZE AND TYPE OF BIT
11. DATUM FOR ELEVATION SHOWN (MSL or NGS)
12. MANUFACTURER'S DESIGNATION OF DRILL
13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN: DISTURBED ____ UNDISTURBED ____
14. TOTAL NUMBER CORE BOXES
15. ELEVATION GROUND WATER
16. DATE HOLE: STARTED ____ COMPLETED ____
17. ELEVATION TOP OF HOLE: 48.0
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)
			DARK GRAY SILT		S-16	
	42				40-42	
		MH	DARK GRAY SILT, TRACE OF ORGANICS	1-0	S-17	
	44			0-0	42-44	
				1-0	S-18	
	46	ML	GRAY SANDY SILT	0-0	44-46	
				1-0	S-19	
	48			0-0	46-48	
		MH	GRAY SILT, SOME ORGANICS AT BOTTOM	0-0	VS-3	$S_{UNDISTURBED} = 818$ PSF
	50			1-8	48-50	$S_{REMOLDED} = 668$ PSF
			GRAY ORGANIC SILT	7-6	S-20	TWISTED VANE SLIGHTLY
	52			7-7	50-52	
		OH		1-4	S-21	
	54			8-8	52-54	
				175PSI	UD-4	PLACED IN JAR
	56			25% REC	54-56	
			GRAY SILT, SOME ORGANICS	175PSI	UD-4A	
	58	MH		NO REC	56-58	
				1-1	S-22	
	60			4-5	58-60	

ENG FORM 1836 MAR 71 PREVIOUS EDITIONS ARE OBSOLETE.

PROJECT: EDGE MOOR DA — HOLE NO. EBB-32

DRILLING LOG — NORTH ATLANTIC — PHILA. DISTRICT — SHEET 1 OF 3 SHEETS

1. PROJECT	Wilmington Harbor DA
2. LOCATION (Coordinates or Station)	N. 462714 E. 99167
3. DRILLING AGENCY	UNI-TECH
4. HOLE NO. (As shown on drawing title and file number)	EEB-39
5. NAME OF DRILLER	JOE JESTER
6. DIRECTION OF HOLE	☒ VERTICAL ☐ INCLINED ____ DEG. FROM VERT.
7. THICKNESS OF OVERBURDEN	60'
8. DEPTH DRILLED INTO ROCK	
9. TOTAL DEPTH OF HOLE	60'
10. SIZE AND TYPE OF BIT	2" S.S.
11. DATUM FOR ELEVATION SHOWN (USM or MSL)	Christina River
12. MANUFACTURER'S DESIGNATION OF DRILL	FALING 1500 140lb/30" drop
13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN	DISTURBED 28 / UNDISTURBED 2
14. TOTAL NUMBER CORE BOXES	—
15. ELEVATION GROUND WATER	—
16. DATE HOLE	STARTED 13 June 95 / COMPLETED 14 June 95
17. ELEVATION TOP OF HOLE	30.6
18. TOTAL CORE RECOVERY FOR BORING	%
19. SIGNATURE OF INSPECTOR	DJK

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
	2	SM	DK to reddish brn. fine to med silty SAND, moist	13 27 23 17	S-1	16' Rec
	4	ML	DK gry SILT, moist	9 5 5 6	S-2	1.7' Rec
	6		DK to med. gry. SILT w/ tr. clay between 5'+6', moist, soft	1 1 1 1	S-3	2.0' Rec
	8	CL	DK gry clay w/ organic odor, becoming med gry. CLAY, moist.	1 0 1 0	S-4	1.8' Rec
				1 1 1 1	S-5	1.9' Rec
	10		DK gry to med gry clayey SILT w/ some carbonized vegetation	1 2 5 4	S-6	1.6' Rec
	12		DK gry clayey SILT w/ 4' layer of med gry SILT @ 12.2', moist	2 3 2 3	S-7	1.7' Rec
	14	MH	Med gry clayey SILT w/ carbonized stems moist	1 2 1 2	S-8	1.8' Rec
	16		SAME	1 1 1 1	S-9	1.5' Rec
	18		SAME	1 1 1 1	S-10	1.1' Rec

ENG FORM 1836 MAR 71 — PREVIOUS EDITIONS ARE OBSOLETE. (TRANSLUCENT)

PROJECT Wilmington HARBOR DA — HOLE NO. EEB-39

DRILLING LOG | Sheet 30.6 | 1 | 10. EEB-39

PROJECT: Wilmington Harbor DA | INSTALLATION: PHILA DISTRICT | SHEET 2 OF 3 SHEETS

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
			Dk. gry, clayey, moist, SILT, tr. sand.	50 psi	U-1	START 0830 14 JUNE 1.8' Rec
	22					
			Same	1 WOH WOH	S-11	2.0' Rec
	24					
		ML	Same	2 1 2 2	S-12	2.0' Rec
	26					
			SAME	WOH R	S-13	1.7' Rec
	28					
				1 2 2 2	S-14	1.8' Rec
	30					
				WOH	S-15	1.2' Rec
	32					
			Dk gry, moist, soft Silty CLAY	2 2 3 3	S-16	2.0' Rec
	34					
			same, Some peat	4 6 6 8	S-17	2.0' Rec
	36					
		CL	SAME	2 3 2 2	S-18	1.0' Rec
	38					
			SAME	2 2 2 4	S-19	1.8' Rec
	40					
			SAME	50. psi	U-2	2.0' Rec
	42					
			SAME	2 2 2 2	S-20	2.0' Rec

ENG FORM 1836-A JUN 67 | PROJECT: Wilmington Harbor DA | HOLE NO. EEB-3

DRILLING LOG | Sheet | AIRUM TOP OF HOLE 30.6 | | No. EEB-39

PROJECT Wilmington Harbor D.A. | INSTALLATION Phila District | SHEET 3 OF 3 SHEETS

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
	46	CL	SAME	2 2 3 4	S-21	0.8' Rec
	48		DK gry, gravelly, med to coarse, loose SAND, some clay	15 16 15 15	S-22	1.1' Rec
	50		SAME, denser	20 22 24 20	S-23	1.8' Rec
	52	SM	SAME	37 48 52 30	S-24	1.7' Rec
	54		SAME	24 18 20 22	S-25	1.6' Rec
	56		SAME	29 33 37 43	S-26	1.6' Rec
	58		SAME	21 35 28 48	S-27	1.4' Rec
-29.4			SAME	28 45 39 53	S-28	2.0' Rec

ENG FORM 1836-A JUN 67

PROJECT Wilmington Harbor DA | HOLE NO. EEB-3

DRILLING LOG — VISION: NAD

INSTALLATION: PHILA DISTRICT — SHEET 1 OF 3 SHEETS

1. PROJECT: WILMINGTON HARBOR DA
2. LOCATION (Coordinates or Station): N462418 E. 98830
3. DRILLING AGENCY: UNITECH DRILLING CO
4. HOLE NO. (As shown on drawing title and file number): EEB-40
5. NAME OF DRILLER: Joe Jester
6. DIRECTION OF HOLE: ☑ VERTICAL ☐ INCLINED _____ DEG. FROM VERT.
7. THICKNESS OF OVERBURDEN: 60
8. DEPTH DRILLED INTO ROCK: 0
9. TOTAL DEPTH OF HOLE: 60
10. SIZE AND TYPE OF BIT: 2" OD split Spoon
11. DATUM FOR ELEVATION SHOWN (TBM or MSL): Chastine River
12. MANUFACTURER'S DESIGNATION OF DRILL: FAILING 1500
13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN: DISTURBED 27 — UNDISTURBED 3
14. TOTAL NUMBER CORE BOXES:
15. ELEVATION GROUND WATER:
16. DATE HOLE: STARTED 6-12-95 — COMPLETED 6-13-95
17. ELEVATION TOP OF HOLE: 35.9
18. TOTAL CORE RECOVERY FOR BORING: %
19. SIGNATURE OF INSPECTOR: S. Krajnik

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)
	0	ML	Brn & dk-gry SILT Dry	7 16	S-1A	140 # Hammer 4/30" drops
			Brn, m-f SAND w/tr clay & silt wet	23 15	S-1B	1.8' Rec.
	2	SP/SM	Brn, c-f SAND w/tr. Silt. wet	4 4 4 4	S-2	Sample mud Contaminated 1.5'
	4	CL	DK-gry silty CLAY wet	1 1 3 4	S-3	1.6'
	6		Same to 7' w/few pcs of gravel wet	1 2		
		ML	becomes dk-gry SILT 7 to 8' wet	2 3	S-4	Both in 1 Jar 1.6'
	8		DK-gry SILT w/some clay wet	2 1 3 2	S-5	1.5' 6-13-95
	10					6-13-95
		CL	DK-gry, silty CLAY w/Pc Carbonized stems wet	2 3 3 3	S-6	1.7'
	12		Same wet	2 1 1 2	S-7	2.0'
	14		Same wet	1 1 1 3	S-8	1.7'
	16		Same wet	1 1 2 2	S-9	2.0'
	18	ML	DK-gry clayey SILT wet	3 2 2 2	S-10	1.9'
	20					

ENG FORM 1836 MAR 71 — PREVIOUS EDITIONS ARE OBSOLETE. (TRANSLUCENT)

PROJECT: Wilmington Harbor D.A. — HOLE NO.: EEB-40

DRILLING LOG (Co. Sheet) | ELEVATION TOP OF HOLE 35.9 | Hole no. EEB-40

PROJECT Wilmington Harbor DA | INSTALLATION Phila District | SHEET 2 OF 3 SHEETS

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
	20	ML	DK-gry clayey SILT in bottom of Tube wet	P U S H 50 PSI	S-10	2.0 Rec'
	22		DK-gry clayey SILT to 22.5' Becomes dk-gry CLAY to 24' wet	2 2 2 3	S-11	Both in 1 Jar 1.9'
	24	CL	DK-gry, silty CLAY wet	2 2 2 2	S-12	2.0'
	26		DK-gry CLAY w/2" Pocket of H.gry silt wet	1 1 1 1	S-13	1.9'
	28	ML	Med-gry, clayey SILT wet	2 1 1 3	S-14	2.0'
	30	CL	Med-gry silty CLAY w/2" pocket of lt.gry silt wet	2 1 1 2	S-15	2.0'
	32	ML	Med-gry SILT to 32.5'	1 2	S-16	both in 1 Jar
		CL	becomes med-gry silty CLAY to 34'	2 1		2.0'
	34		Med-gry, soft, silty CLAY wet	1 1 1 2	S-17	2.0'
	36	ML	med-gry, clayey SILT v. soft but becomes stiffer w/depth wet	W.O.H. W.O.H W.O.H 1	S-18	2.0'
	38		Brn SILT w/tr of Peat in bottom of Tube wet	P U S H 100 PSI	S-24	2.0'
	40	PT	Brn Peat wet	1 1 1 2	S-19	2.0'
	42		Brn Peat w/tr of med-gry clay becomes drier w/depth wet	3 3 3 4	S-20	2.0'
	44					

ENG FORM 1836-A JUN 67

PROJECT Wilmington Harbor D.A. | HOLE NO. EEB-40.

DRILLING LOG Sheet 55-4 No. EEB-40

PROJECT Wilmington Harbor D.A | INSTALLATION Phila District | SHEET 3 OF 3 SHEETS

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
	44		Peatty, med-brn CLAY Peat decreases w/depth	1 2 2 2	S-21	2.0' Rec
	46	CL	med-gry, soft, silty CLAY, plastic w/scattered pc of peat wet	WoH WoH 1 2	S-22	2.0'
	48		Same	2 2 2 2	S-23	2.0'
	50		med-gry, silty CLAY wet	WoH WoH WoH 1	S-24	overwashed 1.0'
	52		Med-gry, clayey SILT sl. plastic w/ ½" layer of peat in shoe wet	1 0 1 1	S-25	2.0'
	54	ML	Med. gry SILT w/tr clay wet	WoH WoH WoH 1	S-26	1.9'
	56		med-gry, clayey SILT wet	WoH WoH WoH WoH	S-27	2.0'
	58		Same in bottom of tube w Blob of peat wet	P U SH 100 Psi	S-34	2.0' Rec
	60		Bottom of Hole @ 60.0'			

ENG FORM 1836-A JUN 67 | PROJECT Wilmington Harbor DA | HOLE NO. EEB-4

DRILLING LOG NAD

1. PROJECT: Wilmington Harbor Foundation Improvement	10. SIZE AND TYPE OF BIT
2. LOCATION (Coordinates or Station): N461313 E.97818	11. DATUM FOR ELEVATION SHOWN (TBM or MSL): Christina Tower
3. DRILLING AGENCY: [illegible]	12. MANUFACTURER'S DESIGNATION OF DRILL: Failing 1500
4. HOLE NO. (As shown on drawing title and title number): E-B-41	13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN: DISTURBED 24; UNDISTURBED 3
5. NAME OF DRILLER: Joe [illegible]	14. TOTAL NUMBER CORE BOXES: —
6. DIRECTION OF HOLE: [X] VERTICAL [ ] INCLINED ____ DEG. FROM VERT.	15. ELEVATION GROUND WATER: —
7. THICKNESS OF OVERBURDEN: 60'	16. DATE HOLE: STARTED 7 Jun 95; COMPLETED 7 June 95
8. DEPTH DRILLED INTO ROCK: —	17. ELEVATION TOP OF HOLE: 44.3
9. TOTAL DEPTH OF HOLE: 100'	18. TOTAL CORE RECOVERY FOR BORING: — %
	19. SIGNATURE OF INSPECTOR: MC

INSTALLATION: PHILA DISTRICT

SHEET 1 OF 3 SHEETS

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
	0		dk gray sandy SILT	4 7 / 18 15	S-1	2 Rec.
	2		SAME	7 9 / 12 12	S-2	1.2 Rec.
	4		SAME	2 3 / 3 3	S-3	2.0 Rec.
	6	ML	SAME	8 5 / 7 6	S-4	0.7 Rec.
	8		SAME	1 3 / 2 1		No Rec.
	10		dk gray silty CLAY	1 2 / 2 2	S-5	2.0 Rec.
	12		SAME	1 3 / 3 3	S-6	1.5 Rec.
	14	CL	SAME	2 2 / 3 2	S-7	2.0 Rec.
	16		SAME	2 3 / 2 3	S-8	2.0 Rec.
	18		SAME	1 2 / 1 2	S-9	1.5 Rec.
	20					

ENG FORM 1836 MAR 71 PREVIOUS EDITIONS ARE OBSOLETE. (TRANSLUCENT)

PROJECT: Wilm. Harbor Foundation Improvement

HOLE NO. E-B-41

DRILLING LOG (Co.. sheet)	ELEVATION TOP OF HOLE 44.3	Hole No. EEB-41
PROJECT [illegible] Fund [illegible]	INSTALLATION PHILA DISTRICT	SHEET 2 OF 3 SHEETS

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
			dry gray silty CLAY	50 psi	S-11	2.0 Rec.
	22		SAME	1 2 2 1	S-10	1.7 Rec.
	24		SAME	1 2 2 2	S-11	1.0 Rec.
	26		No Recovery	1 0 1 1		No Rec.
	28		SAME	1 2 2 1	S-12	1.3 Rec.
	30		No Recovery	1 0 0 1		No Rec
	32	CL	SAME	1 1 1 1	S-13	1.7 Rec
	34		SAME	2 3 3 3	S-14	2.0 Rec.
	36		dry gray brownish silty CLAY	2 2 3 2	S-15	1.5 Rec.
	38		SAME	0 0 0 1	S-16	1.3 Rec
	40		SAME	75 psi	S-24	1.5 Rec
	42		SAME	1 0 0 1	S-17	1.0 Rec.

ENG FORM 1836-A JUN 67

PROJECT Wilm. Harbor [illegible] | HOLE NO. EEB-41

DRILLING LOG (Co... sheet)	ELEVATION TOP OF HOLE 44.3	Hole No. EEB-41
PROJECT [illegible] Radar Foundation Log	INSTALLATION PHILA DISTRICT	SHEET 3 OF 3 SHEETS

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
	46		SAME, some organics [illegible]	1 1 1 1	S-18	1.0 Rec.
	48		SAME	1 0 1 0	S-19	0.4 Rec.
	50		Same w/ [illegible] layers	2 3 3 3	S-20	2.0 Rec.
	52		Same w/ some peat	2 1 3 3	S-21	2.0 Rec
	54	CL	SAME	2 2 3 3	S-22	1.3 Rec
	56		SAME	1 0 1 0	S-23	2.0 Rec
	58		SAME	1 0 1 0	S-24	1.0 Rec
			SAME	175 psi	S-30	2.0 Rec.
			B.O.H.			

ENG FORM 1836-A JUN 67 | PROJECT [illegible] | HOLE NO. EEB-41

DRILLING LOG JAD

1. PROJECT: Wilmington Harbor DA	INSTALLATION: Phila District
2. LOCATION (Coordinates or Station): N460605 E97875	10. SIZE AND TYPE OF BIT
3. DRILLING AGENCY: Uni-Tech	11. DATUM FOR ELEVATION SHOWN (TSM or MSL): Christina River
4. HOLE NO. (As shown on drawing title and title number): EEB-42	12. MANUFACTURER'S DESIGNATION OF DRILL: Failing 1500
5. NAME OF DRILLER: Joe Jester	13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN: DISTURBED 27, UNDISTURBED 3
6. DIRECTION OF HOLE: ☒ VERTICAL ☐ INCLINED ____ DEG. FROM VERT.	14. TOTAL NUMBER CORE BOXES: —
7. THICKNESS OF OVERBURDEN: 60'	15. ELEVATION GROUND WATER: —
8. DEPTH DRILLED INTO ROCK: —	16. DATE HOLE: STARTED 8 June 95, COMPLETED 9 June 95
9. TOTAL DEPTH OF HOLE: 60'	17. ELEVATION TOP OF HOLE: 37.9
	18. TOTAL CORE RECOVERY FOR BORING: %
	19. SIGNATURE OF INSPECTOR: MC.

SHEET 1 OF 3 SHEETS

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
	0	SM	brwn SAND w/	15 17 10 21	S-1	1.0 Rec
	2					
			blk clayey SILT	11 8 9 9	S-2	1.2 Rec
	4					
		MH	SAME	7 8 14 15	S-3	1.8 Rec
	6					
			SAME	9 11 12 12	S-4	1.8 Rec
	8					
		CL	blk & dk brn SILTY CLAY, sat	3 3 2 3	S-5	2.0 Rec
	10					
			SAME	2 3 2 2	S-6	1.0 Rec
	12					
		MH	dk brwn SILT, some clay	1 1 1 2	S-7	1.7 Rec
	14					
			SAME	2 2 1 2	S-8	1.3 Rec
	16					
			blk, brwn SILT some CLAY, trace sand, peat	1 2 3 1	S-9	1.7 Rec
	18					
			SAME	1 1 2 1	S-10	1.7 Rec
	20					

DRILLING LOG (Con... sheet)	ELEVATION TOP OF HOLE 37.9	Hole No. EEB-42
PROJECT Wilmington Harbor DA	INSTALLATION PHILA DISTRICT	SHEET 2 OF 3 SHEETS

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
	20		drk gray. blk silty CLAY. same 200+	50 psi	S-14	1.0 Rec No shelby, took jar
	22		drk gray. blk silty CLAY	2 2 3 3	S-11	1.8 Rec
	24		SAME	3 2 3 3	S-12	2.0 Rec
	26		SAME	w o h	S-13	0.9 Rec
	28		SAME	2 3 3 3	S-14	1.5 Rec Stop 4:00pm 8Jun95
	30		stop SAME w/ [illegible]	2 2 3 2	S-15	Start 8:30am 9Jun95 1.5 Rec
	32	CL	SAME	2 2 2 3	S-16	1.0 Rec
	34		SAME	1 1 0	S-[illegible]	1.3 Rec
	36		SAME	1 1 1 1	S-18	1.7 Rec
	38		[illegible]	1 1 1 1	S-19	0.3 Rec
	40		SAME	100 psi	S-24	2.0' Rec
	42		SAME	1 1 1 1	S-20	1.4' Rec
	44					

ENG FORM 1836-A JUN 67 GPO: 1969 OF—[illegible]

PROJECT Wilmington Harbor DA | HOLE NO. EEB-42

DRILLING LOG (Con.. sheet) | ELEVATION TOP OF HOLE 37.9 | Hole No. EEB-47

PROJECT Wilmington Harbor DA | INSTALLATION PHILA DISTRICT | SHEET 3 OF 3 SHEETS

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
	46		SAME	2 2 1 1	S-21	2.0 Rec
	48		SAME	2 2 1 2	S-22	1.6 Rec
	50		SAME	2 2 2 3	S-23	1.4 Rec
	52		SAME	2 1 1 1	S-24	2.0 Rec
	54	CL	SAME	2 3 2 3	S-25	2.0 Rec
	56		SAME	2 1 1 1	S-26	1.6 Rec
	58		SAME	1 1 1 1	S-27	1.4 Rec
	60		SAME	100 psi	S-28	1.9 Rec
			B.O.H			

ENG FORM 1836-A JUN 67

PROJECT Wilmington Harbor DA | HOLE NO. EEB-47

DRILLING LOG JAD

1. PROJECT: Wilmington Harbor DA	INSTALLATION: PHILA DISTRICT
2. LOCATION (Coordinates or Station): N459972 E99171	SHEET 1 OF 3 SHEETS
3. DRILLING AGENCY: UNI-TECH	10. SIZE AND TYPE OF BIT
4. HOLE NO. (As shown on drawing title and file number): EEB-43	11. DATUM FOR ELEVATION SHOWN (TBM or MSL): Christina River
5. NAME OF DRILLER: Joe Jester	12. MANUFACTURER'S DESIGNATION OF DRILL: FAILING 1500
6. DIRECTION OF HOLE: ☒ VERTICAL ☐ INCLINED ____ DEG. FROM VERT.	13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN: DISTURBED 25; UNDISTURBED 1
7. THICKNESS OF OVERBURDEN: 60	14. TOTAL NUMBER CORE BOXES: —
8. DEPTH DRILLED INTO ROCK: —	15. ELEVATION GROUND WATER: —
9. TOTAL DEPTH OF HOLE: 60'	16. DATE HOLE: STARTED 9 June 95; COMPLETED 9 June 95
	17. ELEVATION TOP OF HOLE: 34.01
	18. TOTAL CORE RECOVERY FOR BORING: %
	19. SIGNATURE OF INSPECTOR: MC

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
	0–2	SM	1st brown SAND w/ some silt, pebbles	8 5 5 3	S-1	0.8' Rec
	2–4		0.5 SAME 1.1 dk gray blk silty CLAY	4 5 5 5	S-2	1.6' Rec
	4–6		No Recovery	2 3 3 2		No Rec
	6–8		dk gray blk silty CLAY	3 3 4 3	S-3	0.2 Rec (Rec)
	8–10	CL	SAME	0 0 1 1	S-4	.5 Rec
	10–12		SAME	2 2 3 2	S-5	1.5 Rec
	12–14		SAME	1 1 1 1	S-6	1.7' Rec
	14–16		SAME	100 psi	S-14	2.0 Rec
	16–18		SAME	2 3 4 4	S-7	1.6' Rec
	18–20		No Recovery	2 2 2 2		No Rec

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PROJECT: Wilmington HARBOR DA

HOLE NO.: EEB-13

DRILLING LOG | Sheet 34.0 | 1 | No. EEB-43

PROJECT: Wilmington Harbor DA | INSTALLATION: PHILA DISTRICT | SHEET 2 OF 3 SHEETS

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOV. ERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
	20		No Recovery	2 3 3 6		No Rec
	22		dark gray/olk silty CLAY	2 3 3 3	S-8	2.0 Rec
	24		No Recovery	1 1 1 1		No Rec
	26		dark gray/olk silty CLAY	1 1 2 1	S-9	0.2 Rec Pexr
	28		SAME	2 3 4 2	S-10	2.0 Rec
	30	CL	SAME	2 2 1 2	S-11	2.0 Rec
	32		SAME	1 1 2 2	S-12	2.0 Rec
	34		SAME	1 1 1 1	S-13	0.6 Rec
	36		SAME	1 2 2 1	S-14	1.4 Rec
	38		SAME	1 2 2 2	S-15	1.7 Rec
	40		SAME	75 psi	S-16	Pour Rec took of sample
	42		SAME	2 1 1 2	S17	1.5 Rec

ENG FORM 1836-A JUN 67

PROJECT: Wilmington Harbor DA | HOLE NO. EEB-43

DRILLING LOG | Sheet 34.0 | h | No. EEB-43

PROJECT: Wilmington Harbor DA | INSTALLATION: PHILA DISTRICT | SHEET 3 OF 3 SHEETS

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOV. ERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
	46	CL	SAME	1 1 2 1	S-18	1.5' Rec
	48		SAME	1 2 3 3	S-19	2.0 Rec
	50		SAME	2 3 3 4	S-20	2.0 Rec
	52		SAME	1 2 2 2	S-21	2.0 Rec
	54		SAME	2 2 1 3	S-22	0.9 Rec
	56	OH	dark blk/gray clayey PEAT	2 2 3 2	S-23	2.0 Rec
	58		SAME	2 1 1 2	S-24	1.1 Rec
	60		SAME	2 1 1 1	S-25	1.4 Rec
			B.O.H			

ENG FORM 1836-A JAN 67

PROJECT: Wilmington Harbor DA | HOLE NO. EEB-43

DRILLING LOG

1. PROJECT	WILMINGTON HARBOR D.A
2. LOCATION (Coordinates or Station)	N459898 E.100063
3. DRILLING AGENCY	UNITECH DRILLING Co
4. HOLE NO. (As shown on drawing title and file number)	EEB-44
5. NAME OF DRILLER	JOE JESTER
6. DIRECTION OF HOLE	☒ VERTICAL ☐ INCLINED ____ DEG. FROM VERT.
7. THICKNESS OF OVERBURDEN	60
8. DEPTH DRILLED INTO ROCK	0
9. TOTAL DEPTH OF HOLE	60'
10. SIZE AND TYPE OF BIT	2" OD Split Spoon
11. DATUM FOR ELEVATION SHOWN (TSM or MSL)	Christine Riv.
12. MANUFACTURER'S DESIGNATION OF DRILL	Failing 1500
13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN	DISTURBED 27 / UNDISTURBED 3
14. TOTAL NUMBER CORE BOXES	
15. ELEVATION GROUND WATER	
16. DATE HOLE	STARTED 6-12-95 / COMPLETED 6-12-95
17. ELEVATION TOP OF HOLE	36.2
18. TOTAL CORE RECOVERY FOR BORING	%
19. SIGNATURE OF INSPECTOR	S. Krajnik

PHILA DISTRICT

SHEET 1 OF 3 SHEETS

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
	0		Brn & dkgry SILT mottled brn. moist	8 7 6 5	S-1	140 # Hammer w/30" Drops 0.8' Rec.
	2		DKgry clayey SILT wet	2 2 2 2	S-2	1.7'
	4	ML	Dkgry, soft, clayey SILT wet	1 1 2 3	S-3	1.6'
	6		Same w/brn mottling wet	2 5 7 7	S-4	1.8'
	8		Becomes dk-gry silty CLAY	2 2 3 4	S-5	1.5'
	10	CL	Same wet	2 3 2 3	S-6	1.8'
	12		Becomes dk-gry SILT w/occ. pc. of gravel and root matter between 13'&14' wet	2 2 2 3	S-7	1.5'
	14	ML	DK-gry SILT wet	1 1 2 1	S-8	1.8'
	16		DK-gry SILT, locally clayey between 17 & 18' wet	1 2 2 3	S-9	2.0'
	18	CL	Becomes dk-gry Silty CLAY wet	1 1 2 2	S-10	2.0'
	20					

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PROJECT WILMINGTON HARBOR DA | HOLE NO. EEB-44

DRILLING LOG (Cont. sheet) | ELEVATION TOP OF HOLE 36.2 | Hole No. EEB-44

PROJECT Wilmington Harbor DA | INSTALLATION Phila District | SHEET 2 OF 3 SHEETS

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOV. e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
	20			P U S H 50 PSI	S-10	1.6' Rec'
	22	ML	DK-gry SILT, clayey betueen 22.5 ± 23.5' wet	1 1 2 3	S-11	1.9'
	24	CL	DK-gry silty CLAY w/m-f sand lens @ 25.8' wet	2 1 1 3	S-12	2.0'
	26	CL ± ML	Alternating layers 3" to 4" thick of med-gry, silty CLAY & dk gry SILT w/carbonized vegetation wet	1 1 1 2	S-13	1.9'
	28		DK-gry to med-gry, silty CLAY wet	2 1 2 3	S-14	2.0'
	30	CL	Same w/2 layers 2"-3" thick of dk-gry SILT @ 30.5' ± 31.7' wet	2 2 2 3	S-15	2.0'
	32		DK-gry, silty CLAY	1 2 1 1	S-16	2.0'
	34		Same w/pcs. of Phragmites stems wet	1 1 2 1	S-17	2.0'
	36	OL	Black organic SILT wet	WOH	S-18A	
		CL ML	Alternating v. thin laminae of med-gry silty CLAY & Lt-gry SILT w/silt partings wet	WOH WOH 2	S-18B	2.0'
	38	CL	DK-gry, silty CLAY w/ lt.gry silt partings wet	WOH WOH WOH WOH	S-19	2.0'
	40		DK-gry, silty CLAY w/lt.gry silt partings wet	P U S H 100 PSI	S-20	2.0'
	42	ML	DK-gry SILT, sl. organic odor wet & SAT	WOH WOH WOH WOH		2.0'
	44					

ENG FORM 1836-A JUN 67 | PROJECT Wilmington Harbor DA | HOLE NO. EEB-44

DRILLING LOG (Co ,sheet) | ELEVATION TOP OF HOLE 36.2 | Hole No. EEB-44

PROJECT: Wilmington Harbor D.A | INSTALLATION: Phila. District | SHEET 3 OF 3 SHEETS

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
	44		DK-gry, silty CLAY w/pc of Phragmitic's	3 2 3 4	S-21	
	46		wet			2.0' Rec
			Same w/increase in peaty matter	1 1 1 1	S-22	
	48		wet			2.0'
			Same, sl organic odor	wolt 3 1 2	S-23	
	50		wet			2.0'
		CL	Same w increasing Peat in layers ± blebs	2 2 2 3	S-24	
	52		wet			2.0'
			Med-gry, med stiff, plastic CLAY w scattered brn Phragmites stems	3 2 3 4	S-25	
	54		wet			2.0'
			DK-gry CLAY w/lt.gry silt partings	1 1 1 1	S-26	
	56		wet			2.0'
			DK-gry, med stiff CLAY w/scattered Phragmites stems.	2 3 2 3	S-27	
	58		wet			2.0'
			DK-gry CLAY in bottom of tube	P.U. S.H. 100 PSI	S-30	
	60					1.9' Rec
			Bottom of Hole 60.0'			

ENG FORM 1836-A JUN 67

APPENDIX C

FIELD VANE SHEAR TESTING SHEETS

DATA: VANE SHEAR TEST

1. JOB: Edgemoor Disposal Area
2. MAKE OF EQUIP: Acker
3. VANE SIZE: 3 5/8"
4. TORQUE ARM: 6"
5. INSPECTOR: J.D. Kane
6. BH # EBB - 2
7. TEST # V-1
8. DEPTH: 5'-5.5' / Blow Count - Push
9. FORCE TO PUSH VANE: Two Men - Slight Stiff
10. DATE: June '67

Material: No recovery in spoon. Tip of vane & sides of spoon showed brown f. sandy silt. wet

UNDISTURBED			REMOLDED			FRICTION		
TIME ELAPSED (SEC)	DEGREE OF ROTATION	DILLON FORCE GAGE (lbs.)	TIME ELAPSED (SEC)	DEGREE OF ROTATION	DILLON FORCE GAGE (lbs.)	TIME ELAPSED (SEC)	DEGREE OF ROTATION	DILLON FORCE GAGE (lbs.)
	1	4.0		1	2.0			
	2	17.0		2	3.0			
	3	29.5		3	3.0			
	4	31.0		4	3.0			
	5	37.5		5	3.0			
	6	41.0		6	3.0			
	7	44.5		7	3.0			
	8	46.0		8	3.0			
	9	46.5		9	3.5			
	10	46.5		10	3.0			
	11	46.5		11	3.0			
	12	(47.0)		12	3.0			
	13	46.0		13	3.5			
	14	44.5		14	3.5			
	15	43.5		15	3.5			
	16	43.5		16	3.5			
	17	43.0		17	3.5			
	18	43.5		18	4.0			
	19	43.0		19	4.0			
	20	43.0		20	4.0			
	21	42.5		26	4.0			
	22	42.5		32	4.5			
	23	42.0		38	4.0			
	24	42.0						
	25	42.0						

Corr. S = 24 lb/ft²

DATA: VANE SHEAR TEST

1. JOB: Edgemoor Disposal Area
2. MAKE OF EQUIP: Acker
3. VANE SIZE: 3 5/8"
4. TORQUE ARM: 6"
5. INSPECTOR: J.D. Kane
6. BH # EBB-2
7. TEST # V-2
8. DEPTH: 9'-9.5' Blow Count
9. FORCE TO PUSH VANE: Two Men
10. DATE: 16 June 67

Material: Dark gray clay w/occ. pockets of organic matter
Wet. Soft

UNDISTURBED			REMOLDED			FRICTION		
TIME ELAPSED (SEC)	DEGREE OF ROTATION	DILLON FORCE GAGE (lbs.)	TIME ELAPSED (SEC)	DEGREE OF ROTATION	DILLON FORCE GAGE (lbs.)	TIME ELAPSED (SEC)	DEGREE OF ROTATION	DILLON FORCE GAGE (lbs.)
10	1	4.0	10	1	2.0			
20	2	9.0	20	2	4.0			
30	3	10.5	30	3	4.5			
40	4	12.5	40	4	4.5			
50	5	14.0	50	5	4.0			
60	6	16.5	60	6	4.0			
70	7	18.0	70	7	4.0			
80	8	18.5	80	8	4.0			
90	9	19.0	90	9	4.0			
100	10	20.0	100	10	4.0			
110	11	20.0	110	11	4.0			
120	12	20.0	120	12	4.0			
130	13	19.8	130	13	4.0			
140	14	19.8	140	14	4.0			
150	15	19.8	150	15	4.0			
180	18	19.5						
210	21	19.5						
240	24	19.0						
270	27	18.5						
300	30	18.0						
330	33	16.0						
360	36	15.0						

Corr. S = 103 lb/ft²

DATA: VANE SHEAR TEST

1. JOB: Edgemoor Disposal Area
2. MAKE OF EQUIP: Acker
3. VANE SIZE: 3 5/8"
4. TORQUE ARM: 6
5. INSPECTOR: J.D. Kane
6. BH # EBB-2
7. TEST # V-3
8. DEPTH: 25.2 - 25.7
9. FORCE TO PUSH VANE: One Man-Soft
10. DATE: 20 June '67

Material:

UNDISTURBED			REMOLDED			FRICTION		
TIME ELAPSED (SEC)	DEGREE OF ROTATION	DILLON FORCE GAGE (lbs.)	TIME ELAPSED (SEC)	DEGREE OF ROTATION	DILLON FORCE GAGE (lbs.)	TIME ELAPSED (SEC)	DEGREE OF ROTATION	DILLON FORCE GAGE (lbs.)
10	1.0	9.0	10	1.0	7.5			
20	2.0	19.0	20	2.0	12.0			
30	3.0	24.0	30	3.0	13.5			
40	4.0	32.5	40	4.0	14.0			
50	5.0	38.5	50	5.0	14.0			
60	6.0	43.5	60	6.0	14.5			
70	7.0	50.0	70	7.0	14.5			
80	8.0	54.0	80	8.0	15.0			
90	9.0	58.5	90	9.0	17.0			
100	10.0	61.5	100	10.0	17.0			
110	11.0	64.5	110	11.0	19.0			
120	12.0	67.0	120	12.0	15.0			
130	13.0	67.5	130	13.0	15.0			
140	14.0	69.0	140	14.0	15.0			
150	15.0	69.5	150	15.0	15.0			
160	16.0	69.0	160	16.0	17.0			
170	17.0	68.5	170	17.0	16.5			
180	18.0	68.5	180	18.0	16.5			
190	19.0	67.5	190	19.0	16.5			
200	20.0	67.0	200	20.0	17.0			
210	21.0	67.0	250	25.0	18.0			
220	22.0	66.0	270	27.0	21.0			
230	23.0	66.0	300	30.0	21.0			
240	24.0	66.0	350	35.0	22.0			
250	25.0	65.5	400	40	23.5			
260	26.0	65.0	450	45	24.0			
270	27.0	64.5	510	51	26.0			
280	28.0	64.0	580	58	26.0			
290	29.0	64.0	650	65	25.5			
300	30.0	63.0	700	70	25.0			
			750	75	24.0			
T=	69.5 x 6	= 417				Corr. Factor for Dillon Gage		
S=	417 x 0.905	=	377 lb/ft^2					
						W. George	U.S.C.E.	
Corr.	S = 377	x 0.97	365 lb/ft^2			67.8	65.8	
							65.8 / 67.8	0.97

DATA: VANE SHEAR TEST

1. JOB: Edgemoor Disposal Area
2. MAKE OF EQUIP: Acker
3. VANE SIZE: 3 5/8"
4. TORQUE ARM: 6"
5. INSPECTOR: J.D. Kane

Material :

6. BH # EBB-3
7. TEST # V-1
8. DEPTH: 9'-9.5'
9. FORCE TO PUSH VANE: One Man - Easy
10. DATE: 23 June 67

UNDISTURBED			REMOLDED			FRICTION		
TIME ELAPSED (SEC)	DEGREE OF ROTATION	DILLON FORCE GAGE (lbs.)	TIME ELAPSED (SEC)	DEGREE OF ROTATION	DILLON FORCE GAGE (lbs.)	TIME ELAPSED (SEC)	DEGREE OF ROTATION	DILLON FORCE GAGE (lbs.)
10	1.0	12.5	10	1.0	4.0			
20	2.0	18.0	20	2.0	5.5			
30	3.0	24.5	30	3.0	6.0			
40	4.0	30.0	80	8.0	6.0			
50	5.0	33.0	120	12.0	6.0			
60	6.0	35.5	150	15.0	6.0			
70	7.0	38.0	200	20.0	6.0			
80	8.0	39.5	250	25.0	6.5			
90	9.0	40.5	300	30.0	7.0			
100	10.0	40.5	350	35.0	7.0			
120	12.0	(41.0)	400	40.0	7.5			
160	16.0	41.0	450	45.0	7.5			
190	19.0	40.0	500	50.0	7.5			
210	21.0	39.0	700	70.0	7.0			
220	22.0	36.0						
240	24.0	35.0						
260	26.0	34.5						
280	28.0	33.0						
300	30.0	32.0						

Friction

T= 39.5 x 6 = 237

Corr. Factor for Dillon Gage

S= 0.905 x 237 = 214 lb/ft²

U.S.C.E	W. George
39.5	41.2

DATA: VANE SHEAR TEST

1. JOB: Edgemoor Disposal Area
2. MAKE OF EQUIP: Acker
3. VANE SIZE: @ 3 5/8"
4. TORQUE ARM: 6"
5. INSPECTOR: J.D. Kane
6. BH # EBB-4
7. TEST # V-1
8. DEPTH: 5'-5.5' / Blow Count-Rust
9. FORCE TO PUSH VANE: Two Men
10. DATE: 22 June 67

Material: Gry clay w/brn. organic mat'l. Wet

UNDISTURBED			REMOLDED			FRICTION		
TIME ELAPSED (SEC)	DEGREE OF ROTATION	DILLON FORCE GAGE (lbs.)	TIME ELAPSED (SEC)	DEGREE OF ROTATION	DILLON FORCE GAGE (lbs.)	TIME ELAPSED (SEC)	DEGREE OF ROTATION	DILLON FORCE GAGE (lbs.)
10	1.0	2.5	10	1.0	2.0			
20	2.0	13.0	20	2.0	3.0			
30	3.0	17.5	30	3.0	3.0			
40	4.0	20.0	40	4.0	3.0			
50	5.0	22.5	100	10.0	3.0			
60	6.0	25.5	150	15.0	3.0			
70	7.0	27.5	200	20.0	4.0			
80	8.0	29.5	250	25.0	4.0			
90	9.0	31.0	300	30.0	4.0			
100	10.0	32.0	350	35.0	4.0			
110	11.0	32.5						
120	12.0	33.0						
130	13.0	33.5						
140	14.0	33.5						
150	15.0	(33.5)						
160	16.0	33.5						
170	17.0	33.5						
180	18.0	33.5						
200	20.0	33.0						
220	22.0	31.0						
250	25.0	29.5						
280	28.0	27.0						
300	30.0	25.5						
350	35.0	24.5						

Friction: Flush / Rust / Sss

T = 33.5 x 6 = 201

S = 0.905 x 201 = 182

Corr. S = 182 ÷ 0.93 = 169 lb/ft²

Corr. Factor For Dillen Gage

W. George	U.S.C.E.
32.2	32.9 = 2.3
30.9	29.6 = 1.3

32.9 / 35.2 = 0.93

DATA: VANE SHEAR TEST

1. JOB: Edgemoor Disposal Area
2. MAKE OF EQUIP: Acker
3. VANE SIZE: 3⅝"
4. TORQUE ARM: 6"
5. INSPECTOR: J.D. Kane
6. BH # EBB-4
7. TEST # V-12
8. DEPTH: 11'-11.5 / Blow Count = Push
9. FORCE TO PUSH VANE: Two Men = Easy
10. DATE: 22 June 67

Material: Dark gray clay. Wet. Soft

UNDISTURBED			REMOLDED			FRICTION		
TIME ELAPSED (SEC)	DEGREE OF ROTATION	DILLON FORCE GAGE (lbs.)	TIME ELAPSED (SEC)	DEGREE OF ROTATION	DILLON FORCE GAGE (lbs.)	TIME ELAPSED (SEC)	DEGREE OF ROTATION	DILLON FORCE GAGE (lbs.)
10	1.0	1.5	10	1.0	3.0	10	1.0	0.0
20	2.0	6.5	20	2.0	4.0	40	4.0	0.0
30	3.0	9.0	30	3.0	4.5	100	10.0	0.0
40	4.0	10.5	40	4.0	4.5	150	15.0	0.0
50	5.0	11.5	50	5.0	5.0			
60	6.0	13.0	60	6.0	5.0	F		
70	7.0	15.5	70	7.0	5.0	r		
80	8.0	17.0	80	8.0	5.0	i		
90	9.0	18.0	150	15.0	5.0	c		
100	10.0	20.0	200	20.0	5.0	t		
110	11.0	20.5	250	25.0	5.0	i		
120	12.0	21.0				o		
130	13.0	21.5				n		
140	14.0	21.5				l		
150	15.0	22.0				e		
160	16.0	(22.0)				s		
220	22.0	22.0				s		
240	24.0	21.0						
300	30.0	20.0						
340	34.0	19.0						
380	38.0	17.5						
400	40.0	17.0						
T =	22 x 6 =	132						
S =	0.905 x 132 = 119							
Corr.	S = 119 x 0.93 =		110 lb/ft²			W. George	U.S.C.E.	
						21.1	19.7	

$\frac{19.7}{21.1} = 0.93$

DATA: VANE SHEAR TEST

1. JOB: Edgemoor Disposal Area
2. MAKE OF EQUIP: Acker
3. VANE SIZE: 3 5/8"
4. TORQUE ARM: 6"
5. INSPECTOR: J.D. Kane
6. BH # EBB-4
7. TEST # V-3
8. DEPTH: 23'-23.5' & Push
9. FORCE TO PUSH VANE: One Man-Easy
10. DATE: 22 June 67

Material: Dark gray clay w/trace blk. peat

UNDISTURBED			REMOLDED			FRICTION		
TIME ELAPSED (SEC)	DEGREE OF ROTATION	DILLON FORCE GAGE (lbs.)	TIME ELAPSED (SEC)	DEGREE OF ROTATION	DILLON FORCE GAGE (lbs.)	TIME ELAPSED (SEC)	DEGREE OF ROTATION	DILLON FORCE GAGE (lbs.)
10	1.0	5.5	10	1.0	4.5			
20	2.0	10.5	20	2.0	8.5	F		
30	3.0	12.5	30	3.0	8.5	r		
40	4.0	13.0	40	4.0	8.5	i		
50	5.0	13.0	80	8.0	9.0	c		
100	10.0	12.5	100	10.0	9.5	+		
130	13.0	13.5	120	12.0	9.5		1	
150	15.0	16.0	140	14.0	10.0		o	
160	16.0	18.0	180	18.0	10.0		n	
170	17.0	21.0	200	20.0	10.5			
190	18.0	23.0	240	24.0	10.5		e	
200	20.0	28.5	300	30.0	10.5		s	
210	21.0	32.0	320	32.0	11.0		s	
230	23.0	37.0	350	35.0	11.0			
250	25.0	38.0	380	38.0	11.5			
280	28.0	(39.0)	420	42.0	12.5			
320	32.0	39.0	500	50.0	12.5			
340	34.0	39.0	650	65.0	12.5			
380	38.0	37.0	750	79.0	12.0			
400	40.0	36.5	820	82.0	8.0			
420	42.0	35.0						
450	45.0	34.5						
500	50.0	34.5						

T = 39.0 x 6 = 234

S = 0.905 x 234 = 212

Corr: S = 219 x 0.96 = 203 lb/ft²

W. George	U.S.C.E.
41.2	39.5

39.5 / 41.2 = 0.96

DATA: VANE SHEAR TEST

1. JOB: Edgemoor Disposal Area
2. MAKE OF EQUIP: Acker
3. VANE SIZE: 3 5/8"
4. TORQUE ARM: 6"
5. INSPECTOR: J.D. Kane
6. BH # EBB-4
7. TEST # V-4
8. DEPTH: 29.0-29.5 / Push spoon
9. FORCE TO PUSH VANE: One Man - Easy
10. DATE: 23 June 67

Material: Dark gray clay

UNDISTURBED			REMOLDED			FRICTION		
TIME ELAPSED (SEC)	DEGREE OF ROTATION	DILLON FORCE GAGE (lbs.)	TIME ELAPSED (SEC)	DEGREE OF ROTATION	DILLON FORCE GAGE (lbs.)	TIME ELAPSED (SEC)	DEGREE OF ROTATION	DILLON FORCE GAGE (lbs.)
10	1.0	11.0	10	1.0	8.0			
20	2.0	13.5	20	2.0	14.5	F		
30	3.0	21.5	30	3.0	15.0	r		
40	4.0	29.0	40	4.0	15.5	i		
50	5.0	34.0	50	5.0	15.5	c		
60	6.0	37.5	60	6.0	15.5	t		
70	7.0	42.0	100	10.0	15.5	i		
80	8.0	47.0	140	14.0	15.0	o		
90	9.0	(48.5)	200	20.0	15.5	n		
100	10.0	48.5	220	22.0	16.5			
110	11.0	48.5	250	25.0	17.0			
120	12.0	48.0	280	28.0	17.5			
150	15.0	46.0	300	30.0	18.0			
160	16.0	44.0	350	35.0	18.0			
180	18.0	42.0	420	42.0	18.0			
200	20.0	39.5	450	45.0	19.0			
220	22.0	38.0	470	47.0	20.0			
240	24.0	37.0	500	50.0	20.0			
260	26.0	36.0	550	55.0	20.0			
280	28.0	35.0	600	60.0	20.0			
300	30.0	34.0	650	65.0	21.0			
			750	75.0	21.0			
			900	90.0	21.0			
			1000	100.0	20.0			
			1080	108.0	19.0			
			1150	115.0	18.0			
T =	48.5 x 6 = 291					W. George	U.S.C.E	
S =	0.905 x 291 = 263					47.5	46.1	
Corr	S = 263 x 0.97 = 255 lb/ft²					46.1 / 47.5 = 0.97		

DATA: VANE SHEAR TEST

1. JOB: Edgemoor Disposal Area
2. MAKE OF EQUIP: Acker
3. VANE SIZE: 3 5/8"
4. TORQUE ARM: 6"
5. INSPECTOR: J.D. Kane
6. BH # EBB-7
7. TEST # V-1
8. DEPTH: 5'-5.5
9. FORCE TO PUSH VANE: One Man - Easy
10. DATE: 26 June '67

Material

UNDISTURBED			REMOLDED			FRICTION		
TIME ELAPSED (SEC)	DEGREE OF ROTATION	DILLON FORCE GAGE (lbs.)	TIME ELAPSED (SEC)	DEGREE OF ROTATION	DILLON FORCE GAGE (lbs.)	TIME ELAPSED (SEC)	DEGREE OF ROTATION	DILLON FORCE GAGE (lbs.)
10	1.0	2.0	10	1.0	0.5			
20	2.0	4.0	20	2.0	1.5	F		
30	3.0	5.5	30	3.0	1.5	r		
40	4.0	7.0	60	6.0	1.0	i		
50	5.0	10.0	100	10.0	1.0	c		
60	6.0	11.0	140	14.0	0.5	+		
70	7.0	11.5	180	18.0	1.5	i		
80	8.0	12.0	200	20.0	2.0	o		
90	9.0	13.0	250	25.0	2.0	n		
100	10.0	(13.0)	300	30.0	2.0		l	
140	14.0	13.0	350	35.0	2.0		e	
190	19.0	13.0	400	40.0	2.0		s	
200	20.0	12.5	500	50.0	2.0		s	
220	22.0	12.0						
250	25.0	11.0						
290	29.0	10.0						
310	31.0	9.0						
350	35.0	8.5						
380	38.0	8.0						
400	40.0	7.5						

T = 13.0 x 6 = 78

S = 0.905 x 78 = 70 lb/ft²

Corr. S = 70 x 0.95 = 66 lb/ft²

2.0 + 6 = 12

0.905 x 12 = 10.86

Corr. Factor For Dillon Gage

W. George	U.S.C.E.
14.0	13.2

Corr. Factor = 13.2 / 14.0 = 0.95

MADE FROM

DATA: VANE SHEAR TEST

1. JOB: Edgemoor Disposal Area
2. MAKE OF EQUIP: Acker
3. VANE SIZE: 3 5/8"
4. TORQUE ARM: 6"
5. INSPECTOR: J.D. Kane
6. BH # EBB-7
7. TEST # V-2
8. DEPTH: 13'-13.5'
9. FORCE TO PUSH VANE: Two Men
10. DATE: 26 June 67

Material: Dk. gray clay including reeds. Wet. Soft

UNDISTURBED			REMOLDED			FRICTION		
TIME ELAPSED (SEC)	DEGREE OF ROTATION	DILLON FORCE GAGE (lbs.)	TIME ELAPSED (SEC)	DEGREE OF ROTATION	DILLON FORCE GAGE (lbs.)	TIME ELAPSED (SEC)	DEGREE OF ROTATION	DILLON FORCE GAGE (lbs.)
			After 5 minutes					
10	1.0	10.5	10	1.0	2.5			
20	2.0	15.0	20	2.0	2.5			
30	3.0	17.0	30	3.0	2.5			
40	4.0	19.0	40	4.0	3.0			
50	5.0	21.5	100	10.0	3.0			
60	6.0	24.0	150	15.0	3.0			
70	7.0	24.0	200	20.0	3.0			
80	8.0	24.5	250	50.0	3.0			
90	9.0	25.5						
100	10.0	26.0						
150	15.0	25.5						
170	17.0	25.0						
190	19.0	24.0	Remolded Test					
210	21.0	23.0	[After 13 hours]					
230	23.0	21.0						
250	25.0	20.0	10	1.0	6.0			
270	27.0	18.0	20	2.0	11.0			
300	30.0	17.0	30	3.0	12.0			
			40	4.0	13.5			
			50	5.0	12.5			
			80	8.0	12.0			
			100	10.0	11.0			
			120	12.0	10.0			
			130	13.0	9.0			
			150	15.0	8.5			
T = 26	0 x 6 =	156						
S =	156 x 0.905 =		141 lb/ft²			Corr. Factor For Dillon Gage		
						W. George	U.S.C.E.	
Corr. S	= 141 x 0.92 =	130 lb/ft²				25.0	23.0	
							= 23.0/25.0	
						Corr. Factor = 0.92		

NAVFAC FORM

DATA: VANE SHEAR TEST

1. JOB: Edgemoor Disposal Area
2. MAKE OF EQUIP: Acker
3. VANE SIZE: 3 7/8"
4. TORQUE ARM: 6"
5. INSPECTOR: J.D. Kane
6. BH # EBB-7
7. TEST # V-3
8. DEPTH: 30'-30.5'
9. FORCE TO PUSH VANE:
10. DATE: 27 June '67

Material :

UNDISTURBED			REMOLDED			FRICTION		
TIME ELAPSED (SEC)	DEGREE OF ROTATION	DILLON FORCE GAGE (lbs.)	TIME ELAPSED (SEC)	DEGREE OF ROTATION	DILLON FORCE GAGE (lbs.)	TIME ELAPSED (SEC)	DEGREE OF ROTATION	DILLON FORCE GAGE (lbs.)
10	1.0	3.0	10	1.0	9.0			
20	2.0	10.0	20	2.0	14.0			
30	3.0	13.0	30	3.0	16.5			
40	4.0	17.0	50	5.0	16.5			
50	5.0	21.5	60	6.0	16.0			
60	6.0	27.0	80	8.0	16.0			
70	7.0	33.0	140	14.0	16.5			
80	8.0	38.0	150	15.0	17.0			
90	9.0	42.0	170	17.0	18.0			
100	10.0	45.5	200	20.0	18.5			
110	11.0	50.0	210	21.0	19.0			
120	12.0	53.5	240	24.0	19.0			
130	13.0	58.0	260	26.0	19.5			
150	15.0	60.0	270	27.0	20.0			
160	16.0	62.0	300	30.0	20.0			
180	18.0	63.0	350	35.0	20.0			
200	20.0	(63.5)	370	37.0	21.0			
210	21.0	63.5	400	40.0	21.0			
220	22.0	63.0	430	43.0	20.0			
230	23.0	61.0	480	48.0	20.0			
240	24.0	60.0	510	51.0	20.0			
250	25.0	59.0	560	56.0	19.5			
260	26.0	57.0	600	60.0	19.0			
280	28.0	55.0	700	70	18.0			
300	30.0	54.0	750	75	16.0			
320	32.0	52.0						
350	35.0	49.0						

$T = 63.5 \times 6 = 381$

$S = 381 \times 0.905 = 345$ lb/ft^2

Corr. $S = 345 \times 0.96 =$ 331 lb/ft^2

Corr. Factor For Dillon Gage

W. George	U.S.C.E.
61.9	59.2

Corr. Factor $= \frac{59.2}{61.9} = 0.96$

NAVD FORM

DATA: VANE SHEAR TEST

1. JOB: Edgemoor Disposal Area
2. MAKE OF EQUIP: Acker
3. VANE SIZE: 3 5/8"
4. TORQUE ARM: 12"
5. INSPECTOR: J.D. Kane
6. BH # EBB-10
7. TEST # V-1
8. DEPTH: [redacted] T-7.5
9. FORCE TO PUSH VANE: Two Men-Very Stiff
10. DATE: 29 June 1967

Material:

UNDISTURBED			REMOLDED			FRICTION		
TIME ELAPSED (SEC)	DEGREE OF ROTATION	DILLON FORCE GAGE (lbs.)	TIME ELAPSED (SEC)	DEGREE OF ROTATION	DILLON FORCE GAGE (lbs.)	TIME ELAPSED (SEC)	DEGREE OF ROTATION	DILLON FORCE GAGE (lbs.)
10	1.0	10.5	10	1.0	6.5			
20	2.0	21.0	20	2.0	9.0	F		
30	3.0	29.0	30	3.0	11.0	r		
40	4.0	34.0	40	4.0	12.0	i		
50	5.0	39.0	50	5.0	13.0	c		
60	6.0	43.0	60	6.0	13.5	t		
70	7.0	47.5	70	7.0	15.0	i		
80	8.0	50.0	80	8.0	15.5	o		
90	9.0	53.0	90	9.0	16.0	n		
100	10.0	55.0	100	10.0	16.5			
110	11.0	57.5	110	11.0	17.0		e	
120	12.0	59.5	120	12.0	17.5		s	
130	13.0	60.5	130	13.0	18.0		s	
140	14.0	61.0	140	14.0	18.5			
150	15.0	61.5	150	15.0	18.5			
160	16.0	62.0	170	17.0	19.0			
170	17.0	62.5	190	19.0	19.5			
180	18.0	(62.5)	210	21.0	20.0			
220	22.0	62.5	240	29.0	20.5			
230	23.0	62.0	270	27.0	21.0			
240	24.0	61.5	310	31.0	21.5			
270	27.0	61.0	340	34.0	22.0			
280	28.0	60.5	420	42.0	22.5			
290	29.0	69.5	480	48.0	22.0			
310	31.0	59.0	540	54.0	21.0			
320	32.0	58.0	600	60.0	21.0			
340	34.0	57.0	650	65.0	20.5			
350	39.0	96.0	700	70.0	20.0			
370	37.0	55.0						

Corr. Factor For Dillon Gag

W. George U.S.C.E.
61.9 59.2

$\frac{59.2}{61.9} = 0.96$

$T = 62.5 \times 12 = 750$ lb-in

$S = 0.905 \times 750 = 679$ lb/ft^2

Corr. $S = 679 \times 0.96 = 651$ lb/ft^2

DATA: VANE SHEAR TEST

1. JOB: Edgemoor Disposal Area
2. MAKE OF EQUIP: Acker
3. VANE SIZE: 3⅜"
4. TORQUE ARM: 12"
5. INSPECTOR: J.D. Kane
6. BH # EBB-10
7. TEST # V-2
8. DEPTH: 15-19.5 / 5-1.0-1
9. FORCE TO PUSH VANE: Two Men
10. DATE: 29 June 67

Material: Dk. gray clay w/occ. lt. streaks of clay

UNDISTURBED			REMOLDED			FRICTION		
TIME ELAPSED (SEC)	DEGREE OF ROTATION	DILLON FORCE GAGE (lbs.)	TIME ELAPSED (SEC)	DEGREE OF ROTATION	DILLON FORCE GAGE (lbs.)	TIME ELAPSED (SEC)	DEGREE OF ROTATION	DILLON FORCE GAGE (lbs.)
10	1.0	8.5	10	1.0	10.0	F		
20	2.0	20.5	20	2.0	14.0	r		
30	3.0	29.5	30	3.0	16.0	i		
40	4.0	36.0	40	4.0	16.5	c		
50	5.0	41.0	100	10.0	16.5	t		
60	6.0	45.0	130	13.0	17.5	i		
70	7.0	48.0	150	15.0	18.0	o		
80	8.0	53.0	220	22.0	18.0	n		
90	9.0	55.0	230	23.0	18.5			
100	10.0	56.5	250	25.0	19.0	e		
110	11.0	57.5	280	28.0	19.0	s		
120	12.0	58.0	320	32.0	19.0	s		
130	13.0	58.5	330	33.0	19.5			
140	14.0	58.5	380	38.0	19.5			
180	18.0	59.0	430	43.0	19.5			
230	23.0	59.0	450	45.0	20.5			
250	25.0	56.0	500	50.0	20.5			
260	26.0	55.0	550	55.0	20.5			
280	28.0	54.0	600	60.0	20.5			
290	29.0	53.0	650	65.0	20.5			
300	30.0	52.0	1080	108.0	20.0			
310	31.0	51.0						
320	32.0	50.0						
340	34.0	49.0						
360	36.0	48.0						
T = 59 x 12 =		708						
S =	108 x 0.905 =		640 lb/ft²			Corr. Factor For Dillon Gag		
						W. George - U.S.C.E.		
						66.9	59.2	
Corr. S = 0.96 x		640 =	614 lb/ft²					
						Corr. Factor = 0.96		

NADP FORM

DATA: VANE SHEAR TEST

1. JOB: Edgemoor Disposal Area
2. MAKE OF EQUIP: Acker
3. VANE SIZE: 3 5/8"
4. TORQUE ARM: 12"
5. INSPECTOR: J.D. Kane
6. BH # EBB - 10
7. TEST # V-3
8. DEPTH: 24'-24.5' / Push
9. FORCE TO PUSH VANE: Two Men - Difficult
10. DATE: 29 Jun '67

Material: Dark gray clay w/ some f sand. Micaceous

UNDISTURBED			REMOLDED			FRICTION		
TIME ELAPSED (SEC)	DEGREE OF ROTATION	DILLON FORCE GAGE (lbs.)	TIME ELAPSED (SEC)	DEGREE OF ROTATION	DILLON FORCE GAGE (lbs.)	TIME ELAPSED (SEC)	DEGREE OF ROTATION	DILLON FORCE GAGE (lbs.)
10	1.0	10.0	10	1.0	11.5			
20	2.0	20.0	20	2.0	19.0			
30	3.0	29.0	30	3.0	26.0			
40	4.0	39.0	40	4.0	29.0			
50	5.0	47.0	50	5.0	29.5			
60	6.0	52.0	60	6.0	30.0			
70	7.0	56.0	100	10.0	30.5			
80	8.0	61.0	150	15.0	30.5			
90	9.0	66.0	200	20.0	31.0			
100	10.0	69.0	220	22.0	31.5			
110	11.0	71.0	250	25.0	31.5			
120	12.0	73.5	280	28.0	32.0			
130	13.0	76.0	300	30.0	32.0			
140	14.0	77.0	350	35.0	32.0			
150	15.0	(77.5)	400	40.0	32.0			
160	16.0	77.0	450	45.0	32.0			
180	18.0	76.0	1000	80.0	30.0			
190	19.0	75.0						
200	20.0	73.0						
210	21.0	72.0						
220	22.0	71.0						
230	23.0	69.0						
240	24.0	67.0						
260	26.0	66.0						
270	27.0	65.0						
280	28.0	64.5						
300	30.0	63.5						
320	32.0	63.0						
						Corr. Factor for Dillon Gage		
T=	77.5 x 12 = 930							
						W. George	U.S.C.E	
S=	0.905 x 930 =	842 lb/ft²				74-8	72.4	
Corr. S	= 842 x 0.97 =	816 lb/ft²						
						Corr. Factor = 72.4 / 74.8		= 0.97

WARP FORM

VANE SHEAR TEST DATA

1. JOB Edgemoor
2. MAKE OF EQUIP S&H
3. VANE SIZE 3"x6"
4. TORQUE ARM 3'1"
5. INSPECTOR RGL
6. BH # EBB-16
7. TEST # 1
8. DEPTH 11.5' - Bottom of Vane
9. FORCE TO PUSH VANE hand
10. DATE 13 May 76

UNDISTURBED			REMOLDED			FRICTION		
TIME ELAPSED (SEC)	DEGREE OF ROTATION	DILLON FORCE GAGE (lbs.)	TIME ELAPSED (SEC)	DEGREE OF ROTATION	DILLON FORCE GAGE (lbs.)	TIME ELAPSED (SEC)	DEGREE OF ROTATION	DILLON FORCE GAGE (lbs.
0	0	0	0	0	0		0	0
20	2	20	20	2	3		2	0
40	4	25	40	4	3		4	0
60	6	35	1 min	6	3		6	2
80	8	40	20	8	5		8	2
100	10	41	40	10	5		10	2
120	12	42	2	12	5		12	2
140	14	44	20	14	5		14	0
160	16	45	40	16	6		16	2
180	18	46	3	18	6		18	0
200	20	48	20	20	6		20	0
220	22	48	40	22	6		22	2
240	24	48	4	24	7		24	2
260	26	48	20	26	6		26	2
280	28	52	40	28	6		28	2
300	30	54	5	30	6		30	2
320	32	55	20	32	6		32	2
340	34	55	40	34	6		34	3
360	36	55	6	36	4		36	2
380	38	55	20	38	7		38	2
400	40	55	40	40	4		40	2
420	42	55	7	42	4		42	0
440	44	53	20	44	4		44	0
460	46	53	40	46	4		46	0
480	48	54	8	48	5		48	0
500	50	54	20	50	6		50	0
20	52	54	40	52	4		52	0
40	54	52	9	54	4		54	2
60	56	52	20	56	4		56	0
80	58	52	40	58	4		58	0
600	60	50	10	60	6		60	2
20	62	50	20	62	6		62	2
40	64	48	40	64	6		64	2
60	66	45	11	66	2		66	0
80	68	42	20	68	7		68	0
700	70	44	40	70	7		70	0
20	72	42	12	72	7		72	0
40	74	42	20	74	4		74	0
60	76	42	40	76	7		76	0
80	78	41	13	78	5		78	0
800	80	40	20	80	7		80	0
20	82	35	40	82	7		82	0
40	84	32	14	84	7		84	2
60	86	32	20	86	5		86	0
80	88	36	40	88	4		88	0
900	90	36	15 min	90	4		90	0
20								
40								

VANE SHEAR TEST DATA

1. JOB Edgemoor DA
2. MAKE OF EQUIP Sch
3. VANE SIZE 3"x6"
4. TORQUE ARM 3"
5. INSPECTOR RGL
6. BH # FBB-16
7. TEST # 2
8. DEPTH 26.5'
9. FORCE TO PUSH VANE hand
10. DATE 13 May 1976

Serial # 3200

UNDISTURBED			REMOLDED			FRICTION		
TIME ELAPSED (SEC)	DEGREE OF ROTATION	DILLON FORCE GAGE (lbs.)	TIME ELAPSED (SEC)	DEGREE OF ROTATION	DILLON FORCE GAGE (lbs.)	TIME ELAPSED (SEC)	DEGREE OF ROTATION	DILLON FORCE GAGE (lbs.)
0	0	0		0	0		0	0
20	2	35		2	27		2	5
40	4	62		4	28		4	7
1min	6	77		6	32		6	7
20	8	85		8	34		8	8
40	10	87		10	35		10	8
2	12	90		12	40		12	8
20	14	92		14	42		14	8
40	16	95		16	42		16	10
3	18	96		18	42		18	8
20	20	96		20	48		20	8
40	22	97		22	50		22	8
4	24	97		24	50		24	
20	26	97		26	47		26	
40	28	97		28	45		28	10
5	30	94		30	45		30	10
20	32	96		32	45		32	10
40	34	98		34	45		34	10
6	36	98		36	45		36	10
20	38	100		38	44		38	10
40	40	102		40	44		40	10
7	42	104		42	42		42	10
20	44	105		44	40		44	10
40	46	105		46	40		46	10
8	48	106		48	37		48	10
20	50	107		50	35		50	10
40	52	107		52	32		52	10
9	54	108		54	31		54	10
20	56	108		56	30		56	10
40	58	105		58	28		58	12
10	60	104		60	27		60	12
20	62	103		62	26		62	12
40	64	104		64	25		64	12
11	66	98		66	25		66	20
20	68	98		68	25		68	20
40	70	98		70	25		70	20
12	72	99		72	25		72	20
20	74	98		74	25		74	20
40	76	98		76	25		76	20
13	78	97		78	25		78	20
20	80	97		80	24		80	20
40	82	92		82	24		82	20
14	84	97		84	24		84	20
20	86	90		86	24		86	20
40	88	88		88	24		88	20
15	90	88		90	24		90	20

VANE SHEAR TEST DATA

1. JOB Edgemoor
2. MAKE OF EQUIP SSH
3. VANE SIZE 3"x6"
4. TORQUE ARM 3"
5. INSPECTOR [illegible]

6. BH # EBB-16
7. TEST # 3
8. DEPTH 41.5'
9. FORCE TO PUSH VANE Hand
10. DATE 13 May 1976

UNDISTURBED			REMOLDED			FRICTION		
TIME ELAPSED (SEC)	DEGREE OF ROTATION	DILLON FORCE GAGE (lbs.)	TIME ELAPSED (SEC)	DEGREE OF ROTATION	DILLON FORCE GAGE (lbs.)	TIME ELAPSED (SEC)	DEGREE OF ROTATION	DILLON FORCE GAGE (lbs.)
	15'1 0	0	0	0	0	0	0	0
	2	20		2	30	30	2	16
	4	42		4	42	40	4	15
1min	6	40		6	34	1	6	15
	8	40		8	33	20	8	13
	10	40		10	33	40	10	13
2min	12	45		12	24	1	12	12
	14	48		14	34	20	14	12
	16	48		16	35	40	16	12
3	18	48		18	35	3	18	12
	20	48		20	35	20	20	12
	22	48		22	35	40	22	12
4	24	48		24	35	4	24	12
	26	48		26	35	20	26	12
	28	50		28	35	40	28	12
5	30	48		30	36	5	30	10
	32	40		32	37	20	32	10
	34	40		34	37	40	34	9
6	36	40		36	37	6	36	9
	38	40		38	37	20	38	9
	40	40		40	40	40	40	8
7	42	42		42	40	7	42	8
	44	44		44	40	20	44	8
	46	46		46	40	40	46	10
8	48	44		48	40	8	48	8
	50	42		50	40		50	8
	52	42		52	40		52	8
9	54	42		54	40	9	54	8
	56	42		56	40		56	8
	58	42		58	40		58	8
10	60	40		60	40	10	60	8
	62	40		62	40		62	8
	64	40		64	38		64	8
11	66	40		66	38	11	66	8
	68	40		68	38		68	8
	70	38		70	38		70	6
12	72	38		72	36	12	72	6
	74	38		74	36		74	6
	76	38		76	36	1	76	6
13	78	38		78	36	13	78	6
	80	36		80	36		80	6
	82	36		82	36		82	4
14	84	36		84	36	14	84	4
	86	36		86	35		86	4
	88	36		88	35		88	4
15	90	36		90	35	15	90	4

VANE SHEAR TEST DATA

1. JOB Edgemoor DA
2. MAKE OF EQUIP S&H
3. VANE SIZE 3"x6"
4. TORQUE ARM 3"
5. INSPECTOR [illegible]
6. BH # EBB-17
7. TEST # 1
8. DEPTH 11.5'
9. FORCE TO PUSH VANE [illegible]
10. DATE 17 May 1971

Ser. # 3280

UNDISTURBED			REMOLDED			FRICTION		
TIME ELAPSED (SEC)	DEGREE OF ROTATION	DILLON FORCE GAGE (lbs.)	TIME ELAPSED (SEC)	DEGREE OF ROTATION	DILLON FORCE GAGE (lbs.)	TIME ELAPSED (SEC)	DEGREE OF ROTATION	DILLON FORCE GAGE (lbs.)
0	0	0		0	0		0	0
	2	25		2	20		2	0
	4	30		4	27		4	0
1	6	38		6	30		6	0
	8	40		8	32		8	0
	10	46		10	32		10	0
2	12	53		12	34		12	0
	14	60		14	35		14	0
	16	70		16	35		16	0
3	18	90		18	36		18	0
	20	104		20	37		20	0
	22	112		22	37		22	0
4	24	120		24	37		24	
	26	128		26	37		26	
	28	145		28	37		28	0
5	30	150		30	38		30	0
	32	152		32	38		32	0
	34	150		34	38		34	0
6	36	148		36	40		36	0
	38	145		38	40		38	0
	40	142		40	40		40	0
7	42	140		42	40		42	0
	44	137		44	40		44	0
	46	132		46	40		46	0
8	48	130		48	40		48	0
	50	127		50	40		50	0
	52	120		52	42		52	0
9	54	117		54	42		54	0
	56	110		56	42		56	0
	58	110		58	42		58	0
10	60	110		60	40		60	0
	62	107		62	40		62	0
	64	102		64	40		64	0
11	66	100		66	40		66	0
	68	100		68	40		68	0
	70	100		70	38		70	0
12	72	98		72	38		72	0
	74	95		74	38		74	0
	76	90		76	37		76	0
13	78	88		78	37		78	0
	80	82		80	35		80	0
	82	82		82	35		82	0
14	84	78		84	32		84	0
	86	75		86	32		86	0
	88	73		88	30		88	0
15	90	68		90	30		90	0

VANE SHEAR TEST DATA

1. JOB Edgemoor DA
2. MAKE OF EQUIP ESH
3. VANE SIZE 3"x6"
4. TORQUE ARM 3"
5. INSPECTOR [illegible]
6. BH # EBB-77
7. TEST # 2
8. DEPTH 27'
9. FORCE TO PUSH VANE by hand
10. DATE 17 May 1976

#3280

UNDISTURBED			REMOLDED			FRICTION		
TIME ELAPSED (SEC) 1307	DEGREE OF ROTATION	DILLON FORCE GAGE (lbs.)	TIME ELAPSED (SEC)	DEGREE OF ROTATION	DILLON FORCE GAGE (lbs.)	TIME ELAPSED (SEC)	DEGREE OF ROTATION	DILL FORC GAGE (lbs.
0	0	0		0	0		0	0
	2	60		2	50		2	15
	4	80		4	65		4	17
1	6	85		6	65		6	17
	8	125		8	65		8	17
	10	130		10	65		10	17
2	12	135		12	65		12	17
	14	147		14	67		14	17
	16	147		16	67		16	17
3	18	150		18	67		18	17
	20	150		20	67		20	17
	22	155		22	67		22	17
4	24	157		24	68		24	17
	26	162		26	68		26	17
	28	165		28	68		28	17
5	30	167		30	68		30	17
	32	170		32	68		32	17
	34	172		34	68		34	17
6	36	175		36	70		36	17
	38	180		38	70		38	17
	40	182		40	68		40	17
7	42	185		42	68		42	17
	44	187		44	68		44	17
	46	190		46	68		46	15
8	48	190		48	67		48	15
	50	190		50	68		50	15
	52	190		52	68		52	15
9	54	190		54	68		54	15
	56	190		56	68		56	15
	58	188		58	65		58	15
10	60	188		60	63		60	15
	62	188		62	63		62	15
	64	188		64	63		64	15
11	66	188		66	63		66	15
	68	185		68	62		68	15
	70	185		70	62		70	17
12	72	185		72	62		72	17
	74	185		74	62		74	17
	76	185		76	62		76	17
13	78	183		78	62		78	17
	80	183		80	62		80	17
	82	183		82	62		82	17
14	84	183		84	62		84	17
	86	183		86	62		86	17
	88	180		88	62		88	17
15	90	180		90	62		90	17

VANE SHEAR TEST DATA

1. JOB Edgemoor D.A
2. MAKE OF EQUIP CME
3. VANE SIZE 3" x 6"
4. TORQUE ARM 3"
5. INSPECTOR [illegible]
6. BH # EBB-17
7. TEST # 3
8. DEPTH 42'
9. FORCE TO PUSH VANE Hydraulic
10. DATE 18 May 76

#3280

UNDISTURBED			REMOLDED			FRICTION		
TIME ELAPSED (SEC) 0915	DEGREE OF ROTATION	DILLON FORCE GAGE (lbs.)	TIME ELAPSED (SEC)	DEGREE OF ROTATION	DILLON FORCE GAGE (lbs.)	TIME ELAPSED (SEC)	DEGREE OF ROTATION	DILLON FORCE GAGE (lbs.)
0	0	0	0	0	0	0	0	0
	2	30		2	50		2	0
	4	60		4	60		4	0
1	6	90		6	67		6	4
	8	110		8	65		8	4
	10	140		10	60		10	5
2	12	150		12	70		12	5
	14	162		14	70		14	5
	16	165		16	72		16	5
3	18	165		18	75		18	5
	20	165		20	78		20	5
	22	162		22	78		22	5
4	24	162		24	80		24	-
	26	160		26	84		26	-
	28	160		28	84		28	2
5	30	160		30	85		30	2
	32	160		32	86		32	2
	34	160		34	88		34	2
6	36	165		36	88		36	2
	38	165		38	90		38	2
	40	165		40	90		40	2
7	42	165		42	90		42	2
	44	165		44	90		44	2
	46	168		46	90		46	4
8	48	170		48	90		48	4
	50	173		50	90		50	4
	52	173		52	90		52	4
9	54	173		54	90		54	4
	56	175		56	90		56	4
	58	175		58	90		58	4
10	60	180		60	90		60	4
	62	180		62	90		62	4
	64	182		64	90		64	4
11	66	182		66	90		66	2
	68	184		68	90		68	2
	70	184		70	90		70	2
12	72	184		72	90		72	0
	74	185		74	90		74	0
	76	187		76	90		76	0
13	78	187		78	90		78	0
	80	190		80	88		80	0
	82	190		82	88		82	0
14	84	190		84	88		84	0
	86	195		86	90		86	0
	88	195		88	90		88	0
15	90	195		90	88		90	0
	92	195		92	90		92	0
	94	195		94	86		94	0
	96	197		96	86		96	0
	98	200		98	86		98	0
	100	200		100	86		100	
	102	200		102	86		102	
	104	200		104	86		104	
	106	200		106	86		106	0
	108	200		108	86		108	0

VANE SHEAR TEST DATA

1. JOB Edgemoor
2. MAKE OF EQUIP Sch
3. VANE SIZE 3"x 6"
4. TORQUE ARM 3"
5. INSPECTOR Rgt

6. BH # E13B-17
7. TEST # 4
8. DEPTH 62'
9. FORCE TO PUSH VANE hand
10. DATE 19 May 1976

#3280

UNDISTURBED			REMOLDED			FRICTION		
TIME ELAPSED (SEC)	DEGREE OF ROTATION	DILLON FORCE GAGE (lbs.)	TIME ELAPSED (SEC)	DEGREE OF ROTATION	DILLON FORCE GAGE (lbs.)	TIME ELAPSED (SEC)	DEGREE OF ROTATION	DILLON FORCE GAGE (lbs.)
1006	0	0	1031	0	0	1102	0	0
	2	32		2	7		2	12
	4	50		4	20		4	15
	6	75		6	35		6	15
	8	92		8	42		8	15
	10	110		10	45		10	15
	12	122		12	45		12	15
	14	134		14	45		14	15
	16	147		16	48		16	15
	18	155		18	50		18	15
	20	160		20	52		20	15
	22	175		22	55		22	15
	24	195		24	55		24	15
	26	200		26	57		26	17
	28	210		28	60		28	17
	30	217		30	62		30	17
	32	220		32	62		32	17
	34	225		34	64		34	17
	36	225		36	66		36	17
	38	230		38	70		38	20
	40	232		40	70		40	20
	42	230		42	75		42	20
	44	230		44	75		44	20
	46	225		46	70		46	20
	48	225		48	70		48	20
	50	225		50	85		50	20
	52	230		52	85		52	19
	54	220		54	85		54	17
	56	220		56	85		56	20
	58	220		58	87		58	20
	60	205		60	90		60	20
	62	205		62	95		62	20
	64	205		64	95		64	20
	66	2120		66	97		66	20
	68	200		68	97		68	20
	70	200		70	95		70	20
	72	195		72	90		72	20
	74	195		74	90		74	20
	76	190		76	90		76	20
	78	190		78	90		78	20
	80	190		80	90		80	20
	82	190		82	90		82	20
	84	190		84	90		84	20
	86	185		86	90		86	20
	88	185		88	90		88	20
1021	90	185	1046	90	90		90	20

Illegible Above 90 Degrees Stopped Test

VANE SHEAR TEST DATA

1. JOB Edgemoor
2. MAKE OF EQUIP SCPT
3. VANE SIZE 3"x6"
4. TORQUE ARM 3"
5. INSPECTOR [illegible]

6. BH # EBB-18
7. TEST # 1
8. DEPTH 12
9. FORCE TO PUSH VANE by Hand
10. DATE 20 May 1976

3280

UNDISTURBED			REMOLDED			FRICTION		
TIME ELAPSED (SEC)	DEGREE OF ROTATION	DILLON FORCE GAGE (lbs.)	TIME ELAPSED (SEC)	DEGREE OF ROTATION	DILLON FORCE GAGE (lbs.)	TIME ELAPSED (SEC)	DEGREE OF ROTATION	DILLON FORCE GAGE (lbs.)
1235	0		1251	0	0	1320	0	0
	2	45		2	17		2	7
	4	103		4	20		4	8
	6	117		6	22		6	8
	8	125		8	22		8	8
	10	127		10	22		10	8
	12	128		12	22		12	8
	14	128		14	22		14	8
	16	128		16	22		16	8
	18	127		18	22		18	8
	20	122		20	22		20	8
	22	122		22	22		22	8
	24	120		24	22		24	8
	26	120		26	22		26	8
	28	119		28	22		28	8
	30	118		30	22		30	8
	32	117		32	22		32	8
	34	117		34	22		34	8
	36	114		36	22		36	8
	38	112		38	22		38	8
	40	112		40	22		40	8
	42	110		42	22		42	8
	44	108		44	22		44	10
	46	106		46	22		46	12
	48	105		48	22		48	12
	50	103		50	22		50	12
	52	100		52	22		52	12
	54	98		54	22		54	12
	56	96		56	22		56	12
	58	96		58	22		58	12
	60	93		60	22		60	12
	62	93		62	22		62	12
	64	92		64	22		64	12
	66	90		66	22		66	12
	68	87		68	22		68	12
	70	87		70	22		70	12
	72	85		72	20		72	12
	74	85		74	20		74	10
	76	82		76	20		76	10
	78	82		78	20		78	10
	80	81		80	20		80	12
	82	80		82	20		82	12
	84	80		84	20		84	14
	86	80		86	20		86	12
	88	80		88	20		88	12
1250	90	78	1311	90	20		90	12

Good test

VANE SHEAR TEST DATA

1. JOB Edgemoor D.A
2. MAKE OF EQUIP SH
3. VANE SIZE 3"x6"
4. TORQUE ARM 3"
5. INSPECTOR RFS
6. BH # EBB-18
7. TEST # 2
8. DEPTH 26.5
9. FORCE TO PUSH VANE hydraulic
10. DATE 20 May 1976

#3200

UNDISTURBED			REMOLDED			FRICTION		
TIME ELAPSED (SEC)	DEGREE OF ROTATION	DILLON FORCE GAGE (lbs.)	TIME ELAPSED (SEC)	DEGREE OF ROTATION	DILLON FORCE GAGE (lbs.)	TIME ELAPSED (SEC)	DEGREE OF ROTATION	DILLON FORCE GAGE (lbs.)
1458	0		1519	0	0	1544	0	0
	2	45		2	10		2	0
	4	75		4	28		4	0
	6	110		6	28		6	0
	8	137		8	30		8	0
	10	152		10	30		10	2
	12	170		12	30		12	2
	14	177		14	32		14	4
	16	182		16	32		16	4
	18	184		18	34		18	5
	20	184		20	32		20	5
	22	184		22	33		22	7
	24	182		24	33		24	7
	26	180		26	33		26	7
	28	178		28	33		28	8
	30	178		30	34		30	8
	32	178		32	33		32	10
	34	175		34	33		34	10
	36	175		36	33		36	12
	38	173		38	35		38	12
	40	170		40	35		40	12
	42	168		42	35		42	12
	44	167		44	35		44	12
	46	163		46	35		46	20
	48	162		48	35		48	20
	50	160		50	34		50	20
	52	157		52	34		52	20
	54	153		54	34		54	20
	56	150		56	33		56	22
	58	148		58	33		58	22
	60	146		60	33		60	22
	62	143		62	32		62	22
	64	140		64	32		64	22
	66	140		66	32		66	22
	68	138		68	30		68	22
	70	135		70	30		70	22
	72	133		72	30		72	22
	74	132		74	28		74	22
	76	130		76	28		76	22
	78	128		78	28		78	22
	80	127		80	28		80	22
	82	125		82	26		82	22
	84	125		84	26		84	22
	86	123		86	26		86	22
	88	123		88	26		88	22
1515	90	120	1533	90	25	1559	90	25

44.6'
5.0
59-6'
+6
65-6'
3'
-3.12'

VANE SHEAR TEST DATA

1. JOB Edgemoor D.A
2. MAKE OF EQUIP SCH
3. VANE SIZE 3" x 6"
4. TORQUE ARM 3'
5. INSPECTOR [illegible]
6. BH # EBB-18
7. TEST # 3
8. DEPTH 62'
9. FORCE TO PUSH VANE hydraulic
10. DATE 24 May 1976

UNDISTURBED			REMOLDED			FRICTION		
TIME ELAPSED (SEC)	DEGREE OF ROTATION	DILLON FORCE GAGE (lbs.)	TIME ELAPSED (SEC)	DEGREE OF ROTATION	DILLON FORCE GAGE (lbs.)	TIME ELAPSED (SEC)	DEGREE OF ROTATION	DILLON FORCE GAGE (lbs.)
0910	0	0		0			0	
	2	45		2			2	
	4	95		4			4	
	6	150		6			6	
	8	187		8			8	
	10	235		10			10	
	12	265		12			12	
	14	285		14			14	
	16	310		16			16	
	18	350		18			18	
	20	375		20			20	
	22	405		22			22	
	24	420		24			24	
	26	430		26			26	
	28	450		28			28	
	30	470		30			30	
	32	490		32			32	
	34	500		34			34	
	36			36			36	
	38			38			38	
	40			40			40	
	42			42			42	
	44			44			44	
	46			46			46	
	48			48			48	
	50			50			50	
	52			52			52	
	54			54			54	
	56			56			56	
	58			58			58	
	60			60			60	
	62			62			62	
	64			64			64	
	66			66			66	
	68			68			68	
	70			70			70	
	72			72			72	
	74			74			74	
	76			76			76	
	78			78			78	
	80			80			80	
	82			82			82	
	84			84			84	
	86			86			86	
	88			88			88	
	90			90			90	

VANE SHEAR TEST DATA

1. JOB Edgemont, SD
2. MAKE OF EQUIP SIH
3. VANE SIZE 3" x 6"
4. TORQUE ARM 3"
5. INSPECTOR [illegible]
6. BH # EBB-19
7. TEST # 1
8. DEPTH 12'
9. FORCE TO PUSH VANE by hand
10. DATE 25 May 76

#3280

UNDISTURBED			REMOLDED			FRICTION		
TIME ELAPSED (SEC)	DEGREE OF ROTATION	DILLON FORCE GAGE (lbs.)	TIME ELAPSED (SEC)	DEGREE OF ROTATION	DILLON FORCE GAGE (lbs.)	TIME ELAPSED (SEC)	DEGREE OF ROTATION	DILLON FORCE GAGE (lbs.)
0906	0	0	0937	0	0	1000	0	0
	2	40		2	20		2	10
	4	75		4	23		4	15
	6	85		6	23		6	20
	8	87		8	25		8	20
	10	90		10	25		10	18
	12	85		12	30		12	20
	14	85		14	37		14	20
	16	92		16	40		16	22
	18	90		18	37		18	22
	20	80		20	35		20	22
	22	80		22	32		22	20
	24	77		24	34		24	21
	26	77		26	35		26	21
	28	82		28	35		28	21
	30	75		30	35		30	21
	32	72		32	28		32	21
	34	70		34	30		34	21
	36	70		36	32		36	21
	38	68		38	32		38	21
	40	67		40	32		40	21
	42	65		42	32		42	21
	44	65		44	30		44	21
	46	65		46	32		46	21
	48	65		48	32		48	21
	50	63		50	32		50	21
	52	60		52	32		52	22
	54	60		54	32		54	22
	56	60		56	35		56	22
	58	62		58	40		58	22
	60	62		60	38		60	21
	62	60		62	38		62	21
	64	57		64	35		64	21
	66	57		66	38		66	20
	68	57		68	40		68	20
	70	57		70	44		70	20
	72	60		72	44		72	22
	74	57		74	44		74	21
	76	55		76	45		76	20
	78	57		78	40		78	18
	80	57		80	45		80	18
	82	57		82	50		82	18
	84	57		84	50		84	18
	86	57		86	50		86	18
	88	55		88	50		88	18
0922	90	53	0952	90	45		90	15

VANE SHEAR TEST DATA

1. JOB Edgemoo
2. MAKE OF EQUIP SSH
3. VANE SIZE 3"x6"
4. TORQUE ARM 3"
5. INSPECTOR [illegible]
6. BH # EBB-19
7. TEST # 2
8. DEPTH 27'
9. FORCE TO PUSH VANE [illegible]
10. DATE 25 May 197[illegible]

UNDISTURBED			REMOLDED			FRICTION		
TIME ELAPSED (SEC)	DEGREE OF ROTATION	DILLON FORCE GAGE (lbs.)	TIME ELAPSED (SEC)	DEGREE OF ROTATION	DILLON FORCE GAGE (lbs.)	TIME ELAPSED (SEC)	DEGREE OF ROTATION	DILLON FORCE GAGE (lbs.)
1252	0	0	1315	0	0	1347	0	0
	2	18		2	27		2	15
	4	33		4	45		4	22
	6	33		6	55		6	24
	8	33		8	60		8	30
	10	33		10	62		10	30
	12	33		12	65		12	30
	14	37		14	65		14	30
	16	40		16	65		16	30
	18	52		18	65		18	32
	20	55		20	65		20	3[illegible]
	22	65		22	67		22	[illegible]
	24	77		24	67		24	[illegible]
	26	82		26	67		26	[illegible]
	28	95		28	67		28	[illegible]
	30	110		30	67		30	[illegible]
	32	127		32	67		32	[illegible]
	34	155		34	67		34	[illegible]
	36	165		36	65		36	[illegible]
	38	175		38	65		38	[illegible]
	40	195		40	65		40	[illegible]
	42	200		42	63		42	[illegible]
	44	205		44	65		44	[illegible]
	46	205		46	67		46	[illegible]
	48	205		48	67		48	[illegible]
	50	197		50	70		50	[illegible]
	52	185		52	72		52	[illegible]
	54	170		54	72		54	[illegible]
	56	165		56	72		56	[illegible]
	58	162		58	70		58	[illegible]
	60	160		60	67		60	[illegible]
	62	154		62	67		62	[illegible]
	64	146		64	72		64	[illegible]
	66	142		66	72		66	[illegible]
	68	138		68	74		68	[illegible]
	70	135		70	72		70	[illegible]
	72	133		72	67		72	[illegible]
	74	127		74	67		74	[illegible]
	76	123		76	70		76	[illegible]
	78	118		78	70		78	45
	80	115		80	75		80	45
	82	115		82	73		82	45
	84	113		84	67		84	45
	86	107		86	68		86	45
	88	107		88	72		88	45
1307	90	108	1330	90	75		90	45

VANE SHEAR TEST DATA

1. JOB Edgemoor
2. MAKE OF EQUIP SCM
3. VANE SIZE 2½"x5"
4. TORQUE ARM 3"
5. INSPECTOR SAK
6. BH # EBB-20
7. TEST # #2
8. DEPTH 25'-27'
9. FORCE TO PUSH VANE by hand
10. DATE 5-27-76

UNDISTURBED			REMOLDED			FRICTION		
TIME ELAPSED (SEC)	DEGREE OF ROTATION	DILLON FORCE GAGE (lbs.)	TIME ELAPSED (SEC)	DEGREE OF ROTATION	DILLON FORCE GAGE (lbs.)	TIME ELAPSED (SEC)	DEGREE OF ROTATION	DILLON FORCE GAGE (lbs.)
1430	0	0	1455	0	0	1545	0	0
	2	48		2	57		2	3
	4	65		4	44		4	5
	6	72		6	55		6	4
	8	75		8	60		8	4
	10	70		10	62		10	4
	12	62		12	62		12	4
	14	57		14	64		14	5
	16	52		16	64		16	5
	18	48		18	64		18	5
	20	45		20	64		20	6
	22	42		22	65		22	7
	24	39		24	63		24	8
	26	38		26	62		26	10
	28	37		28	61		28	10
	30	36		30	61		30	10
	32	36		32	61		32	11
	34	36		34	61		34	12
	36	36		36	60		36	14
	38	36		38	61		38	15
	40	36		40	62		40	16
	42	36		42	61		42	17
	44	36		44	61		44	18
	46	36		46	61		46	19
	48	36		48	61		48	20
	50	36		50	61		50	20
	52	36		52	60		52	20
	54	36		54	58		54	21
	56	36		56	58		56	22
	58	37		58	58		58	23
	60	37		60	57		60	24
	62	37		62	57		62	24
	64	38		64	60		64	25
	66	38		66	60		66	25
	68	38		68	61		68	25
	70	38		70	61		70	26
	72	38		72	61		72	26
	74	39		74	61		74	26
	76	39		76	60		76	26
	78	40		78	60		78	26
	80	38		80	60		80	26
	82	38		82	60		82	26
	84	40		84	60		84	26
	86	40		86	61		86	26
	88	40		88	60		88	25
1445	90	40	1509	90	60	1600	90	26

VANE SHEAR TEST DATA

1. JOB Edgemoor DA.
2. MAKE OF EQUIP SEH
3. VANE SIZE 3"x6"
4. TORQUE ARM 3"
5. INSPECTOR SAK
6. BH # EBR-20
7. TEST # 3
8. DEPTH 40'-42'
9. FORCE TO PUSH VANE Driller & Helper by
10. DATE 5-28-76

UNDISTURBED			REMOLDED			FRICTION		
TIME ELAPSED (SEC)	DEGREE OF ROTATION	DILLON FORCE GAGE (lbs.)	TIME ELAPSED (SEC)	DEGREE OF ROTATION	DILLON FORCE GAGE (lbs.)	TIME ELAPSED (SEC)	DEGREE OF ROTATION	DILLON FORCE GAGE (lbs.)
1035	0	0	1108	0	0	1203	0	0
	2	15		2	16		2	2
	4	29		4	6		4	4
	6	36		6	11		6	4
	8	43		8	16		8	4
	10	55		10	22		10	6
	12	65		12	24		12	7
	14	72		14	26		14	16
	16	76		16	27		16	10
	18	83		18	30		18	10
	20	86		20	33		20	12
	22	88		22	35		22	1
	24	93		24	37		24	
	26	95		26	40		26	1
	28	96		28	40		28	13
	30	98		30	42		30	12
	32	100		32	44		32	13
	34	103		34	45		34	15
	36	101		36	47		36	14
	38	100		38	46		38	12
	40	97		40	47		40	11
	42	96		42	50		42	11
	44	96		44	53		44	12
	46	96		46	55		46	12
	48	96		48	57		48	13
	50	96		50	60		50	13
	52	97		52	61		52	14
	54	97		54	66		54	15
	56	97		56	68		56	15
	58	98		58	70		58	15
	60	100		60	75		60	15
	62	101		62	78		62	15
	64	105		64	82		64	15
	66	106		66	87		66	15
	68	111		68	93		68	15
	70	116		70	97		70	15
	72	118		72	105		72	15
	74	120		74	108		74	15
	76	123		76	112		76	16
	78	125		78	116		78	16
	80	125		80	120		80	16
	82	128		82	122		82	16
	84	132		84	58		84	17
	86	135		86	59		86	18
	88	132		88	61		88	18
1051	90	134	1124	90	66	1213	90	18
	92	132		92	73			
	94	140		94	74			
	96	132		96	75			
	98	134		98	77			
	100	140		100	77			
	102	140		102	78			
	104	142		104	81			
1059	106	144	1126	106	93			

VANE SHEAR TEST DATA

1. JOB Edgemoor D.A.
2. MAKE OF EQUIP SEH
3. VANE SIZE 2.5"x5
4. TORQUE ARM 3"
5. INSPECTOR SAK
6. BH # EBB-20
7. TEST # 1
8. DEPTH 12
9. FORCE TO PUSH VANE bare
10. DATE 27/May 76

UNDISTURBED			REMOLDED			FRICTION		
TIME ELAPSED (SEC)	DEGREE OF ROTATION	DILLON FORCE GAGE (lbs.)	TIME ELAPSED (SEC)	DEGREE OF ROTATION	DILLON FORCE GAGE (lbs.)	TIME ELAPSED (SEC)	DEGREE OF ROTATION	DILLON FORCE GAGE (lbs.)
0838	0	0	0905	0	0	0955	0	0
	2	12		2	6		2	5
	4	17		4	6		4	7
	6	20		6	6		6	8
	8	22		8	6		8	10
	10	24		10	6		10	11
	12	24		12	6		12	13
	14	24		14	6		14	15
	16	24		16	7		16	16
	18	25		18	7		18	17
	20	25		20	8		20	18
	22	25		22	8		22	18
	24	25		24	11		24	17
	26	25		26	12		26	17
	28	25		28	14		28	18
	30	25		30	14		30	20
	32	25		32	14		32	24
	34	25		34	16		34	28
	36	25		36	17		36	32
	38	25		38	18		38	32
	40	25		40	19		40	33
	42	25		42	21		42	32
	44	23		44	21		44	34
	46	23		46	22		46	34
	48	23		48	23		48	35
	50	23		50	23		50	38
	52	23		52	24		52	37
	54	23		54	25		54	36
	56	23		56	26		56	37
	58	23		58	27		58	40
	60	21		60	27		60	40
	62	21		62	27		62	43
	64	21		64	27		64	44
	66	21		66	28		66	44
	68	21		68	29		68	43
	70	21		70	30		70	43
	72	21		72	32		72	43
	74	21		74	32		74	43
	76	20		76	32		76	44
	78	20		78	32		78	44
	80	20		80	34		80	45
	82	20		82	34		82	50
	84	20		84	34		84	50
	86	20		86	34		86	49
	88	20		88	34		88	48
0853	90	20	0911	90	34	1011	90	48
				92	33			
				94	33			
				96	33			
				98	33			
				100	33			
				102	32			
				104	32			
				106	32			

VANE SHEAR TEST DATA

1. JOB Edgemoor D.A
2. MAKE OF EQUIP 5 HP
3. VANE SIZE 3"x6"
4. TORQUE ARM 3'
5. INSPECTOR RQL

6. BH # EBB-21
7. TEST # 1
8. DEPTH 12'
9. FORCE TO PUSH VANE hand
10. DATE 3 June 76

UNDISTURBED			REMOLDED			FRICTION		
TIME ELAPSED (SEC)	DEGREE OF ROTATION	DILLON FORCE GAGE (lbs.)	TIME ELAPSED (SEC)	DEGREE OF ROTATION	DILLON FORCE GAGE (lbs.)	TIME ELAPSED (SEC)	DEGREE OF ROTATION	DILLON FORCE GAGE (lbs.)
0859	0	0	0923	0	0	0957	0	0
	2	15		2	2		2	2
	4	22		4	2		4	2
	6	25		6	2		6	2
	8	26		8	2		8	2
	10	26		10	2		10	2
	12	27		12	2		12	2
	14	27		14	2		14	2
	16	27		16	2		16	2
	18	27		18	2		18	2
	20	27		20	2		20	2
	22	27		22	5		22	2
	24	28		24	5		24	2
	26	27		26	5		26	2
	28	27		28	6		28	2
	30	27		30	7		30	2
	32	28		32	10		32	2
	34	30		34	12		34	2
	36	30		36	17		36	3
	38	30		38	20		38	4
	40	30		40	25		40	4
	42	31		42	27		42	4
	44	32		44	32		44	4
	46	34		46	32		46	4
	48	35		48	32		48	4
	50	37		50	35		50	4
	52	40		52	37		52	4
	54	45		54	37		54	4
	56	47		56	40		56	4
	58	50		58	41		58	4
	60	50		60	42		60	4
	62	50		62	42		62	4
	64	50		64	44		64	4
	66	48		66	44		66	4
	68	46		68	44		68	4
	70	45		70	44		70	4
	72	42		72	44		72	4
	74	38		74	44		74	4
	76	37		76	44		76	4
	78	35		78	42		78	4
	80	35		80	42		80	4
	82	32		82	42		82	4
	84	30		84	42		84	4
	86	30		86	40		86	4
	88	30		88	40		88	4
0915	90	30	0938	90	40	1013	90	4

VANE SHEAR TEST DATA

1. JOB Edgemoor
2. MAKE OF EQUIP S&H
3. VANE SIZE 3" x 6"
4. TORQUE ARM 3"
5. INSPECTOR [illegible]
6. BH # EBB-21
7. TEST # 2
8. DEPTH 27'
9. FORCE TO PUSH VANE hand
10. DATE 3 June 76

#3280

UNDISTURBED			REMOLDED			FRICTION		
TIME ELAPSED (SEC)	DEGREE OF ROTATION	DILLON FORCE GAGE (lbs.)	TIME ELAPSED (SEC)	DEGREE OF ROTATION	DILLON FORCE GAGE (lbs.)	TIME ELAPSED (SEC)	DEGREE OF ROTATION	DILLON FORCE GAGE (lbs.)
1207:00	0	0	1225	0	0	1250	0	0
1207:20	2	25		2	17		2	0
:30	4	37		4	17		4	0
:60	6	43		6	17		6	2
	8	48		8	17		8	2
	10	50		10	17		10	2
	12	50		12	18		12	3
	14	51		14	18		14	3
	16	51		16	20		16	3
	18	51		18	22		18	3
	20	48		20	22		20	3
	22	48		22	22		22	3
	24	47		24	24		24	3
	26	47		26	25		26	5
	28	47		28	25		28	5
	30	47		30	26		30	5
	32	47		32	27		32	5
	34	47		34	28		34	5
	36	47		36	30		36	5
	38	47		38	30		38	5
	40	47		40	33		40	5
	42	47		42	34		42	5
	44	47		44	34		44	5
	46	47		46	34		46	5
	48	47		48	35		48	5
	50	47		50	37		50	7
	52	47		52	42		52	7
	54	45		54	44		54	7
	56	45		56	45		56	7
	58	45		58	45		58	7
	60	43		60	50		60	7
	62	43		62	50		62	7
	64	45		64	52		64	7
	66	45		66	52		66	7
	68	42		68	52		68	7
	70	40		70	52		70	7
	72	48		72	52		72	7
	74	48		74	52		74	7
	76	48		76	52		76	7
	78	48		78	52		78	5
	80	48		80	52		80	5
	82	48		82	52		82	4
	84	48		84	52		84	5
	86	48		86	52		86	5
	88	48		88	52		88	5
1247:00	90	48	1240	90	52	1305	90	5

VANE SHEAR TEST DATA

1. JOB Edgemoor D.A
2. MAKE OF EQUIP SH
3. VANE SIZE 3" x 6"
4. TORQUE ARM 3'
5. INSPECTOR Duff
6. BH # EBB-21
7. TEST # 3
8. DEPTH 40'
9. FORCE TO PUSH VANE hand
10. DATE 3 June 76

UNDISTURBED			REMOLDED			FRICTION		
TIME ELAPSED (SEC)	DEGREE OF ROTATION	DILLON FORCE GAGE (lbs.)	TIME ELAPSED (SEC)	DEGREE OF ROTATION	DILLON FORCE GAGE (lbs.)	TIME ELAPSED (SEC)	DEGREE OF ROTATION	DILLON FORCE GAGE (lbs.)
1429	0	0	1457	0	0	1526	0	0
	2	35		2	25		2	0
	4	54		4	30		4	0
	6	54		6	31		6	0
	8	54		8	32		8	0
	10	54		10	32		10	0
	12	54		12	34		12	0
	14	54		14	34		14	0
	16	55		16	34		16	0
	18	56		18	34		18	0
	20	56		20	34		20	0
	22	57		22	32		22	
	24	57		24	32		24	
	26	58		26	32		26	
	28	60		28	32		28	
	30	60		30	32		30	2
	32	64		32	32		32	2
	34	65		34	32		34	4
	36	67		36	32		36	4
	38	70		38	31		38	5
	40	72		40	30		40	7
	42	74		42	30		42	7
	44	77		44	30		44	7
	46	79		46	32		46	10
	48	77		48	32		48	10
	50	75		50	32		50	12
	52	73		52	32		52	15
	54	71		54	34		54	15
	56	71		56	34		56	17
	58	70		58	34		58	17
	60	67		60	33		60	20
	62	65		62	33		62	20
	64	60		64	33		64	22
	66	57		66	33		66	24
	68	56		68	35		68	25
	70	55		70	35		70	25
	72	53		72	35		72	27
	74	52		74	37		74	27
	76	50		76	37		76	27
	78	50		78	37		78	27
	80	50		80	37		80	27
	82	50		82	37		82	27
	84	50		84	37		84	27
	86	48		86	37		86	27
	88	48		88	37		88	27
1441	90	48		90	37		90	27
				92	35		92	27
				94	37		94	27
				96	36		96	27
				98	36		98	27
				100	35		100	
				102	35		102	
				104	35		104	
			1515	106	35	1544	106	

VANE SHEAR TEST DATA

1. JOB Edgemoor, D.A
2. MAKE OF EQUIP SSH
3. VANE SIZE 2" x 4"
4. TORQUE ARM 3'
5. INSPECTOR [illegible]
6. BH # EBB-22
7. TEST # 1
8. DEPTH 17
9. FORCE TO PUSH VANE by hand Cm
10. DATE 4 June 76

UNDISTURBED			REMOLDED			FRICTION		
TIME ELAPSED (SEC)	DEGREE OF ROTATION	DILLON FORCE GAGE (lbs.)	TIME ELAPSED (SEC)	DEGREE OF ROTATION	DILLON FORCE GAGE (lbs.)	TIME ELAPSED (SEC)	DEGREE OF ROTATION	DILLON FORCE GAGE (lbs.)
1311	0	0	1340	0	0	1412	0	0
	2	12		2	5		2	3
	4	25		4	5		4	3
	6	32		6	5		6	3
	8	35		8	5		8	5
	10	40		10	5		10	5
	12	43		12	5		12	5
	14	48		14	6		14	6
	16	57		16	7		16	7
	18	61		18	10		18	7
	20	67		20	10		20	7
	22	75		22	12		22	7
	24	75		24	12		24	9
	26	77		26	12		26	9
	28	80		28	15		28	10
	30	85		30	15		30	10
	32	87		32	17		32	12
	34	90		34	19		34	12
	36	95		36	19		36	12
	38	101		38	19		38	12
	40	103		40	19		40	12
	42	107		42	19		42	12
	44	110		44	19		44	14
	46	117		46	19		46	16
	48	123		48	19		48	16
	50	127		50	20		50	16
	52	132		52	21		52	16
	54	136		54	21		54	20
	56	140		56	21		56	18
	58	145		58	22		58	18
	60	149		60	24		60	18
	62	152		62	24		62	18
	64	154		64	24		64	20
	66	157		66	24		66	20
	68	157		68	24		68	20
	70	159		70	22		70	20
	72	159		72	22		72	20
	74	160		74	22		74	20
	76	160		76	22		76	20
	78	160		78	22		78	20
	80	162		80	22		80	22
	82	162		82	22		82	22
	84	162		84	22		84	22
	86	162		86	22		86	22
	88	162		88	20		88	22
	90	162	1355	90	22		90	22
	92	162						
	94	162						
	96	162						
	98	162						
	100	162						
	102	162	Peak Val = 4.88 x (22 - 2)					
	104	162						
1330	106	160			= 97			

(162 - 12) 4.35 = 613

VANE SHEAR TEST DATA

1. JOB Edgemoor D.A
2. MAKE OF EQUIP S&H
3. VANE SIZE 3"x6"
4. TORQUE ARM 3'
5. INSPECTOR Reff
6. BH # EBB-22
7. TEST # 2
8. DEPTH 31.5
9. FORCE TO PUSH VANE Hand
10. DATE 6 June 76

UNDISTURBED			REMOLDED			FRICTION		
TIME ELAPSED (SEC)	DEGREE OF ROTATION	DILLON FORCE GAGE (lbs.)	TIME ELAPSED (SEC)	DEGREE OF ROTATION	DILLON FORCE GAGE (lbs.)	TIME ELAPSED (SEC)	DEGREE OF ROTATION	DILLON FORCE GAGE (lbs.)
1541	0	0	1605	0	0	1635	0	0
	2	35		2	7		2	2
	4	37		4	7		4	3
	6	37		6	7		6	5
	8	41		8	10		8	6
	10	47		10	8		10	6
	12	50		12	8		12	7
	14	57		14	8		14	7
	16	60		16	8		16	7
	18	62		18	8		18	7
	20	69		20	6		20	7
	22	75		22	6		22	7
	24	77		24	6		24	1
	26	85		26	5		26	
	28	87		28	4		28	1
	30	89		30	4		30	10
	32	92		32	4		32	10
	34	95		34	4		34	12
	36	97		36	4		36	12
	38	102		38	4		38	12
	40	110		40	4		40	14
	42	115		42	3		42	14
	44	117		44	3		44	14
	46	122		46	3		46	14
	48	125		48	2		48	14
	50	127		50	0		50	16
	52	132		52	0		52	17
	54	135		54	0		54	17
	56	135		56	0		56	17
	58	137		58	0		58	17
	60	137		60	0		60	17
	62	139		62	0		62	17
	64	139		64	0		64	17
	66	140		66	0		66	17
	68	140		68	2		68	17
	70	140		70	3		70	17
	72	140		72	3		72	25
	74	140		74	4		74	25
	76	138		76	4		76	27
	78	138		78	4		78	27
	80	138		80	4		80	27
	82	138		82	6		82	27
	84	138		84	6		84	27
	86	140		86	6		86	27
	88	140		88	6		88	27
1556	90	140	1622	90	6		90	27

Test questionable; after removing vane from hole material on vane was found to organic clay mostly, could not obtain —

5½ Turns/Sec.

VANE SHEAR TEST DATA

1. JOB Edgemoor Disposal Area
2. MAKE OF EQUIP Sprague & Hammond
3. VANE SIZE 3"
4. TORQUE ARM 3"
5. INSPECTOR M.E.C.
6. BH # EBB-23
7. TEST # 1 VOID
8. DEPTH 6.0 – 6.5
9. FORCE TO PUSH VANE 400 lbs ± Wed, bottom
10. DATE 24 July 1978

UNDISTURBED			REMOLDED			FRICTION		
TIME ELAPSED (SEC) 11:49:00	DEGREE OF ROTATION	DILLON FORCE GAGE (lbs.)	TIME ELAPSED (SEC)	DEGREE OF ROTATION	DILLON FORCE GAGE (lbs.)	TIME ELAPSED (SEC)	DEGREE OF ROTATION	DILLON FORCE GAGE (lbs.)
0	0			0			0	
20	2	15		2			2	
40	4	35		4			4	
60	6	70		6			6	
	8	78		8			8	
	10	95		10			10	
	12	104		12			12	
	14	108		14			14	
	16	112		16			16	
	18	112		18			18	
	20	112		20			20	
	22	112		22			22	
	24	115		24			24	
	26	116		26			26	
	28	120		28			28	
	30			30			30	
	32			32			32	
	34			34			34	
	36			36			36	
	38			38			38	
	40			40			40	
	42			42			42	
	44			44			44	
	46			46			46	
	48			48			48	
	50			50			50	
	52			52			52	
	54			54			54	
	56			56			56	
	58			58			58	
	60			60			60	
	62			62			62	
	64			64			64	
	66			66			66	
	68			68			68	
	70			70			70	
	72			72			72	
	74			74			74	
	76			76			76	
	78			78			78	
	80			80			80	
	82			82			82	
	84			84			84	
	86			86			86	
	88			88			88	
	90			90			90	

No Good. Dillon hitting the gear @ 30°

After taking the following vane test, I will consider this layer to have a higher strength (probably +100#/□') than the value obtained for vane test 1. [illegible]

VANE SHEAR TEST DATA

1. JOB Edgemoor Disp. Area
2. MAKE OF EQUIP Sprague & Henwood
3. VANE SIZE 3"
4. TORQUE ARM 3"
5. INSPECTOR M.E.C.
6. BH # EBB-23
7. TEST # 1
8. DEPTH 11.0' - 11.5'
9. FORCE TO PUSH VANE by hand, 2 man.
10. DATE 24 July 1978

UNDISTURBED			REMOLDED			FRICTION		
TIME ELAPSED (SEC) 13:22	DEGREE OF ROTATION	DILLON FORCE GAGE (lbs.)	TIME ELAPSED (SEC) 13:42	DEGREE OF ROTATION	DILLON FORCE GAGE (lbs.)	TIME ELAPSED (SEC) 1407	DEGREE OF ROTATION	DILLON FORCE GAGE (lbs.)
0	0	—	0	0	—	—	0	0
20	2	70	20	2	10	20	2	0
40	4	95	40	4	18	40	4	0
60	6	100	60	6	22	60	6	0
80	8	102	80	8	25	80	8	0
100	10	100	100	10	26	100	10	0
120	12	100	120	12	27	120	12	0
	14	98	140	14	30	140	14	0
	16	95	160	16	30	160	16	0
	18	93	180	18	30	180	18	2
	20	~~90~~	200	20	30	200	20	2
	22	90	220	22	30	220	22	
	24	87	240	24	30	240	24	
	26	85	260	26	30	260	26	
	28	85	280	28	30	280	28	
	30	84	300	30	30	300	30	2
	32	80	320	32	31		32	2
	34	80	340	34	33		34	2
	36	78	360	36	35		36	2
	38	77	380	38	35		38	2
	40	75	400	40	36	400	40	2
	42	75	420	42	36		42	2
	44	74	440	44	36		44	2
	46	73	460	46	37		46	2
	48	72	480	48	38		48	2
	50	71	500	50	40	500	50	2
	52	70	520	52	40		52	2
	54	68	540	54	40		54	2
	56	66	560	56	40		56	2
	58	63	580	58	40		58	2
	60	65	600	60	40	600	60	2
	62	65	620	62	40		62	2
	64	70	640	64	40		64	2
	66	70	660	66	40		66	2
	68	70	680	68	40		68	2
	70	70	700	70	42		70	2
	72	70	720	72	42		72	2
	74	72	740	74	42		74	2
	76	72	760	76	42		76	0
	78	73	780	78	43		78	0
	80	75	800	80	43		80	0
	82	75	820	82	45		82	0
	84	80	840	84	45		84	0
	86	80	860	86	45		86	0
	88	82	880	88	45		88	0
13:32	90	83	900	90	45	1419	90	0
			13:53					

At: 8°

102 - 2 = 100

4.375 x 100 = 438 #/0' Undisturbed

Remolded = 45 - 2 = 43

= 188 #/0'

VANE SHEAR TEST DATA

1. JOB Edgemoor Disp. Area
2. MAKE OF EQUIP Sur. & Hen.
3. VANE SIZE 3"
4. TORQUE ARM 3"
5. INSPECTOR MEC
6. BH # EBB-23
7. TEST # 2
8. DEPTH 16.0' — 16.5'
9. FORCE TO PUSH VANE Push-2 men (?)
10. DATE 24 July 1978

UNDISTURBED			REMOLDED			FRICTION		
TIME ELAPSED (SEC) 13:03	DEGREE OF ROTATION	DILLON FORCE GAGE (lbs.)	TIME ELAPSED (SEC) 15:20	DEGREE OF ROTATION	DILLON FORCE GAGE (lbs.)	TIME ELAPSED (SEC) 15:50	DEGREE OF ROTATION	DILLO FORC GAGE (lbs.
0	0	0	0	0	0	0	0	0
20	2	44		2	9	20	2	0
40	4	56		4	11	40	4	0
60	6	66		6	12	60	6	0
80	8	68		8	12		8	0
100	10	69		10	12		10	0
120	12	70		12	13		12	0
140	14	68		14	13		14	0
160	16	68		16	13		16	0
180	18	68		18	13		18	0
200	20	67		20	13		20	0
220	22	65		22	13		22	0
240	24	63		24	13		24	0
260	26	60		26	13		26	0
280	28	58		28	12		28	0
300	30	58		30	11		30	0
13:08	32			32	11		32	0
	34			34	11		34	0
	36			36	11		36	0
	38			38	11		38	0
	40			40	11		40	0
	42			42	12		42	0
	44			44	12		44	0
	46			46	12		46	0
	48			48	12		48	0
	50			50	13		50	0
	52			52	14		52	0
	54			54	14		54	0
	56			56	14		56	0
	58			58	14		58	0
	60			60	14		60	0
	62			62	14		62	0
	64			64	14		64	0
	66			66	14		66	0
	68			68	14		68	0
	70			70	14		70	0
	72			72	14		72	0
	74			74	14		74	0
	76			76	15		76	0
	78			78	15		78	0
	80			80	15		80	0
	82			82	15		82	0
	84			84	15		84	0
	86			86	15		86	0
	88			88	15		88	0
	90			90	15		90	0
			15:33			16:04		
	70 = 306 #/0'							
				13 = 57 #/0'				

Good Test.

VANE SHEAR TEST DATA

1. JOB Edgemoor Disp Area
2. MAKE OF EQUIP Soil Armored
3. VANE SIZE 3"
4. TORQUE ARM 3"
5. INSPECTOR MEC
6. BH # EBB-23
7. TEST # 3
8. DEPTH 21.0' - 21.5'
9. FORCE TO PUSH VANE By hand-simen.
10. DATE 25 July 1978

UNDISTURBED			REMOLDED			FRICTION		
TIME ELAPSED (SEC) 8:47	DEGREE OF ROTATION	DILLON FORCE GAGE (lbs.)	TIME ELAPSED (SEC) 09:13	DEGREE OF ROTATION	DILLON FORCE GAGE (lbs.)	TIME ELAPSED (SEC) 09:47	DEGREE OF ROTATION	DILLON FORCE GAGE (lbs.)
0	0	0	0	0	0	0	0	0
20	2	90		2	20		2	0
40	4	105		4	20		4	0
60	6	117		6	21		6	0
80	8	121		8	21		8	0
100	10	123		10	21		10	0
120	12	125		12	21		12	0
	14	125		14	22		14	0
	16	125		16	22		16	0
	18	126		18	22		18	0
	20	126		20	23		20	0
	22	126		22	23		22	0
	24	127		24	24		24	
	26	128		26	24		26	
	28	129		28	25		28	0
	30	129		30	25		30	0
	32	129		32	25		32	0
	34	130		34	25		34	0
	36	131		36	25		36	0
320	38	132		38	25		38	0
	40	133		40	25		40	0
	42	134		42	26		42	0
	44	134		44	27		44	0
	46	135		46	27		46	0
	48	135		48	28		48	0
	50	135		50	29		50	0
	52	135		52	30		52	0
	54	135		54	30		54	0
	56	135		56	30		56	0
	58	135		58	30		58	0
	60	136		60	30		60	2
	62	136		62	30		62	2
	64	136		64	30		64	2
	66	135		66	30		66	4
	68	133		68	30		68	4
	70	132		70	30		70	4
	72	130		72	30		72	4
	74	129		74	31		74	4
	76	127		76	31		76	3
	78	127		78	31		78	4
	80	127		80	32		80	4
	82	126		82	32		82	4
	84	126		84	32		84	4
	86	126		86	32		86	4
	88	125		88	30		88	4
	90	125		90	30		90	4
7:06			09:28			10:02		
	136-4 =	132			32-4=28			
	132 =	528 #/0'			28 = 123 #/0'			

VANE SHEAR TEST DATA

1. JOB Edgemoor Disp. Area
2. MAKE OF EQUIP Sprt. & Hem.
3. VANE SIZE 3"
4. TORQUE ARM 3"
5. INSPECTOR M. E. C.
6. BH # EBB-53
7. TEST # 4
8. DEPTH 26.0' – 26.5'
9. FORCE TO PUSH VANE By hand, easy to
10. DATE 25 July 1975

UNDISTURBED			REMOLDED			FRICTION		
TIME ELAPSED (SEC) 10:47	DEGREE OF ROTATION	DILLON FORCE GAGE (lbs.)	TIME ELAPSED (SEC) 11:02	DEGREE OF ROTATION	DILLON FORCE GAGE (lbs.)	TIME ELAPSED (SEC) 11:37	DEGREE OF ROTATION	DILLON FORCE GAGE (lbs.)
0	0	0		0	0		0	0
	2	45		2	15		2	10
	4	60		4	20		4	20
	6	75		6	20		6	25
	8	80		8	20		8	25
	10	84		10	20		10	25
	12	84		12	20		12	28
	14	84		14	20		14	30
	16	82		16	20		16	30
	18	82		18	20		18	30
	20	80		20	20		20	30
	22	79		22	20		22	35
	24	78		24	20		24	36
	26	76		26	20		26	36
	28	76		28	20		28	38
	30	76		30	20		30	40
	32	76		32	21		32	40
	34	76		34	22		34	42
	36	75		36	22		36	42
	38	75		38	23		38	43
	40	75		40	24		40	45
	42	74		42	25		42	45
	44	74		44	26		44	45
	46	74		46	28		46	45
	48	74		48	30		48	45
	50	73		50	32		50	45
10:55	52			52	35		52	44
	54			54	36		54	44
	56			56	38		56	44
	58			58	39		58	44
	60			60	40		60	44
	62			62	40		62	45
	64			64	41		64	46
	66			66	41		66	46
	68			68	41		68	46
	70			70	41		70	45
	72			72	41		72	45
	74			74	42		74	46
	76			76	42		76	44
	78			78	42		78	43
	80			80	42		80	41
	82			82	42		82	41
	84			84	43		84	42
	86			86	43		86	37
	88			88	43		88	37
	90			90	42		90	37
			11:17			11:52		
	84–45 =	39		43–43 =	0 ft/lb?			
		= 171 ft/lb						

Note: Mud in vane slots

VANE SHEAR TEST DATA

1. JOB Edgemoor Disp. Area
2. MAKE OF EQUIP Sprl. & Hsn
3. VANE SIZE 3"
4. TORQUE ARM 3"
5. INSPECTOR M.E.C.
6. BH # EBB-23
7. TEST # 5
8. DEPTH 31.0'-31.5'
9. FORCE TO PUSH VANE Hand, easy 2me.
10. DATE 25 July 1978

UNDISTURBED			REMOLDED			FRICTION		
TIME ELAPSED (SEC) 13:09	DEGREE OF ROTATION	DILLON FORCE GAGE (lbs.)	TIME ELAPSED (SEC) 13:25	DEGREE OF ROTATION	DILLON FORCE GAGE (lbs.)	TIME ELAPSED (SEC) 14:00	DEGREE OF ROTATION	DILLON FORCE GAGE (lbs.)
0	0	0	0	0	0	0	0	0
	2	45		2	14		2	0
	4	80		4	22		4	0
	6	115		6	30		6	0
	8	140		8	33		8	0
	10	150		10	39		10	0
	12	154		12	40		12	0
	14	155		14	40		14	0
	16	156		16	40		16	0
	18	156		18	40		18	0
	20	154		20	40		20	5
	22	151		22	40		22	
	24	150		24	40		24	
	26	149		26	40		26	
	28	147		28	40		28	2
	30	145		30	40		30	3
	32	142		32	40		32	4
	34	140		34	40		34	4
	36	139		36	40		36	5
	38	135		38	40		38	6
	40	133		40	40		40	7
	42	130		42	40		42	8
	44	128		44	39		44	10
	46	125		46	39		46	12
	48	120		48	39		48	14
13:17	50			50	39		50	15
	52			52	39		52	16
	54			54	38		54	16
	56			56	37		56	16
	58			58	37		58	17
	60			60	37		60	18
	62			62	36	→	62	19
	64			64	36		64	16
	66			66	36		66	16
	68			68	36		68	16
	70			70	35		70	17
	72			72	35		72	19
	74			74	35		74	20
	76			76	35		76	21
	78			78	35		78	21
	80			80	35		80	21
	82			82	35		82	23
	84			84	35		84	24
	86			86	35		86	23
	88			88	35		88	22
	90		13:38	90	35	14:13	90	21

156
-19
137 = 594.7#

40
-19
21 = 92#

VANE SHEAR TEST DATA

1. JOB Edgemoor Disposal Area
2. MAKE OF EQUIP Soil Test
3. VANE SIZE 3"
4. TORQUE ARM 3"
5. INSPECTOR MEC
6. BH # EBB-23
7. TEST # 6
8. DEPTH 36.0' - 36.5'
9. FORCE TO PUSH VANE by hand, only, 1ME
10. DATE 25 July 1978

UNDISTURBED			REMOLDED			FRICTION		
TIME ELAPSED (SEC) 15:07	DEGREE OF ROTATION	DILLON FORCE GAGE (lbs.)	TIME ELAPSED (SEC) 15:28	DEGREE OF ROTATION	DILLON FORCE GAGE (lbs.)	TIME ELAPSED (SEC) 16:00	DEGREE OF ROTATION	DILLON FORCE GAGE (lbs.
0	0	0	0	0	0		0	0
	2	15		2	5		2	0
	4	45		4	10		4	1
	6	75		6	20		6	2
	8	100		8	20		8	4
	10	125		10	20		10	5
	12	140		12	20		12	5
	14	145		14	20		14	5
	16	150		16	20		16	5
	18	154		18	21		18	6
	20	155		20	21		20	6
	22	156		22	21		22	8
	24	156		24	21		24	10
	26	158		26	21		26	10
	28	160		28	21		28	10
	30	164		30	22		30	10
	32	165		32	22		32	10
	34	165		34	22		34	10
	36	165		36	22		36	10
	38	165		38	22		38	10
	40	165		40	21		40	10
	42	165		42	21		42	10
	44	165		44	20		44	10
	46	166		46	20		46	10
	48	166		48	20		48	10
	50	166		50	20		50	10
	52	166		52	20		52	10
	54	162		54	20		54	11
	56	157		56	20		56	11
	58	155		58	19		58	11
	60	157		60	19		60	11
	62	158		62	19		62	11
	64	157		64	19		64	12
	66	156		66	19		66	12
	68	156		68	19		68	12
	70	156		70	18		70	12
	72	155		72	16		72	12
	74	155		74	15		74	12
	76	155		76	15		76	12
	78	155		78	17		78	13
	80	154		80	17		80	13
	82	154		82	20		82	14
	84	154		84	22		84	15
	86	154		86	22		86	15
	88	152		88	22		88	15
	90	151		90	22		90	15
15:20			15:42			15:14		
	166 - 15 = 151			22 - 15 = 7				
	= 681 #/0'			= 31.5#/0'				

VANE SHEAR TEST DATA

1. JOB Edgemoor Disposal Area
2. MAKE OF EQUIP Spr. #1 Hanwood
3. VANE SIZE 3"
4. TORQUE ARM 3"
5. INSPECTOR M.E.C.
6. BH # EBB-23
7. TEST # 7
8. DEPTH 41.0' - 41.5'
9. FORCE TO PUSH VANE Hand rate, twice 270
10. DATE 26 July 1978

UNDISTURBED			REMOLDED			FRICTION		
TIME ELAPSED (SEC) 07:53	DEGREE OF ROTATION	DILLON FORCE GAGE (lbs.)	TIME ELAPSED (SEC) 08:42	DEGREE OF ROTATION	DILLON FORCE GAGE (lbs.)	TIME ELAPSED (SEC) 08:58	DEGREE OF ROTATION	DILLON FORCE GAGE (lbs.)
0	0	0	0	0	0	0	0	0
20	2	5	20	2	20	20	2	4
40	4	6		4	25		4	5
60	6	10		6	24		6	7
	8	10		8	26		8	8
	10	11		10	26		10	9
	12	14		12	29		12	10
	14	20		14	29		14	11
	16	25		16	30		16	12
	18	25		18	31		18	12
	20	30		20	31		20	13
	22	35		22	31		22	1
	24	40		24	33		24	
	26	43		26	34		26	
	28	45		28	35		28	14
	30	50		30	35		30	15
	32	52		32	35		32	15
	34	55		34	35		34	15
	36	57		36	36		36	15
	38	60		38	36		38	15
	40	60		40	37		40	15
	42	60		42	38		42	15
	44	65		44	38		44	15
	46	70		46	38		46	15
	48	70		48	38		48	14
	50	75		50	38		50	14
	52	83		52	38		52	13
	54	90		54	39		54	12
	56	100		56	39		56	11
	58	110		58	39		58	11
	60	120		60	39		60	11
	62	126		62	39		62	11
	64	131		64	38		64	10
	66	134		66	38		66	10
	68	136		68	36		68	9
	70	138		70	35		70	9
	72	140		72	35		72	9
	74	141		74	35		74	9
	76	141		76	35		76	9
	78	139		78	35		78	9
	80	145		80	35		80	9
	82	148		82	35		82	9
	84	150		84	35		84	9
	86	151		86	35		86	10
	88	154		88	35		88	10
	90	154		90	30		90	10
	91	159	08:36			09:13		
	94	160						
	96	159						
	98	160						
	100	160						
	102	160						
	104	156						
	106	160						
	108	155						
	110	155						
	112	155						
	114	155						
	116	155						
	118	155						
	120	154						
08:15	122	154						

VANE SHEAR TEST DATA

1. JOB Edgemoor Disposal Area
2. MAKE OF EQUIP Spec. 1 Hen.
3. VANE SIZE 3"
4. TORQUE ARM 3"
5. INSPECTOR M.E.C.

6. BH # EBB - 23
7. TEST # 8
8. DEPTH 46.0' - 48.5'
9. FORCE TO PUSH VANE Hand-smen-easy-
10. DATE 26 July 1978

UNDISTURBED			REMOLDED			FRICTION		
TIME ELAPSED (SEC) 10:18	DEGREE OF ROTATION	DILLON FORCE GAGE (lbs.)	TIME ELAPSED (SEC) 10:44	DEGREE OF ROTATION	DILLON FORCE GAGE (lbs.)	TIME ELAPSED (SEC) 11:19	DEGREE OF ROTATION	DILLON FORCE GAGE (lbs.
0	0	0	0	0	0		0	0
20	2	25	20	2	15		2	0
	4	50		4	20		4	0
	6	70		6	25		6	0
	8	90		8	27		8	0
	10	105		10	30		10	0
	12	120		12	36		12	0
	14	128		14	40		14	0
	16	140		16	40		16	0
	18	144		18	49		18	1
	20	145		20	46		20	1
	22	145		22	46		22	2
	24	145		24	51		24	2
	26	145		26	54		26	3
	28	146		28	54		28	3
	30	147		30	54		30	4
	32	149		32	55		32	4
	34	149		34	55		34	4
	36	149		36	59		36	4
	38	149		38	60		38	4
	40	149		40	61		40	3
	42	149		42	61		42	1
	44	150		44	63		44	4
	46	150		46	65		46	5
	48	150		48	67		48	5
	50	150		50	68		50	5
	52	150		52	70		52	5
	54	151		54	70		54	5
	56	152		56	72		56	5
	58	154		58	72		58	5
	60	155		60	72		60	5
	62	160		62	74		62	5
	64	170		64	75		64	6
	66	175		66	75		66	6
	68	180		68	75		68	6
	70	183		70	75		70	7
	72	185		72	75		72	7
	74	189		74	75		74	7
	76	190		76	75		76	8
	78	190		78	75		78	9
	80	190		80	75		80	9
	82	190		82	72		82	9
	84	190		84	72		84	9
	86	191		86	71		86	9
	88	195		88	70		88	9
	90	196		90	70	11:33	90	9
	92	198		92	70			
	94	199		94	68			
	96	196		96	65			
	98	196		98	65			
	100	196	10:59	100	63			
	102	196						
	104	196						
	106	196						
	108	196						
	110	198						
	112	198						
	114	198						
	116	198						
	118	198						
	120	198						
10:37	122	198						

VANE SHEAR TEST DATA

1. JOB Edgemoor Disposal Area
2. MAKE OF EQUIP Sprl. & Henwood
3. VANE SIZE 13"
4. TORQUE ARM 3"
5. INSPECTOR M.E.C.
6. BH # EBB-23
7. TEST # 9
8. DEPTH 51.0' — 51.5'
9. FORCE TO PUSH VANE Hand-limit - 170#+
10. DATE 26 July 1978

UNDISTURBED			REMOLDED			FRICTION		
TIME ELAPSED (SEC) 12:54	DEGREE OF ROTATION	DILLON FORCE GAGE (lbs.)	TIME ELAPSED (SEC) 13:15	DEGREE OF ROTATION	DILLON FORCE GAGE (lbs.)	TIME ELAPSED (SEC) 13:54	DEGREE OF ROTATION	DILLON FORCE GAGE (lbs.)
0	0	0	0	0	0	0	0	0
20	2	22		2	30	20	2	2
40	4	52		4	60		4	3
	6	75		6	70		6	5
	8	85		8	75		8	5
	10	95		10	77		10	5
	12	104		12	84		12	5
	14	112		14	86		14	5
	16	130		16	90		16	5
	18	132		18	95		18	5
	20	135		20	96		20	5
	22	145		22	104		22	
	24	150		24	105		24	
	26	156		26	106		26	
	28	160		28	109		28	
	30	165		30	110		30	10
	32	172		32	112		32	10
	34	175		34	115		34	10
	36	175		36	120		36	10
	38	175		38	121		38	10
	40	176		40	124		40	11
	42	179	→	42	125		42	14
	44	180		44	120		44	14
	46	180		46	124		46	15
	48	180		48	125		48	15
	50	180		50	125		50	16
	52	181		52	125		52	16
	54	181		54	124		54	18
	56	181		56	124		56	18
	58	181		58	125		58	18
	60	181		60	125		60	19
	62	181		62	125		62	20
	64	181		64	125		64	20
	66	181		66	126		66	20
	68	183		68	130		68	20
	70	183		70	130		70	21
	72	185		72	130		72	21
	74	185		74	133		74	21
	76	185		76	135		76	22
	78	185		78	136		78	22
	80	186		80	136		80	22
	82	187		82	136		82	22
	84	189		84	136		84	22
	86	190		86	136		86	22
	88	190		88	136		88	22
	90	190	13:32	90	136	14:09	90	22
	92	190						
	94	193						
	96	194						
	98	195						
	100	197						
	102	200						
	104	202						
	106	203						
	108	205			125			
	110	205			12			
	112	206			103			
	114	208						
	116	210						
	118	212						
	120	214						
13:09	122	214						

VANE SHEAR TEST DATA

1. JOB Edgemoor Disposal Area
2. MAKE OF EQUIP Sprague & Henwood
3. VANE SIZE 3"
4. TORQUE ARM 3"
5. INSPECTOR M.E.C.
6. BH # EBB-24
7. TEST # 1
8. DEPTH 160' — 165'
9. FORCE TO PUSH VANE Hand-Auger-Tool-4
10. DATE 27 July 1978

UNDISTURBED			REMOLDED			FRICTION		
TIME ELAPSED (SEC) 09'14	DEGREE OF ROTATION	DILLON FORCE GAGE (lbs.)	TIME ELAPSED (SEC) 09:40	DEGREE OF ROTATION	DILLON FORCE GAGE (lbs.)	TIME ELAPSED (SEC) 10:04	DEGREE OF ROTATION	DILLON FORCE GAGE (lbs.
0	0	0	0	0	0	0	0	0
20	2	20	20	2	5	20	2	1
40	4	35	40	4	5	40	4	4
60	6	46	60	6	10	60	6	5
	8	48		8	12	80	8	5
	10	50		10	15	100	10	5
	12	54		12	15		12	5
	14	55		14	15		14	5
	16	55		16	17		16	5
	18	55		18	17		18	5
	20	56		20	19		20	5
	22	56		22	20		22	5
	24	56		24	20		24	5
	26	56		26	20		26	5
	28	57		28	20		28	5
	30	57		30	20		30	5
	32	57		32	23		32	5
	34	57		34	24		34	5
	36	57		36	24		36	5
	38	56		38	25		38	5
	40	55		40	25		40	5
	42	54		42	25		42	5
	44	54		44	25		44	5
	46	54		46	25		46	5
	48	54		48	25		48	5
	50	54		50	25		50	5
	52	56		52	25		52	5
	54	60		54	25		54	5
	56	60		56	25		56	5
	58	60		58	25		58	5
	60	64		60	25		60	5
	62	65		62	25		62	5
	64	65		64	25		64	5
	66	70		66	25		66	5
	68	70		68	25		68	5
	70	75		70	25		70	5
	72	76		72	25		72	5
	74	78		74	25		74	5
	76	80		76	25		76	4
	78	90		78	25		78	4
	80	80		80	25		80	3
	82	80		82	25		82	3
	84	80		84	25		84	3
	86	80		86	25		86	2
	88	76		88	25		88	1
	90	75	9:54	90	25	10:18	90	0
	92	75						
	94	75						
	96	75						
	98	75						
	100	75						
	102	74						
	104	74						
	106	70						
	108	70		25-5 = 20				
9:33	110	70		= 88 #/0'				
	57-5 = 52							
	= 220 #/0'							

VANE SHEAR TEST DATA

1. JOB Edgewood Disposal Area
2. MAKE OF EQUIP Soiltest & Hennessy
3. VANE SIZE 3"
4. TORQUE ARM 3"
5. INSPECTOR M.E.C.
6. BH # EBB-24
7. TEST # 2
8. DEPTH 16.0' — 16.5'
9. FORCE TO PUSH VANE Hand-2nds-easy
10. DATE 27 July 1978

UNDISTURBED			REMOLDED			FRICTION		
TIME ELAPSED (SEC) 10:52	DEGREE OF ROTATION	DILLON FORCE GAGE (lbs.)	TIME ELAPSED (SEC) 11:14	DEGREE OF ROTATION	DILLON FORCE GAGE (lbs.)	TIME ELAPSED (SEC) 11:38	DEGREE OF ROTATION	DILLON FORCE GAGE (lbs.)
	0	0	0	0	0	0	0	0
	2	5	20	2	0	20	2	1
	4	10		4	0		4	4
	6	20		6	1		6	5
	8	25		8			8	5
	10	35		10			10	6
	12	40		12			12	7
	14	42		14			14	10
	16	45		16			16	10
	18	48		18			18	10
	20	50		20			20	10
	22	50		22			22	11
	24	50		24			24	
	26	51		26			26	
	28	54		28			28	12
	30	55		30			30	13
	32	55		32			32	15
	34	55		34	0		34	15
	36	55		36	1		36	15
	38	55		38	2		38	15
	40	55		40	3		40	15
	42	53		42	4		42	15
	44	50		44	5		44	15
	46	49		46	5		46	14
	48	48		48	5		48	14
	50	47		50	6		50	14
	52	47		52	9		52	14
	54	46		54	10		54	14
	56	45		56	11		56	18
	58	43		58	11		58	18
	60	40		60	11		60	18
	62	40		62	12		62	18
	64	40		64	13		64	20
	66	40		66	13		66	20
	68	40		68	13		68	21
	70	40		70	14		70	24
	72	38		72	14		72	25
	74	38		74	15		74	25
	76	38		76	15		76	25
	78	38		78	15		78	25
	80	37		80	15		80	25
	82	36		82	16		82	23
	84	35		84	16		86	20
	86	35		86	17		86	20
	88	35		88	17		88	20
11:07	90	35	11:22	90	17	11:59	90	20
	55-15	= 40			17-15=2			
		= 175#/ft			=A			

VANE SHEAR TEST DATA

1. JOB Edgemoor Disposal Area
2. MAKE OF EQUIP Sprague & Henwood
3. VANE SIZE 3"
4. TORQUE ARM 3"
5. INSPECTOR M.E.C.

6. BH # EBB-24
7. TEST # 3
8. DEPTH 21.0' – 21.5'
9. FORCE TO FUSH VANE Hand-Shear, 2men
10. DATE 27 July 1978

UNDISTURBED			REMOLDED			FRICTION		
TIME ELAPSED (SEC) 13:00	DEGREE OF ROTATION	DILLON FORCE GAGE (lbs.)	TIME ELAPSED (SEC) 13:23	DEGREE OF ROTATION	DILLON FORCE GAGE (lbs.)	TIME ELAPSED (SEC) 13:50	DEGREE OF ROTATION	DILLON FORCE GAGE (lbs.)
0	0	0	0	0	0	0	0	0
	2	20		2	0		2	0
	4	25		4	0		4	0
	6	30		6	1		6	0
	8	28		8	1		8	0
	10	35		10	1		10	0
	12	36		12	2		12	0
	14	40		14	2		14	0
	16	42		16	2		16	0
	18	42		18	2		18	0
→	20	43		20	2		20	0
	22	38		22	2		22	0
	24	32		24	2		24	0
	26	31		26	2		26	0
	28	30		28	2		28	0
	30	30		30	2		30	0
	32	30		32	3		32	0
	34	30		34	3		34	0
	36	28		36	3		36	0
	38	28		38	3		38	0
	40	27		40	3		40	0
	42	27		42	3		42	0
	44	27		44	3		44	0
	46	26		46	3		46	0
	48	26		48	3		48	0
	50	24		50	4		50	0
	52	22		52	4		52	0
	54	20		54	4		54	0
	56	18		56	4		56	0
	58	16		58	4		58	1
	60	16		60	4		60	1
	62	16		62	4		62	2
	64	15		64	4		64	3
	66	15		66	4		66	3
	68	14		68	4		68	3
	70	12		70	4		70	4
	72	11		72	3		72	4
	74	10		74	3		74	4
	76	9		76	3		76	4
	78	7		78	2		78	5
	80	6		80	2		80	5
	82	5		82	2		82	5
	84	5		84	1		84	5
	86	5		86	1		86	5
	88	5		88	1		88	5
13:15	90	5	13:34	90	1	14:03	90	5

43 – 5 = 38

= 166710

4 – 5 = 0

0

VANE SHEAR TEST DATA

1. JOB Edgemoor Disposal Area
2. MAKE OF EQUIP Soiltest Hand
3. VANE SIZE 3" x 1"
4. TORQUE ARM 3"
5. INSPECTOR M.E.I.C.
6. BH # EBB-24
7. TEST # 4
8. DEPTH 26.0' — 26.5'
9. FORCE TO PUSH VANE Hand - Soiltest E70
10. DATE 27 July 1978

UNDISTURBED			REMOLDED			FRICTION		
TIME ELAPSED (SEC) 14:43	DEGREE OF ROTATION	DILLON FORCE GAGE (lbs.)	TIME ELAPSED (SEC) 15:05	DEGREE OF ROTATION	DILLON FORCE GAGE (lbs.)	TIME ELAPSED (SEC) 15:37	DEGREE OF ROTATION	DILLON FORCE GAGE (lbs.)
0	0	0	0	0	0	0	0	0
20	2	30		2	25		2	2
	4	40		4	30		4	1
	6	51		6	35		6	1
	8	59		8	37		8	1
	10	72		10	40		10	1
	12	73		12	41		12	1
	14	75		14	43		14	1
	16	75		16	45		16	1
	18	75		18	45		18	1
	20	76		20	45		20	1
	22	80		22	45		22	
	24	80		24	45		24	
	26	81		26	45		26	
	28	85		28	46		28	2
	30	85		30	46		30	2
	32	87		32	47		32	2
	34	90		34	47		34	2
	36	92		36	47		36	2
	38	93		38	47		38	2
	40	93		40	47		40	2
	42	94		42	47		42	2
	44	95		44	47		44	2
	46	95		46	48		46	2
	48	96		48	48		48	2
	50	99		50	47		50	3
	52	100		52	46		52	3
	54	100		54	46		54	3
	56	100		56	46		56	3
	58	100		58	45		58	3
	60	100		60	45		60	3
	62	100		62	45		62	3
	64	100		64	45		64	3
→	66	100		66	45		66	3
	68	99		68	44		68	3
	70	99		70	44		70	3
	72	99		72	44		72	3
	74	99		74	43		74	3
	76	99		76	43		76	3
	78	99		78	43		78	3
	80	99		80	43		80	2
	82	97		82	43		82	1
	84	97		84	43		84	1
	86	96		86	41		86	0
	88	96		88	40		88	0
14:58	90	96	15:20	90	40	15:51	90	0

100 − 3 = 97

= 4243/0'

48 − 3 = 45

= 1977/0'

VANE SHEAR TEST DATA

1. JOB Edgemoor DA
2. MAKE OF EQUIP Acker
3. VANE SIZE 3.5" (6" tapered keyway)
4. TORQUE ARM 18"
5. INSPECTOR JPA
6. BH # EBB-29
7. TEST # VS-2
8. DEPTH 20'-22'
9. FORCE TO PUSH VANE Truck-Heavy
10. DATE 7 June 84

BENT VANE - 1 FIN -

UNDISTURBED			REMOLDED			FRICTION		
TIME ELAPSED (SEC)	DEGREE OF ROTATION	DILLON FORCE GAGE (lbs.)	TIME ELAPSED (SEC)	DEGREE OF ROTATION	DILLON FORCE GAGE (lbs.)	TIME ELAPSED (SEC)	DEGREE OF ROTATION	DILLON FORCE GAGE (lbs.)
0	0	0	0	0	0	0	0	0
20	2	14	20	2	6.5	20	2	0
40	4	21	40	4	6.5	40	4	0
60	6	33.5	60	6	7.5	60	6	0
1.20	8	47.5	1.20	8	7.5	1.20	8	0
1.40	10	54	1.40	10	8	1.40	10	0
2.00	12	59	2.00	12	8	2.00	12	0
2.20	14	64	2.20	14	8.5	2.20	14	0
2.40	16	70	2.40	16	8.5	2.40	16	0
3.00	18	73.5	3.00	18	8.5	3.00	18	0
3.20	20	77	3.20	20	8.5	3.20	20	0
3.40	22	81	3.40	22	8.5	3.40	22	0.5
4.00	24	84.5	4.00	24	8.5	4.00	24	0.5
4.20	26	89	4.20	26	9.0	4.20	26	0.5
4.40	28	94	4.40	28	9.0	4.40	28	0.5
5.00	30	98	5.00	30	9.0	5.00	30	0.5
5.20	32	102	5.20	32	9.0	5.20	32	0.5
5.40	34	104.5	5.40	34	9.0	5.40	34	0.5
6.00	36	106	6.00	36	9.0	6.00	36	0.5
6.20	38	108	6.20	38	9.5	6.20	38	0.5
6.40	40	109.5	6.40	40	9.5	6.40	40	0.5
7.00	42	111	7.00	42	9.5	7.00	42	0.5
7.20	44	112	7.20	44	9.5	7.20	44	0.5
7.40	46	112	7.40	46	10	7.40	46	0.5
8.00	48	113	8.00	48	10	8.00	48	0.5
8.20	50	114.5	8.20	50	10	8.20	50	0.5
8.40	52	115	8.40	52	10	8.40	52	0.5
9.00	54	116	9.00	54	10.5	9.00	54	0.5
9.20	56	116	9.20	56	10.5	9.20	56	0.5
9.40	58	114.5	9.40	58	10.5	9.40	58	0.5
10.00	60	112.5	10.00	60	10.5	10.00	60	0.5
10.20	62	108	10.20	62	10.5	10.20	62	0.5
10.40	64	107.5	10.40	64	10.5	10.40	64	0.5
11.00	66	107.5	11.00	66	10.5	11.00	66	0.5
11.20	68	107.5	11.20	68	10.5	11.20	68	0.5
11.40	70	107.5	11.40	70	10.5	11.40	70	0.5
12.00	72	107.5	12.00	72	10.5	12.00	72	0.5
12.20	74	107.5	12.20	74	10.5	12.20	74	0.5
12.40	76	107.5	12.40	76	10.5	12.40	76	0.5
13.00	78	107.5	13.00	78	10.5	13.00	78	0.5
13.20	80	107.5	13.20	80	10.5	13.20	80	0.5
13.40	82	107.5	13.40	82	10.5	13.40	82	0.5
14.00	84	107.5	14.00	84	10.5	14.00	84	0.5
14.20	86	107.5	14.20	86	10.5	14.20	86	0.5
14.40	88	107.5	14.40	88	10.5	14.40	88	0.5
15.00	90	107	15.00		10.5	15.00	90	0.5

$T = 115.5 \times 18 = 2079$ in-lb $T = 10 \times 18 = 180$ in-lb

$S = 2077 \times .905 = 1881$ psf $S = 180 \times .905 = 163$ psf

NADP FORM OCT 75 1734 (TEMPORARY)

VANE SHEAR TEST DATA

1. JOB Edgemoor D.A.
2. MAKE OF EQUIP Acker
3. VANE SIZE 2.5" / 5" tapered length
4. TORQUE ARM 18"
5. INSPECTOR JPA
6. BH # EBB-30
7. TEST # VS-1
8. DEPTH 30'-32'
9. FORCE TO PUSH VANE Truck-light
10. DATE 8 June 84

UNDISTURBED			REMOLDED			FRICTION		
TIME ELAPSED (SEC)	DEGREE OF ROTATION	DILLON FORCE GAGE (lbs.)	TIME ELAPSED (SEC)	DEGREE OF ROTATION	DILLON FORCE GAGE (lbs.)	TIME ELAPSED (SEC)	DEGREE OF ROTATION	DILLON FORCE GAGE (lbs.)
0	0	0	0	0	0	0	0	0
20	2	12	20	2	6.5	20	2	0
40	4	19	40	4	7	40	4	0
60	6	20.5	60	6	7.5	60	6	0
1.20	8	21.5	1.20	8	7.5	1.20	8	0
1.40	10	22	1.40	10	8	1.40	10	0.5
2.00	12	21.5	2.00	12	8	2.00	12	0.5
2.20	14	21.5	2.20	14	7.5	2.20	14	0.5
2.40	16	22	2.40	16	7.5	2.40	16	0.5
3.00	18	21.5	3.00	18	7	3.00	18	0.5
3.20	20	21.5	3.20	20	6.5	3.20	20	0.5
3.40	22	21.5	3.40	22	6.5	3.40	22	0.5
4.00	24	21	4.00	24	6.5	4.00	24	0.5
4.20	26	20.5	4.20	26	6	4.20	26	0.5
4.40	28	20.5	4.40	28	5.5	4.40	28	0.5
5.00	30	20.5	5.00	30	5.5	5.00	30	0.5
5.20	32	20.5	5.20	32	5.5	5.20	32	0.5
5.40	34	20.5	5.40	34	5.5	5.40	34	0.5
6.00	36	20	6.00	36	5.5	6.00	36	0.5
6.20	38	19	6.20	38	6	6.20	38	0.5
6.40	40	18.5	6.40	40	5.5	6.40	40	0.5
7.00	42	18.0	7.00	42	5.5	7.00	42	0.5
7.20	44	17	7.20	44	5.5	7.20	44	0.5
7.40	46	16.5	7.40	46	5.5	7.40	46	0.5
8.00	48	16	8.00	48	5.5	8.00	48	0.5
8.20	50	16	8.20	50	5.5	8.20	50	0.5
8.40	52	15.5	8.40	52	6	8.40	52	0
9.00	54	15.5	9.00	54	6	9.00	54	0
9.20	56	15.5	9.20	56	6.5	9.20	56	0
9.40	58	15.5	9.40	58	6.5	9.40	58	0
10.00	60	15.5	10.00	60	6.5	10.00	60	0
10.20	62	15	10.20	62	7	10.20	62	0
10.40	64	15	10.40	64	7	10.40	64	0
11.00	66	15	11.00	66	7	11.00	66	0
11.20	68	15	11.20	68	7.5	11.20	68	0
11.40	70	14.5	11.40	70	8	11.40	70	0
12.00	72	14.5	12.00	72	8.5	12.00	72	0
12.20	74	14.5	12.20	74	8.5	12.20	74	0
12.40	76	14.5	12.40	76	7.5	12.40	76	0
13.00	78	14.5	13.00	78	7.5	13.00	78	0
13.20	80	14.5	13.20	80	7	13.20	80	0
13.40	82	14.5	13.40	82	7	13.40	82	0
14.00	84	14.5	14.00	84	7	14.00	84	0
14.20	86	14.5	14.20	86	7	14.20	86	0
14.40	88	14.5	14.40	88	6.5	14.40	88	0
15.00	90	14.5	15.00	90	6	15.00	90	0
T = 21.5 x 18 =		387 in-lb	T = 7.5 x 18 = 135 in-lb					
S = 387 x 2.59		1002 psf	S = 135 x 2.59 = 350 psf					

NADP FORM 1734 (TEMPORARY)

VANE SHEAR TEST DATA

1. JOB: EDGEMOOR DE
2. MAKE OF EQUIP: ACKER
3. VANE SIZE: 2½" x 5"
4. TORQUE ARM: 18"
5. INSPECTOR: R. PINCIOTTI
6. BH #: E86-31
7. TEST #: VS-1
8. DEPTH: 16'-18'
9. FORCE TO PUSH VANE:
10. DATE: 13 JUNE 84

UNDISTURBED			REMOLDED			FRICTION		
TIME ELAPSED (SEC)	DEGREE OF ROTATION	DILLON FORCE GAGE (lbs.)	TIME ELAPSED (SEC)	DEGREE OF ROTATION	DILLON FORCE GAGE (lbs.)	TIME ELAPSED (SEC)	DEGREE OF ROTATION	DILLON FORCE GAGE (lbs.)
0	0			0			0	
20	2	20	20	2	8	20	2	0.5
40	4	24	40	4	10	40	4	0.5
55	6	25	1.05	6	10	55	6	
1.16	8	27	1.26	8	10	1-15	8	
	10	29	1.40	10	10	1-25	10	
	12	30	2	12	10	1-40	12	
1.20	14	34	2.25	14	11	1-55	14	
1.40	16	34	3.0	16	11	2-20	16	
1.55	18	36	3.20	18	11	2-40	18	
2.20	20	37	3.40	20	11	3 00	20	
2.40	22	38 38	4.05	22	11	3 -20	22	
3.0	24	39	4.25	24	11	3 -35	24	
3.20	26	38	5.00	26	11	4-0	26	
3.45	28	38	5.20	28	11.5	4-15	28	
4.10	30	38.5	5.40	30	11.5	4-30	30	
4.25	32	38.5	6.0	32	11.5	4-50	32	1.0
4.45	34	38	6.20	34	11.5	6-10	34	
5.05	36	38	6.45	36	11.5	6-30	36	
5.30	38	37	7.10	38	11.5	6-50	38	
	40	33	7.24	40	11.5	7-10	40	
6.25	42	32	7.55	42	11.5	7-30	42	
6.45	44	30	8.20	44	12	7-50	44	
7.05	46	29	8.40	46	11.5	8-10	46	
7.25	48	30	9.00	48	11.5	8-50	48	
7.40	50	30	9.25	50	12.0	9-05	50	
7.50	52	30	10.20	52	12.0	9-20	52	
8.05	54	30	10.45	54	12.0	9-45	54	1.5
8.25	56	28	11.25	56	11.5	10-15	56	
8.50	58	27	11.40	58	12.0	10-30	58	
9.15	60	26	12.00	60	11.5	10-55	60	
9.30	62	27	12.20	62	11.5	11-15	62	
9.45	64	27	12.50	64	11.5	11-35	64	
10.20	66	28	13.20	66	11.0	12-05	66	
10.30	68	28	13.40	68	11.0	12-25	68	
10.40	70	27	14.00	70	10.5	12-55	70	
10.55	72	28	14.20	72	11.5	13-20	72	2
	74	26	14.40	74	11.0	13-40	74	
11.35	76	26	15.00	76	10.0	14-	76	1.5
11.40	78	25	15.20	78	10.5		78	
12.00	80	25	15.40	80	10	14 40	80	
12.20	82	25	16.00	82	10	15.00	82	
12.35	84	25	16.20	84	10	15.20	84	
13.00	86	25	16.40	86	10	15.45	86	
13.20	88	25	17.00	88	10	16.10	88	2
13.40	90	25	17.20	90	10	16.30	90	
T = 37 - 18 = 666		IN-16	T = 10 - 18 = 180		IN-16			
S = 666 x 2.59 =		1725 PSF	S = 180 x 2.59 =		466. PSF			

VANE SHEAR TEST DATA

1. JOB EDGEMOOR DA
2. MAKE OF EQUIP ACKER
3. VANE SIZE 3" X 6"
4. TORQUE ARM 18"
5. INSPECTOR R. PINCIOTTI
6. BH # EBP 31
7. TEST # VS-2
8. DEPTH 28-30'
9. FORCE TO PUSH VANE
10. DATE 13 JUNE 84

UNDISTURBED			REMOLDED			FRICTION		
TIME ELAPSED (SEC)	DEGREE OF ROTATION	DILLON FORCE GAGE (lbs.)	TIME ELAPSED (SEC)	DEGREE OF ROTATION	DILLON FORCE GAGE (lbs.)	TIME ELAPSED (SEC)	DEGREE OF ROTATION	DILLON FORCE GAGE (lbs.)
	0	0		0	0	0	0	0
20	2	16	20	2	3	20	2	0
40	4	31	40	4	4	40	4	0
60	6	42	60	6	4.5	60	6	0
1-20	8	52	1-20	8	5	1-20	8	0
1-35	10	61	1-40	10	5	1-40	10	0
1-50	12	69	2-0	12	6	2-0	12	0
2-05	14	67	2-20	14	6	2-20	14	0
2-20	16	77	2-40	16	7	2-40	16	0
2-40	18	78	3-0	18	7	3-0	18	0
3-00	20	91	3-20	20	7	3-20	20	0
3-20	22	85	3-40	22	7.5	3-40	22	0
	24		4-0	24	8	4-0	24	0
3-48	26	85	4-20	26	8	4-20	26	0
	28		4-40	28	8	4-40	28	0
4-20	30	82	5-0	30	8	4-60	30	0
4-40	32	80	5-20	32	8.5	5-20	32	0
4-56	34	78	5-40	34	8	5-40	34	0
5-00	36	75	6-0	36	8	6-0	36	0
	38		6-20	38	8	6-20	38	0
5-20	40	73	6-40	40	9	6-40	40	0
5-40	42	71	7-0	42	8.5	7-0	42	0
6-00	44	70	7-20	44	8.5	7-20	44	0
6-20	46	68	7-40	46	8	7-40	46	0
6-40	48	66	8-0	48	8	8-0	48	0
7-00	50	65	8-20	50	8.5	8-20	50	0
7-15	52	63	8-40	52	8	8-40	52	0
7-30	54	62	9-00	54	8	8-60	54	0
7-50	56	61	10-20	56	8	9-20	56	0
8-00	58	60	10-40	58	8	9-40	58	0
8-15	60	60	11-0	60	8	10-0	60	0.5
8-30	62	58	11-20	62	8	10-20	62	0.5
8-50	64	58	11-40	64	8	10-40	64	0.5
9-10	66	56	12-0	66	8	11-0	66	0.5
9-30	68	55	12-20	68	8	11-20	68	0.5
9-50	70	55	12-40	70	8	11-40	70	0.5
10-10	72	54	13-0	72	8	12-0	72	0.5
10-30	74	54	13-20	74	8	12-20	74	0.5
10-50	76	52	13-40	76	8	12-40	76	0.5
11-10	78	52	13-60	78	8	13-0	78	0.5
11-30	80	52	14-20	80	8	13-20	80	0.5
11-50	82	52	14-40	82	8	13-40	82	0.5
12-10	84	51	15-00	84	8	14-00	84	0.5
12-30	86	50	15-20	86	8	14-20	86	0.5
12-50	88	50	15-40	88	8	14-40	88	0.5
13-10	90	50	16-00	90	8	15-00	90	0.5
T = .84.5 * 18 =		1521 IN-lb	T = 8 * 18 =		144 IN-lb			
S = 1521 * .905		1377 PSF	S = 144 * .905 =		130. PSF			

VANE SHEAR TEST DATA

1. JOB EDGE MOOR DM
2. MAKE OF EQUIP ACKER
3. VANE SIZE 2½ x 5"
4. TORQUE ARM 18"
5. INSPECTOR R. PINCIOTTI
6. BH # EBB-31
7. TEST # VS-3
8. DEPTH 42-44'
9. FORCE TO PUSH VANE
10. DATE 14 JUNE 84

BENT 2 FINS OF VANE IN LOWER ½ of

UNDISTURBED			REMOLDED			FRICTION		
TIME ELAPSED (SEC)	DEGREE OF ROTATION	DILLON FORCE GAGE (lbs.)	TIME ELAPSED (SEC)	DEGREE OF ROTATION	DILLON FORCE GAGE (lbs.)	TIME ELAPSED (SEC)	DEGREE OF ROTATION	DILLO FORC GAGE (lbs.
0	0	0	0	0	0	0	0	0
20	2	5	20	2	3	20	2	0
40	4	10	40	4	3	40	4	0
1-0	6	13	1-0	6	3.5	1-0	6	0
1-20	8	14.5	1-20	8	3.5	1-20	8	0
1-40	10	16	1-40	10	3	1-40	10	0
2-0	12	18	2-0	12	3	2-0	12	0
2-20	14	19	2-20	14	2.5	2-20	14	0
2-40	16	20.5	2-40	16	2.5	2-40	16	0
3-0	18	21.5	3-0	18	2.5	3-0	18	0
3-20	20	22.5	3-20	20	3	3-20	20	0
3-40	22	23.5	3-40	22	4	3-40	22	0
4-0	24	24	4-0	24	4	4-0	24	0
4-20	26	24.5	4-20	26	(4.5)	4-20	26	0
4-40	28	25.5	4-40	28	4.5	4-40	28	0
5-0	30	26	5-0	30	4.5	4-60	30	0
5-20	32	(26.5)	5-20	32	4	5-20	32	0
5-40	34	26.0	5-40	34	3.5	5-40	34	
6-0	36	26.0	6-0	36	2.5	6-0	36	
6-20	38	26.0	6-20	38	2	6-20	38	
6-40	40	25.5	6-40	40	2	6-40	40	
7-0	42	25.0	6-60	42	2	7-0	42	
7-20	44	25	7-20	44	2	7-20	44	
7-40	46	25	7-40	46	2	7-40	46	
8-0	48	24.5	8-0	48	2	8-0	48	
8-20	50	24.5	8-20	50	2	8-20	50	
8-40	52	24	8-40	52	2	8-40	52	
9-0	54	23	8-60	54	1.5 2	9-0	54	
9-20	56	23	9-20	56	1.5 2	9-20	56	
9-40	58	21.5	9-40	58	2	9-40	58	
10-0	60	20.5	10-0	60	2	9-60	60	0.5
10-20	62	20	10-20	62	2	10-20	62	
10-40	64	19	10-40	64	2	10-40	64	
11-0	66	18	11-0	66	2	11-0	66	
11-20	68	17	11-20	68	2	11-20	68	
11-40	70	16	11-40	70	2	11-40	70	
12-00	72	15	12-0	72	2	12-0	72	
12-20	74	13	12-20	74	2	12-20	74	
12-40	76	14	12-40	76	2	12-40	76	
13-00	78	13	13-0	78	2	13-00	78	
13-20	80	12	13-20	80	2	13-20	80	
13-40	82	11	13-40	82	2	13-40	82	
14-0	84	10.5	14-00	84	2	14-0	84	
14-20	86	10.5	14-20	86	2	14-20	86	
14-40	88	10.5	14-40	88	1.5 2	14-40	88	
15-0	90	10.5	15-00	90	1.5 2	15-0	90	
T = 26 x 18 = 468 in-lb			T = 4 x 18 = 72 in-lb					
S = 468 ÷ 2.59 = 180.7 PSF			S = 72 ÷ 2.59 = 28 PSF					

WARP FORM

VANE SHEAR TEST DATA

1. JOB EDGEMONT DA
2. MAKE OF EQUIP ACKER
3. VANE SIZE 2½ x 5" STRAIGHTENED*
4. TORQUE ARM 19"
5. INSPECTOR R. PINCOTT
6. BH # EBB 32
7. TEST # VS-1
8. DEPTH 16-18'
9. FORCE TO PUSH VANE
10. DATE 15 JUNE 84

* VANE STRAIGHTENED IN FIELD BY INSPECTOR AFTER BEING BENT YESTERDAY

UNDISTURBED			REMOLDED			FRICTION		
TIME ELAPSED (SEC)	DEGREE OF ROTATION	DILLON FORCE GAGE (lbs.)	TIME ELAPSED (SEC)	DEGREE OF ROTATION	DILLON FORCE GAGE (lbs.)	TIME ELAPSED (SEC)	DEGREE OF ROTATION	DILLON FORCE GAGE (lbs.)
	0			0		c	0	0
20	2	3	20	2	3.6	20	2	0
40	4	20	40	4	3.6	40	4	0
1-0	6	16	1	6	3.6	1-	6	0
1-20	8	18	1-20	8	(4)	1-20	8	0.5
1-40	10	19.5	1-40	10	4	1-40	10	
2-0	12	19.5	2	12	4	2	12	
2-20	14	19.5	2-20	14	4	2-20	14	
2-40	16	(20.0)	2-40	16	4	2-40	16	
3-0	18	20	3	18	4	3	18	
3-20	20	20	3-20	20	4	3-20	20	
3-40	22	20	3-40	22	4	3-40	22	
4-0	24	19.5	4	24	4.5	4	24	
4-20	26	19.5	4-20	26	4	4-20	26	
4-40	28	19.5	4-40	28	4	4-40	28	
5-0	30	19	5	30	4	5	30	
5-20	32	19	5-20	32	4	5-20	32	
5-40	34	19	5-40	34	4	5-40	34	
6-0	36	19	6	36	4	6	36	
6-20	38	19	6-20	38	4	6-20	38	
6-40	40	18.5	6-40	40	4	6-40	40	
7-0	42	18	7	42	4	7	42	
7-20	44	18	7-20	44	4	7-20	44	
7-40	46	17.5	7-40	46	4	7-40	46	
8-0	48	17	8	48	4	8	48	
8-20	50	17.5	8-20	50	4	8-20	50	
8-40	52	17	8-40	52	4	8-40	52	
9	54	16	9	54	4	9	54	
9-20	56	16	9-20	56	3.5	9-20	56	
9-40	58	16	9-40	58	3.5	9-40	58	
10	60	15.5	10	60	3.5	10	60	
10-20	62	15	10-20	62	3.5	10-20	62	(1.0)
10-40	64	15	10-40	64	3.5	10-40	64	
11	66	14.5	11	66	3.5	11	66	
11-20	68	14	11-20	68	3.5	11-20	68	
11-40	70	14.5	11-40	70	3.5	11-40	70	
12	72	14	12	72	3.5	12	72	
12-20	74	14	12-20	74	3.5	12-20	74	
12-40	76	13.5	12-40	76	3.5	12-40	76	
13	78	13	13	78	3.5	13	78	
13-20	80	13	13-20	80	3.5	13-20	80	
13-40	82	13	13-40	82	3.5	13-40	82	
14	84	13	14	84	3.5	14	84	
14-20	86	12.5	14-20	86	3.5	14-20	86	
14-40	88	12.5	14-40	88	3.5	14-40	88	
15	90	12.5	15	90	3.5	15	90	
T = 19	x 18 =	342 in-lb	T = 3	18 = 54	in-lb			
S = 342	x 2.59 =	886 PSF	S = 54 *	2.59 = 140	PSF			

VANE SHEAR TEST DATA

1. JOB EDGEMOOR DA
2. MAKE OF EQUIP ACKER
3. VANE SIZE 3" HC" x 2"
4. TORQUE ARM 18"
5. INSPECTOR R. PINCHOTTI
6. BH # EBB-3Z
7. TEST # VS-Z
8. DEPTH 30-32'
9. FORCE TO PUSH VANE
10. DATE 18 JUNE 84

UNDISTURBED			REMOLDED			FRICTION		
TIME ELAPSED (SEC)	DEGREE OF ROTATION	DILLON FORCE GAGE (lbs.)	TIME ELAPSED (SEC)	DEGREE OF ROTATION	DILLON FORCE GAGE (lbs.)	TIME ELAPSED (SEC)	DEGREE OF ROTATION	DILLON FORCE GAGE (lbs.)
	0			0			0	
20	2	9	20	2	10	20	2	6
40	4	19	40	4	12	40	4	
1	6	25	1	6	12	1	6	
1-20	8	30	1-20	8	12	20	8	
1-40	10	36	1-40	10	12	40	10	
2-0	12	41	2	12	12	0	12	
2-20	14	46	20	14	12	20	14	
3 2-40	16	48 1/2	40	16	12 1/2	40	16	
3	18	53	3	18	12	3	18	
3-40 20	20	49	20	20	12	20	20	
3-40	22	48 1/2	40	22	12	40	22	
4-0	24	48 1/2	4	24	12	4	24	1/2
4-20	26	48	20	26	12	20	26	
4-40	28	47	40	28	12	40	28	
5	30	46	5	30	12	5	30	
5-20	32		20	32	12	20	32	
5-40	34	44	40	34	12	40	34	
6	36	43	6	36	12	6	36	
6-20	38	42	20	38	12	20	38	
6-40	40	41	40	40	12 1/2	40	40	
7	42	40	7	42	12	7	42	
7-20	44	39	20	44	12	20	44	
7-40	46	39	40	46	12	40	46	
8	48	37 1/2	8	48	12	8	48	
8-20	50	37	20	50	12	20	50	
8-40	52	35 1/2	8 40	52	12	40	52	
9	54	35 1/2	9	54	12 1/2	9	54	
9-20	56	36	20	56	12 1/2	20	56	
9-40	58	35	40	58	12 1/2	40	58	
9-60	60	34 1/2	60	60	12 1/2	0	60	
10-20	62	34	20	62	12	20	62	
10-40	64	34	40	64	12	40	64	
11	66	33 1/2	11	66	13	1	66	
11-20	68	33	20	68	12 1/2	20	68	1/4
11-40	70	33	40	70	12	40	70	
12	72	31 1/2	12	72	12 1/4	12	72	
12-20	74	30 1/2	20	74	12	20	74	
12-40	76	30	40	76	12	40	76	
13	78	29 1/2	13	78	12	13	78	
13-20	80	29	20	80	12	20	80	
13-40	82	29	40	82	12	40	82	
14	84	29	14	84	12	14	84	
14-20	86	29	20	86	12	20	86	
14-40	88	28	40	88	12	40	88	
15	90	28	15	90	12	15	90	
T = 48.5 * 18 =		873 in-lb	T = 11.5 * 18 =		207 in-lb			
S = 873 * .705 =		790 PSF	S = 207 * .905 =		187 PSF			

MARD FORM

VANE SHEAR TEST DATA

1. JOB EDGEMOOR DA
2. MAKE OF EQUIP ACKER
3. VANE SIZE 3 x 6 x 2"
4. TORQUE ARM 12"
5. INSPECTOR R. PINCUTTI
6. BH # EBB-32
7. TEST # VS-3
8. DEPTH 48-50
9. FORCE TO PUSH VANE KALLY
10. DATE 19 JUNE 84

UNDISTURBED			REMOLDED			FRICTION		
TIME ELAPSED (SEC)	DEGREE OF ROTATION	DILLON FORCE GAGE (lbs.)	TIME ELAPSED (SEC)	DEGREE OF ROTATION	DILLON FORCE GAGE (lbs.)	TIME ELAPSED (SEC)	DEGREE OF ROTATION	DILLON FORCE GAGE (lbs.)
20	0			0	0	0	0	
40	2	12	20	2	12	20	2	
1	4	22	40	4	22	40	4	
20	6	32	1	6	31	1	6	
40	8	~~42~~ 37	20	8	35	20	8	
2	10	42	40	10	37	40	10	
20	12	46	2	12	33	2	12	
40	14	50	20	14	33	20	14	
3	16	53	40	16	33 1/2	40	16	
20	18	53	3	18	33 1/2	3	18	
40	20	56	20	20	32	20	20	
	22	56	40	22	31	40	22	
4 40	24		4	24	27 1/2	4	24	
5	26	56	20	26	28	20	26	
20	28	56	40	28	28	40	28	
40	30	56	5	30	26	5	30	ASSUM
6	32	56 1/2	20	32	25	20	32	FRICTI
20	34	56 1/2	40	34	25	40	34	= 1
40	36		6	36	25	6	36	
7	38	50	20	38	25	20	38	
20	40		40	40	25	40	40	
40	42		7	42	25	7	42	
8	44	53	20	44	25	20	44	
20	46	56	40	46	25	40	46	
40	48	56	8	48	25	8	48	
9	50	55	20	50	25	20	50	
20	52	55 1/2	40	52	25	40	52	
40	54	55	9	54	25	9	54	
10	56	55	20	56	25	20	56	
20	58	54	40	58	25	40	58	
40	60	54	10	60	25	10	60	
11	62	54	20	62	25	20	62	
20	64	53	40	64	25	40	64	
40	66	53	11	66	25	11	66	
12	68	52	20	68	25	20	68	
20	70	53	40	70	25	40	70	
40	72	52 1/2	12	72	25	12	72	
13	74	52	20	74	25	20	74	
20	76	52 1/2	40	76	25	40	76	
40	78	52	13	78	30	13	78	
14	80	51	20	80	34	20	80	
20	82	51 1/2	40	82	37	40	82	
40	84	51	14	84	39	14	84	
15	86	51	20	86	41	20	86	
20	88	51	40	88	42	40	88	
40	90	51	15	90	41 1/2	15	90	
			20	92	40			
			40	94	39			
T =	55.5 x 18	= 999 in lb	16	96	36			
			20	98	36			
S =	999 x .905	= 818 PSF	40	100	37			
			17	102	37			
			20	104	37			
			40	106	36			
			18	108	35			
34	CASING SLIPPING		20	110	34			
	3 VANE ENDS BENT		40	112	30			
	5 SEPPE		19	114	30			
	VANE ENDS BROKEN		20	116	28			
	NO PRECAUD.		40	118	25			
	TEST		T = 41 x 18 = 738 in lb					
			S =	= 668 PSF				

HADP FORM

APPENDIX D

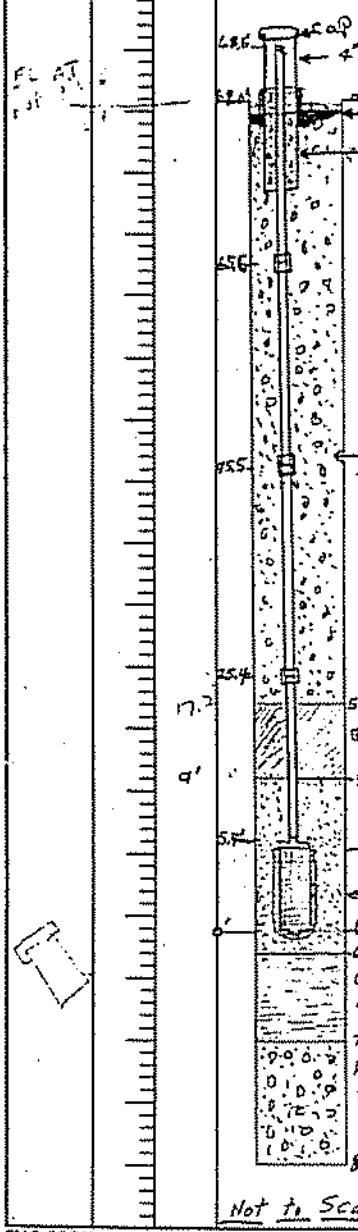
PIEZOMETER LOGS (EBL-1 through EBL-11)

Hole No. FBL-1

DRILLING LOG	DIVISION NAD	INSTALLATION PDO	SHEET OF SHEETS

1. PROJECT Edge Moor Piezometer Installation	10. SIZE AND TYPE OF BIT
2. LOCATION (Coordinates or Station)	11. DATUM FOR ELEVATION SHOWN (TBM or MSL)
3. DRILLING AGENCY	12. MANUFACTURER'S DESIGNATION OF DRILL
4. HOLE NO. (As shown on drawing title and file number) FBL-1	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 S. Krainik

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



Note Measurements are taken 0.6" above ground

Water level in Piezometer @ Completion of Installation

Date	hr	Depth
5/3/72	1700	19.8'
5/4/72	1730	25.7'
5/5/72	0700	26.4'
5/5/72	1730	26.7'
5/6/72	0700	26.8'
5/6/72	1730	26.8'
5/8/72	0700	26.8'
5/8/72	1730	26.8
5/9/72	1200	26.5
5/10/72	1200	26.7
5/11/72	1200	26.8
5/12/72	1200	26.
5/13/72	0700	26.
6/5/72	1030	27.
7/11/72	1030	26.
7/20/72	1510	26.
7/27/72	1515	26.
8/2/72	1400	26.
8/10/72	1510	26.
8/22/72		26.
1/22/74		27.
3/19/74	No reading made inst. on Order	

Water 4' from Top of dike

Depth	Sample No.
17.2	3.5
9'	3.5
	3.5
	3.5
	4.5'

ENG FORM 1836 1 APR 63 PREVIOUS EDITIONS MAY BE USED (EM 1110-1-1801)

PROJECT Elsewhere Disposal Area — HOLE NO. FBL

No. EBL-1

DRILLING LOG — DIVISION: NAD — INSTALLATION: PDO — SHEET 1 OF 2 SHEETS

1. PROJECT: Edgemoor Disposal Area Piezometer Installation	10. SIZE AND TYPE OF BIT: 3", 2" Split Spoon & 4x5½ bit
2. LOCATION (Coordinates or Station):	11. DATUM FOR ELEVATION SHOWN (TBM or MSL): Delaware River Datum
3. DRILLING AGENCY: MOBILE DIST C of E	12. MANUFACTURER'S DESIGNATION OF DRILL: Failing 314 Truck mtd.
4. HOLE NO. (As shown on drawing title and file number): EBL-1	13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN: DISTURBED 18; UNDISTURBED
5. NAME OF DRILLER: James Carpenter	14. TOTAL NUMBER CORE BOXES: —
6. DIRECTION OF HOLE: ☒ VERTICAL ☐ INCLINED ___ DEG. FROM VERT.	15. ELEVATION GROUND WATER:
	16. DATE HOLE: STARTED 1 MAY 72; COMPLETED 2 May 72
7. THICKNESS OF OVERBURDEN: 86.5	17. ELEVATION TOP OF HOLE:
8. DEPTH DRILLED INTO ROCK: —	18. TOTAL CORE RECOVERY FOR BORING: %
9. TOTAL DEPTH OF HOLE: 86.5	19. SIGNATURE OF INSPECTOR: S. KRAJNIK

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	SM	1' Brn silty gravelly SAND	Auger		START 0815
		ML	Med.grg., med.stiff. SILT w/tr. of clay & C-f sand & few pcs. of gravel. moist	2 4 6	3.0 S-1 3.5	used 3" spoon w/300# hammer 24" drops on first sample
	5			Auger		
		ML & CL	Dk gry SILT w/occ. layer of dk.gry CLAY to 2" thick v.soft org. odor wet	2 1 2	7.0 S-2 8.5	Water @ 7.0' Using 2" OD split spoon 140# ham. w/30" drop.
	10			Auger		
		MH	Dk.gry. clayey SILT w/small amt. carbonized vegetation sl.org. odor, v. soft wet	2 2 2	12.0 S-3 13.5	
	15		Same w/occ. pc. of fine rnd. gvl. to ½" v.soft. wet	1 1 2	15.0 S-4 16.5	
				Auger		
	20	ML	Dk.gry soft micaceous SILT w/some clay. sl.org.odor wet	2 3 3	20.0 S-5 21.5	
				Auger		
	25	CL	Dk.gry. silty CLAY. soft mic. w/pcs. of org. matter wet	2 2 2	25.0 S-6 26.5	
				Auger		Change occured in mtl. on auger @ 29.0'
	30	SP SM	Multi col. C-f subrnd. SAND w/tr of dk.gry silt & few pcs. of rnd gvl. to 1" compact sat.	10 12 8	30.0 S-7 31.5	
				Fish Tail		
	35	GP	Multi col. Sandy C-f GRAVEL subang to subrnd w/less than tr of silt. Gvl. to 1" in size sat.	6 18 19	35.0 S-8 36.5	
				Fish Tail		
	40		Same w/ Gvl. to 1¾" Loose sat	8 19 21	40.0 S-9 41.5	
				Fish Tail		
	45			16 16 27	45.0 No Recov. 46.5	Set 6" Casing to 4½
		GP GM	Sandy C-f GRAVEL in dk gry silt matrix wet	8 8 11	S-10 48.0	Xpoor recov. Shoe full
	50	GM				

ENG FORM 1836 1 APR 63 PREVIOUS EDITIONS MAY BE USED (EAR 1110-1-1901) — PROJECT: Edgemoor ... Piezometer ... — HOLE NO. EBL-1

Hole No. EBL – 1

DRILLING LOG — VISION — INSTALLATION — SHEET 2 OF 2 SHEETS

1. PROJECT: Edgemont Disp Area Piezometer Installation	10. SIZE AND TYPE OF BIT
2. LOCATION (Coordinates or Station)	11. DATUM FOR ELEVATION SHOWN (FEET or MSL)
3. DRILLING AGENCY	12. MANUFACTURER'S DESIGNATION OF DRILL
4. HOLE NO. (As shown on drawing title and file number): EBL – 1	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 (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	GM	Silty, sandy GRAVEL w/occ. dk gry clay layers 1" thick Sat	9 / 12	S-11A / S-11B	52.0 SLS
		CL	DK gry Silty CLAY wet	Fish Tail		soft.
	55		COBBLE	Cored 4 3/4" Bit	No Sample 55.0	Install Casing to 55' Fish Tail hole going Cored rapidly 7 ft. VSH Cobble was jammed in end of bit.
		ML	Alternating layers of dk gry & med gry clayey SILT to ½" thick w/pkts. of fine Sand & 3" layer of m-f Sand @ 57' wet	13 / 17	S-12	58.5 soft
	60		DK gry. med. stiff silty CLAY layers to ½" thick w/many lenses and partings of lt. gry v.f. mic. Sand. moist	Fan Tail 5 5 / 4	S-13	60.0 61.5
		CL	Same w/layers up to 1" thick	Fish Tail		soft
	65			4 4 5	S-14	66.0 66.5
				Fish Tail		soft.
	70		Layer of dk gry clayey SILT to ½" and (1) c-f; (1) m-f ¼" SAND beds among silt partings of lt gry. v.f. mic. Sand.	4 4 4	S-15	70.0 Last sample Recovered Same w/3 spoon. 71.5 STOP 1720 START 0900 5/4 GWL @ 14.8'
		ML		Fish Tail		soft
	75		DK. gry clayey SILT layers ½" to 2" thick w/many lt. gry silt & fine & m-f sand partings. moist	4 4 5	S-16	75.0 76.5
				Fish Tail		soft.
	80	GP GM	Multi col. sandy GRAVEL subang. to rnd. To 1" size w/tr of silt. loose wet	18 / 25 / 23	S-17	80.0 82.5
				Fish Tail		Bouncy Chatter
	85		Same as S-17 to 86.0'. Becomes brn m-f Sand w/few c-grains wet	18 / 45 / 25	S-18	85.0 SLS Completed @ 1000 5/4
			Bottom of Hole @ 86.5			
	90					
	95					
	100					

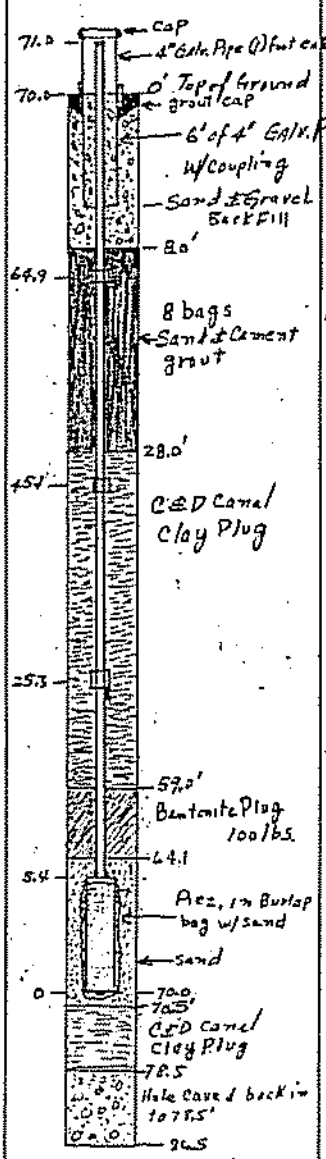
ENG FORM 1836 — PREVIOUS EDITIONS MAY BE USED (EM 3110-1-1801) — PROJECT: Ed. Mon Piezometer Installation — HOLE NO. EBL-

Hole No. EBL-2

DRILLING LOG	DIVISION NAD	INSTALLATION PPO	SHEET OF SHEETS

1. PROJECT Edge Moor Piezometer Installation	10. SIZE AND TYPE OF BIT
2. LOCATION (Coordinates or Station)	11. DATUM FOR ELEVATION SHOWN (TBM or MSL)
3. DRILLING AGENCY	12. MANUFACTURER'S DESIGNATION OF DRILL
4. HOLE NO. (As shown on drawing title and file number) EBL-2	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 S. Krajnik

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



Note Measurements are taken (1) foot above ground

water level in Piezometer

Date	hr.	Depth
5/10/72	1730	22.0
5/11/72	0700	23.0
5/12/72	0700	22
5/12/72	1730	22
5/13/72	0700	
6/5/72	1020	23.2
7/11/72	1040	23.4
7/20/72	1520	23.2
7/27/72	1525	23.0
8/2/72	1500	23.3
8/10/72	1510	23.2
8/22/72		23.1
1/22/74		24.0
3/19/74	10:40	24'=4"

water 4' From Top of 4 PIPE

3.5'	
3.5'	
3.5'	
3.5'	
4.5'	

ENG FORM 1836 1 APR 63 PREVIOUS EDITIONS MAY BE USED (EM 1110-1-1901)

PROJECT Edge Moor Piezometer Installation — HOLE NO. EBL-2

Hole No. EBL-2

DRILLING LOG	DIVISION NAD	INSTALLATION PDQ	SHEET 1 OF 2 SHEETS
1. PROJECT Edge Moor Disposal Area Piezometer Installation		10. SIZE AND TYPE OF BIT 2" Auger; 6" Fish Tail bit 2" OD	
2. LOCATION (Coordinates or Station)		11. DATUM FOR ELEVATION SHOWN (TBM or MSL) Delaware River Datum	
3. DRILLING AGENCY MOBILE DIST C of E		12. MANUFACTURER'S DESIGNATION OF DRILL Failing 314 Truck Mtd.	
4. HOLE NO. (As shown on drawing title and file number) EBL-2		13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN: DISTURBED 18; UNDISTURBED —	
5. NAME OF DRILLER James Carpenter		14. TOTAL NUMBER CORE BOXES	
6. DIRECTION OF HOLE ☒ VERTICAL ☐ INCLINED ____ DEG. FROM VERT.		15. ELEVATION GROUND WATER	
		16. DATE HOLE: STARTED 4 May 72; COMPLETED 5 May 72	
7. THICKNESS OF OVERBURDEN 86.5		17. ELEVATION TOP OF HOLE	
8. DEPTH DRILLED INTO ROCK —		18. TOTAL CORE RECOVERY FOR BORING	
9. TOTAL DEPTH OF HOLE 86.5		19. SIGNATURE OF INSPECTOR S. Kratnik	

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
	0	GM	Brn. silty sandy GRAVEL to 2" in size wet	4 15 6	S-1A S-1B	START 1030 using 2" split spoon 140 lb hamm. w/30" drops
			DK gry SILT w/pc. of soft organic matter, sl. plastic, organic odor wet	Auger		
	5	ML	DK gry SILT w/tr of clay, sl. plastic Fe stnd. v. soft, org. odor wet	2 2 2	S-2	5.0 6.5
				Auger		
	10		DK gry SILT w/some clay bet. 10.5' & 10.5' plastic. v. soft. v. wet	2 2 2	S-3	10.0 11.5
				Auger		
	15	MH	Same w/carbonized org. matter v. wet	2 2 2	S-4	15.0 16.5
				Auger		
	20		Same w/some clay. org odor. wet.	1 2 3	S-5	20.0 21.5
				Auger		
	25		DK gry clayey SILT. soft plastic micaceous. org odor. wet.	3 3 3	S-6	25.0 26.5
				Auger		
	30		DK gry SILT w/tr. to some clay soft, sl. plastic. small amt of carbonized matter. org odor wet	3 3 7	S-7	30.0 31.5
				Auger		
	35	ML	DK gry SILT w/tr. to some clay & occ. lt gry silt partings wet.	3 3 3	S-8	35.0 36.5 Silt partings start in this sample.
				Auger		
	40		DK gry SILT w/tr. of clay w/occ. lt gry silt partings. med. stiff sl. plastic, micaceous	6 6 6	S-9	40.0 41.5
				Auger		
	45		Same	5 5 5	S-10	45.0 46.5
	50					

ENG FORM 1836 1 APR 63 PREVIOUS EDITIONS MAY BE USED (EM 1110-1-1801)

PROJECT Edge Moor Disposal Area Piezometer | HOLE NO. EBL-

Hole No. EBL-2

DRILLING LOG

1. PROJECT: Edge Mer Disposal Area Piezometer Installation	10. SIZE AND TYPE OF BIT
2. LOCATION (Coordinates or Station)	11. DATUM FOR ELEVATION SHOWN (TBM or MSL)
3. DRILLING AGENCY	12. MANUFACTURER'S DESIGNATION OF DRILL
4. HOLE NO. (As shown on drawing title and file number): EBL-2	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 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	SC & SP-SC / SP & SM	0.3' dk.gry. clayey m-f SAND sat. / 0.4' dk.gry c-f SAND tr. of clay sat. / 0.3' dk gry clayey m-f SAND v. wet	3 3 3	S-11A / S-11B	50.0 / 51.0 / 51.5
			0.25' Brn C-f SAND w/few pcs of rnd gravel to 1" wet / 0.25' dk.gry m-f silty SAND wet	Auger		
	55	ML	Dk.gry, clayey, plastic SILT, med stiff w/1/4" layer of m-f sand @ 56.2 wet / Embedded gvl. to 1 1/2" in SILT on auger	5 5 8 / Auger	S-12	55.0 / 56.5
	60	ML & SM / SP & SP / ML	Alternating layers of dk.gry SILT 1/16" to 1" thick & v.f. silty SAND partings to 1/32" & 1 1/2" layer of compact sandy GRAVEL rnd to 1 1/2" @ 60.3' / 1" layer of m-f Sand @ 60.5' wet	4 4 5 / Auger	S-13A / S-13B	60.0 / 60.5 / 61.5
	65	SM	0.5' dk.gry clayey SILT w/occ rnd gvl. to 2" wet	6 6 10	S-14A / S-14B	65.0 / 65.5 / 66.5
		ML	0.5 m-f silty SAND w/occ rnd gvl to 1" / 0.3' alt. layers dk.gry SILT to 1/8" w partings. / Embedded gvl. to 2" on auger	Auger		
	70	ML & SP	Alt. layers of dk.gry clayey SILT 1/2" to 4" thick w silt partings and several layers of c-f & m-f SAND to 1 1/2" thick wet	6 6 6 / Auger	S-15	70.0 / 70.5 / Stop 1730 5-5-72 / START 0710 5-5-72 / G.W. @ 6.1'
	75	OL	0.2' layer dk.gry clayey m-f SAND sat. / soft dk.gry. org. SILT wet	5 5 5 / Fish Tail	S-16	75.0' / 76.5' / Poor Recov. / Install (6") casing to 78'
	80	SC & SP / GM	0.5 dk.gry clayey SAND sat. / 0.5 Brn C-f SAND subang to subrnd. w/tr gravel to 1" sat. / multi col. C-f silty GRAVEL subang to rnd sat.	6 17 25 / Fish Tail / 30 100 65	S-17 / S-18	80.0' / 81.5' / Chatter-Ebounce / 85.0 / 85 / Completed 1520 5-5-72
			Bottom of Hole @ 86.5'			
	90					
	95					
	100					

ENG FORM 1836 1 APR 63 PREVIOUS EDITIONS MAY BE USED (EM 1110-1-1801)

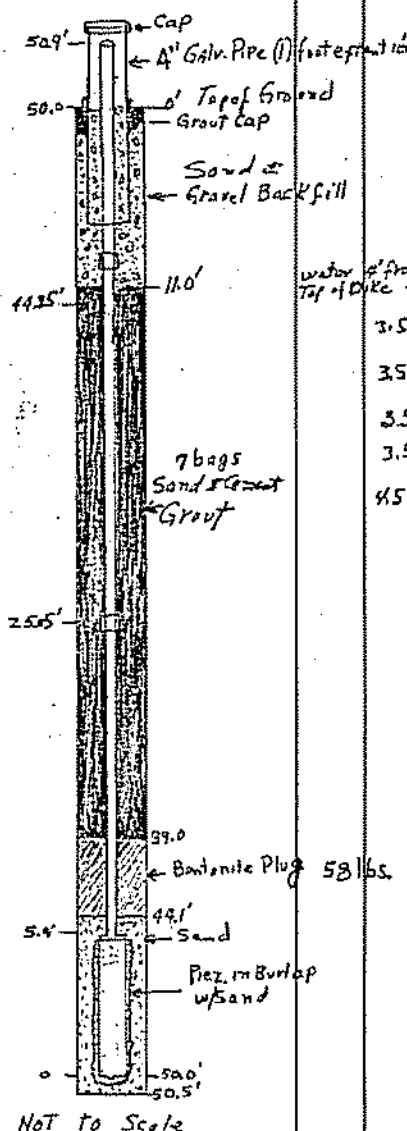
PROJECT: Elm Mer Disp Area Piezometer Installation | HOLE NO. EBL-2

Hole No. EBL-3

DRILLING LOG — VERSION: NAD

1. PROJECT: Edge Moor Disp Area Piezometer Installation	10. SIZE AND TYPE OF BIT: 6" Fish Tail Bit
2. LOCATION (Coordinates or Station)	11. DATUM FOR ELEVATION SHOWN (TBM or MSL): Delaware River Datum
3. DRILLING AGENCY	12. MANUFACTURER'S DESIGNATION OF DRILL: Failing 314 Truck Mtd
4. HOLE NO. (As shown on drawing title and file number)	13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN: DISTURBED None / UNDISTURBED None
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	16A. DATE HOLE: STARTED 10 May 72 / COMPLETED 11 May 72
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 (Descriptions) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g



Note Measurements are Taken 0.5' above gr

Water level in Piezomet

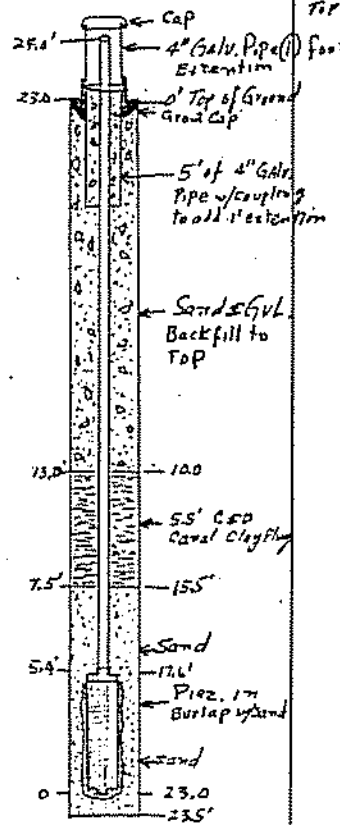
Date	hr.	Depth
5/10/72	1730	22.1
5/11/72	0700	27.1
5/12/72	0730	26.7
5/12/72	1730	26.1
5/13/72	0730	25.6
6/5/72	1020	25.9
7/11/72	1045	27.
3.5' 7/20/72	1520	27.8
3.5' 7/27/72	1530	25.1
3.5' 8/2/72	1510	27.3
3.5' 9/10/72	1515	25.9
4.5' 8/22/72		26.
1/22/74		25.
3/19/74	10:47	25.7
12/26/74	1130	25.9
5/28/76		25.

