REGULATORY INFORMATION DISTRIBUTION SYSTEM (RIDS)

ACCESSION NBR:8112210414 DOC.DATE: 81/12/15 NOTARIZED: NO DOCKET #
FACIL:50-397 WPPSS Nuclear Project, Unit 2, Washington Public Powe 05000397
AUTH.NAME AUTHOR AFFILIATION
BOUCHEY,G.D. Washington Public Power Supply System
RECIP.NAME RECIPIENT AFFILIATION
SCHWENCER,A. Licensing Branch 2

SEE REPORT (2 VOLUMES)

SUBJECT: Forwards "Soil Backfill Testing Program," Vols 1 & 2,GA File 81-605,summarizing results of test program & conclusions re suspected deficiency in soil backfill.Effects of soil on safety-related utils & structures acceptable.

DISTRIBUTION CODE: B001S COPIES RECEIVED:LTR 1 ENCL 1 SIZE: 2+150
TITLE: PSAR/FSAR AMDTS and Related Correspondence

NOTES:2 copies all matl:PM. 05000397

	RECIPIENT ID CODE/NAME		COPIES LTTR	COPIES ENCL	RECIPIENT ID CODE/NAME		COPIES LTTR	COPIES ENCL
ACTION:	A/D LICENSNG		1	0	LIC BR #2 BC		1	0
	LIC BR #2 LA		1	0	AULUCK,R.	01	1	1
INTERNAL:	ELD		1	0	IE	06	3	3
	IE/DEP/EPDB	35	1	1	IE/DEP/EPLB	36	3	3
	MPA		1	0	NRR/DE/CEB	11	1	1
	NRR/DE/EQB	13	3	3	NRR/DE/GB	28	2	2
	NRR/DE/HGEB	30	2	2	NRR/DE/MEB	18	1	1
	NRR/DE/MTEB	17	1	1	NRR/DE/QAB	21	1	1
	NRR/DE/SAB	24	1	1	NRR/DE/SEB	25	1	1
	NRR/DHFS/HFEB	40	1	1	NRR/DHFS/LQB	32	1	1
	NRR/DHFS/OLB	34	1	1	NRR/DHFS/PTRB	20	1	1
	NRR/DSI/AEB	26	1	1	NRR/DSI/ASB	27	1	1
	NRR/DSI/CPB	10	1	1	NRR/DSI/CSB	09	1	1
	NRR/DSI/ETSB	12	1	1	NRR/DSI/ICSB	16	1	1
	NRR/DSI/PSB	19	1	1	NRR/DSI/RAB	22	1	1
	NRR/DSI/RSB	23	1	1	NRR/DST/LGB	33	1	1
	REG FILE	04	1	1				
EXTERNAL:	ACRS	41	16	16	BNL(AMDTS ONLY)		1	1
	FEMA-REP DIV	39	1	1	LPDR	03	1	1
	NRC PDR	02	1	1	NSIC	05	1	1
	NTIS		1	1				

DEC 28 1981

TOTAL NUMBER OF COPIES REQUIRED: LTTR ~~67~~ 65 ENCL ~~56~~ 60

Washington Public Power Supply System
P.O. Box 968 3000 George Washington Way Richland, Washington 99352 (509) 372-5000

December 15, 1981
G02-81-527

Docket No. 50-397

Mr. A. Schwencer, Chief
Licensing Branch No. 2
Division of Licensing
Nuclear Reactor Regulation
U. S. Nuclear Regulatory Commission
Washington, D. C. 20555

Dear Mr. Schwencer:

Subject: NUCLEAR PROJECT NO. 2
QUALITY CLASS I SOIL BACKFILL TEST PROGRAM

Reference: G02-81-462, November 12, 1981, GD Bouchey (Supply System) to RA Schwencer (NRC)

The Reference letter provided a summary of the efforts being taken to resolve a suspected deficiency concerning soil backfill placed since May 1976 for support of Quality Class I utilities and structures (remote air intake structures, remote air intake piping, standby service water piping, and electrical duct banks for the standby service water system). To resolve the concerns regarding this backfill, an extensive test program was conducted to determine in-situ properties of the soil. The attached report, "Evaluation of Quality Class I Utility Backfill, GA File 81-605", was prepared by Geologic Associates, Inc. and Burns and Roe to summarize the results of the test program and conclusions regarding the acceptability of the soil. The report concludes that although the existing soil does not meet specification requirements for relative density, the effect on safety-related utilities and structures is acceptable.

A copy of this report was given to Mr. Dinesh Gupta of the NRC, Geosciences Branch, during his visit to the WNP-2 site on December 7, 1981, to discuss this matter.

Based on the conclusions of the report, we have informed NRC, Inspection and Enforcement Branch, Region V, that this condition, which had been identified as a potentially reportable condition under the provision of 10CFR50.55(e), is not reportable.

B001
s
1/1

With transmittal of this report, and subject to your review, the open item identified in the draft SER for WNP-2 is considered closed.

During a meeting with the NRC staff on this matter on October 7, 1981, the Supply System was requested to assess the significance of the soil backfill deficiencies in light of IE Circular No. 81-08, and advise the staff of our conclusions. IE Circular No. 81-08 is primarily concerned with insufficient compaction of foundation and backfill materials leading to excessive settlement of plant structures. As stated in a separate report by Shannon and Wilson dated May 11, 1976 (Referenced in FSAR Chapter 2.5), the compaction and backfill work performed for the major plant structures prior to May 1976 is acceptable. This is further verified by the excellent results of the settlement monitoring program in progress (Reference NRC question 362.10 and the response). Accordingly, it is concluded that the primary concern of IE Circular 81-08 (excessive settlement of major plant structures) is not a problem at the WNP-2 facility.

Very truly yours,

GD Bouchey

GD Bouchey
Deputy Director, Safety and Security

EAF:kjf

Attachment: "Evaluation of Quality Class I Utility Backfill, WNP-2, Hanford, Washington", GA File 81-605

cc: JA Forrest - B&R RO
RE Snaith - B&R NY
JJ Verderber - B&R NY
AI Cygelman - B&R 954W
FA MacLean - General Electric
S. Smith - General Electric
ND Lewis - EFSEC, Olympia
WS Chin - BPA
NS Reynolds - Debevoise & Liberman
OK Earle - B&R RO
EF Beckett - Nuclear Projects, Inc.
R Feil - Resident Inspector
JA Satir - B&R NY
WNP-2 Files

8112210414

WASHINGTON PUBLIC POWER SUPPLY SYSTEM

WNP-2

PROCEDURE

FOR

SOIL BACKFILL TESTING PROGRAM

BURNS AND ROE, INC.
ORADELL, N. J.

APPROVED E. D. Zisman
E. Zisman
Supervising Geotechnical Engineer

Rev. 1
September 30, 1981

TABLE OF CONTENTS

1.0 SCOPE

1.1 General

This procedure shall establish a testing program to determine insitu densities in various Quality Class I backfill areas. The insitu test program shall be divided into two phases: the first to develop site dependent correlations between relative density and the various indirect methods used to measure relative density. The second phase shall be to actually measure field densities and other engineering fill properties in areas under question by 50.55(e) Condition 146.

The correlation testing (Phase 1) shall be accomplished by comparing known relative density values in test fills to the following test methods: standard penetration tests (SPT), pressure meter tests (PMT), and downhole nuclear density tests (DNDT) in representative locations. These correlations will establish site specific dependency of material type and depth on test results.

Once initial correlations, acceptable to the geotechnical engineer, have been established, fill testing (Phase 2) will be conducted. The various tests will be performed in selected areas of the service water pipe line, and the remote air intake structures and piping. Correlations will continue to be made as additional data becomes available.

All testing will be done under the direction of a geotechnical engineer.

1.2 Applicable Publications

D 1452	Soil Investigation and Sampling by Auger Borings
D 1556	Density of Soil in Place by Sand-Cone Method
D 1586	Penetration Test and Split-Barrel Sampling of Soils
D 1587	Thin-Walled Tube Sampling of Soils
D 2049	Relative Density of Cohesionless Soils
D 2167	Standard Test Method for Density of Soil in Place by the Rubber-Balloon Method
D 2216	Laboratory Determination of Moisture Content of Soil
D 2487	Classification of Soils for Engineering Purposes
D 2488	Recommended practice for Description of Soils (Visual-Manual Procedure)
D 2850	Unconsolidated, Undrained Strength of Cohesive Soils in Triaxial Compression
STP479	"Suggested Methods of Test for Identification of Soils" by D. M. Burmister, Special Procedures for Testing Soil and Rock for Engineering Purposes, 5th Edition, 1970.

2.0 MATERIALS EFFECTS

2.1 Grain Size

It is expected that occasional gravel sized particles present in the site fill materials will have some effect on test results. To compensate for high blow counts resulting from the occasional gravel size particles, SPT values will not be considered when: A. Greater than approximately trace (0-10%) amounts of gravel size material is found in the spoon, B. A loss of sample occurs, C. Angular gravel fragments are found in the spoon sample indicating (to the geotechcical engineer) the material has been broken during sampling, D. Comparison of SPT values with the other methods indicates SPT values are unusually high due to the presence of gravel.

Gravel sized material is not believed to pose a problem with the PMT or the DNDT.

3.0 BORING AND TESTING REQUIREMENTS

3.1 General Boring Requirements

.1 All borings shall be advanced by means of a drill rig equipped with hollow stem augers.

.2 Soil sampling shall be performed in accordance with ASTM D 1586.

.3 Continuous SPT's shall be taken from the ground surface to the bottom of the boring.

.4 Split-Spoon samples shall not be driven more than 18 inches for any sample interval.

.5 Boring locations shall not deviate more than 0.5 ft. from surveyed locations determined by the geotechnical engineer.

.6 All borings will have their locations referenced to the plant grid system.

.7 At the completion of the boring, all drill holes will be backfilled with insitu material to the satisfaction of the geotechnical engineer.

.8 Representative portions of each split spoon sample shall be preserved in a glass sample jar clearly labeled with the project title, date, number of boring, sample number, depth between which the sample was taken, soil identification, and SPT values.

.9 Boring Contractor shall furnish a driller's logs for each boring.

.10 All field testing shall be monitored by a Geotechnical Engineer

.11 Geotechnical engineer shall maintain a boring log, furnishing the information required on the sample boring log form contained in Appendix A.

.12 Borings shall extend (except as noted below) to which ever depth

is greater: a minimum of 3 feet below the Category I utility, or until two consecutive SPT values are each equal to or greater than 15. However, borings will extend deeper than required above in areas where backfill was placed for circulating water and storm sewer Class II systems that cross under the area of investigation. The deepest extent of this fill is elevation 413.

3.2 Correlation Testing (Phase 1)

3.2.1 Standard Penetration Tests (SPT's)

.1 A minimum of four borings shall be drilled at locations of known relative density; these locations shall be determined by the geotechnical engineer.

.2 SPT samples shall be classified in the field by a geotechnical engineer in accordance with ASTM D 2487. In addition, any unusal occurances shall be reported on the boring log.

3.2.2 Pressure Meter Testing (PMT)

.1 PMT will be done in each boring.

.2 Initially PMT shall be done in representative types of site materials with respect to density and gradation.

3.2.3 Downhole Nuclear Density Testing (DNDT)

.1 DNDT shall be done in each boring.

.2 The DNDT shall be done in three foot increments for the entire depth of the boring.

3.3 Fill Testing (Phase 2)

3.3.1 Standard Penetration Tests

.1 Approximately 40 borings shall be drilled in the area requiring supplementary test data.

.2 Same as in 3.2.1.2

3.3.2 Pressure Meter Testing

.1 PMT shall be performed in each boring.

.2 PMT will be done alongside or immediately below the elevation of the safety related pipe, and at all loose zones (SPT values less than 15).

3.3.3 Downhole Nuclear Density Testing

.1 Same as in 3.2.3.1 and 3.2.3.2.

4.0 FIELD TESTING PROCEDURES

4.1 Pressure Meter Test

A Menard pressure meter shall be used to determine the insitu deformation modulus of the soil; this modulus shall ultimately be compared to relative density by excavating adjacent to the bore hole at PMT locations and measuring relative densities. Generally, a downhole probe which consists of an inner and outer expanding tube shall be lowered to the desired depth for testing; a coaxial cable shall connect the probe to the volume measuring panel board. Nitrogen gas shall be forced under pressure in the outer part of the coaxial cable while water under the same pressure shall be forced down the inner part of the coaxial cable. The water under pressure causes the probe to enlarge and deform the borehole wall, the amount of volume change shall be measured on the panel board. A separate nitrogen system shall keep the water system from expanding beyond the test limits so that a controlled interval 210mm long can be tested.

The pressure meter to be used in the testing shall be manufactured by Menard, Inc. and procedures generally followed shall be those described by Louis Menard in the equipment operation manual. Testing shall be performed in 210mm segments at locations discussed in Section 3.3.2 within the borings.

4.2 Downhole Nuclear Density Test

The wet density of the relatively undisturbed soil in the borehole shall be determined using the DNDT; the nuclear gauge shall be calibrated to be used in thin-walled aluminum casing.

The moisture content of split spoon samples shall be determined in accordance with ASTM D 2216 in order to convert the wet density determined by nuclear methods to dry density. Further, at selected locations, test pits shall be excavated adjacent to the boring locations and the insitu wet and dry densities at the bottom of these test pits shall be determined using a Washington Densometer and/or the sand cone, (ASTM D 1556). These values of inplace density and relative density shall be used to compare the densities determined by nuclear methods at adjacent depths.

The nuclear gauge and probe used in the density testing shall be a Campbell Pacific Nuclear Model 501 calibrated and operated as described in the CPN Operator's Manual dated 1980. Generally, wet and dry densities shall be determined on 3 feet intervals. The density determined at each 3 foot interval is that contained in the volume of influence of a sphere having a diameter of 10 inches.

4.3 General Drilling and Testing Procedure for SPT, PMT, & DNDT

Initially at each boring location, a SPT sample shall be taken from the surface and extend to a depth of 18 inches. The split spoon sampler shall then be removed to obtain the sample and the sampler shall be relowered to the bottom of that hole. A second SPT sample shall be taken to create a hole extending to a total depth of 3 feet. Subsequently, an aluminum casing (2" O.D. and 1.9" I.D.) shall be inserted in the open hole created during the SPT sampling in preparation for the nuclear downhole density testing. The nuclear probe shall then be lowered down the casing to determine the wet density of the soil.

After the nuclear density testing of the upper level soils is completed, the hole shall be augered to the depth of 3 feet (to the bottom of the zone previously tested) and two consecutive SPT samples will be taken below the augers, (creating a hole with a bottom depth of 6' beneath the surface). Similarly, as before, the aluminum casing will be placed in the open hole created beneath the augers so that the nuclear density testing can again be performed. This procedure of continuous SPT sampling and nuclear density testing will be followed throughout the borings.

At selected depth intervals within each borehole, the aluminum cases will be removed after the density testing is completed, and BX-Size Steel casing (2 7/8" O.D., 2 3/8" I.D.) shall be driven to the bottom of the hole. The BX casing shall be used to enlarge the hole 3 feet beneath the augers for insertion of the pressure meter probe and subsequent pressure meter testing.

4.4 Disturbance Effects

The procedures described will be followed in a manner that minimizes soil disturbance. This results because the soil displaced during the SPT sampling is forced into the split spoon sampler and removed leaving a zone relatively undisturbed for DNDT testing . A further factor which tends to decrease soil disturbance effects is that the nuclear probe used in the DNDT records the average density in approximately a 10 inch diameter sphere of influence around the probe. Since this zone of influence extends well beyond the limits of any significant disturbance, an averaging effect results tending to decrease any disturbance effects in the DNDT value.

For the pressure meter testing, the BX casing used to create the test section interval is driven down the 2" diameter hole created by the SPT sampling displacing the soil into the BX casing and removed with the BX casing leaving a zone relatively undisturbed for PMT. Furthermore, the results of the pressure meter testing shall be plotted in the form of volume change verses pressure curve that allows soil disturbance to be detected and taken into account in the data calculations. This results because the disturbed zone appears as non-linear on the volume change versus pressure curve and the deformation modulus is calculated based only on the straight line portion of that curve.

4.5 Loose Zones

In the event loose zones (SPT values less than 15) are encountered in any boring, additional borings will be placed such that they are offset approximately 20 feet from first boring in each direction along the edge of the underground utility

If the additional boring(s) encounter loose zones another boring(s) will be placed approximately 20 feet from the last boring until the extent of the loose zone has been defined in horizontal and vertical extent.

5.0 REPORTS

5.1 Final Backfill Testing Report

The geotechnical engineer shall prepare a report summarizing all field test results. The report will include a geotechnical evaluation of the test program and will include recommendations for resolution of the 50.55(e) condition 146.

APPENDIX A

BURNS AND ROE, INC.	BORING NO.

PROJECT WNP-2	GRND. WATER	DATE	TIME	DEPTH	CASING	SHEET NO.: 1 OF	
OWNER W.P.P.S.S						PROJECT NO.: 3900	
CONTRACTOR Geologic Assoc.						ELEVATION:	
METHOD OF ADVANC. BORING	DEPTH		CAS.	SAMP.	CORE	TUBE	DATUM: MSL
POWER AUGER	TO	TYPE					DATE START:
HAND CHOP. W/MUD: W/WATER	TO	DIA.					DATE FINISHED
ROT. DRILL: W/MUD: W/WATER	TO	WT.					DRILLER: F. Reynolds
DIAMOND CORE	TO	FALL					INSPECTOR: R. Smith

DEPTH FT.	TYPE OF TEST	SAMPLE NO.	SAMPLES TOT. REC	SAMPLES N VAL.	SAMPLES PENETR. RESIST. BL./6 IN.	SYMBOL	MOIST.	IDENTIFICATION	DEPTH	REMARKS
1										
2										
3										
4										
5									5	
6										
7										
8										
9										
10									10	
11										
12										
13										
14										
15									15	
16										
17										
18										
19										
20									20	
21										
22										
23										

BURNS AND ROE, INC.	BORING NO.

PROJECT WNP-2 | SHEET NO.: 2 OF 2

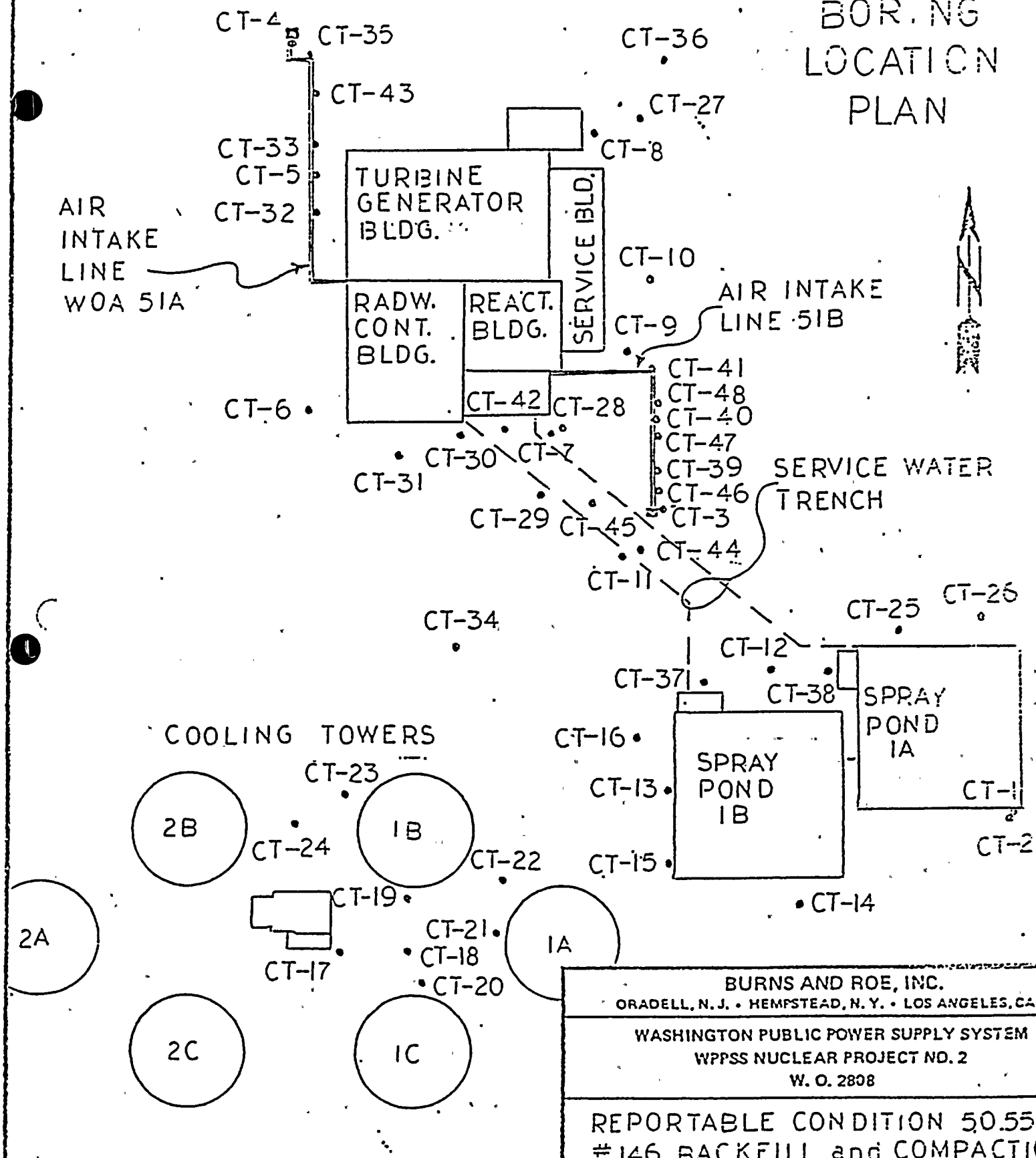
OWNER W.P.P.S.S. | JOB NO.: 3900

DEPTH FT.	TYPE OF TEST	SAMPLE NO.	SAMPLES TOT. REC.	SAMPLES N VAL.	SAMPLES PENETR. RESIST. BL./6 IN.	SYMBOL	MOIST.	IDENTIFICATION	DEPTH	REMARKS
24										
25									25	
26										
27										
28										
29										
30									30	
31										
32										
33										
34										
35									35	
36										
37										
38										
39										
40									40	
41										
42										
43										
44										
45									45	
46										
47										
48										
49										

APPENDIX B

FIGURE 1

BORING LOCATION PLAN



BURNS AND ROE, INC.
ORADELL, N.J. • HEMPSTEAD, N.Y. • LOS ANGELES, CAL.

WASHINGTON PUBLIC POWER SUPPLY SYSTEM
WPPSS NUCLEAR PROJECT NO. 2
W. O. 2808

REPORTABLE CONDITION 50.55e
#146 BACKFILL and COMPACTION

DRWN. R.D.S.	CHKD.	APPVD.
DATE: 10-27-81	DATE:	DATE:
SCALE 1" = 200'	DWG. NO.	REV. 0

CI-VI
IA-IC
IC01 1 FT.FT
CONFIDENCE
UNCERTAIN

WPPSS Hanford No. 2
50.55(e) Concern No. 146

TABLE I - BORING LOCATION AND TESTING TABULATION

Burns and Roe, Inc.
See page _____ for notes

Correlation Tests (CT)	Hanford Area Coordinates		Type, Depth & Number of Tests			Subject of Testing
	North	West	STP	PMT Depth of Tests	DNDT Number of Tests	
CT-32	12,017	1,565	Continuous	5.0'	4	Class I fill for Class I Air Intake Line (WOA51A).
CT-33	12,121	1,565	Continuous	4.7'	--	Class I fill for Class I Air Intake Line WOA51A).
CT-35	12,286	1,565	Continuous	4.8'	--	Class I fill for Class I Air Intake Line (WOA51A).
CT-37	11,292	956	Continuous	7.7 14.0	6	Class I fill for Class I Service Water.
CT-38	11,319	769	Continuous	4.9	3	Class I fill for Class I Service Water.
CT-39	11,623	1,031	Nearly	4.4	6	Class I fill for Class I Air Intake Line (WOA51B).
CT-40	11,698	1,031	Nearly Continuous	4.7 11.7 26.0	14	Class I fill for Class I Air Intake Line (WOA51B) and Class II Storm Sewer.
CT-41	11,771	1,031	Nearly Continuous	6.6	7	Class I fill for Class I Air Intake Line (WOA51B) and Class II Storm Sewer.

C1-5a	1'234 1'135

TABLE I - BORING LOCATION AND TESTING TABULATION

Correlation Tests (CT)	Hanford Area Coordinates		Type, Depth & Number of Tests			Subject of Testing
	North	West	STP	PMT Depth of Tests	DNDT Number of Tests	
CT-3	11,565	1,020	Continuous	--	--	Class I fill for Class I Air Intake Structure (51B).
CT-4	12,281	1,596	Nearly Continuous	--	--	Class I fill for Class I Air Intake Structure (51A).
CT-5	12,072	1,562	Nearly Continuous	--	--	Class I fill outside of Air Intake Line (WOA51A) trench.
CT-7	11,679	1,191	Nearly Continuous	--	--	Class I fill for Class I Service Water.
CT-11	11,485	1,075	Continuous	--	--	Class I fill for Class I Service Water and Class II Circulating Water.
CT-12	11,317	867	Continuous	--	--	Class I fill for Class I Service Water.
CT-28	11,689	1,178	Nearly Continuous	13.4' 14.1'	10	Class I fill for Class I Service Water and Class II Storm Sewer.
CT-29	11,574	1,182	Continuous*	7.0'*	6*	Class I fill for Service Water.

WPPSS Hanford No. 2
50.55(e) Concern No. 146

TABLE 1 - BORING LOCATION

Burns and Roe, Inc.
See page ____ for notes

Correlation Tests (CT)	Hanford Area Coordinates North	Hanford Area Coordinates West	Type, Depth & Number of Tests: STP	PMT Depth of Tests	DNDT Number of Tests	Subject of Testing
CT-42	11,681	1,264	Continuous	10.0*	5*	Class I fill for Class I Service Water and Class II Storm Sewer.
CT-43	12,200	1,565	Continuous	9.0*	4*	Class I fill for Class I Air Intake Line (WOA51A).
CT-44	11,509	1,057	Continuous	9.0*	4*	Class I fill for Class I Service Water Pipe Ln.
CT-45	11,563	1,120	Continuous	7.0*	5*	Class I fill for Class I Service Water Pipe Ln.

* Planned location and number of tests.

SUMMARY OF SYMBOLS

FOR BORING LOGS

GRAIN SIZE

f - Fine

m - Medium

c - Coarse

MOISTURE CONTENT

D - Dry

M - Moist

W - Wet

COLOR

Gr - Gray

Br - Brown

Bl - Black

GRAIN SIZE QUANTITIES

t - trace

l - little

s - some

SOIL TYPES

SP - Sand, poorly graded

SW - Sand, well graded

SM - Silty Sand

GP - Gravel, poorly graded

TEST METHOD

N - Down-Hole Nuclear Density Test (DNDT)

P - Pressure Meter Test (PMT)

BURNS AND ROE, INC.	BORING NO. CT-1 Light Pole 19

PROJECT Hanford #2	GRND. WATER	DATE	TIME	DEPTH	CASING	SHEET NO.: 1 OF 1
OWNER WPPSS		9/23	9:00			PROJECT NO.:
CONTRACTOR Burns & Roe						ELEVATION:

METHOD OF ADVANC. BORING	DEPTH	9'	CAS.	SAMP.	CORE	TUBE	DATUM:
POWER AUGER	TO	TYPE	3 3/8	2" o.d			DATE START: 9/23/81
HAND CHOP. W/MUD: W/WATER	TO	DIA.					DATE FINISHED 9/23/81
ROT. DRILL: W/MUD: W/WATER	TO	WT.					DRILLER: PTL Gene
DIAMOND CORE	TO	FALL					INSPECTOR: Rodney Smith

DEPTH FT.	CASING BLOWS	SAMPLE NO.	SAMPLES RECOV. TOT.	RQD.	PENETR. RESIST. BL./6 IN.	SYMBOL	MOIST.	IDENTIFICATION (D tr - 0 - 10%; M - ± lt - 10 - 20%; S sm - 20 - 35% & 35-50%)	DEPTH	REMARKS
				N	2					
1		1		12	4	SP	M	Medium to coarse, clean sligihtly gravely, sand,		1½" gravel middle of sampler
					8					
2					6					
					8	SP	M	Grey m to c sand		
3		2		18	10					
					4					
4		3			8	SP	M	Grey m to c sand, traces of gravel		1/2" gravel piece
				19	11					
5					6					51" gravel in bit and near bit
					10	SP	M	Grey m to c sand, traces of gravel		
6				22	12					
					8	SP	M	Grey m to c sand, light gravel		1" gravel & rock fragments in middle of sampler
7					8					
				19	11					
8					10					
					10			Grey m to c sand, no gravel		
9					17					
				39	22					
10										10
11								Avoided need to clean out hole by leaving sampler in place while augering. Zisman verified fall makrs on hammer is 30".		
12										
13										
14										
15										15
16										
17										
18										
19										
20										20
21										
22										
23										

BURNS AND ROE, INC.	BORING NO. CT-2 Light Pole 19

PROJECT Hanford No. 2	GRND. WATER	DATE	TIME	DEPTH	CASING	SHEET NO.: 1 OF 1
OWNER WPPSS			10:50			PROJECT NO.:
CONTRACTOR Burns & Roe						ELEVATION:

METHOD OF ADVANC. BORING	DEPTH		CAS.	SAMP.	CORE	TUBE	
POWER AUGER	0 TO 35	TYPE	3 3/8	2" O.D.		--	DATUM:
HAND CHOP. W/MUD: W/WATER	TO	DIA.					DATE START: 9/23/81
ROT. DRILL: W/MUD: W/WATER	TO	WT.					DATE FINISHED
DIAMOND CORE	TO	FALL					DRILLER: PTL Gene
							INSPECTOR: Rodney Smith

DEPTH FT.	CASING BLOWS	SAMPLE NO.	SAMPLES RECOV. TOT.	SAMPLES RECOV. RQD.	PENETR. RESIST. BL./6IN.	SYMBOL	MOIST.	IDENTIFICATION	DEPTH	REMARKS
					2					
		1			5	SP	M	Grey m to c sand, traces of gravel		1" piece of gravel near bit
1				9	4					
					2					
2		2			2	SP	M	Grey and brown f to c sand, traces of fine gravel		
3				5	3					
3.5					6					
					22			Grey and brown f to c sand with a little gravel fragment		
4		3			33					
5									5	
6								Abandoned hole when it was realized we were not drilling in recently placed backfill.		
7										
8										
9										
10									10	
11										
12										
13										
14										
15									15	
16										
17										
18										
19										
20									20	
21										
22										
23										

BURNS AND ROE, INC.	BORING NO. CT-3 Air Intake SE

PROJECT Hanford No. 2	GRND. WATER	DATE	TIME	DEPTH	CASING	SHEET NO.: 1 OF 1
OWNER WPPSS						PROJECT NO::
CONTRACTOR Burns & Roe						ELEVATION:

METHOD OF ADVANC. BORING	DEPTH		CAS.	SAMP.	CORE	TUBE	
POWER AUGER	0 TO	TYPE	3 3/8	2" o.d			DATUM:
HAND CHOP. W/MUD: W/WATER	TO	DIA.					DATE START: 9/23/81
ROT. DRILL: W/MUD: W/WATER	TO	WT.					DATE FINISHED 9/24/81
DIAMOND CORE	TO	FALL					DRILLER: PTL Gene
							INSPECTOR: Rodney Smith

DEPTH FT.	CASING BLOWS	SAMPLE NO.	SAMPLES RECOV. TOT.	SAMPLES RECOV. RQD.	PENETR. RESIST. BL./6 IN.	SYMBOL	MOIST.	IDENTIFICATION	DEPTH	REMARKS (gravel/interference for rubber balloon correlation)
		1		1.2	2 5 7 6	SM	M	Brown f to m sand, traces of silt dry towards surface		
1										
2		2		2.9	10 19 26	SM	M	Brown f to m sand, traces of silt and fine gravel in bit		
3										
4		3		2.8	11 17 11	SP	M	Brown f to c sand, traces of gravel		
5		4		1.7	10 7 3	SP	M	Brown f to m sand, traces of coarse sand		5
6										Augered ahead with shelby in casing then quit for the day. pushed 1½" rock.
7		5		7	4 3 3	SP	M	Brown f to c sand, traces of gravel		
8										
9		6		5	3 2 2	SP	M	Brown f to c sand Grey h to c sand, little gravel		
10		7		5	4 7 17	SP	M	Grey course sand, trace gravel		10 Disregard n of 50*
11										
12		8		6.0	33 17 32	SP	M	Grey m to c sand, some gravel		Disregard N of 68*
13		9		6.8	36 30 41	SP	M	Grey f to c sand, little gravel broken gravel		Disregard N of 84*
14										
15		10		8.4	43 23 27	SP	M	Grey m to c sand, some broken gravel		15 Disregard N of 77/11*
16										
17		11		77/11	50/5" 9 28	SP SM SP	M	Grey m to c sand, little broken gravel 6" grey m to c sand, traces broken gravel		Disregard N of 67*
18		15a 14b 13c		67	39	SM		2½" brown fine sand, little silt		
19		12d		/	14	SM		3" grey course sand, some broken gravel		
20		16 17b		54	25 29 12		M	6" brown fine sand, little silt		20
21		18		47	21 28 17	SM	M	Brown fine sand, little silt (small layer of grey m to c sand)		
22										
23		19		60	25 35	SM	M	Brown fine sand, little silt Brown fine sand, little silt		

BURNS AND ROE, INC.	BORING NO. CT-9A

PROJECT WNP-2	GRND. WATER	DATE	TIME	DEPTH	CASING	SHEET NO.: 1 OF 1
OWNER W.P.P.S.S						PROJECT NO.: 3900
CONTRACTOR Geologic Assoc.						ELEVATION: 441.7
METHOD OF ADVANC. BORING	DEPTH		CAS.	SAMP.	CORE	TUBE	DATUM: MSL
POWER AUGER	TO 23	TYPE					DATE START: 10/17/81
HAND CHOP. W/MUD: W/WATER	TO	DIA.					DATE FINISHED 10/17/81
ROT. DRILL: W/MUD: W/WATER	TO	WT.					DRILLER: F. Reynolds
DIAMOND CORE	TO	FALL					INSPECTOR: R. Smith

DEPTH FT.	TYPE OF TEST	SAMPLE NO.	SAMPLES TOT. REC	SAMPLES N VAL.	SAMPLES PENETR. RESIST. BL./6 IN.	SYMBOL	MOIST.	IDENTIFICATION	DEPTH	REMARKS
1										
2										
3										
4										
5									5	
6										
7										
8										
9										
10									10	
11										
12	N	1		98	36 49 49 48	SP	M	Gray - brown f-c SAND, some Gravel.		
13	N									
14		2		131	48 83	SP SM	M	Gray - brown f +c SAND, little f Gravel t.+ of Silt		
15					12				15	
16	N	3		83	32 51 35	SP	M	Gray - br f-C SAND, t.Gravel, t.Silt		
17		4		78	31 47 14	SP	M	Gray - brown f-C SAND, t. Gravel t. of Silt		
18										
19	N	5		48	21 27 18	SP	M	Gray - brown f-C SAND, t. of Silt t. of Gravel		
20	N	6		40	20 20 10	SP	M	Gray - brown f-C + SAND, t. of Gravel	20	
21					16	SP	M	Gray - M-C SAND		
22	N	7		38	22 16					
23	N	8		47	22 25	SP	M	Gray - M-C SAND		

BURNS AND ROE, INC.	BORING NO. CT-22

PROJECT WNP-2	GRND. WATER	DATE	TIME	DEPTH	CASING	SHEET NO.: 1 OF 2
OWNER W.P.P.S.S						PROJECT NO.: 3900
CONTRACTOR Geologic Assoc.						ELEVATION: 444.2

METHOD OF ADVANC. BORING	DEPTH		CAS.	SAMP.	CORE	TUBE	DATUM: MSL
POWER AUGER	TO 25'	TYPE					DATE START: 10/15/81
HAND CHOP. W/MUD: W/WATER	TO	DIA.					DATE FINISHED 10/16/81
ROT. DRILL: W/MUD: W/WATER	TO	WT.					DRILLER: F. Reynolds
DIAMOND CORE	TO	FALL					INSPECTOR: R. Smith

DEPTH FT.	TYPE OF TEST	SAMPLE NO.	SAMPLES TOT. REC	N VAL.	PENETR. RESIST. BL./6 IN.	SYMBOL	MOIST.	IDENTIFICATION	DEPTH	REMARKS
					3					
1		1		35	12	SP	M	Brown f-C SAND, some Silt, little Gravel		
					23					
2					21					
		2			29			Brown fine SAND, some Silt, some Gravel, t. of C Sand		
3	N			67	38	SP	M			
	N				32					
4		3			32					
				81	49	SP	M	Brown fine SAND, little Silt, little Gravel, t. of C Sand		
5					23					5
		4			42			Brown f-C SAND, little Silt little Gravel		
6				97	55					
					41			Brown f-C SAND, little Gravel,		
7		5			75	SP	M	t. of Silt		
					23					
8					32	SP	M	Brown M-C SAND, little Gravel,		
		6		63	31			t. of Silt		
9	N P				29					
					47	SP	M	Brown - gray M-C SAND, some		
10		7		92	45			Gravel, t. of Silt		10
11					28					
		8		72	32	SP	M	Brown - gray M-C SAND, little		
12	N				40			Gravel, t. of fine Sand		
	N				48					
13		9			44			Brown - gray M-C SAND, little		
				101	57			Gravel, t. of fine Sand		
14					22					
	N	10			34	SP	M	Brown - gray M-C SAND, little		
15	N			79	45			Gravel, t. of fine Sand		15
	P				47					
16		11			36	SP	M	Brown - gray M-C SAND, t. of		
				70	34			Gravel		
17					14					
		12			25			Brown - gray M-C SAND, some		
18				51	26	SP	M	Gravel, t. of fine Sand		
					28					
19	N	13			32	SP	M	Brown - gray M-C SAND, some		
				58	26			Gravel		
20					16					20
		14			23	SP	M	Brown - gray, M-C SAND		
21	N			72	49			t. of Gravel		
					41					
22	NP	15		109	62	SP	M	Brown - gray M-C SAND		
					47					
23					15					

BURNS AND ROE, INC.	BORING NO. CT-22
PROJECT WNP-2	SHEET NO.: 2 OF 2
OWNER W.P.P.S.S.	JOB NO.: 3900

DEPTH FT.	TYPE OF TEST	SAMPLE NO.	SAMPLES TOT. REC	SAMPLES N VAL.	SAMPLES PENETR. RESIST. BL./6 IN.	SYMBOL	MOIST.	IDENTIFICATION	DEPTH	REMARKS
					25					
24		16		47	22	SP	M	Black f-m-c SAND, trace f. Gravel		
					15					
25		17		26	10	SP	M	Black f-m-c SAND, trace f. Gravel	25	
					16					
					16					
26		18		51	22	SP	M	Black f-m-c SAND, trace f. Gravel		
					29					
27					21					
		19		38	19	SP	M	Black f-m-c SAND, trace f. Gravel		
28					19					
29					-					
					4					
		20		26	16	SP	M	Black f-m-c SAND, trace Gravel		
30					16				30	
31										
32										
33										
34										
35									35	
36										
37										
38										
39										
40									40	
41										
42										
43										
44										
45									45	
46										
47										
48										
49										

BURNS AND ROE, INC.	BORING NO. CT-24

PROJECT WNP-2	GRND. WATER	DATE	TIME	DEPTH	CASING	SHEET NO.: 1 OF 1
OWNER W.P.P.S.S						PROJECT NO.: 3900
CONTRACTOR Geologic Assoc.						ELEVATION: 444.7
METHOD OF ADVANC. BORING	DEPTH		CAS.	SAMP.	CORE	TUBE	DATUM: MSL
POWER AUGER	0 TO 16.5	TYPE					DATE START: 10/16/81
HAND CHOP. W/MUD: W/WATER	TO	DIA.					DATE FINISHED 10/16/81
ROT. DRILL: W/MUD: W/WATER	TO	WT.					DRILLER: F. Reynolds
DIAMOND CORE	TO	FALL					INSPECTOR: R. Smith

DEPTH FT.	TYPE OF TEST	SAMPLE NO.	SAMPLES TOT. REC	SAMPLES N VAL.	SAMPLES PENETR. RESIST. BL./6 IN.	SYMBOL	MOIST.	IDENTIFICATION	DEPTH	REMARKS
					3					
1		1		9	3	SP	M	Brown f-C SAND, t. of Silt, t. of fine Gravel		
					6					
2					6					
					10	SP	M	Brown f-M SAND, t. of Silt		
3	N	2		22	12					
					18					
4	N	3		48	20	SP	M	Brown - gray f-M SAND		
					28					
5					7				5	
					18	SP	M	Gray Medium SAND, t. of coarse and fine sand		
6	N	4		41	23					
	N				64					
7					16	SP	M	Gray Medium SAND, t. of coarse and fine sand		
		5		34	18					
8					11					
					19	SP	M	Black f-M SAND,		
9	N	6		40	21					
					27					
10	NP				22	SP	M	Black f-m SAND, t. of Gravel	10	
		7		41	19					
11					5					
					14	SP	M	Black f-m SAND, t. of Gravel		
12		8		33	19					
	N				12					
13					13	SP	M	Black - brown f-C SAND, t. of fine Gravel		
		9		33	20					
14					8					
					12	SP	M	Black - brown f-C SAND, t. of Gravel		
15		10		31	19				15	
					17					
16		11		42	21	SP	M	Black f-C SAND, little Gravel		
					21					
17										
18										
19										
20									20	
21										
22										
23										

