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STRUCTURES AND MATERIALS RESEARCH
Department of Civil Engineering

STUDIES OF CONCRETE
FOR CALLAWAY
UNION ELECTRIC COMPANY
UNIT Nº 1
POST TENSIONED REACTOR BUILDING

Final Report

by DAVID PIRTZ

Report to

Bechtel Power Corporation Gaithersburg, Maryland

Nov. 1977

STRUCTURAL ENGINEERING LABORATORY UNIVERSITY OF CALIFORNIA BERKELEY, CALIFORNIA

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Final Report

STUDIES OF CONCRETE FOR CALLAWAY, UNION ELECTRIC COMPANY, UNIT #1, POST TENSIONED REACTOR BUILDING

1.0 SCOPE

The purpose of this test program was to establish the uniaxial creep and other mechanical and thermal properties of the proposed concrete mix design for the Callaway, Union Electric Company, Unit #1, Reactor Building. The work consisted of furnishing all supervision, labor, material, equipment, and performance of all operation and incidentals necessary for the concrete material properties test, except as noted in Section 2.7.

The test program consisted of two options: Option I, the final test program; and, Option II, a preliminary test program. Option II was completed and a report was submitted on October 5, 1975.

The Option I test program required the testing of one concrete mix.

1.1 Mix No. E-1

- 1.1.1 A mix with 3/4-in. maximum size aggregate.
- 1.1.2 Compressive strength of 6000 psi at 90 days.
- 1.1.3 Mix design supplied by Owner.

2.0 TEST PROGRAM

The Option I test program comprised the evaluation of the following properties of the concrete for Class E-1 concrete.

- 2.1 <u>Compressive Strength</u> to be determined on sealed concrete specimens, stored at 73°F, at ages of 7, 28, 90, 180, and 365 days.
- 2.2 <u>Modulus of Elasticity and Poisson's Ratio</u> to be determined on 6-in. by 12-in. sealed concrete specimens, stored at 73°F, at ages of 7, 28, 90, 180, and 365 days.

- 2.3 <u>Coefficient of Thermal Expansion</u> to be determined on two 6-in. by 16-in. sealed concrete specimens, stored at 73°F, at ages of 28, 180, and 365 days.
- 2.4 Specific Heat to be determined on two 8-in. by 16-in. sealed concrete specimens, stored at 73°F, at ages of 28 and 365 days.
- 2.5 <u>Diffusivity</u> to be determined on two 8-1/2-in. by 17-in. sealed concrete specimens, stored at 73°F, at ages of 28 and 365 days.
- 2.6 <u>Creep Characteristics</u> of sealed concrete specimens to be determined at a sustained stress of 2100 psi initially applied at ages of 28, 90, 180, and 365 days. The autogenous strain change shall be determined for a period of one year on sealed creep specimens that are to be loaded at age one year. The creep tests shall be carried out at 73°F and 110°F. Each creep test shall be conducted on a set of two 6-in. by 16-in. sealed concrete specimens.
- 2.7 The following related work is not included.
 - 2.7.1 Supply of portland cement, admixtures, and aggregate used for the test program.
 - 2.7.2 Performance of acceptance or user tests for concrete materials.

3.0 ABBREVIATIONS

ACI - American Concrete Institute

ASTM - American Society for Testing and Materials

AISI - American Iron Steel Institute

4.0 CODES AND STANDARDS

Codes and standards referenced herein are listed below, together with their common abbreviations and year of adoption, as used in this Specification. Standards or codes, including the year of adoption or revision, appearing in referenced documents other than those describing test procedures or methods of sampling shall not be considered as part of this Specification unless specifically referenced below.

ASTM C 33-74	Standard Specification for Concrete Aggregates
ASTM C 39-72	Standard Method of Test for Compressive Strength of Cylindrical Concrete Specimens
ASTM C 125-74	Standard Definitions of Terms Relating to Concrete and Concrete Aggregates
ASTM C 127-73	Standard Method of Test for Specific Gravity and Absorption of Coarse Aggregate
ASTM C 128-73	Standard Method of Test for Specific Gravity and Absorption of Fine Aggregate
ASTM C 138-75	Standard Method of Test for Unit Weight, Yield, and Air Content (Gravimetric) of Concrete
ASTM C 143-74	Standard Method of Test for Slump of Portland Cement Concrete
ASTM C 150-74	Standard Specification for Portland Cement
ASTM C 192-69	Standard Method of Making and Curing Concrete Test Specimens in the Laboratory
ASTM C 231-75	Standard Method of Test for Air Content of Freshly Mixed Concrete by the Pressure Method
ASTM C 469-65	Standard Method of Test for Static Modulus of Elasticity and Poisson's Ratio of Concrete in Compression
ASTM C 566-67	Standard Method of Test for Total Moisture Content of Aggregate by Drying
ASTM C 617-73	Standard Method of Capping Cylindrical Concrete Specimens
ASTM E 4-72	Standard Method of Verification of Testing Machines
ASTM E 6-73	Standard Definitions of Terms Relating to Methods of Mechanical Testing
ASTM E 12-70	Standard Definitions of Terms Relating to Density and Specific Gravity of Solids, Liquids and Gases
ASTM E 83-67	Standard Method of Verification and Classification of Extensometers

5.0 MANUFACTURE OF CONCRETE SPECIMENS

5.1 Mixing and Placing

Concrete was proportioned in accordance with the mix design and materials supplied by the Owner. The mix design is shown in Table A.

Aggregates were prepared in accordance with ASTM C 192, Section 4.3. Bulk specific gravity and absorption were determined for the aggregates in accordance with ASTM C 127 and C 128 and are reported in Table B. Cement and aggregate were stored in sealed steel drums.

Mixing of concrete was in accordance with ASTM C 192, Section 5.1.2. Cement and aggregate were stored at 73°±3°F for at least two days before mixing to assure a uniform temperature of these materials. Slump was measured in accordance with ASTM Method C 143. Entrained air content was measured in accordance with ASTM Method C 231. Unit weight and yield were determined in accordance with ASTM C 138. Specimens were made and consolidated in accordance with ASTM C 192, Sections 5.3 and 5.4.3, respectively. Accurate records of the mix proportions, moisture content of aggregate, air content, unit weight, and yield were retained.

The specimens for the creep and thermal coefficient of expansion were cast in 6.000 inches (within a tolerance of -.002 inches) by 18 inches machined split cast iron molds. Prior to casting, one Carlson 8-in. strain gage, properly calibrated, was centered on the axis of the cast iron mold. The lead wire from the strain gage was brought out through a hole drilled in the center of a 2-in. thick plate placed at the bottom of the mold and sealed by means of an "O" ring. The final specimen length was 16 inches.

A 1/8-in. by 8-in. metal rod was placed diametrically across the top of this mold to serve as a support for a wire which held the meter in an axial position during casting. After casting, the wire was cut-off and the rod removed and the top of the cast iron mold sealed with Saran wrap.

The creep and thermal expansion specimens were allowed to set five hours after casting to allow bleeding water to be reabsorbed prior to capping. Then, a conical shaped layer of mortar made from the original mix was formed on the top of each cylinder. The 1-1/2-in. thick steel top-plates were then worked back and forth into position until the mortar appeared to be

spread uniformly between the plate and the specimen. A leveling plate was used to assure that each top-plate was normal to the axis of the specimen. The creep and thermal expansion specimens were then moved to the 73°F, 50 percent RH room.

The split cast iron molds were stripped from the creep and thermal expansion specimens at the age of one day. Within three minutes after removal of the cast iron mold, a 1/16-in. thick butyl rubber sheet was wrapped and bonded to the top and bottom steel plates with rubber cement. A three-inch wide lap splice was used to join the butyl rubber sheet. Large hose clamps were placed over the butyl rubber and the end steel plates to assure that the specimens would be internally sealed. The specimens to be tested at 73°F remained in the 73°F, 50 percent RH room. The specimens to be tested at 110°F were moved to the 110°F room at the age of 14 days and insulated with two inches of fiberglass insulation so that the temperature would rise slowly.

Compressive strength specimens were cast in 6-in. by 12-in. sheet-metal cans. The lid and all joints were sealed with silicon rubber to internally seal the specimens. All sealed compressive strength specimens remained in the 100 percent RH room until just prior to testing, at which time they were stripped, capped, and covered with Saran wrap to ensure water retention throughout the test period.

Modulus of elasticity and Poisson's ratio were determined on the compressive strength cylinders.

Specimens for thermal diffusivity tests were cast in 8-1/2-in. by 17-in. by 0.020-in. thick steel cans. They were cast solid except for a 3/8-in. diameter by 8-1/2-in. deep thermometer well which was centered on the axis of the specimen. After casting, lids were placed on the specimens and the cans were sealed with silicon rubber prior to being moved to the 73°F, 100 percent RH room. The external metal container was left on the cylinders throughout the duration of the test.

Specimens for the specific heat tests were cast in 8-in. by 16-in. by 0.020-in. thick copper cans. They were cast solid except for a 1-5/8-in. 0.D. by 1-1/2-in. I.D. brass tube centered on the axis for the full length of the specimen. After casting, lids were placed on the specimens and the

cans were sealed with silicon rubber prior to being moved to the 73°F, 100 percent RH room. The external metal container remains on the cylinders throughout the duration of the test.

5.2 Curing Procedure

After each specimen was consolidated and finishing of the top surface was completed, it was placed in a room under the environmental conditions specified herein for the required test.

6.0 TEST RESULTS

6.1 Mix Design Data

The mix design and data for the concrete mixes used in casting the specimens are shown in Table C. In Table C the weight of cement, water, sand, and 3/4-in. aggregate per cubic yard of concrete were computed using the measured unit weight of the concrete and the batch weights of each material. [Weight of each material, pcy = (Unit weight of concrete, pcy) × (Batch weight of each material, lb.) ÷ (Total batch weight, lb.)]

6.2 Compressive Strength and Elastic Properties

Compressive strengths were determined at the ages of 7, 28, 90, 180 & 365 days for Class E-1 concrete. The average diameter of each specimen was between 5.96-in. and 5.98-in. The ends of the cylinders to which loads were applied were plane square end surfaces at right angles to the axis of the specimen and met the planeness requirements of Section 1.2 of ASTM Method C 617. Each specimen was checked for planeness. Testing procedures were in accordance with ASTM C 469, Sections 4.3 through 4.7, inclusive. The testing machine and compressometer used comply with ASTM C 469, Section 2. Each strength determination represents the average obtained from three 6-in. by 12-in. cylinders. The same three 6-in. by 12-in. concrete cylinders were used in the determination of compressive strength, modulus of elasticity (E), and Poisson's ratio (µ). The modulus of elasticity and Poisson's ratio were determined by use of an XYY recorder employing differential transformers. This arrangement produces a continuous plot of stress versus longitudinal strain and lateral strain versus longitudinal strain from which both modulus of elasticity (E) and Poisson's ratio (μ) were

computed. The loading rate used was 60,000 lbs. per minute which is equivalent to 35 psi per second for a 6-in. diameter specimen. Compressive strengths, modulus of elasticity, and Poisson's ratio for sealed concrete specimens stored at 73°F and 100 percent RH are shown in Table D.

6.3 Thermal Diffusivity

The values for Thermal Diffusivity represent the average of two values obtained by separately testing two 8-1/2-in. diameter by 17-in. long concrete cylinders for each age. These average values of thermal diffusivity for 28 and 365 days were $0.044~\rm{ft}^2/hr$ and $0.038~\rm{ft}^2/hr$, respectively.

Thermal Diffusivity is determined by cooling 8-1/2-in. diameter by 17-in. long cylinders from 120°F to 40°F and measuring the temperature change at the center of the specimen. To assure uniform heat throughout, the specimen was placed in a hot water bath and kept at 120°±1°F for a period of 24 hours prior to the start of the test. Cooling was started when the specimen was removed from the hot water bath and placed in a cold water bath set at 40°F in which it remained until the end of the test. During the test the cold water bath was kept at a constant temperature of 40°±0.2°F by the addition of ice. Each water bath was located in rooms controlled at 110°F and 40°F, respectively.

To monitor the temperature of both the cold water and the specimen, a Hewlett Packard model HP2801A Quartz Thermometer indicator was used. Good thermal contact between the concrete and the quartz thermometer was made by the use of a small amount of mercury at the bottom of a thin walled brass tube cast in the specimen at the time of casting. The quartz thermometer probe has an equivalent mass of 1-1/2 grams of water.

A more detailed description of this test appears in "Thermal Properties of Concrete", Bulletin 1, United States Bureau of Reclamation, Boulder Canyon Project, Final Reports, 1940, pp. 66-86 and pp. 133-143.

6.4 Specific Heat

The values for 28 and 365 day specific heat represent the average of two values obtained by separately testing two 8-in. diameter by 16-in.

long concrete cylinders for each age. These average values for 28 and 365 day specific heat were 0.225 Btu/lb and 0.208 Btu/lb.

Specific Heat was determined by the use of an adiabatic calorimeter designed to measure the amount of heat required to raise the temperature of a cylindrical test specimen. By using this instrument, no heat is either lost or gained from sources surrounding the testing apparatus, and thus, all heat is transferred directly from the heaters in the calorimeter to the specimen. The device is similar to that described in "Thermal Properties of Concrete", Bulletin 1, United States Bureau of Reclamation, Boulder Canyon Project Analysis, Final Reports, 1940, pp. 26-27, and pp. 112 to 117.

The test specimen was first submerged in a water bath and the surrounding air, water, and specimen were allowed 24 hours to come to equilibrium at approximately 73°F. The test was started and the specimen was heated by heating the water under adiabatic conditions obtained by heating the surrounding air at the same rate as the water until a temperature rise of about 30°F was obtained. The temperatures of the water bath and difference between the water and air was measured by the use of iron-constantan (Type A) thermocouples in which the voltage was monitored by a Dana Digital Voltmeter Model 5900 capable of measuring a voltage of 1×10⁻⁶ volts. This corresponds to a temperature of approximately 0.01°F. The amount of heat given to the specimen was determined by measuring the amount of power used by the heaters with a watt-hour meter with an accuracy of 0.10 watt hour.

6.5 Thermal Coefficient of Expansion

The two sealed 6-in. by 16-in. thermal coefficient of expansion specimens containing Class E-1 concrete were measured for length changes by means of a Carlson strain meter at successive temperatures of 73°F, 40°F, 100°F, 40°F, and 73°F. Specimens were left for at least 24 hours at each temperature before strain readings were taken. At the end of the cycling period, the specimens were stored at 73°F. The average linear thermal expansion for the two specimens at ages 28, 180, and 365 days were 4.2, 4.6 and 4.9 respectively. These values are listed in Table D.

6.6 Sustained Modulus of Elastic, Creep, and Autogenous Strains

Creep characteristics for the concrete were determined on sealed 6-in. by 16-in. cylinders with centrally embedded Carlson strain meters.

Creep specimens were loaded at ages of 28, 90, 180, and 365 days. At each age, four specimens were initially loaded, two at 73°F with class E-1 concrete and two at 110°F also with class E-1 concrete. The specimens which were loaded at the age of 365 days were also used to determine autogenous strains for the 28, 90, and 180 day loaded specimens.

The loading frames used are capable of applying and maintaining a stress level of 2100 psi to all loaded creep specimens despite any change in the dimension of the specimen. Each frame is capable of accepting two specimens in tandem (lengthwise) for simultaneous loading. The frame consists of two header plates (thickness of 1 inch) connected by three 1-1/2-in. (AISI C 1215) steel rods. Care was taken to prevent eccentric loading on all specimens. The hydraulic load-maintaining element consisted of accumulators, regulators, indicator gages, and a high pressure pump which is used to maintain the load on each frame. Pressure gages provide a means for measuring the load to the nearest 2 percent of the total applied stress.

For applying the initial stress of 2100 psi, a manual hand pump was used to apply the stress at a uniform rate of 35±5 psi per second. At this rate the total stress was applied in 1 minute. Each loaded creep specimen's strain gage was read at: 1 minute before loading was started (shown in the tables as -0.0007 days; zero time (full load applied); one minute and approximately at 10 minutes, 2 hours, 6 hours, and 24 hours after full load was applied. The gages were then read daily for the next week, weekly for one month and monthly until the age of 365 days at which time the 28, 90, and 180 day loaded specimens were unloaded. The strain gages imbedded in these specimens were read at: -.0007 days before unloading was started (full load still applied); zero time (fully unloaded); five minutes; two hours; eight hours; 24 hours, daily for a week and weekly for a month. At this time, the 365 day old specimens used to determine the autogenous strains were loaded using the same procedure previously described above.

Sustained modulus of elasticity, creep characteristics, and autogenous strains for sealed concrete specimens are shown in Tables E to L.

- Table E Class E-1 concrete stored at 73°F and stressed for 337 days starting at age 28 days.
- Table F Class E-1 concrete stored at 110°F and stressed for 337 days starting at age 28 days.
- Table G Class E-1 concrete stored at 73°F and stressed for 276 days starting at age 90 days.
- Table H Class E-1 concrete stored at 110°F and stressed for 276 days starting at age 90 days.
- Table I Class E-1 concrete stored at 73°F and stressed for 185 days starting at age 180 days.
- Table J Class E-1 concrete stored at 110°F and stressed for 185 days starting at age 180 days.
- Table K Class E-1 concrete stored at 73°F and stressed for 42 days starting at age 365 days.
- Table L Class E-1 concrete stored at 110°F and stressed for 42 days starting at age 365 days.

In the above tables, the sustained modulus of elasticity was computed by dividing the applied stress of 2100 psi by the sum of the elastic, creep, and autogenous strains. The autogenous strain values shown are based on a zero value at time of full load. The data for creep plus autogenous strains, creep strains, and creep strains per psi of stress starts after full load was applied.

Elastic plus creep plus autogenous strains, creep plus autogenous strains, and creep strains versus log of time plus one day for the average of two sealed concrete specimens are all plotted and shown in Figs. 1-10.

- Fig. 1 Class E-1 concrete stressed at age 28 days and stored at 73°F.
- Fig. 2 Class E-1 concrete stressed at age 90 days and stored at 73 °F.
- Fig. 3 Class E-1 concrete stressed at age 180 days and stored at 73°F.
- Fig. 4 Class E-1 concrete stressed at age 365 days and stored at 73°F.

- Fig. 5 Class E-1 concrete stressed at age 28 days and stored at 110°F.
- Fig. 6 Class E-1 concrete stressed at age 90 days and stored at 110°F.
- Fig. 7 Class E-1 concrete stressed at age 180 days and stored at 110°F.
- Fig. 8 Class E-1 concrete stressed at age 365 days and stored at 110°F.

Elastic plus creep plus autogenous strains are plotted versus time for the average of two sealed concrete specimens in Figures 9 and 10.

- Fig. 9 Class E-1 concrete stressed at ages 28, 90, 180 days and stored at 73°F.
- Fig. 10 Class E-1 concrete stressed at ages 28, 90, 180 days and stored at 110°F.

The complete computer calculations for determining the strains due to loading the sealed concrete specimens are shown in Tables El & E2 to L1 & L2.

- Tables E1 & E2 Class E-1 concrete stressed at age 28 days and stored at 73°F.
- Tables F1 & F2 Class E-1 concrete stressed at age 28 days and stored at 110°F.
- Tables G1 & G2 Class E-1 concrete stressed at age 90 days and stored at 73°F.
- Tables H1 & H2 Class E-1 concrete stressed at age 90 days and stored at 110°F.
- Tables I1 & I2 Class E-1 concrete stressed at age 180 days and stored at 73°F.
- Tables J1 & J2 Class E-1 concrete stressed at age 180 days and stored at 110°F.
- Tables K1 & K2 Class E-1 concrete stressed at age 365 days and stored at 73°F.
- Tables L1 & L2 Class E-1 concrete stressed at age 365 days and stored at 110°F.

The complete computer calculations for determining the autogenous strains are shown in Tables M1 & M2 to N1 & N2.

Tables M1 & M2 - Class E-1 concrete stored at 73°F.

Tables N1 & N2 - Class E-1 concrete stored at 110°F.

7.0 COMMENTS

- 7.1 Bechtel specifications for slump are given for field conditions measured at point and time of placement. Clarification is needed as to what procedure should be followed in the laboratory to measure the desired slump. For the mixes made at Berkeley, slump was measured three minutes and eight minutes after end of mixing.
- 7.2 All work was performed in accordance with the "Quality Assurance Program" submitted prior to the start of testing.
- 7.3 In Table A of Progress Report No. 2, the modulus of elasticity and Poisson's ratio at age 180 days are shown as 6.42×10^6 psi and 0.24 respectively. These seem to be too large when comparing to the values at ages 90 and 365 days shown in Table D of the final report. Rechecking the calibration on the XYY recorder the value at modulus of elasticity and Poisson's ratio at age 180 days should be 6.24×10^6 psi and 0.21 respectively.

TABLE A

CALLAWAY, UNION ELECTRIC COMPANY, UNIT #1, POST TENSIONED REACTOR BUILDING

Ma	terial		Source
	Cement:		Alpha Portland Cement Co., Type II
	Sand:		Callaway County Sand Co., Callaway County, Missouri
	3/4-in. A	ggregate:	Auxvasse Quarry (crushed limestone)

WRA Admixture: Sika Plastocrete 161-Type A
AEA Admixture: Sika AER CC-135

Specifications

Compressive Strength: 6000 psi at 90 days

Slump:

Working limit at point
of placement:

Inadvertency margin:

Rejection limit:

3 inches - Mix E-1
2 inches - Mix E-1
5 inches - Mix E-1

Air: 3 to 6 percent Temperature: 73°F ± 3°F

Weights (SSD) for one cubic yard of concrete (as per letter from Pittsburgh Testing Laboratory dated August 10, 1976)

E-1 Mix No. 3/4-in.Maximum Size Aggregate: 634 Cement, 1bs: 232 Water, 1bs: 1466 Sand, 1bs: 1662 3/4-in. Aggregate, lbs: 31.7 WRA, fl. oz: 1.86 AEA, fl. oz:

TABLE B

CALLAWAY, UNION ELECTRIC COMPANY, UNIT #1, POST TENSIONED REACTOR BUILDING

Bulk Specific Gravity & Absorption Capacity

Aggregate	Bulk Specific Gravity (Saturated Surface Dry)	Absorption Capacity percent (Berkeley)
Sand	2.63	0.32
3/4 in. Aggregate	2.69	0.77

Note: Aggregates not initially oven dried in the determination of these values.

TABLE C

CASTING DATA FOR MIX E-1

Date	Sept. 8, 1976	Sept.	9, 1976	
Specimens Cast	4 - 6×16-in. creep specs. 6 - 6×12-in. cylinders 1 - 8-1/2×17- in. diffusiv- ity cylinder 1 - 8×16-in. specific heat cylinder	8 - 6×16-in. creep specs. 6 - 6×12-in. cylinders	6 - 6×16-in. creep specs. 6 - 6×12-in. cylinders 1 - 8-1/2×17- in. diffusiv- ity cylinder 1 - 8×16-in. specific heat specimen	
Batch No.	4	5	6	Avg.
Batch Size, cu. ft. Cement, pcy	3.8	3.8	3.8	3.8
	648	639	641	643
Water, pcy Sand, pcy (SSD)	237	234	234	235
	1497	1476	1481	1485
3/4-in. Aggregate, pcy, SSD AER, oz/cu. yd.	1697	1673	1679	1683
	1.89	1.86	1.89	1.88
WRA, oz/cu. yd.	32.4	31.9	32.0	32.1
Unit Wt., pcf	151	149	149	150
1st Slump, in.(a) 2nd Slump, in.(b)	1-1/2	1-1/2	1-1/2	1-1/2
	1-1/4	1-1/2	1-1/2	1-1/2
	3.1	3.3	2.7	3.0
Air, % by volume Temp., °F W/C Ratio by wt.	74	74	75	74
	0.366	0.366	0.365	0.366

⁽a) First slump was taken three minutes after end of mixing.

⁽b) Second slump was taken eight minutes after end of mixing.

TABLE D

MECHANICAL AND THERMAL PROPERTIES

Property *	Age, days	Class E-1
Compressive Strength, psi	7 28 90 180 365	5990 7600 8540 9180 9430
Poisson's Ratio	7 28 90 180 365	0.21 0.21 0.18 -0.24- 0.21 0.21
Modulus of Elasticity, (psi × 10 ⁶)	7 28 90 180 365	5.20 5.63 5.65 -6-42- 6.24 6.25
Linear Thermal Expansion, microstrain/°F	28 180 365	4.2 4.6 4.9

^{*}All concrete specimens were sealed up to and during testing.

TABLE E

AVERACE ELASTIC, CREEP AND AUTCGENOUS STRAINS UNION ELECTRIC OPTION 1 CLASS E-1 ES7414 (SPECIMEN: SEALED 6 BY 16 IN. CONCRETE CYL.)

AGE OF LCACING : 28 DAYS
TEST TEMPERTURE : 73 DEG. F.
ULT. STR. : 7600. PSI
APPLIED TEST STRESS : 2100. PSI
PER. ULT. STR. APPLIED: 27.6 PERCENT
METER NUMEERS

ALTDGENDUS : 73-10 AND 73-11 CREEP : 73-08 AND 73-09

*****	*******		-	CRESTRAIN-		
TIME	SUSTAINED 1	*ELASTIC,	* CREEP	•	•	•
UNDER	*MCDULUS CF	• CREEP	* PLUS	*	\$	
STRESS,	*ELASTICITY	PLUS	* AUTOG-	# ALTEG-	CREEF	*SPECIFIC
DAYS	# MPST	AUTCG-	* ENCUS	* ENOUS	*	* CREEF
	# (A) ³	* ENGUS	*	•	•	* (B)
*****	*******	******	******	******	******	****
00C7		0				
.00CC	E.E7	-377	0	0	0	0•
-0028	€.30	-396	-18	0	-18	0086
.G063	5.25	-400	-22	0	-22	01C5
-0201	5.16	-407	-29	0	-29	0138
.0896	5.02	-418	-41	0	-41	0155
-3049	4.86	-432	-55	0	-55	0262
1.2597	4.63	-454	-76	-1	-75	0357
2.1	4.53	-464	-86	0	-66	0410
3.1	4.42	-475	-97	– 1	-96	0457
4-0	4.32	-486	-108	-1	-107	0510
5.1	4.26	-453	-116	-1	-115	0548
6.1	4.22	-498	-121	-2	-119	0567
e.2	4.11	-511	-134	-3	-131	0624
13.2	3.93	-534	-156	-4	-152	0724
14.1	3.90	-538	-161	-4	-157	0748
21.0	2.76	-555	-181	-6	-175	0833
28 - 1	3.66	-574	-197	-9	-166	0895
43.3	3.45	-608	-231	-19	-212	1010
77.0	3.24	-648	-270	-30	-240	1143
68.1	3.17	-662	-284	-33	-251	1195
59.1	2.13	-67C	-293	-33	-260	1238
104-1	3.11	-675	-297	-33	-264	1257
119.0	3.G7	-684	-307	-32	-275	1310
121.0	3.06	-686	-308	-32	-276	1314
138.0	3.03	-693	-315	-33	-282	1343
145.0	3.C2	-696	-318	-30	-269	1371
160.3	3.00	-699	-322	-32	-290	1361
181.2	2.91	-721	-344	-32	-312	1486
201-1	2.88	-729	-352	-33	-319	1519
214.2	2.86	-734	-356	-34	-322	1533
229.0	2.85	-737	-359	-33	-326	1552
253.0	2.83	-743	-366	-32	-334	159C
272.1	2.80	-745	-372	-31	-341	1624
279.0	2-81	-748	-371	-30	-341	1624
284.C	2.61	-747	-370	-33	-337	1605
291.0	2.79	-753	-376	-34	-342	1625
299.0	2.78	-755	-378	-35	-343	1633
319.0	2.76	-761	-383	-36	-347	1652
337.0	2.74	-766	-389	-38	-351	1671

⁽A) SUSTAINED MCDULUS OF ELASTIC = 2100. PSI DIVIDED BY SUM OF ELASTIC, CREEP, AND AUTOGENOUS STRAINS.