ENG FORM 1836 1 APR 63 — PREVIOUS EDITIONS MAY BE USED (EM 1110-1-1803) — PROJECT: Edge Moor Disp Area Piezometer — HOLE NO. EBL-3

Hole No. EBL-4

DRILLING LOG	DIVISION NAD	INSTALLATION PDO	SHEET 1 OF 1 SHEETS
1. PROJECT Edgemoor Disposal Area Piezometer Installation		10. SIZE AND TYPE OF BIT 6" Fish Tail Bit	
2. LOCATION (Coordinates or Station)		11. DATUM FOR ELEVATION SHOWN (TBM or MSL) Delaware River Datum	
3. DRILLING AGENCY MOBILE Ala. DIST C of E		12. MANUFACTURER'S DESIGNATION OF DRILL Failing 314 Truck mtd.	
4. HOLE NO. (As shown on drawing title and file number) EBL-4		13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN DISTURBED NONE; UNDISTURBED NONE	
5. NAME OF DRILLER James Carpenter		14. TOTAL NUMBER CORE BOXES —	
6. DIRECTION OF HOLE ☒ VERTICAL ☐ INCLINED ___ DEG. FROM VERT.		15. ELEVATION GROUND WATER	
		16. DATE HOLE STARTED 10 May 72; COMPLETED 11 May 72	
7. THICKNESS OF OVERBURDEN 23.5		17. ELEVATION TOP OF HOLE	
8. DEPTH DRILLED INTO ROCK —		18. TOTAL CORE RECOVERY FOR BORING — %	
9. TOTAL DEPTH OF HOLE 23.5		19. SIGNATURE OF INSPECTOR S Krajnik	

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
						Note Measurements are taken from (1) Foot above ground
						Water level in Piezometer
						Date / hr. / Depth
						5/12/72 0700 1.9'
						5/12/72 1730 1.9'
						5/13/72 0700 2.0
						6/5/72 1020 1.
				water 4' from Top of Dike		7/11/72 1050 1.
					3.5'	7/20/72 1525 1.7
					3.5'	7/27/72 1530 1.7
					3.5'	8/2/72 1530 1.7
					3.5'	8/10/72 1520 1.9
					4.5'	8/22/72 1.9
						1/22/74 4.1
						3/19/74 1052 4'-3"
						12/24/74 1110 No Rdg. Water ponded in [illegible] filled casing & pz.
						5/27/76 — 3.5'
						March 9/78 — Casing was laying in an ice puddle.



Not to Scale

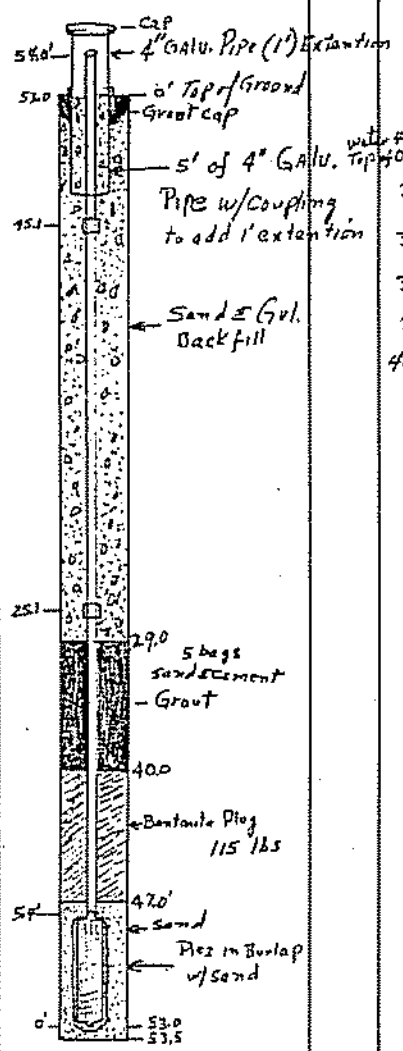
ENG FORM 1836 1 APR 63 PREVIOUS EDITIONS MAY BE USED (EM 1110-1-1802) PROJECT Edgemoor Disposal Area Piezometer HOLE NO. EBL-4

Hole No. EBL-5

DRILLING LOG	DIVISION NAD	INSTALLATION PDO	SHEET 1 OF 1 SHEETS

1. PROJECT Edge Moor Disposal Area Piezometer Installation	10. SIZE AND TYPE OF BIT 5 7/8 Rock bit
2. LOCATION (Coordinates or Station)	11. DATUM FOR ELEVATION SHOWN (TBM or MSL) Delaware River Datum
3. DRILLING AGENCY MOBILE Ala. DIST. C of E	12. MANUFACTURER'S DESIGNATION OF DRILL Failing 314 Truck mtd.
4. HOLE NO. (As shown on drawing title and file number) ELB-5	13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN — DISTURBED NONE — UNDISTURBED NONE
5. NAME OF DRILLER James Carpenter	14. TOTAL NUMBER CORE BOXES
6. DIRECTION OF HOLE ☒ VERTICAL ☐ INCLINED ___ DEG. FROM VERT.	15. ELEVATION GROUND WATER
	16. DATE HOLE — STARTED 11 May 72 — COMPLETED 13 May 72
7. THICKNESS OF OVERBURDEN 53.5	17. ELEVATION TOP OF HOLE
8. DEPTH DRILLED INTO ROCK —	18. TOTAL CORE RECOVERY FOR BORING
9. TOTAL DEPTH OF HOLE 53.5	19. SIGNATURE OF INSPECTOR S. Krajnik

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



Not to Scale

Note measurements are taken from (1) foot above ground.

Water level in Piezom

Date	hr.	Depth
5/12/72	1730	5.9'
5/13/72	0700	6.0
6/5/72	1025	6.0'
7/11/72	1105	6.0
7/20/72	1530	6.2
7/27/72	1535	6.0
8/2/72	1535	6.0
8/10/72	1530	6.1
8/22/72		6.1
1/22/74		5.8
5/19/74	1105	*6.7

* Instrument not extr. right.

12/26/74

5/27/76 → 6.5

ENG FORM 1836 1 APR 63 PREVIOUS EDITIONS MAY BE USED (EM 1110-1-1801)

PROJECT Edge Moor Disp. Area Piezometer — HOLE NO. EBL-

Hole No. EBL C-7

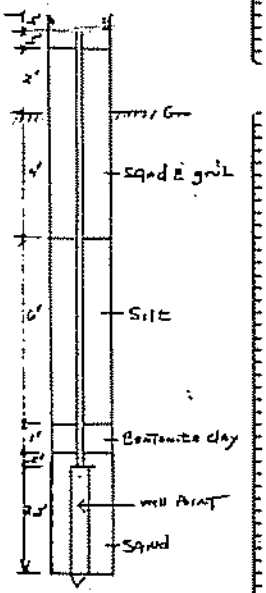
DRILLING LOG	DIVISION NAD	INSTALLATION PDO	SHEET OF SHEETS

1. PROJECT: Edgemoor Disposal (Piezometer Install)	10. SIZE AND TYPE OF BIT
2. LOCATION (Coordinates or Station): STA. 5+00	11. DATUM FOR ELEVATION SHOWN (TBM or MSL): MSL
3. DRILLING AGENCY: Sprague & Henwood	12. MANUFACTURER'S DESIGNATION OF DRILL: Skid Rig
4. HOLE NO. (As shown on drawing title and file number): C-7	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 17 Dec 74 / COMPLETED 18 Dec 74
7. THICKNESS OF OVERBURDEN	17. ELEVATION TOP OF HOLE: 35.5' I P ✓
8. DEPTH DRILLED INTO ROCK	18. TOTAL CORE RECOVERY FOR BORING %
9. TOTAL DEPTH OF HOLE: 15.0'	19. SIGNATURE OF INSPECTOR: Jack A. Scott

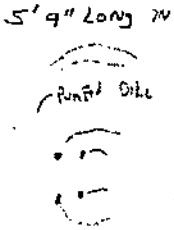
ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY Blow Count	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
	0		gruly Sand.	15		Drove 6" casing w/50# hamme & 18" drop
	2			35		
				47		
	4			46		Diagram
			gry Org. Silt	28		
	6			30		
				27		
	8			23		
				24		
	10			21		
				15		
	12			35		
				34		
	14			31		
			Bottom of hole @ 15'	31		
	16					

DATE	TIME	WATER LEVEL
17 Dec	1610	0.25 Ft Above G.L
18 Dec	0800	0.25 Ft " "
19 Dec	0800	0.5 Ft " "
19 Dec	1100	Inspector Filled Pipe to Top.
19 Dec	1200	0.5 Ft Above G.L
19 Dec	1300	0.5 Ft " "
19 Dec	1400	0.6 Ft " "
19 Dec	1500	0.66 Ft " "
20 Dec	0800	0.8 Ft " "
20 Dec	0801	Inspector Filled Pipe to Top
20 Dec	0900	1.75 Ft Above G.L
20 Dec	1000	1.5 Ft " "
20 Dec	1100	1.5 Ft " "
20 Dec	1245	1.5 Ft " "
20 Dec	1400	1.67 Ft " "
20 Dec	1500	1.67 Ft " "
20 Dec	1600	1.67 Ft " "

Capped 20 Dec 74



Left 6" casing 5' 9" Long in Place



Diamond Rip

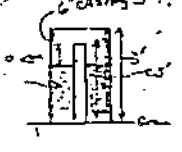
ENG FORM 1836 MAR 71 PREVIOUS EDITIONS ARE OBSOLETE. (TRANSLUCENT) | PROJECT | HOLE NO. EBL C-7

H - EDE-7

DRILLING LOG — DIVISION NAD — INSTALLATION PDO — SHEET — OF SHEET

1. PROJECT: Edgemoor Disposal Piezometer
2. LOCATION (Coordinates or Station): STA 5+00
3. DRILLING AGENCY: Sprague & Henwood
4. HOLE NO. (As shown on drawing title and file number): C-7
5. NAME OF DRILLER:
6. DIRECTION OF HOLE: ☒ VERTICAL ☐ INCLINED _____ DEG. FROM VERT.
7. THICKNESS OF OVERBURDEN:
8. DEPTH DRILLED INTO ROCK: ——
9. TOTAL DEPTH OF HOLE: 15.0'
10. SIZE AND TYPE OF BIT:
11. DATUM FOR ELEVATION SHOWN (GS or MSL): MSL
12. MANUFACTURER'S DESIGNATION OF DRILL:
13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN: DISTURBED: —— UNDISTURBED: ——
14. TOTAL NUMBER CORE BOXES:
15. ELEVATION GROUND WATER:
16. DATE HOLE: STARTED 17 Dec 74 COMPLETED 18 Dec 74
17. ELEVATION TOP OF HOLE:
18. TOTAL CORE RECOVERY FOR BORING:
19. SIGNATURE OF INSPECTOR: Jack A. Seato
CASING

ELEVATION	DEPTH	LEGEND	CLASSIFICATION OF MATERIALS (Description)	BLOW COUNT	BOX OR SAMPLE NO.	REMARKS
	2		Grvlly SAnd	15		Drove 6" CASing w/ 58 ≠ HAMMER & 18" drop
				35		
				47		
	4			46		
			Gry Org. Silt	28		
	6			30		
				27		
	8			23		
				24		
	10			21		
				15		
	12			35		
				34		
	14			31		
			Bottom of hole @ 15'	31		
	16					



DATE	TIME	WATER LEVEL
17 Dec	1610	3" Above G.
18 Dec.	0500	3" Above G.L
19 Dec	0800	0.5" " "
19 Dec	1100	Drilled to Tot
19 Dec	1230	0.5' Above G
19 Dec	1330	0.5' "
19 Dec	1400	0.5' Above
19 Dec	1500	0.5' "
20 Dec	0800	0.5' " "
20 Dec	0900	Filled to Tot
20 Dec	0900	1.5' Above
20 Dec	1000	1.5' Above
20 Dec	1100	1.5' "
20 Dec	1225	1.5' "
20 Dec	1400	1.67' "
20 Dec	1500	1.67' "
26 Dec	1600	1.67' "

CAPPED 20 Dec 74

ENG FORM 1836 MAR 71 — PREVIOUS EDITIONS ARE OBSOLETE. (TRANSLUCENT)

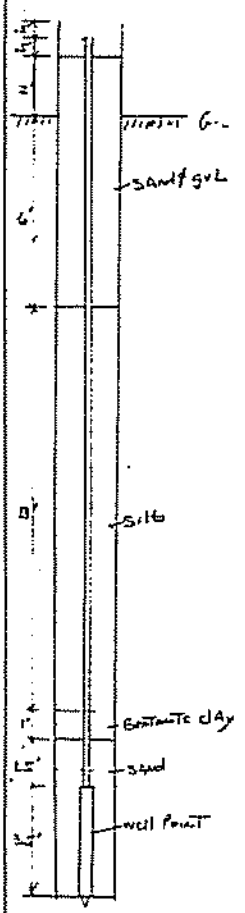
PROJECT: Edgemoor Disposal (Piezometer) — HOLE NO. EDE-7

Hole No. EBL-8

DRILLING LOG	DIVISION NAD	INSTALLATION PDO	SHEET OF SHEETS

1. PROJECT Edgemoor Disposal (Piezometer installation)	10. SIZE AND TYPE OF BIT
2. LOCATION (Coordinates or Station) STA. 5+00, 6.75 ft North of C-7	11. DATUM FOR ELEVATION SHOWN (TBM or MSL)
3. DRILLING AGENCY Sprague & Henwood	12. MANUFACTURER'S DESIGNATION OF DRILL
4. HOLE NO. (As shown on drawing title and file number) C-8	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 18 Dec — COMPLETED 19 Dec 74
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 25.0 ft	19. SIGNATURE OF INSPECTOR Jack A. Scott

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY Blow Cont	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
	0		gruly Sand	9		Drove 6" casing w/ 580 hammer & 18" drop
				24		
	2			25		
				31		
	4			26		Diagram
				33		
	6		gry. Org. Silt	24		
				22		
	8			25		
				26		
	10			29		
				32		
	12			31		
				29		
	14			28		
				36		
	16			34		
				30		
	18			32		
				34		
	20			35		
				35		
	22			34		
				29		
	24		Bottom of hole @ 25.0 ft	22		
	26					



Date	Time	Water Level
18 Dec	1630	1.5 ft Above G.L
19 Dec	0800	Flowing 2.5 ft Above G.L
19	1100	Top
19	1200	Top
19	1300	Top
19	1400	Top
19	1500	Top
20	0800	Top
20	0900	Top
20	1000	Top & slightly flowing
20	1100	" "
20	1245	" "
20	1400	" "
20	1500	" "
20	1600	" "
20	1630	* 2.6 ft Above G.L

* Coupling on Extension Pipe Caked

Left 6" casing 5' long in place

Capped 20 Dec 74

ENG FORM 1836 MAR 71 PREVIOUS EDITIONS ARE OBSOLETE. (TRANSLUCENT)

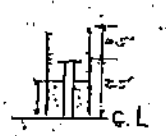
PROJECT — HOLE NO. EBL-8

Hole No. EBL-8

DRILLING LOG	DIVISION NAD	INSTALLATION PDO	SHEET OF SHEETS

1. PROJECT: Edgemoor Disposal (Piezometer)
2. LOCATION (Coordinates or Station): STA 5+00, Ets Dwn from C-7
3. DRILLING AGENCY: Sprague & Henwood
4. HOLE NO. (As shown on drawing title and file number): C-8
5. NAME OF DRILLER:
6. DIRECTION OF HOLE: ☑ VERTICAL ☐ INCLINED ___ DEG. FROM VERT.
7. THICKNESS OF OVERBURDEN:
8. DEPTH DRILLED INTO ROCK:
9. TOTAL DEPTH OF HOLE: 25'
10. SIZE AND TYPE OF BIT:
11. DATUM FOR ELEVATION SHOWN (TBM or MSL):
12. MANUFACTURER'S DESIGNATION OF DRILL:
13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN: DISTURBED ___ UNDISTURBED ___
14. TOTAL NUMBER CORE BOXES:
15. ELEVATION GROUND WATER:
16. DATE HOLE: STARTED 18 Dec 74 COMPLETED 19 Dec 74
17. ELEVATION TOP OF HOLE:
18. TOTAL CORE RECOVERY FOR BORING:
19. SIGNATURE OF INSPECTOR: Jack G. Scott

ELEVATION	DEPTH	LEGEND	CLASSIFICATION OF MATERIALS (Description)	% CORE RECOVERY	BOX OR SAMPLE NO. DISPOSITION	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant)
	0					
5'3½"			grvly Sand	9		Drove 6" casing w/582# hammer & 18" drop
5'4"	2			24		
				25		
10'7½"	4			31		Sand & gvl
				26		
				33		
	6			24		6" casing 5'3" left whole
			Gry Organic Silt	22		
	8			25		
				26		
	10			29		Silt
				32		
	12			31		
				29		
	14			28		
				36		
	16			34		
				30		
	18			32		
				34		Bentonite Clay
	20			35		Sand
				35		
	22			34		
				29		
	24		Bottom of hole @ 25'	22		
	26					
			CAPPED 20 Dec 74			



DATE	TIME	WATER LEVEL
18 Dec	1630	1.5' Above GL
19 Dec.	0800	Flowing 2.5' Above G.L
19 Dec	1100	Filled to Top
19 Dec	1200	Top
19 Dec	1300	Top
"	1400	"
19 Dec	1500	"
20 Dec	0800	Top
20 Dec	0900	Top
20 Dec	1000	Top [illegible]
20 Dec	1100	" "
20 Dec	1245	" "
20 Dec	1400	" "
20 Dec	1500	" "
20 Dec	1600	Flowing
20 Dec	1630	*2.6' Above G.L

* Cutting on Extension Pipe Leaked

ENG FORM 1836 MAR 71 PREVIOUS EDITIONS ARE OBSOLETE. (TRANSLUCENT) PROJECT HOLE NO. EBL-8

H. No. EBL-9

± DRILLING LOG	DIVISION NAD	INSTALLATION PDO	SHEET OF SHEETS

1. PROJECT: Edgemoor Disposal (Piezometer)	10. SIZE AND TYPE OF BIT
2. LOCATION (Coordinates or Station): STA. 8+75	11. DATUM FOR ELEVATION SHOWN (TBM or MSL)
3. DRILLING AGENCY: Sprague & Henwood	12. MANUFACTURER'S DESIGNATION OF DRILL
4. HOLE NO. (As shown on drawing title and file number): C-9	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: 19 Dec 74 — COMPLETED: 20 Dec 74
8. DEPTH DRILLED INTO ROCK	17. ELEVATION TOP OF HOLE
9. TOTAL DEPTH OF HOLE: 15'	18. TOTAL CORE RECOVERY FOR BORING %
	19. SIGNATURE OF INSPECTOR (Casing & Cement): [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
	0		gravly Sand	12		Drove 6" casing w/ 582# hammer & 19" Drop
	2			19		
				28		
				30		sand/gravel
	4			31		
	6		Gray Organic Silts	25		
				26		
	8			29		Silt
				24		
	10			23		Beatmine clay
				34		
	12			31		
				25		sand
	14			44		
			Bottom of hole @ 15'	46		
	16		Capped 20 Dec 74			

DATE	TIME	WATER LEVEL
20 Dec	0950	WL 0.8 Below GL
20 Dec	0955	filled to Top
20 Dec	1100	1.25' below GL
20 Dec	1205	1.2' below GL
20 Dec	1400	1.2' below GL
20 Dec	1500	1.2' below GL
20 Dec	1600	1.0' below GL

Note: Readings of water levels dated 20 Dec were taken while C-10 was being placed & drilled.

3.3
2.5
.8
3.75
3.5
1.25
1.00
2.67
1.97
3.3
1.0

ENG FORM 1836 MAR 71 PREVIOUS EDITIONS ARE OBSOLETE. (TRANSLUCENT) PROJECT HOLE NO. EBL-9

EBL H. No. C-9

DRILLING LOG	DIVISION NAD	INSTALLATION PDO	SHEET OF SHEET

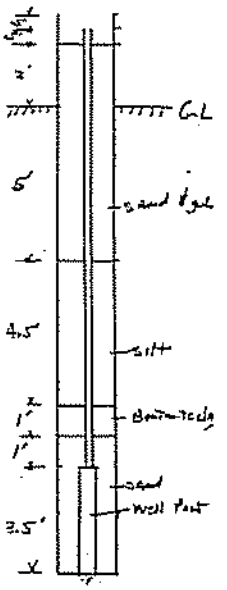
1. PROJECT: Edgemoor Disposal (Piezometer Installation)	10. SIZE AND TYPE OF BIT
2. LOCATION (Coordinates or Station): STA 8+75	11. DATUM FOR ELEVATION SHOWN (TBM or MSL)
3. DRILLING AGENCY: Sprague & Henwood	12. MANUFACTURER'S DESIGNATION OF DRILL
4. HOLE NO. (As shown on drawing title and file number): C-9	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 19 Dec 74 — COMPLETED 20 Dec 74
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: 15.0 ft	19. SIGNATURE OF INSPECTOR: Casing — Jack A. Scott

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	~~% CORE RECOVERY~~ Blow Count	BOX OR SAMPLE NO.	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) e
	0		grv'ly Sand	12		Drove 6" casing w/ 5B2F hammer & 18" drop
	2			19		
				28		
	4			30		
				31		
	6		gry Org. Silt	28		
				26		
	8			29		
				24		
	10			23		
				34		
	12			31		
				25		
	14			44		
			Bottom of hole @ 15'	46		
	16					

DATE	TIME	WATER LEVEL
20 Dec	0950	0.8 ft Below G.L
20	0955	Inspector Filled Pipe to Top
20	1100	1.25 ft below GL
20	1245	1.2 ft " "
20	1400	1.2 ft " "
20	1500	1.2 ft " "
20	1600	1.0 ft " "

Note: Readings of Water Levels Dated 20 Dec were taken while C-10 was under construction

Diagram



Capped 20 Dec 74

ENG FORM 1836 MAR 71 PREVIOUS EDITIONS ARE OBSOLETE. (TRANSLUCENT) PROJECT HOLE NO. EBL C-9

Hole No. EBL-10

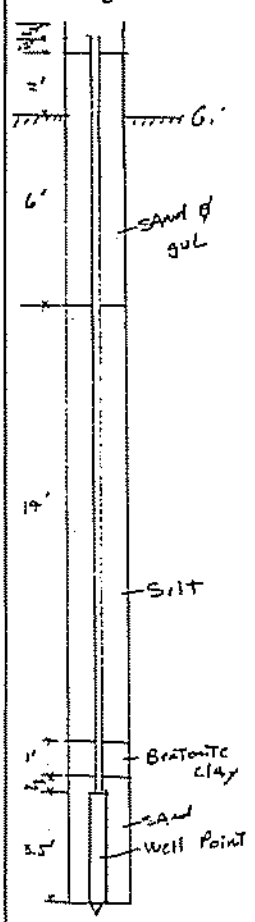
DRILLING LOG	DIVISION NAD	INSTALLATION PDO	SHEET OF SHEETS

1. PROJECT: Edgemoor Disposal (Piezometer Installation)	10. SIZE AND TYPE OF BIT
2. LOCATION (Coordinates or Station): STA 8+75, 7 ft North of C-9	11. DATUM FOR ELEVATION SHOWN (TBM or MSL): MSL
3. DRILLING AGENCY: Sprague & Henwood	12. MANUFACTURER'S DESIGNATION OF DRILL
4. HOLE NO. (As shown on drawing title and file number): C-10	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 20 Dec 74 COMPLETED 20 Dec 74
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: 25.0 ft	19. SIGNATURE OF INSPECTOR: Jack A. Scott

ELEVATION	DEPTH	LEGEND	CLASSIFICATION OF MATERIALS (Description)	~~% CORE RECOVERY~~ Blows Cont.	BOX OR SAMPLE NO.	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant)
	0		grvly Sand	5		Drove casing w/ 582# hammer & 18" drop
	2			13		
				26		
	4			34		
				27		Diagram
	6			25		
			gry Org. Silt	19		
	8			24		
				23		
	10			25		
				16/10" 6/2"		
	12			26		
				21		
	14			27		
				24		
	16		Washed Ahead of casing	27		
				24		
	18			25		
				29		
	20			29		
				30		
	22			31		
				21		
	24			27		
			Bottom of hole @ 25'	29		
	26					

DATE	TIME	WATER LEVEL
20 Dec	1500	Flowing
20	1600	Flowing
20	1630	*3.1 ft Above G.L.

* coupling on extension pipe leaks



Left 5.5' of 6" casing in PI

Capped 20 Dec. 74

ENG FORM 1836 MAR 71 PREVIOUS EDITIONS ARE OBSOLETE. (TRANSLUCENT) PROJECT HOLE NO. EBL-10

H No. EBL-10

DRILLING LOG	VISION NAD	INSTALLATION PDO	SHEET OF SHEETS

1. PROJECT Edgemoor Disposal (Piezometer)	10. SIZE AND TYPE OF BIT
2. LOCATION (Coordinates or Station) STA 8+75, 3' North from C-7	11. DATUM FOR ELEVATION SHOWN (TBM or MSL) MSL
3. DRILLING AGENCY Sprague & Henwood	12. MANUFACTURER'S DESIGNATION OF DRILL
4. HOLE NO. (As shown on drawing title and file number) C-10	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 20 Dec 74 — COMPLETED 20 Dec 74
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 25'	19. SIGNATURE OF INSPECTOR Casimirian Const. Jack A. Scott

ELEVATION	DEPTH	LEGEND	CLASSIFICATION OF MATERIALS (Description)	% CORE RECOVERY	BOX OR SAMPLE NO. Diagram	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant)
	0		gruly Sand	5		Drove casing w/582# hammer & 12" drop
	2			13		
				26		
				34		sand & gvl
	4			27		
5'6"				25		
5'4"	6		gry org Silt	19		
5'4"				24		
5'7"	8			23		
21'9"				25		
33"	10			16/6	16	
25'				6/6"		
	12			20		
				21		
	14		Washed Ahead of casing	27		
				24		
	16			27		silt
				24		
	18			25		lt
				29		
	20			29		
				30		Bentonite clay
	22			31		
				21		sand
	24			27		
			Bottom of hole @ 25'	29		
	26					

Date	Time	Water Level
20 Dec	1500	Flowing
20 Dec	1600	Flowing
20 Dec	1630	3.1 ft Above

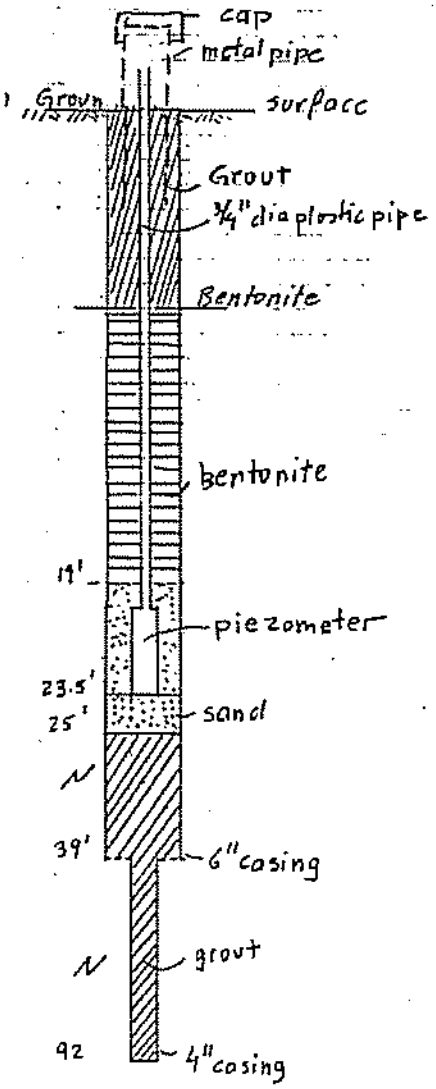
Completed & capped 20 Dec 74

* Coupling on extension pipe leaks

ENG FORM 1836 MAR 71 PREVIOUS EDITIONS ARE OBSOLETE. (TRANSLUCENT) PROJECT HOLE NO. EBL-10

Edgemoor Disposal Area

Piezometer EBL-11



Total length of piezometer 25.1'. 1.5' of plastic pipe above the surface of orig ground.

Falling head test.

0 min	1.5'	above ground
1 min	1.5'	below ground.
2 "	3.6	"
3 "	4.6	"
4 "	5.1	"
5 "	5.6	"
6 "	6.0	"
7 "	6.3	"
8 "	6.5	"
9 "	7.0	"
10 "	7.3	"
15 "	8.2	"
20 "	8.6'	"
25 "	8.7'	"
30 "	9.2'	" - 5 June 76

Piezometer installed on 5 June 76

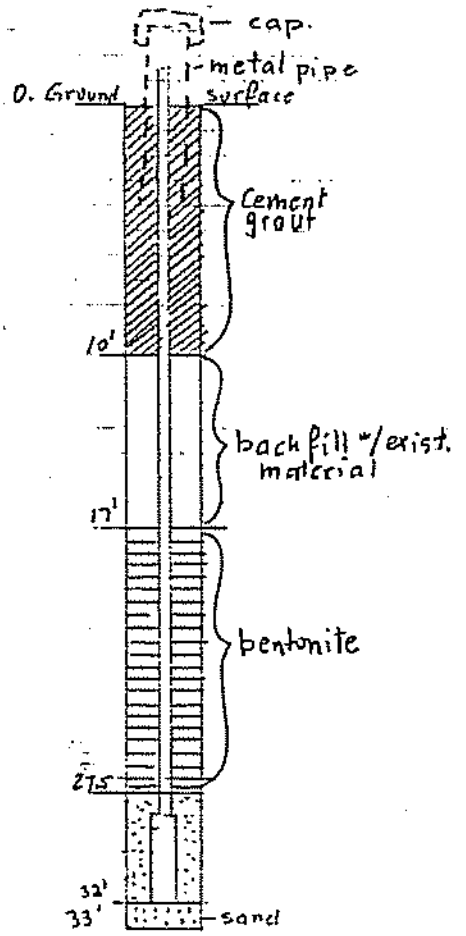
7 June 76 water @ 9.3' below surface

9 March 78 water @ 10.5' below "

EBL-11

Edgemoor Disposal Area
Piezometer EBL-12

Total length of piezometer.
33.5'
1.5' of plastic pipe above the original ground.



Falling head test

0 min	0.8'	above ground
1 "	3.7'	below "
2 "	4.1'	"
3 "	4.2	"
4 "	4.5'	"
5 "	4.6'	"
10 "	5.2	"
20 "	5.8'	"
30 "	6.3	"
60 "	7.3	"
120 "	8.0	" - 8 above

Piezometer installed on 8 June 76

NOTE: This piezometer was buried when dike was raised in Oct. '77

EBL-12
(in EBS-23)

APPENDIX E

APPROXIMATE DATUM CONVERSIONS

USACE DOCUMENT REVIEW: SUMMARY OF VARIOUS VERTICAL DATUMS USED AT WILMINGTON HARBOR

DSWA CHERRY ISAND LANDFILL EXPANSION WILMINGTON, DELAWARE

Datum	NAVD 88 (ft)
North American Vertical Datum-NAVD 88 (EL 0 FT NAVD 88)	0.00
National Geodetic Vertical Datum-NGVD 29, 1967 List (EL 0 FT NGVD 29)	- 0.89
Mean Low Water at Wilmington Harbor-MLW (EL 0 FT MLW)	- 2.55
City of Wilmington Datum-CWD (EL 0 FT CWD)	- 3.80
Delaware River Datum-DRD (EL 0 FT DRD)	- 3.89
Christina River Datum-CRD, 1967 List (EL 0 FT CRD)	- 4.31

Note: Difference between various datum and NAVD 88 based on available information for the Wilmington Harbor Area provided by the USACE.

Sample calculation: To convert an elevation of 10 feet CRD to NAVD 88, -4.31 feet is added to the CRD elevation, therefore 10 feet CRD is equal to 5.69 feet NAVD 88.

APPENDIX F

LABORATORY TESTING RESULTS

Edgemoor & Oldman's Summary Copy, keep

Testing Instructions

Hole No.	Sample No.	Depth	Sample Recovery	Triaxial "Q" "R"	Consolidation	Unit Wt & Moisture Content	Hydrometer Analysis	Atterberg Limits	Specific Gravity of Solids (d)
EBB-1	U/D-1	4'-6'	24"			x (c)	x	x	x
	U/D-2	13'-15'	24"		x (b)		x	x	x
	U/D-3	21'-23'	24"			x (c)	x	x	x
	U/D-4	27'-29'	24"			x (c)	x	x	x
EBB-2	U/D-1	10'-12'	24"			x (c)	x	x	x
	U/D-2	16'-18'	22"	x (a) 17			x	x	x
	U/D-3	22'-24'	24"		x (b)		x	x	x
	U/D-4	28'-30'	24"			x (c)	x	x	x
EBB-3	U/D-1	4'- 6'	24"			x (c)	x	x	x
	U/D-2	12'-14'	19½"		x (b)		x	x	x
	U/D-3	18'-20'	17"			x (c)	x	x	x
	U/D-4	26'-28'	24"			x (c)	x	x	x

Undisturbed samples, 4½" O. D. Stationary Piston Tubes.

(a) (One test of each--3 specimens each test) Specimen diameter 1.4". Confining pressures 0.5, 2.0 and 4.0 tsf.

(b) (One test) Apply loading schedule of 0.10, 0.25, 0.5, 1.0, 2.0, 4.0, and 8.0 tons per square foot.

(c) (One test) Perform in accordance with EM 1110-2-1906. Wet and dry unit weight, void ratio, porosity and degree of saturation to be determined in test.

(d) (One test) Determine specific gravity of solids in accordance with EM 1110-2-1906.

140

Hole No.	Sample No.	Depth	Sample Recovery	Triaxial "Q" "R"	Consolidation	Unit Wt & Moisture Content	Hydrometer Analysis	Atterberg Limits	Specific Gravity of Solid (d)
EBB-4	U/D-1	8'-10'	24"		x (b)		x	x	x
	U/D-2	16'-18'	24"			x (c)	x	x	x
	U/D-3	26'-28'	24"			x (c)	x	x	x
EBB-5	U/D-1	2'- 4'	24"	1 x (a) ✓27	x (b)		x	x	x
	U/D-2	10'-12'	24"			x (c)	x	x	x
	U/D-3	16'-18'	24"		x (b)		x	x	x
	U/D-4	22'-24'	24"	5 x (a) 8			x	x	x
	U/D-5	28'-30'	24"			x (c)	x	x	x
	U/D-6	34'-36'	24"		x (b)		x	x	x
EBB-6	U/D-1	4'- 6'	24"	2 x (a) ✓21			x	x	x
	U/D-2	12'-14'	24"			x (c)	x	x	x
	U/D-3	21'-23'	24"	7 x (a) 5			x	x	x
	U/D-4	29'-31'	9"		x (b) ✓		x	x	x
EBB-7	U/D-1	6'- 8'	24"			x (c)	x	x	x
	U/D-2	17'-19'	24"		x (b) ✓		x	x	x
	U/D-3	23'-25'	23"			x (c)	x	x	x
	U/D-4	27'-29'	24"		x (b) ✓		x	x	x
EBB-8	U/D-1	4'- 6'	23.5"			x (c)	x	x	x
	U/D-2	10'-12'	24"		x (b) ✓		x	x	x
	U/D-3	16'-18'	24"	4 x (a) 9			x	x	x
	U/D-4	22'-24'	23"			x (c)	x	x	x
	U/D-5	28'-30'	22.3"			x (c)	x	x	x
EBB-9	U/D-1	4'- 6'	9"			x (c)	x	x	x
	U/D-2	12'-14'	24"	6 x (a) 6	x (b) ✓		x	x	x
	U/D-3	18'-20'	24"		x ✓		x	x	x
		24'-26'	22"						

Hole No.	Sample No.	Depth	Sample Recovery	Triaxial "Q" "R"	Consolidation	Unit Wt & Moisture Content	Hydrometer Analysis	Atterberg Limits	Specific Gravity of Solids
EBB-10	U/D-1	8'-10'	23.5"			x (c)	x	x	x
EAB-1	U/D-1	6'- 8'	24"	x (a)	x (b)		x	x	x
	U/D-2	17'-19'	24"			x (c)	x	x	x
EAB-2	U/D-1	12'-14'	24"		x (b)		x	x	x
	U/D-2	18'-20'	24"		x (b)		x	x	x
EAB-3	U/D-1	8'-10'	23"		x (b)		x	x	x
	U/D-2	14'-16'	24"			x (c)	x	x	x
EAB-4	U/D-1	4'- 6'	23"	x (a)			x	x	x
	U/D-2	10'-12'	24"			x (c)	x	x	x
	U/D-3	14'-16'	24"			x (c)	x	x	x
EAB-5	U/D-1	4'- 6'	23"			x (c)	x	x	x
	U/D-2	13'-15'	24"	x (a)			x	x	x
	U/D-3	19'-21'	24"			x (c)	x	x	x
EAB-6	U/D-1	6'- 8'	24"			x (c)	x	x	x
	U/D-2	12'-14'	24"		x (b)		x	x	x
	U/D-3	18'-20'	23"			x (c)	x	x	x
	U/D-4	22'-24'	24"			x (c)	x	x	x

Old Mine's No. 1 Disposal Area

Edgemoor

BORING NO. EBB-1
SAMPLE NO. UD-1
DEPTH: 4.0 to 6.0 ft.

PROJECT Delaware River Study
DATE October 1967
COMP. By WS CHK'D By RJS

LABORATORY LOG	DESCRIPTION	W, CAN NO.	TEST SAMPLES
	Med gray & Dark gray w/yellow FeO staining organic SILT (OH) micaceous w/trace of fine sand.		W_n = 56.1%
	Dark gray highly organic CLAY (OH), micaceous w/thin irregular seams of decayed vegetation	Hydr-1 G_1 = 2.50 LL = 109 PL = 44 PI = 65	W_n = 77.0% γ_n = 54.5 pcf e = 1.985 n = 65.0% S = 97.0%
	decayed Vegetation		
	Dark gray organic CLAY (OH)	Hydr-2 G_2 = 2.57 LL 107 PL 41 PI 66	W_n = 82.0% γ_n = 50.7 pcf e = 2.077 n = 67.4% S = 98.7%
	Alternating laminae of dark gray highly organic CLAY (OH) and med gray slightly organic SILT (OH), micaceous, thickness ranging from hairline to 3/16"		W_n = 54.5% γ_n = 66.7 pcf e = 1.403 n = 58.5% S = 99.8%
			W_n = 60.5%
	Bottom of Sample		

SAMPLE DEPTH IN FEET

SAMPLE LENGTH IN INCHES

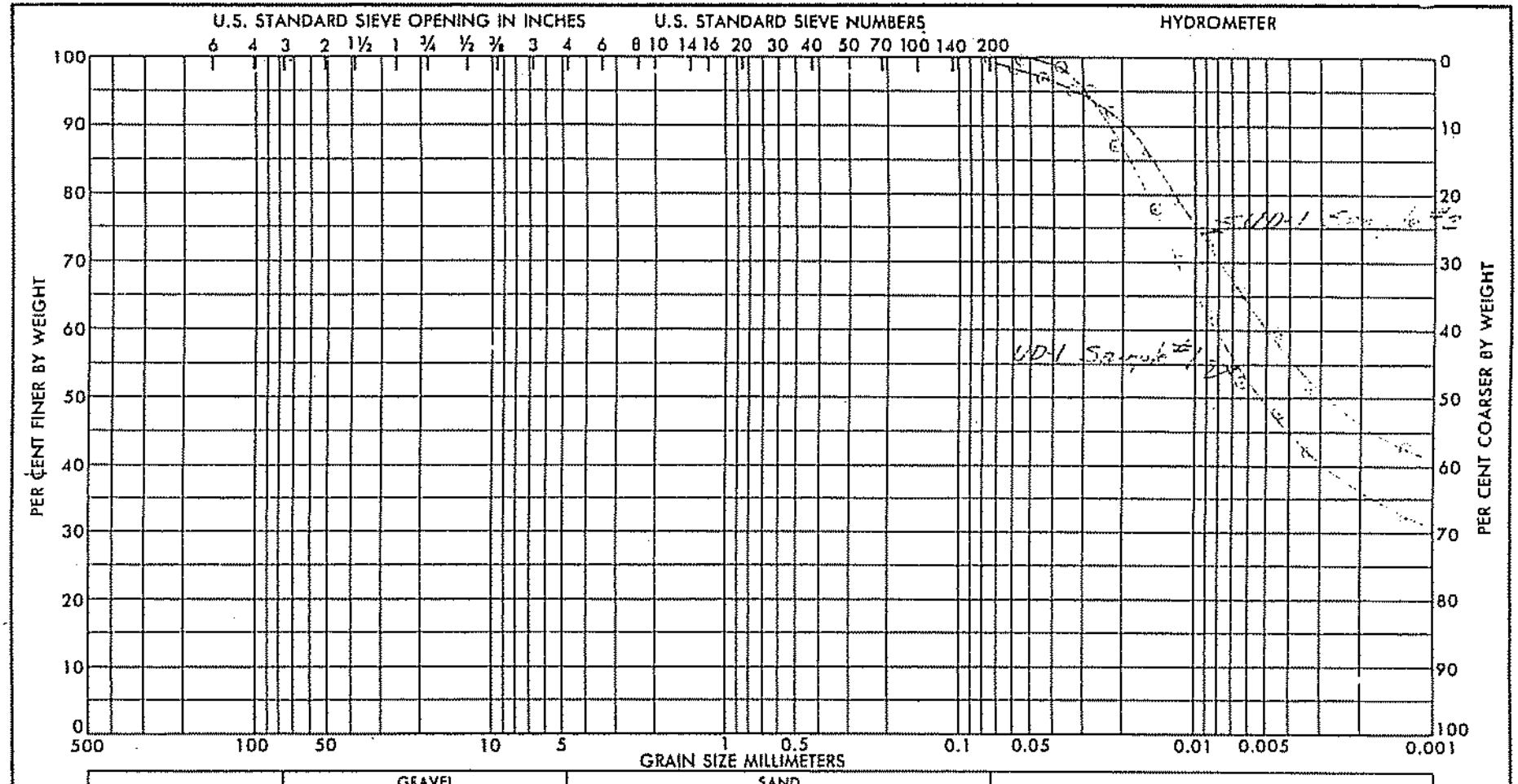
Length of Sample, L 23.32 in.
Weight of Tube and Wet Soil 15,700 g.
Weight of Tube 7,270 g.
Weight of Wet Soil, W 8,430 g.
Diameter of Tube, D 4.25 in.
Total Unit Weight, $\gamma_t = \frac{4.85\,W}{L\,D^2}$ 97.1 lbs/cu.ft.

UNDISTURBED SAMPLE LOG

LEGEND

W_n — Natural Water Content
MA — Mechanical Analysis
LL — Atterberg Limits
G — Specific Gravity
C — Consolidation
Q — Unconsolidated Undrained
γ_d — Dry Density
R — Consolidated Undrained
S — Consolidated Drained
UC — Unconfined Compression

NED FORM DEC 62 501



COBBLES	GRAVEL		SAND			SILT OR CLAY
	COARSE	FINE	COARSE	MEDIUM	FINE	

SAMPLE NO.	ELEV. OR DEPTH	CLASSIFICATION	NAT W%	LL	PL	PI
UD1 Sample #1	4.0'-6.0'	Organic CLAY (OH)		109	44	65
UD1 Sample #2	4.0'-6.0'	Organic CLAY (OH)		107	41	66

GRADATION CURVES

PROJECT Long Range Delaware River Dispersal Area

AREA

BORING NO. EB8-1

DATE Dec. 1963

ENG FORM 2087
1 MAY 63

REPLACES WES FORM NO. 1241, SEP 1962, WHICH IS OBSOLETE. (TRANSLUCENT)

U.S. GOVERNMENT PRINTING OFFICE : 1963 OF—709-128

Edgemoor

BORING NO. EBB-1
SAMPLE NO. UD-2
DEPTH: 13.0 to 15.0 ft.

PROJECT Delaware River Study
DATE October 1967
COMP. By WS CHK'D By RJS

LABORATORY LOG	DESCRIPTION	W, CAN NO.	TEST SAMPLES
	Dark gray organic CLAY (OH), micaceous w/decayed vegetation		
		Hydr-1 G = 2.56	
		Nat O.D. LL 121 73 PL 42 41 PI 79 32	C-1 Wn = 109.4%
	Med. colored brownish-gray organic CLAY (OH) micaceous w/decayed vegetation		
	Bottom of Sample		

SAMPLE DEPTH IN FEET

SAMPLE LENGTH IN INCHES

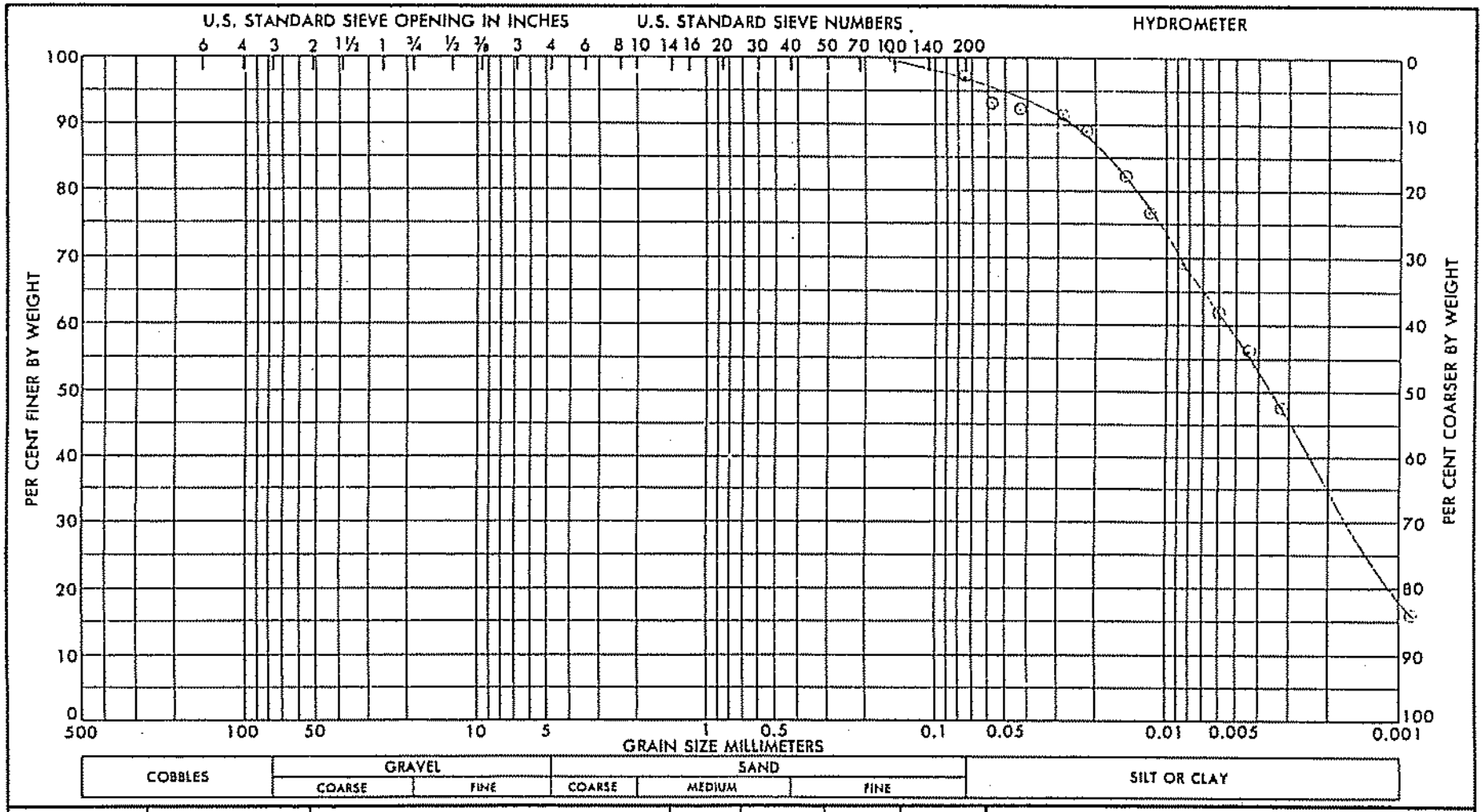
Length of Sample, L 23.22 in.
Weight of Tube and Wet Soil 14,350 g.
Weight of Tube 6,890 g.
Weight of Wet Soil, W 7,460 g.
Diameter of Tube, D 4.25 in.
Total Unit Weight, $\gamma_t = \frac{4.85\,W}{L\,D^2}$ [illegible] lbs/cu.ft.

UNDISTURBED SAMPLE LOG

LEGEND

- W_n — Natural Water Content
- MA — Mechanical Analysis
- LL — Atterberg Limits
- G — Specific Gravity
- C — Consolidation
- Q — Unconsolidated Undrained
- γ_d — Dry Density
- R — Consolidated Undrained
- S — Consolidated Drained
- UC — Unconfined Compression

NED FORM DEC 62 501



SAMPLE NO.	ELEV OR DEPTH	CLASSIFICATION	NAT W%	LL	PL	PI
UD-2	13.0' – 15.0'	Organic CLAY (OH)	Natural	121	42	79
			Over-Dried	73	41	32

GRADATION CURVES

PROJECT Long Range Delaware River Disposal Area

AREA

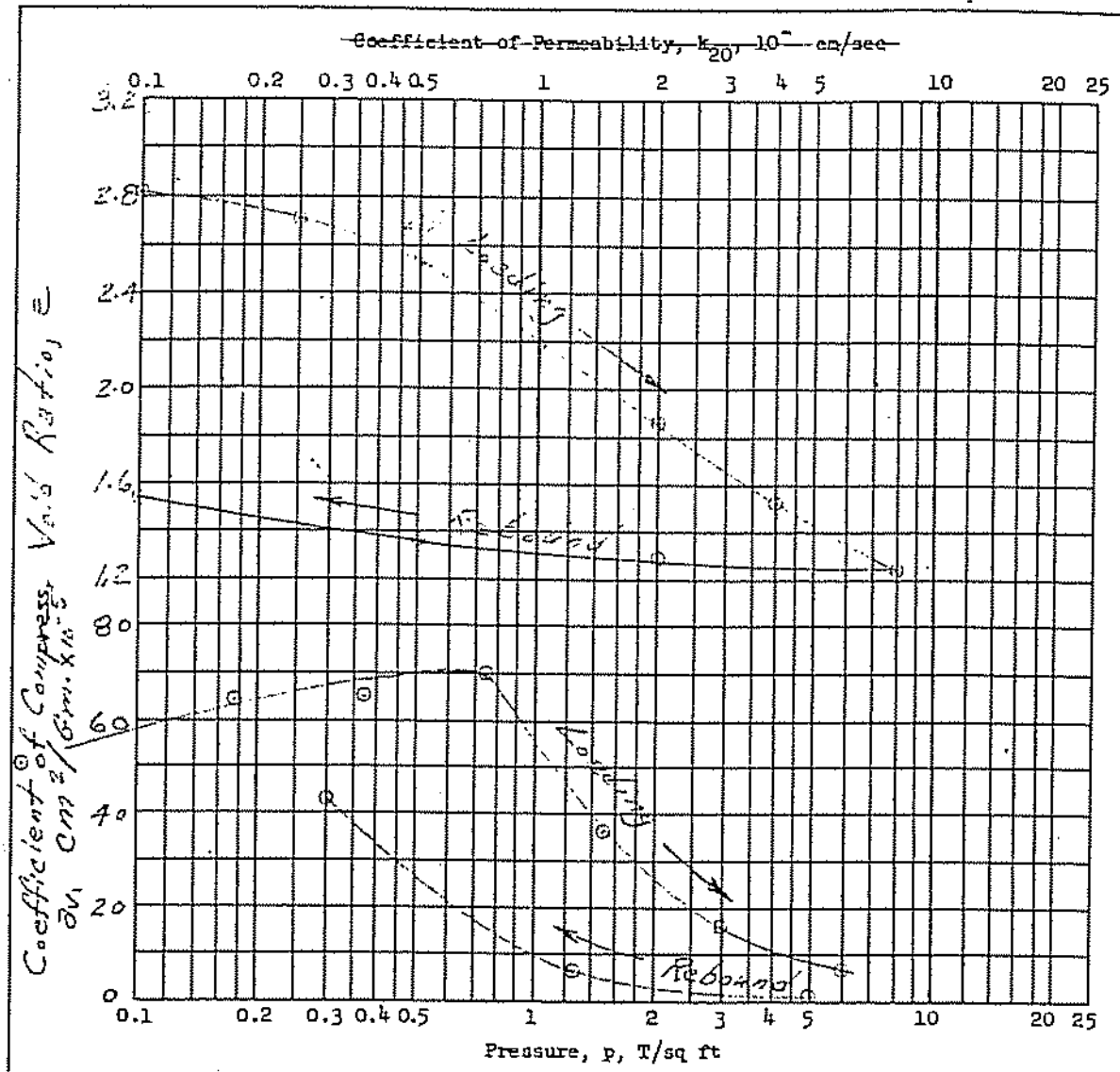
BORING NO. EBB-1

DATE Oct. 1967

ENG FORM 2087
1 MAY 63

REPLACES WES FORM NO. 1241, SEP 1962, WHICH IS OBSOLETE. (TRANSLUCENT)

U.S. GOVERNMENT PRINTING OFFICE : 1963 OF—709-114



Type of Specimen	Undisturbed	Before Test		After Test	
Diam 3.0 in.	Ht 0.75 in.	Water Content, w_o	109.4 %	w_f	61.7 %
Overburden Pressure, p_o	0.22 T/sq ft	Void Ratio, e_o	2.854	e_f	1.531
Preconsol. Pressure, p_c	0.33 T/sq ft	Saturation, S_o	98.1 %	S_f	100+ %
Compression Index, C_c	1.13	Dry Density, γ_d	41.4 lb/ft^3		
Classification	Organic CLAY (CH) w/ decayed veg.	k_{20} at e_o =	$\times 10^{-}$ cm/sec		
LL 121 (Nat.) 73 (O.D.)	G_s 2.56	Project	Long Range Delaware River Disposal Area		
PL 42 41	D_{10} < 0.001				
Remarks		Area	Edgemoor		
		Boring No.	EKB-1	Sample No.	UD-2
		Depth El	13.0' - 15.0'	Date	Oct. 1967

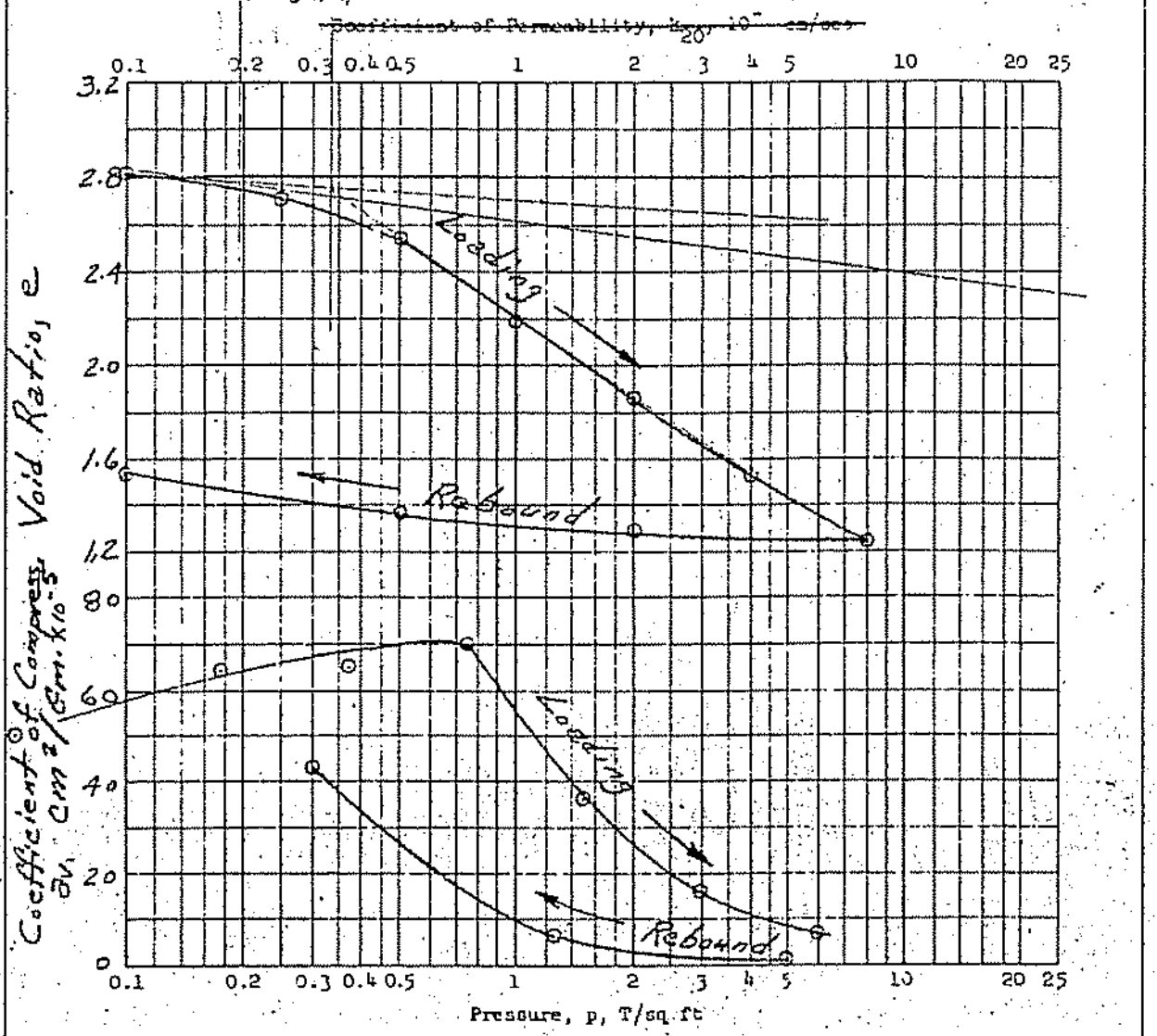
CONSOLIDATION TEST REPORT

ENG FORM 1 MAY 63 2090 PREVIOUS EDITIONS ARE OBSOLETE. (TRANSLUCENT)

$P_c = 0.33$

$P_c = 0.22$

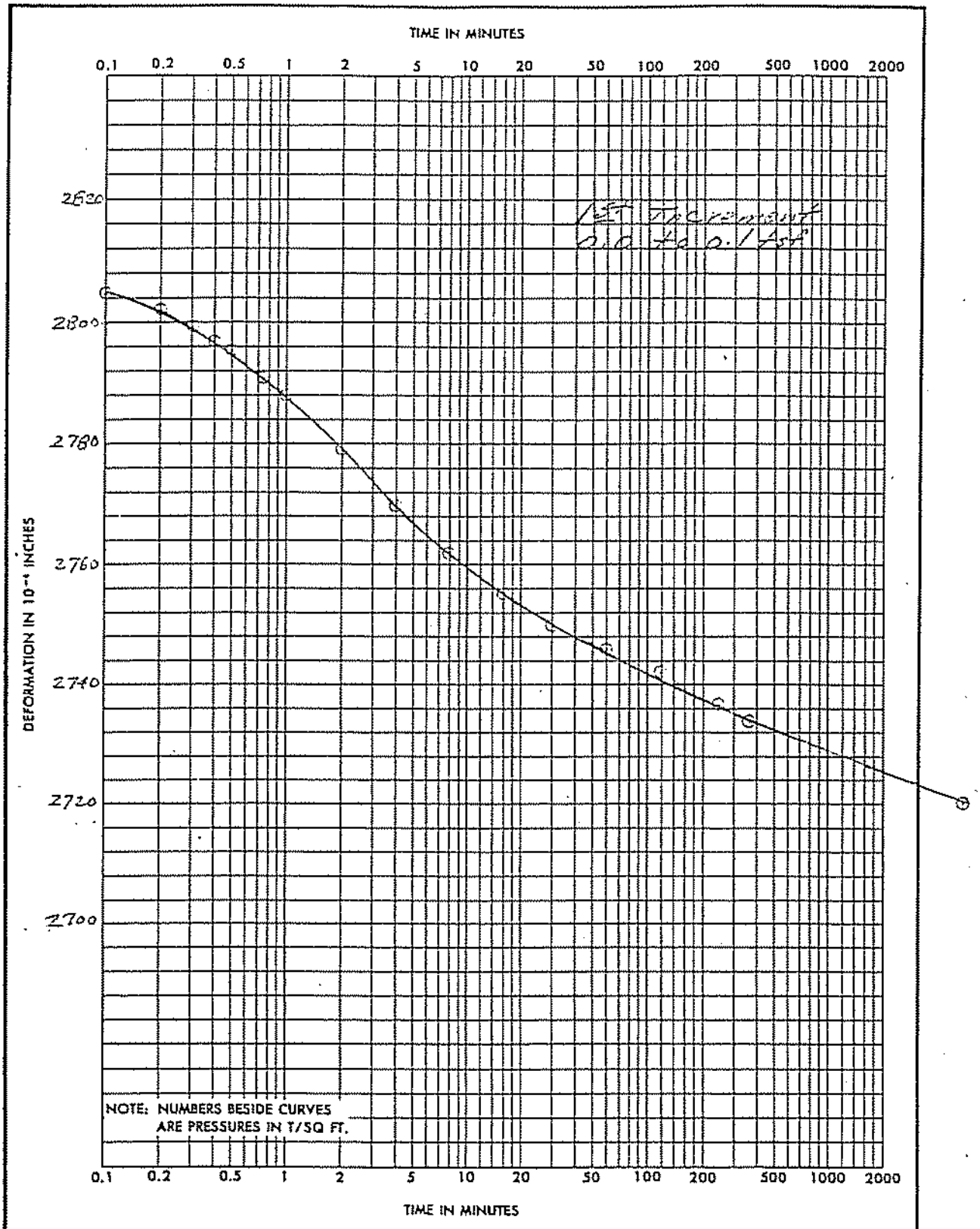
Pre Con 3,



Type of Specimen: Undisturbed		Before Test		After Test	
Diam 3.0 in.	Ht 0.75 in.	Water Content, w_o	108.4 %	w_f	61.7 %
Overburden Pressure, Po 0.22 T/sq ft		Void Ratio, e_o	2.854	e_f	1.531
Preconsol. Pressure, P_c 0.33 T/sq ft		Saturation, S_o	98.1 %	S_f	100+ %
Compression Index, C_c 1.13		Dry Density, γ_d	41.4 lb/ft³		
Classification Organic CLAY (OH) w/ decayed veg.		k_{20} at e_o =	x 10^{-} cm/sec		
LL 121 73	G_s 2.56	Project: Long Range Delaware River Disposal Area			
PL 42 41	D_{10} < 0.001	Area: Edgemoor			
Remarks		Boring No. EBB-1		Sample No. UD-2	
$P_o = 0.22$ T/ft²		Depth 13.0'-15.0'		Date Oct. 1967	
		CONSOLIDATION TEST REPORT			

ENG FORM 2090 (MAY 63) PREVIOUS EDITIONS ARE OBSOLETE (TRANSLUCENT)

$\gamma_b = 25.3$

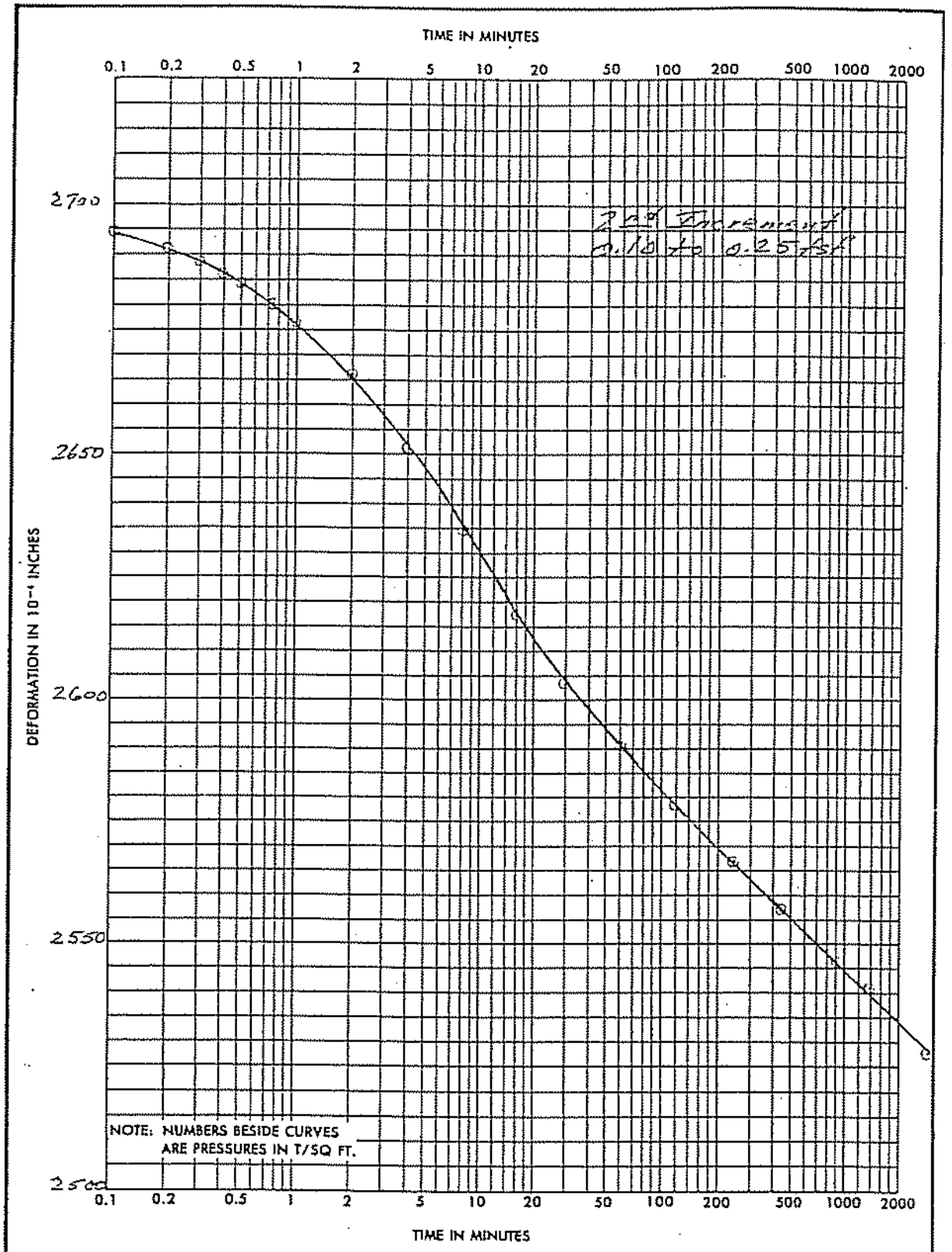


PROJECT	Long Range Delaware River Disposal Area Study			
AREA	Edgemoor			
BORING NO. EBS-1	SAMPLE NO. UD-2	DEPTH ~~EL~~ 13.0'-15.0'	DATE Nov. 1967	

ENG FORM 2088 1 MAY 63 PREVIOUS EDITIONS ARE OBSOLETE.

CONSOLIDATION TEST—TIME CURVES (TRANSLUCENT)

* GPO : 1964 OF—715-545



PROJECT Long Beach Delaware River Disposal Area Study

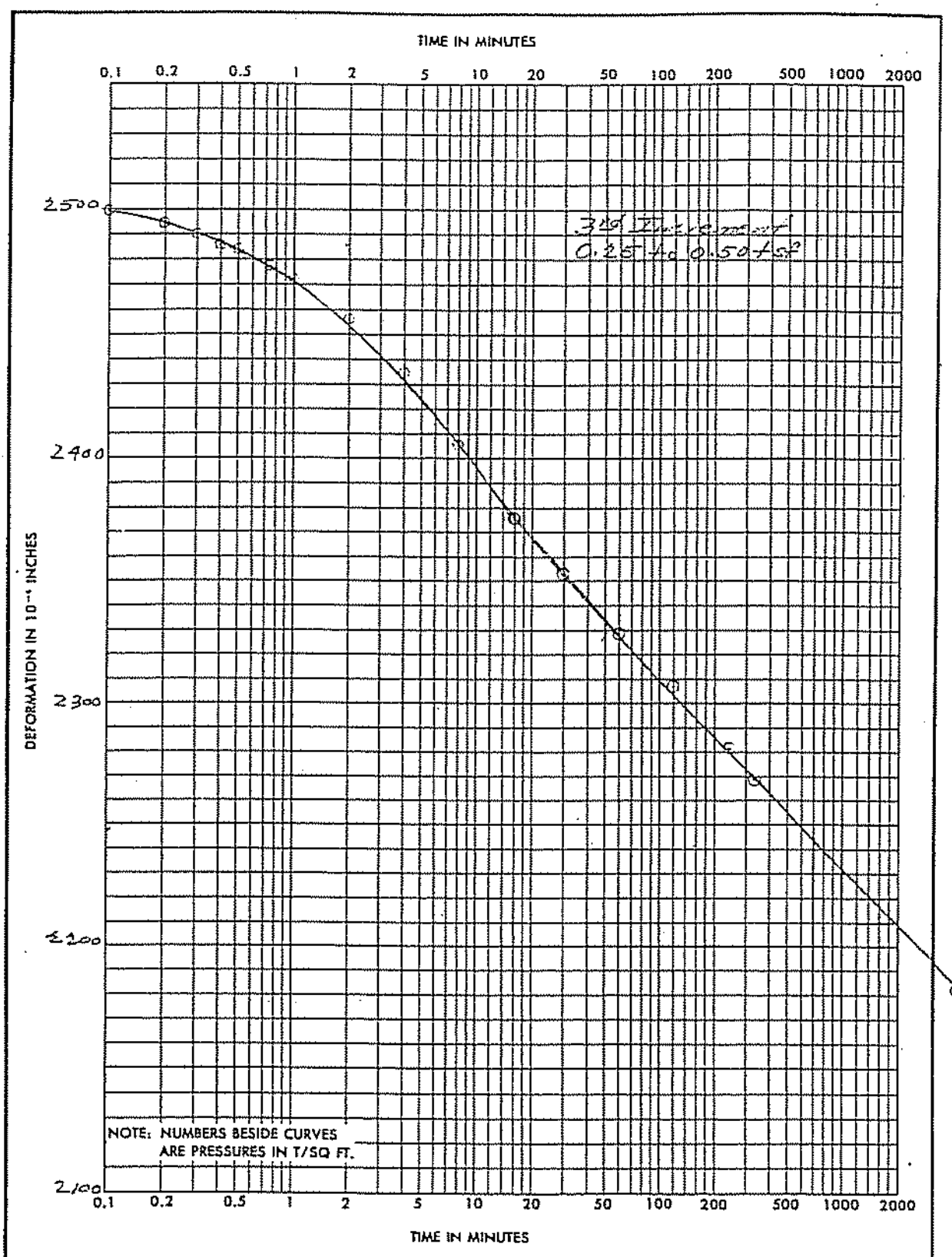
AREA Edge Moor

BORING NO. EBE-1 SAMPLE NO. UD-3 DEPTH EL 13.0'- 15.0' DATE Nov. 1971

ENG FORM 2088 1 MAY 63 PREVIOUS EDITIONS ARE OBSOLETE.

CONSOLIDATION TEST—TIME CURVES (TRANSLUCENT)

* GPO : 1964 OF—715-565



PROJECT Long Range Delaware River Disposal Area Study

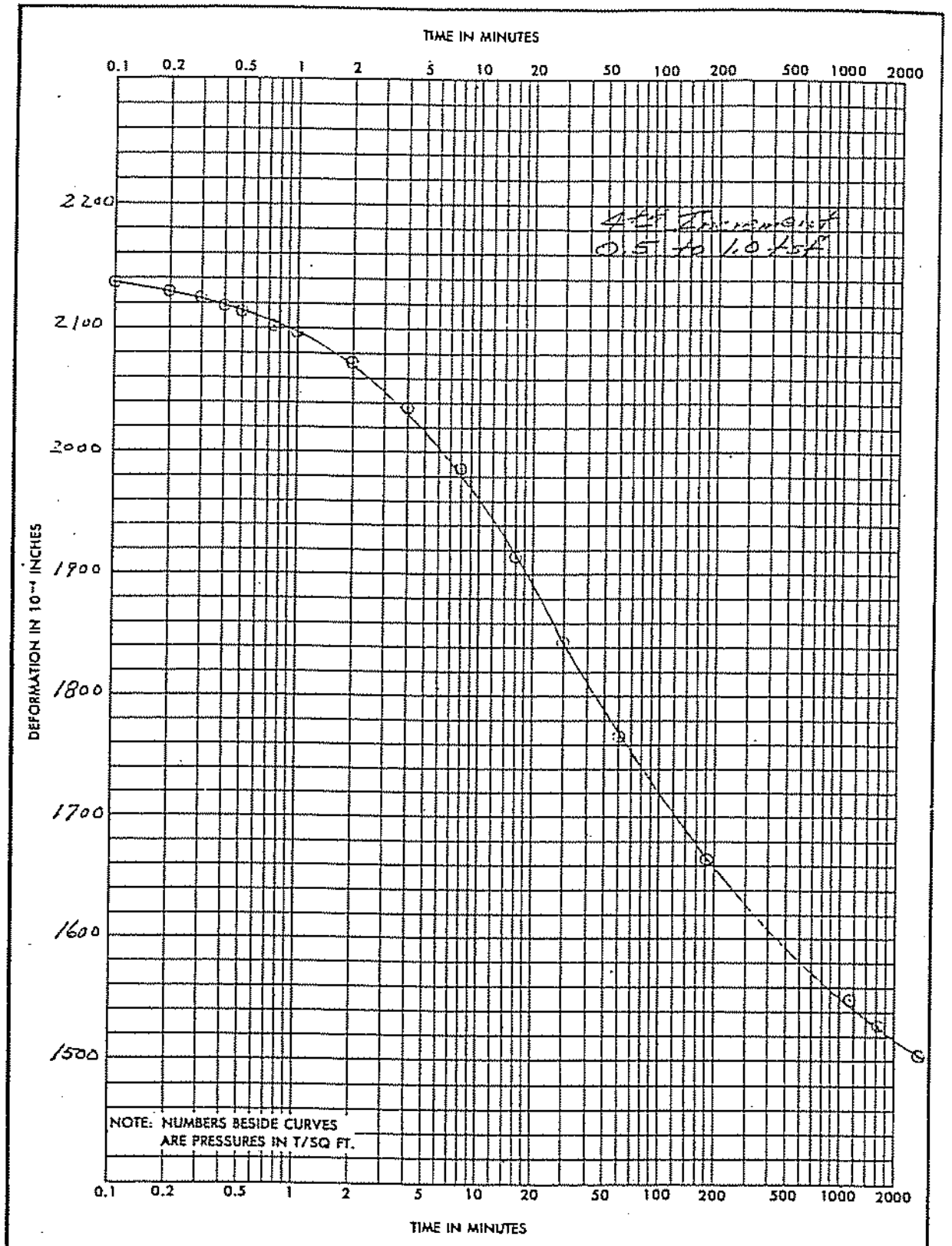
AREA Edgemoor

BORING NO.	SAMPLE NO.	DEPTH -Ft-	DATE
ESE-1	UD-2	13.0' - 15.0'	Nov. 1967

ENG FORM 2088 1 MAY 63 PREVIOUS EDITIONS ARE OBSOLETE.

CONSOLIDATION TEST—TIME CURVES (TRANSLUCENT)

* GPO : 1964 OP—713-963



PROJECT Long Range Delaware River Disposal Area Study

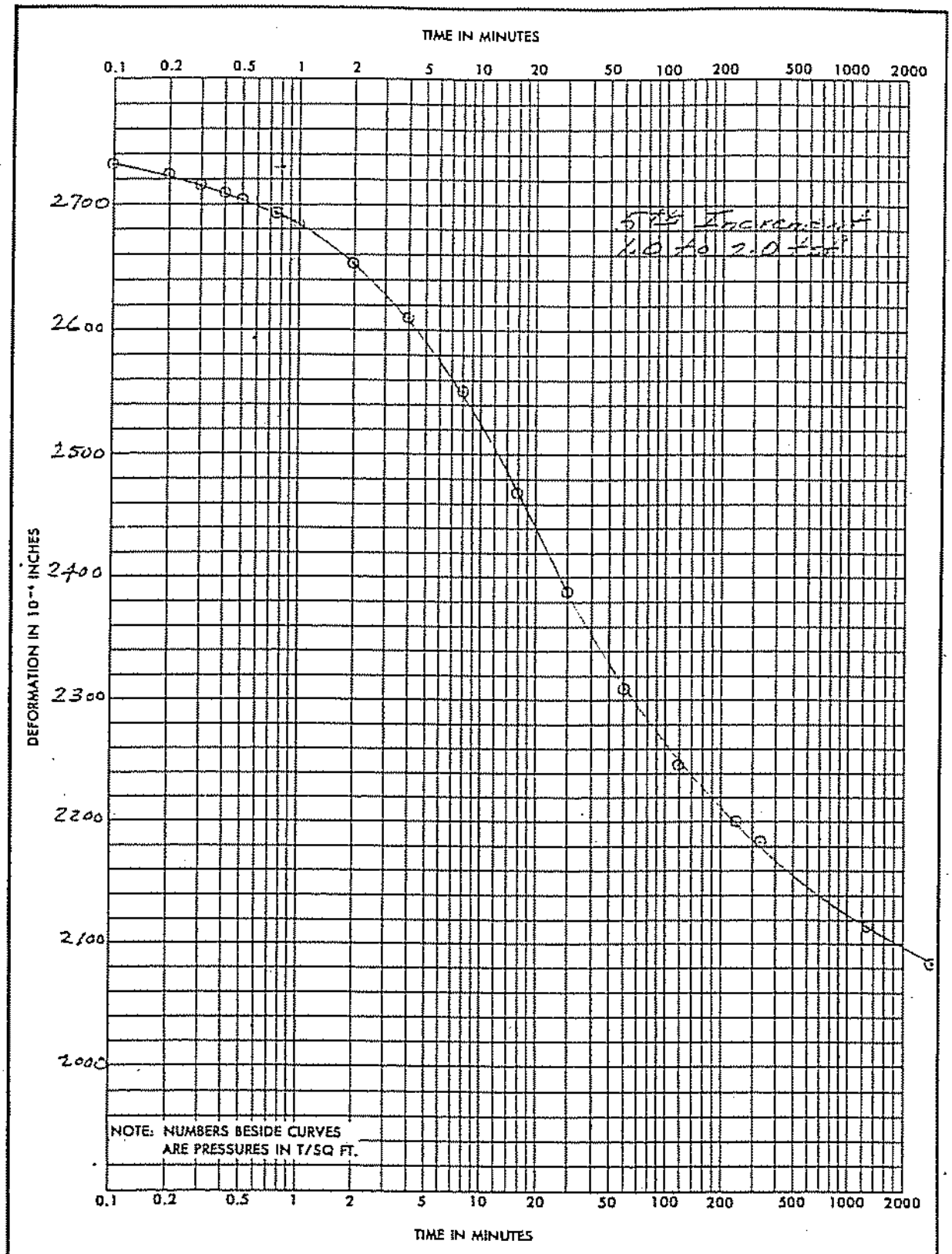
AREA

BORING NO. EBB-1	SAMPLE NO. UD-2	DEPTH EL. 13.0'–15.0'	DATE Nov. 19??

ENG FORM 2088 1 MAY 63 PREVIOUS EDITIONS ARE OBSOLETE.

CONSOLIDATION TEST—TIME CURVES (TRANSLUCENT)

* GPO : 1964 OF—713-963



PROJECT Lower Delaware River Disposal Area Study

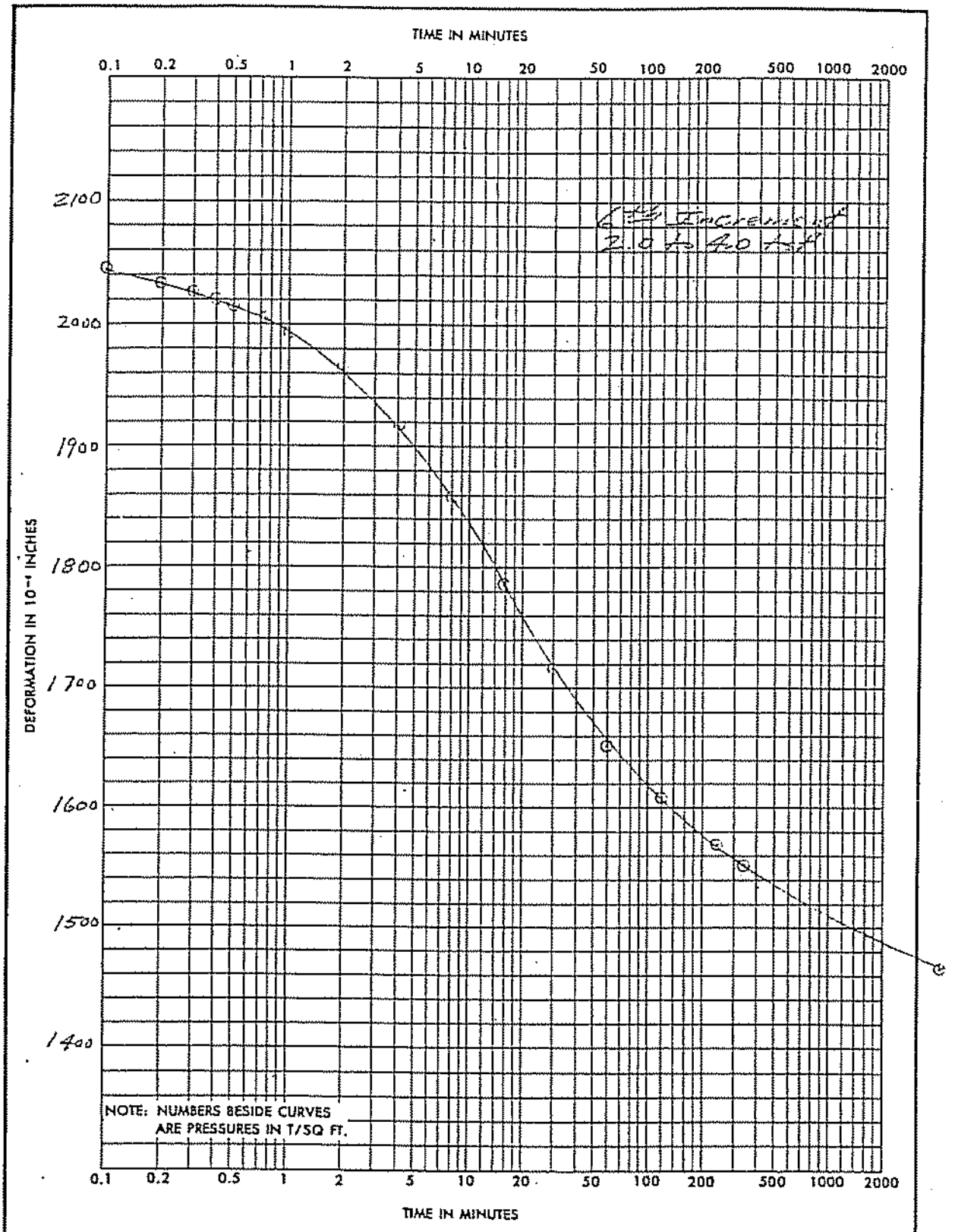
AREA

BORING NO. EDB-1	SAMPLE NO. UD-2	DEPTH -EL. 13.0' - 15.0'	DATE Nov. 1963

ENG FORM 2088 1 MAY 63 PREVIOUS EDITIONS ARE OBSOLETE.

CONSOLIDATION TEST—TIME CURVES (TRANSLUCENT)

* GPO : 1964 OP—715-163



PROJECT Long Range Delaware River Disposal Area Study

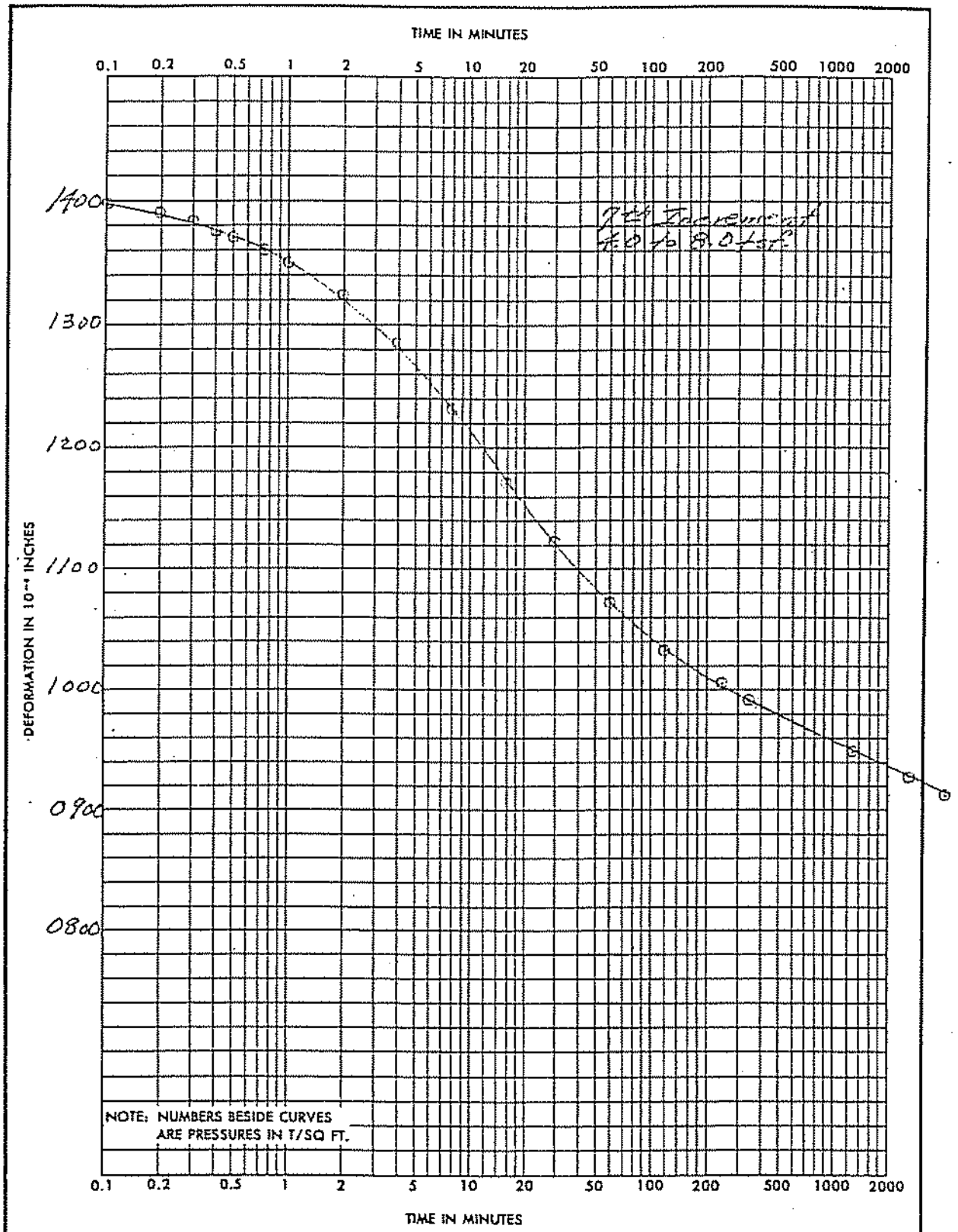
AREA

BORING NO.	SAMPLE NO.	DEPTH EL	DATE
EBB-1	UD-2	13.0' - 15.0'	Nov. 1957

ENG FORM 2088 1 MAY 63 PREVIOUS EDITIONS ARE OBSOLETE.

CONSOLIDATION TEST—TIME CURVES (TRANSLUCENT)

GPO : 1964 OF—715-965



PROJECT Long Range Delaware River Disposal Area Study			
AREA			
BORING NO. EBB-1	SAMPLE NO. UD-2	DEPTH ~~EL~~ 13.0' - 15.0'	DATE Nov. 1967

ENG FORM 2088 1 MAY 63 PREVIOUS EDITIONS ARE OBSOLETE.

CONSOLIDATION TEST—TIME CURVES (TRANSLUCENT)

* GPO : 1964 OF—213-965

Edgemoor

BORING NO. EBB-1
SAMPLE NO. UD-3 ~~3210~~
DEPTH: 21.0 to ~~28.0~~ ft.

PROJECT Delaware River Study
DATE October 1967
COMP. By CW CHK'D By RJS

LABORATORY LOG	DESCRIPTION	W, CAN NO.	TEST SAMPLES
	Dark gray laminated organic SILT(OH), micaceous, with trace of fine sand, hairline to 1/16" thick laminae		W_n = 58.1%
	Dark gray organic CLAY(OH)	Hydr-1 G_1 = 2.50 LL = 117 PL = 53 PI = 64	W_n = 80.5% γ_n = 48.2 pcf e = 2.234 n = 69.1% S = 90.1%
	Dark gray laminated organic SILT (OH)		W_n = 85.5% γ_n = 47.6 pcf e = 2.277 n = 69.5 S = 93.9
	Dark gray Organic CLAY (OH)	Hydr-2 G_2 = 2.49 LL = 123 PL = 44 PI = 79	W_n = 93.5% γ_n = 45.7 pcf e = 2.396 n = 70.6 S = 97.2
			W_n = 85.6%

SAMPLE DEPTH IN FEET: 24, 23, 22, 21, 20, 19, 18, 17, 16, 15, 14, 13, 12, 11, 10, 9, 8, 7, 6, 5, 4, 3, 2, 1, 0

SAMPLE LENGTH IN INCHES

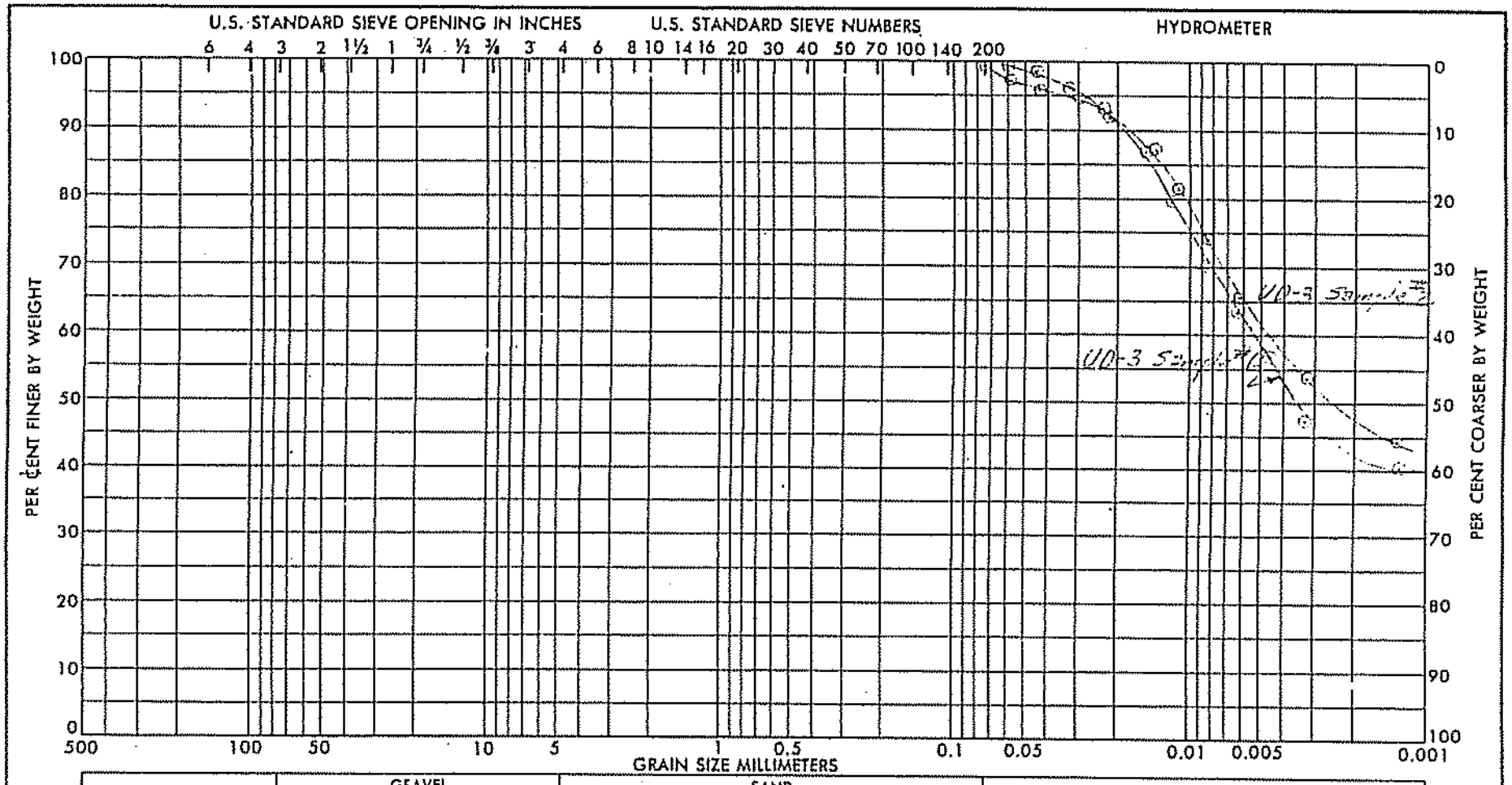
Length of Sample, L 23.42 in.
Weight of Tube and Wet Soil 14.600 g.
Weight of Tube 6,920 g.
Weight of Wet Soil, W 7,680 g.
Diameter of Tube, D 4.25 in.
Total Unit Weight, $\gamma_t = \frac{4.85\,W}{LD^2}$ 88.1 lbs/cu.ft.

LEGEND

W_n — Natural Water Content
MA — Mechanical Analysis
LL — Atterberg Limits
G — Specific Gravity
C — Consolidation
Q — Unconsolidated Undrained
γ_d — Dry Density
R — Consolidated Undrained
S — Consolidated Drained
UC — Unconfined Compression

UNDISTURBED SAMPLE LOG

NED FORM DEC 62 501



SAMPLE NO.	ELEV. OR DEPTH	CLASSIFICATION	NAT W%	LL	PL	PI
UD-3 Sample #1	21.0' - 23.0'	Organic CLAY (OH)		117	53	64
UD-3 Sample #2	21.0' - 23.0'	Organic CLAY (OH)		123	44	79

GRADATION CURVES

PROJECT Long Range Delaware River Disposal Area

AREA

BORING NO. ERB-1

DATE Oct. 1967

ENG FORM 2087
1 MAY 63

REPLACES WES FORM NO. 1241, SEP 1962, WHICH IS OBSOLETE. (TRANSLUCENT)

U.S. GOVERNMENT PRINTING OFFICE : 1963 O-709-136

Edgemoore

BORING NO. EBB-1
SAMPLE NO. UD-4
DEPTH: 27.0 to 29.0 ft.

PROJECT Delaware River Study
DATE October 1967
COMP. By WS CHK'D By RJS

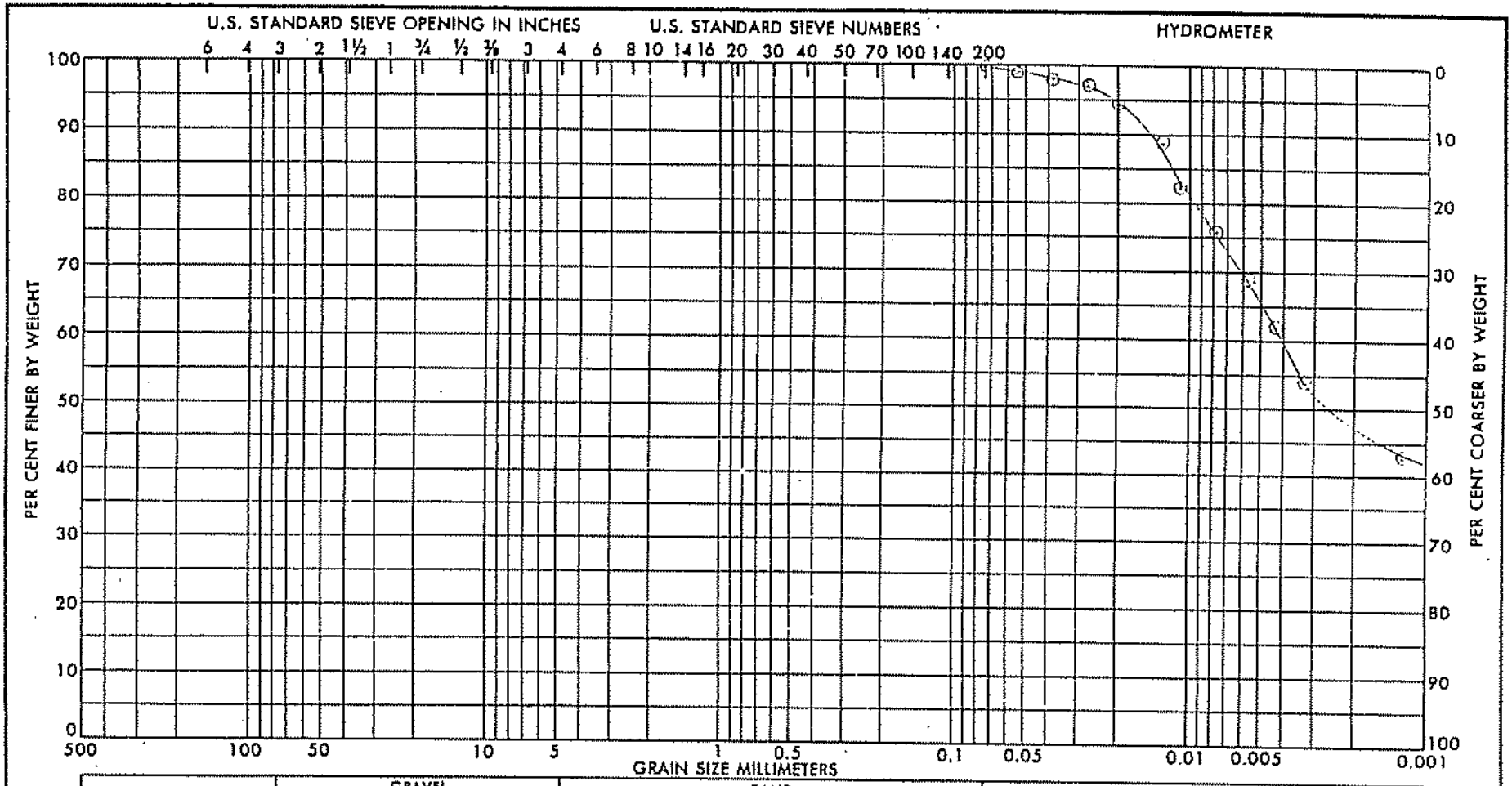
LABORATORY LOG	DESCRIPTION	W, CAN NO.	TEST SAMPLES
SAMPLE DEPTH IN FEET	SAMPLE LENGTH IN INCHES		
24			
23			W_n = 82.1 %
22	Dark gray organic CLAY(OH)		
21	micaceous w/decayed vegetation		
20		Hydr-1 G = 2.52	W_n = 88.6 %
19		LL = 124	
18		PL = 46 PI = 78	
17	Med. gray organic CLAY (OH)		
16	micaceous, irregular defined Bedding		W_n = 89.5 %
15			
14			W_n = 81.1 %
13			γ_n = 50.4 pcf
12			e = 2.120
11	Dark gray organic CLAY (OH)		n = 68.0 %
10	micaceous w/ decayed		S = 96.4 %
9	vegetation and with irreg.		
8	ribbony seams		W_n = 94.2 %
7			
6			
5			
4			
3			W_n = 94.1 %
	Partially decayed Reeds		
2			
1			
0	Bottom of Sample		

Length of Sample, L 23.19 in.
Weight of Tube and Wet Soil 14,900 g.
Weight of Tube 7,870 g.
Weight of Wet Soil, W 7,530 g.
Diameter of Tube, D 4.25 in.
Total Unit Weight, $\gamma_t = \frac{4.85\,W}{LD^2}$ 97.2 lbs/cu.ft.

LEGEND
W_n – Natural Water Content
MA – Mechanical Analysis
LL – Atterberg Limits
G – Specific Gravity
C – Consolidation
Q – Unconsolidated Undrained
γ_d – Dry Density
R – Consolidated Undrained
S – Consolidated Drained
UC – Unconfined Compression

UNDISTURBED SAMPLE LOG

NED FORM DEC 62 501



SAMPLE NO.	ELEV. OR DEPTH	CLASSIFICATION	NAT W%	LL	PL	PI
UD-4	24.0'-29.0'	Organic CLAY (OH)		124	46	78

GRADATION CURVES

PROJECT Long Reach Delaware River
Disposal Area

AREA

BORING NO. EBB-1

DATE Oct. 1967

ENG FORM 2087
1 MAY 63

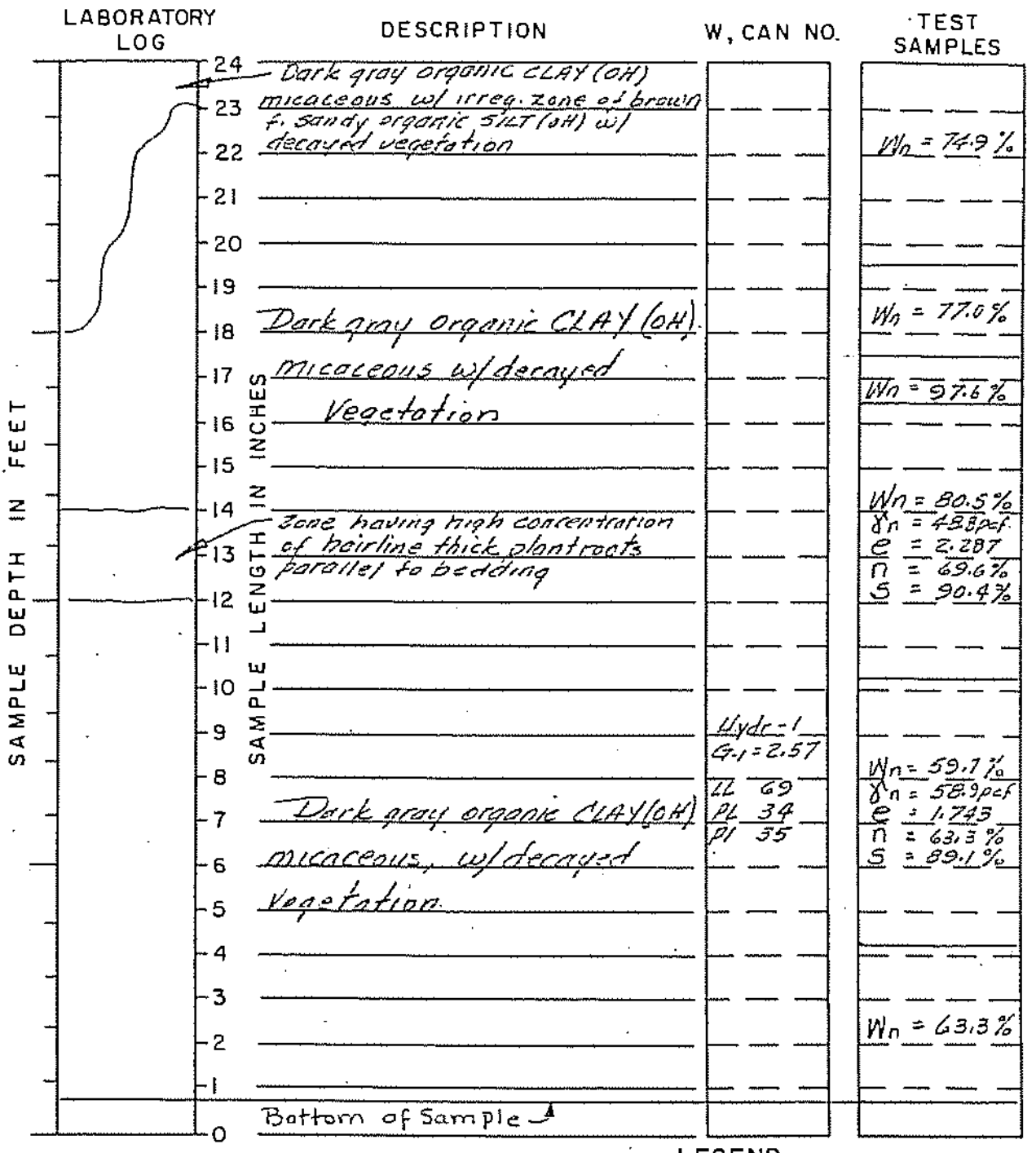
REPLACES WES FORM NO. 1241, SEP 1962, WHICH IS OBSOLETE.

U.S. GOVERNMENT PRINTING OFFICE : 1963 O—709-128

Edgemoor

BORING NO. EBB-2
SAMPLE NO. UD-1
DEPTH: 10.0 to 12.0 ft.

PROJECT Delaware River Study
DATE October 1967
COMP. By WS CHK'D By RJS



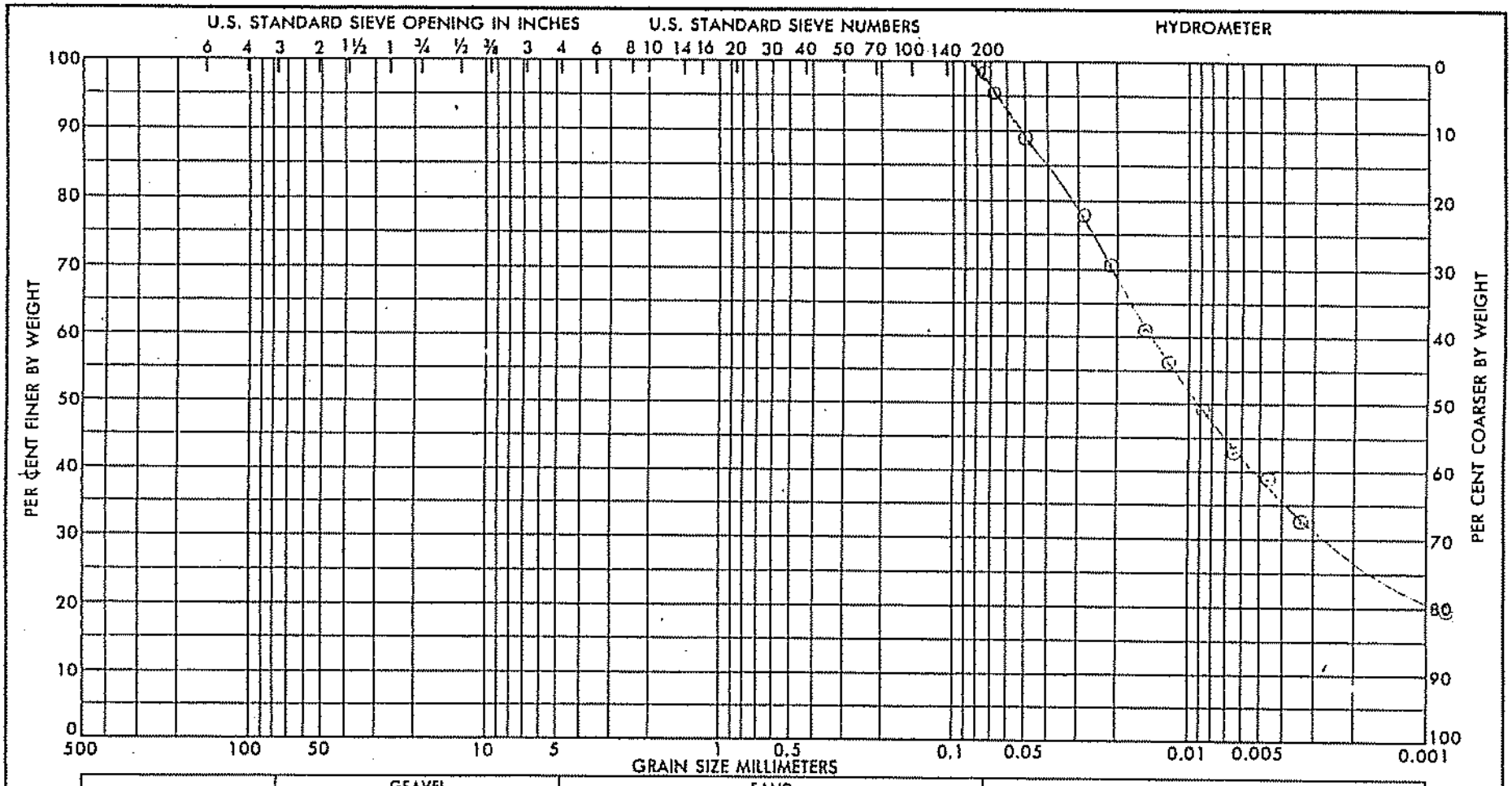
Length of Sample, L 23.15 in.
Weight of Tube and Wet Soil 15,000 g.
Weight of Tube 7,250 g.
Weight of Wet Soil, W 7,750 g.
Diameter of Tube, D 4.25 in.
Total Unit Weight, $\gamma_t = \frac{4.85\,W}{L\,D^2}$ 82.8 lbs/cu.ft.

LEGEND

W_n — Natural Water Content
MA — Mechanical Analysis
LL — Atterberg Limits
G — Specific Gravity
C — Consolidation
Q — Unconsolidated Undrained
γ_d — Dry Density
R — Consolidated Undrained
S — Consolidated Drained
UC — Unconfined Compression

UNDISTURBED SAMPLE LOG

NED FORM DEC 62 501



SAMPLE NO.	ELEV OR DEPTH	CLASSIFICATION	NAT W%	LL	PL	PI
UD-1	10.0'-12.0'	Organic CLAY (OH)		69	34	35

GRADATION CURVES

PROJECT Long Reach Delaware River Disposal Area

AREA

BORING NO. EB8-2

DATE Oct 1967

ENG FORM 2087
1 MAY 63

REPLACES WES FORM NO. 1241, SEP 1962, WHICH IS OBSOLETE. (TRANSLUCENT)

U.S. GOVERNMENT PRINTING OFFICE : 1963 O—709-126

Edgemoor

BORING NO. EBB-2
SAMPLE NO. UD-2
DEPTH: 16.0 to 18.0 ft.

PROJECT Delaware River Study
DATE October 1967
COMP. By WS CHK'D By RJS

LABORATORY LOG	DESCRIPTION	W, CAN NO.	TEST SAMPLES
	Dark grayish-brown organic CLAY (OH) micaceous	Hydr-1 G = 2.55 LL = 119 PL = 99 PI = 70	Q-2B W_{2B} = 73.3% Q-3A W_{3A} = 85.7% R-1, 2, & 3 Q-4 W_1 = 86.6% W_2 = 84.7% W_3 = 95.0% W_4 = 88.5% Q-1, 2, 2A & 3 W_1 = 91.9% W_2 = 91.2% W_{2A} = 91.0% W_3 = 83.5%

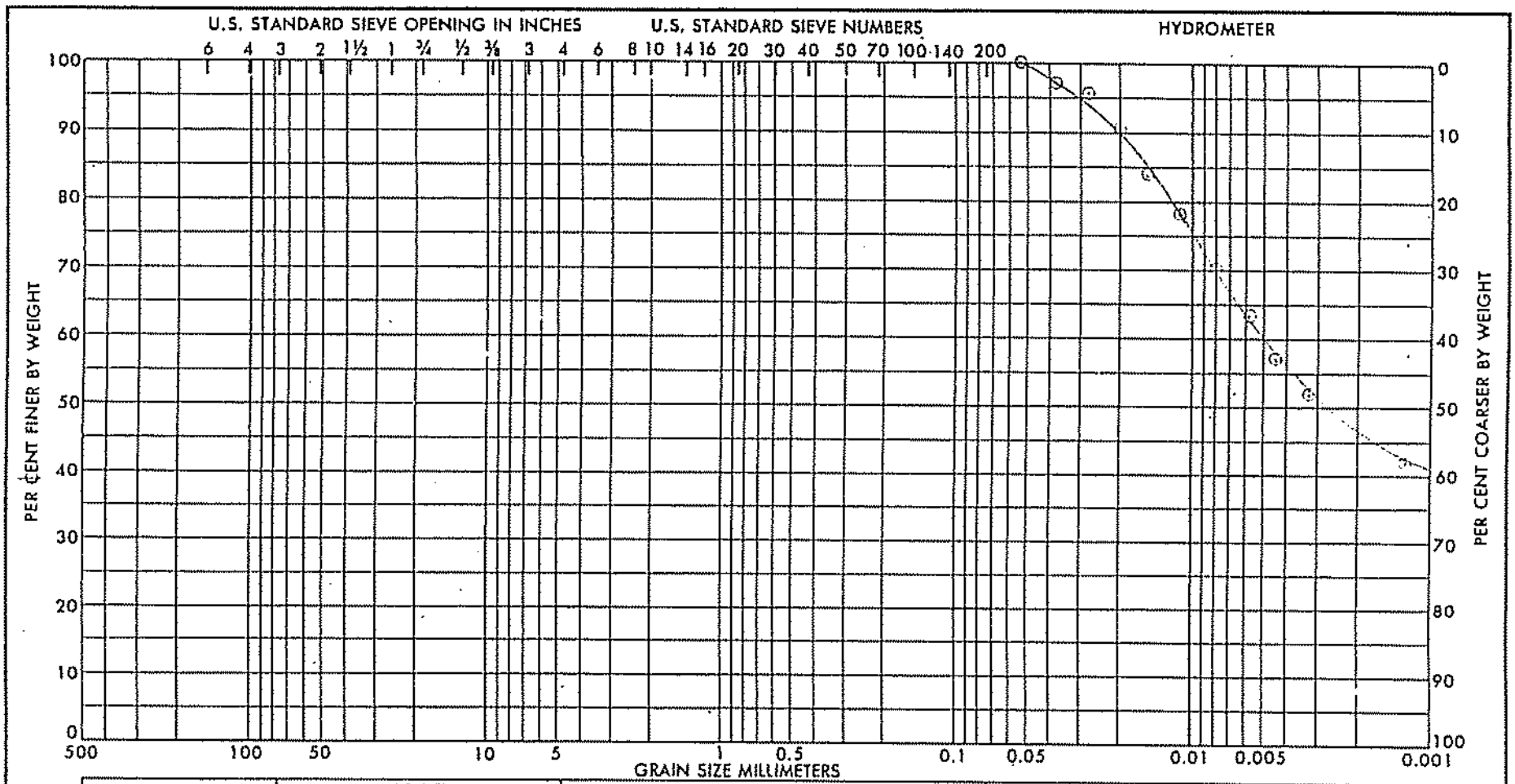
SAMPLE DEPTH IN FEET — SAMPLE LENGTH IN INCHES

Length of Sample, L 23.00 in.
Weight of Tube and Wet Soil 14,950 g.
Weight of Tube 7,320 g.
Weight of Wet Soil, W 7,630 g.
Diameter of Tube, D 4.25 in.
Total Unit Weight, $\gamma_t = \frac{4.85\,W}{LD^2}$ 89.1 lbs/cu.ft.

UNDISTURBED SAMPLE LOG

LEGEND
W_n — Natural Water Content
MA — Mechanical Analysis
LL — Atterberg Limits
G — Specific Gravity
C — Consolidation
Q — Unconsolidated Undrained
γ_0 — Dry Density
R — Consolidated Undrained
S — Consolidated Drained
UC — Unconfined Compression

NED FORM DEC 62 501



SAMPLE NO.	ELEV-OR-DEPTH	CLASSIFICATION	NAT W%	LL	PL	PI
UD-2	16.0'-18.0'	Organic CLAY (OH)		119	49	70

GRADATION CURVES

PROJECT Long Range Delaware River Disposal Area

AREA

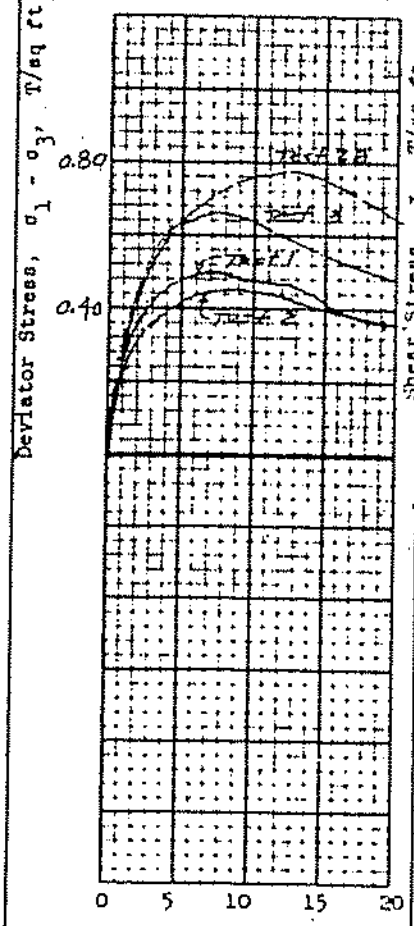
BORING NO. EBB-2

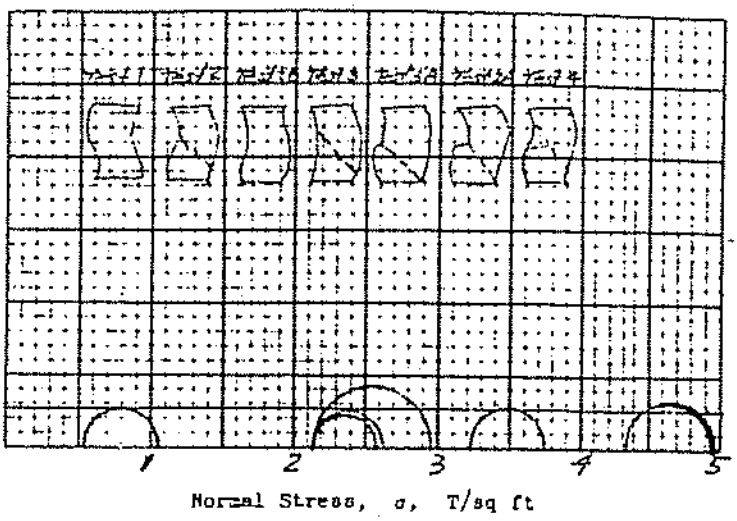
DATE Oct. 1967

ENG FORM 2087
1 MAY 63

REPLACES WES FORM NO. 1241, SEP 1962, WHICH IS OBSOLETE. (TRANSLUCENT)

U.S. GOVERNMENT PRINTING OFFICE : 1963 OF—708-126





Shear Strength Parameters

ϕ = — °

tan ϕ = —

c = 0.28 T/sq ft

Method of saturation None

☐ Controlled stress

☒ Controlled strain

Test No.			1	2	2B	3
Initial	Water content	w_o	91.4 %	91.2 %	73.3	83.5 %
	Void ratio	e_o	2.489	2.482	2.074	2.284
	Saturation	S_o	93.6 %	93.7 %	90.1 %	93.3 %
	Dry density, lb/cu ft	γ_d	45.6	45.7	51.8	48.5
Before Shear	Water content	w_c	— %	— %	— %	— %
	Void ratio	e_c	—	—	—	—
	Saturation	S_c	— %	— %	— %	— %
	Final back pressure, T/sq ft	u_o	—	—	—	—
Final	Water content	w_f	— %	— %	— %	— %
	Void ratio	e_f	—	—	—	—
Minor principal stress, T/sq ft		σ_3	0.54	2.16	2.16	4.32
Max deviator stress, T/sq ft		$(\sigma_1-\sigma_3)_{max}$	0.50	0.45	0.77	0.66
Time to failure, min		t_f	6.8	8.0	13.8	6.8
Rate of strain, percent/min			1.03	1.02	0.77	1.03
Ult deviator stress, T/sq ft		$(\sigma_1-\sigma_3)_{ult}$	0.41*	0.40*	0.75*	0.55*
Initial diameter, in.		D_o	1.40	1.40	1.40	1.40
Initial height, in.		H_o	3.15	3.15	3.05	3.15

Type of test Q | Type of specimen Undisturbed

Classification Organic CLAY (OH)

LL 119 | PL 49 | PI 70 | D_{10} < 0.001 | G_s 2.55

Remarks *Stress at 15% Strain

Project Long Reach, Delaware River Disposal Area

Area Edgemoor

Boring No. EEE-2 | Sample No. UD 2

Depth 16.0'-18.0' | Date Sept. 1967

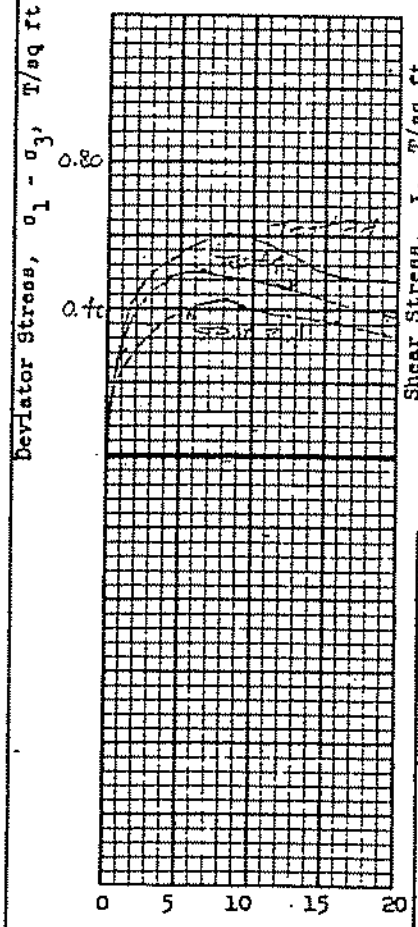
TRIAXIAL COMPRESSION TEST REPORT

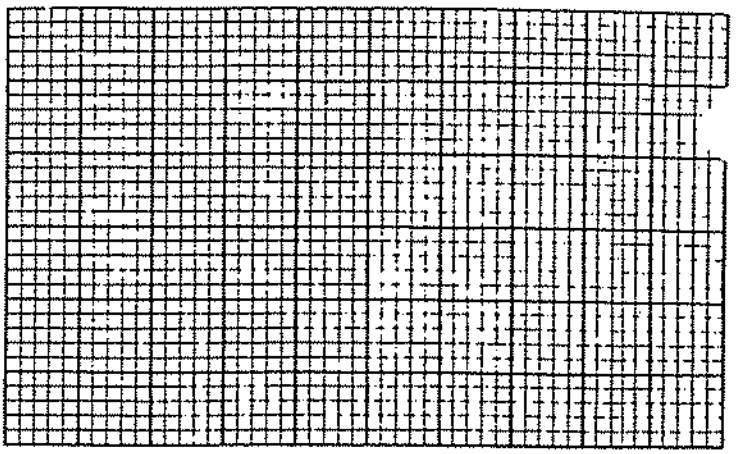
Sheet 1 of 2

ENG FORM 2089 (EM 1110-2-1902)

TRANSLUCENT

γ_b = 27.8





Normal Stress, σ, T/sq ft

Test No.			3A	2A	4	
Initial	Water content	w_o	95.7 %	91.0 %	88.8 %	%
	Void ratio	e_o	2.425	2.454	2.504	
	Saturation	S_o	90.2 %	94.6 %	90.4 %	%
	Dry density, lb/cu ft	γ_d	46.5	46.1	45.4	
Before Shear	Water content	w_c	— %	— %	— %	%
	Void ratio	e_c	—	—	—	
	Saturation	S_c	— %	— %	— %	%
	Final back pressure, T/sq ft	u_o	—	—	—	
Final	Water content	w_f	— %	— %	— %	%
	Void ratio	e_f	—	—	—	
Minor principal stress, T/sq ft		σ_3	4.32	2.16	3.24	
Max deviator stress, T/sq ft		$(\sigma_1-\sigma_3)_{max}$	0.60	0.42	0.50	
Time to failure, min		t_f	8.0	8.0	6.2	
Rate of strain, percent/min			1.03	1.03	1.03	
Ult deviator stress, T/sq ft		$(\sigma_1-\sigma_3)_{ult}$	0.58*	0.37*	0.45*	
Initial diameter, in.		D_o	1.40	1.40	1.40	
Initial height, in.		H_o	3.15	3.15	3.15	

Shear Strength Parameters

ϕ = — °

tan ϕ = —

c = 0.28 T/sq ft

Method of saturation None

☐ Controlled stress

☒ Controlled strain

Type of test Q | Type of specimen Undisturbed

Classification Organic CLAY (OH)

LL	PL	PI	D_{10}	G_s
119	49	70	< 0.001	2.55

Remarks * Stress at 15% strain

See sheet 1 of 2 for additional information

Sheet 2 of 2

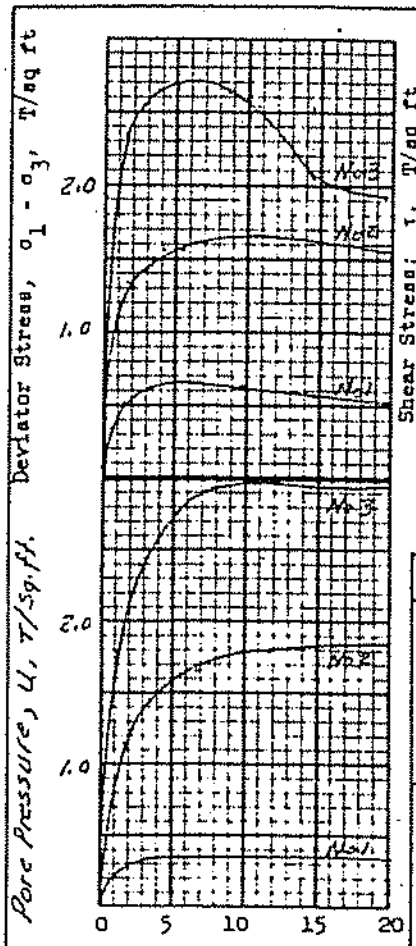
Project Long Reach Delaware River Disposal Area

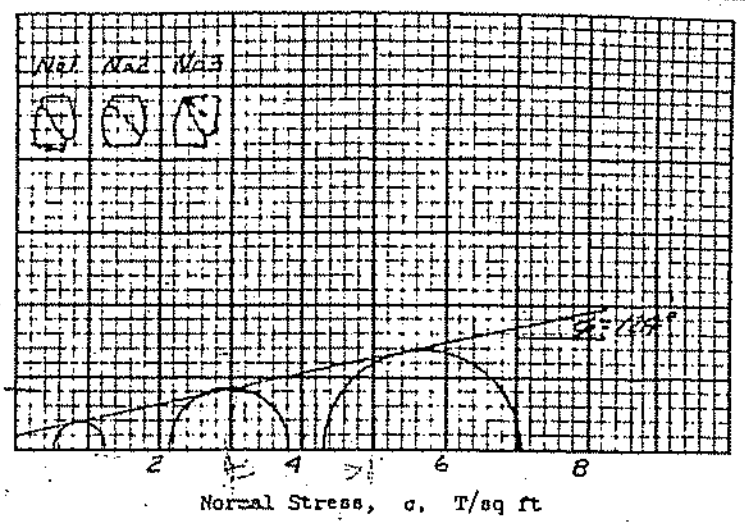
Area Edgemoor

Boring No. EB-3 | Sample No. UD 2

Depth 16.0' - 18.0' | Date Sept 1967

TRIAXIAL COMPRESSION TEST REPORT





Test No.			1	2	3	
Initial	Water content	w_o	86.6 %	84.7 %	95.0 %	%
	Void ratio	e_o	2.434	2.393	2.681	
	Saturation	S_o	90.7 %	90.3 %	90.4 %	%
	Dry density, lb/cu ft	γ_d	46.3	46.9	43.2	
Before Shear	Water content	w_c	80.4%	68.1 %	59.2 %	%
	Void ratio	e_c	2.050	1.736	1.509	
	Saturation	S_c	100 %	100 %	100 %	%
	Final back pressure, T/sq ft	u_o	7.20	7.20	7.20	
Final	Water content	w_f	80.9 %	68.1 %	59.2 %	%
	Void ratio	e_f	2.050	1.736	1.509	
Minor principal stress, T/sq ft		σ_3	0.54	2.16	4.32	
Max deviator stress, T/sq ft	$(\sigma_1-\sigma_3)_{max}$		0.67	1.65	2.71	
Time to failure, min		t_f	26.3	49.6	31.8	
Rate of strain, percent/min			0.19	0.19	0.20	
Pore Pressure T/sq.ft.		U	+0.35	+1.74	+2.88	
Ult deviator stress, T/sq ft	$(\sigma_1-\sigma_3)_{ult}$		0.56	1.61	2.01	
Initial diameter, in.		D_o	1.40	1.41	1.40	
Initial height, in.		H_o	3.15	3.15	3.15	

Shear Strength Parameters

ϕ = 12.4 °

tan ϕ = 0.220

c = 0.15 T/sq ft

Method of saturation

Backpressure

☐ Controlled stress

☒ Controlled strain

Type of test R | Type of specimen Undisturbed

Classification Organic CLAY (OH)

LL	PL	PI	D_{10}	G_s
119	49	70	< 0.001	2.55

Remarks

Project Delaware River Disposal Area Study

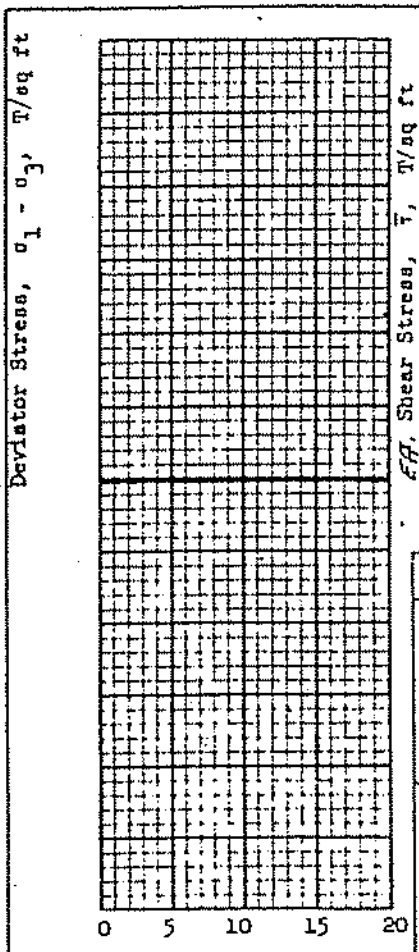
Area Edgemoor Disposal Area

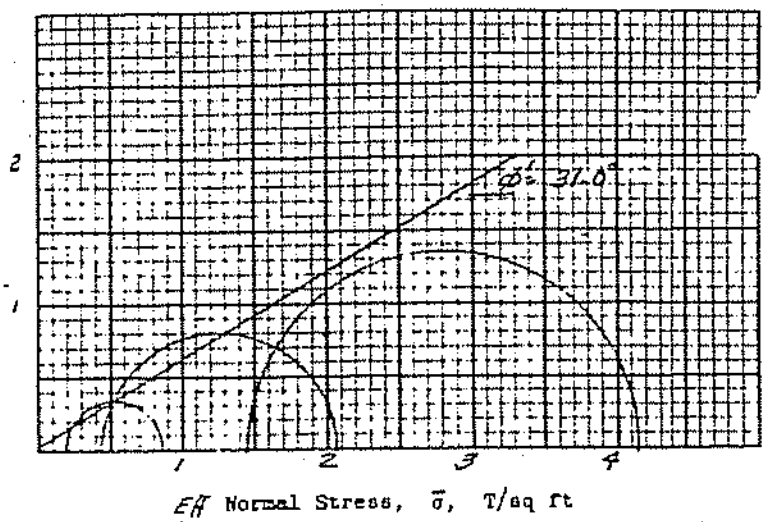
Boring No. EBB-2 | Sample No. UD-2

Depth 16.0'-18.0' | Date Oct. 1967

TRIAXIAL COMPRESSION TEST REPORT

Sheet 1 of 2





Shear Strength Parameters

$\phi' =$ 31.0 °

$\tan \phi =$ 0.600

$c =$ 0 T/sq ft

Method of saturation Backpressure

☐ Controlled stress

☒ Controlled strain

Test No.			1	2	3	
Initial	Water content	w_o	%	%	%	%
	Void ratio	e_o				
	Saturation	S_o	%	%	%	%
	Dry density, lb/cu ft	γ_d				
Before Shear	Water content	w_c	%	%	%	%
	Void ratio	e_c				
	Saturation	S_c	%	%	%	%
	Final back pressure, T/sq ft	u_o				
Final	Water content	w_f	%	%	%	
	Void ratio	e_f				
Minor principal stress, T/sq ft Eff.		$\bar{\sigma}_3$	0.19	0.42	1.44	
Max deviator stress, T/sq ft		$(\sigma_1-\sigma_3)_{max}$				
Time to failure, min		t_f				
Rate of strain, percent/min						
Major Principal Stress, T/sq ft Eff		$\bar{\sigma}_1$	0.86	2.07	4.15	
Ult deviator stress, T/sq ft		$(\sigma_1-\sigma_3)_{ult}$				
Initial diameter, in.		D_o				
Initial height, in.		H_o				

Type of test $\bar{R}$ | Type of specimen Undisturbed

Classification Organic CLAY (OH).

LL	PL	PI	D_{10}	G_s
119	49	70	< 0.001	2.55

Remarks See Sheet 1 of 2 for other data.

Sheet 2 of 2

Project Delaware River Disposal Area Study

Area Edgemoor Disposal Area

Boring No. EBB-2 | Sample No. UD-2

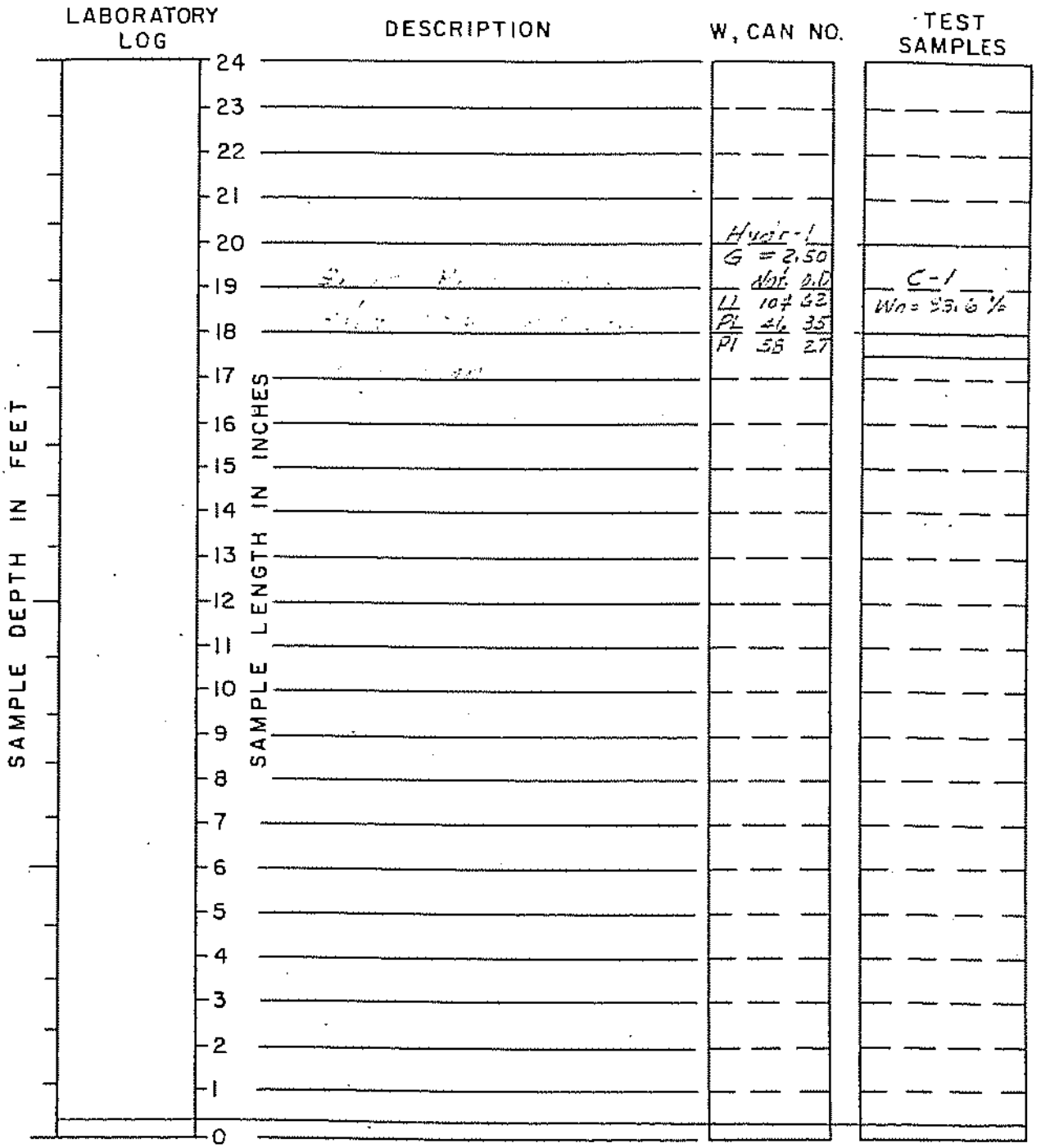
Depth 16.0' - 18.0' | Date Oct 1967

TRIAXIAL COMPRESSION TEST REPORT

Edgemoor

BORING NO. EBB-2
SAMPLE NO. UD-3
DEPTH: 22.0 to 24.0 ft.

PROJECT Delaware River Study
DATE October 1967
COMP. By WS CHK'D By RJS



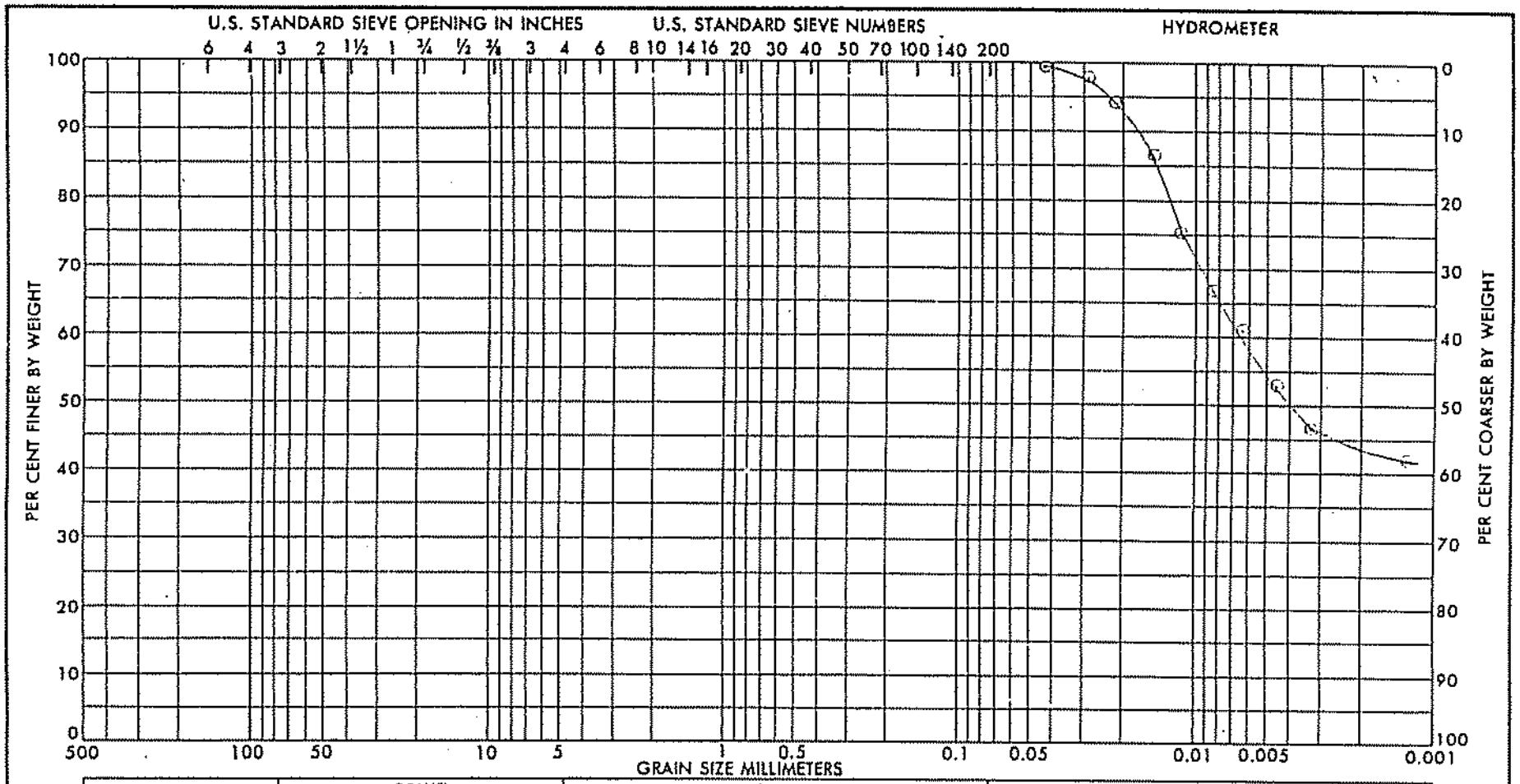
Length of Sample, L 23.77 in.
Weight of Tube and Wet Soil 15,325 g.
Weight of Tube 7,425 g.
Weight of Wet Soil, W 7,900 g.
Diameter of Tube, D 4.25 in.
Total Unit Weight, $\gamma_t = \frac{4.85\,W}{LD^2}$ 92.2 lbs/cu.ft.

UNDISTURBED SAMPLE LOG

LEGEND

W_n — Natural Water Content
MA — Mechanical Analysis
LL — Atterberg Limits
G — Specific Gravity
C — Consolidation
Q — Unconsolidated Undrained
γ_d — Dry Density
R — Consolidated Undrained
S — Consolidated Drained
UC — Unconfined Compression

NED FORM DEC 62 501



SAMPLE NO.	ELEV. OR DEPTH	CLASSIFICATION	NAT W%	LL	PL	PI
UD-1	22.0'-24.0'	Organic CLAY (OH)	Natural	104	46	58
			Oven-Dried	62	35	27

GRADATION CURVES

PROJECT Long Range Delaware River Disposal Area

AREA

BORING NO. EBB-2

DATE Sept. 1967

ENG FORM 2087
1 MAY 63

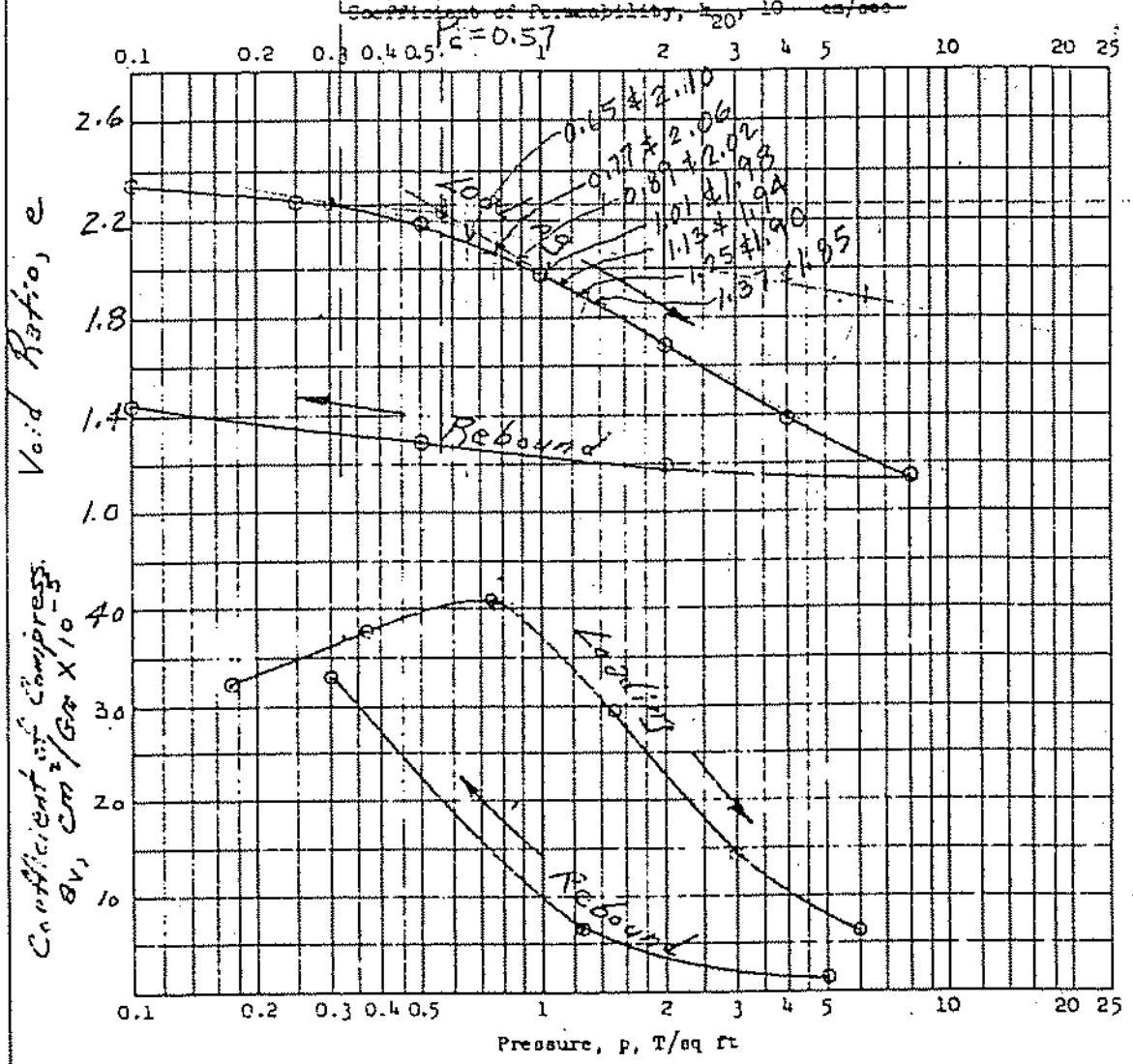
REPLACES WES FORM NO. 1241, SEP 1962, WHICH IS OBSOLETE.

U.S. GOVERNMENT PRINTING OFFICE : 1963 O-709-128

$P_o = 0.36$ T/sq ft

Pre cons.

$P_c = 0.57$

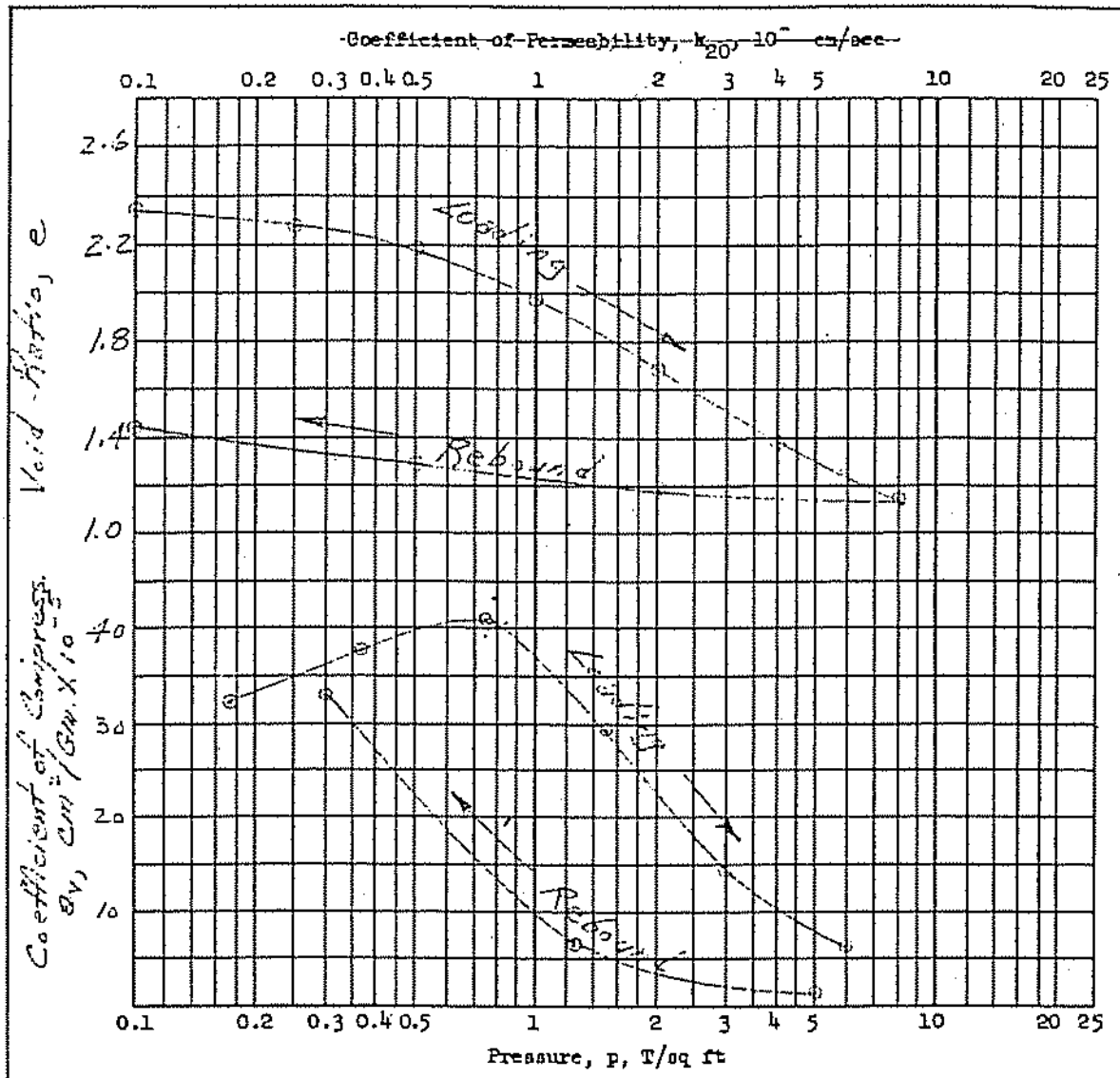


Type of Specimen: Undisturbed		Before Test		After Test	
Diam 3.0 in.	Ht 0.75 in.	Water Content, w_o	93.6 %	w_f	59.5 %
Overburden Pressure, p_o 0.36 T/sq ft		Void Ratio, e_o	2.363	e_f	1.426
Preconsol. Pressure, p_c 0.57 T/sq ft		Saturation, S_o	99.0 %	S_f	100+ %
Compression Index, C_c 0.99		Dry Density, γ_d	46.4 lb/ft³		
Classification Organic Silt (OH) w/ fibrous vegetation		k_{20} at e_o =	x 10^{-} cm/sec		
LL 104 62	G_s 2.50	Project Long Range Delaware River Disposal Area			
PL 46 35	k_{20} < 0.001	Area Edgemoor			
Remarks		Boring No. EBB-2	Sample No. UD-3		
$P_o = 0.36$ T/sq ft		Depth 22.0'-24.0'	Date Oct. 1967		

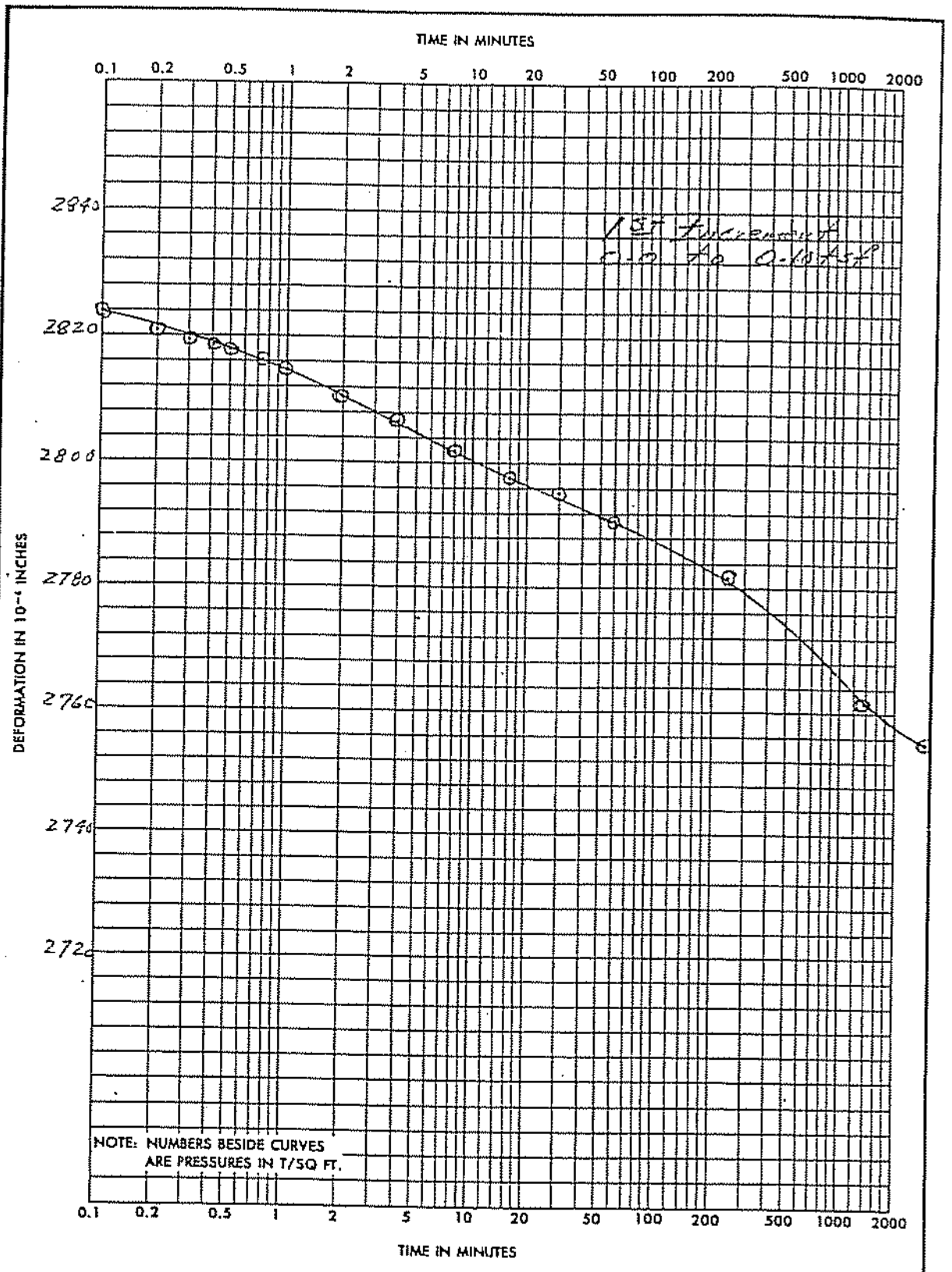
CONSOLIDATION TEST REPORT

ENG FORM 2090 PREVIOUS EDITIONS ARE OBSOLETE. (TRANSLUCENT)

$\gamma_b = 27.9$ p.c.f.



Type of Specimen	Undisturbed	Before Test		After Test	
Diam 3.0 in.	Ht 0.75 in.	Water Content, w_o	93.6 %	w_f	59.5 %
Overburden Pressure, Po 0.36 T/sq ft		Void Ratio, e_o	2.363	e_f	1.426
Preconsol. Pressure, Pc 0.57 T/sq ft		Saturation, S_o	99.0 %	S_f	100+ %
Compression Index, C_c 0.99		Dry Density, γ_d	46.4 lb/ft³		
Classification Organic SILT (OH) w/fibrous vegetation		k_{20} at e_o =	× 10^{-} cm/sec		
LL 104 62	G_s 2.50	Project Long Range Delaware River Disposal Area			
PL 46 35	D_{10} < 0.001				
Remarks		Area Elsinboro			
		Boring No. EB-2		Sample No. UD-2	
		Depth 22.0'-22.6'		Date Oct 73	
		CONSOLIDATION TEST REPORT			



PROJECT Long Range Labrador River Disposal Area Study

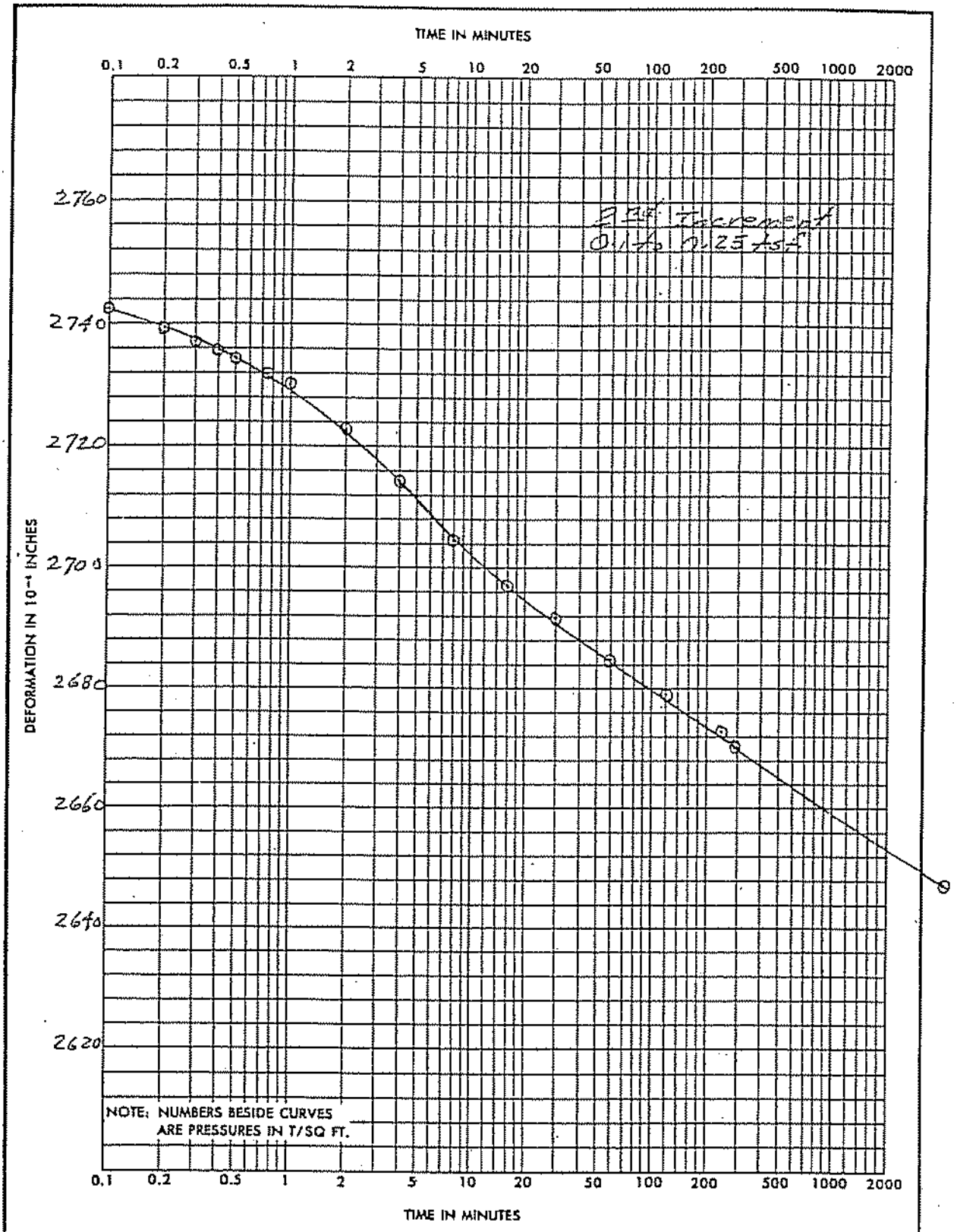
AREA

BORING NO. EBB-2 | SAMPLE NO. UD-3 | DEPTH ~~El~~ 22.0'-24.0' | DATE Dec. 1965

ENG FORM 2088 1 MAY 63 PREVIOUS EDITIONS ARE OBSOLETE.

CONSOLIDATION TEST—TIME CURVES (TRANSLUCENT)

* GPO : 1964 OF—715-965



PROJECT Long Range Delaware River Disposal Area Study

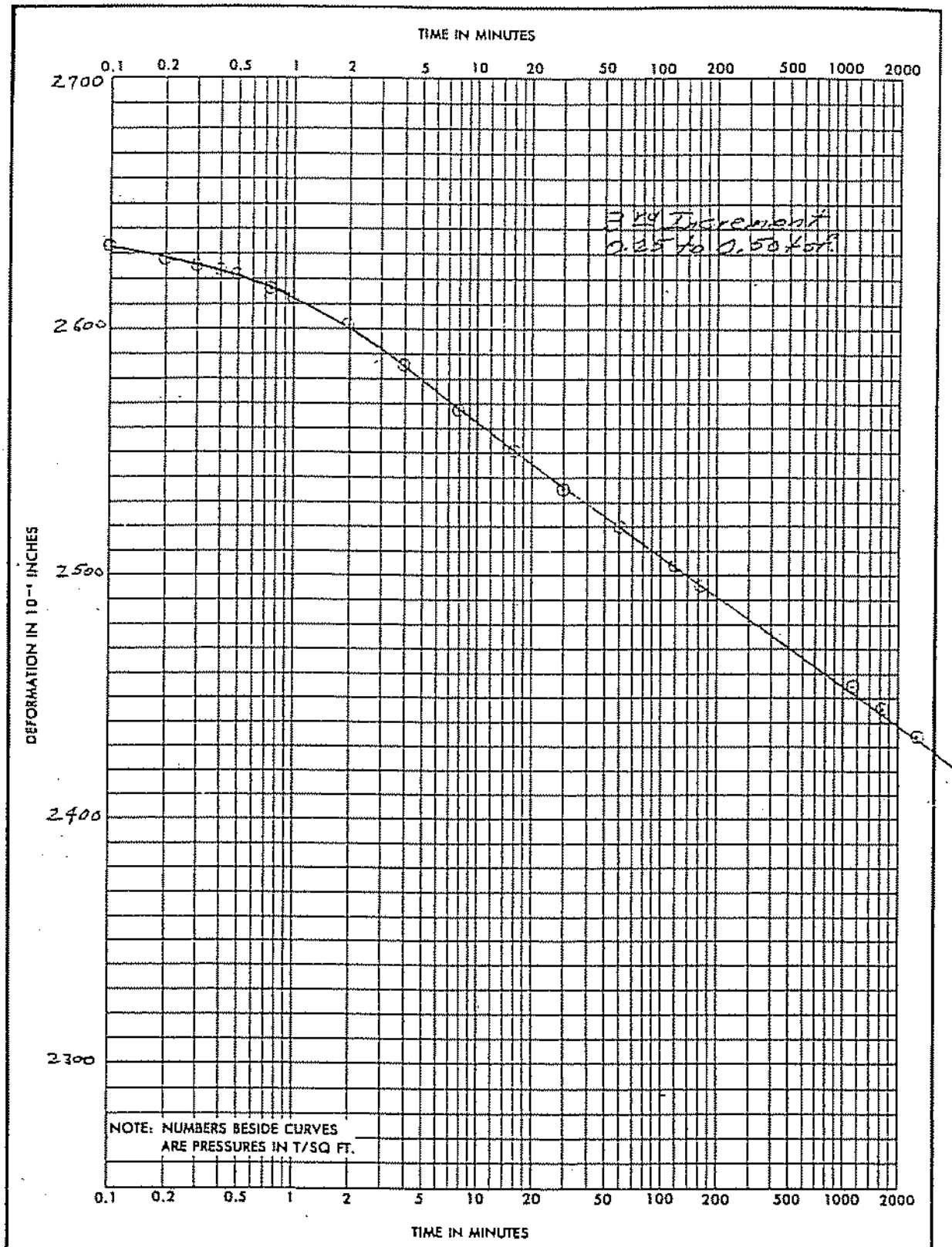
AREA

BORING NO.	SAMPLE NO.	DEPTH ~~EL~~	DATE
EB5-2	UD-3	22.0' - 24.0'	Dec. 1967

ENG FORM 2088 1 MAY 63 PREVIOUS EDITIONS ARE OBSOLETE.

CONSOLIDATION TEST—TIME CURVES (TRANSLUCENT)

* GPO : 1964 OF—715-963

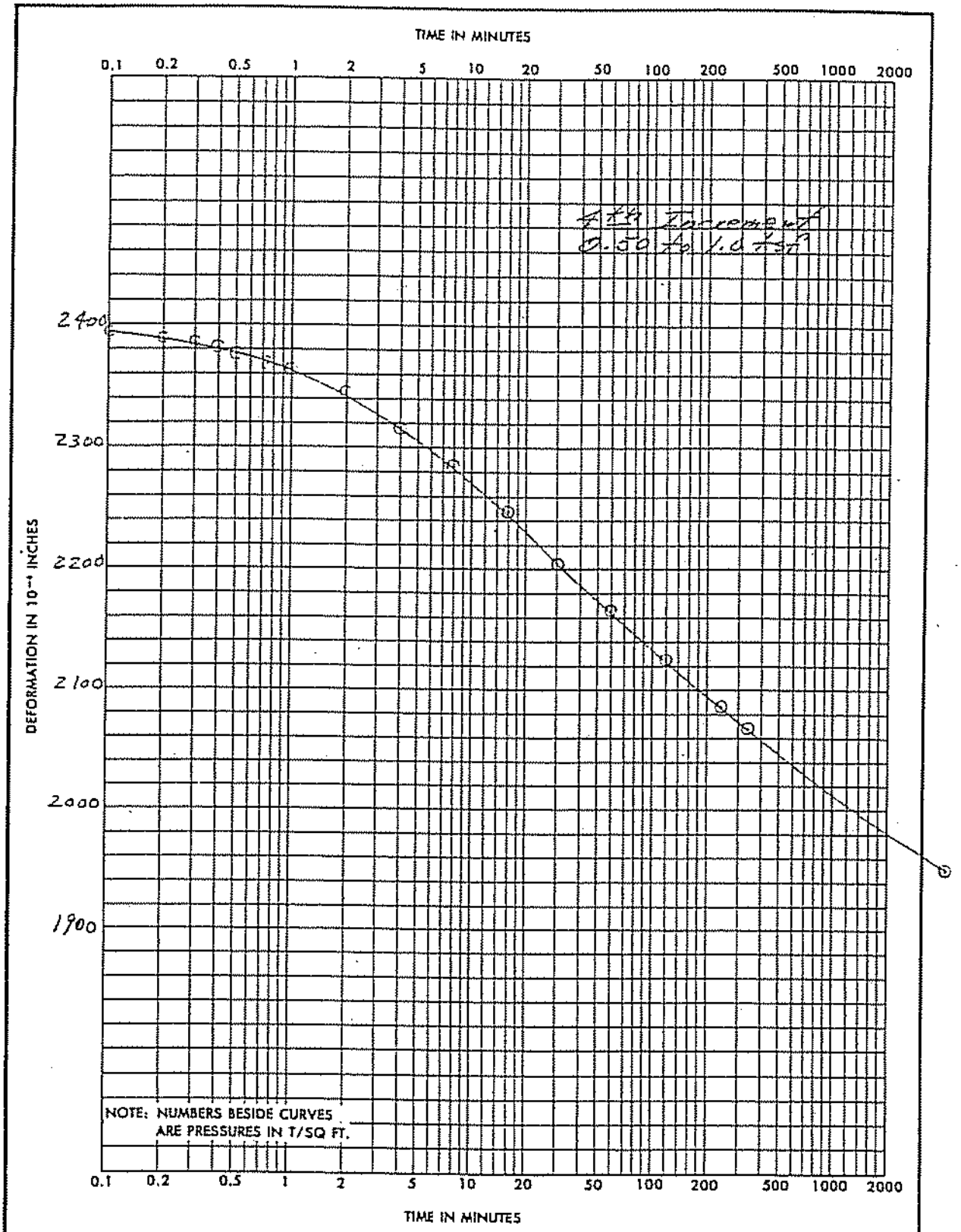


PROJECT	Long Range Delaware River Disposal Area Study			
AREA	Edgewood			
BORING NO. EBB-2	SAMPLE NO. UD-3	DEPTH 22.0'-24.0'	DATE Dec. 1967	

ENG FORM 2088 1 MAY 63 PREVIOUS EDITIONS ARE OBSOLETE.

CONSOLIDATION TEST—TIME CURVES (TRANSLUCENT)

* GPO : 1964 OP—715-965



PROJECT Long Range Blizzard River Disposal Area Study

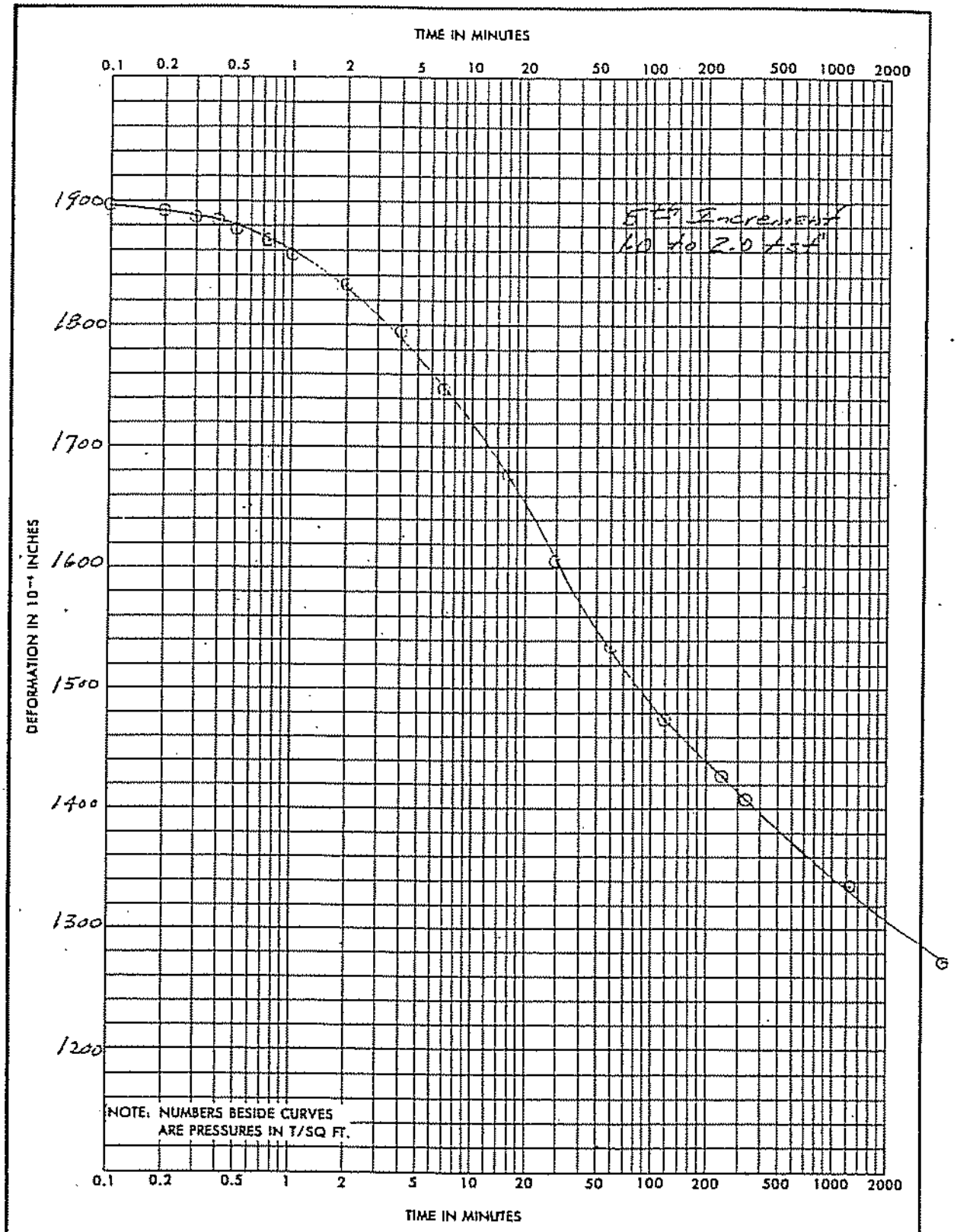
AREA

BORING NO.	SAMPLE NO.	DEPTH	DATE
EB-2	UD-3	22.0' - 24.0'	Dec. 1967

ENG FORM 2088 1 MAY 63 PREVIOUS EDITIONS ARE OBSOLETE.

CONSOLIDATION TEST—TIME CURVES (TRANSLUCENT)

* GPO : 1964 O—715-965



PROJECT Long Range Delaware River Disposal Area Study

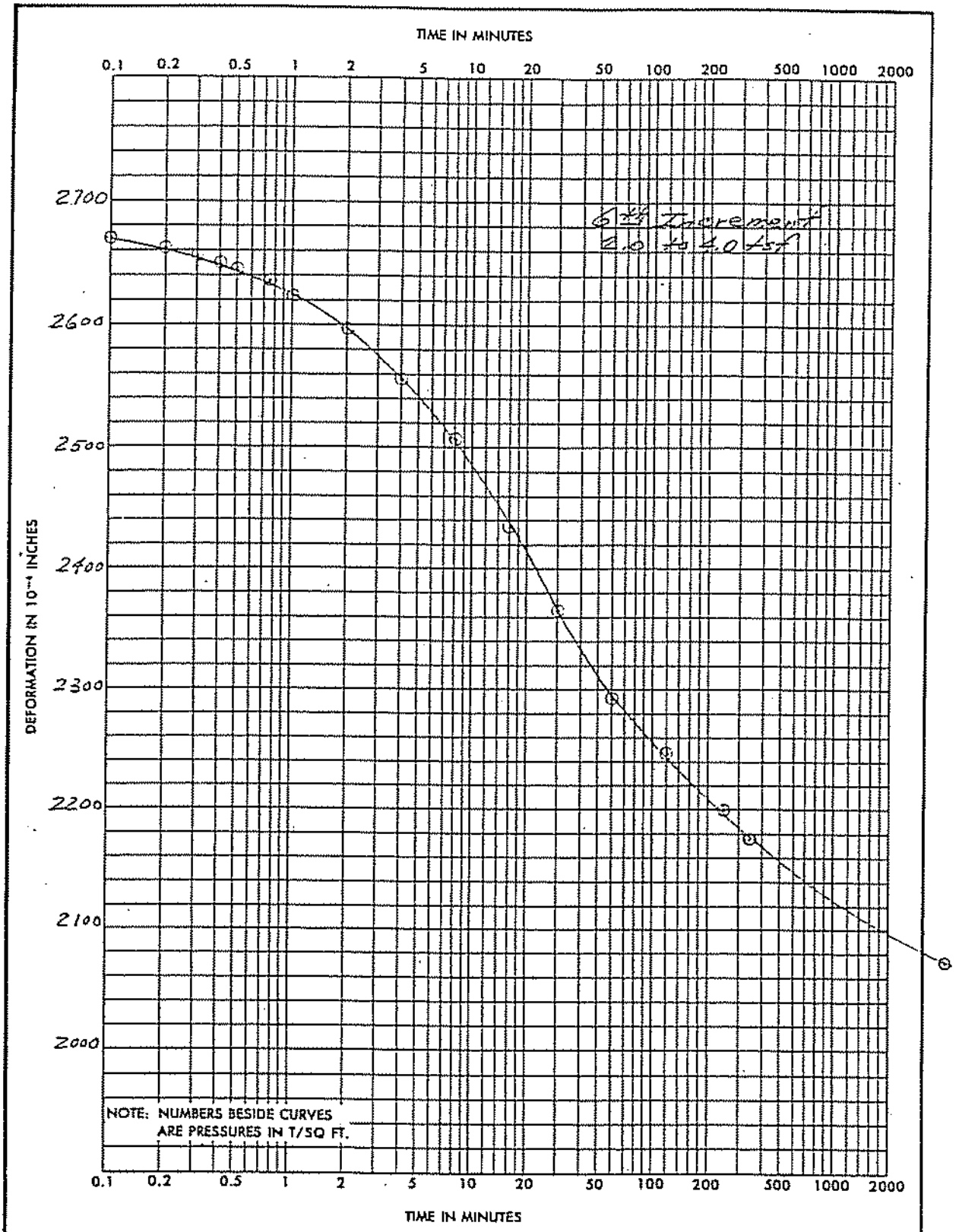
AREA

BORING NO.	SAMPLE NO.	DEPTH	DATE
ES8-3	UD-3	22.0' - 24.0'	Dec. 1967

ENG FORM 2088 1 MAY 63 PREVIOUS EDITIONS ARE OBSOLETE.

CONSOLIDATION TEST—TIME CURVES (TRANSLUCENT)

* GPO : 1964 OF—715-965



PROJECT Long Range Delaware River Disposal Area Study

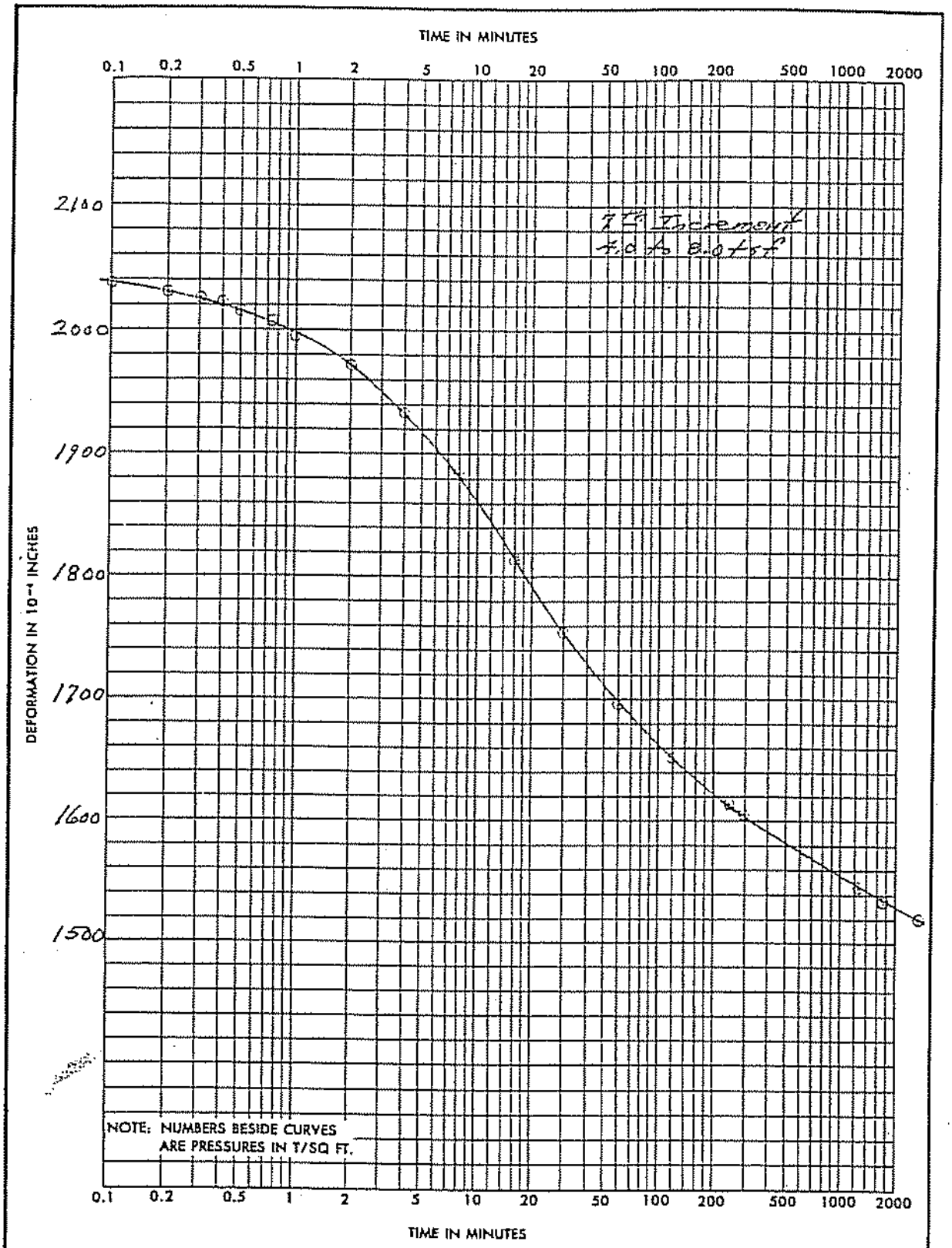
AREA

BORING NO.	SAMPLE NO.	DEPTH	DATE
EBB-2	UD-3	22.0' - 24.0'	Dec. 1967

ENG FORM 2088 1 MAY 63 PREVIOUS EDITIONS ARE OBSOLETE.

CONSOLIDATION TEST—TIME CURVES (TRANSLUCENT)

* GPO : 1964 OF—715-965



PROJECT Long Range Delaware River Disposal Area Study

AREA

BORING NO.	SAMPLE NO.	DEPTH	DATE
EBB-2	UD-3	22.0'-24.0'	Dec. 1967

ENG FORM 2088 1 MAY 63 PREVIOUS EDITIONS ARE OBSOLETE.

CONSOLIDATION TEST—TIME CURVES (TRANSLUCENT)

* GPO : 1964 OP—715-965

Edgemoor

BORING NO. EBB-2
SAMPLE NO. UD-4
DEPTH: 28.0 to 30.0 ft.

PROJECT Delaware River Study
DATE October 1967
COMP. By WS CHK'D By RJS

LABORATORY LOG	DESCRIPTION	W, CAN NO.	TEST SAMPLES
	Dark gray organic CLAY (OH), micaceous		W_n = 88.4%
	Alternating zones of dark gray micaceous organic CLAY (OH) ½" to hairline in thickness and med-gray slightly organic SILT (OH) in zones ranging from 1" to hairline in thickness.		W_n = 45.5% γ_n = 73.6 pcf e = 1.137 n = 53.2 % S = 100 %
			W_n = 42.7%
	Dark gray micaceous organic CLAY (OH) w/occ. hairline lenses of med-gray organic SILT (OH)	Hydr-1 G = 2.52 LL = 119 PL = 49 PI = 70	W_n = 87.2% W_n = 77.4% γ_n = 51.1 pcf e = 2.074 n = 67.5% S = 94.0%
	Dark gray micaceous organic CLAY (OH)		W_n = 77.0%
	Bottom of Sample		

SAMPLE DEPTH IN FEET

SAMPLE LENGTH IN INCHES

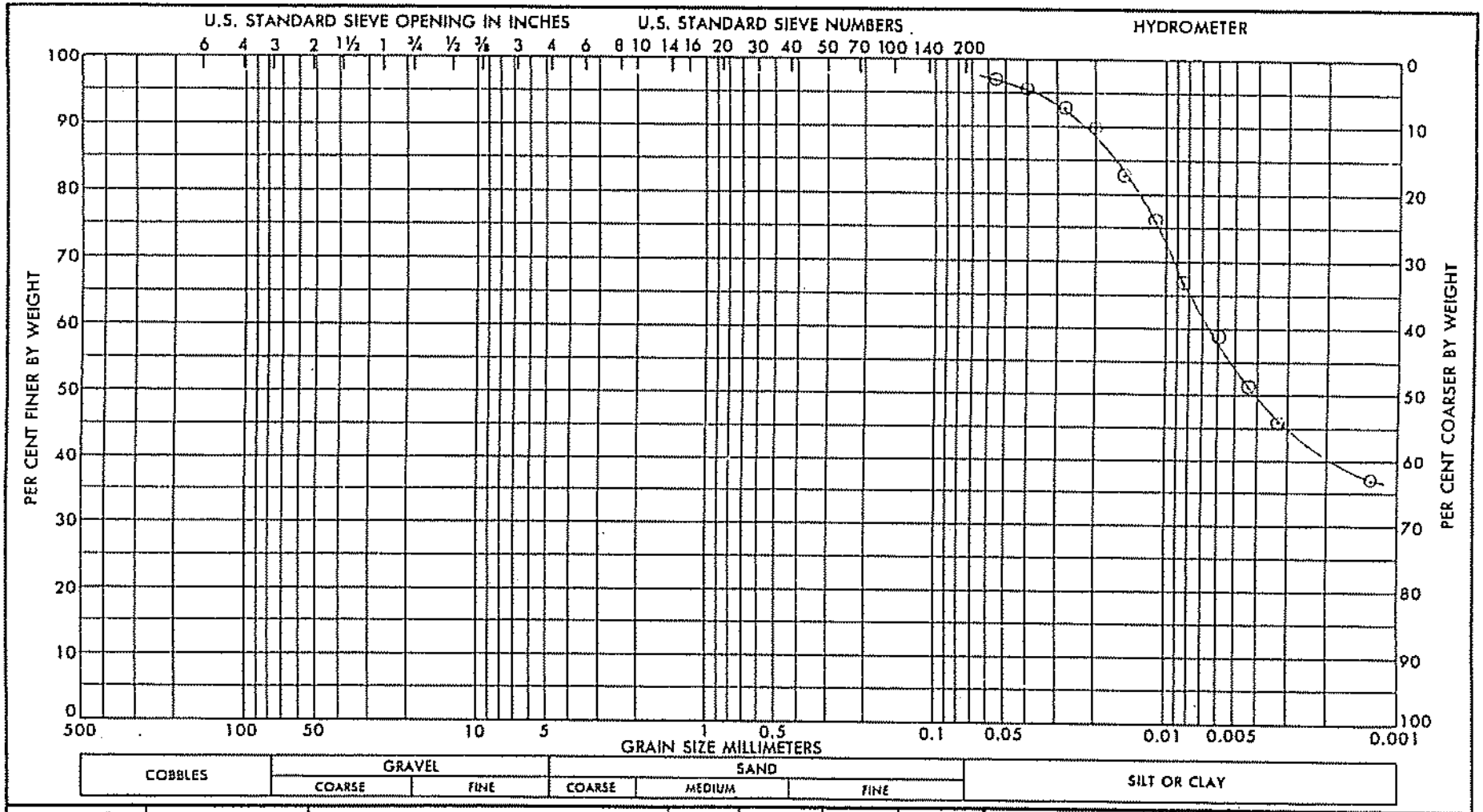
Length of Sample, L 23.06 in.
Weight of Tube and Wet Soil 15.400 g.
Weight of Tube 7.250 g.
Weight of Wet Soil, W 8.150 g.
Diameter of Tube, D 4.25 in.
Total Unit Weight, $\gamma_t = \frac{4.85\,W}{LD^2}$ 95.0 lbs/cu.ft.

