NRC FORM 195 (2-76)

U.S. NUCLEAR REGULATORY COMMISSION

DOCKET NUMBER 50-412

FILE NUMBER

NRC DISTRIBUTION FOR PART 50 DOCKET MATERIAL

TO: Mr Vassallo	FROM: Duquesne Light Co Pittsburg, Pa E J Woolever	DATE OF DOCUMENT 6-18-76 DATE RECEIVED 6-21-76

[X] LETTER [X] ORIGINAL [ ] COPY	[X] NOTORIZED [X] UNCLASSIFIED	PROP	INPUT FORM

NUMBER OF COPIES RECEIVED: one signed

DESCRIPTION

Ltr notarized 6-18-76...trans the following:

PLANT NAME: Beaver Valley #2

ENCLOSURE

Corrections to their 5-27-76 & 6-3-76 submittals entitled "Thirty Day Rpt, Reactor Containment Foundation Soils...."....w/rev #1

(1 cy encl rec'd)

DO NOT REMOVE

ACKNOWLEDGED

ENVIRO 6-23-76 ehf

SAFETY		FOR ACTION/INFORMATION		ENVIRO
	ASSIGNED AD:		ASSIGNED AD:	
/	BRANCH CHIEF:	Vassallo	BRANCH CHIEF:	
/	PROJECT MANAGER:	Angelo	PROJECT MANAGER:	
/	LIC. ASST.:	Lee	LIC. ASST.:	

INTERNAL DISTRIBUTION

~~REG FILE~~		SYSTEMS SAFETY		PLANT SYSTEMS		ENVIRO TECH	
/	NRC PDR		HEINEMAN		TEDESCO		ERNST
/	I & E (2)		SCHROEDER		BENAROYA		BALLARD
	OELD				LAINAS		SPANGLER
	GOSSICK & STAFF		ENGINEERING		IPPOLITO		
	MIPC		MCCARY				SITE TECH
	CASE		KNIGHT		OPERATING REACTORS	/	GAMMILL
	HANAUER	/	SIHWEIL		STELLO	/	STEPP (2)
	HARLESS		PAWLICKI				HULMAN
					OPERATING TECH		Heller
	PROJECT MANAGEMENT		REACTOR SAFETY		EISENHUT		SITE ANALYSIS
	BOYD		ROSS		SHAO		VOLLMER
	P COLLINS		NOVAK		BAER		BUNCH
	HOUSTON		ROSZTOCZY		SCHWENCER		J. COLLINS
	PETERSON		CHECK		GRIMES		KREGER
	MELTZ						
	HELTEMES		AT & I		SITE SAFETY & ENVIRO		
	SKOVHOLT		SALTZMAN		ANALYSIS		
			RUTBERG		DENTON & MULLER		

EXTERNAL DISTRIBUTION

/	LPDR: Beaver, Pa		NATL LAB	BROOKHAVEN NATL LAB
/	TIC		REG. V-IE	ULRIKSON (ORNL)
/	NSIC		LA PDR	
	ASLB		CONSULTANTS	
/	ACRS 16 ~~HOLDING~~/SENT TO LA Lee			

CONTROL NUMBER 6267

Mr Vassallo

Duquesne Light Co
Pittsburg, Pa
E J Woolever

6-18-76
6-21-76

one signed

Ltr notarized 6-18-76...trans the following: Corrections to their 5-27-76 & 6-3-76 submittals entitled "Thirty Day Rpt, Reactor Containment Foundation Soils..."....w/rev #1

(1 cy encl rec'd)

Beaver Valley #2

6-23-76 cbf

Duquesne Light

435 Sixth Avenue
Pittsburgh, Pennsylvania
15219

(412) 471-4300

June 18, 1976

Director of Nuclear Reactor Regulation
Attention: Mr. D. B. Vassallo, Director
LW Reactors Branch 5
United States Nuclear Regulatory Commission
Washington, D. C. 20555

SUBJECT: Beaver Valley Power Station - Unit No. 2
Reactor Containment Structure Founding Material
Docket No. 50-412

Gentlemen:

Our letter dated May 27, 1976 transmitted the Thirty-Day Report, Reactor Containment Foundation Soils, Beaver Valley Power Station, Unit No. 2. On June 3, 1976 we had a conference call between our geotechnical engineers and your Messrs. Lyman Heller and Joseph Kane at which the Thirty-Day Report was discussed.