⁽E) SPECIFIC CREEP = CREEP STHAIN DIVIDED BY 2100. PSI

TABLE F

AVERAGE ELASTIC. CREEP AND ALTCGENCUS STRAINS UNION ELECTRIC OPTION 1 CLASS E-1 ES7414 (SPECIMEN: SEALED 6 BY 16 IN. CONCRETE CYL.)

DAYS : : 28 : 110 AGE CF LCADING TEST TEMPERTURE DEG. F. : 7600. PSI ULT. STR. APPLIED TEST STRESS : 2100. PSI PER. LLT. STR. APPLIED: 27.6 PERCENT METER NUMBERS

AUTOGENOUS : 11-08 AND 11-09 : 11-06 AND 11-07 CREEP

*********** --MICRESTRAIN--TIME *SUSTAINED *ELASTIC, * CREEP * * UNDER *MODULUS CF* CREEP * PLUS * * * * *

STRESS,*ELASTICITY* PLUS * AUTOG- * CREEP *SPECIFIC

DAYS * MFSI * AUTOG- * ENOUS * ENOUS * CREEF

* (A) * ENOUS * * * * (B) -.OCO7 0 5-19 -405
 E-19
 -405
 0
 0

 E-15
 -408
 -3
 0
 -3

 E-08
 -413
 -7
 0
 -7

 4.95
 -424
 -19
 0
 -19

 4.86
 -432
 -27
 0
 -27

 4.61
 -456
 -51
 -1
 -50

 4.26
 -493
 -88
 -4
 -84

 4.11
 -511
 -105
 -5
 -100

 3.98
 -527
 -122
 -6
 -116

 3.90
 -539
 -133
 -8
 -125

 3.83
 -549
 -144
 -9
 -135

 3.76
 -558
 -152
 -11
 -141

 3.63
 -578
 -172
 -14
 -158

 3.44
 -610
 -204
 -20
 -184

 3.25
 -646
 -241
 -27
 -214
 0 -0000 0 0 .002E --0014 .0063 -.0033 .0201 -. 005C 4.26 --0129 .CE35 .2688 --0400 1.2236 2.0 -.047£ -116 -.0552 3.0 4.0 -.0595 5 - 1 -- 0643 6.0 -.0671 --0752 8-1 14.1 -.087€ 3.25 -646 -27 21.0 -241 -z, -31 -214 -.1019 3.12 -674 -268 2.95 -711 -305 28 . 1 -237 -.1129 -32 43.2 -273 --1300 2.79 -752 -347 -774 -368 -46 62.7 -301 --1433 -774 -52 74.2 .2.71 -316 --1505 -7.76 -370 77.0 2-71 -317 --151C -794 88.1 2.64 -389 -58 -33t --1576 2.60 -807 -62 95.2 -402 -340 --1615 2.58 -409 -423 105.1 -814 -64 -345 -- 1643 -829 119.0 2.53 -67 -356 --1695 2.53 -0---830 -424 -67 -357 120.5 --170C 2.47 -849 -443 -860 -455 -870 -465 -443 -74 137.9 -369 --1757 148.5 2.44 -77 -378 --1866 -62 2-41 -383 160.3 --1824 -879 -473 2.39 181.2 -.1895 -75 -358 -85 -492 -857 201.0 2.34 -407 --1938 -907 -501 -919 -514 214-2 2.32 -412 -.1962 2.29 229.0 -64 -420 --2000 253.0 -531 -100 2.24 -936 -431 --2052 -947 -541 -102 -947 -546 -104 -439 272.1 2.22 -,2050 279.0 2.21 -442 -.21CE 2.18 -963 -558 -108 -450 291.0 -.2143 -.2167 -969 -564 -109 -455 302-1 2 - 17 -575 -980 -113 -462 -.22CC 318.5 2-14 -351 -585 -115 -470 -.2238 336.9 2.12

⁽A) SUSTAINED MODULUS OF FLASTIC = 2100. PSI DIVIDED BY SUM OF ELASTIC, CREEP, AND AUTOGENOUS STRAINS.
(B) SPECIFIC CREEP = CREEP STRAIN DIVIDED BY 2100. PSI

TABLE G

AVERAGE ELASTIC. CREEP AND AUTOGENOUS STRAINS UNION ELECTRIC CPTION 1 CLASS E-1 ES7414 (SPECIMEN: SEALED 6 BY 16 IN. CONCRETE CYL.)

: 90 DAYS : 73 DEG. F. : 8540. PSI AGE OF LEADING TEST TEMPERTURE ULT. STR. APPLIED TEST STRESS : 2100. PSI PER. ULT. STR. APPLIED: 24.6 PERCENT PETER NUMBERS

: 73-10 AND 73-11 : 73-14 AND 73-15 AUTOGENOUS CREEP

						100				
*****	* * * * *	*****	* *				-	CSTRAIN		
TIPE				ELASTIC	• *		*		# -	
UNDER		PULUS (*	PLUS	*		•	*
STRESS	* ELA		Y*	PLLS	*	AUT CG-	.*		* CREEP	
DAYS	#	MPSI	*	AUTEG-	*	ENDUS	*	ENCUS	*	* CREEF
		(A)	*	ENOUS	*		*		•	* (B)
*******	****	*****	**	*****	* *	******	* * *	******	*****	*******
0007				0		_				
.0000		5.79		-363		0		0	0	0.
•c056		5.60		-375		-12		0	-12	0057
•0063		5.59		-376		-13		0	-13	0062
.0410		5.48		-383		-20		C	-20	0055
.0826		E.43		-387		-24		0	-24	0114
.207€		5.36		-392		-29		0	-29	0128
.3550		5.28		-398		-35		0	-35	0167
•9993		5.13		-409		-46		-1	-45	0214
1.7		4.58		-422		-58		-1	-57	0271
3.0		4.91		-428		-65		0	-65	031C
4.0		4.63		-435		-71		-1	-70	0333
5.0		4.79		-438		-75		-1	-74	0352
€-0		4.76		-441		-78		-2	-76	0362
7.0		4.74		-443		-80		-2	-78	0371
8.2		4.68		-449		-86		-3	-83	0395
13.3		4.55		-462		-99		-6	-93	0443
16.0		4.51		-466		-103		-7	-96	0457
27.1		4.27		-492		-128		-10	-118	05£2
38.2		4.15		-5C6		-143		-10	-133	0633
43-1		4.10		-512		-149		-10	-139	0662
56.1		3.98		-527		-164		-9	-155	0738
60.0		3.56		-530		-167		-9	-158	0752
77.0		3.86		-544		-180		-10	-170	081C
ee.0		3.86		-552		-188		-7	-181	0862
99.3		3.76		-558		-195		-9	-166	0866
107.1		3.72		-565		-201		- e	-193	0919
120.3		3.65		-575		-211		-9	-202	0962
140-1		2.58		-586		-223		-10	-213	1014
153.2		3.55		-592		-229		-11	-218	1038
168.1		3.54		-594		-231		-10	-221	1052
192.0		3.49		-602		-239		-9	-230	1095
211.1		3.44		-610		-247		-8	-239	1138
218.0		3.44		-611		-248		-7	-241	1148
223.0		3.41		-616		-252		-10	-242	1152
230.0		3.38		-622		-259		-11	-248	1161
238.0		3.35		-626		-263		-12	-251	1155
258.0		3.32		-633		-270		-13	-257	1224
276.C		3.26		-644		-280		-15	-265	1262
graduate and the second										

⁽A) SUSTAINED MODULUS OF ELASTIC = 2100. PSI DIVIDED BY SUM CF ELASTIC, CREEP, AND AUTOGENOUS STRAINS.
(B) SPECIFIC CREEP = CREEP STRAIN DIVIDED BY 2100. PSI

TABLE H

AVERAGE ELASTIC, CREEP AND AUTCGENOUS STRAINS UNIGN ELECTRIC CPTICN 1 CLASS E-1 ES7414 (SPECIMEN: SEALED 6 BY 16 IN. CCNCRETE CYL.)

AGE OF LCACING : 90 DAYS
TEST TEMPERTURE : 110 DEG. F.
ULT. STR. : 8540. PSI
APPLIED TEST STRESS : 2100. PSI
PER. ULT. STR. APPLIED: 24.6 PERCENT
METER NUMBERS

ALTCGENCUS : 11-08 AND 11-09 CREEP : 11-10 AND 11-11

******	********	*	N 1	CECSTRAIN		
TIME	*SUSTAINED	*ELASTIC		*	*	
UNDER	*MCCLLUS C		* PLUS	*	•	*
STRESS	.*ELASTICIT			# ALTOG-	* CREEP	*SPECIFIC
CAYS	# MFSI	* AUTEG-			*	* CREEP
	# (A)	# ENDUS			*	¢ (B)
*******	********	*******	******	*******	******	******
0007		0				
-0C0C	5.57	-352	0	0	0	0.
.0028	5.69	-369	-17	o	-17	0081
£300.	5.63	-373	-21	Ö	-21	0100
-041C	5.40	-389	-37	Ö	-37	0176
.0826	E-30	-396	-44	ō	-44	0210
.3361	5-10	-412	-60	0	-60	0286
.9993	4.90	-429	-77	-2	-75	~.0357
2.2	4.75	-442	-90	-2	-88	0419
4-0	4.48	-469	-117		-113	0538
5.0	4.39	-478	-126	-4	-122	0581
6.C	4.33	-485	-133	-5	-128	061C
13.3	4-14	-507	-155	-8	-147	0700
16.C	4.08	-515	-163	-9	-154	0733
27.1	3.83	-549	-197	-14	-183	0871
38.2	3.68	-571	-219	-1e	-201	0957
44.1	3.61	-582	-230	-20	-210	1000
58-1	3.48	-603	-251	-23	-228	1086
60.0	3.48	-604	-252	-23	-229	105C
77.G	3.34	-628	-276	-30	-246	1171
88.0	3.27	-642	-290	-33	-257	1224
99.3	3.22	-652	-300	-38	-262	1248
107.1	3.17	-662	-310	-39	-271	1250
120.3	3.16	-664	-312	-31	-281	1338
140-1	3.C7	-685	-333	-41	-292	1390
153.2	3-01	-697	-345	-45	-300	1429
168.1	2.55	-711	-359	-50	-309	1471
192.0	2.88	-730	-378	-56	-322	1533
211.1	2.83	-742	-390	-58	-332	1561
218.0	2.81	-748	-396	-60	-336	16C0
230.0	2.76	-760	-408	-64	-344	1638
241.1	2.74	-766	-414	-65	-349	1662
258.0	2.70	-778	-426	-69	-357	1700
276.C	2.65	-791	-439	-71	-368	1752
	INED MEDULU				ICED BY	
	TIC, CREEP					

⁽B) SPECIFIC CREEP = CREEP STRAIN DIVIDED BY 2100. PSI

TABLE I

AVERAGE ELASTIC, CREEP AND AUTOGENOUS STRAINS UNION ELECTRIC OPTION 1 CLASS E-1 ES7414 (SPECIMEN: SEALED 6 BY 16 IN. CONCRETE CYL.)

AGE CF LOADING : 180 DAYS
TEST TEMPERTURE : 73 DEG. F.
ULT. STR. : 9180. PSI
APPLIED TEST STRESS : 2100. PSI
PER. ULT. STR. APPLIED: 22.9 PERCENT
METER NUMBERS

ALTCGENCUS : 73-10 AND 73-11 CREEP : 73-16 AND 73-17

********** ----MICROSTRAIN---*SUSTAINED *ELASTIC * CREEP * TIME UNDER *MCDULUS CF* CREEP * PLUS * STRESS, *ELASTICITY* PLUS * AUTOG- * AUTOG- * CREEP *SPECIFIC MFSI * AUTCG- * ENDUS * ENCUS * DAYS * * CREEP * (A) * ENDUS * * (B) ********************* --0007 0 -CCOC 6.14 -342 0 0 0 .0028 5.80 -362 -20 -20 0 -.0055 -00E3 5.79 -363 -20 0 -20 --0055 .0618 5.72 -367 -25 0 -25 -.0119 .0813 5.72 -367 -25 0 -25 -.0119 .14C3 5.71 -368 -26 0 -26 -.0124 -37 1.1021 5.54 -379 -1 -36 -.0171 2.1 5.41 -388 -46 0 -46 -.0219 3.1 5.36 -392 -50 -1 -49 -.0233 3.9 5.29 -397 -54 -1 -53 -.0252 5.0 5.25 -400 -58 -1 -57 --0271 7.0 5.19 -405 -62 0 -62 -.0295 5.15 8.1 -408 -65 -2 -.03CC -63 15.5 4.56 -423 -81 -1 -60 -.0361 29.1 4.72 -445 -103 -2 -101-.04E1 48.5 4.54 -463 -120 -3 -117 -.0557 62.0 4.44 -473 -130 -4 -126 -.0600 4.38 76.8 -480 -138 -3 -135 -.0643 -452 -149 100.E 4.27 -2 -147 -. 07CC -159 119.9 4.18 -5C2 -1 -158 -.0752 126.8 4.17 -504 -162 0 -162 --0771 131.8 4.13 -509 -166 -3 -163 -.0776 138.8 4.09 -514 -172 -4 -168 -- 08CC 146.8 4 . C5 -519 -5 -171-176-.0814 166.8 3.98 -527 -184-6 -178 -- 084E 184.8 3.92 -536 -194-8 -186 -.0886

⁽A) SUSTAINED MODULUS OF ELASTIC = 2100. PSI DIVICED BY SUM OF ELASTIC, CREEP, AND AUTOGENOUS STRAINS.

⁽B) SPECIFIC CREEP = CREEP STRAIN DIVIDED BY 2100. PSI

TABLE J

AVERAGE ELASTIC, CREEP AND AUTCGENOUS STRAINS UNION ELECTRIC OPTION 1 CLASS E-1 ES7414 (SPECIMEN: SEALED 6 BY 16 IN. CONCRETE CYL.)

AGE CF LCADING 180 DAYS TEST TEMPERTURE 110 DEG. F. ULT. STR. : 9180. PSI APPLIED TEST STRESS : 2100. PSI PER. ULT. STR. APPLIED: 22.9 PERCENT METER NUMBERS AUTOGENOUS : 11-08 AND 11-09 CREEP 11-12 AND 11 - 13

\$4\$\$\$\$\$\$\$\$\$\$\$\$\$\$\$\$\$\$\$ *SUSTAINED *ELASTIC, * CREEP * TIME * UNDER *MCCULUS CF* CREEP * PLUS * STRESS, *ELASTICITY* PLUS * AUTOG- * AUTOG- * CREEP *SPECIFIC DAYS * MPSI * AUTOG- * ENDUS * ENDUS * * CKEEF * (A) * ENGUS * * * (B) *************** --0007 0 -CCCO E . 33 -332 0 0 0 0 . .0028 6.29 -334 -2 0 -2 -. 001C .0063 6.19 -339 -7 0 -7 -.0033 -351 .0403 5.58 -19 0 -19 -.0050 5.88 .0882 -357 -25 0 -25 -.0119 .1201 5.83 -360 -28 0 -28 -.0133 1.0951 5.43 -327 -55 -1 -54 -.0257 2.1 5.28 -398 -66 -2 -64 -.0305 3.1 5.17 -406 -74 -3 -71-.0338 3.9 5.10 -412 -80 -3 -77 -.0367 5.0 5.02 -418 -86 -3 -83 --0395 -95 6.9 4.92 -427 -3 -92 -.0438 -432 8.1 4.86 -100 -5 -95 --0452 15.9 4.59 -458 -126 -6 -120 -.0571 29.0 4.40 -477 -145 -.07CC 2 -14748.9 4.13 -508 -176-8 -168 -.0800 62 . C 4.00 -525 -193-12 -181 -.0862 76.8 -544 3.86 -212 -17 -195 -.0929 100.8 3.69 -569 -237 -23 -214 --1019 119.5 3.60 -584 -252 -25 -227 --10E1 3.55 -591 126.8 -259 -27 -232 -.11C5 138.8 3.48 -604 -272 -31 -241 -.114E 149.9 3.43 -612 -280 -32 -248 -.1181 3.36 -625 166.8 -293 -257 -36 --1224 184.8 3.29 -639 -307 -38 -269 -.1281

⁽A) SUSTAINED MODULUS OF ELASTIC = 2100. PSI DIVIDED BY SUM OF ELASTIC, CREEP, AND AUTOGENOUS STRAINS.

⁽B) SPECIFIC CREEP = CREEP STRAIN DIVIDED BY 2100 PSI

TABLE K

AVERAGE ELASTIC, CREEP AND AUTCGENCUS STRAINS UNION ELECTRIC CPTION 1 CLASS E-1 ES7414 (SPECIMEN: SEALED 6 BY 16 IN. CONCRETE CYL.)

AGE OF LEADING 365 DAYS : 73 TEST TEMPERTURE DEG. F. ULT. STR. : 9430. PSI APPLIED TEST STRESS : 2100. PSI 22.3 PERCENT PER. ULT. STR. APPLIED: METER NUMBERS

ALTOGENOUS 8 73-10 AND 73-11 : 73-10 AND 73-11 CREEP

****	****	*** *			-MICRES	STRAIN-		
TINE	#SUSTAI	NED #EL	ASTIC,	# CREE	₽ *	*	•	*
UNDER	*MCDULU			* PLU			raile see a ling.	*
STRESS	, *ELASTI	CITY*	FLUS	# AUTO	G- + AL	TOG- *	CREEP	*SPECIFIC
CAYS	# MFS	I # A	UT DG-	* ENOU	S + EN	OUS *		* CREEF
	4 (A)	* E	NOLS	*	*	*		* (B)
*****	******	*****	****	****	****	****	******	****
0007			0					
.OCOC	6.1	4	-342	. 0)	0	0	0.
.0278	5.7	5	-365	-23	l· .	0	-23	011C
E130.	5.6	8	-370	-28		0	-28	0133
.2458	5.5	S	-376	-34	, · · · · · · · · · · · · · · · · · · ·	0	-34	0162
1.0764	5.3	2	-395	-53	\$ [*] . *	1	-54	0257
2.0	5.3	5	-392	-50	ľ	1	-51	0243
3.1	5.29	9	-397	-55		1	-56	0267
4.0	5.2	5	-400	-58		1	-59	0261
5.0	5.14	9	-405	-63		1	-64	0305
6.0	5.2	2	-402	-60		1	-61	025C
14-0	4.9	5	-424	-82		1	-e3	0395
18.3	4.8	3	-430	-88		1	-89	0424
29.3	4.6	2 .	-445	-107		1	-108	0514
42.0	4.6	7.	-450	-108		1	-109	0519

- (A) SUSTAINED MCDULUS OF ELASTIC = 2100. PSI DIVICED BY SUM CF ELASTIC, CREEP, AND AUTOGENOUS STRAINS.
- (B) SPECIFIC CREEP = CREEP STRAIN DIVIDED BY 2100. PSI

TABLE L

AVERAGE ELASTIC, CREEP AND AUTOGENOUS STRAINS UNION ELECTRIC CPTION 1 CLASS E-1 ES7414 (SPECIMEN: SEALED 6 BY 16 IN. CONCRETE CYL.)

: 365 DAYS AGE OF LOADING TEST TEMPERTURE : 110 DEG. F. : 9430. PSI ULT. STR. APPLIED TEST STRESS : 2100. PSI PER. ULT. STR. APPLIED: 22.3 PERCENT

METER NUMBERS

AUTOGENOUS : 11-08 AND 11-09 CREEP : 11-08 AND 11-09

*****	*******		×	ICFCSTRAIN		
TIME	*SUSTAINED	*ELASTIC,	CREEP	4	*	*
UNDER	#MCDULUS CF	* CREEP 4	PLUS	*	*	
STRESS	, *ELASTICITY	* FLLS	AUTCG-	* AUTCG-	* CREEP	*SPECIFIC
DAYS	* MFSI	* AUTCG- 4	ENCUS	* ENCUS	*	* CREEF
	* (A)	* ENDLS 4	k ang ing panggarangan	*	*	* (B)
*****	*******	******	*****	******	*****	*****
CCC7		0				
.0000	6.25	-336	0	0	0	0.
.0111	6.07	-346	-9	0	-9	0043
.075C	5.80	-362	-26	0	-26	0124
•239€	5.61	-374	-37	0	-37	017€
1.0118	5.30	-396	-60	1	-61	0250
1.0840	5.26	-399	-62	1	-63	0300
2.0	5.17	-406	-70	1	-71	35E0
3.1	5.07	-414	-78	1	-79	0376
4.0	5.10	-412	-76	1	-77	0367
5.0	5.08	-413	-76	1	-77	0367
6.0	4.92	-427	-90	1	-91	0423
14.0	4.71	-446	-109	1	-110	0524
18.3	4.59	-458	-121	1	-122	0581
29.3	4.41	-476	-140	1	-141	0671
42.0	4.33	-485	-149	1	-150	0714

- (A) SUSTAINED MCDULUS OF ELASTIC = 2100. PSI DIVICED BY SUM OF ELASTIC, CREEP, AND AUTOGENOUS STRAINS.
- (B) SPECIFIC CREEP = CREEP STRAIN DIVIDED BY 2100. FSI

TABLE E1

ELASTIC AND CREEP STRAINS (NOT CORRECTED FOR AUTOGENOUS STRAINS) UNION ELECTRIC OPTION 1 CLASS E-1 ES7414 (SPECIMEN: SEALED 6 BY 16 IN- CONCRETE CYL.)

CALIBRATION CONSTANTS:

METER RESISTANCE AT 0.0 DEGREES F. = 48.22 CHMS

TEMP. CALIBRATION CONSTANT = 10.83 F/CHM CHANGE IN RESIST.

STRAIN CALIBRATION CONSTANT = 8.87 MICROVOLTS/VOLT/MICROSTRAIN

CALIBRATED RANGE = 11100 TO -10100 MICROVOLTS/VOLT

METER COEFF. OF THERMAL EXPANSION = 6.7 MICROSTRAIN/DEGREE F.

CONCRETE COEFF. OF THERMAL EXPANSION = 4.6 MICROSTRAIN/DEGREE F.

STRAIN INCREMENT FACTOR = 0 PERCENT PER ULT. STR. APPLIED: 27.6 PERCENT

NOTE: FOR MODE 4 OR 5 VOLTS, AND MODE 3 MICHOVOLTS -- THE ERIDGE VOLTAGE WAS 2.00000 VOLTS.

*******		******	********	********	*******	*******				PICECSTRAI		
DATE			DAYS 4									ECTED
	*	* DAYS	. LADER 4		* CHMS	* DEGREE				*ELASTIC*	CREE	
*******	*	*	· LCAD 4	VOLTS	•	• F.	* VOLTS	*VOLTS	PDAY CHE	* +CREEP*		* CREEP
* 9 -9-76	1000	0	SPECIPEN		********	*********	******	********	******	*********	****	********
9-10-76	1430	1.2	SPECIPEN	36586	55-2€	34 7						
9-16-76	1400	7.2		37166	55.03	76.3	12081		0			
9-21-76	1145	12.1		37186	55.01	73.8 73.5	11766	-315 -587	-22 -38			
9-23-76	915	14.0		37177	55.02	73.6	11428					
10 -1-76	930	22.0		37171	55.02	73.7		-653 -717	-41 -45			
*10 -7-76	855	28.0	LCADING				11304		5			
10 -7-76	855	28.0	0007	37167	55.03	73.7	11332	-749	-46	0		
*10 -7-76	856	28.0		FULLY LO				100 FSI	0	•		
10 -7-76	856	28.0	•0000	37167	55.03	73.7	4710	-7371	-420	-374	0	0.
10 -7-76	900	26.0	-0028	37160	E5.04	73.8	4367	-7714	-439	-393	-15	60905
10 -7-76	905	28.0	.0063	37157	55.04	73.9	4300	-7781	-443	-397	-23	01095
10 -7-76	925	26.0	-0201	37157	55.04	73.9	4180	-7501	-449	-403	-29	C1381
10 -7-76	1105	28.0	.089€	37131	55.07	74.2	3985	-8096	-460	-414	-40	01905
10 -7-76	1615	28.3	.3049	37141	55.06	74-1	3745	-8336	-473	-427	-53	02524
10 -8-76	1510	29.2	1.2597	37156	55.04	73.9	3389	-8692	-494	-448	-74	03524
10 -9-76	1010	30.0	2-1	37156	55.04	73.9	3215	-8866	-504	-458	-84	04000
10-10-76	1145	31.1	3.1	37176	55.02	73.6	3046	-9035	-514	-468	-94	C447E
10-11-76	950	32.0	4.0	37176	55.02	73.6	2847	-9234	-525	-479	-105	05000
10-12-76	1130	33-1	5-1	37172	55.02	73.7	2710	-9371	-533	-487	-113	05381
10-13-76	1045	34.0	6.1	37166	55.03	73.8	2620	-9461	-538		-118	05619
10-15-76	1320	36.1	8.2	37171	55.02	73.7	2376	-9705	-551	-505	-131	06238
10-20-76	1400	41.2	13.2	~.37171	55.02	73.7	1967	-10114	-574		-154	07333
10-21-76	1145	42.1	14.1	37186	55.01	73.5	1892	-10189	-579		-159	07571
10-28-76	930	49.0	21.0	37158	55.04	73.9	1512	-10569	-600		-180	CE571
11 -4-76	1100	56.0	28.1	37175	55.02	73.6	1240	-10641	-616	-570	-196	09333
11-19-76	1500	71.2	E.E4	37190	55.00	73.4	680	-11401	-648	-602	-226	10857
12-23-76	845	104.9	77.0	37222	54.96	73-0	7	-12074	-686	-640	-266	12667
1 -3-77	1145	116-1	88.1	37242	54.93	72.7	-184	-12265	-698	-652	-278	13238
1-14-77	1200	127.1	99.1	37217	54.97	73.1	-314	-12395	-704	-658	-284	13524
1-19-77	1050	132.0	104.1	37211	54.97	73.1	-376	-12457	-708	-662	-268	13714
2 -3-77	945	147.0	119.0	37199	54.99	73.3	-536	-12617	-716	-670	-296	14095
2 -5-77	826	148.9	121.0	37208	54.98	73.2	-549	-12630	-717	-671	-257	14143
2-22-77	905	166.0	138.0	37196	54.99	73.3	-670	-12751	-724	-678	-304	14476
3 -5-77	747	176.9	149.0	37158	55.04	73.9	-740	-12821	-727	-681	-307	14615
3-16-77	1547	186.2	166.3	37171	55.02	73.7	-794	-12675	-730	-684	-310	14762
4 -6-77	1446	209.2	181.2	37161	55.04	73.8	-1109	-13190	-748		-326	15615
4-26-77	1041	229.0	201-1	37165	55.03	73.8	-1219	-13300	-754		-334	15905
5 -9-77	1347	242.2	214.2	37173	55.02	73.7	-1280	-13361	-758		-338	16095
5-24-77 6-17-77	938 -856	257.0	229.0	37163	55.03	73.8	-1334	-13415	-760		-34C	1619C
7 -6-77	1056	281.0 300.0	253.0 272.1	37181 37148	55.01	73.5	-1447	-13528	-767		-347	16524
7-13-77	850	307.0	279.0	37165	55.05 55.03	74.0	-1561	-13642	-773		-353	16810
7-18-77	920	312.0	264.0	37122	55.03	73.8 74.2	-1541	-13622	-772		-352	16762
7-25-77	816	318.9	291.0	37140	55.06	74.1	-1544	-13625	-771		-351	16714
8 -2-77	842	326.9	299.0	37100	55.11	74.7	-1639 -1704	-13720 -13785	-777 -779		-357	1700C
8-22-77	808	346.9	319.0	37133	55.07	74.2	-1789	-13/85 -13E70	-779 -785		-359 -366	17095
9 -9-77	206	364.9	337.0	37156	55.04	73.9	-1865	-13546	-790		-365	17381
9 9 -9-77	812	364.9		(S) FULLY					-790	-744	-370	17619
9 -9-77	812	364.9		37162	55.04	73.8	3977	-8104	-461	-415	-41	
9 -9-77	820	364.9		37157	55.04	73.9	4087	-7994	-455	-409		
9 -9-77	1006	365.0		37151	55.05	74.0	4224	-7857	-447	-401	-35 -27	
9 -9-77	1316	365.1		37155	55.04	73.9	4287	-7794	-443	-397	-27	
9-10-77	815	365.9		37176	55.02	73.6	4412	-7669	-437	-391	-17	
9-11-77	1117	367.1		37181	55.01	73.6	4502	-7579	-432	-386	-12	
9-12-77	758	367.9		37186	55.00	73.5	4550	-7531	-429	-363	-9	
9-13-77	922	369.0		37176	55.02	73.6	4595	-7486	-427	-361	-7	
9-22-77	831	377.9		37188	55.00	73.5	4781	-7300	-416	-3e1 -370	-/	
10 -7-77	1639	393.3		37160	55.04	73.8	4876	-7205	-410	-370 -364	10	
10-20-77	926	406.0		37161	55.04	73.8	4951	-7130	-406	-360	14	
							-101		-400	-360	. 4	

MODULUS: LOADING

E= 5.6 AT AGE 20 DAYS (STRESS LEVEL 0 TC 2100 PSI)

NOTE: MINUS DAYS UNCER LOAD INDICATES SPECIMEN LOADING TIME PRICE TO FULL LOAD

TABLE E2

ELASTIC AND CREEP STRAINS (NCT CORRECTED FOR AUTOGENOUS STRAINS) UNION ELECTRIC OPTION 1 CLASS E-1 ES7414 (SPECIMEN: SEALED 6 BY 16 IN. CONCRETE CYL.)