LEGEND

W_n — Natural Water Content
MA — Mechanical Analysis
LL — Atterberg Limits
G — Specific Gravity
C — Consolidation
Q — Unconsolidated Undrained
γ_d — Dry Density
R — Consolidated Undrained
S — Consolidated Drained
UC — Unconfined Compression

UNDISTURBED SAMPLE LOG

NED FORM DEC 62 501



SAMPLE NO.	ELEV OR DEPTH	CLASSIFICATION	NAT W%	LL	PL	PI
UD-4	28.0'-30.0'	Organic CLAY (OH)		119	49	70

GRADATION CURVES

PROJECT Long Range Delaware River Disposal Area

AREA

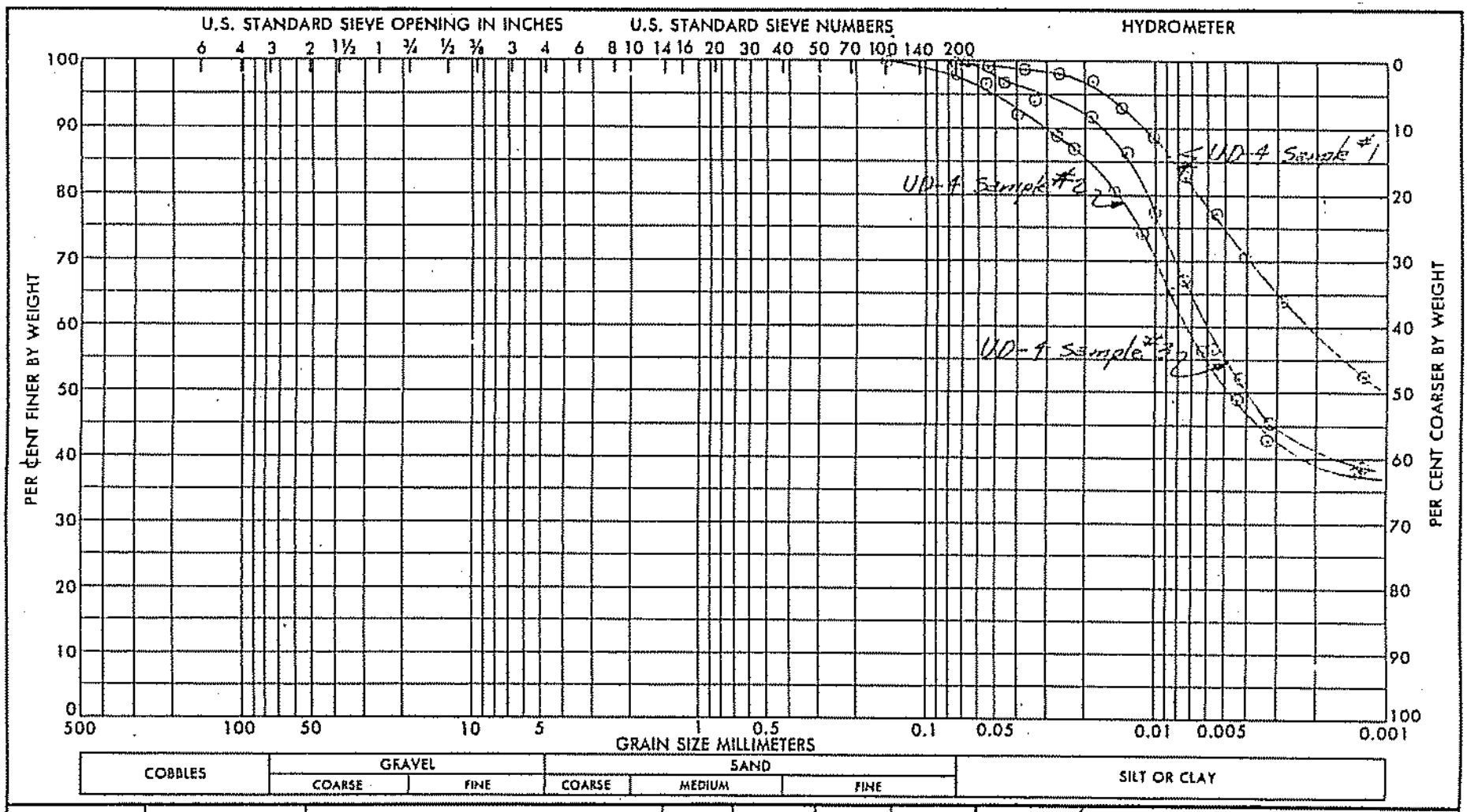
BORING NO. EBE-2

DATE Oct 1967

ENG FORM 2087
1 MAY 63

REPLACES WES FORM NO. 1241, SEP 1962, WHICH IS OBSOLETE. (TRANSLUCENT)

U.S. GOVERNMENT PRINTING OFFICE: 1963 O-705-184



SAMPLE NO.	~~ELEV OR~~ DEPTH	CLASSIFICATION	NAT W%	LL	PL	PI
UD-4 Sample #1	26.0'-28.0'	Organic CLAY (OH)		114	40	74
UD-4 Sample #2	"	Organic CLAY (OH)		73	34	39
UD-4 Sample #3	"	Organic CLAY (OH)		80	33	47

GRADATION CURVES

PROJECT Long Range Delaware River

AREA

BORING NO. EBB-3

DATE Oct. 1967

ENG FORM 2087
1 MAY 63

REPLACES WES FORM NO. 1241, SEP 1962, WHICH IS OBSOLETE. (TRANSLUCENT)

U.S. GOVERNMENT PRINTING OFFICE : 1963 O—709-126

Edgemoor

BORING NO. EBB-3
SAMPLE NO. UD-1
DEPTH: 4.0 to 6.0 ft.

PROJECT Delaware River Study
DATE October 1967
COMP. By WS CHK'D By RJS

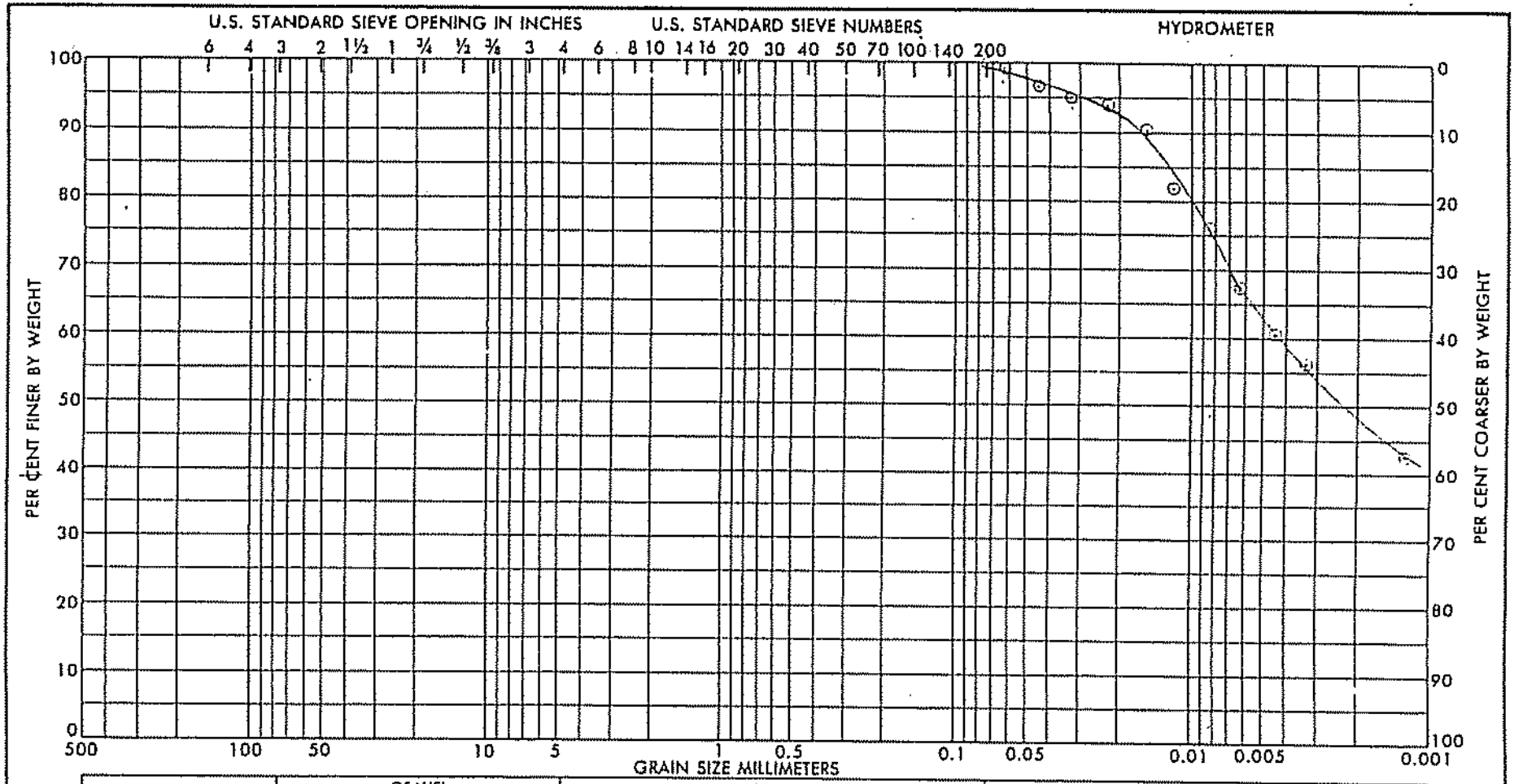
SAMPLE DEPTH IN FEET	SAMPLE LENGTH IN INCHES	DESCRIPTION	W, CAN NO.	TEST SAMPLES
		Grayish brown micaceous organic CLAY (OH) w/ numerous reeds, and hairline plant roots, moist.		W_n = 113.9 %
		Dark grayish-brown micaceous CLAY (OH), very moist	Hydr-1 G = 2.52 LL = 131 PL = 49 PI = 82	W_n = 118.0 % γ_n = 36.7 pcf e = 3.289 n = 76.7 % S = 90.4 %
		Grayish-brown micaceous organic CLAY (OH) w/ numerous reeds and hairline thick plant roots	Hydr-2 G = 2.54 LL = 115 PL = 44 PI = 71	W_n = 113.0 % γ_n = 37.2 pcf e = 3.263 n = 76.5 % S = 88.0 %
		Dark grayish brown micaceous organic CLAY (OH)		W_n = 122.4 %
		Bottom of sample		

Length of Sample, L 22.68 in.
Weight of Tube and Wet Soil 13,750 g.
Weight of Tube 6,890 g.
Weight of Wet Soil, W 6,860 g.
Diameter of Tube, D 4.25 in.
Total Unit Weight, $\gamma_t = \frac{4.85\,W}{L\,D^2}$ 81.2 lbs/cu.ft.

LEGEND
W_n – Natural Water Content
MA – Mechanical Analysis
LL – Atterberg Limits
G – Specific Gravity
C – Consolidation
Q – Unconsolidated Undrained
γ_d – Dry Density
R – Consolidated Undrained
S – Consolidated Drained
UC – Unconfined Compression

UNDISTURBED SAMPLE LOG

NED FORM DEC 62 501



SAMPLE NO.	ELEV OR DEPTH	CLASSIFICATION	NAT W%	LL	PL	PI
UD/Sample #1	4.0'-6.0'	Organic CLAY (OH)		131	49	82

GRADATION CURVES

PROJECT Long Range Delaware River Disposal Area

AREA

BORING NO. EBB-3

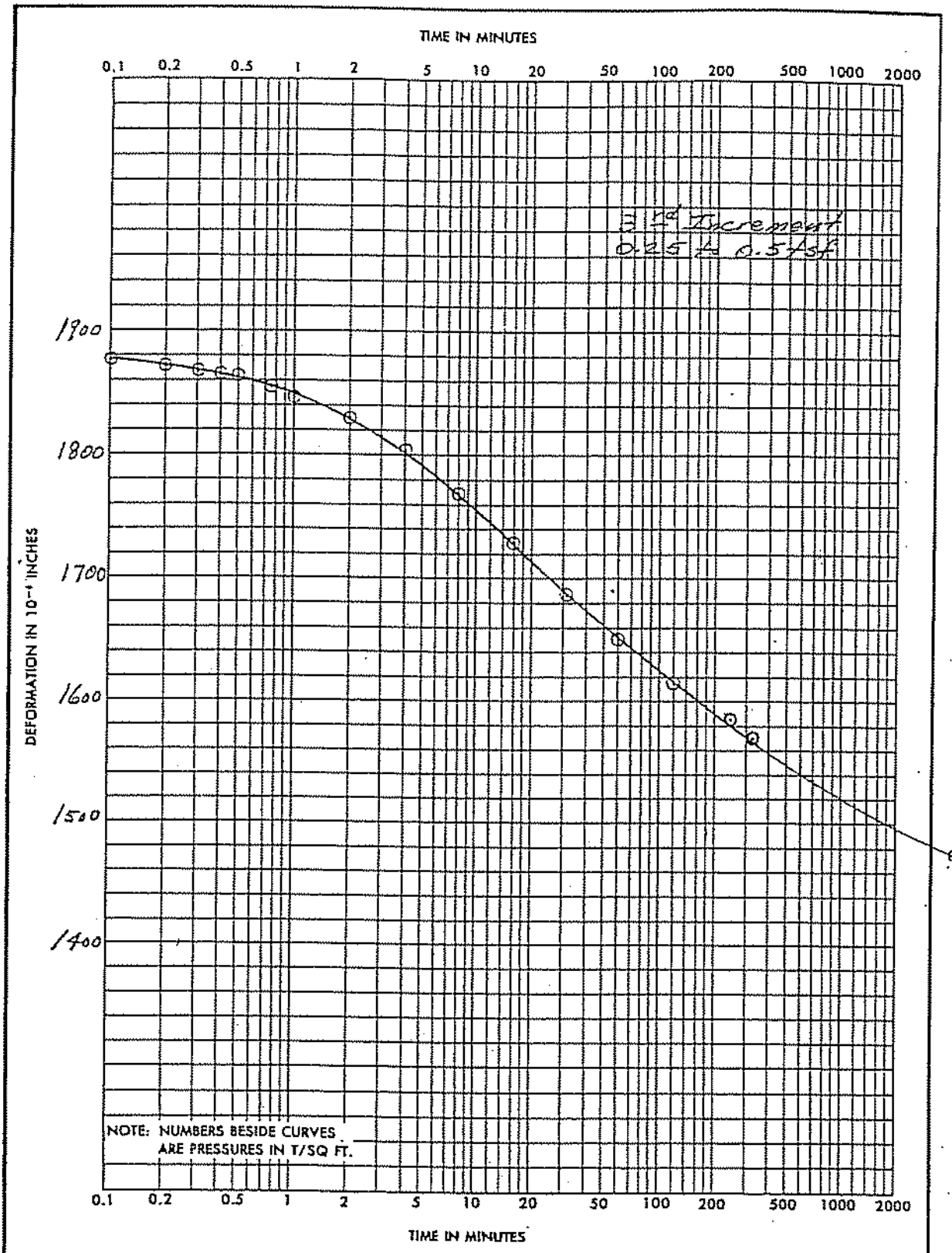
DATE Oct 1967

ENG FORM 2087
1 MAY 63

REPLACES WES FORM NO. 1241, SEP 1962, WHICH IS OBSOLETE.

(TRANSLUCENT)

U.S. GOVERNMENT PRINTING OFFICE : 1963 OF—709-124



PROJECT Long Range Delaware River Disposal Area Study

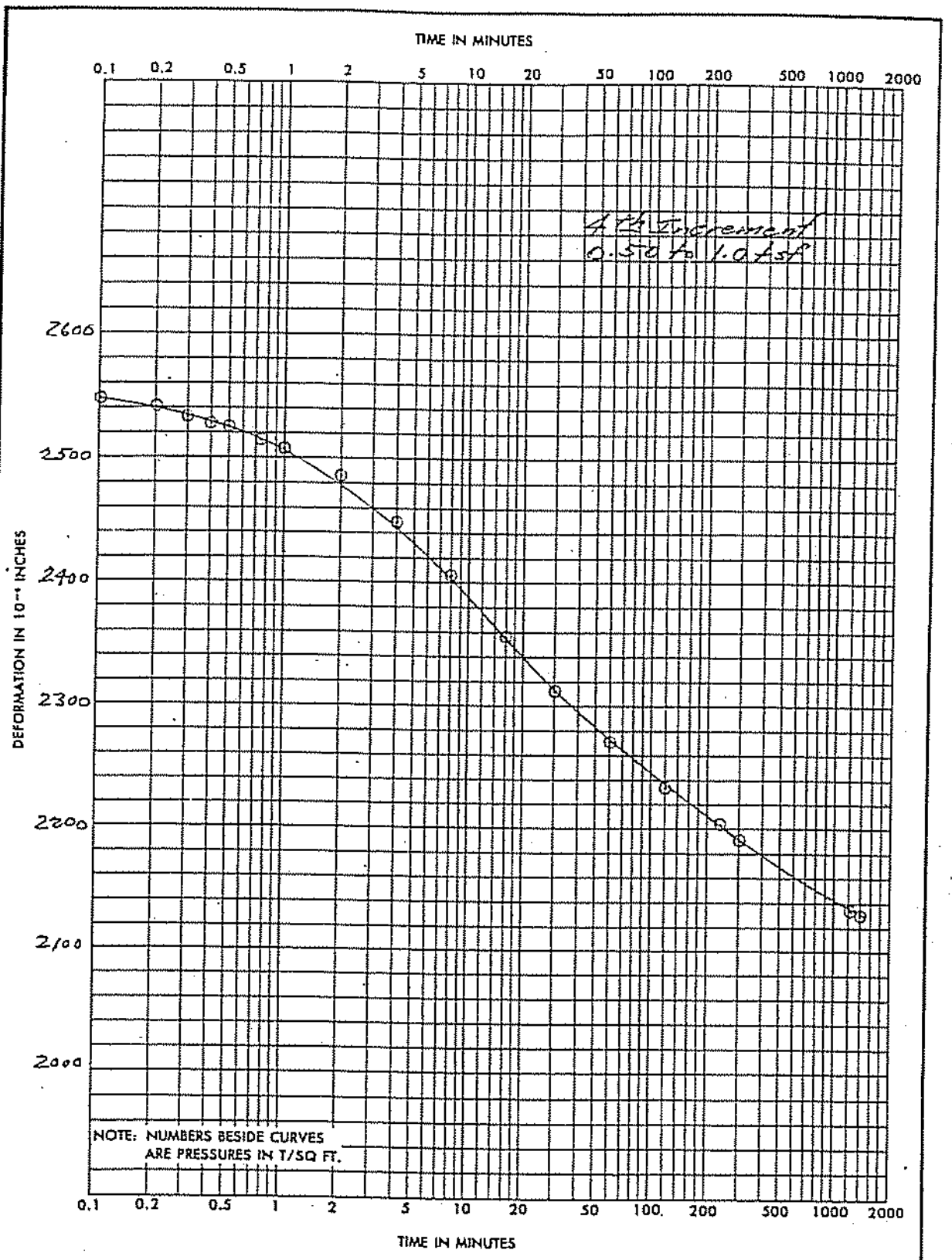
AREA

BORING NO. EBB-4	SAMPLE NO. UD-1	DEPTH ~~EL~~ 8.0'-10.0'	DATE Dec. 1967

ENG FORM 2088 1 MAY 63 PREVIOUS EDITIONS ARE OBSOLETE.

CONSOLIDATION TEST—TIME CURVES (TRANSLUCENT)

* GPO : 1964 OF—715-965



PROJECT Long Range Delaware River Disposal Area Study

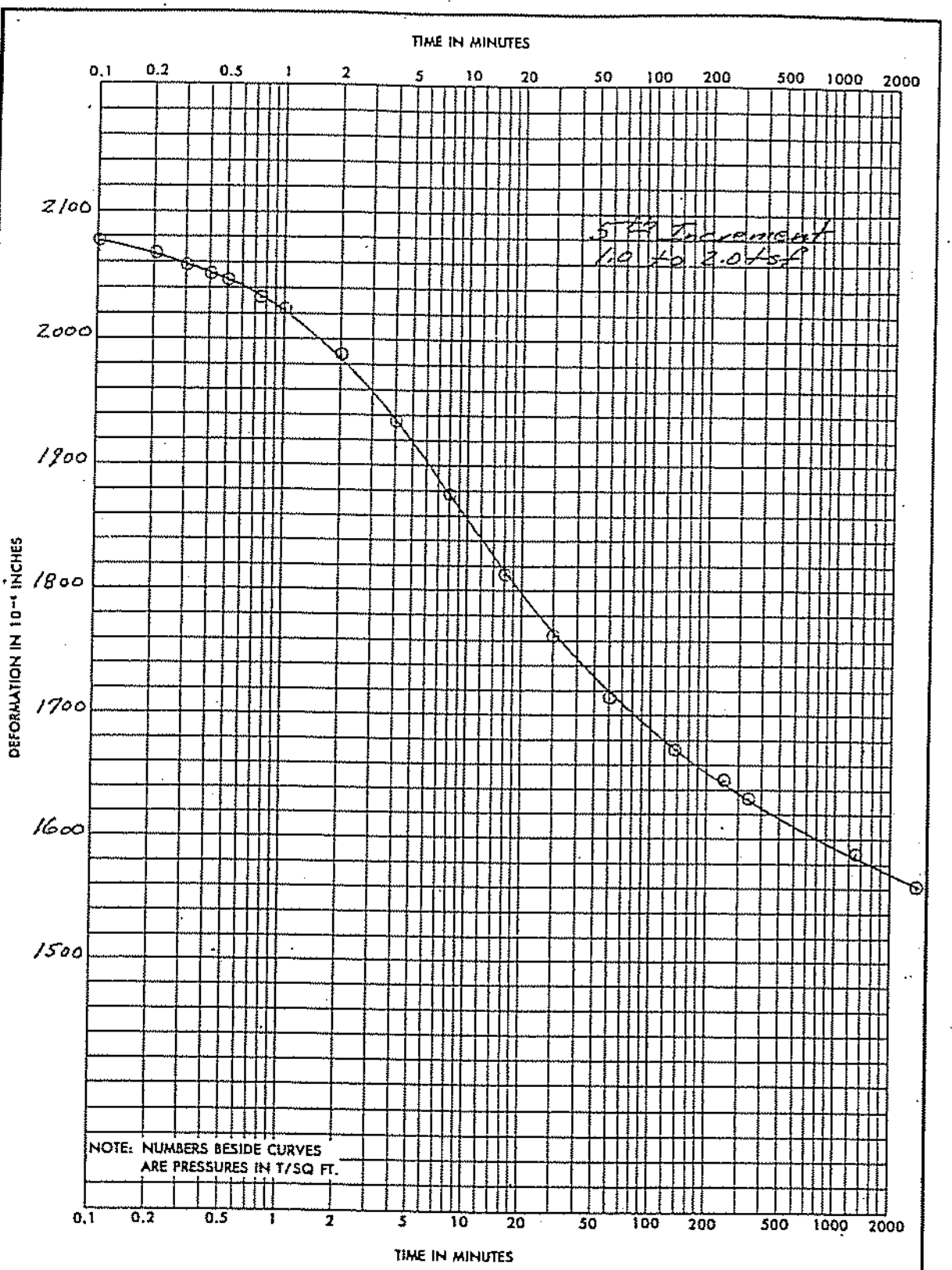
AREA

BORING NO. EB-4 | SAMPLE NO. UD-1 | DEPTH Ft 8.0'-10.0' | DATE Dec. 1967

ENG FORM 2088 1 MAY 63 PREVIOUS EDITIONS ARE OBSOLETE.

CONSOLIDATION TEST—TIME CURVES (TRANSLUCENT)

* GPO : 1964 O-713-965



PROJECT Long Range Delaware River Disposal Area Study

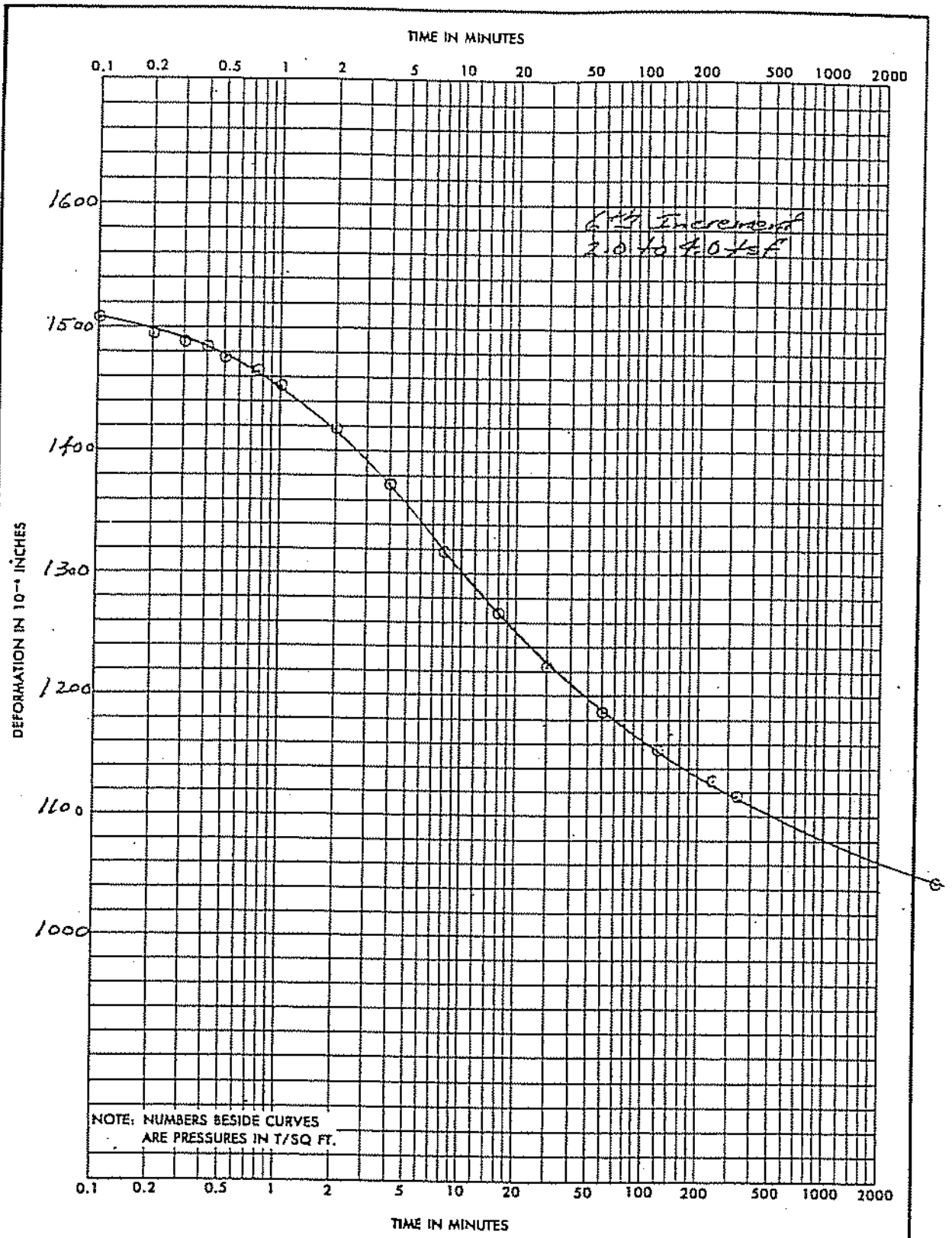
AREA

BORING NO.	SAMPLE NO.	DEPTH	DATE
E88-4	UD-1.	8.0'-10.0'	Dec. 1967

ENG FORM 2088 1 MAY 63 PREVIOUS EDITIONS ARE OBSOLETE.

CONSOLIDATION TEST—TIME CURVES (TRANSLUCENT)

* GPO : 1964 O-715-965



PROJECT Long Range Delaware River Disposal Area Study

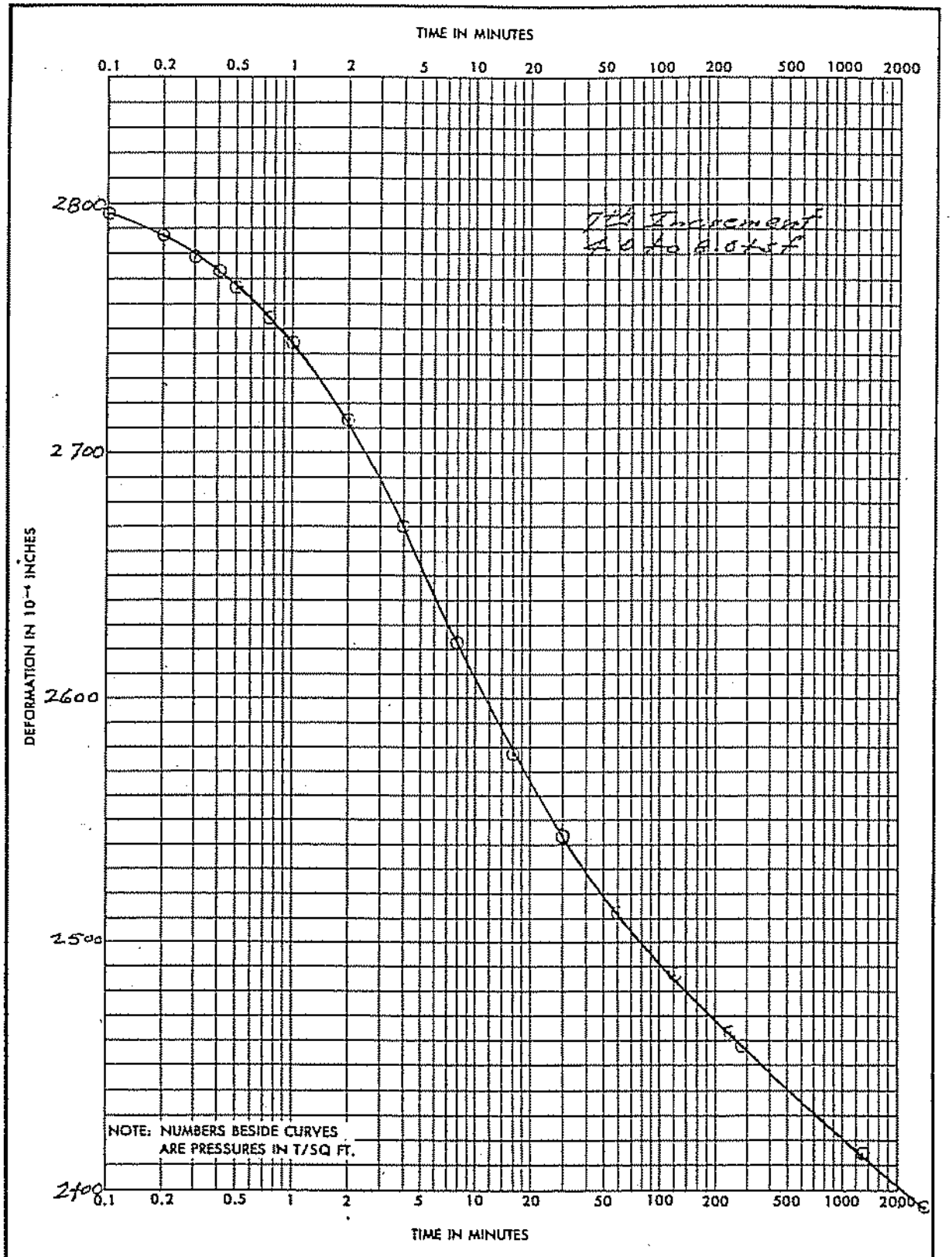
AREA

BORING NO. EBB-4	SAMPLE NO. UD-1	DEPTH ~~EL~~ 8.0'-10.0'	DATE Dec. 1967

ENG FORM 2088 1 MAY 63 PREVIOUS EDITIONS ARE OBSOLETE.

CONSOLIDATION TEST—TIME CURVES (TRANSLUCENT)

GPO : 1964 OF—715-963



PROJECT Long Range Delaware River Disposal Area Study

AREA Edgemoor

BORING NO. EBB-4 | SAMPLE NO. UD-1 | DEPTH ft 8.0'-10.0' | DATE Dec. 1967

ENG FORM 2088 1 MAY 63 PREVIOUS EDITIONS ARE OBSOLETE.

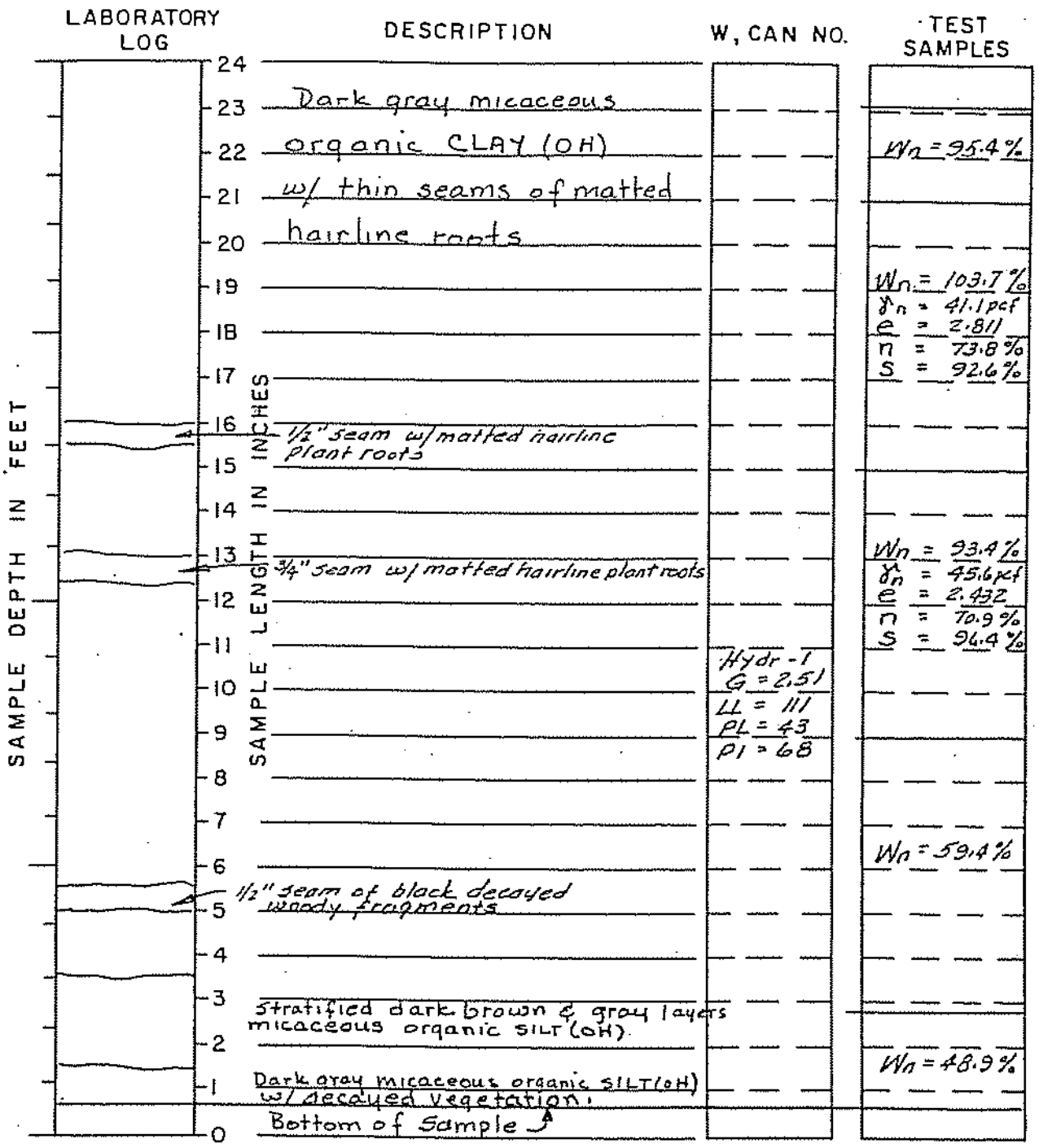
CONSOLIDATION TEST—TIME CURVES (TRANSLUCENT)

GPO : 1964 OF—715-965

Edgemoor

BORING NO. EBB-4
SAMPLE NO. UD-2
DEPTH: 16.0 to 18.0 ft.

PROJECT Delaware River Study
DATE October 1967
COMP. By WS CHK'D By RJS

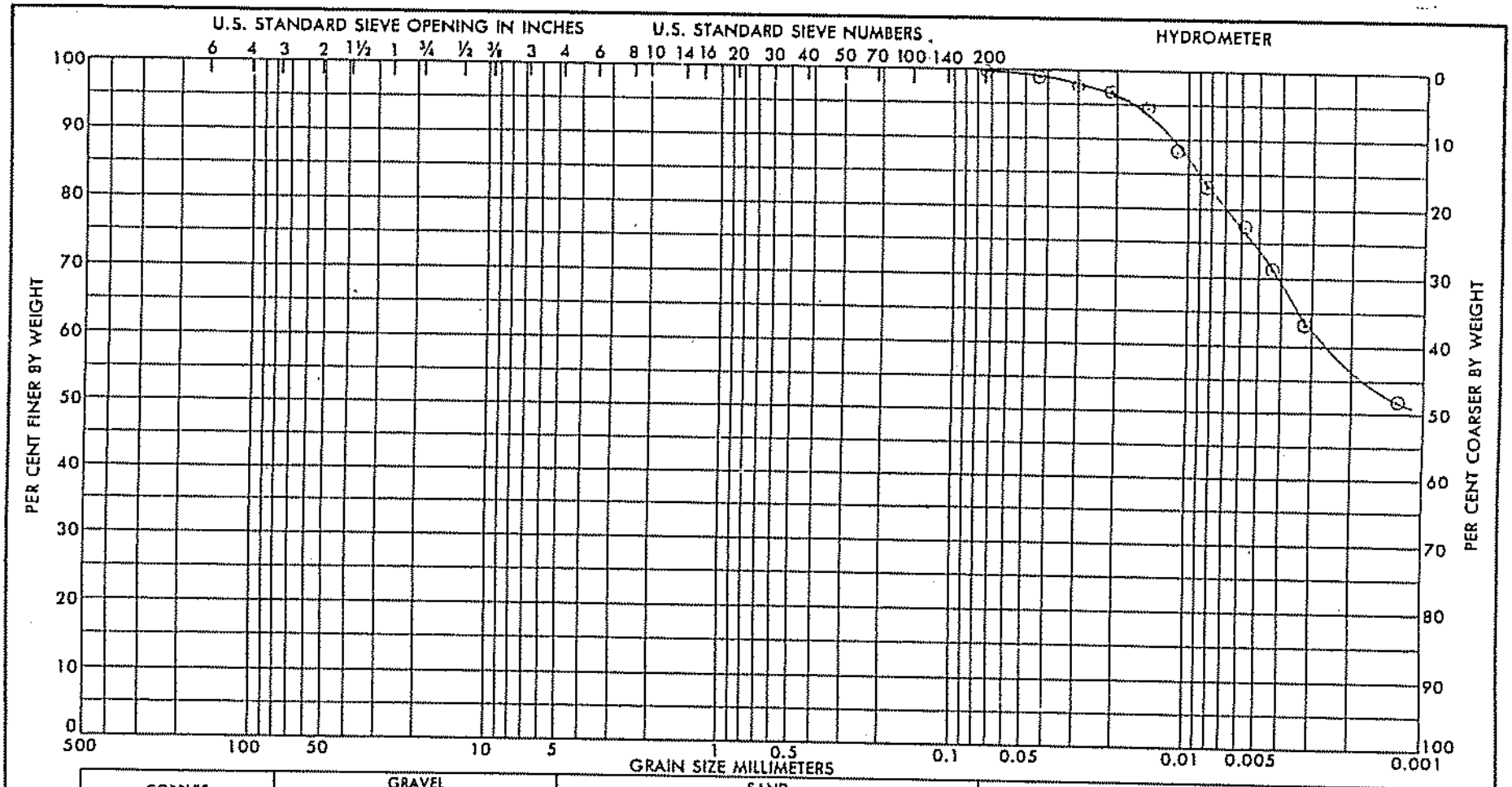


Length of Sample, L 23.28 in.
Weight of Tube and Wet Soil 14,725 g.
Weight of Tube 6,940 g.
Weight of Wet Soil, W 7,785 g.
Diameter of Tube, D 4.25 in.
Total Unit Weight, $\gamma_t = \frac{4.85\,W}{L\,D^2}$ 89.8 lbs/cu.ft.

UNDISTURBED SAMPLE LOG

LEGEND
- W_n — Natural Water Content
- MA — Mechanical Analysis
- LL — Atterberg Limits
- G — Specific Gravity
- C — Consolidation
- Q — Unconsolidated Undrained
- γ_d — Dry Density
- R — Consolidated Undrained
- S — Consolidated Drained
- UC — Unconfined Compression

NED FORM DEC 62 501



SAMPLE NO.	ELEV. OR DEPTH	CLASSIFICATION	NAT W%	LL	PL	PI
UD-2	16.0'-18.0'	Organic CLAY (OH)		111	43	68

GRADATION CURVES

PROJECT Long Range Delaware River Disposal Area

AREA

BORING NO. EBB-4

DATE Oct. 1967

ENG FORM 2087
1 MAY 63

REPLACES WES FORM NO. 1241, SEP 1962, WHICH IS OBSOLETE. (TRANSLUCENT)

U.S. GOVERNMENT PRINTING OFFICE : 1963 O-705-126

Edgemoor

BORING NO. EBB-4
SAMPLE NO. UD-3
DEPTH: 26.0 to 28.0 ft.

PROJECT Delaware River Study
DATE October 1967
COMP. By WS CHK'D By RJS

SAMPLE DEPTH IN FEET	SAMPLE LENGTH IN INCHES	DESCRIPTION	W, CAN NO.	TEST SAMPLES
	24	Alternating lenses 1/16" to 1/4" thick of organic CLAY (OH) and Lt. gray fine sandy SILT (ML).		W_n = 53.3 % γ_n = 67.2 pcf e = 1.292 n = 56.4 % S = 100 %
	23			
	22			
	21			
	20			
	19	med-gray micaceous, organic silty fine SAND (SM)		W_n = 67.2 %
	18			
	17	(1/4" silt (ML) lense) Dark Gray micaceous organic CLAY (OH)		
	16			W_n = 65.8 % γ = 64.0 pcf e = 1.536 n = 61.5 % S = 100 %
	15			
	14			
	13	Alternating hairline lenses of dark gray organic CLAY (OH) & Lt to med gray fine sandy SILT (OL)		
	12	w/ irreg. discontinuous lenses of Dark gray CLAY (OH) 1/2" thick		
	11			
	10	Dark gray micaceous organic CLAY (OH)		W_n = 92.0 % γ_n = 48.0 pcf e = 2.213 n = 68.9 % S = 100 %
	9	Med gray organic fine sandy SILT (OL) w/ irreg. dk. gray hairline lenses of organic SILT (OH)		
	8		Hydr-1 G = 2.47 LL = 141 PL = 46 PI = 95	
	7			
	6	Dark gray micaceous organic		
	5	CLAY (OH) w/ hairline thick		W_n = 108.3 % γ_n = 42.6 pcf e = 2.619 n = 72.4 % S = 100 %
	4	brown lenses of decayed		
	3	organic material		
	2			W_n = 107.7 %
	1			
	0			

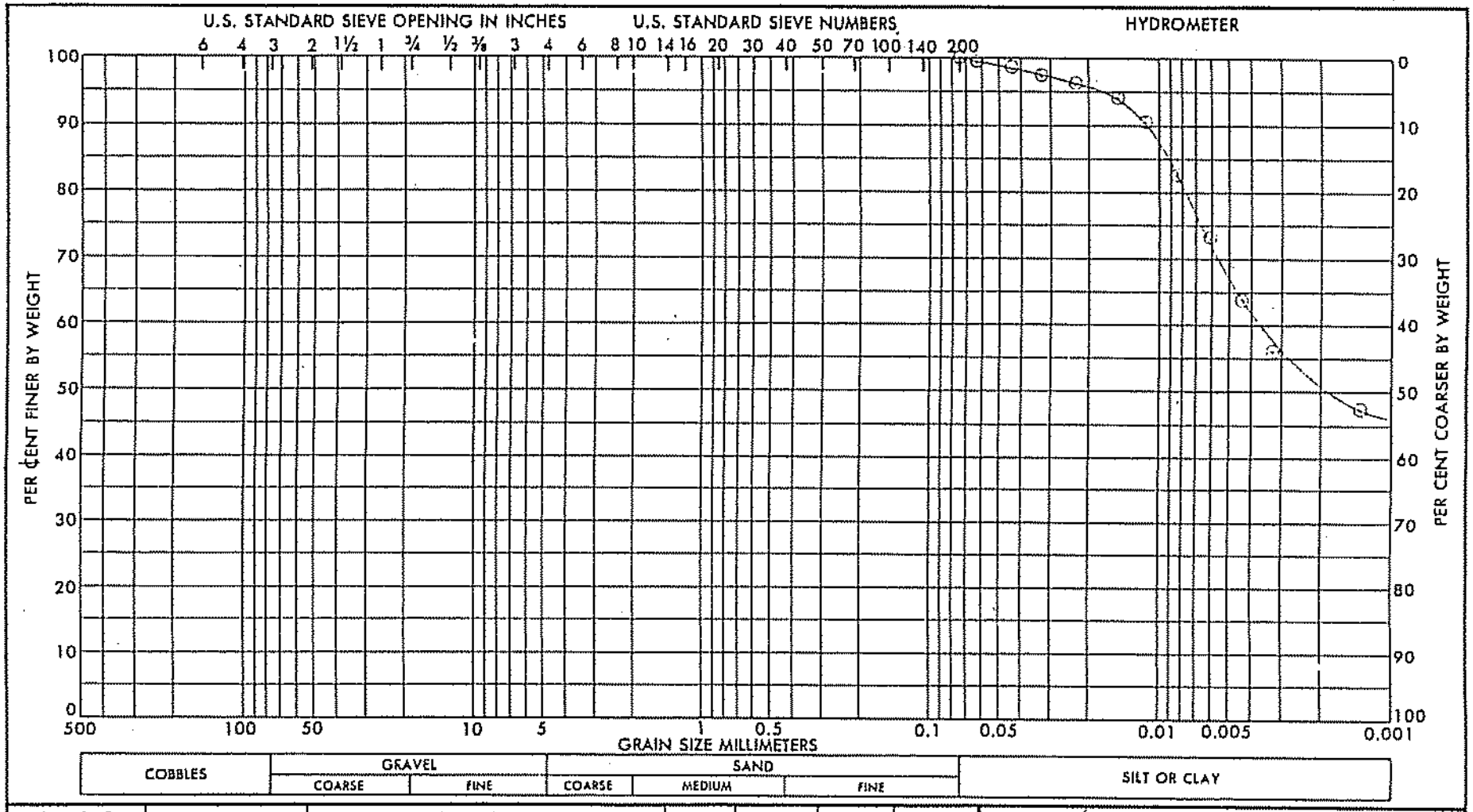
Length of Sample, L 22.81 in.
Weight of Tube and Wet Soil 14,825 g.
Weight of Tube 6,920 g.
Weight of Wet Soil, W 7,905 g.
Diameter of Tube, D 4.25 in.
Total Unit Weight, $\gamma_t = \frac{4.85\,W}{LD^2}$ 93.1 lbs/cu.ft.

LEGEND

W_n — Natural Water Content
MA — Mechanical Analysis
LL — Atterberg Limits
G — Specific Gravity
C — Consolidation
Q — Unconsolidated Undrained
γ_0 — Dry Density
R — Consolidated Undrained
S — Consolidated Drained
UC — Unconfined Compression

UNDISTURBED SAMPLE LOG

NED FORM DEC 62 501



SAMPLE NO.	ELEV. OR DEPTH	CLASSIFICATION	NAT W%	LL	PL	PI
UD-2	26.0'-28.0'	Organic CLAY (OH)		141	46	95

GRADATION CURVES

PROJECT Long Range Delaware River Disposal Area

AREA

BORING NO. EB3-4

DATE Oct. 1967

ENG FORM 2087
1 MAY 63

REPLACES WES FORM NO. 1241, SEP 1962, WHICH IS OBSOLETE. (TRANSLUCENT)

U.S. GOVERNMENT PRINTING OFFICE : 1963 O—709-126

EDGEMOOR

BORING NO. EBB-5
SAMPLE NO. UD-1
DEPTH: 2.0 to 4.0 ft.

PROJECT Delaware River Study
DATE October 1967
COMP. By WS CHK'D By RJS

LABORATORY LOG	DESCRIPTION	W, CAN NO.	TEST SAMPLES
SAMPLE DEPTH IN FEET / SAMPLE LENGTH IN INCHES	Dark grayish-brown Organic CLAY (OH) micaceous; w/ trace sand and hairline thick plant roots	Hydr-1 G = 2.48 LL = 154 PL = 51 PI = 83	R-2 W_2 = 98.9 % Q-1A W_{1A} = 100.1 % R-1 W_1 = 100.9 % R-3 W_3 = 101.7 % Q-1, 2, & 3 W_1 = 124.2 % W_2 = 108.6 % W_3 = 110.3 % C-1

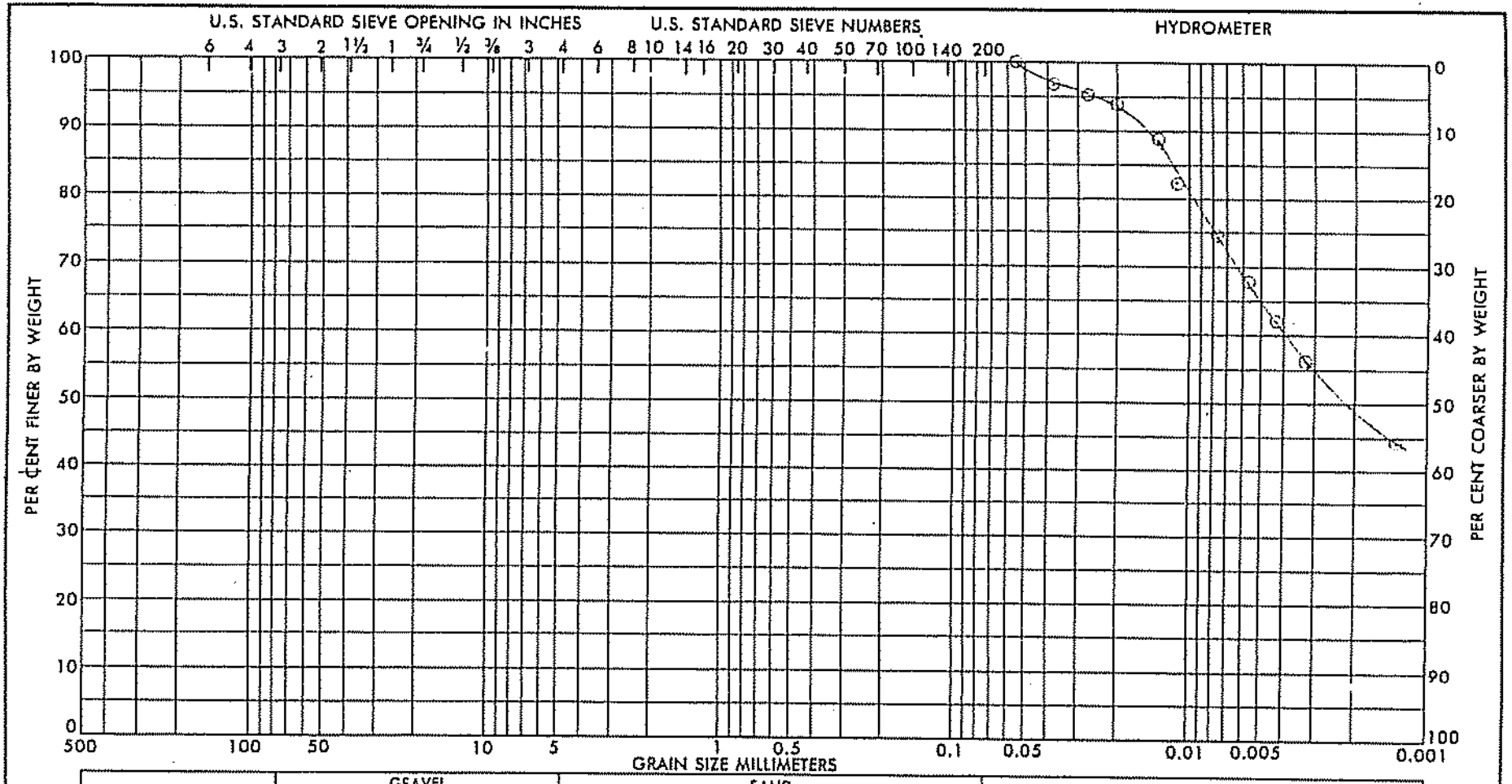
Length of Sample, L 23.70 in.
Weight of Tube and Wet Soil 14,030 g.
Weight of Tube 7,300 g.
Weight of Wet Soil, W 6,730 g.
Diameter of Tube, D 4.25 in.
Total Unit Weight, $\gamma_t = \frac{4.85\,W}{LD^2}$ 76.2 lbs/cu.ft.

LEGEND

W_n — Natural Water Content
MA — Mechanical Analysis
LL — Atterberg Limits
G — Specific Gravity
C — Consolidation
Q — Unconsolidated Undrained
γ_d — Dry Density
R — Consolidated Undrained
S — Consolidated Drained
UC — Unconfined Compression

UNDISTURBED SAMPLE LOG

NED FORM DEC 62 501



SAMPLE NO.	ELEV. OR DEPTH	CLASSIFICATION	NAT W%	LL	PL	PI
UD-1	2.0'-4.0'	Organic CLAY (OH)		134	51	83

GRADATION CURVES

PROJECT Long Range Delaware River Disposal Area

AREA

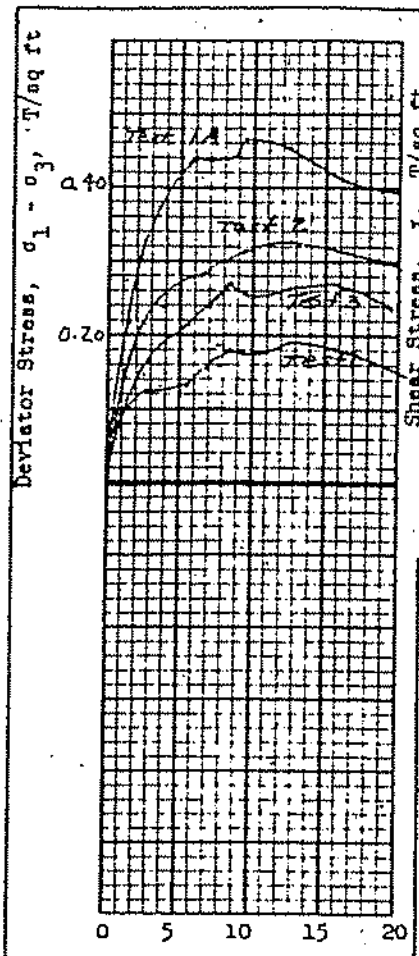
BORING NO. EBB-5

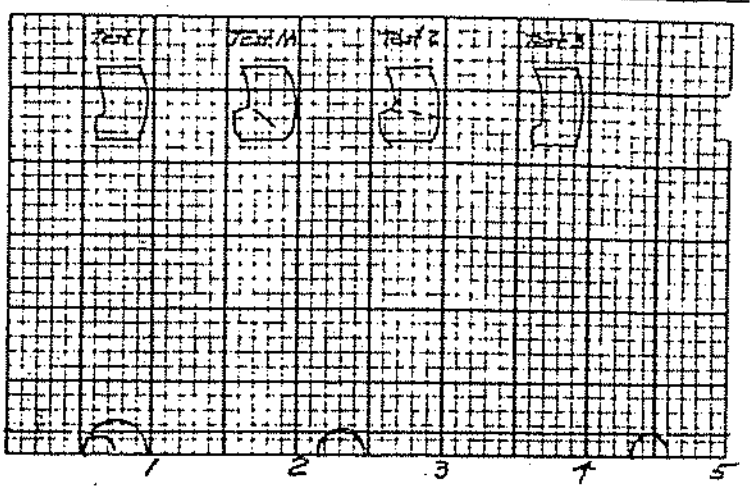
DATE Oct. 1967

ENG FORM 2087
1 MAY 63

REPLACES WES FORM NO. 1241, SEP 1962, WHICH IS OBSOLETE. (TRANSLUCENT)

U.S. GOVERNMENT PRINTING OFFICE : 1963 O-705-126





Test No.			1	1A	2	3
Initial	Water content	w_o	124.2%	100.1%	108.6%	110.3%
	Void ratio	e_o	3.610	2.914	3.014	2.977
	Saturation	S_o	85.3%	87.3%	89.3%	94.6%
	Dry density, lb/cu ft	γ_d	33.6	39.5	38.6	38.9
Before Shear	Water content	w_c	— %	— %	— %	— %
	Void ratio	e_c	—	—	—	—
	Saturation	S_c	— %	— %	— %	— %
	Final back pressure, T/sq ft	u_o	—	—	—	—
Final	Water content	w_f	— %	— %	— %	— %
	Void ratio	e_f	—	—	—	—
Minor principal stress, T/sq ft		σ_3	0.54	0.54	2.16	4.32
Max deviator stress, T/sq ft		$(\sigma_1-\sigma_3)_{max}$	0.18	0.44	0.33	0.27
Time to failure, min		t_f	8.0	5.5	5.5	8.0
Rate of strain, percent/min			1.03	1.02	1.02	1.03
Ult deviator stress, T/sq ft		$(\sigma_1-\sigma_3)_{ult}$	0.17	0.42*	0.32*	0.25
Initial diameter, in.		D_o	1.40	1.40	1.40	1.40
Initial height, in.		H_o	3.15	3.17	3.17	3.15

Shear Strength Parameters

ϕ = — °

tan ϕ = —

c = 0.15 T/sq ft

Method of saturation None

☐ Controlled stress

☒ Controlled strain

Type of test CU Type of specimen Undisturbed

Classification Organic CLAY (OH)

LL 134 PL 51 PI 83 D_{10} < 0.001 G_s 2.48

Remarks * stress at 15% strain

Project Long Range Delaware River Disposal Area

Area Edgemoor

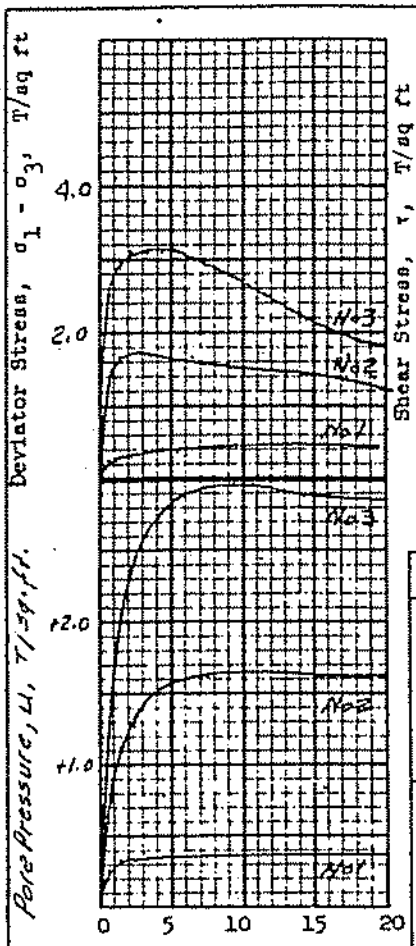
Boring No. EBB-5 Sample No. UD 1

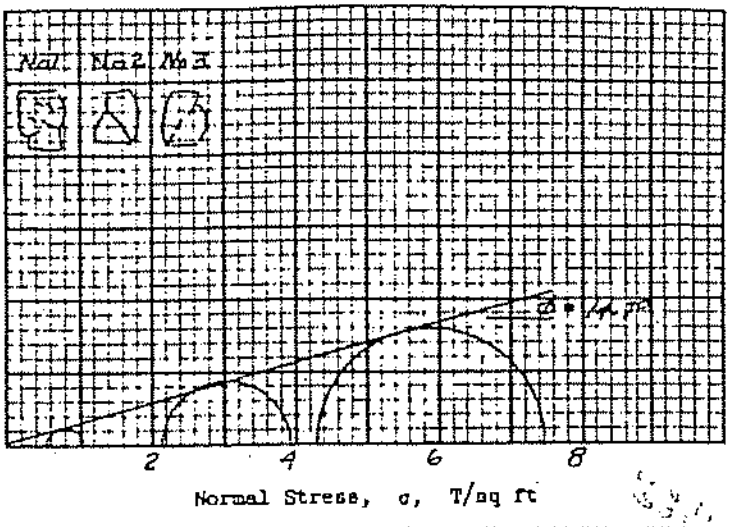
Depth El 2.0' – 4.0' Date Sept. 1967

TRIAXIAL COMPRESSION TEST REPORT

ENG FORM 1 JUN 63 2089 (EM 1110-2-1902) PREVIOUS EDITIONS ARE OBSOLETE

TRANSLUCENT





Shear Strength Parameters

ϕ = 14.7 °

tan ϕ = 0.262

c = 0.05 T/sq ft

Method of saturation Backpressure

☐ Cootrolled stress

☒ Controlled strain

Test No.			1	2	3	
Initial	Water content	w_o	100.9 %	98.9 %	101.7 %	%
	Void ratio	e_o	2.764	2.916	2.773	
	Saturation	S_o	90.5 %	84.1 %	96.9 %	%
	Dry density, lb/cu ft	γ_d	41.1	39.5	41.0	
Before Shear	Water content	w_c	94.7 %	81.8 %	63.8 %	%
	Void ratio	e_c	2.349	2.028	1.583	
	Saturation	S_c	100 %	100 %	100 %	%
	Final back pressure, T/sq ft	u_o	7.20	7.20	7.20	
Final	Water content	w_f	94.7 %	81.8 %	63.8 %	%
	Void ratio	e_f	2.349	2.028	1.583	
Minor principal stress, T/sq ft		σ_3	0.54	2.16	4.32	
Max deviator stress, T/sq ft		$(\sigma_1-\sigma_3)_{max}$	0.48	1.74	3.14	
Time to failure, min		t_f	79.6	14.2	24.7	
Rate of strain, percent/min			0.18	0.20	0.20	
Pore Pressure T/sq.ft.		U	+0.38	+1.39	+2.88	
Ult deviator stress, T/sq ft		$(\sigma_1-\sigma_3)_{ult}$	0.47	1.41	2.09	
Initial diameter, in.		D_o	1.39	1.43	1.43	
Initial height, in.		H_o	3.20	3.15	3.15	

Type of test R | Type of specimen Undisturbed

Classification Organic CLAY (OH)

LL 134 | PL 51 | PI 83 | D_{10} < 0.001 | G_s 2.48

Remarks

Project Delaware River Disposal Area Study

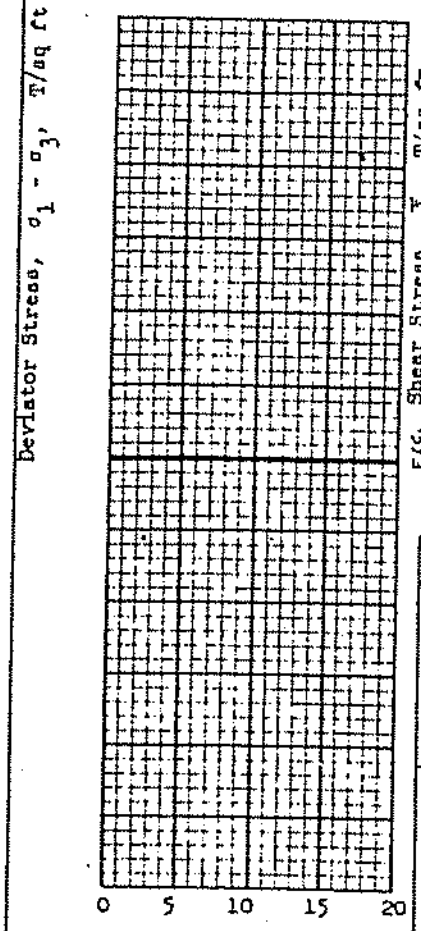
Area Edgemoor Disposal Area

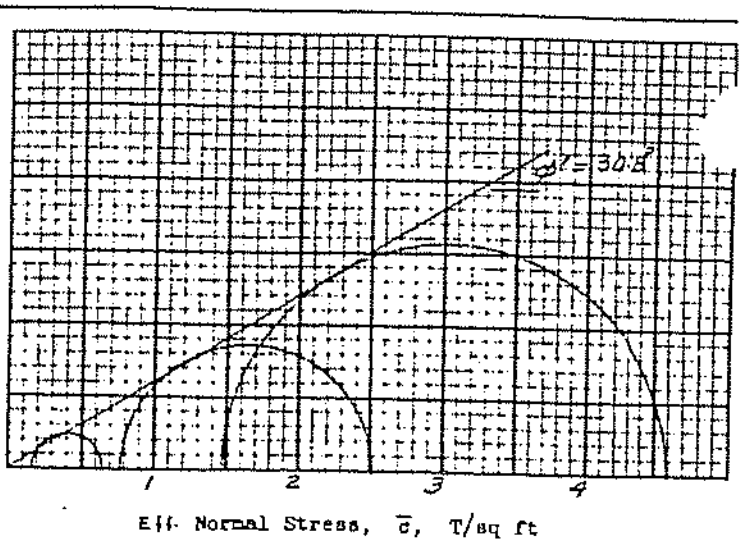
Boring No. EBB-5 | Sample No. UD-1

Depth 2.0'-4.0' | Date Oct. 1967

Sheet 1 of 2

TRIAXIAL COMPRESSION TEST REPORT





Test No.			1	2	3	
Initial	Water content	w_o	%	%	%	%
	Void ratio	e_o				
	Saturation	S_o	%	%	%	%
	Dry density, lb/cu ft	γ_d				
Before Shear	Water content	w_c	%	%	%	%
	Void ratio	e_c				
	Saturation	S_c	%	%	%	%
	Final back pressure, T/sq ft	u_o				
Final	Water content	w_f	%	%	%	%
	Void ratio	e_f				
Minor principal stress, T/sq ft Eff		$\bar{\sigma}_3$	0.16	0.77	1.44	
Max deviator stress, T/sq ft		$(\sigma_1-\sigma_3)_{max}$				
Time to failure, min		t_f				
Rate of strain, percent/min						
Major principal Stress, T/sq ft. Eff		$\bar{\sigma}_1$	0.64	2.52	4.58	
Ult deviator stress, T/sq ft		$(\sigma_1-\sigma_3)_{ult}$				
Initial diameter, in.		D_o				
Initial height, in.		H_o				

Shear Strength Parameters

ϕ = 30.8 °

tan ϕ = 0.595

c = 0 T/sq ft

Method of saturation Backpressure

☐ Controlled stress

☒ Controlled strain

Type of test R | Type of specimen Undisturbed

Classification Organic CLAY (OH)

LL 134 | PL 51 | PI 83 | D_{10} <0.001 | G_s 2.48

Remarks See Sheet 1 of 2 for other data.

Sheet 2 of 2

Project Delaware River Disposal Area Study

Area Edgemoor Disposal Area

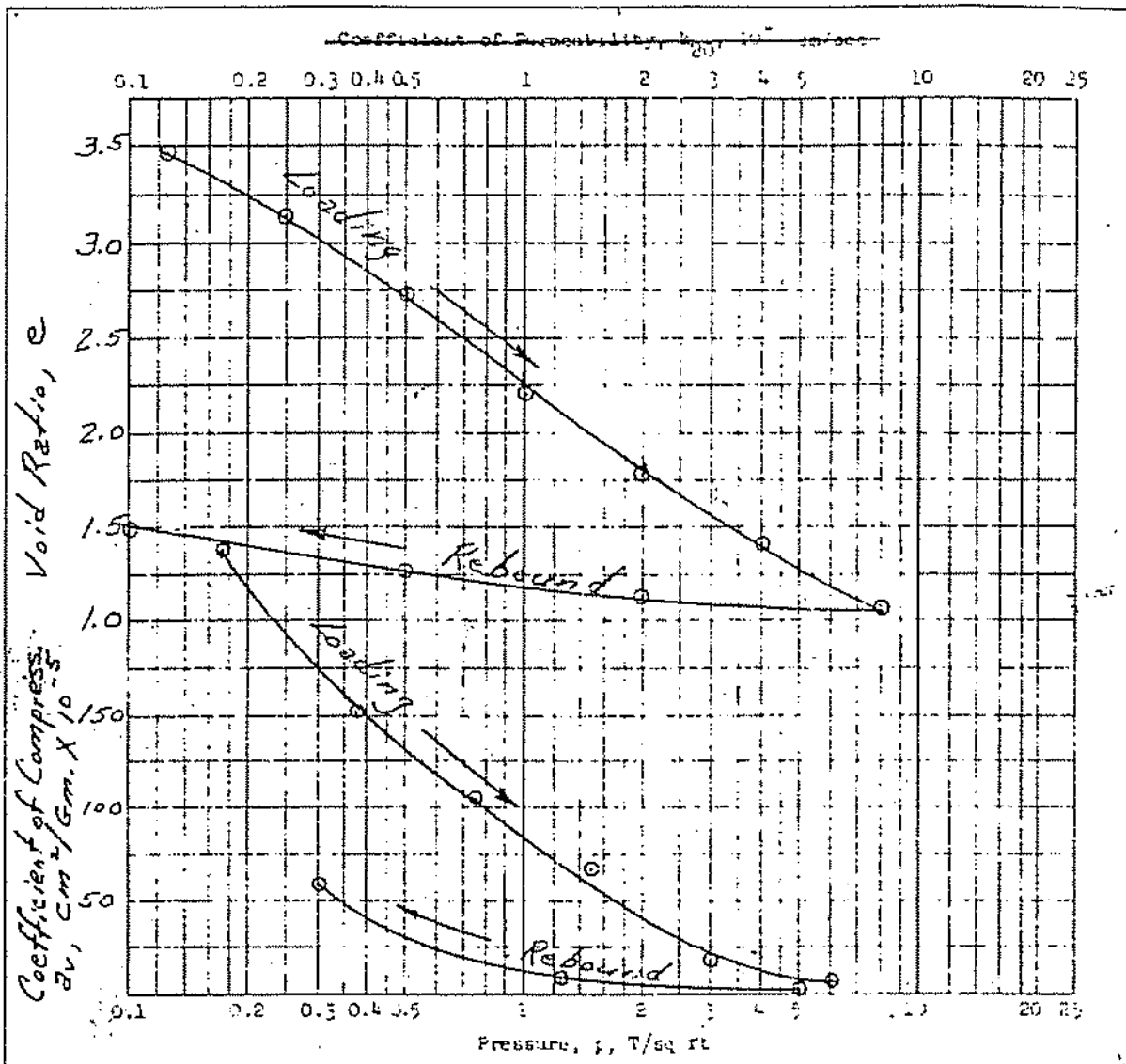
Boring No. EBB-5 | Sample No. UD-1

Depth 2.0'-4.0' | Date Oct. 1967

TRIAXIAL COMPRESSION TEST REPORT

ENG FORM 2089 1 JUN 63 (EM 1110-2-1902) PREVIOUS EDITIONS ARE OBSOLETE

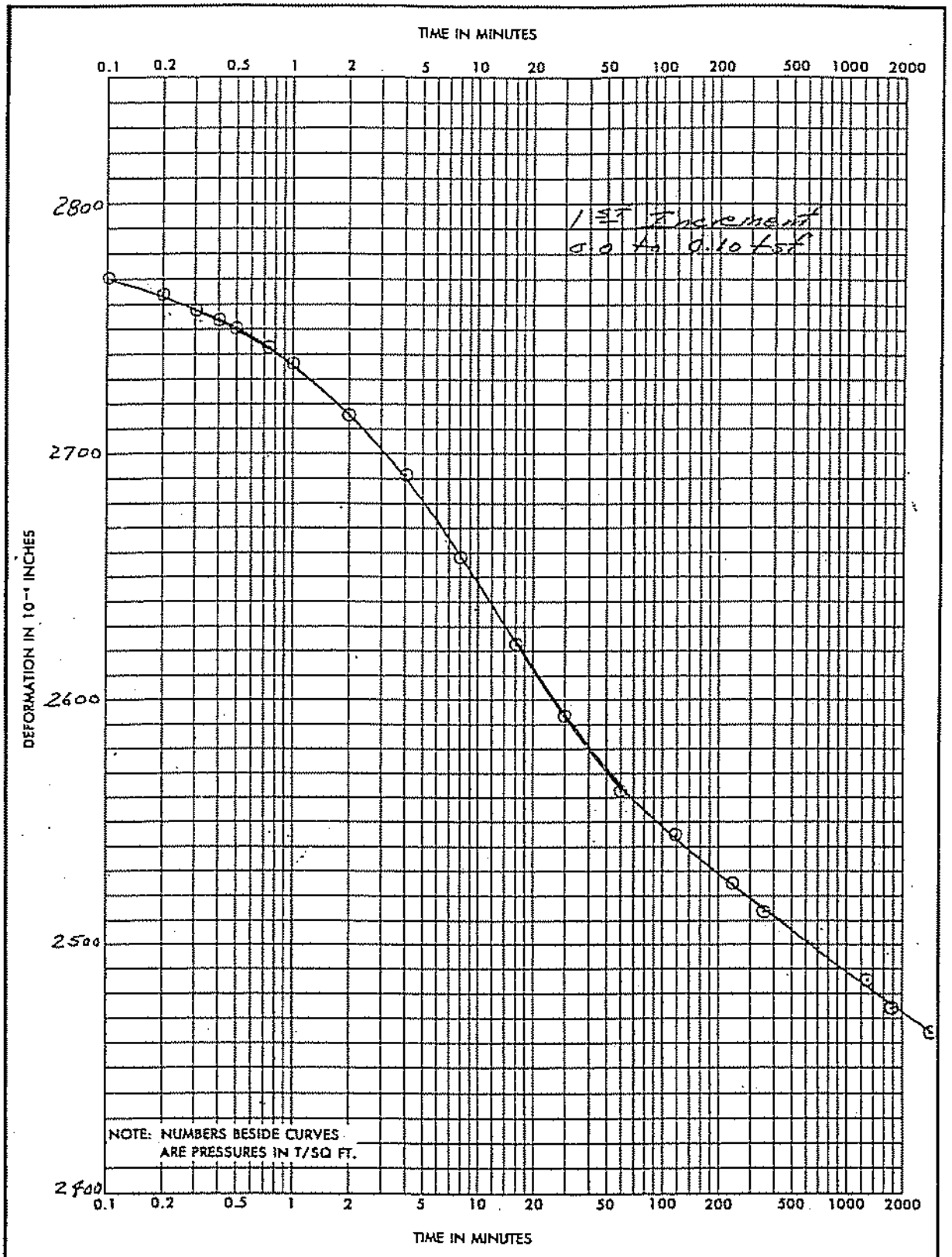
TRANSLUCENT



Type of Specimen	Undisturbed	Before Test		After Test	
Diam 2.60 in.	Ht 0.75 in.	Water Content, w_o	147.4 %	w_f	68.1 %
Overburden Pressure, p_o	0.07 T/sq ft	Void Ratio, e_o	3.685	e_f	1.497
Preconsol. Pressure, p_c	0.18 T/sq ft	Saturation, S_o	99.2 %	S_f	100+ %
Compression Index, C_c	1.45	Dry Density, γ_d	33.0 lb/ft³		
Classification	Organic CLAY (OH) w/hair size dart roots	k_{20} at e_o =	× 10^{-} cm/sec		
LL 134	G_s 2.48	Project	Long Range Delaware River Disposal Area		
PL 51	<0.001				
Remarks		Area	Edgemoor		
		Boring No.	EBB-5	Sample No.	UD-1
		Depth	2.0'-4.0'	Date	Oct. 1967

CONSOLIDATION TEST REPORT

ENG FORM 2090 PREVIOUS EDITIONS ARE OBSOLETE (TRANSLUCENT)



PROJECT Long Range Delaware River Disposal Area Study

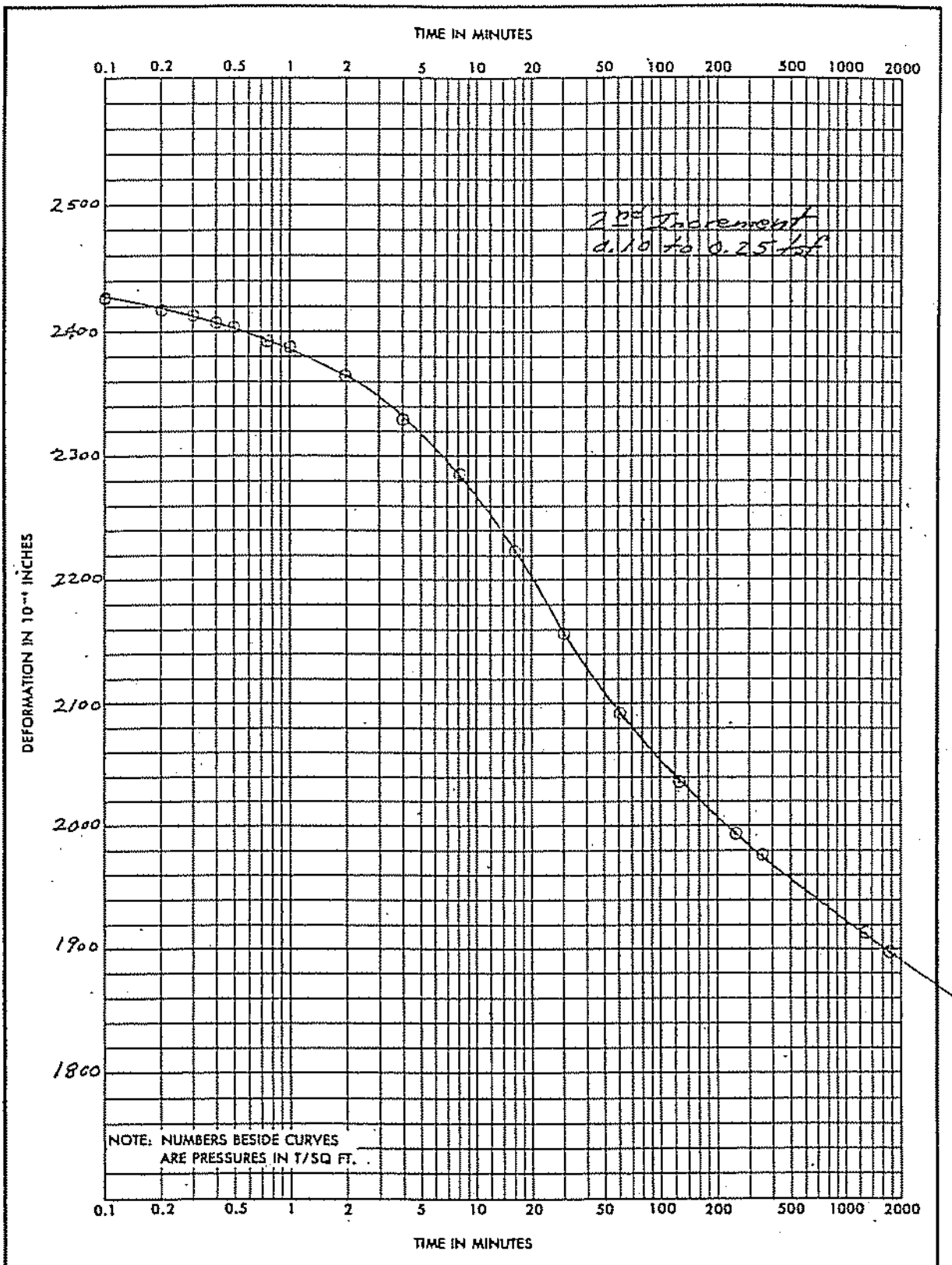
AREA Edgemoor

BORING NO. EBB-5 | SAMPLE NO. UD-1 | DEPTH ~~ft~~ 2.0' - 4.0' | DATE Dec. 1967

ENG FORM 2088 1 MAY 63 PREVIOUS EDITIONS ARE OBSOLETE.

CONSOLIDATION TEST—TIME CURVES (TRANSLUCENT)

* GPO : 1964 OF—715-965



PROJECT Long Range Delaware River Disposal Area Study

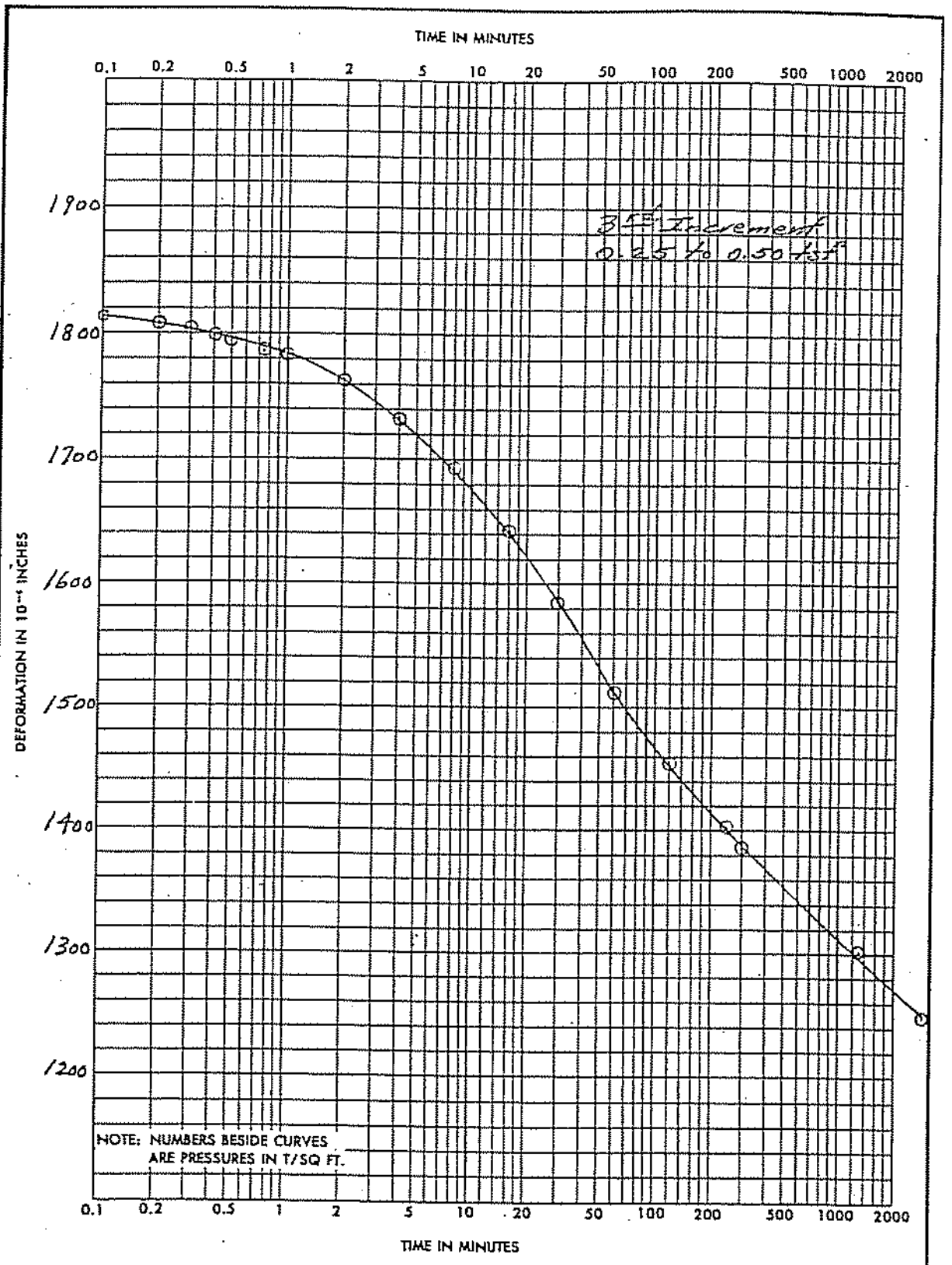
AREA

BORING NO.	SAMPLE NO.	DEPTH	DATE
EBB-5	UD-1	2.0'–4.0'	Dec. 1967

ENG FORM 2088 1 MAY 63 PREVIOUS EDITIONS ARE OBSOLETE.

CONSOLIDATION TEST—TIME CURVES (TRANSLUCENT)

* GPO : 1964 O—715-965



PROJECT Long Range Delaware River Disposal Area Study

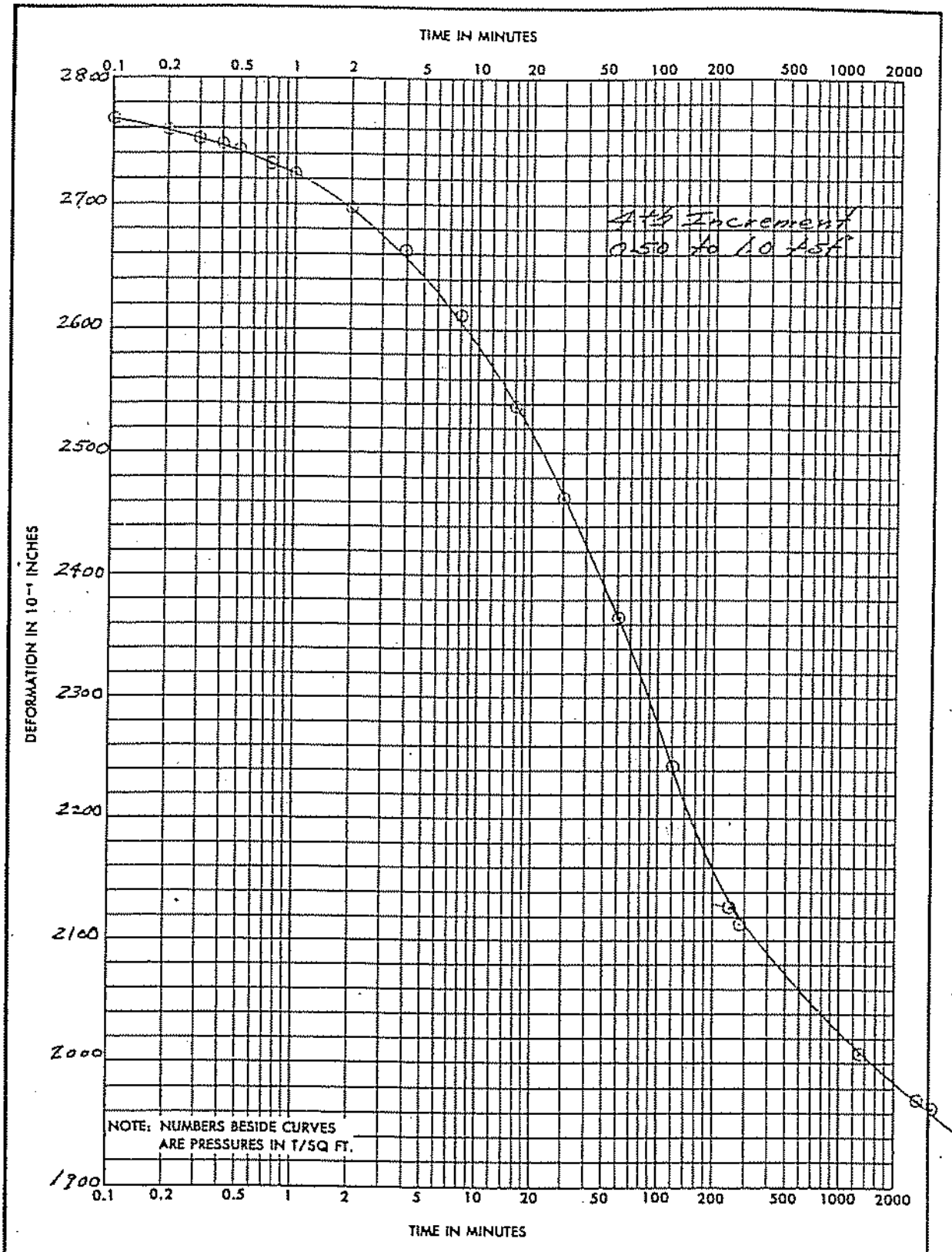
AREA

BORING NO.	SAMPLE NO.	DEPTH	DATE
EBB-5	UD-1	2.0'-4.0'	Dec. 1967

ENG FORM 2088 1 MAY 63 PREVIOUS EDITIONS ARE OBSOLETE.

CONSOLIDATION TEST—TIME CURVES (TRANSLUCENT)

* GPO : 1964 OF—713-965



PROJECT Long Range Delaware River Disposal Area Study

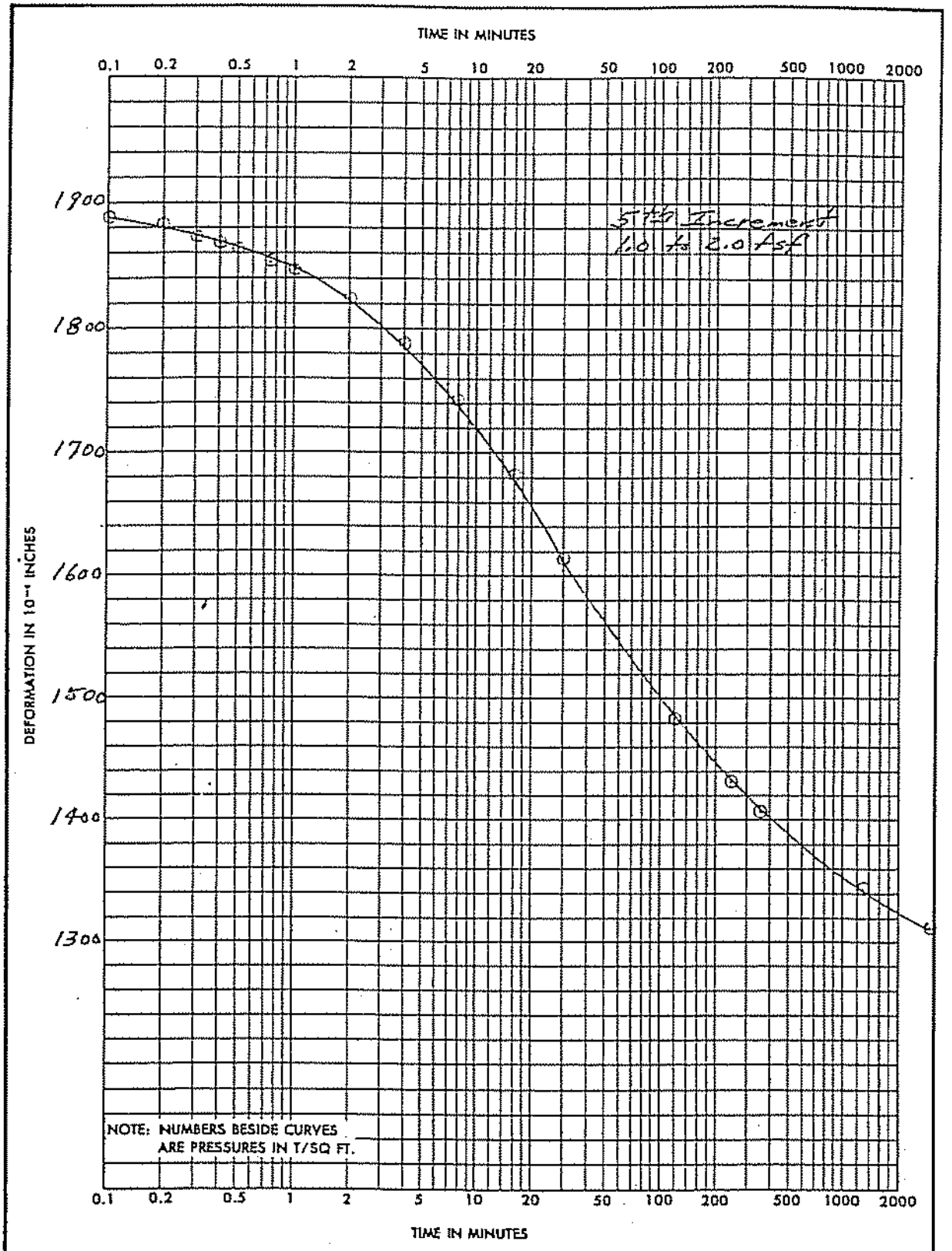
AREA

BORING NO. EBB-5 | SAMPLE NO. UD-1 | DEPTH ~~EL~~ 2.0' – 4.0' | DATE Dec. 1967

ENG FORM 2088 1 MAY 63 PREVIOUS EDITIONS ARE OBSOLETE.

CONSOLIDATION TEST—TIME CURVES (TRANSLUCENT)

* GPO : 1966 OF—715-963



PROJECT Long Range Delaware River Disposal Area Study

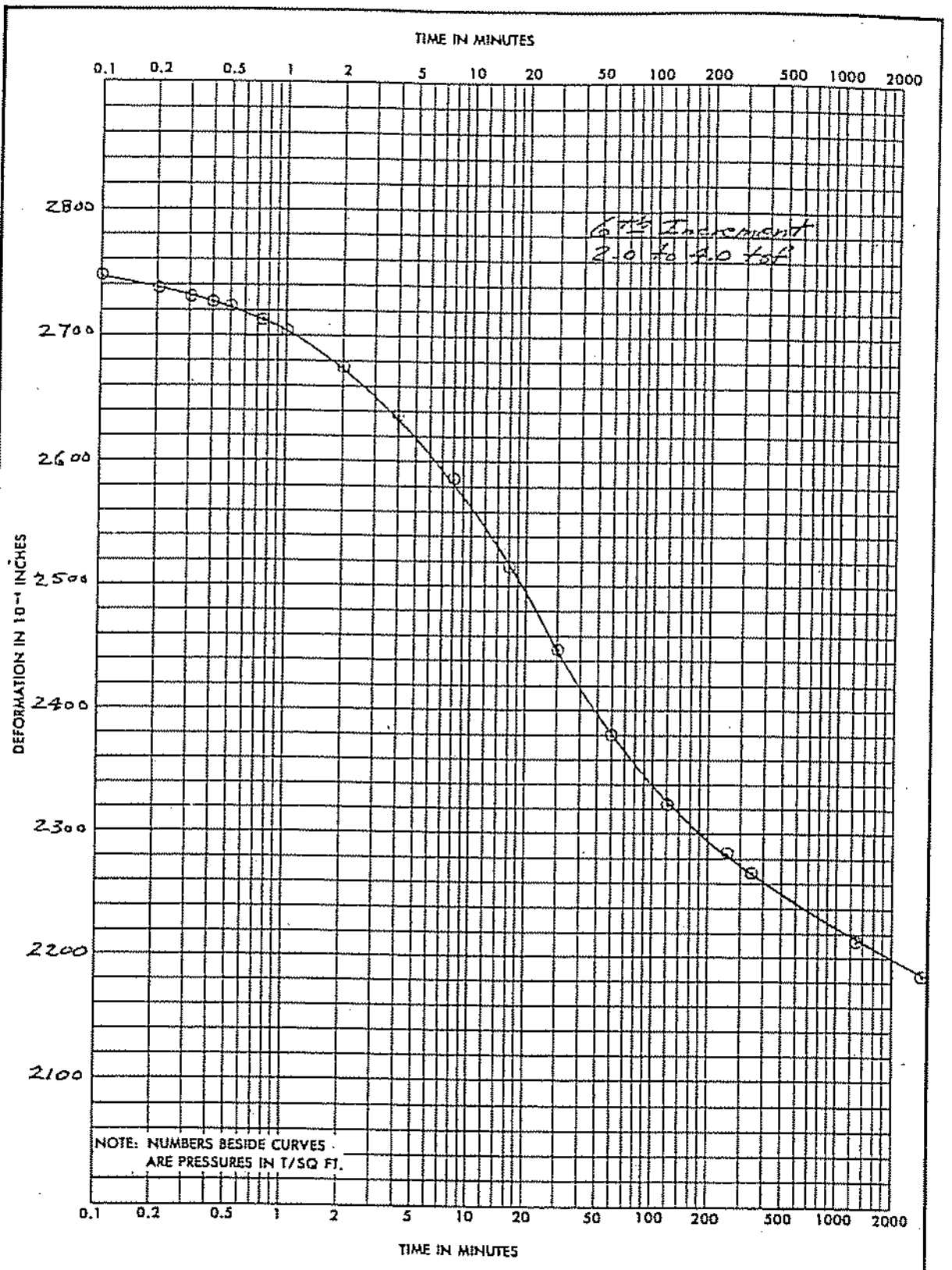
AREA

BORING NO.	SAMPLE NO.	DEPTH	DATE
EBB-5	UD-1	2.0' - 4.0'	Dec. 1967

ENG FORM 2088 1 MAY 63 PREVIOUS EDITIONS ARE OBSOLETE.

CONSOLIDATION TEST—TIME CURVES (TRANSLUCENT)

R GPO : 1964 O7—715-965



PROJECT Long Range Delaware River Disposal Area Study

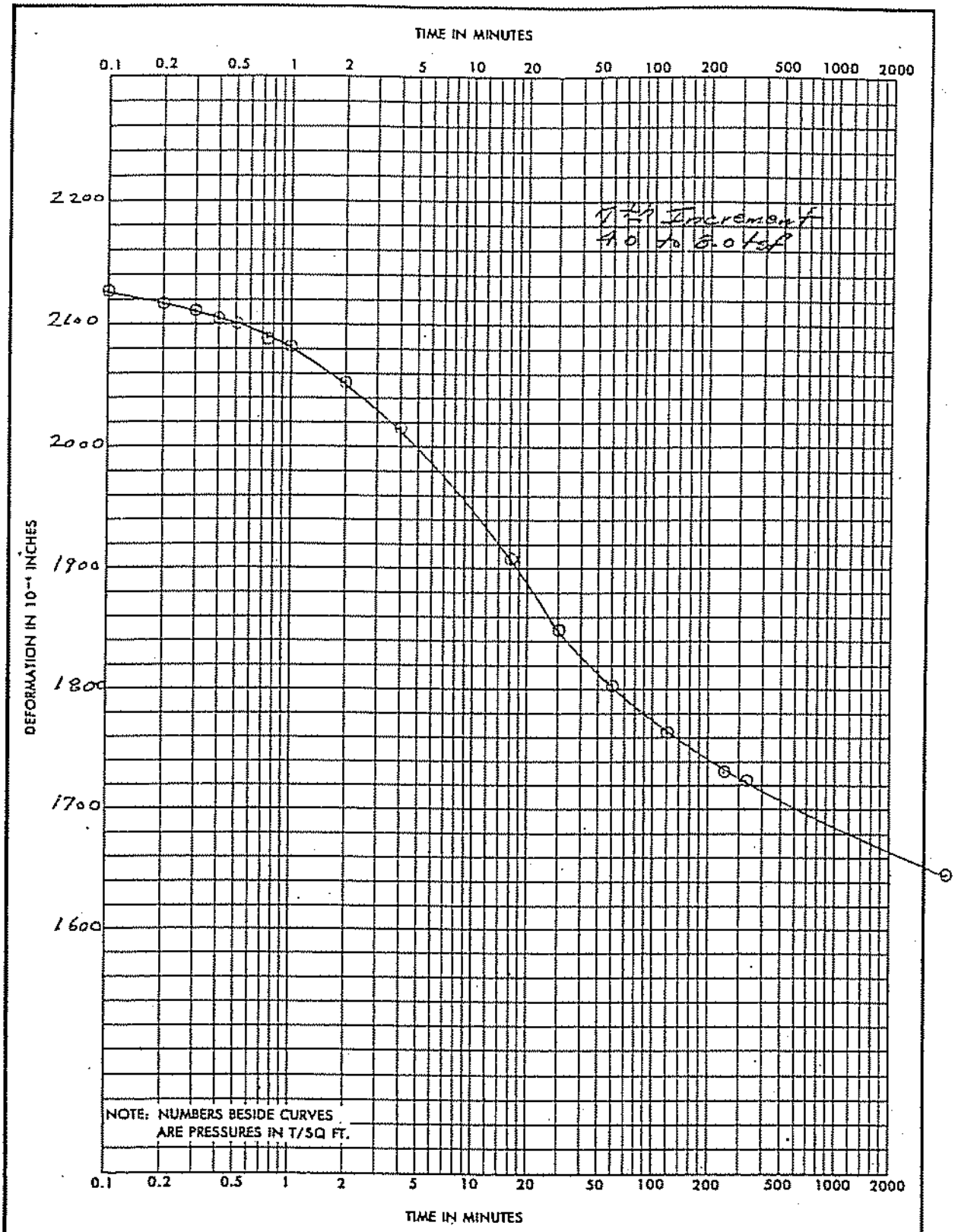
AREA

BORING NO.	SAMPLE NO.	DEPTH ft	DATE
EBB-5	UD-1	2.0'-4.0'	Dec. 1967

ENG FORM 2088 1 MAY 63 PREVIOUS EDITIONS ARE OBSOLETE.

CONSOLIDATION TEST—TIME CURVES (TRANSLUCENT)

* GPO : 1964 OF—715-965



PROJECT Long Range Delaware River Disposal Area Study

AREA

BORING NO.	SAMPLE NO.	DEPTH ft	DATE
EBB-5	UD-1	2.0'-4.0'	Dec. 1967

ENG FORM 2088 1 MAY 63 PREVIOUS EDITIONS ARE OBSOLETE.

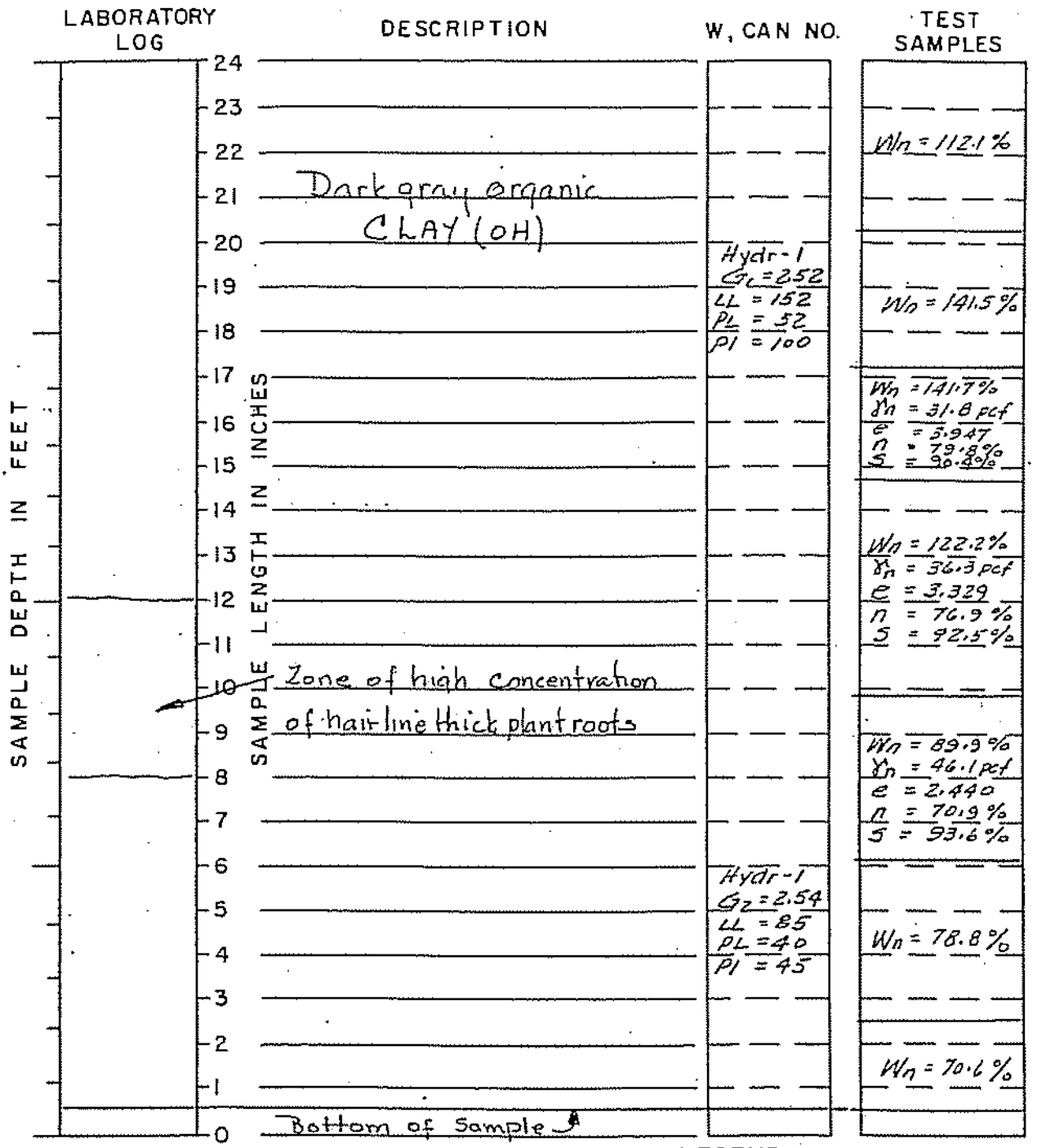
CONSOLIDATION TEST—TIME CURVES (TRANSLUCENT)

* GPO : 1964 OF—715-965

Edgemoor

BORING NO. EBB-5
SAMPLE NO. UD-2
DEPTH: 10.0 to 12.0 ft.

PROJECT Delaware River Study
DATE October 1967
COMP. By WS CHK'D By RJS



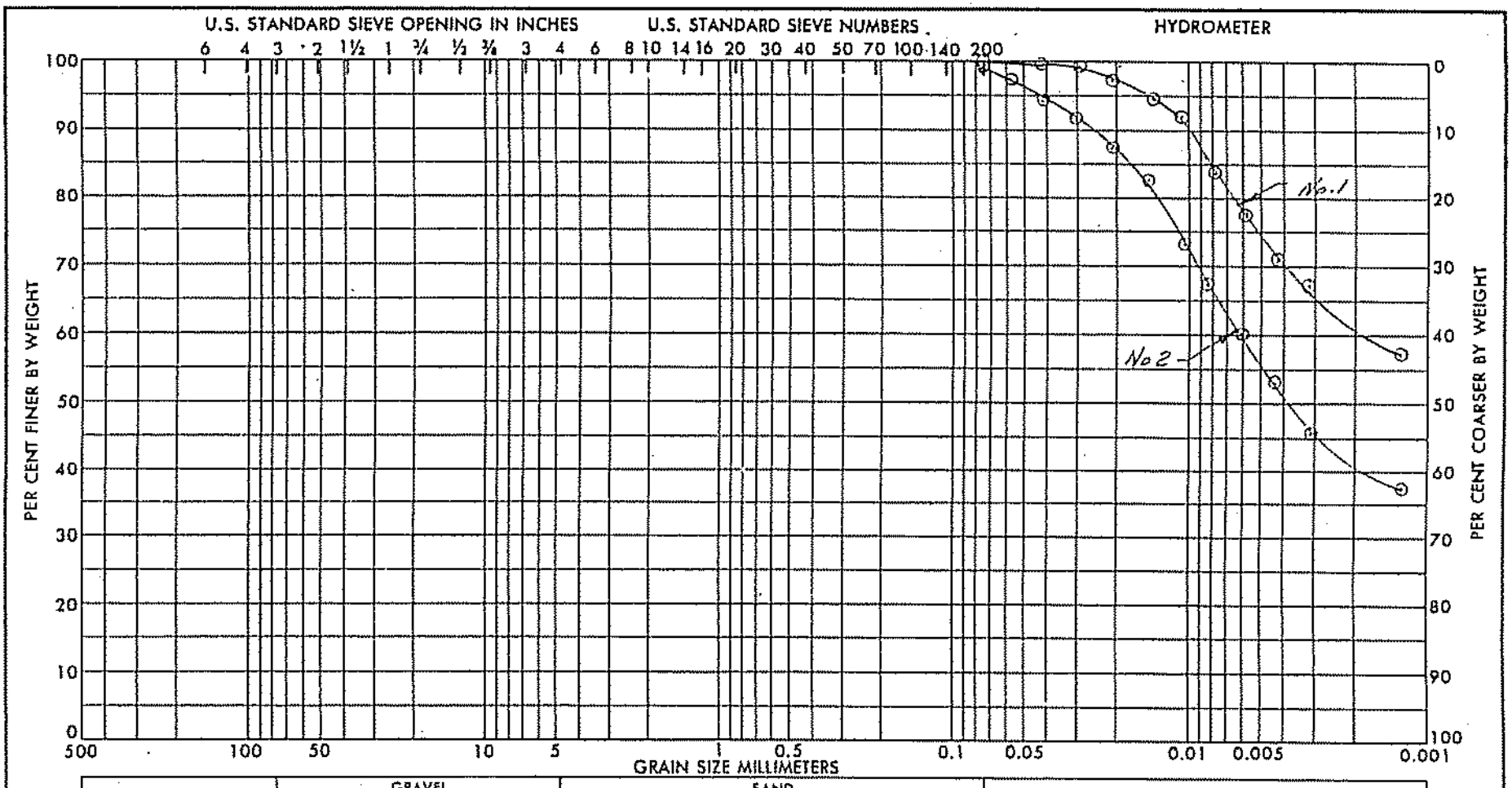
Length of Sample, L 23.36 in.
Weight of Tube and Wet Soil 14,350 g.
Weight of Tube 7,230 g.
Weight of Wet Soil, W 7,120 g.
Diameter of Tube, D 4.25 in.
Total Unit Weight, $\gamma_t = \frac{4.85\,W}{L\,D^2}$ 81.8 lbs/cu.ft.

LEGEND

W_n — Natural Water Content
MA — Mechonical Analysis
LL — Atterberg Limits
G — Specific Gravity
C — Consolidation
Q — Unconsolidoted Undroined
γ_d — Dry Density
R — Consolidoted Undrained
S — Consolidoted Droined
UC — Unconfined Compression

UNDISTURBED SAMPLE LOG

NED FORM DEC 62 501



SAMPLE NO.	~~ELEV~~ GR DEPTH	CLASSIFICATION	NAT W%	LL	PL	PI
UD-2 No1	10.0' - 12.0'	organic CLAY (OH)		152	52	100
UD-2 No2	10.0' - 12.0'	organic SILT (OH)		85	40	45

GRADATION CURVES

PROJECT Long Range Delaware River Disposal Area Study

AREA Edgemoor

BORING NO. EBB-5

DATE Oct. 1967

ENG FORM 2087
1 MAY 63

REPLACES WES FORM NO. 1241, SEP 1962, WHICH IS OBSOLETE. (TRANSLUCENT)

U.S. GOVERNMENT PRINTING OFFICE : 1963 OF—709-124

Edgemoor

BORING NO. EBB-5
SAMPLE NO. UD-3
DEPTH: 16.0 to 18.0 ft.

PROJECT Delaware River Study
DATE October 1967
COMP. By WS CHK'D By RJS

LABORATORY LOG	DESCRIPTION	W, CAN NO.	TEST SAMPLES
	Dark gray micaceous organic CLAY (OH) w/ irreg. ribbony rust brown seams in an essentially vertical plane	Hydr-1 G_s = 2.49 LL = 122 PL = 45 PI = 77	W_n = 95.8% W_n = 103.9% C-1 W_n = 108.5%
	Bottom of Sample 3		

SAMPLE DEPTH IN FEET

SAMPLE LENGTH IN INCHES

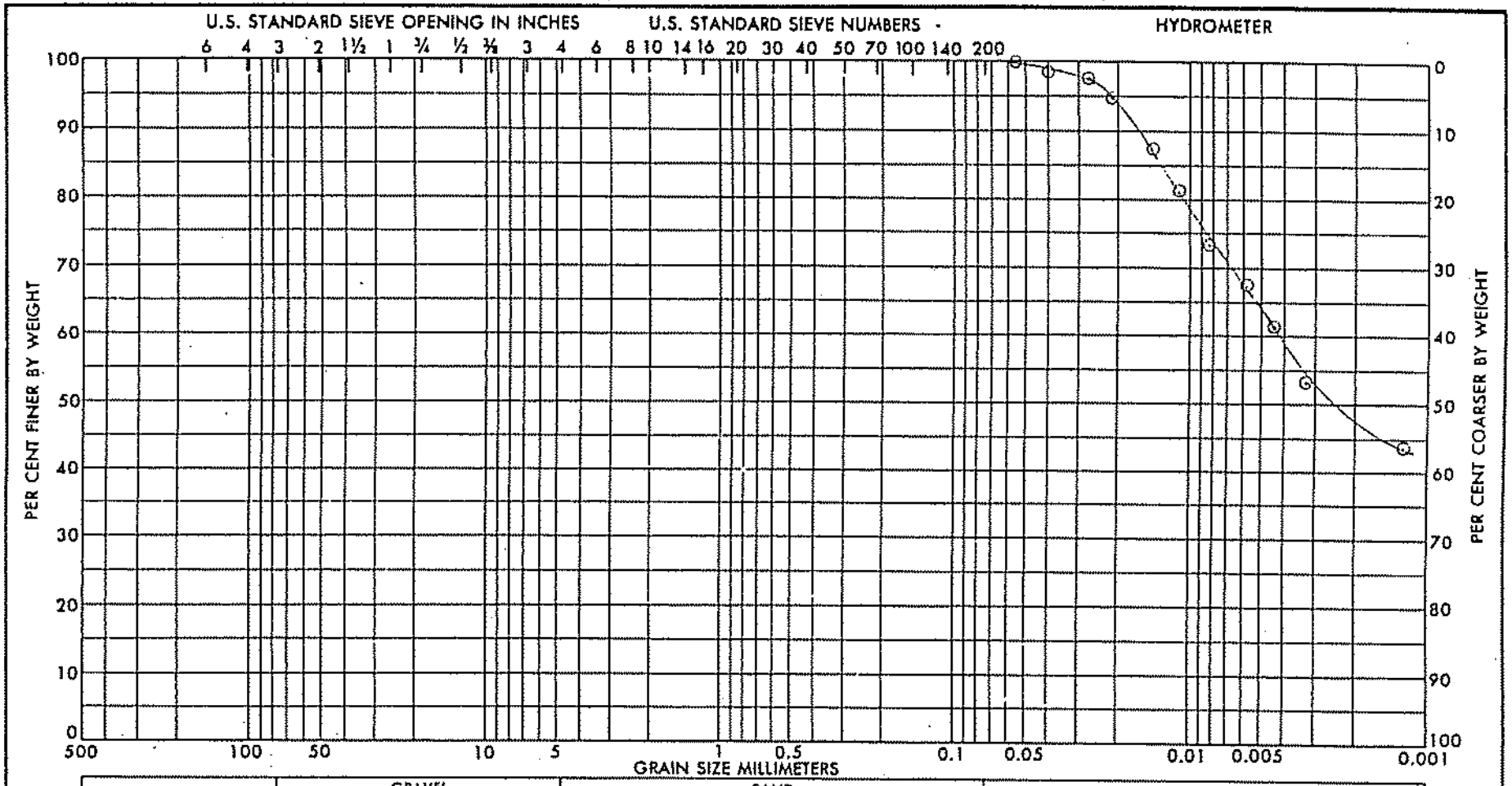
Length of Sample, L 23.25 in.
Weight of Tube and Wet Soil 14,875 g.
Weight of Tube 7,300 g.
Weight of Wet Soil, W 7,575 g.
Diameter of Tube, D 4.25 in.
Total Unit Weight, $\gamma_t = \frac{4.85\,W}{LD^2}$ 87.5 lbs/cu.ft.

LEGEND

W_n — Natural Water Content
MA — Mechanical Analysis
LL — Atterberg Limits
G — Specific Gravity
C — Consolidation
Q — Unconsolidated Undrained
γ_d — Dry Density
R — Consolidated Undrained
S — Consolidated Drained
UC — Unconfined Compression

UNDISTURBED SAMPLE LOG

NED FORM DEC 62 501



SAMPLE NO.	ELEV OR DEPTH	CLASSIFICATION	NAT W%	LL	PL	PI
UD-3	16.0'-18.0'	Organic CLAY (OH)		122	45	77

GRADATION CURVES

PROJECT Long Range Delaware River Disposal Area

AREA

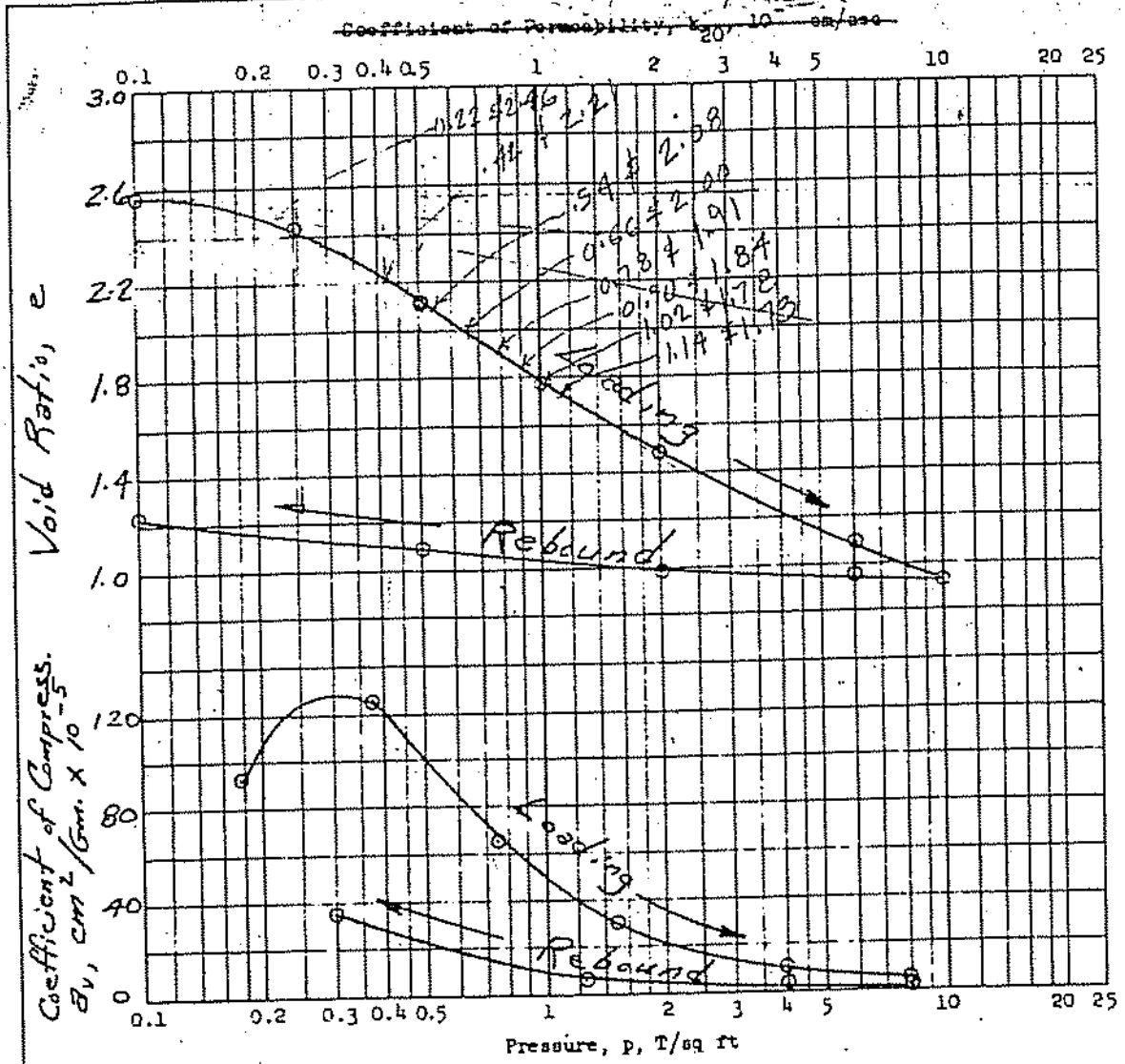
BORING NO. EBB-5

DATE Oct. 1967

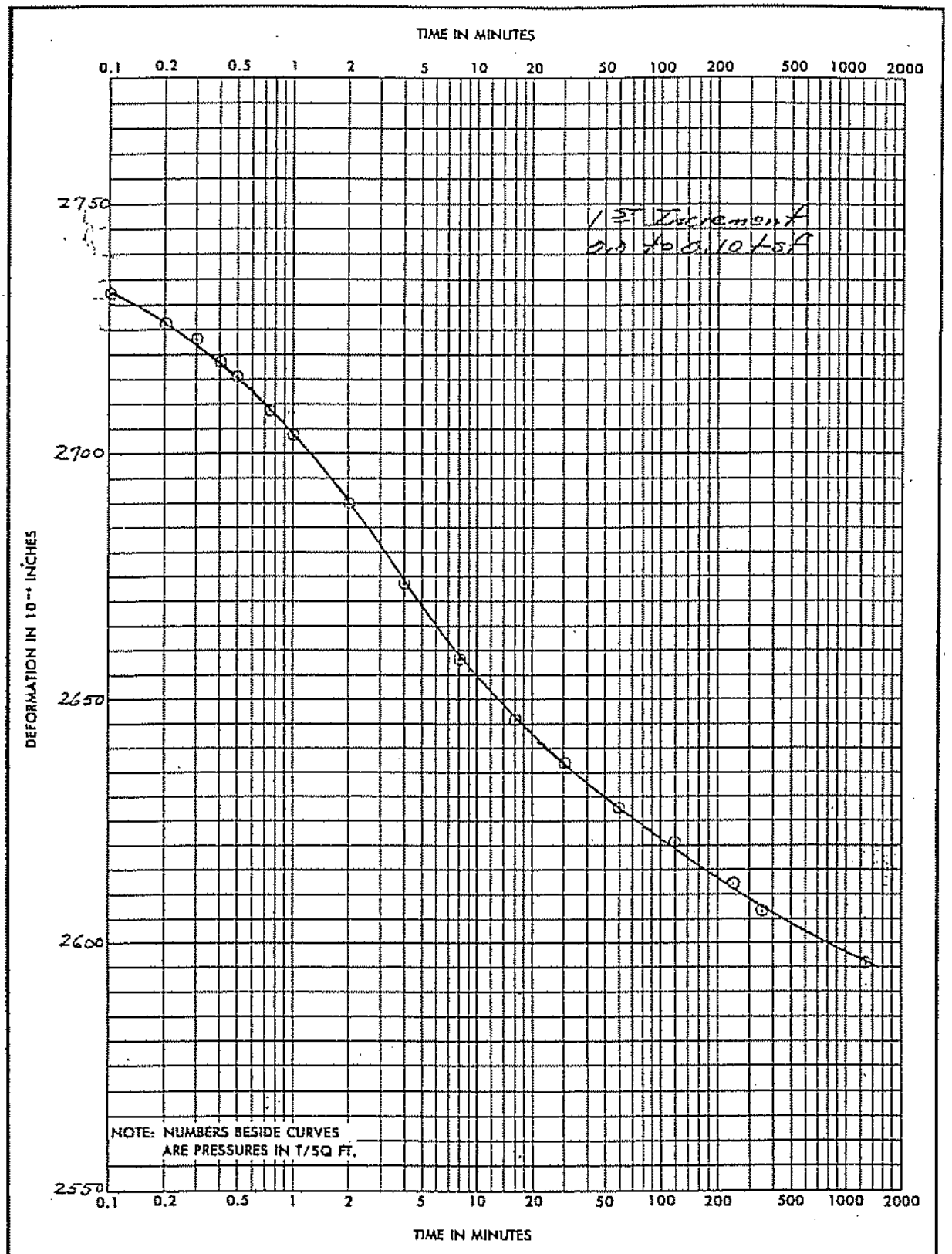
ENG FORM 2087
1 MAY 63

REPLACES WES FORM NO. 1241, SEP 1962, WHICH IS OBSOLETE.

U.S. GOVERNMENT PRINTING OFFICE : 1963 O—709-124



Type of Specimen: Undisturbed		Before Test		After Test	
Diam 2.6 in.	Ht 0.75 in.	Water Content, w_o	108.5 %	w_f	57.1 %
Overburden Pressure, p_o 0.25 T/sq ft		Void Ratio, e_o	2.643	e_f	1.240
Preconsol. Pressure, p_c 0.29 T/sq ft		Saturation, S_o	98.8 %	S_f	100 %
Compression Index, C_c 0.90		Dry Density, γ_d	42.6 lb/ft³		
Classification w/ irreg. ribbony rust seams: Organic CLAY (CH)		k_{20} at e_o =	× 10⁻ cm/sec		
LL 122	G_s 2.49	Project: Long Range Delaware River Disposal Area			
PL 45	P_{10} < 0.001	Area: Edgemoor			
Remarks		Boring No. EBB-5	Sample No. UD-3		
		Depth Ft 16.0' – 18.0'	Date Oct. 1967		
		CONSOLIDATION TEST REPORT			



PROJECT Long Range Delaware River Disposal Area Study

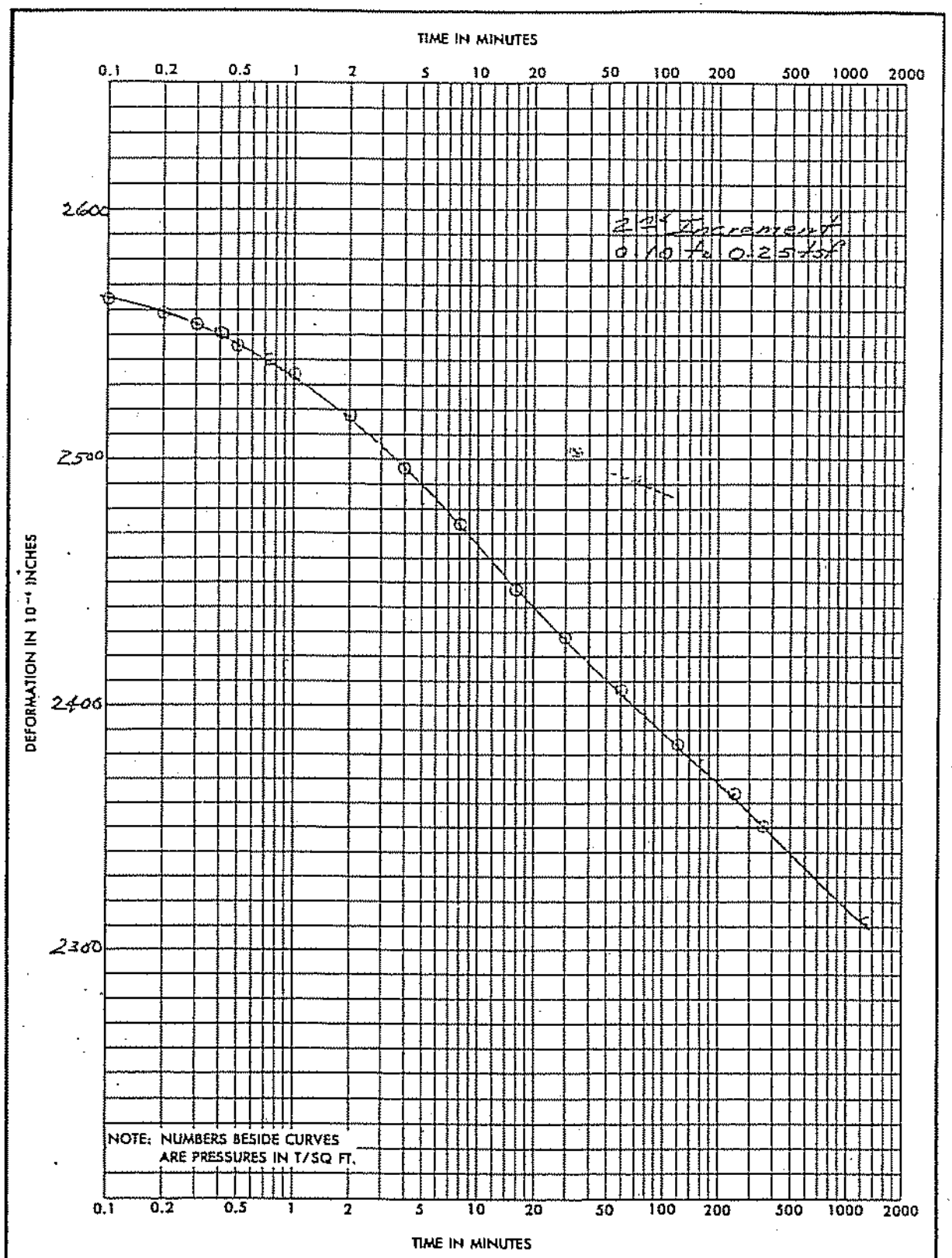
AREA Edgemoor

BORING NO.	SAMPLE NO.	DEPTH EL	DATE
EBB-5	UD-3	16.0'-18.0'	Dec. 1967

ENG FORM 2088 1 MAY 63 PREVIOUS EDITIONS ARE OBSOLETE.

CONSOLIDATION TEST—TIME CURVES (TRANSLUCENT)

* GPO : 1964 O—713-965



PROJECT Long Range Delaware River Disposal Area Study

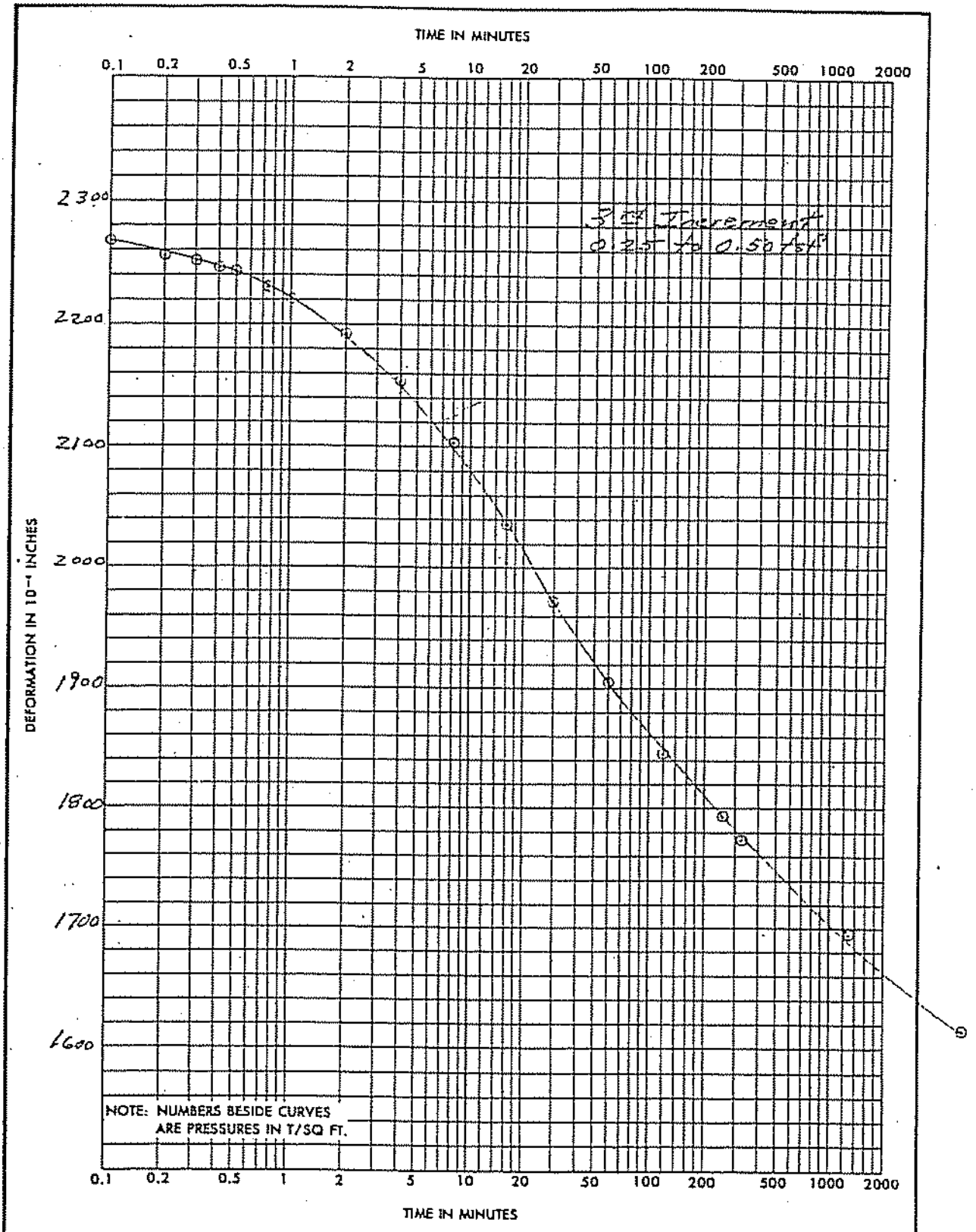
AREA

BORING NO.	SAMPLE NO.	DEPTH	DATE
EBB-5	UD-3	16.0'-18.0'	Dec. 1967

ENG FORM 2088 1 MAY 63 PREVIOUS EDITIONS ARE OBSOLETE.

CONSOLIDATION TEST—TIME CURVES (TRANSLUCENT)

* GPO : 1964 OF—715-965



PROJECT Long Range Delaware River Disposal Area Study

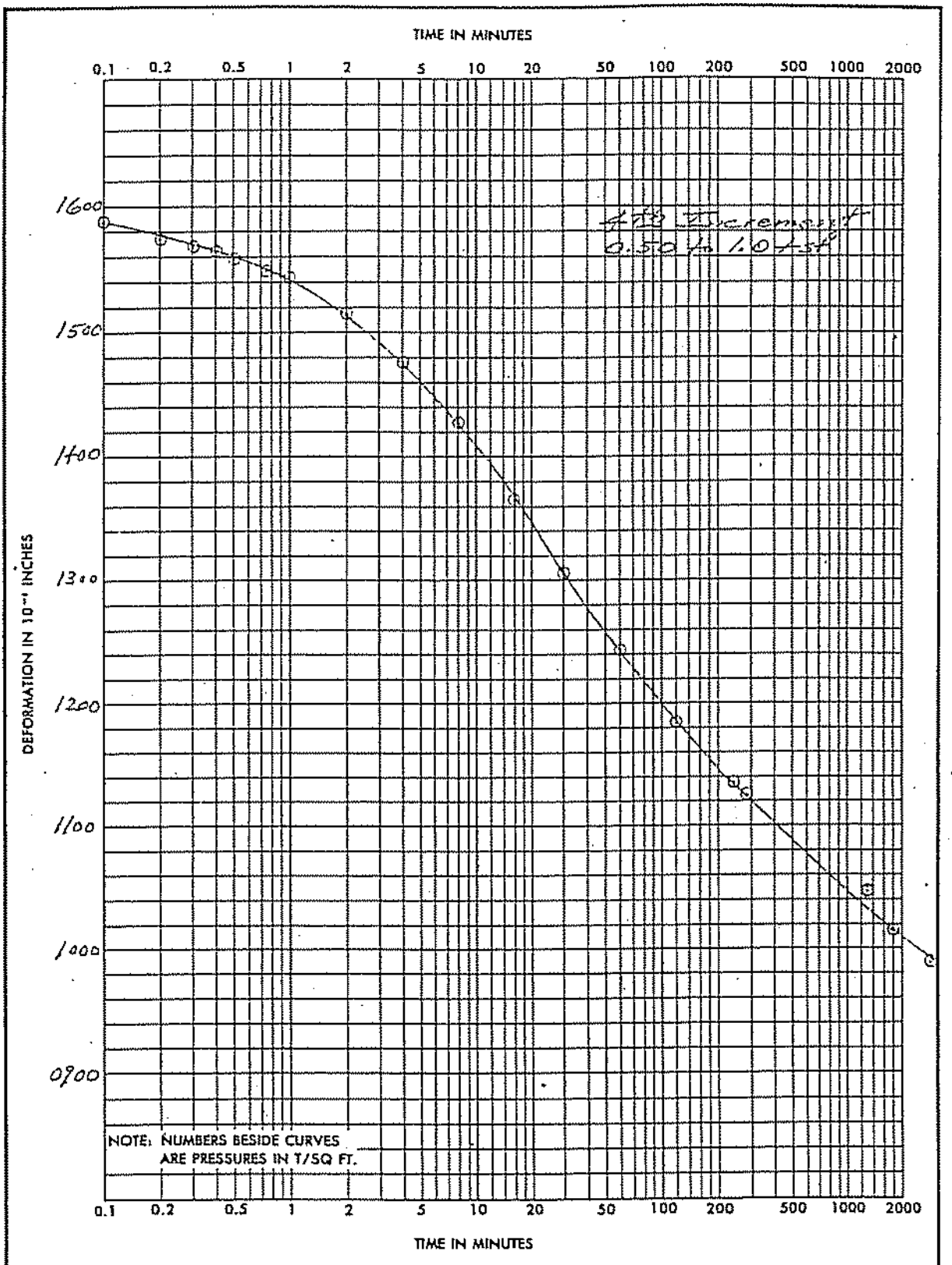
AREA

BORING NO.	SAMPLE NO.	DEPTH	DATE
EBR-5	UD-3	16.0'-18.0'	Dec. 1967

ENG FORM 2088 1 MAY 63 PREVIOUS EDITIONS ARE OBSOLETE.

CONSOLIDATION TEST—TIME CURVES (TRANSLUCENT)

* GPO : 1964 OF—711-983



PROJECT Long Range Delaware River Disposal Area Study

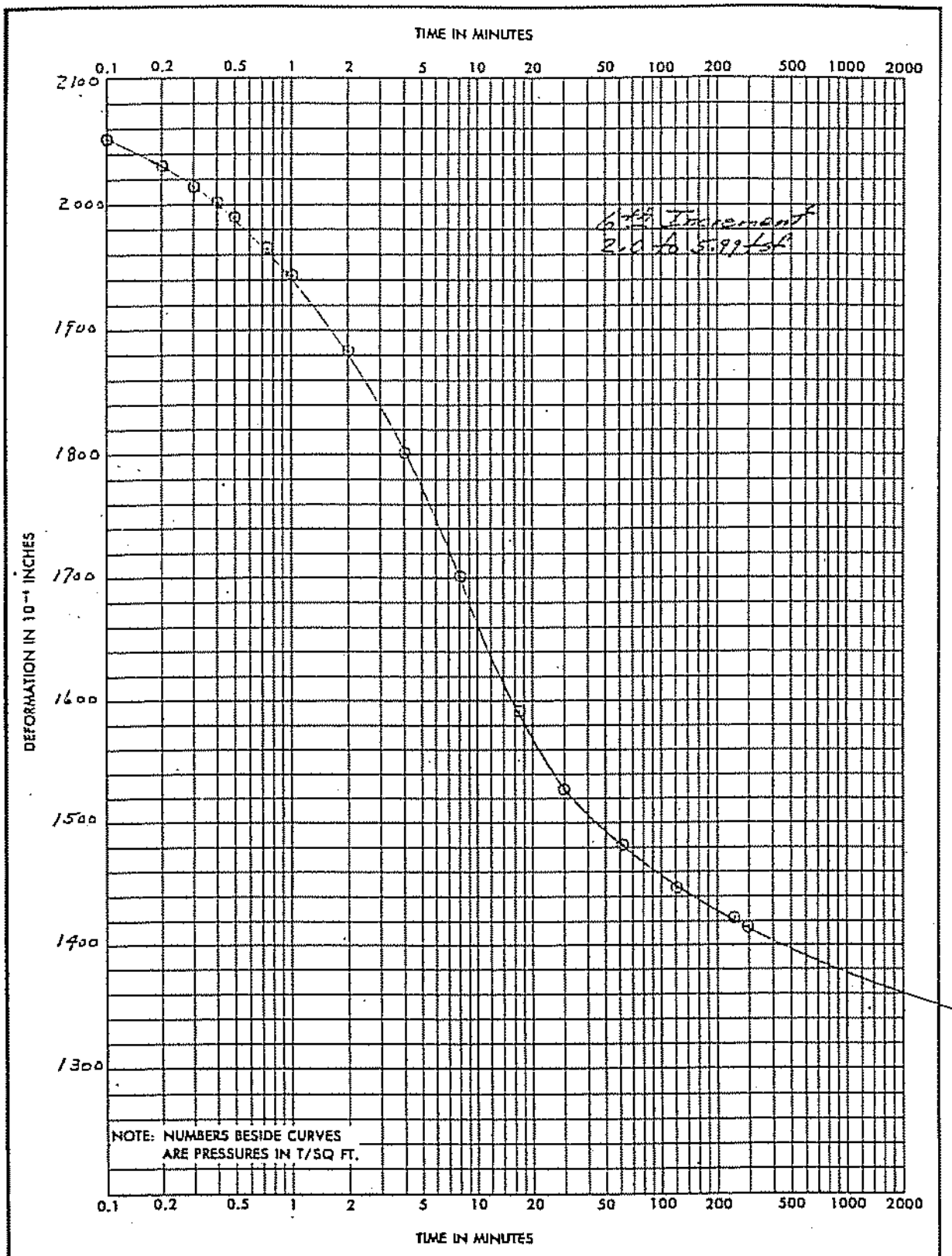
AREA

BORING NO.	SAMPLE NO.	DEPTH EL.	DATE
EBA-5	UD-3	16.0'-18.0'	Dec. 1967

ENG FORM 2088 1 MAY 63 PREVIOUS EDITIONS ARE OBSOLETE.

CONSOLIDATION TEST—TIME CURVES (TRANSLUCENT)

* GPO : 1964 OF—715-963



PROJECT Long Range Delaware River Disposal Area Study

AREA

BORING NO.	SAMPLE NO.	DEPTH ~~Ft~~	DATE
EBB-5	UD-3	16.0'-18.0'	Dec. 1967

ENG-FORM 2088 1 MAY 63 PREVIOUS EDITIONS ARE OBSOLETE.

CONSOLIDATION TEST—TIME CURVES (TRANSLUCENT)

* GPO : 1964 OF—715-965

Edgemoor

BORING NO. EBB-5
SAMPLE NO. UD-4
DEPTH: 22.0 to 24.0 ft.

PROJECT Delaware River Study
DATE October 1967
COMP. By WS CHK'D By RJS

LABORATORY LOG	DESCRIPTION	W, CAN NO.	TEST SAMPLES
	Dark gray organic CLAY (OH), micaceous	Hydr-1 G = 2.52 LL = 121 PL = 49 PI = 72	Q-1 W_{n1} = 93.5% Q-2 W_2 = 92.2% Q-3 W_3 = 95.1% Q-3A W_{3A} = 91.9% R-1 W_1 = 99.4% R-2 W_2 = 100.1% R-3 W_3 = 99.7%
	Bottom of Sample		

SAMPLE DEPTH IN FEET

SAMPLE LENGTH IN INCHES

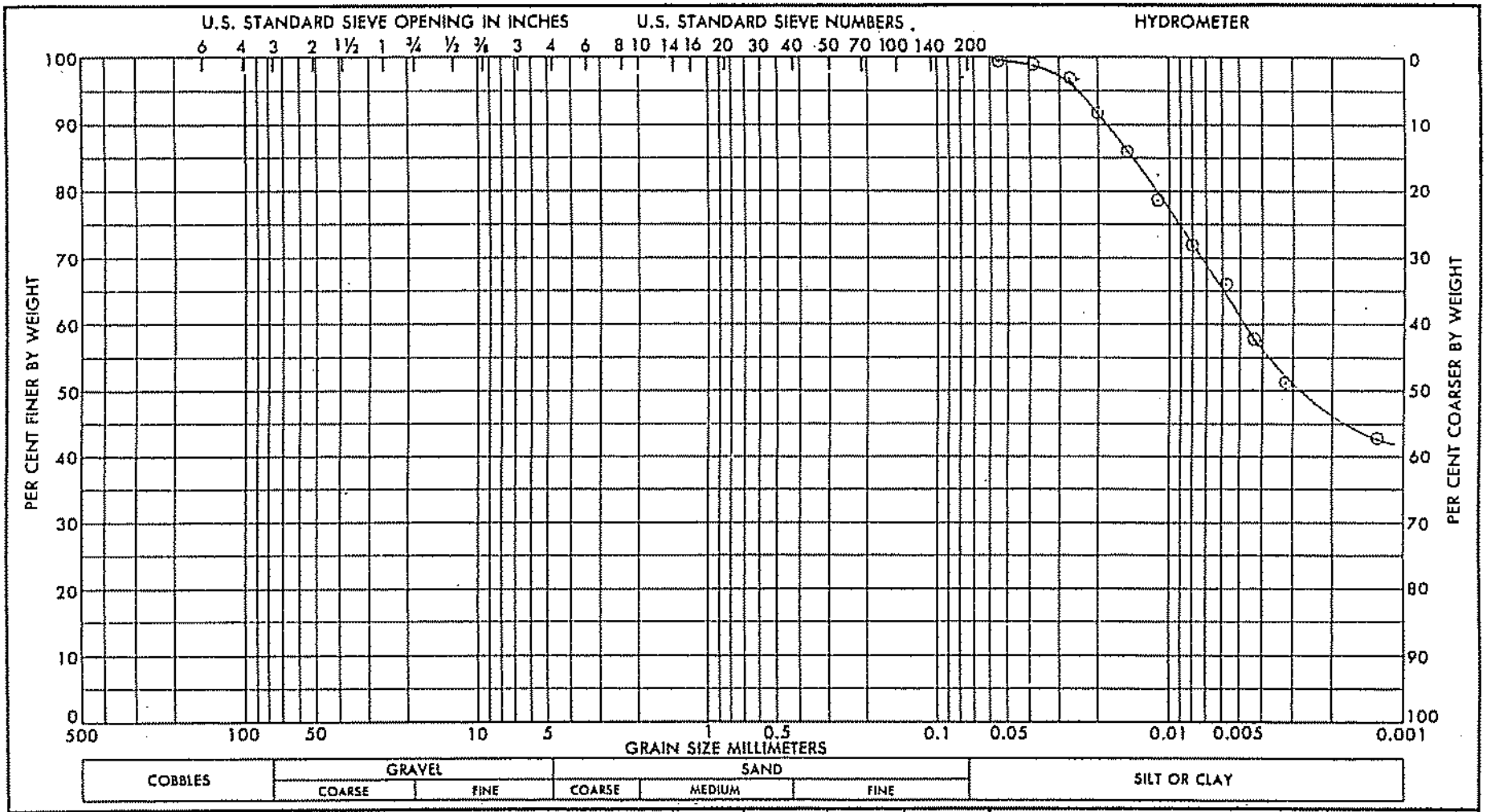
Length of Sample, L 23.50 in.
Weight of Tube and Wet Soil 14,710 g.
Weight of Tube 6,950 g.
Weight of Wet Soil, W 7,760 g.
Diameter of Tube, D 4.25 in.
Total Unit Weight, $\gamma_t = \frac{4.85\,W}{LD^2}$ 88.7 lbs/cu.ft.

LEGEND

W_n — Natural Water Content
MA — Mechanical Analysis
LL — Atterberg Limits
G — Specific Gravity
C — Consolidation
Q — Unconsolidated Undrained
γ_d — Dry Density
R — Consolidated Undrained
S — Consolidated Drained
UC — Unconfined Compression

UNDISTURBED SAMPLE LOG

NED FORM DEC 62 501



SAMPLE NO.	ELEV OR DEPTH	CLASSIFICATION	NAT W%	LL	PL	PI
UD-4	22.0'-24.0'	Organic CLAY (OH)		121	49	72

GRADATION CURVES

PROJECT Long Range Delaware River Disposal Area

AREA

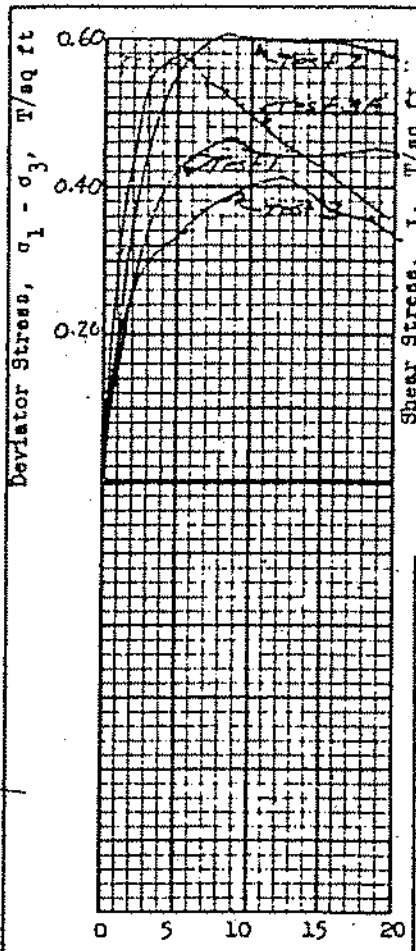
BORING NO. EBB-5

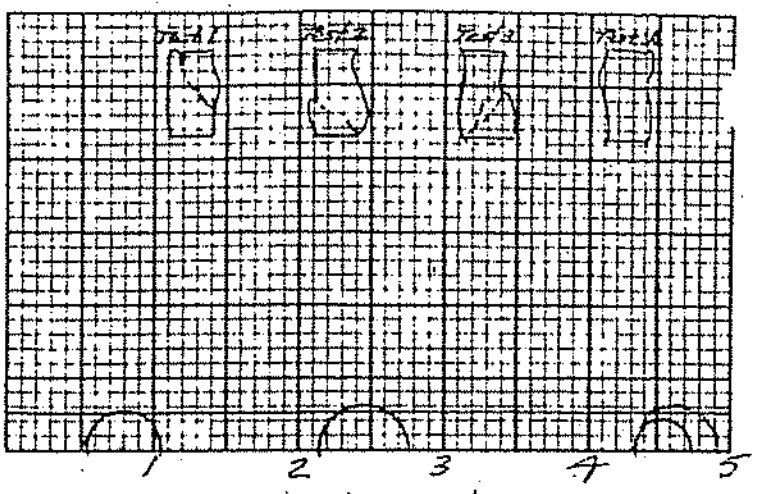
DATE Oct. 1962

ENG FORM 2087
1 MAY 63

REPLACES WES FORM NO. 1241, SEP 1962, WHICH IS OBSOLETE. (TRANSLUCENT)

U.S. GOVERNMENT PRINTING OFFICE : 1963 OF—703-126





Test No.			1	2	3	3A
Initial	Water content	w_o	93.5%	92.2%	95.1%	91.9%
	Void ratio	e_o	2.544	2.479	2.601	2.484
	Saturation	S_o	92.6%	93.7%	92.1%	93.2%
	Dry density, lb/cu ft	γ_d	44.4	45.2	43.7	45.1
Before Shear	Water content	w_c	— %	— %	— %	— %
	Void ratio	e_c	—	—	—	—
	Saturation	S_c	— %	— %	— %	— %
	Final back pressure, T/sq ft	u_o	—	—	—	—
Final	Water content	w_f	— %	— %	— %	— %
	Void ratio	e_f	—	—	—	—
Minor principal stress, T/sq ft		σ_3	0.54	2.16	4.32	4.32
Max deviator stress, T/sq ft		$(\sigma_1-\sigma_3)_{max}$	0.47	0.61	0.41	0.58
Time to failure, min		t_f	8.6	8.0	12.3	5.2
Rate of strain, percent/min			1.03	1.03	1.00	0.99
Ult deviator stress, T/sq ft		$(\sigma_1-\sigma_3)_{ult}$	*0.44	*0.60	*0.38	*0.42
Initial diameter, in.		D_o	1.40	1.40	1.40	1.40
Initial height, in.		H_o	3.17	3.15	3.23	3.15

Shear Strength Parameters

ϕ = — °

tan ϕ = —

c = 0.25 T/sq ft

Method of saturation None

☐ Controlled stress

☒ Controlled strain

Type of test Q | Type of specimen Undisturbed

Classification Organic CLAY (OH)

LL 121 | PL 49 | PI 72 | D_{10} <0.001 | G_s 2.52

Remarks * Stress at 15% strain

Project Long Range Delaware River Disposal Area

Area Edgemoor

Boring No. EBB-5 | Sample No. UD 4

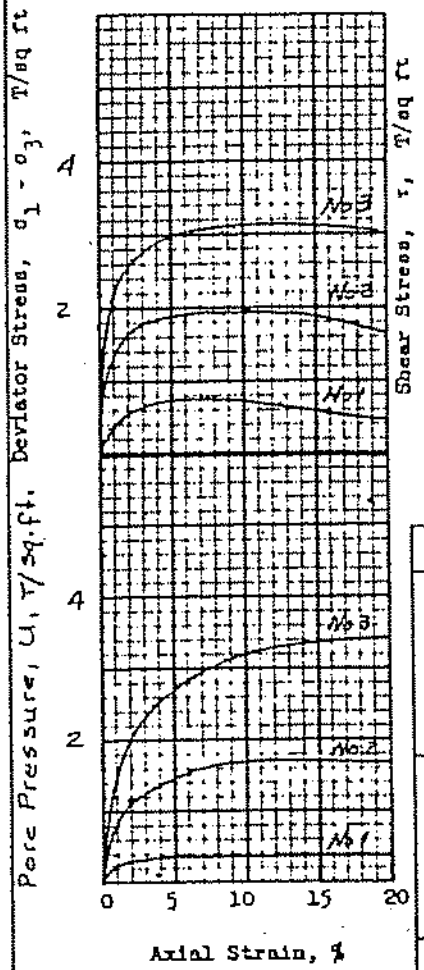
Depth 22.0' – 24.0' | Date Sept. 1967

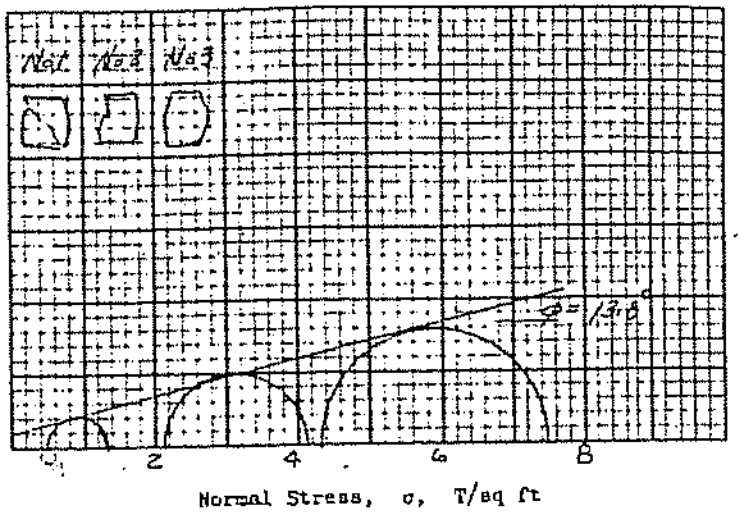
TRIAXIAL COMPRESSION TEST REPORT

ENG FORM 2089 1 JUN 55 (EM 1110-2-1902) PREVIOUS EDITIONS ARE OBSOLETE

TRANSLUCENT

γ_b = 2612 pcf





Test No.			1	2	3	
Initial	Water content	w_o	99.4 %	100.1 %	99.7 %	%
	Void ratio	e_o	2.648	2.737	2.666	
	Saturation	S_o	94.6 %	92.2 %	94.2 %	%
	Dry density, lb/cu ft	γ_d	43.1	42.1	42.9	
Before Shear	Water content	w_c	92.5 %	75.7 %	64.4 %	%
	Void ratio	e_c	2.330	1.908	1.622	
	Saturation	S_c	100 %	100 %	100 %	%
	Final back pressure, T/sq ft	u_o	7.20	7.20	7.20	
Final	Water content	w_f	92.5 %	75.7 %	64.4 %	%
	Void ratio	e_f	2.330	1.908	1.622	
Minor principal stress, T/sq ft		σ_3	0.54	2.16	4.32	
Max deviator stress, T/sq ft		$(\sigma_1-\sigma_3)_{max}$	0.77	1.98	3.16	
Time to failure, min		t_f	42.5	53.1	55.4	
Rate of strain, percent/min			0.18	0.19	0.19	
Pore Pressure T/sq.ft.		U	+0.38	+1.68	+3.23	
Ult deviator stress, T/sq ft		$(\sigma_1-\sigma_3)_{ult}$	0.60	1.88	3.12	
Initial diameter, in.		D_o	1.41	1.42	1.41	
Initial height, in.		H_o	3.25	3.23	3.15	

Shear Strength Parameters

ϕ = 13.8 °

tan ϕ = 0.245

c = 0.20 T/sq ft

Method of saturation Backpressure

☐ Controlled stress

☒ Controlled strain

Type of test R | Type of specimen Undisturbed

Classification Organic CLAY (OH)

LL	PL	PI	D_{10}	G_s
121	49	72	< 0.001	2.52

Remarks

Project Delaware River Disposal Area Study

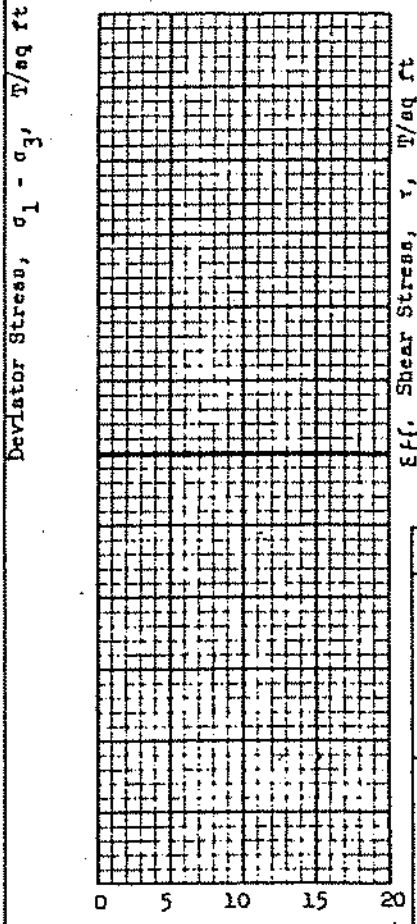
Area Edgemoor Disposal Area

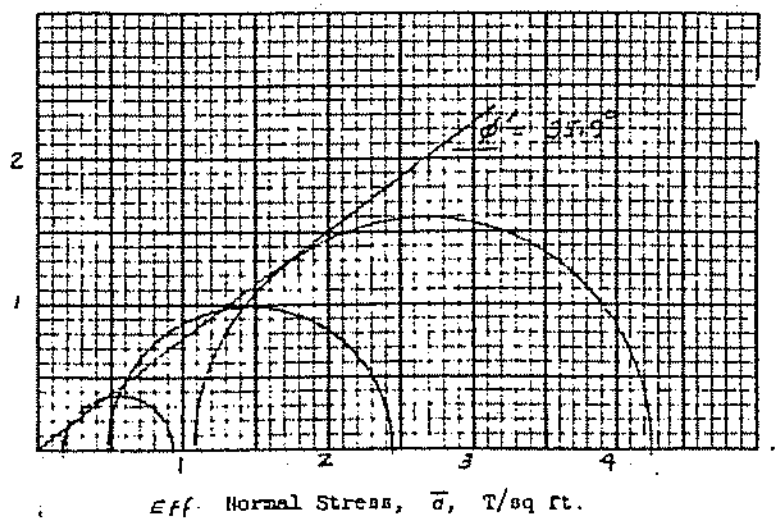
Boring No. EBB-5 | Sample No. UD-4

Depth 22.0' - 24.0' | Date Oct. 1967

TRIAXIAL COMPRESSION TEST REPORT

Sheet 1 of 2





Test No.			1	2	3	
Initial	Water content	w_o	%	%	%	%
	Void ratio	e_o				
	Saturation	S_o	%	%	%	%
	Dry density, lb/cu ft	γ_d				
Before Shear	Water content	w_c	%	%	%	%
	Void ratio	e_c				
	Saturation	S_c	%	%	%	%
	Final back pressure, T/sq ft	u_o				
Final	Water content	w_f	%	%	%	%
	Void ratio	e_f				
Minor principal stress, T/sq ft Eff		$\bar{\sigma}_3$	0.16	0.48	1.09	
Max deviator stress, T/sq ft		$(\sigma_1-\sigma_3)_{max}$				
Time to failure, min		t_f				
Rate of strain, percent/min						
Major principal Stress, T/sq ft Eff.		$\bar{\sigma}_1$	0.92	2.46	4.25	
Ult deviator stress, T/sq ft		$(\sigma_1-\sigma_3)_{ult}$				
Initial diameter, in.		D_o				
Initial height, in.		H_o				

Shear Strength Parameters

ϕ = 35.9 °

tan ϕ = 0.725

c = 0 T/sq ft

Method of saturation Backpressure

☐ Controlled stress

☒ Controlled strain

Type of test $\bar{R}$ | Type of specimen Undisturbed

Classification Organic CLAY (OH)

LL	PL	PI	D_{10}	G_s
121	49	72	< 0.001	2.52

Remarks See Sheet 1 of 2 for other data.

Project Delaware River Disposal Area Study

Area Edgemoor Disposal Area

Boring No. EBB-5 | Sample No. UD-4

Depth ~~ft~~ 22.0'-24.0' | Date Oct 1967

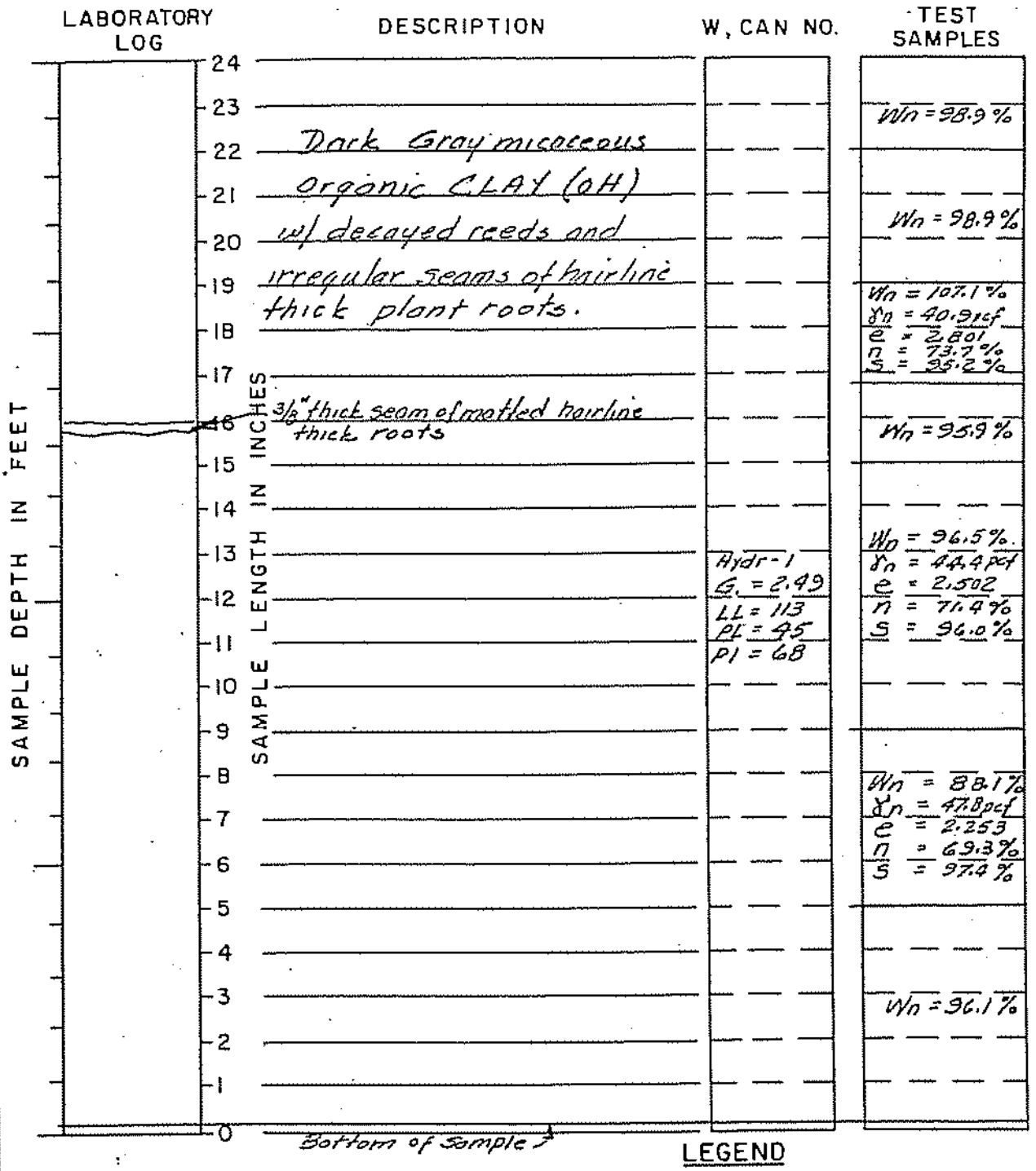
TRIAXIAL COMPRESSION TEST REPORT

Sheet 2 of 2

Edgemoor

BORING NO. EBB-5
SAMPLE NO. UD-5
DEPTH: 28.0 to 30.0 ft.

PROJECT Delaware River Study
DATE October 1967
COMP. By WS CHK'D By RJS



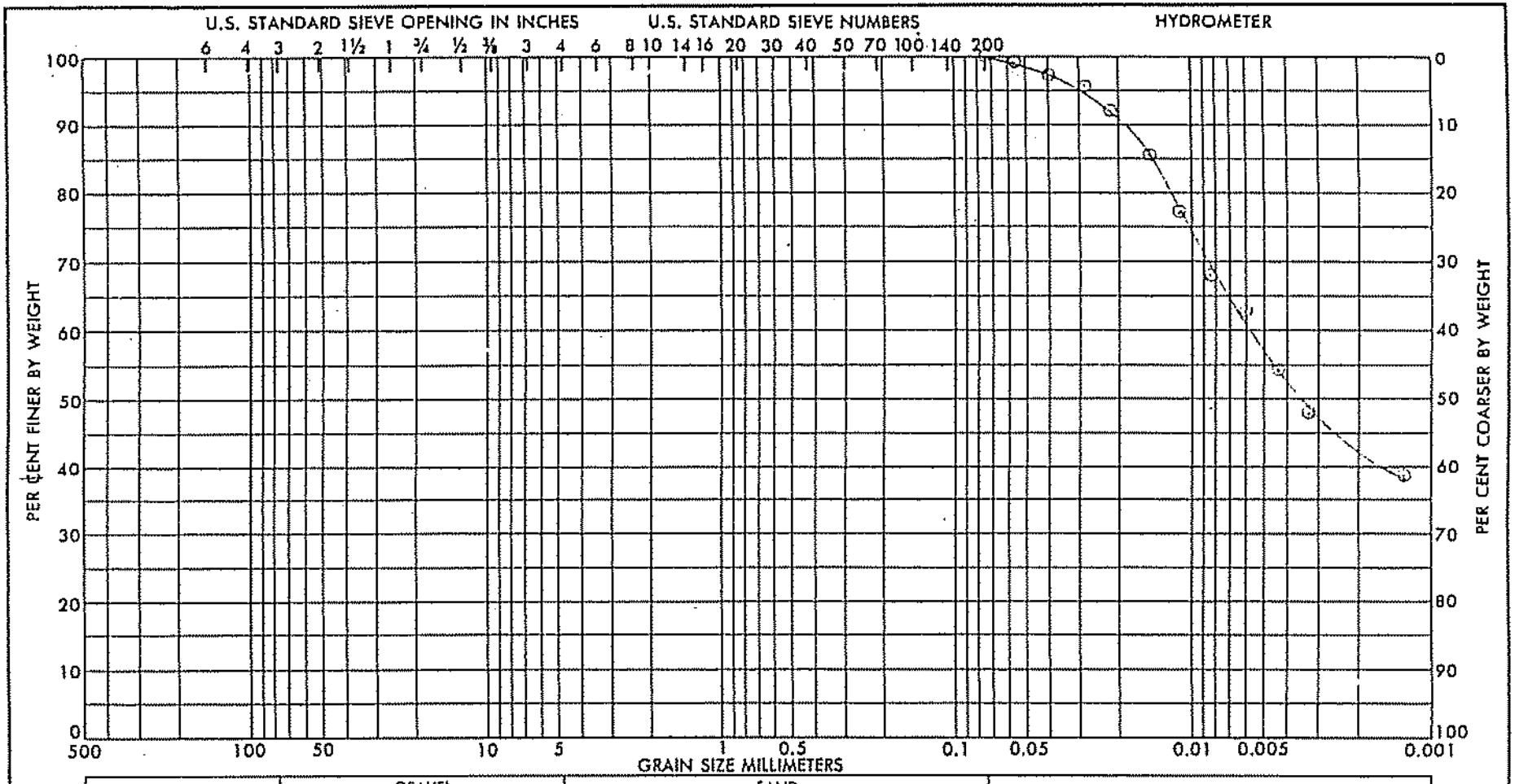
Length of Sample, L 23.87 in.
Weight of Tube and Wet Soil 14.950 g.
Weight of Tube 7.360 g.
Weight of Wet Soil, W 7.590 g.
Diameter of Tube, D 4.25 in.
Total Unit Weight, $\gamma_t = \frac{4.85\,W}{L\,D^2}$ 85.4 lbs/cu.ft.

UNDISTURBED SAMPLE LOG

LEGEND

W_n — Natural Water Content
MA — Mechanical Analysis
LL — Atterberg Limits
G — Specific Gravity
C — Consolidation
Q — Unconsolidated Undrained
γ_o — Dry Density
R — Consolidated Undrained
S — Consolidated Drained
UC — Unconfined Compression

NED FORM DEC 62 501



SAMPLE NO.	ELEV OR DEPTH	CLASSIFICATION	NAT W%	LL	PL	PI
110-5	28.0'-30.0'	Organic CLAY (OH)		113	45	68

PROJECT Long Range Delaware River Disposal Area

AREA

BORING NO. EBB-5

DATE Oct. 1967

GRADATION CURVES

ENG FORM 2087
1 MAY 63

REPLACES WES FORM NO. 1241, SEP 1962, WHICH IS OBSOLETE.

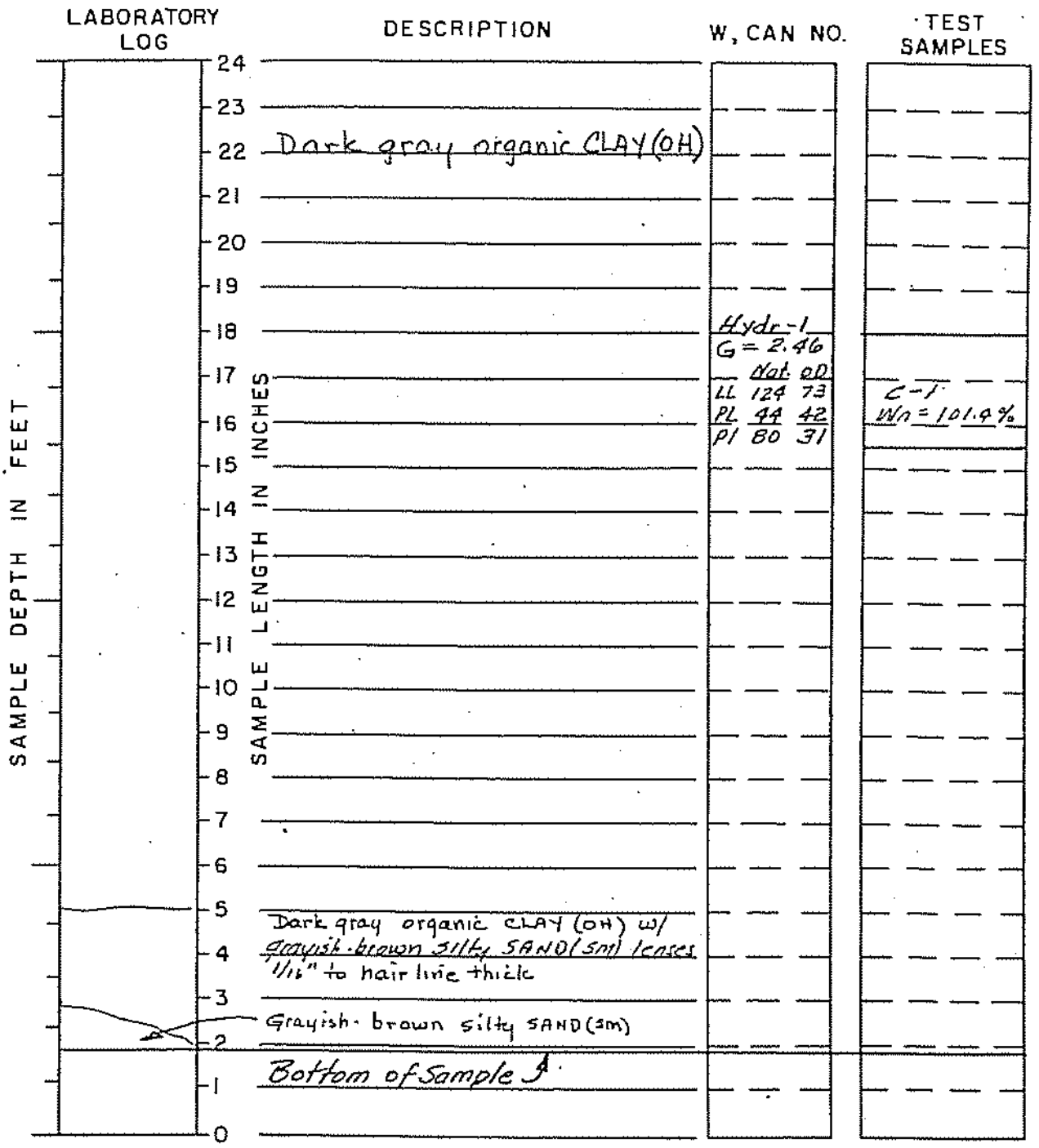
(TRANSLUCENT)

U.S. GOVERNMENT PRINTING OFFICE : 1963 OF—709-124

Edgemoor

BORING NO. EBB-5
SAMPLE NO. UD-6
DEPTH: 34.0 to 36.0 ft.

PROJECT Delaware River Study
DATE October 1967
COMP. By WS CHK'D By RJS



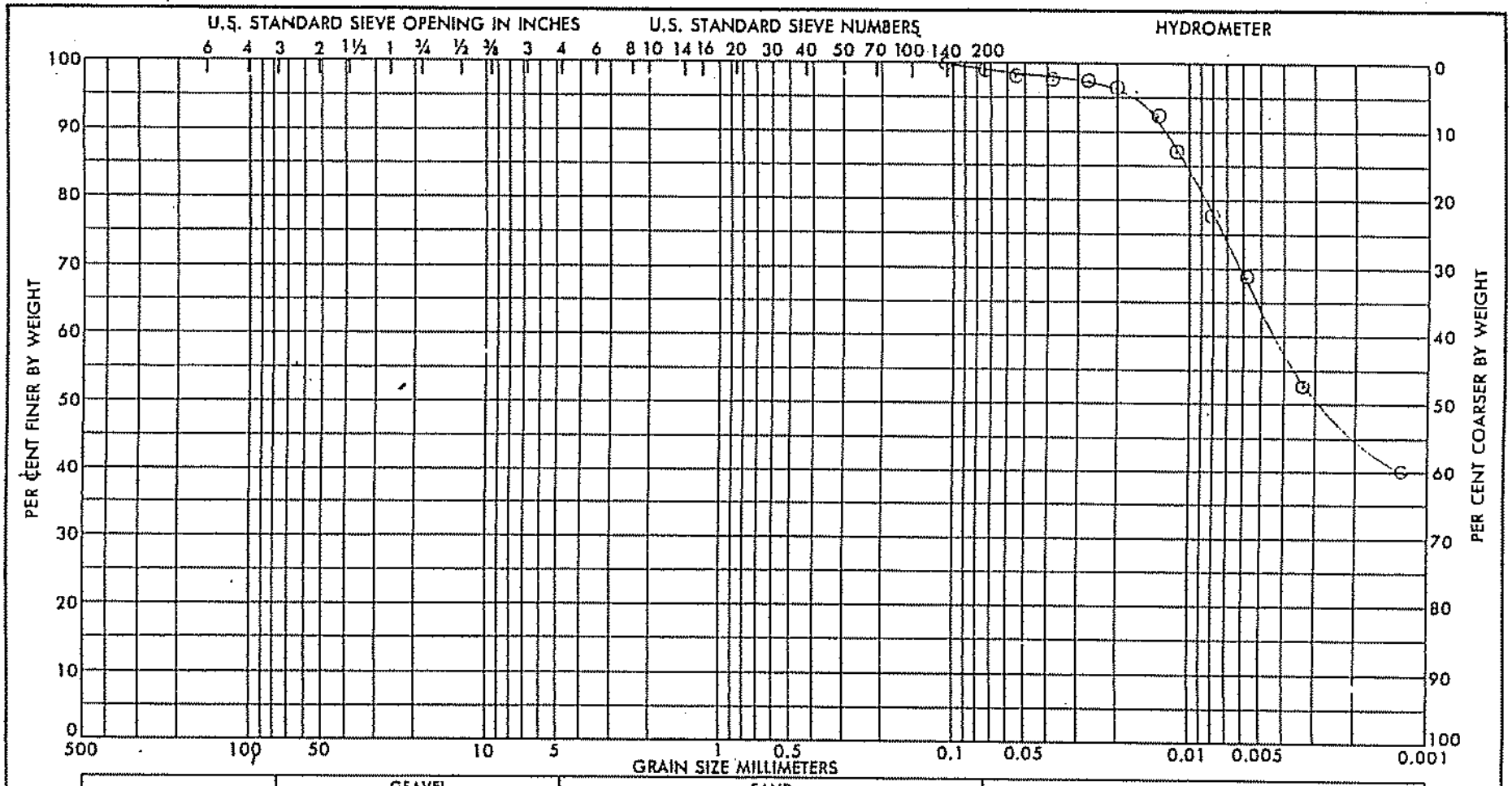
Length of Sample, L 22.12 in.
Weight of Tube and Wet Soil 14,800 g.
Weight of Tube 7,275 g.
Weight of Wet Soil, W 7,525 g.
Diameter of Tube, D 4.25 in.
Total Unit Weight, $\gamma_t = \frac{4.85\,W}{L\,D^2}$ 91.3 lbs/cu.ft.

LEGEND

W_n – Natural Water Content
MA – Mechanical Analysis
LL – Atterberg Limits
G – Specific Gravity
C – Consolidation
Q – Unconsolidated Undrained
γ_0 – Dry Density
R – Consolidated Undrained
S – Consolidated Drained
UC – Unconfined Compression

UNDISTURBED SAMPLE LOG

NED FORM DEC 62 501



SAMPLE NO.	~~ELEV. OR~~ DEPTH	CLASSIFICATION	NAT W%	LL	PL	PI
111-6	34.0'-36.0'	Organic CLAY (OH)	Natural	124	44	80
			Oven-Dried	73	42	31

GRADATION CURVES

PROJECT Long Range Delaware River Disposal Area

AREA

BORING NO. EBB-5

DATE Oct. 1967

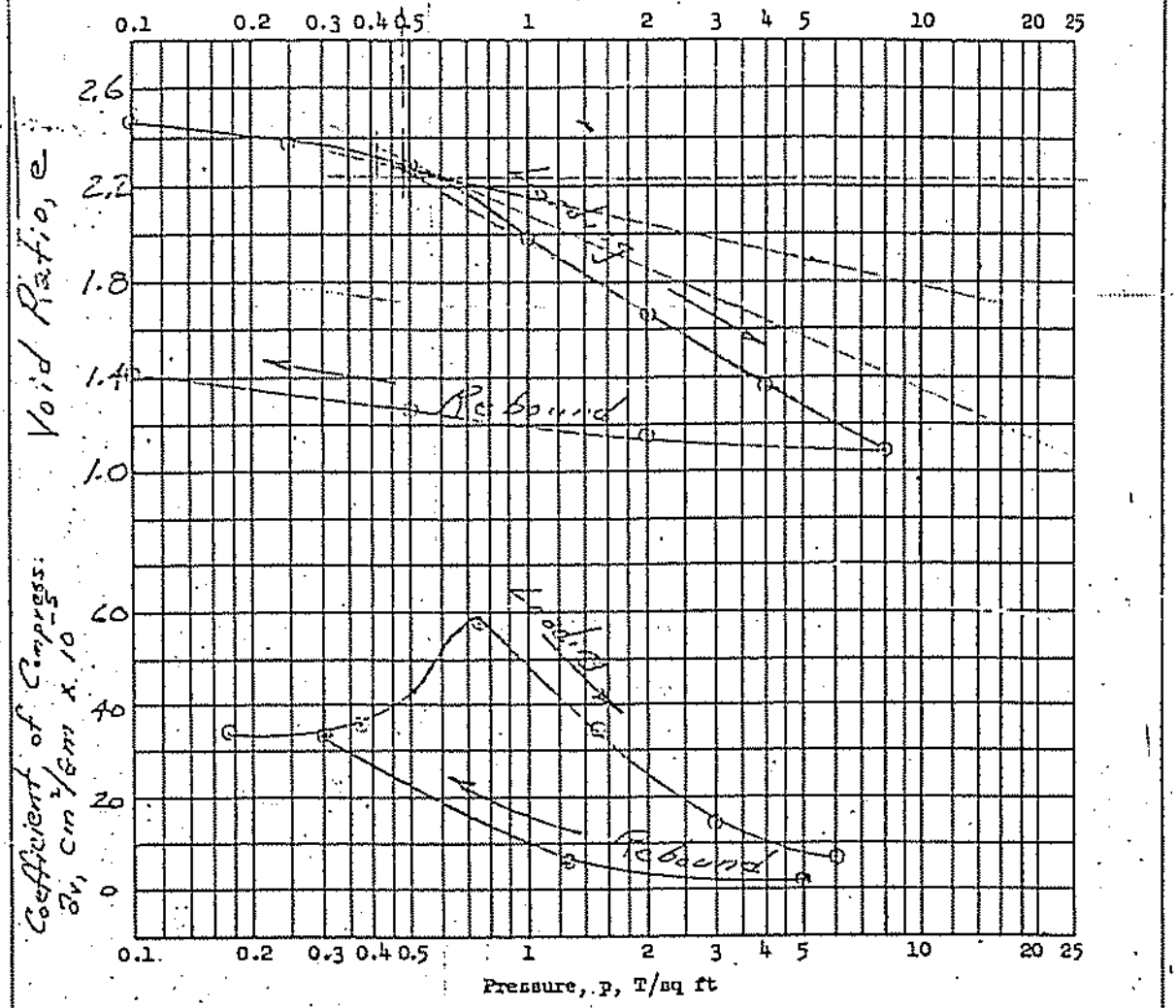
ENG FORM 2087
1 MAY 63

REPLACES WES FORM NO. 1241, SEP 1962, WHICH IS OBSOLETE. (TRANSLUCENT)

U.S. GOVERNMENT PRINTING OFFICE : 1963 O—709-124

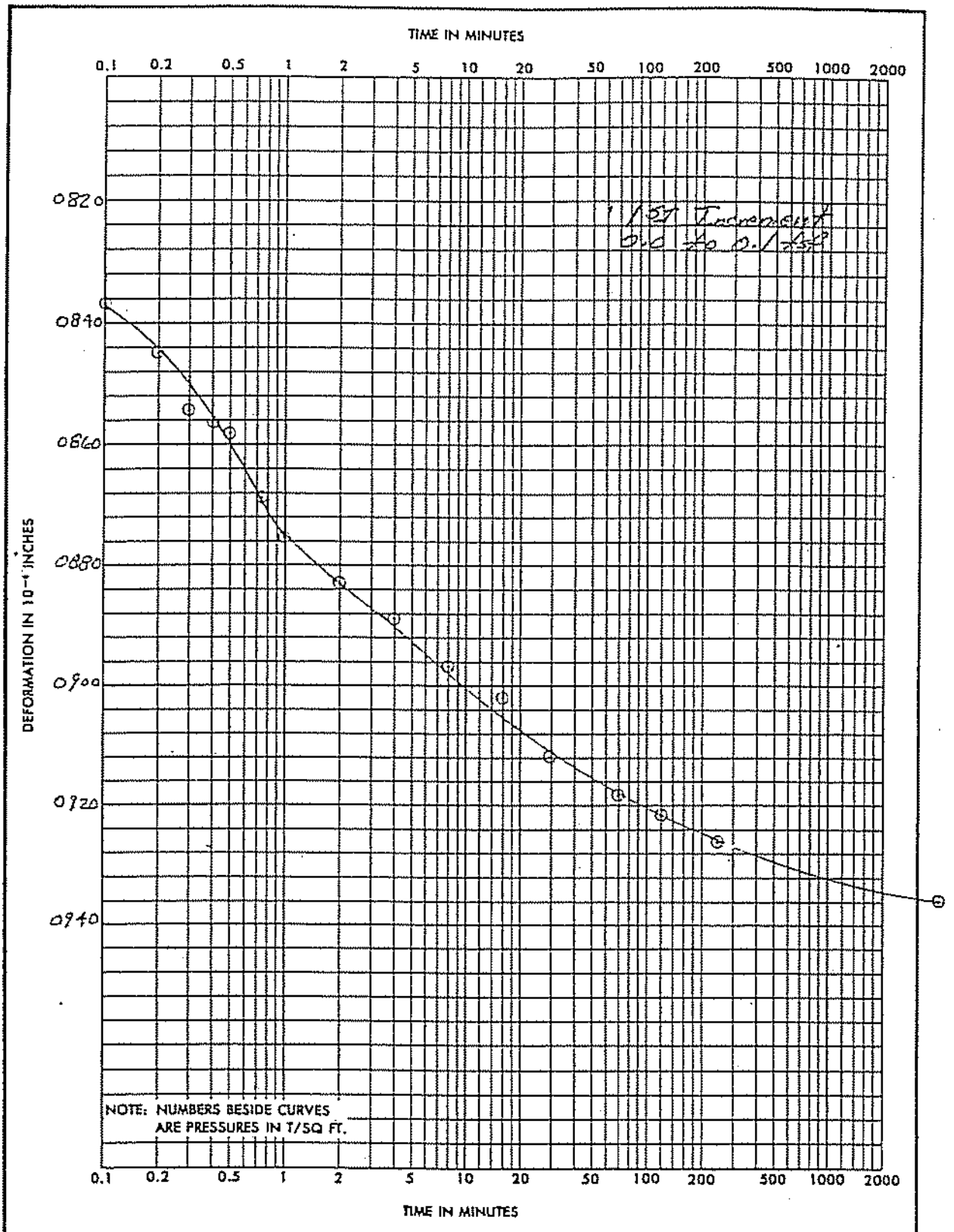
$P_c = 0.48$ T/D'
$P_o = 0.49$ T/D'

Norm. Cons.



Type of Specimen: Undisturbed		Before Test		After Test	
Diam 3.0 in.	Ht 0.75 in.	Water Content, w_o	101.4 %	w_f	61.4 %
Overburden Pressure, Po 0.49 T/sq ft		Void Ratio, e_o	2.482	e_f	1.405
Preconsol. Pressure, P_c 0.48 T/sq ft		Saturation, S_o	100 %	S_f	100+ %
Compression Index, C_c 1.02		Dry Density, γ_d	44.1 lb/ft³		
Classification Organic CLAY (OH)		k_{20} at e_o =	x 10⁻ cm/sec		
LL Nat 124 O.D. 73	G_s 2.46	Project: Long Range Delaware River Disposal Area			
PL 44 42	D_{10} < 0.001				
Remarks		Area: Edgemoor			
		Boring No. EBB-5	Sample No. UD-6		
		Depth El 34.0' - 36.0'	Date Oct. 1967		
		CONSOLIDATION TEST REPORT			

$P_o = 0.49$ T/D'



PROJECT Long Range Delaware River Disposal Area Study

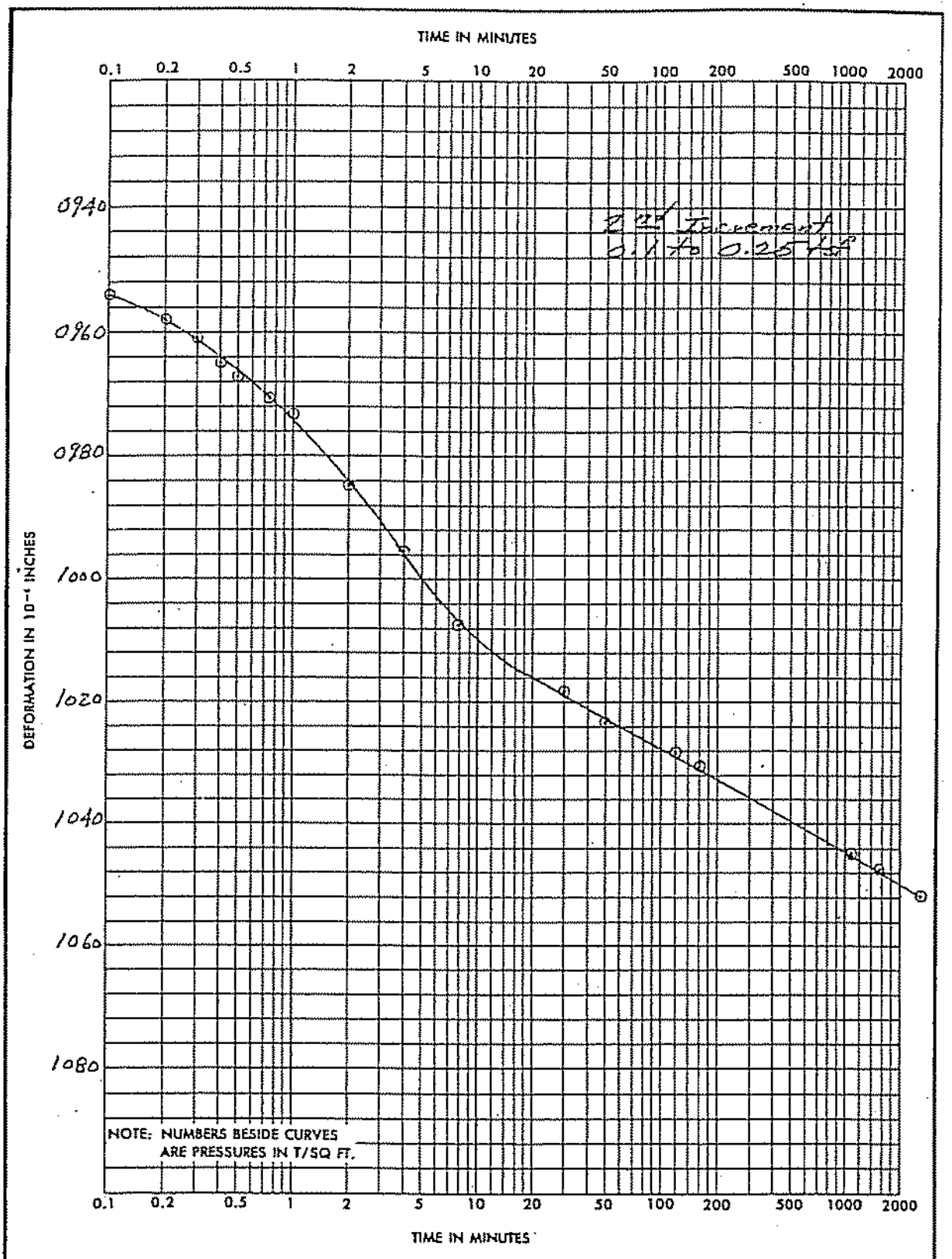
AREA

BORING NO.	SAMPLE NO.	DEPTH	DATE
EBB-5	UD-6	34.0' – 36.0'	Dec. 1967

ENG FORM 2088 1 MAY 63 PREVIOUS EDITIONS ARE OBSOLETE.