BURNS AND ROE, INC.	BORING NO. CT-25

PROJECT WNP-2	GRND. WATER	DATE	TIME	DEPTH	CASING	SHEET NO.: 1 OF 2
OWNER W.P.P.S.S						PROJECT NO.: 3900
CONTRACTOR Geologic Assoc.						ELEVATION: 434.5
METHOD OF ADVANC. BORING	DEPTH		CAS.	SAMP.	CORE	TUBE	DATUM: MSL
POWER AUGER	0 TO 9	TYPE					DATE START: 10/17/81
HAND CHOP. W/MUD: W/WATER	TO	DIA.					DATE FINISHED 10/17/81
ROT. DRILL: W/MUD: W/WATER	TO	WT.					DRILLER: F. Reynolds
DIAMOND CORE	TO	FALL					INSPECTOR: R. Smith

DEPTH FT.	TYPE OF TEST	SAMPLE NO.	SAMPLES TOT. REC	SAMPLES N VAL.	SAMPLES PENETR. RESIST. BL./6 IN.	SYMBOL	MOIST.	IDENTIFICATION	DEPTH	REMARKS
					5					
1		1			7	SM	M	Brown f-C SAND, little Silt, t. of fine Gravel		
				20	13					
2					16					
		2			18	SP	M	Brown f-C SAND, little Gravel, t. of Silt		
3				51	33					
					22					
4	N	3			22	SP	M	Brown f-C SAND, t. of Gravel, t. of Silt		
				45	23					
5					25				5	
	N	4			37	–	–	No recovery		
6	N			74	37					
	N				32					
7		5		46	22	SP	M	Brown f-C SAND, t. of Gravel, t. of Silt		
					24					
8					30					
					70	–	–	No recovery		
9				141	71					
10									10	
11										
12										
13										
14										
15									15	
16										
17										
18										
19										
20									20	
21										
22										
23										

BURNS AND ROE, INC.	BORING NO. CT-25A

PROJECT WNP-2	GRND. WATER	DATE	TIME	DEPTH	CASING	SHEET NO.: 2 OF 2
OWNER W.P.P.S.S						PROJECT NO.: 3900
CONTRACTOR Geologic Assoc.						ELEVATION: 434.5
METHOD OF ADVANC. BORING	DEPTH		CAS.	SAMP.	CORE	TUBE	DATUM: MSL
POWER AUGER	0 TO 15	TYPE					DATE START: 10/17/81
HAND CHOP. W/MUD: W/WATER	TO	DIA.					DATE FINISHED 10/17/81
ROT. DRILL: W/MUD: W/WATER	TO	WT.					DRILLER: F. Reynolds
DIAMOND CORE	TO	FALL					INSPECTOR: R. Smith

DEPTH FT.	TYPE OF TEST	SAMPLE NO.	SAMPLES TOT. REC	SAMPLES N VAL.	SAMPLES PENETR. RESIST. BL./6 IN.	SYMBOL	MOIST.	IDENTIFICATION	DEPTH	REMARKS
1										
2										
3										
4										
5									5	
6										
7										
8					14					
		6			26	SP	M	Brown f-C SAND, t. of fine Gravel, t. of Silt		
9	N			56	30					
					30					
10					26	SP	M	Gray - brown f-C SAND, t. of Gravel, t. of Silt	10	
		7		48	22					
11					7					
					16	SP	M	Gray M-C SAND, t. of fine Gravel t. of Silt		
12	N	8		49	33					
	N				40					
13	N	9		86	43	SP	M	Gray M-C SAND, little Gravel, t. of fine SAND		
	P				43					
14					16					
		10		62	22	SP	M	Brown f-m SAND, little Gravel, little Silt		
15					40				15	
16										
17										
18										
19										
20									20	
21										
22										
23										

BURNS AND ROE, INC.	BORING NO. CT-26

PROJECT WNP-2	GRND. WATER	DATE	TIME	DEPTH	CASING	SHEET NO.: 1 OF 1
OWNER W.P.P.S.S						PROJECT NO.: 3900
CONTRACTOR Geologic Assoc.						ELEVATION: 433.2
METHOD OF ADVANC. BORING	DEPTH		CAS.	SAMP.	CORE	TUBE	DATUM: MSL
POWER AUGER	0 TO 15	TYPE					DATE START: 10/17/81
HAND CHOP. W/MUD: W/WATER	TO	DIA.					DATE FINISHED 10/17/81
ROT. DRILL: W/MUD: W/WATER	TO	WT.					DRILLER: F. Reynolds
DIAMOND CORE	TO	FALL					INSPECTOR: R. Smith

DEPTH FT.	TYPE OF TEST	SAMPLE NO.	SAMPLES TOT. REC	SAMPLES N VAL.	SAMPLES PENETR. RESIST. BL./6 IN.	SYMBOL	MOIST.	IDENTIFICATION	DEPTH	REMARKS
1		1		53	10, 21, 32, 33	SP	M	Light brown f-M SAND, t. of Gravel, t. of Silt		
2, 3		2		116	51, 65	SP	M	Brown f-M SAND, some Silt, t. of Gravel		
4	N	3		57	23, 24, 33	SP	M	Brown f-M SAND, some Silt, t. of Gravel		
5	N				28				5	
6		4		65	29, 36	SP	M	Brown f-M SAND, some Silt, little Gravel		
7		5		67	27, 30, 37	SP	M	Brown, f-M SAND, some Silt, t. of Gravel		
8	N				23					
9	N	6		116	41, 75	SP	M	Brown f-C SAND, little Silt, t. of Gravel		
10		7		36	16, 17, 19	SP	M	Brown f-C SAND, t. of Silt	10	
11	N, NP				14					
12	N	8		40	15, 26, 75/0.4	SP	M	Brown f-C SAND, t. of fine Gravel, t. of Silt No recovery		
13										
14		9			33, 59	SP	M	Brown - gray f-C SAND, t. of Gravel, t. of Silt		
15					75/0.3				15	
16										
17										
18										
19										
20									20	
21										
22										
23										

BURNS AND ROE, INC.	BORING NO. CT-27

PROJECT WNP-2	GRND. WATER	DATE	TIME	DEPTH	CASING	SHEET NO.: 1 OF 1
OWNER W.P.P.S.S						PROJECT NO.: 3900
CONTRACTOR Geologic Assoc.						ELEVATION: 441.1
METHOD OF ADVANC. BORING	DEPTH		CAS.	SAMP.	CORE	TUBE	DATUM: MSL
POWER AUGER	0 TO 19.5	TYPE					DATE START: 10/17/81
HAND CHOP. W/MUD: W/WATER	TO	DIA.					DATE FINISHED 10/19/81
ROT. DRILL: W/MUD: W/WATER	TO	WT.					DRILLER: F. Reynolds
DIAMOND CORE	TO	FALL					INSPECTOR: R. Smith

DEPTH FT.	TYPE OF TEST	SAMPLE NO.	SAMPLES TOT. REC	SAMPLES N VAL.	SAMPLES PENETR. RESIST. BL./6IN.	SYMBOL	MOIST.	IDENTIFICATION	DEPTH	REMARKS
1		1		5	1 1 4	SP	M	Black f-M SAND		
2					8					
3	N	2		24	10 14 15	SP	M	Black f-M SAND		
4	N	3		34	17 17 7	SP	M	Black f-M SAND		
5					12				5	
6	N	4		31	19 17	SP	M	Black f-M SAND, t. of C Sand		
7	N	5		37	18 19 8	SP	M	Black f-M SAND		
8		6		30	15 15 16	SP	M	Gray f-M SAND, t. of Gravel		
9	N									
10		7		38	20 18 7	SP	M	Gray f-C SAND, t. of fine Gravel	10	
11		8		22	11 11 9	SP	M	Gray f-C SAND, little Gravel		
12	N									
13	N	9		17	9 8 8	SP	M	Gray f-C SAND		
14		10		14	7 7 6	SP	M	Gray - brown f-C SAND, t. of Gravel		
15	N								15	
16	N	11		11	5 6 6	SP	M	Gray - brown f-C SAND, t. of Silt		
17		12		8	4 4 3	SP	M	Gray - brown f-C SAND, t. of Silt		
18	N									
19	N	13		10	4 6 4	SP	M	Gray - brown f-C SAND, little Gravel, t. of Silt		
20		14		18	9 9 10	SP	M	Gray - brown f-C SAND, t. of Silt, t. of Gravel	20	
21										
22		15		17	9 8	SP	M	Gray - brown f-C SAND, Some Gravel, t. of Silt		
23										

BURNS AND ROE, INC.	BORING NO. CT-28

PROJECT WNP-2	GRND. WATER	DATE	TIME	DEPTH	CASING	SHEET NO.: 1 OF 1
OWNER W.P.P.S.S						PROJECT NO.: 3900
CONTRACTOR Geologic Assoc.						ELEVATION: 440.9

METHOD OF ADVANC. BORING	DEPTH		CAS.	SAMP.	CORE	TUBE	
POWER AUGER	0 TO 18	TYPE					DATUM: MSL
HAND CHOP. W/MUD: W/WATER	TO	DIA.					DATE START: 10/19/81
ROT. DRILL: W/MUD: W/WATER	TO	WT.					DATE FINISHED 10/19/81
DIAMOND CORE	TO	FALL					DRILLER: F. Reynolds
							INSPECTOR: R. Smith

DEPTH FT.	TYPE OF TEST	SAMPLE NO.	SAMPLES TOT. REC.	SAMPLES N VAL.	SAMPLES PENETR. RESIST. BL./6 IN.	SYMBOL	MOIST.	IDENTIFICATION	DEPTH	REMARKS
					4	GP				
		1			22		M	Lt. brown GRAVEL and SAND		
1	N			77	55	SP		little Silt		
2	N				26					
		2		49	23	SP	M	Lt. brown f-C SAND, little		
3					26			Gravel, little Silt		
					8					
4	N	3		32	13	SP	M	Gray - brown f-M + - C SAND,		
	NP				19			t. Gravel, t. Silt		
5					20				5	
		4		48	23	SP	M	Gray - brown f-C SAND		
6					25			little Gravel, little Silt		
					10					
7		5		42	20	SP	M	Gray f-C SAND, little		
	N				22			Gravel		
8	N				24					
		6		102	27	SP	M	Gray f-C SAND, some		
9					75			Gravel		
	N				24					
10	N	7		67	27	SP	M	Gray - brown f-C SAND,	10	
					40			some Gravel, little Silt		
11					28					
		8		58	25	SP	M	Gray f-C SAND, t. of Gravel		
12					33					
					5					
13		9		67	27	SP	M	Gray f-C - SAND, t. of		
					40			Gravel		
14					26					
		10		59	31	SP	M	Gray f-C SAND and GRAVEL		
15					28	-GP			15	
					75					
16		11		-	-	SP	M	Gray - brown f-C SAND,		
					-			little Silt, little Gravel		
17					23					
		12		58	28	SP	M	Gray f-C SAND and GRAVEL		
18					30	-GP				
19										
20									20	
21										
22										
23										

BURNS AND ROE, INC.	BORING NO. CT-29

PROJECT WNP-2	GRND. WATER	DATE	TIME	DEPTH	CASING	SHEET NO.: 1 OF 1
OWNER W.P.P.S.S						PROJECT NO.: 3900
CONTRACTOR Geologic Assoc.						ELEVATION: 440.7
METHOD OF ADVANC. BORING	DEPTH		CAS.	SAMP.	CORE	TUBE	DATUM: MSL
POWER AUGER	0 TO 9	TYPE					DATE START: 10/23/81
HAND CHOP. W/MUD: W/WATER	TO	DIA.					DATE FINISHED 10/23/81
ROT. DRILL: W/MUD: W/WATER	TO	WT.					DRILLER: F. Reynolds
DIAMOND CORE	TO	FALL					INSPECTOR: R. Smith

DEPTH FT.	TYPE OF TEST	SAMPLE NO.	SAMPLES TOT. REC	SAMPLES N VAL.	SAMPLES PENETR. RESIST. BL./6 IN.	SYMBOL	MOIST.	IDENTIFICATION	DEPTH	REMARKS
					31					
1		1		78	43	SP	D	lt. brown f-C SAND, some Silt, little Gravel		
					35					
2					1					
		2		39	21	SP	M	Brown - gray f-C SAND, t. of Silt, t. of fine Gravel		
3					18					
					16					
4		3		34	18	SP	M	Brown - gray f-C SAND, t. of Silt, t. of fine Gravel		
					16					
5	N				8					5
		4		35	13	SP	M	Brown - gray, f-c SAND, t. of Silt		
6	N				22					
	NP				21					
7		5		60	29	SP	M	Gray f-c SAND, t. Gravel		
					31					
8					24					
		6		66	30	SP	M	Gray f-c SAND, little Gravel		
9					36					
10										10
11										
12										
13										
14										
15										15
16										
17										
18										
19										
20										20
21										
22										
23										

BURNS AND ROE, INC.	BORING NO. CT-30

PROJECT WNP-2	GRND. WATER	DATE	TIME	DEPTH	CASING	SHEET NO.: 1 OF 1
OWNER W.P.P.S.S						PROJECT NO.: 3900
CONTRACTOR Geologic Assoc.						ELEVATION: 439.7
METHOD OF ADVANC. BORING	DEPTH		CAS.	SAMP.	CORE	TUBE	DATUM: MSL
POWER AUGER	0 TO 9.5	TYPE					DATE START: 10/20/81
HAND CHOP. W/MUD: W/WATER	TO	DIA.					DATE FINISHED 10/20/81
ROT. DRILL: W/MUD: W/WATER	TO	WT.					DRILLER: F. Reynolds
DIAMOND CORE	TO	FALL					INSPECTOR: R. Smith

DEPTH FT.	TYPE OF TEST	SAMPLE NO.	SAMPLES TOT. REC	SAMPLES N VAL.	PENETR. RESIST. BL./6 IN.	SYMBOL	MOIST.	IDENTIFICATION	DEPTH	REMARKS
					1					
					4					
1		1		17	7	SP	M	Gray f-C SAND		
					10					
2					12					
3		2		37	18	SP	M	Gray f-C SAND		
					19					
4					20					
		3		35	20	SP	M	Gray f-C SAND, t. of Gravel, t. of Silt		
5					15				5	
					12					
6		4		28	14	SP	M	Gray - brown f-C SAND, little gravel, t. of Silt		
					14					
7					10					
		5		15	8	SP	M	Gray, f-M+-C SAND, t. of Gravel		
8					7					
					10					
9		6		55	18	SP	M	Gray f-C SAND, t. of Silt, t. fine Gravel		
					37					
10									10	
11										
12										
13										
14										
15									15	
16										
17										
18										
19										
20									20	
21										
22										
23										

BURNS AND ROE, INC.	BORING NO. CT-31

PROJECT WNP-2	GRND. WATER	DATE	TIME	DEPTH	CASING	SHEET NO.: 1 OF 2
OWNER W.P.P.S.S						PROJECT NO.: 3900
CONTRACTOR Geologic Assoc.						ELEVATION: 439.8
METHOD OF ADVANC. BORING	DEPTH		CAS.	SAMP.	CORE	TUBE	DATUM: MSL
POWER AUGER	0 TO 23'	TYPE					DATE START: 10/20/81
HAND CHOP. W/MUD: W/WATER	TO	DIA.					DATE FINISHED 10/20/81
ROT. DRILL: W/MUD: W/WATER	TO	WT.					DRILLER: F. Reynolds
DIAMOND CORE	TO	FALL					INSPECTOR: R. Smith

DEPTH FT.	TYPE OF TEST	SAMPLE NO.	SAMPLES TOT. REC	SAMPLES N VAL.	SAMPLES PENETR. RESIST. BL./6 IN.	SYMBOL	MOIST.	IDENTIFICATION	DEPTH	REMARKS
1		1		61	10, 32, 29	SP	M	Brown f+-C SAND, some Silt, t. of Gravel		
2		2		69	29, 34, 35	SP	M	Brown f+-C SAND, some Silt, some Gravel		
3					21					
4		3		63	31, 32, 33	SP	M	Gray - brown f-C SAND, little Silt, little Gravel		
5		4		114	55, 59, 30	SP	M	Gray f-C - SAND, some Gravel, little Silt		5
7		5		83	38, 45, 33	SP	M	Gray f-C - SAND, little Silt, t. of Gravel		
8		6		139	52, 87, 43	SP	M	Lt. gray f-C SAND, t. of Gravel, t. of Silt		
10		7		-	75, -, 75	SP	M	Gray f-m+-C SAND, t. of Silt, t. of Gravel		10
11		8		-	-, -, 45	GP-SP	M	Gray br. GRAVEL and SAND, t. of Silt		
13		9		-	90, -, 42	SP	M	Gray f-C SAND, little Gravel, t. of Silt		
14		10		-	75, -	SP	M	Gray f-M-C SAND, t. of Gravel		
15		11		-	75/.4, -	SP	M	Gray f-C - SAND, little Gr., t.Silt		15
16		12		-	55, 75/.4, 56	SP	M	Gray f-C - SAND, t. of Gravel		
18		13		-	75/.6, -	SP	M	Gray f-C - SAND, t. of Silt, t.Gr.		
19		14		-	56, 175, -	SP	M	Gray f-c - SAND, t. of Gravel t. of Silt		
20		15		-	56, 75, 75/.3	SP	M	Gray f-M+-C SAND, t. of Gravel		20
22		16		-	59, 80	SP	M	Gray f-M-C SAND, t. of Gravel		
23										

BURNS AND ROE, INC.	BORING NO. CT-32

PROJECT WNP-2	GRND. WATER	DATE	TIME	DEPTH	CASING		SHEET NO.: 1 OF 1
OWNER W.P.P.S.S							PROJECT NO.: 3900
CONTRACTOR Geologic Assoc.							ELEVATION: 440.5
METHOD OF ADVANC. BORING	DEPTH		CAS.	SAMP.	CORE	TUBE	DATUM: MSL
POWER AUGER	0TO9	TYPE					DATE START: 10/20/81
HAND CHOP. W/MUD: W/WATER	TO	DIA.					DATE FINISHED 10/20/81
ROT. DRILL: W/MUD: W/WATER	TO	WT.					DRILLER: F. Reynolds
DIAMOND CORE	TO	FALL					INSPECTOR: R. Smith

DEPTH FT.	TYPE OF TEST	SAMPLE NO.	SAMPLES TOT. REC	SAMPLES N VAL.	SAMPLES PENETR. RESIST. BL./6 IN.	SYMBOL	MOIST.	IDENTIFICATION	DEPTH	REMARKS
					7					
1		1		19	10	SP	M	Brown fine SAND, little Silt, t. Gravel		
					9					
2	N				10					
	N	2		20	10	SP	M	Brown fine SAND, little Silt,		
3					10					
					3					
4		3		8	5	SP	M	Brown fine SAND, little Silt, t. of Gravel		
					3					
5					3					5
		4		3	2	SP	M	Brown fine SAND, little Silt		
6					1					
					2					
7		5		14	3	SP	M	Brown fine SAND, little Silt t. of Gravel		
	N				11					
8	N				30					
		6		87	40	SP	M	Gray f-C SAND, little Gravel		
9					47					
10										10
11										
12										
13										
14										
15										15
16										
17										
18										
19										
20										20
21										
22										
23										

BURNS AND ROE, INC.	BORING NO. CT-33

PROJECT WNP-2	GRND. WATER	DATE	TIME	DEPTH	CASING		SHEET NO.: 1 OF 1
OWNER W.P.P.S.S							PROJECT NO: 3900
CONTRACTOR Geologic Assoc.							ELEVATION: 440.3
METHOD OF ADVANC. BORING	DEPTH		CAS.	SAMP.	CORE	TUBE	DATUM: MSL
POWER AUGER	0 TO 9	TYPE					DATE START: 10/20/81
HAND CHOP. W/MUD: W/WATER	TO	DIA.					DATE FINISHED 10/20/81
ROT. DRILL: W/MUD: W/WATER	TO	WT.					DRILLER: F. Reynolds
DIAMOND CORE	TO	FALL					INSPECTOR: R. Smith

DEPTH FT.	TYPE OF TEST	SAMPLE NO.	SAMPLES TOT. REC	SAMPLES N VAL.	SAMPLES PENETR. RESIST. BL./6 IN.	SYMBOL	MOIST.	IDENTIFICATION	DEPTH	REMARKS
1		1		11	1 5 6	SP	M	Gray - brown f-m SAND, t. of Gravel, t. of Silt		
2		2		12	5 6 6	SP	M	Brown fine SAND, t. of Silt, t. of Gravel		
3		3		5	3 2 3	SP	M	Brown f-m SAND, t. of Silt, t. of Gravel		
4										
5	P	4		10	4 6 4	GP SP	M	Gray - brown GRAVEL, some f. Sand	5	
6										
7		5		12	4 5 7	SP	M	Gray - brown f-C SAND, t. of Gravel, t. of Silt		
8		6		30	11 14 16	SP	M	Gray - brown f-C SAND, t. of br. Gravel, t. of Silt		
9										
10									10	
11										
12										
13										
14										
15									15	
16										
17										
18										
19										
20									20	
21										
22										
23										

BURNS AND ROE, INC.	BORING NO. CT-34

PROJECT WNP-2	GRND. WATER	DATE	TIME	DEPTH	CASING	SHEET NO.: 1 OF 1
OWNER W.P.P.S.S						PROJECT NO.: 3900
CONTRACTOR Geologic Assoc.						ELEVATION: 439.6

METHOD OF ADVANC. BORING	DEPTH		CAS.	SAMP.	CORE	TUBE	DATUM: MSL
POWER AUGER	0TO23	TYPE					DATE START: 10/21/81
HAND CHOP. W/MUD: W/WATER	TO	DIA.					DATE FINISHED 10/21/81
ROT. DRILL: W/MUD: W/WATER	TO	WT.					DRILLER: F. Reynolds
DIAMOND CORE	TO	FALL					INSPECTOR: R. Smith

DEPTH FT.	TYPE OF TEST	SAMPLE NO.	SAMPLES TOT. REC	SAMPLES N. VAL.	SAMPLES PENETR. RESIST. BL./6 IN.	SYMBOL	MOIST.	IDENTIFICATION	DEPTH	REMARKS
					3					
1		1		33	15	SP	M	Brown f-C SAND, t. of Silt, t. of fine Gravel		
					18					
2					21					
	N	2		48	23	SP	M	Brown f-C SAND, t. of Silt, t. of Gravel		
3					25					
	N				25					
4		3		84	36	SM	M	Brown - gray f-c SAND, t. of Silt, t. of br. Gravel		
					48					
5					49				5	
	N	4		143	82	GP	M	Gray f. GRAVEL		
6					61					
	NP				35					
7		5		40	22	SP	M	Gray f-C SAND		
					18					
8					6					
		6		25	12	SP	M	Gray f-M SAND		
9					13					
					14					
10		7		36	16	SP	M	Gray f-M SAND	10	
					20					
11					18					
		8		35	19	SP	M	Gray f-M SAND		
12					16					
					7					
13	P	9		19	10	SP	M	Gray f-M SAND		
					9					
14					5					
		10		14	6	SP	M	Gray f-C SAND		
15					8				15	
					7					
16		11		17	8	SP	M	Gray f-M SAND		
					9					
17					7					
		12		13	6	SP	M	Gray f-M SAND, t. of Gravel		
18					7					
					8					
19		13		17	8	SP	M	Gray f-C - SAND, t. of Gravel		
					9					
20					10				20	
		14		24	12	SP	M	Black f-C SAND, t. of fine Gravel		
21					12					
					12					
22		15		26	14	SP	M	Black f-m SAND, t. of Gravel		
					12					
23										

BURNS AND ROE, INC.

BORING NO. CT-35

PROJECT WNP-2	GRND. WATER	DATE	TIME	DEPTH	CASING	SHEET NO.: 1 OF	
OWNER W P P S S						PROJECT NO.: 3900	
CONTRACTOR Geologic Assoc.						ELEVATION: 440.4	
METHOD OF ADVANC. BORING	DEPTH		CAS.	SAMP.	CORE	TUBE	DATUM: MSL
POWER AUGER	0 TO 9	TYPE					DATE START: 10/21/81
HAND CHOP. W/MUD: W/WATER	TO	DIA.					DATE FINISHED 10/21/81
ROT. DRILL: W/MUD: W/WATER	TO	WT.					DRILLER: F. Reynolds
DIAMOND CORE	TO	FALL					INSPECTOR: R. Smith

DEPTH FT.	TYPE OF TEST	SAMPLE NO.	SAMPLES TOT. REC	N VAL.	PENETR. RESIST. BL./6 IN.	SYMBOL	MOIST.	IDENTIFICATION	DEPTH	REMARKS
					4					
					5	SP	M	Brown, f-m sand, little silt		
1		1		10	5					
					6					
2					9	SP	M	Brown, f-m sand, little silt, t. of gravel		
3		2		27	18					
					7					
4					8	SP	M	Brown, f-m sand, little silt, t. of gravel.		
		3		17	9					
5					12	SP	M	Brown, f-m sand, little silt, t. of gravel	5	
					12					
6		4		29	17					
					17					
7					19					
		5		37	18	SP	M	Brown, f-m sand, little silt, little gravel		
8					15					
					16	SP	M	Gray, f-c sand, little silt, t. of gravel		
9		6		35	19					
10									10	
11										
12										
13										
14										
15									15	
16										
17										
18										
19										
20									20	
21										
22										
23										

BURNS AND ROE, INC.	BORING NO. CT-36

PROJECT WNP-2	GRND. WATER	DATE	TIME	DEPTH	CASING	SHEET NO.: 1 OF 1
OWNER W.P.P.S.S						PROJECT NO.: 3900
CONTRACTOR Geologic Assoc.						ELEVATION: 439.9

METHOD OF ADVANC. BORING	DEPTH		CAS.	SAMP.	CORE	TUBE	
POWER AUGER	0 TO 9	TYPE					DATUM: MSL
HAND CHOP. W/MUD: W/WATER	TO	DIA.					DATE START: 10/21/81
ROT. DRILL: W/MUD: W/WATER	TO	WT.					DATE FINISHED 10/21/81
DIAMOND CORE	TO	FALL					DRILLER: F. Reynolds
							INSPECTOR: R. Smith

DEPTH FT.	TYPE OF TEST	SAMPLE NO.	SAMPLES TOT. REC	SAMPLES N VAL.	SAMPLES PENETR. RESIST. BL./6 IN.	SYMBOL	MOIST.	IDENTIFICATION	DEPTH	REMARKS
					15					
1		1		52	22	SM	M	Gray - brown f-C SAND, little Silt, t. of Gravel		
	N				30					
2					27					
	N	2		56	26	SP	M	Gray - brown f-C SAND, little Gravel, t. of Silt		
3					30					
					11					
4		3		25	15	SP	M	Gray - brown f-c SAND, little Gravel, t. of Silt		
	N				10					
5					7				5	
	NP	4		28	8	SP	M	Gray - brown f-C SAND, little Gravel, t. of Silt		
6					20					
					13					
7		5		49	29	SP	M	Gray - brown f-C SAND some Gravel, t. of Silt		
	N				20					
8					20					
		6		36	17	SP	M	Gray - brown f-C SAND, t. of Gravel		
9					19					
10									10	
11										
12										
13										
14										
15									15	
16										
17										
18										
19										
20									20	
21										
22										
23										

BURNS AND ROE, INC.	BORING NO. CT-37

		GRND. WATER	DATE	TIME	DEPTH	CASING	
PROJECT	WNP-2						SHEET NO.: 1 OF 1
OWNER	W.P.P.S.S						PROJECT NO.: 3900
CONTRACTOR	Geologic Assoc.						ELEVATION: 438.8

METHOD OF ADVANC. BORING	DEPTH		CAS.	SAMP.	CORE	TUBE	
POWER AUGER	0 TO 18	TYPE					DATUM: MSL
HAND CHOP. W/MUD: W/WATER	TO	DIA.					DATE START: 10/21/81
ROT. DRILL: W/MUD: W/WATER	TO	WT.					DATE FINISHED 10/22/81
DIAMOND CORE	TO	FALL					DRILLER: F. Reynolds
							INSPECTOR: R. Smith

DEPTH FT.	TYPE OF TEST	SAMPLE NO.	SAMPLES TOT. REC	N VAL.	PENETR. RESIST. BL./6 IN.	SYMBOL	MOIST.	IDENTIFICATION	DEPTH	REMARKS
1		1		7	1 2 5	SP	M	Gray f-c SAND		
2	N N	2		18	5 7 11	SP	M	Gray f-M SAND		
3					7					
4	N N	3		26	10 16 24	SP	M	Gray - brown f-C SAND, t. of fine Gravel		
5		4		48	22 26 5	SP	M	Gray f-C - SAND, t. of fine Gravel	5	
6										
7	N N P	5		26	10 16 14	SP	M	Gray f-C SAND, t. of fine Gravel		
8		6		28	14 14 9	SP	M	Gray f-C SAND, t. of fine Gravel		
9										
10		7		41	15 26 28	SP	M	Gray f-C SAND, t. of fine Gravel	10	
11		8		71	32 39 24	SP	M	Gray f-C SAND, t. of fine Gravel		
12										
13		9		53	26 27 24	SP	M	Gray - brown f-C SAND, t. of Silt		
14	P	10		65	29 36 23	SP	M	Gray f-C SAND, little Gravel		
15									15	
16		11		60	28 32 27	SP	M	Gray f-C SAND, little Gravel		
17		12		87	46 41	SP	M	Gray f-C SAND, some Gravel		
18										
19										
20									20	
21										
22										
23										

BURNS AND ROE, INC.	BORING NO. CT-38

PROJECT WNP-2	GRND. WATER	DATE	TIME	DEPTH	CASING	SHEET NO.: 1 OF 1
OWNER W.P.P.S.S						PROJECT NO.: 3900
CONTRACTOR Geologic Assoc.						ELEVATION: 438.3

METHOD OF ADVANC. BORING	DEPTH		CAS.	SAMP.	CORE	TUBE	DATUM: MSL
POWER AUGER	0 TO 12	TYPE					DATE START: 10/22/81
HAND CHOP. W/MUD: W/WATER	TO	DIA.					DATE FINISHED 10/22/81
ROT. DRILL: W/MUD: W/WATER	TO	WT.					DRILLER: F. Reynolds
DIAMOND CORE	TO	FALL					INSPECTOR: R. Smith

DEPTH FT.	TYPE OF TEST	SAMPLE NO.	SAMPLES TOT. REC	N VAL.	PENETR. RESIST. BL./6 IN.	SYMBOL	MOIST.	IDENTIFICATION	DEPTH	REMARKS
1		1		23	1, 6, 17	SP	M	Gray f-c SAND, t. of fine Gravel		
2		2		35	15, 16, 19	SP	M	Gray f-C SAND, t. of fine Gravel		
3										
4	N	3		34	7, 18, 16	SP	M	Gray f-C SAND, t. of Gravel		
5	N				13				5	
	P	4		29	11, 18, 8	SP	M	Gray f-c SAND, some Gravel		
6										
7		5		15	9, 6, 11	SP	M	Gray f-c SAND		
8										
9	N	6		16	8, 8, 16	SP	M	Gray f-C SAND, t. of fine Gravel		
10		7		58	24, 34, 44	SP	M	Gray f-C SAND, t. of fine Gravel	10	
11										
12		8		64	25, 39	SP	M	Gray f-C SAND, t. of fine Gravel		
13										
14										
15									15	
16										
17										
18										
19										
20									20	
21										
22										
23										

BURNS AND ROE, INC.	BORING NO. CT-39

PROJECT WNP-2	GRND. WATER	DATE	TIME	DEPTH	CASING	SHEET NO.: 1 OF 1
OWNER W.P.P.S.S						PROJECT NO.: 3900
CONTRACTOR Geologic Assoc.						ELEVATION: 440.8
METHOD OF ADVANC. BORING	DEPTH		CAS.	SAMP.	CORE	TUBE	DATUM: MSL
POWER AUGER	0TO9	TYPE					DATE START: 10/22/81
HAND CHOP. W/MUD: W/WATER	TO	DIA.					DATE FINISHED 10/22/81
ROT. DRILL: W/MUD: W/WATER	TO	WT.					DRILLER: F. Reynolds
DIAMOND CORE	TO	FALL					INSPECTOR: R. Smith

DEPTH FT.	TYPE OF TEST	SAMPLE NO.	SAMPLES TOT. REC	SAMPLES N VAL.	SAMPLES PENETR. RESIST. BL./6IN.	SYMBOL	MOIST.	IDENTIFICATION	DEPTH	REMARKS
					5					
1		1		36	11	SP	M	Brown f-C SAND, t. of Silt, little Gravel		
					25					
	N				29	SP				
2	N	2		49	25		M	Gray - brown f-C SAND, t. of Silt, t. of f. Gravel		
3					24					
					4					
4		3		22	8	SP	M	Black f-M SAND, little Gravel		
					14					
	NP				13					
5	N	4		32	14	SP	M	Grey f-m SAND	5	
6					18					
					6					
7	N	5		37	11	SP	M	Gray f-C SAND, little f. Gravel		
	N				26					
8					22					
		6		77	32	SP	M	Gray f-C SAND, t. Gravel		
9					45					
10									10	
11										
12										
13										
14										
15									15	
16										
17										
18										
19										
20									20	
21										
22										
23										

BURNS AND ROE, INC.	BORING NO. CT-40

PROJECT WNP-2	GRND. WATER	DATE	TIME	DEPTH	CASING	SHEET NO.: 1 OF 2
OWNER W.P.P.S.S						PROJECT NO.: 3900
CONTRACTOR Geologic Assoc.						ELEVATION: 441.7

METHOD OF ADVANC. BORING	DEPTH		CAS.	SAMP.	CORE	TUBE	
POWER AUGER	0 TO 30	TYPE					DATUM: MSL
HAND CHOP. W/MUD: W/WATER	TO	DIA.					DATE START: 10/22/81
ROT. DRILL: W/MUD: W/WATER	TO	WT.					DATE FINISHED 10/23/81
DIAMOND CORE	TO	FALL					DRILLER: F. Reynolds
							INSPECTOR: R. Smith

DEPTH FT.	TYPE OF TEST	SAMPLE NO.	SAMPLES TOT. REC	SAMPLES N VAL.	SAMPLES PENETR. RESIST. BL./6 IN.	SYMBOL	MOIST.	IDENTIFICATION	DEPTH	REMARKS
1	N	1		24	2, 11, 13, 13	SP	M	Gray f-C SAND, t. of Silt, t. of Gravel		
2	N	2		41	22, 19, 6	SP	M	Gray - brown f-C SAND, little Gravel, t. of Silt		
3										
4	N	3		27	10, 17, 14	SP	M	Gray - brown f-C SAND, t. of Silt, t. of Gravel		
5	NP	4		36	17, 19, 12	SP	M	Gray - brown f-C SAND, t. of Silt, t. Gravel	5	
6										
7		5		21	12, 9, 6	SP	M	Gray f-c SAND, t. of fine Gravel		
8	N	6		15	6, 9, 4	SP	M	Gray f-C SAND		
9	N									
10		7		7	4, 3, 2	SP	M	Gray f-C SAND, t. of Silt	10	
11	P	8		16	6, 10, 3	SP	M	Gray f-C SAND, little Gravel		
12										
13		9		6	3, 3, 2	SP	M	Gray f-C SAND, little Gravel		
14	N	10		5	2, 3, 3	SP	M	Gray M-C SAND		
15	N								15	
16		11		7	3, 4, 6	SP	M	Gray M-C SAND		
17	N	12		10	5, 5, 8	SP	M	Gray f-C SAND		
18	N									
19	N	13		35	20, 15, 13	SP	M	Gray f-C SAND, t. of Silt, t. of Gravel		
20		14		20	14, 6, 12	SP	M	Gray f-C SAND, t. of Gravel	20	
21										
22	N	15		10	4, 6, 6	SP	M	Gray f-C SAND, t. of Gravel		
23	N									

BURNS AND ROE, INC.

BORING NO. CT-40

PROJECT WNP-2

OWNER W.P.P.S.S.

SHEET NO.: 2 OF 2

JOB NO.: 3900-03

DEPTH FT.	TYPE OF TEST	SAMPLE NO.	SAMPLES TOT. REC.	SAMPLES N VAL.	SAMPLES PENETR. RESIST. BL./6 IN.	SYMBOL	MOIST.	IDENTIFICATION	DEPTH	REMARKS
					5			Gray f-C SAND, t. of Gravel		
24		16		11	6	SP	M			
					2					
25		17		8	4	SP	M	Gray f-M+ SAND	25	
					4					
26					4					
	P	18		8	4	SP	M	Gray f-M SAND		
27					4					
					3					
28		19		9	5	SP	M	Gray f-M SAND		
					4					
29					3	SP-SM				
		20		11	5		W	Brown SAND and SILT		
30					6				30	
31										
32										
33										
34										
35									35	
36										
37										
38										
39										
40									40	
41										
42										
43										
44										
45									45	
46										
47										
48										
49										

BURNS AND ROE, INC.	BORING NO. CT-41

PROJECT WNP-2	GRND. WATER	DATE	TIME	DEPTH	CASING	SHEET NO.: 1 OF 1
OWNER W.P.P.S.S						PROJECT NO.: 3900
CONTRACTOR Geologic Assoc.						ELEVATION: 442.6
METHOD OF ADVANC. BORING	DEPTH		CAS.	SAMP.	CORE	TUBE	DATUM: MSL
POWER AUGER	0 TO 15	TYPE					DATE START: 10/23/81
HAND CHOP. W/MUD: W/WATER	TO	DIA.					DATE FINISHED 10/23/81
ROT. DRILL: W/MUD: W/WATER	TO	WT.					DRILLER: F. Reynolds
DIAMOND CORE	TO	FALL					INSPECTOR: R. Smith

DEPTH FT.	TYPE OF TEST	SAMPLE NO.	SAMPLES TOT. REC	SAMPLES N VAL.	SAMPLES PENETR. RESIST. BL./6 IN.	SYMBOL	MOIST.	IDENTIFICATION	DEPTH	REMARKS
1		1		91	3, 16, 75	SP	M	Gray - br f SAND, little Silt, little Gravel		
2		2		7	3, 4, 3	SP	M	Gray - brown f. SAND, t. of Silt		
3					5	SP				
4		3		24	8, 16, 8		M	Gray - brown f. SAND, t. of Silt		
5	N	4		34	17, 17, 13, 10	SP	M	Gray f-C SAND, t. of Gravel	5	
6	N N									
7	N P	5		21	11, 7	SP	M	Gray f-C SAND, t. of f. Gravel		
8		6		20	9, 11, 10	SP	M	Gray f-C SAND, t. of f. Gravel		
9	N									
10	N	7		28	10, 18, 13	SP	M	Gray M^{+}-C SAND, little f. Gravel	10	
11										
12	N	8		64	31, 33, 3	SP	M	Gray M-C SAND, little Gravel		
13					75/35	SP	M	Gray, f-C SAND, little f. Gravel		
14		10		54	16, 30, 24	SP	M	Gray f-C SAND, little Gravel		
15									15	
16										
17										
18										
19										
20									20	
21										
22										
23										

BURNS AND ROE, INC.	BORING NO. CT-42

PROJECT WNP-2	GRND. WATER	DATE	TIME	DEPTH	CASING	SHEET NO.: 1 OF 1
OWNER W.P.P.S.S						PROJECT NO.: 3900
CONTRACTOR Geologic Assoc.						ELEVATION: 441.0
METHOD OF ADVANC. BORING	DEPTH		CAS.	SAMP.	CORE	TUBE	DATUM: MSL
POWER AUGER	0 TO 15	TYPE					DATE START: 10-26-81
HAND CHOP. W/MUD: W/WATER	TO	DIA.					DATE FINISHED 10-27-81
ROT. DRILL: W/MUD: W/WATER	TO	WT.					DRILLER: F. Reynolds
DIAMOND CORE	TO	FALL					INSPECTOR: R. Smith

DEPTH FT.	TYPE OF TEST	SAMPLE NO.	SAMPLES TOT. REC	SAMPLES N VAL.	SAMPLES PENETR. RESIST. BL./6 IN.	SYMBOL	MOIST.	IDENTIFICATION	DEPTH	REMARKS
1		1		40	6 18 22	SP	D	Lt. brown f-c SAND, little fine Gravel, t. of Silt		
2	N	2		2	- 1 1	SP	M	Brown f-c SAND, little Gravel, t. of Silt		
3 4		3		69	20 32 37	SP	M	Gray-brown f-c SAND some Gravel		
5	N	4		70	15 32 38	SP	M	Gray f-c SAND, little Gravel	5	
6 7		5		64	38 34 30	SP	M	Gray f-c SAND, t. of Gravel		
8	N	6		40	11 20 20	SP	M	Gray f-c SAND, t. of fine Gravel		
9 10	N P	7		66	24 30 36	SP	M	Gray f-c SAND, t. of fine Gravel	10	
11 12	N N	8		54	29 24 30	SP	M	Gray f-c SAND, t. of fine Gravel		
13		9		82	33 40 42	SP	M	Gray f-c SAND, little Gravel		
14 15		10		37	12 16 21	SP	M	Gray f-c SAND, little Gravel	15	
16 17 18 19 20 21 22 23									20	

BURNS AND ROE, INC.	BORING NO. CT-43

PROJECT WNP-2	GRND. WATER	DATE	TIME	DEPTH	CASING	SHEET NO.: 1 OF 1
OWNER W.P.P.S.S						PROJECT NO.: 3900
CONTRACTOR Geologic Assoc.						ELEVATION: 440.6
METHOD OF ADVANC. BORING	DEPTH		CAS.	SAMP.	CORE	TUBE	DATUM: MSL
POWER AUGER	0 TO 23	TYPE					DATE START: 10-28-81
HAND CHOP. W/MUD: W/WATER	TO	DIA.					DATE FINISHED 10-28-81
ROT. DRILL: W/MUD: W/WATER	TO	WT.					DRILLER: F. Reynolds
DIAMOND CORE	TO	FALL					INSPECTOR: R. Smith