CALIBRATICN CCNSTANTS:

METER RESISTANCE AT 0.0 DEGREES F. # 40.43 CHMS

TEMP. CALIBRATICN CCNSTANT # 10.79 F/Chm CHANGE IN RESIST.

STRAIN CALIBRATICN CCNSTANT # 8.77 PICRCVQLTS/VQLT/MICROSTRAIN

CALIBRATICN CCNSTANT # 11100 TO -10100 MICROVQLTS/VQLT

METER COEFF. OF THERMAL EXPANSION # 6.7 MICRCSTRAIN/DEGREE F.

CCNCRETE COEFF. OF THERMAL EXPANSION# 4.6 PICRCSTRAIN/DEGREE F.

STRAIN INCPEMENT FACTOR # 0 PERCENT

STRAIN INCPEMENT FACTOR # 0 PERCENT

STRAIN INCPEMENT FACTOR # 20 PERCENT

STRAIN INCPEMENT FACTOR # 20 PERCENT

STRAIN INCPEMENT FACTOR # 20 PERCENT

STRAIN STRAIN METER NO.: 957 73-09

AGE OF LCACING: 22 CAYS

AGE OF LCACING: 73 DEG. F.

LLT. STR. : 7600. PSI

APPLIED TEST STRESS : 2100. PSI

STRAIN INCPEMENT FACTOR # 0 PERCENT

NOTE: FOR MODE 4 OR 5 VOLTS, AND MODE 3 MICROVOLTS -- THE BRIDGE VOLTAGE WAS 2.00000 VOLTS.

And was been as as on the way of the contract of

DATE TIME COLD CO	*******		******	******	******	******	*******	*******	********		MICECSTRA	IA	
* OAYS * UNCEF * 0 FOR 5 * DEGRE * PICAG- WILLIAM STORY CASE * SECRETARY COLLEGE * SEC	DATE	# TIME	# AGE,			*RESIST.	* TEMP.	MODE 3	*CHANGE *	т	EMPERATUR	E COFFE	CTEC
9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9			* DAYS		4 DF 5	* CHMS							
***		•	•		VOLTS	•	• F.	* VOLTS					
9-10-76 1400 7.2						******	********	*****	*******	******	*******	******	*********
9-16-76 1400 7.2				SPECIPEN									
9-21-76 1145 12-1	,									. 0			
10 - 1-76 915 14.0 -3.6564 55.26 74.0 10.01 -676 -3.8								10809	-270	-19			
10 -7-76 855 22.0 LCADING EEGINS 10 -7-76 855 22.0 LCADING EEGINS 110 -7-76 855 22.0 LCADING EEGINS 110 -7-76 855 22.0 SFECIMEN FULLY LCADED, APPLIED TST STRESS 2100 FS1 110 -7-76 955 22.0 SFECIMEN FULLY LCADED, APPLIED TST STRESS 2100 FS1 110 -7-76 955 22.0 SFECIMEN FULLY LCADED, APPLIED TST STRESS 2100 FS1 110 -7-76 955 22.0 SFECIMEN FULLY LCADED, APPLIED TST STRESS 2100 FS1 110 -7-76 955 22.0 SFECIMEN FULLY LCADED, APPLIED TST STRESS 2100 FS1 110 -7-76 955 22.0 SFECIMEN FULLY LCADED, APPLIED TST STRESS 2100 FS1 110 -7-76 955 22.0 SFECIMEN FULLY LCADED, APPLIED TST STRESS 2100 FS1 110 -7-76 955 22.0 SFECIMEN FULLY LCADED, APPLIED TST STRESS 2100 FS1 110 -7-76 955 22.0 SFECIMEN FULLY LCADED, APPLIED TST STRESS 2100 FS1 110 -7-76 955 22.0 SFECIMEN FULLY LCADED, APPLIED TST STRESS 2100 FS1 110 -7-76 955 22.0 SFECIMEN FULLY LCADED, APPLIED TST STRESS 2100 FS1 110 -7-76 955 22.0 SFECIMEN FULLY LCADED, APPLIED TST STRESS 2100 FS1 110 -7-76 955 22.0 SFECIMEN FULLY LCADED, SFECIMEN FULLY LCADED, APPLIED TST STRESS 2100 FS1 110 -7-76 1105 22.0 SFECIMEN FULLY LCADED, SFECIMEN FULLY LCADED, APPLIED TST STRESS 2100 FS1 110 -7-76 1105 22.0 SFECIMEN FULLY LCADED, SFECIMEN FULLY LCADED, APPLIED TST STRESS 2100 FS1 110 -7-76 1105 22.0 SFECIMEN FULLY LCADED, SFECIMEN FULLY LCADED, APPLIED TST STRESS 2100 FS1 110 -7-76 1105 22.0 SFECIMEN FULLY LCADED, SFECIMEN FULLY LCADED, APPLIED TST STRESS 2100 FS1 110 -7-76 1105 22.0 SFECIMEN FULLY LCADED, SFECIMEN FULLY LCADED, APPLIED TST STRESS 2100 FS1 110 -7-76 1105 22.0 SFECIMEN FULLY LCADED, APPLIED TST STRESS 2100 FS1 110 -7-76 1105 22.0 SFECIMEN FULLY LCADED, APPLIED TST STRESS 2100 FS1 110 -7-76 1105 22.0 SFECIMEN FULLY LCADED, APPLIED TST STRESS 2100 FS1 110 -7-76 1105 22.0 SFECIMEN FULLY LCADED, APPLIED TST STRESS 2100 FS1 110 -7-76 1105 22.0 SFECIMEN FULLY LCADED, APPLIED TST STRESS 2100 FS1 110 -7-76 1105 22.0 SFECIMEN FULLY LCADED, APPLIED TST STRESS 2100 FS1 110 -7-76 1105 22.0 SFECIMEN FULLY LCADED, APPLIED TST STRESS 2100 FS1 110 -7-76 1105 22.0 SFECIMEN FULLY LCADED, APP									-520	-34			
10							74.0	10493	-586	-38			
10 -7-76						55.29	74.0	10401	-678	-43			
### PROPRIES \$20, \$20, \$36, \$36, \$40, \$36, \$40, \$40, \$40, \$40, \$40, \$40, \$40, \$40										100			
10 - 7-76										-45	0		
10 -7-76 900 28-0 .002836590 55.26 73.6 3300 -7:09 -444 -399 -1E00857 10 -7-76 905 28-0 .0021 -3.4590 55.26 73.6 3302 -7:07 -448 -403 -2201042 10 -7-76 1105 28-0 .005636606 55.26 73.6 3172 -7:007 -456 -411 -3001420 10 -7-76 1105 28-0 .005636506 55.26 73.9 2952 -8127 -488 -423 -423 -4202000 10 -7-76 1105 28-0 .005636506 55.26 73.9 2952 -8127 -488 -423 -423 -4202000 10 -7-76 1105 28-1 .0056736506 55.27 73.8 2692 -8387 -483 -438 -5702714 10 -8-70 1510 29-22 1.259735506 55.27 73.8 2692 -8387 -483 -438 -5702714 10 -8-70 1510 29-22 1.259735506 55.26 73.7 2299 -870 -805 -860 -75 -0.07742 10 -10-76 1105 30.2 1.2 1.2 1.2 1.2 1.2 1.2 1.2 1.2 1.2 1													
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10 -77-76 1105 28-0 .008632608 55.28 73.0 2952 -8127 -408 -423 -4202201 10 -77-76 1615 2263 .326532675 55.27 73.8 2692 -8127 -403 -432 -32 -4202201 10 -87-76 1615 2263 1.2567 -326586 55.28 73.7 2299 -8780 -805 -400 -7603762 10 -97-76 1010 30.0 2.1 -326586 55.28 73.7 2134 -6645 -515 -400 -7603762 10 -97-76 1010 30.0 2.1 -336586 55.28 73.7 2134 -6645 -515 -400 -7603762 10 -97-76 1105 31.1 3.1 -37008 55.23 73.4 1928 -9151 -527 -482 -1010810 10 -117-76 1145 31.1 3.1 -37008 55.23 73.4 1928 -9151 -527 -482 -1010810 10 -117-76 1135 33.0 -12 -37008 55.23 73.4 1928 -9151 -527 -482 -1010810 10 -117-76 1135 33.1 5.137008 55.23 73.4 1928 -9157 -550 -555 -500 -11905667 10 -10 -10 -10 -10 -10 -10 -10 -10 -10													
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9 -9-77 806 364-9 337.C37001 55.24 73.5 -3456 -14535 -834 -769 -40615425 9 -9-77 812 364-9 SPECIMEN(5) FULLY UNLOADEC, ZERO APPLIED TEST STRESS 9 -9-77 812 364-9 -36597 55.25 73.6 2198 -8681 -511 -466 -65 9 -9-77 820 364-9 -36590 55.25 73.6 2346 -8733 -503 -455 -77 9 -9-77 1006 365-036590 55.25 73.6 2518 -8561 -493 -448 -67 9 -9-77 1316 365-136590 55.25 73.6 2596 -8483 -489 -444 -63 9 -10-77 815 365-9 -37013 55.23 73.3 2766 -8213 -479 -434 -53 9 -11-77 1117 367-1 -37018 55.22 73.3 2866 -8213 -479 -434 -53 9 -12-77 758 367-9 -37021 55.22 73.3 2866 -8213 -474 -429 -48 9 -13-77 922 369.0 -37014 55.22 73.3 2672 -8100 -471 -226 -45 9 -13-77 92 369.0 -37014 55.22 73.3 2672 -8107 -468 -423 -42 9 -22-77 831 377-9 -37031 55.20 73.1 3212 -7667 -455 -410 -29 10 -7-77 1639 393.3 -37002 55.24 73.5 3374 -7705 -445 -400 -19	8-22-77	808	346.9	319.0	36575								
• 9 -9-77 812 364.9 SPECIMEN(S) FULLY UNLOADED; ZERO APPLIED TEST STRESS 9 -9-77 812 364.9 36597 55.25 73.6 2198 -8881 -511 -466 -85 9 -9-77 820 364.9 36599 55.25 73.6 2346 -8733 -503 -455 -77 9 -9-77 1006 365.0 36590 55.25 73.6 2516 -8561 -493 -448 -67 9 -9-77 1316 365.1 36992 55.25 73.6 2596 -8483 -489 -444 -63 9 -10-77 815 365.9 37013 55.23 73.3 2766 -8313 -479 -434 -53 9 -11-77 1117 367.1 37018 55.22 73.3 2866 -8213 -474 -429 -48 9 -12-77 758 367.9 37021 55.22 73.3 2866 -8213 -474 -426 -45 9 -13-77 922 369.0 37014 55.22 73.3 2572 <td>9 -9-77</td> <td>806</td> <td>364.9</td> <td>337.C</td> <td>37001</td> <td>55.24</td> <td>73.5</td> <td>-3456</td> <td>-14535</td> <td></td> <td></td> <td></td> <td></td>	9 -9-77	806	364.9	337.C	37001	55.24	73.5	-3456	-14535				
9 -9-77 812 364.936597 55.25 73.6 2198 -8881 -511 -466 -85 9 -9-77 820 364.936595 55.25 73.6 2346 -8733 -503 -455 -77 9 -9-77 1006 365.036590 55.25 73.6 2518 -8561 -493 -448 -67 9 -9-77 1316 365.136592 55.25 73.6 2518 -8661 -493 -448 -67 9-10-77 815 365.937013 55.23 73.3 2766 -8313 -479 -434 -63 9-11-77 1117 367.137018 55.22 73.3 2866 -8213 -474 -429 -48 9-12-77 758 367.937021 55.22 73.2 2919 -8160 -471 -425 -45 9-13-77 922 369.037014 55.22 73.3 2672 -8107 -468 -423 -42 9-22-77 831 377.937031 55.20 73.1 3212 -7667 -455 -410 -29 10 -7-77 1639 393.337002 55.24 73.5 3374 -7705 -445 -400 -19	9 -9-77	812	364.9	SPECIPEN									
9 -9-77 820 364.9 -36595 55.25 73.6 2346 -8733 -503 -455 -77 9 -9-77 1006 365.0 -36590 55.25 73.6 2518 -8561 -493 -448 -67 9 -9-77 1316 365.1 -36992 55.25 73.6 2518 -8661 -493 -448 -63 9-10-77 815 365.9 -37613 55.23 73.3 2766 -8313 -479 -434 -53 9-11-77 1117 367.1 -37618 55.22 73.3 2866 -8213 -474 -429 -48 9-12-77 758 367.9 -37621 55.22 73.2 2919 -8160 -471 -426 -45 9-13-77 922 369.0 -37614 55.22 73.3 2672 -8107 -468 -423 -42 9-22-77 831 377.9 -37631 55.20 73.1 3212 -7667 -455 -410 -29 10 -7-77 1639 393.3 -37602 55.24 73.5 3374 -7705 -445 -400 -19	9 -9-77									-511	-466	- 2 5	
9 -9-77 1006 365.0	9 -9-77	820	364.9		36 995	55.25							
9 -9-77 1316 365.1	9 -9-77	1006	365.0		36990								
9-10-77 815 365.937C13 55.23 73.3 2766 -8313 -479 -434 -53 9-11-77 1117 367.137C18 55.22 73.3 2866 -8213 -474 -429 -48 9-12-77 758 367.937C21 55.22 73.2 2919 -8160 -471 -426 -45 9-13-77 922 369.037C14 55.22 73.3 2972 -8107 -468 -423 -42 9-22-77 831 377.937C31 55.20 73.1 3212 -7667 -455 -410 -29 10 -7-77 1639 393.337C02 55.24 73.5 3374 -7705 -445 -400 -19	9 -9-77	1316	365.1										
9-11-77 1117 367-137018 55-22 73-3 2866 -8213 -474 -429 -48 9-12-77 758 367-937021 55-22 73-2 2919 -8160 -471 -426 -45 9-13-77 922 369-037014 55-22 73-3 2572 -8107 -468 -423 -42 9-22-77 831 377-937031 55-20 73-1 3212 -7867 -455 -410 -29 10 -7-77 1639 393-337002 55-24 73-5 3374 -7705 -445 -400 -19	9-10-77	815	365.9										
9-12-77 758 367-937021 55-22 73-2 2919 -8160 -471 -426 -45 9-13-77 922 369-037014 55-22 73-3 2972 -8107 -468 -423 -42 9-22-77 831 377-937031 55-20 73-1 3212 -7667 -455 -410 -29 10 -7-77 1639 393-337002 55-24 73-5 3374 -7705 -445 -400 -19	9-11-77	1117	367-1		37018	55.22							
9-13-77 922 369.037C14 55.22 73.3 2972 -8107 -468 -423 -42 9-22-77 831 377.937C31 55.20 73.1 3212 -7E67 -455 -410 -29 10 -7-77 1639 393.337C02 55.24 73.5 3374 -7705 -445 -400 -19	9-12-77	758	367.9		37621	55.22	73.2						
9-22-77 831 377-937031 55-20 73-1 3212 -7667 -455 -410 -29 10 -7-77 1639 393-337002 55-24 73-5 3374 -7705 -445 -400 -19	9-13-77	922	369.0		37014		73.3	2572	-8107				
10 -7-77 1639 393-337002 55-24 73-5 3374 -7705 -445 -400 -19	9-22-77	831	377.9		37031	55.20	73.1	3212	-7867	-455		-29	
10-20-77 926 406.036998 55.25 73.5 3486 -7593 -438 -393 -12			393.3			55.24	73.5	3374	-7705	-445	-400	-19	
	10-20-77	926	406.0		36998	55.25	73.5	3426	-7593	-438	-393	-12	

MODULUS: LOADING

E= 5.5 AT AGE 28 DAYS (STRESS LEVEL 0 TC 2100 PS1)

NOTE: MINUS DAYS UNDER LCAL INDICATES SPECIMEN LOACING TIME PRICE TO FULL LCAD

TABLE F1

ELASTIC AND CREEP STRAIRS (NOT CORRECTED FOR AUTOGENOUS STRAIRS) UNION ELECTRIC OPTION 1 CLASS E-1 ES7414 (SPECIMEN: SEALED 6 BY 16 IN. CONCRETE CYL.)

CALIBRATION CCNSTANTS:

METER RESISTANCE AT 0.0 DEGREES F. = 48.18 CHMS

TEMP. CALIBRATION CONSTANT = 10.84 F/OHM CHANGE TN RESIST. AGE OF LCACING : 28 DAYS

STRAIN CALIBRATION CONSTANT = 8.65 MICROVOLTS/VOLT/MICROSTRAIN

CALIBRATED RANGE = 11100 TC -10100 MICROVOLTS/VOLT

METER COFFF. OF THERMAL EXPANSION = 6.7 MICROSTRAIN/DEGREE F. ULT. STR. : 76CC. PSI

CONCRETE COEFF. OF THERMAL EXPANSION = 4.6 MICROSTRAIN/DEGREE F. APPLIED TEST STRESS : 2100 PSI

STRAIN INCREMENT FACTOR = 0 PERCENT PERCENT.

NOTE: FOR MCDE 4 CR 5 VCLTS, AND MODE 3 PICHOVOLTS -- THE BRIDGE VCLTAGE WAS 2.00000 VOLTS.

*******			*******			*******	******			PICECSTRA	[K	
DATE	* TIME	. AGE.	DAYS !					*CHANGE	тт	EMPERATURE	CCFFE	CTED
	.0	* DAYS	# UNDER	4 OF 5	# OHMS	* DEGREE	- MICRC-			PELASTIC		
	•	•	. LCAD .	VOLTS	•	. F.	• VCLTS	*VOLTS 4	DAY ONE	. +CREEP		• CREEP
********	******		******	********	*******	*******		*******	******	******	*****	*******
8 9 -9-76	1000	. 0	SPECIPE									
9-10-76	1430	1.2		37C28	55.21	76.2	7964	•	0			
9-16-76	1400	7-2	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	37201	54,-,95	73.8	7511	-453	-30			
9-21-76	1145	12-1		37226	54.95	73.4	7226	-738	-46			
9-23-76	915	14-0		37219	54.96	73.5	7167	-757	-50			
10 -1-76	930	22.0		34643	58.31	109.8	5776	-2166	-52			
#10 -7-76	947	28.0	LOADING				5491	-2473	_4.			
10 -7-76	947	26.0	0007	34596 FULLY LO	58.37	110-5			-67			
10 -7-76	948	28.0		34596	58.37	110.5	-1794	-9756	-478	-411	C	0.
10 -7-76	948	28.0	.0000 .0028	34596	58.37	110.5	-1864	-9828	-482	-415	-4	CC190
10 -7-76	952 957	28.0	.0063	34594	58.37	110.5	-1939	-9903	-486	-419	-e	0381
10 -7-76	1017	28.0	.0201	34604	58.36	110-4	-2144	-10108	-498	-431	-20	00552
10 -7-76	1105	28.0	-0535	34599	58.37	110.4	-2296	-10260	-507	-440	-25	01381
10 -7-76	1615	28.3	.2688	34578	58.39	110.7	-2736	-10700	-531	-464	-53	02524
10 -8-76	1510	29.2	1.2236	34583	58.39	110.7	-3408	-11272	-569	-502	-91	04333
10 -9-76	1025	30.0	2.0	34583	58.39	110-7	-3705	-11669	-586	-515	-100	05143
10-10-76	1045	31.0	3.C	34601	58.36	110-4	-4020	-11984	-604	-537	-126	06000
10-11-76	950	32-0	4-0	34601	58.36	110.4	-4239	-12203	-617	-650	-139	06615
10-12-76	1130	33.1	5.1	34622	58.34	110-1	-4424	-12388	-628	-561	-15C	07143
10-13-76	1045	34-0	6.0	34622	58.34	110-1	-4582	-12546	-637	-570	-155	07571
10-15-76	1320	36.1	6.1	34641	58.31	109-8	-4907	-12271	-655	-566	-177	08425
10-21-76	1210	42.1	14-1	34526	58.46	111.5	-5510	-13474	-686	-619	-208	09905
10-28-76	930	49.0	21.0	34547	58.44	111.2	-6083	-14647	-719	-652	-241	11476
11 -4-76	1110	56.0	20.1	34558	58.42	111-0	-6555	-14519	-746	-679	-268	12762
11-19-76	1500	71.2	43.2	34496	58.50	111.9	-7217	-15161	-782	-715		14476
12 -9-76	145	90.7	62.7	34573	56.40	110.8	-7937	-15901	-825	-756	-347	16524
12-20-76	1445	102-2	74.2	34524	58.47	111.5	-8413	-16377	-850	-783 -785	-372	17714 1781C
12-23-76	845	104.9	77.0	34490 34519	58-51	112.0	-8460 -8785	-16424 -16749	-852 -871	-804	-374 -393	16714
1 -3-77	1145	116-1	88.1 99.2	34557	58-47 58-42	111.6	-9015	-16579	-885	-818	-407	19381
1-14-77	1330	127-1	105.1	34551	58.43	111-1	-9138	-17102	-892	-825	-414	15714
1-20-77	1155	133-1	119.0	34523	58.47	111.5	-9407	-17371	-906	-839	-428	20381
2 -3-77 2 -5-77	754	148.9	120.9	34536	58.45	111.3	-9417	-17381	-907	-840	-429	20425
2-22-77	836	165.9	137-9	34515	58-46	111.6	-9762	-17726	-926	-859	-448	21333
3 -5-77	800	176.9	146.9	34517	50.48	111.6	-9961	-17925	-937	-670	-459	21857
3-16-77	1605	188.3	160.3	34524	58.47	111.5	-10127	-18691	-947	-680	-469	22333
4 -6-77	1500	209-2	181.2	34507	58.49	111-8	-10271	-18235	-955	-882	-477	22714
4-26-77	1053	225.0	201.0	34551	96.32	110.6	-10549	-18513	-973	-906	-495	23571
5 -9-77	1327	242.1	214.2	34449	58.57	112.6	-10796	-18760	-982	-915	-504	2400C
5-24-77	1005	257.0	229.0	34487	56.52	112.0	-10989	-18953	-994	-927 -944	-516	24571 25381
6-17-77	842	280.9	253.0	34516	56.48	111.6	-11272	-19236	-1011		-544	25905
7 -6-77	1201	300-1	272.1	34466	58.54	112.3	-11487	-19451	-1022	-955 -960	-549	26143
7-13-77	948	307.0	275.0	34486	56.52	112.0	-11563	-19527	-1027 -1038	-971	-560	26667
7-25-77	906	319.0	291.0	34492	58.51 58.56	112.0	-11763	-19727 -19854	-1044	-977	-566	26952
8 -5-77	1156	330.1	302-1	34454	58.43	111.1	-12026	-19590	-1055	-see	-577	2747E
8-22-77	832	346.9	318.9	34519	58.47		-12234	-20198	-1066	-599	-588	28000
9 -9-77	833		336.9	(S) FLLLY								
* 9 -9-77	840	364.9	SPECIME	34532	58.46	111.4	-5979	-13943	-713	-646	-235	
9 -9-77	840 850			34529	58.46	111.4	-5804	-13768	-703	-636	-225	
9 -9-77	1034	365.0		34549	58.43	111.2		-13610	-694	-£27	-216	
9 -9-77	1326			34559	58.42	111.0	-5522	-13486	-688	-621	-210	
9-10-77	825			34590	50.30	110.€	-5322	-13286	-677	-610	+199	
9-11-77	1127	367.1		34587	58.36	110.6	-5217	-13161	-671	-604	-193	
9-12-77	e12			34584	58.39	110.6	-5032	-12596	-661	- 594	-163	
9-13-77	938	369.0		34634	58.32	109.9	-4854	-12618	-652	-585	-174	
9-26-77	1519			34620	58.34	110-1	-4699	-12663	-643	-576	-165	
10 -7-77	1653			35114	57.69	103.1	-4559	-12523	-650	-583	-172	
10-20-77	910	406.0		34595	58.37	110.5	-4437	-12401	-628	-561	-150	

MODULUS: LOADING E= 5.1 AT ACE 28 DAYS (STRESS LEVEL 0 TC 2100 PSI)

NOTE: MINUS DAYS UNDER LOJC INCICATES SPECIMEN LOACING TIME PRICE TO FULL LOAD

TABLE F2

ELASTIC AND CREEP STRAINS (NOT CORRECTED FOR AUTOGENOUS STRAINS) UNION FLECTRIC CRITICN 1 CLASS E-1 ES7414 (SPECIMEN: SEALED 6 BY 16 IN. CONCRETE CYL.)

CALIBRATION CONSTANTS: METER RESISTANCE AT 0.0 DEGREES F. = 48.27 CHMS STRAIN PETER NO. : 498 11-07 TEMP. CALIFRATION CONSTANT STRAIN CALIERATION CONSTANT = 10.F2 F/GHM CHANGE IN RESIST.
= 9.CR MICROVOLTS/VOLT/MICROSTRAIN AGE OF LEADING : CAYS TEST TEMPERATURE : 110 DEG. F. CALIBRATED RANGE # 11100 TC -10100 MICROVOLTS/VCLT METER COEFF. OF THERMAL EXPANSION = 6.7 MICRESTRAIN/DEGREE F.