CONSOLIDATION TEST—TIME CURVES (TRANSLUCENT)

* GPO : 1964 O7—715-965



PROJECT Long Range Delaware River Disposal Area Study

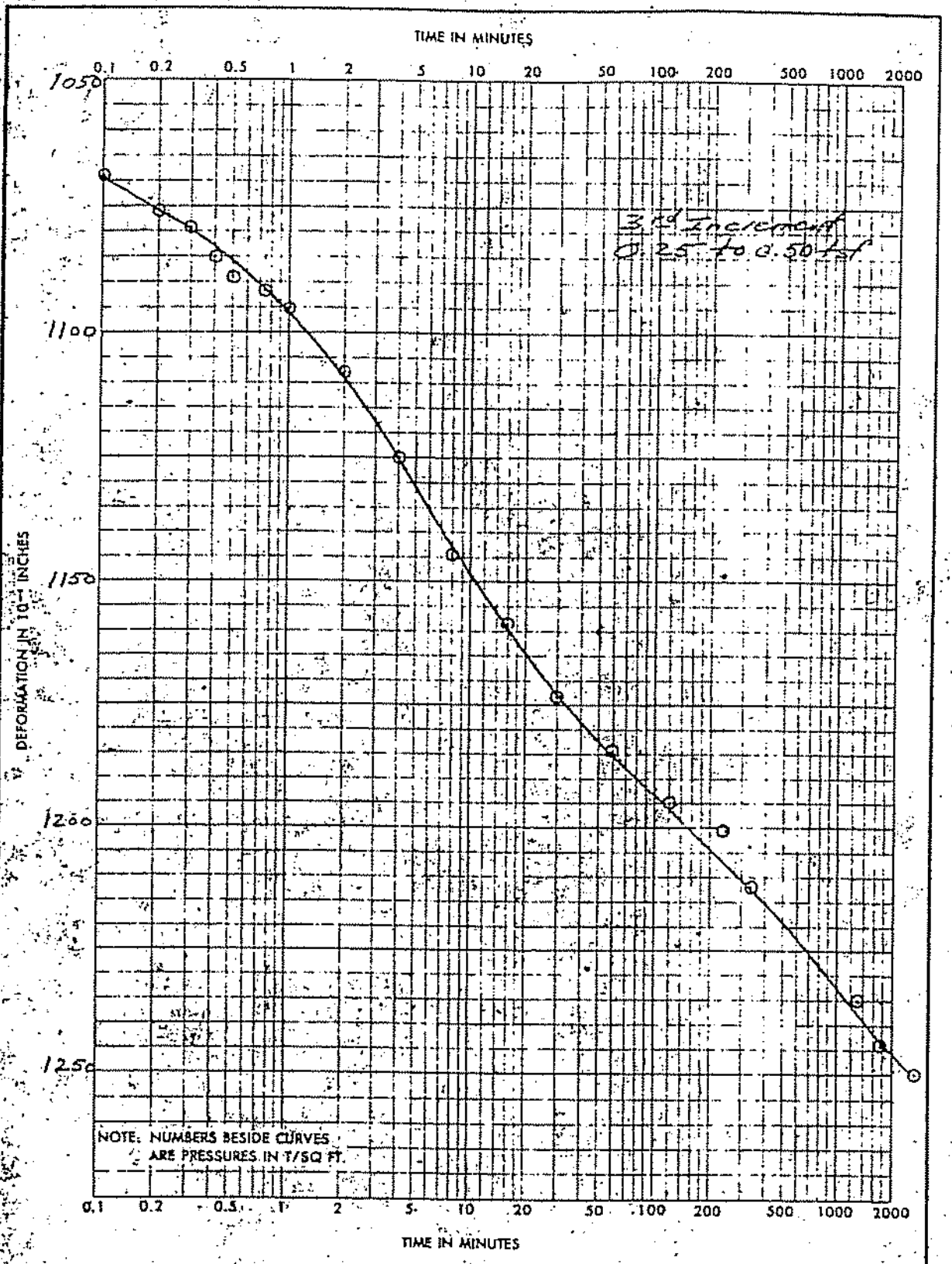
AREA

BORING NO. EBH-5 | SAMPLE NO. UD-6 | DEPTH ~~El.~~ 34.0'-36.0' | DATE Dec. 1967

ENG FORM 2088 1 MAY 63 PREVIOUS EDITIONS ARE OBSOLETE.

CONSOLIDATION TEST—TIME CURVES (TRANSLUCENT)

* GPO : 1966 OP—715-963



PROJECT: Long Range Delaware River Disposal Area Study

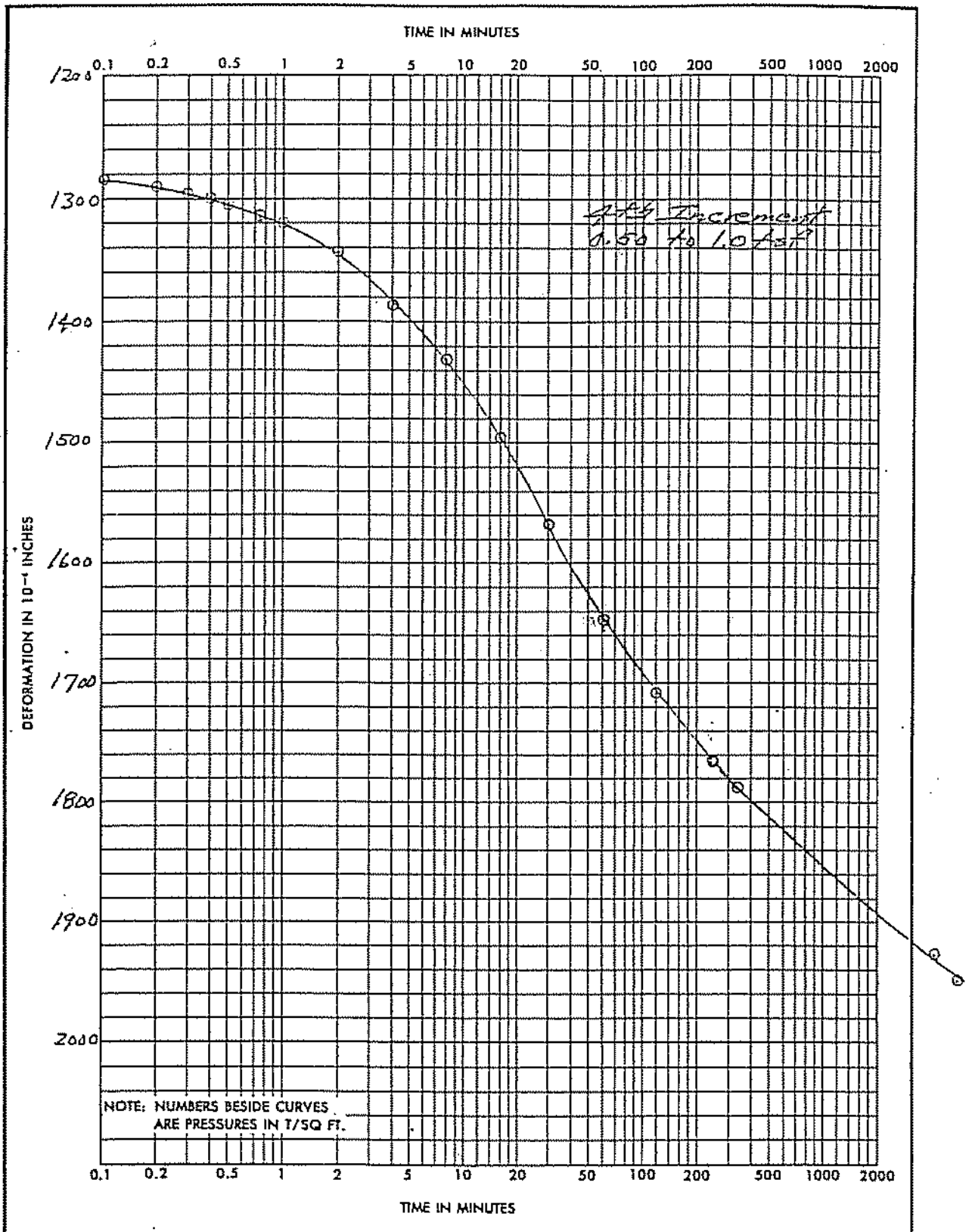
AREA

BORING NO. EBB-5 | SAMPLE NO. UD-6 | DEPTH 34.0'-36.0' | DATE Dec. 1967

ENG FORM 2088 1 MAY 63 PREVIOUS EDITIONS ARE OBSOLETE.

CONSOLIDATION TEST—TIME CURVES (TRANSLUCENT)

* GPO : 1964 O—715-963



PROJECT Long Range Delaware River Disposal Area Study

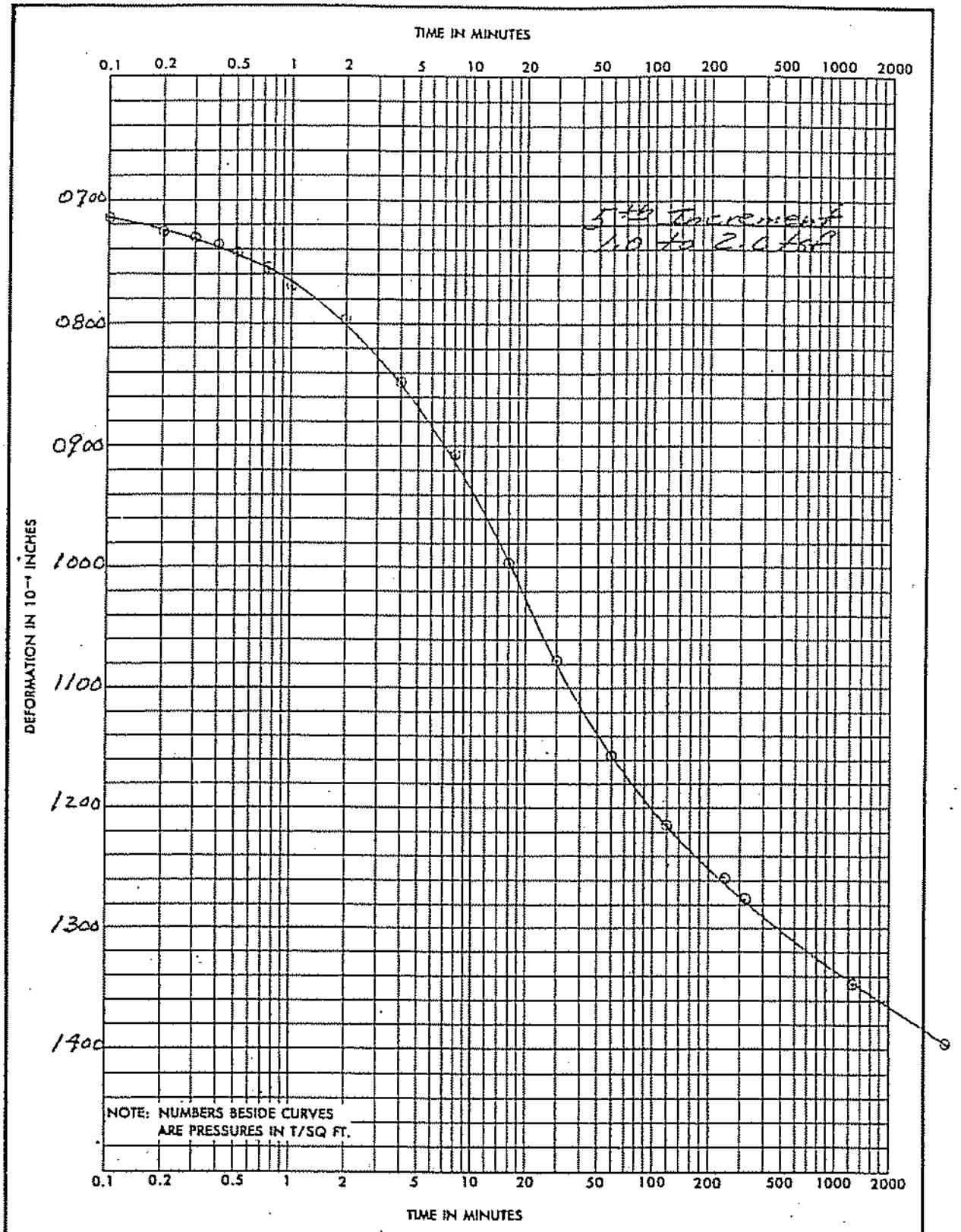
AREA

BORING NO.	SAMPLE NO.	DEPTH	DATE
EBB-5	UD-6	34.0'-36.0'	Dec. 1967

ENG FORM 2088 1 MAY 63 PREVIOUS EDITIONS ARE OBSOLETE.

CONSOLIDATION TEST—TIME CURVES (TRANSLUCENT)

* GPO : 1964 OF—733-963



PROJECT Long Range Delaware River Disposal Area Study

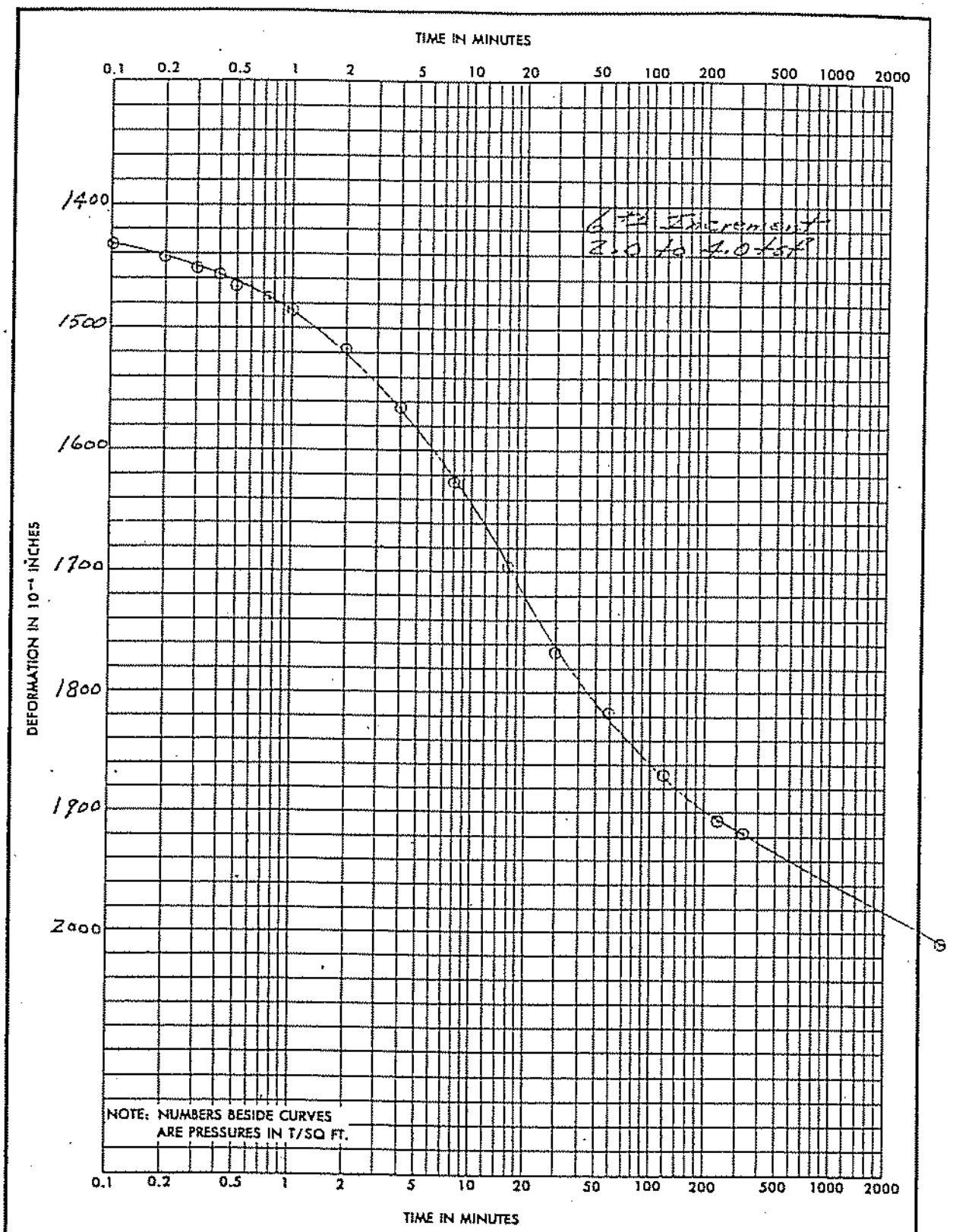
AREA

BORING NO.	SAMPLE NO.	DEPTH	DATE
EBB-5	UD-6	34.0'-36.0'	Dec. 1967

ENG FORM 2088 1 MAY 63 PREVIOUS EDITIONS ARE OBSOLETE.

CONSOLIDATION TEST—TIME CURVES (TRANSLUCENT)

* GPO : 1964 OF—715-985



PROJECT Long Range Delaware River Disposal Area Study

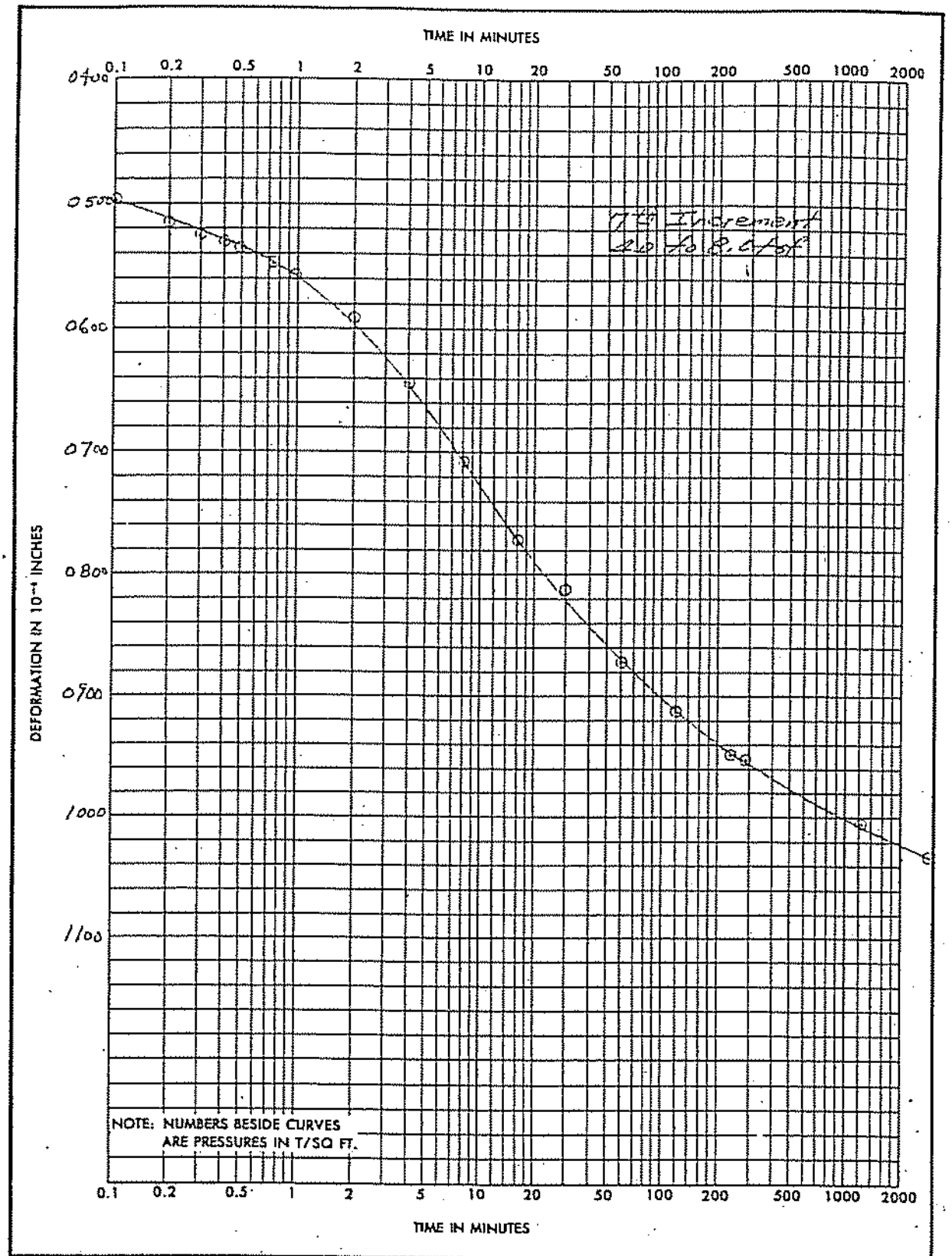
AREA

BORING NO. EBB-5 | SAMPLE NO. UD-6 | DEPTH 34'-36.0' | DATE Dec. 1967

ENG FORM 2088 1 MAY 63 PREVIOUS EDITIONS ARE OBSOLETE.

CONSOLIDATION TEST—TIME CURVES (TRANSLUCENT)

* GPO : 1966 OF—715-945



PROJECT Long Range Delaware River Disposal Area Study

AREA

BORING NO. EB-5 | SAMPLE NO. UD-6 | DEPTH FT. 34.5 - 36.0' | DATE Dec. 1967

ENG FORM 2088 1 MAY 63 PREVIOUS EDITIONS ARE OBSOLETE.

CONSOLIDATION TEST—TIME CURVES (TRANSLUCENT)

* GPO : 1964 O-715-115

Edgemoor

BORING NO. EBB-6
SAMPLE NO. UD-1
DEPTH: 4.0 to 6.0 ft.

PROJECT Delaware River Study
DATE October 1967
COMP. By WS CHK'D By RJS

LABORATORY LOG	DESCRIPTION	W, CAN NO.	TEST SAMPLES
	Brown, micaceous organic CLAY (OH) w/ decayed vegetation, organic matl increases with depth.		
		Hydr-1 G = 2.49 LL = 110 PL = 41 PI = 69	R-1, 2, & 3 W_{n_1} = 93.3 % W_{n_2} = 95.9 % W_{n_3} = 92.3 %
	Dark gray-brown micaceous organic CLAY (OH)		Q-1, 2, & 3 W_{n_1} = 95.7 % W_{n_2} = 99.7 % W_{n_3} = 100.4 %
	Bottom of Sample		

SAMPLE DEPTH IN FEET

SAMPLE LENGTH IN INCHES

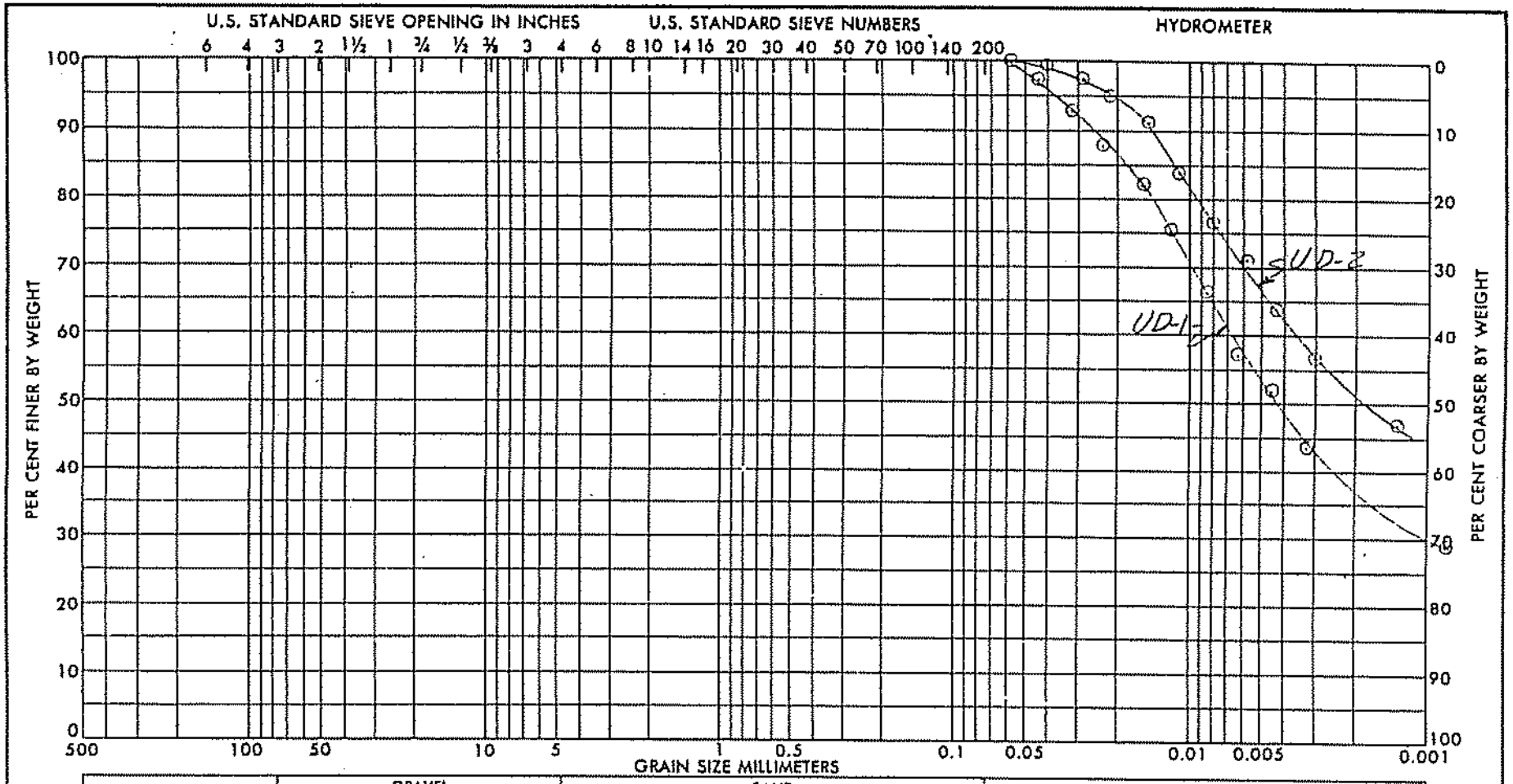
24 23 22 21 20 19 18 17 16 15 14 13 12 11 10 9 8 7 6 5 4 3 2 1 0

Length of Sample, L 23.10 in.
Weight of Tube and Wet Soil 14,350 g.
Weight of Tube 6,950 g.
Weight of Wet Soil, W 7,400 g.
Diameter of Tube, D 4.25 in.
Total Unit Weight, $\gamma_t = \frac{4.85\,W}{L\,D^2}$ 86.0 lbs/cu.ft.

UNDISTURBED SAMPLE LOG

LEGEND
W_n — Natural Water Content
MA — Mechanical Analysis
LL — Atterberg Limits
G — Specific Gravity
C — Consolidation
Q — Unconsolidated Undrained
γ_0 — Dry Density
R — Consolidated Undrained
S — Consolidated Drained
UC — Unconfined Compression

NED FORM DEC 62 501



COBBLES	GRAVEL		SAND			SILT OR CLAY
	COARSE	FINE	COARSE	MEDIUM	FINE	

SAMPLE NO.	~~ELEV OR~~ DEPTH	CLASSIFICATION	NAT W%	LL	PL	PI
UD-1	4.0'-6.0'	Organic CLAY (OH)		110	41	69
UD-2	12.0'-14.0'	Organic CLAY (OH)		129	51	78

GRADATION CURVES

PROJECT Long Range Delaware River Disposal Area

AREA

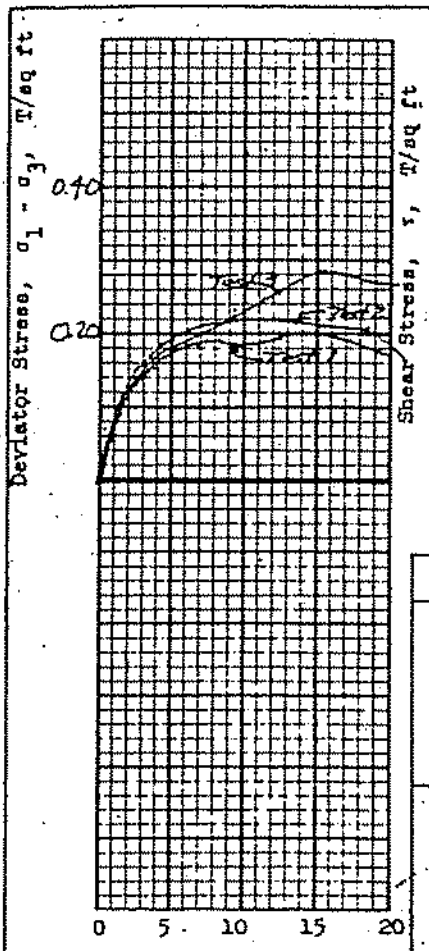
BORING NO. EBB-6

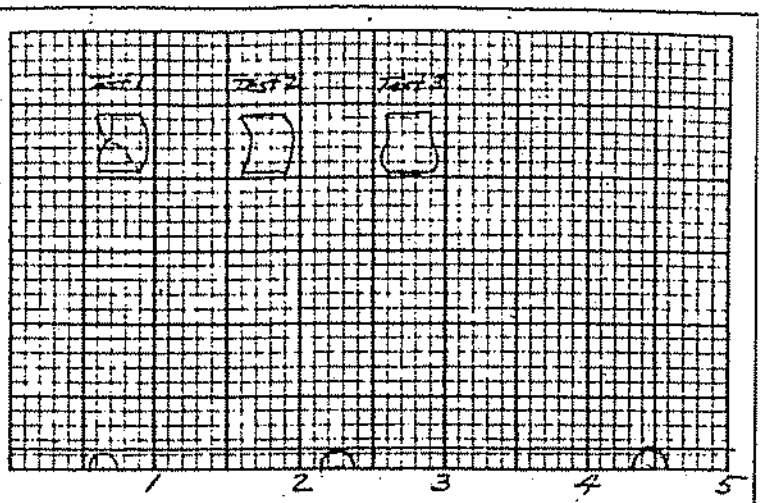
DATE Oct. 1967

ENG FORM 2087
1 MAY 63

REPLACES WES FORM NO. 1241, SEP 1962, WHICH IS OBSOLETE.

U.S. GOVERNMENT PRINTING OFFICE : 1963 OF—709-124





Shear Strength Parameters

ϕ = — °

tan ϕ = —

c = 0.12 T/sq ft

Method of saturation None

☐ Controlled stress

☒ Controlled strain

Test No.			1	2	3	
Initial	Water content	w_o	95.7 %	99.7 %	100.4	%
	Void ratio	e_o	2.647	2.631	2.629	
	Saturation	S_o	91.4 %	95.9 %	96.6 %	%
	Dry density, lb/cu ft	γ_d	43.3	43.5	43.5	
Before Shear	Water content	w_c	— %	— %	— %	%
	Void ratio	e_c	—	—	—	
	Saturation	S_c	— %	— %	— %	%
	Final back pressure, T/sq ft	u_o	—	—	—	
Final	Water content	w_f	— %	— %	— %	%
	Void ratio	e_f	—	—	—	
Minor principal stress, T/sq ft		σ_3	0.54	2.16	4.32	
Max deviator stress, T/sq ft		$(\sigma_1-\sigma_3)_{max}$	0.194	0.218	0.285*	
Time to failure, min		t_f	8.0	9.2	16.2	
Rate of strain, percent/min			1.03	1.01	1.00	
Ult deviator stress, T/sq ft		$(\sigma_1-\sigma_3)_{ult}$	0.200*	0.208*	—	
Initial diameter, in.		D_o	1.4	1.4	1.4	
Initial height, in.		H_o	3.15	3.21	3.23	

Type of test Q | Type of specimen Undisturbed

Classification Organic CLAY (OH)

LL	PL	PI	D_{10}	G_s
110	41	69	< 0.001	2.53

Remarks *Stress at 15% Strain

Project Long Range Delaware River Disposal Area

Area Edgemoor

Boring No. EB8-6 | Sample No. U01

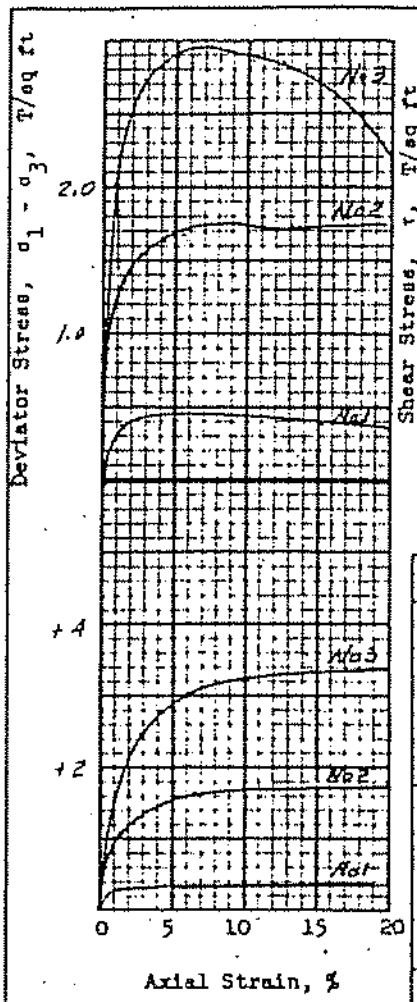
Depth 40'-6.0' | Date Sept. 1967

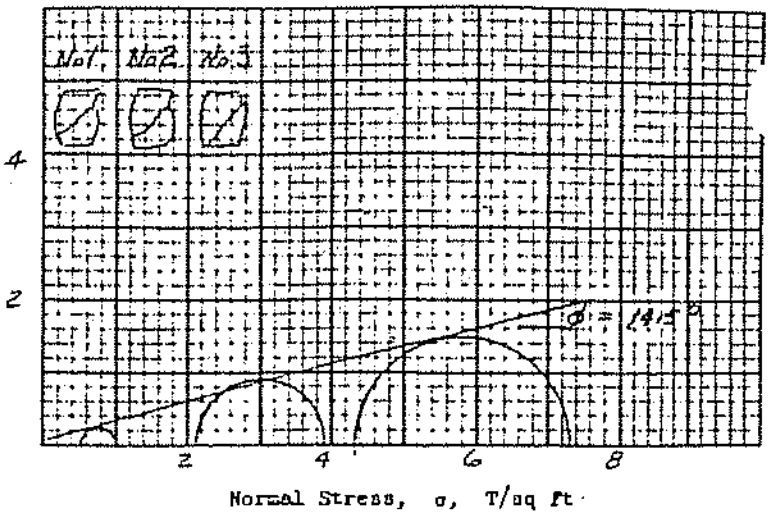
TRIAXIAL COMPRESSION TEST REPORT

ENG FORM 1 JUN 65 2089 (EM 1110-2-1902) PREVIOUS EDITIONS ARE OBSOLETE

TRANSLUCENT

$\gamma_b = 26.3$





Test No.			1	2	3	
Initial	Water content	w_o	93.3 %	95.9 %	92.3 %	%
	Void ratio	e_o	2.567	2.588	2.541	
	Saturation	S_o	91.9 %	93.7 %	91.9 %	%
	Dry density, lb/cu ft	γ_d	44.3	44.0	44.6	
Before Shear	Water content	w_c	81.5 %	63.7 %	55.1 %	%
	Void ratio	e_c	2.061	1.612	1.395	
	Saturation	S_c	100 %	100 %	100 %	%
	Final back pressure, T/sq ft	u_o	7.20	7.20	7.20	
Final	Water content	w_f	81.5 %	63.7 %	55.1 %	%
	Void ratio	e_f	2.061	1.612	1.395	
Minor principal stress, T/sq ft		σ_3	0.54	2.16	4.32	
Max deviator stress, T/sq ft		$(\sigma_1-\sigma_3)_{max}$	0.47	1.75	2.97	
Time to failure, min		t_f	29.5	51.7	37.0	
Rate of strain, percent/min			0.18	0.18	0.19	
Pore Pressure T/sq ft		u	+0.38	+1.68	+3.12	
Ult deviator stress, T/sq ft		$(\sigma_1-\sigma_3)_{ult}$	0.39	1.71	2.83	
Initial diameter, in.		D_o	1.40	1.41	1.40	
Initial height, in.		H_o	3.15	3.28	3.17	

Shear Strength Parameters

ϕ = 14.5°

tan ϕ = 0.258

c = 0.05 T/sq ft

Method of saturation
Backpressure

☐ Controlled stress

☒ Controlled strain

Type of test R | Type of specimen Undisturbed

Classification Organic CLAY (OH)

LL	PL	PI	D_{10}	G_s
110	41	69	< 0.001	2.53

Remarks

Project Delaware River Disposal Area Study

Area Edgemoor Disposal Area

Boring No. EBB-6 | Sample No. UD-1

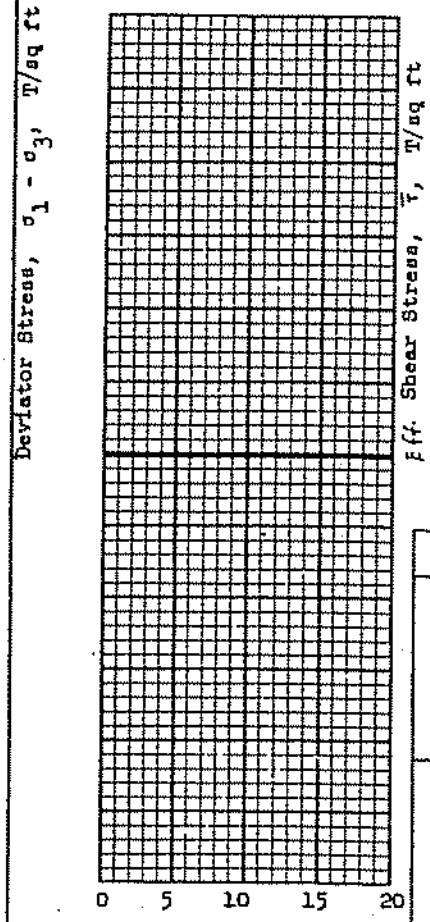
Depth 4.0'-6.0' | Date Oct. 1961

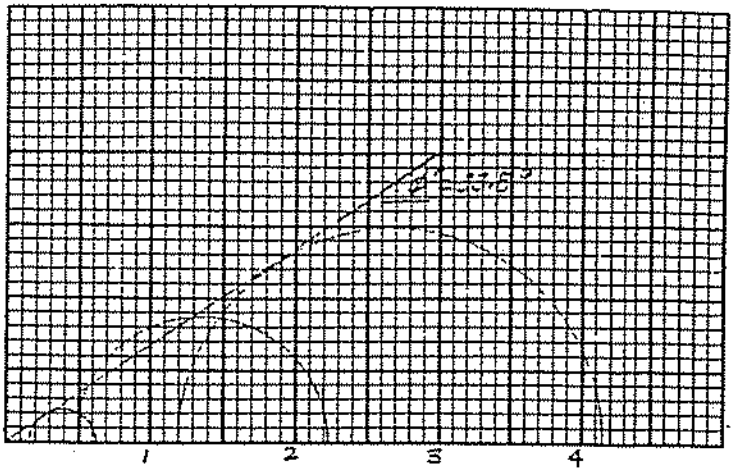
Sheet 1 of 2

TRIAXIAL COMPRESSION TEST REPORT

ENG FORM 2089 (EM 1110-2-1902) 1 JUN 63 PREVIOUS EDITIONS ARE OBSOLETE

TRANSLUCENT





Shear Strength Parameters

$\phi' =$ 33.8 °

$\tan \phi' =$ 0.670

$c =$ 0 T/sq ft

Method of saturation Back pressure

☐ Controlled stress

☒ Controlled strain

Test No.			1	2	3	
Initial	Water content	w_o	%	%	%	%
	Void ratio	e_o				
	Saturation	S_o	%	%	%	%
	Dry density, lb/cu ft	γ_d				
Before Shear	Water content	w_c	%	%	%	%
	Void ratio	e_c				
	Saturation	S_c	%	%	%	%
	Final back pressure, T/sq ft	u_o				
Final	Water content	w_f	%	%	%	%
	Void ratio	e_f				
Minor principal stress, T/sq ft Eff.		$\bar{\sigma}_3$	0.16	0.48	1.20	
Max deviator stress, T/sq ft		$(\sigma_1-\sigma_3)_{max}$				
Time to failure, min		t_f				
Rate of strain, percent/min						
Major Principal Stress, T/sq.ft. Eff.		$\bar{\sigma}_1$	0.63	2.23	4.16	
Ult deviator stress, T/sq ft		$(\sigma_1-\sigma_3)_{ult}$				
Initial diameter, in.		D_o				
Initial height, in.		H_o				

Type of test $\bar{E}$ Type of specimen Undisturbed

Classification Organic CLAY (OH)

LL 110	PL 41	PI 69	D_{10} <0.001	G_s 2.53

Remarks See Sheet 1 of 2 for other data.

Sheet 2 of 2

Project Delaware River Disposal Area Study

Area Edgemoor Disposal Area

Boring No. EBB-6 Sample No. UD-1

Depth 4.0' - 6.0' Date Oct 1967

TRIAXIAL COMPRESSION TEST REPORT

ENG FORM 1 JUN 63 2089 (EM 1110-2-1902) PREVIOUS EDITIONS ARE OBSOLETE

TRANSLUCENT

Edgemoor

BORING NO. EBB-6
SAMPLE NO. UD-2
DEPTH: 12.0 to 14.0 ft.

PROJECT Delaware River Study
DATE October 1967
COMP. By WS CHK'D By RJS

LABORATORY LOG	DESCRIPTION	W, CAN NO.	TEST SAMPLES
	Dark gray micaceous organic CLAY (OH) w/ decayed vegetation	Hydr-1 G = 2.50 LL = 129 PL = 51 PI = 78	W_n = 111.2 %
	Same as above but with considerable decayed vegetation approx. 30–40% by Vol.		W_n = 85.2 %
			W_n = 97.4 %
			W_n = 102.3 %
	Bottom of Sample
	Note 1. Free Water @ bottom when opened. 2. Large Voids along sample - No separate densities determined.

SAMPLE DEPTH IN FEET

SAMPLE LENGTH IN INCHES

Length of Sample, L 22.13 in.
Weight of Tube and Wet Soil 13,500 g.
Weight of Tube 6,900 g.
Weight of Wet Soil, W 6,600 g.
Diameter of Tube, D 4.25 in.
Total Unit Weight, $\gamma_t = \frac{4.85\,W}{LD^2}$ 80.1 lbs/cu.ft.

LEGEND

W_n — Natural Water Content
MA — Mechanical Analysis
LL — Atterberg Limits
G — Specific Gravity
C — Consolidation
Q — Unconsolidated Undrained
γ_d — Dry Density
R — Consolidated Undrained
S — Consolidated Drained
UC — Unconfined Compression

UNDISTURBED SAMPLE LOG

NED FORM DEC 62 501

Edgemoor

BORING NO. EBB-6
SAMPLE NO. UD-3
DEPTH: 21.0 to 23.0 ft.

PROJECT Delaware River Study
DATE October 1967
COMP. By WS CHK'D By RJS&T

LABORATORY LOG	DESCRIPTION	W, CAN NO.	TEST SAMPLES
	Grayish-brown micaceous organic CLAY (OH) w/ decayed vegetation	Hydr-1 G = 2.50 LL = 87 PL = 38 PI = 49	R-2 & 3 W_{n2} = 81.5% W_{n3} = 80.1% R-1 W_{n1} = 60.0% Q-1, 2, & 3 W_{n1} = 64.3% W_{n2} = 61.8% W_{n3} = 60.4%
	Bottom of Sample		

SAMPLE DEPTH IN FEET

SAMPLE LENGTH IN INCHES

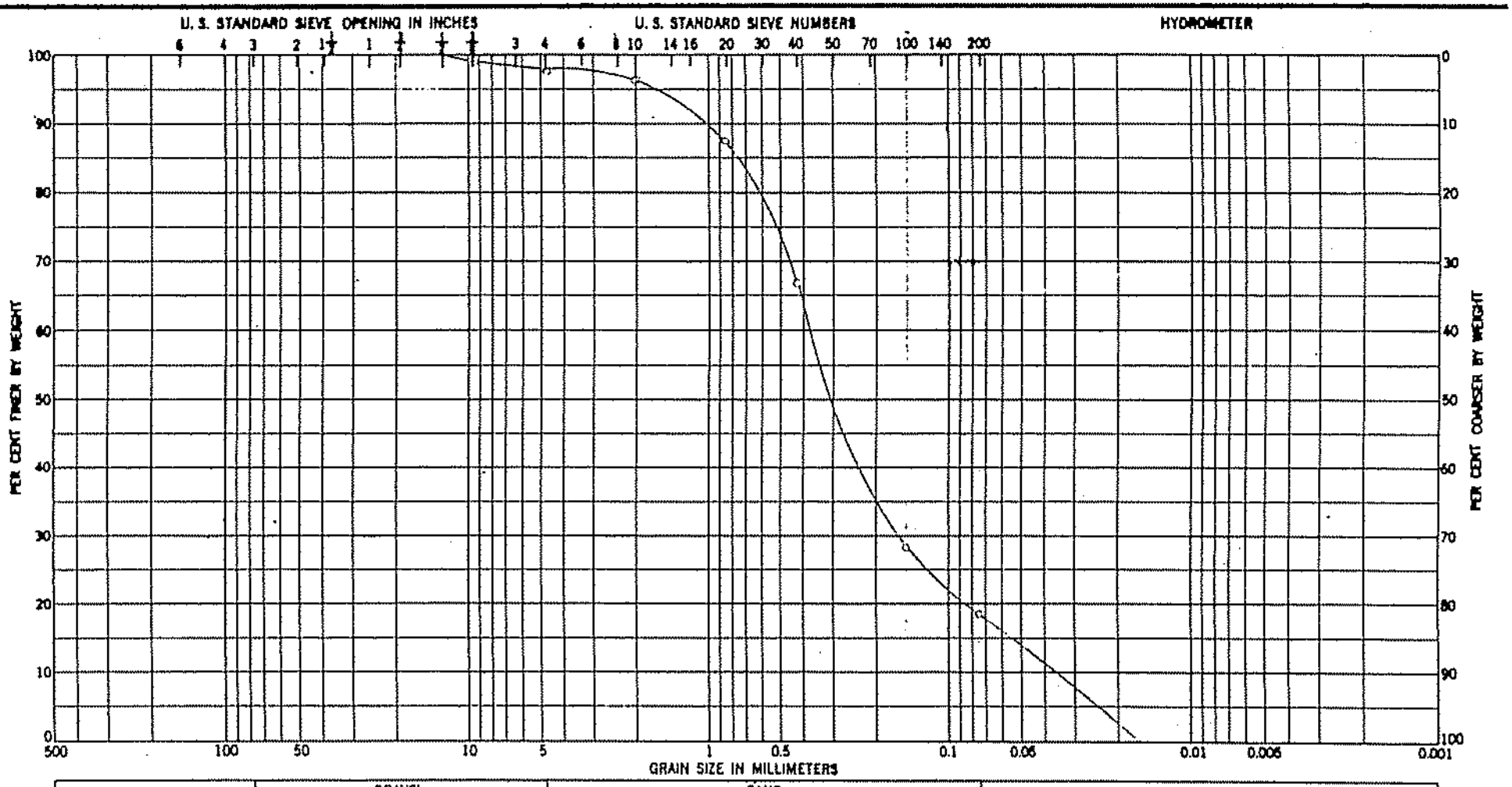
24 23 22 21 20 19 18 17 16 15 14 13 12 11 10 9 8 7 6 5 4 3 2 1 0

Length of Sample, L 21.31 in.
Weight of Tube and Wet Soil 14,530 g.
Weight of Tube 6,950 g.
Weight of Wet Soil, W 7,580 g.
Diameter of Tube, D 4.25 in.
Total Unit Weight, $\gamma_t = \frac{4.85\,W}{L\,D^2}$ 95.5 lbs/cu.ft.

UNDISTURBED SAMPLE LOG

LEGEND
W_n — Natural Water Content
MA — Mechanical Analysis
LL — Atterberg Limits
G — Specific Gravity
C — Consolidation
Q — Unconsolidated Undrained
γ_d — Dry Density
R — Consolidated Undrained
S — Consolidated Drained
UC — Unconfined Compression

NED FORM DEC 62 501



Sample No.	Elev-or Depth	Classification	Nat w %	LL	PL	PI
1	15.5 - 19.0	Gravelly SAND some org. silt	20.6			

GRADATION CURVES

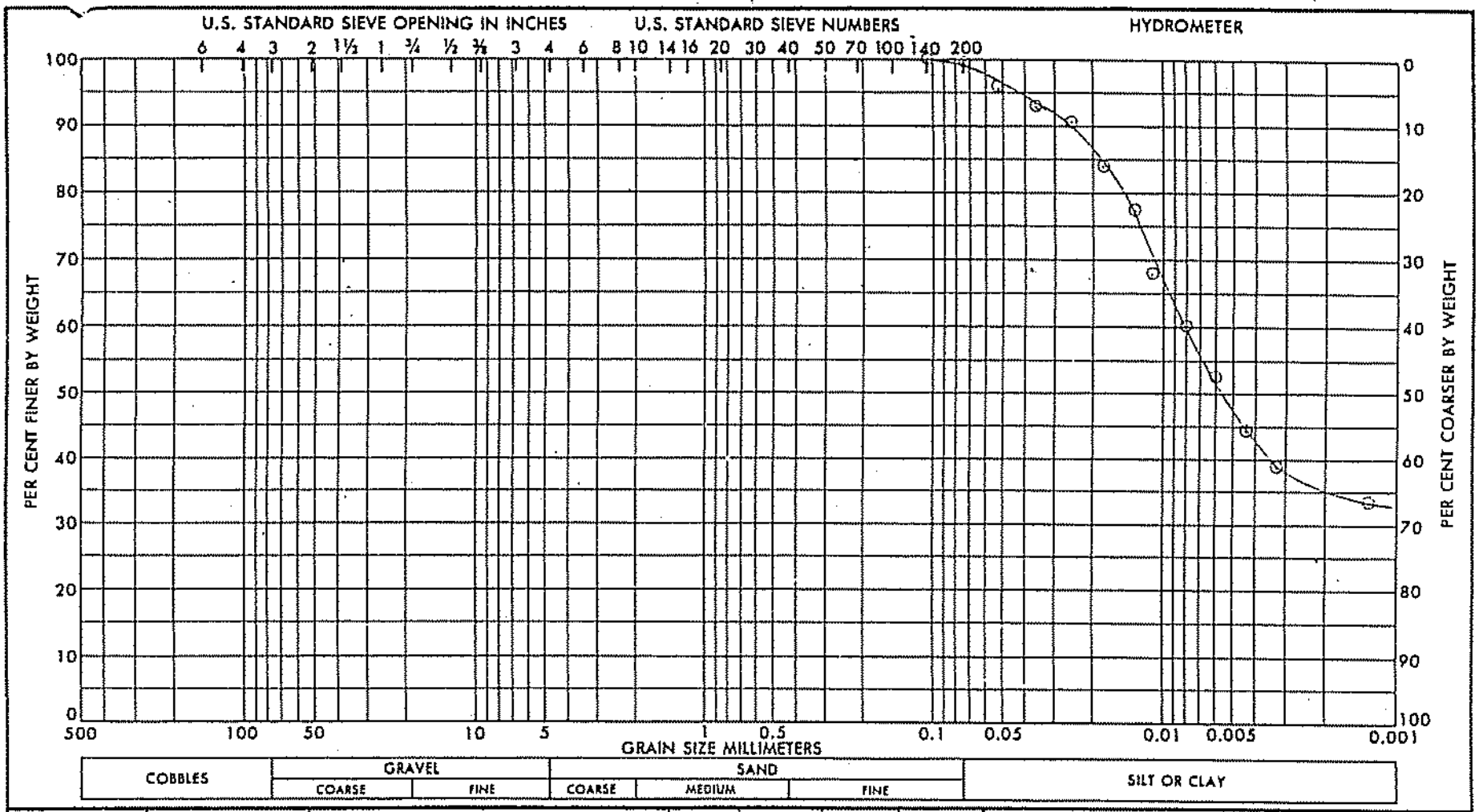
Project: Edgemoor Disposal Area

Area:

Boring No.: E 35-6

Date: 9 Aug 67

ENG FORM



SAMPLE NO.	~~ELEV OR~~ DEPTH	CLASSIFICATION	NAT W%	LL	PL	PI
UD-3	21.0-23.0'	Organic CLAY (OH)		87	38	49

GRADATION CURVES

PROJECT Long Range Delaware River Disposal Area

AREA

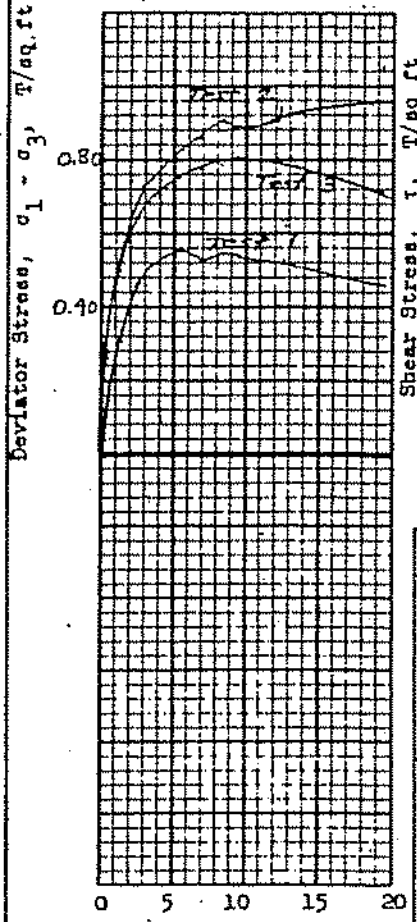
BORING NO. EBB-6

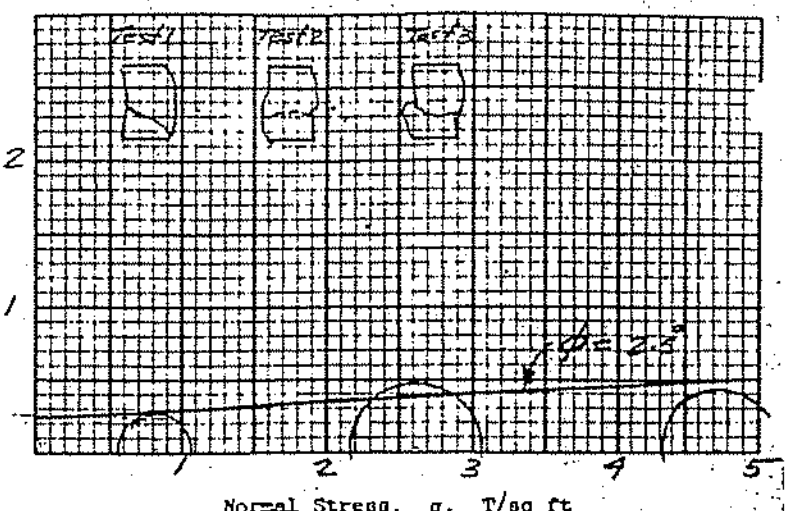
DATE Oct. 1967

ENG FORM 2087
1 MAY 63

REPLACES WES FORM NO. 1241, SEP 1962, WHICH IS OBSOLETE.

U.S. GOVERNMENT PRINTING OFFICE : 1963 OF—705-126





Shear Strength Parameters

ϕ = 2.5 °

tan ϕ = 0.0429

c = 0.25 T/sq ft

Method of saturation None

☐ Controlled stress

☒ Controlled strain

Test No.			1	2	3	
Initial	Water content	w_o	64.3 %	61.8 %	60.4 %	%
	Void ratio	e_o	1.827	1.679	1.633	
	Saturation	S_o	88.0 %	92.0 %	92.5 %	%
	Dry density, lb/cu ft	γ_d	55.2	58.2	59.2	
Before Shear	Water content	w_c	— %	— %	— %	%
	Void ratio	e_c	—	—	—	
	Saturation	S_c	— %	— %	— %	%
	Final back pressure, T/sq ft	u_b	—	—	—	
Final	Water content	w_f	— %	— %	— %	%
	Void ratio	e_f	—	—	—	
Minor principal stress, T/sq ft		σ_3	0.54	2.16	4.32	
Max deviator stress, T/sq ft		$(\sigma_1-\sigma_3)_{max}$	0.55	0.90	0.80	
Time to failure, min		t_f	4.9	8.0	9.2	
Rate of strain, percent/min			1.03	1.01	1.03	
Ult deviator stress, T/sq ft		$(\sigma_1-\sigma_3)_{ult}$	0.50*	0.94*	0.76*	
Initial diameter, in.		D_o	1.40	1.40	1.40	
Initial height, in.		H_o	3.15	3.23	3.15	

Type of test Q | Type of specimen Undisturbed

Classification Organic CLAY (OH)

LL	PL	PI	D_{10}	G_s
87	38	49	< 0.001	2.50

Remarks * Stress at 15% Strain

Project Long Range Delaware River Disposal Area

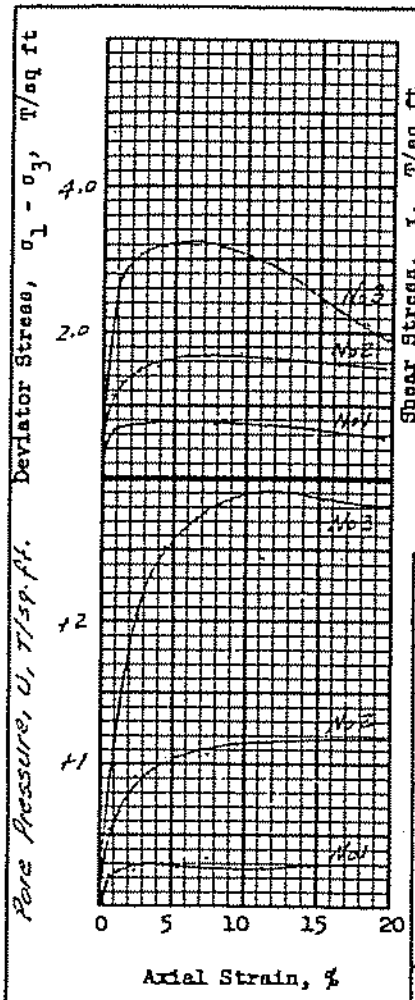
Area Edgemoor

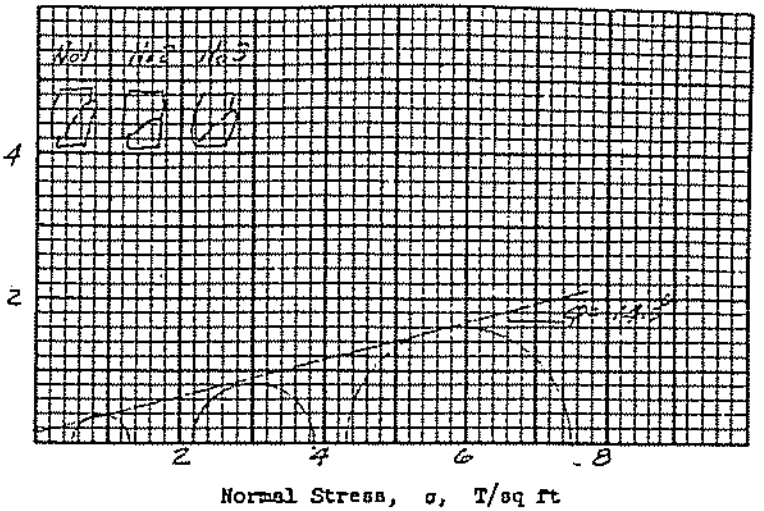
Boring No. EBB-6 | Sample No. UD3

Depth 21.0'-23.0' | Date Sept. 1967

TRIAXIAL COMPRESSION TEST REPORT

γ_b = 33.0 pcf





Test No.			1	2	3	
Initial	Water content	w_o	60.0 %	81.5 %	80.1 %	%
	Void ratio	e_o	1.617	2.278	2.181	
	Saturation	S_o	92.8 %	89.5%	91.8 %	%
	Dry density, lb/cu ft	γ_d	59.6	47.6	49.0	
Before Shear	Water content	w_c	59.4 %	70.7 %	61.4 %	%
	Void ratio	e_c	1.485	1.768	1.534	
	Saturation	S_c	100 %	100 %	100 %	%
	Final back pressure, T/sq ft	u_o	7.20	7.20	7.20	
Final	Water content	w_f	59.4 %	70.7 %	61.4 %	%
	Void ratio	e_f	1.485	1.768	1.534	
Minor principal stress, T/sq ft		σ_3	0.54	2.16	4.32	
Max deviator stress, T/sq ft		$(\sigma_1-\sigma_3)_{max}$	0.79	1.68	3.21	
Time to failure, min		t_f	29.4	33.2	36.9	
Rate of strain, percent/min			0.18	0.18	0.18	
Pore Pressure T/sq. ft.		u	+0.27	+1.06	+2.72	
Ult deviator stress, T/sq ft		$(\sigma_1-\sigma_3)_{ult}$	0.66	1.61	2.40	
Initial diameter, in.		D_o	1.41	1.41	1.41	
Initial height, in.		H_o	3.15	3.27	3.23	

Shear Strength Parameters

ϕ = 14.5 °

tan ϕ = 0.258

c = 0.13 T/sq ft

Method of saturation Backpressure

☐ Controlled stress

☒ Controlled strain

Type of test R | Type of specimen Undisturbed

Classification Organic CLAY (OH)

LL 87 | PL 38 | PI 49 | D_{10} < 0.001 | G_s 2.50

Remarks

Project Delaware River Disposal Area Study

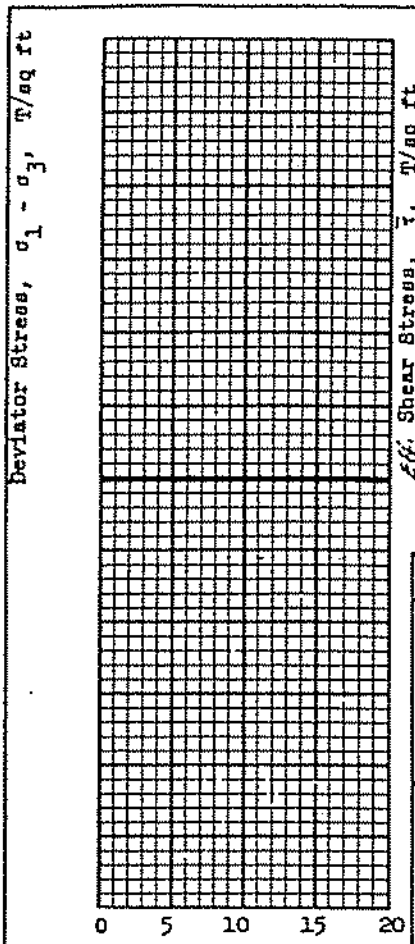
Area Edgemoor Disposal Area

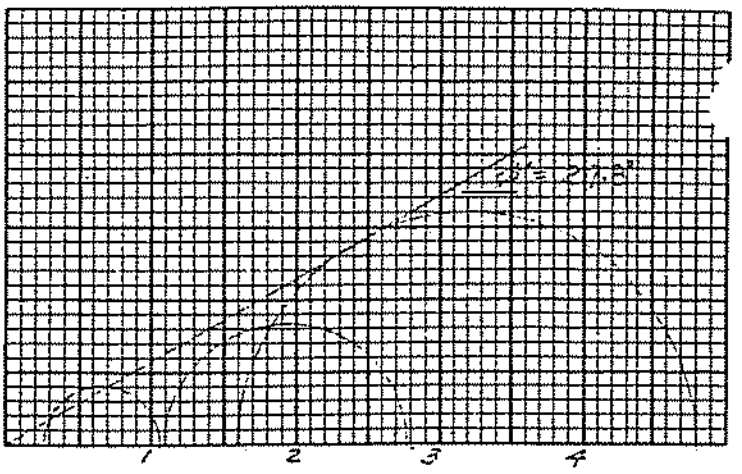
Boring No. EBB-6 | Sample No. UD-3

Depth Ft 21.0' - 23.0' | Date Oct. 1967

TRIAXIAL COMPRESSION TEST REPORT

Sheet 1 of 2





Test No.			1	2	3	
Initial	Water content	w_o	%	%	%	%
	Void ratio	e_o				
	Saturation	S_o	%	%	%	%
	Dry density, lb/cu ft	γ_d				
Before Shear	Water content	w_c	%	%	%	%
	Void ratio	e_c				
	Saturation	S_c	%	%	%	%
	Final back pressure, T/sq ft	u_o				
Final	Water content	w_f	%	%	%	%
	Void ratio	e_f				
Minor principal stress, T/sq ft Eff.		$\bar{\sigma}_3$	0.27	1.10	1.60	
Max deviator stress, T/sq ft		$(\sigma_1-\sigma_3)_{max}$				
Time to failure, min		t_f				
Rate of strain, percent/min						
Major Principal Stress, T/sq.ft. Eff.		$\bar{\sigma}_1$	1.06	2.77	4.81	
Ult deviator stress, T/sq ft		$(\sigma_1-\sigma_3)_{ult}$				
Initial diameter, in.		D_o				
Initial height, in.		H_o				

Shear Strength Parameters

$\phi' = 29.8°$

$\tan \phi' = 0.572$

$c' = 0$ T/sq ft

Method of saturation Backpressure

☐ Controlled stress

☒ Controlled strain

Type of test R | Type of specimen Undisturbed

Classification Organic CLAY (OH)

LL 87 | PL 38 | PI 49 | D_{10} <0.001 | G_s 2.50

Remarks See Sheet 1 of 2 for other data.

Sheet 2 of 2

Project Delaware River Disposal Area Study

Area Edgemoor Disposal Area

Boring No. EBB-6 | Sample No. UD-3

Depth 21.0' - 23.0' | Date Oct. 1967

TRIAXIAL COMPRESSION TEST REPORT

Edgemoor

BORING NO. EBB-6
SAMPLE NO. UD-4
DEPTH: 29.0 to 31.0 ft.

PROJECT Delaware River Study
DATE October 1967
COMP. By WS CHK'D By RJS

LABORATORY LOG	DESCRIPTION	W, CAN NO.	TEST SAMPLES
	Dark grayish-brown micaceous organic CLAY(OH) w/ considerable decayed vegetation	Hydr-1 G_s = 2.26 LL = 169 PL = 70 PI = 94	C-1 W_n = 132.7
	Bottom of Sample		

SAMPLE DEPTH IN FEET

SAMPLE LENGTH IN INCHES

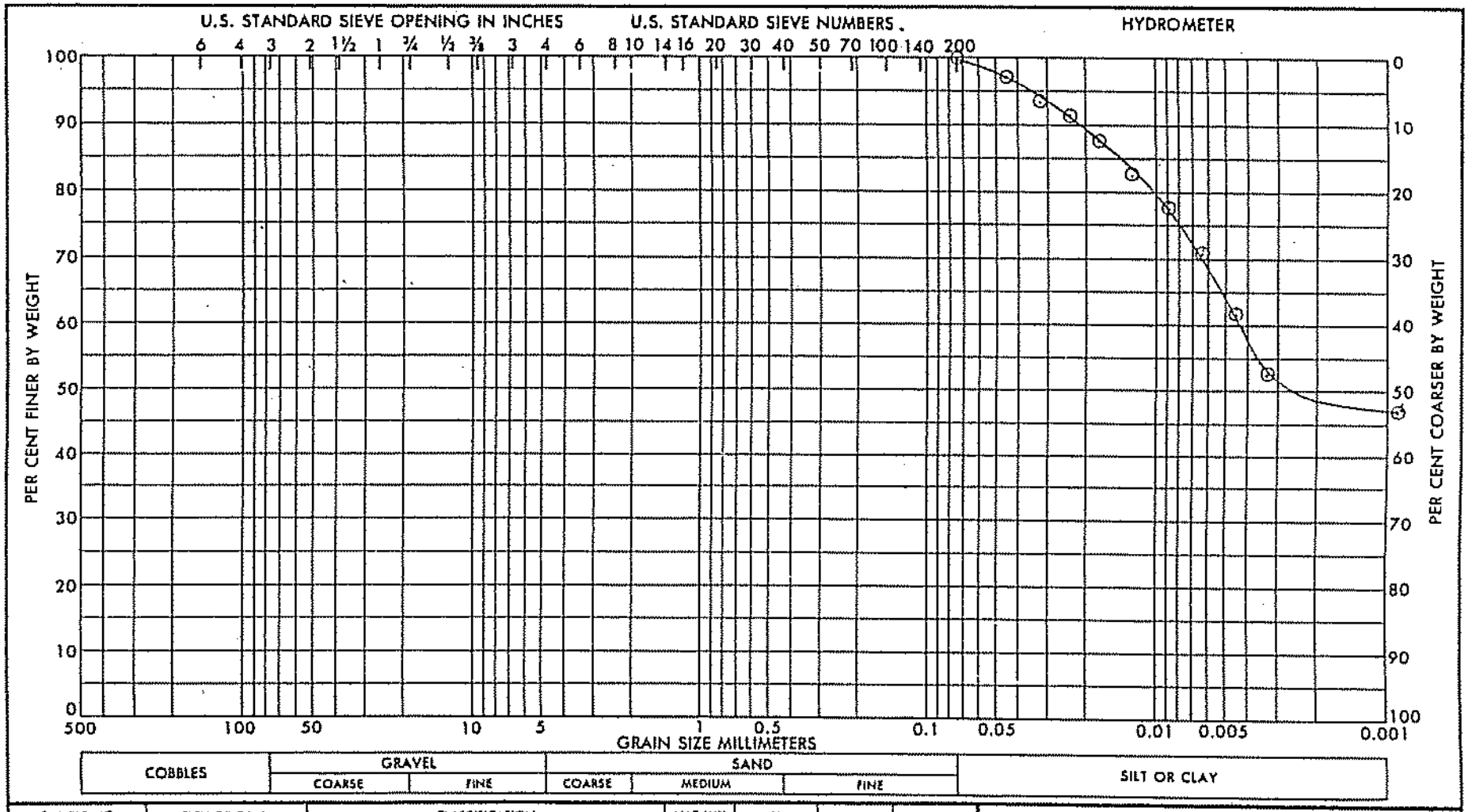
Length of Sample, L 7.75 in.
Weight of Tube and Wet Soil 3020.0 g.
Weight of Tube 860.5 g.
Weight of Wet Soil, W 2159.5 g.
Diameter of Tube, D 4.25 in.
Total Unit Weight, $\gamma_t = \frac{4.85\,W}{L\,D^2}$ 74.8 lbs/cu.ft.

LEGEND

W_n — Natural Water Content
MA — Mechanical Analysis
LL — Atterberg Limits
G — Specific Gravity
C — Consolidation
O — Unconsolidated Undrained
γ_d — Dry Density
R — Consolidated Undrained
S — Consolidated Drained
UC — Unconfined Compression

UNDISTURBED SAMPLE LOG

NED FORM DEC 62 501



SAMPLE NO.	~~ELEV~~ OR DEPTH	CLASSIFICATION	NAT W%	LL	PL	PI
UD-4	29.0'-31.0'	Organic SILT (OH)		164	70	94

GRADATION CURVES

PROJECT Long Range Delaware River Disposal Area Study

AREA Edgemoor

BORING NO. EBB-6

DATE Oct. 1967

ENG FORM 2087
1 MAY 63

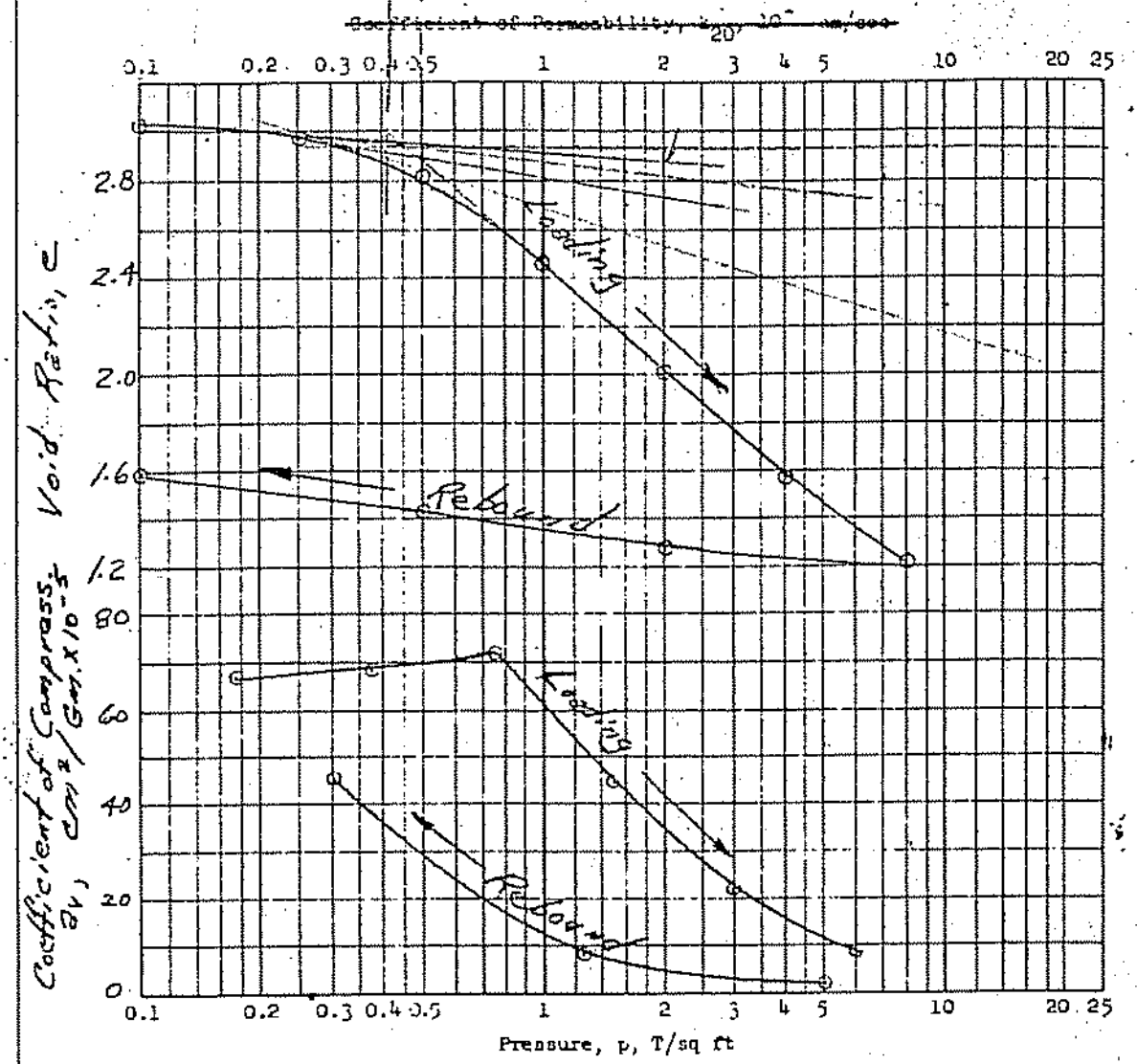
REPLACES WES FORM NO. 1241, SEP 1962, WHICH IS OBSOLETE.

(TRANSLUCENT)

U.S. GOVERNMENT PRINTING OFFICE : 1963 OF—709-128

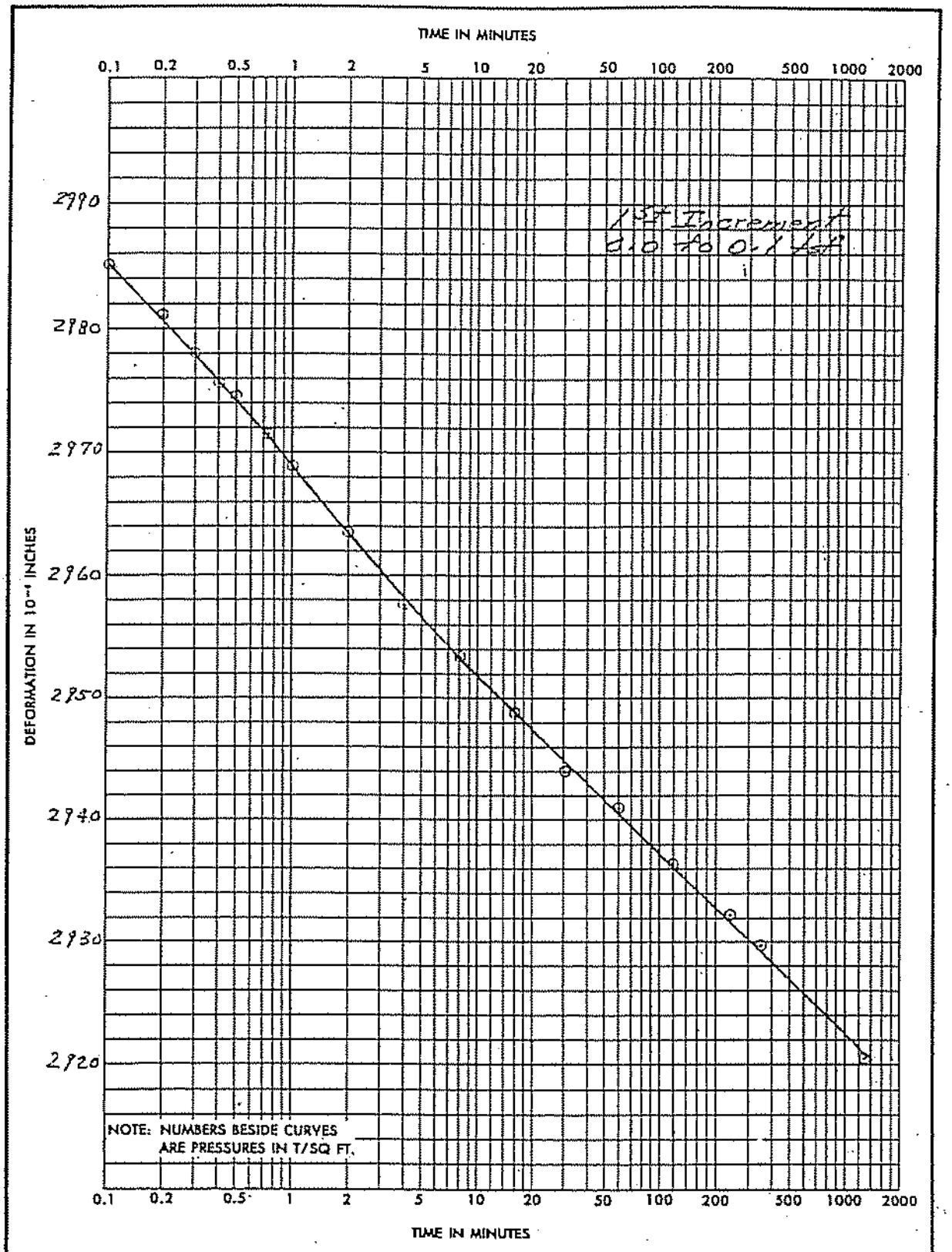
$P_c = 0.50 T/0'$

Precon.



Type of Specimen: Undisturbed		Before Test		After Test	
Diam 3.0 in.	Ht 0.75 in.	Water Content, w_o	132.7 %	w_f	79.0 %
Overburden Pressure, p_o	0.43 T/sq ft	Void Ratio, e_o	3.141	e_f	1.595
Preconsol. Pressure, P_c	0.50 T/sq ft	Saturation, S_o	95.5 %	S_f	100+ %
Compression Index, C_c	1.43	Dry Density, γ_d	34.1 lb/ft³		
Classification	Organic CLAY (OH) w/ fossil. decayed veg.	k_{20} at e_o =	x 10^{-} cm/sec		
LL 164	G_s 2.26	Project	Long Range Delaware River Disposal Area		
PL 70	D_{10} <0.001	Area	Edgemoor		
Remarks		Boring No.	EBB-6	Sample No.	UD-4
Av $\bar{\sigma}_o$ = 27.1 p.s.i.		Depth	29.0'-31.0'	Date	Oct. 1967

CONSOLIDATION TEST REPORT



PROJECT Logg Range, Delaware River Disposal Area Study

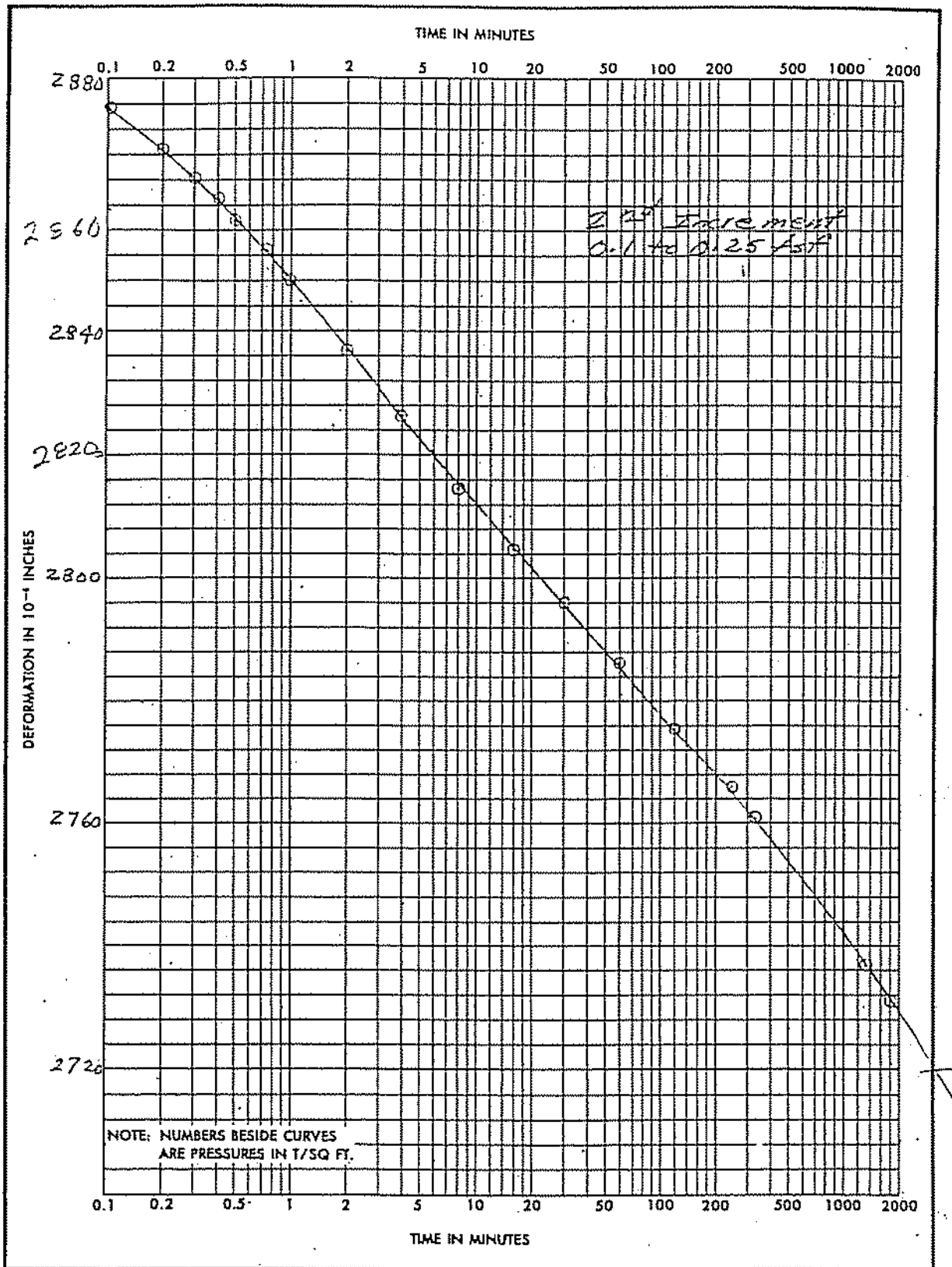
AREA Edgemoor

BORING NO.	SAMPLE NO.	DEPTH	DATE
E86-6	UD-4	29.0'-31.0'	Dec. 1967

ENG FORM 2088 1 MAY 63 PREVIOUS EDITIONS ARE OBSOLETE.

CONSOLIDATION TEST—TIME CURVES (TRANSLUCENT)

* GPO : 1966 OF—715-965



PROJECT Long-Range Delaware River Disposal Area Study

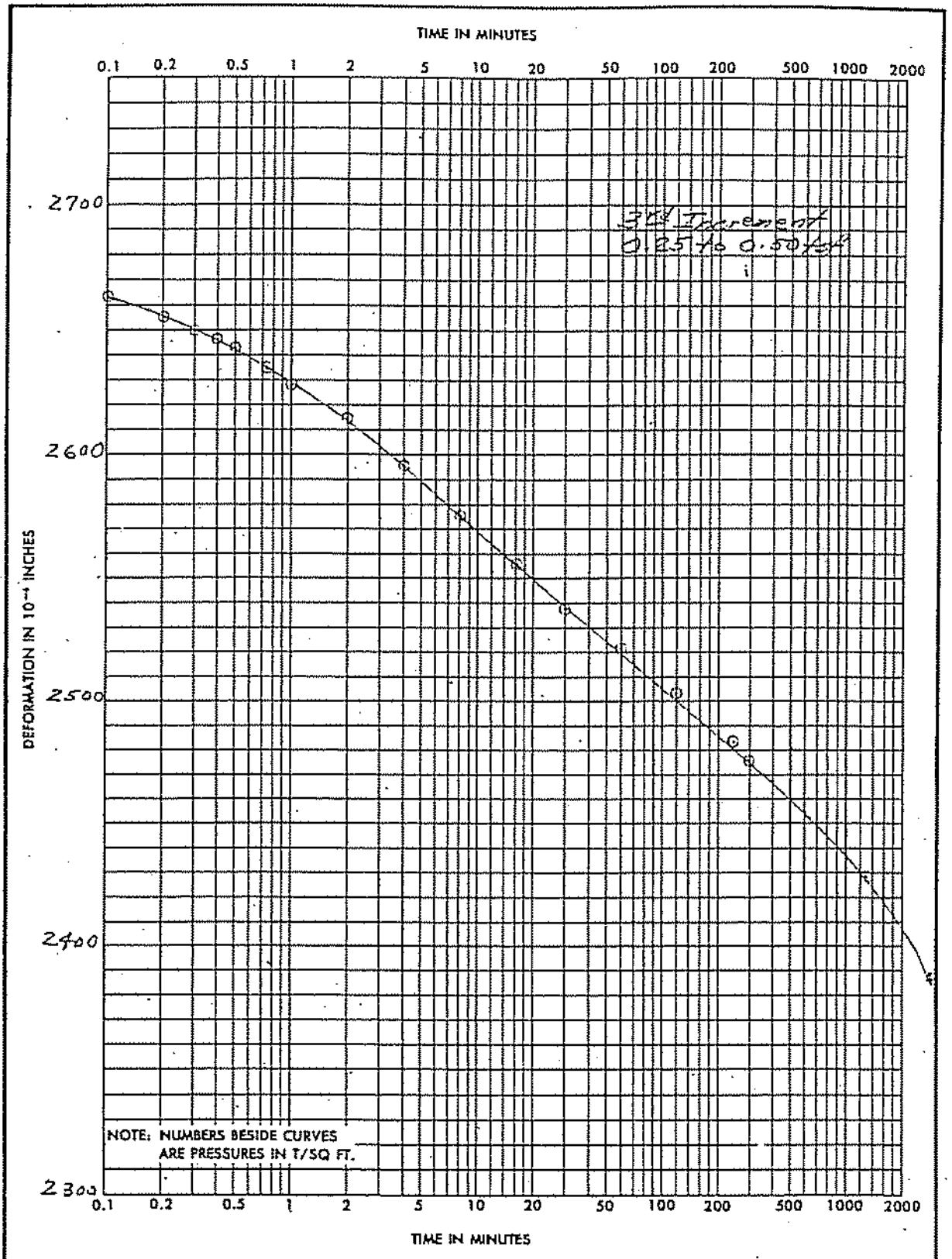
AREA

BORING NO. EB4-6 | SAMPLE NO. UD-4 | DEPTH 28.0'-31.0' | DATE Dec. 1967

ENG FORM 2088 1 MAY 63 PREVIOUS EDITIONS ARE OBSOLETE.

CONSOLIDATION TEST—TIME CURVES (TRANSLUCENT)

* GPO : 1964 OP—715-983



PROJECT Long Range Delaware River Disposal Area Study

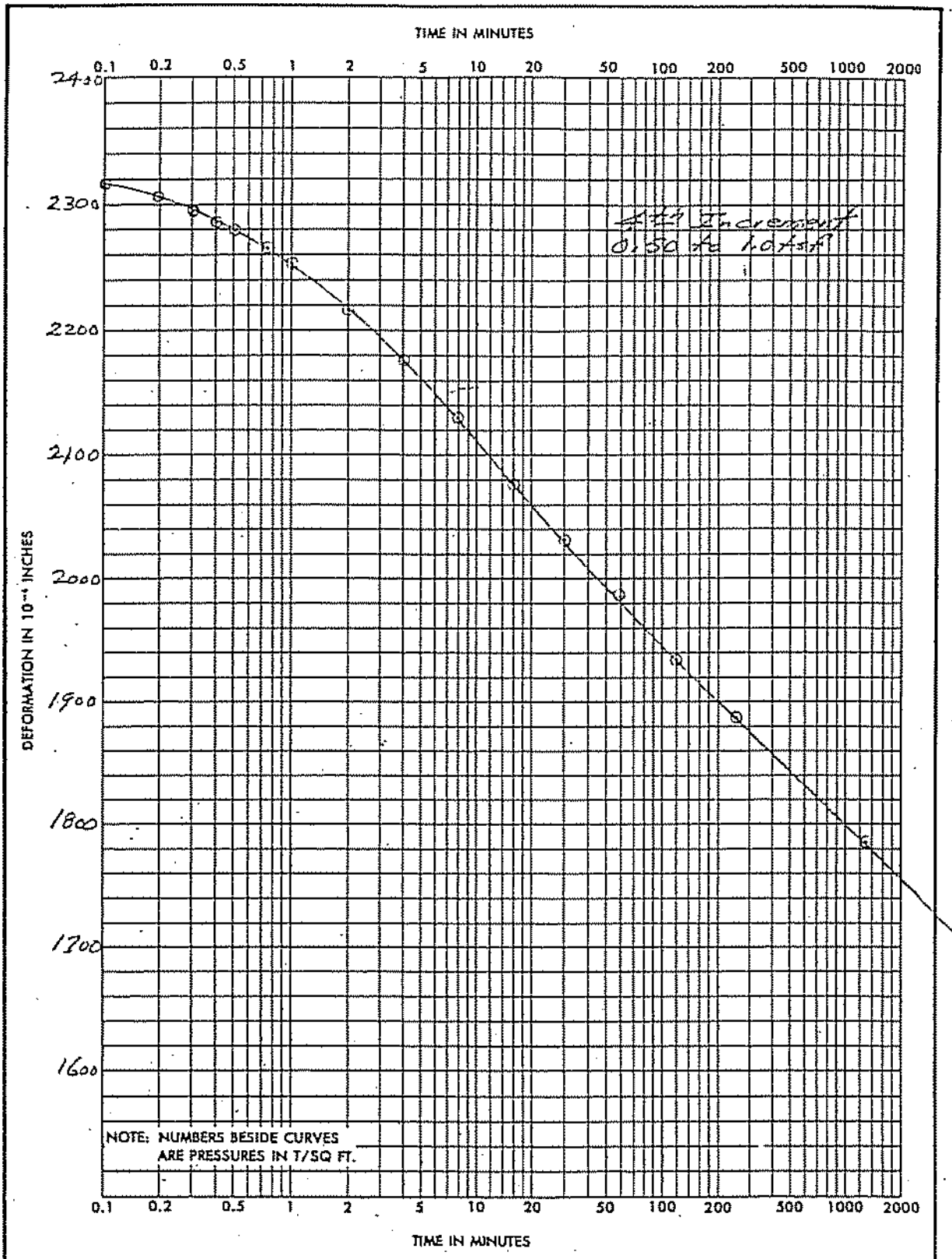
AREA

BORING NO.	SAMPLE NO.	DEPTH	DATE
EB2-6	UD-4	290-310'	Dec. 1967

ENG FORM 2088 1 MAY 63 PREVIOUS EDITIONS ARE OBSOLETE.

CONSOLIDATION TEST—TIME CURVES (TRANSLUCENT)

* GPO : 1964 OF—715-965



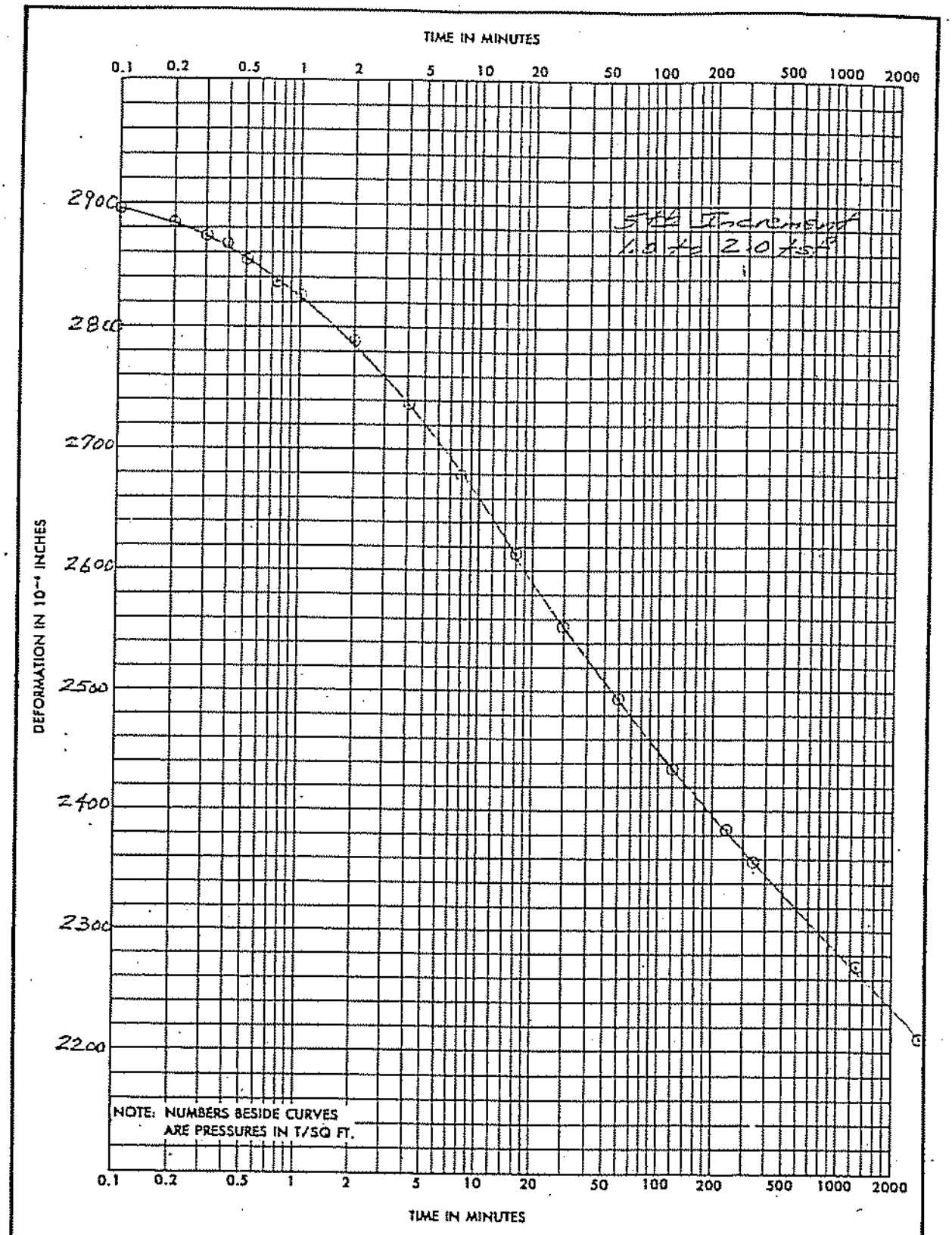
PROJECT Long Range Delaware River Disposal Area Study

AREA

BORING NO. EBB-6 | SAMPLE NO. UD-4 | DEPTH ~~ft~~ 29.0'-31.0' | DATE Dec. 1967

ENG FORM 2088 1 MAY 63 | PREVIOUS EDITIONS ARE OBSOLETE. | **CONSOLIDATION TEST—TIME CURVES** (TRANSLUCENT)

* GPO : 1966 OF—715-965



PROJECT Long Range Delaware River Disposal Area Study

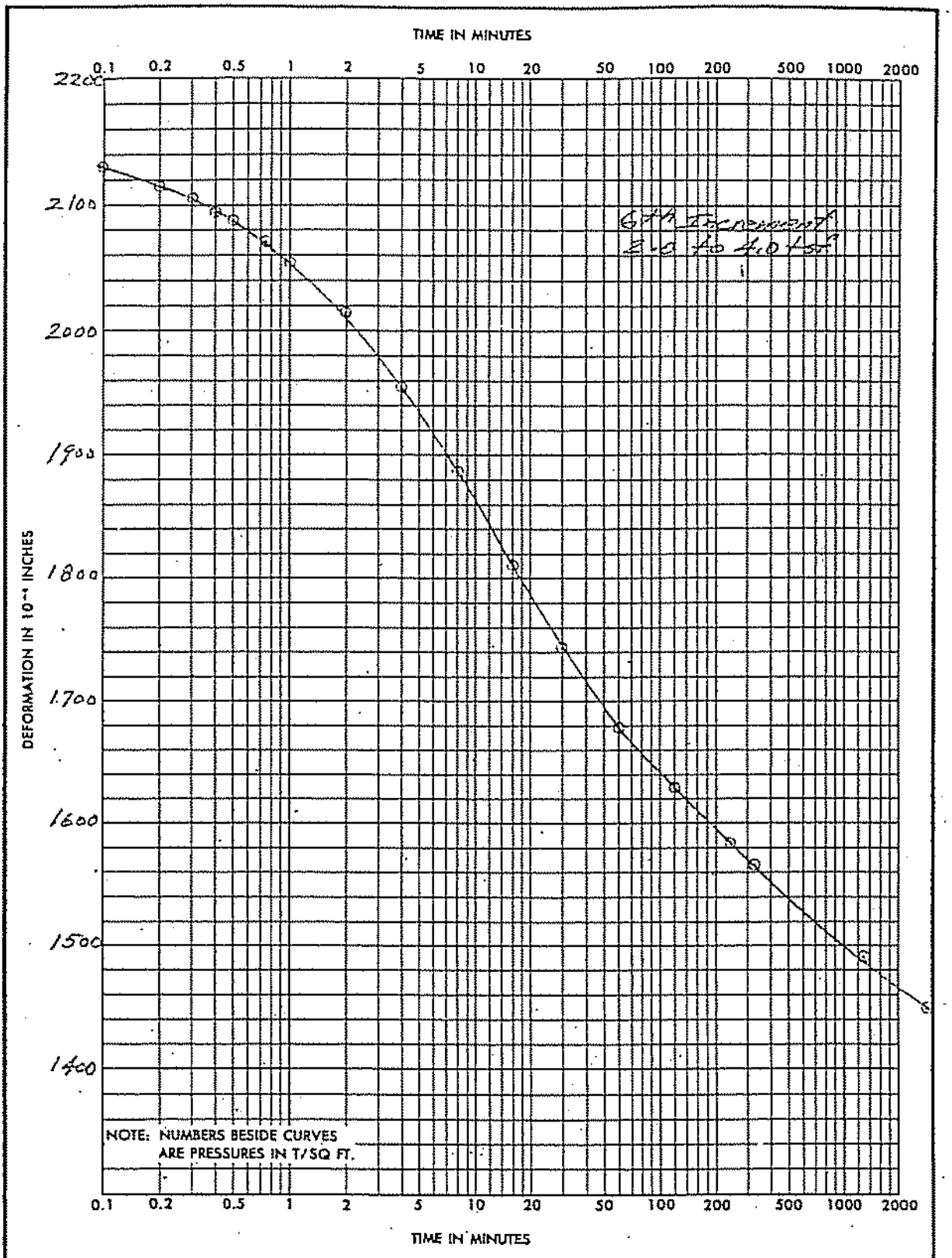
AREA

BORING NO. EBB-6 | SAMPLE NO. UD-4 | DEPTH ~~EL~~ 29.0'-31.0' | DATE Dec. 1967

ENG FORM 2088 1 MAY 63 PREVIOUS EDITIONS ARE OBSOLETE.

CONSOLIDATION TEST—TIME CURVES (TRANSLUCENT)

* GPO : 1964 OF—715-965



PROJECT Long Range Delaware River Disposal Area Study

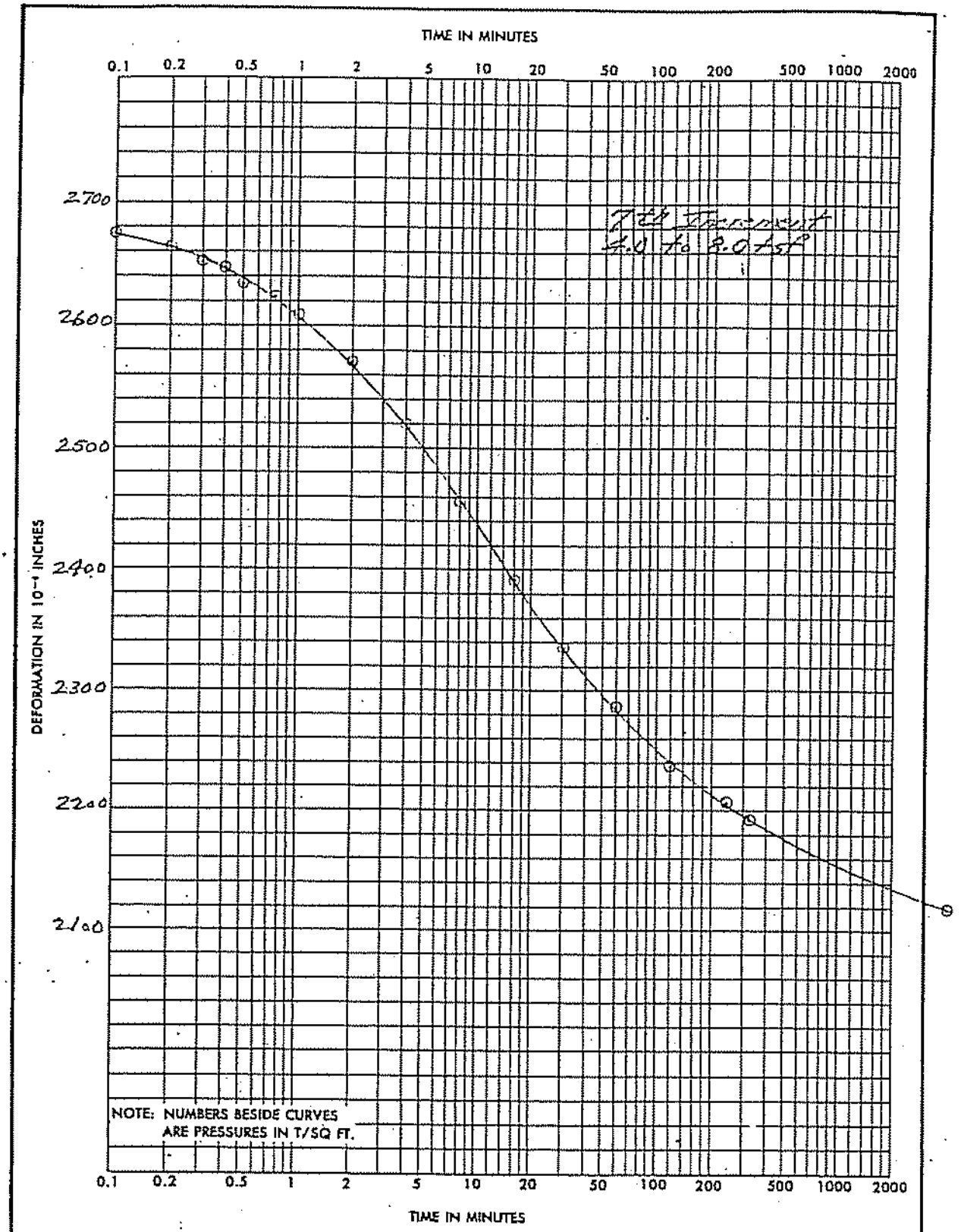
AREA

BORING NO. EBR-6 | SAMPLE NO. UD-4 | DEPTH EL. 29.0'-31.0' | DATE Dec. 1967

ENG FORM 2088 1 MAY 63 PREVIOUS EDITIONS ARE OBSOLETE.

CONSOLIDATION TEST—TIME CURVES (TRANSLUCENT)

* GPO : 1964 OF—715-965



PROJECT Long Range Delaware River Disposal Area Study

AREA

BORING NO. EBB-6	SAMPLE NO. UD-4	DEPTH 29.0'-31.0'	DATE Dec. 1967

ENG FORM 2088 1 MAY 63 PREVIOUS EDITIONS ARE OBSOLETE.

CONSOLIDATION TEST—TIME CURVES (TRANSLUCENT)

* GPO : 1964 OF—715-365

Edgemoor

BORING NO. EBB-7
SAMPLE NO. UD-1
DEPTH: 6.0 to 8.0 ft.

PROJECT Delaware River Study
DATE October 1967
COMP. By WS CHK'D By RJS

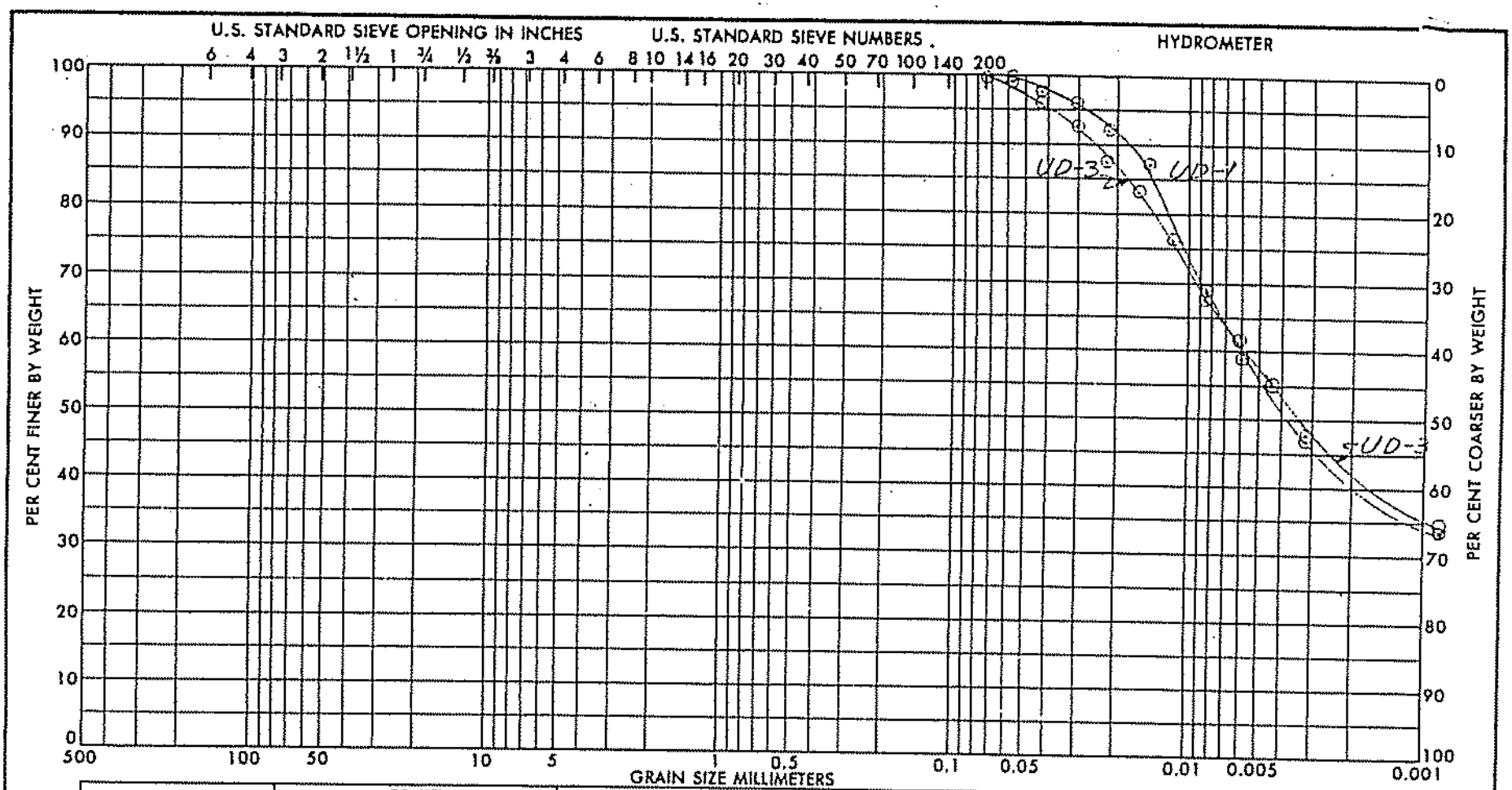
LABORATORY LOG	DESCRIPTION	W, CAN NO.	TEST SAMPLES
SAMPLE DEPTH IN FEET / SAMPLE LENGTH IN INCHES	Gray-brown micaceous organic CLAY (OH) w/ decayed vegetation.	Hydr-1 G_s = 2.55 LL = 87 PL = 38 PI = 49	W_n = 116.7% γ_n = 38.8 pcf e = 3.102 n = 75.6% S = 95.9%
	Zone of very soft mottled with high content of decayed vegetation		W_n = 105.9% γ_n = 39.7 pcf e = 3.011 n = 75.1% S = 89.7%
			W_n = 119.8%
			W_n = 132.7%

Length of Sample, L 22.88 in.
Weight of Tube and Wet Soil 13,700 g.
Weight of Tube 7,000 g.
Weight of Wet Soil, W 6,700 g.
Diameter of Tube, D 4.25 in.
Total Unit Weight, $\gamma_t = \frac{4.85\,W}{LD^2}$ 78.6 lbs/cu.ft.

LEGEND
W_n — Natural Water Content
MA — Mechanical Analysis
LL — Atterberg Limits
G — Specific Gravity
C — Consolidation
Q — Unconsolidated Undrained
γ_d — Dry Density
R — Consolidated Undrained
S — Consolidated Drained
UC — Unconfined Compression

UNDISTURBED SAMPLE LOG

NED FORM DEC 62 501



SAMPLE NO.	*ELEV OR DEPTH	CLASSIFICATION	NAT W%	LL	PL	PI
UD-1	6.0'–8.0'	Organic CLAY (OH)		119	43	76
UD-3	23.0'–25.0'	Organic CLAY (OH)		114	40	74

GRADATION CURVES

PROJECT Long Range, Delaware River Disposal Area

AREA

BORING NO. EB8-7

DATE Oct. 1967

ENG FORM 2087
1 MAY 63

REPLACES WES FORM NO. 1241, SEP 1962, WHICH IS OBSOLETE.

U.S. GOVERNMENT PRINTING OFFICE : 1962 O—709-128

Edgemoor

BORING NO. EBB-7
SAMPLE NO. UD-2
DEPTH: 17.0 to 19.0 ft.

PROJECT Delaware River Study
DATE October 1967
COMP. By WS CHK'D By RJS

LABORATORY LOG	DESCRIPTION	W, CAN NO.	TEST SAMPLES
SAMPLE DEPTH IN FEET / SAMPLE LENGTH IN INCHES	Dark gray micaceous organic CLAY (OH)	Hydr-1 $G_1 = 2.50$ LL = 130 PL = 45 PI = 85	C-1 $W_n = 111.5\%$
24 23 22 21 20 19 18 17 16 15 14 13 12 11 10 9 8 7 6 5 4 3 2 1 0	Bottom of Sample		

Length of Sample, L 22.69 in.
Weight of Tube and Wet Soil 14,025 g.
Weight of Tube 6,960 g.
Weight of Wet Soil, W 7,065 g.
Diameter of Tube, D 4.25 in.
Total Unit Weight, $\gamma_t = \frac{4.85\,W}{LD^2}$ 83.6 lbs/cu.ft.

LEGEND

W_n — Natural Water Content
MA — Mechanical Analysis
LL — Atterberg Limits
G — Specific Gravity
C — Consolidation
Q — Unconsolidated Undrained
γ_0 — Dry Density
R — Consolidated Undroined
S — Consolidated Drained
UC — Unconfined Compression

UNDISTURBED SAMPLE LOG

NED FORM DEC 62 501

Edgemoor

BORING NO. EBB-7
SAMPLE NO. UD-3
DEPTH: 23.0 to 25.0 ft.

PROJECT Delaware River Study
DATE October 1967
COMP. By WS CHK'D By RJS

LABORATORY LOG	DESCRIPTION	W, CAN NO.	TEST SAMPLES
	Dark gray micaceous organic CLAY (OH)		W_n = 82.8%
	med-gray micaceous organic SILT (OH)		W_n = 80.9 %
	Dark gray micaceous organic CLAY (OH)		W_n = 88.7% γ_n = 48.6pcf e = 2.250 n = 69.2% S = 99.7%
		Hydc-1 G_1 = 2.53 LL = 114 PL = 40 PI = 74	
			W_n = 96.7% γ_n = 45.5pcf e = 2.471 n = 71.2% S = 99.0%
	Dark gray micaceous organic SILT (OH) w/ irreg brown silt seams approx 1/16" thick		W_n = 69.7 %

SAMPLE DEPTH IN FEET

SAMPLE LENGTH IN INCHES

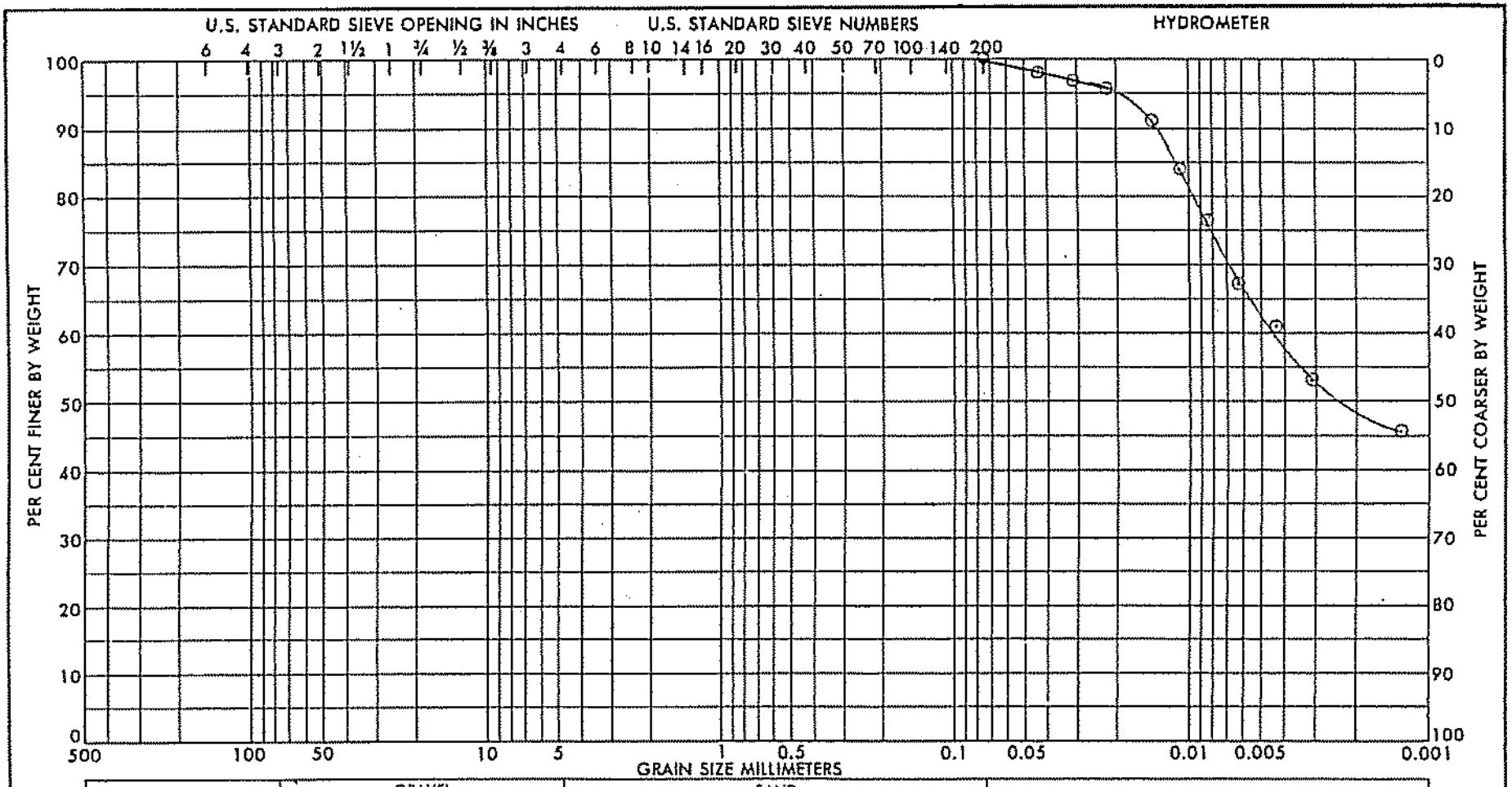
Bottom of sample #

Length of Sample, L 24.22 in.
Weight of Tube and Wet Soil 15,100 g.
Weight of Tube 6,950 g.
Weight of Wet Soil, W 8,150 g.
Diameter of Tube, D 4.25 in.
Total Unit Weight, $\gamma_t = \frac{4.85\,W}{LD^2}$ 90.4 lbs/cu.ft.

LEGEND
W_n — Natural Water Content
MA — Mechanical Analysis
LL — Atterberg Limits
G — Specific Gravity
C — Consolidation
Q — Unconsolidated Undrained
γ_d — Dry Density
R — Consolidated Undrained
S — Consolidated Drained
UC — Unconfined Compression

UNDISTURBED SAMPLE LOG

NED FORM DEC 62 501



SAMPLE NO.	ELEV OR DEPTH	CLASSIFICATION	NAT W%	LL	PL	PI
UD-2	17.0' - 19.0'	Organic CLAY (OH)		130	45	85

GRADATION CURVES

PROJECT Long Range Delaware River Disposal Area Study

AREA Edgemoor

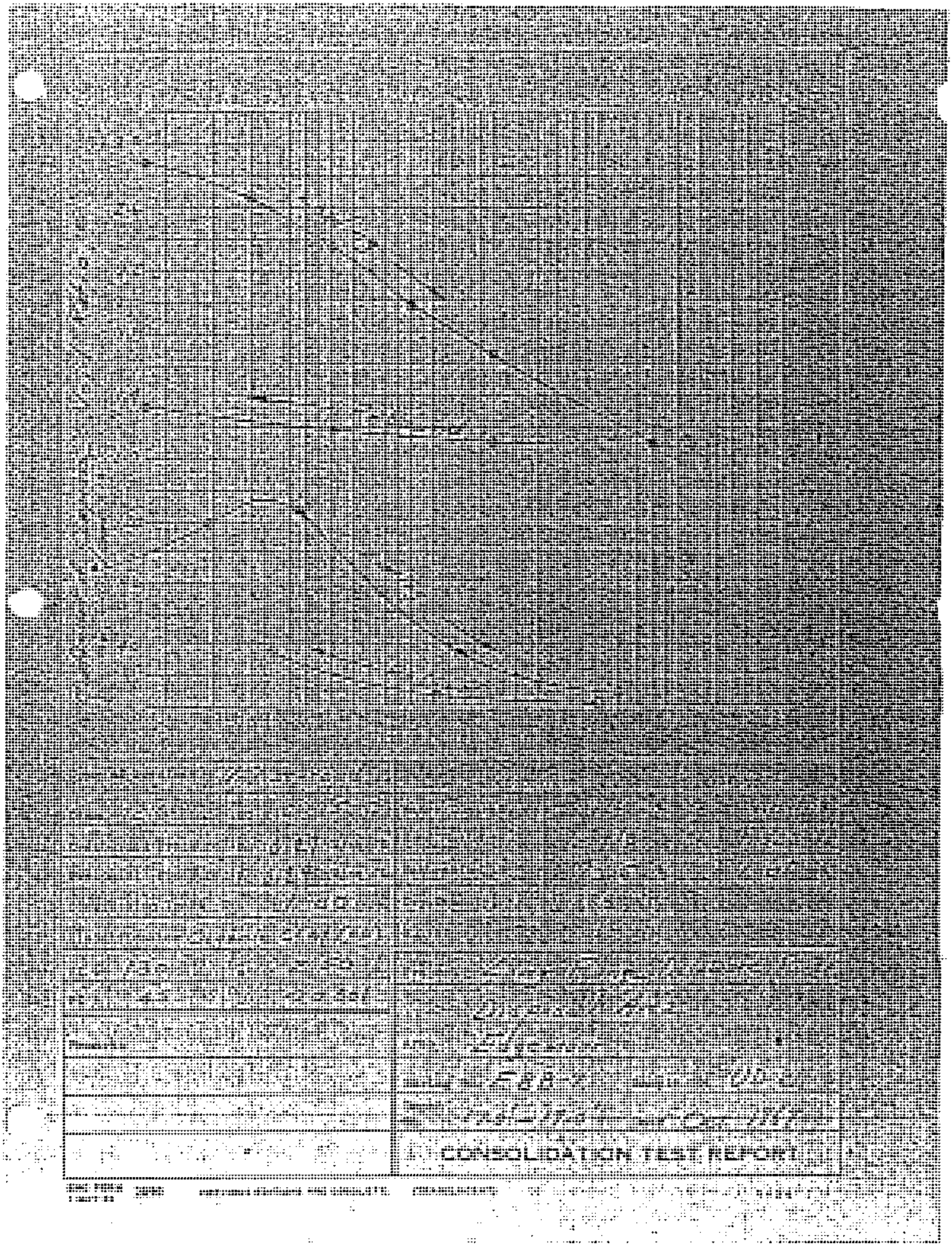
BORING NO. EBB-7

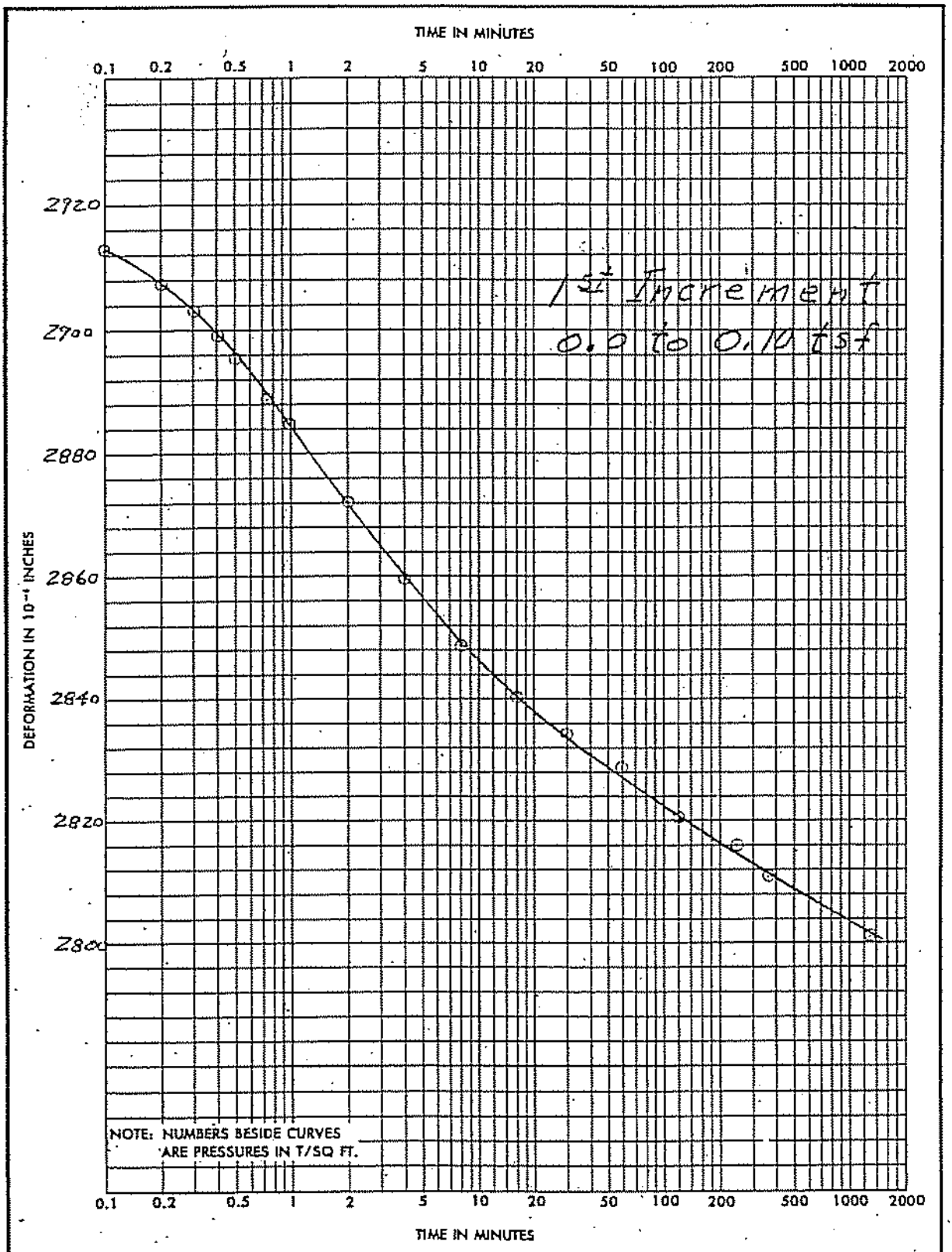
DATE Oct. 1967

ENG FORM 2087
1 MAY 63

REPLACES WES FORM NO. 1241, SEP 1962, WHICH IS OBSOLETE. (TRANSLUCENT)

U.S. GOVERNMENT PRINTING OFFICE : 1963 O—709-128


CONSOLIDATION TEST REPORT



PROJECT Long Range Delaware River Disposal Area Study

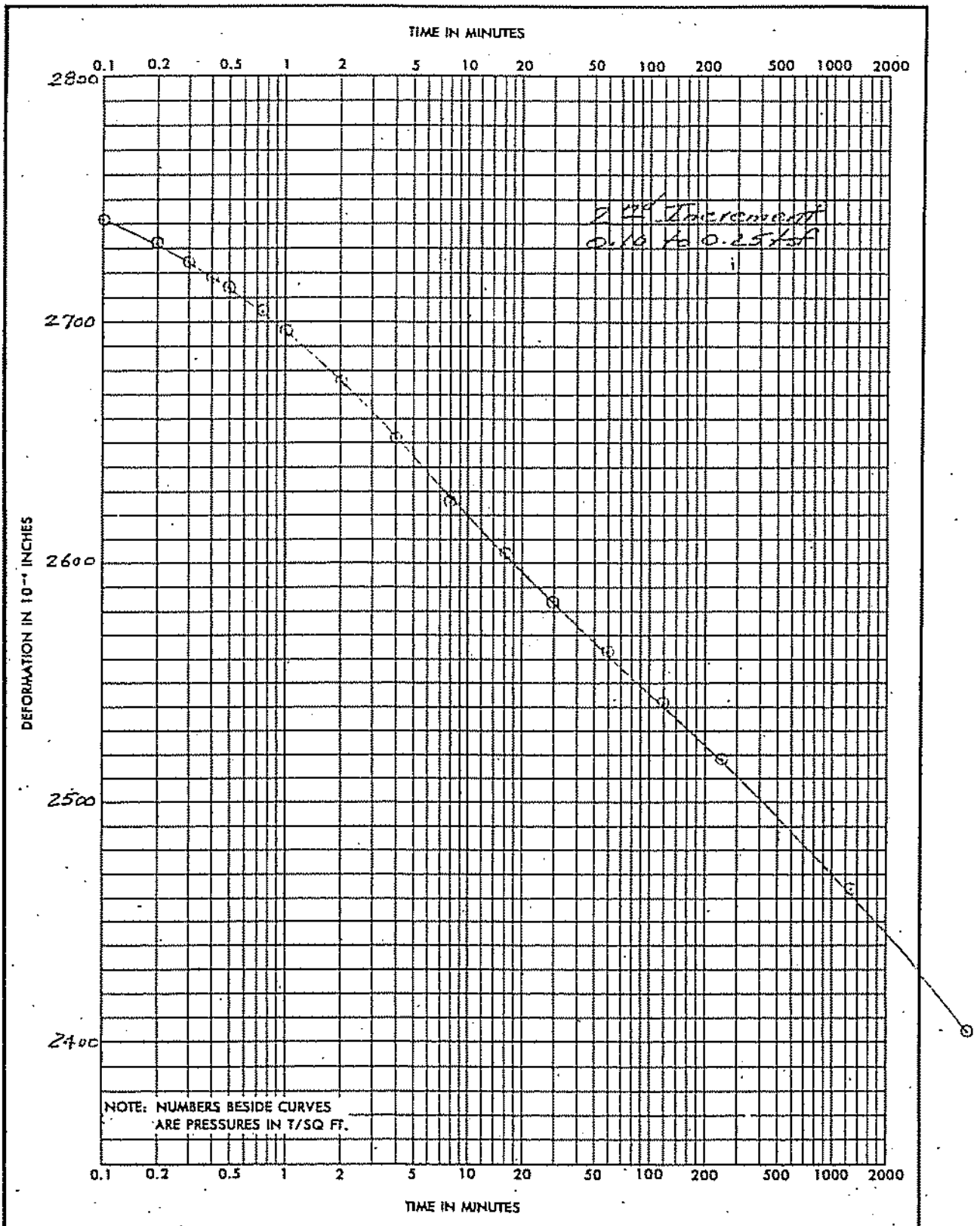
AREA Edgemoor

BORING NO. EBB-7 | SAMPLE NO. UD-2 | DEPTH El. 17.0'-19.0' | DATE Dec. 1967

ENG FORM 2088 1 MAY 63 PREVIOUS EDITIONS ARE OBSOLETE.

CONSOLIDATION TEST—TIME CURVES (TRANSLUCENT)

* GPO : 1964 OF—715-945



PROJECT Long Range Delaware River Disposal Area Study

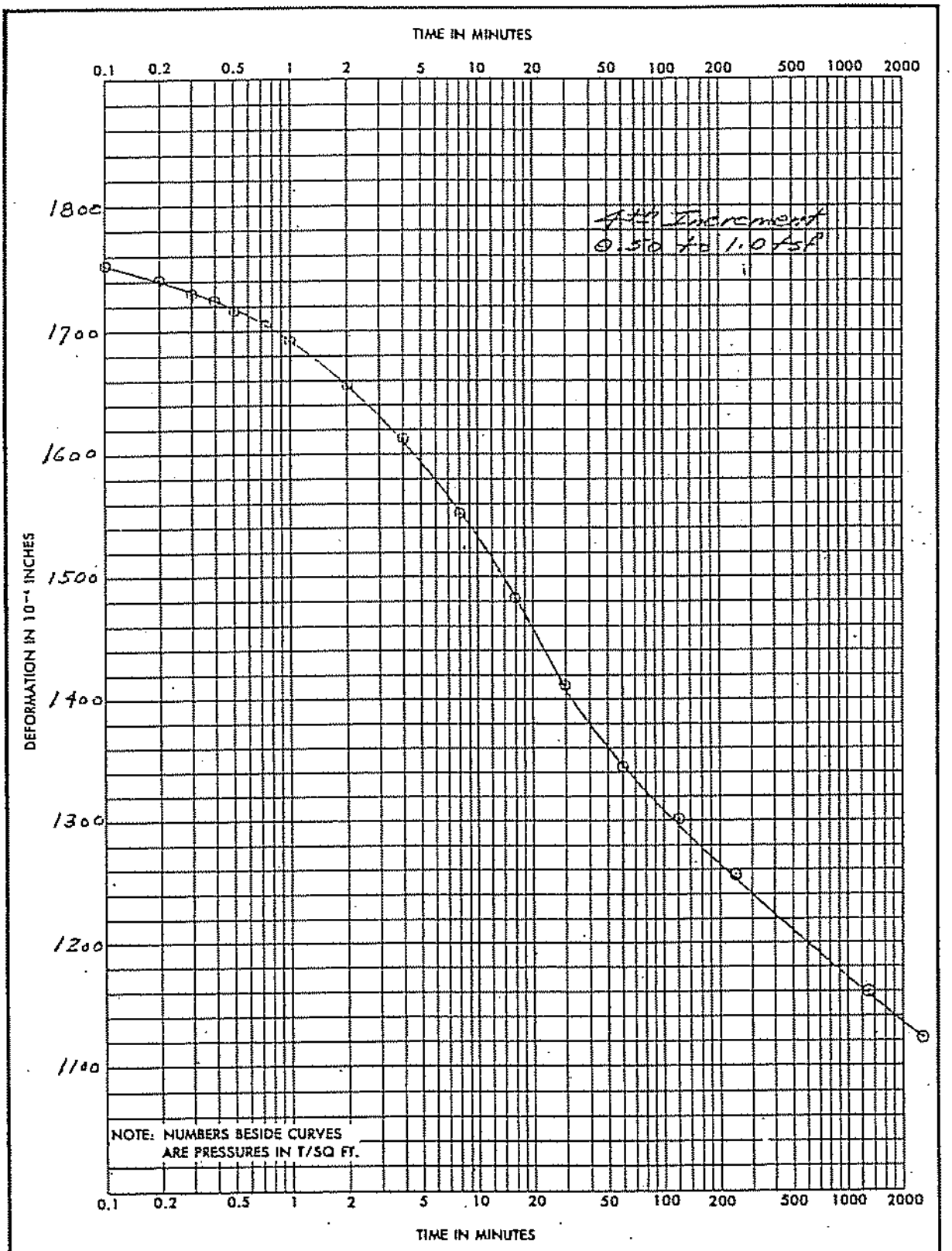
AREA

BORING NO. EBB-4	SAMPLE NO. UD-2	DEPTH EL 17.0'-19.0'	DATE Dec. 1967

ENG FORM 2088 1 MAY 63 PREVIOUS EDITIONS ARE OBSOLETE.

CONSOLIDATION TEST—TIME CURVES (TRANSLUCENT)

GPO : 1964 OF—715-565



PROJECT Long Range Delaware River Disposal Area Study

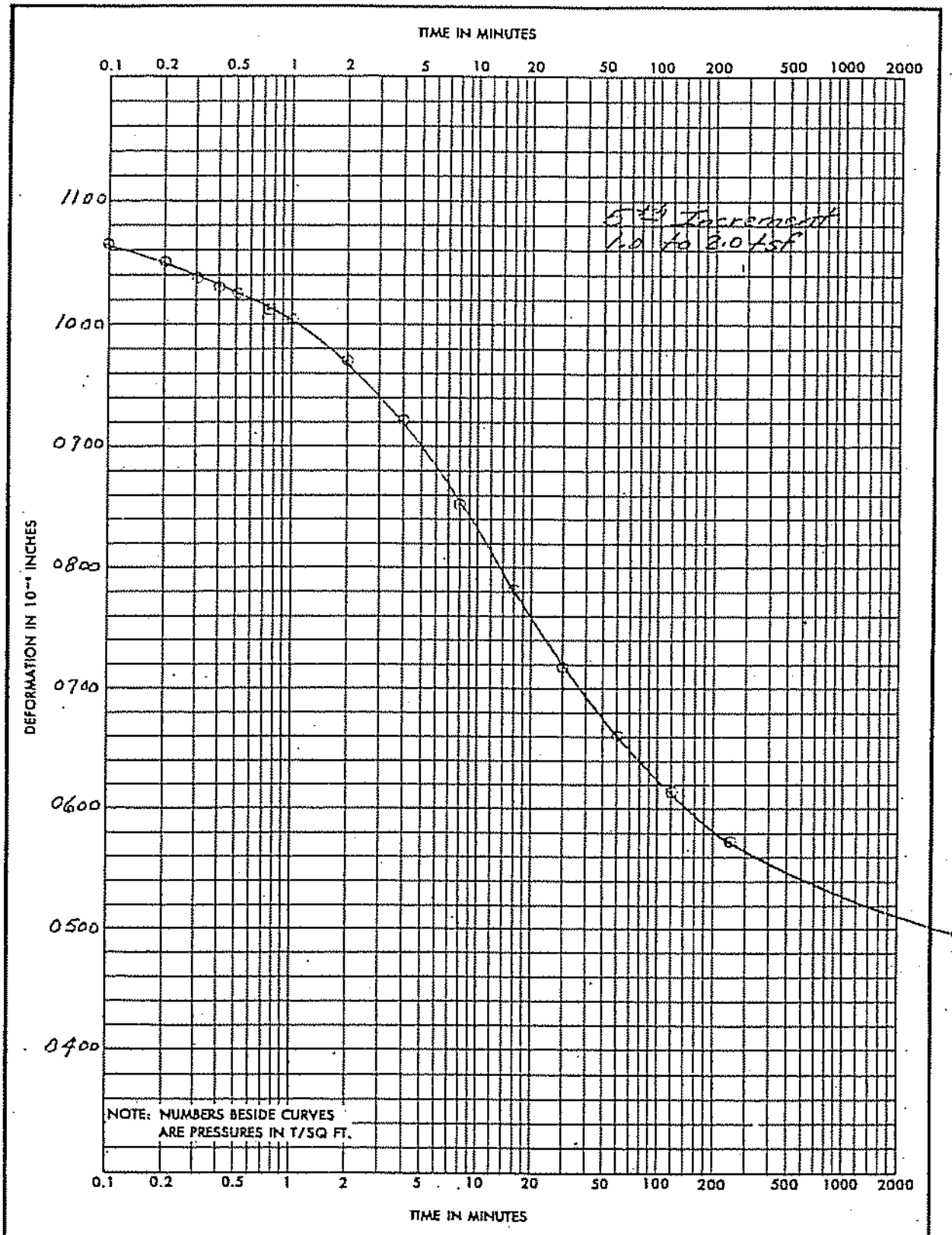
AREA

BORING NO. EBB-7	SAMPLE NO. UU-2	DEPTH -St- 17.0'-19.0'	DATE Dec. 1967

ENG FORM 2088 1 MAY 63 PREVIOUS EDITIONS ARE OBSOLETE.

CONSOLIDATION TEST—TIME CURVES (TRANSLUCENT)

* GPO : 1964 O-715-165



PROJECT Long Range Delaware River Disposal Area Study

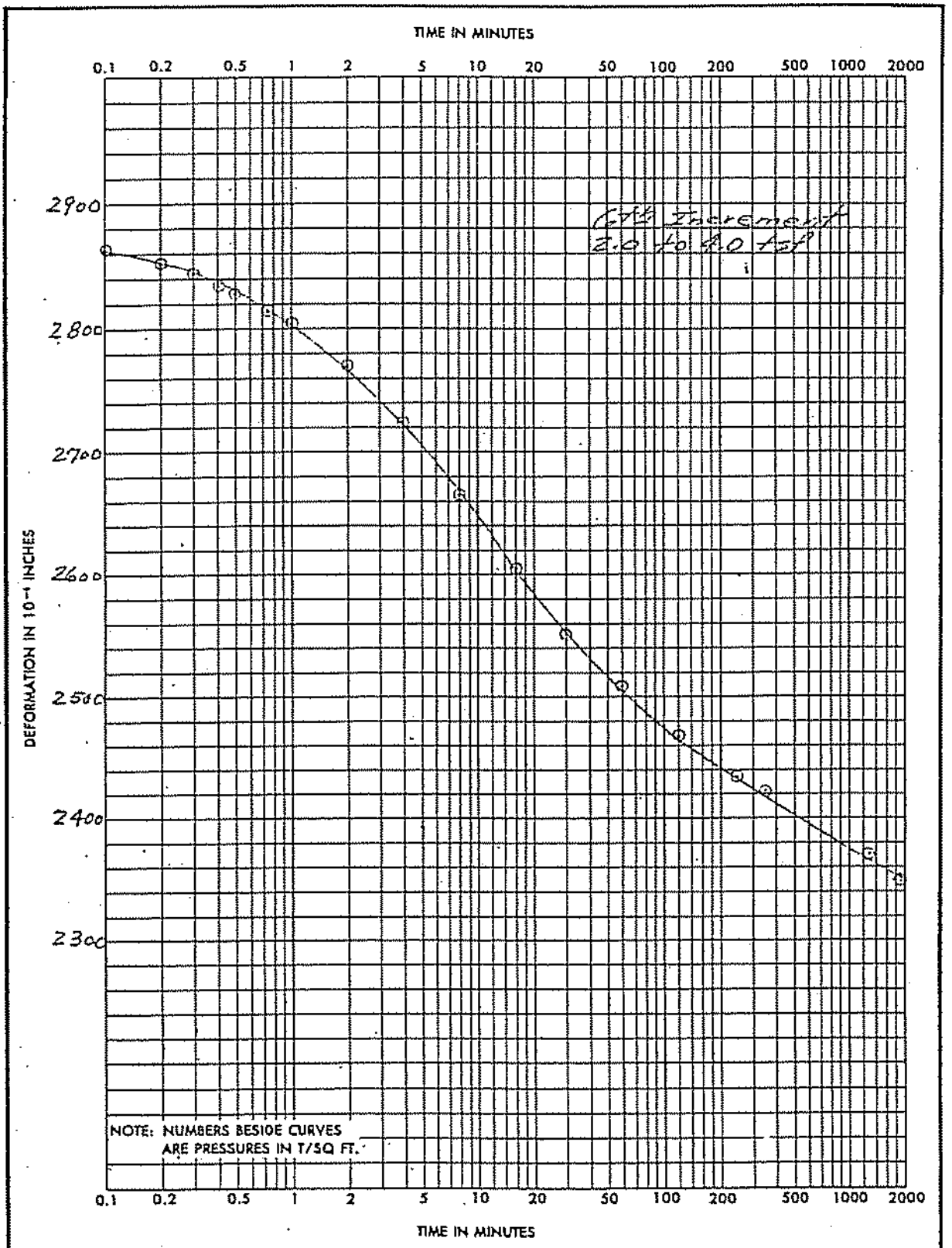
AREA

BORING NO.	SAMPLE NO.	DEPTH	DATE
EB-7	UD-2	17.0'-19.0'	Dec. 1967

ENG FORM 2088 1 MAY 63 PREVIOUS EDITIONS ARE OBSOLETE.

CONSOLIDATION TEST—TIME CURVES (TRANSLUCENT)

* GPO : 1964 OF—715-943



PROJECT Long Range Delaware River Disposal Area Study

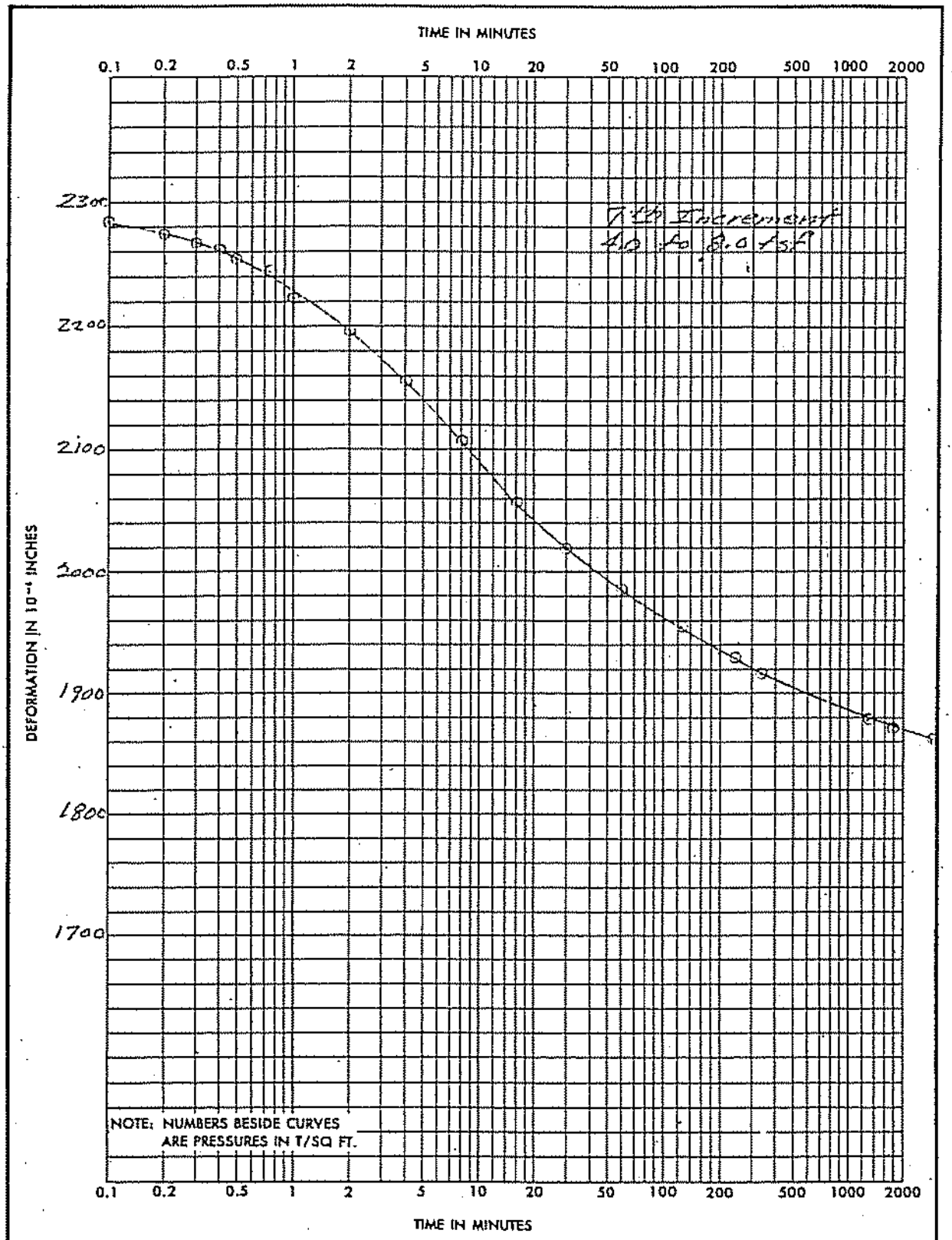
AREA

BORING NO. EBR-7	SAMPLE NO. UD-2	DEPTH EL 17.0'-19.0'	DATE Dec. 1967

ENG FORM 2088 1 MAY 63 PREVIOUS EDITIONS ARE OBSOLETE.

CONSOLIDATION TEST—TIME CURVES (TRANSLUCENT)

* GPO : 1964 OF—715-961



PROJECT Long Range Delaware River Disposal Area Study

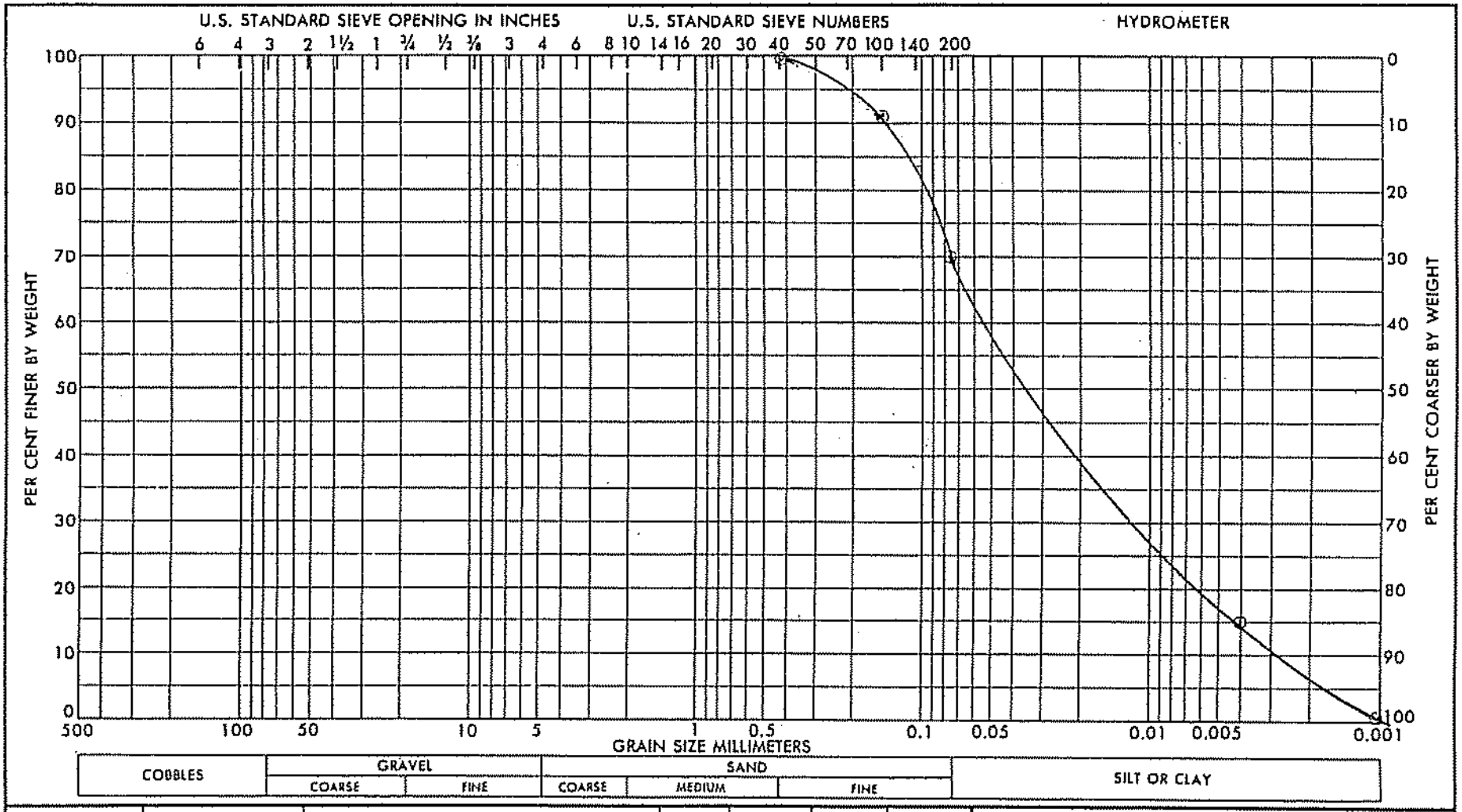
AREA

BORING NO.	SAMPLE NO.	DEPTH	DATE
EL-4-7	UD-2	17.0 - 19.0'	Dec. 1967

ENG FORM 2088 1 MAY 63 PREVIOUS EDITIONS ARE OBSOLETE.

CONSOLIDATION TEST—TIME CURVES (TRANSLUCENT)

* GPO : 1966 OF—715-963



SAMPLE NO.	ELEV OR DEPTH	CLASSIFICATION	NAT W%	LL	PL	PI
9	21.0 - 23.0	DK. grn. sandy org. SILT	48.5	25	23	2

GRADATION CURVES

PROJECT: Edgemoor Disposal Area

AREA:

BORING NO. EBB-7

DATE 9 Aug 67

ENG FORM 2087
1 MAY 63

REPLACES WES FORM NO. 1241, SEP 1962, WHICH IS OBSOLETE. (TRANSLUCENT)

U.S. GOVERNMENT PRINTING OFFICE : 1963 O-709-124

Edgemoor

BORING NO. EBB-7
SAMPLE NO. UD-4
DEPTH: 27.0 to 29.0 ft.

PROJECT Delaware River Study
DATE October 1967
COMP. By WS CHK'D By RJS

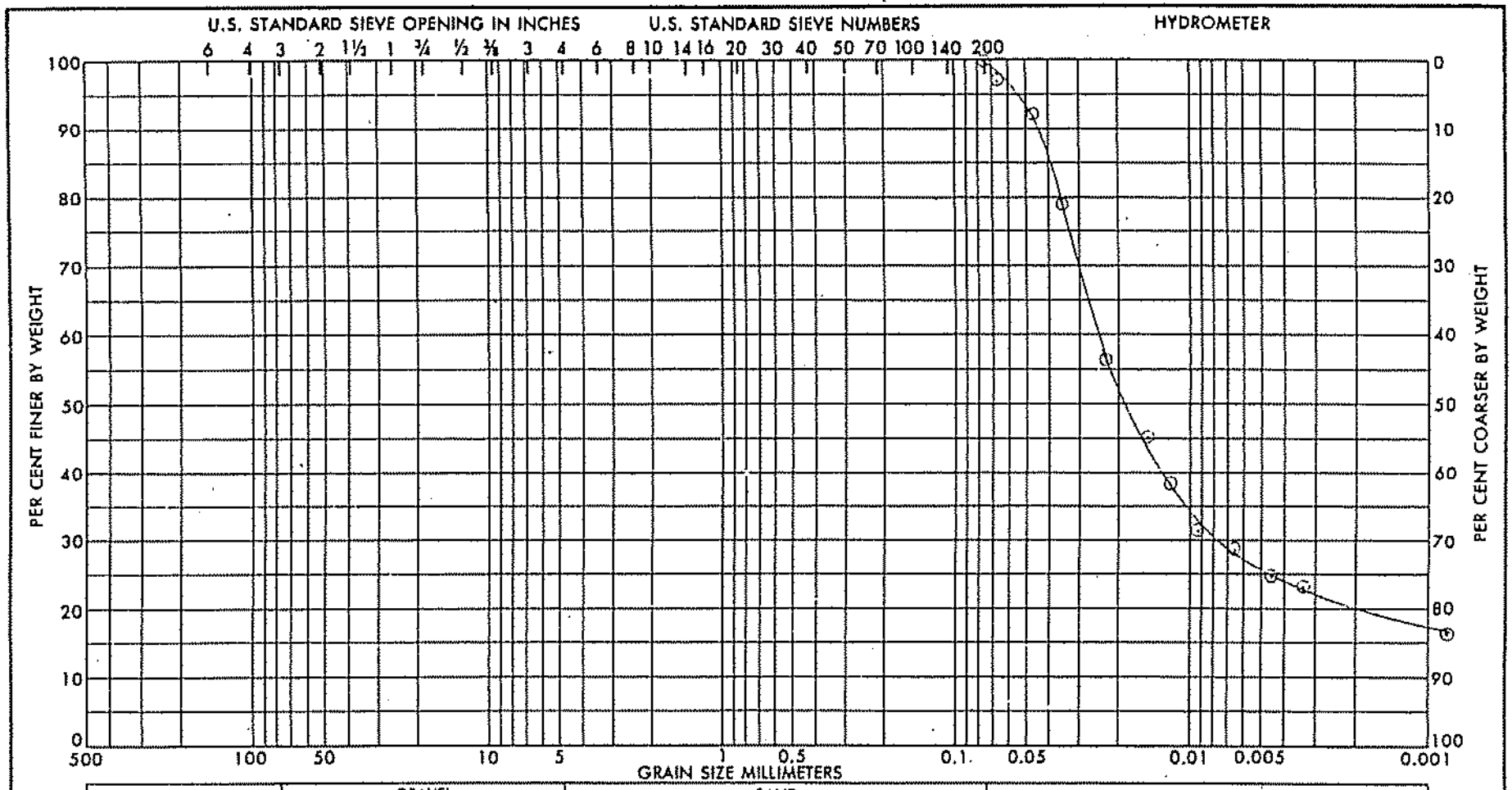
LABORATORY LOG	DESCRIPTION	W, CAN NO.	TEST SAMPLES
SAMPLE DEPTH IN FEET / SAMPLE LENGTH IN INCHES	Dark grayish-brown Organic SILT (OH)	Hydr-L G = 2.34 Nal 00 LL 56 46 PL 36 34 PI 20 12	C-1 Wn = 68.6%
	Bottom of Sample		

Length of Sample, L 23.48 in.
Weight of Tube and Wet Soil 15,700 g.
Weight of Tube 6,990 g.
Weight of Wet Soil, W 8,710 g.
Diameter of Tube, D 4.25 in.
Total Unit Weight, $\gamma_t = \frac{4.85\,W}{L\,D^2}$ 99.6 lbs/cu.ft.

LEGEND
W_n — Natural Water Content
MA — Mechanical Analysis
LL — Atterberg Limits
G — Specific Gravity
C — Consolidation
Q — Unconsolidated Undrained
γ_d — Dry Density
R — Consolidated Undrained
S — Consolidated Drained
UC — Unconfined Compression

UNDISTURBED SAMPLE LOG

NED FORM DEC 62 501



SAMPLE NO.	ELEV-OR DEPTH	CLASSIFICATION	NAT W%	LL	PL	PI
UD-4	27.0'-29.0'	Organic CLAY (OH)	Natural	56	36	20
			Oven Dried	46	34	12

GRADATION CURVES

PROJECT Long Range Delaware River Disposal Area

AREA

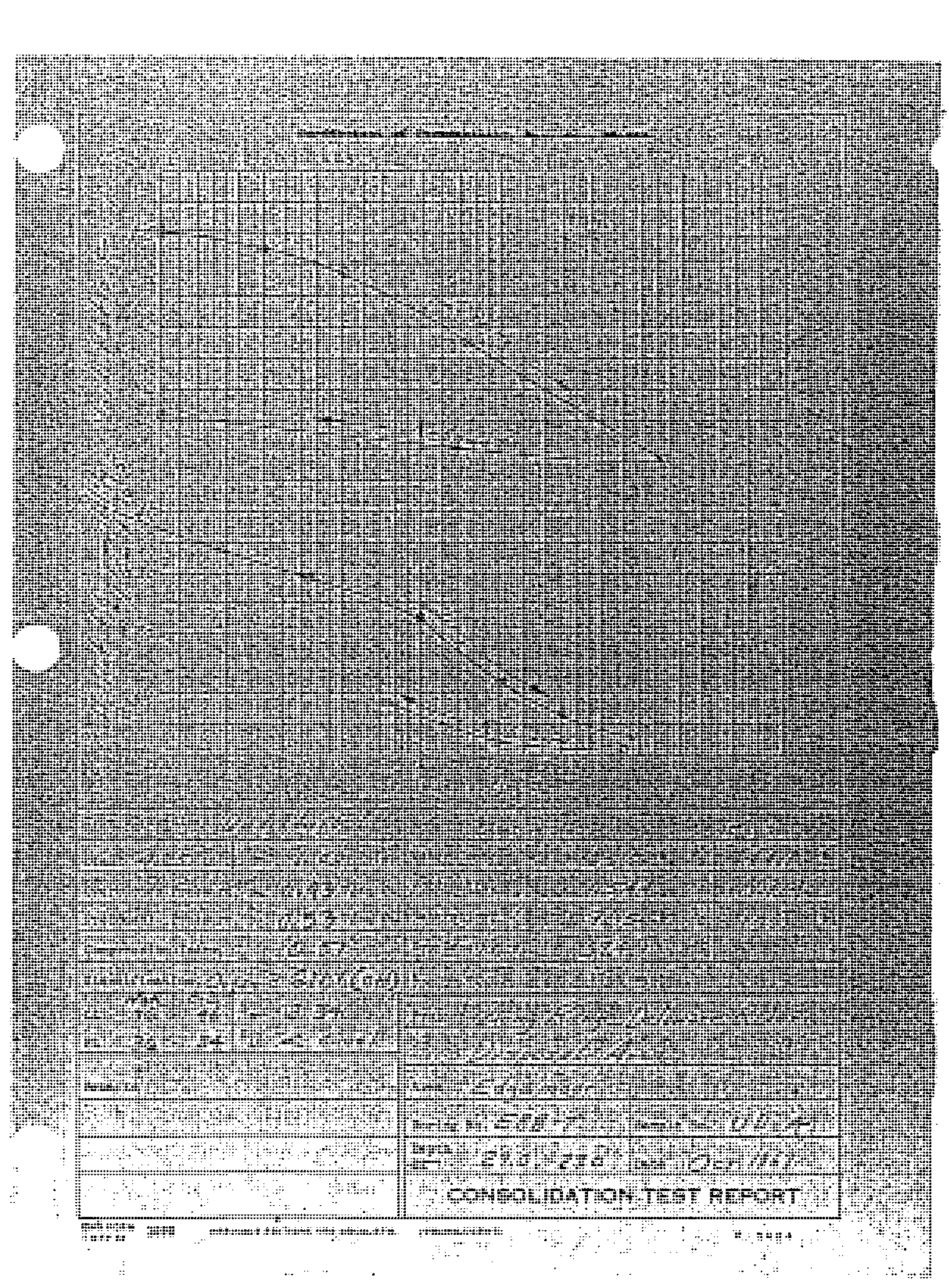
BORING NO. EBB-7

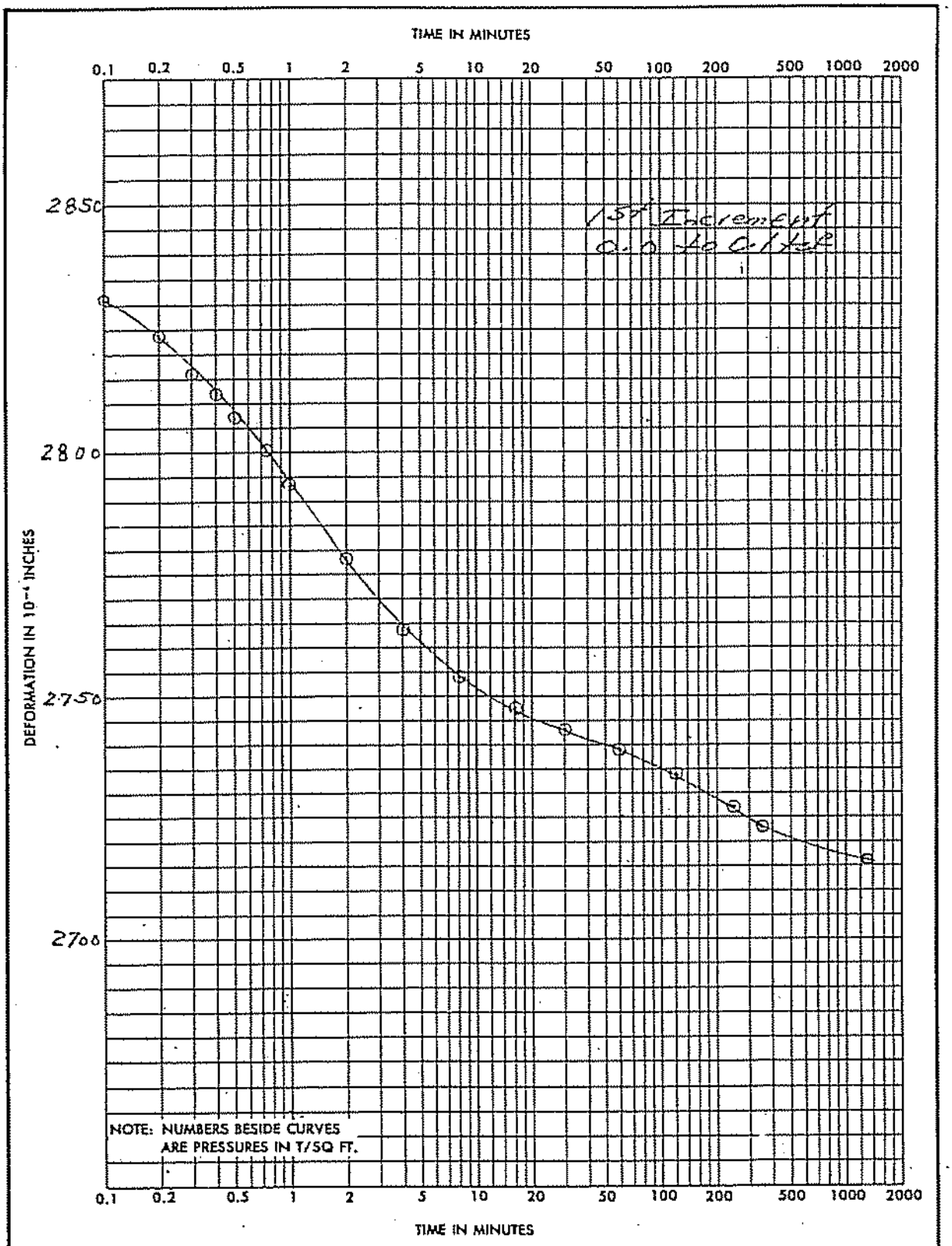
DATE Sept. 1967

ENG FORM 2087
1 MAY 63

REPLACES WES FORM NO. 1241, SEP 1962, WHICH IS OBSOLETE.

U.S. GOVERNMENT PRINTING OFFICE : 1963 O—709-124


CONSOLIDATION TEST REPORT



PROJECT Long Range Delaware River Disposal Area Study

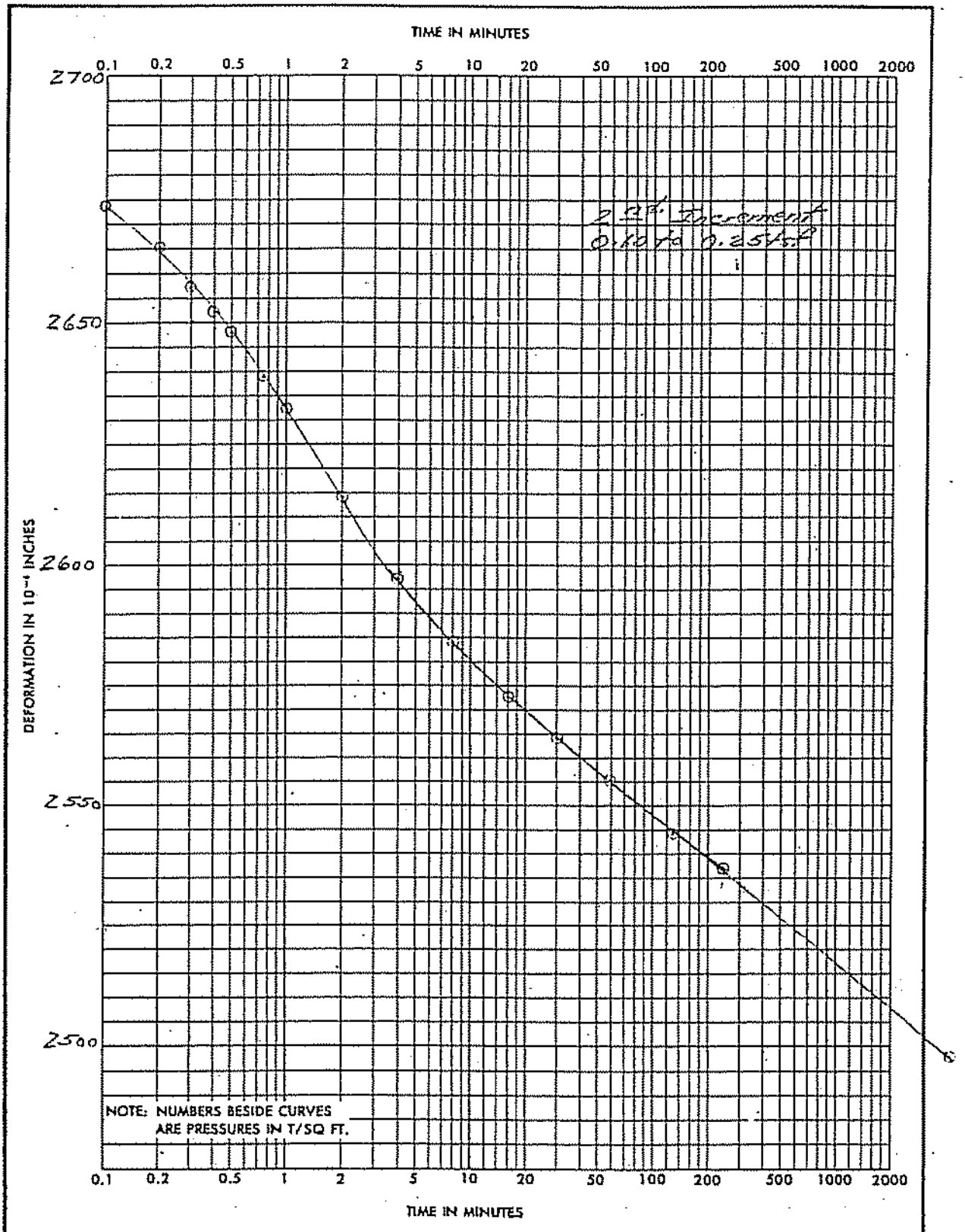
AREA

BORING NO.	SAMPLE NO.	DEPTH El.	DATE
EAB-7	UD-4	27.0'-29.0'	Dec. 1962

ENG FORM 2088 1 MAY 63 PREVIOUS EDITIONS ARE OBSOLETE.

CONSOLIDATION TEST—TIME CURVES (TRANSLUCENT)

* GPO : 1964 OF—715-963



PROJECT Long Range Delaware River Dispersal Area Study

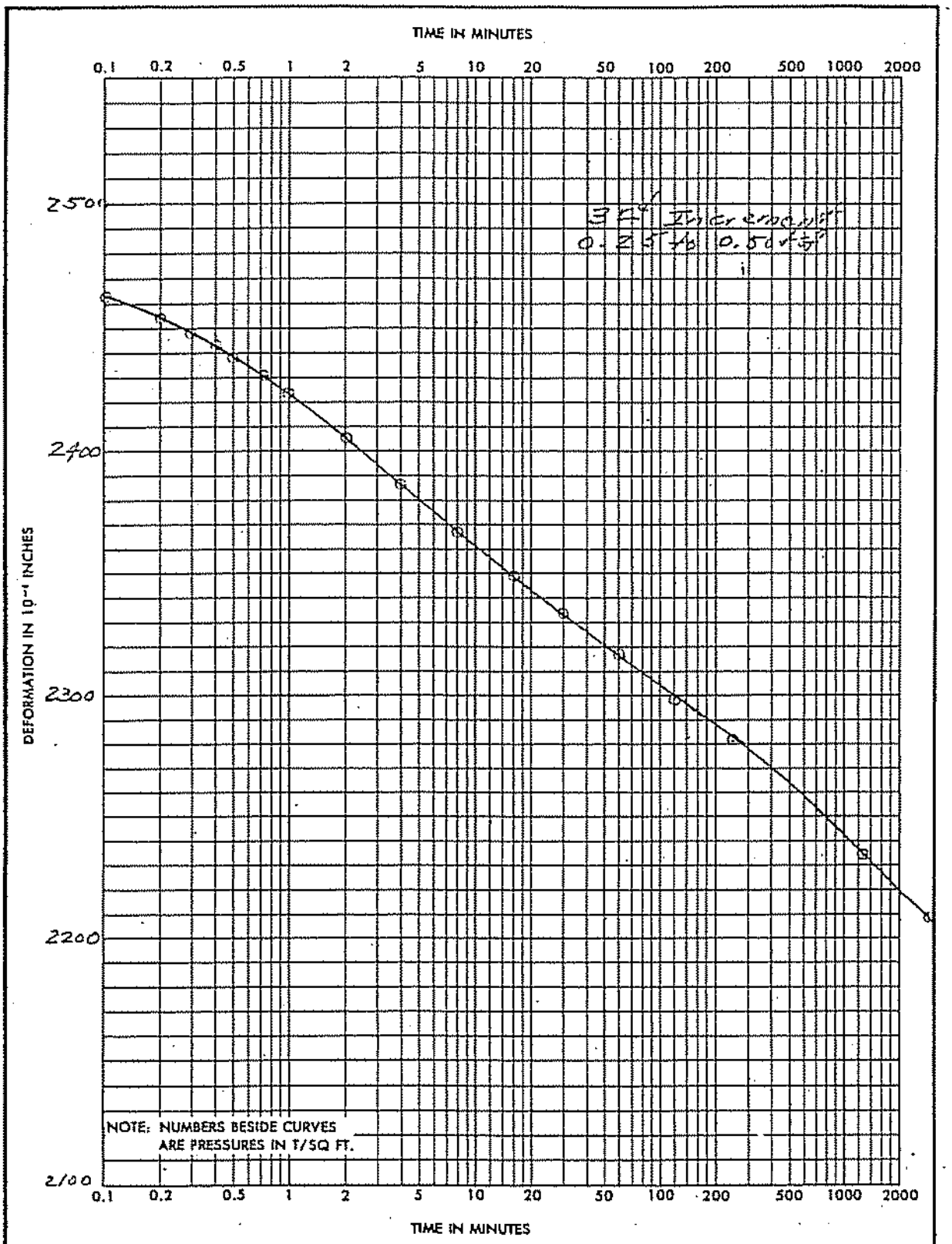
AREA

BORING NO.	SAMPLE NO.	DEPTH El.	DATE
EB-7	UD-4	27.0'-29.0'	Dec. 1967

ENG FORM 2088 1 MAY 63 PREVIOUS EDITIONS ARE OBSOLETE.

CONSOLIDATION TEST—TIME CURVES (TRANSLUCENT)

* GPO : 1964 O-715-963



PROJECT Long Range Delaware River Disposal Area Study

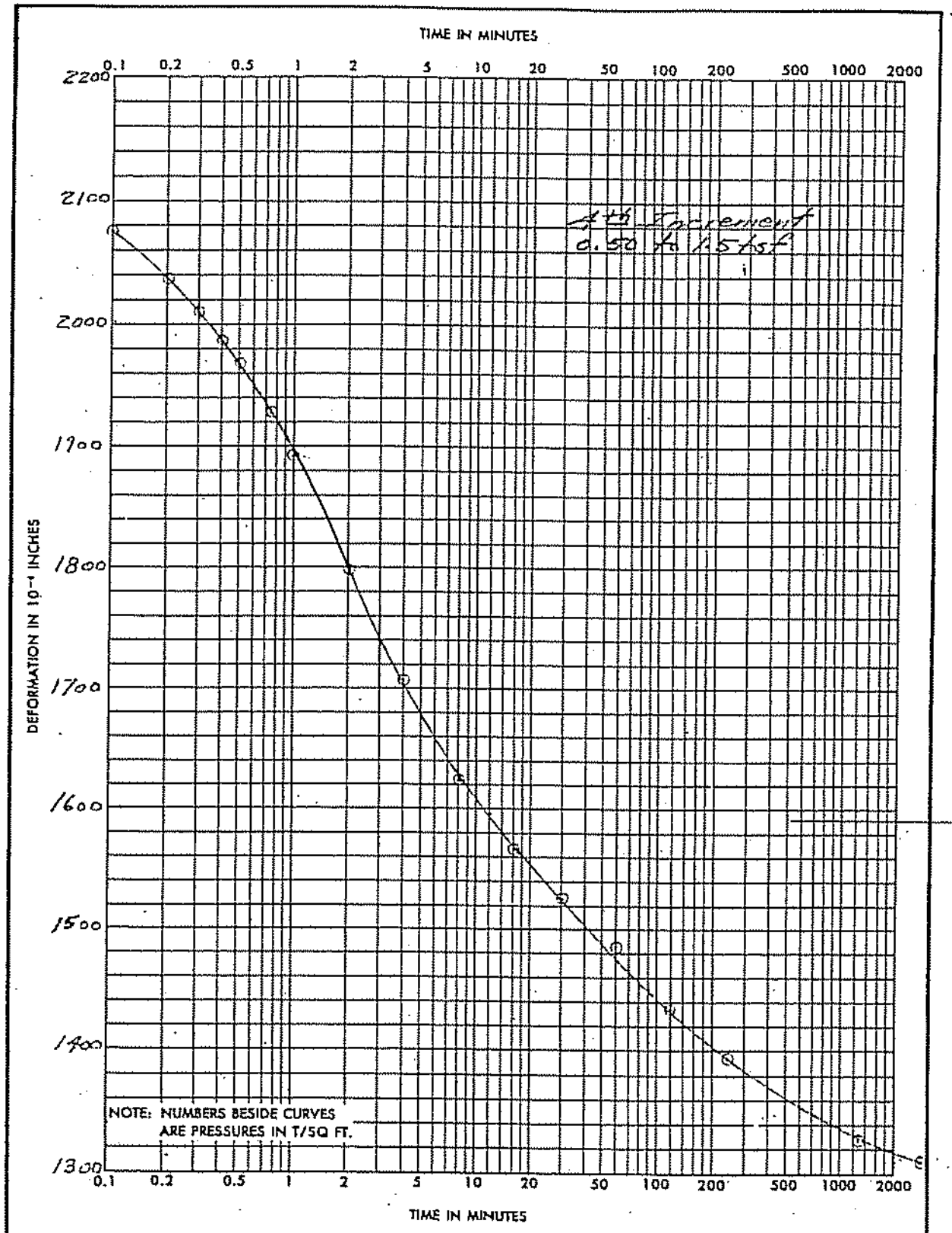
AREA Edgemoor

BORING NO.	SAMPLE NO.	DEPTH	DATE
ERB-7	UD-4	27.0'-29.0'	Dec. 1965

ENG FORM 2088 1 MAY 63 PREVIOUS EDITIONS ARE OBSOLETE.

CONSOLIDATION TEST—TIME CURVES (TRANSLUCENT)

* GPO : 1964 OF—715-965



PROJECT Long Range Delaware River Disposal Area Study

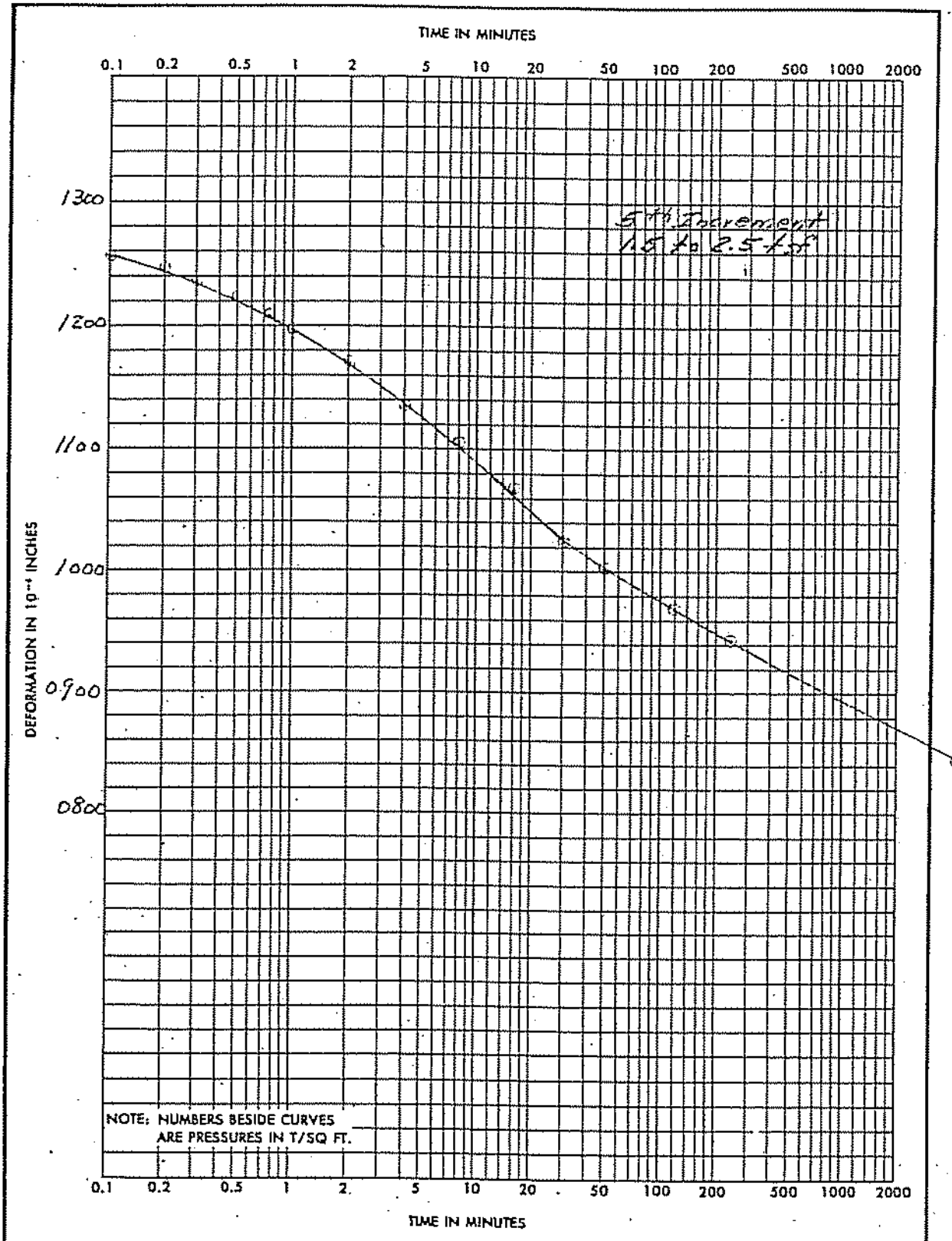
AREA

BORING NO. EB8-7	SAMPLE NO. UD-4	DEPTH Eb 27.0'-29.0'	DATE Dec. 1967

ENG FORM 2088 1 MAY 63 PREVIOUS EDITIONS ARE OBSOLETE.

CONSOLIDATION TEST—TIME CURVES (TRANSLUCENT)

* GPO : 1964 OF—715-563



PROJECT Long Range Delaware River Disposal Area Study

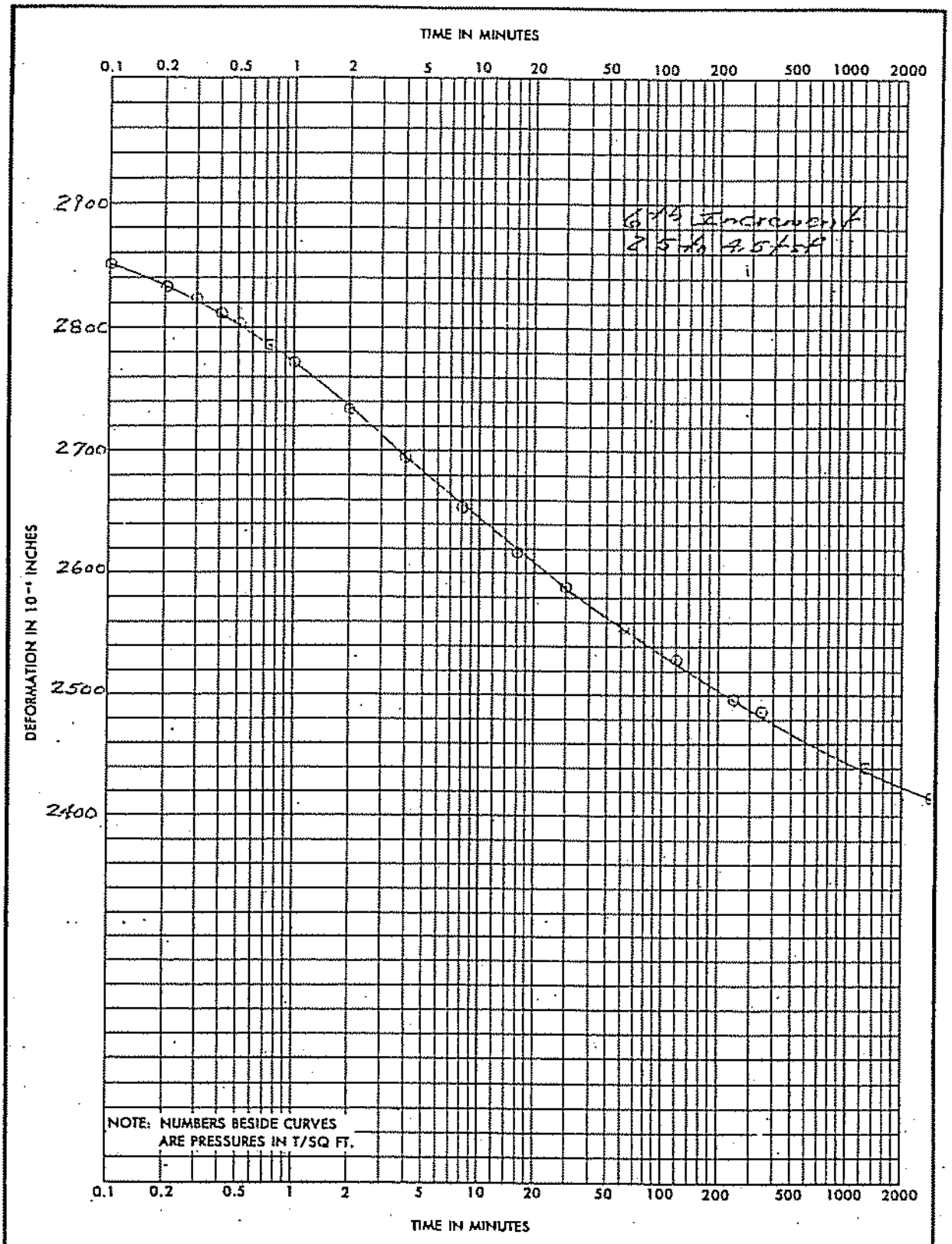
AREA

BORING NO.	SAMPLE NO.	DEPTH	DATE
EB-7	UU-4	270'-290'	Dec. 1967

ENG FORM 2088 1 MAY 63 PREVIOUS EDITIONS ARE OBSOLETE.

CONSOLIDATION TEST—TIME CURVES (TRANSLUCENT)

* GPO : 1964 OF—715-963



PROJECT Long Range Delaware River Disposal Area Study

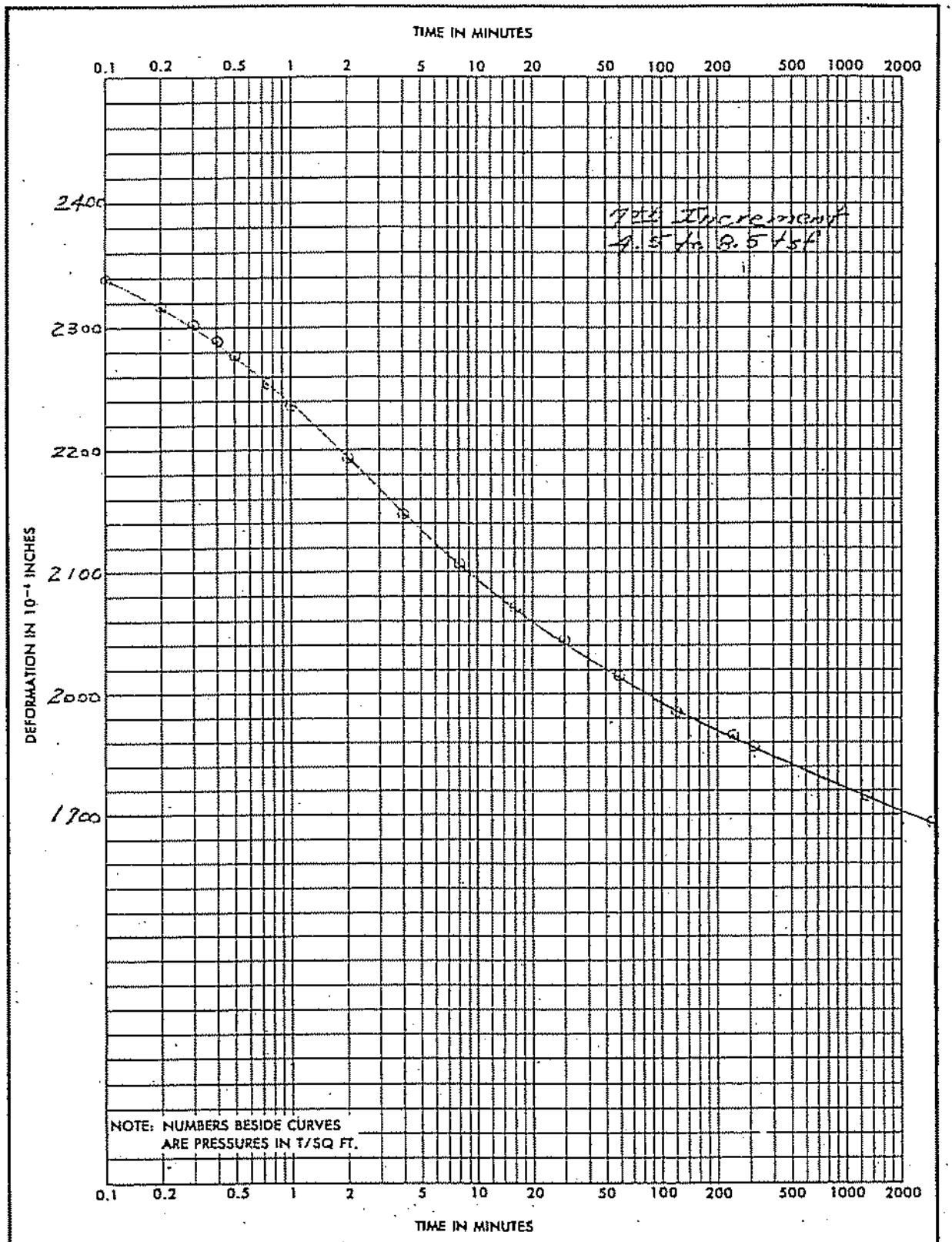
AREA

BORING NO.	SAMPLE NO.	DEPTH	DATE
L-22-7	UD-7	27.0'-29.0'	Dec. 1967

ENG FORM 2088 1 MAY 63 PREVIOUS EDITIONS ARE OBSOLETE.