On the June 3, 1976 conference call the Duquesne Light Company engineers reported figure reference errors on page 4 of the Thirty-Day Report. These errors have been corrected on the attached Thirty-Day Report (Revision 1) dated June 9, 1976 for the Reactor Containment Foundation Soils of Beaver Valley Power Station, Unit No. 2.

DUQUESNE LIGHT COMPANY

By E. J. Woolever
E. J. Woolever
Vice President

(CORPORATE SEAL)

Attest:

H. W. Staas
Secretary

6267

COMMONWEALTH OF PENNSYLVANIA)
) SS:
COUNTY OF ALLEGHENY)

On this 18th day of June, 1976, before me, Robert J. Monroe, a Notary Public in and for said Commonwealth and County, personally appeared E. J. Woolever who, being duly sworn, disposed, and said that (1) he is Vice President of Duquesne Light Company, (2) he is duly authorized to execute and file the foregoing Information on behalf of said Company, and (3) the statements set forth in the Information are true and correct to the best of his knowledge, information and belief.

WITNESS my hand and seal the day and year first above written.

Robert J. Monroe

ROBERT J. MONROE, Notary Public
PITTSBURGH ALLEGHENY COUNTY, PA.
MY COMMISSION EXPIRES
DECEMBER 4, 1978

9 June 1976

THIRTY-DAY REPORT (REVISION 1)
REACTOR CONTAINMENT FOUNDATION SOILS
BEAVER VALLEY POWER STATION - UNIT NO. 2

INTRODUCTION

The excavation for the reactor containment structure was completed to elevation 679 ft. on April 19, 1976. During April 19 and 20, 1976 the founding conditions were documented. This documentation consisted of:

1. Establishing a 25 ft. square reference grid over the floor of the containment excavation,
2. Photographing the floor of the containment excavation,
3. Performing in situ density tests at each grid intersection, and
4. Obtaining a bag sample of the founding soil at each grid intersection for classification.

The above documentation revealed the presence of a lense of very stiff, desicated silty clay along the northern perimeter of the containment excavation at Elevation 679 ft. The location of the silty clay lense, which had a chord length of about 100 ft. and a maximum width of about 30 ft, is shown on the attached Figure 1. In an attempt to remove the silty clay lense, the containment excavation was deepened to about elevation 674 ft. over the area where the silty clay lense in plan but revealed that it extended below Elevation 674 ft. After an initial evalution of the properties of the silty clay lense, as determined from laboratory test data on two small chunk samples, it was decided that no further excavations should be made for the following reasons:

1. The silty clay is an adequate foundation material as indicated by its very stiff consistency,

2. The proximity of the groundwater table at Elevation 667 ft, and

3. The tip of the cofferdam sheet piles is at Elevation 671 ft.

Due to the oncoming inclement weather, the over excavation was filled with lean concrete backfill to Elevation 678 ft. Three undisturbed block samples were obtained from the silty clay lense prior to the placing of the lean concrete.

Section 2.6.4 of the PSAR for Beaver Valley Power Station - Unit No. 2 states that the concrete mat for the reactor containment structure shall be founded on undisturbed gravels. The presence of the silty clay lense was not encountered in the original subsurface investigation.

In order to evaluate the effects of the presence of the silty clay, an investigation has been undertaken to establish its extent and to determine its strength and compressibility. Details of this continuing investigation are given below.

INVESTIGATION

The investigation of the effects of the presence of the silty clay consists of:

1. Borings to investigate the extent of the silty clay lense,
2. Laboratory testing of samples of the silty clay to determine classification data, maximum past pressure, compressibility and undrained strength,
3. Analyses of the effects of the presence of the silty clay and backfill concrete on the anticipated settlements, and
4. Dynamic performance of the containment foundation.