CONCRETE COEFF. OF THERMAL EXPANSION= 4.6 MICRESTRAIN/DEGREE F. ULT. STR. ULT. STR. : 7000. PSI
APPLIED TEST STRESS : 2100. PSI
PER. ULT. STR. APPLIED: 27.6 PERCENT STRAIN INCHEMENT FACTOR 0 PERCENT

NOTE: FOR MCDE 4 OR 5 VCLTS, AND MCDE 3 PICKCVCLTS -- THE BRIDGE VCLTAGE WAS 2.00000 VOLTS.

********		*****			******		•••••	********		P ICRCSTRAI	N	
DATE	# TIME		DAYS 4		*RESIST.	# TEMP.	MODE 3	*CHANGE *	· 7	EMPERATURE	CCRRI	ECTED
		P DAYS	# UNDER 4		OHMS	P DEGREE	MICAG-	ONI CEC-4	FROM	PELASTICO	CREEF	PSPECIFIC
********	•	•	· LCAC ·	VCLTS	•	* F.	P VCLTS	PVOLTS #	DAY ONE	# 4CREEP#		* CPEEP
* 9 -9-76					********	*******	*******	********	******	********	*****	*********
9-10-76	1000	1.2	SPECIMEN			<u> </u>	4					
9-16-76	1400	7.2		36961 37093		76.0	13554	0	0			
9-21-76	1145	12-1		37118		74.2	13316	-238	-16			
9-23-76	915	14.0		37119		73.8 73.8	13122	-432	-27			
10 -1-76	930	22.0		34534		110-2	13070	-484	-30			
910 -7-76	947		LUADING		20043	110.2	11/19	-1.635	-28			
10 -7-76	947	28.0	CCC7	34484	58.52	110.9	11759	-1795	-25	_		
*10 -7-76	948	28.0				IED TEST S			-23	0		
10 -7-76	948	28-0	.0000	34484		110.9	4485	-9069	-425	-400	C	0.
10 -7-76	952	28.0	-0028	34484		110-9	4442	-9112	-427	-402	-2	00095
10 -7-76	957	28.0	.0063	34477	58.53	111.0	4355	-9199	-432	-407	-7	00333
10 -7-76	1017	28.0	.0201	34462		110.9	4157	-9397	-443	-418	-16	00857
10 -7-76	1105	28.0	.0535	34479	50.53	111-0	4032	-9522	-450	-425	-25	01190
10 -7-76	1615	28.3	-2688	34472	58.54	111-1	3595	-9559	-474	-449	-45	02333
10 -8-76	1510	29.2	1.2236	34463	58-55	111-2	2936	-10618	-510	-485	-85	04048
10 -9-76	1025	30.0	2.0	34463	58.55	111-2	2611	-10943	-528	-503	-103	C4905
10-10-76	1045	31.0	3.0	34482		110.9	2347	-11207	-543	-518	-116	05619
10-11-76	950	32.0	4=0	34482	58.52	110.9	2162	-11292	-553	-528	-126	06095
10-12-76	1130	33.1	5-1	34502		110.6	1987	-11567	-563	-538	-136	06571
10-13-76	1045	34.0	6.0	34497	58-50	110-7	1842	-11712	-571	-546	-146	06952
10-15-76	1320	36.1	8.1	34519	58.47	110.4	1452	-12102	-593	-568	-168	08000
10-21-76	1210	42-1	14-1	34406	-	112.0	797	-12757	-626	-601	-201	09571
10-28-76	930	49.0	21-0	34419	58.61	111.8	77	-13477	-666	-641	-241	11476
11 -4-76 11-19-76	1110	56.0	26.1	34427	58.60	111.7	-439	-13693	-694		-265	12616
12 -9-76	1500	71.2 90.7	43.2 62.7	34359	58.69	112.7	-1163	-14717	-732		-307	14619 .
12-20-76	1445	102.2	74.2	34354	58.58 58.64	111.6	-1836	-15390	-772		-347	16524
12-23-76	845	104.9	77.0	34362	58.68	112.2 112.7	-2186	-15740	-790		-365	17381
1 -3-77	1145	116.1	88.1	34389	58.65	112.3	-2559	-15796 -16113	-792		-367	1747c
1-14-77	1330	127-1	99.2	34424	58-60	111.8	-2764	-16318	-810		-385	18333
1-20-77	1155	133.1	105.1	34419	58.61	111.8		-16448	-822 -829		-397	18905
2 -3-77	1000	147-0	119.0	34365	58.65	112-3	-3175	-16729	-844	- T	-404 -419	19238 19952
2 -5-77	754	148.9	120.9	34395	58.64	112.2	-3193	-16747	-845		-420	2000C
2-22-77	836	165.9	137.9	34380	58.66	112.4	-3548	-17102	-864		-435	20905
3 -5-77	800	176-9	148.9	34380	58.66	112.4	-3764	-17318	-876		-451	21476
3-16-77	1605	188.3	160-3	34379	58.66	112.4	-3942	-17496	-886		-461	21952
4 -6-77	1500	209.2	181.2	34365	58.68	112.6	-4106	-17660	-895		-470	22381
4-26-77	1053	229.0	201.0	34451	58.56	111.4	-4412	-17966	-914		-489	23286
5 -9-77	1327	242.1	214.2	34309	58.75	113.4	-4679	-18233	-924		-499	23762
5-24-77	1005	257.0	229.0	34342	58.71	112.9	-4884	-18433	-937	-912	-512	24381
6-17-77	842	260.9	253.0	34371	58.67	112.5	-5177	-18731	-954		-525	25190
7 -6-77	1201	300-1	272.1	34316	58.74	113.3	-5400	-18954	-964	-939	-539	25667
7-13-77	548	307.0	279.0	34343	58.71	112.9	-5478	-19032	-969	-544	- 544	25905
7-25-77	906	319.0	291.0	34342	58.71	112.9	-5682	-19236	-981	-956	-556	26476
8 -5-77		330-1	302.1	34309	58.75	113.4	-5613	-19367	-987	-962	-562	26762
e-22-77	832	346.9	318.9	34405	58.62	112.0	-5959	-19513	-998	-973	-573	27286
9 -9-77	833	364.9	336.9	34361	58.68	112.7		-19717	-1008	-983	-563	27762
0 9 -9-77	240	364.9	SPECIPEN			ZERC APPL						
9 -9-77 9 -9-77	840	364.9		34364	58.65	112.3	-11	-13565	-670		-245	
9 -9-77	850	365.0		34382	58.66	112.4	142	-13412	-661		-236	
9 -9-77	1034	365.0		34399	58.63	112.1	315	-13239	-652		-227	
9-10-77	1326 825	365.1		34402	58.63	112-1	435	-13119	-646	-	-551	
9-11-77	1127	365.9 367.1		34434	58.59	111-6	€27	-12527	-636		-211	
9-11-77	812	367.9		34429	58.59 58.59	111.7	732	-12622	-630		-205	
9-13-77	938	369.0		34459	58.55	111.7	910	-12644	-620		-195	
9-26-77	1519	382.2		34460	58.55	111.3	1076 1236	-12478 -12316	-612		-167	
10 -7-77	1653	393.3		34543	58.44	110-1	1360	-12316	-603 -599		-176 -176	
10-20-77	910	406.0		34430	58.59	111-7		-12080	-589		-174 -164	
							-717	* = 100	-567	-504	-104	

MCDULUS: LOADING E= 5.3 AT AGE 28 DAYS (STRESS LEVEL 0 TO 2100 PS1)

NOTE: MINUS DAYS UNDER LCAD INDICATES SPECIMEN LOADING TIME PRICE TO FULL LCAD

TABLE G1

ELASTIC AND CREEP STRAINS (NOT CORRECTED FOR AUTOGENOUS STRAINS) UNION ELECTRIC OPTION 1 CLASS E-1 ES7414 (SPECIMEN: SEALED 6 BY 16 IN. CONCRETE CYL.)

CALIBRATION CONSTANTS: METER RESISTANCE AT 0.0 DEGREES F. = 48.30 CHMS STRAIN PETER NO. : 993 73-14 TEMP. CALIFRATION CONSTANT STRAIN CALIFRATION CONSTANT # 10.82 F/OHV CHANGE IN RESIST. # 8.73 MICROVOLTS/VOLT/MICROSTRAIN TEST TEMPERATURE : 73 DAYS DEG. F. CALIBRATED RANGE # 11100 TO -10100 MICROVOLTS/VOLT WETER COEFF. OF THERMAL EXPANSION # 6.7 MICROSTRAIN/DEGREE F.

CONCRETE COEFF. OF THERMAL EXPANSION # 4.6 MICROSTRAIN/DEGREE F. LLT. STR. : 8540. PSI APPLIED TEST STRESS : 2100. PSI STRAIN INCREMENT FACTOR O PERCENT PER- ULT. STR. APPLIED: 24.6 PERCENT

NOTE: FOR MCDE 4 CR 5 VCLTS, AND MODE 3 MICROVOLTS -- THE BRIDGE VCLTAGE WAS 2.00000 VDLTS.

DATE	TIME	. AGE	# DAYS 4	MODE	ADECTET	* ***			* -	PICFCSTRAI	,,	
	•			4 DF 5	# UMMC	* TEMP.	# MEDE 3	CHANGE	*T	EFFERATURE	CCRF	ECTED
			# LCAD 4		9	DEGREE			# FROM	*ELASTIC*	CREE	
*******	******			******	******	* F.	* VCLTS	PVDLTS	DAY DNE	* +CREEP*		* CREEP
# 9 -9-76	1000	0	SPECIPEN	CAST				******	*******	*********	*****	*******
9-10-76	1430	1.2		36938	55.32	76.0	-2291	٥				
9-16-76	1400	7.2		371C1		73.7	-2591	-300	0			
9-21-76	1145	12.1		37126		73.4	-2761		-21			
9-23-76	915	14.0		37114		73.5		-470	-31			
10 -1-76	930	22.0		37103		73.7	-2805 -2894		-34			
10 -7-76	1105	28.0		37076		74-1	-2974	-603	-38			
10-15-76	1320	36.1		37109		73.6		-683	-42			
912 -7-76	£17	88.9	LCADING		550.0	.3.0	-2987	-696	-44			
12 -7-76	217	88.9		37107	55.11	73.6	-301E	-727				
912 -7-76	618	88.9			ADED, APPL	IED TEST	CTRECC		-46			
12 -7-76	816	88.9	-0000	37179	55.01	72.6	-9448	2100 PSI			12	
12 -7-76	822	88.9	-002E	37179		72.6	-9688	-7157	-416	-370		0-
12 -7-76	€27	88.9	.00£3	37084	55-14	74.0	-9738	-7397	-430	-384	-14	00667
12 -7-76	917	89.0	-0410	37088	55.13	73.9	-9867	-7447 -7576	-430	-384	-14	00667
12 -7-76	1017	89.0	-0826	37ces	55-13	73.9		-7576 -7440	-437	-391	-21	01006
12 -7-76	1317	89.1	.207€	37078	55.14	74.0	-9939	-7648	-441	-395	-25	01190
12 -7-76	1655	89.3	-3590	37676	55.15	74.0	-10026	-7735 - 3545	-446	-400	-30	01425
12 -8-76	817	89.9	•9993	37093	55.12	73.8	-10136	-7845	-452	-406	-36	01714
12 -9-76	145	90.7	1.7271	37076	55.15	74.1		-8C34	-464	-416	-48	02286
12-10-76	815	91.9	3.0	37CE7	55.13		-10558	-8267	-476	-430	-€0	02857
12-11-76	815	92.9	4.0	37087	55.13	73.9	-10699	-8408	-485	-439	-68	03286
12-12-76	815	93.9	5.0	37087		73.9	-10849	-8558	-493	-447	-77	03667
12-13-76	830	94.9	€.0	37098	55.13 55.12	73.9	-10874	-8563	-495	-449	-79	03762
12-14-76	815	95.9	7.0	37687	55.13	73.8	-10900	-8609	-497	-451	- e ı	03857
12-15-76	1220	97.1	8.2	37090		73.9	-10924	-8633	-498	-452	- 82	03905
12-20-76	1445	102.2	13.3	37099	55-13	73.9	-11056	-8765	-505	-459	-89	04238.
12-23-76	845	104.9	16.0	37068	55-12	73.8	-11297	-9 c o c	-519		-103	04905
1 -3-77	1145	116.1	27.1	37123	55.16	74.2	-11378	-9087	-523		-107	05095
1-14-77	1200	127.1	36.2	37117	55.07	73.3	-11825	-9534	-551		-135	06429
1-19-77	1050	132.0	43.1	37108	55.09	73.5	-12120	-9829	-567		-151	0719C
2 -3-77	945	147.0	56.1	37057	55-10	73.6	-12240	-9549	-574		-156	07524
2 -5-77	826	148.9	60.0	37106	55.12	73.8	-12547	-10256	-591		-175	08333
2-22-77	905	166.0	77.0	37091	55-11	73.6	-12598	-10307	-594	-548	-178	08476
3 -5-77	747	176.9	88.0	37063	55.13	73.9	-12868	-10577	-609		-153	C919C
3-16-77	1547	188.2	99.3	37669	55.16	74.3	-13038	-10747	-618	-572	-202	05615
3-24-77	1138	196.1	107.1	37061	55.15	74.2	-13164	-10673	-626	-580	-210	10000
4 -6-77	1446	209.2	120.3	37654	55-16	74-3	-13290	-10999	-633		-217	10333
4-26-77	1041	229.0	140-1	37(62	55-17	74.4	-13444	-11153	-641	-595	-225	10714
5 -9-77	1347	242.2	153.2	37665	55-16	74-3	-13644	-11353	-653		-237	11286
5-24-77	938	257.0	166.1		55-16	74.2	-13761	-11470	-660		-244	11619
6-17-77	856	281.0	192.0	37056	55.17	74.3	-13856	-11565	-665		-245	11857
7 -6-77	1056	300.0	211.1	37040	55.21	74.8	-14020	-11729	-673		-257	12236
7-13-77	850	307.0	216-0	37040	55.19	74.6	-14153	-11662	-681		-265	12615
7-18-77	920	312.0	223.0		55.16	74.3	-14159	-11666	-682		-266	12667
7-25-77	816	318.9	230.0	37C45	55.18	74.5	-14246	-11955	-687	-641 -	-271	12905
8 -2-77	842	326.9	238.0	37C45	55.10	74.5	-14359	-12068	-693		277	13190
8-22-77	808	346.9	256.0		55.23	75.0	-14446	-12155	-697	-651 -	-281	13381
9 -9-77	806	364.9	276.C	37040	55-19	74.6	-14556	-12265	-704	-656 -	-288	13714
9 -9-77	812	364.9		37061	55.16	74.3	-14701	-12410	-713	-667 -	-297	14142
9 -9-77	812	364.9	でした 小田に V ()	= 37474	UNLOADED,						1.00	
9 -9-77	820	364.9		37676	55.15	74.2	-9077	-6786	-391	-345	25	
9 -9-77	1006	365.0		37065	55.16	74.2	- 6917	-6626	-382	-236	24	
9 -9-77	1316			37655	55.17	74.4	- 8 888	-6597	-380	-334	3€	
9-10-77		365.1		37665	55.16	74.2	-8622	-6331	-365	-319	51	
9-11-77	815	365.9		37CEE	55.13	73.9	-6490	-6199	-358	-312	5.6	
9-11-77	1117 758	367.1		37093	55.12	73.8	-6398	-6107	-353	-307	63	
9-12-77		367.9		37096	55-12	73.8	-6354	-6063	-351	-305	65	
	922	369.0		37686	55.13	73.9	-8309	-6018	-348	-302	€e	
9-26-77	1433	382.2		37059	55.17	74-3	-8055	-5764	-333	-267	83	
10 -7-77	1639	393.3		37CEO	55.14	74.0	-2071	-5780	-334	-288	62	
10-20-77	926	406.0		37673	55.15	74.1	-7754	-5503	-318	-272	98	

MODULUS: LOADING E= 5.7 AT AGE &9 DAYS (STRESS LEVEL O TC 2100 PSI)

NOTE: MINUS DAYS UNCER LOAD INDICATES SPECIMEN LOADING TIME PRICE TO FULL LOAD

TABLE G2

ELASTIC AND CREEP STRAINS (NOT CORRECTED FOR AUTOGENOUS STRAINS) UNION ELECTRIC OPTION 1 CLASS E-1 ES7414 (SPECIMEN: SEALED 6 BY 16 IN. CONCRETE CYL.)

CALIBRATICN CONSTANTS:

METER RESISTANCE AT 0.0 DEGREES F. = 48.24 CHMS

TEMP. CALIBRATION CONSTANT = 10.83 F/CHM CHANGE IN RESIST.

STRAIN CALIBRATION CONSTANT = 8.90 MICROVOLTS/VOLT/MICROSTRAIN

CALIBRATED RANGE = 11100 TO -10100 MICROVOLTS/VOLT

METER COEFF. OF THERMAL EXPANSION = 6.7 MICROSTRAIN/DEGREE F. LUT. STR. : 8540 PSI

CONCRETE COEFF. OF THERMAL EXPANSION = 4.6 MICROSTRAIN/DEGREE F. APPLIED IEST STR. : 4..... CAL

STRAIN METER ND. : \$59 73-15

DATA

AGE OF LCADIN. : 50 DATA

TEST TEMPERATURE : 73 DEG. F.

LUT. STR. : 8540 PSI

CONCRETE COEFF. OF THERMAL EXPANSION = 4.6 MICROSTRAIN/DEGREE F. PERCENT

NOTE: FOR MODE 4 OR 5 VOLTS, AND MODE 3 MICROVELTS -- THE ENIDGE VOLTAGE WAS 2-000030 VOLTS.

00000000	******	******	******		*******	,,,,,,,,,,,	*******	********		* ichteine:	المراجع فالمسهار	
DATE	. TIME	. AGE.	# DAYS	MGDE	*RESIST.	* TEMP.	* MODE 3					- سندوءب
	•	P DAYS	. UNDER	4 OF 5	* CHMS	* DEGREE	* MICRC-			PELASIZE		
			. LCAD	VOLTS	•	• F.	* VOLTS			* +CREE++		* CHECK
*******	*****	*****			*******	*******	*******	****	*****	********	*****	********
\$ 9 -9-76	1000	. 0	SPECIPE									
9-10-76	1430	1.2		36548	55.31	76.6	11321	0	0			
9-16-76	1400	7.2		37096	55.12	74.5	10949	-372	-24			
9-21-76	1145	12.1		37141	55.06	73.9	10694	-627	-40			
9-23-76	915	14-0		37129	55.08	74-1	10611	-710	-44			
10 -1-70	930	22.0		37128	55.08	74-1	10389	-932	-57			
10 -7-76		28.0		37116	55.09	74.2	10331	-990	-60			
10-15-76		36-1		37149	55-05	73.8	10285	-1033	-63			
*12 -7-76		88.9							-77	0		
12 -7-76		88.9		37179	55-01	73.4	10053	-1268		U		
*12 -7-76		88.9		FULLY LC.						-357	c	c.
12 -7-76		88.9		37179	55.01		3691 3519	-7630 -7802	-434 -444	-367	-16	00476
12 -7-76		88.9		37179	55-01				-446	-369	-12	005/1
12 -7-76		88.9		37162	55.04	73.6	3479 3351	-7842 -7570	-453	-376	-15	00302
12 -7-76				37166	55-03	73.5	3280	-8041	-457	-383	-23	01092
12 -7-76		89.0		37162		73.6 73.6	3195	-8126	-462	-385	-28	-201333
12 -7-76		69-1	.207e	37158	55.04	73.7	3083	-8232	-468	-391	-34	01619
12 -7-76		89.3		37156	55.04 55.03	73.5	2902	-8419	-478	-401	-44	02095
12 -8-70		89.9		37166		73.8	2676	-8645	-491	-414	-57	-102714
12 -9-76		90-7		37151 37166	55.05 55.03	73.5	2610	-8711	-495	-418	-61	02505
12-10-76		91.9		37166	55.03	73.5	2510	-8611	-500	-423	-66	03142
12-11-70		92.9		37166	55.03	73.5	2420	-8901	-505	- 42 E	- 71	033331
12-12-70		93.9		37188	55.01		2357	-8964	-509	-432	-75	03571
12-13-70		95.9		37166	55.03	73.5	2310	-9C11	-512	-435	78	03714 .
12-14-76		97.1		37175	55.02		2217	-9104	-517	-443	- 23	33952
12-15-76		102.2		37186	55.31	73.3	2502	-9315	-529	-452	-95.	
12-23-76		104.9		37157	55-04		1917	-9404	-533	-456	-99	64714
1 -3-7		116-1		37241	54.93		1565	-9756	-556	-479	-122	55216
1-14-77		127.1		37207	54.98		1315	-tocce	-569	-492	-135	00429
1-19-77				37201	54.99	73.1	1216	-10105	-574	-497	- L 40	~.26557
2 -3-77				37187	55.00	73.3	971	-10350	-587	-510	-153	G7286
2 -5-77				37198	54.99	73.1	939	-10382	-590	-513	-156	07429
2-22-77		166.0	77.0	37178	55.02	73.4	706	-10615	-602	-525	-168	38636
3 -5-77		176.9	25.0	37166	55.03	73.5	582	-10739	-609	-532	-175	08333
3-16-77	7 1547	188.2	99.3	37169			487	-10834	-614	-537	- 1.80	00371
3-24-7		196.1		37156			382	-10539	-620	-543	-186	68657
4 -6-77				37151			162	-11159	-632 -643	-555 -566	-198 -255	09429
4-26-7		229.0		37157			-29	-11350				-10130
5 -9-7		_		37165			-126	-11447	-648 -647	-571 -570	-214	10143
5-24-7				37153			+111 -269	-11432 -11590	-655	-676	-421	
6-17-7				37117			-409	-11730	-663	-586	-225	16988
7 -6-7				37131			-416	-11737	-664	-587	-230	10952
7-13-7				37140 37130			-501	-11622	-668	-591	-234	11143
7-18-7							-616	-11537	-675	-558	-241	114/6
7-25-7				37120 37087			-709	-12030	-679	-602	-245	11601
8 -2-7				37111	55-10		-831	-12152	-686	-609	-282	12000
6-22-7				37139			-1020	-12341	-698	-621	-264	125/1
9 -9-7				N(S) FULLY								
* 9 -9-7				37142			4689	-6632	-377	-300	21	
9 -9-7				37137			4852	-6469	-368	-291	66	
9 -9-7				37129			4882	-6439	-366	-289	66	
9 -9-7				37140			5147	-6174	-351	-274	63	
9-10-7				37161			5288	-6033	-344	-267	90	
9-11-7				37164			5380	-5941	-319	-262	56	
9-12-7				37169			5431	-5E90	-336	-259	. 5â	
9-12-7				37156			5476	-5845	-333	-256	161	
10 -7-7				37157			5737	-5584	-319	-242	115	
10-20-7				37148			5996	-5325	-304	-221	130	

MODULUS: LOADING

E= 5.9 AT AGE E9 DAYS (STRESS LEVEL 5 10 2100 PSL)

NOTE: MINUS DAYS UNDER LOAD INDICATES SPECIMEN LEADING TIME PAICS TO FULL LUAD

TABLE H1

ELASTIC AND CREEP STRAINS (NOT CORRECTED FOR AUTOGENOUS STRAINS) UNION ELECTRIC OPTION 1 CLASS F-1 ES7414 (SPECIMEN: SEALED 6 BY 16 IN. CONCRETE CYL.)

CALIBRATICN CONSTANTS:

METER RESISTANCE AT 0.0 DEGREES F. = 48.55 CHMS

TEMP. CALIBRATICN CONSTANT = 10.80 F/CHM CHANGE IN RESIST.

STRAIN CALIBRATIGN CONSTANT = 8.67 MICROVOLTS/VOLT/MICROSTRAIN

CALIBRATED RANCE = 11100 MICROVOLTS/VOLT

METER COEFF. OF THERMAL EXPANSION = 6.7 MICROSTRAIN/DEGREE F. L

CONCRETE COEFF. OF THERMAL EXPANSION = 6.7 MICROSTRAIN/DEGREE F. L

STRAIN INCREMENT FACTOR = 0 PERCENT

STRAIN PETER NO.: 554 11-10 AGE OF LCACING : 50 CAYS TEST TEMPERATURE : 110 DEG. F.

LLT. STR. : 2540. PSI
APPLIED TEST STRESS : 2100. PSI
PER. ULT. STR. APPLIED: 24.6 PERCENT

NOTE: FOR MCDE' 4 OR 5 VOLTS, AND MCDE 3 MICPOVOLIS -- THE BRIDGE VOLTAGE WAS 2.00000 VOLTS.