CONSOLIDATION TEST—TIME CURVES (TRANSLUCENT)

* GPO : 1964 OF—715-965



PROJECT Long Range Delaware River Disposal Area Study

AREA

BORING NO. ATR-11 | SAMPLE NO. UD-4 | DEPTH EL. 27.0 - 29.0' | DATE Dec. 1967

ENG FORM 2088 1 MAY 63 PREVIOUS EDITIONS ARE OBSOLETE.

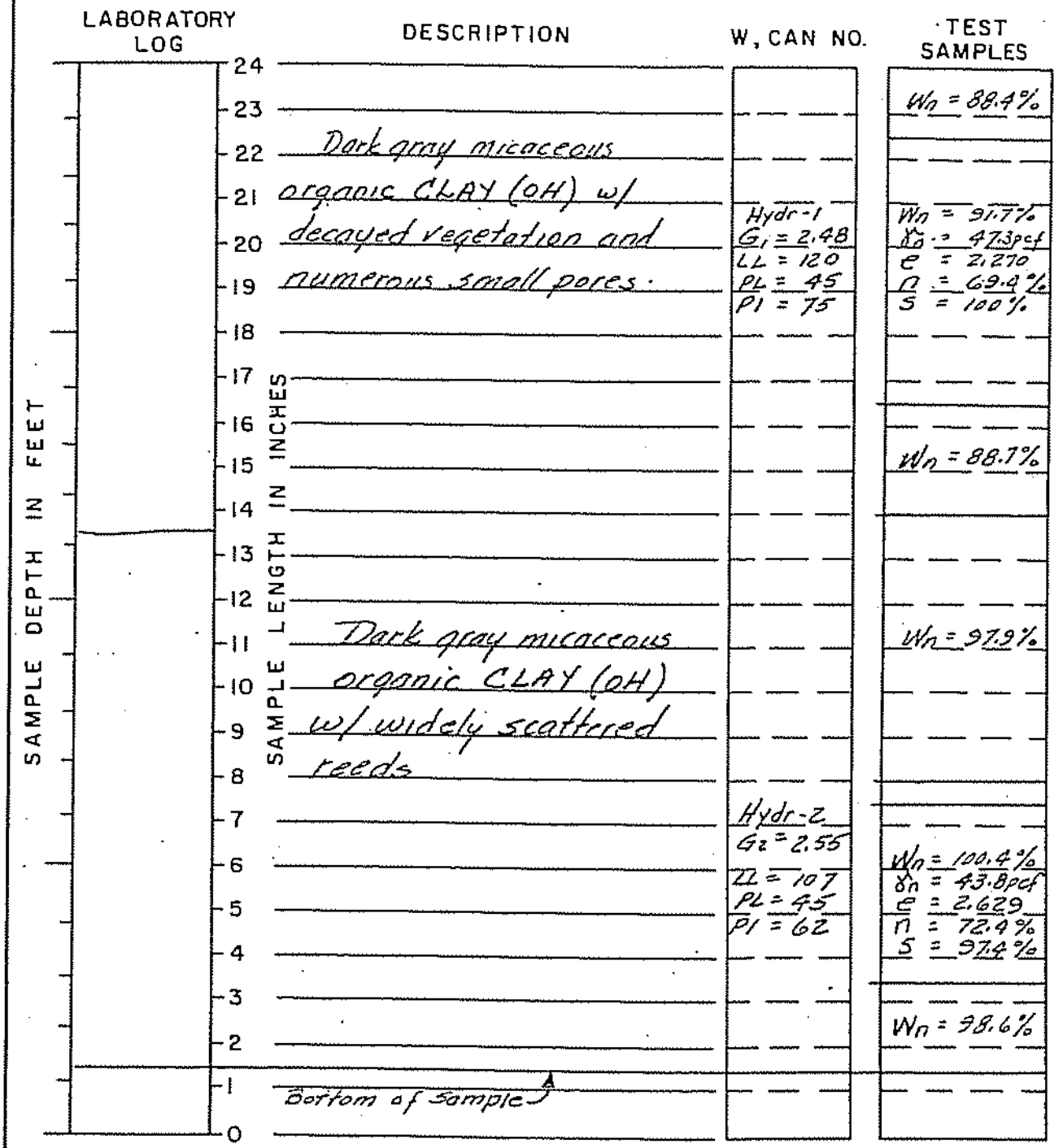
CONSOLIDATION TEST—TIME CURVES (TRANSLUCENT)

* GPO : 1964 OF—715-963

Edgemoor

BORING NO. EBB-8
SAMPLE NO. UD-1
DEPTH: 4.0 to 6.0 ft.

PROJECT Delaware River Study
DATE October 1967
COMP. By WS CHK'D By RJS



Length of Sample, L 22.56 in.
Weight of Tube and Wet Soil 14,220 g.
Weight of Tube 6,920 g.
Weight of Wet Soil, W 7,300 g.
Diameter of Tube, D 4.25 in.
Total Unit Weight, $\gamma_t = \frac{4.85\,W}{LD^2}$ 86.9 lbs/cu.ft.

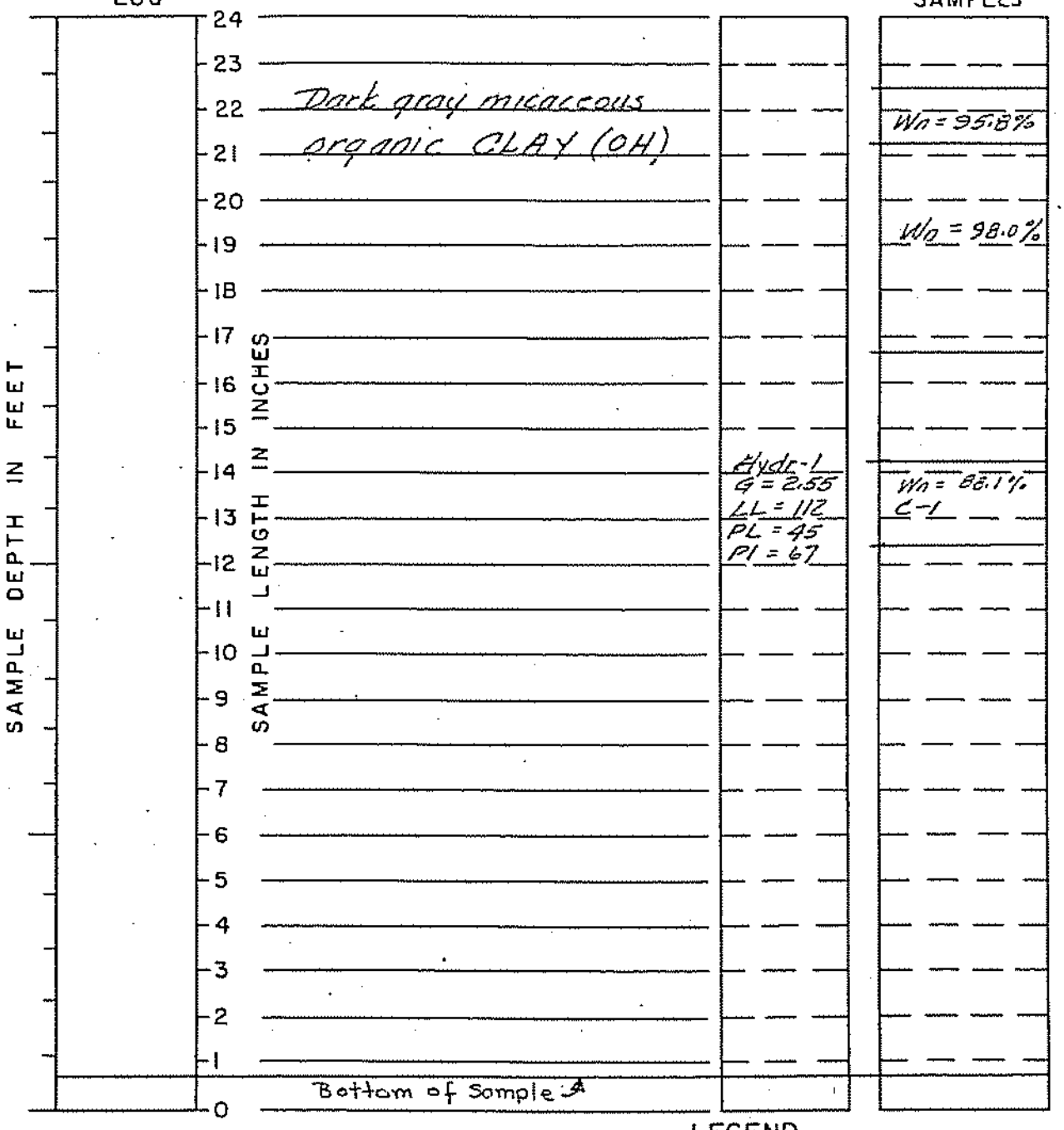
LEGEND

W_n — Natural Water Content
MA — Mechanical Analysis
LL — Atterberg Limits
G — Specific Gravity
C — Consolidation
Q — Unconsolidated Undrained
γ_d — Dry Density
R — Consolidated Undrained

Edgemoor

BORING NO. EBB-8
SAMPLE NO. UD-2
DEPTH: 10.0 to 12.0 ft.

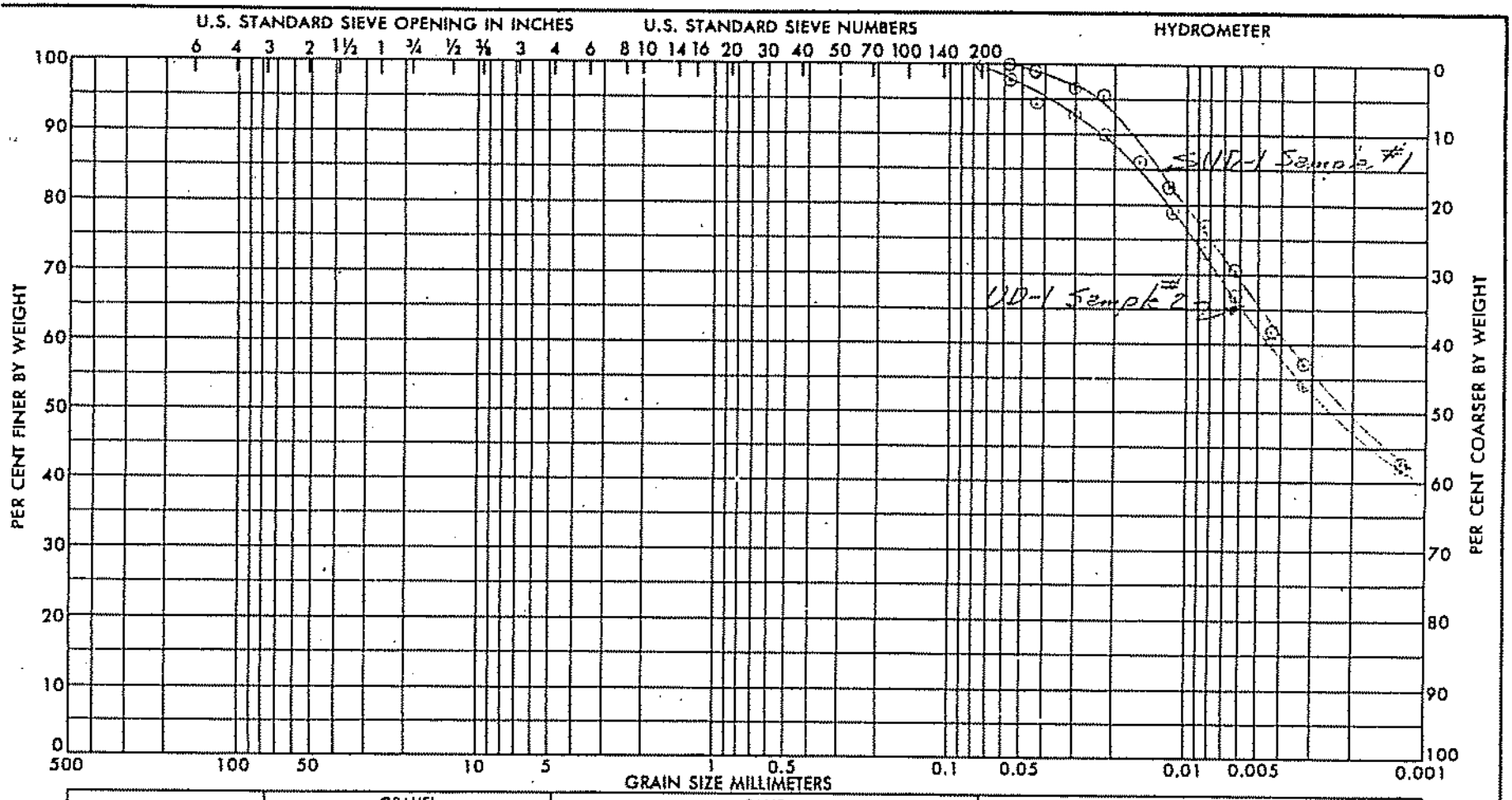
PROJECT Delaware River Study
DATE October 1967
COMP. By WS CHK'D By RJS



Length of Sample, L 23.33 in.
Weight of Tube and Wet Soil 14,350 g.
Weight of Tube 6,930 g.
Weight of Wet Soil, W 7,420 g.
Diameter of Tube, D 4.25 in.
Total Unit Weight, $\gamma_t = \frac{4.85\,W}{L\,D^2}$ 85.4 lbs/cu.ft.

LEGEND

W_n — Natural Water Content
MA — Mechanical Analysis
LL — Atterberg Limits
G — Specific Gravity
C — Consolidation
Q — Unconsolidated Undrained
γ_d — Dry Density
R — Consolidated Undrained



COBBLES	GRAVEL		SAND			SILT OR CLAY
	COARSE	FINE	COARSE	MEDIUM	FINE	

SAMPLE NO.	ELEV. OR DEPTH	CLASSIFICATION	NAT W%	LL	PL	PI
UD-1 Sample #1	4.0'-6.0'	Organic CLAY (OH)		120	45	75
UD-1 Sample #2	4.0'-6.0'	Organic CLAY (OH)		107	45	62

GRADATION CURVES

PROJECT Long Range Delaware River Disposal Area

AREA

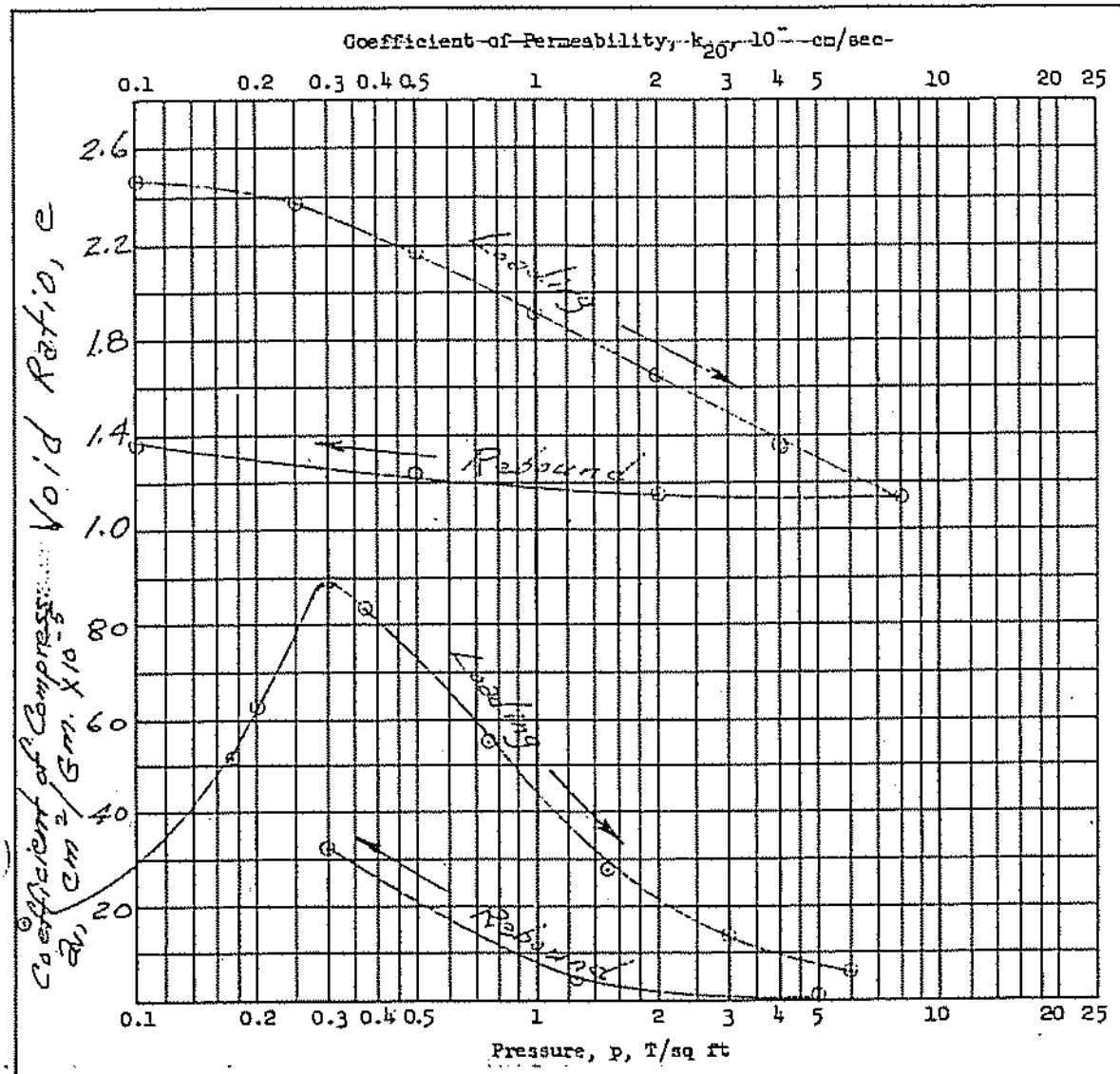
BORING NO. EBB-8

DATE Oct. 1967

NG FORM 2087
MAY 63

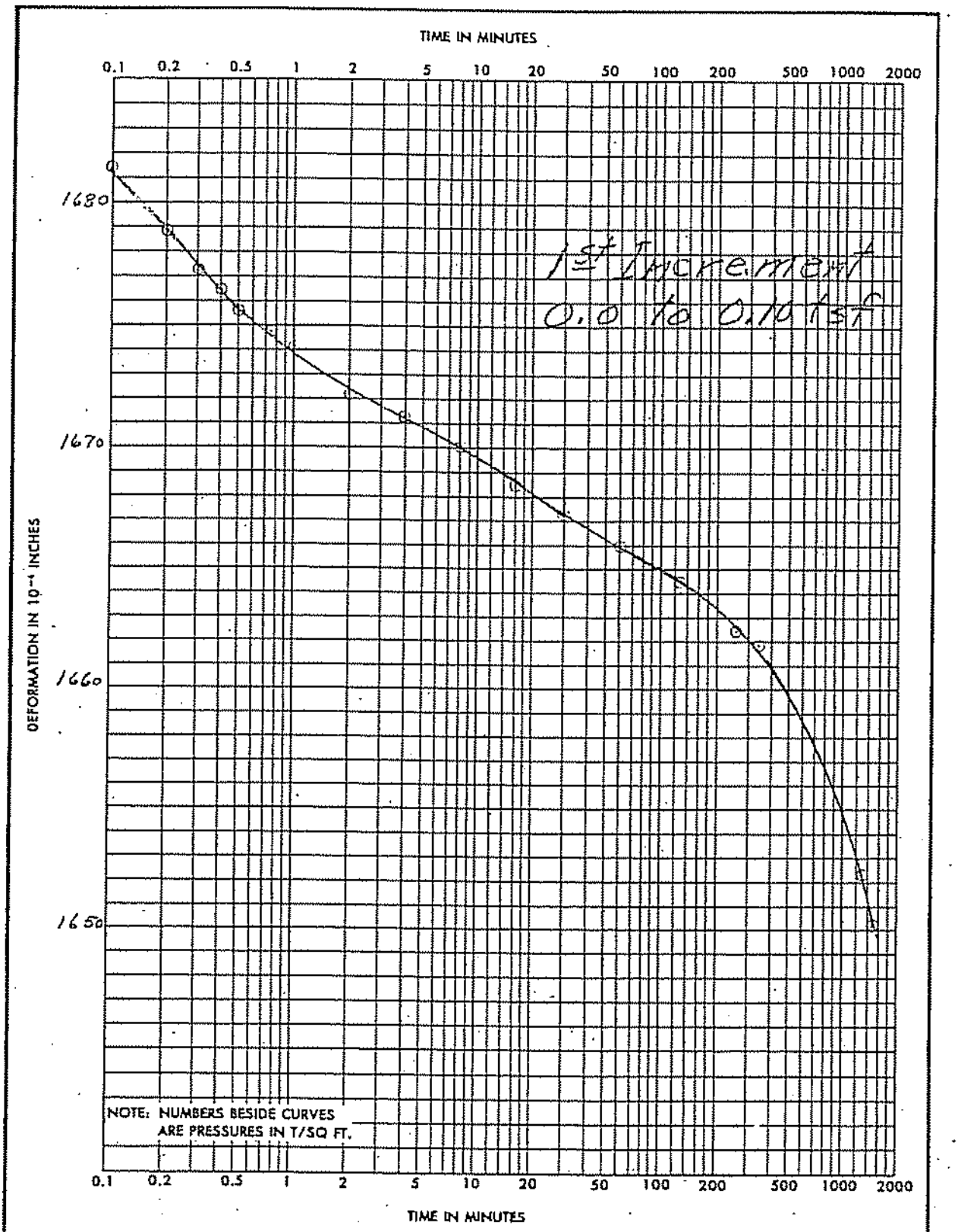
REPLACES WES FORM NO. 1241, SEP 1962, WHICH IS OBSOLETE.

U.S. GOVERNMENT PRINTING OFFICE : 1963 OF—709-126



Type of Specimen *Undisturbed*		Before Test		After Test	
Diam *2.5* in.	Ht *1.0* in.	Water Content, w_o	*88.1* %	w_f	*53.7* %
Overburden Pressure, p_o *0.18* T/sq ft		Void Ratio, e_o	*2.459*	e_f	*1.355*
Preconsol. Pressure, p_c *0.33* T/sq ft		Saturation, S_o	*90.3* %	S_f	*100+* %
Compression Index, C_c *0.87*		Dry Density, γ_d	*45.6* lb/ft^3		
Classification *Organic CLAY(OH)*		k_{20} at e_o =	x 10^{-} cm/sec		
LL *112*	G_s *2.55*	Project *Long Range Delaware River Disposal Area*			
PL *45*	D_{10} *< 0.001*				
Remarks		Area *Edgemoor*			
		Boring No. *EBB-6*		Sample No. *UD-2*	
		Depth *10.0' - 12.0'*		Date *Oct. 1967*	

CONSOLIDATION TEST REPORT



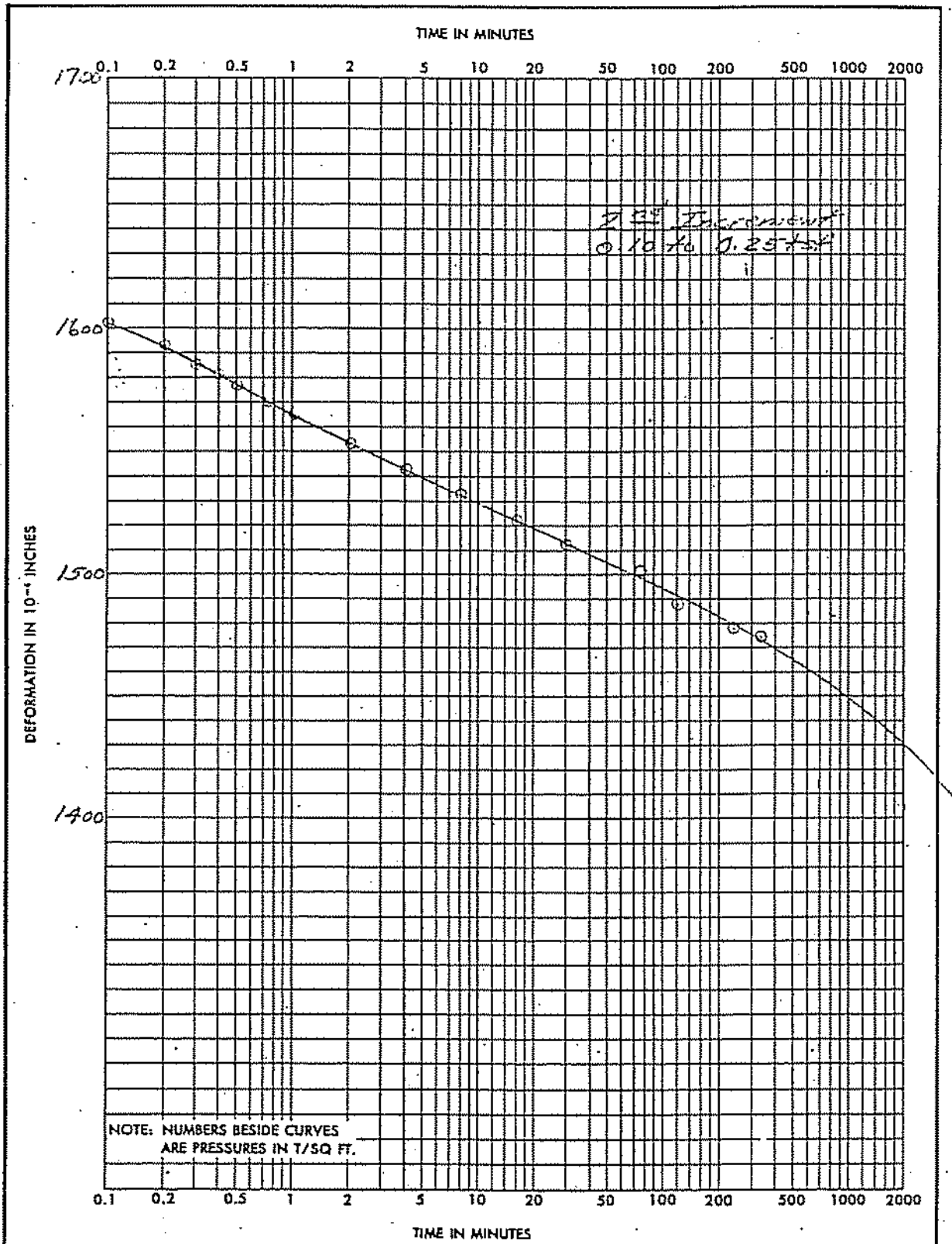
PROJECT Long Range Delaware River Disposal Area Study

AREA Edgemoor

BORING NO. EBR-8 | SAMPLE NO. UD-2 | DEPTH ~~ft~~ 10.0' - 12.0' | DATE Dec. 1967

ENG FORM 2088 1 MAY 63 PREVIOUS EDITIONS ARE OBSOLETE.

CONSOLIDATION TEST—TIME CURVES (TRANSLUCENT)



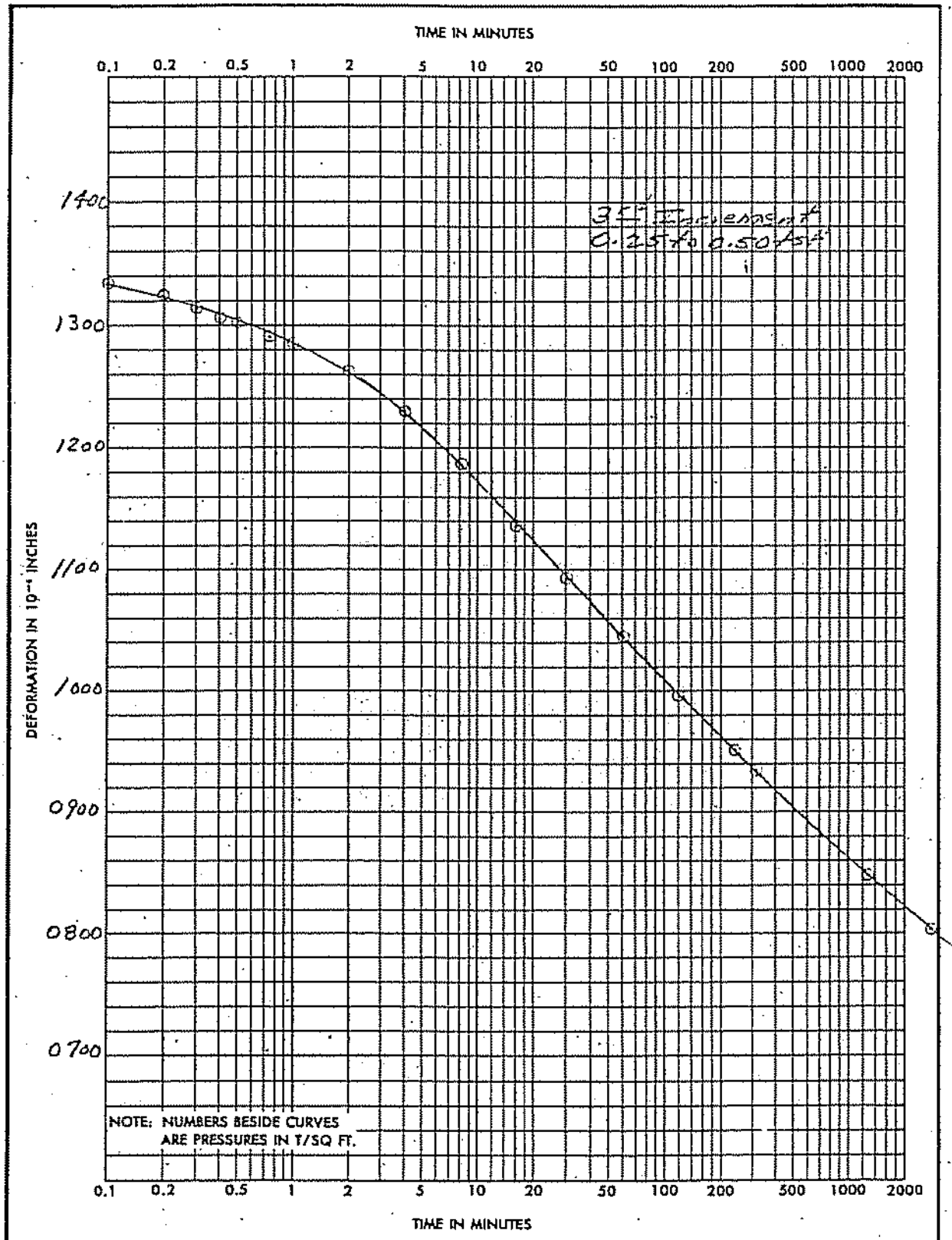
PROJECT Long Range Delaware River Disposal Area Study

AREA

BORING NO. EB5-8 | SAMPLE NO. UD-2 | DEPTH 10.0'-12.0' | DATE Dec. 1967

ENG FORM 2088 1 MAY 63 PREVIOUS EDITIONS ARE OBSOLETE.

CONSOLIDATION TEST—TIME CURVES (TRANSLUCENT)



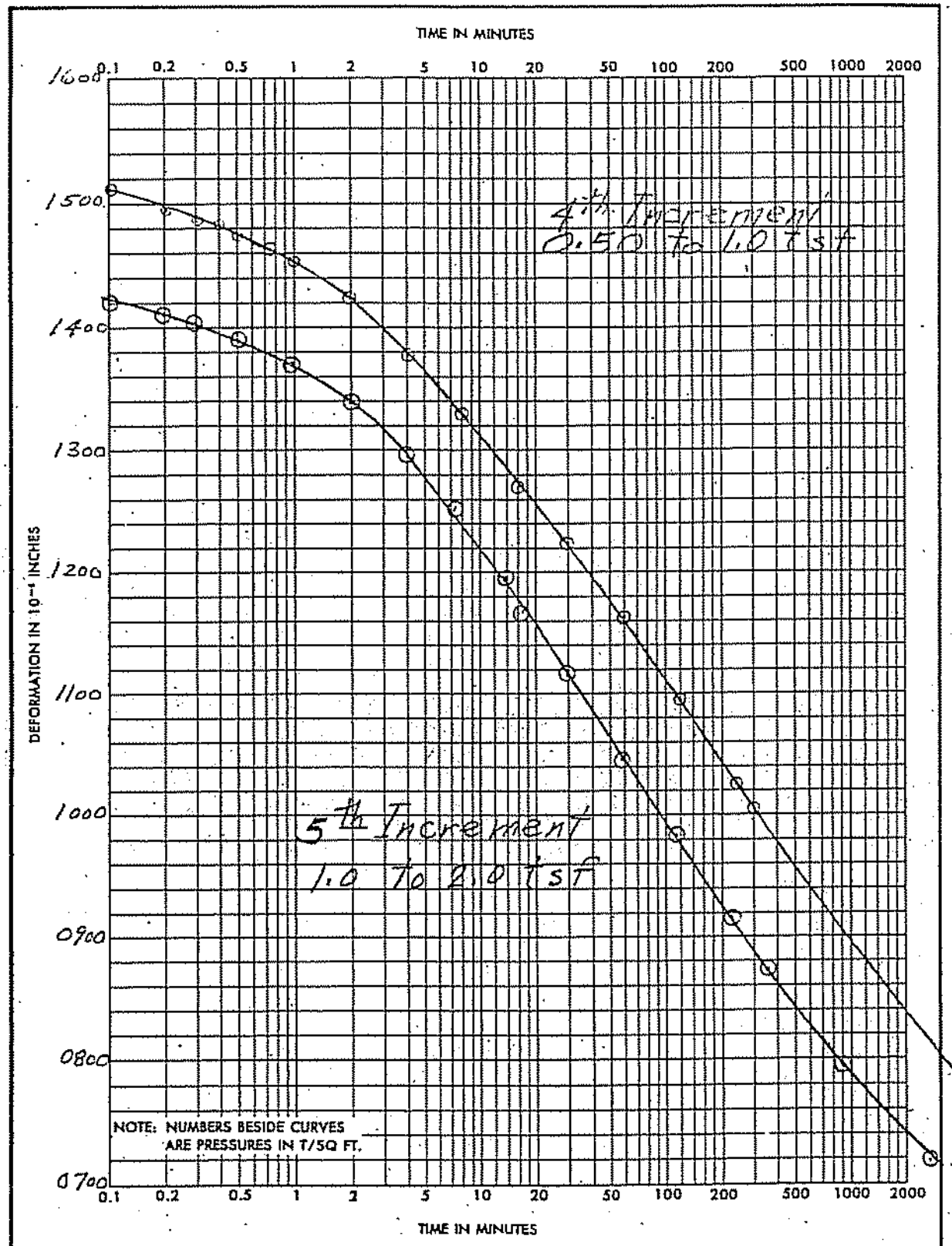
PROJECT Long Range Delaware River Disposal Area Study

AREA

BORING NO. EBB-8 | SAMPLE NO. UD-2 | DEPTH ~~ft~~ 10.0'-12.0' | DATE Dec. 1967

ENG FORM 2088 1 MAY 63 PREVIOUS EDITIONS ARE OBSOLETE.

CONSOLIDATION TEST—TIME CURVES (TRANSLUCENT)

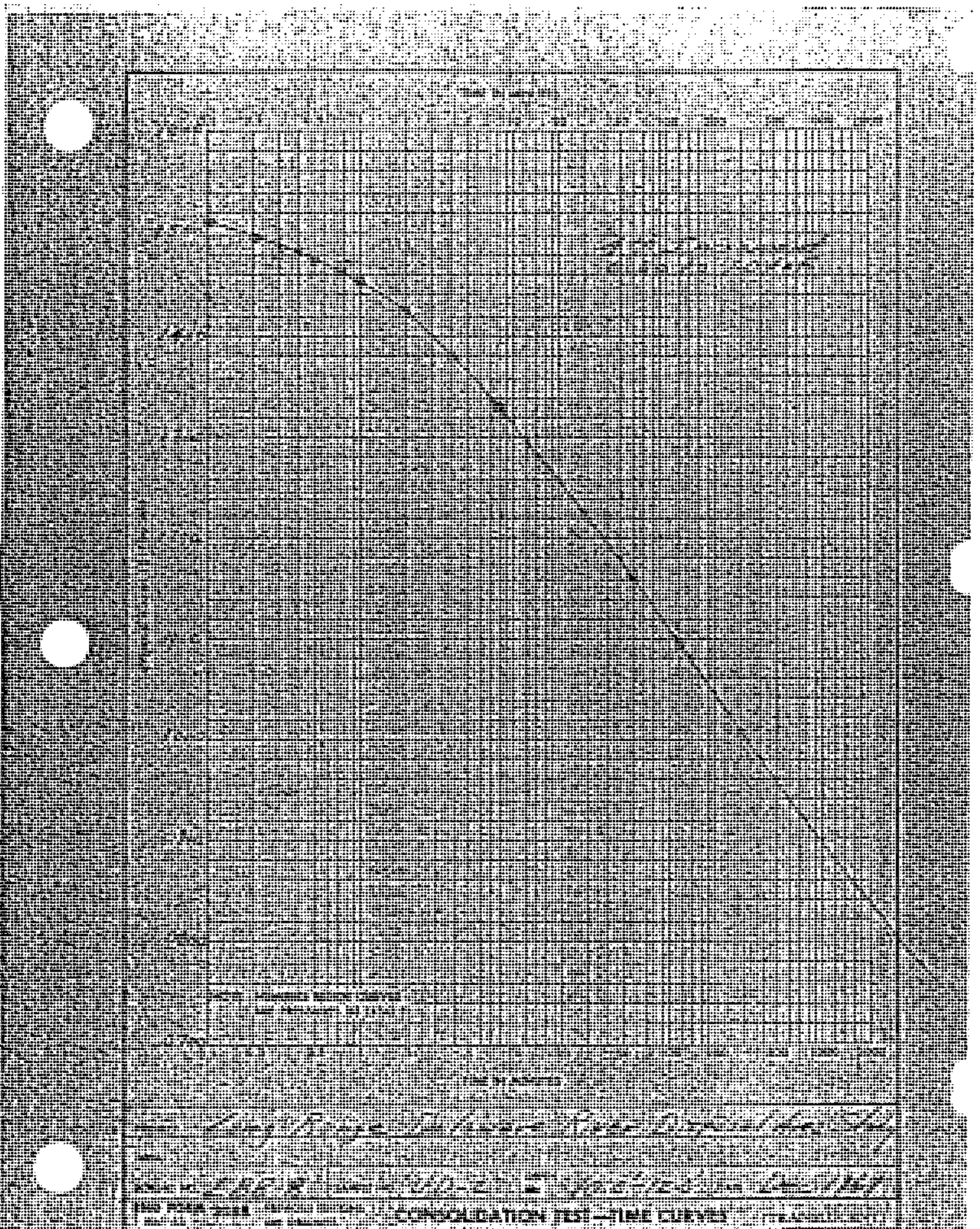


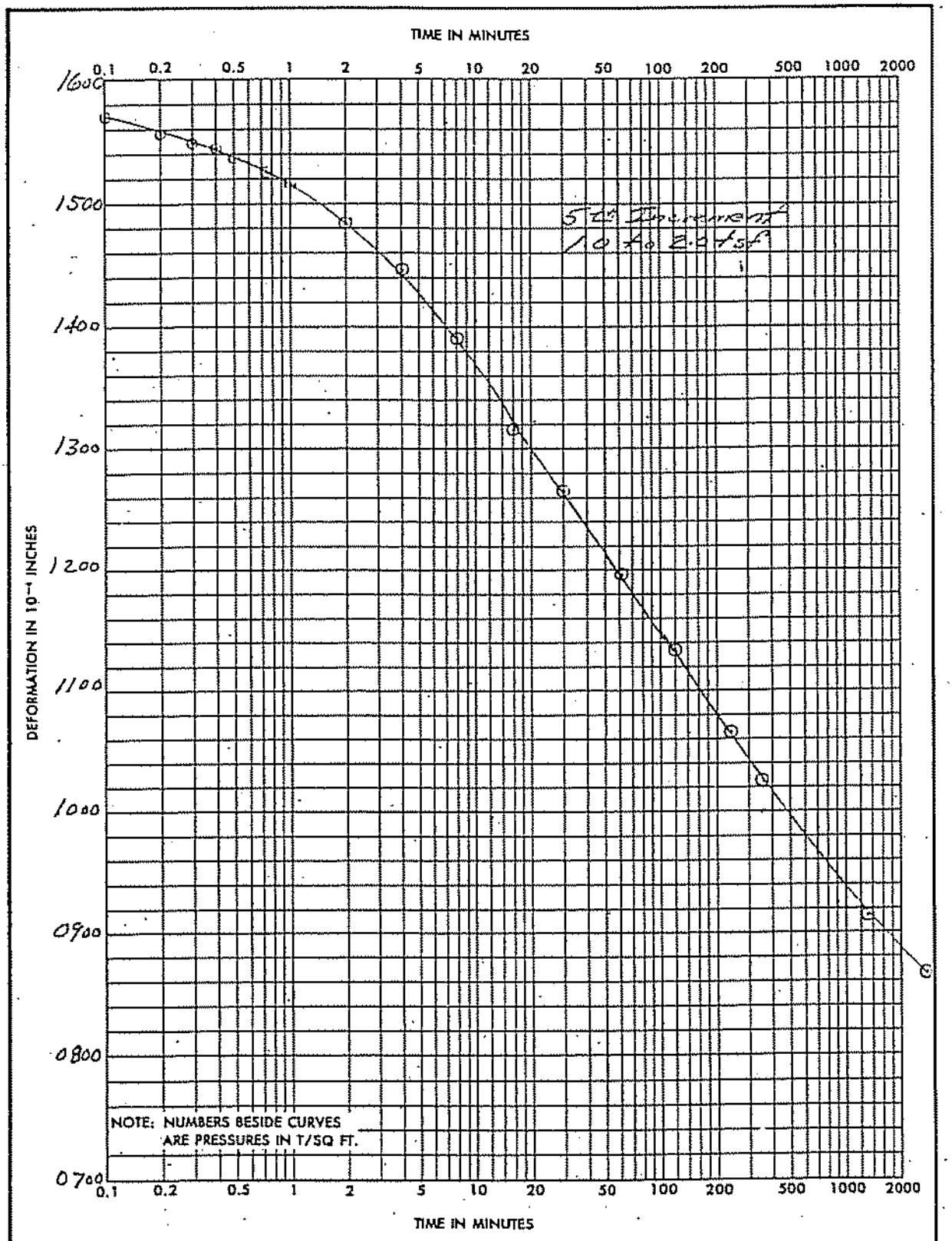
PROJECT Long Range Delaware River Disposal Area Study

AREA Edgemoor

BORING NO. EBB-8 | SAMPLE NO. UD-2 | DEPTH 10.0'-12.0' | DATE Dec. 1967

ENG FORM 2088 1 MAY 63 PREVIOUS EDITIONS ARE OBSOLETE. **CONSOLIDATION TEST—TIME CURVES** (TRANSLUCENT)



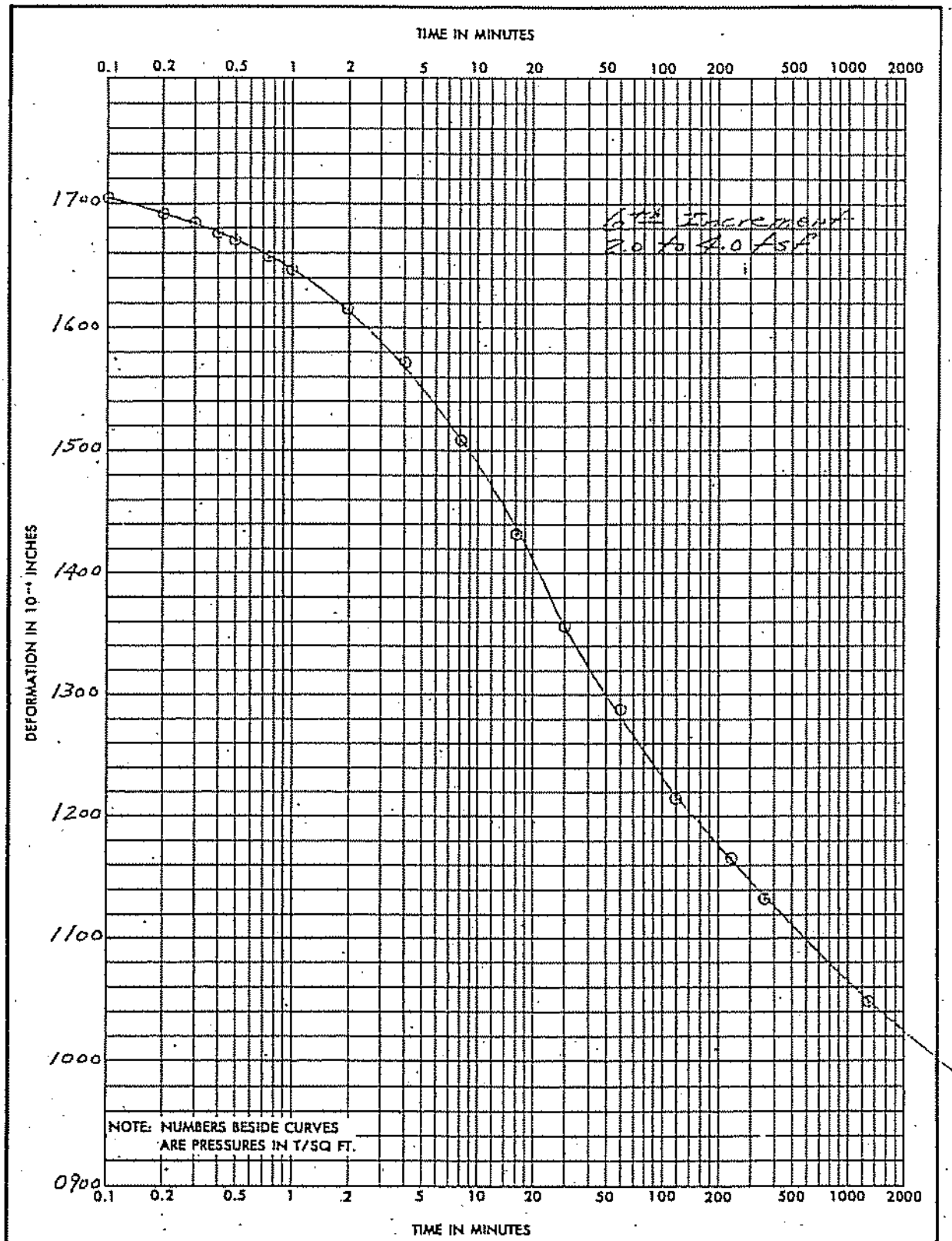


PROJECT Long Range Delaware River Disposal Area Study

AREA

BORING NO. EBR-8 | SAMPLE NO. UD-2 | DEPTH -EL- 10.0'-12.0' | DATE Dec. 1967

ENG FORM 2088 1 MAY 63 PREVIOUS EDITIONS ARE OBSOLETE. **CONSOLIDATION TEST—TIME CURVES** (TRANSLUCENT)



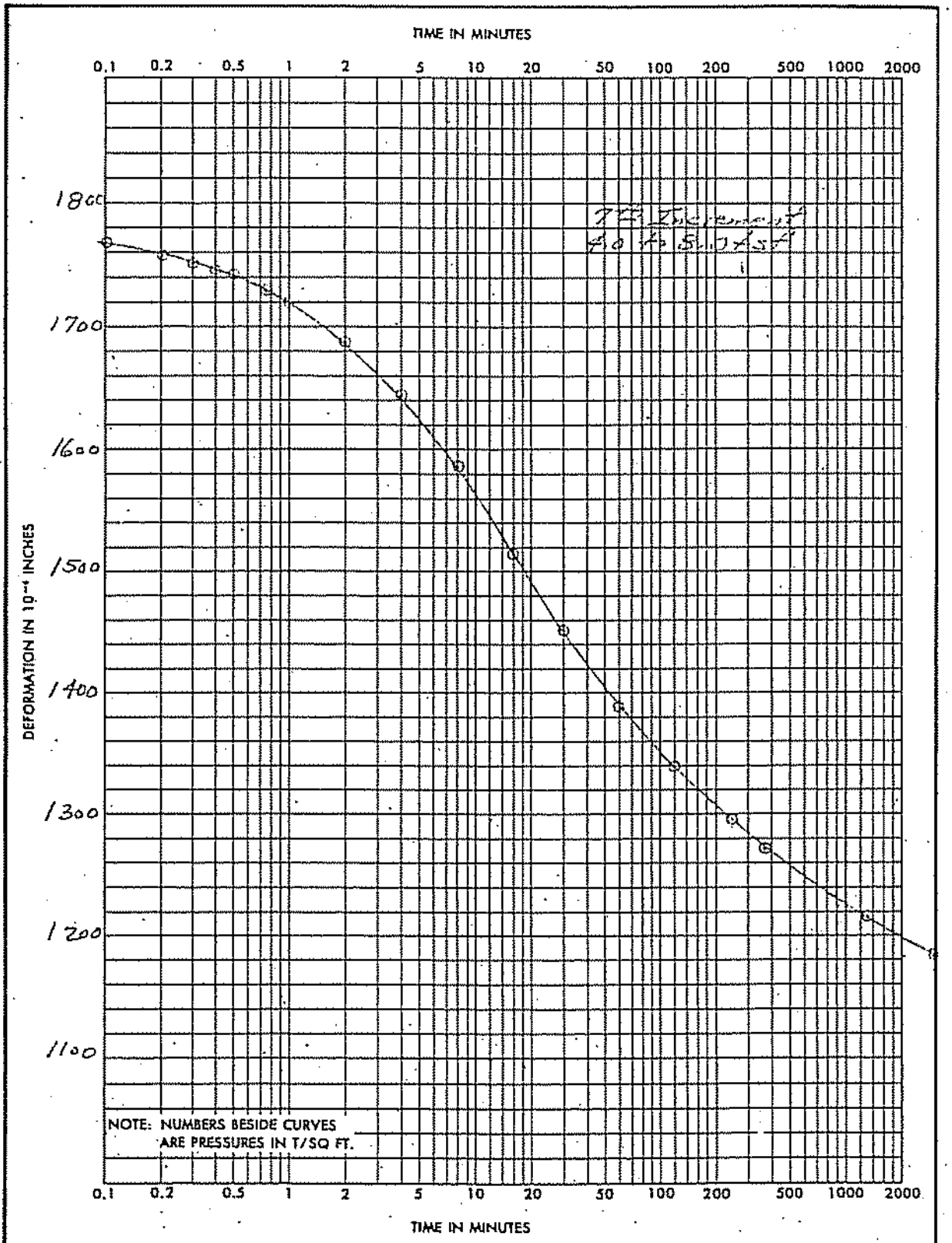
PROJECT Long Range Delaware River Disposal Area Study

AREA

BORING NO.	SAMPLE NO.	DEPTH ft	DATE
EBB-8	UD-2	10.0'–12.0'	Dec. 1967

ENG FORM 2088 1 MAY 63 PREVIOUS EDITIONS ARE OBSOLETE.

CONSOLIDATION TEST—TIME CURVES (TRANSLUCENT)



PROJECT Long Range Delaware River Disposal Area Study

AREA

BORING NO. EBB-8 | SAMPLE NO. UD-2 | DEPTH 10.0'-12.0' | DATE Dec. 1967

ENG FORM 2088 1 MAY 63 PREVIOUS EDITIONS ARE OBSOLETE.

CONSOLIDATION TEST—TIME CURVES (TRANSLUCENT)

Edgemoor

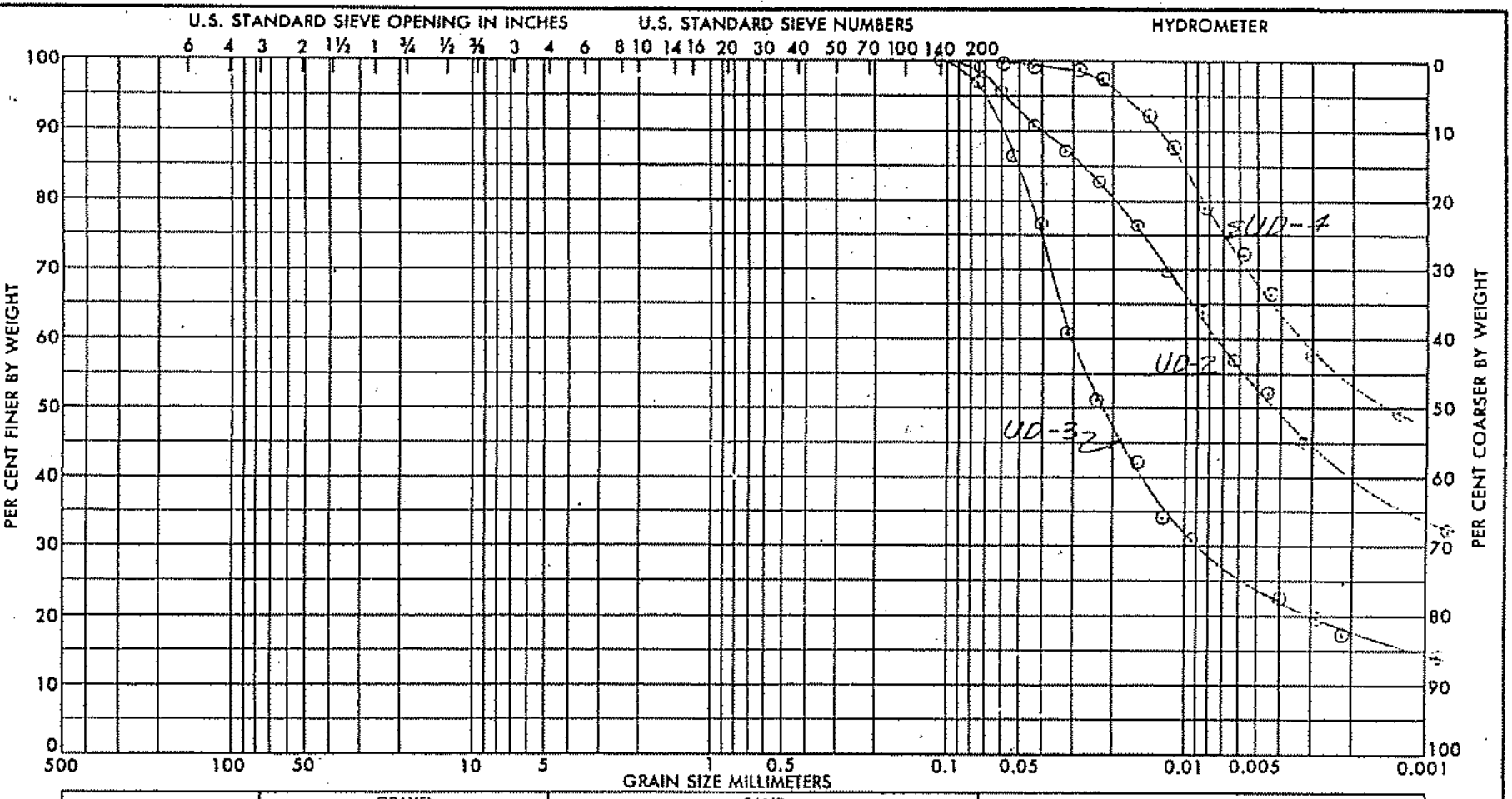
BORING NO. EBB-8
SAMPLE NO. UD-3
DEPTH: 16.0 to 18.0 ft.

PROJECT Delaware River Study
DATE October 1967
COMP. By WS CHK'D By RJS

LABORATORY LOG	DESCRIPTION	W, CAN NO.	TEST SAMPLES
SAMPLE DEPTH IN FEET / SAMPLE LENGTH IN INCHES	Dark gray micaceous organic SILT (OH) w/decayed vegetation		
	Dark gray micaceous organic SILT (OH) w/occ. hairline thick med. gray silty fine sand lenses	Hydr-1 G = 2.61 LL = 51 PL = 32 PI = 19	R-1, 2, &3 W_1 = 46.5 % W_2 = 44.4 % W_3 = 49.2 % Q-1, 2, &3 W_1 = 43.4 % W_2 = 47.9 % W_3 = 41.6 % W_n = 50.5 %

Length of Sample, L 22.13 in.
Weight of Tube and Wet Soil 15,000 g.
Weight of Tube 6,940 g.
Weight of Wet Soil, W 8,060 g.
Diameter of Tube, D 4.25 in.
Total Unit Weight, $\gamma_t = \frac{4.85\,W}{LD^2}$ 97.8 lbs/cu.ft.

LEGEND
W_n — Natural Water Content
MA — Mechanical Analysis
LL — Atterberg Limits
G — Specific Gravity
C — Consolidation
Q — Unconsolidated Undrained
γ_d — Dry Density
R — Consolidated Undrained



COBBLES	GRAVEL		SAND			SILT OR CLAY
	COARSE	FINE	COARSE	MEDIUM	FINE	

SAMPLE NO.	ELEV OR DEPTH	CLASSIFICATION	NAT W%	LL	PL	PI
UD-2	10.0'-12.0'	Organic CLAY (OH)		112	45	67
UD-3	16.0'-18.0'	Organic SILT (OH)		51	32	19
UD-4	22.0'-24.0'	Organic CLAY (OH)		128	50	78

GRADATION CURVES

PROJECT Long Range Delaware River Disposal Area

AREA

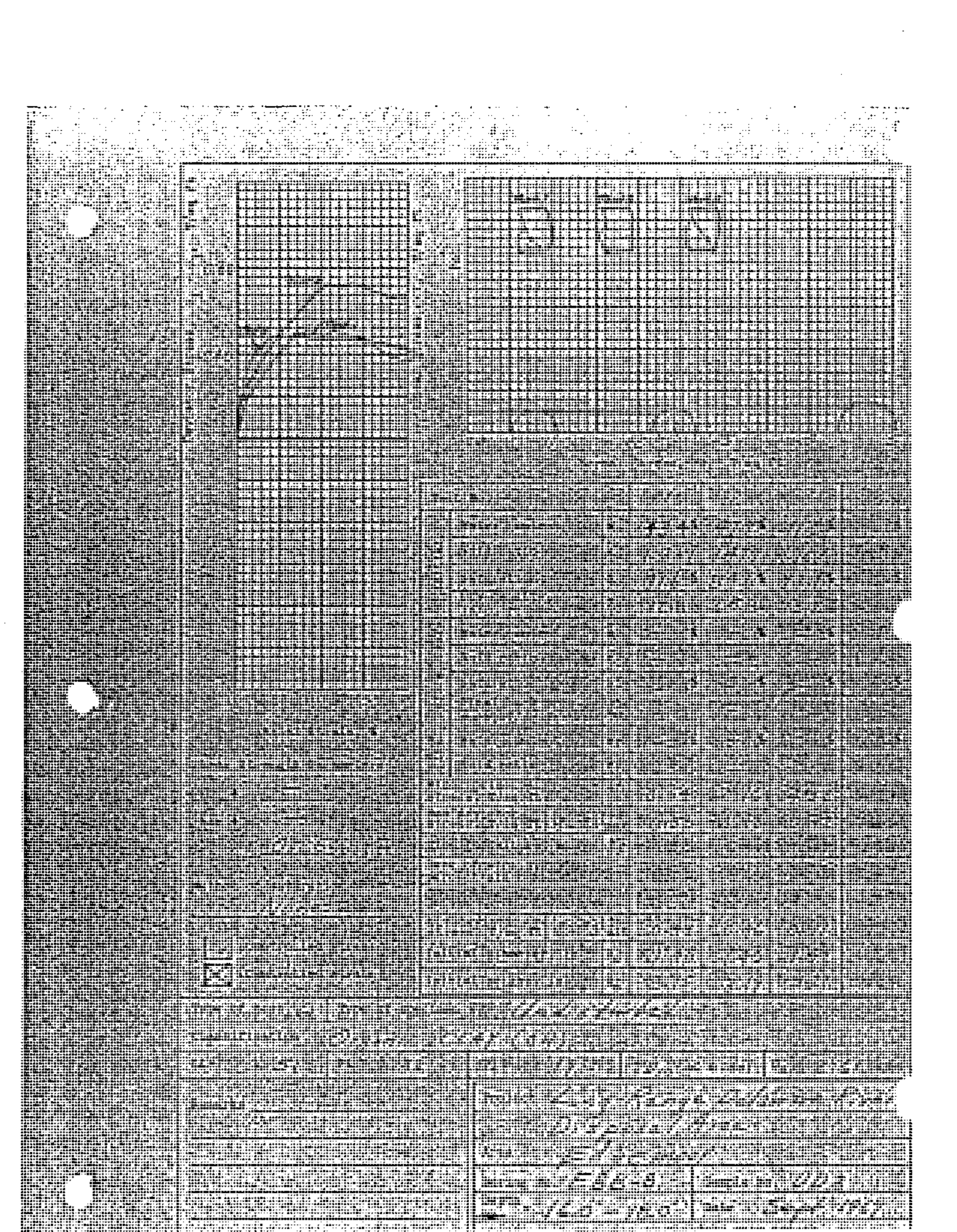
BORING NO. EBB-8

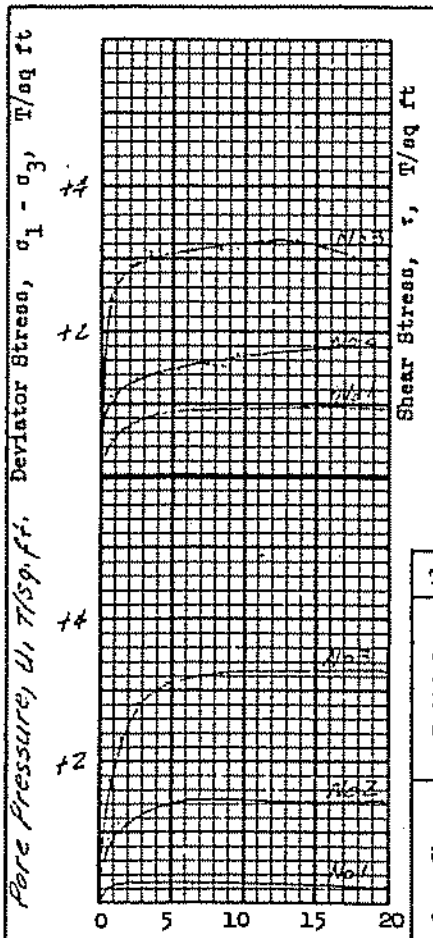
DATE Oct. 1967

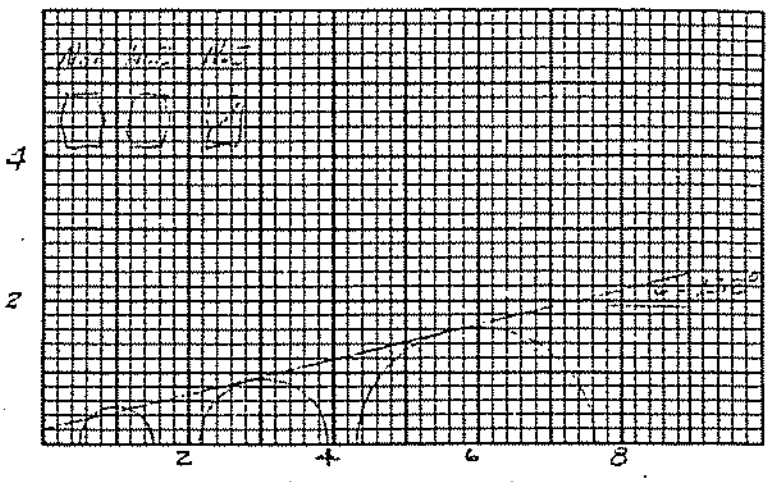
NG FORM 2087
MAY 63

REPLACES WES FORM NO. 1241, SEP 1962, WHICH IS OBSOLETE.

U.S. GOVERNMENT PRINTING OFFICE : 1963 OF—709-124







Test No.			1	2	3	
Initial	Water content	w_o	46.5 %	44.4 %	49.2 %	%
	Void ratio	e_o	1.310	1.252	1.413	
	Saturation	S_o	92.6 %	92.5 %	90.8 %	%
	Dry density, lb/cu ft	γ_d	70.5	70.5	67.5	
Before Shear	Water content	w_c	42.5 %	37.6 %	31.4 %	%
	Void ratio	e_c	1.108	0.980	0.818	
	Saturation	S_c	100 %	100 %	100 %	%
	Final back pressure, T/sq ft	u_o	7.20	7.20	7.20	
Final	Water content	w_f	42.5 %	37.6 %	31.4 %	%
	Void ratio	e_f	1.108	0.980	0.818	
Minor principal stress, T/sq ft		σ_3	0.54	2.16	4.32	
Max deviator stress, T/sq ft		$(\sigma_1-\sigma_3)_{max}$	0.98	1.77 *	3.27	
Time to failure, min		t_f	83.0	83.5	64.6	
Rate of strain, percent/min			0.18	0.18	0.19	
Pore Pressure T/sq.ft.		U	+0.22	+1.94 *	+3.24	
Ult deviator stress, T/sq ft		$(\sigma_1-\sigma_3)_{ult}$	—	—	3.19	
Initial diameter, in.		D_o	1.40	1.40	1.40	
Initial height, in.		H_o	3.17	3.15	3.17	

Shear Strength Parameters

ϕ = 13.2 °

tan ϕ = 0.235

c = 0.25 T/sq ft

Method of saturation Back pressure

☐ Controlled stress

☒ Controlled strain

Type of test R | Type of specimen Undisturbed

Classification Organic CLAY (OH)

LL	PL	PI	D_{10}	G_s
51	32	19	<0.001	2.61

Remarks *Stress @ 15% Strain

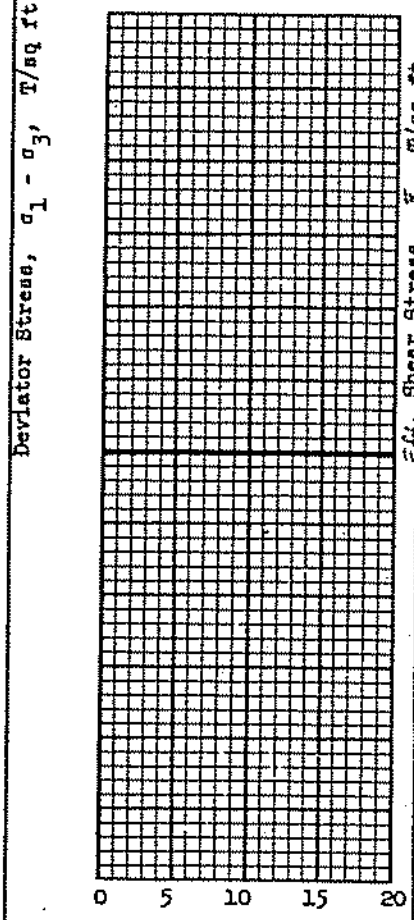
Project Delaware River Disposal Area Study

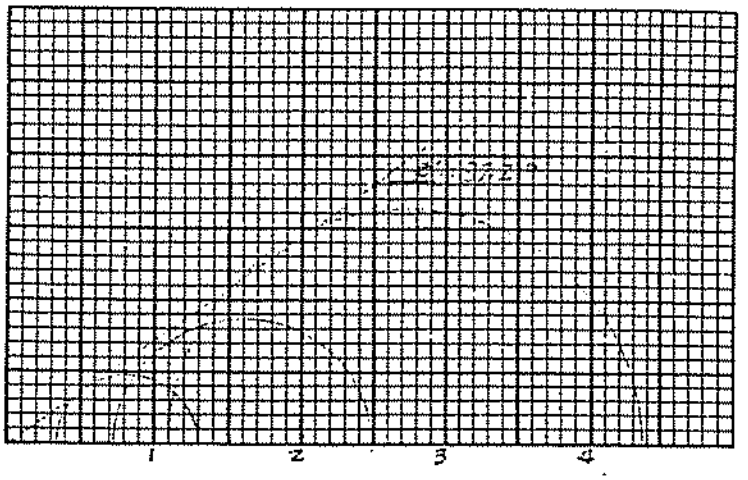
Area Edgemoor Disposal Area

Boring No. EBS-8 | Sample No. UD-3

Depth 16.0'-18.0' | Date Oct. 1967

TRIAXIAL COMPRESSION TEST REPORT





Shear Strength Parameters

ϕ = 37.2 °

tan ϕ = 0.760

c = 0 T/sq ft

Method of saturation Back pressure

☐ Controlled stress

☒ Controlled strain

Test No.			1	2	3	
Initial	Water content	w_o	%	%	%	%
	Void ratio	e_o				
	Saturation	S_o	%	%	%	%
	Dry density, lb/cu ft	γ_d				
Before Shear	Water content	w_c	%	%	%	
	Void ratio	e_c				
	Saturation	S_c	%	%	%	%
	Final back pressure, T/sq ft	u_o				
Final	Water content	w_f	%	%	%	%
	Void ratio	e_f				
Minor principal stress, T/sq ft Eff		$\bar{\sigma}_3$	0.32	0.72*	1.08	
Max deviator stress, T/sq ft		$(\sigma_1-\sigma_3)_{max}$				
Time to failure, min		t_f				
Rate of strain, percent/min						
Major Principal Stress, T/sq ft. Eff		$\bar{\sigma}_1$	1.30	2.49*	4.36	
Ult deviator stress, T/sq ft		$(\sigma_1-\sigma_3)_{ult}$				
Initial diameter, in.		D_o				
Initial height, in.		H_o				

Type of test $\bar{R}$ | Type of specimen Undisturbed

Classification Organic CLAY (OH)

LL	PL	PI	D10	G_s
51	32	19	<0.001	2.61

Remarks *Stress @ 15% strain. See Sheet 1 of 2 for other data.

Project Delaware River Disposal Area Study

Area Edgemoor Disposal Area

Boring No. EBB-8 | Sample No. UD-3

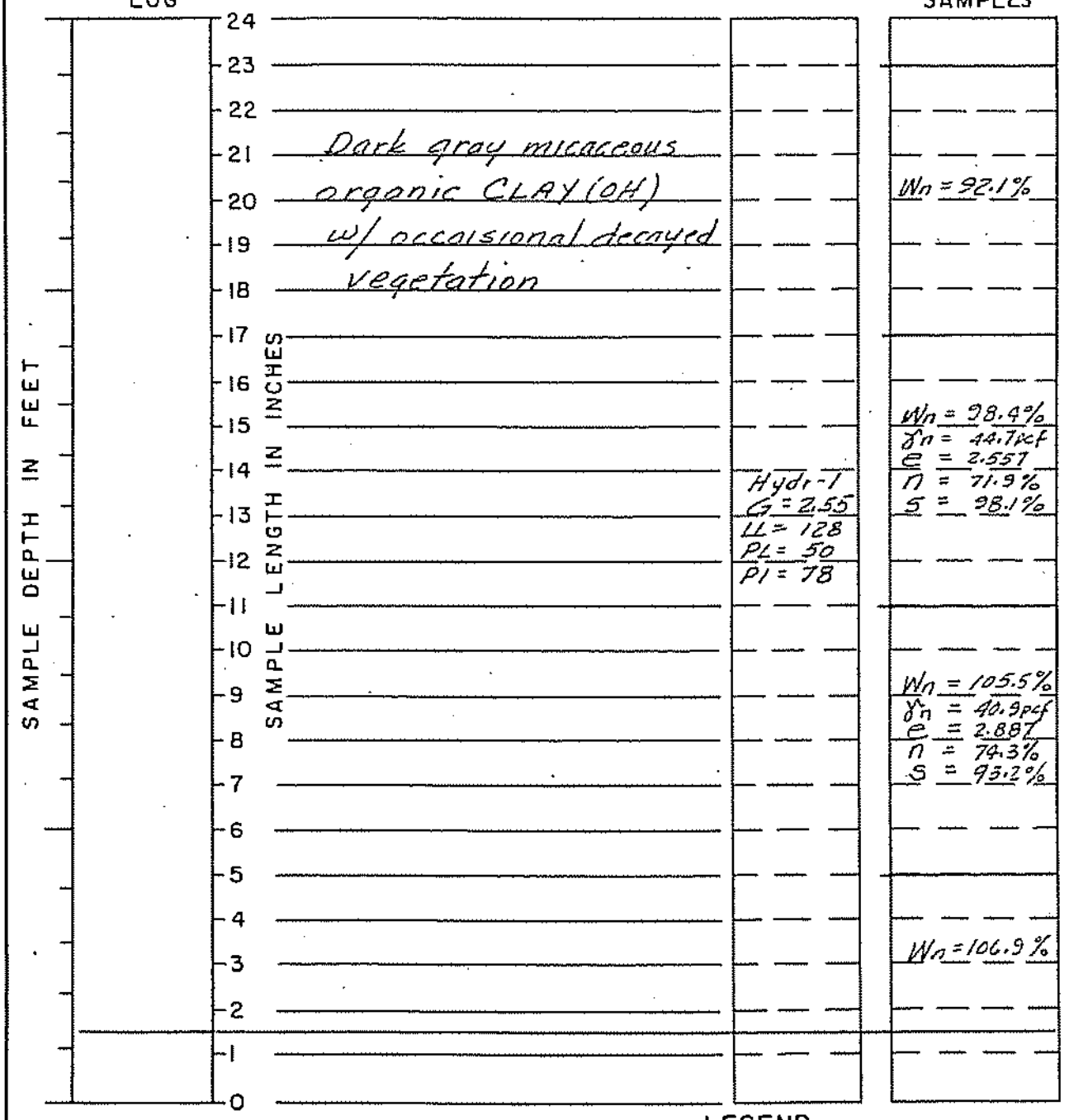
Depth 16.0'-18.0' | Date Oct. 1967

TRIAXIAL COMPRESSION TEST REPORT

Edgemoor

BORING NO. EBB-8
SAMPLE NO. UD-4
DEPTH: 22.0 to 24.0 ft.

PROJECT Delaware River Study
DATE October 1967
COMP. By WS CHK'D By RJS



Length of Sample, L 22.44 in.
Weight of Tube and Wet Soil 14,175 g.
Weight of Tube 6,925 g.
Weight of Wet Soil, W 7,250 g.
Diameter of Tube, D 4.25 in.
Total Unit Weight, $\gamma_t = \frac{4.85\,W}{LD^2}$ 86.8 lbs/cu.ft.

LEGEND

W_n — Natural Water Content
MA — Mechanical Analysis
LL — Atterberg Limits
G — Specific Gravity
C — Consolidation
Q — Unconsolidated Undrained
γ_d — Dry Density
R — Consolidated Undrained

Edgemoor

BORING NO. EBB-8
SAMPLE NO. UD-5
DEPTH: 28.0 to 30.0 ft.

PROJECT Delaware River Study
DATE October 1967
COMP. By WS CHK'D By RJS

LABORATORY LOG	DESCRIPTION	W, CAN NO.	TEST SAMPLES
	Alternating strata of dark gray micaceous organic CLAY (OH) (1/16 to 1 1/4" thick) and med-gray micaceous organic sandy SILT (OH) (1/2" to 1/4" thick)		W_o = 64.4%
			W_n = 69.1% γ_n = 58.0 pcf e = 1.644 n = 62.2% S = 100 %
	Dark gray micaceous organic CLAY (OH)	Hydr-1 G = 2.46 LL = 109 PL = 43 PI = 66	W_n = 85.9% γ_n = 49.2 pcf e = 2.118 n = 67.9% S = 99.8 %
			W_n = 85.3% γ_n = 49.0 pcf e = 2.131 n = 68.1 % S = 98.4 %
			W_n = 84.1%

SAMPLE DEPTH IN FEET

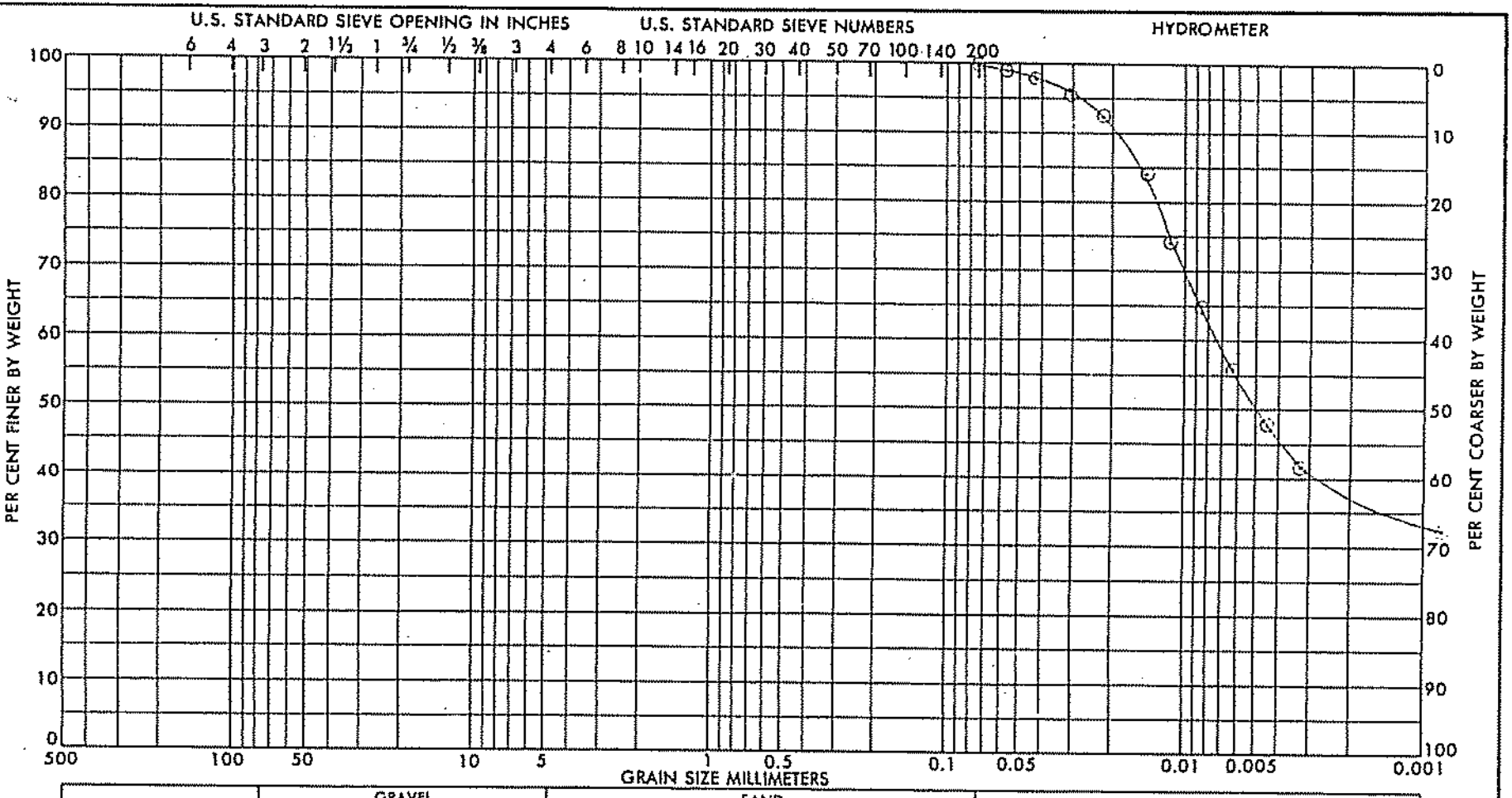
SAMPLE LENGTH IN INCHES

Bottom of sample

Length of Sample, L 23.97 in.
Weight of Tube and Wet Soil 15,425 g.
Weight of Tube 6,975 g.
Weight of Wet Soil, W 8,450 g.
Diameter of Tube, D 4.25 in.
Total Unit Weight, $\gamma_t = \frac{4.85\,W}{L\,D^2}$ 94.8 lbs/cu.ft.

LEGEND

W_n — Natural Water Content
MA — Mechanical Analysis
LL — Atterberg Limits
G — Specific Gravity
C — Consolidation
Q — Unconsolidated Undrained
γ_d — Dry Density
R — Consolidated Undrained



SAMPLE NO.	ELEV OR DEPTH	CLASSIFICATION	NAT W%	LL	PL	PI
UD-5	28.0'-30.0'	Organic CLAY (OH)		109	43	66

GRADATION CURVES

PROJECT Long Range Delaware River Disposal Area

AREA

BORING NO. EBB-8

DATE Oct. 1967

NG FORM 2087 MAY 63

REPLACES WES FORM NO. 1241, SEP 1962, WHICH IS OBSOLETE. (TRANSLUCENT)

U.S. GOVERNMENT PRINTING OFFICE : 1965 OF—708-126

BORING NO. EBB-9
SAMPLE NO. UD-1
DEPTH: 4.0 to 6.0 ft.

PROJECT Edgemoor Delaware River Study
DATE October 1967
COMP. By WS CHK'D By RJS

LABORATORY LOG	DESCRIPTION	W, CAN NO.	TEST SAMPLES
	Grayish-brown micaceous organic CLAY (OH) with partially decayed vegetation	Hydr-1	W_n = 95.1 %
		G = 2.53	
		LL = 116	W_n = 91.9 %
		PL = 50	γ_n = 45.4 pcf
		PI = 66	e = 2.477
			n = 71.2 %
			S = 93.9 %
	Gray-brown micaceous clayey SILT (OH) with high percentage of partially decayed vegetation		W_n = 84.1 %
	Bottom of sample		

SAMPLE DEPTH IN FEET

SAMPLE LENGTH IN INCHES

Length of Sample, L 7.72 in.
Weight of Tube and Wet Soil 9575 g.
Weight of Tube 7025 g.
Weight of Wet Soil, W 2550 g.
Diameter of Tube, D 4.25 in.
Total Unit Weight, $\gamma_t = \frac{4.85\,W}{LD^2}$ 88.7 lbs/cu.ft.

LEGEND
W_n — Natural Water Content
MA — Mechanical Analysis
LL — Atterberg Limits
G — Specific Gravity
C — Consolidation
Q — Unconsolidated Undrained
γ_d — Dry Density
R — Consolidated Undrained

Edgemoor

BORING NO. EBB-9
SAMPLE NO. UD-2
DEPTH: 12.0 to 14.0 ft.

PROJECT Delaware River Study
DATE October 1967
COMP. By WS CHK'D By RJS

LABORATORY LOG	DESCRIPTION	W, CAN NO.	TEST SAMPLES
	Dark grayish-brown organic Sandy CLAY (OL)		
	Stratified, med-gray, dark gray & yellowish brown layers of organic SILT (OH), micaceous with trace of fine and coarse Sand and hairline lenses of organic CLAY (OH) Silt lenses vary from hair line to ½" thick		C-1 W_n = 65.9 %
		G = 2.54 Hydr-1 LL = 89 PL = 49 PI = 40	R-1 W_{n1} = 78.7 % R-2 W_{n2} = 76.6 % R-3 W_{n3} = 75.7 %
			Q-1 W_{n1} = 82.1 % Q-2 W_{n2} = 88.4 % Q-3 W_{n3} = 81.5 %

SAMPLE DEPTH IN FEET

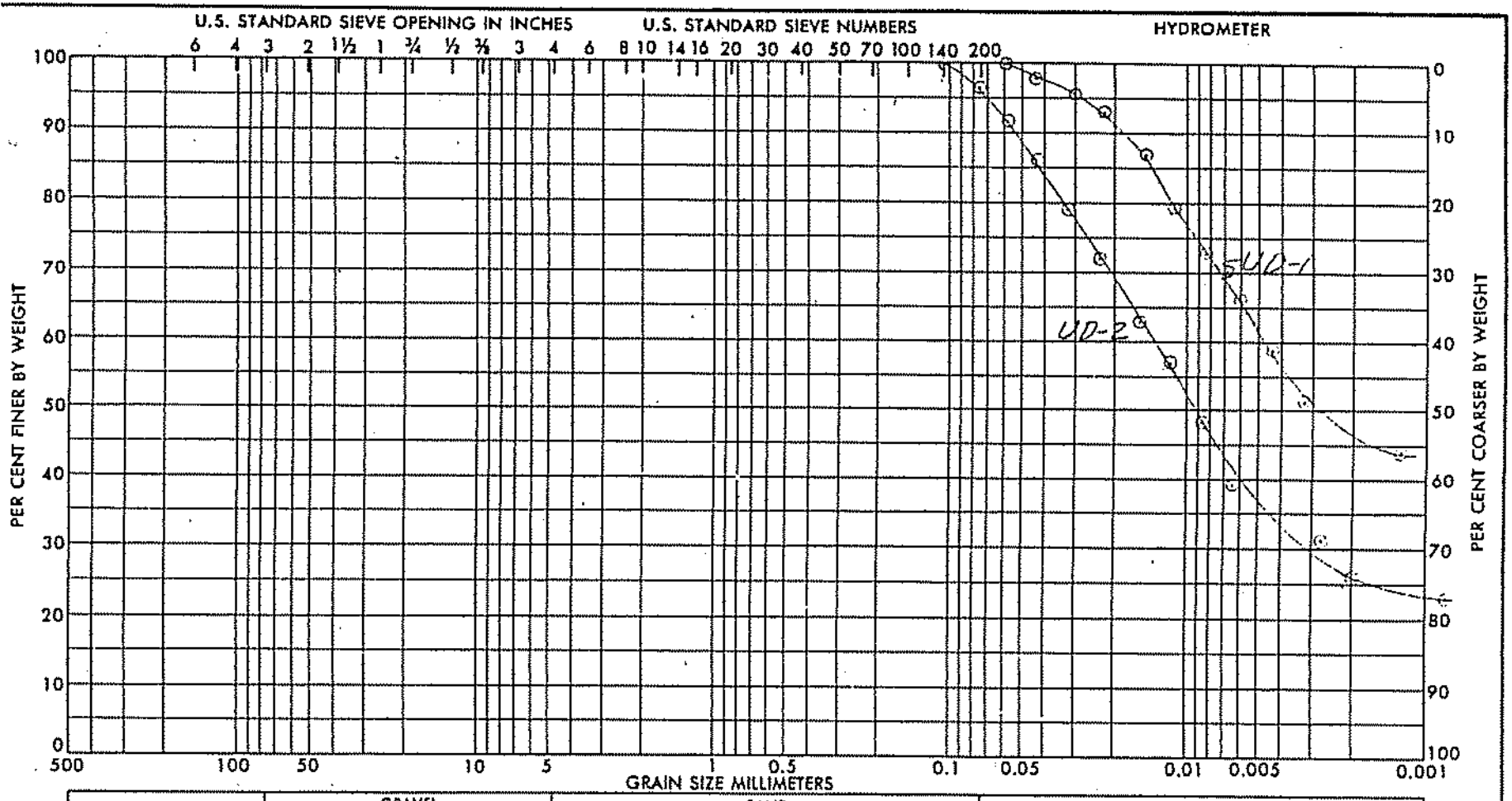
SAMPLE LENGTH IN INCHES

24 23 22 21 20 19 18 17 16 15 14 13 12 11 10 9 8 7 6 5 4 3 2 1 0

Length of Sample, L 24.25 in.
Weight of Tube and Wet Soil 16,220 g.
Weight of Tube 6,980 g.
Weight of Wet Soil, W 9,240 g.
Diameter of Tube, D 4.25 in.
Total Unit Weight, $\gamma_t = \frac{4.85\,W}{LD^2}$ 102.3 lbs/cu.ft.

LEGEND

W_n — Natural Water Content
MA — Mechanical Analysis
LL — Atterberg Limits
G — Specific Gravity
C — Consolidation
Q — Unconsolidated Undrained
γ_d — Dry Density
R — Consolidated Undrained



SAMPLE NO.	ELEV OR DEPTH	CLASSIFICATION	NAT W%	LL	PL	PI
UD-1	4.0'-6.0'	Organic CLAY (OH)		116	50	66
UD-2	12.0'-14.0'	Organic CLAY (OH)		89	49	40

GRADATION CURVES

PROJECT Long Range Delaware River Disposal Area

AREA Edgemoor

BORING NO. EBB-9

DATE Oct. 1967

NG FORM 2087
MAY 63

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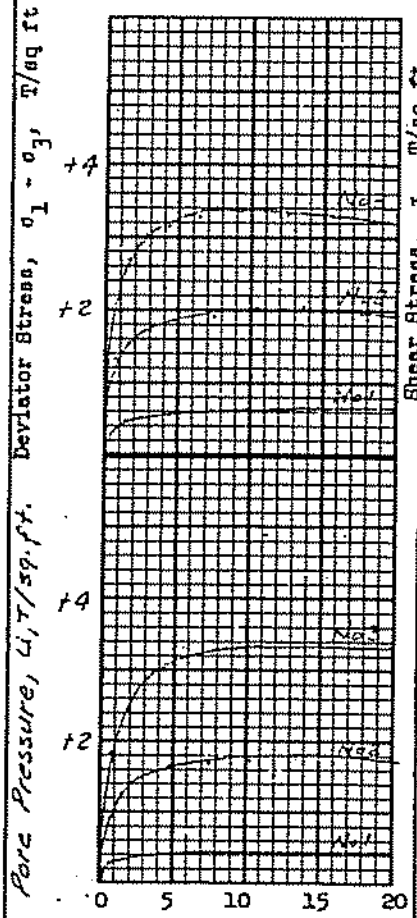
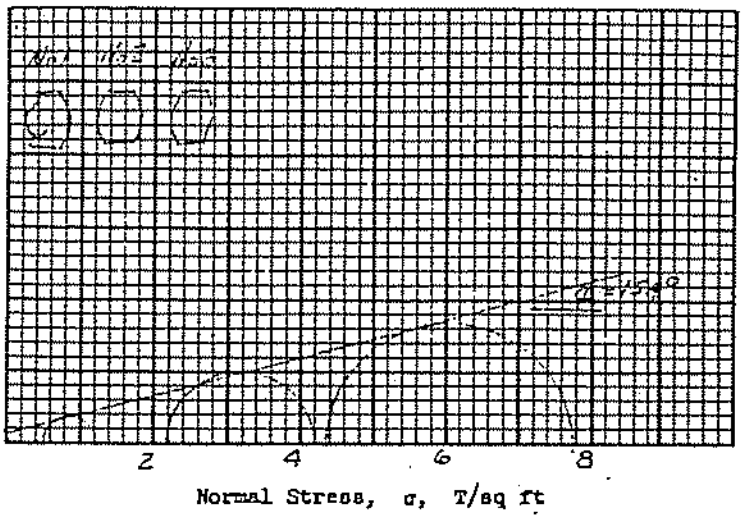
U.S. GOVERNMENT PRINTING OFFICE : 1963 O—709-126





Test No.			1	2	3	
Initial	Water content	w_o	78.7 %	76.6 %	75.7 %	%
	Void ratio	e_o	2.149	2.121	2.082	
	Saturation	S_o	94.1 %	92.8 %	93.4 %	%
	Dry density, lb/cu ft	γ_d	50.9	51.4	52.0	
Before Shear	Water content	w_c	71.7 %	57.8 %	50.1 %	
	Void ratio	e_c	1.842	1.486	1.288	
	Saturation	S_c	100 %	100 %	100 %	%
	Final back pressure, T/sq ft	u_o	7.20	7.20	7.20	
Final	Water content	w_f	71.7 %	57.8 %	50.1 %	%
	Void ratio	e_f	1.842	1.486	1.288	
Minor principal stress, T/sq ft		σ_3	0.54	2.16	4.32	
Max deviator stress, T/sq ft	$(\sigma_1-\sigma_3)_{max}$		0.65*	2.04	3.42	
Time to failure, min		t_f	84.3	55.4	40.6	
Rate of strain, percent/min			0.18	0.18	0.19	
Pore Pressure T/sq.ft.		u	+0.44*	+1.78	+3.31	
Ult deviator stress, T/sq ft	$(\sigma_1-\sigma_3)_{ult}$		—	2.04	3.36	
Initial diameter, in.		D_o	1.40	1.40	1.41	
Initial height, in.		H_o	3.15	3.17	3.15	

Shear Strength Parameters

ϕ = 15.4 °

tan ϕ = 0.275

c = 0.15 T/sq ft

Method of saturation Backpressure

☐ Controlled stress

☒ Controlled strain

Type of test R | Type of specimen Undisturbed

Classification Organic SILT (OH)

LL 89 | PL 49 | PI 40 | D_{10} < 0.001 | G_s 2.54

Remarks *Stress @ 15% Strain

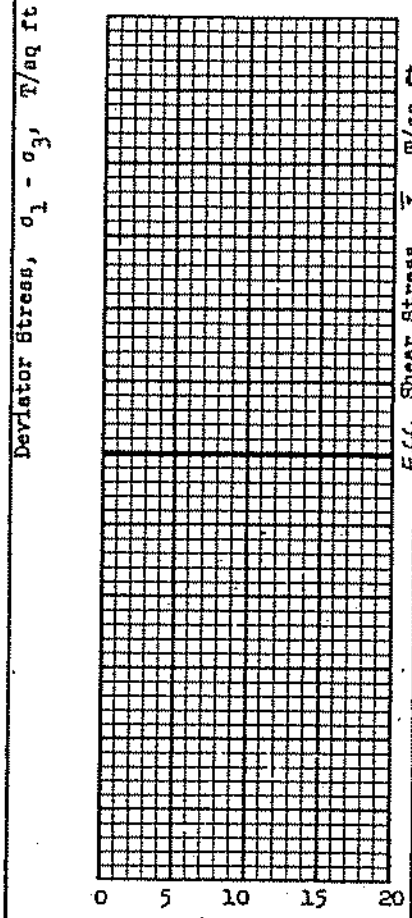
Project Delaware River Disposal Area Study

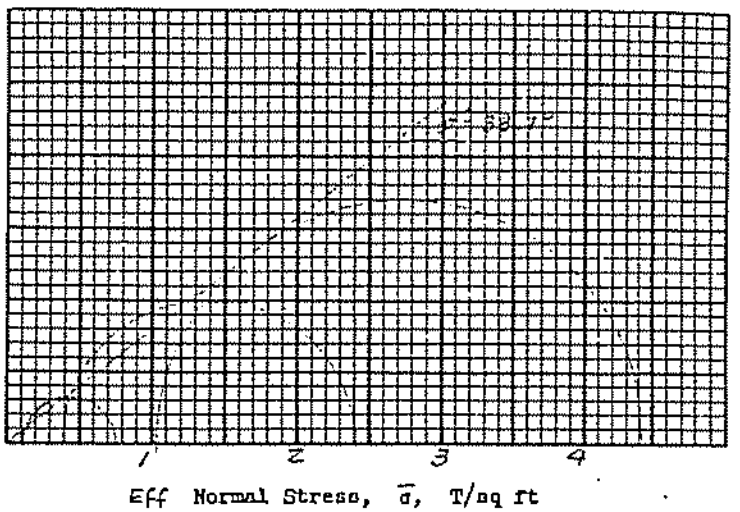
Area Edgemoor Disposal Area

Boring No. EBB-5 | Sample No. UD-2

Depth ft 12.0'-14.0' | Date Oct. 1967

TRIAXIAL COMPRESSION TEST REPORT





Test No.			1	2	3	
Initial	Water content	w_o	%	%	%	%
	Void ratio	e_o				
	Saturation	S_o	%	%	%	%
	Dry density, lb/cu ft	γ_d				
Before Shear	Water content	w_c	%	%	%	%
	Void ratio	e_c				
	Saturation	S_c	%	%	%	%
	Final back pressure, T/sq ft	u_o				
Final	Water content	w_f	%	%	%	%
	Void ratio	e_f				
Minor principal stress, T/sq ft Eff.		$\bar{\sigma}_3$	0.10 *	0.38	1.01	
Max deviator stress, T/sq ft		$(\sigma_1-\sigma_3)_{max}$				
Time to failure, min		t_f				
Rate of strain, percent/min						
Major Principal Stress, T/sq ft Eff.		$\bar{\sigma}_1$	0.75 *	2.42	4.43	
Ult deviator stress, T/sq ft		$(\sigma_1-\sigma_3)_{ult}$				
Initial diameter, in.		D_o				
Initial height, in.		H_o				

Shear Strength Parameters

$\phi' =$ 38.7 °

$\tan \phi' =$ 0.800

$c' =$ 0 T/sq ft

Method of saturation Back pressure

☐ Controlled stress

☒ Controlled strain

Type of test $\bar{R}$ | Type of specimen Undisturbed.

Classification Organic SILT (OH)

LL 89 | PL 49 | PI 40 | D_{10} <0.001 | G_s 2.54

Remarks * Stress @ 15% Strain
See Sheet 1 of 2 for other data.

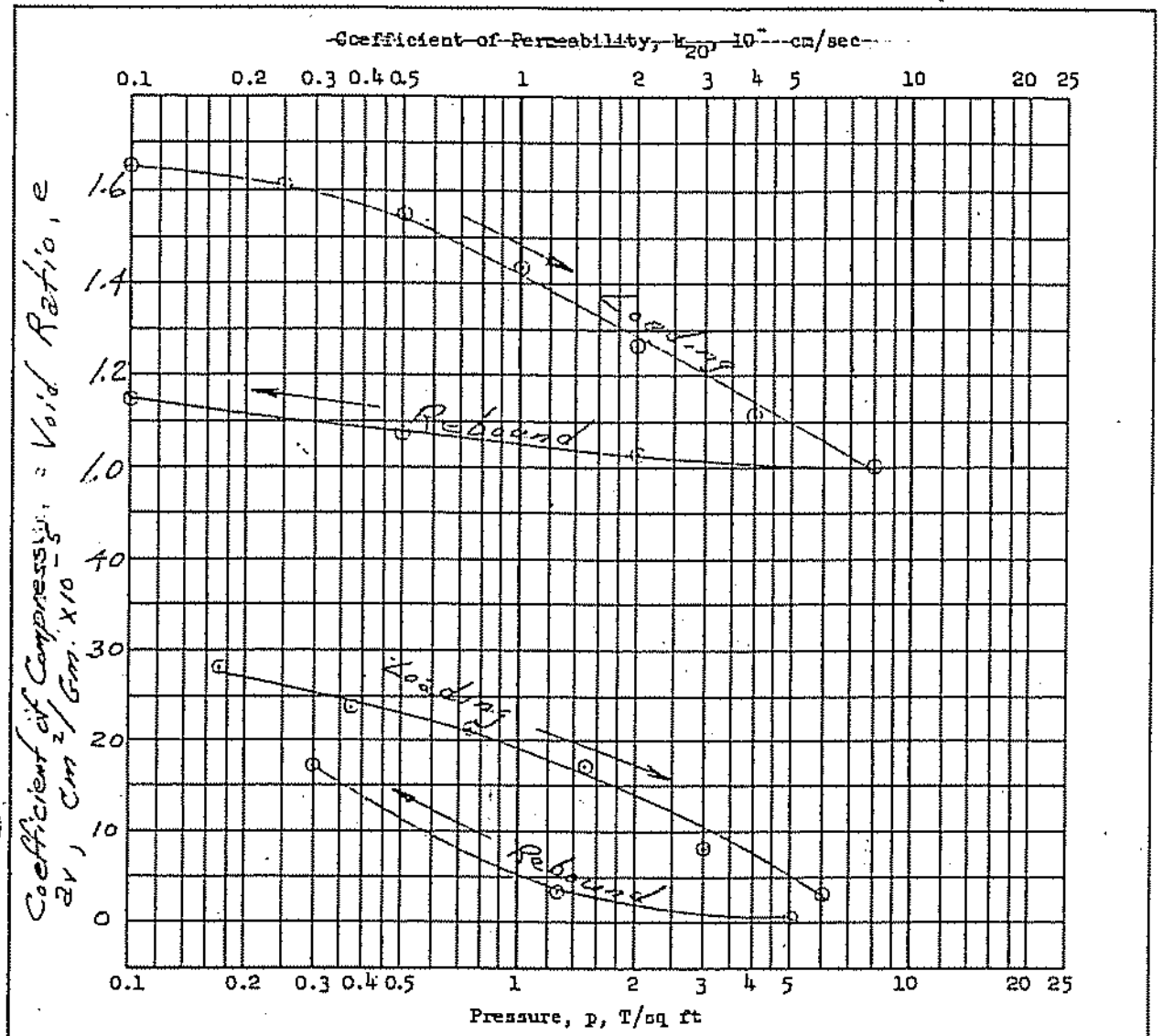
Project Delaware River Disposal Area Study

Area Edgemoor Disposal Area

Boring No. EBB-9 | Sample No. UD-2

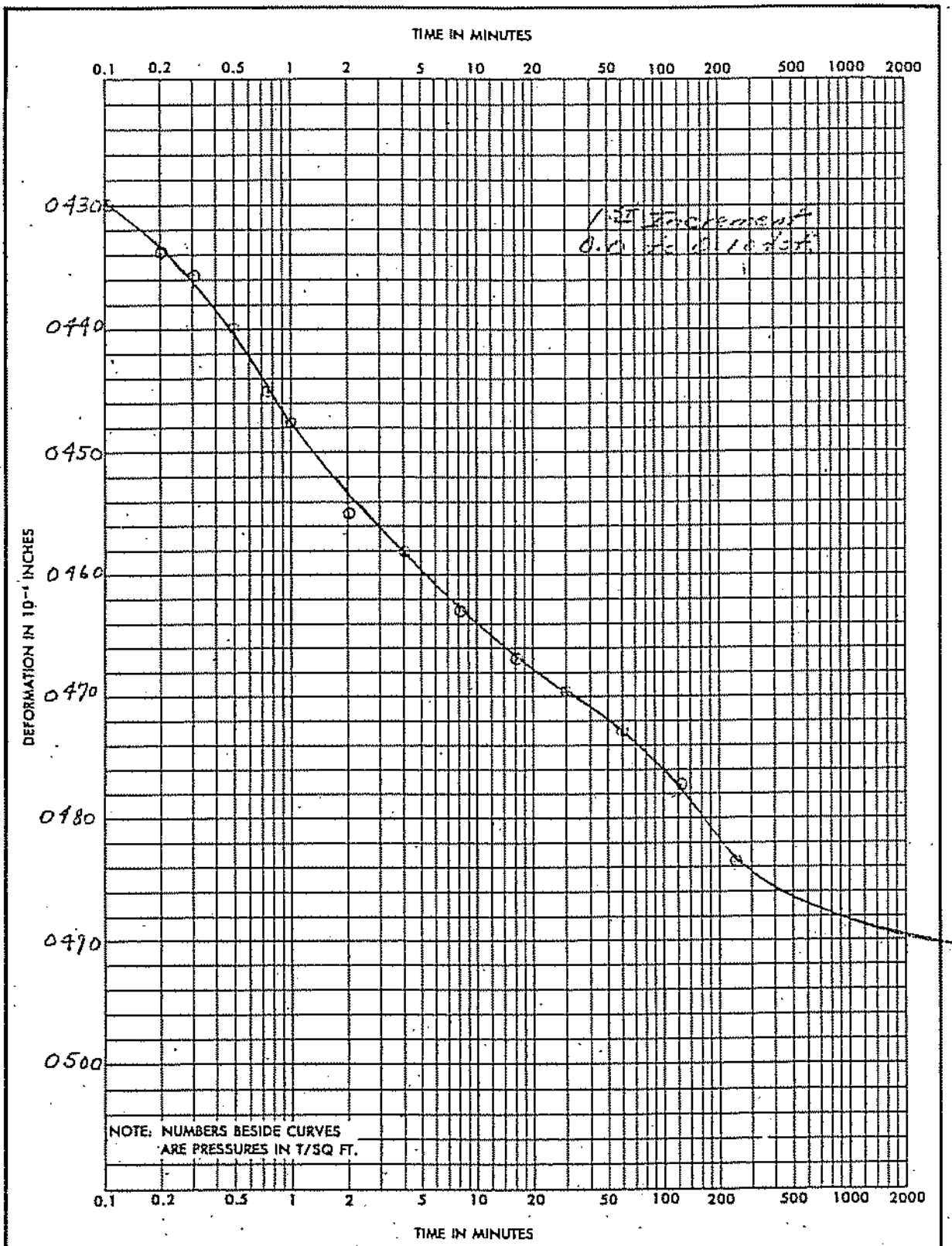
Depth 12.0'-14.0' | Date Oct. 1967

TRIAXIAL COMPRESSION TEST REPORT



Type of Specimen Undisturbed		Before Test		After Test	
Diam 3.0 in.	Ht 0.75 in.	Water Content, w_o	65.9 %	w_f	43.9 %
Overburden Pressure, p_o 0.33 T/sq ft		Void Ratio, e_o	1.681	e_f	1.145
Preconsol. Pressure, p_c 0.45 T/sq ft		Saturation, S_o	99.6 %	S_f	100+ %
Compression Index, C_c 0.48		Dry Density, γ_d	59.1 lb/ft³		
Classification Organic SILT (OH)		k_{20} at e_o =	x 10^{-} cm/sec		
LL 89	G_s 2.54	Project Long Range Delaware River Disposal Area			
PL 49	D_{10} <0.001				
Remarks		Area Edgemoor			
		Boring No. EBB-9	Sample No. UD-2		
		Depth 12.0' – 14.0'	Date Oct. 1967		

CONSOLIDATION TEST REPORT



PROJECT Long Range Delaware River Disposal Area Study

AREA Edgemoor

BORING NO.	SAMPLE NO.	DEPTH	DATE
EBB-9	UD-2	12.0'–14.0'	Dec. 1967

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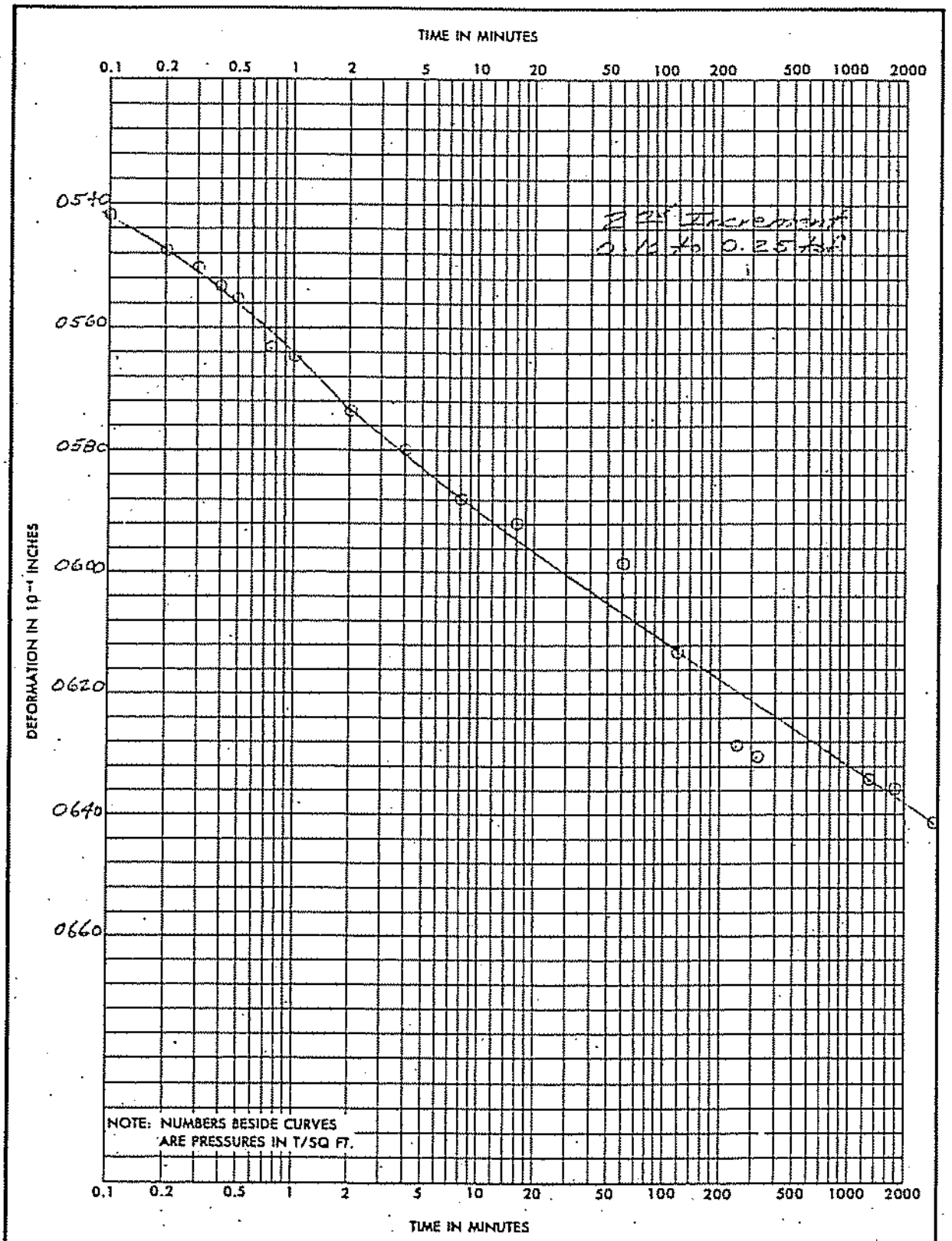
CONSOLIDATION TEST—TIME CURVES (TRANSLUCENT)



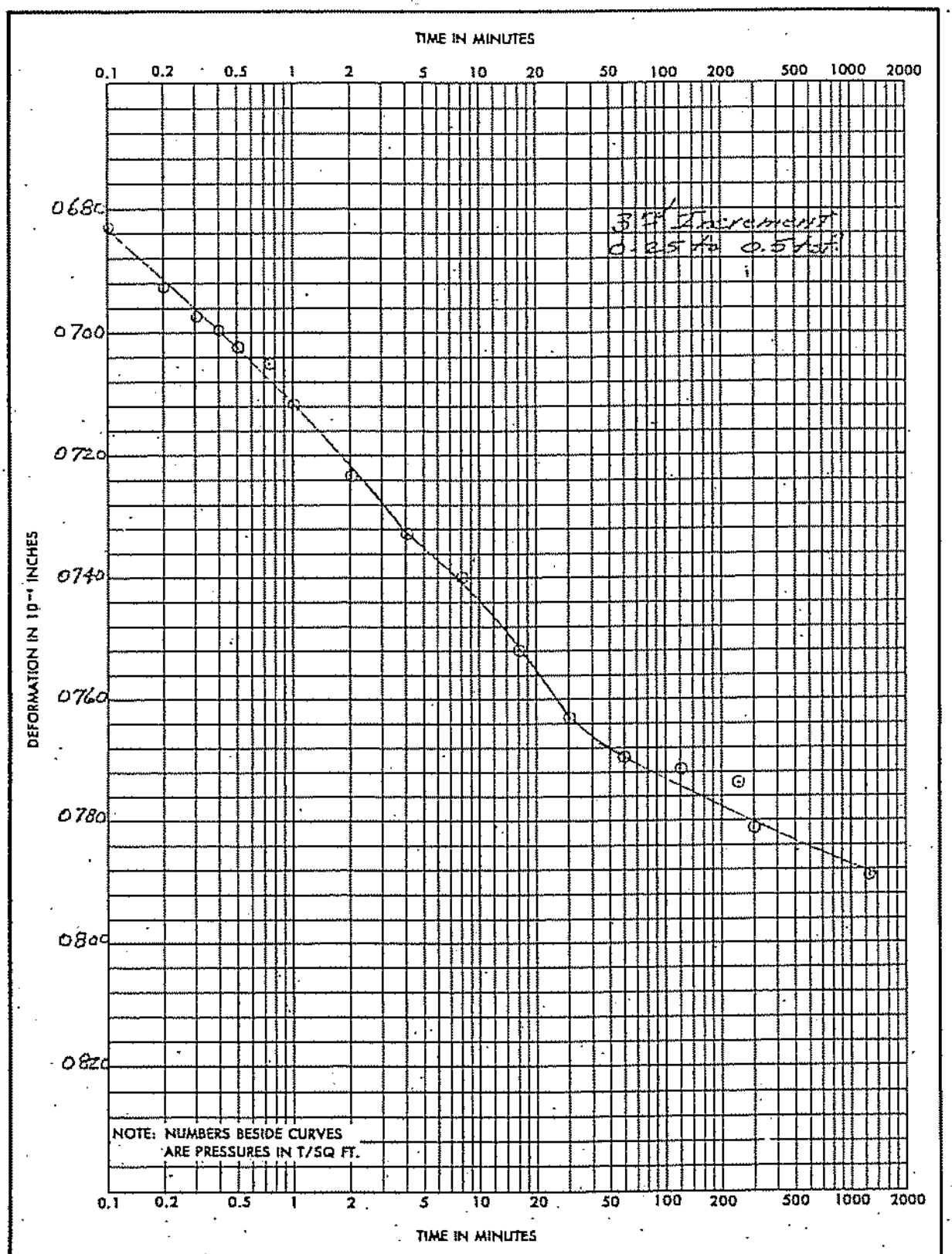
PROJECT Long Range Delaware River Disposal Area Study

AREA

BORING NO. EBB-9 | SAMPLE NO. UD-2 | DEPTH 12.0'-14.0' | DATE Dec. 1967

ENG FORM 2088 1 MAY 63 PREVIOUS EDITIONS ARE OBSOLETE.

CONSOLIDATION TEST—TIME CURVES (TRANSLUCENT)



PROJECT Long Range Delaware River Disposal Area Study

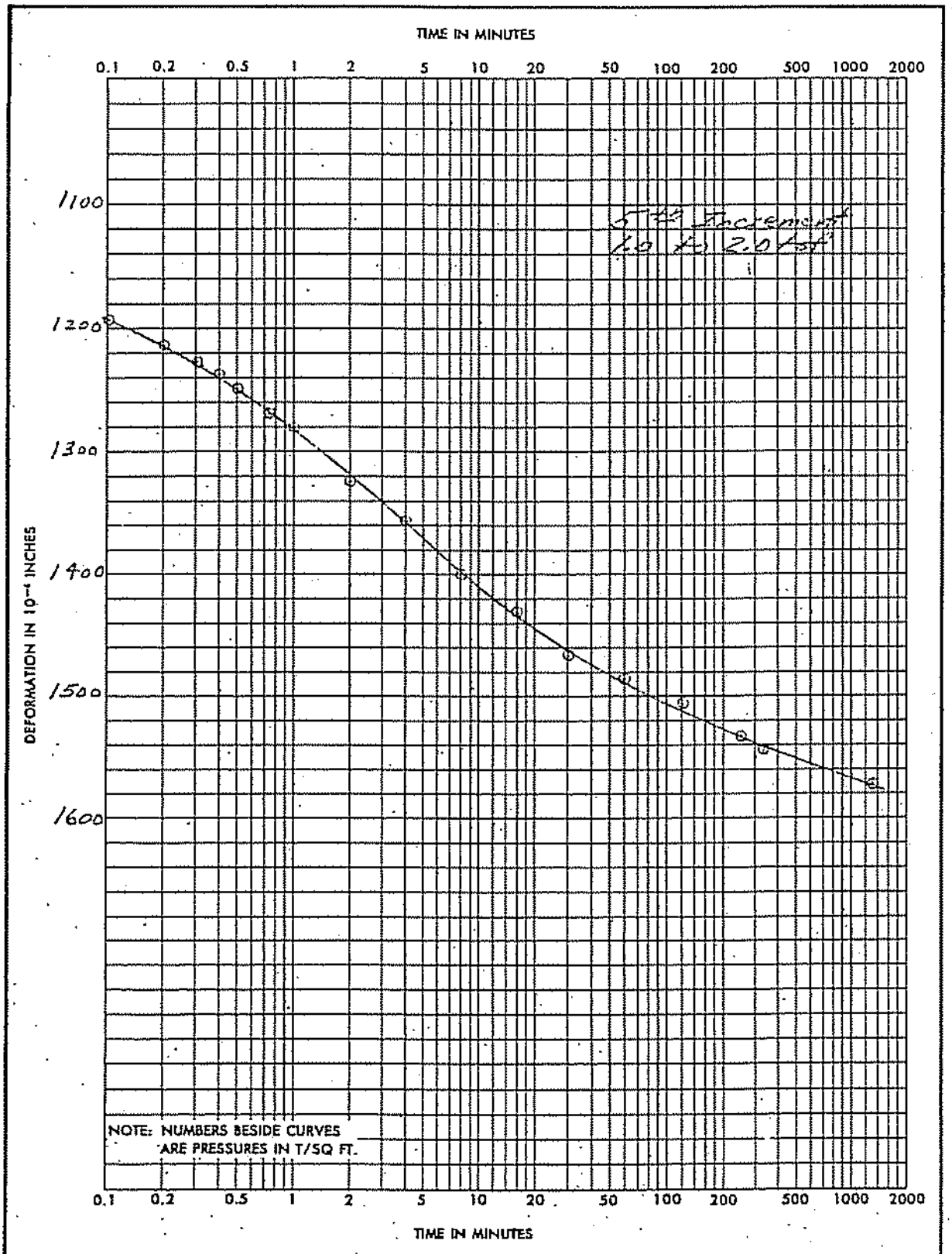
AREA

BORING NO.	SAMPLE NO.	DEPTH	DATE
E 88-9	UD-2	12.0 - 14.0'	Dec. 1967

ENG FORM 2088 1 MAY. 63 PREVIOUS EDITIONS ARE OBSOLETE.

CONSOLIDATION TEST—TIME CURVES (TRANSLUCENT)

CONSOLIDATION TEST – TIME CURVES



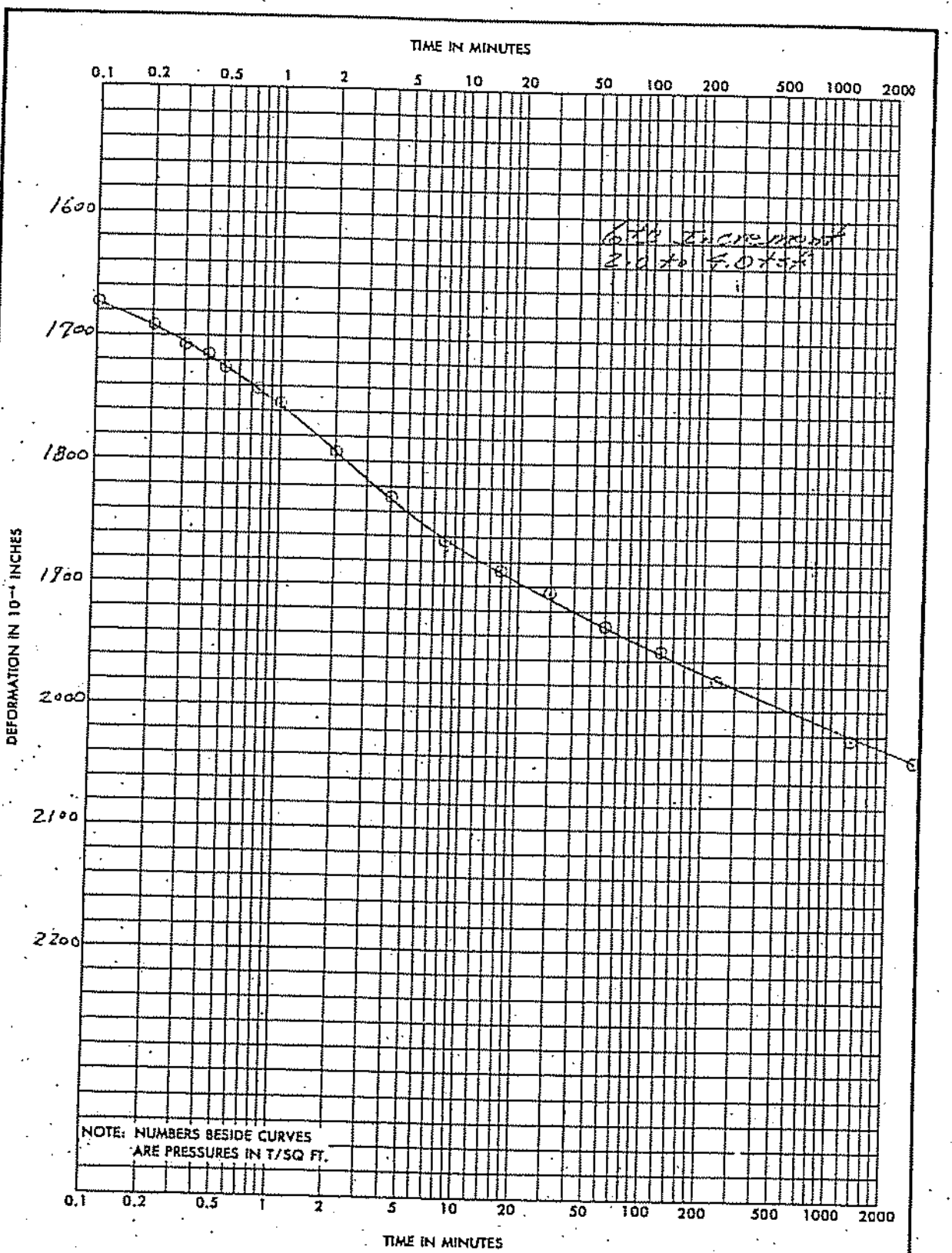
PROJECT Long Range Delaware River Disposal Area Study

AREA

BORING NO.	SAMPLE NO.	DEPTH El.	DATE
EBB-9	UD-2	12.0'–14.0'	Dec. 1967

ENG FORM 2088 1 MAY, 63 PREVIOUS EDITIONS ARE OBSOLETE.

CONSOLIDATION TEST—TIME CURVES (TRANSLUCENT)



PROJECT Long Range Delaware River Disposal Area Study

AREA

BORING NO. EBS-9	SAMPLE NO. UD-2	DEPTH 12.0'-14.0'	DATE Dec. 1967

ENG FORM 2088 1 MAY 63 PREVIOUS EDITIONS ARE OBSOLETE.

CONSOLIDATION TEST—TIME CURVES (TRANSLUCENT)

Edgemoor

BORING NO. EBB9
SAMPLE NO. UD-3
DEPTH: 18.0 to 20.0 ft.

PROJECT Delaware River Study
DATE October 1967
COMP. By WS CHK'D By RJS

LABORATORY LOG	DESCRIPTION	W, CAN NO.	TEST SAMPLES
SAMPLE DEPTH IN FEET / SAMPLE LENGTH IN INCHES	Dark grayish-brown micaceous organic CLAY (OH)	Hydr-1 G = 2.55 LL 96 PL 38 PI 58	C-1 Wn = 65.8%
	Bottom of Sample		

Length of Sample, L 21.82 in.
Weight of Tube and Wet Soil 14.625 g.
Weight of Tube 7.000 g.
Weight of Wet Soil, W 7.625 g.
Diameter of Tube, D 4.25 in.
Total Unit Weight, $\gamma_t = \frac{4.85\,W}{LD^2}$ 93.8 lbs/cu.ft.

LEGEND
W_n — Natural Water Content
MA — Mechanical Analysis
LL — Atterberg Limits
G — Specific Gravity
C — Consolidation
Q — Unconsolidated Undrained
γ_d — Dry Density
R — Consolidated Undrained

Edgemoor

BORING NO. EBB-9
SAMPLE NO. UD-4
DEPTH: 24.0 to 26.0 ft.

PROJECT Delaware River Study
DATE October, 1967
COMP. By WS CHK'D By RJS

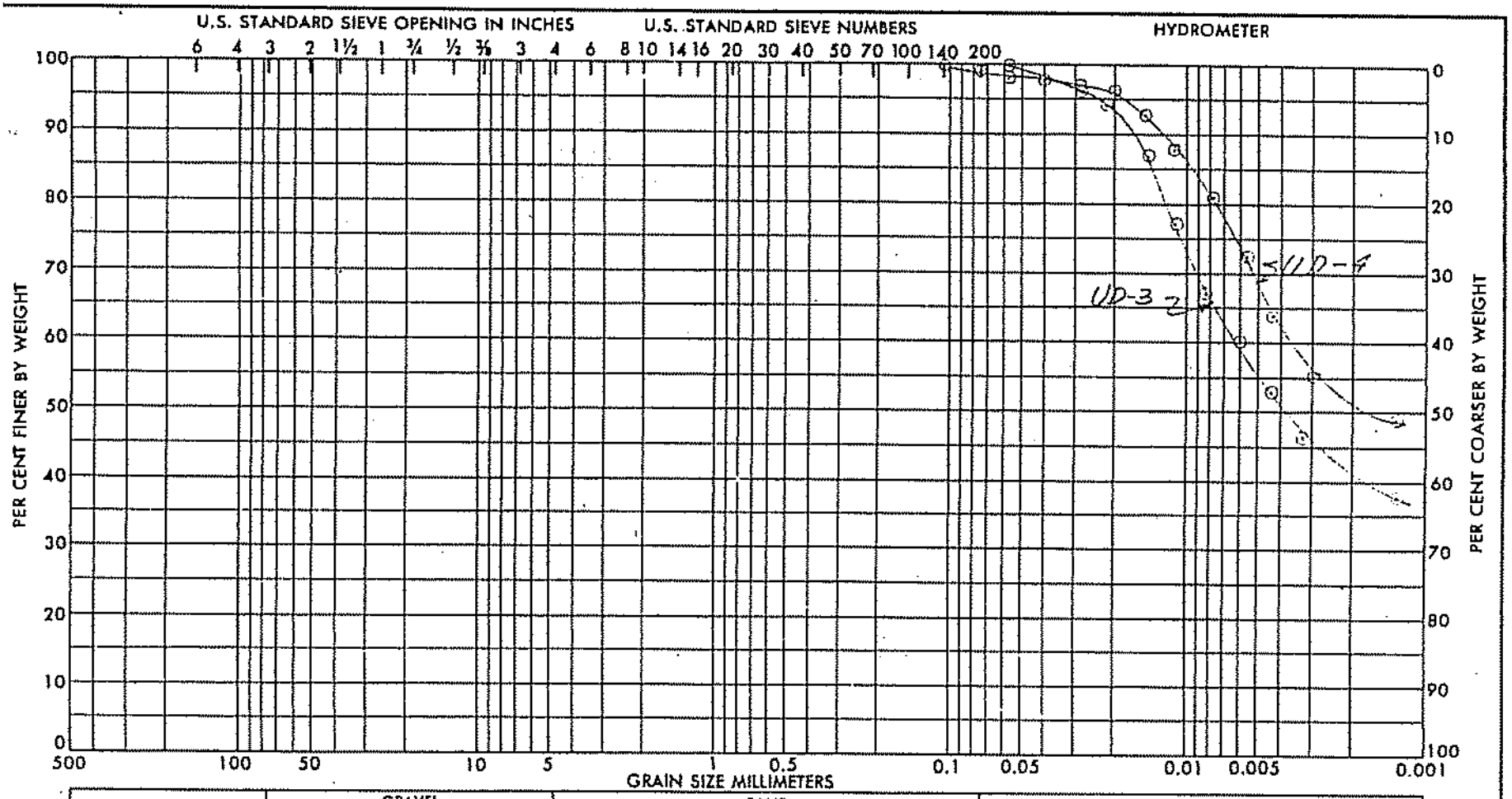
LABORATORY LOG	DESCRIPTION	W, CAN NO.	TEST SAMPLES
	Dark gray micaceous organic CLAY (OH) w/ trace of decayed vegetation.	Hydc-1 G = 2.50 LL = 109 PL = 42 PI = 67	W_n = 65.3 % γ_n = 59.6 pcf e = 1.620 n = 61.8 % S = 100 % W_n = 83.7 % γ_n = 50.0 pcf e = 2.122 n = 68.0 % S = 98.6 % W_n = 89.1 % γ_n = 46.9 % e = 2.326 n = 69.9 % S = 95.8 % W_n = 77.4 %

SAMPLE DEPTH IN FEET: 24, 23, 22, 21, 20, 19, 18, 17, 16, 15, 14, 13, 12, 11, 10, 9, 8, 7, 6, 5, 4, 3, 2, 1, 0

SAMPLE LENGTH IN INCHES

Length of Sample, L 21.15 in.
Weight of Tube and Wet Soil 14.250 g.
Weight of Tube 6.975 g.
Weight of Wet Soil, W 7.275 g.
Diameter of Tube, D 4.25 in.
Total Unit Weight, $\gamma_t = \frac{4.85\,W}{LD^2}$ 92.4 lbs/cu.ft.

LEGEND
W_n — Natural Water Content
MA — Mechanical Analysis
LL — Atterberg Limits
G — Specific Gravity
C — Consolidation
Q — Unconsolidated Undrained
γ_d — Dry Density
R — Consolidated Undrained



SAMPLE NO.	ELEV OR DEPTH	CLASSIFICATION	NAT W%	LL	PL	PI
UD-3	18.0'-20.0'	Organic CLAY (OH)		96	38	58
UD-4	24.0'-26.0'	Organic CLAY (OH)		109	42	67

GRADATION CURVES

PROJECT Long Range Delaware River Disposal Area

AREA

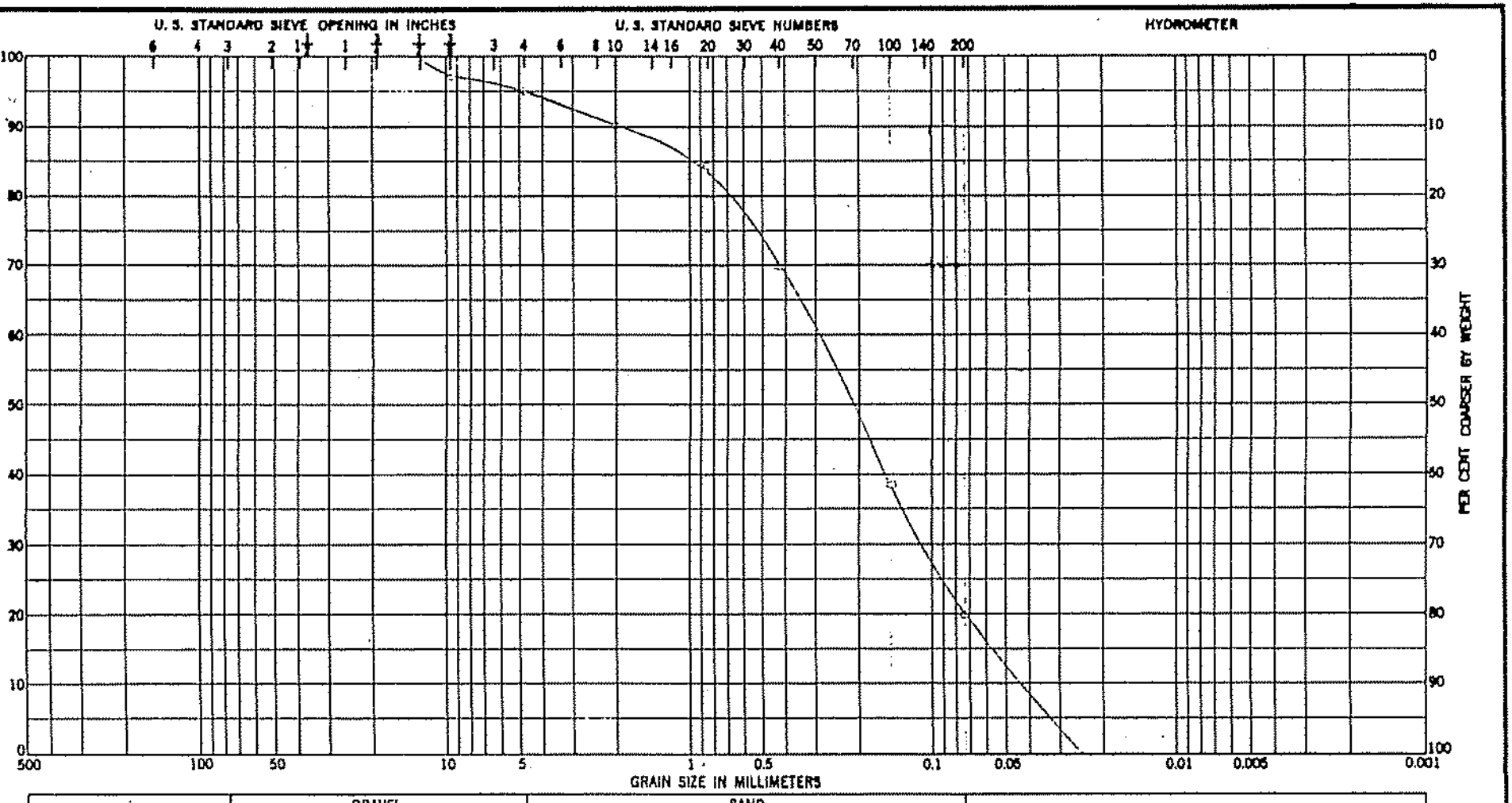
BORING NO. EBB-9

DATE Oct. 1967

NG FORM 2087
MAY 63

REPLACES WES FORM NO. 1241, SEP 1962, WHICH IS OBSOLETE.

U. S. GOVERNMENT PRINTING OFFICE : 1963 O—708-124



mple No.	Elev--or- Depth	Classification	Nat w %	LL	PL	PI
4	8.0 - 10.0	Br-gry, m-f, SAND some org.	25.5			
		silt, tr. gvl.				

Project [illegible]

Area

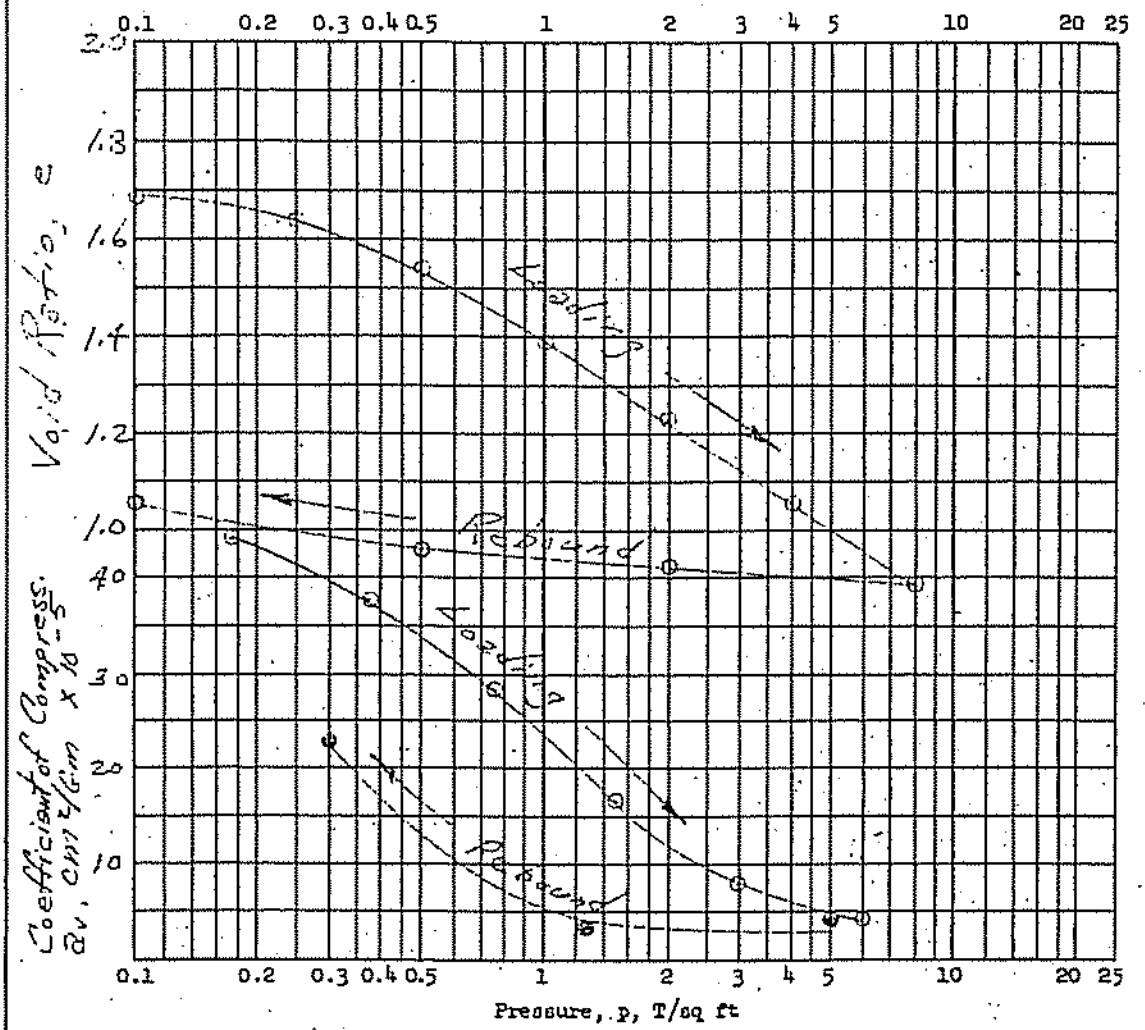
Boring No. BBB-[illegible]

Date 9 [illegible]

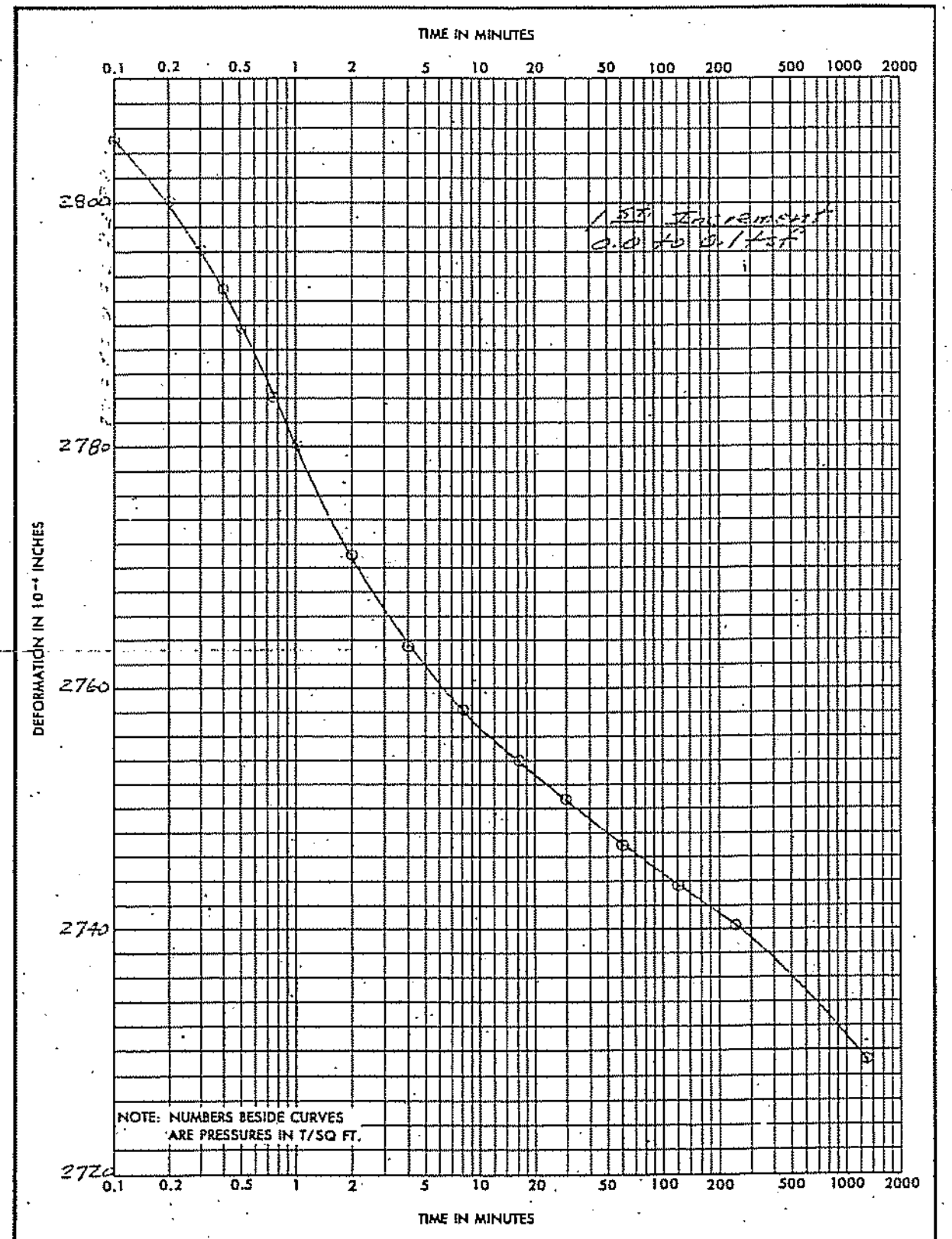
GRADATION CURVES

ORM 2087 REPLACES WES FORM NO. 1241, SEP 1962, WHICH IS OBSOLETE. (TRANSLUCENT)

051031



Type of Specimen: Undisturbed		Before Test		After Test	
Diam: 3.0 in.	Ht: 0.75 in.	Water Content, w_o	65.8 %	w_f	44.2 %
Overburden Pressure, p_o: 0.41 T/sq ft		Void Ratio, e_o	1.737	e_f	1.052
Preconsol. Pressure, p_c: 0.47 T/sq ft		Saturation, S_o	96.6 %	S_f	100+ %
Compression Index, C_c: 0.50		Dry Density, γ_d	58.1 lb/ft^3		
Classification: Organic CLAY (OH)		k_{20} at e_o =	x 10^{-} cm/sec		
LL: 96	G_s: 2.55	Project: Long Range Delaware River Disposal Area			
PL: 38	D_{10}: <0.001				
Remarks		Area: Edgemoor			
		Boring No.: EBB-9	Sample No.: UD-3		
		Depth: 18.0' – 20.0'	Date: Oct. 1967		
		CONSOLIDATION TEST REPORT			

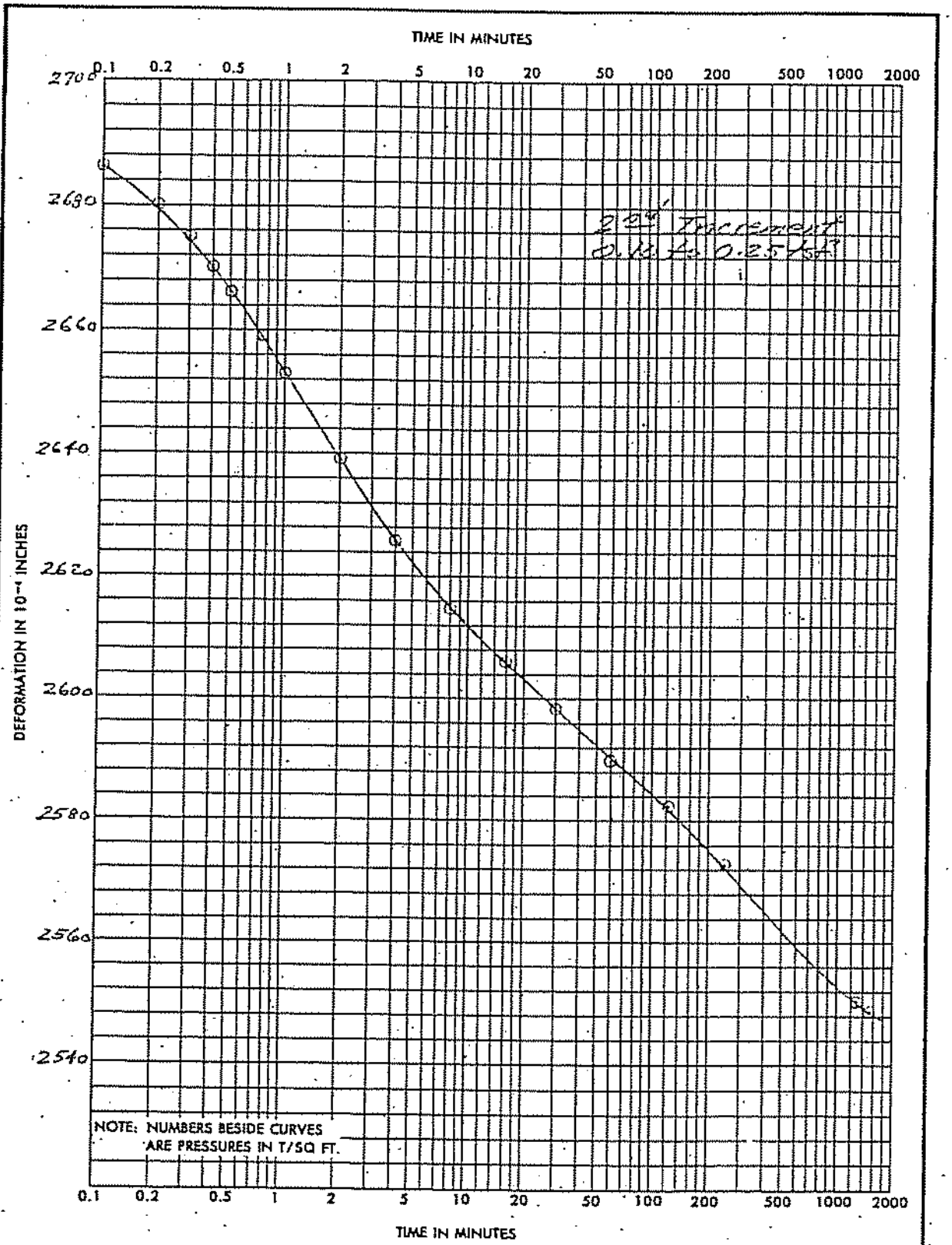


PROJECT Long Range Delaware River Disposal Area Study

AREA

BORING NO. E8A-9 | SAMPLE NO. UD-3 | DEPTH Ft. 18.0' - 20.0' | DATE Dec. 1967

ENG FORM 2088 1 MAY 63 PREVIOUS EDITIONS ARE OBSOLETE. **CONSOLIDATION TEST—TIME CURVES** (TRANSLUCENT)



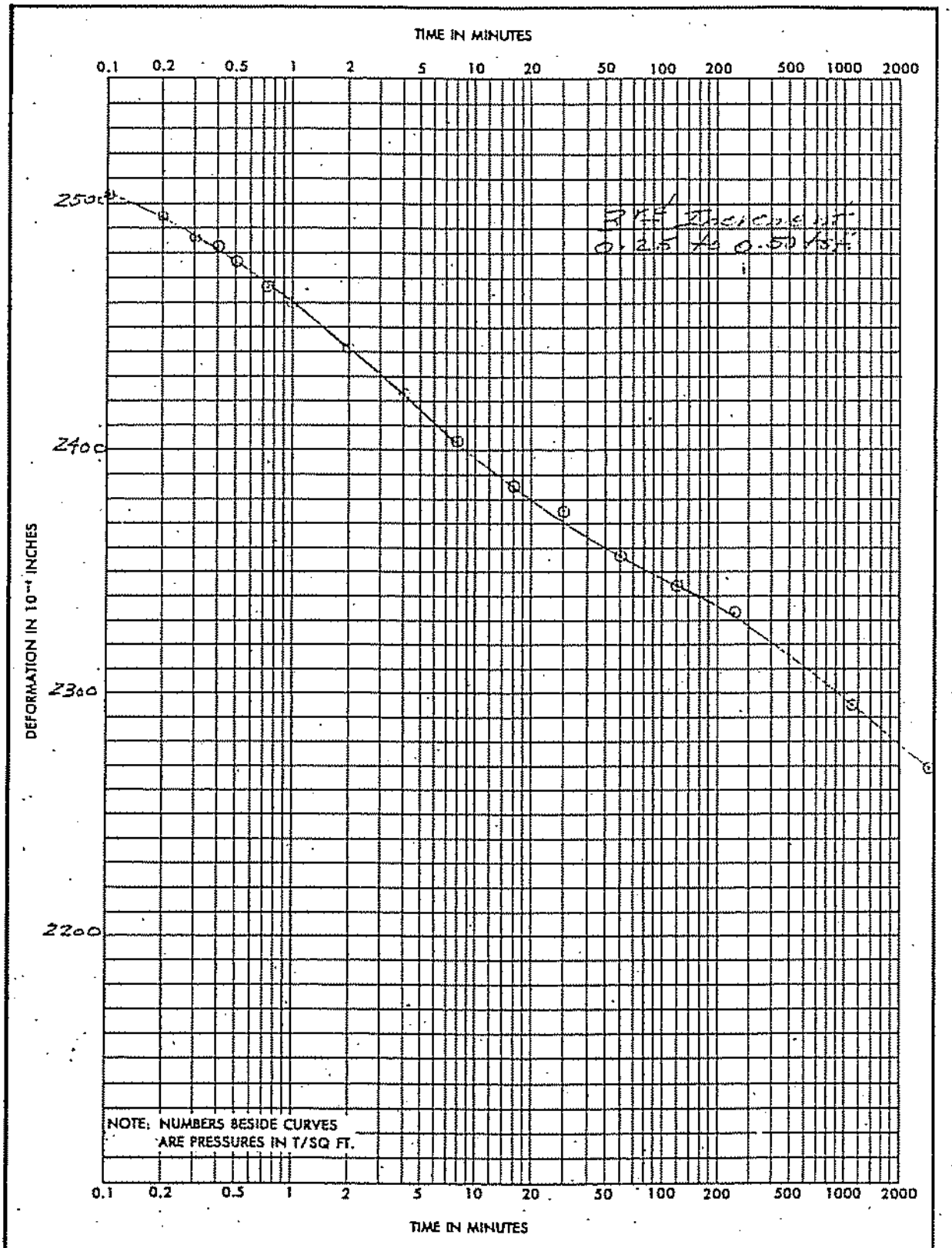
PROJECT Long Range Delaware River Disposal Area Study

AREA

BORING NO. EBR-9 | SAMPLE NO. UD-3 | DEPTH 18.0'-20.0' | DATE Dec. 1967

ENG FORM 2088 1 MAY 63 PREVIOUS EDITIONS ARE OBSOLETE.

CONSOLIDATION TEST—TIME CURVES (TRANSLUCENT).



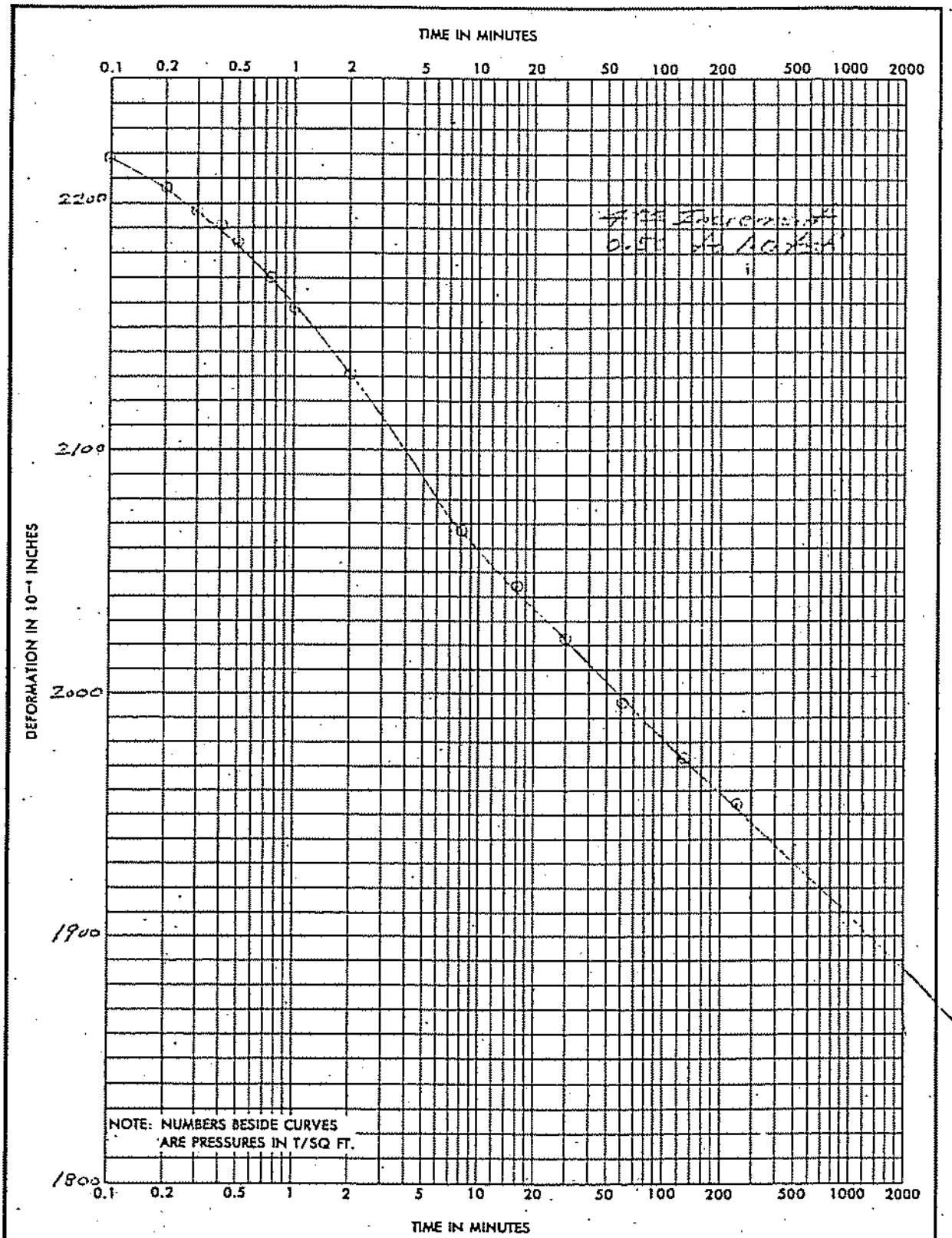
PROJECT Long Range Delaware River Disposal Area Study

AREA

BORING NO. E88-9 | SAMPLE NO. UD-3 | DEPTH ~~Ft~~ 18.0'-20.0' | DATE Dec. 1967

ENG FORM 2088 1 MAY 63 PREVIOUS EDITIONS ARE OBSOLETE.

CONSOLIDATION TEST—TIME CURVES (TRANSLUCENT)



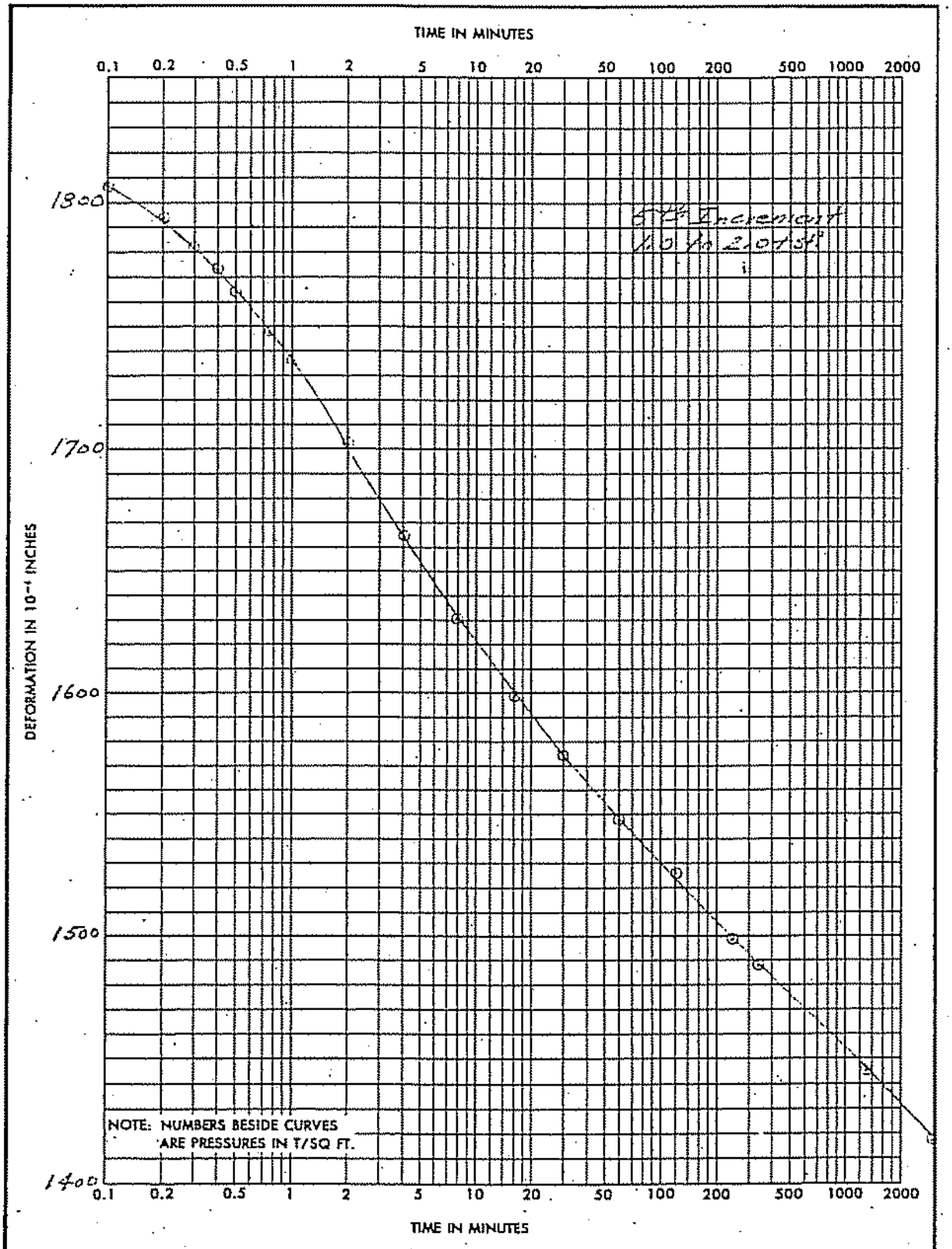
PROJECT Long Range Delaware River Disposal Area, Stage I

AREA

BORING NO.	SAMPLE NO.	DEPTH	DATE
EBB-9	UD-3	18.0' - 20.0'	Dec. 1967

ENG FORM 2088 1 MAY 63 PREVIOUS EDITIONS ARE OBSOLETE.

CONSOLIDATION TEST—TIME CURVES (TRANSLUCENT)



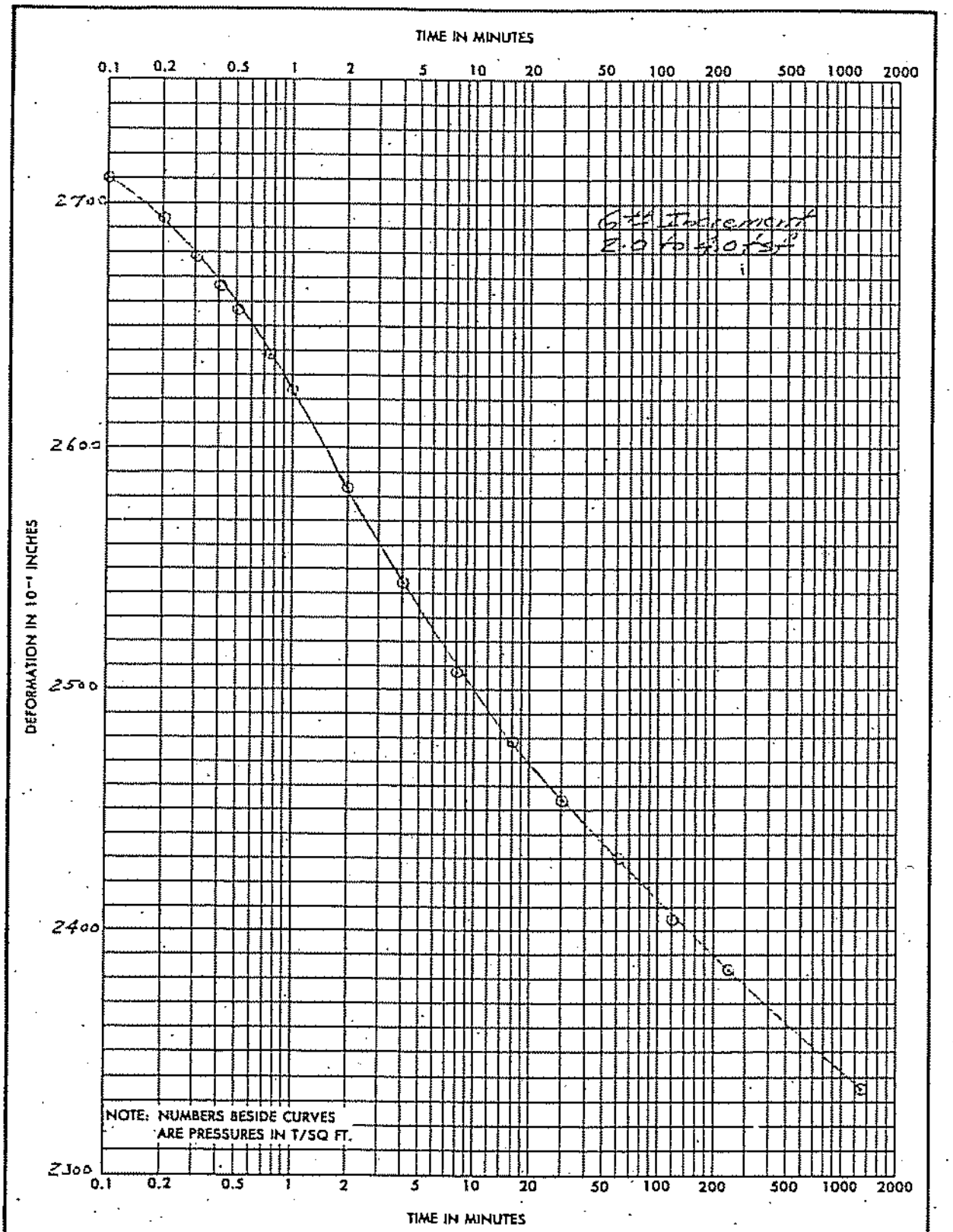
PROJECT Long Range Delaware River Disposal Area Study

AREA

BORING NO.	SAMPLE NO.	DEPTH	DATE
EB4-9	UD-3	18.0'-20.0'	Dec. 1967

ENG FORM 2088 1 MAY 63 PREVIOUS EDITIONS ARE OBSOLETE.

CONSOLIDATION TEST—TIME CURVES (TRANSLUCENT)



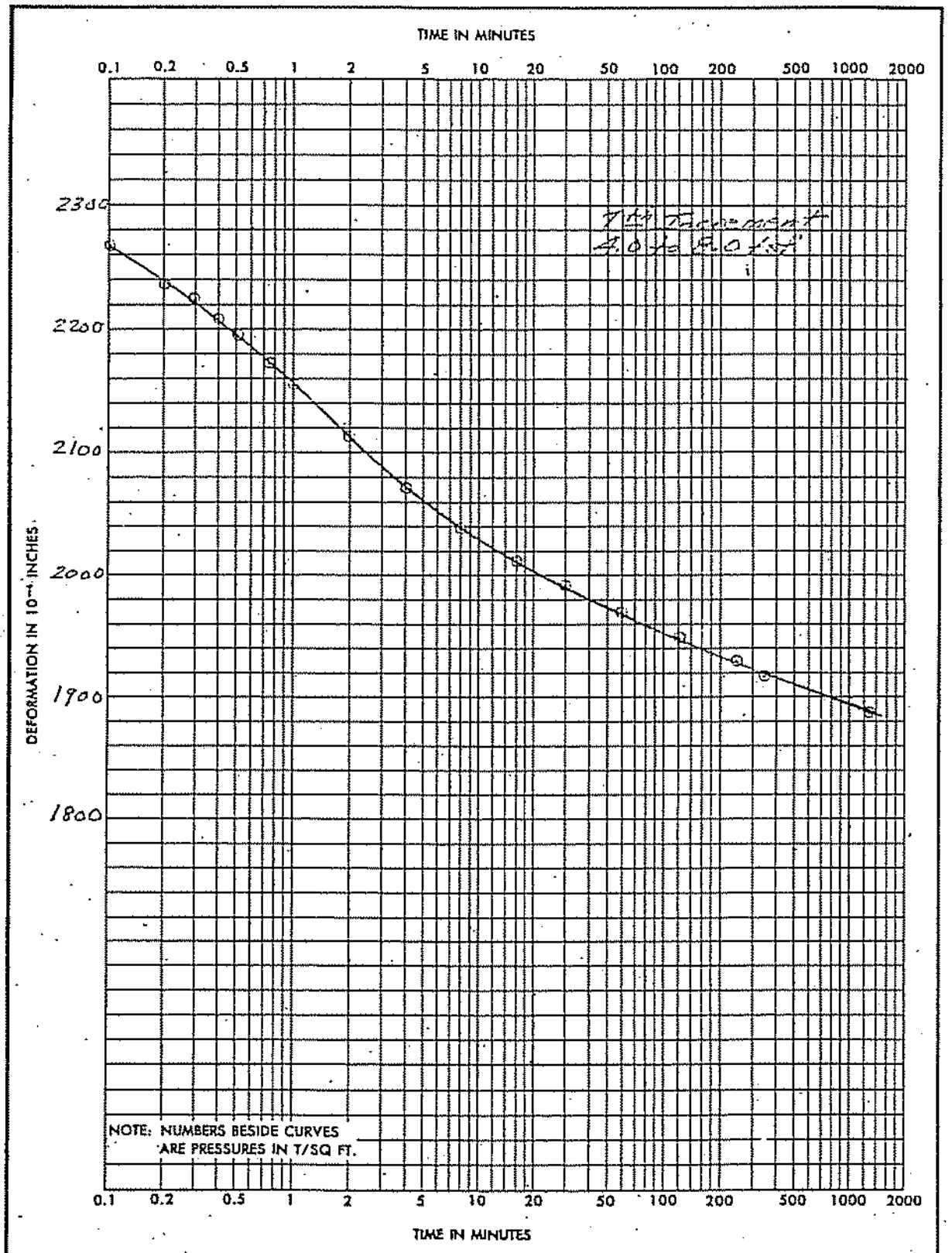
PROJECT Long Range Delaware River Disposal Area Study

AREA

BORING NO. EBB-9 | SAMPLE NO. UD-3 | DEPTH ~~6'~~ 18.0'-20.0' | DATE Dec. 1967

ENG FORM 2088 1 MAY 63 PREVIOUS EDITIONS ARE OBSOLETE.

CONSOLIDATION TEST—TIME CURVES (TRANSLUCENT)



PROJECT Long Range Delaware River Disposal Area Study

AREA Edgemoor

BORING NO. EBB-9 | SAMPLE NO. UD-3 | DEPTH 18.0'-20.0' | DATE Dec. 1967

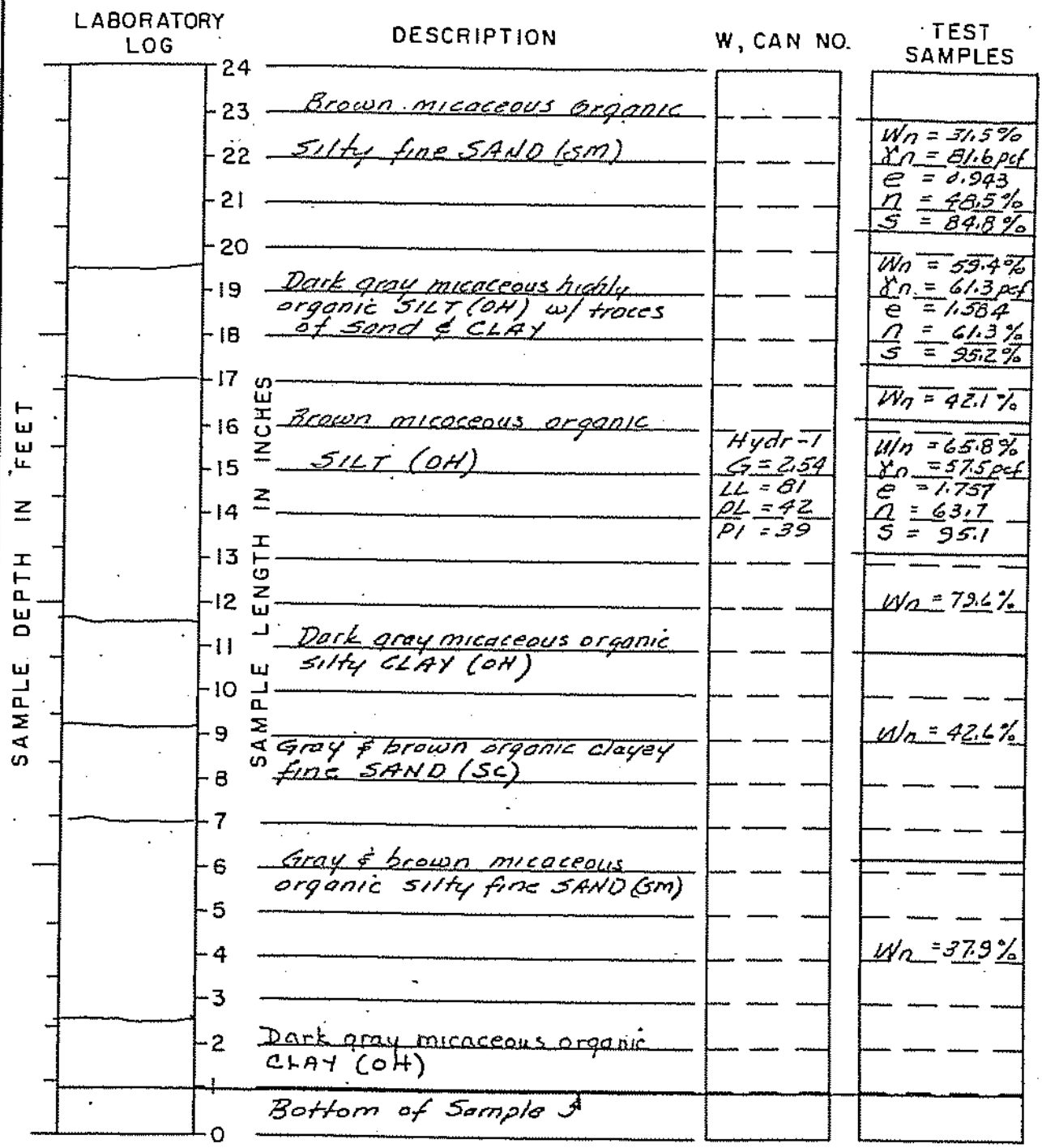
ENG FORM 2088 1 MAY 63 PREVIOUS EDITIONS ARE OBSOLETE.

CONSOLIDATION TEST—TIME CURVES (TRANSLUCENT)

Edgemoor

BORING NO. EBB-10
SAMPLE NO. UD-1
DEPTH: 8.0 to 10.0 ft.

PROJECT Delaware River Study
DATE October 1967
COMP. By WS CHK'D By RJS

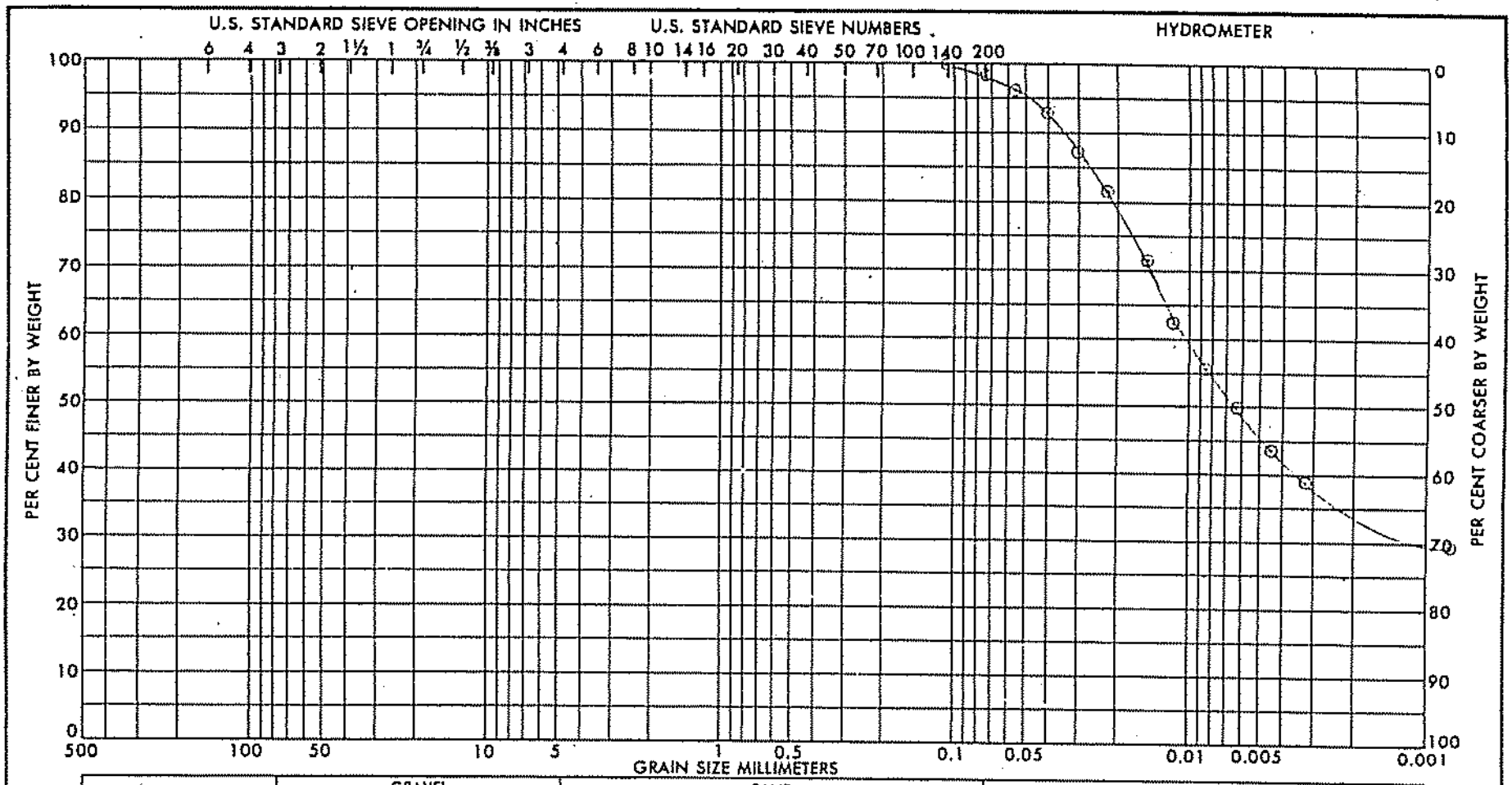


Length of Sample, L 23.03 in.
Weight of Tube and Wet Soil 15,000 g.
Weight of Tube 6,975 g.
Weight of Wet Soil, W 8,025 g.
Diameter of Tube, D 4.25 in.
Total Unit Weight, $\gamma_t = \frac{4.85\,W}{LD^2}$ 93.6 lbs/cu.ft.

UNDISTURBED SAMPLE LOG

LEGEND
- W_n — Natural Water Content
- MA — Mechanical Analysis
- LL — Atterberg Limits
- G — Specific Gravity
- C — Consolidation
- Q — Unconsolidated Undrained
- γ_d — Dry Density
- R — Consolidated Undrained
- S — Consolidated Drained
- UC — Unconfined Compression

NED FORM DEC 62 501



SAMPLE NO.	~~ELEV-GR~~ DEPTH	CLASSIFICATION	NAT W%	LL	PL	PI
DD-1	8.0'-10.0'	Organic SILT (OH)		81	42	39

GRADATION CURVES

PROJECT Long Range Delaware River Disposal Area

AREA

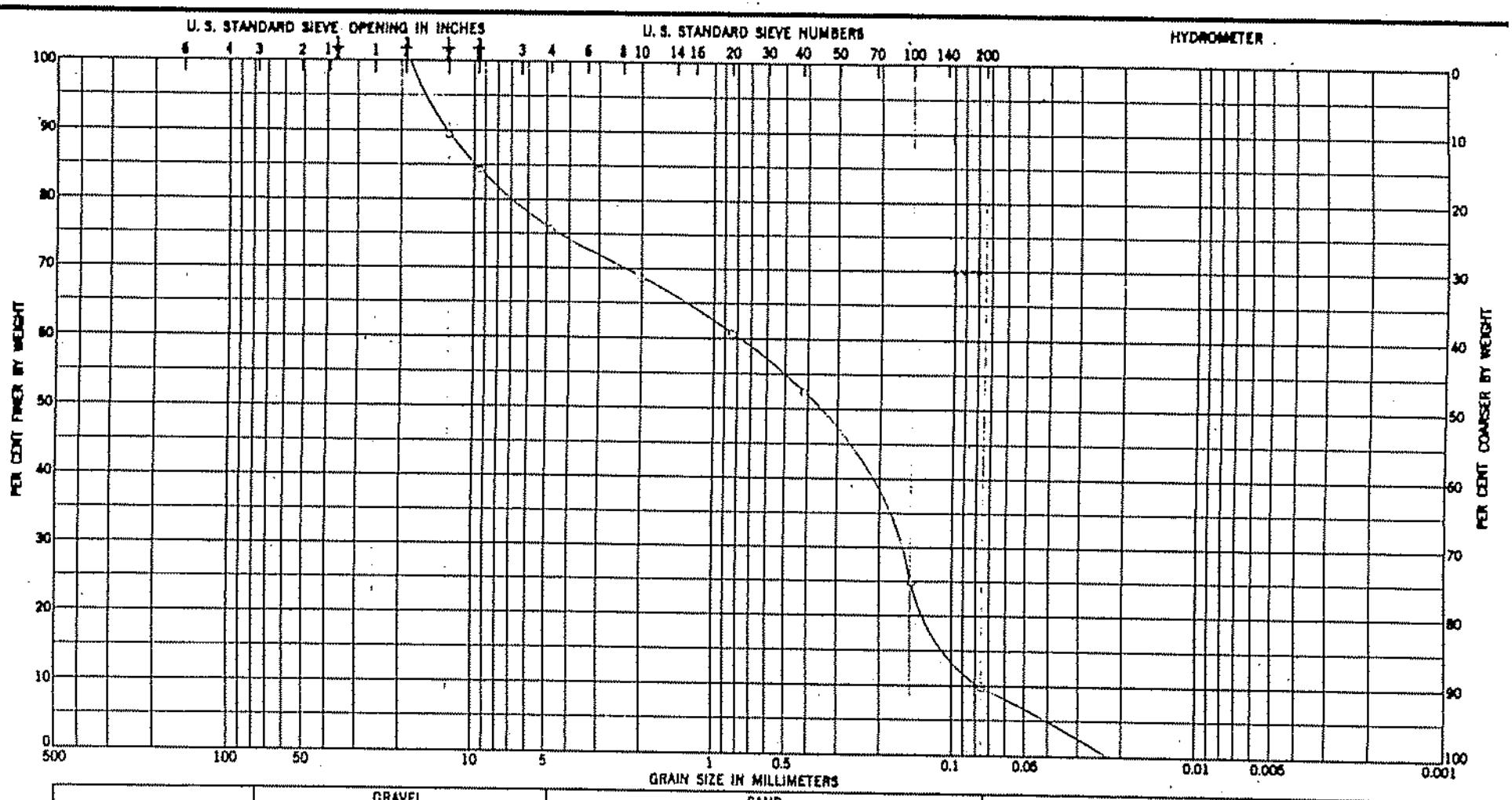
BORING NO. EBB-10

DATE Oct. 1967

ENG FORM 2087
1 MAY 63

REPLACES WES FORM NO. 1241, SEP 1962, WHICH IS OBSOLETE.

U.S. GOVERNMENT PRINTING OFFICE : 1963 OF—700-128



COBBLES	GRAVEL		SAND			SILT OR CLAY
	COARSE	FINE	COARSE	MEDIUM	FINE	

Sample No.	--Elev--or Depth	Classification	Nat w %	LL	PL	PI
S	10.0 - 11.0	Gy. br. gvly. f. SAND, tr. of crg. silt	28.1			

GRADATION CURVES

Project: Edgemoor Disposal Area

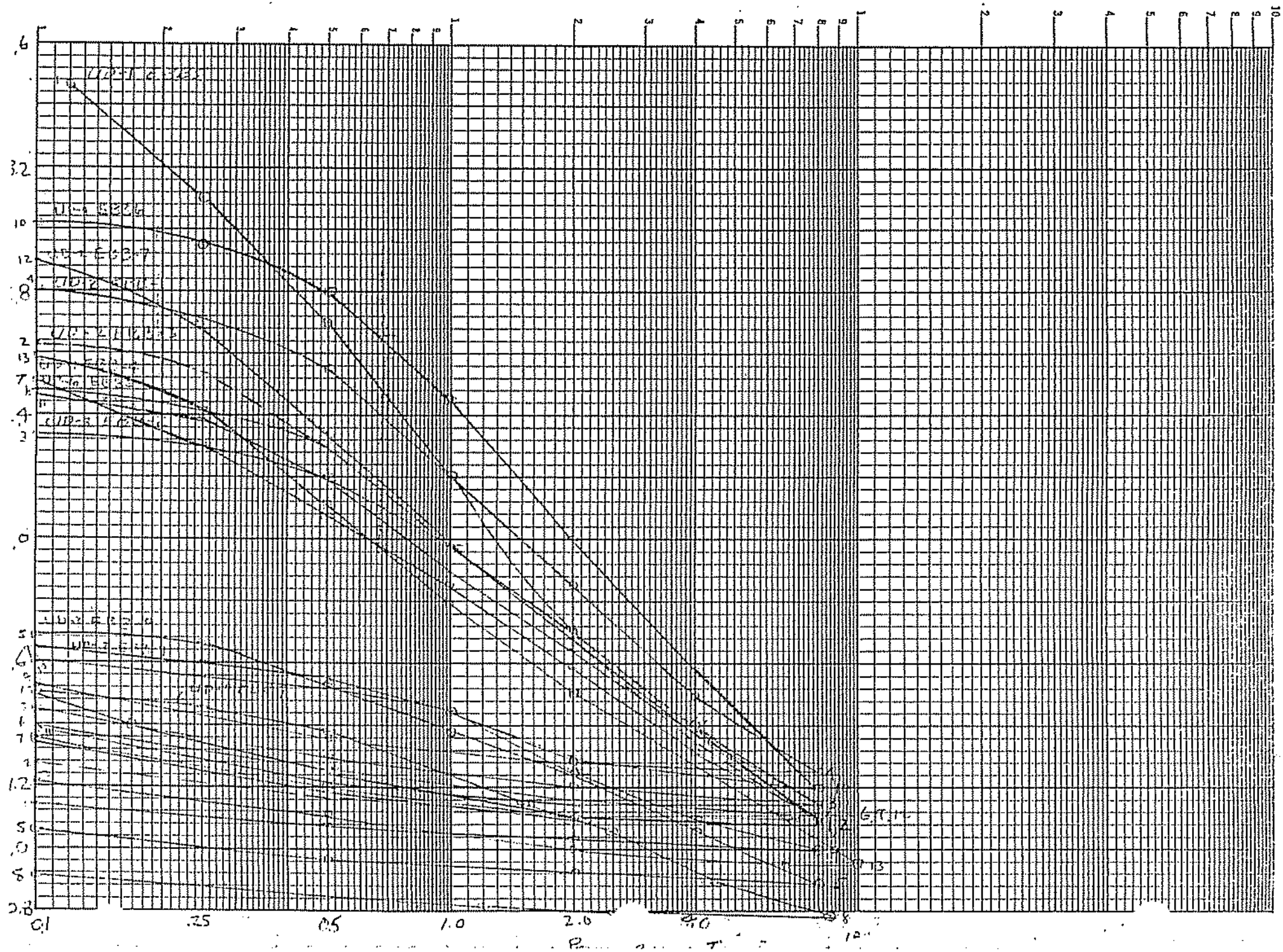
Area:

Boring No.: EBE-10

Date: 9 Aug 67

ENG FORM

REPLACES WES FORM NO. 3241, SEP 1952, WHICH IS OBSOLETE.


K+E 5 CYCLES X 70 DIVISIONS MADE IN U.S.A.
KEUFFEL & ESSER CO.
.6
3.2
10
12
.8
2
13
7
.4
.0
1.2
0.1
.25
0.5
1.0
2.0
4.0

[illegible] Shelby Tubes Basis — Sept. Oct. 07

HOLE No.	UNDISTURBED SAMPLE No.	SAMPLE DEPTH	SAMPLE RECOVERY	TRIAXIAL "Q"	TRIAXIAL "$\bar{R}$"	CONSOLIDATION	UNCONFINED COMPRESSION	SIEVE & HYDROMETER ANALYSIS	ATTERBERG LIMITS	SPECIFIC GRAVITY	UNIT WT. & MOISTURE CONTENT
EBB-25	UD-1	8-10'	100%				X	X	X	X	X
	UD-2	22-24'	100%				X	X	X	X	X
EBB-26	UD-3	36-38'	100%				X	X	X	X	X
EBB-27	UD-1	14-16'	90%		X			X	X	X	X
	UD-2	26-28'	65%			X		X	X	X	X
	UD-3	34-36'	100%	X				X	X	X	X
	UD-5	48-50'	100%		X			X	X	X	X
EBB-28	UD-1	8-10'	80%				X	X	X	X	X
EBB-29	UD-1	14-16'	100%	X				X	X	X	X
	UD-2	34-36'	100%		X			X	X	X	X
	UD-3	44-46'	100%	X				X	X	X	X
	UD-4	50-52	100%			X		X	X	X	X
EBB-30	UD-2	22-24'	90%	X				X	X	X	X
	UD-5	54-56'	100%		X			X	X	X	X
EBB-31	UD-1	6-8'	100%	X				X	X	X	X

X [illegible]

HOLE No.	UNDISTURBED SAMPLE No.	SAMPLE DEPTH	SAMPLE RECOVERY	TRIAXIAL "Q"	TRIAXIAL "R̄"	CONSOLIDATION	UNCONFINED COMPRESSION	SIEVE & HYDROMETER ANALYSIS	ATTERBERG LIMITS	SPECIFIC GRAVITY	UNIT WT & MOISTURE CONTENT	
EB0-32	UD-1	8-10'	95%			X		X	X	X	X	
	UD-2	24-26'	100%		X			X	X	X	X	
	UD-4A	56-58'	100%	X				X	X	X	X	
TOTALS	—			6	5	3	4	18	18	18	18	

NOTES:

① TRIAXIAL - TESTS
   a) $\overline{Q}$ TEST ACCORDING TO SE 903
   b) $\overline{R}$ TEST ACCORDING TO SE 911
      WITH PORE PRESSURE MEASUREMENTS (SE 931)

② CONSOLIDATION TEST - SE 600
   LOADS OF 0.25, 0.5, 1.0, 2.0, 4.0, 8.0, 16.0.

③ UNCONFINED COMPRESSION TEST - SE 934

④ HYDROMETER ANALYSIS TO BE PERFORMED ON EACH SAMPLE.
   SIEVE ANALYSIS TO BE PERFORMED ONLY WHEN THERE IS +10 SIEVE MATERIAL PRESENT.