Borings

Six borings have been located within the containment cofferdam to determine the thickness of the silty clay lense that remains beneath the lean concrete backfill. The locations of the borings are shown in Figure 1.

Drilling commenced on May 18, 1976 and it is anticipated that these borings will be completed by May 27, 1976. Each boring will extend down to bedrock and split barrel samples will be recovered for classification, and, if possible, undisturbed tube samples of the silty clay will be taken.

On completion of these borings within the containment excavation, additional borings will be located outside the cofferdam to define the areal extent of the silty clay lense.

To date four of the borings within the containment cofferdam have been completed. Data from the borings shows that the silty clay lense only extends to a maximum depth of four feet below the lean backfill concrete.

The presence of gravel in the remaining silty clay has precluded the recovery of undisturbed tube samples.

Laboratory Testing

The soil testing is presently being conducted in Stone & Webster Engineering Corporation's Geotechnical laboratory. The following tests are being conducted on samples of the silty clay:

1. Atterberg limits and natural water content
2. Unconsolidated undrained (UU) triaxial compression tests
3. Consolidated undrained ($\bar{C}IU$) triaxial compression tests
4. Constant rate of strain (CRS) and incrementally loaded (IC) consolidation tests.

The testing completed to date indicate that the silty clay has a Liquid Limit of 50, a Plastic Limit of 23 and a natural water content of 23 percent. Three UU triaxial tests have been run on samples trimmed from the undisturbed block samples. The data shows that the undrained shear strength (Su) of the silty clay is slightly greater than 4 KSF. Summary

plots of the completed UU triaxial tests are given in Figures 5 through 8.

A total of three CRS consolidation tests have been completed and summary plots of the test data are given in Figures 2 through 4. The vertical strain versus log effective stress show that the clay has been preloaded to a maximum vertical stress of between 15 KSF and 20 KSF. The presence of small fissures and discoloration along the fissure surfaces suggests that the overconsolidation may be due to desication.

The CIU triaxial tests and the incrementatally loaded consolidation tests are still in progress.

Analyses

The effect of the silty clay lense on the anticipated settlement of the reactor containment structure will be analyzed using a finite element model. The modulus of deformation for the silty clay lense will be determined from the test data or the undisturbed samples. The modulus of deformation for the granular soils will be determined by adjusting the modulus of deformation given in Figure 2.6-5 of the PSAR. An adjustment is required since the modulus of deformation given in Figure 2.6-5 of the PSAR was computed from actual settlement data obtained for Unit 1 and Shippingport. This modulus of deformation is a function of the simplified analytical technique used to evaluate these settlement data. The analytical technique used to evaluate the clay lense in combination with the sand requires the use of a more refined model.

Preliminary results of the settlement analysis indicated that the presence of the silty clay lense and lean concrete backfill will have a minimal effect on the anticipated settlements.

The method used to evaluate the dynamic effects of the silty clay lense and lean concrete backfill has not been finalized at this time.

WORK IN PROGRESS

The following work is still in progress:

1. Additional borings to define the areal extent of the silty clay lense.
2. Laboratory testing of undisturbed samples of the silty clay.
3. Analyses of the effect of the silty clay lense on the settlement of the reactor containment structure.
4. Analyses of the effect of the silty clay lense and lean concrete backfill on the dynamic performance of the reactor containment structure.

SAFETY IMPLICATIONS

The presence of the silty clay lense and the lean concrete backfill will have some influence upon the settlement and dynamic performance of the reactor containment structure. However, preliminary evaluation indicates that this influence will be minimal.

SCHEDULE

Final results of the investigation will be available August 1, 1976.