********	******					******				MICECSTRAI		
		+ AGE,				. TEMP.				EPPERATURE		
		. DAYS	• UNDER			• DEGREE				*ELASTIC*	CREEP	
			S. LCAD	• VOLTS	•	6 F.	VCLTS	AADETS DE	SAY ONE	* +CFEEP*		• CREEP
********					,,,,,,,,,,,				*****		,,,,,,	********
9 -9-76 9-10-76	1000	1.2	SFECIPE	36863	55.42	73.7	1461	0				
9-16-76	1400	7.2		37023	55.21	71.5	1102	-259	-24			
9-21-76	1145	12.1		37046	55.18	71.2	855	-606	-38			
9-23-76	915	14.0		37037	55.20	71.3	770	-691	-43			
10 -1-76	930	22.0		34437	58.58	107.9	-469	-1530	-36			
107-76	1105	26.0		34392	58.64	108.6	-439	-1900	-33			
10-15-76	1320	36.1		34456	50.56	107.6	-609	-2070	-44			
*12 -7-76	840	22.9	LCADING		2000			-20.0				
12 -7-76	840	86.9	0007	34300	58.76	109.9	-1598	-3059	-96			
*12 -7-76	841	88.9		FULLY LEA								
12 -7-76	841	88.9	.0000	34300	58.76	109.9	-7786	-9247	-444	-348	0	0.
12 -7-76	845	86.9	.0028	34300	50.76	109.9	-8066	-9527	-460	-364	-16	CC762
12 -7-76	850	89.0	.0063	34300	58.76	109.9	-8126	-9567	-464	-368	-20	0952
12 -7-76	940	89.0	.0410	34298	58.77	109.9	-8324	-9785	-475	-379	-21	C1476
12 -7-76	1040	89.0	.0826	34303	58.76	109.8	-8436	-9697	-481	-385	-37	C1762
12 -7-76	1645	89.3	•3361	34312	58.75	109.7	-8703	-10164	-496	-400	-52	02476
12 -8-76	840	89.9	9993	34290	58.76	110.0	-8996	-10457	-512	-416	-68	C3238
12 -9-76	1345	91.2	2.2	34356	50.69	109.1	-9126	-10587	-522	-426	-78	03714
12-11-76	815	92.9	4.0	34320	58.74	109.6	-9888	-11349	-563	-467	-119	05667
12-12-76	815	93.9	5.0	34340	58.71	109.3	-9950	-11411	-568	-472	-124	05505
12-13-76	815	94.9	6.0	34300	58.76	109.9	-10060	-11521	-573	-477	-129	06143
12-15-76	815	96.9	e.o	34300	58.7€	109.9	-10169	-11630	-579	-483	-135	06425
12-20-76	1445	102.2	13.3	34214	£8.75	109.7	-10311	-11772	-587	-491	-143	06810
12-23-76	845	104.9	16.0	34280	58.79	110.2	-10447	-11508	-594	-498	-150	07143
1 -3-77	1145	116.1	27.1	34307	58.76	109.8	-11000	-12461	-626	-530	-162	08667
1-14-77	1330	127-1	38.2	34347	58.70	109.2	-11365	-12826	-648	-552	-204	09714
1-20-77	1155	133-1	44.1	34339	58.71	109.3	-11552	-13013	-658	- 5 6 2	-214	10190
2 -3-77	1000	147.0	5 E . 1	34310	58.75	109.7	-11917	-13378	-678	-582	-234	11143
2 -5-77	754	148.9	€0.0	34323	58.73	109.6	-11937	-13398	-679	-563	-235	11190
2-22-77	836	165.9	77.0	34305	58.76	109.8	-12330	-13751	-701	-605	-257	12236
3 -5-77	800	176.9	E9.0	34302	58.76	109-9	-12569	-14630	-714	-618	-270	12857
3-16-77	1 6 0 5	188.3	59.3	34306	58.76	109-8	-12719	-14160	-723	-£27	-279	13286
3-24-77	1131	196.1	107-1	34303	58.76	109.8	-12881	-14342	-732	-636	-288	13714
4 -6-77	1500	209-2	120.3	34295	58.77	110-0	-12931	-14392	-734	-636	-290	13610
4-26-77	1053	225.0	140-1	34381	58.66	108.7	-13234	-14655	-754	-65E	-31C	14762
5 -9-77	1327	242-1	153.2	34237	58.85	110.8	-13510	-14571	-765	-665	-321	15286
5-24-77	1005	257.0	168.1	34272	50.00	110.3	-13724	-15185	-778		-234	15905
6-17-77	842	280.9	192.0	34361	58.76	109.9	-14038	-15499	-797		-353	16810
7 -6-77	1201	300-1	211.1	34249	50.83	110.6	-14263	-15724	-808	-712	-364	17333
7-13-77	948	307.0	216.0	34271	58.20	110.3	-14340	-15601	-613		-369	17571
7-25-77	906	319.0	230.0	34277	58.79	110.2	-14543	-16004	-825	-725	-361	18143
8 -5-77	1156	330.1	241-1	34242	50.84	110.7	-14675	-16136	-831		-3e7	18429
8-22-77	832	346.9	258.0	34235	58.72	109-4	-14824	-16285	-842	-746	-398	18952
9 -9-77	833	364.9	276.0	34299	58.77	109.9	-15080	-16541	-855	-759	-411	16571
• 9 -9-77	840	364.9	SPECIMEN	(5) FLLLY								
9 -9-77	640	364.9		34309	58.75	109.8	-9153	-10614	-522	-426	-7E	
9 -9-77	850	365.0		34309	50.75	109.8	-6818	-10279	-503	-407	-56	
9 -9-77	1034	365.0		34314	58.75	109.7	- 2609	-10070	-491	-395	-47	
9 -9-77	1326	365.1		34312	58.75	107.7	-8505	-9966	-485	-366	-41	
9-10-77	e 2 5	365.9		34337	58-71	107.3	-8331	-9792	-476	-360	-32	
9-11-77	1127	367.1		34337	58.72	109.4	-8225	-5666	-470	-374	-26	
9-12-77	812	367.9		34329	58.73	109.5	-6178	-9639	-467	-371	-23	
9-13-77	938	369.0		34354	58.69	109.1	-8004	-9465	-458	-362	-14	
9-26-77	1519	382.2		34.343	58.71	109.3	-7855	-9316	-450	-354	-6	
10 -7-77	1653	393.3		34435	58.58	107-9	-7747	-9206	-446	-350	-2	
10-20-77	910	406.0		34310	58.75	109.7	-7653	-9114	-437	-341	7	

MCDULUS: LOADING Ex 6.0 AT AGE 89 DAYS (STRESS LEVEL 0 TC 2100 PSI)

NOTE: MINUS DAYS UNDER LEAC INCICATES SPECIMEN LOADING TIME PRICE TO FULL LEAD

TABLE H2

ELASTIC AND CREEP STHAIRS (NOT CORRECTED FOR AUTOGENOUS STRAINS) UNION ELECTRIC OPTION 1 CLASS E+1 ES7414 (SPECIMEN: SEALED 6 BY 16 IN. CONCRETE CYL.)

CALIBRATION CONSTANTS:

METER RESISTANCE AT 0.0 DEGREES F. = 48.35 CHMS

THMP. CALIBRATION CONSTANT = 10.66 F/OHM CHANGE IN RESIST.

STRAIN PATER NO.: 1002 11-11

AGE OF LOADING: 90 DAYS

STRAIN CALIBRATION CONSTANT = 9.00 MICROVOLITS/VOLIT/MICROSTRAIN

CALIBRATED RANGE = 11100 TC -10100 MICROVOLITS/VOLT

METER CLEFF. OF THERMAL EXPANSION = 6.7 MICROSTRAIN/DEGREE F.

STRAIN PATER NO.: 1002 11-11

DEG. F.

ULT. STR. : 6:40. PSI

APPLIED TEST STRESS : 2100. PSI

STRAIN INCREMENT FACTOR = 0 PERCENT FER. ULT. STR. APPLIED: 24.6 PERCENT

NOTE: FOR MCDE 4 CR 5 VCLTS, AND MCDE 3 MICROVOLTS -- THE BRIDGE VOLTAGE WAS 2.00000 VOLTS.

							****			. ICECSTRAI	۸	
DATE	* * * * * * * * * * * * * * * * * * * *	# AGE.	DAYS	MODE	*RESIST.	. TEMP.	● PCDE 3					CTED
DATE	9 1175	# DAYS		4 DF 5		• DEGREE				#ELASTIC#		
	*		D LCAD				* VCLTS			. +CREEF*		* CREEP
		******		*******	********	*******	*******	*******	*****	********	*****	******
# 9 -9-76	1000		SPEC I PE	CAST								
9-10-76		1.2		37076	55.15	73.4	15041	0	0			
9-16-76	1400	7.2		37213	54.97	71-5	14776	-265	-18			
9-21-76	1145	12-1		3724£	54.93	71-0	14567	-474	-30			
9-23-76	915	14.0		37244	54.53	71.0	14505	- 536	-34			
10 -1-76	930	22.0		34669	58.28	107.4	13136	-1505	-33			
10 -7-76	1105	28.0		34624	58.33	108.0	13269	-1772	-25			
10-15-76		36.1		34664	26.56	107-1	13068	-1573	-38			
\$12 -7-76		86.9	LCACING					0563	-82	o		
12 -7-76		86.9		34536		109.2	12188	-2853	-02			
#12 -7-76		88.9			ADEC, APPL 58.76	112.7	518633 2 5650	-9291	-438	-356	c	0.
12 -7-76		88.9	.0000	34300	58.76	112.7	5318	-9723	-457	-375	-15	00905
12 -7-76		88.9		34300	58.76	112.7	5235	-9606	-461	-379	-23	01095
12 -7-76		89.0 89.0	.0063 .0410	34528	56.46	109.4	4994	-10047	-482	-400	-44	62095
12 -7-76		89.0	•082€	34530	58.46	109.3	4868	-10173	-489	-407	-51	62429
12 -7-76		89.2	.207€	34534	58.45	109.3	4700	-10341	-498	-416	- 60	02857
12 -7-76		89.3		34534	58.45	109.3	4557	-10484	-506	-424		C3238
12 -8-76		89.9	.9953	34520	58.47	109.5	4229	-10612	-524	-442	- 66	C4095
12 -9-76		91.2	2.2	34560	50.39	108-6	3970	-11071	-540	-458	-102	C4E57
12-11-76		92.9	4-0	34300	58.76	112.7	3574	-11467	-554	-472	-116	05524
12-12-76		93.9	5-0	34300	58.76	112.7	3324	-11717	-567	-485	-125	06143
12-13-76		94.9	6.0	34300	58.76	112.7	3164	-11 277	-576	-494	-136	06571
12-15-76		97-1	e • 2	34532	58.46	109.3	3150	-11691	-584	-502	-146	06952
12-20-76	1445	102.2	13.3	34534	58.45	109.3	2757	-12294	-606	-524	-168	CECOC
12-23-76	845	104-9		34500	58.50	109.8	2588	-12453	-614	-532	-176	06361
1 -3-77	1145	116-1	27.1	34526		109-4	1967	-13074	-650	-566	-212	10095
1-14-77	1330	127-1	36-2	34563	58-41	106-6	1560	-13481	-673	-591	-235	11190
1-20-77		133.1	44-1	34559	58.42	100.9	1364	-13677	-684 -706	-602 -624	-246 -268	11714 12762
2 -3-77		147.0	56.1	34533	58.46	109.3	949	-14C92 -14117	-708	-626	-27C	12857
2 -5-77		148.9		34545	58.44 58.47	109.4	465	-14576	-733	-651	-295	1404E
2-22-77		165.9		34525 34522		109.5	200	-14641	-748	-666	-210	14762
3 -5-77		176.9		34534	58.45	109.3	-21	-15062	-760	-678	-322	15333
3-16-77		188.3	107.1	34528		109.4	-199	-15240	-770	-688	-332	15810
3-24-77	-	203.2	120.3	34520	58.47	109.5	-261	-15202	-773	-691	-335	15952
4-26-77		229.0		24664	58.36	108-3	-601	-15642	-795	-713	-357	1700C
5 -9-77		242-1	153.2	34457	58.56	110.4	-911	-15552	-807	-725	-369	17571
5-24-77			168.1	34495	58.51	109.9	-1149	-16190	-822	-740	-364	18286
6-17-77		280.9	192.0	34521	58-47	109.5	-1499	-16540	-642	-7.60	-4C4	19238
7 -6-77		300.1	211-1	34474	58.53	110.2	-1759	-16600	-855	-773	-417	15857
7-13-77		307.0		24496	56.50	109.8	-1846	-16887	-861	-779	-423	20143
7-25-77	906	319.0		34502	58.5C	109-7	-2069	-17110	-873	-791	-435	20714
8 -5-77		330.1	241-1	34462	58.55	110.3	-2211	-17252	-880 -892	~75E -Elo	-442 -454	2104E 21615
8-22-77				34557	58.42	109.0	-2381	-17422	-892	-623	-467	22238
9 -9-77				34529	58.46	109.4		-17668	-90:	-623	-467	- 422230
* 9 -9-77					UNLCADED,		3537	-11504	-563	-481	-125	
9 -9-77		364-9		34544	50.44 50.44	109•1 109•2	3699	-11242	-554	-472	-116	
9 -9-77				34541	58.44	109-2	3859	-11182	-545	-463	-107	
9 -9-77		365.0		34527	58.46	109.4	3964	-11077	-539	-457	-101	
9 -9-77		365.1 365.9		34553	56.43	109.0	4153	-10688	-529	-447	-51	
9-10-77		367.1		34549		109.1	4257	-107E4	-523	-441	- 65	
9-11-77 9-12-77				34547		109.1	4342	-10655	-518	-436	- E C	
9-12-77		369.0		34575		100.7	4528	-10513	-509	-427	-71	
9-26-77				34570		108.8	4745	-10296	-497	-41E	- 5 9	
10 -7-77		393.3		34635	58.32	107-8	4870	-10171	-492	-410	-54	
10-20-77				34538	58.45	109.2	4980	-10061	-483	-401	-45	

MODULUS: LOADING E= 5.9 AT AGE E9 DAYS (STRESS LEVEL O TC 2100 PS1)

NOTE: MINUS DAYS UNDER LCAC INCICATES SPECIMEN LOADING TIME PRICE TO FULL LCAC

TABLE I1

ELASTIC AND CREEP STRAIRS (NOT CORRECTED FOR AUTOGENOUS STRAIRS) UNION ELECTRIC OPTION 1 CLASS E-1 ES7414 (SPECIPEN: SEALED 6 BY 16 IA. CONCRETE CYL.)

CALIERATION CONSTANTS: METER RESISTANCE AT 0.0 DEGREES F. = 48-12 DHMS
TEMP. CALIERATION CONSTANT = 10-86 F/GHM
STRAIN CALIERATION CONSTANT = 8-40 MICRO STRAIN PETER NO. : 995 73-16 = 10-86 F/GHM CHANGE IN RESIST. AGE OF LCACING : 180 TEST TEMFERATURE : 73 CAYS = 8.40 MICREVOLTS/VOLT/MICRESTRAIN 73 CALIERATED RANGE DEG. F. # 11100 TC -10100 MICROVELTS/VELT METER COEFF. DF THERNAL EXPANSION # 6.7 MICROSTRAIN/DEGREE F.
CONCRETE COEFF. OF THERNAL EXPANSION: 4.6 MICROSTRAIN/DEGREE F. LLT. STR. : 9180. PSI
APPLIED TEST STRESS : 2100. PSI
PER. ULT. STR. AFFLIEC: 22.5 PERCENT STRAIN INCREMENT FACTOR 6 PERCENT

NOTE: FOR MODE 4 OR 5 VOLTS, AND MODE 3 MICROVOLTS -- THE BRIDGE VOLTAGE BAS 2-00000 VOLTS-

DATE	S TIME	AGE.	# DAVS	• 4				*****	***	PICFESTRA	· [N	
DATE	4 1177	* DAYS		* MODE	PRESIST.	* TEMP.	. HCCE 3	PCHANG	E	EMPERATUR	E CORR	FCTFD
		# DAYS			* CHMS	A DECKEE	. PICHE-	BMICEC-	-* FROM	#ELASTIC	• CREE	P#SPECIFI
******		******	* LCAD	* VCLTS		* F.	* VCLTS	PVCLTS	PEAY CHE	* +CREEP		* CREEP
9 -9-76	1000	0	2022147	*******	********	********	******	*******	*******	*******	*****	*******
9-10-76	1430	1.2	SPEC IME			·						
9-16-76	1400	7.2		37091			2431	0	0			
9-21-76	1145	12-1		37266	54.90	73.7	2155	-276	-21			
9-23-76	915	14.0		37288	54.88	73.4	1997	-434	-31			
10 -1-76	930	22.0		37277	54.89	73.5	1951	-480	-33			
10 -7-76	1105	28.0		37246	54.89	73.6	1915	-516	-35			
10-15-76	1320	36.1		37279	54.93	73.9	1905	-526	-35			
3 -8-77	1307	180-1		37276	54.89	73.5	1922	- 509	-35			
3 -8-77	1327	180.1	LCADING		54.89	73.5	1234	-1197	-76			
3 -6-77	1327	180.1	OCO7	37276	54.89							
3 -8-77	1328	180-1		FULLY LCA	10E0 400	73.5	1224	-1207	-72	0		
3 -8-77	1328	180.1	•0000	37276	54.89			2100 FSI				
3 -8-77	1332	180.1	- CC2 E	37276		73.5	- 5166	-7557	-431	-359	C	0.
3 -8-77	1337	100-2	-0063	37276	54.89	73.5	-5551	-7582	-453	-361	-22	C104
3 -6-77	1457	180-2	.0618	37272	54.89	73.5	-5566	-7597	-453	-381	-22	01046
3 -8-77	1525	180.2	•0613	37274	54.89	73.6	-5641	-8072	-458	-386	-27	C128
3 -8-77	1650	180.3	-1403	37274	54.85	73.5	-5644	-8075	-456	-386	-27	0128
3 -9-77	1555	181.2	1.1021		54.89	73.6	-5669	-8100	-459	-387	-28	0133
3-10-77	1617	162.3	2-1	37274	54.89	73.6	-5862	-6293	-470	-396	-35	C185
3-11-77	1546	183.2	3.1	37285	54.88	73.4	-6035	-8466	-480	-408	-49	0233
3-12-77	1202	184.1	3.9	37279	54.89	73.5	~6109	-8540	-484	-412	-53	02524
3-13-77	1326	185.1	5.0	373C3	54.26	73.2	-6177	-6606	-489	-417	-58	02762
3-15-77	1230	187.1	7.0	37297	54.86	73.2	-6249	-8680	-492	-420	-61	C2905
3-16-77	1547	188.2	2.1	37311	54.85	73.0	-6320	- e 751	-497	-425	-66	03143
3-24-77	1138	196.1	15.9	37311	54.85	73.0	-6382	-8613	-500	-428	-69	C3286
4 -6-77	1446	209-2	29.1	37258 37251	54 - 86	73.2	-6670	-9101	-516	-444	- 8 5	C4 C4 E
4-26-77	1041	229.0	48.9		54.87	73.3	-7085	-9516	-539	-467	-108	05143
5 -9-77	1347	242.2	62.0	37297 37309	54-86	73.2	-7359	-9830	-557	-485	-126	06000
5-24-77	938	257.0	76.8	37296	54.85	73.1	-7570	-10001	-567	-455	-136	CE 476
6-17-77	856	281.0	100.6	37262	54.87	73.3	-7717	-10148	-575	- £03	-144	OE e 5 7
7 -6-77	1056	300.0	119.9		54.91	73.7	-7959	-10390	-587	-515	-156	67425
7-13-77	850	307.0	126.8	37273 37285	54.29	73.6		-10576	-598	-526	-167	07952
7-18-77	920	312.0	131.6	37275	54.88	73.4	-8174	-10605	-600	-526	-169	CE04E
7-25-77	216	318.9	138.8		54.89	73.5	-8271	-10702	-605	-533	-174	08286
8 -2-77	242	326.9	146.8	37265	54.90	73.7	-6361	-10512	-611	-539	-180	08571
8-22-77	808	346.9		37230	54.95	74.2	-6464	-10515	-616	-544	-185	ceeic
9 -9-77	806	364.9	166.E 164.8	37256	54.92	73.8	-8612	-11C43	-624	-552	-153	09190
9 -9-77	812	364.9		37276	54.89	73.5	-8769	-11200	-633	-561	-202	05615
9 -9-77	812	364.9	SPECIFER	(S) FULLY (JALUADED,			STRESS				
9 -9-77	820	364.9		37277	54.89	73.5	-2575	-5406	-30e	-23£	123	
9 -9-77	1006	365.0		37275	54.89	73.5	-2832	-5263	-300	-228	131	
9 -9-77	1316			37266	54.90	73.7	-2750	-5221	-297	-225	134	
9-10-77	815	365.1		37275	54.89	73.5	-2515	-4546	-282	-210	145	
9-11-77	1117	365.9		37299	54.86	73.2	-2372	-4603	-275	-203	156	
9-11-77 9-12-77	758	367-1		37301	54.86	73.2	-2287	-4718	-270	-198	161	
9-12-77 9-13-77		367.9		37309	54.85	73.1	-2225	-4656	-267	-195	164	
9-13-77 9-26-77	922	369.0		37294	54.87	73.3	-2182	-4613	-264	-192	167	
	1433	382.2		37273	54.89	73-6	-1908	-4339	-248	-176	163	
0 -7-77	1639	393.3		37290	54.87	73.3	-1913	-4344	-249	-177	165	
0- <i>2</i> 0-77	926	406.0		37283	54.88	73.4	-1659	-4090	-234	-162	157	

MCDULUS: LOADING E= 5.8 AT AGE 1EC DAYS (STRESS LEVEL O TC 2100 PSI)

NOTE: MINUS DAYS UNDER LOAD INDICATES SPECIMEN LOADING TIME PRICE TO FULL LOAD

TABLE 12

ELASTIC AND CREEP STRAIRS (NOT CORRECTED FOR AUTUSENDUS STRAIRS) UNION ELECTRIC OPTION 1 CLASS E-1 ES7414 (SPECIMEN: SEALED 6 BY 16 IN. CONCRETE CYL.)

CALIBRATICA CINSTANTS:

METER RESISTANCE AT 0.0 DEGREES F. = 48.31 OHMS

TEMP. CALIBRATICA CONSTANT = 10.66 F/CPM CHANGE IN RESIST.

STRAIN CALIBRATICA CONSTANT = 9.15 MICROVOLTS/VOLT/MICHOSTRAIN

CALIBRATED HANCE = 11100 TC -10100 MICROVOLTS/VOLT

METER COFFF. OF THERMAL EXPANSION = 6.7 MICROSTRAIN/DEGREE F.

STRAIN INCREMENT FACTOR = 6 PERCENT STRAIN/DEGREE F.

STRAIN INCREMENT FACTOR = 6 PERCENT STRAIN/DEGREE F.

STRAIN METER NO. : 1001 73-17

AGE OF LEACING : 16C CAYS

TEST TEMPERATURE : 73 DEG. F.

ULT. STR. : 9180 PSI

APPLIED TEST STRESS : 2100 PSI

STRAIN INCREMENT FACTOR = 6 PERCENT FER. ULT. STR. AFFLIEC: 22.5 PERCENT

NOTE: FOR MODE 4 OR 5 VOLTS, AND MODE 3 PICKEVELTS -- THE BRIDGE VOLTAGE WAS 2.00000 VOLTS.

********	****	******	******	*******	*******	*******		******		PICECSTRAIS		
DATE	BMIT .		DAYS .		PRESIST.					EMPERATURE		
	•	# DAYS	# UNDER #		* CHMS	• DEGREE				*ELASTIC*		
	• ,	•	. LCAC .	VOLTE	•	* , F.	VCLTS	BACTAR	PEAY CHE	. ACFEEPS		CREEP
********	******	********	SFECIPE.	CACT					• • • • • • • • • • • • • • • • • • • •	••••••		•••••
9 9 -9-76	1000	0	SPECIFER	37641	55.15	74.9	16010	O	0			
9-10-76	1430	1.2		37166	55.03	73.1	15668	-342	-21			
9-16-76	1400	7.2		37203	54.9€	72.6	15494	-516	-32			
9-21-76	1145	12-1		37157	54.99	72.7	15437	-573	-35			
9-23-76 10 -1-76	915	22.0		37191	55.0C	72.8	15328	-682	-41			
10 -1-76	1105	26.0		3717E	55.01	72.9	15298	-712	-42			
10-15-76	1320	36-1		37211	54.97	72.5	15316	-694	-42			
3 -8-77	1307	186.1		37178	55.01	72.9	15104	-506	-53			
■ 3 -8-77	1327	186-1	LOADING									
3 -8-77	1327	180.1	0007	37178	55.01	72.9	15102	-508	-50	0		
* 3 -8-77	1328	100-1		FULLY LCA	DED, APFL	IED TEST	STRESS 2	100 FSI				
3 -8-77	1328	180-1	.0000	37178	55.01	72.9	8782	-7226	-376	-32€	C	0.
3 -8-77	1332	180-1	• C02E	37178	55.01	72.9	8430	-7580	-394	-344	-18	00857
3 -8-77	1337	180.2	.00€3	37176	55.01	72.9	8415	-7595	-395	-345	- 19	00905
3 -8-77	1457	180-2	.0618	37175	55.02	73.0	8334	-7676	-399	-349	-23	01095
3 -8-77	1525	180.2	.0013	37178	55.02	73.0	6324	-7686	-399	-349	-23	C1095
3 -8-77	1650	180.3	-1403	37175	55.02	73.0	8304	-7706	-400	-350	-24	01143
3 -9-77	1555	151.2	1-1021	37176	55.02	73.0	8096	-7914	-411	-361	-35	C1667
3-10-77	1617	162.3	2-1	37187	55.00	72.8	7939	-8C71	-419	-369	-43	02048
3-11-77	1546	183.2	3-1	37177	55.02	73.0	7860	-8150	-423	-373	-47	C223E
3-12-77	1202	184-1	3.5	372CE	54.98	72.6	7795	-8215	-427	-377	-51	02429
3-13-77	1326	165-1	5.0	37197	54.99	72.7	7720	-8290	-431	-3e1	-65	02615
3-15-77	1230	167-1	7 • C	37211	54.97	72.5	7651	-8359	-435	-365	-55	0281C
3-16-77	1547	186.2	6.1	37209	54.98	72.5	7583	-8427	-438	-388	-62	02952
3-24-77	1135	196.1	15.9	37201	54.99	72.6	7291	-8715	-453	-403	-77	03667
4 -6-77	1446	205.2	25.1	37156	54.99	72.7	6876	-9134	-474	-424	-98	04667
4-26-77	1041	229.0	46.5	37202	54.98	72.6	6557	-9453	-491	-441 -451	-115 -125	05476 05952
5 -9-77	1347	242.2	62.C	37209	54.98	72.5	6375	-9635	-501 -508	-451 -456	-125	06286
5-24-77	536	257.0	76.8	37196	54.99 55.03	72.7 73.1	6226 5994	-9784 -10016	-519	-469	-142	06286
6-17-77	856	281.0	100.8	37170	55.03	72.9	5018	-10192	-528	-478	-152	07238
7 -6-77	1056	300.0	119.5	37181	54.99	72.6	5790	-10220	-531	-481	-155	07381
7-13-77	850	307.0	126.8 131.8	37182	55.01	72.9	5695	-10215	-535	-465	-155	07571
7-18-77	920	312.0	138.8	37182	55-01	72.9	5597	-10413	-540	-490	-164	07810
7-25-77	81¢ 842	318.9	146.8	37140	55.06	73.5	5485	-10525	-544	-494	-166	08000
8 -2-77				37176	£5.02	73.0	5358	-10652	-552	-502	-176	08361
8-22-77	80E P06	346.9 364.9	166.8	37176	54.99	72.7	5183	-10627	-562	-512	-166	08857
9 -9-77	812	364.9	SEECIMEN	(S) FLLLY								
9 -9-77	612	364.9	SPECIMEN	37200	54.99	72.6	10914	-5096	-266	-216	110	
9 -9-77	650	364.9		37192	55.0C	72.8	11041	-4569	-260	-210	116	
9 -9-77	1000			37184	55.01	72.9	11056	-4954	-259	-209	117	
9 -9-77	1316	365.1		37195	54.99	72.7	11315	-4695	-246	-198	1,30	
9-10-77	815	365.9		37219	54.96	72.4	11451	-4559	-239	-189	137	
9-11-77	1117	367-1		37224	54.96	72.3	11543	-4467	-235	-185	141	
9-12-77		367.9		37229	54.95	72.2	11588	-4422	-232	-182	144	
9-13-77		365.0		37216	54.97	72.4	11638	-4272	-230	-160	146	
9-26-77	1433	382.2		37188	55.00	72.8	11896	-4114	-215	-165	161	
10 -7-77		393.3		37210	54.97	72.5	11871	-4139	-217	-167	159	
10-20-77		406.0		37201	54.99	77.6	12134	-3676	-203	-153	173	

MODULUS: LOADING

E= 6.4 AT AGE 180 DAYS (STRESS LEVEL O TC 2100 PSI)

NOTE: MINUS CAYS UNDER LEAD INDICATES SPECIMEN LOADING TIME PRICE TO FULL LEAD

TABLE J1

ELASTIC AND CREEP STRAINS (NOT CORRECTED FOR AUTOGENOUS STRAINS) UNION ELECTRIC OPTION 1 CLASS E-1 ESTA14 (SPECIMEN: SEALED 6 BY 16 IN. CONCRETE CYL.)

CALIBRATION CCNSTANTS:

METER RESISTANCE AT 0.0 DEGREES F. = 48.36 CHMS

TEMP. CALIERATICA CCNSTANT = 10.82 F/CHM CHANGE IN RESIST.

STRAIN CALIBRATICA CONSTANT = 8.66 MICROVOLTS/VOLT/MICROSTRAIN

CALIERATED RANGE = 11100 TO -10100 MICROVOLTS/VOLT

METER COEFF. OF THERMAL EXPANSION = 6.7 MICROSTRAIN/DEGREE F.

CONCRETE COEFF. OF THERMAL EXPANSION = 4.6 MICROSTRAIN/DEGREE F.

STRAIN INCREMENT FACTOR = 6 PERCENT PER ULT. STR. APPLIED: 22.9 PERCENT

NOTE: FOR MODE 4 OR 5 VOLTS, AND MODE 3 PICKOVOLTS -- THE BRIDGE VOLTAGE WAS 2.00000 VOLTS.

