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MIDLAND ENERGY CENTER
MIDLAND DOCKET NOS 50-329, 50-330
TRIAXIAL TEST RESULTS - AUXILIARY BUILDING
FILE: 0485.16, C-125B(QR) SERIAL: 23882

REFERENCE: CPCO LETTER (J A MOONEY) TO NRC (J J HARRISON) DATED 6/19/83
SERIAL CSC-6735

The purpose of this letter is to closeout the commitment in the reference for providing the Auxiliary Building triaxial test results. The enclosed report presents the results of tests performed for piers W11, E8 and W8. It should be noted that these tests have been performed in accordance with Appendix A to the report, "Guidelines for Thin-Walled Tube Sampling of Pier Subgrade," by Hanson Engineers, Springfield, IL and are for information only. The design has been based on earlier tests.

JAMooney

JAM/JNL/bjw

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RESULTS OF THE
TRIAXIAL TESTING FOR THE

AUXILIARY BUILDING UNDERPINNING

The purpose of this report is to summarize the guidelines for taking thin-walled tube samples in designated piers, and to present the results of laboratory tests performed on selected tube samples taken to date. Tube samples are taken to provide relatively undisturbed samples of pier subgrade soils suitable for performing unconsolidated-undrained triaxial shear strength tests. These shear strength test results can then be compared to the average shear strength used in design.

Piers designated for tube sampling are W 11, E/W 2, 5, and 8, and CT 3, 10 and 14. To date, tube samples have been obtained in piers W 11, W 8, and E 8.

At designated piers, two (2) thin-walled tube samples are obtained according to the guidelines in Appendix A (except as noted in Table 1 for Pier W 11). The tubes are sent to the laboratory of Hanson Engineers in Springfield, Illinois for testing. The testing program consists of determining water content, wet density, Atterberg limits, and shear strength from unconsolidated-undrained triaxial compression tests performed on selected portions of the samples. Three (3) triaxial tests are performed using confining pressures of 15, 30, and 45 psi.

The laboratory test results obtained to date are summarized in Table 1 of this report. The Mohr's circles for the triaxial test results are included in Appendix B of this report.

The average of the data shown in Table 1 can be compared to the average anticipated design values for pier subgrade soils which are given on Bechtel Design Drawing C-1304 (Q), Rev. 1, as summarized below:

	Design	Measured
Water Content	20%	21.2%
Liquid Limit	42%	47.1%
Plastic Limit	20%	18.8%
Wet Density	130 pcf	130.2 pcf
Undrained shear strength	7 ksf	7.3 ksf

The measured range of undrained shear strength values of 6.2 to 8.0 ksf is within the anticipated range of 5 to 10 ksf. As expected, the natural soils encountered near the pier subgrade elevation have been consistent with the design basis.

STS/WORK3

TABLE 1

SUMMARY OF LABORATORY TEST RESULTS

Pier No.	Sample No.	Elev. Ft.	INDEX PROPERTIES Water Cont. %	Liquid Limit % (3)	Plastic Limit % (3)	Wet Unit Weight	UNCONSOLIDATED-UNDRAINED TRIAXIAL TEST RESULTS Conf. Pres. PSI	Shear Strength KSF	Average Shear Strength KSF
W 11(1)	1U-3	565.3	19.7	-	-	132.5	15	7.4	
W 11(1)	1U-2	565.7	21.3	43.1	19.1	131.4	30	8.0	7.7
W 11(1)	1U-1	566.0	21.5	-	-	130.6	45	7.8	
W 8(2)	S-1	565.6	20.0	-	-	130.0	15	6.8	
W 8(2)	S-2	565.6	20.6	49.2	18.4	130.3	30	6.2	6.8
W 8(2)	S-2	565.3	20.6	-	-	131.5	45	7.4	
E 8(2)	S-1	564.3	23.1	-	-	127.3	15	7.1	
E 8(2)	S-1	564.0	23.9	49.1	18.8	126.7	30	6.7	7.2
E 8(2)	S-2	564.4	20.5	-	-	131.3	45	7.9	

(1) Tube advanced using jacking system. Only one tube sample was obtained in Pier W 11.

(2) Tube advanced by driving.

(3) One set of Atterberg limits performed from tube sample at each pier location: for E 8 and W 8 the samples were obtained by combining portions of both tube samples.

APPENDIX A

GUIDELINES FOR THIN-WALLED TUBE SAMPLING OF PIER SUBGRADE

GUIDELINES FOR THIN-WALLED TUBE SAMPLING OF PIER SUBGRADE

PURPOSE

The purpose of this procedure is to provide a method for using thin-walled tubes to obtain soil samples suitable for laboratory testing from the subgrade of piers at the Midland Nuclear Plant.