DEPTH FT.	TYPE OF TEST	SAMPLE NO.	SAMPLES TOT. REC	N VAL.	PENETR. RESIST. BL./6IN.	SYMBOL	MOIST.	IDENTIFICATION	DEPTH	REMARKS
1		1		18	3 7 11	SP	M	Gray-brown f-c SAND, t. of fine Gravel		
2	N N	2		20	7 11 9	SP	M	Gray-brown f-c SAND, t. of fine Gravel		
3 4	N	3		13	4 6 7	SP	M	Gray f-m SAND, t. of fine Gravel		
5	N	4		32	8 20 12	GP SP	M	Black GRAVEL and SAND	5	
6 7	N	5		19	7 9 10	SP	M	Brown f-c SAND, some Gravel		
8	N P	6		18	6 7 11	SP	M	Gray-brown f+-c SAND, little fine Gravel		
9 10	N	7		117	12 48 69	SP	M	Gray f-c SAND, t. Gravel	10	
11 12		8		28	9 15 13	SP	M	Gray f-c- SAND, t fine Gravel		
13	N	9		14	7 7 7	SP	M	Gray f-c SAND, t. of fine Gravel		
14 15	N	10		15	6 8 7	SP	M	Gray f-c SAND, t. of fine Gravel	15	
16	N N	11		14	9 8 6	SP	M	Gray f-c-SAND, t. of Gravel		
17 18		12		12	6 6 6	SP	M	Gray m-c SAND, t. Gravel		
19	N	13		12	3 5 7	SP	M	Gray m-c SAND		
20 21	N P	14		28	10 14 14	SP	M	Gray f-c SAND, little Gravel	20	
22 23		15		31	9 15 16	SP	M	Gray m-c SAND, little fine Gravel		

BURNS AND ROE, INC.	BORING NO. CT-44

PROJECT WNP-2	GRND. WATER	DATE	TIME	DEPTH	CASING	SHEET NO.: 1 OF 1		
OWNER W.P.P.S.S						PROJECT NO.: 3900		
CONTRACTOR Geologic Assoc.						ELEVATION: 440.1		
METHOD OF ADVANC. BORING	DEPTH		CAS.	SAMP.	CORE	TUBE	DATUM: MSL	
POWER AUGER	0 TO 24	TYPE					DATE START: 10-26-81	
HAND CHOP. W/MUD: W/WATER	TO	DIA.					DATE FINISHED 10-26-81	
ROT. DRILL: W/MUD: W/WATER	TO	WT.					DRILLER: F. Reynolds	
DIAMOND CORE	TO	FALL					INSPECTOR: R. Smith	

DEPTH FT.	TYPE OF TEST	SAMPLE NO.	SAMPLES TOT. REC	N VAL.	PENETR. RESIST. BL./6 IN.	SYMBOL	MOIST.	IDENTIFICATION	DEPTH	REMARKS
	N	1		30	3, 12, 18	SP-	M	Brown f-c SAND, t. of Silt, t. of fine Gravel		
1	N									
2		2		62	26, 31, 31	SP	M	Gray-brown f-c SAND, t. of Gravel		
3					75/.45					
4					-			No recovery		
	N				-					
5	N	3		59	8, 25, 34	SP	M	Gray f-c SAND, t. of Gravel		5
6										
7		4		76	39, 36, 40	SP	M	Gray f-m+-c SAND, t. of f. Gravel		
8	N	5		43	11, 18, 25	SP	M	Gray f-m SAND		
9	N P									
10		6		76	39, 36, 40	SP-	M	Gray-brown f-c SAND, some Gravel, fine Silt		10
11	N	7		120	32, 56, 64	SP-	M	Gray-brown f-c SAND, little Gravel, t. of Silt		
12										
13	N	8		101	42, 44, 57	SP-	M	Gray-brown f+-c SAND, little Gravel, little Silt		
	N									
14		9		60	19, 28, 32	SP-	M	Gray-brown f+-c SAND, t. of Gravel, t. of Silt		
15										15
16		10		68	28, 32, 36	SP-	M	Gray-brown f+-c SAND, little Gravel, t. of Silt		
17		11		125	12, 50, 75	SP-	M	Gray-brown f-c SAND, little Gravel, t. of Silt		
18	N	12		34	10, 17, 17	SP	M	Gray m-c SAND, t. of fine Gravel		
19	N									
20	P	13		33	17, 18, 15	SP	M	Gray f-c SAND, little Gravel		20
21										
22		14		11	11, 5, 6	SP	M	Brown f+-m-c- SAND, t. of Silt		
23					6	SP	M	Brown-Gray f-c SAND, t. of		
		15		24	8, 16			f Gravel		

BURNS AND ROE, INC.	BORING NO. CT-45

PROJECT WNP-2	GRND. WATER	DATE	TIME	DEPTH	CASING	SHEET NO.: 1 OF 1	
OWNER W.P.P.S.S						PROJECT NO.: 3900	
CONTRACTOR Geologic Assoc.						ELEVATION: 440.1	
METHOD OF ADVANC. BORING	DEPTH		CAS.	SAMP.	CORE	TUBE	DATUM: MSL
POWER AUGER	0 TO 23.5	TYPE					DATE START: 10-23-81
HAND CHOP. W/MUD: W/WATER	TO	DIA.					DATE FINISHED 10-23-81
ROT. DRILL: W/MUD: W/WATER	TO	WT.					DRILLER: F. Reynolds
DIAMOND CORE	TO	FALL					INSPECTOR: R. Smith

DEPTH FT.	TYPE OF TEST	SAMPLE NO.	SAMPLES TOT. REC	SAMPLES N VAL.	SAMPLES PENETR. RESIST. BL./6 IN.	SYMBOL	MOIST.	IDENTIFICATION	DEPTH	REMARKS
1	N	1		50	1, 23, 27	SP	M	Gray-brown, f-c SAND, little Silt, little Gravel		
2	N	2		54	23, 28, 26	SP	M	Gray f-c SAND, t. of Gravel		
3										
4	N	3		90	22, 32, 58	SP	M	Gray f-c SAND, little Gravel		
5	N	4		68	31, 32, 36	SP	M	Gray f-c SAND, t. of Gravel	5	
6										
7		5		33	9, 15, 18	SP	M	Gray m-c SAND, t. fine Gravel		
8	N, N P	6		38	17, 19, 19	SP	M	Gray m+-c SAND, t. of Gravel		
9										
10	N, N	7		33	10, 17, 16	SP	M	Gray f-c SAND, t. of Gravel	10	
11		8		76	15, 37, 39	SP-	M	Gray-brown f-c SAND, t. of Silt, t. of Gravel		
12	N	9		60	16, 29, 31	SP-	M	Gray-brown f-c SAND, t. of Silt, t. of Gravel		
13	N									
14	N	10		61	20, 24, 37	SP	M	Gray f-c SAND, t. of fine Gravel		
15									15	
16	N	11		86	16, 41, 45	SP	M	Gray m-c SAND, t. of Gravel		
17	P	12		62	36, 35, 27	SP	M	Gray m-c SAND, little Gravel		
18										
19	N	13		25	8, 13, 12	SP	M	Gray m-c SAND, some Gravel		
20	N	14		36	13, 16, 20	SP	M	Gray f-c SAND, t. of fine Gravel	20	
21										
22		15		75	19, 30, 45	SP	M	Brown f+-m SAND, little Silt		
23										

BURNS AND ROE, INC.	BORING NO. CT-46

PROJECT WNP-2	GRND. WATER	DATE	TIME	DEPTH	CASING	SHEET NO.: 1 OF 1
OWNER W.P.P.S.S						PROJECT NO.: 3900
CONTRACTOR Geologic Assoc.						ELEVATION: 441.2
METHOD OF ADVANC. BORING	DEPTH		CAS.	SAMP.	CORE	TUBE	DATUM: MSL
POWER AUGER	0 TO 12	TYPE					DATE START: 10-27-81
HAND CHOP. W/MUD: W/WATER	TO	DIA.					DATE FINISHED 10-27-81
ROT. DRILL: W/MUD: W/WATER	TO	WT.					DRILLER: F. Reynolds
DIAMOND CORE	TO	FALL					INSPECTOR: R. Smith

DEPTH FT.	TYPE OF TEST	SAMPLE NO.	SAMPLES TOT. REC	N VAL.	PENETR. RESIST. BL./6 IN.	SYMBOL	MOIST.	IDENTIFICATION	DEPTH	REMARKS
1	N	1		38	4, 18, 20	SP	M	Brown f-c SAND, little Gravel, t. of Silt		
2		2		110	60, 60, 50	SP	M	Gray-brown f-c SAND, t. of Gravel		
3										
4	N	3		40	8, 18, 22	SP	M	Gray f-c SAND, t. of Gravel		
5		4		41	20, 20, 21	SP	M	Gray f⁻-c SAND, t. of Gravel	5	
6										
7	N, N	5		53	28, 32, 21	SP	M	Gray f-c SAND, some Gravel		
8	P	6		52	18, 18, 34	SP	M	Black f⁻-c SAND, little Gravel		
9										
10		7		71	11, 37, 34	SP	M	Gray f⁻-c SAND	10	
11		8		97	21, 59, 38	SP	M	Gray f⁻-c SAND, t. of fine Gravel		
12										
13										
14										
15									15	
16										
17										
18										
19										
20									20	
21										
22										
23										

BURNS AND ROE, INC.	BORING NO. CT-47

PROJECT WNP-2	GRND. WATER	DATE	TIME	DEPTH	CASING	SHEET NO.: 1 OF 2
OWNER W.P.P.S.S						PROJECT NO.: 3900
CONTRACTOR Geologic Assoc.						ELEVATION: 441.3
METHOD OF ADVANC. BORING	DEPTH		CAS.	SAMP.	CORE	TUBE	DATUM: MSL
POWER AUGER	0 TO 30	TYPE					DATE START: 10-27-81
HAND CHOP. W/MUD: W/WATER	TO	DIA.					DATE FINISHED 10-27-81
ROT. DRILL: W/MUD: W/WATER	TO	WT.					DRILLER: F. Reynolds
DIAMOND CORE	TO	FALL					INSPECTOR: R. Smith

DEPTH FT.	TYPE OF TEST	SAMPLE NO.	SAMPLES TOT. REC	SAMPLES N VAL.	SAMPLES PENETR. RESIST. BL./6 IN.	SYMBOL	MOIST.	IDENTIFICATION	DEPTH	REMARKS
		1		25	4 12 13	SP	M	Gray-brown f-c⁻ SAND		
1	N									
2	N	2		44	17 22 22	SP	M	Gray f-c SAND, t. of fine Gravel		
3										
4	N N	3		40	10 18 22	SP	M	Gray f-c⁻ SAND, t. Gravel		
5		4		80	22 51 29	SP	M	Black f⁻-c SAND, t. of f. Gravel	5	
6										
7	N	5		19	12 10 9	SP	M	Gray-brown f-c SAND		
8	N P	6		16	7 6 10	SP	M	Gray-brown f-c⁻ SAND, little Gravel		
9										
10	N P	7		39	4 19 20	SP	M	Brown-gray f-c SAND, t. of fine Gravel	10	
11		8		–	75 – –	SP	M	Brown-gray f-c SAND, t. of fine Gravel		
12										
13	N	9		25	8 12 13	SP	M	Gray f⁻-c SAND, little fine Gravel		
14	N	10		35	16 17 18	SP	M	Gray f⁻-c SAND, little Gravel		
15									15	
16	N	11		25	12 13 12	SP	M	Gray f⁻-c SAND, t. Gravel		
17	N	12		18	5 7 11	SP	M	Gray f⁻-c SAND, t. Gravel		
18										
19	N N	13		22	7 10 12	SP	M	Gray m-c⁻ SAND, t. fine Gravel		
20		14		12	7 5 7	SP	M	Gray f-m⁺-c SAND, t. fine Gravel	20	
21										
22		15		26	8 12 14	SP	M	Gray f-m SAND		
23					13					

BURNS AND ROE, INC.	BORING NO. 47
PROJECT WNP-2	SHEET NO.: 2 OF 2
OWNER W.P.P.S.S.	JOB NO.: 3900

DEPTH FT.	TYPE OF TEST	SAMPLE NO.	SAMPLES TOT. REC.	SAMPLES N VAL.	SAMPLES PENETR. RESIST. BL./6 IN.	SYMBOL	MOIST.	IDENTIFICATION	DEPTH	REMARKS
					15					
24		16		27	12	SP	M	Gray f-m SAND		
					7					
25		17		25	11	SP	M	Gray f-m SAND	25	
					14					
					11					
26		18		24	13	SP	M	Gray f-m SAND, trace Sand and Silt lenses		
					11					
27					3					
		19		13	6	SP-SM	W	Gray-brown fine SAND and SILT		
28					7					
					14					
29		20		23	11	SP	M	Gray m^{+}-c SAND, little fine Gravel		
					12					
30									30	
31										
32										
33										
34										
35									35	
36										
37										
38										
39										
40									40	
41										
42										
43										
44										
45									45	
46										
47										
48										
49										

BURNS AND ROE, INC.	BORING NO. CT-48

PROJECT WNP-2	GRND. WATER	DATE	TIME	DEPTH	CASING	SHEET NO.: 1 OF 1
OWNER W.P.P.S.S						PROJECT NO.: 3900
CONTRACTOR Geologic Assoc.						ELEVATION: 442.1
METHOD OF ADVANC. BORING	DEPTH		CAS.	SAMP.	CORE	TUBE	DATUM: MSL
POWER AUGER	0 TO 12	TYPE					DATE START: 10-27-81
HAND CHOP. W/MUD: W/WATER	TO	DIA.					DATE FINISHED 10-28-81
ROT. DRILL: W/MUD: W/WATER	TO	WT.					DRILLER: F. Reynolds
DIAMOND CORE	TO	FALL					INSPECTOR: R. Smith

DEPTH FT.	TYPE OF TEST	SAMPLE NO.	SAMPLES TOT. REC	N VAL.	PENETR. RESIST. BL./6 IN.	SYMBOL	MOIST.	IDENTIFICATION	DEPTH	REMARKS
					4					
1	N	1		28	11	GP	D	Black GRAVEL, some SAND		
					17					
2					34					
		2		68	40	SP	M	Gray-brown f-c SAND, t. of fine Gravel		
3					28					
					12					
4		3		44	22	SP	M	Gray f-c SAND, little Gravel		
					22					
5					49				5	
		4		66	38			No recovery		
6	N				28					
	N				10					
7	P	5		28	15	SP	M	Brown f-m SAND, little Gravel		
					13					
8	N				8					
		6		24	11	GP -SP	M	Black GRAVEL and f-c SAND		
9	N				13					
					7					
10		7		44	18	SP	M	Brown-gray f-c SAND, t. of Silt, t. of fine Gravel	10	
					26					
11					75					
		8		58	27	SP	M	Brown-gray f-c SAND and GRAVEL		
12					31					
13										
14										
15									15	
16										
17										
18										
19										
20									20	
21										
22										
23										

BURNS AND ROE, INC.	BORING NO. CT-49

PROJECT WNP-2	GRND. WATER	DATE	TIME	DEPTH	CASING	SHEET NO.: 1 OF 1	
OWNER W.P.P.S.S						PROJECT NO.: 3900	
CONTRACTOR Geologic Assoc.						ELEVATION: 440.9	
METHOD OF ADVANC. BORING	DEPTH		CAS.	SAMP.	CORE	TUBE	DATUM: MSL
POWER AUGER	0 TO 9	TYPE					DATE START: 10-28-81
HAND CHOP. W/MUD: W/WATER	TO	DIA.					DATE FINISHED 10-28-81
ROT. DRILL: W/MUD: W/WATER	TO	WT.					DRILLER: F. Reynolds
DIAMOND CORE	TO	FALL					INSPECTOR: R. Smith

DEPTH FT.	TYPE OF TEST	SAMPLE NO.	SAMPLES TOT. REC	SAMPLES N VAL.	SAMPLES PENETR. RESIST. BL./6 IN.	SYMBOL	MOIST.	IDENTIFICATION	DEPTH	REMARKS
1		1		17	3 6 11	SP	M	Gray-brown f-c SAND, t. of Gravel		
2		2		40	9 19 21	SP	M	Gray f⁻-c SAND, t. of Gravel		
3	N									
4	N	3		115	18 40 75	SP	M	Gray f⁻-c SAND,		Cobble?
5		4		43	12 21 22	SP	M	Gray f⁻-c SAND, t. of Gravel	5	
6	N									
7	N P	5		28	14 13 15	SP	M	Gray f⁻-c SAND, t. of Gravel		
8	N	6		49	6 20 29	SP	D	Lt. Gray f-c SAND, little Gravel, fine Silt		
9										
10									10	
11										
12										
13										
14										
15									15	
16										
17										
18										
19										
20									20	
21										
22										
23										

BURNS AND ROE, INC.	BORING NO. CT-50

PROJECT WNP-2	GRND. WATER	DATE	TIME	DEPTH	CASING	SHEET NO.: 1 OF 1
OWNER W.P.P.S.S						PROJECT NO.: 3900
CONTRACTOR Geologic Assoc.						ELEVATION: 441.2
METHOD OF ADVANC. BORING	DEPTH		CAS.	SAMP.	CORE	TUBE	DATUM: MSL
POWER AUGER	0 TO 21	TYPE					DATE START: 10-29-81
HAND CHOP. W/MUD: W/WATER	TO	DIA.					DATE FINISHED 10-29-81
ROT. DRILL: W/MUD: W/WATER	TO	WT.					DRILLER: F. Reynolds
DIAMOND CORE	TO	FALL					INSPECTOR: R. Smith

DEPTH FT.	TYPE OF TEST	SAMPLE NO.	SAMPLES TOT. REC	SAMPLES N VAL.	SAMPLES PENETR. RESIST. BL./6 IN.	SYMBOL	MOIST.	IDENTIFICATION	DEPTH	REMARKS
1	N	1		14	3, 10, 4	SP	M	Brown-gray f-c SAND, t. of Gravel		
2	N	2		14	5, 7, 7	SP	M	Brown-gray f-c SAND, t. of fine Gravel		
4	N, N	3		7	1, 4, 3	SP	M	Brown-gray f-m SAND		
5		4		15	7, 8, 7	SP	M	Brown-gray f-m SAND	5	
7	N, N	5		17	4, 5, 12	SP	M	Brown f-m SAND and gray m-c SAND		
8		6			19, 17, 15	SP	M	Gray f⁻-c SAND, some Gravel		
10	N, N	7		29	6, 13, 16	SP	M	Gray-brown f-c SAND, little Gravel	10	
11		8		42	16, 18, 24	SP	M	Gray-brown f-c SAND, t. of Gravel		
13	N, N	9		51	13, 28, 33	SP	M	Gray f⁻-c SAND, little Gravel		
14		10		44	23, 23, 21	SP	M	Gray f⁻-c SAND, little Gravel	15	
16	N, N	11		36	14, 18, 18	SP	M	Gray f⁻-c SAND, t. of Gravel		
17	P	12		28	14, 12, 16	SP	M	Gray f⁻-c SAND, t. of Gravel		
19	N	13		24	15, 13, 11	SP	M	Gray f⁻-c SAND, little Gravel		
20		14		17	8, 8, 9	SP	M	Gray m-c SAND, t. of Gravel	20	
21										
22										
23										

BURNS AND ROE, INC.	BORING NO. CT-51

PROJECT WNP-2	GRND. WATER	DATE	TIME	DEPTH	CASING	SHEET NO.: 1 OF 1	
OWNER W.P.P.S.S						PROJECT NO.: 3900	
CONTRACTOR Geologic Assoc.						ELEVATION: 441.5	
METHOD OF ADVANC. BORING	DEPTH		CAS.	SAMP.	CORE	TUBE	DATUM: MSL
POWER AUGER	0 TO 22	TYPE					DATE START: 10-28-81
HAND CHOP. W/MUD: W/WATER	TO	DIA.					DATE FINISHED 10-29-81
ROT. DRILL: W/MUD: W/WATER	TO	WT.					DRILLER: F. Reynolds
DIAMOND CORE	TO	FALL					INSPECTOR: R. Smith

DEPTH FT.	TYPE OF TEST	SAMPLE NO.	SAMPLES TOT. REC	SAMPLES N VAL.	SAMPLES PENETR. RESIST. BL./6IN.	SYMBOL	MOIST.	IDENTIFICATION	DEPTH	REMARKS
		1		11	2 4 7 9	SP	M	Brown-grey f-c SAND t. of Gravel		
1	N									
2	N	2		17	8 9 5 9	SP	P	Gray m+-c SAND. some Gravel		
3		3		17	8 5 4 4	SP	M	Gray m+-c SAND, t. of fine Gravel		
4	N									
5	N	4		8	4 4 4 7	SP	M	Gray m+-c SAND. t. Gravel	5	
6										
7	N	5		21	14 13 11 11	SP	M	Gray f−-c SAND little Gravel		
8	N	6		22	11 11 19 21	SP	M	Gray m-c SAND t. of fine Gravel		
9										
10		7		40	22 74 26 18	SP	M	Gray-brown m-c SAND, t. of fine Gravel	10	
11	N	8		100	19 13 10 9	SP	M	Gray m-c SAND. some Gravel		
12										
13	N	9		32	6 1 3 3	SP	M	Gray m-c SAND, some Gravel		
14	N	10		15	3 2 3 –	SP	M	Gray f-c SAND little Gravel		
15									15	
16	N	11		6	– 7 11 13	SP	M	Gray f-m+-c SAND, t. of Gravel		
17	N p	12		5	10 17 21	SP	M	Gray m-c SAND, t. of fine Gravel		
18										
19	N							No recovery		
20	N	13		24		SP	M	Gray f-m SAND	20	
21		14		38		SP	M	Gray f-m SAND		
22										
23										

BURNS AND ROE, INC.	BORING NO. CT-52

PROJECT WNP-2	GRND. WATER	DATE	TIME	DEPTH	CASING	SHEET NO.: 1 OF 1	
OWNER W.P.P.S.S						PROJECT NO.: 3900	
CONTRACTOR Geologic Assoc.						ELEVATION: 440.8	
METHOD OF ADVANC. BORING	DEPTH		CAS.	SAMP.	CORE	TUBE	DATUM: MSL
POWER AUGER	0 TO 21	TYPE					DATE START: 10-29-81
HAND CHOP. W/MUD: W/WATER	TO	DIA.					DATE FINISHED 10-29-81
ROT. DRILL: W/MUD: W/WATER	TO	WT.					DRILLER: F. Reynolds
DIAMOND CORE	TO	FALL					INSPECTOR: R. Smith

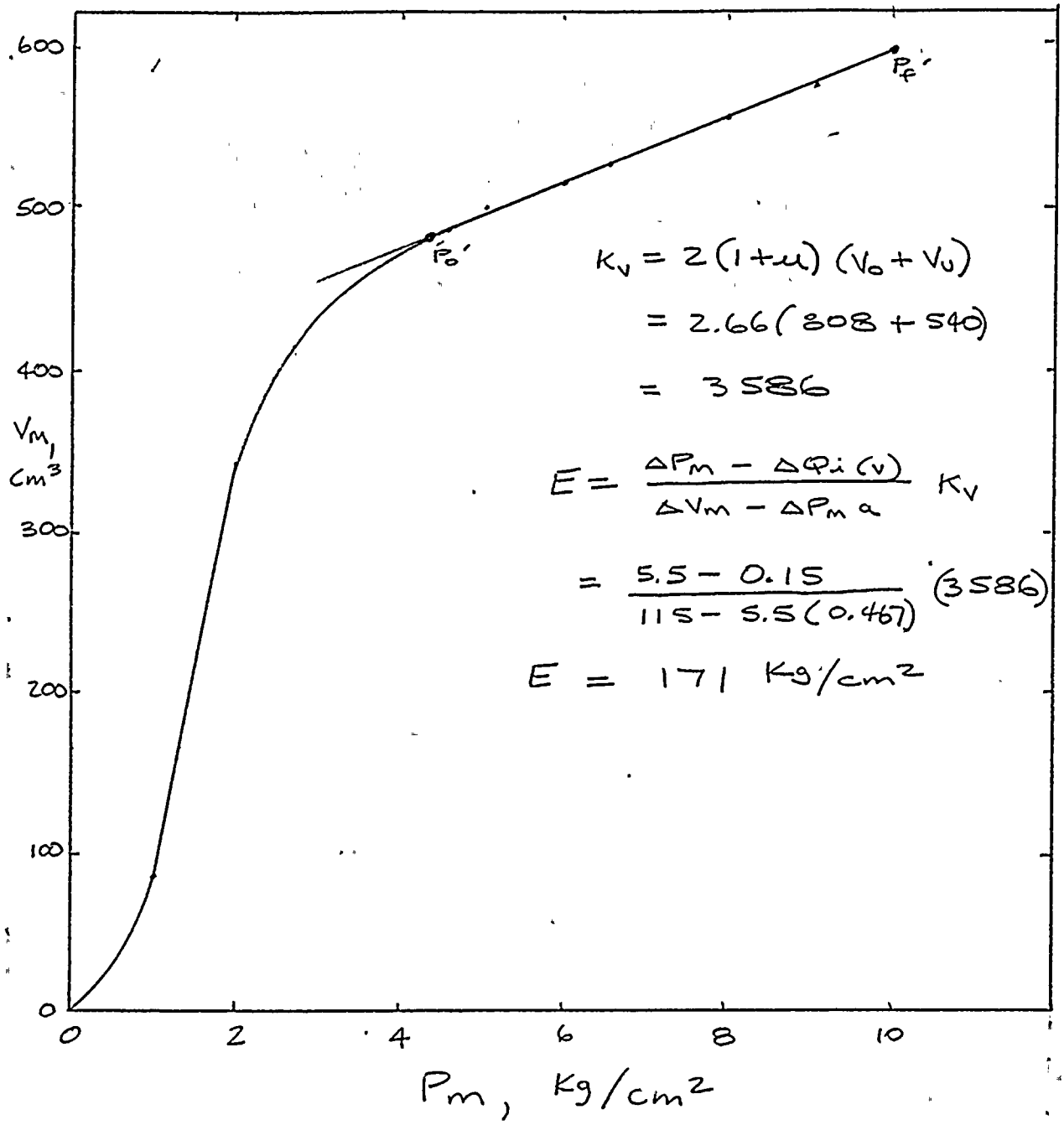
DEPTH FT.	TYPE OF TEST	SAMPLE NO.	SAMPLES TOT. REC	SAMPLES N VAL.	SAMPLES PENETR. RESIST. BL./6 IN.	SYMBOL	MOIST.	IDENTIFICATION	DEPTH	REMARKS
1	N	1		5	1 2 3	SP	M	Gray f-c SAND, t. of Gravel		
2	N	2		11	5 6 5	SP	M	Gray - brown f-c SAND, t t. of Gravel		
3					4					
4	N	3		9	4 5	SPA	M	Gray - brown f-c SAND, t Silt, t. f Gravel		
5	N	4		21	5 9 12		M	Gray - brown f-c SAND, Silt, little Gravel, trace Silt	5	
6					15					
7	N	5		30	15 15			No recovery		
8	N P	6		39	14 19 20			No recovery		
9					11					
10		7		26	13 13		M	Gray m-c SAND. little Gravel	10	
11	N	8		30	10 12	SP	M	Gray f-c SAND, little Gravel		
12	N				18					
13	N	9		27	14 14 13	SP	M	Gray f-c SAND. little Gravel		
14	N	10		18	9 9 9	SP	M	Gray - brown f-c SAND		
15									15	
16	N	11		15	5 9 6	SP	M	Gray - brown f⁻-c SAND, t. of fine Gravel		
17	N P	12		7	5 3 4	SP	M	Gray f-m⁺-c SAND		
18										
19	N	13		17	6 8 9	SP	M	Gray f-m⁺-c SAND		
20	N	14		16	9 8 8	SP	M	Gray f-m⁺-c SAND	20	
21										
22										
23										

PRESSUREMETER TEST #1

TP 1

DEPTH = 2.7' - 3.4'

SAND, MEDIUM, BROWN, W/GVL



$$K_v = 2(1+\mu)(V_o + V_u)$$

$$= 2.66(808 + 540)$$

$$= 3586$$

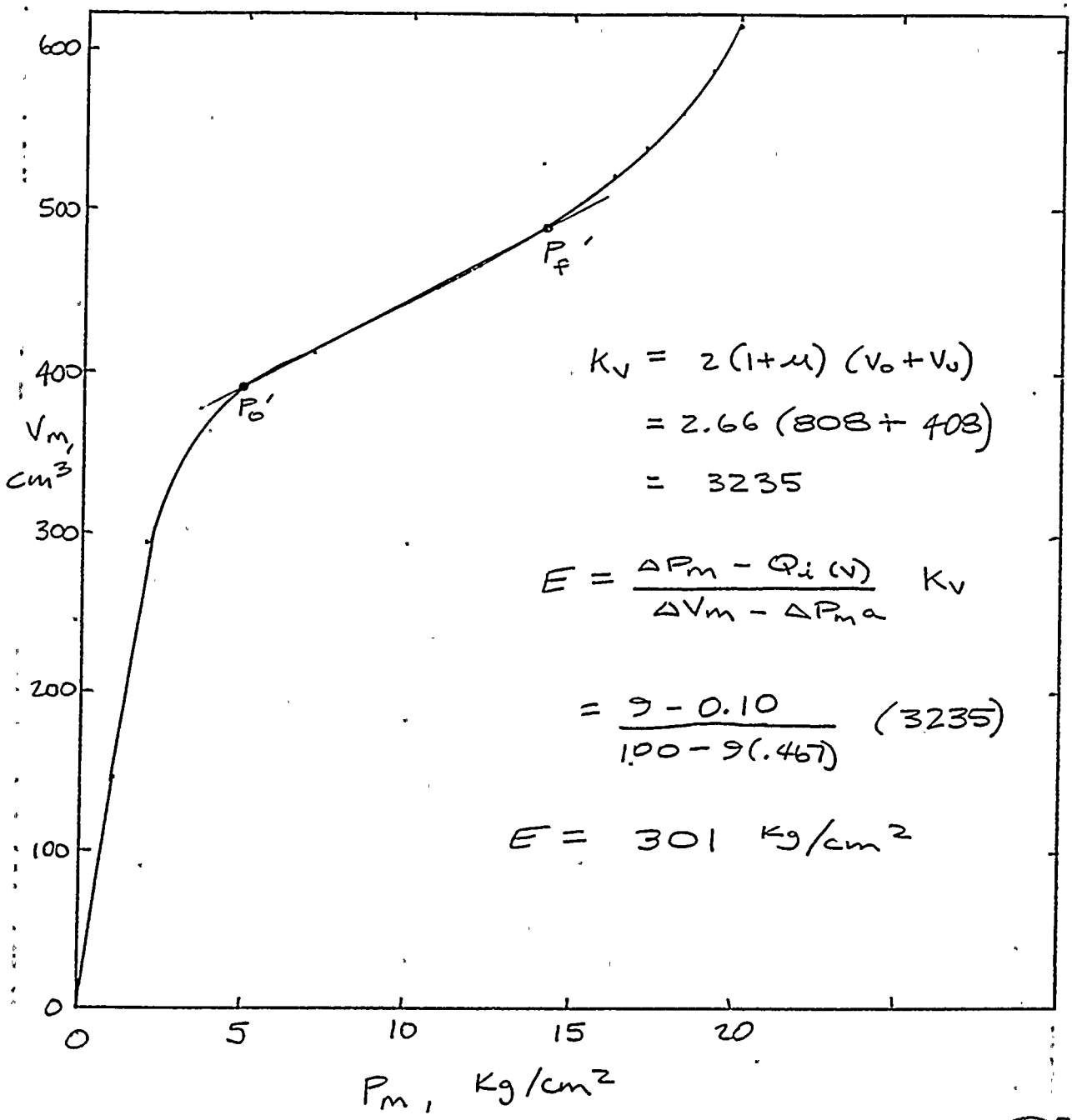
$$E = \frac{\Delta P_m - \Delta P_i(v)}{\Delta V_m - \Delta P_m a} K_v$$

$$= \frac{5.5 - 0.15}{115 - 5.5(0.467)} (3586)$$

$$E = 171 \ Kg/cm^2$$

PRESSUREMETER TEST # 2

TP 2
DEPTH = 6.1' – 6.8'
SAND, FINE GRAINED, BROWN, W/GRAVEL



$$K_V = 2(1+\mu)(V_o + V_u)$$
$$= 2.66\,(808 + 408)$$
$$= 3235$$

$$E = \frac{\Delta P_m - Q_i(v)}{\Delta V_m - \Delta P_m a} K_V$$

$$= \frac{9 - 0.10}{100 - 9(.467)}(3235)$$

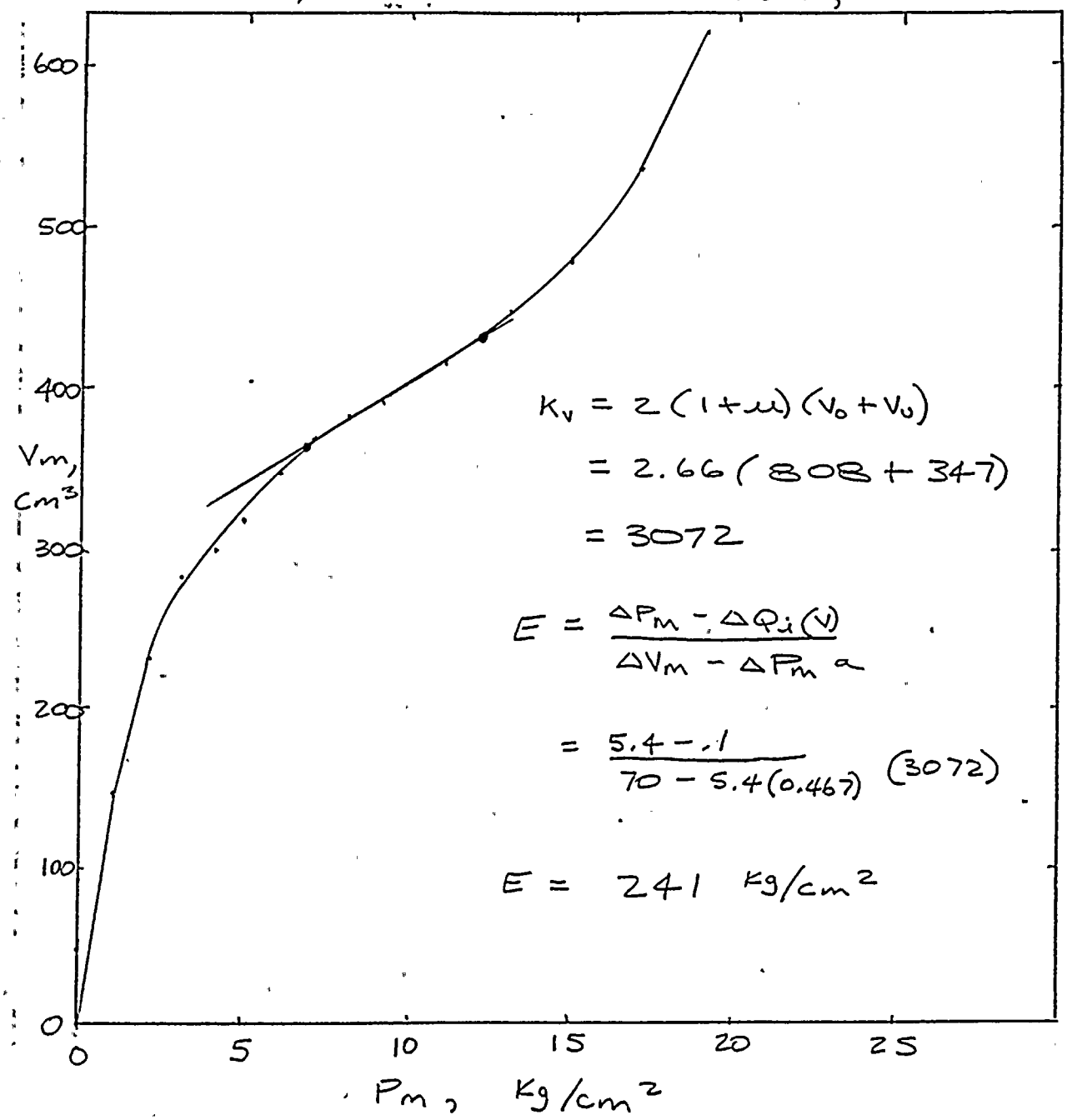
$$E = 301 \ Kg/cm^2$$

PRESSUREMETER TEST #3

TP 3

DEPTH = 2.8′ – 3.5′

SAND, FINE TO MED. GRAINED, BROWN



$$K_v = 2(1+\mu)(V_o + V_u)$$

$$= 2.66(808 + 347)$$

$$= 3072$$

$$E = \frac{\Delta P_m - \Delta Q_i(V)}{\Delta V_m - \Delta P_m a}$$

$$= \frac{5.4 - .1}{70 - 5.4(0.467)}(3072)$$

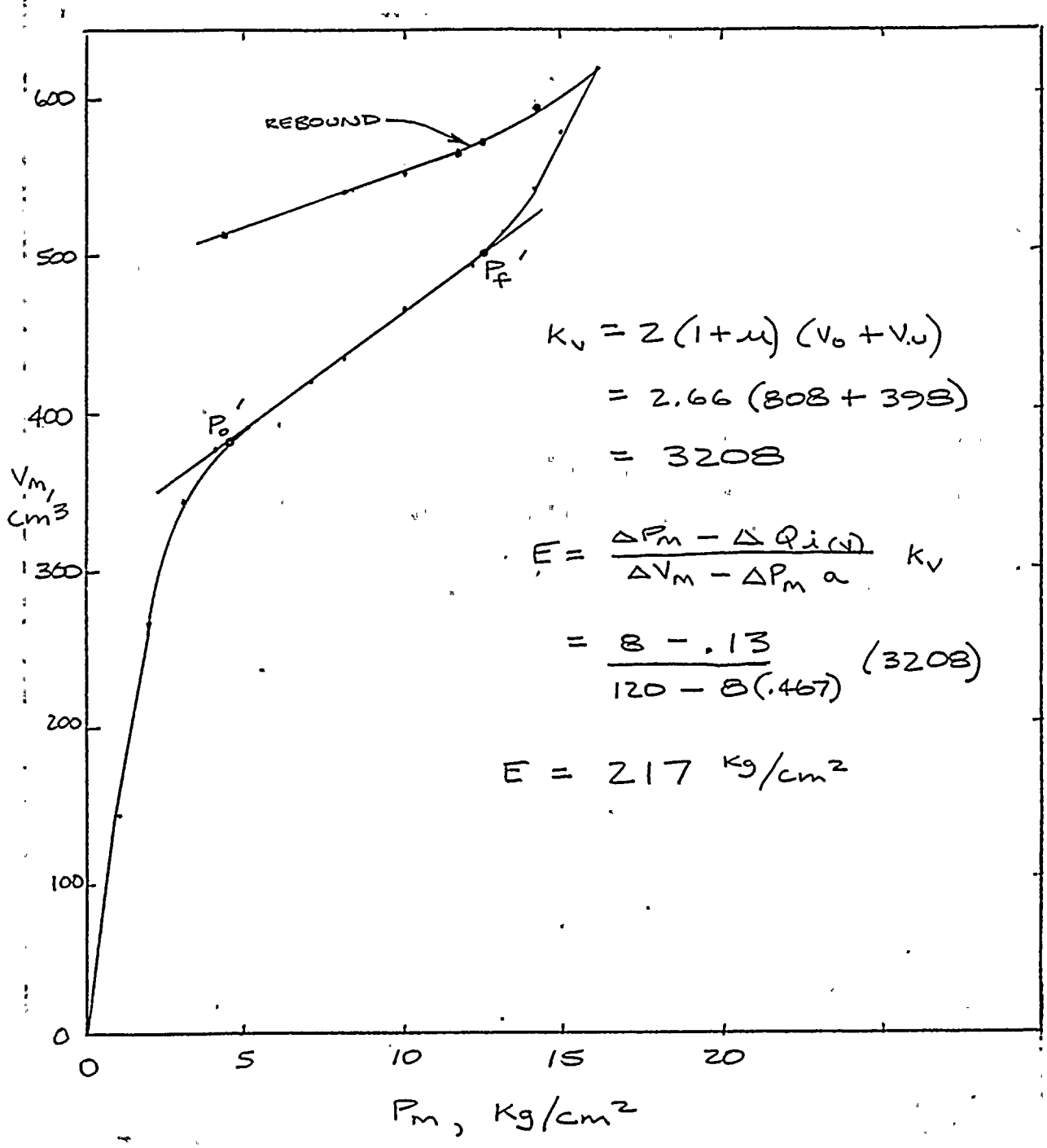
$$E = 241 \text{ Kg/cm}^2$$

PRESSUREMETER TEST #4

TP 4

DEPTH = 3.2′ – 3.9′

SAND, FINE GRAINED, BROWN, W/GRAVEL



$$K_v = 2(1+\mu)(V_o + V_u)$$

$$= 2.66\,(808 + 398)$$

$$= 3208$$

$$E = \frac{\Delta P_m - \Delta Q_{i(v)}}{\Delta V_m - \Delta P_m\, a}\, K_v$$

$$= \frac{8 - .13}{120 - 8(.467)}\,(3208)$$

$$E = 217\ Kg/cm^2$$

TP 4 (CONT)
DEPTH 3.2' - 3.9'

