Report no.
UC SI 77-7

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

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Report to

Bechtel Power Corporation
Gaithersburg, Maryland

Nov. 1977

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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 Compressive Strength to be determined on sealed concrete specimens, stored at 73°F, at ages of 7, 28, 90, 180, and 365 days.

2.2 Modulus of Elasticity and Poisson's Ratio 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 Coefficient of Thermal Expansion 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 Diffusivity 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 Creep Characteristics 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. O.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 ft^2/hr and 0.038 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, 100°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 E1 & 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

Material	Source
Cement:	Alpha Portland Cement Co., Type II
Sand:	Callaway County Sand Co., Callaway County, Missouri
3/4-in. Aggregate:	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:	3 inches - Mix E-1
Inadvertency margin:	2 inches - Mix E-1
Rejection limit:	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)

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

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. diffusivity 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. diffusivity cylinder 1 - 8×16-in. specific heat specimen	
Batch No.	4	5	6	Avg.
Batch Size, cu. ft.	3.8	3.8	3.8	3.8
Cement, pcy	648	639	641	643
Water, pcy	237	234	234	235
Sand, pcy (SSD)	1497	1476	1481	1485
3/4-in. Aggregate, pcy, SSD	1697	1673	1679	1683
AER, oz/cu. yd.	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)	1-1/2	1-1/2	1-1/2	1-1/2
2nd Slump, in.(b)	1-1/4	1-1/2	1-1/2	1-1/2
Air, % by volume	3.1	3.3	2.7	3.0
Temp., °F	74	74	75	74
W/C Ratio by wt.	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
		3/4-in. MSA
Compressive Strength, psi	7	5990
	28	7600
	90	8540
	180	9180
	365	9430
Poisson's Ratio	7	0.21
	28	0.21
	90	0.18
	180	0.21
	365	0.21
Modulus of Elasticity, (psi × 10^6)	7	5.20
	28	5.63
	90	5.65
	180	6.24
	365	6.25
Linear Thermal Expansion, microstrain/°F	28	4.2
	180	4.6
	365	4.9

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

TABLE E

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

AGE OF LOADING : 28 DAYS
TEST TEMPERTURE : 73 DEG. F.
ULT. STR. : 7600. PSI
APPLIED TEST STRESS : 2100. PSI
PER. ULT. STR. APPLIED: 27.6 PERCENT
METER NUMBERS
AUTOGENOUS : 73-10 AND 73-11
CREEP : 73-08 AND 73-09

TIME UNDER STRESS, DAYS	SUSTAINED MODULUS OF ELASTICITY (A) MPSI	ELASTIC, CREEP PLUS AUTOG- ENOUS	CREEP PLUS AUTOG- ENOUS	AUTOG- ENOUS	CREEP	SPECIFIC CREEP (B)
		MICROSTRAIN				
-.0007		0				
.0000	5.57	-377	0	0	0	0.
.0028	5.30	-396	-18	0	-18	-.0086
.0063	5.25	-400	-22	0	-22	-.0105
.0201	5.16	-407	-29	0	-29	-.0138
.0896	5.02	-418	-41	0	-41	-.0195
.3045	4.86	-432	-55	0	-55	-.0262
1.2597	4.63	-454	-76	-1	-75	-.0357
2.1	4.53	-464	-86	0	-86	-.0410
3.1	4.42	-475	-97	-1	-96	-.0457
4.0	4.32	-486	-108	-1	-107	-.0510
5.1	4.26	-493	-116	-1	-115	-.0548
6.1	4.22	-498	-121	-2	-119	-.0567
8.2	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	3.76	-559	-181	-6	-175	-.0833
28.1	3.66	-574	-197	-9	-188	-.0895
43.3	3.45	-608	-231	-19	-212	-.1010
77.0	3.24	-648	-270	-30	-240	-.1143
88.1	3.17	-662	-284	-33	-251	-.1195
99.1	3.13	-670	-293	-33	-260	-.1238
104.1	3.11	-675	-297	-33	-264	-.1257
119.0	3.07	-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	3.02	-696	-318	-30	-288	-.1371
160.3	3.00	-699	-322	-32	-290	-.1381
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	-.1590
272.1	2.80	-749	-372	-31	-341	-.1624
279.0	2.81	-748	-371	-30	-341	-.1624
284.0	2.81	-747	-370	-33	-337	-.1605
291.0	2.79	-753	-376	-34	-342	-.1629
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 MODULUS OF ELASTIC = 2100. PSI DIVIDED BY SUM OF ELASTIC, CREEP, AND AUTOGENOUS STRAINS.
(B) SPECIFIC CREEP = CREEP STRAIN DIVIDED BY 2100. PSI

TABLE F

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

AGE OF LOADING : 28 DAYS
TEST TEMPERTURE : 110 DEG. F.
ULT. STR. : 7600. PSI
APPLIED TEST STRESS : 2100. PSI
PER. ULT. STR. APPLIED: 27.6 PERCENT
METER NUMBERS
AUTOGENOUS : 11-08 AND 11-09
CREEP : 11-06 AND 11-07

TIME UNDER STRESS, DAYS	SUSTAINED MODULUS OF ELASTICITY (A) MPSI	ELASTIC, CREEP PLUS AUTOG- ENOUS	CREEP PLUS AUTOG- ENOUS	AUTOG- ENOUS	CREEP	SPECIFIC CREEP (B)
		MICROSTRAIN				
-.0007		0				
.0000	5.19	-405	0	0	0	0.
.0028	5.15	-408	-3	0	-3	-.0014
.0063	5.08	-413	-7	0	-7	-.0033
.0201	4.95	-424	-19	0	-19	-.0090
.0538	4.86	-432	-27	0	-27	-.0129
.2688	4.61	-456	-51	-1	-50	-.0238
1.2236	4.26	-493	-88	-4	-84	-.0400
2.0	4.11	-511	-105	-5	-100	-.0476
3.0	3.98	-527	-122	-6	-116	-.0552
4.0	3.90	-539	-133	-8	-125	-.0595
5.1	3.83	-549	-144	-9	-135	-.0643
6.0	3.76	-558	-152	-11	-141	-.0671
8.1	3.63	-578	-172	-14	-158	-.0752
14.1	3.44	-610	-204	-20	-184	-.0876
21.0	3.25	-646	-241	-27	-214	-.1019
28.1	3.12	-674	-268	-31	-237	-.1129
43.2	2.95	-711	-305	-32	-273	-.1300
62.7	2.79	-752	-347	-46	-301	-.1433
74.2	2.71	-774	-368	-52	-316	-.1505
77.0	2.71	-776	-370	-53	-317	-.1510
88.1	2.64	-794	-389	-58	-331	-.1576
99.2	2.60	-807	-402	-62	-340	-.1619
105.1	2.58	-814	-409	-64	-345	-.1643
119.0	2.53	-829	-423	-67	-356	-.1695
120.9	2.53	-830	-424	-67	-357	-.1700
137.9	2.47	-849	-443	-74	-369	-.1757
148.9	2.44	-860	-455	-77	-378	-.1800
160.3	2.41	-870	-465	-82	-383	-.1824
181.2	2.39	-879	-473	-75	-398	-.1895
201.0	2.34	-897	-492	-85	-407	-.1938
214.2	2.32	-907	-501	-89	-412	-.1962
229.0	2.29	-919	-514	-94	-420	-.2000
253.0	2.24	-936	-531	-100	-431	-.2052
272.1	2.22	-947	-541	-102	-439	-.2090
279.0	2.21	-952	-546	-104	-442	-.2105
291.0	2.18	-963	-558	-108	-450	-.2143
302.1	2.17	-969	-564	-109	-455	-.2167
318.9	2.14	-980	-575	-113	-462	-.2200
336.9	2.12	-991	-585	-115	-470	-.2238

(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 G

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

AGE OF LOADING : 90 DAYS
TEST TEMPERTURE : 73 DEG. F.
ULT. STR. : 8540. PSI
APPLIED TEST STRESS : 2100. PSI
PER. ULT. STR. APPLIED: 24.6 PERCENT
METER NUMBERS
AUTOGENOUS : 73-10 AND 73-11
CREEP : 73-14 AND 73-15

TIME UNDER STRESS, DAYS	SUSTAINED MODULUS OF ELASTICITY MPSI (A)	MICROSTRAIN: ELASTIC, CREEP PLUS AUTOG-ENOUS	CREEP PLUS AUTOG-ENOUS	AUTOG-ENOUS	CREEP	SPECIFIC CREEP (B)
-.0007		0				
.0000	5.79	-363	0	0	0	0.
.0028	5.60	-375	-12	0	-12	-.0057
.0063	5.59	-376	-13	0	-13	-.0062
.0410	5.48	-383	-20	0	-20	-.0095
.0826	5.43	-387	-24	0	-24	-.0114
.2076	5.36	-392	-29	0	-29	-.0138
.3590	5.28	-398	-35	0	-35	-.0167
.9993	5.13	-409	-46	-1	-45	-.0214
1.7	4.98	-422	-58	-1	-57	-.0271
3.0	4.91	-428	-65	0	-65	-.0310
4.0	4.83	-435	-71	-1	-70	-.0333
5.0	4.79	-438	-75	-1	-74	-.0352
6.0	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	-.0562
38.2	4.15	-506	-143	-10	-133	-.0633
43.1	4.10	-512	-149	-10	-139	-.0662
58.1	3.98	-527	-164	-9	-155	-.0738
60.0	3.96	-530	-167	-9	-158	-.0752
77.0	3.86	-544	-180	-10	-170	-.0810
88.0	3.80	-552	-188	-7	-181	-.0862
99.3	3.76	-558	-195	-9	-186	-.0886
107.1	3.72	-565	-201	-8	-193	-.0919
120.3	3.65	-575	-211	-9	-202	-.0962
140.1	3.58	-586	-223	-10	-213	-.1014
152.2	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	-.1181
238.0	3.35	-626	-263	-12	-251	-.1195
258.0	3.32	-633	-270	-13	-257	-.1224
276.0	3.26	-644	-280	-15	-265	-.1262

(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 H

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

AGE OF LOADING : 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
AUTOGENOUS : 11-08 AND 11-09
CREEP : 11-10 AND 11-11

TIME UNDER STRESS, DAYS	SUSTAINED MODULUS OF ELASTICITY (A) MPSI	ELASTIC, CREEP PLUS AUTOG- ENOUS	CREEP PLUS AUTOG- ENOUS	AUTOG- ENOUS	CREEP	SPECIFIC CREEP (B)
		MICROSTRAIN				
-.0007		0				
.0000	5.57	-352	0	0	0	0.
.0028	5.69	-369	-17	0	-17	-.0081
.0063	5.63	-373	-21	0	-21	-.0100
.0410	5.40	-389	-37	0	-37	-.0176
.0826	5.30	-396	-44	0	-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	-4	-113	-.0538
5.0	4.39	-478	-126	-4	-122	-.0581
6.0	4.33	-485	-133	-5	-128	-.0610
13.3	4.14	-507	-155	-8	-147	-.0700
16.0	4.08	-515	-163	-9	-154	-.0733
27.1	3.83	-549	-197	-14	-183	-.0871
38.2	3.68	-571	-219	-18	-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	-.1090
77.0	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	-.1290
120.3	3.16	-664	-312	-31	-281	-.1338
140.1	3.07	-685	-333	-41	-292	-.1390
153.2	3.01	-697	-345	-45	-300	-.1429
168.1	2.95	-711	-359	-50	-309	-.1471
192.0	2.88	-730	-378	-56	-322	-.1533
211.1	2.83	-742	-390	-58	-332	-.1581
218.0	2.81	-748	-396	-60	-336	-.1600
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
276.0	2.65	-791	-439	-71	-368	-.1752

(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 I

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

AGE OF 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
AUTOGENOUS : 73-10 AND 73-11
CREEP : 73-16 AND 73-17

TIME UNDER STRESS, DAYS	SUSTAINED MODULUS OF ELASTICITY (A) MPSI	ELASTIC, CREEP PLUS AUTOG- ENOUS MICROSTRAIN	CREEP PLUS AUTOG- ENOUS	AUTOG- ENOUS	CREEP	SPECIFIC CREEP (B)
-.0007		0				
.0000	6.14	-342	0	0	0	0.
.0028	5.80	-362	-20	0	-20	-.0095
.0063	5.79	-363	-20	0	-20	-.0095
.0618	5.72	-367	-25	0	-25	-.0119
.0813	5.72	-367	-25	0	-25	-.0119
.1403	5.71	-368	-26	0	-26	-.0124
1.1021	5.54	-379	-37	-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
8.1	5.15	-408	-65	-2	-63	-.0300
15.9	4.96	-423	-81	-1	-80	-.0381
29.1	4.72	-445	-103	-2	-101	-.0481
48.9	4.54	-463	-120	-3	-117	-.0557
62.0	4.44	-473	-130	-4	-126	-.0600
76.8	4.38	-480	-138	-3	-135	-.0643
100.8	4.27	-492	-149	-2	-147	-.0700
119.9	4.18	-502	-159	-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	-.0800
146.8	4.05	-519	-176	-5	-171	-.0814
166.8	3.98	-527	-184	-6	-178	-.0848
184.8	3.92	-536	-194	-8	-186	-.0886

(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 J

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

AGE OF LOADING : 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

TIME UNDER STRESS, DAYS	SUSTAINED MODULUS OF ELASTICITY MPSI (A)	MICROSTRAIN ELASTIC, CREEP PLUS AUTOG- ENOUS	CREEP PLUS AUTOG- ENOUS	AUTOG- ENOUS	CREEP	SPECIFIC CREEP (B)
-.0007		0				
.0000	6.33	-332	0	0	0	0.
.0028	6.29	-334	-2	0	-2	-.0010
.0063	6.19	-339	-7	0	-7	-.0033
.0403	5.98	-351	-19	0	-19	-.0090
.0882	5.88	-357	-25	0	-25	-.0119
.1201	5.83	-360	-28	0	-28	-.0133
1.0951	5.43	-387	-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
6.9	4.92	-427	-95	-3	-92	-.0438
8.1	4.86	-432	-100	-5	-95	-.0452
15.9	4.59	-458	-126	-6	-120	-.0571
29.0	4.40	-477	-145	2	-147	-.0700
48.9	4.13	-508	-176	-8	-168	-.0800
62.0	4.00	-525	-193	-12	-181	-.0862
76.8	3.86	-544	-212	-17	-195	-.0929
100.8	3.69	-569	-237	-23	-214	-.1019
119.9	3.60	-584	-252	-25	-227	-.1081
126.8	3.55	-591	-259	-27	-232	-.1105
138.8	3.48	-604	-272	-31	-241	-.1148
149.9	3.43	-612	-280	-32	-248	-.1181
166.8	3.36	-625	-293	-36	-257	-.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 AUTOGENOUS STRAINS
UNION ELECTRIC OPTION 1 CLASS E-1 ES7414
(SPECIMEN: SEALED 6 BY 16 IN. CONCRETE CYL.)

AGE OF LOADING : 365 DAYS
TEST TEMPERTURE : 73 DEG. F.
ULT. STR. : 9430. PSI
APPLIED TEST STRESS : 2100. PSI
PER. ULT. STR. APPLIED: 22.3 PERCENT
METER NUMBERS
AUTOGENOUS : 73-10 AND 73-11
CREEP : 73-10 AND 73-11

TIME UNDER STRESS, DAYS	SUSTAINED MODULUS OF ELASTICITY MPSI (A)	ELASTIC, PLUS AUTOG- ENOUS	CREEP PLUS AUTOG- ENOUS	AUTOG- ENOUS	CREEP	SPECIFIC CREEP (B)
		MICROSTRAIN				
-.0007		0				
.0000	6.14	-342	0	0	0	0.
.0278	5.75	-365	-23	0	-23	-.0110
.0813	5.68	-370	-28	0	-28	-.0133
.2458	5.59	-376	-34	0	-34	-.0162
1.0764	5.32	-395	-53	1	-54	-.0257
2.0	5.36	-392	-50	1	-51	-.0243
3.1	5.29	-397	-55	1	-56	-.0267
4.0	5.25	-400	-58	1	-59	-.0281
5.0	5.19	-405	-63	1	-64	-.0305
6.0	5.22	-402	-60	1	-61	-.0290
14.0	4.95	-424	-82	1	-83	-.0395
18.3	4.88	-430	-88	1	-89	-.0424
29.3	4.68	-449	-107	1	-108	-.0514
42.0	4.67	-450	-108	1	-109	-.0519

(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 L

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

AGE OF LOADING : 365 DAYS
TEST TEMPERTURE : 110 DEG. F.
ULT. STR. : 9430. PSI
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

TIME UNDER STRESS, DAYS	SUSTAINED MODULUS OF ELASTICITY (A) PSI	MICROSTRAIN ELASTIC, CREEP PLUS AUTOG-ENOUS	CREEP PLUS AUTOG-ENOUS	AUTOG-ENOUS	CREEP	SPECIFIC CREEP (B)
-.0007		0				
.0000	6.25	-336	0	0	0	0.
.0111	6.07	-346	-9	0	-9	-.0043
.0758	5.80	-362	-26	0	-26	-.0124
.2396	5.61	-374	-37	0	-37	-.0176
1.0118	5.30	-396	-60	1	-61	-.0290
1.0840	5.26	-399	-62	1	-63	-.0300
2.0	5.17	-406	-70	1	-71	-.0338
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	-.0433
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 MODULUS OF ELASTIC = 2100. PSI DIVIDED BY SUM OF ELASTIC, CREEP, AND AUTOGENOUS STRAINS.
(B) SPECIFIC CREEP = CREEP STRAIN DIVIDED BY 2100. PSI

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 OHMS
TEMP. CALIBRATION CONSTANT = 10.83 F/OHM 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

STRAIN METER NO. : 551 73-08
AGE OF LOADING : 28 DAYS
TEST TEMPERATURE : 73 DEG. F.
ULT. STR. : 7600. PSI
APPLIED TEST STRESS : 2100. PSI
PER. ULT. STR. APPLIED: 27.6 PERCENT

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

DATE	TIME	AGE, DAYS	DAYS UNDER LOAD	MODE 4 OR 5 VOLTS	RESIST. OHMS	TEMP. DEGREE F.	MODE 3 MICRO-VOLTS	CHANGE MICRO-VOLTS	MICROSTRAIN FROM DAY ONE	TEMPERATURE CORRECTED ELASTIC	TEMPERATURE CORRECTED CREEP	SPECIFIC CREEP
* 9 -9-76	1000	0	SPECIMEN CAST									
9-10-76	1430	1.2		-.36586	55.26	76.3	12081	0	0			
9-16-76	1400	7.2		-.37166	55.03	73.8	11766	-315	-22			
9-21-76	1145	12.1		-.37186	55.01	73.5	11494	-587	-38			
9-23-76	915	14.0		-.37177	55.02	73.6	11428	-653	-41			
10 -1-76	930	22.0		-.37171	55.02	73.7	11364	-717	-45			
*10 -7-76	855	28.0	LOADING BEGINS									
10 -7-76	855	28.0	-.0007	-.37167	55.03	73.7	11332	-749	-46	0		
*10 -7-76	856	28.0	SPECIMEN FULLY LOADED, APPLIED TEST STRESS 2100 PSI									
10 -7-76	856	28.0	.0000	-.37167	55.03	73.7	4710	-7371	-420	-374	0	0.
10 -7-76	900	28.0	.0028	-.37160	55.04	73.8	4367	-7714	-439	-393	-19	-.00905
10 -7-76	905	28.0	.0063	-.37157	55.04	73.9	4300	-7781	-443	-397	-23	-.01095
10 -7-76	925	28.0	.0201	-.37157	55.04	73.9	4180	-7901	-449	-403	-29	-.01381
10 -7-76	1105	28.0	.0896	-.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	-.04476
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	-492	-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	-528	-154	-.07333
10-21-76	1145	42.1	14.1	-.37186	55.01	73.5	1892	-10189	-579	-533	-159	-.07571
10-28-76	930	49.0	21.0	-.37158	55.04	73.9	1512	-10569	-600	-554	-180	-.08571
11 -4-76	1100	56.0	28.1	-.37175	55.02	73.6	1240	-10841	-616	-570	-196	-.09333
11-19-76	1500	71.2	43.3	-.37190	55.00	73.4	680	-11401	-648	-602	-228	-.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	-288	-.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	-297	-.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	-.14619
3-16-77	1547	188.2	160.3	-.37171	55.02	73.7	-794	-12875	-730	-684	-310	-.14762
4 -6-77	1446	209.2	181.2	-.37161	55.04	73.8	-1109	-13190	-748	-702	-328	-.15619
4-26-77	1041	229.0	201.1	-.37165	55.03	73.8	-1219	-13300	-754	-708	-334	-.15905
5 -9-77	1347	242.2	214.2	-.37173	55.02	73.7	-1280	-13361	-758	-712	-338	-.16095
5-24-77	938	257.0	229.0	-.37163	55.03	73.8	-1334	-13415	-760	-714	-340	-.16190
6-17-77	856	281.0	253.0	-.37181	55.01	73.5	-1447	-13528	-767	-721	-347	-.16524
7 -6-77	1056	300.0	272.1	-.37148	55.05	74.0	-1561	-13642	-773	-727	-353	-.16810
7-13-77	850	307.0	279.0	-.37165	55.03	73.8	-1541	-13622	-772	-726	-352	-.16762
7-18-77	920	312.0	284.0	-.37122	55.07	74.2	-1544	-13625	-771	-725	-351	-.16714
7-25-77	816	318.9	291.0	-.37140	55.06	74.1	-1639	-13720	-777	-731	-357	-.17000
8 -2-77	842	326.9	299.0	-.37100	55.11	74.7	-1704	-13785	-779	-733	-359	-.17095
8-22-77	808	346.9	319.0	-.37133	55.07	74.2	-1789	-13870	-785	-739	-365	-.17381
9 -9-77	806	364.9	337.0	-.37156	55.04	73.9	-1865	-13946	-790	-744	-370	-.17619
* 9 -9-77	812	364.9	SPECIMEN(S) FULLY UNLOADED, ZERO APPLIED TEST STRESS									
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	-35	
9 -9-77	1006	365.0		-.37151	55.05	74.0	4224	-7857	-447	-401	-27	
9 -9-77	1316	365.1		-.37155	55.04	73.9	4287	-7794	-443	-397	-23	
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	-383	-9	
9-13-77	922	369.0		-.37176	55.02	73.6	4595	-7486	-427	-381	-7	
9-22-77	831	377.9		-.37188	55.00	73.5	4781	-7300	-416	-370	4	
10 -7-77	1639	393.3		-.37160	55.04	73.8	4876	-7205	-410	-364	10	
10-20-77	926	406.0		-.37161	55.04	73.8	4951	-7130	-406	-360	14	

MODULUS: LOADING E= 5.6 AT AGE 28 DAYS (STRESS LEVEL 0 TO 2100 PSI)

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

TABLE E2

ELASTIC AND CREEP STRAINS (NOT CORRECTED FOR AUTOGENOUS STRAINS)
UNION ELECTRIC OPTION 1 CLASS E-1 ES7414
(SPECIMEN: SEALED 6 BY 18 IN. CONCRETE CYL.)