STONE & WEBSTER ENGINEERING CORPORATION

CONSOLIDATION TEST REPORT

CLIENT	J.O. NUMBER	BORING NUMBER
DUQUESNE LIGHT COMPANY	12241	--
SITE	**DATE**	**SAMPLE NUMBER**
BEAVER VALLEY UNIT 2	28 APR 76	BAG 1
CONSTANT RATE OF STRAIN - 0.039 PERCENT PER MINUTE		DEPTH --- FT

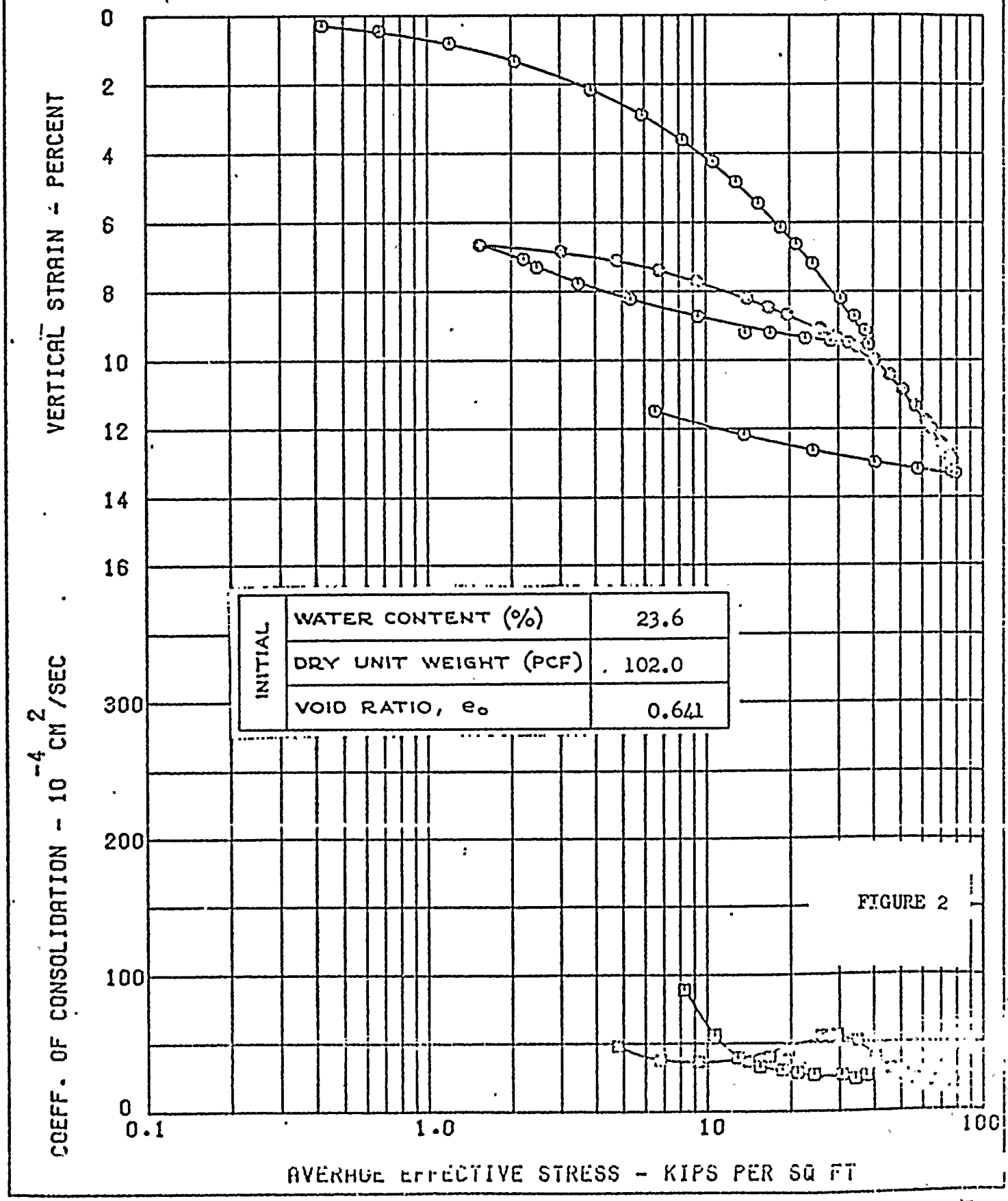

FIGURE 2

CLIENT	J.O. NUMBER	BORING NUMBER
DUQUESNE LIGHT COMPANY	12[illegible]1	--
SITE	**DATE**	**SAMPLE NUMBER**
BEAVER VALLEY UNIT 2	28 APR 76	BAG 2
CONSTANT RATE OF STRAIN - 0.040 PERCENT PER MINUTE		**DEPTH** ---