DATE	* TIME	* AGE.	P DAYS	* MCDE	*RESIST.		A 4000 -			PICECSTRAI		
		* DAYS	* UNDER		* CHMS		# #CDE 3		= + T	EFFERATURE		
	•			* VOLTS	# LMMS		* PICEC-		-* FROM	PELASTICA	CFEE	POSPECIFI
********	******	******	*******	*****		* F.	* VCLTS	PVCLTS	PEAY CHE	* +CREEP*		* CREEP
9 -9-76	1000	0	SPECIME	N CAST	********	*****	*******	****	*******	********	****	******
9-10-76	1430	1.2	0. 22.22	36903	£5.37							
9-16-76	1400	7.2		37C48	55.16	75.8	13023		0			
9-21-76	1145	12.1		37C88	55.13	73-8	12614	-409	-27			
9-23-76	915	14.0		37C82		73.3	12357		-43			
10 -1-76	930	22.0		34514	55-14	73.3	12303	-720	-46			
10 -7-76	1105	28.0		34514	58.48	109.5	10936	-2 CE7	-49			
10-15-76	1320	36.1		34574	58-48	109.5	11001	-2022	-45			
3 -8-77	1348	180-2	LOADING		58.40	108.6	10913	-2110	-52			
3 -8-77	1348	180-2	0007	34398								
3 -8-77	1349	180.2		34396 L EULES LE	58.63	111.2	9545	-3478	-114	C		
3 -8-77	1349	180-2	•C000	N FULLY LC/ 34398	ADED, APPL							
3 -8-77	1353	180-2	-002E		58.63	111.2	3623	-9400	-437	-323	C	0.
3 -8-77	1358	180.2		34398	58.63	111.2	3565	-9458	-440	-326	-3	0014
3 -6-77	1447	180.2	-0063	34398	58.63	111-2	3478	-9545	-445	-331	- 8	00381
3 -8-77	1556		-0402	34383	58.65	111.4	3205	-9616	-459	-345	-22	CI C4
3 -8-77	1642	180.2	-0682	34272	52.67	111.5	3071	-9552	-466	-352	-25	0138
3 -9-77		180.3	-1201	34367	58.68	111.6	3013	-10010	-469	-355	-32	01524
	1606	181.3	1.0951	34363	58.68	111.7	2505	-10516	-497	-363	-60	0285
3-10-77	1626	182.3	2 - 1	34377	58.66	111.5	2298	-10725	-508	-394	-71	0338
3-11-77	1554	183.2	3.1	34380	58.66	111-4	2147	-10E7E	-517	-403	-80	0381
3-12-77	1150	184.1	3.5	34373	5.8.67	111.5	2029	-10554	-523	-409	- 26	04095
3-13-77	1332	185.1	5.0	34365	58.68	111-6	1892	-11131	~530	-416	-53	04429
3-15-77	1156	167.1	€.5	34396	58.64	111.2	1752	-11271	-539	-425	-102	04857
3-16-77	1605	188.3	8-1	34379	58.66	111-4	1645	-11378	-544		-107	05095
3-24-77	1131	196.1	15.9	34368	58.67	111.6	1115	-11508	-572	~458	-125	06429
4 -6-77	1500	209.2	29.0	34360	58.68	111.7	777	-12246	-591		-154	07333
4-26-77	1053	229.0	48.9	34444	58.57	110.5	227	-12796	-623		-186	08857
5 -9-77	1327	242.1	€2.0	34297	58.77	112.6	-189	-13212	-641		-204	05714
5-24-77	1005	257.0	76.8	34332	58.72	112.1	-521	-13544	-660		-223	10619
6-17-77	842	280.9	100.8	34361	58.68	111.7	-961	-13984	-685		-248	11810
7 -6-77	1201	300.1	119.5	34309	56.75	112.5	-1281	-14304	-701		-264	12571
7-13-77	948	307.0	126-8	34331	58.72	112-1	-1389	-14412	-708		-271	12905
7-25-77	906	319.0	138.8	34355	52.69	111.8	-1641	-14664	-722		-265	13571
8 -5-77	1156	330 - 1	149.9	34307	58.76	112.5	-1811	-14834	-730		-293	
8-22-77	832	346.9	166.8	34397	58.64	111.2	-1996		-743		-243 -366	13952
9 -9-77	833	364.9	184.8	34361	58.68	111.7	-2312	-15335	-759		-322	14571
9 -9-77	840	364.9	SFECIPEN	(S) FULLY	UNLCADED.		TER TEET	STREES	-,,,	-643	-222	15333
9 -9-77	840	364.9		34377	58.66	111.5	3729		-430			
9 -9-77	850	365.0		34377	58.66	111.5	3899	-9124	-421	-316	7	
9 -9-77	1034	365.0		34366	58.68	111.6	4067	-8956	-412	-307	16	
9 -9-77	1326	365.1		34359	58.69	111.7	4169			-298	25	
9-10-77	825	365.9		34382	58.65	111.4	4368	-8854	-406	-292	31	
9-11-77	1127	367.1		34377	58-66	111.5		-8655	-396	-262	41	
9-12-77	612	367.9		34377	58.66	111.5	4467	-8556	-390	-276	47	
9-13-77	938	369.0		34402	51.63	111.1	4552	-8471	-386	-272	£1	
9-26-77	1519	382.2		34280	58.66		4740	-8283	-376	-262	61	
0 -7-77	1653	393.3		34423	58.60	111-4	4930	-8093	-365	-251	72	
				437723	20.00	110.8	5037	-75E6	-361	-247	7.6	

MCDULUS: LDADING

E= 6.5 AT AGE 180 DAYS (STRESS LEVEL 0 TO 2100 PSI)

NOTE: MINUS DAYS UNDER LCAD INDICATES SPECIPEN LCADING TIME PRICE TO FULL LCAD

TABLE J2

ELASTIC AAD CREEP STRAINS (NOT CORRECTED FOR AUTOGENOUS STRAINS) UNION ELECTRIC OPTICN 1 CLASS E-1 ES7414 (SPECIMEN: SEALED 6 BY 16 IN- CONCRETE CYL.)

CALIBRATION CONSTANTS: METER RESISTANCE AT 0.0 DEGREES F. = 48.65 DHMS STRAIN METER NO. : 996 AGE OF LEACING : 180 TEMP. CALIERATION CONSTANT STRAIN CALIBRATION CONSTANT 11-13 = 10.75 F/OHN CHANGE IN RESIST. = 8.84 MICRCVOLTS/VOLT/MICRCSTRAIN 180 DAYS TEST TEMPERATURE : 110 DEG. F. CALIBRATED RANGE CALIBRATED RANGE # 11100 TO -10100 FICROVCLTS/V METER COEFF. OF THERMAL EXPANSION # 6.7 MICROSTRAIN/DEGREE F. CONCRETE COEFF. OF THERMAL EXPANSION # 4.6 MICROSTRAIN/DEGREE F. # 11100 TO -10100 PICROVCLTS/VCLT LT. STR. : 9180. PSI APPLIED TEST STRESS : 2100. PSI PER. ULT. STR. APPLIED: 22.9 PERCENT STRAIN INCREMENT FACTOR 6 PERCENT

NOTE: FOR MODE 4 OR 5 VOLTS, AND MODE 3 PICKOVELTS -- THE BRIDGE VELTAGE WAS 2.00000 VELTS.

*******		******			******				2 1	12 Contract 1 (1)		
DATE	. TIME	. AGE.	DAYS	MODE	*RESIST.	* ****	*******	*****	*	PICFOSTRAL	V	
	•	DAYS	# UNDER		* CHMS	# DECREE	* PICEC-	PCHANGE	9	EMPERATURE	CORRE	CTED
	•	•		VOLTS		* F.	* VCLTS		# FROM	*ELASTIC*	CREEP	
*******	*******	*****	******	********	********		* *****	*******	TOAT GRE	# 4CREEP#		• CREEP
* 9 -9-76	1000		SPEC IPE	CAST						*********		*******
9-10-76	1430	1.2	. 11 576 7	36706	55.62	74.9	€003	á.	_			
9-16-76	1400	7.2		36848		73.0	5619	-384	0			
9-21-76	1145	12.1		36881	55.40	72.5	5388	-615	-25			
9-23-76	915	14.0		36877		72.6	5315	-688	-39			
10 -1-76	930	22.0		34289		108.9	4160	-1643	-43			
10 -7-76	1105	28.0		34247	58.84	109.5	4227	-1776	-32 -27			
10-15-76	1320	36.1		34314	58.75	108.5	4166	-1 617	-31			
\$ 3 -8-77	1348	180.2	LCACING				7100	-1617	-31			
3 -6-77	1348	180-2	0007	34180	58.92	110-4	2906	-3097	-90	_		
9 3 -8-77	1349	180.2	SPEC IPEN	FULLY LO		LED TEST	STORES 2	100 FSI	-90	0		
3 -8-77	1349	180-2	-0000	34180	58.92	110.4	-3482	-9485	-421			
3 -8-77	1353	180.2	-0026	34160	56.92	110-4	-3537	-9540	-431 -433	-341	0	0.
3 -8-77	1358	180.2	.0063	34180	58.92	110-4	-3602	-9605		-343	-2	00095
3 -8-77	1447	180.2	.0403	34163	58.95	110.7	-3802	-9605	-437 -447	-347	-6	00286
3 -8-77	1556	180.2	-0862	34150	58.96	110-9	-3916	-9519	-453	-357	-16	0762
3 -8-77	1642	180.3	-1261	34145	58-97	111.0	-3973	-9576	-456	-363	-22	01046
3 -9-77	1606	181.3	1.0951	34144	58.97	111.0	-4447	-10450	-481	-366	-25	61190
3-10-77	1626	182.3	2.1	34161	58.95	110.7	~4652	-10655	-492	-391 -402	-50	02361
3-11-77	1554	163.2	3.1	34164	50.95	110.7	-4781	-10784	-499		-61	02905
3-12-77	1150	184-1	3.9	34155	58.96	110-8	-4889	-10692	-505	-409	-68	0323€
3-13-77	1332	185-1	5.0	34152	58.96	110.8	-5004	-11007	-511	-415	-74	03524
3-15-77	1156	187.1	6.9	34186	58.92	110.4	-5133	-11136	-519	-421	-60	03810
3-16-77	1605	188.3	8-1	34169	58.94	110.6	-5245	-11248	-524	-429	- 6 6	04190
3-24-77	1131	196-1	15.5	34161	58.95	110.7	-5718	-11721	-549	-434	-93	04425
4 -6-77	1500	209.2	29.0	34155	58.96	110.8	-6064	-12067	-568		-116	05615
4-26-77	1053	229.0	48.9	34236	58.85	109.7	-6575	-12578	-597		-137	06524
5 -9-77	1327	242.1	62.0	34689	59.05	111.7	-6980	-12583	-614		-166	07905
5-24-77	1005	257.0	76.8	34125	59.00	111.2	-7304	-13307	-633		-163	06714
6-17-77	842	280.9	100.6	34154	58.96	110.8	-7747	-13750	-657		-202	09615
7 -6-77	1201	300-1	119.5	34100	59.03	111.6	-8046	-14 649	-672		-22E	10762
7-13-77	948	307.0	126-8	34126	59.00	111.2	-8149	-14152	-678		-241	11476
7-25-77	906	319.0	138.8	34135	58.98	111.1	-8390	-14393	-691		-247	11762
8 -5-77	1156	330-1	149.9	34099	59.03	111.6	-6558	-14561	-699		-260	12381
8-22-77	832	346.9	166.8	34190	58.91	110.3	-8749	-14752	-712		-268	12762
9 -9-77	633	364.9	164.6	34159	58.95	110.8	-8999	-15C02	-724		-261	13381
# 9 -9- 77	840	364-9	SPECIPEN	(S) FULLY		ZERC APP	IED TEST	STRESS	-124	-034	-293	13952
9 -9-77	840	364.9		34169	58.94	110.6	-2952	-8955	-402	-312	29	
9 -9-77	850	365.0		34169	58.94	110.6	-2752	-8755	-391	-301	40	
9 -9-77	1034	365.0		34164	58.95	110.7	-2597	-8600	-383	-293	48	
9 -9-77	1326	365.1		34159	58.95	110.7	-2490	-8493	-377	-287	54	
9-10-77	825	365.9		34167	58.91	110.3	-2297	-8300	-367	-277	64	
9-11-77	1127	367-1		34182	58.92	110-4	-2195	-8198	-362	-272	65	
9-12-77	812	367.9		34179	58.93	110.5	-2107	-8110	-357	-267	74	
9-13-77	938	369.0		34199	58.90	110-2	-1925	-7528	-348	-258	83	
9-26-77	1519	382.2		34183	58-92	110-4	-1725	-7728	-337	-247		
10 -7-77	1653	393.3		34224	58.67	109.8	-1607	-7610	-332	-242	94 95	
10-20-77	910	406-0		34153	58.96	110.8	-1505	-7508	-324	-234		
							-505		-324	-634	107	

MODULUS: LOADING

E= 6.2 AT AGE 180 DAYS (STRESS LEVEL 0 TO 2100 PSI)

NOTE: MINUS DAYS UNDER LCAD INDICATES SPECIPEN LOADING TIME PRICE TO FULL LCAD

TABLE K1

ELASTIC AND CREEP STRAINS (NOT CORRECTED FOR AUTOGENOUS STRAINS)
UNION ELECTRIC OPTION 1 CLASS E-1 ES7414
(SPECIMEN: SEALED 6 BY 16 IN. CONCRETE CYL.)

CALIBRATION CCNSTANTS:

METER RESISTANCE AT 0.0 DEGREES F. = 48.18 CHMS

TEMP. CALIBRATION CONSTANT = 10.84 F/GMM CHANGE IN RESIST.

STRAIN PETER NO.: 567 73-10

AGE OF LCADING: 369 DAYS

STRAIN CALIBRATION CONSTANT = 8.53 MICROVOLTS/VOLT/MICROSTRAIN

CALIBRATED RANGE = 11100 TO -10100 MICROVOLTS/VOLT

METER COEFF. OF THERMAL EXPANSION = 6.7 PICROSTRAIN/DEGREE F.

CONCRETE COEFF. OF THERMAL EXPANSION = 4.6 MICROSTRAIN/DEGREE F.

STRAIN INCREMENT FACTOR = 6 PERCENT PER. ULT. STR. 2100. PSI

STRAIN INCREMENT FACTOR = 22.3 PERCENT

NOTE: FOR HCDE 4 OR 5 VOLTS, AND MCDE 3 MICROVOLTS -- THE BRIDGE VOLTAGE WAS 2.00000 VOLTS.

***	****	*****	*******	****	*******		******	*******		PICRESTRAI	^	
		# AGE,	O DAYS	HODE				*CHANGE*	T	EPFERATURE	CCRREC	TED
		DAYS				DEGREE 4				PELASTICO		
	•	• *******	* LCAD * V		*		VOLTS			* 4CREEP*		CREEP
9 -8-76	1000	0	SPECIPEN CA		********						••••	
9 -9-76	1630	1.3		.37002	55.24	76.5	3520	0	0			
9-16-76	1400	8.2		.37166		74.3	2975	-545	-34			
9-21-76	1145	13.1		.37176		74.1	2802	-718	-44			
9-23-76	915	15-0		.37184		74.0	2764	- 756	-47			
10 -1-76	930	23.0		.37173 .37153		74.2 74.4	2702 2672	-218 -248	-50 -51			
10 -7-76 10-15-76	1105	29.0 37.1		•37133 •37179		74-1	2646	-274	-53			
10-21-76	1145	43.1		.37201		73.8	2615	-505	-55			
10-28-76	930	50.0		.37203		73.7	2580	-540	-57			
11 -4-76	1100	57.0	•	.37227	54.95	73.4	2530	-990	-61			
11-19-76	1430	72.2		.37525		69.3	2382	-1138	-78			
12 -7-76	917	90.0		.37251		73.1	2236	-1284	-78			
12 -7-76	1655	90.3		.37236		73.3 72.9	2234 2235	-128E -1285	-78 -78			
12 -8-76 12-20-76	817 1445	90.9 103.2		.37261 .37338		71.9	2157	-1363	-85			
1 -3-77	1145	117-1		.37357		71.6	2100	-1420	-89			
1-14-77	1200	128.1		.37327		72.0	2066	-1454	-90			
1-19-77	1050	133-0		.37326		72.0	2064	-1456	-90			
2 -3-77	945	148.0	-	.37299	54.86	72.4	2059	-1461	-89			
2 -5-77	826	149.9		.37313		72.2	2070	-1450	-89			
2-22-77	905	167-0		.37288		72.6	2044	-1476	-90			
3 -5-77	747	177.9		.37256		73.0	2076	-1444	-87			
3 -8-77	1525			.37252 .37246		73.1 73.1	2083	-1437 -1435	-87 -86			
3 -8-77 3 -9-77	1650 1555	181.3		•37236 •37236		73.3	2080	-1440	-86			•
3-10-77	1617			.37247		73.1	2069	-1451	-87			
3-11-77	1546	184.2		.37242		73.2	2069	-1451	-87			
3-12-77	1202			.37268		72.9	2079	-1441	-87			
3-13-77	1326	186-1	-	.37270	54.90	72.8	2082	-1438	-87			
3-15-77	1230			.37263		72.6	2080	-1440	-88			
3-16-77	1547			.37291		72.5	2091	-1429	-87			
3-24-77	1138	197.1		.37271		72.8 72.9	2065 2043	-1455 -1477	-88			
4 -6- 77 4-26-77	1446	210.2 230.0		.37261 .37265		72.9	2023	-1497	-90			
5 -9-77	1347	243.2		.37280		72.7	2014	-1506	-91			
5-24-77	938	258.0		.37271		72.8	2017	-1503	-91			
6-17-77	856	282.0	-	.37245	54.93	73.2	2153	-1267	-83			
7 -6-77	1056	301.0		.37223		73.5	2110	-1410	-84			
7-13-77	850	308.0		.37245		73.2	2145	-1375	-83			
7-18-77	920	313.0		.37222		73.5	2060	-1460	-87			
7-25-77	816	319.9		.37227 .37165		73.4 74.3	2075 2017	-1445 -1503	-86 -88			
8 -2-77 8-22-77	842 808	327.9 347.9		.37125 .37226		73.4	2005	-1515	-90			
9 -8-77	806	364.9		.37154		73.9	1998	-1522	-90			
8 9 -8-77	815		LOADING BEG									
9 -8-77	815	364.9		.37154	54.99	73.9	1998	-1522	-85	0		
# 9 -8-77	816	364.9	SPECIPEN FU					100 PSI				
9 -8-77	816	364.9		.37174		74.2	-4588	-8108	-432	-347	0	0.
9 -8-77	856	365.0		-37161		74.3	-5047	-8567	-456 -463	-371 -377	-24 -30	01143 01429
9 -8-77	1013	365.0		-3716L		74.3 74.4	-5152 -5279	-8672 -8799	-462 -468	-383	-36	01714
9 -8-77 9 -9-77	1410	365.2 366.0		.37156 .37154		74.4	-5649	-9169	-488	-403	-56	02667
9-10-77	815			.37194		73.9	-5589	-9109	-486	-401	-54	02571
9-11-77	1117	368.1		.37199		73.6	-5692	-9212	-491	-406	-59	02810
9-12-77	758			.37204		73.7	-5745	-9265	-494	-409	-62	02552
9-13-77	922			.37196		73.8	-5850	-9370	-500	-415	-68	03238
9-14-77	810			.37201		73.8	-5790	-9310	-497	-412	-65	03095
9-22-77	831	378.9		.37203		73.8	-6202	-9722	-518	-433	-66	04095
9-26-77	1433			-37168		74.2	-6337	-9857	-525 -544	-440 -459	-93 -112	04429
10 -7-77	1639			.37172 .37176		74.2	-6699 -6719	-10219 -10239	-545	-460	-113	05381
10-20-77	926	407.0	42.0 -	-3,1,0	55.02	74-1	-3119		343	700		

MODULUS: LOADING E= 6-1 AT AGE 365 DAYS (STRESS LEVEL 0 TC 2100 PS1)

NOTE: MINUS DAYS UNDER LOAD INDICATES SPECIMEN LOADING TIME PRICE TO FULL LOAD

TABLE K2

ELASTIC AND CREEP STRAINS (NOT CORRECTED FOR AUTOGENOUS STRAINS) UNION ELECTRIC OPTION 1 CLASS E-1 ES7414 (SPECIPEN: SEALED 6 BY 16 IN. CONCRETE CYL.)

CALIBRATION CONSTANTS:

METER RESISTANCE AT 0.0 DEGREES F. = 48.10 DHMS

STRAIN PETER NO.: \$68 73-11

TEMP. CALIBRATICA CONSTANT = 10.86 F/OHM CHANGE IN RESIST.

STRAIN CALIBRATICA CONSTANT = 8.79 PICROVOLTS/VOLT/MICROSTRAIN

CALIBRATED RANGE = 11100 TO -10100 PICROVOLTS/VOLT

METER COEFF. OF THERMAL EXPANSION = 6.7 PICROSTRAIN/DEGREE F.

STRAIN INCREMENT FACTOR = 6 PERCENT PER. ULT. STR. APPLIED: 22.3 PERCENT

NOTE: FOR MODE 4 OR 5 VOLTS, AND MODE 3 PICKEVELTS -- THE BRIDGE VELTAGE WAS 2.00000 VOLTS.

*******	*****	******			*******	******	*******	******		PICECSTRA	IN	
DATE	# TIME	# AGE,										
	•				* CHMS	. DEGREE						*SPECIFIC
				VCLTS	9	9 F.	* VCL15			* +CFEEF		O CREEP
00000000					********	,,,,,,,,,,,		*****	****	*******	*****	********
9 -8-76			SPEC IMEN	37112	55-10	76.0	5429	•	0			
9 -9-76 9-16-76		1.J 8.2		37278	54-89	73.7	5014	-415	-27			
9-21-76		13.1		37278	54.87	73.5	4831	-598	-38			
9-23-76		15.0		37299	54.86	73.4	4770	-659	-42			
10 -1-76		23.0		37293	54.87	73.5	4667	-762	-48			
10 -7-76		29.0		37268	54.90	73.8	4580	-849	-52			
10-15-76		37-1		37294	54.87	73.5	4536	-693	-55			
10-21-76		43.1		37331	54.82	73.0	4541	-686	-56			
10-26-76		50.0		37341	54-81	72.6	4502	-527	-58			
11 -4-76	1100	57.0		37365	54.78	72.5	4465	-964	-61			
11-19-76	1430	72.2		37397	54.74	72-1	4407	-1022	-65			
12 -7-76	917	90.0		37396	54.74	72.L	4306	-1123	-71			
12 -7-76	1655	90.3		37386	54.75	72.2	4306	-1123	-71			
12 -8-76	817	90.9		37401	54.73	72.0	4305	-1124	-71			
12-20-76		103.2		37485		70.9	4257	-1172	-76			
1 -3-77	1145	117-1		37515		70.4	4237	-1192	-79			
1-14-77	1200	128.1		37482		70.9	4224	-1205	-78			
1-19-77	1050	133.0		37478	54.63	70.9	4233	-1,196	-78			
2 -3-77		148-0		37447	54-67	71.4	4216	-1213	-78			
2 -5-77		149.9		37458		71-2	4222	-1207	-78			
2-22-77		167.0		37433		71.6	4206 4236	-1 <i>2</i> 23 -1193	-78 -75			
3 -5-77		177.9		37403 37397	54.73 54.74	72.0 72.1	4238	-1191	-75			
3 -8-77 3 -8-77		181.2		37391	54.74	72.2	4244	-1185	-75			
3 -9-77		182.2		37380		72.3	4234	-1195	-75			
3-10-77		183.3		37394	54.74	72-1	4225	-1204	-76			
3-11-77		184.2		37389		72.2	4225	-1204	-76			
3-12-77		185.1		37418	54.71	71.8	4234	-1195	-76			
3-13-77		186.1		37417	54.71	71-8	4237	-1192	-76			
3-15-77		100-1		37438	54.68	71.5	4240	-1189	-76			
3-16-77	1547	189.2		37449	54.67	71.3	4248	-1181	-76			
3-24-77	1138	197-1		37423	54.70	71.7	4222	-1207	-77			
4 -6-77	1446	210-2		37396		72-1	4193	-1236	-78			
4-26-77		230.0		37392		72.1	4172	-1257	-79			
5 -9-77		243.2		37416	54.71	71.8	4184	-1245	-79			
5-24-77		258-0		37406		72.0	4186	-1243	-78			
6-17-77		282-0		37372	54.77 54.79	72.4	4154	-1275	-79 -80			
7 -6-77 7-13-77		301.0		37380	54.76	72.6 72.3	4123	-1306 -1282	-80			
7-18-77		313.0		37357	54.79	72.6	4065	-1364	-84			
7-25-77		319.9		37382		72.3	4080	-1349	-84			
8 -2-77		327.9		37310	54.85	73.3	4040	-1389	-84			
8-22-77		347.9		37378	54.76	72.3	3986	-1443	-89			
8 9 -8-77		364.9	LOADING	BEGINS		1745			- F.			
9 -8-77	815	364.9	0007	37291	54.87	73.5	3983	-1446	-82	0		
0 9 -8-77	816	364.9	SPECIPEN	FULLY LC	ADED, APPL	IED TEST	STRESS 2	100 PSI				
9 -8-77	816	364.9	-0000	37279	54.89	73.7	-2307	-7736	-419	-337	0	0.
9 -8-77	856	365-0	.0278	37266	54.90	73.9	-2717	-8146	-441	-359	-22	01048
9 -8-77	1013	365.0	-0813	37266		73.9	-2815	-8244	-446	-364	-27	01286
9 -8-77	1410	365.2		37256	54.92	74.0	-2920	-8349	-451	-369	-32	01524
9 -9-77	1006	366.0	1.0764	37259	54-91	74.0	-3256	-8685	-469	-387	-50	02381
9-10-77	815	366-9	1.9993	37299	54-86	73.4	-3163	-8592	-465	-383	-46	02190
9-11-77	1117	366-1	3-1	37306	54.85	73.3	-3261	-8690	-471	-389	-52	02476
9-12-77	758	368.9	4.0	37311	54-85	73.3	-3308	-8737	-474	-392	-66	02615
9-13-77	922	370.0	5.0	37299	54.86	73.4	-3403	-8832	-478	-396	-59	02810
9-14-77	810	370.9	6.0	37304 37306	54-85 54-85	73.4	-3336	-8765 -0146	-475 -407	-393	-56	02667
9-22-77 9-26-77	831 1433	378.9 383.2	14.0 18.3	37266	54.90	73.3 73.9	-3737 -3857	-9166 -9286	-497 -502	-415 -420	-7e -83	03714
10 -7-77	1639	394.3	29.3	37275	54.89	73.6	-4207	-9226 -9636	-502 -521	-420	-102	03952
10-20-77	926	407.0	42.0	37261	54.86	73.7	-4218	-9647	-522	-440	-102	04857 04905
	720	77.10	~~~				-4510	,	- 46.6	-770	-103	-007703

MODULUS: LOADING E= 6.2 AT AGE 365 DAYS (STRESS LEVEL 0 TC 2100 PSI)

NOTE: MINUS DAYS UNDER LOAD INDICATES SPECIMEN LOADING TIME PRIOR TO FULL LOAD

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TABLE L1

ELASTIC AND CREEP STRAIRS (NOT CORRECTED FOR AUTOGENOUS STRAIRS) UNION ELECTRIC OPTION 1 CLASS E-1 ES7414 (SPECIMEN: SEALED 6 BY 16 IN. CONCRETE CYL.)