REBOUND CALCULATIONS

$$E_R = \frac{8 - 0.05}{55 - 8(.085)} \cdot 3320$$

$$E_R = 486 \ kg/cm^2$$

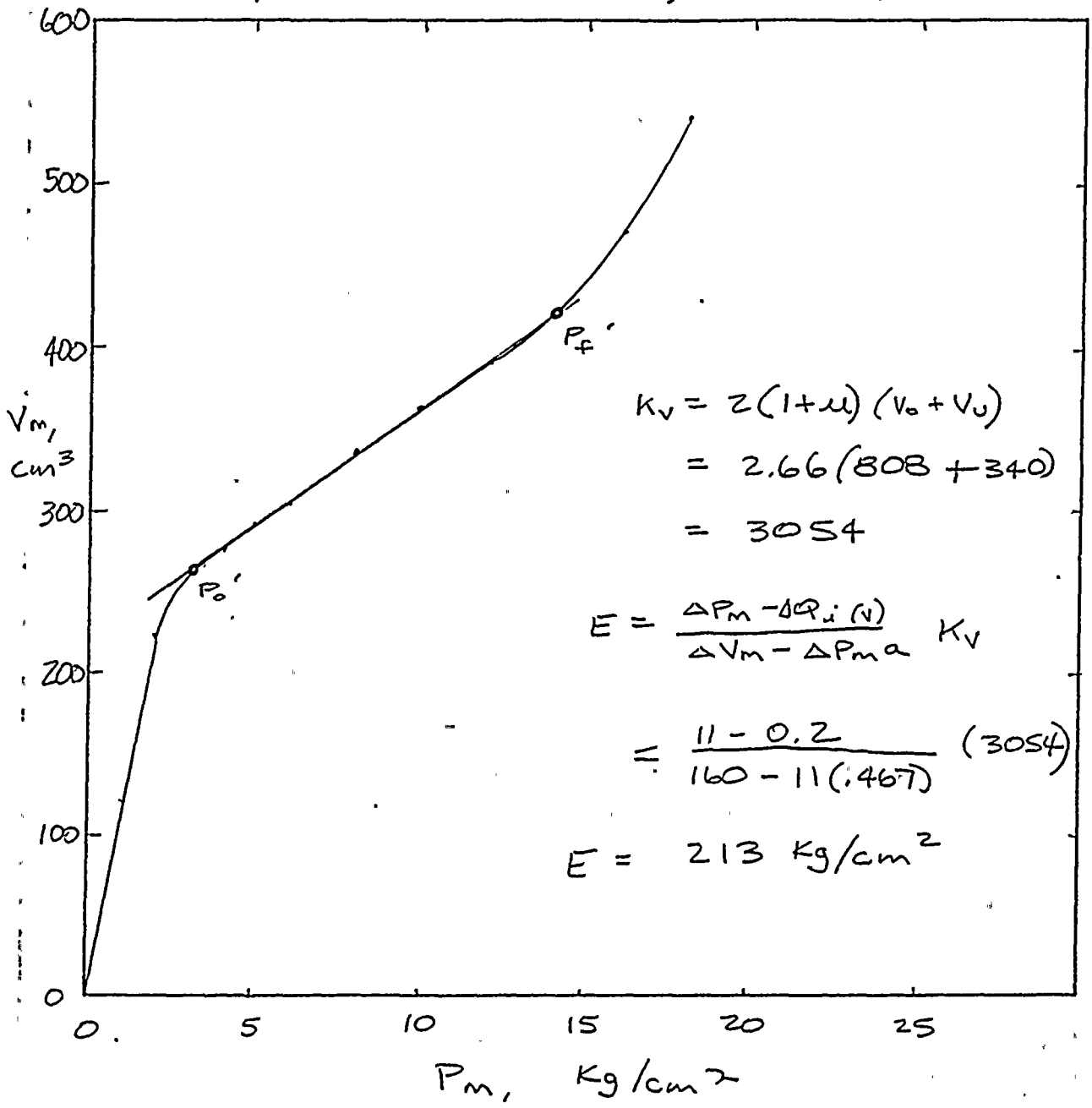
$$\frac{E_R}{E} = \frac{486}{217} = 2.2$$

PRESSUREMETER TEST #5

TP 4

Depth = 6.2' – 6.9'

SAND, FINE TO MEDIUM, BROWN, TR. SILT.



$$K_V = 2(1+\mu)(V_o + V_u)$$

$$= 2.66(808 + 340)$$

$$= 3054$$

$$E = \frac{\Delta P_m - \Delta Q_i(V)}{\Delta V_m - \Delta P_m a} K_V$$

$$= \frac{11 - 0.2}{160 - 11(.467)} (3054)$$

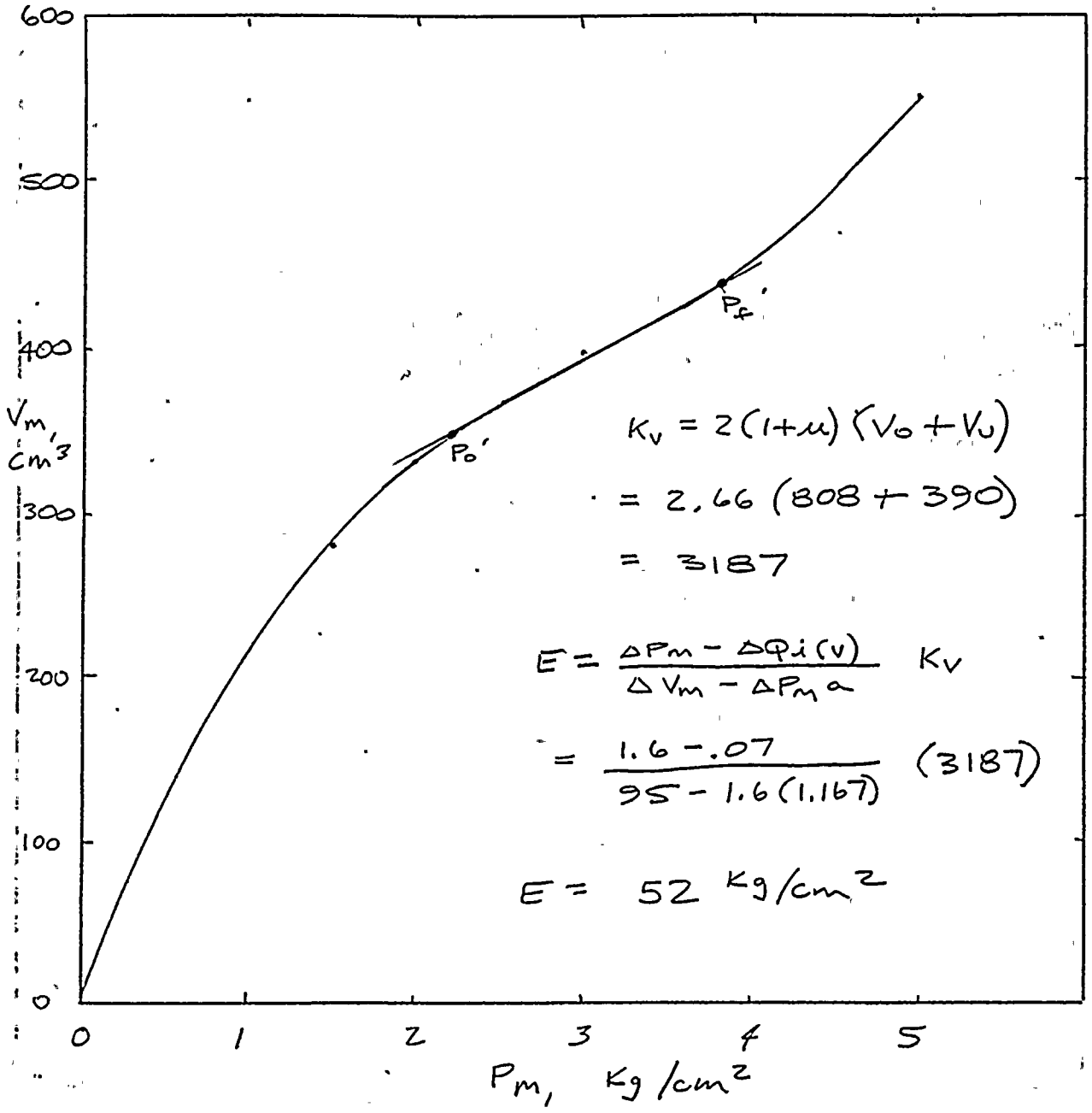
$$E = 213 \ Kg/cm^2$$

PRESSUREMETER TEST # 15

TS 1

DEPTH = 3.2' - 3.9'

SAND, FINE TO MED. GRAINED, BR., W/GVL



$$K_v = 2(1+\mu)(V_o + V_u)$$

$$= 2.66\,(808 + 390)$$

$$= 3187$$

$$E = \frac{\Delta P_m - \Delta Q_i(v)}{\Delta V_m - \Delta P_m a} K_v$$

$$= \frac{1.6 - .07}{95 - 1.6(1.167)} (3187)$$

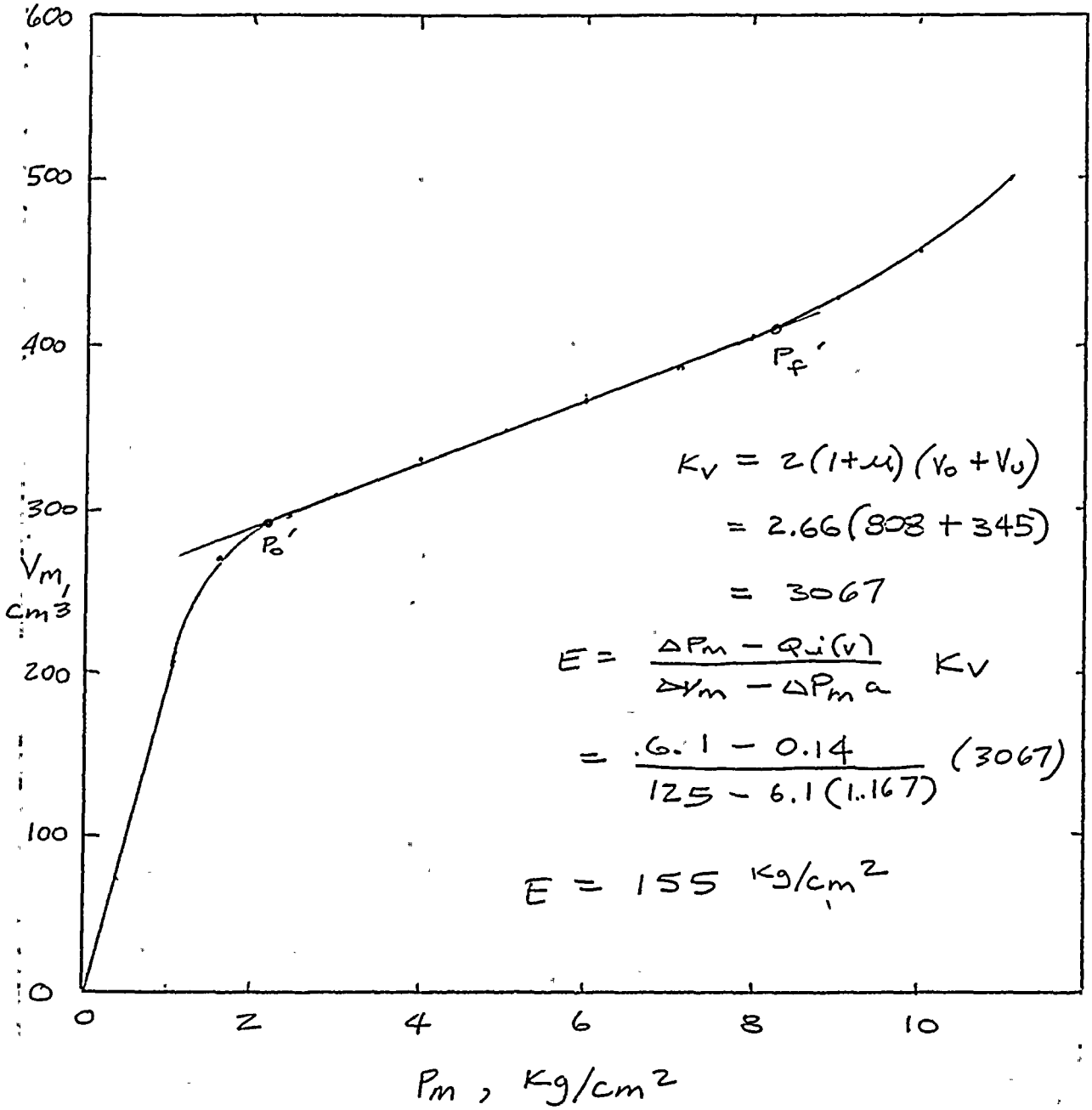
$$E = 52 \ Kg/cm^2$$

PRESSUREMETER TEST #16

TS 2

DEPTH = 3.2' – 3.9'

SAND, FINE TO MED. GRAINED, BR., W/GVL



$$K_V = 2(1+\mu)(V_o + V_u)$$

$$= 2.66(808 + 345)$$

$$= 3067$$

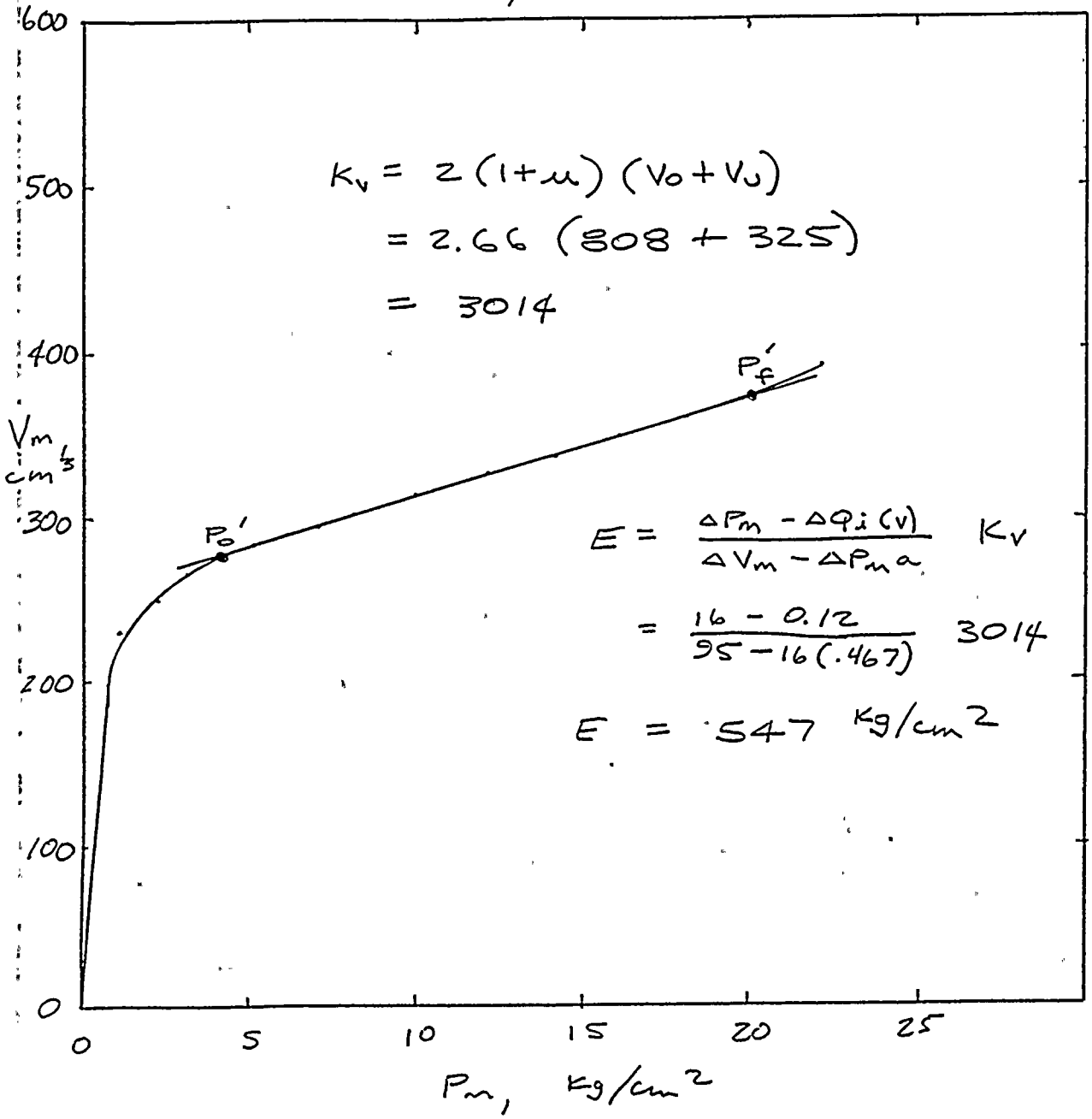
$$E = \frac{\Delta P_m - Q_u(v)}{\Delta V_m - \Delta P_m a} K_V$$

$$= \frac{6.1 - 0.14}{125 - 6.1(1.167)} (3067)$$

$$E = 155 \ Kg/cm^2$$

PRESSUREMETER TEST # 29

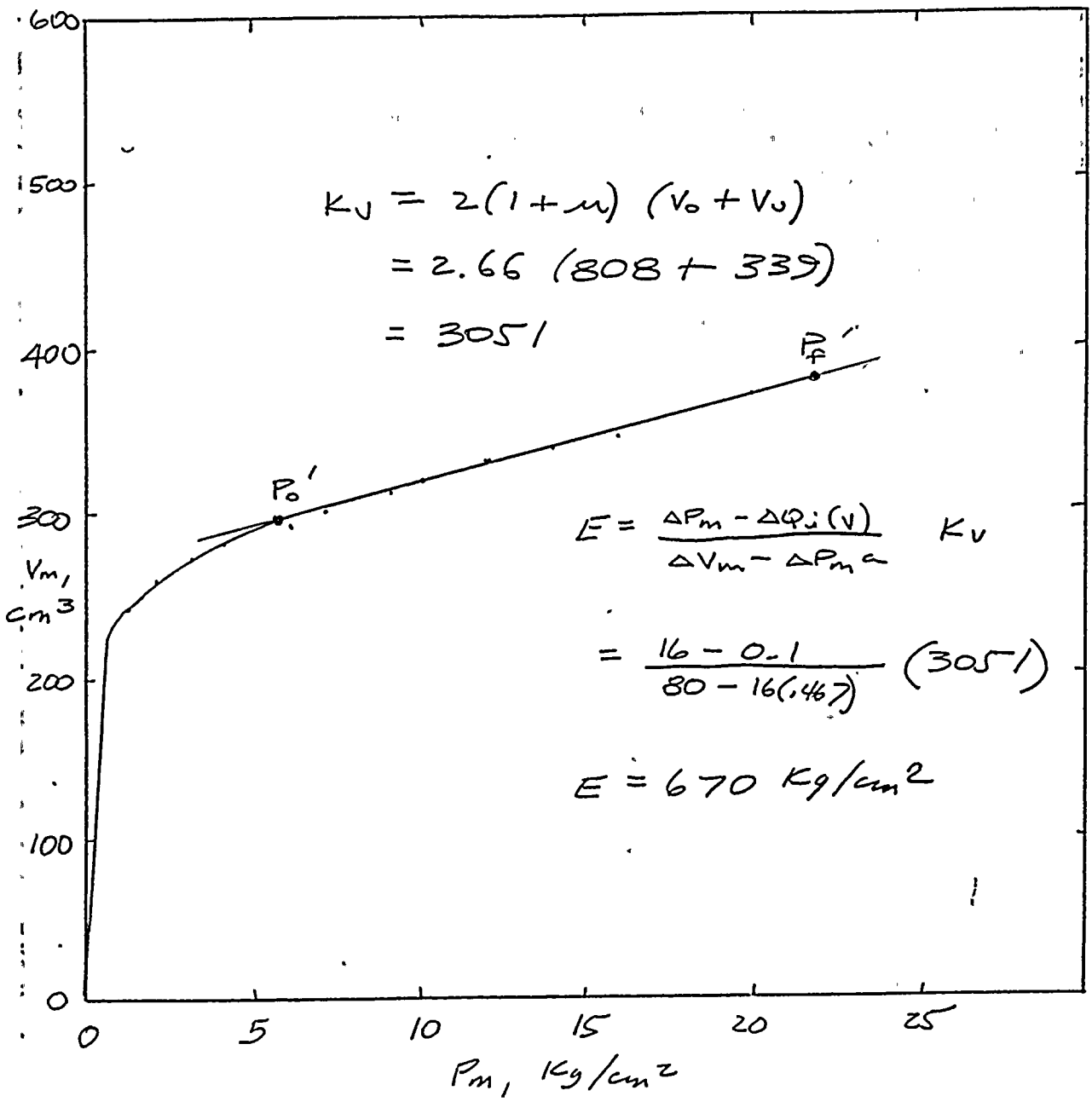
CT 25
DEPTH = 12.2' - 12.9'
SAND, MEDIUM, GR.-BR, W/GVL



$$K_v = 2(1+\mu)(V_o + V_u)$$
$$= 2.66\,(808 + 325)$$
$$= 3014$$

$$E = \frac{\Delta P_m - \Delta P_i(v)}{\Delta V_m - \Delta P_m a} K_v$$
$$= \frac{16 - 0.12}{95 - 16(.467)} 3014$$
$$E = 547 \text{ kg/cm}^2$$

PRESSIOREMETER TEST #33
CT 9A
DEPTH = 13.0' – 13.7'



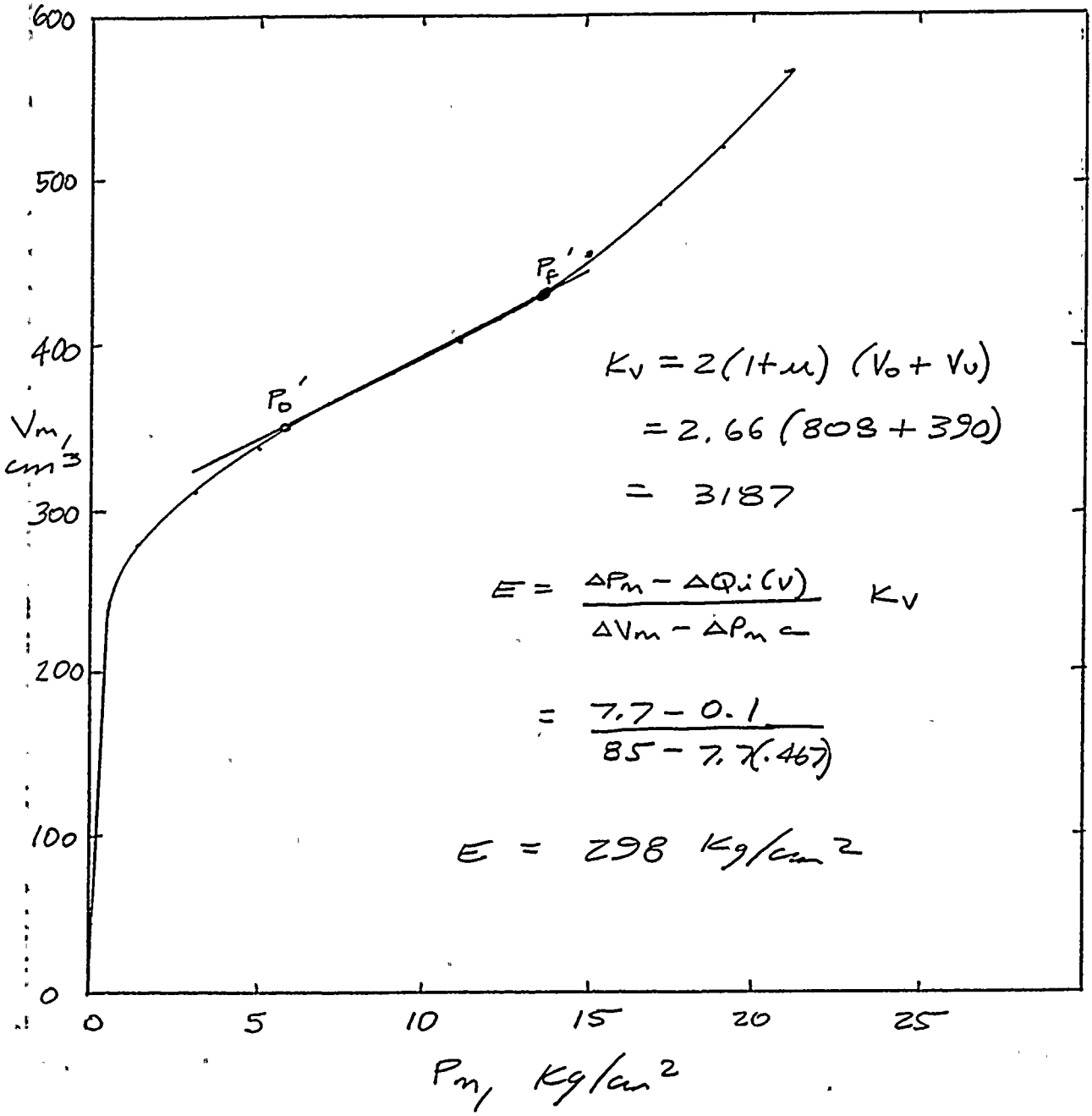
$$K_V = 2(1+\mu)(V_o + V_u)$$
$$= 2.66\ (808 + 339)$$
$$= 3051$$

$$E = \frac{\Delta P_m - \Delta P_i(V)}{\Delta V_m - \Delta P_m a} K_V$$

$$= \frac{16 - 0.1}{80 - 16(.467)}(3051)$$

$$E = 670\ Kg/cm^2$$

PRESSUREMETER TEST #34
CT 9A
DEPTH = 22.2′ - 22.9′



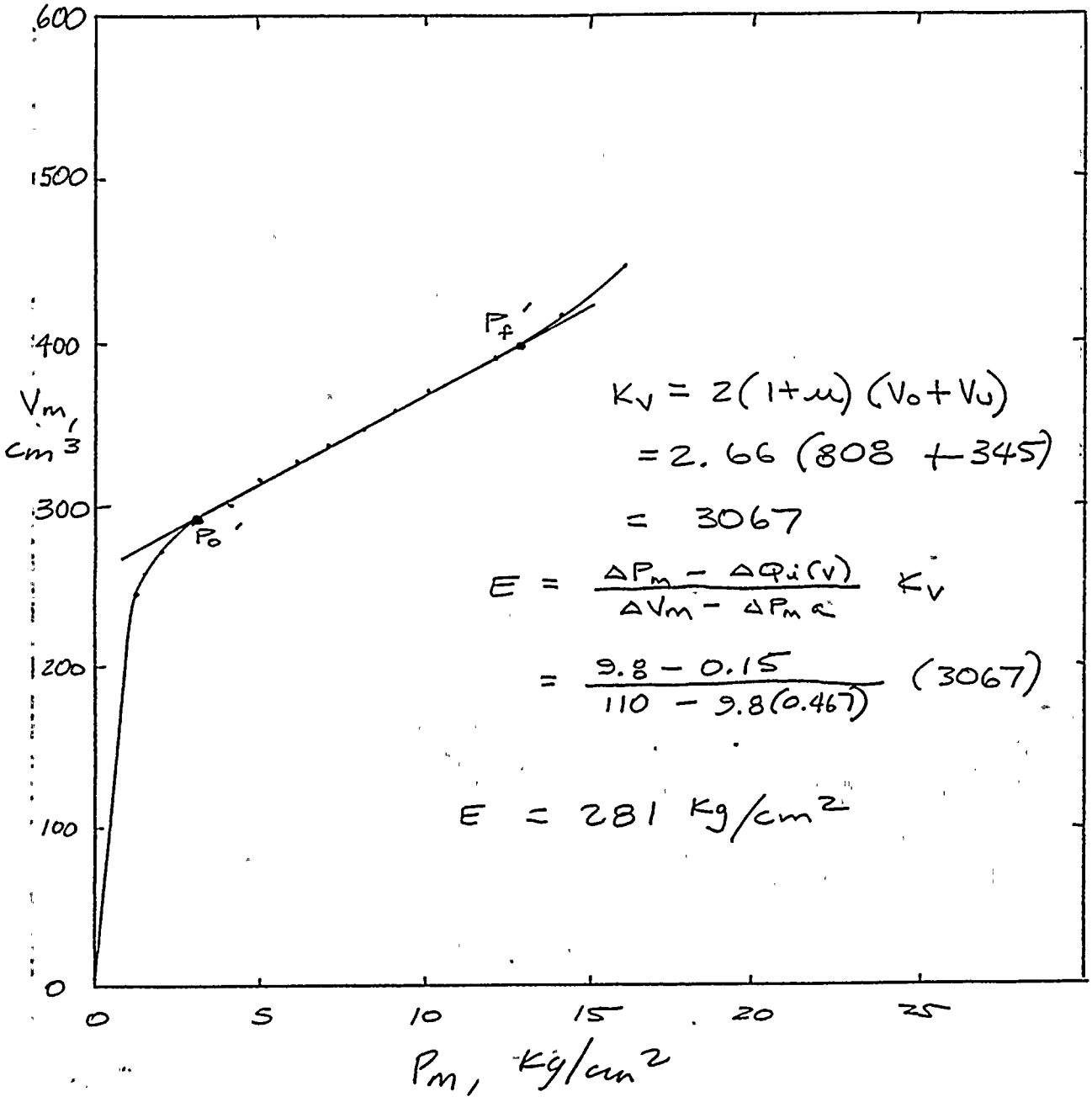
$$K_v = 2(1+\mu)(V_o + V_u)$$
$$= 2.66(808 + 390)$$
$$= 3187$$

$$E = \frac{\Delta P_m - \Delta Q_i(v)}{\Delta V_m - \Delta P_m c} K_v$$

$$= \frac{7.7 - 0.1}{85 - 7.7(.467)}$$

$$E = 298 \text{ Kg/cm}^2$$

PRESSUREMETER TEST # 35
CT 28
DEPTH = 13.7' - 14.4'



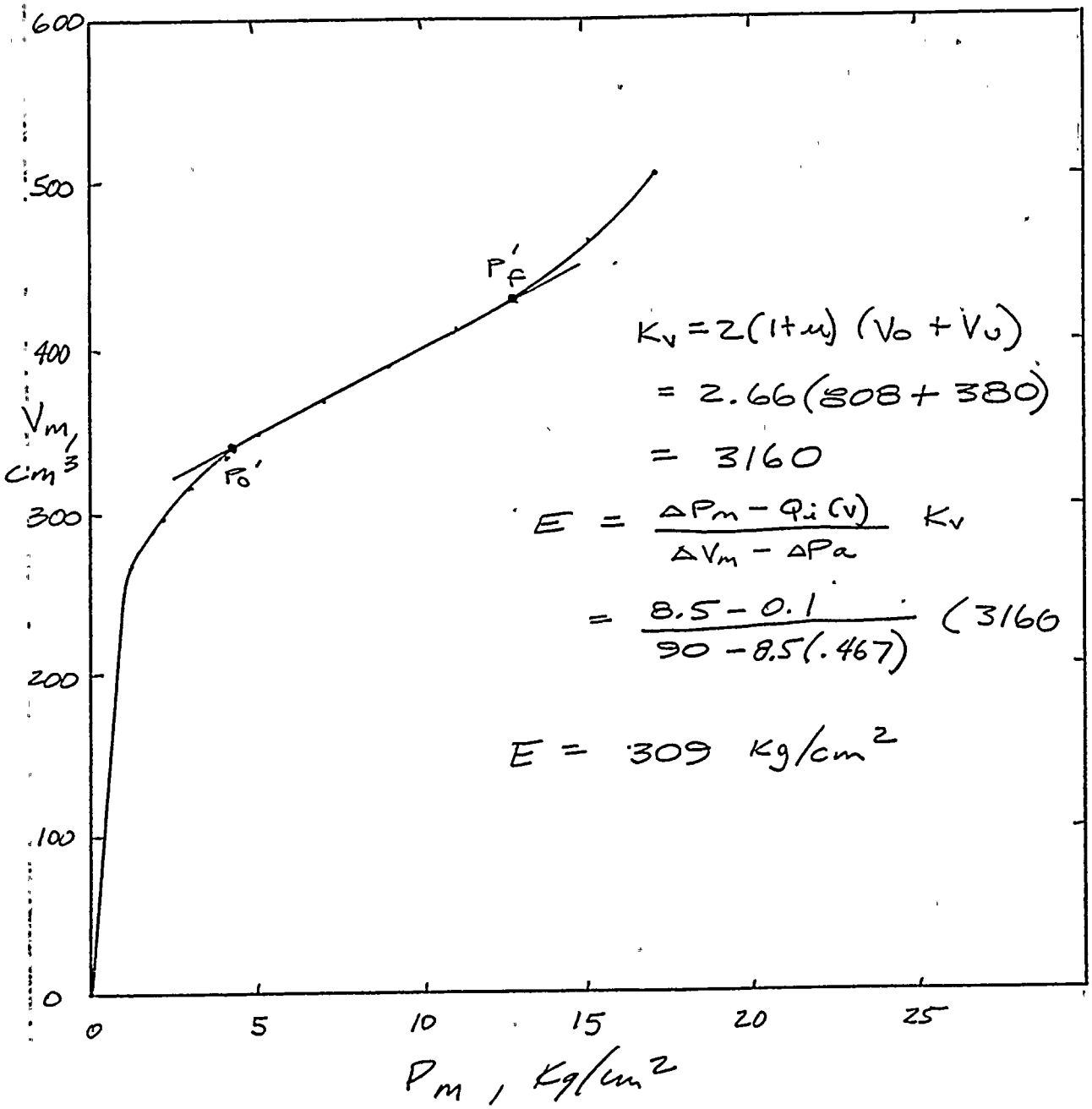
$$K_V = 2(1+\mu)(V_o + V_u)$$
$$= 2.66\,(808 + 345)$$
$$= 3067$$

$$E = \frac{\Delta P_m - \Delta P_i(v)}{\Delta V_m - \Delta P_m \alpha} K_V$$

$$= \frac{9.8 - 0.15}{110 - 9.8(0.467)}\,(3067)$$

$$E = 281\ kg/cm^2$$

PRESSUREMETER TEST # 36
CT 30
DEPTH = 3.4' - 4.1'



$K_v = 2(1+\mu)(V_o + V_u)$

$= 2.66(808 + 380)$

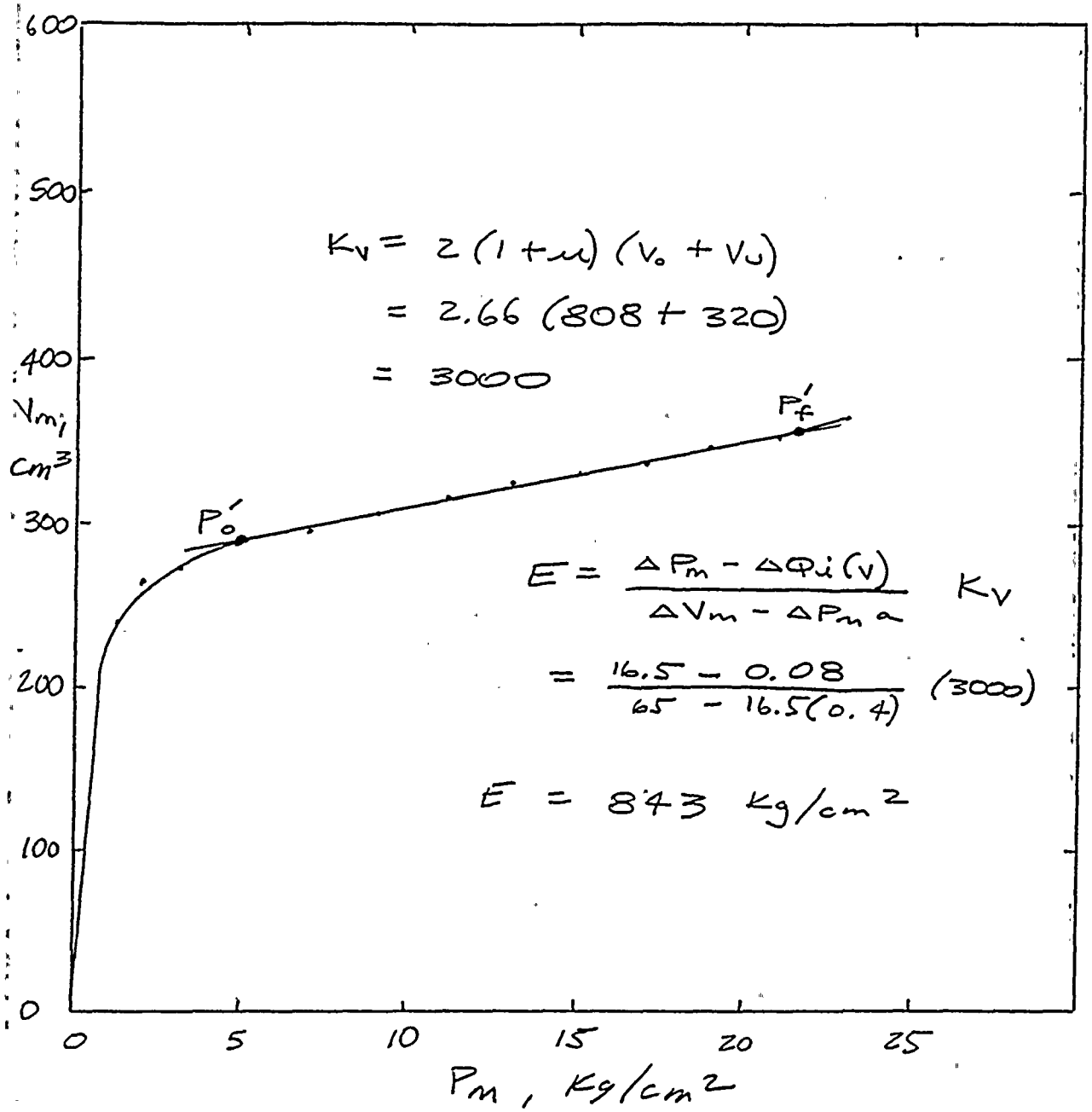
$= 3160$

$E = \frac{\Delta P_m - Q_i(v)}{\Delta V_m - \Delta P_a} K_v$

$= \frac{8.5 - 0.1}{90 - 8.5(.467)} (3166$

$E = 309 \ Kg/cm^2$

PRESSUREMETER TEST #37
CT 31
DEPTH = 18.0'-18.7'

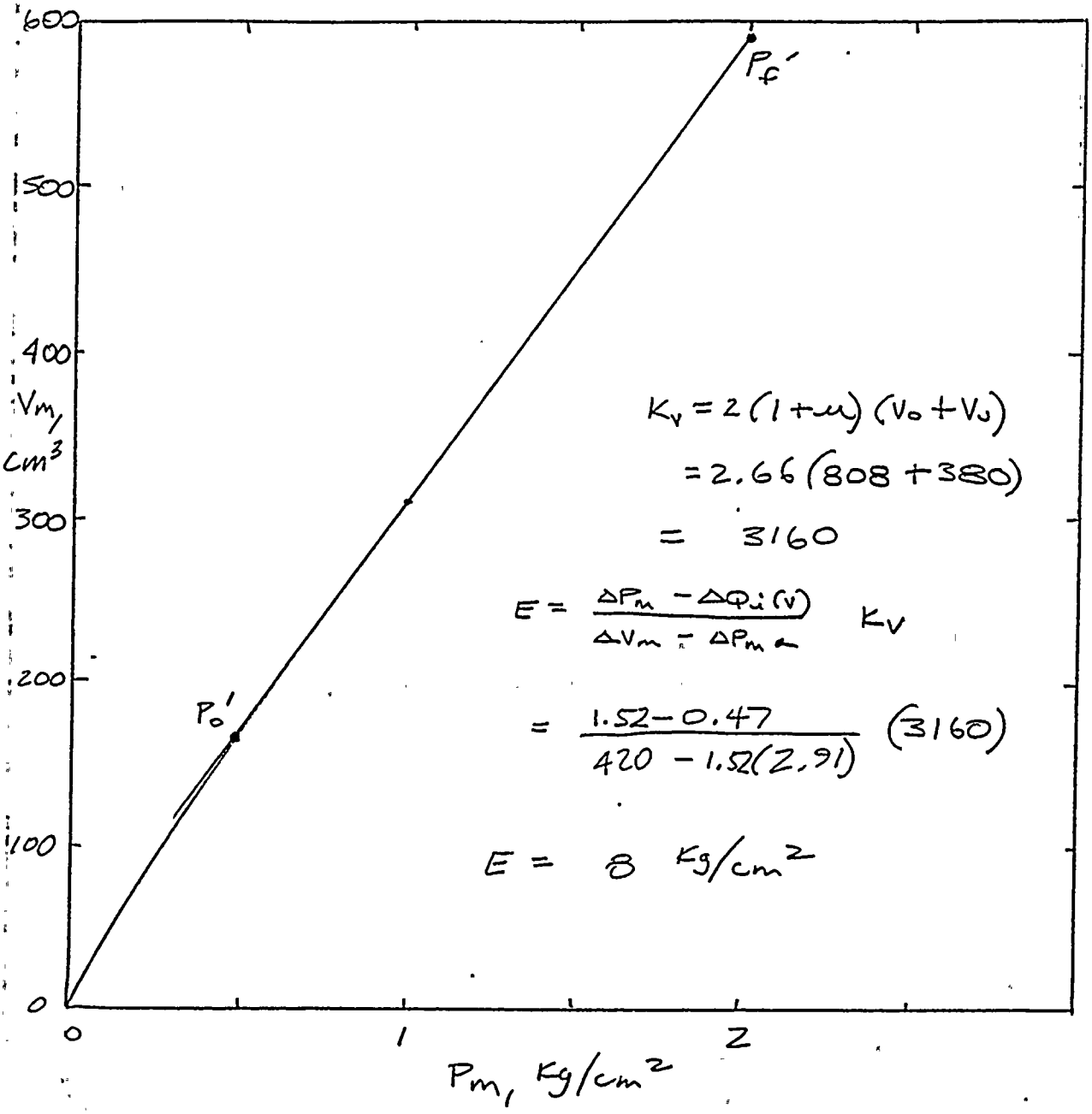


$$K_v = 2(1+\mu)(V_o + V_u)$$
$$= 2.66\,(808 + 320)$$
$$= 3000$$

$$E = \frac{\Delta P_m - \Delta P_{ui}(v)}{\Delta V_m - \Delta P_m a} K_v$$
$$= \frac{16.5 - 0.08}{65 - 16.5(0.4)}(3000)$$

$$E = 843\ kg/cm^2$$

PRESSUREMETER TEST #38
CT 32
DEPTH = 4.7' - 5.4'