SCOPE

The piers to be sampled using this procedure are E/W 2, 5, 8, and CT 3, 10, 14, and at other locations as determined by the RGE.

PROCEDURE

After the pier shaft has been excavated to approximately one foot above the design subgrade elevation, the bottom of the excavation shall be cleared of loose material. The sample tube shall be a 14.5 inch long steel tube with a two inch outside diameter and a 1/16 inch wall. Other tubes acceptable to the resident geotechnical engineer may be used.

Place the sample tube with a coupler attached to the top in a vertical position on the bottom of the excavation. Place a cushion such as wood blocking on top of the coupler and advance the tube using a sledge hammer. Care shall be taken to maintain the tube as vertical as possible and to reduce the tendency for swaying during driving. After determining that the tube has reached adequate depth, record the depth of penetration. Before removing the tube, rotate the tube at least two full revolutions to shear the sample at the bottom. Measure and record the length of the sample obtained. The job number, sampling date, pier number, sample number, and sample elevations (top and bottom of sample) shall be shown on the tube. The tube may also be advanced using a hand-operated jack, braced as necessary, using as uniform and penetration rate as possible.

Remove any loose material from the upper end. Trim at least ½ inch of material from the lower end. Seal both ends with wax. Microcrystalline wax is preferable, but paraffin may be used. After waxing, fill the space in the upper end of the tube with a filler such as rags or newspaper. Securely tape both ends and seal again with wax.

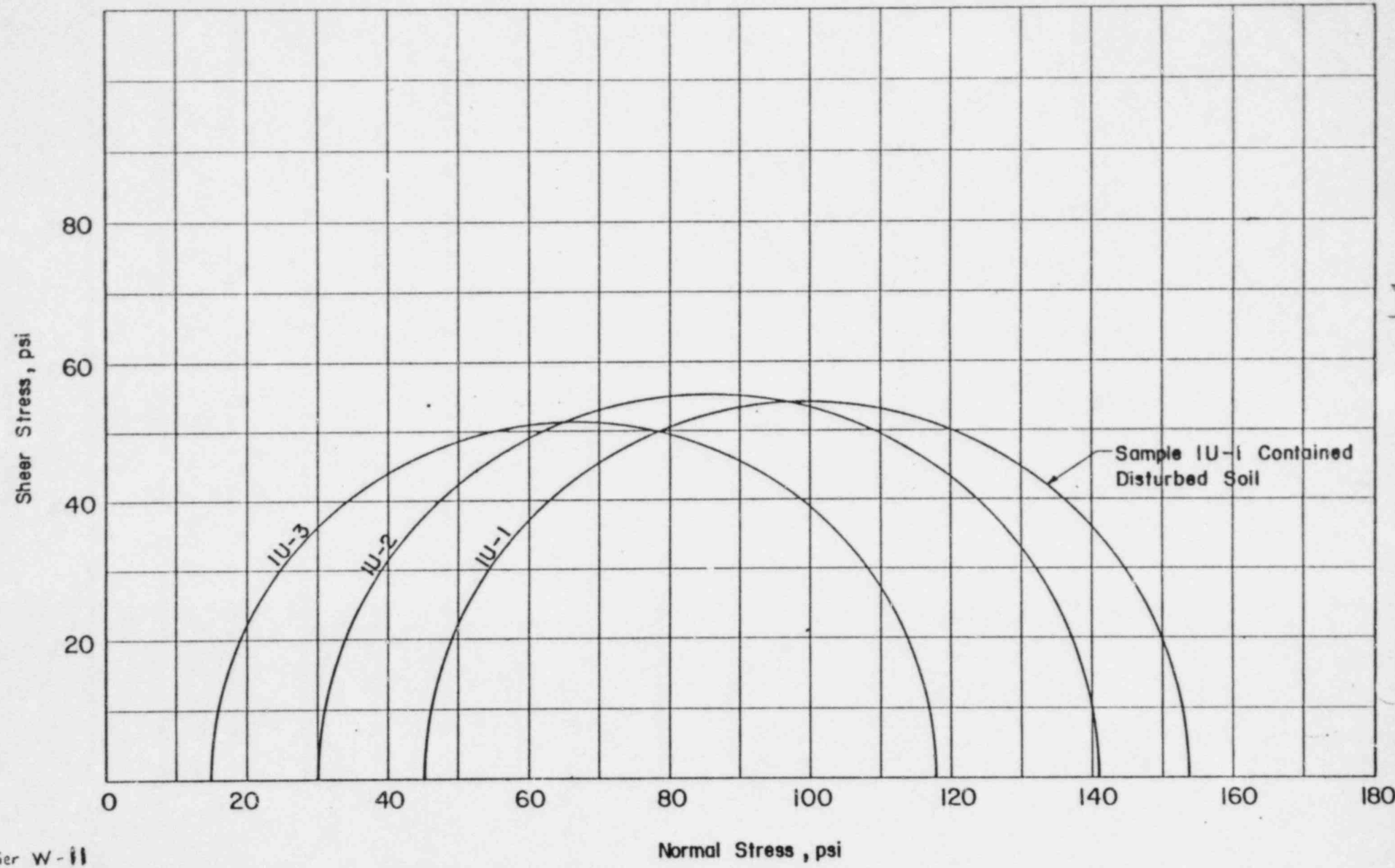
The tube sample shall be shipped in a cardboard tube with an annular space between the sample and the cardboard wall filled with a cushioning material such as styrofoam pellets.