CALIBRATION CONSTANTS:
METER RESISTANCE AT 0.0 DEGREES F. = 48.43 OHMS
TEMP. CALIBRATION CONSTANT = 10.79 F/OHM CHANGE IN RESIST.
STRAIN CALIBRATION CONSTANT = 8.77 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

STRAIN METER NO. : 957 73-09
AGE OF LOADING : 28 DAYS
TEST TEMPERATURE : 73 DEG. F.
ULT. STR. : 7600. PSI
APPLIED TEST STRESS : 2100. PSI
PER. ULT. STR. APPLIED: 27.6 PERCENT

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

DATE	TIME	AGE, DAYS	DAYS UNDER LOAD	MODE 4 OR 5 VOLTS	RESIST. OHMS	TEMP. DEGREE F.	MODE 3 MICRO-VOLTS	MICROSTRAIN CHANGE MICRO-VOLTS	MICROSTRAIN TEMPERATURE CORRECTED FROM DAY ONE	MICROSTRAIN ELASTIC + CREEP	MICROSTRAIN CREEP	MICROSTRAIN SPECIFIC CREEP
* 9 -9-76	1000	0	SPECIMEN CAST									
9-10-76	1430	1.2		-.36788	55.51	76.4	11079	0	0			
9-16-76	1400	7.2		-.36941	55.32	74.3	10809	-270	-19			
9-21-76	1145	12.1		-.36973	55.28	73.9	10559	-520	-34			
9-23-76	915	14.0		-.36964	55.29	74.0	10493	-586	-38			
10 -1-76	930	22.0		-.36963	55.29	74.0	10401	-678	-43			
*10 -7-76	855	28.0	LOADING BEGINS									
10 -7-76	855	28.0	-.0007	-.36990	55.26	73.6	10367	-712	-45	0		
*10 -7-76	856	28.0	SPECIMEN FULLY LOADED, APPLIED TEST STRESS 2100 PSI									
10 -7-76	856	28.0	.0000	-.36990	55.26	73.6	3687	-7392	-426	-381	0	0.
10 -7-76	900	28.0	.0028	-.36990	55.26	73.6	3380	-7699	-444	-399	-18	-.00857
10 -7-76	905	28.0	.0063	-.36990	55.26	73.6	3302	-7777	-448	-403	-22	-.01048
10 -7-76	925	28.0	.0201	-.36990	55.26	73.6	3172	-7907	-456	-411	-30	-.01429
10 -7-76	1105	28.0	.0856	-.36968	55.28	73.9	2952	-8127	-468	-423	-42	-.02000
10 -7-76	1615	28.3	.3045	-.36976	55.27	73.8	2692	-8387	-483	-438	-57	-.02714
10 -8-76	1510	29.2	1.2597	-.36986	55.26	73.7	2299	-8780	-505	-460	-79	-.03762
10 -9-76	1010	30.0	2.1	-.36986	55.26	73.7	2134	-8945	-515	-470	-89	-.04238
10-10-76	1145	31.1	3.1	-.37008	55.23	73.4	1928	-9151	-527	-482	-101	-.04810
10-11-76	950	32.0	4.0	-.37008	55.23	73.4	1745	-9334	-538	-493	-112	-.05333
10-12-76	1130	33.1	5.1	-.37002	55.24	73.5	1617	-9462	-545	-500	-119	-.05667
10-13-76	1045	34.0	6.1	-.37001	55.24	73.5	1522	-9557	-550	-505	-124	-.05905
10-15-76	1320	36.1	8.2	-.37006	55.23	73.4	1290	-9789	-563	-518	-137	-.06524
10-20-76	1400	41.2	13.2	-.37006	55.24	73.4	917	-10162	-585	-540	-159	-.07571
10-21-76	1145	42.1	14.1	-.37023	55.21	73.2	842	-10237	-589	-544	-163	-.07762
10-28-76	930	49.0	21.0	-.36998	55.24	73.5	482	-10597	-609	-564	-183	-.08714
11 -4-76	1100	56.0	28.1	-.37020	55.22	73.2	232	-10847	-624	-579	-198	-.09429
11-19-76	1500	71.2	43.3	-.37035	55.20	73.0	-381	-11460	-660	-615	-234	-.11143
12-23-76	845	104.9	77.0	-.37085	55.13	72.3	-1079	-12158	-701	-656	-275	-.13095
1 -3-77	1145	116.1	88.1	-.37115	55.10	71.9	-1349	-12428	-717	-672	-291	-.13857
1-14-77	1200	127.1	99.1	-.37072	55.15	72.5	-1555	-12634	-728	-683	-302	-.14381
1-19-77	1050	132.0	104.1	-.37068	55.15	72.6	-1650	-12729	-733	-688	-307	-.14615
2 -3-77	945	147.0	119.0	-.37054	55.17	72.8	-1853	-12932	-744	-699	-318	-.15143
2 -5-77	826	148.9	121.0	-.37071	55.15	72.5	-1876	-12955	-746	-701	-320	-.15238
2-22-77	905	166.0	138.0	-.37046	55.18	72.9	-2023	-13102	-753	-708	-327	-.15571
3 -5-77	747	176.9	149.0	-.37026	55.21	73.2	-2078	-13157	-756	-711	-330	-.15714
3-16-77	1547	188.2	160.3	-.37034	55.20	73.0	-2147	-13226	-760	-715	-334	-.15905
4 -6-77	1446	209.2	181.2	-.37019	55.22	73.2	-2605	-13684	-786	-741	-360	-.17143
4-26-77	1041	229.0	201.1	-.37027	55.21	73.1	-2775	-13854	-796	-751	-370	-.17619
5 -9-77	1347	242.2	214.2	-.37033	55.20	73.0	-2867	-13946	-801	-756	-375	-.17857
5-24-77	938	257.0	229.0	-.37022	55.21	73.2	-2946	-14025	-805	-760	-379	-.18048
6-17-77	856	281.0	253.0	-.36987	55.26	73.7	-3057	-14136	-811	-766	-385	-.18333
7 -6-77	1056	300.0	272.1	-.36998	55.25	73.5	-3154	-14233	-817	-772	-391	-.18619
7-13-77	850	307.0	279.0	-.37012	55.23	73.3	-3141	-14220	-816	-771	-390	-.18571
7-18-77	920	312.0	284.0	-.36987	55.26	73.7	-3139	-14218	-815	-770	-389	-.18524
7-25-77	816	318.9	291.0	-.36985	55.26	73.7	-3236	-14315	-821	-776	-395	-.18810
8 -2-77	842	326.9	299.0	-.36950	55.31	74.2	-3299	-14378	-823	-778	-397	-.18905
8-22-77	808	346.9	319.0	-.36975	55.27	73.8	-3370	-14449	-828	-783	-402	-.19143
9 -9-77	806	364.9	337.0	-.37001	55.24	73.5	-3456	-14535	-834	-789	-408	-.19429
* 9 -9-77	812	364.9	SPECIMEN(S) FULLY UNLOADED; ZERO APPLIED TEST STRESS									
9 -9-77	812	364.9		-.36997	55.25	73.6	2198	-8881	-511	-466	-85	
9 -9-77	820	364.9		-.36995	55.25	73.6	2346	-8733	-503	-458	-77	
9 -9-77	1006	365.0		-.36990	55.25	73.6	2518	-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	73.2	2919	-8160	-471	-426	-45	
9-13-77	922	369.0		-.37014	55.22	73.3	2972	-8107	-468	-423	-42	
9-22-77	831	377.9		-.37031	55.20	73.1	3212	-7867	-455	-410	-29	
10 -7-77	1639	393.3		-.37002	55.24	73.5	3374	-7705	-445	-400	-19	
10-20-77	926	406.0		-.36998	55.25	73.5	3486	-7593	-438	-393	-12	

MODULUS: LOADING E= 5.5 AT AGE 28 DAYS (STRESS LEVEL 0 TO 2100 PSI)

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

TABLE F1

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. = 48.18 OHMS
TEMP. CALIBRATION CONSTANT = 10.84 F/OHM CHANGE IN RESIST.
STRAIN CALIBRATION CONSTANT = 8.85 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

STRAIN METER NO. : 992 11-06
AGE OF LOADING : 28 DAYS
TEST TEMPERATURE : 110 DEG. F.

ULT. STR. : 7600. PSI
APPLIED TEST STRESS : 2100. PSI
PER. ULT. STR. APPLIED: 27.6 PERCENT

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

DATE	TIME	AGE, DAYS	DAYS UNDER LOAD	MODE 4 OR 5 VOLTS	RESIST. OHMS	TEMP. DEGREE F.	MODE 3 MICRO-VOLTS	MICROSTRAIN CHANGE MICRO-VOLTS/DAY ONE	MICROSTRAIN FROM TEMPERATURE CORRECTED ELASTIC	MICROSTRAIN CREEP	MICROSTRAIN SPECIFIC CREEP
* 9 -9-76	1000	0	SPECIMEN CAST								
9-10-76	1430	1.2		-.37028	55.21	76.2	7964	0	0		
9-16-76	1400	7.2		-.37201	54.99	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	-797	-50		
10 -1-76	930	22.0		-.34643	58.31	109.8	5776	-2188	-52		
*10 -7-76	947	28.0	LOADING BEGINS								
10 -7-76	947	28.0	-.0007	-.34596	58.37	110.5	5491	-2473	-67	0	
*10 -7-76	948	28.0	SPECIMEN FULLY LOADED, APPLIED TEST STRESS 2100 PSI								
10 -7-76	948	28.0	.0000	-.34596	58.37	110.5	-1794	-9756	-478	-411	0	0.
10 -7-76	952	28.0	.0028	-.34596	58.37	110.5	-1864	-9828	-482	-415	-4	-.00190
10 -7-76	957	28.0	.0063	-.34594	58.37	110.5	-1939	-9903	-486	-419	-8	-.00381
10 -7-76	1017	28.0	.0201	-.34604	58.36	110.4	-2144	-10108	-498	-431	-20	-.00952
10 -7-76	1105	28.0	.0535	-.34599	58.37	110.4	-2296	-10260	-507	-440	-29	-.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	-11372	-569	-502	-91	-.04333
10 -9-76	1025	30.0	2.0	-.34583	58.39	110.7	-3705	-11669	-586	-519	-108	-.05143
10-10-76	1045	31.0	3.0	-.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	-550	-139	-.06619
10-12-76	1130	33.1	5.1	-.34622	58.34	110.1	-4424	-12388	-628	-561	-150	-.07143
10-13-76	1045	34.0	6.0	-.34622	58.34	110.1	-4582	-12546	-637	-570	-159	-.07571
10-15-76	1320	36.1	8.1	-.34641	58.31	109.8	-4907	-12871	-655	-588	-177	-.08429
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	-14047	-719	-652	-241	-.11476
11 -4-76	1110	56.0	28.1	-.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	-15181	-782	-715	-304	-.14476
12 -9-76	145	90.7	62.7	-.34573	58.40	110.8	-7937	-15901	-825	-758	-347	-.16524
12-20-76	1445	102.2	74.2	-.34524	58.47	111.5	-8413	-16377	-850	-783	-372	-.17714
12-23-76	845	104.9	77.0	-.34490	58.51	112.0	-8460	-16424	-852	-785	-374	-.17810
1 -3-77	1145	116.1	88.1	-.34519	58.47	111.6	-8785	-16749	-871	-804	-393	-.18714
1-14-77	1330	127.1	99.2	-.34557	58.42	111.0	-9015	-16979	-885	-818	-407	-.19381
1-20-77	1155	133.1	105.1	-.34551	58.43	111.1	-9138	-17102	-892	-825	-414	-.19714
2 -3-77	1000	147.0	119.0	-.34523	58.47	111.5	-9407	-17371	-906	-839	-428	-.20381
2 -5-77	754	148.9	120.9	-.34538	58.45	111.3	-9417	-17381	-907	-840	-429	-.20429
2-22-77	836	165.9	137.9	-.34515	58.48	111.6	-9762	-17726	-926	-859	-448	-.21333
3 -5-77	800	176.9	148.9	-.34517	58.48	111.6	-9961	-17925	-937	-870	-459	-.21857
3-16-77	1605	188.3	160.3	-.34524	58.47	111.5	-10127	-18091	-947	-880	-469	-.22333
4 -6-77	1500	209.2	181.2	-.34507	58.49	111.8	-10271	-18235	-955	-888	-477	-.22714
4-26-77	1053	229.0	201.0	-.34591	58.38	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	-.24000
5-24-77	1005	257.0	229.0	-.34487	58.52	112.0	-10989	-18953	-994	-927	-516	-.24571
6-17-77	842	280.9	253.0	-.34516	58.48	111.6	-11272	-19236	-1011	-944	-533	-.25381
7 -6-77	1201	300.1	272.1	-.34466	58.54	112.3	-11487	-19451	-1022	-955	-544	-.25905
7-13-77	948	307.0	279.0	-.34486	58.52	112.0	-11563	-19527	-1027	-960	-549	-.26143
7-25-77	906	319.0	291.0	-.34492	58.51	112.0	-11763	-19727	-1038	-971	-560	-.26667
8 -5-77	1156	330.1	302.1	-.34454	58.56	112.5	-11890	-19854	-1044	-977	-566	-.26952
8-22-77	832	346.9	318.9	-.34550	58.43	111.1	-12026	-19990	-1055	-988	-577	-.27476
9 -9-77	833	364.9	336.9	-.34519	58.47	111.6	-12234	-20198	-1066	-999	-588	-.28000
* 9 -9-77	840	364.9	SPECIMEN(S) FULLY UNLOADED, ZERO APPLIED TEST STRESS								
9 -9-77	840	364.9		-.34532	58.46	111.4	-5979	-13943	-713	-646	-235	
9 -9-77	850	365.0		-.34529	58.46	111.4	-5804	-13768	-703	-636	-225	
9 -9-77	1034	365.0		-.34549	58.43	111.2	-5646	-13610	-694	-627	-216	
9 -9-77	1326	365.1		-.34559	58.42	111.0	-5522	-13486	-688	-621	-210	
9-10-77	825	365.9		-.34550	58.38	110.6	-5322	-13286	-677	-610	-199	
9-11-77	1127	367.1		-.34587	58.38	110.6	-5217	-13181	-671	-604	-193	
9-12-77	812	367.9		-.34584	58.39	110.6	-5032	-12996	-661	-594	-183	
9-13-77	938	369.0		-.34634	58.32	109.9	-4854	-12818	-652	-585	-174	
9-26-77	1519	382.2		-.34620	58.34	110.1	-4699	-12663	-643	-576	-165	
10 -7-77	1653	393.3		-.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 AGE 28 DAYS (STRESS LEVEL 0 TO 2100 PSI)

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

TABLE F2

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. = 48.27 OHMS
TEMP. CALIBRATION CONSTANT = 10.82 F/OHM CHANGE IN RESIST.
STRAIN CALIBRATION CONSTANT = 9.08 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

STRAIN METER NO. : 998 11-07
AGE OF LOADING : 28 DAYS
TEST TEMPERATURE : 110 DEG. F.
ULT. STR. : 7600. PSI
APPLIED TEST STRESS : 2100. PSI
PER. ULT. STR. APPLIED: 27.6 PERCENT

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

DATE	TIME	AGE, DAYS	DAYS UNDER LOAD	MODE 4 OR 5 VOLTS	RESIST. OHMS	TEMP. DEGREE F.	MODE 3 MICRO-VOLTS	MICROSTRAIN CHANGE MICRO-VOLTS	MICROSTRAIN TEMPERATURE CORRECTED FROM DAY ONE	ELASTIC	CREEP	SPECIFIC CREEP
* 9 -9-76	1000	0	SPECIMEN CAST									
9-10-76	1430	1.2		-.36961	55.29	76.0	13554	0	0			
9-16-76	1400	7.2		-.37093	55.12	74.2	13316	-238	-16			
9-21-76	1145	12.1		-.37118	55.09	73.8	13122	-432	-27			
9-23-76	915	14.0		-.37119	55.09	73.8	13070	-484	-30			
10 -1-76	930	22.0		-.34534	58.45	110.2	11719	-1835	-28			
*10 -7-76	947	28.0	LOADING BEGINS									
10 -7-76	947	28.0	-.0007	-.34484	58.52	110.9	11759	-1795	-25	0		
*10 -7-76	948	28.0	SPECIMEN FULLY LOADED, APPLIED TEST STRESS 2100 PSI									
10 -7-76	948	28.0	.0000	-.34484	58.52	110.9	4485	-9069	-425	-400	0	0.
10 -7-76	952	28.0	.0028	-.34484	58.52	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	-.34482	58.52	110.9	4157	-9397	-443	-418	-18	-.00857
10 -7-76	1105	28.0	.0535	-.34479	58.53	111.0	4032	-9522	-450	-425	-25	-.01190
10 -7-76	1615	28.3	.2668	-.34472	58.54	111.1	3595	-9959	-474	-449	-49	-.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	-.04905
10-10-76	1045	31.0	3.0	-.34482	58.52	110.9	2347	-11207	-543	-518	-118	-.05619
10-11-76	950	32.0	4.0	-.34482	58.52	110.9	2162	-11392	-553	-528	-128	-.06095
10-12-76	1130	33.1	5.1	-.34502	58.50	110.6	1987	-11567	-563	-538	-138	-.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	58.62	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	1110	56.0	28.1	-.34427	58.60	111.7	-439	-13593	-694	-669	-269	-.12810
11-19-76	1500	71.2	43.2	-.34359	58.69	112.7	-1163	-14717	-732	-707	-307	-.14619
12 -9-76	145	90.7	62.7	-.34436	58.58	111.6	-1836	-15390	-772	-747	-347	-.16524
12-20-76	1445	102.2	74.2	-.34394	58.64	112.2	-2186	-15740	-790	-765	-365	-.17381
12-23-76	845	104.9	77.0	-.34362	58.68	112.7	-2242	-15796	-792	-767	-367	-.17476
1 -3-77	1145	116.1	88.1	-.34389	58.65	112.3	-2559	-16113	-810	-785	-385	-.18333
1-14-77	1330	127.1	99.2	-.34424	58.60	111.8	-2764	-16318	-822	-797	-397	-.18905
1-20-77	1155	133.1	105.1	-.34419	58.61	111.8	-2894	-16448	-829	-804	-404	-.19238
2 -3-77	1000	147.0	119.0	-.34385	58.65	112.3	-3175	-16729	-844	-819	-419	-.19952
2 -5-77	754	148.9	120.9	-.34395	58.64	112.2	-3193	-16747	-845	-820	-420	-.20000
2-22-77	836	165.9	137.9	-.34380	58.66	112.4	-3548	-17102	-864	-839	-439	-.20905
3 -5-77	800	176.9	148.9	-.34380	58.66	112.4	-3764	-17318	-876	-851	-451	-.21476
3-16-77	1605	188.3	160.3	-.34379	58.66	112.4	-3942	-17496	-886	-861	-461	-.21952
4 -6-77	1500	209.2	181.2	-.34365	58.68	112.6	-4106	-17660	-895	-870	-470	-.22381
4-26-77	1053	229.0	201.0	-.34451	58.56	111.4	-4412	-17966	-914	-889	-489	-.23286
5 -9-77	1327	242.1	214.2	-.34309	58.75	113.4	-4679	-18233	-924	-899	-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	280.9	253.0	-.34371	58.67	112.5	-5177	-18731	-954	-929	-529	-.25190
7 -6-77	1201	300.1	272.1	-.34316	58.74	113.3	-5400	-18954	-964	-939	-539	-.25667
7-13-77	948	307.0	279.0	-.34343	58.71	112.9	-5478	-19032	-969	-944	-544	-.25905
7-25-77	906	319.0	291.0	-.34342	58.71	112.9	-5682	-19236	-981	-956	-556	-.26476
8 -5-77	1156	330.1	302.1	-.34309	58.75	113.4	-5813	-19367	-987	-962	-562	-.26762
8-22-77	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	-6163	-19717	-1008	-983	-583	-.27762
* 9 -9-77	840	364.9	SPECIMEN(S) FULLY UNLOADED, ZERO APPLIED TEST STRESS									
9 -9-77	840	364.9		-.34384	58.65	112.3	-11	-13565	-670	-645	-245	
9 -9-77	850	365.0		-.34382	58.66	112.4	142	-13412	-661	-636	-236	
9 -9-77	1034	365.0		-.34399	58.63	112.1	315	-13239	-652	-627	-227	
9 -9-77	1326	365.1		-.34402	58.63	112.1	435	-13119	-646	-621	-221	
9-10-77	825	365.9		-.34434	58.59	111.6	627	-12927	-636	-611	-211	
9-11-77	1127	367.1		-.34429	58.59	111.7	732	-12822	-630	-605	-205	
9-12-77	812	367.9		-.34429	58.59	111.7	910	-12644	-620	-595	-195	
9-13-77	938	369.0		-.34455	58.55	111.3	1076	-12478	-612	-587	-187	
9-26-77	1519	382.2		-.34460	58.55	111.3	1236	-12318	-603	-578	-178	
10 -7-77	1653	393.3		-.34543	58.44	110.1	1360	-12194	-599	-574	-174	
10-20-77	910	406.0		-.34430	58.59	111.7	1474	-12080	-589	-564	-164	

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

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

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 OHMS
TEMP. CALIBRATION CONSTANT = 10.82 F/OHM CHANGE IN RESIST.
STRAIN CALIBRATION CONSTANT = 8.73 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

STRAIN METER NO. : 993 73-14
AGE OF LOADING : 90 DAYS
TEST TEMPERATURE : 73 DEG. F.