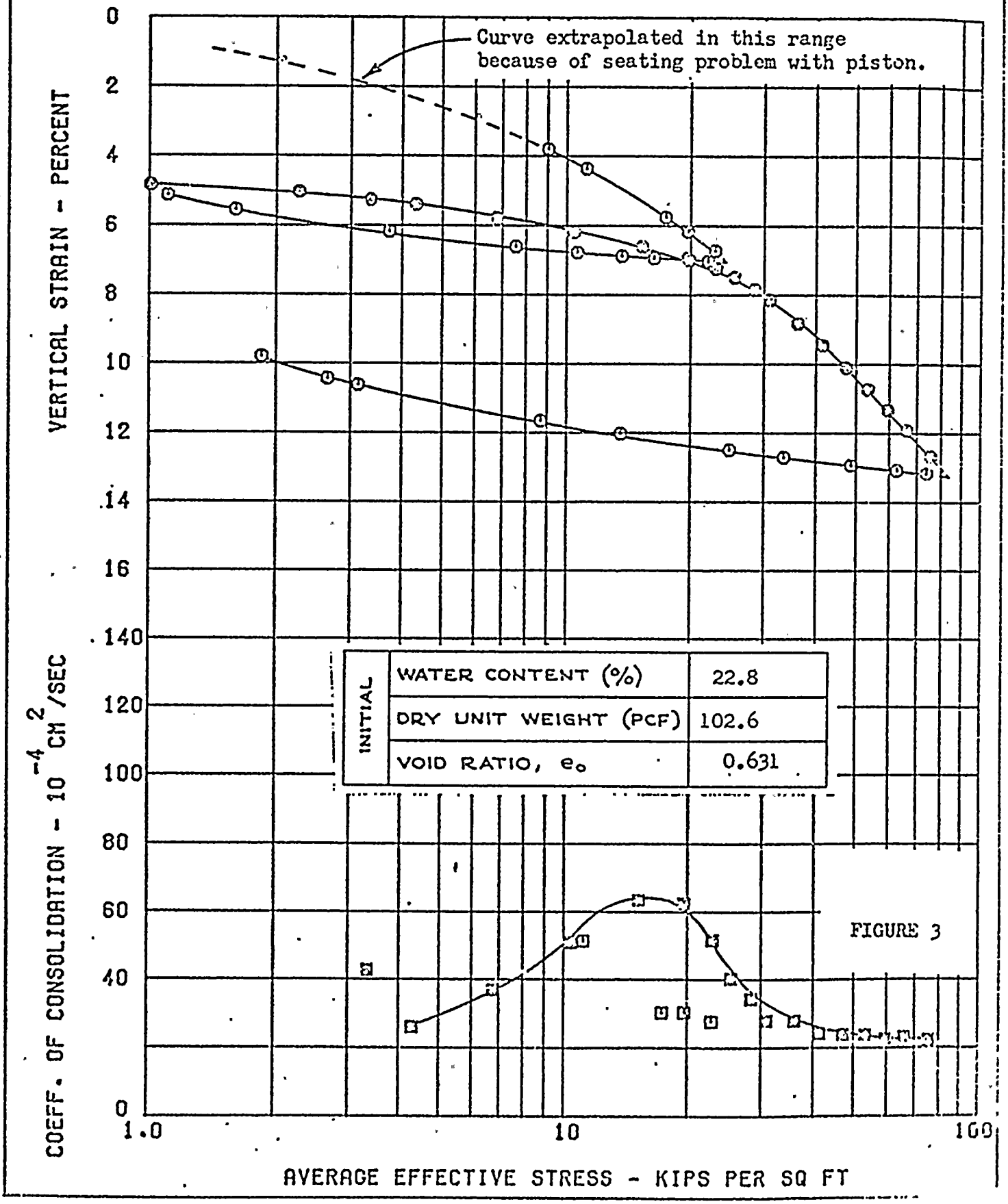

FIGURE 3

STONE & WEBSTER ENGINEERING CORPORATION

CONSOLIDATION TEST REPORT

CLIENT: DUQUESNE LIGHT COMPANY	J.O. NUMBER: 12241	BORING NUMBER: BLOCK II
SITE: BEAVER VALLEY UNIT 2	DATE: 19 MAY 76	SAMPLE NUMBER: 1F
CONSTANT RATE OF STRAIN - 0.029 PERCENT PER MINUTE		DEPTH: --- FT