CALIBRATION CONSTANTS: METER RESISTANCE AT 0.0 DEGREES F. - 48-06 CHMS STRAIN PETER NO.: 929 AGE OF LCADING 2 365 TEST TEMPERATURE: 110 11-08 TEMP. CALIBRATION CONSTANT STRAIN CALIBRATION CONSTANT CALIBRATED RANGE = 10.87 F/CH# CHANGE IN RESIST.
= 8.80 HICROVOLTS/VOLT/MICROSTRAIN DAYS DEG. F. = 11100 TO -10100 MICROVOLTS/VOLT = 6.7 PICRCSTRAIN/DEGREE F. METER COEFF. OF THERMAL EXPANSION = CONCRETE COEFF. OF THERMAL EXPANSION= STRAIN INCREMENT FACTOR = : 9430. PSI APPLIED TEST STRESS : 2100. PSI PER. ULT. STR. APPLIED: 22.3 PER 4.6 MICRESTRAIN/DEGREE F. 6 PERCENT 22.3 PERCENT

MOTE: FOR MCDE 4 OR 5 VOLTS, AND MODE 3 MICROVOLTS -- THE BRIDGE VOLTAGE WAS 2.00000 VOLTS.

DATE	ė iine		* DAYS * * UNDER *		* OHMS	* TEMP.						CTED
	*		. LCAD .		* URMS	• DEGREE	* WICKO-			PELASTICA		
*******		******		*******	*******	******	* *****	440112	DAY UNE	9 +CREEP+		* CREEP
9 9 -8-76	1000	0	SPECIPEN	CAST							*****	
9 -9-76	1630	1.3		37147	55.05	76.0	4103	0	0			
9-16-76	1400	8.2		37308	54-85	73.8	3687	-416	-27			
9-21-76	1145	13-1		37321	54.83	73.6	3393	-710	-44			
9-23-76 10 -1-76	915	15-0		37329	54-62	73.5	3306	-797	-50			
10 -7-76	930	23.0		34728	58.20	110-2	1865	-2238	-54			
10-15-76	1320	37.1		34702	58.23 58.16	109.8	1387	-2716	-81			
10-21-76	1210	43.1		34663	58.28	111-1	1200	-2686 -2903	-92 -90			
10-28-76	930	50.0		34648	50.30	111.3	1132	-2571	-94			
11 -4-76	1110	57.0		34658	58.29	111.2	1072	-3031	-97			
11-19-76	1500	72.2		34601	58.36	112.0	1034	-3669	-98			
12 -7-76	940	90.0		34616	56-34	111-8	832	-3271	-110			
12 -7-76	1645	90.3		34624	58.33	111-7	e 25	-3278	-110			
12 -8-76 12 -9-76	145	90.9 91.7		34608	50.36	111.9	815	-3268	-110			
12-15-76	1220	98.1		34693 34622	58.24 58.34	110.7	832	-3271	-112		100	
12-20-76	1445	103.2		34624	58.33	111.7	752 724	-3351 -3379	-114 -116			
12-23-76	845	105.9	•	34592	58.38	112-1	704	-3399	-116			
1 -3-77	1145	117-1		34619	58.34	111-8	635	-3466	-121			
1-14-77	1330	128-1		34657	58.29	111.2	587	-3516	-125			
1-20-77	1155	134.1		34654	58.29	111.2	557	-3546	-127			
2 -3-77	1000	148.0		34628	50.33	111-6	495	-3608	-129			
2 -5-77 2-22-77	754	149.9		34643	58.31	111.4	€07	-3596	-129			
3 -5-77	836	166.9 177.9		34625	58.33	111-7	400	-3703	-135			
3 -8-77	1556	181.2		34606	58.33 £8.36	111.6	340 321	-3763 -3782	-136			
3 -8-77	1642	181.3		34603	56.36	112.0	321	-3782	-138 -138			
3 -9-77	1606	182.3		34622	58.34	111-7	323	-3780	-139			
3-10-77	1626	183.3		34638	58.32	111.5	323	-3780	-139			
3-11-77	1554	184.2		34642	58.31	111.4	315	-3788	-140			
3-12-77	1150	185.1	•	34636	58.32	111.5	310	-3793	-140			
3-13-77	1332	186-1		34630	58.33	111.6	305	-3798	-140			
3-15-77	1156	188-1		34656	58.29	111.2	300	-3603	-141			
3-16-77 3-24-77	1131	189.3 197.1		34636 34631	58.32 58.32	111.5	295	-3606	-141			
4 -6-77	1500	210.2		34622	58.34	111.6	245 412	-3658 -3651	-144 -134			• ••
4-26-77	1053	230.0		34704	56-23	110-5	260	-3843	-145			
5 -9-77	1327	243.1		34567	56.41	112.5	135	-3568	-148			
5-24-77	1005	258.0		34602	58.36	112.0	50	-4053	-154			
6-17-77	842	281.9		34629	58.33	111.6	-46	-4149	-160		100	
7 -6-77	1201	301-1		34561	58.39	112.3	-104	-4207	-162			
7-13-77 7-25-77	948 906	308.0 320.0		34603 34615	58.36 58.35	112-0	-126	-4229	-164			
8 -5-77	1156	331.1		34577	58.40	111.8	-181 -221	-4284 -4324	-167 -168	ting in the second		
8-22-77	832	347.9		34670	58.27	111.0	-241	-4344	-172			
8 9 -6-77	832	364.9	LCADING !				777		• • • • • • • • • • • • • • • • • • • •			
9 -8-77	832	364.9	0007	34574	58-40	112.4	-311	-4414	-159	0		
9 -8-77	833	364.9		FULLY LCA								
9 -8-77	633	364.9	.0000	34567	58-41	112.5	-6539	-10642	-493	-334	0	0-
9 -8-77	849	365.0	.0111	34574	58.40	112-4	-6709	-10612	-502	-343	-9	00425
9 -8-77 9 -8-77	1021	365.0 365.2	.0750 .2396	34574	58.40	112.4	-7019	-11122	-519	-360	-26	01236
9 -9-77	850	366.0	1.0118	34566 34604	58.41 58.36	112.5	-7231	-11334	-530 -555	-371	-37	01762
9 -9-77	1034	366.0	1-0840	34599	58.37	112.0	-7677 -7732	-11780 -11835	-555 -558	-396	-62	02952
9-10-77	825	366.9	1.9944	34618	58.34	111.8		-11979	-566	-399 -407	-05 -73	03095
9-11-77	1127	368-1	3-1	34609	58.35	111.9		-12131	-574	-415	-73 -81	03476
9-12-77	812	368.9	4.0	34607	58.36	111.9	-7985		-572	-413	-79	03762
9-13-77	938	370.0	5-0	34638	58.32	111.5			-572	-413	-76	03762
9-14-77	925	371.0	6-0	34570	58-41	112.5	-8284	-12387	-586	-427	-93	04429
9-22-77	853	379.0	14.0	34640	58.31	111.5		-12696	-605	-446	-112	05333
9-26-77	1519	383.2	18.3	34640	58.31	111.5	-6814		-617	-458	-124	05905
10 -7-77	1653 910	394.3 407.0	29.3 42.0	34735 34610	58.19 58.35	110-1		-13218 -13435	-636 -644	-477	-143	06810
10-20-77										- (-151	07190

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MODULUS: LOADING E= 6.3 AT AGE 365 DAYS (STRESS LEVEL 0 TO 2100 PSI)

NOTE: MINUS DAYS UNDER LEAG INDICATES SPECIFEN LOADING TIME PRICE TO FULL LOAD

TABLE L2

ELASTIC AND CREEP STRAIRS (NCT CORRECTED FOR AUTOGENOUS STRAIRS) UNION ELECTRIC OPTION 1 CLASS E-1 ES7414 (SPECIMEN: SEALED 6 BY 16 IN. CONCRETE CYL.)

CALIBRATION CONSTANTS:

METER RESISTANCE AT 0.0 DEGREES F. = 48.16 CHMS

TEMP. CALIBRATION CONSTANT = 10.85 F/CHM CHANGE IN RESIST.

STRAIN CALIBRATION CONSTANT = 8.90 MICROVOLTS/VOLT/MICROSTRAIN

CALIBRATED RANGE = 11100 TO -10100 MICROVOLTS/VOLT

METER COEFF. OF THERMAL EXPANSION = 6.7 MICROSTRAIN/DEGREE F.

CONCRETE COEFF. OF THERMAL EXPANSION = 4.6 MICROSTRAIN/DEGREE F.

STRAIN INCREMENT FACTOR = 6 PERCENT STRESS : 2100. PSI

PER. ULT. STR. APPLIED: 22.3 PERCENT

NOTE: FOR MCDE 4 OR 5 VOLTS, AND MODE 3 MICROVOLTS -- THE BRIDGE VOLTAGE WAS 2.00000 VOLTS.

	*******	*****		*******	*******	*******	*******	******	*****	**	MICENSTRAI	N
	DATE	8 TIME	# AGE.	+ DAYS	MODE	PRESIST.	. TEMP.	# MODE 3	#CHANG	F 8 T	EMBEDATUDE	CORRECTED
		•	* DAYS			* CHMS	DEGREE	· MICEO-	#MI CRC	-\$ FROM	SEL ASTICA	CREEPOSPECIFIC
				* LCAD	. VOLTS	•	• F.	* VOLTS			+CREEP+	
	*******	*****	******		*******	*******	*******	******	****	****	44444444	**********
	0 9 -8-76		0	SPECIPE							*********	
	9 -9-76		1.3	U. 11111	37059	55.17	76.0	10506	0	0		
	9-16-76		0.2		37216			10004				
	9-21-76		13.1		37233		73.6		-=02			
								9896	-610			
	9-23-76		15-0		37237		73.6	9862	-644	-40		
	10 -1-76		23.0		34642		110-1	8469	-2037			
	10 -7-76		29.0		34638		110-2	8296	-2210			
	10-15-76		37.1		34689		109.5	8047	-2459	-67		
	10-21-76		43.1		34586	58.38	110.9	7798	-2708	-78		
	10-28-76	930	50.0		34553	58.43	111.4	7574	-2532	~89		
	11 -4-76	1110	57-0		34572	58-40	111-1	7511	-2995	-94		
	11-19-76	1500	72.2		34534	58.45	111-7	7498	-3008	-93		
	12 -7-76	940	90.0		34551		111.4	7278	-3228			
	12 -7-76	1645	90.3		34557	58.42	111.4	7269	-3237			
	12 -8-76		90.9		34540	58.45	111.6	7257	-3249	-107		
	12 -9-76		91.7		34626	58.33	110-4	7278	-3228			
	12-15-76		98-1		34557							
	12-20-76		103.2				111-4	7167	-3339	-112		
	The second secon				34557		111-4	7123	-3383	-115		
	12-23-76		105.9		34525		111-8	7091	-3415	-116		to the state of t
	1 -3-77	1145	117-1		34553	58.43	111-4	7009	-3497	-121		
	1-14-77	1330	128-1		34589		110.9	6946	-3560	-126		
	1-20-77	1155	134-L		34586		110.9	6907	-3599	-128		
	2 -3-77	1000	148.0		34563	58.42	111.3	6824	-3682	-132		
	2 -5-77	754	149.9		34500	58.39	111.0	6829	- 3677	-132		
	2-22-77	836	166.9		34555	56.43	111-4	6692	-3614	-139		
	3 -5-77	800	177-9		34557	58.42	111.4	6622	-3684	-143		
	3 -8-77	1556	181.2		34538	58.45	111.6	6606	-3900	-143		
	3 -8-77	1642	181.3		34536		111-7	6599	-3907	-144		
	3 -9-77	1606	182.3		34554	58.43	111.4	6600	-3906	-144		
	3-10-77	1626	183.3		34571	58.40	111-2	6596	-3910	-145		
	3-11-77	1554	184.2		34572		111-1	6588	-3518	-145		
	3-12-77	1150	185.1		34570	58-41	The second secon					
	3-13-77	1332	186-1		34560		111.2	6586	-3520	-145		
						58.42	111-3	6575	-3931	-146		
	3-15-77	1156	188.1		34586	58.38	110.9	6573	-3933	-147	*	
	3-16-77	1605	189.3		34569	58.41	111.2	6563	-3943	-147		
	3-24-77	1131	197-1		34558	58.42	111-3	6510	-3996	-149		
	4 -6-77	1500	210.2		34547	50.44	111.5	6652	-3654	-141		
	4-26-77	1053	230.0		34629	58.33	110.3	6488	-4018	-153		
	5 -9- 77	1327	243-1		34492	58.51	112.3	6356	-4150	-156		
	5-24-77	1005	258.0		34527	58.46	111.6	6280	-4226	-161		
	6-17-77	642	281.9		34556	58.42	111-4	6189	-4217	-167		
	7 -6-77	1201	301-1		34509	58.49	112.1	6129	-4377	-169		
	7-13-77	948	308-0		34526	58.46	111.8	6100	-4406	-171		
	7-25-77	906	320.0		34542	58.44	111-6	6053	-4453	-175		
	8 -5-77	1156	331-1		34502	58.50	112.2	6006	-4500	-176		
	8-22-77	832	347.9		34595	58.37	110.8	5987	-4519	-180	talan tahun 1996	
-	9 -8-77	832	364.9	LUADING								
	9 -8-77	832	364.9	0007	34496	58-50	112.2	5902	-4604	-167	0	
1	9 -8-77	833	364.9		FULLY LCA					•••		
	9 -8-77	833	364.9	•0000	34487	58.52	112-4		-11012	-506	-339	0 0.
	9 -8-77	849	365.0	.0111	34489	58.51	112.3	-684	-11190			
	9 -8-77	1021	365.0	-0750	34492	58.51				-516 -570	-349	-10C0476
									-11500	-532	-365	-2601236
	9 -8-77	1418	365-2	-2396	34486	58-52	112-4		-11717	-544	-377	-3801810
	9 -9-77	. 850	366-0	1.0118	34524	58.47	111.6		-12083	-564	-397	-5802762
	9 -9-77	1034	366.0	1.0840	34519	58.47	111.9		-12123	-566	-399	-6002857
	9-10-77	825	366.9	1.9944	34534	58.45	111.7		-12248	-573	-406	-670319C
	9-11-77	1127	368.1	3 · t	34527	50.46	111.8	-1892	-12398	-581	-414	-7503571
	9-12-77	812	368.9	4-0	34527	58.46	111.8	-1852	-12358	-579	-412	-7303476
	9-13-77	938	370.0	5.0	34554	58.43	111.4	-1850	-12356	-580	-413	-7403524
	9-14-77	925	371-0	6.0	34483	58.52	112.4	-2165	-12671	-594	-427	-8804190
	9-22-77	853	379.0	14.0	34558	58.42	111.3		-12991	-613	-446	-10705095
	9-26-77	1519	383.2	10.3	34553	58.43	111.4	-2710	-13216	-625	-458	-11905667
	10 -7-77	1653	394.3	29.3	34608	58.36	110.6	-3021	-13527	-643	-476	-13706524
	10-20-77	910	407.0	42.0	34518	58.47	111.9		-13764	-653	-486	-14707000
						-24-7		3230	10704	-055	-466	

MODULUS: LOADING

E- 6.2 AT AGE 365 DAYS (STRESS LEVEL O TO 2100 PSI)

NOTE: MINUS DAYS UNDER LOAD INDICATES SPECIMEN LOADING TIME PRIOR TO FULL LOAD

TABLE M1

ELASTIC AND CREEP STRAINS (NOT CORRECTED FOR AUTOGENOUS STRAINS) UNION ELECTRIC OPTION 1 CLASS E-1 ES7414 (SPECIMEN: SEALED 6 BY 16 IN- CONCRETE CYL.)

CALIBRATION CONSTANTS:
METER RESISTANCE AT 0.0 DEGREES F.
TEMP. CALIBRATION CONSTANT
STRAIN CALIBRATION CONSTANT # 48.18 CMMS
10.84 F/CMM CHANGE IN RESIST.
8.93 PICROVOLTS/VOLT/MICROSTRAIN STRAIN METER NO.: 987 AGE OF LCADING : YEST TEMFERATURE: 73 73-10 DAYS CALIBRATED RANGE = 11100 TO -10100 MICROVOLTS/VOLT
METER COEFF. OF THERMAL EXPANSION = 6.7 MICROSTRAIN/DEGREE F.
CONCRETE COEFF. OF THERMAL EXPANSION = 4.6 MICROSTRAIN/DEGREE F.
STRAIN INCREMENT FACTOR = 0 PERCEME DEG. F. O. PSI APPLIED TEST STRESS : 0. PSI PER. ULT. STR. APPLIED: I PERCENT

DATE		. AGE.	8		^	MACC		-		MOCE -	AC		PICEGSTRAI	
DAIL	-	DAYS	•	DAYS		MODE 4 OR 5	PRESIST.			MODE 3				CORRECTED
		8	ī	LCAD	•	VOLTS	9		DEGREE 4	VOLTS	OMICRC-0			CREEPOSPECIF
******	*****			****		*****		• •		****	4444444	AY UNE	* +CREEP*	* CREEP
9 -8-76	1000	0		SPEC IM	FN.	CAST		-			***********			*********
9 -9-76	1630	1.3		-,		37002	55.24		76.5	3520	0			
9-16-76	1400	8.2				37166	55.03		74.3	2975	-545	-34		
9-21-76	1145	13-1				37176	55.02		74-1	2802	-718	-44		
9-23-76	915	15.0				37184	55-01		74.0	2764	-756	-47		
0 -1-76	930	23.0				37173	55.02		74.2	2702	-818	-50		
0 -7-76	1105	29.0				37153	55-05		74.4	2672	-648	-51		
0-15-76	1320	37.1				37179	55.01		74.1	2646	-674	-53		
0-21-76	1145	43-1			. .	37201	54.99		73.8	2615	-905	-55		
0-28-76	930	50.0				37203	54.98		73.7	2580	-940	-57		
1 -4-76	1100	57.0				37227	54.95		73.4	2530	-890	-61		
1-19-76	1430	72-2				37525	54.57		69.3	2382	-1130	-78		
2 -7-76	917	90.0	•			37251	54.92		73.1	2236	-1284	-78		
2 -7-76	1655	90.3				37236	54.94		73.3	2234	-1286	-78		
2 -8-76	817	90.9				37261	54.91		72.9	2235	-1285	-78		
2-20-76	1445	103-2				37338	54-81		71.9	2157	-1363	-85		
1 -3-77	1145	117-1				37357	54.79		71.6	2100	-1420	-89		
1-14-77	1200	128-1				37327	54.83		72.0	2066	-1454	-90		
1-19-77	1050	133.0				37326	54.83		72.0	2064	-1456			
2 -3-77	945	148.0				37299	54.86		72.4			-90		
2 -5-77	826	149.9				37313	54.84		72.2	2059 2070	-1461	-89		
2-22-77	905	167.0				37288	54.88				-1450	-89		
3 -5-77	747	177.9				37256	54.92	:	72.6	2044	-1476	-90		
3 -8-77	1525	181.2				37252	54.92		73.0 73.1	2076	-1444	-87		
3 -8-77	1650	181.3				37246	54.93			2083	-1437	-87		
3 -9-77	1555	182.2				37236	54.94		73-1	2085	-1435	-86		
3-10-77	1617	183.3				37247	54.93		73.3 73.1	2080	-1440	-86		
3-11-77	1546	184.2				37242	54.93		73.2	2069	-1451	-87		
3-12-77	1202	185-1				37268	54.90			2069	-1451	-87		
3-13-77	1326								72.9	2079	-1441	-87		
3-15-77	1230	186.1				37270	54-90		72.8	2062	-1438	-87		
3-16-77		188.1				37263	54.88		72.6	2080	-1440	-88		
7.1	1547	189.2				37291	54-87		72.5	2091	-1429	-87		
3-24-77	1138	197-1				37271	54.90		72.8	2065	-1455	-88		
-6-77	1446	210.2				37261	54.91		72.9	2043	-1477	-89		
1-26-77	1041	230.0				37265	54.90		72.9	2023	-1497	-90		
5 -9-77 5-17-77	1347	243.2				37280	54.88		72.7	2014	-1506	-91		•
5-1/-// 5-24-77	823 938	250.9 258.0				37289	54.87		72.6	2016	-1504	-92		
7 -6-77	1056	301.0				37271	54.90		72.8	2017	-1503	-91	1.1	
7-13-77	850	308.0				37223	54.96		73.5	2110	-1410	-84		
7-10-77	920					37245	54.93		73.2	2145	-1375	-83		
1-10-77 1-25-77		313.0				37222	54.96		73.5	2060	-1460	-87		
-2-77	816	319.9				37227	54.95		73.4	2075	-1445	-86		
	842	327-9				37165	55.03		74.3	2017	-1503	-88		
-8-77	815	364.9				37194	54.99		73.9	1998	-1522	-90		

TABLE M2

ELASTIC AND CREEP STRAINS (NOT CORRECTED FOR AUTOGENOUS STRAINS) UNION ELECTRIC OPTION 1 CLASS E-1 ES7414 (SPECIMEN: SEALED 6 BY 16 IN- CONCRETE CYL-)

TEMP. CALIERATION CONSTANT STRAIN CALIBRATION CONSTANT	# 10.86 F/OHM CHANGE IN RESIST. # 8.79 MICROVOLTS/VOLT/MICROSTRAIN	STRAIN PETER NO. 1 AGE OF LCADING 1 TEST TEMPERATURE 1	DAYS
CALIBRATED RANGE METER COEFF. OF THERMAL EXPANSION CONCRETE COEFF. OF THERMAL EXPANSION STRAIN INCREMENT FACTOR	A A MICROSTRAIN/DEGREE F. API	T. STR. : PLIED TEST STRESS : R. ULT. STR. APPLIED:	G. PSI G. PSI I PERCENT

*****	*****		DAYS 8	MODE	*****	A TEMO -	MCDE 3	#CHANGE #-	т	EPPERATURE	CCRPECTED
DATE	T TIME				O OHMS	. DEGREE		*MICRO-*	FROM	*ELASTIC*	CREEP+SPECIF
	•	DAYS	# LOAD #		•		VOLTS			. +CREEP+	• CREEP
			******	******	*******	********	******	********	****	********	*********
9 -8-76	1000	0	SPECIPEN	CAST							
9 -9-76	1630	1.3		37112	55-10	76.0	5429	0	0		
9-16-76	1400	8.2		37278	54.89	73.7	5014	-415	-27		
9-21-76	1145	13.1		37293	54.87	73.5	4831	-598	-38		
9-23-76	915	15.0		37299		73.4	4770	-659	-42		
0 -1-76	930	23.0		37293		73.5	4667	-762	-48		
10 -7-76	1105	29.0		37268	54.90	73.8	4580	-849	-52		
10-15-76	1320	37.1		37294	54.87	73.5	4536	-693	-55		
0-21-76	1145	43.1		37331	54.82	73.0	4541	-668	-56		1.5
0-28-76		50.0		37341	54.61	72.8	4502	-927	-58		
1 -4-76		57.0		37365	54.78	72.5	4465	-964	-61		
1-19-76	1430	72.2		37397		72.1	4407	-1022	-65		
2 -7-76		90.0		37396		72.1	4306	-1123	-71		
2 -7-76		90.3		37386	54.75	72.2	4306	-1123	-71		
2 -8-76		90.9		37401	54.73	72.0	4305	-1124	-71		
2-20-76		103.2		37485		70-9	4257	-1172	-76		
1 -3-77		117-1		37515	54.59	70.4	4237	-1192	-79		
1-14-77		128-1		37482		70.9	4224	-1205	-78		
1-19-77		133.0		37478		70.9	4233	-1196	-78		
2 -3-77		148.0		37447		71.4	4216	-1213	-78		
2 -5-77		149.9		37458	54.66	71.2	4222	-1207	-78		
2-22-77		167-0		37433	54.69	71.6	4206	-1223	-78		
3 -5-77		177.9		37403	54.73	72.0	4236	-1193	-75		
3 -8-77				37397	54.74	72.1	4238	-1191	-75		
3 -8-77		181.3		37391	54.74	72.2	4244	-1185	-75		
3 -9-77		182.2		37380	54.76	72.3	4234	-1195	-75		
3-10-77		183.3		37394	54.74	72.1	4225	-1204	-76		
3-11-77		184.2		37389	54.75	72.2	4225	-1204	-76		
3-12-77		185-1		37418	54.71	71.8	4234	-1195	-76		
3-13-77				37417	54.71	71.8	4237	-1192	-76		
3-15-77				37438		71.5	4240	-1189	-76		
3-16-77				37449		71.3	4248	-1181	-76		
3-24-77				37423		71-7	4222	-1207	-77		
4 -6-77				37396			4193	-1236	-78		
4-26-77				37392			4172	-1257	-79		
5 -9-77		and the second second		37416			4184	-1245	-79		
5-17-77	7 . 7 .			37419			4191	-1238	-78		
5-24-77				37406			4186	-1243	-78		
7 -6-77				37356			4123	-1306	-80		
7-13-77				37380			4147	-1282	-80		
7-18-77				37357			4065	-1364	-84		
7-25-77				37382			4080	-1349	-84		
8 -2-77		and the second second		37310			4040	-1389	-84		
9 -8-77				37291			3983	-1446	-86		
9 - 0- 11	815			37291			3983	-1446	-86		

ELASTIC AND CREEP STRAIRS (NOT CORRECTED FOR AUTOGENOUS STRAIRS) UNION ELECTRIC OPTION 1 CLASS E-1 ES7414 (SPECIPEN: SEALED 6 BY 16 IN- CONCRETE CYL.)

(SPECIPEN: SEALED 6 BY 16 IN. CONCRETE CYL.)
CALIBRATION CONSTANTS:
METER RESISTANCE AT 0.0 DEGREES F. - 48.06 DMMS

TEMP. CALIERATION CONSTANT

STRAIN CALIBRATION CONSTANT

CALIBRATED RANGE

METER COEFF. OF THERNAL EXPANSION

STRAIN INCREMENT FACTOR

TEMP. CALIERATICA CONSTANT

10.87 F/CMM CHANGE IN RESIST.

8.60 MICROVOLTS/VOLT/MICROVOLTS/VOLT

11100 TC -10100 MICROVOLTS/VOLT

6.7 PICRCSTRAIN/DEGREE F.

9.6 MICROSTRAIN/DEGREE F.

9.7 PICRCSTRAIN/DEGREE F.

9.8 MICROSTRAIN/DEGREE F.

9.9 PERCENT

TEST TEMFERATURE: 110 DEG. F.

LLT. STR. : 0. PSI
APPLIED TEST STRESS : 0. PSI
PER. ULT. STR. APPLIED: I PERCENT

STRAIN PETER NO. : 989 AGE OF LOADING :

11-08

DAYS

NOTE: FOR MCDE 4 OR 5 VOLTS, AND MODE 3. PICKCVCLTS -- THE BRIDGE VCLTAGE WAS 2.00000 VCLTS.