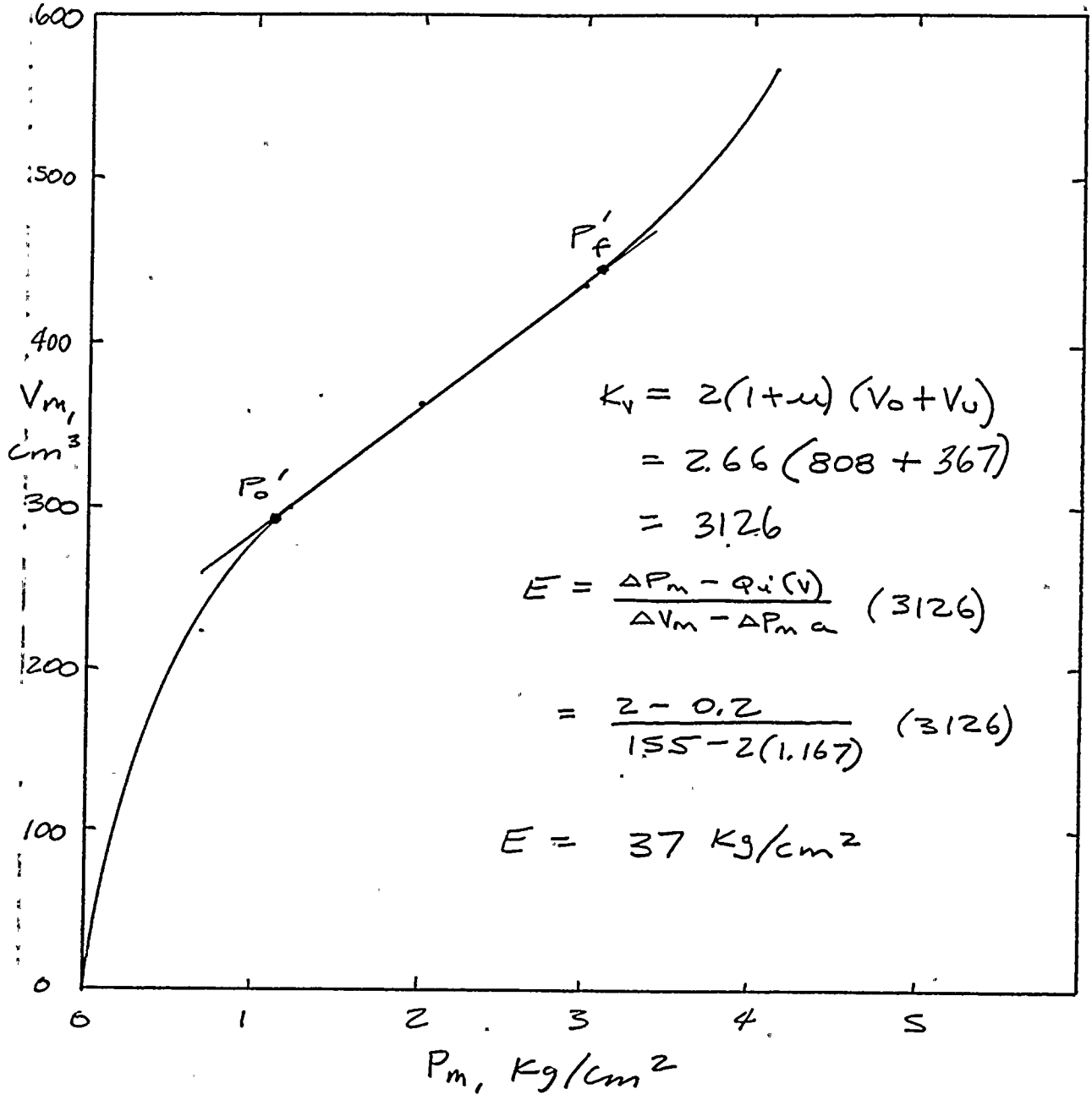
$$K_v = 2(1+\mu)(V_o + V_J)$$
$$= 2.66(808 + 380)$$
$$= 3160$$

$$E = \frac{\Delta P_m - \Delta Q_i(v)}{\Delta V_m - \Delta P_m a} K_v$$

$$= \frac{1.52 - 0.47}{420 - 1.52(2.91)} (3160)$$

$$E = 8 \ Kg/cm^2$$

PRESSUREMETER TEST #39
CT 33
DEPTH = 4.4′ – 5.1′



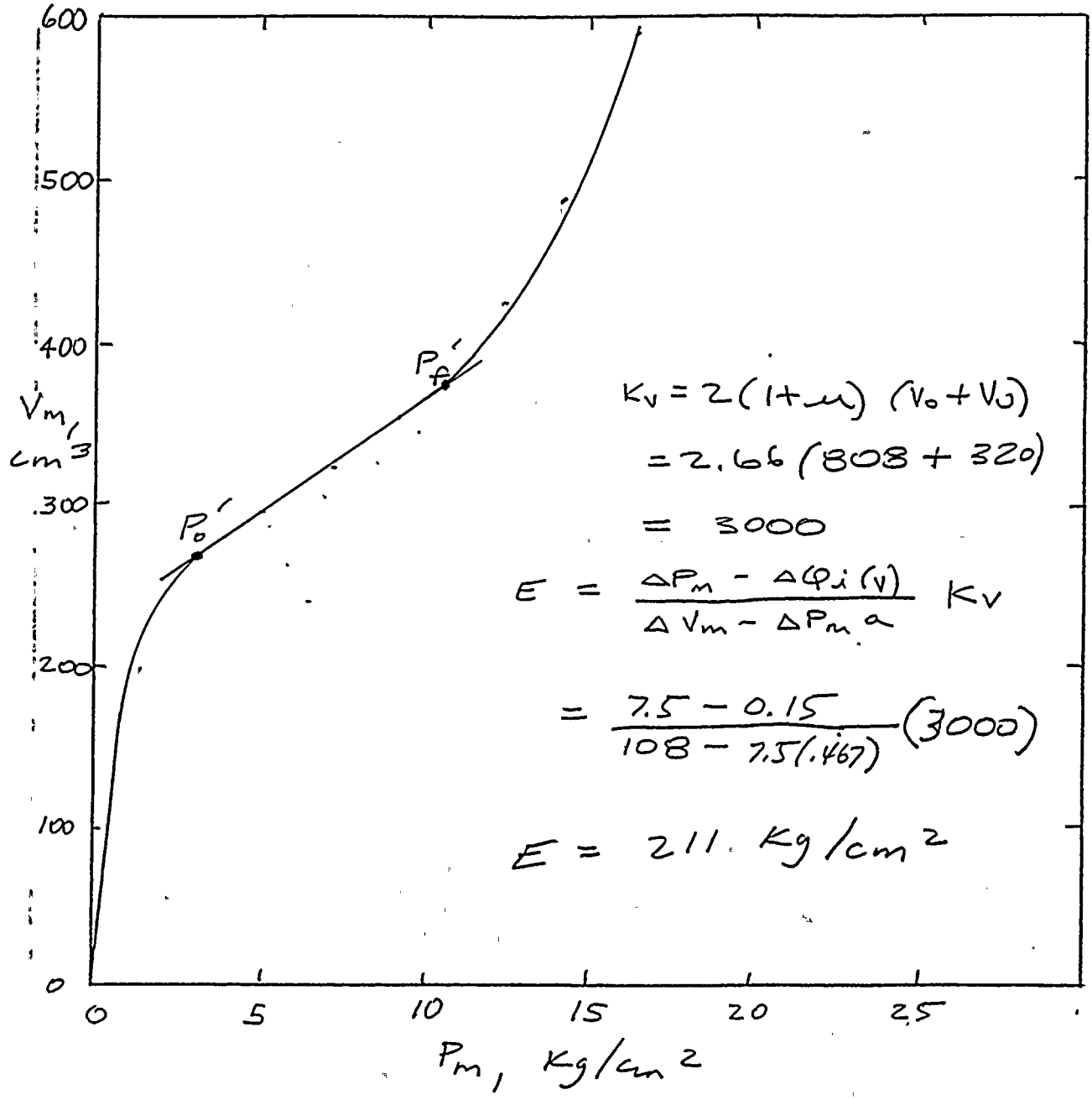
$$K_v = 2(1+\mu)(V_o + V_u)$$
$$= 2.66(808 + 367)$$
$$= 3126$$

$$E = \frac{\Delta P_m - Q_i(v)}{\Delta V_m - \Delta P_m a}(3126)$$

$$= \frac{2 - 0.2}{155 - 2(1.167)}(3126)$$

$$E = 37 \text{ Kg/cm}^2$$

PRESSUREMETER TEST # 42
CT 35
DEPTH = 4.5' – 5.2'



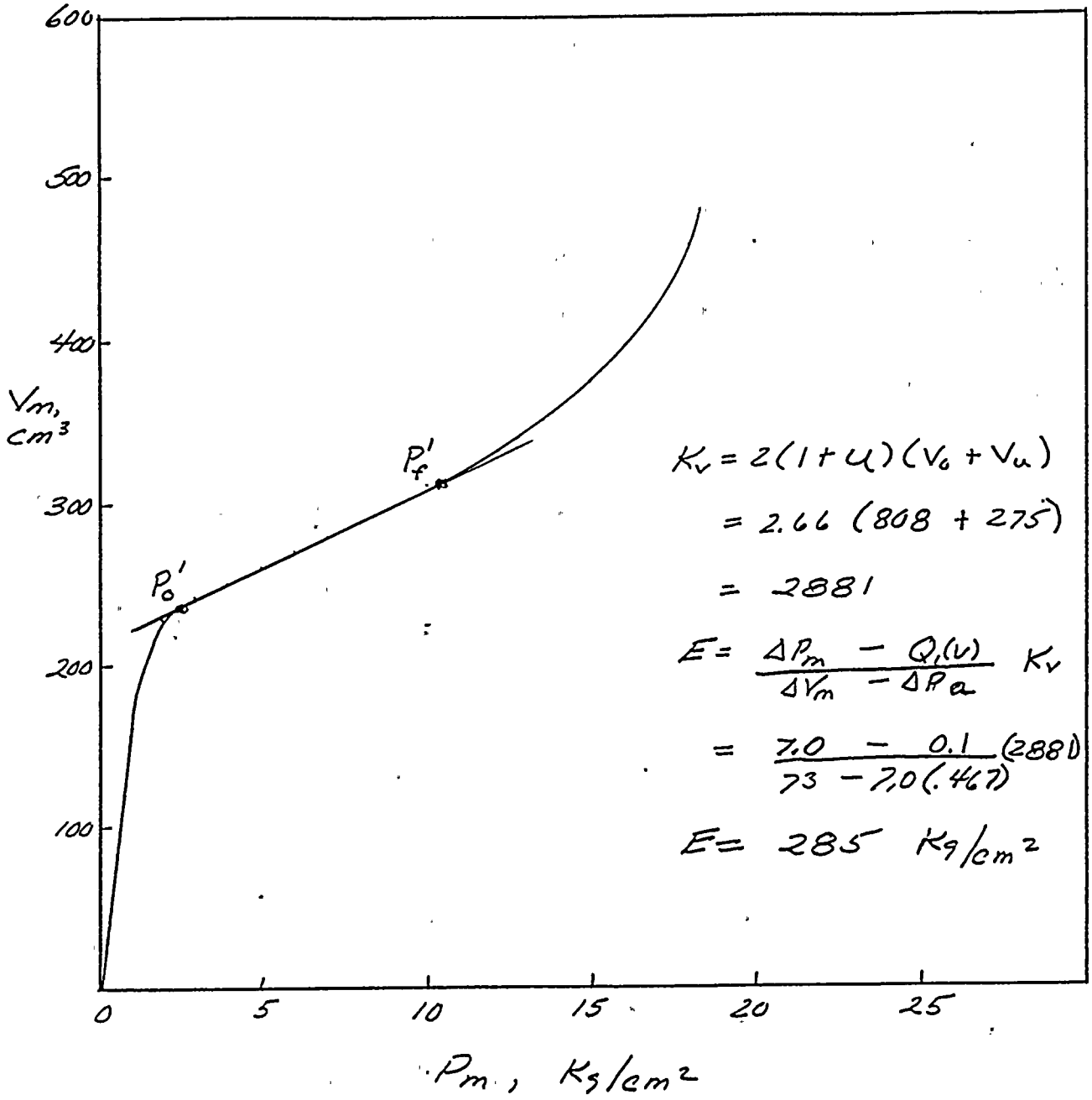
$$K_v = 2(1+\mu)(V_o + V_J)$$
$$= 2.66(808 + 320)$$
$$= 3000$$

$$E = \frac{\Delta P_m - \Delta \varphi_i(v)}{\Delta V_m - \Delta P_m a} K_v$$

$$= \frac{7.5 - 0.15}{108 - 7.5(.467)}(3000)$$

$$E = 211.\ Kg/cm^2$$

PRESSUREMETER TEST #44
CT 37
DEPTH = 7.5' - 8.2'



$$K_v = 2(1+\mu)(V_o + V_u)$$

$$= 2.66\ (808 + 275)$$

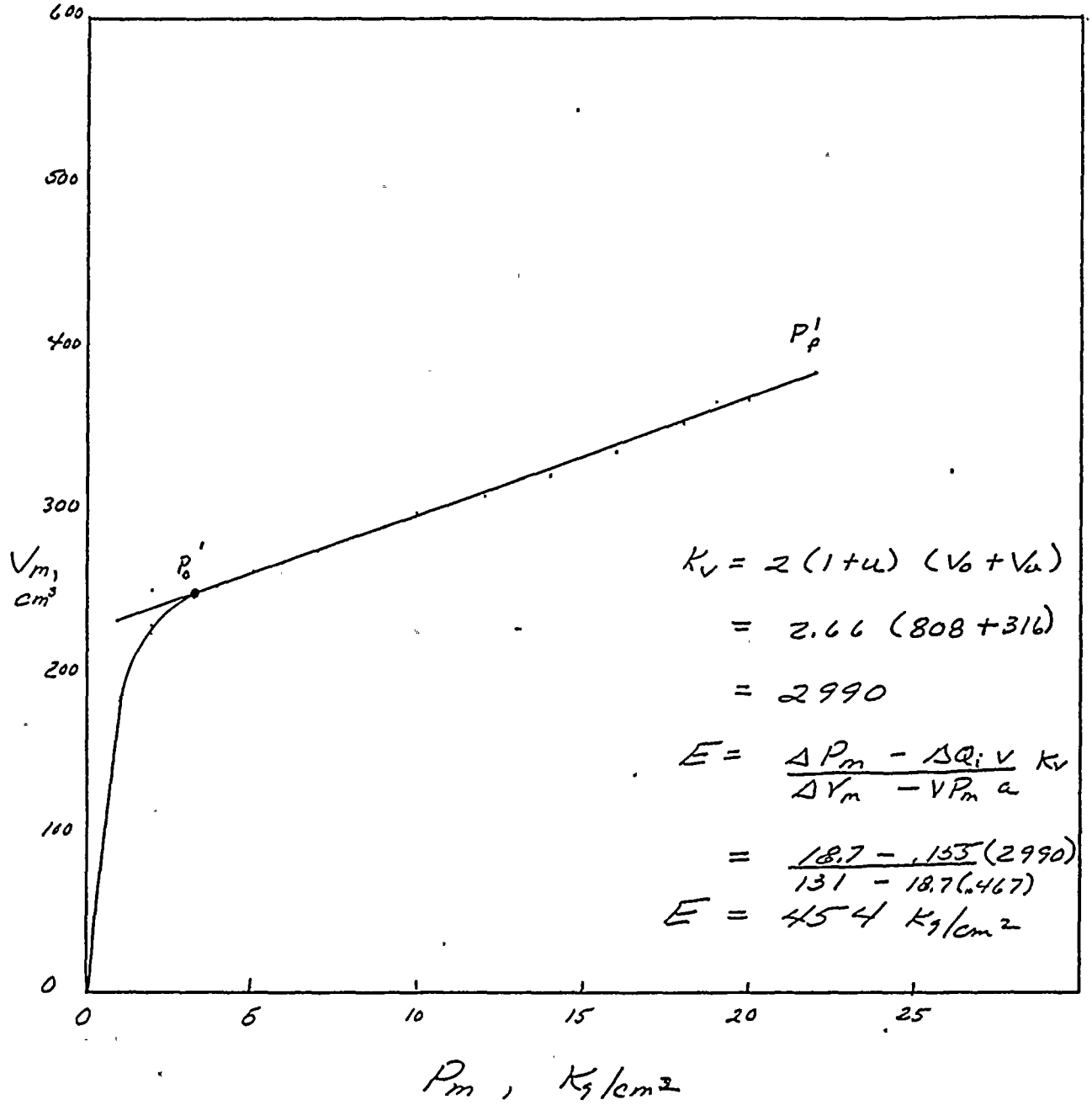
$$= 2881$$

$$E = \frac{\Delta P_m - Q_1(V)}{\Delta V_m - \Delta P_a} K_v$$

$$= \frac{7.0 - 0.1}{73 - 7.0(.467)}(2881)$$

$$E = 285\ Kg/cm^2$$

PRESSUREMETER TEST # 45
CT-29
DEPTH 5.9' - 6.6'



$$K_v = 2(1+u)(V_o + V_u)$$
$$= 2.66\,(808 + 316)$$
$$= 2990$$

$$E = \frac{\Delta P_m - \Delta Q_i \frac{V}{a} K_v}{\Delta V_m - V P_m}$$

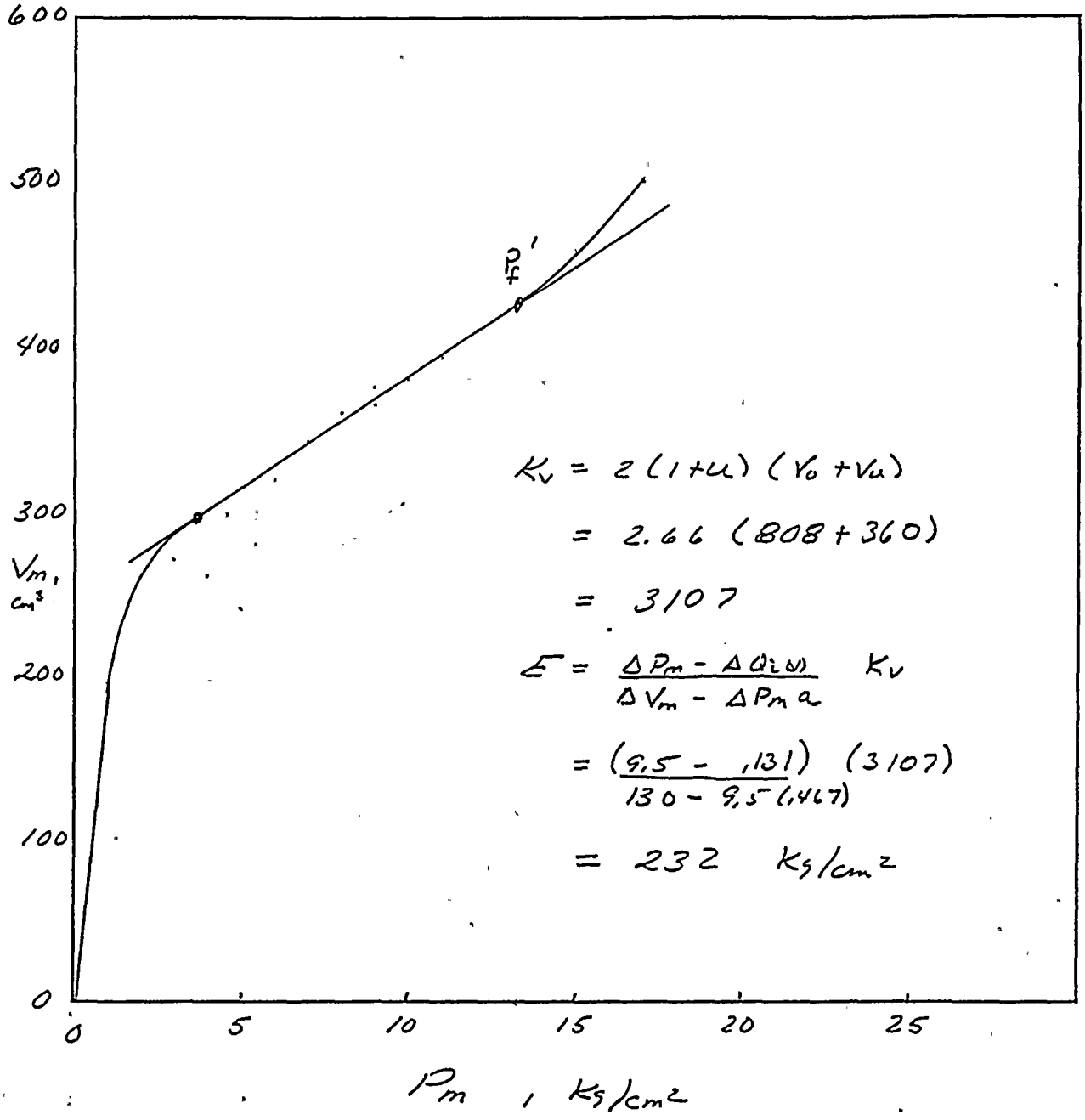
$$= \frac{18.7 - .155(2990)}{131 - 18.7(.467)}$$

$$E = 454 \ Kg/cm^2$$

PRESSUREMETER TEST # 46

CT 39

DEPTH - 4.2'-4.9'



$$K_v = 2(1+u)(V_o + V_u)$$

$$= 2.66\ (808 + 360)$$

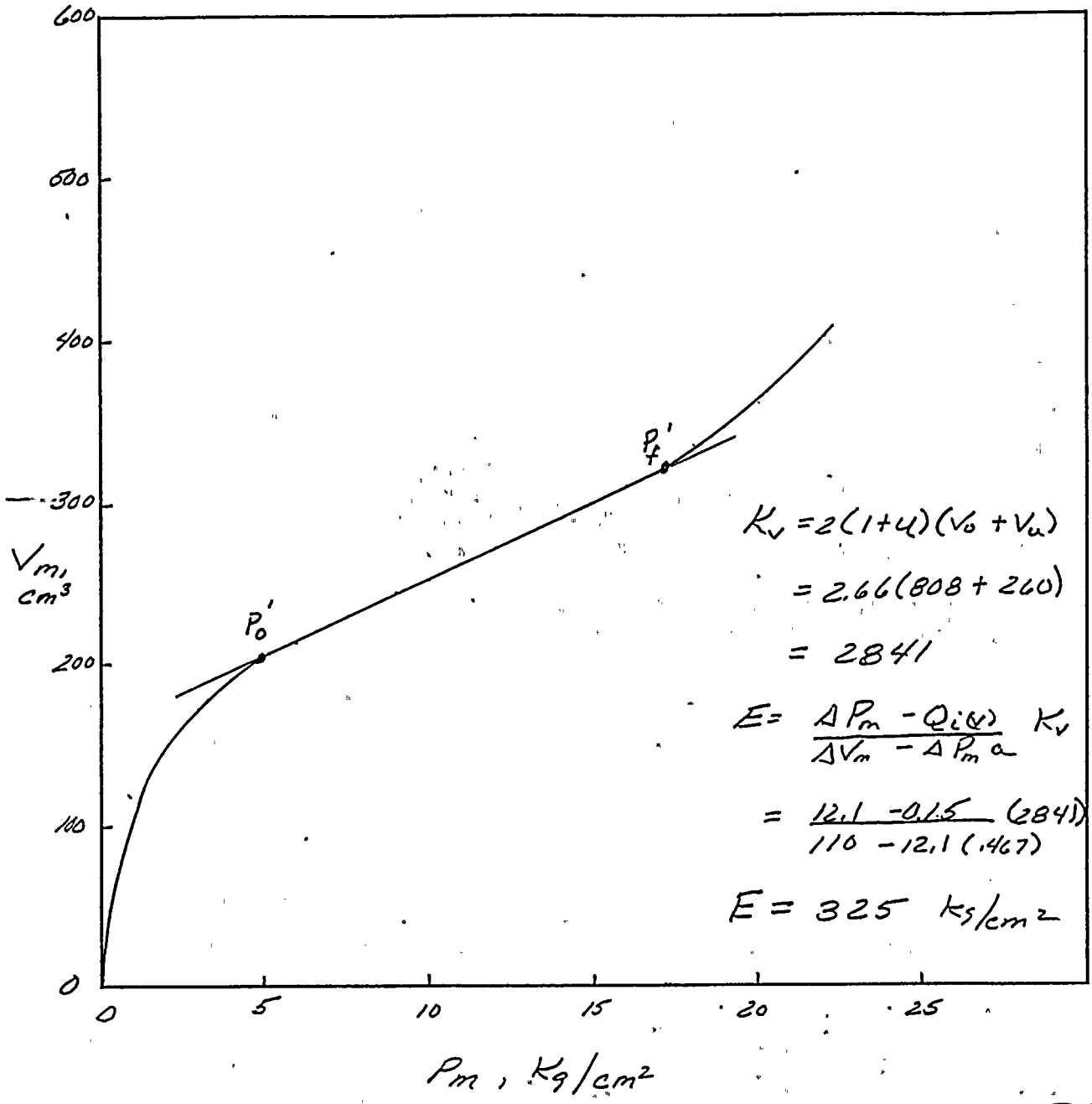
$$= 3107$$

$$E = \frac{\Delta P_m - \Delta Q_{(N)}}{\Delta V_m - \Delta P_m a} K_v$$

$$= \frac{(9.5 - .131)}{130 - 9.5(.467)} (3107)$$

$$= 232 \quad Kg/cm^2$$

PRESSUREMETER TEST #47
CT-40
DEPTH - 4.4'-5.1'



$$K_v = 2(1+\mu)(V_o + V_u)$$
$$= 2.66(808 + 260)$$
$$= 2841$$

$$E = \frac{\Delta P_m - Q_i(\mu)}{\Delta V_m - \Delta P_m a} K_v$$

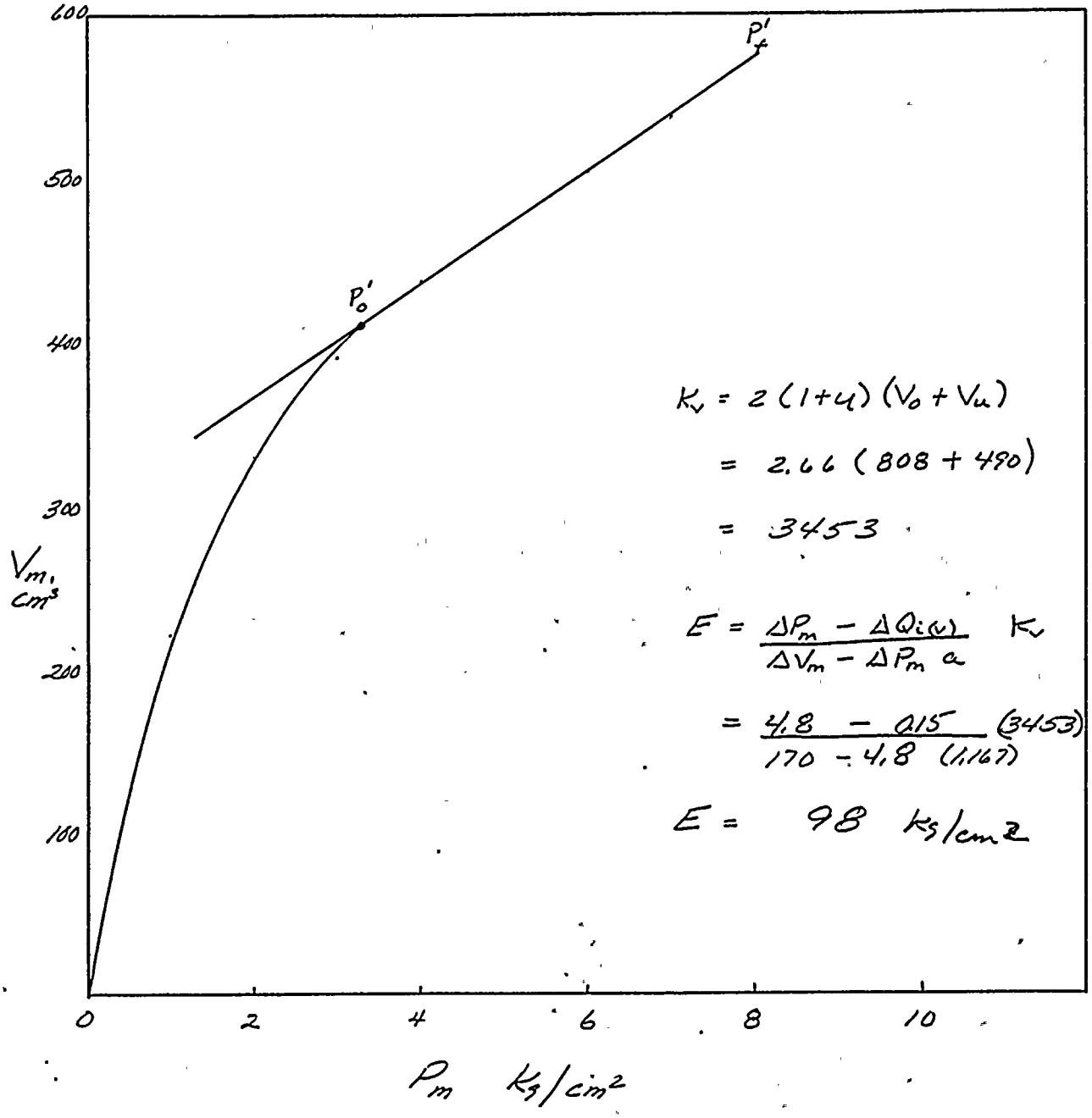
$$= \frac{12.1 - 0.15}{110 - 12.1(.467)}(2841)$$

$$E = 325 \ Ks/cm^2$$

PRESSUREMETER TEST # 48

CT-40

DEPTH 11.0'-11.7'



$$K_v = 2(1+\mu)(V_o + V_u)$$

$$= 2.66\,(808 + 490)$$

$$= 3453$$

$$E = \frac{\Delta P_m - \Delta Q_{i(v)}}{\Delta V_m - \Delta P_m\, a}\, K_v$$

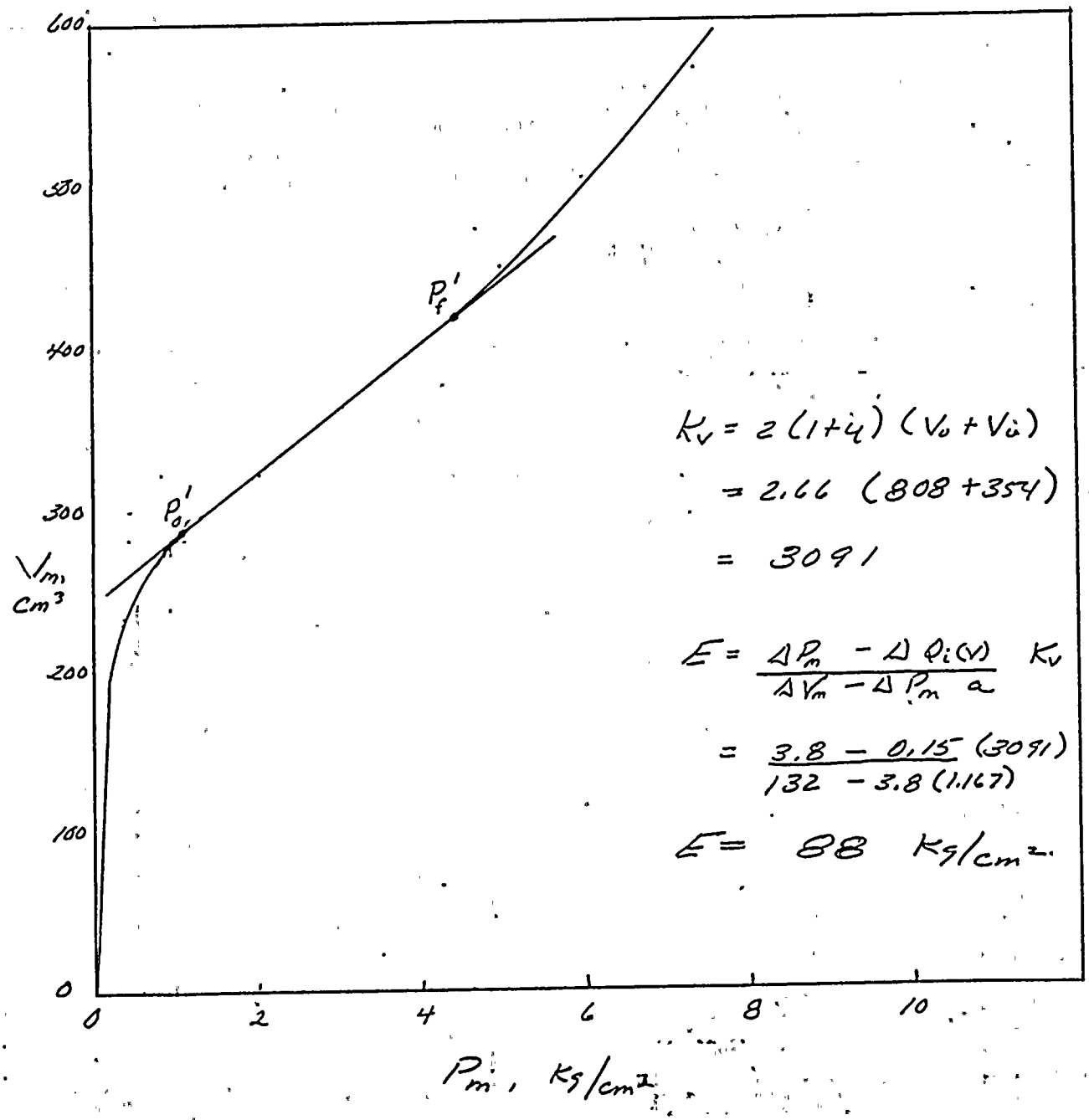
$$= \frac{4.8 - 0.15}{170 - 4.8\,(1.167)}\,(3453)$$

$$E = 98 \ Kg/cm^2$$

PRESSUREMETER TEST # 49

CT-40

DEPTH - 25.8'-26.5'



$K_v = 2(1+\mu)(V_o + V_i)$

$= 2.66\ (808 + 354)$

$= 3091$

$E = \dfrac{\Delta P_m - \Delta P_i(V)}{\Delta V_m - \Delta P_m\ a} K_v$

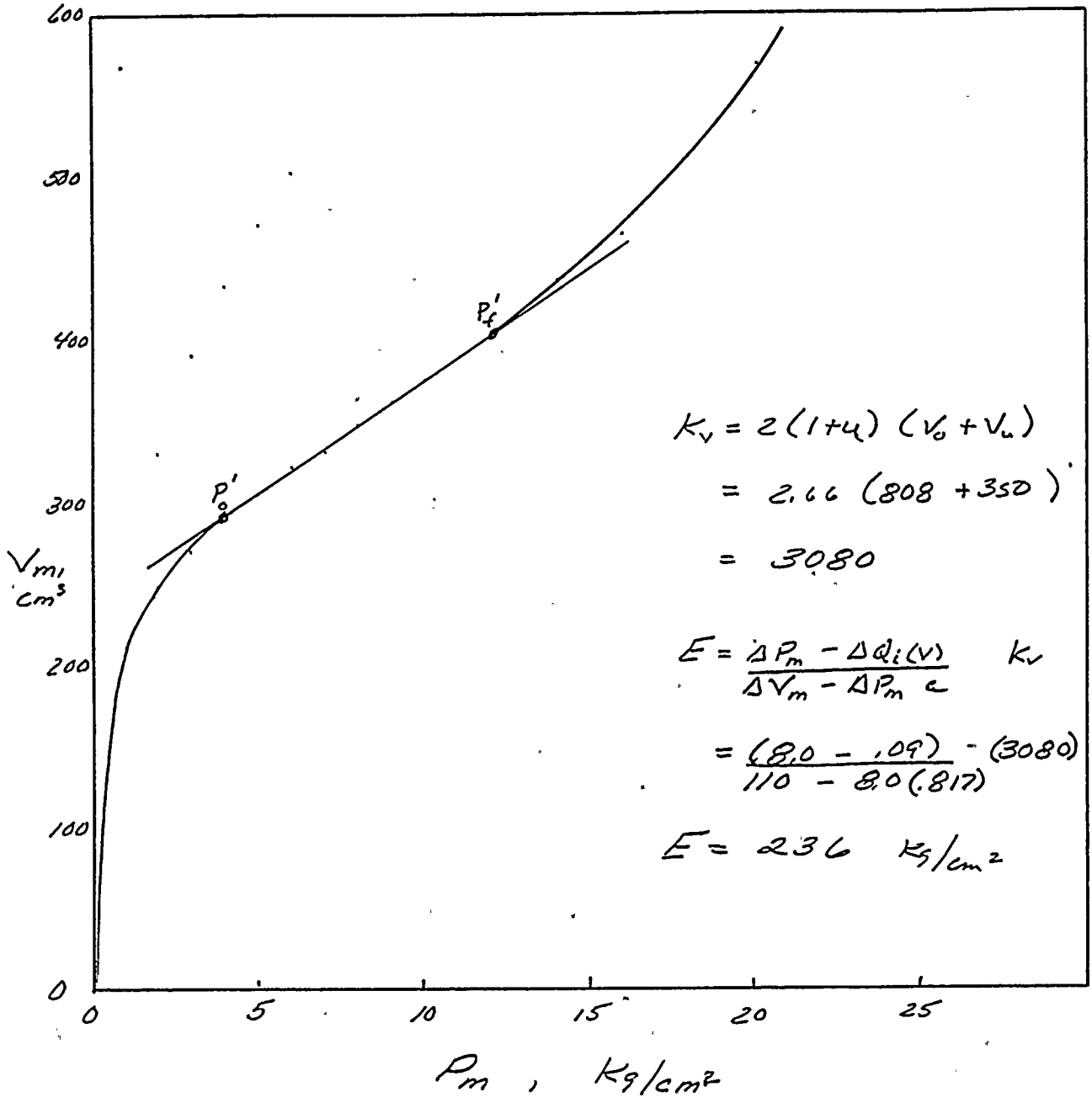
$= \dfrac{3.8 - 0.15\ (3091)}{132 - 3.8\ (1.167)}$