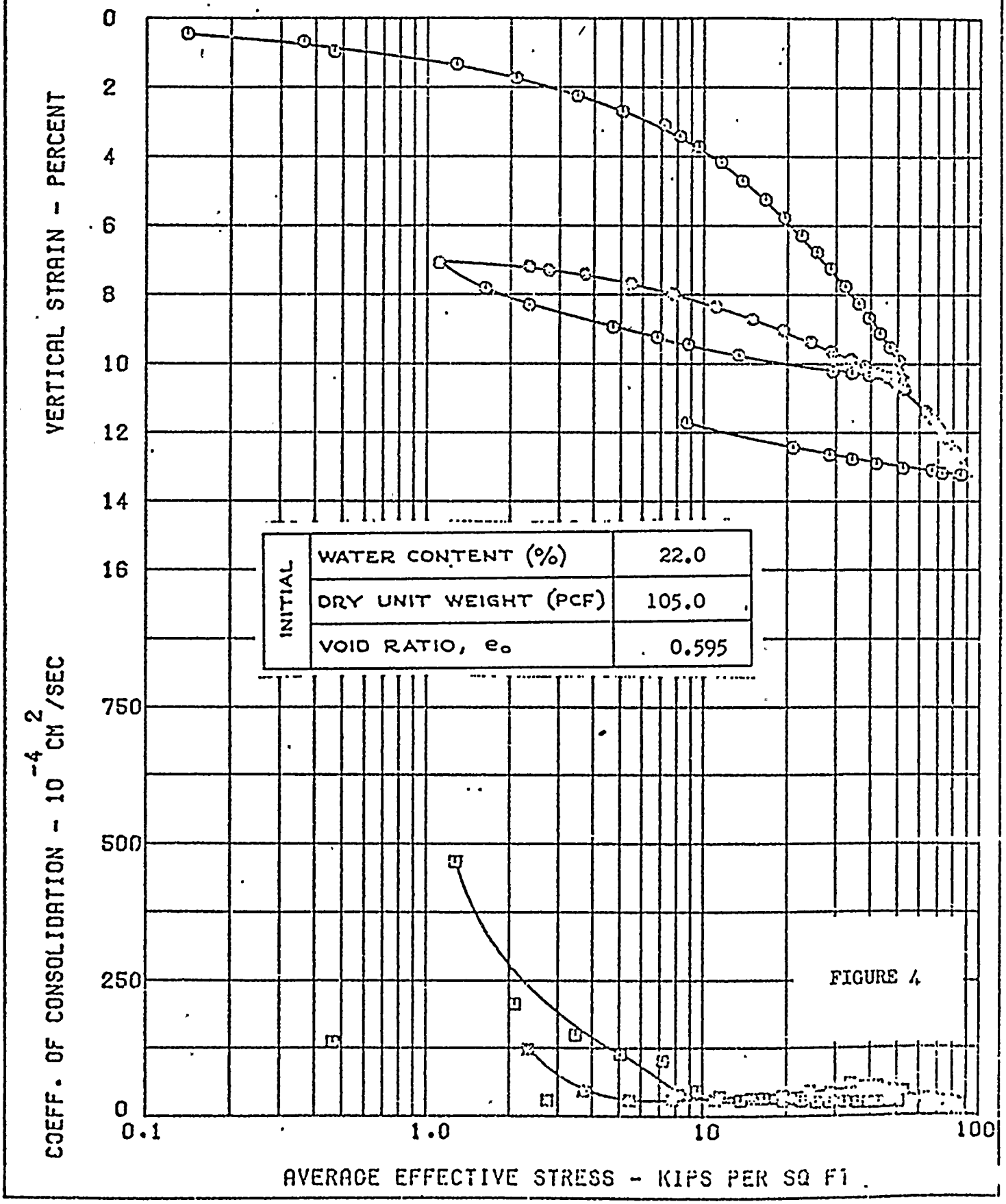

FIGURE 4

STONE & WEBSTER ENGINEERING CORPORATION

TRIAXIAL TEST STRENGTH SUMMARY

CLIENT	J.O. NUMBER	EXPLORATION TYPE AND NUMBER
DUQUESNE LIGHT COMPANY	12241	BLOCK SAMPLE I
SITE	DATE	SAMPLE NUMBERS
BEAVER VALLEY UNIT 2	25 MAY 76	IA, IB AND IC