JG/F2

APPENDIX B

TRIAXIAL TEST RESULTS

Piers W 11, E/W 8



Pier W-11

Material Description

V.F. Sandy Silty Clay
/so-tr v.f sa. silt seams
(W_L = 43%, Wp = 19%)

MOHR CIRCLES - Q TESTS

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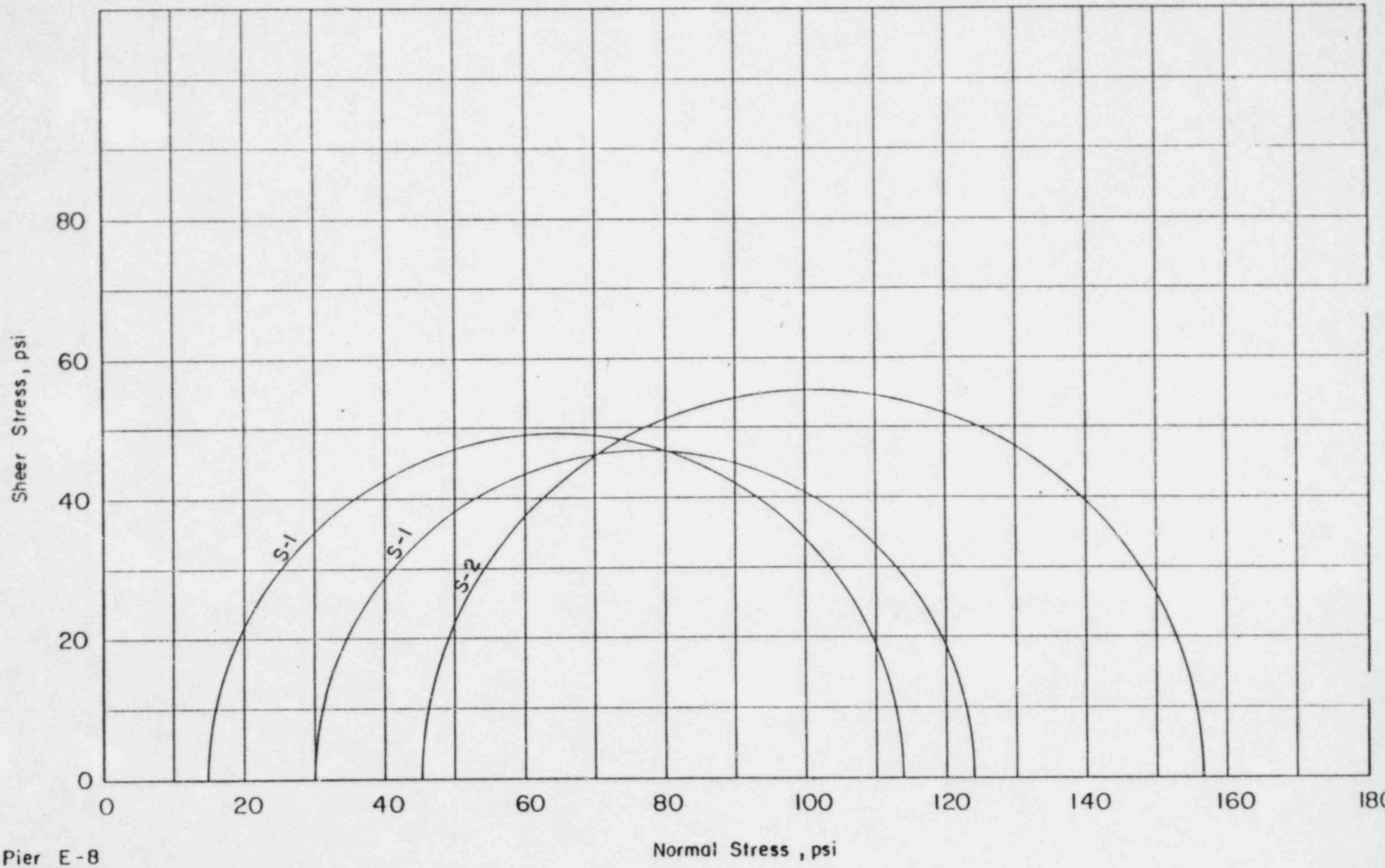

Pier E-8

Material Description

Gray v.f. sandy, silty clay (tr. c sand & sm. gravel.)