ULT. STR. : 8540. PSI
APPLIED TEST STRESS : 2100. PSI
PER. ULT. STR. APPLIED: 24.6 PERCENT

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

DATE	TIME	AGE, DAYS	DAYS UNDER LOAD	MODE 4 OR 5 VOLTS	RESIST. OHMS	TEMP. DEGREE F.	MODE 3 MICRO-VOLTS	MICRO-STRAIN CHANGE FROM PREV.	MICRO-STRAIN TEMPERATURE CORRECTED ELASTIC	MICRO-STRAIN TEMPERATURE CORRECTED CREEP	MICRO-STRAIN SPECIFIC CREEP
* 9 -9-76	1000	0	SPECIMEN CAST								
9-10-76	1430	1.2		-.36938	55.32	76.0	-2291	0	0		
9-16-76	1400	7.2		-.37101	55.11	73.7	-2591	-300	-21		
9-21-76	1145	12.1		-.37128	55.08	73.4	-2761	-470	-31		
9-23-76	915	14.0		-.37114	55.10	73.5	-2805	-514	-34		
10 -1-76	930	22.0		-.37103	55.11	73.7	-2894	-603	-38		
10 -7-76	1105	28.0		-.37076	55.14	74.1	-2974	-683	-42		
10-15-76	1320	36.1		-.37109	55.10	73.6	-2987	-696	-44		
*12 -7-76	817	88.9	LOADING BEGINS								
12 -7-76	817	88.9	-.0007	-.37107	55.11	73.6	-3018	-727	-46	0	
*12 -7-76	818	88.9	SPECIMEN FULLY LOADED, APPLIED TEST STRESS 2100 PSI								
12 -7-76	818	88.9	.0000	-.37179	55.01	72.6	-9448	-7157	-416	-370	0 0.
12 -7-76	822	88.9	.0028	-.37179	55.01	72.6	-9688	-7397	-430	-384	-14 -.00667
12 -7-76	827	88.9	.0063	-.37084	55.14	74.0	-9738	-7447	-430	-384	-14 -.00667
12 -7-76	917	89.0	.0410	-.37088	55.13	73.9	-9867	-7576	-437	-391	-21 -.01000
12 -7-76	1017	89.0	.0826	-.37085	55.13	73.9	-9939	-7648	-441	-395	-25 -.01190
12 -7-76	1317	89.1	.2076	-.37078	55.14	74.0	-10026	-7735	-446	-400	-30 -.01429
12 -7-76	1655	89.3	.3590	-.37076	55.15	74.1	-10136	-7845	-452	-406	-36 -.01714
12 -8-76	817	89.9	.9993	-.37093	55.12	73.8	-10325	-8034	-464	-418	-48 -.02286
12 -9-76	145	90.7	1.7271	-.37076	55.15	74.1	-10558	-8267	-476	-430	-60 -.02857
12-10-76	815	91.9	3.0	-.37087	55.13	73.9	-10699	-8408	-485	-439	-69 -.03286
12-11-76	815	92.9	4.0	-.37087	55.13	73.9	-10849	-8558	-493	-447	-77 -.03667
12-12-76	815	93.9	5.0	-.37087	55.13	73.9	-10874	-8583	-495	-449	-79 -.03762
12-13-76	830	94.9	6.0	-.37098	55.12	73.8	-10900	-8609	-497	-451	-81 -.03857
12-14-76	815	95.9	7.0	-.37087	55.13	73.9	-10924	-8633	-498	-452	-82 -.03905
12-15-76	1220	97.1	8.2	-.37090	55.13	73.9	-11056	-8765	-505	-459	-89 -.04238
12-20-76	1445	102.2	13.3	-.37099	55.12	73.8	-11297	-9006	-519	-473	-103 -.04905
12-23-76	845	104.9	16.0	-.37068	55.16	74.2	-11378	-9087	-523	-477	-107 -.05095
1 -3-77	1145	116.1	27.1	-.37133	55.07	73.3	-11825	-9534	-551	-505	-135 -.06429
1-14-77	1200	127.1	38.2	-.37117	55.09	73.5	-12120	-9829	-567	-521	-151 -.07190
1-19-77	1050	132.0	43.1	-.37108	55.10	73.6	-12240	-9949	-574	-528	-158 -.07524
2 -3-77	945	147.0	58.1	-.37097	55.12	73.8	-12547	-10256	-591	-545	-175 -.08333
2 -5-77	826	148.9	60.0	-.37106	55.11	73.6	-12598	-10307	-594	-548	-178 -.08476
2-22-77	905	166.0	77.0	-.37091	55.13	73.9	-12868	-10577	-609	-563	-193 -.09190
3 -5-77	747	176.9	88.0	-.37063	55.16	74.3	-13038	-10747	-618	-572	-202 -.09619
3-16-77	1547	188.2	99.3	-.37069	55.15	74.2	-13164	-10873	-626	-580	-210 -.10000
3-24-77	1138	196.1	107.1	-.37061	55.16	74.3	-13290	-10999	-633	-587	-217 -.10333
4 -6-77	1446	209.2	120.3	-.37054	55.17	74.4	-13444	-11153	-641	-595	-225 -.10714
4-26-77	1041	229.0	140.1	-.37062	55.16	74.3	-13644	-11353	-653	-607	-237 -.11286
5 -9-77	1347	242.2	153.2	-.37065	55.16	74.2	-13761	-11470	-660	-614	-244 -.11619
5-24-77	938	257.0	168.1	-.37056	55.17	74.3	-13856	-11565	-665	-619	-249 -.11857
6-17-77	856	281.0	192.0	-.37025	55.21	74.8	-14020	-11729	-673	-627	-257 -.12238
7 -6-77	1056	300.0	211.1	-.37040	55.19	74.6	-14153	-11862	-681	-635	-265 -.12619
7-13-77	850	307.0	218.0	-.37062	55.16	74.3	-14159	-11868	-682	-636	-266 -.12667
7-18-77	920	312.0	223.0	-.37045	55.18	74.5	-14246	-11955	-687	-641	-271 -.12905
7-25-77	816	318.9	230.0	-.37045	55.18	74.5	-14359	-12068	-693	-647	-277 -.13190
8 -2-77	842	326.9	238.0	-.37007	55.23	75.0	-14446	-12155	-697	-651	-281 -.13381
8-22-77	808	346.9	258.0	-.37040	55.19	74.6	-14556	-12265	-704	-658	-288 -.13714
9 -9-77	806	364.9	276.0	-.37061	55.16	74.3	-14701	-12410	-713	-667	-297 -.14143
* 9 -9-77	812	364.9	SPECIMEN(S) FULLY UNLOADED, ZERO APPLIED TEST STRESS								
9 -9-77	812	364.9		-.37070	55.15	74.2	-9077	-6786	-391	-345	25
9 -9-77	820	364.9		-.37065	55.16	74.2	-8917	-6626	-382	-336	34
9 -9-77	1006	365.0		-.37055	55.17	74.4	-8888	-6597	-380	-334	36
9 -9-77	1316	365.1		-.37065	55.16	74.2	-8622	-6331	-365	-319	51
9-10-77	815	365.9		-.37088	55.13	73.9	-8490	-6199	-358	-312	58
9-11-77	1117	367.1		-.37093	55.12	73.8	-8398	-6107	-353	-307	63
9-12-77	758	367.9		-.37096	55.12	73.8	-8354	-6063	-351	-305	65
9-13-77	922	369.0		-.37086	55.13	73.9	-8309	-6018	-348	-302	68
9-26-77	1433	382.2		-.37059	55.17	74.3	-8055	-5764	-333	-287	83
10 -7-77	1639	393.3		-.37080	55.14	74.0	-8071	-5780	-334	-288	82
10-20-77	926	406.0		-.37073	55.15	74.1	-7794	-5503	-318	-272	98

MODULUS: LOADING E= 5.7 AT AGE 89 DAYS (STRESS LEVEL 0 TO 2100 PSI)

NOTE: MINUS DAYS UNDER LOAD INDICATES SPECIMEN LOADING TIME PRIOR 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.)

CALIBRATION CONSTANTS:
METER RESISTANCE AT 0.0 DEGREES F. = 48.24 OHMS
TEMP. CALIBRATION CONSTANT = 10.83 F/OHM 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 = 0 PERCENT

STRAIN METER NO. : 999 73-15
AGE OF LOADING : 56 DAYS
TEST TEMPERATURE : 73 DEG. F.

ULT. STR. : 8540. PSI
APPLIED TEST STRESS : 2100. PSI
PER. ULT. STR. APPLIED: 24.6 PERCENT

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

DATE	TIME	AGE, DAYS	DAYS UNDER LOAD	MODE 4 OR 5 VOLTS	RESIST. OHMS	TEMP. DEGREE F.	MODE 3 MICRO-VOLTS	MICRO-STRAIN CHANGE FROM DAY ONE	MICRO-STRAIN TEMPERATURE CORRECTED ELASTIC + CREEP	MICRO-STRAIN TEMPERATURE CORRECTED ELASTIC	MICRO-STRAIN TEMPERATURE CORRECTED CREEP
* 9 -9-76	1000	0	SPECIMEN CAST								
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 -1-76	930	22.0		-.37128	55.08	74.1	10389	-932	-57		
10 -7-76	1105	28.0		-.37116	55.09	74.2	10331	-990	-60		
10-15-76	1320	36.1		-.37149	55.05	73.8	10288	-1033	-63		
*12 -7-76	817	88.9	LOADING BEGINS								
12 -7-76	817	88.9	-.0007	-.37179	55.01	73.4	10053	-1268	-77	0	
*12 -7-76	818	88.9	SPECIMEN FULLY LOADED, APPLIED TEST STRESS 2100 PSI								
12 -7-76	818	88.9	.0000	-.37179	55.01	73.4	3691	-7630	-434	-357	0	0.
12 -7-76	822	88.9	.0028	-.37179	55.01	73.4	3519	-7802	-444	-367	-10	-.00478
12 -7-76	827	88.9	.0063	-.37162	55.04	73.6	3479	-7842	-446	-369	-12	-.00571
12 -7-76	917	89.0	.0410	-.37166	55.03	73.5	3351	-7970	-453	-376	-19	-.00905
12 -7-76	1017	89.0	.0826	-.37162	55.04	73.6	3280	-8041	-457	-380	-23	-.01098
12 -7-76	1317	89.1	.2076	-.37158	55.04	73.6	3195	-8126	-462	-385	-28	-.01333
12 -7-76	1655	89.3	.3590	-.37156	55.04	73.7	3089	-8232	-468	-391	-34	-.01619
12 -8-76	817	89.9	.9993	-.37166	55.03	73.5	2902	-8419	-478	-401	-44	-.02095
12 -9-76	145	90.7	1.7271	-.37151	55.05	73.8	2676	-8645	-491	-414	-57	-.02714
12-10-76	815	91.9	3.0	-.37166	55.03	73.5	2610	-8711	-495	-418	-61	-.02905
12-11-76	815	92.9	4.0	-.37166	55.03	73.5	2510	-8811	-500	-423	-66	-.03142
12-12-76	815	93.9	5.0	-.37166	55.03	73.5	2420	-8901	-505	-428	-71	-.03381
12-13-76	830	94.9	6.0	-.37181	55.01	73.3	2357	-8964	-509	-432	-75	-.03571
12-14-76	815	95.9	7.0	-.37166	55.03	73.5	2310	-9011	-512	-435	-78	-.03714
12-15-76	1220	97.1	8.2	-.37175	55.02	73.4	2217	-9104	-517	-440	-83	-.03952
12-20-76	1445	102.2	13.3	-.37186	55.01	73.3	2002	-9319	-529	-452	-95	-.04521
12-23-76	845	104.9	16.0	-.37157	55.04	73.7	1917	-9404	-533	-456	-99	-.04714
1 -3-77	1145	116.1	27.1	-.37241	54.93	72.5	1565	-9756	-556	-479	-122	-.05810
1-14-77	1200	127.1	38.2	-.37207	54.98	73.0	1315	-10006	-569	-492	-135	-.06429
1-19-77	1050	132.0	43.1	-.37201	54.99	73.1	1216	-10105	-574	-497	-140	-.06667
2 -3-77	945	147.0	58.1	-.37187	55.00	73.3	971	-10350	-587	-510	-153	-.07286
2 -5-77	826	148.9	60.0	-.37198	54.99	73.1	939	-10382	-590	-513	-156	-.07429
2-22-77	905	166.0	77.0	-.37178	55.02	73.4	706	-10615	-602	-525	-168	-.08000
3 -5-77	747	176.9	88.0	-.37166	55.03	73.5	582	-10739	-609	-532	-175	-.08333
3-16-77	1547	188.2	99.3	-.37169	55.03	73.5	487	-10834	-614	-537	-180	-.08571
3-24-77	1138	196.1	107.1	-.37156	55.04	73.7	382	-10939	-620	-543	-186	-.08857
4 -6-77	1446	209.2	120.3	-.37151	55.05	73.7	162	-11159	-632	-555	-198	-.09429
4-26-77	1041	229.0	140.1	-.37157	55.04	73.7	-29	-11350	-643	-566	-209	-.09952
5 -9-77	1347	242.2	153.2	-.37165	55.03	73.5	-126	-11447	-648	-571	-214	-.10190
5-24-77	938	257.0	168.1	-.37153	55.05	73.7	-111	-11432	-647	-570	-213	-.10143
6-17-77	856	281.0	192.0	-.37117	55.09	74.2	-269	-11590	-655	-578	-221	-.10524
7 -6-77	1056	300.0	211.1	-.37131	55.08	74.0	-409	-11730	-663	-586	-229	-.10905
7-13-77	850	307.0	218.0	-.37140	55.06	73.9	-416	-11737	-664	-587	-230	-.10952
7-18-77	920	312.0	223.0	-.37130	55.08	74.0	-501	-11822	-668	-591	-234	-.11143
7-25-77	816	318.9	230.0	-.37120	55.09	74.2	-616	-11937	-675	-598	-241	-.11476
8 -2-77	842	326.9	238.0	-.37087	55.13	74.6	-709	-12030	-679	-602	-245	-.11667
8-22-77	808	346.9	258.0	-.37111	55.10	74.3	-831	-12152	-686	-609	-252	-.12000
9 -9-77	806	364.9	276.0	-.37139	55.06	73.9	-1020	-12341	-698	-621	-264	-.12571
* 9 -9-77	812	364.9	SPECIMEN(S) FULLY UNLOADED, ZERO APPLIED TEST STRESS								
9 -9-77	812	364.9		-.37142	55.06	73.9	4689	-6632	-377	-300	87	
9 -9-77	820	364.9		-.37137	55.07	73.9	4852	-6469	-368	-291	66	
9 -9-77	1006	365.0		-.37129	55.08	74.1	4882	-6439	-366	-289	66	
9 -9-77	1316	365.1		-.37140	55.06	73.9	5147	-6174	-351	-274	83	
9-10-77	815	365.9		-.37161	55.04	73.6	5288	-6033	-344	-267	90	
9-11-77	1117	367.1		-.37164	55.03	73.6	5380	-5941	-339	-262	96	
9-12-77	758	367.9		-.37169	55.03	73.5	5431	-5890	-336	-259	98	
9-13-77	922	369.0		-.37156	55.04	73.7	5476	-5845	-333	-256	101	
10 -7-77	1639	393.3		-.37157	55.04	73.7	5737	-5584	-319	-242	115	
10-20-77	926	406.0		-.37148	55.05	73.8	5996	-5325	-304	-227	130	

MODULUS: LOADING E= 5.9 AT AGE 89 DAYS (STRESS LEVEL 2 TO 2100 PSI)

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

TABLE H1

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. = 48.59 OHMS
TEMP. CALIBRATION CONSTANT = 10.80 F/OHM 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

STRAIN METER NO. : 554 11-10
AGE OF LOADING : 90 DAYS
TEST TEMPERATURE : 110 DEG. F.

ULT. STR. : 8540. PSI
APPLIED TEST STRESS : 2100. PSI
PER. ULT. STR. APPLIED: 24.6 PERCENT

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

DATE	TIME	AGE, DAYS UNDER LOAD	DAYS UNDER 4 OR 5 VOLTS	MODE	RESIST. OHMS	TEMP. DEGREE F.	MODE 3 MICRO-VOLTS	MICROSTRAIN CHANGE VOLTS	MICROSTRAIN FROM DAY ONE	TEMPERATURE CORRECTED ELASTIC	TEMPERATURE CORRECTED CREEP	TEMPERATURE CORRECTED SPECIFIC CREEP
* 9 -9-76	1000	0	SPECIMEN CAST									
9-10-76	1430	1.2		-.36863	55.42	73.7	1461	0	0			
9-16-76	1400	7.2		-.37023	55.21	71.5	1102	-359	-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	-1930	-36			
10 -7-76	1105	28.0		-.34392	58.64	108.6	-439	-1900	-33			
10-15-76	1320	36.1		-.34456	58.56	107.6	-609	-2070	-44			
*12 -7-76	840	88.9	LOADING BEGINS									
12 -7-76	840	88.9	-.0007	-.34300	58.76	109.9	-1598	-3059	-96	0		
*12 -7-76	841	88.9	SPECIMEN FULLY LOADED, APPLIED TEST STRESS 2100 PSI									
12 -7-76	841	88.9	.0000	-.34300	58.76	109.9	-7786	-9247	-444	-348	0	0.
12 -7-76	845	88.9	.0028	-.34300	58.76	109.9	-8066	-9527	-460	-364	-16	-.00762
12 -7-76	850	89.0	.0063	-.34300	58.76	109.9	-8126	-9587	-464	-368	-20	-.00952
12 -7-76	940	89.0	.0410	-.34298	58.77	109.9	-8324	-9785	-475	-379	-31	-.01476
12 -7-76	1040	89.0	.0826	-.34303	58.76	109.8	-8436	-9897	-481	-385	-37	-.01762
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	58.78	110.0	-8996	-10457	-512	-416	-68	-.03238
12 -9-76	1345	91.2	2.2	-.34356	58.69	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	-.05905
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	8.0	-.34300	58.76	109.9	-10169	-11630	-579	-483	-135	-.06429
12-20-76	1445	102.2	13.3	-.34314	58.75	109.7	-10311	-11772	-587	-491	-143	-.06810
12-23-76	845	104.9	16.0	-.34280	58.79	110.2	-10447	-11908	-594	-498	-150	-.07143
1 -3-77	1145	114.1	27.1	-.34307	58.76	109.8	-11000	-12461	-626	-530	-182	-.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	-562	-214	-.10190
2 -3-77	1000	147.0	58.1	-.34310	58.75	109.7	-11917	-13378	-678	-582	-234	-.11143
2 -5-77	754	148.9	60.0	-.34323	58.73	109.6	-11937	-13398	-679	-583	-235	-.11190
2-22-77	836	165.9	77.0	-.34305	58.76	109.8	-12330	-13791	-701	-605	-257	-.12236
3 -5-77	800	176.9	88.0	-.34302	58.76	109.9	-12569	-14030	-714	-618	-270	-.12857
3-16-77	1605	188.3	99.2	-.34306	58.76	109.8	-12719	-14180	-723	-627	-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	-638	-290	-.13810
4-26-77	1053	229.0	140.1	-.34381	58.66	108.7	-13234	-14695	-754	-656	-310	-.14762
5 -9-77	1327	242.1	153.2	-.34237	58.85	110.8	-13510	-14971	-765	-665	-321	-.15286
5-24-77	1005	257.0	168.1	-.34272	58.80	110.3	-13724	-15185	-778	-682	-334	-.15905
6-17-77	842	280.9	192.0	-.34301	58.76	109.9	-14038	-15499	-797	-701	-353	-.16810
7 -6-77	1201	300.1	211.1	-.34249	58.83	110.6	-14263	-15724	-808	-712	-364	-.17333
7-13-77	948	307.0	218.0	-.34271	58.80	110.3	-14340	-15801	-813	-717	-369	-.17571
7-25-77	906	319.0	230.0	-.34277	58.79	110.2	-14543	-16004	-825	-729	-381	-.18143
8 -5-77	1156	330.1	241.1	-.34242	58.84	110.7	-14675	-16136	-831	-735	-387	-.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	-.19571
* 9 -9-77	840	364.9	SPECIMEN(S) FULLY UNLOADED, ZERO APPLIED TEST STRESS									
9 -9-77	840	364.9		-.34309	58.75	109.8	-9153	-10614	-522	-426	-78	
9 -9-77	850	365.0		-.34309	58.75	109.8	-8818	-10279	-503	-407	-59	
9 -9-77	1034	365.0		-.34314	58.75	109.7	-8609	-10070	-491	-395	-47	
9 -9-77	1326	365.1		-.34312	58.75	109.7	-8505	-9966	-485	-389	-41	
9-10-77	825	365.9		-.34337	58.71	109.3	-8331	-9792	-476	-380	-32	
9-11-77	1127	367.1		-.34332	58.72	109.4	-8225	-9686	-470	-374	-26	
9-12-77	812	367.9		-.34329	58.73	109.5	-8178	-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		-.34343	58.71	109.3	-7855	-9316	-450	-354	-6	
10 -7-77	1653	393.3		-.34435	58.58	107.9	-7747	-9208	-446	-350	-2	
10-20-77	910	406.0		-.34310	58.75	109.7	-7653	-9114	-437	-341	7	