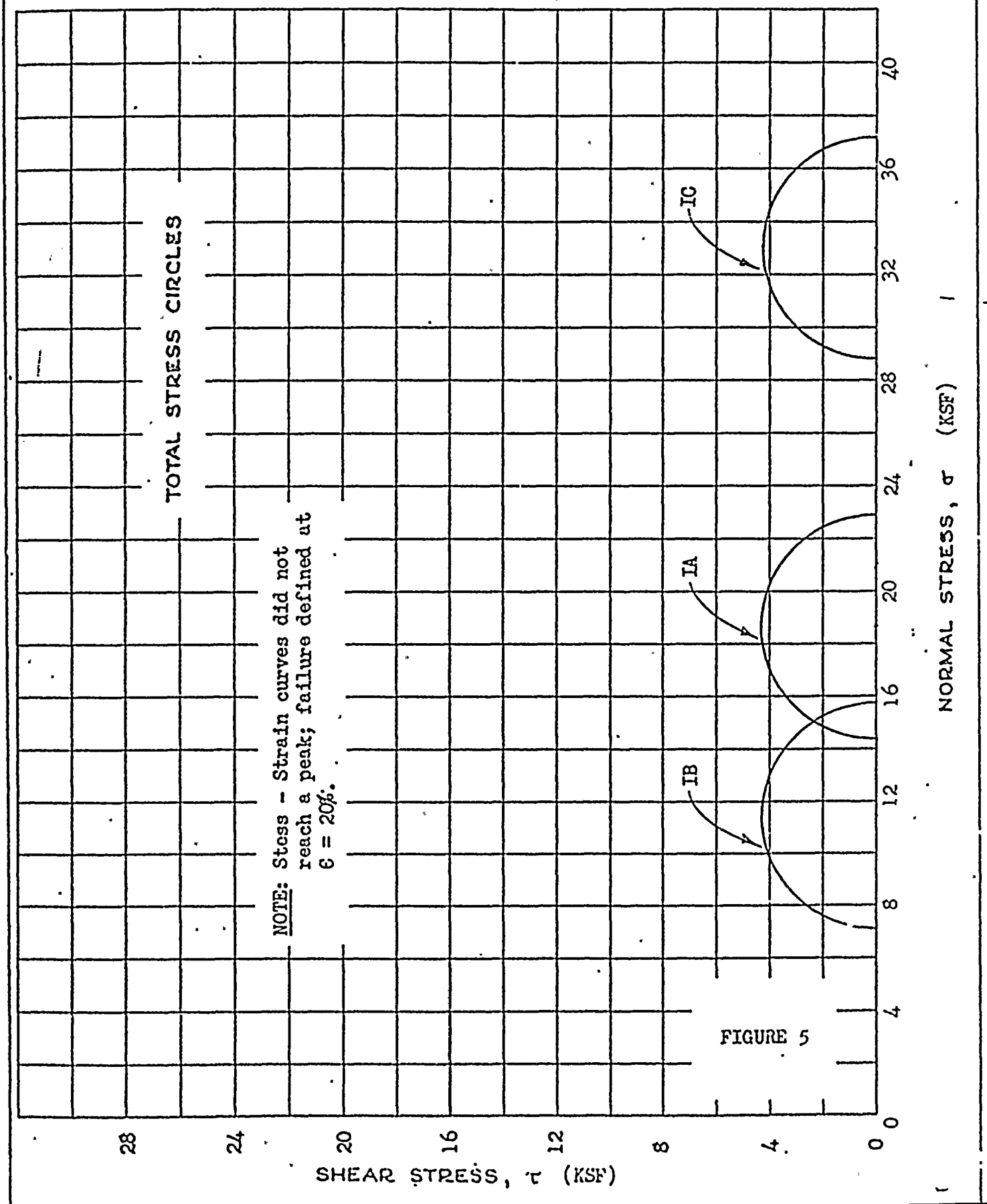

FIGURE 5

STONE & WEBSTER ENGINEERING CORPORATION

UNDRAINED COMPRESSION TEST REPORT

CLIENT	J.O. NUMBER	BORING NUMBER
DUQUESNE LIGHT COMPANY	12241	BLOCK SAMPLE I
SITE	DATE	SAMPLE NUMBER
BEAVER VALLEY UNIT 2	18 MAY 76	IA
CONFINING PRESSURE: 14.40 KIPS PER SQ. FT. (100.0 PSI)		DEPTH -

SAMPLE NUMBER	IA
DEPTH (FT)	-
WATER CONTENT (%)	22.1
DRY UNIT WEIGHT (PCF)	101.3
SPECIMEN DIAMETER (IN.)	2.58
RATE OF STRAIN (% PER MIN)	0.33
CONFINING PRESSURE (KSF)	14.40

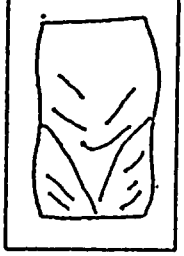

FIGURE 6

STONE & WEBSTER ENGINEERING CORPORATION

UNDRAINED COMPRESSION TEST REPORT

CLIENT	J.O. NUMBER	BORING NUMBER
DUQUESNE LIGHT COMPANY	12241	BLOCK SAMPLE I
SITE	**DATE**	**SAMPLE NUMBER**
BEAVER VALLEY UNIT 2	13 MAY 76	1B