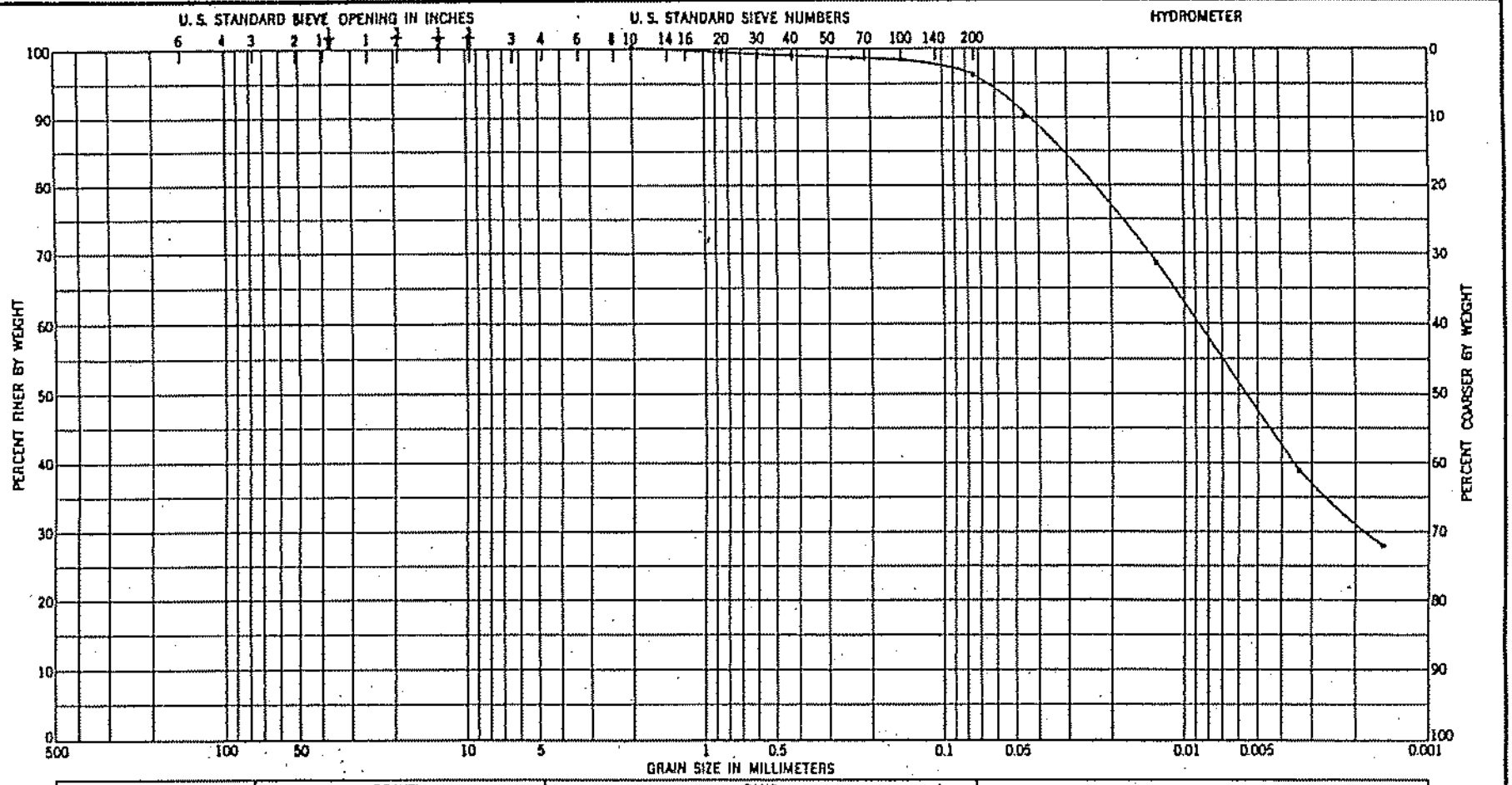
⑤ ATTERBERG LIMITS - SI 102

⑥ SPECIFIC GRAVITY - SI 401

⑦ UNIT WT & MOISTURE CONTENT - SE 105

DEPARTMENT OF THE ARMY, SOUTH ATLANTIC DIVISION LABORATORY
CORPS OF ENGINEERS, 611 SOUTH COBB DRIVE, MARIETTA, GA. 30060

WORK ORDER NO. 4129
Req. No. NAPEN-84-34



Sample No.	Elev. or Depth	Classification	Nat w %	LL	PL	PI
UD-1	8'-10'	Dark gray clayey inorganic silt, high LL (MH) with a trace of sand.	66.7	98	42	*56
		*Plots near A-Line				

GRADATION CURVES

Project: Philadelphia District
Lab No. 184/397
Area: Edgemoor Disposal Area
Boring No.: EBB-25, Sample No. UD-1
Date: 20 September 1984

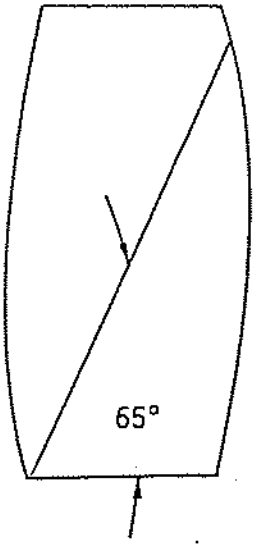
ENG FORM 1 MAY 63 2087

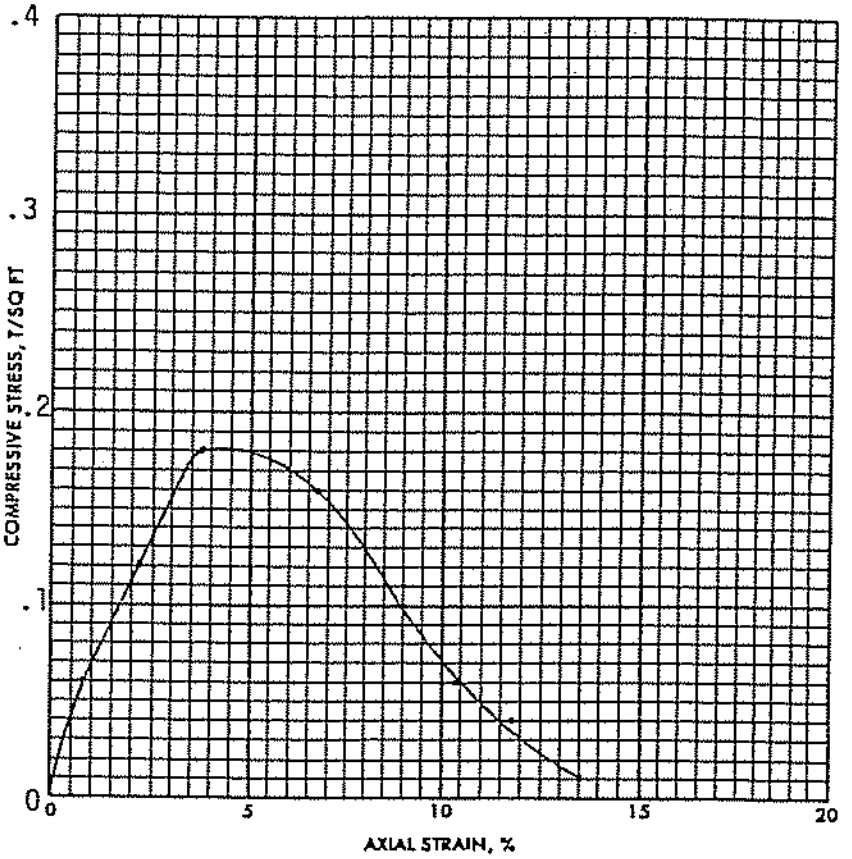
Unconfined Compression Test

DEPARTMENT OF THE ARMY, SOUTH ATLANTIC DIVISION LABORATORY
CORPS OF ENGINEERS, 611 SOUTH COBB DRIVE, MARIETTA, GA. 30061

WORK ORDER NO. 4129
Req. No. NAPEN-84-34

FAILURE SKETCHES





☐ CONTROLLED STRESS

☒ CONTROLLED STRAIN

TEST NO.			1			
TYPE OF SPECIMEN			Undisturbed			
INITIAL	WATER CONTENT	w_o	66.7 %	%	%	%
INITIAL	VOID RATIO	e_o	1.864			
INITIAL	SATURATION	S_o	94.8 %	%	%	%
INITIAL	DRY DENSITY, LB/CU FT	γ_d	57.8			
TIME TO FAILURE, MIN		t_f	5			
UNCONFINED COMPRESSIVE STRENGTH, T/SQ FT		q_u	0.18			
UNDRAINED SHEAR STRENGTH, T/SQ FT		s_u	0.09			
~~STRAIN~~ Rate of Strain, %/min		$\dot{\varepsilon}$	0.75			
INITIAL SPECIMEN DIAMETER, IN		D_o	1.38			
INITIAL SPECIMEN HEIGHT, IN.		H_o	3.08			

CLASSIFICATION Dark gray clayey inorganic silt, high LL (MH) w/a trace of sand

LL	PL	PI	G_s
98	42	56	2.65

REMARKS See gradation curve on ENG Form 2087.

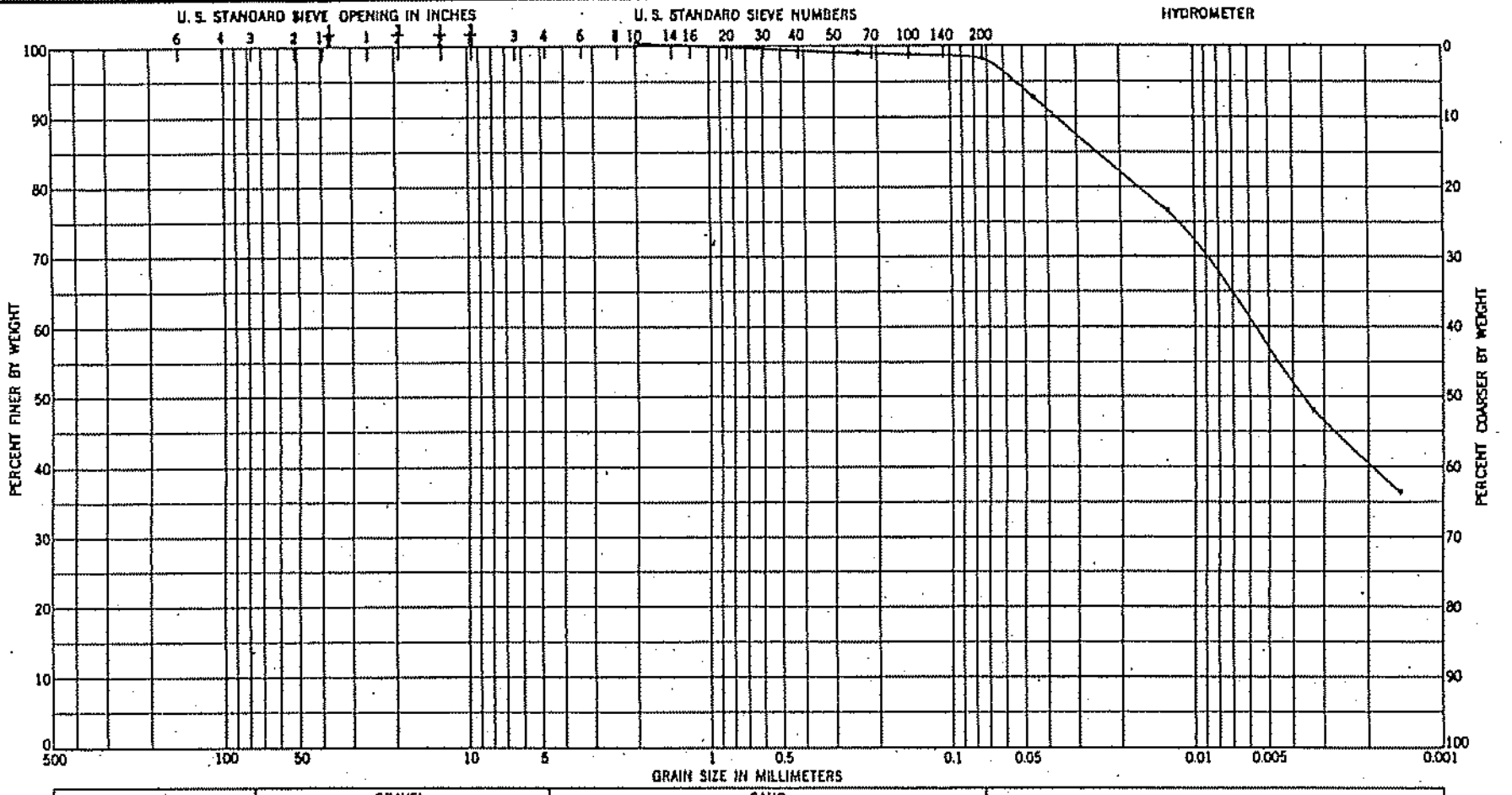
PROJECT Philadelphia District
Lab No. 184/397
AREA Edgemoor Disposal Area
BORING NO. EBB-25 SAMPLE NO. UD-1
DEPTH Ety 8'-10' DATE 20 Sept 1984

UNCONFINED COMPRESSION TEST REPORT

ENG FORM 3659 1 JUN 65 (EM 1110-2-1906) (TRANSLUCENT) GPO : 1966 O—214-344 PLATE XI-2

DEPARTMENT OF THE ARMY, SOUTH ATLANTIC DIVISION LABORATORY
CORPS OF ENGINEERS, 611 SOUTH COBB DRIVE, MARIETTA, GA. 30060

WORK ORDER NO. 4129
Reg. No. NAPEN-84-34



Sample No.	Depth	Classification	Nat w %	LL	PL	PI
UD-2	22'-24'	Gray clayey inorganic silt, high LL (MH) with a trace of sand & organic matter. *Plots near A-Line	81.0	118	48	70*

GRADATION CURVES

Project: Philadelphia District
Lab No. 184/398
Area: Edgemoor Disposal Area
Boring No. EBB-25, Sample No. UD-2
Date: 20 September 1984

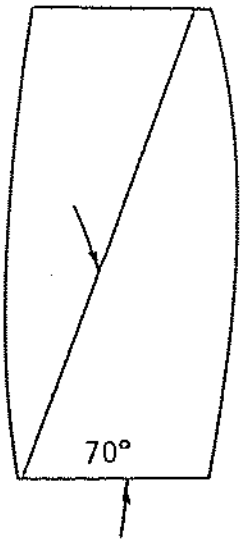
ENG FORM 1 MAY 83 2087

Unconfined Compression Test

DEPARTMENT OF THE ARMY, SOUTH ATLANTIC DIVISION LABORATORY
CORPS OF ENGINEERS, 611 SOUTH COBB DRIVE, MARIETTA, GA. 30061

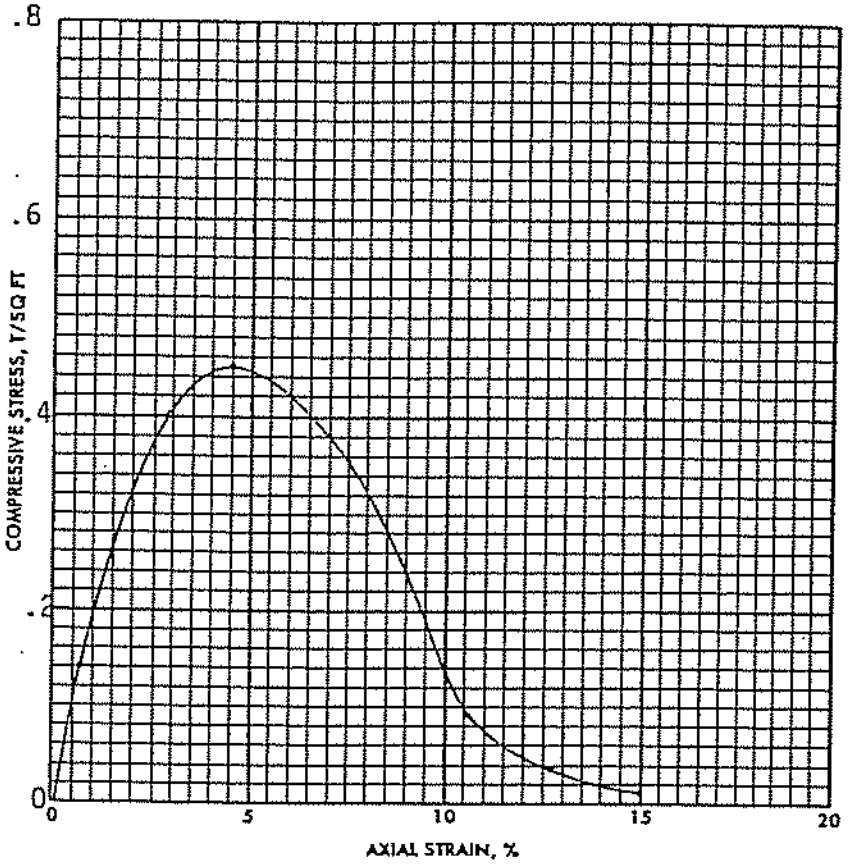
WORK ORDER NO. 4129
Req. No. NAPEN-84-34

FAILURE SKETCHES



☐ CONTROLLED STRESS

☒ CONTROLLED STRAIN



TEST NO.		1			
TYPE OF SPECIMEN		Undisturbed			
INITIAL: WATER CONTENT	w_o	81.0 %	%	%	%
INITIAL: VOID RATIO	e_o	2.182			
INITIAL: SATURATION	S_o	95.8 %	%	%	%
INITIAL: DRY DENSITY, LB/CU FT	γ_d	50.6			
TIME TO FAILURE, MIN	t_f	6			
UNCONFINED COMPRESSIVE STRENGTH, T/SQ FT	q_u	0.45			
UNDRAINED SHEAR STRENGTH, T/SQ FT	s_u	0.23			
~~SENSITIVITY RATIO~~ Rate of Strain, %/Min	~~St~~	0.75			
INITIAL SPECIMEN DIAMETER, IN	D_o	1.38			
INITIAL SPECIMEN HEIGHT, IN.	H_o	3.08			

CLASSIFICATION Gray clayey inorganic silt, high LL (MH) w/a trace of sand & organic matter

LL	PL	PI	G_s
118	48	70	2.58

REMARKS
See gradation curve on ENG Form 2087.

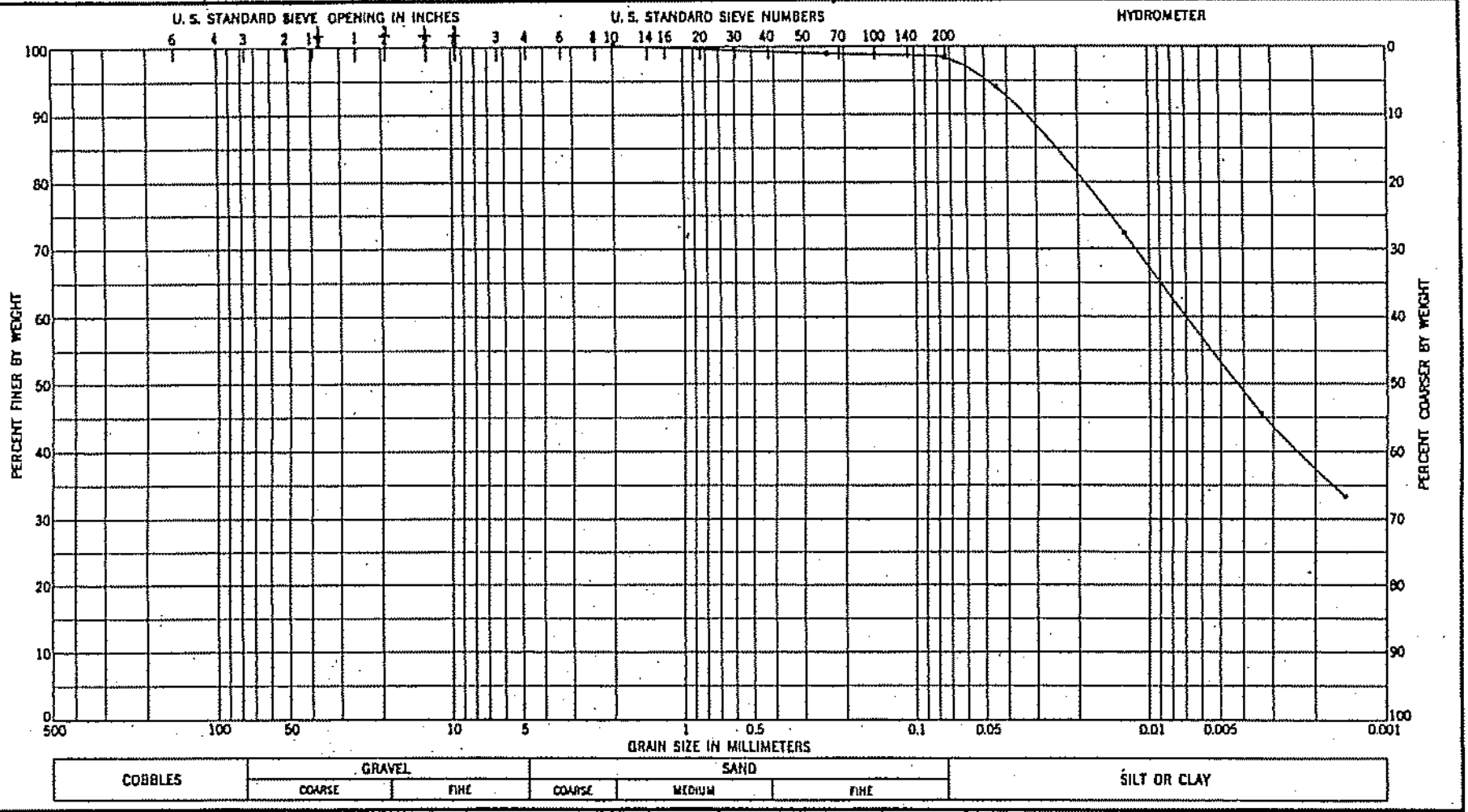
PROJECT Philadelphia District
Lab No. 184/398
AREA Edgemoor Disposal Area
BORING NO. EBB-25 SAMPLE NO. UD-2
DEPTH El. 22'-24' DATE 20 Sept 1984

UNCONFINED COMPRESSION TEST REPORT

ENG FORM 3659 1 JUN 65 (EM 1110-2-1906) (TRANSLUCENT) GPO : 1968 OF—314-348 PLATE XI-2

DEI ...T OF THE ARMY, SOUTH ATLANTIC DIVISION LABORATL
CORPS OF ENGINEERS, 611 SOUTH COBB DRIVE, MARIETTA, GA. 30060

WORK ORDER NO. 4129
Reg. No. NAPEN-84-34



Sample No.	Depth	Classification	Nat w %	LL	PL	PI
UD-3	36'-38'	Dark gray clayey inorganic silt, high LL (MH), with a trace of sand & organic matter. *Plots near A-Line	75.1	88	39	*49

Project: Philadelphia District
Lab No. 184/399
Area: Edgemoor Disposal Area
Boring No.: EBB-26, Sample No. UD-3
Date: 20 September 1984

GRADATION CURVES

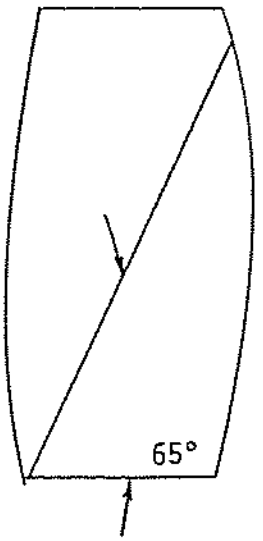
ENG FORM 1 MAY 63 2087

Unconfined Compression Test

DEPARTMENT OF THE ARMY, SOUTH ATLANTIC DIVISION LABORATORY
CORPS OF ENGINEERS, 611 SOUTH COBB DRIVE, MARIETTA, GA. 30061

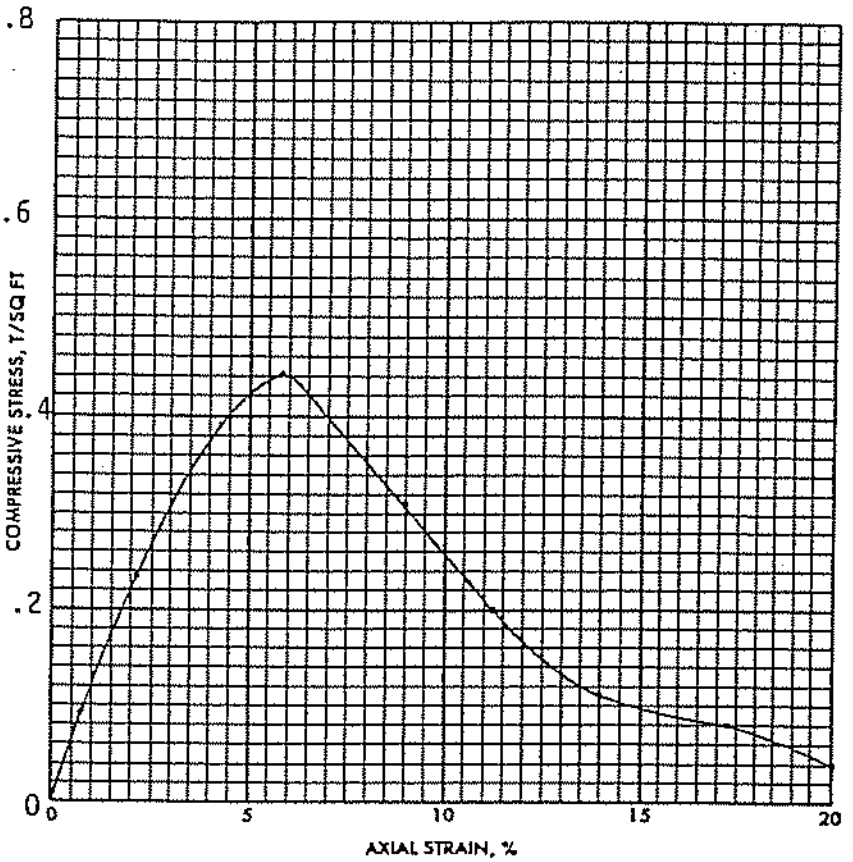
WORK ORDER NO. 4129
Req. No. NAPEN-84-34

FAILURE SKETCHES



☐ CONTROLLED STRESS

☒ CONTROLLED STRAIN



TEST NO.			1			
TYPE OF SPECIMEN			Undisturbed			
INITIAL	WATER CONTENT	w_o	75.1 %	%	%	%
INITIAL	VOID RATIO	e_o	1.947			
INITIAL	SATURATION	S_o	98.4 %	%	%	%
INITIAL	DRY DENSITY, LB/CU FT	γ_d	54.0			
TIME TO FAILURE, MIN		t_f	8			
UNCONFINED COMPRESSIVE STRENGTH, T/SQ FT		q_u	0.44			
UNDRAINED SHEAR STRENGTH, T/SQ FT		s_u	0.22			
~~SENSITIVITY~~ Rate of Strain, %/Min		S_t	0.73			
INITIAL SPECIMEN DIAMETER, IN		D_o	1.38			
INITIAL SPECIMEN HEIGHT, IN.		H_o	3.08			

CLASSIFICATION Dark gray clayey inorganic silt, high LL (MH) w/a trace of sand & organic matter

LL 88 | PL 39 | PI 49 | G_s 2.55

REMARKS See gradation curve on ENG Form 2087.

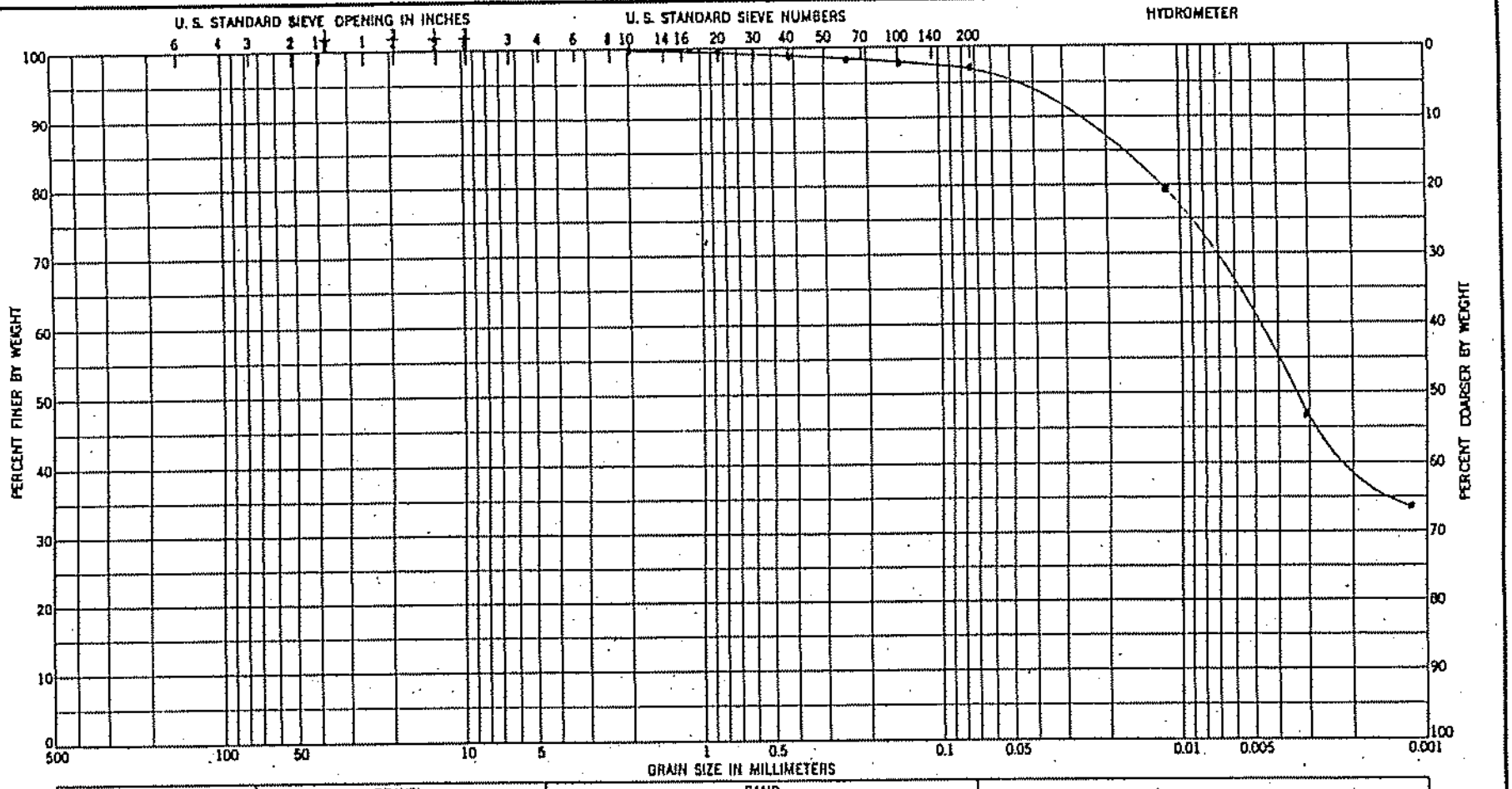
PROJECT Philadelphia District
Lab No. 184/399
AREA Edgemoor Disposal Area
BORING NO. EBB-26 | SAMPLE NO. UD-3
DEPTH EL 36'-38' | DATE 20 Sept 1984

UNCONFINED COMPRESSION TEST REPORT

ENG FORM 3659 1 JUN 65 (EM 1110-2-1906) (TRANSLUCENT) GPO : 1968 OP—814-948 PLATE XI-2

DEPARTMENT OF THE ARMY, SOUTH ATLANTIC DIVISION LABORATORY
CORPS OF ENGINEERS, 611 SOUTH COBB DRIVE, MARIETTA, GA. 30060

WORK ORDER NO. 4129
Req. No. NAPEN-84-34



Sample No.	Depth	Classification	Nat w %	LL	PL	PI
UD-1	14'-16'	Gray clayey inorganic silt, high LL (MH) with a trace of sand	79.5	98	45	53

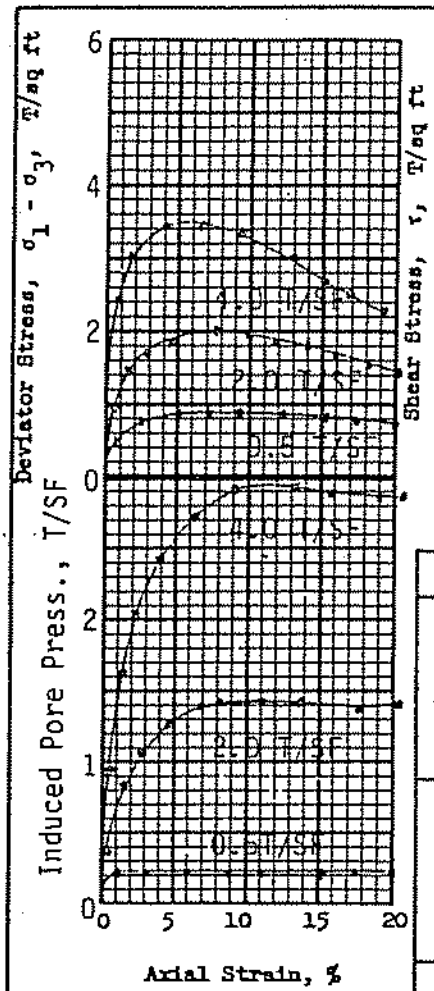
GRADATION CURVES

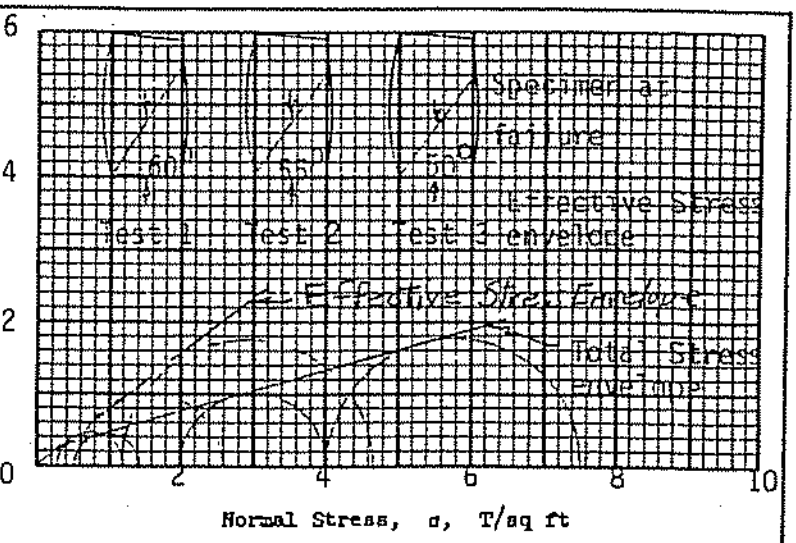
Project Phila. District
Lab. No. 184/400 (R Test)
Area Edgemoor Disposal Area
Boring No. EBB-27, Sample UD-1
Date 20 September 1984

ENG FORM 1 MAY 63 2087

Requisition No. NAPEN-84-34

Work No. 4129





Test No.			1	2	3	
Initial	Water content	w_o	71.0 %	79.3 %	88.1 %	%
	Void ratio	e_o	2.049	2.177	2.345	
	Saturation	S_o	90.4 %	95.0 %	98.0 %	%
	Dry density, lb/cu ft	γ_d	53.4	51.3	48.7	
Before Shear	Water content	w_c	72.0 %	64.1 %	51.9 %	%
	Void ratio	e_c	1.879	1.673	1.355	
	Saturation	S_c	100.0 %	100.0 %	100.0 %	%
	Final back pressure, T/sq ft	u_o	4.00	4.00	4.00	
Final	Water content	w_f	72.0 %	64.1 %	51.9 %	%
	Void ratio	e_f	1.879	1.673	1.355	
Minor principal stress, T/sq ft		σ_3	0.50	2.00	4.00	
Max deviator stress, T/sq ft		$(\sigma_1-\sigma_3)_{max}$	0.92	2.01	3.51	
Time to failure, min		t_f	50	75	60	
Rate of strain, percent/min			0.10	0.10	0.11	
% Strain at $(\sigma_1-\sigma_3)_{Max}$			4.99	7.67	6.63	
Ult deviator stress, T/sq ft		$(\sigma_1-\sigma_3)_{ult}$	0.82	1.75	2.68	
Initial diameter, in.		D_o	1.38	1.38	1.38	
Initial height, in.		H_o	3.08	3.08	3.08	

Shear Strength Parameters

	Total	Effective
ϕ =	15.5	37.5
tan ϕ =	.277	.767
c =	0.20	0.0 T/sq ft

Method of saturation Back pressure

☐ Controlled stress

☒ Controlled strain

Type of test $\bar{R}$ | Type of specimen Undisturbed

Classification Gray, clayey inorganic silt high LL (MH) w/a trace of sand

LL 98 | PL 45 | PI 53 | D_{10} <.001mm | G_s 2.61

Remarks

See gradation curve on ENG form 2087.

Project Phila. District

Lab No. 184/400

Area Edgemoor Disposal Area

Boring No. EBB-27 | Sample No. UD-1

Depth 14'-16' | Date 20 Sept. 1984

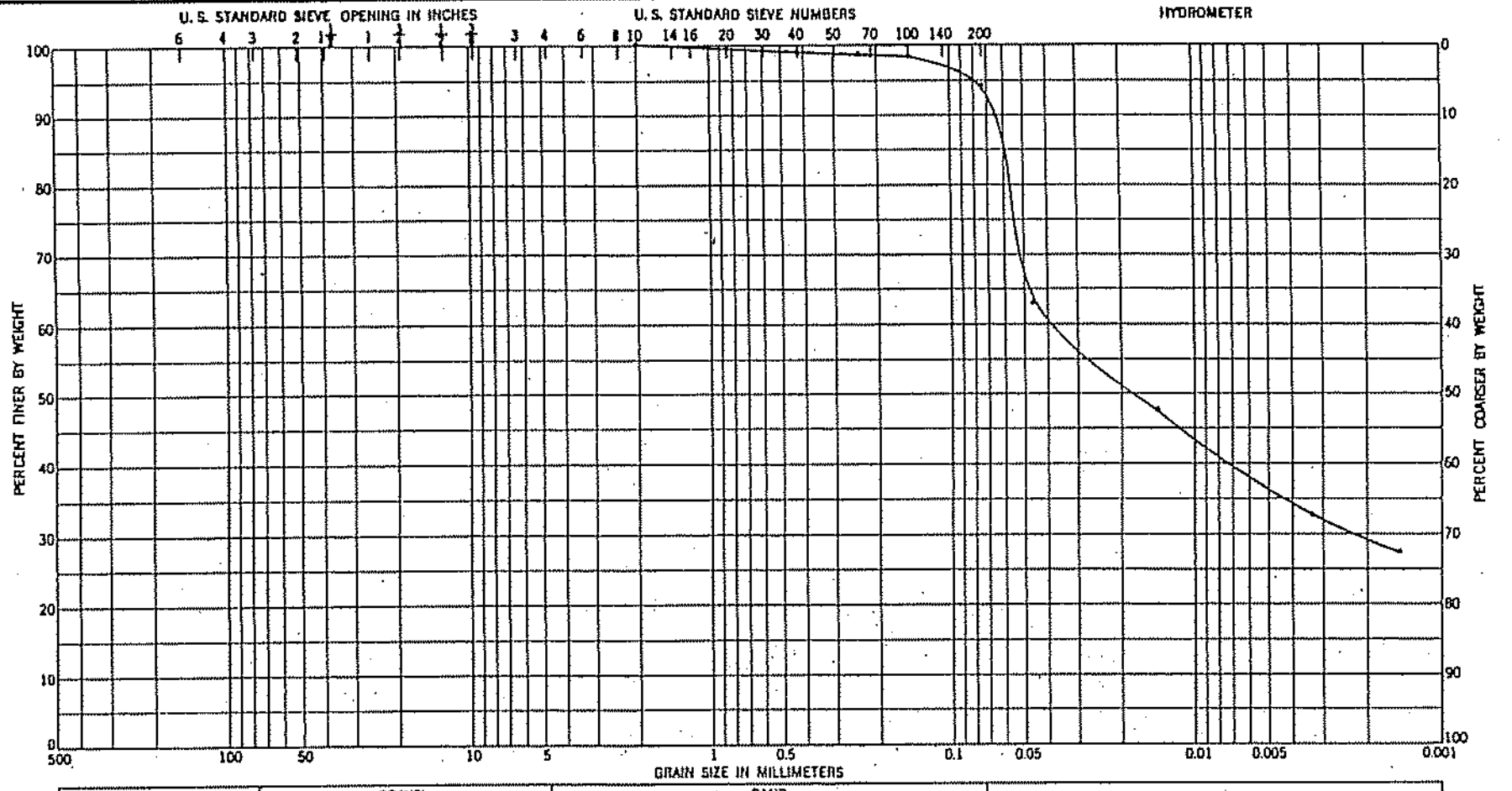
TRIAXIAL COMPRESSION TEST REPORT

ENG FORM 2089 1 JUN 63 (EM 1110-2-1902) PREVIOUS EDITIONS ARE OBSOLETE

TRANSLUCENT

DEP ..T OF THE ARMY, SOUTH ATLANTIC DIVISION LABORATO — WORK ORDER NO. 4129

CORPS OF ENGINEERS, 611 SOUTH COBB DRIVE, MARIETTA, GA. 30060 — Req. No. NAPEN-84-34



Sample No.	~~X~~ Depth	Classification	Nat w %	LL	PL	PI
UD-2	26'-28'	Gray fat clay (CH).	62.5	95	39	*56
		*Plots near A-line				

GRADATION CURVES

Project Philadelphia District

Lab. No. 184/401

Area EdgeMoor Disposal Area

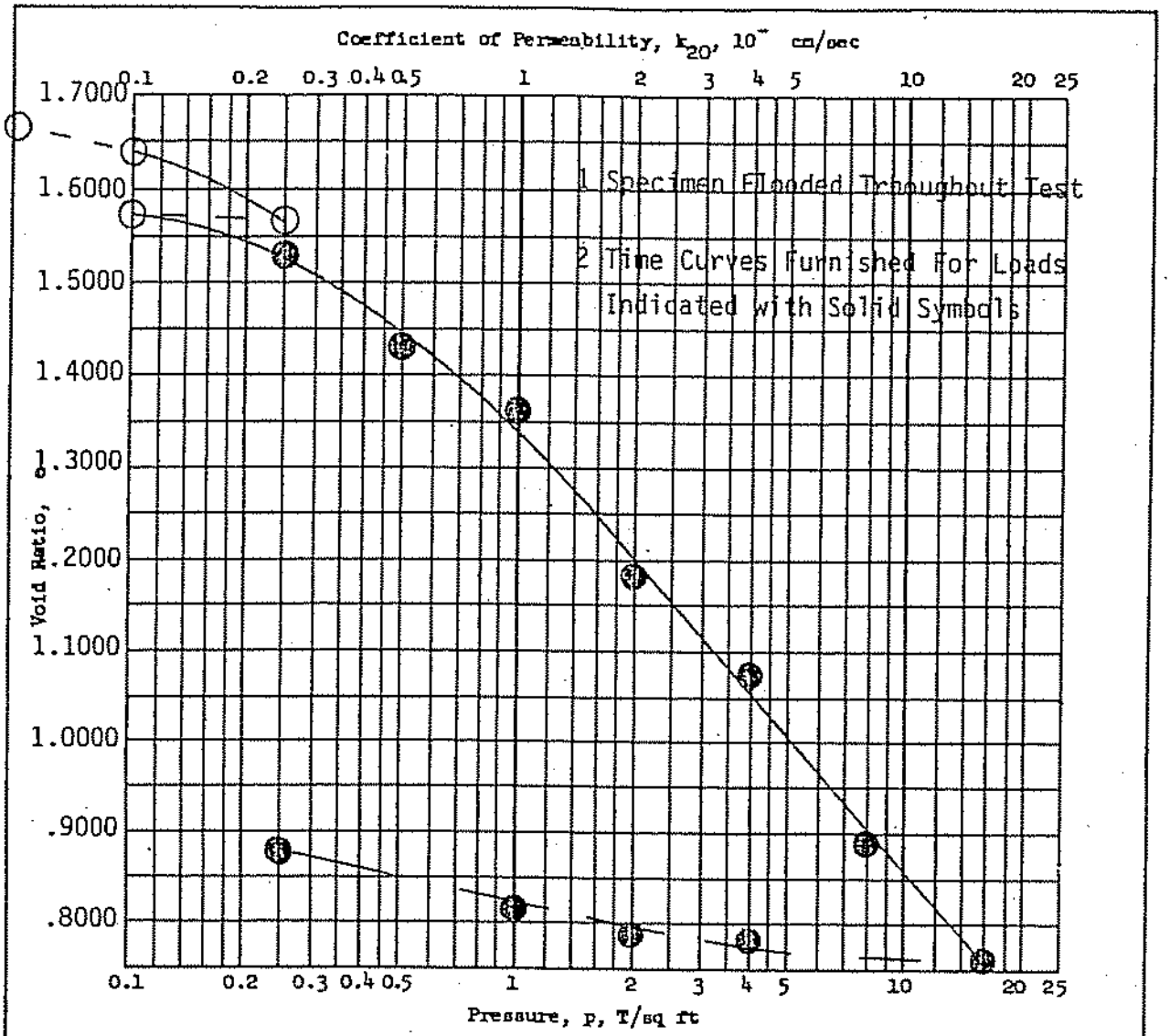
Boring No. EBB-27, Sample No. UD-2

Date 27 September 1984

ENG FORM 1 MAY 83 2087

DEPARTMENT OF THE ARMY, SOUTH ATLANTIC DIVISION LABORATORY
CORPS OF ENGINEERS, 611 SOUTH COBB DRIVE, MARIETTA, GA. 30060

REQ. NO. NAPEN-84-34

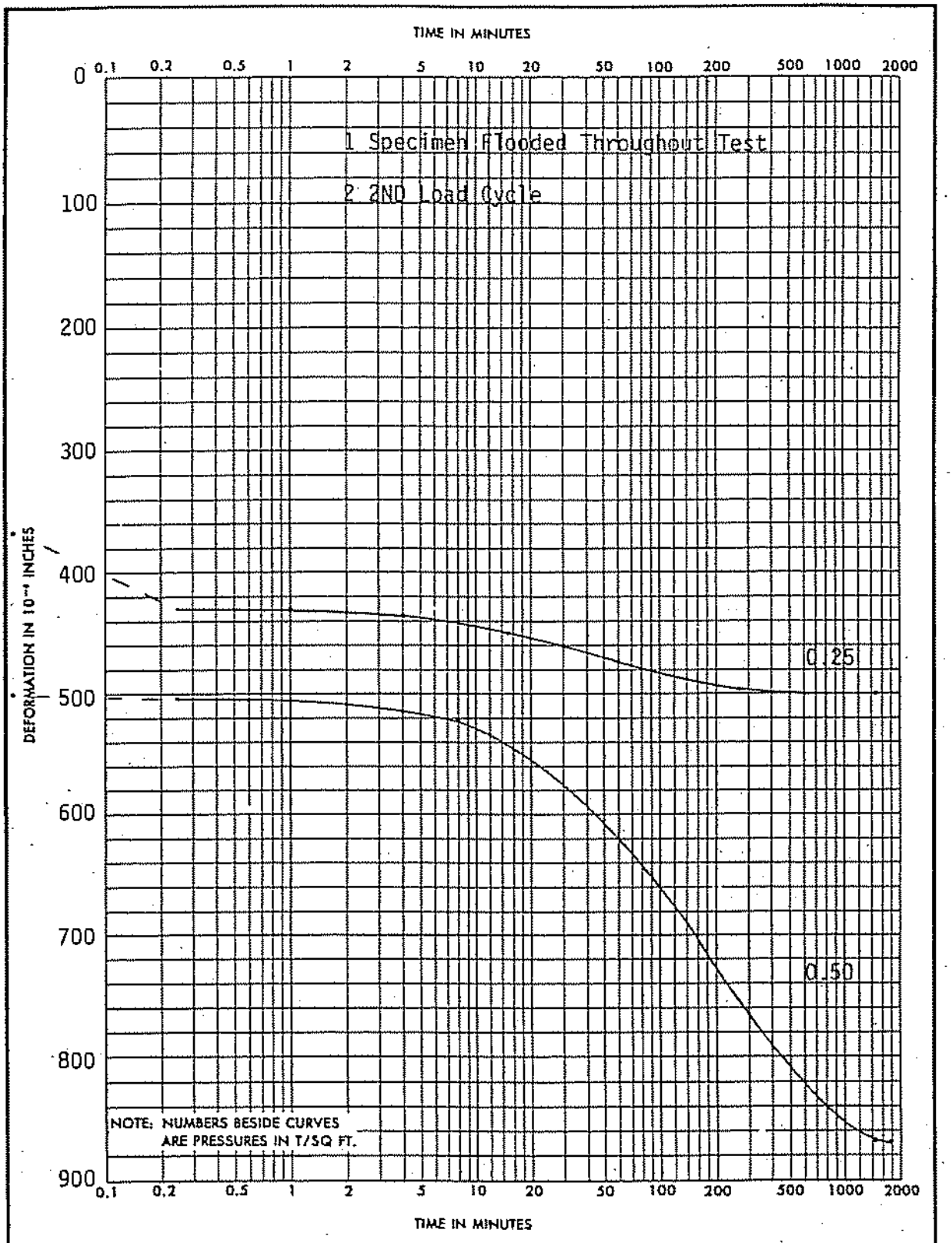


Type of Specimen: Undisturbed		Before Test		After Test	
Diam 2.49 in.	Ht 1.00 in.	Water Content, w_o	62.5 %	w_f	33.2 %
Overburden Pressure, p_o T/sq ft		Void Ratio, e_o	1.667	e_f	0.880
Preconsol. Pressure, p_c T/sq ft		Saturation, S_o	99.4 %	S_f	100.0 %
Compression Index, C_c		Dry Density, γ_d	62.0 lb/ft^3		
Classification: Gray, fat clay (CH).		k_{20} at e_o =	x 10^{-} cm/sec		
LL 95	G_s 2.65	Project Philadelphia District			
PL 39	D_{10} --	Lab. No. 184/401			
Remarks: See gradation curve and additional information on ENG Form 2087.		Area EdgeMoor Disposal Area			
		Boring No. EBB-27	Sample No. UD-2		
		Depth 26'-28'	Date 27 Sept. 1984		

CONSOLIDATION TEST REPORT

ENG FORM 2090 1 MAY 53 PREVIOUS EDITIONS ARE OBSOLETE.

DEP. ...JT OF THE ARMY, SOUTH ATLANTIC DIVISION LABORATO. WORK ORDER NO. 4129
CORPS OF ENGINEERS, 611 SOUTH COBB DRIVE, MARIETTA, GA. 30060 Req. No. NAPEN-84-34



PROJECT Philadelphia District

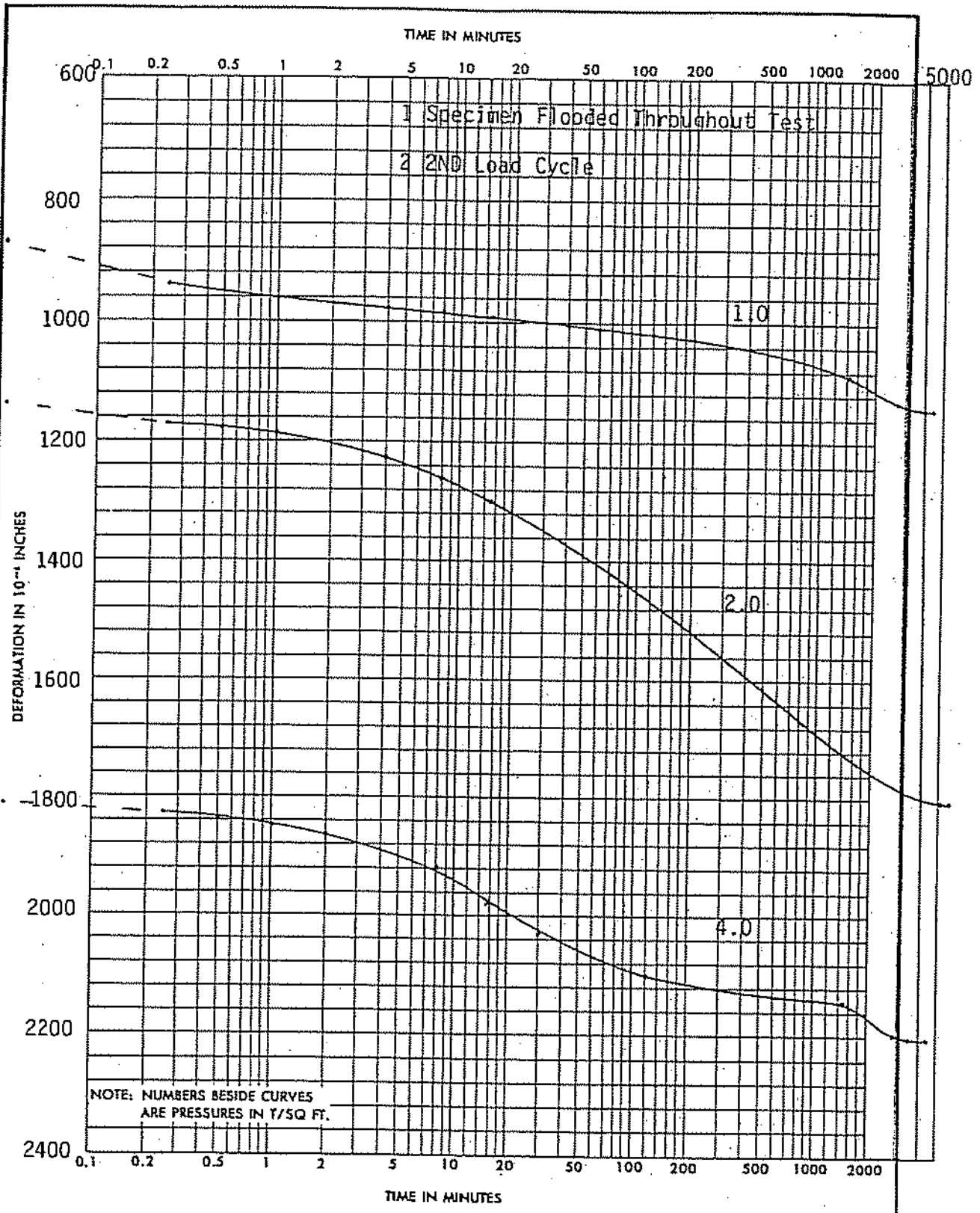
AREA EdgeMoor Disposal Area

BORING NO.	SAMPLE NO.	DEPTH	DATE
EBB-27	UD-2	~~XXX~~ 26'-28'	27 Sept. 1984

ENG FORM 2088 1 MAY 63 PREVIOUS EDITIONS ARE OBSOLETE.

CONSOLIDATION TEST—TIME CURVES (TRANSLUCENT)

* GPO : 1964 OF—715-945



PROJECT Philadelphia District

AREA EdgeMoor Disposal Area Lab. No. 184/401

BORING NO. EBB-27 | SAMPLE NO. UD-2 | DEPTH ~~4~~X 26'-28' | DATE 27 Sept 1984

ENG FORM 2088 1 MAY 63 PREVIOUS EDITIONS ARE OBSOLETE.

CONSOLIDATION TEST—TIME CURVES (TRANSLUCENT)

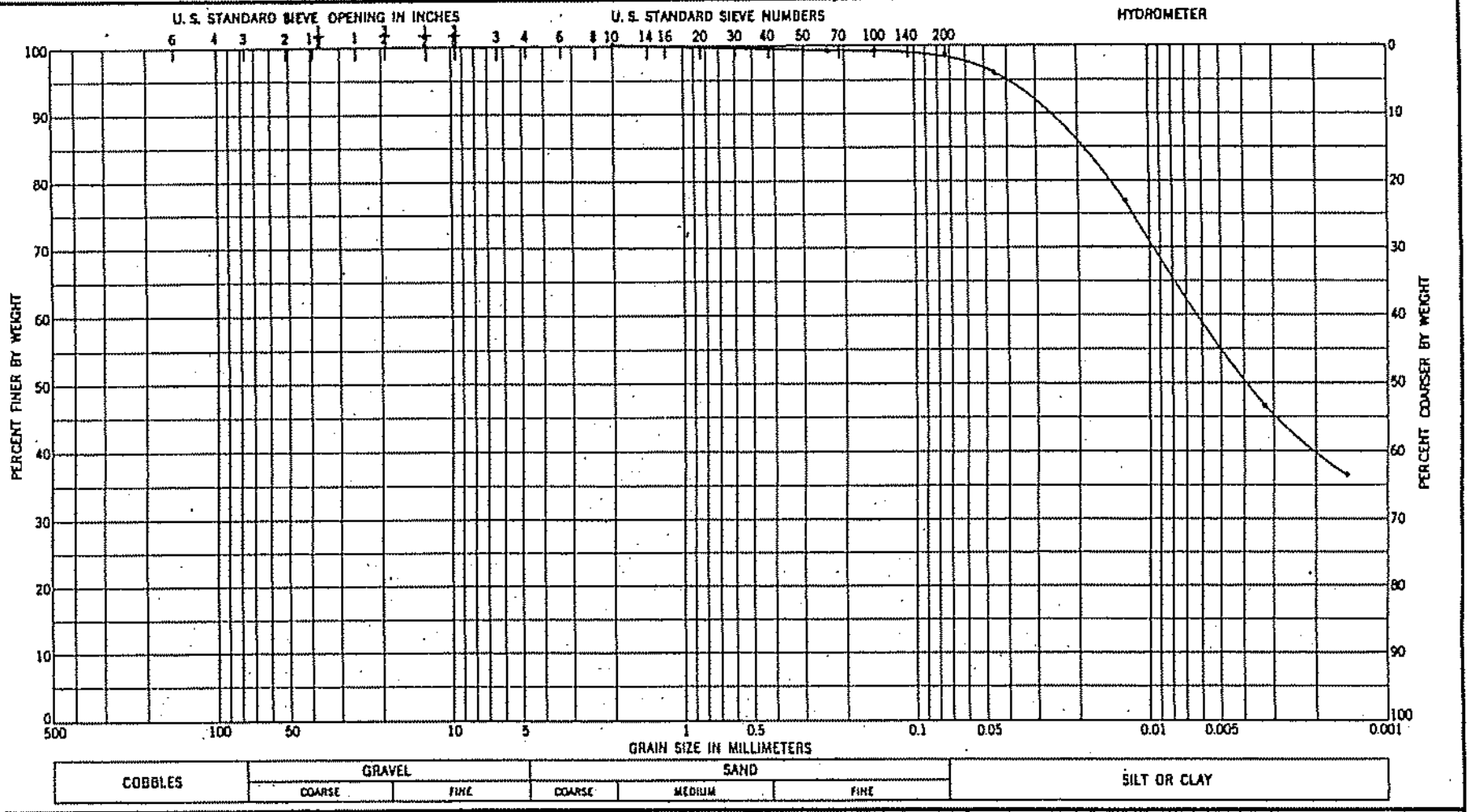
* GPO : 1984 OF—715-963

CORPS OF ENGINEERS, 611 SOUTH COOB DRIVE, MARIETTA, GA. 30060

WORK ORDER NO. 4129
Req. No. NAPEN-84-34

DEPARTMENT OF THE ARMY, SOUTH ATLANTIC DIVISION LABORATORY
CORPS OF ENGINEERS, 611 SOUTH COBB DRIVE, MARIETTA, GA. 30060

WORK ORDER NO. 4129
Req. No. NAPEN-84-34



Sample No.	Elev. or Depth	Classification	Nat w %	LL	PL	PI
UD-3	34'-36'	Gray fat clay (CH), with	87.9	120	46	*74
		organic matter.				
		*Plots near A-Line.				

GRADATION CURVES

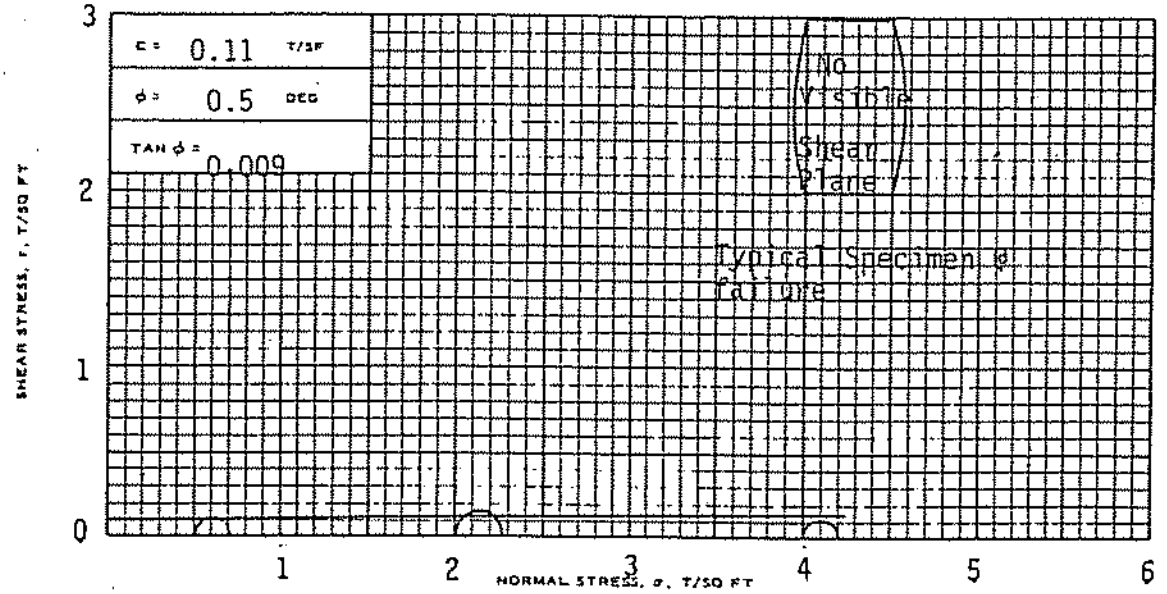
Project Philadelphia District
Lab. No. 184/402
Area EdgeMoor Disposal Area
Boring No. EBB-27, Sample No. UD-3
Date 21 September 1984

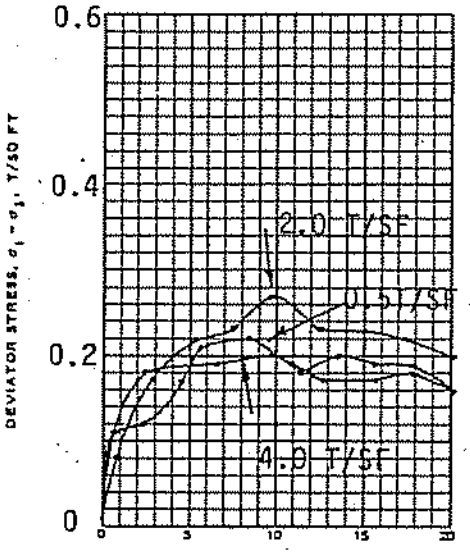
ENG FORM 1 MAY 03 2087

Q-triaxial

DEPARTMENT OF THE ARMY, SOUTH ATLANTIC DIVISION LABORATORY, CORPS OF ENGINEERS, 611 SOUTH COBB DRIVE, MARIETTA, GA. 30060

WORK ORDER NO. 4129
Req. No. NAPEN-84-34





SPECIMEN NO.			1	2	3
INITIAL	WATER CONTENT, %	w_o	92.3	85.3	86.2
	DRY DENSITY LB/ CU FT	γ_{d_o}	46.6	48.0	48.2
	SATURATION, %	S_o	97.2	93.4	95.1
	VOID RATIO	e_o	2.453	2.358	2.34
BEFORE SHEAR	WATER CONTENT, %	w_c	--	--	--
	DRY DENSITY LB/CU FT	γ_{d_c}	--	--	--
	SATURATION, %	S_c	--	--	--
	VOID RATIO	e_c	--	--	--
	FINAL BACK PRESSURE, T/SQ FT	u_b	--	--	--
MINOR PRINCIPAL STRESS, T/SQ FT		σ_3	0.50	2.00	4.00
MAXIMUM DEVIATOR STRESS, T/SQ FT		$\lvert\sigma_1 - \sigma_3\rvert_{max}$	0.22	0.27	0.20
TIME TO $(\sigma_1 - \sigma_3)_{max}$, MIN		t_f	11	13	13
ULTIMATE DEVIATOR STRESS, T/SQ FT		$\lvert\sigma_1 - \sigma_3\rvert_{ult}$	0.18	0.23	0.17
INITIAL DIAMETER, IN.		D_o	1.38	1.38	1.38
INITIAL HEIGHT, IN.		H_o	3.08	3.08	3.08

CONTROLLED Strain(0.75%/Min.) TEST

DESCRIPTION OF SPECIMENS Gray fat clay (CH), w/organic matter

LL 120	PL 46	PI *74	G_s 2.58	TYPE OF SPECIMEN Undisturbed	TYPE OF TEST 0

REMARKS:

1. See gradation curve on ENG Form 2087.
2. *Plots near A-Line.

PROJECT Philadelphia District
Area EdgeMoor Diposal Area
BORING NO. EBB-27 SAMPLE NO. UD-3
DEPTH XXXX 34'-36'
LABORATORY SADEN-FL DATE 21 Sept 1984

TRIAXIAL COMPRESSION TEST REPORT

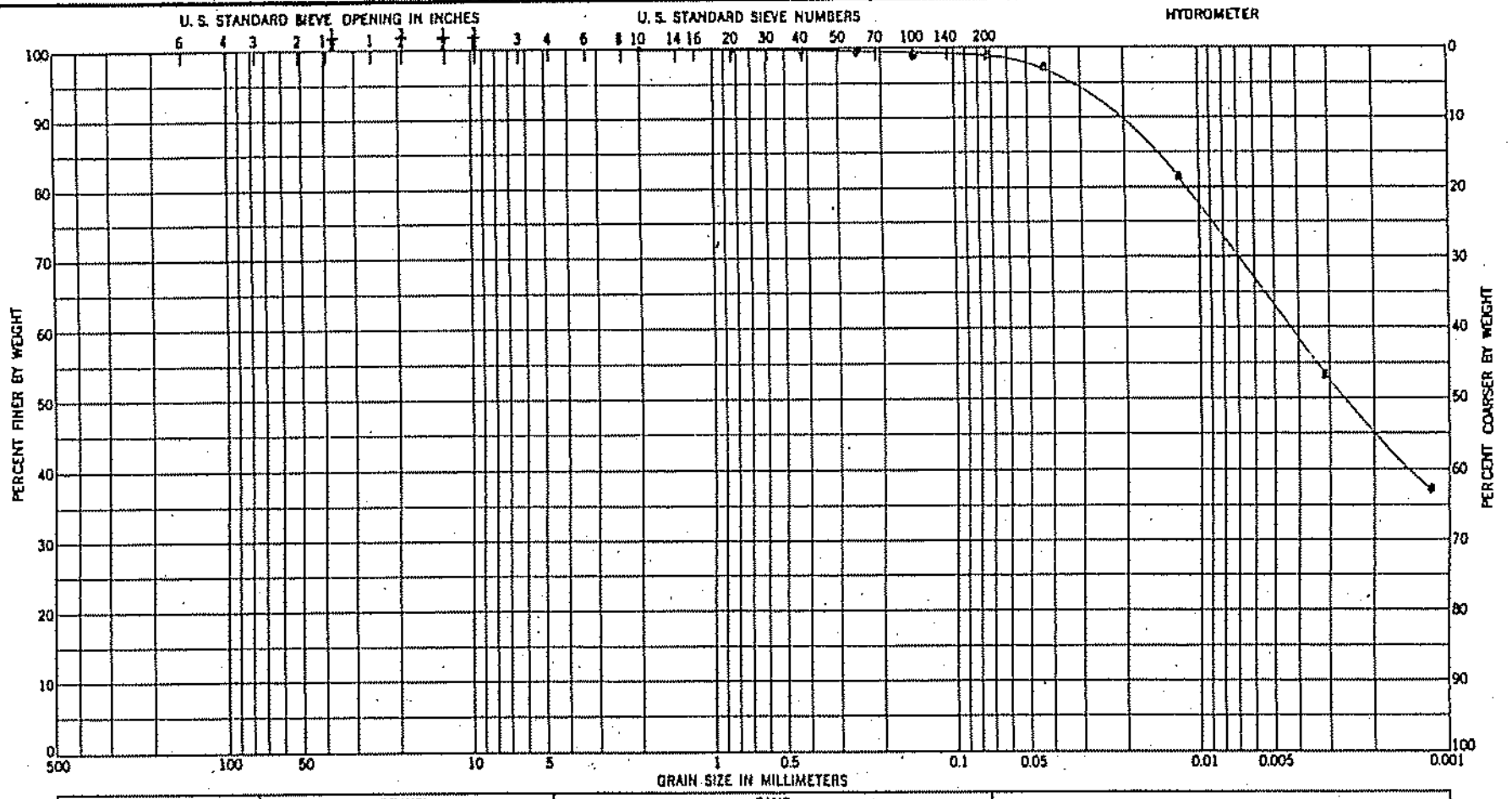
ENG FORM NO. 2089
REV JUNE 1970

Lab. No. 184/402

GPO : 1982 0 - 375-356

DEP. ...T OF THE ARMY, SOUTH ATLANTIC DIVISION LABORATO.
CORPS OF ENGINEERS, 611 SOUTH COBB DRIVE, MARIETTA, GA. 30060

WORK ORDER NO. 4129
Rep. No. NAPEN-84-34



Sample No.	Elev or Depth	Classification	Nat w %	LL	PL	PI
UD-5	48'-50'	Dk. gray clayey inorganic silt high LL (MH) w/a trace of organic fines	78.4	107	46	61

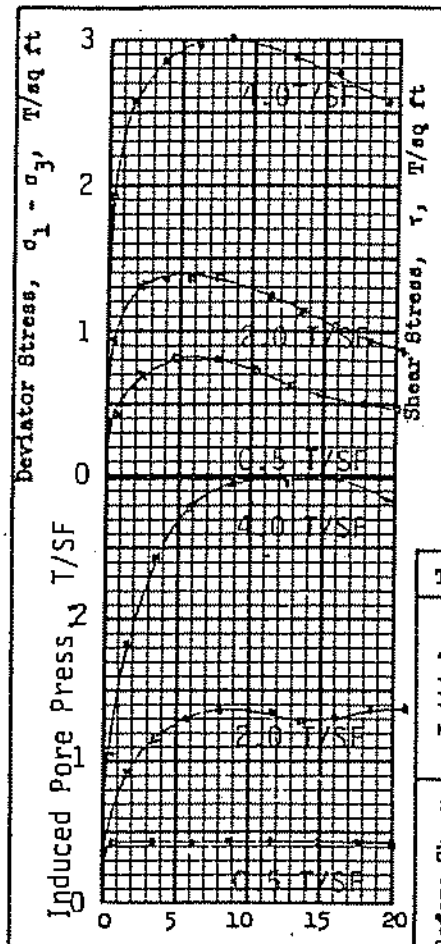
GRADATION CURVES

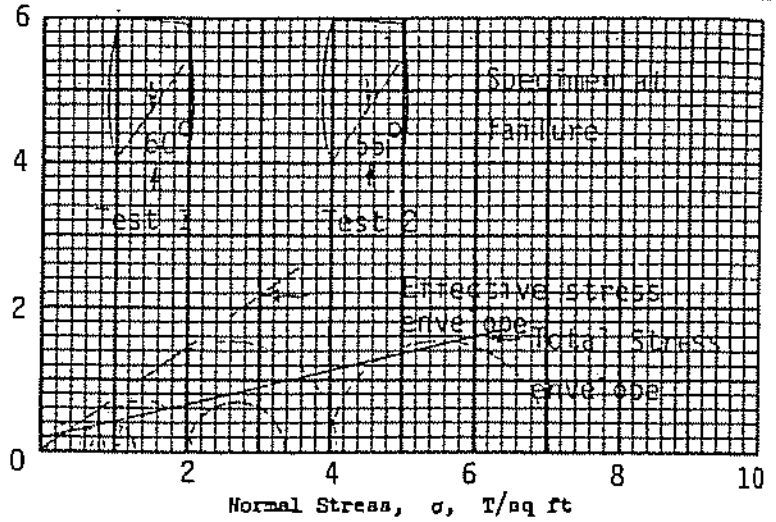
Project Philadelphia District
Lab. No. 184/403 (R Test)
Area EdgeMoor Disposal Area
Boring No. EBB-27, Sample UD-5
Date 21 September 1984

ENG FORM 1 MAY 63 2087

DEPARTMENT OF THE ARMY, SOUTH ATLANTIC DIVISION LABORATORY
CORPS OF ENGINEERS, 611 SOUTH COBB DRIVE, MARIETTA, GA. 30060

Requisition No. NAPEN-84-34
Work No. 4129





Test No.			1	2	3	
Initial	Water content	w_o	86.8 %	73.9 %	74.4 %	%
	Void ratio	e_o	2.283	1.984	1.961	
	Saturation	S_o	97.7 %	95.8 %	97.5 %	%
	Dry density, lb/cu ft	γ_d	49	53.8	54.2	
Before Shear	Water content	w_c	83.2 %	59.7 %	49.1 %	%
	Void ratio	e_c	2.137	1.534	1.263	
	Saturation	S_c	100.0 %	100.0 %	100.0 %	%
	Final back pressure, T/sq ft	u_o	4.00	4.00	4.00	
Final	Water content	w_f	83.2 %	59.7 %	49.1 %	%
	Void ratio	e_f	2.137	1.534	1.263	
Minor principal stress, T/sq ft		σ_3	0.50	2.00	4.00	
Max deviator stress, T/sq ft		$(\sigma_1-\sigma_3)_{max}$	0.83	1.39	3.02	
Time to failure, min		t_f	50	75	80	
Rate of strain, percent/min			0.10	0.10	0.11	
% Strain at $(\sigma_1-\sigma_3)$ Max.			4.90	7.66	8.61	
Ult deviator stress, T/sq ft		$(\sigma_1-\sigma_3)_{ult}$	0.55	1.08	2.80	
Initial diameter, in.		D_o	1.38	1.38	1.38	
Initial height, in.		H_o	3.08	3.08	3.08	

Shear Strength Parameters

	Total	Effective
ϕ =	13.0	35.5
tan ϕ =	.231	.713
c =	0.20	0.0 T/sq ft

Method of saturation: Back Pressure

☐ Controlled stress
☒ Controlled strain

Type of test R | Type of specimen Undisturbed

Classification Dark gray clayey inorganic silt high LL (MH) w/a trace of organic fines

LL 107 | PL 46 | PI 61 | D_{10} < .001 mm | G_s 2.57

Remarks

See gradation curve on ENG Form 2087.

Project Philadelphia District
Lab. No. 184/403
Area EdgeMoor Disposal Area
Boring No. EBB-27 | Sample No. UD-5
Depth 48'-50' | Date 21 Sept. 1984

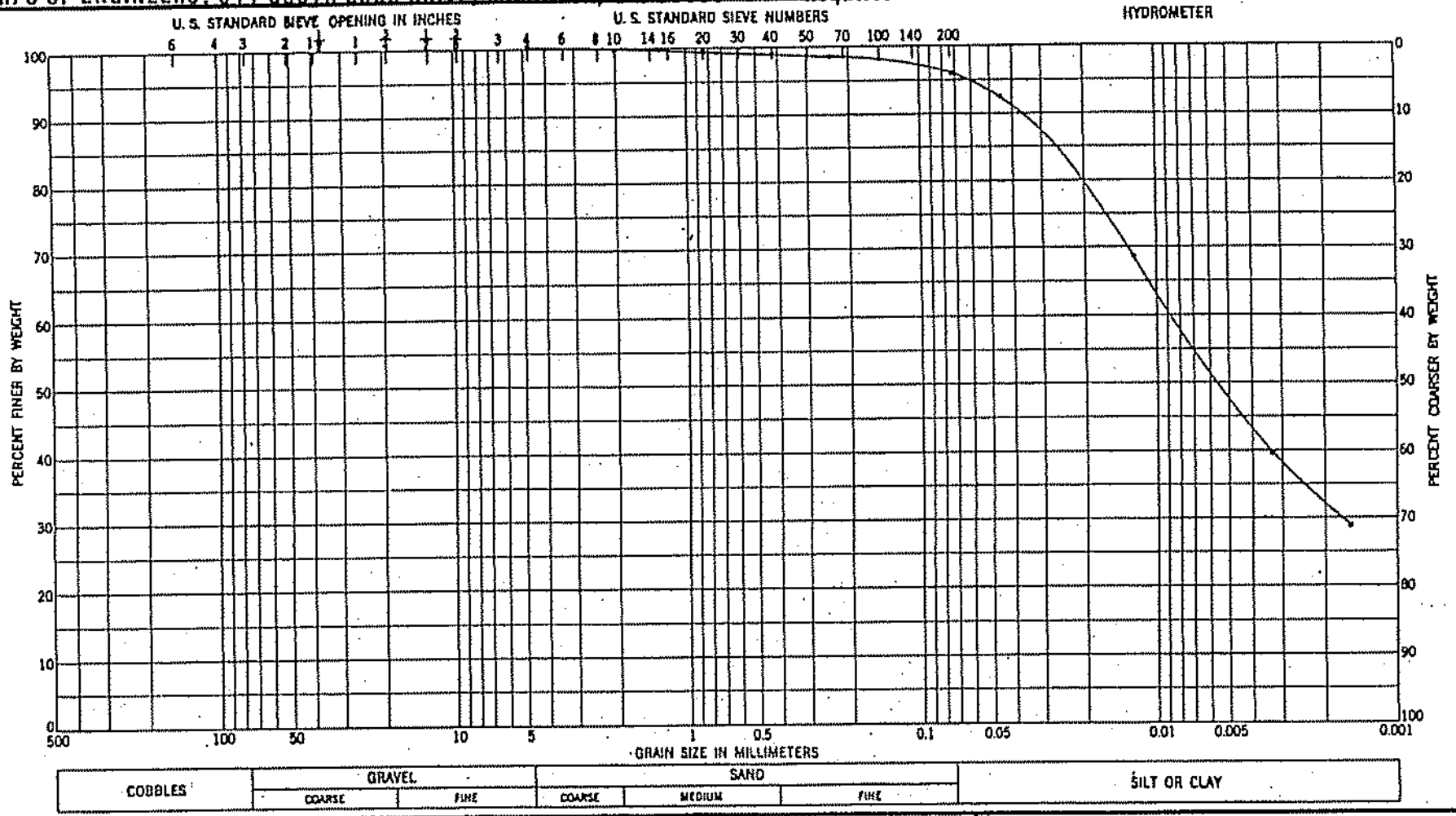
TRIAXIAL COMPRESSION TEST REPORT

ENG FORM 1 JUN 65 2089 (EM 1110-2-1902) PREVIOUS EDITIONS ARE OBSOLETE

TRANSLUCENT

DEPARTMENT OF THE ARMY, SOUTH ATLANTIC DIVISION LABORATORY
CORPS OF ENGINEERS, 611 SOUTH COBB DRIVE, MARIETTA, GA 30060

WORK ORDER NO. 4129
Req. No. NAPEN-84-34



Sample No.	XXXX Depth	Classification	Nat w %	LL	PL	PI
UD-1	8'-10'	Gray clayey, inorganic silt	77.2	103	42	*61
		high LL (MH), w/a trace of				
		sand				
		*Plots on A-line				

GRADATION CURVES

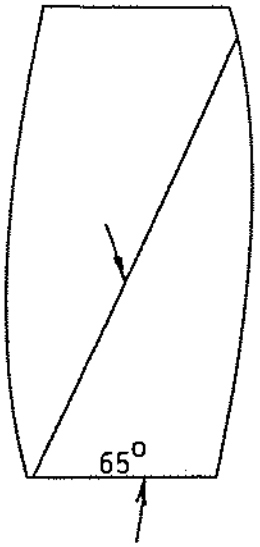
Project Philadelphia District
Lab. No. 184/404
Area EdgeMoor Disposal Area
Boring No. EB8-28, Sample No. UD-1
Date 24 September 1984

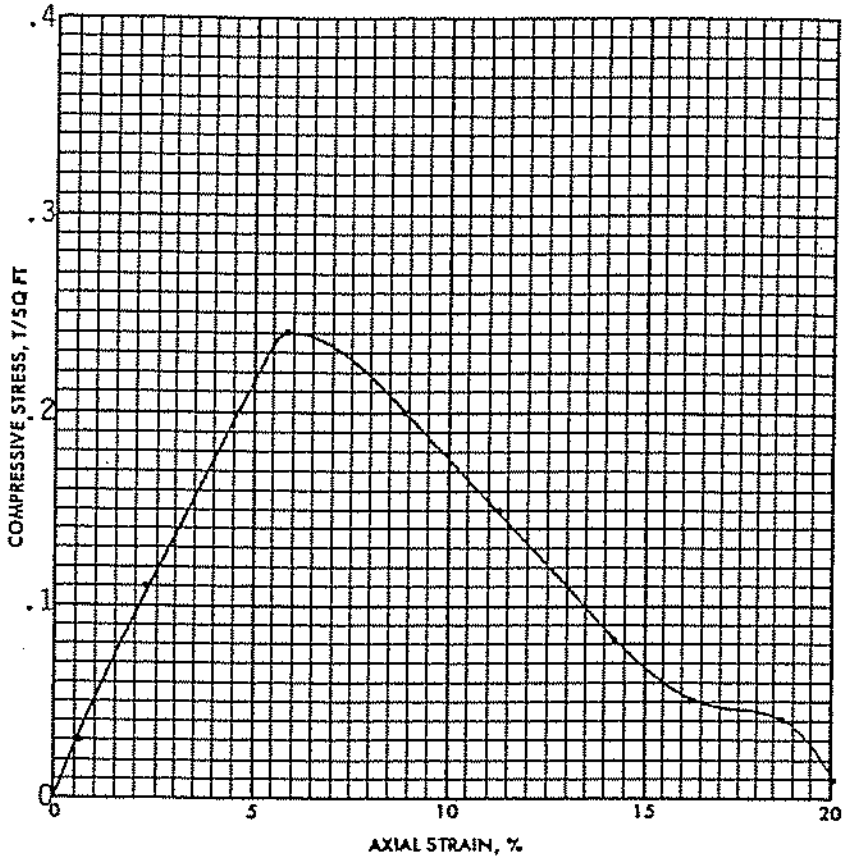
ENG FORM 1 MAY 63 2087

DEPARTMENT OF THE ARMY, SOUTH ATLANTIC DIVISION LABORATORY
CORPS OF ENGINEERS, 611 SOUTH COBB DRIVE, MARIETTA, GA. 30061

WORK ORDER NO. 4129
Req.' Np. NAPEN-84-34

FAILURE SKETCHES





☐ CONTROLLED STRESS

☒ CONTROLLED STRAIN

TEST NO.		1			
TYPE OF SPECIMEN		Undisturbed			
INITIAL WATER CONTENT	w_o	77.2 %	%	%	%
INITIAL VOID RATIO	e_o	2.061			
INITIAL SATURATION	S_o	97.4 %	%	%	%
INITIAL DRY DENSITY, LB/CU FT	γ_d	53.0			
TIME TO FAILURE, MIN	t_f	8			
UNCONFINED COMPRESSIVE STRENGTH, T/SQ FT	q_u	0.24			
UNDRAINED SHEAR STRENGTH, T/SQ FT	s_u	0.12			
~~Sensitivity~~ Rate of strain %/min.	$\dot{\varepsilon}$	0.74			
INITIAL SPECIMEN DIAMETER, IN	D_o	1.38			
INITIAL SPECIMEN HEIGHT, IN.	H_o	3.08			

CLASSIFICATION Gray, clayey, inorganic silt high LL (MH), w/a trace of sand.

LL	PL	PI	G_s
103	42	*61	2.60

REMARKS

1. See gradation curve on ENG Form 2087.

2 *Plots on A-Line.

PROJECT Philadelphia District

Lab. No. 184/404

AREA EdgeMoor Disposal Area

BORING NO. EBB-28 SAMPLE NO. UD-1

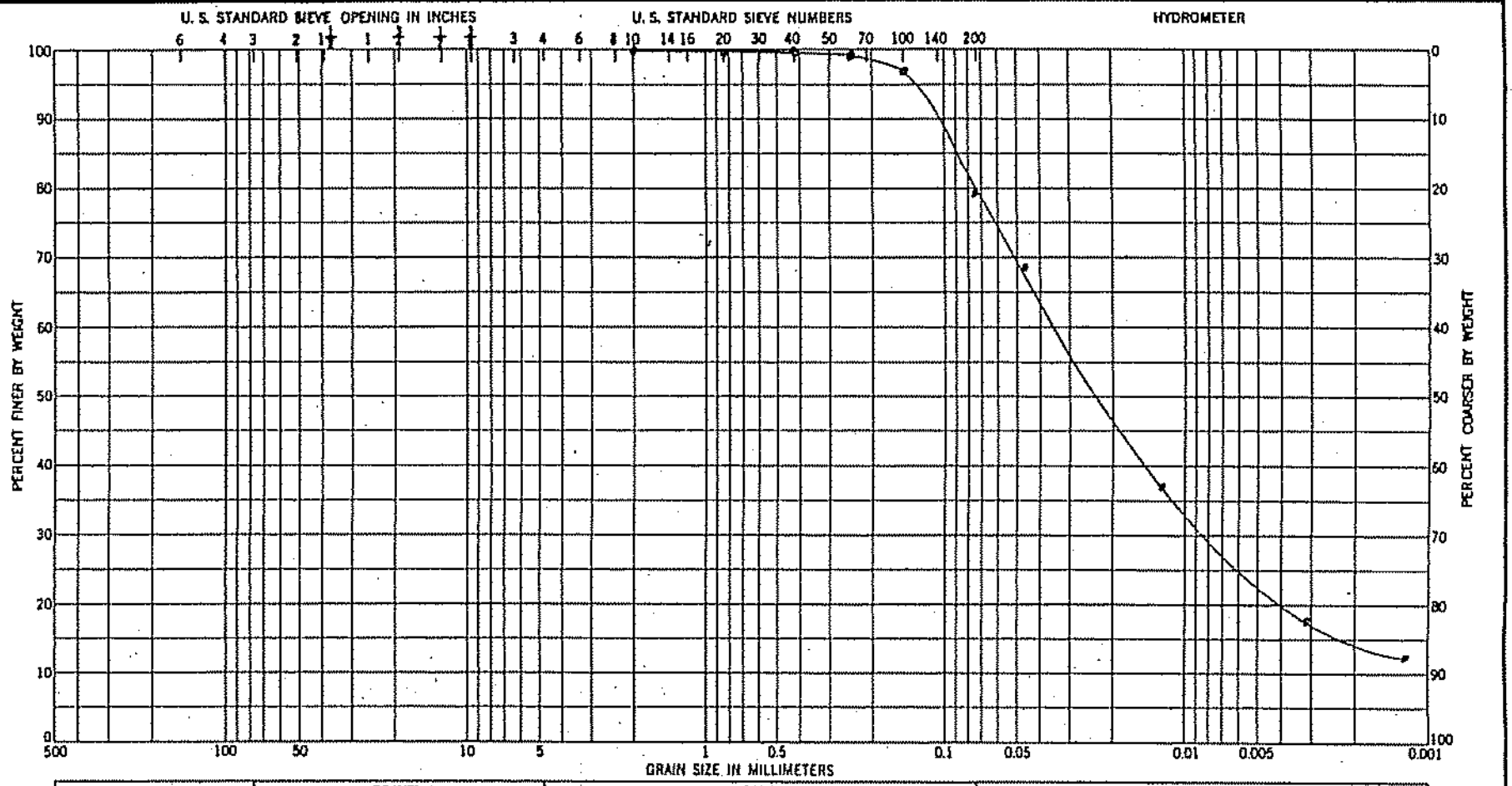
DEPTH 8'-10' DATE 24 Sept. 1984

UNCONFINED COMPRESSION TEST REPORT

ENG FORM 1 JUN 65 **3659** (EM 1110-2-1906) (TRANSLUCENT) GPO : 1966 O-214-546 PLATE XI-2

OE[illegible]T OF THE ARMY, SOUTH ATLANTIC DIVISION LABORAT[illegible] - WORK ORDER NO. 4129

CORPS OF ENGINEERS, 611 SOUTH COBB DRIVE, MARIETTA, GA. 30060 Rep. No. NAPEN-84-34



Sample No.	Depth	Classification	Nat w %	LL	PL	PI
UD-1	14'-16'	Dk., gray silty fat clay (CH)	53.0	54	29	25
		w/some sand				

GRADATION CURVES

Project Philadelphia District

Lab. No. 184/405 (Q-Test)

Area EdgeMoor Disposal Area

Boring No. EBB-29, Sample UD-1

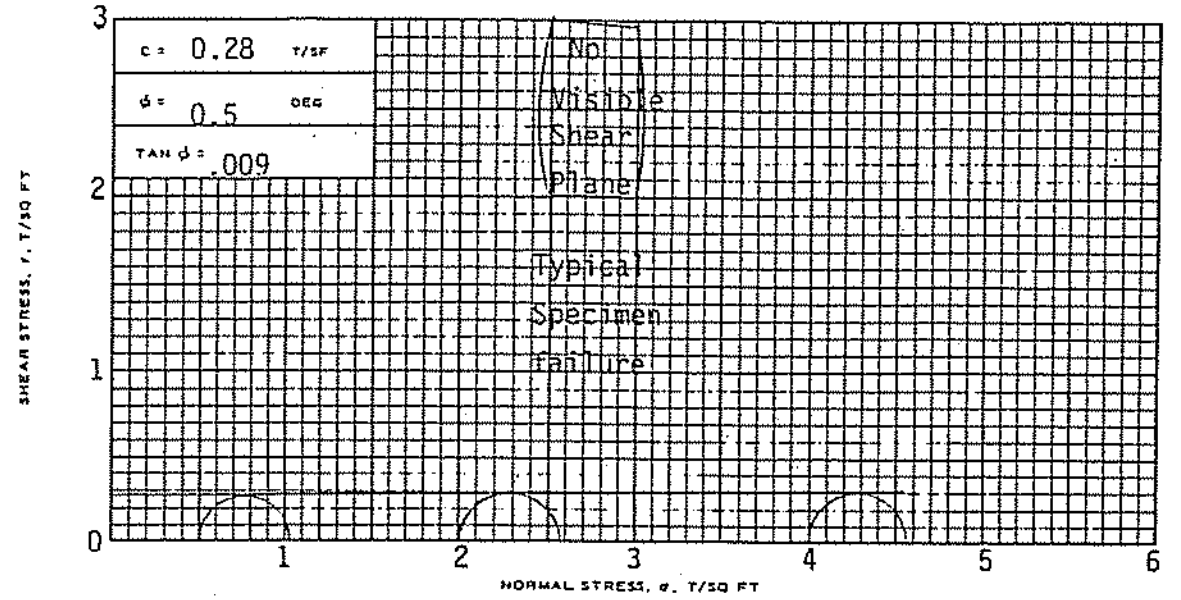
Date 25 September 1984

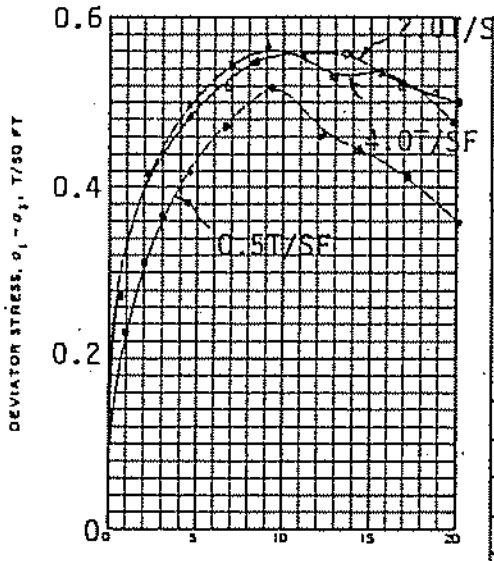
ENG FORM 1 MAY 63 2087

DEPARTMENT OF THE ARMY, SOUTH ATLANTIC DIVISION LABORATORY, CORPS OF ENGINEERS, 611 SOUTH COBB DRIVE, MARIETTA, GA. 30060

WORK ORDER NO. 4129

Req. No. NAPEN-84-34





SPECIMEN NO.			1	2	3
INITIAL	WATER CONTENT, %	w_o	63.0	47.8	48.1
	DRY DENSITY LB/ CU FT	γ_{d_o}	59.7	68.5	66.6
	SATURATION, %	S_o	94.4	89.6	86.2
	VOID RATIO	e_o	1.762	1.407	1.473
BEFORE SHEAR	WATER CONTENT, %	w_c	---	---	---
	DRY DENSITY LB/CU FT	γ_{d_c}	---	---	---
	SATURATION, %	S_c	---	---	---
	VOID RATIO	e_c	---	---	---
	FINAL BACK PRESSURE, T/SQ FT	u_b	---	---	---
MINOR PRINCIPAL STRESS, T/SQ FT		σ_3	0.50	2.00	4.00
MAXIMUM DEVIATOR STRESS, T/SQ FT		$(\sigma_1 - \sigma_3)_{MAX}$	0.52	0.56	0.56
TIME TO $(\sigma_1 - \sigma_3)_{MAX}$, MIN		t_f	12	15	12
ULTIMATE DEVIATOR STRESS, T/SQ FT		$(\sigma_1 - \sigma_3)_{ult}$	0.44	0.54	0.54
INITIAL DIAMETER, IN.		D_o	1.38	1.38	1.38
INITIAL HEIGHT, IN.		H_o	3.08	3.08	3.08

CONTROLLED- Strain(.75%/Min.) TEST

DESCRIPTION OF SPECIMENS Dk., gray silty fat clay (CH) w/some sand

LL 54	PL 29	PI 25	G_s 2.64	TYPE OF SPECIMEN Undisturbed	TYPE OF TEST U

REMARKS:

See gradation curve on ENG Form 2087.

PROJECT Philadelphia District

Area: EdgeMoor Disposal Area

BORING NO. EBB-29 SAMPLE NO. UO-1

DEPTH/ELEV. ~~XXX~~ 14'-16'

LABORATORY SADEN-FL DATE 25 Sept. 1984

TRIAXIAL COMPRESSION TEST REPORT

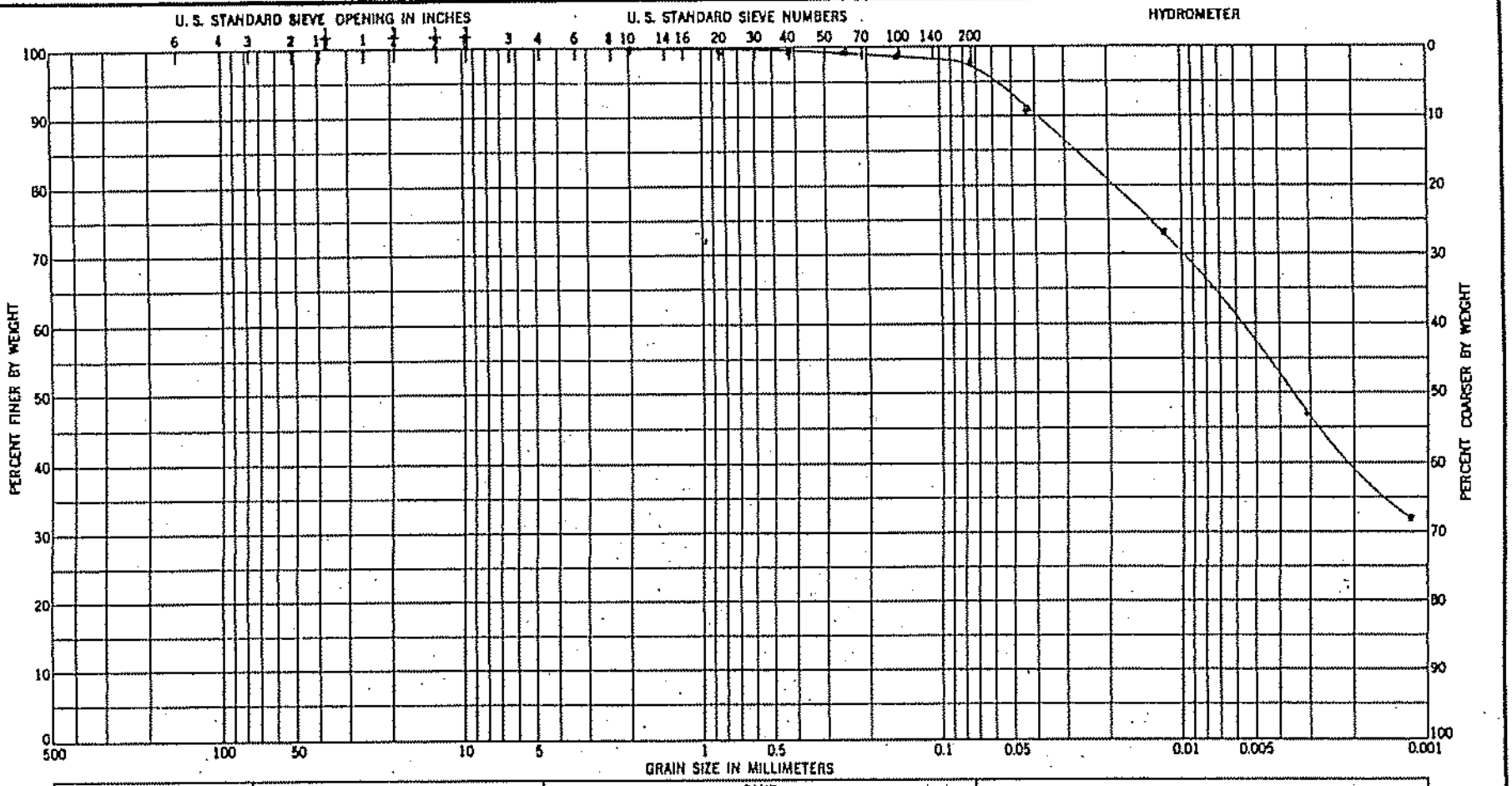
ENG FORM NO. 2089
REV JUNE 1970

GPO : 1982 0 - 375-356

Lab. No. 184/405

DEP. .n. .T OF THE ARMY, SOUTH ATLANTIC DIVISION LABORATO.
CORPS OF ENGINEERS, 611 SOUTH COBB DRIVE, MARIETTA, GA. 30060

WORK ORDER NO. 4129
Reg. No. NAPEN-84-34



Sample No.	Depth	Classification	Nat w %	LL	PL	PI
UD-2	34'-36'	Dk. gray clayey inorganic silt, high LL (MH) w/a trace of organic matter.	68.4	101	43	58

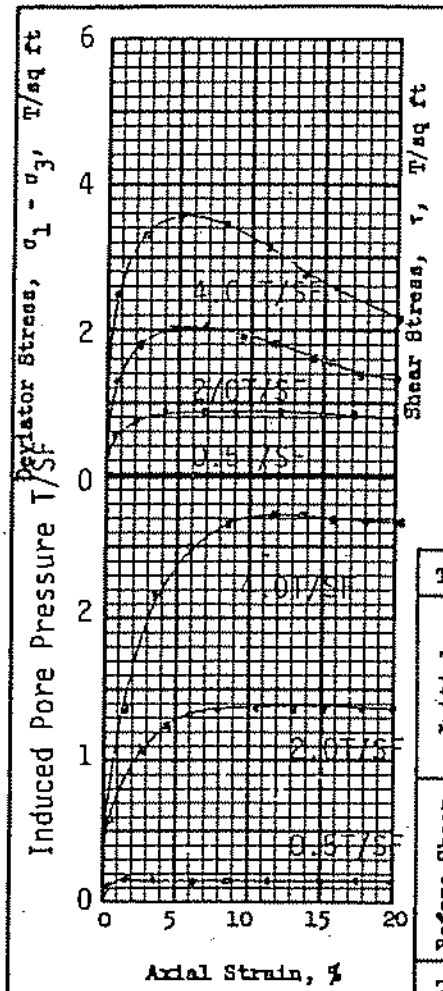
GRADATION CURVES

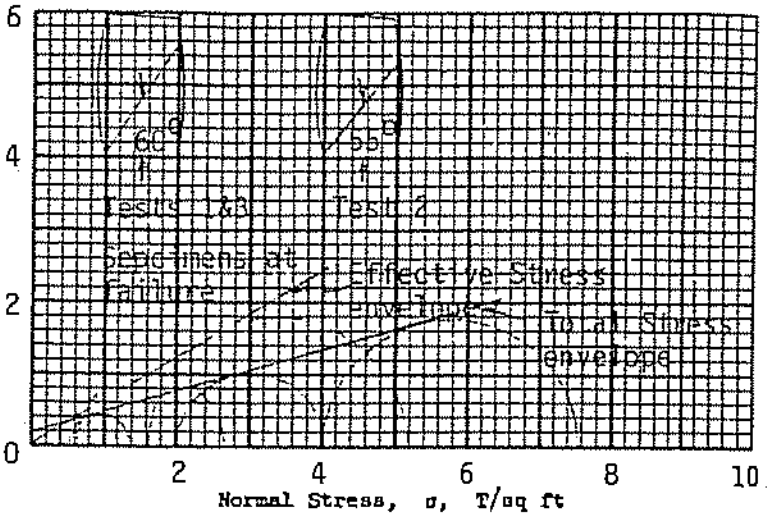
Project Project District
Lab. No. 184/406 (R Test)
Area EdgeMoor Disposal Area
Boring No EBB-29, Sample UD-2
Date 28 September 1984

ENG FORM 1 MAY 83 2087

DEPARTMENT OF THE ARMY, SOUTH ATLANTIC DIVISION LABORATORY
CORPS OF ENGINEERS, 611 SOUTH COBB DRIVE, MARIETTA, GEORGIA 30060

WORK ORDER NO. 4129
REQ. NO. NAPEN-84-34





Test No.			1	2	3	
Initial	Water content	w_o	69.1 %	72.4 %	63.6%	%
	Void ratio	e_o	1.870	1.921	1.699	
	Saturation	S_o	95.7 %	97.6 %	96.9 %	%
	Dry density, lb/cu ft	γ_d	56.3	55.3	59.9	
Before Shear	Water content	w_c	66.0 %	59.3 %	49.0 %	%
	Void ratio	e_c	1.710	1.535	1.268	
	Saturation	S_c	100.0 %	100.0%	100.0%	%
	Final back pressure, T/sq ft	u_o	4.00	4.00	4.00	
Final	Water content	w_f	66.0 %	59.3 %	49.0 %	%
	Void ratio	e_f	1.710	1.535	1.268	
Minor principal stress, T/sq ft		σ_3	0.50	2.00	4.00	
Max deviator stress, T/sq ft	$(\sigma_1-\sigma_3)_{max}$		0.90	2.02	3.58	
Time to failure, min		t_f	65	65	45	
Rate of strain, percent/min			0.10	0.10	0.10	
			6.56	6.58	4.71	
Ult deviator stress, T/sq ft	$(\sigma_1-\sigma_3)_{ult}$		0.82	1.58	2.65	
Initial diameter, in.		D_o	1.38	1.38	1.38	
Initial height, in.		H_o	3.08	3.08	3.08	

Shear Strength Parameters

	Total	Effective
ϕ =	16.0	31.5
tan ϕ =	.287	.613
c =	0.20	0.0 T/sq ft

Method of saturation: Back Pressure

[ ] Controlled stress
[X] Controlled strain

Type of test R | Type of specimen Undisturbed

Classification Dk. gray clayey inorganic silt, high LL (MH)w/a trace of organic matter

LL	PL	PI		G_s
101	43	58	D10 < .001mm	2.59

Remarks: See gradation curve on ENG Form 2087.

Project Philadelphia District
Lab. No. 184/406
Area EdgeMoor Disposal Area
Boring No. EBB-29 | Sample No. UD-2
Depth 34'-36' | Date 28 September 1984

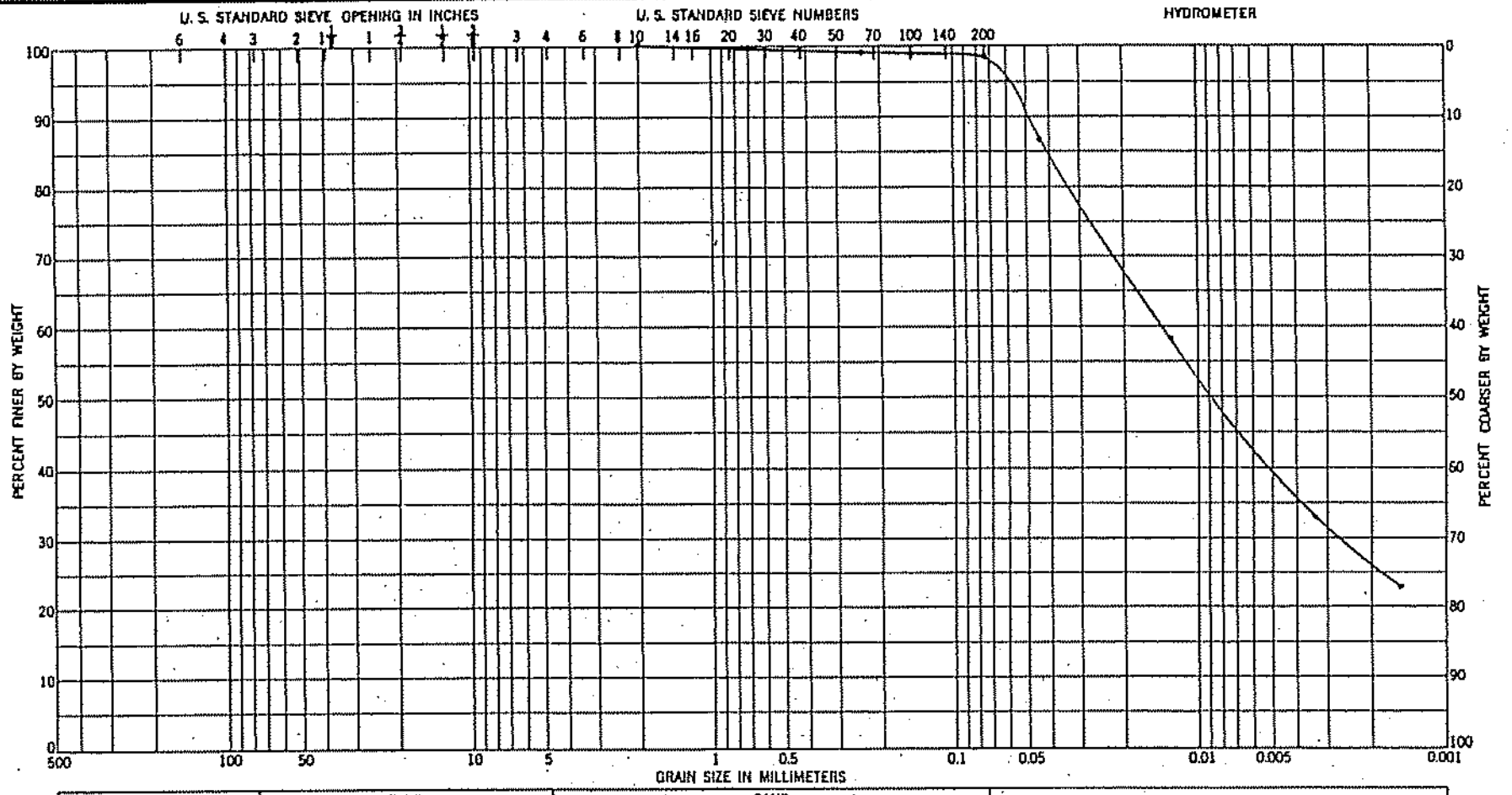
TRIAXIAL COMPRESSION TEST REPORT

ENG FORM 2089 1 JUN 63 (EM 1110-2-1902) PREVIOUS EDITIONS ARE OBSOLETE

TRANSLUCENT

DEPARTMENT OF THE ARMY, SOUTH ATLANTIC DIVISION LABORATORY
CORPS OF ENGINEERS, 611 SOUTH COBB DRIVE, MARIETTA, GA. 30060

WORK ORDER NO. 4129
Reg. No. NAPEN-84-34



Sample No.	Depth	Classification	Nat w %	LL	PL	PI
UD-3	44'-46'	Gray fat clay (CH), w/organic matter	54.3	79	35	44*
		*Plots near A-line				

GRADATION CURVES

Project Philadelphia District
Lab. No. 184/407
Area EdgeMoor Disposal Area
Boring No. EBB-29, Sample No. UD-3
Date 28 September 1984

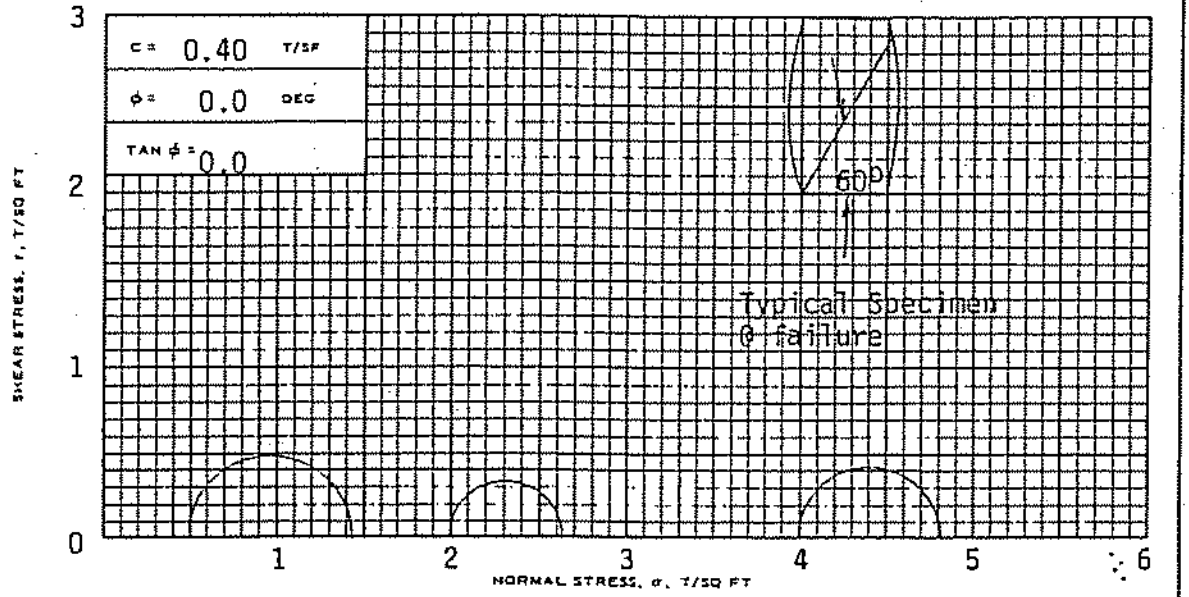
ENG FORM 1 MAY 83 2087

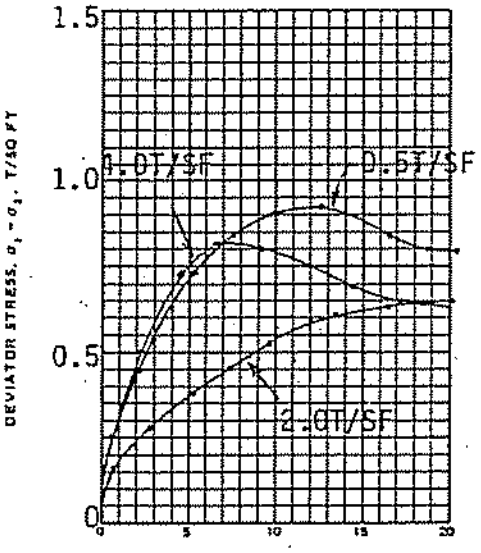
Q-triaxial

DEPARTMENT OF THE ARMY, SOUTH ATLANTIC DIVISION LABORATORY, CORPS OF ENGINEERS, 611 SOUTH COBB DRIVE, MARIETTA, GA. 30060

WORK ORDER NO. 4129

Req. No. NAPEN-84-34





SPECIMEN NO.			1	2	3
INITIAL	WATER CONTENT, %	w_o	51.0	48.0	63.8
	DRY DENSITY LB/CU FT	γd_o	69.8	70.7	60.3
	SATURATION, %	S_o	100.0	96.4	98.2
	VOID RATIO	e_o	1.326	1.296	1.690
BEFORE SHEAR	WATER CONTENT, %	w_c	---	---	---
	DRY DENSITY LB/CU FT	γd_c	---	---	---
	SATURATION, %	S_c	---	---	---
	VOID RATIO	e_c	---	---	---
	FINAL BACK PRESSURE, T/SQ FT	u_b	---	---	---
MINOR PRINCIPAL STRESS, T/SQ FT		σ_3	0.50	2.00	4.00
MAXIMUM DEVIATOR STRESS, T/SQ FT	$(\sigma_1 - \sigma_3)_{MAX}$		0.92	0.62	0.82
TIME TO $(\sigma_1 - \sigma_3)_{MAX}$, MIN		t_f	17	20	9
ULTIMATE DEVIATOR STRESS, T/SQ FT	$(\sigma_1 - \sigma_3)_{ULT}$		0.88	0.62	0.68
INITIAL DIAMETER, IN.		D_o	1.38	1.38	1.38
INITIAL HEIGHT, IN.		H_o	3.08	3.08	3.08

CONTROLLED Strain(0.75%/Min) TEST

DESCRIPTION OF SPECIMENS Gray fat clay (CH), w/organic matter.

LL	PL	PI	G_s	TYPE OF SPECIMEN	TYPE OF TEST
79	35	44*	2.60	Undisturbed	Q

REMARKS:

1 See gradation curve on ENG Form 2087.

2 *Plots near A-Line

PROJECT Philadelphia District

Area: EdgeMoor Disposal Area

BORING NO. EBB-29 SAMPLE NO. UD-3

DEPTH XXX 44'-46

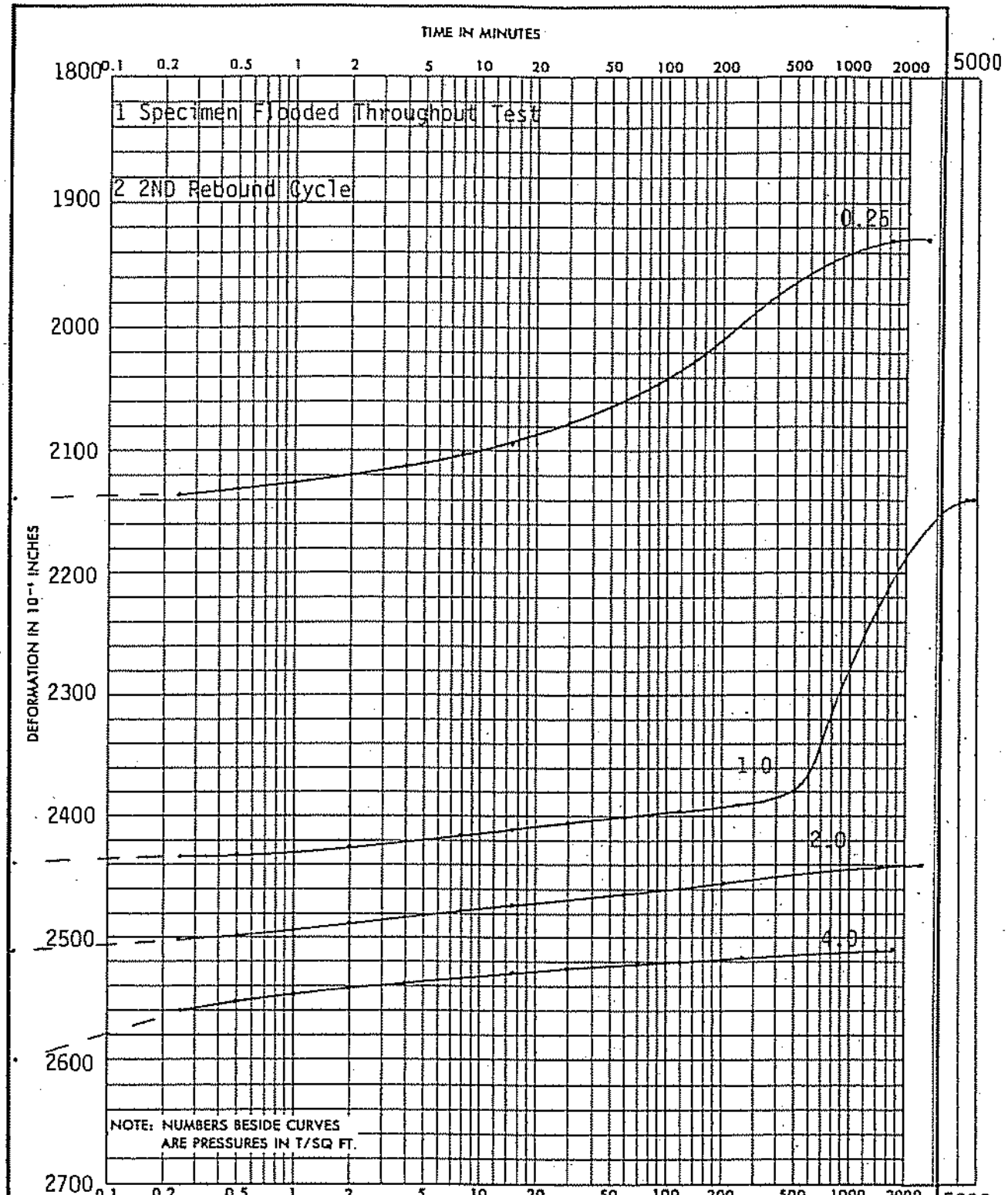
LABORATORY SADEN-FL DATE 28 September1984

TRIAXIAL COMPRESSION TEST REPORT

ENG FORM NO. 2089
REV JUNE 1970

Lab. No. 184/407

GPO : 1992 0 - 375-356



PROJECT Philadelphia District

AREA EdgeMoor Disposal Area Lab. No. 184/408

BORING NO.	SAMPLE NO.	DEPTH	DATE
EBB-29	UD-4	~~X~~ 50'-52'	28 Sept. 1984

ENG FORM 2088 1 MAY 63 PREVIOUS EDITIONS ARE OBSOLETE.

CONSOLIDATION TEST—TIME CURVES (TRANSLUCENT)

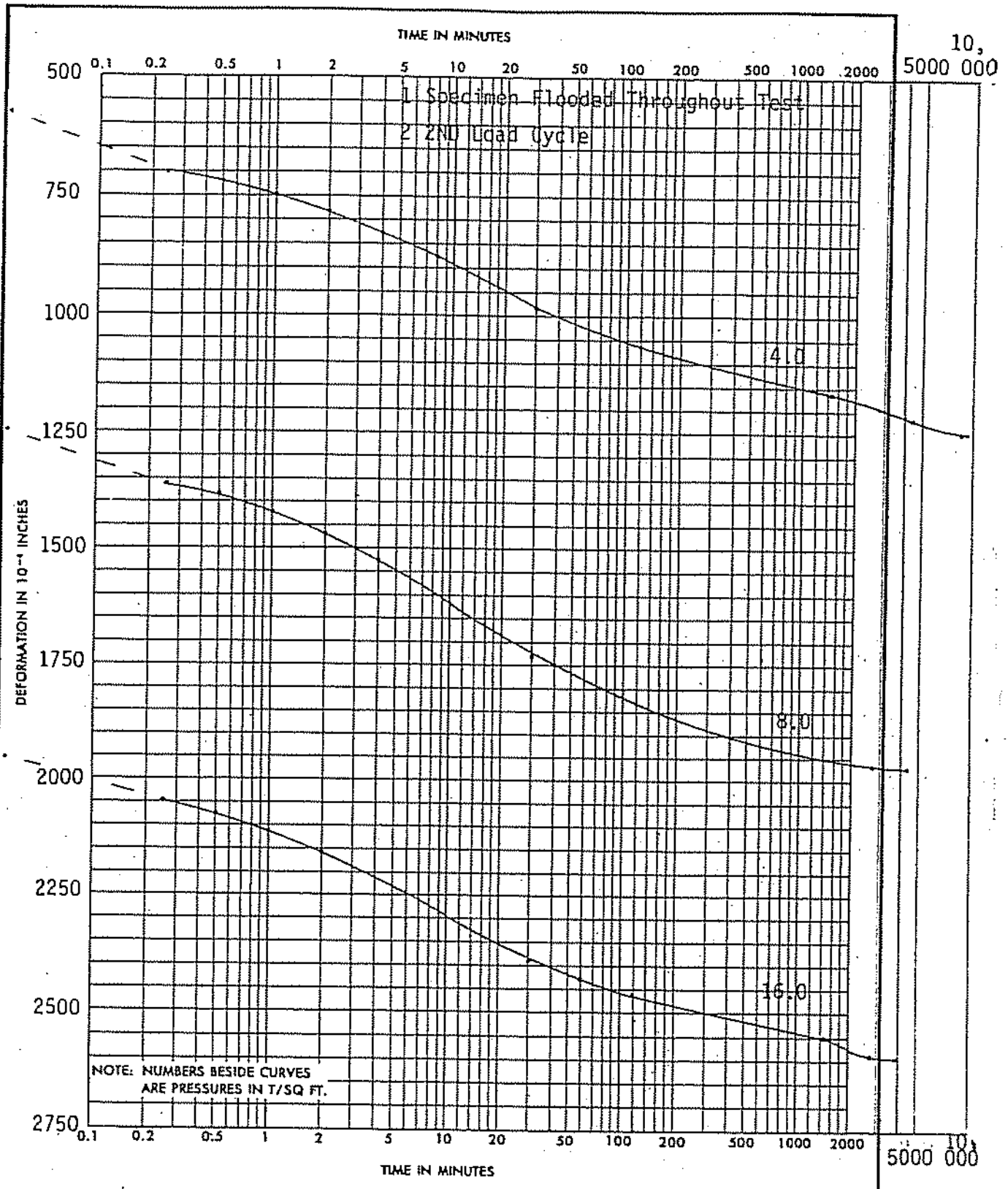
* GPO : 1964 OF—713-365

DE[illegible] OF THE ARMY, SOUTH ATLANTIC DIVISION LABORA[illegible]
CO[illegible] ENGINEERS, 611 SOUTH COBB DRIVE, MARIETTA, GA. 30060

WORK ORDER NO. 4129
Req. No. NAEPN-84-34

CORPS OF ENGINEERS, 611 SOUTH COBB DRIVE, MARIETTA, GA. 30060
SOUTH ATLANTIC DIVISION LABORATORY

WORK ORDER NO. 4129
Req. No. NAPEN-84-34



PROJECT Philadelphia District

AREA EdgeMoor Disposal Area Lab. No. 184/408

BORING NO.	SAMPLE NO.	DEPTH	DATE
EBB-29	UD-4	50'52'	28 Sept. 1984

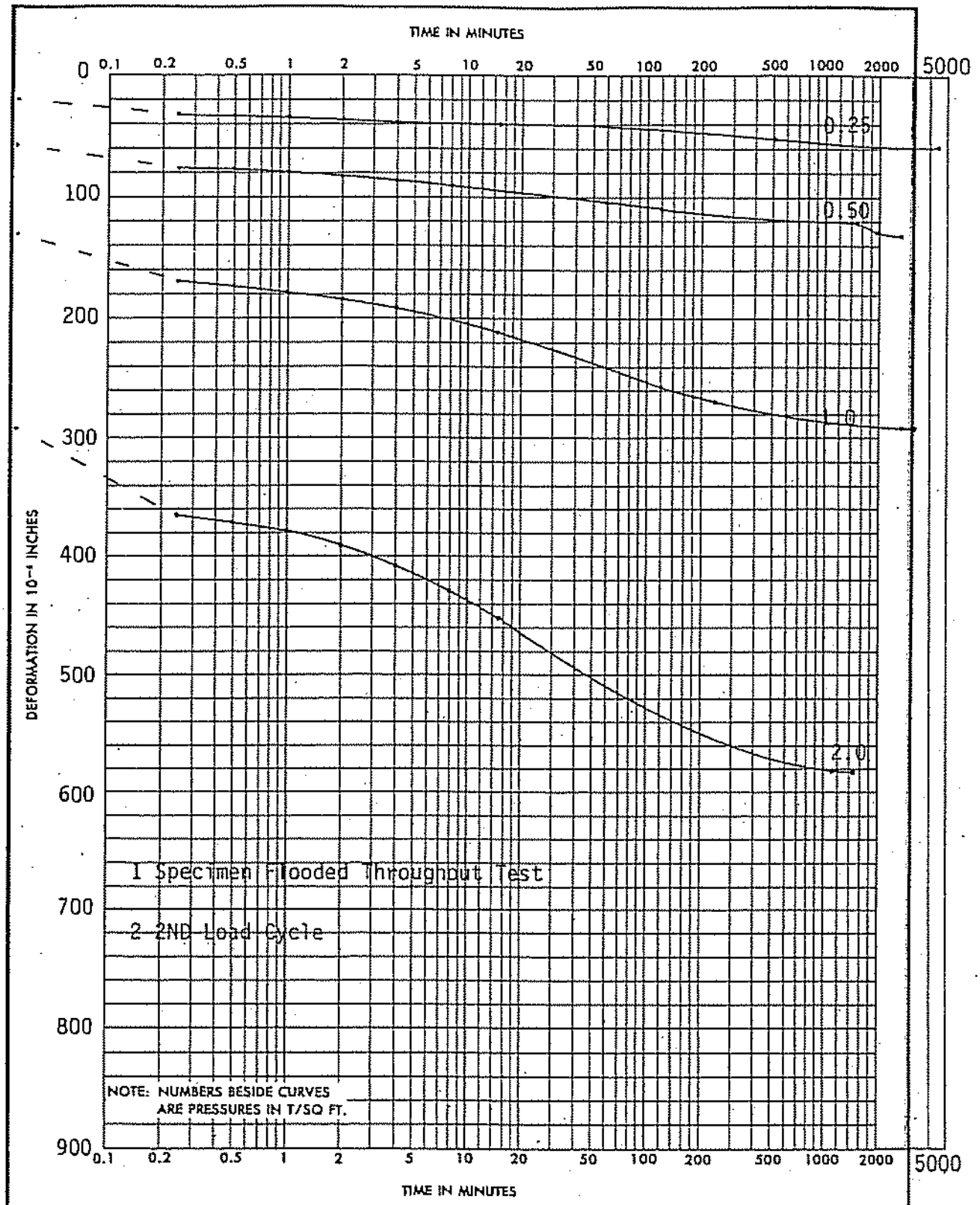
ENG FORM 2088 1 MAY 63 PREVIOUS EDITIONS ARE OBSOLETE.

CONSOLIDATION TEST—TIME CURVES (TRANSLUCENT)

* GPO : 1964 OP—715-943

DE[illegible] OF THE ARMY, SOUTH ATLANTIC DIVISION LABORA[illegible]
CE[illegible] OF ENGINEERS, 611 SOUTH COBB DRIVE, MARIETTA, GA. 30060

WORK ORDER NO. 4129
Req. No. NAPEN-84-34



PROJECT Philadelphia District

AREA Edgemoor Disposal Area Lab. No. 184/408

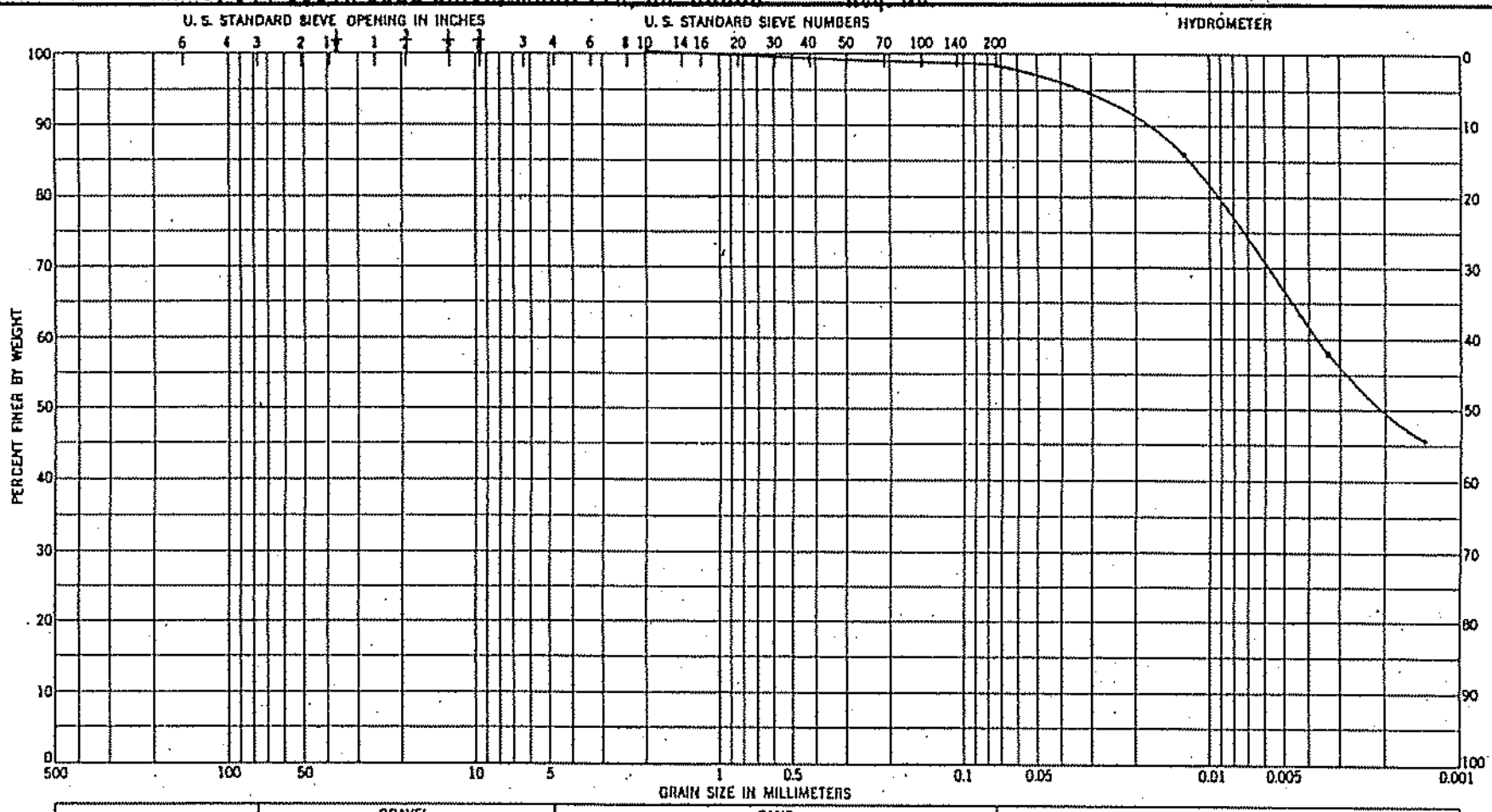
BORING NO.	SAMPLE NO.	DEPTH	DATE
EBB-29	UD-4	50'-52'	28 Sept. 1984

ENG FORM 2088 1 MAY 63 PREVIOUS EDITIONS ARE OBSOLETE.

CONSOLIDATION TEST—TIME CURVES (TRANSLUCENT)

* GPO : 1984 O[illegible]—715-965

DEPART..:T OF THE ARMY, SOUTH ATLANTIC DIVISION LABORATORY — WORK ORDER NO. 4129
CORPS OF ENGINEERS, 611 SOUTH COBB DRIVE, MARIETTA, GA 30060 — Req. No NAPEN-84-34



Sample No.	Depth	Classification	Nat w %	LL	PL	PI
UD-4	50'-52'	Gray, clayey, inorganic silt high LL (MH)	57.1	117	48	*69
		*Plots near A-line				

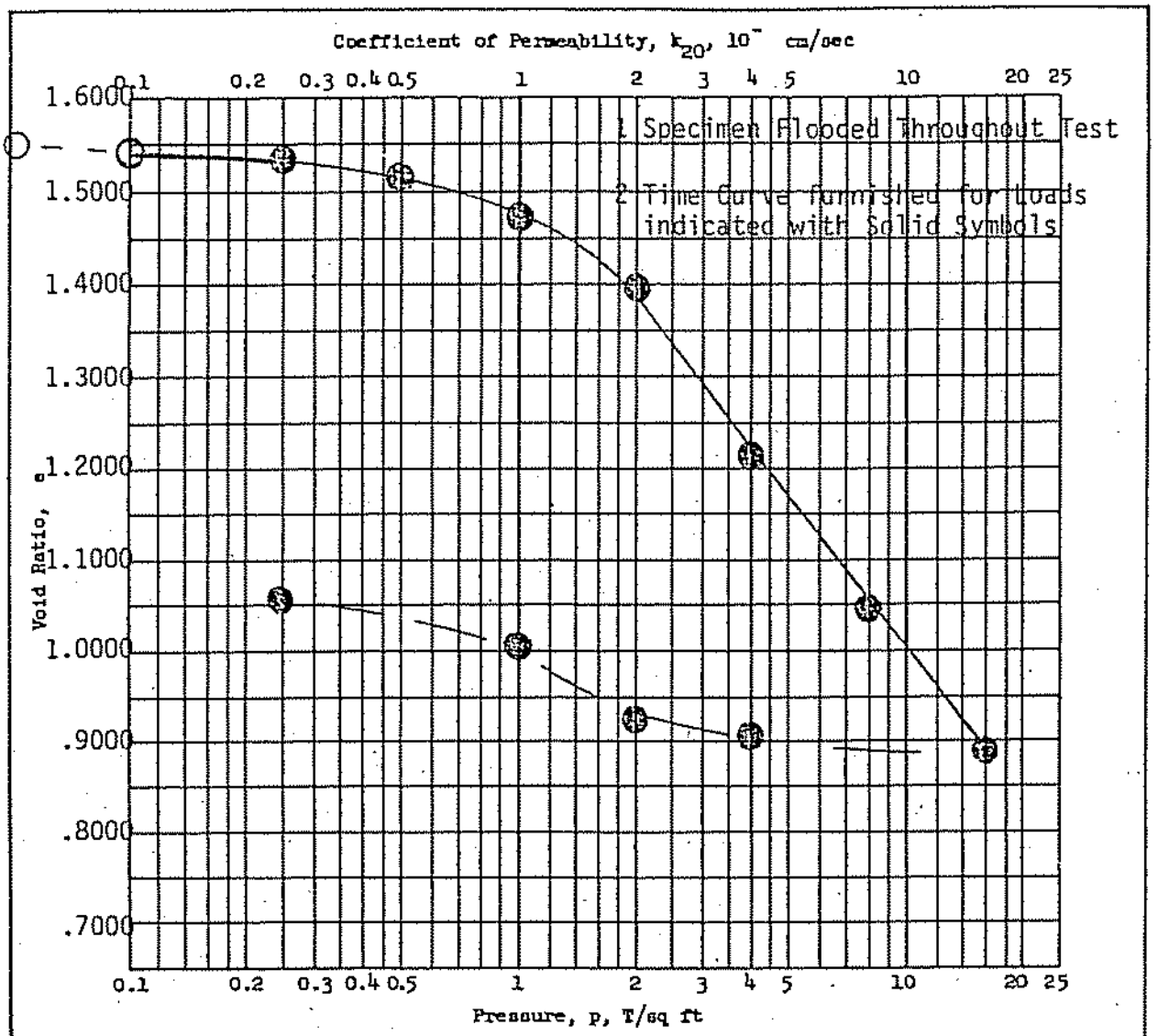
GRADATION CURVES

Project Philadelphia District
Lab. No. 184/408
Area EdgeMoor Disposal Area
Boring No. EBB-29, Sample No. UD-4
Date 28 Sept. 1984

ENG FORM 1 MAY 63 2087

Consolidation Test

DEPT. OF THE ARMY, SOUTH ATLANTIC DIVISION LABORATORY
CORPS OF ENGINEERS, 611 SOUTH COBB DRIVE, MARIETTA, GA. 30060
WORK ORDER NO. 4129
Req. No. NAPEN-84-34



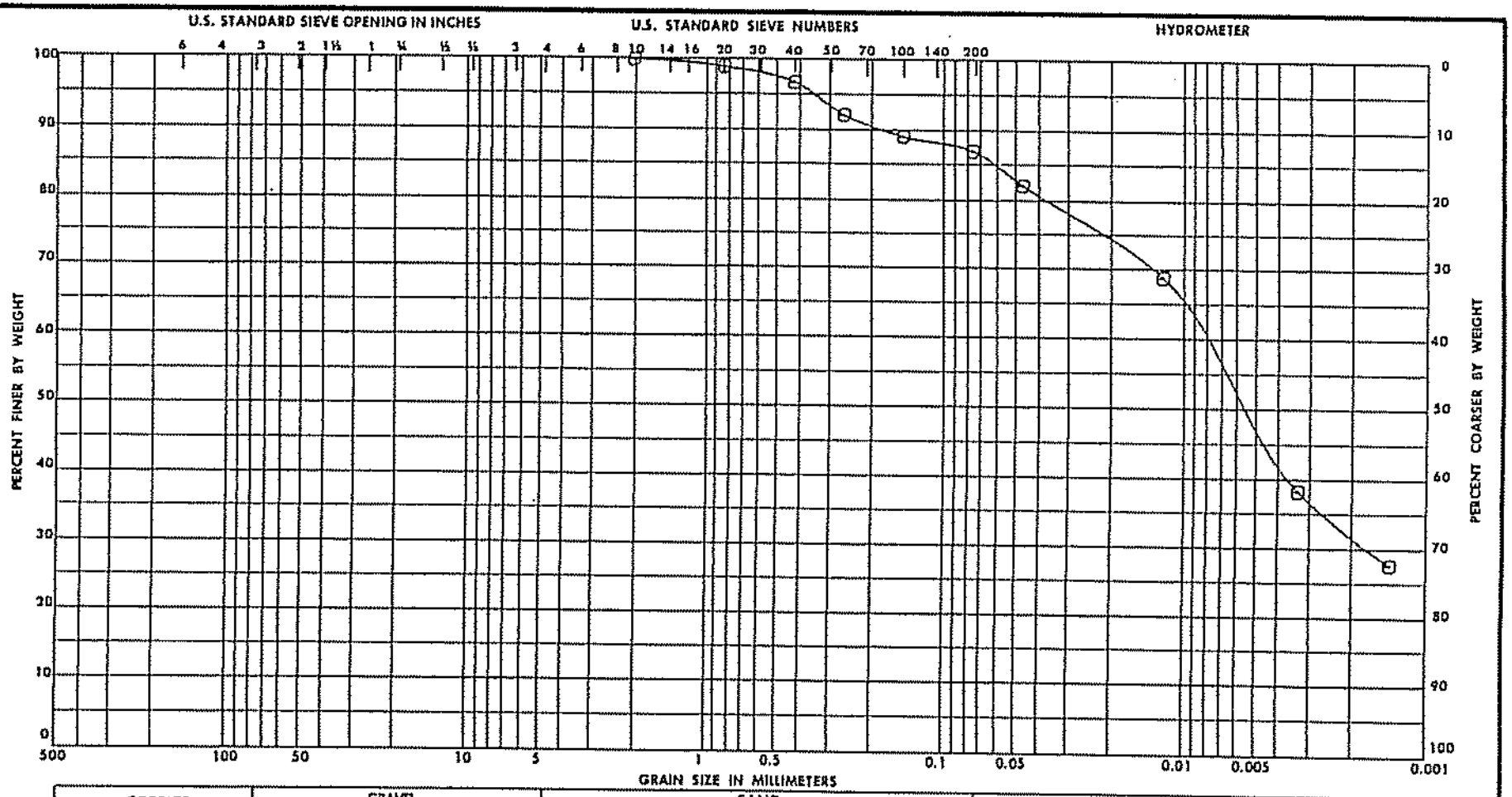
Type of Specimen Undisturbed		Before Test		After Test	
Diam 2.49 in.	Ht 1.00 in.	Water Content, w_o	57.1 %	w_f	40.4 %
Overburden Pressure, p_o T/sq ft		Void Ratio, e_o	1.547	e_f	1.055
Preconsol. Pressure, p_c T/sq ft		Saturation, S_o	96.4 %	S_f	100.0 %
Compression Index, C_c		Dry Density, γ_d	64.0 lb/ft^3		
Classification Gray, clayey, inorganic silt, High LL (MH)		k_{20} at e_o =		× 10^{-} cm/sec	
LL 117	G_s 2.61	Project Phildelphia District			
PL 48	D_{10} --	Lab. No. 184/408			
Remarks		Area EdgeMoor Disposal Area			
See gradation curve and addi-		Boring No. E88-29		Sample No. UD-4	
tional information on ENG Form		Depth MX 50'-52'		Date 28 Sept. 1984	
2087.		CONSOLIDATION TEST REPORT			

ENG FORM 2090 1 MAY 63 PREVIOUS EDITIONS ARE OBSOLETE.

DEPARTMENT OF THE ARMY, SOUTH ATLANTIC DIVISION LABORATORY
CORPS OF ENGINEERS, 611 SOUTH COBB DRIVE, MARIETTA, GA. 30060

W.O. No. 4129

Req. No. NAPEN-84-34



Sample No.	~~Elev or~~ Depth	Classification	Nat w %	LL	PL	PI
2	22-24'	FAT CLAY (CH), SILTY	58.9	62	30	32
		GRAY, WITH A TRACE OF SAND AND				
		ORGANIC MATTER.				

GRADATION CURVES

Project PHIL. DISTRICT
EDGEMOOR DISPOSAL AREA
Area LAB NO. 184/409
Boring No. EBB-30 SAMPLE NO. 2
Date 09/26/84

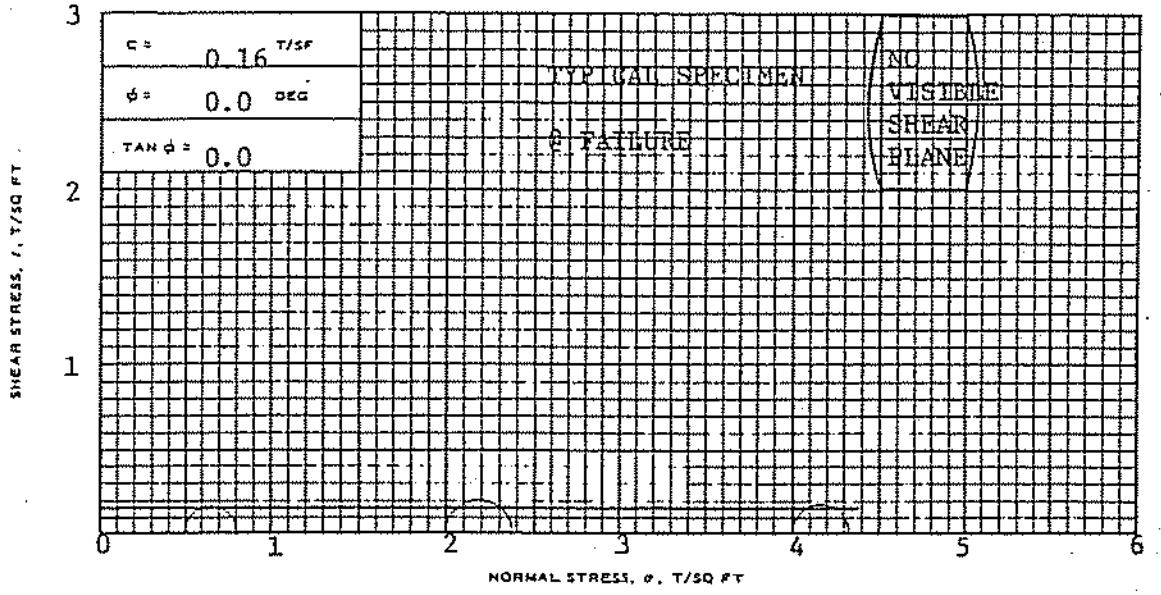
ENG FORM 1 MAY 03 2087

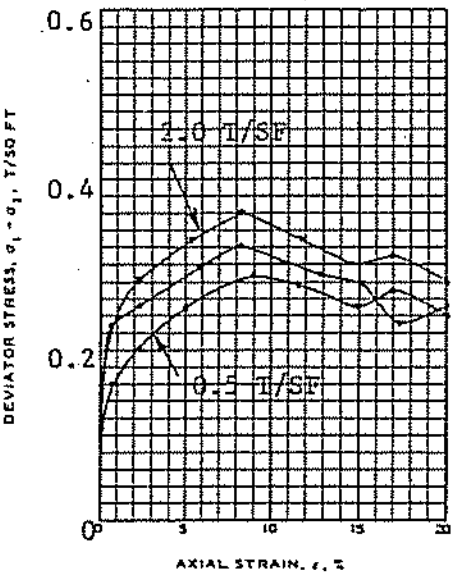
Q Test

DEPARTMENT OF THE ARMY, SOUTH ATLANTIC DIVISION LABORATORY, CORPS OF ENGINEERS, 611 SOUTH COBB DRIVE, MARIETTA, GA. 30060

WORK ORDER NO. 4129

Req. No. NAPEN-84-34





SPECIMEN NO.			1	2	3
INITIAL	WATER CONTENT, %	w_o	57.8	62.8	56.5
	DRY DENSITY LB/ CU FT	γ_{d_o}	64.1	61.4	65.4
	SATURATION, %	S_o	99.0	100.0	99.8
	VOID RATIO	e_o	1.501	1.613	1.454
BEFORE SHEAR	WATER CONTENT, %	w_c	—	—	—
	DRY DENSITY LB/CU FT	γ_{d_c}	—	—	—
	SATURATION, %	S_c	—	—	—
	VOID RATIO	e_c	—	—	—
	FINAL BACK PRESSURE, T/SQ FT	u_b	—	—	—
MINOR PRINCIPAL STRESS, T/SQ FT		σ_3	0.50	2.00	4.00
MAXIMUM DEVIATOR STRESS, T/SQ FT		$(\sigma_1 - \sigma_3)_{MAX}$	0.29	0.36	0.32
TIME TO $(\sigma_1 - \sigma_3)_{MAX}$, MIN		t_f	12	11	11
ULTIMATE DEVIATOR STRESS, T/SQ FT		$(\sigma_1 - \sigma_3)_{ULT}$	0.25	0.30	0.28
INITIAL DIAMETER, IN.		D_o	1.38	1.38	1.38
INITIAL HEIGHT, IN.		H_o	3.08	3.08	3.08

CONTROLLED TEST: Strain (0.75%/min)

DESCRIPTION OF SPECIMENS: Gray, silty, fat clay (CH), w/trace of sand and organic matter

LL 62 | PL 30 | PI 32 | Gs 2.57

TYPE OF SPECIMEN: Undisturbed | TYPE OF TEST: Q

REMARKS: See gradation curve and additional information on ENG Form 2087.

PROJECT: Phil. District
Area Edgemoor Disposal Area

BORING NO. EBB-30 | SAMPLE NO. UD-2

DEPTH: 22' - 24'

LABORATORY: SADEN-FL | DATE: 28 Sept 1984

TRIAXIAL COMPRESSION TEST REPORT

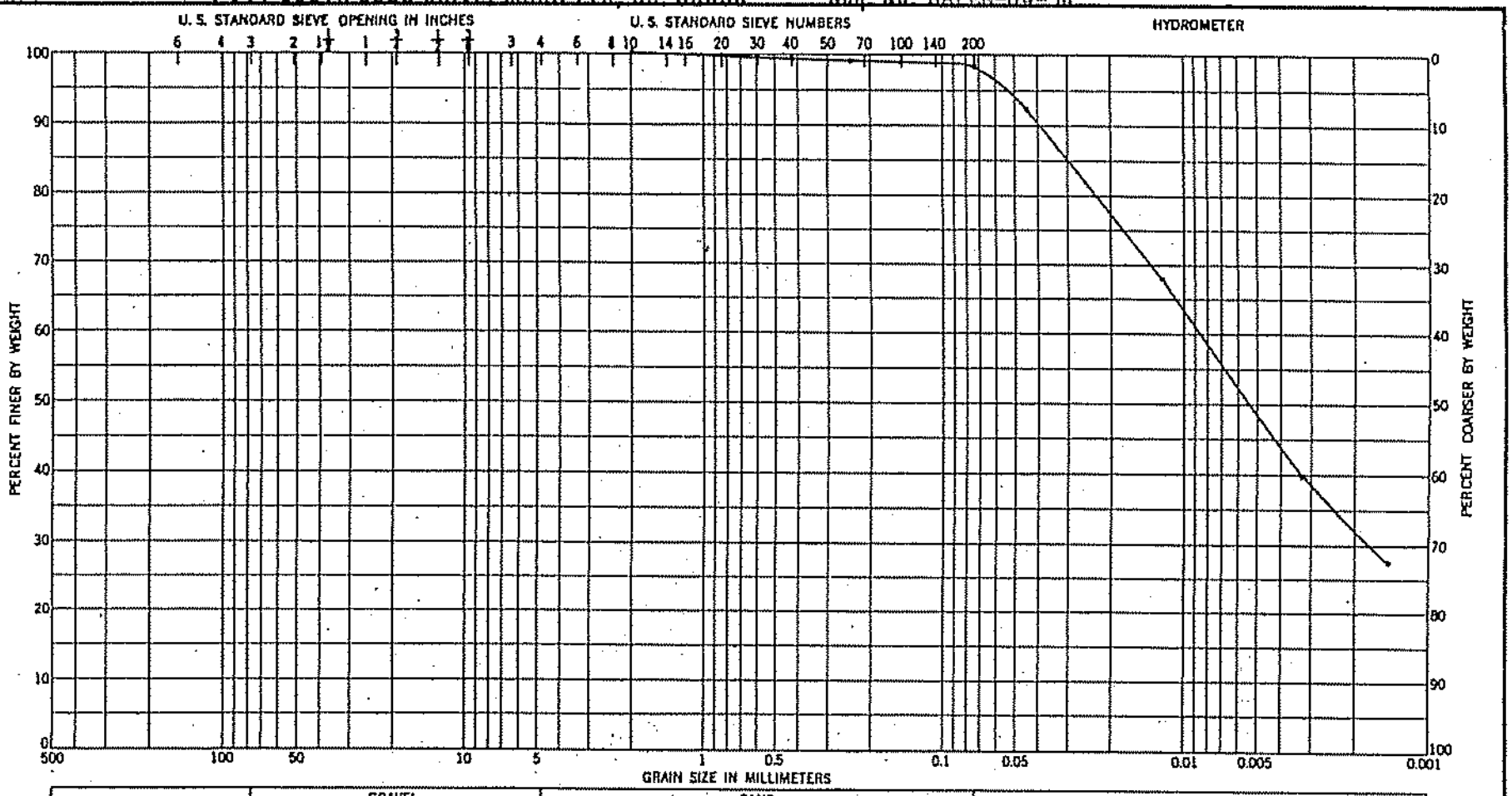
ENG FORM NO. 2009
REV JUNE 1970

Lab. No. 184/409

GPO : 1982 0 - 375-356

DEPARTMENT OF THE ARMY, SOUTH ATLANTIC DIVISION LABORATORY
CORPS OF ENGINEERS, 611 SOUTH COBB DRIVE, MARIETTA, GA 30060

WORK ORDER NO. 4129
Req No. NAPEN-84-34



Sample No.	Depth	Classification	Nat w %	LL	PL	PI
UD-5	54'-56'	Gray fat clay (CH), w/ organic matter.	66.8	99	39	*60
		* Plots near A-Line.				

GRADATION CURVES

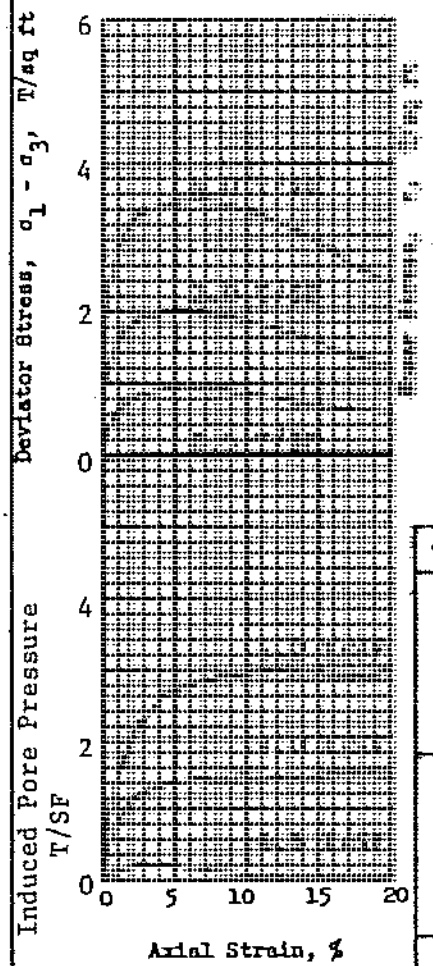
Project: Philadelphia District
Lab. No. 184/410
Area: Edgemoor Disposal Area
Boring No.: EBB-30, Sample No. UD-5
Date: 28 September 1984

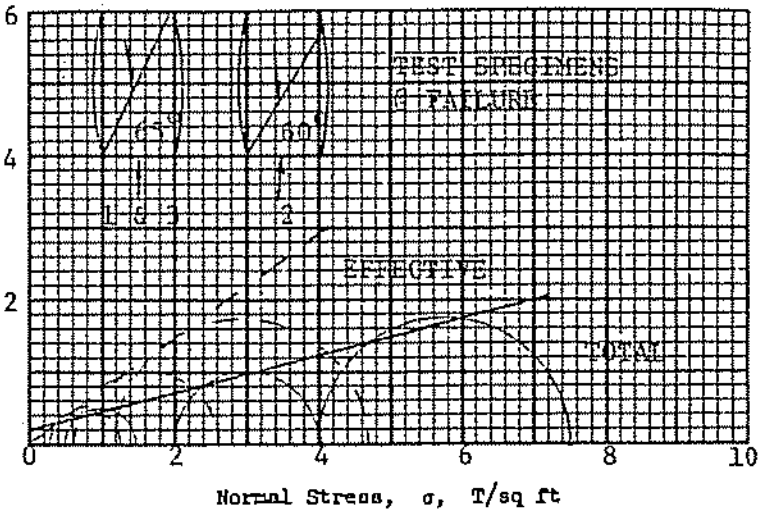
ENG FORM 1 MAY 63 2087

R Triaxial

DEPARTMENT OF THE ARMY, SOUTH ATLANTIC DIVISION LABORATORY
CORPS OF ENGINEERS, 611 SOUTH COBB DRIVE, MARIETTA, GEORGIA 30060-3112

WORK ORDER NO. 4129
REQN. NO. NAPEN-84-34





Test No.			1	2	3	
Initial	Water content	w_o	68.2 %	66.2 %	66.0 %	%
	Void ratio	e_o	1.801	1.735	1.739	
	Saturation	S_o	98.8 %	99.5 %	99.0 %	%
	Dry density, lb/cu ft	γ_d	58.2	59.6	59.5	
Before Shear	Water content	w_c	62.0 %	50.1 %	41.0 %	%
	Void ratio	e_c	1.618	1.308	1.070	
	Saturation	S_c	100.0 %	100.0%	100.0%	%
	Final back pressure, T/sq ft	u_o	4.00	4.00	4.00	
Final	Water content	w_f	62.0 %	50.1 %	41.0 %	%
	Void ratio	e_f	1.618	1.308	1.070	
Minor principal stress, T/sq ft		σ_3	0.50	2.00	4.00	
Max deviator stress, T/sq ft		$(\sigma_1-\sigma_3)_{max}$	0.95	1.99	3.50	
Time to failure, min		t_f	60	45	60	
Rate of strain, percent/min			0.10	0.10	0.11	
%Strain@$(\sigma_1-\sigma_3)$Max.			6.0	4.6	6.5	
Ult deviator stress, T/sq ft		$(\sigma_1-\sigma_3)_{ult}$	0.67	1.55	2.90	
Initial diameter, in.		D_o	1.38	1.38	1.38	
Initial height, in.		H_o	3.08	3.08	3.08	

Shear Strength Parameters

	Total	Effective
ϕ =	14.5	36.0
tan ϕ	0.259	0.727
c =	0.20	0.0 T/sq ft

Method of saturation Back Pressure

☐ Controlled stress
☒ Controlled strain

Type of test $\overline{R}$ | Type of specimen Undisturbed

Classification Gray fat clay (CH), w/organic matter.

LL	PL	PI	--	G_s
99	39	60		2.61

Remarks See gradation curve on ENG Form 2087.

Project Philadelphia District
Lab. No. 184/410
Area Edgemoor Disposal Area
Boring No. EBB-30 | Sample No. UD-5
Depth Elev. 54'-56' | Date 28 Sept 1984

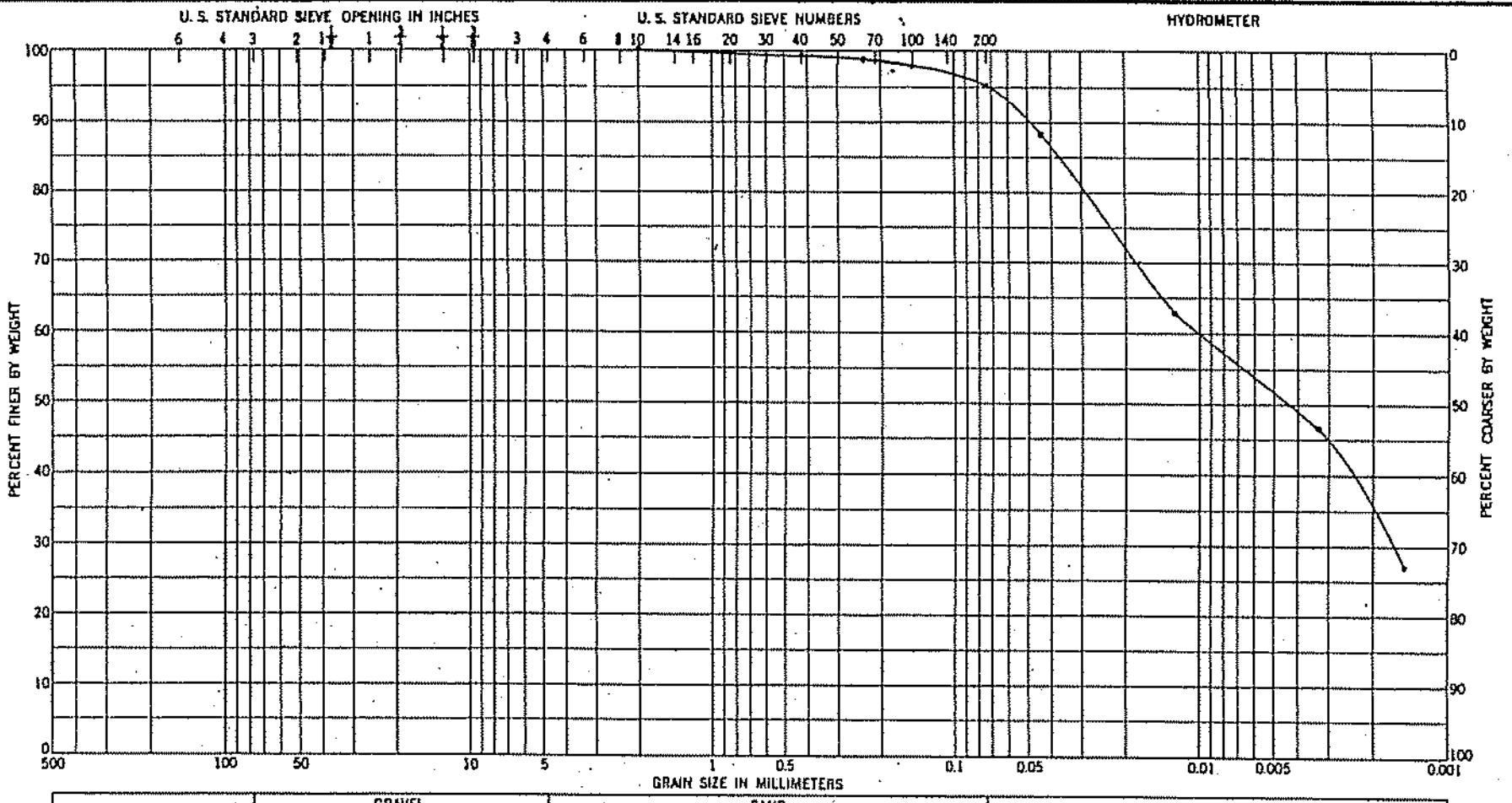
TRIAXIAL COMPRESSION TEST REPORT

ENG FORM 2089 1 JUN 63 (EM 1110-2-1902) PREVIOUS EDITIONS ARE OBSOLETE

TRANSLUCENT

DEPARTMENT OF THE ARMY, SOUTH ATLANTIC DIVISION LABORATORY
CORPS OF ENGINEERS, 611 SOUTH COBB DRIVE, MARIETTA, GA. 30060

WORK ORDER NO. 4129
Req. No. NAPEN-84-34



Sample No.	Elev. or Depth	Classification	Nat w %	LL	PL	PI
UD-1	6'-8'	Gray, clayey, inorganic silt high LL (MH), w/ organic matter.	62.2	78	36	*42
		*Plots near A-line				

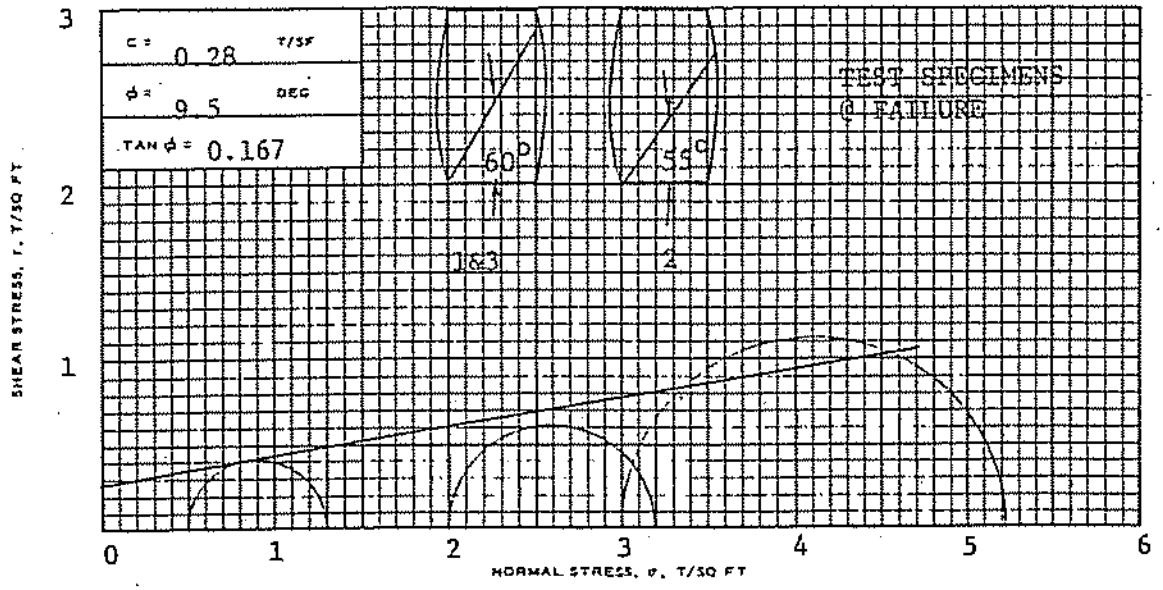
GRADATION CURVES

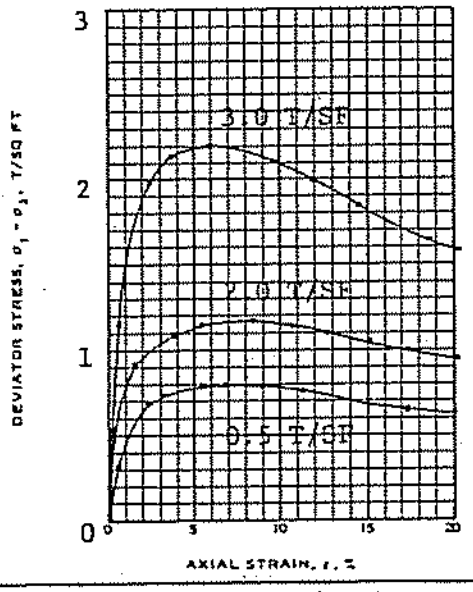
Project Philadelphia District
Lab. No. 184/411
Area Edgemoor Disposal Area
Boring No. EBB-31, Sample No. UD-1
Date 28 September 1984

Q-Triaxial

ENG FORM 1 MAY 63 2087

DE. ENT OF THE ARMY, SOUTH ATLANTIC DIVISION LABORAT. WORK ORDER NO. 4129
CORPS OF ENGINEERS, 611 SOUTH COBB DRIVE, MARIETTA, GA. 30060 Req. No. NAPEN-84-34





SPECIMEN NO.			1	2	3
INITIAL	WATER CONTENT, %	w_o	66.9	58.7	61.0
	DRY DENSITY LB/CU FT	γ_{d_o}	54.7	59.8	60.3
	SATURATION, %	S_o	88.3	88.9	93.5
	VOID RATIO	e_o	1.979	1.723	1.704
BEFORE SHEAR	WATER CONTENT, %	w_c	—	—	—
	DRY DENSITY LB/CU FT	γ_{d_c}	—	—	—
	SATURATION, %	S_c	—	—	—
	VOID RATIO	e_c	—	—	—
	FINAL BACK PRESSURE, T/SQ FT	u_o	—	—	—
MINOR PRINCIPAL STRESS, T/SQ FT		σ_3	0.50	2.00	3.00
MAXIMUM DEVIATOR STRESS, T/SQ FT		$(\sigma_1 - \sigma_3)_{max}$	0.80	1.17	2.22
TIME TO $(\sigma_1 - \sigma_3)_{max}$, MIN		t_f	7	11	8
ULTIMATE DEVIATOR STRESS, T/SQ FT		$(\sigma_1 - \sigma_3)_{ult}$	0.69	1.05	1.82
INITIAL DIAMETER, IN.		D_o	1.38	1.38	1.38
INITIAL HEIGHT, IN.		H_o	3.08	3.08	3.08

CONTROLLED-Strain(0.75%/min) TEST

DESCRIPTION OF SPECIMENS Gray, clayey, inorganic silt high LL (MH), w/organic matter.

LL	PL	PI	G_s	TYPE OF SPECIMEN	TYPE OF TEST
78	36	42	2.61	Undisturbed	0

REMARKS: See gradation curve and additional information on ENG Form 2087.

PROJECT Philadelphia District Area Edgemoor Disposal Area

BORING NO EBB-31 SAMPLE NO. UD-1

DEPTH/ELEV 6'-8'

LABORATORY SADEN-FL DATE 28 Sept 1984

TRIAXIAL COMPRESSION TEST REPORT

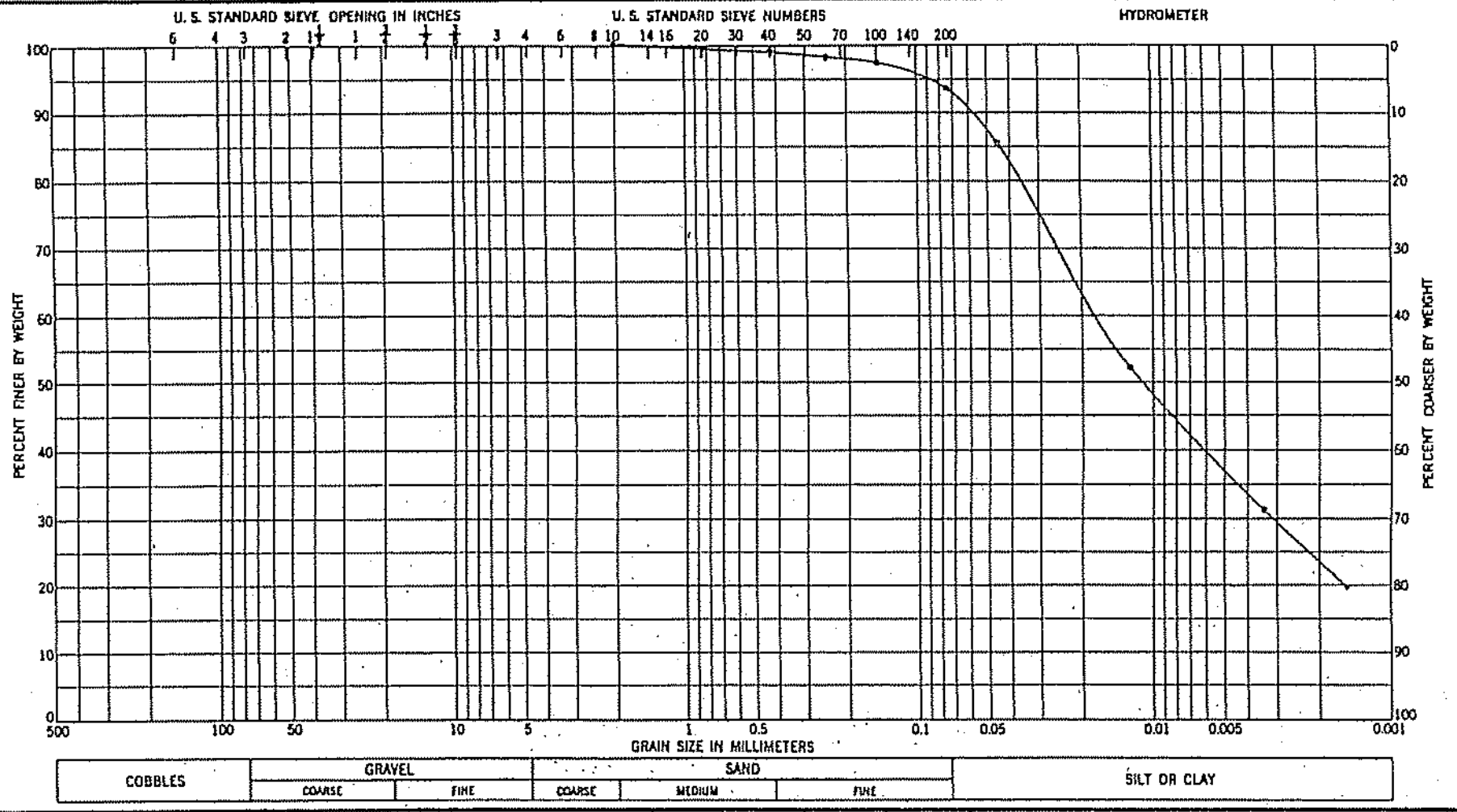
ENG FORM NO. 2089
REV JUNE 1970

Lab. No. 184/411

GPO : 1982 0 - 375-356

DEPART. _NT OF THE ARMY, SOUTH ATLANTIC DIVISION LABORATORY
CORPS OF ENGINEERS, 611 SOUTH COBB DRIVE, MARIETTA, GA. 30060

WORK ORDER NO. 4129
Req. No. NAPEN-84-34



Sample No.	Depth	Classification	Nat w %	LL	PL	PI
UD-1	8'-10'	Gray, clayey inorganic silt high LL (MH).	54.1	65	35	30

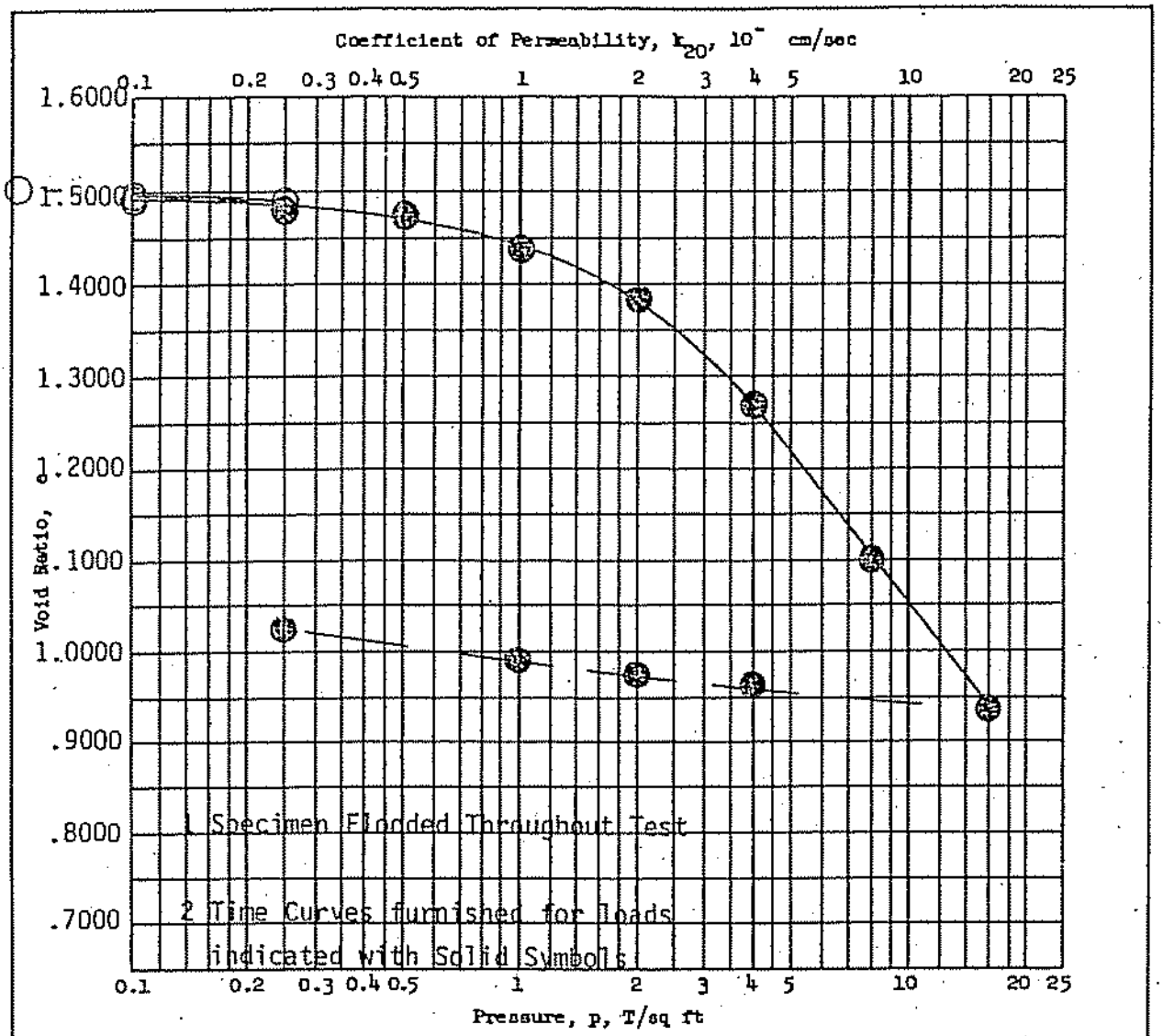
GRADATION CURVES

Project Philadelphia District
Lab. No. 184/412
Area EdgeMoor Disposal Area
Boring No. FBB-32, Sample No. UD-1
Date 27 September 1984

ENG FORM 1 MAY 83 2087

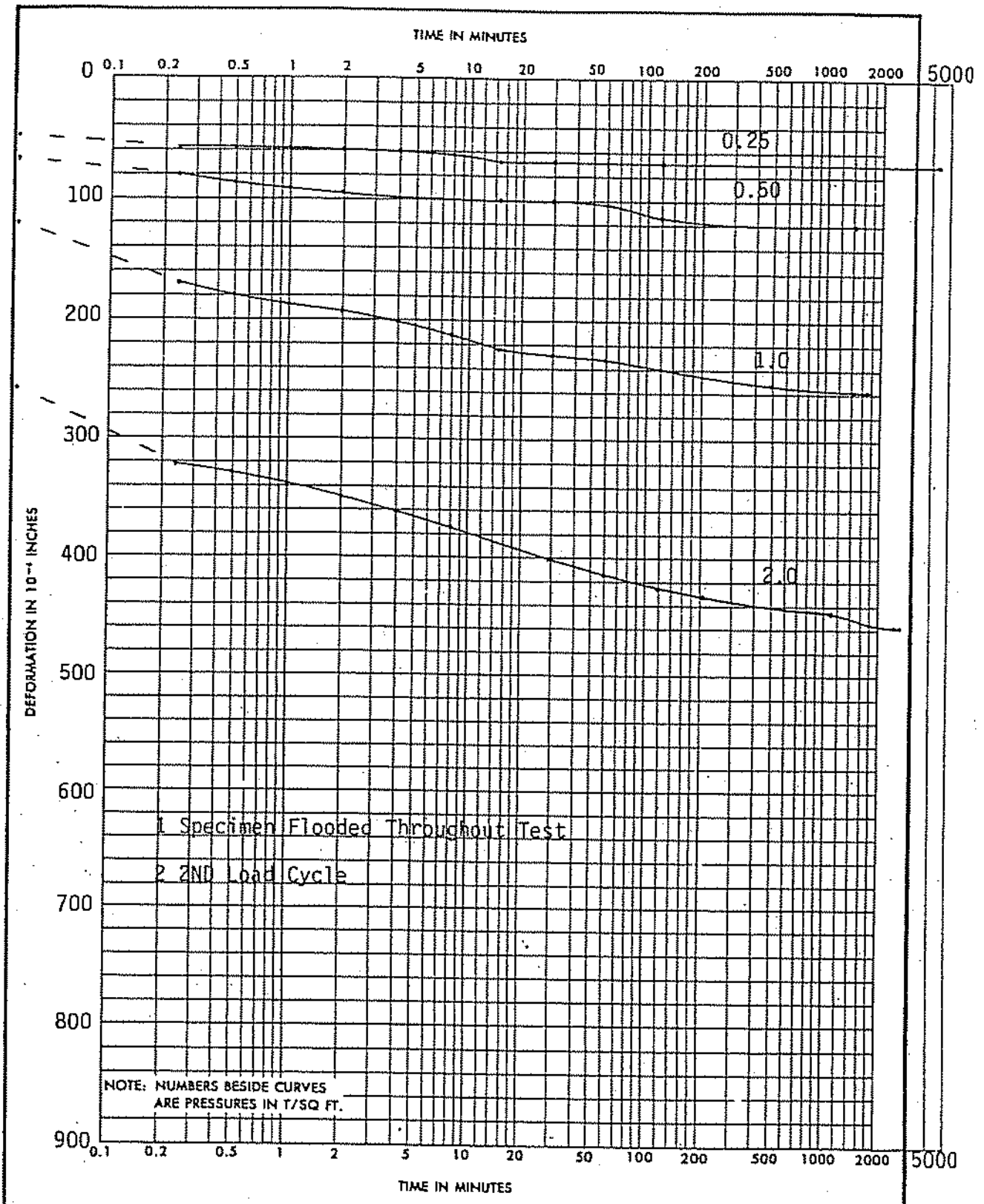
ENGINEERS, 611 SOUTH COBB DRIVE, MARIETTA, GA. 30060

Req. No. NAPEN-84-34



Type of Specimen Undisturbed		Before Test		After Test	
Diam 2.49 in.	Ht 1.00 in.	Water Content, w_o	54.1 %	w_f	39.1 %
Overburden Pressure, Po T/sq ft		Void Ratio, e_o	1.505	e_f	1.029
Preconsol. Pressure, P_c T/sq ft		Saturation, S_o	94.5 %	S_f	100.0 %
Compression Index, C_c		Dry Density, γ_d	65.6 lb/ft^3		
Classification Gray, clayey, inorganic silt high LL (MH).		k_{20} at e_o =	x 10^{-} cm/sec		
LL 65	G_s 2.63	Project Philadelphia District			
PL 35	D_{10} ---	Lab. No. 184/412			
Remarks		Area EdgeMoor Disposal Area			
See gradation curve and		Boring No. EBB-32	Sample No. UD-1		
additional information on ENG		Depth XX 8'-10'	Date 27 September 1984		
Form 2087		CONSOLIDATION TEST REPORT			

ENG FORM 2090 1 MAY 63 PREVIOUS EDITIONS ARE OBSOLETE.



PROJECT Philadelphia District			
AREA EdgeMoor Disposal Area			
BORING NO. EBB-32	SAMPLE NO. UD-1	DEPTH ~~XX~~ 8'-10'	DATE 27 September 1984

ENG FORM 2088 1 MAY 63 PREVIOUS EDITIONS ARE OBSOLETE.

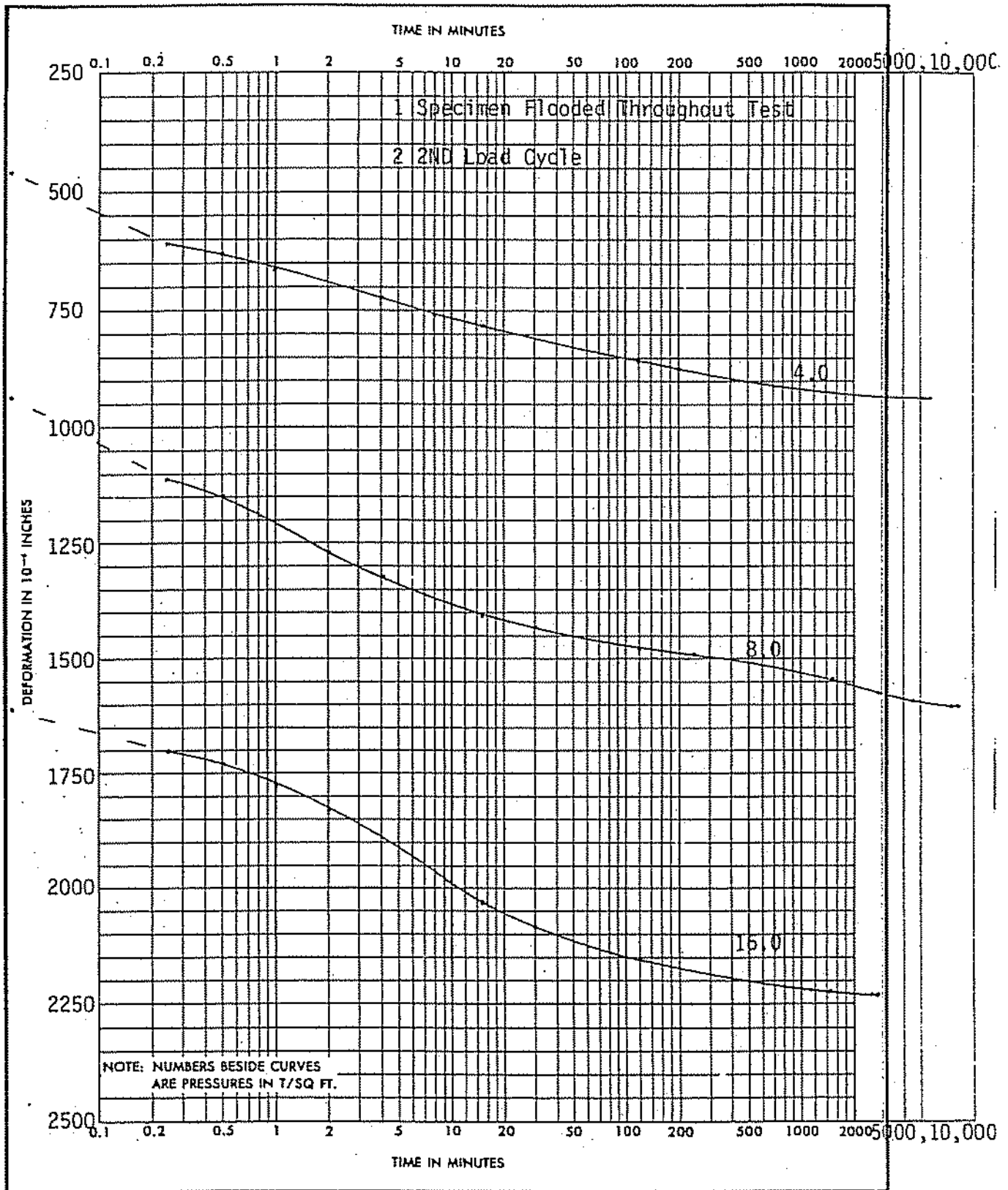
CONSOLIDATION TEST—TIME CURVES (TRANSLUCENT)

DEPARTMENT OF THE ARMY, SOUTH ATLANTIC DIVISION LABORATORY
CORPS OF ENGINEERS, 611 SOUTH COBB DRIVE, MARIETTA, GA. 30060

WORK ORDER NO. 4129
Req. No. NAPEN-84-34

DE' ..NT OF THE ARMY, SOUTH ATLANTIC DIVISION LABORAT
CORPS OF ENGINEERS, 611 SOUTH COBB DRIVE, MARIETTA, GA. 30060

WORK ORDER NO. 4129
Req. No. NAPEN-84-34



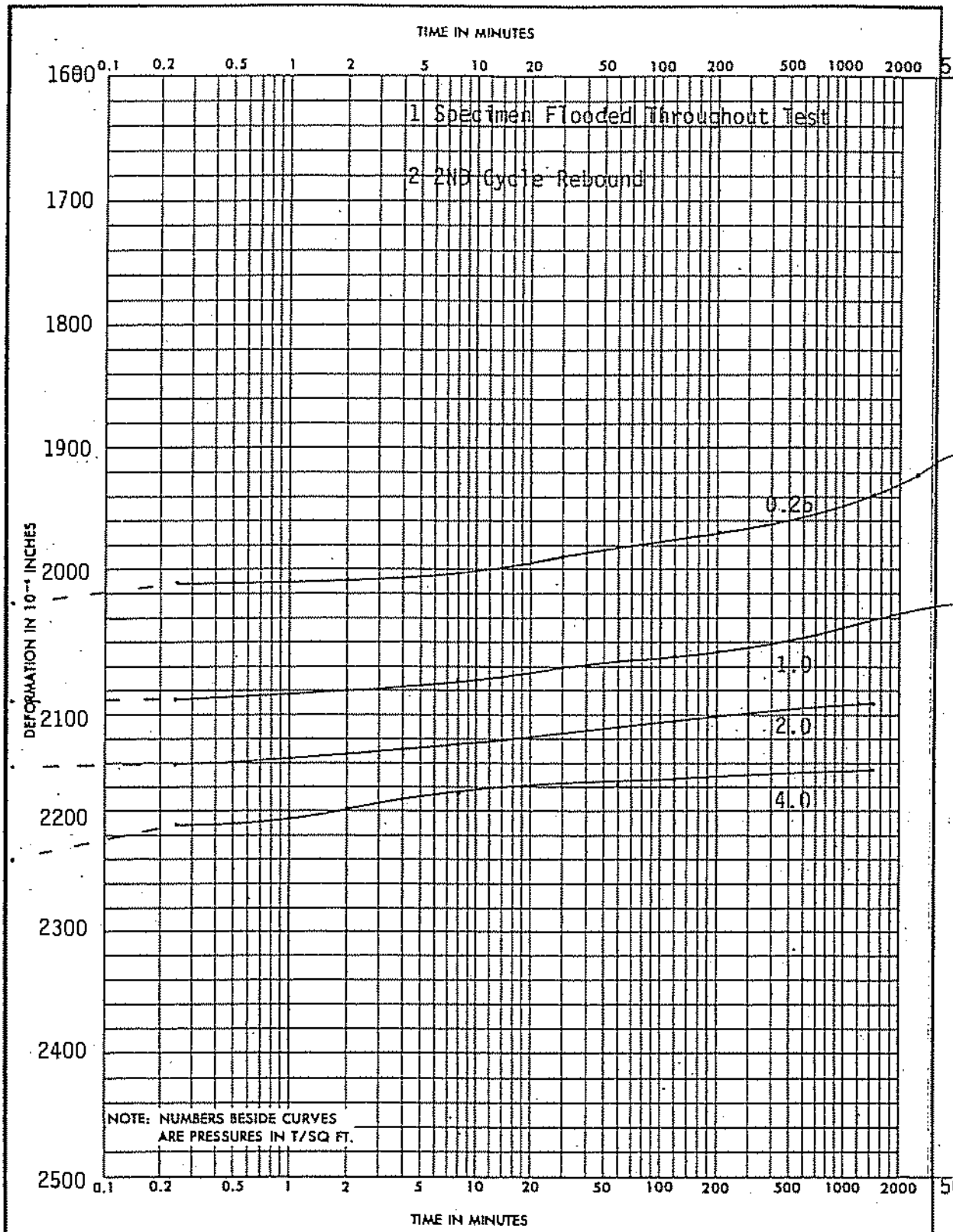
PROJECT Philadelphia District				
AREA EdgeMoor Disposal Area		Lab. No. 184/412		
BORING NO. EBB-32	SAMPLE NO. UD-1	DEPTH &X 8'-10'	DATE 27 Sept. 1984	

ENG FORM 2088 1 MAY 63 PREVIOUS EDITIONS ARE OBSOLETE. **CONSOLIDATION TEST—TIME CURVES** (TRANSLUCENT)

* GPO : 1964 OF—713-953

CORPS OF ENGINEERS, 611 SOUTH COBB DRIVE, MARIETTA, GA. 30060
SOUTH ATLANTIC DIVISION LABORATORY

WORK UNIT NO. 4129
Req. No. NAPEN-84-34



PROJECT	Philadelphia District				
AREA	EdgeMoor Disposal Area		Lab. No. 184/412		
BORING NO.	EBB-32	SAMPLE NO.	UD-1	DEPTH MX 8'-10'	DATE 27 Sept. 1984

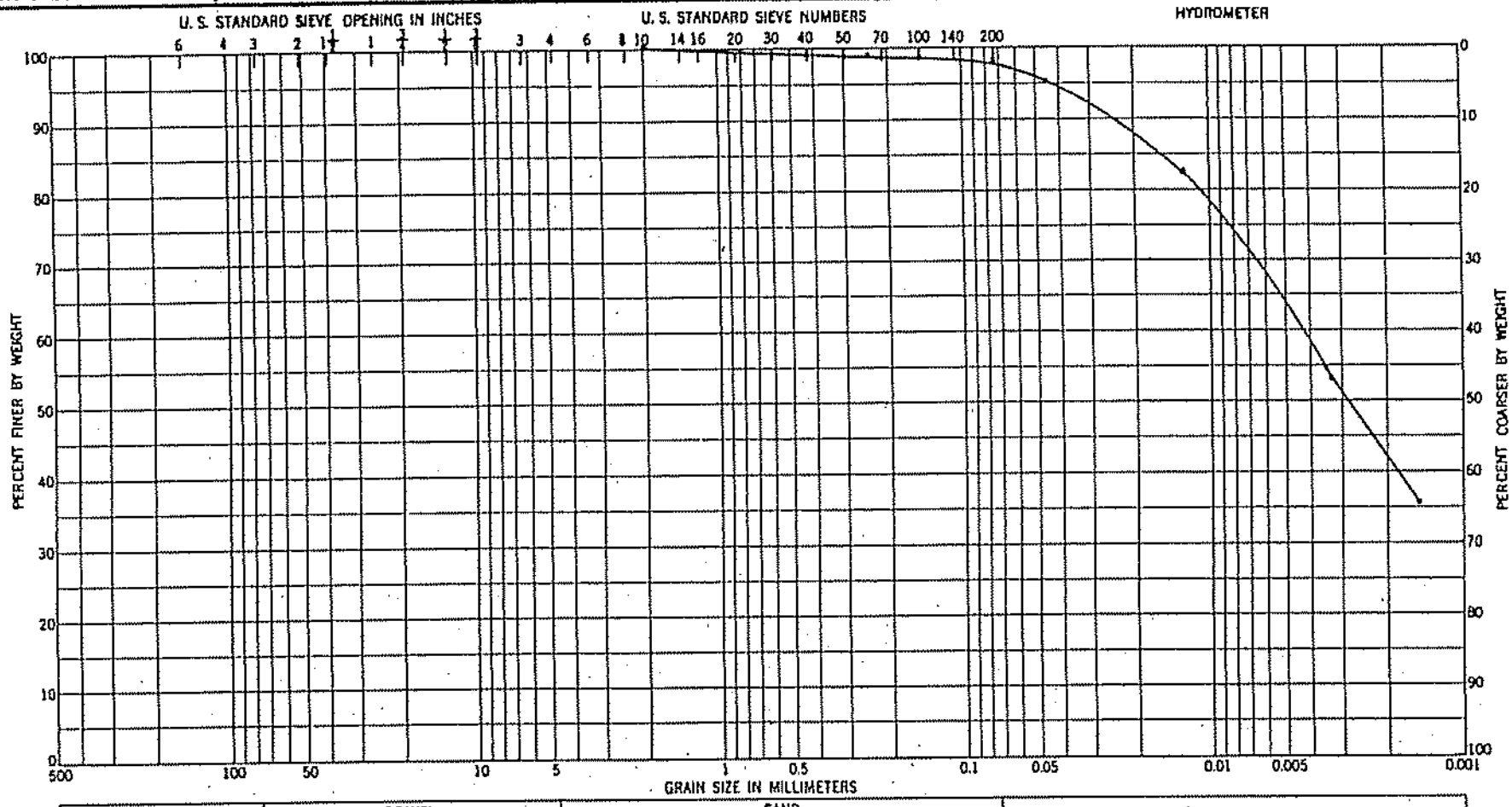
ENG FORM 2088 1 MAY 63 PREVIOUS EDITIONS ARE OBSOLETE.