MODULUS: LOADING E= 6.0 AT AGE 89 DAYS (STRESS LEVEL 0 TO 2100 PSI)

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

TABLE H2

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. = 48.35 OHMS
TEMP. CALIBRATION CONSTANT = 10.66 F/OHM CHANGE IN RESIST.
STRAIN CALIBRATION CONSTANT = 9.00 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

STRAIN METER NO. : 1002 11-11
AGE OF LOADING : 90 DAYS
TEST TEMPERATURE : 110 DEG. F.
ULT. STR. : 8540. PSI
APPLIED TEST STRESS : 2100. PSI
PER. ULT. STR. APPLIED: 24.6 PERCENT

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

DATE	TIME	AGE, DAYS	DAYS UNDER LOAD	MODE 4 OR 5 VOLTS	RESIST. OHMS	TEMP. DEGREE F.	MODE 3 MICRO-VOLTS	CHANGE MICRO-VOLTS	FROM DAY ONE	TEMPERATURE CORRECTED ELASTIC	TEMPERATURE CORRECTED CREEP	SPECIFIC CREEP
MICROSTRAIN												
9 -9-76	1000	0	SPECIMEN CAST									
9-10-76	1430	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		-.37246	54.93	71.0	14567	-474	-30			
9-23-76	915	14.0		-.37244	54.93	71.0	14505	-536	-34			
10 -1-76	930	22.0		-.34669	58.26	107.4	13136	-1505	-33			
10 -7-76	1105	28.0		-.34624	58.33	108.0	13269	-1772	-25			
10-15-76	1320	36.1		-.34684	58.26	107.1	13068	-1573	-38			
12 -7-76	840	88.9	LOADING BEGINS									
12 -7-76	840	88.9	-.0007	-.34638	58.45	109.2	12188	-2653	-82	0		
12 -7-76	841	88.9	SPECIMEN FULLY LOADED, APPLIED TEST STRESS 2100 PSI									
12 -7-76	841	88.9	.0000	-.34300	58.76	112.7	5650	-9291	-438	-356	0	0.
12 -7-76	845	88.9	.0028	-.34300	58.76	112.7	5318	-9723	-457	-375	-19	-.00905
12 -7-76	850	89.0	.0063	-.34300	58.76	112.7	5235	-9826	-461	-379	-23	-.01095
12 -7-76	940	89.0	.0410	-.34328	58.46	109.4	4994	-10047	-482	-400	-44	-.02095
12 -7-76	1040	89.0	.0826	-.34330	58.46	109.3	4868	-10173	-489	-407	-51	-.02429
12 -7-76	1340	89.2	.2076	-.34334	58.45	109.3	4700	-10341	-498	-416	-60	-.02857
12 -7-76	1645	89.3	.3361	-.34324	58.45	109.3	4557	-10484	-506	-424	-68	-.03238
12 -8-76	840	89.9	.9993	-.34320	58.47	109.5	4229	-10812	-524	-442	-86	-.04095
12 -9-76	1345	91.2	2.2	-.34360	58.39	108.6	3970	-11071	-540	-458	-102	-.04857
12-11-76	815	92.9	4.0	-.34300	58.76	112.7	3574	-11467	-554	-472	-116	-.05524
12-12-76	815	93.9	5.0	-.34300	58.76	112.7	3324	-11717	-567	-485	-129	-.06143
12-13-76	815	94.9	6.0	-.34300	58.76	112.7	3164	-11877	-576	-494	-138	-.06571
12-15-76	1220	97.1	8.2	-.34332	58.46	109.3	3150	-11891	-584	-502	-146	-.06952
12-20-76	1445	102.2	13.3	-.34334	58.45	109.3	2757	-12284	-606	-524	-168	-.08000
12-23-76	845	104.9	16.0	-.34300	58.50	109.8	2588	-12453	-614	-532	-176	-.08381
1 -3-77	1145	116.1	27.1	-.34326	58.46	109.4	1967	-13074	-650	-566	-212	-.10095
1-14-77	1330	127.1	38.2	-.34363	58.41	108.9	1560	-13481	-673	-591	-235	-.11190
1-20-77	1155	133.1	44.1	-.34359	58.42	108.9	1364	-13677	-684	-602	-246	-.11714
2 -3-77	1000	147.0	58.1	-.34333	58.46	109.3	949	-14092	-706	-624	-268	-.12762
2 -5-77	754	148.9	60.0	-.34345	58.44	109.1	924	-14117	-708	-626	-270	-.12857
2-22-77	836	165.9	77.0	-.34325	58.47	109.4	465	-14576	-733	-651	-295	-.14048
3 -5-77	800	176.9	88.0	-.34322	58.47	109.5	200	-14841	-748	-666	-310	-.14762
3-16-77	1605	188.3	99.3	-.34334	58.45	109.3	-21	-15062	-760	-678	-322	-.15333
3-24-77	1131	196.1	107.1	-.34328	58.46	109.4	-199	-15240	-770	-688	-332	-.15810
4 -6-77	1500	209.2	120.3	-.34320	58.47	109.5	-261	-15302	-773	-691	-335	-.15952
4-26-77	1053	229.0	140.1	-.34304	58.36	108.3	-601	-15642	-795	-713	-357	-.17000
5 -9-77	1327	242.1	153.2	-.34357	58.56	110.4	-911	-15952	-807	-725	-369	-.17571
5-24-77	1005	257.0	168.1	-.34495	58.51	109.9	-1149	-16190	-822	-740	-384	-.18286
6-17-77	842	280.9	192.0	-.34521	58.47	109.5	-1499	-16540	-842	-760	-404	-.19238
7 -6-77	1201	300.1	211.1	-.34474	58.53	110.2	-1759	-16800	-855	-773	-417	-.19857
7-13-77	948	307.0	218.0	-.34496	58.50	109.8	-1846	-16887	-861	-779	-423	-.20143
7-25-77	906	319.0	230.0	-.34502	58.50	109.7	-2069	-17110	-873	-791	-435	-.20714
8 -5-77	1156	330.1	241.1	-.34462	58.55	110.3	-2211	-17252	-880	-798	-442	-.21048
8-22-77	832	346.9	258.0	-.34557	58.42	109.0	-2381	-17422	-892	-810	-454	-.21619
9 -9-77	833	364.9	276.0	-.34529	58.46	109.4	-2627	-17668	-905	-823	-467	-.22238
9 -9-77	840	364.9	SPECIMEN(S) FULLY UNLOADED, ZERO APPLIED TEST STRESS									
9 -9-77	840	364.9		-.34544	58.44	109.1	3537	-11504	-563	-481	-125	
9 -9-77	850	365.0		-.34542	58.44	109.2	3699	-11342	-554	-472	-116	
9 -9-77	1034	365.0		-.34541	58.44	109.2	3859	-11182	-545	-463	-107	
9 -9-77	1326	365.1		-.34527	58.46	109.4	3964	-11077	-539	-457	-101	
9-10-77	825	365.9		-.34553	58.43	109.0	4153	-10888	-529	-447	-91	
9-11-77	1127	367.1		-.34549	58.43	109.1	4257	-10784	-523	-441	-85	
9-12-77	812	367.9		-.34547	58.44	109.1	4342	-10699	-518	-436	-80	
9-13-77	938	369.0		-.34575	58.40	108.7	4528	-10513	-509	-427	-71	
9-26-77	1519	382.2		-.34570	58.41	108.8	4745	-10296	-497	-415	-59	
10 -7-77	1653	393.3		-.34635	58.32	107.8	4870	-10171	-492	-410	-54	
10-20-77	910	406.0		-.34538	58.45	109.2	4980	-10061	-483	-401	-45	

MODULUS: LOADING E= 5.9 AT AGE 89 DAYS (STRESS LEVEL 0 TO 2100 PSI)

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

TABLE I1

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. = 48.12 OHMS
TEMP. CALIBRATION CONSTANT = 10.86 F/OHM CHANGE IN RESIST.
STRAIN CALIBRATION CONSTANT = 8.40 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

STRAIN METER NO. : 995 73-16
AGE OF LOADING : 180 DAYS
TEST TEMPERATURE : 73 DEG. F.

ULT. STR. : 9180. PSI
APPLIED TEST STRESS : 2100. PSI
PER. ULT. STR. APPLIED: 22.9 PERCENT

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

DATE	TIME	AGE, DAYS	DAYS UNDER LOAD	MODE 4 OR 5 VOLTS	RESIST. OHMS	TEMP. DEGREE F.	MODE 3 MICRO-VOLTS	CHANGE MICRO-VOLTS	MICROSTRAIN TEMPERATURE CORRECTED FROM DAY ONE	ELASTIC	CREEP	SPECIFIC CREEP
* 9 -9-76	1000	0	SPECIMEN CAST									
9-10-76	1430	1.2		-.37091	55.13	76.1	2431	0	0			
9-16-76	1400	7.2		-.37266	54.90	73.7	2155	-276	-21			
9-21-76	1145	12.1		-.37288	54.88	73.4	1997	-434	-31			
9-23-76	915	14.0		-.37277	54.89	73.5	1951	-480	-33			
10 -1-76	930	22.0		-.37273	54.89	73.6	1915	-516	-35			
10 -7-76	1105	28.0		-.37246	54.93	73.9	1905	-526	-35			
10-15-76	1320	36.1		-.37279	54.89	73.5	1922	-509	-35			
3 -8-77	1307	180.1		-.37276	54.89	73.5	1234	-1197	-76			
* 3 -8-77	1327	180.1	LOADING BEGINS									
3 -8-77	1327	180.1	-.0007	-.37276	54.89	73.5	1224	-1207	-72	0		
* 3 -8-77	1328	180.1	SPECIMEN FULLY LOADED, APPLIED TEST STRESS 2100 PSI									
3 -8-77	1328	180.1	.0000	-.37276	54.89	73.5	-5166	-7597	-431	-359	0	0.
3 -8-77	1332	180.1	.0028	-.37276	54.89	73.5	-5551	-7982	-453	-381	-22	-.01048
3 -8-77	1337	180.2	.0063	-.37276	54.89	73.5	-5566	-7997	-453	-381	-22	-.01048
3 -8-77	1457	180.2	.0618	-.37272	54.89	73.6	-5641	-8072	-458	-386	-27	-.01286
3 -8-77	1525	180.2	.0813	-.37274	54.89	73.5	-5644	-8075	-456	-386	-27	-.01286
3 -8-77	1650	180.3	.1403	-.37274	54.89	73.6	-5669	-8100	-459	-387	-28	-.01333
3 -9-77	1555	181.2	1.1021	-.37274	54.89	73.6	-5862	-8293	-470	-398	-39	-.01857
3-10-77	1617	182.3	2.1	-.37285	54.88	73.4	-6035	-8466	-480	-408	-49	-.02333
3-11-77	1546	183.2	3.1	-.37279	54.89	73.5	-6109	-8540	-484	-412	-53	-.02524
3-12-77	1202	184.1	3.9	-.37303	54.86	73.2	-6177	-8608	-489	-417	-58	-.02762
3-13-77	1326	185.1	5.0	-.37297	54.86	73.2	-6249	-8680	-492	-420	-61	-.02905
3-15-77	1230	187.1	7.0	-.37311	54.85	73.0	-6320	-8751	-497	-425	-66	-.03143
3-16-77	1547	188.2	8.1	-.37311	54.85	73.0	-6382	-8813	-500	-428	-69	-.03286
3-24-77	1138	196.1	15.9	-.37298	54.86	73.2	-6670	-9101	-516	-444	-85	-.04048
4 -6-77	1446	209.2	29.1	-.37291	54.87	73.3	-7085	-9516	-539	-467	-108	-.05143
4-26-77	1041	229.0	48.9	-.37297	54.86	73.2	-7359	-9830	-557	-485	-126	-.06000
5 -9-77	1347	242.2	62.0	-.37309	54.85	73.1	-7570	-10001	-567	-495	-136	-.06476
5-24-77	938	257.0	76.8	-.37296	54.87	73.3	-7717	-10148	-575	-503	-144	-.06857
6-17-77	856	281.0	100.8	-.37262	54.91	73.7	-7959	-10390	-587	-515	-156	-.07429
7 -6-77	1056	300.0	119.9	-.37273	54.89	73.6	-8145	-10576	-598	-526	-167	-.07952
7-13-77	850	307.0	126.8	-.37285	54.88	73.4	-8174	-10605	-600	-528	-169	-.08048
7-18-77	920	312.0	131.8	-.37275	54.89	73.5	-8271	-10702	-605	-533	-174	-.08286
7-25-77	816	318.9	138.8	-.37265	54.90	73.7	-8381	-10812	-611	-539	-180	-.08571
8 -2-77	842	326.9	146.8	-.37230	54.95	74.2	-8484	-10915	-616	-544	-185	-.08810
8-22-77	808	346.9	166.8	-.37256	54.92	73.8	-8612	-11043	-624	-552	-193	-.09190
9 -9-77	806	364.9	184.8	-.37276	54.89	73.5	-8769	-11200	-633	-561	-202	-.09615
* 9 -9-77	812	364.9	SPECIMEN(S) FULLY UNLOADED, ZERO APPLIED TEST STRESS									
9 -9-77	812	364.9		-.37277	54.89	73.5	-2975	-5406	-308	-236	123	
9 -9-77	820	364.9		-.37275	54.89	73.5	-2832	-5263	-300	-228	131	
9 -9-77	1006	365.0		-.37266	54.90	73.7	-2790	-5221	-297	-225	134	
9 -9-77	1316	365.1		-.37275	54.89	73.5	-2515	-4946	-282	-210	149	
9-10-77	815	365.9		-.37299	54.86	73.2	-2372	-4803	-275	-203	156	
9-11-77	1117	367.1		-.37301	54.86	73.2	-2287	-4718	-270	-198	161	
9-12-77	758	367.9		-.37309	54.85	73.1	-2225	-4656	-267	-195	164	
9-13-77	922	369.0		-.37294	54.87	73.3	-2182	-4613	-264	-192	167	
9-26-77	1433	382.2		-.37273	54.89	73.6	-1908	-4339	-248	-176	183	
10 -7-77	1639	393.3		-.37290	54.87	73.3	-1913	-4344	-249	-177	182	
10-20-77	926	406.0		-.37283	54.88	73.4	-1659	-4090	-234	-162	197	

MODULUS: LOADING E= 5.8 AT AGE 180 DAYS (STRESS LEVEL 0 TO 2100 PSI)

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

TABLE I2

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. = 48.31 OHMS
TEMP. CALIBRATION CONSTANT = 10.88 F/OHM CHANGE IN RESIST.
STRAIN CALIBRATION CONSTANT = 9.15 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

STRAIN METER NO. : 1001 73-17
AGE OF LOADING : 180 DAYS
TEST TEMPERATURE : 73 DEG. F.

ULT. STR. : 9180. PSI
APPLIED TEST STRESS : 2100. PSI
PER. ULT. STR. APPLIED: 22.9 PERCENT

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

DATE	TIME	AGE, DAYS	DAYS UNDER LOAD	MODE 4 OR 5 VOLTS	RESIST. OHMS	TEMP. DEGREE F.	MODE 3 MICRO-VOLTS	MICROSTRAIN CHANGE MICRO-VOLTS	MICROSTRAIN TEMPERATURE CORRECTED FROM DAY ONE	ELASTIC	CREEP	SPECIFIC CREEP
* 9 -9-76	1000	0	SPECIMEN CAST									
9-10-76	1430	1.2		-.37041	55.15	74.9	16010	0	0			
9-16-76	1400	7.2		-.37166	55.03	73.1	15668	-342	-21			
9-21-76	1145	12.1		-.37203	54.98	72.6	15494	-516	-32			
9-23-76	915	14.0		-.37157	54.99	72.7	15437	-573	-35			
10 -1-76	930	22.0		-.37191	55.00	72.8	15328	-682	-41			
10 -7-76	1105	28.0		-.37178	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	180.1		-.37178	55.01	72.9	15104	-906	-53			
* 3 -8-77	1327	180.1	LOADING BEGINS									
3 -8-77	1327	180.1	-.0007	-.37178	55.01	72.9	15102	-908	-50	0		
* 3 -8-77	1328	180.1	SPECIMEN FULLY LOADED, APPLIED TEST STRESS 2100 PSI									
3 -8-77	1328	180.1	.0000	-.37178	55.01	72.9	8782	-7228	-376	-326	0	0.
3 -8-77	1332	180.1	.0028	-.37178	55.01	72.9	8430	-7580	-394	-344	-18	-.00857
3 -8-77	1337	180.2	.0063	-.37178	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	.0813	-.37178	55.02	73.0	8324	-7686	-399	-349	-23	-.01095
3 -8-77	1650	180.3	.1403	-.37175	55.02	73.0	8304	-7706	-400	-350	-24	-.01143
3 -9-77	1555	181.2	1.1021	-.37176	55.02	73.0	8096	-7914	-411	-361	-35	-.01667
3-10-77	1617	182.3	2.1	-.37187	55.00	72.8	7939	-8071	-419	-369	-43	-.02048
3-11-77	1546	183.2	3.1	-.37177	55.02	73.0	7860	-8150	-423	-373	-47	-.02238
3-12-77	1202	184.1	3.9	-.37206	54.98	72.6	7795	-8215	-427	-377	-51	-.02429
3-13-77	1326	185.1	5.0	-.37197	54.99	72.7	7720	-8290	-431	-381	-55	-.02615
3-15-77	1230	187.1	7.0	-.37211	54.97	72.5	7651	-8359	-435	-385	-59	-.02810
3-16-77	1547	188.2	8.1	-.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	-8719	-453	-403	-77	-.03667
4 -6-77	1446	209.2	29.1	-.37196	54.99	72.7	6876	-9134	-474	-424	-98	-.04667
4-26-77	1041	229.0	48.9	-.37202	54.98	72.6	6857	-9453	-491	-441	-115	-.05476
5 -9-77	1347	242.2	62.0	-.37209	54.98	72.5	6375	-9635	-501	-451	-125	-.05952
5-24-77	938	257.0	76.8	-.37196	54.99	72.7	6226	-9784	-508	-458	-132	-.06286
6-17-77	856	281.0	100.8	-.37170	55.03	73.1	5954	-10016	-519	-469	-143	-.06810
7 -6-77	1056	300.0	119.9	-.37181	55.01	72.9	5818	-10152	-528	-478	-152	-.07238
7-13-77	850	307.0	126.8	-.37200	54.99	72.6	5790	-10220	-531	-481	-155	-.07381
7-18-77	920	312.0	131.8	-.37182	55.01	72.9	5695	-10315	-535	-485	-159	-.07571
7-25-77	816	318.9	138.8	-.37182	55.01	72.9	5597	-10413	-540	-490	-164	-.07810
8 -2-77	842	326.9	146.8	-.37140	55.06	73.5	5485	-10525	-544	-494	-168	-.08000
8-22-77	808	346.9	166.8	-.37176	55.02	73.0	5358	-10652	-552	-502	-176	-.08381
9 -9-77	806	364.9	184.8	-.37196	54.99	72.7	5183	-10827	-562	-512	-186	-.08857
* 9 -9-77	812	364.9	SPECIMEN(S) FULLY UNLOADED, ZERO APPLIED TEST STRESS									
9 -9-77	812	364.9		-.37200	54.99	72.6	10914	-5096	-266	-216	110	
9 -9-77	820	364.9		-.37192	55.00	72.8	11041	-4969	-260	-210	116	
9 -9-77	1000	365.0		-.37184	55.01	72.9	11056	-4954	-259	-209	117	
9 -9-77	1316	365.1		-.37195	54.99	72.7	11315	-4695	-246	-196	130	
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	758	367.9		-.37229	54.95	72.2	11588	-4422	-232	-182	144	
9-13-77	922	368.0		-.37216	54.97	72.4	11638	-4372	-230	-180	146	
9-26-77	1433	382.2		-.37188	55.00	72.8	11896	-4114	-215	-165	161	
10 -7-77	1639	393.3		-.37210	54.97	72.5	11871	-4139	-217	-167	159	
10-20-77	921	406.0		-.37201	54.99	72.6	12134	-3876	-203	-153	173	

MODULUS: LOADING E= 6.4 AT AGE 180 DAYS (STRESS LEVEL 0 TO 2100 PSI)

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

TABLE J1

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. = 48.36 OHMS
TEMP. CALIBRATION CONSTANT = 10.82 F/OHM CHANGE IN RESIST.
STRAIN CALIBRATION CONSTANT = 8.66 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

STRAIN METER NO. : 1000 11-12
AGE OF LOADING : 180 DAYS
TEST TEMPERATURE : 110 DEG. F.