(W_L = 49%, W_P = 19%)

MOHR CIRCLES - Q TESTS

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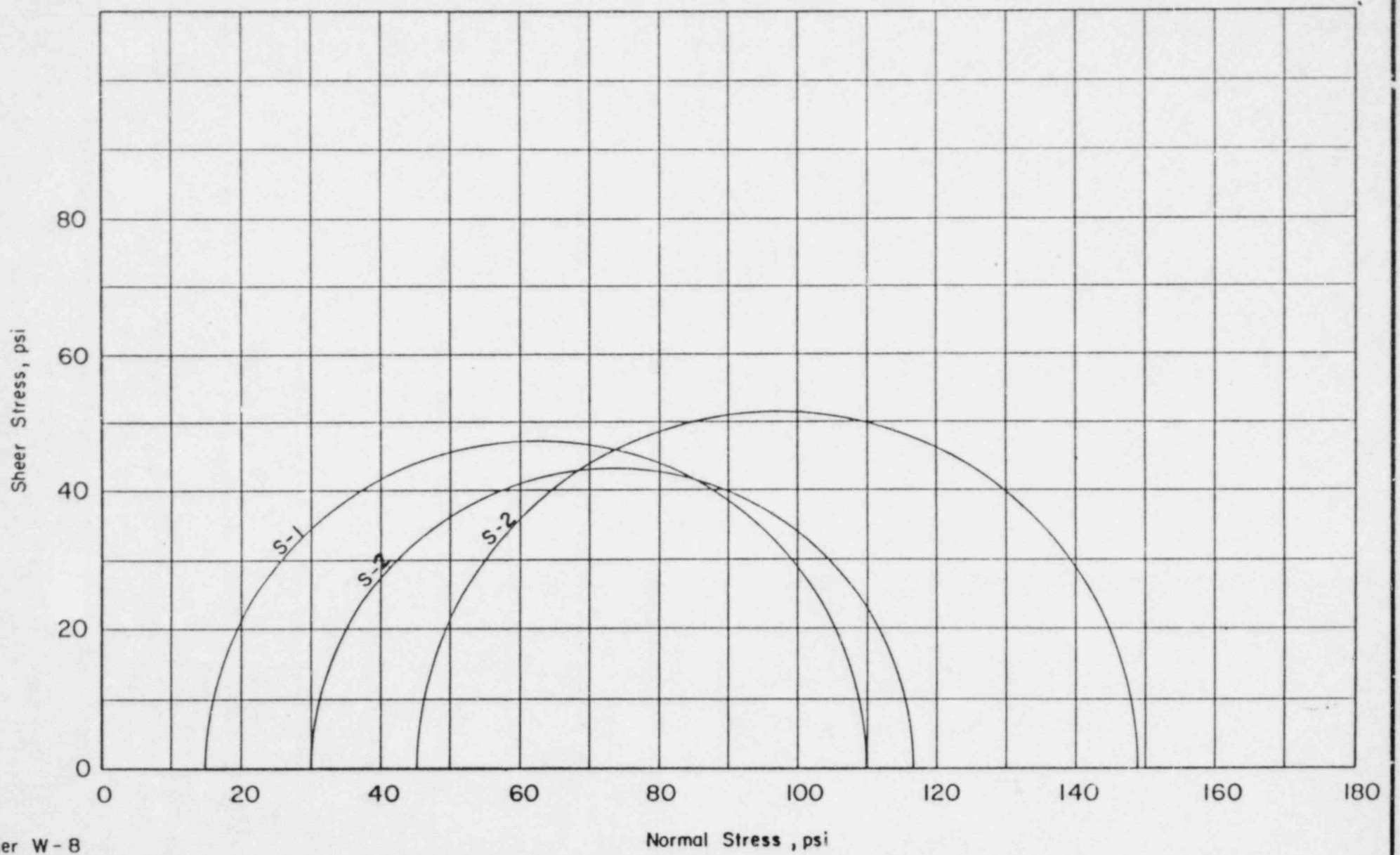

Pier W-8

Material Description

Gray v.f. sandy, silty clay / v.f. sandy silt seams.

(W_L = 49.2 %, W_p = 18.4 %)

MOHR CIRCLES - Q TESTS

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UNDERPINNING AUXILIARY BUILDING
MIDLAND PLANT UNITS 1 & 2
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