CONSOLIDATION TEST—TIME CURVES (TRANSLUCENT)

* GPO : 1984 OF—715-983

DEPARTMENT OF THE ARMY, SOUTH ATLANTIC DIVISION LABORAT.
CORPS OF ENGINEERS, 611 SOUTH COBB DRIVE, MARIETTA, GA. 30060

WORK ORDER NO. 4129
Req. No. NAPEN-84-34



Sample No.	XXXX Depth	Classification	Nat w %	LL	PL	PI
UD-2	24'-26'	Gray, clayey, inorganic silt high LL (MH), w/organic matter.	79.5	121	48	*73
		*Plots near A-Line				

GRADATION CURVES

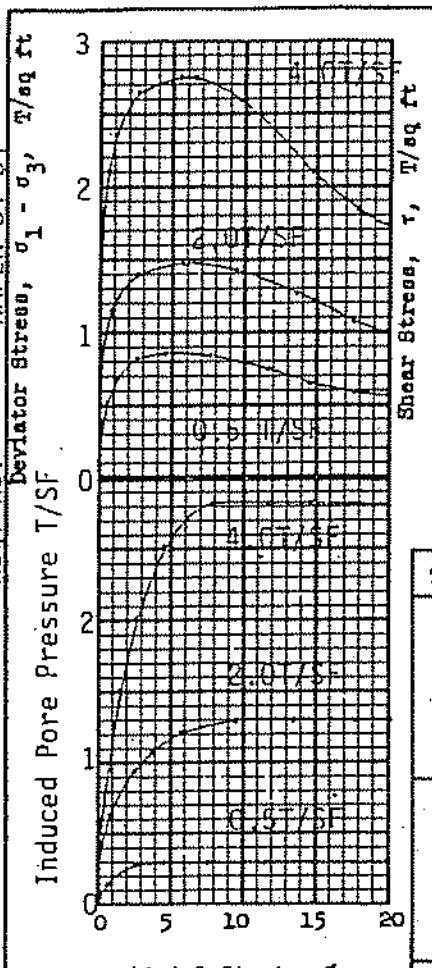
Project Philadelphia District
Lab. No. 184/413
Area EdgeMoor Disposal Area
Boring No. EBB-32, Sample No. UD-2
Date 28 September 1984

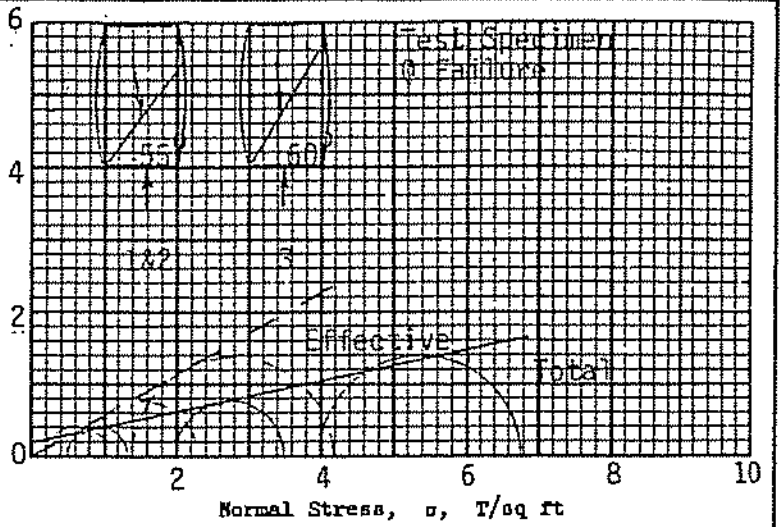
ENG FORM 1 MAY 63 2087

R Triaxial

DEPARTMENT OF THE ARMY, SOUTH ATLANTIC DIVISION LABORATORY
CORPS OF ENGINEERS, 611 SOUTH COBB DRIVE, MARIETTA, GEORGIA 30060

Work Order No. 4129
Req. No. NAPEN-84-34





Test No.			1	2	3	
Initial	Water content	w_o	79.9 %	82.1 %	76.5 %	%
	Void ratio	e_o	2.121	2.192	2.061	
	Saturation	S_o	97.2 %	96.6 %	95.8 %	%
	Dry density, lb/cu ft	γ_d	51.6	50.5	52.6	
Before Shear	Water content	w_c	74.7 %	66.1 %	55.7 %	%
	Void ratio	e_c	1.926	1.706	1.436	
	Saturation	S_c	100.0 %	100.0 %	100.0 %	%
	Final back pressure, T/sq ft	u_o	4.00	4.00	4.00	
Final	Water content	w_f	74.7 %	66.1 %	55.7 %	%
	Void ratio	e_f	1.926	1.706	1.436	
Minor principal stress, T/sq ft		σ_3	0.50	2.00	4.00	
Max deviator stress, T/sq ft	$(\sigma_1-\sigma_3)_{max}$		0.85	1.49	2.75	
Time to failure, min		t_f	45	55	60	
Rate of strain, percent/min			4.6	5.7	6.3	
%Strain @ $(\sigma_1-\sigma_3)_{Max.}$			0.10	0.10	0.10	
Ult deviator stress, T/sq ft	$(\sigma_1-\sigma_3)_{ult}$		0.63	1.21	2.06	
Initial diameter, in.		D_o	1.38	1.38	1.38	
Initial height, in.		H_o	3.08	3.08	3.08	

Shear Strength Parameters

	Total	Effective
ϕ =	12.0	29.5°
tan ϕ =	0.213	0.566
c =	0.20	0.0 T/sq ft

Method of saturation: Back Pressure

[ ] Controlled stress
[X] Controlled strain

Type of test R | Type of specimen Undisturbed

Classification Gray, clayey, inorganic silt high LL (MH), w/organic matter.

LL	PL	PI	--	G_s
121	48	73	--	2.58

Remarks: See gradation curve and additional information on ENG Form 2087.

Project Philadelphia District
Lab. No. 184/413
Area EdgeMoor Disposal Area
Boring No. EBB-32 | Sample No. UD-2
Depth 24'-26' | Date 28 September 1984

TRIAXIAL COMPRESSION TEST REPORT

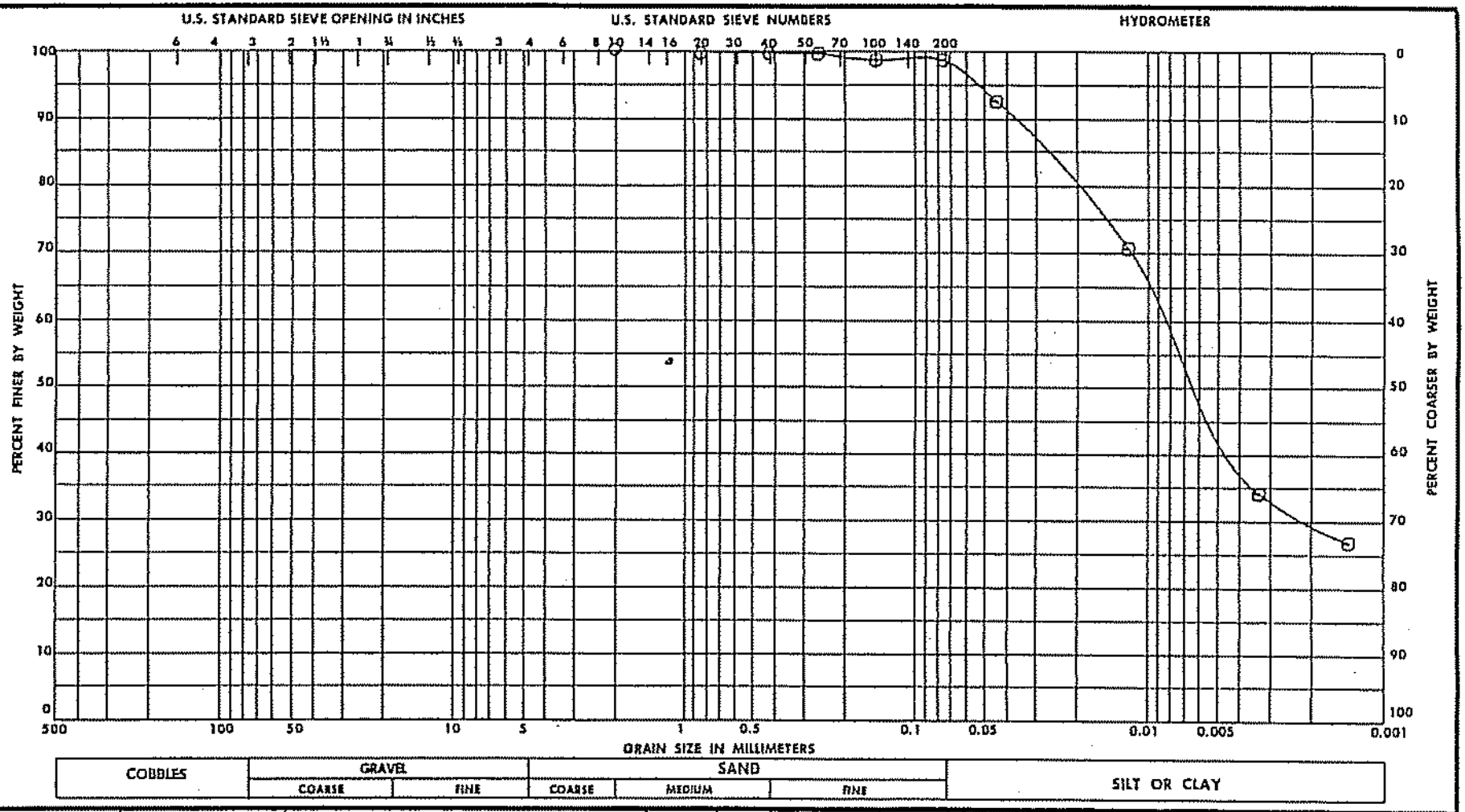
ENG FORM 2089 1 JUN 63 (EM 1110-2-1902) PREVIOUS EDITIONS ARE OBSOLETE

TRANSLUCENT

DEPARTMENT OF THE ARMY, SOUTH ATLANTIC DIVISION LABORATORY
CORPS OF ENGINEERS, 611 SOUTH COBB DRIVE, MARIETTA, GA. 30060

W.O. No. 4129

Req. No. NAPEN-84-34



Sample No.	~~Elev~~ Depth	Classification	Nat w %	LL	PL	PI
4A	56-58'	FAT CLAY (CH)	46.6	56	27	29
		GRAY, WITH ORGANIC MATTER.				

GRADATION CURVES

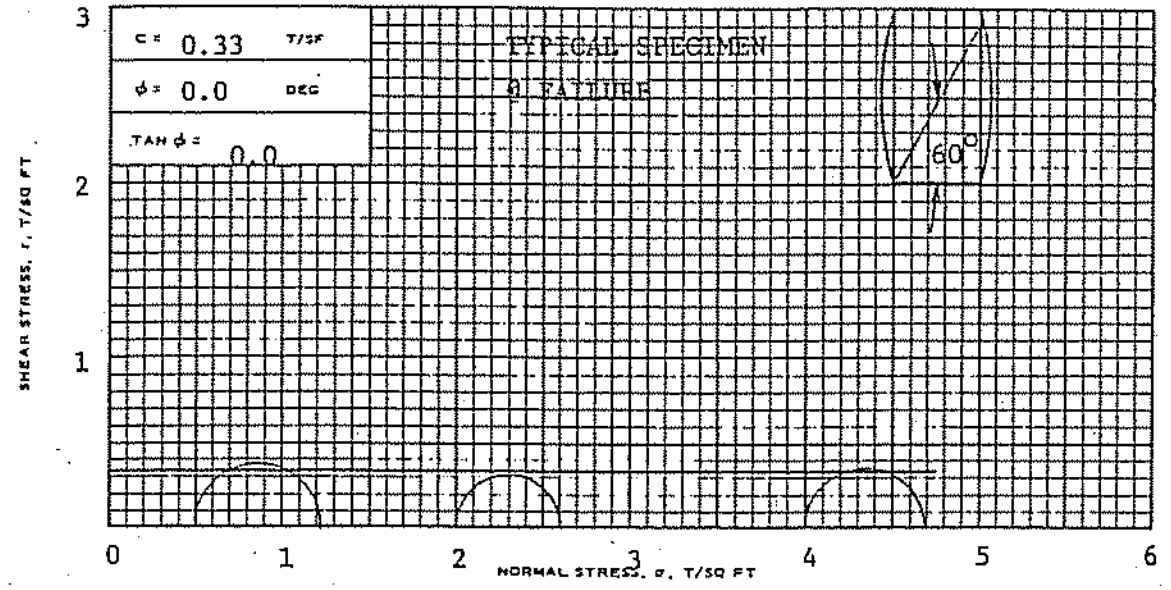
Project PHIL. DISTRICT
EDGEMOOR DISPOSAL AREA
Area LAB NO. 184/414
Boring No. EBB-32 SAMPLE NO. 4A
Date 09/26/84

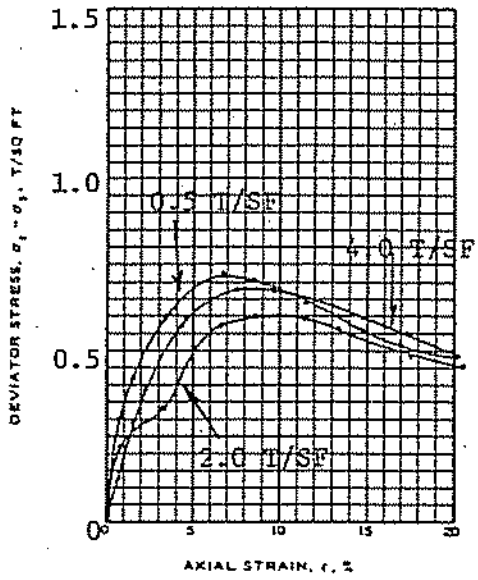
ENG FORM 1 MAY 83 2087

Q Test

DEPARTMENT OF THE ARMY, SOUTH ATLANTIC DIVISION LABORATORY
CORPS OF ENGINEERS, 611 SOUTH COOB DRIVE, MARIETTA, GA. 30060

WORK ORDER NO. 4129
Req. No. NAPEN-84-34





SPECIMEN NO.			1	2	3
INITIAL	WATER CONTENT, %	w_o	49.1	55.1	47.1
	DRY DENSITY LB/CU FT	γ_{d_o}	70.8	66.7	72.6
	SATURATION, %	S_o	98.8	100.0	99.1
	VOID RATIO	e_o	1.293	1.433	1.236
BEFORE SHEAR	WATER CONTENT, %	w_c	–	–	–
	DRY DENSITY LB/CU FT	γ_{d_c}	–	–	–
	SATURATION, %	S_c	–	–	–
	VOID RATIO	e_c	–	–	–
	FINAL BACK PRESSURE, T/SQ FT	u_o	–	–	–
MINOR PRINCIPAL STRESS, T/SQ FT		σ_3	0.50	2.00	4.00
MAXIMUM DEVIATOR STRESS, T/SQ FT		$(\sigma_1 - \sigma_3)_{MAX}$	0.72	0.60	0.68
TIME TO $(\sigma_1 - \sigma_3)_{MAX}$, MIN		t_f	9	11	10
ULTIMATE DEVIATOR STRESS, T/SQ FT		$(\sigma_1 - \sigma_3)_{ULT}$	0.56	0.53	0.59
INITIAL DIAMETER, IN.		D_o	1.38	1.38	1.38
INITIAL HEIGHT, IN.		H_o	3.08	3.08	3.08

CONTROLLED TEST: Strain (0.75%/min)

DESCRIPTION OF SPECIMENS: Gray fat clay (CH) w/organic matter

LL 56 | PL 27 | PI 29 | G_s 2.60

TYPE OF SPECIMEN: Undisturbed | TYPE OF TEST: Q

REMARKS: See gradation curve and additional information on ENG Form 2087.

PROJECT: Phil. District Area Edgemoor Disposal Area

BORING NO. EBB-32 | SAMPLE NO. UD-~~2~~ 4a

DEPTH/~~XXXXX~~ ~~24'-26'~~ 56'-58'

LABORATORY: SADEN-FL | DATE: 28 Sept 1984

TRIAXIAL COMPRESSION TEST REPORT

ENG FORM NO. 2089
REV JUNE 1970

Lab. No. 184/414

GPO : 1982 O - 375-356

DUFFIELD ASSOCIATES

GEOTECHNICAL INVESTIGATION

WILMINGTON HARBOR NORTH
DREDGED MATERIAL
CONFINED DISPOSAL FACILITY
WILMINGTON, DELAWARE

DAI W.O. 4276.GE
USACE Contract No. DACW-61-98-D-0008
Task Order 27

June 2001

Prepared for:

Department of the Army
Philadelphia District
Corps of Engineers
Wanamaker Building
100 Penn Square East
Philadelphia, Pennsylvania 19107-3391

Prepared by:

Duffield Associates, Inc.
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W. Hank Stack
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Senior Project Manager

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APPENDICES

Appendix A	Site Location Sketch Test Boring/CPT Boring Location Sketch	
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EXECUTIVE SUMMARY

The following report summarizes Duffield Associates' field and laboratory evaluation of the subsurface conditions around the perimeter of the existing Wilmington Harbor North Dredged Material Confined Disposal Facility (Wilmington Harbor North). This approximate 155-acre site is located in Wilmington, Delaware, near the confluence of the Christina and Delaware Rivers. This facility is one of two areas currently being utilized by the U.S. Army Corps of Engineers' Philadelphia District (USACE) for the containment of material dredged from Wilmington Harbor.

In its current condition, Wilmington Harbor North is nearing its capacity. Slope stability analyses performed by the USACE suggest that an adequate factor of safety cannot be achieved if the containment dikes are raised by typical methods above their present elevation. Data gathered from the sampling and testing performed as a part of this evaluation will be utilized by the USACE in the evaluation of conceptual design alternatives and the subsequent development of design documents to extend the life and capacity of this facility.

The purpose of this evaluation was to obtain additional subsurface data from the site, including the performance of one Standard Penetration Test boring (SPT), four auger test borings to collect undisturbed samples, and six Cone Penetration Test borings (CPT) at locations spaced along the outside toe of the existing perimeter containment dike. The approximate locations of the borings and the elevations at which undisturbed samples were to be collected were provided by the USACE. Test borings were performed by the Walton Corporation of Newark, Delaware and CPT borings were performed by ConeTec, Inc. of West Berlin, New Jersey, as subcontractors to Duffield Associates. The field program was completed between October 13 and 19, 2000.

Selected samples obtained from the SPT borings and auger borings were returned to Duffield Associates' laboratory for testing. Laboratory testing included the performance of index testing as well as determination of unit weight, unconfined compression strength, triaxial "Q" and "R" compression strengths, and one-dimensional consolidation characteristics.

Based on the information obtained from the field and laboratory program for this evaluation, the subsurface conditions in the vicinity of the containment dike consist of a thin surficial layer of firm, improved silty or sandy soils overlying dredged material and apparent natural site soils consisting of medium to high plasticity silty clay/clayey silt of very soft to medium consistency. The interface between these strata could not be readily determined. These soils were observed to range in thickness from approximately 60 feet to greater than 80 feet below the existing ground surface. In borings that fully penetrated the compressible fine-grained soils, these soils were underlain by dense to very dense silty sands.

This report includes a summary of the field and laboratory testing programs. Logs summarizing the conditions observed during performance the SPT, CPT, and auger borings are also included.

I. INTRODUCTION

The U. S. Army Corps of Engineers' Philadelphia District (USACE) retained Duffield Associates to perform Standard Penetration Test (STP) borings, auger test borings for the collection of undisturbed samples, and Cone Penetration Test (CPT) borings along the outer toe of the containment dike at the Wilmington Harbor North Dredged Material Confined Disposal Facility (Wilmington Harbor North) located in Wilmington, Delaware. This data, along with the results of laboratory testing data performed on selected samples, is to be utilized by the USACE in the evaluation of conceptual design alternatives and the subsequent development of design documents to extend the life and capacity of this facility. These services were performed in general accordance with the scope of work for Contract DACW-61-98-D-0008, Task Order No. 27, Revision 2, dated September 25, 2000.

The following report summarizes Duffield Associates' evaluation of subsurface conditions along the existing containment dike at Wilmington Harbor North. The general site area is indicated on the enclosed Location Sketch in Appendix A. Wilmington Harbor North is an approximate 155-acre site located near the confluence of the Christina and Delaware Rivers, and is one of two facilities currently utilized by the USACE for the containment of materials dredged from the Wilmington Harbor. Currently, Wilmington Harbor North is nearing its disposal capacity. Slope stability analyses performed by the USACE suggest that an adequate factor of safety cannot be achieved if the containment dikes are raised using typical methods, due to the poor subsurface conditions observed at the site during previous evaluations. Given the absence of an alternate disposal site, consideration of alternatives for improving the subsurface conditions at Wilmington Harbor North, in order to further increase the capacity of the facility, is being evaluated.

Prior to the start of this project, the USACE provided Duffield Associates with a scope of work, including:

- Project description;
- Reference standards and scope for subsurface exploration, including SPT boring, auger boring, and CPT boring numbering, proposed locations and depths;
- Reference standards and scope for geotechnical laboratory testing;
- "Location Map" indicating the project location;
- Reference information for survey control of the test borings; and
- Drawing titled "Wilmington Harbor Disposal Area, Wilmington, Delaware, Subsurface Investigation 2000," prepared by U. S. Army Corps of Engineers, Philadelphia District, drawing number IDC98-8TO27Fig1, Figure 1.

This information was utilized as the basis for this evaluation.

II. FIELD EXPLORATION PROGRAM

The field exploration program included the performance of five test borings and six CPT borings. These borings were performed at ten different locations around the perimeter of the disposal area and adjacent to the outer toe of the containment dike as jointly agreed to by the USACE and Duffield Associates. Prior to the performance of the field investigation, the test boring and CPT boring locations and ground surface elevations were estimated in the field based oo existing site features and the elevation references provided by the USACE via facsimile on October 2, 2000.

A. SPT AND AUGER TEST BORINGS

One continuous Standard Penetration Test boring (SPT, ASTM: D 1586) and four test auger borings to collect undisturbed samples (ASTM: D 1587) were performed by the Walton Corporation, as a subcontractor to Duffield Associates, using an all-terrain vehicle (ATV) mounted CME-45C drill rig. Drilling services were performed between October 13 and 19, 2000.

The continuous SPT boring was performed at test boring location EEB-50. The remaining four test borings, EEB-51 through EEB-54 were performed as auger borings. Test borings EEB-50 through EEB-53 were terminated at depths ranging from approximately 76 to 82 feet below the existing ground surface. Boring EEB-54 was terminated at approximately 40 feet below the existing ground surface.

Performance of the SPT boring included continuous disturbed and "undisturbed" sampling. Performance of the auger borings included the collection of only "undisturbed" samples. "Undisturbed" samples in both the SPT and auger borings were collected at approximate elevations provided by the USACE prior to the start of the field program. A total of 27 "undisturbed" Shelby Tube samples were collected. Twenty-one Shelby Tubes met the recovery criteria established by the USACE (i.e., a minimum of 18 inches of recovery) and were returned to Duffield Associates to be logged and tested.

Duffield Associates' representative was present during the performance of the drilling, and logged the conditions observed in the SPT and auger borings. Logs describing the soil and groundwater conditions encountered in the test borings are included in Appendix C. Upon completion of test borings, each borehole was grouted with portland cement-bentonite slurry to the ground surface.

B. CPT TEST BORINGS

Six CPT borings (ASTM D: 5778), identified as EER-1 through EER-6, were performed adjacent to the outside toe of the perimeter containment dike. These borings were performed concurrently with the test boring program between October 16 and 17, 2000. The testing was performed by ConeTec, Inc. of West Berlin, New Jersey, as a subcontractor to Duffield Associates, using a 20 ton CPT rig mounted on a tracked, all-terrain vehicle.

The CPT borings were generally advanced through the compressible site soils, and ranged in depth from approximately 71 to 105 feet below the existing ground surface. CPT boring EER-2 was performed adjacent to SPT boring EEB-51 for data comparison. As requested by the USACE, logs were generated for the CPT borings based on Duffield Associates' review of the field reports provided by ConeTec. Copies of these logs, CPT general notes and the ConeTec field reports are included in Appendix D. Upon completion of CPT borings, each borehole was grouted with bentonite to the ground surface.

Upon the completion of the field investigation, the "as-performed" locations and elevations for the SPT, auger and CPT borings were determined by VanDemark and Lynch, Inc., as a subcontractor to Duffield Associates. Horizontal controls were established within Delaware State Plane Coordinates (NAD 1983) and vertical control was referenced to the North American Vertical Datum (NAVD 1988) and Christina River Datum (CRD). "As-performed" survey coordinates of each boring, and the elevation of the ground surface at each boring location, are noted on the boring logs in Appendices C and D and are summarized in Appendix B. A sketch indicating the "as-performed" locations of the borings is included in Appendix A.

III. LABORATORY TESTING

The samples obtained from the SPT and auger borings were returned to Duffield Associates' office for further review and laboratory testing. Following review of the visual descriptions for each test boring, a proposed laboratory-testing schedule was prepared by Duffield Associates and forwarded, along with preliminary test boring logs, to the USACE for review and approval. The scope was subsequently modified and approved by the USACE on November 16, 2000, and again on May 23, 2001. A copy of the most recently approved Schedule of Laboratory Testing is included in Appendix E.

Laboratory tests performed for this project included the following:

Test	ASTM Designation	Number of Samples
Atterberg Limits	D 4318	25
Sieve Analysis w/Hydrometer	D 422	25
Natural Water Content	D 2216	25
Sample Unit Weight	D 2937	20
Unconfined Compressive Strength	D 2166	10
Triaxial "Q" Test (Unconsolidated Undrained)	D 2850	12
One-Dimensional Consolidation	D 2435	5
Triaxial "R" Test (Consolidated Undrained with Pore Pressure Measurements)	D 4767	2

Three additional Atterberg Liquid Limits were performed according to procedures outlined in ASTM D 2487, Section 11.3.2, to determine if the fine-grained soils should be classified as organic soils.

The laboratory testing results are summarized in Appendix F. Actual laboratory testing results, including data forms for the laboratory testing performed, are included in Appendix G. Additionally, the enclosed test boring logs have been modified to reflect the laboratory testing results.

IV. SUBSURFACE CONDITIONS

A. REGIONAL GEOLOGY

Wilmington Harbor North is situated in the Coastal Plain Physiographic Province. Holocene or geologically recent, unconsolidated estuary deposits, consisting of dark colored silts and clays with varying amounts of sand and organics material, are underlain by materials of the Columbia Formation (or materials similar in texture but deposited by the Delaware River), the Potomac Formation, and weathered crystalline rock as indicated by regional mapping. The Columbia Formation typically consists of gravely and silty, medium to fine-grained quartz sands with some interbedded silts and clays. The Potomac Formation typically consists of varicolored (red, gray, white, purple), silt and clay deposits with interbedded sand strata. Due to complex fluvial deposition, the sand deposits within the Potomac Formation are extremely variable in both horizontal and vertical directions. Duffield Associates' experience on the north bank of the Christina River indicates that the Potomac Formation extends to elevations deeper than 220 feet in this area.

B. STRATIGRAPHIC CONDITIONS

The subsurface conditions observed along the outer toe of the containment dike generally consisted of a thin surficial stratum of improved sandy or silty soils, overlying a layer of fine-grained, compressible soils, which included dredged material and natural site soils. These compressible soils consisted of very soft to medium consistency, medium to high plasticity, inorganic silty clays and clayey silts, with varying amounts of organic material, sand, and mica. These soils were observed to extend to depths ranging from approximately 60 feet to greater than 80 feet below the existing ground surface.

Because the dredged materials and underlying natural site soils are similar in texture and consistency, it is difficult to determine where the change between these strata occurs. However, considering the available topographic information, which indicates a ground surface elevation of approximately 30 feet in the interior of the disposal area, it is estimated that the thickness of the dredged material is in the range of 25 to 30 feet.

The compressible soils were penetrated in all but two of the auger borings (EEB-52 and EEB-54) and two of the CPT borings (EER-4 and EER-5). Where they were fully penetrated, these soils were underlain by dense to very dense silty sands.

C. GROUNDWATER

Groundwater observations made during the field evaluation are indicated on the test boring logs in Appendix C. Groundwater was only observed in test boring, EEB-50. At this location, a "wet-on-spoon" condition was observed at a depth of approximately 12 feet below the existing ground surface, corresponding to an elevation of approximately 29 feet.

The depth to groundwater utilized in the CPT field reports, and presented on the CPT boring logs, is based on an assumed groundwater elevation of 30 feet. This elevation corresponds to the approximate elevation of the ground surface elevation in the interior of the containment area, and therefore likely represents the perched groundwater conditions within the disposal area.

V. CONCLUSIONS AND RECOMMENDATIONS

Based on the data obtained by this evaluation, the following conclusions and recommendations are presented.

1. Beneath a thin shallow stratum of dike fill materials, subsurface conditions observed during this evaluation generally consisted of very soft to medium consistency, medium to high plasticity fine-grained soils. The index testing results for these soils, which are classified under the Unified Soil Classification System (USCS) as ML and MH soils, is consistent with historical laboratory data for soils at the site. These fine-grained soils were observed to depths ranging from approximately 60 feet to an unknown depth below the existing ground surface. These soils were not fully penetrated in borings performed along the Christina River side of the site (EEB-52, EER-4, and EER-5). Although it is estimated that the upper 25 to 30 feet of these soils represent previously placed dredged materials, the similarities in texture and consistency of the dredged materials and the natural underlying deposits makes it difficult to distinguish between the two strata. Therefore, these soils have been considered as single stratum for the purpose of this evaluation.

2. Unconfined and triaxial "Q" compression tests were performed on undisturbed samples taken within the compressible silty clay/clayey silt stratum at a variety of depths. Laboratory testing indicated undrained cohesive strengths ranging from approximately 270 to 1,260 pounds per square foot (psf), which is consistent with very soft to medium consistency soils, with soil strengths generally increasing with depth. Data collected from the CPT program indicated undrained cohesive strengths for these soils ranging from approximately 560 to 1,940 psf, also with soil strengths increasing with depth. Overall, the results of the CPT testing are consistent with the generalized stratigraphy encountered by the test borings and indicated greater undrained cohesive strengths than those determined based on laboratory testing.

3. Two triaxial "R" compression tests with pore pressure measurements were performed on undisturbed samples taken within the compressible fine-grained stratum at depths of approximately 30.0 to 32.0 feet, in boring EEB-52, and 44.0 to 46.0 feet, in boring EEB-54. Laboratory testing indicated cohesive strengths ranging from 600 to 750 psf and friction angles ranging from 11.2° to 13.1° based on the resulting total stress envelopes for these samples. The resulting effective stress envelopes indicated drained cohesive strengths ranging from 310 to 400 psf and drained friction angles ranging from approximately 33° to 34°. The range of values obtained for both the drained and undrained friction angles is consistent with historical laboratory data for these soils, including laboratory testing performed as a part of the USACE's 1986 subsurface investigation at the site.

   Although cohesive strengths are typically assumed to be zero in drained analyses (i.e., the drained cohesive intercept is neglected), the presence of some cohesion in the plots of the drained strength test is consistent with that described in several

geotechnical references, including the NAVFAC Soil Mechanics Design Manual (DM-7.1) and "The Measurement of Soil Properties in the Triaxial Test," by A.W. Bishop and D.F. Henkel (1962) for overconsolidated soils. Overconsolidated soils will generally have a cohesion intercept for both total and effective stresses based on their Mohr envelopes. Review of the data for the five consolidation tests run as part of this program indicates that all five samples, which ranged in depths from approximately 10 to 80 feet below the ground surface, were overconsolidated. Using an effective groundwater elevation of 30 feet, overconsolidation ratios (OCRs) ranging from approximately 1.5 to 4.0 were calculated for these samples, with the highest OCRs occurring in the 20 to 30 foot depth range. This apparent overconsolidation may be the result of the cyclic placement and desiccation of these soils, which is typical for dredged disposal facilities. It is recommended that the indicated cobesion be neglected for the drained analysis.

4. Groundwater was only observed in the SPT boring, at an elevation of approximately 29 feet. This elevation is similar to the elevation of the interior of the dredged disposal area, approximately elevation 30, and, therefore, likely represents the perched groundwater conditions present within the disposal area. The natural groundwater elevation in the vicinity of the site should approximately correspond to the water surface elevation in the Christina River. Since effective (perched or natural) groundwater levels will vary based on dredging operations and seasonal fluctuations, the groundwater levels assumed for future dike stability analyses should be based on review of the cumulative geotechnical data and consideration of perched groundwater conditions within the disposal area.

5. Duffield Associates recommends the data and testing results acquired for this evaluation be compiled with the existing database for Wilmington Harbor North and reviewed in conjunction with historical strength data, for use in review of alternatives for extending the capacity of the disposal area and associated stability analyses.

This report has been prepared according to generally accepted soil engineering standards and is based on the conditions encountered by the test borings performed for this evaluation. Duffield Associates has presented field boring logs and laboratory testing in accordance with a scope of services prepared by the U.S. Army Corps of Engineers. Interpretation of this data should consider the requested scope of services and the conditions encountered at the site as a whole. In the event that changes in the presentation of this data are proposed, this report will not be considered valid unless the changes have been reviewed and the recommendations of this report modified and re-approved in writing by Duffield Associates, Inc.

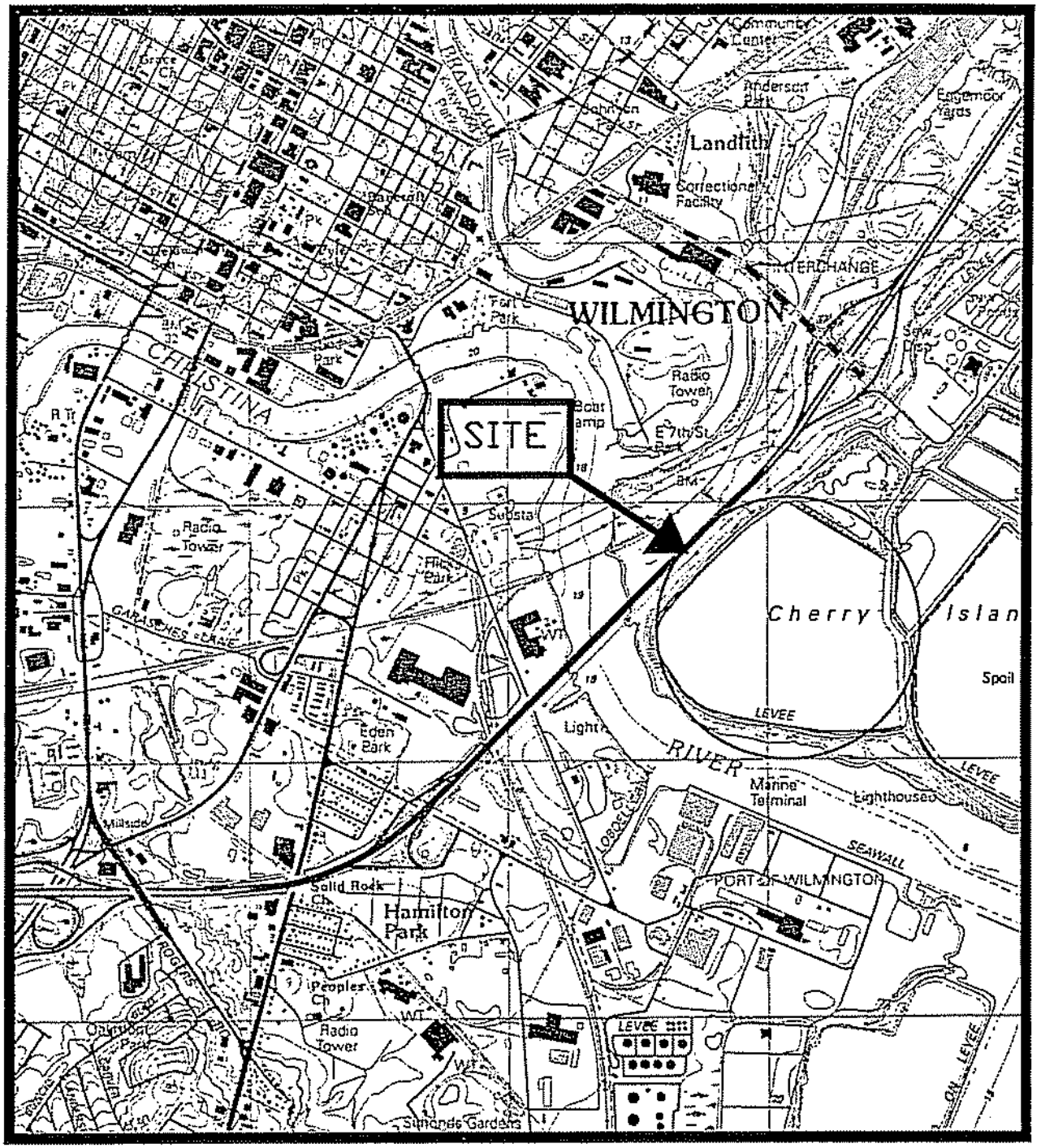
VI. REFERENCES

Soil Mechanics – Design Manual 7.1. (1982). Department of the Naval Facilities Engineering Command, Alexandria, VA, 7.1-145 – 7.1-148.

Bishop, A.W. and Henkel, D.F. (1962). *The Measurement of Soil Properties in the Triaxial Test*. Edward Arnold Publishers, Ltd., London, England.

APPENDIX A

SITE LOCATION SKETCH
TEST BORING/CPT BORING LOCATION SKETCH



NOTE:
THIS LOCATION SKETCH IS ADAPTED FROM THE U.S.G.S. TOPOGRAPHIC MAP, 7.5 MINUTE SERIES, FOR WILMINGTON SOUTH, DEL. (1993).

SITE LOCATION SKETCH

US ARMY CORPS OF ENGINEERS WILMINGTON HARBOR NORTH CONFINED DISPOSAL FACILITY

WILMINGTON–NEW CASTLE COUNTY–DELAWARE

DUFFIELD ASSOCIATES
Consultants in the Geosciences
5400 LIMESTONE ROAD
WILMINGTON, DE 19808-1232
TEL. (302)239-6634 FAX (302)239-8485
1528 WALNUT STREET, SUITE 725
PHILADELPHIA, PA 19102
E-MAIL: DUFFIELD@DUFFNET.COM

Drawn: JMW	Chk'd: WHS	Date:	4 JUNE 2001
Scale:	1"=2000'	W.O.:	4276.GE
Drawing No:	A4276GE01		FIGURE 1

KETCH IS ADAPTED FROM A
'SUBSURFACE
00,"DRAWING NUMBER
PREPARED BY US ARMY
ERS, PHILADELPHIA

AND CPT BORING
EST BORING LOCATION

IMATE LOCATION
F BORING

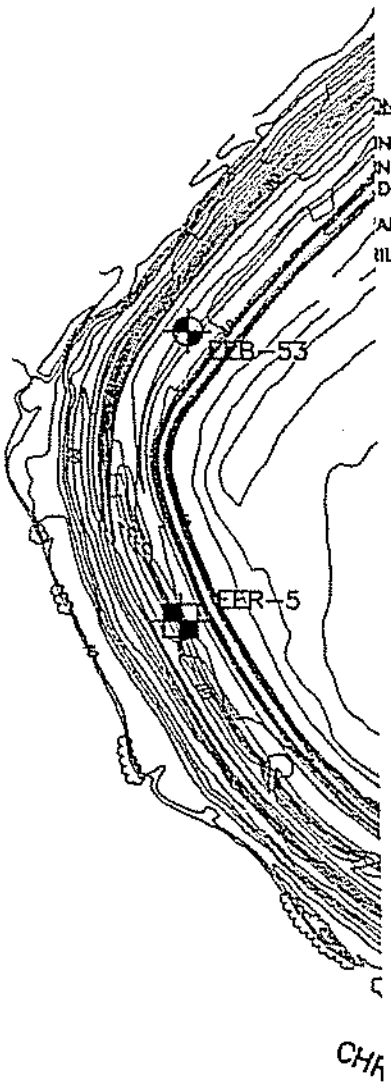
IMATE LOCATION
BORING

ON USACE BASE DRAWING)

N FEET AND REFER TO
NA RIVER DATUM
D. 1929 ADJUSTMENT.

ARE STATE PLANE GRID SYSTEM.

IIL 13, 1992.



CHA

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E-MAIL: DUFFIELD@DUFFIELDASSOC.COM

DESIGNED BY:	WHS
DRAWN BY:	JMW
CHECKED BY:	WHS
FILE:	D-4276GE-01

TEST BORING/CPT BORING LOCATION SKETCH

U.S. ARMY CORPS OF ENGINEERS

WILMINGTON HARBOR NORTH CONFINED DISPOSAL FACILITY

SUBSURFACE INVESTIGATION 2000

WILMINGTON - NEW CASTLE COUNTY - DELAWARE

DATE: 4 JUNE 2001

SCALE:

W.O. NO. 4276.GE

SHEET: FIGURE 2

APPENDIX B

"AS-PERFORMED" LOCATION DATA

VANDEMARK
& LYNCH, INC.
ENGINEERS • PLANNERS • SURVEYORS

4305 MILLER RD./PO BOX 2047
WILMINGTON, DE 19899
(302) 764-7635 FAX (302)764-4170

April 30, 2001

Mr. Hank Stack
Duffield Associates
5400 Limestone Road
Wilmington, DE 19808

Re: Port of Wilmington COE Contract No. DACW-61-98-D-0008
Cherry Island
Boring Positions

Subject: Tabulated Results, revised: Corrected Christina River Datum Elevations and boring descriptions (4/30/01).

Dear Mr. Stack:

Enclosed is a compiled list of all the Test Borings VanDemark & Lynch, Inc. field surveyed on October 23 and 24, 2000.

Horizontal datum is referenced to the Delaware State Plane Coordinate System, NAD 83.

Northing	Easting	Elevation NAVD 88	Elevation Christiana River Datum*	Boring Description
630,108	625,560	34.6	38.9	EEB-54
629,453	624,895	34.7	39.0	EER-6
628,915	624,381	32.6	36.9	EEB-53
628,306	624,369	30.0	34.3	EER-5
627,736	624,900	30.8	35.1	EEB-52
627,517	625,947	31.2	35.5	EER-4
627,456	626,999	32.3	36.6	EEB-51
628,316	627,440	45.0	49.3	EER-3
629,387	627,224	41.3	45.6	EEB-50, EER-2
630,056	626,305	38.7	43.0	EER-1

*Conversion of vertical datums, NAVD 88 to Christina River Datum is (-) 4.31 feet as per George Griffith of the U.S. Army Corps of Engineers, Philadelphia District, based on COE control monument T2-1995.

Thank you for having VanDemark & Lynch, Inc. provide you with the survey of this site. Please call if we can be of further service.

Sincerely,
VanDemark & Lynch, Inc.

John S. Bianco, P.L.S.
Chief of Surveys

W:\jb\BORINGS Cherry Island.wpd

APPENDIX C

SPT AND AUGER TEST BORINGS (5)

DUFFIELD ASSOCIATES
Consultants in the Geosciences

TEST BORING EEB-50

U.S. Army Corps of Engineers
Geotechnical Investigation
Contract Number DACW-61-98-D-0008
Task Order 27
Wilm. Harbor North Subsurface Investigation

Date Started	: October 13, 2000	Drilling Equipment	: ATV Mounted CME 55
Date Completed	: October 17, 2000	Drilling Methods	: See Note No. 1
Logged by	: SLK	Surface Elevation	: 41.3 feet NAVD 88
Weather	: Clear, 70's	Northing	: 629,387 DE-NAD 83
Driller/Agency	: D. Taylor/Walton Corporation	Easting	: 627,244 DE-NAD 83

Sample Condition: Remolded; Undisturbed

Water Levels: ▼ During Drilling; ▽ At completion

Depth in feet	Surf. Elev. 41.3 feet	GRAPHIC	USCS	DESCRIPTION	Samples	Sample Number	Blows per 6 inches	Recovery (ft)	Water Level	Remarks
0	40		SM	Brown/yellow fine to medium SAND, little silt, trace coarse sand, trace gravel, trace root fibers.		S-1	2-5-10-14	1.8		
				SAME.		S-2	18-14-14-10	1.9		
				SAME.						
5			MH	Dark-gray SILT, trace fine sand, trace clay.		S-3	2-7-8-5	1.0		
	35			Dark-gray/black SILT, trace fine sand (strong organic odor).		S-4	5-3-4-2	0.5		
				Dark-gray/black SILT, trace organics, trace fine sand, trace clay.		S-5	WH/1.5'-2	1.9		Value in blow counts column equal to water pressure during sampling with piston sampler.
10	30			SHELBY TUBE ST-1: 10.0' - 12.0' - Dark-gray/black CLAYEY SILT, trace fine sand, trace medium sand, trace organics.		ST-1	100 - 125 psi	2.0	▼	
				SAME.		S-6	1-1-2-3	2.0		
15	25			SAME.		S-7	WH/1.5'-1	2.0		
				SAME.		S-8	WH-2-2-3	2.0		
				Dark-gray/black CLAYEY SILT, trace fine sand, trace medium sand, trace organics.		S-9	WH/1.5'-1	2.0		
20	20			SAME.		S-10	WH-WH-2-2	2.0		
				SAME.		S-11	WH/1.5'-1	2.0		Value in blow counts column equal to water pressure during sampling with piston sampler.
25	15			SHELBY TUBE ST-2: 24.0' - 26.0' - Dark-gray/black CLAYEY SILT, trace fine sand, trace organics (vegatative fibers).		ST-2	10 psi			
				SAME.		S-12	WH/2.0'	2.0		
				Dark-gray/black CLAYEY SILT, trace fine sand, trace organics (vegetative fibers).		S-13	WH/1.5'-1	2.0		
30	10			SAME.		S-14	2-2-2-2	2.0		
				SAME.		S-15	WH/1.5'-2	2.0		
				SAME.		S-16	WH/2.0'	2.0		
35	5			Dark-gray CLAYEY SILT, trace fine sand, trace medium sand (sandy lenses present).		S-17	WH-2-1-2	2.0		
				Dark-gray CLAYEY SILT, little fine sand, trace medium sand.		S-18	WH-WH-2-1	2.0		
40	0			SHELBY TUBE ST-3: 40.0' 42.0' - SAME.		ST-3	5 - 10 psi	< 1.0	▽	Value in blow counts column equal to water pressure during sampling with piston sampler.
				SHELBY TUBE ST-4: 42.0' - 44.0' - Dark-gray/black CLAYEY SILT, little organics, trace fine sand.		ST-4	10 - 15 psi	0.4		
45			ML			ST-5	35 psi	2.0		

NOTES:
1. Drilling procedures performed with 3 1/4-inch hollow stem augers according to ASTM D: 1586 for SPT sampling and ASTM D: 1587 for thin-walled tube sampling.
2. Soil descriptions & classifications according to ASTM D: 2488 (Visual-Manual Procedure) and ASTM D:2487 (Unified Soil Classification System) along with laboratory analysis if analysis performed.
3. Boring terminated approximately 80.0 feet below existing ground surface.
4. Wet on spoon at 12.0 feet. Water level through augers at 12.6 feet after 15 minutes, observed at 40.8 feet through augers upon completion.

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DUFFIELD ASSOCIATES
Consultants in the Geosciences

TEST BORING EEB-50

U.S. Army Corps of Engineers
Geotechnical Investigation
Contract Number DACW-61-98-D-0008
Task Order 27
Wilm. Harbor North Subsurface Investigation

Date Started	: October 13, 2000	Drilling Equipment	: ATV Mounted CME 55
Date Completed	: October 17, 2000	Drilling Methods	: See Note No. 1
Logged by	: SLK	Surface Elevation	: 41.3 feet NAVD 88
Weather	: Clear, 70's	Northing	: 629,387 DE-NAD 83
Driller/Agency	: D. Taylor/Walton Corporation	Easting	: 827,244 DE-NAD 83

Sample Condition: Remolded; Undisturbed
Water Levels: During Drilling; At completion

Depth in feet	Surf. Elev. 41.3 feet	GRAPHIC	USCS	DESCRIPTION	Samples	Sample Number	Blows per 6 inches	Recovery (ft)	Water Level	Remarks
45	-5		ML	SHELBY TUBE ST-5: 44.0' - 36.0' - Dark-gray SILT, some clay sand, little fine sand, trace medium sand.		ST-5	35 psi	2.0		
						S-19	WR-WH/1.0'-3	2.0		*S-20: Driller augered past 48 feet, augered to 49 feet and drove spoon 1-foot.
50	-10		MH	Dark-gray/brown CLAYEY SILT and peat, trace fine sand.		S-20	–3-2	1.0		
				Dark-gray/brown CLAYEY SILT, trace fine sand, trace medium sand, trace organics.		S-21	3-3-4-5	2.0		Value in blow counts column equal to water pressure during sampling with piston sampler.
				SAME.		S-22	1-2-3-4	2.0		
55	-15			SHELBY TUBE ST-6: 54.0' - 56.0' - Dark-gray/brown CLAYEY SILT, trace fine sand, trace medium sand, trace organics.		ST-6	70 psi	1.6		
				SAME.		S-23	3-4-5-4	2.0		
				Dark-gray CLAYEY SILT, trace fine sand, trace to little organics.		S-24	—	2.0		*S-24: No blow counts, slide plate relased rods,drove spoon 2.5 feet.
60	-20			Dark-gray CLAYEY SILT, trace fine sand, trace organics.		S-25	-3-5-5	1.5		
				Dark-gray/brown CLAYEY SILT, trace fine sand, trace medium sand, trace organics.		S-26	1-3-5-9	2.0		*S-25: Spoon driven from 60.5 feet to 62 feet, due to slipped rods during previous sample.
				SAME.		S-27	21-22-21-22	1.3		
65	-25		SP-SM	Gray/brown fine to medium SAND, some gravel, little coarse sand, trace clayey silt.		S-28	16-18-20-21	1.4		
				Brown/gray fine to medium SAND, little to some coarse sand, little gravel, trace clayey silt, trace shell fragments.		S-29	16-29-30-31	1.5		
				SAME.		S-30	20-20-20-21	1.5		
70	-30			Gray/brown fine to coarse SAND and gravel, trace clayey silt, trace shell fragments.		S-31	20-22-32-38	1.4		*S-31 & S-32: Heave observed during sampling, washed boring prior to sampling. 9" heave in boring after washing for S-32, drove spoon 1-foot.
				SAME.		S-32	31-30	0.8		
				SAME.		S-33	23-38-35-36	1.4		
75	-35			Dark-gray/brown fine to medium SAND, little coarse sand/gravel, little clayey silt, trace shell fragments.		S-34	28-32-28-19	1.4		
				Dark-gray/brown fine to medium SAND, some gravel/coarse sand, little clayey silt, trace shell fragments.						
80	-40									
85	-45									
90										

NOTES:
1. Drilling procedures performed with 3 1/4-inch hollow stem augers according to ASTM D: 1586 for SPT sampling and ASTM D: 1587 for thin-walled tube sampling.
2. Soil descriptions & classifications according to ASTM D: 2488 (Visual-Manual Procedure) and ASTM D:2487 (Unified Soil Classification System) along with laboratory analysis if analysis performed.
3. Boring terminated approximately 60.0 feet below existing ground surface.
4. Wet on spoon at 12.0 feet. Water level through augers at 12.6 feet after 15 minutes, observed at 40.8 feet through augers upon completion.

04-30-2001 f:\boring logs\4276gelwin\eeb51.bor

DUFFIELD ASSOCIATES
Consultants in the Geosciences

TEST BORING EEB-51

U.S. Army Corps of Engineers
Geotechnical Investigation
Contract Number DACW-61-98-D-0008
Task Order 27
Wilm. Harbor North Subsurface Investigation

Date Started	: October 17, 2000	Drilling Equipment	: ATV Mounted CME 55
Date Completed	: October 18, 2000	Drilling Method	: See Note No. 1
Logged by	: SLK	Surface Elevation	: 32.3 feet NAVD 88
Weather	: Cloudy, 70's	Northing	: 627,456 DE-NAD 83
Driller/Agency	: D. Taylor/Walton Corporation	Easting	: 626,999 DE-NAD 83

Sample Condition: Remolded / Undisturbed
Water Levels: During Drilling / At completion

Depth in feet	Surf. Elev. 32.3 feet	GRAPHIC	USCS	DESCRIPTION	Samples	Sample Number	Blows per 6 inches	Recovery (ft)	Water Level	Remarks
0			ML	Brown/dark-brown SILT, trace fine to coarse sand, trace gravel, trace vegetative fibers.						
	30			SHELBY TUBE ST-1: 4.0' - 6.0' - NO RECOVERY, unable to push tube through soil with piston sampler.		ST-1	100 + psi	NO REC.		Value in blow counts column equal to water pressure during sampling with piston sampler.
5			MH	Dark-gray CLAYEY SILT, trace fine to medium sand, trace vegetative fibers.						
	25									
10										
	20			SHELBY TUBE ST-2: 12.0' - 14.0' - Dark-gray CLAYEY SILT, trace medium sand, trace fine sand, trace organics.		ST-2	100 + psi	1.8		Value in blow counts column equal to water pressure during sampling with piston sampler.
15										
	15									*Mud rotary drilling techniques utilized below 19 feet.
20										
	10									
25										
	5									
30										
	0			SHELBY TUBE ST-3: 32.0' - 34.0' - Dark-gray CLAYEY SILT, trace fine sand.		ST-3	50 psi	2.0		Value in blow counts column equal to water pressure during sampling with piston sampler.
35										
	-5									
40										
	-10									
45										

NOTES:
1. Drilling procedures performed with 3 1/4-inch hollow stem augers according to ASTM D: 1586 for SPT sampling and ASTM D: 1587 for thin-walled tube sampling.
2. Soil descriptions & classifications according to ASTM D: 2488 (Visual-Manual Procedure) and ASTM D:2487 (Unified Soil Classification System) along with laboratory analysis if analysis performed.
3. Boring terminated at approximately 76.0 feet below existing ground surface.
4. Boring grouted to ground surface with portland cement grout.

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DUFFIELD ASSOCIATES
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TEST BORING EEB-51

U.S. Army Corps of Engineers
Geotechnical Investigation
Contract Number DACW-61-98-D-0008
Task Order 27
Wilm. Harbor North Subsurface Investigation

Date Started	: October 17, 2000	Drilling Equipment	: ATV Mounted CME 55
Date Completed	: October 18, 2000	Drilling Method	: See Note No. 1
Logged by	: SLK	Surface Elevation	: 32.3 feet NAVD 88
Weather	: Cloudy, 70's	Northing	: 627,456 DE-NAD 83
Driller/Agency	: D. Taylor/Walton Corporation	Easting	: 626,999 DE-NAD 83

Sample Condition: Remolded; Undisturbed
Water Levels: During Drilling; At completion

Depth in feet	Surf. Elev. 32.3 feet	GRAPHIC	USCS	DESCRIPTION	Samples	Sample Number	Blows per 6 inches	Recovery (ft)	Water Level	Remarks
45 / -15			MH	SHELBY TUBE ST-4: 56.0' - 58.0' - Dark-gray SILT, some clay, trace fine sand (fine sand lenses).		ST-4	30 -40 psi	1.8		Value in blow counts column equal to water pressure during sampling with piston sampler.
70 / -40			SP-SM	Dark-gray fine SAND, trace clayey silt, trace medium sand.						
				SHELBY TUBE ST-5: 72.0' - 74.0' - NO RECOVERY.		ST-5	30 psi	NO REC.		Value in blow counts column equal to water pressure during sampling with piston sampler.
				SHELBY TUBE ST-6: 74.0' - 76.0' - Dark-gray fine SAND, trace clayey silt		ST-6	----	0.5		
90 / -55										

NOTES:
1. Drilling procedures performed with 3 1/4-inch hollow stem augers according to ASTM D: 1586 for SPT sampling and ASTM D: 1587 for thin-walled tube sampling.
2. Soil descriptions & classifications according to ASTM D: 2488 (Visual-Manual Procedure) and ASTM D:2487 (Unified Soil Classification System) along with laboratory analysis if analysis performed.
3. Boring terminated at approximately 76.0 feet below existing ground surface.
4. Boring grouted to ground surface with portland cement grout.

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TEST BORING EEB-52

U.S. Army Corps of Engineers
Geotechnical Investigation
Contract Number DACW-61-98-D-0008
Task Order 27
Wilm. Harbor North Subsurface Investigation

Date Started	: October 18, 2000	Drilling Equipment	: ATV Mounted CME 55
Date Completed	: October 18, 2000	Drilling Method	: See Note No. 1
Logged by	: SLK	Surface Elevation	: 30.8 feet NAVD 88
Weather	: Cloudy, 70's	Northing	: 627,736 DE-NAD 83
Driller/Agency	: D. Taylor/Walton Corporation	Easting	: 624,900 DE-NAD 83

Sample Condition: Remolded; Undisturbed
Water Levels: During Drilling; At completion

Depth in feet	Surf. Elev. 30.8 feet	GRAPHIC	USCS	DESCRIPTION	Samples	Sample Number	Blows per 6 inches	Recovery (ft)	Water Level	Remarks
0	30		ML	Brown/gray SILT, trace fine to coarse sand, trace vegetative fibers.						
5	25									
10	20			Dark-gray CLAYEY SILT, trace fine sand, trace vegetative fibers, trace medium sand.						
15	15			SHELBY TUBE ST-1: 16.0' - 18.0' - Dark-gray CLAYEY SILT, trace fine sand, trace organics (vegatative fibers).		ST-1	60 psi	1.8		Value in blow counts column equal to water pressure during sampling with piston sampler.
20	10									*Mud rotary drilling techniques utilized below 19 feet.
25	5		MH							
30	0			SHELBY TUBE ST-2: 30.0' - 32.0' - Dark-gray CLAYEY SILT, trace fine sand.		ST-2	65 psi	2.0		Value in blow counts column equal to water pressure during sampling with piston sampler.
35	-5									
40	-10									
45										

NOTES:
1. Drilling procedures performed with 3 1/4-inch hollow stem augers according to ASTM D: 1586 for SPT sampling and ASTM D: 1587 for thin-walled tube sampling.
2. Soil descriptions & classifications according to ASTM D: 2488 (Visual-Manual Procedure) and ASTM D:2487 (Unified Soil Classification System) along with laboratory analysis if analysis performed.
3. Boring terminated at approximately 82.0 feet below existing ground surface.
4. Boring grouted to ground surface with portland cement grout.

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TEST BORING EEB-52

U.S. Army Corps of Engineers
Geotechnical Investigation
Contract Number DACW-61-98-D-0008
Task Order 27
Wilm. Harbor North Subsurface Investigation

Date Started	: October 18, 2000	Drilling Equipment	: ATV Mounted CME 55
Date Completed	: October 18, 2000	Drilling Method	: See Note No. 1
Logged by	: SLK	Surface Elevation	: 30.8 feet NAVD 88
Weather	: Cloudy, 70's	Northing	: 627,736 DE-NAD 83
Driller/Agency	: D. Taylor/Walton Corporation	Easting	: 624,900 DE-NAD 83

Sample Condition: Remolded; Undisturbed
Water Levels: During Drilling; At completion

Depth in feet	Surf. Elev. 30.8 feet	GRAPHIC	USCS	DESCRIPTION	Samples	Sample Number	Blows per 6 inches	Recovery (ft)	Water Level	Remarks
45	-15			SHELBY TUBE ST-3: 46.0' - 48.0' - Dark-gray/brown CLAYEY SILT, trace fine sand.		ST-3	50 psi	1.8		Value in blow counts column equal to water pressure during sampling with piston sampler.
50	-20									
55	-25									
60	-30		MH	SHELBY TUBE ST-4: 60.0' - 62.0' - Dark-gray CLAYEY SILT, trace fine sand, trace organics (vegetative fibers).		ST-4	55 psi	1.6		Value in blow counts column equal to water pressure during sampling with piston sampler.
65	-35									
70	-40									
75	-45									
80	-50			SHELBY TUBE ST-5: 80.0' - 82.0' - Dark-gray CLAYEY SILT, trace fine sand, trace organics.		ST-5	50 psi	1.5		Value in blow counts column equal to water pressure during sampling with piston sampler.
85	-55									
90										

NOTES:
1. Drilling procedures performed with 3 1/4-inch hollow stem augers according to ASTM D: 1586 for SPT sampling and ASTM D: 1587 for thin-walled tube sampling.
2. Soil descriptions & classifications according to ASTM D: 2488 (Visual-Manual Procedure) and ASTM D:2487 (Unified Soil Classification System) along with laboratory analysis if analysis performed.
3. Boring terminated at approximately 82.0 feet below existing ground surface.
4. Boring grouted to ground surface with portland cement grout.

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TEST BORING EEB-53

U.S. Army Corps of Engineers
Geotechnical Investigation
Contract Number DACW-61-98-D-0008
Task Order 27
Wilm. Harbor North Subsurface Investigation

Date Started	: October 19, 2000	Drilling Equipment	: ATV Mounted CME 55
Date Completed	: October 19, 2000	Drilling Method	: See Note No. 1
Logged by	: SLK	Surface Elevation	: 32.6 feet NAVD 88
Weather	: Clear, 70's	Northing	: 628,915 DE-NAD 83
Driller/Agency	: D. Taylor/Walton Corporation	Easting	: 624,381 DE-NAD 83

Sample Condition: Remolded; Undisturbed
Water Levels: During Drilling; At completion

Depth in feet	Surf. Elev. 32.6 feet	GRAPHIC	USCS	DESCRIPTION	Samples	Sample Number	Blows per 6 inches	Recovery (ft)	Water Level	Remarks
0	30		ML	Brown/gray SILT, trace fine to coarse sand, trace vegetative fibers.						
5	25			Dark-gray CLAYEY SILT, trace fine sand, trace vegetative fibers, trace medium sand.						
10	20			SHELBY TUBE ST-1: 9.0' - 11.0' - Dark-gray CLAYEY SILT, trace fine sand, trace organics.		ST-1	60 psi	1.9		Value in blow counts column equal to water pressure during sampling with piston sampler.
15	15									*Mud rotary drilling techniques utilized below 19 feet.
20	10		MH	SHELBY TUBE ST-2: 23.0' - 25.0' - NO RECOVERY.		ST-2	50 psi	NO REC.		Value in blow counts column equal to water pressure during sampling with piston sampler.
25	5			SHELBY TUBE ST-3: 25.0' - 27.0' - Dark-gray CLAYEY SILT, trace fine sand.		ST-3	45 psi	1.9		
30	0			SHELBY TUBE ST-4: 33.0' - 35.0' - Dark-gray CLAYEY SILT, trace fine sand.		ST-4	45 psi	1.9		Value in blow counts column equal to water pressure during sampling with piston sampler.
35	-5									
40	-10			SHELBY TUBE ST-5: 43.0' - 45.0' - Dark-gray CLAYEY SILT, trace medium sand, trace fine sand, trace organics.		ST-5	40 psi	1.6		Value in blow counts column equal to water pressure during sampling with piston sampler.
45										

NOTES:
1. Drilling procedures performed with 3 1/4-inch hollow stem augers according to ASTM D: 1586 for SPT sampling and ASTM D: 1587 for thin-walled tube sampling.
2. Soil descriptions & classifications according to ASTM D: 2488 (Visual-Manual Procedure) and ASTM D:2487 (Unified Soil Classification System) along with laboratory analysis if analysis performed.
3. Boring terminated at approximately 82.0 feet below existing ground surface.
4. Boring grouted to ground surface with portland cement grout.

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TEST BORING EEB-53

U.S. Army Corps of Engineers
Geotechnical Investigation
Contract Number DACW-61-98-D-0008
Task Order 27
Wilm. Harbor North Subsurface Investigation

Date Started	: October 19, 2000	Drilling Equipment	: ATV Mounted CME 55
Date Completed	: October 19, 2000	Drilling Method	: See Note No. 1
Logged by	: SLK	Surface Elevation	: 32.6 feet NAVD 88
Weather	: Clear, 70's	Northing	: 628,915 DE-NAD 83
Driller/Agency	: D. Taylor/Walton Corporation	Easting	: 624,381 DE-NAD 83

Sample Condition: Remolded; Undisturbed
Water Levels: During Drilling; At completion

Depth in feet	Surf. Elev. 32.6 feet	GRAPHIC	USCS	DESCRIPTION	Samples	Sample Number	Blows per 6 inches	Recovery (ft)	Water Level	Remarks
45										
	-15									
50										
	-20									
55										
	-25									
60			MH	SHELBY TUBE ST-6: 63.0' - 65.0' - Dark-gray CLAYEY SILT, trace fine sand, trace organics.		ST-6	50 psi	1.8		Value in blow counts column equal to water pressure during sampling with piston sampler.
	-30									
65										
	-35									
70										
	-40									
75										
	-45		SP-SM	Dark-gray/gray fine to medium SAND, little coarse sand, trace clayey silt. SHELBY TUBE ST-7: 78.0' -80.0' - NO RECOVERY.		ST-7	—	NO REC.		No sample recovered for ST-7, spoon driven for next sample interval.
80				Dark-gray fine to medium SAND, little coarse sand, trace gravel, trace clayey silt.		S-1	5-8-12-6	1.2		
	-50									
85										
	-55									
90										

NOTES:
1. Drilling procedures performed with 3 1/4-inch hollow stem augers according to ASTM D: 1586 for SPT sampling and ASTM D: 1587 for thin-walled tube sampling.
2. Soil descriptions & classifications according to ASTM D: 2488 (Visual-Manual Procedure) and ASTM D:2487 (Unified Soil Classification System) along with laboratory analysis if analysis performed.
3. Boring terminated at approximately 82.0 feet below existing ground surface.
4. Boring grouted to ground surface with portland cement grout.

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TEST BORING EEB-54

U.S. Army Corps of Engineers
Geotechnical Investigation
Contract Number DACW-61-98-D-0008
Task Order 27
Wilm. Harbor North Subsurface Investigation

Date Started	: October 19, 2000	Drilling Equipment	: ATV Mounted CME 55
Date Completed	: October 19, 2000	Drilling Method	: See Note No. 1
Logged by	: SLK	Surface Elevation	: 34.6 feet NAVD 88
Weather	: Clear, 70's	Northing	: 630,108 DE-NAD 83
Driller/Agency	: D. Taylor/Walton Corporation	Easting	: 625,560 DE-NAD 83

Sample Condition: Remolded / Undisturbed
Water Levels: During Drilling / At completion

Depth in feet	Surf. Elev. 34.6 feet	GRAPHIC	USCS	DESCRIPTION	Samples	Sample Number	Blows per 6 inches	Recovery (ft)	Water Level	Remarks
0	34		ML	Brown/red-brown CLAYEY SILT, trace fine to coarse sand, trace gravel.						
5	29		MH	SHELBY TUBE ST-1: 7.0' - 9.0' - Dark-gray CLAYEY SILT, trace fine sand, trace medium sand, trace organics.		ST-1	25 - 50 psi	1.7		Did not use piston sampler for undisturbed sampling due to soil stiffness.
10	24									
15	19									
20	14									
25	9			SHELBY TUBE ST-2: 24.0' - 26.0' - Dark-gray CLAYEY SILT, trace fine sand, trace medium sand, trace organics.		ST-2	45 psi	1.9		Value in blow counts column equal to water pressure during sampling with piston sampler.
30	4									
35	-1									
40	-6									
45	-11			SHELBY TUBE ST-3: 44.0' - 46.0' - Dark-gray CLAYEY SILT, trace fine sand, trace organics (vegatative fibers).		ST-3	40 psi	2.0		Value in blow counts column equal to water pressure during sampling with piston sampler.
50										

NOTES:
1. Drilling procedures performed with 3 1/4-inch hollow stem augers according to ASTM D: 1586 for SPT sampling and ASTM D: 1587 for thin-walled tube sampling.
2. Soil descriptions & classifications according to ASTM D: 2488 (Visual-Manual Procedure) and ASTM D:2487 (Unified Soil Classification System) along with laboratory analysis if analysis performed.
3. Boring terminated at approximately 46.0 feet below existing ground surface.
4. Boring grouted to ground surface with portland cement grout.

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APPENDIX D

CPT BORING LOGS (6), GENERAL NOTES, AND FIELD REPORTS

DUFFIELD ASSOCIATES
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CPT BORING EER-1

U.S. Army Corps of Engineers
Geotechnical Investigation
Contract Number DACW-61-98-D-0008
Task Order 27
Wilm. Harbor North Subsurface Investigation

Date Started	: October 17, 2000	Drilling Equipment	: 20 Ton AD066
Date Finished	: October 17, 2000	Drilling Method	: See Note No. 1
Weather	: Clear, 70's	Surface Elevation	: 38.7 feet NAVD 88
Logged by	: ConeTec	Northing	: 626,056 DE-NAD 83
Driller/Agency	: R. Pope/ConeTec	Easting	: 626,305 DE-NAD 83

Depth in feet	Surf. Elev. 38.7 feet	DESCRIPTION	Undrained Cohesion (psf)	Angle of Internal Friction	Relative Density (%)	Est. N-value from N60	Avg. Dynamic Pore Pressure (feet)	Coeff. of Consolidation (ft^2/day)	Assumed Water Levels
0	38	CLAY/SILTY CLAY	1170	–	–	4	-1.6		
5	33	CLAY/SILTY CLAY							▼
10	28		560	–	–	3	14		
15	23								
20	18	SILT/CLAYEY SILT							
25	13								
30	8								
35	3								
40	-2		1170	–	–	5	59		
45	-7								
50	-12								
55	-17							2.2	
60	-22	SAND/GRAVELLY SAND							
65	-27		–	42	81	44	9		
70	-32								
75	-37								
80									

NOTES:
1. Cone Penetration Test (CPT) boring performed according to ASTM D: 5778.
2. See CPT General Notes for parameter definitions.
3. Boring terminated approximately 73 feet below existing ground surface.

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DUFFIELD ASSOCIATES
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CPT BORING EER-2

U.S. Army Corps of Engineers
Geotechnical Investigation
Contract Number DACW-61-98-D-0008
Task Order 27
Wilm. Harbor North Subsurface Investigation

Date Started	: October 17, 2000	Drilling Equipment	: 20 Ton AD066
Date Finished	: October 17, 2000	Drilling Method	: See Note No. 1
Weather	: Clear, 70's	Surface Elevation	: 41.3 feet NAVD 88
Logged by	: ConeTec	Northing	: 629,387 DE-NAD 83
Driller/Agency	: R. Pope/ConeTec	Easting	: 627,224 DE-NAD 83

Depth in feet	Surf. Elev. 41.3 feet	DESCRIPTION	Undrained Cohesion (psf)	Angle of Internal Friction	Relative Density (%)	Est. N-value from N60	Avg. Dynamic Pore Pressure (feet)	Coeff. of Consolidation (ft^2/day)	Assumed Water Levels
0	41	SAND	–	50	95	28	-1.15		
5	36	SILT	2600	17	–	8	8		
10	31	SILTY CLAY							
15	26								
20	21		580	–	–	3	26		
25	16								
30	11								
35	6	CLAYEY SILT							
40	1								
45	-4		1000	–	–	4	92		
50	-9								
55	-14								
60	-19								
65	-24	SAND/GRAVELLY SAND	–	40	72	41	18		
70	-29								
75	-34								
80									

NOTES:
1. Cone Penetration Test (CPT) boring performed according to ASTM D: 5778.
2. See CPT General Notes for parameter definitions.
3. Boring terminated approximately 71 feet below existing ground surface.

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CPT BORING EER-3

U.S. Army Corps of Engineers
Geotechnical Investigation
Contract Number DACW-61-98-D-0008
Task Order 27
Wilm. Harbor North Subsurface Investigation

Date Started	: October 16, 2000	Drilling Equipment	: 20 Ton AD066
Date Finished	: October 16, 2000	Drilling Method	: See Note No. 1
Weather	: Clear, 70's	Surface Elevation	: 45.0 feet NAVD 88
Logged by	: ConeTec	Northing	: 628,316 DE-NAD 83
Driller/Agency	: R. Pope/ConeTec	Easting	: 627,440 DE-NAD 83

Depth in feet	Surf. Elev. +5.0 feet	DESCRIPTION	Undrained Cohesion (psf)	Angle of Internal Friction	Relative Density (%)	Est. N-value from N60	Avd. Dynamic Pore Pressure (feet)	Coeff. of Consolidation (ft^2/day)	Assumed Water Levels
0	44	SILTY CLAY/CLAY							
5	39		2350	–	–	7	0.8		
10	34	SILTY CLAY/CLAY							
15	29		750	–	–	4	12		
20	24								
25	19	CLAYEY SILT/SILT							
30	14								
35	9								
40	4								
45	-1		1130	–	–	5	60		
50	-6								
55	-11								
60	-16								
65	-21								
70	-26	SILTY SAND/SAND/GRAVELLY SAND							
75	-31		–	40	71	34	22		
80									

NOTES:
1. Cone Penetration Test (CPT) boring performed according to ASTM D: 5778.
2. See CPT General Notes for parameter definitions.
3. Boring terminated approximately 88 feet below existing ground surface.

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CPT BORING EER-3

U.S. Army Corps of Engineers
Geotechnical Investigation
Contract Number DACW-61-98-D-0008
Task Order 27
Wilm. Harbor North Subsurface Investigation

Date Started	: October 16, 2000	Drilling Equipment	: 20 Ton AD066
Date Finished	: October 16, 2000	Drilling Method	: See Note No. 1
Weather	: Clear, 70's	Surface Elevation	: 45.0 feet NAVD 88
Logged by	: ConeTec	Northing	: 628,316 DE-NAD 83
Driller/Agency	: R. Pope/ConeTec	Easting	: 627,440 DE-NAD 83

Depth in feet	Surf. Elev. 45.0 feet	DESCRIPTION	Undrained Cohesion (psf)	Angle of Internal Friction	Relative Density (%)	Est. N-value from NGD	Avd. Dynamic Pore Pressure (feet)	Coeff. of Consolidation ((ft^2/day)	Assumed Water Levels
80	-36	SILTY SAND/SAND/GRAVELLY SAND	–	40	71	34	22		
85	-41								
90	-46								
95	-51								
100	-56								
105	-61								
110	-66								
115	-71								
120	-76								
125	-81								
130	-86								
135	-91								
140	-96								
145	-101								
150	-106								
155	-111								
160									

NOTES:
1. Cone Penetration Test (CPT) boring performed according to ASTM D: 5778.
2. See CPT General Notes for parameter definitions.
3. Boring terminated approximately 88 feet below existing ground surface.

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CPT BORING EER-4

U.S. Army Corps of Engineers
Geotechnical Investigation
Contract Number DACW-61-98-D-0008
Task Order 27
Wilm. Harbor North Subsurface Investigation

Date Started	: October 16, 2000	Drilling Equipment	: 20 Ton AD066
Date Finished	: October 16, 2000	Drilling Method	: See Note No. 1
Weather	: Clear, 70's	Surface Elevation	: 31.2 feet NAVD 88
Logged by	: ConeTec	Northing	: 627,517 DE-NAD 83
Driller/Agency	: R. Pope/ConeTec	Easting	: 625,947 DE-NAD 83

Depth in feet	Surf. Elev. 31.2 feet	DESCRIPTION	Undrained Cohesion (psf)	Angle of Internal Friction	Relative Density (%	Est. N-value from N60	Avd. Dynamic Pore Pressure (feet)	Coeff. of Consolidation (ft^2/day)	Assumed Water Levels
0	31	SILTY CLAY/CLAY	1450	–	–	11	-2		
5	26	SILTY CLAY/ CLAY							▼
10	21								
15	16		845	–	–	4	8		
20	11								
25	6								
30	1	CLAYEY SILT/SILT							
35	-4								
40	-9								
45	-14								
50	-19		940	–	–	4	109		
55	-24								
60	-29								
65	-34								
70	-39								
75	-44	SANDY SILT/CLAYEY SILT							
80									

NOTES:
1. Cone Penetration Test (CPT) boring performed according to ASTM D: 5778.
2. See CPT General Notes for parameter definitions.
3. Boring terminated approximately 104 feet below existing ground surface.

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CPT BORING EER-4

U.S. Army Corps of Engineers
Geotechnical Investigation
Contract Number DACW-61-98-D-0008
Task Order 27
Wilm. Harbor North Subsurface Investigation

Date Started	: October 16, 2000	Drilling Equipment	: 20 Ton AD066
Date Finished	: October 16, 2000	Drilling Method	: See Note No. 1
Weather	: Clear, 70's	Surface Elevation	: 31.2 feet NAVD 88
Logged by	: ConeTec	Northing	: 627,517 DE-NAD 83
Driller/Agency	: R. Pope/ConeTec	Easting	: 625,947 DE-NAD 83

Depth in feet	Surf. Elev. 31.2 feet	DESCRIPTION	Undrained Cohesion (psf)	Angle of Internal Friction	Relative Density (%)	Est. N-value from N60	Avd. Dynamic Pore Pressure (feet)	Coeff. of Consolidation (ft^2/day)	Assumed Water Levels
80	-49	SANDY SILT/CLAYEY SILT							
85	-54								
90	-59		1940	31	--	8	183		
95	-64								
100	-69								
105	-74								
110	-79								
115	-84								
120	-89								
125	-94								
130	-99								
135	-104								
140	-109								
145	-114								
150	-119								
155	-124								
160									

NOTES:
1. Cone Penetration Test (CPT) boring performed according to ASTM D: 5778.
2. See CPT General Notes for parameter definitions.
3. Boring terminated approximately 104 feet below existing ground surface.

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CPT BORING EER-5

U.S. Army Corps of Engineers
Geotechnical Investigation
Contract Number DACW-61-98-D-0008
Task Order 27
Wilm. Harbor North Subsurface Investigation

Date Started	: October 17, 2000	Drilling Equipment	: 20 Ton AD066
Date Finished	: October 17, 2000	Drilling Method	: See Note No. 1
Weather	: Clear, 70's	Surface Elevation	: 30.0 feet NAVD 88
Logged by	: ConeTec	Northing	: 628,306 DE-NAD 83
Driller/Agency	: R. Pope/ConeTec	Easting	: 624,369 DE-NAD 83

Depth in feet	Surf. Elev. 30.0 feet	DESCRIPTION	Undrained Cohesion (psf)	Angle of Internal Friction	Relative Density (%)	Est. N-value from N60	Avg. Dynamic Pore Pressure (feet)	Coeff. of Consolidation (ft^2/day)	Assumed Water Levels
0	30	CLAYEY SILT/SILTY CLAY	3700	--	--	10	-2		▼
5	25	CLAYEY SILT/SILTY CLAY							
10	20								
15	15								
20	10		1190	--	--	5	37		
25	5								
30	0								
35	-5								
40	-10	CLAYEY SILT/SILTY CLAY	1580	--	--	6	71		
45	-15								
50	-20	SANDY SILT/CLAYEY SILT							
55	-25								
60	-30								
65	-35		1900	30	30	7	171	0.8	
70	-40								
75	-45								
80									

NOTES:
1. Cone Penetration Test (CPT) boring performed according to ASTM D: 5778.
2. See CPT General Notes for parameter definitions.
3. Boring terminated approximately 104 feet below existing ground surface.

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DUFFIELD ASSOCIATES
Consultants in the Geosciences

CPT BORING EER-5

U.S. Army Corps of Engineers
Geotechnical Investigation
Contract Number DACW-61-98-D-0008
Task Order 27
Wilm. Harbor North Subsurface Investigation

Date Started	: October 17, 2000	Drilling Equipment	: 20 Ton AD066
Date Finished	: October 17, 2000	Drilling Method	: See Note No. 1
Weather	: Clear, 70's	Surface Elevation	: 30.0 feet NAVD 88
Logged by	: ConeTec	Northing	: 828,306 DE-NAD 83
Driller/Agency	: R. Pope/ConeTec	Easting	: 624,369 DE-NAD 83

Depth in feet	Surf. Elev. 30.0 feet	DESCRIPTION	Undrained Cohesion (psf)	Angle of Internal Friction	Relative Density (%)	Est. N-value from N60	Avg. Dynamic Pore Pressure (feet)	Coeff. of Consolidation (R^2/day)	Assumed Water Levels
80	-50	SILT							
85	-55								
90	-60		1900	30	30	7	171		
95	-65								
100	-70								
105	-75								
110	-80								
115	-85								
120	-90								
125	-95								
130	-100								
135	-105								
140	-110								
145	-115								
150	-120								
155	-125								
160									

NOTES:
1. Cone Penetration Test (CPT) boring performed according to ASTM D: 5778.
2. See CPT General Notes for parameter definitions.
3. Boring terminated approximately 104 feet below existing ground surface.

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CPT BORING EER-6

U.S. Army Corps of Engineers
Geotechnical Investigation
Contract Number DACW-61-98-D-0008
Task Order 27
Wilm. Harbor North Subsurface Investigation

Date Started	: October 17, 2000	Drilling Equipment	: 20 Ton AD066
Date Finished	: October 17, 2000	Drilling Method	: See Note No. 1
Weather	: Clear, 70's	Surface Elevation	: 34.7 feet NAVD 88
Logged by	: ConeTec	Northing	: 629,453 DE-NAD 83
Driller/Agency	: R.Pope/ConeTec	Easting	: 624,895 DE-NAD 83

Depth in feet	Surf. Elev. 34.7 feet	DESCRIPTION	Undrained Cohesion (psf)	Angle of Internal Friction	Relative Density (%)	Est. N-value from N60	Avg. Dynamic Pore Pressure (feet)	Coeff. of Consolidation (ft^2/day)	Assumed Water Levels
0	34	SILTY CLAY/CLAY/CLAYEY SILT							
5	29		4850	–	–	16	-9		
10	24	SILTY CLAY/CLAY							▼
15	19		1180	–	–	7	2		
20	14	SILTY CLAY							
25	9								
30	4		940	–	–	5	48		
35	-1								
40	-6	CLAYEY SILT							
45	-11								
50	-16								
55	-21								
60	-26		980	–	–	5	123		
65	-31								
70	-36								
75	-41								
80									

NOTES:
1. Cone Penetration Test (CPT) boring performed according to ASTM D: 5778.
2. See CPT General Notes for parameter definitions.
3. Boring terminated approximately 100 feet below existing ground surface.

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DUFFIELD ASSOCIATES
Consultants in the Geosciences

CPT BORING EER-6

U.S. Army Corps of Engineers
Geotechnical Investigation
Contract Number DACW-61-98-D-0008
Task Order 27
Wilm. Harbor North Subsurface Investigation

Date Started	: October 17, 2000	Drilling Equipment	: 20 Ton AD066
Date Finished	: October 17, 2000	Drilling Method	: See Note No. 1
Weather	: Clear, 70's	Surface Elevation	: 34.7 feet NAVD 88
Logged by	: ConeTec	Northing	: 629,453 DE-NAD 83
Driller/Agency	: R.Pope/ConeTec	Easting	: 624,895 DE-NAD 83

Depth in feet	Surf. Elev. 34.7 feet	DESCRIPTION	Undrained Cohesion (psf)	Angle of Internal Friction	Relative Density (%)	Est. N-value from N60	Avg. Dynamic Pore Pressure (feet)	Coeff. of Consolidation (ft^2/day)	Assumed Water Levels
80	-46								
		SILT/SAND							
85	-51								
90	-56		2500	32	42	19	98		
95	-61								
100	-66								
105	-71								
110	-76								
115	-81								
120	-86								
125	-91								
130	-96								
135	-101								
140	-106								
145	-111								
150	-116								
155	-121								
160									

NOTES:
1. Cone Penetration Test (CPT) boring performed according to ASTM D: 5778.
2. See CPT General Notes for parameter definitions.
3. Boring terminated approximately 100 feet below existing ground surface.

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CPT GENERAL NOTES

The following definitions apply to the information and parameters presented on the CPT Boring Logs prepared by Duffield Associates and included as part of this report.

Description: Strata descriptions are based on the Soil Behavior Types (SBT) presented on the CPT field reports prepared by ConeTec, as defined by Robertson and Campanella (see ConeTec interpretation sheet for reference) and summarized below.

Designation	Soil Behavior Type (SBT)
1	Sensitive fine grained
2	Organic material
3	Clay
4	Silty clay to clay
5	Clayey silt to silty clay
6	Sandy silt to clayey silt
7	Silty sand to sandy silt
8	Sand to silty sand
9	Sand
10	Gravelly sand to sand
11	Very stiff fine grained
12	Sand to clayey sand

Undrained Cohesion: The undrained cohesion parameter, reported in pounds per square foot on the CPT logs, represents an "average" of the undrained shear strengths (S_u) reported on the ConeTec CPT field reports for the referenced stratum.

Angle of Internal Friction: The angle of internal friction reported on the CPT logs represents an "average" of the drained friction angles (phi) reported on the ConeTec CPT field reports for the referenced stratum.

Relative Density: The percent relative density reported on the CPT logs represents an "average" of the relative density (Dr) values estimated from the cone penetration resistance and reported on the ConeTec CPT field reports for the referenced stratum. This parameter is reported on the CPT logs only for cohesionless strata.

Estimated SPT N Value: The estimated SPT value reported on the CPT logs represents the average of the N60 value reported on the ConeTec CPT field reports for the referenced stratum. The N60 value represents the estimated Standard Penetration Test N value based on the CPT data, using an energy efficiency ratio of 60%.

Coefficient of Consolidation: The coefficient of consolidation (C_v) reported on the CPT logs represents a value estimated by measuring the dissipation or rate of decay of pore pressure with time after a stop in CPT penetration performed within the referenced stratum. This value is reported in square feet per day.

Average Dynamic Pore Pressure: The pore pressure reported on the CPT logs represents an "average" of the "Averaged dynamic pore pressure (AvgUd)" reported on the ConeTec CPT field report for the referenced stratum, in feet. The averaged dynamic pore pressure represents the sum of the equilibrium pore pressure from the groundwater conditions plus the excess pore pressure generated by penetration of the cone, often referred to as penetration pore pressures, which is a function of both the soil behavior and the cone geometry.

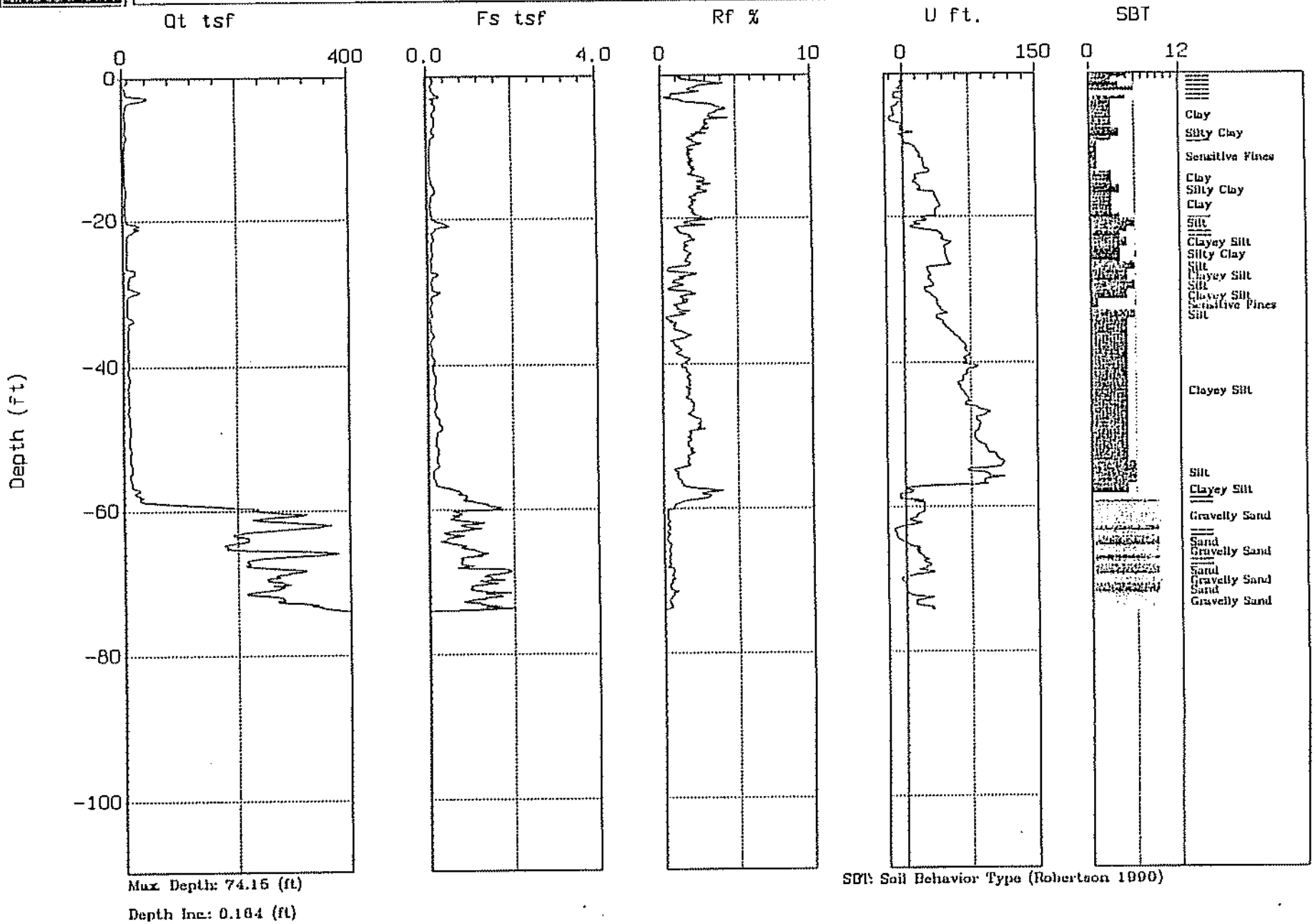
Water Levels: The water levels indicated on the CPT logs are the groundwater levels assumed by ConeTec in reduction of the CPT field data and preparation of their CPT field reports.

CONETEC

Duffield Associates

Site: EER-1
Location: Harbour North

Cone: 20 TON AD066
Date: 10:17:00 09:56



Max Depth: 74.15 (ft)

Depth Inc: 0.164 (ft)

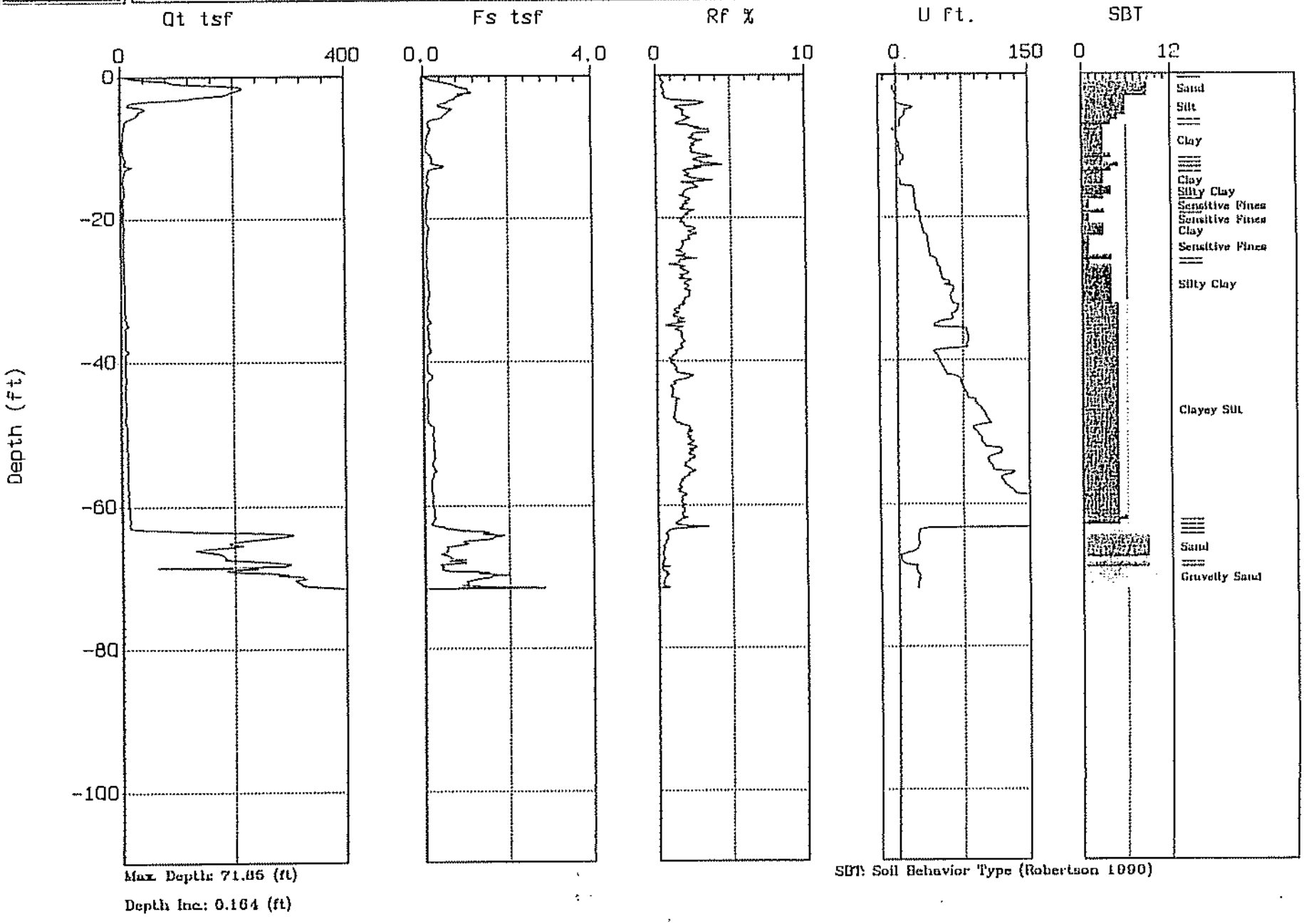
SBT: Soil Behavior Type (Robertson 1990)

CONETEC

Duffield Associates

Site: EEA-2
Location: Harbour North

Cone: 20 TON AD066
Date: 10.17.00 11:26



Max. Depth: 71.86 (ft)

Depth Inc: 0.164 (ft)

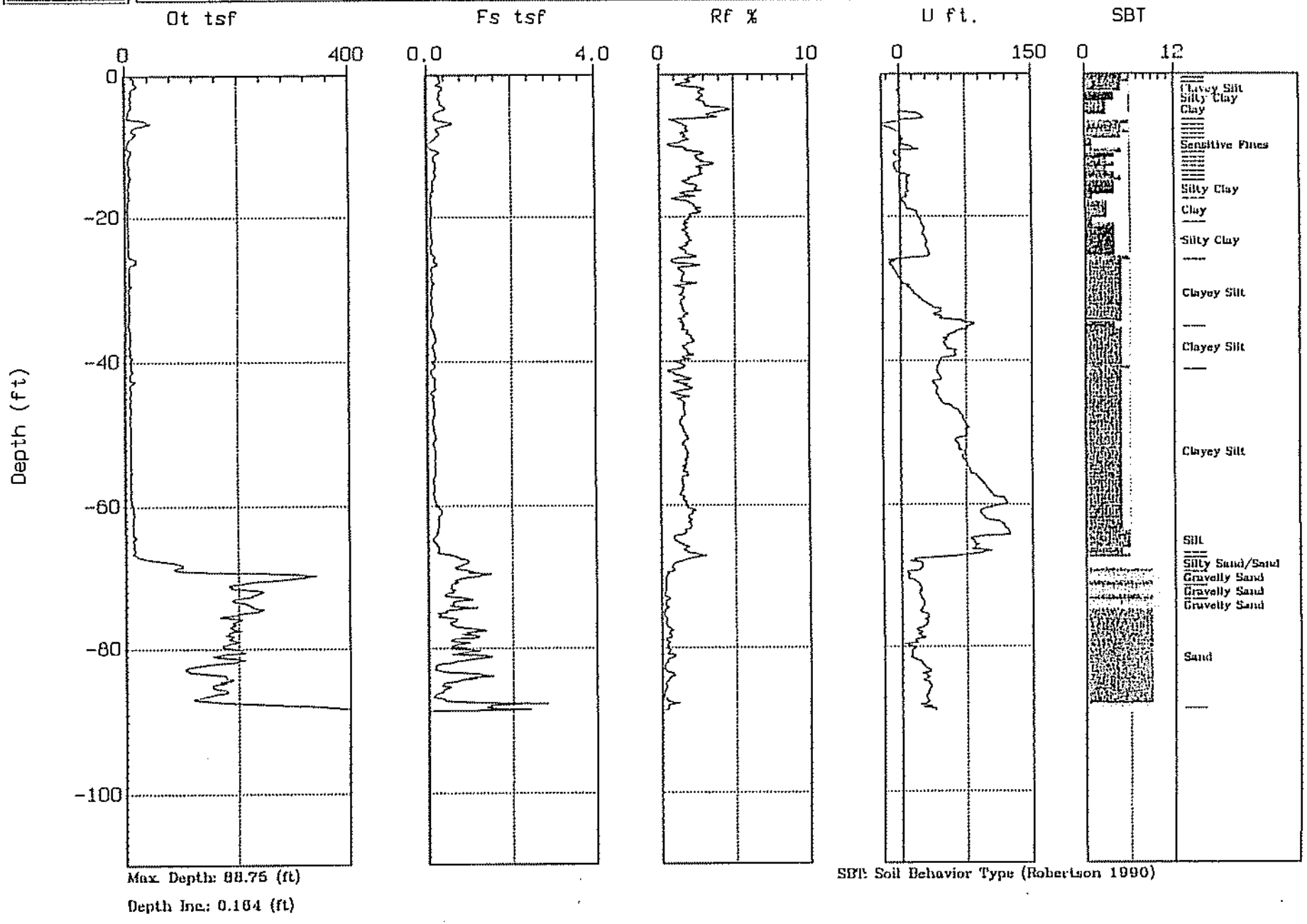
SBT: Soil Behavior Type (Robertson 1990)

CONETEC

Duffield Associates

Site: EER-3
Location: Harbour North

Cone: 20 TON AD066
Date: 10:16:00 07:26



Max. Depth: 88.75 (ft)

Depth Inc.: 0.164 (ft)

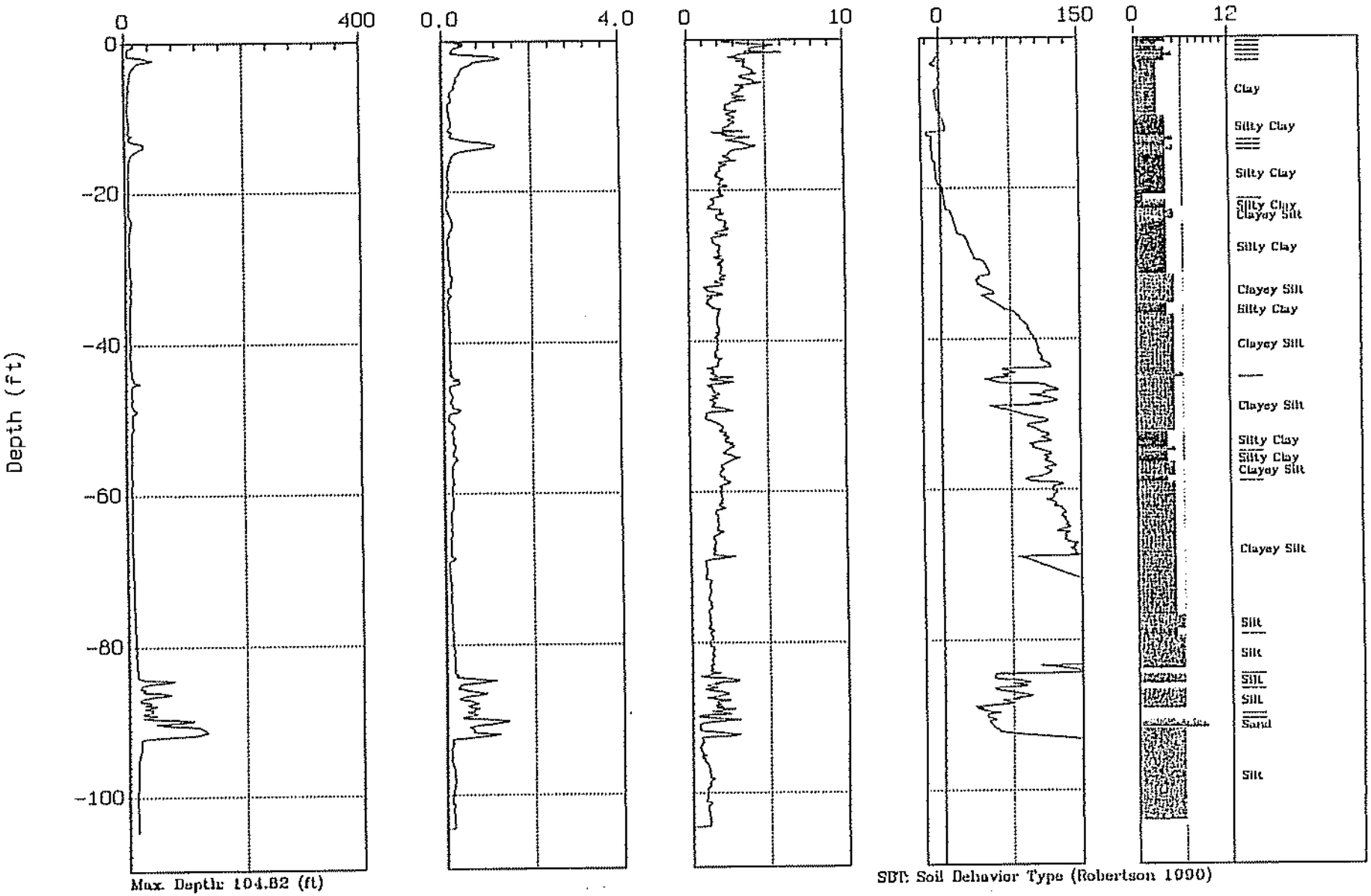
SBT: Soil Behavior Type (Robertson 1990)

CONETEC

Duffield Associates

Site: EEA-4
Location: Harbour North

Cone: 20 TON ADOGG
Date: 10:16:00 09:08



Max. Depth: 104.82 (ft)

Depth Inc.: 0.164 (ft)

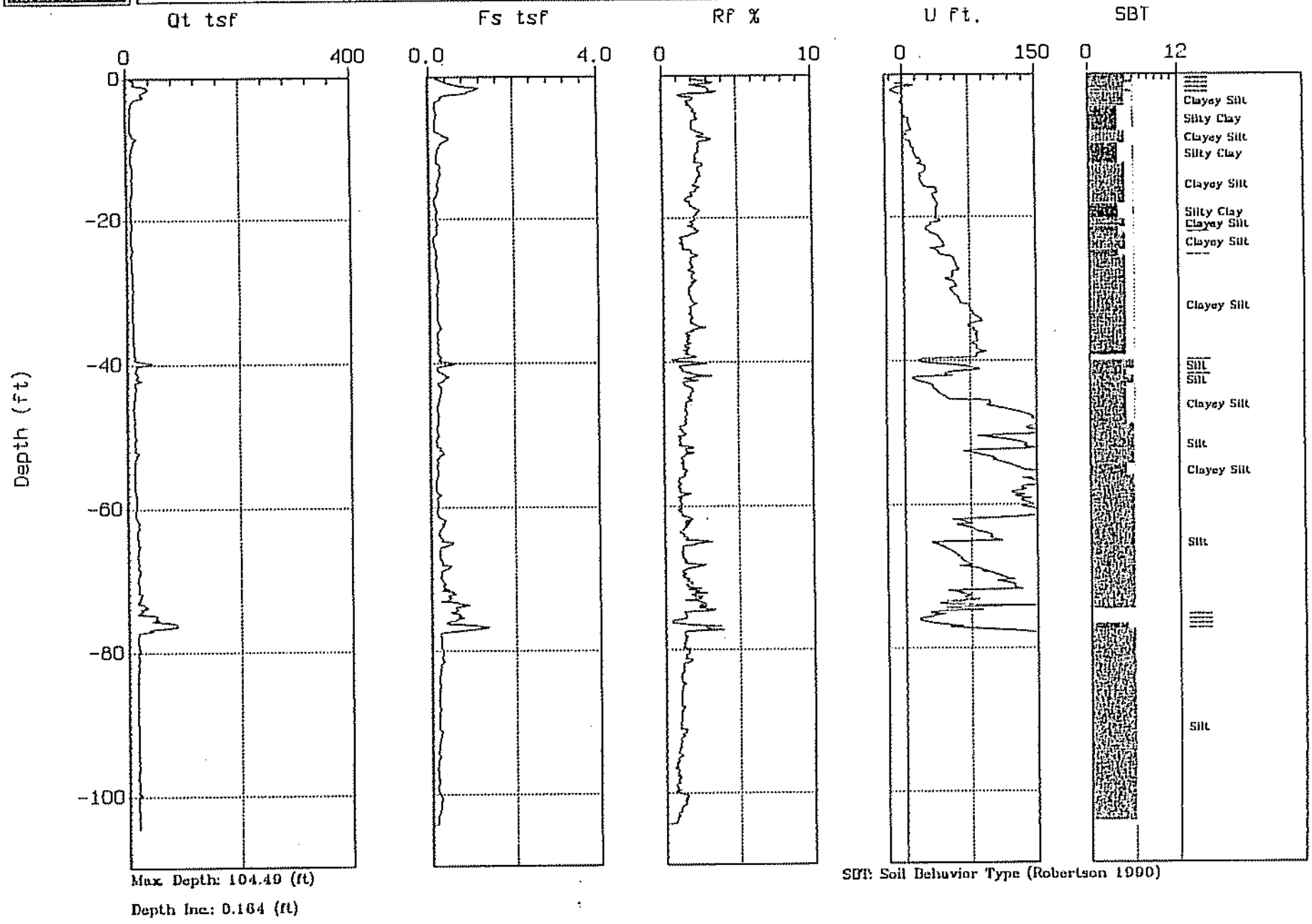
SBT: Soil Behavior Type (Robertson 1990)

CONETEC

Duffield Associates

Site: EEA-5
Location: Harbour North

Cone: 20 TON AD066
Date: 10:17:00 06:18



Max. Depth: 104.49 (ft)

Depth Inc: 0.164 (ft)

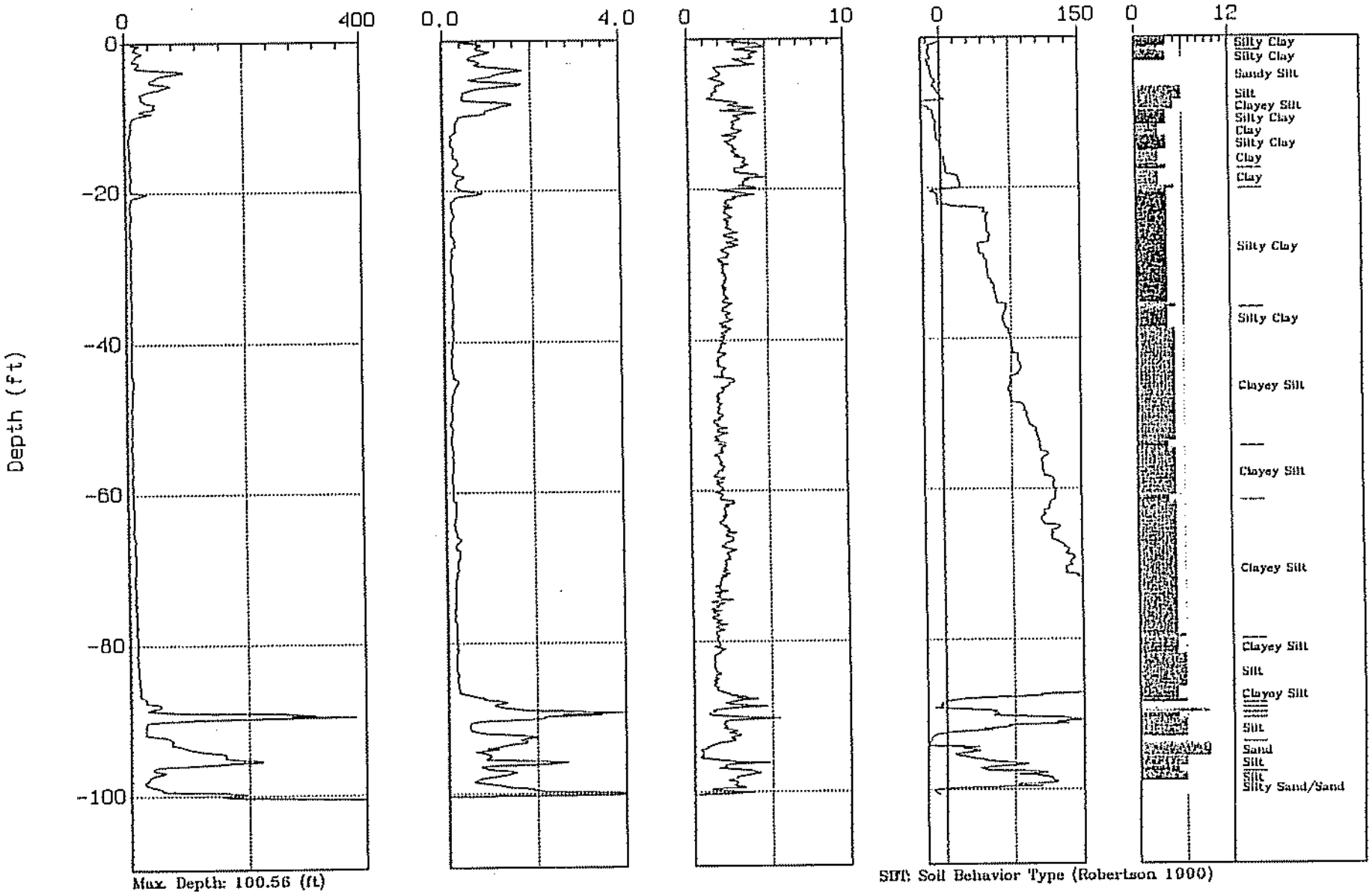
SBT: Soil Behavior Type (Robertson 1990)

CONETEC

Duffield Associates

Site: EER-6
Location: Harbour North

Cone: 20 TON AD0066
Date: 10:17:00 07:59



Max. Depth: 100.56 (ft)

Depth Inc: 0.164 (ft)

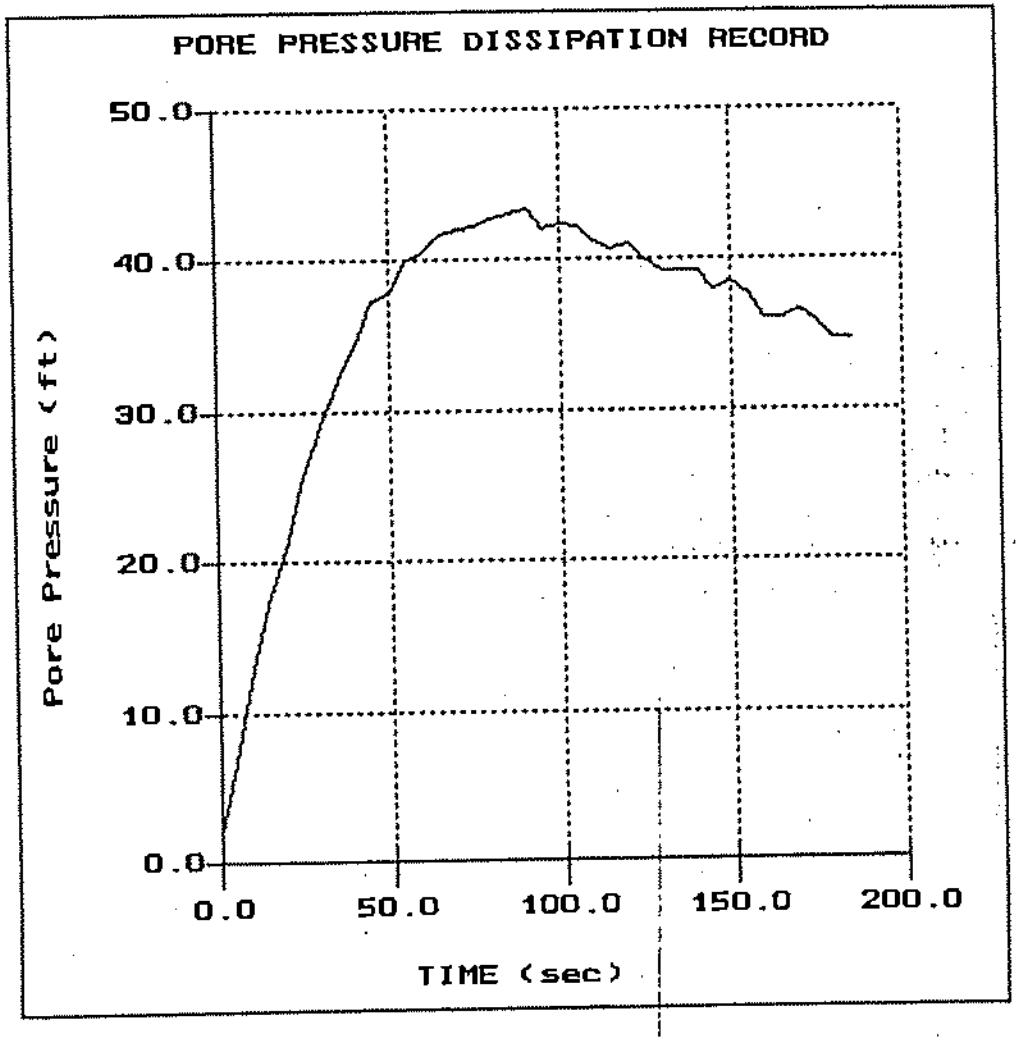
SBT: Soil Behavior Type (Robertson 1990)

Duffield Associates

Hole:EER-1
Location:Harbour North

Cone:20 TON AD066
Date:10:17:00 09:5

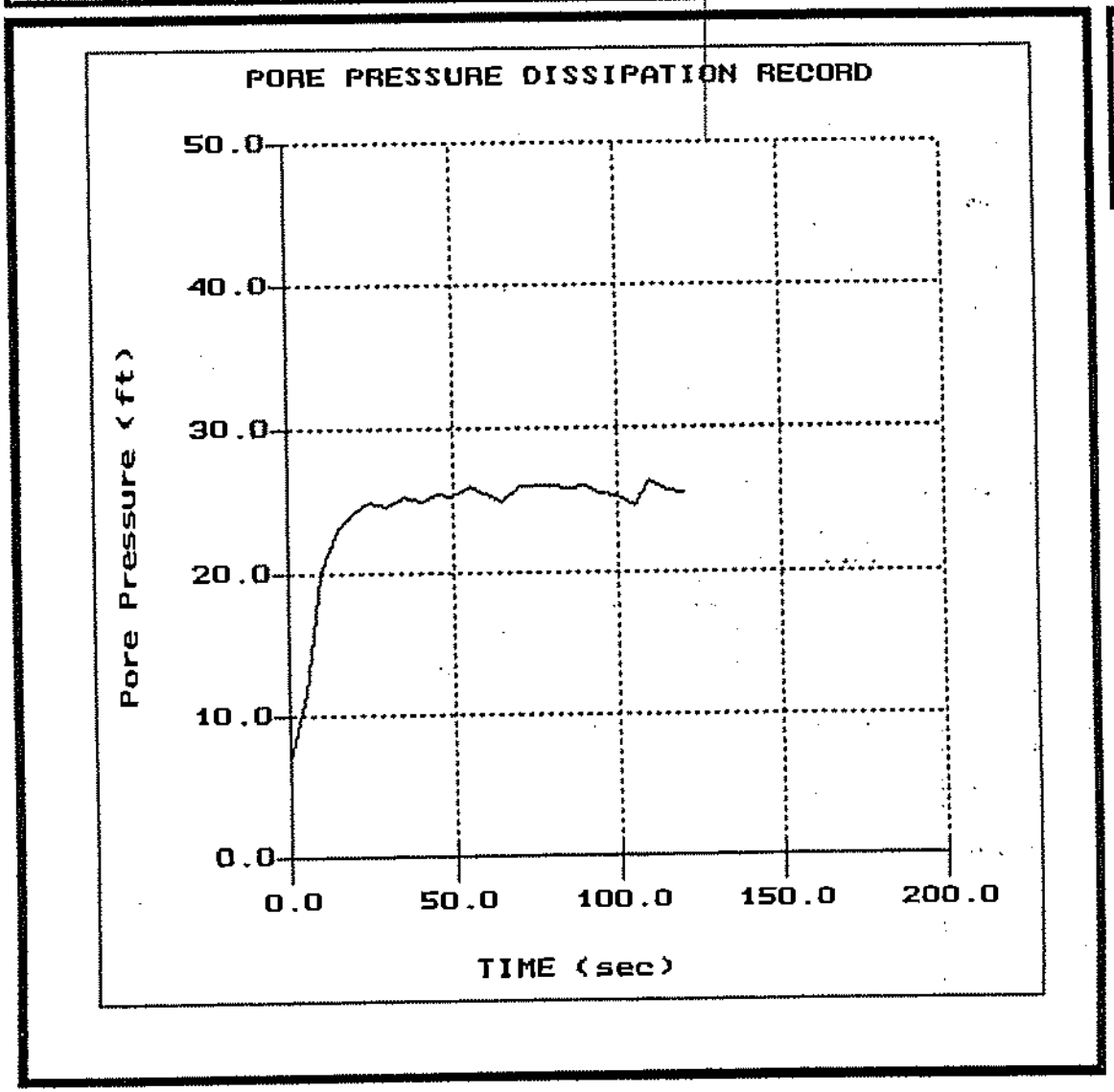
File: 731CP050.PPD
Depth (m): 17.55
(ft): 57.58
Duration : 185.0s
U-min: 1.90 0.0s
U-max: 43.40 90.0s



Duffield Associates

Hole:EER-1
Location:Harbour North

Cone:20 TON AD066
Date:10:17:00 09:5



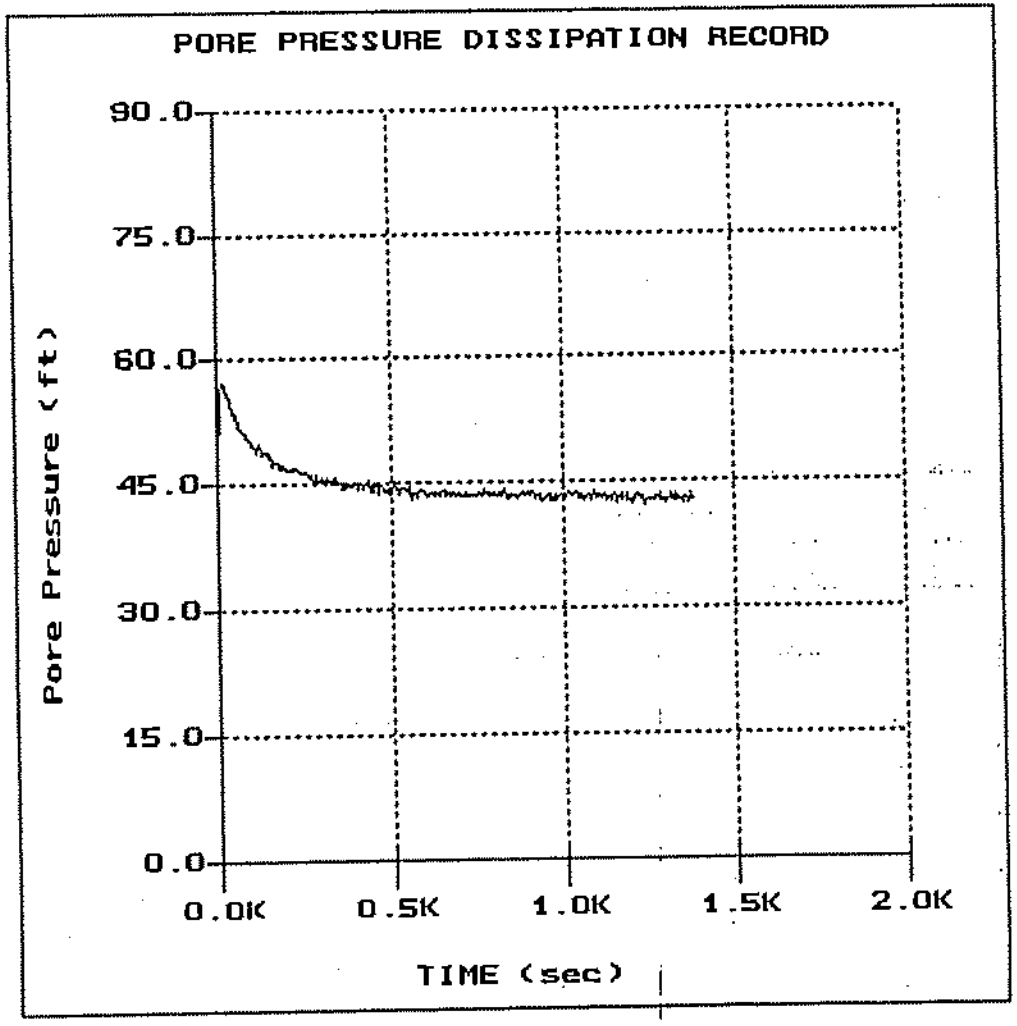
File: 731CP050.PPD
Depth (m): 18.90
(ft): 62.01
Duration : 120.0s
U-min: 6.80 0.0s
U-max: 26.30 110.0s

Duffield Associates

Hole:EER-2
Location:Harbour North

Cone:20 TON AD066
Date:10:17:00 11:2

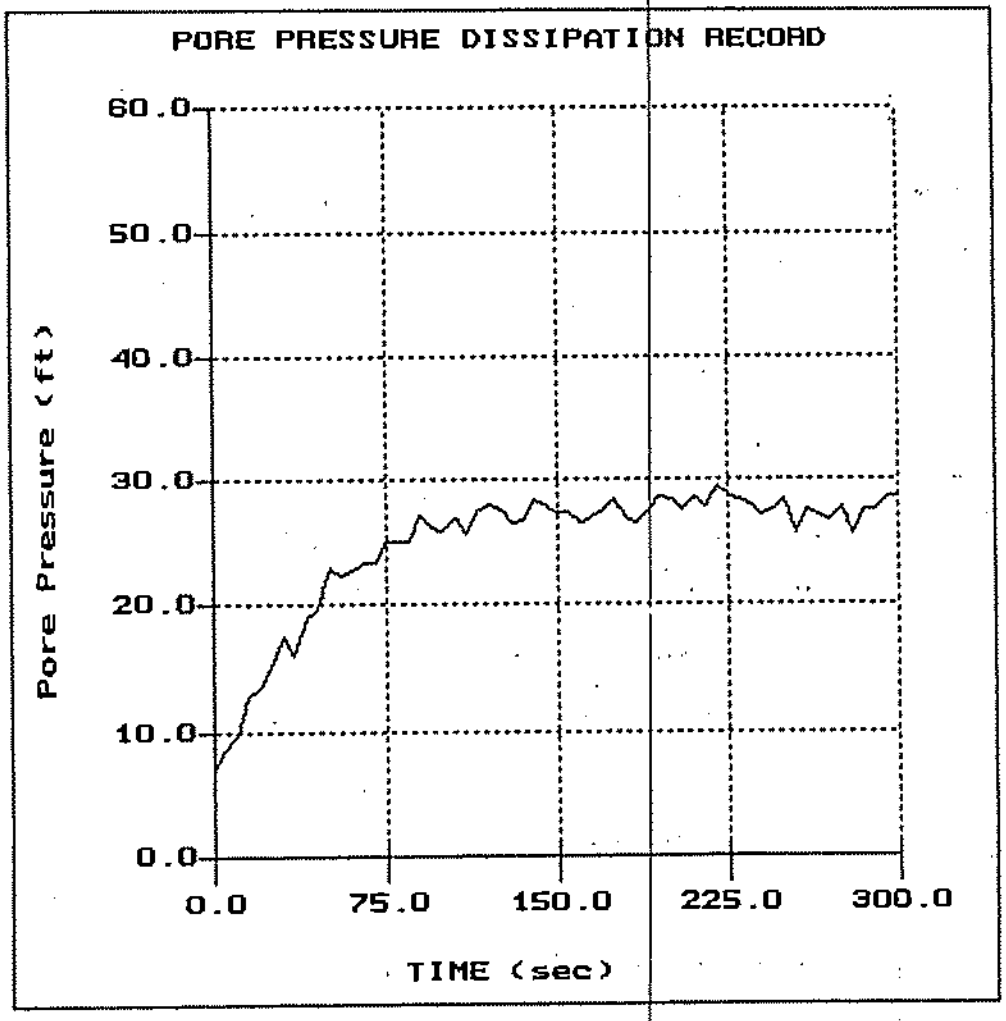
File: 731CP051.PPD
Depth (m): 11.75
(ft): 38.55
Duration : 1380.0s
U-min: 42.30 1240.0s
U-max: 57.10 15.0s



Duffield Associates

Hole:EER-2
Location:Harbour North

Cone:20 TON ADO66
Date:10:17:00 11:2



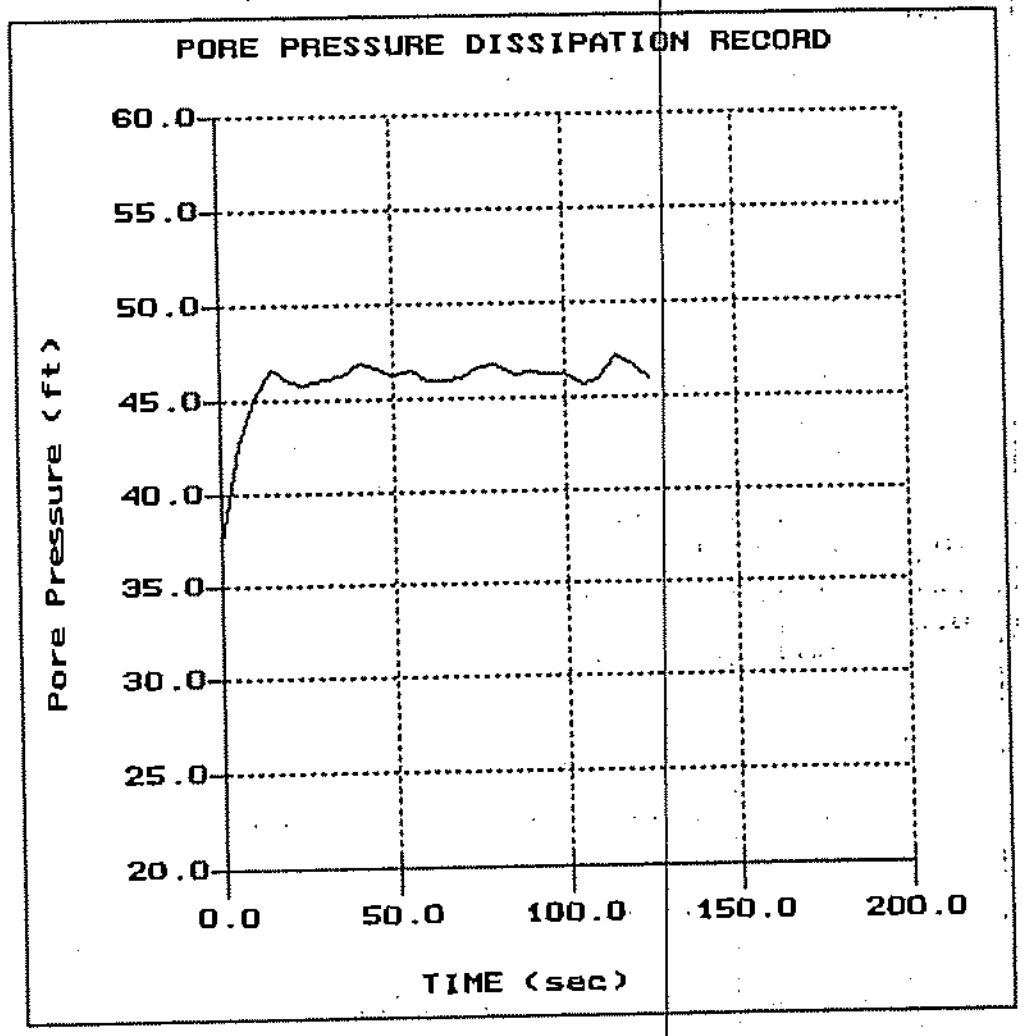
File: 731CP051.PPD
Depth (m): 20.85
(ft): 68.41
Duration : 300.0s
U-min: 6.90 0.0s
U-max: 29.40 220.0s

Duffield Associates

Hole:EER-3
Location:Harbour North

Cone:20 TON AD066
Date:10:16:00 07:2

File: 731CP052.PPD
Depth (m): 27.05
(ft): 88.75
Duration : 125.0s
U-min: 37.30 0.0s
U-max: 47.20 115.0s

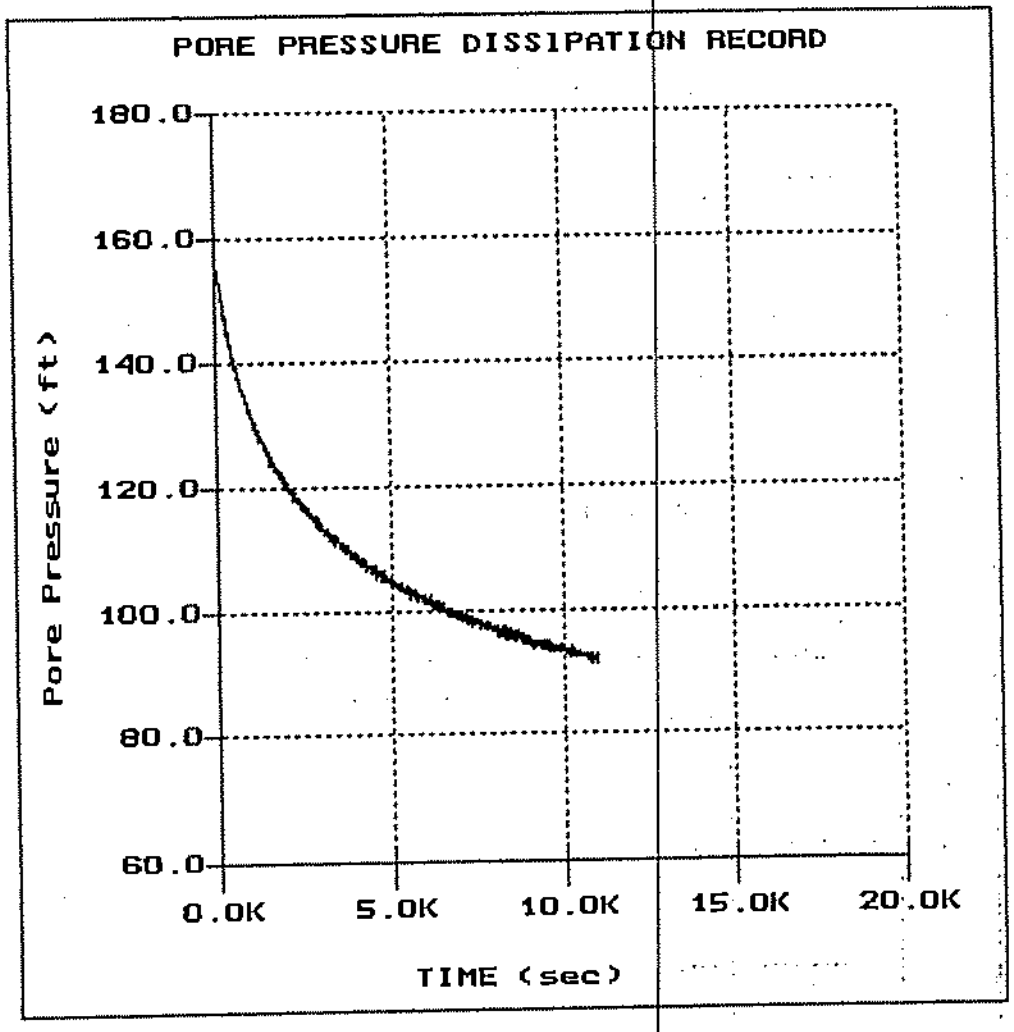


Duffield Associates

Hole:EER-4
Location:Harbour North

Cone:20 TON AD066
Date:10:16:00 09:0

File: 731CP054.PPD
Depth (m): 20.95
(ft): 68.73
Duration : 11000.0s
U-min: 91.30 10950.0s
U-max: 155.10 40.0s

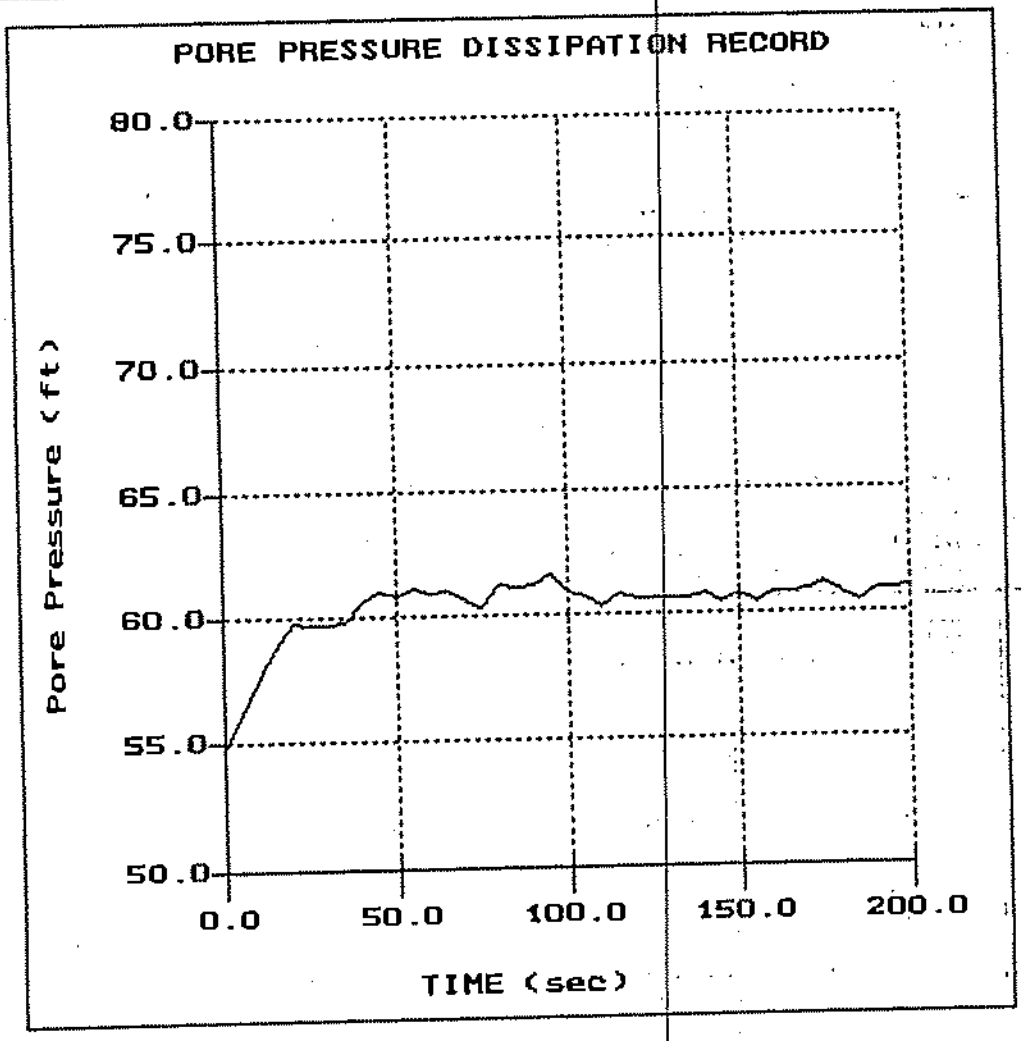


Duffield Associates

Hole:EER-4
Location:Harbour North

Cone:20 TON ADO66
Date:10:16:00 09:0

File: 731CP054.PPD
Depth (m): 27.95
(ft): 91.70
Duration : 200.0s
U-min: 54.90 0.0s
U-max: 61.70 95.0s

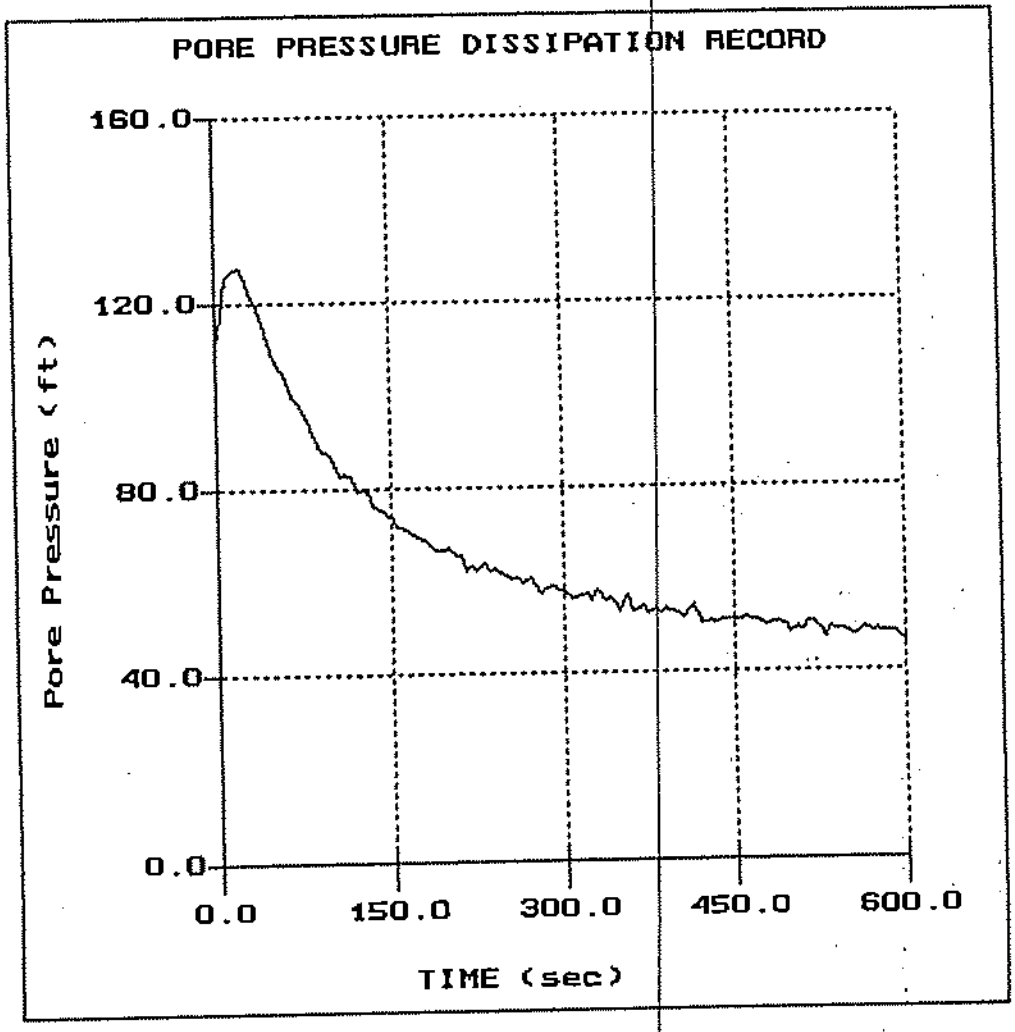


Duffield Associates

Hole:EER-5
Location:Harbour North

Cone:20 TON AD066
Date:10:17:00 06:1

File: 731CP056.PPD
Depth (m): 19.85
(ft): 65.12
Duration : 600.0s
U-min: 46.70 600.0s
U-max: 127.80 20.0s

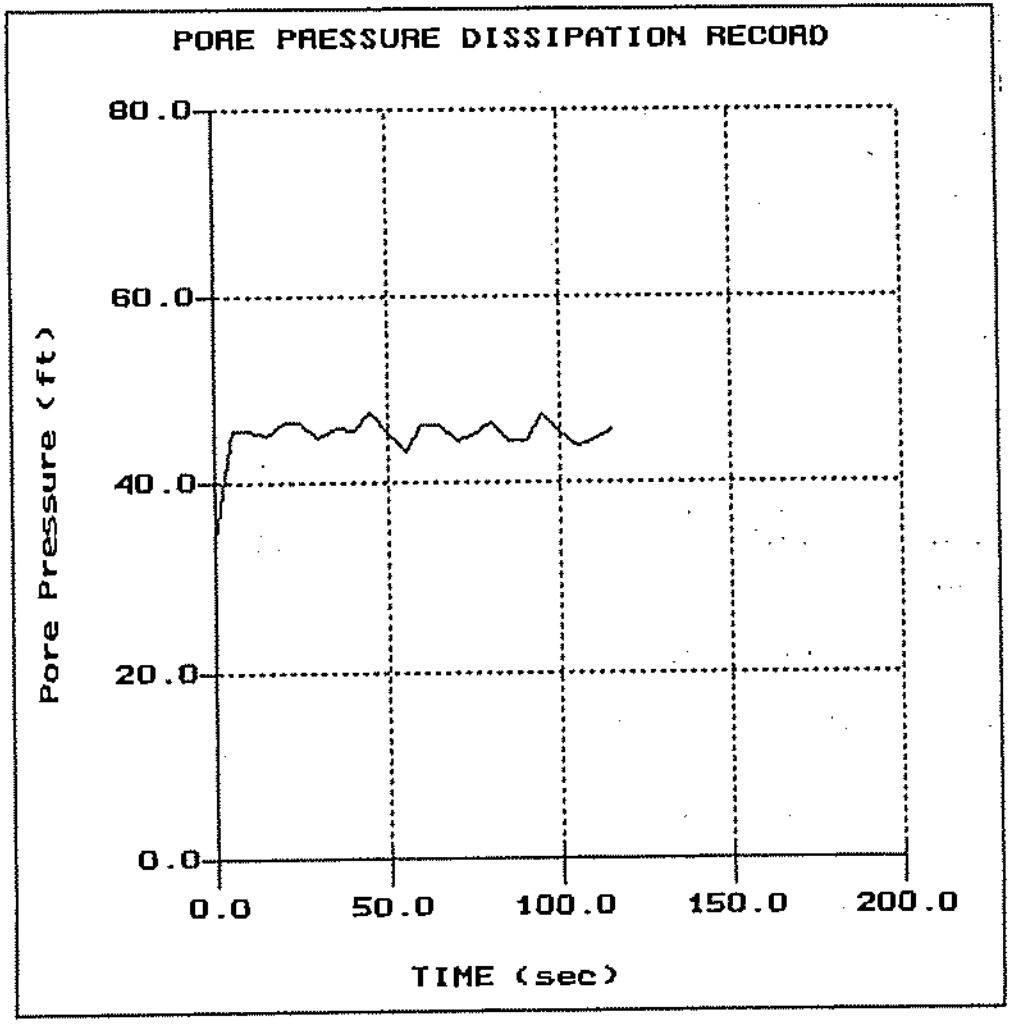


Duffield Associates

Hole:EER-5
Location:Harbour North

Cone:20 TON AD066
Date:10:17:00 06:1

File: 731CP056.PPD
Depth (m): 22.85
(ft): 74.97
Duration : 115.0s
U-min: 33.90 0.0s
U-max: 47.60 45.0s



APPENDIX E

SCHEDULE OF LABORATORY TESTING

Schedule of Laboratory Testing

Subsurface Investigation
Geotechnical Laboratory Testing
Wilmington Harbor North Dredged
Material Confined Disposal Facility
Wilmington, Delaware
Contract Number: DACW-61-98-D-0008
Task Order Number 0027

Test Boring	Sample Number	Sample Depth (ft)	Testing
EEB-50	ST-1	10-12	MC, Sieve w/Hydrometer, Unconfined Compression, Atterberg Limits, Unit Weight, Consolidation
	S-9	18-20	MC, Sieve w/Hydrometer, Atterberg Limits
	ST-2	24-26	MC, Sieve w/Hydrometer, Unconfined Compression, Atterberg Limits, Unit Weight
	S-13	28-30	MC, Sieve w/Hydrometer, Atterberg Limits
	S-17	36-38	MC, Sieve w/Hydrometer, Atterberg Limits
	ST-5	44-46	MC, Sieve w/Hydrometer, Unconfined Compression, Atterberg Limits, Unit Weight
	S-21	50-52	MC, Sieve w/Hydrometer, Atterberg Limits
	ST-6	54-56	MC, Sieve w/Hydrometer, Q-Test, Unconfined Compression, Atterberg Limits, Unit Weight
	S-25	60.5-62	MC, Sieve w/Hydrometer, Atterberg Limits
EEB-51	ST-2	12-14	MC, Sieve w/Hydrometer, Unconfined Compression, Atterberg Limits, Unit Weight
	ST-3	32-34	MC, Sieve w/Hydrometer, Q-Test, Unconfined Compression, Atterberg Limits, Unit Weight
	ST-4	56-58	MC, Sieve w/Hydrometer, Atterberg Limits, Unit Weight, Consolidation, 1-Point Q Test
EEB-52	ST-1	16-18	MC, Sieve w/Hydrometer, Atterberg Limits, Unit Weight, 1-Point Q Test
	ST-2	30-32	MC, Sieve w/Hydrometer, R-Test, Atterberg Limits, Unit Weight
	ST-3	46-48	MC, Sieve w/Hydrometer, Unconfined Compression, Atterberg Limits, Unit Weight
	ST-4	60-62	MC, Sieve w/Hydrometer, Q-Test, Unconfined Compression, Atterberg Limits, Unit Weight
	ST-5	80-82	MC, Sieve w/Hydrometer, Atterberg Limits, Unit Weight, Consolidation, 1-Point Q Test

Schedule of Laboratory Testing

Subsurface Investigation
Geotechnical Laboratory Testing
Wilmington Harbor North Dredged
Material Confined Disposal Facility
Wilmington, Delaware
Contract Number: DACW-61-98-D-0008
Task Order Number 0027

Test Boring	Sample Number	Sample Depth (ft)	Testing
EEB-53	ST-1	9-11	MC, Sieve w/Hydrometer, Q-Test, Unconfined Compression, Atterberg Limits, Unit Weight
	ST-3	25-27	MC, Sieve w/Hydrometer, Atterberg Limits, Unit Weight, Consolidation
	ST-4	33-35	MC, Sieve w/Hydrometer, Q-Test, Atterberg Limits, Unit Weight
	ST-5	43-45	MC, Sieve w/Hydrometer, Atterberg Limits, Unit Weight
	ST-6	63-65	MC, Sieve w/Hydrometer, Q-Test, Atterberg Limits, Unit Weight
EEB-54	ST-1	7-9	MC, Sieve w/Hydrometer, Atterberg Limits, Unit Weight, 1-Point Q Test
	ST-2	24-26	MC, Sieve w/Hydrometer, Q-Test, Unconfined Compression, Atterberg Limits, Unit Weight, Consolidation
	ST-3	44-46	MC, Sieve w/Hydrometer, R-Test, Atterberg Limits, Unit Weight, 1-Point Q Test

APPENDIX F

SUMMARY OF LABORATORY TESTING RESULTS

WILMINGTON HARBOR NORTH DREDGED MATERIAL CONFINED DISPOSAL FACILITY
NEW CASTLE COUNTY, DELAWARE
USACE CONTRACT No. DACW-61-98-D-0008, TASK ORDER 27

Test Boring Number	Sample #	Sample Depth (feet)	Visual Description	Natural Moisture Content (ASTM D 2216) %	Less Than No. 200 Sieve (ASTM D 1140) %	Atterberg Limits[1] (ASTM D 4318)		USCS Classification (ASTM D 2487)	Dry Density (pcf)	Unconfined Compressive Strength, q_u (ASTM D 2166) (ksf)	Triaxial Compression Tests[2]			Consolidation Test[2] (ASTM D 2435)			Grain Size (ASTM D 422)		
											U.U. (ASTM D 2850) C (ksf)	C.U. (ASTM D 4767) Cohesion (ksf)	C.U. (ASTM D 4767) Friction Angle (degrees)				Sieve		
						Liquid Limit	Plasticity Index							C_c'	C_r'	p_c' (ksf)	C_u[3]	C_c[3]	Hyd
EEB-50	ST-1	10.0 - 12.0	Dark-gray/black CLAYEY SILT, trace fine sand, trace medium sand, trace organics.	55.0	94.8	71	29	MH	60.6	0.66				0.205	0.022	1.6	--	--	[6]
	S-0	10.0 - 20.0	Dark-gray/black CLAYEY SILT, trace fine sand, trace medium sand, trace organics.	66.4	90.7	75	25	MH									--	--	[6]
	ST-2	24.0 - 26.0	Dark-gray/black CLAYEY SILT, trace fine sand, trace organics.	77.6	97.8	70	28	MH	51.8	0.57							--	--	[6]
	S-13	28.0 - 30.0	Dark-gray/black CLAYEY SILT, trace fine sand, trace organics.	77.3	99.0	69	27	MH									--	--	[6]
	S-17	36.0 - 38.0	Dark-gray CLAYEY SILT, trace fine sand, trace medium sand.	69.7	92.5	69	26	MH									--	--	[6]
	ST-5	44.0 - 46.0	Dark-gray SILT, some clay, little fine sand, trace medium sand.	39.8	80.0	41	16	ML	78.5	0.62							--	--	[6]
	S-21	50.0 - 52.0	Dark-gray/brown CLAYEY SILT, trace fine sand, trace medium sand, trace organics.	66.5	92.2	67	23	MH									--	--	[6]
	ST-8	54.0 - 56.0	Dark-gray/brown CLAYEY SILT, trace fine sand, trace medium sand, trace organics.	63.5	92.8	67	31	MH	45.0	2.16	1.66						--	--	[6]
	S-25	60.5 - 62.0	Dark-gray/brown CLAYEY SILT, trace fine sand, trace medium sand, trace organics.	55.8	90.2	64	30	MH									--	--	[6]

[1] Atterberg Limit results only provided for fine grained soils.
[2] Dry densities and natural moisture content are averages of all values from a given Shelby Tube.
[3] U.U. denotes Unconsolidated-Undrained Triaxial Compression Test (Q Test), C.U. denotes Consolidated-Drained Triaxial Compression Test with Pore Pressure Measurements (R Test), Tot. denotes total and Eff. denotes effective.
[4] C_c', C_r' = slope of virgin compression and recompression lines respectively in % strain versus log (pressure), p_c' = preconsolidation pressure.
[5] C_u = Uniformity Coefficient = D_{60}/D_{10} ; C_c = Curvature Coefficient = $D_{30}^2/(D_{60}D_{10})$ for coarse-grained soils. Values not calculated for fine-grained soils.
[6] Hydrometer performed.
[7] U.U. performed as 1-point test.

WILMINGTON HARBOR NORTH DREDGED MATERIAL CONFINED DISPOSAL FACILITY
NEW CASTLE COUNTY, DELAWARE
USACE CONTRACT No. DACW-61-98-D-0008, TASK ORDER 27

Test Boring Number	Sample #	Sample Depth (feet)	Visual Description	Natural Moisture Content (ASTM D 2216) %	Less Than No. 200 Sieve (ASTM D 1140) %	Atterberg Limits[1] (ASTM D 4318)		USCS Classification (ASTM D 2487)	Dry Density (pcf)	Unconfined Compressive Strength, q_u (ASTM D 2166) (ksf)	Triaxial Compression Tests [2]			Consolidation Test[3] (ASTM D 2435)			Grain Size (ASTM D 422)		
						Liquid Limit	Plasticity Index				U.U. (ASTM D 2850) C (ksf)	C.U. (ASTM D 4767) Cohesion (ksf)	C.U. (ASTM D 4767) Friction Angle (degrees)	C_c'	C_r'	p_c' (ksf)	Sieve C_u[5]	Sieve C_c[5]	Hyd
EED-51	ST-2	12.0 - 14.0	Dark-gray CLAYEY SILT, trace medium sand, trace fine sand, trace organics.	59.5	97.0	62	24	MH	63.5	0.99							--	--	[6]
	ST-3	32.0 - 34.0	Dark-gray CLAYEY SILT, trace fine sand.	56.8	98.6	62	21	MH	64.9	2.37	1.07						--	--	[6]
	ST-4	50.0 - 50.0	Dark-gray SILT, some clay, trace fine sand.	47.9	94.9	48	18	ML	72.2		1.26[7]			0.266	0.029	4.3	--	--	[6]

[1] Atterberg Limit results only provided for fine grained soils.
[2] Dry densities and natural moisture content are averages of all values from a given Shelby Tube.
[3] U.U. denotes Unconsolidated-Undrained Triaxial Compression Test (Q Test), C.U. denotes Consolidated-Drained Triaxial Compression Test with Pore Pressure Measurements (R Test), Tot. denotes total and Eff. denotes effective.
[4] C_c', C_r' = slope of virgin compression and recompression lines respectively in % strain versus log (pressure), p_c' = preconsolidation pressure.
[5] C_u = Uniformity Coefficient = D_{60}/D_{10} ; C_c = Curvature Coefficient = $D_{30}^2/(D_{60}D_{10})$ for coarse-grained soils. Values not calculated for fine-grained soils.
[6] Hydrometer performed.
[7] U.U. performed as 1-point test.

WILMINGTON HARBOR NORTH DREDGED MATERIAL CONFINED DISPOSAL FACILITY
NEW CASTLE COUNTY, DELAWARE
USACE CONTRACT No. DACW-61-98-D-0008, TASK ORDER 27

Test Boring Number	Sample #	Sample Depth (feet)	Visual Description	Natural Moisture Content (ASTM D 2216) %	Less Than No. 200 Sieve (ASTM D 1140) %	Atterberg Limits[1] (ASTM D 4318)		USCS Classification (ASTM D 2487)	Dry Density (pcf)	Unconfined Compressive Strength, q_u (ASTM D 2166) (ksf)	Triaxial Compression Tests [2]			Consolidation Test[3] (ASTM D 2435)			Grain Size (ASTM D 422)		
												C.U. (ASTM D 4767)						Sieve	
						Liquid Limit	Plasticity Index				U.U. (ASTM D 2850) C (ksf)	Cohesion (ksf)	Friction Angle (degrees)	C_c'	C_r'	p_c' (ksf)	C_u[5]	C_c[5]	Hyd
EEB-52	ST-1	16.0 - 18.0	Dark-gray CLAYEY SILT, trace fine sand, trace organics.	55.5	97.4	60	22	MH	84.9		0.03[7]						--	--	[6]
	ST-2	30.0 - 32.0	Dark-gray CLAYEY SILT, trace fine sand.	66.0	98.2	66	20	MH	59.3			Tot. = 0.60 Eff. = 0.40	Tot. = 13.1 Eff. = 33.4				--	--	[6]
	ST-3	40.0 - 46.0	Dark-gray/brown CLAYEY SILT, trace fine sand.	74.4	99.0	72	28	MH	53.7	1.88							--	--	[6]
	ST-4	60.0 - 62.0	Dark-gray/black CLAYEY SILT, trace medium sand, trace fine sand, trace organics.	57.5	92.0	74	28	MH	64.8	2.09	0.98						--	--	[6]
	ST-5	80.0 - 82.0	Dark-gray CLAYEY SILT, trace fine sand, trace organics.	56.8	98.9	54	20	MH	65.4		1.25[7]			0.150	0.032	5.0	--	--	[6]

[1] Atterberg Limit results only provided for fine grained soils.
[2] Dry densities and natural moisture content are averages of all values from a given Shelby Tube.
[3] U.U. denotes Unconsolidated-Undrained Triaxial Compression Test (Q Test), C.U. denotes Consolidated-Drained Triaxial Compression Test with Pore Pressure Measurements (R Test), Tot. denotes total and Eff. denotes effective.
[4] C_c', C_r' = slope of virgin compression and recompression lines respectively in % strain versus log (pressure), p_c' = preconsolidation pressure.
[5] C_u = Uniformity Coefficient = D_{60}/D_{10} ; C_c = Curvature Coefficient = $D_{30}^2/(D_{60}D_{10})$ for coarse-grained soils. Values not calculated for fine-grained soils.
[6] Hydrometer performed.
[7] U.U. performed as 1-point test.

WILMINGTON HARBOR NORTH DREDGED MATERIAL CONFINED DISPOSAL FACILITY
NEW CASTLE COUNTY, DELAWARE
USACE CONTRACT No. DACW-61-98-D-0008, TASK ORDER 27

Test Boring Number	Sample #	Sample Depth (feet)	Visual Description	Natural Moisture Content (ASTM D 2216) %	Less Than No. 200 Sieve (ASTM D 1140) %	Atterberg Limits[1] (ASTM D 4318)		USCS Classification (ASTM D 2487)	Dry Density (pcf)	Unconfined Compressive Strength, q_u (ASTM D 2166) (ksf)	Triaxial Compression Tests [3]			Consolidation Test[4] (ASTM D 2435)			Grain Size (ASTM D 422)		
											U.U. (ASTM D 2850) C (ksf)	C.U. (ASTM D 4767) Cohesion (ksf)	C.U. (ASTM D 4767) Friction Angle (degrees)	C_c'	C_r'	p_c' (ksf)	Sieve C_u[5]	Sieve C_c[5]	Hyd
						Liquid Limit	Plasticity Index												
EEB-53	ST-1	9.0 – 11.0	Dark-gray CLAYEY SILT, trace fine sand, trace organics.	59.9	96.4	67	29	MH	61.5	0.54	0.80						--	--	[6]
	ST-3	25.0 - 27.0	Dark-gray CLAYEY SILT, trace fine sand.	47.7	99.3	59	22	MH	72.0					0.190	0.020	2.3	--	--	[6]
	ST-4	33.0 - 35.0	Dark-gray CLAYEY SILT, trace fine sand.	76.9	99.2	58	24	MH	52.4		0.74						--	--	[6]
	ST-5	43.0 - 45.0	Dark-gray CLAYEY SILT, trace medium sand, trace fine sand, trace organics.	64.2	98.0	68	28	MH	59.6								--	--	[6]
	ST-6	63.0 - 65.0	Dark-gray CLAYEY SILT, trace fine sand, trace organics.	55.0	99.5	55	23	MH	65.4		1.01						--	--	[6]

[1] Atterberg Limit results only provided for fine grained soils.
[2] Dry densities and natural moisture content are averages of all values from a given Shelby Tube.
[3] U.U. denotes Unconsolidated-Undrained Triaxial Compression Test (Q Test), C.U. denotes Consolidated-Drained Triaxial Compression Test with Pore Pressure Measurements (R Test), Tot. denotes total and Eff. denotes effective.
[4] C_c', C_r' = slope of virgin compression and recompression lines respectively in % strain versus log (pressure), p_c' = preconsolidation pressure.
[5] C_u = Uniformity Coefficient = D_{60}/D_{10} ; C_c = Curvature Coefficient = $D_{30}^2/(D_{60}D_{10})$ for coarse-grained soils. Values not calculated for fine-grained soils.
[6] Hydrometer performed.
[7] U.U. performed as 1-point test.

WILMINGTON HARBOR NORTH DREDGED MATERIAL CONFINED DISPOSAL FACILITY
NEW CASTLE COUNTY, DELAWARE
USACE CONTRACT No. DACW-61-98-D-0008, TASK ORDER 27

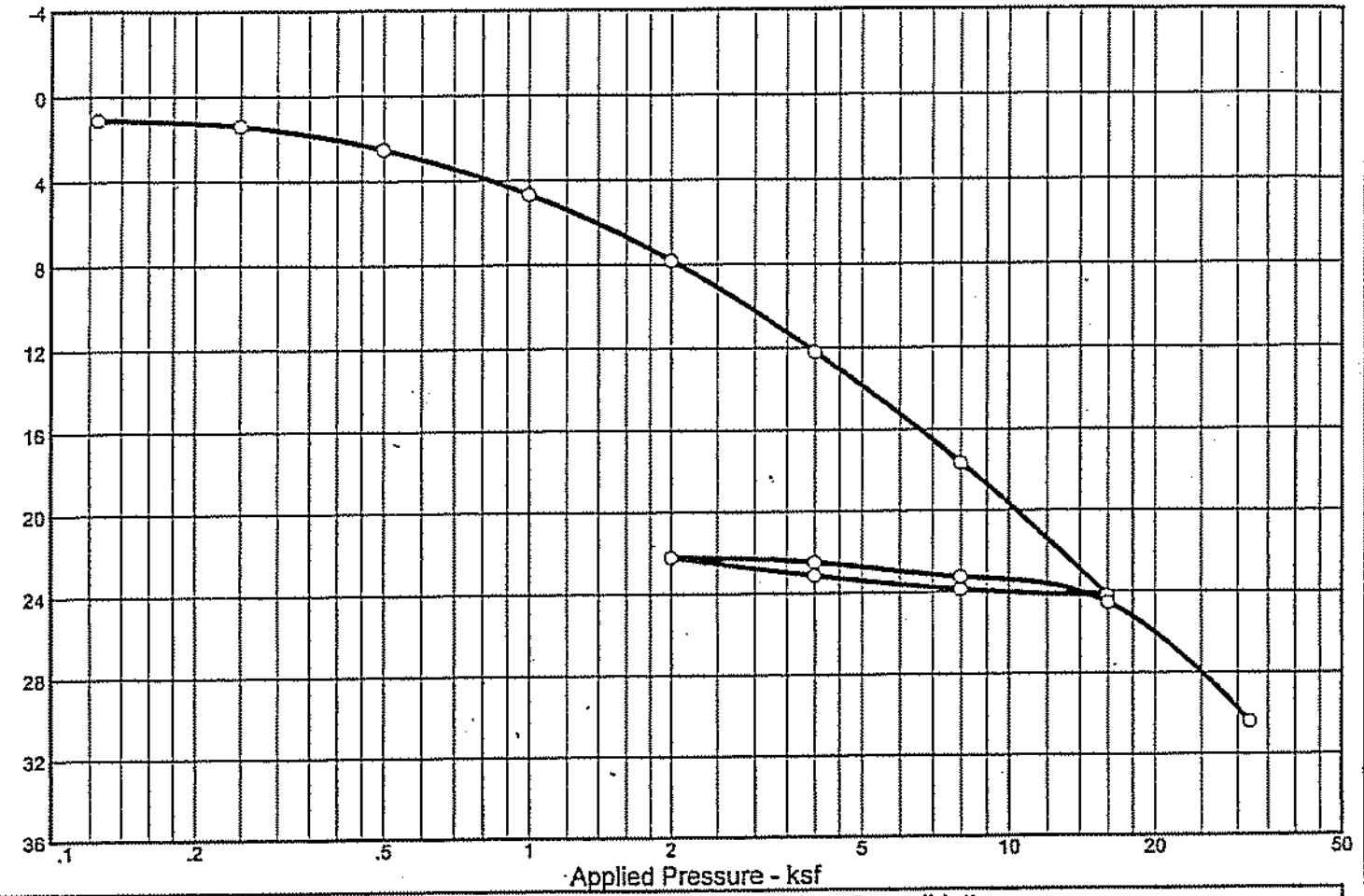
...ber	Sample #	Sample Depth (feet)	Visual Description	Natural Moisture Content (ASTM D 2216) %	Less Than No. 200 Sieve (ASTM D 1140) %	Atterberg Limits[A] (ASTM D 4318)		USCS Classification (ASTM D 2487)	Dry Density (pcf)	Unconfined Compressive Strength, q_u (ASTM D 2166) (ksf)	Triaxial Compression Tests [B]			Consolidation Test[C] (ASTM D 2435)			Grain Size (ASTM D 422)		
											U.U. (ASTM D 2850) C (ksf)	C.U. (ASTM D 4767) Cohesion (ksf)	C.U. (ASTM D 4767) Friction Angle (degrees)				Sieve		
						Liquid Limit	Plasticity Index							C_c'	C_r'	p_c' (ksf)	C_u[D]	C_c[D]	Hyd
...-54	ST-1	7.0 – 9.0	Dark-gray CLAYEY SILT, trace medium sand, trace fine sand, trace organics.	59.6	97.6	73	31	MH	63.6		0.84[E]						--	--	[G]
	ST-2	24.0 - 26.0	Dark-gray CLAYEY SILT, trace fine sand, trace medium sand, trace organics.	70.6	94.2	71	30	MH	54.3	1.16	0.77			0.249	0.022	2.3	--	--	[G]
	ST-3	44.0 - 46.0	Dark-gray CLAYEY SILT, trace fine sand, trace organics.	52.3	99.2	52	22	MH	68.9		0.84[E]	Tot. = 0.75 Eff. = 0.31	Tot. = 11.2 Eff. = 34.1				--	--	[G]

[A] Atterberg Limit results only provided for fine grained soils.
[B] Dry densities and natural moisture content are averages of all values from a given Shelby Tube.
[C] U.U. denotes Unconsolidated-Undrained Triaxial Compression Test (Q Test), C.U. denotes Consolidated-Drained Triaxial Compression Test with Pore Pressure Measurements (R Test).
Tot. denotes total and Eff. denotes effective.
[D] C_c', C_r' = slope of virgin compression and recompression lines respectively in % strain versus log (pressure), p_c' = preconsolidation pressure.
C_u = Uniformity Coefficient = D_{60}/D_{10} ; C_c = Curvature Coefficient = $D_{30}^2/(D_{60}D_{10})$ for coarse-grained soils. Values not calculated for fine-grained soils.
[E] Hydrometer performed.
[F] C.U. performed as 1-point test.