ULT. STR. : 9180. PSI
APPLIED TEST STRESS : 2100. PSI
PER. ULT. STR. APPLIED: 22.9 PERCENT

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

DATE	TIME	AGE, DAYS	DAYS UNDER LOAD	MODE 4 OR 5 VOLTS	RESIST. OHMS	TEMP. DEGREE F.	MODE 3 MICRO-VOLTS	CHANGE MICRO-VOLTS	MICROSTRAIN TEMPERATURE CORRECTED FROM DAY ONE	ELASTIC	CREEP	SPECIFIC CREEP
* 9 -9-76	1000	0	SPECIMEN CAST									
9-10-76	1430	1.2		-.36903	55.37	75.8	13023	0	0			
9-16-76	1400	7.2		-.37048	55.18	73.8	12614	-409	-27			
9-21-76	1145	12.1		-.37088	55.13	73.3	12357	-666	-43			
9-23-76	915	14.0		-.37082	55.14	73.3	12303	-720	-46			
10 -1-76	930	22.0		-.34514	58.48	109.5	10936	-2087	-49			
10 -7-76	1105	28.0		-.34514	58.48	109.5	11001	-2022	-45			
10-15-76	1320	36.1		-.34574	58.40	108.6	10913	-2110	-52			
* 3 -8-77	1348	180.2	LOADING BEGINS									
3 -8-77	1348	180.2	-.0007	-.34398	58.63	111.2	9545	-3478	-114	0		
* 3 -8-77	1349	180.2	SPECIMEN FULLY LOADED, APPLIED TEST STRESS 2100 PSI									
3 -8-77	1349	180.2	.0000	-.34398	58.63	111.2	3623	-9400	-437	-323	0	0.
3 -8-77	1353	180.2	.0028	-.34398	58.63	111.2	3565	-9458	-440	-326	-3	-.00143
3 -8-77	1358	180.2	.0063	-.34398	58.63	111.2	3478	-9545	-445	-331	-8	-.00381
3 -8-77	1447	180.2	.0402	-.34383	58.65	111.4	3205	-9818	-459	-345	-22	-.01048
3 -8-77	1556	180.2	.0882	-.34372	58.67	111.5	3071	-9952	-466	-352	-29	-.01381
3 -8-77	1642	180.3	.1201	-.34367	58.68	111.6	3013	-10010	-469	-355	-32	-.01524
3 -9-77	1606	181.3	1.0951	-.34363	58.68	111.7	2505	-10518	-497	-383	-60	-.02857
3-10-77	1626	182.3	2.1	-.34377	58.66	111.5	2298	-10725	-508	-394	-71	-.03381
3-11-77	1554	183.2	3.1	-.34380	58.66	111.4	2147	-10878	-517	-403	-80	-.03810
3-12-77	1150	184.1	3.9	-.34373	58.67	111.5	2029	-10994	-523	-409	-86	-.04095
3-13-77	1332	185.1	5.0	-.34365	58.68	111.6	1892	-11131	-530	-416	-93	-.04429
3-15-77	1156	187.1	6.9	-.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	-430	-107	-.05095
3-24-77	1131	196.1	15.9	-.34368	58.67	111.6	1115	-11908	-572	-458	-135	-.06429
4 -6-77	1500	209.2	29.0	-.34360	58.68	111.7	777	-12246	-591	-477	-154	-.07333
4-26-77	1053	229.0	48.9	-.34444	58.57	110.5	227	-12796	-623	-509	-186	-.08857
5 -9-77	1327	242.1	62.0	-.34297	58.77	112.6	-189	-13212	-641	-527	-204	-.09714
5-24-77	1005	257.0	76.8	-.34332	58.72	112.1	-521	-13544	-660	-546	-223	-.10619
6-17-77	842	280.9	100.8	-.34361	58.68	111.7	-961	-13984	-685	-571	-248	-.11810
7 -6-77	1201	300.1	119.9	-.34309	58.75	112.5	-1281	-14304	-701	-587	-264	-.12571
7-13-77	948	307.0	126.8	-.34331	58.72	112.1	-1389	-14412	-708	-594	-271	-.12905
7-25-77	906	319.0	138.8	-.34355	58.69	111.8	-1641	-14664	-722	-608	-285	-.13571
8 -5-77	1156	330.1	149.9	-.34307	58.76	112.5	-1811	-14834	-730	-616	-293	-.13952
8-22-77	832	346.9	166.8	-.34397	58.64	111.2	-1996	-15019	-743	-629	-306	-.14571
9 -9-77	853	364.9	184.8	-.34361	58.68	111.7	-2312	-15335	-759	-645	-322	-.15333
* 9 -9-77	840	364.9	SPECIMEN(S) FULLY UNLOADED, ZERO APPLIED TEST STRESS									
9 -9-77	840	364.9		-.34377	58.66	111.5	3729	-9294	-430	-316	7	
9 -9-77	850	365.0		-.34377	58.66	111.5	3899	-9124	-421	-307	16	
9 -9-77	1034	365.0		-.34366	58.68	111.6	4067	-8956	-412	-298	25	
9 -9-77	1326	365.1		-.34359	58.69	111.7	4169	-8854	-406	-292	31	
9-10-77	825	365.9		-.34382	58.65	111.4	4368	-8655	-396	-282	41	
9-11-77	1127	367.1		-.34377	58.66	111.5	4467	-8556	-390	-276	47	
9-12-77	812	367.9		-.34377	58.66	111.5	4552	-8471	-386	-272	51	
9-13-77	938	369.0		-.34402	58.63	111.1	4740	-8283	-376	-262	61	
9-26-77	1519	382.2		-.34380	58.66	111.4	4930	-8093	-365	-251	72	
10 -7-77	1653	393.3		-.34423	58.60	110.8	5037	-7986	-361	-247	76	
10-20-77	910	406.0		-.34353	58.69	111.8	5140	-7883	-353	-239	84	

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

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

TABLE J2

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. = 48.65 OHMS
TEMP. CALIBRATION CONSTANT = 10.75 F/OHM CHANGE IN RESIST.
STRAIN CALIBRATION CONSTANT = 8.84 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

STRAIN METER NO. : 996 11-13
AGE OF LOADING : 180 DAYS
TEST TEMPERATURE : 110 DEG. F.

ULT. STR. : 9180. PSI
APPLIED TEST STRESS : 2100. PSI
PER. ULT. STR. APPLIED: 22.9 PERCENT

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

DATE	TIME	AGE, DAYS UNDER LOAD	DAYS UNDER LOAD	MODE 4 OR 5 VOLTS	RESIST. OHMS	TEMP. DEGREE F.	MODE 3 MICRO-VOLTS	MICROSTRAIN CHANGE FROM DAY ONE	MICROSTRAIN TEMPERATURE CORRECTED ELASTIC	MICROSTRAIN TEMPERATURE CORRECTED CREEP	MICROSTRAIN TEMPERATURE CORRECTED SPECIFIC CREEP	
* 9 -9-76	1000	0	SPECIMEN CAST									
9-10-76	1430	1.2		-.36706	55.62	74.9	6003	0	0			
9-16-76	1400	7.2		-.36848	55.44	73.0	5619	-384	-25			
9-21-76	1145	12.1		-.36881	55.40	72.5	5388	-615	-39			
9-23-76	915	14.0		-.36877	55.40	72.6	5315	-688	-43			
10 -1-76	930	22.0		-.34289	58.78	108.9	4160	-1843	-32			
10 -7-76	1105	28.0		-.34247	58.84	109.5	4227	-1776	-27			
10-15-76	1320	36.1		-.34314	58.75	108.5	4186	-1817	-31			
* 3 -8-77	1348	180.2	LOADING BEGINS									
3 -8-77	1348	180.2	-.0007	-.34180	58.92	110.4	2906	-3097	-90	0		
* 3 -8-77	1349	180.2	SPECIMEN FULLY LOADED, APPLIED TEST STRESS 2100 PSI									
3 -8-77	1349	180.2	.0000	-.34180	58.92	110.4	-3482	-9485	-431	-341	0	0.
3 -8-77	1353	180.2	.0028	-.34180	58.92	110.4	-3537	-9540	-433	-343	-2	-.00095
3 -8-77	1358	180.2	.0063	-.34180	58.92	110.4	-3602	-9605	-437	-347	-6	-.00286
3 -8-77	1447	180.2	.0403	-.34163	58.95	110.7	-3802	-9805	-447	-357	-16	-.00762
3 -8-77	1556	180.2	.0882	-.34150	58.96	110.9	-3916	-9919	-453	-363	-22	-.01048
3 -8-77	1642	180.3	.1261	-.34145	58.97	111.0	-3973	-9976	-456	-366	-25	-.01190
3 -9-77	1606	181.3	1.0951	-.34144	58.97	111.0	-4447	-10450	-481	-391	-50	-.02381
3-10-77	1626	182.3	2.1	-.34161	58.95	110.7	-4652	-10655	-492	-402	-61	-.02905
3-11-77	1554	183.2	3.1	-.34164	58.95	110.7	-4781	-10784	-499	-409	-68	-.03236
3-12-77	1150	184.1	3.9	-.34155	58.96	110.8	-4889	-10892	-505	-415	-74	-.03524
3-13-77	1332	185.1	5.0	-.34152	58.96	110.8	-5004	-11007	-511	-421	-80	-.03810
3-15-77	1156	187.1	6.9	-.34186	58.92	110.4	-5133	-11136	-519	-429	-88	-.04190
3-16-77	1605	188.3	8.1	-.34169	58.94	110.6	-5245	-11248	-524	-434	-93	-.04429
3-24-77	1131	196.1	15.9	-.34161	58.95	110.7	-5718	-11721	-549	-459	-118	-.05615
4 -6-77	1500	209.2	29.0	-.34155	58.96	110.8	-6064	-12067	-568	-478	-137	-.06524
4-26-77	1053	229.0	48.9	-.34236	58.85	109.7	-6575	-12578	-597	-507	-166	-.07905
5 -9-77	1327	242.1	62.0	-.34089	59.05	111.7	-6980	-12983	-614	-524	-183	-.08714
5-24-77	1005	257.0	76.8	-.34125	59.00	111.2	-7304	-13307	-633	-543	-202	-.09615
6-17-77	842	280.9	100.8	-.34154	58.96	110.8	-7747	-13750	-657	-567	-226	-.10762
7 -6-77	1201	300.1	119.9	-.34100	59.03	111.6	-8046	-14049	-672	-582	-241	-.11476
7-13-77	948	307.0	126.8	-.34126	59.00	111.2	-8149	-14152	-678	-588	-247	-.11762
7-25-77	906	319.0	138.8	-.34135	58.98	111.1	-8390	-14393	-691	-601	-260	-.12381
8 -5-77	1156	330.1	149.9	-.34099	59.03	111.6	-8558	-14561	-699	-609	-268	-.12762
8-22-77	832	346.9	166.8	-.34190	58.91	110.3	-8749	-14752	-712	-622	-281	-.13381
9 -9-77	833	364.9	184.8	-.34159	58.95	110.8	-8999	-15002	-724	-634	-293	-.13952
* 9 -9-77	840	364.9	SPECIMEN(S) FULLY UNLOADED, ZERO APPLIED TEST STRESS									
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		-.34187	58.91	110.3	-2297	-8300	-367	-277	64	
9-11-77	1127	367.1		-.34182	58.92	110.4	-2195	-8198	-362	-272	69	
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	-7928	-348	-258	83	
9-26-77	1519	382.2		-.34183	58.92	110.4	-1725	-7728	-337	-247	94	
10 -7-77	1653	393.3		-.34224	58.87	109.8	-1607	-7610	-332	-242	99	
10-20-77	910	406.0		-.34153	58.96	110.8	-1505	-7508	-324	-234	107	

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

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

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 CONSTANTS:

METER RESISTANCE AT 0.0 DEGREES F.	= 48.18 OHMS	STRAIN METER NO. :	567 73-10
TEMP. CALIBRATION CONSTANT	= 10.84 F/OHM CHANGE IN RESIST.	AGE OF LOADING :	365 DAYS
STRAIN CALIBRATION CONSTANT	= 8.53 MICROVOLTS/VOLT/MICROSTRAIN	TEST TEMPERATURE :	73 DEG. F.
CALIBRATED RANGE	= 11100 TO -10100 MICROVOLTS/VOLT		
METER COEFF. OF THERMAL EXPANSION	= 6.7 MICROSTRAIN/DEGREE F.	ULT. STR. :	9430. PSI
CONCRETE COEFF. OF THERMAL EXPANSION	= 4.6 MICROSTRAIN/DEGREE F.	APPLIED TEST STRESS :	2100. PSI
STRAIN INCREMENT FACTOR	= 6 PERCENT	PER. ULT. STR. APPLIED:	22.3 PERCENT

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

DATE	TIME	AGE, DAYS	DAYS UNDER LOAD	MODE 4 OR 5 VOLTS	RESIST. OHMS	TEMP. DEGREE F.	MODE 3 MICRO-VOLTS	CHANGE MICRO-VOLTS	MICROSTRAIN TEMPERATURE CORRECTED FROM DAY ONE	ELASTIC	CREEP	SPECIFIC CREEP
* 9 -8-76	1000	0	SPECIMEN CAST									
9 -9-76	1630	1.3		-.37002	55.24	76.5	3520	0	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			
10 -1-76	930	23.0		-.37173	55.02	74.2	2702	-818	-50			
10 -7-76	1105	29.0		-.37153	55.05	74.4	2672	-848	-51			
10-15-76	1320	37.1		-.37179	55.01	74.1	2646	-874	-53			
10-21-76	1145	43.1		-.37201	54.99	73.8	2615	-905	-55			
10-28-76	930	50.0		-.37203	54.98	73.7	2580	-940	-57			
11 -4-76	1100	57.0		-.37227	54.95	73.4	2530	-990	-61			
11-19-76	1430	72.2		-.37525	54.57	69.3	2382	-1138	-78			
12 -7-76	917	90.0		-.37251	54.92	73.1	2236	-1284	-78			
12 -7-76	1655	90.3		-.37236	54.94	73.3	2234	-1286	-78			
12 -8-76	817	90.9		-.37261	54.91	72.9	2235	-1285	-78			
12-20-76	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	-90			
2 -3-77	945	148.0		-.37299	54.86	72.4	2059	-1461	-89			
2 -5-77	826	149.9		-.37313	54.84	72.2	2070	-1450	-89			
2-22-77	905	167.0		-.37288	54.88	72.6	2044	-1476	-90			
3 -5-77	747	177.9		-.37256	54.92	73.0	2076	-1444	-87			
3 -8-77	1525	181.2		-.37252	54.92	73.1	2083	-1437	-87			
3 -8-77	1650	181.3		-.37246	54.93	73.1	2085	-1435	-86			
3 -9-77	1555	182.2		-.37236	54.94	73.3	2080	-1440	-86			
3-10-77	1617	183.3		-.37247	54.93	73.1	2069	-1451	-87			
3-11-77	1546	184.2		-.37242	54.93	73.2	2069	-1451	-87			
3-12-77	1202	185.1		-.37268	54.90	72.9	2079	-1441	-87			
3-13-77	1326	186.1		-.37270	54.90	72.8	2082	-1438	-87			
3-15-77	1230	188.1		-.37283	54.88	72.6	2080	-1440	-88			
3-16-77	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			
4 -6-77	1446	210.2		-.37261	54.91	72.9	2043	-1477	-89			
4-26-77	1041	230.0		-.37265	54.90	72.9	2023	-1497	-90			
5 -9-77	1347	243.2		-.37280	54.88	72.7	2014	-1506	-91			
5-24-77	938	258.0		-.37271	54.90	72.8	2017	-1503	-91			
6-17-77	856	282.0		-.37245	54.93	73.2	2153	-1367	-83			
7 -6-77	1056	301.0		-.37223	54.96	73.5	2110	-1410	-84			
7-13-77	850	308.0		-.37245	54.93	73.2	2145	-1375	-83			
7-18-77	920	313.0		-.37222	54.96	73.5	2060	-1460	-87			
7-25-77	816	319.9		-.37227	54.95	73.4	2075	-1445	-86			
8 -2-77	842	327.9		-.37165	55.03	74.3	2017	-1503	-88			
8-22-77	808	347.9		-.37226	54.95	73.4	2005	-1515	-90			
9 -8-77	806	364.9		-.37194	54.99	73.9	1998	-1522	-90			
* 9 -8-77	815	364.9	LOADING BEGINS									
9 -8-77	815	364.9	-.0007	-.37194	54.99	73.9	1998	-1522	-85	0		
* 9 -8-77	816	364.9	SPECIMEN FULLY LOADED, APPLIED TEST STRESS 2100 PSI									
9 -8-77	816	364.9	.0000	-.37174	55.02	74.2	-4588	-8108	-432	-347	0	0.
9 -8-77	856	365.0	.0278	-.37161	55.04	74.3	-5047	-8567	-456	-371	-24	-.01143
9 -8-77	1013	365.0	.0813	-.37161	55.04	74.3	-5152	-8672	-462	-377	-30	-.01429
9 -8-77	1410	365.2	.2458	-.37156	55.04	74.4	-5279	-8799	-468	-383	-36	-.01714
9 -9-77	1006	366.0	1.0764	-.37154	55.05	74.4	-5649	-9169	-488	-403	-56	-.02667
9-10-77	815	366.9	1.9993	-.37194	55.00	73.9	-5589	-9109	-486	-401	-54	-.02571
9-11-77	1117	368.1	3.1	-.37199	54.99	73.8	-5692	-9212	-491	-406	-59	-.02810
9-12-77	758	368.9	4.0	-.37204	54.98	73.7	-5745	-9265	-494	-409	-62	-.02952
9-13-77	922	370.0	5.0	-.37196	54.99	73.8	-5850	-9370	-500	-415	-68	-.03238
9-14-77	810	370.9	6.0	-.37201	54.99	73.8	-5790	-9310	-497	-412	-65	-.03095
9-22-77	831	378.9	14.0	-.37203	54.98	73.8	-6202	-9722	-518	-433	-86	-.04095
9-26-77	1433	383.2	18.3	-.37168	55.03	74.2	-6337	-9857	-525	-440	-93	-.04429
10 -7-77	1639	394.3	29.3	-.37172	55.02	74.2	-6699	-10219	-544	-459	-112	-.05333
10-20-77	926	407.0	42.0	-.37176	55.02	74.1	-6719	-10239	-545	-460	-113	-.05381

MODULUS: LOADING E= 6.1 AT AGE 365 DAYS (STRESS LEVEL 0 TO 2100 PSI)

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

TABLE K2

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.	= 48.10 OHMS	STRAIN METER NO. :	968 73-11
TEMP. CALIBRATION CONSTANT	= 10.86 F/OHM CHANGE IN RESIST.	AGE OF LOADING :	365 DAYS
STRAIN CALIBRATION CONSTANT	= 8.79 MICROVOLTS/VOLT/MICROSTRAIN	TEST TEMPERATURE :	73 DEG. F.
CALIBRATED RANGE	= 11100 TO -10100 MICROVOLTS/VOLT		
METER COEFF. OF THERMAL EXPANSION	= 6.7 MICROSTRAIN/DEGREE F.	ULT. STR. :	9430. PSI
CONCRETE COEFF. OF THERMAL EXPANSION	= 4.6 MICROSTRAIN/DEGREE F.	APPLIED TEST STRESS :	2100. PSI
STRAIN INCREMENT FACTOR	= 6 PERCENT	PER. ULT. STR. APPLIED:	22.3 PERCENT

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

DATE	TIME	AGE, DAYS	DAYS UNDER LOAD	MODE 4 OR 5 VOLTS	RESIST. OHMS	TEMP. DEGREE F.	MODE 3 MICRO-VOLTS	CHANGE MICRO-VOLTS	CHANGE DAY ONE	TEMPERATURE CORRECTED FROM CREEP	TEMPERATURE CORRECTED ELASTIC	TEMPERATURE CORRECTED CREEP	TEMPERATURE CORRECTED SPECIFIC CREEP
* 9 -8-76	1000	0	SPECIMEN 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	54.86	73.4	4770	-659	-42				
10 -1-76	930	23.0		-.37293	54.87	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	-893	-55				
10-21-76	1145	43.1		-.37331	54.82	73.0	4541	-888	-56				
10-28-76	930	50.0		-.37341	54.81	72.8	4502	-927	-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	72.1	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	1445	103.2		-.37485	54.62	70.9	4257	-1172	-76				
1 -3-77	1145	117.1		-.37515	54.59	70.4	4237	-1192	-79				
1-14-77	1200	128.1		-.37482	54.63	70.9	4224	-1205	-78				
1-19-77	1050	133.0		-.37478	54.63	70.9	4233	-1196	-78				
2 -3-77	945	148.0		-.37447	54.67	71.4	4216	-1213	-78				
2 -5-77	826	149.9		-.37456	54.66	71.2	4222	-1207	-78				
2-22-77	905	167.0		-.37433	54.69	71.6	4206	-1223	-78				
3 -5-77	747	177.9		-.37403	54.73	72.0	4236	-1193	-75				
3 -8-77	1525	181.2		-.37397	54.74	72.1	4238	-1191	-75				
3 -8-77	1650	181.3		-.37391	54.74	72.2	4244	-1185	-75				
3 -9-77	1555	182.2		-.37380	54.76	72.3	4234	-1195	-75				
3-10-77	1617	183.3		-.37394	54.74	72.1	4225	-1204	-76				
3-11-77	1546	184.2		-.37389	54.75	72.2	4225	-1204	-76				
3-12-77	1202	185.1		-.37418	54.71	71.8	4234	-1195	-76				
3-13-77	1326	186.1		-.37417	54.71	71.8	4237	-1192	-76				
3-15-77	1230	188.1		-.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	54.74	72.1	4193	-1236	-78				
4-26-77	1041	230.0		-.37392	54.74	72.1	4172	-1257	-79				
5 -9-77	1347	243.2		-.37416	54.71	71.8	4184	-1245	-79				
5-24-77	938	258.0		-.37406	54.73	72.0	4186	-1243	-78				
6-17-77	856	282.0		-.37372	54.77	72.4	4154	-1275	-79				
7 -6-77	1056	301.0		-.37356	54.79	72.6	4123	-1306	-80				
7-13-77	850	308.0		-.37380	54.76	72.3	4147	-1282	-80				
7-18-77	920	313.0		-.37357	54.79	72.6	4065	-1364	-84				
7-25-77	816	319.9		-.37382	54.76	72.3	4080	-1349	-84				
8 -2-77	842	327.9		-.37310	54.85	73.3	4040	-1389	-84				
8-22-77	808	347.9		-.37378	54.76	72.3	3986	-1443	-89				
* 9 -8-77	815	364.9	LOADING BEGINS										
9 -8-77	815	364.9	-.0007	-.37291	54.87	73.5	3983	-1446	-82	0			
* 9 -8-77	816	364.9	SPECIMEN FULLY LOADED, APPLIED TEST STRESS 2100 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	54.90	73.9	-2815	-8244	-446	-364	-27	-.01286	
9 -8-77	1410	365.2	.2456	-.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	368.1	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	-55	-.02619	
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	54.85	73.4	-3336	-8765	-475	-393	-56	-.02667	
9-22-77	831	378.9	14.0	-.37306	54.85	73.3	-3737	-9166	-497	-415	-78	-.03714	
9-26-77	1433	383.2	18.3	-.37266	54.90	73.9	-3857	-9286	-502	-420	-83	-.03952	
10 -7-77	1639	394.3	29.3	-.37275	54.89	73.8	-4207	-9636	-521	-439	-102	-.04857	
10-20-77	926	407.0	42.0	-.37281	54.88	73.7	-4218	-9647	-522	-440	-103	-.04905	