CONFINING PRESSURE: 7.20 KIPS PER SQ. FT. (50.0 PSI)		DEPTH -

SAMPLE NUMBER	1B
DEPTH (FT)	-
WATER CONTENT (%)	22.3
DRY UNIT WEIGHT (PCF)	101.3
SPECIMEN DIAMETER (IN.)	2.57
RATE OF STRAIN (% PER MIN)	0.31
CONFINING PRESSURE (KSF)	7.20

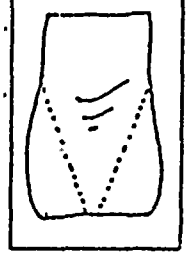

FIGURE 7

STONE & WEBSTER ENGINEERING CORPORATION

UNDRAINED COMPRESSION TEST REPORT

CLIENT	J.O. NUMBER	BORING NUMBER
DUQUESNE LIGHT COMPANY	12241	BLOCK SAMPLE I
SITE	**DATE**	**SAMPLE NUMBER**
BEAVER VALLEY UNIT 2	21 MAY 76	IC
CONFINING PRESSURE: 28.8 KIPS PER SQ. FT. (200.0 PSI)		DEPTH -

SAMPLE NUMBER	IC
DEPTH (FT)	-
WATER CONTENT (%)	22.5
DRY UNIT WEIGHT (PCF)	100.8
SPECIMEN DIAMETER (IN.)	2.59
RATE OF STRAIN (% PER MIN)	0.33
CONFINING PRESSURE (KSF)	28.8

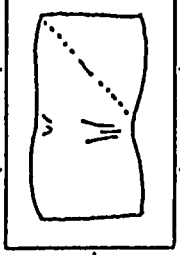

FIGURE 8