APPENDIX G

LABORATORY TESTING RESULTS

CONSOLIDATION TEST REPORT EEB - 50



Coefficients of Consolidation and Secondary Consolidation

No.	Load (ksf)	C_v (ft.2/day)	C_α	No.	Load (ksf)	C_v (ft.2/day)	C_α	No.	Load (ksf)	C_v (ft.2/day)	C_α
2	0.25	0.16	0.001	12	4.00	0.47	0.001				
3	0.50	0.04	0.002	13	8.00	0.15	0.001				
4	1.00	0.07	0.003	14	16.00	0.12	0.003				
5	2.00	0.07	0.005	15	32.00	0.02	0.010				
6	4.00	0.04	0.008								
7	8.00	0.03	0.009								
8	16.00	0.02	0.005								
9	8.00	0.41									
10	4.00	0.07									
11	2.00	0.01									

Natural Moisture Content	Dry Density (pcf)	LL	PI	P_c'	C_c'	C_r'	Approximate Overburden Pressure (ksf)	
55.8 %	60.6	71	29	1.6	.205	.022	1.1	

MATERIAL DESCRIPTION	USCS	AASHTO
Dark-gray/black CLAYEY SILT, trace fine sand, trace medium sand, trace organics.	MH	

Project No. 4276.GE Client: U.S. Army Corps of Engineers

Project: Wilmington Harbor North Dredged Material CDF Subsurface Investigation

Contract No. DACW-61-98-D-0008 Task Order 27

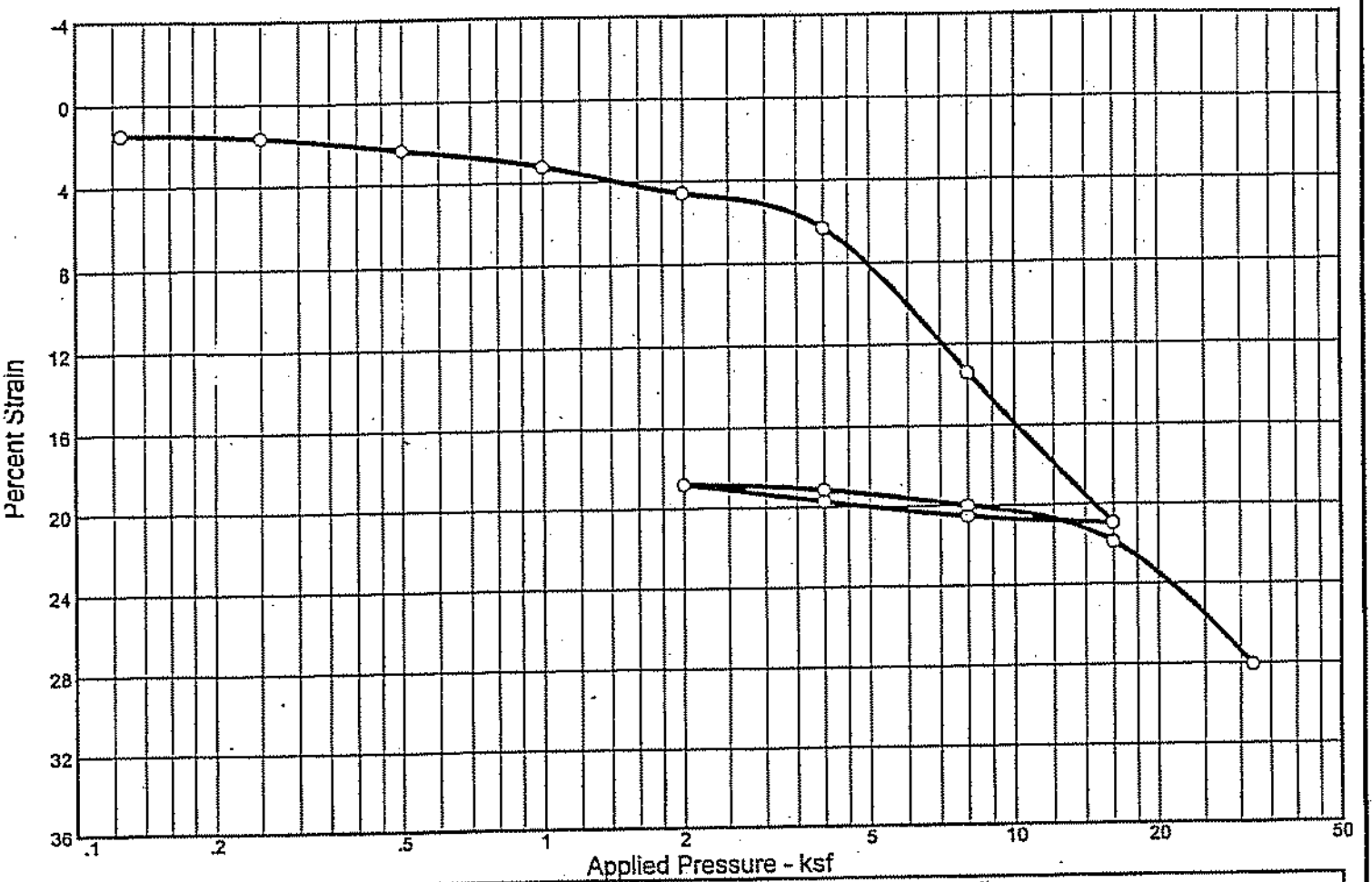
Source: EEB-50 Sample No.: ST-1 Elev./Depth: 10.0'-12.0'

Remarks:

DUFFIELD ASSOCIATES
5400 LIMESTONE ROAD
WILMINGTON, DELAWARE 19808-1232
TEL. (302) 239-6634 FAX (302) 239-8485

Chk'd by: WHS

CONSOLIDATION TEST REPORT EEB - 51



Coefficients of Consolidation and Secondary Consolidation

No.	Load (ksf)	C_v (ft.2/day)	C_α	No.	Load (ksf)	C_v (ft.2/day)	C_α	No.	Load (ksf)	C_v (ft.2/day)	C_α
1	0.13	0.67	0.000	12	4.00	0.73	0.000				
2	0.25	2.61	0.000	13	8.00	0.35	0.001				
3	0.50	0.63	0.000	14	16.00	0.33	0.005				
4	1.00	0.32	0.001	15	32.00	0.05	0.010				
5	2.00	0.17	0.001								
6	4.00	0.27	0.003								
7	8.00	0.06	0.014								
8	16.00	0.05	0.013								
10	4.00	0.24									
11	2.00	0.03									

Natural Moisture Content	Dry Density (pcf)	LL	PI	P_c'	C_c'	C_r'	Approximate Overburden Pressure (ksf)	
47.9 %	72.2	48	18	4.3	.266	.029	2.3	

MATERIAL DESCRIPTION	USCS	AASHTO
Dark-gray SILT, some clay, trace fine sand.	ML	

Project No. 4276.GE Client: U.S. Army Corps of Engineers

Project: Wilmington Harbor North Dredged Material CDF Subsurface Investigation

Contract No. DACW-61-98-D-0008 Task Order 27

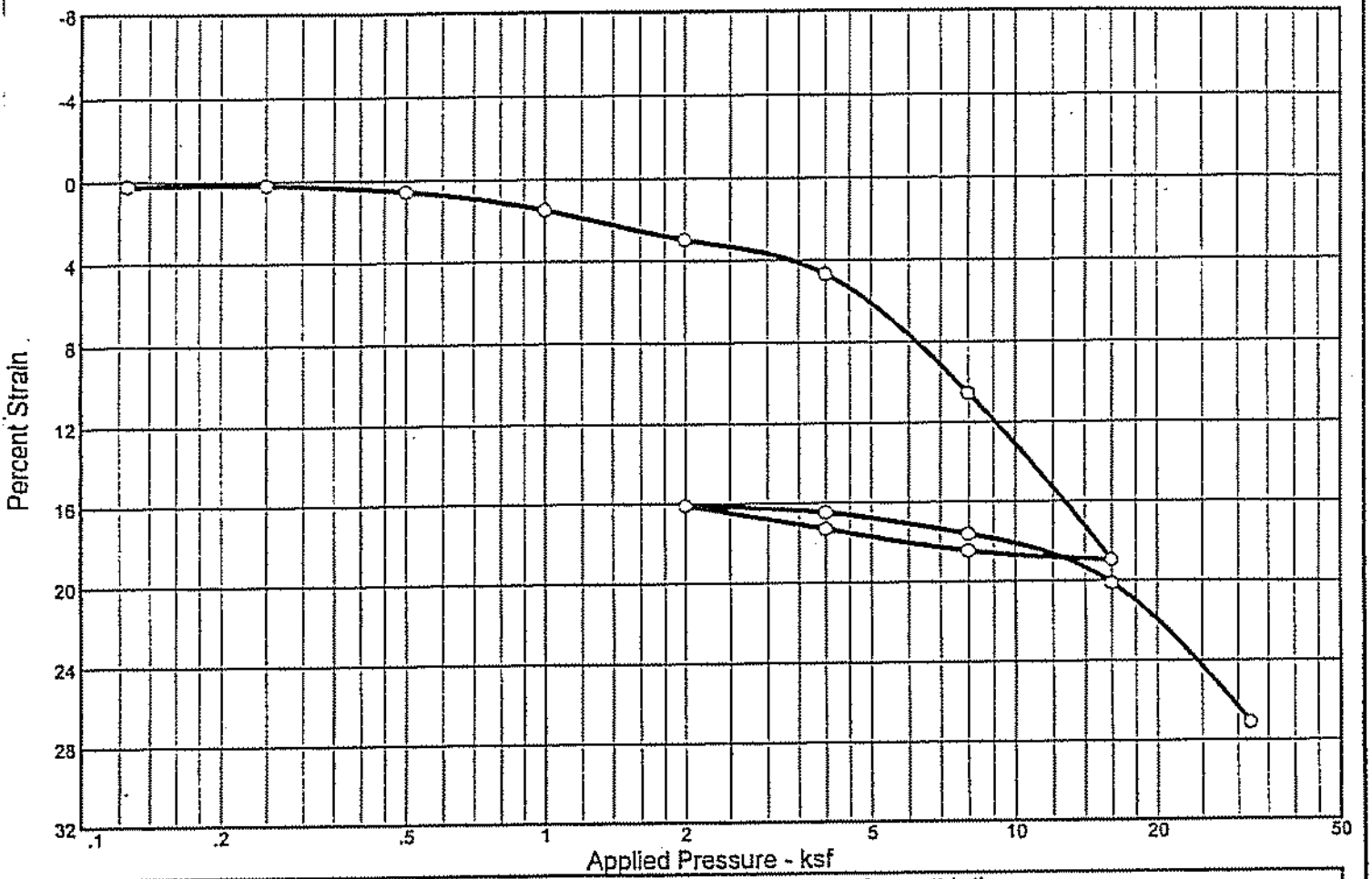
Source: EEB-51 Sample No.: ST-4 Elev./Depth: 56.0'-58.0'

Remarks:

DUFFIELD ASSOCIATES 5400 LIMESTONE ROAD WILMINGTON, DELAWARE 19808-1232 TEL. (302) 239-6634 FAX (302) 239-8485

Chk'd by: WHS

CONSOLIDATION TEST REPORT EEB - 52



Coefficients of Consolidation and Secondary Consolidation

No.	Load (ksf)	C_v (ft.2/day)	C_α	No.	Load (ksf)	C_v (ft.2/day)	C_α	No.	Load (ksf)	C_v (ft.2/day)	C_α
1	0.13	1.13	0.000	11	2.00	0.01					
2	0.25	0.52	0.000	12	4.00	0.19	0.001				
3	0.50	0.40	0.000	13	8.00	0.12	0.002				
4	1.00	0.12	0.001	14	16.00	0.10	0.006				
5	2.00	0.14	0.001	15	32.00	0.02	0.011				
6	4.00	0.17	0.003								
7	8.00	0.04	0.012								
8	16.00	0.02	0.015								
9	8.00	0.36									
10	4.00	0.05									

Natural Moisture Content	Dry Density (pcf)	LL	PI	P_c'	C_c'	C_r'	Approximate Overburden Pressure (ksf)	
56.8 %	65.4	54	20	5.0	.150	.032	3.3	

MATERIAL DESCRIPTION	USCS	AASHTO
Dark-gray CLAYEY SILT, trace fine sand, trace organics.	MH	

Project No. 4276.GE Client: U.S. Army Corps of Engineers

Project: Wilmington Harbor North Dredged Material CDF Subsurface Investigation

Contract No. DACW-61-98-D-0008 Task Order 27

Source: EEB-52 Sample No.: ST-5 Elev./Depth: 80.0'-82.0'

Remarks:

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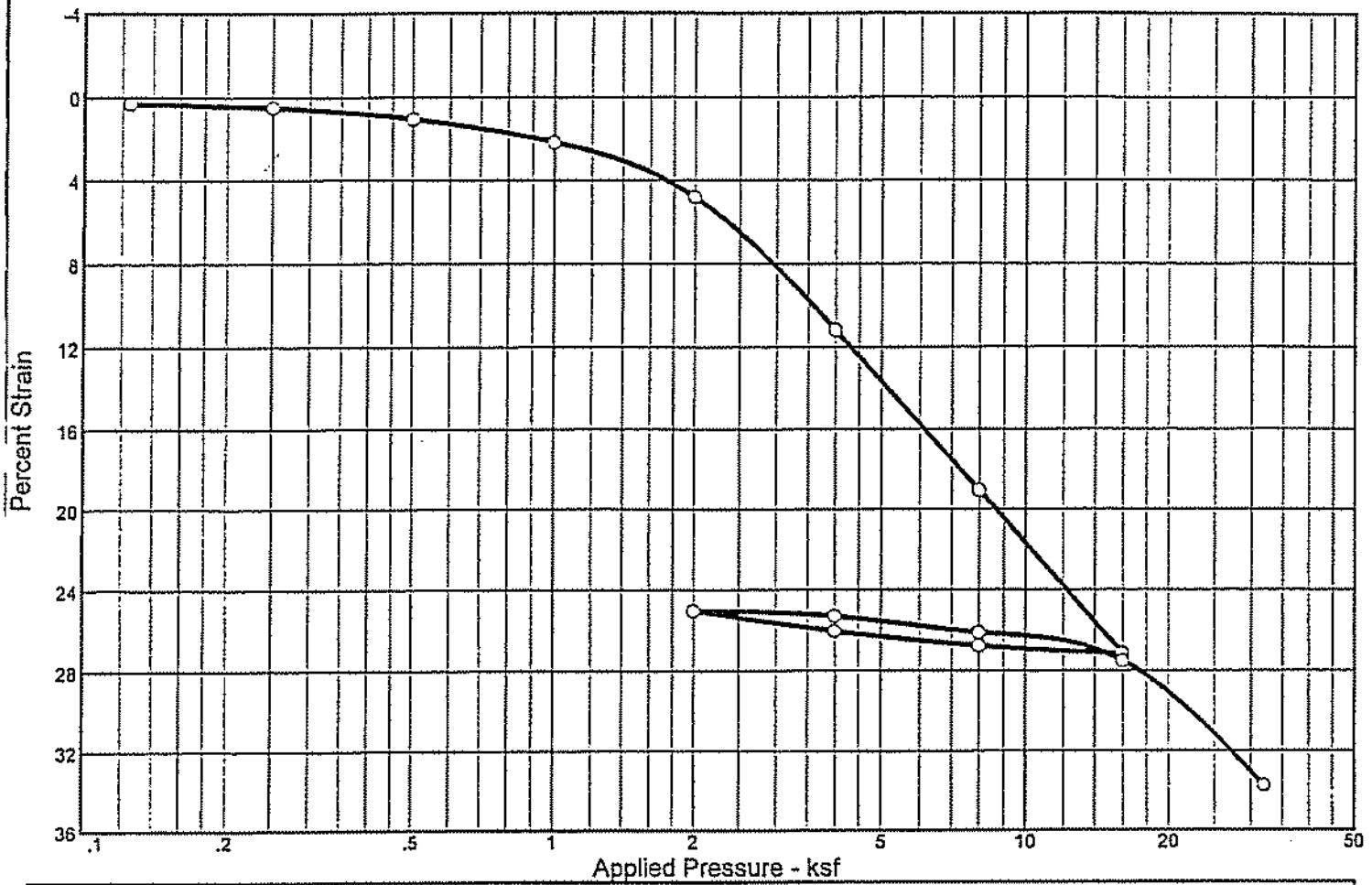
Chk'd by: WHS

CONSOLIDATION TEST REPORT EEB - 53



Coefficients of Consolidation and Secondary Consolidation

No.	Load (ksf)	C_v (ft.2/day)	C_α	No.	Load (ksf)	C_v (ft.2/day)	C_α	No.	Load (ksf)	C_v (ft.2/day)	C_α
11	2.00	0.02									
12	4.00	0.81	0.001								
13	8.00	0.11	0.001								
14	16.00	0.19	0.005								
15	32.00	0.07	0.001								

Natural Moisture Content	Dry Density (pcf)	LL	PI	P_c'	C_c'	C_r'	Approximate Overburden Pressure (ksf)	
47.7%	65.4	59	22	2.3	.190	.020	·1.0	

MATERIAL DESCRIPTION	USCS	AASHTO
Dark-gray CLAYEY SILT, trace fine sand, trace medium sand, trace organics.	MH	

Project No. 4276.GE Client: U.S. Army Corps of Engineers

Project: Wilmingtoo Harbor North Dredged Material CDF Subsurface Investigation

Contract No. DACW-61-98-D-0008 Task Order 27

Source: EEB-53 Sample No.: ST-2 Elev./Depth: 24.0'-26.0'

Remarks:

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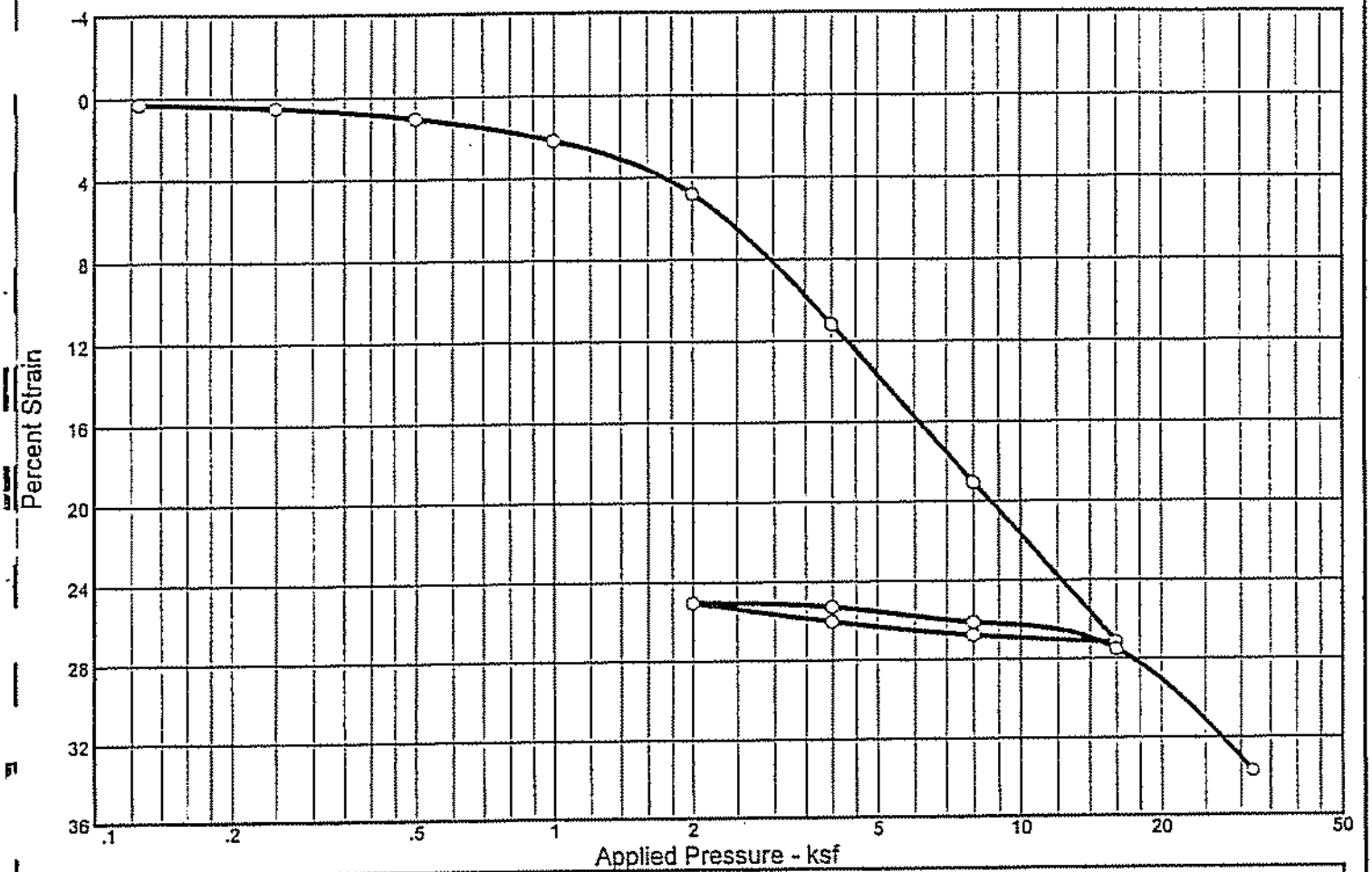
5400 LIMESTONE ROAD
WILMINGTON, DELAWARE 19808-1232
TEL. (302) 239-6634 FAX (302) 239-8485

Chk'd by: WHS

CONSOLIDATION TEST REPORT EEB - 54



Coefficients of Consolidation and Secondary Consolidation

No.	Load (ksf)	C_v (ft2/day)	C_α	No.	Load (ksf)	C_v (ft2/day)	C_α	No.	Load (ksf)	C_v (ft2/day)	C_α
1	0.13	0.66	0.000	12	4.00	0.81	0.001				
2	0.25	2.50	0.000	13	8.00	0.11	0.001				
4	1.00	0.27	0.002	14	16.00	0.19	0.005				
5	2.00	0.13	0.005	15	32.00	0.07	0.001				
6	4.00	0.04	0.012								
7	8.00	0.03	0.012								
8	16.00	0.03	0.010								
9	8.00	1.83									
10	4.00	0.09									
11	2.00	0.02									

Natural Moisture Content	Dry Density (pcf)	LL	PI	P'_c	C_c'	C_r'	Approximate Overburden Pressure (ksf)	
70.8 %	54.3	71	30	2.3	.249	.022	1.1	

MATERIAL DESCRIPTION	USCS	AASHTO
Dark-gray CLAYEY SILT, trace fine sand, trace medium sand, trace organics.	MH	

oject No. 4276.GE Client: U.S. Army Corps of Engineers

Project: Wilmington Harbor North Dredged Material CDF Subsurface Investigation

Contract No. DACW-61-98-D-0008 Task Order 27

Source: EEB-54 Sample No.: ST-2 Elev./Depth: 24.0'-26.0'

Remarks:

DUFFIELD ASSOCIATES
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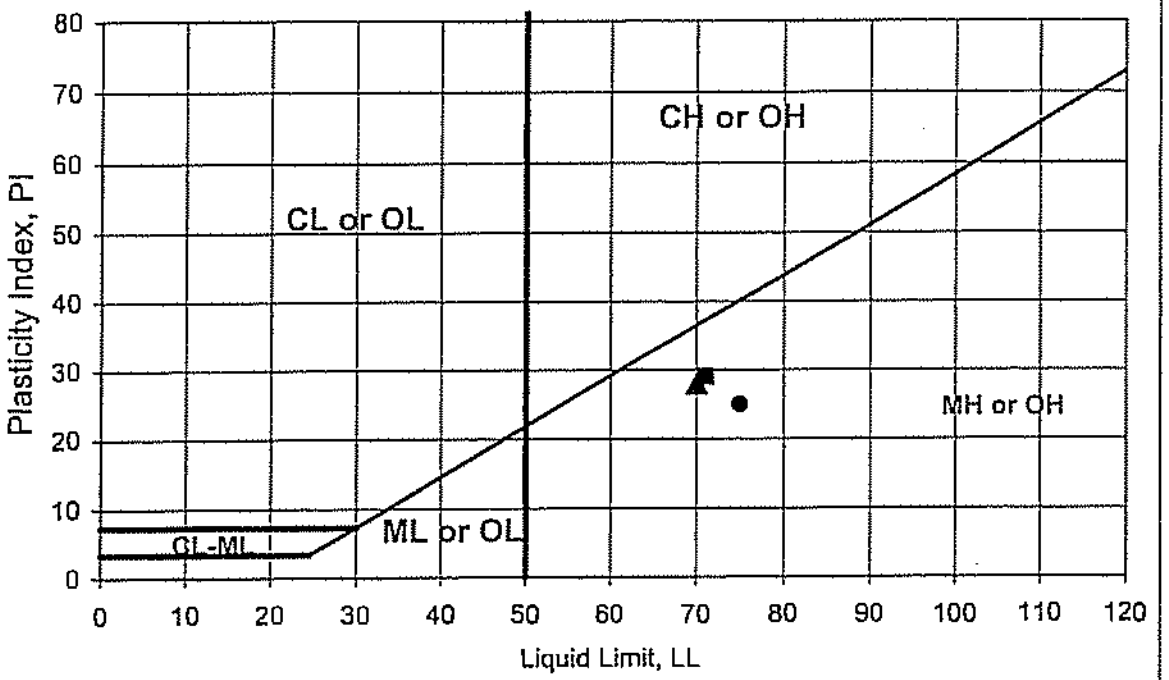
TEL. (302) 239-6634 FAX (302) 239-8485
E-MAIL: DUFFIELD@QUEENET.COM

Chk'd by: WHS

Date: June 2001

ATTERBERG LIMITS SUMMARY EEB-50



Boring No.	Sample	Depth (feet)	Description	% SILT [2]	% CLAY [2]	Moisture Content	LL	PL	PI	USCS [1]	Symbol
EEB-50	ST-1	10.0-12.0	Dark-gray/black CLAYEY SILT, trace fine sand, trace medium sand, trace organics.	42.2	52.6	55.8	71	42	29	MH	■
	S-9	18.0-20.0	Dark-gray/black CLAYEY SILT, trace fine sand, trace medium sand, trace organics.	43.9	54.8	86.4	75	50	25	MH	●
	ST-2	24.0-26.0	Dark-gray/black CLAYEY SILT, trace fine sand, trace organics.	42.9	54.9	77.6	70	42	28	MH	▲

NOTES:

[1] USCS - Unified Soil Classification System

[2] Percent SILT and CLAY from Hydrometer Testing

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Client: U.S. Army Corps of Engineers

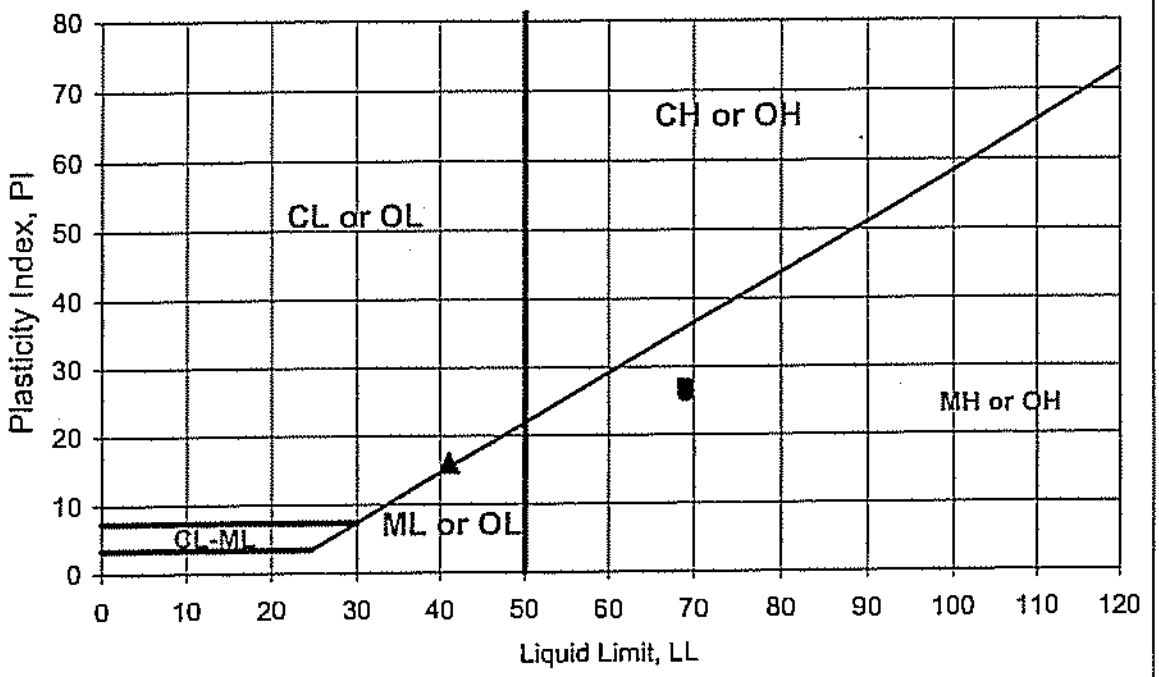
Project: Wilmington Harbor North Dredged Material Confined Disposal Facility Subsurface Investigation

Contract No. DACW-61-98-D-0008 Task Order 27

Project No.: 4276.GE

Date: June/2001

ATTERBERG LIMITS SUMMARY EEB-50



Boring No.	Sample	Depth (feet)	Description	% SILT [2]	% CLAY [2]	Moisture Content	LL	PL	PI	USCS [1]	Symbol
EEB-50	S-13	28.0-30.0	Dark-gray/black CLAYEY SILT, trace fine sand, trace organics.	52.9	46.1	77.3	69	42	27	MH	■
	S-17	36.0-38.0	Dark-gray CLAYEY SILT, trace fine sand, trace medium sand.	46.7	45.8	69.7	69	43	26	MH	●
	ST-5	44.0-46.0	Dark-gray SILT, some clay, little fine sand, trace medium sand.	54.3	26.6	39.8	41	25	16	ML	▲

NOTES:

[1] USCS - Unified Soil Classification System

[2] Percent SILT and CLAY from Hydrometer Testing

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Client: U.S. Army Corps of Engineers

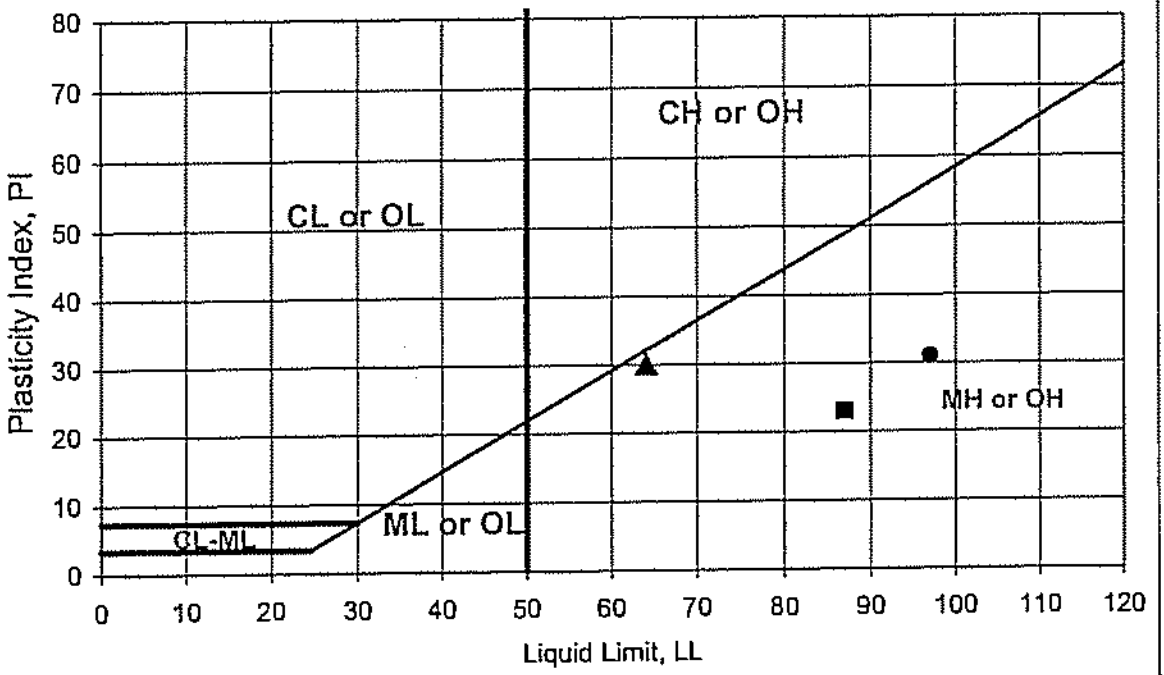
Project: Wilmington Harbor North Dredged Material Confined Disposal Facility Subsurface Investigation

Contract No. DACW-61-98-D-0008 Task Order 27

Project No.: 4276.GE

Date: June/2001

ATTERBERG LIMITS SUMMARY EEB-50



Boring No.	Sample	Depth (feet)	Description	% SILT [2]	% CLAY [2]	Moisture Content	LL	PL	PI	USCS [1]	Symbol
EEB-50	S-21	50.0-52.0	Dark-gray/brown CLAYEY SILT, trace fine sand, trace medium sand, trace organics.	41.0	51.1	96.5	87	64	23	MH	■
	ST-6	54.0-56.0	Dark-gray/brown CLAYEY SILT, trace fine sand, trace medium sand, trace organics.	37.5	55.3	93.5	97	66	31	MH	●
	S-25	60.5-62.0	Dark-gray/brown CLAYEY SILT, trace fine sand, trace medium sand, trace organics.	37.9	60.3	55.8	64	34	30	MH	▲

NOTES:

[1] USCS - Unified Soil Classification System

[2] Percent SILT and CLAY from Hydrometer Testing

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Client: U.S. Army Corps of Engineers

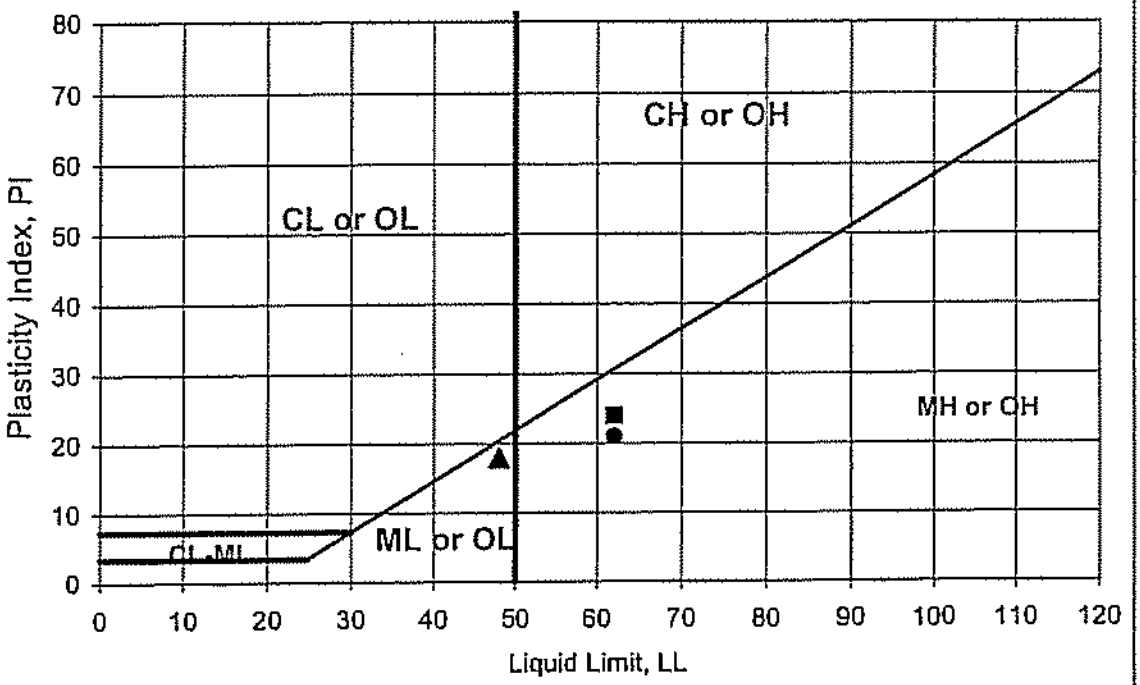
Project: Wilmington Harbor North Dredged Material Confined Disposal Facility Subsurface Investigation

Contract No. DACW-61-98-D-0008 Task Order 27

Project No.: 4276.GE

Date: June/2001

ATTERBERG LIMITS SUMMARY EEB-51



Boring No.	Sample	Depth (feet)	Description	% SILT [2]	% CLAY [2]	Moisture Content	LL	PL	PI	USCS [1]	Symbol
EEB-51	ST-2	12.0-14.0	Dark-gray CLAYEY SILT, trace medium sand, trace fine sand, trace organics.	47.7	49.3	59.5	62	38	24	MH	■
	ST-3	32.0-34.0	Dark-gray CLAYEY SILT, trace fine sand.	54.6	42.0	56.8	62	41	21	MH	●
	ST-4	56.0-58.0	Dark-gray SILT, some clay, trace fine sand.	63.1	31.8	47.9	48	30	18	ML	▲

NOTES:

[1] USCS - Unified Soil Classification System

[2] Percent SILT and CLAY from Hydrometer Testing

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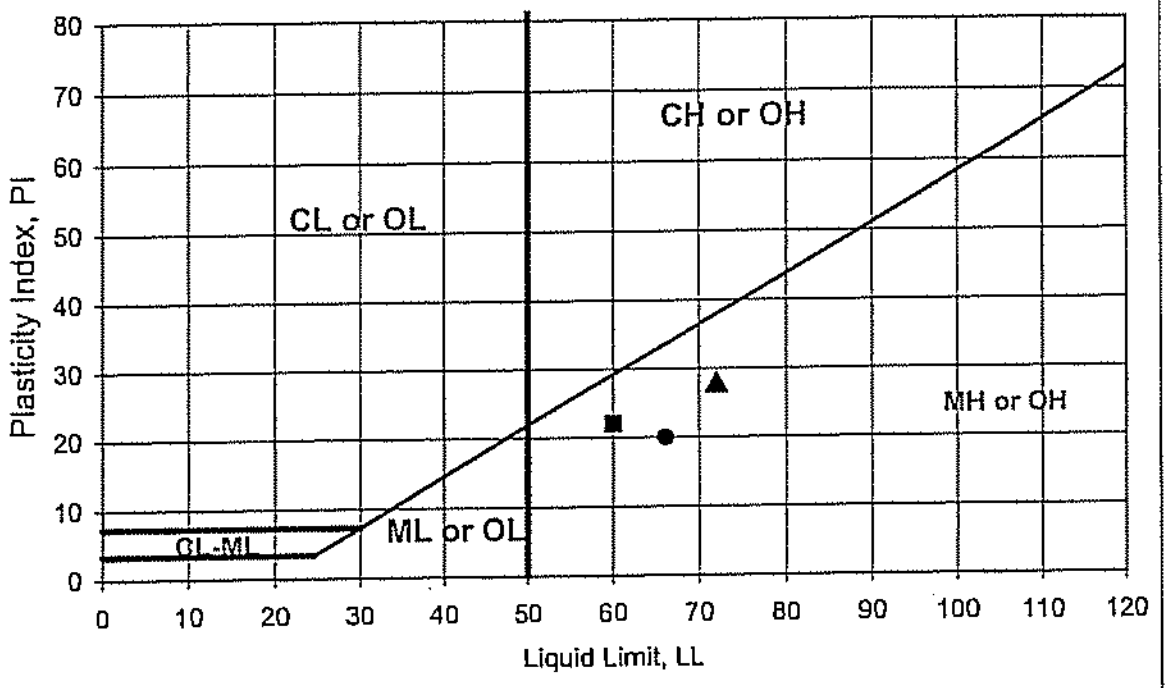
Project No.: 4276.GE

Date: June/2001

ATTERBERG LIMITS SUMMARY EEB-52



Boring No.	Sample	Depth (feet)	Description	% SILT [2]	% CLAY [2]	Moisture Content	LL	PL	PI	USCS [1]	Symbol
EEB-52	ST-1	16.0-18.0	Dark-gray CLAYEY SILT, trace fine sand, trace organics.	53.0	44.4	55.5	60	38	22	MH	■
	ST-2	30.0-32.0	Dark-gray CLAYEY SILT, trace fine sand.	47.8	50.4	66	66	46	20	MH	●
	ST-3	46.0-48.0	Dark-gray/brown CLAYEY SILT, trace fine sand.	42.0	55.9	74.4	72	44	28	MH	▲

NOTES:

[1] USCS - Unified Soil Classification System

[2] Percent SILT and CLAY from Hydrometer Testing

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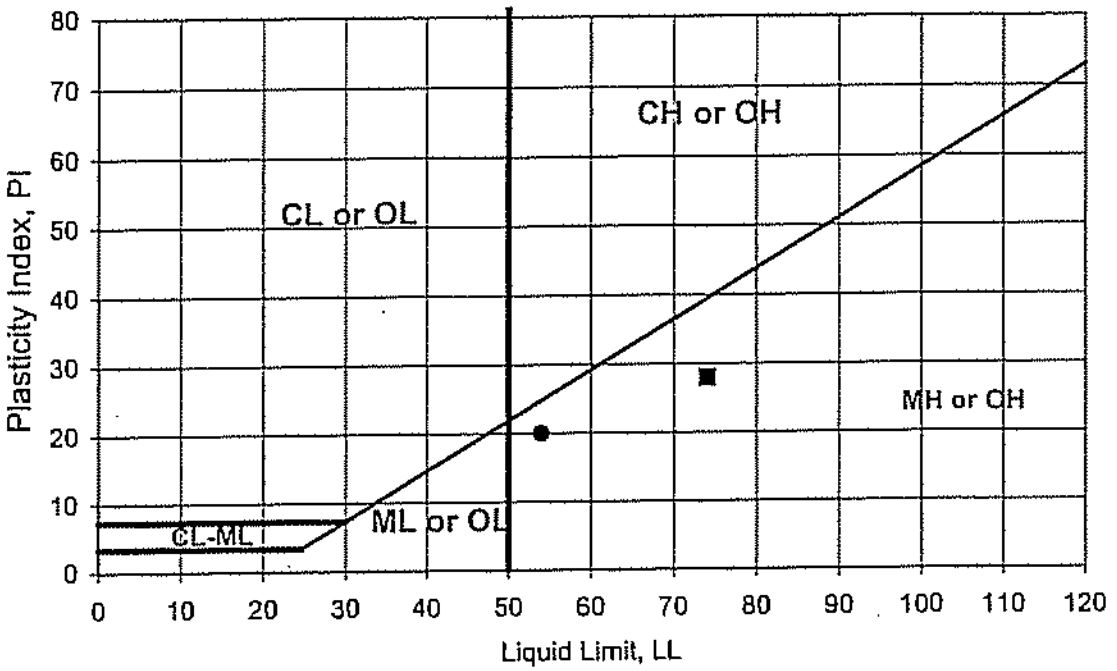
ATTERBERG LIMITS SUMMARY EEB-52



Boring No.	Sample	Depth (feet)	Description	% SILT [2]	% CLAY [2]	Moisture Content	LL	PL	PI	USCS [1]	Symbol
EEB-52	ST-4	60.0-62.0	Dark-gray CLAYEY SILT, trace medium sand, trace fine sand, trace organics.	45.9	46.1	57.5	74	46	28	MH	■
	ST-5	80.0-82.0	Dark-gray CLAYEY SILT, trace fine sand, trace organics.	53.9	45.0	56.8	54	34	20	MH	●

NOTES:

[1] USCS - Unified Soil Classification System

[2] Percent SILT and CLAY from Hydrometer Testing

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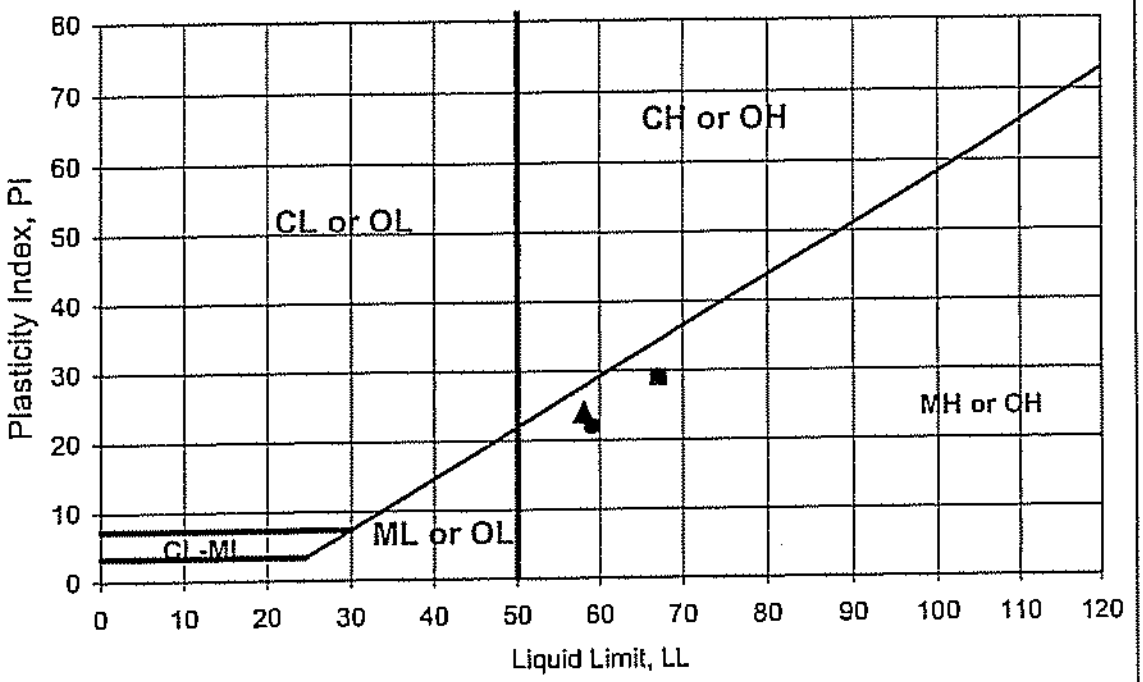
Date: June/2001

ATTERBERG LIMITS SUMMARY EEB-53



Boring No.	Sample	Depth (feet)	Description	% SILT [2]	% CLAY [2]	Moisture Content	LL	PL	PI	USCS [1]	Symbol
EEB-53	ST-1	9.0-11.0	Dark-gray CLAYEY SILT, trace fine sand, trace organics.	51.0	45.4	59.9	67	38	29	MH	■
	ST-3	25.0-27.0	Dark-gray CLAYEY SILT, trace fine sand.	51.9	44.4	47.7	59	37	22	MH	●
	ST-4	33.0-35.0	Dark-gray CLAYEY SILT, trace fine sand.	43.0	56.2	76.9	58	34	24	MH	▲

NOTES:

[1] USCS - Unified Soil Classification System

[2] Percent SILT and CLAY from Hydrometer Testing

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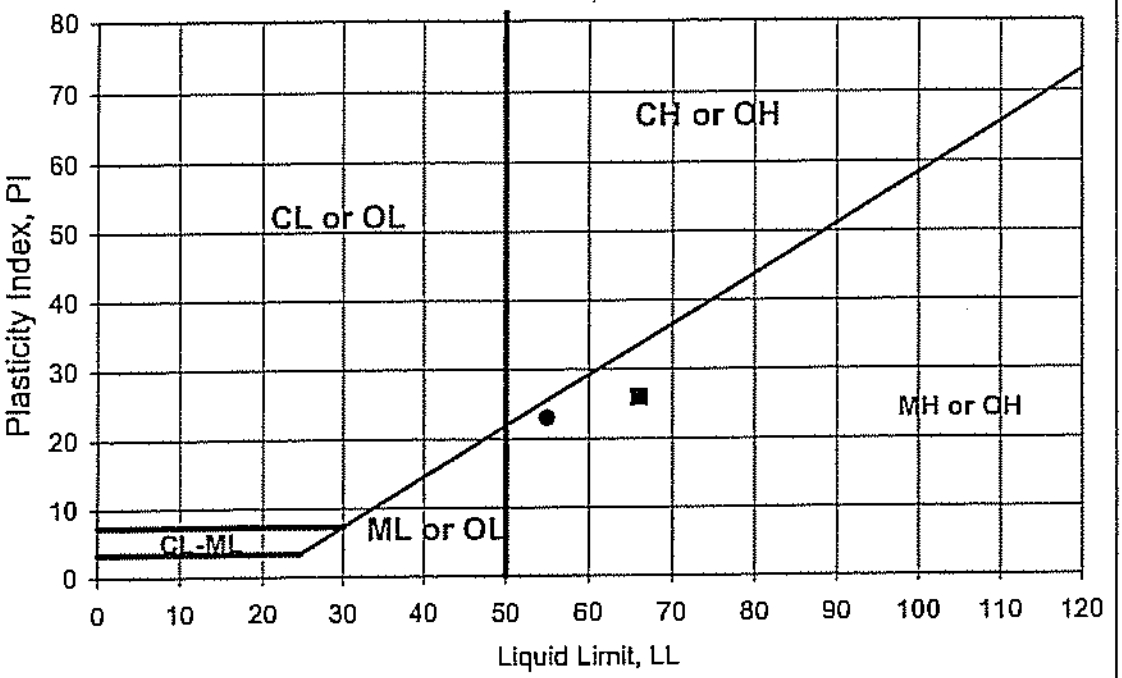
Date: June/2001

ATTERBERG LIMITS SUMMARY EEB-53



Boring No.	Sample	Depth (feet)	Description	% SILT [2]	% CLAY [2]	Moisture Content	LL	PL	PI	USCS [1]	Symbol
EEB-53	ST-5	43.0-45.0	Dark-gray CLAYEY SILT, trace medium sand, trace fine sand, trace organics.	40.0	58.0	64.2	66	40	26	MH	■
	ST-6	63.0-65.0	Dark-gray CLAYEY SILT, trace fine sand, trace organics.	60.4	39.1	55.8	55	32	23	MH	●

NOTES:

[1] USCS - Unified Soil Classification System

[2] Percent SILT and CLAY from Hydrometer Testing

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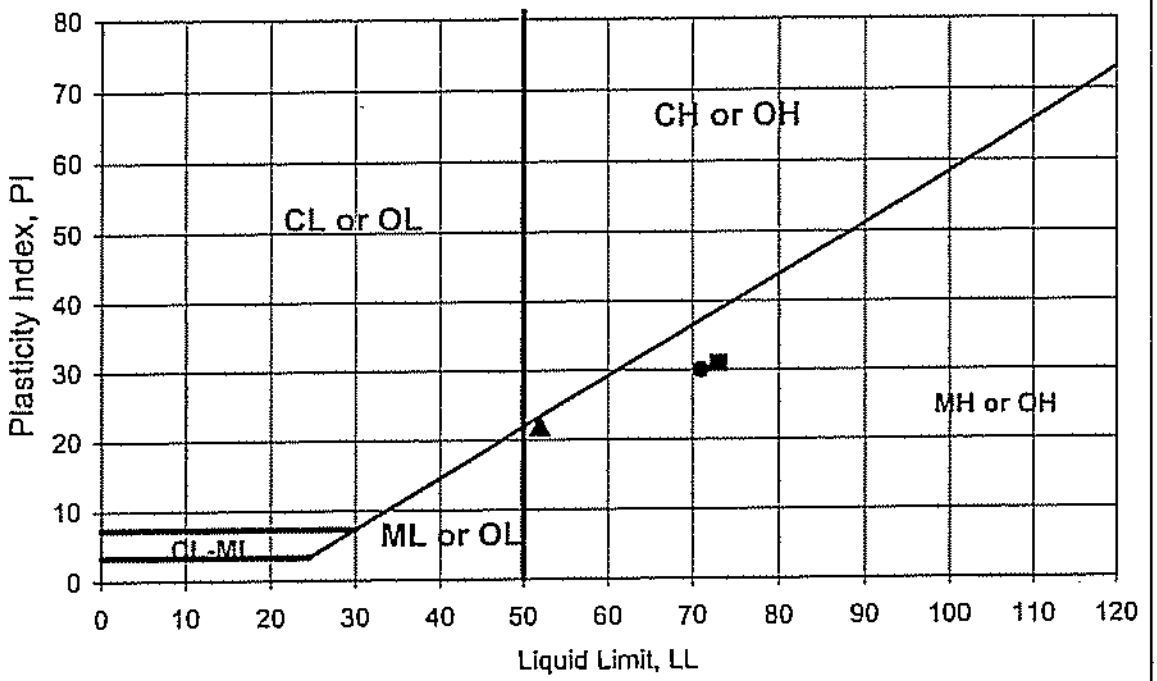
Date: June/2001

ATTERBERG LIMITS SUMMARY EEB-54



Boring No.	Sample	Depth (feet)	Description	% SILT [2]	% CLAY [2]	Moisture Content	LL	PL	PI	USCS [1]	Symbol
EEB-54	ST-1	7.0-9.0	Dark-gray CLAYEY SILT, trace fine sand, trace medium sand, trace organics.	46.7	51.1	59.6	73	42	31	MH	■
	ST-2	24.0-26.0	Dark-gray CLAYEY SILT, trace fine sand, trace medium sand, trace organics.	44.0	50.2	70.8	71	41	30	MH	●
	ST-3	44.0-46.0	Dark-gray CLAYEY SILT, trace fine sand, trace organics.	53.8	45.4	52.3	52	30	22	MH	▲

NOTES:

[1] USCS - Unified Soil Classification System

[2] Percent SILT and CLAY from Hydrometer Testing

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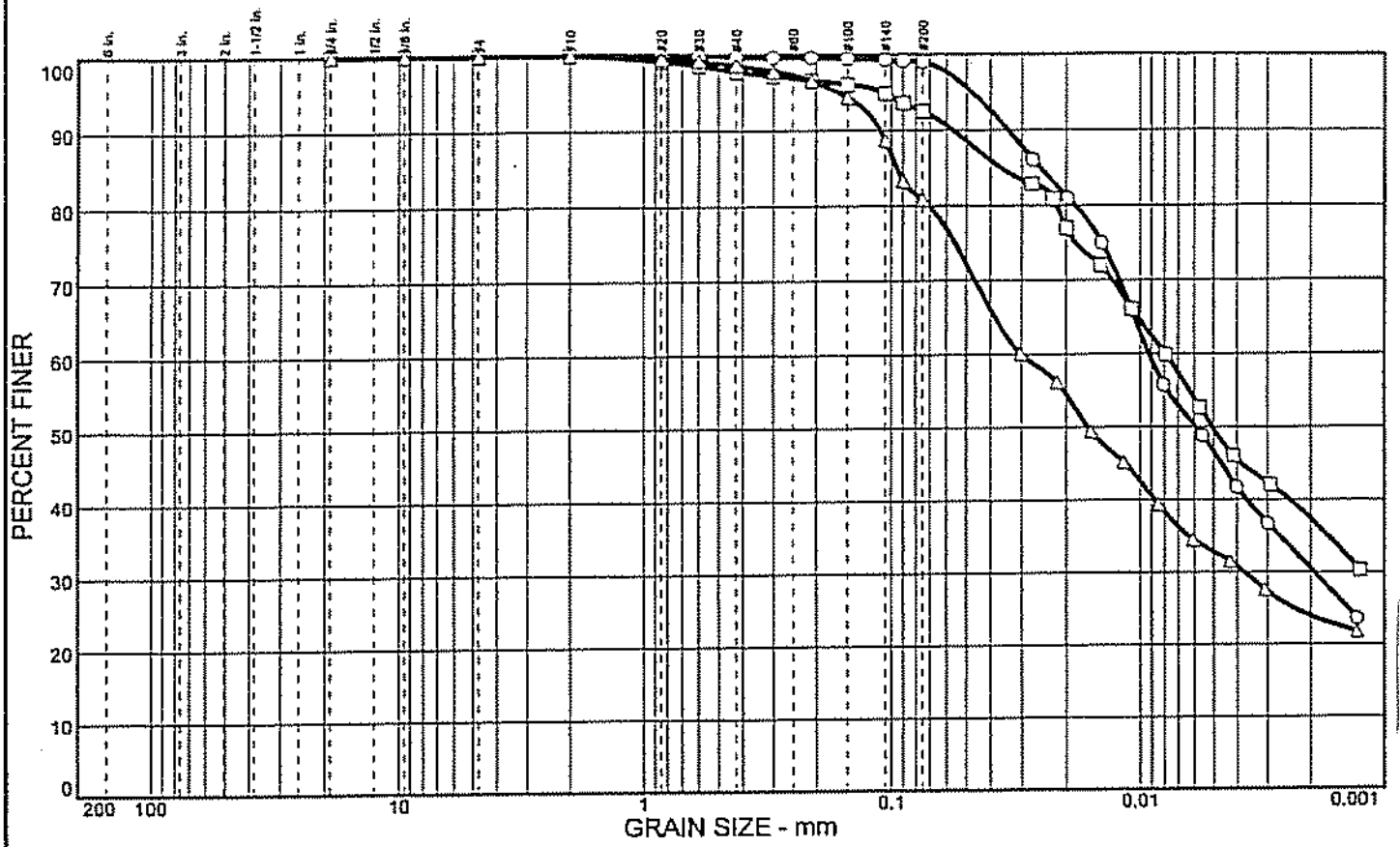
Project No.: 4276.GE

Date: June/2001

PARTICLE SIZE DISTRIBUTION REPORT: EEB-50



	% COBBLES	% GRAVEL	% SAND	% SILT	% CLAY	USCS	AASHTO	PL	LL
O			1.0	52.4	46.6	MH		42	69
□			7.5	42.8	49.7	MH		43	69
△			19.1	48.1	32.8	ML		25	41

SIEVE Inches size	PERCENT FINER O	□	△
3/4	100.0	100.0	100.0
3/8	100.0	100.0	100.0
	GRAIN SIZE		
D_{60}	0.0092	0.0079	0.0301
D_{30}	0.0019		0.0037
D_{10}			
	COEFFICIENTS		
C_c			
C_u			

SIEVE number size	PERCENT FINER O	□	△
#4	100.0	100.0	100.0
#10	100.0	100.0	100.0
#20	100.0	99.2	99.5
#30	99.9	98.6	99.2
#40	99.8	97.8	98.6
#50	99.6	97.2	97.8
#70	99.6	96.6	96.5
#100	99.5	96.1	94.3
#140	99.3	94.9	88.7
#170	99.2	93.6	83.3
#200	99.0	92.5	80.9

SOIL DESCRIPTION

O Dark-gray/black CLAYEY SILT, trace fine sand, trace organics.

□ Dark-gray CLAYEY SILT, trace fine sand, trace medium sand.

△ Dark-gray SILT, some clay, little fine sand, trace medium sand.

REMARKS:

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O Source: EEB-50 Sample No.: S-13 Elev./Depth: 28.0'-30.0'

D Source: EEB-50 Sample No.: S-17 Elev./Depth: 36.0'-38.0'

△ Source: EEB-50 Sample No.: ST-5 Elev./Depth: 44.0'-46.0'

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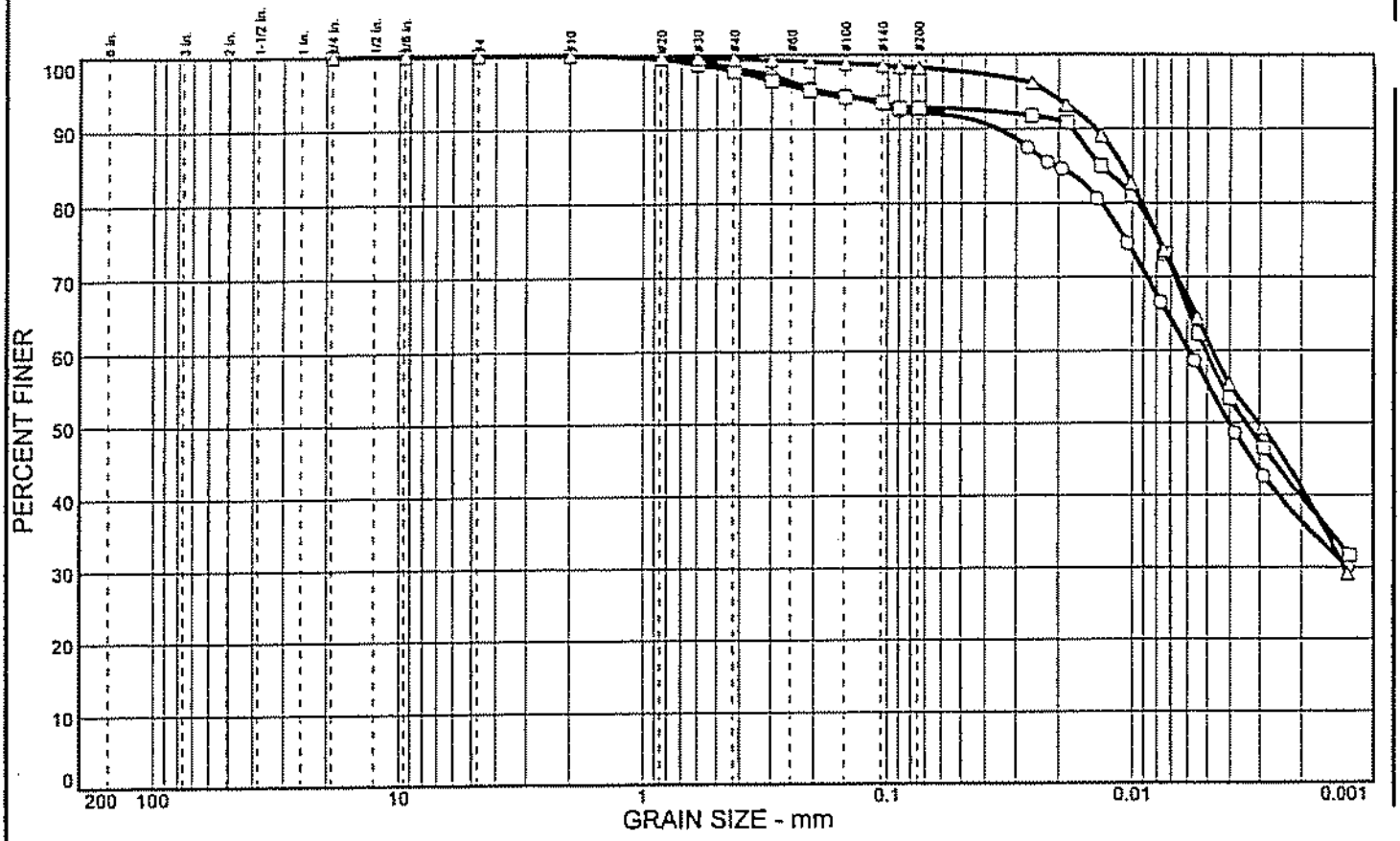

	% COBBLES	% GRAVEL	% SAND	% SILT	% CLAY	USCS	AASHTO	PL	LL
○			7.9	36.6	55.5	MH		64	87
□			7.2	33.2	59.6	MH		66	97
△			1.8	36.6	61.6	MH		34	64

SIEVE inches size	PERCENT FINER ○	□	△
3/4	100.0	100.0	100.0
3/8	100.0	100.0	100.0
GRAIN SIZE			
D_{60}	0.0059	0.0051	0.0047
D_{30}	0.0013		0.0013
D_{10}			
COEFFICIENTS			
C_c			
C_u			

SIEVE number size	PERCENT FINER ○	□	△
#4	100.0	100.0	100.0
#10	100.0	100.0	100.0
#20	99.7	99.5	99.7
#30	99.3	98.7	99.5
#40	98.2	97.8	99.5
#50	97.2	96.5	99.3
#70	95.5	95.2	99.1
#100	94.5	94.3	98.8
#140	93.2	93.6	98.5
#170	92.4	92.8	98.3
#200	92.2	92.8	98.2

SOIL DESCRIPTION

○ Dark-gray/brown CLAYEY SILT, trace fine sand, trace medium sand, trace organics.

□ Dark-gray/brown CLAYEY SILT, trace fine sand, trace medium sand, trace organics.

△ Dark-gray/brown CLAYEY SILT, trace fine sand, trace medium sand, trace organics.

REMARKS:

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○ Source: EEB-50 Sample No.: S-21 Elev./Depth: 50.0'-52.0'

□ Source: EEB-50 Sample No.: ST-6 Elev./Depth: 54.0'-56.0'

△ Source: EEB-50 Sample No.: S-25 Elev./Depth: 60.5'-62.0'

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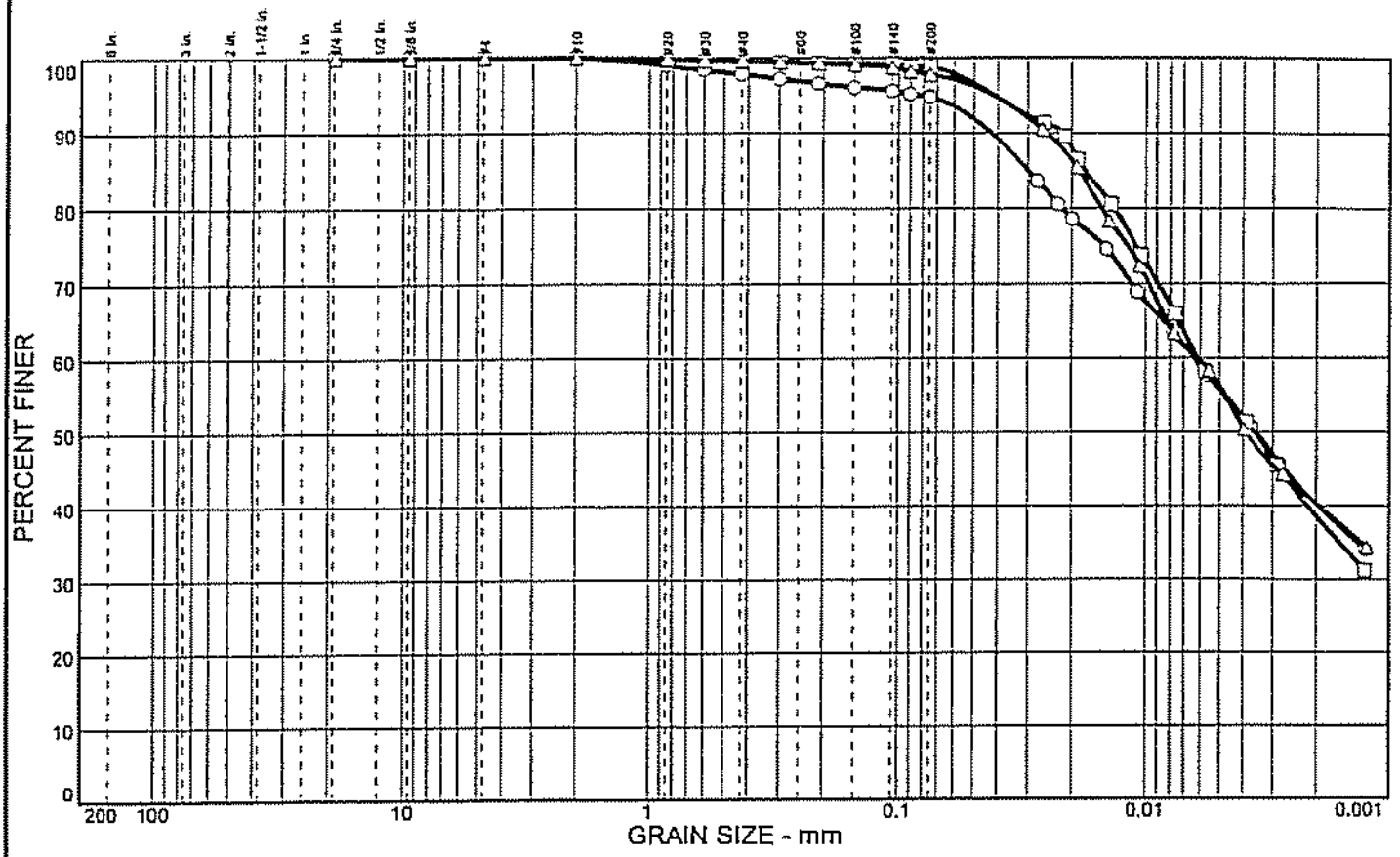

	% COBBLES	% GRAVEL	% SAND	% SILT	% CLAY	USCS	AASHTO	PL	LL
○			5.2	39.1	55.7	MH		42	71
□			1.3	43.2	55.5	MH		50	75
△			2.2	41.6	56.2	MH		42	70

SIEVE inches size	PERCENT FINER ○	□	△
3/4	100.0	100.0	100.0
3/8	100.0	100.0	100.0
GRAIN SIZE			
D_{60}	0.0064	0.0062	0.0062
D_{30}			
D_{10}			
COEFFICIENTS			
C_c			
C_u			

SIEVE number size	PERCENT FINER ○	□	△
#4	100.0	100.0	100.0
#10	100.0	100.0	100.0
#20	99.0	99.7	99.9
#30	98.4	99.6	99.7
#40	97.8	99.5	99.6
#50	97.2	99.4	99.4
#70	96.6	99.3	99.3
#100	96.1	99.2	99.1
#140	95.6	99.1	98.7
#170	95.2	98.8	98.2
#200	94.8	98.7	97.8

SOIL DESCRIPTION

○ Dark-gray/black CLAYEY SILT, trace fine sand, trace medium sand, trace organics.

□ Dark-gray/black CLAYEY SILT, trace fine sand, trace medium sand, trace organics.

△ Dark-gray/black CLAYEY SILT, trace fine sand, trace organics.

REMARKS:

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○ Source: EEB-50 Sample No.: ST-1 Elev./Depth: 10.0'-12.0'

□ Source: EEB-50 Sample No.: S-9 Elev./Depth: 18.0'-20.0'

△ Source: EEB-50 Sample No.: ST-2 Elev./Depth: 24.0'-26.0'

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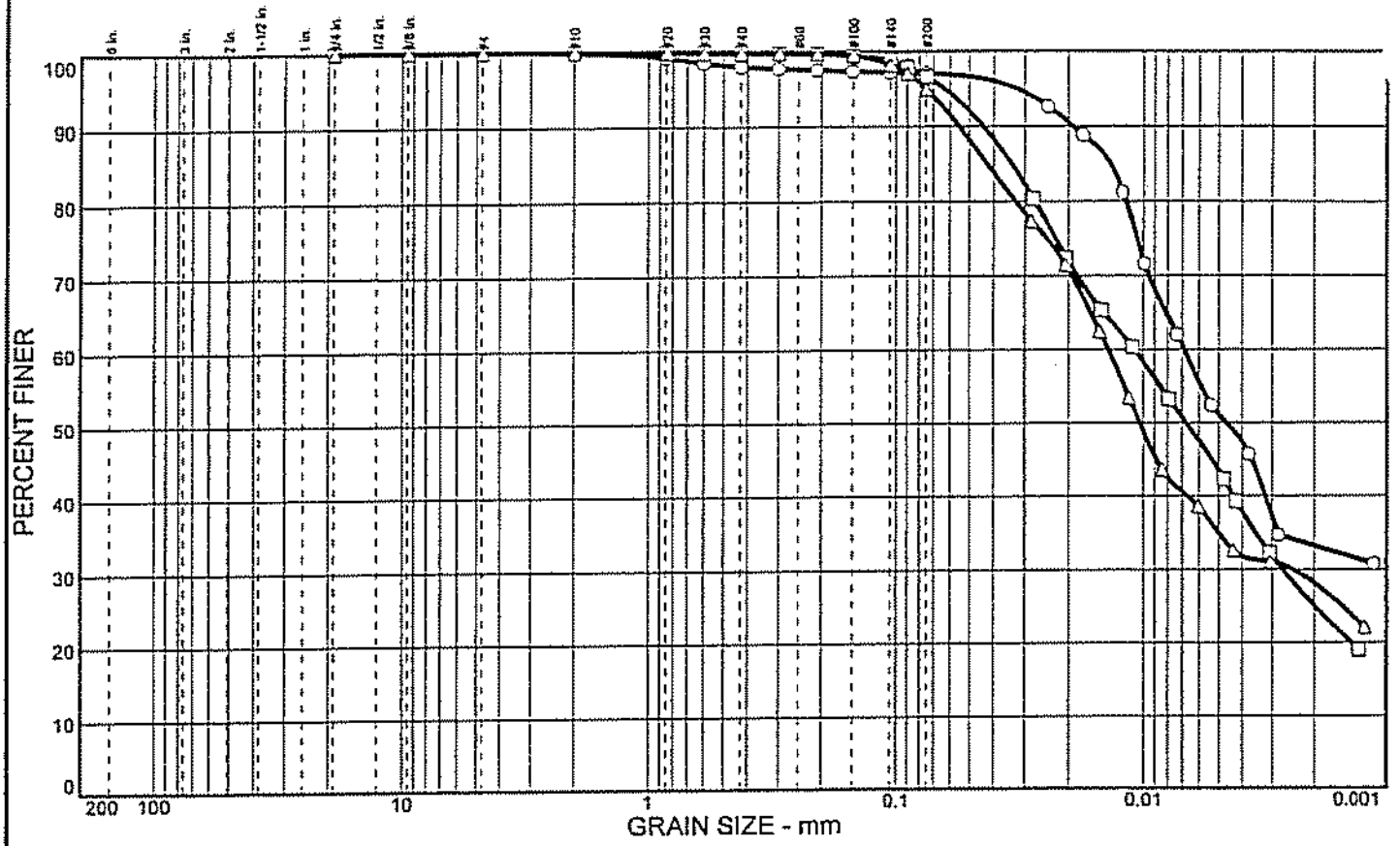
PARTICLE SIZE DISTRIBUTION REPORT: EEB-51



	% COBBLES	% GRAVEL	% SAND	% SILT	% CLAY	USCS	AASHTO	PL	LL
○			3.0	45.9	51.1	MH		38	62
□			3.4	53.1	43.5	MH		41	62
△			5.1	60.0	34.9	ML		30	48

SIEVE Inches size	PERCENT FINER ○	□	△
3/4	100.0	100.0	100.0
3/8	100.0	100.0	100.0
	GRAIN SIZE		
D_{60}	0.0069	0.0108	0.0140
D_{30}		0.0027	0.0024
D_{10}			
	COEFFICIENTS		
C_C			
C_U			

SIEVE number size	PERCENT FINER ○	□	△
#4	100.0	100.0	100.0
#10	99.9	100.0	100.0
#20	99.2	100.0	99.9
#30	98.5	99.9	99.8
#40	98.0	99.9	99.8
#50	97.7	99.8	99.8
#70	97.5	99.7	99.7
#100	97.3	99.4	99.5
#140	97.2	98.8	98.2
#170	97.1	97.9	97.1
#200	97.0	96.6	94.9

SOIL DESCRIPTION

○ Dark-gray CLAYEY SILT, trace medium sand, trace fine sand, trace organics.

□ Dark-gray CLAYEY SILT, trace fine sand.

△ Dark-gray SILT, some clay, trace fine sand.

REMARKS:

○

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○ Source: EEB-51 Sample No.: ST-2 Elev./Depth: 12.0'-14.0'

□ Source: EEB-51 Sample No.: ST-3 Elev./Depth: 32.0'-34.0'

△ Source: EEB-51 Sample No.: ST-4 Elev./Depth: 56.0'-58.0'

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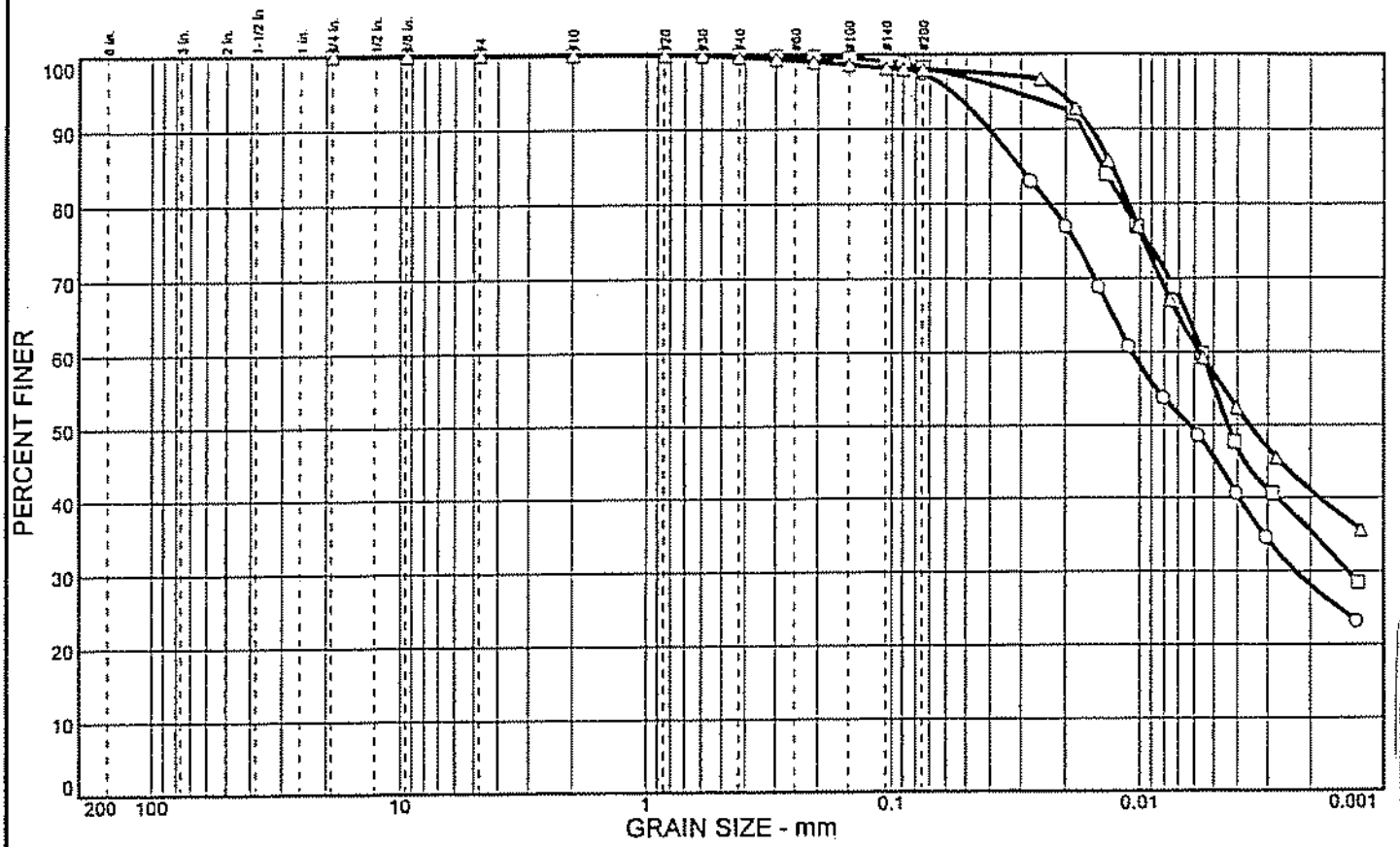

	% COBBLES	% GRAVEL	% SAND	% SILT	% CLAY	USCS	AASHTO	PL	LL
○			2.6	51.8	45.6	MH		38	60
□			1.8	42.9	55.3	MH		46	66
△			2.1	40.9	57.0	MH		44	72

SIEVE inches size	PERCENT FINER ○	□	△
3/4	100.0	100.0	100.0
3/8	100.0	100.0	100.0
	GRAIN SIZE		
D_{60}	0.0107	0.0056	0.0057
D_{30}	0.0023	0.0014	
D_{10}			
	COEFFICIENTS		
C_c			
C_u			

SIEVE number size	PERCENT FINER ○	□	△
#4	100.0	100.0	100.0
#10	100.0	100.0	100.0
#20	100.0	100.0	100.0
#30	99.9	99.9	99.9
#40	99.8	99.9	99.7
#50	99.8	99.8	99.4
#70	99.7	99.7	99.0
#100	99.5	99.5	98.7
#140	98.9	99.0	98.2
#170	98.2	98.7	98.0
#200	97.4	98.2	98.0

SOIL DESCRIPTION

○ Dark-gray CLAYEY SILT, trace fine sand, trace organics.

□ Dark-gray CLAYEY SILT, trace fine sand.

△ Dark-gray/brown CLAYEY SILT, trace fine sand.

REMARKS:

○

□

△

○ Source: EEB-52 Sample No.: ST-1 Elev./Depth: 16.0'-18.0'

□ Source: EEB-52 Sample No.: ST-2 Elev./Depth: 30.0'-32.0'

△ Source: EEB-52 Sample No.: ST-3 Elev./Depth: 46.0'-48.0'

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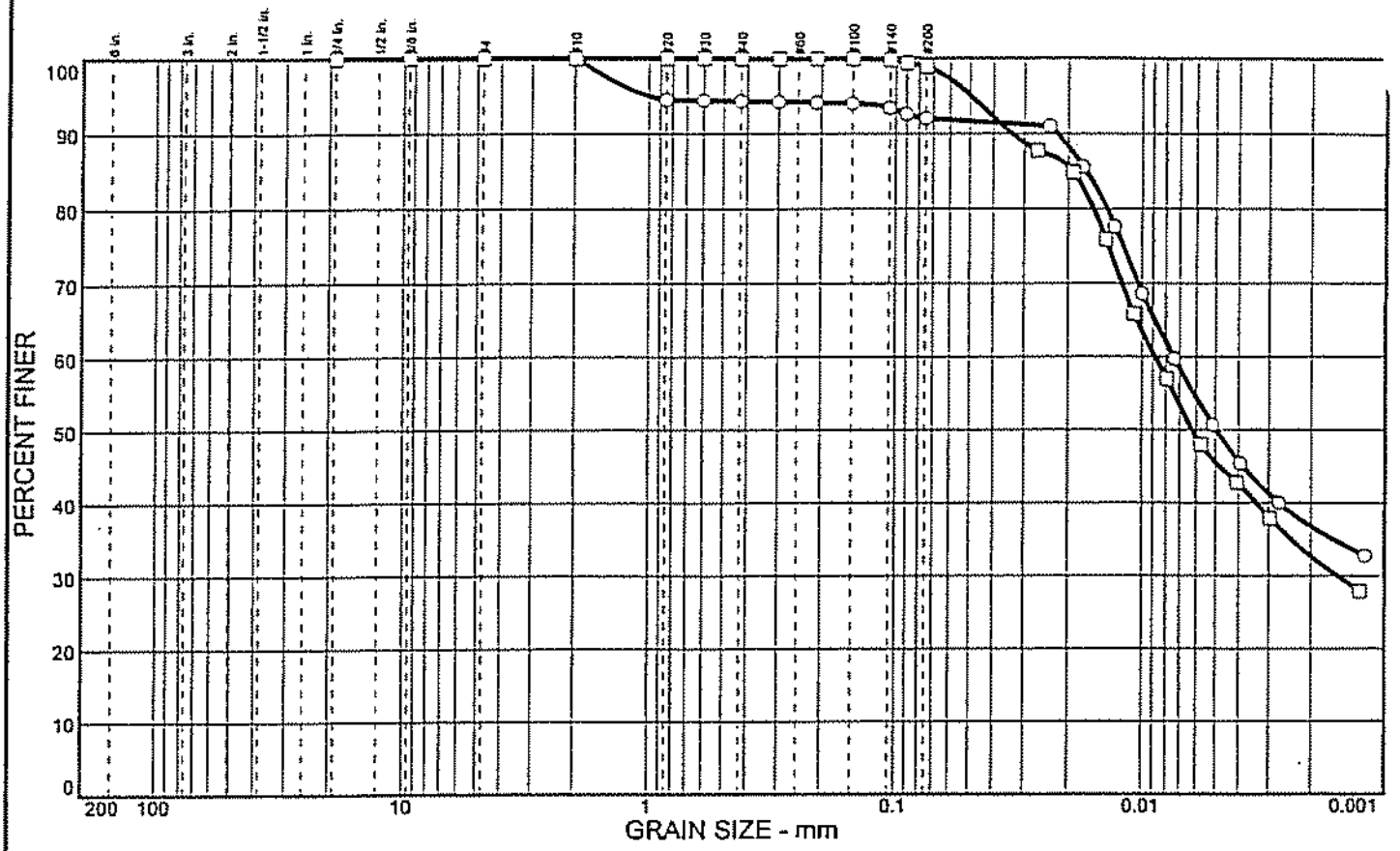
Contract No. DACW-61-98-D-0008 Task Order 27

Project No.: 4276.GE Date/Chk'd by: June 2001/WHS

PARTICLE SIZE DISTRIBUTION REPORT: EEB-52



	% COBBLES	% GRAVEL	% SAND	% SILT	% CLAY	USCS	AASHTO	PL	LL
O			8.0	41.9	50.1	MH		46	74
□			1.1	53.4	45.5	MH		34	54

SIEVE inches size	PERCENT FINER O	PERCENT FINER □
3/4	100.0	100.0
3/8	100.0	100.0
GRAIN SIZE		
D_{60}	0.0074	0.0088
D_{30}		0.0016
D_{10}		
COEFFICIENTS		
C_c		
C_u		

SIEVE number size	PERCENT FINER O	PERCENT FINER □
#4	100.0	100.0
#10	100.0	100.0
#20	94.5	100.0
#30	94.4	100.0
#40	94.3	99.9
#50	94.2	99.9
#70	94.1	99.9
#100	94.0	99.9
#140	93.4	99.8
#170	92.6	99.4
#200	92.0	98.9

SOIL DESCRIPTION

O Dark-gray CLAYEY SILT, trace medium sand, trace fine sand, trace organics.

□ Dark-gray CLAYEY SILT, trace fine sand, trace organics.

REMARKS:

O

□

O Source: EEB-52 Sample No.: ST-4 Elev./Depth: 60.0'-62.0'

□ Source: EEB-52 Sample No.: ST-5 Elev./Depth: 80.0'-82.0'

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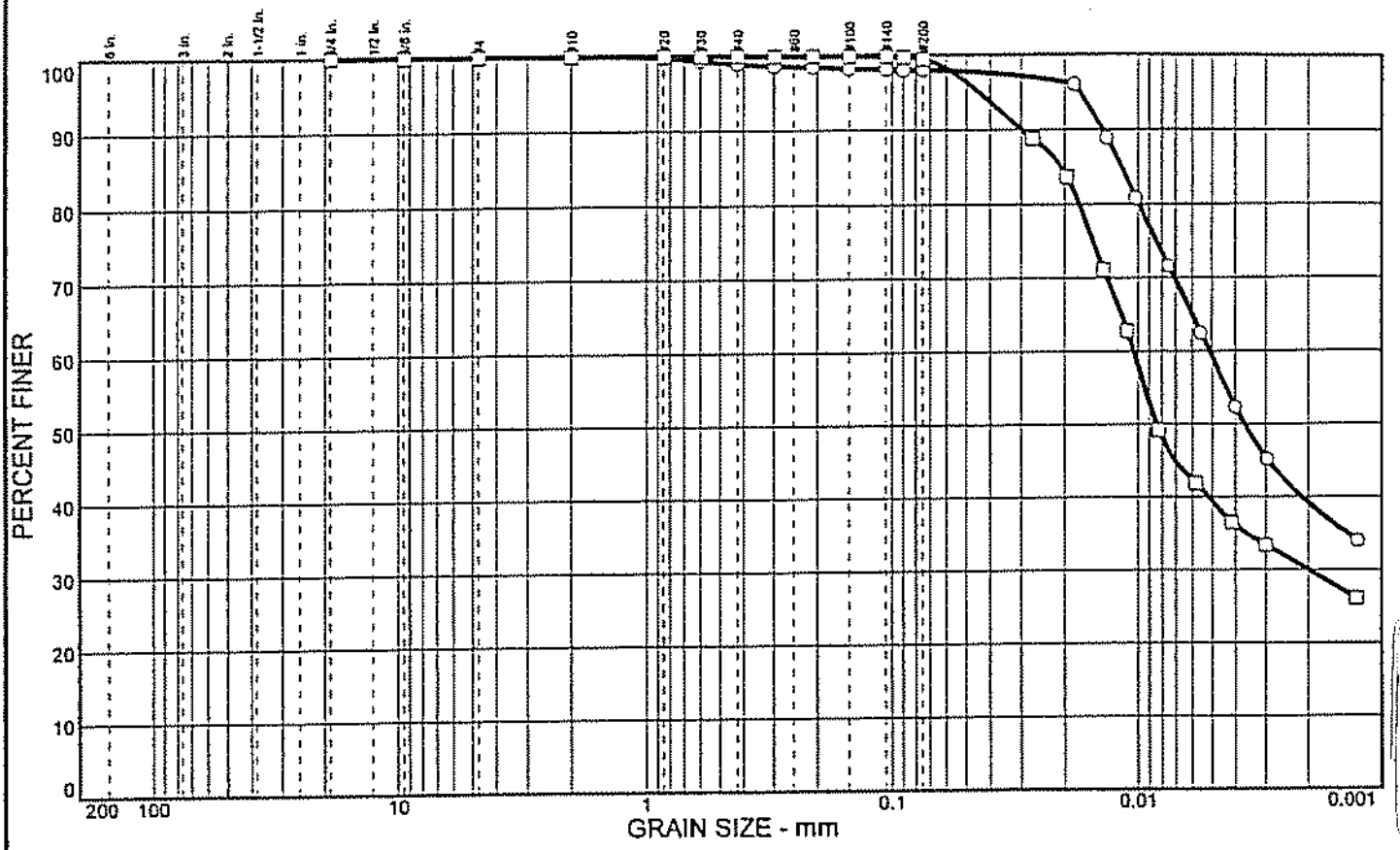

	% COBBLES	% GRAVEL	% SAND	% SILT	% CLAY	USCS	AASHTO	PL	LL
○			2.0	38.7	59.3	MH		40	66
□			0.5	60.1	39.4	MH		32	55

SIEVE inches size	PERCENT FINER ○	PERCENT FINER □
3/4	100.0	100.0
3/8	100.0	100.0
GRAIN SIZE		
D_{60}	0.0051	0.0104
D_{30}		0.0020
D_{10}		
COEFFICIENTS		
C_c		
C_u		

SIEVE number size	PERCENT FINER ○	PERCENT FINER □
#4	100.0	100.0
#10	100.0	100.0
#20	99.7	100.0
#30	99.3	100.0
#40	98.9	99.9
#50	98.6	99.9
#70	98.4	99.9
#100	98.2	99.9
#140	98.1	99.9
#170	98.0	99.8
#200	98.0	99.5

SOIL DESCRIPTION

○ Dark-gray CLAYEY SILT, trace medium sand, trace fine sand, trace organics.

□ Dark-gray CLAYEY SILT, trace fine sand, trace organics.

REMARKS:

○

□

○ Source: EEB-53 Sample No.: ST-5 Elev./Depth: 43.0'-45.0'

□ Source: EEB-53 Sample No.: ST-6 Elev./Depth: 63.0'-65.0'

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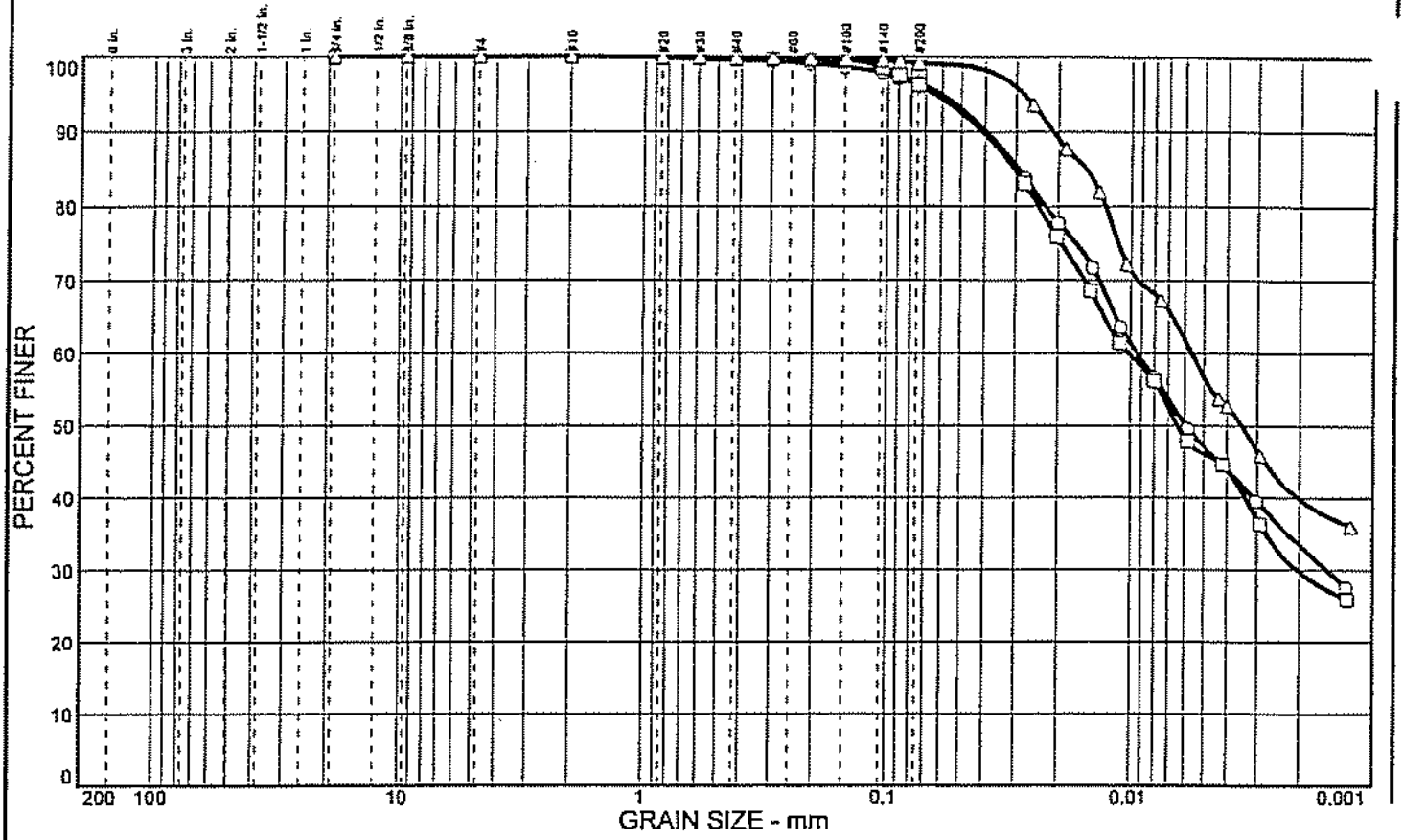
PARTICLE SIZE DISTRIBUTION REPORT: EEB-53



	% COBBLES	% GRAVEL	% SAND	% SILT	% CLAY	USCS	AASHTO	PL	LL
○			3.6	49.3	47.1	MH		38	67
□			3.7	50.1	46.2	MH		37	59
△			0.8	42.5	56.7	MH		34	58

SIEVE inches size	PERCENT FINER ○	□	△
3/4	100.0	100.0	100.0
3/8	100.0	100.0	100.0
GRAIN SIZE			
D_{60}	0.0094	0.0102	0.0056
D_{30}	0.0015	0.0020	
D_{10}			
COEFFICIENTS			
C_C			
C_U			

SIEVE number size	PERCENT FINER ○	□	△
#4	100.0	100.0	100.0
#10	100.0	100.0	100.0
#20	99.9	99.9	100.0
#30	99.7	99.8	100.0
#40	99.6	99.8	99.9
#50	99.4	99.7	99.9
#70	99.1	99.6	99.8
#100	98.6	99.5	99.7
#140	97.9	98.6	99.6
#170	97.2	97.6	99.4
#200	96.4	96.3	99.2

SOIL DESCRIPTION

○ Dark-gray CLAYEY SILT, trace fine sand, trace organics.

□ Dark-gray CLAYEY SILT, trace fine sand.

△ Dark-gray CLAYEY SILT, trace fine sand.

REMARKS:

○

□

△

○ Source: EEB-53 Sample No.: ST-1 Elev./Depth: 9.0'-11.0'

□ Source: EEB-53 Sample No.: ST-3 Elev./Depth: 25.0'-27.0'

△ Source: EEB-53 Sample No.: ST-4 Elev./Depth: 33.0'-35.0'

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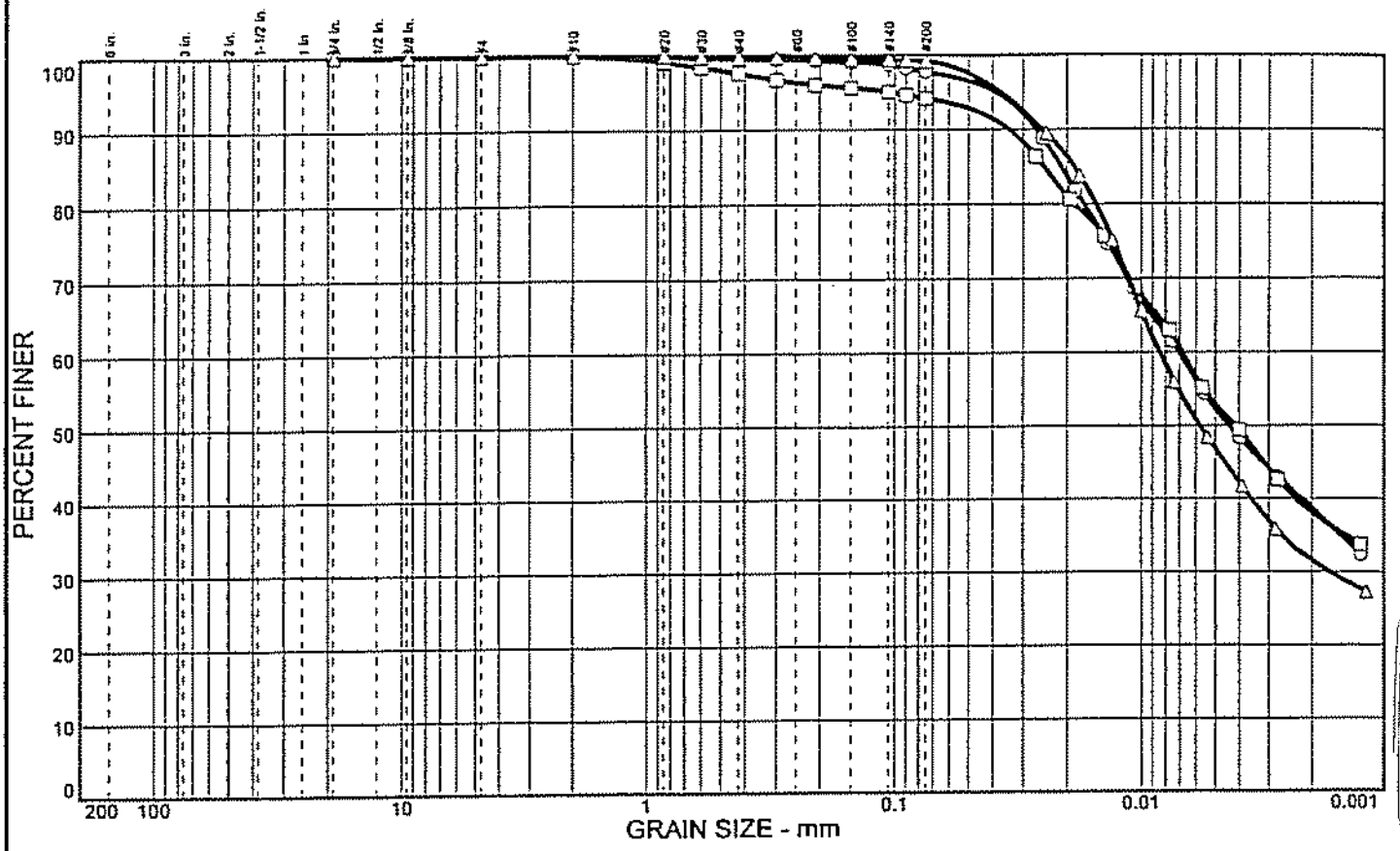
Project No.: 4276.GE Date/Chk'd by: June 2001/WHS

PARTICLE SIZE DISTRIBUTION REPORT: EEB-54



	% COBBLES	% GRAVEL	% SAND	% SILT	% CLAY	USCS	AASHTO	PL	LL
○			2.2	45.5	52.3	MH		42	73
□			5.8	41.4	52.8	MH		41	71
△			0.8	52.4	46.8	MH		30	52

SIEVE inches size	PERCENT FINER ○	□	△
3/4	100.0	100.0	100.0
3/8	100.0	100.0	100.0
GRAIN SIZE			
D_{60}	0.0071	0.0068	0.0085
D_{30}			0.0017
D_{10}			
COEFFICIENTS			
C_c			
C_u			

SIEVE number size	PERCENT FINER ○	□	△
#4	100.0	100.0	100.0
#10	100.0	100.0	100.0
#20	99.8	99.2	99.9
#30	99.7	98.4	99.8
#40	99.6	97.6	99.7
#50	99.4	96.7	99.7
#70	99.3	96.1	99.6
#100	99.1	95.7	99.5
#140	98.7	95.1	99.4
#170	98.3	94.7	99.3
#200	97.8	94.2	99.2

SOIL DESCRIPTION

○ Dark-gray CLAYEY SILT, trace fine sand, trace medium sand, trace organics.

□ Dark-gray CLAYEY SILT, trace fine sand, trace medium sand, trace organics.

△ Dary-gray CLAYEY SILT, trace fine sand, trace organics.

REMARKS:

○

□

△

○ Source: EEB-54 Sample No.: ST-1 Elev./Depth: 7.0'-9.0'

□ Source: EEB-54 Sample No.: ST-2 Elev./Depth: 24.0'-26.0'

△ Source: EEB-54 Sample No.: ST-3 Elev./Depth: 44.0'-46.0'

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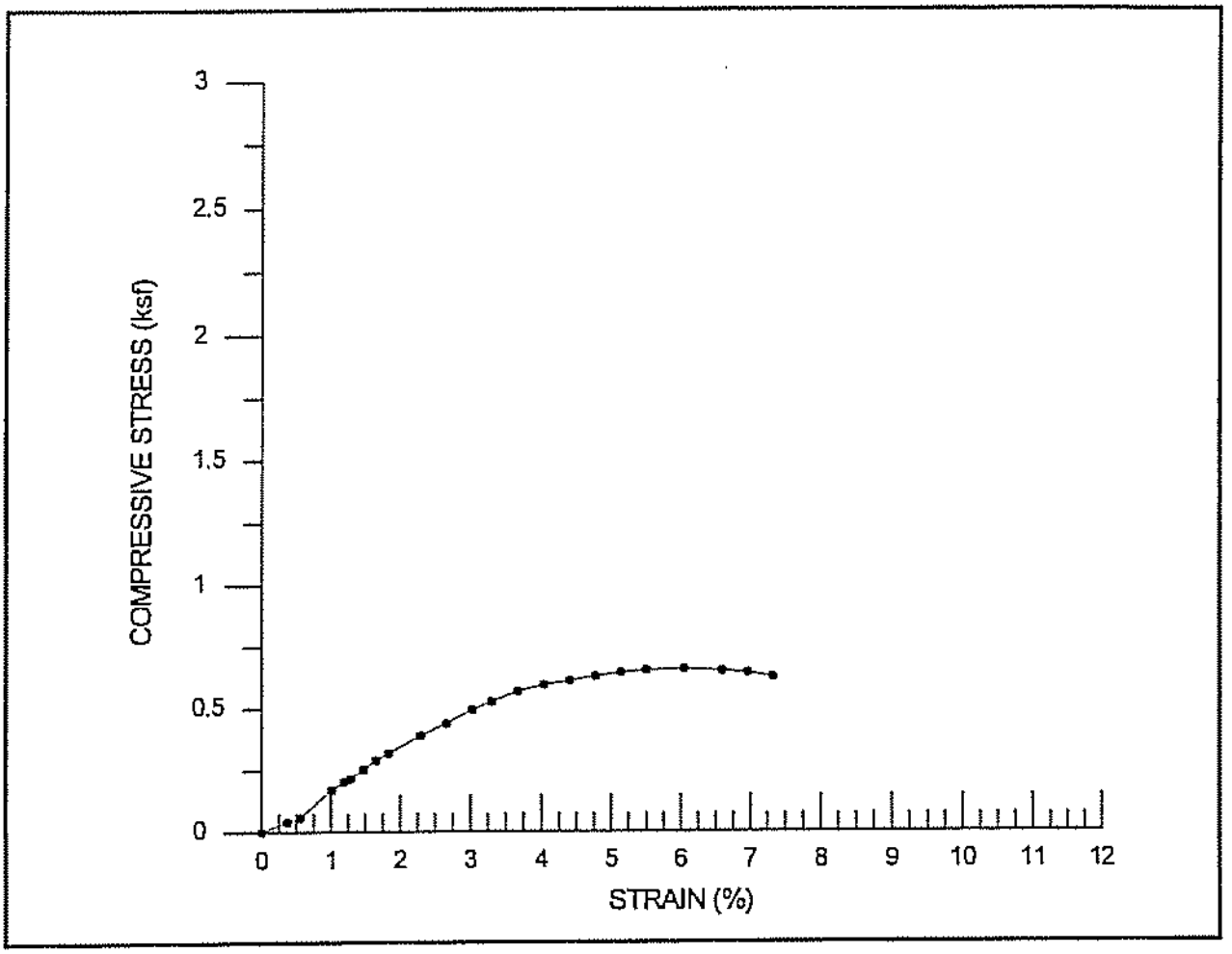
UNCONFINED COMPRESSIVE STRENGTH (ASTM D2166)



Unconfined Compressive Strength: 0.66 ksf
Cohesion: 0.33 ksf

Initial Height (in.): 5.46
Initial Diameter (in.): 2.80
Rate of Strain (%/min.): 0.5

Failure Sketch:

Remarks:

Sample Identification: EEB-50: ST-1 (10.0'-12.0')

Sample Description: Dark-gray/black CLAYEY SILT, trace fine sand, trace medium sand, trace organics.
Moisture Content (%): 55.8
% Passing No. 200 Sieve: 94.8
Dry Unit Weight (PCF): 60.6
Liquid Limit 71
Plastic Limit 42
Plasticity Index 29
USCS Class: MH

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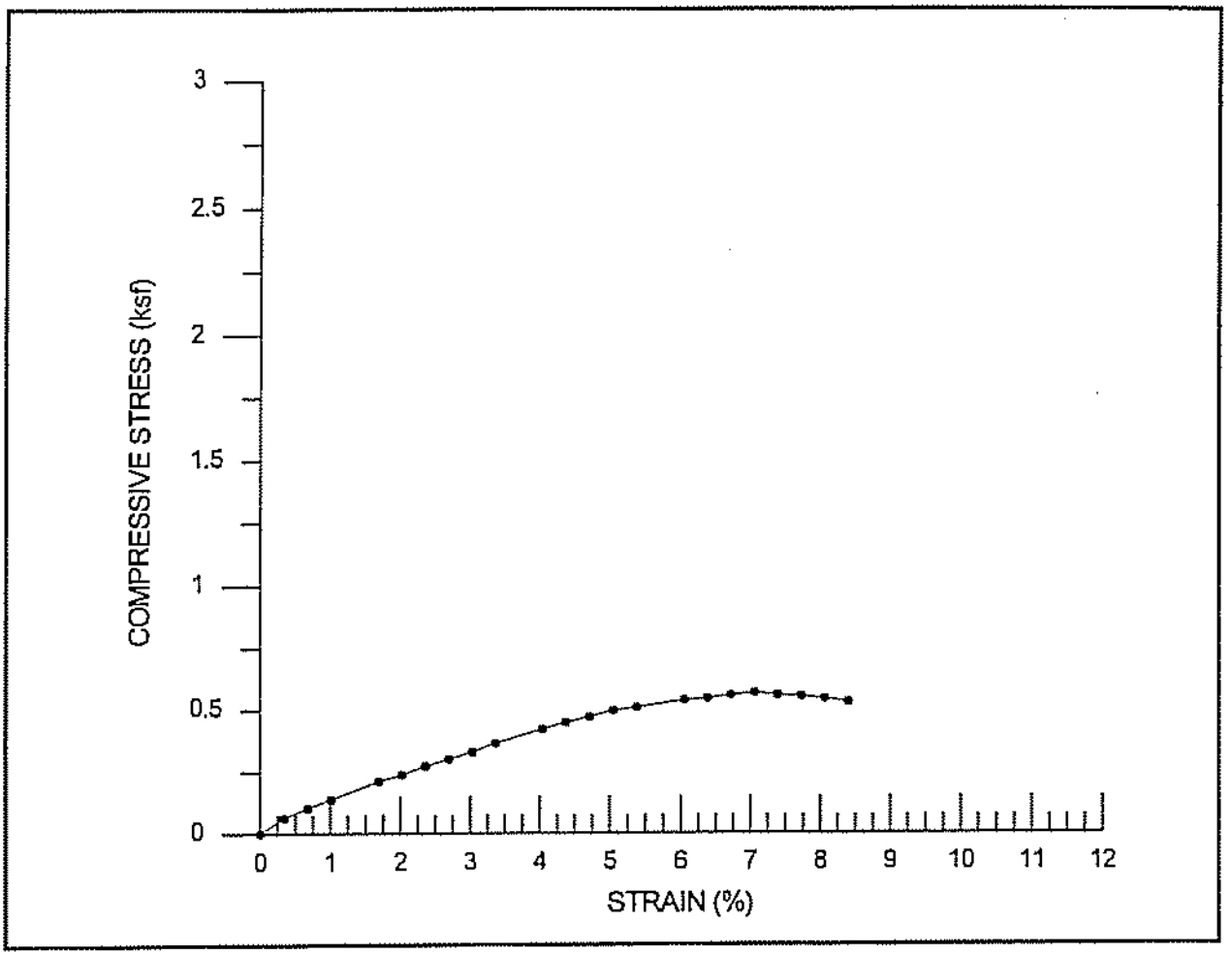
UNCONFINED COMPRESSIVE STRENGTH (ASTM D2166)



Unconfined Compressive Strength: 0.57 ksf
Cohesion: 0.28 ksf

Initial Height (in.): 5.95
Initial Diameter (in.): 2.87
Rate of Strain (%/min.): 1.0

Failure Sketch:

Sample Identification: EEB-50: ST-2 (24.0'-26.0')

Sample Description: Dark-gray/black CLAYEY SILT, trace fine sand, trace organics.
Moisture Content (%): 77.6
% Passing No. 200 Sieve: 97.8
Dry Unit Weight (PCF): 51.8
Liquid Limit: 70
Plastic Limit: 42
Plasticity Index: 28
USCS Class: MH

Remarks:

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Project No. : 4276.GE

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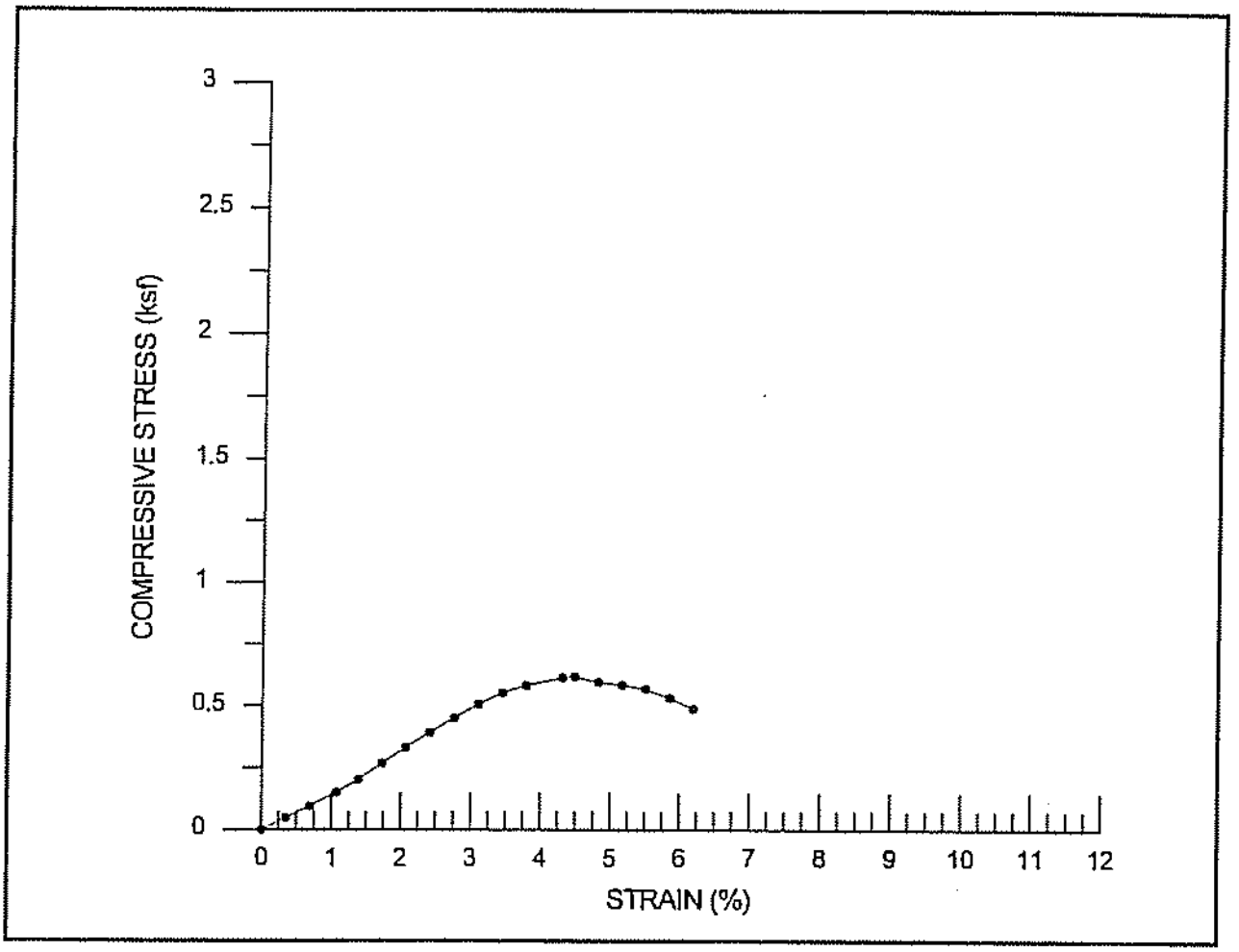
UNCONFINED COMPRESSIVE STRENGTH (ASTM D2166)



Unconfined Compressive Strength: 0.62 ksf
Cohesion: 0.31 ksf

Initial Height (in.): 5.81
Initial Diameter (in.): 2.87
Rate of Strain (%/min.): 1.0

Failure Sketch:

Sample Identification: EEB-50: ST-5 (44.0'-46.0')

Sample Description: Dark-gray SILT, some clay, little fine sand, trace medium sand.
Moisture Content (%): 39.8
% Passing No. 200 Sieve: 80.9
Dry Unit Weight (PCF): 78.5
Liquid Limit: 41
Plastic Limit: 25
Plasticity Index: 16
USCS Class: ML

Remarks:

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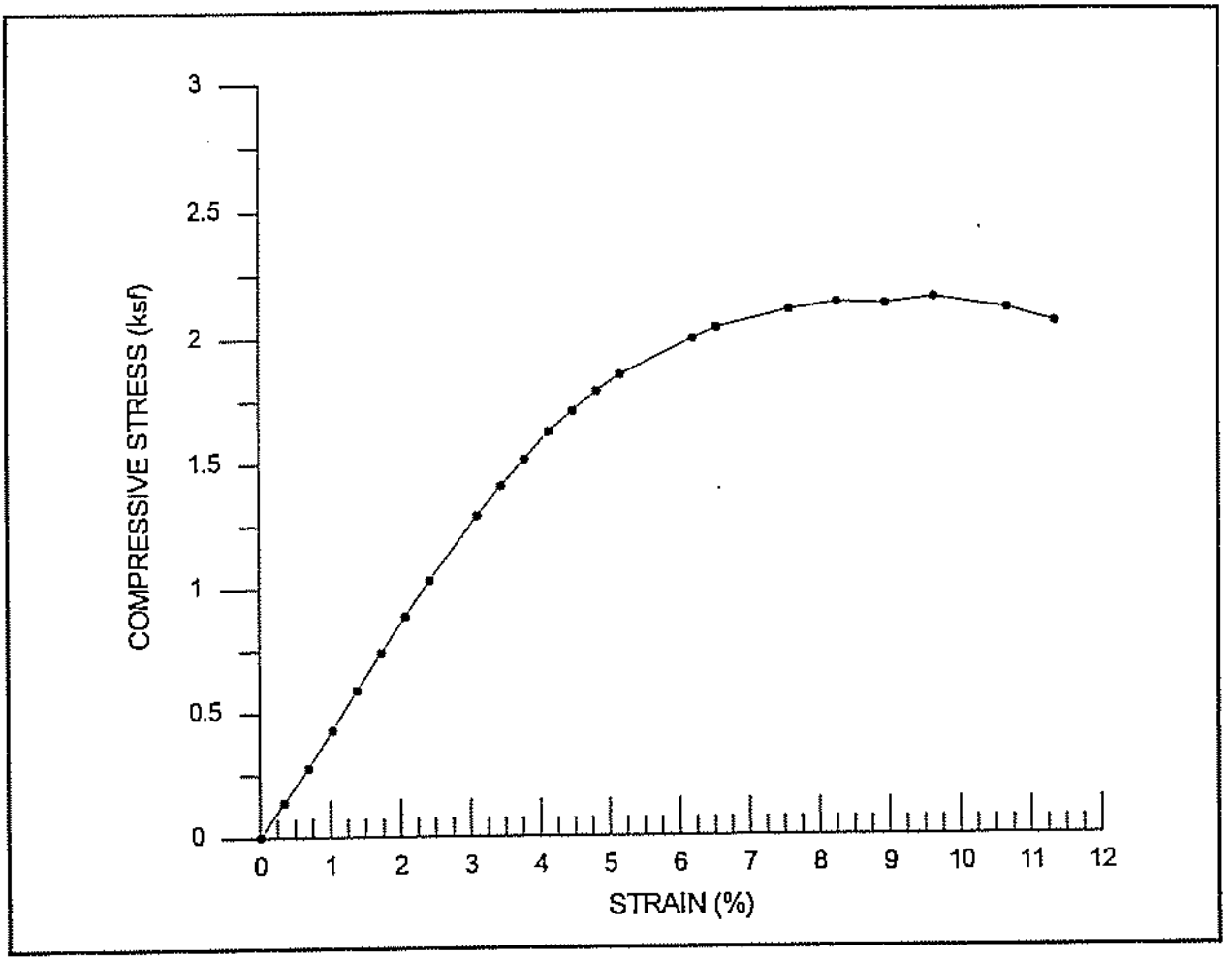
UNCONFINED COMPRESSIVE STRENGTH (ASTM D2166)



Unconfined Compressive Strength: 2.16 ksf
Cohesion: 1.08 ksf

Initial Height (in.): 5.82
Initial Diameter (in.): 2.87
Rate of Strain (%/min.): 1.0

Failure Sketch:

Sample Identification: EEB-50: ST-6 (54.0'-56.0')

Sample Description: Dark-gray/brown CLAYEY SILT, trace fine sand, trace medium sand, trace organics.
Moisture Content (%): 93.5
% Passing No. 200 Sieve: 92.8
Dry Unit Weight (PCF): 45.0
Liquid Limit: 97
Plastic Limit: 66
Plasticity Index: 31
USCS Class: MH

Remarks:

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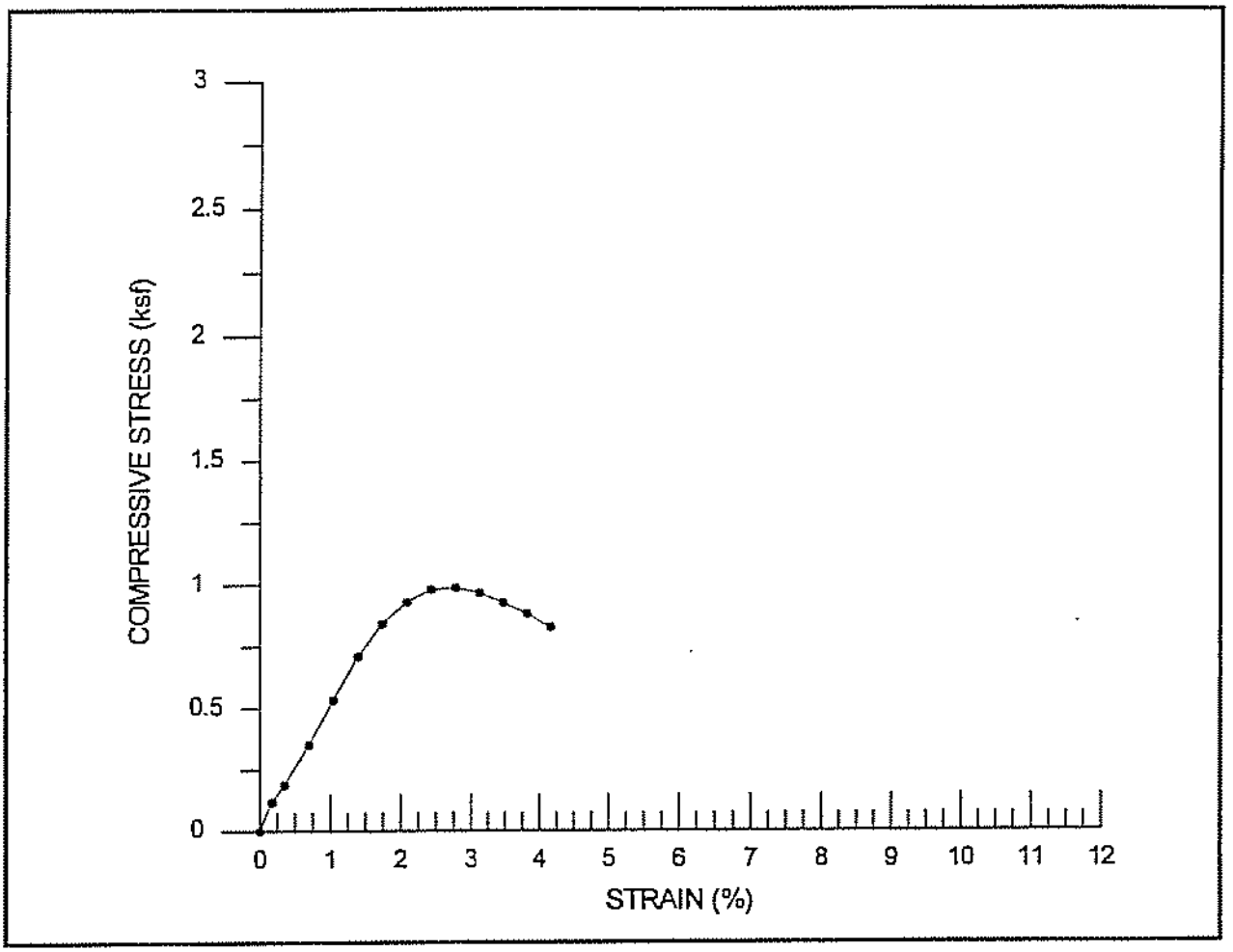
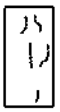
UNCONFINED COMPRESSIVE STRENGTH (ASTM: D2166)



Unconfined Compressive Strength: 0.99 ksf
Cohesion: 0.49 ksf

Initial Height (in.): 5.77
Initial Diameter (in.): 2.87
Rate of Strain (%/min.): 1.0

Failure Sketch:



Sample Identification: EEB-51: ST-2 (12.0'-14.0')

Sample Description: Dark-gray CLAYEY SILT, trace medium sand, trace fine sand, trace organics.
Moisture Content (%): 59.5
% Passing No. 200 Sieve: 97.0
Dry Unit Weight (PCF): 63.5
Liquid Limit: 62
Plastic Limit: 38
Plasticity Index: 24
USCS Class: MH

Remarks:

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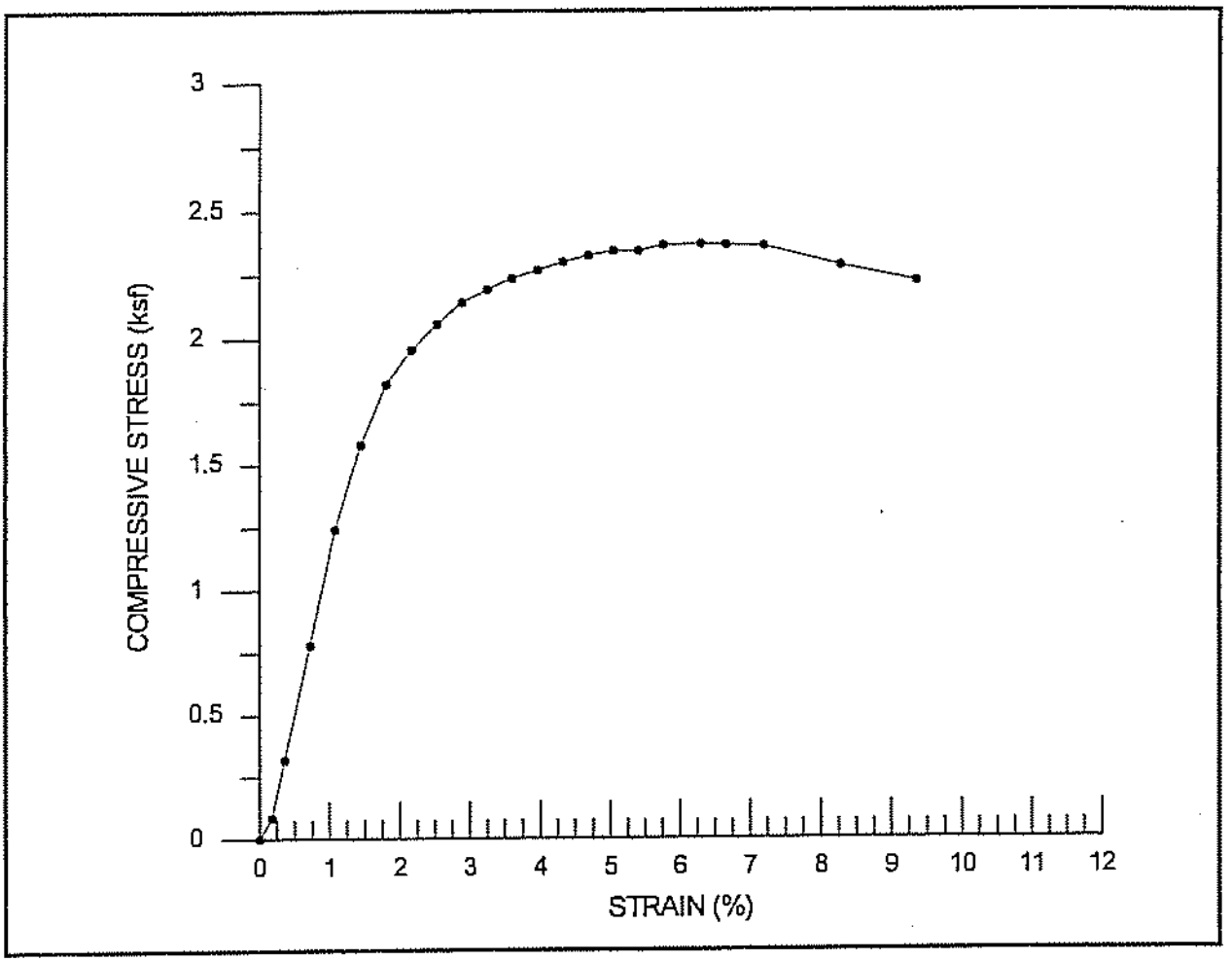
UNCONFINED COMPRESSIVE STRENGTH (ASTM D2166)



Unconfined Compressive Strength: 2.37 ksf
Cohesion: 1.18 ksf

Initial Height (in.): 5.56
Initial Diameter (in.): 2.8
Rate of Strain (%/min.): 1.0

Failure Sketch:

Sample Identification: EEB-51: ST-3 (32.0'-34.0')

Sample Description: Dark-gray CLAYEY SILT, trace fine sand.
Moisture Content (%): 56.8
% Passing No. 200 Sieve: 96.6
Dry Unit Weight (PCF): 64.9
Liquid Limit: 62
Plastic Limit: 41
Plasticity Index: 21
USCS Class: MH

Remarks:

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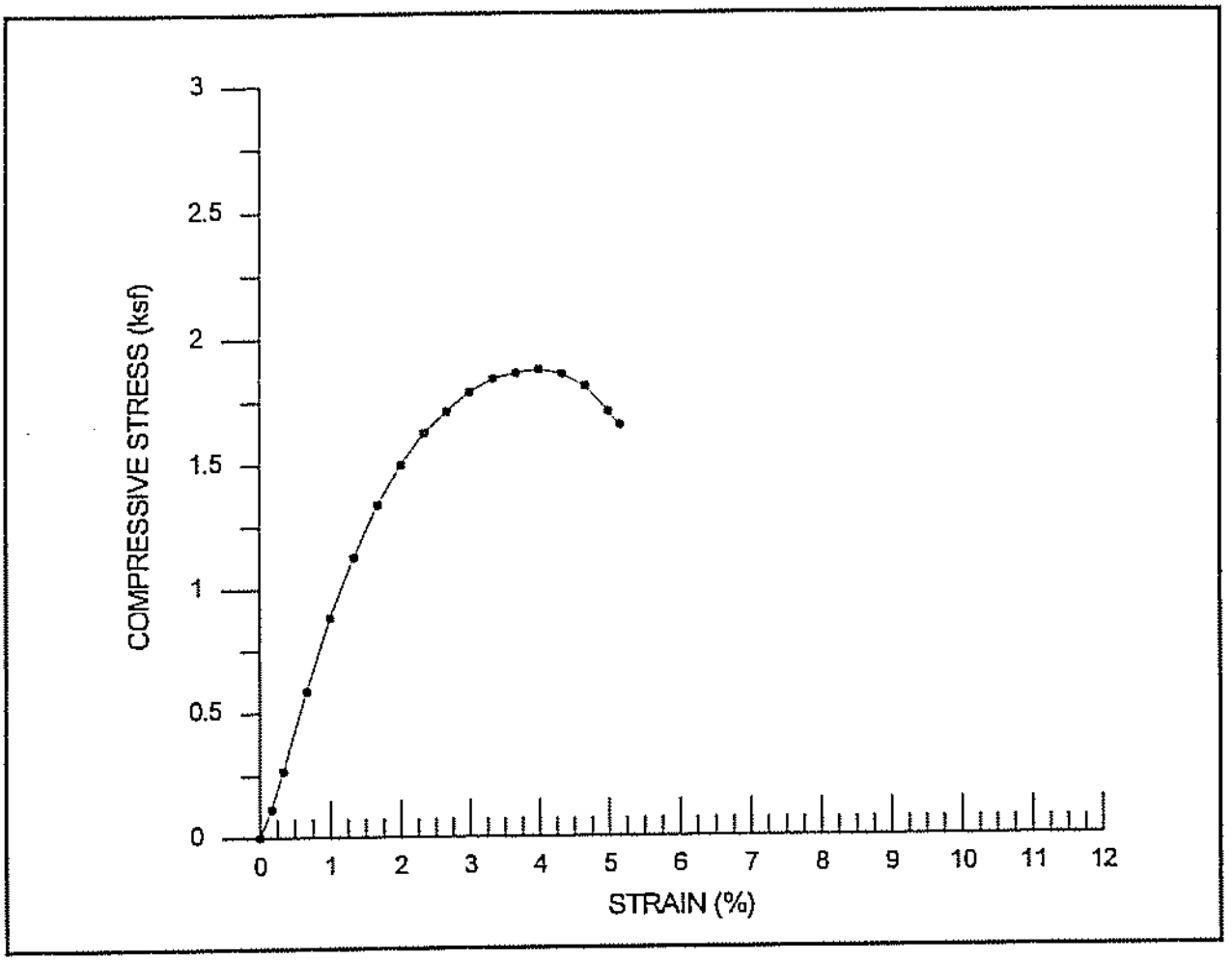
UNCONFINED COMPRESSIVE STRENGTH (ASTM D2166)



Unconfined Compressive Strength: 1.88 ksf
Cohesion: 0.94 ksf

Initial Height (in.): 6.02
Initial Diameter (in.): 2.87
Rate of Strain (%/min.): 1.0

Failure Sketch:

Sample Identification: EEB-52: ST-3 (46.0'-48.0')

Sample Description: Dark-gray/brown CLAYEY SILT, trace fine sand.
Moisture Content (%): 74.4
% Passing No. 200 Sieve: 98.0
Dry Unit Weight (PCF): 53.7
Liquid Limit: 72
Plastic Limit: 44
Plasticity Index: 28
USCU Class: MH

Remarks:

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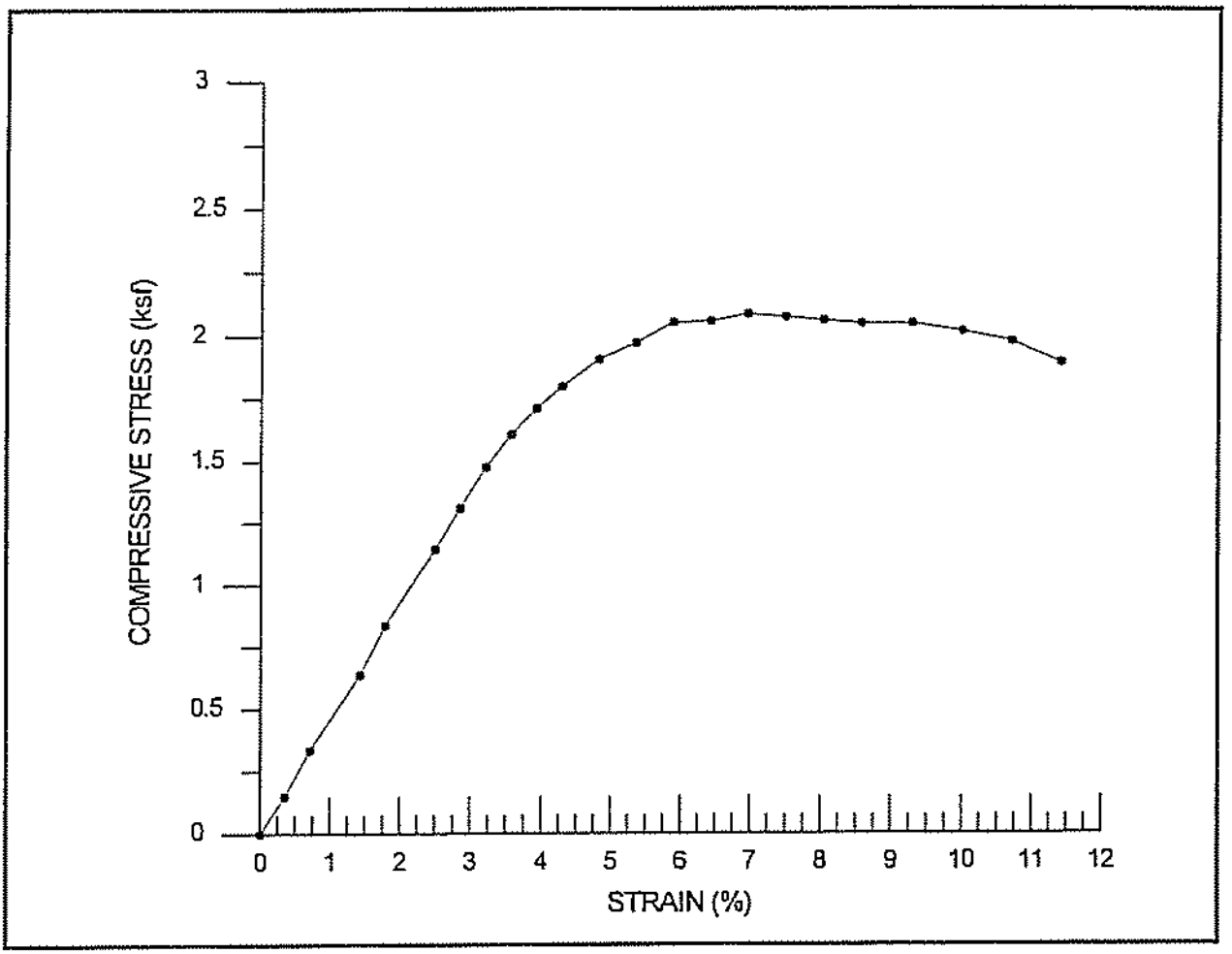
UNCONFINED COMPRESSIVE STRENGTH (ASTM D2166)



Unconfined Compressive Strength: 2.09 ksf
Cohesion: 1.04 ksf

Initial Height (in.): 2.80
Initial Diameter (in.): 1.44
Rate of Strain (%/min.): 1.0

Failure Skelch:

Sample Identification: EEB-52: ST-4 (60.0'-62.0')

Sample Description: Dark-gray CLAYEY SILT, trace medium sand, trace fine sand, trace organics.
Moisture Content (%): 57.5
% Passing No. 200 Sieve: 92.0
Dry Unit Weight (PCF): 64.8
Liquid Limit: 74
Plastic Limit: 46
Plasticity Index: 28
USCS Class: MH

Remarks:

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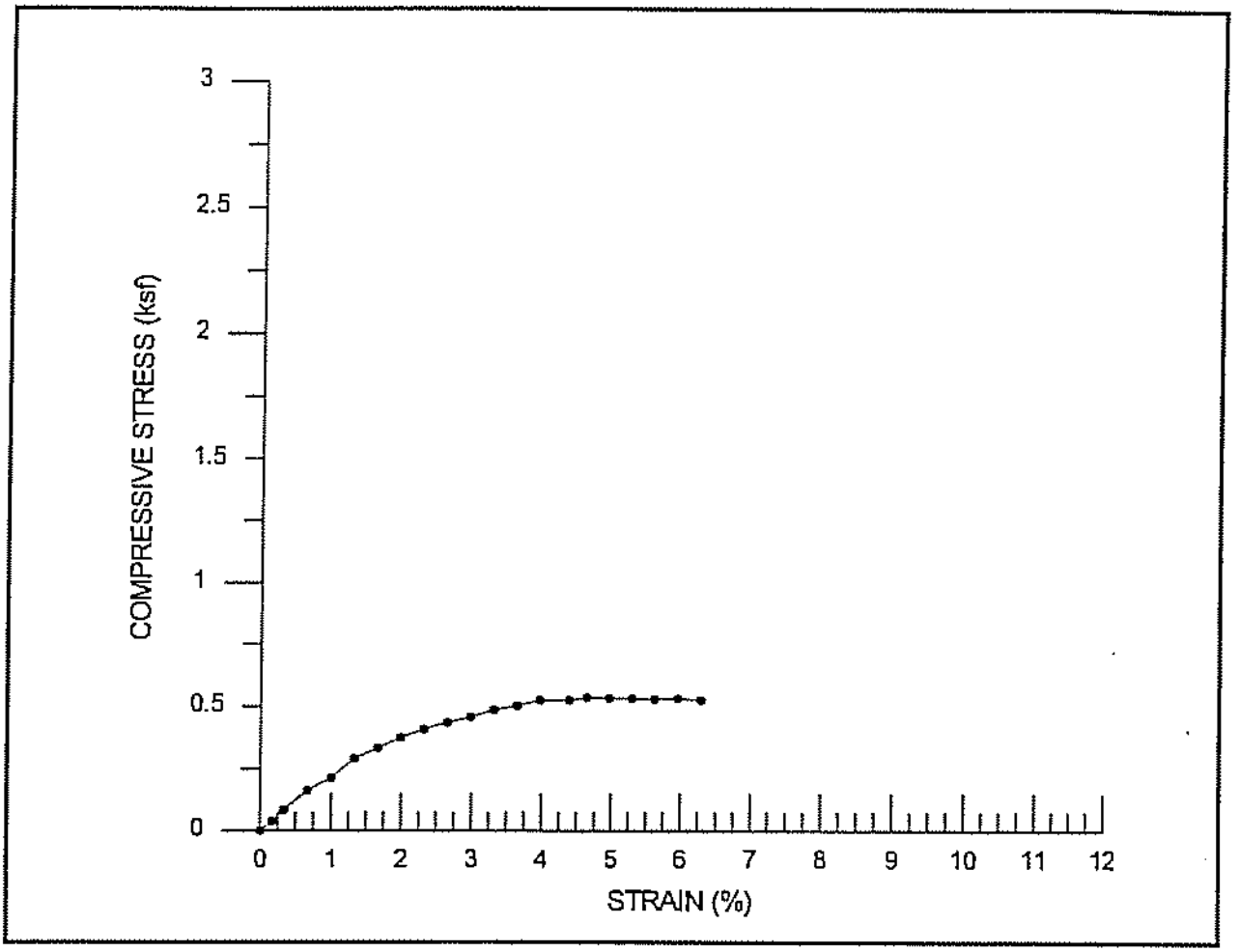
UNCONFINED COMPRESSIVE STRENGTH (ASTM D2166)



Unconfined Compressive Strength: 0.54 ksf
Cohesion: 0.27 ksf

Initial Height (in.): 6.04
Initial Diameter (in.): 2.87
Rate of Strain (%/min.): 1.0

Failure Sketch:

Sample Identification: EEB-53: ST-1 (9.0'-11.0')

Sample Description: Dark-gray CLAYEY SILT, trace fine sand, trace organics.
Moisture Content (%): 59.9
% Passing No. 200 Sieve: 96.4
Dry Unit Weight (PCF): 61.5
Liquid Limit: 67
Plastic Limit: 38
Plasticity Index: 29
USCS Class: MH

Remarks:

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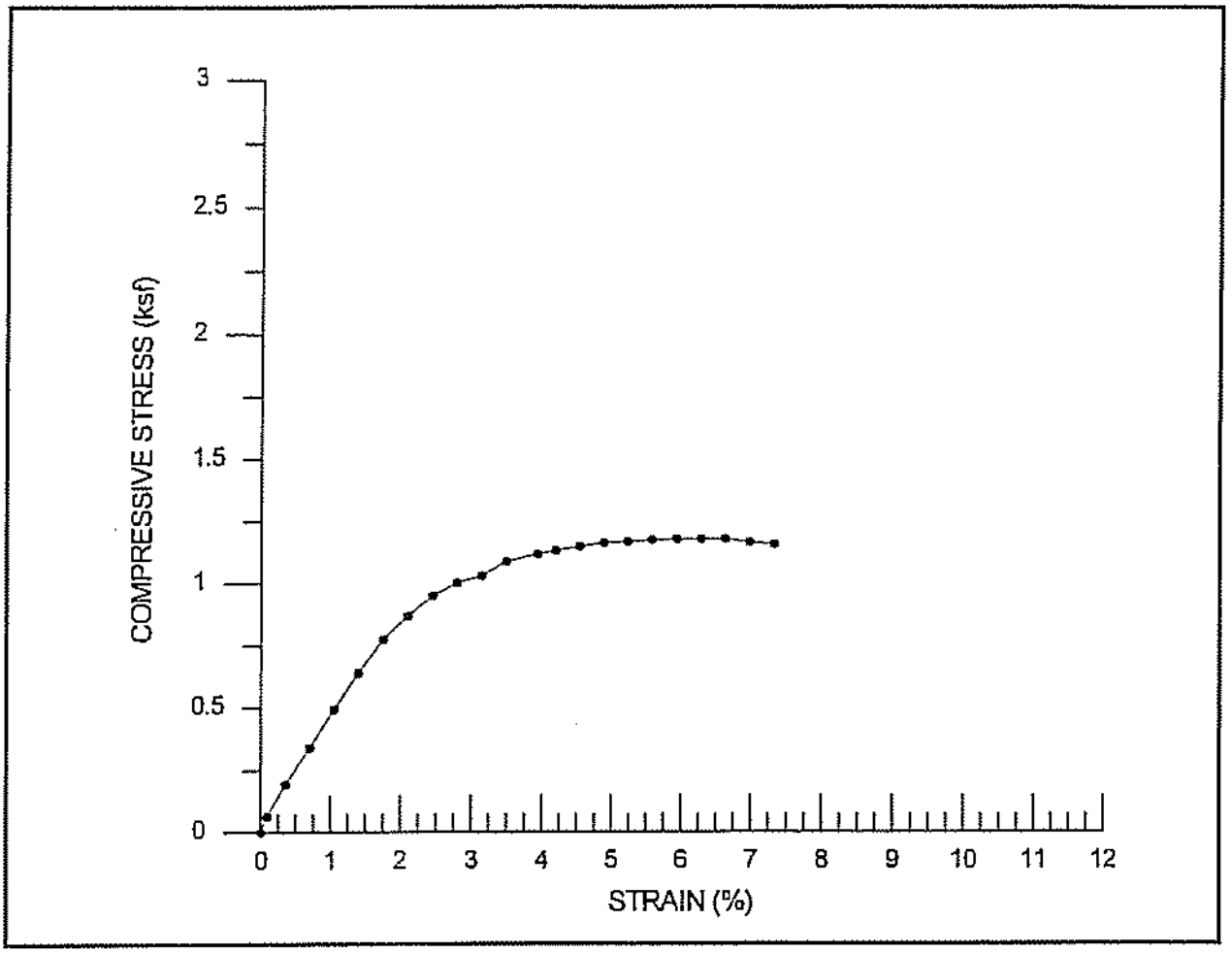
UNCONFINED COMPRESSIVE STRENGTH (ASTM D2166)



Unconfined Compressive Strength: 1.18 ksf
Cohesion: 0.59 ksf

Initial Height (in.): 5.73
Initial Diameter (in.): 2.87
Rate of Strain (%/min.): 1.0

Failure Sketch:

Sample Identification: EEB-54: ST-2 (24.0'-26.0')

Sample Description: Dark-gray CLAYEY SILT, trace fine sand, trace medium sand, trace organics.
Moisture Content (%): 70.8
% Passing No. 200 Sieve: 94.2
Dry Unit Weight (PCF): 54.3
Liquid Limit: 71
Plastic Limit: 41
Plasticity Index: 30
USCS Class: MH

Remarks:

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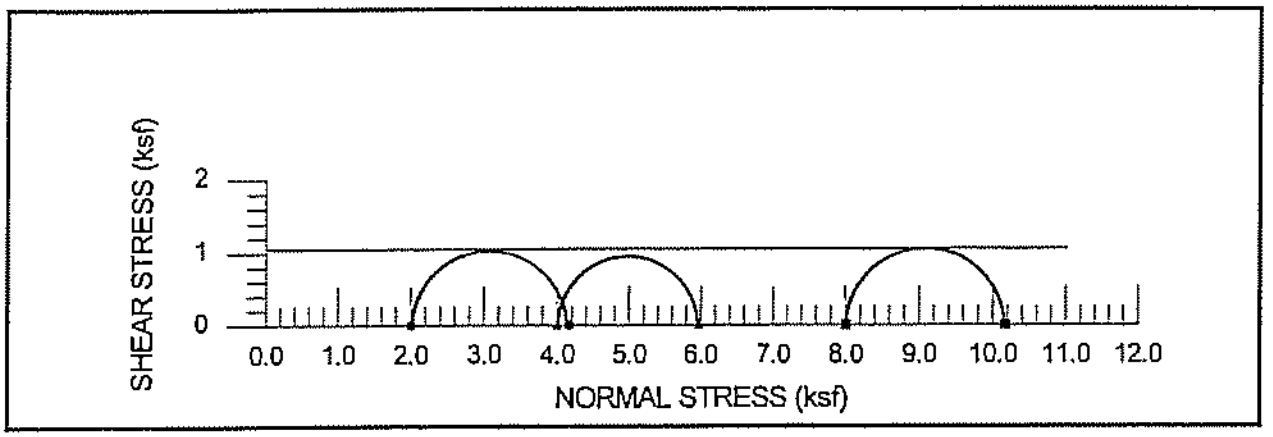
Client: U.S. Army Corps of Engineers

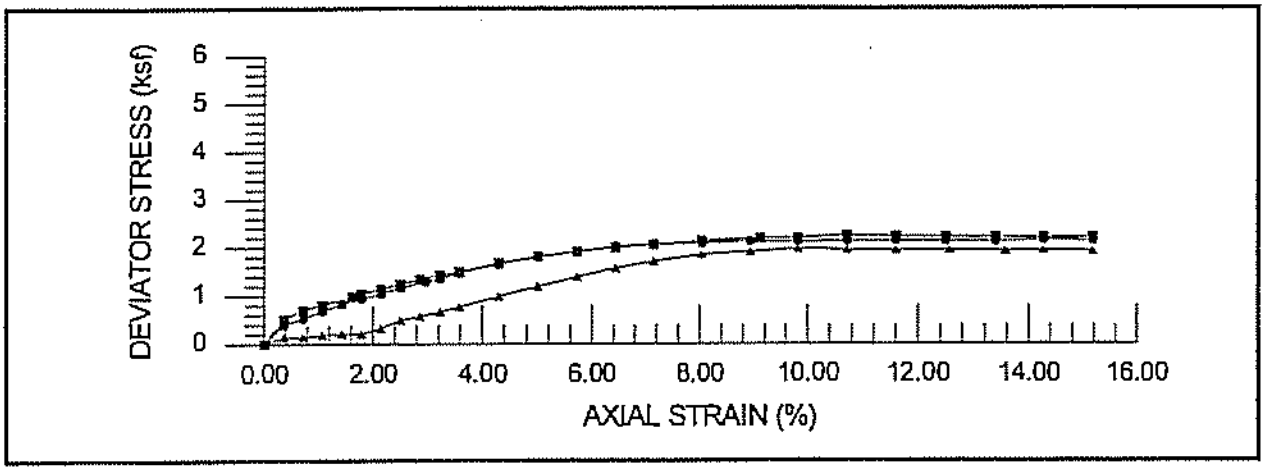
Project: Wilmington Harbor North Dredged Material CDF Subsurface Investigation
Contract No. DACW-61-98-D-0008 Task Order 27

Project No.: 4276.GE

Date/Chk'd by: June 2001/WHS

UNCONSOLIDATED-UNDRAINED TRIAXIAL COMPRESSION "Q" TEST, (ASTM D2850)





c = 1.06 (ksf avg.)

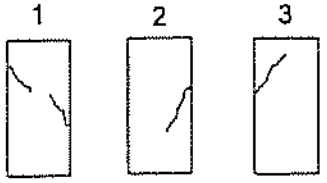
Sample Identification: EEB-50: ST-6 (54.0' - 56.0')

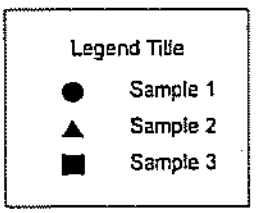
Sample Description: Dark-gray/brown CLAYEY SILT, trace fine sand, trace medium sand, trace organics.

Minor Prin. Stress (ksf) :	2.00	4.00	8.00
Max. Deviator Stress (ksf):	2.16	1.97	2.25
Initial Height (in.):	2.80	2.80	2.80
Initial Diameter (in.):	1.40	1.40	1.40
Saturation:	96.0%	95.0%	95.0%

Initial Moisture Content (%): 93.5
% Passing No. 200 Sieve: 92.8
Dry Unit Weight (PCF): 47.7 (test 1), 43.4 (test 2), 43.8 (test 3)
Liquid Limit: 97
Plastic Limit: 66
Plastic Index: 31
USCS Class: MH

Failure Sketch:





Remarks: Initial moisture content is average of all values from Shelby Tube.

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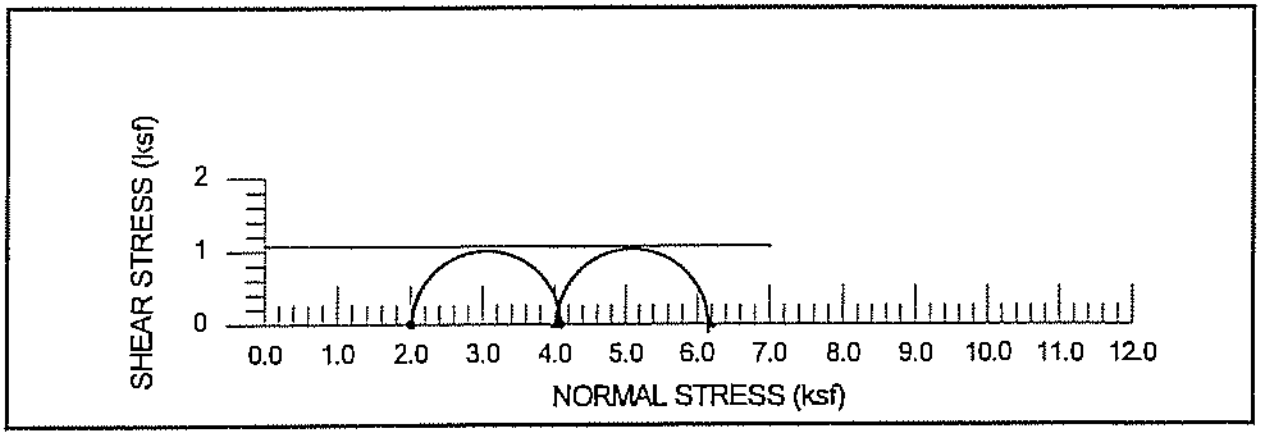
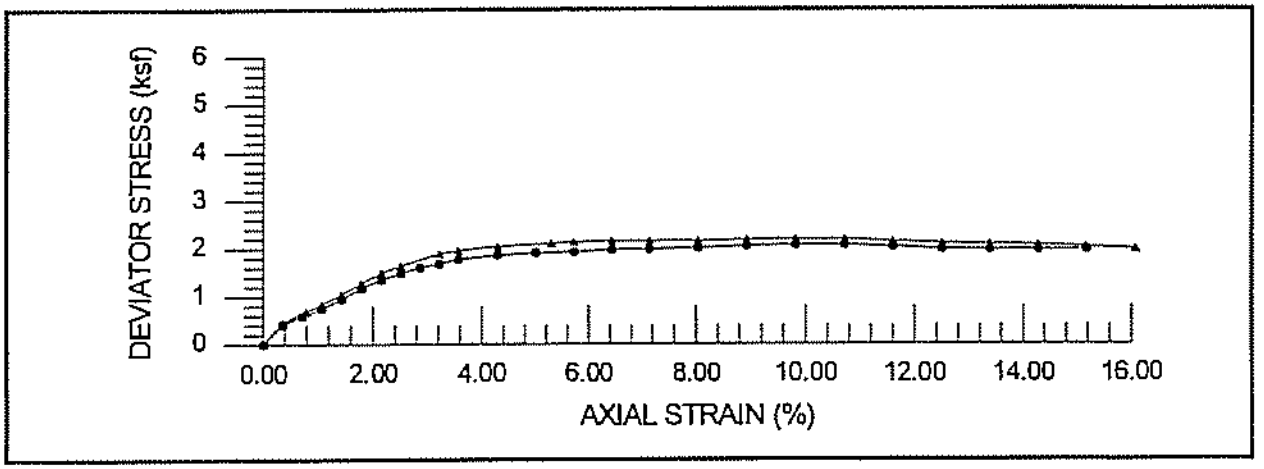
Project: Wilmington Harbor North Dredged Material CDF Subsurface Investigation
Contract No. DACW-61-98-D-0008 Task Order 27

Project No.: 4276.GE

Date/Chk'd by: June 2001/JFC

UNCONSOLIDATED-UNDRAINED TRIAXIAL COMPRESSION "Q" TEST, (ASTM D2850)





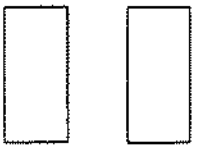
c = 1.07 (ksf avg.)

Sample Identification: EEB-51: ST-3 (32.0' - 34.0')

Sample Description: Dark-gray CLAYEY SILT, trace fine sand.
Initial Moisture Content (%): 47.9
% Passing No. 200 Sieve: 94.9
Dry Unit Weight (PCF): 68.9 (test 1), 63.4 (test 2)
Liquid Limit: 62
Plastic Limit: 41
Plastic Index: 21
USCS Class: MH

Minor Prin. Stress (ksf) :	2.00	4.00
Max. Deviator Stress (ksf):	2.08	2.19
Initial Height (in.):	2.80	2.80
Initial Diameter (in.):	1.40	1.40
Saturation:	99.0%	97.0%
	2	3

Failure Sketch:
no distinct failure
both samples



Legend
● Sample 1
▲ Sample 2

Remarks: Initial moisture content is average of all values from Shelby Tube.

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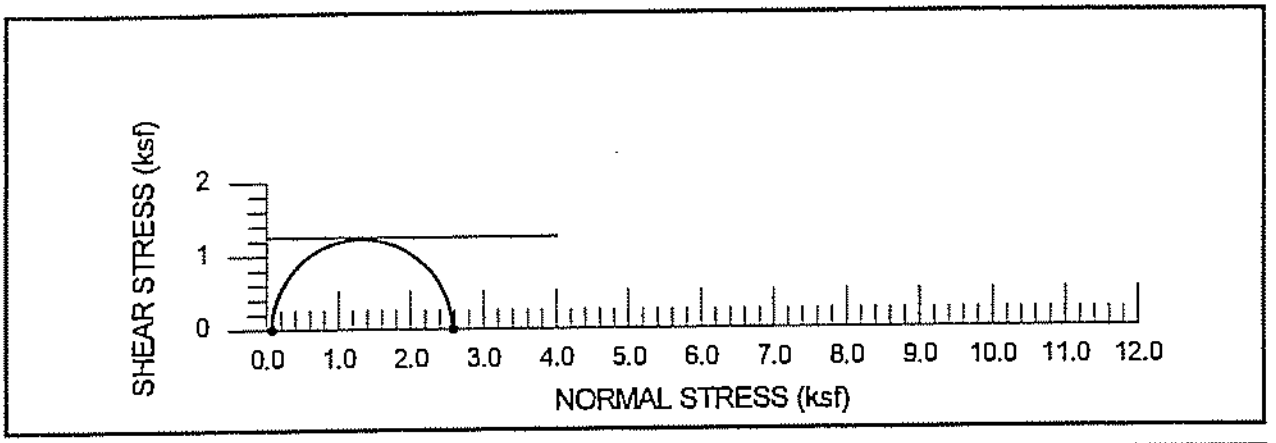
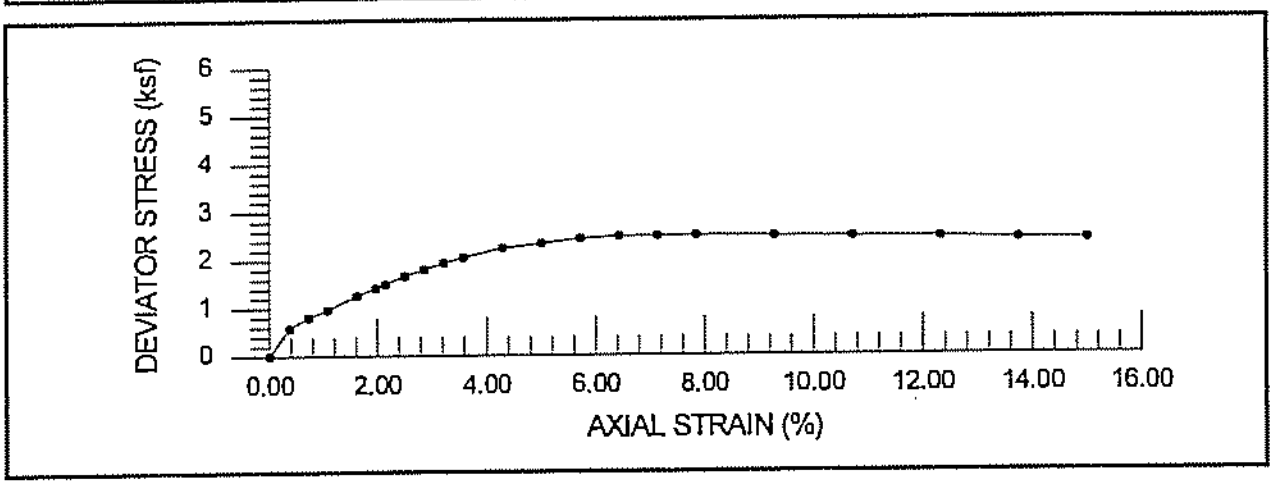
Contract No. DACW-61-98-D-0008 Task Order 27

Project No.: 4276.GE

Date/Chk'd by: June 2001/JFC

UNCONSOLIDATED-UNDRAINED TRIAXIAL COMPRESSION "Q" TEST, (ASTM D2850)





c = 1.26 ksf

Minor Prin. Stress (ksf): 0.07
Max. Deviator Stress (ksf): 2.51

Initial Height (in.): 2.80
Initial Diameter (in.): 1.40
Saturation: 97.0%

Failure Sketch:

No distinct failure plane

Sample Identification: EEB-51: ST-4 (56.0'-58.0')

Sample Description: Dark-gray SILT, some clay, trace fine sand
Initial Moisture Content (%): 47.9
% Passing No. 200 Sieve: 94.9
Dry Unit Weight (PCF): 69.0
Liquid Limit: 48
Plastic Limit: 30
Plastic Index: 18
USCS Class: ML

Remarks: Initial moisture content is average of all values from Shelby Tube.

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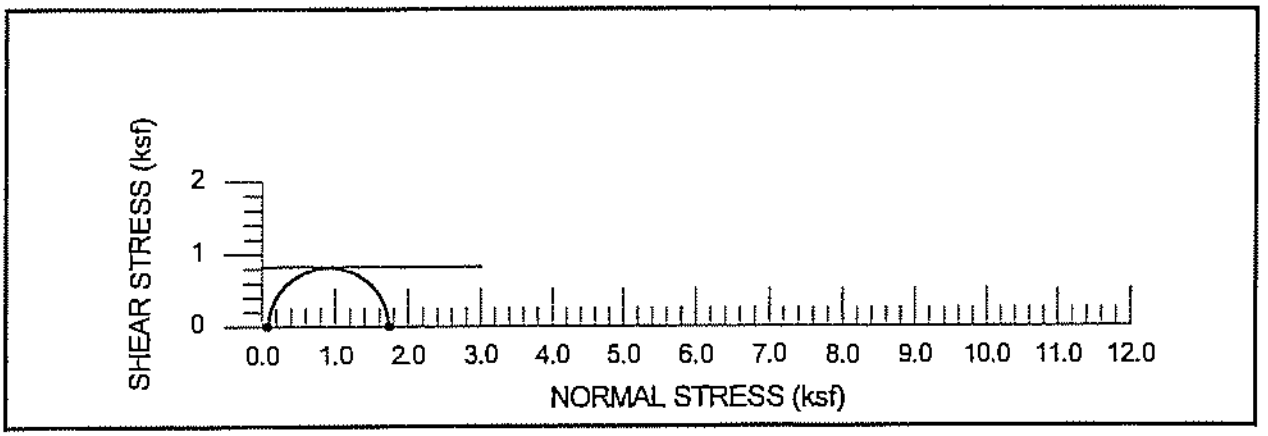
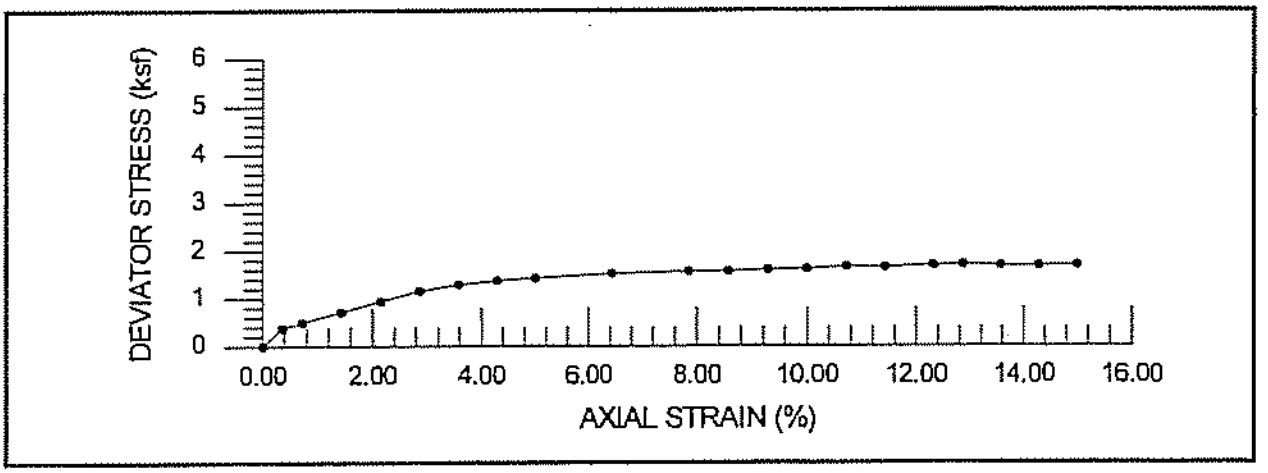
Project No.: 4276.GE

Date/Chk'd by: June 2001/JFC

UNCONSOLIDATED-UNDRAINED TRIAXIAL COMPRESSION "Q" TEST, (ASTM D2850)





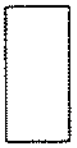
c = 0.83 ksf

Minor Prin. Stress (ksf) : 0.07
Max. Deviator Stress (ksf): 1.66

Initial Height (in.): 2.80
Initial Diameter (in.): 1.40
Saturation: 98.0%

Failure Sketch:

No distinct failure plane



Sample Identification: EEB-52: ST-1 (16.0'-18.0')

Sample Description: Dark-gray CLAYEY SILT, trace fine sand, trace organics.
Initial Moisture Content (%): 55.5
% Passing No. 200 Sieve: 97.4
Dry Unit Weight (PCF): 64.3
Liquid Limit: 60
Plastic Limit: 38
Plastic Index: 22
USCS Class: MH

Remarks: Initial moisture content is average of all values from Shelby Tube.

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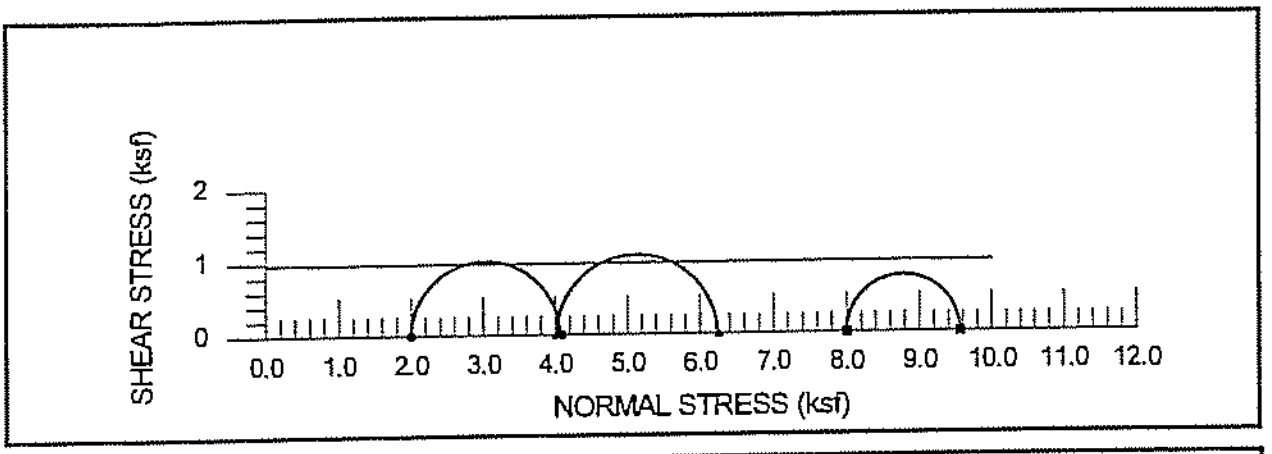
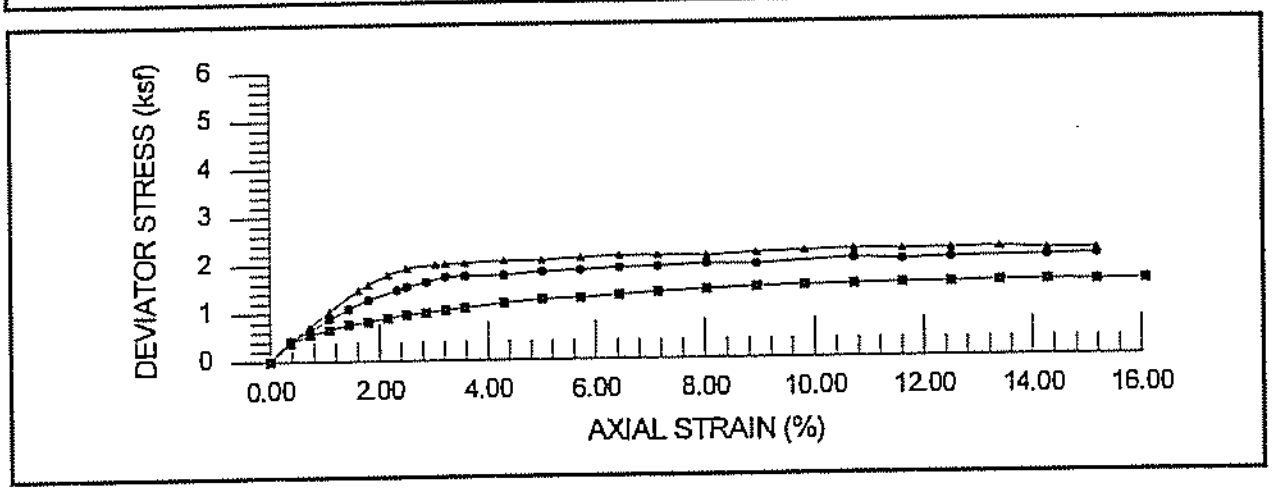
UNCONSOLIDATED-UNDRAINED TRIAXIAL COMPRESSION "Q" TEST, (ASTM D2850)





c = 0.98 (ksf avg.)

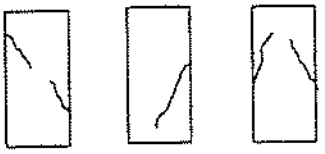
Sample Identification: EEB-52: ST-4 (60.0' - 62.0')

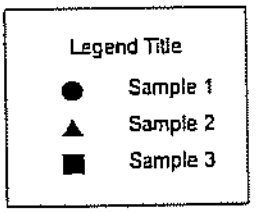
Sample Description: Dark-gray/black CLAYEY SILT, trace medium sand, trace fine sand, trace organics

	1	2	3
Minor Prin. Stress (ksf):	2.00	4.00	8.00
Max. Deviator Stress (ksf):	2.09	2.25	1.56
Initial Height (in.):	2.80	2.80	2.80
Initial Diameter (in.):	1.40	1.40	1.40
Saturation:	99.0%	98.0%	99.0%

Initial Moisture Content (%): 57.5
% Passing No. 200 Sieve: 92.0
Dry Unit Weight (PCF): 64.5 (test 1), 61.9 (test 2), 58.8 (test 3)
Liquid Limit: 74
Plastic Limit: 46
Plastic Index: 28
USCS Class: MH

Failure Sketch:





Remarks: Initial moisture content is average of all values from Shelby Tube.

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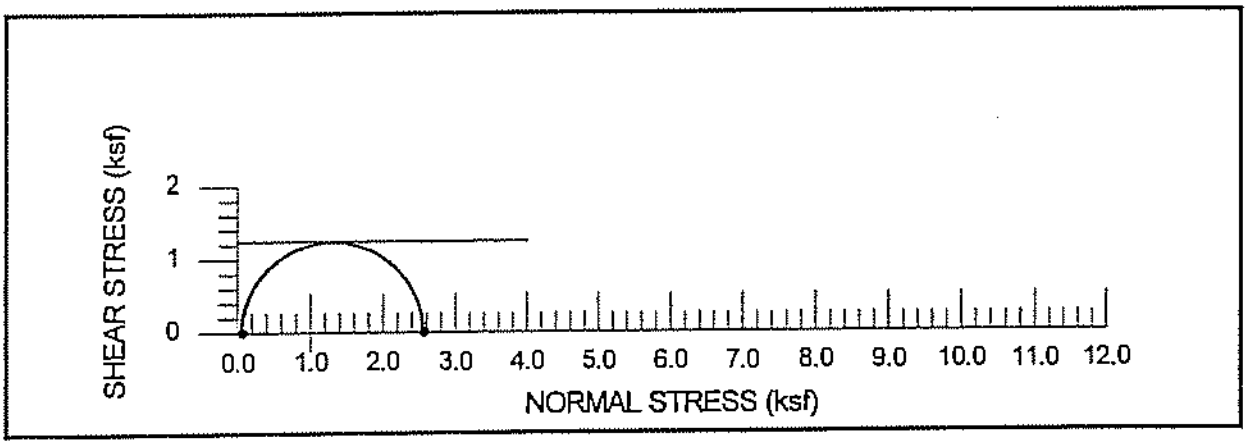
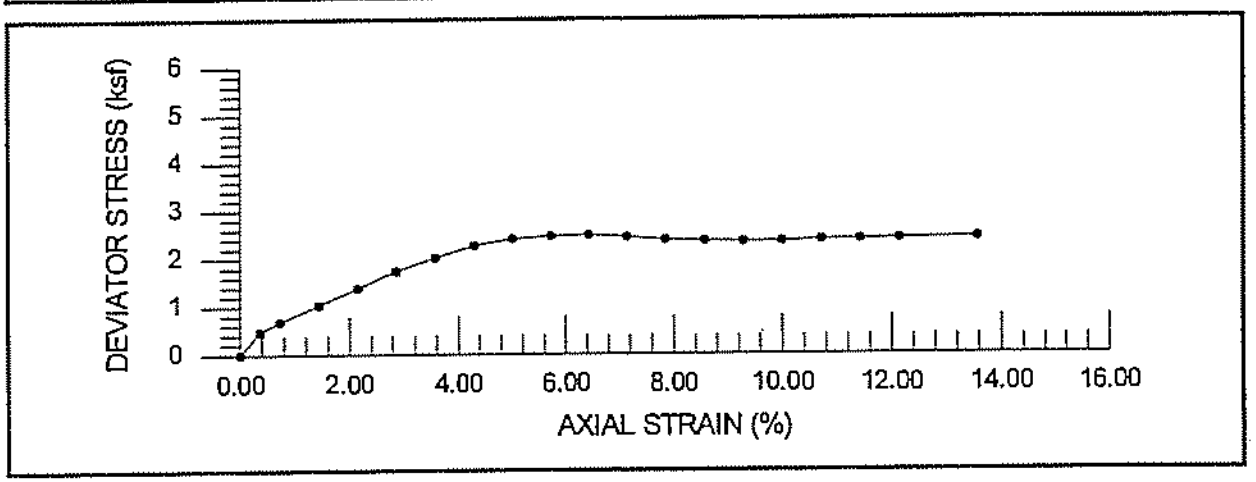
Contract No. DACW-61-98-D-0008 Task Order 27

Project No.: 4276.GE

Date/Chk'd by: June 2001/JFC

UNCONSOLIDATED-UNDRAINED TRIAXIAL COMPRESSION "Q" TEST, (ASTM D2850)





c = 1.25 ksf

Minor Prin. Stress (ksf) :	0.07
Max. Deviator Stress (ksf):	2.49
Initial Height (in.):	2.80
Initial Diameter (in.):	1.4
Saturation:	97.0%

Failure Sketch:

No distinct failure plane

Sample Identification: EEB-52: ST-5 (80.0'-82.0')

Sample Description: Dark-gray CLAYEY SILT, trace fine sand, trace organics.
Initial Moisture Content (%): 56.8
% Passing No. 200 Sieve: 98.9
Dry Unit Weight (PCF): 68.8
Liquid Limit: 54
Plastic Limit: 34
Plastic Index: 20
USCS Class: MH

Remarks: Initial moisture content is average of all values from Shelby Tube.

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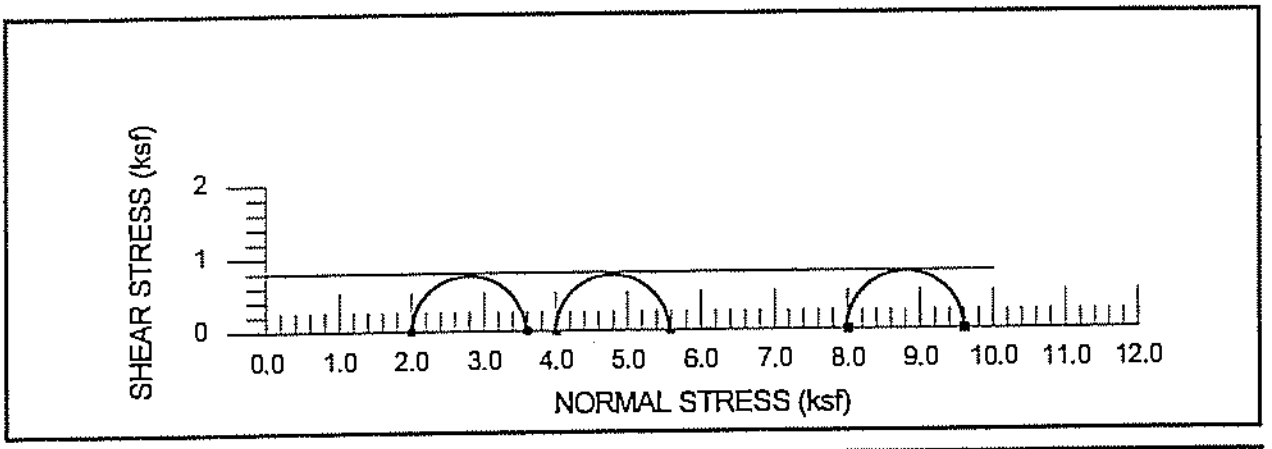
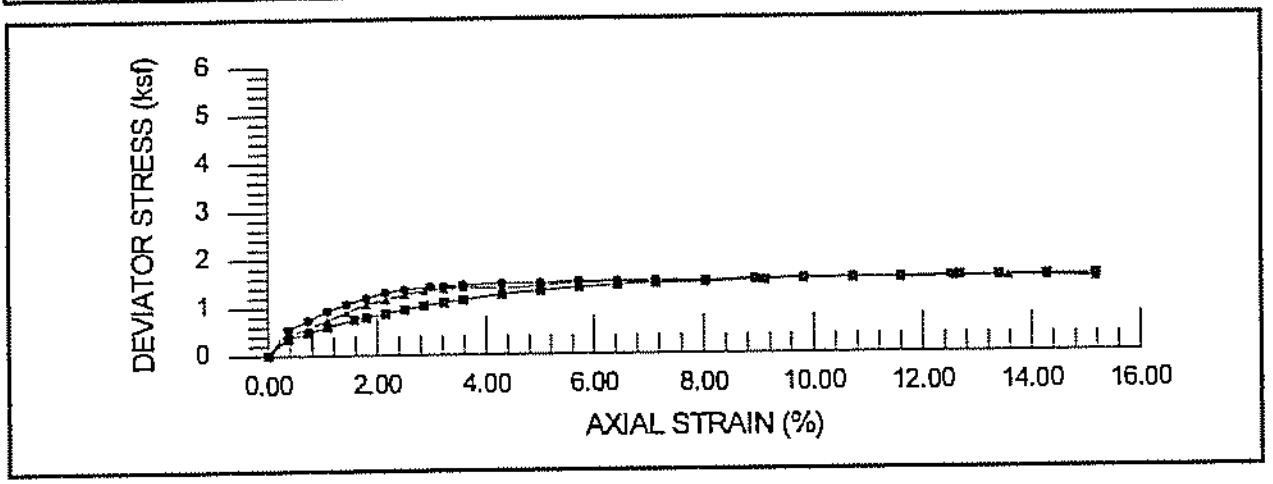
UNCONSOLIDATED-UNDRAINED TRIAXIAL COMPRESSION "Q" TEST, (ASTM D2850)





c = 0.80 (ksf avg.)

Sample Identification: EEB-53: ST-1 (9.0' - 11.0')

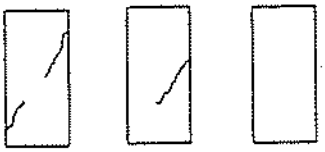
Sample Description: Dark-gray CLAYEY SILT, trace fine sand, trace organics.

	1	2	3
Minor Prin. Stress (ksf) :	2.00	4.00	8.00
Max. Deviator Stress (ksf):	1.60	1.58	1.60
Initial Height (in.):	2.80	2.80	2.80
Initial Diameter (in.):	1.40	1.40	1.40
Saturation:	98.0%	97.0%	98.0%

Initial Moisture Content (%): 59.9
% Passing No. 200 Sieve: 96.4
Dry Unit Weight (PCF): 60.0 (test 1), 58.3 (test 2), 64.0 (test 3)
Liquid Limit: 67
Plastic Limit: 38
Plastic Index: 29
USCS Class: MH

Failure Sketch:

No distinct failure sample no. 3



Legend Title
Sample 1
Sample 2
Sample 3

Remarks: Initial moisture content is average of all values from Shelby Tube.

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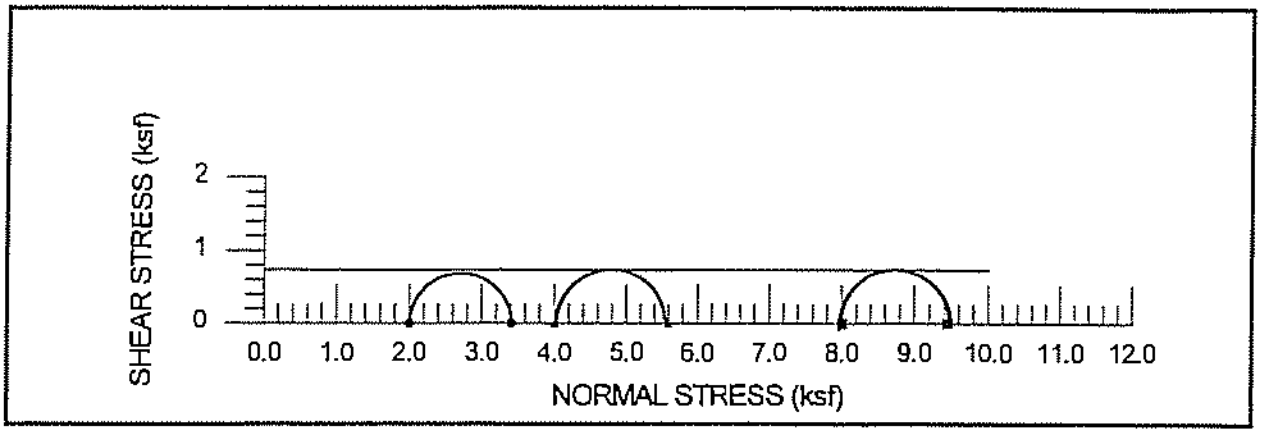
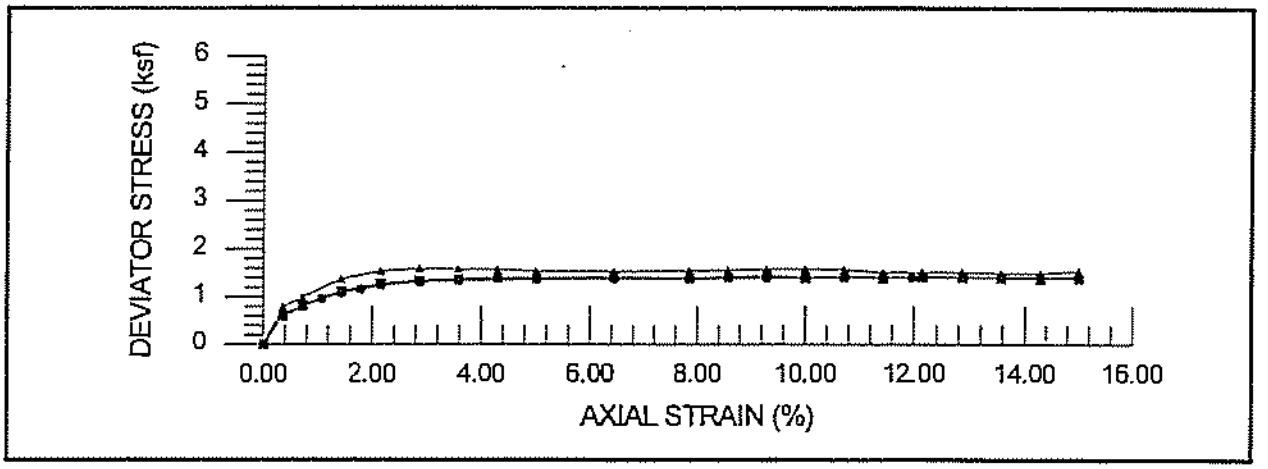
UNCONSOLIDATED-UNDRAINED TRIAXIAL COMPRESSION "Q" TEST, (ASTM D2850)





c = 0.74 (ksf avg.)

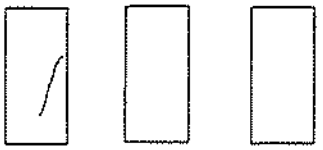
Sample Identification: EEB-53: ST-4 (33.0'-35.0')

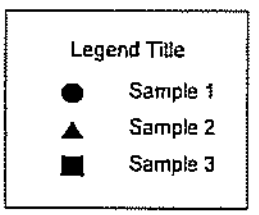
Sample Description: Dark-gray CLAYEY SILT, trace fine sand.
Initial Moisture Content (%): 76.9
% Passing No. 200 Sieve: 99.2
Dry Unit Weight (PCF): 55.0 (test 1), 51.3 (test 2), 50.9 (test 3)
Liquid Limit: 58
Plastic Limit: 34
Plastic Index: 24
USCS Class: MH

	1	2	3
Minor Prin. Stress (ksf):	2.00	4.00	8.00
Max. Deviator Stress (ksf):	1.41	1.59	1.44
Initial Height (in.):	2.80	2.80	2.80
Initial Diameter (in.):	1.40	1.40	1.40
Saturation:	98.0%	99.0%	98.0%

Failure Sketch:

No distinct failure plane, sample Nos. 2 & 3





Remarks: Initial moisture content is average of all values from Shelby Tube.

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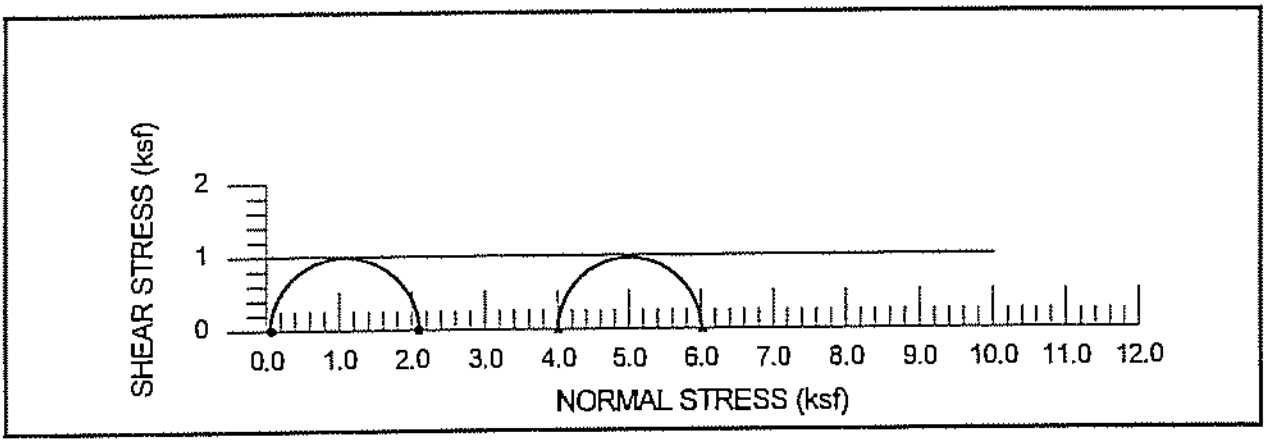
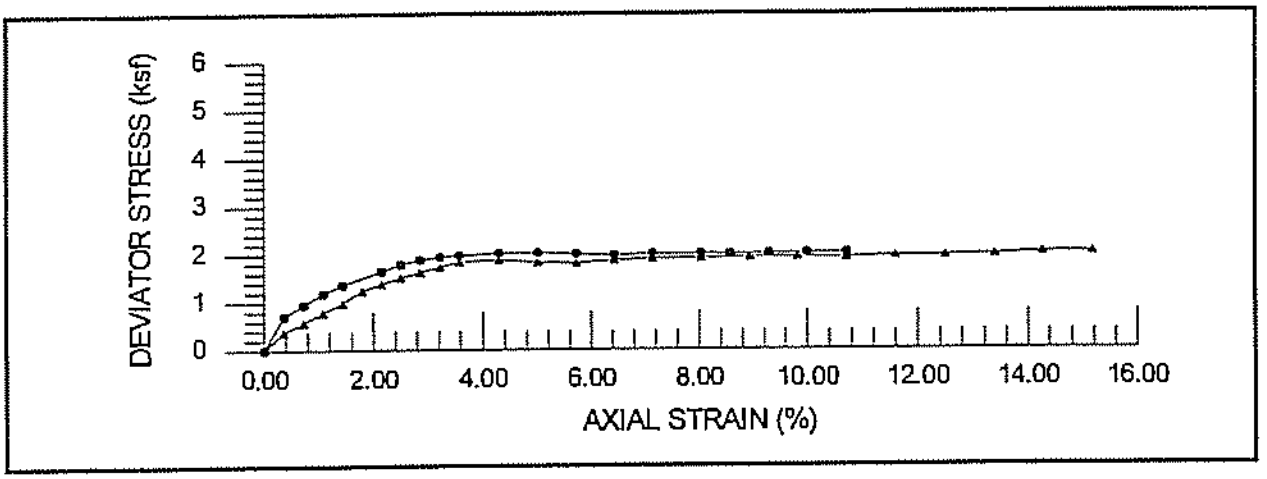
Project No.: 4276.GE

Date/Chk'd by: May 2001/JFC

UNCONSOLIDATED-UNCONFINED TRIAXIAL COMPRESSION "Q" TEST, (ASTM D2850)

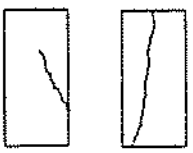




c = 1.01 (ksf avg.)

Minor Prin. Stress (ksf) :	0.07	4.00
Max. Deviator Stress (ksf):	2.02	2.02
Initial Height (in.):	2.80	2.80
Initial Diameter (in.):	1.40	1.40
Saturation:	97.0%	98.0%

Failure Sketch:



Sample Identification: EEB-53: ST-6 (63.0'-65.0')

Sample Description: Dark gray CLAYEY SILT, trace fine sand, trace organics.
Initial Moisture Content (%): 55.8
% Passing No. 200 Sieve: 99.5
Dry Unit Weight (PCF): 66.4 (test 1), 63.9 (test 2),
Liquid Limit: 55
Plastic Limit: 32
Plastic Index: 23
USCS Class: MH

Remarks: Initial moisture content is average of all values from Shelby Tube.

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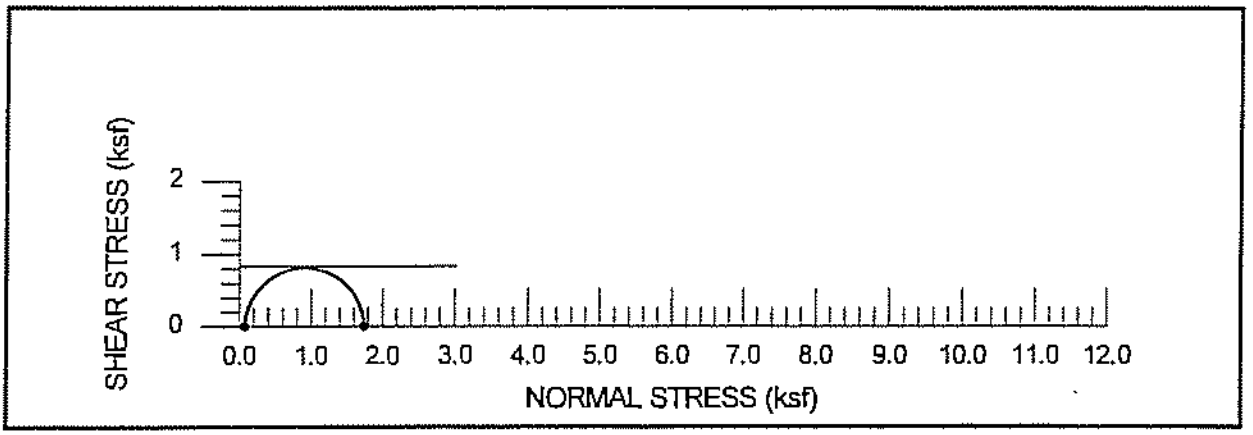
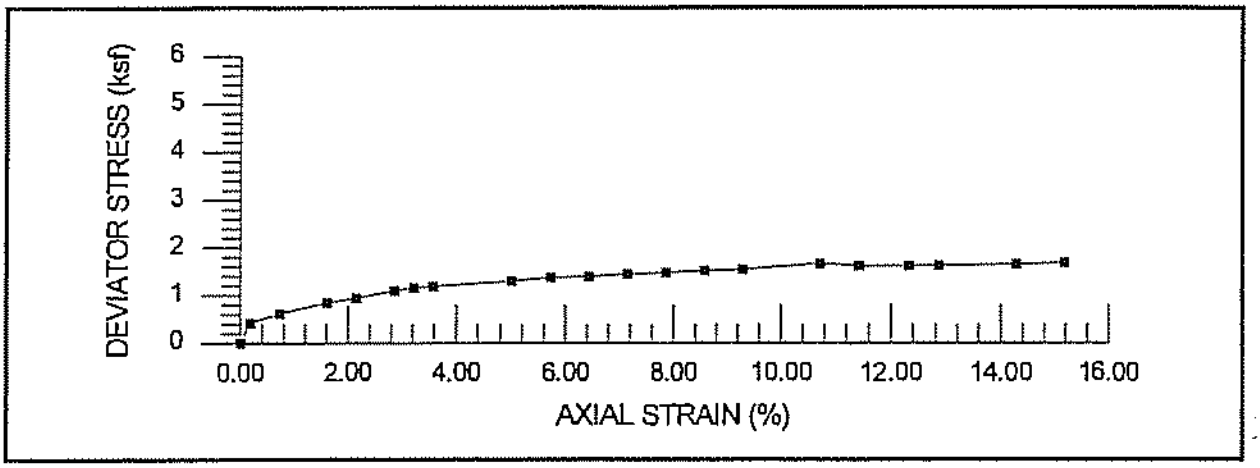
UNCONSOLIDATED-UNDRAINED TRIAXIAL COMPRESSION "Q" TEST, (ASTM D2850)



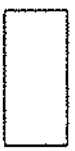


c = 0.84 (ksf)

Minor Prin. Stress (ksf) :	0.07
Max. Deviator Stress (ksf):	1.67
Initial Height (in.):	2.80
Initial Diameter (in.):	1.40
Saturation:	98.0%

Failure Sketch:

No distinct failure plane



Sample Identification: EEB-54: ST-1 (7.0'-9.0')

Sample Description: Dark-gray CLAYEY SILT, trace fine sand, trace medium sand, trace organics.
Initial Moisture Content (%): 59.6
% Passing No. 200 Sieve: 97.8
Dry Unit Weight (PCF): 64.8
Liquid Limit: 73
Plastic Limit: 42
Plastic Index: 31
USCS Class: MH

Remarks: Initial moisture is average of all values from Shelby Tube.

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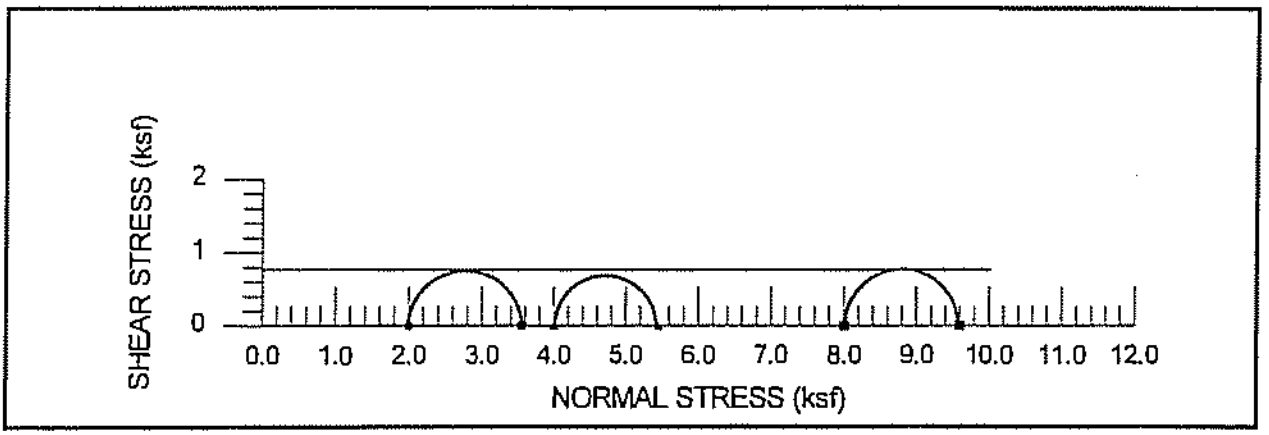
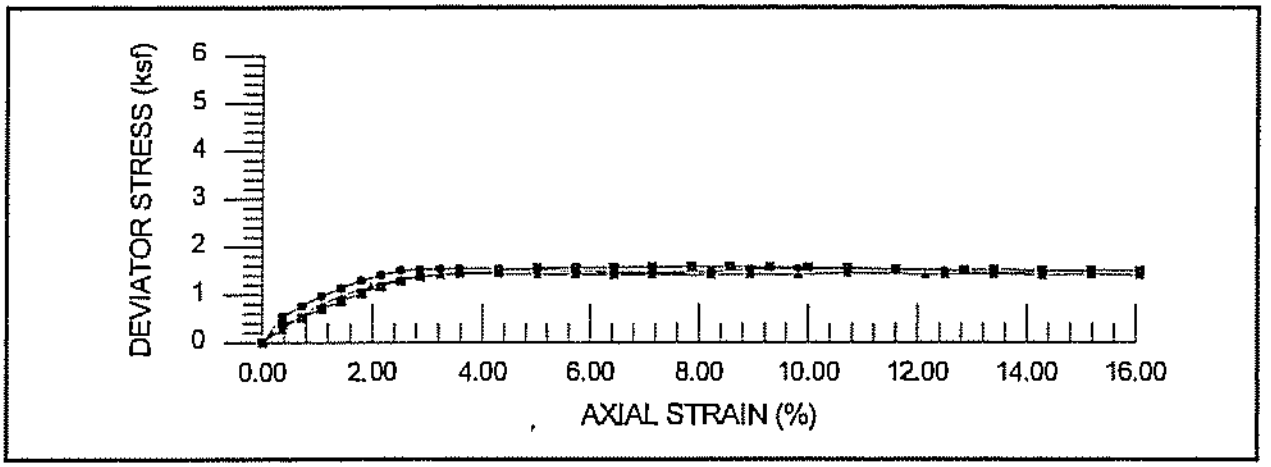
Project: Wilmington Harbor North Dredged Materials CDF Subsurface Investigation
Contract No. DACW-61-98-D-0008 Task Order 27

Project No.: 4276.GE

Date/Chk'd by: June 2001/JFC

UNCONSOLIDATED-UNDRAINED TRIAXIAL COMPRESSION "Q" TEST, (ASTM D2850)





c = 0.77 (ksf avg.)

Sample Identification: EEB-54: ST-2 (24.0'-26.0')

Sample Description: Dark-gray CLAYEY SILT, trace fine sand, trace medium sand, trace organics.

	1	2	3
Minor Prin. Stress (ksf):	2.00	4.00	8.00
Max. Deviator Stress (ksf):	1.55	1.45	1.59
Initial Height (in.):	2.80	2.80	2.80
Initial Diameter (in.):	1.40	1.40	1.40
Saturation:	95.0%	95.0%	96.0%

Initial Moisture Content (%): 70.8
% Passing No. 200 Sieve: 94.2
Dry Unit Weight (PCF): 51.9 (test 1), 52.1 (test 2), 53.8 (test 3)
Liquid Limit: 71
Plastic Limit: 41
Plastic Index: 30
USCS Class: MH

Failure Sketch:

Legend
- Sample 1
- Sample 2
- Sample 3

Remarks: Initial moisture content is average of all values from Shelby Tube.

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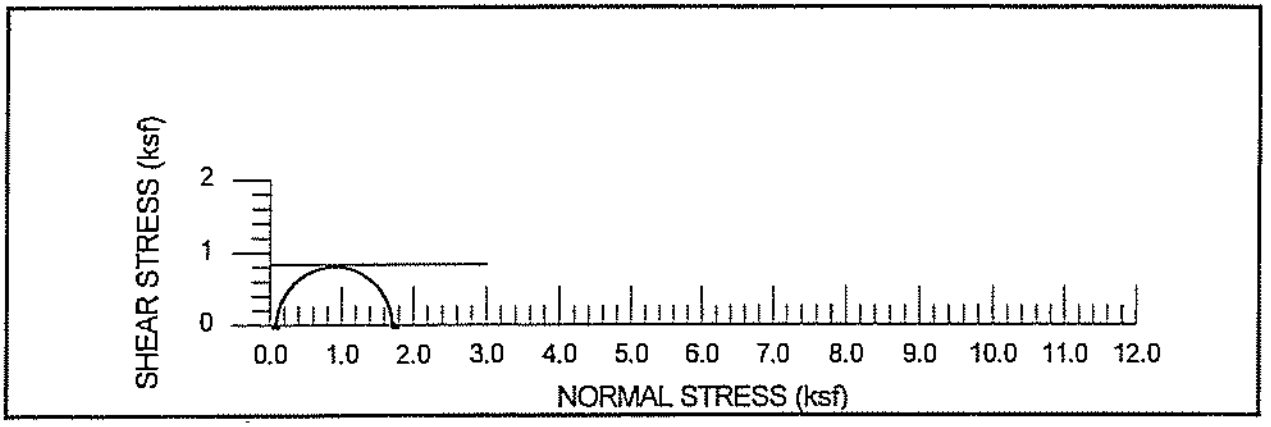
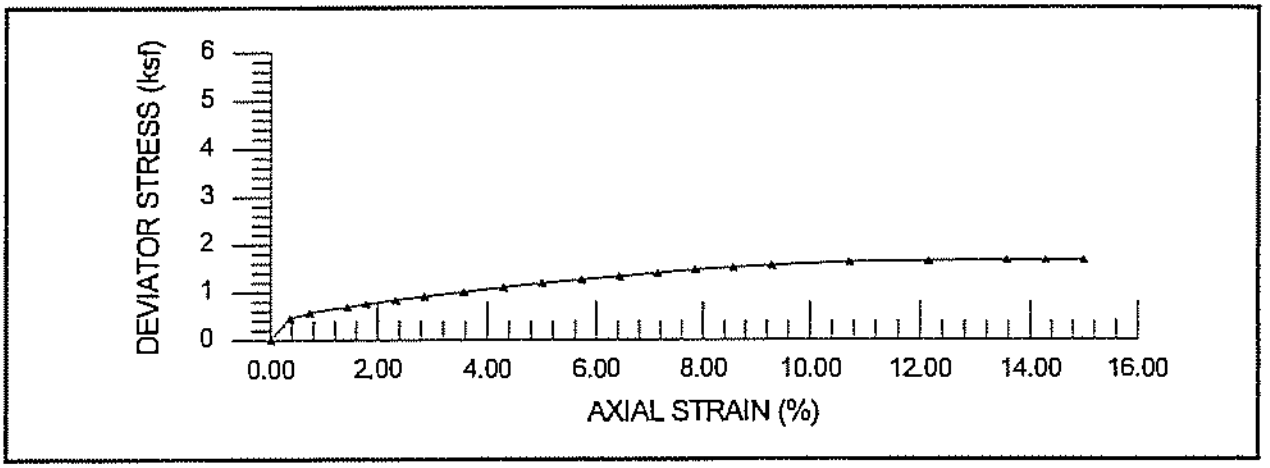
UNCONSOLIDATED-UNDRAINED TRIAXIAL COMPRESSION "Q" TEST, (ASTM D2850)





c = 0.84 ksf

Minor Prin. Stress (ksf) :	2.00
Max. Deviator Stress (ksf):	1.67
Initial Height (in.):	2.80
Initial Diameter (in.):	1.40
Saturation:	97.0%

Failure Sketch:

No distinct failure plane

Sample Identification: EEB-54: ST-3 (44.0'-46.0')

Sample Description: Dark-gray CLAYEY SILT, trace fine sand, trace organics.
Initial Moisture Content (%): 52.3
% Passing No. 200 Sieve: 99.2
Dry Unit Weight (PCF): 70.7
Liquid Limit: 52
Plastic Limit: 30
Plastic Index: 22
USCS Class: MH

Remarks: Initial moisture content is average of all values from Shelby Tube.

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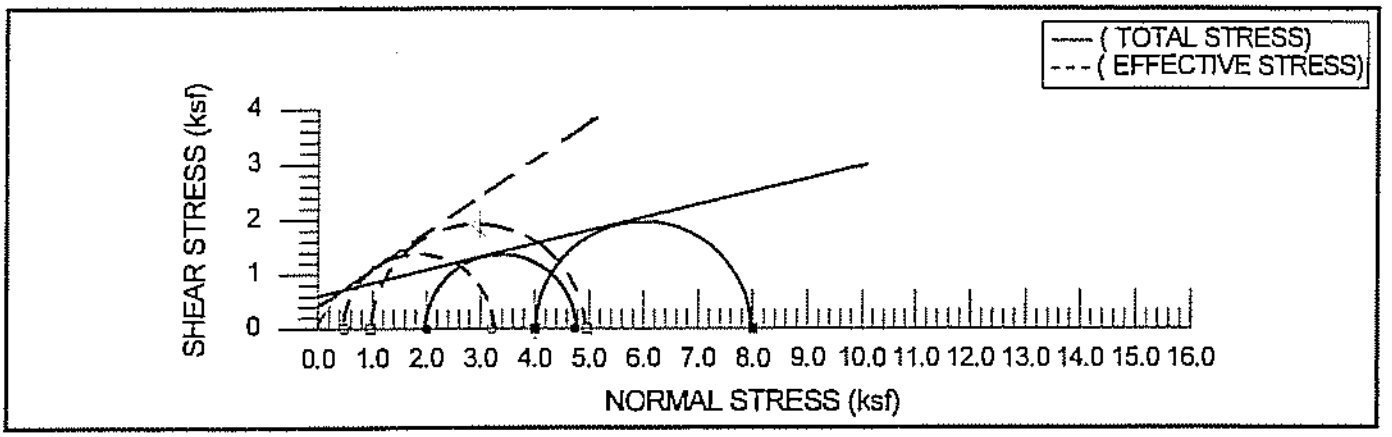
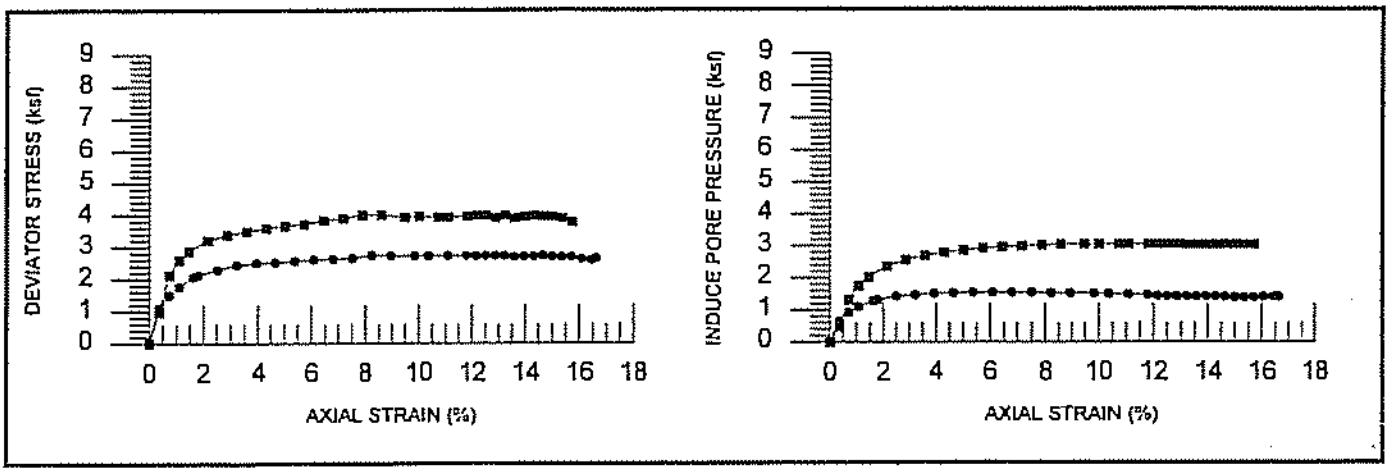
Date/Chk'd by: June 2001/JFC

CONSOLIDATED-UNDRAINED TRIAXIAL COMPRESSION "R" TEST WITH PORE PRESSURE MEASUREMENTS (ASTM D4767)



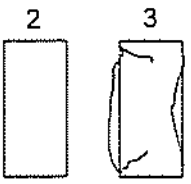


Total Strength: c = 0.60 ksf ϕ = 13.1°
Effective Strength: c' = 0.40 ksf ϕ' = 33.4°

Minor Prin. Stress (ksf) :	2.0	4.0
Max. Deviator Stress (ksf):	2.74	4.0
Initial Height (in.):	3.03	2.94
Initial Diameter (in.):	1.4	1.4
Saturation:	95.0%	97.0%

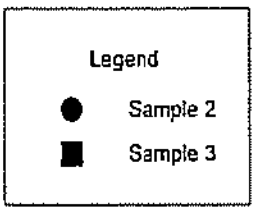
Failure Sketch:

No distinct failure plane, sample No. 2.



Sample Identification: EEB-52: ST-2 (30.0'-32.0')

Sample Description: Dark-gray CLAYEY SILT, trace fine sand.
Initial Moisture Content (%): 66.0
% Passing No. 200 Sieve: 98.2
Dry Unit Weight (PCF): 61.1 (test 1), 56.8 (test 2), 59.9 (test 3)
Liquid Limit: 66
Plastic Limit: 46
Plastic Index: 20
USCS Class: MH



Remarks: Initial moisture content is average of all values from Shelby Tube.

Sample No.1 not reported due to inconsistency in sample.

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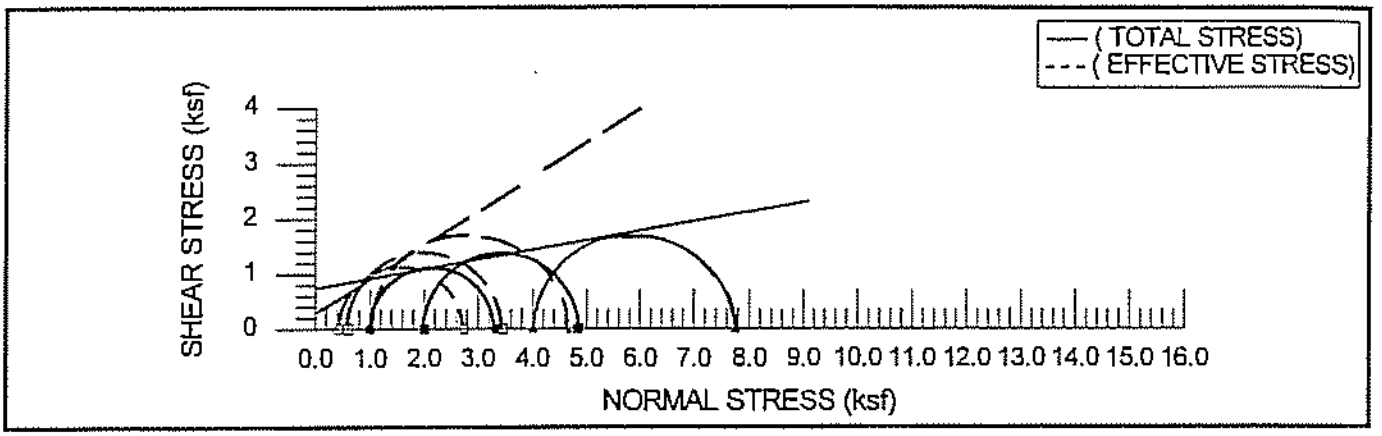
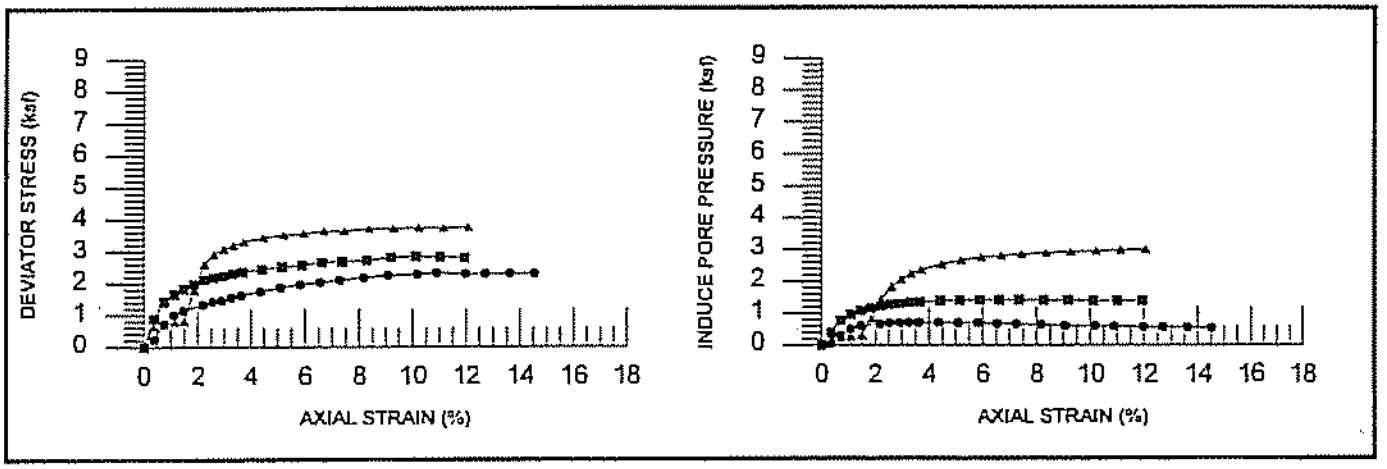
CONSOLIDATED-UNDRAINED TRIAXIAL COMPRESSION "R" TEST WITH PORE PRESSURE MEASUREMENTS (ASTM D4767)

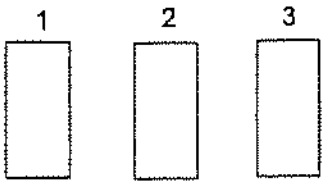




Total Strength: c = 0.75 ksf $\phi = 11.2°$
Effective Strength: c' = 0.31 ksf $\phi' = 34.1°$

Minor Prin. Stress (ksf) :	1.0	2.0	4.0
Max. Deviator Stress (ksf):	2.32	2.84	3.76
Initial Height (in.):	2.8	2.8	2.8
Initial Diameter (in.):	1.4	1.4	1.4
Saturation:	100%	100%	100%

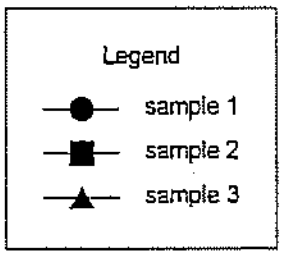
Failure Sketch:



No distinct failure plane, all samples.

Sample Identification: EEB-54: ST-3 (44.0' - 46.0')

Sample Description: Dark-gray CLAYEY-SILT, trace fine sand, trace organics.
Initial Moisture Content (%): 51.9
% Passing No. 200 Sieve: 98.3
Dry Unit Weight (PCF): 65.7 (test 1), 66.8 (test 2), 57.5 (test 3)
Liquid Limit: 52
Plastic Limit: 30
Plastic Index: 22
USCS Class: MH



Remarks:

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APPENDIX G

REFERENCES

REFERENCES

1. Vaughan, H.B. (1940). "Report Upon the Improvement of the Rivers and Harbors in the Philadelphia, PA., District," *Annual Report of the Chief of Engineers, 1940, Extract*, United States Government Printing Office, Washington D.C., 357-361.

2. USACE (1967). *Operations Division Summary of Development of Edgemoor Disposal Area.*

3. USACE Chief of Operations Division (1983). *Research Required for the Potts, Inc. Condemnation - Operations Section Summary of Development of Edgemoor Disposal Area.*