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

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

TABLE L1

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. = 48.06 OHMS
TEMP. CALIBRATION CONSTANT = 10.87 F/OHM CHANGE IN RESIST.
STRAIN CALIBRATION CONSTANT = 8.80 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

STRAIN METER NO. : 925 11-08
AGE OF LOADING : 365 DAYS
TEST TEMPERATURE : 110 DEG. F.
ULT. STR. : 9430. PSI
APPLIED TEST STRESS : 2100. PSI
PER. ULT. STR. APPLIED: 22.3 PERCENT

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

DATE	TIME	AGE, DAYS	DAYS UNDER LOAD	MODE 4 OR 5 VOLTS	RESIST. OHMS	TEMP. DEGREE F.	MODE 3 MICRO-VOLTS	MICROSTRAIN CHANGE FROM DAY ONE	TEMPERATURE CORRECTED MICROSTRAIN ELASTIC	TEMPERATURE CORRECTED MICROSTRAIN CREEP	SPECIFIC CREEP	
* 9 -8-76	1000	0	SPECIMEN 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	915	15.0		-.37329	54.82	73.5	3306	-797	-50			
10 -1-76	930	23.0		-.34728	58.20	110.2	1865	-2238	-54			
10 -7-76	1105	29.0		-.34702	58.23	110.6	1387	-2716	-81			
10-15-76	1320	37.1		-.34754	58.16	109.8	1217	-2886	-92			
10-21-76	1210	43.1		-.34663	58.28	111.1	1200	-2903	-90			
10-28-76	930	50.0		-.34648	58.30	111.3	1132	-2971	-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	-3069	-98			
12 -7-76	940	90.0		-.34616	58.34	111.8	832	-3271	-110			
12 -7-76	1645	90.3		-.34624	58.33	111.7	825	-3278	-110			
12 -8-76	840	90.9		-.34608	58.36	111.9	815	-3288	-110			
12 -9-76	145	91.7		-.34693	58.24	110.7	832	-3271	-112			
12-15-76	1220	98.1		-.34622	58.34	111.7	752	-3351	-114			
12-20-76	1445	103.2		-.34624	58.33	111.7	724	-3379	-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	-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	321	-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	185.1		-.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	-3808	-141			
3-24-77	1131	197.1		-.34631	58.32	111.6	245	-3858	-144			
4 -6-77	1500	210.2		-.34622	58.34	111.7	412	-3691	-134			
4-26-77	1053	230.0		-.34704	58.23	110.5	260	-3843	-145			
5 -9-77	1327	243.1		-.34567	58.41	112.5	135	-3968	-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			
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	111.8	-181	-4284	-167			
8 -5-77	1156	331.1		-.34577	58.40	112.4	-221	-4324	-168			
8-22-77	832	347.9		-.34670	58.27	111.0	-241	-4344	-172			
* 9 -8-77	832	364.9	LOADING BEGINS									
9 -8-77	832	364.9	-.0007	-.34574	58.40	112.4	-311	-4414	-159	0		
* 9 -8-77	833	364.9	SPECIMEN FULLY LOADED, APPLIED TEST STRESS 2100 PSI									
9 -8-77	833	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	-10812	-502	-343	-9	-.00429
9 -8-77	1021	365.0	.0750	-.34574	58.40	112.4	-7019	-11122	-519	-360	-26	-.01238
9 -8-77	1418	365.2	.2396	-.34566	58.41	112.5	-7231	-11334	-530	-371	-37	-.01762
9 -9-77	850	366.0	1.0118	-.34604	58.36	112.0	-7677	-11780	-555	-396	-62	-.02952
9 -9-77	1034	366.0	1.0840	-.34599	58.37	112.0	-7732	-11835	-558	-399	-65	-.03095
9-10-77	825	366.9	1.9944	-.34618	58.34	111.8	-7876	-11979	-566	-407	-73	-.03476
9-11-77	1127	368.1	3.1	-.34609	58.35	111.9	-8028	-12131	-574	-415	-81	-.03857
9-12-77	812	368.9	4.0	-.34607	58.36	111.9	-7985	-12088	-572	-413	-79	-.03762
9-13-77	938	370.0	5.0	-.34638	58.32	111.5	-7979	-12082	-572	-413	-79	-.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	-8593	-12696	-605	-446	-112	-.05333
9-26-77	1519	383.2	18.3	-.34640	58.31	111.5	-8814	-12917	-617	-458	-124	-.05905
10 -7-77	1653	394.3	29.3	-.34735	58.19	110.1	-9115	-13218	-636	-477	-143	-.06810
10-20-77	910	407.0	42.0	-.34610	58.35	111.9	-9332	-13435	-644	-485	-151	-.07190

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

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

TABLE L2

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.	= 48.16 OHMS		STRAIN METER NO.	: 990	11-09
TEMP. CALIBRATION CONSTANT	= 10.85 F/OHM CHANGE IN RESIST.		AGE OF LOADING	: 365	DAYS
STRAIN CALIBRATION CONSTANT	= 8.90 MICROVOLTS/VOLT/MICROSTRAIN		TEST TEMPERATURE	: 110	DEG. F.
CALIBRATED RANGE	= 11100 TO -10100 MICROVOLTS/VOLT				
METER COEFF. OF THERMAL EXPANSION	= 6.7 MICROSTRAIN/DEGREE F.		ULT. STR.	: 9430.	PSI
CONCRETE COEFF. OF THERMAL EXPANSION	= 4.6 MICROSTRAIN/DEGREE F.		APPLIED TEST STRESS	: 2100.	PSI
STRAIN INCREMENT FACTOR	= 6 PERCENT		PER. ULT. STR. APPLIED	: 22.3	PERCENT

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

DATE	TIME	AGE, DAYS	DAYS UNDER LOAD	MODE 4 OR 5 VOLTS	RESIST. OHMS	TEMP. DEGREE F.	MODE 3 MICRO-VOLTS	MICROSTRAIN CHANGE MICRO-VOLTS	MICROSTRAIN TEMPERATURE CORRECTED FROM DAY ONE	MICROSTRAIN TEMPERATURE CORRECTED ELASTIC	MICROSTRAIN TEMPERATURE CORRECTED CREEP	SPECIFIC CREEP
* 9 -8-76	1000	0	SPECIMEN CAST									
9 -9-76	1630	1.3		-.37059	55.17	76.0	10506	0	0			
9-16-76	1400	8.2		-.37216	54.97	73.8	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	58.32	110.2	8296	-2210	-51			
10-15-76	1320	37.1		-.34689	58.25	109.5	8047	-2459	-67			
10-21-76	1210	43.1		-.34586	58.38	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	58.33	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	111.8	7091	-3415	-116			
1 -3-77	1145	117.1		-.34553	58.43	111.4	7009	-3497	-121			
1-14-77	1330	128.1		-.34589	58.38	110.9	6946	-3560	-126			
1-20-77	1155	134.1		-.34586	58.38	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	58.39	111.0	6829	-3677	-132			
2-22-77	836	166.9		-.34555	58.43	111.4	6692	-3814	-139			
3 -5-77	800	177.9		-.34557	58.42	111.4	6622	-3884	-143			
3 -8-77	1556	181.2		-.34538	58.45	111.6	6606	-3900	-143			
3 -8-77	1642	181.3		-.34536	58.45	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	58.40	111.1	6588	-3918	-145			
3-12-77	1150	185.1		-.34570	58.41	111.2	6586	-3920	-145			
3-13-77	1332	186.1		-.34560	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	58.44	111.5	6652	-3854	-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	111.8	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	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			
* 9 -8-77	832	364.9	LOADING BEGINS									
9 -8-77	832	364.9	-.0007	-.34496	58.50	112.2	5902	-4604	-167	0		
* 9 -8-77	833	364.9	SPECIMEN FULLY LOADED, APPLIED TEST STRESS 2100 PSI									
9 -8-77	833	364.9	.0000	-.34487	58.52	112.4	-506	-11012	-506	-339	0	0.
9 -8-77	849	365.0	.0111	-.34489	58.51	112.3	-684	-11190	-516	-349	-10	-.00476
9 -8-77	1021	365.0	.0750	-.34492	58.51	112.3	-994	-11500	-532	-365	-26	-.01238
9 -8-77	1418	365.2	.2396	-.34486	58.52	112.4	-1211	-11717	-544	-377	-38	-.01810
9 -9-77	850	366.0	1.0118	-.34524	58.47	111.8	-1577	-12083	-564	-397	-58	-.02762
9 -9-77	1034	366.0	1.0840	-.34519	58.47	111.9	-1617	-12123	-566	-399	-60	-.02857
9-10-77	825	366.9	1.9944	-.34534	58.45	111.7	-1742	-12248	-573	-406	-67	-.03190
9-11-77	1127	368.1	3.1	-.34527	58.46	111.8	-1892	-12398	-581	-414	-75	-.03571
9-12-77	812	368.9	4.0	-.34527	58.46	111.8	-1852	-12358	-579	-412	-73	-.03476
9-13-77	938	370.0	5.0	-.34554	58.43	111.4	-1850	-12356	-580	-413	-74	-.03524
9-14-77	925	371.0	6.0	-.34483	58.52	112.4	-2165	-12671	-594	-427	-88	-.04190
9-22-77	853	379.0	14.0	-.34558	58.42	111.3	-2485	-12991	-613	-446	-107	-.05095
9-26-77	1519	383.2	18.3	-.34553	58.43	111.4	-2710	-13216	-625	-458	-119	-.05667
10 -7-77	1653	394.3	29.3	-.34608	58.36	110.6	-3021	-13527	-643	-476	-137	-.06524
10-20-77	910	407.0	42.0	-.34518	58.47	111.9	-3258	-13764	-653	-486	-147	-.07000

MODULUS: LOADING E= 6.2 AT AGE 365 DAYS (STRESS LEVEL 0 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 I CLASS E-I ES7414
(SPECIMEN: SEALED 6 BY 16 IN. CONCRETE CYL.)

CALIBRATION CONSTANTS:

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

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

DATE	TIME	AGE, DAYS UNDER LOAD	DAYS	MODE 4 OR 5 VOLTS	RESIST. OHMS	TEMP. DEGREE F.	MODE 3 MICRO-VOLTS	MICROSTRAIN CHANGE MICRO-VOLTS	TEMPERATURE CORRECTED FROM DAY ONE	ELASTIC	CREEP	SPECIFIC CREEP
9 -8-76	1000	0	SPECIMEN CAST									
9 -9-76	1630	1.3		-.37002	55.24	76.5	3520	0	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			
10 -1-76	930	23.0		-.37173	55.02	74.2	2702	-818	-50			
10 -7-76	1105	29.0		-.37153	55.05	74.4	2672	-848	-51			
10-15-76	1320	37.1		-.37179	55.01	74.1	2646	-874	-53			
10-21-76	1145	43.1		-.37201	54.99	73.8	2615	-905	-55			
10-28-76	930	50.0		-.37203	54.98	73.7	2580	-940	-57			
11 -4-76	1100	57.0		-.37227	54.95	73.4	2530	-990	-61			
11-19-76	1430	72.2		-.37525	54.57	69.3	2382	-1138	-78			
12 -7-76	917	90.0		-.37251	54.92	73.1	2236	-1284	-78			
12 -7-76	1655	90.3		-.37236	54.94	73.3	2234	-1286	-78			
12 -8-76	817	90.9		-.37261	54.91	72.9	2235	-1285	-78			
12-20-76	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	-90			
2 -3-77	945	148.0		-.37299	54.86	72.4	2059	-1461	-89			
2 -5-77	826	149.9		-.37313	54.84	72.2	2070	-1450	-89			
2-22-77	905	167.0		-.37288	54.88	72.6	2044	-1476	-90			
3 -5-77	747	177.9		-.37256	54.92	73.0	2076	-1444	-87			
3 -8-77	1525	181.2		-.37252	54.92	73.1	2083	-1437	-87			
3 -8-77	1650	181.3		-.37246	54.93	73.1	2085	-1435	-86			
3 -9-77	1555	182.2		-.37236	54.94	73.3	2080	-1440	-86			
3-10-77	1617	183.3		-.37247	54.93	73.1	2069	-1451	-87			
3-11-77	1546	184.2		-.37242	54.93	73.2	2069	-1451	-87			
3-12-77	1202	185.1		-.37268	54.90	72.9	2079	-1441	-87			
3-13-77	1326	186.1		-.37270	54.90	72.8	2082	-1438	-87			
3-15-77	1230	188.1		-.37283	54.88	72.6	2080	-1440	-88			
3-16-77	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			
4 -6-77	1446	210.2		-.37261	54.91	72.9	2043	-1477	-89			
4-26-77	1041	230.0		-.37265	54.90	72.9	2023	-1497	-90			
5 -9-77	1347	243.2		-.37280	54.88	72.7	2014	-1506	-91			
5-17-77	823	250.9		-.37289	54.87	72.6	2016	-1504	-92			
5-24-77	938	258.0		-.37271	54.90	72.8	2017	-1503	-91			
7 -6-77	1056	301.0		-.37223	54.96	73.5	2110	-1410	-84			
7-13-77	850	308.0		-.37245	54.93	73.2	2145	-1375	-83			
7-18-77	920	313.0		-.37222	54.96	73.5	2060	-1460	-87			
7-25-77	816	319.9		-.37227	54.95	73.4	2075	-1445	-86			
8 -2-77	842	327.9		-.37165	55.03	74.3	2017	-1503	-88			
9 -8-77	815	364.9		-.37194	54.99	73.9	1998	-1522	-90			
12 -8-77	815	455.9		-.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.)

CALIBRATION CONSTANTS:
METER RESISTANCE AT 0.0 DEGREES F. = 48.10 OHMS
TEMP. CALIBRATION CONSTANT = 10.86 F/OHM CHANGE IN RESIST.
STRAIN CALIBRATION CONSTANT = 0.79 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

STRAIN METER NO. : 988 73-11
AGE OF LOADING : DAYS
TEST TEMPERATURE : 73 DEG. F.
ULT. STR. : 0. PSI
APPLIED TEST STRESS : 0. PSI
PER. ULT. STR. APPLIED: 1 PERCENT

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

DATE	TIME	AGE, DAYS UNDER LOAD	DAYS	MODE 4 OR 5 VOLTS	RESIST. OHMS	TEMP. DEGREE F.	MODE 3 MICRO-VOLTS	MICROSTRAIN CHANGE MICRO-VOLTS	FROM DAY ONE	ELASTIC	CREEP	SPECIFIC CREEP
9 -8-76	1000	0	SPECIMEN 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	54.86	73.4	4770	-659		-42		
10 -1-76	930	23.0		-.37293	54.87	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	-893		-55		
10-21-76	1145	43.1		-.37331	54.82	73.0	4541	-888		-56		
10-28-76	930	50.0		-.37341	54.81	72.8	4502	-927		-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		-.37356	54.74	72.1	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	1445	103.2		-.37485	54.62	70.9	4257	-1172		-76		
1 -3-77	1145	117.1		-.37515	54.59	70.4	4237	-1192		-79		
1-14-77	1200	128.1		-.37482	54.63	70.9	4224	-1205		-78		
1-19-77	1050	133.0		-.37478	54.63	70.9	4233	-1196		-78		
2 -3-77	945	148.0		-.37447	54.67	71.4	4216	-1213		-78		
2 -5-77	826	149.9		-.37458	54.66	71.2	4222	-1207		-78		
2-22-77	905	167.0		-.37433	54.69	71.6	4206	-1223		-78		
3 -5-77	747	177.9		-.37403	54.73	72.0	4236	-1193		-75		
3 -8-77	1525	181.2		-.37397	54.74	72.1	4238	-1191		-75		
3 -8-77	1650	181.3		-.37391	54.74	72.2	4244	-1185		-75		
3 -9-77	1555	182.2		-.37380	54.76	72.3	4234	-1195		-75		
3-10-77	1617	183.3		-.37394	54.74	72.1	4225	-1204		-76		
3-11-77	1546	184.2		-.37389	54.75	72.2	4225	-1204		-76		
3-12-77	1202	185.1		-.37418	54.71	71.8	4234	-1195		-76		
3-13-77	1326	186.1		-.37417	54.71	71.8	4237	-1192		-76		
3-15-77	1230	188.1		-.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	54.74	72.1	4193	-1236		-78		
4-26-77	1041	230.0		-.37392	54.74	72.1	4172	-1257		-79		
5 -9-77	1347	243.2		-.37416	54.71	71.8	4184	-1245		-79		
5-17-77	823	250.9		-.37419	54.71	71.8	4191	-1238		-78		
5-24-77	938	258.0		-.37406	54.73	72.0	4186	-1243		-78		
7 -6-77	1056	301.0		-.37356	54.79	72.6	4123	-1306		-80		
7-13-77	850	308.0		-.37380	54.76	72.3	4147	-1282		-80		
7-18-77	920	313.0		-.37357	54.79	72.6	4065	-1364		-84		
7-25-77	816	319.9		-.37382	54.76	72.3	4080	-1349		-84		
8 -2-77	842	327.9		-.37310	54.85	73.3	4040	-1389		-84		
9 -8-77	815	364.9		-.37291	54.87	73.5	3983	-1446		-86		
12 -8-77	815	455.9		-.37291	54.87	73.5	3983	-1446		-86		

TABLE N1

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.	= 46.06 OHMS		STRAIN METER NO. :	989	11-08
TEMP. CALIBRATION CONSTANT	= 10.87 F/OHM CHANGE IN RESIST.		AGE OF LOADING :		DAYS
STRAIN CALIBRATION CONSTANT	= 8.80 MICROVOLTS/VOLT/MICROSTRAIN		TEST TEMPERATURE :	110	DEG. F.
CALIBRATED RANGE	= 11100 TO -10100 MICROVOLTS/VOLT				
METER COEFF. OF THERMAL EXPANSION	= 6.7 MICROSTRAIN/DEGREE F.	ULT. STR.	:	0.	PSI
CONCRETE COEFF. OF THERMAL EXPANSION	= 4.6 MICROSTRAIN/DEGREE F.	APPLIED TEST STRESS	:	0.	PSI
STRAIN INCREMENT FACTOR	= 0 PERCENT	PER. ULT. STR. APPLIED:		1	PERCENT