$E = 88\ Kg/cm^2$

PRESSUREMETER TEST #50

CT-4.1

DEPTH 6.3'-7.0'



$$K_v = 2(1+\mu)(V_o + V_u)$$

$$= 2.66\,(808 + 350)$$

$$= 3080$$

$$E = \frac{\Delta P_m - \Delta Q_i(V)}{\Delta V_m - \Delta P_m\, c}\, K_v$$

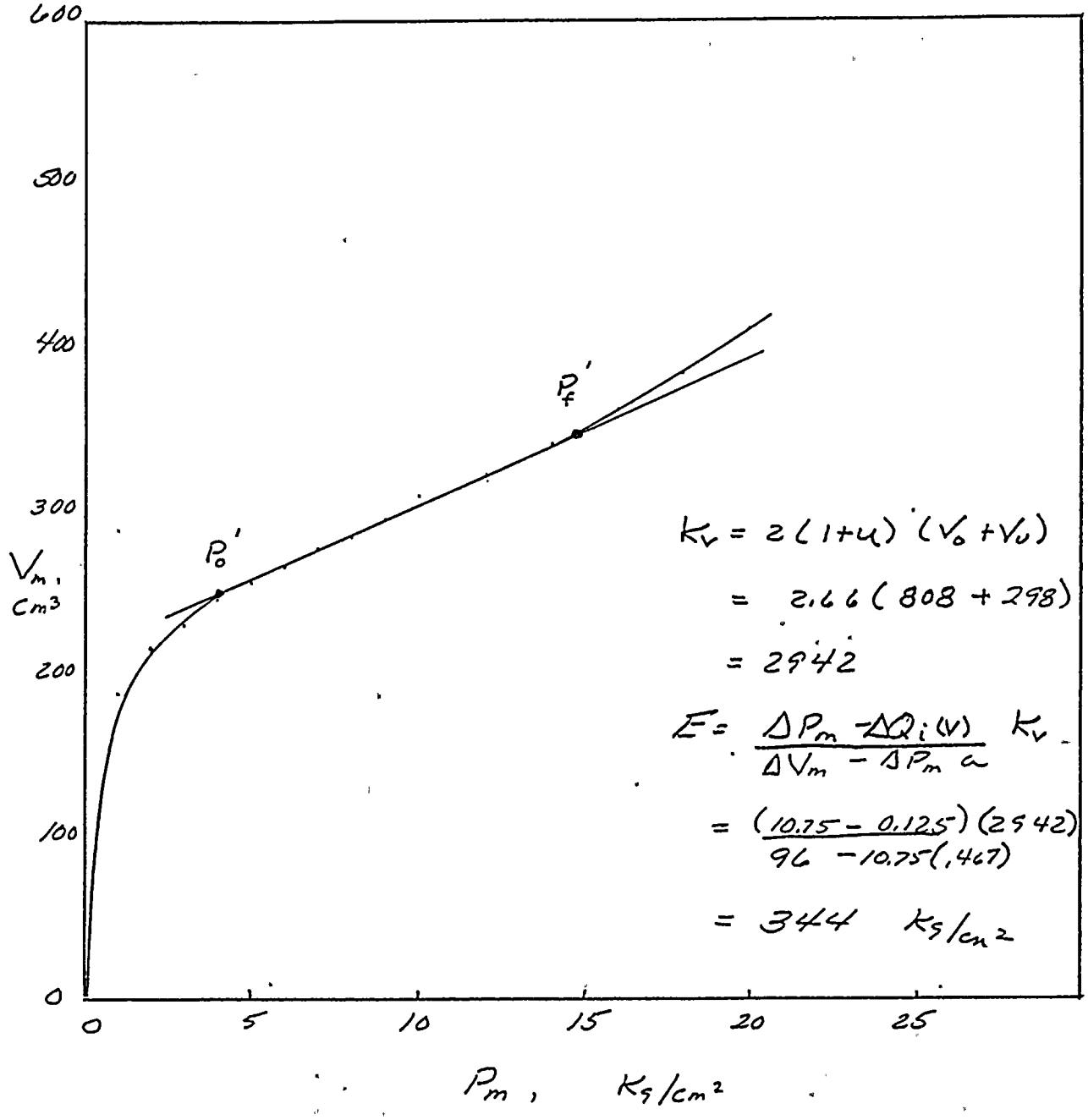
$$= \frac{(8.0 - .09)}{110 - 8.0(.817)} \cdot (3080)$$

$$E = 236 \ \text{Kg/cm}^2$$

PRESSUREMETER TEST #51

CT-42

DEPTH 8.8'-9.5'



$$K_v = 2(1+\mu)(V_o + V_u)$$

$$= 2.66(808 + 298)$$

$$= 2942$$

$$E = \frac{\Delta P_m - \Delta Q_i(V)}{\Delta V_m - \Delta P_m a} K_v$$

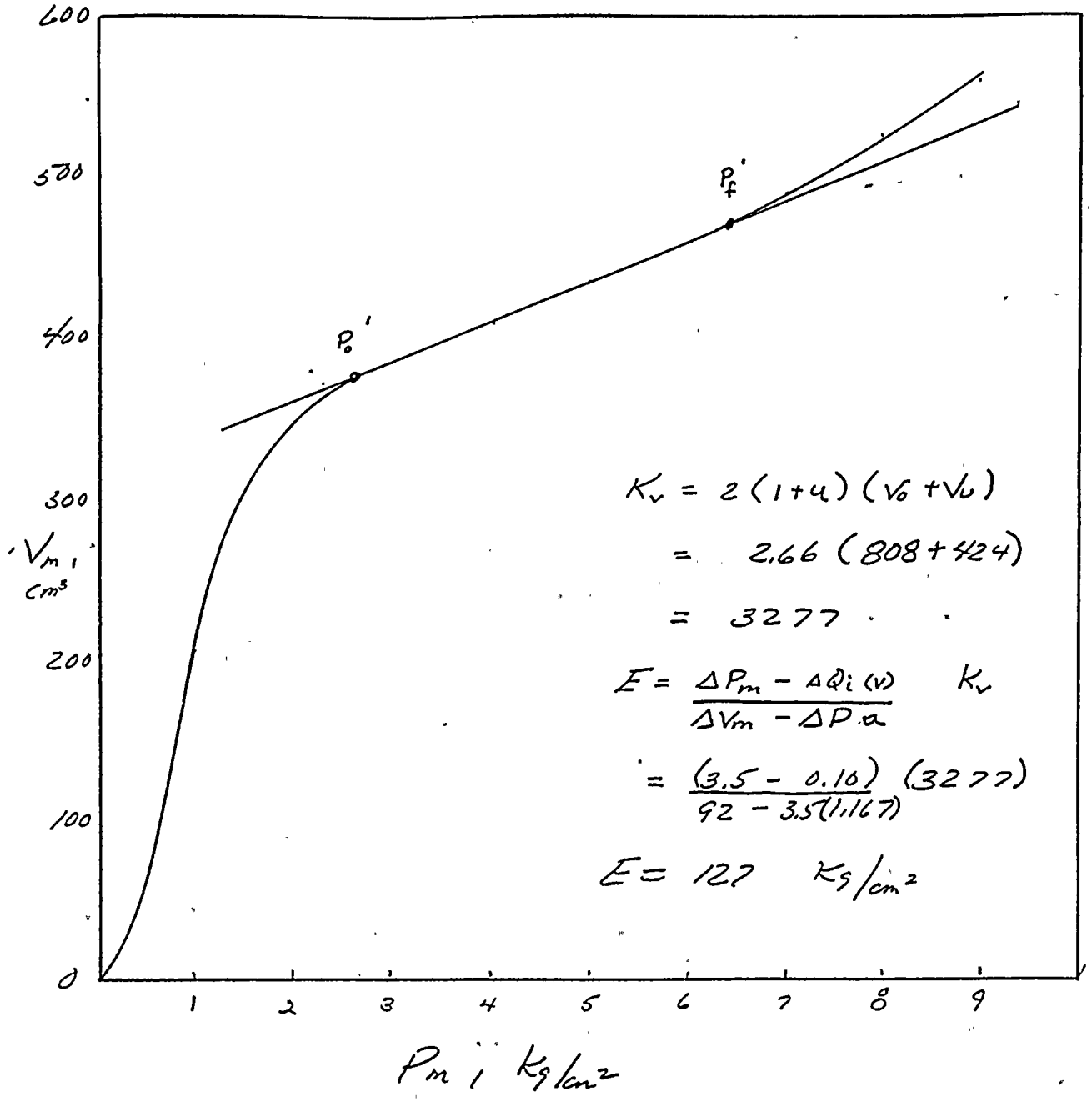
$$= \frac{(10.75 - 0.125)(2942)}{96 - 10.75(.467)}$$

$$= 344 \quad Ks/cm^2$$

PRESSUREMETER TEST # 52

CT-43

DEPTH 7.4'-8.1'



$$K_v = 2(1+u)(V_o + V_u)$$

$$= 2.66\,(808 + 424)$$

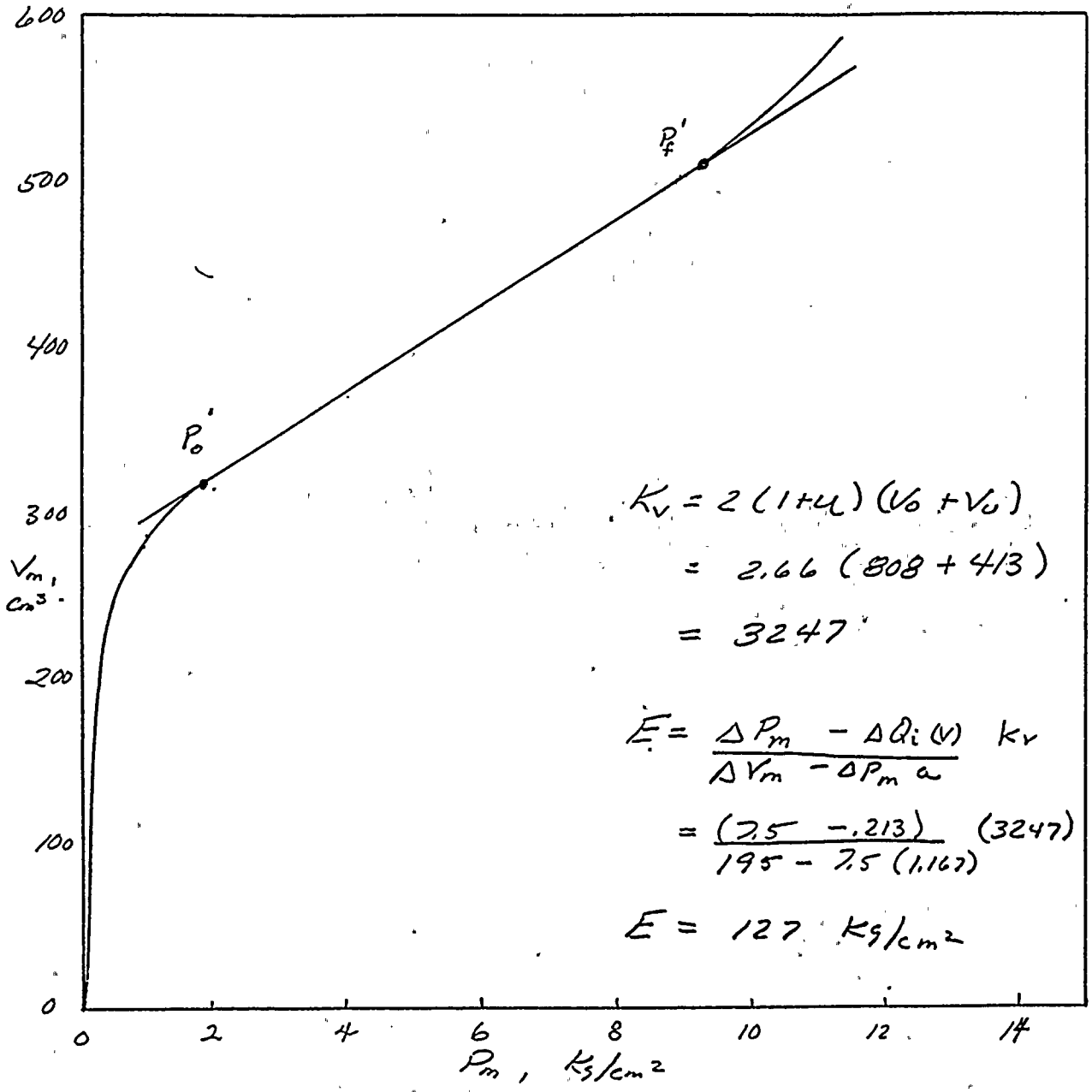
$$= 3277$$

$$E = \frac{\Delta P_m - \Delta Q_i(v)}{\Delta V_m - \Delta P \cdot a} K_v$$

$$= \frac{(3.5 - 0.10)}{92 - 3.5(1.167)}(3277)$$

$$E = 127 \text{ kg/cm}^2$$

PRESSUREMETER TEST #53
CT 43
DEPTH. 19.0'-19.7'



$$K_v = 2(1+\mu)(V_o + V_o)$$
$$= 2.66\,(808 + 413)$$
$$= 3247$$

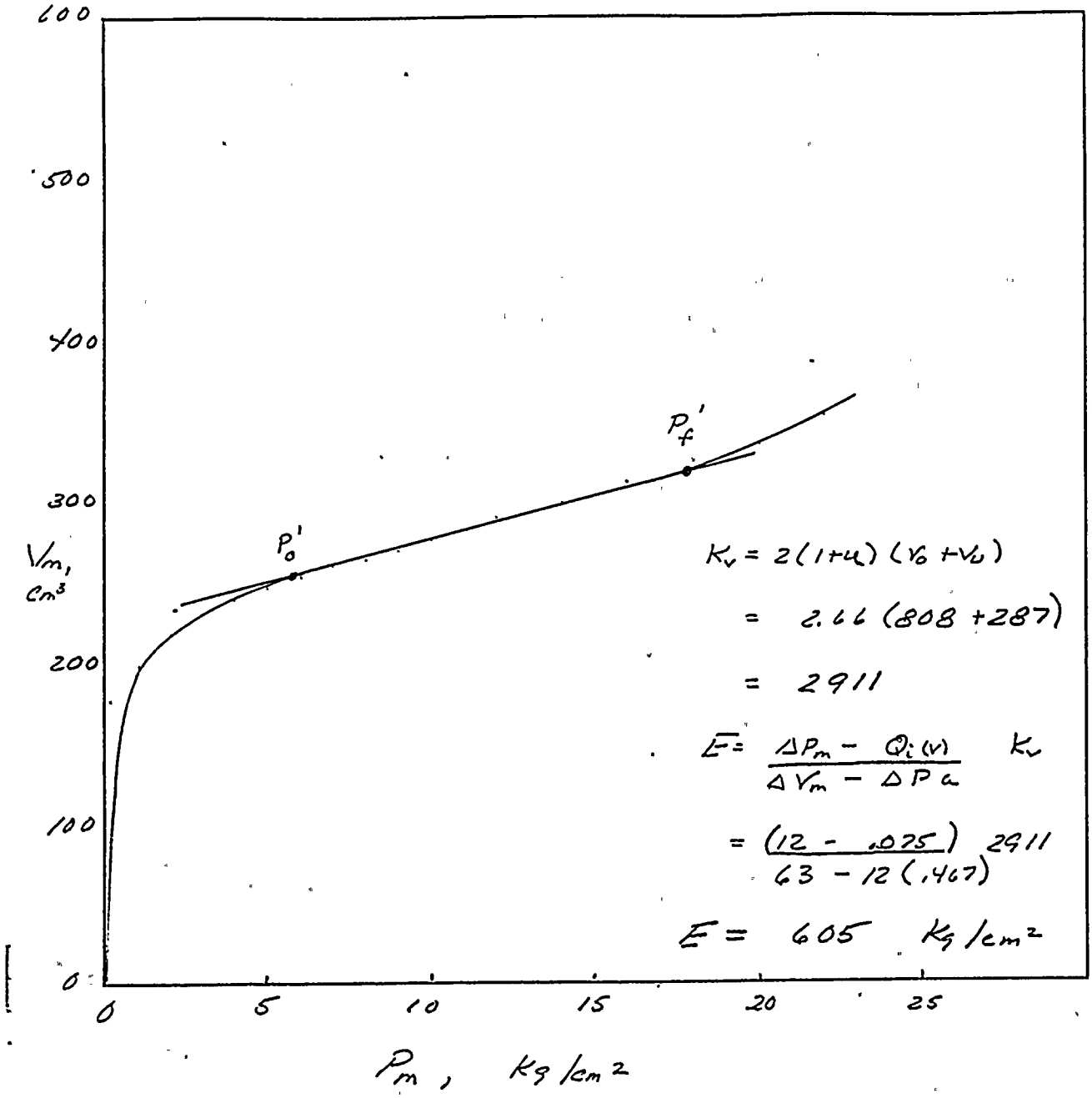
$$E = \frac{\Delta P_m - \Delta Q_i(V)}{\Delta V_m - \Delta P_m\, a}\, K_v$$
$$= \frac{(7.5 - .213)}{195 - 7.5\,(1.167)}\,(3247)$$

$$E = 127\ Kg/cm^2$$

PRESSUREMETER TEST #54

CT-44

DEPTH 8.8'-9.5'



$$K_v = 2(1+\mu)(V_o + V_b)$$

$$= 2.66\,(808 + 287)$$

$$= 2911$$

$$E = \frac{\Delta P_m - Q_i(v)}{\Delta V_m - \Delta P\,a}\,K_v$$

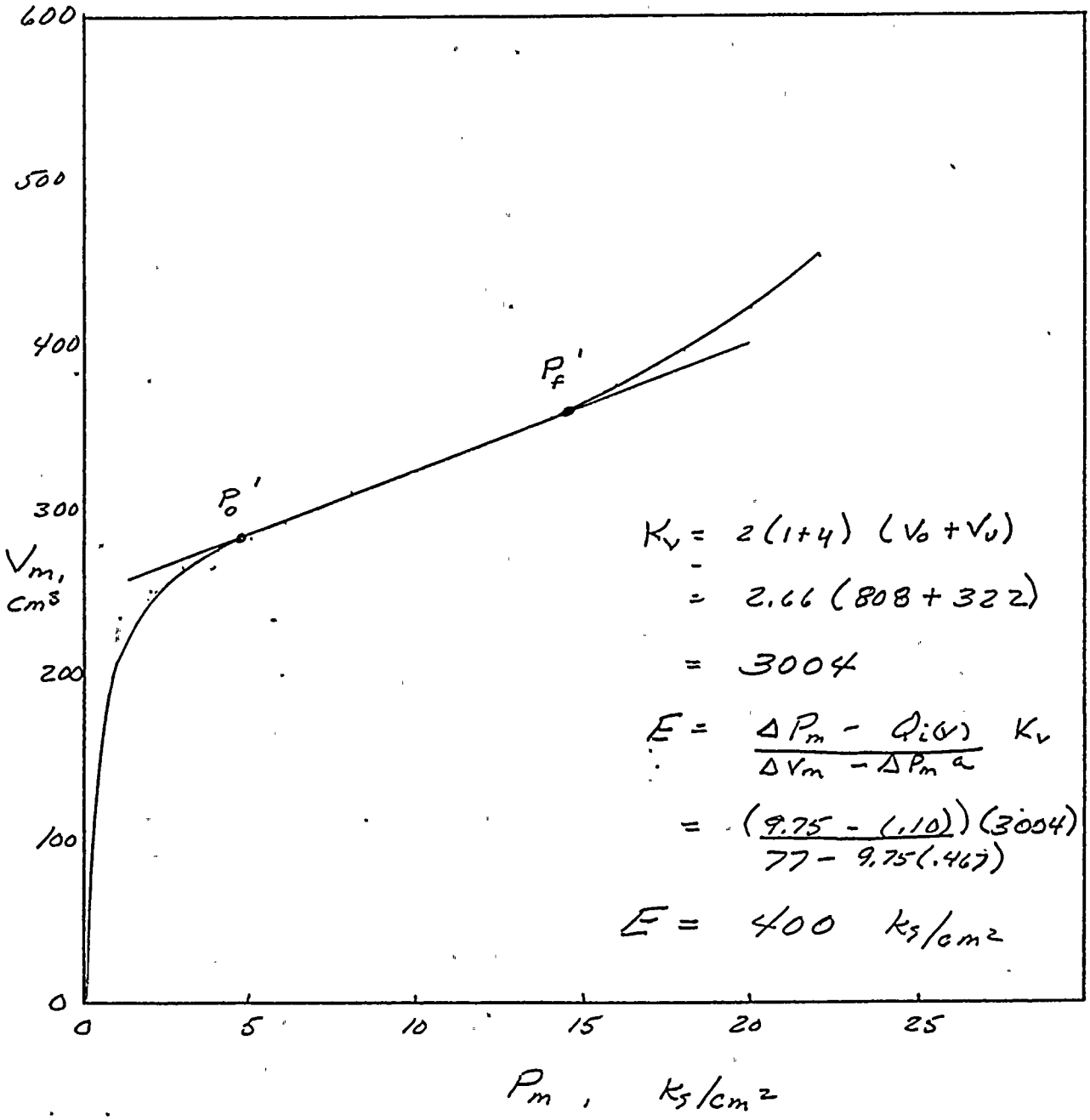
$$= \frac{(12 - .075)}{63 - 12\,(.467)}\,2911$$

$$E = 605 \ kg/cm^2$$

PRESSUREMETER TEST # 55

CT 44

DEPTH · 19.5'-20.2'



$$K_v = 2(1+\mu)(V_o + V_u)$$

$$= 2.66(808 + 322)$$

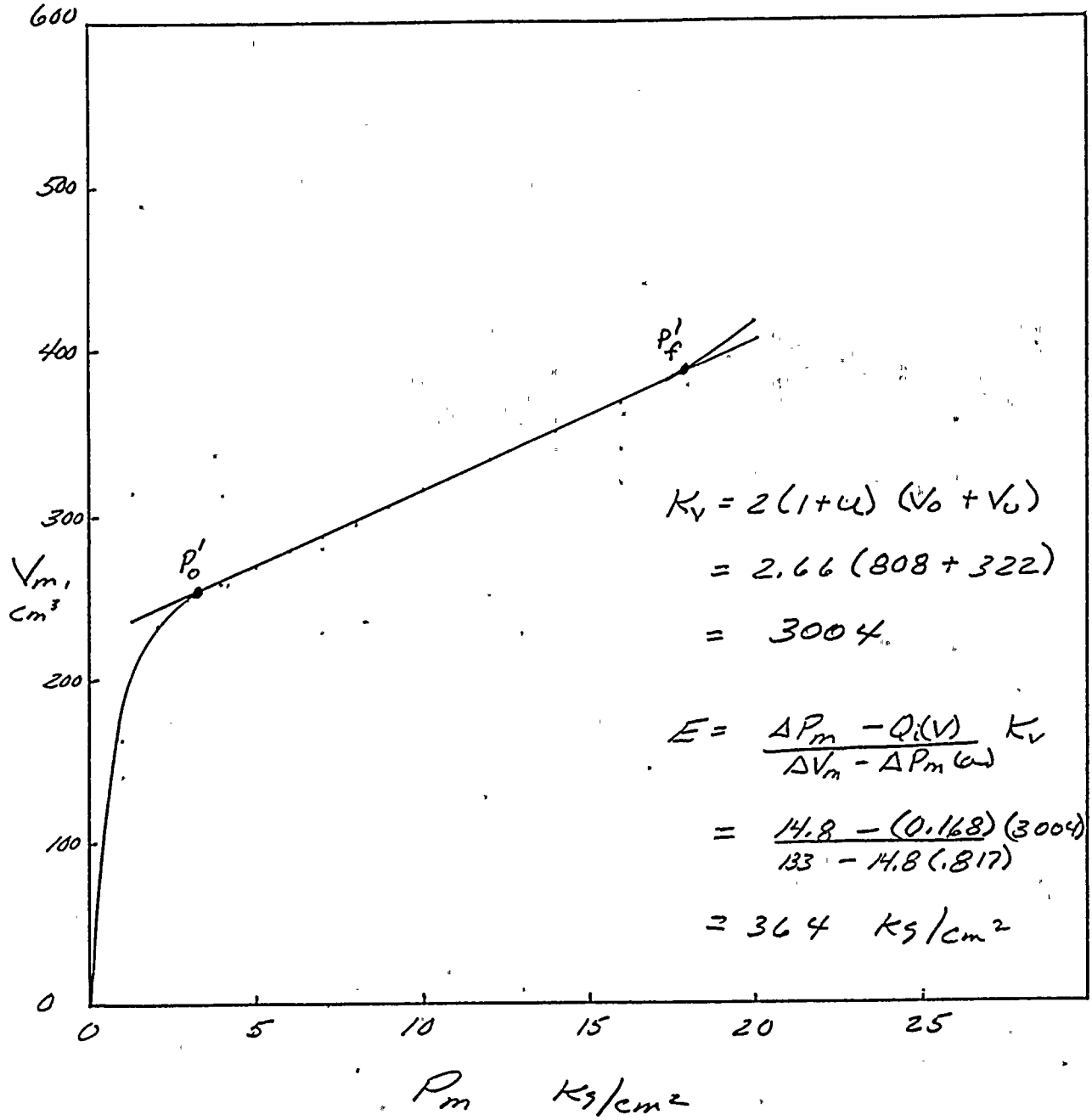
$$= 3004$$

$$E = \frac{\Delta P_m - Q_i(v)}{\Delta V_m - \Delta P_m a} K_v$$

$$= \frac{(9.75 - (.10))}{77 - 9.75(.467)}(3004)$$

$$E = 400 \text{ ks/cm}^2$$

PRESSUREMETER TEST #56
CT-45
DEPTH - 7.5'-8.2'



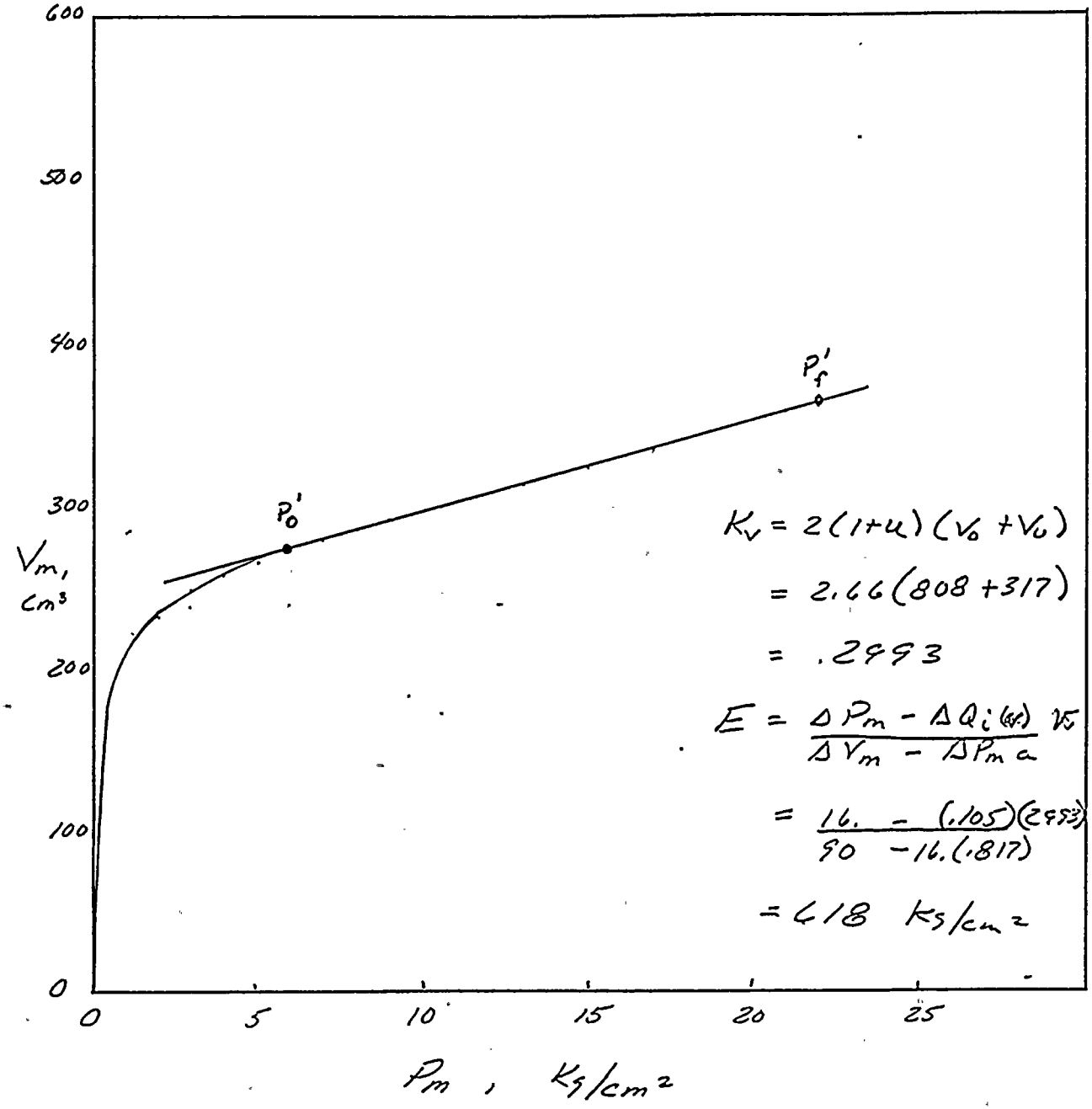
$$K_V = 2(1+\omega)(V_o + V_u)$$
$$= 2.66(808 + 322)$$
$$= 3004$$

$$E = \frac{\Delta P_m - Q_i(V)}{\Delta V_m - \Delta P_m(\omega)} K_V$$
$$= \frac{14.8 - (0.168)(3004)}{133 - 14.8(.817)}$$
$$= 364 \ Ks/cm^2$$

PRESSUREMETER TEST #57

CT-45

DEPTH – 16.3'-17.0'



$$K_v = 2(1+u)(V_o + V_u)$$

$$= 2.66(808 + 317)$$

$$= .2993$$

$$E = \frac{\Delta P_m - \Delta Q_i(K_v)}{\Delta V_m - \Delta P_m a}$$

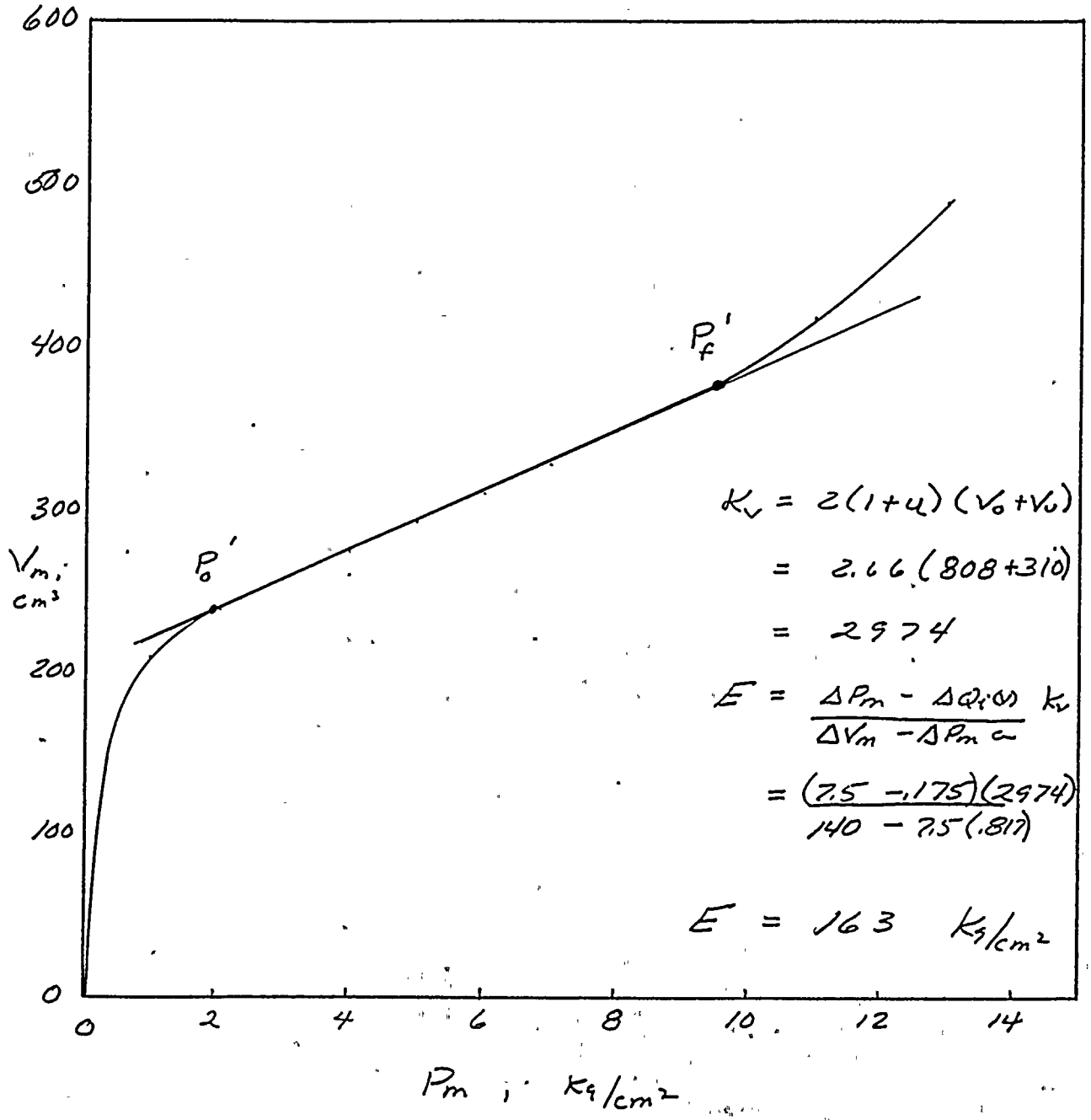
$$= \frac{16. - (.105)(2993)}{90 - 16.(.817)}$$

$$= 618 \ Ks/cm^2$$

PRESSUREMETER TEST #58

CT 46

DEPTH 7.4'-8.1'



$$K_v = 2(1+\mu)(V_o+V_o)$$

$$= 2.66(808+310)$$

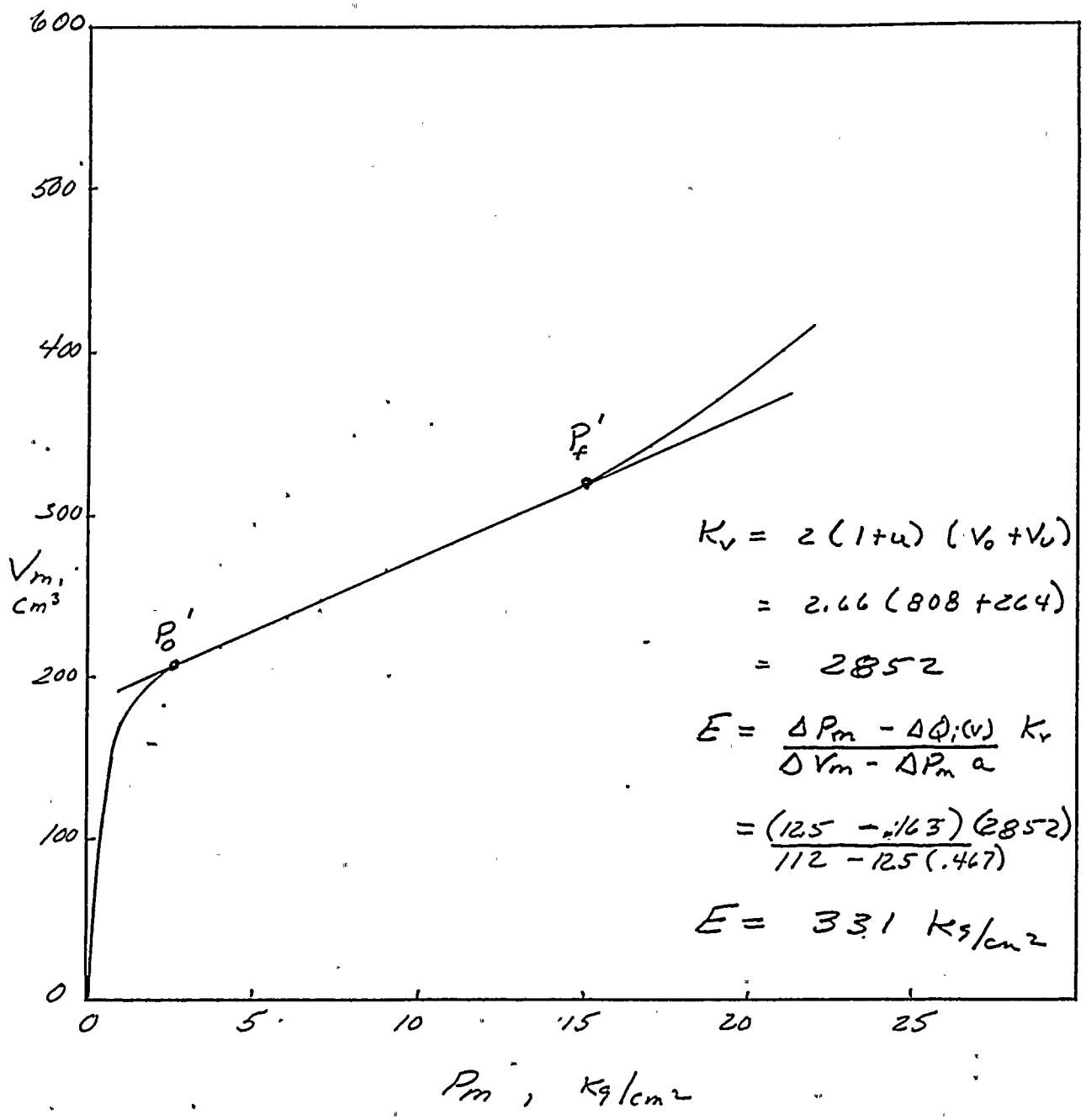
$$= 2974$$

$$E = \frac{\Delta P_m - \Delta Q_i(\alpha)}{\Delta V_m - \Delta P_m \alpha} K_v$$

$$= \frac{(7.5 - .175)(2974)}{140 - 7.5(.817)}$$

$$E = 163 \ kg/cm^2$$

PRESSUREMETER TEST #59
CT 457
DEPTH 7.4'–8.1'



$$K_v = 2(1+u)(V_o + V_u)$$

$$= 2.66(808 + 264)$$

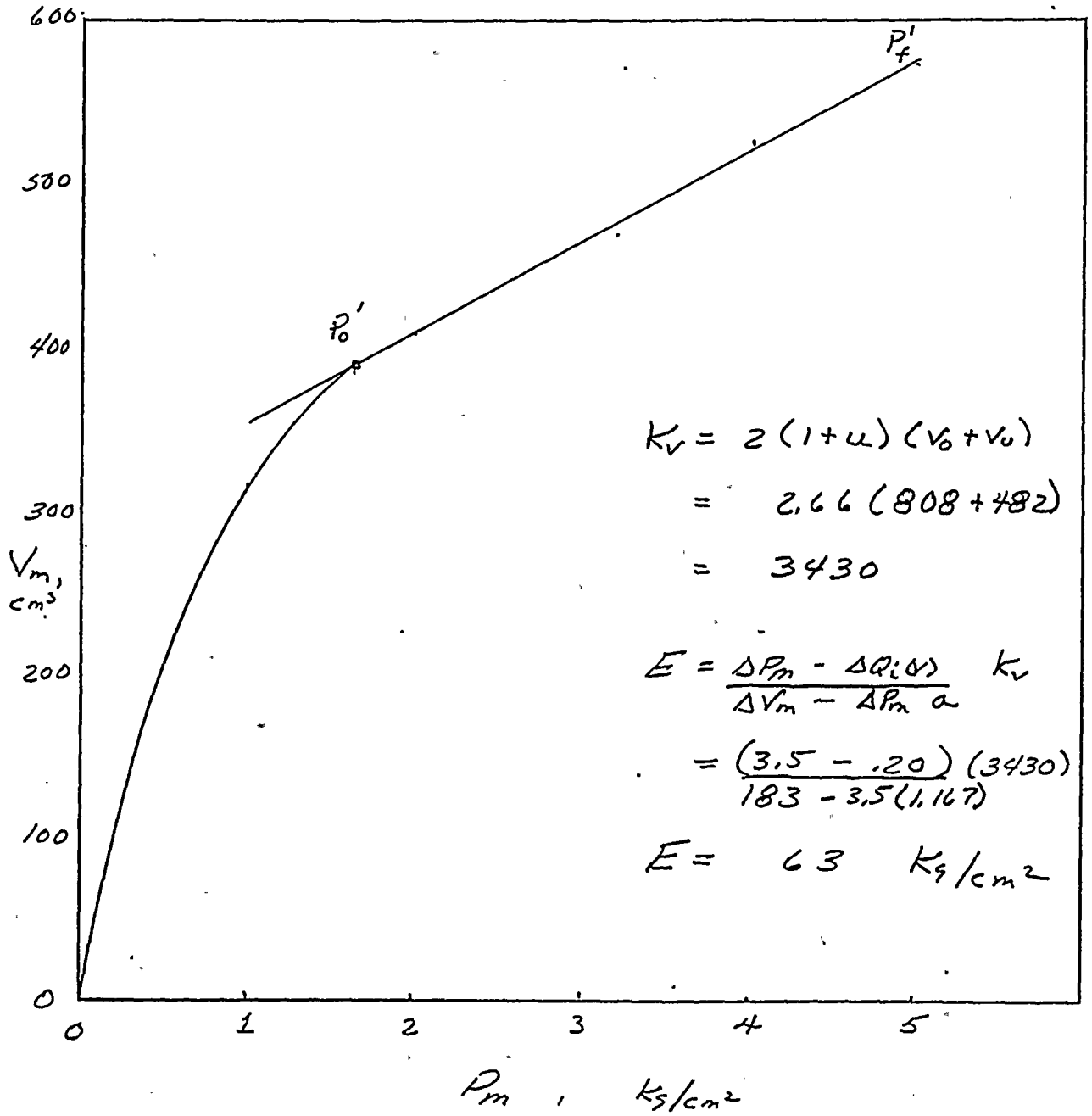
$$= 2852$$

$$E = \frac{\Delta P_m - \Delta Q_i(v)}{\Delta V_m - \Delta P_m a} K_v$$

$$= \frac{(12.5 - .163)}{112 - 12.5(.467)}(2852)$$

$$E = 331 \ kg/cm^2$$

PRESSUREMETER TEST #60
CT 47
DEPTH 19.0'-19.7'



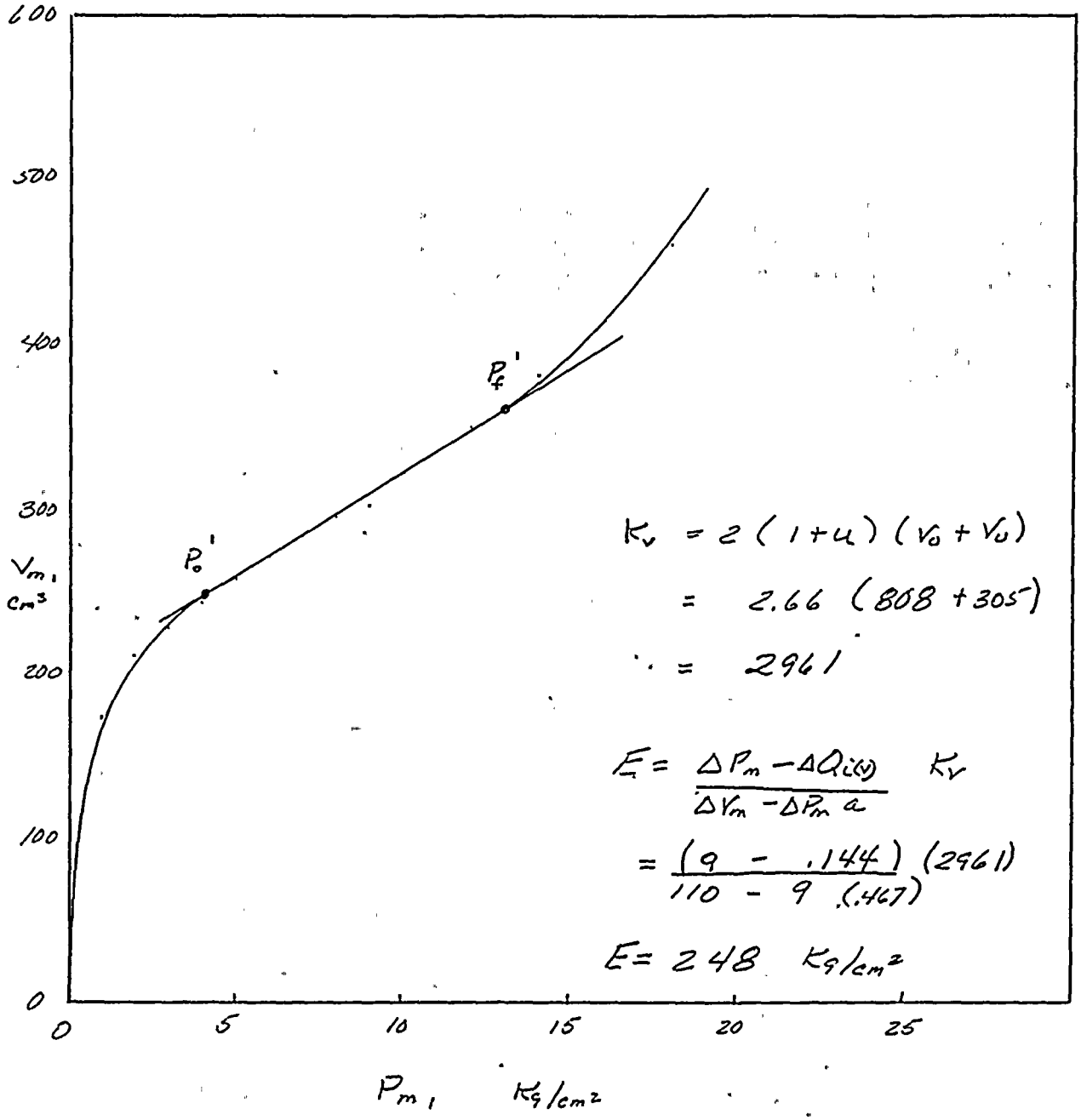
$$K_v = 2(1+\mu)(V_o+V_u)$$
$$= 2.66(808+482)$$
$$= 3430$$

$$E = \frac{\Delta P_m - \Delta Q_i(\nu)}{\Delta V_m - \Delta P_m\, a} K_v$$
$$= \frac{(3.5 - .20)}{183 - 3.5(1.167)}(3430)$$
$$E = 63 \quad Ks/cm^2$$