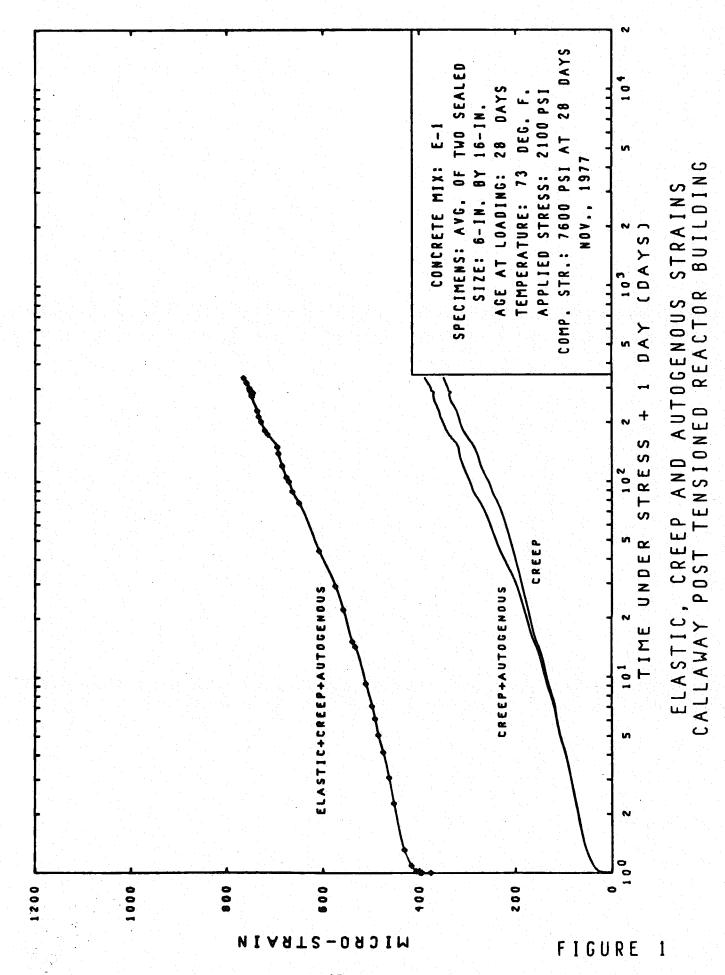
DATE	. TIME	# AGE.		DAYS		MODE	*RESIST.		TEMP. 4	MODE	ACMANGE A		EMPERATION	CORRECTED
	•	P DAYS	ě	UNDER		4 CR 5	* CHMS		DEGREE .					CREEP+SPECIF
:	•	•		LCAD	•	VOLTS	•	•		VCLTS			* +CREEP*	• CREEP
*****	******	******		*****			*******		******	******	******	******	********	
9 -8-76	1000			SPEC I	EN	CAST							2322324	
9 -9-76	1630	1.3				37147	55.05		76.0	4103	0			
9-16-76	1400	8.2				37308	54.85		73.8	3687	-416	-27		
9-21-76	1145	13-1		٠.		37321	54.83		73-6	3393	-710	-44		
9-23-76	915	15.0				37329	54.82		73.5	3306	-797	-50		
0 -1-76	930	23.0				34728	56.20		110.2	1865	-2238	-54		
0 -7-76	1105	29.0				34702	58.23		110.6	1387	-2716	-81		
0-15-76	1320	37.1				34754	22.16		109.8	1217	-2886	-92		
0-21-76	1210	43-1				34663	58.26		111-1	1200	-2903	-90		
0-28-76	930	50.0				34648	58.30		111.3	1132	-2571	-94		
1 -4-76	1110	57.0		•		34658	58.29		111.2	1072	-3031	-97		
1-19-76	1500	72.2				34601	58.36		112.0	1034	-3669	-98		
2 -7-76	940	90.0				34616	58.34		111.8	832	-3271	-110		
2 -7-76	1645	90.3				34624	58.33		111-7					
2 -8-76	840	90.9				34608	58.36			825 815	-3278	-110		
2 -9-76	145	91.7							111.9		-3268	-110		
2-15-76	1220	98.1				34693	58.24		110-7	832	-3271	-112		
2-20-76						34622	58.34		111-7	752	-3351	-114		
2-20-76 2-23-76	1445	103.2				34624	58.33		111-7	724	-3379	-116	1.00	
		105.9				34592	58.38		112.1	704	-3399	-116		
-3-77	1145	117-1				34619	58.34		111.8	635	-3468	-121		
1-14-77	1330	128.1				34657	58-29		111.2	587	-3516	-125		
1-20-77	1155	134-1				34654	58.29		111.2	557	-3546	-127		
2 -3-77	1000	148.0				34628	58.33		111.6	495	-3608	-129		
2 -5-77	754	149.9				34643	58.31		111-4	507	-3596	-129		
2-22-77	836	166.9				34625	58.33		111.7	400	-3703	-135		
3 -5-77	800	177.9				34627	58.33		111-6	340	-3763	-138		
3 -8-77	1556	181-2				34606	58.36		111.9	32,1	-3782	-138		
3 -8-77	1642	181.3				34603	58. 36		112-0	321	-3782	-138		
3 -9-77	1606	182.3				34622	58.34		111-7	323	-3780	-139		
3-10-77	1626	183.3				34638	58.32		111.5	323	-3780	-139		
3-11-77	1554	184.2				34642	58.31		111-4	315	-3788	-140		• • •
3-12-77	1150	105-1				34638	58.32		111.5	310	-3793	-140		
3-13-77	1332	186.1				34630	58.33		111.6	305	-3798	-140		
3-15-77	1156	188-1				34656	58.29		111.2	300	-3803	-141		
3-16-77	1605	189.3				34636	58.32		111.5	295	-3608	-141		
1-24-77	1131	197.1				34631	58.32		111.6	245	-385E	-144		
-6-77	1500	210-2				34622	58.34		111.7	412	-3691	-134		
1-26-77	1053	230.0				34704	58.23		110-5	260	-3643	-145		
5 -9-77	1327	243.1				34567	50.41		112.5	135	-3568	-148		
5-17-77	811	250.9				34625	58.33		111-7	100	-4003	-152		
5-24-77	1005	258.0				34602	28.36		112.0	50	-4053	-154		
-17-77	842	281.9				34629	56.33		111.6	-46	-4149	-160		
7 -6-77	1201	301-1				34581	58.39		112.3	-104	-4207	-162		
7-13-77	948	308.0				34603	58.36		112.0	-126	-4229	-164		
7-25-77	906	320.0				34615	58.35		111.6	-181	-4284	-167		
-5-77	1156	331.1				34577	58.40		112.4	-221	-4224			
-22-77	832	347.9				34670	58.27		111.0	-241	-4344	-168		
-6-77	832	364.9				34574	58.40					-172		
-8-77	632	455.9				34574	58.40		112.4	-311	-4414	-173		

TABLE N2

ELASTIC AND CREEP STRAINS (NOT CORRECTED FOR AUTOGENOUS STRAINS) UNION ELECTRIC OPTION 1 CLASS E-1 ES7414 (SPECIMEN: SEALED 6 BY 16 IN- CONCRETE CYL.)

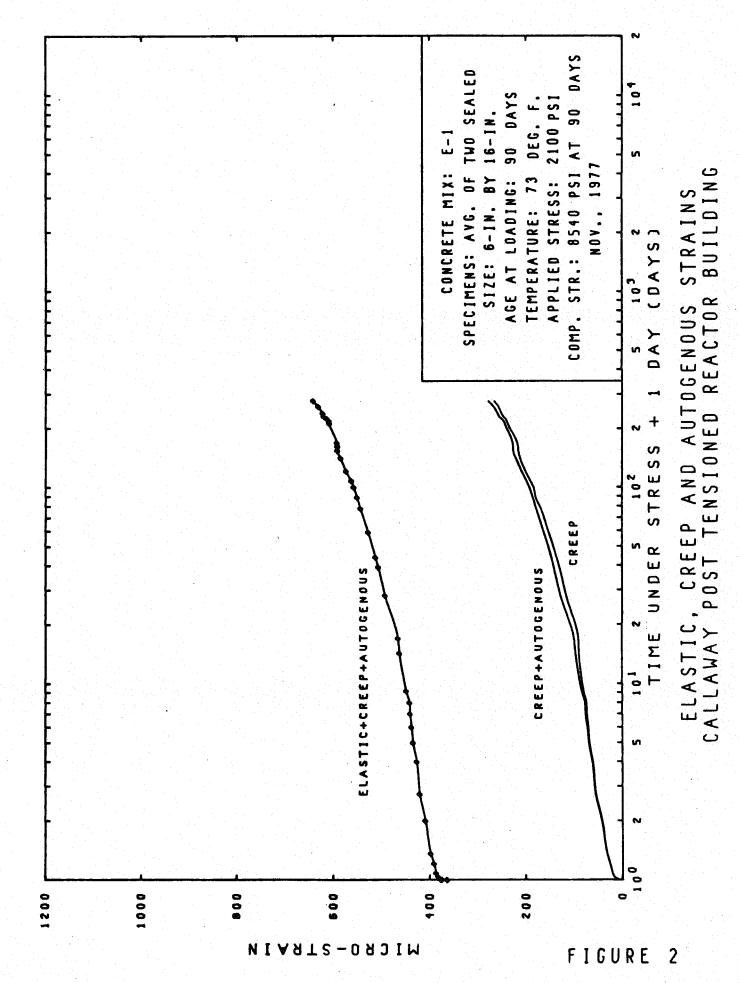
CALIBRATION CONSTANTS: METER RESISTANCE AT 0.0 DEGREES F. TEMP. CALIBRATION CONSTANT STRAIN CALIBRATICH CONSTANT CALIBRATED RANGE 46.16 CHMS
 10.85 F/OHM CHANGE IN RESIST.
 8.90 MICROVOLTS/VOLT/MICROSTRAIN STRAIN PETER NO. : AGE OF LCACING : TEST TEPFERATURE : 11-09 DAYS DEG. F. = 11100 TC -10100 MICROVOLTS/VCLT = 6.7 PICRCSTRAIN/DEGREE F. = 4.6 MICROSTRAIN/DEGREE F. METER COEFF. OF THERMAL EXPANSION = CONCRETE COEFF. OF THERMAL EXPANSION= STRAIN INCREMENT FACTOR LLT. STR. :
APPLIED TEST STRESS :
PER. ULT. STF. APPLIED: PSI PSI I PERCENT O PERCENT

****				****							
DATE	* TIME	9 AGE -	DAYS	9 MODE	•RESIST.	9 TEMP. 9	MUDE 3			PICPCSTRAI	CCRRECTED
	•		9 UNDER		O OHMS	DEGREE 0					CREEP+SPECIFIC
	•			* VOL15	8	0 F. 0				# +CREEP#	• CREEP
******				*****			****	****	****	****	******
0 9 -8-76	1000	0	SPEC IME	N CAST		~~~~					
9 -9-76	1630	1.3		37059	55.17	76.0	10506	0	0		
9-16-76	1400	8.2	and the second	37216	54.97	73.6	10004	-502	-32		
9-21-76	1145	13.1		37233	54.95	73.6	9896	-610	-38		
9-23-76	915	15.0		37237	54.94	73.6	9862	-644	-40		
10 -1-76	930	23.0		34642	58.31	110-1	8469	-2037	-42		
10 -7-76	1105	29.0		34638	50.32	110.2	8296	-2210	-51		
10-15-76	1320	37.1		34689	56.25	109-5	8047	-2459	-67		
10-21-76	1210	43-1		34586	50.3€	110.9	7798	-2708	-78		
10-28-76	930	50.0		34553	58.43	111.4	7574	-2932	-89		
11 -4-76	1110	57.0		34572	58.40	111-1	7511	-2995	-94		
11-19-76	1500	72.2		34534	58.45	111-7	7498	-3008	-93		
12 -7-76	940	90.0		34551	58-43	111-4	7278	-3228	-106		
12 -7-76	1645	90.3		34557	58.42	111-4	7269	-3237	-107		
12 -8-76	840	90.9		34540	58.45	111.6	7257	-3249	-107		
12 -9-76	145	91.7		34626	56.33	110.4	7278	-3228	-108		
12-15-76	1220	98-1		34557	58.42	111-4	7167	-3339	-112		
12-20-76	1445	103.2		34557	58.42	111.4	7123	-3383	-115		
12-23-76	845	105.9		34525	58.47	111.0	7091	-3415	-116		
1 -3-77	1145	117-1		34553	58.43	111.4	7009	-3497	-121		
1-14-77	1330	128.1		34569	58.38	110-9	6946	-3560	-126		
1-20-77	1155	134.1		34566	50.36	110.9	6907	-3599	-128		
2 -3-77	1000	148-0		34563	58-42	111.3	6824	-3682	-132		
2 -5-77	754	149.9		34580	56.39	111.0	6829	-3677	-132		
2-22-77	836	166.9		34555	58.43	111.4	6692	-3614	-139		
3 -5-77	800	177.9		34557	58.42	111.4	6622	-3884	-143		
3 -8-77	1556	181-2		34536	50.45	111.6	6606	-3900	-143		
3 -8-77	1642	101.3		34536	58-45	111-7	6599	-3907	-144		
3 -9-77	1606	182.3		34554	58.43	111-4	6600	-3506	-144		
3-10-77	1626	183.3		34571	58.40	111.2	6596	-3510	-145		
3-11-77	1554	184.2		34572	58.40	111.1	6568	-3918	-145	•	
3-12-77	1150	185.1		34570	58.41	111-2	6586	-3920	-145	• 100	
3-13-77	1332	186-1		34560	58.42	111.3	6575	-3931	-146		
3-15-77	1156	188.1		34586	96.38	110.9	6573	-3933	-147		
3-16-77	1605	189.3		34569	58.41	111.2	6563	-3543	-147		
3-24-77	1131	197.1		34556	56.42	111.3	6510	-3996	-149		
4 -6-77	1500	210.2		34547	58.44	111.5	6652	-3654	-141		
4-26-77	1053	230.0		34629	58.33	110.3	6488	-4018	-153		
5 -9-77	1327	243-1		34492	56.51	112.3	6356	-4150	-156		
5-17-77	811	250.9		34550	58.43	111-5	€330	-4176	-159		
5-24-77	1005	258.0		34527	58.46	111-0	6280	-4226	-161		
6-17-77	842	281.9		34556	58-42	111-4	6189	-4317	-167		
7 -6-77	1201	301-1		34509	58.49	112-1	6129	-4377	-169		
7-13-77	548	308.0		34526	58.46	111.8	6100	-4406	-171		
7-25-77	906	320.0		34542	58.44	111.6	6053	-4453	-175		
8 -5-77	1156	331-1		34502	58.50	115.5	6006	-4500	-176		
8-22-77	832	347.9		34595	58.37	110.8	5987	-4519	-180		
9 -8-77	832	364.9		34496	50.50	112.2	5902	-4604	-182		
12 -8-77	832	455.9		34496	58.50	112-2	5902	-4604	-182		

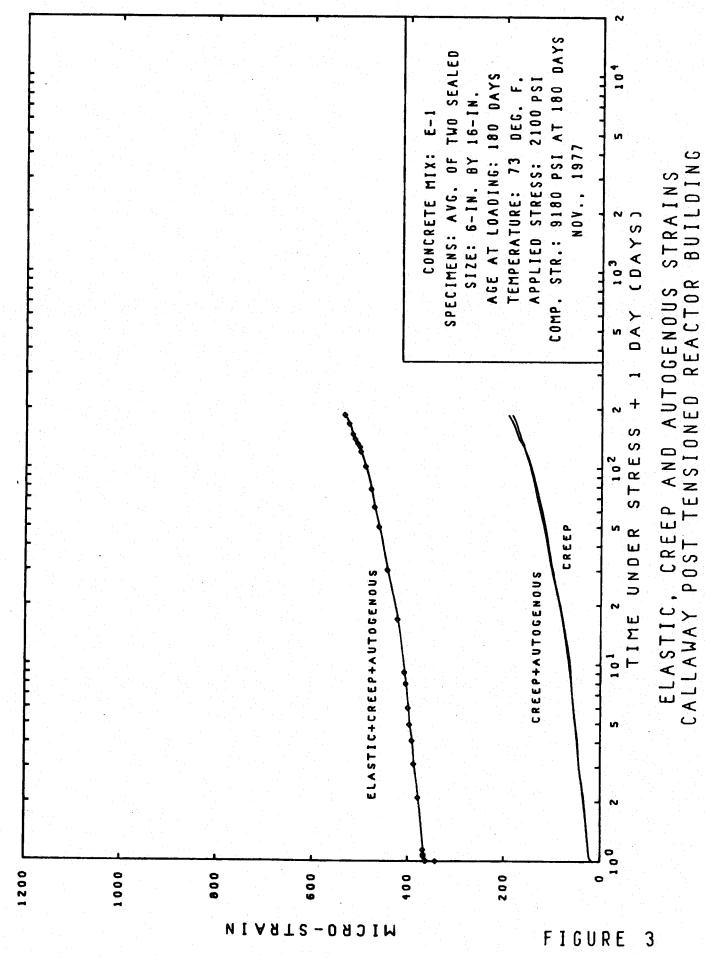


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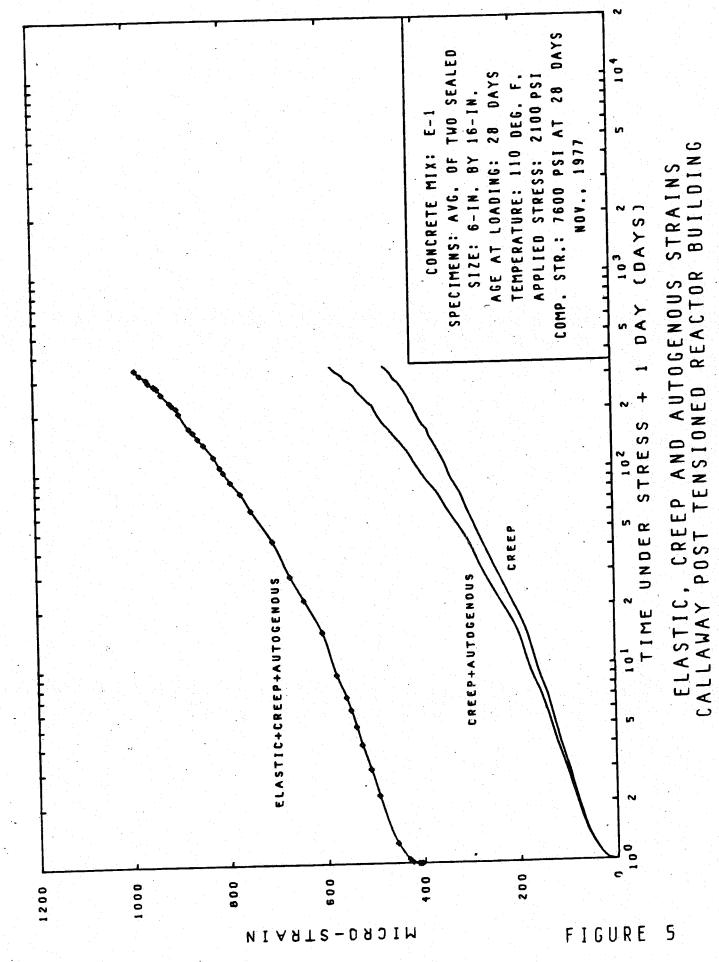
- 45 -

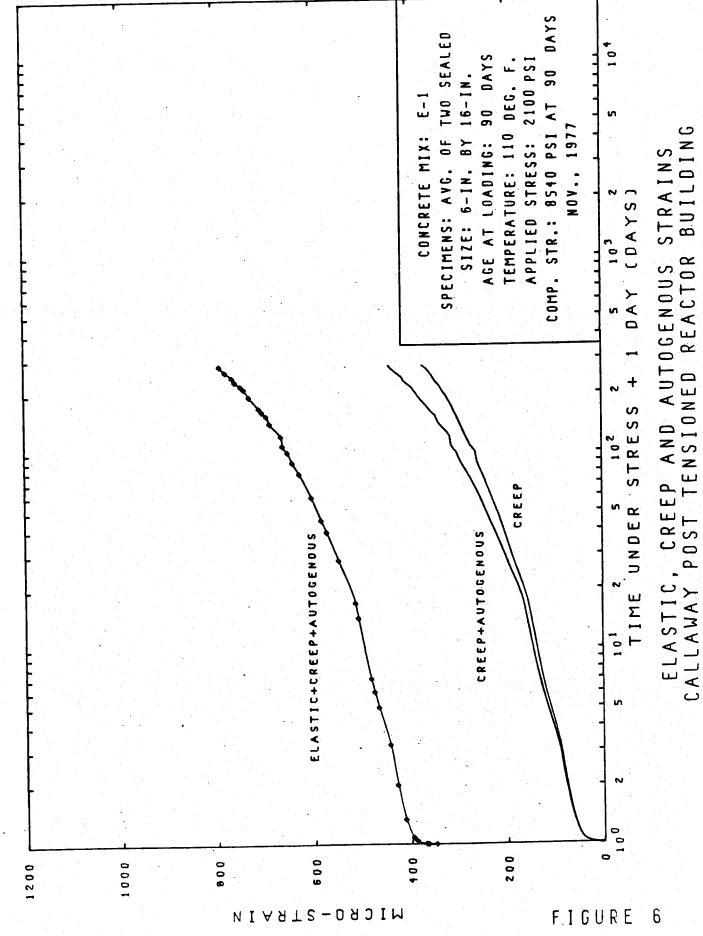


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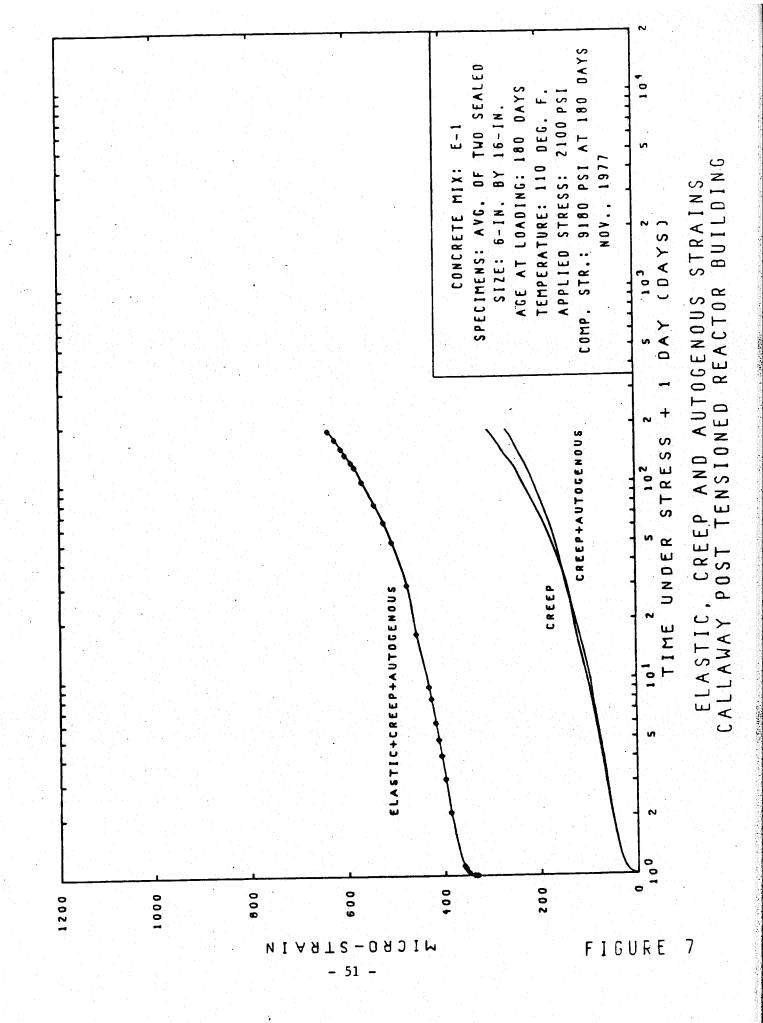


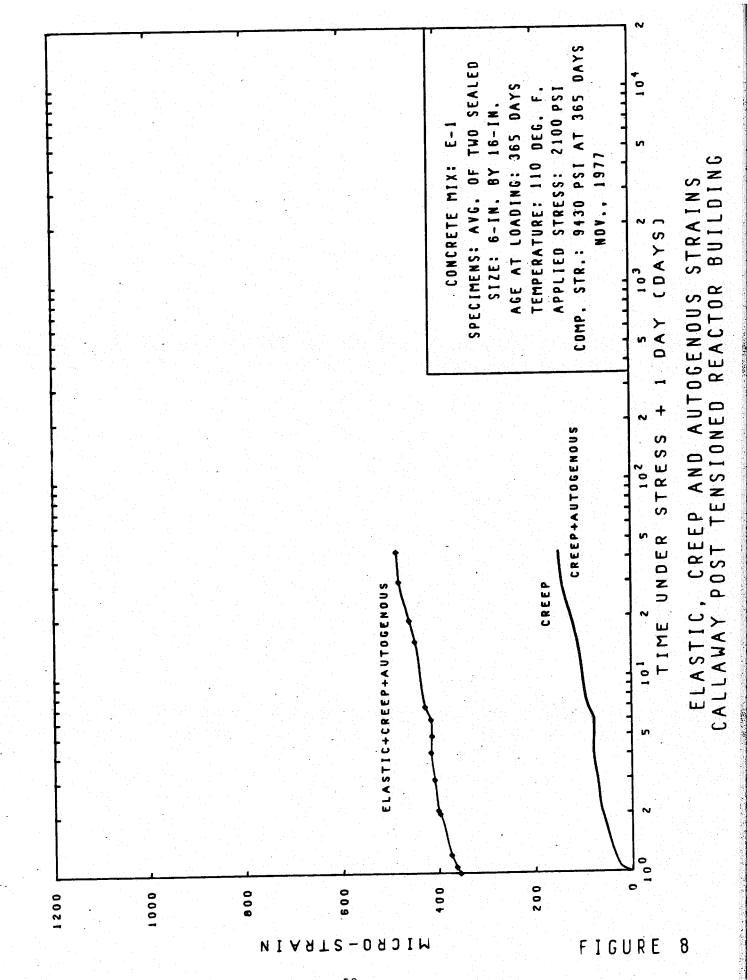
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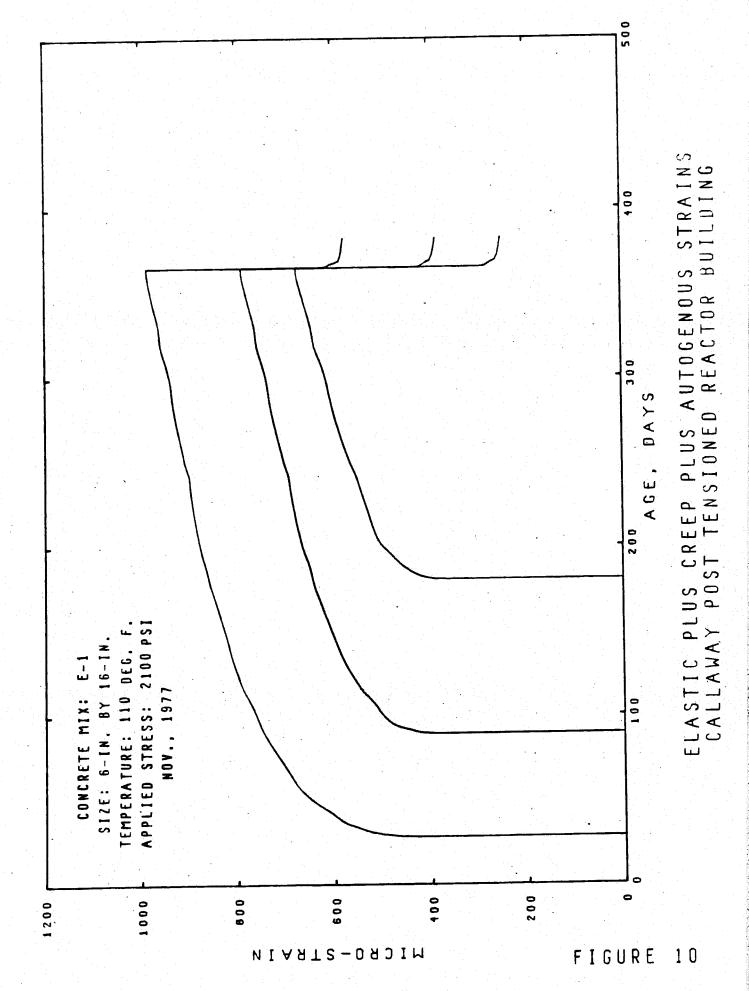


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