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

DATE	TIME	AGE, DAYS UNDER LOAD	DAYS	MODE 4 OR 5 VOLTS	RESIST. OHMS	TEMP. DEGREE F.	MODE 3 MICRO-VOLTS	MICROSTRAIN CHANGE MICRO-VOLTS	MICROSTRAIN TEMPERATURE CORRECTED FROM DAY ONE ELASTIC	MICROSTRAIN TEMPERATURE CORRECTED CREEP	MICROSTRAIN TEMPERATURE CORRECTED SPECIFIC CREEP
9 -8-76	1000	0	SPECIMEN 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	915	15.0		-.37329	54.82	73.5	3306	-797	-50		
10 -1-76	930	23.0		-.34728	58.20	110.2	1865	-2238	-54		
10 -7-76	1105	29.0		-.34702	58.23	110.6	1387	-2716	-81		
10-15-76	1320	37.1		-.34754	58.16	109.8	1217	-2886	-92		
10-21-76	1210	43.1		-.34663	58.28	111.1	1200	-2903	-90		
10-28-76	930	50.0		-.34648	58.30	111.3	1132	-2971	-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	-3069	-98		
12 -7-76	940	90.0		-.34616	58.34	111.8	832	-3271	-110		
12 -7-76	1645	90.3		-.34624	58.33	111.7	825	-3278	-110		
12 -8-76	840	90.9		-.34608	58.36	111.9	815	-3288	-110		
12 -9-76	145	91.7		-.34653	58.24	110.7	832	-3271	-112		
12-15-76	1220	98.1		-.34622	58.34	111.7	752	-3351	-114		
12-20-76	1445	103.2		-.34624	58.33	111.7	724	-3379	-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	-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	321	-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	185.1		-.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	-3808	-141		
3-24-77	1131	197.1		-.34631	58.32	111.6	245	-3858	-144		
4 -6-77	1500	210.2		-.34622	58.34	111.7	412	-3691	-134		
4-26-77	1053	230.0		-.34704	58.23	110.5	260	-3843	-145		
5 -9-77	1327	243.1		-.34567	58.41	112.5	135	-3968	-148		
5-17-77	811	250.9		-.34625	58.33	111.7	100	-4003	-152		
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		
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	111.8	-181	-4284	-167		
8 -5-77	1156	331.1		-.34577	58.40	112.4	-221	-4324	-168		
8-22-77	832	347.9		-.34670	58.27	111.0	-241	-4344	-172		
9 -8-77	832	364.9		-.34574	58.40	112.4	-311	-4414	-173		
12 -8-77	832	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.	= 48.16 OHMS	STRAIN METER NO. :	950	11-09	
TEMP. CALIBRATION CONSTANT	= 10.85 F/OHM CHANGE IN RESIST.	AGE OF LOADING :		DAYS	
STRAIN CALIBRATION CONSTANT	= 8.90 MICROVOLTS/VOLT/MICROSTRAIN	TEST TEMPERATURE :	110	DEG. F.	
CALIBRATED RANGE	= 11100 TO -10100 MICROVOLTS/VOLT				
METER COEFF. OF THERMAL EXPANSION	= 6.7 MICROSTRAIN/DEGREE F.	ULT. STR. :	0.	PSI	
CONCRETE COEFF. OF THERMAL EXPANSION	= 4.6 MICROSTRAIN/DEGREE F.	APPLIED TEST STRESS :	0.	PSI	
STRAIN INCREMENT FACTOR	= 0 PERCENT	PER. ULT. STR. APPLIED:		1 PERCENT	

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

DATE	TIME	AGE, DAYS UNDER LOAD	DAYS	MODE 4 OR 5 VOLTS	RESIST. OHMS	TEMP. DEGREE F.	MODE 3 MICRO-VOLTS	MICROSTRAIN CHANGE MICRO-VOLTS	MICROSTRAIN FROM DAY ONE	TEMPERATURE CORRECTED ELASTIC +CREEP	TEMPERATURE CORRECTED CREEP	TEMPERATURE CORRECTED SPECIFIC CREEP
9 -8-76	1000	0	SPECIMEN CAST									
9 -9-76	1630	1.3		-.37059	55.17	76.0	10506	0	0			
9-16-76	1400	8.2		-.37216	54.97	73.8	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	58.32	110.2	8296	-2210	-51			
10-15-76	1320	37.1		-.34689	58.25	109.5	8047	-2459	-67			
10-21-76	1210	43.1		-.34586	58.38	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	58.33	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	111.8	7091	-3415	-116			
1 -3-77	1145	117.1		-.34553	58.43	111.4	7009	-3497	-121			
1-14-77	1330	128.1		-.34589	58.38	110.9	6946	-3560	-126			
1-20-77	1155	134.1		-.34586	58.38	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	58.39	111.0	6829	-3677	-132			
2-22-77	836	166.9		-.34555	58.43	111.4	6692	-3814	-139			
3 -5-77	800	177.9		-.34557	58.42	111.4	6622	-3884	-143			
3 -8-77	1556	181.2		-.34538	58.45	111.6	6606	-3900	-143			
3 -8-77	1642	181.3		-.34536	58.45	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	58.40	111.1	6588	-3918	-145			
3-12-77	1150	185.1		-.34570	58.41	111.2	6586	-3920	-145			
3-13-77	1332	186.1		-.34560	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	58.44	111.5	6652	-3854	-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			
5-17-77	811	250.9		-.34550	58.43	111.5	6330	-4176	-159			
5-24-77	1005	258.0		-.34527	58.46	111.8	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	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			
9 -8-77	832	364.9		-.34496	58.50	112.2	5902	-4604	-182			
12 -8-77	832	455.9		-.34496	58.50	112.2	5902	-4604	-182			