PRESSUREMETER TEST #61

CT-48

DEPTH 6.1'-6.8'



$$K_v = 2(1+u)(V_o + V_u)$$

$$= 2.66\ (808 + 305)$$

$$= 2961$$

$$E = \frac{\Delta P_m - \Delta Q_{i(v)}}{\Delta V_m - \Delta P_m\, a} K_v$$

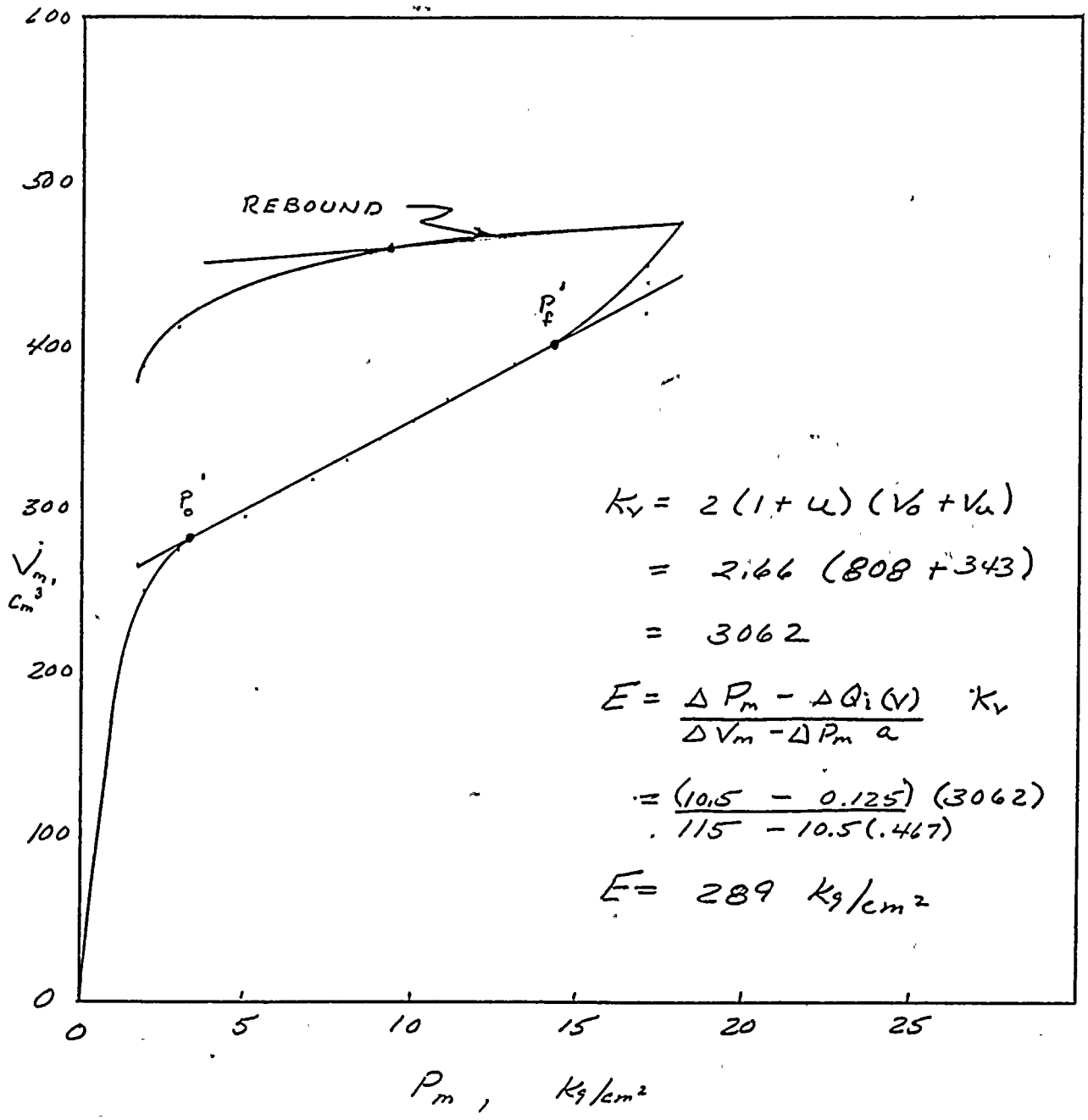
$$= \frac{(9 - .144)}{110 - 9\ (.467)} (2961)$$

$$E = 248\ Kg/cm^2$$

PRESSUREMETER TEST #62

CT 49

DEPTH 5.9'-6.6'



$$K_v = 2(1+\mu)(V_o + V_u)$$

$$= 2.66\ (808 + 343)$$

$$= 3062$$

$$E = \frac{\Delta P_m - \Delta Q_i(V)}{\Delta V_m - \Delta P_m\ a}\ K_v$$

$$= \frac{(10.5 - 0.125)}{115 - 10.5(.467)}\ (3062)$$

$$E = 289\ kg/cm^2$$

CT-49 (CONT'D)
DEPTH 5.9'-6.6'

REBOUND CALCULATIONS

$$K_v = 2(1+\mu)(V_o + V_u)$$

$$= 2.66\,(808 + 468)$$

$$= 3394$$

$$E_R = \frac{\Delta P_m - \Delta Q_i(v)}{\Delta V_m - \Delta P_m a} K_v$$

$$= \frac{(.9 - .1038)}{15 - 9(.085)}(3394)$$

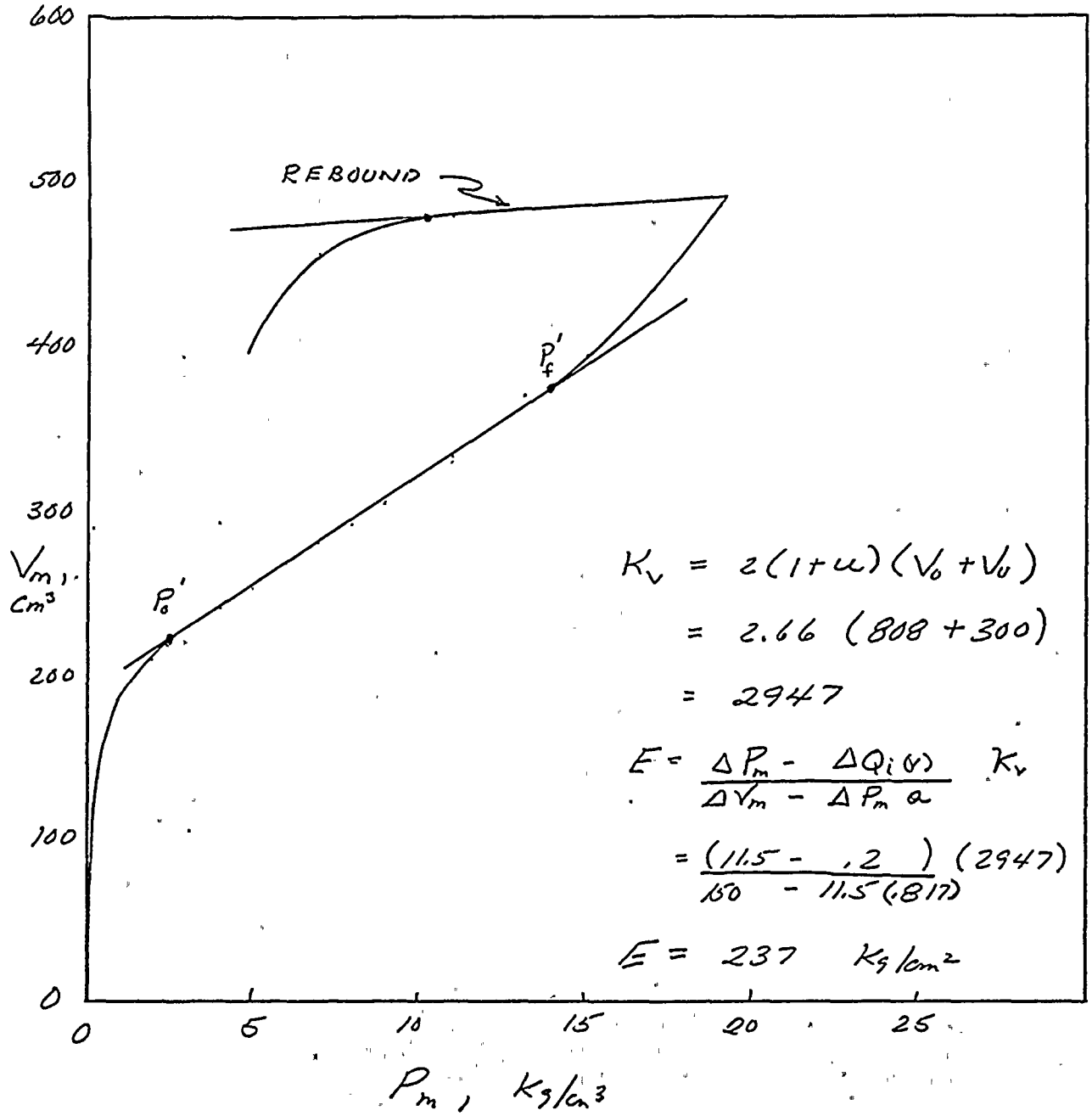
$$= 2137 \cdot Ks/cm^2$$

$$\frac{E_R}{E} = \frac{2137}{289} = 7.4$$

PRESSUREMETER TEST #63

CT 50

DEPTH 16.6'-17.3'



$$K_v = 2(1+\mu)(V_o + V_u)$$

$$= 2.66\ (808 + 300)$$

$$= 2947$$

$$E = \frac{\Delta P_m - \Delta Q_i(v)}{\Delta V_m - \Delta P_m\, a}\ K_v$$

$$= \frac{(11.5 - .2)}{160 - 11.5(.817)}\ (2947)$$

$$E = 237\ \ kg/cm^2$$

CT-50 (CONT'D)
DEPTH 16.6' - 17.3'

REBOUND CALCULATIONS

$$K_v = 2(1+u)(V_o + V_u)$$

$$= 2.66\,(808 + 485)$$

$$\approx 3439$$

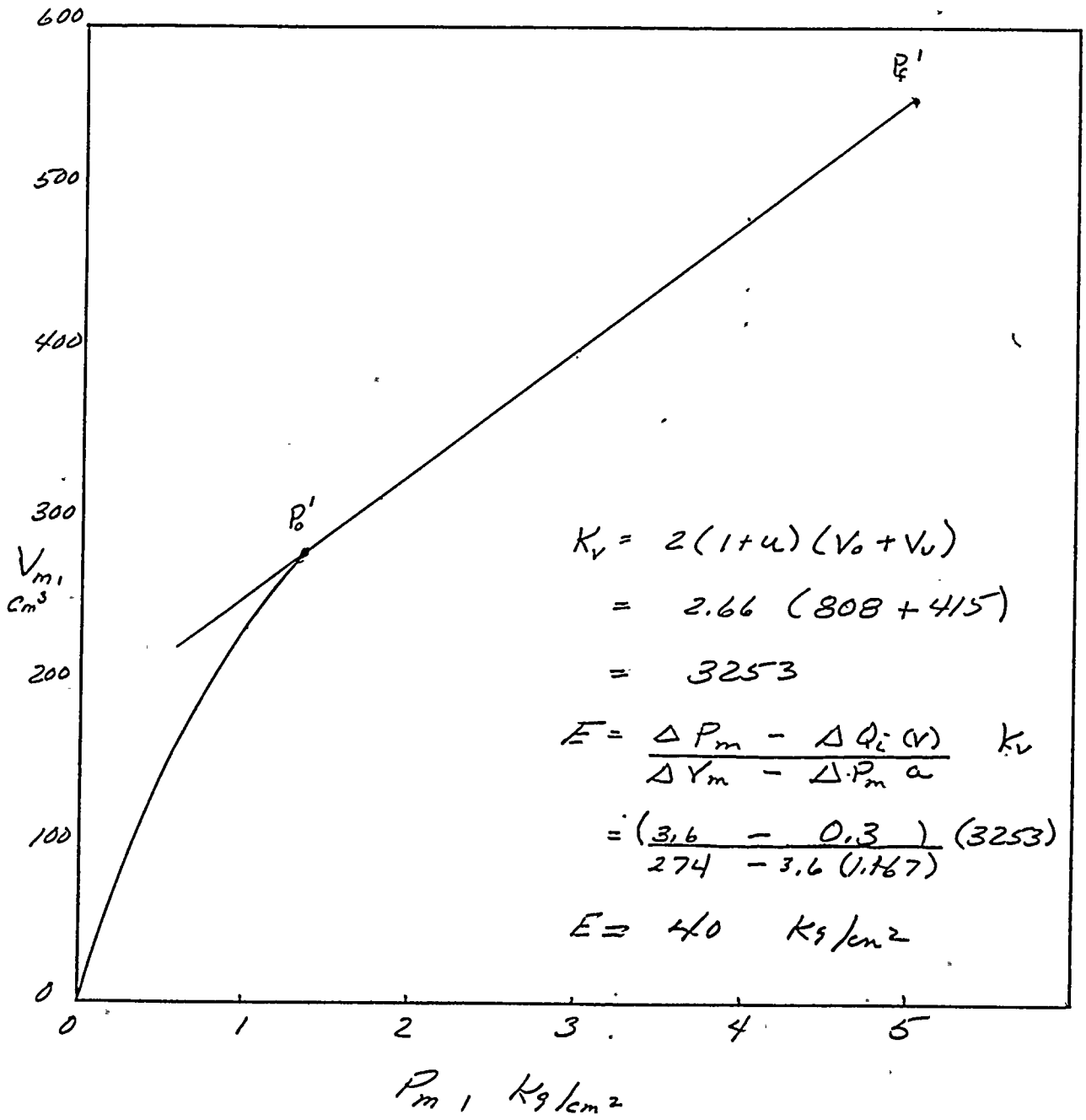
$$E_R = \frac{\Delta P_m - \Delta Q_i(v)}{\Delta V_m - \Delta P_m a} K_v$$

$$= \frac{(9 - 0.025)}{10 - 9(.085)}(3439)$$

$$= 3342 \text{ Kg/cm}^2$$

$$\frac{E_R}{E} = \frac{3342}{237} = 14$$

PRESSUREMETER TEST #64
CT 51
DEPTH 16.4'-17.1'



$$K_v = 2(1+u)(V_o + V_u)$$
$$= 2.66\ (808 + 415)$$
$$= 3253$$

$$E = \frac{\Delta P_m - \Delta Q_i(v)}{\Delta V_m - \Delta P_m\, a} K_v$$
$$= \left(\frac{3.6 - 0.3}{274 - 3.6\,(1.167)}\right)(3253)$$

$$E = 40\ Kg/cm^2$$

DENSITIES DETERMINED BY

DOWNHOLE NUCLEAR DENSITY GAUGE

Boring Number	Depth (ft)	Density (PCF) Wet	Dry*
TS-1	2.7	128.2	122.1
	3.4	121.6	116.0
TS-2	2.7	126.8	122.0
TS-5	1.7	139.2	131.9
	2.2	138.5	131.3
	5.7	134.6	128.7
	6.7	136.0	130.0
CT-9A	11.9	138.8	132.3
	12.2	141.0	134.4
	12.4	138.8	132.3
	14.9	137.8	131.1
	15.3	140.9	134.1
	18.7	140.0	133.6
	19.4	141.2	134.7
	19.7	117.3	112.3
	22.4	112.2	107.4
CT-15	3.0	140.7	135.8
CT-16	14.3	143.5	130.7
	14.9	144.4	131.5
	18.7	127.6	120.3
CT-17	1.7	118.3	112.6
	5.7	129.1	122.8
	8.5	116.2	110.5
	9.0	113.6	108.2
	9.5	117.0	111.3
	11.7	109.2	103.7
	12.7	107.5	102.2
	14.7	112.9	107.2
	15.7	118.9	112.8
	18.0	129.9	122.4

*Dry Density calculated using moisture content determined from SPT samples.

Boring Number	Depth (ft)	Density (PCF) Wet	Dry*
CT-18	5.7	122.6	115.2
	9.2	120.7	115.2
	11.6	127.6	121.9
	14.7	134.0	127.0
	15.5	132.5	125.5
	17.4	132.6	125.6
	20.5	133.2	125.2
	21.5	137.0	128.7
CT-19	3.4	137.1	130.9
	6.7	124.8	117.7
	10.7	132.0	118.2
	13.7	135.1	128.9
	18.0	125.3	120.4
CT-20	2.9	126.8	122.4
	7.0	125.9	117.1
	10.2	127.1	119.2
	10.7	130.4	123.6
	12.7	121.1	116.2
	14.0	122.3	116.1
	16.5	123.4	115.8
	17.2	124.7	119.5
	19.1	122.5	117.3
	19.8	128.2	122.8
CT-21	2.2	106.2	102.1
	5.3	105.8	100.9
	7.9	105.6	100.7
	11.0	118.2	112.5
	13.3	117.5	112.3
	14.0	109.3	104.5
	17.0	108.6	106.6
	19.8	106.3	102.5
CT-22	2.3	135.6	129.0
	3.0	129.8	123.5
	8.5	140.0	132.5
	11.5	139.2	131.2
	12.3	138.2	130.5
	14.0	141.3	134.2
	14.7	142.8	135.6
	17.8	138.9	132.0
	18.5	140.6	133.6
	20.8	121.3	115.4
	21.5	126.6	120.6

*Dry Density calculated using moisture content determined from SPT samples.

Boring Number	Depth (ft)	Density (PCF) Wet	Dry*
CT-23	1.9	138.9	133.0
	2.6	131.3	125.8
	5.6	118.9	114.2
	6.3	117.0	113.3
	8.7	125.3	119.3
	9.4	123.3	117.4
	11.5	103.8	101.3
	12.3	98.6	96.2
	15.5	104.2	100.9
	16.2	100.4	97.2
CT-24	2.7	127.8	122.1
	5.4	141.8	135.4
	8.5	126.7	118.9
	9.1	119.4	112.0
	12.1	131.3	124.2
	14.7	126.7	122.4
	15.4	130.1	125.7
CT-25	2.5	126.0	122.3
	3.2	134.0	130.1
	5.5	132.7	125.3
	6.1	132.8	125.4
	8.2	135.4	128.5
	8.9	132.8	126.6
	11.3	133.5	127.3
	12.0	139.4	132.9
	12.2	140.8	133.1
CT-26	1.2	131.0	126.0
	1.9	136.8	131.5
	4.1	132.4	129.3
	4.8	133.1	130.0
	7.3	138.6	133.7
	8.0	133.6	128.8
	10.6	124.5	119.8
	11.3	122.7	118.1
CT-27	2.7	132.6	122.3
	3.4	126.5	116.2
	5.5	127.0	116.1
	6.2	132.5	121.1
	8.3	130.7	118.5
	9.0	131.6	119.3
	11.7	131.3	119.0

*Dry Density calculated using moisture content determined from SPT samples.

Founded 1953

Boring Number	Depth (ft)	Density (PCF) Wet	Dry*
CT-27	12.4	123.3	113.6
	14.7	125.8	117.0
	15.4	119.6	112.1
	17.8	119.3	110.7
	18.5	133.7	124.0
	19.6	126.8	116.9
	21.3	128.7	118.6
CT-28	1.7	134.5	129.1
	3.5	135.1	129.9
	4.0	135.1	129.9
	4.2	129.6	124.6
	7.0	132.9	128.3
	7.7	135.4	130.7
	9.3	137.7	132.9
	10.0	135.9	131.2
CT-29	0.7	132.0	127.4
	1.4	135.7	131.0
	3.5	135.8	131.1
	4.2	131.3	125.2
	4.5	135.3	128.2
	5.6	139.2	134.7
	6.3	134.5	130.2
CT-31	17.3	143.2	136.9
CT-32	1.5	115.4	110.2
	2.2	112.0	107.7
	6.8	130.9	123.8
	7.5	121.1	
CT-34	2.2	126.9	131.8
	2.9	128.0	133.0
	5.9	128.4	132.3
CT-36	1.2	129.9	125.4
	1.9	131.8	127.2
	3.9	121.7	113.1
	4.6	114.2	102.3
	7.1	120.7	117.6

*Dry Density calculated using moisture content determined from SPT samples.

Boring Number	Depth (ft)	Density (PCF) Wet	Dry*
CT-37	1.4	115.3	111.3
	2.0	122.6	118.3
	3.8	123.2	118.2
	4.3	127.0	121.1
	6.6	129.8	123.9
	7.3	135.0	128.9

*Dry Density calculated using moisture content determined from SPT samples.

DENSITIES DETERMINED BY DOWNHOLE NUCLEAR DENSITY GAUGE

(Continued)

Boring Number	Depth (ft.)	Density (PCF) Wet	Dry
CT-38	3.3	130.42	123.9
	4.0	121.8	115.0
	9.6	124.8	119.1
CT-39	1.3	120.3	116.2
	2.0	138.8	134.1
	4.4	114.4	109.8
	5.1	114.4	109.8
	6.5	123.8	119.2
	7.2	126.3	121.7
CT-40	0.9	131.9	125.8
	1.6	124.5	118.8
	3.9	123.1	117.4
	4.6	122.9	117.5
	7.4	113.8	106.9
	8.1	108.1	101.5
	13.3	120.2	114.6
	14.0	121.7	116.0
	16.1	122.6	117.5
	16.8	124.4	119.2
	17.4	127.5	122.1
	18.1	112.4	107.7
	22.0	121.7	114.8
	22.7	120.3	113.5
CT-41	5.3	103.6	99.8
	5.8	124.4	119.8
	6.0	107.0	103.1
	6.5	115.6	111.6
	8.7	98.1	95.7
	9.4	110.5	106.8
	11.2	135.8	130.2
CT-42	1.9	128.7	126.2
	4.8	144.4	136.5
	8.2	129.5	124.8
	8.9	126.2	121.6
	11.2	130.4	127.1
	11.9	132.1	128.8

*Dry Density calculated using moisture content determined from SPT samples.

DENSITIES DETERMINED BY DOWNHOLE NUCLEAR DENSITY GAUGE (Continued)

Boring Number	Depth (ft.)	Density (PCF) Wet	Dry
CT-43	1.6	123.7	118.9
	2.3	118.1	113.6
	3.9	109.7	104.6
	4.6	109.7	103.6
	7.1	124.4	118.3
	7.8	122.5	116.4
	9.7	97.6	92.8
	13.2	96.	93.2
	13.9	108.6	105.4
	15.6	108.9	105.7
	16.3	105.1	102.1
	19.3	106.0	102.5
	20.0	100.7	97.4
CT-44	0.5	122.6	117.9
	1.2	128.7	123.8
	4.3	142.0	135.2
	5.0	143.1	136.3
	8.0	112.6	106.0
	8.7	110.0	104.8
	10.8	140.1	135.5
	12.6	139.5	135.2
	13.3	145.1	136.8
	18.5	122.2	117.0
	19.2	131.4	125.0
CT-45	0.5	132.0	127.4
	1.2	135.7	131.0
	3.6	136.6	131.1
	4.3	131.3	125.2
	7.3	118.0	114.0
	8.0	124.4	120.2
	9.5	136.8	131.2
	10.2	132.6	127.1
	12.1	120.6	115.6
	12.8	138.4	131.4
	15.7	132.6	125.9
	18.7	133.3	128.7
	19.4	131.9	126.1

*Dry Density calculated using moisture content determined from SPT samples.

DENSITIES DETERMINED BY DOWNHOLE NUCLEAR DENSITY GAUGE (Continued)

Boring Number	Depth (ft.)	Density (PCF) Wet	Dry
CT-46	1.4	134.5	129.5
	3.8	115.9	111.5
	6.7	123.7	120.9
	7.4	120.7	116.7
CT-47	1.2	121.7	117.2
	1.9	127.4	122.6
	3.6	119.6	115.8
	4.3	108.1	105.3
	7.1	115.3	110.5
	7.8	126.8	121.6
	9.8	134.7	129.1
	12.9	128.7	123.4
	13.6	129.5	123.0
	16.5	132.5	125.4
	17.2	107.8	102.0
	18.7	79.9	75.7
	19.4	117.5	111.3
CT-48	1.1	133.8	129.8
	5.7	112.1	107.9
	6.4	117.4	112.0
	8.0	118.4	113.0
	8.7	128.4	127.5
CT-49	2.8	123.8	118.1
	3.5	119.6	114.1
	5.8	126.9	122.6
	6.5	121.5	117.4
	8.2	133.8	130.0
CT-50	1.4	123.4	117.5
	2.1	128.6	127.5
	3.9	108.2	103.2
	4.6	116.5	111.3
	6.7	115.2	110.0
	7.4	123.4	118.0
	9.8	134.4	128.1
	10.3	141.2	133.8
	12.5	139.2	131.9
	13.2	138.4	130.2

*Dry Density calculated using moisture content determined from SPT samples.

DENSITIES DETERMINED BY

DOWNHOLE NUCLEAR DENSITY GAUGE
(Continued)

Boring Number	Depth (ft.)	Density (PCF) Wet	Dry
CT-51	1.4	109.7	120.7
	2.1	113.0	110.2
	4.1	110.7	107.8
	4.8	109.1	106.2
	6.8	125.0	121.4
	7.5	127.2	121.8
	11.0	124.2	117.6
	11.3	128.7	121.9
	12.7	123.7	117.1
	13.4	131.8	124.5
	13.9	121.3	114.5
	16.0	115.2	108.8
	16.7	115.1	108.2
	18.8	109.6	103.5
	19.5	106.7	101.6

*Dry Density calculated using moisture content determined from SPT samples.

Founded 1953

SUMMARY OF NATURAL MOISTURE CONTENTS DETERMINED FROM SPT SAMPLES

Hole Number	Sample Number	Depth, (feet)	Natural Moisture Content,%
CT-25	2	1.5- 3.0	3.0
CT-25	5	6.0- 7.5	5.9
CT-25	7	9.0-10.5	4.9
CT-25	9	12.0-13.5	5.8
CT-28	2	1.5- 3.0	4.2
CT-28	4	4.5- 6.0	4.0
CT-28	6	7.5- 9.0	3.6
CT-28	8	10.5-12.0	5.6
CT-28	10	13.5-15.0	4.6
CT-28	12	16.5-18.0	5.0
CT-29	2	1.5- 3.0	3.3
CT-29	4	4.5- 6.0	5.5
CT-29	6	7.5- 9.0	3.3
CT-30	2	2.0- 3.5	4.3
CT-30	4	5.0- 6.5	4.8
CT-30	6	8.0- 9.5	5.1
CT-32	2	1.5- 3.0	4.2
CT-32	4	4.5- 6.0	6.7
CT-32	6	7.5- 9.0	4.7
CT-33	2	1.5- 3.0	4.2
CT-33	4	4.5- 6.0	4.1
CT-33	6	7.5- 9.0	5.1
CT-35	2	1.5- 3.0	4.5
CT-35	4	4.5- 6.0	5.3
CT-35	6	7.5- 9.0	3.3
CT-37	2	1.5- 3.0	3.6
CT-37	4	4.5- 6.0	4.9
CT-37	6	7.5- 9.0	4.7
CT-37	8	10.5-12.0	4.6
CT-37	10	13.5-15.0	6.6
CT-37	12	16.5-18.0	6.1
CT-38	2	1.5- 3.0	4.7
CT-38	4	4.5- 6.0	5.9
CT-38	6	7.5- 9.0	4.8
CT-39	2	1.5- 3.0	3.5
CT-39	4	4.5- 6.0	3.8
CT-39	6	7.5- 9.0	4.8

SUMMARY OF NATURAL MOISTURE CONTENTS

DETERMINED FROM SPT SAMPLES

Hole Number	Sample Number	Depth (feet)	Natural Moisture Content,%
CT-40	10	13.5-15.0	4.9
CT-40	12	16.5-18.0	4.4
CT-40	14	19.5-21.0	6.0
CT-40	16	22.5-24.0	6.0
CT-40	18	25.5 27.0	3.1
CT-40	20	28.5-30.0	26.0
CT-41	2	1.5- 3.0	3.5
CT-41	4	4.5- 6.0	3.8
CT-41	6	7.5- 9.0	3.3
CT-41	8	10.5-12.0	4.5
CT-41	10	12.85-15.0	5.1
CT-42	2	1.5- 3.0	2.6
CT-42	4	4.5- 6.0	5.8
CT-42	6	7.5- 9.0	3.8
CT-42	8	10.5-12.0	2.6
CT-42	10	13.5-15.0	4.2
CT-43	2	1.5- 3.0	4.0
CT-43	4	4.5- 6.0	5.9
CT-43	6	7.5- 9.0	5.2
CT-43	8	10.5-12.0	4.3
CT-43	10	13.5-15.0	3.0
CT-43	12	16.5-18.0	2.9
CT-44	2	1.5- 3.0	4.0
CT-44	4	6.0- 7.5	6.2
CT-44	6	9.5-10.5	3.4
CT-44	8	12.0-13.5	3.2
CT-44	10	15.0-16.5	10.5
CT-44	12	18.0-19.5	4.4
CT-44	14	21.0-22.5	3.5
CT-45	2	1.5- 3.0	3.6
CT-45	4	4.5- 6.0	4.9
CT-45	6	7.5- 9.0	3.5
CT-45	8	10.5-12.0	4.5
CT-45	10	13.5-15.0	5.1
CT-45	12	16.5-18.0	3.6
CT-45	14	19.5-21.0	4.6
CT-46	2	1.5- 3.0	3.9
CT-46	4	4.5- 6.0	2.3
CT-46	6	7.5- 9.0	3.4

SUMMARY OF NATURAL MOISTURE CONTENTS DETERMINED FROM SPT SAMPLES

Hole Number	Sample Number	Depth (feet)	Natural Moisture Content, %
CT-47	2	1.5- 3.0	3.9
CT-47	4	4.5- 6.0	2.7
CT-47	6	7.5- 9.0	4.3
CT-47	9	12.0-13.5	5.3
CT-47	11	15.0-16.5	5.7
CT-47	13	18.0-19.5	5.6
CT-47	15	21.0-22.5	5.0
CT-47	17	24.0-25.5	4.6
CT-47	19	27.0-28.5	28.7
CT-48	2	1.5- 3.0	3.1
CT-48	6	7.5- 9.0	4.8
CT-48	8	10.5-12.0	4.6
CT-49	2	1.5- 3.0	4.8
CT-49	4	4.5- 6.0	3.5
CT-49	6	7.5- 9.0	2.9
CT-49	8	10.5-12.0	2.9
CT-50	2	1.5- 3.0	5.0
CT-50	4	4.5- 6.0	4.7
CT-50	6	7.5- 9.0	4.9
CT-50	8	10.5-12.0	5.5
CT-50	10	13.5-15.0	6.3
CT-50	12	16.5-18.0	7.2
CT-50	14	19.5-21.0	6.0
CT-51	2	1.5- 3.0	2.5
CT-51	4	4.5- 6.0	2.7
CT-51	6	7.5- 9.0	4.4
CT-51	8	10.5-12.0	5.6
CT-51	10	13.5-15.0	5.9
CT-51	12	16.5-18.0	5.9
CT-51	14	20.5-22.0	5.0

LABORATORY TEST — MOISTURE DENSITY RELATIONSHIP

CLIENT Burns & Roe, Inc.

DATE November 16, 1981

PROJECT WNP-2

SOIL PROPERTIES:

PROJECT NO. 81-605

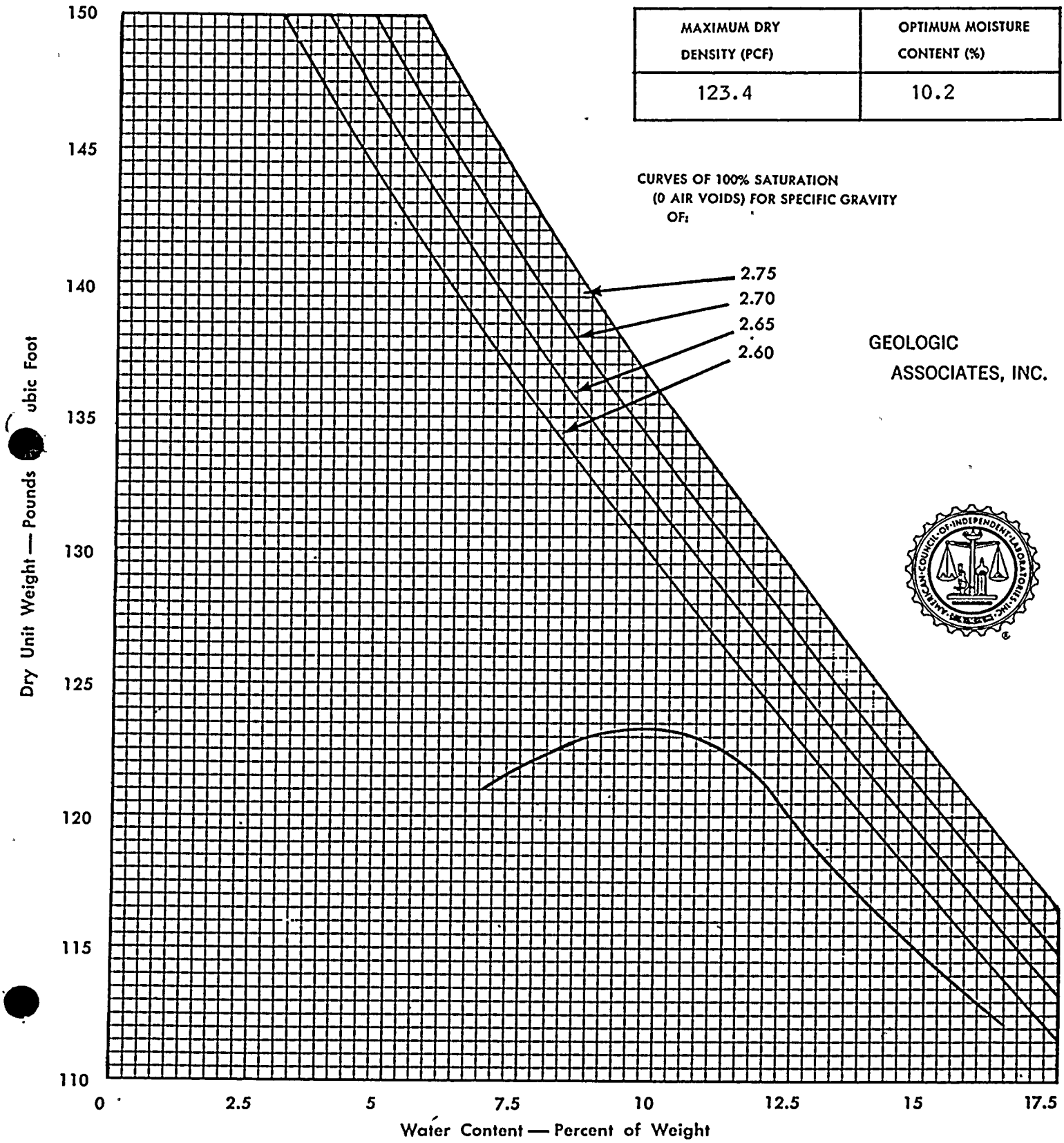
NATURAL MOISTURE (%)

SAMPLE LOCATION CT-6

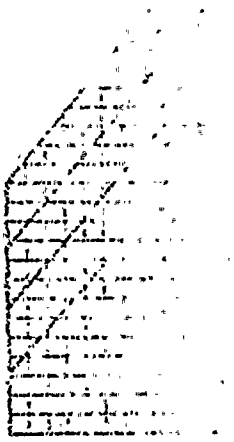
SOIL DESCRIPTION See logs

TEST METHOD: ASTM D 1557

MAXIMUM DRY DENSITY (PCF)	OPTIMUM MOISTURE CONTENT (%)
123.4	10.2



GEOLOGIC
ASSOCIATES, INC.



LABORATORY TEST — MOISTURE DENSITY RELATIONSHIP

CLIENT Burns & Roe, Inc.

DATE November 16, 1981

PROJECT WNP-2

SOIL PROPERTIES:

PROJECT NO. 81-605

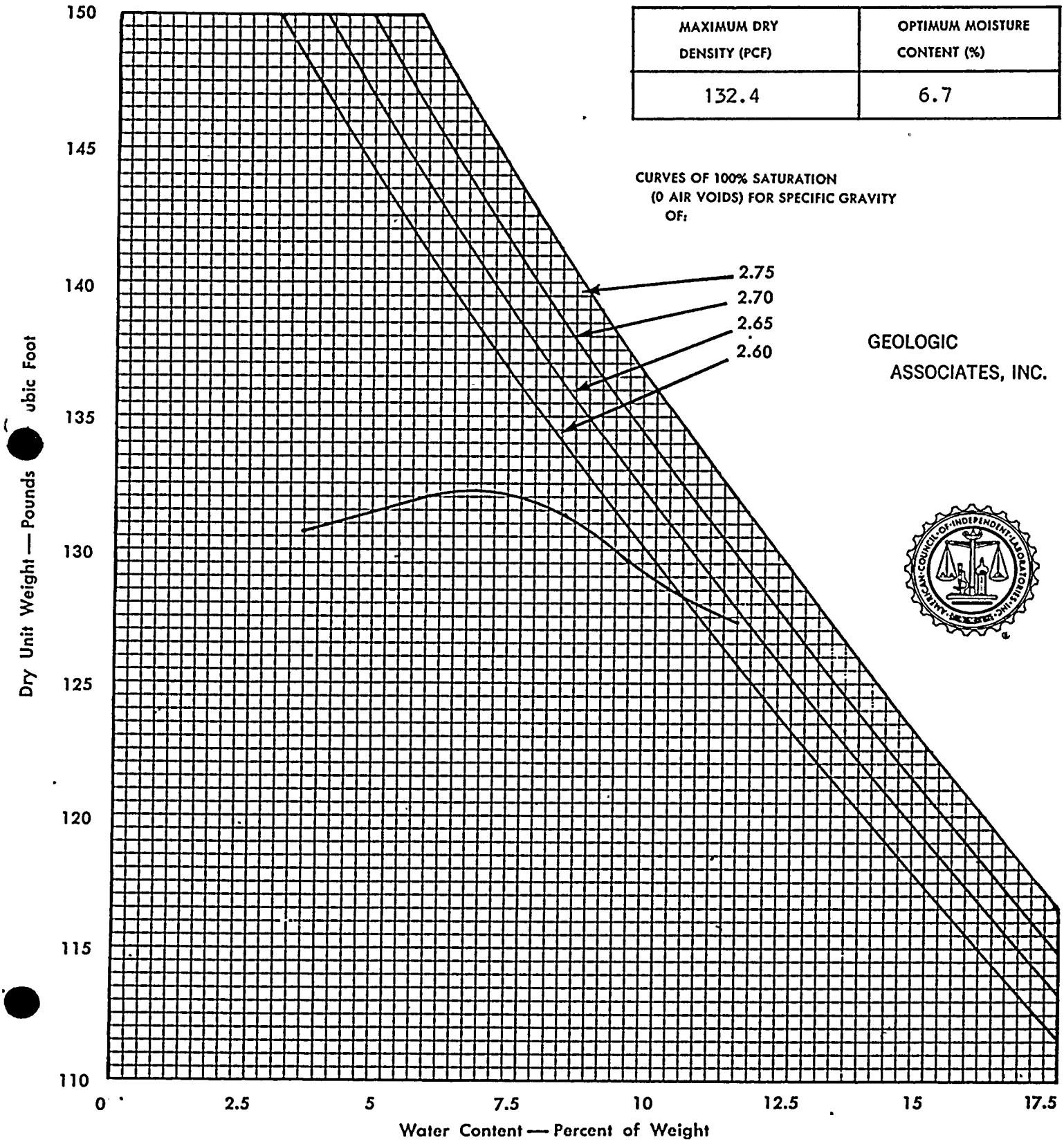
NATURAL MOISTURE (%)

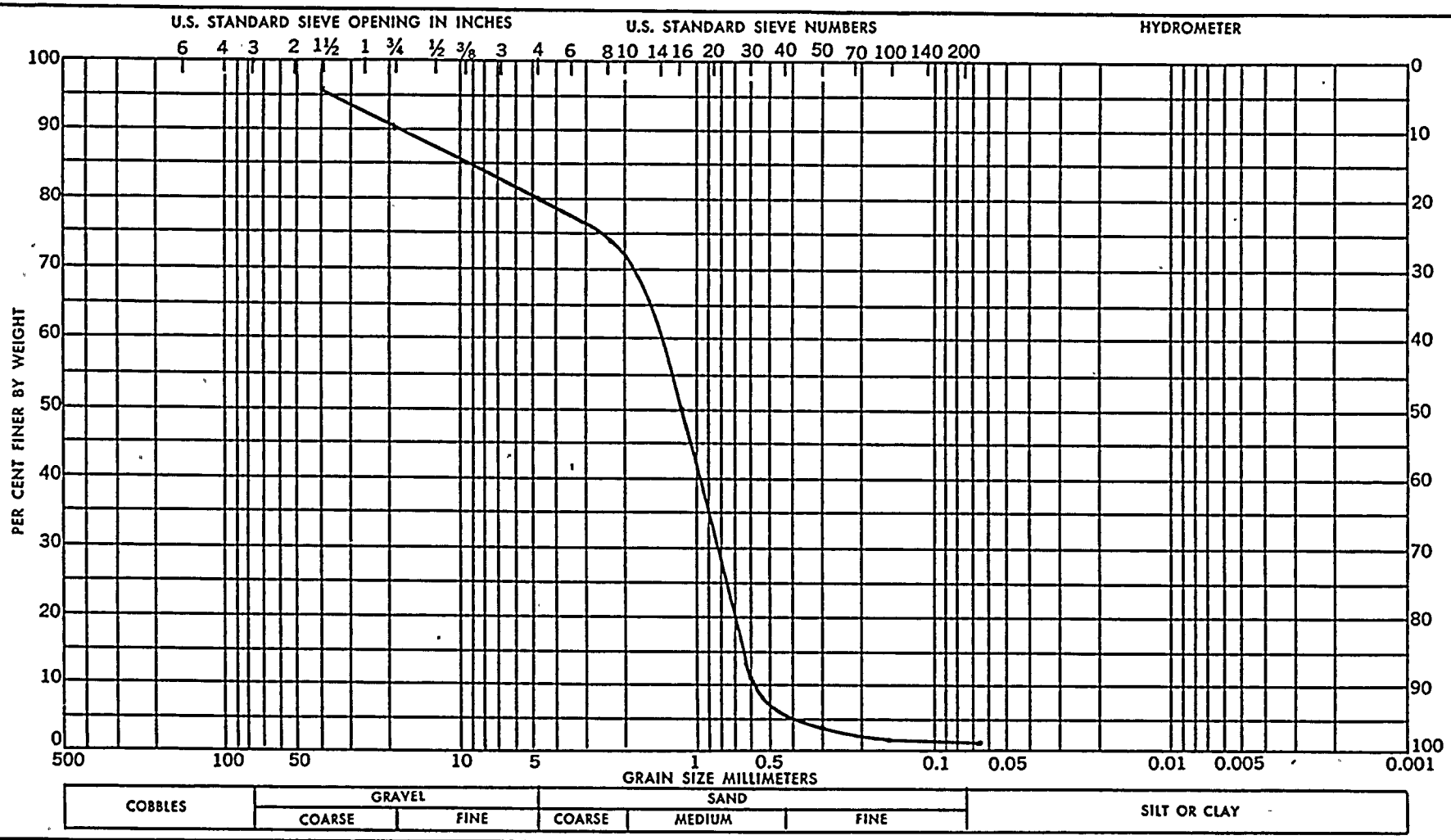
SAMPLE LOCATION CT-7

SOIL DESCRIPTION See Logs

TEST METHOD: ASTM D 1557

MAXIMUM DRY DENSITY (PCF)	OPTIMUM MOISTURE CONTENT (%)
132.4	6.7

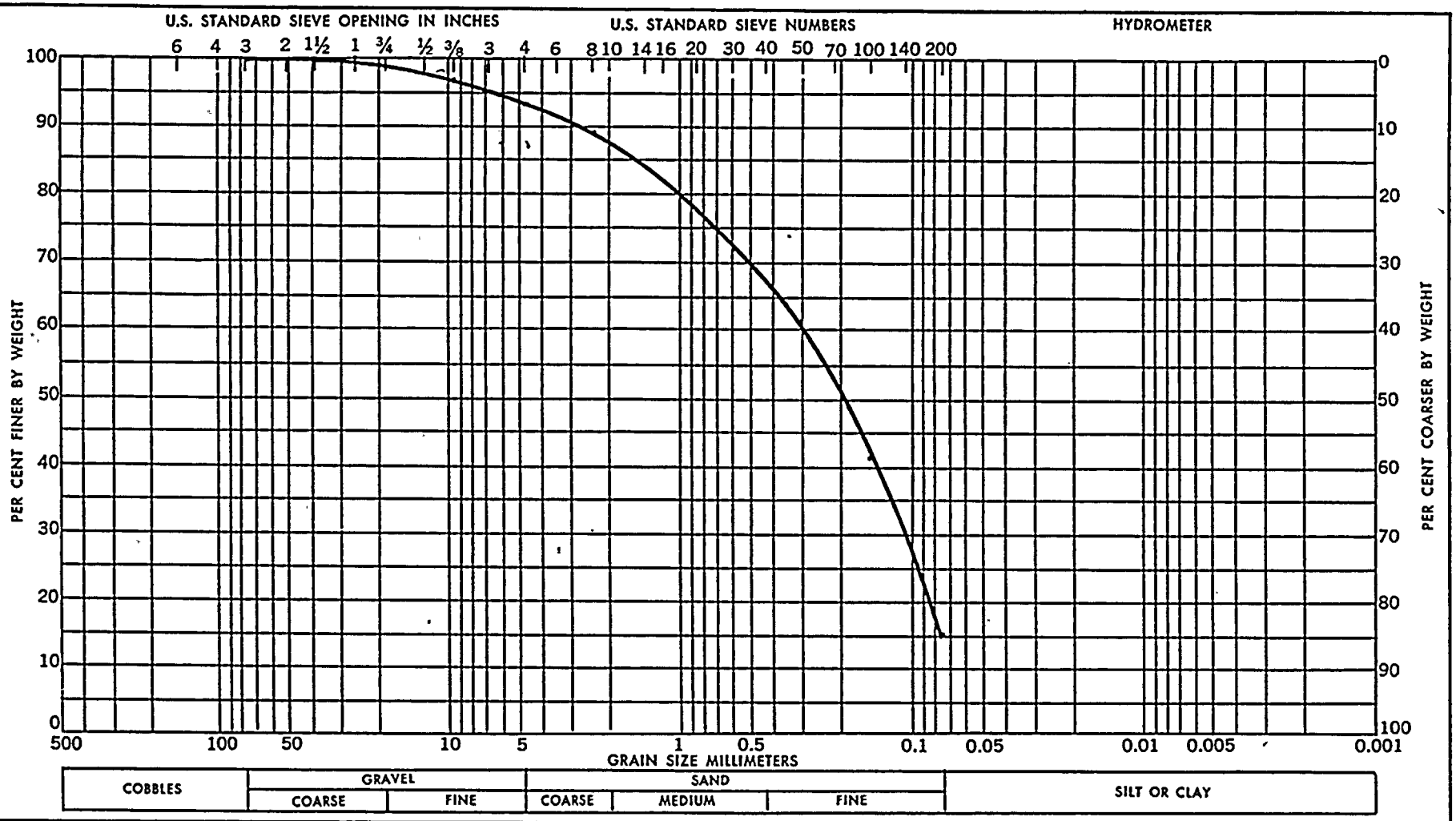




SAMPLE NO.	ELEV. OR DEPTH	SOIL DESCRIPTION	SP. GR.	NAT. W. %	LL	.PI	USC
CT-5	3.0'-4.0'	See logs					

PROJECT NO. 81-605
PROJECT WNP-2
CLIENT
BORING NO.
DATE 11/16/81

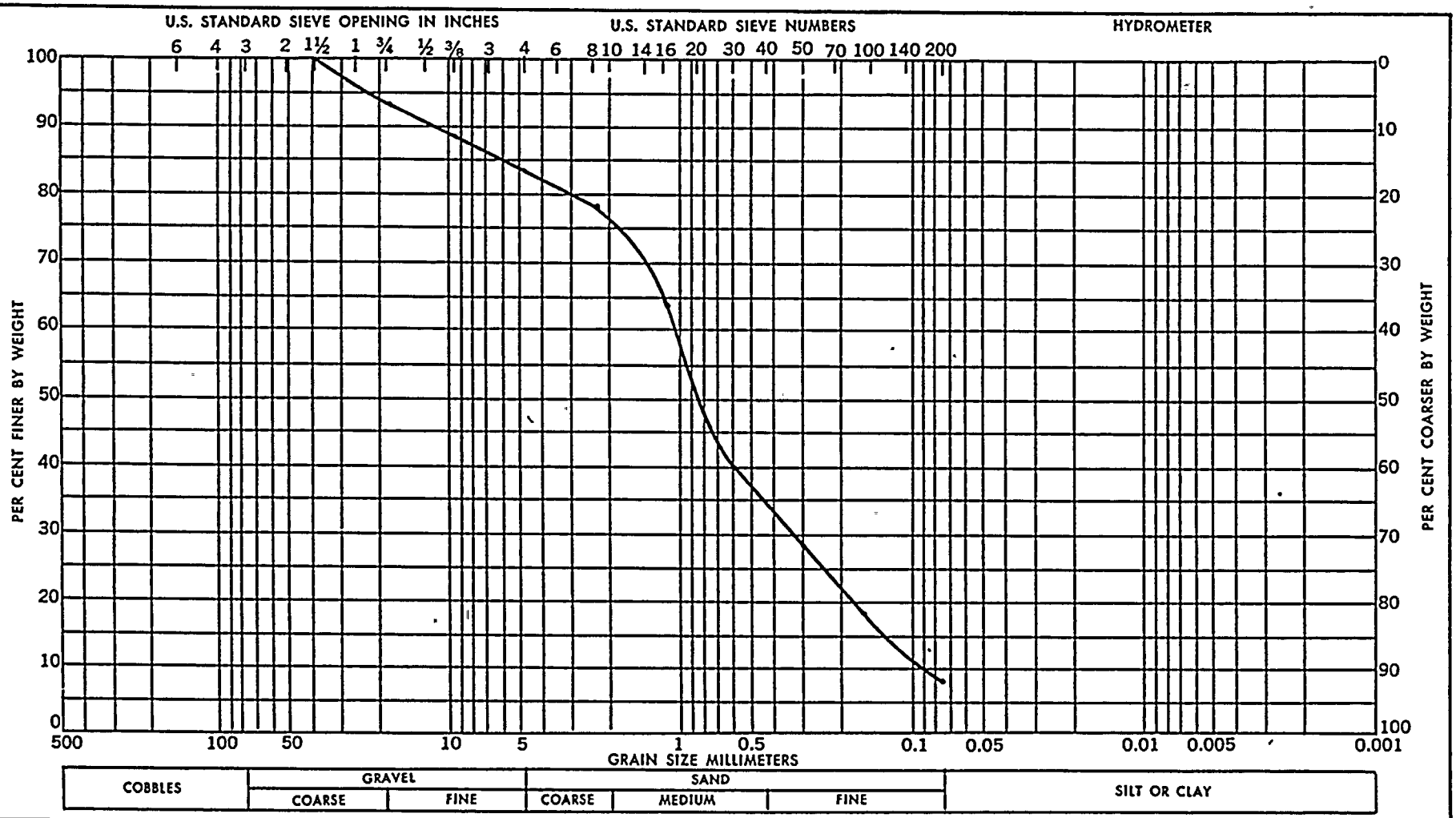
GEOLOGIC ASSOCIATES, INC.



SAMPLE NO.	ELEV. OR DEPTH	SOIL DESCRIPTION	SP. GR.	NAT. W. %	LL	PI	USC
CT-6	3.0' - 4.0'	See logs					

PROJECT NO. 81-605
PROJECT WNP-2
CLIENT
BORING NO.
DATE 11/16/81

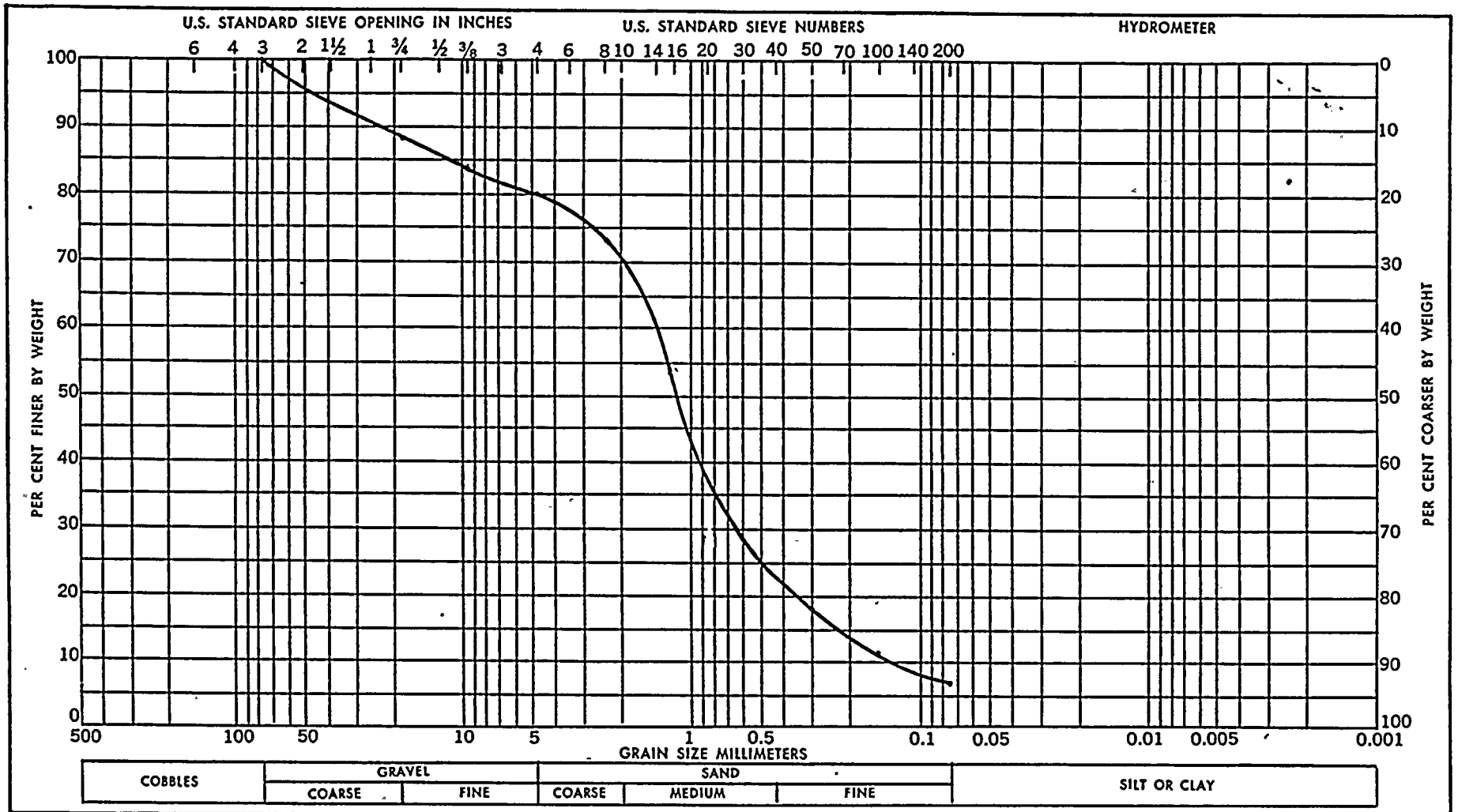
GEOLOGIC ASSOCIATES, INC.



SAMPLE NO.	ELEV. OR DEPTH	SOIL DESCRIPTION	SP. GR.	NAT. W. %	LL	PI	USC
CT-7	3.0' - 4.0'	See Logs					

PROJECT NO. 81-605
PROJECT WNP-2
CLIENT
BORING NO.
DATE November 16, 1981

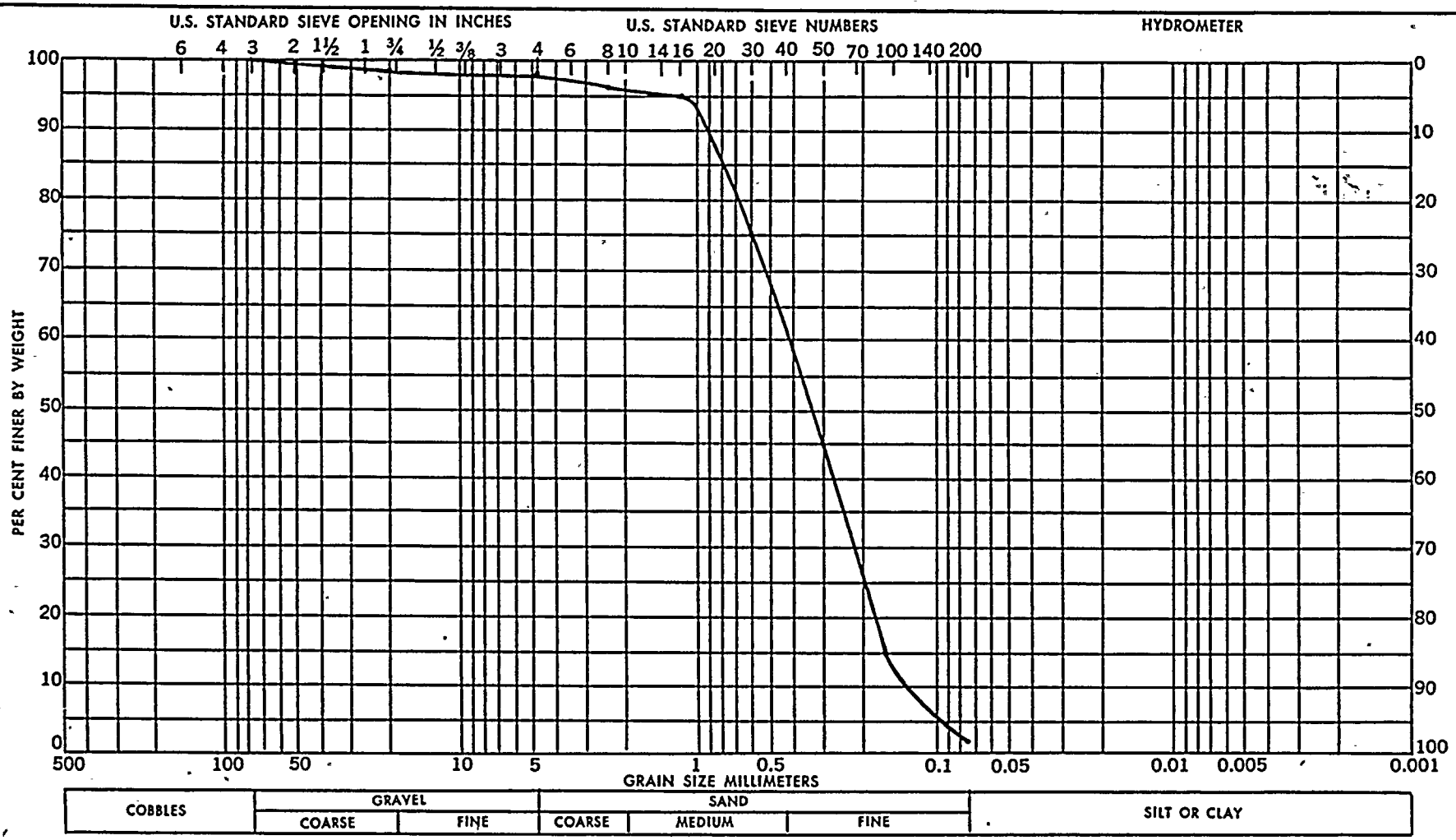
GEOLOGIC ASSOCIATES, INC.



SAMPLE NO.	ELEV. OR DEPTH	SOIL DESCRIPTION	SP. GR.	NAT. W. %	LL	PI	USC
CT-10	3.0' - 4.0'	See logs					

PROJECT NO. 81-605
PROJECT WNP-2
CLIENT
BORING NO.
DATE 11/16/81

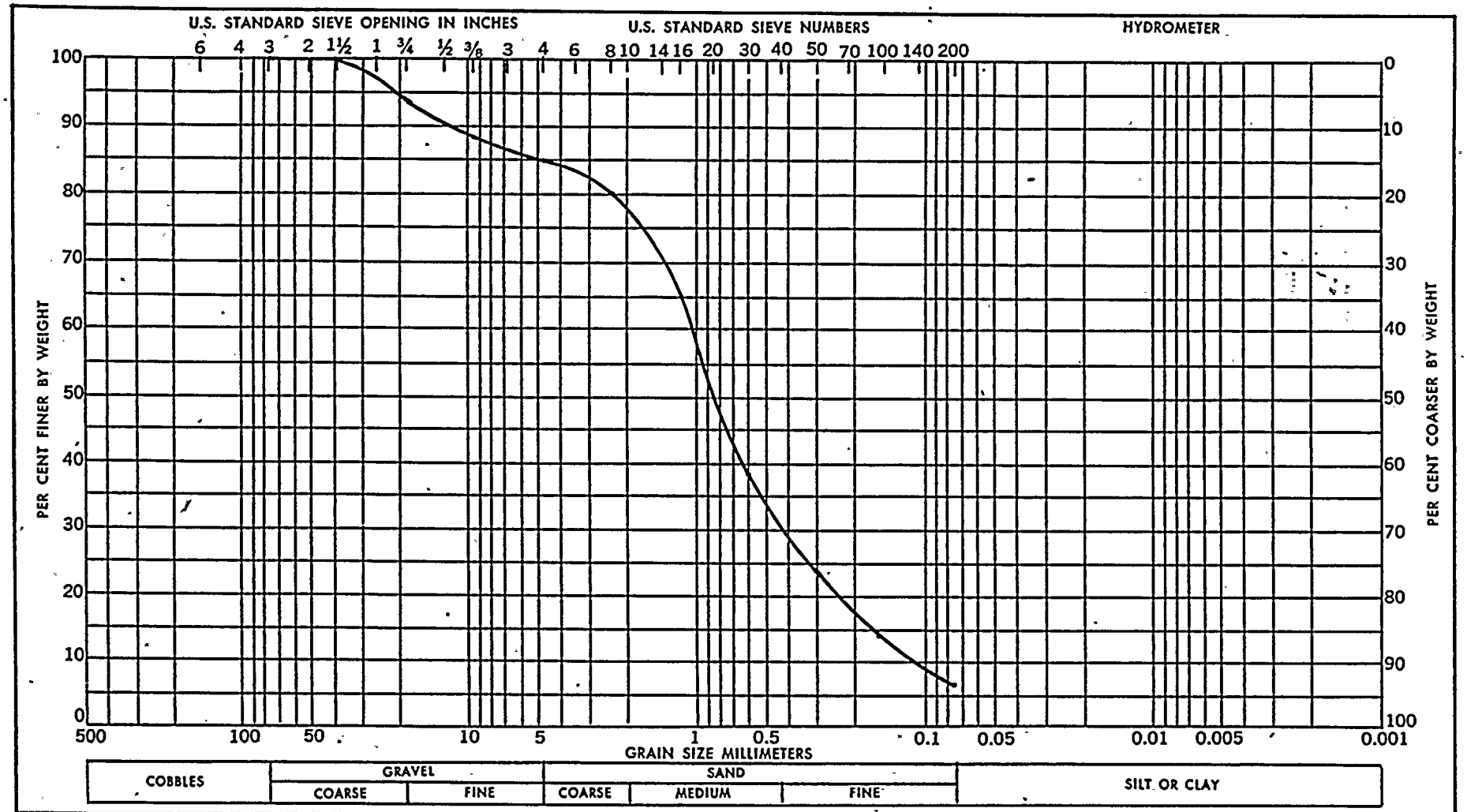
GEOLOGIC ASSOCIATES, INC.



SAMPLE NO.	ELEV. OR DEPTH	SOIL DESCRIPTION	SP. GR.	NAT. W. %	LL	PI	USC
CT-43	3.0' - 4.0'	See logs					

PROJECT NO. 81-605
PROJECT WNP-2
CLIENT
BORING NO.
DATE 11/16/81

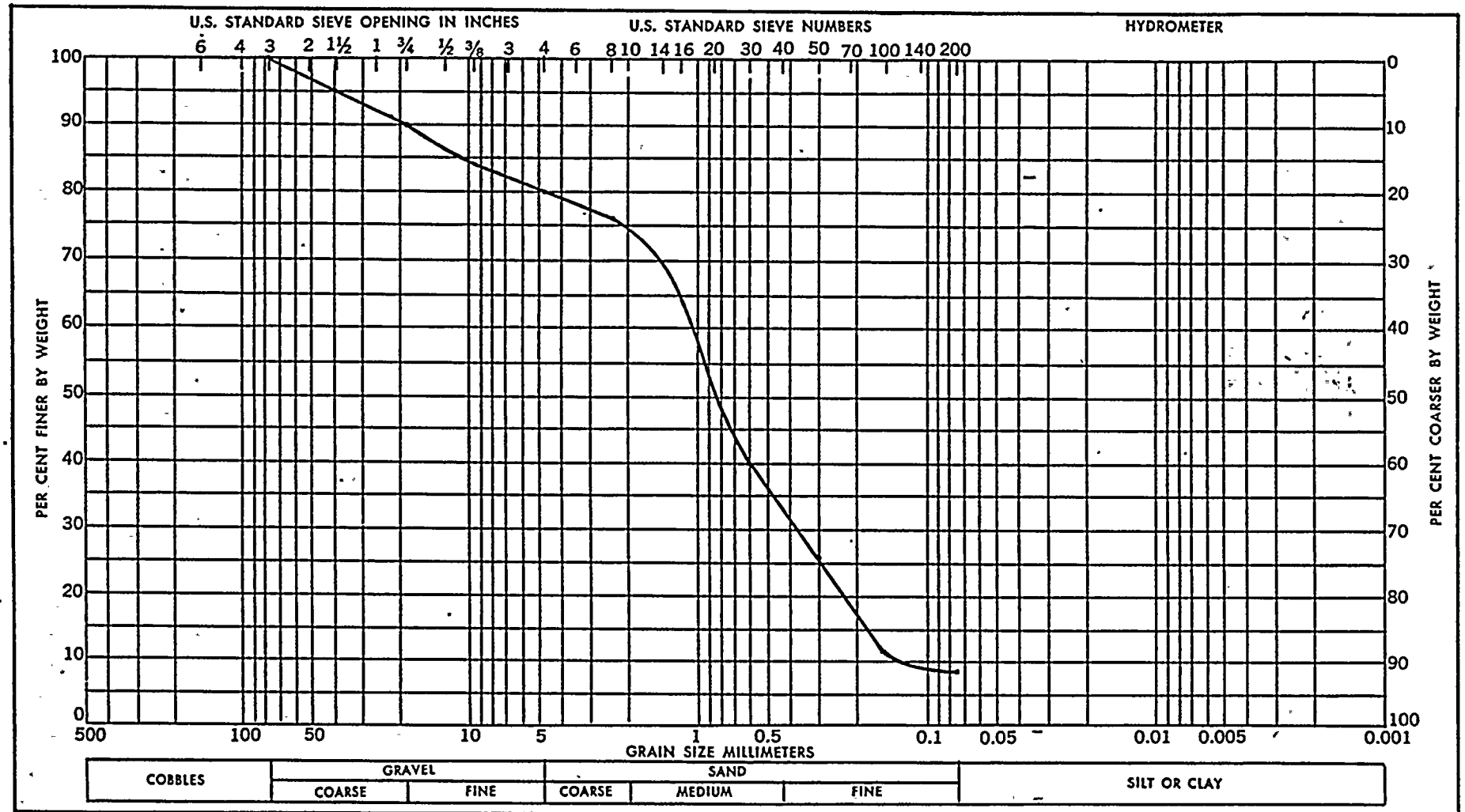
GEOLOGIC ASSOCIATES, INC.



SAMPLE NO.	ELEV. OR DEPTH	SOIL DESCRIPTION	SP. GR.	NAT. W. %	LL	PI	USC
TS-Level 6	4.0'	See logs					

PROJECT NO. 81-605
PROJECT WNP-2
CLIENT
BORING NO.
DATE 11/16/81

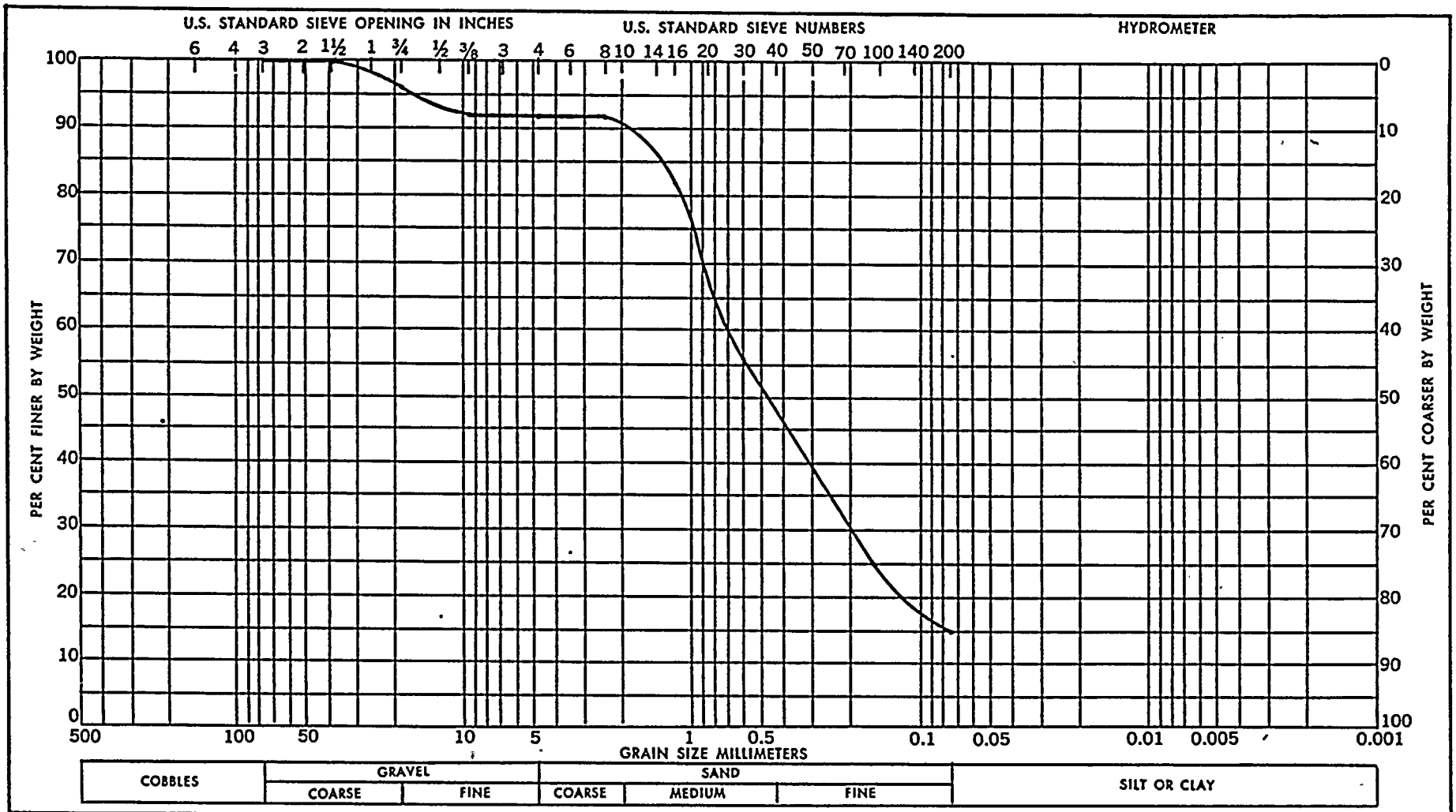
GEOLOGIC ASSOCIATES, INC.



SAMPLE NO.	ELEV. OR DEPTH	SOIL DESCRIPTION	SP. GR.	NAT. W. %	LL	PI	USC
TS-Level-5	5.0'	See logs					

PROJECT NO. 81-605
PROJECT WNP-2
CLIENT
BORING NO.
DATE 11/16/81

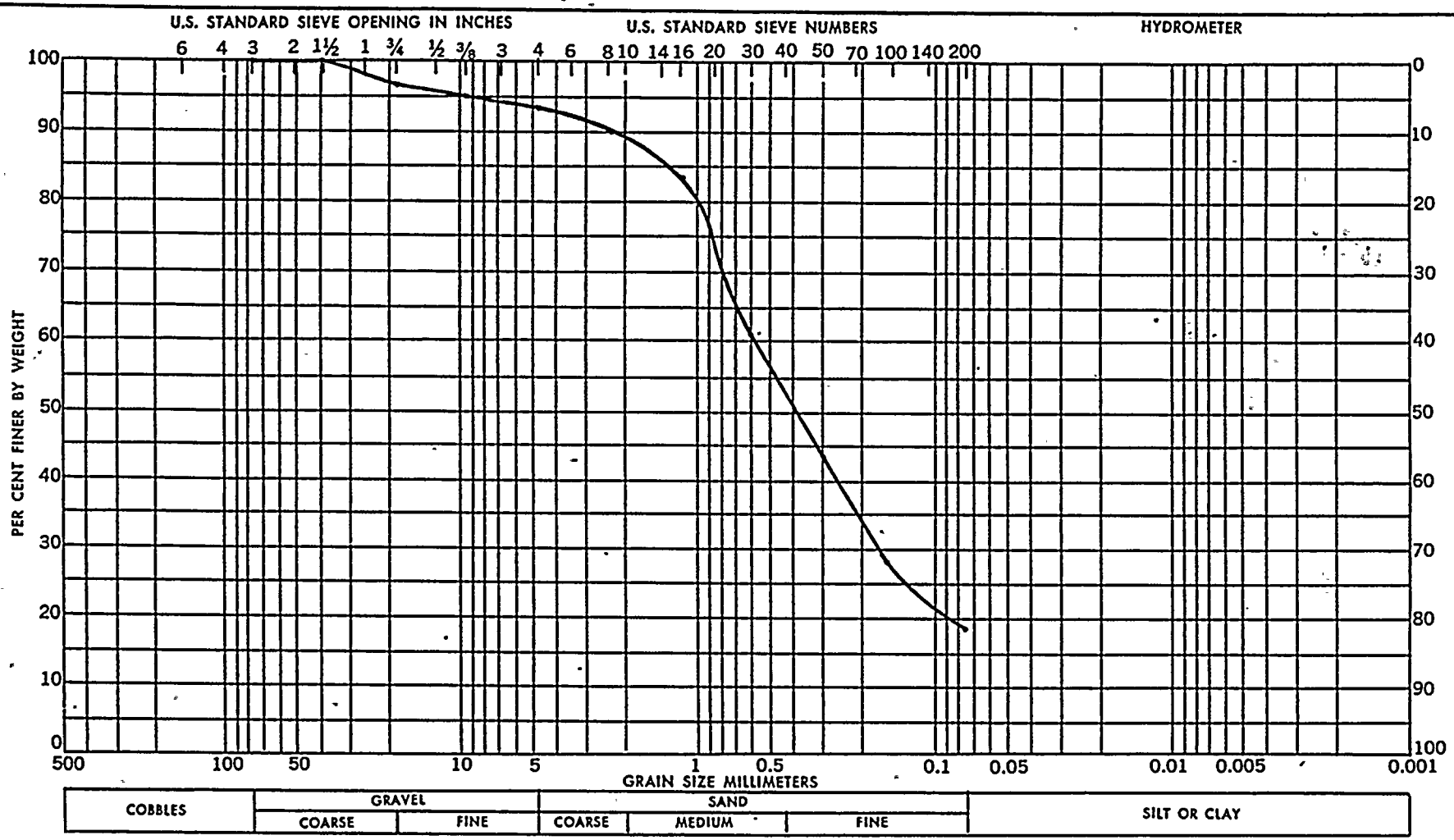
GEOLOGIC ASSOCIATES, INC.



SAMPLE NO.	ELEV. OR DEPTH	SOIL DESCRIPTION	SP. GR.	NAT. W. %	LL	PI	USC
TS-Level 4	6.0'	See logs					

PROJECT NO. 81-605
PROJECT WNP-2
CLIENT
BORING NO.
DATE 11/16/81

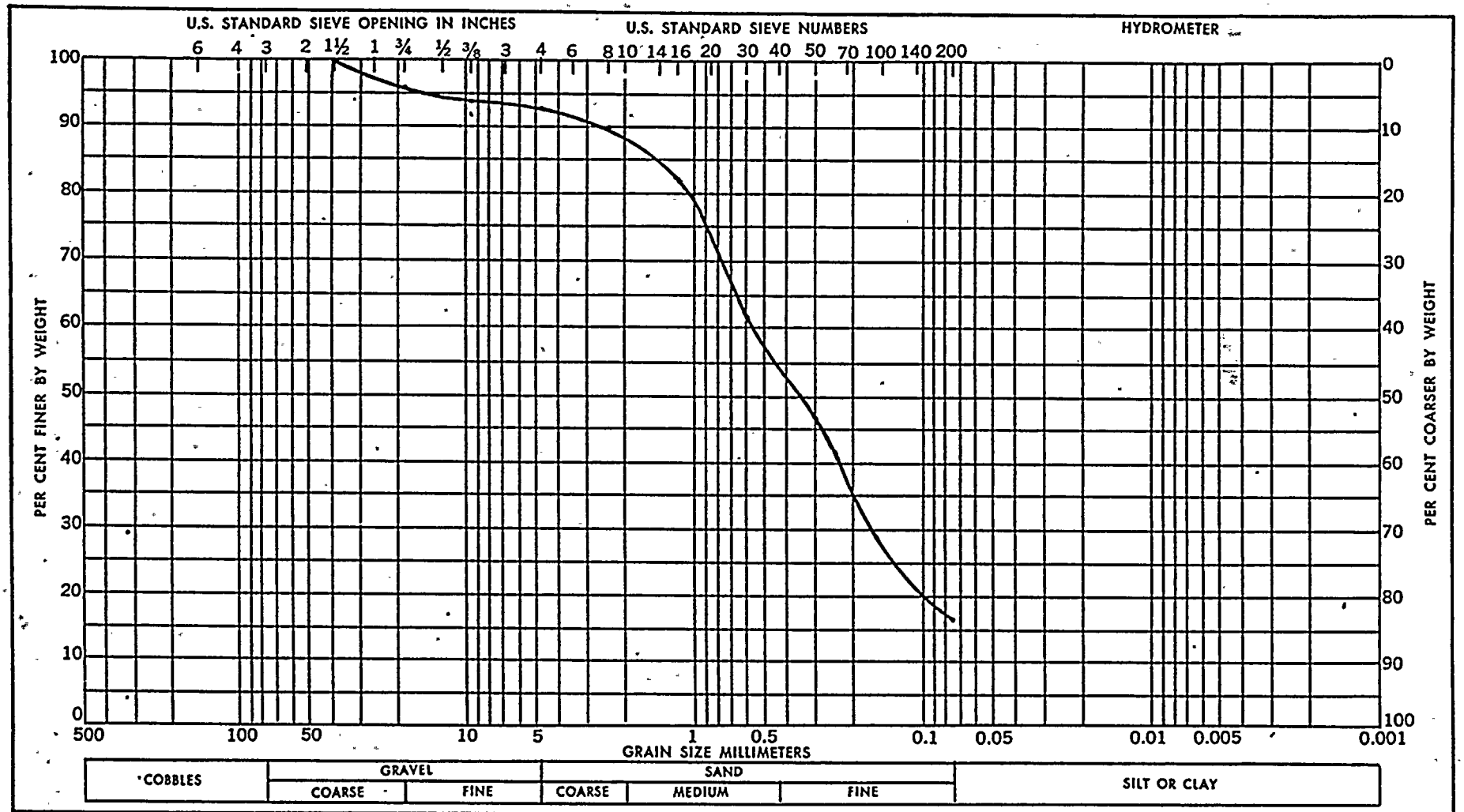
GEOLOGIC ASSOCIATES, INC.



SAMPLE NO.	ELEV. OR DEPTH	SOIL DESCRIPTION	SP. GR.	NAT. W. %	LL	PI	USC
TS-Level 3	7.0'	See logs					

PROJECT NO. 81-605
PROJECT WNP-2
CLIENT
BORING NO.
DATE 11/16/81

GEOLOGIC ASSOCIATES, INC.



SAMPLE NO.	ELEV. OR DEPTH	SOIL DESCRIPTION	SP. GR.	NAT. W. %	LL	PI	USC
TS-Level 2	8.0'	See logs					

PROJECT NO. 81-605
PROJECT WNP-2
CLIENT
BORING NO.
DATE 11/16/81

GEOLOGIC ASSOCIATES, INC.

IN-PLACE DENSITY TESTS PERFORMED

USING WASHINGTON DENSOMETER

Number	Depth (ft)	Density (PCF) Wet	Density (PCF) Dry	Relative Density
TS	8.0	123.8	117.5	98
(Level 2)		125.3	123.2	116
		124.0	121.6	111
		124.4	119.0	103
		112.3	107.3	42
TS	7.0	125.2	119.6	83
(Level 3)		122.2	115.6	74
		126.1	120.0	83
		121.7	116.0	75
TS	6.0	122.6	115.7	73
(Level 4)		130.9	120.0	83
		126.9	120.1	83
		131.9	120.0	83
TS	5.0	124.6	119.5	75
(Level 5)		130.1	121.7	85
		135.2	125.3	91
		131.6	120.8	83
		126.1	121.1	83
TS	4.0	125.4	119.3	83
(Level 6)		123.8	119.8	84
		126.8	116.7	78
		119.5	112.8	69
		107.2	103.9	
TS	1.0	122.2	114.3	69
(Level 9)		124.0	116.3	
		128.6	115.6	72
TS	0.0	132.9	124.8	89
(Level 10)		127.3	116.6	66
		129.4	116.7	66
		134.7	125.7	91
CT-17	0.0	133.4	123.6	106
CT-22	6.0	115.7	110.2	42

IN-PLACE DENSITY TESTS PERFORMED

USING WASHINGTON DENSOMETER

Number	Depth (ft)	Density (PCF) Wet	Density (PCF) Dry	Relative Density
CT-15A	3.0	130.7	125.3	
CT-15A	3.0	141.4	138.8	
CT-17A	3.0	116.7	112.0	79
CT-17B	3.0	107.8	103.8	36
CT-3	1.5	118.0	114.0	42
CT-3	3.0	122.4	117.5	76
CT-3	4.5	120.3	116.1	69
CT-3	6.0	110.3	105.4	
CT-3	7.5	112.4	106.8	39
CT-3	9.0	110.2	106.5	37
CT-19	1.25	119.1	110.9	95
CT-19	2.25	124.9	113.0	84
CT-19	3.25	119.0	110.1	92
CT-19	4.25	120.0	110.6	89
CT-19	5.25	118.2	108.7	81
CT-19	6.25	121.4	108.8	76
CT-19	7.25	125.9	113.1	92
CT-19	8.25	130.3	114.2	95
CT-27	.3	126.3	111.0	60
CT-27	1.3	127.1	110.7	82
CT-27	2.3	119.0	108.5	73
CT-27	3.3	126.2	111.2	68
CT-27	4.3	119.1	108.9	78
CT-27	5.3	130.4	113.7	100
CT-27	6.3	120.4	106.6	67
CT-27	7.3	127.7	116.1	99
CT-27	8.3	129.7	112.6	82

IN-PLACE DENSITY TESTS PERFORMED

USING SAND CONE METHOD

Number	Depth (ft)	Density (PCF) Wet	Dry
TP	2.5	133.6	127.1
CT-15	3.0	110.3	94.8
CT-17	2.5	136.7	130.1
CT-17	3.0	134.4	125.0
CT-21	2.5	106.5	101.5
CT-21	3.0	105.2	101.3
CT-22	2.0	135.5	128.9
CT-22	4.0	130.0	123.2
CT-22	6.2	116.9	111.0