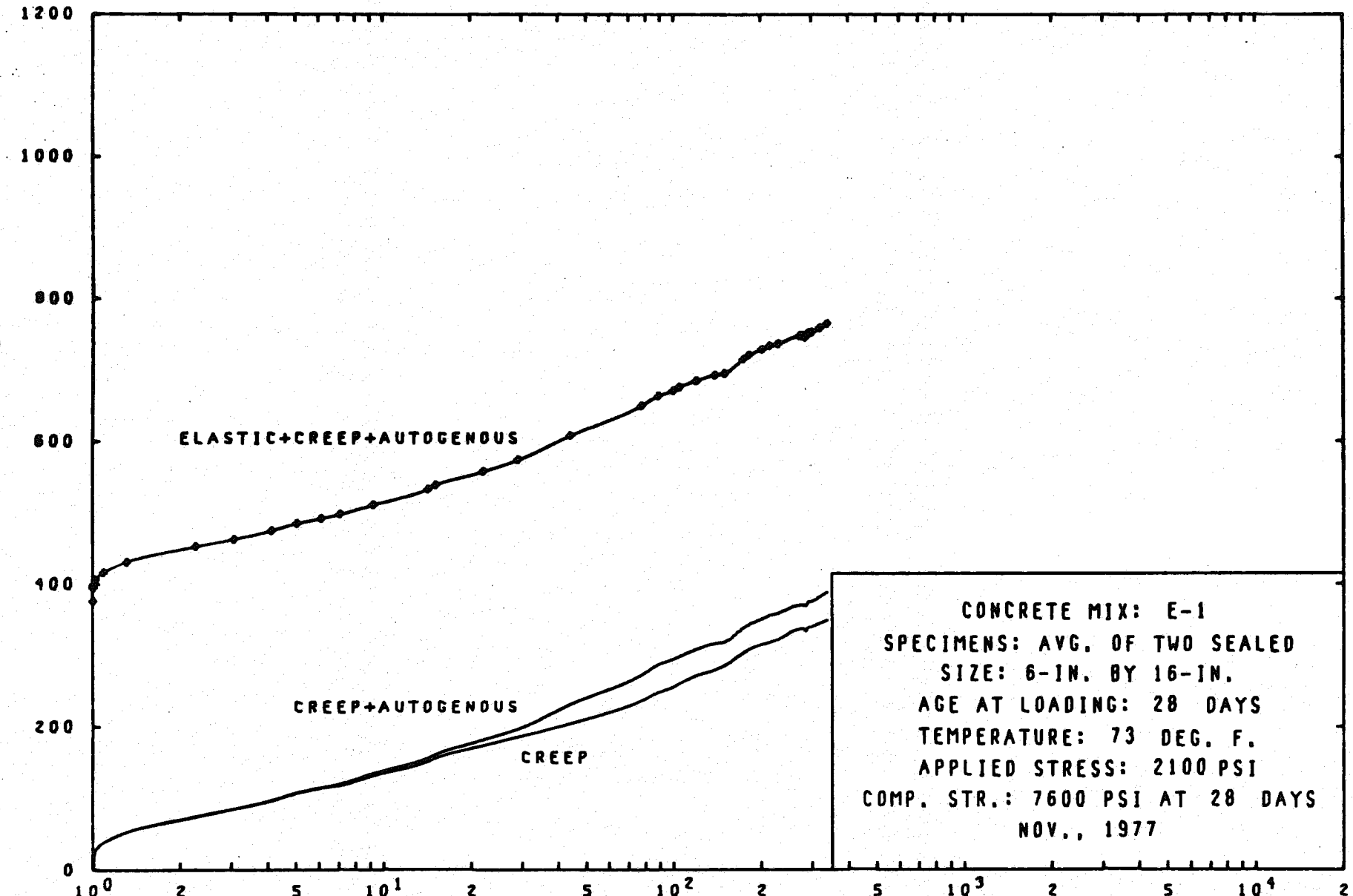

FIGURE 1

ELASTIC, CREEP AND AUTOGENOUS STRAINS
CALLAWAY POST TENSIONED REACTOR BUILDING

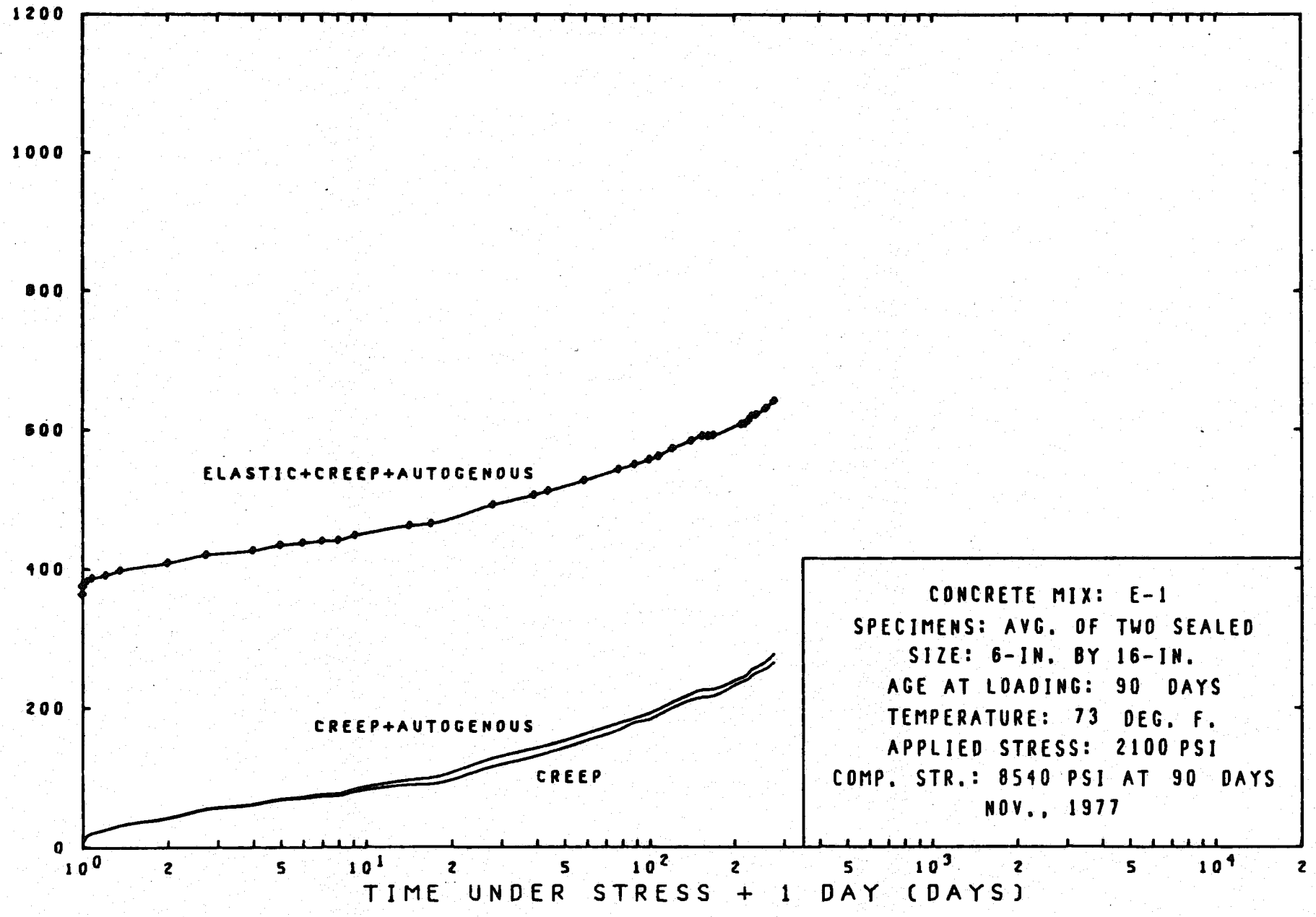

FIGURE 2

ELASTIC, CREEP AND AUTOGENOUS STRAINS
CALLAWAY POST TENSIONED REACTOR BUILDING

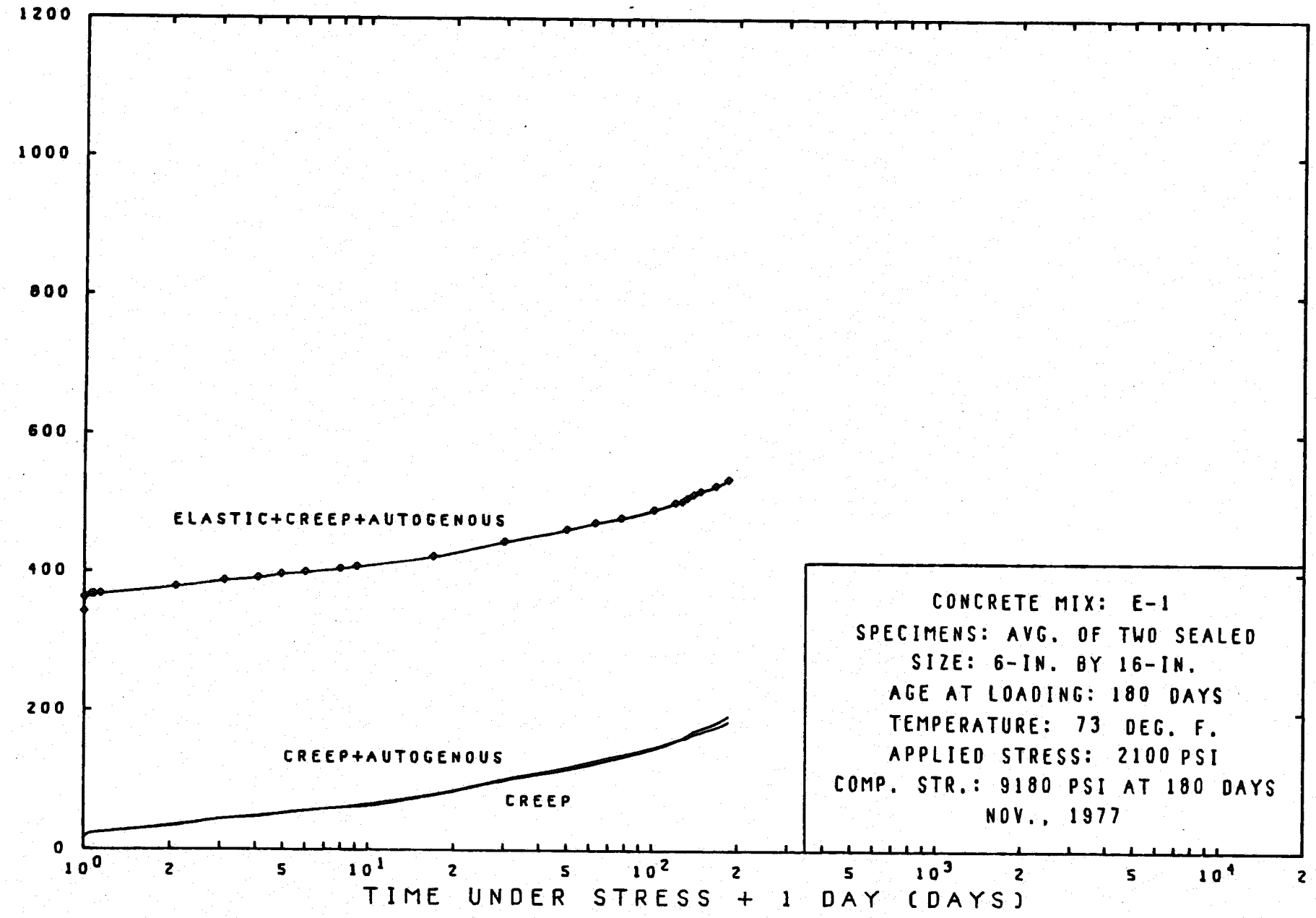

FIGURE 3

ELASTIC, CREEP AND AUTOGENOUS STRAINS
CALLAWAY POST TENSIONED REACTOR BUILDING

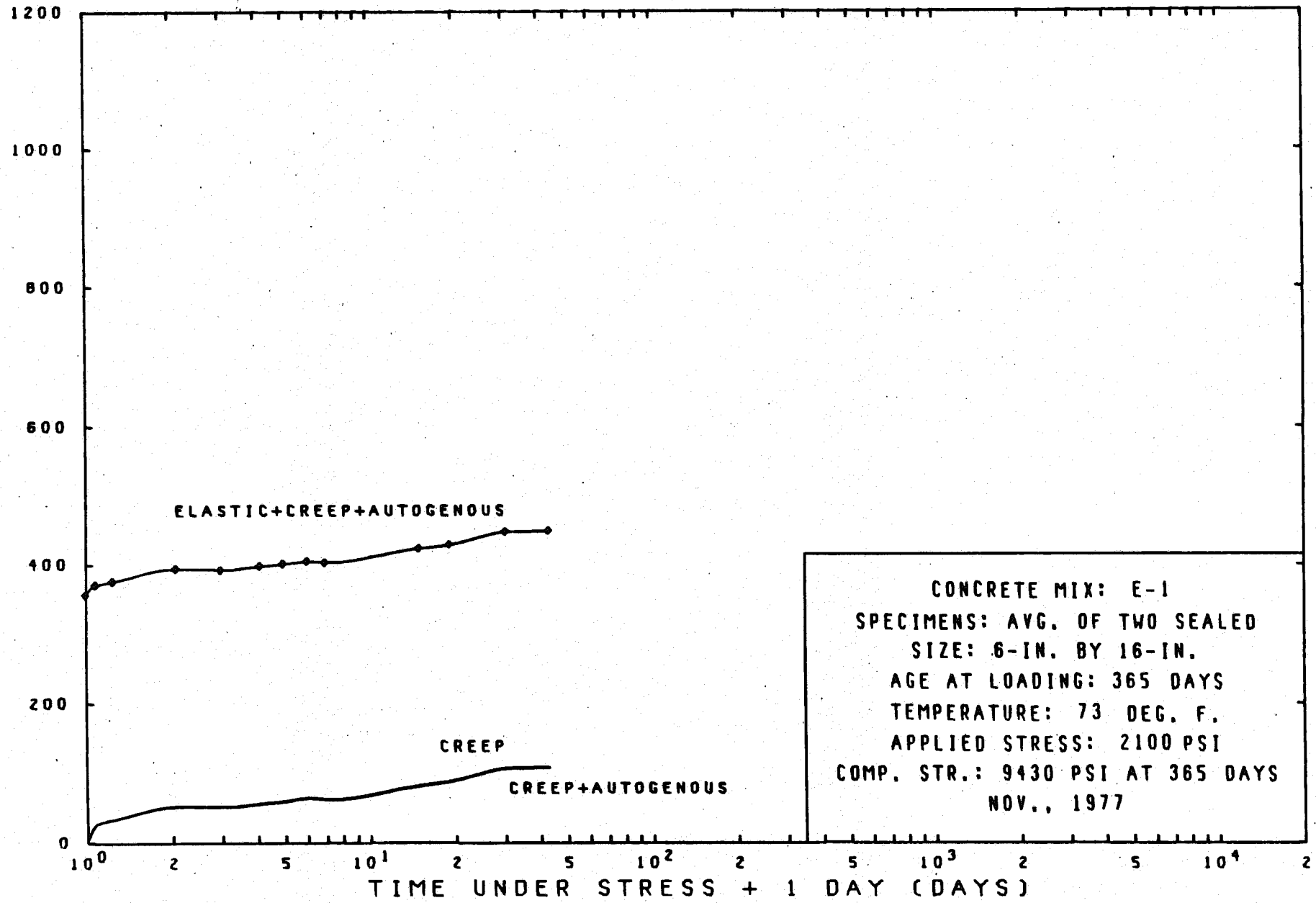

FIGURE 4

ELASTIC, CREEP AND AUTOGENOUS STRAINS
CALLAWAY POST TENSIONED REACTOR BUILDING

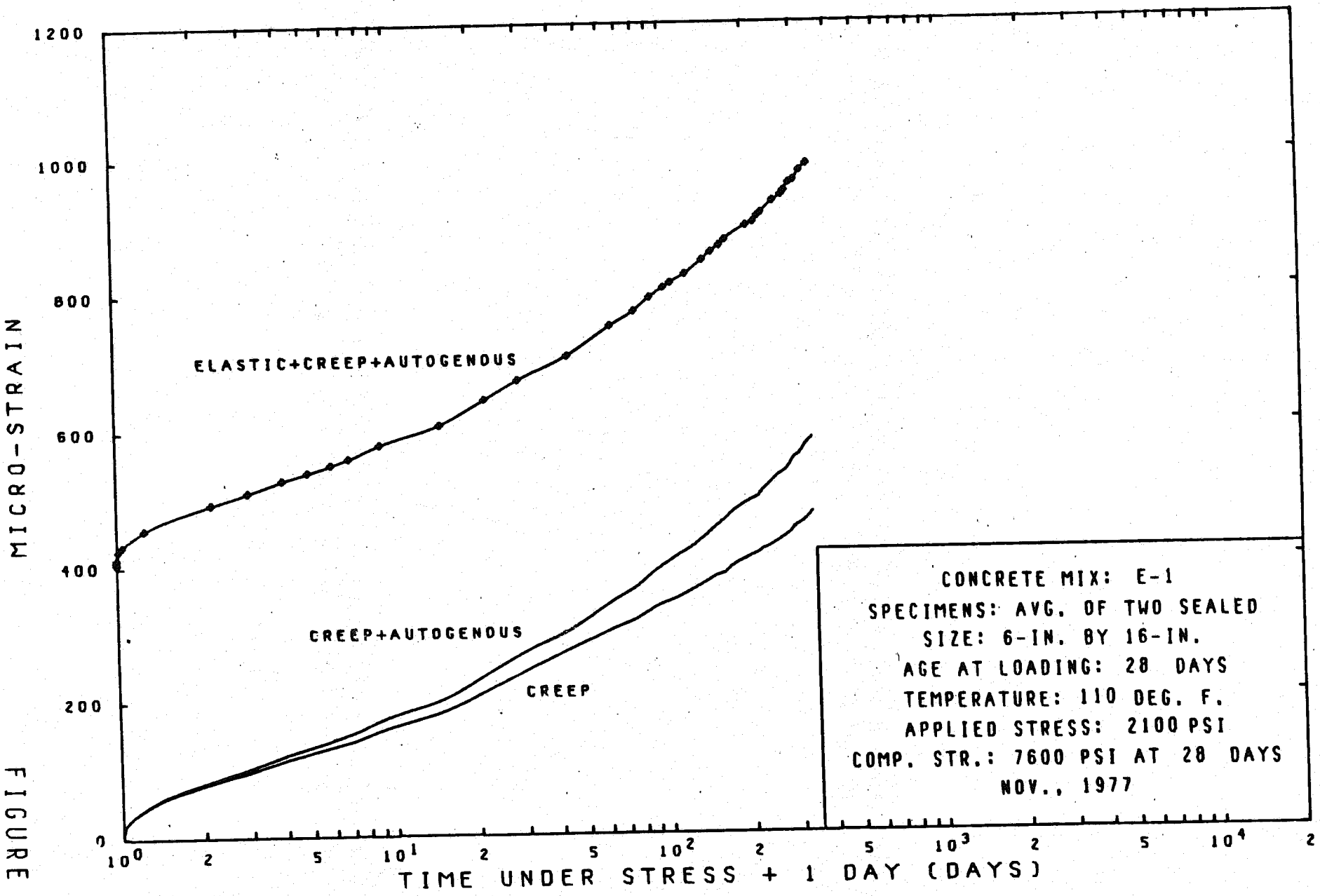

FIGURE 5

ELASTIC, CREEP AND AUTOGENOUS STRAINS
CALLAWAY POST TENSIONED REACTOR BUILDING

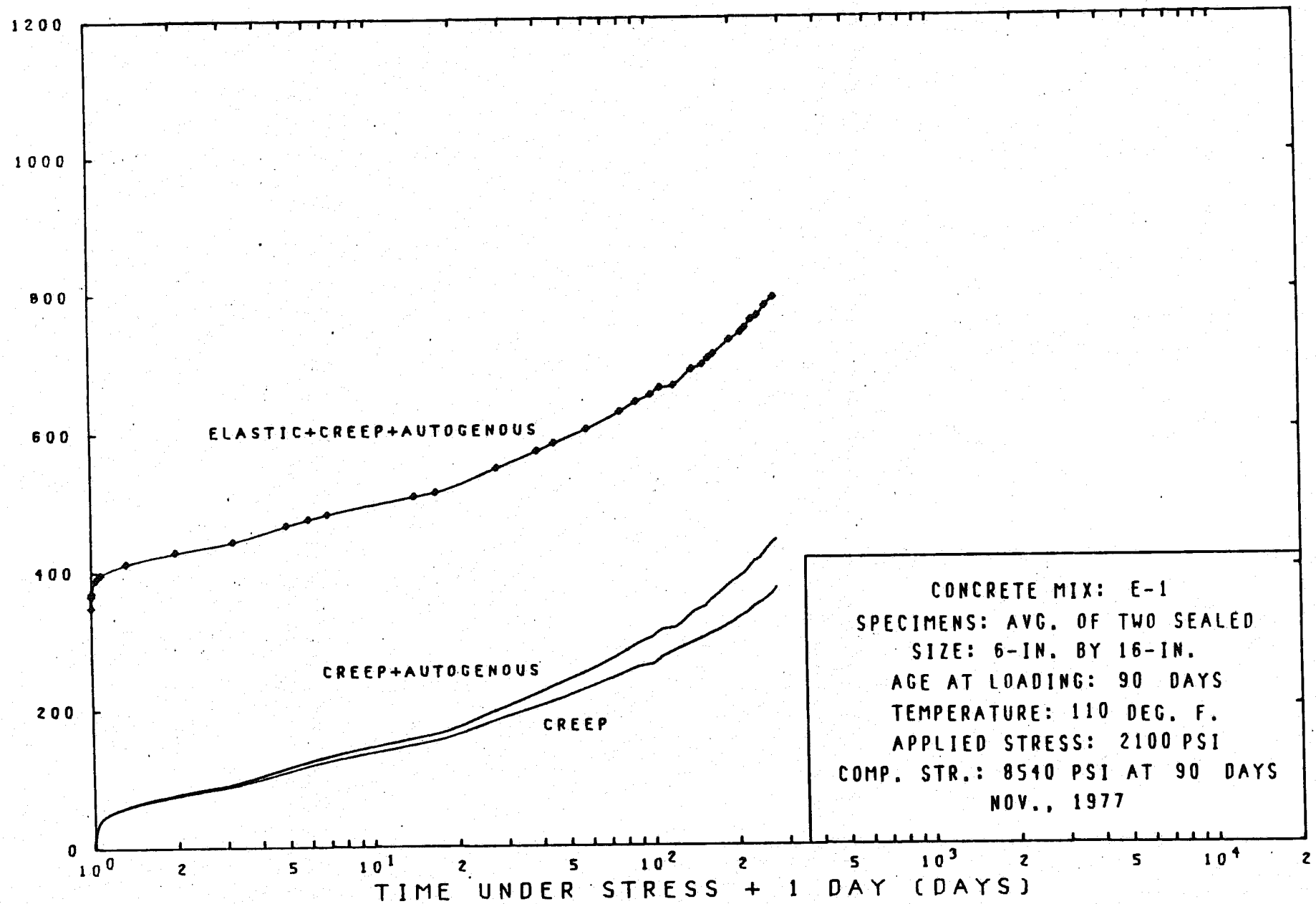

FIGURE 6

ELASTIC, CREEP AND AUTOGENOUS STRAINS
CALLAWAY POST TENSIONED REACTOR BUILDING

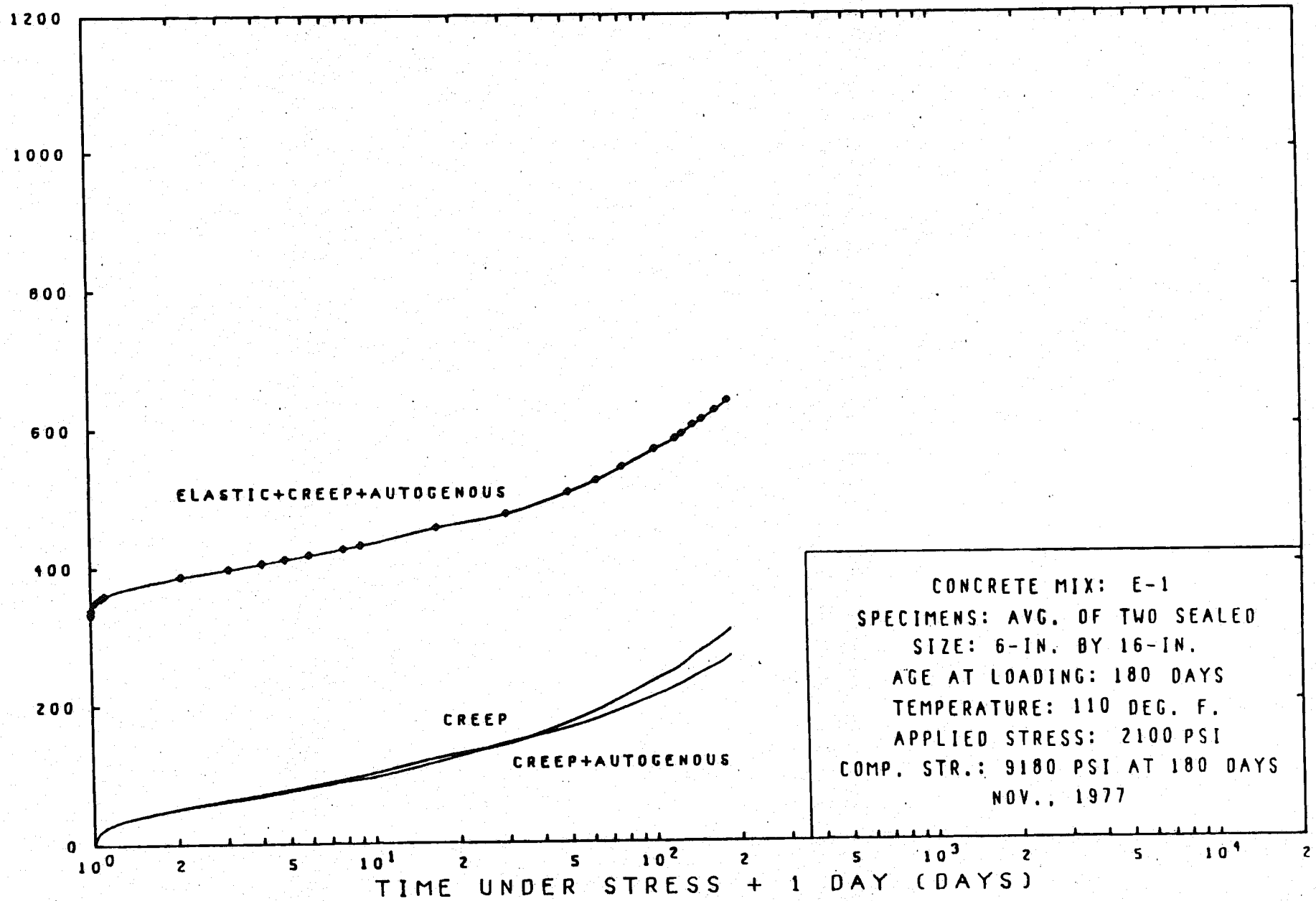

FIGURE 7

ELASTIC, CREEP AND AUTOGENOUS STRAINS
CALLAWAY POST TENSIONED REACTOR BUILDING

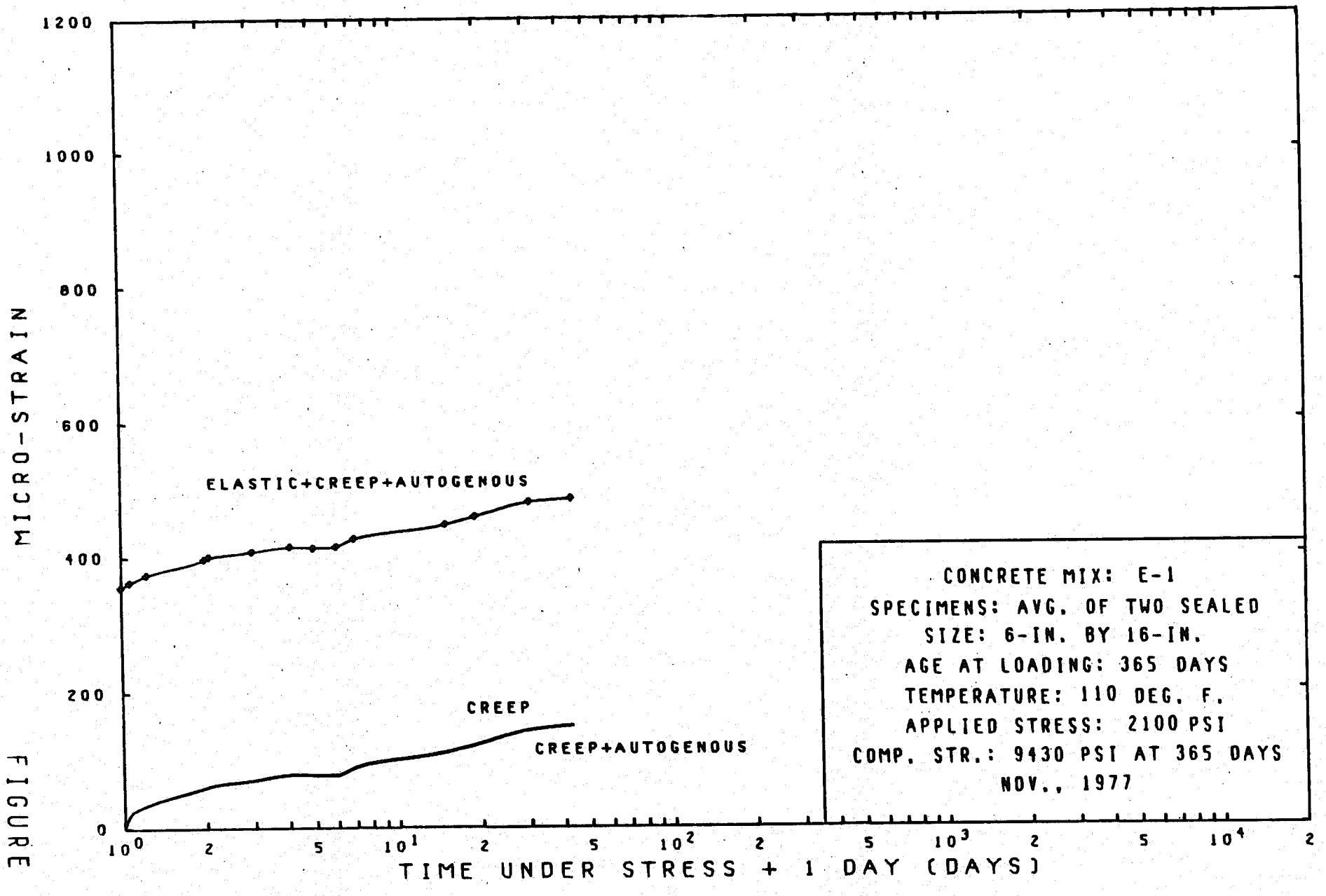

FIGURE 8

ELASTIC, CREEP AND AUTOGENOUS STRAINS
CALLAWAY POST TENSIONED REACTOR BUILDING

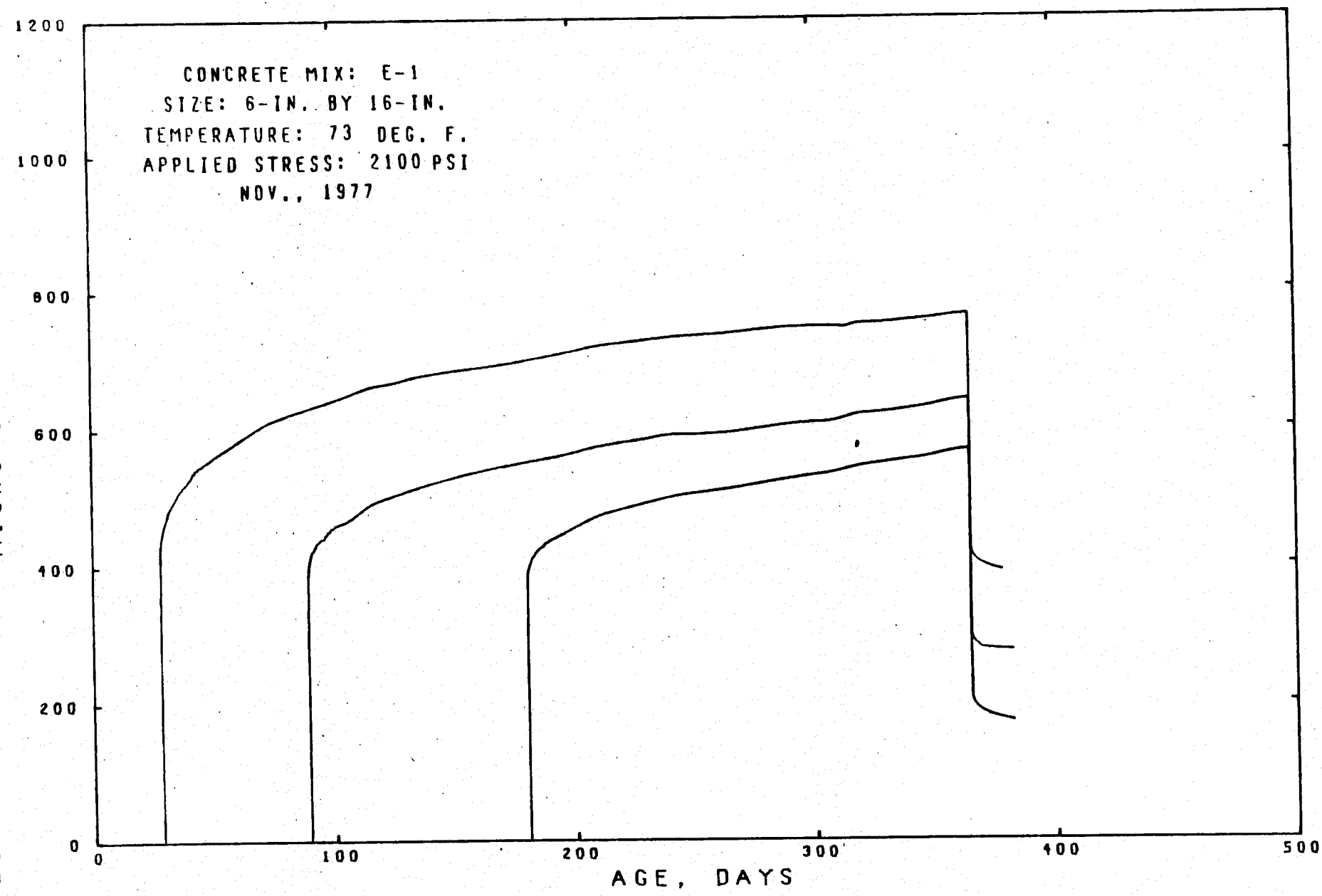

FIGURE 9

ELASTIC PLUS CREEP PLUS AUTOGENOUS STRAINS
CALLAWAY POST TENSIONED REACTOR BUILDING

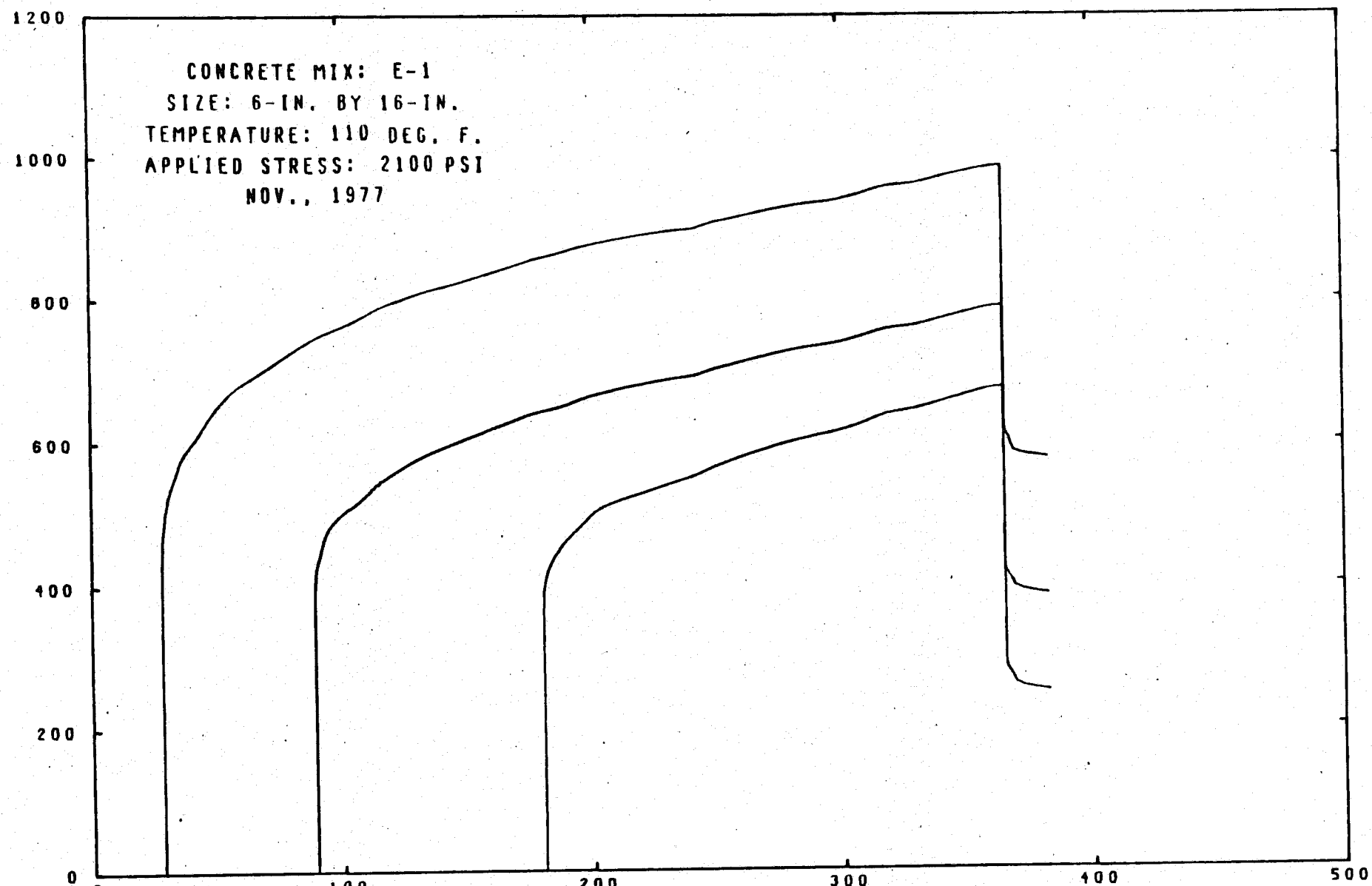

FIGURE 10

ELASTIC PLUS CREEP PLUS AUTOGENOUS STRAINS
CALLAWAY POST TENSIONED REACTOR BUILDING